

LANDSCAPE PERFORMANCE SERIES

presented by the
Landscape Architecture Foundation

Methods Document

Railroad Park

Auburn University

Research Fellow - Charlene LeBleu, FASLA, AICP, Chair Landscape Architecture, Auburn University

Research Assistants - Ryan Bowen, MLA Candidate, Auburn University

Britton Garrett, MLA Candidate, Auburn University

Landscape Architect - Tom Leader Studio

Firm Liaison - Emily Leader, Marketing and Administration Coordinator, Tom Leader Studio

Associate Landscape Architect - Macknally Land Design

This Methods Document accompanies a *Landscape Performance Series* Case Study Brief. It was produced through the Landscape Architecture Foundation's *Case Study Investigation* (CSI) program, a unique research collaboration that matches LAF-funded faculty-student research teams with leading practitioners to document the benefits of exemplary high-performing landscape projects.

The full case study can be found at:

<https://landscapeperformance.org/case-study-briefs/railroad-park>

Landscape Performance Benefits

Environmental Benefits

1. Sequesters approximately 20,000 lbs of atmospheric carbon annually in 531 newly-planted trees, equivalent to driving a single passenger vehicle 21,000 miles. The tree canopies also intercept 92,000 gallons of stormwater runoff annually.

Calculations

The National Tree Benefit Calculator was used to calculate the amount of carbon sequestered by an individual tree in a single year. The species and caliper were chosen in the drop-down menu of the calculator based off of the plant schedule of the planting plan. If a caliper range was given, the lower end of the range was used. For river birch, the only multi-trunk tree specified, it was assumed that 3 leaders were typical. For evergreen trees specified at a particular height instead of caliper, an estimate was made based off of similar observed species. As part of the National Tree Benefit Calculator, the amount of stormwater captured by a plant's physical structure is also estimated.

20,822 total lbs of atmospheric carbon sequestered as estimated by the National Tree Benefit Calculator (see Appendix A).

Per the United States Environmental Protection Agency Greenhouse Gas Equivalencies Calculator, that amount of carbon is comparable to 21,742 miles driven by an average passenger vehicle.

The estimate from individual trees was multiplied by the number of a given species, then all were added to produce total stormwater capture (see Appendix A).

Limitations

This number does not take into account any of the shrubs or perennials within the park. Wax myrtle was included in the planting plan as a tree; however, it is often considered a large shrub and was not available in the National Tree Benefit Calculator so it is not reflected in this number. These calculations are estimations based off of the trees at installation and are expected to increase as time passes.

Sources

National Tree Benefit Calculator - Davey Tree Experts and Casey Trees

Planting schedule provided by Emily Leader of Tom Leader Studios

United States Environmental Protection Agency Greenhouse Gas Equivalencies Calculator. Accessed May 16, 2017: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

2. Increased the number of bird species observed on the site by 250%, from an estimated 10 to 35, including the bobolink, wood duck, peregrine falcon, loggerhead shrike, and northern mockingbird.

Information provided by the Birmingham Audubon Society indicates 35 bird species observed within park boundaries since the establishment of Railroad Park. The Society estimates 10 species observed before the park's establishment, which indicates a 250% increase in species present.

Calculations

*Formula for Percent Change $((y-x)/x) \times 100$
 x represents pre-development, y represents post-development*

$$\begin{aligned}(35-10) &= 25 \\ 25/10 &= 2.5 \\ 2.5 \times 100 &= 250\%\end{aligned}$$

Limitations

36 birds were spotted, however one (American white pelican) was discounted because it was flying over the park and not actually within it.

Sources

Greg Harber, Birmingham Audubon Society, Board Member (see Appendix B).

Social Benefits

1. Attracts over 600,000 visitors annually.

Calculations

"The park attracted 600,000 visitors in 2014 and already had exceeded that number by August of 2015."

Limitations

Information attributed to source cited; researchers did not independently verify data.

Source

Stein K. "Railroad Park turns 5: How it reignited civic pride, inspired development and transformed a district"; AL.com. Sept. 20, 2015. Accessed June 1, 2017:
http://www.al.com/news/birmingham/index.ssf/2015/09/railroad_park_5th_anniversary.html

2. Improves the perception of Downtown Birmingham for 98% of 95 survey respondents and improves the unification of the northern and southern parts of the city for 92% of respondents.

Calculations

93 of the 95 respondents said that the park has helped improve city perceptions. 70 respondents claimed the park improved North/South unification "very much" while an additional 17 claimed "somewhat."

$$\begin{aligned}\text{City Perceptions} \\ 93 \div 95 = .979 \times 100 = 97.9\% \approx 98\%\end{aligned}$$

$$\begin{aligned}\text{Unification} \\ 70+17=87 \\ 87 \div 95 = .916 \times 100 = 91.6\% \approx 92\%\end{aligned}$$

Limitations

None

Sources

Survey Questions 9 and 11 (see Appendix C).

3. Influenced the housing choice of 43% of 63 survey respondents who live near the park.

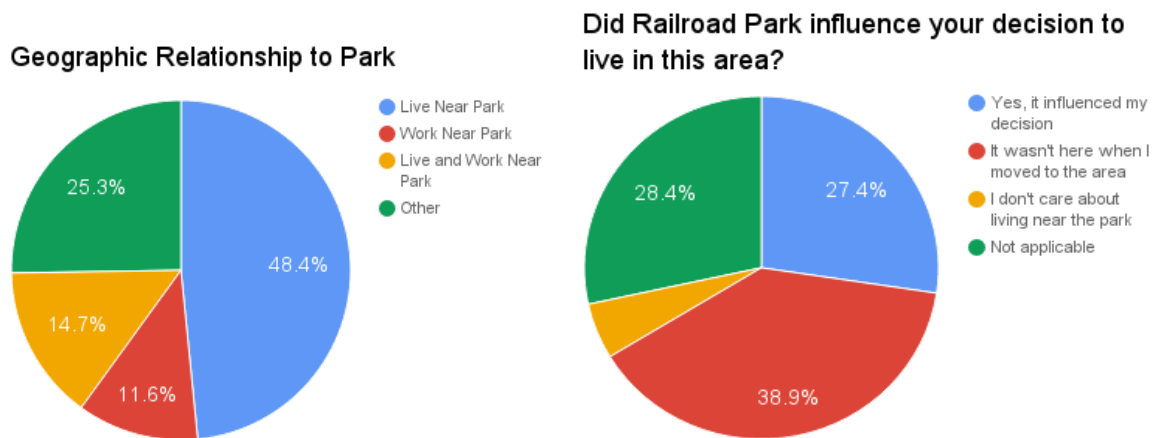
Calculations

Of the 95 survey respondents, 60 claimed to live or live and work near the park. In a separate question, 26 respondents said the park did influence their decision in their housing choice.

$$26 \div 60 = 0.4333 = 43\%$$

Limitations

There is a slight discrepancy between Question 4 and Question 8. Question 4 established that 60 people live near the park. However, Question 8 implies that possibly 68 people live near the park. The housing choice summary statistic does not take into account the fact that a portion of the 60 respondents already lived in the area prior to the park's construction.



Sources

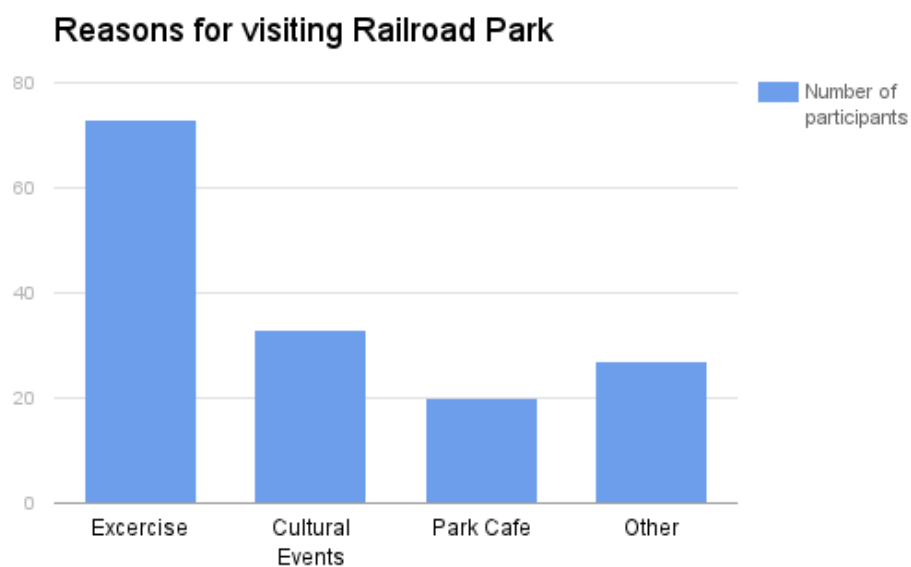
Survey Question 4 (see Appendix C).

4. Serves as a place to exercise for 77% of 95 survey respondents.

Calculations

Of 95 survey respondents, 73 claimed to use the park for exercise.

$$73 \div 95 = .768 \times 100 = 76.8\% \approx 77\%$$



Limitations

“Exercise” was not defined, leaving it open to interpretation for the survey respondents.

Sources

Survey Question 7 (see Appendix C).

Economic Benefits

1. **Catalyzed \$324.5 million in public and private investment in the area since the park’s opening, with over \$200 million more in private investment in the works.**

“The area has seen \$324.5 million in public and private investment in the past few years, and more than \$200 million more in private investment is in the works.”

Limitations

Information attributed to source cited; researchers did not independently verify data.

Source

Stein K. “Railroad Park turns 5: How it reignited civic pride, inspired development and transformed a district”; AL.com. Sept. 20, 2015. Accessed June 1, 2017:
http://www.al.com/news/birmingham/index.ssf/2015/09/railroad_park_5th_anniversary.html

Appendix A - National Tree Benefits Calculator Results

Tree Species		# of Trees	Height	Caliper (inches)	Stormwater per tree (gal)	Total Stormwater (gal)	Carbon per Tree (lbs)	Total Carbon (lbs)	
Acer saccharum	Sugar Maple	22		3	157	3454	53	1166	
Betula nigra 'Dura Heat'	River Birch	18	16'	2.5	206	3708	41	738	*3 trunks, 1.5 in caliper
Betula nigra "dura heat"	River Birch	53	10'	1.7	102	5406	15	795	*3 trunks, 1 in caliper
Cercis canadensis	Oklahoma Redbud	22		2.5	154	3388	30	660	
Crataegus phaenopyrum 'Washington'	Washington Hawthorn	19		2.5	154	2926	30	570	
Fagus grandiflora	American Beech	15		2.5	117	1755	30	450	
Fraxinus pennsylvanica 'Urbanite'	Urbanite Ash	39		4	211	8229	59	2301	
Gleditsia triacanthos inermis 'Shademaster'	Thornless Honey Locust	4		4	211	844	59	236	
Ilex opaca 'Greenleaf'	Greenleaf Holly	31	10'	2	52	1612	11	341	
Liriodendron tulipifera	Tulip Poplar	18		3	148	2664	40	720	
Magnolia grandiflora	Alta Magnoli	15	10'	2	114	1710	9	135	

a 'Alta'	a								
Magnolia virginiana 'Australis'	Sweetbay Magnolia	12	10'	2	141	1692	25	300	
Myrica cerifera	Wax Myrtle	0	8'	2		0		0	*Not available within iTree-often considered shrub.
Nyssa sylvatica	Black Gum	44		3	272	11968	57	2508	
Pinus virginiana	Virginia Pine	26	10'	2	60	1560	7	182	
Pistacia chinensis	Chinese Pistache	20		4	402	8040	89	1780	
Quercus lyrata	Overcup Oak	60		3	272	16320	57	3420	
Quercus nutallii	Nutall Oak	13		3	148	1924	40	520	
Taxodium distichum	Bald Cypress	50		3	148	7400	40	2000	
Ulmus americana 'Princeton'	American Elm	50		3	148	7400	40	2000	
Totals		531				92000		20822	

Bird Count Information

- Ovenbird B
- Warbler, Worm-eating B
- Waterthrush, Louisiana B
- Northern Warbler, Golden-winged
- Blue-winged B
- Black-and-white B
- Prothonotary B
- Swainson's B
- Tennessee Orange-crowned
- Nashville Connecticut
- MacGillivray's Mourning Kentucky B
- Yellowthroat, Common B
- Warbler, Hooded B
- Redstart, American B
- Warbler, Cape May
- Cerulean B
- Parula, Northern B
- Warbler, Magnolia Bay-breasted
- Blackburnian Yellow B
- Chestnut-sided B
- Blackpoll Black-throated Blue
- Palm Pigeon B
- Yellow-rumped Yellow-throated B
- Prairie B
- Black-thr. Gray Black-thr. Green B
- Canada Wilson's
- Redstart, Painted Chat, Yellow-breasted B
- Towhee, Green-tailed Eastern B
- Sparrow, Bachman's B
- American Tree Chipping B
- Clay-colored Field B
- Vesper Lark B
- Bunting, Lark Sparrow, Savannah
- Grasshopper B
- Henlow's Le Conte's Nelson's Seaside B
- Fox Song B
- Lincoln's Swamp
- White-throated 6-10
- Harris's
- White-crowned Junco, Dark-eyed
- Tanager, Summer B
- Scarter B
- Western Cardinal, Northern B
- Grosbeak, Rose-breasted Black-headed Blue B
- Bunting, Lazuli Indigo B
- Painted B Dickcissel B
- Bobolink Blackbird, Red-winged B
- Meadowlark, Eastern B
- Western Blackbird, Yellow-headed
- Rusty Brewer's
- Grackle, Common B
- Boat-tailed B Cowbird, Shiny
- Bronzed Brown-headed B
- Oriole, Orchard B
- Hooded Baltimore's
- Finch, House B
- Purple Crossbill, Red B
- White-winged Redpoll, Common
- Siskin, Pine
- Goldfinch, American B
- Grosbeak, Evening Sparrow, House B
- Hypothetical Species Garganey Hawk, Ferruginous Crane, Whooping Woodcock, Eurasian
- Ter, Roseate Swift, Vaux's Hummingbird, Blue-thr. Vireo, Plumbeous Warbler, Kirtland's Townsends
- Towhee, Spotted Grackle, Green-tailed
- Extirpated Species Woodpecker, Ivory-billed B
- Extinct Species Pigeon, Passenger Parakeet, Carolina Warbler, Bachman's B



FIELD NOTES



Funding for this publication was provided by the Wildlife Restoration Program and the Alabama Division of Wildlife and Freshwater Fisheries with funds provided by hunting licenses and equipment.



Copies of this field card and additional information may be obtained from the Alabama Ornithological Society, P.O. Box 1325, Dauphin Island, AL, 36528, the A.O.S. website at <http://www.aosbirds.org>, or the Outdoor Alabama Watchable Wildlife website at <http://www.outdooralabama.com/watchable-wildlife/>.

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BIRDS OF RAILROAD PARK

FIELD CHECKLIST OF ALABAMA BIRDS

PROVIDED BY:

ALABAMA ORNITHOLOGICAL SOCIETY
 ALABAMA WILDLIFE AND FRESHWATER FISHERIES DIVISION

Date: Multiple Time: _____

Locality: Railroad Park, Birmingham, AL

Observers: Multiple, mostly Greg Harber

Weather: _____ Total Species: _____

This field card is based on the decisions of the Bird Records Committee of the Alabama Ornithological Society as of October 2013. Sightings of species that are boldfaced or listed as "Hypothetical" should be reported with full written details (a Rare Bird Report, for example). *Italicized* species often need written details, but these may be brief, listing only the diagnostic points used in the identification. Out-of-season and locally rare birds also should be documented. Reports should be submitted to Greg D. Jackson, 2220 Bancberry Drive, Birmingham, AL 35244, g_d_jackson@bellsouth.net. Species marked as "B" are known to have attempted breeding in the state. Those listed as "Hypothetical" have sightings with acceptable documentation, but are not validated by physical evidence (specimens or photographs) or have not been verified by several experienced observers. Taxonomy follows the seventh edition of *The A.O.U. Check-list of North American Birds* (through 54th Supplement 2013).

- Whistling Duck, Blk.-b. B
- Fulvous B
- Goose, Gr. White-fronted
- Snow
- Ron's Brant
- Goose, Cackling
- Canada B
- Swan, Trumpeter
- Tundra Gadwall B
- Duck, Wood B
- Wigeon, Eurasian
- American Duck, American Black B
- Mallard B
- Duck, Mottled B
- Teal, Blue-winged B
- Cinnamon Shoveler, Northern B
- Pintail, White-checked
- Northern Teal, Green-winged Canvasback
- Redhead Duck, Ring-necked
- Scap, Greater
- Lesser Elder, King
- Duck, Harlequin
- Scoter, Surf
- White-winged
- Duck, Long-tailed
- Bufflehead Goldeneye, Common
- Merganser, Hooded B 6-10
- Common Red-breasted
- Duck, Ruddy
- Bobwhite, Northern B
- Grouse, Ruffed B
- Turkey, Wild B
- Loon, Red-throated
- Pacific Grebe, Pied-billed B
- Horned Red-necked
- Eared Yellow
- Western Shearwater, Cory's
- Great Sooty
- Audubon's
- Storm-Petrel, Wilson's
- Leach's Band-rumped
- Tropicbird, Red-billed
- Siskin, Wood B
- Frigatebird, Magnificent
- Booby, Masked
- Brown
- Gannet, Northern Cormorant, Neotropic
- Double-crested B Great
- Anhinga B Pelican, American
- White-winged 6-10
- Brown B
- Bittern, American
- Least B Heron, Great Blue B
- Egret, Great B
- Snowy B
- Heron, Little Blue B
- Tricolored B
- Egret, Reddish B
- Cattle B
- Heron, Green B
- Night-Heron, Black-cr. B
- Yellow-crowned B
- Ibis, White B
- Glossy B
- White-faced B
- Spoonbill, Roseate
- Vulture, Black B
- Turkey B Osprey B
- Kite, Swallow-tailed B
- White-tailed Mississippi B
- Eagle, Bald B
- Harrier, Northern
- Hawk, Sharp-shinned B
- Cooper's B
- Goshawk, Northern
- Hawk, Red-shouldered B
- Broad-winged B
- Short-tailed Swainson's
- Red-tailed B
- Rough-legged Eagle, Golden
- Bald, Yellow
- Black
- Clapper B
- King B
- Virginia B
- Sora

- Gallinule, Purple B
- Common B
- Coot, American B
- Limpkin
- Crane, Sandhill B
- Silt, Black-necked B
- Avocet, American
- Oystercatcher, American B
- Plover, Black-bellied Golden-Plover, American
- Plover, Snowy B
- Wilson's B
- Semipalmated Piping
- Killdeer B, w/ chick
- Plover, Mountain
- Sandpiper, Spotted B
- Sandpiper, Solitary
- Yellowlegs, Greater
- Willet B
- Yellowlegs, Lesser
- Sandpiper, Upland
- Whimbrel
- Curlew, Long-billed
- Godwit, Hudsonian
- Marsh
- Turnstone, Ruddy
- Knot, Red
- Ruff
- Sandpiper, Sharp-tailed
- Silt
- Curlew Sandpiper
- Duetin
- Sandpiper, Purple
- Baird's
- Least
- White-rumped
- Buff-breasted
- Pectoral Semipalmated
- Western Dowitcher, Short-billed
- Long-billed
- Snipe, Wilson's
- Woodcock, American B
- Phalarope, Wilson's
- Red-necked
- Red
- Jaeger, Pomarine
- Parasitic
- Long-tailed
- Razor-bill
- Kittiwake, Black-legged
- Gull, Ivory
- Sabine's Bonaparte's
- Little Laughing B
- Franklin's Ring-billed
- California Herring B
- Brewer's Iceland
- Lesser Black-backed
- Glaucous-winged
- Gleaner
- Great Black-backed
- Noddy, Brown
- Tern, Sooty B
- Bridled
- Least B
- Gull-billed B
- Caspian B
- Black Common B
- Forster's B
- Royal B
- Sandwich B
- Skimmer, Black B
- Pigeon, Rock B
- Band-tailed
- Collared-Dove, Farsman B
- Dove, White-winged B
- Mourning B
- Inca B
- Ground-Dove, Common B
- Owl, Barn B
- Cuckoo, Yellow-billed B
- Mangrove Black-billed B
- Ani, Groove-billed
- Barn B
- Flammulated Screech-Owl, Eastern B
- Owl, Great Horned B
- Snowy Burrowing
- Barred B
- Long-eared
- Short-eared Northern Saw-whet
- Nighthawk, Lesser
- Common B 6-10
- Chuck-will-widow B
- Whip-poor-will, Eastern B
- Swift, Black
- Chimney B
- Violetear, Green

- Hummingbird, Magnif.
- Ruby-throated B
- Black-chinned
- Anna's
- Costa's B
- Broad-tailed Rufous
- Allen's
- Calliope
- Broad-billed B
- Kingfisher, Belted B
- Woodpecker, Red-head B
- Red-billed B
- Sapsucker, Yellow-bellied
- Woodpecker, Downy B
- Hairy B
- Red-cockaded B
- Flicker, Northern B
- Woodpecker, Pileated B
- Caracara, Crested
- Kestrel, American B
- Merlin
- Falcon, Peregrine B
- Prairie Flycatcher, Olive-sided
- Wood-Pewee, Eastern B
- Flycatcher, Yellow-bellied
- Acadian B
- Alder
- Willow B
- Least
- Hammond's
- Dusky Pacific-slope/Cord.
- Phoebe, Eastern B
- Say's
- Flycatcher, Vermilion
- Ash-throated
- Great Crested B
- Brown-crested
- La Sagra's
- Sulphur-bellied
- Kingbird, Couch's
- Western
- Eastern B
- Gray B
- Flycatcher, Scissor-tailed B
- Fork-tailed
- Shrike, Loggerhead B
- Vireo, White-eyed B
- Bell's
- Yellow-throated B
- Blue-headed B
- Warbling B
- Philadelphia Red-eyed B
- Yellow-green Black-whiskered
- Jay, Blue B
- Nuthatch, Clark's
- Crow, American B
- Fish B
- Raven, Common B
- Lark, Horned B
- Martin, Purple B
- Swallow, Tree B
- Nighth-winged B
- Barn B
- Cliff B
- Cave
- Chickadee, Carolina B
- Titmouse, Tufted B
- Nuthatch, Red-breasted
- White-breasted B
- Brown-headed B
- Creeper, Brown
- Wren, Rock
- House B
- Winter
- Sedge
- Marsh B
- Carolina B
- Bewick's B
- Gnatcatcher, Blue-gray B
- Least
- Kinglet, Golden-crowned
- Ruby-crowned
- Whetstar, Northern
- Bluebird, Eastern B
- Veery B
- Thrush, Gray-checked
- Swainson's Hermit
- Wood B
- Robin, American B 6-10
- Thrush, Varied
- Catbird, Gray B
- Thrasher, Brown B
- Sage
- Mockingbird, Northern B
- Starling, European B
- Wagtail, Yellow/E. Yellow
- Pipit, American
- Sparrow's
- Waxwing, Cedar B
- Longspur, Lapland
- Chestnut-collared
- Sooty's
- Bunting, Snow

Survey by Auburn University: Railroad Park, Birmingham, AL
Sponsored by: Landscape Architecture Foundation Case Study Initiative

1. I wish to participate in this survey:

- a. Yes
- b. No

2. My age range is:

- a. 18 - 35
- b. 36 - 64
- c. 65 and older
- d. I do not wish to disclose this information

3. I identify as:

- a. Male
- b. Female
- c. Other (Please explain) _____
- d. I do not wish to disclose this information.

4. What is your geographic relationship to this park?

- a. I live near this park.
- b. I work near this park.
- c. I live and work near this park
- d. Other (Please Explain) _____

5. How often do you visit this park?

- a. Daily (everyday)
- b. Weekly (2 or more times a week)
- c. Monthly (2 or more times a month)
- d. Other (Please explain) _____

6. How long do you stay at the park?

- a. Less than 1 hour.
- b. 1-3 hours.
- c. More than 3 hours.
- d. Other (Please explain) _____

7. What are the reasons you use/visit this park? (Indicate all options that apply)

- a. To exercise
- b. To attend cultural events, such as film screenings or festivals
- c. To eat in the park's café'
- d. Other (Please explain) _____

8. Did the park influence your decision to live in the area?

- a. Yes- it influenced my decision.
- b. No- it did not exist when I moved to the area
- c. No- I did not care about living near the park
- d. I do not live in the area so this question does not apply to me

9. Do you feel the park has helped unify the northern and southern sides of the city?

- a. Yes, very much so

- b. Yes, somewhat
- c. No, not at all
- d. I am not sure

10. How do you most closely identify? (Select all that apply)

- a. College student/ young professional
- b. Parent with young/school-aged children
- c. Mid-career/established professional
- d. Retired individual

11. Has the park contributed to a more positive perception of downtown Birmingham?

- a. Yes
- b. No
- c. Unsure

Comments: _____

Appendix D

Biofiltration Capacity of Circulating Pond-Stream System

(appears in Sustainable Features section)

The circulating pond-stream system provides biofiltration for over 1.5 million gallons of water.

Calculations

A site map provided by the contractor was scaled up in AutoCAD and the bathymetric lines were outlined. The “area” function was used for each elevation and was then used in the Contour Area Method to calculate the estimated volume.

	Cubic Feet	Cubic Yards	Gallons
Biopond	3579.80	132.59	26776.90
Northlake	25605.75	948.36	191531.01
South Lake	150190.65	5562.62	1123426.06
Pond 1	8903.05	329.74	66594.81
Pond 2	10870.50	402.61	81311.34
Wetland	7430.90	275.22	55583.13
Total	206,580.65	7,651.14	1,545,223.26

Limitations

This calculation does not take into account the water displaced by flora/fauna or held within the soils and streams (due to their shallow, fast moving nature). It also assumes that the park is not in flood condition, but rather all bodies of water are at their normal levels.

Sources

Site Map - Provided by the general contractor, not for public release.

Calculations were derived from Equation 8.3 in *Site Engineering for Landscape Architects*(Strom, Nathan, Woland 2013).