

East Lake Park: Designing Water Quality and Park Improvements in an Urban Setting

SESWA 2019 - Chattanooga

October 10, 2019

**CDM
Smith**

Presenters:

David Mason, PE, CDM Smith, Nashville, TN

Mo Minkara, PE, City of Chattanooga



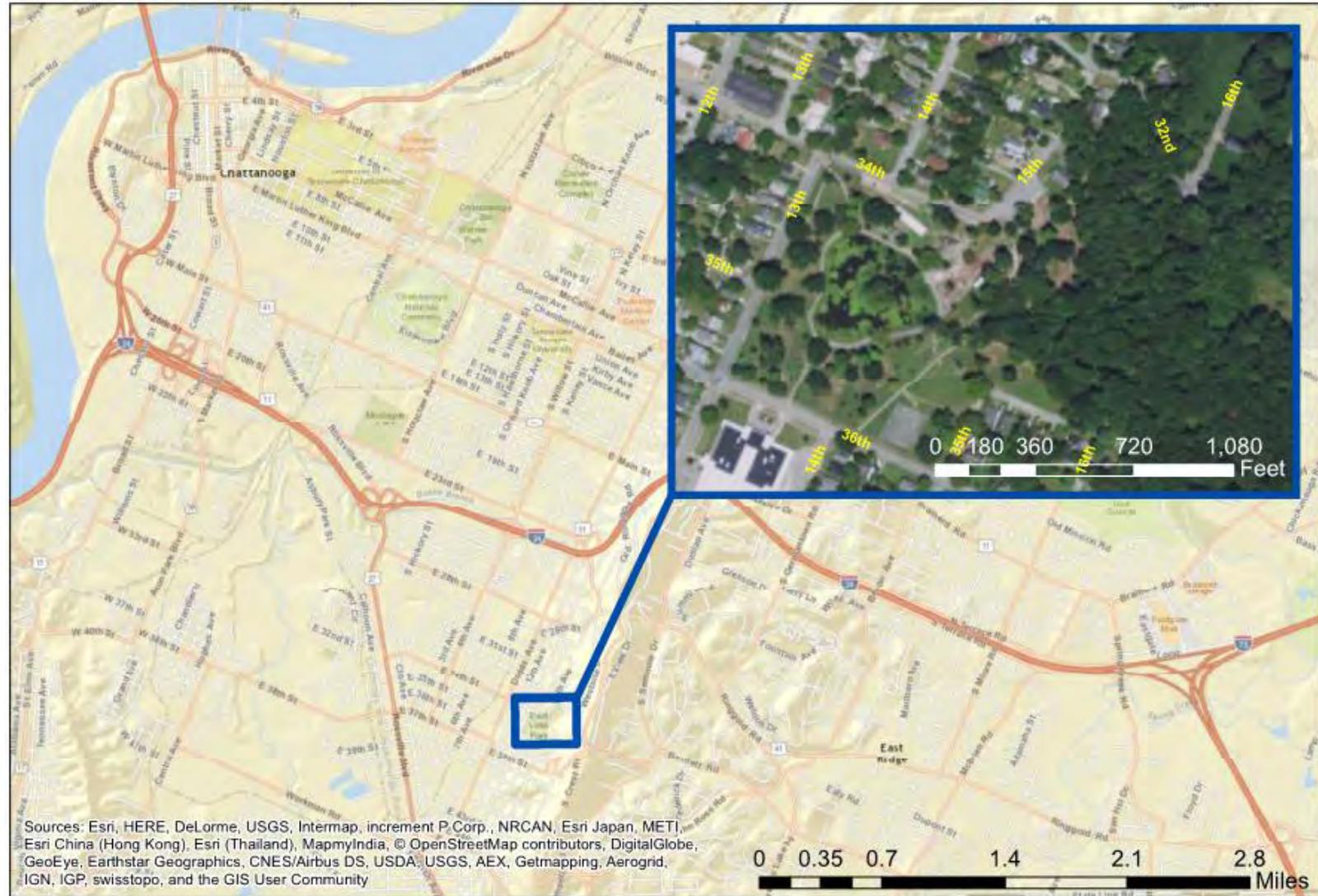
Agenda

- Introduction
- Existing Site Conditions & Preliminary Investigations
- Public Input
- Design Considerations
- Construction Progress



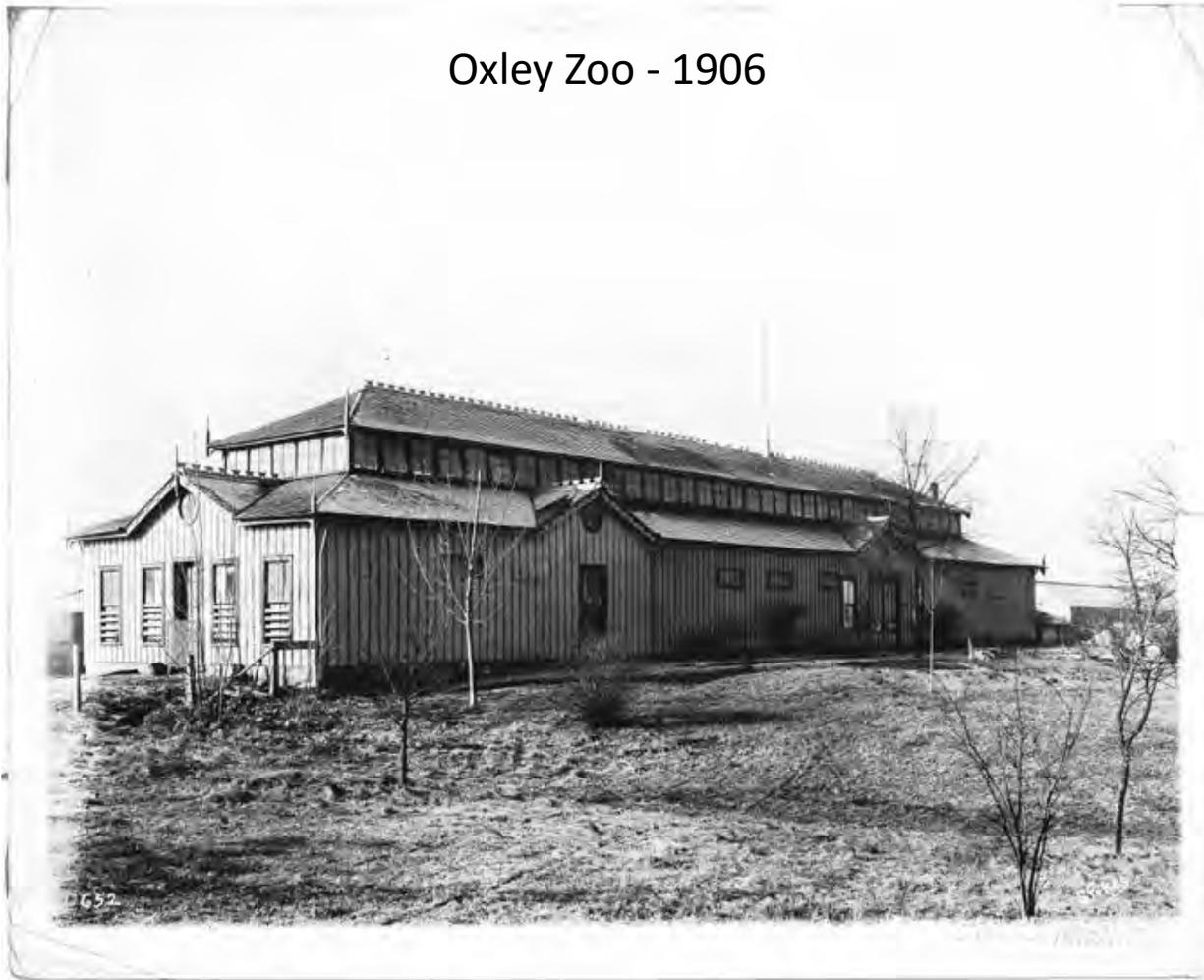
Introduction

- First park in the City dating back to 1800's
- Served numerous historical purposes
 - Zoo
 - Urban fishing
- Goals
 - Pond Clean-Up and Restoration
 - Green Infrastructure Integration
 - Educational Spaces
 - Sustainable Design



Historical Images

Oxley Zoo - 1906



Spring House - 1900



Historical Images

Fishing/Recreation - 1900



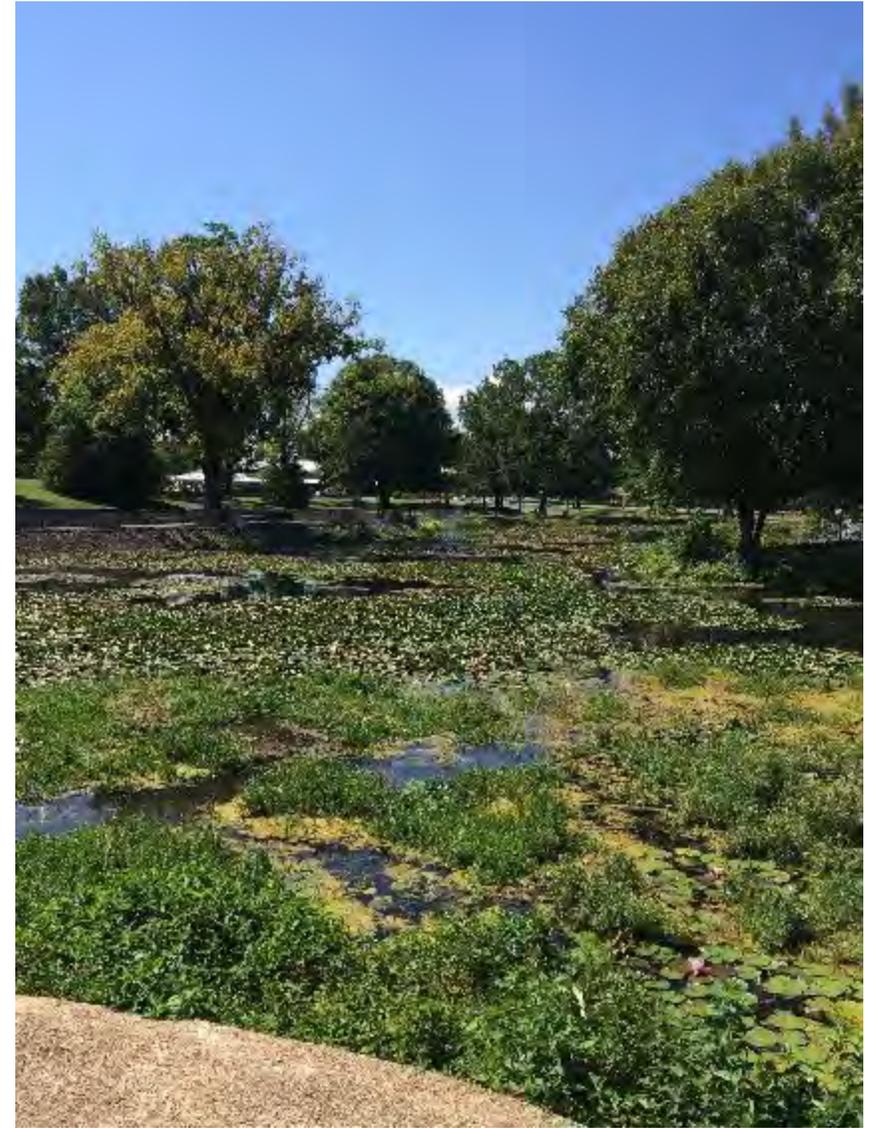
Boat House - 1890

Existing Site Conditions and Features

- Significant algal growth in pond
- Natural spring
- Recreational features
- Nearby elementary school

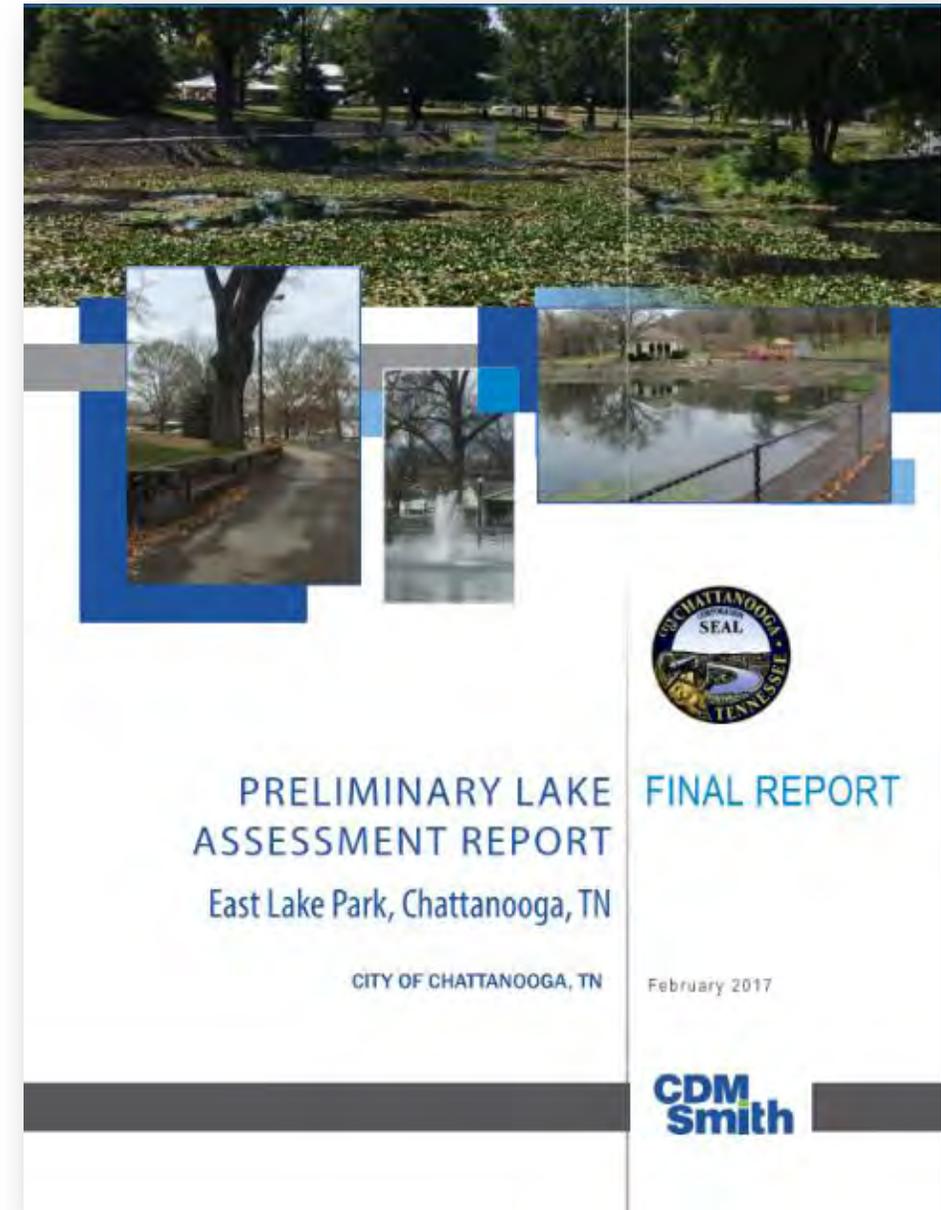


Existing Site Conditions and Features



Preliminary Engineering Investigation

- General field observations
- Bathymetric survey
- Sediment sampling
- Hydrologic/hydraulic assessment
- Water quality evaluation
- Ecological assessment
- Regulatory considerations



Hydrologic/Hydraulic Assessment



Bathymetric Survey

- Max water depth: 5' – 6'
- Max sediment depth: 10" – 14"
- Very little sediment in lower portion of the lake **[TRUE?]**



Nutrient Load Assessment

- Internal load – released from pond sediments through chemical reactions and organic detrital build-up
- External load – non point sources
- Waterfowl load – fecal matter from duck and geese populations

Table 2-3. Phosphorus Load Summary to East Lake Park Pond.

Source	Range of Potential Phosphorus Load (lb/yr)	Relative Contribution of Phosphorus Load to Pond (%) ²
Internal Load	7.7 ¹	20% - 34%
External (nonpoint) Load	1.56 – 3.9	7% - 10%
Waterfowl Load	13 - 27	59% - 70%

Notes: ¹The internal load calculation considers a well-mixed water column with dissolved oxygen conditions above 5 mg/L. If anoxic conditions develop the internal load could be up to a factor of 10 higher.



Sediment Removal Evaluation

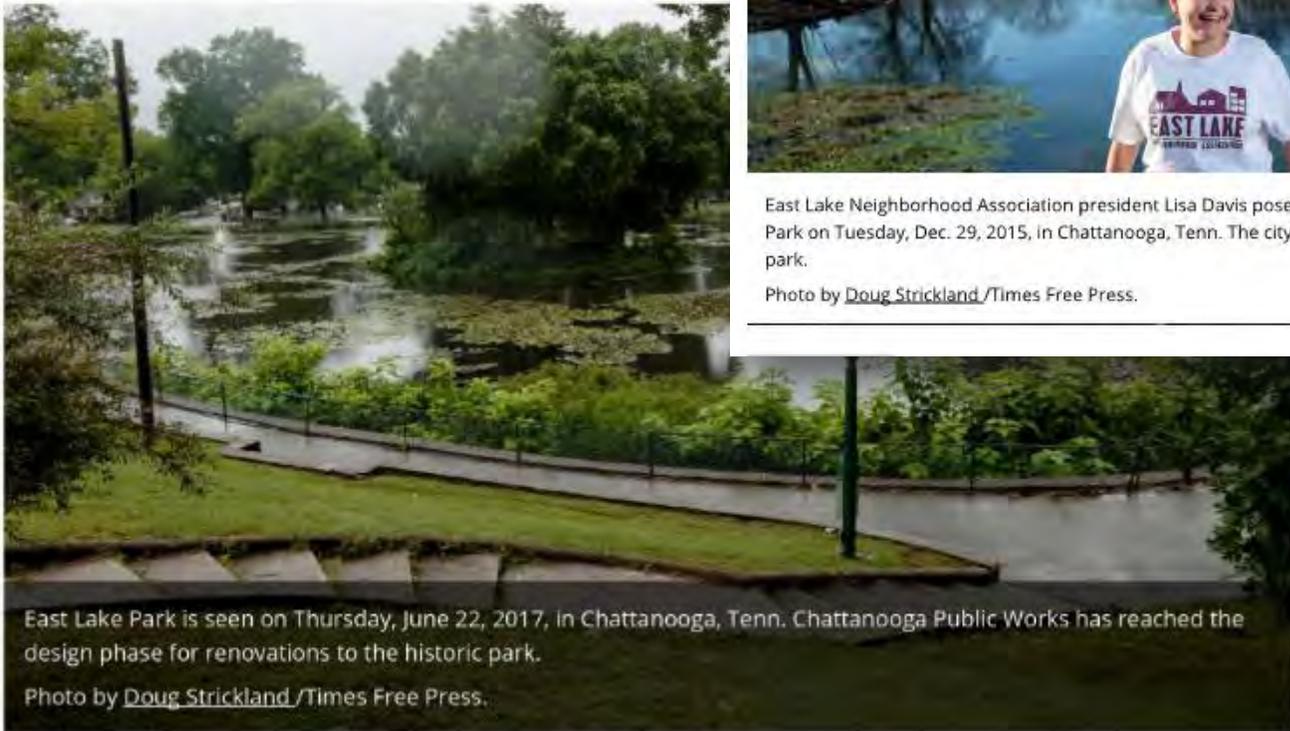
- Hydraulic dredging
- Mechanical Excavation
 - Wet or dry



Press Coverage

East Lake Park makover in d [photos]

June 25th, 2017 | by **Paul Leach** | in Local Regional News



East Lake Park is seen on Thursday, June 22, 2017, in Chattanooga, Tenn. Chattanooga Public Works has reached the design phase for renovations to the historic park.

Photo by [Doug Strickland](#) /Times Free Press.

Can a refurbished park bring back East Lake?

January 1st, 2016 | by **Steve Johnson** | in Local Regional News |
Read Time: 4 mins.



East Lake Neighborhood Association president Lisa Davis poses for a portrait at East Lake Park on Tuesday, Dec. 29, 2015, in Chattanooga, Tenn. The city is planning to refurbish the park.

Photo by [Doug Strickland](#) /Times Free Press.

Foundation money jump-starts restoration of Chattanooga's East Lake Park pond

Paul Leach | in Local Regional News | Read Time: 2 mins.



“This is a very popular project in East Lake, in a park that was once — and hopefully will be again one day — the greatest park in Chattanooga.

— Chris Anderson, Chattanooga City Council member

Student Design Competition

Partnership for LID Student Education Grant Report, August 2016
Green Sparks: Outdoor Classroom Design Competition
 City of Chattanooga Water Quality Program

Tennessee Stormwater Association (TNSA) Green Development Grant
 2014-2016



Water Quality and GI Components:

- Educational Signs around the pond
- Classroom has a watershed shape for sharing watershed concept with students & public
- Classroom has a green roof



GREEN SPARKS
 A STUDENT DESIGN COMPETITION



Public Involvement/Information Process

Potential Location of Proposed Park & Lake Improvements

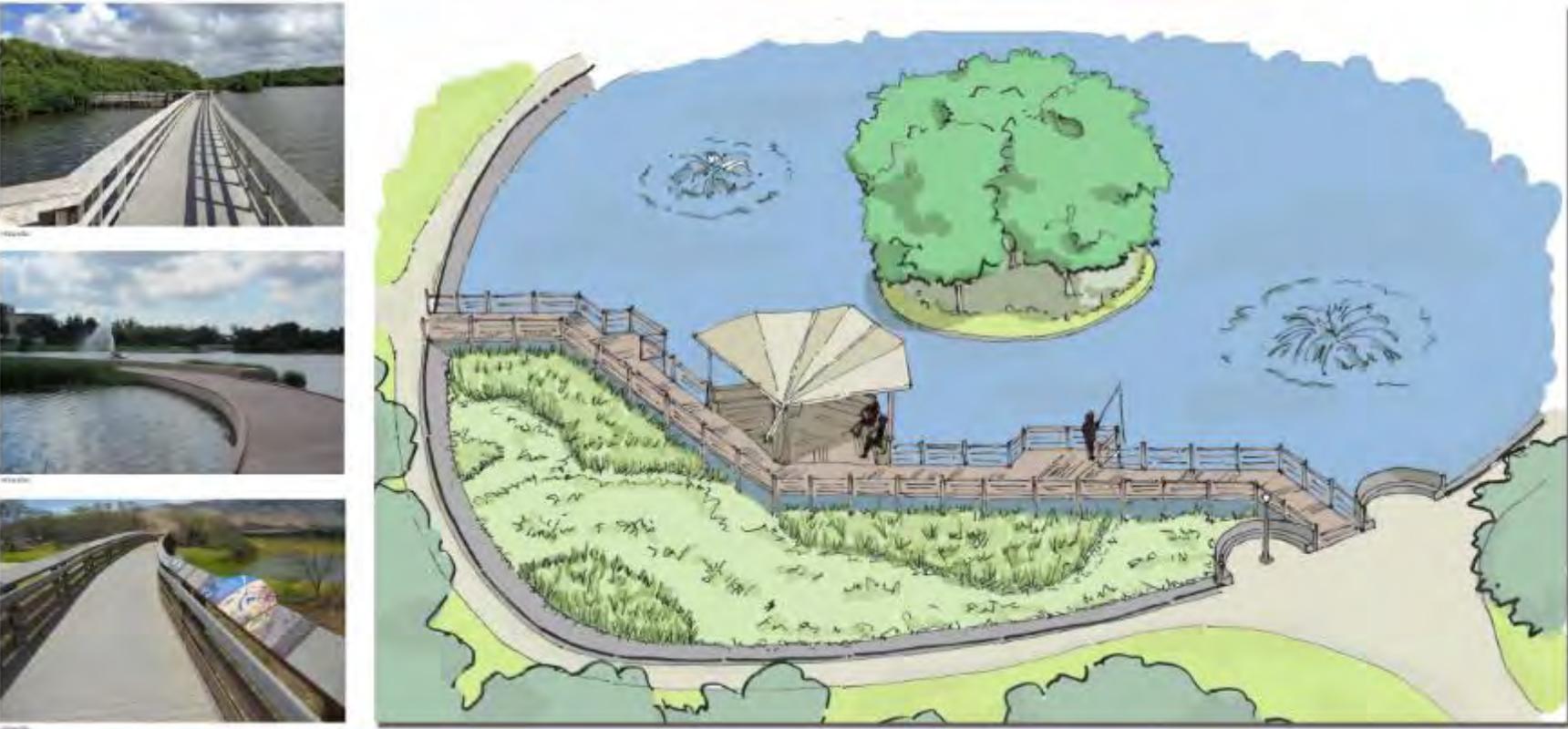
- 1. Redesigned outlet structure with restored stream
- 2. Boardwalk/walkway over pond for education
- 3. Highlighted spring with water feature
- 4. Amphitheater with parking and connecting trails



Refined Concepts for Public Input

  LYNDHURST FOUNDATION   Hawkins Partners, Inc.

East Lake Park Water Quality Improvement Plan



The image displays refined concepts for public input. On the left, three photographs illustrate existing or proposed features: a dam structure, a fountain, and a walkway. The main drawing is a conceptual landscape plan showing a park area with a lake, a tree island, a fountain, a gazebo, and a walkway.

Final Concept Master Plan



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Hawkins Partners, Inc.

- ① MEADOW WALK
- ② BOARDWALK
- ③ WETLAND PLANTING
- ④ PERVIOUS PAVEMENT
- ⑤ SPRING LOCATION
- ⑥ RELOCATED PLAYGROUND
- ⑦ OUTDOOR CLASSROOMS
- ⑧ BIORETENTION AREA
- ⑨ EXISTING PAVILION
- ⑩ PERVIOUS PAVEMENT
- ⑪ EAST LAKE ELEMENTARY
- ⑫ EXISTING SINDOR CENTER
- ⑬ EXISTING PARKING
- ⑭ EXISTING PAVILION
- ⑮ EXISTING TENNIS COURTS
- ⑯ EXISTING MAINTENANCE BUILDING
- ⑰ OPEN FIELD FOR FLEXIBLE PLAY
- ⑱ EXISTING TENNIS COURT
- ⑲ NATIVE VEGETATION PLANTING

--- EDUCATION WALK

CONCEPTUAL MASTER PLAN

EAST LAKE PARK
FINAL: JAN 2017



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Final Concept Design Renderings

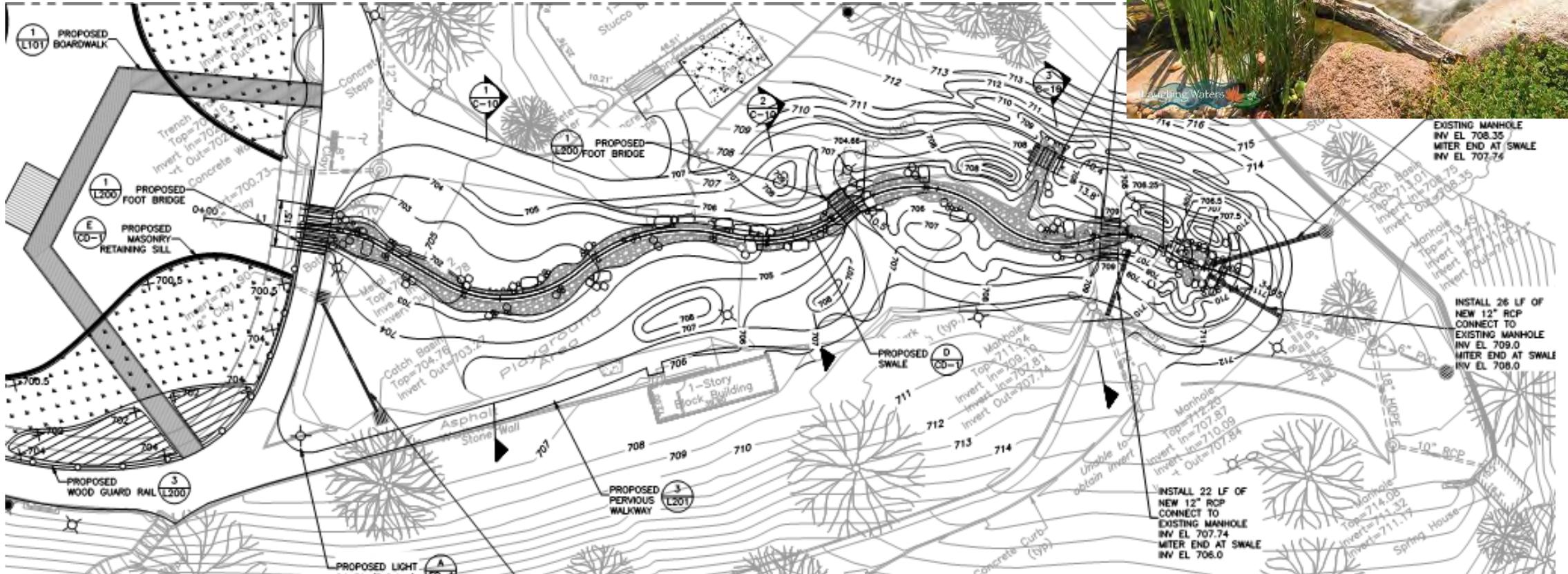


What Was Once a Water Quality Project Is Now a Park Project

- Water Quality Improvements
 - Pond excavation
 - Pre-treatment wetland
 - Littoral Vegetation
 - Spring Daylighting
 - Waterfowl control
 - Green infrastructure
 - Educational Signage
- Park Improvements
 - Boardwalk
 - Water Access
 - Fishing Opportunities
 - New Lighting
 - ADA Compliance

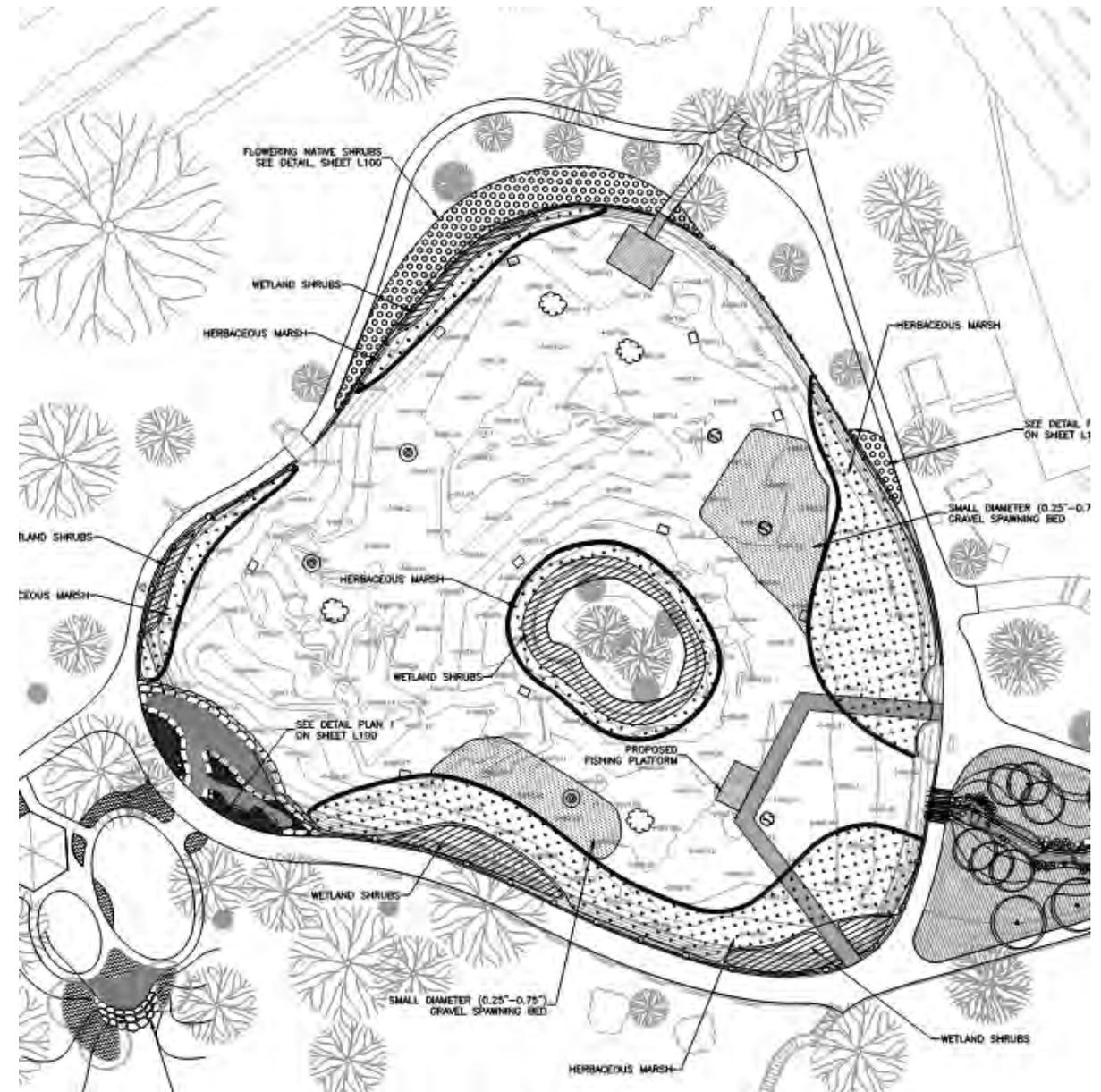


Final Design – Daylighted Spring



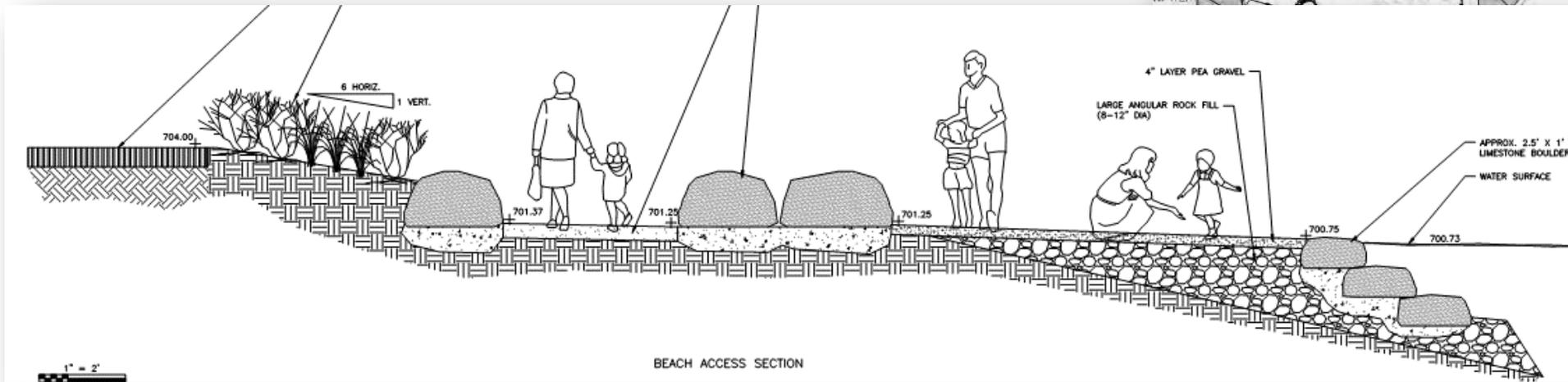
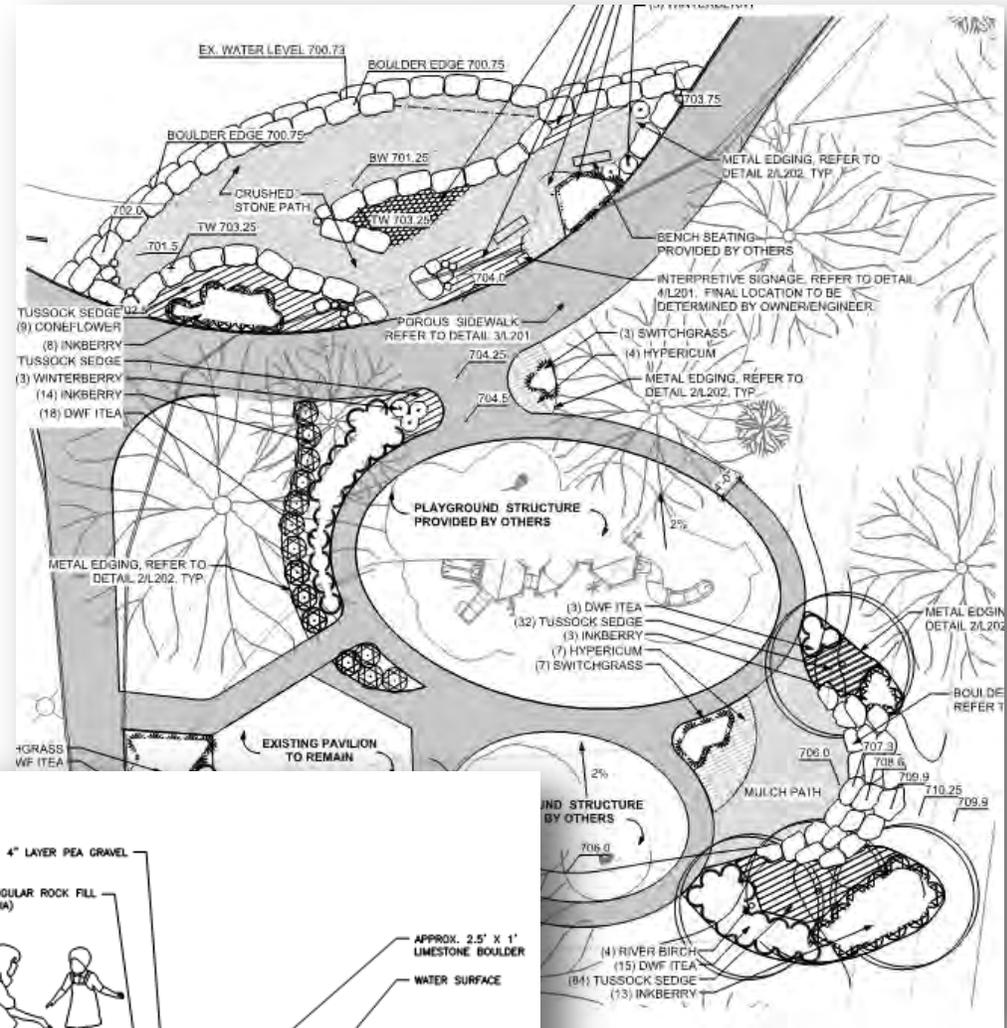
Final Design – Pond Restoration

- Sediment removal
- Wetland shelves
- Herbaceous marsh
- Spawning beds
- Fish structures
- Fish stocking
- Pervious pavement
- Upland native shrubs



Final Design – Public Engagement

- New playground
- “Beach” access
- Boardwalk
- Fishing pier
- Outdoor classroom
- Perimeter fencing



Bidding Process

- Initially not enough bidders
- Provided references and contacts for more
- Lack of truly qualified firms provided bids
- Two bids received: \$1.7M vs \$2.5M



Construction Progress – Geese/Duck “Removal”

Advocates want to save animals during East Lake Park renovation

They are worried the park’s renovation will kill the turtles that call this area home and rely on it for food.

Wednesday, April 17th 2019, 7:17 PM EDT by Michelle Heron



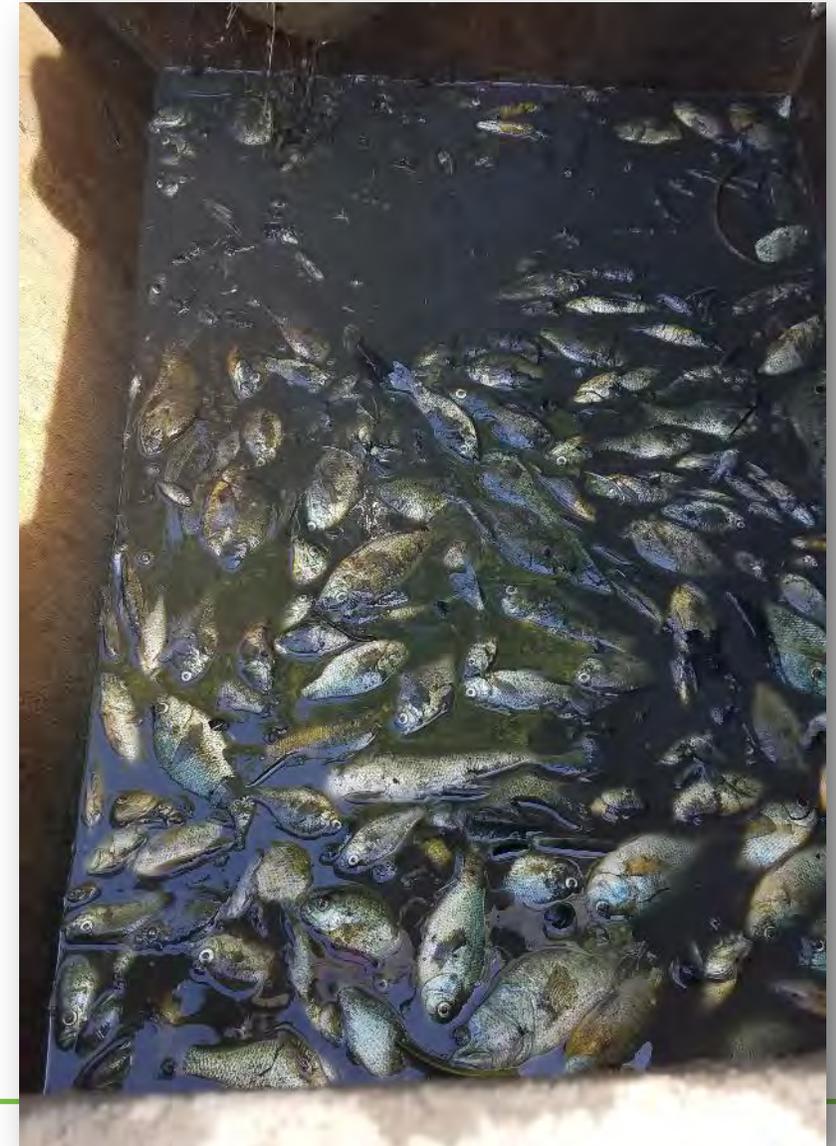
Volunteers Trying To Save The Ducks At East Lake Park

Tuesday, April 16, 2019

Wildlife rescue and rehabilitation specialists along with other concerned citizens, including veterinarians, said they have reached out to the Mayor and to the Department of Public Works "with expressions of concern and offers of help for a humane relocation of the ducks at East Lake Park."

Susan Perruso said, "In connection with the long-planned renovation of the park and pond, a high fence has been erected around the area, heavy equipment is on site, and the pond is in the process of being drained. But the bewildered ducks are still there. These are domestic ducks unable to fly high enough to clear the fence to find a new habitat. And no fresh water is coming into the pond as of today. Unless the City allows qualified people to relocate the ducks to a safe place, their fate will be to die a slow death behind that fabric fence, out of the sight of the public. The fish and turtles will die as well.

Construction Progress – Fish Relocation



Construction Progress – Sediment/Muck Removal



Construction Progress – Sediment/Muck Removal



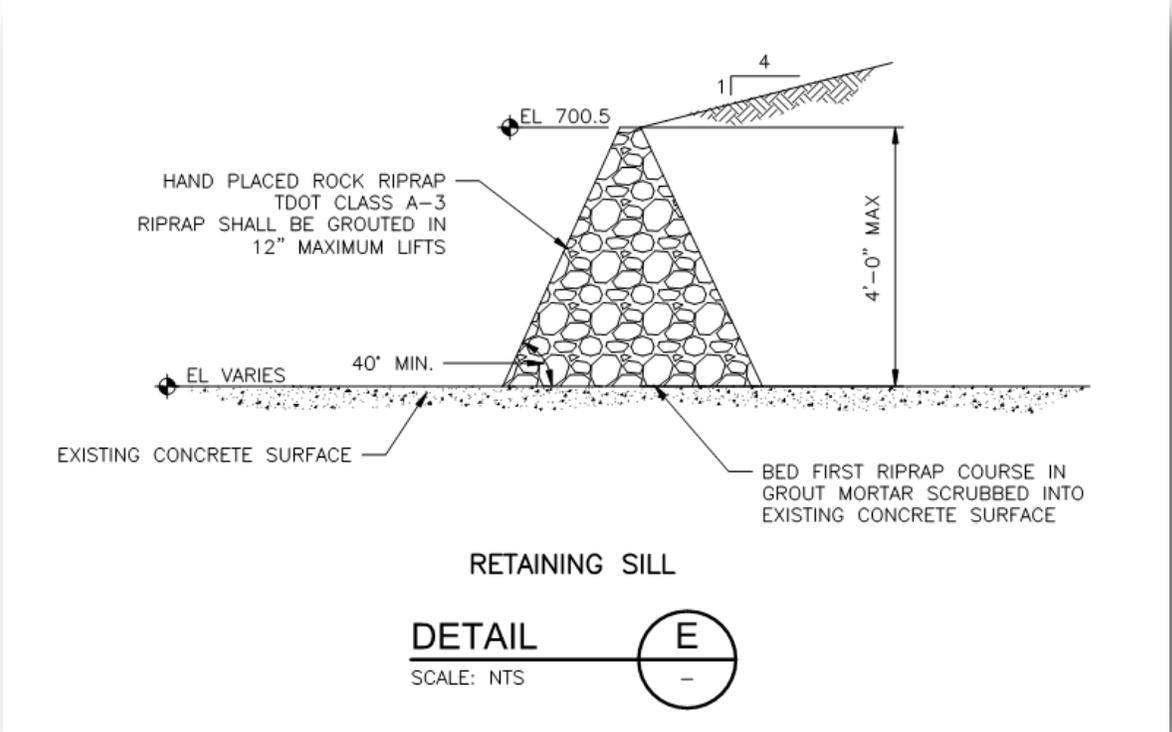
Construction Progress – Sediment/Muck Removal



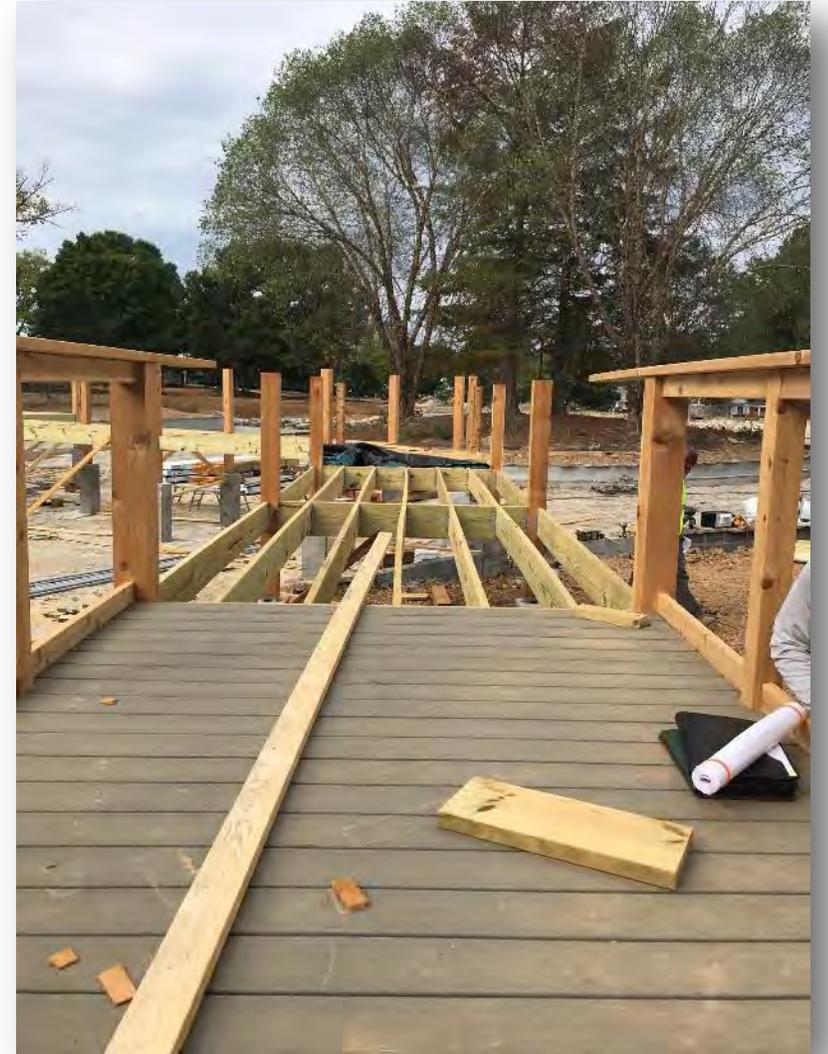
Construction Progress – Lake Cleared!



Construction Progress – Wetland Sill Walls



Construction Progress – Boardwalk and Fishing Pier



Construction Progress – Daylighted Spring



Construction Progress – Daylighted Spring



Construction Progress – Daylighted Spring



Construction Progress – Daylighted Spring



Construction Progress - Plants

East Lake Park Landscaping and Constructed Wetlands Submittals				
Submittal	Reference (Spec Section)	Schedule	Overdue (Y/N) ¹	Date Submitted
Landscaping (Section 02931)				
Tennessee Landscape Contractor's License	1.03.A.1 Submittals	At Award	Y	
Professional Landcare Network or American Nursery and Landscape Association Membership	1.03.A.1 Submittals	At Award	Y	
Professional Landcare Network Certification in one of the following [field supervisor only]: CLT-Exterior or COLP	1.03.A.1 Submittals	At Award	Y	
Ten (10) Successfully Completed Similar Projects	1.03.A.1 Submittals	At Award	Y	
State-licensed Commercial Pesticide Applicator	1.03.A.1 Submittals	At Award	Y	
Source(s) List for all Plants to be Installed	1.03.A.2 Submittals	Immediately after NTP	Y	
Shop Drawings for all Landscaping Materials and Equipment	1.03.A.2 Submittals	Prior to Start of Landscaping Activities	Y	
Plant Stock Certification – Specified Species, Sizes, and Quality	1.03.A.3 Submittals	Prior to Nursery Selection(s)	Y	
Long-Term Maintenance Plan	1.03.A.4 Submittals	Prior to Soil Preparation and Planting	N	
Plant Photographs – Nursery	1.03.A.5 Submittals	Prior to Plant Delivery	N	
Material Test Reports: Soils -Soil Analysis Report -Plant Growth Suitability -Treatment/Amendment Recommendations	1.03.A.6 Submittals 1.04.C Quality Control	Prior to Soil Acquisition	N	
Nursery Certification – Seed Source Locations	1.04.A.1. Quality Control	Prior to Nursery Selection(s)	Y	
Soil-Testing Laboratory Qualifications	1.04.B Quality Control	Prior to Soils Tests	N	
Bulk Fertilizer, Lime, and Soil Amendment Delivery Certificates	1.05.B.3 Delivery, Storage, and Handling	At Delivery	N	
Mulch Samples and pH	2.01.L.6 Materials	Prior to Mulch Delivery	N	
Initial Engineer Inspection Request	3.02.A Plant Maintenance and Guarantee	After Planting	N	
Final Engineer Inspection Request	3.02.C-E Plant Maintenance and Guarantee	Prior to End of Warranty Period	N	
Constructed Wetlands (Section 02955)				
Tennessee State Landscape Contractor's License	1.04.A.1 Submittals	At Award	Y	
Demonstrate experience with at least five wetland restoration or creation projects of at least one acre each completed within the past ten years	1.04.A.1 Submittals	At Award	Y	
Shop drawings for all materials and equipment	1.04.A.2 Submittals	Prior to start of Wetland Construction	Y	
State Nursery Inspection Certificates	1.04.A.4 Submittals	Prior to start of Wetland Construction	Y	
Plant Materials: list of all plants and seed, including names and addresses of sources, whether plants will be contract grown, or documentation from sources that sufficient quantities will be available, using Latin binomials	1.04.A.2 Submittals 1.09.A Planting Time and Completion 2.02.A-C Plant Materials	Prior to Nursery Selection	Y	
Wetland seed mix species, purity, and percentages	2.02.A-C Plant Materials, Drawings	Prior to Nursery Selection	Y	
Samples of plant material for inspection and acceptance	1.04.A.4 Submittals 2.02.A-C Plant Materials 2.03.A-D Inspection of Plant Materials	Prior to start of Wetland Construction	Y	
Certification by landscaping contractor that all plant stock obtained for the work is the plant indicated and of quality as specified, using Latin binomials	1.04.A.5 Submittals	Prior to start of Wetland Construction	N	
Analyses and reports documenting compliance with the loam testing program for all soils. Backfill to meet Section 02200. Organic Rich Loam (wetland soil) testing for nutrient fertilizer	1.04.A.3 Submittals 2.01.A.1 Materials-Backfill	Prior to start of Wetland Construction	N	

Tips for Your Next Urban Lake Restoration Project

- Make sure all parties that may touch the project are engaged early in the process
- If you have the ability to pre-qualify contractors, do so
- Err on the high side with the sediment removal estimate
- Gather as much info as you reasonably can regarding the subsurface
- Engage experts if fish/waterfowl relocation is necessary
- Have a plan to deal with the sensitive nature of fish/waterfowl impacts
- Structure your schedule around the plants and stay on your contractor re: submittals
- Plan for surprises!

Contact Us!

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