APPENDIX A

SHELBY FARMS PARK MASTER PLAN; ADVISORY TEAM RECOMMENDATIONS; AND BICYCLE, PEDESTRIAN, AND EQUESTRIAN TRAIL TRANSPORTATION ENHANCEMENT APPLICATION

SHELBY FARMS PARK

MASTER PLAN EXECUTIVE SUMMARY · JULY 2008

PREPARED BY **field operations**

SHELBY FARMS PARK

MASTER PLAN EXECUTIVE SUMMARY · JULY 2008

PREPARED BY **field operations**

July 2008

MASTER PLAN EXECUTIVE SUMMARY

SHELBY FARMS PARK

PREPARED FOR:

SHELBY FARMS PARK CONSERVANCY
500 Pine Lake Drive
Memphis, TN 38134

PREPARED BY:

field operations
landscape architecture + urban design

with

HR&A ADVISORS · economics + finance
PICKERING FIRM INC · engineering + hydrology
UNIVERSITY OF MEMPHIS ECOLOGICAL RESEARCH CENTER · ecology
JPA INC · landscape architecture
FAITHFUL + GOULD · cost estimating
TERRY ADKINS · public art

ACKNOWLEDGEMENTS

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SHELBY FARMS PARK USER GROUPS

Bike and Pedestrian Advocates
Canoe & Kayak/Outdoors Inc.
Greening Greater Memphis
Master Gardeners
Memphis Disc Golf Club
Memphis Hightailers
Memphis Runners Track Club
Mid-South Fly Fishers
Mid South Song Writers Association
Model Airplane Club
SCSCTP (Clay Shooting)
Shelby County Community Gardens
Shelby Farms BMX
Shelby Farms Off-Leash Society
Sierra Club – Chickasaw Chapter
Tennessee Ornithological Society
Tornado Alley Sailing Club
Wolf River Conservancy
Boy Scouts
Greater Memphis Greenline
High School Cross Country Coaches
Memphis Amateur Retriever Club
Memphis Ultimate Frisbee Association
Memphis in Motion
Memphis Whitewater
Mid-South Hunting Retriever Club
Mid-South Trails Association
Park Concession, LLC
SFPC Youth Alliance
Shelby Farms Assoc. of Neighborhoods
Shelby Farms Equestrian Alliance
Shelby Farms Trail Crew
Stables at Shelby Farms Park
Tennessee Trails
West Tennessee Clean Cities Coalition
Women and Running

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1.0 PROJECT DESCRIPTION | ONE PARK, ONE MILLION TREES, TWELVE LANDSCAPES

THE SITE

Formerly a penal farm and agricultural area, Shelby Farms Park is today a 4,500 acre reserve of scenic fields, meadows, woodlands, lakes, pathways and trails. At more than five-times the size of New York's Central Park, this enormous site affords a very broad range of uses, appealing to an equally broad range of users and interest groups. Its huge scale offers an extraordinary resource for people who are interested in large-scale recreation activities – strolling, jogging, cycling, roller-blading, picnicking, dog-walking, frisbee, horseback riding, fishing, boating, dog training, gardening and the like. Its agricultural heritage is also a great resource for land husbandry practices, including farming, research, food production, energy creation, education, markets and festivals. The site also offers ample opportunities for arts, music, culture and large-scale outdoor events, such as Earth Day and July 4th celebrations.

A NEW CENTRAL DESTINATION AND CULTURAL RESOURCE

With the new Master Plan, Shelby Farms Park will become a major landmark public open space and defining destination for Memphis. While the site is located east of the center of Memphis proper, it is actually quite central to the larger population settlement across the metropolitan area. Extensions along the Wolf River Greenway and the future greenline (former CSX rail line) further embed the Park in the fabric of the Memphis Region and help to connect it to a broad range of constituents and neighborhoods. The development of the Park is an important part of Memphis Fast Forward – the largest and most comprehensively supported economic development program in the region. It is in this context that investment in and transformation of Shelby Farms Park will not only enrich the lives of all who visit and use the Park, but will also enhance the attractiveness of Memphis for business, creative talent, families and individuals.

THE VISION

Continuing both the agricultural and more recent recreational uses of the site, the new Park offers a generous and beautiful large-scale public landscape for cultivation, growth, health and wellbeing (as in a sports farm, a tree farm, a culture farm, an arts farm, an energy farm, as well as the more familiar land husbandry farm) for a broad constituency of public user groups, families and individuals. In this way traditional land practices meet the new urban 21st century culture of health, fitness, leisure, play, education, and ecology, creating a unique place of large-scale interaction with the land. As such, the Park will become a leading-edge, international model for design and sustainable management practices.

1.0 PROJECT DESCRIPTION | ONE PARK, ONE MILLION TREES, TWELVE LANDSCAPES

THE MASTER PLAN

The Master Plan offers a vision and a guiding framework for how the Park may be improved and developed over time. At the same time, it is intended to be dynamic and flexible, capable of being adapted to changing needs and desires. The Master Plan is also designed to be implemented flexibly in realistic phases, depending upon the availability of funding and priorities set by the Conservancy.

As a guiding vision, the Master Plan provides a bold yet practical framework for future investment in the Park, creating a world-class Park of exceptional distinction, that appeals to the broadest possible constituency and heralds a new era where visionary parks are central to the creation of a wholesome, just and rich quality of urban life.

ONE PARK, ONE MILLION TREES, TWELVE LANDSCAPES

By framing the Master Plan around the threefold concept of "One Park, One Million Trees, Twelve Landscapes," an otherwise complex series of site design initiatives can be more simply understood:

"One Park" addresses the goals of unity, connectivity, sense-of-place, ecosystem, identity and inclusion. New circulation systems plantings, signage and consistent design elements will shape the Park as one.

"One Million New Trees" addresses the goals of ecological improvement and biodiversity, defining edges and screening out undesirable views while maintaining some of the site's most spectacular vistas; engaging the community in planting and stewardship; creating more shade for strolling; and reducing Memphis's overall carbon footprint.

"Twelve Landscapes" addresses the diversity and richness of the different areas of the site; the varied user group needs; and the definition of future management zones, with respective goals and objectives.

Together, these three guiding principles will help to steer and form the basis around which the future Park takes shape. New entrances, pathways, plantings and facilities will shape a more defined and beautiful identity for Shelby Farms Park as a whole. In the center will be a magnificent new lake – nearly three times the size of the current Patriot Lake – able to support a wide range of non-motorized water sport activities. Twelve distinctive large-scale landscapes surround the expanded Patriot Lake, each supporting certain uses and events while allowing a strong 'sense-of-place structure' for the many varied user groups set within the larger park setting. The plan is respectful of current Park users and the unique qualities of the landscape, while at the same time affording enhanced amenities – improved and expanded trails, play areas, water bodies, performance spaces, activity areas and facilities – for an even broader spectrum of users.

The Master Plan describes a series of bold, yet pragmatic land planning and physical design improvements that will help to create a world-class park for the 21st century. Key strategies are driven by:

a) over-coming the segmentation of the larger site created by Walnut Grove Road and the new north-south Shelby Farms Parkway (Kirby-Whitten Parkway), and creating instead a strong sense of a unified large-scale landscape with improved access and seamless pedestrian connectivity;

b) enhancing and diversifying the natural ecosystems, plantings, water-bodies and landscapes across the site, primarily through the planting of new trees and careful land management practices;

c) creating a unique, beautiful and contemporary sense-of-place where nature, physical health and fitness, agriculture and the production of food and energy, environmental education, arts and culture, and scenic beauty are all equally foregrounded;

d) establishing distinctive landscape character zones where particular uses are accommodated;

e) creating an iconic new center for the Park, in the form of a very large lake that supports a diverse array of non-motorized water sport activities;

f) phasing Park improvements that work with funding capital and operating budget plans over the long-term; and

g) promoting the highest qualities of landscape architecture, land preservation, environmental stewardship and sustainable management practices.

1 SHELBY FARMS PARKWAY (KIRBY-WHITTEN PKWY.)
2 COMMUNITY CENTER *
3 SPORTS FIELDS *
4 PUBLIC GARDENS *
5 BISON RANGE
6 PATRIOT LAKE
7 BEACH + ACTIVITY BAR
8 EARTHEN AMPHITHEATER
9 PLOUGH PARK
10 THE OUTBACK
11 GREEN BRIDGE
12 FRUIT + NUT ORCHARDS
13 AGRICENTER
14 RESEARCH FIELDS
15 WOLF RIVER PEDESTRIAN BRIDGE
16 STRAWBERRY FIELDS
17 THE REFUGE
18 CATCH 'EM LAKES
19 "Y" GATEWAY BRIDGE
20 ART MOUND
21 SCULPTURE PARK
22 WOLF RIVER PEDESTRIAN BRIDGE
23 WOLF RIVER PEDESTRIAN BRIDGE
24 LUCIUS BURCH NATURAL AREA
25 AREA10 / GOVERNMENT FACILITIES

* PENDING AREA 10 APPROVAL

1.1 VISION + GUIDING PRINCIPLES

The Shelby Farms Park Conservancy has outlined a unique vision and an ambitious set of goals for the transformation of the existing Shelby Farms territory in order to give rise to a celebrated 21st century park that defines and shapes a great city. The Conservancy has established a set of core principles that guide the stewardship of the design, planning, management and maintenance of Shelby Farms Park. These Guiding Principles are as follows:

- *We are leading the reinvention of large urban parks.*
- *We are creating a constantly improving park that is layered, flexible and adaptive.*
- *We are creating an exceptional and distinctive park that capitalizes on its unique natural resources and size.*
- *We insist on both environmental and financial sustainability.*
- *Shelby Farms Park will capitalize on its size to create options: places grand and expansive and others small and personal.*
- *Shelby Farms Park will connect and strengthen the fabric of community through its accessibility, inclusiveness and connections to the city.*
- *We are creating a beloved place where powerful memories are delivered to the people of Shelby County.*
- *We are known for work that is bold, dedicated, visionary and public-spirited.*

In addition, the Conservancy and the design team moved forward through the master plan process while keeping the following questions in mind:

- *Does it promote green and open?*
- *Is it flexible and adaptive?*
- *Is it accessible and inviting?*
- *Is it environmentally and financially sustainable?*
- *Is it exceptional and distinctive?*
- *Does it capitalize on the size of the park?*
- *Does it respect the limitations of the easement?*
- *Does it capitalize on our natural resources?*
- *Does it reflect the highest possible standards?*
- *Does it encourage a sense of community?*
- *Is it safe?*

ART MOUND + PARK CIRCLE
PUBLIC GARDENS
COMMUNITY CENTER + SPORTS FIELDS
THE RANGE + ARBORETUM
PATRIOT LAKE
PLOUGH PARK
THE OUTBACK
sfp
CATCH 'EM LAKES
THE REFUGE
ORCHARDS + BERRY FIELDS
CROP + RESEARCH FIELDS
AGRICENTER

1.2 PROCESS + PURPOSE

PROCESS

While conducting an extensive first round of public input forums in the fall of 2007, the Shelby Farms Park Conservancy issued a Request For Qualifications (RFQ) for the *Shelby Farms Park Innovative Design Competition*. From the 33 responses to this RFQ, three teams were invited to Memphis to begin a three-month process of developing a proposal for the Schematic Design of Shelby Farms Park. At the end of this process, the three proposals were exhibited during the month of March 2008 at the Shelby Farms Park Visitor Center, the Benjamin Hooks Central Library, and the Cossitt Library. Visitors to the exhibition were asked to complete a questionnaire indicating what they liked and disliked about each design proposal. The three proposals and the questionnaire were also available via the Shelby Farms Park Conservancy's Web site from March 6 - March 31, 2008. The results from each of these venues were tabulated following the Master Plan competition exhibit. They represent thoughts from a wide cross-section of the Memphis community and include the ideas and opinions of both current Park users and those who do not currently use the Park.

At the end of this process, field operations was chosen by the Shelby Farms Park Conservancy to prepare a Master Plan for Shelby Farms Park. The Conservancy selected field operations based on several factors, including their responsiveness to the public's views on the future of the Park; design philosophy; big ideas; their approaches to environmental sustainability and project phasing needs; and the Conservancy's general impression of the firm's passion for the Park.

Since the awarding of the Master Plan, field operations has made multiple trips to Memphis to meet with stakeholders and related public agencies, as well as the Park Master Plan Committee to calibrate the content of the Master Plan Report to the priorities and vision of the Park users, and the Memphis community.

shelby farms park youth alliance public input meeting

PURPOSE

The Shelby Farms Park Master Plan provides a vision and a strategic framework for review, discussion and decision-making. Its recommendations are not fixed or final, but offer a flexible framework for implementation. The continued input of many experts, policy makers and most importantly, the public, will be critical to the refinement of the plan as the Shelby Farms Park Conservancy moves forward in the implementation of the recommendations outlined herein. The following four points outline the purpose of this Master Plan Document.

1. Outline the goals, vision and organizational framework for Shelby Farms Park;
2. Demonstrate that the goals, vision and strategic direction are grounded and realistic;
3. Advance discussion at the leadership level regarding implementation, finance and long-term management options; and
4. Build broader understanding, support and leadership for the Park at the community, stakeholder and civic levels.

It should be noted that this is not a conventional Master Plan that organizes information in a manner that clearly responds to every specific existing condition. Rather, it is a bold but concise vision for Shelby Farms Park that describes the key principles, characteristics and opportunities that are enabled by such a vision. It is important to understand that this Master Plan is an integrated document. For any goal, objective or proposition to be fully understood, it must be read as a whole.

public input meeting

CONSULTATION + OUTREACH 1.3

CONSULTATION

Once field operations was awarded the contract to prepare the Master Plan Report for Shelby Farms Park, the design team reviewed all of the comments provided by the Conservancy from both the fall 2007 and spring 2008 public input meetings and surveys, and began a series of meetings with Park stakeholders and related public agencies. These consultations included meetings and review sessions with the Conservancy's Master Plan Committee; a series of meetings with the Conservancy leadership regarding finance and operations of an expanded Shelby Farms Park; working sessions with representatives from Agricenter International; a presentation and feedback forum with the leadership of each of the Park's user groups; meeting with representatives from the Memphis Community Connector (the group responsible for the acquisition of the former CSX rail line); meeting with representatives from the Wolf River Conservancy; as well as various discussions with the Shelby County Department of Public Works, the Memphis City Engineer, and the director of Germantown Parks and Recreation.

This public input, and the accompanying series of meetings and working sessions, were a critical aspect of the development of this Master Plan document. It is anticipated that these opportunities for public review and input will continue as the Conservancy begins the process of implementing the Master Plan.

OUTREACH

The public and stakeholder process should not end with the completion and approval of the Master Plan document. Continued stakeholder and public participation in, and support for the Shelby Farms Park Master Plan are as crucial for its future success as they were for the development of a Master Plan that reflects the desires and needs of the Memphis Community. In this context, it is important to note that the Shelby Farms Park Conservancy is guided by a strong policy regarding minority and local participation. As the Shelby Farms Park project moves into future stages of design and planning, the public and relevant stakeholder groups - including all user groups - must continue to be consulted to ensure that the future Park achieves the objectives of the Master Plan, the goals of Park users, and abides by the guiding principles of the Shelby Farms Park Conservancy.

exhibition at public library

shelby farms park public forum

2.0 MEMPHIS' ASSETS

For the thousands of people who visit Memphis every week, the wide range of social, cultural and historical assets of the City is quite well known and readily cited. Elvis, the Blues, Rock'n Roll, Gospel Music, Dr. Martin Luther King, Jr. and the National Civil Rights Museum, BBQ, the Memphis Zoo and its pandas, several great Museums for adults and kids, and a diverse amateur and professional sports scene all need little introduction.

Memphis is also the business center of the Mid-South and a major player in the global economy. Sited at the geographic center of the United States, overlooking the Mississippi River, Memphis is ideally positioned for industries associated with transportation and shipping related commerce, and has a rich history of agriculture, medicine and entrepreneurism. Fortune 500 companies FedEx, AutoZone, and International Paper, along with world-renowned medical and research companies such as St. Jude Children's Research Hospital all call Memphis home. Memphis is home to the world's busiest airport in terms of cargo traffic handled, boasts two major Mississippi River rail crossings, and is the convergence of a number of east-west and north-south rail lines. Memphis is also home to a growing bioscience industry. In 2000, the city was cited as one of the top 50 best places to start a new business in the United States.

This combination of culture and commerce places Memphis in an enviable position moving forward into the 21st century. It is well known that in addition to an available workforce and positive business environment, the real driver for corporate location managers is the potential quality of life available to their employees. With the new design for Shelby Farms Park, Memphis can add to its unique culture and a fertile business environment, as well as offer a one-of-a-kind civic amenity that can position Memphis as a national and international talent magnet through the exceptional quality of life the City can provide.

A PARK FOR EVERYONE 2.1

Shelby Farms Park is envisioned to become a Park for all of those living in the Memphis Metropolitan Region. A top priority of the Shelby Farms Park Conservancy is to improve connectivity and accessibility to the Park, particularly for poorly served parts of the City. The Park's central geographic location affords the Conservancy a great opportunity to make these connections a reality. It is easy to imagine residents of Downtown, Midtown, Collierville, Germantown, Cordova, Bartlett, Millington, Arlington, Lakeland, Olive Branch, South Haven and West Memphis all coming to Shelby Farms Park, whether it is for a major event like the Fourth of July, or just for a weekend or evening outing. This new connectivity will allow the Park to become a place populated and activated by the diverse cultures and ethnicities of the entire Memphis Region.

In addition, the huge scale of the Park allows for such a wide range of uses and activities that nearly everyone – at every age and from every background – will be able to find something that interests and engages them at Shelby Farms Park. A huge range of amenities, paired with ample opportunities for active and passive recreation in a unique agrarian landscape at the center of a growing metropolitan region, will truly make Shelby Farms Park a place to be enjoyed by all.

2.2 THE PARK IN THE CITY

Shelby Farms Park is the single largest urban figure in the Memphis landscape after the Mississippi River. This exceptional scale affords the opportunity to grow a Park that is cherished not just by the residents of East Memphis where the Park sits, but by the entire Memphis Metropolitan region including the populations of Downtown, Midtown, Collierville, Germantown, Cordova, Bartlett, West Memphis and beyond. Though it lies just east of the I-240/I-40 loop, Shelby Farms is located at the geographic population center of Shelby County. This combination of size, location, and amenity generates a true destination potential for the Park within the Mid-South Region – a new "green heart."

A major objective of the Shelby Farms Park Conservancy is to improve connectivity and accessibility to the Park, particularly for poorly served parts of the City. The northern and southern boundaries of the property already offer immediate opportunities to create these first linkages to the broader metropolitan region, and can be instrumental in promoting improved access for all.

To the north, the existing CSX line has the potential in the short term to become a recreational connection to the Fairgrounds and Midtown through the creation of a future pedestrian and bicycle oriented greenline. To the east, this future greenline will connect Shelby Farms Park with a number of other neighborhoods between the Park and Cordova. Over the long-term, it is imagined that this pedestrian corridor could be expanded to include a transit linkage like light rail that would connect Memphis' existing business centers with its growing population centers.

To the south of the Park is the Wolf River and the proposed Wolf River Greenway. This pedestrian connection is intended to tie Collierville and Germantown all the way to downtown Memphis and the Mississippi River via a paved recreation trail that runs along the Wolf River. A portion of this Greenway is already in place in Collierville and along the Germantown section of the River-Park boundary. It is currently in the planning stages as it moves west along the Park's southern perimeter and through the City of Memphis to the Mississippi River.

Both of these connections will link a variety of seemingly distant and disparate neighborhoods to Shelby Farms Park, creating a public venue that is directly accessible by a huge portion of the Memphis population. To optimize this potential, these connections need to be tied into a larger bike and pedestrian network that is not yet present within Memphis. It is our hope that the momentum behind Shelby Farms Park will translate into momentum for this broader bike and pedestrian network within the City.

In addition to these recreational and pedestrian linkages, the Master Plan recommends a regional transit link that will tie into the Memphis Area Transit Authority system. This transit link will improve access to Shelby Farms by connecting future bus routes to an internal circulation system (trolley) within the Park so that any place in Memphis will essentially connect to any place within Shelby Farms Park.

The transformation of Shelby Farms Park has the capacity to enhance the continued greening of Greater Memphis; promote a healthy lifestyle for the City's residents; and provide a resource that contributes to the overall quality of life for all current and future Memphians.

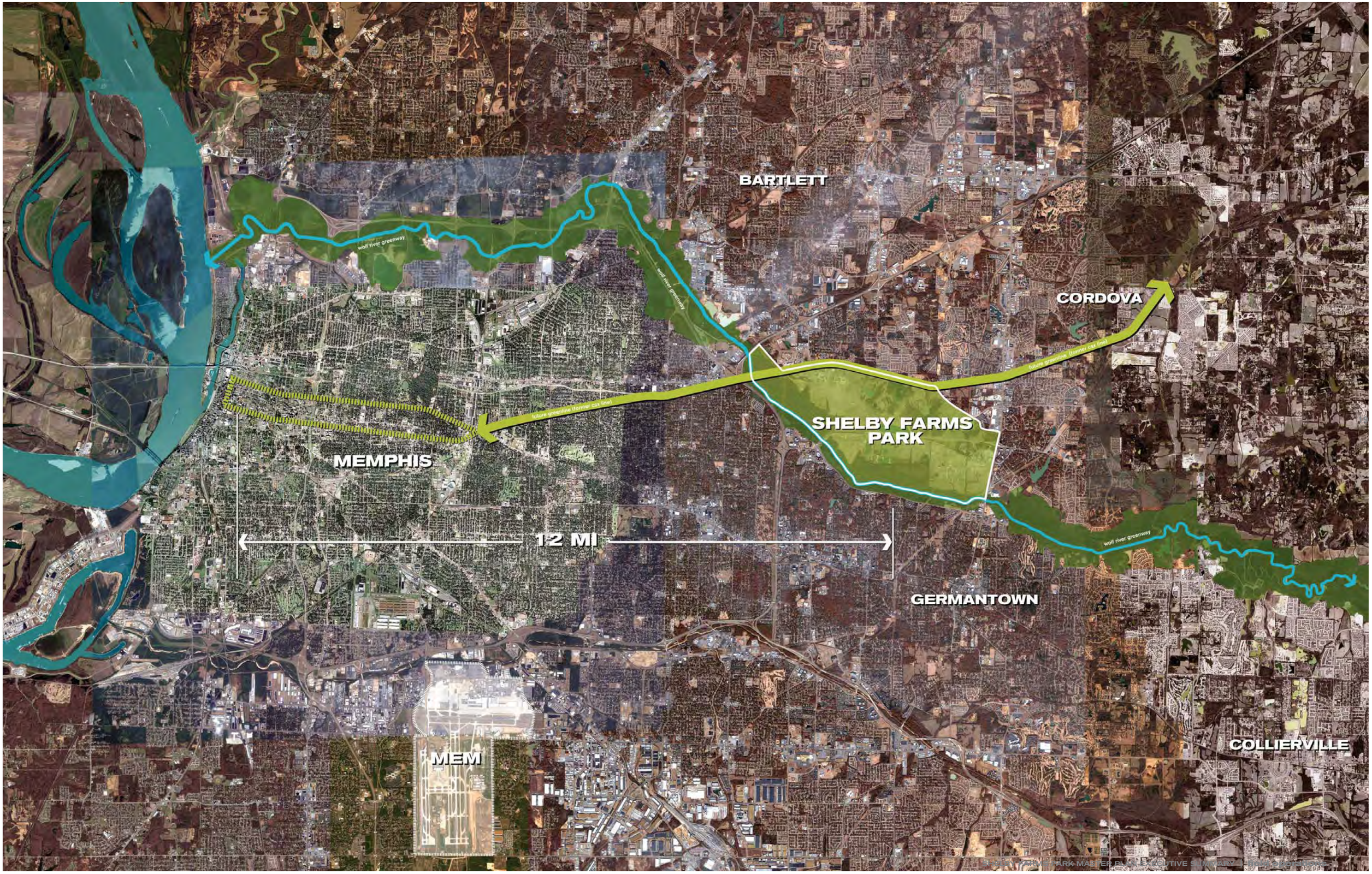
URBAN SCALE COMPARISON

shelby farms park: 4,500 acres

mem airport: 3,600 acres

cbd / downtown: 1,200 acres

central park, nyc: 840 acres


BARTLETT
CORDOVA
wolf river greenway
wolf river greenway
future greenline (former csx line)
future greenline (former csx line)
SHELBY FARMS PARK
MEMPHIS
12 MI
wolf river greenway
GERMANTOWN
MEM
COLLIERVILLE

3.0 SITE HISTORY + THE SITE TODAY

The outcome and eventual social and cultural position of Shelby Farms Park within Western Tennessee and the Memphis Region has a long and storied history, and until very recently has remained unresolved to some degree.

During the mid-nineteenth century, Shelby Farms was home to Frances Wright's Nashoba Experiment. A Humanist reformer, Ms. Wright set up a commune on the land intended to prepare slaves for their future freedom by training them in the time's worthwhile skills and educating them in the liberal arts. Though there is some discussion as to the various successes and failures of this experiment, there is little doubt as to the vanguard role Ms. Wright played during period in West Tennessee's history.

In 1928, Shelby County acquired 1,600 acres of this land for use as a model penal farm. By 1942, the penal farm lands had been expanded to more than 5,000 acres, and it had become a national model visited by prison experts from around the country. In the late 1960's, Shelby County determined the penal farm was no longer viable and shut it down.

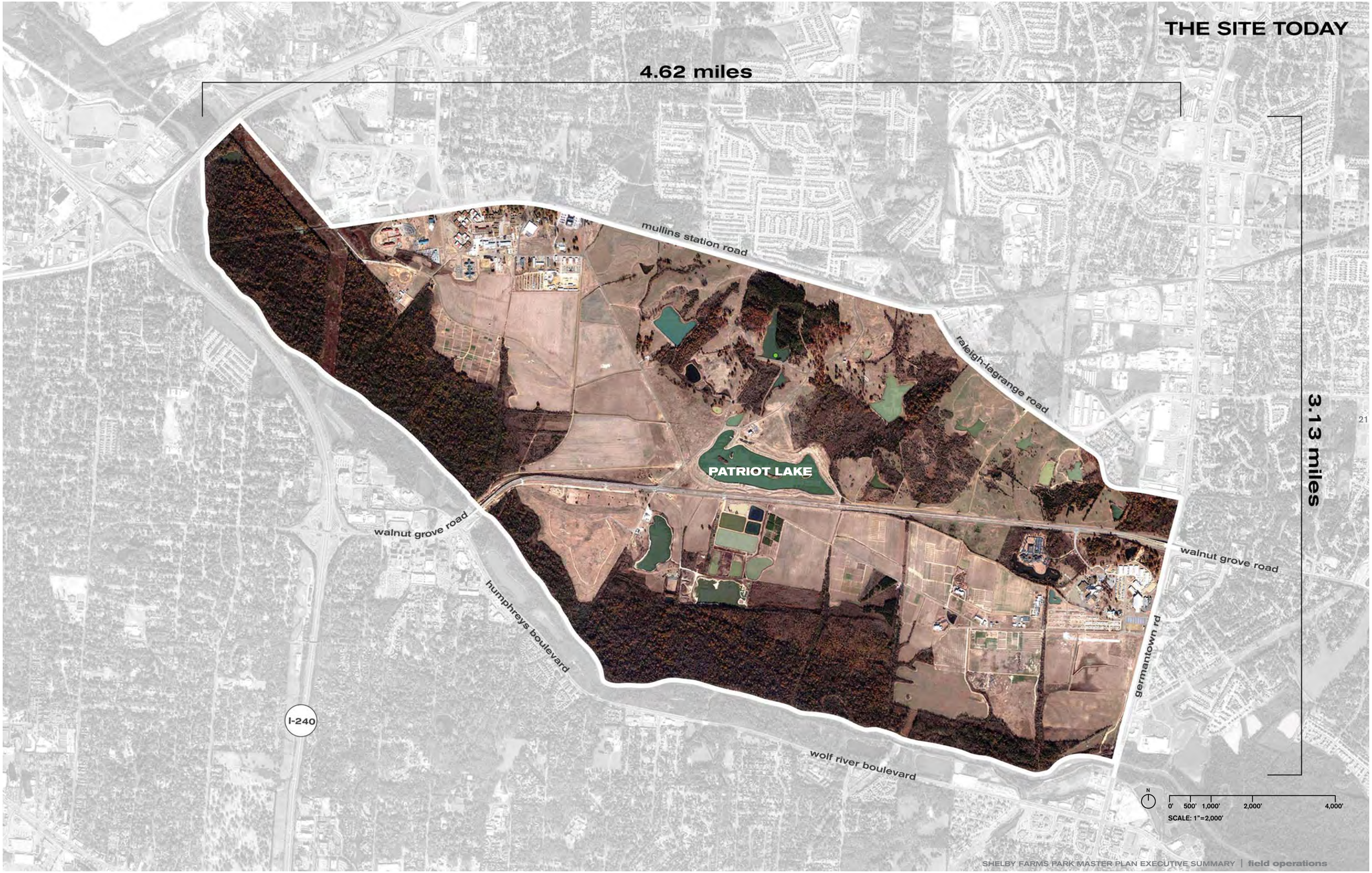
Though this land was initially a great distance from the City center, rapid expansion during the mid-twentieth century brought the territory within the Memphis City limits. It was following this expansion that a series of development plans were proposed for the site intending to transform it into the center of a new town concept. The three most well-known of these plans included the Bartholomew Report (1970); the American City Corporation Report (1972); and the Rouse-Boyle Proposal (1973). Though each of these three proposals increased the ratio of open space to development from the one that preceded it, each was met with strident public opposition and eventually discarded due in large part to the various open spaces offered being comprised mostly of lowland and flood plain areas of the site rather, than the more valuable rolling hills and hollows of the upland.

In October 1975, Garrett Eckbo submitted a final plan and report outlining "best alternative future land uses for Shelby Farms." This plan transitioned from a development-oriented approach to one that treated the land as an important and impressive resource for the community. Though very little of this report was implemented, the document did loosely guide the development and transformation of the Shelby Farms territory over the past thirty years. Related products of the Eckbo Plan include the creation of Plough Park and the designation of the land near the present day Area 10 for County-related development purposes. In 1981, the Tennessee State Legislature established the Agricenter Commission to promote education, research and agribusiness with the explicit intent of spurring economic development. The Agricenter manages 1,000 acres in the southeastern portion of Shelby Farms Park for these purposes. This territory includes cropland, convention space, an RV park and the 45-acre Showplace Arena area.

Excluding the 1,000 acres at the Agricenter and the 300 acres comprising Area 10, the majority of the remaining 3,200 acres at Shelby Farms Park are currently used for recreation or recreation-related purposes. Of this 3,200 acres, 780 acres a designated and protected within the Lucius Burch State Natural Area, which runs along the Wolf River. Significant portions of the 3,200 acres not used for recreation-related purposes include a dormant landfill south of Walnut Grove Road adjacent to the Agricenter property and an inactive shooting range also in this area of the Park.

Currently, much of Shelby Farms Park remains zoned for industrial use. In response to a variety of development pressures, a permanent easement was proposed to protect the Park from what were deemed incongruent uses. In December 2006, the Shelby County Commission approved a Conservation Easement, which anticipated incorporating recommendations from this Master Plan. Pre-existing master plans or development proposals for Area 10 and tiers 2+4 of the Agricenter would be maintained within this easement. In August 2007, the Shelby Farms Park Conservancy assumed management of 3,200 acres of the Shelby Farms Park territory from Shelby County.

THE SITE TODAY



3.1 CONSERVATION EASEMENT

In December 2006, the Shelby County Commission passed a Conservation Easement, which anticipated incorporating recommendations from this Master Plan. This Easement was entered into by the County of Shelby, Tennessee ("County") and the Shelby County Agricenter Commission ("Agricenter") as Grantors of the Easement and the Land Trust of Tennessee as the recipient of the Easement. The County has previously granted 1,000 acres of the Shelby Farms land to Agricenter for use as an agri-center pursuant to a state statute. The Agricenter Property is subject to reversion to the County under certain specific circumstances. The grant of the Conservation Easement may be terminated upon the 50th anniversary of its execution.

The Conservation Easement has been executed because the Property has been found to have "significant conservation, natural, scenic, recreational, agricultural, scientific and parkland resources and values in the fields, forests, open spaces, vistas, wetlands, ponds, lakes and streams on the Property, which resources and values are worthy of protection, maintenance, preservation, and enhancement for the benefit of the people of Tennessee." This Easement was received and is enforced by the non-profit group, The Land Trust for Tennessee, Inc. The County, the Agricenter, and the Land Trust for Tennessee have agreed to protect, maintain, preserve and enhance the various natural resources and values of the Property.

This Master Plan is anticipated to become part of the Conservation Easement once it is approved by the Shelby Farms Park Conservancy, Agricenter and the Shelby County Board of Commissioners as defined under Section II, item 3 of the Conservation Easement– "Grantors and Grantee agree that Grantee shall become a party to the planning process for said Master Plan, which upon completion shall become incorporated into the Easement as though set out fully herein."

The Conservation Easement includes provisions for permitted and existing uses within the Park including but not limited to, paved and unpaved recreation trails; observation structures; gardens; recreational sports venues; park pavilions; agricultural and horticultural uses; scientific research; boating and water sport activities including fishing; habitat and wildlife enhancement; short term events; way-finding and locational signage; outdoor classrooms; retreat facilities; maintenance and operation facilities; and/or a historic carousel. Standard maintenance; completion of any buildings or facilities under construction; and repair or replacement of existing roads and trails is also permitted within the Easement.

The Conservation Easement prohibits uses such as stadiums or arena facilities; the introduction of new transmission lines unless permitted by an existing leases; the use of motorized equipment on unpaved trails; real estate development; manufacturing or industrial uses; commercial mining; residential or hotel uses; subdivision of the property; zoos; permanent fairgrounds; billboards; and/or commercial advertising.

The Master Plan described herein is designed to be consistent with the uses and purposes of the Easement to promote "the use of the Property by the public as an urban park." The full Conservation Easement can be found in Appendix B of this report. It can also be found on the Shelby Farms Park Conservancy web site:
http://www.shelbyfarmspark.org/sfpc/park_info/park_mgmt

Conservation Easement Areas:

TIER 1: Shelby Farms Park

TIER 2: Agricenter Campus Area

TIER 3: Agricenter Crop and Recreation Area

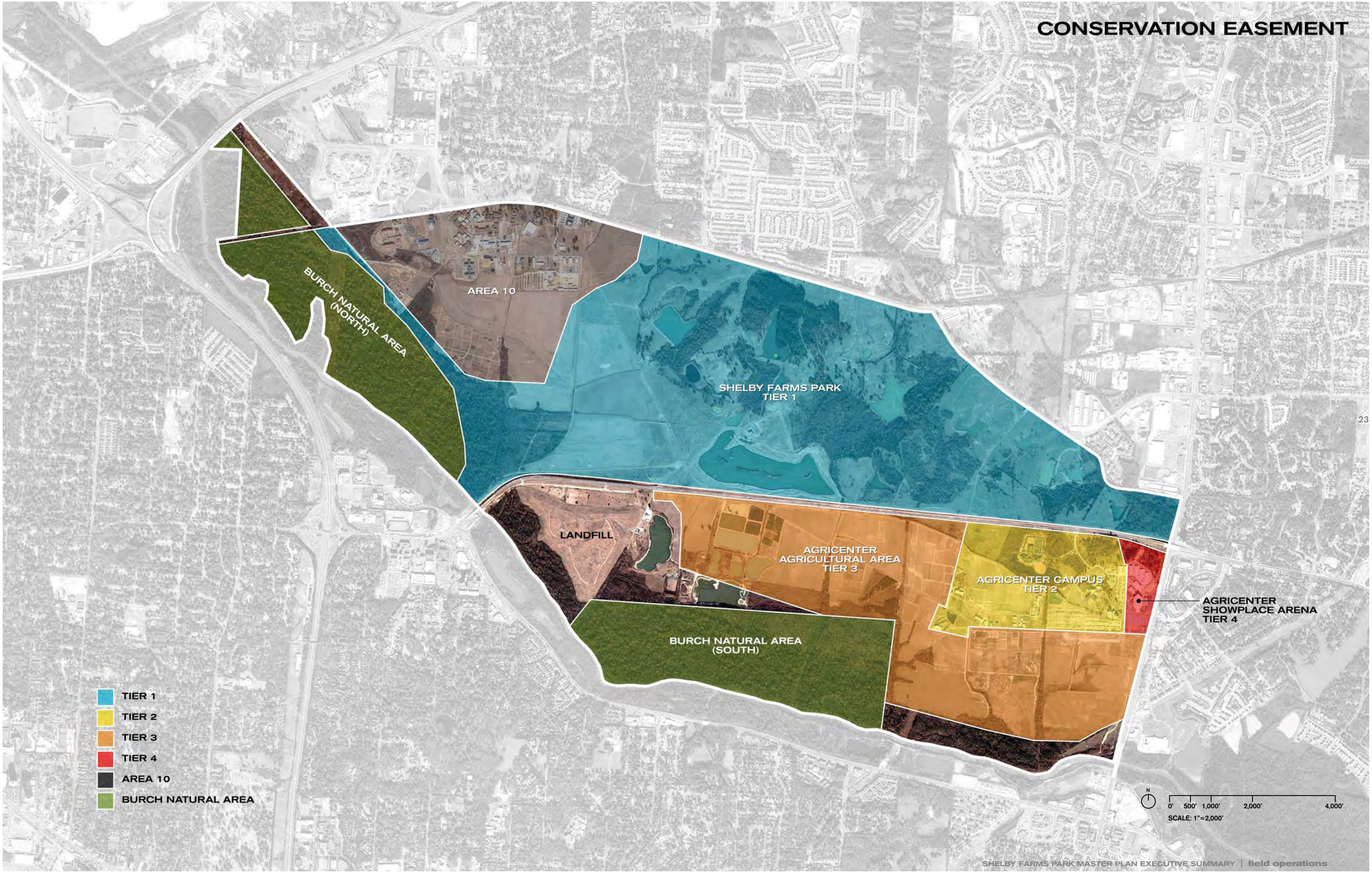
TIER 4: Agricenter Showplace Arena Area

AREA 10: County property not restricted by provisions of this Easement

Lucius Burch Natural Area

NOTE: The drawing to the right is a graphic representation only of the subject property. The controlling legal descriptions of metes and bounds of this property shall take precedence over the appearance of this document.

CONSERVATION EASEMENT



4.0 KEY CHALLENGES

Shelby Farms Park is currently a successful public Park. However, it does possess four significant structural deficiencies which we believe the Master Plan must address in order to guide the long-term transformation and growth of the Park.

Poor Identity (Is it an agricultural farm, a penal farm or a park?) – Perhaps the single greatest deficiency of Shelby Farms is an absence of identity. The boundaries of the Park lack a strong physical presence that easily indicates it is a premier public open space venue. In addition, a large percentage of Memphians are unaware of its role within the city (that is, they don't know the Park exists). Driving along Walnut Grove Road is like driving on any other divided highway in Western Tennessee. What signage is present is not immediate and is therefore lost amongst the visual congestion of the road. Further, a public understanding of what the Park is and who it is for (everybody), would substantially help to increase the number of Park users and in turn, support for the Park.

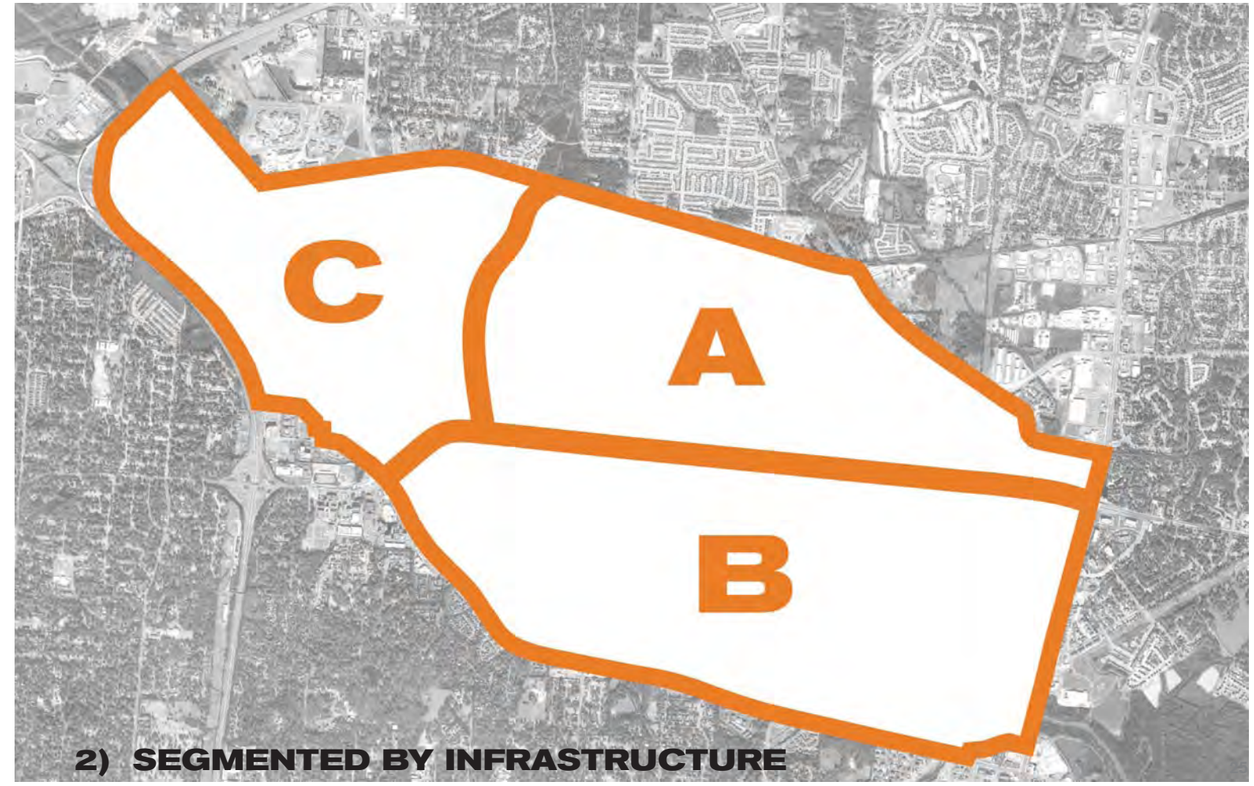
Segmented by Infrastructure – Walnut Grove Road already bisects the Park into northern and southern halves, isolating the programs and activities in each. Implementation of the new Shelby Farms Parkway necessitates a strong approach that will physically and perceptually link these areas of the Park into a single, legible whole. The alternative is a further erosion of the Park's physical presence within the City.

Fragmented Ecosystem – Though the Park is often thought of as "natural," it is in fact a highly constructed and continually modified environment. The existing pockets of upland forest are healthy, but ecologically limited in that they remain unconnected and isolated. Further, habitat in this area is cut off from the more ecologically productive Wolf River corridor which is a critical piece of wildlife movement within the region. Connecting the various ecological components of the Park into an interconnected mosaic would serve to improve the overall health and ecological value of the land.

Deficient Access / Connectivity / Circulation – Shelby Farms Park is well positioned for access by vehicular traffic, however its location well east of Midtown and Downtown Memphis make the site difficult to reach by means other than an automobile. No mass transit reaches the interior or the Park, and the few stops at its perimeter are too far from any major Park destination to be of any real utility. Providing connections to recreation and alternative transportation linkages such as public greenways or bike lanes, as well as modifying and expanding existing transit service to the Park will help to truly make Shelby Farms accessible and usable by the entire Memphis Region.

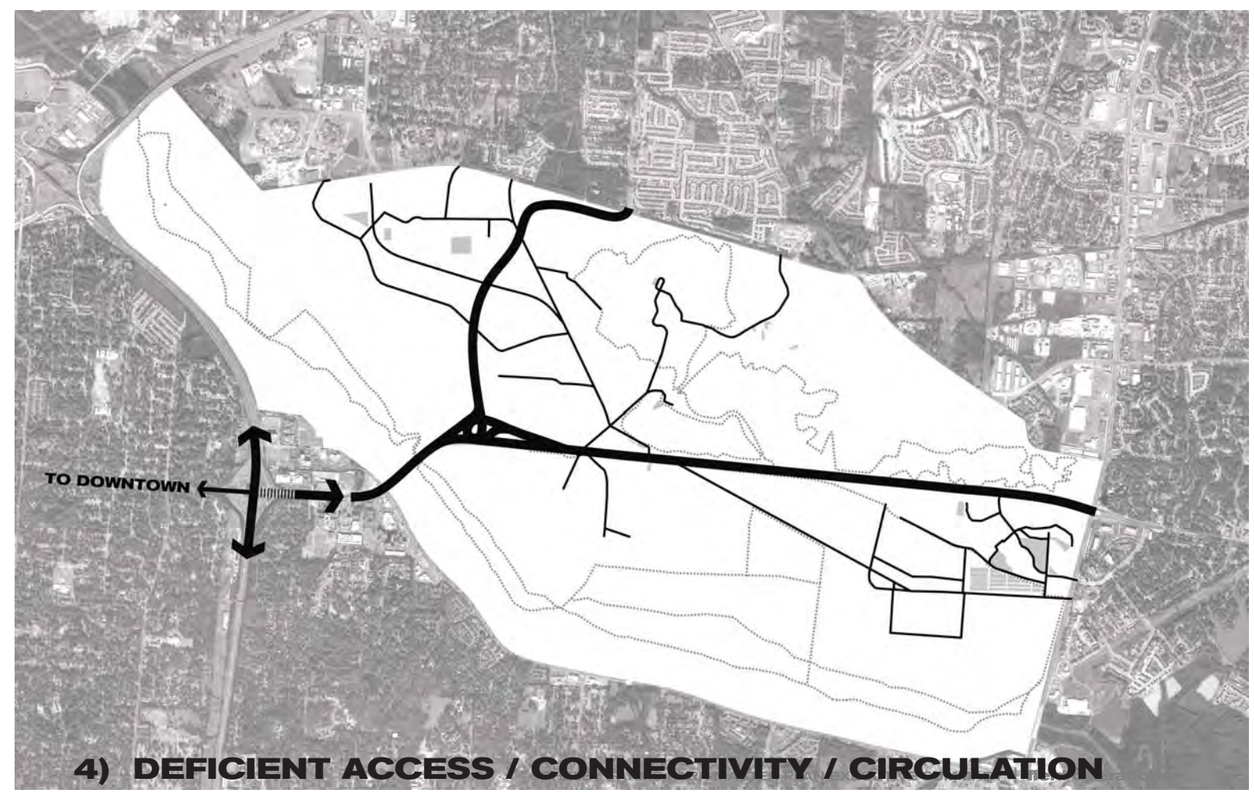
Once inside the Park, taking advantage of the various venues is difficult because of the under-developed existing circulation system. Many of the roadways and circulation routes within the Park are re-appropriated field roads or user-defined trails. In fact, the heavily trafficked Farm Road is actually not a public thoroughfare but an internal "farm" road. Because it provide a direct connection between Walnut Grove and Mullins Station Roads, it is heavily utilized. Definition of a clear hierarchy of circulation types; implementation of way-finding elements; and the creation of redundant connections between Park areas rather than single linkages will help improve movement within and enjoyment of the Park.

1) POOR IDENTITY



2) SEGMENTED BY INFRASTRUCTURE

3) FRAGMENTED ECOSYSTEM



4) DEFICIENT ACCESS / CONNECTIVITY / CIRCULATION

4.1 CREATE ONE PARK

In order to expand the presence of Shelby Farms Park within the culture of Memphis, the Park needs to project a stronger identity – both physically and conceptually. It has been noted above, but is worth repeating that Shelby Farms Park is already home to a healthy mix of uses. These activities should be the basis upon which the Conservancy defines a strategy for attracting those who don't yet use the Park.

We believe step one in generating an identity for Shelby Farms Park is emphatically demonstrating that it is in fact a totally accessible and welcoming public open space. This means creating a series of opportunities or events that will engage multiple segments of the Memphis population who are not currently using the Park. These could include a series of small group visits organized through Memphis schools, churches and/or community groups. It could also mean organizing and heavily publicizing highly visible activities such as a temporary art installations or public performances, as well as additional events along the lines of the current Earth Day or Fourth of July celebrations that will draw upon populations who wouldn't readily define themselves as "park users".

The second and equally important step in generating an identity for Shelby Farms Park is creating memorable, physical markings at the edges of the Park that are legible from the window of a passing automobile. These should include a strong sense of gateway along Walnut Grove Road and the proposed Shelby Farms Parkway (Kirby-Whitten Parkway), as well as clearly defined entrances to the Park – each distinctively marked with iconic signage and plantings. There should also be a clear delineation of the Park's boundaries through elements such as a visually compelling fence or lighting. Ultimately, the intention is for Shelby Farms Park to be easily legible as a welcoming public open space from both within the Park and at its perimeter.

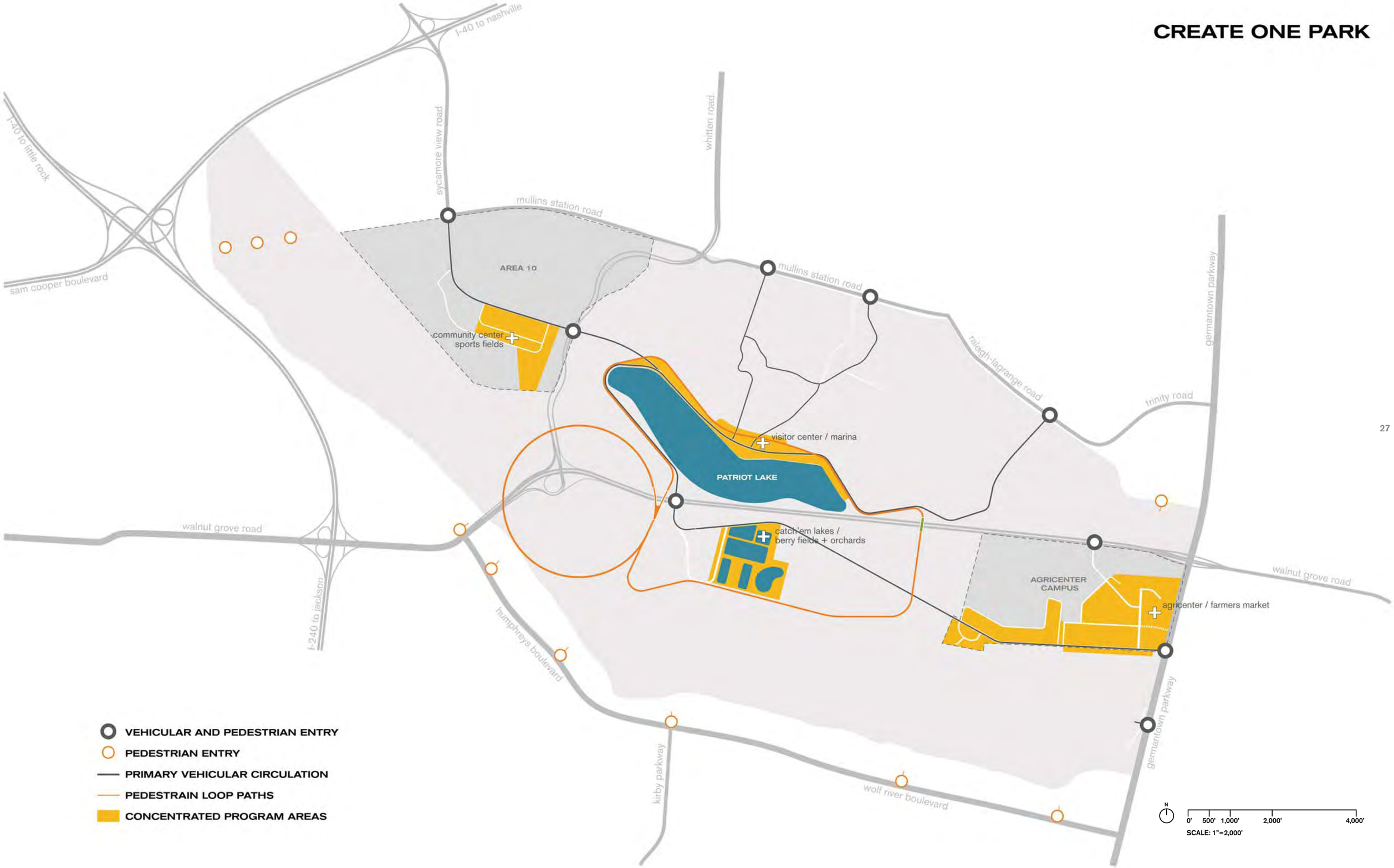
Once inside Shelby Farms Park, it is critical to clarify movement so that first time visitors know exactly where important venues are and how to reach their particular destination whether by bike, by bus or by car. In order to accomplish this, visually clear way-finding signage and a new vehicular circuit is proposed. This circuit will be tied to a 5.25 mi multi-use loop path that will connect all parts of the Park together and help centralize orientation, circulation, transit and parking. An internal park shuttle will provide connections to various points throughout Shelby Farms Park, departing from centralized activity areas with their associated parking facilities. A second 2 mi "circle" loop allows for pedestrian connectivity across major roads and intersections (via tunnels and bridges), and connects the upper Park to the Wolf River and neighborhoods to the south. An expanded network of paths and trails compliments the two central multi-use loops including 12+ miles of equestrian trails; 15+ miles of mountain bike trails; and 20+ miles of wilderness and unpaved trails.

The scale of Shelby Farms Park is its most important attribute. Therefore, the Master Plan promotes a strategy of concentrating programs and facilities at particular locations within the Park to maintain the various landscape characters already present within the site. This approach not only limits the presence of obtrusive architectural elements within the Park landscape, but allows large areas of the Park to remain "natural" and unoccupied by permanent Park activity. The Master Plan proposes less than 10% of the total Shelby Farms Park site area be actively programmed.

an idea for temporary gateway signage along walnut grove road

existing historic gate along mullins station road

CREATE ONE PARK



4.2 PLANT 1,000,000 NEW TREES

One of the most effective moves in generating an identity will be the planting of one-million new trees at Shelby Farms Park. This seemingly simple operation will actually do five very important things for the Park to promote its long-term growth and transformation.

The first, as was noted above, is to help with the creation of identity for Shelby Farms Park by establishing a strong boundary definition and spatial enclosure.

Secondly, the plantings will diversify the ecology and habitat on site by expanding contiguous forest cover and adding new community mixes. These extensive plantings will create many varied woodland settings and ecologies, ranging from Swamp Cypress groves to Oak-Hickory stands, Birch Thickets, Pine Forests and Bottomland Hardwoods.

Third, this new planting will allow for undesirable outside qualities such as major vehicular thoroughfares to be screened from within the Park, creating a true sense of otherness and escape. At the same time, important views and vistas of open landscapes and horizons important to the site will be preserved.

Fourth will be the ability to create a strong sense of community engagement with the planting of these new trees. By partnering with local schools and religious groups to participate in the planting of many of the new trees, the Shelby Farms Park Conservancy can create an immediate momentum building transformation of the Park that will serve to excite and entice the public as other projects are developed and implemented over time. One could easily imagine thousands of local school children coming to Shelby Farms Park to plant these trees and thereby become invested stewards of the long-term health of the Park.

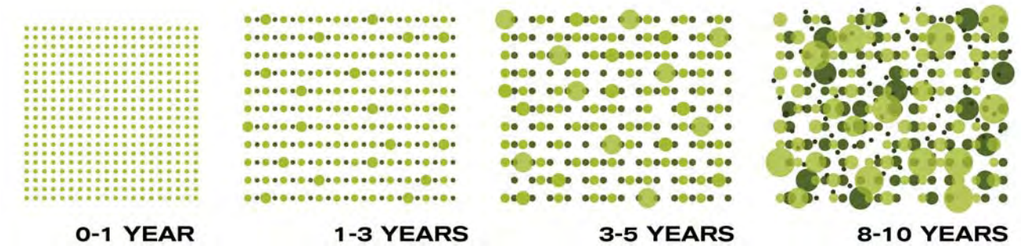
Finally, the planting of a million new trees will also create a potentially large-scale fund-raising intervention. Memphis is home to a number of regional and international corporations who might logically be interested in a contribution of part or all of these trees as a highly desirable “green” public relations opportunity and a way to truly give back to the Memphis Community.

It should be noted that the planting of the one-million new trees is not a singular or monolithic operation. The vast majority of the trees will be planted as small saplings in both unforested areas to expand canopy cover, and in already forested areas to diversify the existing habitat. Some of these saplings will be thinned out in the process of managing the woodland, while others will be allowed to grow to full size. A portion of this new tree planting regime is anticipated to be grown and transplanted to other areas of the City, helping to green Greater Memphis.

community tree planting

new forest cover

PLANT 1,000,000 NEW TREES



A mix of densely planted native tree saplings can be later thinned and transplanted elsewhere across the site to effectively "grow" a complex multi-aged woodland over time. Reforestation is most successful when a mixture of early-successional and later-successional tree species is planted.

49% OPEN LANDSCAPE
51% WOODLAND COVER

- HORIZON VIEWS
- INTERIOR PARK VISTAS
- PROPOSED TREES
- EXISTING TREES

N

0' 500' 1,000' 2,000' 4,000'

SCALE: 1"=2,000'

4.3 DEFINE 12 LANDSCAPE ROOMS

Shelby Farms Park is big. At more than 4,500 acres, the scale of the Park makes it difficult to navigate and spatially comprehend. The deployment of one-million new trees will allow for the definition of distinct landscapes or rooms within the Park, each with its own discrete set of physical and programmatic characteristics. Each landscape or room will be characterized by a different set of users and accommodate a unique set of programs. These large-scale public "rooms" will each support a coherent "sense-of-place" structure for the many varied user groups set within the larger Park setting. As such, each landscape room has its own discrete entrance(s) while also connecting openly into the larger Park system.

The definition of the individual rooms also provides a potential fund-raising mechanism and phasing scenario for Park development. The level of physical transformation varies from room to room and thereby lends itself to a strategy of development of Park areas based on the availability of resources and demands for use. Development at the core of the Park is the logical point of departure, but once this has been established, the transformation of other areas of the Park can occur under any number of scenarios.

DEFINE 12 LANDSCAPE ROOMS

1 PATRIOT LAKE
2 PLOUGH PARK
3 THE RANGE + ARBORETUM
4 THE PUBLIC GARDENS *
5 COMMUNITY CENTER + SPORTS FIELDS *
6 THE OUTBACK
7 THE ART MOUND + PARK CIRCLE
8 CATCH 'EM LAKES
9 THE REFUGE
10 THE ORCHARDS + BERRY FIELDS
11 CROP + RESEARCH FIELDS
12 THE AGRICENTER

* pending area 10 approval

LANDSCAPE ROOMS
MAJOR WATER BODIES

N
0' 500' 1,000' 2,000' 4,000'
SCALE: 1"=2,000'

PATRIOT LAKE

PLOUGH PARK

THE RANGE + ARBORETUM

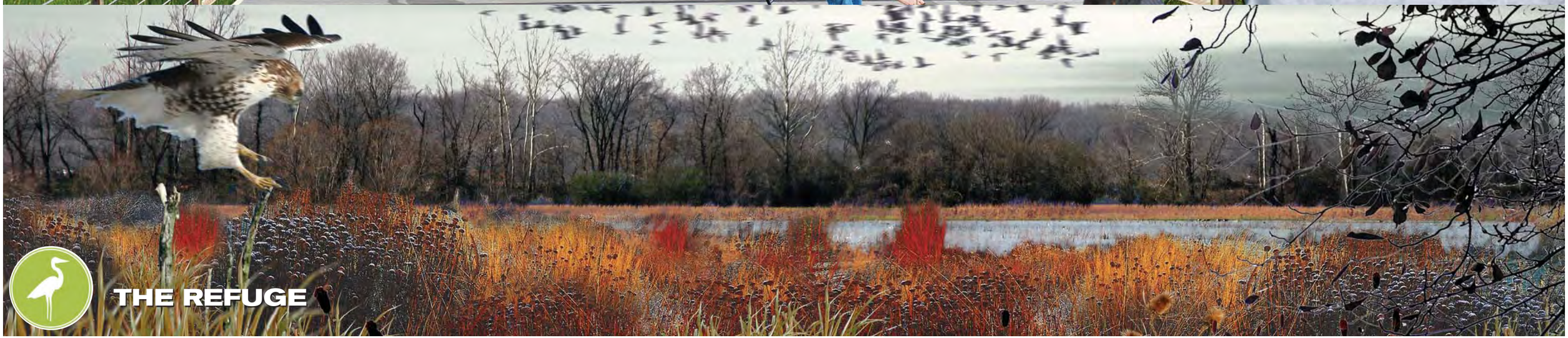
THE PUBLIC GARDENS

COMMUNITY CENTER + SPORTS FIELDS

THE OUTBACK

THE ART MOUND + PARK CIRCLE

CATCH 'EM LAKES


THE REFUGE

THE ORCHARDS + BERRY FIELDS

CROP + RESEARCH FIELDS

TURKEY LEGS HERE !
MESQUITE
THE AGRICENTER

5.0 PROGRAMMATIC DIVERSITY | A UNIQUE 21ST CENTURY MIX

Shelby Farms Park is more than just a place of recreation. It is Memphis's green heart – a place that is engaged in a variety of uses and activities related to health, exercise, play, nature, food, energy, ecology, research and education. This combination of programs is exceptional. It positions Shelby Farms Park and Memphis at the forefront of 21st century sustainable growth and civic development.

In the very near future, a visit to Shelby Farms Park might include a brisk five-mile jog through an expansive car free territory within the City, followed by a leisurely swim and afternoon reading on the beach of the region's largest recreation-only lake. A different day at Shelby Farms Park could start with a visit to an outdoor classroom sited at the edge of a healthy and productive cypress swamp, followed by a snack of locally cultivated fruit and berries purchased from a farmers market powered by on-site renewable energy sources like wind turbines or solar power. A different visitor to the Park might go for an early morning horseback ride before meeting up with a group of friends volunteering to help a church group set up for their summer picnic and choir performance at the Park's new woodland amphitheatre Another Park user might spend the day working on cutting-edge agricultural practices at the Agricenter before taking a vigorous afternoon ride on the Region's premier skate venue and enjoying a picnic dinner watching the sunset over the newly expanded Patriot Lake.

The Shelby Farms Park experience is endless.

With the execution of this Master Plan Shelby Farms Park can become a place characterized by a dynamic environment that combines active recreation and a healthy lifestyle with state of the art green energy production, and local and organic agricultural practices; a place that will comprise diverse natural ecologies and cutting edge agricultural research. The Park has the potential to become a 4,500 acre natural science laboratory and classroom for the Greater Memphis Community that can help educate generations of Memphians on the value of their natural environment.

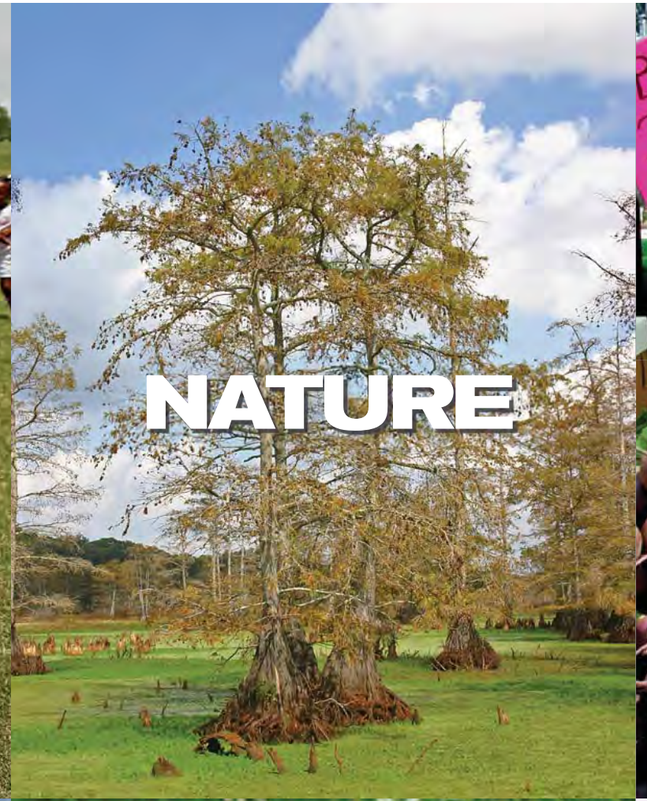
This "mix" of programs, uses and activities will set a global precedent for a new kind of Urban Park – one that does more than just provide a civic venue for active and passive recreation. Shelby Farms Park will transform Memphis. It will influence the culture of the City and the Region. It will redefine the reputation of the place, and the health and well being of its population. Shelby Farms Park will help Memphis offer a high quality of life that is both desirable and enviable.

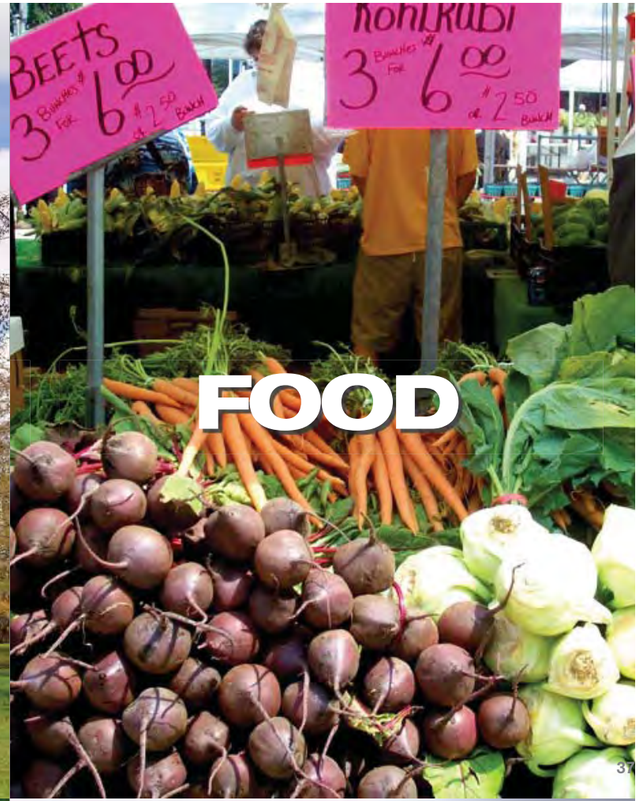
Shelby Farms Park will impact the way Memphis and West Tennessee move forward into the 21st century.

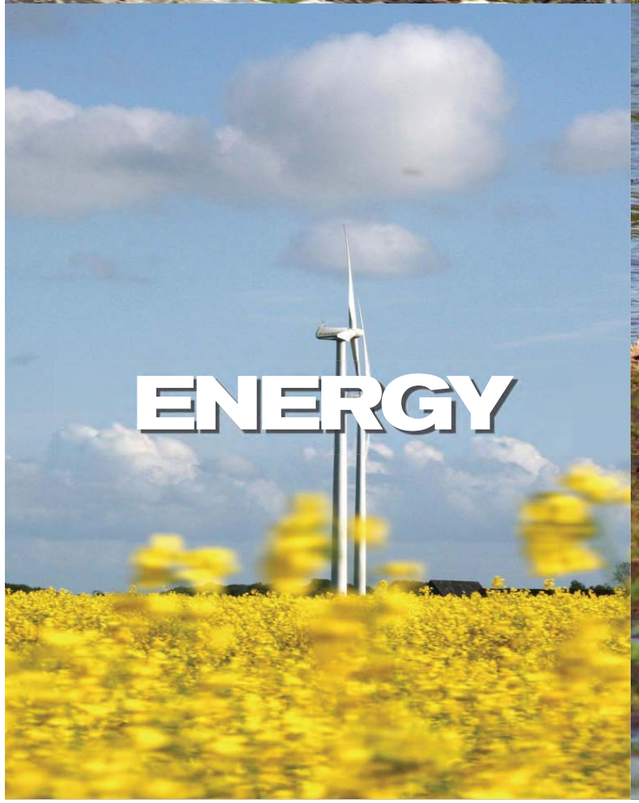
existing park users

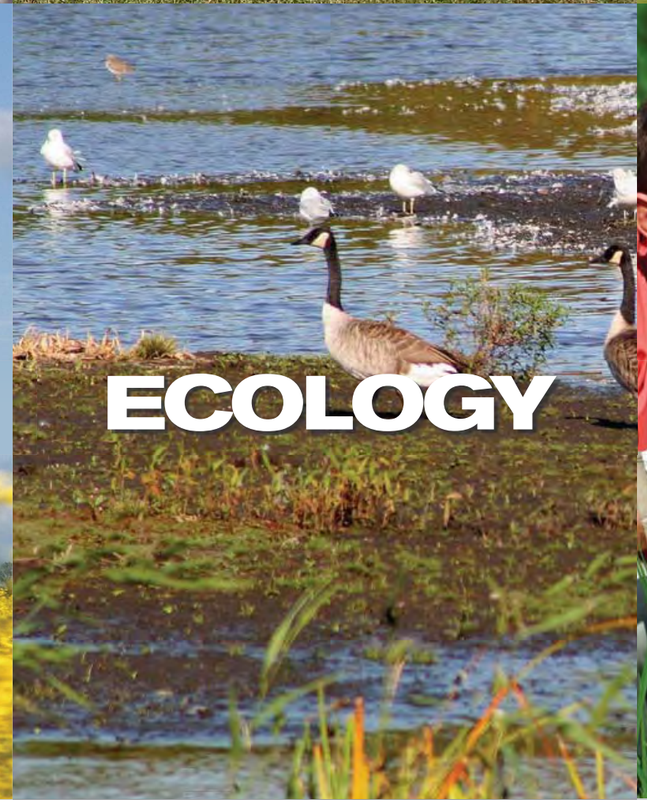
HEALTH
+
EXERCISE

PLAY

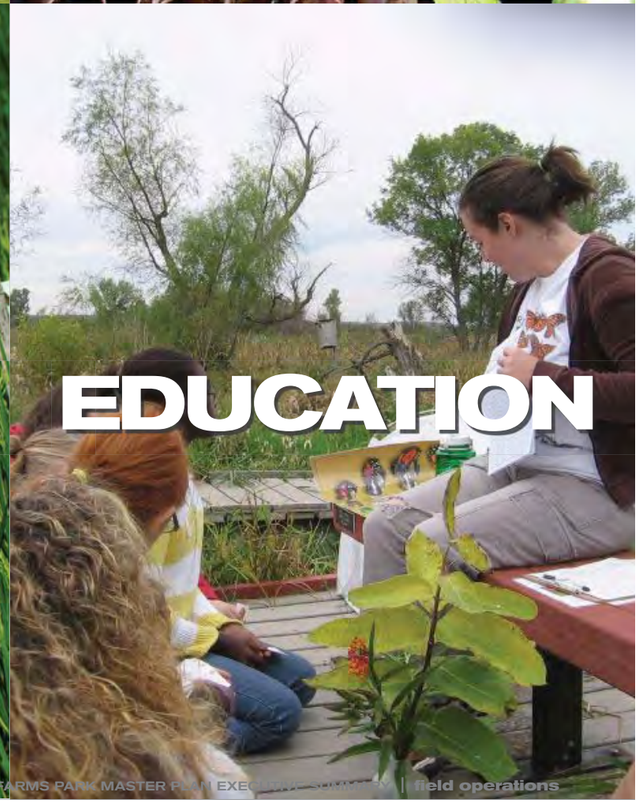

NATURE


BEETS
3 Bunches For 6.00
@ 2.50 Bunch
KOHLRUBI
3 Bunches For 6.00
@ 2.50 Bunch
FOOD


ENERGY


ECOLOGY

RESEARCH


EDUCATION

6.0 PHASING | GROWTH OF THE PARK OVER TIME

The large scale and complexity of Shelby Farms Park dictates that the implementation of the Master Plan for the Park will take time. It will likely be more than a decade before Shelby Farms Park is fully realized, and the planning processes over this period will need to address the existing challenges outlined above– including the lack of identity; segmented infrastructure; a fragmented ecosystem; deficient circulation; and poor regional access – as well as new challenges such as the environmental and economic sustainability of managing an expanded parkland. Add to this equation the anticipated public and stakeholder consultation processes, and it becomes clear that the Shelby Farms Park Conservancy needs a robust strategy for dealing with the shifting priorities and financial requirements of developing the Park over an extended period of time.

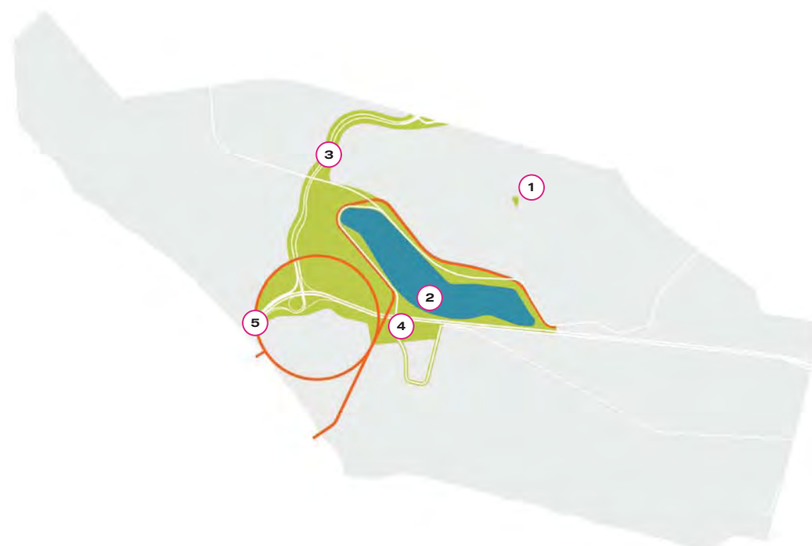
Due to this great complexity, Shelby Farms Park will need to be developed in phases or planned stages of growth that 1) target clear design principles; 2) expand on existing facilities, resources and character; 3) capitalize on the availability of funds, to maximize the exposure and legibility of the Park; and 4) build momentum and support for the Park with each project that is implemented.

It is critical to note however, that incremental, staged growth does not mean that implementation and detailed planning should happen in an ad-hoc or piecemeal fashion. Quite the opposite. To guarantee the long-term success of Shelby Farms Park, it is crucial that early stages of development are founded on clear design objectives while simultaneously building excitement for what is yet to come. The momentum for investing in later stages of the Park's development will depend on public and stakeholder appraisal of the success of initial phases of implementation of the Master Plan.

The Master Plan sets out a strategic and intelligent framework to guide the growth of the Park, with public and stakeholder consultation supporting all future planning and design efforts. Shelby Farms Park is a unique landscape, both in terms of its features and character, as well as the type of efforts, cooperation and leadership that will be required from the Conservancy and the associated public agencies to move the implementation process forward. What the Master Plan phasing scenario outlined here provides is a structure for:

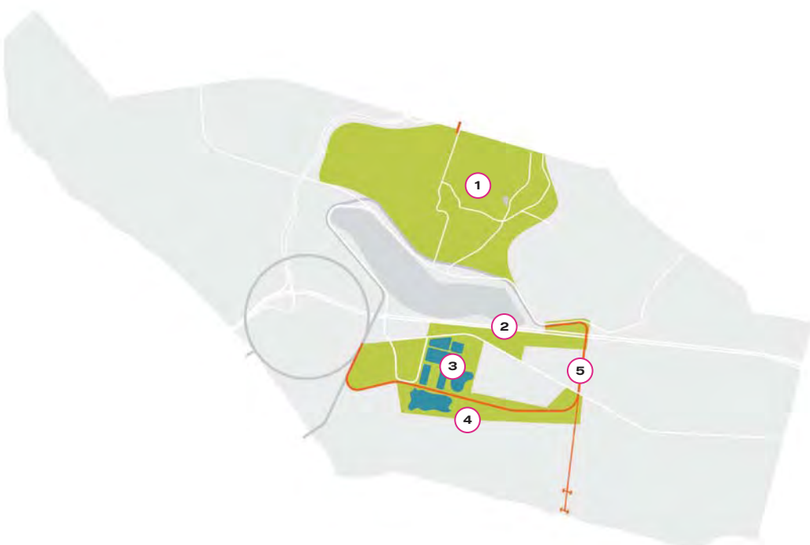
- creating early enthusiasm to propel the implementation process;
- establishing the principal framework necessary to guide long-term development of the Park;
- enhancing the site through ecology and habitat diversification;
- shaping a more defined and memorable identity for the Park; and
- respecting the highly valued existing places in the Park.

The Phasing diagrams shown below and to the right are not intended to comprehensively describe every project and the order with which they are to be implemented. Rather, the four phases are intended to indicate priorities in terms of the areas of the Park where we believe capital projects should be concentrated for maximum gain. As each phase of the project is developed, the limits of each will be clearly defined prior to any design work or construction taking place. It is expected that some adjustments can and will take place regarding the particular location of elements within the master plan provided these adjustments do not conflict with the Conservation Easement or the Master Plan Implementation Instrument. This flexible strategy will establish a strong spatial and organizational design framework for the Park so that its development over time is assured.



PHASE ONE: Establish the Core + Create Identity

1) Expanded Playground at Plough Park
2) Expanded Patriot Lake
3) Shelby Farms Parkway (Kirby-Whitten Parkway) - *by others*
4) New Walnut Grove Gateway + Park Entry
5) Park Circle Access + Trails



PHASE TWO: Expand Core Public Park Area

1) Trail + Facility Enhancements to Plough Park
2) Walnut Grove Planting Strip
3) Reconfiguration + Expansion of Catch 'Em Lakes
4) Development of Refuge Area
5) Completion of Mutli-Use Loop

PHASE THREE: Enhance Landscape Rooms

1) Trail Enhancements to Outback Area
2) Enhancement + Expansion of Agricenter Campus Area
3) Development of Amenities + Activities along Wolf River
4) Development of Wolf River Greenway - *by others*

PHASE FOUR: Enhance Landscape Rooms (later phases TBD)

1) Communtity Center + Sports Fields *
2) Public Gardens *
3) Agricenter Research +Crop Field Area

* *pending area 10 approval*

6.1 PHASING | PHASE ONE CENTERPIECE

The centerpiece of Phase One will be the expansion of Patriot Lake at the center of the Shelby Farms Park property. The transformation and expansion of the lake will be a bold, dramatic and exciting step in the process of realizing the Shelby Farms Park project. As the iconic destination of the entire Park, the new Patriot Lake will be a highly visible and defining landmark for Memphis: one that is rich with new public amenities, diverse recreational opportunities, spectacular vistas and remarkably unique events.

The Patriot Lake Project is a complex one, as it involves works on land and in the water and will require the collective participation of a broad range of technical consultants, city agencies and the public. However, the promise of its spectacular presence in the future Park, replete with its great physical beauty and recreational resources, signals the importance of prioritizing this remarkable feature in the early stages of the Park's life.

aerial view of the existing patriot lake

EXPANDED PATRIOT LAKE 150-ACRES
(EXISTING PATRIOT LAKE 54-ACRES)
1 SMALL VIEWING TOWER
2 PERMEABLE SURFACE PARKING LOTS
3 PICNIC PAVILION
4 EQUIPMENT RENTAL
5 REST FACILITY
6 ICON BALLOON
7 TREE ALLEE
8 SWIMMING BEACH
9 VISITOR CENTER
10 GREAT LAWN
11 MARINA
12 WATER PLAYGROUND
13 EARTHEN AMPHITHEATER
14 FLOATING STAGE
15 M+O FACILITIES (15,000 SF BUILDING AND 2-ACRE YARD)
16 SAILBOAT COURSE
17 SWAMP CYPRESS GROVE
18 2.5-MILE BOARDWALK
19 FISHING PIERS
20 1250 METER / 1.25 KILOMETER ROWING COURSE
21 SWAMP CYPRESS GROVE
22 MULTI-USE CIRCUIT
23 PATRIOT LAKE ROAD (PRIMARY VEHICULAR ROAD)
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

cypress swamp and boardwalk at the expanded patriot lake

earthen amphitheatre at the expanded patriot lake

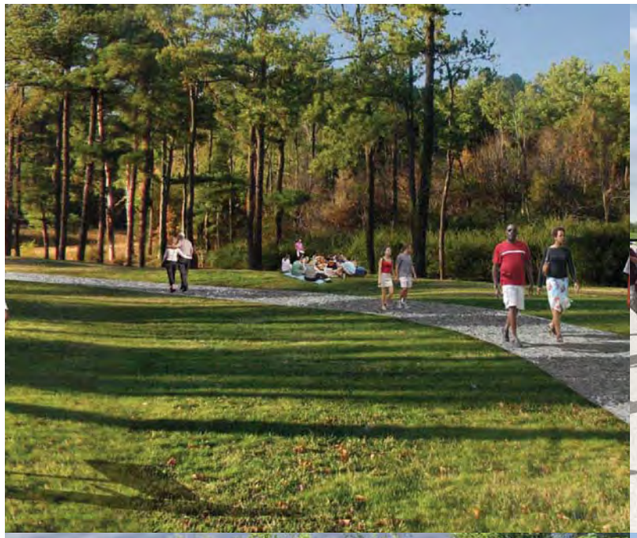
7.0 CONCLUSION

Shelby Farms Park is already an amazing reserve of public parkland, amenity and urban nature. Its huge scale offers an extraordinary resource for people who are interested in large-scale recreation activities – strolling, jogging, cycling, mountain biking, rollerblading, picnicking, dog walking, swimming, kayaking, windsurfing, sailing, fishing and the like. The site's unique argrarian character and diverse ecological habitat is a great draw to a public interested in escaping the frenetic quality of the city and immersing themselves in a large-scale 'green' landscape. Whether for hiking, bird watching, private refuge, reflection, plant and wildlife identification, ecological research or education, Shelby Farms Park offers a "Big Nature" setting that lays the grounds for creating one of the world's most distinct and distinguished urban parks.

The Shelby Farms Park Master Plan amplifies these qualities to provide for a higher intensity and variety of uses on site. A new legible physical identity highlighted by an expanded Patriot Lake; a revised circulation system replete with multi-use circuits and user-specific paths; concentrated areas of public programs; an expanded educational agenda and accompanying facilities; cutting edge agrarian practices; and a new focus on sustainable development and renewable energy sources will distinguish Shelby Farms as the 21st century example of what great urban public space is capable of contributing to a city and a region.

Through intelligent management and enhancement of Shelby Farms' distinct natural resources, the development of the Park has the capacity to transform Memphis and the Region. The Park will significantly enrich the culture of the City; it will redefine the reputation of the place, and help to attract new creative talent, business and families to the area; and it will offer a great resource for the improvement of public health, fitness and well-being. Shelby Farms Park will help Memphis offer a wonderful quality of life that is both highly desirable and globally enviable.

Shelby Farms Park will impact the way Memphis and West Tennessee move forward into the 21st century.



THIS BUS EATS ITS VEGETABLES
SHELBY FARMS SHUTTLE

field operations
475 tenth ave, 10th floor
new york, new york 10018
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SHELBY FARMS PARK

MASTER PLAN REPORT · JULY 2008

PREPARED BY **field operations**

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21st July, 2008

Rick Masson
Executive Director,
Shelby Farms Park Conservancy,
500 North Pine Lake Drive,
Memphis, TN 38134

Dear Rick,

It gives me great pleasure to submit to you and to the Board of the Shelby Farms Park Conservancy this Master Plan document. In the pages that follow are descriptions of a vision that has been shaped by carefully listening to the needs and desires of the many different users of the Park today, as well as to the potential aspirations of an even broader populace that may be attracted to the Park in the future. The document describes how the land may be enhanced, improved and modified over time to become even more beautiful and special than it is today, accommodating an even wider spectrum of visitors and creating a new “green heart” for Memphis. While the Master Plan outlines specific ideas for transforming parts of the Park over the next few years, it is also provides a good deal of flexibility to allow a fluid response to changing demands, needs and desires over time.

We look forward to continuing to work with you and the Conservancy as you move forward in making this vision for Shelby Farms Park a reality.

With my very best regards,

James Corner

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July 2008

MASTER PLAN REPORT
SHELBY FARMS PARK

PREPARED FOR:

SHELBY FARMS PARK CONSERVANCY
500 Pine Lake Drive
Memphis, TN 38134

PREPARED BY:

field operations
landscape architecture + urban design

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Memphis Runners Track Club
Mid-South Fly Fishers
Mid South Song Writers Association
Model Airplane Club
SCSCTP (Clay Shooting)
Shelby County Community Gardens
Shelby Farms BMX
Shelby Farms Off-Leash Society
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Tennessee Ornithological Society
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Wolf River Conservancy
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Greater Memphis Greenline
High School Cross Country Coaches
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Memphis Ultimate Frisbee Association
Memphis in Motion
Memphis Whitewater
Mid-South Hunting Retriever Club
Mid-South Trails Association
Park Concession, LLC
SFPC Youth Alliance
Shelby Farms Assoc. of Neighborhoods
Shelby Farms Equestrian Alliance
Shelby Farms Trail Crew
Stables at Shelby Farms Park
Tennessee Trails
West Tennessee Clean Cities Coalition
Women and Running

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0.0 REPORT SUMMARY

0.1 REPORT SUMMARY | ONE PARK, ONE MILLION TREES, TWELVE LANDSCAPES

THE SITE

Formerly a penal farm and agricultural area, Shelby Farms Park is today a 4,500 acre reserve of scenic fields, meadows, woodlands, lakes, pathways and trails. At more than five-times the size of New York's Central Park, this enormous site affords a very broad range of uses, appealing to an equally broad range of users and interest groups. Its huge scale offers an extraordinary resource for people who are interested in large-scale recreation activities – strolling, jogging, cycling, roller-blading, picnicking, dog-walking, frisbee, horseback riding, fishing, boating, dog training, gardening and the like. Its agricultural heritage is also a great resource for land husbandry practices, including farming, research, food production, energy creation, education, markets and festivals. The site also offers opportunities for arts, music, culture and large-scale outdoor events, such as Earth Day and July 4th celebrations.

A NEW CENTRAL DESTINATION AND CULTURAL RESOURCE

With the new Master Plan, Shelby Farms Park will become a major landmark public open space and defining destination for Memphis. While the site is located east of the center of Memphis proper, it is actually quite central to the larger population settlement across the metropolitan area. Extensions along the Wolf River Greenway and the future greenline (former CSX rail line) further embed the Park in the fabric of the Memphis Region and help to connect it to a broad range of constituents and neighborhoods. The development of the Park is an important part of Memphis Fast Forward – the largest and most comprehensively supported economic development program in the region. It is in this context that investment in and transformation of Shelby Farms Park will not only enrich the lives of all who visit and use the Park, but will also enhance the attractiveness of Memphis for business, creative talent, families and individuals.

ONE PARK, ONE MILLION TREES, TWELVE LANDSCAPES

By framing the Master Plan around the threefold concept of "One Park, One Million Trees, Twelve Landscapes," an otherwise complex series of site design initiatives can be more simply understood:

"One Park" addresses the goals of unity, connectivity, sense-of-place, ecosystem, identity and inclusion. New circulation systems plantings, signage and consistent design elements will shape the Park as one.

"One Million New Trees" addresses the goals of ecological improvement and biodiversity, defining edges and screening out undesirable views while maintaining some of the site's most spectacular vistas; engaging the community in planting and stewardship; creating more shade for strolling; and reducing Memphis's overall carbon footprint.

"Twelve Landscapes" addresses the diversity and richness of the different areas of the site; the varied user group needs; and the definition of future management zones, with respective goals and objectives.

Together, these three guiding principles will help to steer and form the basis around which the future Park takes shape. New entrances, pathways, plantings and facilities will shape a more defined and beautiful identity for Shelby Farms Park as a whole. In the center will be a magnificent new lake – nearly three times the size of the current Patriot Lake – able to support a wide range of non-motorized water sport activities. Twelve distinctive large-scale landscapes surround the expanded Patriot Lake, each supporting certain uses and events while allowing a strong 'sense-of-place structure' for the many varied user groups set within the larger park setting. The plan is respectful of current Park users and the unique qualities of the landscape, while at the same time affording enhanced amenities – improved and expanded trails, play areas, water bodies, performance spaces, activity areas and facilities – for an even broader spectrum of users.

THE VISION

Continuing both the agricultural and more recent recreational uses of the site, the new Park offers a generous and beautiful large-scale public landscape for cultivation, growth, health and wellbeing (as in a sports farm, a tree farm, a culture farm, an arts farm, an energy farm, as well as the more familiar land husbandry farm) for a broad constituency of public user groups, families and individuals. In this way traditional land practices meet the new urban 21st century culture of health, fitness, leisure, play, education, and ecology, creating a unique place of large-scale interaction with the land. As such, the Park will become a leading-edge, international model for design and sustainable management practices.

The Master Plan

The Master Plan offers a vision and a guiding framework for how the Park may be improved and developed over time. At the same time, it is intended to be dynamic and flexible, capable of being adapted to changing needs and desires. The Master Plan is also designed to be implemented flexibly in realistic phases, depending upon the availability of funding and priorities set by the Conservancy.

As a guiding vision, the Master Plan provides a bold yet practical framework for future investment in the Park, creating a world-class Park of exceptional distinction, that appeals to the broadest possible constituency and heralds a new era where visionary parks are central to the creation of a wholesome, just and rich quality of urban life.

1 SHELBY FARMS PARKWAY (KIRBY-WHITTEN PKWY.)
2 COMMUNITY CENTER *
3 SPORTS FIELDS *
4 PUBLIC GARDENS *
5 BISON RANGE
6 PATRIOT LAKE
7 BEACH + ACTIVITY BAR
8 EARTHEN AMPHITHEATER
9 PLOUGH PARK
10 THE OUTBACK
11 GREEN BRIDGE
12 FRUIT + NUT ORCHARDS
13 AGRICENTER
14 RESEARCH FIELDS
15 WOLF RIVER PEDESTRIAN BRIDGE
16 STRAWBERRY FIELDS
17 THE REFUGE
18 CATCH 'EM LAKES
19 "Y" GATEWAY BRIDGE
20 ART MOUND
21 SCULPTURE PARK
22 WOLF RIVER PEDESTRIAN BRIDGE
23 WOLF RIVER PEDESTRIAN BRIDGE
24 LUCIUS BURCH NATURAL AREA
25 AREA10 / GOVERNMENT FACILITIES

* PENDING AREA 10 APPROVAL

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Shelby Farms Park is poised to join the ranks of the world's great large contemporary urban parks. There is increasing recognition that parks of this generous size present a unique combination of opportunities and challenges with respect to design, ecology, programming and sense of place. At their best, large urban parks define the character of the neighborhoods around them, drawing both residents and visitors for a full range of experiences while catalyzing economic development and attracting creative talent to their region. At the same time, large parks make a fundamental contribution to environmental sustainability through their scale of open space, water, air and habitat opportunities, as well as their contribution to urban livability. These are parks that help to define the cities where they are located and their unique features make them calling cards for their home towns around the world.

The Master Plan describes a series of bold, yet pragmatic land planning and physical design improvements that will help to create a world-class park for the 21st century. Key strategies are driven by:

a) over-coming the segmentation of the larger site created by Walnut Grove Road and the new north-south Shelby Farms Parkway (Kirby-Whitten Parkway), and creating instead a strong sense of a unified large-scale landscape with improved access and seamless pedestrian connectivity;

b) enhancing and diversifying the natural ecosystems, plantings, water-bodies and landscapes across the site, primarily through the planting of new trees and careful land management practices;

c) creating a unique, beautiful and contemporary sense-of-place where nature, physical health and fitness, agriculture and the production of food and energy, environmental education, arts and culture, and scenic beauty are all equally foregrounded;

d) establishing distinctive landscape character zones where particular uses are accommodated;

e) creating an iconic new center for the Park, in the form of a very large lake that supports a diverse array of non-motorized water sport activities;

f) phasing park improvements that work with funding capital and operating budget plans over the long-term; and

g) promoting the highest qualities of landscape architecture, land preservation, environmental stewardship and sustainable management practices.

The threefold concept of "One Park, One Million Trees, Twelve Landscapes" offers a simply understood vision for how the park should be transformed over time.

"One Park" addresses the goals of unity, connectivity, sense-of-place, ecosystem, identity and inclusion. New circulation systems plantings, signage and consistent design elements will shape the Park as one.

"One Million New Trees" addresses the goals of ecological improvement and biodiversity, defining edges and screening out undesirable views while maintaining some of the sites most spectacular vistas; engaging the community in planting and stewardship; creating more shade for strolling; and reducing Memphis's carbon footprint.

"Twelve Landscapes" addresses the diversity and richness of the different areas of the site; the varied user group needs; and the definition of future management zones, with respective goals and objectives.

Together, these three guiding principles should help to steer and form the basis around which the future Park takes shape.

1.2 VISION + GUIDING PRINCIPLES

The Shelby Farms Park Conservancy has outlined a unique vision and an ambitious set of goals for the transformation of the existing Shelby Farms territory in order to give rise to a celebrated 21st century park that defines and shapes a great city. The Conservancy has established a set of core principles that guide the stewardship of the design, planning, management and maintenance of Shelby Farms Park. These Guiding Principles are as follows:

- *We are leading the reinvention of large urban parks.*
- *We are creating a constantly improving park that is layered, flexible and adaptive.*
- *We are creating an exceptional and distinctive park that capitalizes on its unique natural resources and size.*
- *We insist on both environmental and financial sustainability.*
- *Shelby Farms Park will capitalize on its size to create options: places grand and expansive and others small and personal.*
- *Shelby Farms Park will connect and strengthen the fabric of community through its accessibility, inclusiveness and connections to the city.*
- *We are creating a beloved place where powerful memories are delivered to the people of Shelby County.*
- *We are known for work that is bold, dedicated, visionary and public-spirited.*

In addition, the Conservancy and the design team moved forward through the master plan process while keeping the following questions in mind:

- *Does it promote green and open?*
- *Is it flexible and adaptive?*
- *Is it accessible and inviting?*
- *Is it environmentally and financially sustainable?*
- *Is it exceptional and distinctive?*
- *Does it capitalize on the size of the park?*
- *Does it respect the limitations of the easement?*
- *Does it capitalize on our natural resources?*
- *Does it reflect the highest possible standards?*
- *Does it encourage a sense of community?*
- *Is it safe?*

ART MOUND + PARK CIRCLE
PUBLIC GARDENS
COMMUNITY CENTER + SPORTS FIELDS
THE RANGE + ARBORETUM
PATRIOT LAKE
PLOUGH PARK
THE OUTBACK
CATCH 'EM LAKES
THE REFUGE
ORCHARDS + BERRY FIELDS
CROP + RESEARCH FIELDS
AGRICENTER
sfp

1.3 PROCESS + PURPOSE

PROCESS

While conducting an extensive first round of public input forums in the fall of 2007, the Shelby Farms Park Conservancy issued a Request For Qualifications (RFQ) for the *Shelby Farms Park Innovative Design Competition*. From the 33 responses to this RFQ, three teams were invited to Memphis to begin a three-month process of developing a proposal for the Schematic Design of Shelby Farms Park. At the end of this process, the three proposals were exhibited during the month of March 2008 at the Shelby Farms Park Visitor Center, the Benjamin Hooks Central Library, and the Cossitt Library. Visitors to the exhibition were asked to complete a questionnaire indicating what they liked and disliked about each design proposal. The three proposals and the questionnaire were also available via the Shelby Farms Park Conservancy's Web site from March 6 - March 31, 2008. The results from each of these venues were tabulated following the Master Plan competition exhibit. They represent thoughts from a wide cross-section of the Memphis community and include the ideas and opinions of both current Park users and those who do not currently use the Park.

At the end of this process, field operations was chosen by the Shelby Farms Park Conservancy to prepare a Master Plan for Shelby Farms Park. The Conservancy selected field operations based on several factors, including their responsiveness to the public's views on the future of the Park; design philosophy; big ideas; their approaches to environmental sustainability and project phasing needs; and the Conservancy's general impression of the firm's passion for the Park.

Since the awarding of the Master Plan, field operations has made multiple trips to Memphis to meet with stakeholders and related public agencies, as well as the Park Master Plan Committee to calibrate the content of this Master Plan Report to the priorities and vision of the Park users, and the Memphis community.

shelby farms park youth alliance public input meeting

PURPOSE

The Shelby Farms Park Master Plan provides a vision and a strategic framework for review, discussion and decision-making. Its recommendations are not fixed or final, but offer a flexible framework for implementation. The continued input of many experts, policy makers and most importantly, the public, will be critical to the refinement of the plan as the Shelby Farms Park Conservancy moves forward in the implementation of the recommendations outlined herein. The following four points outline the purpose of this Master Plan Document.

1. Outline the goals, vision and organizational framework for Shelby Farms Park;
2. Demonstrate that the goals, vision and strategic direction are grounded and realistic;
3. Advance discussion at the leadership level regarding implementation, finance and long-term management options; and
4. Build broader understanding, support and leadership for the Park at the community, stakeholder and civic levels.

It should be noted that this is not a conventional Master Plan that organizes information in a manner that clearly responds to every specific existing condition. Rather, it is a bold but concise vision for Shelby Farms Park that describes the key principles, characteristics and opportunities that are enabled by such a vision. It is important to understand that this Master Plan is an integrated document. For any goal, objective or proposition to be fully understood, it must be read as a whole.

public input meeting

1.4 CONSULTATION + OUTREACH

CONSULTATION

Once field operations was awarded the contract to prepare the Master Plan Report for Shelby Farms Park, the design team reviewed all of the comments provided by the Conservancy from both the fall 2007 and spring 2008 public input meetings and surveys, and began a series of meetings with Park stakeholders and related public agencies. These consultations included meetings and review sessions with the Conservancy's Master Plan Committee; a series of meetings with the Conservancy leadership regarding finance and operations of an expanded Shelby Farms Park; working sessions with representatives from Agricenter International; a presentation and feedback forum with the leadership of each of the Park's user groups; meeting with representatives from the Memphis Community Connector (the group responsible for the acquisition of the former CSX rail line); meeting with representatives from the Wolf River Conservancy; as well as various discussions with the Shelby County Department of Public Works, the Memphis City Engineer, and the director of Germantown Parks and Recreation.

This public input, and the accompanying series of meetings and working sessions, were a critical aspect of the development of this Master Plan document. It is anticipated that these opportunities for public review and input will continue as the Conservancy begins the process of implementing the Master Plan.

OUTREACH

The public and stakeholder process should not end with the completion and approval of the Master Plan document. Continued stakeholder and public participation in, and support for the Shelby Farms Park Master Plan are as crucial for its future success as they were for the development of a Master Plan that reflects the desires and needs of the Memphis Community. In this context, it is important to note that the Shelby Farms Park Conservancy is guided by a strong policy regarding minority and local participation. As the Shelby Farms Park project moves into future stages of design and planning, the public and relevant stakeholder groups - including all user groups - must continue to be consulted to ensure that the future Park achieves the objectives of the Master Plan, the goals of Park users, and abides by the guiding principles of the Shelby Farms Park Conservancy.

exhibition at public library

shelby farms park public forum

2.0 EXISTING SITE OVERVIEW

2.1 OVERVIEW | THE PARK IN THE CITY

Shelby Farms Park is the single largest urban figure in the Memphis landscape after the Mississippi River. This exceptional scale affords the opportunity to grow a Park that is cherished not just by the residents of East Memphis where the Park sits, but by the entire Memphis region including the populations of Downtown, Midtown, Collierville, Germantown, Cordova, Bartlett, West Memphis and beyond. Though it lies just east of the I-240/I-40 loop, Shelby Farms is located at the geographic population center of Shelby County. This combination of size, location, and amenity generates a true destination potential for the Park within the Mid-South region – a new "green heart."

In addition to the creation of a one-of-a-kind civic amenity, the transformation of Shelby Farms Park has the capacity to enhance the continued greening of Greater Memphis; promote a healthy lifestyle for the City's residents; and provide a resource that contributes to the overall quality of life for all current and future Memphians.

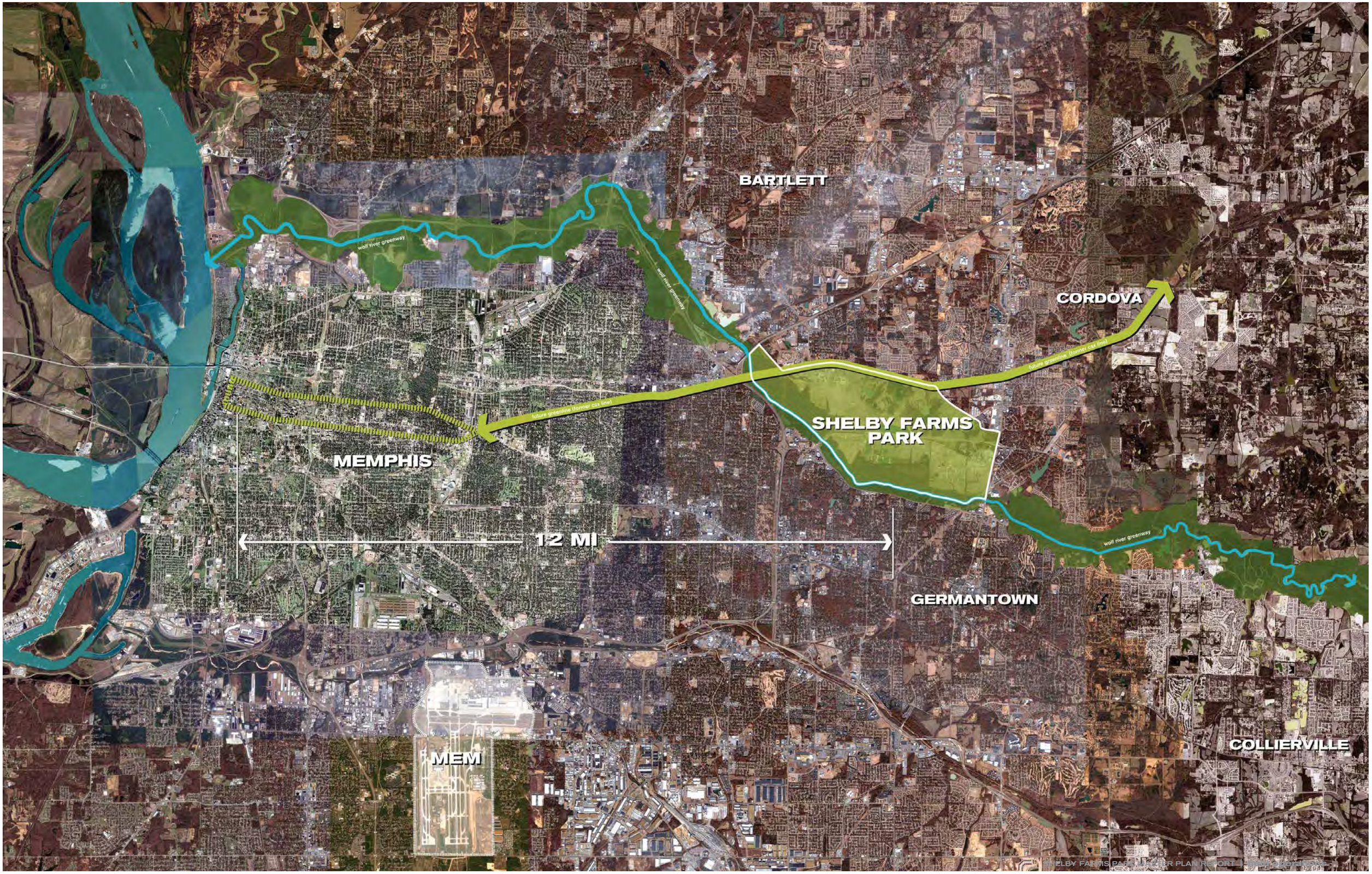
URBAN SCALE COMPARISON

shelby farms park: 4,500 acres

mem airport: 3,600 acres

cbd / downtown: 1,200 acres

central park, nyc: 840 acres


BARTLETT
CORDOVA
wolf river greenway
wolf river greenway
future greenline (former csx line)
future greenline (former csx line)
SHELBY FARMS PARK
MEMPHIS
12 MI
wolf river greenway
GERMANTOWN
MEM
COLLIERVILLE

2.2 OVERVIEW | MEMPHIS' ASSETS

For the thousands of people who visit Memphis every week, the wide range of social, cultural and historical assets of the City is quite well known and readily cited. Elvis, the Blues, Rock'n Roll, Gospel Music, Dr. Martin Luther King, Jr. and the National Civil Rights Museum, BBQ, the Memphis Zoo and its pandas, several great Museums for adults and kids, and a diverse amateur and professional sports scene all need little introduction.

Memphis is also the business center of the Mid-South and a major player in the global economy. Sited at the geographic center of the United States, overlooking the Mississippi River, Memphis is ideally positioned for industries associated with transportation and shipping related commerce, and has a rich history of agriculture, medicine and entrepreneurism. Fortune 500 companies FedEx, AutoZone, and International Paper, along with world-renowned medical and research companies such as St. Jude Children's Research Hospital all call Memphis home. Memphis is home to the world's busiest airport in terms of cargo traffic handled, boasts two major Mississippi River rail crossings, and is the convergence of a number of east-west and north-south rail lines. Memphis is also home to a growing bioscience industry. In 2000, the city was cited as one of the top 50 best places to start a new business in the United States.

This combination of culture and commerce places Memphis in an enviable position moving forward into the 21st century. It is well known that in addition to an available workforce and positive business environment, the real driver for corporate location managers is the potential quality of life available to their employees. With the new design for Shelby Farms Park, Memphis can add to its unique culture and a fertile business environment, as well as offer a one-of-a-kind civic amenity that can position Memphis as a national and international talent magnet through the exceptional quality of life the City can provide.

HISTORY

TREES

MUSIC

COMMERCE

EVENTS

BIG RIVER

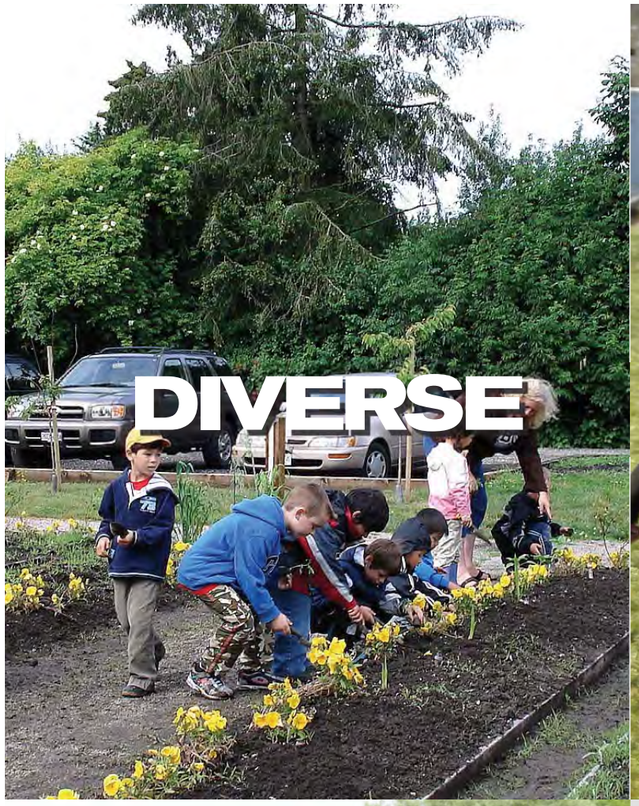
RIBS

CULTURE

2.3 OVERVIEW | A PARK FOR EVERYONE

Shelby Farms Park is envisioned to become a Park for all of those living in the Memphis Metropolitan Region. A top priority of the Shelby Farms Park Conservancy is to improve connectivity and accessibility to the Park, particularly for poorly served parts of the City. The Park's central geographic location affords the Conservancy a great opportunity to make these connections a reality. It is easy to imagine residents of Downtown, Midtown, Collierville, Germantown, Cordova, Bartlett, Millington, Arlington, Lakeland, Olive Branch, South Haven and West Memphis all coming to Shelby Farms Park, whether it is for a major event like the Fourth of July, or just for a weekend or evening outing. This new connectivity will allow the Park to become a place populated and activated by the diverse cultures and ethnicities of the entire Memphis Region.

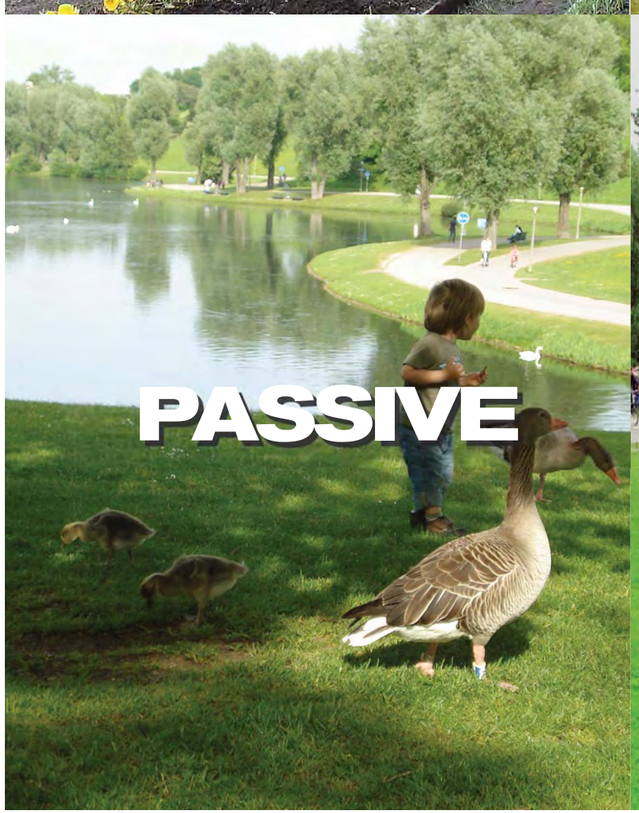
In addition, the huge scale of the Park allows for such a wide range of uses and activities that nearly everyone – at every age, from every background – will be able to find something that interests and engages them at Shelby Farms Park. A huge range of amenities, paired with ample opportunities for active and passive recreation in a unique agrarian landscape at the center of a growing metropolitan region, will truly make Shelby Farms Park a place to be enjoyed by all.


DIVERSE

ACTIVE
PLAY

FAMILY

AMENITY


PASSIVE

ACCESSIBLE

COMMUNITY

BIG

2.4 OVERVIEW | SITE HISTORY + THE SITE TODAY

The outcome and eventual social and cultural position of Shelby Farms Park within Western Tennessee and the Memphis Region has a long and storied history, and until very recently has remained unresolved to some degree.

During the mid-nineteenth century, Shelby Farms was home to Frances Wright's Nashoba Experiment. A Humanist reformer, Ms. Wright set up a commune on the land intended to prepare slaves for their future freedom by training them in the time's worthwhile skills and educating them in the liberal arts. Though there is some discussion as to the various successes and failures of this experiment, there is little doubt as to the vanguard role Ms. Wright played during period in West Tennessee's history.

In 1928, Shelby County acquired 1,600 acres of this land for use as a model penal farm. By 1942, the penal farm lands had been expanded to more than 5,000 acres, and it had become a national model visited by prison experts from around the country. In the late 1960's, Shelby County determined the penal farm was no longer viable and shut it down.

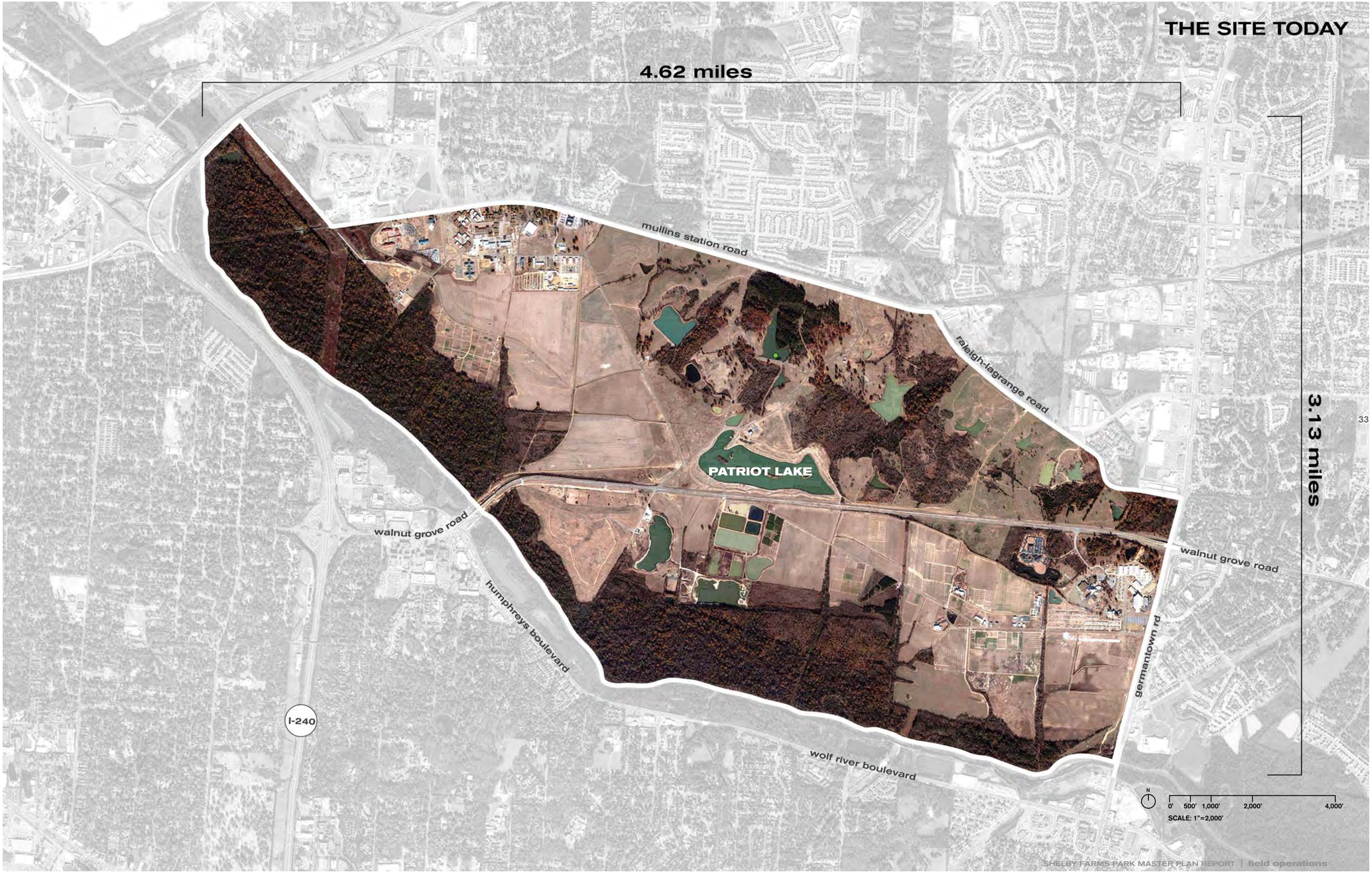
Though this land was initially a great distance from the city center, rapid expansion during the mid-twentieth century brought the territory within the Memphis City limits. It was following this expansion that a series of development plans were proposed for the site intending to transform it into the center of a new town concept. The three most well-known of these plans included the Bartholomew Report (1970); the American City Corporation Report (1972); and the Rouse-Boyle Proposal (1973). Though each of these three proposals increased the ratio of open space to development from the one that preceded it, each was met with strident public opposition and eventually discarded due in large part to the various open spaces offered being comprised mostly of lowland and flood plain areas of the site rather, than the more valuable rolling hills and hollows of the upland.

In October 1975, Garrett Eckbo submitted a final plan and report outlining "best alternative future land uses for Shelby Farms." This plan transitioned from a development-oriented approach to one that treated the land as an important and impressive resource for the community. Though very little of this report was implemented, the document did loosely guide the development and transformation of the Shelby Farms territory over the past thirty years. Related products of the Eckbo Plan include the creation of Plough Park and the designation of the land near the present day Area 10 for County-related development purposes. In 1981, the Tennessee State Legislature established the Agricenter Commission to promote education, research and agribusiness with the explicit intent of spurring economic development. The Agricenter manages 1,000 acres in the southeastern portion of Shelby Farms Park for these purposes. This territory includes cropland, convention space, an RV park and the 45-acre Showplace Arena area.

Excluding the 1,000 acres at the Agricenter and the 300 acres comprising Area 10, the majority of the remaining 3,200 acres at Shelby Farms Park are currently used for recreation or recreation-related purposes. Of this 3,200 acres, 780 acres a designated and protected within the Lucius Burch State Natural Area, which runs along the Wolf River. Significant portions of the 3,200 acres not used for recreation-related purposes include a dormant landfill south of Walnut Grove Road adjacent to the Agricenter property and an inactive shooting range also in this area of the Park.

Currently, much of Shelby Farms Park remains zoned for industrial use. In response to a variety of development pressures, a permanent easement was proposed to protect the Park from what were deemed incongruent uses. In December 2006, the Shelby County Commission approved a Conservation Easement, which anticipated incorporating recommendations from this Master Plan. Pre-existing master plans or development proposals for Area 10 and tiers 2+4 of the Agricenter would be maintained within this easement. In August 2007, the Shelby Farms Park Conservancy assumed management of 3,200 acres of the Shelby Farms Park territory from Shelby County.

THE SITE TODAY



2.5 OVERVIEW | CONSERVATION EASEMENT

In December 2006, the Shelby County Commission passed a Conservation Easement, which anticipates incorporating recommendations from this Master Plan. This Easement was entered into by the County of Shelby, Tennessee ("County") and the Shelby County Agricenter Commission ("Agricenter") as Grantors of the Easement and the Land Trust of Tennessee as the recipient of the Easement. The County has previously granted 1,000 acres of the Shelby Farms land to Agricenter for use as an agri-center pursuant to a state statute. The Agricenter Property is subject to reversion to the County under certain specific circumstances. The grant of the Conservation Easement may be terminated upon the 50th anniversary of its execution.

The Conservation Easement has been executed because the Property has been found to have "significant conservation, natural, scenic, recreational, agricultural, scientific and parkland resources and values in the fields, forests, open spaces, vistas, wetlands, ponds, lakes and streams on the Property, which resources and values are worthy of protection, maintenance, preservation, and enhancement for the benefit of the people of Tennessee." This Easement was received and is enforced by the non-profit group, The Land Trust for Tennessee, Inc. The County, the Agricenter, and the Land Trust for Tennessee have agreed to protect, maintain, preserve and enhance the various natural resources and values of the Property.

This Master Plan is anticipated to become part of the Conservation Easement once it is approved by the Shelby Farms Park Conservancy, Agricenter and the Shelby County Board of Commissioners as defined under Section II, item 3 of the Conservation Easement– "Grantors and Grantee agree that Grantee shall become a party to the planning process for said Master Plan, which upon completion shall become incorporated into the Easement as though set out fully herein."

The Conservation Easement includes provisions for permitted and existing uses within the Park including but not limited to, paved and unpaved recreation trails; observation structures; gardens; recreational sports venues; park pavilions; agricultural and horticultural uses; scientific research; boating and water sport activities including fishing; habitat and wildlife enhancement; short term events; way-finding and locational signage; outdoor classrooms; retreat facilities; maintenance and operation facilities; and/or a historic carousel. Standard maintenance; completion of any buildings or facilities under construction; and repair or replacement of existing roads and trails is also permitted within the Easement.

The Conservation Easement prohibits uses such as stadiums or arena facilities; the introduction of new transmission lines unless permitted by an existing leases; the use of motorized equipment on unpaved trails; real estate development; manufacturing or industrial uses; commercial mining; residential or hotel uses; subdivision of the property; zoos; permanent fairgrounds; billboards; and/or commercial advertising.

The Master Plan described herein is designed to be consistent with the uses and purposes of the Easement to promote "the use of the Property by the public as an urban park." The full Conservation Easement can be found in Appendix B of this report. It can also be found on the Shelby Farms Park Conservancy web site:
http://www.shelbyfarmspark.org/sfpc/park_info/park_mgmt

Conservation Easement Areas:

TIER 1: Shelby Farms Park

TIER 2: Agricenter Campus Area

TIER 3: Agricenter Crop and Recreation Area

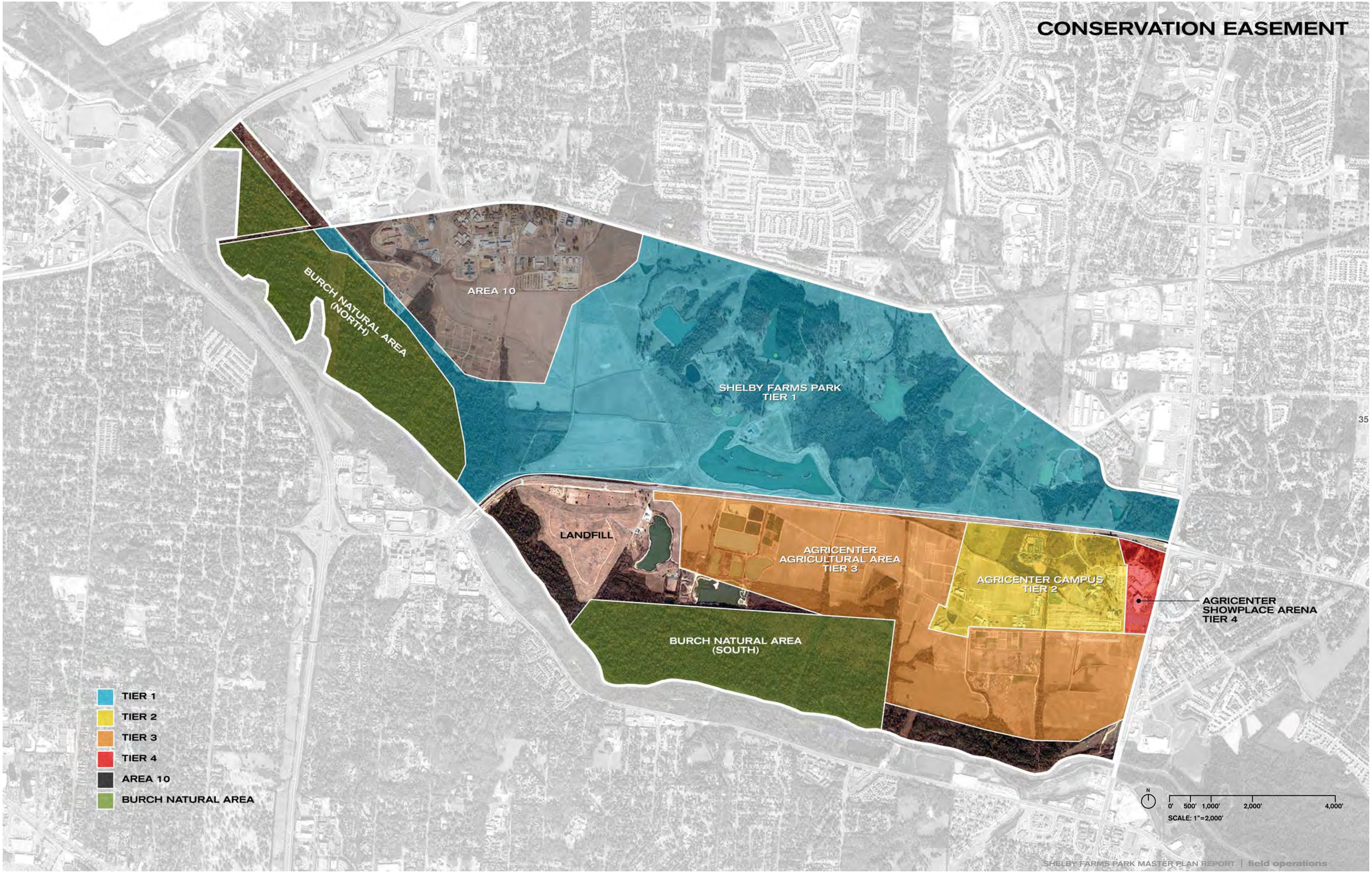
TIER 4: Agricenter Showplace Arena Area

AREA 10: County property not restricted by provisions of this Easement

Lucius Burch Natural Area

NOTE: The drawing to the right is a graphic representation only of the subject property. The controlling legal descriptions of metes and bounds of this property shall take precedence over the appearance of this document.

CONSERVATION EASEMENT



2.6 OVERVIEW | EXISTING LAND-CHARACTER AREAS

The existing Shelby Farms territory is comprised of 10 major land-character areas that already accommodate a wide variety and diverse range of activities and uses.

Hills + Hollows (Plough Park): Northern section of territory developed most intensely as park following submission of the Eckbo Plan in late 1975. This area of Shelby Farms Park is home to more domestic uses including picnicking and grilling; paved pedestrian and bike paths; mown lawns and fields; playgrounds and picnic pavilions; small fishing lakes; as well as unpaved hiking and running trails.

Patriot Lake: The centerpiece of Plough Park, Patriot Lake functions as the gateway to Shelby Farms Park. Sited between Walnut Grove Road and Farm Road and wrapped by a well-used multi-use path, Patriot Lake provides kayak and paddle-boat rental; small picnic areas; and a splendid foreground for sunset vistas viewed from the visitor center patio.

Big Activities: The area east of Plough Park and north of Walnut Grove Road can be characterized by the scale and type of recreational activities it can accommodate. Home to the Shelby Farms' equestrian, mountain bike and off-leash dog users, this area of the Park offers a less managed, more varied landscape for Big Nature activities rarely able to be accommodated in a contemporary urban Park.

Bison + Farms Fields: Shelby Farms most iconic feature, if not its most cherished. The curiously located and ever-present Bison herd residing west of Patriot Lake along Farm Road offer a true destination for first-time and regular visitors to Shelby Farms Park alike.

Senior Gardens: Well used, though somewhat under-serviced, this area of Shelby Farms Park provides a welcome amenity to an important segment of Memphians.

Area 10: Home to various Shelby County Government facilities, Area 10 has little adverse impact on the Shelby Farms territory despite its seemingly incongruous set of programs and uses. The introduction of Shelby Farms Parkway (Kirby-Whitten Parkway) and the extension of Sycamore View Road will further isolate this area from the rest of Shelby Farms.

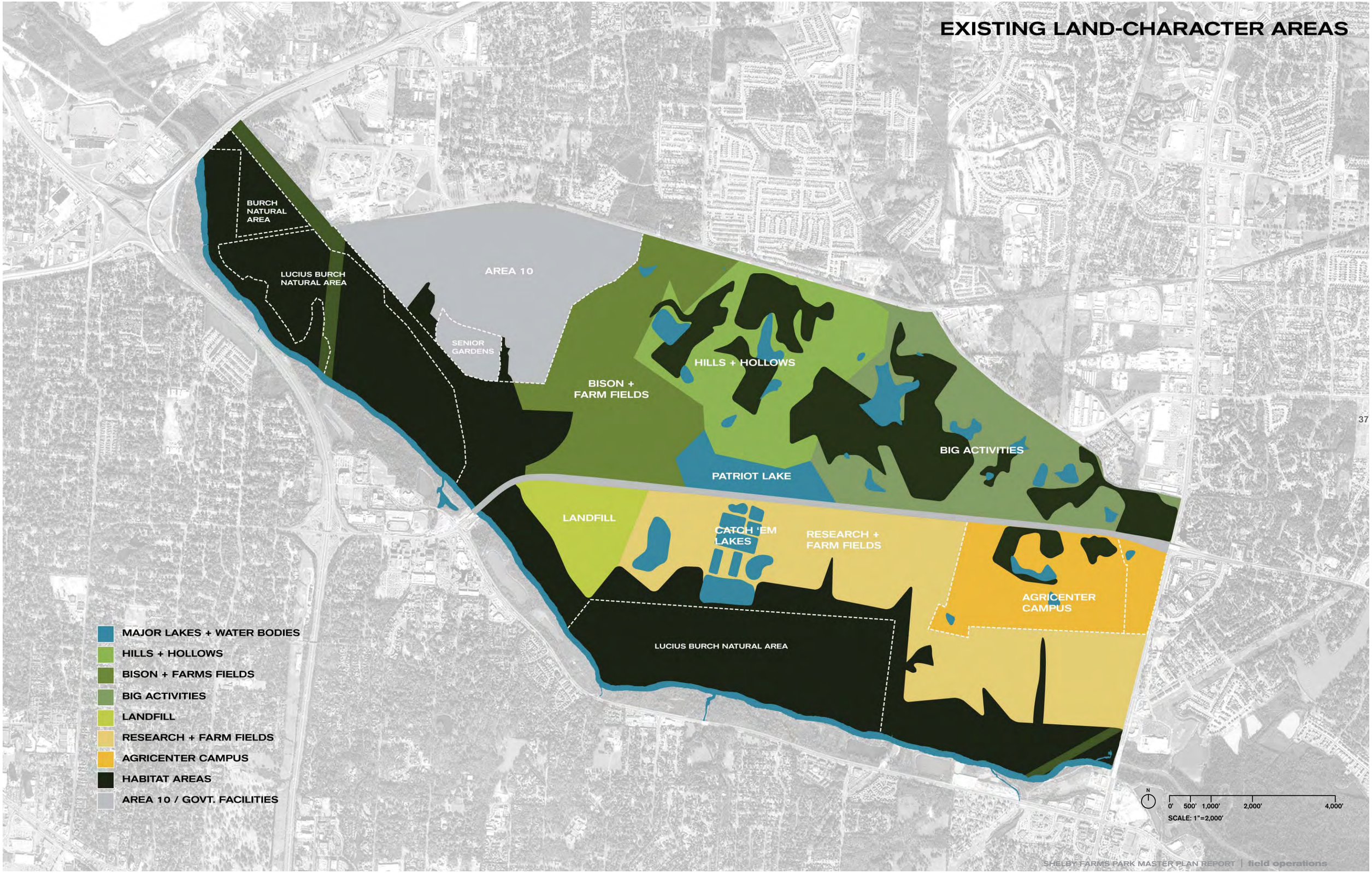
Landfill: The least valuable of the 10 existing land-use areas, the small landfill mound south of the proposed Shelby Farms Parkway (Kirby-Whitten Parkway) - Walnut Grove Road interchange remains a significant concern because of its questionable structural integrity; its inability to shed water; and its location near significant water bodies within the Park. Potential usefulness as a methane source is limited because of the landfill's age and its unknown subsurface conditions.

Research + Farm Fields: Perhaps the most memorable attribute of the Shelby Farms Park property, the various agricultural fields to the north and south of Walnut Grove Road provide unique vistas to both those inside and those passing through the Park. The managed and research-based fields contribute both programmatically and physically to the current identity of Shelby Farms Park within the Memphis landscape.

Agricenter Campus: Programmatically the most diverse area within the Park. The Agricenter Campus is home to convention and exhibition facilities; office and research spaces; retail elements; a restaurant; livestock boarding and show venues; a farmers market; bird refuge and wetland areas; as well as a limited-stay RV campground.

Lucius Burch Natural Area: Comprising a significant portion of the bottomland hardwood areas within the Wolf River flood plain, the Lucius Burch Natural area is home to a series of primitive trails including the White, Blue and Yellow trails. Access to the Wolf River is limited because of the River's erosion of sandy soils along its banks.

EXISTING LAND-CHARACTER AREAS



2.7 OVERVIEW | EXISTING LANDSCAPE TOPOGRAPHY

The Shelby Farms Property can be characterized by three primary topographic zones within the territory. Though the three areas vary in existing health and potential value, they are each an important element within the ecological makeup of the overall Park. The distinct landscapes characterizing each of these three areas strongly influence both the existing and proposed character and uses of Shelby Farms Park.

Upland: The Upland area of the Park is home to rolling hills and hollows; managed lawns and wild meadows; as well as a diverse habitat area composed of an assortment of canopy trees including oaks, hickories, maples, pines, black locust, elm, sycamore, sweetgum, tulip poplar, American holly, hackberry and black cherry. The range in age classes of these trees is significant. Though much of the area is open fields, the various habitat areas support a high degree of plant and animal diversity. Historically-present native grasslands and wildflowers of Western Tennessee are sparse within Shelby Farms Park. The Upland area of the Park is populated by a variety of water bodies ranging significantly in size and health.

Lowland: Primarily comprised of agricultural research and managed fields, this area of Shelby Farms Park is most often viewed at a high rate of speed through the window of a passing automobile. The Lowland area extends from the Germantown Road perimeter in the southeast, across Walnut Grove Road to Mullins Station Road in the Northwest, essentially occupying the middle third of the Shelby Farms territory. Two of the three major water bodies at Shelby Farms Park – Patriot Lake and the Catch 'Em Lakes – occupy this landscape zone. Historically, stormwater runoff in particular in this area of the Park has been highly controlled for irrigation purposes and because of the zone's bisection by Walnut Grove Road.

River Plain: Composed primarily of Bottomland Hardwood, the River Plain section of the landscape defines the southern edge of the site and frames the agricultural fields to the north. Nearly 800 acres of this zone is protected as part of the Lucius Burch Natural Area. However, despite the "natural area" designation, this area is in fact not "natural" in that it is mostly fill deposited by the Army Corps of Engineers when they realigned the Wolf River during the early 1960's. The River Plain is comprised of an assortment of canopy trees including oaks, hickories, sycamore, maples, sweetgum, tulip poplar, cottonwood, baldcypress, hackberry, green ash, river birch as well as willow and other species in lesser numbers. The River Plain is populated by permanent and intermittent sloughs and pools of standing water, as well as areas of wetland habitat. This area is part of a larger forested corridor along the Wolf River that allows for movement of animal species and is an important site for wildlife in the region.

Landfill: See description under Existing Land-Use Areas

lowland agricultural fields

upland habitat

EXISTING LANDSCAPE TOPOGRAPHY

3.0 CONCEPT AND APPROACH

3.1 KEY CHALLENGES

Shelby Farms Park is currently a successful public Park. However, it does possess four significant structural deficiencies which we believe the Master Plan must address in order to guide the long-term transformation and growth of the Park.

Poor Identity (Is it an agricultural farm, a penal farm or a park?) – Perhaps the single greatest deficiency of Shelby Farms is an absence of identity. The boundaries of the Park lack a strong physical presence that easily indicates it is a premier public open space venue. In addition, a large percentage of Memphians are unaware of its role within the city (that is, they don't know the Park exists). Driving along Walnut Grove Road is like driving on any other divided highway in Western Tennessee. What signage is present is not immediate and is therefore lost amongst the visual congestion of the road. Further, a public understanding of what the Park is and who it is for (everybody), would substantially help to increase the number of Park users and in turn, support for the Park.

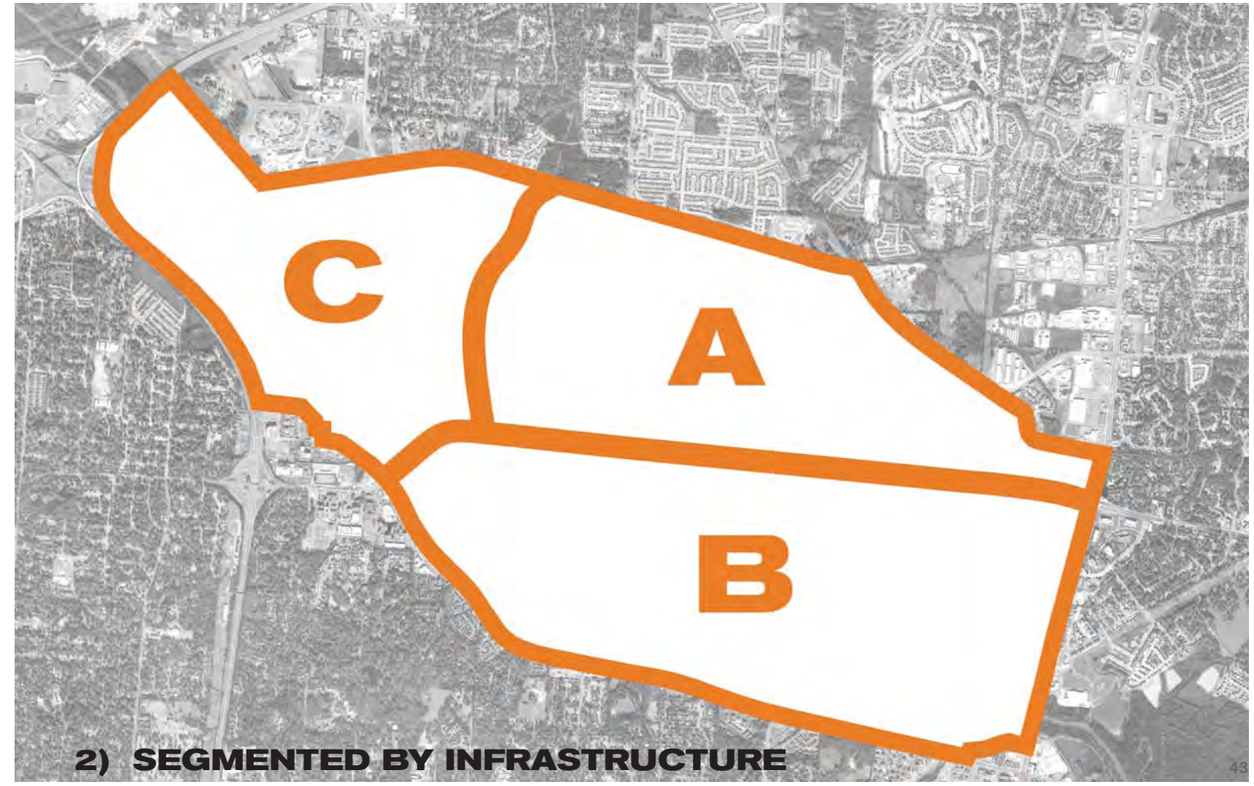
Segmented by Infrastructure – Walnut Grove Road already bisects the Park into northern and southern halves, isolating the programs and activities in each. Implementation of the new Shelby Farms Parkway necessitates a strong approach that will physically and perceptually link these areas of the Park into a single, legible whole. The alternative is a further erosion of the Park's physical presence within the City.

Fragmented Ecosystem – Though the Park is often thought of as "natural," it is in fact a highly constructed and continually modified environment. The existing pockets of upland forest are healthy, but ecologically limited in that they remain unconnected and isolated. Further, habitat in this area is cut off from the more ecologically productive Wolf River corridor which is a critical piece of wildlife movement within the region. Connecting the various ecological components of the Park into an interconnected mosaic would serve to improve the overall health and ecological value of the land.

Deficient Access / Connectivity / Circulation – Shelby Farms Park is well positioned for access by vehicular traffic, however its location well east of Midtown and Downtown Memphis make the site difficult to reach by means other than an automobile. No mass transit reaches the interior or the Park, and the few stops at its perimeter are too far from any major Park destination to be of any real utility. Providing connections to recreation and alternative transportation linkages such as public greenways or bike lanes, as well as modifying and expanding existing transit service to the Park will help to truly make Shelby Farms accessible and usable by the entire Memphis Region.

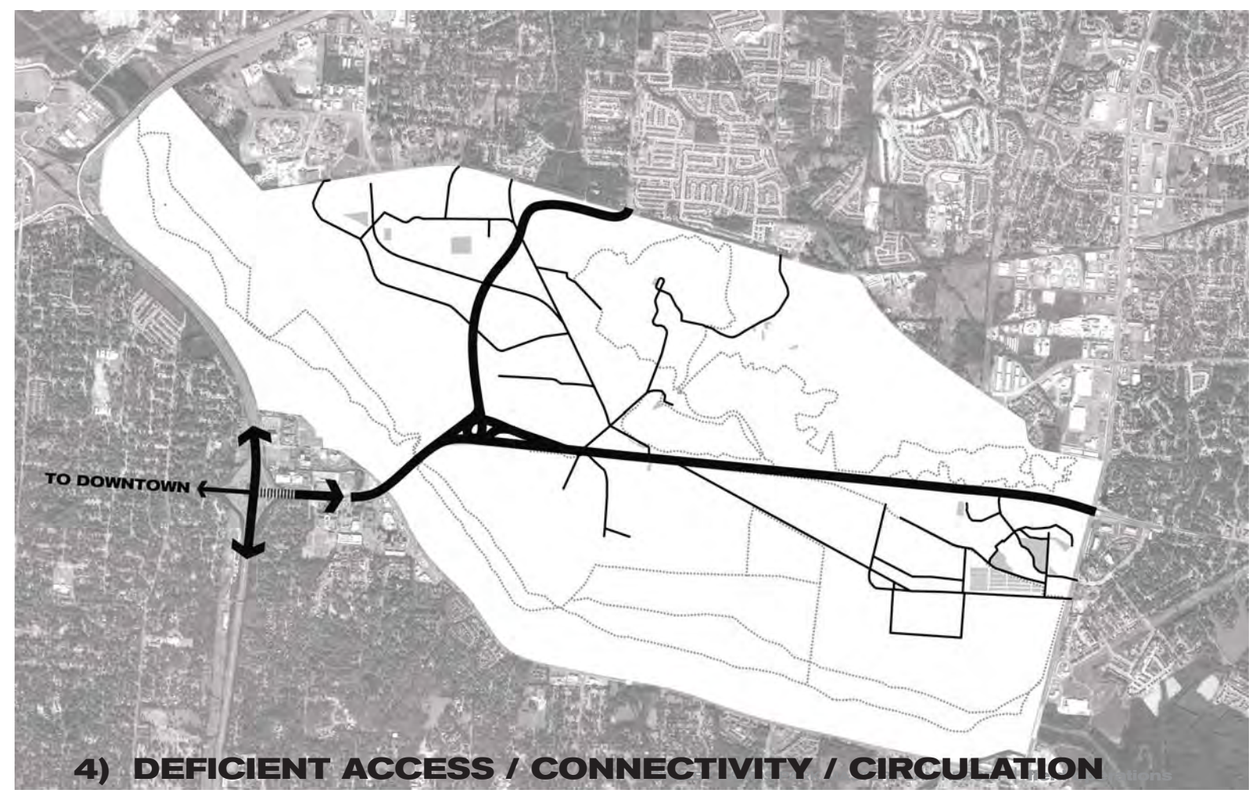
Once inside the Park, taking advantage of the various venues is difficult because of the under-developed existing circulation system. Many of the roadways and circulation routes within the Park are re-appropriated field roads or user-defined trails. In fact, the heavily trafficked Farm Road is actually not a public thoroughfare but an internal "farm" road. Because it provide a direct connection between Walnut Grove and Mullins Station Roads, it is heavily utilized. Definition of a clear hierarchy of circulation types; implementation of way-finding elements; and the creation of redundant connections between Park areas rather than single linkages will help improve movement within and enjoyment of the Park.

1) POOR IDENTITY



2) SEGMENTED BY INFRASTRUCTURE

3) FRAGMENTED ECOSYSTEM



4) DEFICIENT ACCESS / CONNECTIVITY / CIRCULATION

3.2 FOUR STRATEGIES | CREATE IDENTITY + CLARIFY ACCESS

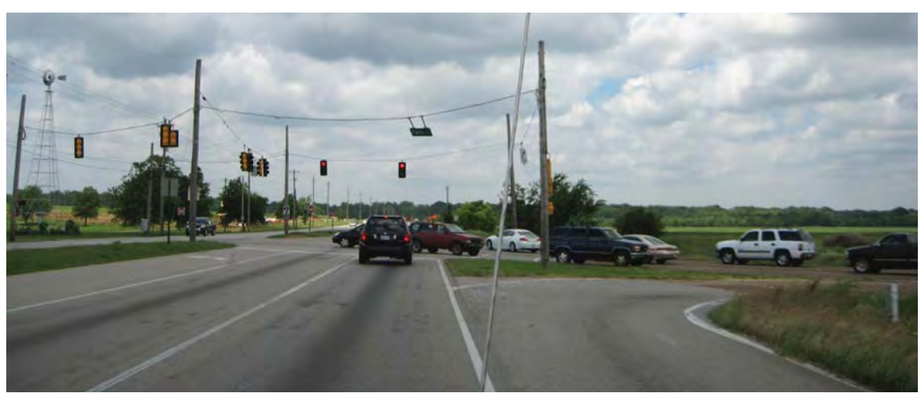
In order to expand the presence of Shelby Farms Park within the culture of Memphis, the Park needs to project a stronger identity – both physically and conceptually. It has been noted above, but is worth repeating that Shelby Farms Park is already home to a healthy mix of uses. These activities should be the basis upon which the Conservancy defines a strategy for attracting those who don't yet use the Park.

We believe step one in generating an identity for Shelby Farms Park is emphatically demonstrating that it is in fact a totally accessible and welcoming public open space. This means creating a series of opportunities or events that will engage multiple segments of the Memphis population who are not currently using the Park. These could include a series of small group visits organized through Memphis schools, churches and/or community groups. It could also mean organizing and heavily publicizing highly visible activities such as a temporary art installations or public performances, as well as additional events along the lines of the current Earth Day or Fourth of July celebrations that will draw upon populations who wouldn't readily define themselves as "park users".

The second and equally important step in generating an identity for Shelby Farms Park is creating memorable, physical markings at the edges of the Park that are legible from the window of a passing automobile. These should include a sense of gateway along Walnut Grove Road and the proposed Shelby Farms Parkway (Kirby-Whitten Parkway), as well as clearly defined entrances to the Park – each distinctively marked with iconic signage and plantings. There should also be a clear delineation of the Park's boundaries through elements such as a visually compelling fence or lighting. Ultimately, the intention is for Shelby Farms Park to be easily legible as a welcoming public open space from both within the Park and at its perimeter.

Once inside Shelby Farms Park, it is critical to clarify movement so that first time visitors know exactly where important venues are and how to reach their particular destination whether by bike, by bus or by car. In order to accomplish this, visually clear way-finding signage and a new vehicular circuit is proposed. This circuit will be tied to a multi-use loop path that will connect all parts of the Park together and help centralize orientation, circulation, transit and parking. An internal park shuttle will provide connections to various points throughout Shelby Farms Park, departing from centralized activity areas with their associated parking facilities. A second "circle" loop allows for pedestrian connectivity across major roads and intersections (via tunnels and bridges), and connects the upper Park to the Wolf River.

By building early interest in the Park beyond those who already enjoy its resources, momentum can be created that will help transform Shelby Farms Park over the coming years.



existing intersection of walnut grove road and farm road

existing historic gate along mullins station road

IDENTITY + ACCESS

3.2 FOUR STRATEGIES | PLANT 1,000,000 NEW TREES

One of the most effective moves in generating an identity will be the planting of one-million new trees at Shelby Farms Park. This seemingly simple operation will actually do five very important things for the Park to promote its long-term growth and transformation.

The first, as was noted above, is to help with the creation of identity for Shelby Farms Park by establishing a strong boundary definition and spatial enclosure.

Secondly, the plantings will diversify the ecology and habitat on site by expanding contiguous forest cover and adding new community mixes. These extensive plantings will create many varied woodland settings and ecologies, ranging from Swamp Cypress groves to Oak-Hickory stands, Birch Thickets, Pine Forests and Bottomland Hardwoods.

Third, this new planting will allow for undesirable outside qualities such as major vehicular thoroughfares to be screened from within the Park, creating a true sense of otherness and escape. At the same time, important views and vistas of open landscapes and horizons important to the site will be preserved.

Fourth will be the ability to create a strong sense of community engagement with the planting of these new trees. By partnering with local schools and religious groups to participate in the planting of many of the new trees, the Shelby Farms Park Conservancy can create an immediate momentum building transformation of the Park that will serve to excite and entice the public as other projects are developed and implemented over time. One could easily imagine thousands of local school children coming to Shelby Farms Park to plant these trees and thereby become invested stewards of the long-term health of the Park.

Finally, the planting of a million new trees will also create a potentially large-scale fund-raising intervention. Memphis is home to a number of regional and international corporations who might logically be interested in a contribution of part or all of these trees as a highly desirable “green” public relations opportunity and a way to truly give back to the Memphis Community.

It should be noted that the planting of the one-million new trees is not a singular or monolithic operation. The vast majority of the trees will be planted as small saplings in both unforested areas to expand canopy cover, and in already forested areas to diversify the existing habitat. Some of these saplings will be thinned out in the process of managing the woodland, while others will be allowed to grow to full size. A portion of this new tree planting regime is anticipated to be grown and transplanted to other areas of the City, helping to green Greater Memphis.

community tree planting

new tree saplings

PLANT 1,000,000 NEW TREES

HORIZON VIEWS

INTERIOR PARK VISTAS

PROPOSED TREES

EXISTING TREES

N

0' 500' 1,000' 2,000' 4,000'

SCALE: 1"=2,000'

3.2 FOUR STRATEGIES | DEFINE 12 LANDSCAPE ROOMS

Shelby Farms Park is big. At more than 4,500 acres, the scale of the Park makes it difficult to navigate and spatially comprehend. The deployment of one-million new trees will allow for the definition of distinct landscapes or rooms within the Park, each with its own discrete set of physical and programmatic characteristics. Each landscape or room will be characterized by a different set of users and accommodate a unique set of programs. These large-scale public "rooms" will each support a coherent "sense-of-place" structure for the many varied user groups set within the larger Park setting. As such, each landscape room has its own discrete entrance(s) while also connecting openly into the larger Park system.

The definition of the individual rooms also provides a potential fund-raising mechanism and phasing scenario for Park development. The level of physical transformation varies from room to room and thereby lends itself to a strategy of development of Park areas based on the availability of resources and demands for use. Development at the core of the Park is the logical point of departure, but once this has been established, the transformation of other areas of the Park can occur under any number of scenarios.

1 PATRIOT LAKE
2 PLOUGH PARK
3 THE RANGE + ARBORETUM
4 THE PUBLIC GARDENS *
5 COMMUNITY CENTER + SPORTS FIELDS *
6 THE OUTBACK
7 THE ART MOUND + PARK CIRCLE
8 CATCH 'EM LAKES
9 THE REFUGE
10 THE ORCHARDS + BERRY FIELDS
11 CROP + RESEARCH FIELDS
12 THE AGRICENTER

* pending area 10 approval

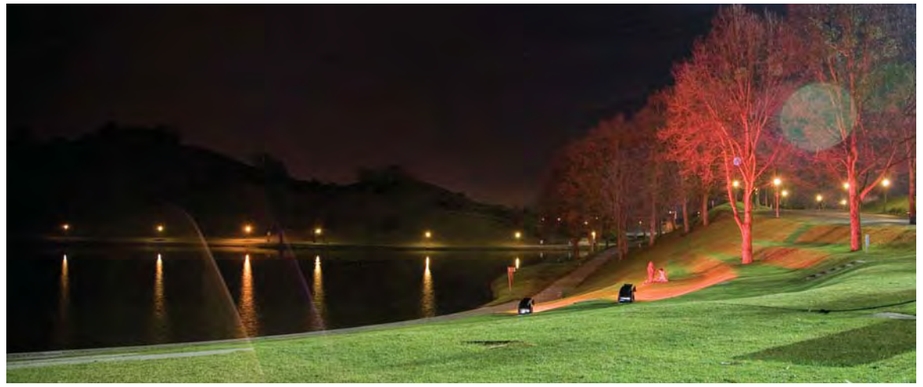
LANDSCAPE ROOMS
MAJOR WATER BODIES

N
0' 500' 1,000' 2,000' 4,000'
SCALE: 1"=2,000'

3.2 FOUR STRATEGIES | CONCENTRATE PROGRAMS + FACILITIES

The scale of Shelby Farms Park is its most important attribute. Therefore, the Master Plan promotes a strategy of concentrating programs and facilities at particular locations within the Park to maintain the various landscape characters already present within the site. This approach not only limits the presence of obtrusive architectural elements within the Park landscape, but also serves a more pragmatic purpose by allowing these facilities to share basic infrastructures and thereby create a high degree of economic and environmental efficiency in their implementation. Additionally, the concentration of new Park facilities will provide a clear sense of transformation within a particular area.

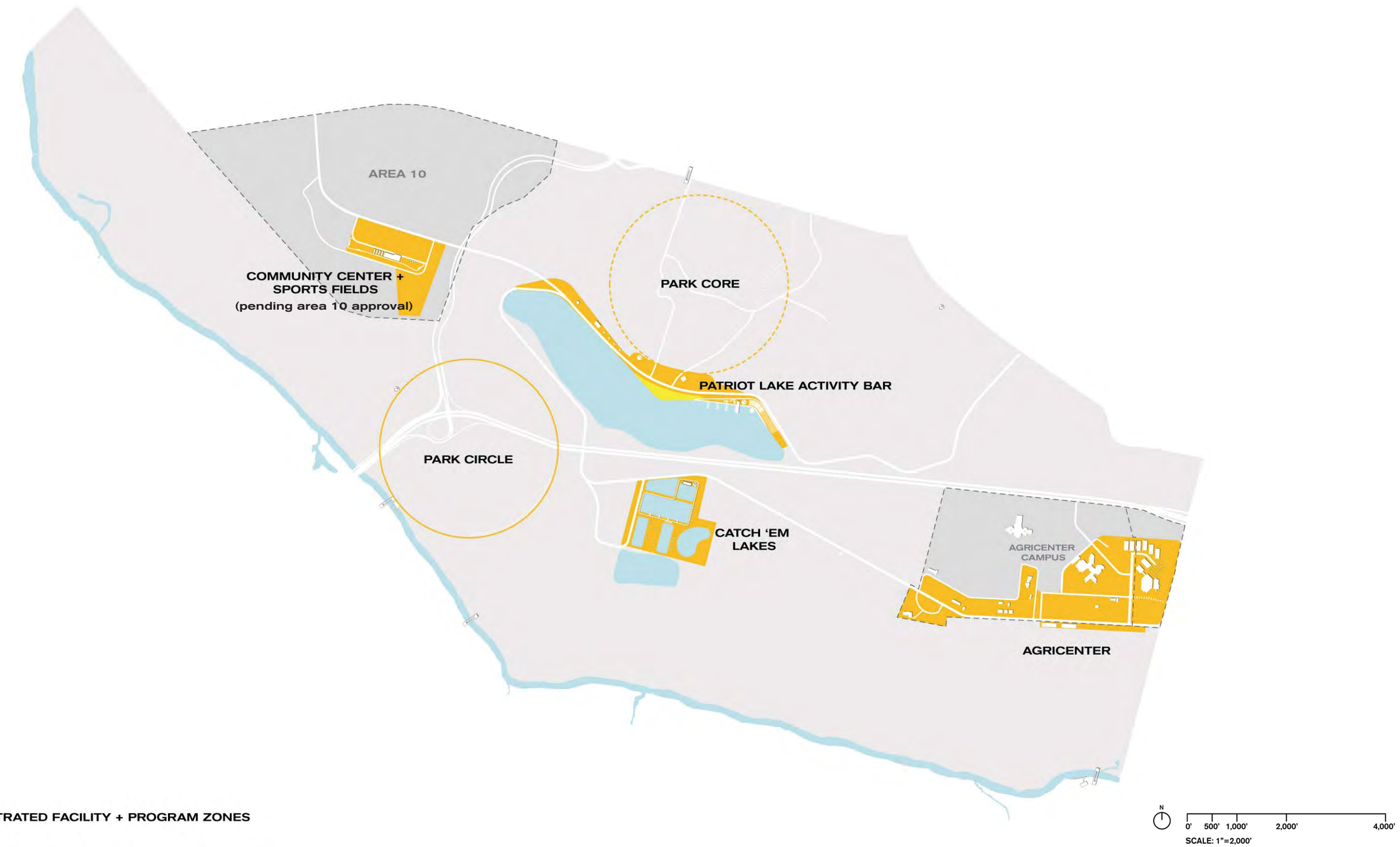
The type of new structure or facilities we imagine would include things like a viewing platform or tower; market and event roofs; an earthen amphitheater; a boathouse; and pedestrian bridges or tunnels. These elements should be carefully sited, and only proposed at locations where they can intensify the quality of the Park experience. Fundamentally, it is the position of the Master Plan that overwhelming the Park with architectural interventions would only detract from its inherent agrarian beauty.



earthen amphitheater

new pavilions

CONCENTRATE PROGRAM + FACILITIES



3.3 PROGRAMMATIC DIVERSITY | A UNIQUE 21ST CENTURY MIX

Shelby Farms Park is more than just a place of recreation. It is Memphis's green heart – a place that is engaged in a variety of uses and activities related to health, exercise, play, nature, food, energy, ecology, research and education. This combination of programs is exceptional. It positions Shelby Farms Park and Memphis at the forefront of 21st century sustainable growth and civic development.

In the very near future, a visit to Shelby Farms Park might include a brisk five-mile jog through an expansive car free territory within the City, followed by a leisurely swim and afternoon reading on the beach of the region's largest recreation-only lake. A different day at Shelby Farms Park could start with a visit to an outdoor classroom sited at the edge of a healthy and productive cypress swamp, followed by a snack of locally cultivated fruit and berries purchased from a farmers market powered by on-site renewable energy sources like wind turbines or solar power. A different visitor to the Park might go for an early morning horseback ride before meeting up with a group of friends volunteering to help a church group set up for their summer picnic and choir performance at the Park's new woodland amphitheatre Another Park user might spend the day working on cutting-edge agricultural practices at the Agricenter before taking a vigorous afternoon ride on the Region's premier skate venue and enjoying a picnic dinner watching the sunset over the newly expanded Patriot Lake.

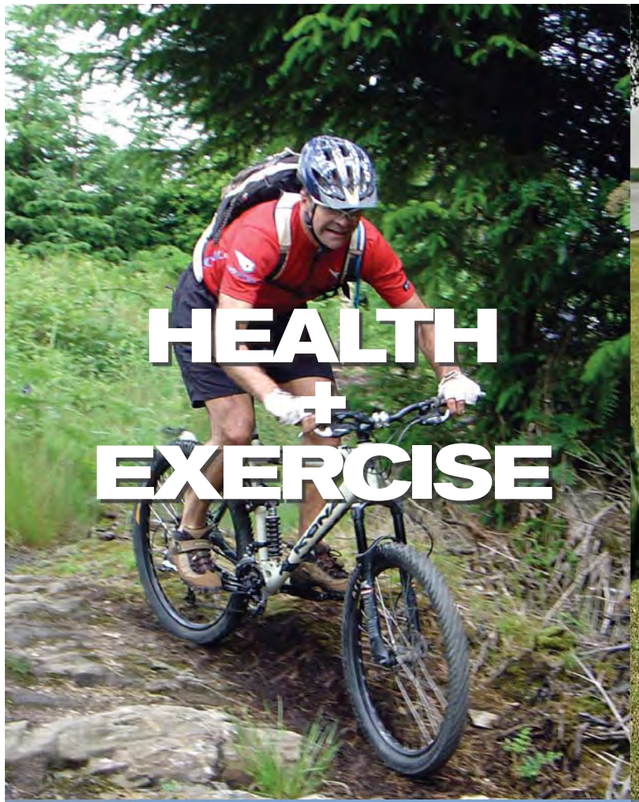
The Shelby Farms Park experience is endless.

With the execution of this Master Plan Shelby Farms Park can become a place characterized by a dynamic environment that combines active recreation and a healthy lifestyle with state of the art green energy production, and local and organic agricultural practices; a place that will comprise diverse natural ecologies and cutting edge agricultural research. The Park has the potential to become a 4,500 acre natural science laboratory and classroom for the Greater Memphis Community that can help educate generations of Memphians on the value of their natural environment.

This "mix" of programs, uses and activities will set a global precedent for a new kind of Urban Park – one that does more than just provide a civic venue for active and passive recreation. Shelby Farms Park will transform Memphis. It will influence the culture of the City and the Region. It will redefine the reputation of the place, and the health and well being of its population. Shelby Farms Park will help Memphis offer a high quality of life that is both desirable and enviable.

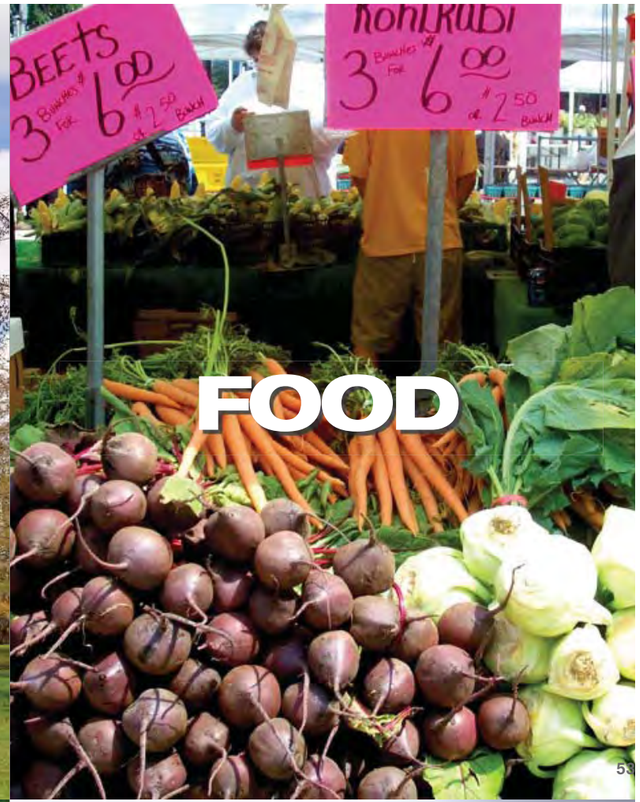
Shelby Farms Park will impact the way Memphis and West Tennessee move forward into the 21st century.

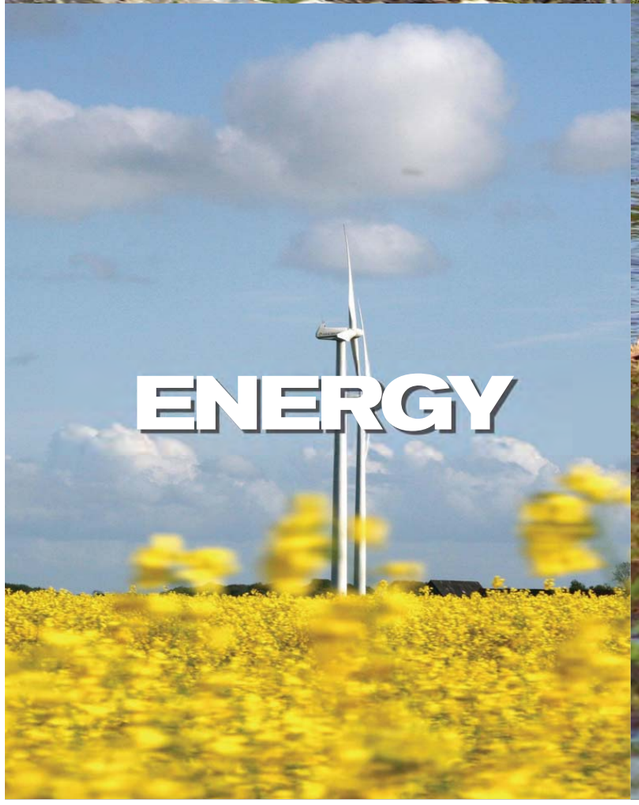
existing park users

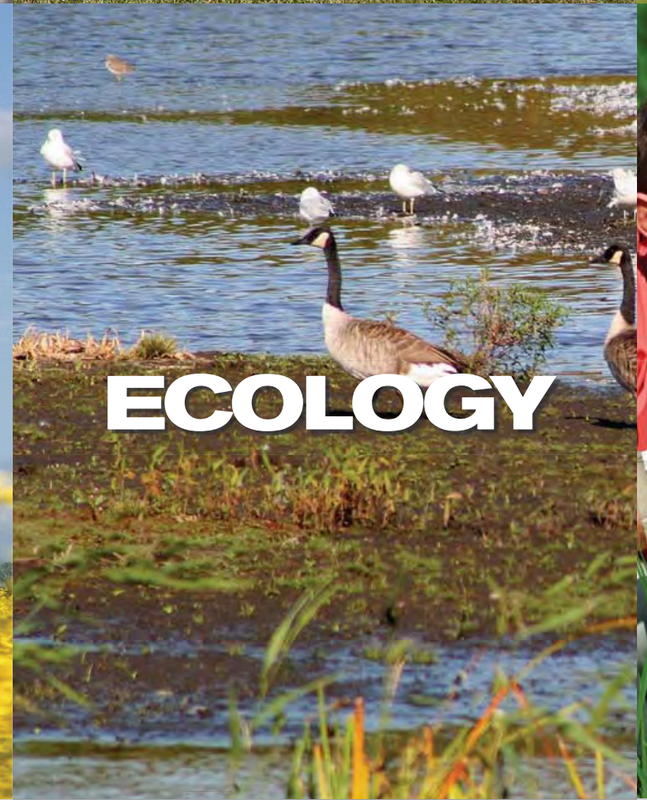

HEALTH
+
EXERCISE

PLAY

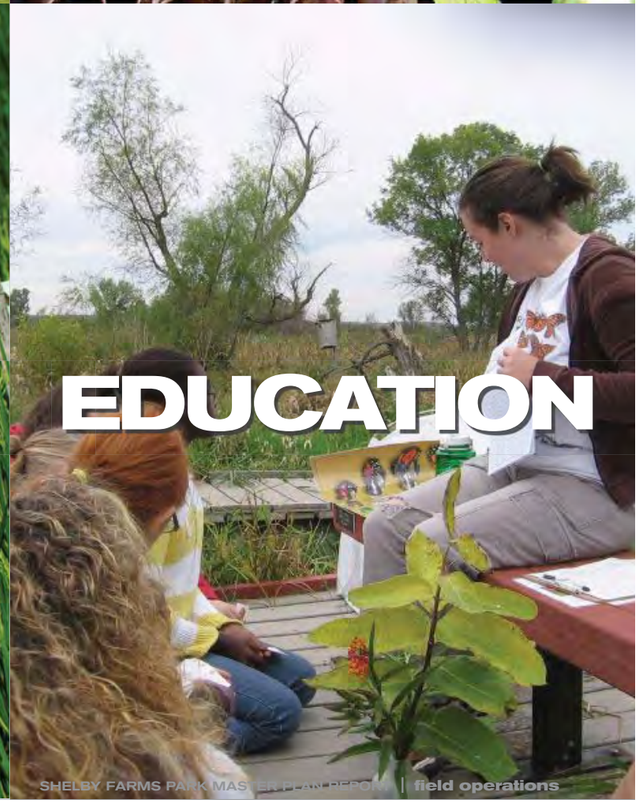
NATURE


BEETS
KOHLRUBI
FOOD


ENERGY


ECOLOGY

RESEARCH


EDUCATION

4.0 MASTER PLAN

4.1 THE MASTER PLAN | ILLUSTRATIVE PLAN

The Shelby Farms Park Master Plan amplifies and enhances the existing agrarian characteristics of this unique site – a landscape of rolling hills, flat fields, open meadows thick woods quiet lakes and diverse habitats. These landscapes provide a memorable series of views and vistas, exposing the Park user to the expanse of the Memphis horizon and the vast scale of the park territory. The Master Plan intensifies an already active parkland into a venue for extensive opportunities for physical exertion and play, as well as for passive and ambient uses. The Master Plan is also intended to diversify the range, extent and health of the Park's various ecosystems.

Shelby Farms Park is intended to become a regional Park that will provide a signature destination and amenity for the Greater Memphis Area as well as continuing to serve the adjacent neighborhoods of Memphis, Germantown and Cordova, which are anticipated to change dramatically over the next 30 years. The Park will become the defining feature of the broader greening of greater Memphis as the City and Region push forward into the 21st century.

In the context of changing priorities and pressures, it should be understood that the greatest efficacy of the Master Plan is in providing a series of strategic recommendations to guide the organization of land-use principles, key program sites, Park features, circulation systems and ecological restoration. Although some of the Park features currently exist, the Master Plan largely reflects a long-tem vision that will require continued consultation and design prior to implementation.

A project of this scale requires determined leadership at the civic level in addition to a clear set of guiding principles that will ensure that the Park grows into a coherent signature feature of Memphis. To this end, the Master Plan is intended to be both a bold, big-picture vision for the future Park as well as a grounded, practical framework of realistic opportunities and recommendations. To a large extent, the Master Plan proposals are based on the challenges and opportunities identified through the research and consultation phases of the project. However, additional information regarding the project site is continuing to be compiled and will be folded into the process of implementation for the Master Plan.

For reference purposes, the four primary challenges of Shelby Farms Park are:

1) **POOR IDENTITY**

2) **SEGMENTED BY INFRASTRUCTURE**

3) **FRAGMENTED ECOSYSTEM**

4) **DEFICIENT ACCESS / CONNECTIVITY / CIRCULATION**

ILLUSTRATIVE PLAN

1 SHELBY FARMS PARKWAY (KIRBY-WHITTEN PKWY.)
2 COMMUNITY CENTER *
3 SPORTS FIELDS *
4 PUBLIC GARDENS *
5 BISON RANGE
6 PATRIOT LAKE
7 BEACH + ACTIVITY BAR
8 EARTHEN AMPHITHEATER
9 PLOUGH PARK
10 THE OUTBACK
11 GREEN BRIDGE
12 FRUIT + NUT ORCHARDS
13 AGRICENTER
14 RESEARCH FIELDS
15 WOLF RIVER PEDESTRIAN BRIDGE
16 STRAWBERRY FIELDS
17 THE REFUGE
18 CATCH 'EM LAKES
19 "Y" GATEWAY BRIDGE
20 ART MOUND
21 SCULPTURE PARK
22 WOLF RIVER PEDESTRIAN BRIDGE
23 WOLF RIVER PEDESTRIAN BRIDGE
24 LUCIUS BURCH NATURAL AREA
25 AREA10 / GOVERNMENT FACILITIES

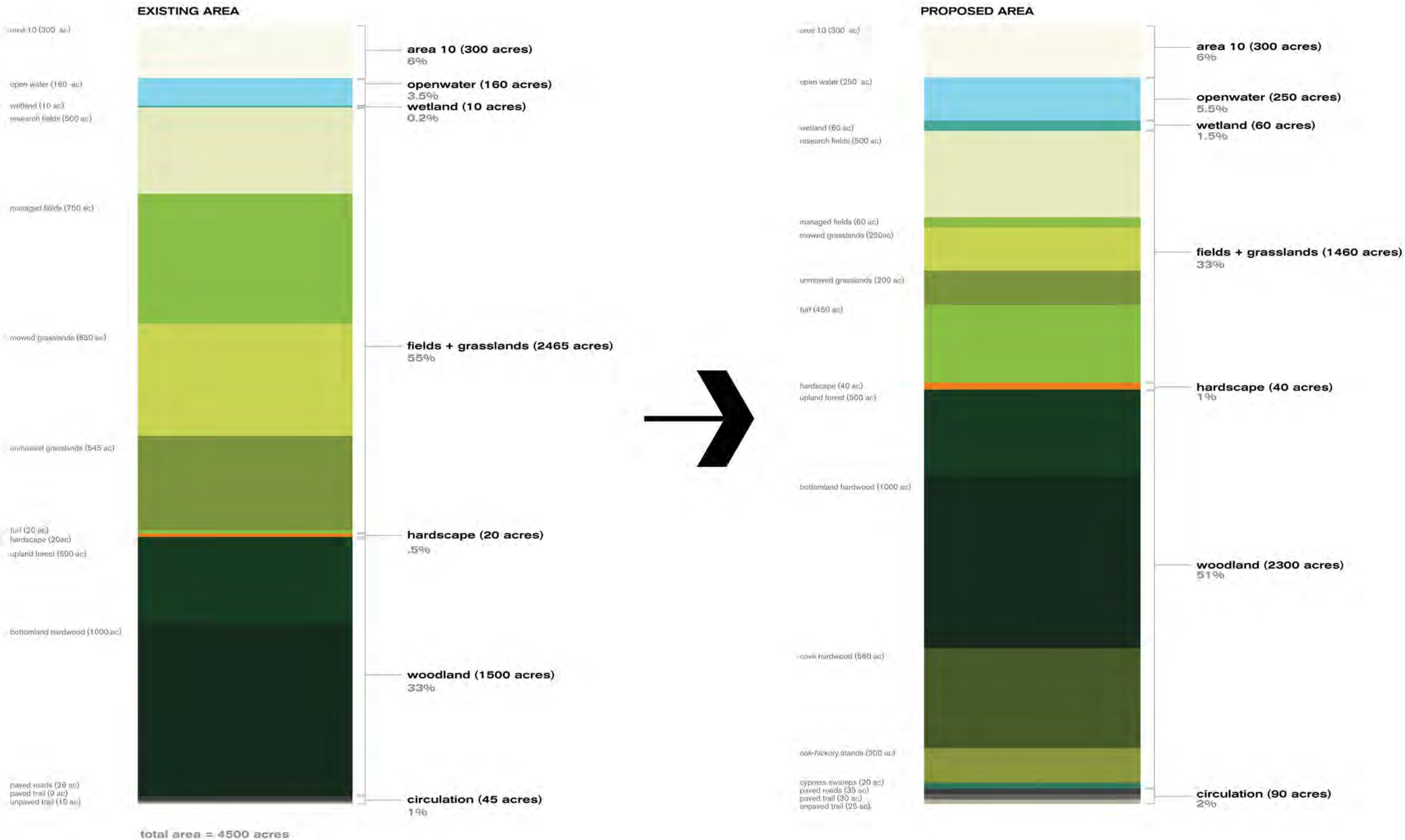
* PENDING AREA 10 APPROVAL

4.1 THE MASTER PLAN | SURFACE COMPARISON

Shelby Farms Park is made up of a varied combination of ground surfaces that influence the use and character of particular areas of the Park. The most common surface condition currently present at Shelby Farms can be characterized as fields and grasslands comprising nearly 2,500 acres. Approximately one-third of the existing site is woodland. Excluding the 300 acres designated around Area 10, approximately 5% of the remaining site is a combination of water, hardscape and circulation.

The proposed Master Plan increases the area of open water and wetlands on site to 310 acres, nearly doubling the percentage of the total site area from 3.7% to 7%. Circulation and hardscape are modestly increased (mostly in the form of new trails and multi-use paths), but still account for only 3% of the total site area. Though the total area of fields and grasslands is reduced, the approximately 500 acres devoted to research and crop production fields remains unchanged. This reduction in field and grassland area is consumed by 800 acres of new woodland planting comprising much of the proposed one-million new trees. Woodland cover increases from 33% to 50%, which is important for both ecology and shade.

The proposed ratio of nearly one-tenth water, one-half woodland, and the remainder open space represents an ideal equation for ecological health and robustness.


EXISTING AREA
area 10 (300 ac)
open water (160 ac)
wetland (10 ac)
research fields (500 ac)
managed fields (750 ac)
mowed grasslands (650 ac)
unmowed grasslands (545 ac)
turf (20 ac)
hardscape (20ac)
upland forest (500 ac)
bottomland hardwood (1000 ac)
paved roads (26 ac)
paved trail (9 ac)
unpaved trail (10 ac)
area 10 (300 acres)
6%
openwater (160 acres)
3.5%
wetland (10 acres)
0.2%
fields + grasslands (2465 acres)
55%
hardscape (20 acres)
.5%
woodland (1500 acres)
33%
circulation (45 acres)
1%
total area = 4500 acres
PROPOSED AREA
area 10 (300 ac)
open water (250 ac)
wetland (60 ac)
research fields (500 ac)
managed fields (60 ac)
mowed grasslands (250ac)
unmowed grasslands (200 ac)
turf (450 ac)
hardscape (40 ac)
upland forest (500 ac)
bottomland hardwood (1000 ac)
cove hardwood (580 ac)
oak-hickory stands (200 ac)
cypress swamps (20 ac)
paved roads (35 ac)
paved trail (30 ac)
unpaved trail (25 ac)
area 10 (300 acres)
6%
openwater (250 acres)
5.5%
wetland (60 acres)
1.5%
fields + grasslands (1460 acres)
33%
hardscape (40 acres)
1%
woodland (2300 acres)
51%
circulation (90 acres)
2%

4.1 THE MASTER PLAN | PROGRAM COMPARISON

Much of the appeal of Shelby Farms Park comes from the vast expanses of agricultural fields, managed grasslands and habitat areas. At present, nearly 77% of the total site area is devoted to passive recreation and/or ecological habitat, while approximately 5% of the site is occupied by active recreation programs and Park facilities. The proposed Master Plan increases the areas of active recreation programs and Park facilities by nearly 80 acres, much of which is in the form of new recreation trails and multi-use paths. The habitat area of the Park is also generously expanded through the proposed tree planting, diversifying and increasing the ecological habitat area of the Park from 1,510 acres to more than 2,360 acres – an increase of nearly 20% of the total Park area.

The Master Plan retains more than three-quarters of the total Shelby Farms Park area for passive recreation and/or ecological habitat areas, while carefully enhancing strategic areas suited for active recreation programs. The program areas defined as municipal (Area 10), or agricultural research and crop production fields, remain under current land use in the proposed Master Plan.

EXISTING AREA
area 10 (300 ac)
open water (160 ac)
hardscape (20ac)
paved roads (26 ac)
paved trail (9 ac)
unpaved trail (10 ac)
research fields (500 ac)
managed fields (750 ac)
mowed grasslands (650 ac)
unmowed grasslands (545 ac)
turf (20 ac)
wetland (10 ac)
upland forest (500 ac)
bottomland hardwood (1000 ac)
municipal (300 acres)
7%
active (225 acres)
5%
agricultural research
+ crop production (500 acres)
11%
passive (1975 acres)
44%
habitat (1510 acres)
33%
total area = 4500 acres
PROPOSED AREA
area 10 (300 ac)
open water (250 ac)
hardscape (40 ac)
paved roads (35 ac)
paved trail (30 ac)
unpaved trail (25 ac)
research fields (500 ac)
managed fields (60 ac)
mowed grasslands (250ac)
unmowed grasslands (200 ac)
turf (450 ac)
wetland (60 ac)
upland forest (500 ac)
bottomland hardwood (1000 ac)
cove hardwood (580 ac)
oak-hickory stands (200 ac)
cypress swamps (20 ac)
municipal (300 acres)
7%
active (380 acres)
8%
agricultural research
+ crop production (500 acres)
11%
passive (960 acres)
21%
habitat (2360 acres)
53%

4.2 REGIONAL CONNECTIONS | GREENWAYS + TRANSIT

Shelby Farms Park sits at the geographical center of the Memphis Metropolitan Area. A major objective of the Shelby Farms Park Conservancy is to improve connectivity and accessibility to the Park, particularly for poorly served parts of the City. The northern and southern boundaries of the property already offer immediate opportunities to create these first linkages to the broader metropolitan region, and can be instrumental in promoting improved access for all.

To the north, the existing CSX line has the potential in the short term to become a recreational connection to the Fairgrounds and Midtown through the creation of a future pedestrian and bicycle oriented greenline. To the east, this future greenline will connect Shelby Farms Park with a number of other neighborhoods between the Park and Cordova. Over the long-term, it is imagined that this pedestrian corridor could be expanded to include a transit linkage like light rail that would connect Memphis' existing business centers with its growing population centers.

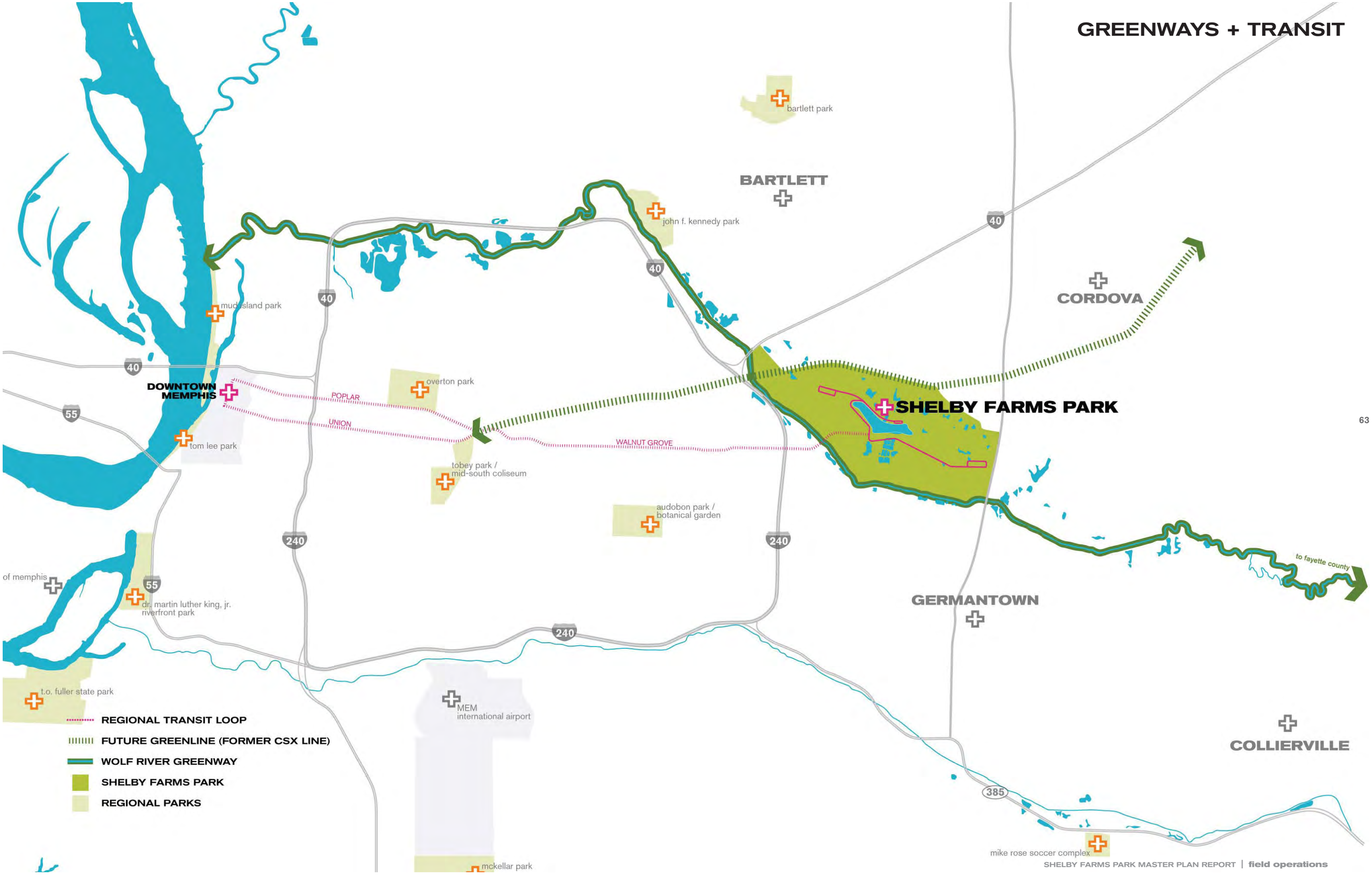
To the south of the Park is the Wolf River and the proposed Wolf River Greenway. This pedestrian connection is intended to tie Collierville and Germantown all the way to downtown Memphis and the Mississippi River via a paved recreation trail that runs along the Wolf River. A portion of this Greenway is already in place in Collierville and along the Germantown section of the River-Park boundary. It is currently in the planning stages as it moves west along the Park's southern perimeter and through the City of Memphis to the Mississippi River.

Both of these connections will link a variety of seemingly distant and disparate neighborhoods to Shelby Farms Park, creating a public venue that is directly accessible by a huge portion of the Memphis population. However, to optimize this potential, these connections need to be tied into a larger bike and pedestrian network that is not yet present within Memphis. It is our hope that the momentum behind Shelby Farms Park will translate into momentum for this broader bike and pedestrian network within the City.

In addition to these recreational and pedestrian linkages, the Master Plan recommends a regional transit link that will tie into the Memphis Area Transit Authority system. This transit link will improve access to Shelby Farms by connecting future bus routes to an internal circulation system (trolley) within the Park so that any place in Memphis will essentially connect to any place within Shelby Farms Park.

shelby farms park in the foreground with downtown memphis in the distance

GREENWAYS + TRANSIT



4.2 REGIONAL CONNECTIONS | EXTERNAL VEHICULAR CONNECTIONS

In addition to the recreational and transit connections linking Shelby Farms Park to Greater Memphis, the Park is positioned at a location easily served by regional and arterial vehicular thoroughfares. The major ring-road around the city (I-40 / I-240) provides signed exits to Shelby Farms Park from both the north and the south. These thoroughfares regularly carry traffic from as far away as Nashville, Little Rock and Jackson, Mississippi.

Walnut Grove Road which bisects the site provides linkages to Poplar and Union Avenues, Midtown and Downtown. This road is the primary vehicular corridor servicing the Park and carries the vast majority of traffic to Shelby Farms Park. Thus, Walnut Grove provides the single most important vehicular gateway to the Park and requires particular attention to its landscape treatment. This is a doubly important consideration should the road be widened as has been widely speculated.

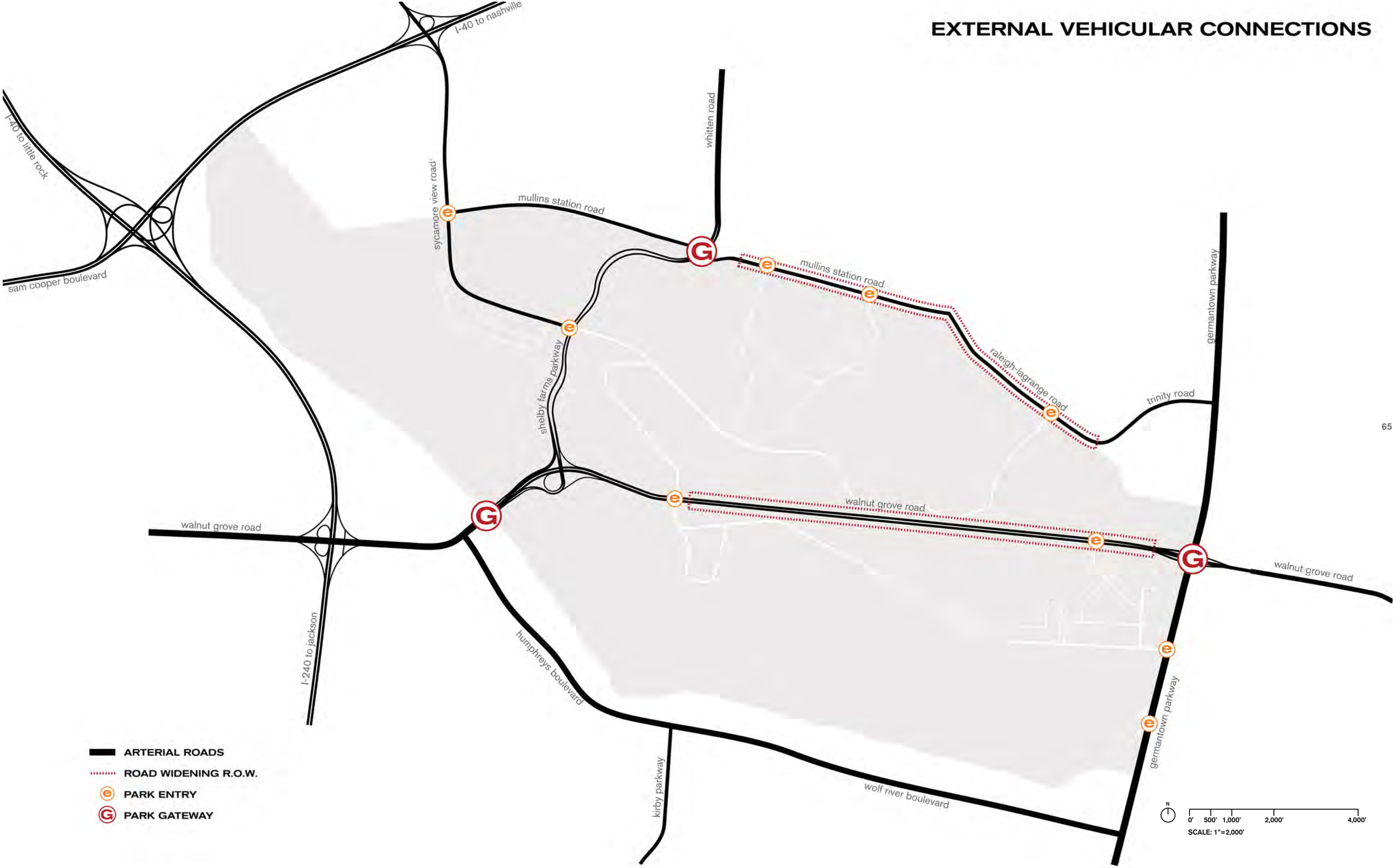
The new Shelby Farms Parkway will replace the over-burdened Farm Road and connect traffic using Walnut Grove Road to the neighborhoods to the north by connecting the east-west thoroughfare to the north-south Whitten-Kirby Road. Germantown Road, which bounds the eastern edge of the Park, also connects the Park to significant population centers to the north and to the south.

It is imperative that both the new Shelby Farms Parkway and an existing or widened Walnut Grove Road be companioned with multiple bike/pedestrian crossings and treated in such a way that their impact on the Park is significantly minimized.

I-40 / I-240 interchange at the edge of shelby farms near area 10

walnut grove road within shelby farms park

EXTERNAL VEHICULAR CONNECTIONS



4.3 INTERNAL CIRCULATION | PARK SIGNAGE + IDENTITY STRATEGY

As was noted above, marking the edges to Shelby Farms Park is critical to defining the presence of the Park within the City and the Region. By defining a sense of gateway and a clear hierarchy for entry, the perimeter circulation system for the Park will invite people slow down and enter, rather than reinforce their quick passage through. We propose the creative use of large-scale graphic signage, distinct plantings and the use of temporary installations to mark points of entry and edges of the Park while also helping to create a memorable public identity that provokes the curiosity of passersby and invites people to explore the Park for themselves.

The Master Plan proposes using a combination of elements to clearly indicate both vehicular and pedestrian entries to the Park, as well as clearly marking connections to/from the future greenline (former CSX line) and the developing Wolf River Greenway.

an idea for temporary gateway signage along walnut grove road

institutions like the ornamental metals museum could help curate or develop a series of shelby farms park gates

I-40 to nashville
I-40 to little rock
sam cooper boulevard
sycamore view road
whitten road
mullins station road
mullins station road
sycamore view road
(new) pine lake road west
overlook road
pine lake road east
raleigh-lagrange road
germantown parkway
trinity road
pattern lake road
patriot lake road (south)
patriot lake road (north)
trap lake road
moore road (ham smythe III road)
research road
walnut grove road
walnut grove road
humphreys boulevard
kirby parkway
wolf river boulevard
germantown parkway
I-240 to jackson
community center + sports fields
circle path area
patriot lake area
outback area
"Y" gateway bridge
sunflower strip
"green" ecological bridge
catch'em lakes area
agricenter area
sunflower strip
GATEWAY PEDESTRIAN BRIDGE
LARGE-SCALE GATEWAY SIGN
ICON BALLOON
VIEWING TOWER
FLOWERING PLANTING
GROVE PLANTING
VEHICULAR AND PEDESTRIAN ENTRY
PEDESTRIAN ENTRY
N
0' 500' 1,000' 2,000' 4,000'
SCALE: 1"=2,000'

4.3 INTERNAL CIRCULATION | INTERNAL VEHICULAR CIRCULATION

Existing Park vehicular access and circulation is deficient and unclear. The revised vehicular circulation system builds upon the presence of Walnut Grove Road and Shelby Farms Parkway to create a hierarchy of routes and a logical series of entries into the Park that are intuitive and easily navigable. A main circuit consisting of the New Patriot Lake Road, Moore Road (Ham Smythe, III Road) and the extension of Sycamore View Road will link the three sections of the Shelby Farms Park territory and serve as the primary points of access into the Park. Secondary access points, including the three proposed off of Mullins Station Road as well as the Agricenter entry off Walnut Grove Road, will provide direct access for local traffic and those park users not needing to visit the central program areas of the Park.

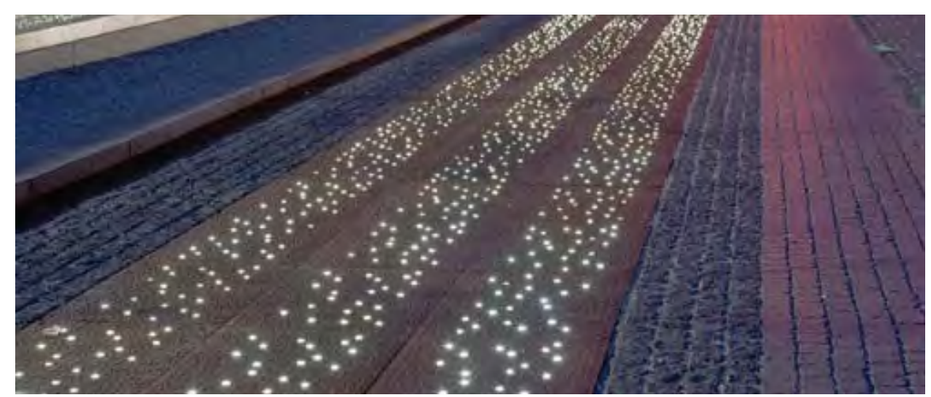
Clearly marked entries and turning lane provisions within the surrounding roadway system are critical to this strategy. Supplementing these primary and secondary points of access and circulation are internal roadway that connect particular elements within the Park including the individual rooms.

All roadways within the Park – excluding Walnut Grove Road, Shelby Farms Parkway (Kirby-Whitten Parkway) and Sycamore View Road west of the new Shelby Farms Parkway – will have their access controlled by the Shelby Farms Park Conservancy and/or the Agricenter. Portions of these roads may have access restricted and/or be temporarily closed to accommodate particular Park-related events.

VEHICULAR CIRCULATION ALTERNATIVE

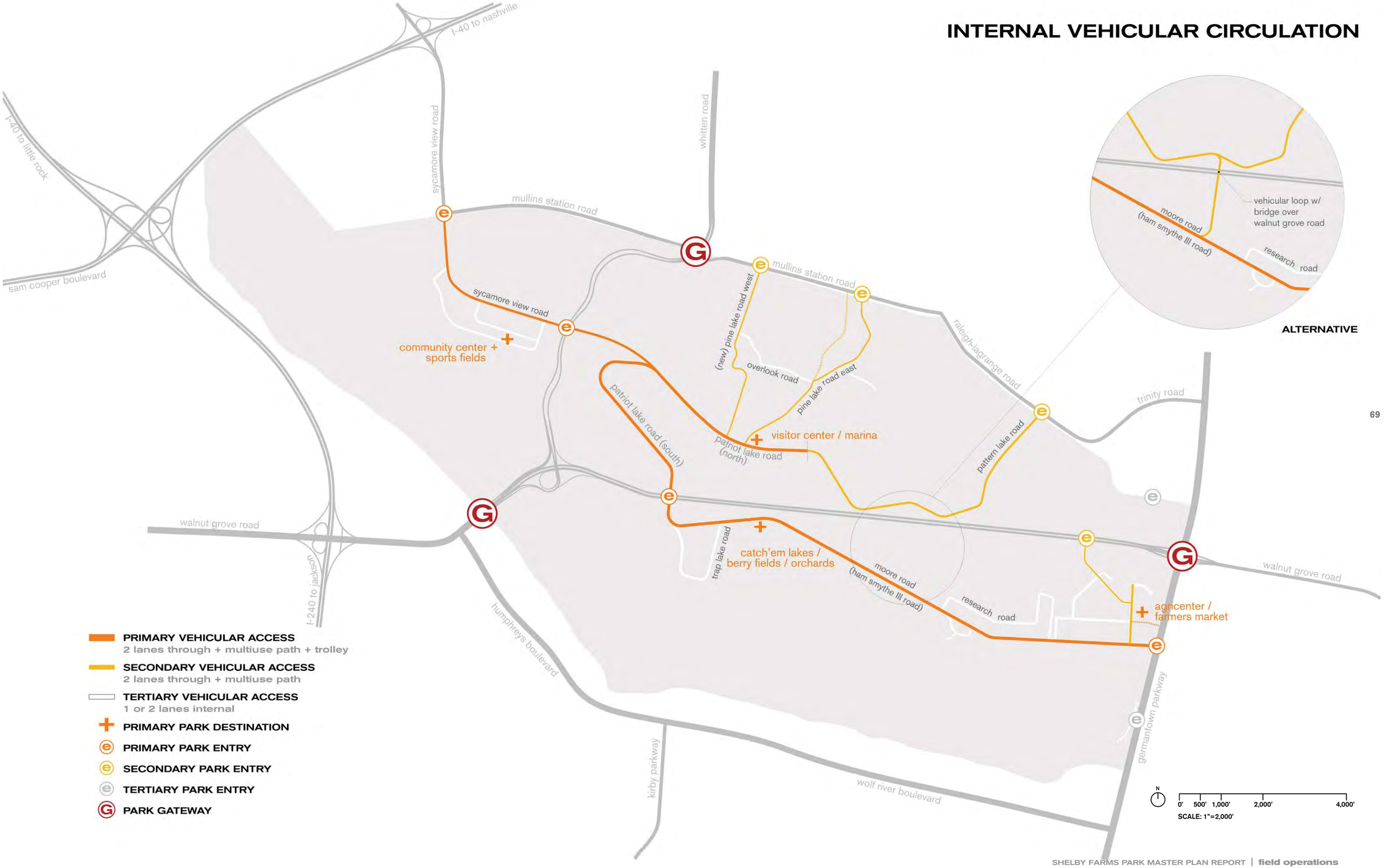
Over the course of the Park's development, the Shelby Farms Park Conservancy and the Agricenter may find it necessary to supplement the primary vehicular circuit (comprising the New Patriot Lake Road, Moore Road (Ham Smythe, III Road) and the extension of Sycamore View Road) with a second connection across Walnut Grove Road to allow for the two sides of the Park to have a stronger physical and conceptual linkage. This additional connection would logically be sited at the location of the proposed Green Bridge. Should such an alternative be pursued, it will require the Green Bridge to be designed and dimensioned in such a way that it can accommodate the proposed multi-use loop and an ecological corridor, as well as the additional vehicular route. Motorized traffic along this alternative connection will be limited to the Park Trolley and Park maintenance vehicles to reduce any potential impact on the adjacent Agricenter research fields.

primary roadways should minimal, in material yet designed with a distinct character and palette



illumination and material change can mark special areas within the park

INTERNAL VEHICULAR CIRCULATION



4.3 INTERNAL CIRCULATION | PARKING STRATEGY

The proposed approach to parking within Shelby Farms Park is to concentrate parking areas at four particular locations adjacent to the most highly programmed areas of the Park. As such, the bulk of parking will be located near the expanded Patriot Lake, the Agricenter Campus, the Catch 'Em Lakes and the Community Center. Smaller parking areas will be distributed at various locations throughout the Park adjacent to existing venues like the upland amphitheatre, the equestrian facilities and some of the picknic areas. Despite their distribution, these areas will provide only a minimum number of parking spaces necessary for local use. Overflow areas can be accommodated in a number of locations throughout the park nearby major program areas.

Even though the goal of the Master Plan is to focus on public transportation, the Park must be prepared to accommodate visitors to the site arriving by car. However, because the site is intended to be a major urban habitat, the parking program needs to be carefully integrated into the overall landscape and phasing of the Park. Basic requirements of all parking areas include permeable surfaces to reduce the heat island effect and control stormwater runoff, as well as screening or shading parking areas with trees in combination with sinking these areas into the ground so as not to be visually legible within the landscape.

The Master Plan calls for overflow parking to be accommodated in a number of locations within the Park with a focus on siting these areas adjacent to the major proposed program areas. For reference purposes, the existing northern half of the Shelby Farms Park territory has approximately 790 permanent parking spaces. The southern half of the Park – encompassing the Agricenter and Catch 'Em Lakes areas – has approximately 2,300 permanent parking spaces. The proposed distribution of parking in the Master Plan is as follows.

Patriot Lake:	520 permanent / 1,000 overflow
Community Center:	460 permanent / 300 overflow
Catch'Em Lakes:	350 permanent / 400 overflow
Agricenter Campus:	2,050 permanent / 1,000 overflow
Satellite Areas:	520 permanent
Total:	3,900 permanent / 2,700 overflow

parking surfaces should recede into the park rather than standing out

parking surfaces should be tough and resilient, yet porous an green

PARKING STRATEGY

4.3 INTERNAL CIRCULATION | TRANSIT CONNECTIONS + PARK TROLLEY

To minimize the impact of the automobile and discourage its use within the Park, an internal shuttle is proposed to connect the Park's four major program areas with the 12 landscape rooms. This shuttle will be provided free of charge and will circumnavigate the Park in approximately 30 minute intervals. The circuit would follow the main vehicular spine of the Park, coursing along the New Patriot Lake Road, Moore Road (Ham Smythe, III Road) and the extension of Sycamore View Road. This route will link the three sections of the Shelby Farms Park territory created by the presence of Walnut Grove Road and Shelby Farms Parkway, and serve to reinforce Patriot Lake, the Agricenter Campus, the Catch 'em Lakes and the Community Center as the concentrated activity areas of the Park.

In order to operate this trolley, it is anticipated that some preferred parking areas may require a fee to fund the trolley service. Other lots that are less popular or in areas of less impact would remain free.

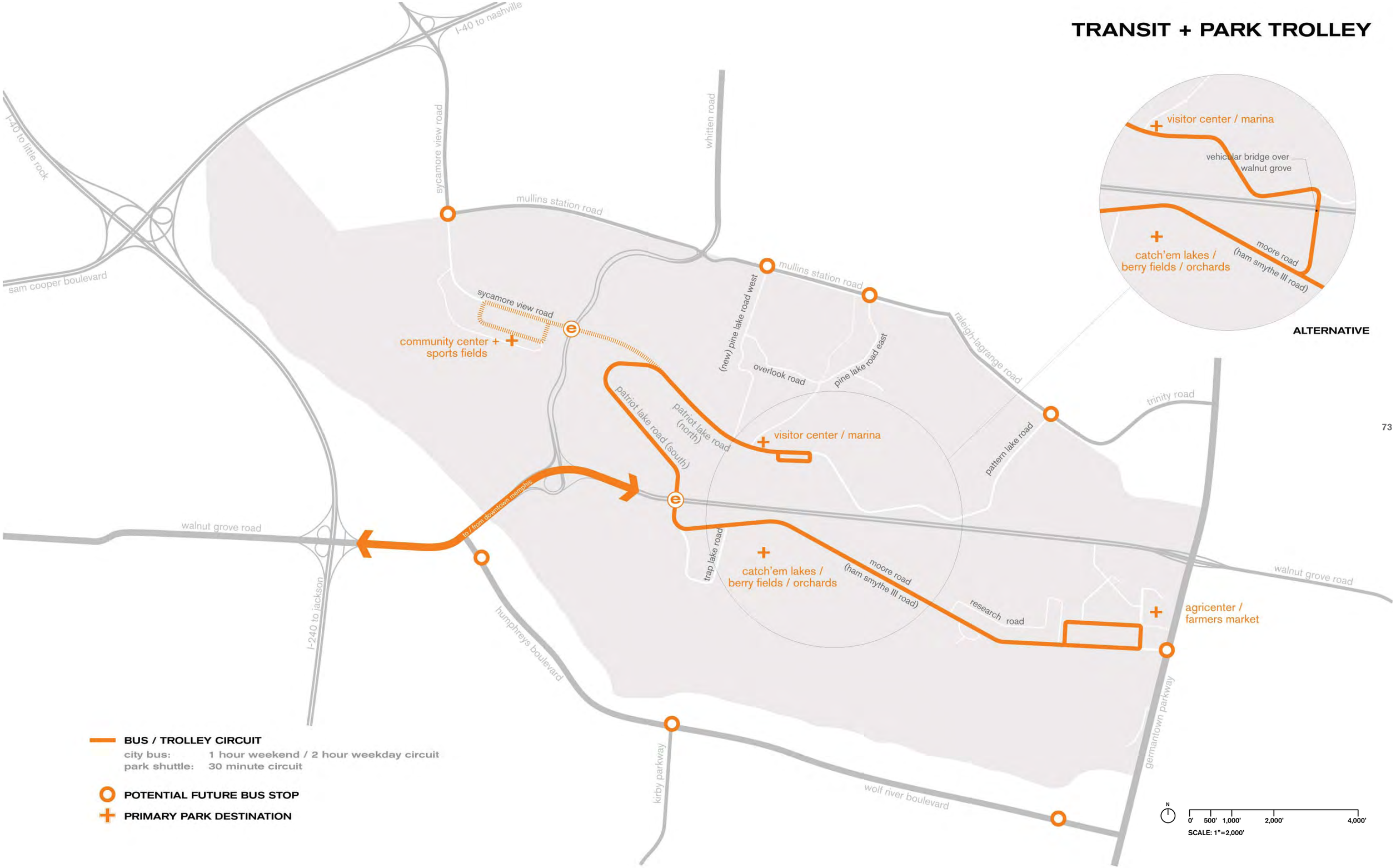
Though the trolley system would be managed by the Conservancy through an operator, it is assumed that this system will be coordinated with the MATA bus route(s) serving Shelby Farms Park in terms of drop-off and pick-up locations, as well as timing and routes. This too is intended to discourage vehicular traffic within the Park and increase opportunities for local and regional accessibility to Shelby Farms Park.

the park shuttle will become a icon of shelby farms park

VEHICULAR CIRCULATION ALTERNATIVE

As was noted above, over the course of the Park's development, the Shelby Farms Park Conservancy and the Agricenter may find it necessary to supplement the primary vehicular circuit with a second connection across Walnut Grove Road to allow for the two sides of the Park to have a stronger physical and experiential linkage. This "loop" would effectively be managed by the Conservancy, allowing parts of the road to be opened and closed as needed to minimize traffic and maximize pedestrian use.

TRANSIT + PARK TROLLEY



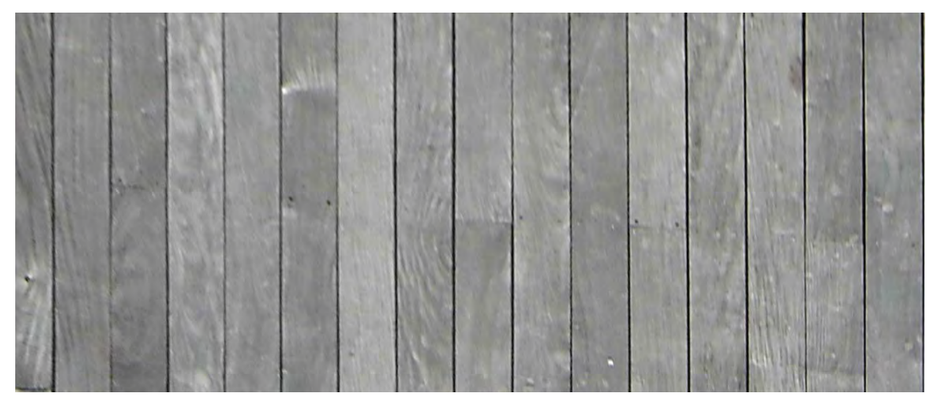
4.3 INTERNAL CIRCULATION | USER-SPECIFIC PATH + TRAIL SYSTEM

The primary recommendation for pedestrian access and circulation in the Master Plan is to preserve the unique capacity for large-scale recreation and habitat through an efficient pedestrian network. In addition to renovating and improving the existing user-specific trails and paths on site, the Master Plan proposes a double loop circuit as the primary organizing device for pedestrian movement within Shelby Farms Park. The main loop is a 5.25 mile multi-use path that will connect all parts of the park together and will help centralize orientation, circulation, transit and parking. It would include both a gateway pedestrian bridge as well as a Green Bridge – an ecological and pedestrian corridor intended to mitigate the adverse effects of Walnut Grove Road by re-linking the two sides of the Park. This loop would be a combination of an asphaltic speed surface for bikes and rollerblades, and a rubberized walking / jogging surface for pedestrians.

The smaller "Park Circle" path is 2 miles in circumference and allows for connections across major roadways like Walnut Grove and the new Shelby Farms Parkway (Kirby-Whitten Parkway). This stone dust trail would connect the three sections of the Park through a series of bridge and tunnel connections and would link the Park via pedestrian access to neighborhoods to the south, near Shady Grove Road, and along the proposed Wolf River Greenway. The "Park Circle" path would also link to the multiuse path along the new Walnut Grove Road bridge providing direct pedestrian access to the Park from the south.

Important paths and trails in addition to the double loop circuit are the 3.5 mile Patriot Lake boardwalk and path; the 12.25 mile equestrian circuit linking the northern half of Shelby Farms with the southern half and the Wolf River corridor; a renovated Chickasaw Trail and Tour de Wolf; a series of 3k, 5k and 10k cross-county circuits; as well as 20+ miles of diverse wilderness trails. Although some paths will be designated for single use, many others will be designed to accommodate a bundle of multiple users. All paths and trails will be separate from roads, with special attention paid to pedestrian crossings as needed to facilitate safe passage.

TRAILS	LENGTH	USER-TYPE
Loop	5.25 mi	walker / runner / bike / rollerblade / horse
Circle Trail	2 mi	walker / runner / bike / horse
Equestrian Trail	approx. 12.25 mi	horse
Tour De Wolf	approx. 5.85 mi	mountain bike
Cross Country Trails	approx. 20 mi	walker / runner
Chickasaw Trail	approx. 3 mi	walker / runner
Patriot Lake Boardwalk	3.5 mi	walker / runner
Catch 'Em Lakes Boardwalk	0.75 mi	walker
Wilderness + Unpaved Trails	approx. 20 mi	walker / runner / bike / horse



the paths materials palette should include a broad mixture of surface with a rustic, but 'tough' character

USER-SPECIFIC PATH + TRAIL SYSTEM

4.3 INTERNAL CIRCULATION | PARK LIGHTING STRATEGY

A distinct lighting vocabulary specific to Shelby Farms Park should distinguish the site from its context and help to shape the agrarian and remote character that defines much of the Master Plan design. Large areas of Shelby Farms Park should remain dark. Although major activity areas that may be used at night like the Bar at Patriot Lake, the Community Center and the Agricenter should be sufficiently lit, the skies atop Shelby Farms Park should remain predominately dark in order to preserve habitat quality in natural areas. Glare controls on major program area fixtures will protect surrounding areas where darkness is desired. Gateways, defined by landscape and architectural elements, might double as light markers that express the perimeter and access points. Distinctive lighting along the program bars will reinforce the idea of these areas as the primary activity and event locations of the site.

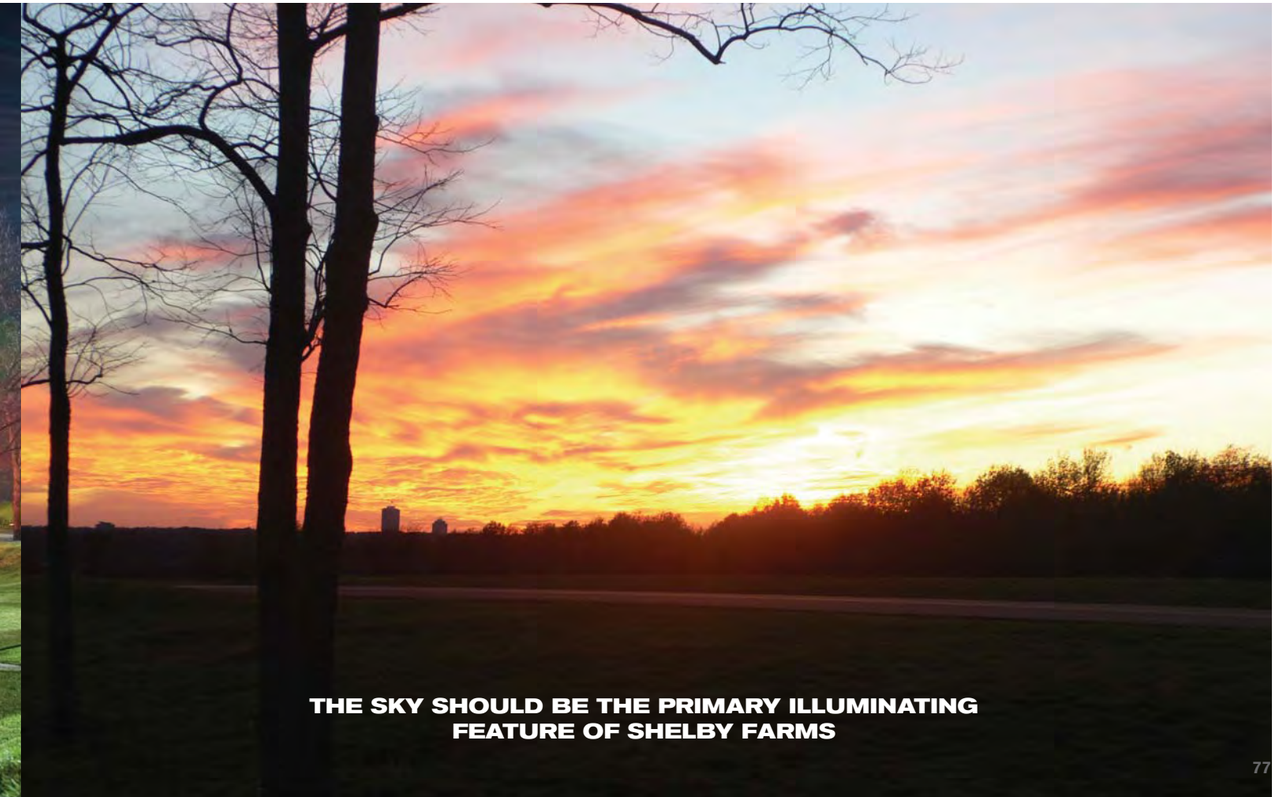
A distinctive treatment for Walnut Grove Road and Shelby Farms Parkway should enhance the sense of gateway and difference between these "parkways" and ordinary city streets or highways. Several credible studies suggest that directing light away from the center of the road and to the sides increases the overall field of vision for the driver. A more efficient lighting solution that calls for the major roadways crossing Shelby Farms Park to have less light and less contrast should be explored with the Shelby County Department of Public Works and the Tennessee Department of Transportation.

Lighting can continually refresh expectations as new areas of the Park undergo change and are re-opened to the public. Lighting design is inherently linked to temporality. In keeping with the phasing plan, the Shelby Farms Park lighting design should build over time, emphasizing the site's evolution.

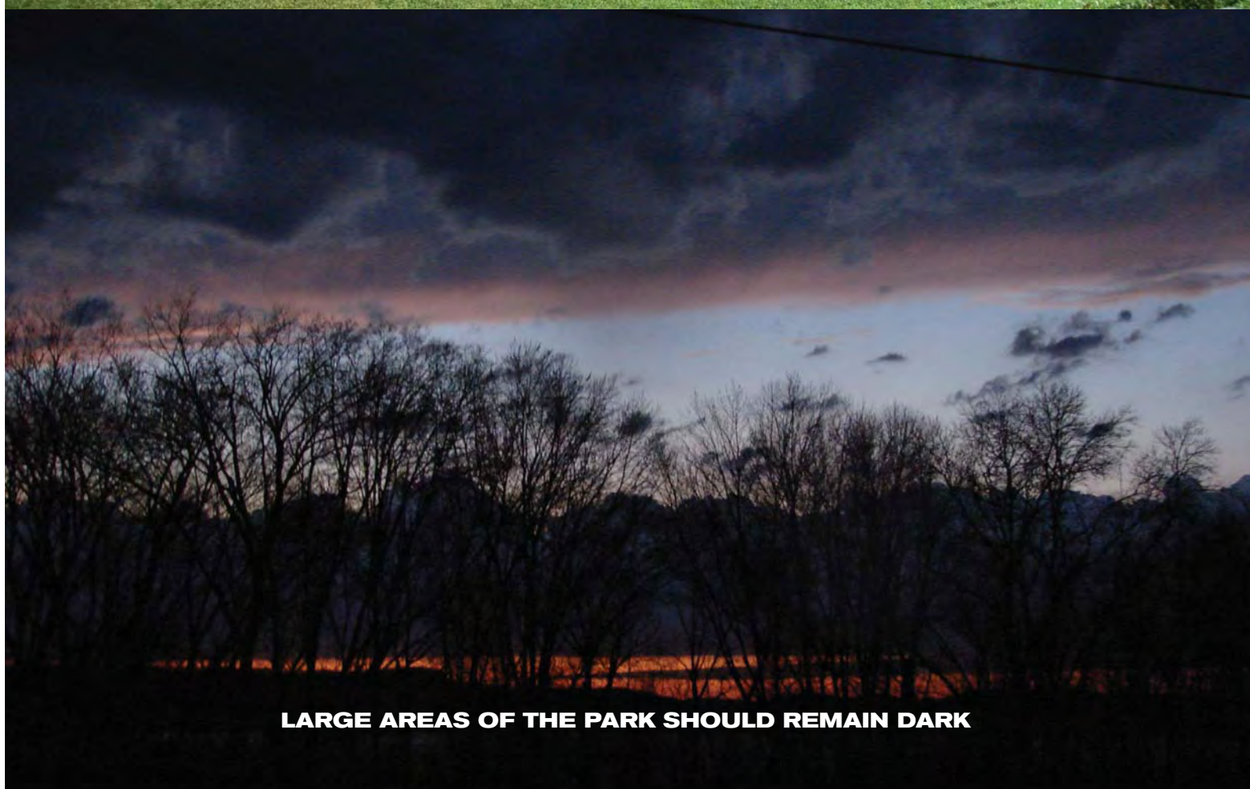
Lighting design should explore ways in which Shelby Farms Park might produce its own energy. Solar-powered fixtures, energy-efficient light sources (high brightness LEDs, for example) and networks of sensor controls that respond to motion, occupation, and dawn and dusk should be incorporated as fully as possible to demonstrate a commitment to conservation and sustainability.

The Shelby Farms Park Conservancy's philosophy and approach towards lighting should focus as much on moonlight, dark skies, dawn/dusk and stars as it does on artificial means of illumination. This will allow the site to retain a truly distinct experience within the urbanized areas of the Memphis Metropolitan Region.

LIGHTING SHOULD BE CONCENTRATED AT DISCRETE AREAS WITHIN THE PARK



THE SKY SHOULD BE THE PRIMARY ILLUMINATING FEATURE OF SHELBY FARMS



LARGE AREAS OF THE PARK SHOULD REMAIN DARK

EVENT-RELATED LIGHTING CREATES A SENSE OF TEMPORALITY + SPECTACLE

4.4 WATER BODIES | SITE-WIDE HYDROLOGICAL APPROACH

In combination with the improvements for Patriot Lake which are outlined in the following pages, it is recommended that three other zones within the upland area of Shelby Farms Park be addressed – Chickasaw Lake, Mayor Lake and the slough west of Pine Lake.

Based on preliminary discussions with Brian Waldron, Ph.D. PE, Assistant Professor of Civil Engineering at the University of Memphis, there are indications of seepage across the dam at Chickasaw Lake. If seepage is occurring through this dam, it can undermine the structural integrity of the dam and could pose a safety issue for the downstream land. Geotechnical investigation can confirm the possible seepage and identify the magnitude of the problem, helping to direct the Conservancy towards a potential solution.

To enhance the quality and function of Mayor Lake, it is recommended that the adjacent low-lying areas be connected to the Lake. This would expand the drainage basin and create a more visually attractive water body. A discharge pipe or weir could be added to regulate the stormwater function of the lake and route the discharge to Patriot Lake.

A similar, but less extensive remedy is suggested for the marshy area just south and west of Pine Lake. Based on field observation, this slough is stagnant and odorous. Cleaning this area of debris and locating the discharge route may be enough action to provide a properly functioning habitat. If this does not seem sufficient, the area could be connected directly to the downstream swale on the south end. The goal here should be to promote positive drainage within the slough.

Additional alterations to the existing site-wide hydrological system will help guarantee long term sustainability of the Park's stormwater drainage system. These alterations include:

1. Enhancement of vegetation and habitat within the existing swales and sloughs where possible to increase wildlife diversity, water quality and groundwater recharge throughout the site;
2. Adjustments and rehabilitation of discharge structures adjacent to the existing lakes to maximize drainage flows and prevent stagnant water bodies; and
3. Where possible, maintaining the uplands area of the Park with vegetation to secure the soil and limit sediment and run-off from contaminating the adjacent lakes.

wetland habitat

healthy water bodies

HYRDROLOGICAL APPROACH

1. CHICKASAW LAKE: 11 ACRES
2. MAYOR LAKE: 3 ACRES
3. PINE LAKE: 10 ACRES
4. PATRIOT LAKE: 150 ACRES
5. BEAVER LAKE: 21 ACRES
6. BOY SCOUT LAKE: 3 ACRES
7. UNNAMED LAKE: 5 ACRES
8. PATTERN LAKE: 2 ACRES
9. UNNAMED LAKE: 4 ACRES
10. INDIAN LAKE: 4 ACRES
11. WILLOW LAKE: 2 ACRES
12. UNNAMED LAKE: 2 ACRES
13. CATCH 'EM LAKES: 27 ACRES
14. MEANDER LAKE: 18 ACRES
15. TRAP LAKE: 17 ACRES
16. UNNAMED LAKE: 5 ACRES

- POTENTIAL WATER FLOWS
- POTENTIAL FILL AREA
- GROUND WATER RECHARGE
- WATER FLOWS
- WETLANDS
- EXISTING WATER BODIES
- NEW PROPOSED LAKES

N

0' 500' 1,000' 2,000' 4,000'

SCALE: 1"=2,000'

4.4 WATER BODIES | PATRIOT LAKE EXPANSION

Expanding Patriot Lake into a recreational lake with 150 acres of surface area is an ambitious, but feasible, goal. The important factors in transforming Patriot Lake into a successful amenity for Shelby Farms Park involve water quantity, water quality and the aesthetics of the banks. Additional concerns include constructability and permitting.

For the purposes of analyzing Patriot Lake, the study area is comprised of three major drainage basins. These basins are the Patriot Lake Basin, the area northwest of Patriot Lake and the area east of Patriot Lake.

Patriot Lake currently has a water surface area of 54 acres at elevation 262.00 feet. Per original construction plans, the depth of the Lake varies from nine to fourteen feet. Although much of the adjacent land has been graded to drain away from the Lake through a system of concrete swales, approximately 329 acres of surface drainage still enters the lake.

The expanded 150-acre Patriot Lake will maintain the existing water surface elevation of 262.00 feet. The adjacent drainage basin will be expanded to accommodate the additional lake volume. A ratio ranging between 4:1 and 10:1 for drainage area to surface water area is desirable to balance water levels and manage stormwater in lakes. The restructured basins shown to the right and in Appendix C of this document include approximately 980 acres. This drainage area compared to the expanded lake water surface provides a ratio of 6.5:1 which is well within the acceptable range.

MINIMIZING WATER LOSS

It is expected that some water will be lost through evaporation. Based on average monthly precipitation data, the lowest lake elevation estimated for the expanded Patriot Lake is 261.00 feet. Details of this calculation can be found in Appendix C of this document. If this is an unacceptable amount of change in water surface elevation for the surrounding amenities, pumping water from the Wolf River could be used to supplement the overland drainage. The unpredictable nature of drought events makes this an attractive alternative. Details regarding this permitting process and allowable volume of water pumped can be found in the full feasibility report.

Further study is needed to verify soil conditions on site, but geotechnical investigations on adjacent properties indicate that the soils will be comprised primarily of silt and clay. The silty overburden is susceptible to erosion and seepage, but the deeper clay layers provide a fairly impermeable surface. The clay depths vary but it seems feasible that the lake could be lined with this clay to avoid water loss through seepage. If the depths of clay in this area make this impossible, a liner could be installed to address the loss of water through seepage.

MAINTAINING WATER QUALITY

A key component of good water quality is the depth and variance of the bottom surface. To promote a healthy fish habitat, the lake bottom needs to be irregularly shaped and sloped with depths varying from eight to sixteen feet. In order to promote natural aeration and water circulation within the lake, much of the water body should be twelve to sixteen feet deep. This depth is the ideal depth for the majority of the lake. Additional lake aeration by means of air compressors is possible, but not necessary if the lake is deep enough.

AESTHETICS

There is much concern over the appearance of the slopes above water surface and the ability of the water's edge to maintain a high quality appearance. This is a valid concern since the existing soils in the area have a large silt content that can be highly erodible.

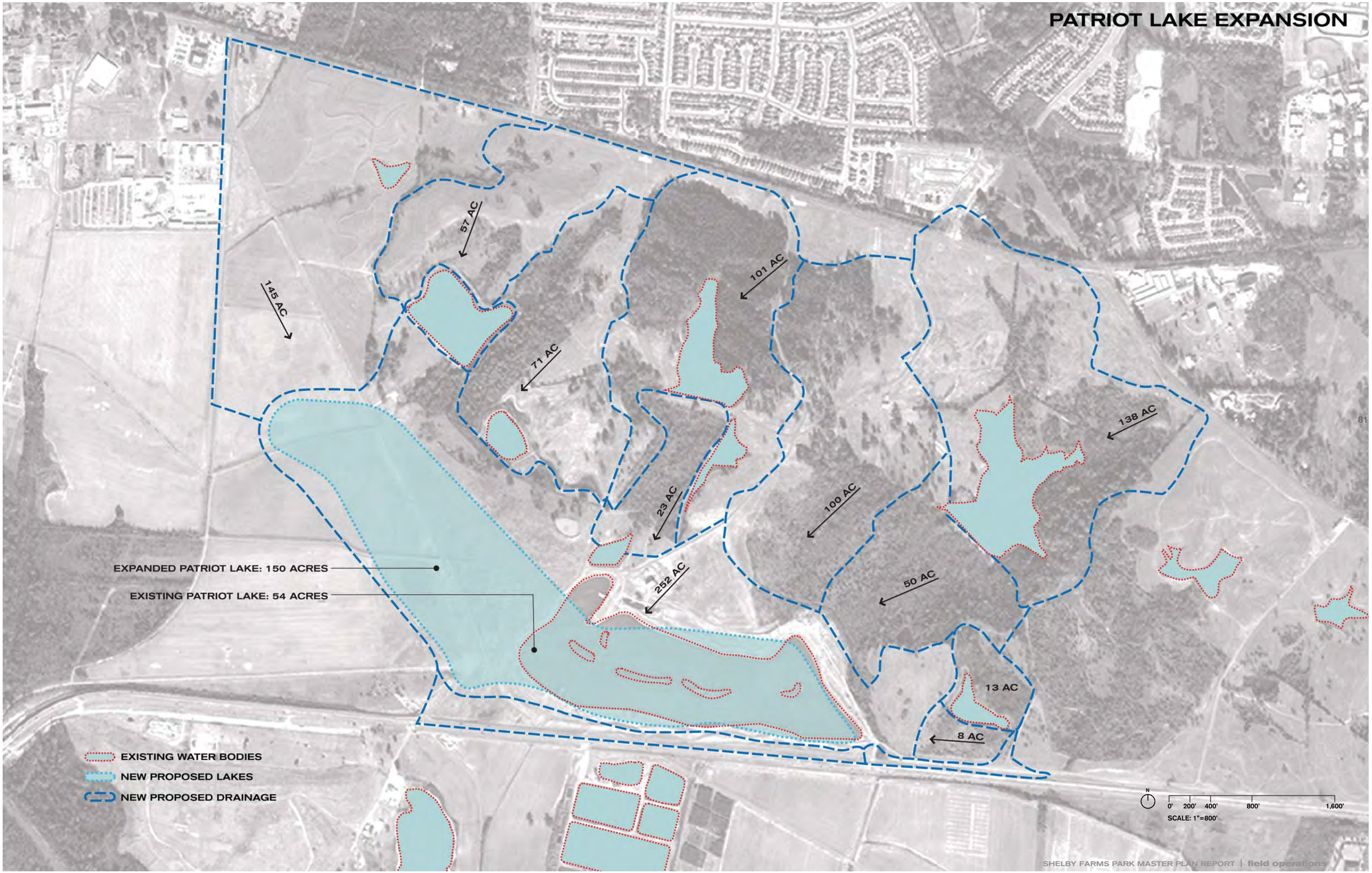
One recommended edge treatment involves sea walls or sheet piling. This installation is successful at creating a definite boundary for the water body. The rigid structure adapts well to the change in water surface elevation and is relatively weather-proof. Areas that seem most compatible with a sea wall edge include the marina, boathouse and amphitheater. Another edge treatment alternative is created with a combination of erosion control products and careful vegetation selection. A third edge treatment will be required for the beach area. Each of these potential edge treatments has one thing in common – maintenance requirements. The edges of the lake must be carefully managed in order to ensure an attractive and healthy edge.

CONSTRUCTABILITY

Constructing a lake of this magnitude requires moving large quantities of dirt. The lake was modeled with a top of bank elevation of 265.00 feet and a bottom elevation of 248.00 feet throughout the entire expanded Patriot Lake. In reality, the bottom of the lake will be varied to create a diverse habitat but the 14 foot depth provides an average depth for analysis. One recommendation to avoid costly hauling fees is to use this excess excavation to fill the roughly 80 acres west of the expanded lake but east of Shelby Farms Parkway. Another suggestion is to coordinate with the construction of Shelby Farms Parkway for the earthwork needs at the intersection and roadway.

It is important to remember that any final design can and will vary from the conceptual ideas that are presented here and in the full feasibility report. However, the basic principles of the design are expected to remain the same.

PATRIOT LAKE EXPANSION



4.5 ECOLOGY | HABITAT + NATURAL AREA OVERVIEW

Situated within the lower Mississippi River basin and Wolf River watershed, Shelby Farms Park plays an important regional ecological function by enhancing water quality of and connectivity to the Mississippi River. The floodplains and natural areas of Shelby Farms Park provide a crucial interface between aquatic, cropland and terrestrial habitats, and is thus critical to ecosystem health and the diversity of species in the greater Memphis region. Numerous opportunities exist for enhancing the ecological health and sustainability of natural resources at Shelby Farms Park. A first goal in planning should involve establishing ecological objectives and priorities for development of the Park. The most apparent opportunities include the following:

Restoration Potentials:

1. Improve bottomland and upland forests through the removal of invasive species, especially Chinese privet;
2. Link habitat patches through appropriate corridors;
3. Restore native grasslands;
4. Improve stream drainage;
5. Establish additional and improved wetland habitat;
6. Enhance and expand aquatic and terrestrial species;
7. Expand ecological territories; and
8. Improve ponds and lakes.

shallow water ponds

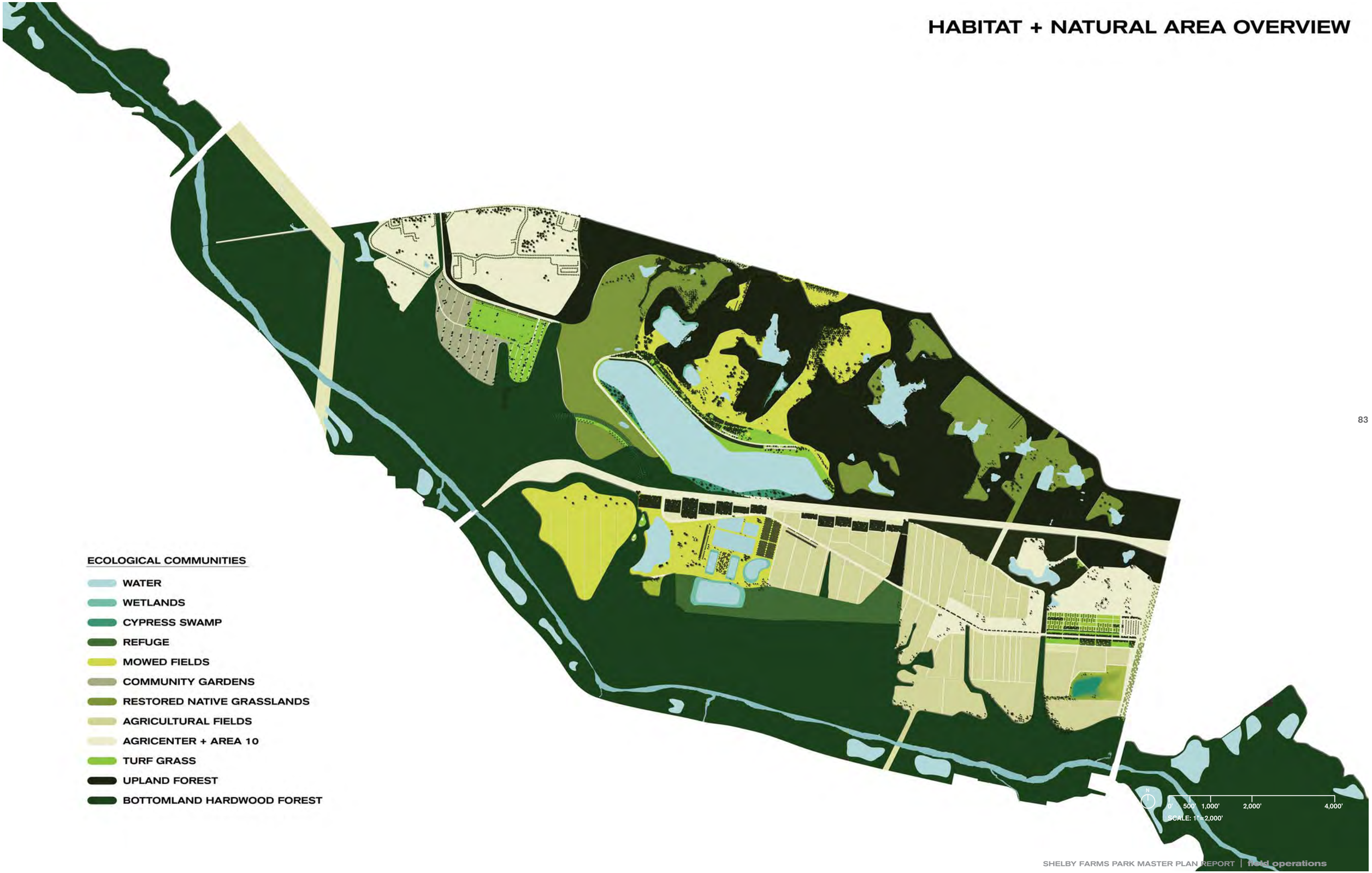
Education and Outreach:

1. Foster ecological literacy through interactive educational programs focused on understanding how we sustain our natural resources;
2. Develop an outreach group with the Shelby Farms Conservancy to communicate with stakeholders as to the development and implementation of management activities with a goal of providing information, and fostering interaction with stakeholders;
3. Provide opportunities for nature appreciation and interpretation;
4. Foster local and national partnerships that could enhance the wildlife experience at the Park, expand habitat diversity, draw visitors, and play an important conservation role; and
5. Provide agricultural research education programs to bring awareness to youth and adults concerning the diverse ecological systems involved in and around a farm.

Research:

1. Research potential for Shelby Farms Park to qualify as one of 26 Long Term Ecological Research (LTER) program sites set up by the National Science Foundation to support long-term ecosystem and research (of which only two sites in Baltimore and Phoenix are urban);
2. Develop an Integrated Natural Resource Management Plan for integrative and management-adaptive conservation and management programs;
3. Incorporate novel research approaches for interfacing people and wildlife and for reducing wildlife damage to habitats at urban parks;
4. Catalogue the status and distribution of existing biodiversity to provide a measure for success in the future and an assessment for management consideration; and
5. Foster new and innovative ideas in crop and bio-energy research that can aid in renewable solutions to food, fuel and environmental concerns.

HABITAT + NATURAL AREA OVERVIEW



4.5 ECOLOGY | NEW CANOPY COVER

Shelby Farms Park is already home to remarkable stands of bottomland and upland forest. Overall the upland forest habitat represents a mosaic of successional stages that supports a high degree of plant and animal diversity. While a wide range of age structure and species diversity are present within the existing forest stands, several exotic species (e.g. Chinese privet, Japanese honeysuckle, Kudzu, Puerania lobata, and nettle) run rampant through them. The Master Plan aims to preserve existing canopy species to the greatest extent possible and expand the ecological assets of the Park through the addition of one-million new trees.

Given the significant ecological role that a park of this size could play regionally and the current ecological fragmentation, there are many parts of the Park that can be reclaimed by forest. The majority of new canopy cover wraps the existing stands of Upland forest in the northern part of the Park and flanks major roadways (e.g., Walnut Grove Road, Mullins Station Road and the proposed Shelby Farms Parkway). New tree planting has been designed to maximize connectivity between existing habitats and screen the interior of the Park from the aural and visual impact of major transportation corridors.

In addition to new forested areas, infill of young canopy species should be coordinated with mature tree stands to ensure their health and perpetuity. The strategic infill of young canopy species within relatively mature stands will ensure that the presence of canopy persists for the life of the Park. The location, extent and severity of remediation areas will determine the potential for preserving, restoring or regenerating canopy species.

community tree planting

new forest cover

CANOPY COVER

A mix of densely planted native tree saplings can be later thinned and transplanted elsewhere across the site to effectively "grow" a complex multi-aged woodland over time. Reforestation is most successful when a mixture of early-successional and later-successional tree species is planted.

49% OPEN LANDSCAPE
51% WOODLAND COVER

- HORIZON VIEWS
- INTERIOR PARK VISTAS
- PROPOSED CANOPY
- EXISTING CANOPY

4.5 ECOLOGY | CONNECTIVITY OPPORTUNITIES

Shelby Farms Park presents an opportunity to refine and expand the ecological resources of this largely man-made landscape. The location of the Park just outside of downtown Memphis, within the heart of Shelby County and the Mississippi River watershed, provides an ideal opportunity to simultaneously promote the enhancement of a public recreational landscape while maintaining and improving the ecological quality and regional ecological role of the Park. Regionally, opportunities exist to link the Park to downtown Memphis and to the Shelby County suburbs through the future greenline and the existing Wolf River corridor.

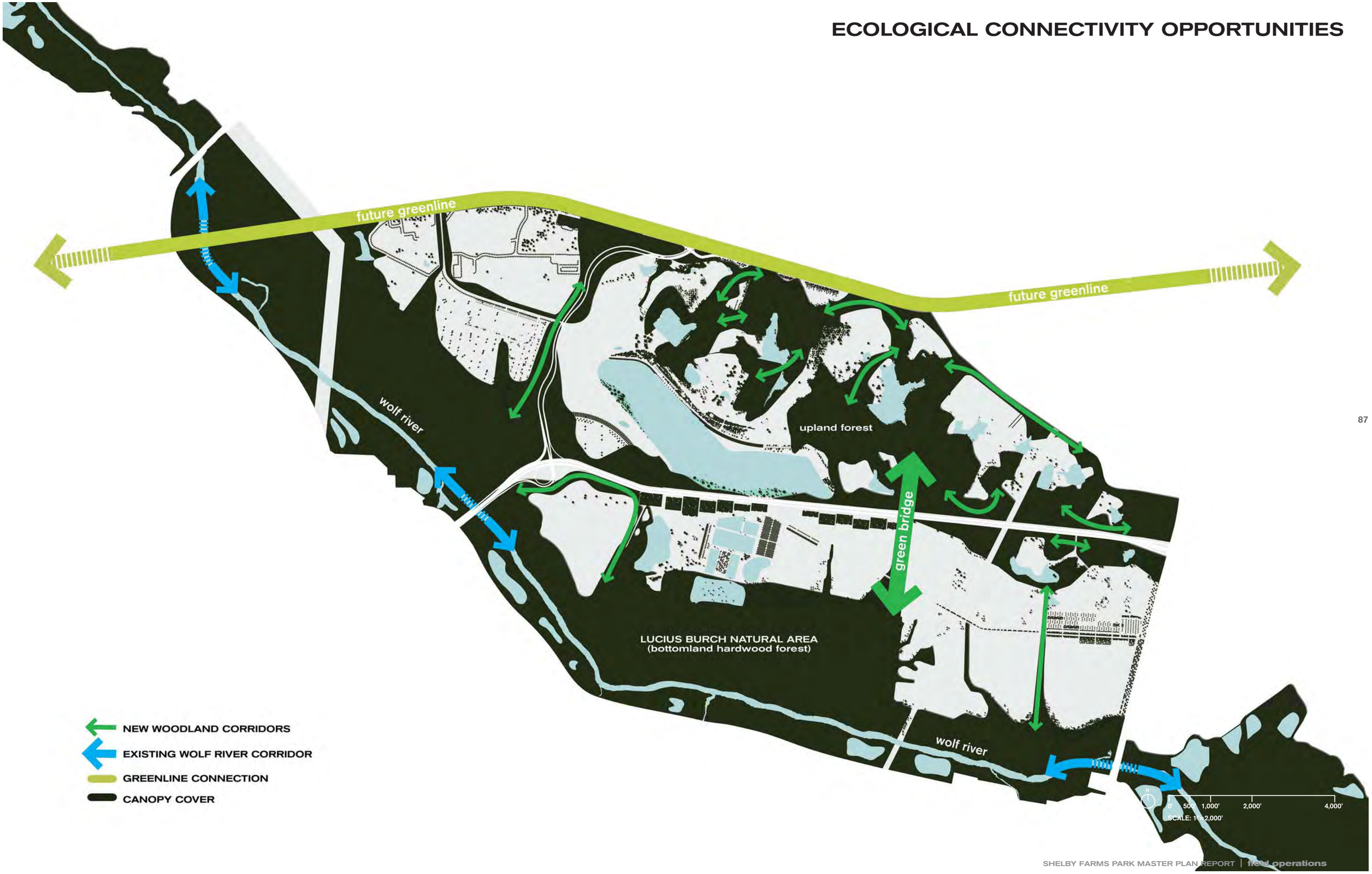
Given the fragmented nature, disjunct spatial associations of habitats and anthropogenic practices associated with the Park, there is great opportunity for improving the ecological quality and connectivity of the Park's terrestrial and wildlife habitats. Currently, habitat patches within the Park are isolated from each other and from the Lucius Burch Natural Area by the heavily trafficked Walnut Grove Road. With the installation of 1,000,000 new trees and a green bridge crossing Walnut Grove Road, new corridors will allow movement of animals and people through the Park to enhance biodiversity and serve the needs of visitors in a friendly and beneficial manner.

To the greatest extent possible, the Master Plan will utilize environmental site management and strategic park implementation practices to promote contiguous habitat conditions to ensure a high-value wildlife network throughout the Park. The expansion of ecological territories includes:

1. Cluster human activities;
2. Minimize barriers to animal movements (e.g., powerlines and roads);
3. Soften hard edges;
4. Maintain connectivity through existing corridors;
5. Construct bridges or underpasses that allow movement of animals and people across well traveled corridors, such as Walnut Grove Road;
6. Minimize fragmentation and maximize area of habitat patches;
7. Develop new habitats or historic habitats as appropriate (e.g., shallow water ponds for shore birds and amphibians);
8. Re-establish predator-prey dynamics;
9. Restore native species (plant and animal);
10. Establish monitoring programs at a variety of spatial and temporal scales for assessing success in conservation programs;
11. Establish greater linkage between SFP and other green spaces in the region through the Wolf River corridor and the abandoned CSX rail line; and
12. Incorporate the Wolf River into mainstream park activities.

green bridge

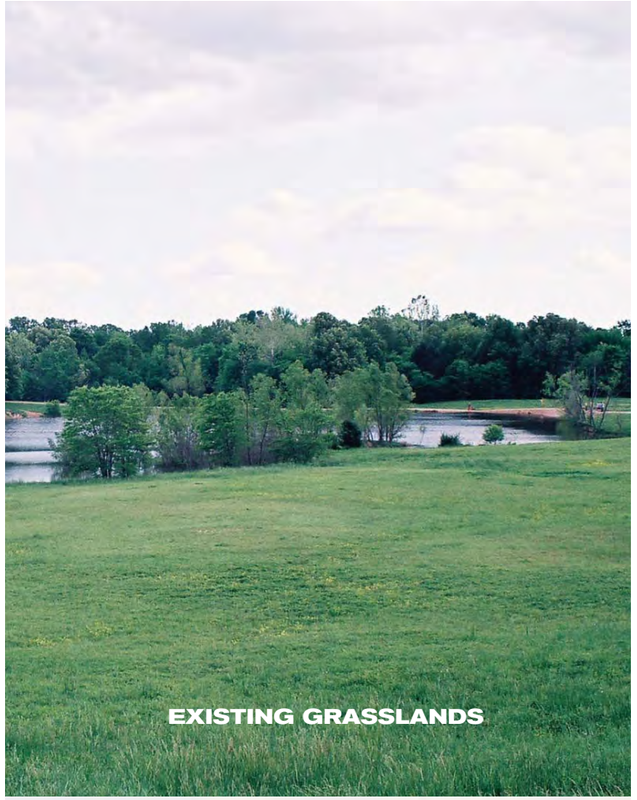
ECOLOGICAL CONNECTIVITY OPPORTUNITIES



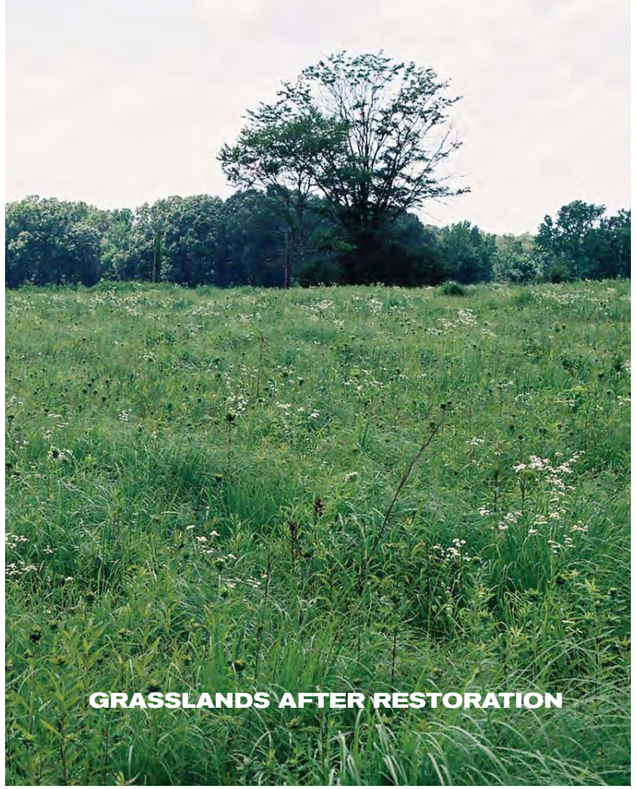
4.5 ECOLOGY | ENHANCEMENT RECOMMENDATIONS

The Park's major habitat types (e.g., bottomland forests, upland forests, grasslands, and wetlands) could all be enhanced in relation to exotic species eradication; overall species richness; and ecological integrity. Several areas of the Park will have limited to no access by the general public in order to provide sanctuaries for wildlife. Enhancement opportunities for the Park include:

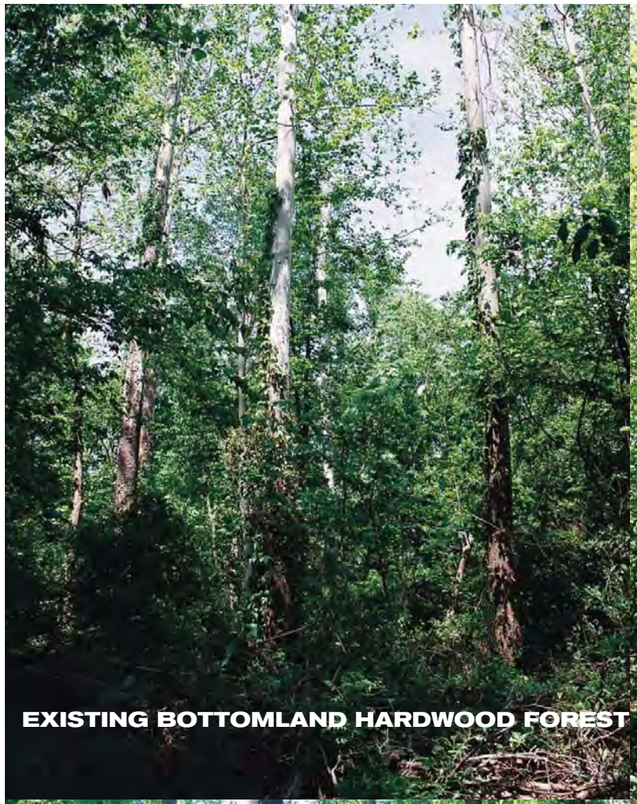
1. Historically native grasslands and wildflowers typical of Western Tennessee are sparse in the Park and significant opportunities for restoration of native grasslands exist on the site;
2. Most habitat edges throughout the Park could be made more biodiversity friendly through the conversion of hard to soft edges;
3. Stream drainage and sloughs in most parts of the Park could be improved to slow the flow of water and bank erosion, and to encourage ground water recharge;
4. Areas associated with landfill on the south end of the park will need restoration;
5. Establishment of additional and improved wetland habitat, including shallow water ponds for shore birds and amphibians;
6. Enhancement of aquatic and terrestrial species; and
7. Improvement of ponds and lakes.



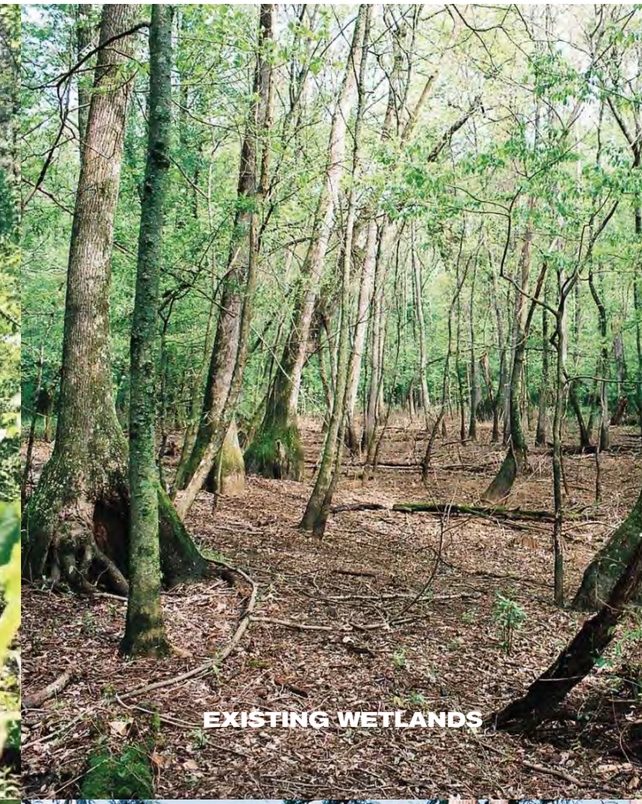
EXISTING GRASSLANDS



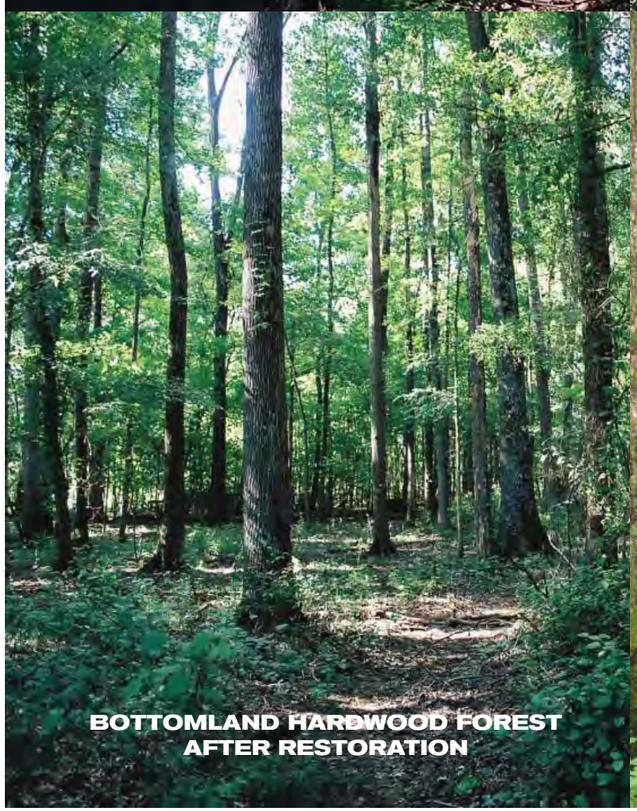
GRASSLANDS AFTER RESTORATION


EXISTING BOTTOMLAND HARDWOOD FOREST

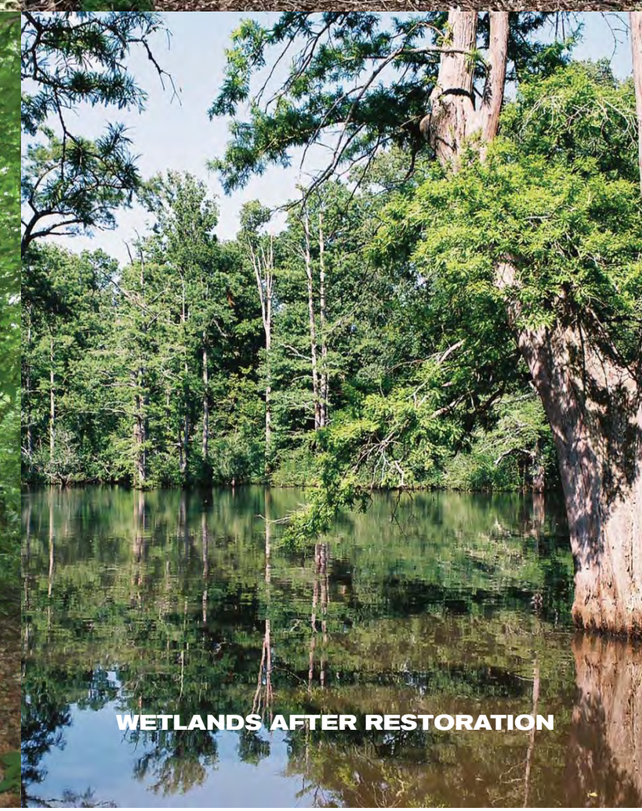
EXISTING UPLAND FOREST


EXISTING WETLANDS

EXISTING HARD EDGE CONDITION


BOTTOMLAND HARDWOOD FOREST AFTER RESTORATION

UPLAND FOREST AFTER RESTORATION


WETLANDS AFTER RESTORATION

SOFT EDGE CONDITION AFTER RESTORATION

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4.6 PROGRAM | ZONES + LAND-USE

At Shelby Farms Park, a wide range of active uses are set within a generous and extraordinary landscape. The Park has tremendous potential to expand and bolster its range of amenities and diverse landscapes to become a rich reserve for nature and wildlife, cultural and social life, environmental education and outdoor activities. The sheer size of the site allows seemingly incompatible programs (wild, natural areas and major public gatherings) to coexist.

Shelby Farms Park has an extensive and diverse range of user groups that have already capitalized on the many recreational uses the Park has to offer: hiking and exploring the upland hills and hollows, picnicking in Plough Park, kayaking on Patriot Lake, attending events at the Agricenter and fishing for catfish in Catch 'Em Lakes. As the twelve distinct landscapes rooms within the Park become further defined, each with its own discrete set of physical and programmatic characteristics informed by existing land uses, the range of amenities and possibilities for informal, passive and active uses will increase tremendously.

Shelby Farms Park will be a destination park. The future park will attract users - including new active recreation participants - from across the city and beyond. In addition, Shelby Farms Park will also have to fulfill the role of a neighbourhood park for residential communities that will continue to grow and densify along its edges. Understanding that Shelby Farms Park will require designated active recreational facilities, the Master Plan looks to concentrate new facilities in proximity to parking and primary vehicular intersections. The program strategy for the Park has several major goals:

1. Enhance a variety of multi-purpose, informal park features and landscapes that exploit the great recreational potentials and unique settings of the park site;
2. Ensure that the scale, configuration and topography of park features enrich the experiences of the varied, rugged character of the Park;
3. Ensure a means for protecting sensitive natural areas, regeneration zones and habitats through a clear, legible system of signage and wayfinding.
4. Concentrate active programs and structures at major intersections in the Park, responding to both central connectivity and the preservation of large open landscape areas;
5. Create diversely-scaled, multi-purpose recreational facilities for different users and age groups;
6. Identify opportunities for programs that will help generate revenue and sustain the Park; and
7. Define large-scale public "rooms" to support a coherent and appropriate "sense-of-place" structure for the many varied user groups within the Park.

kite flying

paddle boating

disc golfing

LAND CHARCTER + USER GROUPS

4 COMMUNITY CENTER + SPORTS FIELDS *

sierra club
memphis publlic schools
shelby farms youth alliance
shelby farms bmx
boy scouts
tourists
colleges + universities
all park user groups

3 THE RANGE + ARBORETUM

university of memphis
sierra club
memphis publlic schools
tourists
all park user groups

2 PATRIOT LAKE

memphis fly fisher association
tornado alley sailing club
memphis whitewater
memphis hightailers
tourists
boat concession
all park users

1 PLOUGH PARK

memphis disc golf club
memphis runners track club
mid-south trails association
shelby farms womens' running club
memphis runners track club
high school cross country
shelby farms association of neighborhoods
tennessee trails
memphis fly fisher association
shelby farms equestrian alliance
tourists
all park users

6 THE OUTBACK

memphis amateur retreiver club
mid-south hunting retreiver club
mid-south trails association
shelby farms horse stables
shelby farms off-leash society
boy scouts
memphis hightailers
memphis fly fisher association
tennessee trails
shelby farms equestrian alliance
all park users

5 PUBLIC GARDENS *

shelby farms master gardeners
shelby county community gardens
shelby farms association of neighborhoods

7 THE ART MOUND

memphis college of art
university of memphis
memphis public schools

8 CATCH 'EM LAKES

memphis fly fisher association
boy scouts
tourists
all park user groups

9 THE REFUGE

university of memphis
sierra club
tennessee ornithological society
tourists
all park user groups

10 THE ORCHARDS

tourists
all park user groups

11 RESEARCH FIELDS

agricultural research companies
colleges + universities

12 AGRICENTER

show place arena
boy scouts
expo center
rv park
shelby farms equestrian alliance
tourists
all park users

- AREA 10
- PUBLIC GARDENS
- BIG ACTIVITIES
- PASSIVE PARKLAND
- ACTIVE PARKLAND
- ARGRICULTURAL - PUBLIC
- AGRICULTURAL - RESEARCH
- ARGRICENTER
- HABITAT + NATURAL AREAS
- WATER-BASED ACTIVITIES

* pending area 10 approval

N

0' 500' 1,000' 2,000' 4,000'

SCALE: 1"=2,000'

4.6 PROGRAM | SMALL STRUCTURES + FACILITIES

The landscapes at Shelby Farms Park will provide settings for new cultural landmarks in Memphis: iconic performance venues, a wildlife refuge, catfish ponds, public art and exhibition spaces, community gardens and clubs, outdoor classrooms, picnic areas, playgrounds, restaurants, meeting places and an active lakefront esplanade. These new, eventful landscapes should correspond with the natural character of the Park. New and continued events at Shelby Farms Park should support the Park's rustic, raw and wild character in emphatic ways - potentially giving rise to drastically different means of using public park spaces.

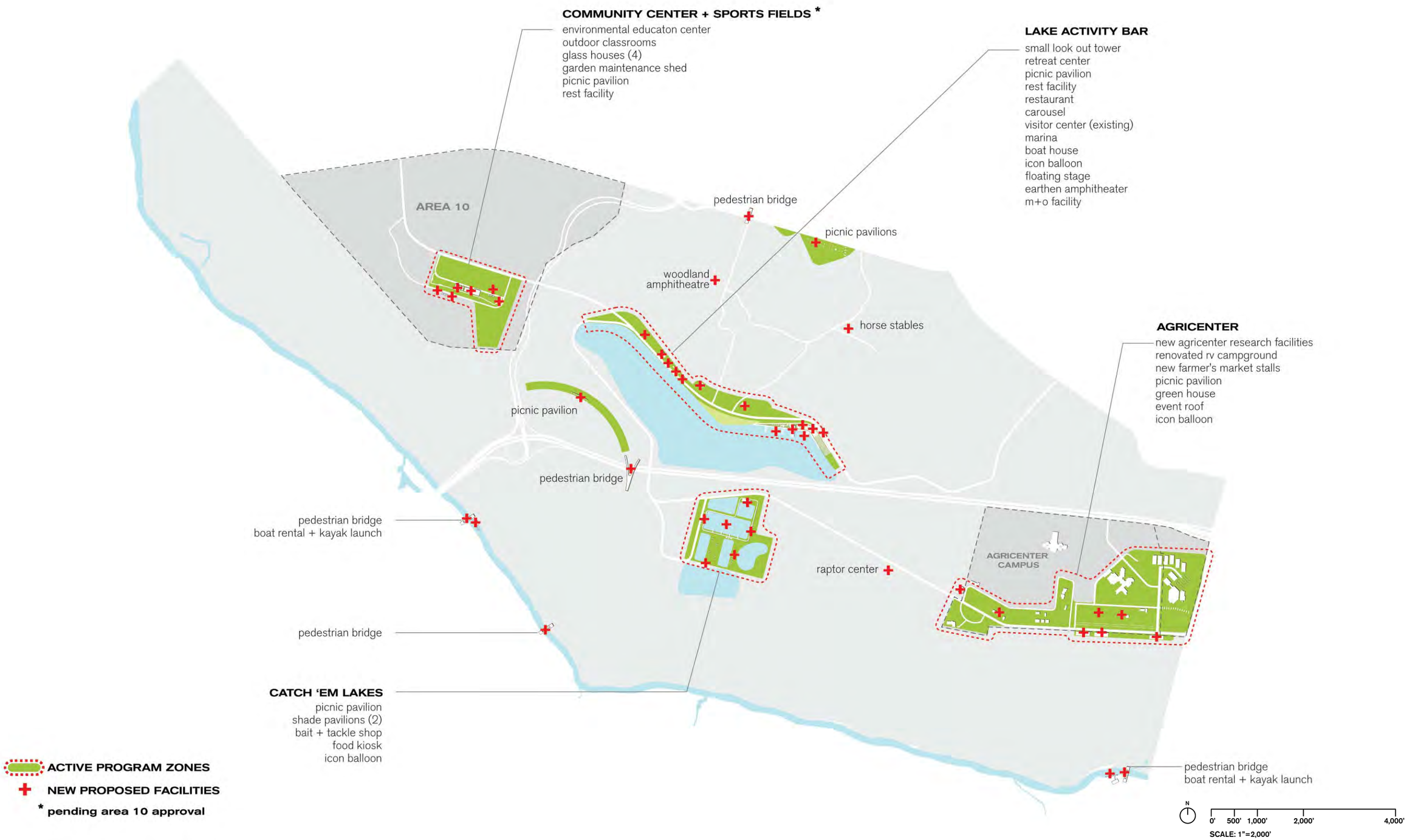
Shelby Farms Park will offer a broad range of facilities to accommodate both daily and special event uses. New facilities will be concentrated into four high-intensity areas: the Patriot Lake Activity Bar; the Catch 'Em Lakes mollusk farm and catfish ponds; the Community Center and Sports Fields; and the Agricenter. For the most part, these zones currently operate as active program areas within the Park and already offer service facilities and parking areas to support various activities. The Visitor Center is equipped with offices, restrooms, classrooms and a large outdoor terrace. In order to support a heightened concentration of new activities in these areas, facilities such as washrooms, change rooms, picnic shelters and rest facilities will be required.

The locations and form of these facilities have yet to be determined but when implemented would be complementary to the adjacent areas and other new facilities within Shelby Farms Park. New facilities proposed for each of the high-intensity areas are illustrated in the diagram to the right.

rest facility

woodland viewing tower

SMALL STRUCTURES + FACILITIES



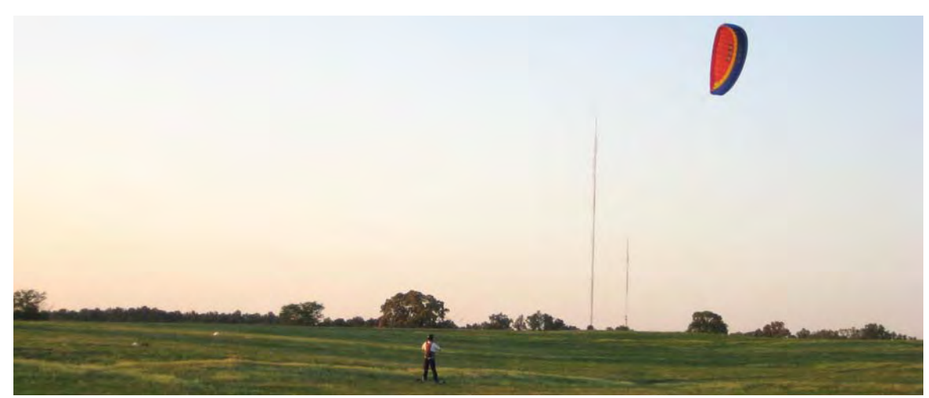
4.6 PROGRAM | ACTIVITIES + DESTINATIONS

Shelby Farms Park is already a defining amenity for Shelby County and will continue to grow into a world class amenity for the Memphis Region. The Master Plan aims to expand the development of an already lively mix of programs by enhancing extraordinary settings to accommodate an even broader range of activities at Shelby Farms Park.

The program strategy for the Master Plan aims to further define a distinctive programmatic identity for the Park that is contemporary, active and green. New Park programming will be organized and staged around existing natural resources, site features, and an existing recreational framework of trails, activities, productive landscapes and facilities.

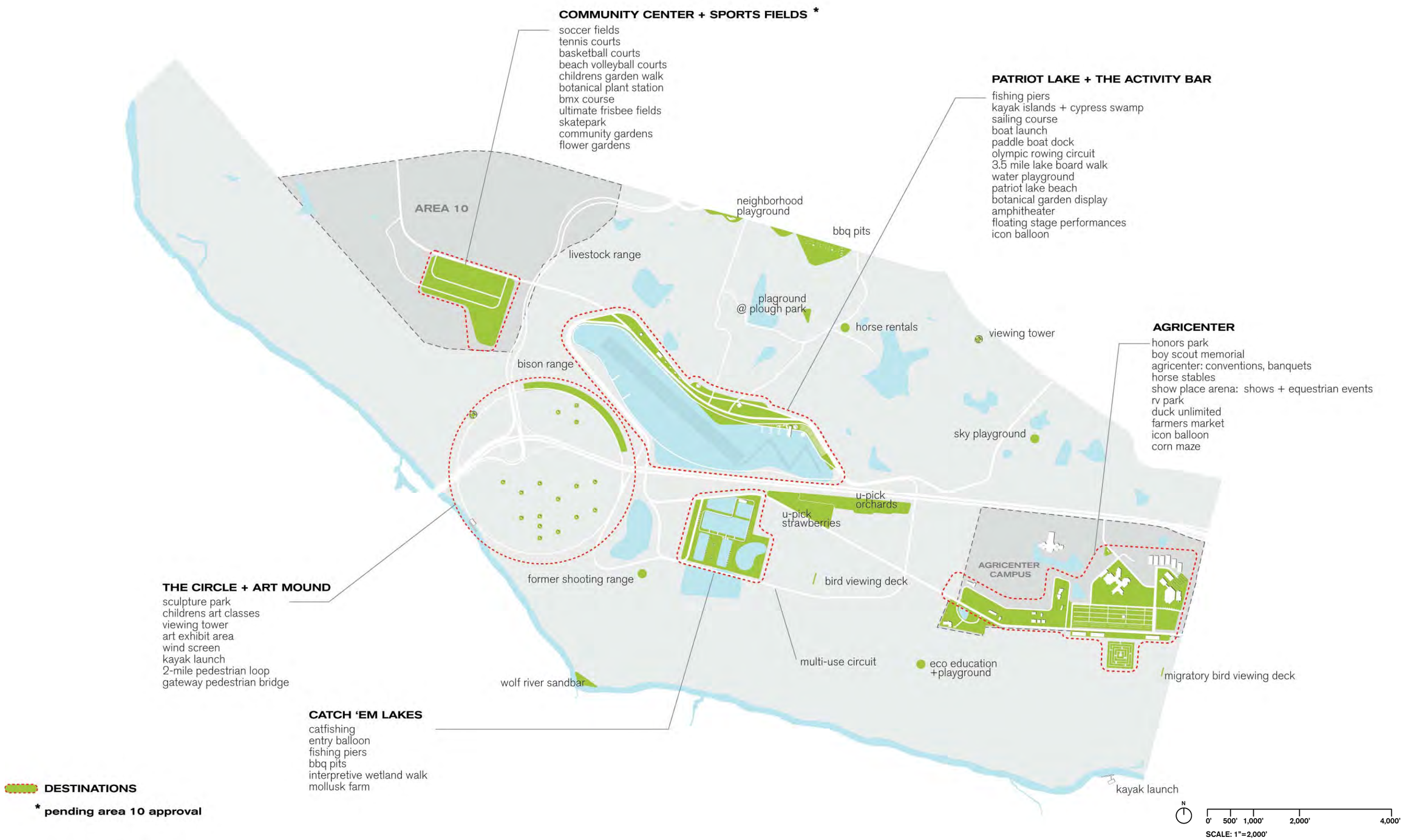
The many recommendations for additional recreation, educational amenities and cultural enrichment at Shelby Farms Park include:

1. Running, walking, cycling, rollerblading and seating along the new 5-mile multi-use circuit;
2. Hiking, mountain biking, horseback riding and running along the enhanced extensive network of multi-use trails;
3. Wading and swimming at the new Patriot Lake beach;
4. Kayaking, paddle boating, sailing, foiling, windsurfing, canoeing, kite boarding and rowing in the newly expanded Patriot Lake;
5. Exploring the unique habitat of the upland and bottomland forests;
6. Viewing the downtown skyline from a new woodland viewing tower;
7. Hosting picnics, bonfires and fireworks;
8. Renting a canoe for the afternoon on the Wolf River;
9. Paddling through the new Cypress Swamps at Patriot Lake;
10. Playing competitive soccer, tennis, basketball, ultimate frisbee and beach volleyball;
11. Eating at a new restaurant along the Patriot Lake activity bar;
12. Eating freshly caught catfish and shellfish at a new Catch 'Em Lakes cafe;
13. Touring emergent wetlands, native grasslands and successional forests;
14. Take a guided birdwatching tour through the Refuge;
15. Bringing children to the distinctive playgrounds and eco-education 'classrooms' scattered throughout the Park;
16. Enjoying sailing lessons at the lake boat clubs;
17. Fishing at Catch 'Em Lakes and the Patriot Lake Piers;
18. Riding a carousel next to Patriot Lake;
19. Watching a concert on a floating stage;
20. Picnicking and watching the sunset from an earthen amphitheater;
21. Observing and learning about bison, llama, goats, elk, rhea and Friesian cows;
22. BMX racing and skateboarding at a new extreme sports facilities;
23. Learning about farming, sustainable agriculture, renewable energy and natural resources;
24. Taking horseback riding lessons;
25. Training your dog and participating in a training clinic;
26. Picking fresh strawberries, apples, peaches, pecans, nectarines and plums at the Orchards;
27. Wandering through the outdoor sculpture park and observing various temporary art installations on the Art Mound;
28. Going on a tractor-pulled hay ride;
29. Walking along an interpretive wetland walk; and
30. Listening to live music at the woodland amphitheater.



kite boarding at plough park

ACTIVITIES + DESTINATIONS



4.6 PROGRAM | SUSTAINABILITY PRINCIPLES

Shelby Farms Park will be a defining park of the 21st Century. The Park celebrates life; wilderness; diverse forms of recreation and play; ecological restoration; and innovative measures for designing world-class parklands in creative, sustainable ways. Indeed, Shelby Farms Park can be a model for design and sustainable management practices for future parks in the Memphis Region and around the world. Given that Shelby Farms Park is very large, an adaptive approach for long-term sustainability demands the capacity for resilience - the ability to recover from a long history of disturbance, to adapt to a new state of health and to accommodate future change.

As a model park for the City of Memphis, Shelby Farms park should push innovative and sustainable practices for the following park operations:

Energy Strategies

Given its large scale and fairly remote natural areas, future planning and design at Shelby Farms Park should incorporate measures that reduce the overall energy consumption throughout the Park. Whether through energy saving - or producing (biomass, wind or solar) - fixtures and elements, Shelby Farms Park can set a new standard for energy savings in parks. Together with the Agricenter's mission of agricultural research and environmental conservation, Shelby Farms Park should continue to grow and expand crops such as corn, sweet sorghum and soybeans for bio-fuel production, research and educational purposes.

Stormwater Management

Water is a primary resource and feature in the Park that should be engaged to support an exceptional range of sustainable, natural areas and vegetal landscapes. Stormwater management design should improve water quality through nutrient uptake and reduced sediment discharge into the upland lakes and Patriot Lake. Vegetated filters, buffer strips, and other measures should be used to clean storm water prior to release. Stormwater design must account for the broad range of drainage areas in the park plan, including roadways and parking lots, aquatic environments and enhanced wetland, meadows and woodland areas, each which affects flow differently and requires unique methods of control.

Waste Management / Recycling

Given its size, the diversity of its landscape and the proposed intensity of programming, Shelby Farms Park will undoubtedly generate large amounts of waste through the normal maintenance of the Park and as a by-product of the park's numerous users and events. It will be critical to consider the potential for on-site composting of natural waste and the creation of a general maintenance facility that can process, store and effectively distribute the composted material. Equally critical is a smart approach to recycling materials such a paper, plastic, aluminum and glass that sets a precedent for both parks in general, and the Memphis Region specifically.

ALARM
20% LEL METHANE
10% LEL METHANE
PURGE ON
HORN OFF
OPERATE
% LEL METHANE
ENMET
CORPORATION

4.7 OPERATIONS + MAINTENANCE | MANAGEMENT STRATEGY

With public transportation, enhanced recreational amenities, and new programs, Shelby Farms Park is anticipated to attract large numbers of visitors and be subject to high levels of use throughout an extended seasonal period. Notwithstanding the fact that the Master Plan promotes the use of high quality, durable materials in the construction of the Park, the intensity of use will act as a stressor on the park landscape that will need to be addressed through the implementation of an effective and comprehensive maintenance program. The maintenance program will need to be developed to respond to the diversity of landscape types that comprise Shelby Farms Park as well as the myriad of programs that enliven the Park. Although much of the Park will be comprised of wild, natural landscapes, it should not be perceived that these areas will not require maintenance and management. In actuality these landscapes may require a more intensive degree of management in the early stages of succession than traditional pastoral landscapes to facilitate the establishment of new plantings and catalyze succession. The maintenance program will need to be developed in consideration of both specific short-term and routine maintenance requirements and long-term management needs.

MAINTENANCE FACILITY

Given its size, the diversity of its landscape and intensity of programming, Shelby Farms Park will require a dedicated central maintenance facility to house the equipment and materials necessary to maintain the park landscape and to serve as a base of operations for park maintenance personnel. Although the Shelby Farms Park Conservancy staff will ultimately determine precise facility needs, specifications and location, the following preliminary recommendations have been provided for consideration in the future planning process.

In consideration of the configuration and size of Shelby Farms Park, the maintenance facility is situated centrally, with easy accessibility to the core active zones of the Park. The facility is located so that it is accessible by public transit and proximate to cycling routes with the objective of providing staff with alternative transportation options. The facility itself should be designed with a view to integrating the building and compound discretely into the landscape. The architecture of the building should be integrated with and complementary to the image and character of other buildings and structures within the Park. The facility should be designed with consideration given to its relationship with adjacent natural heritage features and habitats and their functions. The facility should be designed to accommodate the Park's maintenance and administrative staff, vehicles, equipment and supplies within a secure compound that is located away from primary activity areas and adjacent residential communities.

MANAGEMENT INTENSITY

Shelby Farms Park is comprised of a mosaic of landscape types knitted together to accommodate a broad spectrum of recreational, social, practical and ecological objectives.

Each of these landscape types is subject to different stresses and is required to support varying programmatic objectives at different times throughout the year. In order to ensure that each landscape type functions as intended over the long term, differing management regimes will be further defined in order to be applied to each new landscape type.

Management regimes can vary from the intensive and frequent to limited and periodic, contingent on anticipated intensity of use, seasonal demand and desired ecological function and evolutionary outcome within the overall park landscape. The distinct landscape types that comprise Shelby Farms Park include:

- Active Surfaces
- Managed Woodland
- Passive Parkland
- Managed Meadow
- Managed Agriculture
- Landfill

The location of each management area within the overall context of Shelby Farms Park is illustrated in the plan to the right.

park maintenance

PARK MAINTENANCE AREAS

5.0 PARK LANDSCAPE AREAS

5.1 12 LANDSCAPE ROOMS | OVERVIEW

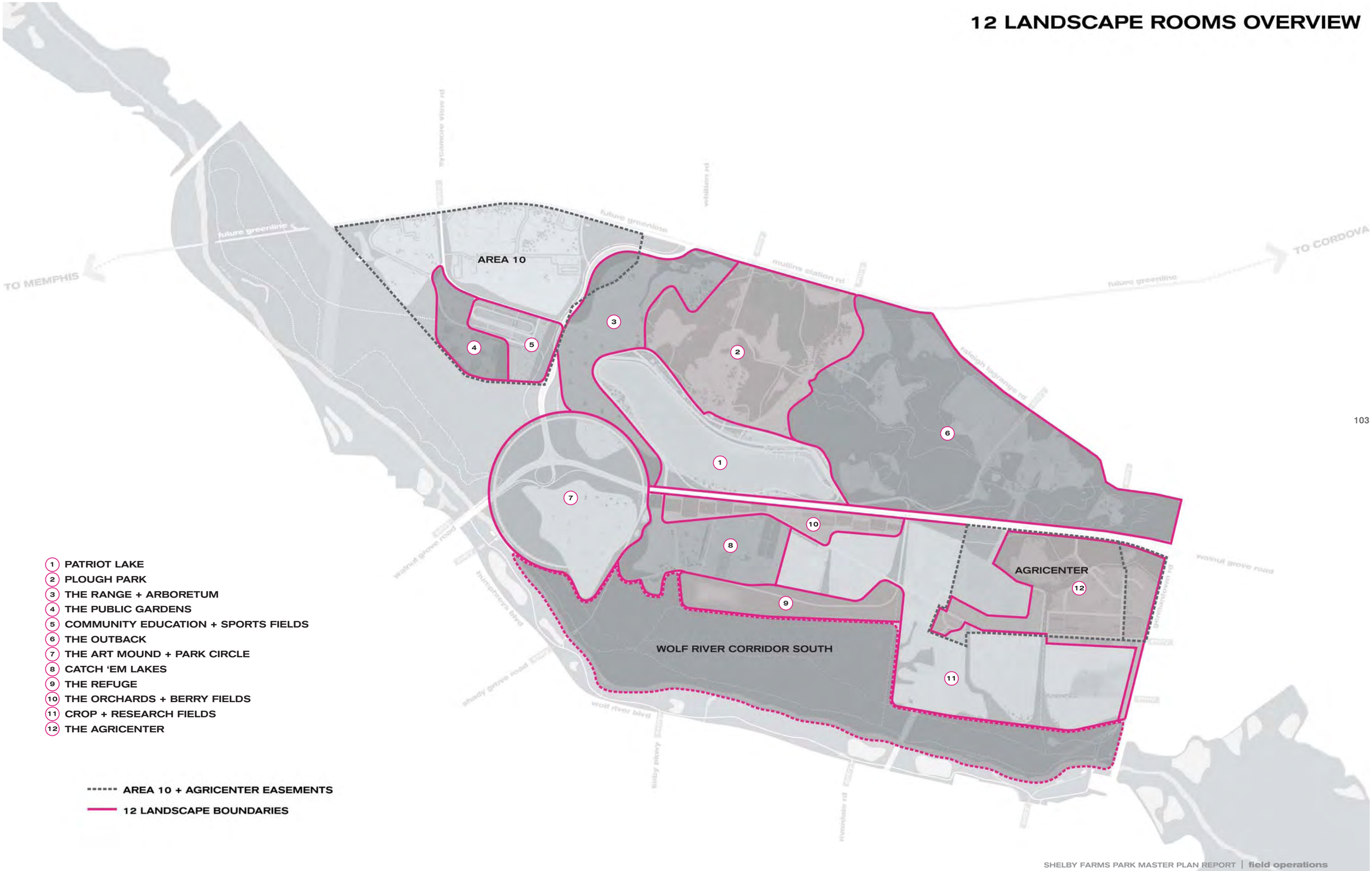
Shelby Farms Park will be one of the defining recreational amenities of Memphis and the region. The Park is big and offers a diverse range of landscapes - from vast pastoral farmland to intimate playgrounds to extensive wild woodlands. Varied zones of distinct character within the 4,500-acre site offer dramatically different landscape experiences and opportunities for Park programming. The Master Plan attempts to enhance and exploit the unique beauty and distinctive recreational settings of the existing Park through the development of 12 landscape rooms.

The development of these landscape rooms has several benefits for Shelby Farms Park including: definition of distinct landscapes with discrete physical and programmatic characteristics; a coherent "sense-of-place" structure for the many varied user groups; and a potential fund-raising mechanism for the Park where user and donor groups can be specifically aligned with certain areas and features of the Park. The 12 landscape rooms are defined by existing site qualities that draw specific user groups, existing and historic land uses, and boundaries identified in the Conservation Easement.

Consultation with existing Park users, boaters, and activists has been instrumental in defining the full range of characteristics, qualities and features that make the existing places so memorable. Continued consultation with the public and Stakeholders through subsequent design phases will be critical to the Park's success.

The proposed definition of 12 landscape rooms, concentrated program zones, a strong identity, clear access and areas of refuge are strategic; they represent a solid and practical means of creating a connected parkland without being overly prescriptive or transformative. The effect will be a vast, fully accessible landscape that is defined by a richly varied collection of places for play (5 of the 12 rooms have playgrounds), big activities, exploration, learning, wildlife and refuge.

12 LANDSCAPE ROOMS OVERVIEW



5.2 12 LANDSCAPE ROOMS | PATRIOT LAKE

233 ACRES

The iconic centerpiece of the entire Shelby Farms Park is an expanded Patriot Lake - nearly three times the size of the existing Patriot Lake. At 150 acres in area - more than one mile in length and three miles in perimeter - the Lake offers a major regional attraction for various water sports, including a 1.25 kilometer rowing course and facilities for sailing, windsurfing, kayaking, and paddle-boating. It is intended that the Lake only support non-motorized boating activities, and that different areas of the Lake be assigned to different kinds of boating and watersports.

The Lake Activity Bar will be the active and playful heart of the Park. A boathouse, a marina, a water playground, equipment rental facilities, a restaurant, a generous swimming beach, and spectator lawns line the northern edge of the Lake. As one of the concentrated program zones, this area creates opportunities for a diverse array of waterfront experiences and programs that cannot be found elsewhere in Memphis. The existing topography lends itself to a gently sloping, sculpted earthwork amphitheater nestled into the north-eastern elbow of the lake. Informal lawn terraces set into the existing slope will allow an audience to watch a performance against the backdrop of the lake and the setting sun. The expanded lake and adjacent activity bar will allow the Park to hold various large scale events (festivals, competitions and performances) that will generate revenue for enhancement and maintenance of the overall park.

DESIGN OBJECTIVES

- Create a rich and eventful landscape that supports diverse forms of recreation and passive play;
- Showcase a diverse range of landscape settings along the Lake perimeter - for passive enjoyment and ecological health;
- Ensure that existing Lake and Lake-side uses are preserved and/or enhanced;
- Establish hydrologic linkages with other lakes and sloughs to increase the ecological and sustainable character of Patriot Lake; and
- Develop landscape treatments for screening Walnut Grove Road from the interior views of the Lake landscape.

1 SMALL VIEWING TOWER
2 PARKING LOT
3 RETREAT CENTER
4 RESTAURANT
5 PICNIC PAVILION
6 BOAT + EQUIPMENT RENTAL
7 REST FACILITY
8 ICON BALLOON
9 TREE ALLEE
10 SWIMMING BEACH
11 VISITOR CENTER (EXISTING)
12 BOTANICAL DISPLAY GARDENS
13 BOAT LAUNCH
14 MARINA
15 WATER PLAYGROUND
16 BOAT HOUSE
17 CAROUSEL
18 EARTHEN AMPHITHEATER
19 FLOATING STAGE
20 M+O FACILITIES (15,000 SF) AND 2-ACRE YARD
21 SAILBOAT COURSE
22 SWAMP CYPRESS GROVE
23 3-MILE BOARDWALK
24 FISHING PIERS
25 1250 METER / 1.25 KILOMETER ROWING COURSE
26 SWAMP CYPRESS GROVE
27 EXPANDED PATRIOT LAKE
28 MULTI-USE CIRCUIT
29 PATRIOT LAKE ROAD NORTH
30 CONTROLLED SWIMMING AREA
31 EXISTING PATRIOT LAKE FOOTPRINT (FOR REFERENCE)
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

5.2 12 LANDSCAPE ROOMS | PLOUGH PARK

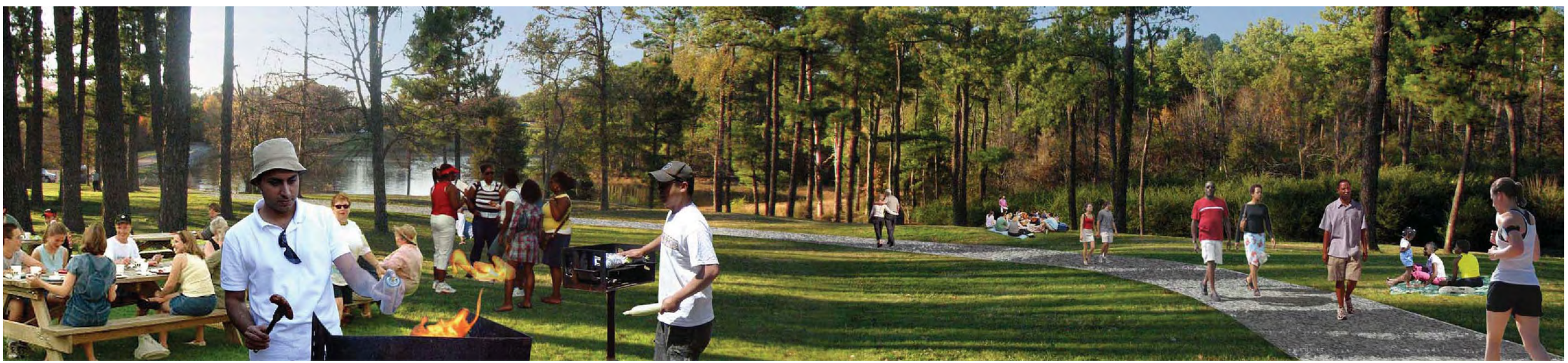
308 ACRES

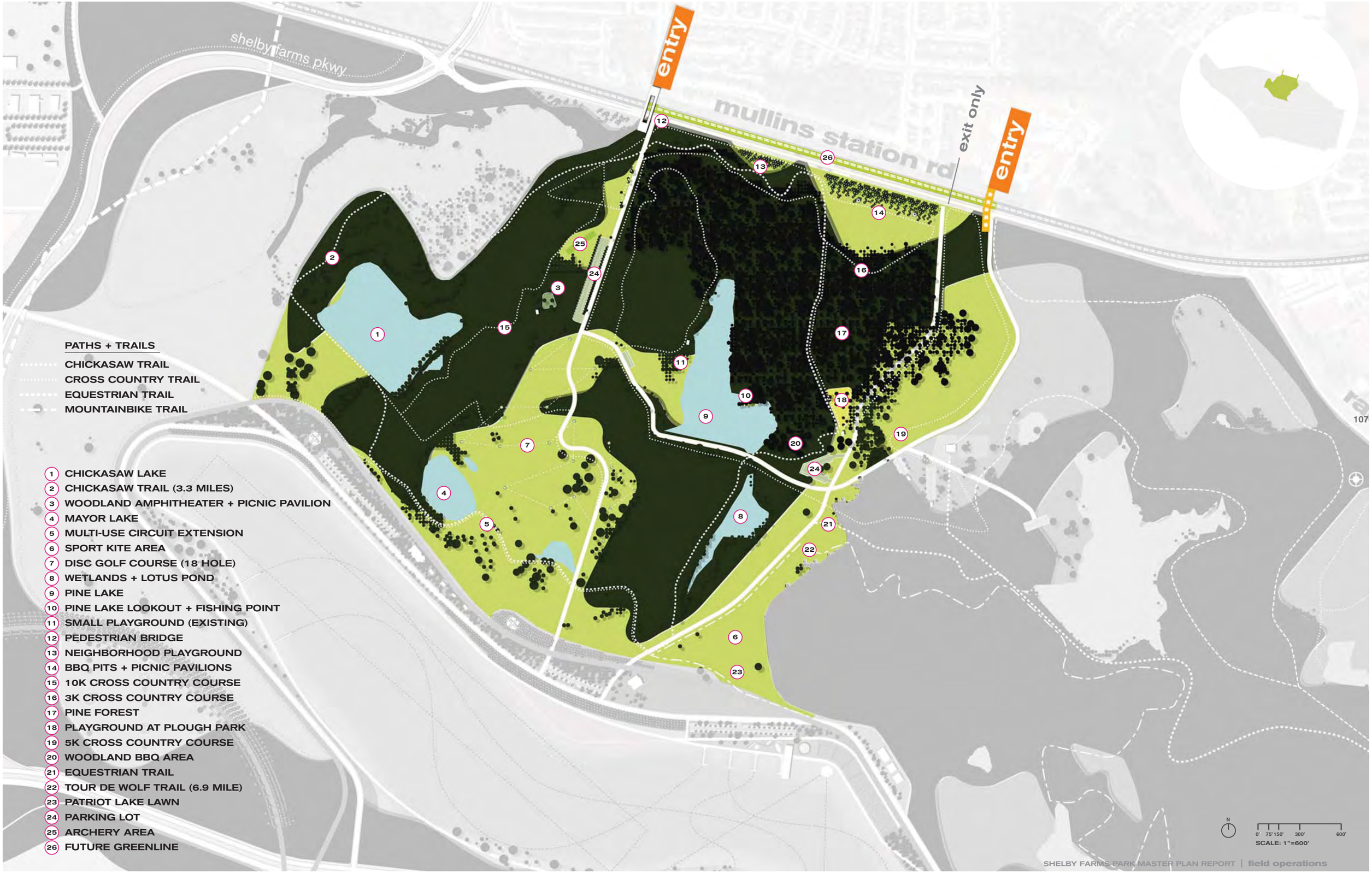
The most pastoral and intense area of the Park, Plough Park is a centerpiece of domestic visitor activity and scenic settings. Rolling hills and hollows create a landscape with extraordinary vistas, panoramic overlooks and various scaled spaces for Park use. Extensive paths and trails support strolling, jogging, cross country running, cycling, mountain biking, roller blading and dog walking, while providing access to lawn and lake areas for swimming, picnics, barbecue cookouts, disc golf, informal games and play.

Two existing playgrounds can be found in Plough Park today, the larger of which (referred to as the playground at Plough Park in the plan shown opposite) has been voted one of the most popular playgrounds in Memphis. The Master Plan aims to expand and enhance this popular amenity as a regional draw for the Park. A new, smaller playground along Mullins Station Road will serve the neighborhoods north of the Park and the anticipated influx of visitors from the adjacent future greenline. There are also dedicated areas for archery, tai-chi, yoga, outdoor classrooms and children's playgrounds.

DESIGN OBJECTIVES

- "Refresh" and expand the existing network of pedestrian and multi-use trails to create a world-class destination;
- Preserve existing park uses and much-loved elements and settings;
- Restore and reconnect the network of upland lakes and sloughs to establish a more ecologically sustainable water system; and
- Restore and enhance existing forest landscapes through selective management of the vegetal understory, increased canopy plantings and greater connectivity between the various forest stands.




shelby farms pkwy
mullins station rd
entry
entry
exit only
PATHS + TRAILS
CHICKASAW TRAIL
CROSS COUNTRY TRAIL
EQUESTRIAN TRAIL
MOUNTAINBIKE TRAIL
1 CHICKASAW LAKE
2 CHICKASAW TRAIL (3.3 MILES)
3 WOODLAND AMPHITHEATER + PICNIC PAVILION
4 MAYOR LAKE
5 MULTI-USE CIRCUIT EXTENSION
6 SPORT KITE AREA
7 DISC GOLF COURSE (18 HOLE)
8 WETLANDS + LOTUS POND
9 PINE LAKE
10 PINE LAKE LOOKOUT + FISHING POINT
11 SMALL PLAYGROUND (EXISTING)
12 PEDESTRIAN BRIDGE
13 NEIGHBORHOOD PLAYGROUND
14 BBQ PITS + PICNIC PAVILIONS
15 10K CROSS COUNTRY COURSE
16 3K CROSS COUNTRY COURSE
17 PINE FOREST
18 PLAYGROUND AT PLOUGH PARK
19 5K CROSS COUNTRY COURSE
20 WOODLAND BBQ AREA
21 EQUESTRIAN TRAIL
22 TOUR DE WOLF TRAIL (6.9 MILE)
23 PATRIOT LAKE LAWN
24 PARKING LOT
25 ARCHERY AREA
26 FUTURE GREENLINE
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

5.2 12 LANDSCAPE ROOMS | THE RANGE + ARBORETUM

212 ACRES

An extensive open landscape of fields supports a bison herd in the lower area and a collection of stunning southeastern specimen trees in the upper area. The existing bison herd will be added to in number and the area of range expanded to create a regional attraction. Other livestock such as llama, goats, elk, rhea and Friesian cows will also have dedicated pastures as part of a larger animal husbandry exhibit.

The arboretum area will feature distinctive and unusual tree specimens, both native and cultivar, as well as some of the finest examples of flowering trees, all set individually within expansive meadows. This large area can also support kite-flying, strolling and jogging.

DESIGN OBJECTIVES

- Cultivate the open vistas, distinctive character and public attraction of the Livestock fields;
- Enrich the educational aspects of the pastures through an increase in the range of livestock;
- Ensure that the pastures are developed and managed in a manner that contributes to the sustainability objectives of the Park; and
- Increase the aesthetic qualities of the fields with the introduction and curation of a unique range of tree specimens.

mullins st
entry
entry
1 BISON RANGE
2 BISON WATER HOLE
3 LIVESTOCK FENCE
4 SPECIMEN TREES
5 KITE-FLYING
6 LIVESTOCK RANGE
7 NATIVE MEADOWS
8 CHICKASAW TRAIL
9 ARBORETUM
10 PEDESTRIAN TRAIL
11 SHELBY FARMS PKWY / KIRBY-WHITTEN PKWY
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

5.2 12 LANDSCAPE ROOMS | THE PUBLIC GARDENS

52 ACRES

The Public Gardens improve, expand and enrich the existing senior gardens area. Pathways, hedgerows, small storage sheds, picnic pavilions and restrooms enrich the existing gardens to support more year-round activity by a wider range of gardeners. There will also be areas devoted to exhibition, display and flower markets for broader public enjoyment and horticultural education. The public gardens fall within the northwest quadrant of the Park referred to as 'Area 10' and all proposals within this zone will require Shelby County approval.

DESIGN OBJECTIVES

- Preserve and expand the interactive, community garden landscape;
- Increase the visibility of the gardens through distinctive signage and community outreach;
- Establish linkages with youth programs and schools in the greater Memphis area to further cultivate a rich and broad educational aspect to the gardens; and
- Encourage diverse and sustainable agricultural practices as a means to showcase the innovations involved in organic farming.

1 INFORMAL FIELDS
2 PUBLIC GARDEN PLOTS
3 VEHICULAR ACCESS ROAD
4 GARDEN MAINTENANCE SHED
5 PICNIC PAVILION
6 REST FACILITY
7 SPECIMEN TREES
8 PARKING LOT

N

0' 50' 100' 200' 400'
SCALE: 1"=400'

5.2 12 LANDSCAPE ROOMS | COMMUNITY CENTER + SPORTS FIELDS

45 ACRES

A new community center and sports fields located in the northwest quadrant of the Park will help accommodate the increasing number of children and families settling in the area. Given its size, Shelby Farms Park is an ideal location for large recreational facilities and can offer a venue for underrepresented activities (such as ultimate frisbee, beach volleyball, climbing, BMX and skate boarding) in the state and Mid-South region. Intended to comprise the bulk of structured recreational programs, this room will include: a running track, a climbing wall, various sports fields and courts, a skatepark facility and a world class BMX circuit (relocated from its current home adjacent to the landfill). This concentration of diverse programs will promote cross hybridization of activities in a safe environment, while simultaneously offering entertainment to all Park users.

These recreational amenities will be anchored by a community center with a special focus on issues related to health, environment, recreation and education in order to capitalize upon the resources of the larger Park. Such public amenities require easy access and benefit from being part of a larger social district of diverse activities in order to share basic infrastructures and resources for a more successful, efficient and lively environment.

Located within 'Area 10', this room is adjacent to myriad governmental facilities and is highly accessible to the whole community. All proposals within this zone will require 'Area 10' approval.

DESIGN OBJECTIVES

- Promote a model, innovative and destination facility for environmental, sustainable agricultural and earth sciences education;
- Promote cross hybridization of activities in a safe environment where families of all ages can recreate and play;
- Cultivate relationships with local school districts, universities, the Agricenter and regional environmental programs to create greater depth to the activities, educational services and resources offered; and
- Create a broad range of recreation and playing fields that can be shared by the community center and the public alike, thereby linking the educational programs with facilities for health, fitness, well-being and public enjoyment.

1 SOCCER FIELD
2 TENNIS COURTS (4)
3 BASKETBALL COURTS (3)
4 PARKING LOT
5 SOCCER FIELD
6 SOCCER FIELD
7 CLIMBING WALL
8 OUTDOOR CLASSROOM
9 GLASS HOUSES (4)
10 ENVIRONMENTAL EDUCATION CENTER
11 PICNIC PAVILION
12 OUTDOOR CLASSROOM
13 SMALL CONCESSION STAND
14 CHILDREN'S GARDENS
15 BEACH VOLLEYBALL COURTS (5)
16 ICON BALLOON
17 BMX COURSE
18 SKATE PARK (10,000 SF)
19 ULTIMATE FRISBEE FIELDS (4)
20 EQUESTRIAN TRAIL
21 LAWN
N
0' 50' 100' 200' 400'
SCALE: 1"=400'

5.2 12 LANDSCAPE ROOMS | THE OUTBACK

610 ACRES

An extensive, rolling landscape of large meadows, lakes and woodlands provides a setting for large-scale recreation activities such as horse back riding and equestrian sports, dog training, mountain bike trails, cross-country running, hiking and camping. Different areas of the Outback will be assigned to particular user-groups to avoid conflict, while paths and trails would allow for extensive sharing of this large landscape. The Outback will be managed over time to sustain its large, open scale and sense of pastoral "country."

The existing network of horseback riding, mountain biking and cross country running trails will be improved and expanded. A viewing tower sited at the Park's high point (just off Raleigh Lagrange Road) will rise up through the woodland canopy and offer stunning views toward downtown Memphis and the surrounding Shelby County.

DESIGN OBJECTIVES

- Preserve existing Park uses and the much-loved, expansive settings;
- "Refresh" and expand the existing network of equestrian and multi-use trails;
- Restore and enhance existing meadow and forest landscapes through sustainable, ecological management practices;
- Promote stronger wildlife habitat landscapes by creating greater connectivity between the various forest stands; and
- Improve the existing hydrological system to guarantee the long term sustainability of the Park's stormwater functionality, groundwater elevations and surface water quality.

raleigh lagrange rd
entry
entry
PATHS + TRAILS
CHICKASAW TRAIL
CROSS COUNTRY TRAIL
EQUESTRIAN TRAIL
MOUNTAINBIKE TRAIL
1 HORSE RENTAL STABLES
2 HORSE PASTURE
3 BEAVER LAKE
4 FISHING PIER
5 PARKING LOT (EXISTING)
6 BOY SCOUT LAKE
7 10K CROSS COUNTRY COURSE EXTENSION
8 VIEWING TOWER
9 HORSE JUMPING CIRCUIT
10 RETRIEVER CLUB TRAINING
11 PATTERN LAKE ROAD
12 PATTERN LAKE
13 GAS LINE
14 RESTORED GRASSLANDS
15 OFF-LEASH DOG AREA
16 INDIAN LAKE
17 EQUESTRIAN TRAIL
18 WILLOW LAKE
19 PARKING LOT
20 TOUR DE WOLF TRAIL
21 MULTI-USE CIRCUIT
600'

5.2 12 LANDSCAPE ROOMS | THE ART MOUND + PARK CIRCLE

282 ACRES

Pending a landfill assessment and feasibility study, the old landfill mound will be transformed into a new venue for large-scale outdoor sculpture and public art. The abstractness of the flat-top mound and level horizons lends itself to extraordinary interpretation by artists. We imagine a rotating series of installations by both regional and international artists, curated around themes such as “Memphis Outdoors,” “Sustainability” or “Climate Change.” Such programming would bring high visibility to the Park as an arts and culture destination.

The Park Circle is a pedestrian and multi-use loop path (stone dust) that circumnavigates the landfill mound, Shelby Farms Parkway (Kirby-Whitten Parkway) and Walnut Grove Road through a series of pedestrian bridges and at-grade underpasses. The Park Circle connects the Park to a pedestrian bridge across the Wolf River, which links to the Germantown Greenway and neighborhoods to the south and west of the Park. The circular path passes through the Wolf River Corridor forest, across the landfill mound and along side the Bison Range. A distinctive shade tree allee buffers the Park Circle path from the Bison Range and helps to enclose a small sculpture park and several sculptural play features just inside the circle.

Also pending a feasibility study, possibilities for methane collection will be considered.

DESIGN OBJECTIVES

- Coordinate with Shelby County and on-going geo-technical studies to ensure that clear criteria is established with regard to Master Plan proposals and future public access;
- Promote an appropriate land-use for the landfill mound that supports the educational, scenic and cultural goals of the Park, while ensuring that the integrity and performance of the landfill surface is preserved and/or improved; and
- Explore alternative forms of suitable land-uses - whether art or energy-based - to ensure that there is broad public appeal to the experience of this feature. The image presented below is only an impression of one temporary art installation. A broad range of alternatives will be explored and coordinated with County and Conservancy review.

entry
walnut grove road
entry
humphreys blvd
wolf river
entry
1 SHELBY FARMS PKWY / KIRBY WHITTEN PKWY
2 PEDESTRIAN TUNNEL
3 THE CIRCLE TRAIL
4 VIEWING TOWER
5 WALNUT GROVE ROAD BIKE TRAIL CONNECTION
6 PEDESTRIAN UNDERPASS
7 PEDESTRIAN BRIDGE
8 KAYAK LAUNCH + BOAT RENTAL
9 WOLF RIVER GREENWAY
10 PARKING LOT (EXISTING)
11 TEMPORARY ART INSTALLATIONS
12 LANDFILL MOUND
13 "Y" PEDESTRIAN BRIDGE
14 SCULPTURE PARK
15 SPECIMEN TREES
16 SHADE PAVILION
17 TREE ALLEE
18 SCULPTURAL PLAY FEATURES
19 LANDFILL MAINTENANCE FACILITIES
20 MULTI-USE CIRCUIT
21 MULTI-USE TRAIL CONNECTION TO SHADY GROVE RD
22 WALNUT GROVE ROAD
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

5.2 12 LANDSCAPE ROOMS | CATCH 'EM LAKES

126 ACRES

The existing fish farm ponds will be enhanced to create a regional attraction centered around fishing, fish cultivation and mollusk farming. There will be a boardwalk, fishing piers, a bait and tackle shop, a mollusk farm, exhibits where one can learn about fish species and cultivation and a small restaurant for sampling local fish and shellfish delicacies. Wetland edges will ensure the health and vitality of the aquatic ecosystems, while also enhancing the scenic and educational value of the area.

Two of the three southern most ponds at Catch 'Em Lakes are mostly dry and lend themselves to fantastic wetland garden plantings. The third pond (the center pond) is completely dry and will be replaced with a pine forest bosque and BBQ pits for picnics and gatherings. Three large shade structures and new canopy trees will offer a shaded respite from the sun while fishing, wildlife viewing and picnicking.

DESIGN OBJECTIVES

- Expand and diversify the Catch 'Em Lakes to create a greater range of recreational, educational and ecological experiences;
- Cultivate distinctive landscape settings - with shaded lawns, beautiful canopy trees, boardwalks, fishing piers, and picnic areas - to maximize public enjoyment and further define the ponds as a regional destination; and
- Promote innovative water filtration and management techniques to increase the ecological role of the ponds, as well as to further define Shelby Farms Park as a showcase of leading environmental land management practices.

1 BAIT + TACKLE SHOP
2 CAFE / RESTAURANT
3 ICON BALLOON
4 CATCH 'EM LAKES
5 FISHING PIERS
6 BAMBOO GROVES (MANAGED)
7 SHADE PAVILION
8 PARKING LOT
9 WETLAND GARDENS
10 BBQ PITS + PINE BOSQUE
11 MOLLUSK FARM
12 MULTI-USE CIRCUIT
13 PATRIOT LAKE ROAD SOUTH
14 TRAP LAKE ROAD
15 TRAP LAKE
16 MODEL ROCKET AREA
17 FORMER SHOOTING RANGE
18 ENTRY BOSQUE
N
0' 50' 100' 200' 400'
SCALE: 1"=400'

5.2 12 LANDSCAPE ROOMS | THE REFUGE

90 ACRES

This part of the site already functions as a bird sanctuary and wetland area. The Mid-South Raptor Rehab Center is located in the north-east corner of this area on Moore Road (Ham Smythe, III Road). The Refuge is envisioned as an enhancement of the existing bird sanctuary into an extensive nature reserve and bird refuge habitat, linking water resources, wetlands, meadows and woodlands to the forests of the Wolf River Corridor.

Over time, this area can be managed to create an extraordinarily diverse ecology of aquatic, amphibian, insect, mammal and bird life, living within a naturalized landscape of meadows, thickets and wetlands. The Refuge will manage habitat to maximize the production of food for wildlife and offer a great scenic and experiential amenity to nature lovers, bird-watchers, walkers and ecologists. The adjacent agricultural fields can be planted with crops such as corn, milo (sorghum), millet, and winter wheat to supplement natural foods that occur on the Refuge. Refuge farming provides ideal feeding and resting areas for thousands of migrating and wintering waterfowl.

DESIGN OBJECTIVES

- Develop suitable management practices that ensure that the Refuge develops into a healthy, diverse and self-sustaining habitat landscape;
- Promote coordination between habitat and recreational uses;
- Develop a delicate, ecologically sensitive approach to public access and exposure to the unique habitat environments; and
- Establish clear connections to the Lucius Burch Natural Area and the Wolf River.

POTENTIAL REFUGE CROP AREA
POTENTIAL REFUGE CROP AREA
1
2
3
4
5
6
1 VIEWING DECK + SHADE PAVILION
2 MEANDER LAKE
3 WETLANDS
4 MULTI-USE CIRCUIT
5 WET FOREST
6 RAPTOR CENTER
N
0' 50' 100' 200' 400'
SCALE: 1"=400'

5.2 12 LANDSCAPE ROOMS | THE ORCHARDS + BERRY FIELDS

59 ACRES

A new orchard and tree farm running along the southern edge of Walnut Grove Road and adjacent to the Agricenter will help to provide an important local food resource that would be part of the farmers market operation. The orchard both frames the Walnut Grove Road corridor and screens the interior of the Park from vehicular traffic. The orchard could cultivate pecans, figs, nectarines, plums, peaches, apples and pears. A large pick-your-own strawberry field will be located just south of the orchards.

The operational and horticultural aspect of the orchard, tree farm and strawberry fields could also offer great educational benefits as well as beauty and economy. By linking the term "farming" with trees, the Park will communicate the concept of sustainable production of forest products over time and will create an on-site method to help grow the 1,000,000 million new trees proposed for the Park. The Shelby Farms Park free farm blocks will be varied in nature and will contain many different habitats and stages of forest regeneration, from seedlings to mature trees.

DESIGN OBJECTIVES

- Coordinate with the Agricenter to create a unique public amenity that supports their educational and economic goals;
- Establish linkages with local and regional youth programs and schools to ensure that the orchard is a productive, highly visible and much-loved community resource in the Park; and
- Utilize a broad range of fruit and nut species to maximize aesthetic appeal, ensure economic productivity and increase the interactive and educational experiences of the Park's agricultural landscape.

1 NATIVE WILDFLOWER MEADOW
2 TREE FARM BOSQUES
3 FRUIT + NUT ORCHARDS
4 STRAWBERRY FIELDS
5 SUNFLOWER STRIP
6 WHITE TRAIL
7 MULTI-USE CIRCUIT
8 PARKING LOT
9 SHAKE SHACK
10 GREEN BRIDGE
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

5.2 12 LANDSCAPE ROOMS | CROP + RESEARCH FIELDS

454 ACRES

The extensive area of agricultural fields should continue to be used as a research farm - for genetic hybridization of new crops and food sources; for conducting reasearch (including alternative energy resources and the development of new agricultural technologies); and for protected research plot land leases. The Agricenter works with universities, agricultural companies and various farm research partners in R+D and product evaluation. While the agricultural fields are a well-loved and expansive presence within the Park, they need to be maintained as working research fields with limited public access. The Agricenter offers significant programs and demonstrations of advanced agricultural technologies and products to showcase their resources to the public.

Field research services are conducted on Mid-South crops such as: corn, cotton, rice, soybeans and wheat. Several areas of the research fields are used seasonally for alternative programmatic purposes such as: a seasonally flooded wetland area for migrating waterfowl and a corn maze.

DESIGN OBJECTIVES

- Foster the Agricenter's mission to showcase agriculture through educational programs and demonstrations of the most advanced agricultural technologies, techniques and products;
- Continue to promote the forum for individuals, universities and agricultural companies to share first-hand information with each other, as well as make face-to-face contact with researchers, educators, manufacturers and government officials;
- Manage and develop the fields and research plots in a manner that is consistent with the Conservation Easement;
- Develop a means for public experience and enjoyment through a clear network of accessible paths and drives, each contributing to the aesthetic goals of the Master Plan; and
- Establish clear connections to the Lucius Burch Natural Area and the Wolf River.

1 RESEARCH FIELDS
2 WIND TURBINES
3 CROP PRODUCTION
4 SEASONAL CORN MAZE
5 WETLAND (SEASONAL FLOODING FOR MIGRATING WATERFOWL)
6 WET FOREST
entry
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

5.2 12 LANDSCAPE ROOMS | THE AGRICENTER

233 ACRES

The centerpiece of the agricultural heritage of the site is the Agricenter, with a focus upon advancing agricultural practices and improving the cultivation of land, the provision of food and the sustaining of the environment. The existing Agricenter can be further enhanced and expanded by allocating an Agricenter "Campus" along Moore Road (Ham Smythe, III Road). Such an area designated to accommodate new facilities (such as greenhouses, research laboratories, and other facilities for various private, public and entertainment events) associated with future growth will allow these new venues to share basic infrastructures and thereby create a high degree of economic and environmental efficiency in their implementation.

In addition to the designation of an Agricenter "Campus", the Master Plan promotes several public amenities to further knit the resources of the Agricenter into the whole of the Park. Three large event roofs will house an expanded farmer's market, festivals, fairs, demonstrations, lectures, workshops and performances. A generous cookout facility and renovated RV camp area with tree bosques, courts and picnic pavilions to increase useablility and appeal will generate additional revenue. Improved signage and educational resources will also enhance the Agricenter operations and increase visitorship. The Agricenter should be a major attraction for the Park as a whole in terms of the programs and events it supports.

DESIGN OBJECTIVES

- Expand the reputation and role of the Agricenter as a cutting-edge, international resource for agricultural research and industry collaboration;
- Foster greater physical and thematic and linkages between the educational programs of the future Shelby Farms Park and the Agricenter; and
- Continue to promote the Agricenter facilities as destination venues for private, public and entertainment events (weddings and receptions, banquets, trade shows, conventions, equestrian events, festivals, concerts, circuses, trade shows, car & boat shows, etc.).

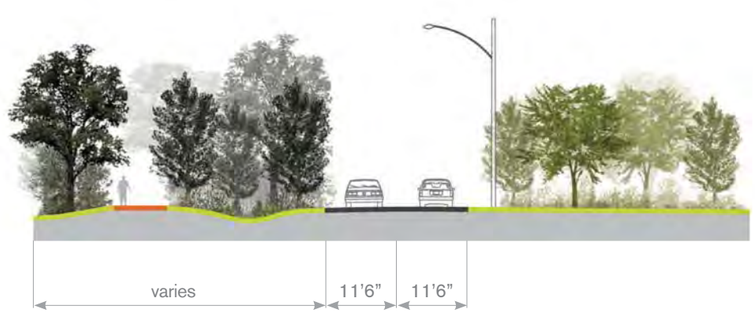
1 FARM EQUIPMENT TRAINING FACILITY
2 AGRICENTER RESEARCH CAMPUS
3 DUCKS UNLIMITED
4 DUCKS UNLIMITED LAKE + CYPRESS SWAMP
5 BOY SCOUT HONOR PARK
6 RENOVATED RV PARK
7 COURTS
8 PARKING LOT (EXISTING)
9 PICNIC PAVILION
10 EXPO CENTER
11 STABLES
12 OUTDOOR ARENA
13 MULTIPURPOSE ARENA
14 WARM-UP BUILDING
15 MAIN SHOW PLACE ARENA
16 RESTAURANT
17 PARKING LOT
18 EVENT ROOF
19 TREE ALLEE
20 WHITE TRAIL (RE-ROUTED)
21 GERMANTOWN RD BOSQUE
22 SUNFLOWER STRIP
23 WILDLIFE OBSERVATION TOWER (EXISTING)
24 EQUESTRIAN TRAIL
25 PARKING LOTS (SHOWPLACE ARENA RV LOTS)
26 FARMERS MARKET (EXISTING)

5.3 PARK EDGES | MULLINS STATION ROAD

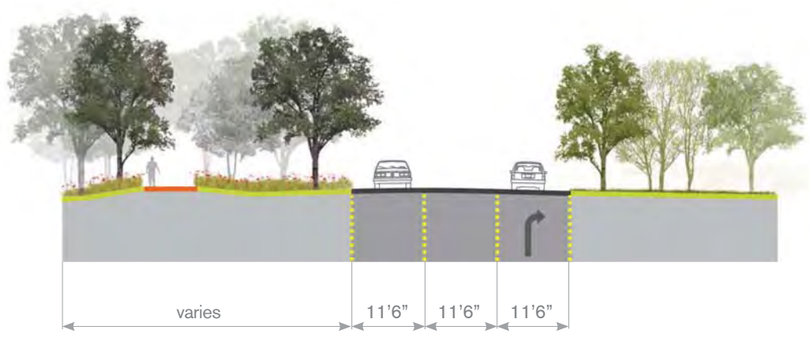
Mullins Station Road is a primary edge of Shelby Farms Park and an opportunity exists to create greater connections between the Park and the neighborhoods to the north. The presently abandoned CSX rail corridor runs along the northern edge of the Park parallel to Mullins Station Road. The future greenline is a proposed recreational park/hiking-biking trail system that would run from Midtown Memphis to the suburbs of Shelby County along the abandoned CSX rail corridor. Three bike and pedestrian crossings cross Mullins Station road from the future Greenline into the Park, including a new pedestrian bridge.

DESIGN OBJECTIVES

- Define and improve Park entrances with signature signage, new fences and lighting, restored forest and meadow landscapes and new pathways and recreational amenities; and
- Create physical linkages (pedestrian bridges and crossings) between the Park and the future greenline (former CSX rail line).



TYPICAL SECTION (looking east)



PEDESTRIAN CROSSING SECTION (looking east)

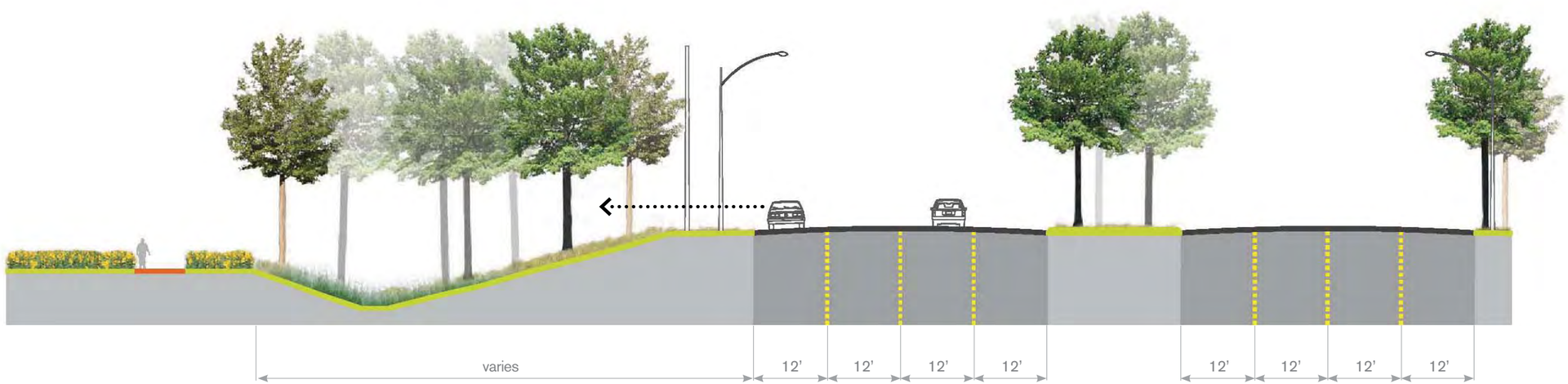
sycamore vi
entry
whitten rd
future greenline
5
6
4
entry
1
2
mullins station rd
entry
3
raleigh lag
1 PEDESTRIAN BRIDGE
2 NEIGHBORHOOD PLAYGROUND
3 BBQ PITS + PICNIC PAVILIONS
4 FUTURE GREENLINE
5 MULLINS STATION ROAD
6 SHELBY FARMS PKWY / KIRBY WHITTEN PKWY
N
0' 125' 250' 500' 1000'
SCALE: 1"=1000'

5.3 PARK EDGES | GERMANTOWN ROAD

Because of its high-level of use, the Germantown Road edge needs to be considered from two perspectives: 1) from the point of view of the Park user and 2) from the point of view of commuters traveling along Germantown Road. On the one hand, western views across the research fields offer commuters a powerful glimpse into the distinctive, scenic character of the Park landscape. For Park users, however, the experience of the future Park landscape - the farmer's market, the RV Park and the seasonally flooded fields - would greatly benefit from a physical screening of the Germantown corridor. The Master Plan proposes creating a mixed bosque of tall, native canopy trees that will be pruned high to preserve views into the Park, while simultaneously reducing visual and aural impact of Germantown Road. In addition to the bosque, a sunflower stripfield will run parallel with Germantown Road and add to the scenic impact of this highly visible Park edge.

DESIGN OBJECTIVES

- Develop the bosque plantings in a manner that screens the vehicular traffic from the interior park, while simultaneously preserving views into the agricultural landscape; and
- Increase the visibility of the Park through greater definition of the edge landscape (tree bosque and sunflower field) , distinctive lighting, and bold, iconic signage.



TYPICAL SECTION (looking north)

walnut grove road
germantown rd
entry
entry
entry
entry
wolf river
1
2
3
4
1 GERMANTOWN RD BOSQUE
2 SUNFLOWER STRIP
3 BIRD VIEWING STAND
4 ACCESS ROAD + PARKING LOT (EXISTING)
N
0' 100' 200' 400' 800'
SCALE: 1"=800'

5.3 PARK EDGES | WOLF RIVER CORRIDOR SOUTH

The southern and western edges of the Park are bound by the Lucius Burch Natural Area, the Wolf River and Wolf River Greenway. When complete the Wolf River Greenway will connect downtown Memphis to Germantown and Collierville as well as a future greenline along the abandoned CSX rail corridor. The Wolf River itself and the adjacent natural area offer passive recreation activities such as day hiking, bird watching, wildlife viewing, kayaking, canoeing, swimming and learning.

Within the larger Wolf River Corridor, the Lucius Burch Natural Area is a State-designated Natural Area and is protected by restrictions to conserve valuable habitat and resident wildlife. The area is a remnant of historic river meanders, bald cypress-water tupelo swamps, bottomland hardwood forests, and open river channel habitat. Unfortunately, much of this ecosystem has been significantly altered as a result of change in hydrology and the invasion of common privet, an invasive exotic plant. It provides a refuge for forest dwelling birds, mammals, reptiles, and amphibians within an urbanized environment. The Shelby Farms Park Conservancy is responsible for management of the Lucius Burch Natural Area.

Two facilities for boat rentals and three small pedestrian bridges will connect the Wolf River Greenway to Shelby Farms Park. Methods for creating an area along a portion of the Wolf River with fast water and rapids for whitewater kayaking and rafting are being considered. A new eco-playground nestled into the forest will enhance visitorship and opportunities for all ages to experience this beautiful natural resource. The eco-playground will use sustainable materials and unique play features (such as a ropes course, a zip line and a tree house) to combine play with learning and team building within the Wolf River's unique natural environment.

Continued consultation with the Wolf River Conservancy, the Shelby Farms Park Conservancy and the Tennessee Department of Environment and Conservation Natural Areas division will ensure the long term health of the River and the adjacent River Plain.

canoeing on the wolf river

hiking through the lucius burch natural area

LUCIUS BURCH NATURAL AREA SOUTH
WOLF RIVER CORRIDOR
wolf river
wolf river
humphreys blvd
shady grove road
wolf river blvd
kirby pkwy
riverdale rd
entry
entry
entry
entry
entry
133
CITY OF MEMPHIS
CITY OF GERMANTOWN
1 PEDESTRIAN BRIDGE
2 KAYAK LAUNCH
3 ACCESS ROAD + PARKING LOT (EXISTING)
4 BLUE TRAIL (EXISTING)
5 YELLOW TRAIL (EXISTING)
6 OUTDOOR CLASSROOM (EXISTING)
7 ECO-PLAYGROUND
8 WHITE TRAIL (EXISTING)
9 SAND BAR - SWIMMING ACCESS
10 MULTI-USE TRAIL CONNECTION TO SHADY GROVE RD

6.0 PHASING

6.1 PHASING | GROWTH OF THE PARK OVER TIME

The large scale and complexity of Shelby Farms Park dictates that the implementation of the Master Plan for the Park will take time. It will likely be more than a decade before Shelby Farms Park is fully realized, and the planning processes over this period will need to address the existing challenges outlined in section 3.1 of this report– including the lack of identity; segmented infrastructure; a fragmented ecosystem; deficient circulation; and poor regional access – as well as new challenges such as the environmental and economic sustainability of managing an expanded parkland. Add to this equation the anticipated public and stakeholder consultation processes, and it becomes clear that the Shelby Farms Park Conservancy needs a robust strategy for dealing with the shifting priorities and financial requirements of developing the Park over an extended period of time.

Due to this great complexity, Shelby Farms Park will need to be developed in phases or planned stages of growth that 1) target clear design principles; 2) expand on existing facilities, resources and character; 3) capitalize on the availability of funds, to maximize the exposure and legibility of the Park; and 4) build momentum and support for the Park with each project that is implemented.

It is critical to note however, that incremental, staged growth does not mean that implementation and detailed planning should happen in an ad-hoc or piecemeal fashion. Quite the opposite. To guarantee the long-term success of Shelby Farms Park, it is crucial that early stages of development are founded on clear design objectives while simultaneously building excitement for what is yet to come. The momentum for investing in later stages of the Park's development will depend on public and stakeholder appraisal of the success of initial phases of implementation of the Master Plan.

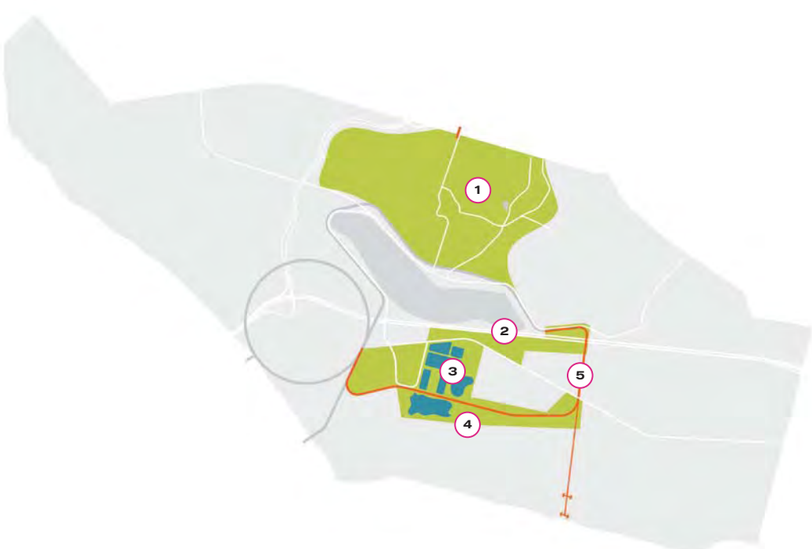
The Master Plan described herein sets out a strategic and intelligent framework to guide the growth of the Park, with public and stakeholder consultation supporting all future planning and design efforts. Shelby Farms Park is a unique landscape, both in terms of its features and character, as well as the type of efforts, cooperation and leadership that will be required from the Conservancy and the associated public agencies to move the implementation process forward. What the Master Plan phasing scenario outlined here provides is a structure for:

- creating early enthusiasm to propel the implementation process;
- establishing the principal framework necessary to guide long-term development of the Park;
- enhancing the site through ecology and habitat diversification;
- shaping a more defined and memorable identity for the Park; and
- respecting the highly valued existing places in the Park.

The Phasing diagrams shown below and to the right are not intended to comprehensively describe every project and the order with which they are to be implemented. Rather, the four phases are intended to indicate priorities in terms of the areas of the Park where we believe capital projects should be concentrated for maximum gain. As each phase of the project is developed, the limits of each will be clearly defined prior to any design work or construction taking place. It is expected that some adjustments can and will take place regarding the particular location of elements within the master plan provided these adjustments do not conflict with the Conservation Easement or the Master Plan Implementation Instrument. This flexible strategy will establish a strong spatial and organizational design framework for the Park so that its development over time is assured.

PHASE ONE: Establish the Core + Create Identity

1) Expanded Playground at Plough Park
2) Expanded Patriot Lake
3) Shelby Farms Parkway (Kirby-Whitten Parkway) - *by others*
4) New Walnut Grove Gateway + Park Entry
5) Park Circle Access + Trails



PHASE TWO: Expand Core Public Park Area

1) Trail + Facility Enhancements to Plough Park
2) Walnut Grove Planting Strip
3) Reconfiguration + Expansion of Catch 'Em Lakes
4) Development of Refuge Area
5) Completion of Mutli-Use Loop

PHASE THREE: Enhance Landscape Rooms

1) Trail Enhancements to Outback Area
2) Enhancement + Expansion of Agricenter Campus Area
3) Development of Amenities + Activities along Wolf River
4) Development of Wolf River Greenway - *by others*

PHASE FOUR: Enhance Landscape Rooms (later phases TBD)

1) Communtity Center + Sports Fields *
2) Public Gardens *
3) Agricenter Research +Crop Field Area

* *pending area 10 approval*

6.2 PROVISIONAL PROJECTS | EARLY WINS 2008-2010

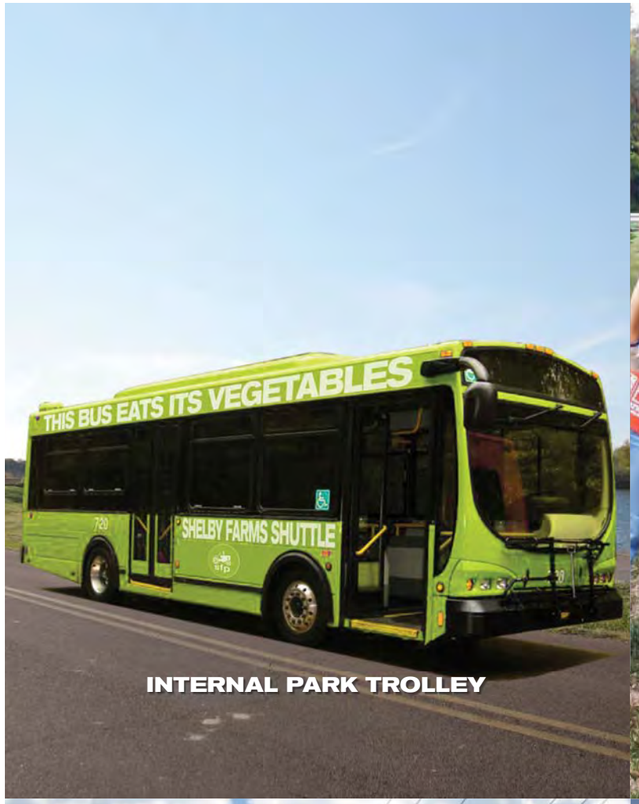
The design and construction of the proposed Phase One projects outlined in the following pages will take anywhere from 3-6 years to implement. Early start projects prior to the larger scale transformations are a useful way to build enthusiasm and to establish a new identity for the future park. These "provisional" projects are as much about building greater awareness of the Shelby Farms Park project as they are about physical change. They do not require substantial amounts of investment or time, rather they act as a clear signal of change and an opportunity to strengthen connections with the surrounding neighborhoods, existing park users and the greater Memphis community.

The Master Plan identifies a set of initial targets to increase the visibility of and access to the Park, with a lens towards upholding the primary organizational and design principles of the Shelby Farms Park project. These "provisional" projects could include:

- Community Participation in Tree Planting;
- Refreshing and expanding existing user-specific trails such as the Equestrian and mountainbike trails;
- Developing distinctive park signage (both permanent and temporary) at Walnut Grove and Mullins Station Roads;
- Developing distinctive interior way-finding signage for both Plough Park and Agricenter areas in order to begin to conceptually link the two halves of the Park;
- Planting pick-your-own berry fields at the Agricenter;
- Expanding the sunflower / wildflower planting strips along Walnut Grove and Germantown Roads
- Initiating the internal Park Trolley for use on weekends or during major events, and connecting the Park to the broader MATA bus system.

Each of these projects can be undertaken immediately following the approval of the Master Plan and as such, can be "on the ground" as soon as spring 2009. This will create increased visibility and interest in the Park and the proposed Master Plan.

In addition, it is the recommendation of the Master Plan that an Integrated Natural Resource Management Plan be developed for the Park following the approval of the Master Plan in order to coordinate conservation and management principles with areas of Park redevelopment such as the expanded Patriot Lake.



INTERNAL PARK TROLLEY

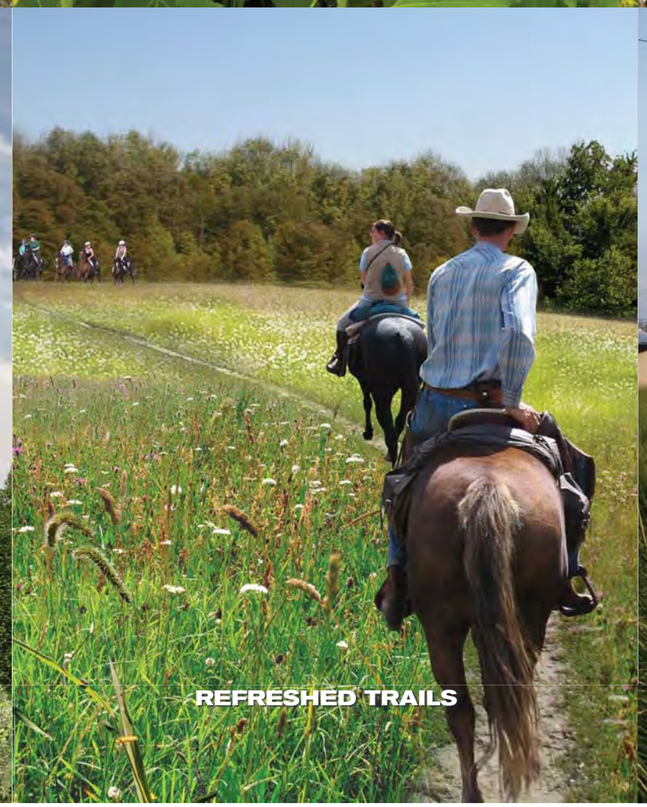
COMMUNITY TREE PLANTING EVENTS

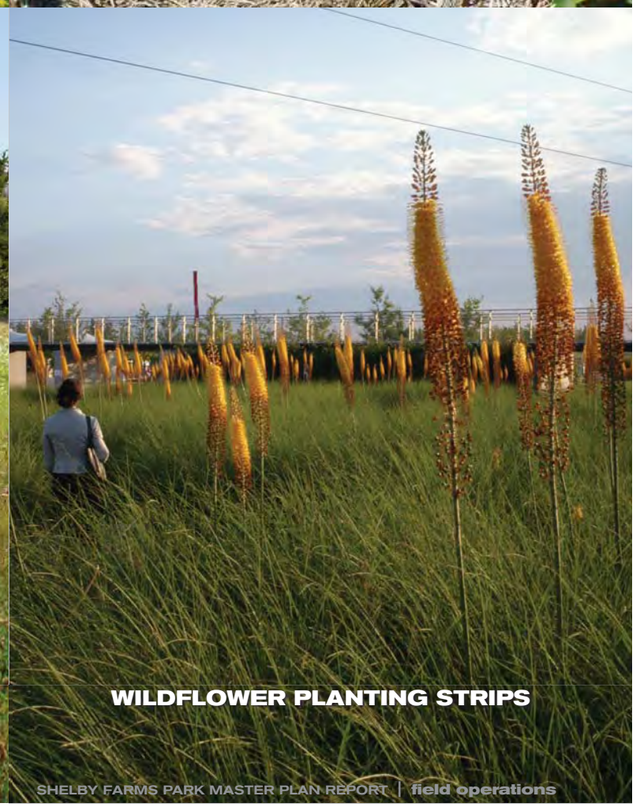
SUNFLOWER PLANTING STRIPS

STRAWBERRY PICKING

PARK SIGNAGE ON MULLINS STATION ROAD

WALNUT GROVE CORRIDOR MARKING


REFRESHED TRAILS


WILDFLOWER PLANTING STRIPS

6.3 PHASE ONE PROJECTS | BIG, BOLD AND PRACTICAL

Four Phase One projects will establish a new center and set up the basic framework for the renovation and enhancement of Shelby Farms Park. These projects provide both a bold physical transformation, as well as a logical first step in establishing an active core for the Park. In turn, the other less populated landscape rooms can be developed over time as the financial resources and the Conservancy's priorities dictate. These Phase One projects are highly pragmatic in that they can be tied to other work outside the Conservancy's domain (such as the new Shelby Farms Parkway) that will potentially allow for coordination and cost sharing, and can help to streamline the overall development of Phase One.

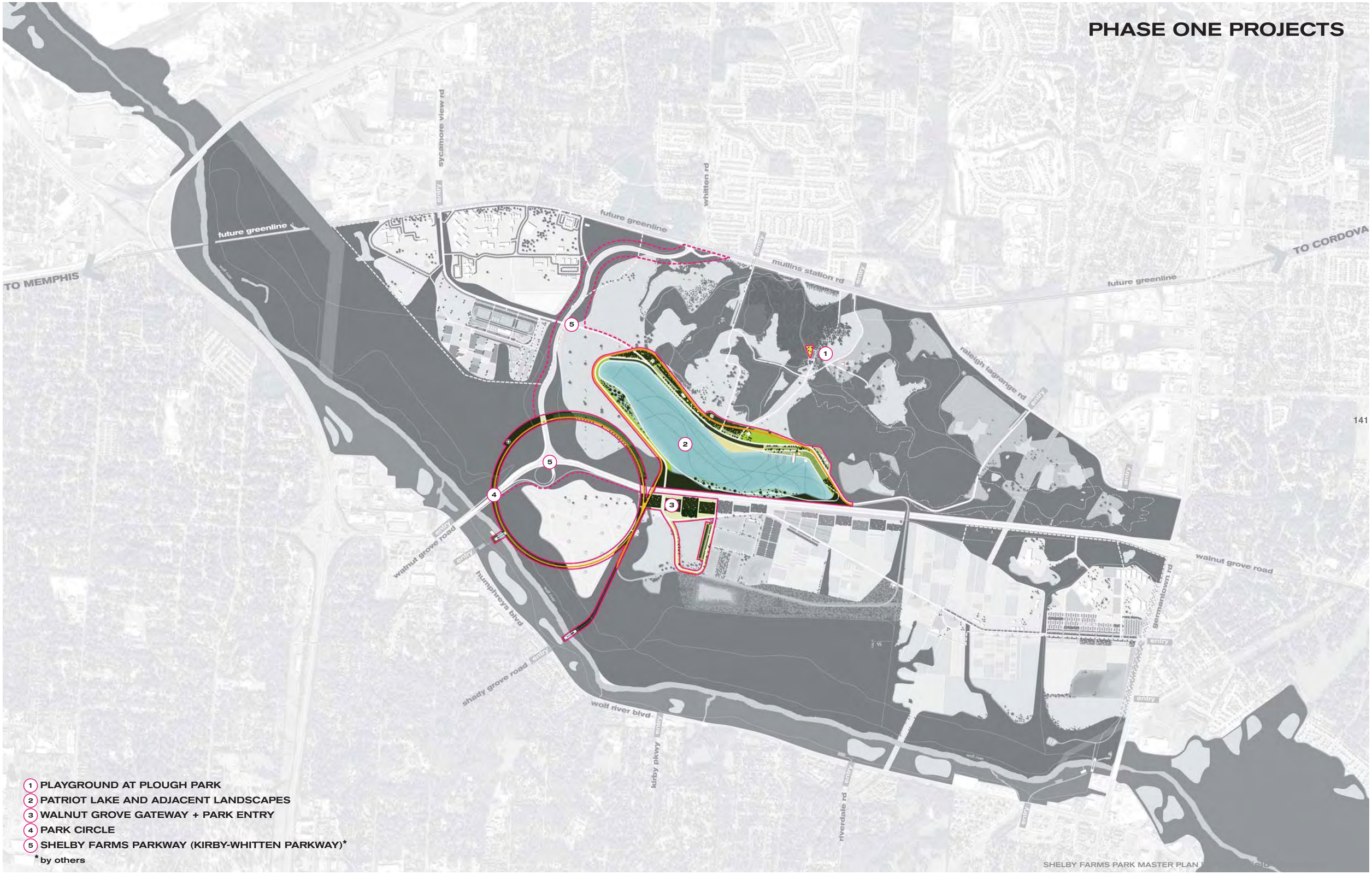
This practical outline for the Park's initial development includes:

- Expanding the Playground at Plough Park;
- Expanding Patriot Lake and developing its adjacent landscapes;
- Developing a new Walnut Grove Gateway + Park Entry; and
- Developing the Park Circle to allow pedestrian navigation of the new Shelby Farms Parkway–Walnut Grove interchange and access to the Park from the south via tunnel, bridge and pathway.

These first phase projects identify an achievable and compelling beginning for the Park: providing highly visible gateways; new means of access, circulation and entry into the Park; expanded opportunities for play; and a bold, iconic centerpiece for the Park, rich with new public amenities and scenic views. In addition to representing a strong beginning for the Park, the Phase One projects provide a structure for:

- creating early enthusiasm to propel the implementation process;
- establishing principal connections necessary to link disparate parcels and provide access across the site;
- shaping a more defined and beautiful identity for the Park; and
- respecting the highly valued existing places in the Park;

PHASE ONE PROJECTS



1. PLAYGROUND AT PLOUGH PARK
2. PATRIOT LAKE AND ADJACENT LANDSCAPES
3. WALNUT GROVE GATEWAY + PARK ENTRY
4. PARK CIRCLE
5. SHELBY FARMS PARKWAY (KIRBY-WHITTEN PARKWAY)*

*by others

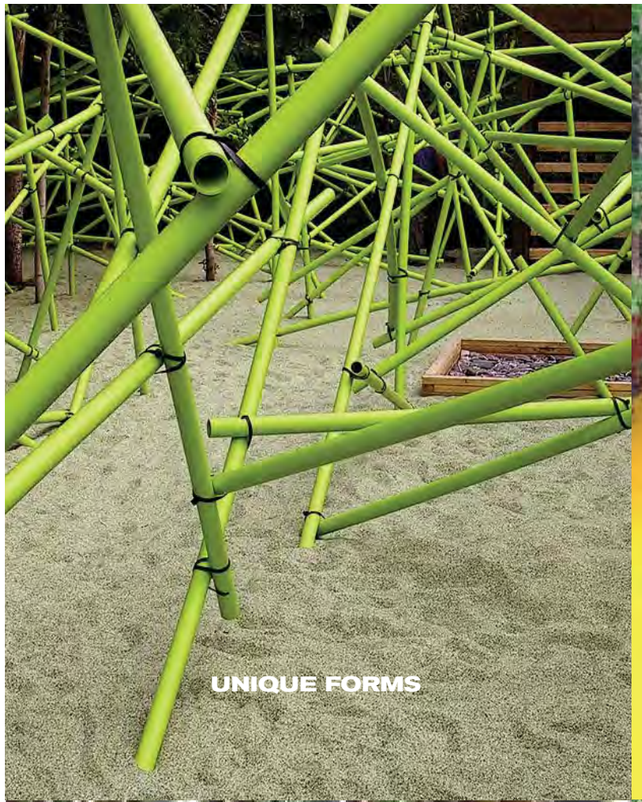
6.3 PHASE ONE PROJECTS | PLAYGROUND AT PLOUGH PARK

Because of its high level of use and close proximity to the "park core", the Playground at Plough park is a logical target for early stage improvements. Although it is well-used and much-loved, the playground is very much in need of renovation and expansion. The current playground is approximately 1/2-acre. The Master Plan proposes doubling this size to one-acre in order to provide a wider range of play activity, equipment and experience. The expansion and remaking of the Plough Park Playground will include new lighting, seating, numerous play elements, preserved and increased canopy plantings, as well as water and shade features. These simple changes will transform the experience of the playground, enabling this much used feature to become fully integrated with the overall identity of Shelby Farms Park.

EARLY OBJECTIVES

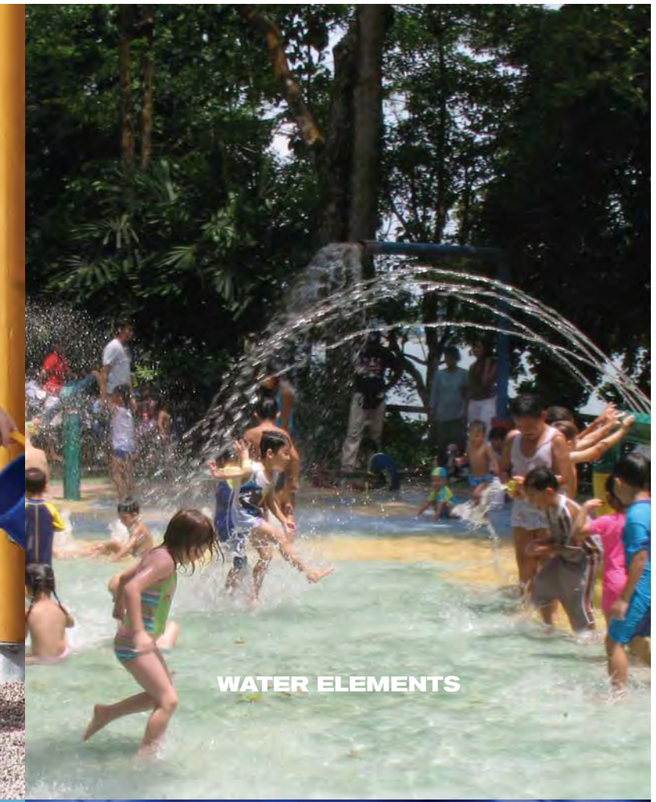
- Expand the range, quantity and character of the playground amenities and features;
- Preserve and enhance the presence of existing tree canopy;
- Utilize soft surfacing materials that contribute to the overall range and types of play; and
- Ensure that new elements and features are safe and durable, yet innovative and coordinated with the playground's distinctive setting.

existing view of the playground at plough park

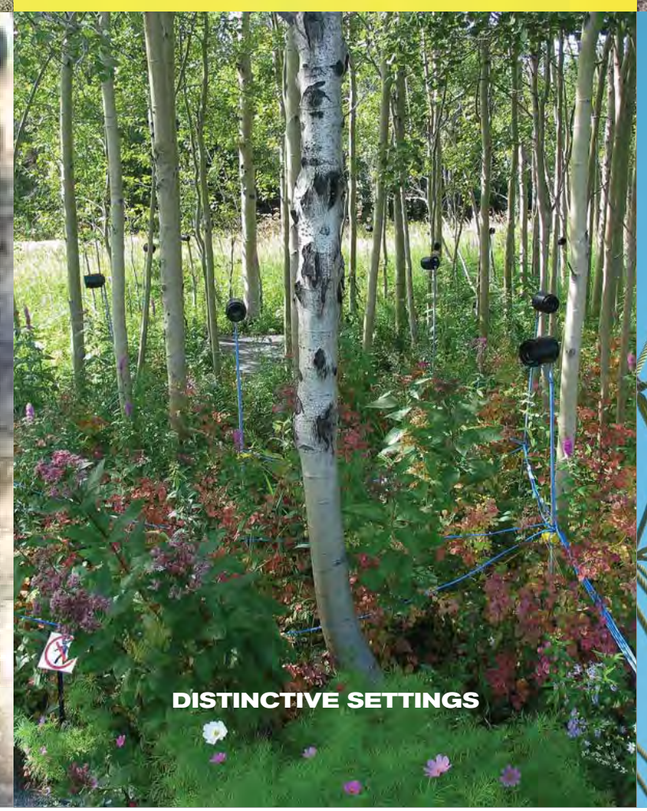

UNIQUE FORMS

SOFT SURFACING

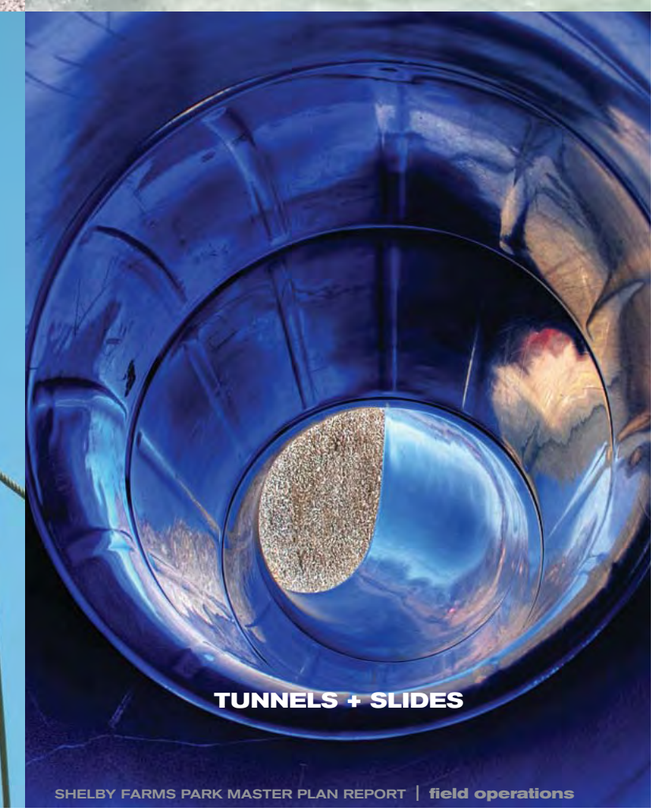
MULTI-AGED PLAY


WATER ELEMENTS

PRESERVED + EXPANDED CANOPY


DISTINCTIVE SETTINGS

CLIMBING ELEMENTS


TUNNELS + SLIDES

6.3 PHASE ONE PROJECTS | PATRIOT LAKE AND ADJACENT LANDSCAPES

The transformation and expansion of Patriot Lake will be a bold, dramatic and exciting step in the process of realizing the Shelby Farms Park project. As the iconic centerpiece of the entire Park, the new Patriot Lake will be a highly visible and defining landmark for Memphis: one that is rich with new public amenities, diverse recreational opportunities, spectacular vistas and remarkably unique events.

The Patriot Lake Project is a complex one, as it involves works on land and in the water and will require the collective participation of a broad range of technical consultants, city agencies and the public. However, the promise of its spectacular presence in the future park, replete with its great physical beauty and recreational resources, signals the importance of prioritizing this remarkable feature in the early stages of the Park's life.

EARLY OBJECTIVES

- Develop a strategic implementation plan that allows existing park uses to continue in areas adjacent to Lake construction;
- Provide for a great diversity of features, elements and landscapes for recreation and passive play; and
- Establish hydrologic linkages with other lakes and sloughs to increase the ecological and sustainable character of the park landscape;

aerial view of the existing patriot lake

EXPANDED PATRIOT LAKE 150-ACRES
(EXISTING PATRIOT LAKE 54-ACRES)
1 SMALL VIEWING TOWER
2 PERMEABLE SURFACE PARKING LOTS
3 PICNIC PAVILION
4 EQUIPMENT RENTAL
5 REST FACILITY
6 ICON BALLOON
7 TREE ALLEE
8 SWIMMING BEACH
9 VISITOR CENTER
10 GREAT LAWN
11 MARINA
12 WATER PLAYGROUND
13 EARTHEN AMPHITHEATER
14 FLOATING STAGE
15 M+O FACILITIES (15,000 SF BUILDING AND 2-ACRE YARD)
16 SAILBOAT COURSE
17 SWAMP CYPRESS GROVE
18 2.5-MILE BOARDWALK
19 FISHING PIERS
20 1250 METER / 1.25 KILOMETER ROWING COURSE
21 SWAMP CYPRESS GROVE
22 MULTI-USE CIRCUIT
23 PATRIOT LAKE ROAD (PRIMARY VEHICULAR ROAD)
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

cypress swamp and boardwalk at the expanded patriot lake

earthen amphitheatre at the expanded patriot lake

6.3 PHASE ONE PROJECTS | PARK CIRCLE + SHELBY FARMS PARK GATEWAY

The implementation of Phase One projects will achieve some of the fundamental objectives of the master plan, including establishing the connections between the edges of the Park and the interior landscapes. As a means to coordinate with the implementation of the Shelby Farms Parkway (Kirby-Whitten Parkway) and to ensure that the Park's objectives are upheld through the Parkway's implementation, the Master Plan recommends the prioritization of the "Park Circle". This new pedestrian and multi-use loop links across the Wolf River to circumnavigate the landfill mound and the reconfigured Parkway interchange through a series of pedestrian bridges, at-grade underpasses, tunnels, forest trails and distinctive shade tree allees. Pedestrian bridges at the Wolf River will allow for direct connection from the southern edge of the Park which does not currently exist. Although a high level of coordination is required with the Parkway planning team, the elements of the Park circle are relatively easy to implement and their impact will be greatly appreciated by new and existing park users.

EARLY OBJECTIVES

- Collaborate with the Parkway planning team to ensure that the necessary pedestrian linkages are accommodated;
- Provide clearly defined pathway connections and entry points at Shady Grove Road and at the Walnut Grove entry; and
- Coordinate with Shelby County to ensure that all work associated with the Landfill preserves and/or improves the integrity of the landfill cap;

aerial view of walnut grove road and the landfill mound

The construction of Shelby Farms Parkway (Kirby-Whitten Parkway) will necessitate a reconfiguration of the Farm Road-Walnut Grove Road intersection. This creates the opportunity to define a grand new entry gateway for the Park that ties the northern and southern halves together through the introduction of a highly distinct planting and landscape installation. This area of the Walnut Grover Road corridor should be used to announce the Park in a bold, immediate and highly visible way. Blocks of tree plantings will line the southern edge of Walnut Grove Road, spatially tying this side of the Park back to the forested planting regime on the northern side of the road. Punctuated by the proposed "Y" pedestrian bridge, the implementation of this project will serve to reinforce the connection of the two sides of the Shelby Farms territory and provide a true address destination to visitors of the Park.

EARLY OBJECTIVES

- Collaborate with the Parkway planning team to ensure that the necessary turning and pedestrian provisions are accommodated at the new intersection;
- Create a spatially memorable definition for the primary Shelby Farms Park entry;
- Ensure the presence of clear way-finding elements for visitors to both the northern and southern halves of the Park; and
- Expand the public park landscape to the southern half of the park adjacent to the existing Catch 'Em Lakes areas.

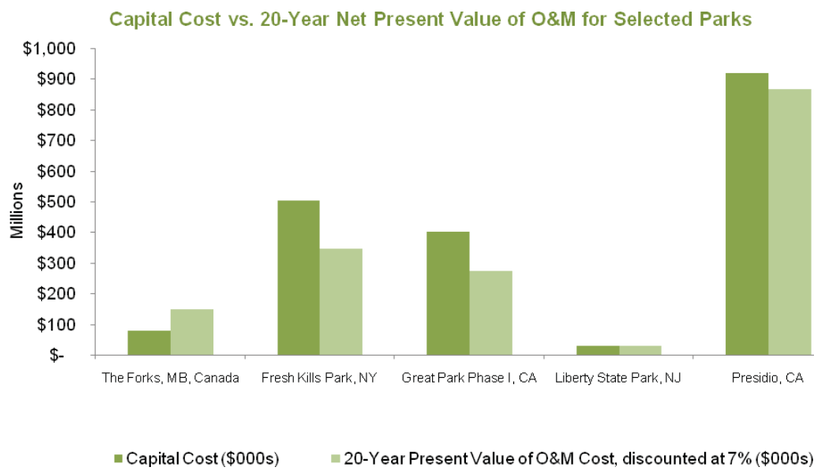
STONE DUST PATH (6m WIDE)
STONE DUST PATH (2-3m WIDE)
PEDESTRIAN BRIDGE (6m)
STABILIZED "LANDFILL-CAP" TRAIL (ASPHALTIC BASE) (2-3m)
1 SHELBY FARMS PARKWAY
2 PEDESTRIAN TUNNEL
3 WOODLAND VIEWING TOWER
4 THE CIRCLE TRAIL
5 PEDESTRIAN UNDERPASS
6 WALNUT GROVE PEDESTRIAN CONNECTION
7 WOLF RIVER PEDESTRIAN BRIDGE (PARK CIRCLE)
8 WOLF RIVER GREENWAY
9 WOLF RIVER PEDESTRIAN BRIDGE (SHADY GROVE ROAD)
10 SHADY GROVE MULTI-USE TRAIL
11 "Y" PEDESTRIAN BRIDGE
12 MULTI-USE CIRCUIT
13 TREE ALLEE
14 REVISED WALNUT GROVE INTERSECTION
15 GROVE TREE PLANTING BLOCKS
16 TRAP LAKE ROAD
17 PERMEABLE PARKING AREA
18 MOORE ROAD (HAM SMYTHE, III ROAD)
N
0' 75' 150' 300' 600'
SCALE: 1"=600'

7.0 OPERATIONS RECOMMENDATIONS

7.1 OPERATIONS FUNDING RECOMMENDATIONS

INTRODUCTION

Developing a funding strategy for the operations and maintenance (O&M) of the new Shelby Farms Park is a critical part of the Master Planning process. Over the long term, O&M costs will equal or exceed the initial capital cost of a park, and underinvestment in O&M costs can lead to park decline and necessitate considerable reinvestment in capital. Realistic expectations for operations and maintenance should therefore be built into the capital program and phasing plan. Inclusion in the initial capital planning of uses that generate revenue, are compatible with the Master Plan vision, and generate life and activity is an important means of meeting those expectations.



The Shelby Farms Park Conservancy (SFPC) and Field Operations commissioned a preliminary study by HR&A Advisors, Inc. (HR&A) to support efforts to plan for park programming, routine maintenance, and capital maintenance (collectively, "O&M") for the new Park. HR&A estimated the annual cost of O&M for Phase I of the Master Plan, and identified revenue sources that might feasibly be used to fund O&M costs.

The findings and recommendations presented here derive from research and analysis of parks and recreation areas in a number of jurisdictions in the United States and Canada; and interviews with a range of local experts and government officials, including:

- Consulting Natural Resource Scientist, Richard C. Young, M.S.
- Memphis Parks Department, Larry Smith, Deputy Director
- Memphis Shelby County Office of Economic Development, Charles Gulotta, Executive Director; Maggie Conway and Clara Harris
- Pittco Management, Pitt and Barbara Hyde
- Science Applications International Corp. (SAIC), Connie Kontogiannis
- Shelby Farms Park Conservancy, Laura Adams & Kate Phillips
- Tennessee DOT, John Hewitt, Manager, Natural Resources Office
- US Army Corps of Engineers, Roger Allan, Permit Manager

ESTIMATING OPERATING & MAINTENANCE COSTS

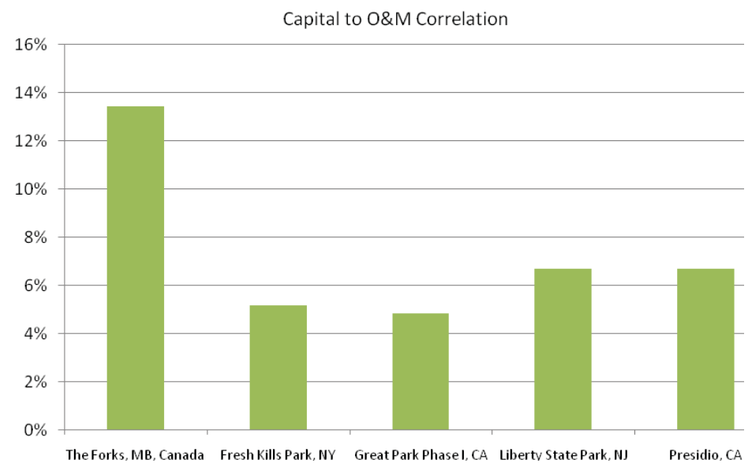
Prior to preparation of detailed line item budgets, future O&M needs of new or substantially renovated parks are generally estimated based on either a comparison to per acre O&M costs of similar parks or on a percent of initial capital cost. Per acre O&M costs vary greatly depending on a park's size, climate and labor market in which it is located, and intensity of use and programming.

City Park Systems O&M Costs	
Denver	$1,550 / acre
Greensboro	$5,300/ acre
New York City	$13,500 / acre
Memphis	$2,200 / acre
Minneapolis	$8,500 / acre

Greensboro, NC		
	Acres	O&M
All Parks	3,700	$5,400/ acre
Center City Park	2	$180,000/ acre

Given the very early stage of planning in which the Shelby Farms Park is currently engaged, we suggest that the percent of capital method is the best means to anticipate the future operating needs of the Park. As capital costs become better understood, the resulting dollar estimate should be reviewed in light of current per acre O&M Costs at Shelby Farms and of comparable parks in the Memphis area.

For discussion purposes, HR&A recommends planning for an annual O&M cost of 5% of initial capital investment. This figure is at the lower end of a range observed in large urban parks across North America and reflects the area's relatively moderate labor costs and usage, less dense programming than most urban core parks, and favorable climate, as well as an assumption that much programming will continue to be offered by third parties.



The Shelby Farms O&M budget estimate can be refined as more information regarding these factors is collected:

- Program options
- Cost sharing with complementary projects such as the Parkway
- Allocation of responsibility for programming
- Cost of maintaining lake water level

BEST PRACTICE: LIBERTY STATE PARK, NEW JERSEY.

Liberty State Park is a 1,150 acre park on the New Jersey Shore directly across the Hudson River from Manhattan. The park hosts 4.9 million visitors per year and has a total land area of 1150 acres, of which 600 have been developed. The park features 250 acres of natural habitat, 350 acres of open space (with another 250 acres planned), 1.5 miles of waterfront promenade, 3 miles of bike paths, two playgrounds, and a boat launch. Cultural attractions in the park include the Liberty Science Center (currently undergoing a major renovation) and the historic Central New Jersey Railroad Terminal (CNJRR). Commercial uses include a restaurant and 20,000 square feet of office space planned for the CNJRR. The park also includes Liberty Landing Marina with 500 slips and a 350 slip dry dock. Visitors can take the Circle Line from the park to the Statue of Liberty and Ellis Island. The park currently has a $2 million annual operating budget and generates $1 million in revenues on site, primarily from the marina, paid parking, and concessions on the Circle Line.

REVENUE SOURCES

HR&A examined an initial list of potential revenue streams to support operations of the Park, including public, on-site/earned income, and off-site/private sources. The initial analysis suggests that new forms of public support are unlikely in the short term, both because a consensus that there is little popular willingness to raise taxes to fund the park and because the more fruitful public revenue streams will likely be restricted to capital uses. Therefore, the primary sources of new operating funding will need to be:

- On-site, earned income from ground leases and user fees, consistent with restrictions on uses within the park established by the Grant of Conservation Easement for the Park and Agricenter Campus, and by the County for the so-called Area 10.
- Philanthropic contributions, including corporate sponsorships, toward an operating endowment.

PUBLIC FUNDING

The Shelby Farms Conservancy currently operates on a $2 million annual budget with income coming primarily from grants, dedicated County funding, and user fees.

County Funding

The County currently dedicates $575,848 to the maintenance and operations of Shelby Farms pursuant to the 2007 Management Agreement with the Shelby Farms Park Conservancy. While the amount of funding is not likely to change, it remains critical to park operations and serves as the base funding to secure private philanthropic contributions. Major donors will likely require a demonstrated public commitment before supplementing it with private contributions.

Recommendation: Maintain Management Agreement with Shelby County.

City Funding

HR&A examined potential Memphis City government funding through either a Tax Increment Financing (TIF) District, and/or a dedicated Sales Tax or Hotel/Motel Tax increase. TIFs utilize the incremental property taxes in the neighborhoods which benefit from an investment to help pay for the investment itself. While TIFs have been successfully implemented in two areas of Shelby County, they require a finding of blight and take several years to establish. More importantly, TIF revenues can only be used for capital costs, exclusive of capital maintenance expenses. While it is technically feasible to increase the City Sales Tax or the Hotel/Motel tax to create a dedicated funding stream for Shelby Farms (or for all Memphis City Parks), the current climate is highly unfavorable for new or increased taxes.

Recommendation: Do not pursue City funding in the short term.

State Funding

HR&A investigated potential State funding through either a Tourism Development Zone (TDZ) or direct financial support from the State. A TDZ functions similar to a TIF except that it captures incremental sales taxes in the area surrounding the investment. TDZs require a total capital investment of over $200 million and may be used only for convention centers or major tourism destinations. While Shelby Farms may meet these requirements, TDZ funds (like TIFs) can only be used for capital investments. Moreover, the areas surrounding Shelby Farms are primarily residential and are therefore less likely to accrue significant incremental sales taxes.

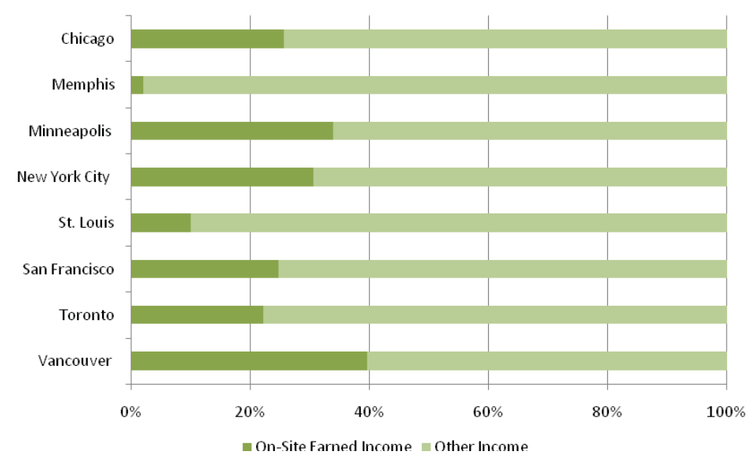
Direct operating support from the State may be achievable, and should be pursued, ideally through an agreement that guarantees, to the extent possible, a steady stream of funds. Given the inherent uncertainty of the receipt of such funding, however, we do not assume that it will form a significant, long term source of operating support.

Recommendation: Explore the potential for State support of O&M.

ON-SITE REVENUE

On-site revenue generating uses, ranging from active recreation opportunities to restaurants, events, and meeting facilities, can provide important amenities to park users and increase activity year round. Memphis' parks currently generate considerably less on-site earned income than park systems in comparable cities, demonstrating a substantial opportunity for Shelby Farms.

City Parks' Earned Income as Percent of Total Revenues



That said, Shelby Farms Park will need to be operated consistent with the provisions of the Grant of Conservation Easement between Shelby County and the Shelby County Agricenter Commission, and the Land Trust for Tennessee, Inc. Preliminary indications are that the recommendations set forth below will comport with those requirements, although this conclusion merits additional examination.

Rentals, User Fees & Events

Most recreational uses in parks are considered user amenities and are designed to break even, not to generate revenue. Despite this, the Shelby Farms Park Conservancy currently generates $100,000 per year from rentals of the picnic areas and meeting rooms, and from per-participant fees for special events not organized by the Conservancy. Recreational groups do not pay to use the Park.

The Master Plan includes many new uses which will require additional resources to maintain. Some of these uses can potentially generate revenue or will require a specialized expertise to manage, such as the expanded meeting facilities with a catering kitchen, as well as the stables, paddle boats, skating/BMX course and pick-your-own fruit activities. For these uses, the Conservancy should consider entering into a contract or ground lease with a private operator as discussed in further detail in the next section.

The Conservancy will likely retain management responsibility for some of the recreational uses, the picnic area rentals and oversight of any non-SFPC events in the new park. User fees and equipment rental fees should be reevaluated to ensure a minimum break-even scenario. To maximize potential revenue, pricing can be scaled so that public users pay lesser fees while corporate users pay more. The Conservancy should also consider charging nominal "good faith" fees to recreational groups for ongoing use of the Park.

The Conservancy generates $350,000 from three large events each year: the Green Shoe Gala, Down to Earth, and Starry Nights. Special events generate revenue while building brand identity and driving visitation to the Park. As such, special event programming should be increased in the new park. An opening gala and related programming throughout the first year present ideal opportunities to raise operating funds and increase public awareness and engagement.

Recommendations:

- *Evaluate new recreational uses and identify those appropriate for third party operators or ground leases.*
- *Establish a pricing policy for user fees and rentals to ensure a break even scenario for those uses.*
- *Expand SFPC's event programming.*

Ground Leases

Leasing to a private operator can maximize operating efficiency, reduce liability, and guarantee a revenue stream to the Park. Shelby Farms already generates $15,000 per year from its lessees, including the Agricenter, Shelby Farms Stables, Paddle Boats (county-run), and an office tenant. However, significant demand appears to exist for uses such as expanded meeting and event venues, a full service restaurant, and additional active recreation opportunities.

The Master Plan currently includes a 10,000 SF boathouse, a 7,500 SF restaurant and a 15,000 SF retreat center. While there is demonstrated demand for these uses, a market study is needed to gauge the exact product most likely to succeed and comport with the restrictions on use of the site. The Conservancy may also consider adding office space to the Master Plan to rent to mission-compatible non-profits or research and educational organizations.

Recommendations:

- *Determine uses compatible with the Conservation Easement and Master Plan.*
- *Perform a market study to determine demand for these uses and adjust the Master Plan accordingly.*
- *Develop a leasing and management plan to evaluate, price, and manage potential operators, vendors, and ground lessees.*
- *Begin dialogue with potential partners including restaurateurs, meeting and event center managers, active recreation vendors, and potential research, educational or non-profit tenants.*

Paid Parking

Many other parks in the United States and Canada have successfully captured parking revenues to support operating expenses. Chicago and Vancouver are leaders, with 5.6% and 4.4% of operating expenses generated by parking revenues, respectively. Parking at Shelby Farms is currently free, and will remain primarily free to support the Park's mission as a public resource.

SFPC can encourage satellite parking and internal bus use by charging for a portion of those spaces in the center of the Park. Paid parking is also a relatively low cost measure to implement. Using conservative assumptions, paid parking could generate $300,000 per year, assuming the park charges $10 for day-long parking at 400 spaces, and the spaces are filled once per day on weekends for six months of the year.

Recommendation: Develop a paid parking program.

Green Revenue

Shelby Farms' considerable natural areas may enable some non-traditional revenue generating uses including a wind farm and/or a wetlands mitigation bank, both of which are compatible with the Park's Easement and with the Master Plan. HR&A investigated the potential financial benefits of these uses.

A wind farm requires 14 mph of wind at the rotor height and must be located more than 1,000 feet from the tree line or buildings. Since rotor heights vary, a rule of thumb for site feasibility is 20 mph of wind at 200 meters. Sites can typically accommodate one turbine per acre, and each turbine can generate up to $250,000 per year depending on local utility prices. There are currently 5-6 turbines planned near the research fields in Shelby Farms. The setback in this area is more than sufficient and turbines would actually be much taller than the treeline. Initial research indicates a wind speed of 17 mph at 200 meters.

Establishment of a wetlands mitigation bank has some potential to offset capital costs, if not generate significant operating income. Ideal sites for mitigation banks have hydric soil, which typically indicates that the site was once a wetland and was filled in for other uses but could still be restored. Mitigation banking requires an initial capital investment to reestablish the wetland; credits are then released over seven years as the wetland develops successfully. One credit is given for every two acres of restored wetlands, and one credit is given for every four acres of newly created wetlands (because they are often less successful). In the Memphis area, a credit sells for $15,000-$25,000 (one time payment). The Tennessee Department of Transportation (TDOT) often buys credits for its capital projects, and it is likely that the planned Parkway adjacent to Shelby Farms will require wetland mitigation credits.

Field Operations has identified three sites within Shelby Farms which may have hydric soil, and where wetland uses would be compatible with the Master Plan:

- Area in south of Agricenter campus along Wolf River (50-80 acres)
- Around Patriot Lake (25-30 acres)
- Around Catch'em Lake (40-50 acres)

Thus, in a best case scenario, mitigation banking could yield a seven year revenue stream on the order of a total $2 - $3 million. While mitigation banking may not generate significant ongoing revenues for park operations, transferring a portion of the land for use as a mitigation bank would relieve the Conservancy of the responsibility of developing and maintaining that area. Various options for mitigation banking might be explored, including partnering with a private mitigation banking firm to maximize revenue to the SFPC, and partnering with TDOT, possibly including transferring soil from the expanded lake to be used for the adjacent Parkway.

Recommendations:

- *Perform wind tests and talk to local utility operators to determine the feasibility and revenue potential of a wind farm.*
- *Perform soil tests to confirm size and location of potential mitigation banks.*
- *Explore potential partnership with TDOT or a private mitigation bank.*

OFF SITE, PRIVATE FUNDING

Philanthropy

Public parks organizations are generally more successful at raising funds for high profile capital projects and programming than for routine operations and maintenance. However, some conservancies such as the Rose Kennedy Greenway and Millennium Park's Lurie Gardens, have successfully raised funds for both capital and operating needs though "legacy" contributions in which a capital gift is coupled with a contribution dedicated to the ongoing maintenance of the capital item. The capital campaign for Shelby Farms Park should work to ensure that a portion of each philanthropic contribution is earmarked for an operating endowment.

Strong champions are the most critical element in maximizing private philanthropic contributions. Shelby Farms already has champions who are actively engaged in the Master Planning process and are seeking out other major donors. In addition, the SFPC is planning a membership campaign to begin this August. The Park has a strong existing donor base and the communities immediately surrounding the park are ideal potential donors.

Recommendations:

- *Support park champions as they pursue new major donors*
- *Link major capital gifts to operating endowment contributions*
- *Provide staff support for a comprehensive capital campaign*

Corporate Sponsorships

Sponsors are willing to pay for capital naming rights and event sponsorships for advertising purposes as well as to be good corporate citizens. The value of naming rights for events and capital features is based on the projected number of "views" by visitors. As a public amenity with a large and diverse visitor base, Shelby Farms can likely capture considerable income from corporate sponsorships. Shelby Farms has an established corporate sponsor base for its events, and sold last year's title sponsorships for Down to Earth and the Green Shoe Gala for $25,000 and $15,000 respectively.

Current major sponsors include:

- AutoZone
- Blue Cross/Blue Shield
- FedEx Corporation
- Harrah's
- International Paper
- McVean Trading Company
- Methodist Healthcare
- Nike
- Smith Nephew
- Wolfchase Toyota
- Baptist Heath Care
- Chuck Hutton Chevrolet
- First Tennessee Bank
- Hyde Family Foundations
- Landers Ford
- Medtronic Sofomar Danek
- MLGW
- Pinnacle Air
- Wild Oats / Whole Foods

While SFPC has successfully cultivated an event sponsor base, it does not currently have a capital feature naming rights policy. The Master Plan centers on 12 "landscape rooms" within the Park, which could be named for major contributions. Smaller iconic capital features could also be included in a naming rights campaign. A naming rights policy, as with philanthropic contributions, should include a capital and an operating component.

Recommendations:

- *Continue event sponsorship program, adjusting price points as visitorship increases.*
- *Identify and value naming rights opportunities based on projected visitorship.*
- *Include twelve landscape rooms and all major capital features in a naming rights program.*

Grants

Significant grant resources exist for parks, but obtaining grant funding requires considerable staff support. Shelby Farms raised $725,000 last year in grants, and anticipates $815,000 in the coming year. The SFPC should conservatively anticipate ongoing grant support at this level, as it may not increase incrementally with park development.

Recommendation:

- *Continue pursuing grant opportunities*
- *Evaluate future staff needs to support enhanced fundraising efforts.*

KEY QUESTIONS

As the Shelby Farms Park Conservancy and Field Operations move forward in the development of Shelby Farms Park, the following key questions should be taken into consideration:

- *How can capital investments be phased to correspond with increased revenue opportunities?*
- *Which additional on-site uses are compatible with the easement and Master Plan and can therefore be incorporated into the Park?*
- *Which activities and amenities are appropriate for SFPC to manage, and which are better suited for a vendor, fee operator, or ground lease?*
- *What additional staff capacities are needed to manage new uses?*
- *What additional staff capacities are needed to obtain increased private support from philanthropic, corporate, and grant sources?*
- *How can the SFPC and the Agricenter share in both capital and operating responsibilities to maximize the benefit to both organizations?*

8.0 CONCLUSION

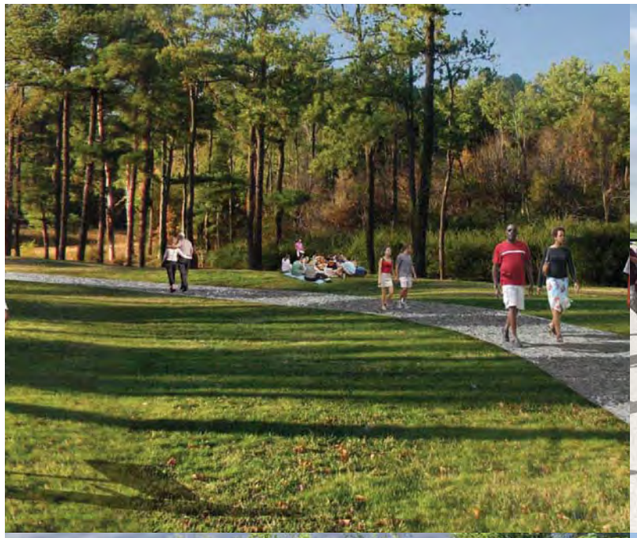
8.1 CONCLUSION

Shelby Farms Park is already an amazing reserve of public parkland, amenity and urban nature. Its huge scale offers an extraordinary resource for people who are interested in large-scale recreation activities – strolling, jogging, cycling, mountain biking, rollerblading, picnicking, dog walking, swimming, kayaking, windsurfing, sailing, fishing and the like. The site's unique argrarian character and diverse ecological habitat is a great draw to a public interested in escaping the frenetic quality of the city and immersing themselves in a large-scale 'green' landscape. Whether for hiking, bird watching, private refuge, reflection, plant and wildlife identification, ecological research or education, Shelby Farms Park offers a "Big Nature" setting that lays the grounds for creating one of the world's most distinct and distinguished urban parks.

The Shelby Farms Park Master Plan amplifies these qualities to provide for a higher intensity and variety of uses on site. A new legible physical identity highlighted by an expanded Patriot Lake; a revised circulation system replete with multi-use circuits and user-specific paths; concentrated areas of public programs; an expanded educational agenda and accompanying facilities; cutting edge agrarian practices; and a new focus on sustainable development and renewable energy sources will distinguish Shelby Farms as the 21st century example of what great urban public space is capable of contributing to a city and a region.

It has been mentioned a number of times previously within this report, but its importance bears repeating. Through intelligent management and enhancement of Shelby Farms' distinct natural resources, the development of the Park has the capacity to transform Memphis and the Region. The Park will significantly enrich the culture of the City; it will redefine the reputation of the place, and help to attract new creative talent, business and families to the area; and it will offer a great resource for the improvement of public health, fitness and well-being. Shelby Farms Park will help Memphis offer a wonderful quality of life that is both highly desirable and globally enviable.

Shelby Farms Park will impact the way Memphis and West Tennessee move forward into the 21st century.



THIS BUS EATS ITS VEGETABLES
SHELBY FARMS SHUTTLE

APPENDIX A
EXISTING CONDITIONS ASSESSMENT

A.1 ELEMENTS | EXISTING VEHICULAR CIRCULATION

Shelby Farms Park is easily accessed by the automobile to both its benefit and its detriment. Sited just east of the I-240 / I-40 loop, Shelby Farms is bisected into northern and souther halves by the divided highway Walnut Grove Road. This arterial services a high volume of traffic in the mornings commuting westward into Memphis, and return traffic in the afternoon and evenings moving back to the eastern suburbs of Germantown and Collierville. Walnut Grove Road provides 3 entry points to the Agricenter property to the south, but only 2of these are accessible from the westbound lanes. There is one major access point to Shelby Farms Park to the north along Walnut Grove Road, though it is poorly marked and easily missed. This intersection with Farm Road is often the site of heavy congestion and backups during heavy commuting times. It is also a dangerous crossing point for bicycles and pedestrians since it was not designed to accommodate such traffic.

Farm Road is a heavily trafficked connector between Walnut Grove Road and Mullins Station Road running along the northern edge of the Park. Though this is actually not a public thoroughfare, its convenience factor creates a high demand for its use. Farm Road further bisects the Shelby Farms Property by isolating Area 10 and the Senior Gardens to the west from the rest of the park. It is anticipated that Farm Road will be replaced by the proposed Shelby Farms Parkway currently in design.

Though Mullins Station Road is immediately adjacent to the northern edge of the Park, its 4 access points are easily missed because of deficient entry signage. They are also difficult to access because of a combination of the narrow dimension of Mullins Station Road and the high rate of speed typical of the roadway. Connection to Germantown Road vis Raleigh-Lagrange and Trinity Roads is a potential asset, but currently is underutilized. A turning lane along Mullins Station Road would improve access to the Park, but widening beyond this would likely be a detriment to the Park.

Germantown Road is another significant arterial that has the potential to connect a significant population to Shelby Farms Park. At present there is no marking or signage designating the presence of Shelby Farms Park along Germantown Road, though the Agricenter property is visible and fairly well indicated.

The Wolf River Parkway and Humphries Boulevard provide no direct access to Shelby Farms Park. In order to access the property from this thoroughfare one must connect with either Walnut Grove or Germantown Roads.

Once inside the Shelby Farms Property, navigating the internal Park roads is difficult and often disorienting because of an absence of way-finding elements or a logical hierarchy of vehicular circulation. One frequently gets the sense they are “missing something” because of the confusing configuration of vehicular ways, particularly in the Plough Park area of Shelby Farms. The deficiency of the internal park circulation system is made acutely apparent during large events at the Park when the concentrated influx of Park visitors quickly creates a congestion situation that impacts not only vehicular circulation within the Park, but also regional traffic, often backing up Walnut Grove Road and its tributaries.

At present there is no bus service to Shelby Farms of any utility. Existing stops are poorly marked, unconnected to the Park via sidewalk or pedestrian path, and are sited too far from the major program areas of the Park to be of any real service. This makes Shelby Farms Park singularly usable by only those with access to an automobile other than those coming from the neighborhoods to the north of Mullins Station Road and the Park.

EXISTING VEHICULAR CIRCULATION

A.2 ELEMENTS | EXISTING PARKING

The parking facilities currently available within Shelby Farms Park to the north of Walnut Grove Road are a combination of paved lots near the Visitor Center and Patriot Lake, the stables, the Plough Park playground, the existing amphitheater, Pine Lake and Beaver Lake and an assortment of gravel lots including those along Farm Road, Mullins Station Road and Raleigh Lagrange Road. These lots are capable of accommodating the typical weekday volume of current park users, however the increase in user population on the weekends and during special events places a particularly high burden on the Park. On non-event days, this overflow tends to create a kind of parking free-for-all where the grass strips adjacent to roadways become the default parking location once the marked lots are full. This is not only an inconvenience, but also creates a maintenance problem, as well as a potentially dangerous situation for Park users.

On event days, the Park does have designated overflow parking areas. These are primarily located on the slope to the northeast of the visitor center; in the area of the Kite Flying Fields near the Farm Road - Walnut Grover intersection; and in the area of upland fields along Mullins Station Road adjacent to the Park entries. Though these overflow areas can accommodate most episodic traffic, major events like Earth Day or the Forth of July tend to overwhelm the capacity of the Park both in terms of parking and egress. A more efficient strategy for dealing with these type of events would be of significant use to the Park

To the south of Walnut Grove Road, the parking deficiencies are less acute. The campus areas around the Agricenter and the Showplace Arena has a significant parking advantage, but still has volume needs. For the most part, the existing capacity of Catch 'Em lakes is sufficient for its current volume of users. However, like the northern half of the Park, events at the Lakes like the Children's Fishing Rodeo create a significant traffic and parking-related deficiency.

Any increase in park usage must be accompanied by increase in parking facilities.

Existing paved parking (Plough Park):	790 spaces
Existing paved parking (Catch 'Em Lakes + Agricenter + Showplace Arena):	2,315 spaces

EXISTING PARKING

A.3 ELEMENTS | EXISTING PATH + TRAIL SYSTEM

The area of Shelby Farms Park north of Walnut Grove Road features a diverse assortment of trails and paths ranging in quality from paved to primitive. These paths are wonderful resources for those capable of navigating them, but for the casual user many of the trails are disorienting and/or poorly marked. The paved trails in this area of Shelby Farms Park are heavily utilized, though they are limited to the multi-use loop around Patriot Lake, and the Chickasaw trail that weaves through the hills and hollows of Plough Park. The Chickasaw trail extends from nearby the Visitor Center north to tangentially touch Mullins Station Road. Another trail within the norther half of the park that is heavily used is the Tour de Wolf. It is primarily a mountain biking trail that extends from Patriot Lake east through the rolling landscape of the Park, nearly reaching Raleigh Lagrange Road. Despite its popularity, the Tour de Wolf is a perfect example of a disorienting trail that could be improved by better marking and way-finding elements

Another unique feature of the northern half of the Park is the series of numbered gates that mark entries to the park. Most of these entries are typically used more for maintenance and agricultural purposes that public gateways. However, an enhancement to these gates, and an opening of them for public access could become part of a way-finding system for the Park tying the entries to the park's path and trail system.

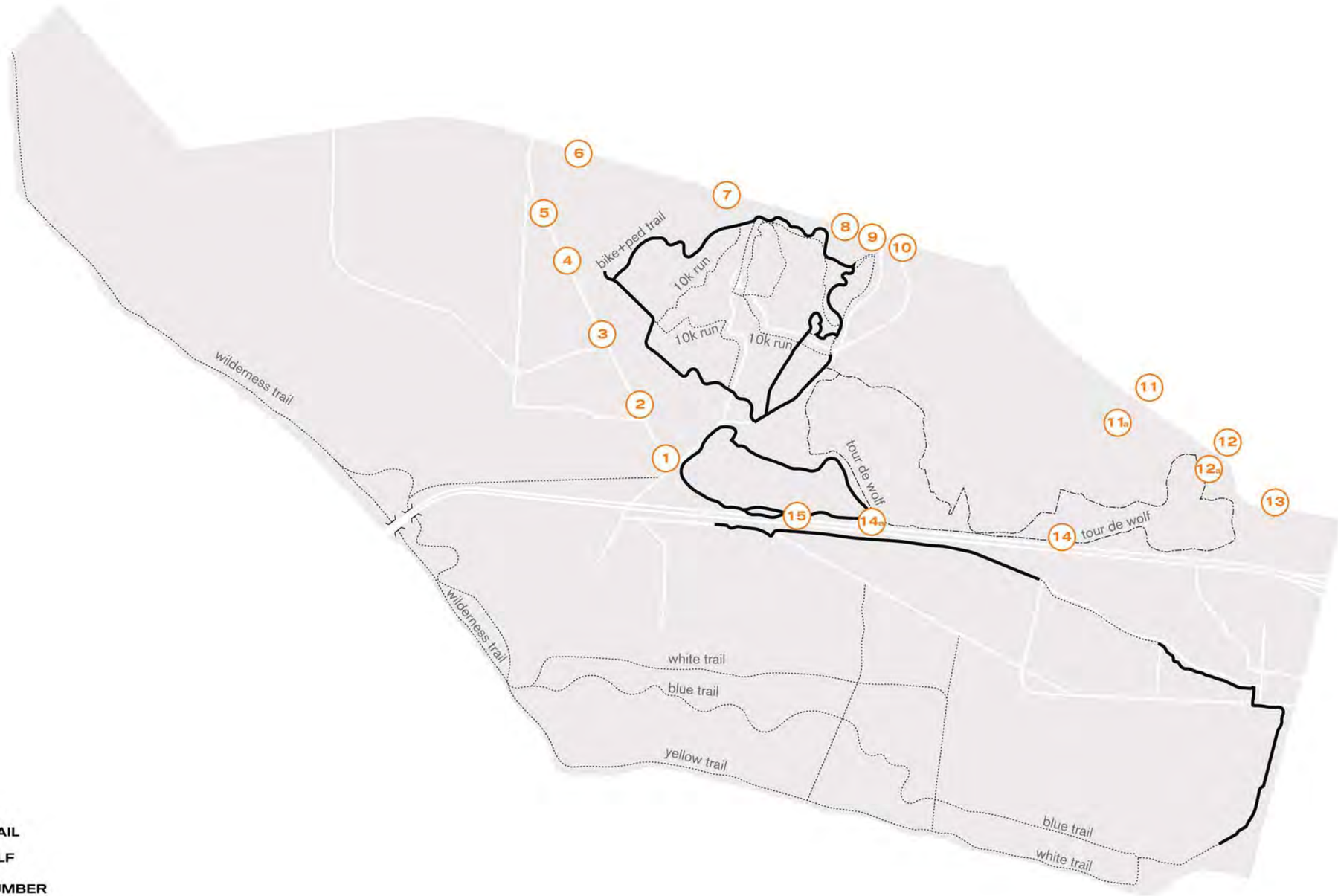
The trail and path system in the southern half of the Park exhibits less variation than the trails in the north and is far less comprehensive in the territory it covers. This limitation in trail location is due in large part to the need to isolate the public thoroughfares from the research being done in the fields within the Agricenter Campus. The trail circuit that wraps the Agricenter property is a mix of paved and unpaved surfaces. It is partially composed of the White Trail which connects the agricultural fields with the bottomland forest along the Wolf River.

In addition to the White Trail, the trail system within the bottomland forest along the Wolf River and within the Lucius Burch Natural Area includes the Blue and Yellow trails, as well as a number of other unmarked wilderness trails. The trails within this area are all extremely primitive in character and are expected to remain this way.

historic shelby farms gate

primitive trail within the wolf river corridor

EXISTING PATH + TRAIL SYSTEM



PAVED TRAIL

UNPAVED TRAIL

TOUR DE WOLF

3 GATES BY NUMBER

UNDERPASS

A.4 ELEMENTS | EXISTING WATER BODIES + HYDROLOGICAL SYSTEM

The upland hills and hollows of Shelby Farms Park north of Walnut Grove Road, currently referred to as Plough Park, is home to nearly 20 small fishing lakes and drainage basins. The lakes were all artificially made and are connected through a complex system of sloughs and drainage basins designed to irrigate the penal farm. The southern half of the park also contains several small water bodies, including a series of lakes called Catch 'Em Lakes that are used for recreational catfishing. The existing 56-acre Patriot Lake located in the heart of the site is one of the Park's biggest draws. Patriot lake is a magnet for a variety of boating and fishing activities and is surrounded by a popular 1.67 mile paved running and biking path. The site's entire hydrological system is undergoing assessment as part of a feasibility study for the proposed Patriot Lake expansion. Several observations of the existing water bodies and hydrological system are as follows:

1. There are four pipe crossings of Farm Road that drain to the west. These drainage basins comprise about 270 acres and include the discharge from Chickasaw Lake.
2. Several existing swales cut around Chickasaw and Mayor Lake and function as water retention areas. Most of these appear stagnant and there is no obvious pipe or weir connection between the lakes and swales. Just east of Pine Lake Drive, north of Chickasaw trail, the drainage swale appears to cut off the drainage from the north and route it to the west. Most of the swales appear disconnected from each other and the lake surface elevations looked low.
3. Due to the cutoff swales surrounding Mayor Lake, the lake's drainage basin is minimized to the rainfall that falls directly into it - roughly 4.5 acres. The lake appears a little stagnant.
4. Several small retention basins throughout the site do not appear to offer much benefit and do not have a significant drainage basin.
5. Currently, about 329 acres of the Park drain to Patriot Lake. The lake discharges to the south through a pipe beneath Walnut Grove Road.

mayor lake

6. Concrete swales were constructed around the perimeter of Patriot Lake to divert surface drainage from entering the lake. The majority of Patriot Lake's current drainage basin comes from Pine Lake and it's surrounding low areas. The water moves from Pine Lake through a vegetated channel into a small sediment basin just north of the Visitor Center before finally entering Patriot Lake.
7. There are two low lying areas south of Pine Lake that serve to cut off downhill drainage flows to Patriot Lake and route it back to Pine Lake. The western-most drainage swale appears stagnant, but the eastern-most one appears healthy and vegetated.
8. Nearly 232 acres drain through Beaver Lake and Boy Scout Lake and discharge through a pipe south across Walnut Grove Road.
9. Four additional pipe crossings under Walnut Grove Road to the east of Patriot Lake route water from one side of the road to the other.
10. Most of the upland water bodies aside from Patriot Lake do not appear to have any drainage structures for water release. Chickasaw Lake has a corrugated metal pipe discharging overflows, but the smaller ponds appear to fill up and spill over the dams.

EXISTING WATER BODIES + HYDROLOGY

1. CHICKASAW LAKE: 11 ACRES
2. MAYOR LAKE: 3 ACRES
3. PINE LAKE: 10 ACRES
4. PATRIOT LAKE: 56 ACRES
5. BEAVER LAKE: 21 ACRES
6. BOY SCOUT LAKE: 3 ACRES
7. UNNAMED LAKE: 5 ACRES
8. PATTERN LAKE: 2 ACRES
9. UNNAMED LAKE: 4 ACRES
10. INDIAN LAKE: 4 ACRES
11. WILLOW LAKE: 2 ACRES
12. UNNAMED LAKE: 2 ACRES
13. CATCH 'EM LAKES: 27 ACRES
14. MEANDER LAKE: 18 ACRES
15. TRAP LAKE: 17 ACRES
16. UNNAMED LAKE: 5 ACRES

WATER FLOW

WATER BODIES

A.5 ELEMENTS | EXISTING ECOLOGICAL STRUCTURE

Ecologically, Shelby Farms Park is characterized by a highly fragmented landscape and contains habitats that have been significantly altered from their natural state. Essentially, Shelby Farms is composed of upland and bottomland habitats. Vegetation appears to have remained similar to that typical of the region, although variation in composition is evident within local sites. The following information is a general and limited assessment of the ecological condition of the Park, although detailed appraisals of the status and distribution of biota have not been conducted.

Major Ecological Assets

1. Significant land area for a park surrounded by urban development
2. Location adjacent to the Wolf River and the existing Wolf River corridor
3. Rich soils typical of the region
4. Relatively mild climate of the region
5. Presence of bottomland and upland forests represented by a mosaic of habitat types, with considerable diversity in plant species
6. Assemblage of older age class hardwood trees
7. Relatively high biodiversity of animal species
8. Potential for restoration of native grasslands
9. Presence of existing lakes, ponds, sloughs, and wetlands
10. Presence of existing natural habitats (e.g., old-age forest, mature upland forest, wetlands) in the region which provide models and insight toward potential habitat restoration

Major Ecological Concerns

1. Habitat fragmentation and a highly altered landscape significantly impacted by anthropogenic practices
2. Impact of exotic species, especially the alien shrub, Chinese privet
3. Erosion of selected drainages
4. Blockage of water flow in selected drainages
5. Maintaining the ecological integrity of the park

Bottomland Forest

Existing bottomland forest (extending west to east along the Wolf River and including the Lucius Birch Jr. Natural Area) is characterized by an assortment of canopy trees. Existing species include oaks, hickories, sycamore, maples, sweetgum, tulip poplar, cottonwood, bald cypress, hackberry, elm, green ash, river birch, willow, and other species in lesser numbers. Loblolly pine has been planted in bottomlands near the Wolf River. This species is scattered throughout the site but is primarily on the southeastern edge of Shelby Farms in this habitat.

While a wide range of age structure exists within trees in bottomlands, a most striking feature in this habitat is the older age class of many of the hardwood species (e.g., oaks, sycamore, hackberry, cypress, and sweetgum). Overall, the bottomland forest represents a wide range of species diversity as well as a mix of age structure in canopy trees.

Reforestation in this habitat is evident on parts of Shelby Farms Park. In 1986, for example, nuttall oak, willow oak, red maple , sycamore, box elder, and green ash were planted at selected sites. Such habitat restoration efforts appear to have been focused on portions of the northern edge of the bottomland forest.

Other species of hardwoods (e.g., sweetgum, elm, maples) have naturally colonized these areas as well and are intermixed with the planted trees. Thus, younger age class forest occurs along much of the northern edge of the bottomland forest which borders agricultural, recreational, and maintained areas.

Permanent and intermittent sloughs and pools of standing water characterize parts of the bottomland habitat. Cypress trees, standing water, and moist soil conditions at sites along the northwestern part of the bottomland forest reflect patches of wetland habitat. Overall, the bottomland habitat forms a long, narrow, yet continuous block that makes provides the largest area of forested habitat on Shelby Farms Park. This habitat provides a forested corridor along the Wolf River that allows movement of animal species and is an important site for wildlife in the region.

Forest edges and openings as well as riparian habitats along smaller drainages in the bottomlands provide habitat for additional species biodiversity. Trees and vegetation in these areas include black locust, box elder, eastern red cedar, blackberry, (Continued) Japanese honeysuckle, nettle, poison ivy, Virginia creeper, trumpet flower, Chinese privet, and various weeds, vines, and grasses.

A large portion of the bottomlands of SFP are involved in agricultural practices. While such practices alter the natural state of the habitat, they can have significant and positive aspects for wildlife when incorporated into management plans.

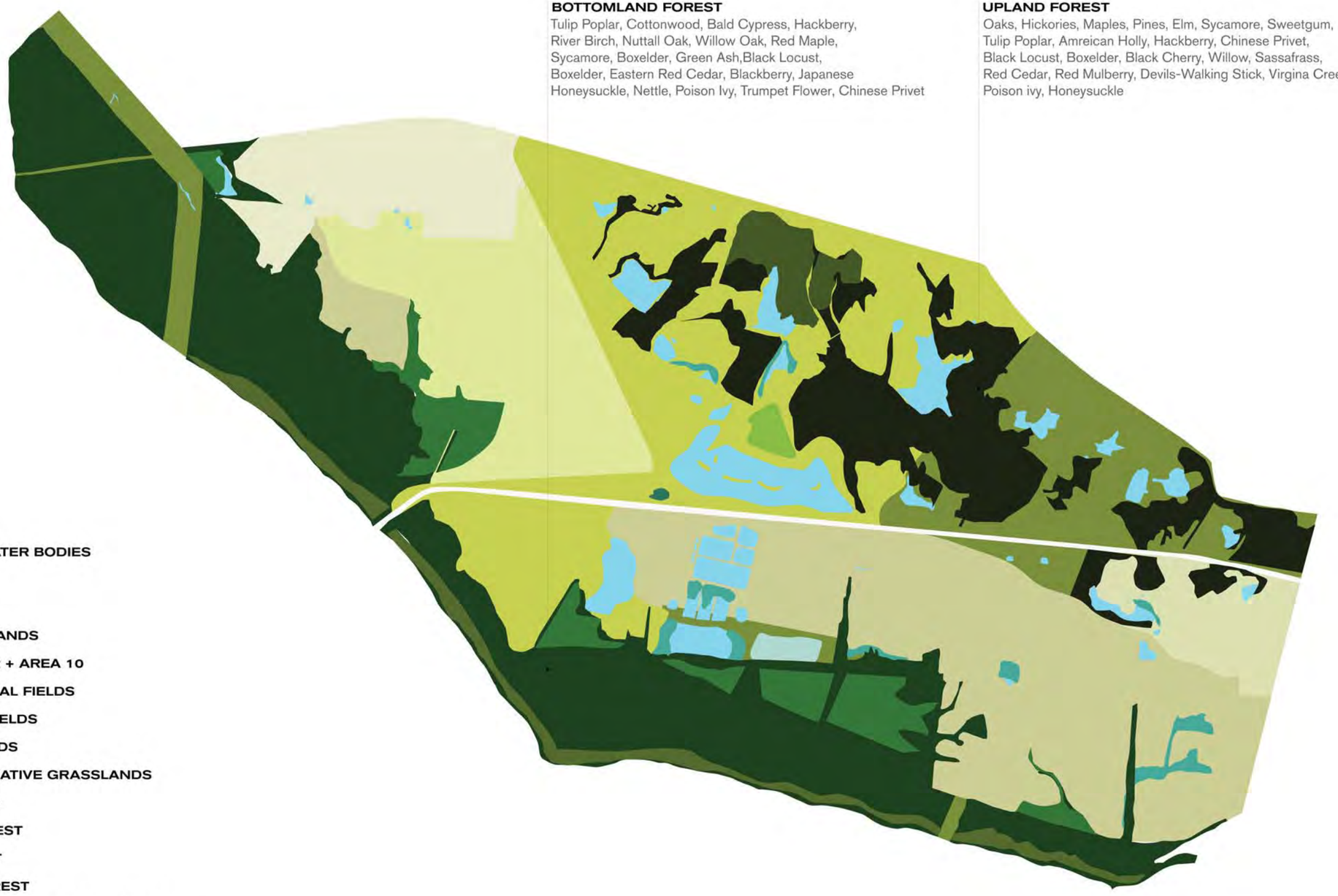
Upland Forest

Upland forest habitat is also characterized by an assortment of canopy trees. These include oaks, hickories, maples, pine, black locust, elm, sycamore, sweetgum, tulip poplar, American holly, hackberry, black cherry, and other species in less abundance. Upland forest is less dense and more fragmented than the bottomland habitat. As in the Shelby Farms Park bottomland forest, a range of age classes exist among the canopy trees (from early successional to older age classes typical of climax stages of succession). The two largest patches of upland forest are associated with Pine Lake and Beaver Lake. The pine forest associated with Pine Lake

EXISTING ECOLOGICAL STRUCTURE

BOTTOMLAND FOREST
Tulip Poplar, Cottonwood, Bald Cypress, Hackberry, River Birch, Nuttall Oak, Willow Oak, Red Maple, Sycamore, Boxelder, Green Ash,Black Locust, Boxelder, Eastern Red Cedar, Blackberry, Japanese Honeysuckle, Nettle, Poison Ivy, Trumpet Flower, Chinese Privet

UPLAND FOREST
Oaks, Hickories, Maples, Pines, Elm, Sycamore, Sweetgum, Tulip Poplar, Amreican Holly, Hackberry, Chinese Privet, Black Locust, Boxelder, Black Cherry, Willow, Sassafrass, Red Cedar, Red Mulberry, Devils-Walking Stick, Virgina Creeper, Poison ivy, Honeysuckle



- EXISTING WATER BODIES
- WETWOODS
- WETLANDS
- CYPRESS STANDS
- AGRICENTER + AREA 10
- AGRICULTURAL FIELDS
- MANAGED FIELDS
- MOWED FIELDS
- RESTORED NATIVE GRASSLANDS
- TURF GRASS
- YOUNG FOREST
- PINE FOREST
- UPLAND FOREST
- BOTTOMLAND HARDWOOD FOREST

is intermixed with hardwoods. This forest patch appears to have been damaged due to some weather event in the past. While most of the upland forest is represented by deciduous trees, patches of red cedar and scattered pines occur in this area of SFP. These patches of red cedar are undergoing succession where cedar is being shaded out by invading hardwoods.

Edges and forest openings associated with larger habitat patches and riparian areas of upland forest are characterized by a number of tree and plant species (e.g., privet, black locust, boxelder, black cherry, willow, sassafras, red cedar, red mulberry, devils-walkingstick, Virginia creeper, poison ivy, honeysuckle; additionally, weeds, vines, grasses, and wild rose. These areas provide valuable wildlife habitat on the uplands of Shelby Farms Park.

Much of the upland habitat is open fields where grasses are cut for hay. Other parts of the upland habitat are used, for the most part, for recreational purposes by visitors and include maintained areas that are mowed and roads, parking lots, and buildings. Some of this area is in pasture for bison and horses. Most noticeable in the uplands are the single and small clusters of large canopy trees (primarily oaks). Many of these are older age class trees and add significantly to the appeal of the landscape. Additionally, they provide valuable wildlife habitat and could potentially be important in construction of corridors that connect habitat patches.
Overall, the upland forest habitat represents a mosaic of successional stages that supports a high degree of plant and animal diversity. Greatest species richness for many non-game species on Shelby Farms Park likely occurs in the habitat east of Beaver Lake that is represented by an intermediate state of succession and is characterized by a mixture of grasses, shrubs, and trees. Historically present native grasslands and wildflowers of western Tennessee are sparse on Shelby Farms Park. Significant opportunities exist for enhancement of such vegetation on the site (both in distribution and abundance).

Invasive Plant Species

Several exotic species of plants exist on Shelby Farms Park (e.g., Chinese privet, Japanese honeysuckle, kudzu, Puerania lobata, and nettle). No attempt has been made at this time to inventory all exotic species on the park. However, the most serious threat to the health of Shelby Farms Park appears to be the invasive Chinese privet. This shrub is considered problematic in much of the southern United States. It can spread rapidly and is difficult to control or remove. At Shelby Farms Park, both bottomland and upland forest are under siege by this species. This alien shrub has become established throughout the edges and interior of most forested areas in the Park, although it appears to be most problematic in the bottomland forest. No doubt, this species is altering the natural composition of plant communities on the site.

Water Resources

The presence of permanent and intermittent water sources (e.g., lakes, ponds, sloughs, and the Wolf River) provide a valuable ecological resource. Selected sites where sloughs are located could provide areas for wetland restoration. The ecological health of these resources are undetermined at this time.

Fish

The Wolf River supports a relatively high fish fauna despite the dredging and industrialization associated with the lower portion of the river (portion in the immediate Memphis area). Specific efforts to investigate the status and distribution of fishes on the Park are yet to be conducted. However, anecdotal reports by fisherman suggest that ponds and lakes have numerous small fish (gizzard shad and sunfish) and large carp, but large bass and crappie are less abundant. Open fishing is popular and, in many cases, successful. A fee fishing lake has operated on Shelby Farms Park for some time, is very popular, and people readily catch fish. Aquaculture ponds have also been established and have supported research and commercial culture of channel catfish and red swamp crawfish. Given the extent of lakes, ponds, and sloughs on Shelby Farms Park and the location adjacent to the Wolf River, there is a high potential for improving the biodiversity of fish and fisheries at Shelby Farms Park.

Amphibians and Reptiles

About 75 species of amphibians and reptiles are known in the region. Species richness and densities within species on Shelby Farms Park are uncertain for this group of vertebrates. Several species of snakes have been reported in Shelby Farms Park (e.g., copperhead, eastern kingsnake, banded water snake, garter snake, and cottonmouth). Other reptiles reportedly include turtles (e.g., eastern box turtle, red-eared slider, and others). Reported frog species are likely to include the bullfrog, northern leopard frog, gray tree frog and others. Toads, salamanders, and other amphibians represent this group. Data gathered by Shelby Farms Park personnel suggest that counts of frog populations are not representative of the higher counts recorded at other sites.

Birds

Bird species have been relatively well documented at Shelby Farms Park from the mid-1930's to the present. A checklist of birds, recorded by the Memphis Chapter of the Tennessee Ornithological Society, reports the occurrence of about 265 species. Common, uncommon, rare, and exceptional occurrences are delineated for all seasons of the year in this work. These counts, and recorded sightings of neotropical migratory taxa, demonstrate that Shelby Farms Park is clearly an important site for conservation and management programs locally, regionally, and nationally.

Canada geese and mallard ducks are among the most visible birds on the Park. In general, an examination of the population counts of the Memphis Chapter of the Tennessee Ornithological Society over recent years could provide valuable insight as to the ecological health of the site. Shelby Farms Park is not only a significant habitat for birds, it also provides numerous opportunities for viewing, photographing, and listening to birds as well as wildlife.

Mammals

Formal surveys of mammals have not been conducted at SFP. Some 55 game and non-game species are known in western Tennessee, although the majority of mammals in the region are non-game. On-site visualizations verify the presence of white-tailed deer , coyote, raccoon, Virginia opossum, bobcat, eastern mole, gray squirrel, and others. The status of most non-game species (e.g., shrews, bats, and small rodents) is unknown. However, given the assemblage of several highly visible species in Shelby Farms Park, it is likely that mammalian biodiversity could be fairly high.

Endangered and Threatened Species

No endangered or threatened species of plants and animals are known to reside on the park at this time. However, species for groups of plants and animals Deemed in Need of Management at the state level (e.g., mammals; southeastern shrew and Rafinesque's big-eared bat) could occur on Shelby Farms Park. Inventories are needed.

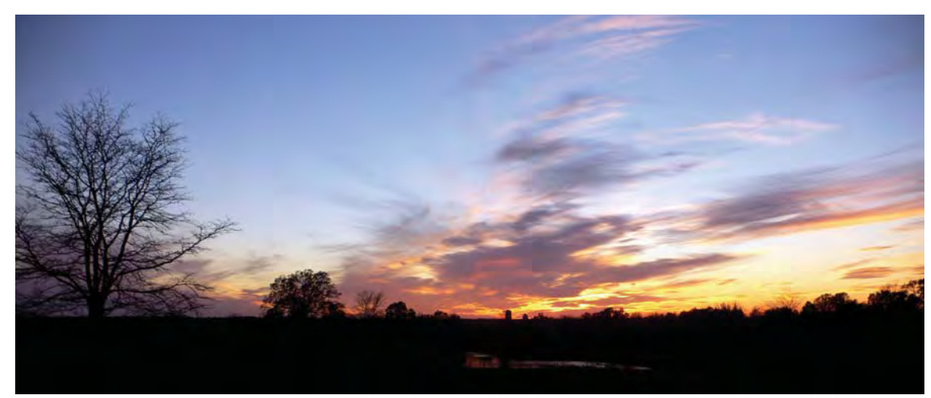
A.7 ELEMENTS | EXISTING VIEWS + VISTAS

Some of the most memorable features of Shelby Farms are the spectacular views a visitor is afforded as they look across the Park in nearly every direction. These perspectives provide a great deal of the Park's inherent character and should be valued and protected as such. Fragmented tree masses in the upland area of the Park frame many of the vistas in this area. Other views are opened wide in the lowland area of the Park looking across the wide horizon of the agricultural fields. The varied topography of the Park adds to the quality of these vistas. For example, the upland areas of the park offer some of the highest elevations between Germantown and Downtown Memphis.

Each of these views and vistas are important not only for their beauty, but because they provide a sense of scale for the Park. It is from these vantage points that a Park visitor is made aware of the true scale and size of Shelby Farms.

Any reforestation of the Park must respect these view corridors, and should look to enhance them by better defining the frame of the landscape through which they are viewed, and improving the characteristics of prospect and refuge that are critical to spatially understanding the Park.

hills + hollows + horizon



a spectacular november sunset

EXISTING VIEWS + VISTAS

EXISTING CANOPY

VIEW CORRIDOR

SCENIC VIEWSHED

A.8 ELEMENTS | EXISTING PROGRAM AREAS + FACILITIES

The majority of Park-related activity at Shelby Farms north of Walnut Grove Road is centered around the Visitor Center, Patriot Lake and Plough Park. Within this area are picnicking venues, playgrounds, fishing lakes and a small amphitheater. In addition there are accommodations for frisbee-golf, kite-flying, horse riding lessons and the bison fields. In addition to these activities, this area of the park is typically utilized for strolling, running, dog-walking, bicycling and roller blading. The remainder of the northern half of the park is utilized with much less frequency, and as such is home to very few structured venues or facilities.

Major park-related activities in the southern half of the Shelby Farms Property are concentrated around the Catch 'Em Lakes and the Agricenter. In addition to fishing, facilities nearby Catch 'Em Lakes include a BMX track, sports fields used primarily for Ultimate Frisbee, and an unused shooting range. The area around the Agricenter campus include a farmers market, exhibition and office facilities, stables, an RV park, and a migratory bird viewing area. Outside of Area 10, the Agricenter is home to the largest concentration of buildings and structures within the Shelby Farms property.

shelby farms park visitor center

late-afternoon activity around patriot lake

EXISTING PROGRAM AREAS + FACILITIES

A.9 ELEMENTS | INFRASTRUCTURAL EASEMENTS

At 4,500 acres, the scale of Shelby Farms means that it is incapable of escaping the presence of large infrastructural elements within its territory. Though these systems are unavoidable, the key to their presence within the Park is minimizing their impact, and where possible, isolating them from the active uses of the other Park areas. In addition to the presence of Walnut Grove Road and its right of way, there are three other areas of major infrastructure within the Shelby Farms Property.

Power Line Easement: To the west of Area 10 is an approximately 400' wide easement for high tension power lines moving northwest to southeast along the edge of the Shelby Farms property before turning due south after crossing the dormant CSX line. From this point the easement moves through an area of bottomland forest, south across the Wolf River. The location of this infrastructure has little impact on existing or anticipated uses within the Park.

Landfill Area: Immediately east of the Walnut Grove Road - Wolf River intersection is an approximately 125 acre territory within which a capped landfill is sited. The mound is managed by the Shelby County Department of Public Works and is currently inaccessible by the public. The integrity of the mound is unknown, though it has shown signs of settlement and does allow water to sit atop it, both signs of a deficient landfill structure. The location of the landfill mound does create some concern because of its adjacency to the Wolf River, Trap Lake and the proposed Walnut Grove-Shelby Farms Parkway Intersection. Once capped, a properly structured and managed landfill mound should be able to accommodate public activity on its surface. We will need to determine the capacity of the Shelby Farms landfill mound to accommodate public activity on its surface before assessing any adverse impact on the Park.

Gas Line Easement: Beginning approximately 800' southeast of the Gate 11 entry to the Park along Raleigh Lagrange Road is an approximately 150' wide easement for a high pressure natural gas line. This easement extends south, southwest across the site, crossing Walnut Grove Road just west of the Ducks Unlimited building. From here it moves through the Agricenter's research fields to a point approximately 5,300' west of Germantown Road where it crosses the Wolf River and the Wolf River Boulevard. Other than limitations on tree planting within the easement, this corridor has little impact on Park usage beyond where it crosses the Agricenter's leasable building property along Moore Road. Here there are particular limitations to how close the foundation of a building can come to the alignment of the gas line.

power line easement through bottomland forest along wolf river

landfill mound south of walnut grove road

INFRSTRUCTURAL EASEMENTS

APPENDIX B
CONSERVATION EASEMENT

Tom Leatherwood
Shelby County Register

As evidenced by the instrument number shown below, this document has been recorded as a permanent record in the archives of the Office of the Shelby County Register.

184

07021070
02/01/2007 - 02:11 PM

23 PGS : R - EASEMENT	
HERTHA 467561-7021070	
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	115.00
DP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	0.00
TOTAL AMOUNT	117.00

TOM LEATHERWOOD
REGISTER OF DEEDS SHELBY COUNTY TENNESSEE

160 N. Main St., Suite 519 ~ Memphis, Tennessee 38103 ~ (901) 545-4366
http://register.shelby.tn.us

Tom Leatherwood, Shelby County Register of Deeds: Instr. # 07021070

GRANT OF CONSERVATION EASEMENT

This Grant of Conservation Easement ("Grant") is made by the County of Shelby, Tennessee ("County") and the Shelby County Agricenter Commission ("Agricenter") (collectively, "Grantors") as of the _____ day of January, 2007, and shall become effective upon being properly recorded in the office of the Shelby County Register ("Effective Date") pursuant to the Conservation Easement Act of 1981, Tenn. Code Ann. 66-9-301 et seq., as amended, and the common law.

Section I - Recitals

Grantors are "public bodies" as defined in Tenn. Code Ann. 66-9-303(5).

County is the owner of the property designated on Exhibit A hereto as "County Property." Agricenter was established by the Tennessee General Assembly, and is the recipient of a grant of the property designated on Exhibit A hereto as "Agricenter Property," said property having been granted to Agricenter pursuant to resolution of the Board of County Commissioners of the County subject to reversion to the County under certain circumstances. All of the property described on Exhibit A, including that designated as "County Property" and that designated as "Agricenter Property," is hereinafter collectively referred to as the "Property."

For purposes of this Grant, four areas of the Property ("Tiers" 1 through 4) have been designated, as reflected and described on Exhibit B hereto.

The Property has significant conservation, natural, scenic, recreational, agricultural, scientific and parkland resources and values in the fields, forests, open spaces, vistas, wetlands, ponds, lakes, and streams on the Property, which resources and values are worthy of protection, maintenance, preservation, and enhancement for the benefit of the people of Tennessee. Grantors deem that it is in the public interest to grant a conservation easement with respect to the Property as herein provided and that the public will gain a substantial benefit by the granting of the conservation easement.

For the purpose of protecting, maintaining, preserving, and enhancing the conservation, natural, scenic, recreational, agricultural, scientific and parkland resources and values of the Property and providing for its use in keeping with such protection, maintenance, preservation and enhancement, Grantors desire to grant a conservation easement with respect to the Property, subject to the terms and conditions hereinafter provided. Grantors acknowledge receipt of good, valuable, and sufficient considerations for this Grant.

The Land Trust for Tennessee, Inc., a Tennessee nonprofit corporation ("Grantee"), has received from the Internal Revenue Service an exemption under 501(c)(3) of the Internal Revenue Code, and is therefore an "exempt organization" as defined in Tennessee Code Ann. 66-9-303(2).

Grantors deem Grantee to be qualified and to be an appropriate entity to receive and enforce the conservation easement herein granted.

12/18/2006
As amended by Shelby County Commission
12947N:061467:706599:6:NASHVILLE

Grantee desires to accept this Easement, subject to the terms and conditions hereinafter provided.

Section II - Grant and Agreements

NOW THEREFORE, for the benefit of the people of Tennessee, Grantors agree as follows:

1. Grant. Grantors grant to Grantee a conservation easement ("Easement") on, over, under, and across the Property for the purposes of protecting, maintaining, preserving, and enhancing the conservation, natural, scenic, agricultural, scientific, recreational, and parkland resources and values of the Property, including without limitation the fields, forests, open spaces, vistas, wetlands, lakes, ponds, and streams of the Property, the biological and ecological integrity and value of the Property, and the use of the Property by the public as an urban park, in keeping with such protection, maintenance, preservation, enhancement, and for other purposes incidental, necessary, and appropriate to the foregoing, such grant being subject to the terms and conditions hereinafter provided.

Included in the Property is property designated as the Lucius Burch Natural Area ("LBNA") by the State of Tennessee. The parties agree that any and all use of the LBNA pursuant to the terms of this Easement shall be consistent with T.C.A. 11-14-101 et seq., as it may hereafter be amended, and all rules and regulations promulgated thereunder, that control the use of the LBNA.

Excluded from the provisions of this Easement is the road right of way property as designated on Exhibit A-1.

Also excluded from the provisions of this Easement is property designated as "Area 10," that is to be reserved for governmental and government-related uses pursuant to a plan to be adopted by the Board of County Commissioners of Shelby County, Tennessee. This Area is described on Exhibit A-2 attached hereto.

2. Declaration of Restriction. Grantors and Grantee declare and agree that the uses of the Property shall be restricted and limited to the uses permitted under this Easement. Such restrictions and limitations shall run with the land and apply to any successive owners of the Property, or any portion thereof, and Grantors shall do all things necessary to ensure that this is the case.

3. Master Plan. It is understood and agreed by Grantors and the Grantee that a Master Plan is to be developed, subject to the provisions of Paragraph 18 herein, for the Property through a planning process to be initiated by the County in the future. Grantors and Grantee agree that Grantee shall become a party to the planning process for said Master Plan, which upon completion shall become incorporated into this Easement as though set out fully herein. Grantors and Grantee hereby declare and agree that, until the completion of said Master Plan and its adoption by the County, or until December 31, 2008, whichever occurs first, no permanent buildings, structures, or infrastructure shall be constructed or placed upon the Property, and no permanent changes shall be made in the topography of the land, except those specific buildings and structures described in Exhibit A-3, it being the intention of the parties that there be a

moratorium on the construction or placement of such buildings, structures, or infrastructure, and on change in the topography of the land, other than those described in Exhibit A-3, until said Master Plan has been adopted or such December 31, 2008 deadline occurs. It is understood and agreed that the Master Plan may increase, but may not decrease, the prohibitions and restrictions on the uses permitted under in this Easement.

If during the moratorium period, a party proposes construction which was not anticipated on the date of this Grant, which is not included on Exhibit A-3, and which is in keeping with the uses and purposes of this Grant, said party may propose an amendment to Exhibit A-3 to permit such construction. The parties will in good faith negotiate the amendment, and consent to the amendment will not be unreasonably withheld, conditioned, or delayed.

4. Permitted Uses. The following uses of the Property are permitted, reserved, and retained, subject to the moratorium set forth in the preceding paragraph, and subject to any restrictions or prohibitions set forth in the Master Plan, and to any restrictions or prohibitions set forth in the 1981 Private Act of the Tennessee Legislature creating the Agricenter Commission (Chapter 141 of the Private Acts of 1981), the 1981 Resolution of the Shelby County Commission adopting and approving said Act, and the 1982 Resolution of the Shelby County Commission granting the property to the Agricenter:

a. pedestrian, bicycle, skating, and equestrian trails and paths, paved and unpaved, and equestrian operations;

b. nature trails, boardwalks and wildlife observation areas and improvements;

c. gardens;

d. recreational sports and uses consistent with the purposes and uses herein provided and in accordance with the approved Master Plan;

e. pavilions, picnic areas, and playgrounds;

f. agronomy and horticulture uses, including but not limited to farming, educational, aquaculture, and nursery uses;

g. scientific purposes, including agricultural, archeological and environmental sciences, which have no material adverse impact on the Property and the uses herein provided and are consistent with the purposes of this grant;

h. dog exercise and training;

i. boating activities consistent with the purposes and uses herein provided; only small electric motors or trolling motors are acceptable; gas powered motors, jet skis, etc. are prohibited;

j. fishing;

k. development and enhancement of wildlife habitat;

l. development and enhancement of forests (including without limitation reforestation), fields, vistas, and open spaces;

m. access by designees of Grantors to the Property at all times in connection with the uses permitted hereunder;

n. short term events not inconsistent with the uses and purposes herein provided, including without limitation outdoor festivals; collection of fees normally associated with the use of park facilities; special events, educational, agronomy and horticultural uses; and food, drink, and merchandise sales incidental to permitted uses. Permanent concessions of permitted uses may be permitted to have food, drink or merchandise sales but with size or quantification limitation on these types of incidental sales to permanent uses;

o. animal control as may be necessary to control property damage, to protect the Property, and/or to protect the health, safety, and welfare of the public;

p. direction, location, and use signs consistent with the purposes and incidental to the uses herein provided;

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q. classes, demonstrations, projects, and other educational uses to promote and teach environmental protection and conservation;

r. retreat and/or camping facilities that are compatible with the rustic and natural setting of the Property, and in accordance with the Master Plan;

s. existing and currently planned uses of the Property or in accordance with the approved Master Plan and prior written approval of Grantee, which approval shall not be unreasonably withheld, conditioned or delayed;

t. maintenance, repair, removal, rearrangement, reconfiguration, renovation, relocation, and reconstruction of existing buildings, structures, facilities, sewer and/or utility lines, and other improvements; and

u. a carousel or historic rollercoaster, in a location to be mutually approved by Grantors and Grantee.

The following additional uses are permitted in the areas designated as Tier 2, Tier 3 and Tier 4 on Exhibit B, attached hereto, subject to the same conditions set forth above (i.e., the moratorium, the prohibitions or restrictions of the Master Plan, and the restrictions and prohibitions set forth in the Private Act and Resolutions referred to above):

Tier 2: Agricenter Campus Area

a. Continuation of construction of any buildings now under construction and construction of additional buildings, structures, facilities, sewer and/or utility lines, and other improvements related to agriculture; and

b. Use, maintenance, repair and replacement of roads and parking areas and construction of new roads.

Tier 3: Agricenter Crop and Recreation Area

a. Construction of ancillary buildings, barns, silos, storage structures, facilities, sewer and/or utility lines, and other improvements;

b. Maintenance, repair, and replacement of roads and parking areas and construction of new roads;

c. A demonstration area for animal husbandry science;

d. Hiking and biking trails, lakes and ponds, and other recreational uses for the public now existing and further additional recreational uses..

Tier 4: Show Place Arena Area

a. Restaurant; catering facility;

b. Showplace arena including indoor arena, enclosed warm-up arena, outdoor covered arena, and outdoor uncovered arena;

c. Six barns (two of which are located on the Agricenter property);

d. Parking area; and

e. Such other commercial uses as may be added as a result of the Master Plan.

Each Grantor reserves the right to adopt rules and regulations with respect to the permitted uses of its property consistent with the uses permitted and purposes provided herein and with respect to protecting the health and safety of the public and consistent with the Master Plan. Each Grantor also reserves and retains the right to move, remove, rearrange, reconfigure, renovate, relocate, and reconstruct facilities, improvements, and features of its property from time to time consistent with uses and purposes herein stated and consistent with the Master Plan.

5. Prohibited Uses. Except as expressly permitted in other Tiers, the following uses of the Property are prohibited:

a. stadiums; arenas; race tracks for animals or motor vehicles; commercial uses other than those specifically permitted by this Easement, provided

that the existing horse show place arena on the Property may be located elsewhere on the Property as determined by the approved Master Plan;

b. electromagnetic transmission lines and towers, other than those permitted under existing leases as such leases may be extended or renewed, without adding additional lines or towers; provided that additional antenna may be added to the existing tower and transmission lines for operation of the Property;

c. use of motorized vehicles on the unpaved paths and trails of the Property except for maintenance and operation of the Property;

d. commercial, industrial, residential, or other real estate development;

e. manufacturing and industrial uses, excluding the mulch facility on the County property;

f. commercial mining activities, except those related to lead recovery and removal on the former firearms range site on Tier 1;

g. residential uses or hotel/motel uses, excluding temporary shelter in case of emergency or disaster;

h. subdivision of the Property;

i. dumping of garbage, trash, or building materials, provided, however, that this prohibition shall not apply to (i) lawful temporary disposal of waste resulting from daily operations of the Property (dumpsters, etc.) or (ii) lawful temporary disposal of products as part of a recycling or recovery operation established for the purpose of environmental preservation and protection (mulch recycling, cardboard recycling, etc.)

j. public or private facilities except those which implement and facilitate the purposes and uses herein provided;

k. zoos;

l. permanent fairgrounds;

m. billboards;

n. commercial advertising, except for temporary signs for marketing of special events and concessions and except for the existing signs on the Agricenter property;

o. schools;

p. colleges, except for the existing Southwest Tennessee Community College facilities on the Agricenter property;

q. structures used primarily for exhibitions and performances except for one amphitheater and outdoor exhibition facilities consistent with park purposes and uses herein provided;

r. roads and parking areas other than existing roads and parking areas and future roads and parking areas permitted by the Master Plan;

s. activities which cause significant erosion or pollution;

t. other uses inconsistent with the Master Plan; and

u. any other activities inconsistent with the purposes and uses herein provided.

6. Right of Entry and Enforcement. Grantee, its agents, and independent contractors shall have the right of entry and access to the Property at all times to make such inspections and investigations as Grantee deems appropriate and to enforce this Grant. Grantee may enforce this Easement by action at law or by injunction or other proceedings in equity. No delay of or forbearance in enforcement of Grantee's rights and remedies under this Easement shall be deemed a waiver of such rights and remedies or preclude Grantee from exercising any of its rights and remedies. Defenses of laches and estoppel based on delay in enforcing rights and remedies are waived. If Grantee is successful in enforcing its rights and remedies under this Easement in a proceeding at law or equity, Grantee shall have the right to recover from the government of Shelby County, Tennessee, its reasonable costs and expenses actually incurred including reasonable attorney's fees, irrespective of whether the need for such enforcement is caused by Grantors or a third party. In the event that Grantee or Grantee's assigns fail to enforce the provisions of this Easement or at the invitation of the Grantee, the Attorney General of the State of Tennessee may enforce the provisions of this Easement by any action at law or in equity.

In the event there is a dispute between Grantor and Grantee whether or not an activity or use is permitted or prohibited, the parties will arbitrate the dispute to a committee of 3 individuals who have significant experience with land use and conservation easements. One individual shall be selected by the Grantor, one individual by the Grantee, and the third selected by those two individuals. The three individuals will determine the dispute by majority vote, following the rules of the American Arbitration Association. The decision of the arbitration committee shall be binding or nonbinding by agreement between Grantee and Grantor prior to selection of the arbitration committee.

7. Duration. The duration of the Conservation Easement herein granted shall be perpetual, provided that Grantors may terminate this Grant to become effective on the date of any fiftieth anniversary of this Grant. Grantors shall give notice as provided in Paragraph 17 herein. This Grant shall run with the land. This Grant shall be binding on the successors and assigns of the parties and shall inure to the benefit of the successors and permitted assigns of the parties.

8. Construction. This Easement shall be liberally construed in favor of protecting, maintaining, preserving, and enhancing the conservation, natural, scenic, recreational, agricultural, scientific and parkland resources and values of the Property. Captions shall not be

used in interpreting this Grant. If any provision of this Easement is found to be ambiguous, an interpretation consistent with the purposes of this Easement and that would render the provision valid shall be favored over any interpretation that would render it invalid.

9. Severability. If any provision of this Easement shall be determined by a court of competent jurisdiction to be invalid or unenforceable, such determination shall not affect the other provisions of this Grant, which other provisions shall be enforced to the full extent permitted by law.

10. Hazardous Materials. Each Grantor agrees that it will comply with all applicable laws with respect to any hazardous or toxic substances, materials, wastes, or other substances regulated by law now located on its property. County will comply with all applicable laws with respect to the landfill and firearms range on the County property. Nothing in this paragraph shall impair Grantors' right to pursue third parties with respect to violations of environmental laws caused by such third parties. Grantee shall have no responsibility with respect to such substances, materials, waste, landfill, and firearms range.

11. Assignment by Grantee. Grantee may assign its rights and interests under this Easement to another organization which is an exempt organization as defined in Tenn. Code Ann. 66-9-303(2), which has the power and authority to hold the conservation easement herein granted subject to the provisions of this Grant, which is a state or nationally recognized conservation organization, or other similar organization accredited to hold conservation easements by the Land Trust Alliance or other successor organization of similar stature, which is approved in writing by Grantors, and which accepts the assignment. If Grantee ceases to be an exempt organization, it will assign its rights and interests under this Easement to an exempt organization approved by Grantors. Grantors will not unreasonably withhold its consent to assignment.

12. Assignment by Grantors. Grantors may assign their rights, privileges, and interests under and as reserved and retained in this Easement (including without limitation all rights of approval, determination, and regulation as to purposes and uses) to an assignee using and operating the Property, provided that such assignment shall be made expressly subject to this Easement, and Grantors agree to take all steps necessary to enforce the provisions of this Easement against any such assignee.

13. Eminent Domain. If any of the Property shall be taken under the power of eminent domain, the entire award shall be the sole property of the County.

14. Maintenance and Insurance. Each Grantor shall continue to maintain its respective property and the improvements thereon in good order, condition, and repair, and in compliance with applicable laws.

As of the date of this Easement, County is self insured as to both casualty and liability insurance with respect to the Property. If and when County shall carry casualty insurance with respect to the improvements, County shall insure the improvements for their full replacement value in accordance with County's insurance standards applicable from time to time to County's facilities. The proceeds of casualty insurance shall be used for repair and restoration of

improvements on the County property. If and when County shall carry public liability insurance with respect to the County property, County shall maintain such insurance in accordance with County's liability insurance standards applicable from time to time to County's facilities, and Grantee and Agricenter shall be named as additional insureds under such liability insurance policies. Grantors will provide Grantee and Agricenter proof of the insurance required by this paragraph.

The Agricenter shall keep the contents of the improvements on Agricenter property insured for their full replacement value. The proceeds of insurance on improvements on the Agricenter Property insured by the County shall be used for repair and restoration of such improvements. The Agricenter shall carry and maintain public liability insurance with respect to the Agricenter property. Initial limits of such liability insurance shall be $1,000,000.00 per incident, $2,000,000.00 aggregate, and thereafter the limits shall be in accordance with commercially reasonable business practices. Grantee and County shall be named as additional insureds under such liability insurance policies. Agricenter will provide Grantee and County proof of the insurance required by this paragraph.

15. Default, Right to Cure. If either party shall default under this Grant, the party in default shall have 30 days after receipt of notice of the default to cure the default, or if such default cannot reasonably be cured within said 30 days, the party in default shall have such additional time as is reasonably necessary to cure the default provided that the party in default begins to cure the default within said 30 days and diligently pursues to completion the curing of the default. No remedy shall be exercised with respect to such default unless and until the default is not cured as herein provided.

16. Notices. All notices required or permitted under this Easement shall be in writing and shall be given by hand delivery or by certified mail, return receipt requested, addressed to the parties as follows:

Grantors:
Shelby County, Tennessee
160 N. Main Street, Suite 850
Memphis, Tennessee 38103
Attention: Chief Administrative Officer

Shelby County Agricenter Commission
7777 Walnut Grove Road
Memphis, Tennessee 38120
Attention: Chairman of the Commission

with a copy to:
County Attorney
160 N. Main Street, Suite 660
Memphis, Tennessee 38103

Grantee: The Land Trust for Tennessee, Inc.
209 10th Avenue South, Suite 530
Nashville, Tennessee 38203
Attention: Executive Director

A party may change its notice address by notice as above provided.

17. Termination. Should circumstances arise that render the purposes of this Grant impossible to accomplish, this Grant may be terminated or extinguished, in whole or in part, by judicial proceedings in a court of competent jurisdiction, subject to the provisions of Paragraph 18 herein. In addition, Grantors reserve the right to terminate this Grant at the end of each fifty-year term, said terms being measured from the Effective Date hereof, and upon notice to the Grantee of intent to terminate no later than ten (10) years before the end of each fifty-year term. Said notice shall be delivered to the Grantee within a one year period beginning on the first day and ending on the last day of such respective fortieth year period. Said notice shall be effective only if in writing and delivered either (i) in person to the parties' respective authorized agent or (ii) by First Class U.S. Mail or (iii) by overnight courier with tracking capabilities to the addresses provided herein, or to such other person or address as either party may designate in writing and deliver as herein provided. Should Grantors fail to provide timely notice of intent to terminate as herein provided, this Grant shall automatically renew for an additional fifty-year term.

18. Interpretation. Nothing in this Grant or the Master Plan shall be interpreted or intended to be utilized to interfere with the rights and duties granted to the Agricenter Commission pursuant to Chapter 141 of the Private Act of 1981, nor shall this Grant, or any provisions herein, be construed or interpreted as in any way modifying or exceeding the provisions of any law with respect to the use of the Property.

IN WITNESS WHEREOF, the parties hereto have caused this Conservation Easement to be duly executed and delivered by their respective officials thereunto duly authorized as of the date first written above.

GRANTEE:

THE LAND TRUST FOR TENNESSEE, INC., a Tennessee nonprofit corporation

By: _____

Print Name: Jean C. Nelson

Title: President and Executive Director

GRANTORS:

SHELBY COUNTY, TENNESSEE

By: _____
A C Wharton, Jr., County Mayor

SHELBY COUNTY AGRICENTER COMMISSION

By: _____
Hamilton Smythe, III, Chairman

Approved as to Form:

By: _____
Brian Kuhn, County Attorney

Other County Approvals:

By: _____
Michael Oakes, P.E.
County Engineer

By: _____
Bill Goss
County Real Estate Manager

STATE OF TENNESSEE
COUNTY OF SHELBY

Before me, the undersigned, a Notary Public within and for said State and County, duly commissioned and qualified, personally appeared **HAMILTON SMYTHE, III**, with whom I am personally acquainted, and who upon oath acknowledged himself to be the **Chairman of the Shelby County Agricenter Commission**, the within named bargainor, and that he as such **Chairman**, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the **Shelby County Agricenter Commission** by himself as such **Chairman**.

9th WITNESS my hand and Notarial Seal, at office in Memphis, in the County aforesaid, this day of January, 2007.

Paula M. Lewis
Notary Public

MY COMMISSION EXPIRES:

PAULA M. LEWIS STATE OF TENNESSEE NOTARY PUBLIC COUNTY OF SHELBY MY COMM. EXP. JUNE 15, 2010

STATE OF TENNESSEE
COUNTY OF SHELBY

Before me, the undersigned, a Notary Public within and for said State and County, duly commissioned and qualified, personally appeared **A C WHARTON, JR., Mayor of Shelby County, Tennessee**, with whom I am personally acquainted, and who upon oath acknowledged himself to be the **Mayor of Shelby County, Tennessee**, the within named bargainor, one of the counties of the State of Tennessee, and that he as such Mayor of said county, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of **Shelby County, Tennessee**, by himself as such **Mayor** of said **Shelby County, Tennessee.**

16 WITNESS my hand and Notarial Seal, at office in Memphis, in the County aforesaid, this day of January, 2007.

Paula M. Lewis
Notary Public

MY COMMISSION EXPIRES:

PAULA M. LEWIS STATE OF TENNESSEE NOTARY PUBLIC COUNTY OF SHELBY MY COMM. EXP. JUNE 15, 2010

STATE OF TENNESSEE)
)
COUNTY OF Davidson)

Personally appeared before me, the undersigned, a Notary Public in and for said State and County, Jean C. Nelson, with whom I am personally acquainted, and who acknowledged that She executed the within instrument for the purposes therein contained, and who further acknowledged that She is the President + Exec. Director of the maker, **The Land Trust for Tennessee, Inc.**, and is authorized by the maker to execute this instrument on behalf of the maker.

WITNESS my hand, at Nashville, Tennessee, this 4th day of January, 2007.

TRACY N. MARSH
NOTARY PUBLIC AT LARGE
DAVIDSON COUNTY, TENN.

Tracy N. Marsh
Notary Public
My Commission Expires My Commission Expires July 21, 2007

Tom Leatherwood, Shelby County Register of Deeds: Instr. # 07021070

EXHIBIT A

PROPERTY DESCRIPTION

"County Property"

BEGINNING at the intersection of the west right-of-way line of Germantown Parkway and the south right-of-way line of Walnut Grove Road; thence south along said west right-of-way line to the north top of bank of the Wolf River; thence with said north and northeasterly top of bank of the Wolf River to a point on the east line of the Brandon Family, LP property (Instrument Number HC 7038); thence N 06°08'17" E along said east line a distance of 529.49 feet to an angle point; thence N 38°15'51" W along said east line a distance of 245.57 feet to an angle point; thence N 46°44'09" E along said east line a distance of 124.00 feet to an angle point; thence N 27°45'51" W along said east line a distance of 83.00 feet to an angle point; thence N 01°29'09" E along said east line a distance of 111.00 feet to an angle point; thence N 31°00'51" W along said east line a distance of 185.00 feet to an angle point; thence N 03°14'09" E along said east line a distance of 175.00 feet to an angle point; thence N 39°45'51" W along said east line a distance of 230.00 feet to an angle point; thence S 69°59'09" W along the north line of said Brandon property a distance of 191.00 feet to a point on the west line; thence S 01°44'09" W along said west line of Brandon property a distance of 241.00 feet to an angle point; thence S 04°44'09" W along said west line a distance of 217.00 feet to an angle point; thence S 18°44'09" W along said west line a distance of 185.00 feet to an angle point; thence S 16°44'09" W along said west line a distance of 127.00 feet to an angle point; thence S 26°44'09" W along said west line a distance of 248.53 feet to a point on the north top of bank of the Wolf River; thence northwestwardly along said top of bank of the wolf river the following courses and distances; N 61°22'43" W a distance of 113.88 feet to a point; N 54°02'51" W a distance of 336.69 feet to a point; N 39°37'53" W a distance of 223.56 feet to a point; N 28°04'22" W a distance of 391.30 feet to a point; thence N 33°32'36" W a distance of 162.98 feet to a point on the east line of the Brandon family property (Instrument Number HC 7038); thence N 35°29'06"E along said east line a distance of 338.46 feet to an angle point; thence N 07°29'06" E along said east line a distance of 250.00 feet to an angle point; thence N 21°00'54" W along said east line a distance of 130.00 feet to an angle point; thence N 76°30'54" W along the north line of said Brandon property a distance of 260.00 feet to an angle point; thence N 60°00'54" W along said north line a distance of 210.00 feet to an angle point; thence S 57°29'06" W along said north line a distance of 408.91 feet to the top of bank of said wolf river; thence N 40°59'52" W a distance of 522.57 feet to an angle point; thence N 41°06'18" W a distance of 406.90 feet to an angle point; thence N 23°49'38" W a distance of 100.55 feet to an angle point; thence N 11°49'27" W a distance of 136.72 feet to an angle point; thence N 01°38'31" W a distance of 142.54 feet to a point on the south line of the CSX Railroad (100 foot ROW); thence N 81°49'23" E along said south line a distance of 670 feet, more or less, to the point; thence N 04°20'02" E crossing said CSX Railroad (100 foot ROW) to a found 1/2" iron pin in the north line of said CSX Railroad, said point also being on the east line of the Brandon family property (Instrument Number HC 7038), said point having Tennessee State Plane Coordinates of N 320530.8667 and E 810031.3384; thence N 04°20'02" E along said east line and along the east line of the Richard Pearce property (Instrument Number DK 6926) a distance of 2072.48 feet to

the northeast corner of said Pearce property; thence N 86°16'39" W along the north line of said Pearce property a distance of 830.34 feet to a point on the said south line of Interstate Highway 40; thence N 44°20'04" E along said south line a distance of 646.52 feet to an angle point; thence N 50°30'38" E along said south line a distance of 493 feet, more or less, to a point in the northwest corner of the federal correctional facility property; thence in a southeastwardly direction along the westerly property line of the federal correctional facility property to a point in the southerly right-of-way line of the said CSX Railroad; thence in an eastwardly direction along said southerly right-of-way line of said CSX Railroad to a point in the southwesterly right-of-way line of Raleigh-LaGrange Road; thence in a southeastwardly direction along the southwesterly right-of-way line of Raleigh-LaGrange Road to its intersection with the west right-of-way line of Germantown Parkway; thence in a southwardly direction along the west right-of-way line of Germantown Parkway to the POINT OF BEGINNING.

Less and Except that portion of the said CSX Railroad (100 foot ROW) contained within this description.

"Agricenter property"

BEGINNING at a point in the south line of Walnut Grove Road (160 feet wide), said point being 1274.81 feet west of the west line of Germantown Parkway (160 feet wide) and said point being the northwest corner of the Shelby Farms Equestrian Center; thence S 16°08'46" E along the west line of the Equestrian Center 727.93 feet to a monument; thence S 02°25'53" W continuing along the west line of the Equestrian Center 1149.38 feet to a monument set in a paved road; thence S 03°17'55" W continuing along the west line of the Equestrian Center along the centerline of said road 518.12 feet to a monument set in the centerline of an intersecting paved road, said point being the southwest corner of the Shelby Farms Equestrian Center; thence S 87°25'42" E along the south line of the Equestrian Center along the centerline of said road 559.09 feet to a monument set in the west line of Germantown Parkway; thence S 14°44'58" W along the west line of Germantown Parkway 2158.85 feet to a monument set in the north line of a power line easement; thence leaving said west line of Germantown Parkway S 60°28'32" W along the north line of said easement 310.02 feet to a monument; thence N 87°25'42" W 5627.20 feet to a monument set on the bank of a drainage ditch; thence N 33°29'14" W 174.81 feet, more or less, to a point in the east line of the 374.5806 acre mature bottomland hardwood/bald cypress forest property designated by the Tennessee General Assembly as the Shelby Farms Forest, known as the Lucius Burch Natural Area (southern forest); thence N 07°00'31" E 2238.00 feet, more or less, to a point, said point being the northeast corner of said Lucius Burch Natural Area; thence N 85°58'13" W along the north line of said Lucius Burch Natural Area 1832.32 feet, more or less, to a point; thence leaving said north line N 33°29'14" W 120.00 feet, more or less, to a monument set in the west edge of a silt levee; thence N 70°58'24" W 3593.12 feet to a monument set in a field; thence N 31 °50'38" W 184.46 feet to a point in the east line of the Walnut Grove Landfill; thence along said east line N 04°00'00" E 740.61 feet to an angle point; thence continuing along said east line N 09°00'00" W 450.00 feet to an angle point; thence continuing along said east line N 48°30'00" W 400.00 feet to a point in the north line of said Walnut Grove Landfill; thence along said north line S 81 °36'16" W 332.10 feet to a point; thence N 03°55'00" E 246.46 feet to a point in the south line of Walnut Grove Road (160 feet wide); thence with said south line of Walnut Grove Road S 84°13'16" E 11373.52 feet to a point of curvature; thence continuing along said south line on a curve to the right having a radius of

Tom Leatherwood, Shelby County Register of Deeds: Instr. # 07021070

2247.83 feet a distance of 288.35 feet to a monument, said point being the POINT OF BEGINNING.

The Agricenter property includes Tier 2 which is the Agricenter campus and Tier 3 which is the property outside the campus.

The Tiers are shown on the map attached hereto as Exhibit B.

12947N:061467:706599:6: NASHVILLE

EXHIBIT A-1

ROAD RIGHT-OF- WAY PROPERTY

The following land is **EXCLUDED** from the provisions of this Conservation Easement:

1. Existing and future widening of designated public roads and rights-of-way including, but not limited to, Walnut Grove Road (160' R.O.W.), Mullins Station Road (108' R.O.W.), and Raleigh-LaGrange Road (108' R.O.W.).

2. Land for proposed "Parkway right-of-way" to be used for the Shelby Fam1S Parkway and Walnut Grove Road widening and improvement projects.

Tom Leatherwood, Shelby County Register of Deeds: Instr. # 07021070

EXHIBIT A-2

AREA 10 PROPERTY DESCRIPTION

The following land is **EXCLUDED** from the provisions of this Conservation Easement:

"Area 10"

BEGINNING at a point in the southerly right-of-way line of the Louisville and Nashville Railroad, said point being located 1500 feet, more or less, west of the centerline of Whitten Road; thence S 13°42'00" W a distance of 710 feet, more or less, to a point; thence S 69°50'04" W a distance of 419.19 feet to a point of curvature; thence along a curve to the left, having a radius of 2710 feet, a distance of 2554.12 feet to a point of tangency; thence S 15°50'04" W a distance of 2119.19 feet to a point; thence N 83°09'56" W a distance of 148.41 feet to a point of curvature; thence along a curve to the right, having a radius of 3000 feet, a distance of 2199.11 feet to a point of tangency, said point being in east line of the 413.7512 acre mature bottomland hardwood/bald cypress forest property designated by the Tennessee General Assembly as the Shelby Farms Forest, known as the Lucius Burch Natural Area (northern forest); thence along said easterly line N 41°09'56" W a distance of 4648.41 feet to a point in the southerly line of the Louisville and Nashville Railroad right-of-way; thence in an eastwardly direction along said southerly line of the Louisville and Nashville Railroad right-of-way to the POINT OF BEGINNING.

12947N:061467:706599:6:NASHVILLE

EXHIBIT A-3

EXCEPTIONS TO MORATORIUM

On Tier I:

a. Lucius Burch Natural Area Gateway Project, if permitted by the State of Tennessee;
b. Visitors Center/Plough Park Sewer Extension;
c. Public Restroom Construction (Plough Park/Gate 12)
d. Renovation/Expansion of Plough Park for playground equipment; and
e. Shelby Farms Parkway.

On Tier 2:

Construction of improvements devoted exclusively to agriculture, which may include agricultural trade association offices but may not include manufacturing.

Office Space Expansion to Helena Chemical Co. office space - 7664 Moore Road

Agricenter East Pavilion - Clear span addition to main complex facility - 7777 Walnut Grove Road

Monsanto - storage area for equipment and cotton sample office - 7616 Moore Road

Equipment shed area for farm equipment for research vendors - 7518 Moore Road

TCI Landscape - office building adjacent to Quonset Hut - 7546 Moore Road
Farmers Market tent on south side of RV Park-7777 Walnut Grove Road

Parking area for Wildlife Observation Tower

On Tier 3:

Catch'em Lake Bait Shop, restrooms and pavilion area - 6913 Moore Road

On Tier 4:

Buildings to accommodate shows of horse show associations.

Agricenter Show Place Arena restroom upgrades - 105 S. Germantown Parkway

Tom Leatherwood, Shelby County Register of Deeds: Instr. # 07021070

EXHIBIT B

MAP OF TIERS

12/11/06
12947N:061467:706599:6:NASHVILLE

Tom Leatherwood, Shelby County Register of Deeds: Instr. # 07021070

APPENDIX C
Patriot Lake Feasibility

PATRIOT LAKE FEASIBILITY

Prepared by Pickering Firm, Inc.

Expanding Patriot Lake into a recreational lake with 150 acres of surface area is an ambitious, but feasible, goal. The important factors in transforming Patriot Lake into a successful amenity for Shelby Farms involve water quantity, water quality and the aesthetics of the banks. Additional concerns include constructability and permitting.

To assess the hydrologic and stormwater functions of an expanded lake, a conceptual grading and drainage plan was established. This concept was used to analyze the drainage basins, model the functionality of the lake and estimate the earthwork requirements. Any final design can and will vary from these conceptual ideas that are presented here as proposed features. However, the principles of the design should remain the same. The following pages include a summary of the hydrological and feasibility analysis.

Water Quantity

1. Existing Hydrologic System
(See Map A)
For the purposes of analyzing Patriot Lake, the study area is comprised of three major drainage basins. These basins are the Patriot Lake Basin, the area northwest of Patriot Lake and the area east of Patriot Lake.

Patriot Lake currently has a water surface area of 54 acres at elevation 262.00 feet. Per original construction plans, the depth of Patriot Lake varies from nine to fourteen feet. Although much of the adjacent land has been graded to drain away from Patriot Lake through a system of concrete swales, approximately 329 acres of surface drainage enters the lake. This includes the recent addition of roughly 119 acres from the north that is piped under the walking trail on the northeast end of the lake. The discharge from Patriot Lake crosses Walnut Grove Road via a 38”x60” corrugated metal pipe. Pine Lake, located upstream of Patriot Lake, appears to be fed by overland drainage and two cut-off ditches found further south. The eastern swale appears healthy and has active vegetation. The western swale appears stagnant. All of this area ultimately drains overland to the upper pond of Patriot Lake.

The land northwest of Patriot Lake is comprised of roughly 270 acres, including Chickasaw Lake and Mayor Lake. These drainage basins route westward and cross Farm Road at four different locations before continuing westward towards the Wolf River. There are low-lying, marshy areas located around Chickasaw Lake and Mayor Lake that appear to have lost their hydrologic function. From field observation, it is not clear how these water bodies are connected, if at all. In addition, there may be some seepage occurring through the dam at Chickasaw Lake.

The upland area east of Patriot Lake drains to Beaver Lake and Boy Scout Lake before entering a 60” diameter corrugated metal pipe that crosses Walnut Grove Road. This drainage basin measures approximately 232 acres.

2. Proposed Hydrologic System
(See Map B)
The expanded 150-acre Patriot Lake will maintain the water surface elevation of 262.00 feet. The drainage basin will be expanded to accommodate the additional lake volume. A ratio ranging between 4:1 and 10:1 for drainage area to surface water area is desirable to balance water levels and manage stormwater in lakes. The restructured basins shown in Map B include approximately 980

acres. This drainage area compared to the expanded lake water surface provides a ratio of 6.5:1. The expanded drainage basin will include the areas west and east of the existing Patriot Lake. With the relocation of Farm Road and construction of Shelby Farms Parkway, 286 acres can be routed directly to Patriot Lake from the northwest. This includes the discharge from Chickasaw Lake and Mayor Lake. On the eastern side, the lake grading will allow the discharges and overland routing from Beaver Lake and Boy Scout Lake to route directly into Patriot Lake. This provides an additional 209 acres of drainage runoff area.

3. Stormwater Function

The expanded drainage basins and hydrologic connectivity was modeled with a computer program called Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) Version 3.2 published by the US Army Corps of Engineers Institute for Water Resources. The discharge structures were modeled first with a program called Hydraflow Hydrographs 2007 published by Intellisolve and then input into the HEC-HMS model. The HEC-HMS model was used to determine maximum discharges for all sub-basins and maximum water elevations within Patriot Lake.

These calculations are modeled with the assumption that no water is detained by the upper lakes. If detention is occurring within the existing systems, the runoff will reach Patriot Lake at a slower rate. It may be necessary to install discharge structures in these upland ponds to ensure that the desired quantity of water reaches Patriot Lake. In addition, any decrease in water elevation due to evaporation in the upper lakes will reduce the amount of runoff that reaches Patriot Lake. The final design should address detention and evaporation in the upper lakes.

The Soil Conservation Service (SCS) Type II hypothetical storm was used to model the precipitation. Rainfall depths of 4.00, 5.61, 7.12 and 7.88 inches were used for the 2, 10, 50 and 100 year storm events respectively.

The SCS curve numbers and unit hydrographs were used to model the runoff, infiltration and basin discharge rates. The curve numbers are determined by soil type and ground cover. The Natural Resources Conservation Service Soils Map for this area can be seen in Map C. The soils vary between three different hydrologic soil groups but the majority of the site is comprised of Memphis silt loam in the upland areas and Falaya silt loam in the lowlands. The stream routing was modeled with lag time.

The restructured drainage area, comprising the 980 acre basin, surrounds the lake and is broken down into seven sub-basins. The drainage sub-basins, as modeled, can be seen on the map in Map D along with the data used in the model. These sub-basins are routed to Patriot Lake and discharged through storm pipes. There are three existing crossings of Walnut Grove that can be utilized for discharge. Some discharge also needs to be routed west to replenish the swales that are currently filled with overland drainage from Chickasaw and Mayor Lakes.

The discharge structures were modeled as two 5' x 5' concrete boxes with weir openings on all four sides. The structures include 42" diameter outflow pipes. Based on the Federal Emergency Management Agency Flood Insurance Rate Map for the area, a tailwater of 257.50 feet was applied to the discharge structures. These maps are included in Appendix E (which can be found in the full feasibility report).

When the sub-basins combine and route through the expanded Patriot Lake, the maximum water surface elevation and discharge rate are obtained. Hydrographs showing the discharge rates into and out of the lake are found in Appendix F (which can be found in the fullfeasibility report). These rates will work with the existing structures but consideration of the proposed downstream activities is needed to correctly divide the discharge into multiple locations.

The maximum water surface elevation and peak outflow from Patriot Lake during the various storm events is summarized below:

Storm Event	Elevation (ft)	Max. Outflow (cfs)
2	262.70	70.65
10	263.20	121.19
50	263.70	172.22
100	263.96	198.79

As a stormwater management tool, the expanded 150-acre Patriot Lake with a drainage basin of 980 acres functions very well and can utilize the existing downstream structures.

4. Water Loss

It is expected that some water will be lost through evaporation. From historical data and pan evaporation equations, the total loss per year is estimated at 40 inches. The distribution of this evaporation varies with heat and humidity but can be expected to peak in July and August. This maximum loss is estimated at 6.5 inches of elevation change per month during the dry, summer conditions. These evaporation numbers combine with the precipitation to create a cumulative effect on the lake. Based on average monthly precipitation data, the lowest lake elevation estimated for the lake is 261.00 feet.

PATRIOT LAKE FEASIBILITY (continued)

If this is an unacceptable amount of change in water surface elevation for the surrounding amenities, pumping from the Wolf River could be used to supplement the overland drainage. The unpredictable nature of drought events makes this an attractive alternative. Details regarding this permitting process and allowable volume of water pumped follow later in this report.

There could also be some water lost through seepage into the soil, but it is an undesirable condition. Further study is needed to verify soil conditions at the site, but geotechnical investigations on adjacent properties indicate that the soils will be comprised primarily of silt and clay. The silty overburden is susceptible to erosion and seepage, but the deeper clay layers provide a fairly impermeable surface. The clay depths vary but it seems feasible that the lake could be lined with this clay to avoid water loss through seepage. If the depths of clay in this area make this impossible, a liner could be installed to address the loss of water through seepage.

5. Other Improvements

In addition to the improvements for Patriot Lake, it is recommended that three other areas be addressed – Chickasaw Lake, Mayor Lake and the slough west of Pine Lake. Based on preliminary discussions with Brian Waldron, Ph.D. PE, Assistant Professor of Civil Engineering at the University of Memphis, there are indications of seepage across the dam at Chickasaw Lake. If seepage is occurring through this dam, it can undermine the structural integrity of the dam and pose a safety issue for the downstream land. Geotechnical investigation can confirm the possible seepage and identify the magnitude of the problem and solution.

To enhance the quality and function of Mayor Lake, it is recommended that the adjacent low-lying areas be connected to the lake. This would expand the drainage basin and create a more visually attractive water body. A discharge pipe or weir could be added to regulate the stormwater function of the lake and route the discharge to Patriot Lake.

A similar, but less extensive remedy is suggested for the marshy area just south and west of Pine Lake. Based on field observation, this slough is stagnant and odorous. Cleaning this area of debris and locating the discharge route may be enough action to provide a properly functioning habitat. If this does not seem sufficient, the area could be connected directly to the downstream swale on the south end. The goal should be to promote positive drainage within the slough.

Water Quality

1. Lake Conditions

A key component of good water quality is the depth and variance of the bottom surface. To promote a healthy fish habitat, the lake bottom needs to be irregularly shaped and sloped with depths varying from eight to sixteen feet. In order to promote natural aeration and water circulation within the lake, much of the water body should be twelve to sixteen feet deep. This depth is the ideal depth for the majority of the lake. Additional lake aeration by means of air compressors is possible, but not necessary if the lake is deep enough.

The maximum change in water surface elevation modeled in this concept is two feet. This allows room for stormwater management, but provides a fairly consistent normal pool elevation for the beaches and dock areas. An additional foot of freeboard is provided above this elevation so that the top of dam in the fill areas is at elevation 265.00 feet.

2. Wetlands

Based on a preliminary onsite evaluation of Patriot Lake, there are potential fringe and wooded wetlands that will be impacted by the expansion of the lake. The US Army Corps of Engineers (USACE) will require a Preliminary Wetland Delineation on the entire project site and then will decide where they have jurisdiction. This could include the wetlands, the lake itself and the ditches that cross the expansion area.

The permitting for these impacts is addressed later in the report, but one component of permitting wetlands is the mitigation of them. This mitigation presents a great opportunity for the expanded Patriot Lake to include some constructed wetlands. These features will aid in filtering the runoff into the lake as well as provide variety in vegetation and water features.

3. Quality Control

The surface water runoff may need pre-treatment before entering the lake. A typical approach is to install oil/water separators on the underground drainage system that collects any runoff from paved areas or to install vegetative swales in overland flow areas. This is especially important where parking is concentrated. The final design should include pretreatment provisions for pavement runoff.

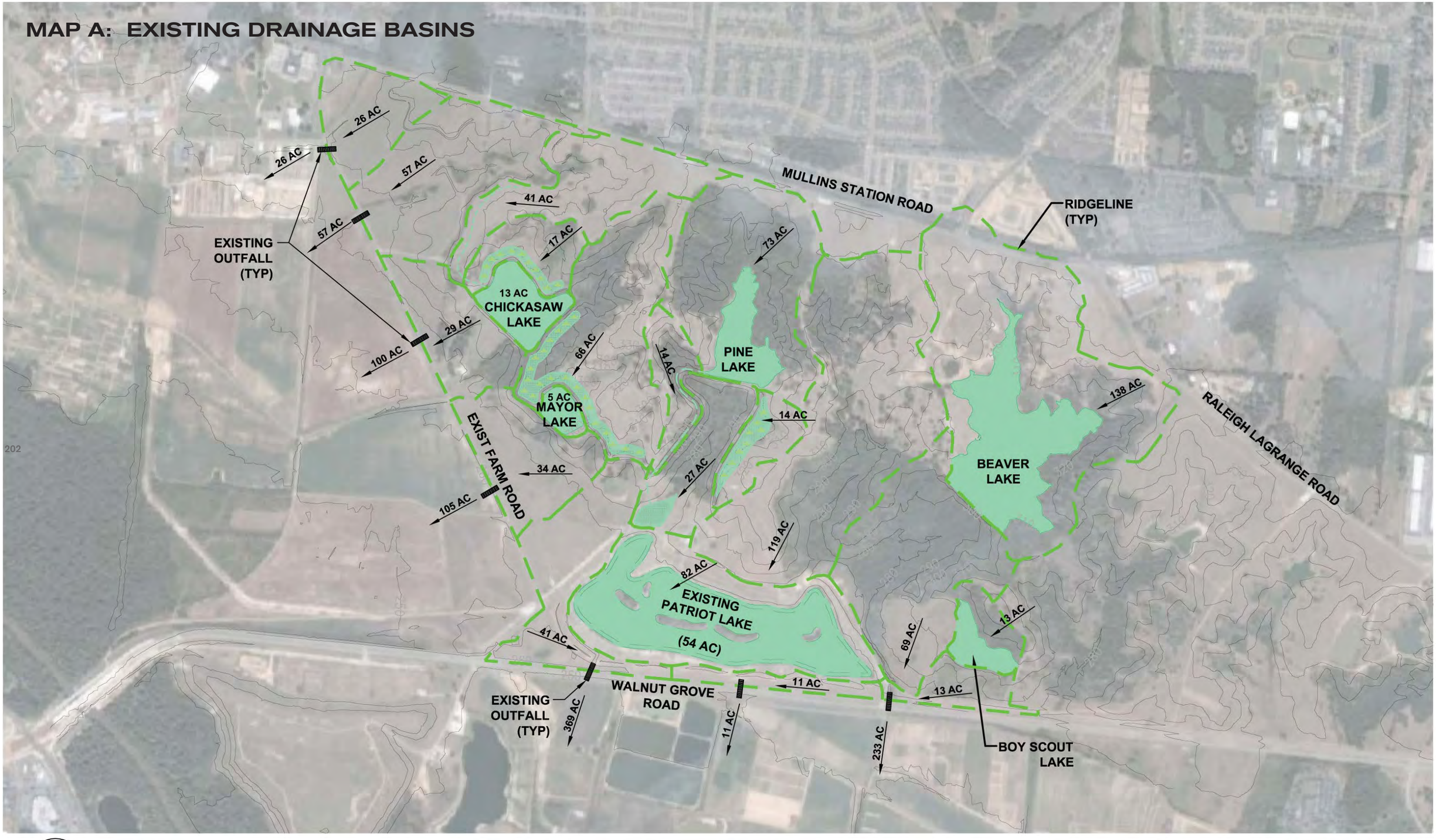
In addition to oil, sediment could be carried into the lake with the runoff. This is especially true when the upland areas topsoil is comprised of erosive silt. The best solution is to maintain the uplands of the park with vegetation in place to secure the soil. The magnitude of the upland area will make this

difficult so it should be anticipated that at some point, the lake may need to be mucked out to remove excess siltation that can occur over time.

If water from the Wolf River is going to be used to supplement the lake, samples should be taken to verify the quality. It is our understanding that this river should require little, if any, in situ treatment at the lake. However, varying usages of water bodies require different levels of screening for pollutants.

In addition, geotechnical and environmental testing should be done to confirm that there are no contaminants leaching from the adjacent landfill. If any contaminants are traveling through the subsoil, the extents of the effects should be determined.

MAP A: EXISTING DRAINAGE BASINS



NORTH

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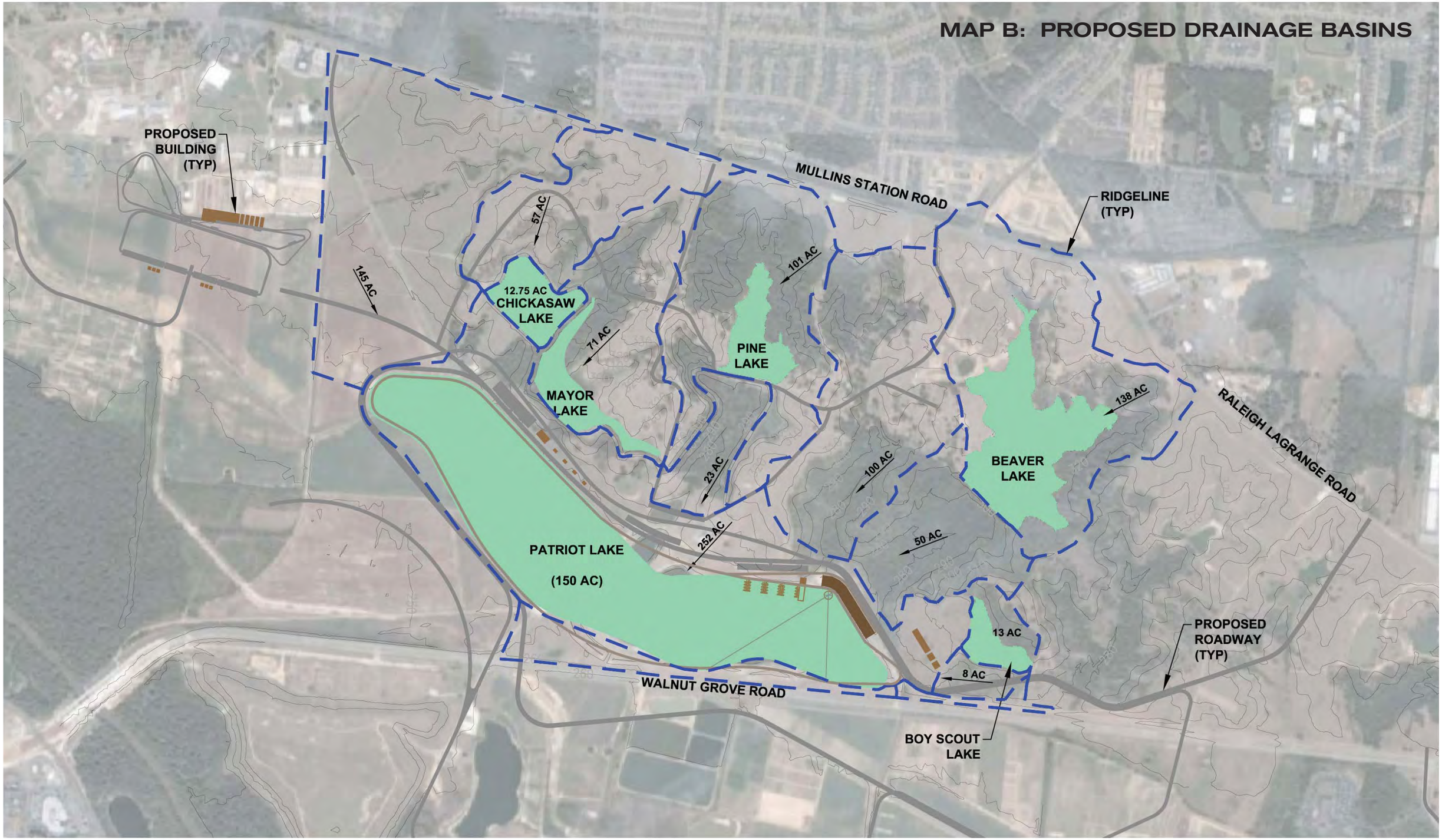
1 INCH = 1000 FEET

MAP B: PROPOSED DRAINAGE BASINS



NORTH

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1 INCH = 1000 FEET

MAP C: SOIL SURVEY

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Shelby County, Tennessee
Survey Area Data: Version 5, Aug 10, 2006

Date(s) aerial images were photographed: 1997

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Shelby County, Tennessee (TN157)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Bo	Bonn silt loam	18.1	1.7%
Ca	Calloway silt loam	3.7	0.3%
Fm	Falaya silt loam	227.4	21.3%
GaB	Grenada silt loam, 2 to 5 percent slopes	29.9	2.8%
GaB2	Grenada silt loam, 2 to 5 percent slopes, eroded	8.8	0.8%
GaD2	Grenada silt loam, 8 to 12 percent slopes, eroded	6.9	0.6%
He	Henry silt loam	23.4	2.2%
LoB	Loring silt loam, 2 to 5 percent slopes	3.3	0.3%
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	0.6	0.1%
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	0.6	0.1%
MeB	Memphis silt loam, 2 to 5 percent slopes	137.0	12.8%
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	27.6	2.6%
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	64.7	6.1%
MeD2	Memphis silt loam, 8 to 12 percent slopes, eroded	238.8	22.4%
MeD3	Memphis silt loam, 5 to 12 percent slopes, severely eroded	52.0	4.9%
MeE	Memphis silt loam, 12 to 20 percent slopes	95.2	8.9%
W	Water	128.4	12.0%
Totals for Area of Interest (AOI)		1,066.5	100.0%

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

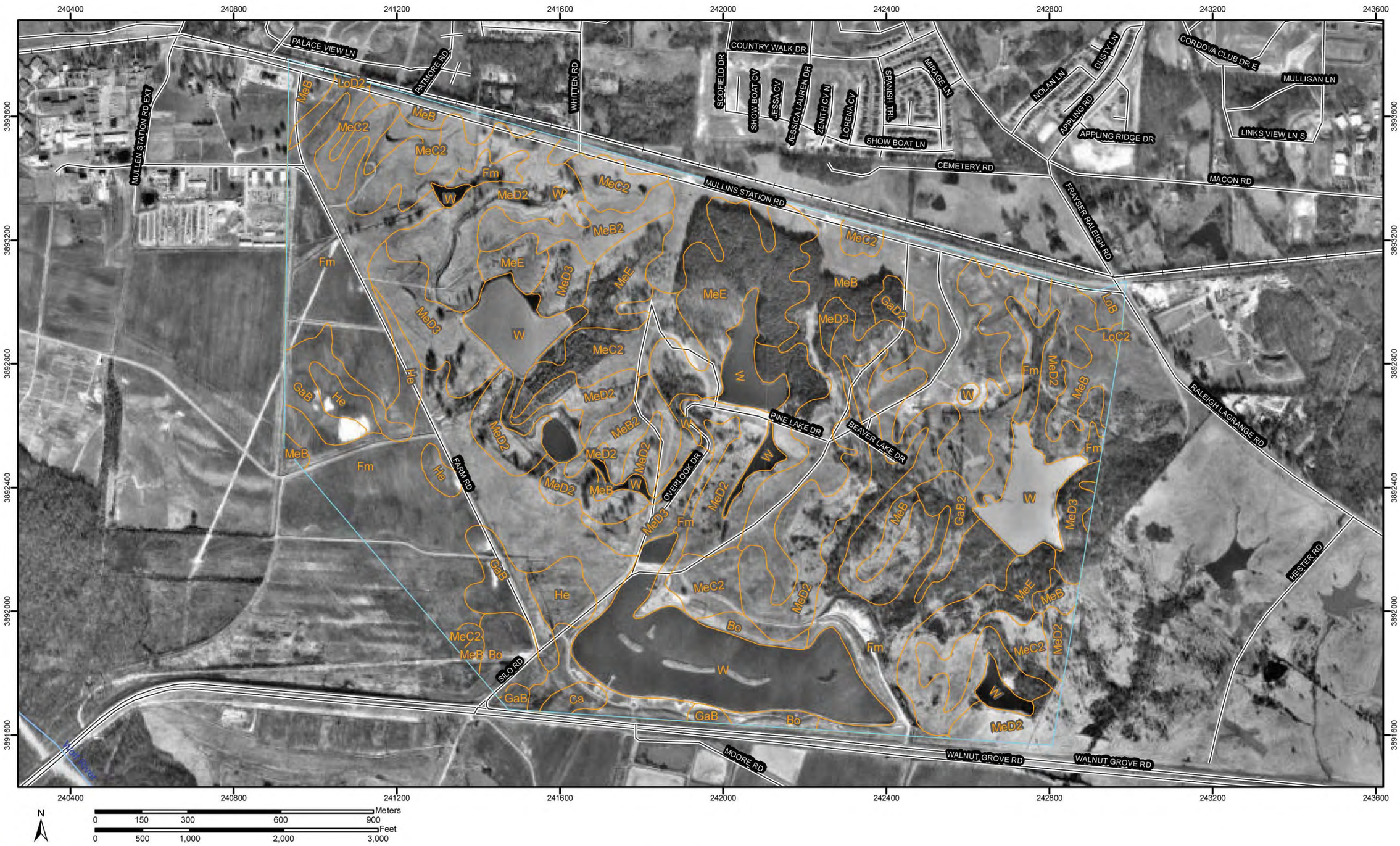
Political Features

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads



Natural Resources Conservation Service

Web Soil Survey 2.0
National Cooperative Soil Survey

6/25/2008
Page 1 of 3

MAP D: HEC + HMS PROPOSED BASIN MAP

Equations Used

Storage at Saturation [S'] (inches) = (1000 / CN) - 10

Initial Abstraction (inches) = 0.2 * S'

Lag Time (hours) = $\frac{L^{0.8} (S' + 1)^{0.7}}{1900\ w^{0.5}}$

L = Travel Length (feet)
w = watershed slope (%)

Western Overland Flow – Subbasin 1

Drainage Area = 145 acres (0.23 sq miles)

Soil Name	Soil Type	Description	Curve Number	Percent of Total
Memphis Silt Loam	B	Pasture/Grassland	79	44
Loring Silt Loam	C	Pasture/Grassland	79	1
Grenada Silt Loam	C	Pasture/Grassland	79	5
Falaya Silt Loam	D	Pasture/Grassland	84	35
Henry Silt Loam	D	Pasture/Grassland	84	15

Composite Curve Number = 82

Saturation Storage = 2.20 inches
Initial Abstraction = 0.44 inches
Impervious Area = 10%

Travel Length = 3700 feet Slope = 1.20%

Lag Time = 46.83 minutes

Reach 1
No attenuation – May be piped

Chickasaw Lake – Subbasin 2

Drainage Area = 70 acres (0.11 sq miles)

Soil Name	Soil Type	Description	Curve Number	Percent of Total
Memphis Silt Loam	B	Brush/Weeds/Grass	56	84
Water	n/a	n/a	98	16

Composite Curve Number = 63

Saturation Storage = 5.87 inches
Initial Abstraction = 1.17 inches
Impervious Area = 3%

Travel Length = 4180 feet Slope = 1.10%

Lag Time = 91.20 minutes

Reach 2
Travel Length = 960 feet Slope = 3.96%

Lag Time = 14.90 minutes

Mayor Lake – Subbasin 3

Drainage Area = 71 acres (0.11 sq miles)

Soil Name	Soil Type	Description	Curve Number	Percent of Total
Memphis Silt Loam	B	Brush/Woods/Grass	60	83
Water	n/a	n/a	98	17

Composite Curve Number = 66

Saturation Storage = 5.15 inches
Initial Abstraction = 1.03 inches
Impervious Area = 2%

Travel Length = 3260 feet Slope = 1.23%

Lag Time = 65.72 minutes

Reach 3
Travel Length = 440 feet Slope = 8.64%

Lag Time = 5.00 minutes

Pine Lake – Subbasin 4

Drainage Area = 124 acres (0.19 sq miles)

Soil Name	Soil Type	Description	Curve Number	Percent of Total
Memphis Silt Loam	B	Woods/Grass	65	86
Falaya Silt Loam	D	Brush/Weeds/Grass	77	4
Water	n/a	n/a	98	10

Composite Curve Number = 69

Saturation Storage = 4.49 inches
Initial Abstraction = 0.90 inches
Impervious Area = 4%

Travel Length = 3880 feet Slope = 1.80%

Lag Time = 57.55 minutes

Reach 4
Travel Length = 650 feet Slope = 2.77%

Lag Time = 11.00 minutes

Eastern Overland Flow – Subbasin 5

Drainage Area = 100 acres (0.16 sq miles)

Soil Name	Soil Type	Description	Curve Number	Percent of Total
Memphis Silt Loam	B	Woods/Grass	65	78
Grenada Silt Loam	C	Meadow	71	9
Falaya Silt Loam	D	Woods/Grass	82	13

Composite Curve Number = 68

Saturation Storage = 4.71 inches
Initial Abstraction = 0.94 inches
Impervious Area = 3.5%

Travel Length = 3620 feet Slope = 1.71%

Lag Time = 57.55 minutes

Reach 5
No attenuation – May be piped

Beaver/Boy Scout Lake – Subbasin 6

Drainage Area = 209 acres (0.33 sq miles)

Soil Name	Soil Type	Description	Curve Number	Percent of Total
Memphis Silt Loam	B	Woods/Brush/Meadow	60	74
Loring Silt Loam	C	Woods/Grass	76	2
Grenada Silt Loam	C	Woods/Grass	76	3
Falaya Silt Loam	D	Woods	79	9
Water	n/a	n/a	98	12

Composite Curve Number = 67

Saturation Storage = 4.93 inches
Initial Abstraction = 0.99 inches
Impervious Area = 5%

Travel Length = 5080 feet Slope = 1.18%

Lag Time = 93.30 minutes

Reach 6
No attenuation – May be piped

Direct Rainfall – Subbasin 7

Drainage Area = 252 acres (0.39 sq miles)

Soil Name	Soil Type	Description	Curve Number	Percent of Total
Memphis Silt Loam	B	Open Space	61	25
Water	n/a	n/a	98	75

Composite Curve Number = 89

Saturation Storage = 1.24 inches
Initial Abstraction = 0.25 inches
Impervious Area = 10%

Travel Length = 1300 feet Slope = 3.54%

Lag Time = 9.20 minutes

Reach 7
No attenuation – Direct rainfall into Patriot Lake and surrounding areas

Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 Thursday, Jul 3, 2008

Pond No. 1 - Patriot Lake

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 262.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sq.ft)	Incr. Storage (cu.ft)	Total storage (cu.ft)
0.00	262.00	5,978,610	0	0
2.00	264.00	6,093,173	12,070,390	12,070,390
3.00	265.00	6,150,672	6,121,288	18,191,680

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 42.00	0.00	0.00	0.00
Span (in)	= 42.00	0.00	0.00	0.00
No. Barrels	= 2	0	0	0
Invert El. (ft)	= 256.80	0.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

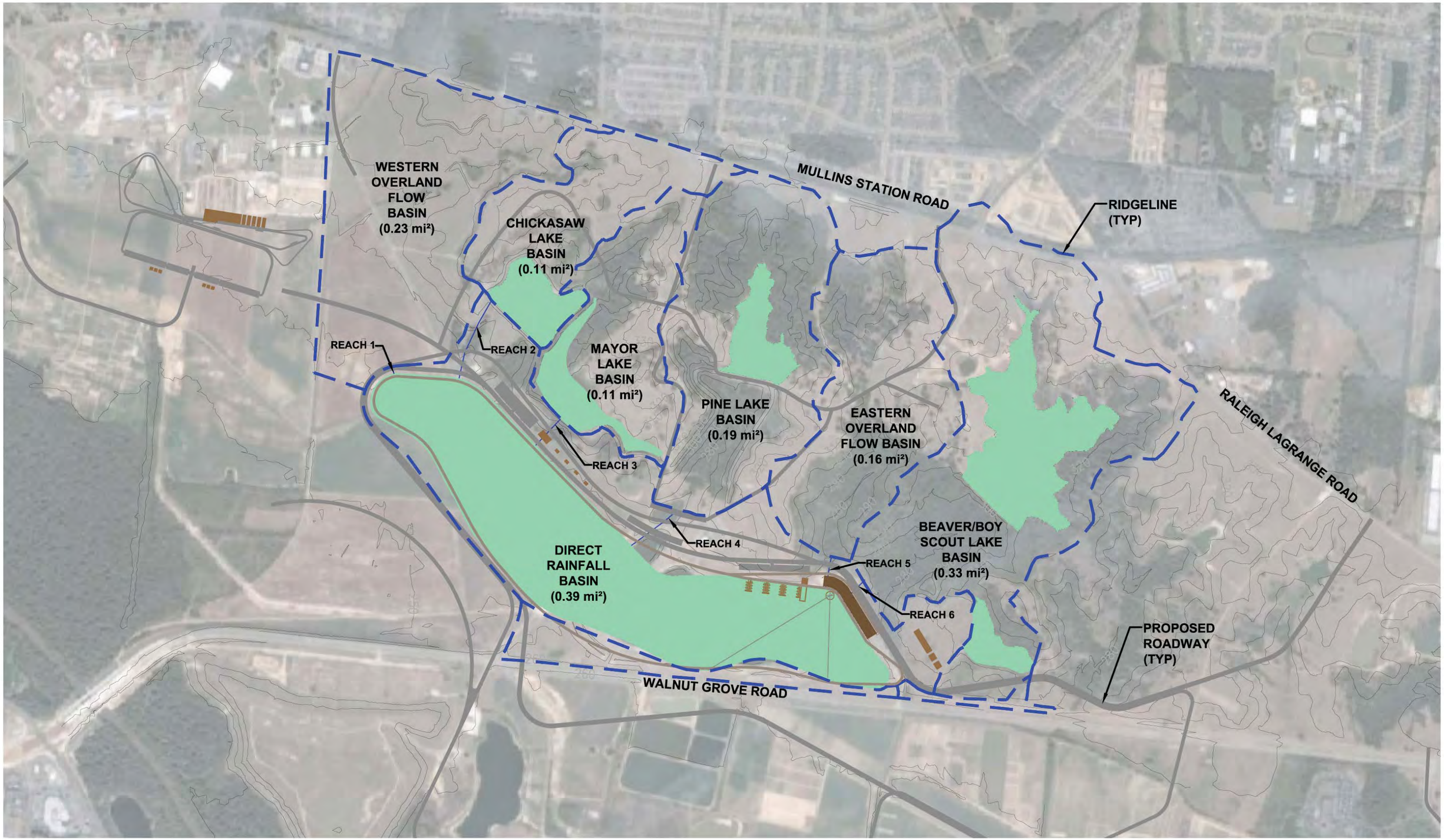
	[A]	[B]	[C]	[D]
Crest Len (ft)	= 32.00	0.00	0.00	0.00
Crest El. (ft)	= 262.10	0.00	0.00	0.00
Weir Coeff.	= 3.30	3.33	3.33	3.33
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (oc)

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	262.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.00	12,070,390	264.00	202.41 oc	---	---	---	202.40 s	---	---	---	---	---	202.40
3.00	18,191,680	265.00	230.90 ic	---	---	---	230.87 s	---	---	---	---	---	230.87



NORTH

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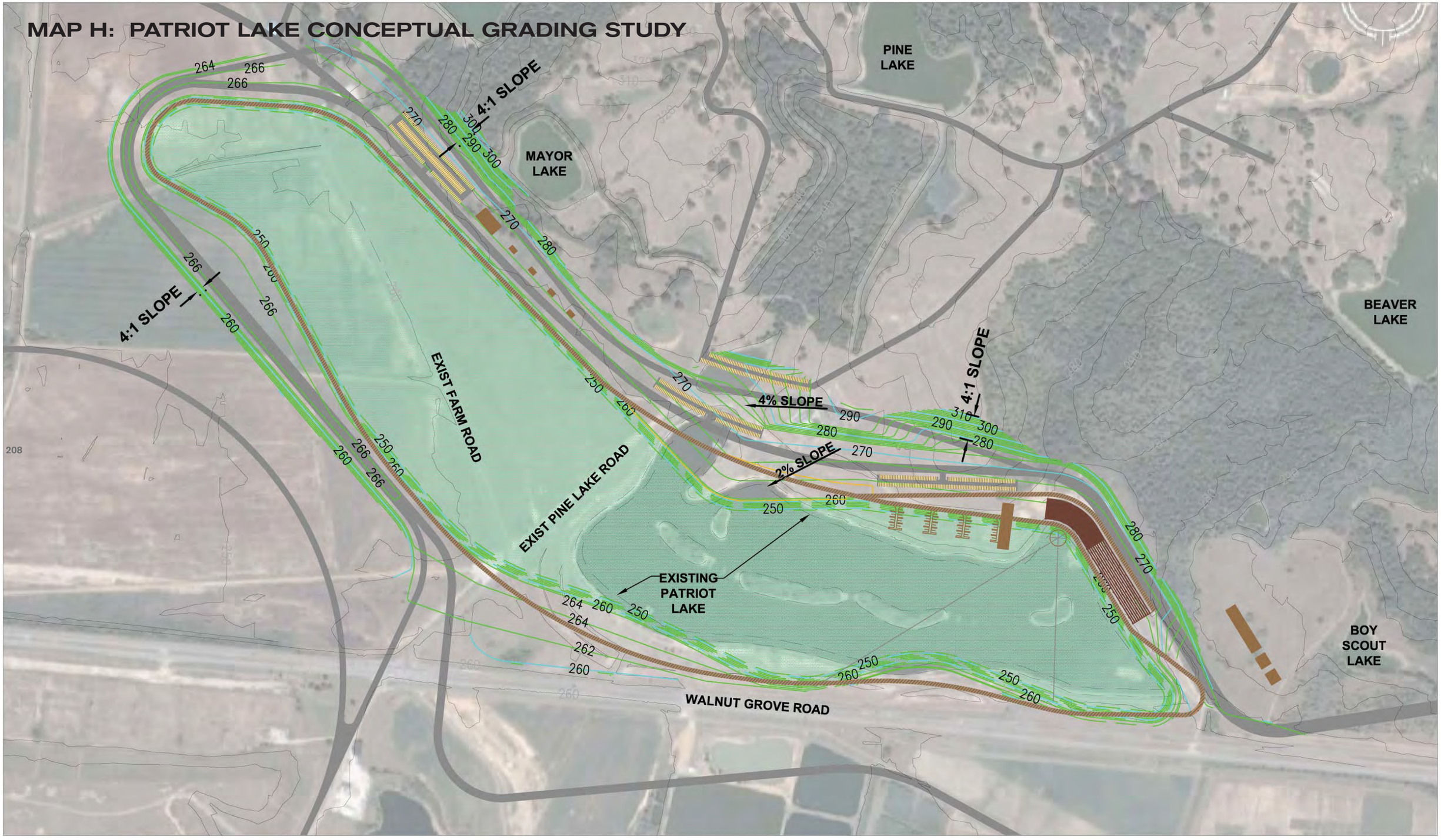
1 INCH = 1000 FEET

MAP H: PATRIOT LAKE CONCEPTUAL GRADING STUDY



NORTH

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1 INCH = 500 FEET

APPENDIX D

ECOLOGICAL MANAGEMENT + INTERPRETIVE OPPORTUNITIES

D.1 ECOLOGICAL MANAGEMENT, ENHANCEMENT, and RESTORATION

Prepared by the Ecological Research Center, University of Memphis

Management Objective

Sustain for future generations the native natural resources that occur at Shelby Farms Park and provide visitors to the park an opportunity for a valuable interaction with animals and plants that is safe and enjoyable, while ecologically friendly to resident biota, and couples with the long-term mission of the park.

Accomplishment of the management objective is through a proactive management philosophy that recognizes the complexities of the biological world and the challenges of responsible stewardship.

Outline of Key Management Steps

1. Assemble an integrated-planning team (committee) from a broad spectrum of people in professional fields relating to natural resources (e.g., Shelby Farms Park, academic institutions, Ducks Unlimited, Agricenter International, Tennessee Wildlife Resources Agency, U. S. Fish and Wildlife Service; Tennessee Department of Environment and Conservation; City of Memphis and Shelby Co.) with a charge of forming an Integrated Natural Resources Management Plan.

2. Create an integrated plan that incorporates goals of all aspects of park development and growth will be necessary for successful-park advancement.

3. The integrated-planning team defines a mission and charts a course for natural-resource management; in drawing from existing databases, it determines the state-of-the-state in relation to the understanding of natural resources on the site at this time; additionally, the planning team provides a means (research) for assembling the databases needed to meet the park's objective relating to natural resources for the future.

4. Because databases for all aspects of management of natural resources on the park are incomplete or lacking, a first priority should be to inventory the status and distribution of the biota on the site; this should be done by knowledgeable individuals to determine if vulnerable species and communities exist on the site.

5. Once the status and distribution of natural resources are known, management plans can be developed to direct actions (e.g., sustain, restore, enhance, remove species).

6. While the detailed ecological state of SFP is yet to be determined, some actions that seem likely to be recommended are:
    1. integrity of bottomland and upland forest improved through the removal of exotic species (especially, Chinese privet and kudzu) and planting of numerous trees
    2. restore native grasslands to the park
    3. improve stream drainages
    4. establish additional and improved wetland habitat
    5. enhance richness of aquatic and terrestrial species on the site
    6. improve existing ponds and lakes
    7. establish ecological corridors that link habitat patches
    8. habitat edges made more wildlife friendly
    9. promotion of the Wolf River as part of the "ecological crown" of SFP

7. Monitoring of status and distribution of species as well as the overall ecological health and integrity of SFP should be included as part of the long-term management plan; a continuing understanding of the status of ecological conditions on the site are critical for long-term sustainability of natural resources on the site.

8. The strategy developed by the planning team should foster efforts to connect SFP with other green space in the region; thus, the plans prevent SFP from becoming an isolated island ecologically and suffering from the biological ills (e.g., inbreeding within species, increased human/wildlife encounters, greater potential for significant impact of wildlife diseases) associated with isolation.

9. Management plans are integrated to foster all aspects of park activities and adaptive to incorporate new understandings as they develop.

Outline
Integrated Planning Team, Integrated Natural Resource Management Plan, Research (status and distribution of natural resources determined), Decisions made as to actions , Management plans implemented, Status and distribution of species and ecological health and integrity of the landscape at SFP are monitored (Research), Integrated and adaptive management plans practiced.

Management reflects a dedication to managing, researching, regulating, preserving, and outreaching.

The Ecological Research Center (The University of Memphis) could play a key role in organization and

implementation of natural-resource management at SFP

-

Identify a Hierarchy of Management Zones

1. Identification of a hierarchy of management zones for SFP is difficult until a detailed inventory of the natural resources have been completed and a potential network of corridors and linkages developed. At this time, it is probably most productive to think of management zones in relation to habitat types. Thus, management zones could include: (1) bottomland forest; (2) upland forest; (3) grassland; (4) wetland; (5) habitat edges; (6) maintained areas; (7) agricultural areas; (8) pasture; (9) lakes and ponds; and (10) Wolf River and drainages

2. Such a hierarchy allows for focus on species classified as habitat specialist as well as habitat generalist.

3. Such a hierarchy allows for assessing overall patch size as well as amount and connectivity of similar habitats

4. Such a hierarchy allows for assessing quality of similar habitats and a later ranking of areas as to need for restoration or protection

Managing Public Access

Public access can be managed at different levels:

1. *No Restriction*: visitors welcome regardless of mode of transportation

2. *Limited Restriction:* no motorized vehicles; visitors welcome only on foot, horseback, or other selected means; visitors welcome only during selected seasons; selected number of visitors welcome at one time.

3. *No Access:* access by park personnel only

Without detailed knowledge of the status and distribution of species and connectivity and linkage of habitats, it is difficult to present specifics about public access other than to imply that is should vary with sensitivity of species and potential negative impact that visitors can have on the habitat.

Sampling fish using drag seines

Future Monitoring Protocols

Protocols adopted to monitor animal and plant species on SFP will follow those recommended by various disciplines within the scientific community and, therefore, will vary depending upon the group of animals or plants to be studied; additionally, where appropriate, protocols utilized for monitoring animal species will follow guidelines of animal care and welfare committees at institutions directing the work; an example for the study of mammals would be as follows:

Mammals

Protocols adapted from: Measuring and monitoring biological diversity: standard methods for mammals (Wilson et al. 1996) The citation is:
Wilson, D. E, F. R. Cole, J. D. Nichols, R. Rudran, and M. S. Foster. 1996. Measuring and monitoring biological diversity: standard methods for mammals. Smithsonian Institution Press, Washington, D. C., USA.
Techniques for studying diversity, distribution, density, and abundance (techniques are numerous and depends on the task; selected examples follow; some techniques apply to more than one group of vertebrates)

1. *Live traps* (size depends on target species): frequently used to study mammals in urban areas

D.1 ECOLOGICAL MANAGEMENT, ENHANCEMENT, and RESTORATION (continued)

2. *Bat detectors:* used to study bats; echolocation calls are measured

3. *Mist nets:* used to study bats and birds

4. *Time area counts:* used for mammals (e.g., gray squirrels)

5. *Hair sampling tubes:* used for small mammals

6. *Nest boxes:* used for birds and mammals

7. *Infrared video cameras:* used for most animals

8. *Aerial surveys:* a fixed-wing aircraft or helicopter is used to obtain total or sample counts of animals that are fairly easily detectable (e.g., deer in a field; ducks and geese on a lake)

9. *Thermal imagery:* a high-speed scanning mirror reflects the infrared radiation from animals based on body temperature (used for white-tailed deer and other selected, large mammals and birds; e.g., eastern turkey on the roost); technique provides a total count

10. *Infrared triggered cameras:* passive infrared monitors that trigger automatic cameras are used; provides a count based on photographs; can be used for selected species of birds and mammals

11. *Call playbacks:* species-specific calls that cause animals to react in predictable ways may be broadcast in an area as a means of increasing the visibility of the animal for counting; measures trends in populations as to being up or down compared to another time periods; can be used for selected species of birds and mammals

12. Ultrasonic bat detection can be used to census bats

13. *Mark and recapture techniques:* animals (techniques is utilized for any species) are captured and marked (using a tag or band) and released at site of capture; based on the total number of animals captured and the number of recaptures, an estimate of population density is determined

14. *Sight-capture/sight recapture techniques:* procedure where animals are sighted and recognized individually; therefore, can be treated like mark/recapture technique; used primarily for selected bird and mammal populations

15. *Drive counts:* animals occupying an area are completely surrounded by people and counted as they are forced to leave the area; can be used for deer and other large mammals as well as selected species of birds

16. *Road counts:* an investigator counts all animals within a specified distance on either side of a road or all animals seen from the road on both sides; used primarily for selected species of mammals

17. *Quadrat sampling:* quadrat (typically square sample plots) all animals within a plot are counted (appropriate for small organisms, especially invertebrates)

18. *Spotlight counts:* using a spotlight from a vehicle, route are traveled at selected speeds and target species counted; can be used for selected species of mammals

19. *Strip transects census:* Where birds within a measured boundary are counted

Bat houses provide roosting sites

20. *Point counts:* Number of birds observed per time unit (e.g., selected number of minutes) at selected points

Birds

Adams et al. (2005) note three techniques have been used most commonly to study distribution, abundance, and composition of bird communities: belt transects, point counts, and territorial mapping.

1. *Belt transects:* observer generally walks slowly along the centerline of the transect counting birds seen or heard on either side to a given distance

2. *Point counts:* differs from belt transects in that the observer remains stationary at a point and counts birds seen or heard, generally within a selected distance from the point

3. *Territorial mapping:* the number of territorial males or breeding pairs are counted for all species within a defined area

Amphibians and Reptiles

Amphibians may be monitored by a number of techniques (e.g., visual encounters, egg surveys, calling censuses, dip nets, seines, aquatic funnel traps, terrestrial pitfall traps)

1. *Cover boards:* large boards (e.g., plywood) are placed on the ground in suitable habitat and checked (lifted up and observed for the presence of
amphibians and reptiles on the ground under the boards) at selected intervals; can be used to monitor population trends in amphibians and reptiles

2. Nighttime tape playback calls

Fish

The American Fisheries Society has developed guidelines for the collection and use of fish (Murphy, B. R. and D. W. Willis, editors. 1996. Fisheries Techniques, American Fisheries Society, Bethesda, MD). Standardized techniques have been developed for collection of fish to compensate for biases associated with type of gear, season and location-related conditions. Effective gear must be chosen for the expected species to be sampled at favorable times of the year in standard locations available for subsequent years, e.g. http://www.usbr.gov/pmts/fish/Equipment.html.

1. Passive techniques most useful in standing waters include various types of entanglement gear (experimental gill nets, trammel nets or fyke nets with various mesh sizes).

2. Capture gear for fish in flowing waters include hoop nets, slat traps, and weirs

3. Active capture methods are applicable to various types of waters, and include dragged or towed nets, surrounding or encircling nets (beach seines, purse seines and lampara nets).

4. Techniques useful in various habitat types and for different life stages include push nets, lift nets, dip nets, cast nets drop nets, angling, spears, detonating cords and fish toxicants such as rotenone and antimycin.

5. Electrofishing via boats or small backpack units enables sampling in a variety of habitats often not suitable for other techniques.

6. Fish eggs and larvae may be collected with ichthyoplankton nets of different mesh sizes drawn at different speeds, through the use of pumps to move water through sampling nets, as well as emergence traps and light traps

Plants

Plants may be monitored by a number of techniques (e.g., quadrat sampling techniques; plotless sampling techniques):

1. *Protocol for problem situations:* successful resource management may lead to overabundance of selected species and to nuisance wildlife; protocols for handling problematic individuals or overabundance should be determined a priori; this reduces potential for conflict among stake holders.

2. *Wildlife Programs*: well-rounded wildlife programs should include strong efforts in inventory, research and monitoring, planning and management, education and extension services, habitat development, preservation, restoration , and conservation

D.1 ECOLOGICAL MANAGEMENT, ENHANCEMENT, and RESTORATION (continued)

A Park of the Future

Monitoring wildlife in a 21st century park should reflect state of the art technology; such monitoring should be adaptive as new technology becomes available; examples of state of the art technology that could be employed today:

1. Animal movements (e.g., coyotes) should be studied employing satellite telemetry and GPS technology.

2. Animal abundance and location (e.g., white-tailed deer) should be studied employing thermal imaging procedures from a helicopter or other aircraft

3. Animal behavior studies (e.g., predators) should be conducted utilizing infrared video cameras

Management of the Future

Ecological management, restoration, and enhancement of natural resources recognizes the complex ecological, socioeconomic, and institutional matrix in which natural-resource management functions:

1. Management fosters cooperation rather than confrontation

2. Management leads (proactive) rather than follows

3. Recognizes that the urban environment is a frontier for understanding and applying ecological, conservation, and other principles in resource management

4. Presents an overall strategy which integrates conservation and development planning for long-term maintenance of environmental quality and sustainability of natural resources

5. Works with the cumulative effect of human population growth, urbanization, and land use changes associated with SFP and recognizes the role of human dimensions in management of wildlife

6. Visionary management will foster a “Memphis Model” for sustaining natural resources for the future

Bat collection using mist net

D.2 ECOLOGICAL INTERPRETIVE OPPORTUNITIES

Inventory of Potential Institutional Linkages

Linkages between SFP and other institutions within the Greater Memphis Region are numerous and represent stakeholders in the academic, public, and private sectors of the community. Examples of potential institutional linkages follow:

1. Colleges and Universities

The University of Memphis, Rhodes College (Memphis, TN), Christian Brothers University (Memphis, TN), LeMoyne Owen College (Memphis, TN), Southwest Tennessee Community College (Memphis, TN), Lane College (Jackson, TN), Union University (Jackson, TN), Lambuth University (Jackson, TN), Dyersburg Community College (Dyersburg, TN), Freed-Hardeman University (Henderson, TN) Bethel College (McKenzie, TN); Northwest Mississippi Community College (Senatobia, MS), Northeast Mississippi Community College (Booneville, MS), Blue Mountain College (Blue Mountain, MS), Delta State University (Cleveland, MS), University of Mississippi (Oxford, MS), Rust College (Holly Springs, MS); Arkansas State University (Jonesboro, AR), Mid-South Community College (West Memphis, AR), Phillips Community College (Helena, AR), East Arkansas Community College (Forest City, AR)

2. Nature centers and Museums

Lichteman Nature Center (Memphis, TN), Coon Creek Science Center (Adamsville, TN), Memphis Botanic Garden (Memphis, TN), Memphis Zoo (Memphis, TN), Meeman-Shelby Forest State Park (Millington, TN), Meeman Biological Station (Millington, TN), Cypress Grove Nature Park (Jackson, TN), Strawberry Plains Audubon Center (Holly Springs, MS), Forest L. Wood Crowley's Ridge Nature Center (Jonesboro, AR); Chucalissa Archaeological Museum (Memphis, TN), Pink Palace Museum (Memphis, TN), National Ornamental Metal Museum (Memphis, TN), Mississippi River Museum (Memphis, TN), Cotton Museum (Memphis, TN), The National Bird Dog Museum (Grand Junction, TN); Tunica Museum (Tunica, MS), Tunica RiverPark Museum (Tunica, MS); Southern Tenant Farmers Museum (Tyronza, AR)

3. Greenways

Greater Memphis Greenline, Wolf River Greenway, Chickasaw Bluffs Conservancy, Tennessee Parks and Greenways

4. Private organizations

Agricenter International, Wolf River Conservancy, Sierra Club, Ducks Unlimited, Tennessee Ornithological Society, Audubon Society, Tennessee Parks and Greenways, The Nature Conservancy, Tennessee Wildlife Federation's Great Outdoors University, Ames Plantation., National Wild Turkey Federation, Quail Unlimited, Mississippi Fish and Wildlife Foundation, Arkansas Wildlife Federation

5. State and Federal Agencies

Tennessee Wildlife Resources Agency, Tennessee Department of Environment and Conservation, Tennessee Urban Forestry Council, Mississippi Wildlife, Fisheries and Parks, Arkansas Game and Fish Commission, Arkansas Department of Parks and Tourism, US Department of Agriculture Wildlife Services, US Fish and Wildlife Service, US Corp of Engineers, US Forest Service, US Geological Survey, National Park Service

Regional Examples of Potential Interpretive Programs, Events, Features and Activities

State Parks

1. *T. O. Fuller State Park, TN:* diverse plant and animal life make the 6-mile Discovery Trail a popular spot for birdwatchers and outdoor enthusiasts –inside the city limits of Memphis. The trail features scenic points of interest, including the Chucalissa Indian Village and unique wetlands of the Mississippi River floodplains

2. *Meeman-Shelby Forest State Park, TN:* borders the Mississippi and offers hiking trails, camping sites, mature forest, and a nature center

3. *Ft. Pillow State Park, TN:* (Owl Prowls (seasonal); Nature Walks (seasonal)

4. *Reelfoot Lake State Park, TN:* Discover the cypress swamps and famed bald eagles of Reelfoot Lake to find out what makes the northwest corner of Tennessee so special. Reelfoot Lake encompasses 25,000 acres and harbors almost every kind of shore and wading bird, as well as the golden and American bald eagles. Summer brings back the always popular Scenic Pontoon Boat Tour. This cruise explores the fascinating habitat and unique beauty of Reelfoot Lake. Guest accommodations include the Airpark Inn with rooms situated over the lake, each with its own balcony. Swimming pool, tennis court and a nature trail are adjacent to the inn. The park also provides two campgrounds and a five-unit motel

5. *Chickasaw State Park:* Tall pines and nearby Lake Placid create a rustic backdrop for a wide

range of accommodations and fun family activities; other parks in western Tennessee offer an array of features and activities (e.g., *Big Cypress Tree, Big Hill Pond, Fort Pillow, Natchez Trace, Pickwick Landing, Pinson Mounds*)

6. *Wall Doxey State Park, MS:* Offers an abundance of outdoor recreation opportunities in a setting rich in natural beauty

7. *John W. Kyle State Park, MS* offers numerous outdoor activities

8. *Parkin Archeological State Park* in eastern Arkansas preserves and interprets the site on the St. Francis River where a 17-acre Mississippi Period American Indian village was located from A.D. 1000 to 1550. A large platform mound on the river bank remains. The site is important for understanding the history and prehistory of northeast Arkansas.

9 *Village Creek State Park, AR*, the unique geology of Crowley's Ridge, a landform of rolling hills in eastern Arkansas's Mississippi Alluvial Plain. A geologic anomaly, the ridge is covered with a lush climax Beech-Maple forest featuring oak, sugar maple, beech, butternut and tulip poplar. Park interpretive programs and exhibits share the story of the natural and cultural heritage of Crowley's Ridge. Five park trails totaling seven miles allow hikers the opportunity to explore this forest on their own, or on guided trail walks. The park also includes 15 miles of horse trails. Anglers can fish for bass, bream, catfish, and crappie at the park's two lakes, Lake Austell and Lake Dunn. Launch ramps, boat docks, bait, fishing boats, electric motors and pedal boats are available late-spring through Labor Day.

State Wildlife Management Areas

These areas are numerous in the Greater Memphis Region and include opportunities for sport fishing, hunting, wildlife observation, photography, and other outdoor activities.

1. *Tennessee: Shelby Forest, Wolf River, John Tulley, Presidents Island, Cold Creek,* and *Eagle Lake*
2. *Mississippi: Tuscumbia, Hell Creek, Divide Section, Sardis Waterfowl,* and *Hamer*
3. *Arkansas: Big Lake. Big Creek, Pine Tree, St. Franjcis,* and *Whitehall*

National Wildlife Refuges

1. *Hatchie National Wildlife Refuge* lies along 23.5 miles of the Hatchie Scenic River, the last unchannelized river of its type in the Lower Mississippi River Valley. The refuge provides an excellent remnant example of the 25 million acres of bottomland hardwood forest once dominating this majestic river valley, includes educational programs, wildlife observation, and auto tour route, other national

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wildlife refuges in the region include: Lake Isom, Reelfoot, Chickasaw, and Lower Hatchie; these refuges offer sport fishing, hunting, wildlife observation and wildlife photography

2. *Wapanocca National Wildlife Refuge*, Turrell, AR is a wildlife oasis in an agricultural sea. An excellent diversity of habitat exists comprised on mainly agricultural land, bottomland hardwood forest, early stage reforested hardwoods, open water and flooded cypress/willow swamp. Thirty small field impoundments totaling 190 acres have been developed for waterfowl in the agricultural area. Because of its strategic location in the heart of the Mississippi Flyway and the diverse habitat, the refuge is a prime wintering area for migratory waterfowl and a major stopping place for migrating warblers. Bald eagles, great blue herons, great egrets and anhinga nest on the refuge

3. *Cache River National Wildlife Refuge* was established in 1986 to protect significant wetland

habitats and provide feeding and resting areas for migrating waterfowl. As one of the few remaining areas in the Lower Mississippi River Valley not drastically altered by channelization and drainage, the Cache River basin contains a variety of wetland communities including some of the most intact and least disturbed bottomland hardwood forests in the Mississippi Valley region. The RAMSAR Convention has protected these unique and valuable wetlands as Wetlands of International Importance. At present the refuge currently encompasses over 56,000 acres located in numerous non-contiguous tracts in Jackson, Woodruff, Monroe and Prairie counties in east central Arkansas

4. *Holly Springs National Forest, MS* is a 147,000-acre mix of public and private land. Located in northern central Mississippi, is only an hour's drive south of Memphis, Tennessee, and attracts many of its citizens escaping for the weekend. The park's 50 or so lakes (dug by the Soil Conservation Service) were originally intended for flood prevention and erosion control, but are today also used for warm-water fishing, boating, swimming, and more.

5. *Mud Island Park* in Memphis provides a recreation of the geography and hydrologic flow of the Mississippi River, from its headwaters in Minnesota to its terminus in Louisiana.

6. *The Ghost River* section of the Wolf River is an example of what the lower Wolf River could be for an excellent canoeing experience.

Potential Interpretive Programs and Events

Programs and events are drawn from institutions and events in the greater Memphis region:

Audio/Visual/Films, Auto Tour, Audio Tour, Ranger Programs (interpretive), Living History Programs (interpretive), Junior Ranger Programs (interpretive), Scuba Diving, Nature Walks, Wildlife Programs (interpretive), Plant Sales, Festivals, Biodiversity Surveys, Bicycling, Camping, Fishing, Hiking, Hunting, Horseback Riding, Boating, Picnicking, Swimming, Wildflower Pilgrimage, Wildlife Viewing, Workshops and Classes, Children's Nature Programs, Bird Watching, Fitness Walks, After School Science Programs, Junior Astronomers-Planetary Travelers, Bluebird Box and Birdhouse Workshop, Full Moon Nite and Owl Prowl, Herbs and Herbology for Beginners, Creating a Backyard Habitat, Fossil Programs (interpretive), Tree Identification, Wildlife Identification, Fall Color Hikes, Park History Programs (interpretive), Outdoor Cooking, Outdoor Education, Archery Programs, Boating Education, Outdoor Photography, Kayaking, Canoeing, Aquatic Resources Education, Boating Safety Education, Professional Development Workshops for Teachers, Science Fair Projects, Fishing Rodeos, High School Environmental Studies Programs, Landscaping for Wildlife Programs, Workshops for Developing Educational Materials for Wildlife, Lunch and Learn Programs, Dutch Oven Cooking, Programs in Reading the Woods, Fly Fishing Programs, Nature Photography Programs, Film Library, Programs in Urban Wildlife, Volunteer Opportunities, Internships, How to Recycle, Programs in Urban Gardening, Programs in Energy Conservation, Programs in Composting, Programs in Wildlife Conservation, Meet the Naturalist Programs, Programs in Art and Nature, Television Show

Shelby Farms Park Opportunities

Providing opportunities, events and activities unique to Shelby Farms is critical. Activities for consideration follow:

1. *Establish Signature Event* (day, week end/week). Most parks and nature centers have a signature day (e.g., Ducks Unlimited, Great Outdoor Festival; Lichterman Nature Center, Earthfest; Pink Palace Museum, Arts and Crafts Festival)

2. Interpretive information could demonstrate vertical diversity in the park.
- *Terrestrial*: develop observational tower in forested areas with an associated arboreal canopy walk. Different environmental conditions and biological communities would be evident for the upper stories compared to ground level.
- *Aquatic:* Enable viewing of Patriot Lake from surface to bottom via the use of video cameras placed in clear vertical tubes. Organisms (surface dwellers such as water striders, top minnows, pelagic fish and benthic organisms) vary significantly with depth. Environmental monitoring equipment could demonstrate the consequences of mixing or lake stratification in which temperature and dissolved oxygen may differ dramatically in different strata within the lake.
- *Soil:* Trenches lined with clear panels in different terrestrial areas of SFP could demonstrate vertical changes in biotic and abiotic features.

3. Integrate activities of Agricenter International with other aspects of SFP. Demonstrate how biofuels can be generated from local materials utilizing an onsite facility such as one developed by the Mechanical Engineering Department at U of M. Provide "how to" interpretive sessions on gardening. A Master Gardener could have demonstration plots of various crops with detailed log of activities that accomplish desired outcome. Demonstrate how compact gardens can be developed and applicable to urban landscapes; e.g. use of buckets to raise tomatoes, use of a trellis for vertical growth of vegetable vines; integrate vegetables among bushes and other landscaped areas around homes. Interpretive information at Farmers Market could enhance the gardening experience. Establish interpretive plots that demonstrate the effectiveness of agricultural management strategies, i.e. use

of chemical and biological control of weeds and pests, consequences of till/no-till practices, models demonstrating effectiveness of different irrigation procedures (and other cutting edge technology identified by Agricenter International). Identify values of herbs and medicinal plants.

4. Organize trips along Wolf River with interpretive stations demonstrating aquatic/riparian habitats.

5. Provide plantings to concentrate seasonally migrating animals, such as butterflies and hummingbirds, and feature special events associated with their arrival in large numbers.

6. Incorporate recycling in all aspects of the operation of SFP. Provide interpretive information of recycling procedures and how they can be applied to other situations. Demonstrate how recycled products can be used and incorporated into operations of the park, not the least of which would be composting.

7. Provide interpretive information and demonstration for aquaculture production, and how it may be applied at different scales. Include seasonal demonstration of hatchery operation.

8. Establish a constructed wetland to demonstrate their function. Inflow and outflow characteristics could be compared via interpretive information.

9. Provide real time views of different habitats in SFP. Include projected images of microscopic life found in adjacent lake; view of nesting area of quail, rodent runways,

Ecologically Managed Landscapes

Site in the Greater Memphis Area that might serve as models for the restoration, management and enhancement projects proposed in the Master Plan.

1. Overton Park Old Growth Forest Tail
2. Wolf River Conservancy Ghost River
3. Reelfoot Lake State Park
4. Reelfoot National Wildlife Refuge
5. Ames Plantation
6. Big Hill Pond State Natural Area
7. Hatchie Scenic River
8. Chickasaw State Park
9. Meeman-Shelby Forest State Park
10. Milan Army Ammunition Plant
11. Shiloh National Military Park
12. Holly Springs National Forest

Additional Educational Opportunities

SFP shares with other parks, nature centers, wildlife management areas, and refuges many of the same educational opportunities. This list is long and verifies a commitment by institutions in the Greater Memphis to education. An educated public will be critical to reaching goals of a sustainable future and a high quality of life for people of the Greater Memphis Region. *Shelby Farms Park has an opportunity to play a significant role in environmental and ecological education in the region.*

Proposed Environmental Education Center

This facility provides the means through which lofty goals relating to education can be achieved. Educational planning and other activities best comes from this unit. Our recommendation is to make this part of Phase I of development for SFP.

Outline of key steps

1. Identify a Director of Education for SFP
2. Assemble a planning team to identify the mission and develop the program
3. Develop the Environmental Education Center and programs
4. Put programs into action
5. Develop system for evaluating success of programs
6. Be proactive and lead rather than follow

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D.2 ECOLOGICAL INTERPRETIVE OPPORTUNITIES (continued)

Resources for Unparalleled Programs in Education

1. Urban setting of SFP
2. Presence of one of the largest K-12 educational systems in the nation
3. Presence of one of the largest urban parks in the nation
4. Presence of Agricenter International on the site (agricultural education)
5. Presence of Ducks Unlimited on the site (waterfowl and conservation education)
6. Presence of The University of Memphis' Ecological Research Center in proximity (ecological education)
7. Presence of Southwest Tennessee Community College in proximity (outreach opportunities)
8. Presence of numerous interdisciplinary departments within academic institutions in the Greater Memphis Region allowing for education focused on the complexities of the urban environment
9. Presence of numerous partners with the private sector for support in educational programs
10. Presence of Baptist Memorial Hospital adjacent to the site (fitness education)
11. Presence of Christian Brothers High School adjacent to the site (outreach opportunities)
12. Presence of a Shelby County government committed to a Sustainable Shelby
13. Presence of a Shelby Farms Park Conservancy committed to a Sustainable Shelby Farms Park

Education Considerations

1. The feasibility of building a new school on SFP property may be a long- term option and should be explored as a means of providing the Memphis Region with an opportunity for a one of a kind (optional) school that provides students with an unparalleled occasion for learning about nature, sustainability, and environmental issues in an urban environment involving the complexities of the region.

2. A short-term alternative to a new building for an optional school would be to explore a partnership between the Environmental Education Center and Agricenter International where they provide space that could be used for day, overnight, weekend, or weeklong educational extension programs. Agricenter space could potentially be converted to dormitories and a kitchen. Great Outdoors University, an environmental education program of the Tennessee Wildlife Federation that targets urban youth is looking for a local partner where they could bring children to natural areas and learn about the environment. Currently, GOU must go long distances to places like Land Between the Lakes and Reelfoot Lake to obtain this experience, but they are looking for a closer solution. The proximity of agricultural and natural environments at SFP and the Agricenter would provide the perfect match for this education program.

3. Environmental Education Exchange Programs where SFP personnel or affiliates go out to interested groups in the region and present information about SFP programs and the reverse.

4. Environmental Education Outreach programs for international students and international sites. The need for environmental education is worldwide.

5. Environmental Education Distance Learning Program where portals can be established on the internet to document the progress of establishing the "Park of the 21st Century", where other organizations and individuals can go to learn from the "Memphis Model" for sustaining natural resources in an urban environment.

6. Environmental Education Marketing Program where SFP could develop its own television and/or radio programs.

7. Opportunity for a Bookstore located in the Environmental Education Center or SFP Visitors Center to provide educational material to the public.

8. Opportunity for Unique Classroom Experiences where students and visitors are located in the outdoors (e.g., in a cypress swamp, old field, or on a boat traveling down the Wolf River). EcoClassrooms scattered throughout SFP.

9. Opportunity for BioBlitz with a goal of identifying as many species as possible within a 24-hour period; provide opportunities for interested members of the general public to hear first-hand about the techniques used by scientists to study the natural world.

10. Opportunity for Programs Relating to "Leave No Child Inside" where unstructured, nature-based time is fostered outside.

11. Opportunity for Programs Relating to "People with Special Needs" where special programs relating to nature are developed for handicapped individuals.

12. Together Green, an Audubon program focused on inspiration, leadership, and cooperation that inspires people to take action at home, in their communities and beyond, to improve the health of the environment.

Shelby Farms Park, as the "Great Outdoors Park of the 21st Century" should be a showcase for environmental responsibility and sustainability. It also should be a showcase of how technology can be used to integrate learning about stewardship of our natural resources. Advanced technologies should be exploited at every opportunity to seamlessly blend educational ventures with the past and future park. For example, interactive listening experiences (the sounds of a wetland, the sounds of a bottomland hardwood forest, the sounds of a river) could be integrated into walkways, boardwalks, and trails. Additionally, educational and research efforts should be multidisciplinary to provide a holistic approach that involves issues from all stakeholders.

Incorporation of a high level of technology will be required to capture the curiosity of tomorrow's young people. With the presence of Agricultural International and Ducks Unlimited on the site, and The University of Memphis' Ecological Research Center in proximity, great opportunities await for educational programs relating to agriculture, conservation, wildlife, and ecology. Additionally, a 21st century park in a large urban area has great potential for educating urban residents about rural issues and sustainability of natural resources. However, as urban sprawl changes the landscape from rural to urban, there is the opportunity and need for educating rural residents to urban issues and the means for sustaining natural resources for the future.

Our educational programs should emphasize the complex ecological, socioeconomic, and institutional interactions that drive resource management. Success in resolving natural-resource issues and in sustaining natural resources for future generations will come from an Educated Public.

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Shelby Farms Parkway Advisory Team

* The Shelby Farms Parkway Advisory Team dedicates their efforts to create a great parkway and environment to the memory of Charlie Rond.

Laura Adams
Friends of Shelby Farms Park

Larry Brown
County Commission, Shelby Farms Advisory Committee

Brad Corey
Mid South Trails Association

John Dudas
Memphis Regional Chamber, Major Roads Committee

Gregg Elliott FOR GREGG ELLIOTT
North Community Representative

Randy Graves
Ducks Unlimited

Richard Hollis
Agricenter

Larry Jensen NOT IN ATTENDANCE
Memphis Tomorrow

Dan Johnson NOT IN ATTENDANCE
Commuter Through Shelby Farms

Keith Kirkland
Wolf River Conservancy

Marty Lipinski
University of Memphis, Traffic Engineering

Steve Reynolds BY BILL TUTTLE
Baptist Healthcare

Charlie Rond (Deceased)*
Don Richardson
Sierra Club

Ritchie Smith
Park Planner / Landscape Architect

Mark Stansbury
Shelby Farms Park Board

David Stevens
Accredo Health

Barry White
Brierwood Neighborhood Association

SHELBY FARMS PARKWAY ADVISORY TEAM

TEAM RECOMMENDATIONS

Team and Project Goals

The goals for the Shelby Farms Parkway Advisory Team were grouped into two categories: Team Goals and Project Goals. Team goals provided guiding principles for team deliberations and activities throughout the CSS process. Project goals were more specifically related to the characteristics of the proposed roadway and the Team's vision and expectations for the project.

Team Goals

- Achieve Community consensus and build public trust.
- Reach consensus for a context sensitive solution in a timely fashion.
- Adhere to a continuous and responsive public involvement process.
- Maintain the spirit of teamwork throughout the project.
- Create an atmosphere of good communication among the team, government, and the community.

Project Goals

- Create a road that enhances and embraces the park.
- Create a design concept that is socially, economically, and environmentally responsible.
- Create a safe and effective roadway design.
- Reduce corridor congestion.
- Produce an excellent design that enhances the quality of life in the community.
- Create the opportunity for non-vehicular traffic to enter and use the park.
- Create the opportunity for vehicular and non-vehicular crossing of the corridor including access for the physically challenged.

Chronology and Process

Six meetings of the Shelby Farms Parkway Advisory Team were held between February 2005 and February 2006. Two Public Workshops were held during the same time period.

The first team meeting (February 10, 2005) was a partnering meeting that concluded with the development of "Team and Project Goals" and outlining key steps in working toward the first public meeting/workshop.

The first Public Workshop (March 24, 2005) was a "blank page" concept. An aerial photograph of the study area was provided and the public was afforded the opportunity to provide their thoughts and concerns for constructing a north-south road through Shelby Farms.

The Team next met on April 28, 2005 to discuss the results from the Public Workshop. The Team discussed the purpose and need for the project, traffic forecasting activities, and similar projects. They concluded their meeting with a "brainstorming session" relating to design criteria and the range of alternatives to be considered. Team members developed sketches of potential alignments.

The Team met on August 18, 2005 to review and discuss five alternative concepts. Alternatives included 4 and 6 lane alternatives, 35, 40, 45, and 50 mph design speeds, and a range of median widths including an independent roadway design concept. Information from the August 18, 2005 meeting was used to develop two refined alternatives.

The Team met again on October 6, 2006. Following a "field walk through" and additional team discussions, these two alternatives were further refined for presentation at the second Public Workshop on November 15, 2005.

Both alternatives presented at the second Public Workshop were 4 lanes and included a curvilinear alignment along the western boundary of the study area. One was developed on the basis of a 40 mph design speed and the other using criteria for a 45 mph design speed. One alternative included a 40-foot common median and the other involved an independent roadway concept. At grade intersections were proposed at Sycamore View and Mullins Station. Two interchange configurations were proposed at Walnut Grove.

The results of the November 15, 2006 meeting were reviewed at the next meeting of the Shelby Farms Parkway Advisory Team on January 11, 2006. The team discussed further opportunities for refinements to alternatives and discussed the development of "team recommendations." The Team met again on February 16, 2006. The focus of this meeting was to finalize the Team Recommendations presented herein.

Team Recommendations

Final team recommendations are grouped into three general categories: (1) Design Features, (2) Interchange Configuration at Walnut Grove, and (3) Other Considerations. It is the Team's vision that these recommendations provide a basic framework for advancing this project to final design with recognition that access and aesthetic elements will be added later per these recommendations and that refinements may be appropriate as additional information and engineering data becomes available.

Recommended Design Features

- 40 mph design speed
- 4 lanes (12-foot lane width)
- Stabilized grass shoulders where feasible
- Independent roadway concept
- Curvilinear alignment (recommended "plan view" to right)
- At-grade intersections at Sycamore View and at Mullins Station
- Grade separation at Walnut Grove
- Tractor Trailers will not be permitted

Interchange Configuration at Walnut Grove

- The recommended configuration for the interchange at Walnut Grove is a "trumpet" configuration that provides for free-flowing traffic for all movements through the interchange.
- The interchange will feature a separate dedicated exit lane from southbound Shelby Farms Parkway to westbound Humphreys Boulevard.
- The interchange will include a single lane exit from southbound Shelby Farms Parkway to westbound Walnut Grove in addition to the dedicated exit lane to Humphreys Boulevard.
- Curvature within the interchange will meet 35mph design criteria with the exception of the loop ramp which shall meet 25mph design criteria.
- With additional geotechnical information, shift the location of the interchange further to the south provided that geotechnical analyses indicate that construction of embankment material over the landfill is prudent and feasible.

Other Considerations

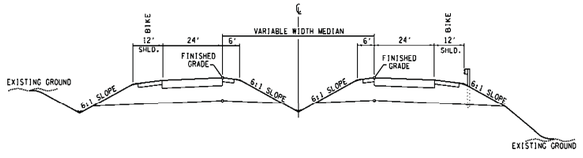
The Shelby County Government is involved in the development of a Master Plan for Shelby Farms. One of this project's goals is to "create a road that enhances and embraces the park." The Team's vision for the Shelby Farms Parkway is a road that blends into the natural and topographic setting of Shelby Farms. The Master Plan for Shelby Farms will provide a fundamental framework for future development and enhancement of Shelby Farms. As such, the Shelby Farms Parkway Advisory Team recognizes that connectivity, access, and aesthetic characteristics of the Shelby Farms Parkway must be consistent with the Master Plan for Shelby Farms and has thus deferred development of recommendations to the Shelby Farms Master Plan. More specific issues that should be considered in the development of the Master Plan include the following:

- Provisions for a "signature" entrance or entrances for Shelby Farms Park, including the bridge over Walnut Grove,
- Provisions for aesthetically appropriate materials (such as stone facing) and landscaping in the construction of the parkway,
- Provisions for safe, easy and convenient connectivity and non-vehicular access to Shelby Farms from surrounding residential areas and greenways on all sides of Shelby Farms,
- Provisions for multi-use paths for walkers, joggers, and recreational bicyclists,
- Provisions for equestrian trails to facilitate movement from one area of Shelby Farms to another,
- Provisions for safe, easy, and convenient connectivity within the park for pedestrians, bicycles and horses,
- Coordination and accommodation for rails to trails and/or future light rail in the vicinity of Mullins Station.
- Provisions for the continued involvement of the SFPAT in the final design,

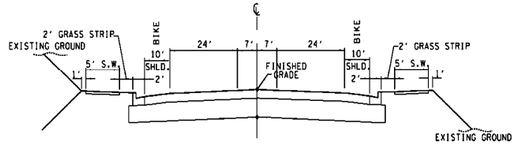
The Team also recommends that authorities from Shelby County, the City of Memphis, and TDOT provide adequate funding for the connectivity, access, and aesthetic features. The Team recommends that design and funding of such features be incorporated into this project included but not limited to access under the Wolf River Bridge north and south.

Typical Sections

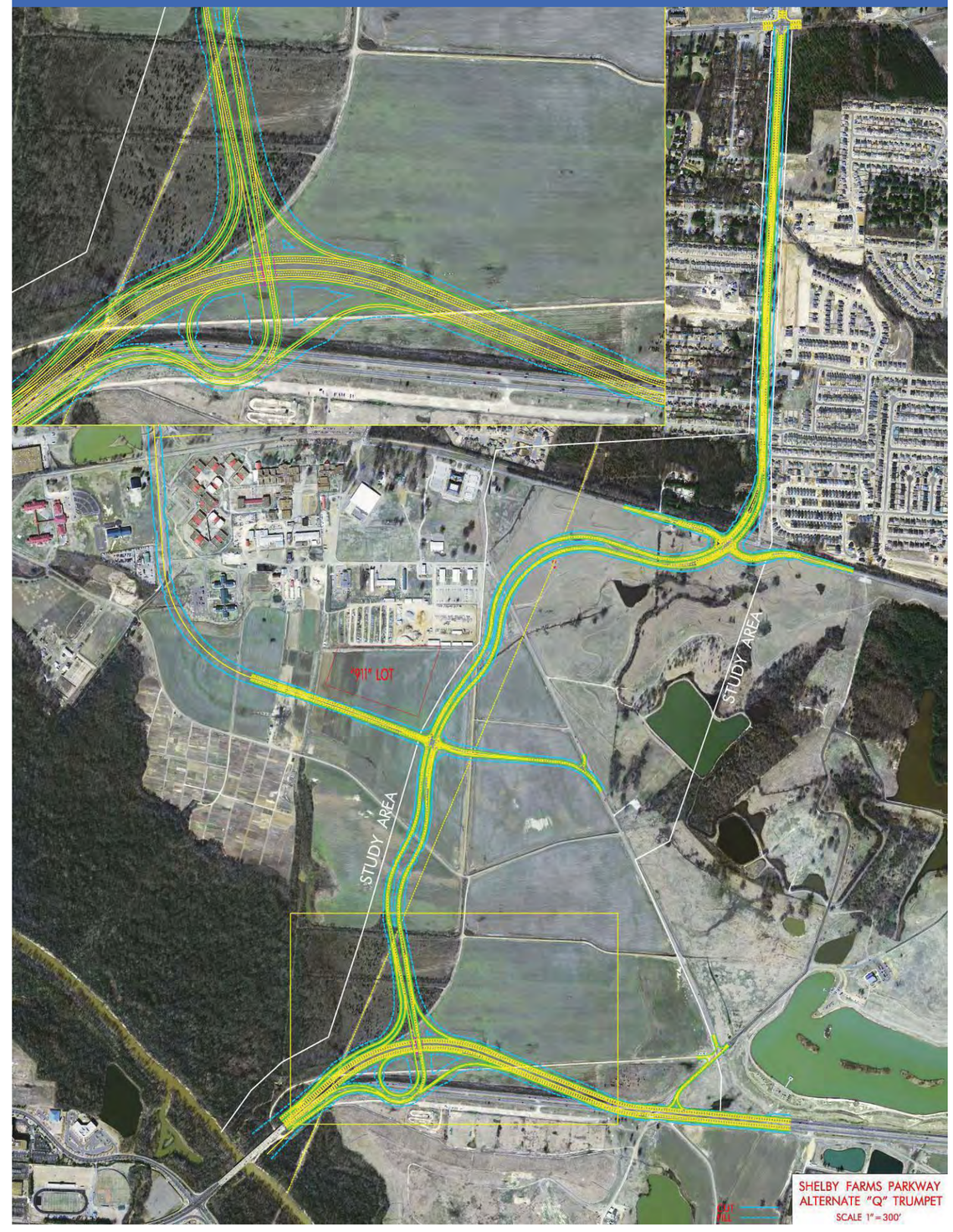
Walnut Grove to Mullins Station



Mullins Station to Macon Road



Plan View



FY 2009 TRANSPORTATION ENHANCEMENT PROGRAM

APPLICATION

Shelby Farms Park looking south from Mullins Station Road

Proposal for Construction of Bicycle, Pedestrian, and Equine Trails

March 27, 2009

TENNESSEE DEPARTMENT OF TRANSPORTATION
ENHANCEMENT PROGRAM APPLICATION
FY 2009

☐ **Check box if this application is a re-submittal.**

Project Title: **Shelby Farms Bicycle, Pedestrian, and Equine Trails**
Project Location (City and County): **Please include detailed driving directions to the project site from 505 Deaderick Street, Nashville for the necessary field reviews.** Take I-40 West to Exit 14. Take Whitten Road South for 1.6 miles to Mullins Station Road at the north end of Shelby Farms.
Grand Total of All Project Costs (including preliminary engineering/design, right-of-way, and construction): $ 2,743,165 (project is segmented and prioritized for partial funding opportunities)

1. **Total Construction Costs (excluding preliminary engineering/design and right-of-way expenses):**

   $ 2,417,165 (100%)

2. **Federal Construction Funds Requested:**
   $ 1,933,732 (80% of number 1)

3. Local Match of Construction Funds:
   $ 483,433 (20% of number 1)

Name of City/County or State Agency Applicant: **Shelby County Government**
Address: **160 North Main Street, Suite 801 Memphis, TN 38103**
Local Government Contact Person, Phone Number and E-mail Address for **Application Process**: **Ted Fox, Director, Public Works Division, (901) 545-4266, Ted.Fox@shelbycountytn.gov**
Local Government Contact Person, Phone Number and E-mail Address for **Project if Awarded**: **Ted Fox, Director, Public Works Division, (901) 545-4266, Ted.Fox@shelbycountytn.gov**

I hereby certify that, to the best of my knowledge, the information submitted with this application is accurate, all rules and regulations contained in TDOT's Local Government Guidelines for the Management of Federal and State Funded Transportation Projects will be adhered to, and that funds are available for the completion of the project as described herein.

Signature: _____ Date _____
County Mayor

Printed Name and Title of elected official: A.C. Wharton, Mayor, Shelby County

NOTE: THE HIGHEST ELECTED OFFICIAL OF A STATE OR LOCAL GOVERNMENT MUST SIGN THIS APPLICATION.

SECTION 1 ENHANCEMENT ACTIVITIES

Check all that apply. Complete explanation of each activity can be found beginning on Page 3 of the instruction booklet.

■	**Facilities for pedestrians or bicycles** All facilities must be hard-surfaced. All work must be at least 51% new construction for approval.	☐	**Rehabilitation and operation of historic transportation buildings, structures or facilities (including historic railroad facilities and canals)**
☐	**Safety and educational activities for pedestrians and bicyclists**	☐	**Preservation of abandoned railway corridors**
☐	**Acquisition of scenic easements and scenic or historic sites (including historic battlefields).** TDOT does not accept applications from local agencies for this activity.	☐	**Inventory, control and removal of outdoor advertising.**
☐	**Scenic or historic highway programs (including visitor centers)** (Visitor Centers must have an elevation and floor plan included in the application with all areas labeled per use.)	☐	**Archaeological planning and research**
■	**Landscaping or other scenic beautification** (All landscaping needs to be broken out and detailed in the budget.)	☐	**Environmental mitigation:** 1. **due to highway runoff** (verification is required)**; or** 2. **Reduce vehicle-caused wildlife mortality**
☐	**Historic preservation**	☐	**Establishment of transportation museums**

SECTION 2 PROJECT DESCRIPTION

In February 2006, the Shelby Farms Parkway Advisory Team (SFPAT) reached consensus on the location of a new four-lane Parkway alignment running through the western edge of Shelby Farms. For many years, previous planning efforts had run into public opposition to this segment of what has been known as the Kirby Parkway. As part of their recommendations to Shelby County, the City of Memphis, and TDOT, the SFPAT proposed that during further design phase of the Parkway that consideration be given to:

- Provisions for safe, easy, and convenient connectivity and non-vehicular access to Shelby Farms from surrounding residential areas and greenways on all sides of Shelby Farms.
- Provisions for multi-use paths for walkers, joggers, and recreational bicyclists.
- Provisions for equestrian trails to facilitate movement from one area of Shelby Farms to another.
- Provisions for safe, easy, and convenient connectivity within the park for pedestrians, bicycles, and horses.

The Team also recommended that design and funding of such features be incorporated into the project (see attached). In 2008, the Shelby Farms Conservancy finalized the preparation of the *Shelby Farms Master Plan* which utilized extensive community involvement to develop an overarching vision for the future of this large and unique urban park. The Master Plan lays the groundwork for the development of non-vehicular facilities within the Farms and has been used as the basis for the recommendations contained herewith. TDOT, the City of Memphis, and the Shelby Farms Conservancy have worked closely to ensure that elements and principles of the Master Plan are included in the development of the Shelby Farms Parkway.

In 2005, TDOT began construction of the Wolf River Bridge as part of the Humphreys Blvd interchange improvement project. While the improvement of the interchange allowed for better access to Shelby Farms for visitors from the west, it was originally not designed with dedicated pedestrian and bicycle facilities. Prior to construction, TDOT met with local stakeholders to discuss concerns with access across the bridges. Through a series of discussion, without changing the bridge size or location, all parties reached agreement on revisions that incorporated a shared use bicycle and pedestrian path across the westbound ramp bridge that was protected from traffic and incorporated some aesthetic features. One goal of this project is to connect this shared use path (pictured at right) with the rest of Shelby Farms.

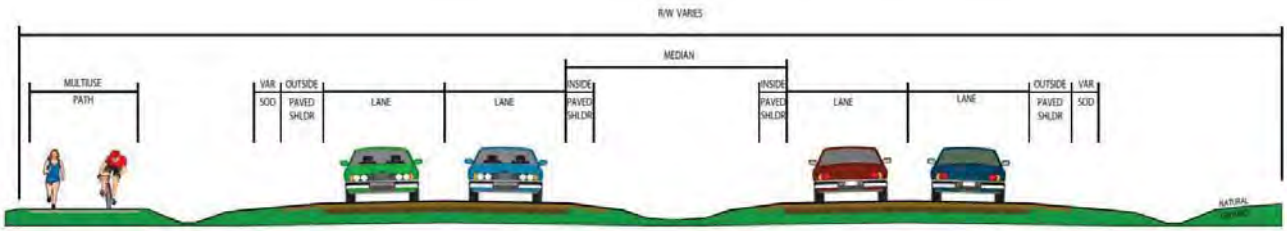
While the Shelby Farms Parkway design is advancing, it has not advanced to a point where ARRA stimulus funding could be used for Parkway construction. This proposal for the:

Shelby Farms Bicycle, Pedestrian, and Equine Trails

seeks to obtain enhancement funding to construct as much of the initial trail system as funding will allow. This enhancement grant will create a much more bicycle and pedestrian friendly "greenspace" in Shelby Farms. Additional recreational uses of Shelby Farms will be encouraged by the addition of these facilities which will result in a healthier Memphis.

All work to be constructed under this proposal will be coordinated so that it is compatible with future design plans for the roadway. The cost estimates in this proposal are separated into buildable segments (see attached exhibit) so that construction can be advanced on each segment as enhancement funding levels allow.

Cost estimates are based on a 13 foot meandering shared use path striped with eight feet for bicyclists and five feet for pedestrians or joggers. Although a 10 foot shared use path is the minimum required, the anticipated volume of pedestrians and bicyclists along with the availability of open space to provide a wider, safer, and more children friendly path led to the proposal for a wider path. The bicycle path standards provided by TDOT will be used to develop a typical section. Equestrian paths are planned to be 10 feet wide but will not be hard surfaced.



Descriptions of each segment in order of their priority for funding are as follows:

Segment A ($177,840) – Bicycle and Pedestrian shared-use path connecting the Wolf River westbound ramp bridge shared path to the proposed Park Circle Trail. The portion of the Park Circle Trail west of the new Shelby Farms parkway would be constructed to a point where the new Parkway will ultimately bridge over the Park Circle Trail. This segment will also include a short connection to the parking area along the Wolf River below the bridges.

Segment B ($130,455) – 2,300 feet of Bicycle and Pedestrian trail running north from the Park Circle Trail to a proposed connection with the Sycamore View Road extension.

Segment C ($257,400) – 4,300 feet of Bicycle and Pedestrian trail running north from the proposed connection to the Sycamore View Road extension to the proposed intersection of the Shelby Farms Parkway and Mullins Station Road.

Segment D ($173,160) – 3,100 feet of Bicycle and Pedestrian trail (Park Circle Trail) passing under the location of the future Shelby Farms parkway and proceeding east to a local access to the Kite Flying Field.

Segment E ($444,600) – 1,200 feet of Bicycle and Pedestrian trail (Park Circle Trail) approach and overpassing Walnut Grove Road to a tie down point south of Walnut Grove Road. This includes a bicycle and pedestrian overpass structure and short connections to existing roads serving the BMX track, soccer fields, and Farm Road south of Walnut Grove Road.

Segment F ($157,950) – 2,000 feet of Bicycle, Pedestrian, and Equine trail connecting Segments B and C to the west with Farm Road to the east. Separation will be provided between the Bicycle and Pedestrian portion of the trail and the Equine portion.

Segment G ($180,180) – 3,100 feet of Bicycle and Pedestrian trail connecting the end of Segment F at Farm Road to the access road leading to the Shelby Farms Visitors Center. This segment follows the north edge of a future planned expansion of Patriot Lake.

Segment H ($140,400) – 1,900 feet of Bicycle and Pedestrian trail connecting the end of Segment C at Mullins Station Road to the parking area along Mullins Station at the north termini of the existing Chickasaw Trail.

Segment I ($112,320) – 2,500 feet of Equestrian trail running south to north between the Park Circle Trail underpass and proposed intersection location of the planned Sycamore View Road extension and the Shelby Farms Parkway.

Segment J ($324,960) – 5,700 feet of Bicycle and Pedestrian trail (Park Circle Trail) running around the south side of the existing landfill from the south end of Segment E to the new Walnut Grove Road bridge over the Wolf River. Includes a trail under the bridge connecting to Segment A completing the Park Circle Trail.

Segment K ($317,900) – 5,000 feet of Bicycle and Pedestrian trail running along the south side of the proposed Sycamore View Road Extension. This segment would tie to Segments B, C, and F and would link the proposed Rails to Trails project on the CSX line near Mullins Station Road to park facilities.

The total construction cost included in this grant application is $2,417,165 excluding preliminary engineering costs. Cost estimates for segment include cost for planting small trees along these greenways. No right of way or utilities impacts are anticipated. Budget sheets for each segment follow in Section 3.

SECTION 3 PROJECT BUDGET

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment A

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 5,000		**Local Match calculated by TDOT prior to Construction funding authorization**
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 10,000		
SUBTOTAL				$ 20,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$2,000	$2,000	$1,600	$400
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	4,000	$5.00	$20,000	$16,000	$4,000
Curb and Gutter						
Concrete/Asphalt	LF	2,300	$14.80	$34,000	$27,200	$6,800
Culvert Extensions/Erosion Control	LS	1	$20,000	$20,000	$16,000	$4,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$38,000	$38,000	$30,400	$7,600
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$5,000	$5,000	$4,000	$1,000
Seeding/Sod	LS	1	$10,000	$10,000	$8,000	$2,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$5,000	$5,000	$4,000	$1,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$12,000	$12,000	$9,600	$2,400
Traffic Control						
CNST. Survey & Layout	LS	1	$4,000	$4,000	$3,200	$800
Construction Administration	LS	1	$2,000	$2,000	$1,600	$400
Construction Contingency	10%	of construction		$15,200	$12,160	$3,040
TDOT Dept. Oversight	2%	of construction		$3,040	$2,432	$608
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$7,600	$6,080	$1,520
SUBTOTAL				$177,840	$142,272	$35,568

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment B

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 5,000		Local Match calculated by TDOT prior to Construction funding authorization
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 8,000		
SUBTOTAL				$ 18,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$2,000	$2,000	$1,600	$400
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	1,000	$5.00	$5,000	$4,000	$1,000
Curb and Gutter						
Concrete/Asphalt	LF	2,200	$14.80	$32,500	$26,000	$6,500
Culvert Extensions/Erosion Control	LS	1	$10,000	$10,000	$8,000	$2,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$28,000	$28,000	$22,400	$5,600
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$5,000	$5,000	$4,000	$1,000
Seeding/Sod	LS	1	$10,000	$10,000	$8,000	$2,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$5,000	$5,000	$4,000	$1,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$9,000	$9,000	$7,200	$1,800
Traffic Control						
CNST. Survey & Layout	LS	1	$3,000	$3,000	$2,400	$600
Construction Administration	LS	1	$2,000	$2,000	$1,600	$400
Construction Contingency	10%	of construction		$11,150	$8,920	$2,230
TDOT Dept. Oversight	2%	of construction		$2,230	$1,784	$446
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$5,575	$4,460	$1,115
SUBTOTAL				$ 130,455	$104,364	$26,091

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment C

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 10,000		Local Match calculated by TDOT prior to Construction funding authorization
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 15,000		
SUBTOTAL				$ 30,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$3,000	$3,000	$2,400	$600
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	2,000	$5.00	$10,000	$8,000	$2,000
Curb and Gutter						
Concrete/Asphalt	LF	4,300	$14.80	$63,600	$50,880	$12,720
Culvert Extensions/Erosion Control	LS	1	$20,000	$20,000	$16,000	$4,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$57,400	$57,400	$45,920	$11,480
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$10,000	$10,000	$8,000	$2,000
Seeding/Sod	LS	1	$20,000	$20,000	$16,000	$4,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$10,000	$10,000	$8,000	$2,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$17,000	$17,000	$13,600	$3,400
Traffic Control						
CNST. Survey & Layout	LS	1	$6,000	$6,000	$4,800	$1,200
Construction Administration	LS	1	$3,000	$3,000	$2,400	$600
Construction Contingency	10%	of construction		$22,000	$17,600	$4,400
TDOT Dept. Oversight	2%	of construction		$4,400	$3,520	$880
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$11,000	$8,800	$2,200
SUBTOTAL				$ 257,400	$205,920	$51,480

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment D

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 5,000		**Local Match calculated by TDOT prior to Construction funding authorization**
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 15,000		
SUBTOTAL				$ 25,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$2,000	$2,000	$1,600	$400
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	1,000	$5.00	$5,000	$4,000	$1,000
Curb and Gutter						
Concrete/Asphalt	LF	3,100	$14.80	$45,900	$36,720	$9,180
Culvert Extensions/Erosion Control	LS	1	$20,000	$20,000	$16,000	$4,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$37,100	$37,100	$29,680	$7,420
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$5,000	$5,000	$4,000	$1,000
Seeding/Sod	LS	1	$10,000	$10,000	$8,000	$2,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$5,000	$5,000	$4,000	$1,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$12,000	$12,000	$9,600	$2,400
Traffic Control						
CNST. Survey & Layout	LS	1	$4,000	$4,000	$3,200	$800
Construction Administration	LS	1	$2,000	$2,000	$1,600	$400
Construction Contingency	10%	of construction		$14,800	$11,840	$2,960
TDOT Dept. Oversight	2%	of construction		$2,960	$2,368	$592
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$7,400	$5,920	$1,480
SUBTOTAL				$ 173,160	$138,528	$34,632

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment E

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 10,000		Local Match calculated by TDOT prior to Construction funding authorization
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 60,000		
SUBTOTAL				$ 75,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$1,000	$1,000	$800	$200
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	2,000	$5.00	$10,000	$8,000	$2,000
Curb and Gutter						
Concrete/Asphalt	LF	1,200	$14.80	$17,800	$14,240	$3,560
Culvert Extensions/Erosion Control	LS	1	$10,000	$10,000	$8,000	$2,000
Pedestrian Bridges	LS	1	$241,000	$241,000		
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$43,200	$43,200	$34,560	$8,640
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$5,000	$5,000	$4,000	$1,000
Seeding/Sod	LS	1	$10,000	$10,000	$8,000	$2,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$5,000	$5,000	$4,000	$1,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$29,000	$29,000	$23,200	$5,800
Traffic Control						
CNST. Survey & Layout	LS	1	$4,000	$4,000	$3,200	$800
Construction Administration	LS	1	$4,000	$4,000	$3,200	$800
Construction Contingency	10%	of construction		$38,000	$30,400	$7,600
TDOT Dept. Oversight	2%	of construction		$7,600	$6,080	$1,520
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$19,000	$15,200	$3,800
SUBTOTAL				$ 444,600	$162,880	$40,720

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment F

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 5,000		Local Match calculated by TDOT prior to Construction funding authorization
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 10,000		
SUBTOTAL				$ 20,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$2,000	$2,000	$1,600	$400
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	1,000	$5.00	$5,000	$4,000	$1,000
Curb and Gutter						
Concrete/Asphalt	LF	2,000	$14.80	$29,600	$23,680	$5,920
Culvert Extensions/Erosion Control	LS	1	$20,000	$20,000	$16,000	$4,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$31,400	$31,400	$25,120	$6,280
Shrubs						
Mulch	LS	1	10,000	$10,000		
Native Species Plantings						
Topsoil	LS	1	$5,000	$5,000	$4,000	$1,000
Seeding/Sod	LS	1	$10,000	$10,000	$8,000	$2,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$5,000	$5,000	$4,000	$1,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$11,000	$11,000	$8,800	$2,200
Traffic Control						
CNST. Survey & Layout	LS	1	$4,000	$4,000	$3,200	$800
Construction Administration	LS	1	$2,000	$2,000	$1,600	$400
Construction Contingency	10%	of construction		$13,500	$10,800	$2,700
TDOT Dept. Oversight	2%	of construction		$2,700	$2,160	$540
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$6,750	$5,400	$1,350
SUBTOTAL				$ 157,950	$118,360	$29,590

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment G

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 5,000		Local Match calculated by TDOT prior to Construction funding authorization
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 10,000		
SUBTOTAL				$ 20,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$2,000	$2,000	$1,600	$400
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	2,000	$5.00	$10,000	$8,000	$2,000
Curb and Gutter						
Concrete/Asphalt	LF	3,100	$14.80	$45,900	$36,720	$9,180
Culvert Extensions/Erosion Control	LS	1	$20,000	$20,000	$16,000	$4,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$39,100	$39,100	$31,280	$7,820
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$5,000	$5,000	$4,000	$1,000
Seeding/Sod	LS	1	$10,000	$10,000	$8,000	$2,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$5,000	$5,000	$4,000	$1,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$10,000	$10,000	$8,000	$2,000
Traffic Control						
CNST. Survey & Layout	LS	1	$5,000	$5,000	$4,000	$1,000
Construction Administration	LS	1	$2,000	$2,000	$1,600	$400
Construction Contingency	10%	of construction		$15,400	$12,320	$3,080
TDOT Dept. Oversight	2%	of construction		$3,080	$2,464	$616
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$7,700	$6,160	$1,540
SUBTOTAL				$ 180,180	$144,144	$36,036

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment H

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 5,000		Local Match calculated by TDOT prior to Construction funding authorization
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 8,000		
SUBTOTAL				$ 18,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$2,000	$2,000	$1,600	$400
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	1,000	$5.00	$5,000	$4,000	$1,000
Curb and Gutter						
Concrete/Asphalt	LF	1,900	$14.80	$28,100	$22,480	$5,620
Culvert Extensions/Erosion Control	LS	1	$20,000	$20,000	$16,000	$4,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$29,900	$29,900	$23,920	$5,980
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$5,000	$5,000	$4,000	$1,000
Seeding/Sod	LS	1	$10,000	$10,000	$8,000	$2,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$5,000	$5,000	$4,000	$1,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$10,000	$10,000	$8,000	$2,000
Traffic Control						
CNST. Survey & Layout	LS	1	$3,000	$3,000	$2,400	$600
Construction Administration	LS	1	$2,000	$2,000	$1,600	$400
Construction Contingency	10%	of construction		$12,000	$9,600	$2,400
TDOT Dept. Oversight	2%	of construction		$2,400	$1,920	$480
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$6,000	$4,800	$1,200
SUBTOTAL				$ 140,400	$112,320	$28,080

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment I

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 5,000		**Local Match calculated by TDOT prior to Construction funding authorization**
Local, State and Federal Permits	LS	1		$ 5,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 5,000		
SUBTOTAL				$ 15,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$2,000	$2,000	$1,600	$400
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	1,000	$5.00	$5,000	$4,000	$1,000
Curb and Gutter						
Concrete/Asphalt					$0	$0
Culvert Extensions/Erosion Control	LS	1	$5,000	$5,000	$4,000	$1,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$38,000	$38,000	$30,400	$7,600
Shrubs						
Mulch	LS	1	10,000	10,000		
Native Species Plantings						
Topsoil	LS	1	$5,000	$5,000	$4,000	$1,000
Seeding/Sod	LS	1	$10,000	$10,000	$8,000	$2,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$5,000	$5,000	$4,000	$1,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$10,000	$10,000	$8,000	$2,000
Traffic Control						
CNST. Survey & Layout	LS	1	$4,000	$4,000	$3,200	$800
Construction Administration	LS	1	$2,000	$2,000	$1,600	$400
Construction Contingency	10%	of construction		$9,600	$7,680	$1,920
TDOT Dept. Oversight	2%	of construction		$1,920	$1,536	$384
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$4,800	$3,840	$960
SUBTOTAL				$ 112,320	$81,856	$20,464

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment J

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 10,000		Local Match calculated by TDOT prior to Construction funding authorization
Local, State and Federal Permits	LS	1		$ 10,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 20,000		
SUBTOTAL				$ 40,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$3,000	$3,000	$2,400	$600
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	5,000	$5.00	$25,000	$20,000	$5,000
Curb and Gutter						
Concrete/Asphalt	LF	5,700	$14.80	$84,360	$67,488	$16,872
Culvert Extensions/Erosion Control	LS	1	$25,000	$25,000	$20,000	$5,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$65,000	$65,000	$52,000	$13,000
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$15,000	$15,000	$12,000	$3,000
Seeding/Sod	LS	1	$25,000	$25,000	$20,000	$5,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$10,000	$10,000	$8,000	$2,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$20,000	$20,000	$16,000	$4,000
Traffic Control						
CNST. Survey & Layout	LS	1	$6,000	$6,000	$4,800	$1,200
Construction Administration	LS	1	$4,000	$4,000	$3,200	$800
Construction Contingency	10%	of construction		$25,000	$20,000	$5,000
TDOT Dept. Oversight	2%	of construction		$5,000	$4,000	$1,000
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$12,600	$10,080	$2,520
SUBTOTAL				$ 324,960	$259,968	$64,992

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

Estimated Project Costs

Shelby Farms Bicycle, Pedestrian, and Equine Trails

Segment K

INSTRUCTIONS: *List all items necessary to develop and construct your project. The applicant is responsible for verifying costs and their accuracy. Construction cost overruns will be the responsibility of the Local Government.*

LOCAL PROJECTS: Please note that the Stage I and II Costs shown below are to be funded by the Local Government and are not eligible for Federal Reimbursement.

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%

Stage I – Preliminary Engineering/Design (PE)

Preliminary Engineering/Design: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Environmental Phase of Preliminary Engineering/Design (PE), and the agency follows TDOT's Consultant Selection Procedures, the costs can be applied toward the Local Government's 20% match.

Preliminary Design Plans (enough to obtain the necessary environmental clearances)	LS	1		$ 15,000		Local Match calculated by TDOT prior to Construction funding authorization
Local, State and Federal Permits	LS	1		$ 10,000		
Plans, Specs, & Estimates (PS&E) Document Completion	LS	1		$ 20,000		
SUBTOTAL				$ 45,000		

Stage II – Right-of-Way/Utilities

Right-of-Way/Utilities: Costs cannot be reimbursed with federal funds. However, if the costs are incurred after receipt of the Notice to Proceed with the Right-of-Way Phase (ROW), the costs can be applied toward the Local Government's 20% match.

ROW Design Plans	LS	0		$		
ROW Acquisition (Applicable for the acquisition of Scenic or Historic Sites applied by State Agencies ONLY)	LS	0		$		
License Agreements, Easements, Recording Fees	LS	0		$		
Utility Relocation and Certifications (Only if not affected as a direct result of the enhancement project)	LS	0		$		
SUBTOTAL				$		

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL	FEDERAL TE FUNDS @ 80%	LOCAL GOVERNMENT MATCHING FUNDS @ 20%
Stage III – Construction (CNST.)						
ROW Acquisition (State Agencies Only)						
Site Preparation & Demolition:						
Clearing and Grubbing	LS	1	$3,000	$3,000	$2,400	$600
Removal of Obstructions						
Removal of concrete sidewalks						
Removal of asphaltic concrete pavement						
Construction Items:						
**Utility Relocation						
Retaining Wall						
Earthwork (including general, drainage and structural excavation and backfill)	CY	5,000	$5.00	$25,000	$20,000	$5,000
Curb and Gutter						
Concrete/Asphalt	LF	5,000	$14.80	$74,000	$59,200	$14,800
Culvert Extensions/Erosion Control	LS	1	$25,000	$25,000	$20,000	$5,000
Pedestrian Bridges						
Pedestrian ADA Ramp						
Bricked Stamp Pavers						
Striping						
Crosswalk Signals						
Landscaping						
Trees	LS	1	$65,000	$65,000	$52,000	$13,000
Shrubs						
Mulch						
Native Species Plantings						
Topsoil	LS	1	$15,000	$15,000	$12,000	$3,000
Seeding/Sod	LS	1	$25,000	$25,000	$20,000	$5,000
Irrigation Systems						
Pedestrian Amenities						
Pedestrian Lighting						
Benches						
Bike Racks						
Trash Receptacles						
Signage	LS	1	$10,000	$10,000	$8,000	$2,000
Comfort Stations						
Mobilization and Administration Costs						
Contractor Mobilization	LS	1	$20,000	$20,000	$16,000	$4,000
Traffic Control						
CNST. Survey & Layout	LS	1	$7,000	$7,000	$5,600	$1,400
Construction Administration	LS	1	$3,000	$3,000	$2,400	$600
Construction Contingency	10%	of construction		$27,000	$21,600	$5,400
TDOT Dept. Oversight	2%	of construction		$5,400	$4,320	$1,080
*Construction Engineering Inspection (CEI)	5%	*See page 12 of the instruction booklet		$13,500	$10,800	$2,700
SUBTOTAL				$ 317,900	$254,320	$63,580

**Only the costs of utilities needing relocation as a direct result of the enhancement project are eligible for federal reimbursement. Because of the costs involved, the undergrounding of overhead utilities is limited to 33% of the total project cost and the project scope must include additional eligible activities beyond utility relocation.

SECTION 4 OPERATION AND MAINTENANCE COST

Is the Local Government willing to be a party to a maintenance agreement for this project? ■ Yes ☐ no

The facility on which this project is being developed shall remain open to the public for a sufficient time based upon the federal investment as shown below:

Federal Amount	Lease
$1.00 - $200,000	5 years from Federal close-out date
>$200,000 - $500,000	10 years from Federal close-out date
>$500,000 - $1,000,000	20 years from Federal close-out date

Projects over $1,000,000 carry a minimum 25 year lease and will be subject to individual review.

SECTION 5 SUPPORT AND COMMITMENT

Include the local, statewide, and legislative support for the proposed project and attach any available documentation.

METROPOLITAN AREAS

Are you in a Metropolitan Area over 50,000 population? ■ yes ☐ no

If yes, please provide a copy of this application to the appropriate MPO/TPO/RPO coordinator.

NOTE: If the project is selected for funding you must have MPO/TPO project endorsement and amendment into the applicable Transportation Improvement Plan (TIP)

Please provide the legislative districts that correspond to the project location.

House District No. 83/96 **Senate District No.** 28 **U.S. Congressional Representative District No.** 9

SECTION 6 PROPERTY OWNERSHIP/ACQUISITIONS

Does all land necessary for the Project fall within public ownership or lease? ■ yes ☐ no

Is any part of the project to be constructed inside State or Federal highway right-of-way? ☐ yes ■ no

Does any part of your project lie within 200 feet of a rail line? ☐ yes ■ no

Does the project include a pedestrian/bike overpass or underpass? ■ yes ☐ no

Is the project along or adjacent to a State or Federal Highway? ☐ yes ■ no

SECTION 7 RELATIONSHIP AND NEED

1. **Relationship to Surface Transportation**

   a. What service or function will this project, or has this project, provided for the traveling public?

   This project will provide opportunities for residential areas both to the north and the west of Shelby Farms to travel both to destinations within Shelby Farms but also through the Farms to destinations on each side. The project will connect the new dedicated bicycle and pedestrian path crossing the Wolf River ramp bridge to a network of trails within Shelby Farms.

   b. How will it impact surface transportation?

   This project will have some impact on congestion within Shelby Farms as residents from the surrounding neighborhoods will be able to access the park with non-vehicular means. This should reduce the number of trips generated by these residents having to drive into the park and park at the Visitors Center or at any of the parking lots by lakes. This will also have a positive impact on air quality for park visitors.

Please refer to www.fhwa.dot.gov/environment/th/relate.htm for more information pertaining to surface transportation relationships.

2. **Demonstrated Need**

   a. What need(s) will this project fulfill within the community?

   Through the Public Involvement aspect of the Shelby Farms Parkway project and the Master Plan development process, there was considerable input regarding the need for non-vehicular facilities that complement the addition of the Shelby Farms Parkway and other new park features.

3. **Historical Impact**

   a. What is the impact of the project to existing or eligible National Register of Historic Sites?

   There are no existing or eligible National Register of Historic Sites resources impacted by the project.

4. **Project Resources**

   a. Is this a continuation of an existing project? If so, include the applicable Project Identification Number (PIN) project description, current status and estimated completion date.

   This project is related to the Shelby Farms Parkway (Kirby Parkway) project in that these facilities were planned to be constructed as part of that project. The Shelby Farms Parkway Environmental Impact Statement covers the majority of the footprint of these proposed improvements. Any segments that fall outside of the environmental footprint of the EIS will be covered in a separate Categorical Exclusion document.

TDOT will accept applications electronically at tdot.enhancements@state.tn.us. By submitting electronically, you eliminate the need to send in additional hard copies of the application. However, the electronic submission must still include the scanned signature of the applicable Mayor or State Agency Head as well as all necessary detailed maps, photographs, preliminary sketches, plans and support letters. **Please note that only Word, PDF and JPG documents will be accepted for electronic submissions.** If you choose not to submit electronically you must send one (1) complete bound application, in a hard cover 3-ring binder, and four (4) stapled copies of your application (these extra four (4) copies **SHOULD NOT** be bound):

The original application and the extra four (4) copies should be submitted to:

Tennessee Department of Transportation
Transportation Enhancement Office
505 Deaderick Street
Suite 600, James K. Polk Building
Nashville, Tennessee 37243-0341

Project Area Photos

Former Wolf River Bridge Entering Shelby Farms with Bicyclists Restricted in 2005

New Wolf River Ramp Bridge Entering Shelby Farms with Protected Multi-Use Path

Project Area Photos

Bicyclists Passing the Shelby Farms Visitors Center

Meeting of the Shelby Farms Parkway Advisory Team

Project Area Photos

Intersection of Whitten Road with Mullins Station Road at North End of Project

View of Project Corridor from South End at Walnut Grove Road

DESIGN CRITERIA

DESIGN SPEED 40 MPH
4 LANE TYPICAL SECTION
VARIABLE MEDIAN WIDTH

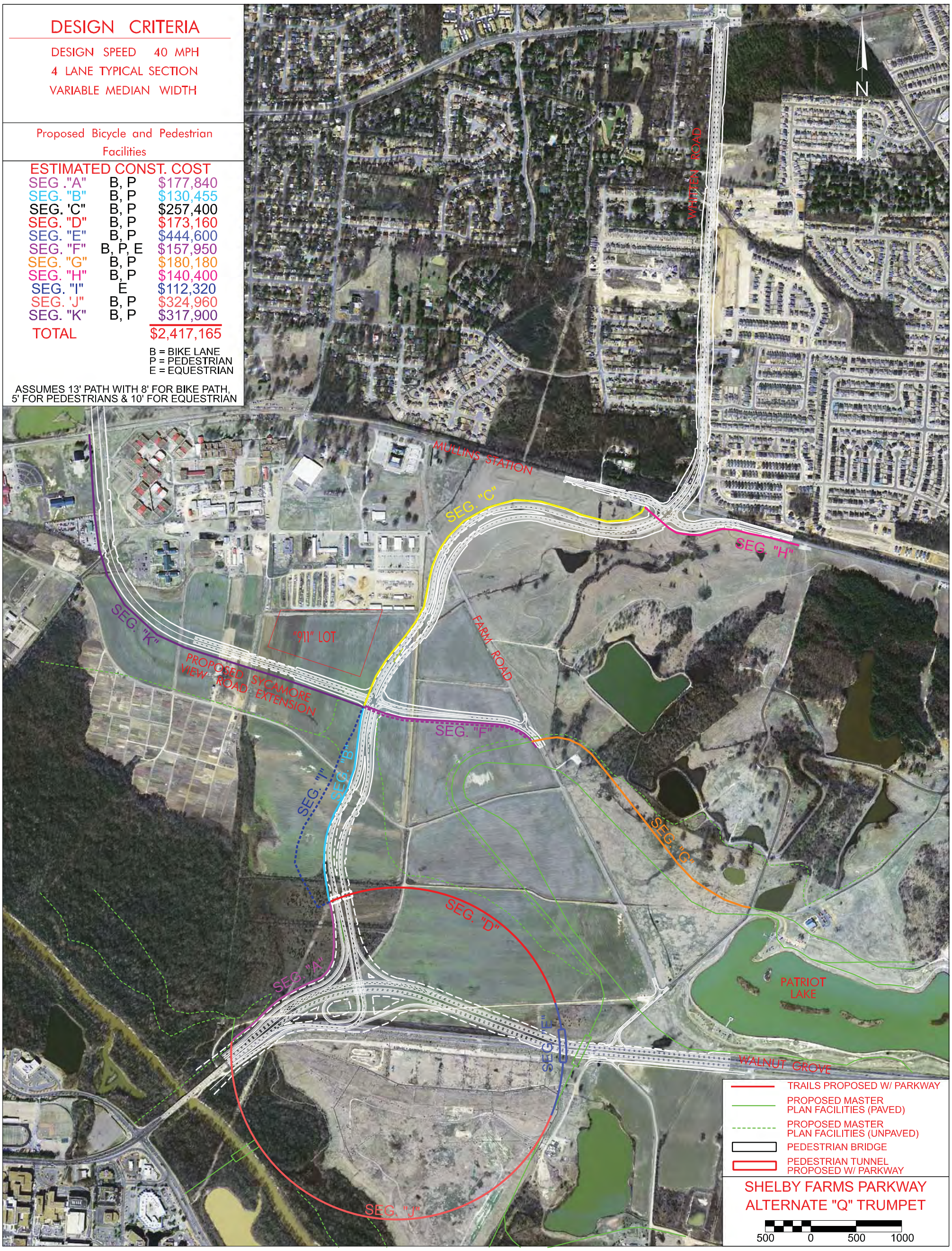
Proposed Bicycle and Pedestrian Facilities

ESTIMATED CONST. COST

SEG ."A"	B, P	$177,840
SEG. "B"	B, P	$130,455
SEG. 'C"	B, P	$257,400
SEG. "D"	B, P	$173,160
SEG. "E"	B, P	$444,600
SEG. "F"	B, P, E	$157,950
SEG. "G"	B, P	$180,180
SEG. "H"	B, P	$140,400
SEG. "I"	E	$112,320
SEG. 'J"	B, P	$324,960
SEG. "K"	B, P	$317,900
TOTAL		$2,417,165

B = BIKE LANE
P = PEDESTRIAN
E = EQUESTRIAN

ASSUMES 13' PATH WITH 8' FOR BIKE PATH, 5' FOR PEDESTRIANS & 10' FOR EQUESTRIAN



Shelby Farms Parkway Advisory Team

* The Shelby Farms Parkway Advisory Team dedicates their efforts to create a great parkway and environment to the memory of Charlie Rond.

Laura Adams
Friends of Shelby Farms Park

Larry Brown
County Commission, Shelby Farms Advisory Committee

Brad Corey
Mid South Trails Association

John Dudas
Memphis Regional Chamber, Major Roads Committee

Gregg Elliott FOR GREGG ELLIOTT
North Community Representative

Randy Graves
Ducks Unlimited

Richard Hollis
Agricenter

Larry Jensen NOT IN ATTENDANCE
Memphis Tomorrow

Dan Johnson NOT IN ATTENDANCE
Commuter Through Shelby Farms

Keith Kirkland
Wolf River Conservancy

Marty Lipinski
University of Memphis, Traffic Engineering

Steve Reynolds BY BILL TUTTLE
Baptist Healthcare

Charlie Rond (Deceased)*
Don Richardson
Sierra Club

Ritchie Smith
Park Planner / Landscape Architect

Mark Stansbury
Shelby Farms Park Board

David Stevens
Accredo Health

Barry White
Brierwood Neighborhood Association

SHELBY FARMS PARKWAY ADVISORY TEAM

TEAM RECOMMENDATIONS

Team and Project Goals

The goals for the Shelby Farms Parkway Advisory Team were grouped into two categories: Team Goals and Project Goals. Team goals provided guiding principles for team deliberations and activities throughout the CSS process. Project goals were more specifically related to the characteristics of the proposed roadway and the Team's vision and expectations for the project.

Team Goals

- Achieve Community consensus and build public trust.
- Reach consensus for a context sensitive solution in a timely fashion.
- Adhere to a continuous and responsive public involvement process.
- Maintain the spirit of teamwork throughout the project.
- Create an atmosphere of good communication among the team, government, and the community.

Project Goals

- Create a road that enhances and embraces the park.
- Create a design concept that is socially, economically, and environmentally responsible.
- Create a safe and effective roadway design.
- Reduce corridor congestion.
- Produce an excellent design that enhances the quality of life in the community.
- Create the opportunity for non-vehicular traffic to enter and use the park.
- Create the opportunity for vehicular and non-vehicular crossing of the corridor including access for the physically challenged.

Chronology and Process

Six meetings of the Shelby Farms Parkway Advisory Team were held between February 2005 and February 2006. Two Public Workshops were held during the same time period.

The first team meeting (February 10, 2005) was a partnering meeting that concluded with the development of "Team and Project Goals" and outlining key steps in working toward the first public meeting/workshop.

The first Public Workshop (March 24, 2005) was a "blank page" concept. An aerial photograph of the study area was provided and the public was afforded the opportunity to provide their thoughts and concerns for constructing a north-south road through Shelby Farms.

The Team next met on April 28, 2005 to discuss the results from the Public Workshop. The Team discussed the purpose and need for the project, traffic forecasting activities, and similar projects. They concluded their meeting with a "brainstorming session" relating to design criteria and the range of alternatives to be considered. Team members developed sketches of potential alignments.

The Team met on August 18, 2005 to review and discuss five alternative concepts. Alternatives included 4 and 6 lane alternatives, 35, 40, 45, and 50 mph design speeds, and a range of median widths including an independent roadway design concept. Information from the August 18, 2005 meeting was used to develop two refined alternatives.

The Team met again on October 6, 2006. Following a "field walk through" and additional team discussions, these two alternatives were further refined for presentation at the second Public Workshop on November 15, 2005.

Both alternatives presented at the second Public Workshop were 4 lanes and included a curvilinear alignment along the western boundary of the study area. One was developed on the basis of a 40 mph design speed and the other using criteria for a 45 mph design speed. One alternative included a 40-foot common median and the other involved an independent roadway concept. At grade intersections were proposed at Sycamore View and Mullins Station. Two interchange configurations were proposed at Walnut Grove.

The results of the November 15, 2006 meeting were reviewed at the next meeting of the Shelby Farms Parkway Advisory Team on January 11, 2006. The team discussed further opportunities for refinements to alternatives and discussed the development of "team recommendations." The Team met again on February 16, 2006. The focus of this meeting was to finalize the Team Recommendations presented herein.

Team Recommendations

Final team recommendations are grouped into three general categories: (1) Design Features, (2) Interchange Configuration at Walnut Grove, and (3) Other Considerations. It is the Team's vision that these recommendations provide a basic framework for advancing this project to final design with recognition that access and aesthetic elements will be added later per these recommendations and that refinements may be appropriate as additional information and engineering data becomes available.

Recommended Design Features

- 40 mph design speed
- 4 lanes (12-foot lane width)
- Stabilized grass shoulders where feasible
- Independent roadway concept
- Curvilinear alignment (recommended "plan view" to right)
- At-grade intersections at Sycamore View and at Mullins Station
- Grade separation at Walnut Grove
- Tractor Trailers will not be permitted

Interchange Configuration at Walnut Grove

- The recommended configuration for the interchange at Walnut Grove is a "trumpet" configuration that provides for free-flowing traffic for all movements through the interchange.
- The interchange will feature a separate dedicated exit lane from southbound Shelby Farms Parkway to westbound Humphreys Boulevard.
- The interchange will include a single lane exit from southbound Shelby Farms Parkway to westbound Walnut Grove in addition to the dedicated exit lane to Humphreys Boulevard.
- Curvature within the interchange will meet 35mph design criteria with the exception of the loop ramp which shall meet 25mph design criteria.
- With additional geotechnical information, shift the location of the interchange further to the south provided that geotechnical analyses indicate that construction of embankment material over the landfill is prudent and feasible.

Other Considerations

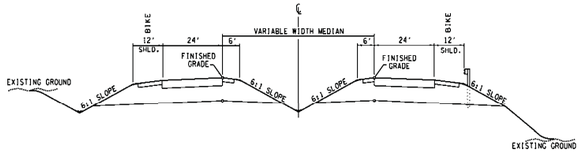
The Shelby County Government is involved in the development of a Master Plan for Shelby Farms. One of this project's goals is to "create a road that enhances and embraces the park." The Team's vision for the Shelby Farms Parkway is a road that blends into the natural and topographic setting of Shelby Farms. The Master Plan for Shelby Farms will provide a fundamental framework for future development and enhancement of Shelby Farms. As such, the Shelby Farms Parkway Advisory Team recognizes that connectivity, access, and aesthetic characteristics of the Shelby Farms Parkway must be consistent with the Master Plan for Shelby Farms and has thus deferred development of recommendations to the Shelby Farms Master Plan. More specific issues that should be considered in the development of the Master Plan include the following:

- Provisions for a "signature" entrance or entrances for Shelby Farms Park, including the bridge over Walnut Grove,
- Provisions for aesthetically appropriate materials (such as stone facing) and landscaping in the construction of the parkway,
- Provisions for safe, easy and convenient connectivity and non-vehicular access to Shelby Farms from surrounding residential areas and greenways on all sides of Shelby Farms,
- Provisions for multi-use paths for walkers, joggers, and recreational bicyclists,
- Provisions for equestrian trails to facilitate movement from one area of Shelby Farms to another,
- Provisions for safe, easy, and convenient connectivity within the park for pedestrians, bicycles and horses,
- Coordination and accommodation for rails to trails and/or future light rail in the vicinity of Mullins Station.
- Provisions for the continued involvement of the SFPAT in the final design,

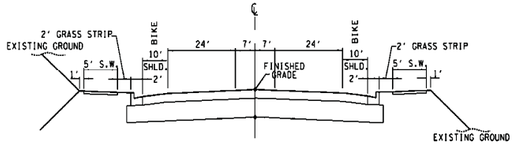
The Team also recommends that authorities from Shelby County, the City of Memphis, and TDOT provide adequate funding for the connectivity, access, and aesthetic features. The Team recommends that design and funding of such features be incorporated into this project included but not limited to access under the Wolf River Bridge north and south.

Typical Sections

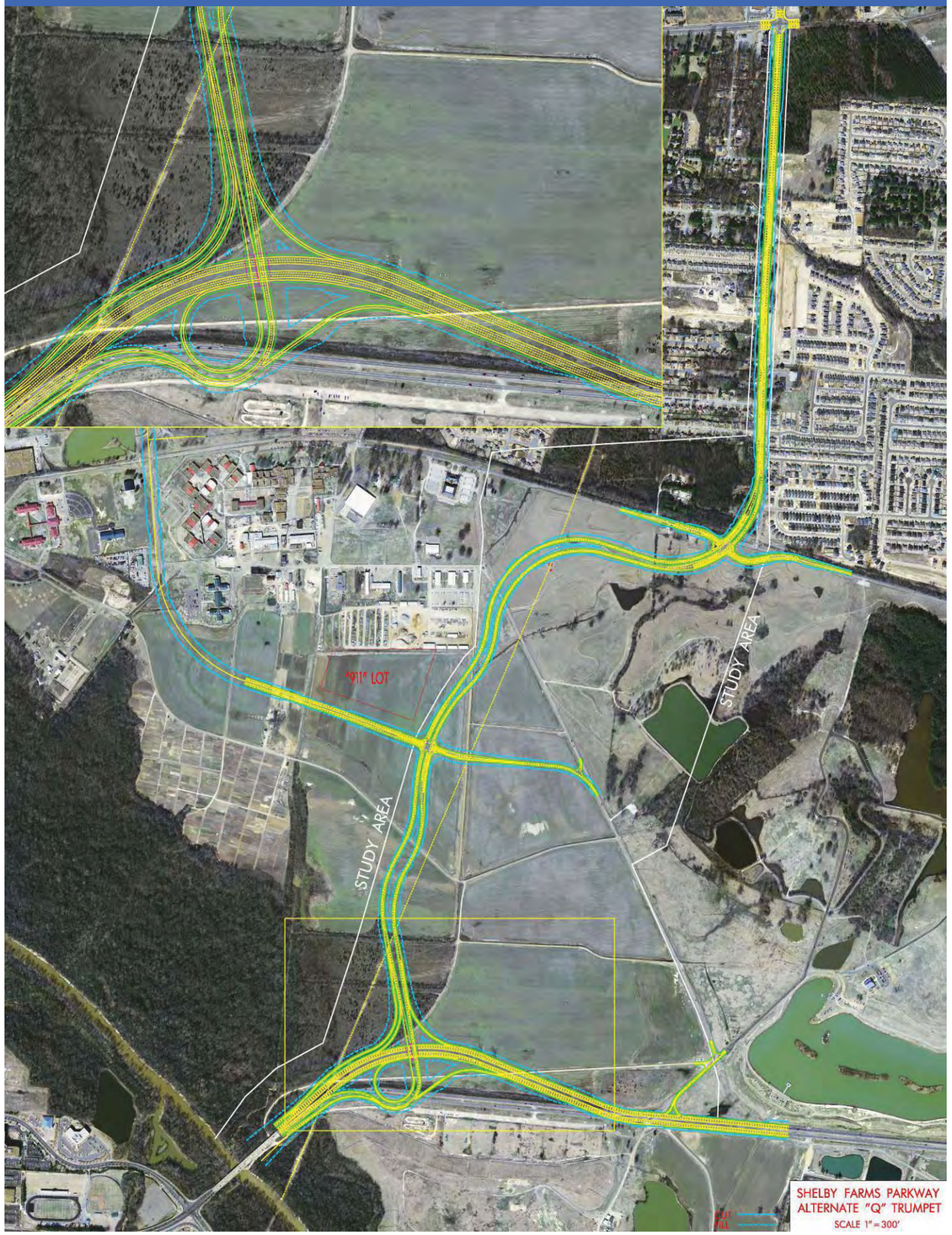
Walnut Grove to Mullins Station



Mullins Station to Macon Road



Plan View



APPENDIX B

NATIONAL WETLAND INVENTORY MAP

PFOIA
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Mullins Sta Ch
Hill Chapel
County Hospital
Radio Tower
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POWHh
Shelby Farms
AND
NASHVILLE
MULLINS
STATION
COUNTY
PENAL FARM
POWHx
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PEMIA
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PEM 1A SS
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APPENDIX C

US FISH AND WILDLIFE SERVICE CORRESPONDENCE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

June 24, 2011

Mr. Matt Richards
Tennessee Department of Transportation
Environmental Planning and Permits
James K. Polk Building, Suite 900
505 Deaderick Street
Nashville, Tennessee 37243-0334

Subject: Proposed Kirby Whitten Parkway from Walnut Grove Road to Macon Road; P.E. 79960-0583-54, PIN# 109182.00, Shelby County, Tennessee. (Re: FWS# 11-CPA-0612).

Dear Mr. Richards:

Thank you for your letter dated June 1, 2011, regarding potential Indiana bat (*Myotis sodalis*) impacts as a result of the proposed construction of Kirby Whitten Parkway from Walnut Grove Road to Macon Road in Shelby County, Tennessee. The Tennessee Department of Transportation (TDOT) has determined that this project is "not likely to adversely affect" the Indiana bat because there are no State records of Indiana bat hibernacula west of the Tennessee River and the project would require removal of relatively few trees. Personnel of the U.S. Fish and Wildlife Service have reviewed the subject proposal and offer the following comments.

Upon review of the information provided and our database, we concur with TDOT's determination of "not likely to adversely affect" for the Indiana bat due to a lack of suitable habitat within the project area. Therefore, based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under section 7 of the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

If you have any questions regarding our comments, please contact John Griffith of my staff at 931/525-4995 or by email at john_griffith@fws.gov.

Sincerely,

Brad Bingham

Acting for Mary E. Jennings
Field Supervisor

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

RECEIVED
JUN 24 2005
PALMER
ENGINEERING

June 21, 2005

Mr. Jeffrey H. Schwierjohann
Senior Environmental Biologist
Palmer Engineering
400 Shoppers Drive
P.O. Box 747
Winchester, Kentucky 40392-0747

Re: FWS #05-1274

Dear Schwierjohann:

Thank you for your correspondence of May 31, 2005, regarding the proposed Kirby Parkway Project in Shelby County, Tennessee. The proposed project entails the construction of approximately 2.6 miles of new highway from Macon Road to Walnut Grove as shown on the attachment to your correspondence. Fish and Wildlife Service (Service) personnel have reviewed the information submitted and we offer the following comments.

Information available to the Service indicates that wetlands exist in the vicinity of the proposed project. Enclosed is a copy of a portion of the National Wetlands Inventory's Ellendale, Tennessee, quadrangle with the referenced wetlands highlighted. This information is provided for your convenience. Our wetlands determination has been made in the absence of a field inspection and does not constitute a wetlands delineation for the purposes of Section 404 of the Clean Water Act. The Corps of Engineers and Tennessee Department of Environment and Conservation should be contacted regarding the presence of regulatory wetlands and the requirements of wetlands protection statutes.

Since the proposed project will involve construction activities over creeks, we recommend that silt barriers be put in place to prevent runoff of sediment. Perennial streams should be bridged rather than culverted. Construction within or adjacent to the streams should be accomplished during low-flow periods, and the streambanks reseeded with native vegetation beneficial to wildlife immediately following disturbance.

Endangered species collection records available to the Service do not indicate that federally listed or proposed endangered or threatened species occur within the impact area of the project. We note, however, that collection records available to the Service may not be all-inclusive. Our data base is a compilation of collection records made available by various individuals and

resource agencies. This information is seldom based on comprehensive surveys of all potential habitat and thus does not necessarily provide conclusive evidence that protected species are present or absent at a specific locality. However, based on the best information available at this time, we believe that the requirements of section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under section 7 of the Act must be reconsidered if (1) new information reveals impacts of the proposed action that may affect listed species or critical habitat in a manner not previously considered, (2) the proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat designated that might be affected by the proposed action.

Thank you for the opportunity to comment on this proposed action. If you have any questions regarding the information which we have provided, please contact Wally Brines of my staff at 931/528-6481, extension 222.

Sincerely,

Lee A. Barclay

Lee A. Barclay, Ph.D.
Field Supervisor

Enclosure

APPENDIX D

CULTURAL HISTORIC RESOURCES CORRESPONDENCE

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

November 20, 2006

Mr. Gerald Kline
Tennessee Department of Transportation
Environmental Planning and Permits Division
Suite 900, James K. Polk Building
505 Deaderick Street
Nashville, Tennessee 37243-0334

RE: FHWA, ARCHAEOLOGICAL ASSESSMENT, KIRBY PARKWAY ALTERNATE Q, UNINCORPORATED, SHELBY COUNTY, TN

Dear Mr. Kline:

At your request, our office has reviewed the above-referenced archaeological survey report in accordance with regulations codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739). Based on the information provided, we find that the project area contains no archaeological resources eligible for listing in the National Register of Historic Places.

If project plans are changed or archaeological remains are discovered during construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act.

Your cooperation is appreciated.

Sincerely,

Richard G. Tune
Deputy State Historic
Preservation Officer

RGT/jmb

TENNESSEE HISTORICAL COMMISSION
701 BROADWAY, B-30
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0442
(615) 532-1550

August 8, 1994

Mr. Raymond Brisson
Environmental Planning
TDOT, 9th. Floor Polk Bldg
Nashville, Tennessee 37219

RE: FHWA, PENAL FARM/KIRBY PARKWAY PROJECT, UNINCORPORATED, SHELBY COUNTY

Dear Mr. Brisson:

Pursuant to the request of Mr. Chris Fales, representing Memphis Heritage, this office has reviewed documentation relative to the above-referenced undertaking which was submitted to our office for Section 106 review in October, 1984, and our previous determination dated October 16, 1994, and additional documentation submitted by Mr. Fales.

Based on the recently-submitted information from Mr. Fales plus other documentation, we now find that the passage of time warrants a revision in our previous finding of "no cultural resources". We now find that the Kirby Parkway project as currently proposed will adversely affect the Shelby County Penal Farm which has been determined by our office to be eligible for listing in the National Register of Historic Places under Criteria "A" and "C" (please see enclosed letter to Mr. Fales and the accompanying National Register boundary map). Therefore, this office now has an objection to the implementation of this project until such time as you have consulted with us concerning ways in which the project adverse effect caused by the introduction of out-of-character elements and the alteration of the historic property called for in this project may be avoided or minimized. You are now obliged to inform the Advisory Council on Historic Preservation of this adverse effect determination and begin immediate consultation with our office. Please enclose a copy of this determination in your notification to the Council as delineated at 36 CFR Part 800. **Until such time as this office has rendered a final comment on this project, your Section 106 obligation under federal law has not been met.** Questions and comments may be directed to Joe Garrison (615)532-1559. Your cooperation is appreciated.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

JWL/jyg

APPENDIX F

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

October 22, 1997

Ms. Rebecca Rogers
Advisory Council on Historic Preservation/Suite 809
1100 Pennsylvania Ave. NW
Washington, DC 20004

RE: FHWA, KIRBY PARKWAY, SHELBY FARMS ELIGIBILITY DETERMINATION., MEMPHIS, SHELBY COUNTY

Dear Ms. Rogers:

Pursuant to your request, this office has reviewed its record of consultation with the Federal Highways Administration and the Tennessee Department of Transportation concerning the above-referenced undertaking. This review of consultation is a consequence of questions raised by Ms. Lois Kulkin, President of the Friends of Shelby Farms, in a letter to Ms. Catherine Slater, Chairman, Advisory Council on Historic Preservation, dated July 19, 1997. Our consultation in this matter is a requirement of our responsibility under Section 106 of the National Historic Preservation Act for compliance by participating federal agencies and applicants for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (51 FR 31115, September 2, 1986).

On September 11, 1984, the Tennessee Department of Transportation submitted an archaeological/historical survey report to this office for review and comment relative to the Kirby Parkway project. At the time of this survey, Shelby Penal Farm, which is within the undertaking's area of potential effect, had not been identified as a property eligible for listing in the National Register of Historic Places. Therefore, on October 16, 1984, our office concurred with TDOT's finding that there were no historic properties affected by the project.

In late spring 1994, our office became aware that Memphis Heritage, a preservation association based in Memphis, was in the process of evaluating the Shelby Penal Farm for National Register eligibility. Members of our office's National Register staff met on site with Mr. Chris Fales representing Memphis Heritage and concluded that various elements within the expanded boundary of the original Shelby Penal Farm were National Register eligible. In a letter dated July 8, 1994, our office informed Mr. Fales of this determination. We also informed Mr. Fales that since there was a Section 106 case ongoing which would affect this resource, that his documentation of the eligibility of the Penal Farm should be of a level suitable for National Register nomination.

Central to this office's review of Mr. Fales' material would be our desire to establish correct boundaries for the National Register eligible property. This was especially true as there was an ongoing Section 106 case involving the property. We also had reason to believe that archaeological resources potentially eligible for listing in the National Register were located within the Kirby Parkway APE, but subsequent survey by the office of the State Archaeologist proved to us that no such resources existed. After determining that some portion of the Shelby Penal Farm was National Register eligible, our office informed the Tennessee Department of Transportation of this change in our determination of eligibility relative to the Kirby Parkway project.

On August 3, 1994, this office sent correspondence to Mr. Fales following our review of his proposed National Register boundaries for the Penal Farm. We also communicated our findings to TDOT. Throughout our review of this case, the key issue relative to determining correct boundaries for the historic area was traditional versus more modern land use within the original and expanded boundaries of the Shelby Penal Farm. We were aware that since 1946, significant portions of the original penal farm had been converted to other uses, thus forfeiting their National Register integrity. We also were aware that inmate farming at the facility, which was the reason for its institution in the first place, had been discontinued for a number of years. Because of these issues, finalizing correct boundaries proved to be more time consuming than usual.

On March 28, 1995, staff from our office met with a number of persons representing Shelby County and TDOT in an effort to resolve our concerns. Non penal farm use such as parkland, gardens, a college campus, a firing range, maintenance shops, an impound lot, and numerous newer buildings had significantly intruded on the 1946 boundary. After protracted discussion, we determined that because of the loss of integrity of a significant portion of the Shelby Penal Farm, correct boundaries would be somewhat less than the 1946 plat which itself had been a significant increase over the original 1928 boundary. This revised boundary was concurred in by the Tennessee Department of Transportation representing the Federal Highways Administration at the consensus level. We also informed TDOT that the current alignment of the proposed Kirby Parkway would traverse a portion of the area within the eligible boundary and would therefore constitute an adverse effect under 36 CFR Part 800. We are currently awaiting TDOT's determination concerning avoidance, minimization, or mitigation of this effect. Pursuant to requests from Ms. Kulken, we communicated with her on August 26, 1996, discussing

our findings and we forwarded a map indicating the correct boundary of the Shelby Penal Farm to her on April 14, 1997.

Ms. Kulkin's assertion to Ms. Slater of July 19, 1997 that our determination of eligible boundaries for the Shelby Penal Farm was arbitrary and established for the convenience of TDOT is untrue. The boundary determination resulted from a thoughtful evaluation of the integrity of the site and on its face is inconvenient to TDOT because of the adverse effect determination with its obvious Section 4(f) implications. Her further charge that eligibility determinations relative to FHWA projects in Knoxville were also arbitrary is also false. As for her request that the Advisory Council initiate a formal determination of eligibility from the Keeper of the National Register, the Council certainly does have that option under 36 CFR Part 800.4(c)(4). We would, however, recommend that the Council not exercise its option in this case. We have concurred with the federal agency in an appropriate boundary for the Shelby Penal Farm. We have come to this consensus determination after a protracted consultation which has included Ms. Kulkin, Mr. Fales, and representatives of TDOT and Shelby County. We have made a determination which circumscribes that portion of the Shelby Penal Farm which has retained its integrity from the inception of the facility in 1926. We have determined that Kirby Parkway will take a portion of the historic property sufficient to warrant an adverse effect determination. We are now in consultation relative to avoidance, minimization, and mitigation.

Throughout the review of this case, our office has found that TDOT and FHWA have acted in compliance with Section 106 of the National Historic Preservation Act. Contrary to Ms. Kulkin's assertions, there has been no collusion between this office and TDOT to "rig" the Shelby Penal Farm boundary to preclude an adverse effect determination or obviate Section 4(f) review of this project by FHWA. As you are no doubt aware, while this office has no jurisdiction over Section 4(f) review, we do know that such review within the southeast region of the Federal Highways Administration is extremely stringent. We feel that such review will compel TDOT to ensure that the proposed route of Kirby Parkway is prudent and feasible, or if not, to alter the route appropriately.

Thank you for the opportunity to comment on this inquiry. Please direct questions and comments to Joe Garrison (615)532-1559. We appreciate your cooperation.

Sincerely,

Herbert L. Harper

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

HLH/jyg

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

May 27, 1998

Martha Carver
Historic Preservation Supervisor
Tennessee Department of Transportation
500 Deaderick Street
J.K. Polk Building - Suite 900
Nashville, Tennessee 37243

Dear Ms. Carver:

Thank you for the opportunity to comment on the draft determination of eligibility for the Shelby County Penal Farm. Several members of my staff have reviewed the documentation and/or visited the site. Although our offices agreed in 1994 that the property was eligible for listing, since the initial review of the property, some important changes have occurred on the site. Today, the consensus of the staff is that the Shelby County Penal Farm no longer retains sufficient integrity to be eligible for listing in the National Register.

Your report and site visits by members of my staff have documented that new buildings have been constructed and historic farm buildings have been demolished. Some of the former penal farm land is still used as farm land or still reflects its historic use in appearance. Yet there are other sections of the land that were historically associated with the penal farm which now have new buildings and, as a result of this, new use of the land. Part of the former penal farm is now used as a park and/or as grazing land for bison and Longhorn cattle. My office does not believe that the land used for grazing has lost its integrity. It is merely the animals that have changed, not the land itself. Stating this in the determination of eligibility may weaken the case you are trying to make. If the bison and Longhorn cattle were removed and other farm animals introduced, how would the land be assessed? The animals are a temporary use of the land, not a change in historic landscape.

Much more important to the eligibility of the Shelby County Penal Farm is the fact that a large part of the significance of the farm was based on the interrelationship between the prison buildings, farm buildings and the land. The loss of the farm buildings and introduction of new buildings on the site has diminished the integrity of setting and feeling. The changes in the remaining historic buildings has resulted in a loss of integrity of design, workmanship and materials.

None of the buildings in the Shelby County Penal Farm appear to meet the National Register criteria as good examples of a particular style of architecture. The Shelby

County Health Care Center (former Shelby County Hospital) does retain integrity of design, workmanship and materials. It is a good example of classical architecture and meets National Register criterion C. (Additional information could support the eligibility of the hospital as eligible under National Register criterion A.)

If you have any questions about my comments, please contact Claudette Stager.

Sincerely,

Herbert L. Harper

Herbert L. Harper
Deputy State Historic Preservation Officer

HLH/cs

pc: Joe Garrison

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

May 7, 1999

Ms. Martha Carver
Environmental Planning
TDOT, 9th. Floor Polk Bldg
Nashville, Tennessee 37219

RE: FHWA, EFFECT DOCUMENTATION, KIRBY PKWY./SYCAMORE VIEW EXT., WALNUT GROVE ROAD TO NORTH OF MACON ROAD, UNINCORPORATED, SHELBY COUNTY,

Dear Ms. Carver:

Pursuant to your request, our office has reviewed the above-referenced document in accordance with regulations codified at 36 CFR 800 (51 FR 31115, September 2, 1986. Based on the information provided, we find that the project area contains a cultural resource eligible for listing in the National Register of Historic Places: the Shelby County Health Care Center. We further find that the project as currently proposed will not affect this resource.

Unless project plans change, this office has no objection to the implementation of this project.. Should project plans change, please contact this office to determine what additional action, if any, is necessary. Questions and comments may be directed to Joe Garrison (615)742-6720. Your cooperation is appreciated.

Sincerely,

Herbert L. Harper
Executive Director and
Deputy State Historic
Preservation Officer

APPENDIX E

SECTION 4(f) DOCUMENTATION

FHWA SECTION 4(f) *de minimis* DETERMINATION

SECTION 4(f) REGULATIONS

In general, under Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. Section 303 and 23 CFR Part 774), the Federal Highway Administration (FHWA) "may not approve the use of land from a significant publicly owned park or recreation area; wildlife and waterfowl refuge; or significant historic site unless a determination is made that: (i) there is no feasible and prudent alternative to the use of land from the property; and (ii) the action includes all possible planning to minimize harm to the property resulting from such use." A "use" under Section 4(f) can be any of the following:

- a direct use - property is permanently incorporated into the transportation project;
- a temporary use - property is temporarily occupied in a way that is adverse to the property's purpose; or
- a constructive use - occurs when "the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished." (23 CFR Section 774.15(a))

Section 6009(a) of SAFTETEA-LU, Public Law 109-59, amended existing Section 4(f) legislation, at 23 United States Code (USC) 138 and 49 USC 303, in order to simplify the processing and approval of projects that have only *de minimis* impacts on lands protected by Section 4(f). This revision of Section 4(f) legislation provides that once FHWA determines that a transportation use of Section 4(f) property, after consideration of any impact avoidance, minimization, and mitigation or enhancement measures, results in a *de minimis* impact on that property, an analysis of avoidance alternatives is not required, and the Section 4(f) evaluation process is complete. In other words, although some impacts may be unavoidable (and would be minimized or mitigated), avoidance alternatives would not need to be developed if a *de minimis* impact determination is made.

In order to implement this legislation, FHWA issued guidance for making findings of *de minimis* impact and also amended its Section 4(f) regulations to provide for these findings (23 CFR 774.3(b), 774.5(b), 774.17)(*Guidance for Determining De Minimis Impacts for Section 4(f) Resources*, FHWA Web site, www.fhwa.dot.gov/hep/qasdeminimis.htm). An impact to a park, recreation area, or wildlife refuge may be determined *de minimis* if:

1. The transportation use of the Section 4(f) resource, together with any impact avoidance, minimization, and mitigation or enhancement measures incorporated into the project, does not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f);

2. The official(s) with jurisdiction over the property are informed of FHWA's intent to make the *de minimis* impact finding based on their written concurrence that the project will not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f); and

3. The public has been afforded an opportunity to review and comment on the effects of the project on the protected activities, features, and attributes of the Section 4(f) resource (FHWA Web site, www.fhwa.dot.gov/hep/qasdeminimis/htm).

Once the FHWA determines that a transportation use of Section 4(f) property results in a *de minimis* impact, analysis of avoidance alternatives is not required, and the Section 4(f) evaluation process is complete (FHWA Web site, www.fhwa.dot.gov/hep/guidedeminimis.htm).

Section A of this Section 4(f) *De Minimis* Impact Analysis provides a brief description of existing Shelby Farms Park. Section B provides a brief history of the land comprising Shelby Farms Park, and Section C provides background information on the project, including the history of a proposed roadway through the area and an overview of Section 4(f) property in the project area. Section D describes the specific path of the proposed project in relation to the various facilities within Shelby Farms Park and impacts upon the Section 4(f) property. Section E describes mitigation measures developed to minimize harm to the contributing elements and activities of Shelby Farms Park. Section F introduces the process proposed for review and comment of this *de minimis* impact analysis. Section G contains TDOT's *de minimis* determination checklist.

A. SHELBY FARMS PARK AT PRESENT

Located 12 miles east of Memphis, Tennessee, Shelby Farms Park consists of 4,500 acres, which is five times the size of New York City's Central Park, of scenic fields, meadows, woodlands, lakes, pathways, and trails. However, not all of the land within the boundaries of the park is devoted to recreational uses. Within the park there are large land areas devoted to non-recreational purposes: a complex of government offices, occupying a plot of 511 acres designated as Area 10; a closed landfill, occupying 178 acres; and Agri-Center International, occupying 1,000 acres. See Figure 1 and Figure 2.7 on page 22 of the FSEIS. There are also a number of roads passing through the park, including Walnut Grove Road, which bisects the proposed road from east to west. See Figure 1 and Figure 2.7 on page 22 of the FSEIS. Finally, there is a 1,000-foot corridor for the Shelby Farms Parkway that was reserved as early as 1983. See Figure 1 and Figure 2.7 on page 22 of the FSEIS. The Shelby Farms Park Master Plan, which is located in Appendix E, refers to the park as being divided into six regions:

- Tier 1, Shelby Farms Park, which encompasses the northeaster section of the property and includes most of the features and attributes that qualify the property for protection under Section 4(f);
- Tier 2, Agricenter Campus Area, which is located within the southeastern section of the property;
- Tier 3, Agricenter Crop and Recreation Area, which is located within the southeastern section of the property and features fields devoted to agricultural use;
- Tier 4, Agricenter Showplace Arena Area, which is located at the eastern end of the property;
- Area 10, which is located within the northwestern section of the property and houses various county government buildings; and
- Lucius E. Burch State Natural Area, which is separated into two sections along Wolf River, one along the western boundary of the property and the second along the south boundary of the property. See Figure 2 (taken from the Shelby Farms Master Plan). See also Exhibit B attached to the Grant of Conservation Easement.

Beyond the bounds of the 1,000 acres devoted to and managed by Agricenter International, additional agricultural fields are located in Tier 1. A buffalo grazing range is also located in Tier

1. See Figure 3. There are also a number of roads passing through the park, including Walnut Grove Road, which essentially bisects Shelby Farms from east to west, and Farm Road, which runs from Walnut Grove Road to Mullins Station Road from south to north. See Figure 4.

The land Shelby Farms Park occupies is owned by Shelby County but managed in part by the Shelby Farms Park Conservancy, a 501(c)3, non-profit organization pursuant to a July 2007 agreement signed with the Shelby County government. Shelby County manages Area 10, which contains a number of government buildings, including the Shelby County jail and a proposed new 911 call center. Agri-Center International manages its own land, and Shelby Farms Park Conservancy manages the day-to-day administration of all Shelby Farms parkland outside Area 10 and Agri-Center International property. The land comprising Shelby Farms Park is zoned for agricultural, heavy industrial, and residential use. See Figure 6 (Zoning map and key). Although land within Shelby Farms Park is devoted to Recreation Vehicle (RV) use, there are not residences within the park. Much of the park is actually used for agricultural purposes. See Figure 5.

Since the 1990s, local government officials have referred to Shelby Farms as a mixed-use facility containing discrete parcels of land devoted to recreational use. (See attached letter dated July 30, 2007 from Shelby County Government located after Exhibit B attached to the Grant of Conservation Easement.) 23 CFR 774.11(d) provides that where public land holdings are administered under statutes permitting management for multiple uses and are in fact managed for multiple uses, Section 4(f) applies only to those portions of such lands which function for, or are designated in the plans of the administering agency as being for, significant park, recreation, or wildlife and waterfowl refuge purposes. However, according to the conservation easement, the entire park, with the exception of those lands specifically exempted from the conservation easement, has been set aside as recreation or parkland. These park and or recreation lands are presumed to be significant. See 23 CFR 774.11(c).

The 2006 conservation easement and the associated Shelby Farms Park Master Plan arguably have altered the nature of the property. Shelby Farms Park Master Plan repeatedly refers to the property as a whole as an urban park; in fact, it refers to it as the largest urban park in the United States. This development casts a shadow over the reasonableness of characterizing Shelby Farms Park as a mixed-use property containing some areas devoted to recreational use. It is also true that significant tracts of land within Shelby Farms Park are devoted to non-recreational uses, to which Section 4(f) does not apply. However, even if Shelby Farms Park is considered a Section 4(f) property as a whole, a *de minimis* finding is appropriate for the following reasons:

- The proposed pathway of the road does not directly or constructively use any of the features and attributes that would qualify Shelby Farms Park for protection under Section 4(f). Instead, the proposed pathway passes almost exclusively through actively farmed and fallow agricultural fields and Area 10, which houses various county government buildings;
- The alignment of Kirby Parkway has been shifted outside its contemplated corridor for the express purpose of minimizing any impacts to any features and attributes that qualify the resource for protection under Section 4(f);
- The number of acres used for Kirby Parkway in relation to the overall acreage of the park is minimal; and
- Development of Kirby Parkway is anticipated to enhance access to the park.

As a result, no Section 4(f) analysis is required for this project, because even assuming the exemptions for joint planning and multiple uses do not apply, any use of Section 4(f) land is *de minimis* in light of the proposed mitigating measures associated with the proposed implementation of Kirby Parkway.

B. SHELBY FARMS HISTORY

In December 2006, Shelby County government and the Shelby County Agri-Center Commission (Agri-Center) signed a deed granting a conservation easement over the majority of the land comprising Shelby Farms to The Land Trust of Tennessee. Expressly exempted from the conservation easement were the plots of land devoted to the agribusiness in the southeast segment of the park; the plot of land designated Area 10 devoted to county government buildings, including a 911 call center; and a 1,000-foot corridor for the Shelby Farms Parkway. Shelby Farms has not always been a park. Over the past eighty years, it has evolved from a model penal farm into the mixed-land use Park. In 1928, Shelby County acquired 1,600 acres of land for use as a model penal farm. (Previously this land had been in use since the mid-nineteenth century as the location of the Nashoba Experiment, a commune created by humanist reformer Frances Wright with the intention of preparing slaves for future freedom.) In years that followed, the farm was expanded to approximately 5,000 acres. Deeds on record show that the property transferred to the County had been used as agricultural land. See Figure 6. During the 1960s Shelby County closed the penal farm. For a period of time the land, still owned by Shelby County but no longer actively farmed, went through a period of transition in which Shelby County contemplated an appropriate use for the land.

Beginning in the early 1970s, the county considered options for protecting the land from housing and industrial development as a means of preserving this large expanse of land as a resource for the people of the greater Memphis area. This rumination and intention to preserve the land is perhaps best captured in the Eckbo plan introduced to the Shelby Farms Planning Board in 1975. The plan presented a report recommending best alternative future land uses for Shelby Farms over short, intermediate, and long-range time periods. While a large pastoral park figured prominently into the Eckbo report and plan for Shelby Farms, the report contemplated from the beginning several roads passing through Shelby Farms, including a north-south road designated “Kirby Road,” in the vicinity of the presently proposed Kirby Parkway. See Figure 7.

C. NORTH-SOUTH CORRIDOR FOR SHELBY FARMS PARK

Several roads have passed through the area as long as it has been known as Shelby Farms. Among these is Farm Road, which runs essentially from north to south in the northeast quadrant of Shelby Farms near where the proposed Kirby Parkway would be situated. Figure 1 shows the proposed roadway in relation to Shelby Farms and its features. Maps dating from as early as 1975 (Figure 7) and 1983 (Figure 5) clearly show plans for a north-south road approximately where Kirby Parkway would lie. These maps which date from a time period prior to any official designation of Shelby Farms as a park or recreation area strongly suggest the joint-planning exception to Section 4(f) applies to the proposed Kirby Parkway. See 23 CFR 774.11(i)(1).

“When a property is formally reserved for a future transportation facility before or at the same time a park, recreation area, or wildlife and waterfowl refuge is established and concurrent or joint planning or development of the transportation facility and the Section 4(f) resource occurs, then any resulting impacts of the transportation facility will not be considered a use” of Section 4(f) land (23 CFR §774.11(i)). One such example of concurrent planning occurs when the entity with jurisdiction over the property designates or donates the property for development of both a

potential transportation facility and a Section 4(f) property. Here, the maps from 1975 and 1983, demonstrate Shelby County, which owned and exercised jurisdiction over Shelby Farms contemplated joint development of a north-south roadway and recreational features for the property long before the conservation easement was established in July 2007. Furthermore, the conservation easement establishing present-day Shelby Farms Park contained an express exception for the right-of-way to be used for construction of Shelby Farms Parkway and widening of Walnut Grove Road. See Conservation Easement p. 2 and Exhibit A-1 in Appendix E of SFEIS. Neither the text of the easement nor the attachment specifically identify the location of the right-of-way, either with a plat map or with a metes and bounds description. As a result, Section 4(f) does not apply to this project under the exception for joint planning; however, the intent to include a north-south roadway in the general location of the proposed Kirby Parkway is clear.

In the wake of litigation challenging this project in 2000, state and local government officials met with members of the Plaintiff organization Friends of Shelby Farms Park. As a result, the Shelby Farms Parkway Advisory Team was later formed. This group, consisting of 17 individuals representing Shelby County Government, Friends of Shelby Farms Park, the Sierra Club, local residents and commuters, and various other interested parties, met on six occasions from March 2005 to August 2008 to define and resolve critical project issues as part of TDOT's Context Sensitive Solutions (CSS) process. These meetings are discussed in detail on pages 73 through 78 of the SFEIS. The group ultimately devised a series of recommendations that influenced the selection of Alternative Q as the preferred pathway for the project. The group's recommendations are included in their entirety at Appendix A of the SFEIS.

Alternative Q features a pathway for Kirby Parkway that lies approximately 2,750 feet west of the corridor envisioned in 1983. See Figure 1. The relocation moves the project pathway closer to the government buildings located in Area 10 and away from the activities, features, and attributes that qualify the resource for protection under Section 4(f). These include Plough Park, Patriot Lake, the Arboretum, and the visitor's center. See Figure 1. In addition, Alternative Q uses 58% fewer acres than were designated for right-of-way in 1983. The original 1,000-foot corridor consisted of 282.63 acres. The total right-of-way for the project as currently contemplated consists of 116.99 acres – a reduction of 165.64 acres. In light of the conservation easement's very general and unrestrictive language describing the right-of-way for Kirby Parkway, the pathway for Alternative Q, Section 4(f) would not apply under the exception for joint planning, even though it lies largely outside the 1983 corridor. However, even if the joint planning exception did not apply, Section 4(f) still does not apply to the project, because any impacts to the features and attributes that qualify Shelby Farms Park for protection under Section 4(f) are *de minimis*.

D. DESCRIPTION OF SECTION 4(f) PROPERTIES AND IMPACTS TO SHELBY FARMS PARK

The proposed route for Kirby Parkway traverses the northeast portion of Shelby Farms Park to the east of Shelby County government buildings in Area 10 and to the west of areas of the park devoted specifically to recreational activities, including the park's visitor's center, Chickasaw Trail, Plough Park, and Patriot Lake. See Figure 1. The project begins by heading east from Wolf River. A trumpet interchange is planned west of existing Farm Road; an eastern segment of the interchange proceeds east through Fields 12 and 17. Heading north from Field 12, the proposed road passes through forested land, which is not within the bounds of Lucius E. Burch State Natural Area, and into Field 10 and other agricultural lands not used for crop production. From there, the road passes through Field 8; agricultural land not used for crop production; and

into Fields 19 and 20, which are used for grazing by buffalo. The proposed road exits Shelby Farms Park as it crosses Mullins Station Road. See Figure 1.

The trumpet interchange where Kirby Parkway would connect to Walnut Grove Road is close to both a BMX track and the Lucius E. Burch SNA, which are within Shelby Farms Park; the project would not directly use the track or the SNA. See Figure 8. These recreational areas will experience some noise-related impacts from the proposed project, but the impact does not rise to the level of constructive use.

Constructive use of a Section 4(f) resources occurs when a transportation project does not permanently incorporate land from the resource, but the proximity of the project results in impacts (i.e., noise, vibration, visual, access, ecological) so severe that the protected activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired (23 CFR §774.15(a)). Substantial impairment occurs only if the protected activities, features, or attributes of the resource are substantially diminished. The determination is made through the following practices:

- Identification of the current activities, features, or attributes of the resource which may be sensitive to proximity impacts;
- Analysis of the potential proximity impacts on the resource; and
- Consultation with the appropriate officials having jurisdiction over the resource.

The BMX track is not considered a noise-sensitive resource given the nature of the activity, which includes cheering by spectators and commentary and announcements via loudspeakers. While the Lucius E. Burch SNA could be a noise-sensitive resource, no substantial impairment would occur given the distance from the proposed project. The SNA is approximately 300 feet from the proposed changes to Walnut Grove Road and approximately 1,200 feet from the proposed path of the north-south section of the project. This area of the SNA and its periphery are highly vegetated, which could reduce noise impacts. For example, as a person moves away from a highway, traffic noise levels are reduced by distance, terrain, vegetation, meteorological conditions, and natural and man-made obstacles. Traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads. Vegetation, if it is tall enough, wide enough, and dense enough that it cannot be seen through, can decrease highway traffic noise. One 200-foot-deep swath of dense vegetation can reduce noise by 10 decibels, which cuts the loudness of traffic noise in half. Since the SNA has at least a 200-foot-deep buffer of vegetation between its boundary and the proposed improvements to Walnut Grove Road, constructive use of the SNA is unlikely.

Other activities, features, and attributes that qualify the property for protection under Section 4(f) include Plough Park, Patriot Lake, the Arboretum, and the Visitor's Center. See Figure 1. All of these features lie far to the east of the proposed pathway and are consequently not used directly or constructively. A soccer field is located south of Walnut Grove Road and is also not used directly or constructively.

E. MINIMIZATION AND MITIGATION MEASURES

Measures to minimize impacts to any Section 4(f) resources were considered throughout project development, even though it has appeared no direct use of Section 4(f) resources would be required. The foremost example is the relocation of the 1,000-foot corridor for the build alternative. The currently proposed site is located approximately 2,700 feet west of a previously planned corridor for this project. See Figure 1. This shift in alignment moves the path closer to the county government buildings in Area 10 and farther away from designated recreational

areas to the east, including Chickasaw Lake, Mayor Lake, the visitor's center, Plough Park, the Arboretum, a kite flying area, and the soccer fields. In fact, the shift in design puts approximately 1,000 feet of agricultural fields and grazing land between the project and many of these designated recreational areas in the northeastern portion of Shelby Farms Park.

Furthermore, the current design of the proposed Kirby Parkway adopts numerous recommendations from the Shelby Farms Parkway Advisory Team, which effectively constitute measures to minimize any impacts the project would have on the features in Shelby Farms Park that qualify for protection under Section 4(f). These recommendations are described in detail in Appendix A. A few of the more prominent minimizing design features include:

- 4 lanes (previous project plans had contemplated 6 lanes);
- 40 mph design speed (previous project plans had contemplate a design speed of 60 mph);
- A curvilinear alignment (previous corridors had contemplated a straighter north-south pathway) See Figure 1;
- A trumpet interchange configuration where the project joins with Walnut Grove Road, which allows for free-flowing traffic for all movements through the interchange.

In addition, consistent with recommendations from the Shelby Farms Parkway Advisory Team and the Shelby Farms Master Plan, the current design plan for the build alternative is intended to be complemented by bicycle, pedestrian, and equine trails that will provide safe, easy, and convenient connectivity within the park. In fact, the project study area was amended to incorporate these facilities within its boundaries. On August 25, 2010, Tennessee Governor Phil Bredesen and TDOT Commissioner Gerald Nicely announced that Shelby County received $1,640,675 in federal Transportation Enhancement (TE) funds for the Shelby Farms Bicycle, Pedestrian, and Equine Trails. Proposed trail segments "A", "B", "C", and "H" will be constructed as a part of the Kirby Parkway project through Shelby Farms. Segments "D", "F", "G", and "I" will be constructed when funding for the proposed Shelby Farms Bicycle, Pedestrian and Equine Trails Transportation Enhancement project is fulfilled. Additional trail segments "X" and "Y" will be constructed in conjunction with the expansion of Patriot Lake. Segments "J" and "K" have no funding in place at this time. See Appendix A for the Transportation Enhancement application and Shelby Farms Park Master Plan.

Finally, the current pathway for Alternative Q acquires less land than contemplated in earlier plans. The original 1,000-foot corridor consisted of 282.63 acres. The total right-of-way for the project as currently contemplated consists of 116.99 acres – a reduction of 165.64 acres. As a result, the project would use approximately 58% less acreage than originally provided. Of the 116.99 acres to be used, 101.1 acres fall outside the original 1,000-foot corridor, and 15.89 acres are within the original corridor; however, much of the new alignment passes through or along Area 10, which is occupied by county government buildings not devoted to recreational activities. See Figure 9. The net result is fewer acres to Kirby Parkway than were planned prior to establishment of the conservation easement for Shelby Farms Park.

F. REVIEW AND COMMENT PERIOD

The public will review and comment on this Section 4(f) *de minimis* determination in conjunction with the review and comment period for the Supplemental Final Environmental Impact Statement (SFEIS). Comments will be solicited by advertising in local newspapers and by distributing the SFEIS to all parties on the project mailing list. A 30-day comment period will

follow. Any comments received will be addressed in the Record of Decision (ROD), and, at that time, a *de minimis* determination will be made.

G. TDOT de minimis DETERMINATION CHECKLIST

Tennessee Department of Transportation
On Behalf of the Federal Highway Administration – Tennessee Division Office

Determination of
Section 4(f) De Minimis Use

PARK ☒
RECREATION AREA ☐
WILDLIFE AND/OR ☐
WATERFOWL REFUGE

County: Shelby City: Memphis Route: Shelby Farms Parkway

Termini: Walnut Grove Road to Macon Road

Project Numbers: Federal #: _____ State #: 79LPLM-FO-052

Pin Number: 109182

Document Type: EIS: ☒ EA: ☐ CE: ☐

IDENTIFICATION OF SECTION 4(F) RESOURCE(S):

Maps/Graphics: Attached: ☒ Not Attached: ☐

Description of resource:

Located 12 miles east of Memphis, Tennessee, Shelby Farms Park is 4,500 acres of scenic fields, meadow, woodlands, lakes, pathways, and trails. Shelby Farms Park is an urban park approximately five times the size of New York City's Central Park; however, not all of the land within the boundaries of the park is devoted to recreational purposes. Within the park, there are large areas devoted to non-recreational uses: a complex of government offices that occupies a plot of 511 acres, designated as Area 10; a closed landfill that occupies 178 acres; and Agri-Center International, which occupies 1,000 acres. A number of roads pass though the park, including Walnut Grove Road, which crosses the proposed road from east to west. Finally, there is a 1,000-foot corridor reserved for Shelby Farms Parkway. Shelby County Government owns the land occupied by Shelby Farms Park. Pursuant to a July 2007 agreement the park is managed by Shelby Farms Park Conservancy, a 501(c)3, non-profit organization.

BRIEF DESCRIPTION OF PROJECT SCOPE:

Shelby County Government, in conjunction with the Federal Highway Administration, and the Tennessee Department of Transportation, is proposing to construct 2.5 miles of Kirby Parkway from Walnut Grove Road through Shelby Farms Park to the intersection of Whitten Road and Macon Road in Memphis, Tennessee. The road is proposed to be a four-lane, median-divided, access-controlled highway.

Tennessee Department of Transportation
On Behalf of the Federal Highway Administration – Tennessee Division Office

Determination of
Section 4(f) De Minimis Use

County: Shelby City: Memphis Route: Shelby Farms Parkway Termini: Walnut Grove Road to Macon Road

Document Type: EIS: ☒ EA: ☐ CE: ☐

APPLICABILITY DETERMINATION:
(to be applicable answers to all statements must be "true")

For publicly owned parks, recreation areas, and wildlife and/or waterfowl refuges:

1. The project involves a minor take of land from the resource. ☒ True ☐ False
   Identify the total acreage of the resource: 4,500 acres

   Describe the use of land from the resource (include the acreage of the resource to be used):

The project is expected to convert approximately 119 acres of Shelby Farms Park to transportation right of way. The current land uses/land covers of the land to be occupied by the project are forest, agriculture, and transportation. Agri-Center International leases a portion of the project area. No recreational resources will be directly affected by the proposed project, and any impacts to recreational resources are expected to be beneficial by improving accessibility.

2. The project does not adversely affect the qualities, activities, features, or attributes of the resource that qualify it for protection under Section 4(f). ☒ True ☐ False
3. The agency with jurisdiction over the resource has concurred in writing ☒ True ☐ False with FHWA's and/or TDOT's determination that the project will not adversely affect the resource.

   If true, identify agency with jurisdiction and date of concurrence and attach written concurrence: Shelby County Government Date: Sept. 13, 2010
4. The agency with jurisdiction over the resource has been informed of ☒ True ☐ False
   FHWA's and/or TDOT's intent to make a de minimis finding.

   If true, attach correspondence.
5. The public will be informed or afforded an opportunity to review ☒ True ☐ False
   and comment on the effects of the project on the protected activities, features, and attributes of the resource.

   a. Describe how the public will be notified.

This de minimis use determination will be made available in the FEIS. The public will be afforded the opportunity to comment on this finding during the FEIS comment period.

Tennessee Department of Transportation
On Behalf of the Federal Highway Administration – Tennessee Division Office

Determination of
Section 4(f) De Minimis Use

County: Shelby **City:** Memphis **Route: Shelby Farms Parkway Termini:** Walnut Grove Road to Macon Road

Document Type: EIS: ☒ **EA:** ☐ **CE:** ☐

ALTERNATIVES ANALYSIS

1. Summarize why the use of property from the resource cannot be avoided.

☒ **Project Needs would not be met. Explain.**

Kirby Parkway is a 10-mile-long north-to-south corridor in eastern Shelby County. Portions of the corridor have been constructed; in the immediate project area, Kirby Parkway has been constructed from I-240 to east of Wolf River and north of Macon Road. Not only would the proposed project serve as a link between two sections of existing Kirby Parkway, but it would also improve mobility, reduce congestion, lessen travel time, improve efficiency and safety, and provide for growth in east Memphis. If Kirby Parkway through Shelby Farms were not constructed, none of these project needs would be met.

☐ **Substantial impacts to other environmental/cultural/social resources would result. Explain.**

☐ **Project complexity would increase resulting in greater construction and maintenance cost.**

Explain.

☐ **Other. Explain.**

2. Summarize the measures taken to minimize harm. This would include, if applicable, design shifts to minimize impacts, use of retaining walls, and other mitigation measures.

The original FEIS, approved in 1991, showed a 1,000-foot corridor reserved for Kirby Parkway through Shelby Farms Park. The 1,000-foot corridor originally abutted the Arboretum. In the FEIS Reevaluation, which was written in 2001, additional alternatives were evaluated to increase the distance of the proposed road from contributing, recreational elements of the Park, such as Patriot Lake, the Visitors Center, Plough Park, and Chickasaw Lake. In the Reevaluation, the typical cross section was revised from six lanes with a raised median to four lanes with a fixed-width, landscaped median. The proposed total right-of-way width through Shelby Farms Park was approximately 150 feet. Since that time, an Advisory Team formed, which consisted of public, local officials, and state and federal agencies, and following the Context Sensitive Solutions process, multiple alternatives were considered. Although the proposed total right-of-way width through Shelby Farms Park was increased from 150 to 200 feet, the preferred alternative, Alternative Q, uses an independent roadway concept, wherein the grade and alignment of the Parkway would vary to blend the roadway into the natural topography, and it is approximately 2,750 feet west of the original 1,000-foot corridor, meeting the goals of the Advisory Team.

Tennessee Department of Transportation
On Behalf of the Federal Highway Administration – Tennessee Division Office

Determination of
Section 4(f) De Minimis Use

County: Shelby City: Memphis Route: Shelby Farms Parkway Termini: Walnut Grove Road to Macon Road

Document Type: EIS: ☒ EA: ☐ CE: ☐

SUMMARY AND DETERMINATION

The project involves a de minimis impact on the Section 4(f) property as evidenced through the minimization of harm to a park, recreation area, or wildlife or waterfowl refuge, and as a result of mitigation to or avoidance of impacts to the qualifying characteristics and/or the functions of the resource.

Based on the scope of the undertaking; the fact that the undertaking does not adversely affect the functions/qualities of the Section 4(f) resource on a permanent or temporary basis; and with agreement from the official with jurisdiction, the proposed action constitutes a De Minimis finding.

Environmental Director: _____ Date: _____

FHWA: _____ Date: _____

Figure 1

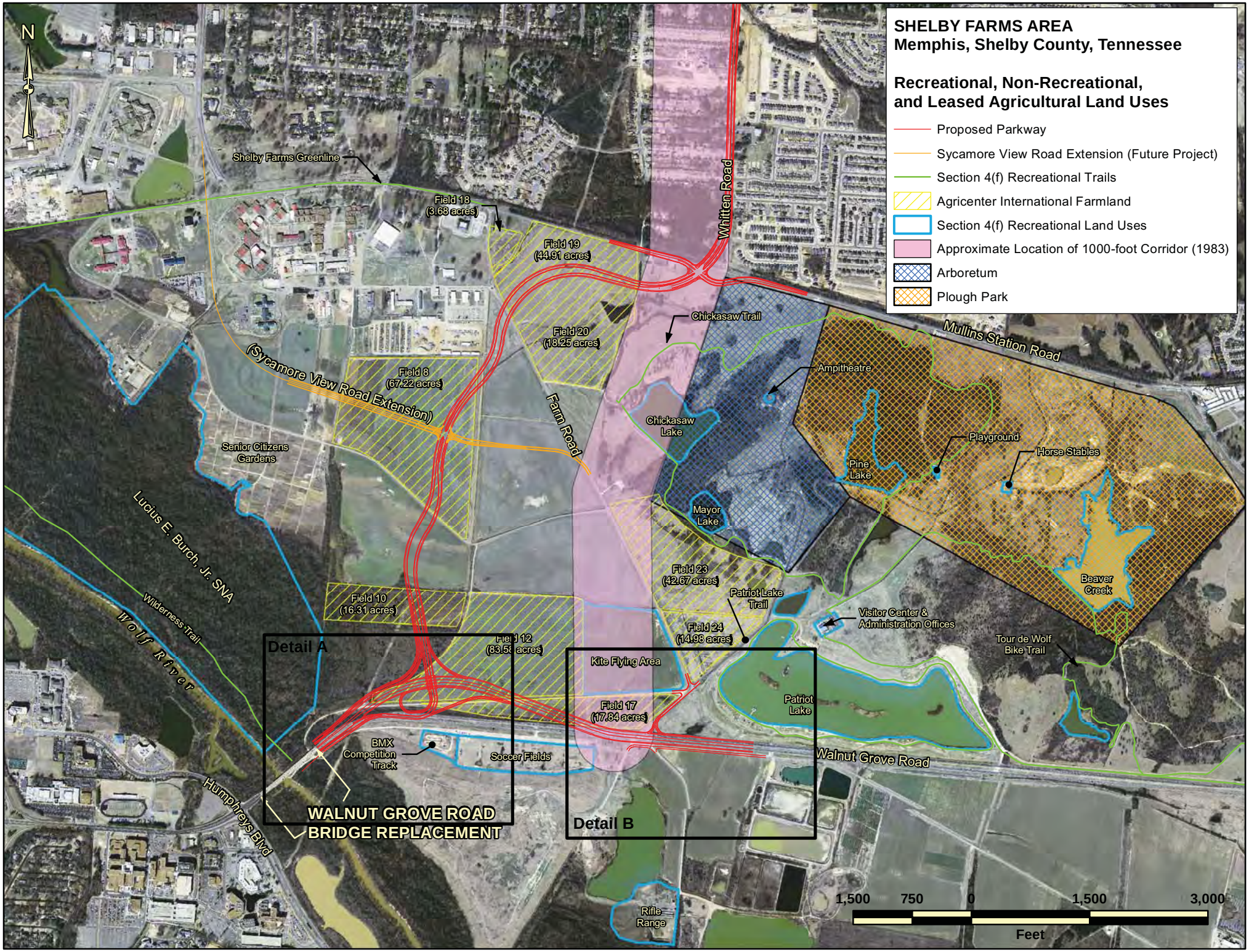

SHELBY FARMS AREA
Memphis, Shelby County, Tennessee
Recreational, Non-Recreational, and Leased Agricultural Land Uses
Proposed Parkway
Sycamore View Road Extension (Future Project)
Section 4(f) Recreational Trails
Agricenter International Farmland
Section 4(f) Recreational Land Uses
Approximate Location of 1000-foot Corridor (1983)
Arboretum
Plough Park
N
Shelby Farms Greenline
Field 18 (3.68 acres)
Field 19 (44.91 acres)
Field 20 (18.25 acres)
Field 8 (67.22 acres)
Field 10 (16.31 acres)
Field 12 (83.58 acres)
Field 23 (42.67 acres)
Field 24 (14.98 acres)
Field 17 (17.84 acres)
Whitten Road
Chickasaw Trail
Mullins Station Road
Ampitheatre
(Sycamore View Road Extension)
Farm Road
Chickasaw Lake
Playground
Horse Stables
Pine Lake
Senior Citizens Gardens
Mayor Lake
Lucius E. Burch, Jr. SNA
Wilderness Trail
Wolf River
Beaver Creek
Patriot Lake Trail
Visitor Center & Administration Offices
Tour de Wolf Bike Trail
Kite Flying Area
Patriot Lake
Detail A
Detail B
BMX Competition Track
Soccer Fields
Walnut Grove Road
Humphreys Blvd
WALNUT GROVE ROAD BRIDGE REPLACEMENT
Rifle Range
1,500 750 0 1,500 3,000
Feet

Figure 2

CONSERVATION EASEMENT

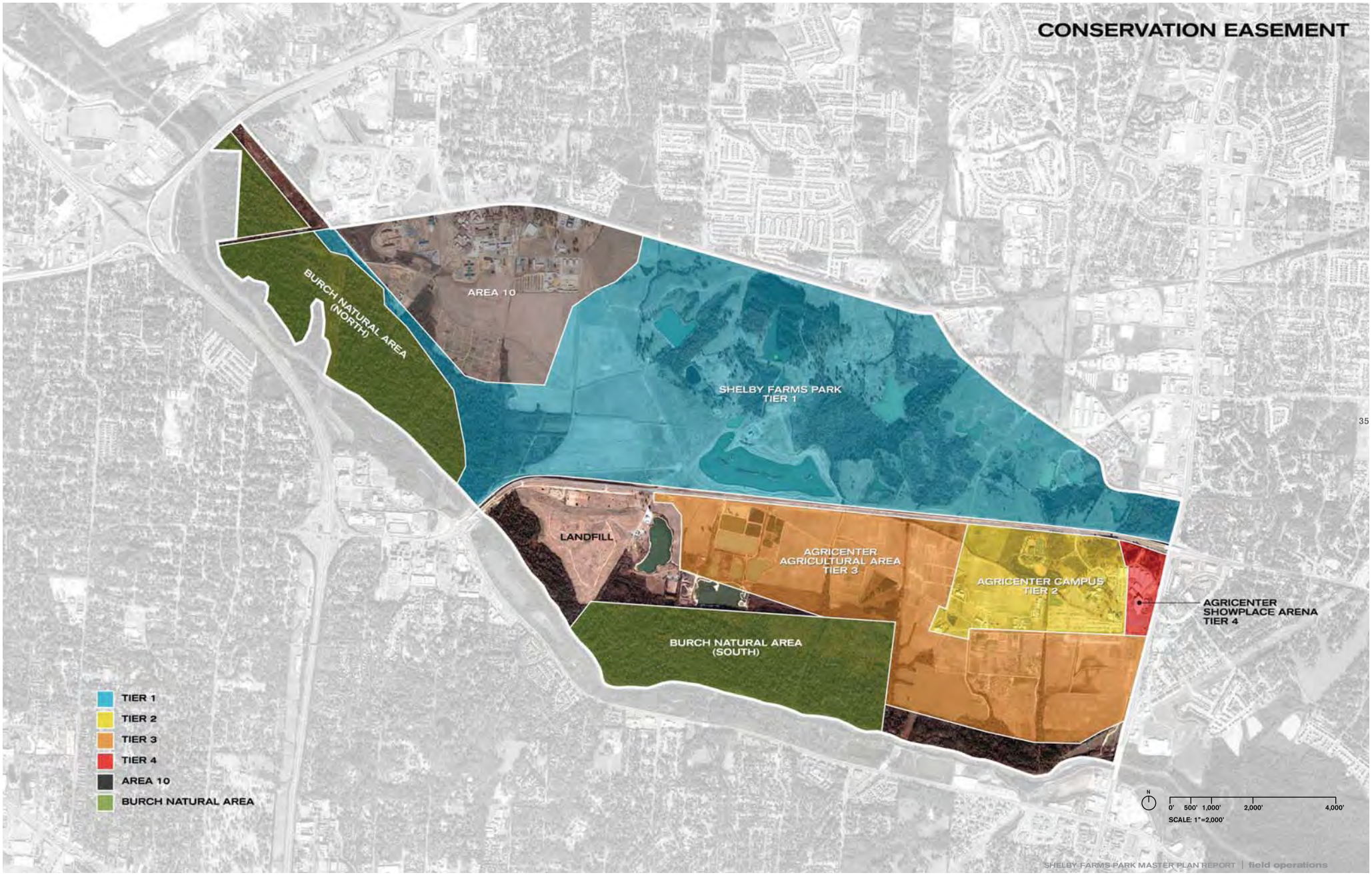


Figure 3

12 LANDSCAPE ROOMS

1 PATRIOT LAKE
2 PLOUGH PARK
3 THE RANGE + ARBORETUM
4 THE PUBLIC GARDENS *
5 COMMUNITY CENTER + SPORTS FIELDS *
6 THE OUTBACK
7 THE ART MOUND + PARK CIRCLE
8 CATCH 'EM LAKES
9 THE REFUGE
10 THE ORCHARDS + BERRY FIELDS
11 CROP + RESEARCH FIELDS
12 THE AGRICENTER

* pending area 10 approval

LANDSCAPE ROOMS
MAJOR WATER BODIES

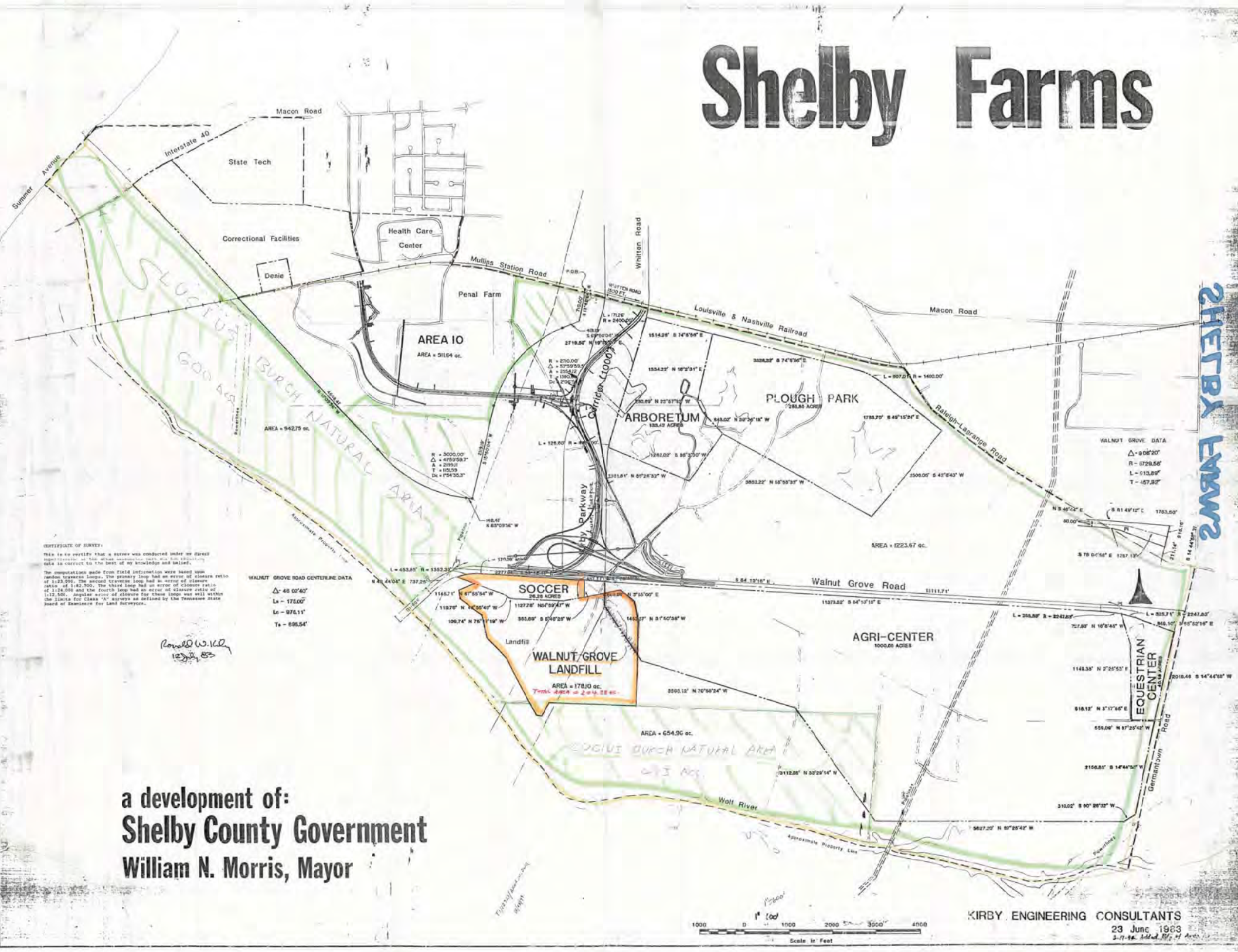
N
0' 500' 1,000' 2,000' 4,000'
SCALE: 1"=2,000'

Figure 4

IDENTITY + ACCESS

Figure 5

Shelby Farms

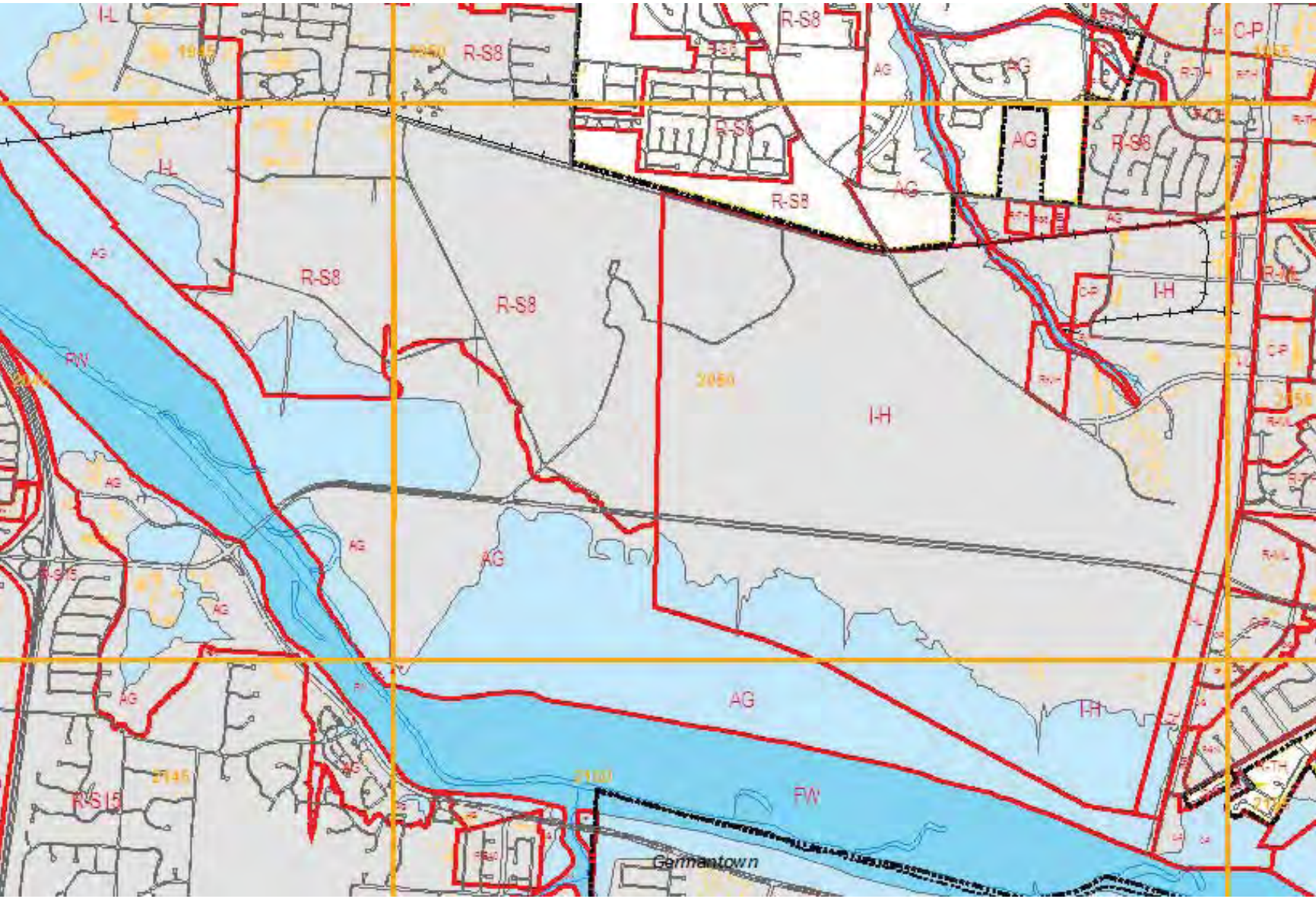


a development of:

Shelby County Government

William N. Morris, Mayor

Figure 6


I-L
R-S8
R-S8
R-S8
C-P
AG
AG
R-S8
R-S8
AG
R-S8
I-L
AG
R-S8
R-S8
I-H
C-P
FW
2050
I-H
AG
AG
AG
AG
AG
AG
I-H
R-S15
FW
Germantown

AG	Agricultural
Residential Districts	
R-S15	Residential Estate
R-S10	Single Family Residential
R-S8	Single Family Residential
R-S6	Single Family Residential
R-D	Duplex Residential
R-TH	Townhouse Residential
R-ML	Multiple Dwelling Residential
R-MM	Multiple Dwelling Residential
R-MH	Multiple Residential Dwelling
R-MO	Mobile Home
Office Districts	
O-L	Limited Office
O-G	General Office
Industrial Districts	
I-L	Light Industry
I-H	Heavy Industry
Commercial Districts	
C-P	Planned Commercial
C-L	Local Commercial
C-H	Highway Commercial
CBD	Central Business
CN	Neighborhood Commercial
Special Purpose Districts	
H	Hospital
CU	College and University
P	Parking
SMSD	South Main Special District
Historic Districts	
HP	Historic Preservation
HC	Historic Conservation
Flood Plain Districts	
FW	FEMA Floodway
FP	FEMA 100 Year Floodway

Figure 7

VEHICULAR

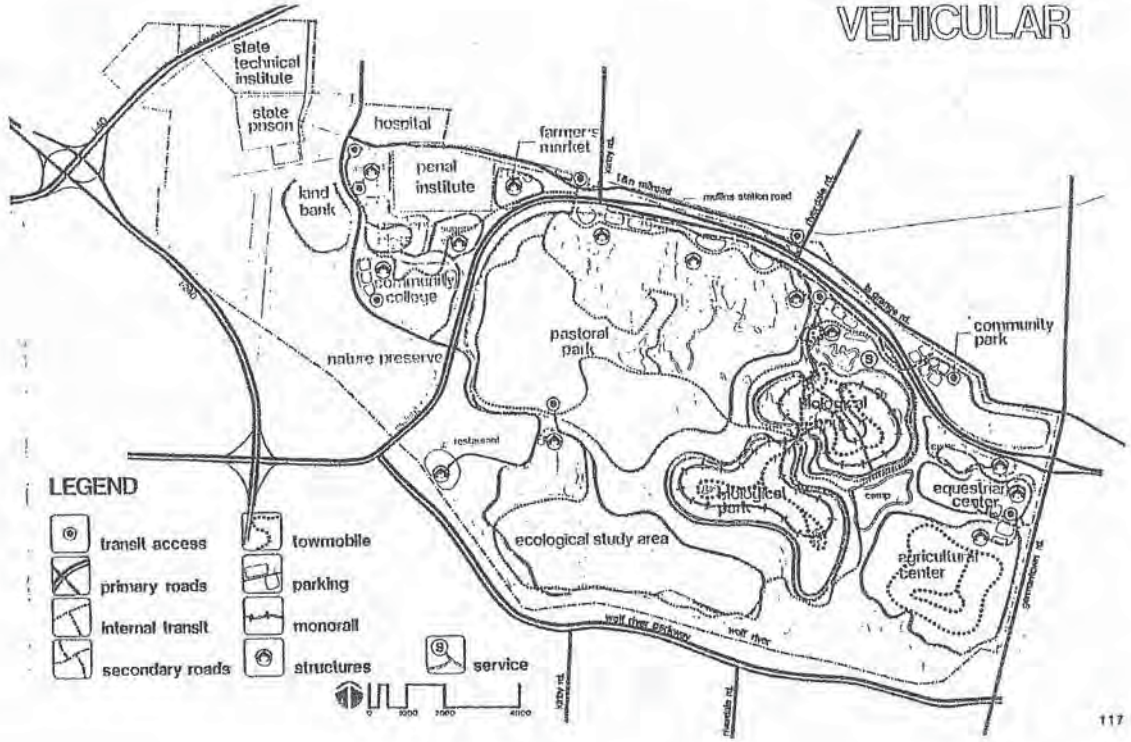

state technical institute
state prison
hospital
farmer's market
penal institute
kind bank
community college
nature preserve
pastoral park
community park
biological park
historical park
equestrian center
agricultural center
ecological study area
restaurant
camp
wolf river parkway
wolf river
LEGEND
transit access
primary roads
internal transit
secondary roads
towmobile
parking
monorail
structures
service

Figure 8

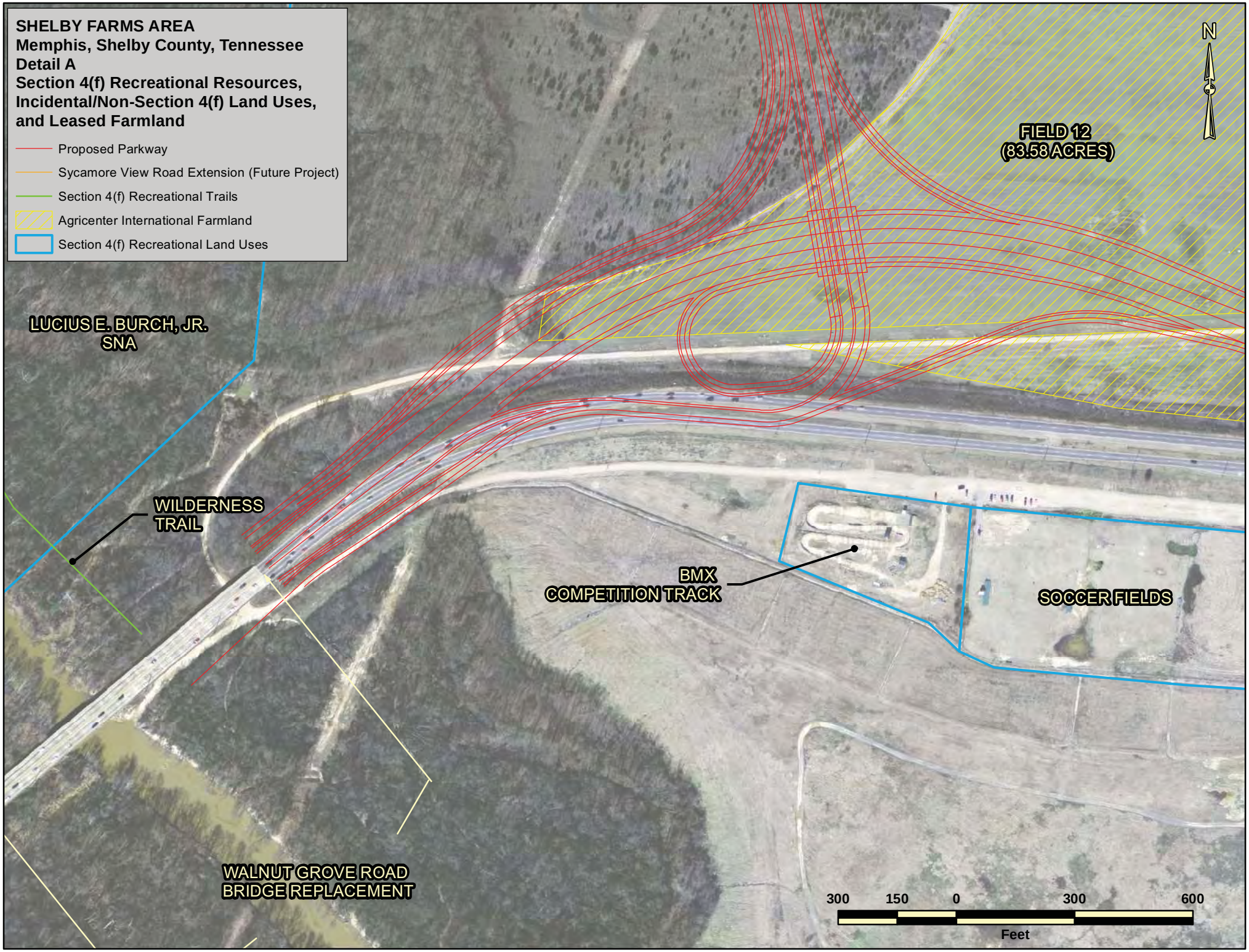

SHELBY FARMS AREA
Memphis, Shelby County, Tennessee
Detail A
Section 4(f) Recreational Resources, Incidental/Non-Section 4(f) Land Uses, and Leased Farmland
Proposed Parkway
Sycamore View Road Extension (Future Project)
Section 4(f) Recreational Trails
Agricenter International Farmland
Section 4(f) Recreational Land Uses
N
FIELD 12
(83.58 ACRES)
LUCIUS E. BURCH, JR. SNA
WILDERNESS TRAIL
BMX COMPETITION TRACK
SOCCER FIELDS
WALNUT GROVE ROAD BRIDGE REPLACEMENT
300 150 0 300 600
Feet

Figure 9

CONCENTRATE PROGRAM + FACILITIES

CONCENTRATED FACILITY + PROGRAM ZONES

N

0' 500' 1,000' 2,000' 4,000'

SCALE: 1"=2,000'

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL DIVISION
SUITE 900 - JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-0334

Theodore C. Fox, III, Director
Division of Public Works
Shelby County Government
160 North Main Street, Suite 801
Memphis, TN 38103

Subject: De minimis impact finding concurrence for Kirby Parkway through Shelby Farms Park

Dear Mr. Fox:

The purpose of this letter is to request your concurrence that the proposed Kirby Parkway will not adversely affect the activities, features, and attributes of Shelby Farms Park, thus allowing the Federal Highway Administration to make a *de minimis* impact finding.

As a facility owned by Shelby County, the Shelby Farms Park is afforded special protections under Section 4(f) of the U.S. Department of Transportation Act (recodified in 49 U.S.C. 303 and 23 U.S.C. 138). Under the provisions of Section 4(f), if the proposed transportation project would result in adverse effects to the park or recreation facility, the transportation agency must conduct an evaluation to demonstrate that there is no prudent and feasible alternative to the use of the 4(f) property. An exemption is provided in cases where the official with jurisdiction over the park or recreation area concurs in a determination that the impacts are not adverse. This concurrence enables the FHWA to make a *de minimis* (minimal impact) finding, which satisfies the requirements of Section 4(f) and precludes the need for a Section 4(f) evaluation. *De minimis* impacts on publicly owned parks, recreation areas, and wildlife and waterfowl refuges are defined as those that do not "adversely affect the activities, features and attributes of the Section 4(f) resource.

For purposes of federal law, including Section 4(f) of the USDOT Act of 1966, the future right of way will be considered transportation right of way, not parkland, and will be purchased from the County. The proposed project would require approximately 119 acres for right of way, as shown in the attached map. The State will compensate the County for any land acquired for the project in accordance with applicable federal and state laws.

If you concur that the acquisition of right of way as shown on the attached figure would not adversely affect the recreational activities, features, and attributes that qualify Shelby Farms Park for protection under Section 4(f), we request that you sign and date this letter in the spaces below. We will maintain a copy of this letter in the project file.

As the official with jurisdiction over Shelby Farms Park, I concur with the determination that the proposed transportation project shown on the accompanying attachment would not adversely affect the activities, features, and attributes that qualify Shelby Farms Park for protection under Section 4(f). I have also been informed that based on my concurrence, the FHWA intends to make a *de minimis* finding regarding impacts to Shelby Farms Park thus satisfying the requirements of Section 4(f).

Signature: Mark H. Luttrell

Printed Name of Official: Mark H. Luttrell

Date: 9-13-10

After signing and dating this letter, please return a copy to me at the address listed above. We appreciate your cooperation.

Sincerely,

Tom Love

Tom Love
Transportation Manager 1

SHELBY FARMS MANAGEMENT AGREEMENT

This Shelby Farms Management Agreement ("Agreement") made and entered into this 13 day of JULY, 2007, by and between Shelby Farms Park Conservancy, a Tennessee nonprofit corporation, ("SFPC"), and Shelby County, Tennessee ("County"). The effective date of this Agreement shall be August 1, 2007 (the "Effective Date").

In consideration of their mutual promises and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereby agree as follows:

ARTICLE 1. DESCRIPTION AND USE OF THE PARK

For purposes of this agreement, Shelby Farms Park ("Park") shall mean those areas which are described by metes and bounds in Exhibit A, which is attached hereto and incorporated by reference. The Park shall at all times be managed, operated and used for the benefit of the citizens of Shelby County, Tennessee, and shall be used in accordance with the Conservation Easement between the County, The Shelby County Agricenter Commission, and the Land Trust for Tennessee, Inc., recorded as instrument number 07021070 in the Shelby County Register's Office in Shelby County, Tennessee on February 1, 2007, which is hereby incorporated by reference. Furthermore, the parties will work together to develop, adopt, and implement a Master Plan for the Park ("Plan"), and SFPC and the County will carry out their responsibilities in accordance with the Plan.

ARTICLE 2. MANAGEMENT

The County hereby appoints SFPC as Manager of that portion of the Park described by metes and bounds in Exhibit B, which is attached hereto and incorporated herein by reference, ("Managed Area"), with the full and exclusive authority and responsibility to manage, operate, lease, rent, preserve, protect, enhance, and develop that Area, to promote the Park, and to carry out all of its other duties as set forth in more detail herein.

ARTICLE 3. TERM

The initial term of this Agreement shall be ten (10) years and will commence upon the Effective Date and end on July 31, 2017. Either party may terminate this agreement on prior written notice given at least one year prior to the expiration of the initial term or any renewal term. This Agreement shall be automatically extended for additional terms of ten (10) years unless, not less than one year prior to the expiration of any term, either party shall give written notice to the other party electing to terminate this Agreement at the expiration of the then current term. Hereinafter, all references to the "term" of this Agreement shall mean the initial term and any extensions or renewals thereof.

ARTICLE 4. COUNTY FUNDS AND SUPPORT

(a) It is the intention and agreement of the parties that the County will continue to provide to Shelby Farms at least the same levels of financial support and in-kind support that it has provided in the past. Attached hereto as Exhibit C are lists of the amounts expended by the County for the management and operation of Shelby Farms, the revenues received by the County from Shelby Farms, and the in-kind goods and services provided by the County to Shelby Farms. The County will continue, throughout the term of this Agreement and any renewal or extension thereof, to provide to SFPC annual funding in the amount of at least $575,848, to be paid to SFPC in quarterly installments on or before the first day of January, April, July, and October of each year of this agreement. On the Effective Date, the County will pay the first pro-rata quarterly installment to SFPC as adjusted herein. The County will also continue, throughout the term of this Agreement and any renewal or extension thereof, to provide to SFPC the same in-kind goods and services it has provided to Shelby Farms in the past, as described in Exhibit C, including the use of work lines through the Shelby County Correction Center as discussed below. The County represents and warrants that Exhibit C is an accurate and complete description of the financial support and in-kind contributions provided by the County. In addition the County will make all reasonable efforts, at County's cost, to maintain the water level in Patriot Lake at appropriate levels to fully support aquatic and recreational activities.

(b) In accordance with the guidelines provided in County policies and procedures, T.C.A. § 41-2-148 and any other applicable law, the County agrees to continue assignment of two work lines (ranging between six and ten trustees from the Adult Offender Center) to augment and support grounds maintenance operations in the Managed Area through the work week. These services are generally scheduled Monday through Friday from 7:00 a.m. to 5:00 p.m., depending on weather and needs of the park. Additional support for special events may be provided subject to availability of manpower.

(c) The County agrees to coordinate communication with the Memphis City Police Department and/or the Shelby County Sheriff's Department, as appropriate, regarding requests for security for both day-to-day security needs and for large scale events.

(d) SFPC shall reimburse the County the County's cost for all utilities (water, sanitary sewer, electricity, and natural gas) arising from the operation of the Park.

(e) The County, as owner of the Park, including the Managed Area, shall retain responsibility for any environmental conditions on or under the Managed Area, including but not limited to the exclusive responsibility for any necessary monitoring and maintenance of hazardous materials, if any, which may be present under those portions of the Managed Area on the south side of Walnut Grove Road which were previously used as a county landfill, and that additional portion of the Managed Area previously used as a fire arms range, it being understood and agreed that the SFPC shall have no responsibility or authority to investigate, remediate or otherwise deal with any such hazardous materials present anywhere within the Managed Area as of the effective date of this Agreement.

ARTICLE 5. SFPC FUNDS

(a) All revenues generated by or in the Managed Area of the Park, and any activities, facilities, events, or programs in the Managed Area of the Park, by rental, lease, or otherwise, or raised by or donated to or for the SFPC for the Managed Area of the Park, shall be paid to the SFPC for use in carrying out its duties set forth herein.

(b) SFPC will raise and collect, from both private and public sources, all additional funds, (over and above the amounts provided by the County to SFPC as provided in Section 4, above, and the other revenues referred to in elsewhere in this Agreement), necessary to carry out its responsibilities set forth herein, including without limitation the management, operation, protection, enhancement, and development of the Managed Area and the promotion of the Park, the development of the Master Plan for the Park, and the implementation of that Plan.

(c) All funds raised by, or donated to SFPC, or received by it in its role as Manager of the Park, through special events, exhibits, sales of goods or services, memberships, advertising, naming rights, sponsorships, private donations, or otherwise, shall be the sole and exclusive property of SFPC, subject to any restrictions imposed on the use of such funds by the Charter and Bylaws of SFPC and/or the terms of the donation. No such funds will be used in a manner which will cause SFPC to lose its status as a charitable organization under the Internal Revenue Code, and SFPC will engage in no activities which would cause it to lose its status as a charitable organization under the Internal Revenue Code.

ARTICLE 6. AUTHORITY

SFPC intends to operate the Park in a manner that will encourage broad public use of the Park, in accordance with the terms of the Conservation Easement and the Management Agreement. SFPC will have the sole authority to determine what activities, events, programs, projects, concessions, facilities, buildings, construction, improvements, landscaping, and changes therein, shall take place in the Managed Area during the term of this Agreement, and to establish rules and regulations governing same.

ARTICLE 7. FEES

(a) SFPC will have the sole authority to determine the amounts to charge for use of or admission to any facility, event, or activity in the Managed Area and shall have control of all concessions in that Area, with the right to operate any such concessions itself or to contract with independent concessionaires to do so; provided, however, that no fee shall be charged for entrance to the Park.

(b) The County agrees to assign its rights under all existing contracts described in Exhibit D, which is attached hereto and incorporated by reference, to SFPC. SFPC agrees to accept and honor the terms of these contracts. Upon the Effective Date of this Management Agreement,

revenues collected pursuant to the terms of said contracts shall be paid to SFPC regardless of whether the contracts have been assigned to SFPC.

(c) SFPC shall allow the County use of the Managed Area free of charge for one day per year for purposes of holding the annual County picnic, on a date agreed upon by the County and SFPC.

ARTICLE 8. LICENSE TO USE EQUIPMENT; MAINTENANCE

(a) Attached hereto as Exhibit E is a list of Personal Property and Equipment which, at the time of the execution of this Agreement, is used by or in connection with the management, operation, and maintenance of Shelby Farms. The County warrants that this is a complete and accurate list thereof. The County hereby grants and conveys to SFPC licenses to use said Personal Property and Equipment during the term of this Agreement, but ownership of such Personal Property and Equipment shall remain with the County. At the end of the useful life of each piece of equipment, said equipment shall be returned to Shelby County for disposal.

(b) The County shall, during the term of this Agreement, continue to provide maintenance and repair of said Personal Property and Equipment, and shall replace said Personal Property and Equipment, upon the request by SFPC for such replacement, when and if any of it requires replacement due to ordinary wear and tear or for any other reason not the fault of SFPC, its agents or employees to the extent that same is not covered by insurance; provided, that the determination when such replacement is necessary shall be made jointly by SFPC and the County upon a reasonable basis. SFPC shall reimburse the County for any maintenance in accordance with published Fleet Shop rates charged to county agencies and departments within thirty (30) days of invoice.

(c) The County hereby grants a license to SFPC for the term of this agreement for use of the Storage Barn located in Area 10 of the Park and described in greater detail on Exhibit F, which is attached hereto and incorporated by reference, to store the equipment and personal property described herein.

(d) The County hereby grants a license to SFPC for the term of this agreement for use of the structure located at 6489 Mullins Station Road in Area 10 of the Park and described in greater detail on Exhibit F, which is attached hereto and incorporated by reference, to use for office space for park purposes.

(e) SFPC shall be solely responsible for the care and maintenance of the Bison Herd ("livestock"), described on Exhibit G, which is attached hereto and incorporated by reference. SFPC agrees to ensure that said livestock is provided with required veterinary services as well as the appropriate timely disposition of sick or dead animals. The County agrees to provide dead animal pick-up to SFPC on an as-needed basis at no cost to SFPC. SFPC has the authority to carry out appropriate herd management practices to ensure that optimum herd size is maintained for the health and safety of the herd and other animals.

ARTICLE 9. CAPITAL IMPROVEMENTS & MAINTENANCE; SIGNAGE

(a) The Managed Area is and shall remain the property of Shelby County. SFPC shall have the right, at its sole expense, to make such changes in and additions and improvements to the Real Property in the Managed Area as it may deem necessary in order to carry out its duties as Manager; provided, however, that any such changes shall be consistent with the Master Plan and the Conservation Easement. All proposed capital additions to the Real Property in the Managed Area shall be submitted to the County Engineer for review to ensure compliance with applicable state and local regulations relative to public health and safety; provided, however, that approval thereof shall not be unreasonably withheld. All capital additions to the Real Property in the Managed Area paid for in part or in whole by SFPC shall be the property of the County, which accepts ownership of and title to such property.

(b) SFPC shall have the right, at its sole expense, to erect or display, or permit or cause to be erected or displayed, any signs within the Managed Area it may deem appropriate in accordance with the Master Plan, the Conservation Easement, and applicable state and local laws and regulations.

(c) The County agrees to consult and coordinate with SFPC regarding the design and construction of any capital improvements other than those initiated by SFPC as referred to in 9(a).

ARTICLE 10. INTELLECTUAL PROPERTY RIGHTS/SPONSORSHIP AND ADVERTISING

(a) The County hereby grants to SFPC, for the term of this Agreement, an exclusive, worldwide, fully paid up and irrevocable license in and to any and all Intangible Property related to Shelby Farms and owned by the County, including any and all names, trade names, marks, trademarks, and other intellectual property, and all of the goodwill and reputation of Shelby Farms; provided, however, that any use of the name "Shelby County Government" or use of the official seal of Shelby County, Tennessee, requires prior approval of the County. The County agrees to execute and deliver to SFPC such assignments, licenses and other instruments and documents as needed to effectively grant said license in and to all such Intangible Property. SFPC is authorized to grant such sub-licenses in any item of Intangible Property as it deems in the best interest of the Park.

(b) SFPC shall have the right to sell naming rights, sponsorships and advertising relating to the Managed Area or any portion thereof, or facility, activity, or event therein; provided, however, that all any naming rights, sponsorships or advertising relating to tobacco or sexually oriented businesses shall be prohibited and the sale of naming rights related to alcohol shall be prohibited.

ARTICLE 11. PERSONNEL

For a period of no longer than ninety (90) days after the Effective Date (the "Transition Period"), the current County employees assigned to the Park shall continue to be employed by the County but shall be under the joint supervision of the County and SFPC. During the Transition Period, the County shall be responsible for all compensation, benefits and worker's compensation insurance for such employees. The actual amount of such compensation paid during the Transition Period to the County employees assigned to the Park shall be deducted from the quarterly installment(s) to be paid to SFPC during the Transition Period. During the Transition Period, SFPC and the County shall notify the employees who are to be hired by SFPC. SFPC shall have the sole authority, in its sole discretion, to select the persons it chooses to employ and to determine the terms and conditions of their employment, provided however that SFPC shall be an equal opportunity employer and shall not discriminate in its employment practices on the basis of race, sex, age, color, religion, national origin, or disabilities. SFPC shall be solely responsible for all compensation, employee benefits and expenses of its employees after the Transition Period.

ARTICLE 12. COMPLIANCE WITH LAWS

SFPC shall manage the Park in compliance with all applicable laws and regulations.

ARTICLE 13. SUBJECT TO FUNDING

The funding provisions herein are subject to annual appropriation by the County of the funds provided herein. If the County fails to appropriate sufficient funds for the operation of properties, such failure shall not be deemed an event of default but shall entitle SFPC to terminate this Agreement immediately upon notice from the County of the County's failure to appropriate such funds.

ARTICLE 14. CONTRACT AUTHORITY

SFPC shall have full authority to negotiate and execute all contracts, agreements, permits, leases, and licenses as may be necessary for the management and operation of the Managed Area and to carry out its duties as Manager under this Agreement. Such agreements shall include, but not be limited to, contracts, agreements, leases, and licenses, with suppliers, tenants, exhibitors, concessionaires, joint venturers, promoters, advertisers, television and radio media, other media, and other parties.

ARTICLE 15. RELATIONSHIP OF PARTIES

The parties agree that the only relationship created by this Agreement is and shall be that between the County and SFPC and that SFPC is an independent contractor, providing

management, operation, and other services to the County, not an agent, agency, employee, joint venturer, partner, division or department of the County.

ARTICLE 16. INSURANCE

(a) County will continue to carry insurance coverage on existing building structures in the managed area and will carry insurance on future buildings resulting from the implementation of the Master Plan.

(b) As of the Effective Date, SFPC shall purchase and maintain, in a company or companies licensed to do business in the State of Tennessee, such insurance as will protect the parties from claims which may arise out of or result from SFPC's operations under the agreement, whether such operations are performed by SFPC or by anyone directly or indirectly employed by SFPC, or by anyone for whose acts SFPC or subcontractor may be liable. SFPC shall also require insurance coverage as outlined herein of any entity or individual that leases or uses the Managed Area for any event(s).

(c) The insurance required shall be written for not less than any limits of liability specified or required by law, whichever is greater. The County, its elected officials, appointees and employees will be named as additional insured. SFPC will maintain throughout the life of this agreement insurances, through insurers rated A- or better by A.M. Best, in the following minimum requirements:

-Commercial General Liability coverage with minimum limits of $1,000,000.00 per occurrence/$2,000,000.00 annual aggregate premises/operations coverage, $2,000,000.00 annual aggregate products/completed operations.
-Workers Compensation coverage, including coverage for sole proprietors, partners, and officers, regardless of requirement by Tennessee State Statute.
-Commercial Auto Liability with minimum limit of $1,000,000 for all owned, hired and non-owned autos.

SFPC shall provide County with a current copy of the Certificate of Insurance or other acceptable evidence of insurance as of the Effective Date and shall maintain said insurance during the entire agreement as well as provide renewal copies on each anniversary date of the Effective Date. SFPC shall not be required to provide the Workers Compensation coverage until the expiration of the Transition Period.

Upon termination or cancellation of insurance currently in effect under this agreement, SFPC shall purchase an extended reporting endorsement and furnish evidence of the same to the County.

ARTICLE 17. RECORDS/INSPECTION

(a) SFPC will establish and maintain accurate records and accounts which sufficiently and properly reflect all direct and indirect revenues and expenditures in the performance of this Agreement. Such records and accounts shall conform to generally accepted accounting principles. Upon request by the County, SFPC will make available, at SFPC's principal place of business, for inspection and audit, SFPC's books and records relating to the performance of this Agreement.

(b) Within one-hundred and twenty (120) days of the end of each fiscal year (June 30th), SFPC shall submit to the County financial audited financial statements regarding the SFPC's management and operation of the Park, including, without limitation, a statement of income, expenses and surplus (or deficit) and the results of operation during such year, such financial statement to be certified by an officer of the SFPC as true, accurate, and complete and fairly reflecting the results of operations of the Park.

(c) Pursuant to Resolution Number 37, enacted by the Board of County Commissioners of Shelby County, Tennessee on March 26, 2007, and Exhibit A attached to said resolution and incorporated by reference, the SFPC shall submit quarterly reports to the County Administration, and the County Commission's Committee #9-Conservation, Chickasaw Basin and Shelby Farms detailing the progress of implementing the Master Plan and raising the necessary funds to pay for the improvements and ongoing public policy matters regarding the governance of Shelby Farms Park.

ARTICLE 18. DEFAULT

Anything in this Agreement to the contrary notwithstanding, it is understood and agreed that in the event of a default, the non-defaulting party shall give notice of default and the party in default shall have 30 days after receipt of the notice to cure any monetary default and 60 days after receipt of the notice to cure any non-monetary default, provided that as to a non-monetary default, if such default cannot reasonably be cured within said 60 days, the party in default shall have such additional time as is reasonably necessary to cure the default, provided that the party in default begins curing the default within said 60 days and diligently prosecutes to completion the curing of the default. A party shall not exercise any right or remedy for default unless and until such notice has been given and the opportunity to cure default has expired.

ARTICLE 19. WAIVER

No waiver of any term, condition, default, or breach of this Agreement, or of any document executed pursuant hereto, shall be effective unless in writing and executed by the party making such waiver; and no such waiver shall operate as a waiver of either (a) such term, condition, default, or breach on any other occasion or (b) any other term, condition, default, or breach of this Agreement or of such document. No delay or failure to enforce any provision in this Agreement or in any document executed pursuant hereto shall operate as a waiver of such

provision or any other provision herein or in any document related hereto. The enforcement by any party of any right or remedy it may have under this Agreement or applicable law shall not be deemed an election of remedies or otherwise prevent such party from enforcement of one or more other remedies at any time.

ARTICLE 20. CONSTRUCTION

All words used herein shall be construed according to their proper gender and number, as the context shall require. Unless specifically designated otherwise, a reference to "including" shall mean "including, but not limited to."

ARTICLE 21. ENTIRE AGREEMENT

This Agreement sets forth the entire understanding of the parties, replacing any and all prior agreements relating to the subject matter hereof. This Agreement may be changed, amended, or terminated only by similar written instrument executed by the parties.

ARTICLE 22. SUCCESSORS

All of the terms and provisions of this Agreement shall be binding upon, shall inure to the benefit of, and be enforceable by and against, the parties hereto and their respective heirs, executors, administrators, successors, and permitted assigns.

ARTICLE 23. ASSIGNMENT

No party may assign or delegate its rights or duties under this Agreement without the prior written consent of the other parties in each instance.

ARTICLE 24. SEVERABILITY

If any provision of this Agreement is held to be unlawful, invalid, or unenforceable under any present or future laws, such provision shall be fully severable; and this Agreement shall then be construed and enforced as if such unlawful, invalid, or unenforceable provision had not been a part hereof. The remaining provisions of this Agreement shall remain in full force and effect and shall not be affected by such unlawful, invalid, or unenforceable provision or by its severance herefrom. Furthermore, in lieu of such unlawful, invalid, or unenforceable provision, there shall be added automatically as a part of this Agreement a provision as similar in terms to such unlawful, invalid, or unenforceable provision as may be possible, and be legal, valid, and enforceable.

ARTICLE 25. NOTICES

Any and all notices, requests, communications, or demands required or permitted to be given pursuant hereto (a) shall be in writing, (b) shall be delivered either (i) in person or by electronic facsimile, (ii) by an established overnight delivery service, such as Federal Express, or (iii) mailed by registered or certified mail, return receipt requested, and (c) shall be addressed as follows:

Shelby County	Shelby County Public Works Department Attn: Ted Fox, Director 160 N. Main Street Suite 801 Memphis, Tennessee 38103
Copy to:	Shelby County Government Contract Administration 160 N. Main St., Suite 550 Memphis, Tennessee 38103
Shelby Farms Park Conservancy:	Shelby Farms Park Conservancy 130 North Court Avenue Memphis, Tennessee 38103
Copy to:	Burch, Porter & Johnson, PLLC 130 North Court Avenue Memphis, Tennessee 38103 Attention: Charles F. Newman, Esq. and Milton L. Lovell, Esq.

or to such other address or addresses as any party may designate to the others, by notice in writing, given as above provided. Notices delivered in person or by electronic facsimile shall be deemed to have been given on the date of delivery; notices delivered by overnight delivery service shall be deemed to have been given on the business day following the date of deposit with such overnight delivery service; and notices given by mail shall be deemed to have been given three (3) days after the date of mailing.

ARTICLE 26. APPLICABLE LAW

This Agreement has been accepted, executed and delivered, and is intended to be performed, in the State of Tennessee. The rights and duties of the parties, and the validity, construction, enforcement, and interpretation of this Agreement, shall be governed and construed according to the laws of such state.

ARTICLE 27. EXHIBITS

All of the Exhibits attached to this Agreement are a part of this Agreement when so attached, and are incorporated herein by reference as fully as if copied herein verbatim. The County represents and warrants that all such Exhibits are complete and accurate descriptions of the matters referred to therein.

ARTICLE 28. FURTHER ASSURANCES

Each of the parties, at all times and from time to time hereafter, and upon reasonable written request to do so, shall make, do, execute, deliver, or cause to be made, done, executed and delivered, all such further acts, deeds, instruments, assurances, and things as may be required for more effectually implementing and carrying out the true intent and meaning of this Agreement.

(SIGNATURES APPEAR ON THE FOLLOWING PAGE)

IN WITNESS WHEREOF, the parties hereto have set their signatures for the purposes contained herein, on this 13 day of July, 2007.

APPROVED AS TO FORM AND LEGALITY:

Contract Administrator/
Assistant County Attorney

SHELBY COUNTY GOVERNMENT

A C Wharton, Jr., Mayor

SHELBY FARMS PARK CONSERVANCY

BY: Calvin Anderson

TITLE: Chairman | President

CORPORATE ACKNOWLEDGMENT

STATE OF TENNESSEE

COUNTY OF SHELBY

Before me, the undersigned Notary Public, in and for the State and County aforesaid, personally appeared Calvin Anderson with whom I am personally acquainted or proved to me on the basis of satisfactory evidence, and who, upon oath, acknowledged himself/herself to be president or other officer authorized by appropriate Corporate action and/or Resolution to execute the preceding instrument of the Shelby Farms Park Conservancy the within named bargainor, a corporation, and that he as such President, executed the foregoing instrument for the purpose therein contained, by signing the name of the corporation by himself/herself as President.

WITNESS my hand and official seal at office this 6TH day of July, 2007.

Theresa D. Estopare
Notary Public
My Commission Expires: MY COMMISSION EXPIRES: March 18, 2009

THERESA D. ESTOPARE STATE OF TENNESSEE NOTARY PUBLIC SHELBY COUNTY

AGREEMENT BETWEEN
SHELBY COUNTY GOVERNMENT
AND
AGRICENTER INTERNATIONAL

This Agreement is entered into this 1st day of April, 2006 by and between Shelby County Government, hereinafter referred to as "County" and Agricenter International, hereinafter referred to as "Agricenter."

WHEREAS, the parties hereto acknowledge that certain lands, more specifically known as Farm #783, Section 10, Fields 8, parts of 10 and 12, 17, 18, 19, 20, and parts of 23 and 24, hereinafter referred to as "Lands" and more particularly described on the map attached hereto as Exhibit A, are the property of Shelby County Government and are subject to oversight and control of the Department of Shelby Farms, and;

WHEREAS, the parties hereto are desirous of entering into a relationship to improve the appearance of the Lands and to minimize County's costs of maintaining said property by providing for the production of crops on the Lands.

NOW THEREFORE, in consideration of the mutual covenants stated above, as well as additional consideration, the adequacy and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. SCOPE OF SERVICES

County agrees to grant Agricenter the right to use, maintain and improve the above specified Lands for the production of crops. Said right of use shall include the following:

A. Notwithstanding subsection C. below, Agricenter shall have the right to plant, maintain and harvest crops and make such improvements to the soil as is generally advisable for the production of agricultural crops.

B. Agricenter will assume all production costs and responsibility for maintaining the Lands throughout the term of this agreement.

C. County does not relinquish and hereby expressly retains all rights to control the management of the Lands including, but not limited to, right of access for necessary maintenance of the grounds and existing or proposed roadways or underlying infrastructures and enforcement of necessary and proper rules for the management and operation of same.

GRANT OF CONSERVATION EASEMENT

This Grant of Conservation Easement ("Grant") is made by the County of Shelby, Tennessee ("County") and the Shelby County Agricenter Commission ("Agricenter") (collectively, "Grantors") as of the _____ day of January, 2007, and shall become effective upon being properly recorded in the office of the Shelby County Register ("Effective Date") pursuant to the Conservation Easement Act of 1981, Tenn. Code Ann. 66-9-301 et seq., as amended, and the common law.

Section I - Recitals

Grantors are "public bodies" as defined in Tenn. Code Ann. 66-9-303(5).

County is the owner of the property designated on Exhibit A hereto as "County Property." Agricenter was established by the Tennessee General Assembly, and is the recipient of a grant of the property designated on Exhibit A hereto as "Agricenter Property," said property having been granted to Agricenter pursuant to resolution of the Board of County Commissioners of the County subject to reversion to the County under certain circumstances. All of the property described on Exhibit A, including that designated as "County Property" and that designated as "Agricenter Property," is hereinafter collectively referred to as the "Property."

For purposes of this Grant, four areas of the Property ("Tiers" 1 through 4) have been designated, as reflected and described on Exhibit B hereto.

The Property has significant conservation, natural, scenic, recreational, agricultural, scientific and parkland resources and values in the fields, forests, open spaces, vistas, wetlands, ponds, lakes, and streams on the Property, which resources and values are worthy of protection, maintenance, preservation, and enhancement for the benefit of the people of Tennessee. Grantors deem that it is in the public interest to grant a conservation easement with respect to the Property as herein provided and that the public will gain a substantial benefit by the granting of the conservation easement.

For the purpose of protecting, maintaining, preserving, and enhancing the conservation, natural, scenic, recreational, agricultural, scientific and parkland resources and values of the Property and providing for its use in keeping with such protection, maintenance, preservation and enhancement, Grantors desire to grant a conservation easement with respect to the Property, subject to the terms and conditions hereinafter provided. Grantors acknowledge receipt of good, valuable, and sufficient considerations for this Grant.

The Land Trust for Tennessee, Inc., a Tennessee nonprofit corporation ("Grantee"), has received from the Internal Revenue Service an exemption under 501(c)(3) of the Internal Revenue Code, and is therefore an "exempt organization" as defined in Tennessee Code Ann. 66-9-303(2).

Grantors deem Grantee to be qualified and to be an appropriate entity to receive and enforce the conservation easement herein granted.

Grantee desires to accept this Easement, subject to the terms and conditions hereinafter provided.

Section II - Grant and Agreements

NOW THEREFORE, for the benefit of the people of Tennessee, Grantors agree as follows:

1. Grant. Grantors grant to Grantee a conservation easement ("Easement") on, over, under, and across the Property for the purposes of protecting, maintaining, preserving, and enhancing the conservation, natural, scenic, agricultural, scientific, recreational, and parkland resources and values of the Property, including without limitation the fields, forests, open spaces, vistas, wetlands, lakes, ponds, and streams of the Property, the biological and ecological integrity and value of the Property, and the use of the Property by the public as an urban park, in keeping with such protection, maintenance, preservation, enhancement, and for other purposes incidental, necessary, and appropriate to the foregoing, such grant being subject to the terms and conditions hereinafter provided.

Included in the Property is property designated as the Lucius Burch Natural Area ("LBNA") by the State of Tennessee. The parties agree that any and all use of the LBNA pursuant to the terms of this Easement shall be consistent with T.C.A. 11-14-101 et seq., as it may hereafter be amended, and all rules and regulations promulgated thereunder, that control the use of the LBNA.

Excluded from the provisions of this Easement is the road right of way property as designated on Exhibit A-1.

Also excluded from the provisions of this Easement is property designated as "Area 10," that is to be reserved for governmental and government-related uses pursuant to a plan to be adopted by the Board of County Commissioners of Shelby County, Tennessee. This Area is described on Exhibit A-2 attached hereto.

2. Declaration of Restriction. Grantors and Grantee declare and agree that the uses of the Property shall be restricted and limited to the uses permitted under this Easement. Such restrictions and limitations shall run with the land and apply to any successive owners of the Property, or any portion thereof, and Grantors shall do all things necessary to ensure that this is the case.

3. Master Plan. It is understood and agreed by Grantors and the Grantee that a Master Plan is to be developed, subject to the provisions of Paragraph 18 herein, for the Property through a planning process to be initiated by the County in the future. Grantors and Grantee agree that Grantee shall become a party to the planning process for said Master Plan, which upon completion shall become incorporated into this Easement as though set out fully herein. Grantors and Grantee hereby declare and agree that, until the completion of said Master Plan and its adoption by the County, or until December 31, 2008, whichever occurs first, no permanent buildings, structures, or infrastructure shall be constructed or placed upon the Property, and no permanent changes shall be made in the topography of the land, except those specific buildings and structures described in Exhibit A-3, it being the intention of the parties that there be a

moratorium on the construction or placement of such buildings, structures, or infrastructure, and on change in the topography of the land, other than those described in Exhibit A-3, until said Master Plan has been adopted or such December 31, 2008 deadline occurs. It is understood and agreed that the Master Plan may increase, but may not decrease, the prohibitions and restrictions on the uses permitted under in this Easement.

If during the moratorium period, a party proposes construction which was not anticipated on the date of this Grant, which is not included on Exhibit A-3, and which is in keeping with the uses and purposes of this Grant, said party may propose an amendment to Exhibit A-3 to permit such construction. The parties will in good faith negotiate the amendment, and consent to the amendment will not be unreasonably withheld, conditioned, or delayed.

4. Permitted Uses. The following uses of the Property are permitted, reserved, and retained, subject to the moratorium set forth in the preceding paragraph, and subject to any restrictions or prohibitions set forth in the Master Plan, and to any restrictions or prohibitions set forth in the 1981 Private Act of the Tennessee Legislature creating the Agricenter Commission (Chapter 141 of the Private Acts of 1981), the 1981 Resolution of the Shelby County Commission adopting and approving said Act, and the 1982 Resolution of the Shelby County Commission granting the property to the Agricenter:

a. pedestrian, bicycle, skating, and equestrian trails and paths, paved and unpaved, and equestrian operations;

b. nature trails, boardwalks and wildlife observation areas and improvements;

c. gardens;

d. recreational sports and uses consistent with the purposes and uses herein provided and in accordance with the approved Master Plan;

e. pavilions, picnic areas, and playgrounds;

f. agronomy and horticulture uses, including but not limited to farming, educational, aquaculture, and nursery uses;

g. scientific purposes, including agricultural, archeological and environmental sciences, which have no material adverse impact on the Property and the uses herein provided and are consistent with the purposes of this grant;

h. dog exercise and training;

i. boating activities consistent with the purposes and uses herein provided; only small electric motors or trolling motors are acceptable; gas powered motors, jet skis, etc. are prohibited;

j. fishing;

k. development and enhancement of wildlife habitat;

l. development and enhancement of forests (including without limitation reforestation), fields, vistas, and open spaces;

m. access by designees of Grantors to the Property at all times in connection with the uses permitted hereunder;

n. short term events not inconsistent with the uses and purposes herein provided, including without limitation outdoor festivals; collection of fees normally associated with the use of park facilities; special events, educational, agronomy and horticultural uses; and food, drink, and merchandise sales incidental to permitted uses. Permanent concessions of permitted uses may be permitted to have food, drink or merchandise sales but with size or quantification limitation on these types of incidental sales to permanent uses;

o. animal control as may be necessary to control property damage, to protect the Property, and/or to protect the health, safety, and welfare of the public;

p. direction, location, and use signs consistent with the purposes and incidental to the uses herein provided;

q. classes, demonstrations, projects, and other educational uses to promote and teach environmental protection and conservation;

r. retreat and/or camping facilities that are compatible with the rustic and natural setting of the Property, and in accordance with the Master Plan;

s. existing and currently planned uses of the Property or in accordance with the approved Master Plan and prior written approval of Grantee, which approval shall not be unreasonably withheld, conditioned or delayed;

t. maintenance, repair, removal, rearrangement, reconfiguration, renovation, relocation, and reconstruction of existing buildings, structures, facilities, sewer and/or utility lines, and other improvements; and

u. a carousel or historic rollercoaster, in a location to be mutually approved by Grantors and Grantee.

The following additional uses are permitted in the areas designated as Tier 2, Tier 3 and Tier 4 on Exhibit B, attached hereto, subject to the same conditions set forth above (i.e., the moratorium, the prohibitions or restrictions of the Master Plan, and the restrictions and prohibitions set forth in the Private Act and Resolutions referred to above):

Tier 2: Agricenter Campus Area

a. Continuation of construction of any buildings now under construction and construction of additional buildings, structures, facilities, sewer and/or utility lines, and other improvements related to agriculture; and

b. Use, maintenance, repair and replacement of roads and parking areas and construction of new roads.

Tier 3: Agricenter Crop and Recreation Area

a. Construction of ancillary buildings, barns, silos, storage structures, facilities, sewer and/or utility lines, and other improvements;

b. Maintenance, repair, and replacement of roads and parking areas and construction of new roads;

c. A demonstration area for animal husbandry science;

d. Hiking and biking trails, lakes and ponds, and other recreational uses for the public now existing and further additional recreational uses..

Tier 4: Show Place Arena Area

a. Restaurant; catering facility;

b. Showplace arena including indoor arena, enclosed warm-up arena, outdoor covered arena, and outdoor uncovered arena;

c. Six barns (two of which are located on the Agricenter property);

d. Parking area; and

e. Such other commercial uses as may be added as a result of the Master Plan.

Each Grantor reserves the right to adopt rules and regulations with respect to the permitted uses of its property consistent with the uses permitted and purposes provided herein and with respect to protecting the health and safety of the public and consistent with the Master Plan. Each Grantor also reserves and retains the right to move, remove, rearrange, reconfigure, renovate, relocate, and reconstruct facilities, improvements, and features of its property from time to time consistent with uses and purposes herein stated and consistent with the Master Plan.

5. Prohibited Uses. Except as expressly permitted in other Tiers, the following uses of the Property are prohibited:

a. stadiums; arenas; race tracks for animals or motor vehicles; commercial uses other than those specifically permitted by this Easement, provided

that the existing horse show place arena on the Property may be located elsewhere on the Property as determined by the approved Master Plan;

b. electromagnetic transmission lines and towers, other than those permitted under existing leases as such leases may be extended or renewed, without adding additional lines or towers; provided that additional antenna may be added to the existing tower and transmission lines for operation of the Property;

c. use of motorized vehicles on the unpaved paths and trails of the Property except for maintenance and operation of the Property;

d. commercial, industrial, residential, or other real estate development;

e. manufacturing and industrial uses, excluding the mulch facility on the County property;

f. commercial mining activities, except those related to lead recovery and removal on the former firearms range site on Tier 1;

g. residential uses or hotel/motel uses, excluding temporary shelter in case of emergency or disaster;

h. subdivision of the Property;

i. dumping of garbage, trash, or building materials, provided, however, that this prohibition shall not apply to (i) lawful temporary disposal of waste resulting from daily operations of the Property (dumpsters, etc.) or (ii) lawful temporary disposal of products as part of a recycling or recovery operation established for the purpose of environmental preservation and protection (mulch recycling, cardboard recycling, etc.)

j. public or private facilities except those which implement and facilitate the purposes and uses herein provided;

k. zoos;

l. permanent fairgrounds;

m. billboards;

n. commercial advertising, except for temporary signs for marketing of special events and concessions and except for the existing signs on the Agricenter property;

o. schools;

p. colleges, except for the existing Southwest Tennessee Community College facilities on the Agricenter property;

q. structures used primarily for exhibitions and performances except for one amphitheater and outdoor exhibition facilities consistent with park purposes and uses herein provided;

r. roads and parking areas other than existing roads and parking areas and future roads and parking areas permitted by the Master Plan;

s. activities which cause significant erosion or pollution;

t. other uses inconsistent with the Master Plan; and

u. any other activities inconsistent with the purposes and uses herein provided.

6. Right of Entry and Enforcement. Grantee, its agents, and independent contractors shall have the right of entry and access to the Property at all times to make such inspections and investigations as Grantee deems appropriate and to enforce this Grant. Grantee may enforce this Easement by action at law or by injunction or other proceedings in equity. No delay of or forbearance in enforcement of Grantee's rights and remedies under this Easement shall be deemed a waiver of such rights and remedies or preclude Grantee from exercising any of its rights and remedies. Defenses of laches and estoppel based on delay in enforcing rights and remedies are waived. If Grantee is successful in enforcing its rights and remedies under this Easement in a proceeding at law or equity, Grantee shall have the right to recover from the government of Shelby County, Tennessee, its reasonable costs and expenses actually incurred including reasonable attorney's fees, irrespective of whether the need for such enforcement is caused by Grantors or a third party. In the event that Grantee or Grantee's assigns fail to enforce the provisions of this Easement or at the invitation of the Grantee, the Attorney General of the State of Tennessee may enforce the provisions of this Easement by any action at law or in equity.

In the event there is a dispute between Grantor and Grantee whether or not an activity or use is permitted or prohibited, the parties will arbitrate the dispute to a committee of 3 individuals who have significant experience with land use and conservation easements. One individual shall be selected by the Grantor, one individual by the Grantee, and the third selected by those two individuals. The three individuals will determine the dispute by majority vote, following the rules of the American Arbitration Association. The decision of the arbitration committee shall be binding or nonbinding by agreement between Grantee and Grantor prior to selection of the arbitration committee.

7. Duration. The duration of the Conservation Easement herein granted shall be perpetual, provided that Grantors may terminate this Grant to become effective on the date of any fiftieth anniversary of this Grant. Grantors shall give notice as provided in Paragraph 17 herein. This Grant shall run with the land. This Grant shall be binding on the successors and assigns of the parties and shall inure to the benefit of the successors and permitted assigns of the parties.

8. Construction. This Easement shall be liberally construed in favor of protecting, maintaining, preserving, and enhancing the conservation, natural, scenic, recreational, agricultural, scientific and parkland resources and values of the Property. Captions shall not be

used in interpreting this Grant. If any provision of this Easement is found to be ambiguous, an interpretation consistent with the purposes of this Easement and that would render the provision valid shall be favored over any interpretation that would render it invalid.

9. Severability. If any provision of this Easement shall be determined by a court of competent jurisdiction to be invalid or unenforceable, such determination shall not affect the other provisions of this Grant, which other provisions shall be enforced to the full extent permitted by law.

10. Hazardous Materials. Each Grantor agrees that it will comply with all applicable laws with respect to any hazardous or toxic substances, materials, wastes, or other substances regulated by law now located on its property. County will comply with all applicable laws with respect to the landfill and firearms range on the County property. Nothing in this paragraph shall impair Grantors' right to pursue third parties with respect to violations of environmental laws caused by such third parties. Grantee shall have no responsibility with respect to such substances, materials, waste, landfill, and firearms range.

11. Assignment by Grantee. Grantee may assign its rights and interests under this Easement to another organization which is an exempt organization as defined in Tenn. Code Ann. 66-9-303(2), which has the power and authority to hold the conservation easement herein granted subject to the provisions of this Grant, which is a state or nationally recognized conservation organization, or other similar organization accredited to hold conservation easements by the Land Trust Alliance or other successor organization of similar stature, which is approved in writing by Grantors, and which accepts the assignment. If Grantee ceases to be an exempt organization, it will assign its rights and interests under this Easement to an exempt organization approved by Grantors. Grantors will not unreasonably withhold its consent to assignment.

12. Assignment by Grantors. Grantors may assign their rights, privileges, and interests under and as reserved and retained in this Easement (including without limitation all rights of approval, determination, and regulation as to purposes and uses) to an assignee using and operating the Property, provided that such assignment shall be made expressly subject to this Easement, and Grantors agree to take all steps necessary to enforce the provisions of this Easement against any such assignee.

13. Eminent Domain. If any of the Property shall be taken under the power of eminent domain, the entire award shall be the sole property of the County.

14. Maintenance and Insurance. Each Grantor shall continue to maintain its respective property and the improvements thereon in good order, condition, and repair, and in compliance with applicable laws.

As of the date of this Easement, County is self insured as to both casualty and liability insurance with respect to the Property. If and when County shall carry casualty insurance with respect to the improvements, County shall insure the improvements for their full replacement value in accordance with County's insurance standards applicable from time to time to County's facilities. The proceeds of casualty insurance shall be used for repair and restoration of

improvements on the County property. If and when County shall carry public liability insurance with respect to the County property, County shall maintain such insurance in accordance with County's liability insurance standards applicable from time to time to County's facilities, and Grantee and Agricenter shall be named as additional insureds under such liability insurance policies. Grantors will provide Grantee and Agricenter proof of the insurance required by this paragraph.

The Agricenter shall keep the contents of the improvements on Agricenter property insured for their full replacement value. The proceeds of insurance on improvements on the Agricenter Property insured by the County shall be used for repair and restoration of such improvements. The Agricenter shall carry and maintain public liability insurance with respect to the Agricenter property. Initial limits of such liability insurance shall be $1,000,000.00 per incident, $2,000,000.00 aggregate, and thereafter the limits shall be in accordance with commercially reasonable business practices. Grantee and County shall be named as additional insureds under such liability insurance policies. Agricenter will provide Grantee and County proof of the insurance required by this paragraph.

15. Default, Right to Cure. If either party shall default under this Grant, the party in default shall have 30 days after receipt of notice of the default to cure the default, or if such default cannot reasonably be cured within said 30 days, the party in default shall have such additional time as is reasonably necessary to cure the default provided that the party in default begins to cure the default within said 30 days and diligently pursues to completion the curing of the default. No remedy shall be exercised with respect to such default unless and until the default is not cured as herein provided.

16. Notices. All notices required or permitted under this Easement shall be in writing and shall be given by hand delivery or by certified mail, return receipt requested, addressed to the parties as follows:

Grantors:

Shelby County, Tennessee
160 N. Main Street, Suite 850
Memphis, Tennessee 38103
Attention: Chief Administrative Officer

Shelby County Agricenter Commission
7777 Walnut Grove Road
Memphis, Tennessee 38120
Attention: Chairman of the Commission

with a copy to:

County Attorney
160 N. Main Street, Suite 660
Memphis, Tennessee 38103

Grantee: The Land Trust for Tennessee, Inc.
209 10th Avenue South, Suite 530
Nashville, Tennessee 38203
Attention: Executive Director

A party may change its notice address by notice as above provided.

17. Termination. Should circumstances arise that render the purposes of this Grant impossible to accomplish, this Grant may be terminated or extinguished, in whole or in part, by judicial proceedings in a court of competent jurisdiction, subject to the provisions of Paragraph 18 herein. In addition, Grantors reserve the right to terminate this Grant at the end of each fifty-year term, said terms being measured from the Effective Date hereof, and upon notice to the Grantee of intent to terminate no later than ten (10) years before the end of each fifty-year term. Said notice shall be delivered to the Grantee within a one year period beginning on the first day and ending on the last day of such respective fortieth year period. Said notice shall be effective only if in writing and delivered either (i) in person to the parties' respective authorized agent or (ii) by First Class U.S. Mail or (iii) by overnight courier with tracking capabilities to the addresses provided herein, or to such other person or address as either party may designate in writing and deliver as herein provided. Should Grantors fail to provide timely notice of intent to terminate as herein provided, this Grant shall automatically renew for an additional fifty-year term.

18. Interpretation. Nothing in this Grant or the Master Plan shall be interpreted or intended to be utilized to interfere with the rights and duties granted to the Agricenter Commission pursuant to Chapter 141 of the Private Act of 1981, nor shall this Grant, or any provisions herein, be construed or interpreted as in any way modifying or exceeding the provisions of any law with respect to the use of the Property.

IN WITNESS WHEREOF, the parties hereto have caused this Conservation Easement to be duly executed and delivered by their respective officials thereunto duly authorized as of the date first written above.

GRANTEE:

THE LAND TRUST FOR TENNESSEE, INC., a Tennessee nonprofit corporation

By: J. C. Nelson

Print Name: Jean C. Nelson

Title: President and Executive Director

GRANTORS:

SHELBY COUNTY, TENNESSEE

By: _____
A C Wharton, Jr., County Mayor

SHELBY COUNTY AGRICENTER COMMISSION

By: _____
Hamilton Smythe, III, Chairman

Approved as to Form:

By: _____
Brian Kuhn, County Attorney

Other County Approvals:

By: _____
Michael Oakes, P.E.
County Engineer

By: _____
Bill Goss
County Real Estate Manager

STATE OF TENNESSEE
COUNTY OF SHELBY

Before me, the undersigned, a Notary Public within and for said State and County, duly commissioned and qualified, personally appeared **HAMILTON SMYTHE, III**, with whom I am personally acquainted, and who upon oath acknowledged himself to be the **Chairman of the Shelby County Agricenter Commission**, the within named bargainor, and that he as such **Chairman**, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the **Shelby County Agricenter Commission** by himself as such **Chairman.**

9th WITNESS my hand and Notarial Seal, at office in Memphis, in the County aforesaid, this _____ day of January, 2007.

Paula M. Lewis
Notary Public

MY COMMISSION EXPIRES:

_____

PAULA M. LEWIS
STATE OF TENNESSEE NOTARY PUBLIC
COUNTY OF SHELBY
MY COMM. EXP. JUNE 15, 2010

STATE OF TENNESSEE
COUNTY OF SHELBY

Before me, the undersigned, a Notary Public within and for said State and County, duly commissioned and qualified, personally appeared **A C WHARTON, JR., Mayor of Shelby County, Tennessee**, with whom I am personally acquainted, and who upon oath acknowledged himself to be the **Mayor of Shelby County, Tennessee**, the within named bargainor, one of the counties of the State of Tennessee, and that he as such Mayor of said county, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of **Shelby County, Tennessee**, by himself as such **Mayor** of said **Shelby County, Tennessee.**

WITNESS my hand and Notarial Seal, at office in Memphis, in the County aforesaid, this 16 day of January, 2007.

Paula M. Lewis
Notary Public

MY COMMISSION EXPIRES:

PAULA M. LEWIS
STATE OF TENNESSEE NOTARY PUBLIC
COUNTY OF SHELBY
MY COMM. EXP. JUNE 15, 2010

STATE OF TENNESSEE)
)
COUNTY OF Davidson)

Personally appeared before me, the undersigned, a Notary Public in and for said State and County, Jean C. Nelson, with whom I am personally acquainted, and who acknowledged that ~~it~~ she executed the within instrument for the purposes therein contained, and who further acknowledged that she is the President + Exec. Director of the maker, **The Land Trust for Tennessee, Inc.**, and is authorized by the maker to execute this instrument on behalf of the maker.

WITNESS my hand, at Nashville, Tennessee, this 4th day of January, 2007.

TRACY N. MARSH
NOTARY PUBLIC AT LARGE
DAVIDSON COUNTY, TENN.

Tracy N. Marsh
Notary Public
My Commission Expires My Commission Expires July 21, 2007

EXHIBIT A

PROPERTY DESCRIPTION

"County Property"

BEGINNING at the intersection of the west right-of-way line of Germantown Parkway and the south right-of-way line of Walnut Grove Road; thence south along said west right-of-way line to the north top of bank of the Wolf River; thence with said north and northeasterly top of bank of the Wolf River to a point on the east line of the Brandon Family, LP property (Instrument Number HC 7038); thence N 06°08'17" E along said east line a distance of 529.49 feet to an angle point; thence N 38°15'51" W along said east line a distance of 245.57 feet to an angle point; thence N 46°44'09" E along said east line a distance of 124.00 feet to an angle point; thence N 27°45'51" W along said east line a distance of 83.00 feet to an angle point; thence N 01°29'09" E along said east line a distance of 111.00 feet to an angle point; thence N 31°00'51" W along said east line a distance of 185.00 feet to an angle point; thence N 03°14'09" E along said east line a distance of 175.00 feet to an angle point; thence N 39°45'51" W along said east line a distance of 230.00 feet to an angle point; thence S 69°59'09" W along the north line of said Brandon property a distance of 191.00 feet to a point on the west line; thence S 01°44'09" W along said west line of Brandon property a distance of 241.00 feet to an angle point; thence S 04°44'09" W along said west line a distance of 217.00 feet to an angle point; thence S 18°44'09" W along said west line a distance of 185.00 feet to an angle point; thence S 16°44'09" W along said west line a distance of 127.00 feet to an angle point; thence S 26°44'09" W along said west line a distance of 248.53 feet to a point on the north top of bank of the Wolf River; thence northwestwardly along said top of bank of the wolf river the following courses and distances; N 61°22'43" W a distance of 113.88 feet to a point; N 54°02'51" W a distance of 336.69 feet to a point; N 39°37'53" W a distance of 223.56 feet to a point; N 28°04'22" W a distance of 391.30 feet to a point; thence N 33°32'36" W a distance of 162.98 feet to a point on the east line of the Brandon family property (Instrument Number HC 7038); thence N 35°29'06"E along said east line a distance of 338.46 feet to an angle point; thence N 07°29'06" E along said east line a distance of 250.00 feet to an angle point; thence N 21°00'54" W along said east line a distance of 130.00 feet to an angle point; thence N 76°30'54" W along the north line of said Brandon property a distance of 260.00 feet to an angle point; thence N 60°00'54" W along said north line a distance of 210.00 feet to an angle point; thence S 57°29'06" W along said north line a distance of 408.91 feet to the top of bank of said wolf river; thence N 40°59'52" W a distance of 522.57 feet to an angle point; thence N 41°06'18" W a distance of 406.90 feet to an angle point; thence N 23°49'38" W a distance of 100.55 feet to an angle point; thence N 11°49'27" W a distance of 136.72 feet to an angle point; thence N 01°38'31" W a distance of 142.54 feet to a point on the south line of the CSX Railroad (100 foot ROW); thence N 81°49'23" E along said south line a distance of 670 feet, more or less, to the point; thence N 04°20'02" E crossing said CSX Railroad (100 foot ROW) to a found 1/2" iron pin in the north line of said CSX Railroad, said point also being on the east line of the Brandon family property (Instrument Number HC 7038), said point having Tennessee State Plane Coordinates of N 320530.8667 and E 810031.3384; thence N 04°20'02" E along said east line and along the east line of the Richard Pearce property (Instrument Number DK 6926) a distance of 2072.48 feet to

the northeast corner of said Pearce property; thence N 86°16'39" W along the north line of said Pearce property a distance of 830.34 feet to a point on the said south line of Interstate Highway 40; thence N 44°20'04" E along said south line a distance of 646.52 feet to an angle point; thence N 50°30'38" E along said south line a distance of 493 feet, more or less, to a point in the northwest corner of the federal correctional facility property; thence in a southeastwardly direction along the westerly property line of the federal correctional facility property to a point in the southerly right-of-way line of the said CSX Railroad; thence in an eastwardly direction along said southerly right-of-way line of said CSX Railroad to a point in the southwesterly right-of-way line of Raleigh-LaGrange Road; thence in a southeastwardly direction along the southwesterly right-of-way line of Raleigh-LaGrange Road to its intersection with the west right-of-way line of Germantown Parkway; thence in a southwardly direction along the west right-of-way line of Germantown Parkway to the POINT OF BEGINNING.

Less and Except that portion of the said CSX Railroad (100 foot ROW) contained within this description.

"Agricenter property"

BEGINNING at a point in the south line of Walnut Grove Road (160 feet wide), said point being 1274.81 feet west of the west line of Germantown Parkway (160 feet wide) and said point being the northwest corner of the Shelby Farms Equestrian Center; thence S 16°08'46" E along the west line of the Equestrian Center 727.93 feet to a monument; thence S 02°25'53" W continuing along the west line of the Equestrian Center 1149.38 feet to a monument set in a paved road; thence S 03°17'55" W continuing along the west line of the Equestrian Center along the centerline of said road 518.12 feet to a monument set in the centerline of an intersecting paved road, said point being the southwest corner of the Shelby Farms Equestrian Center; thence S 87°25'42" E along the south line of the Equestrian Center along the centerline of said road 559.09 feet to a monument set in the west line of Germantown Parkway; thence S 14°44'58" W along the west line of Germantown Parkway 2158.85 feet to a monument set in the north line of a power line easement; thence leaving said west line of Germantown Parkway S 60°28'32" W along the north line of said easement 310.02 feet to a monument; thence N 87°25'42" W 5627.20 feet to a monument set on the bank of a drainage ditch; thence N 33°29'14" W 174.81 feet, more or less, to a point in the east line of the 374.5806 acre mature bottomland hardwood/bald cypress forest property designated by the Tennessee General Assembly as the Shelby Farms Forest, known as the Lucius Burch Natural Area (southern forest); thence N 07°00'31" E 2238.00 feet, more or less, to a point, said point being the northeast corner of said Lucius Burch Natural Area; thence N 85°58'13" W along the north line of said Lucius Burch Natural Area 1832.32 feet, more or less, to a point; thence leaving said north line N 33°29'14" W 120.00 feet, more or less, to a monument set in the west edge of a silt levee; thence N 70°58'24" W 3593.12 feet to a monument set in a field; thence N 31 °50'38" W 184.46 feet to a point in the east line of the Walnut Grove Landfill; thence along said east line N 04°00'00" E 740.61 feet to an angle point; thence continuing along said east line N 09°00'00" W 450.00 feet to an angle point; thence continuing along said east line N 48°30'00" W 400.00 feet to a point in the north line of said Walnut Grove Landfill; thence along said north line S 81 °36'16" W 332.10 feet to a point; thence N 03°55'00" E 246.46 feet to a point in the south line of Walnut Grove Road (160 feet wide); thence with said south line of Walnut Grove Road S 84°13'16" E 11373.52 feet to a point of curvature; thence continuing along said south line on a curve to the right having a radius of

2247.83 feet a distance of 288.35 feet to a monument, said point being the POINT OF BEGINNING.

The Agricenter property includes Tier 2 which is the Agricenter campus and Tier 3 which is the property outside the campus.

The Tiers are shown on the map attached hereto as Exhibit B.

EXHIBIT A-1

ROAD RIGHT-OF- WAY PROPERTY

The following land is **EXCLUDED** from the provisions of this Conservation Easement:

1. Existing and future widening of designated public roads and rights-of-way including, but not limited to, Walnut Grove Road (160' R.O.W.), Mullins Station Road (108' R.O.W.), and Raleigh-LaGrange Road (108' R.O.W.).

2. Land for proposed "Parkway right-of-way" to be used for the Shelby Farms Parkway and Walnut Grove Road widening and improvement projects.

EXHIBIT A-2

AREA 10 PROPERTY DESCRIPTION

The following land is **EXCLUDED** from the provisions of this Conservation Easement:

"Area 10"

BEGINNING at a point in the southerly right-of-way line of the Louisville and Nashville Railroad, said point being located 1500 feet, more or less, west of the centerline of Whitten Road; thence S 13°42'00" W a distance of 710 feet, more or less, to a point; thence S 69°50'04" W a distance of 419.19 feet to a point of curvature; thence along a curve to the left, having a radius of 2710 feet, a distance of 2554.12 feet to a point of tangency; thence S 15°50'04" W a distance of 2119.19 feet to a point; thence N 83°09'56" W a distance of 148.41 feet to a point of curvature; thence along a curve to the right, having a radius of 3000 feet, a distance of 2199.11 feet to a point of tangency, said point being in east line of the 413.7512 acre mature bottomland hardwood/bald cypress forest property designated by the Tennessee General Assembly as the Shelby Farms Forest, known as the Lucius Burch Natural Area (northern forest); thence along said easterly line N 41°09'56" W a distance of 4648.41 feet to a point in the southerly line of the Louisville and Nashville Railroad right-of-way; thence in an eastwardly direction along said southerly line of the Louisville and Nashville Railroad right-of-way to the POINT OF BEGINNING.

EXHIBIT A-3

EXCEPTIONS TO MORATORIUM

On Tier I:

a. Lucius Burch Natural Area Gateway Project, if permitted by the State of Tennessee;
b. Visitors Center/Plough Park Sewer Extension;
c. Public Restroom Construction (Plough Park/Gate 12)
d. Renovation/Expansion of Plough Park for playground equipment; and
e. Shelby Farms Parkway.

On Tier 2:

Construction of improvements devoted exclusively to agriculture, which may include agricultural trade association offices but may not include manufacturing.

Office Space Expansion to Helena Chemical Co. office space - 7664 Moore Road

Agricenter East Pavilion - Clear span addition to main complex facility - 7777 Walnut Grove Road

Monsanto - storage area for equipment and cotton sample office - 7616 Moore Road

Equipment shed area for farm equipment for research vendors - 7518 Moore Road

TCI Landscape - office building adjacent to Quonset Hut - 7546 Moore Road
Farmers Market tent on south side of RV Park-7777 Walnut Grove Road

Parking area for Wildlife Observation Tower

On Tier 3:

Catch'em Lake Bait Shop, restrooms and pavilion area - 6913 Moore Road

On Tier 4:

Buildings to accommodate shows of horse show associations.

Agricenter Show Place Arena restroom upgrades - 105 S. Germantown Parkway

EXHIBIT B

MAP OF TIERS

Tom Leatherwood

Shelby County Register

As evidenced by the instrument number shown below, this document has been recorded as a permanent record in the archives of the Office of the Shelby County Register.

07021070

02/01/2007 - 02:11 PM

23 PGS : R - BASEMENT

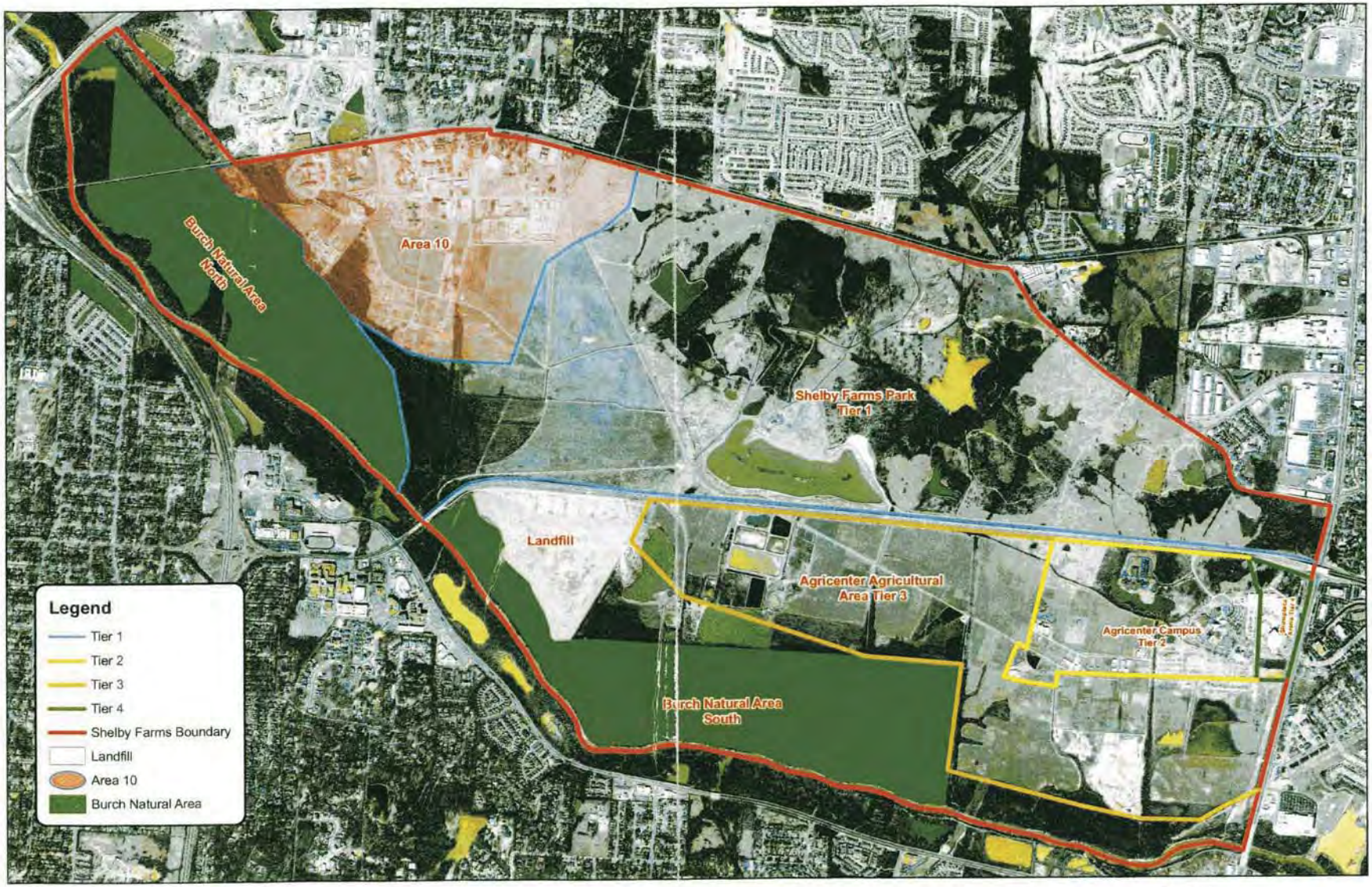
HERTHA 467561-7021070

VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	115.00
DP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	0.00
TOTAL AMOUNT	117.00

TOM LEATHERWOOD

REGISTER OF DEEDS SHELBY COUNTY TENNESSEE

160 N. Main St., Suite 519 ~ Memphis, Tennessee 38103 ~ (901) 545-4366
http://register.shelby.tn.us



0 0.15 0.3 0.6 0.9 1.2 Miles

Exhibit B

Map Date: 8/02/06
Shelby County ReGIS
Aerial Photo courtesy of U.S.G.S.
photography date 2/05

Shelby County Government

A C Wharton, Jr.
Mayor

July 30, 2007

Mr. Gary Fottrell, P.E.
Environmental Program Engineer
Federal Highway Administration
640 Grassmere Park Road, Suite 112
Nashville, TN 37211

RE: Kirby Parkway – Macon Road to Walnut Grove Road
Memphis, Shelby County, Tennessee

Dear Mr. Fottrell,

The proposed Kirby Parkway project from Macon Road to Walnut Grove Road is vital to our citizens and the economic growth of Shelby County. With the support of the Shelby Farms Advisory Team and through information gathered from public comment, Alternative Q was chosen as the preferred alignment through Shelby Farms using the context sensitive process.

As Public Works Director for Shelby County, Shelby Farms falls under my supervision for land management and operational oversight. As such, I work under the guidance and direction of the Mayor of Shelby County.

I understand that Section 4(f) of the U.S. Department of Transportation Act of 1966 affords protection to *significant*, publicly owned and accessible public parks and recreation areas. I would like to provide the following points for your consideration.

- I agree with earlier decisions stating that the Shelby Farms study area **as a whole** is not considered a park. The larger Shelby Farms area is a mixed-use land holding: Shelby County Correctional facilities, Shelby County Road Department, fallow agricultural land used in agricultural pursuits, and casual and/or incidental uses (rifle range, rocket launch, and sport kite field).

- I agree with the Shelby Farms Superintendent that land use in the Shelby Farms study area has not changed to include recreational resources since the Record of Decision for the FEIS was issued in 1991.

- I agree with the Shelby Farms Superintendent that the casual and/or incidental land uses for kite flying and rocket launching can be moved to other locations in

160 North Main Street, Suite 850 • Memphis, TN 38103 • 901-545-4500 • Fax 901-545-4759

Shelby Farms and not impact the activities. Currently, the area used for the rocket launch is only used between two to three times per year and there are numerous alternative sites for this activity in Shelby Farms. The kite flying area is limited to an area of 1,042 feet along Farm Road and 840 feet along Walnut Grove Road for a total of 20.04 acres. This 20.04 acre parcel is bounded to the west and north by areas under cultivation. The Advisory Team's recommended Alternative Q would not adversely impact the kite area. Therefore, while there are numerous alternative sites for this activity in Shelby Farms, relocation of the kite area will not be necessary because of the distance from recommended Alternative Q.

- I agree that Alternative Q does not pass through any new Section 4(f) recreational resource not discussed in the FEIS or Reevaluation. Therefore, the conclusions made in the FEIS and the Reevaluation (2001) regarding Section 4(f) still remain correct.

In conclusion, through consultation with our Shelby Farms Superintendent, I agree with his findings that the project does not affect any Section 4(f) recreational resources.

Sincerely,

Theodore C. Fox, III
Director of Public Works
Shelby County Government

cc: Mayor A C Wharton, Jr.
Shelby County

Tom Love, TDOT

APPENDIX F

FARMLAND CONVERSION FORM

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*

3. Date of Land Evaluation Request: 29 JAN 07
4. Sheet 1 of 1
1. Name of Project: KIRBY PARKWAY
5. Federal Agency Involved: FHWA
2. Type of Project: RECONSTRUCTION/REALIGNMENT
6. County and State: Shelby, Tennessee

PART II *(To be completed by NRCS)*

1. Date Request Received by NRCS: 01-29-2007
2. Person Completing Form: C. LINS
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☒ NO ☐
4. Acres Irrigated: NA
Average Farm Size: 188 ac.
5. Major Crop(s): CORN
6. Farmable Land In Government Jurisdiction: Acres: 380,470 % 76%
7. Amount of Farmland As Defined In FPPA: Acres: 283,300 % 74%
8. Name Of Land Evaluation System Used: SHELBY CO.
9. Name of Local Site Assessment System: NA
10. Date Land Evaluation Returned by NRCS: 01-29-2007

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment			
	Corridor L	Corridor M	Corridor Q	Corridor D
A. Total Acres To Be Converted Directly	74	72	74	
B. Total Acres To Be Converted Indirectly, Or To Receive Services	0	0	0	
C. Total Acres In Corridor	74	72	74	0
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland	23	23	23	
B. Total Acres Statewide And Local Important Farmland	NA	NA	NA	
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	<0.01	<0.01	<0.01	
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	79	79	79	
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	80	80	80	
PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))* — Maximum Points				
1. Area In Nonurban Use — 15	0	0	0	
2. Perimeter In Nonurban Use — 10	0	0	0	
3. Percent Of Corridor Being Farmed — 20	15	15	15	
4. Protection Provided By State And Local Government — 20	0	0	0	
5. Size of Present Farm Unit Compared To Average — 10	0	0	0	
6. Creation Of Nonfarmable Farmland — 25	25	25	25	
7. Availability Of Farm Support Services — 5	0	0	0	
8. On-Farm Investments — 20	10	10	10	
9. Effects Of Conversion On Farm Support Services — 25	0	0	0	
10. Compatibility With Existing Agricultural Use — 10	0	0	0	
TOTAL CORRIDOR ASSESSMENT POINTS — 160	~~0~~ 50	~~0~~ 50	0 50	0
PART VII *(To be completed by Federal Agency)*				
Relative Value Of Farmland (From Part V) — 100	80	80		
Total Corridor Assessment (From Part VI above or a local site assessment) — 160	0 50	0 50	0 50	0
TOTAL POINTS *(Total of above 2 lines)* — 260	0 130	0 130	0	0

1. Corridor Selected:
2. Total Acres of Farmlands to be Converted by Project:
3. Date Of Selection:
4. Was A Local Site Assessment Used? YES ☐ NO ☐

5. Reason For Selection:

Signature of Person Completing this Part: DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

FROM USDA (MON) 1 29 2007 14:45/ST. 14:45/NO. 5011939993 P 2

APPENDIX G

HAZMAT MAP

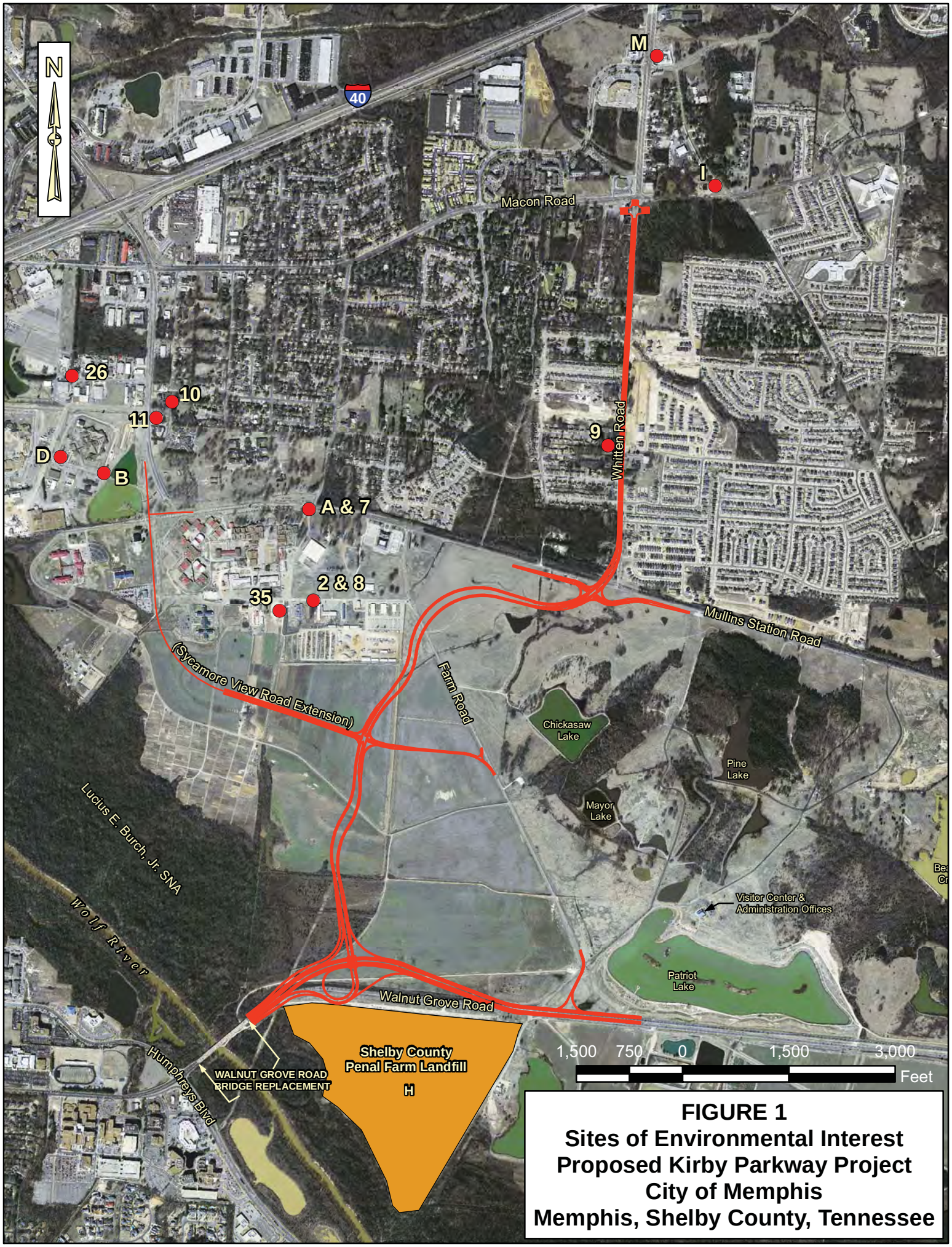


FIGURE 1
Sites of Environmental Interest
Proposed Kirby Parkway Project
City of Memphis
Memphis, Shelby County, Tennessee

APPENDIX H

MEMPHIS AQUIFER INFORMATION

Mapping an aquitard breach using shear-wave seismic reflection

B. A. Waldron · J. B. Harris · D. Larsen · A. Pell

Abstract In multi-layered hydrostratigraphic systems, aquitard breaches caused by faulting or paleo-erosion can allow substantial quantities of water of differing quality to be exchanged between aquifers. Seismic reflection technology was used to map the extent and orientation of an aquitard breach connecting a shallow alluvial aquifer to the deeper semi-confined Memphis aquifer in southwestern Tennessee, USA. Geophysical well logs indicate the presence of the aquitard at borehole locations that define the beginning and end points on two seismic survey lines, which intersect at a borehole where the aquitard is absent. A SE–NW-oriented paleochannel, 350m wide and approximately 35–40m deep, is interpreted from the seismic reflection surveys. The paleochannel cuts through the aquitard and into the upper part of the Memphis aquifer, thus creating a hydraulic connection between the shallow unconfined and deeper, semi-confined aquifers. The results indicate the potential of the shear-wave seismic reflection methods to resolve shallow breaches through fine-grained aquitards given availability of sufficient well control.

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Introduction

In groundwater systems comprising alternating unconsolidated aquifers and aquitards, interaquifer exchange of water influences water quality and assessment of water resource sustainability. The transfer of fresh water between aquifers depends on the aquitard integrity as well as hydraulic head distribution. An aquitard's ability to limit movement of water between adjacent aquifers may be compromised by cross-cutting faults or paleo-erosional features that provide localized short-circuiting. Contaminated water from a shallow aquifer may readily pass through sand and gravel fill of a paleovalley incised into a fine-grained confining unit to reach a deeper water-supply aquifer, for example. These localized discontinuities in an aquitard, termed breaches, can be difficult to identify without extensive subsurface geologic datasets.

Identification and mapping of aquitard breaches are important for source-water assessments and wellhead protection, especially if an aquifer with good water quality is receiving waters of poorer quality from, for example, an unconfined aquifer that is prone to contamination. Larsen et al. (2003a) determined through geochemical modeling and groundwater age-dating that as much as 30% of groundwater pumped from individual production wells in a confined aquifer proximal to a breach in the overlying aquitard came from the shallow aquifer that has water of much poorer quality. Similarly, Gerber and Howard (1996) used isotopic evidence to argue for localized downward vertical leakage through Late Wisconsinan till near Toronto, Ontario (Canada) raising concerns about possible contaminant transport from shallow surficial to deeper aquifers. Timms and Acworth (2002) described a sequence of fresh-water aquifers and aquitards in the Lower Murrumbidgee alluvial fan of the Murray Basin in Australia. Previous paleo-drainage features in this area were identified by van Dijk and Talsma (1964) from outcrop expression at ground surface. Results from Timms and Acworth (2002) using electrical image surveys revealed many more buried paleo-drainage features that were obscured at the surface by an overlying clayey deposit-van Dijk and Talsma (1964) paleo-drainage features account for only 5–20% Timms and Acworth's

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features. This significant increase in the identified number of paleo-drainage features is important as surface irrigation has raised concern regarding the migration of herbicides, pesticides and fertilizers through these aquitard breaches into the lower, partially saturated shallow aquifer.

Water transfer through an aquitard (leakage) can provide a significant source of water to a water-supply aquifer. Bradley and Phatare (1989) described the hydraulic connection between an unconfined aquifer within the Mehsana alluvial plains of the state of Gujarat, India, to underlying confined aquifers separated by a 40–50 m aquitard. The confined aquifers have been over-exploited for purposes of irrigation; therefore, causing a decline in the potentiometric surface and pronounced downward vertical gradient from the phreatic aquifer. Bradley and Phatare (1989) estimate that 90% of the extracted groundwater comes from vertical transfer of water from the phreatic aquifer with only 10% accounted for from lateral movement within the confined system. Brahana and Broshears (2001) developed a numerical model of the Mississippi Embayment in the south-central United States that evaluated groundwater production increases between 1886 and 1985. Mass balance and matching of observed-to-modeled heads were improved by allowing localized leakage through recognized aquitard breaches as well as regional leakage through the aquitard material. Zuber et al. (2000) stated that agreement between modeled and observed water levels in the Oligocene sandy aquifer of the Mazovian basin, Poland, could not be properly modeled without accounting for downward leakage

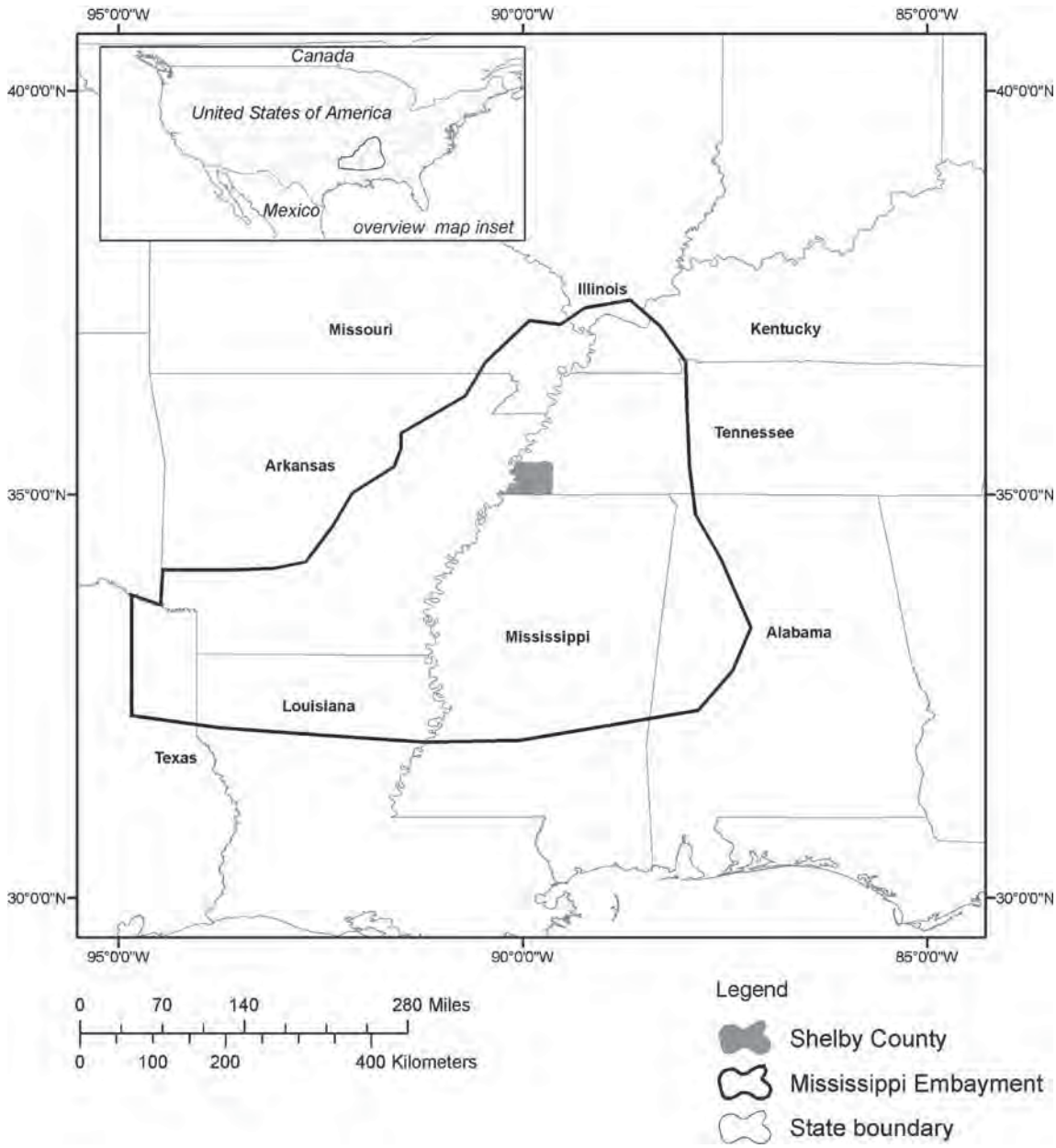

Fig. 1 Location of Shelby County within the Upper Mississippi embayment

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Era	System	Epoch	Geologic group	Geologic unit or formation	Hydrostratigraphic unit
Cenozoic	Quaternary	Holocene		Upper Alluvium	Leaky confining unit
		?			
		Pleistocene		Lower Alluvium	Shallow aquifer
	Tertiary	Eocene	Claiborne	Cockfield	Upper Claiborne confining unit
				Cook Mountain	
				Memphis Sand	Memphis aquifer

Fig. 2 Stratigraphic column of upper Mississippi Embayment for units of interest

through the aquitard; some of this occurring through deeply incised Pliocene deposits, thus connecting the Quaternary and the deeper aquifers. In Ontario, the Regional Municipality of Waterloo, servicing approximately 250,000 people, derives nearly 90% of its drinking water from the complex Waterloo Moraine groundwater system. A numerical model of the multiple aquifer sequence incorporated interaquifer exchange through breaches in the aquitards. Martin and Frind (1998) observed that although aquifer water levels were not sensitive to the presence of these breaches, the effect of this leakage on derived capture zones was profound.

Identification of interaquifer leakage between the shallow and the Memphis aquifers through natural breaches in the Upper Claiborne confining unit dates back

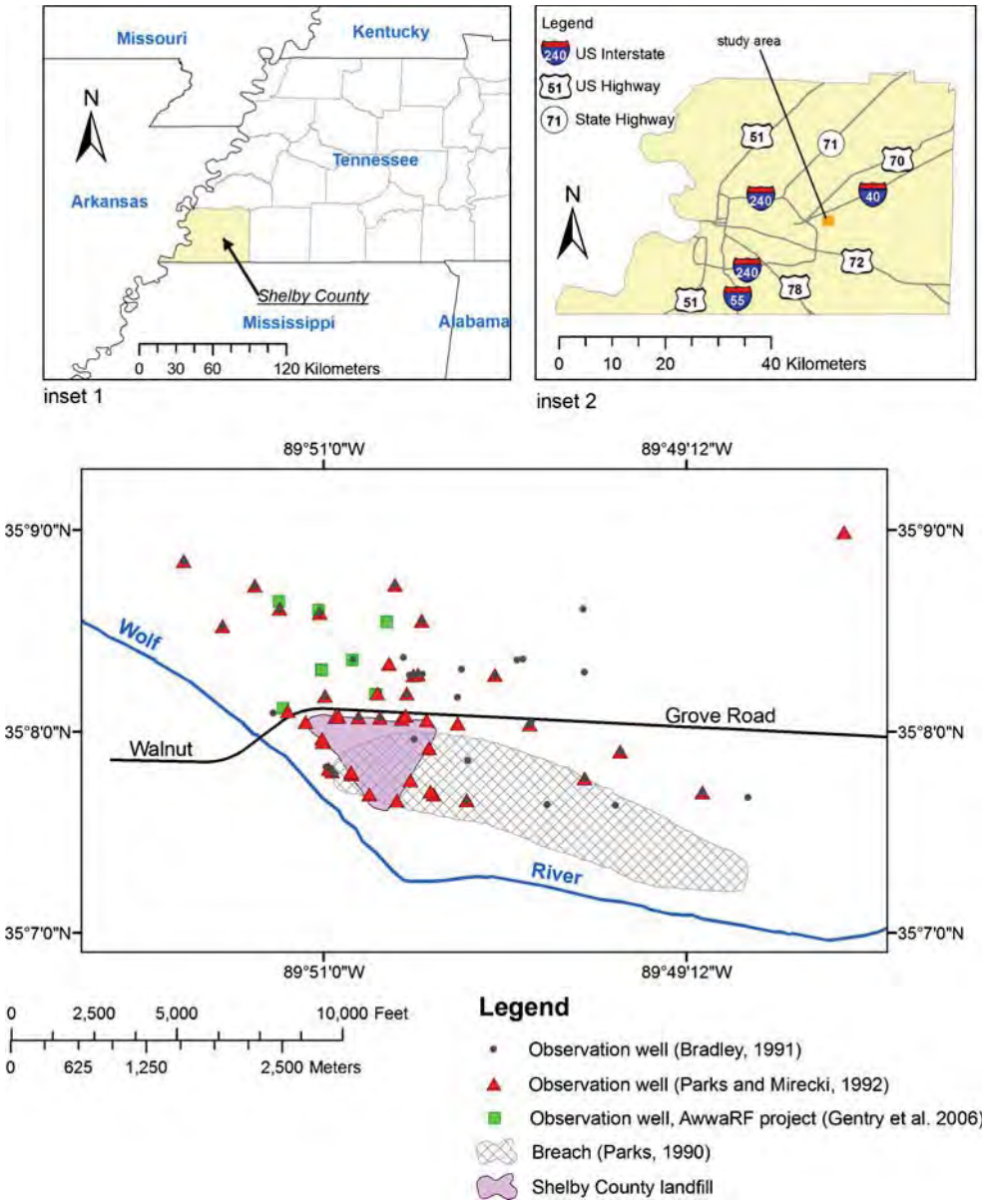

Fig. 3 Study area at Shelby Farms Park in Memphis, Tennessee, north of the closed Shelby County landfill and Walnut Grove Road and east of the Wolf River. Observation wells were installed to monitor leachate migration from the landfill and map the aquitard breach

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to the early 1960s (Criner et al. 1964; Bell and Nyman 1968). Drilling has provided the best indication of the existence of such breaches, yet only serves to represent a point location and not an aerial extent. Analysis of geochemical analyses and environmental tracers using lumped parameter modeling can constrain locations of breaches (Ivey 2003), but again provides limited information on geometry of breaches. Anomalous water-table depressions provide additional means for breach characterization, providing information regarding plausible breach extent and orientation.

In this investigation, seismic reflection methods were used to refine the extent and orientation of an aquitard breach that had previously been identified using borehole, hydraulic, and geochemical data (Bradley 1991; Parks and Mirecki 1992; Gentry et al. 2003, 2006a, b). The seismic data also provide evidence regarding the origin of the aquitard breach that cannot be obtained from the previously employed methods. Seismic reflection methods have been useful in mapping subsurface stratigraphy and structure in regard to groundwater resources (Miller et al. 1994, 1999; Merey et al. 1992; Hammer et al. 2004; Jensen et al. 2002; Sharpe et al. 2003; Shtivelman and Goldman 2000). The results of this study further clarify the capabilities and limitations of seismic reflection methods in assessment of shallow subsurface stratigraphy, and illustrate the utility of the method for identifying the extent and origin of aquitard breaches.

Hydrogeologic setting

The study area lies within the upper Mississippi embayment (Fig. 1), a shallow Cretaceous-Tertiary basin in the south-central United States that is underlain by Paleozoic rocks and filled with over 1,000 m of Cretaceous, Tertiary, and Quaternary sediments (Cushing et al. 1964; Van Arsdale and TenBrink 2000). The embayment sediments form a series of alternating sand aquifers and clay, silt, and sand confining units (Cushing et al. 1964).

Of interest in this study are the Eocene Memphis Sand, Eocene Cook Mountain and Cockfield formations, and various Pleistocene to Holocene loess and alluvial deposits (Fig. 2). The Memphis Sand is composed of fine- to very

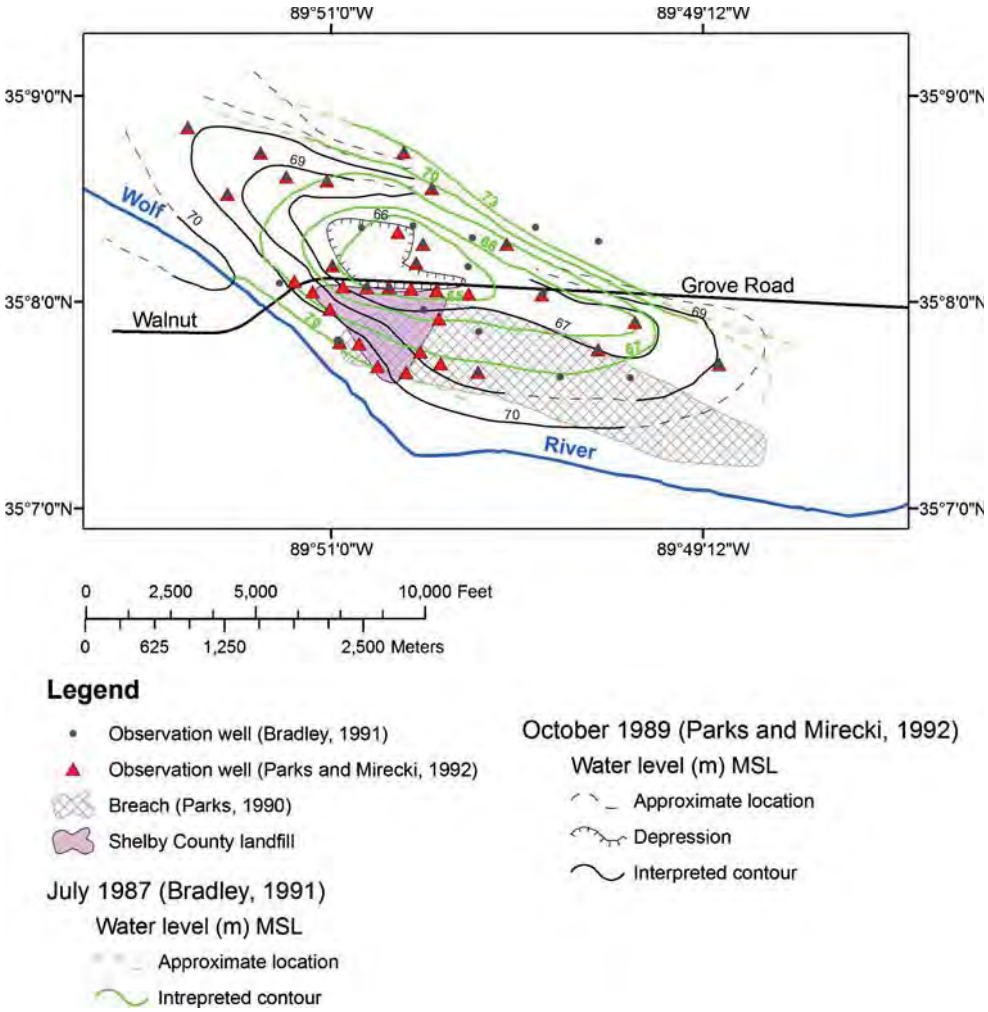

Fig. 4 Water table elevations—m above mean sea level (m MSL)—across the study area of the shallow, unconfined aquifer. Note, contour intervals are not standardized

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coarse-grained sand with subordinate clay and is as much as 240-m thick. The Memphis Sand corresponds directly with the Memphis aquifer, a prolific aquifer that provides water to municipalities and industries throughout the Tennessee-Mississippi-Arkansas region. Overlying the Memphis Sand are mainly fine-grained strata of the Cook Mountain and Cockfield formations. These formations are composed primarily of silty clay interbedded with sand and silt. The Upper Claiborne formations comprise the Upper Claiborne confining unit, which provides confinement for the Memphis aquifer over much of the region; however, sand intervals are locally thick enough to be used as aquifers (Parks and Carmichael 1990) or provide hydraulic communication between the Memphis aquifer and overlying aquifer (Parks 1990; Larsen et al. 2003a, b, c). The Quaternary alluvial deposits include sand and gravel strata of the Pliocene(?) and Pleistocene terrace deposits in the upland areas and lower late Pleistocene and Holocene alluvium in the modern valleys (Carmichael et al. 1997; Larsen et al. 2003c). Blanketing the alluvial deposits is loess and reworked loess of thicknesses ranging from 25 m at the Mississippi bluff line to a few meters in the modern valleys. The Quaternary sand and gravel deposits form a regional shallow aquifer with the overlying loess providing leaky confinement.

Site description

Of the ten identified breaches in the Upper Claiborne aquitard beneath Shelby County (Graham and Parks 1986; Parks 1990; Parks and Mirecki 1992; Parks et al. 1995), a breach identified north of a closed landfill at Shelby Farms was selected for the seismic survey for the following reasons: (1) good well control; (2) the site is part of a 2-km^2 park so surface-generated noise (rail, construction, vehicular traffic) is minimal; (3) geologic cross-sections exist for a portion of the study area; and (4) downward leakage is known to occur from the shallow aquifer to the Memphis aquifer (Fig. 3; Bradley 1991; Parks and Mirecki 1992). Bradley (1991) in cooperation with other agencies conducted a detailed study of the groundwater hydrology and potential leakage near the Shelby Farms landfill. Parks and Mirecki (1992) further investigated the groundwater chemistry proximal to the landfill for potential contamination of the Memphis aquifer. Gentry et al. (2006a, b) studied the groundwater transport process through the breach. A total of 69 observation wells or exploratory boreholes were completed as part of these investigations, thus providing a detailed understanding of the site hydrogeology.

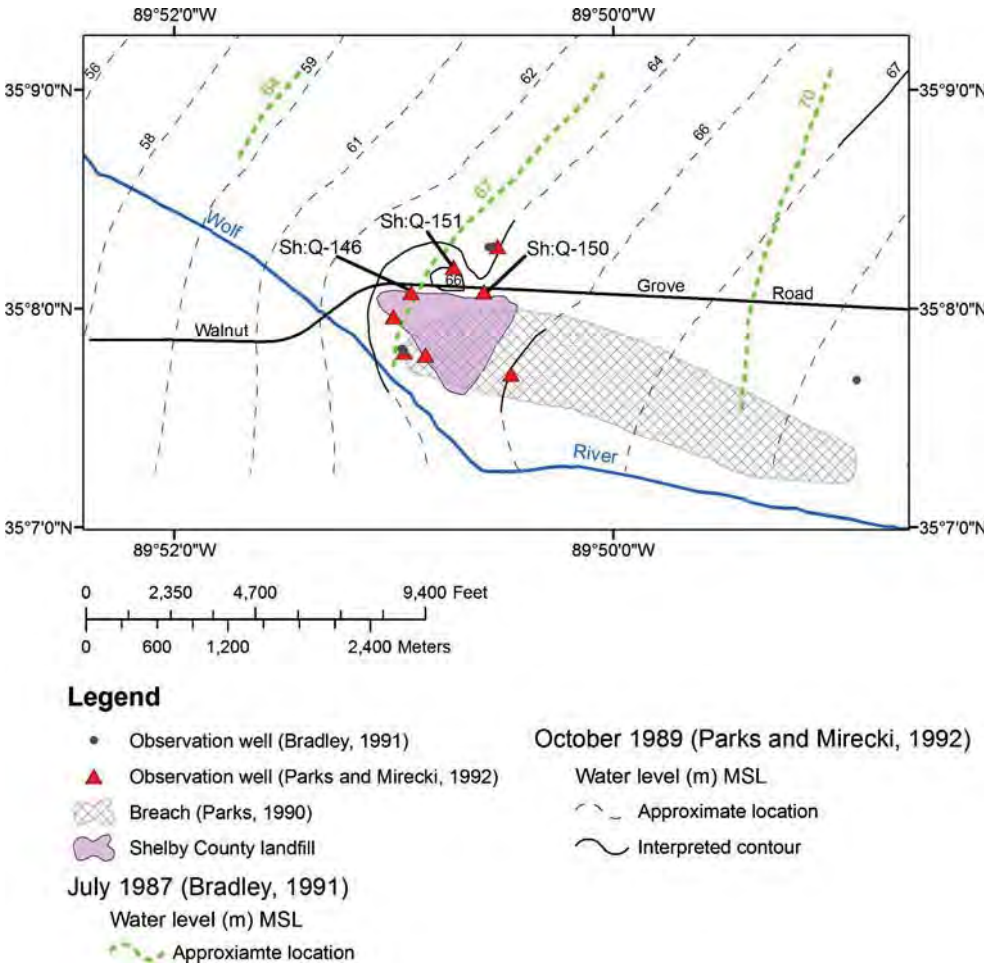

Fig. 5 Potentiometric contours of the Memphis aquifer across the study area. Note: contour intervals are not standardized

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This study focuses on a cluster of wells surrounding well Sh:Q-151 in which the Upper Claiborne confining unit is absent (Fig. 3). The area land use is primarily agricultural with limited open grass field and forest areas. Approximately 3–5 m of loess overlie the shallow aquifer, which ranges from 14 to 17 m thick (Bradley 1988). The Upper Claiborne confining unit underlies the shallow aquifer and ranges in thickness from 0 to 18 m. The underlying Memphis aquifer is approximately 200 m thick.

Past investigations

Water-level measurements were conducted in both the shallow and Memphis aquifers in July 1987 (Bradley 1991) and October 1989 (Parks and Mirecki 1992). The shallow aquifer water levels indicated a persistent depression in the water table north of Walnut Grove with interpreted contours elongated along the course of the Wolf River (Fig. 4). A gradient exists from the Wolf River to the depression in the water table, and flow is corroborated by a calculated reduction in the Wolf River discharge of 0.45 m^3/s—though this is within measurement error (Bradley 1991). Bradley (1991) indicated a gradual gradient in the piezeometric surface of the Memphis aquifer in a W–NW direction, whereas Parks and Mirecki (1992) suggested a slight mounding of the potentiometric surface in the Memphis aquifer north of Walnut Grove in proximity to Sh:Q-151 superimposed on the overall trend shown in Bradley (1991)(Fig. 5).

Parks and Mirecki (1992) constructed two cross-sections, one of which included the segment between wells Sh:Q-146, Sh:Q-151 and Sh:Q-150. All of these

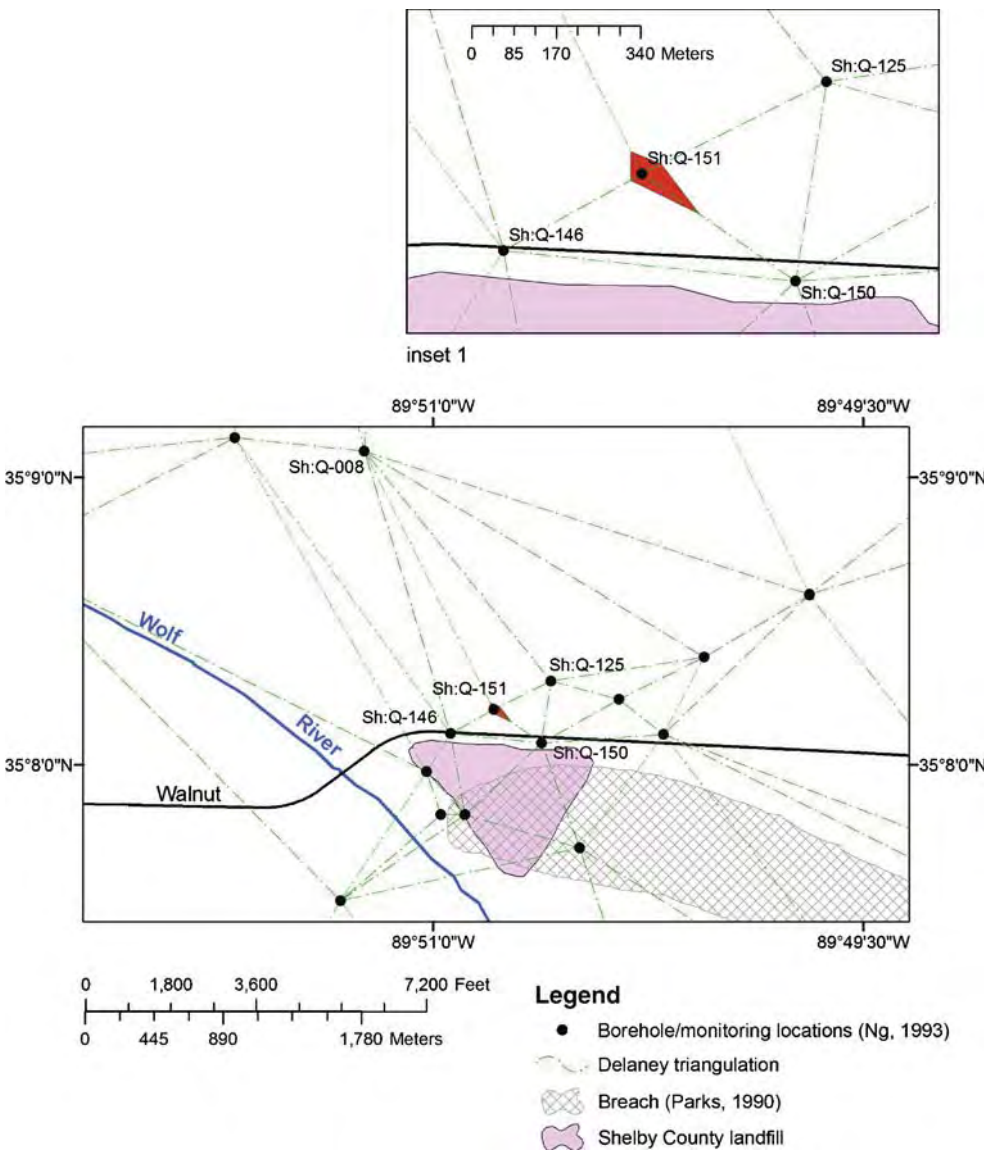

Fig. 6 Delaney triangulation delineation for boreholes used by Ng (1993) to interpolate the thickness of the aquitard separating the shallow aquifer from the Memphis aquifer. *Inset* represents an enlarged view of the aquitard breach mapped by Ng

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observation wells are screened within the Memphis aquifer. Wells Sh:Q-146 and Sh:Q-150 (Fig. 5) indicate thicknesses of aquitard of 11 and 2.5 m, respectively. In their cross-section, the thickness of the confining unit is drawn as an assumed linear reduction in thickness from wells Sh:Q-146 and Sh:Q-150 to Sh:Q-151.

More recent investigations at the Shelby Farms landfill site were conducted by Ng (1993), Gentry (1998), and Gentry et al. (2003), all of whom used numerical modeling studies to estimate the extent of the aquitard breach and groundwater flux to the Memphis aquifer. As part of Ng's work, the extent of the breach north of the landfill, indicated by well Sh:Q-151, was determined through interpolation of well log data using Delauney triangulation (Fig. 6). Delauney triangulation results in breach geometry connecting well Sh:Q-008 with wells Sh:Q-146, Sh:Q-151 and Sh:Q-150 forcing long, thin triangles, an artifact that can limit the ability of the triangulation network to represent local variation (Watson and Philip 1984). Gentry et al. (2003) used a genetic algorithm (GA) to estimate recharge to the Memphis aquifer through the breach north of the landfill, again focusing on the area adjacent to well Sh:Q-151. Their model incorporated aspects of Ng's (1993) numerical model. At specified recharge rates, areas of accretion through suspected thinning or absence of the confining clay were determined with calculated levels of probable occurrence. The resulting area of accretion, which varied in size depending on the recharge rate, was somewhat circular with well Sh:Q-151 forming the centroid.

Gentry et al. (2006a, b) installed more wells at the breach site as well as at several downgradient locations in the Memphis aquifer. They conducted hydraulic testing, sedimentological analyses, chemical and isotopic tracer studies, and further GA modeling to assess groundwater flow rates and processes through the Shelby Farms landfill breach. Although the additional boreholes constrain the extent of the breach and provide additional information regarding its origin, the shape was not further clarified by these efforts.

Seismic data acquisition and analysis

The area of seismic investigation focuses on the water-table depression encompassing well Sh:Q-151, as delineated by Bradley (1991) and Parks and Mirecki (1992) (Fig. 7). A large part of this area is used for crop production and, as a result, at times access to the area was limited. A pilot survey was used to determine if seismic reflection technology had the potential to depict the aquitard at shallow depths.

SH-wave (horizontally polarized) seismic reflection methods have been used to map shallow geologic features in unconsolidated, water-saturated sediments (Suyama et al. 1987; Hasbrouck 1991; Goforth and Hayward 1992; Harris et al. 2000; Young and Hoyos 2001). The choice of SH- as the preferred shear wave phase is based on the idea that SH- signals should be easier to identify because pure SH- energy reflects and refracts only as an SH-wave and, unlike P-waves (compressional wave) and SV-waves (vertically polarized shear wave), does not experience mode conversion. P-wave reflection data are highly influenced (both in quality and geologic significance) by

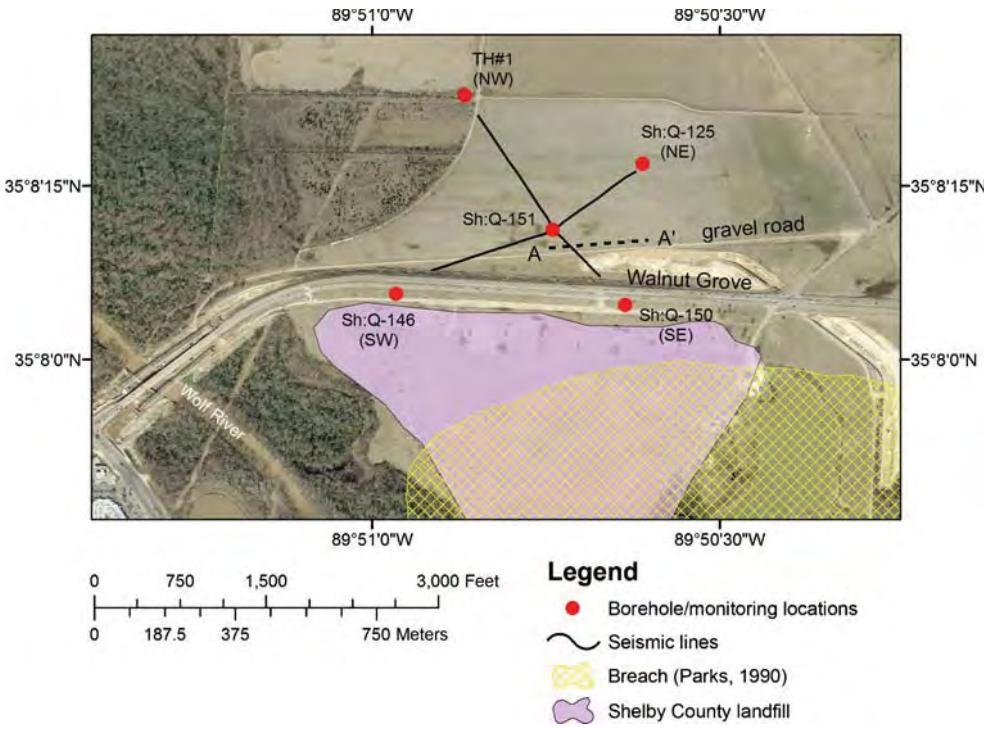

Fig. 7 Aerial photo of study area overlain by the three seismic survey transects: *A–A'*, *SE–NW* and *SW–NE*

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the depth of water saturation in near-surface materials. Because S-waves travel with the velocity of the sediment framework, they are not greatly affected by the degree of saturation, and often lead to more consistent, high-quality data in unconsolidated, water-saturated sediment sequences. Due to the small target size for many shallow reflection surveys, seismic resolution is frequently the most important consideration when choosing a survey method. Although S-waves are rarely observed in the same frequency range as P-waves, in the authors' experience with shallow surveys in the Mississippi Embayment, S-waves commonly have frequencies of 0.5–0.25 to those of P-waves. For seismic energy of the same frequency and because S-waves travel with lower velocities than P-waves, shear wavelengths are shorter and resolution is higher. The higher resolution is particularly evident in water-saturated, alluvial material where the P-wave velocity is regularly 5–10 times higher than the S-wave velocity. Shallow reflections on S-wave field records from the Shelby Farms area show dominant frequencies of 40–50 Hz. Reflection (from shot gathers), refraction (Cramer 2005), and downhole (University of Memphis) S-wave data sets were integrated to develop the velocity functions used in stacking the reflection data. From the frequency and velocity observations, the vertical resolution for the Shelby Farms site was calculated to be between 1.5 and 2.5 m.

The shear (S)-wave seismic method was chosen for the pilot survey based on its ability to provide high-resolution images of near-surface geology in unconsolidated, water-saturated sediments such as those present in the Mississippi Valley (Harris et al. 1998). In addition, a previous study utilizing S-wave reflection methods (Larsen et al. 2003b; Pell et al. 2005) in the Sheahan well field of central Memphis, provided a high-quality image of an erosional swale in the shallow subsurface. The pilot survey (A–A′) was conducted along the shoulder of a gravel access road immediately south of well Sh:Q-151 (Fig. 7). The survey was positioned to cross over areas where the aquitard was present (well Sh:Q-125 with an aquitard thickness of 6 m) to where it was absent near well Sh:Q-151. From prior experience, horizontally polarized geophones were spaced at 2-m intervals, the source for the shear waves was a 1.8-kg sledge hammer struck horizontally against a 10-kg metal I-beam and the reflection data

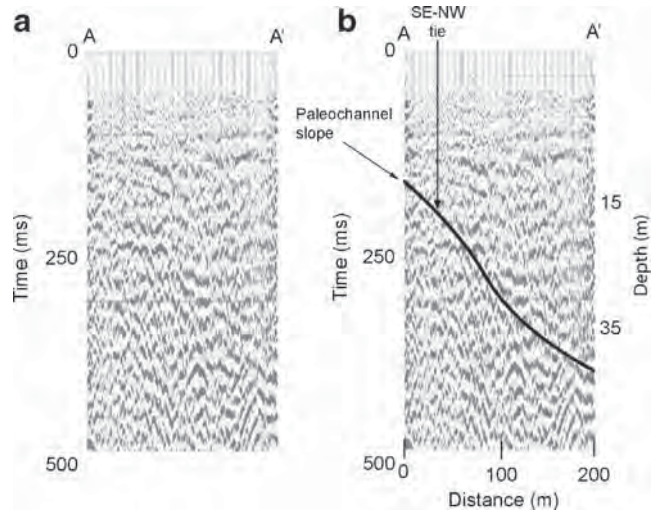

Fig. 8 Seismic profile of transect A–A′ **a** without interpretation and **b** with interpretation

were recorded on a 24-channel engineering seismograph and processed using a standard sequence for shallow CMP (common midpoint) seismic reflection data (i.e., Baker 1999; see Table 1). Data processing followed these steps: reformat to SEGY (Society of Exploration Geophysicists format Y), bad trace edit, first arrival muting, CMP (common-midpoint) sorting, bandpass filter (20–80 Hz), automatic gain control (200 ms window), velocity analysis, normal moveout correction (NMO), and developing the CMP stack (12-fold).

The 12-fold stacked seismic profile indicates a possible erosional structure into the Memphis aquifer with semi-coherent reflection energy, primarily in the 100–350 ms range (10–50 m deep), visible along the length of the line (Fig. 8). Based on the results of previous shallow S-wave seismic reflection profiling in Mississippi valley (Harris et al. 1998), this data set can be considered to be of low to medium quality. The Upper Claiborne confining unit was anticipated to be observed at the eastern margin of the line, then thin and become absent toward the western edge. An east-dipping feature was mapped ranging from approximately 15 m on the west end of the profile to nearly 40 m on the east end of the profile, however. The down-sloping contact is interpreted to be the top of the

Table 1 Seismic data acquisition parameters for pilot and full surveys

Field parameter	Survey line	
	Gravel road (A–A′)	SE–NW and SW–NE
Energy source	1.8-kg sledge hammer/I-beam (5 impacts)	1.8-kg sledge hammer/I-beam (5 impacts)
Source interval	2 m	3 m
Receiver	14-Hz horizontal geophones	14-Hz horizontal geophones
Receiver interval	2 m	3 m
Spread configuration	split spread	split spread
Recording system	Seistronix RAS 24	Seistronix RAS 25
Sample interval	0.25 ms	0.25 ms
Maximum fold	12 fold	12 fold
Field filters	Out	Out
Record length	500 ms	1,000 ms

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Memphis aquifer because the depth of the structure is well below the base of the confining unit interpolated from the four corner control points, boreholes TH#1, Sh:Q-125, Sh:Q-146, and Sh:Q-150. The structure resembles a paleo-erosional feature with horizontal reflections east of the feature boundary suggesting layered depositional fill of a channel. Although data quality was fair, the pilot survey illustrates the potential of seismic reflection to map the extent and possible orientation of the breach.

The full-scale survey was scheduled while the field was fallow. Two survey lines were chosen such that the SE–NW line followed the longitudinal orientation of the water table depression, the SW–NE line traversed the depression (Fig. 7), and the lines intersected at well Sh:Q-151. The NE and NW points were set at well Sh:Q-125 and borehole TH#1, respectively, both with geologic records that penetrated through the aquitard. The SE and SW points fall short of their intended control points, wells

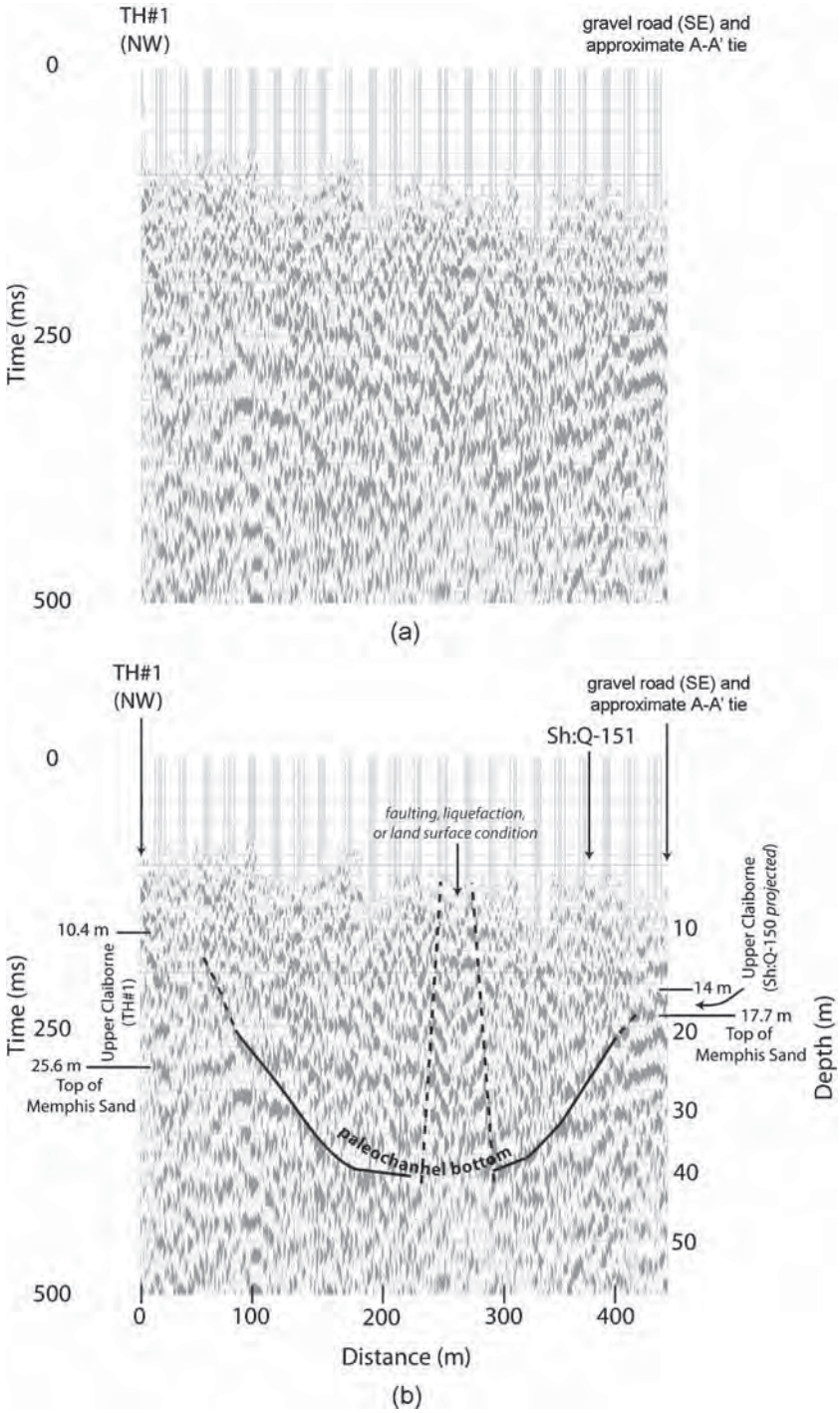

Fig. 9 Seismic profile of transect SE–NW **a** without interpretation and **b** with interpretation. *Dashed lines* indicate possible paleochannel delineation

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ShQ-150 and Sh:Q-146, respectively, because the wells lie on the south side of Walnut Grove Road, a divided four-lane thoroughfare. Thus, the southern portions of the survey lines are truncated prematurely north of Walnut Grove.

The field at the time of the seismic survey was moist after many consecutive weeks of periodic rainfall events. There was concern that the soft soil may allow for slippage of the I-beam seismic source thus reducing energy coupling. There was also concern that wind-induced surface noise and/or traffic noise would negatively influence data quality; however, noise monitoring during the survey indicated a minimal impact. The only change in seismic data acquisition or processing from the pilot survey to the full-scale survey was the use of a 3-m geophone interval (see Table 1). Although overall data quality is fair, well control proximal to the survey line end points allowed the top of the Memphis aquifer to be identified on the profiles with relatively good consistency.

The SE–NW line (Fig. 9) shows strong reflections near the SE termination and weaker reflections approaching the NW control point, borehole TH#1, indicating that a paleochannel feature truncates the Upper Claiborne deposits and uppermost Memphis Sand. Sloping reflec-

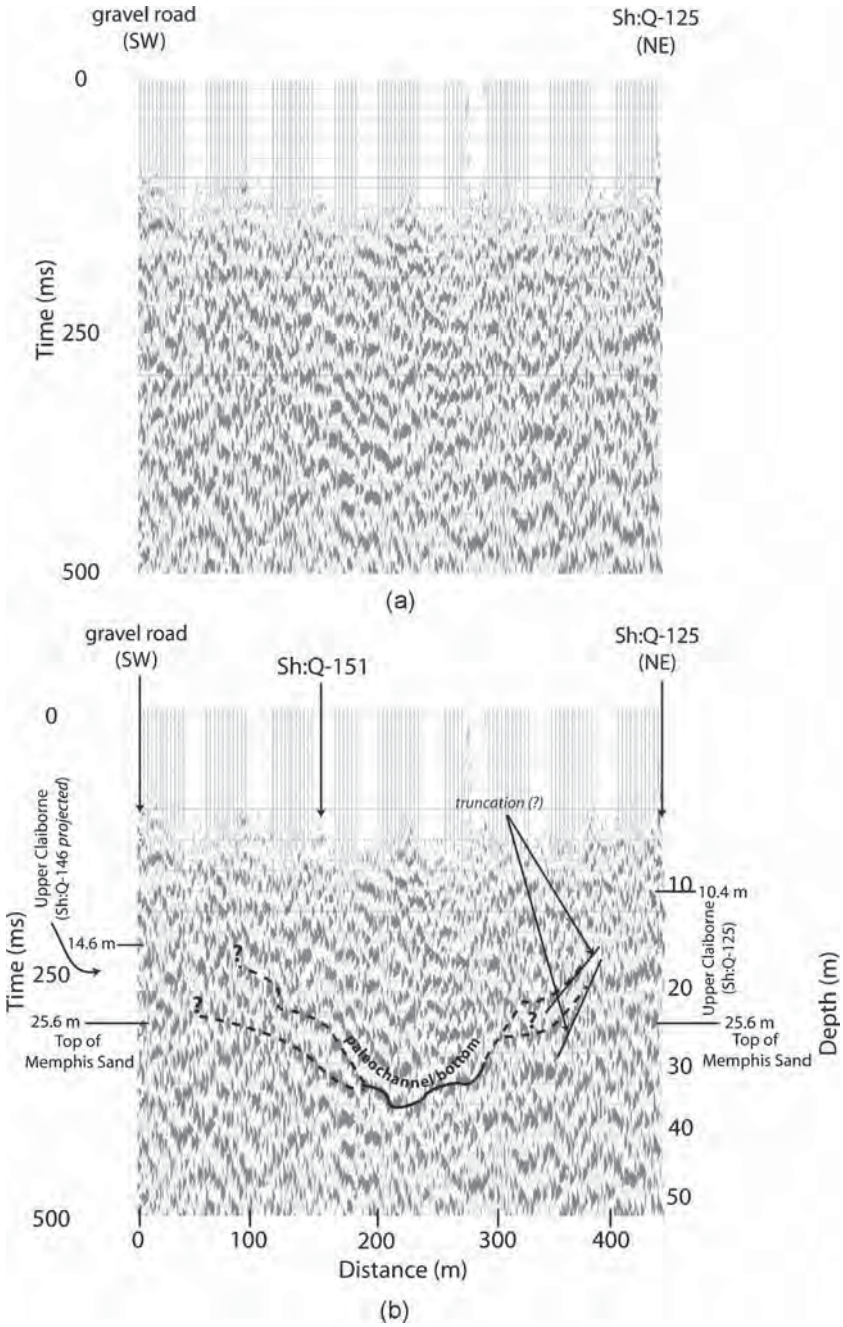

Fig. 10 Seismic profile of transect SW–NE **a** without interpretation and **b** with interpretation. *Dashed lines* indicate possible paleochannel delineation

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tions within the paleochannel follow the general slope of the channel sides and may indicate depositional layering, similar to that observed in the pilot survey. The paleochannel along this orientation is approximately 325 m wide and 30 m deep. An anomalous zone approximately 50 m wide and extending to depth is observed between 200 and 300 m SE of borehole TH#1. The presence of diffractions in this vertically oriented zone suggests a possible geologic structure such as a fault zone or liquefaction vent. Shallow faults (Velasco et al. 2005) and liquefaction (Broughton et al. 2001) have both been identified within the Wolf River floodplain.

The SW–NE line was expected to transect a suspected SE-NW oriented paleochannel or erosional scar; thus, a cross-sectional profile would be revealed by the seismic reflection survey. However, a paleochannel structure is more difficult to interpret in the SW–NE line (Fig. 10). The best well control for this line is at the NE point at well Sh:Q-125. The Upper Claiborne in Sh:Q-125 is identified from the gamma log by two closely spaced, strong gamma signals at 10 m and 19 m (see strong reflector, Fig. 10) followed by a gradual gamma signal decrease (transition) until reaching the Memphis Sand at approximately 25 m. The top of the Memphis Sand in the profile is indicated by a strong reflection signal, then truncated approximately 50 m SW of well Sh:Q-125. Following the paleochannel bank is difficult to the SW, yet the base of the channel is estimated to be at 35 or 40 m below ground surface, thus corroborating the findings from the SE–NW line.

Mapping the paleochannel extent, dimensions and orientation with the pilot survey A–A′, a NW-SE oriented paleochannel is interpreted (Fig. 11), seemingly reversed from the hypothesized profile. The pilot survey begins just outside the western or southern margin of the paleo-erosional feature and terminates within the aquitard breach. The suggested base of the feature mapped in the pilot survey closely approximates the depth mapped in the SE–NW profile.

Discussion

The results of the three seismic surveys have better defined the extent, orientation, and origin of the breach structure north of the Shelby Farms landfill, Memphis, Tennessee. The three seismic lines indicate a paleochannel structure incised through the Upper Claiborne strata and into the Memphis Sand. Drilling returns from borehole Sh:Q-151 (Parks and Mirecki 1992) and cores from adjacent boreholes (Gentry et al. 2006a, b) indicate that the paleochannel feature is filled with fine to medium sand, although some gravel horizons may exist. The paleochannel is approximately 300 m wide, 35–40 m deep and oriented in a SE–NW direction. The delineation of the breach by Ng (1993) using Delauney triangulation was much smaller than the interpreted paleochannel, yet Ng's mapping did indicate a SE–NW orientation. Although the S-wave seismic data quality was fair, seismic reflection in combination with well control and water-level data constrain the breach extent and clarify its fluvial origin.

The lateral continuity of the paleochannel cannot be assessed with the present survey data. Presence of clay in three surrounding boreholes toward the NW section suggests a possible termination; this inference is supported

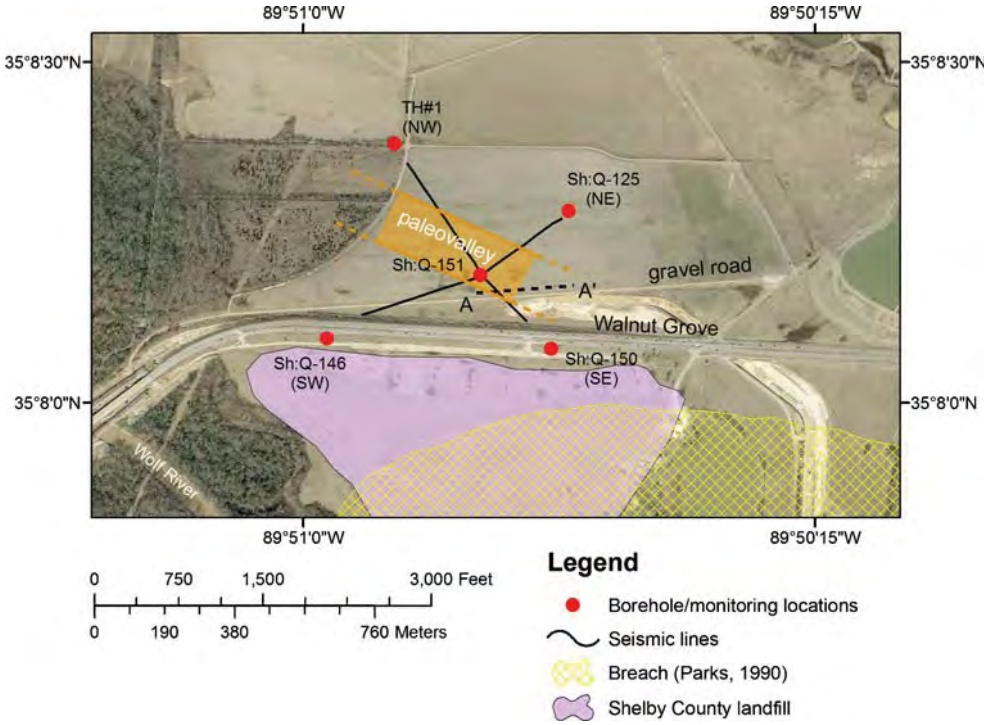

Fig. 11 Location, extent and orientation of a paleochannel forming a breach in the aquitard separating the shallow aquifer from the Memphis aquifer. *Dashing* indicates probable extension of the paleochannel

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further by substantially different water levels in the alluvial and Memphis aquifers (Parks and Mirecki 1992; Gentry et al. 2006a, b). The lack of borehole control and similar water levels in the two aquifers to the SE of borehole Sh:Q-151 suggest that the breach extends or other breaches exist in this direction.

A possible explanation for the low signal-to-noise ratio of the S-wave data is a subsurface with laterally discontinuous units (such as a buried fluvial channel) that would not return strong reflections. More seismic reflection work in the area is required to more fully map the dimensions and path of the paleochannel. Thorough testing of various seismic energy sources in the area, including weight drop, projectile and vibratory sources that generate compressional and shear seismic waves, might improve future survey results and reduce interpretation error. Because low-fold, hammer-impact seismic reflection data commonly have signal-to-noise ratios that are not ideal, only basic processing steps were employed in order to minimize processing artifacts (and maximize interpretation confidence) produced by "over-processing" noisy data. Likewise, migration was not applied as it is not a common step used in processing shallow seismic reflection data (Black et al. 1994). The steep dips on the interpreted paleochannel boundaries are a result of high vertical exaggerations (8–12X) on the plotted seismic sections (Figs. 8, 9, and 10). Actual apparent dips are small, ranging from 6–9°, and migration is unlikely to affect the interpretation.

Beyond the Shelby Farms site, Parks (1990) delineated a number of aquitard breaches that vary in size and shape throughout Shelby County using primarily borehole data. With long-term water production from the Memphis aquifer resulting in a gradient reversal between water levels in it and the unconfined aquifer above, the aquitard breaches will continue to play a large role in the quality and supply of water to the Memphis aquifer. To accurately quantify the water transfer through these breaches in the aquitard and take proactive measures to monitor if not limit human activity in proximity to them, it is imperative that the extent, the origin (e.g., paleochannel, fault, liquefaction, etc.), and the spatial distribution be determined.

Conclusions

A pilot S-wave reflection seismic survey and two full-scale S-wave reflection seismic transects were used to define the extent and origin of a breach through the Upper Claiborne confining at Shelby Farms in Memphis, Tennessee. Previous borehole, hydraulic, and sedimentological studies had established the presence of a breach through the Upper Claiborne confining unit at the site; however, the extent and origin of the breach were still unknown. Although the data quality for the surveys was low to medium, a paleochannel feature that incises through the confining unit and into the upper Memphis Sand was identified. The crossing transects allow determination of a SE–NW trending discontinuity in the fine-grained confining unit strata, which correlates well with stratigraphic control from borehole logs. The results indicate that shallow S-wave reflection seismic methods are useful for detailed characterization of breaches through confining units, especially where suitable borehole log and hydraulic data are available.

Acknowledgements We wish to acknowledge the contributions by the following entities and individuals: The University of Memphis' Ground Water Institute for funding; Ted Fox, Shelby County Director of Public Works, and Steve Satterfield, Shelby Farms superintendent, for site access; and Jack Carmichael, USGS senior hydrologist, for editorial comments and drilling data.

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MEMPHIS LIGHT, GAS AND WATER DIVISION

JERRY R. COLLINS, JR., P.E.
President and CEO

November 9, 2009

Mr. Wain Gaskins
City Engineer Dept.
City of Memphis
125 N Main St., Rm 644
Memphis TN 38103

Dear Mr. Gaskins:

As you know, Memphis is world class when it comes to high quality drinking water. Anything that threatens or has the potential to threaten this resource has to be taken seriously and carefully investigated. MLGW's customers, my staff, and MLGW's Board of Commissioners have called to my attention a potential threat to Memphis and MLGW's greatest natural resource, the Memphis aquifer.

The proposed road in Shelby Farms Park crossing west of Farm Road is located in an area that has been identified in studies as having a direct connection to the Memphis aquifer through hydro geological windows. Dr. Jerry Lee Anderson, Director of the Ground Water Institute at the University of Memphis, has carefully investigated this issue and has made four recommendations for the design, construction, and operation of the proposed road to mitigate any potential effects. I have provided a copy of Dr. Anderson's entire letter for your engineering staff's review. Briefly, Dr. Anderson's recommendations are as follows:

1. A total-containment policy should be adopted for any spills of hazardous or chemical materials on the road crossing Shelby Farms. The use of an in-line oil and grit chamber should suffice to capture oil and grit that might otherwise find their way into the aquifer through the window. Prompt response to such an incident and thoroughly cleaning the spill site including the soil should result in no-spill products reaching the Memphis aquifer.

2. No-fill material should be removed from the Wolf River flood plain that would potentially expose the upper Memphis aquifer.

3. A monitoring program should be initiated to evaluate the down gradient extent of the leachate plume, its direction of migration, and the impacts of decomposition and dilution on leachate contaminants. This would involve periodic sampling of the existing well network for those constituents identified in the Parks and Mirecki report. This information should serve well to evaluate the potential for any spill contents to reach water supplies.

P. O. BOX 430 MEMPHIS, TENNESSEE 38101-0430 TELEPHONE (901) 528-4470 FAX (901) 528-4321

4. All discharge from the proposed road should be discharged as far downstream on the Wolf River as financially feasible. This would ensure any containment introduced into the Wolf River cannot make its way into the aquifer through the windows.

On behalf of MLGW's customers, staff and Board of Commissioners, I would like to ask you to take Dr. Anderson's recommendations into consideration in the design, construction, and operation phases of this project. If clarification is needed on any issue or you want to discuss this further, please do not hesitate to contact me and I will arrange for my staff or Dr. Anderson to meet with you or your staff at your convenience.

Thank you for considering MLGW's customers and Board of Commissioners' request.

Sincerely,

Jerry R. Collins, Jr.

Ground Water Institute

300 Engineering Admin Bldg
Memphis, Tennessee 38152-3170

THE UNIVERSITY OF
MEMPHIS

Office: 901.678.3062
Fax: 901.678.3078

September 9, 2009

Dr. Fred Von Hofe
MLGW Water Quality Laboratory
3937 Grandview Ave
Memphis, TN 38111

Dear Fred;

The staff of the Ground Water Institute was asked to provide a professional opinion regarding the questions that you posed concerning, in general, the impacts of infrastructure activities in the vicinity of Shelby Farms on the quality of water from the Memphis aquifer. The four issues to be addressed are:

1. The actual construction of the proposed roadway crossing west of Farm Road;
2. Runoff from the roadway finding its way into the hydrogeologic window in the vicinity of the closed Shelby Farms landfill and traveling to McCord or Sheahan Pumping Stations;
3. Potential contamination from a major spill on the road way finding its way into the hydrogeologic window and traveling to McCord or Sheahan Pumping Stations;
4. Contamination from major infrastructure improvements such as sewer lines, gas lines, etc.

In general, all of the issues can be succinctly rephrased as "What impacts, if any, will the current and planned activities regarding addition of new infrastructure improvements in the western part of Shelby Farms, namely, the construction of the new road and associated sewer lines crossing west of Farm Road have on the future operation of Sheahan and McCord Pumping stations.

We believe there should be not impacts on the operations of the McCord Pumping Station because it is topographically and geohydrologically upgradient from these activities. The location of the two routes should not even be close to the 10-year capture zone of the McCord Pumping Station. Consequently, only the probable impacts on the Sheahan Pumping Station will be addressed.

Background Information:

In 1986-1987 an investigation of potential leakage of leachate from the Shelby County landfill near Memphis was conducted for the Shelby County Department of Public Works and the Tennessee Department of Public Health and Environment (now Tennessee Department of Environment and Conservation (TDEC)), Division of Solid Waste Management by the United States Geological Survey (USGS). The migration of leachate from the landfill to the shallow alluvial aquifer system and the potential leakage to the confined Memphis aquifer was investigated. Observation wells were installed and water samples were collected to define the potential leachate occurrence.

The investigations determined that a depression or a lowering in the water table within the shallow alluvial aquifer exists north of the now-closed Shelby County landfill at Shelby Farms (Bradley, 1991). Water surface levels within the cone of depression were as much as 14 feet lower than those of the adjacent Wolf River. Recharge from the river and leachate from the landfill was found to be moving toward the depression. The presence of leachate within the shallow aquifer was confirmed from determinations of dissolved solids and dissolved chloride concentrations and comparison with areas upgradient from the affected zone. Additionally, dissolved solids concentrations in water samples from the upper Memphis aquifer near the landfill were higher than in samples from the Memphis aquifer in unaffected areas. Leakage from the alluvial aquifer to the Memphis aquifer was confirmed from chemical analyses and hydraulic head data. Tritium analysis of water from the upper Memphis aquifer

also indicated the presence of modern water. The report found that vertical migration of ground water could transmit leachate down to the Memphis aquifer. The presence of contamination of the alluvial aquifer was confirmed, but chemical data did not demonstrate unequivocally the occurrence of leachate in the Memphis aquifer in this report (Bradley, 1991). This report was inconclusive regarding the presence of contamination in the Memphis aquifer, but strongly indicated leachate movement from the landfill and potential movement of leachate from the landfill to the upper portion of the Memphis aquifer.

Subsequent to the Bradley report in 1991 and as a result of previous findings, the USGS conducted an additional study of the area. This study (Parks and Mirecki, 1992) was conducted in cooperation with the Shelby County Department of Public Works from 1989-1991 to further investigate the hydrogeology and ground water quality specific to the Shelby County landfill in east Memphis. Additional wells were installed and interpretation of the hydrogeologic data again indicated that the confining unit was thin or absent just north of the landfill. A water table map of the landfill vicinity confirmed the existence of a depression in the water table north and northeast of the landfill. Additionally, a map of the potentiometric surface of the Memphis aquifer showed that water levels were anomalously high just north of the landfill, indicating downward leakage of water from the alluvial aquifer to the Memphis aquifer. Analysis of the water quality data for major and trace inorganic constitutes and nutrients confirmed that leachate from the landfill had migrated northeastward in the alluvial aquifer toward the depression in the water table and that contaminants in the alluvial aquifer had migrated downward into the Memphis aquifer. Concentrations of selected constituents in the leachate plume were 2 to 20 times above background concentrations. The major and trace constituents that best characterized the plume were total organic carbon, chloride, dissolved solids, iron, ammonia nitrogen, calcium, sodium, iodide, barium, strontium, boron, and cadmium. The report indicated that several of these contaminants were also found in the Memphis aquifer wells, namely, dissolved solids, calcium, sodium, and possibly ammonia nitrogen, chloride, barium, and strontium. A companion paper by Mirecki and Parks (1994) demonstrated that leachate components in the upper Memphis aquifer could be as much as 37% by volume. The distribution of halogenated alkanes (specifically dichlorodifluoromethane and trichlorofluoromethane) and halogenated alkenes (specifically 1, 2-trans-dichloroethene and vinyl chloride) in samples from wells screened in both the alluvial and Memphis aquifers were similar to the distribution of major and trace inorganic constituents that characterized the leachate plume. The report indicated that the ground water supply most susceptible to this contamination from the Shelby County landfill was the Sheahan well field. No mention was made of pesticides or herbicides that were in use due to the agricultural practices in the immediate vicinity of the depression or "window". It was noted that the Sheahan well field is approximately 5 miles west and downgradient from the landfill in the direction of the groundwater flow. Using an estimated groundwater velocity of 0.5 to 1.5 feet per day in the Memphis aquifer, it was calculated to take from 50 to 150 years for the ground water to travel from the Shelby County landfill to the Sheahan well field. The authors of the report concluded that given the time and distance of the transport, any contaminants in the ground water would not likely persist to reach this well field because of the effects of various physical, chemical and biological processes, including dilution and adsorption.

To further evaluate the potential water quality threats presented by the window north of the Shelby County landfill, Ng (1993) conducted a numerical model study of the ground water flow in the vicinity of the Shelby County landfill. His findings are summarized below. The model incorporated three layers and a 500,000 ft^2 hydrogeologic window between the alluvial aquifer and the Memphis aquifer north of Shelby County landfill. The transient MODFLOW model closely reproduced the measured 1989 water levels. Simulated flows in layer 1 (alluvial aquifer) was primarily towards the window located north of the disposal site. Whereas, simulated flows in layer 2 (Memphis aquifer) was westerly towards the Sheahan well field. The sensitivity analysis of the model indicated that the concept of a relatively impermeable confining unit separating two distinct aquifers was invalid; thus, demonstrating a numerical basis for the window. Results from particle tracking using MODPATH and MODPLOT

indicated the travel time of a particle flowing from the edge of the landfill to the window to be about 2 years. The penetration time through the window was less than 1 year. The travel time from the window to the Sheahan well field was approximately 146 years.

Gentry, (1998) and Gentry et al. (2001; 2003), investigated the use of a genetic algorithm (GA) to determine the flux or flow through the window at the Shelby County landfill. A genetic algorithm (GA) technique was utilized to locate the area of accretion recharge to a semi-confined aquifer and to determine the flux through the probable location of the window. Gentry (1998) determined the flux entering the probable location of the window was about 442,875 ft^3/day or a recharge rate at the window of 0.8 ft/day or greater. However, Gentry et al. (2003) clarified that the GA model cannot uniquely determine the recharge rate without further spatial constraints on the extent of the window location.

Gentry et al. (2006), through a detailed hydrogeologic and tracer study of the study in the vicinity of the Shelby Farms landfill site funded by the American Water Works Association Research Foundation (AwwaRF), further investigated recharge through the hydrogeologic window. Their hydrostratigraphic studies further constrained the size of the window, although clear boundaries could not be constructed. Hydraulic data obtained through grain-size analysis and head levels were used to calculate vertical groundwater velocities of 0.3 to 1.5 ft/day, consistent with a vertical travel time of less than a year estimated by Ng (1993). However, hydraulic data obtained from well tests produced lower hydraulic conductivity values and resulting vertical velocities between 0.002 and 0.015 ft/day. Tritium and helium-3 data yielded recharge rates of 0.003 to 0.013, similar to those of the field hydraulic data. These latter data suggest vertical flux rates approximately 2 orders of magnitude less than that of Ng (1993) and Gentry (1998). However, considering the modeling results of Gentry et al. (2003), they point to a larger window area, consistent with the multiple window hypotheses of Gentry et al. (2006). Tritium/Helium-3 based Darcy velocities between the window and a down gradient site yielded values between 0.2 and 3.6 ft/d, which are higher than velocities obtained from well test data, but are within the range utilized by Parks and Mirecki (1992) in calculating travel time from the Shelby Farms landfill to the Sheahan well field. Water quality data from the Gentry et al. (2006) report extend the influence of leachate in the Memphis aquifer to depths in excess of 200 ft below land surface and 3,600 ft downgradient from the window site.

Most recently, Waldron et al (2009) mapped the aquitard breach north of the Shelby County landfill using seismic reflection. A pilot S-wave reflection seismic survey and two full-scale S-wave seismic reflection transects were used to define the extent and origin of the breach through the Upper Claiborne confining unit at the site. The data quality of the survey was low to medium, but evidence of a 1,100 ft-wide, 35-foot deep paleochannel feature that incised through the confining unit and into the upper Memphis Sand was identified. The crossing transect allowed for the determination of a SE-NW trending discontinuity in the fine-grained confining unit strata which correlated well with the stratigraphic control from borehole logs.

Summary and Conclusions:

With the above information provided as background, there is very little doubt as to the existence of a "window" or vertical leakage path in the vicinity of the area north of the Shelby County landfill. Even with all of the attention given to the size and location, there still remains a doubt as to the extents of the breach or paleochannel. What is known is that the axis of the paleochannel extends from the SE to the NW. It still remains a question as to how far northwest it extends or whether other window features are present in the area. Certainly it could extend and cross the centerline of the proposed route across Shelby Farms. Since the extents of the breach, i.e. width, depths, and length, are not well defined; it would not be in the best interest of protecting the integrity of the Memphis aquifer to allow any construction that would lower the grade of the floodplain. Such construction activities could possibly, depending on depth of excavation, expose the upper part of the Memphis aquifer to direct

contamination from anthropogenic activities and any spill, if not contained on the roadway, could empty directly onto the Memphis aquifer.

Any infiltration of contaminants proximal to the breach north of the Shelby County landfill and within the cone of depression will eventually find their way into the Memphis aquifer. Gentry et al. (2006) has already identified landfill leachate entering into the Memphis aquifer deeper and farther than previously mapped. Of course, any hazardous or chemical material spill on the proposed route in the vicinity of the crossing has a chance of making its way into the existing "window". Bradley (1991) and Waldron (2005) have stated that the Wolf River loses water to the alluvial aquifer proximal to the landfill. Simply capturing road runoff and discharging it westward to Wolf River will not suffice. Road runoff should be discharged further downstream, again away from the present cone of depression centered on the breach. Also, the presence of the new sewer line in the vicinity of the window presents the same dilemma. It seems that no matter how well one tries try to seal sewer line junctions, the possibility of exfiltration from the pipes still exists.

The next question that subsequently arises is "would these sources of additional contamination pose an additional threat to the Sheahan well field?" Parks and Mirecki (1992) indicated that due to the probable retardation and degradation processes during ground-water flow in the Memphis aquifer and the 150-year travel time for leachate from the Shelby County landfill to reach the Sheahan pumping station, the contamination at Shelby Farms was unlikely to cause any problems at production wells. It seems that the addition of any hazard or chemical material from a spill on the route or due to sewer line leakage would be answered the same way. However, this would be true for a substance that would be subject to decomposition, degradation, and/or absorption. Yet, if a substance behaves in a chemically conservative manner (such as MTBE or barium, which are less susceptible to retardation or degradation), then it might very well reach the Sheahan well field. Currently there are no downgradient observations wells in the Memphis aquifer beyond those installed during the AwwaRF study that are available to allow one to monitor the current movement of the known contaminants in the upper Memphis aquifer. An observation well just east of the Wolf River and northwest of the landfill and a second observation well on the west side of Wolf River towards the Sheahan well field would serve as early warning if a contaminant plume is making progress towards Sheahan. Also, through monitoring of existing and additional down gradient wells one should be able to determine if any retardation or degradation processes are affecting leachate concentrations or other contaminants that could later be introduced.

Recommendations:

Given that much is still unknown regarding the ultimate impact of the leachate on the Memphis aquifer and water supplies in the Sheahan well field, any possible introduction of additional contaminants should be viewed in the same light. Therefore, the following recommendations are provided:

1. The true extent of the window or breach should be defined. The breach is anticipated to be larger than what has presently been mapped by Waldron et al. (2009). A combination of geophysical techniques with good well control would be needed to fully map the breach. Recent mapping of the aquitard proximal to the AgriCenter by Waldron and Magnani in 2006 has refined the seismic reflection technique resulting in greatly improved data quality. Knowing the extent of the breach will improve estimates of leakage potential and time of travel and provide planners valuable information that might impact construction such as reducing or eliminating topsoil removal.
2. A total-containment policy should be adopted for any spills of hazardous or chemical materials on the road crossing Shelby Farms. The use of an in-line oil and grit chamber should suffice to capture oil and grits that might otherwise find their way into the aquifer through the window. Prompt response to such an incident and thoroughly cleaning the spill site including the soil should result in no spill products reaching the Memphis aquifer.

3. No fill material should be removed from the Wolf River floodplain that would potentially expose the upper Memphis aquifer.
4. An extensive monitoring program should begin to evaluate the downgradient extent of the leachate plume, its direction of migration, and the impacts of decomposition and dilution on leachate contaminants. This would involve periodic sampling of the existing well network for those constituents identified in the Parks and Mirecki report. This information should serve well to evaluate the potential for any spill contents to reach water supplies.
5. Two additional observations wells should be constructed further downgradient of the breach to monitor the movement of the plume and assist in the determination of the rate of degradation of the chemical contaminants. These two wells may be suitable for well control to conduct the more extensive seismic study reference in 1 above.
6. Recommend that Wolf River discharge measurement be taken at various locations between Germantown Parkway bridge crossing and the I-40 bridge crossing during both low and high flows. This would help in identifying how distant road runoff should be discharged.

If you need further clarification or want to discuss this further, please do not hesitate to contact the Ground Water Institute.

Respectfully submitted;

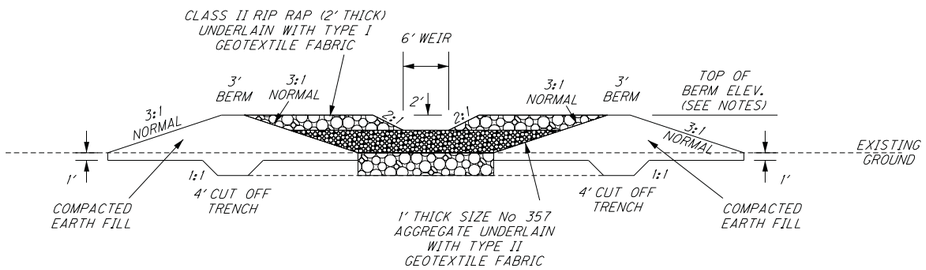
Jerry Lee Anderson, Ph.D., PE, D.WRE, F.ASCE
Director

COUNTY OF	ITEM NO.	SHEET NO.
BARREN	03-13.00	R2G

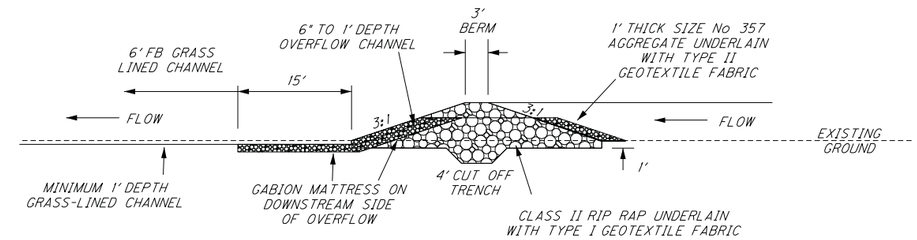
TYPICAL SECTIONS

SINKHOLE PROTECTION BASIN

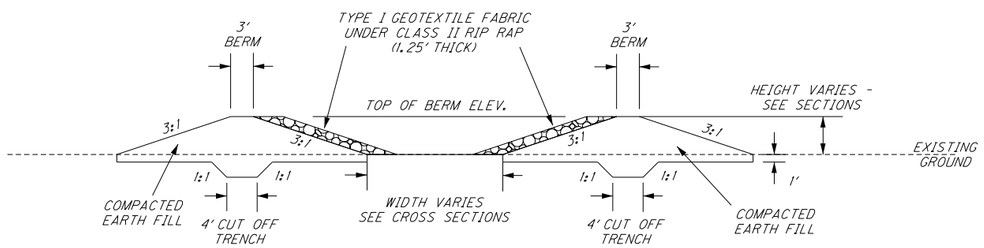
(APART FROM ROADWAY EMBANKMENT)



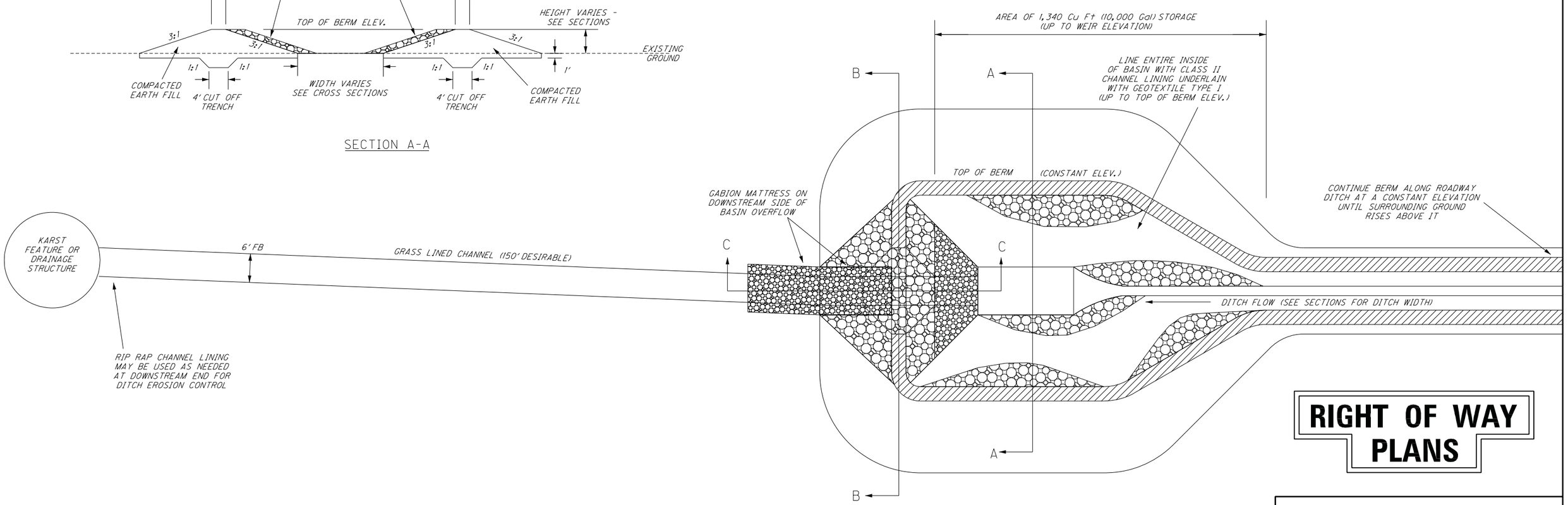
SECTION B-B



SECTION C-C



SECTION A-A



RIGHT OF WAY PLANS

NOT TO SCALE

INTERSTATE 65
SINKHOLE PROTECTION BASIN DETAIL

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5/19/2011

COUNTY OF	ITEM NO.	SHEET NO.
BARREN	03-13.00	R2F

TYPICAL SECTIONS

SINKHOLE PROTECTION BASIN

(CONSTRUCTION NOTES)

THE MINIMUM VOLUME OF THE BASIN IS TO BE 1,340 CUBIC FEET (10,000 GALLONS) AT OR BELOW THE OVERFLOW WEIR ELEVATION. ADDITIONAL VOLUME MAY BE REQUIRED AT THE DISCRETION OF THE ENGINEER. THE BASIN SHOULD BE PLACED SO THAT A MINIMUM OF 100' (150' DESIRABLE) GRASS-LINED CHANNEL CAN BE PLACED BETWEEN THE STRUCTURE AND THE DOWNSTREAM STRUCTURE OR SINKHOLE.

RIP RAP CHANNEL LINING MAY BE USED AT OR NEAR THE SINKHOLE OR DOWNSTREAM DRAINAGE STRUCTURE (AT THE END OF THE GRASS-LINED CHANNEL) AS NEEDED FOR DITCH EROSION CONTROL.

ONLY THE DOWNSTREAM (RIP RAP AND AGGREGATE) PORTION OF THE BASIN IS DESIGNED TO BE POROUS. THE OTHER SIDES SHOULD BE CONSTRUCTED OF COMPACTED CLAY OR OTHER SUITABLE MATERIAL.

BASINS CLOSE TO THE ROADWAY, WHERE THE TOP OF BERM ELEVATION IS WITHIN THE CLEAR ZONE, WILL REQUIRE GUARDRAIL OR OTHER PROTECTION.

THE BASINS ARE DESIGNED TO DETAIN AND MINIMIZE THE POLLUTANTS ASSOCIATED WITH ROADWAY STORMWATER RUNOFF, AND PROVIDE A MEASURE OF PROTECTION FOR NEARBY SINKHOLES AND KARST FEATURES. TO THE MAXIMUM EXTENT PRACTICABLE, ROADWAY RUNOFF SHALL BE KEPT SEPARATE FROM OFF-ROADWAY RUNOFF, AND ROUTED THROUGH A BASIN BEFORE ENTERING A SINKHOLE. ROUTING OF LARGE DRAINAGE AREAS THROUGH A BASIN SHOULD BE AVOIDED.

THE BASIN SHOULD NOT BE PLACED DOWNSTREAM OF ANY PIPE, CULVERT, OR OTHER DRAINAGE STRUCTURE WHOSE HYDRAULIC PERFORMANCE MAY BE AFFECTED BY THE BASIN. WHERE THAT PLACEMENT IS UNAVOIDABLE, HYDRAULIC COMPUTATIONS SHALL BE PROVIDED (STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER) SHOWING THE BASIN HAS NO AFFECT ON THE UPSTREAM STRUCTURE PERFORMANCE. THE COMPUTATIONS WILL BE KEPT ON PERMANENT RECORD WITH OTHER PROJECT DOUMENTATION.

THE TOP OF BERM SHALL BE CONSTUCTED TO BE A MINIMUM DEPTH OF 3' BELOW THE LOWEST AFFECTED ROADWAY SHOULDER ELEVATION, THE LOWEST ENTRANCE OR SIDE ROAD SHOULDER ELEVATION, OR ANY OTHER FLOOD-SENSITIVE STRUCTURE WITHIN THE PONDING LIMITS OF THE BASIN.

THE BASIN MAY BE USED AS A TEMPORARY SEDIMENT CONTROL STRUCTURE PROVIDED:

- ONCE THE ENTIRE BASIN DRAINAGE AREA IS FULLY STABILIZED (PAVED AND/OR FULLY VEGETATED), ALL SEDIMENT IS REMOVED. ALL REMAINING RIP RAP AND AGGREGATE MUST BE CLEAN AND FREE OF SILT AND DEBRIS.
- THE No 357 AGGREGATE AND TYPE II GEOTEXTILE FABRIC MUST BE REMOVED AND REPLACED WITH NEW, CLEAN STONE AND FABRIC.
- THE PERMANENT STORAGE (BELOW THE SPILLWAY) IS A MINIMUM OF 1,340 CUBIC FEET.
- A BELOW-GRADE TRAP FOR SEDIMENT STORAGE (IN OR UPSTREAM FROM THE BASIN) IS SUGGESTED DURING CONSTRUCTION, BEFORE THE DRAINAGE AREA IS FULLY STABILIZED.

SINKHOLE CLASSIFICATIONS

SOURCE: "GROUNDWATER HAZARD MAP OF THE TURNHOLE SPRING KARST GROUNDWATER BASIN" A PRODUCT OF MAMMOTH CAVE AREA INTERNATIONAL BIOSPHERE RESERVE.

SYMBOLS	DESCRIPTION
TYPE V	SOIL COVERED SINKHOLE WITH NO OBVIOUS SINKPOINT, POORLY DRAINED, MAY POND AFTER RAINFALLS, MAY CONTAIN WATER TOLERANT PLANTS.
TYPE IV	SOIL COVERED SINKHOLE WITH NO OBVIOUS SINKPOINT, NO SIGNS OF PONDING, FAIRLY WELL DRAINED.
TYPE III	EXPOSED ROCKBED SINKHOLE WITH NO OBVIOUS SINKPOINT, NO SIGNS OF PONDING, FAIRLY WELL DRAINED.
TYPE II	SOIL COVERED SINKHOLE, OBVIOUS SINKPOINT, VERY WELL DRAINED.
TYPE I	EXPOSED ROCKBED SINKHOLE, OBVIOUS SINKPOINT, VERY WELL DRAINED.
CLASS V INJECTION WELL	A SINKHOLE, CRACK OR FISSURE THAT HAS BEEN MODIFIED OR IMPROVED BY MAN TO ALLOW EFFECIENT DRAINAGE OF SURFACE WATERS.
SWALE	A SHALLOW DEPRESSION ADJACENT TO A ROADWAY WITH NO OBVIOUS SINKPOINT, WATER DRAINS DIFFUSELY INTO THE GROUND.

RIGHT OF WAY PLANS

NOT TO SCALE

INTERSTATE 65
SINKHOLE PROTECTION BASIN NOTES

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APPENDIX I

LIST OF PERSONS RESPONSIBLE FOR PREPARATION OF SFEIS AND THEIR QUALIFICATIONS

This document was prepared by the U.S. Department of Transportation, Federal Highway Administration, and the Tennessee Department of Transportation, with assistance from Palmer Engineering, Inc. Technical assistance was provided by Powers Hill Design, Stantec Consulting Services, Inc., and Panamerican Consultants, Inc.

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Mr. Steve Hill Chief Operating Officer	BS Civil Engineering 32 years experience CSS

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Panamerican Consultants, Inc.

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Mr. C. Andrew Buchner Senior Archaeologist	MA Archaeology 20 years experience Principal Investigator Archaeological Base Study