

TECHNICAL AND REGULATORY ADDENDUMSEPTEMBER 2016









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INTRODUCTION

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

The purpose of this project is to provide planning support to Louisville Metro Parks and Recreation Department (Metro Parks) West Louisville Outdoor Recreational Initiative (WLORI). The goal of the WLORI is to establish infrastructure for nature-based outdoor recreation in west Louisville including a new satellite center, the Shawnee Outdoor Learning Center, which will serve as a base for outreach programming utilizing the new recreation infrastructure created. Specific programming to be offered will generally mirror current programming offered by Metro Parks at the Jefferson Memorial Forest, including expansion of its Louisville is Engaging Children Outdoors (Louisville ECHO) program initiative.

1.2 WLORI STUDY AREA

The WLORI Study Area is located in the west portion of Jefferson County, Louisville Kentucky. The study area consists of four locations: Chickasaw Park, Shawnee Park, Portland Wharf Park, and Shippingport Island. Figure 1-1 presents the four locations that comprise the WLORI Study Area.

1.3 REVIEW OF METRO PARKS PROVIDED INFORMATION

Metro Parks provided documents pertinent to this effort in order to enable more effective coordination with Metro Park consultants and to better understand the issues related to this effort. The documents provided for review include:

- Park Master Plans for Chickasaw Park, Shawnee Park, Portland Wharf Park,
- Documents outlining the general goals of the project,
- LOJIC data for the study area,
- June 2014 feasibility studies for boat access along the Ohio River at Chickasaw and Shawnee Parks,
- Publicly available information regarding contamination of Chickasaw Park pond,
- United States Army Corps of Engineers Continuing Authorities Project Fact Sheet for Ohio River, Portland Wharf Park and Louisville Riverwalk,
- Metro Parks' Natural Areas Division, soft surface trail construction standards,
- Community survey results, and
- Stakeholder meeting minutes.

Figure 1-1: WLORI Study Area Locations





PUBLIC OUTREACH

2.0 PUBLIC OUTREACH

At the project outset, Metro Parks identified over 60 key stakeholders such as District 5 Councilwoman Ms. Cheri Bryant Hamilton, Olmsted Parks Conservancy personnel, and other community groups to encourage attendance at public meetings. A list of the key stakeholders is included in the Conceptual Master Plan Report, Page 2. At the time of this report, a stakeholder meeting was held on October 2, 2015 at the Louisville Shawnee Public Library. The project team then conducted a public meeting on December 10, 2015 at Shawnee Golf Course Clubhouse.

Information presented at the stakeholder and public meetings consisted of the WLORI project area and scope of work, project goals, and schematics of potential improvements. Especially important to the public meetings was giving citizens a forum to discuss proposed potential improvement concerns and to make suggestions.

Attendance at the stakeholder and public meetings was attended by only a few citizens outside of the project team. However we received the following feedback:

- Provide plenty of fishing space at Chickasaw Park Pond;
- Provide access to the river at Chickasaw Park for anglers;
- Consider providing a cover over a portion of the fishing pier at the Chickasaw Pond.

A third public meeting was held on May 31, 2016 at Young Elementary School to present the WLORI Master Plan and project goals. Approximately 40 people were in attendance. Metro Council District 5 Representative Cheri Bryant made opening remarks. Bennett Knox, Metro Parks Project Manager, spoke on the project goals and presented a short video about the project. Andrew Knight, MKSK Project Planner/Designer spoke on the details of the project at each of the three parks in the study – Chickasaw, Shawnee and Portland Wharf Parks. A question and answer session followed. Topics raised during the questions and answer period included the following:

- Any new studies of the Chickasaw Pond contaminants;
- Air pollution;
- Safety of children fishing;
- Status of Louisville Loop stabilization at Portland Wharf and Shawnee Park;
- Availability of maintenance and programming budgets after construction;
- Shawnee boat ramp durability when constructed;
- Ability to change project elements as more people become engaged.





Figure 2-2: Public Meeting Discussion





3.0 CHICKASAW POND

3.1 INTRODUCTION

According to the Chickasaw Park Master Plan dated January 2001, the number one improvement priority is the pond area. Issues with the pond area include: drainage problems affecting the walking path; lack of benches; too many ducks – creating a nuisance, water lotus clogging the water surface, lack of parking and restrooms and the water quality.

The Chickasaw Park Pond dredging was first completed in 1936 and was intended to be used as a canoeing facility in the summer and a place for ice skating in the winter. The contributing drainage area is relatively small, therefore the main water source of the pond is a 2-inch Louisville Water Company line located at the north end of the pond. This line has no backflow prevention and no direct shutoff valve is available (without turning off most of the water supply to the park). The drain for the pond is a 6-inch overflow pipe that connects to the storm drain along Southwestern Parkway. This line is insufficient for extreme in-flows to the pond during wet weather and causes the pond to overflow towards Southwestern Parkway. The following photographs were taken of the pond in September 2015. Additional photographs of the pond can be found in Appendix A.

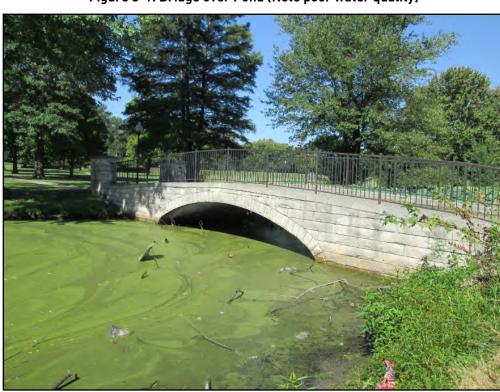


Figure 3-1: Bridge over Pond (Note poor water quality)



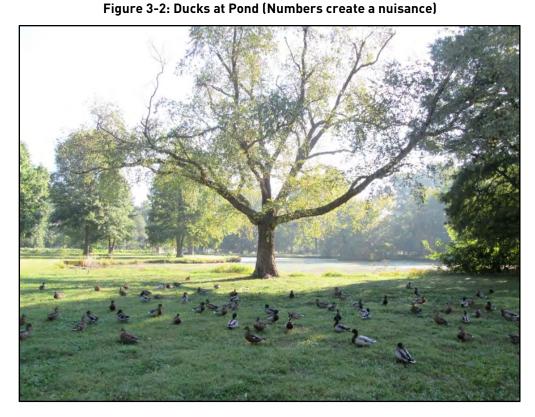
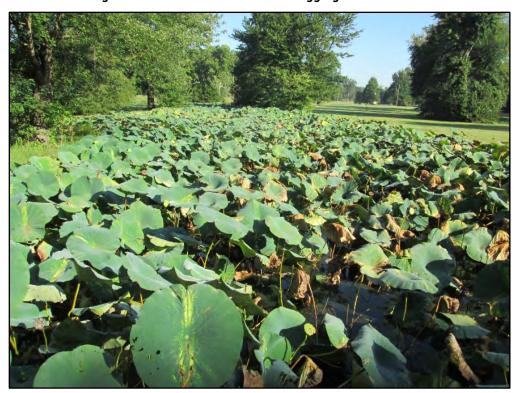


Figure 3-3: Water Lotus at Pond Clogging Water Surface



3.2 POND AREA TOPOGRAPHIC AND BATHYMETRIC SURVEY

A field survey was performed by Jacobi, Toombs, and Lanz, Incorporated (JTL) from 07/30/2015 to 08/06/2015. At the time of the survey the average pond water surface elevation was 452.67 feet producing a water surface area of approximately 1.8 acres. The average depth was 1.6 feet with a maximum depth of 4.6 feet. The typical depth of the bank was one (1) foot with a 1 vertical to 3 horizontal slope. The bottom of the pond has an average slope of 1 vertical to 5-7 horizontal. The main water source of the pond is a 2-inch Louisville Water Company line located at the north end of the pond with an invert of 452.50 feet. The drain for the pond is a 6-inch overflow pipe, with a rim elevation of 453.18 feet that connects to the storm drain along Southwestern Parkway. Figure 3-4 is of the existing pond survey. The full size survey is included in Appendix B.

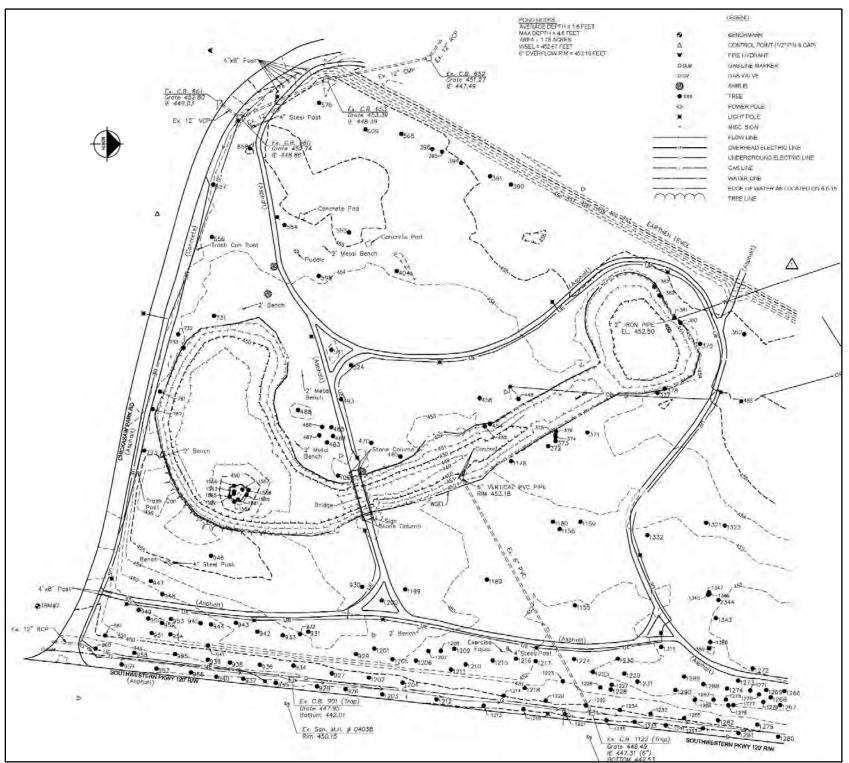


Figure 3-4: Chickasaw Park Pond Existing Survey



3.3 KENTUCKY DEPARTMENT OF FISH AND WILDLIFE REQUIREMENTS

Tetra Tech (Tt) in collaboration with GeoMorphics contacted the Kentucky Department of Fish and Wildlife Resources (KDFWR) to obtain requirements the pond and City must meet for the pond to once again be stocked with fish. Metro Parks has indicated that they would like to pursue regular stocking of this pond by KDFWR under their Fishing in Neighborhoods (FINs) program. The KDFWR created the FINs program in 2006 to provide anglers with quality fishing opportunities close to home. The program currently includes 40 lakes statewide. The aim of the program is to create quality fishing opportunities near cities of all sizes throughout the state. Lakes are regularly stocked with catfish and rainbow trout at various times throughout the year. In addition to these lakes being stocked with catfish and trout, the sunfish and largemouth bass populations are regularly sampled to ensure natural reproduction is meeting the needs of anglers. Stocking of hybrid sunfish and/or largemouth bass occur if needed to balance the fish population per the KDFWR Managing Fish Populations and Improving Habitat guidelines.

Louisville Metro Government and KDFWR have in place a memorandum of agreement with Metro Parks for many lakes in the area; however the program is currently at full capacity with approximately 40 lakes participating in the program. Due to Chickasaw Park Pond's urban location within the City of Louisville, the pond will qualify for the FIN's program assuming additional criteria is met. The pond is on the FIN's program waiting list, at the time of this report. The proposed pond shall be designed per the following KDFWR guidelines to qualify for the FIN'S program for stocking the pond.

- Average depth = minimum 6 feet
- Maximum depth = minimum 12 to 15 feet
- Surface area = greater than 1 acre
- Bank depth = minimum of 2 to 3 feet
- At least one quarter of the pond should be vegetated
- Keep at least 50% or 1,000 perimeter feet open to fishing access.
- Four 10x10 feet areas of pea gravel should be provided to allow good spawning areas and increase pond productivity (bass and bluegill spawning areas). This pea gravel should be placed on banks in 2-6 feet of water.
- Bank access area to launch a boat for routine fish sampling.
- Need access for a large stocking truck to get near water to stock fish, even under wet conditions. Either a paved pad, or fish stocking tube from paved surface to water's edge.
- Testing of water will be required to show the contaminates are within water quality standards (Refer to Section 3.5) before pond can be stocked with fish.

Appendix D contains the KDFWR FINs Lake Policy Effective January 2015.

3.4 USACE/MSD POND & LEVEE GUIDANCE

In November 2015, Tetra Tech met with United States Army Corps. of Engineers (USACE) on site to discuss the proposed improvements to the Chickasaw Park pond in relation to the existing flood protection levee. The goal of the meeting was to determine if dredged material from the pond could be placed on the levee and what restrictions and regulations Metro Parks would have in improving the pond. The following is a summary of the key findings:

- A levee modification permit will be required for this work once approved by the Local Sponsor (Louisville Metropolitan Sewer District (MSD)). Approval from the Local Sponsor does not constitute USACE permit approval.
- Fill may be placed on the landside of the levee, provided it meets the material classification and compaction/moisture criteria indicated in the USACE SOP for "Benching and Compaction for Levee and Floodwall Modifications" dated 30 November 2010.
- Trees and/or vegetation may be planted near the levee provide that they are at minimum 15-feet away from the existing levee toe. The existing levee toe will govern if an overbuild is established. Fill will be allowed on the landside only.
- The domestic water pressure pipe to the pond currently extending through the flood levee section will require removal and, if desired, may be re-routed up and over the levee per USACE SOP for "Utility Penetrations in Levees and Floodwalls, Pressure Pipes Up and Over Existing Earth Levees" dated 7 January 2011. Removal of this pipe shall be by open-cut methods only. Backfill of the pipe shall be in accordance with the attached SOP for "Benching and Compaction for Levee and Floodwall Modifications" dated 30 November 2010.
- Provided the pond size and depths are not altered significantly within 100-feet of the landside levee toe, a detailed under seepage/seepage and/or stability analysis will not likely be required. Excavations greater than 2-feet from existing pond bottom are considered to be significant.
- Any modification of the levee will need to be in compliance with USACE Engineering Manual (EM) 1110-2-1913 "Design and Construction of Levees."

"Unofficially" USACE does not consider the pond to be a jurisdictional water of the U.S. Official response from USACE is still pending as of the writing of this report. Tetra Tech contacted USACE and requested an official response and was told it may be early 2016 before anything is received. This will be discussed more in the regulatory requirements section.

3.5 KENTUCKY DIVISION OF WASTE MANAGEMENT SUPERFUND PROGRAM GUIDANCE

3.5.1 HISTORY OF CONTAMINANTS

The pond has a history of contaminants which were first identified in December 1995. The pond is located in the West Louisville residential area which is downwind of Rubbertown, and historically has likely been subject to the greatest amount of contamination emitted to the air by the Rubbertown Industrial Area. The West County Community Task Force (WCCTF) was established by the Jefferson County Division of Environmental Health and Protection to identify and address community environmental concerns. This group has participated as a work group in the identification of contaminants found in Chickasaw Park Pond. Contaminants found in sediment and fish tissue samples in 1995 include polychlorinated dibenzo-p-dioxins (dioxins) and polychlorinated dibenzofurans (furans) which were slightly above EPA's threshold for acceptable values. Based on the scientific findings, the pond has been designated as catch and release fishing only.

The source of the contamination is unknown and is assumed to be from either air or stormwater runoff from nearby industrial properties. However the pond was not legally being stocked with carp which is what contained the highest level of dioxins based on the findings reported in 1995. It is feasible that the carp and other fish were contaminated in another location and illegally placed in the Chickasaw Park Pond. Regardless, due to the location of the pond and the history of the area it is recommended that Metro Parks take the necessary steps to ensure the public that the pond improvements (sediment, water and fish) are within federal and state regulations.

3.5.1.1 1995 Sediment Contamination Findings

In December of 1995, the Kentucky Natural Resources and Environmental Protection Cabinet (NREPC) sampled for dioxins and furans in Chickasaw Park Pond. The dioxin concentration in the sediment, expressed as toxic equivalents (TEQ) of 2,3,7,8-tetrachlorodebenzo-p-dioxin (TCDD) was 4.62 parts per trillion (ppt).

3.5.1.2 1995 Fish Contamination Findings

In August 1995, the NREPC collected one carp and one crappie from Chickasaw Park Pond to analyze for dioxins and furans. The dioxin TEQ for the crappie was 2.43 ppt. Duplicate samples from the carp were analyzed, with resulting dioxin TEQ values of 13.77 ppt and 17.74 ppt.

3.5.2 WATER QUALITY STANDARDS

The Commonwealth of Kentucky water quality standards are defined in 401 Kentucky Administrative Regulations (KAR) Chapter 10. Metro Parks Chickasaw Park pond intentions of surface water paddling instruction and fishing at the pond would designate the pond as a primary contact recreation



(PCR) and warm water aquatic habitat (WAH) surface water per 401 KAR 10:026. According to the administrative regulations, surface waters shall not be aesthetically or otherwise degraded by substances that:

- settle to form objectionable deposits; float as debris, scum, oil or other matters;
- injure or are chronically or acutely toxic to or produce adverse physiological or behavioral responses in humans, animals, fish, and other aquatic life;
- produce undesirable aquatic life or result in the dominance of nuisance species;
- cause fish flesh tainting.
 - o The concentration of phenol shall not exceed 300 $\mu g/L$ as an instream value.
 - o The water quality criteria to protect human health related to fish consumption shall apply and not be exceeded.
 - The following list relevant pollutant criteria based on the historical pond contaminant findings. For a full list of pollutant criteria refer to 401 KAR 10:031.
 - 2,3,7,8-TCDD (Dioxin) less than or equal to $5.1 \times 10^{-9} \mu g/L^2$
 - o For those substances associated with a cancer risk, an acceptable risk level of not more than one additional cancer case in a population of 1,000,000 people, or 1 x 10-6 shall be utilized to establish the allowable concentration.

There are many parameters and associated criteria that must be met to promote a productive warm water aquatic habitat. A few of those parameters are:

- Natural alkalinity shall not be reduced by more than 25%;
- pH shall be between 6.0 and 9.0;
- flow shall not be altered to a degree that will affect the aquatic community;
- Temperature shall not exceed 89° Fahrenheit;
- Dissolved oxygen shall be maintained at a minimum of 5.0 mg/L;

A full list of the warm water aquatic habitat criteria can be found in 401 KAR 10:031.

There are many parameters and associated criteria that apply to primary contact recreation use during the recreation season of May 1 through October 31. A few of those parameters are:

• Fecal coliform content or Escherichia coli content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during

- a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for Escherichia coli.;
- pH shall be between 6.0 and 9.0.

A full list of the warm water aquatic habitat criteria can be found in 401 KAR 10:031.

3.5.3 RECOMMENDATIONS

In September 2015, Tt contacted the Kentucky Division of Waste Management to gather information and restrictions Metro parks may have implementing pond improvements regarding the potential contaminated soils. At the time of this report our questions were directed to the Division of Waste Superfund Program and was assigned to Scott Collins, Environmental Scientist as the PM. Due to the unknown source of contamination and low levels of sediment contamination the following parameters and criteria were determined:

- Dredged material can stay on site based on the current knowledge of the sludge contaminants;
- Trees/shrubs in addition to turf may be planted within the capped dredged material areas as long as we follow the guidance from USACE that the vegetation not be within 15 feet of the existing landside toe of the levee;
- Base line sampling will determine depth of suitable cover cap over the dredged material used as floodwall backfill. Approximately 1 – 2 feet will likely be required based on findings reported in 1995;
- After dredging the pond to a suitable depth, allowance should be made for a pond liner to be installed with 1 – 2 foot cap of suitable soil laid over the liner;
- Pond liner may be penetrated by footer/pier to provide support to a proposed structure such as a boardwalk. The liner will need to be wrapped around penetrating object and sealed;
- Health and safety plan shall be prepared to notify contractors of risk of dioxins.

3.5.4 SAMPLING

To determine the current level of sediment contamination and necessary depth of suitable material cap, Metro Parks will need to collect sediment samples and have them analyzed for dioxins. Generally 2 – 5 sediment samples are taken by hand per acre and sent to a lab for testing. Method 1668, high resolution mass spectroscopy is the lab test performed and typically cost \$1,200 - \$1,500 per sample with a 15 – 30 day turn around for results. It is suggested that the pond be drained and all fish removed before dredging and sampling occurs. If sediment is dredged from the pond it can be stored on site to dry out but must be in a secure location and clearly identified. Temporary fencing or storage containers marked with signs notifying the public of risk shall be used to securely store the dredged material on-site.

Once the proposed pond liner and suitable material cap has been placed the pond can then be filled with water again. After the pond is at capacity a water sample will need to be collected and analyzed to make sure it meets the federal and state water quality standards established for primary contact recreation and warm aquatic habitat.

The KDFWR recommends that Metro Parks establish an ongoing monitoring program of the pond sediment and fish for dioxins, due to the unknown source of contamination. An ongoing sampling program would ensure all involved that the liner is working properly and the pond is a safe place to fish and paddle.



3.6 PROPOSED POND AREA IMPROVEMENTS

Generally the pond surface area will increase from 1.8 to 2.5 – 3 acres and the depth will increase from 1.5 feet to an average of 6 feet and maximum of 12 – 15 feet. Walking paths will be extended from the current paths within the park to the water's edge. A proposed boardwalk will extend the paths out over the water in some areas of the pond to create an interactive location between users and the water. Multiple hardened bank locations will be established for fisherman. The pond will have a new water service line from Southwestern Parkway with back flow preventer and isolated shutoff valve. The pond will have a new overflow drain pipe adequately sized to handle larger events and eliminate the flooding issues between the pond and Southwestern Parkway. The KDFWR has requested vehicular access to the pond or a fish tube for stocking the pond. Paddlers have requested a beach area along one of the banks as a canoe/kayak launch location. Approximately 16,000 cubic yards of material will need to be dredged and properly placed on site. Figure 3-5 is of the proposed pond survey. The full size conceptual plan is included in Appendix C.

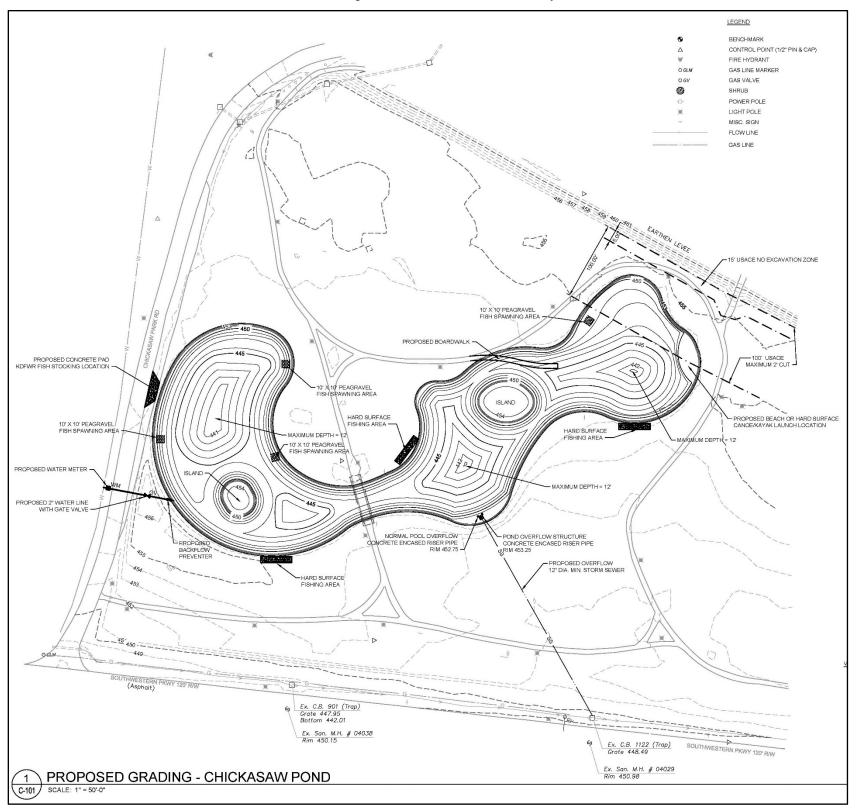
Conceptual-level opinions of probable cost were developed for the proposed canoe/kayak launch options. The conceptual cost opinions are based on contemporary costs from similar projects and engineering judgement. Several assumptions and exclusions were made for the planning level basis in determining the cost for these alternatives. In general, a 35% markup was included in the adjusted unit costs for mobilization / demobilization, maintenance of traffic, bonds and insurance, contingency, engineering and permitting. In addition, a standard 25% contingency was included for planning purposes.

The conceptual costs opinions are summarized in Table 3-1. Appendix G includes a more detailed opinion of probable construction costs.

Table 3-1: Conceptual Cost Opinion of Pond

Description	Cost	
Erosion Control	\$97,372	
Demolition	\$30,217	
Earthwork	\$1,534,576	
Utilities	\$87,386	
Site Improvements	\$572,930	
TOTAL	\$2,322,482	

Figure 3-5: Chickasaw Park Conceptual Pond





3.7 REGULATORY REQUIREMENTS

Tt contacted the local, state and federal agencies to determine what type of permits would be necessary to make improvements to the Chickasaw Park pond. At the time of this contact the existing pond classification as a jurisdictional water of the U.S. was unknown. Therefore, a formal jurisdictional determination request was prepared and submitted to the USACE for review and a determination. The classification of the pond will ultimately indicate which agencies have jurisdiction over the pond and which construction permits would be applicable. In November 2015, Tt met with USACE on site to review the jurisdictional determination request. At this time USACE verbally indicated that the pond would not be considered a jurisdictional water of the U.S.; however, Tt has yet to receive an "official" determination letter from the USACE. For the sake of this report we are assuming that the non-jurisdictional determination will stand and therefore the required permits will not include those necessary when working within a jurisdictional waterway. The typical permits that will not be required are the USACE Section 404 of the Clean Water Act and Section 10 of the Harbors and Rivers Act. Since the pond is currently located on the dry or land side of the levee, it is not within the regulatory floodplain and therefore local and state construction within a floodplain permitting will not be required. The following is a description of each permit that will required. Table 3-1 is a summary of the regulatory requirements of proposed improvements to the pond.

3.7.1 LOUISVILLE METROPOLITAN SEWER DISTRICT

The Louisville Metropolitan Sewer District (MSD) serves as the local sponsor of the flood protection levee that parallels the Ohio River and runs through Chickasaw Park. Due to the placement of fill and excavation within the proximity of the existing levee, Metro Parks will be responsible for preparing a flood protection works permit application and submitting to MSD for approval. Once MSD approves the proposed site improvements, the permit application will be submitted to the USACE for final approval. Refer to www.msdlouky.org/ for the latest version of the permit application.

Louisville MSD also serves as the local regulatory agency regarding site disturbance. According to the Louisville and Jefferson County Erosion

Prevention and Sediment Control Ordinance No. 186, Series 2007, Metro Parks will be required to prepare a site disturbance permit and notice of construction applications and submit to MSD for approval. Since the proposed improvements will disturb more than one acre, Metro Parks will need to prepare a Storm Water Pollution Prevention Plan (SWPPP) and submit to MSD for approval. Refer to www.msdlouky.org/ for the latest version of the permit applications.

3.7.2 UNITED STATES ARMY CORPS. OF ENGINEERS

As mentioned above, Metro Parks will be responsible for preparing a Flood Protection Works application and submitting to MSD as the local sponsor for review and approval. Upon approval from MSD the application will then be sent to the USACE for final approval. The USACE will be concerned with the placement of fill on the dry side of the levee, proximity and depth of excavation of the pond near the dry side of the levee, and the existing water line removal from under the levee.

3.7.3 KENTUCKY DIVISION OF WATER

Since the proposed site improvements will disturb more than one acre, Metro Parks will be responsible for preparing the (KPDES) KYR10 Storm Water Construction general permit. This general permit authorizes the discharge of pollutants in storm water discharges associated with both small and large construction activities. Paper notices of intent and termination are no longer accepted. Electronic NOI/NOT can be filed using the following links:

NOI: https://dep.gateway.ky.gov/eForms/default.aspx?FormID=48

NOT: https://dep.gateway.ky.gov/eForms/default.aspx?FormID=49

In addition to the general permit, Metro Parks will be required to prepare a Storm Water Pollution Prevention Plan and submit to Louisville MSD for approval.

3.7.4 KENTUCKY HERITAGE COUNCIL

Chickasaw Park is not currently listed as a site on the Historic Register, therefore permitting through this agency is not required. However due to the significance of the Olmsted Parks in Louisville, Metro Parks shall coordinate

with the Kentucky Heritage Council and the Louisville Olmsted Parks Conservancy.

3.7.5 LOUISVILLE METRO PLANNING DEPARTMENT

Since the pond is located in a community park, Metro Parks will be responsible for preparing a community facility review package for the Louisville Metro Planning Department approval.

Table 3-2: Summary of Regulatory Requirements

	_	•	-
Permit	Governing Entity	Required	Comment
Section 404/10	USACE	No	Non-Jurisdictional Waterway
Section 401	KYDOW	No	Non-Jurisdictional Waterway
Floodplain Construction	MSD	No	Not within Regulatory Floodplain
Flood Protection Works	MSD / USACE	Yes	Based on fill within 15 feet of existing landside levee toe
Site Disturbance / SWPPP	MSD	Yes	Greater than 1 acre in disturbance
KPDES General Stormwater / SWPPP	KDOW	Yes	Greater than 1 acre in disturbance
Section 106	KY Heritage Council / SHPO	Yes	Olmsted Park eligible for National Historic Park Registry
CFR	Metro Department of Planning	Yes	Community Facility Review



4.0 CANOE/KAYAK ACCESS

4.1 INTRODUCTION

Metro Parks initiative for canoe and kayak access to the Ohio River from public parks located in West Louisville is driven by several factors: a desire to expand recreational opportunities for area residents, a need to increase emergency services access to the river from the Kentucky shore; and a desire to extend educational programming for area youth; and a desire to contribute towards eventual creation of a community-wide blueway for Louisville by focusing on possibilities within the lower pool of the Ohio River.

To this end, the Kentucky Department of Fish and Wildlife Resources has agreed to build and maintain a parking lot and boat ramp at the northern end of Shawnee Park as an extension of West Market Street. This installation will partially fulfill the need for emergency services access to the river, and will also serve as a de-facto kayak/canoe access point. This single access point, however, does not offer the full flexibility that Metro Parks is looking for in their educational and recreational programming in the context of overall blueway planning.

Metro Parks has identified three sites for investigating additional canoe/kayak launch facilities in order to maximize flexibility within their programming and offer more options for river put-in/take-out locations to river users. The sites are Chickasaw Park, Portland Wharf Park, and the publicly-accessible western end of Shippingport Island.

This report identifies two preferred locations for canoe/kayak access based on an analysis of the three eligible sites, presents a conceptual site plan for each of the preferred locations, determines permitting requirements associated with the construction of the preferred alternatives, and provides a parametric cost estimate.

4.2 METHODOLGY

4.2.1 SITE ANALYSIS

Louisville Metro Parks and the USACE Louisville District to assess their suitability for canoe/kayak access. Notations and observations related to site suitability were written on aerial photos and GPS coordinates were recorded in areas of particular interest.

Owner requirements and preferences were also determined at this time through group discussion, and were recorded as follows:

- Access should be able to withstand powerful flooding forces that occur every year.
- Universal accessibility is preferred.
- With potential full boat ramp access at Shawnee Park, it is not necessary for other launch sites to accommodate watercraft other than canoes and kayaks.
- Sitework may take advantage of recent and pending river bank stabilization projects – may combine river access with proposed stabilization measures.
- Maintenance needs must be taken into account. Metro Parks will need to commit to maintaining the launch sites.
- Water utility lines may be included to aid in maintaining the launch sites. (i.e. "hosing off" silt and debris).
- Parking access and vehicular circulation need to be addressed in relation to the proposed launch sites.
- Launch sites and access shall be designed to minimize collection of river debris.
- Canoe/Kayak access and put in areas will also provide access for fishing

Pond & Company also reviewed documents pertinent to this effort so as to better understand the particularities related to the three potential sites, such as issues and opportunities, technical constraints, past findings, community input, etc. The following documents were reviewed as part of this effort:

- Chickasaw Park Bank Stabilization & Restoration Demonstration Project Draft Final Report. Prepared for the Louisville Olmsted Parks Conservancy by Geosyntec Consultants, September 2013.
- Civil Feasibility Study Report, Chickasaw Park Boat Ramp. Prepared for Metro Parks by AMEC, June 2014.
- Civil Feasibility Study Report, Shawnee Park Boat Ramp. Prepared for Metro Parks by AMEC, June 2014.
- Louisville's Olmsted Parks and Parkways: A Guide to Renewal & Management Master Plan. Prepared for the City of Louisville by the Louisville Olmsted Parks Conservancy, Inc., June 1994.

- Master Plan for the Renewal and Management of Chickasaw Park.

 Prepared for Louisville Olmsted Parks Conservancy by
 Environs/Inc., January 2001.
- Master Plan for the Renewal and Management of Chickasaw Park.
 Prepared for Louisville Olmsted Parks Conservancy by
 Environs/Inc., January 2001.
- National Register of Historic Places Nomination Form for Olmsted Park System of Louisville. U.S. Department of the Interior, May 1982.
- Ohio River Navigation Charts, Cairo, Illinois to Foster, Kentucky. U.S. Army Corps of Engineers Louisville District, March 2014.
- Ohio River, Portland Wharf Park and Louisville Riverwalk, Jefferson County, Kentucky: Continuing Authorities Program Section 14 Detailed Project Report. U.S. Army Corps of Engineers Louisville District, February 2015.
- Portland Wharf Park Master Plan. Prepared for Metro Parks by Rhodeside & Harwell, Inc., November 2002.

Site observations and pertinent information from document research were then combined with GIS data of existing conditions and aerial photography obtained from the Louisville/Jefferson County Information Consortium (LOJIC) to create maps of opportunities and constraints for each site (Appendix E). These maps were used to narrow down preferred locations within each site and to judge the viability of each site as a whole. A summary of the findings of each of the three sites may be found in the following sections.



4.2.2 SITE SELECTION

The three sites were contrasted using a weighted evaluation matrix (Table 4-1), which ranked the sites with scores of either one, two, or three, where a score of one indicates low suitability and three indicates high suitability for canoe/kayak river access. Sites were evaluated based on river safety, motor vehicle access/parking, river bank stability/topography, site visibility/security, existing utilities/restrooms, and regulatory restrictions. Because some of these factors are more critical than others when determining site suitability, each factor was given a numeric weight equal to a percentage. The sum of all weight factors equals one. For this analysis, river safety and motor vehicle access/parking were given the highest weight, and existing utilities/restrooms and regulatory restrictions were given the lowest weight.

Table 4-1: Weighted Evaluation Matrix for Site Suitability

Factor	Factor Weight	Chickasaw Park	Portland Wharf Park	Shippingport Island
River Safety	0.3	3	1	2
Motor Vehicle Access/Parking	0.2	3	1	2
River Bank Stability/Topography	0.15	1	3	3
Site Visibility/Security	0.15	2	1	3
Existing Utilities/Restrooms	0.1	3	1	2
Regulatory Restrictions	0.1	3	1	1
Total Score		2.6	1.3	2.2

Each site was assigned a score of 1, 2, or 3, with one indicating low suitability, and three indicating high suitability.

The results of this analysis indicate that Chickasaw Park and Shippingport Island are more suitable for canoe and kayak launches than Portland Wharf Park. A more detailed description of site suitability and analysis for each location may be found in the following sections. Analysis graphic maps may be found in Appendix H.

4.2.3 ACCESSIBILITY REQUIREMENTS

The ADA Standards for Accessible Design (ADASAD) provide guidelines to creating accessible facilities. The recreational boating section only deals with marinas, boat boarding docks and gangways. There are no requirements for launching areas for carry-in watercraft such as canoes, kayaks, and rafts. Furthermore, projects that fall under the Architectural Barriers Act are required to follow the Architectural Barriers Act Accessibility Standards (ABAAS), which are more stringent than ADASAD. The recreational boating section addresses marinas, boarding piers, docks and gangways: there are no design requirements for launching carry-in watercraft.

Although launches for carry down watercraft are not required to be fully accessible under the law, Metro Parks wishes to provide full access wherever feasible.

4.3 SITES

4.3.1 CHICKASAW PARK

Chickasaw Park is a public park on city-owned land on the west side of Louisville. As one of Louisville's Olmsted Parks, Chickasaw Park is a valued asset in the Metro Park system. Although not specifically listed on the National Register of Historic Places, development within the park needs to involve the Louisville Olmsted Parks Conservancy as a major stakeholder. The Conservancy is a public-private partnership charged with the long-term stewardship of the historic and natural resources within the Louisville Olmsted Parks system. Any constructed intervention within the park should respond to the original Olmsted vision for the park. The 2001 Master Plan is a good source for understanding an approach to site design in keeping with the long term vision for the park.

The site has many qualities that make it a suitable location for a canoe/kayak launch. First, the park is already consistently used by the neighborhood, making any programmatic additions more visible and more likely to attract use. The park also has adequate motor vehicle access and parking, existing restrooms, and full utility service. In addition, the presence of an existing pond offers the potential for synergistic programming opportunities for flat water paddling training, followed by river paddling training in the same location. Water safety in this area is also ranked as the highest of the three potential sites, due to its greater distance from the McAlpine Locks and Dam, and associated commercial barge traffic. The commercial sailing line in this part of the river is located away from shore, near the center of the river channel.

Both the topography and stability of the river bank at Chickasaw Park present significant challenges to building a canoe/kayak launch site. The Ohio River

comprises the entire western side of Chickasaw Park, extending approximately 2,200 linear feet from north to south. The slopes above the river rise approximately 70 feet vertically from normal pool elevation of 383 feet (USACE Ohio River Navigation Chart 84) to the top of the bank at an elevation approximately 450 feet. Slopes on the river bank average 3 horizontal to 1 vertical, with areas that approach a near vertical condition in some locations. There is an intermediate terrace approximately halfway down the bank at an elevation of approximately 430 feet that is wide enough to potentially act as a loading/unloading area for motor vehicles. A degraded asphalt road leads from the main parking lot down to this terrace, but it is not usable in its current condition.

Stability of the river bank is a concern. The park is located at the beginning of an outside curve in the Ohio River. Outside curves in the river are known to be more prone to erosion due to higher water velocities, while the inside curves tend to receive silt deposition. Chickasaw Park has a long history of severe erosion, sloughing, undercutting, and groundwater seepage along its river shore. In early 2011, a river bank stabilization demonstration project was completed along part of the shore using a combination of methods for stabilization, including live staking, soil bioengineering, live siltation, and coir. The live staking's are material cut from live native growing plants such as willow (Salix sp) that are expected to root easily from cuttings. The live siltation construction includes live rootable vegetative cuttings that are installed in fill terraces with the growing tips oriented at right angles to the bank face and backed with riprap rock. In addition to the vegetation, coir fabric was used as a stabilization material. Coir fabric is a natural fiber extracted from the husk of coconut and when cured and woven together becomes a high strength, natural and biodegradable solution for erosion control along river banks. As of September 2012, the stabilization project had been deemed to be working by post-installation monitoring, but its long-term effects remain unknown.

In spite of the challenges associated with providing river access down unstable and eroded slopes, Chickasaw Park is one of the two options selected for conceptual design. Due to the design challenges associated with providing access down the steep riverbank slopes, and the added cost of slope stabilization measures, canoe/kayak access at Chickasaw Park will require the most cost intensive design solution.

4.3.2 PORTLAND WHARF PARK

Portland Wharf Park is undeveloped green space on city-owned land just west of the McAlpine Lock on the west side of Louisville. Owing to its location just west of the Falls of the Ohio, the area's location lent itself to commercial activity related to river traffic early in the development of Louisville. Because boats could not pass through the Falls of the Ohio, passengers and goods were shuttled through Portland as they made their way around the Falls.



The bustling port town was replaced with residential communities in the late 19th century when the canal around the Falls was widened, allowing throughtraffic of commercial craft, and weakening Portland's economic base. The historic flood of 1937 devastated this neighborhood, resulting in the demolition of several neighborhood blocks and the construction of the flood levee in the mid-20th century. Those city blocks on the river side of the levee became what is now known as Portland Wharf Park. Due to the extent of human activity through the centuries on this park, it is considered to be rich in archaeological resources and was listed on the National Register of Historic Places in 2006.

The levee acts as a physical, visual, and psychological barrier between Portland Wharf Park and the rest of the Portland community. It is currently undeveloped with the exception of the Louisville Riverwalk, which dead ends at a point about halfway through the park due to it having been abandoned some years ago to sedimentation from flood events. The trail is expected to reopen sometime in 2017 after a river bank stabilization project has concluded.

The site has some qualities that make it attractive for a canoe/kayak launch. The Ohio River comprises the entire northern side of Portland Wharf Park, extending approximately 3,000 feet from east to west. Slopes above the river rise approximately 30 feet vertically from normal pool elevation of 383 feet (USACE Ohio River Navigation Chart 85) to the top of the bank at an elevation of approximately 415 feet on the west end of the park. The topography in the western half of the park consists of shallower slopes such as what may be suitable for a natural surface boat launch. The topography in the eastern half of the park is much steeper and less stable, making it less suitable for boat launches.

Unlike Chickasaw Park, Portland Wharf Park has no current programs or developed areas. It is seldom used by the surrounding residents, though community interest is high in developing the park into an active archaeological park that interprets the neighborhood's past. Current private development interest in the neighborhood may also stimulate the development of Portland Wharf Park as the neighborhood evolves in the coming years.

At the time of this report, there are no current or proposed vehicular access routes into the park. Maintenance vehicles access the park via the Riverwalk, which is designed to convey non-motorized traffic and would be unsuitable to open up to public vehicular traffic. The City owns right-of-way that passes beneath Norfolk Southern's K&I Bridge, but the railroad has shown reluctance to grant permission to pass through their bridge supports. It would be theoretically possible for authorized park vehicles to drive into the site for programmed kayaking trips via the Riverwalk, but this is not ideal from a Riverwalk trail user perspective.

Because of the lack of visibility and motor vehicle access into the site, there are also security considerations for this park. The park is regularly patrolled by law enforcement, but user perception of security may prevent the facility from being used as much as one that is in a less isolated context.

The lack of motor vehicle access, lack of utility services and restrooms, and isolation from the community severely limits this site's potential eligibility as a boat launch site. It is currently a one-mile walk from the closest public parking to the area of the park most suited for launching boats, which is quite a long distance to haul a canoe or kayak. Any development of boat facilities here, however simple, must be accompanied by site improvements to bring vehicular circulation inside the park and provide some basic services (emergency phone, restrooms, lighting, etc.)

Of equal concern is the park's proximity to the lower level of the McAlpine Locks. Commercial barge traffic currently passes within just a few hundred feet of shore along Portland Wharf Park. This close proximity to high volumes of commercial barge traffic poses an unavoidable safety risk. The USACE has requested that any boat launch downstream of the McAlpine Locks be located at least 3,000-5,000 feet downstream of the K&I Bridge. A boat launch at Portland Wharf Park would be unable to meet this threshold, since the park has only about 2,300 feet of shoreline downstream from the K & I Bridge, thus disqualifying it from consideration.

4.3.3 SHIPPINGPORT ISLAND

Shippingport Island is the largest island on the Ohio River in the Louisville Metro Area. Once part of the mainland, the land was separated as an island when a navigable canal was dug to bypass the Falls of the Ohio, the only major barrier to commercial traffic on the Ohio River. It is completely contained within the Falls of the Ohio National Wildlife Conservation Area, a national, bi-state area on the Ohio River, administered by the US Army Corps of Engineers. It is the only National Wildlife Conservation Area under Corps jurisdiction.

Due to the sensitivity of the operations there, which includes power production, navigation, and lock operation, access to island is controlled by a gate at the main access road on 27th Street and Marine Street. However, during normal conditions this gate is open, giving semi-public access to the island, and specifically to a small parking lot and beach known as Angler's Trail.

Shippingport Island has several key advantages to being used for a canoe/kayak launches. At the time of this writing, the Louisville Metro Fire Department (LMFD) was in negotiation with the USACE to construct a concrete boat ramp in the vicinity of Angler's Trail for use in launching rescue boats. Although the boat ramp is being constructed for exclusive use by LMFD, and will be restricted from general public use, the possibility exists

for limited, supervised, and infrequent launches by Metro Parks under certain conditions. If permission is granted to Metro Parks for limited use of the boat ramp, this will significantly reduce costs associated with constructing and maintaining the ramp to almost zero.

Existing parking facilities at Angler's Trail and nearby restrooms at the McAlpine Locks and Dam Visitor Center, combined with a highly secure and visible location, also makes Shippingport Island an attractive candidate for programmed boat launches.

Drawbacks to launching boats from Shippingport Island are primarily related to the water safety in this area. Due to the operation of the hydroelectric dam, water currents in this area are generally swifter than most places on the river, and are subject to sudden change depending on the needs of the power grid.

Additionally, no recreational craft are allowed to pass south of Sand Island due to a restricted area associated with the downstream river wall of the McAlpine Locks. According to the USACE, "[w]hen water in the locks is released during each locking operation, sudden turbulent boils are created which can capsize a boat venturing too near." (*Ohio River Navigation Charts, Cairo, Illinois to Foster, Kentucky, page B*). Although the restricted area is well marked with signage, additional warning signage and/or buoys may be appropriate at the proposed boat ramp site to reiterate this important safety consideration.

As a result of the restricted area south of Sand Island, all recreational craft launched from Shippingport Island must pass north of Sand Island. This will require boaters to pass over an historic dike, which the USACE has indicated is passable by small craft such as canoes and kayaks.

Although the USACE has primary jurisdiction over the National Wildlife Conservation Area, the zone is utilized by several other organizations for purposes such as power production, navigation, education, and fishing. As such, any use of the land for canoe/kayak launches by Louisville Metro Parks would need to be explored by several stakeholders, including the US Army Corps of Engineers, the US Fish & Wildlife Service, the Federal Energy Regulatory Commission, Louisville Gas and Electric, the Indiana Department of Natural Resources, and Louisville Metro Fire & Rescue.

4.4 CONCEPT DEVELOPMENT

Due to the unsuitability of Portland Wharf Park as a boat launch location, and because boat access at Shippingport Island is actively being pursued by another agency at the time of this writing, detailed concept development was not pursued for those two locations. Two concepts were instead developed for Chickasaw Park.



As described previously in this document, slopes on the riverbank at Chickasaw Park rise approximately 70 ft vertically from normal pool elevation to the top of bank. Providing access for carry-down watercraft to the Ohio River from the park is challenging due to the steep and unstable slopes that form the transition zone between the park terrace and the water. Water levels on the Ohio are highly variable during boating season, ranging from a normal pool elevation to 383 to and ordinary high water mark of 408.5.

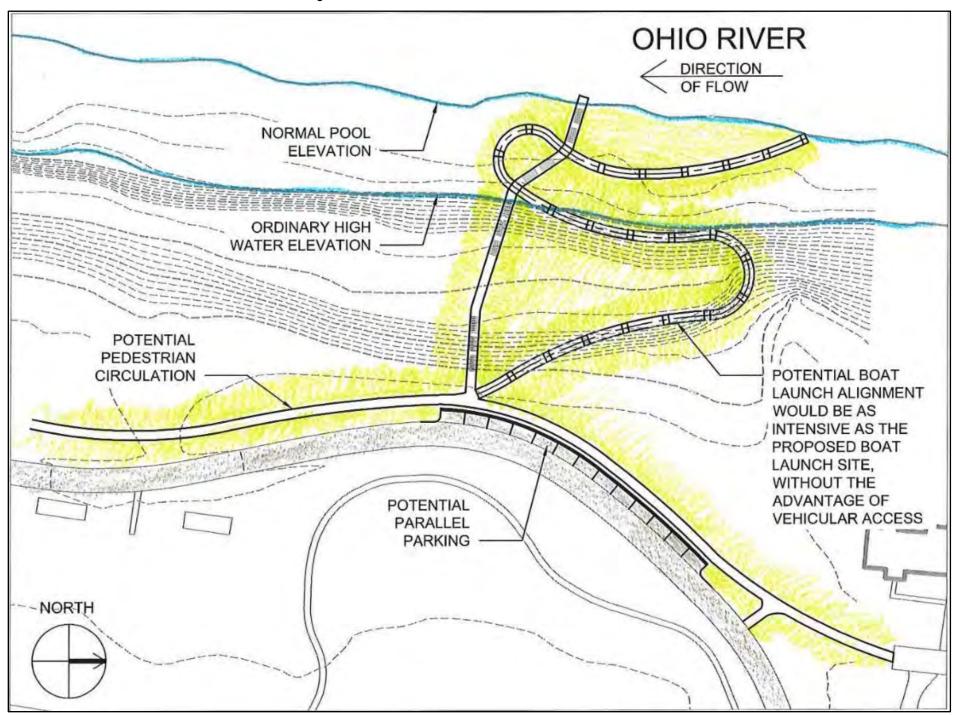
Water levels may be expected to regularly exceed these parameters during flood conditions, and strong erosive forces will be applied to any constructed access each year.

Although the entire shoreline was evaluated, the most advantageous location for a boat launch was selected based in large part on taking full advantage of the existing driveway leading down to the intermediate terrace. Creating a vehicular drop-off loop at the existing intermediate terrace was deemed essential to the success of the project due to the difficulty of carrying a watercraft up or down the entire 70 vertical feet of the river bank. It was believed that the scale and difficulty of this obstacle would discourage all but the most dedicated users. By using the intermediate terrace as a loading/unloading location, the number of vertical feet to the Normal Pool Elevation decreases to approximately 50 feet, significantly decreasing the physical strain on users. Additionally, the intermediate terrace area will be important as a construction staging area for the project. Because this intermediate terrace area was considered so important to the success of the project, both concepts use it as a major feature of the design.

Another site at the far northern end of the park was briefly considered. This area may be receiving funding for a river bank stabilization project in the next few years. It was thought that combining the boat launch project with the stabilization project could result in a cost savings. However, this option was not considered advisable for three reasons. First, the terrain in this area is extremely steep. Site observations made by the consultant team revealed that most slopes in this area are almost vertical. There is little to no advantageous opportunity for a walkway in this part of the park. Second, providing vehicular access to the intermediate terrace would be extremely costly, so as to be practically prohibitive, involving the construction of approximately 1,000 feet of new road on a steep and unstable river bank. The absence of a road would eliminate the advantage of using the intermediate terrace on the river bank, and users would be required to carry their watercraft the entire 70 vertical feet from the top of the bank. This would be equivalent of carrying a watercraft roughly 40% of the way up or down Niagara Falls. Third, it is unlikely that the cost of constructing the launch in this area would be reduced in any significant way by the concurrence of the proposed bank stabilization project, and any synergistic advantages would be offset by the difficulty of the terrain in this area.

A rough sketch showing a conceptual launch configuration at the northern edge of Chickasaw Park is provided in Figure 4-1. A launch in this location would require a ramp approximately 780 feet in length, if it were to comply with Access Guidelines pursuant to the Architectural Barriers Act (ABA), and/or approximately 140 steps with 6 inch risers. New parallel parking spaces would also be advisable along nearby Chickasaw Park Road for use by recreational boaters. This site was disgualified from further development because of near-vertical slopes and lack of vehicular access to the intermediate terrace.

Figure 4-1: Alternate Site at North end of Chickasaw Park





4.4.1 CONCEPTS

Two concepts were developed for the South end of the park, near the terminus of an existing road to the intermediate terrace. The two concepts take two different approaches to providing access to the site. Option 1 (Figure 4-2) provides full access to the Normal Pool Elevation, pursuant to Architectural Barriers Act (ABA) regulations governing outdoor recreation access routes. Option 2 (Figure 4-3) provides full access only to the Ordinary High Water Elevation. Figure 4-4 represents conceptual sections of the proposed river access.

Options 1 and 2 share many common features. Motor vehicle access is provided to the intermediate terrace for short-term loading and unloading of watercraft. Long-term parking is provided in the existing parking lot, and may be used once watercraft have been unloaded. An existing degraded asphalt road currently leads to the intermediate terrace, which is wide enough to accommodate a small one-way loop. The existing road will need to be demolished, re-graded, and repaved in order to serve this function, as well as serve as an outdoor recreation accessible route, in compliance with the ABA. In addition to repaving the road, stabilized shoulders and guardrail will need to be provided on the downslope side of the road.

Pedestrian access to the intermediate terrace will be provided by the inclusion of concrete steps leading from an overlook feature due west of the existing park lodge. This path alignment is based largely on the 2001 Chickasaw Park Master Plan, and will be approximately 160 feet in length and consist of approximately 55 steps. It will bridge an elevation gap of approximately 20 vertical feet. An additional "shortcut" stairway will lead directly from the parking lot down to the intermediate terrace to pre-empt park users from using the slope as a shortcut down to the intermediate terrace. Alternate pedestrian and ABA outdoor recreation access will be provided by using the improved road. Construction of a river access point will necessitate concurrent riverbank stabilization and restoration measures on a scale and of a type similar to what was undertaken in 2010.

4.4.1.1 Option 1

In Option 1, access to the river from the intermediate terrace is achieved by combining a 540 foot ramp (in compliance with ABA regulations for outdoor recreation access routes) and 96 concrete steps. Watercraft transport is facilitated through the use of metal kayak slides in the middle of the stairs. Both the ramp and stairs will bring users down in elevation approximately 44 vertical feet. A handrail is provided on both sides of the stairs, and a single handrail is provided on the downslope side of the ramped outdoor recreation access routes.

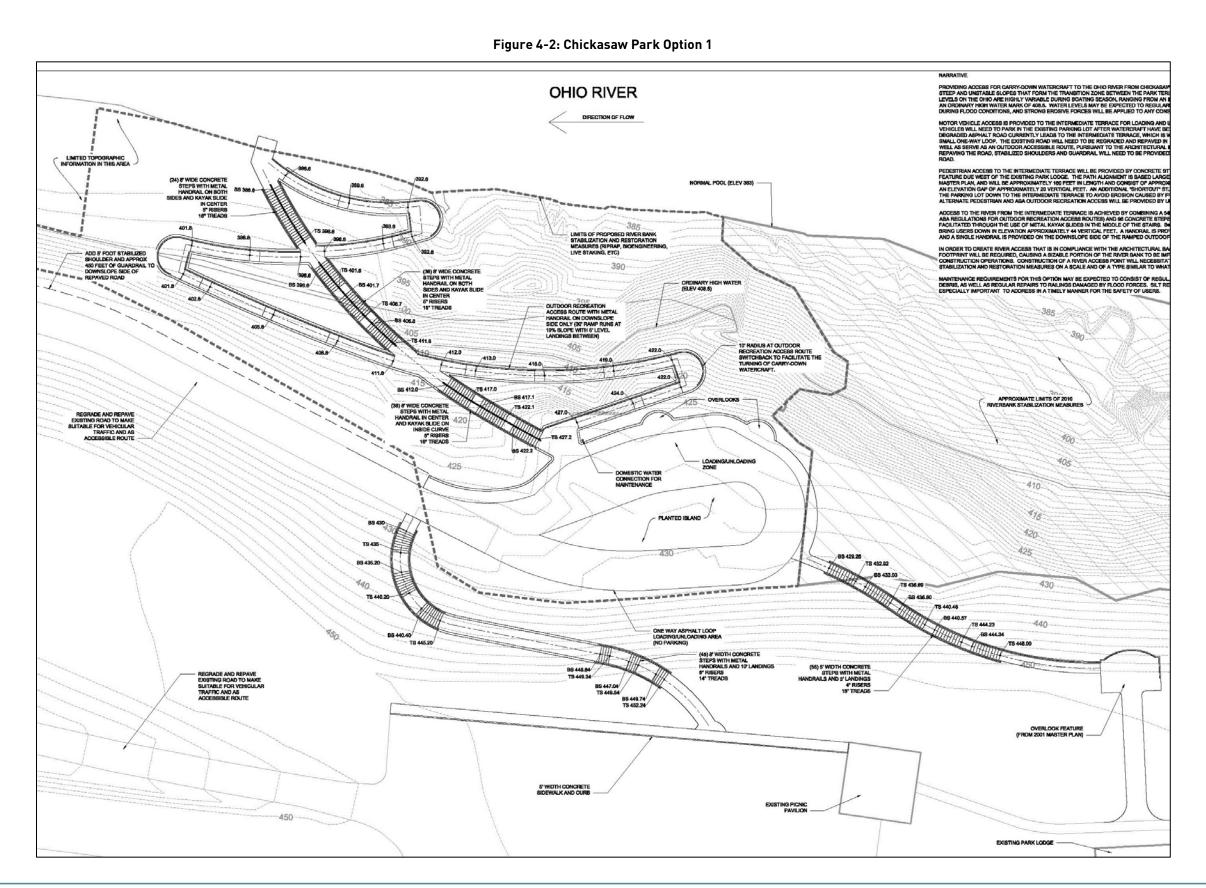
In order to create river access that is in compliance with the ABA and in character with the Olmstedian design of the park, a large project footprint will be required, causing a sizable portion of the river bank to be impacted by grading and construction operations. Option 1 is also included in Appendix F.

4.4.1.2 Option 2

In Option 2, access to the river from the intermediate terrace is divided into two phases. The first phase brings users down just beyond the ordinary high water elevation of the river. Combining a 275 feet ramp (in compliance with ABA regulations for outdoor recreation access routes) and 48 concrete steps, this first phase brings users to the highest elevation where the river would be expected to be in any given boating season. The second phase uses 52 steps to achieve access all the way down beyond the normal pool elevation of the river. Watercraft transport is facilitated through the use of metal kayak slides in the middle of the stairs. A handrail is provided on both sides of the stairs, and a single handrail is provided on the downslope side of the ramped outdoor recreation access routes. Both the ramp and stairs will bring users down in elevation approximately 44 vertical feet.

This option, due to its smaller footprint, would have less impact on the riverbank than Concept 1, but will not provide full access pursuant to ABA regulations. As was described earlier in this document, facilities for carrydown watercraft are not regulated under either the ADA or ABA. Providing access in compliance with either of these acts is desired, but may not be feasible given the high cost to construct compliant routes. Option 2 is also included in Appendix F.







OHIO RIVER NORMAL POOL (ELEV 383

Figure 4-3: Chickasaw Park Option 2



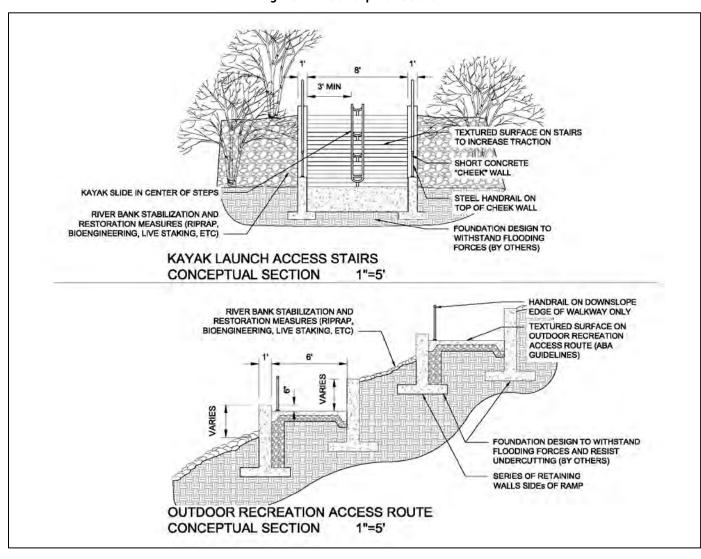


Figure 4-4: Conceptual Sections

4.4.2 MAINTENANCE

Maintenance requirements for both options may be expected to consist of regular cleaning to remove silt and debris, as well as regular repairs to railings damaged by flood forces and floating debris. Because of the size of the installation, and because the facility may be expected to flood every year, regular maintenance will be necessary to ensure it remains operational and safe for use.

Silt and mud on the steps and ramps will be an ongoing concern, and removal will need to be prioritized after flood events to maintain a textured, stable surface and reduce potential for injury to users caused by slippage.

4.5 COST OPINION

Conceptual-level opinions of probable cost were developed for the proposed canoe/kayak launch options. The conceptual cost opinions are based on contemporary costs from similar projects and engineering judgement. Several assumptions and exclusions were made for the planning level basis in determining the cost for these alternatives. In general, a 35% markup was included in the adjusted unit costs for mobilization / demobilization, maintenance of traffic, bonds and insurance, contingency, engineering and permitting. In addition, a standard 25% contingency was included for planning purposes.

The conceptual costs opinions are summarized in Table 4-2. Appendix G includes a more detailed opinion of probable construction costs for each option.

Description Option 1 Option 2 \$117,946 Erosion Control¹ \$111.443 \$27,239 \$27,379 Demolition \$869,296 \$869,296 Earthwork¹ Pedestrian Hardscape \$1,146,707 \$1,679,970 \$186,084 Vehicular Access \$186,084 Terrace and Overlooks \$149,961 \$149,961 Sign and Striping \$1,809 \$1,809 Utilities \$9,303 \$11,703 TOTAL \$3,041,748 \$2.504.382

Table 4-2: Cost Opinion Summary



^{1 -} Cost of bank stabilization is included in Erosion control and Earthwork.

A 35% markup was included for mobilization / demobilization, maintenance of traffic, bonds and insurance, contingency, engineering and permitting.

A standard 25% contingency was included for planning purposes.

4.6 PERMITS REQUIRED FOR PROJECT

Pond & Company contacted the local, state and federal agencies to determine what type of permit would be necessary to construct a boat launch for carry-down watercraft in Chickasaw Park. Permits for construction of a boat launch at Portland Wharf Park were not considered, since no recommendations were made for this site. Construction permits for the proposed Metro Fire & Rescue boat ramp were likewise not considered, as construction of this project will not be the responsibility of Metro Parks.

4.6.1 CHICKASAW PARK

Pond & Company has determined that a number of permits would be required to construct an access route and launch area for personal carrydown watercraft on the Ohio River bank in Chickasaw Park. A description of each permit may be found below. Table 4-3 is a summary of the regulatory requirements.

4.6.1.1 U.S. Army Corps. Of Engineers

Based upon the current design, there will be over 50 CY of fill into the Ohio River and will likely not qualify for a Section 404 Nationwide Permit (NWP) 36. An individual 404 permit will then be required. This application covers the Clean Water Act Section 404 Permit and Section 10 of the Rivers and Harbors Act of 1899 Permit.

Individual Section 404 Permits typically take about 4 months and require coordination with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act, and the Kentucky Heritage Council, which employs the State Historic Preservation Officer (SHPO) for Section 106 of the National Historic Preservation Act (NHPA).

A Phase 1 archeological survey will be required within the project limits to comply with the Section 106 requirements. An archeological field survey and report on findings will need to be conducted and submitted to the USACE. The presence of archeological sites within the project limits will incur additional reporting and costs.

4.6.1.2 U.S. Fish and Wildlife Services

As a part of the 404 Permitting process, it is anticipated that coordination will be required with USFWS for mitigation for impacts to the Indiana Bat population. It is to be assumed that Indiana bats are in the project area and that consultation with the USFWS for tree cutting restriction and potential mitigation will be required. Mitigation may be assumed to be for impact to 1.5 acres of forested land and payment into the Indiana Bat Conservation Fund. USFWS may require field studies or habitat assessments if other federally listed endangered or threatened species are identified within the project area.

4.6.1.3 Kentucky Division of Water

Chapter 151 of the Kentucky Revised Statutes requires approval from the Division of Water prior to any construction or other activity in or along a stream that could in any way obstruct flood flows or adversely impact water quality. An application for permit to construct across or along a stream and/or water quality certification must be filed with the Floodplain Management Section of the Division of Water.

If the project disturbs more than 1 acre of soil, the City will need to file a Notice of Intent for Storm Water Discharges will also need to be returned to the Floodplain Management Section of the Division of Water.

4.6.1.4 Kentucky Heritage Council

Although permitting through this agency is not required for Chickasaw Park because the site is not on the Historic Register, coordination with the Kentucky Heritage Council shall be conducted due to the cultural importance of the site.

4.6.1.5 Metropolitan Sewer District (MSD)

The Metropolitan Sewer District requires an application for a permit to develop/repair in a local regulatory floodplain or in a local regulatory conveyance zone. This shall be submitted at the same time as a plan submittal application and a plan set for review. These are to be submitted to MSD's Development Team. This application process can be conducted at the same time as submission to the Kentucky Division of Water Floodplain Application. MSD will not formally permit the project until after the Division of Water has approved the project.

Construction within the floodplain and floodway may require a Conditional Letter of Map Revision or a formal Letter of Map Revision and associated flood studies.

Submittal for a site disturbance permit shall include EPSC Plans and a Construction Plan Checklist will be required. A preconstruction meeting and site disturbance bond may be required. A letter of completion after final stabilization has occurred shall be sent to MSD.

4.6.1.6 City of Louisville Department of Planning

Because the Chickasaw Property is owned by Metro Parks, the plans will go through a Community Facility Review instead of a full permitting process. No fee is necessary for this.

4.6.1.7 City of Louisville Building Permits

Because the Chickasaw Property is owned by the City of Louisville Metropolitan Parks Division, the development will not require building permits.

4.6.1.8 Louisville Olmsted Parks Conservancy

It is expected that the Conservancy will be given the opportunity to review and comment on the plans before construction documents are finalized.

Table 4-3: Canoe Launch Summary of Regulatory Requirements

Permit	Governing Entity	Required	Comment
Section 404/10	USACE	Yes	Greater than 50 CY of fill into the Ohio River
Section 401	KYDOW	Yes	Construction or other activity in or along a stream
Floodplain Construction	MSD	Yes	Not within Regulatory Floodplain
Site Disturbance / SWPPP	MSD	Yes	Greater than 1 acre in disturbance
KPDES General Stormwater / SWPPP	KDOW	Yes	Greater than 1 acre in disturbance
Section 106	KY Heritage Council / SHPO	Yes	Olmsted Park eligible for National Historic Park Registry
CFR	Metro Department of Planning	Yes	Community Facility Review

4.6.2 SHIPPINGPORT ISLAND

At the time of this report, it is expected that the implementation of the boat access ramp on Shippingport will be the responsibility of the Louisville Metro Fire Department; however, a Special Use Permit will need to be obtained from the US Army Corps of Engineers if the ramp is used for recreational purposes.

The US Army Corps of Engineers has indicated that supervised and infrequent recreational boat access at Shippingport Island could be possible during optimal water conditions, but would require robust coordination and engagement with multiple stakeholders. The feasibility of this option would have to be explored in more detail with the Falls of the Ohio National Wildlife Conservation Ares partners and stakeholders, including the Indiana Department of Natural Resources, the US Army Corps of Engineers, Louisville Gas & Electric, along with the Louisville Metro Fire Department.



5.0 SOFT SURFACE TRAILS

5.1 INTRODUCTION

As part of Base Task 5, the original scope included a feasibility analysis for the construction of multi-use soft surface trails within currently unprogrammed areas adjacent to the Ohio River in Shawnee Park, Shawnee Golf Course and Portland Wharf Park. Geotechnical services were to be performed in areas recommended to confirm trail construction feasibility. The revised scope, dated November 25, 2015, redirects the trail feasibility study to be concentrated in areas adjacent to the Ohio River in Shawnee Park and Chickasaw Park only and includes investigation of 1-2 fisherman access points within Shawnee Park. The team performed a field investigation utilizing a GPS Mobile Mapper to locate trails and access points within feasible areas. Flood frequency and river elevation data was collected to help determine locations as well as maintenance requirements for the trails and access points. The revised scope also reduced the need for geotechnical services due to the fact that flood frequency was determined to be a more successful tool in analyzing trail locations and projected maintenance. Recommendations for typical cross-sections for trail construction continue to be part of the scope as well as a parametric cost estimate for trail construction. This modification to the original scope was necessary for additional planning to support Louisville Metro Parks' (Metro Parks A-E consultant's work - MKSK) for the West Louisville Outdoor Recreation Initiative (WLORI) and to utilize A-E technical support and design services in the assistance in programming of new recreation infrastructure within the identified project target areas.

5.2 OHIO RIVER HISTORICAL RIVER STAGE DATA ANALYSIS

Ohio River elevation data at the McAlpine Dam Lower Gage was gathered from Louisville/Jefferson County Information Consortium (LOJIC). The information was charted in the two graphs shown in Figure 5-1: Chickasaw Park River Bank Stage Data and Figure 5-2 Shawnee Park River Bank Stage Data. Key recurrence intervals and elevations are shown on each park section such as Normal Pool (elevation 383), Ordinary High Water (OHW; elevation 408.5), 10-year, 50-year, 100-year, 500-year, 1997 flood, 1937 flood and the USACE levee for reference. Also depicted on the graphs in the chart labeled 'Average Exceedance' (Figure 5-3) is information derived from monthly realtime McAlpine Dam Lower Gage elevation data collected from 2008 to 2015 received from the USACE River Gages Website. This synthesized information helps to understand the river's historical elevation movement in relationship to each park and projected trail maintenance in relation to flooding frequency. For example, in Shawnee Park, the location of the Louisville Loop is noted at elevation 427 feet which according to the 'Average Exceedance' chart, is projected to be inundated with flood waters once every two years. Note that on November 4, 2015 (the date of the field investigation described below), the Lower McAlpine River gage was at elevation 389.0.

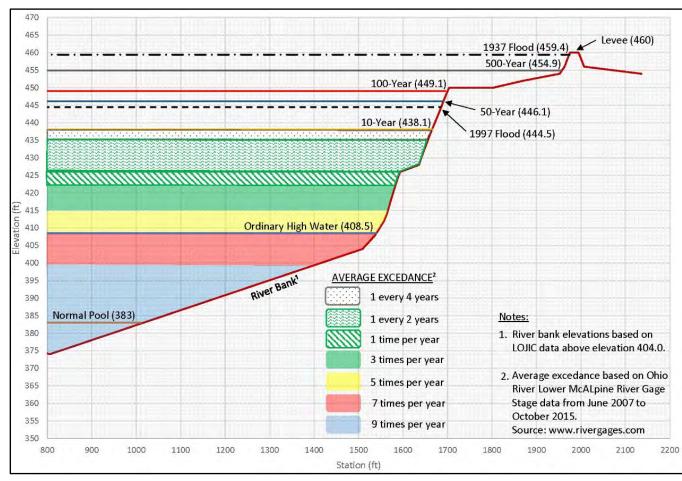
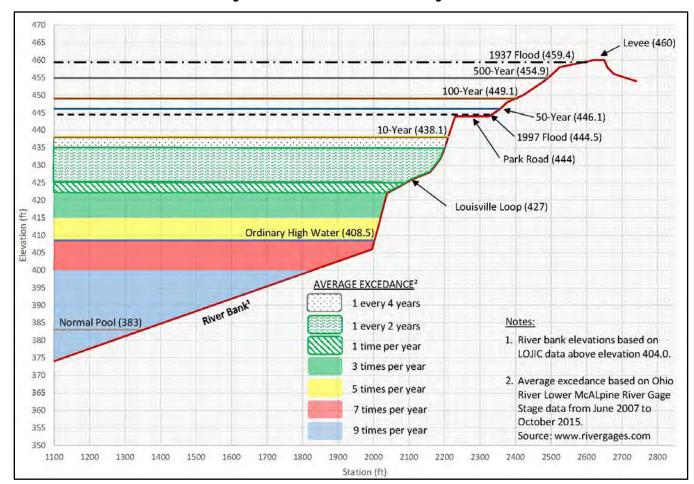


Figure 5-1: Chickasaw Park River Bank Stage Data

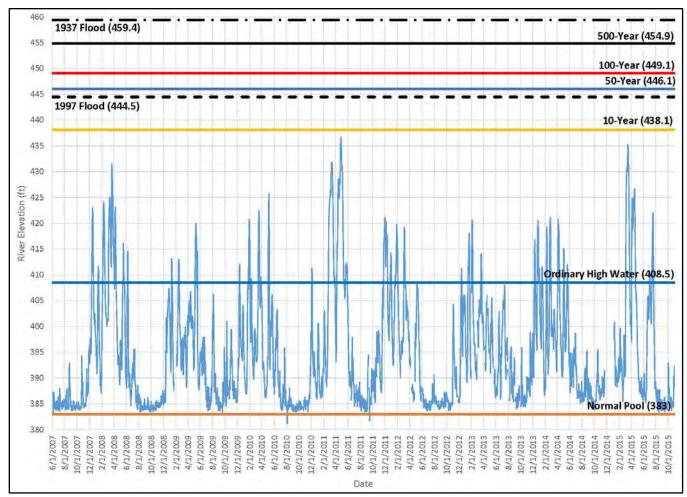


Figure 5-2: Shawnee Park Bank Stage Data



SOFT SURFACE TRAILS

Figure 5-3: Ohio River McAlpine Dam Lower Gage Stage Data 2007 - 2015





5.3 FIELD INVESTIGATION

On November 4, 2015, Chris Diehl (Tetra Tech), Jodi Smiley & Sarah Kopke-Jones (Environs) conducted field investigations to determine feasible fishing access points and connective trails in Shawnee Park and feasible soft surface trail alignment that parallels the river in Chickasaw Park. Refer to map in Appendix H: Chickasaw and Shawnee Parks River Trail Alignment Notes, which was sketched over the preliminary design completed by Louisville Metro Parks West Louisville Outdoor Recreation A-E design team (MKSK).

5.3.1 CHICKASAW PARK

The area in Chickasaw Park that was investigated was essentially from the park's northern boundary south to the proposed Canoe/Kayak Launch along the flat shelf below the main activity area that parallels the river. In order to access the flat shelf, users would need to traverse a severe grade differential via steps (Figure 5-4) from the northern part of the park or utilize the existing road that navigates down to the proposed Canoe/Kayak Launch. Refer to trail alignments in Appendix H and all photos in Appendix I.

Figure 5-4: View of Steep Bank from Main Activity Area of Park



The shelf area in reality is more narrow than LOJIC data shows and if a trail is implemented, the area only has capacity for a single trail to navigate around existing trees and remain away from the shifting cliff edge along the river (instead of a double trail as shown in the preliminary design completed by Louisville Metro Parks West Louisville Outdoor Recreation A-E design team). In some areas, the width becomes very narrow and if a trail is implemented, it should be aligned to hug the park-side of the shelf as opposed to the potentially dangerous shifting cliff edge along the river. Along with major stabilization of the bank, it is also advised that a guardrail be constructed along this cliff edge.

Figure 5-5: View of Severely Eroded Edge - Former Road



Invasive species (bush honeysuckle) are abundant and will need eradication. Views to the river from this shelf are obstructed due to invasive species and tree canopy below the shelf. Better views can be obtained from the main activity area above this shelf where current activities take place. A canopy walk is not advised in this location due to the lack of good canopy and the probability of tree uprooting due to flooding. It is not recommended to construct a trail along the shelf due to required extensive bank stabilization, frequency of flooding at the shelf elevation and lack of access. According to the Chickasaw Park River Bank Stage Data Graph, a trail located above elevation 424 would be optimal for maintenance purposes due to infrequent flooding at or above this level. The graph depicts maintenance requirements to be once every year at or above elevation 424. The trail mapped on this

investigation day and what is depicted on the Chickasaw Park River Trail Alignment Notes stays at or above elevation 424.

5.3.2 SHAWNEE PARK

The area in Shawnee Park that was investigated was essentially south of the 'Active' portion (Harmony Field), from the Northern Concourse access route to the Louisville Loop and due south. A rogue fishing trail was seen near the intersection of the access route and the Louisville Loop and was investigated. However, it became clear that the grade drop-off was too severe at this location to employ a soft surface access point down to the water's edge. In walking north of this rogue trail along the shelf, the group discovered an expansive sand beach, approximately 150 feet in length on this day as in Figure 5-6. Refer to all photos in Appendix I.

Figure 5-6: View of Sand Beach Looking North



Many soft surface trail routes were investigated to reach this beach and one was determined to be the optimal alignment from approximately Mile Marker 7 of the Loop. This trail would navigate from approximately elevation 427 feet at Loop Mile Marker 7 down to elevation 420 feet. At this area of the trail, minimal tree clearing would be necessary however, invasive species (bush honeysuckle, wild grape vine, etc.) removal would be imperative. From elevation 420 feet to 430 feet, the trail would need steps (wood ties and fill), approximately 20 feet in length, to allow users to navigate exposed tree roots. Refer to Section 5.4 Typical Cross Sections for more detailed information.



According to the Lower McAlpine River Gage, the water's elevation was at 389 feet on the day of investigation, which is 6 feet higher than normal pool (383 feet). It is assumed that the beach would be much larger than what was seen on November 4, 2015.

The group walked due south of the mapped beach location along the entire shelf below the Louisville Loop trail to the Southern Concourse to investigate other possible fishing access points. In many areas along this shelf, soils became extremely unstable exhibiting severe sinking in wet areas, shelf separation, cracking and groundwater seepage. At the water's edge and intermittently along the shelf, groundwater poured in a constant stream from elevations above.





(Refer to photos in Appendix I) Access from the Louisville Loop to the shelf was also not feasible due to extreme grade differences and past construction rubble/debris used to stabilize slopes. Therefore, it was determined that no areas for fishing access should be constructed in this area due to unstable soils and lack of accessibility.

An additional area outside the scoped area for this Planning Assistance project was investigated for potential fishing access as well. It is in the far southwestern corner of the park adjacent to the MSD CSO outfall on the Ohio

River. The team determined that this area should not be recommended for fishing access due to the extreme height from top of pipe to water, instability of soils upstream and proximity to overflow leaching into the Ohio River at this exact location. This outfall will be affected by the future construction of the MSD CSO Basin project within Shawnee Park therefore, it is possible that this area can be evaluated for fishing access after construction has concluded. Figures 5-8 and 5-9 are of the MSD CSO location.

Figure 5-8: Shawnee Park CSO Location

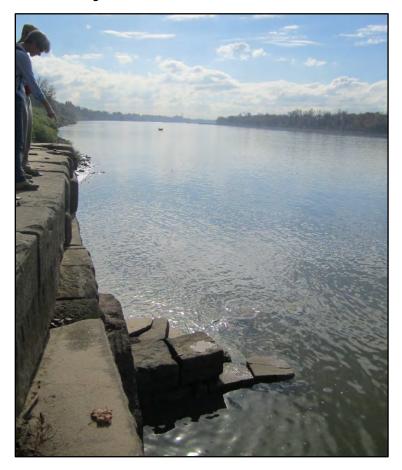


Figure 5-9: Shawnee Park CSO Location



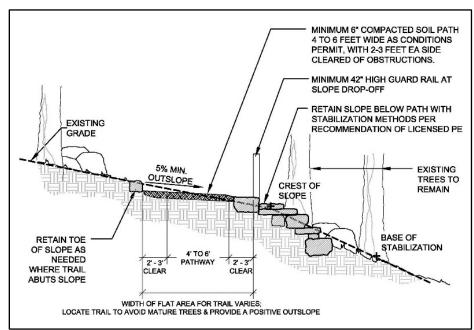


5.4 TYPICAL TRAIL SECTIONS

5.4.1 CHICKASAW PARK

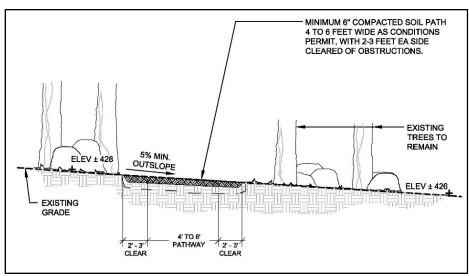
Three typical cross sections have been developed for the trail alignment discussed above in Chickasaw Park. The first trail cross section (Figure 5-10) depicts the proposed trail as it navigates between elevations 424 feet and 426 feet. This cross section is a standard soft-surface trail application consisting of bare mineral soil over compacted subgrade as per the Louisville Loop Soft Surface Trail Standards. It is not anticipated that this trail will be 'heavy use' therefore, bare soil is sufficient and less maintenance. According to the graphs described above in Section 5.2, where this cross section of trail occurs, flooding may occur once every year and trail maintenance from flooding such as debris removal and cleanup can be expected for a cost of \$10,000 to \$12,000 on average once per year. (The approximate trail length where this cross section applies is 690 linear feet.)

Figure 5-10: River Trail 1x per Yr Flooding



The second trail cross section (Figure 5-11) depicts the trail as it navigates above elevation 426. It is the same application noted above: bare mineral soil over compacted subgrade. According to the graphs described above in Section 5.2, the projected flooding within this zone is less frequent, once every 2 years, however maintenance from flooding such as debris removal and cleanup can be expected for a cost of \$9,000 to \$11,000. (The approximate trail length where this cross section applies is 585 linear feet.)

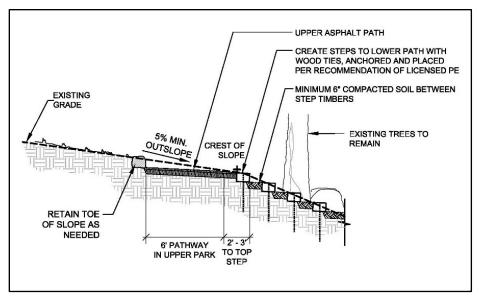
Figure 5-11: River Trail 1X per 2 Yr Flooding



Cost for construction of the entire trail is projected to be \$35,000 to \$40,000 and includes vegetation clearing and compaction of bare soil subgrade. (The approximate square footage of trail calculated for the above cost is 8,000; it consists of 6 feet width by 1,275 feet in length.)

The third cross section (Figure 5-12) shows the requirements at the proposed trail steps. These steps navigate a fairly steep slope, approximately 18-20 feet of grade change over 50-60 feet. The steps are proposed to be wood ties that are anchored into the slope, backfilled with compacted soil. Projected cost for construction of the steps are between \$16,000-\$20,000. Due to the fact that the location of the proposed steps will endure minimal flooding, maintenance on the steps can be projected to happen once every four years. Depending on severity of flooding, maintenance can vary from simple replenishment of soil and stability analysis of wood ties at \$2,000 to a possible complete rebuild of the steps at the construction cost mentioned above.

Figure 5-12: Steps from Park to River Trail



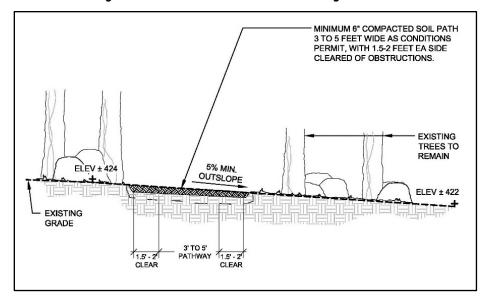
Routine maintenance (in non-flooding years) for the entire trail and steps will consist of yearly clearing of vegetation and stabilization of the wood ties, projected at \$4,000 to \$6,000. (The approximate square footage of trail calculated for the above cost is 8,000; it consists of 6 feet width by 1,275 feet in length.)

5.4.2 SHAWNEE PARK

Two typical cross sections have been developed for the trail access to the proposed fisherman access point (sand beach). The first section (Figure 5-13) is a standard soft-surface trail application consisting bare mineral soil over compacted subgrade as per the Louisville Loop Soft Surface Trail Standards. It is not anticipated that this trail will be 'heavy use' therefore, bare soil is sufficient and less maintenance. This section can be applied from Mile Marker 7 off the Louisville Loop paved path down to the proposed area for steps. Cost for construction of this trail is projected to be from \$5,000 to \$7,000 and includes vegetation clearing and compaction of bare soil subgrade. (The approximate square footage of trail calculated for the above cost is 1,530; it consists of 6 feet width by 255 feet in length.)

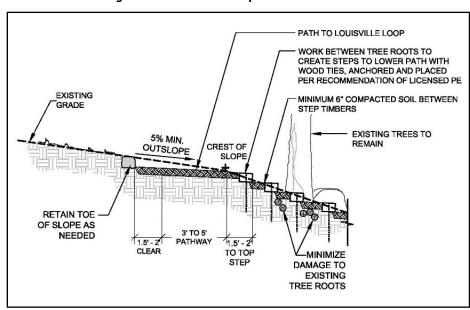


Figure 5-13: Soft Surface Trail to Fishing Beach



The second cross section Figure 5-14 shows the requirements at the proposed location for steps that are needed to traverse large exposed tree roots. The steps navigate about a 10 foot grade change over 25-30 feet. The steps are proposed to be wood ties that are anchored into the slope and backfilled with compacted soil. Projected cost of construction for the steps in this location is \$10,000 to \$12,000.

Figure 5-14: Timber Steps over Root Area



Due to the fact that the trail traverses from elevation 427 feet down to the river's edge at Normal Pool elevation 383, projected maintenance issues due to flooding will vary. According to the graphs described above in Section 5.2, the Louisville Loop trail at elevation 427 feet is affected by flooding once every two years. Therefore, areas below this elevation can be affected by flooding at a minimum once every two years to potentially nine times per year Proposed trail maintenance after flooding will consist of surface replenishment, debris removal and cleanup for an approximate cost of \$4,000 to \$6,000 for each occurrence. Proposed step maintenance after flooding can vary from simple replenishment of soil and stability analysis of wood ties at \$2,000 to a possible complete rebuild of the steps at the construction cost mentioned above.

Routine maintenance (in non-flooding years) for the trail and steps to the fishing access point will be yearly clearing of vegetation and stabilization of the wood ties, projected at \$2,000 to \$4,000.

5.5 RECOMMENDATIONS

5.5.1 CHICKASAW PARK

In conclusion, a trail leading from the proposed canoe/kayak launch area to the northern overlook area is feasible however, a single trail, not double, is recommended due to the width of the flat shelf area. At the northern terminus of the trail, steps are required to traverse the extreme grade back up to the main park activity area. Steps are also recommended at the midpoint of the trail to access the upper main activity area of the park.

5.5.2 SHAWNEE PARK

In conclusion, a location for fisherman to access the river was found and a trail is feasible to reach this access point beginning from Mile Marker 7 of the Louisville Loop Trail however, a set of steps is required to traverse the area noted that contains exposed tree roots. Areas south of this fisherman access location were investigated for possible access points and trails however, no recommendations could be made at this time due to unstable soils and extreme grade change.



FUTURE WORK

6.0 IDENTIFICATION OF FUTURE STUDIES AND ANALYSIS

The developed concepts, goals, and regulatory requirements identified in this technical and regulatory report for the Chickasaw Park Pond, canoe/kayak access and soft surface trails have been completed. However, there are future studies and analysis that will be required before the concepts can become an asset to the west Louisville community. The following is a brief summary of remaining task to be performed for each component of this report.

6.1 CHICKASAW PARK POND

Section 3.0 identifies the existing conditions, conceptual grading plan and regulatory requirements necessary to return Chickasaw Park Pond to a recreational fishing and paddling destination. Recommendations for future work include:

- Sampling and lab testing of sediment for contaminants to establish
 a current baseline of the level of toxicity. Based on the results, Metro
 Parks will be required to drain, dredge, line and cap the existing
 pond or no liner and cap will be needed.
- KDFWR strongly recommends that Metro Parks establish an ongoing monitoring program of the pond.
- The conceptual grading plan presented in this report is not intended to be a final design contract document. Contract documents including grading, layout, EPSC and utility design plans and technical specifications should be prepared for construction purposes.
- Coordination with the following regulatory agencies:
 - o Louisville Metropolitan Sewer District
 - United States Army Corps. of Engineers
 - o Kentucky Division of Water
 - o Kentucky Division of Waste Management
 - Kentucky Department of Fish and Wildlife Resources
 - Kentucky Heritage Council
 - o Louisville Metro Department of Planning

6.2 CANOE/KAYAK ACCESS

Section 4.0 presents a site analysis and recommendation for establishing a canoe/kayak launch access to the Ohio River. Recommendations for future work include:

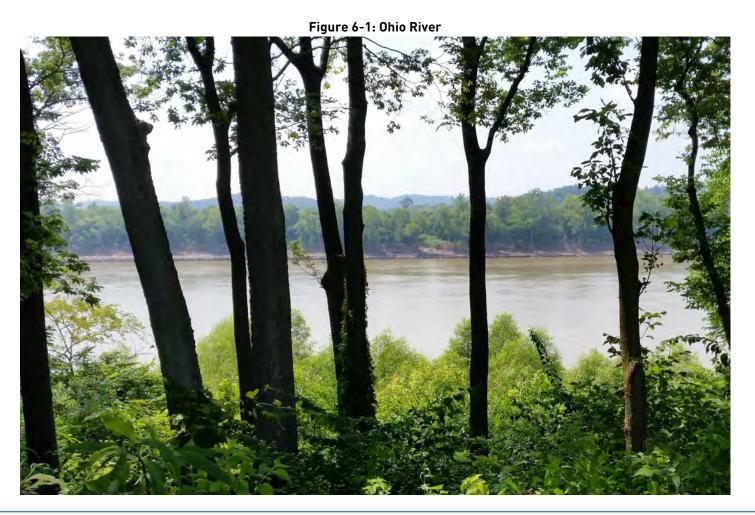
 A topographic survey and geotechnical exploration shall be performed to aid in the design of the slope stabilization and foundation design of the proposed access to the river.

- The conceptual grading and layout plans presented in this report are not intended to be a final design contract documents. Contract documents including grading, layout, EPSC and utility design plans and technical specifications should be prepared for construction purposes.
- Coordination with the following regulatory agencies:
 - o Louisville Metropolitan Sewer District
 - United States Army Corps. of Engineers
 - Kentucky Division of Water
 - o Kentucky Heritage Council
 - o Louisville Metro Department of Planning

6.3 SOFT SURFACE TRAILS

Section 5.0 presents the trail feasibility study in areas adjacent to the Ohio River in Chickasaw and Shawnee Parks. Recommendations for future work include:

- A topographic survey is recommended to aid in the design of the alignment of the proposed trails.
- The typical trail sections presented in this report is not intended to be a final design contract document. Contract documents including grading, layout, EPSC and utility design plans and technical specifications should be prepared for construction purposes.
- Coordination with the following regulatory agencies:
 - Louisville Metropolitan Sewer District
 - o United States Army Corps. of Engineers
 - Kentucky Division of Water
 - Kentucky Heritage Council





APPENDIX A – CHICKASAW PARK POND PHOTOGRAPHS

APPENDIX A - CHICKASAW PARK POND PHOTOGRAPGHS



Figure A-1: Ducks at Chickasaw Park Pond



Figure A-2: Water Lotus at Chickasaw Park Pond



Figure A-3: South Portion of Chickasaw Park Pond



Figure A-4: Overflow Structure at Chickasaw Park Pond



Figure A-5: 2" Water Line at Chickasaw Park Pond



Figure A-6: Water Line Alignment through Levee at Chickasaw Park Pond



Figure A-7: Bridge over Chickasaw Park Pond

Figure A-8: Bridge Over Chickasaw Park Pond

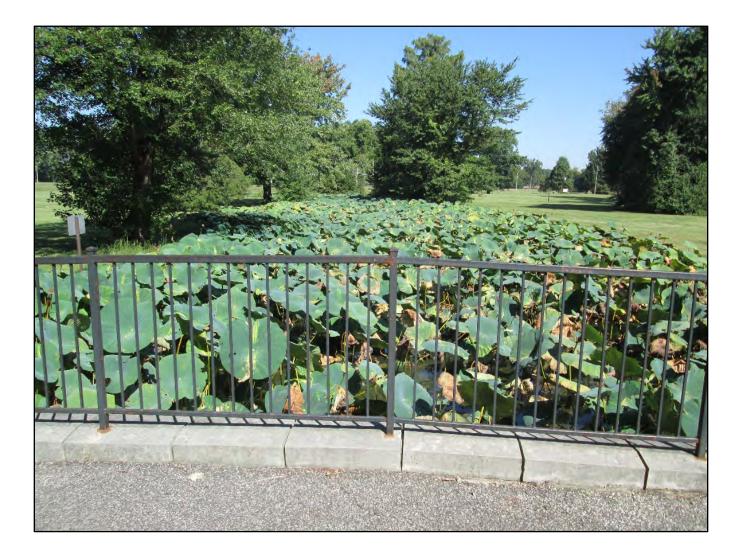




Figure A-9: Warning Sign Posted at Chickasaw Park Pond



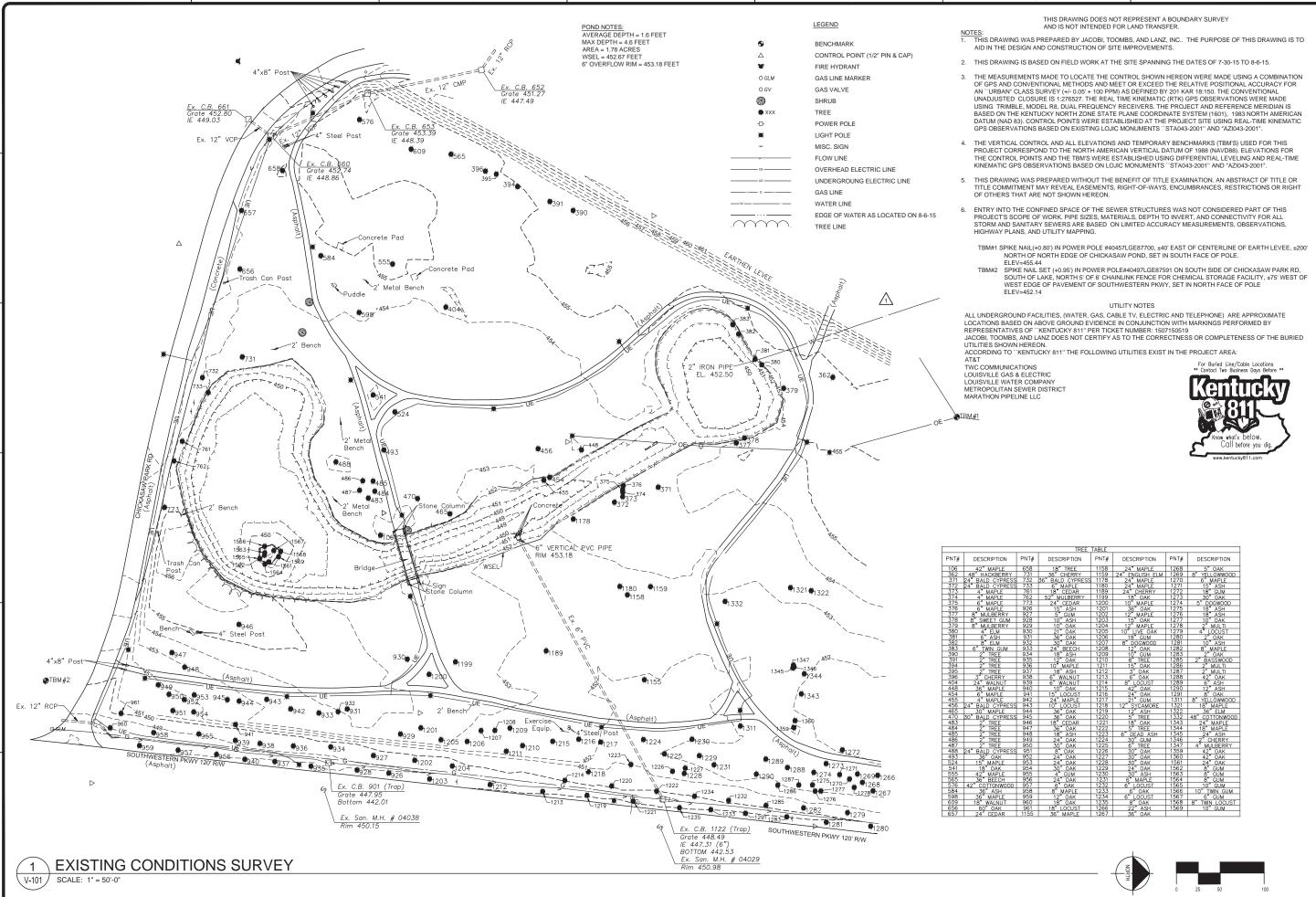
Figure A-10: Water Lotus from Bridge at Chickasaw Park Pond



APPENDIX B – CHICKASAW PARK POND SURVEY

APPENDIX B - CHICKASAW PARK POND SURVEY





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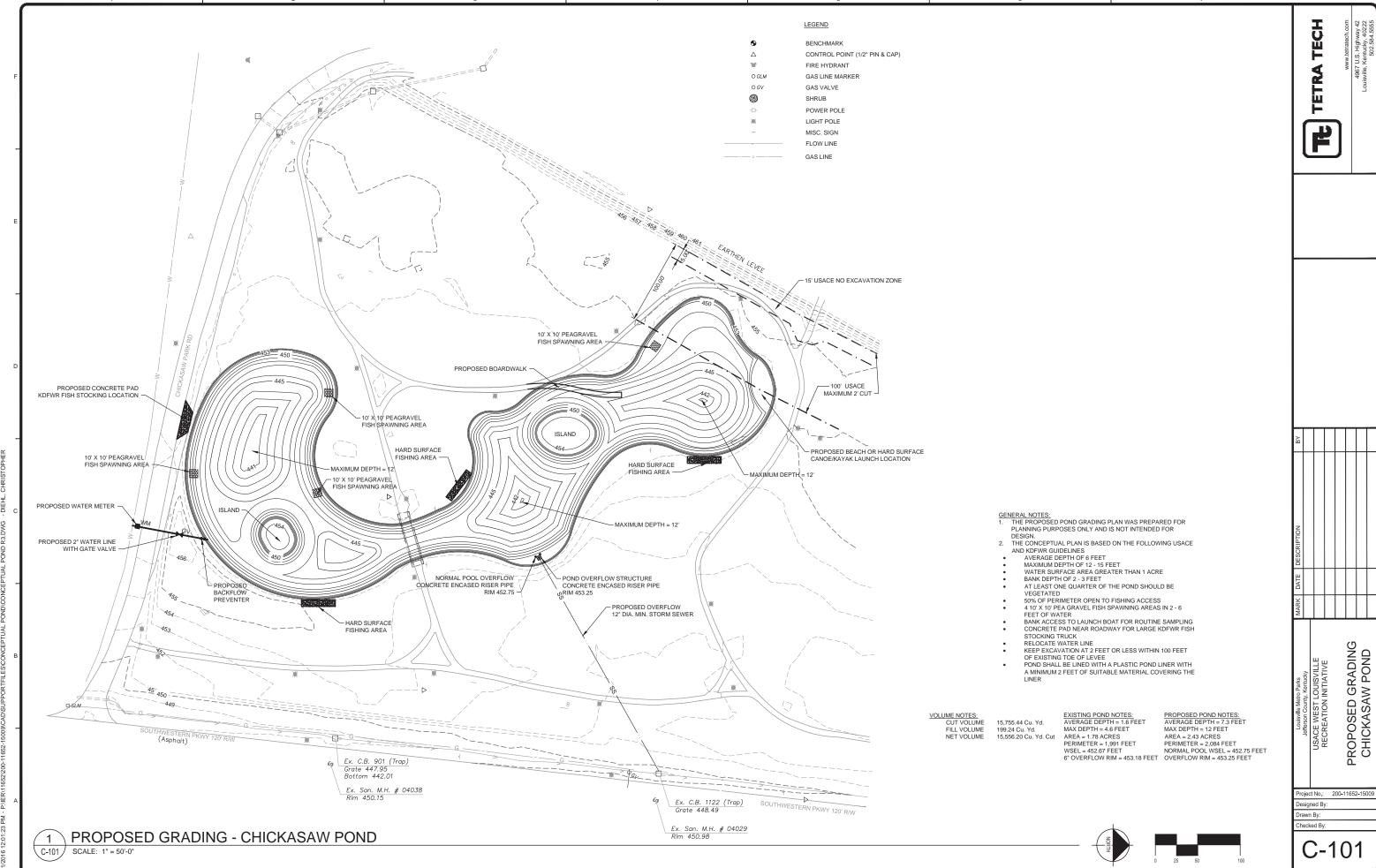
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SURVEY CHICKASAW P

APPENDIX C – CHICKASAW PARK POND CONCEPTUAL PLAN

APPENDIX C – CHICKASAW PARK POND CONCEPTUAL PLAN





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APPENDIX D – KDFWR FINS LAKE POLICY

APPENDIX D - KDFWR FINS LAKE POLICY



KENTUCKY	KDFWR POLICY					
JO'1430	Title / Subject Addition of New Fishing in Neighborhoods (FINs) Lakes Policy		REVISION DATE			
	REFERENCES	DISTRIE	UTION			
& IAITON		All Pers	sonnel			
		REPOR	RT: 🗆			

Purpose:

This policy is designed to provide guidance concerning adding new lakes to the Fishing in Neighborhoods (FINs) program as suitable lakes are identified.

Issue:

The Kentucky Department of Fish and Wildlife Resources (KDWR) expanded the pilot FINs program in 2009 to the point of capacity for our hatcheries and transportation section. In order for new lakes to be added to the FINs program, additional fish would need to be made available and the transportation section's schedule would need to be adjusted. Therefore, the following criteria will be used to determine if a lake can be new added to the FINs program.

Policy:

- 1. Lake owners must sign a memorandum of agreement (MOA) granting KDFWR rights to manage fish populations and set fishing regulations.
- 2. Lake owners are responsible for keeping the lake and grounds in good repair to keep access open to public fishing.
 - 3. Lake owners are also prohibited from charging additional fees for fishing.
- 4. Lake owners agree to cover 25% of costs of rearing and stocking fish by providing in-kind match to federal dollars. Examples of in-kind match include trash pick-up around lake, maintaining restrooms, mowing bank access and hosting fishing events at lake.
- 5. Lake owners must be willing to promote FINs program and fish stockings using various outlets including social media, print, and outreach.
- 6. Lake owners must also be willing to advance the FINS program by hosting or coordinating fishing events at lake.

1

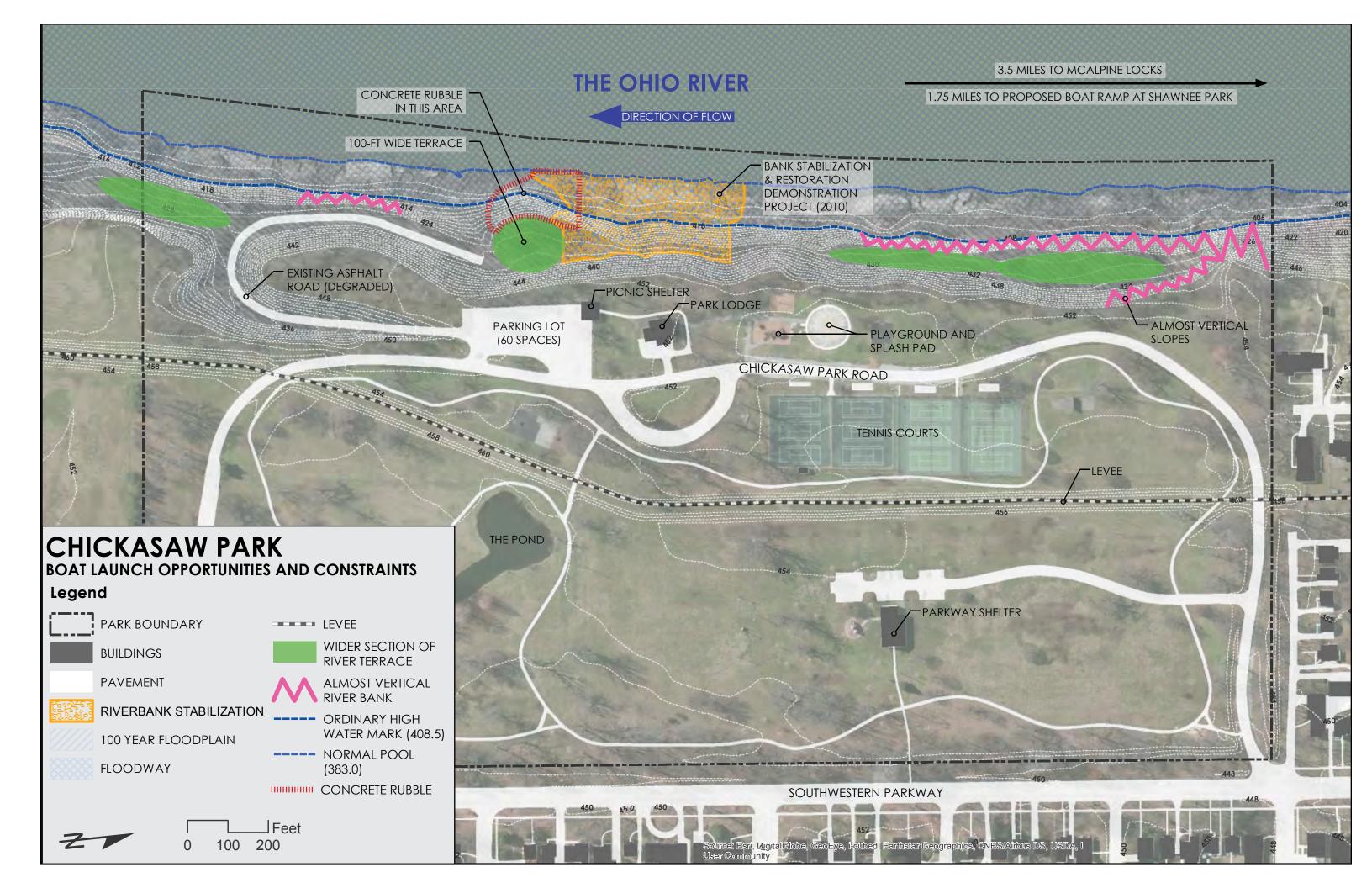
- 7. Lake must be accessible for large hauling trucks to stock fish on paved or gravel surface even under wet conditions. Alternatively, permanent piping could be installed to stock fish from paved surface in event of wet conditions.
- 8. Lake must have an area of no more than 20 acres and at least 1-acre with a minimum depth of 8 feet at its deepest location.
- 9. At least ½ of the lake's shoreline must be accessible for bank angling with some shade trees in proximity to bank fishing sites.
- 10. Public must be able to access the lake for fishing seven days a week during daylight hours for the entire calendar year.
- 11. Preference will be given to those lakes with established handicap accessible fishing areas.
- 12. Preference will be given to those lakes with established restroom facilities or those than plant to implement in the immediate future.
- 13. In the case where multiple lakes meet the criteria specified above, prioritization will be based on proximity to urban areas and the lack of quality fishing opportunities in the area.

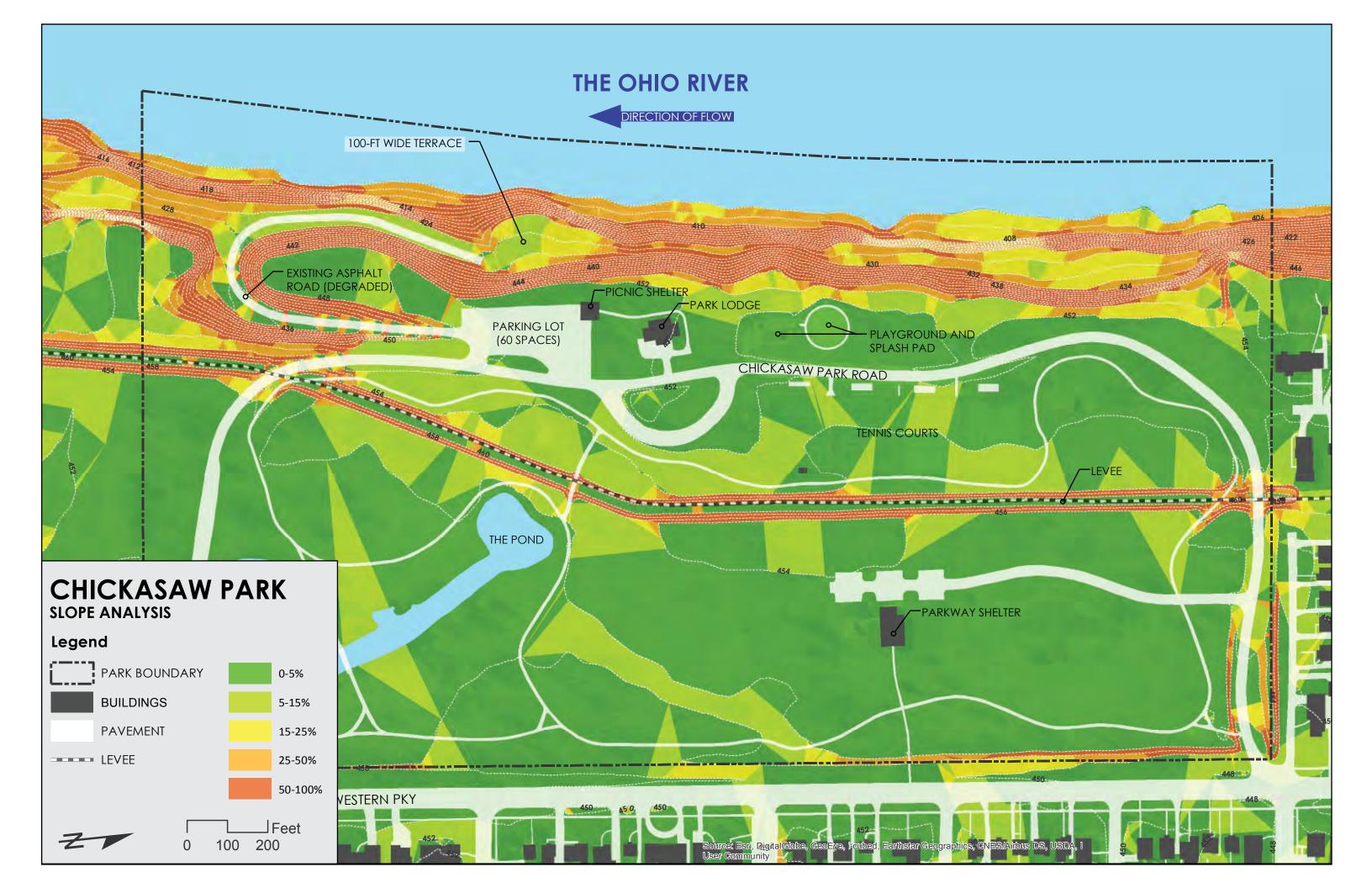
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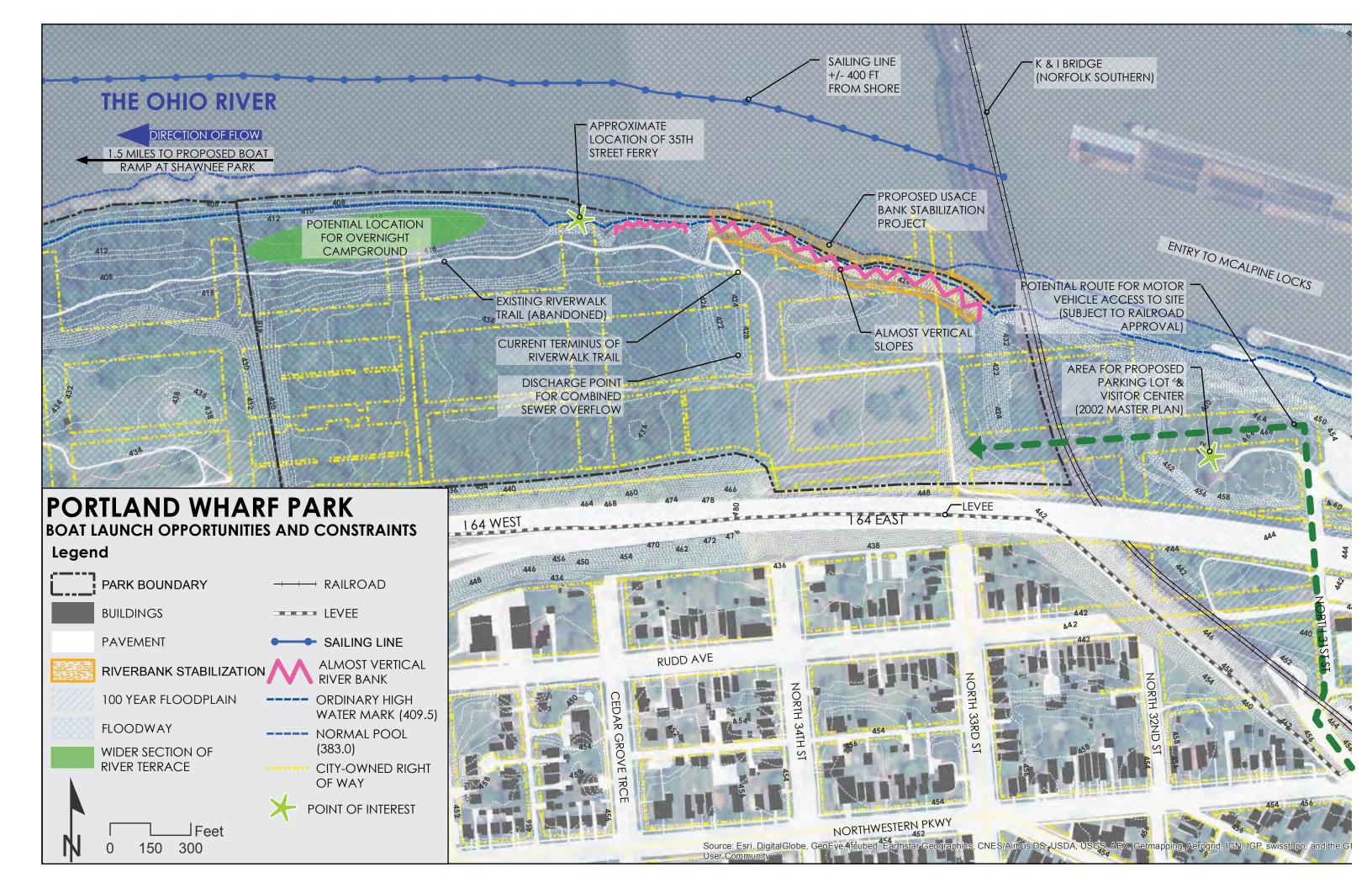
APPENDIX E – CANOE LAUNCH MAPS OF OPPORTUNITIES AND CONSTRAINTS

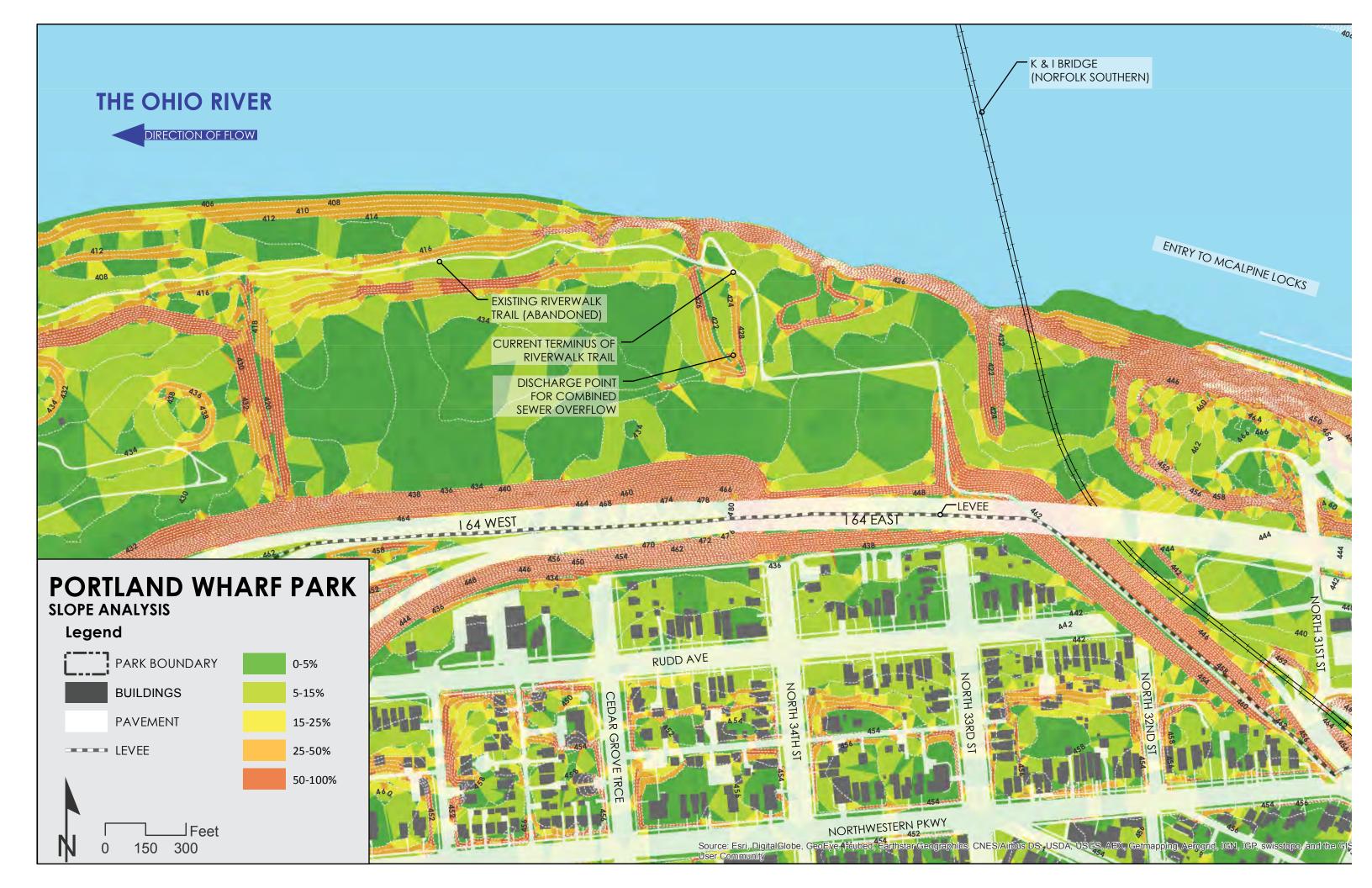
APPENDIX E – CANOE LAUNCH MAPS OF OPPORTUNITIES AND CONSTRAINTS

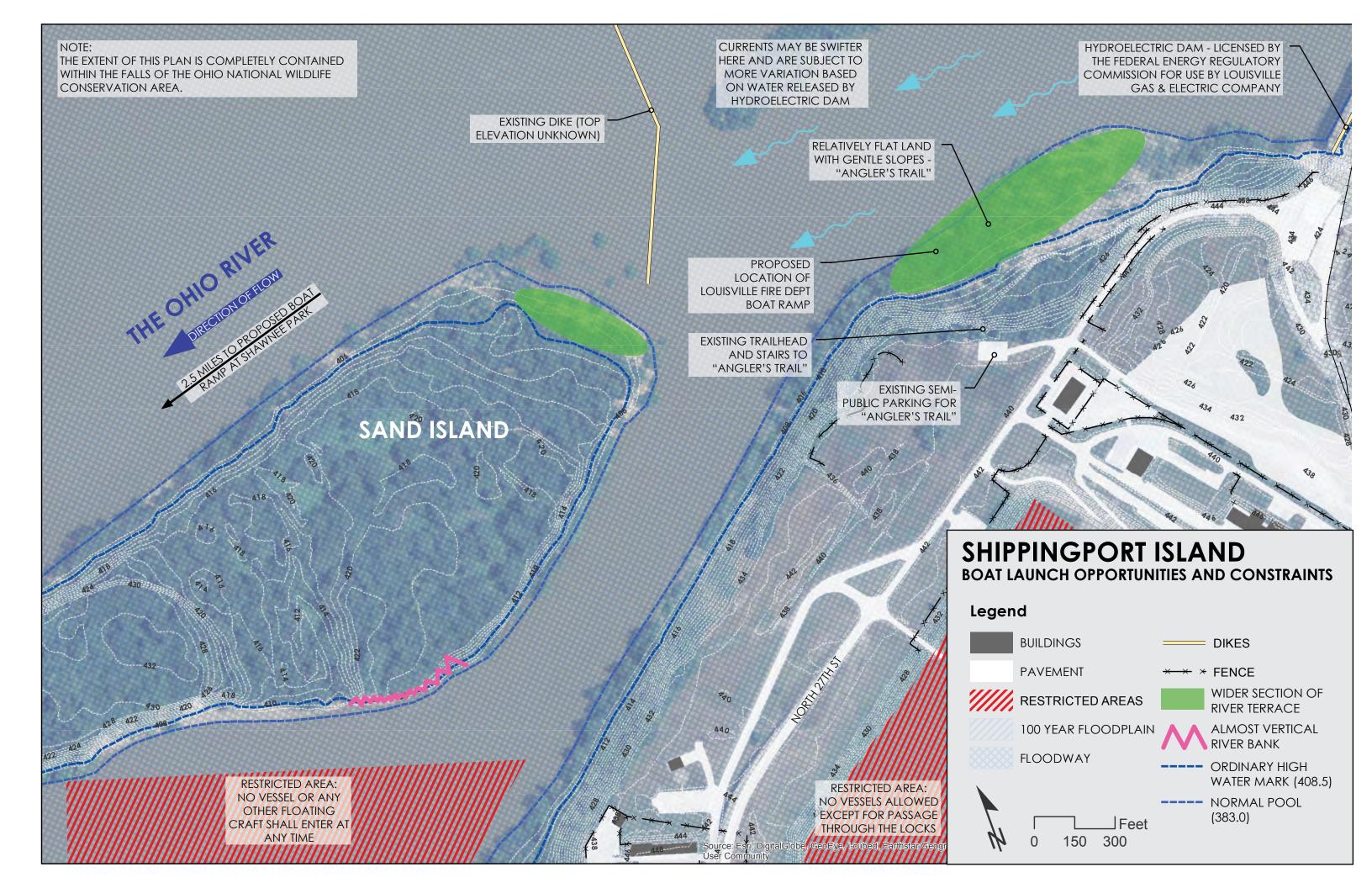










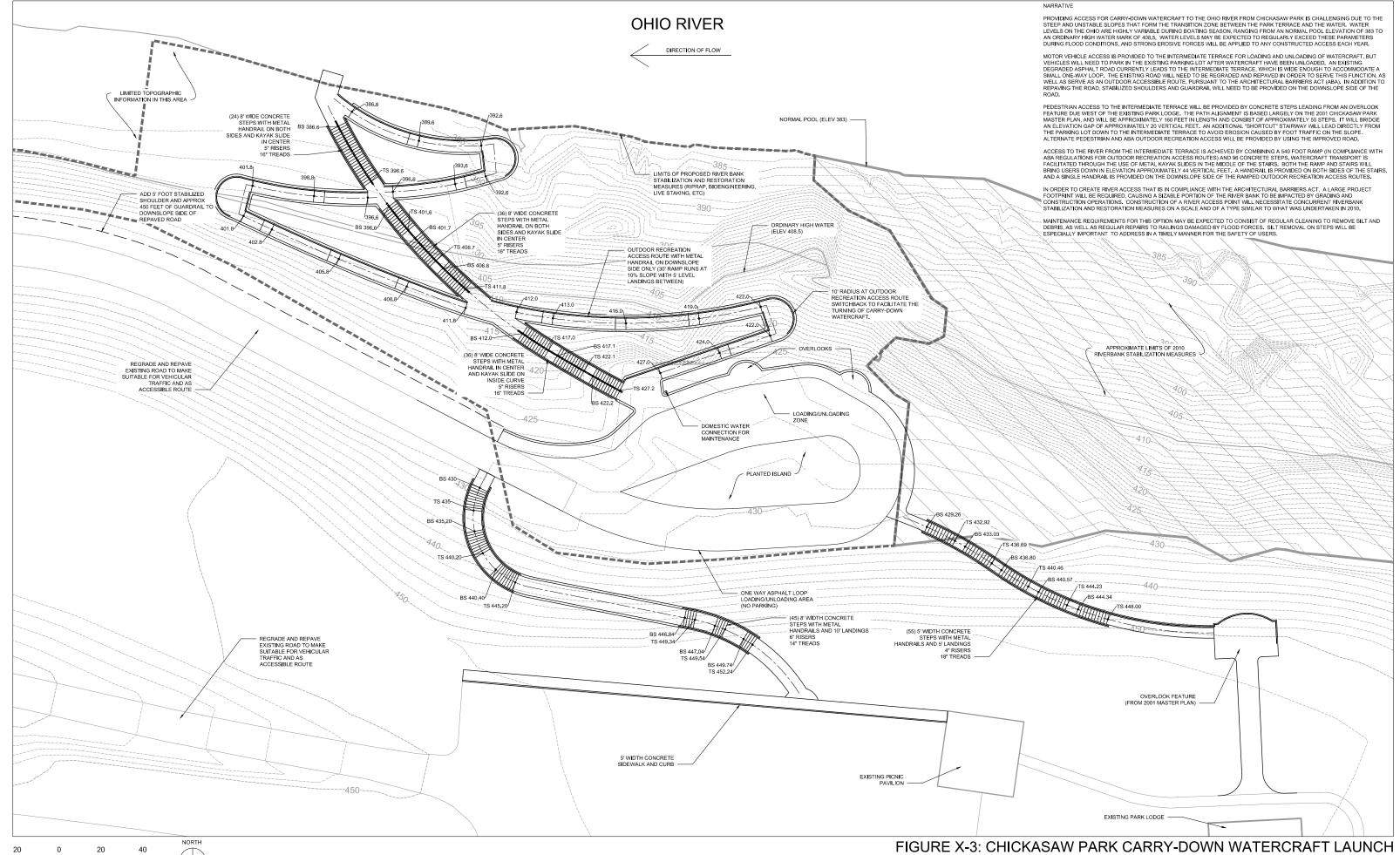




APPENDIX F – CANOE/KAYAK ACCESS CONCEPTUAL OPTIONS

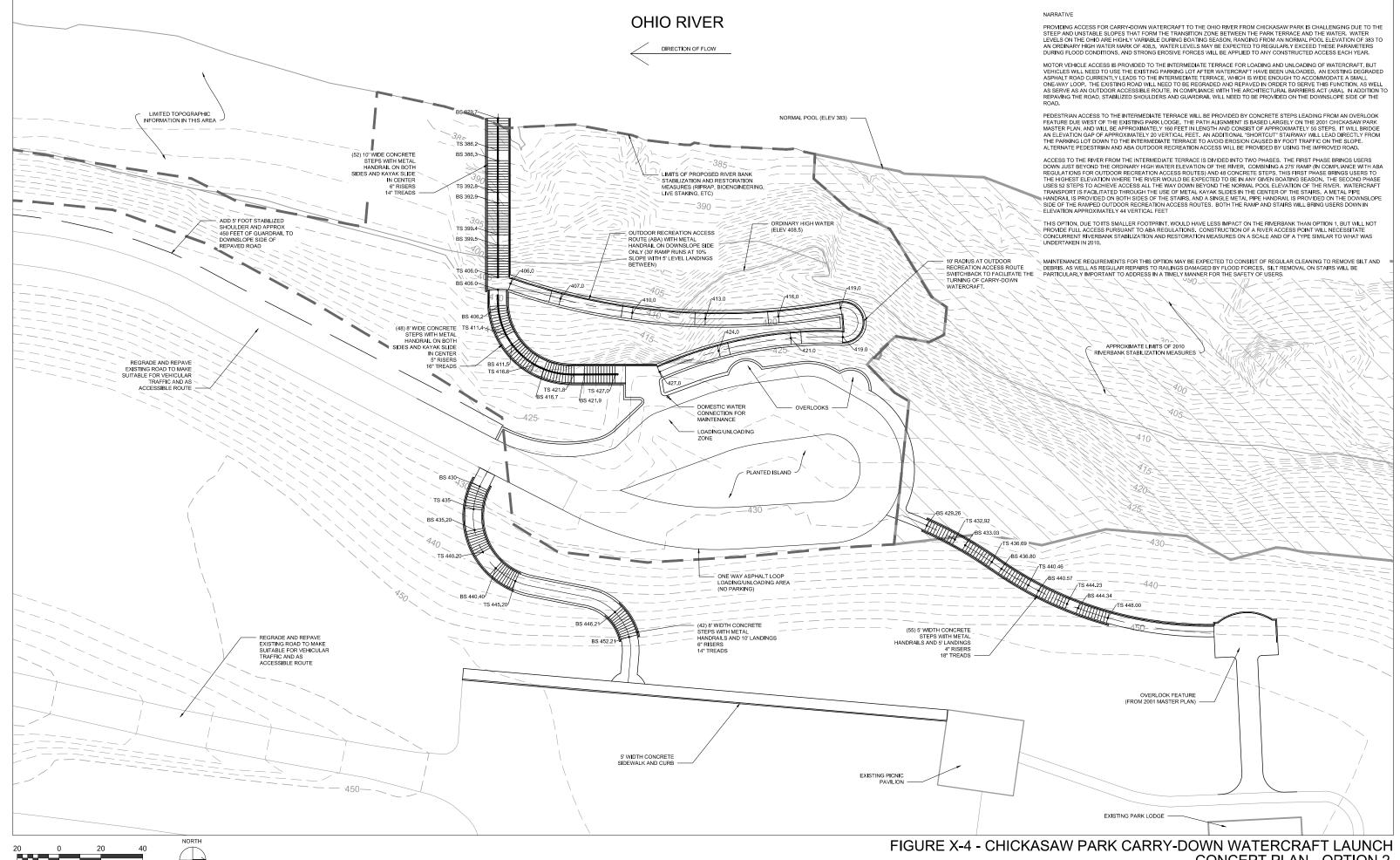
APPENDIX F - CANOE/KAYAK ACCESS CONCEPTUAL OPTIONS





SCALE: 1" = 20'

FIGURE X-3: CHICKASAW PARK CARRY-DOWN WATERCRAFT LAUNCH CONCEPT PLAN - OPTION 1



SCALE: 1" = 20'

CONCEPT PLAN - OPTION 2
DECEMBER 18, 2015

APPENDIX G – COST OPINIONS

APPENDIX G - COST OPINIONS





West Louisville Outdoor Recreation Initiative (WLORI)

Concept Estimate

Prepared By:

Crawford Consulting Services, Inc.

239 Highland Avenue East Pittsburgh, PA 15112

412-823-0400

www.crawfordconsultingservices.com

Build on our Success...

Project : West Louisville Outdoor Recreation Initiative (WLORI)
West Louisville Outdoor Recreation Initiative (WLORI)

Title Page

Time 15:05:28

West Louisville Outdoor Recreation Initiative (WLORI)

Designed by Prepared by

Estimated by Crawford Consulting Services, Inc.

Damion Deringer

Preparation Date 11/30/2015 Effective Date of Pricing 11/30/2015 Estimated Construction Time Days

Project: West Louisville Outdoor Recreation Initiative (WLORI) West Louisville Outdoor Recreation Initiative (WLORI)

Time 15:05:28

Library Properties Page i

Designed by

Estimated by Crawford Consulting Services, Inc. Prepared by Damion Deringer

Direct Costs

LaborCost **EQCost** MatlCost SubBidCost

Costbook CB12EB-b: MII English Cost Book 2012-b

Labor JEFF: Jefferson County (Louisville) KY 11-30-15 **Note: General Decision Number: KY150100**

Labor Rates

LaborCost1 LaborCost2 LaborCost3 LaborCost4

Equipment EP14R02: MII Equipment 2014 Region 02

02 MIDEAST							
Sales Tax	6.00						
Working Hours per Year	1,450						
Labor Adjustment Factor	1.02						
Cost of Money	2.13						
Cost of Money Discount	25.00						
Tire Recap Cost Factor	1.50						
Tire Recap Wear Factor	1.80						
Tire Repair Factor	0.15						
Equipment Cost Factor	1.00						
Standby Depreciation Factor	0.50						

Fuel		Shipping Rates	,
Electricity	0.095	Over 0 CWT 10.54	
Gas	3.760	Over 240 CWT 9.81	
Diesel Off-Road	3.490	Over 300 CWT 8.84	
Diesel On-Road	4.050	Over 400 CWT 7.94	
		Over 500 CWT 5.17	
		Over 700 CWT 5.17	
		Over 800 CWT 8.64	

Design Document

Document Date 11/30/2015

Budget Year 2015 UOM System Original

Preparation Date 11/30/2015

Escalation Date 11/30/2015

Eff. Pricing Date 11/30/2015

Estimated Duration 0 Day(s)

District USACE

Timeline/Currency

Currency US dollars Exchange Rate 1.000000

Contact Damion Deringer

Time 15:05:28 Eff. Date 11/30/2015 Markup Properties Page ii

Direct Cost Markups Productivity		Category Productivity		Method Productivity		
Overtime		Overtime		Overtime		
Standard Actual	Days/Week 5.00 5.00	Hours/Shift 8.00 8.00	Shifts/Day 1.00 1.00	1st Shift 8.00 8.00	2nd Shift 0.00 0.00	3rd Shift 0.00 0.00
Day Monday Tuesday Wednesday Thursday Friday Saturday Sunday	OT Factor 1.50 1.50 1.50 1.50 1.50 2.00		Working Yes Yes Yes Yes Yes No No		OT Percent 0.00	FCCM Percent 0.00
Sales Tax MatlCost		TaxAdj		Running % on Sel	ected Costs	
Contractor Markups JOOH HOOH Profit Bond Sub Overhead Sub Profit Estimating Contingency		Category JOOH HOOH Profit Bond JOOH Allowance Allowance		Method Direct % Running %		
Owner Markups Escalation Contingency SIOH	StartDate 12/1/2015	Category Escalation StartIndex 2,790.00 Contingency SIOH	EndDat 12/1/202	Method Escalation e 0 Running % Running %	EndIndex 3,070.00	Escalation 10.04

Description	Quantity	UOM	ContractCost	Contingency	SIOH	ProjectCost
Summary Report			4,541,248	249,859	299,082	5,546,130
Option 1	1.00	EA	2,490,625	137,034	164,030	3,041,748
Erosion Control	1.00	LS	96,576	5,314	6,360	117,946
Demolition	1.00	LS	22,418	1,233	1,476	27,379
Earthwork	1.00	LS	711,792	39,163	46,878	869,296
Pedestrian Hardscape	1.00	LS	1,375,583	75,685	90,594	1,679,970
Vehicular Access	1.00	LS	152,368	8,383	10,035	186,084
Terrace and Overlooks	1.00	LS	122,790	6,756	8,087	149,961
Sign and Striping	1.00	LS	1,481	82	98	1,809
Utilities	1.00	LS	7,618	419	502	9,303
Option 2	1.00	EA	2,050,622	112,825	135,052	2,504,382
Erosion Control	1.00	LS	91,251	5,021	6,010	111,443
Demolition	1.00	LS	22,418	1,233	1,476	27,379
Earthwork	1.00	LS	711,792	39,163	46,878	869,296
Pedestrian Hardscape	1.00	LS	938,940	51,660	61,838	1,146,707
Vehicular Access	1.00	LS	152,368	8,383	10,035	186,084
Terrace and Overlooks	1.00	LS	122,790	6,756	8,087	149,961
Sign and Striping	1.00	LS	1,481	82	98	1,809
Utilities	1.00	LS	9,583	527	631	11,703

Description	Quantity	UOM	CostToPrime	ContractCost	Contingency	SIOH	ProjectCost
Detail Report			3,017,714	4,541,248	249,859	299,082	5,546,130
Option 1	1.00	EA	1,655,051	2,490,625	137,034	164,030	3,041,748
Erosion Control	1.00	LS	64,176	96,576	5,314	6,360	117,946
RSM 312513101120 Silt Fence, 3' high, includes 7.5' posts	1,775.00	LF	5,074	7,636	420	503	9,325
USR 334626100111.01 NAG S150 Erosion Control Blanket, double-sided netting, straw	2,775.00	SY	3,287	4,947	272	326	6,041
(Note: 100 mils, 270 lbs Grab Tensile Strength, 15% Grab Tensile Elongation, 430 psi Burst Strength, 110 lbs Puncture, 75 lbs Trapezoid	d Tear Strength)						
RSM 329113160200 Soil preparation, mulching, hay, 1" deep, hand spread	5,550.00	SY	8,419	12,670	697	834	15,473
USR 312513101120 Orange Construction Fence, 4' high, includes 7.5' posts	1,000.00	LF	2,217	3,336	184	220	4,074
USR Construction Entrance	135.00	SY	1,520	2,287	126	151	2,793
USR 014523507710 Water Quality Monitoring and Sampling	5.00	MO	43,659	65,701	3,615	4,327	80,239
Demolition	1.00	LS	14,897	22,418	1,233	1,476	27,379
RSM 024113175050 Demolish, remove pavement & curb, remove bituminous pavement, 4" to 6" thick, excludes hauling and disposal fees	1,500.00	SY	12,607	18,972	1,044	1,249	23,170
RSM 312316421300 Excavating, bulk bank measure, 3 C.Y. capacity = 130 C.Y./hour, front end loader, track mounted, excluding truck loading	250.00	BCY	436	656	36	43	801
HNC 312323180260 Hauling, excavated or borrow material, loose cubic yards, 6 mile round trip @ 40 MPH (2.1 cycles/hour), 8 C.Y. truck, highway haulers, excludes loading	250.00	LCY	1,854	2,790	154	184	3,408
Earthwork	1.00	LS	472,994	711,792	39,163	46,878	869,296
RSM 311110100300 Clearing & grubbing	1.00	ACR	26,463	39,824	2,191	2,623	48,636
HNC 312213103020 Rough grading, open site, large area, 300 H.P., dozer	3,227.00	BCY	12,014	18,079	995	1,191	22,079
RSM 312216100100 Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	1.00	ACR	4,073	6,130	337	404	7,486
RSM 313213192020 Soil stabilization, hydrated lime, for base, 2% mix by weight, 6" deep, includes scarifying and compaction	1.00	ACR	373,372	561,874	30,914	37,004	686,205
USR 329333101100 Landscape Allowance	1.00	EA	57,072	85,886	4,725	5,656	104,890
Pedestrian Hardscape	1.00	LS	914,091	1,375,583	75,685	90,594	1,679,970
RSM 321613130406 Concrete Header Curb	235.00	LF	4,082	6,143	338	405	7,503
RSM 055213502050 Powder Coated Steel Pipe Handrail	1,430.00	LF	221,592	333,466	18,347	21,962	407,255
USR 055213500640 Galvanized Steel Pipe - Kayak Slide Rail	155.00	LF	24,066	36,216	1,993	2,385	44,230
USR 033053406850 Structural concrete, in place, stairs (3500 psi), cast on ground, includes forms(4 uses), reinforcing steel, concrete, placing and finishing, excludes safety treads	204.00	LF	6,354	9,561	526	630	11,677
USR Cast-In-Place Concrete Wall - 12"	14,676.00	SF	585,712	881,416	48,496	58,049	1,076,455
(Note: Assembly item includes forming both sides of wall, concrete, rebar reinforcing, finishing, waterproofing & backfill around outside w	all perimeter. Ex	cavation c	overed in footer costs	.)			
USR Foundation Design	1.00	EA	50,000	75,243	4,140	4,955	91,893
Concrete Sidewalk	3,960.00	SF	18,639	28,049	1,543	1,847	34,256
RSM 320610100310 Sidewalks, driveways, and patios, sidewalk, concrete, cast-in-place with 6 x 6 - W1.4 x W1.4 mesh, broomed finish, 3000 psi, 4" thick, excludes base	3,960.00	SF	15,152	22,801	1,255	1,502	27,846
RSM 320610100450 Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	3,960.00	SF	3,487	5,248	289	346	6,409
Concrete Unit Paver Overlook	600.00	SF	3,646	5,487	302	361	6,702
RSM 320610100450 Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	600.00	SF	528	795	44	52	971
NLU 321413161700 Precast concrete paver in sand bed, 24" x 24" x 2", 1/8" joint	600.00	SF	3,118	4,692	258	309	5,731
Vehicular Access	1.00	LS	101,250	152,368	8,383	10,035	186,084
RSM 347113261150 Vehicle guide rails, guide/guard rail, steel box beam, corrugated beam	450.00	LF	19,684	29,622	1,630	1,951	36,176
RSM 347113261140 Vehicle guide rails, guide/guard rail, steel box beam, end assembly	2.00	EA	1,044	1,571	86	103	1,919
RSM 321613130406 Concrete Header Curb	450.00	LF	7,817	11,764	647	775	14,367
USR 329333101100 Landscape Allowance - Vehicular Access	1.00	EA	14,324	21,555	1,186	1,420	26,325

Detail Report Page 3

Project : West Louisville Outdoor Recreation Initiative (WLORI) West Louisville Outdoor Recreation Initiative (WLORI)

Description	Quantity	UOM	CostToPrime	ContractCost	Contingency	SIOH	ProjectCost
Asphalt Pavement	1.00	EA	58,381	87,856	4,834	5,786	107,296
RSM 321123231513 Base course drainage layers, aggregate base course for roadways and large paved areas, alternate method to figure base course, crushed stone, compacted, 3/4", 12" deep	400.00	ECY	15,240	22,934	1,262	1,510	28,009
RSM 321216133000 Plant-mix asphalt paving, pre-treatment for paving, prime coat, emulsion, 0.30 gallons per S.Y., 1000 S.Y.	1,500.00	SY	4,499	6,770	372	446	8,268
RSM 321216133100 Plant-mix asphalt paving, pre-treatment for paving, tack coat, emulsion, 0.10 gallons per S.Y., 1000 S.Y.	1,500.00	SY	2,168	3,262	179	215	3,984
RSM 321216130200 Plant-mix asphalt paving, for highways and large paved areas, binder course, 4" thick, no hauling included	1,500.00	SY	23,173	34,873	1,919	2,297	42,589
RSM 321216130380 Plant-mix asphalt paving, for highways and large paved areas, wearing course, 2" thick, no hauling included	1,500.00	SY	13,301	20,017	1,101	1,318	24,446
Terrace and Overlooks	1.00	LS	81,595	122,790	6,756	8,087	149,961
HNC 129343130720 Park benches, hardwood, with back, steel frame, portable, 8' long	2.00	EA	3,296	4,960	273	327	6,057
USR Cast-In-Place Concrete Wall - 12"	780.00	SF	31,129	46,846	2,577	3,085	57,211
(Note: Assembly item includes forming both sides of wall, concrete, rebar reinforcing, finishing, waterproofing & backfill around outside was a second of the contract of the	all perimeter. Ex	cavation c	covered in footer costs	.)			
USR Foundation Design - Overlook	1.00	EA	15,000	22,573	1,242	1,487	27,568
RSM 055213502050 Powder Coated Steel Pipe Handrail	195.00	LF	30,217	45,473	2,502	2,995	55,535
Concrete Sidewalk	260.00	SF	1,224	1,842	101	121	2,249
RSM 320610100310 Sidewalks, driveways, and patios, sidewalk, concrete, cast-in-place with 6 x 6 - W1.4 x W1.4 mesh, broomed finish, 3000 psi, 4" thick, excludes base	260.00	SF	995	1,497	82	99	1,828
RSM 320610100450 Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	260.00	SF	229	345	19	23	421
Concrete Unit Paver Overlook	120.00	SF	729	1,097	60	72	1,340
RSM 320610100450 Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	120.00	SF	106	159	9	10	194
NLU 321413161700 Precast concrete paver in sand bed, 24" x 24" x 2", 1/8" joint	120.00	SF	624	938	52	62	1,146
Sign and Striping	1.00	LS	984	1,481	82	98	1,809
HNC 101453200560 Signs, stock, 24" x 24", with posts	4.00	EA	363	546	30	36	667
USR 015813500020 Safety Sign	16.00		622	935	51	62	1,142
Utilities	1.00	LS	5,062	7,618	419	502	9,303
RSM 331219104000 Water Utility Distribution Fire Hydrants, yard hydrant, flush, non-freeze, above ground, 1" connection, 4' depth of bury, excludes excavation and backfill	1.00		227	342	19	23	418
RSM 331113253980 Water supply distribution piping, polyvinyl chloride pressure pipe, 1", ASTM D2241, class 200, SDR 21, excludes excavation or backfill	400.00	LF	500	753	41	50	919
RSM 312316131348 Excavating, trench or continuous footing, common earth, 3-1/2 C.Y. excavator, 20' to 24' deep, excludes sheeting or dewatering	2,222.00	BCY	4,335	6,523	359	430	7,967
Option 2	1.00	EA	1,362,663	2,050,622	112,825	135,052	2,504,382
Erosion Control	1.00	LS	60,637	91,251	5,021	6,010	111,443
RSM 312513101120 Silt Fence, 3' high, includes 7.5' posts	1,275.00		3,645	5,485	302	361	6,698
USR 334626100111.01 NAG S150 Erosion Control Blanket, double-sided netting, straw	2,275.00	SY	2,695	4,055	223	267	4,953
(Note: 100 mils, 270 lbs Grab Tensile Strength, 15% Grab Tensile Elongation, 430 psi Burst Strength, 110 lbs Puncture, 75 lbs Trapezoid	d Tear Strength)						
RSM 329113160200 Soil preparation, mulching, hay, 1" deep, hand spread	4,550.00	SY	6,902	10,387	571	684	12,685
USR 312513101120 Orange Construction Fence, 4' high, includes 7.5' posts	1,000.00	LF	2,217	3,336	184	220	4,074
USR Construction Entrance	135.00	SY	1,520	2,287	126	151	2,793
USR 014523507710 Water Quality Monitoring and Sampling	5.00	MO	43,659	65,701	3,615	4,327	80,239
Demolition	1.00	LS	14,897	22,418	1,233	1,476	27,379
RSM 024113175050 Demolish, remove pavement & curb, remove bituminous pavement, 4" to 6" thick, excludes hauling and disposal fees	1,500.00	SY	12,607	18,972	1,044	1,249	23,170
RSM 312316421300 Excavating, bulk bank measure, 3 C.Y. capacity = 130 C.Y./hour, front end loader, track mounted, excluding truck loading	250.00	BCY	436	656	36	43	801
HNC 312323180260 Hauling, excavated or borrow material, loose cubic yards, 6 mile round trip @ 40 MPH (2.1 cycles/hour), 8 C.Y. truck, highway haulers, excludes loading	250.00	LCY	1,854	2,790	154	184	3,408

Description	Quantity	UOM	CostToPrime	ContractCost	Contingency	SIOH	ProjectCost
Earthwork	1.00	LS	472,994	711,792	39,163	46,878	869,296
RSM 311110100300 Clearing & grubbing	1.00	ACR	26,463	39,824	2,191	2,623	48,636
HNC 312213103020 Rough grading, open site, large area, 300 H.P., dozer	3,227.00	BCY	12,014	18,079	995	1,191	22,079
RSM 312216100100 Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	1.00	ACR	4,073	6,130	337	404	7,486
RSM 313213192020 Soil stabilization, hydrated lime, for base, 2% mix by weight, 6" deep, includes scarifying and compaction	1.00	ACR	373,372	561,874	30,914	37,004	686,205
USR 329333101100 Landscape Allowance	1.00	EA	57,072	85,886	4,725	5,656	104,890
Pedestrian Hardscape	1.00	LS	623,937	938,940	51,660	61,838	1,146,707
RSM 321613130406 Concrete Header Curb	235.00	LF	4,082	6,143	338	405	7,503
RSM 055213502050 Powder Coated Steel Pipe Handrail	1,095.00	LF	169,681	255,346	14,049	16,817	311,849
USR 055213500640 Galvanized Steel Pipe - Kayak Slide Rail	155.00	LF	24,066	36,216	1,993	2,385	44,230
USR 033053406850 Structural concrete, in place, stairs (3500 psi), cast on ground, includes forms(4 uses), reinforcing steel, concrete, placing and finishing, excludes safety treads	199.00	LF	6,198	9,327	513	614	11,391
USR Cast-In-Place Concrete Wall - 12"	8,580.00	SF	342,424	515,301	28,352	33,937	629,326
(Note: Assembly item includes forming both sides of wall, concrete, rebar reinforcing, finishing, waterproofing & backfill around outside v	vall perimeter. Ex	cavation c	overed in footer costs	.)			
USR Foundation Design	1.00	EA	50,000	75,243	4,140	4,955	91,893
Concrete Sidewalk	5,065.00	SF	23,840	35,876	1,974	2,363	43,815
RSM 320610100310 Sidewalks, driveways, and patios, sidewalk, concrete, cast-in-place with 6 x 6 - W1.4 x W1.4 mesh, broomed finish, 3000 psi, 4" thick, excludes base	5,065.00	SF	19,380	29,164	1,605	1,921	35,617
RSM 320610100450 Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	5,065.00	SF	4,460	6,712	369	442	8,198
Concrete Unit Paver Overlook	600.00	SF	3,646	5,487	302	361	6,702
RSM 320610100450 Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	600.00	SF	528	795	44	52	971
NLU 321413161700 Precast concrete paver in sand bed, 24" x 24" x 2", 1/8" joint	600.00	SF	3,118	4,692	258	309	5,731
Vehicular Access	1.00	LS	101,250	152,368	8,383	10,035	186,084
RSM 347113261150 Vehicle guide rails, guide/guard rail, steel box beam, corrugated beam	450.00	LF	19,684	29,622	1,630	1,951	36,176
RSM 347113261140 Vehicle guide rails, guide/guard rail, steel box beam, end assembly	2.00	EA	1,044	1,571	86	103	1,919
RSM 321613130406 Concrete Header Curb	450.00	LF	7,817	11,764	647	775	14,367
USR 329333101100 Landscape Allowance - Vehicular Access	1.00	EA	14,324	21,555	1,186	1,420	26,325
Asphalt Pavement	1.00	EA	58,381	87,856	4,834	5,786	107,296
RSM 321123231513 Base course drainage layers, aggregate base course for roadways and large paved areas, alternate method to figure base course, crushed stone, compacted, 3/4", 12" deep	400.00	ECY	15,240	22,934	1,262	1,510	28,009
RSM 321216133000 Plant-mix asphalt paving, pre-treatment for paving, prime coat, emulsion, 0.30 gallons per S.Y., 1000 S.Y.	1,500.00	SY	4,499	6,770	372	446	8,268
RSM 321216133100 Plant-mix asphalt paving, pre-treatment for paving, tack coat, emulsion, 0.10 gallons per S.Y., 1000 S.Y.	1,500.00	SY	2,168	3,262	179	215	3,984
RSM 321216130200 Plant-mix asphalt paving, for highways and large paved areas, binder course, 4" thick, no hauling included	1,500.00	SY	23,173	34,873	1,919	2,297	42,589
RSM 321216130380 Plant-mix asphalt paving, for highways and large paved areas, wearing course, 2" thick, no hauling included	1,500.00	SY	13,301	20,017	1,101	1,318	24,446
Terrace and Overlooks	1.00	LS	81,595	122,790	6,756	8,087	149,961
HNC 129343130720 Park benches, hardwood, with back, steel frame, portable, 8' long	2.00	EA	3,296	4,960	273	327	6,057
USR Cast-In-Place Concrete Wall - 12"	780.00	SF	31,129	46,846	2,577	3,085	57,211
(Note: Assembly item includes forming both sides of wall, concrete, rebar reinforcing, finishing, waterproofing & backfill around outside v	vall perimeter. Ex	cavation o	covered in footer costs	.)			
USR Foundation Design - Overlook	1.00	EA	15,000	22,573	1,242	1,487	27,568
RSM 055213502050 Powder Coated Steel Pipe Handrail	195.00	LF	30,217	45,473	2,502	2,995	55,535
Concrete Sidewalk	260.00	SF	1,224	1,842	101	121	2,249
RSM 320610100310 Sidewalks, driveways, and patios, sidewalk, concrete, cast-in-place with 6 x 6 - W1.4 x W1.4 mesh, broomed finish, 3000 psi, 4" thick, excludes base	260.00	SF	995	1,497	82	99	1,828
RSM 320610100450 Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	260.00	SF	229	345	19	23	421

Detail Report Page 5

Description	Quantity	UOM	CostToPrime	ContractCost	Contingency	SIOH	ProjectCost
Concrete Unit Paver Overlook	120.00	SF	729	1,097	60	72	1,340
RSM 320610100450 Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	120.00	SF	106	159	9	10	194
NLU 321413161700 Precast concrete paver in sand bed, 24" x 24" x 2", 1/8" joint	120.00	SF	624	938	52	62	1,146
Sign and Striping	1.00	LS	984	1,481	82	98	1,809
HNC 101453200560 Signs, stock, 24" x 24", with posts	4.00	EA	363	546	30	36	667
USR 015813500020 Safety Sign	16.00	SF	622	935	51	62	1,142
Utilities	1.00	LS	6,368	9,583	527	631	11,703
RSM 331219104000 Water Utility Distribution Fire Hydrants, yard hydrant, flush, non-freeze, above ground, 1" connection, 4' depth of bury, excludes excavation and backfill	1.00	EA	286	430	24	28	525
RSM 331113253980 Water supply distribution piping, polyvinyl chloride pressure pipe, 1", ASTM D2241, class 200, SDR 21, excludes excavation or backfill	400.00	LF	634	953	52	63	1,164
RSM 312316131348 Excavating, trench or continuous footing, common earth, 3-1/2 C.Y. excavator, 20' to 24' deep, excludes sheeting or dewatering	2,222.00	BCY	5,449	8,199	451	540	10,014

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West Louisville Outdoor Recreation Initiative - Chickasaw Pond

Concept Estimate

Prepared By:

Crawford Consulting Services, Inc.

239 Highland Avenue East Pittsburgh, PA 15112

412-823-0400

www.crawfordconsultingservices.com

Build on our Success...

Title Page

Time 08:02:00

TRACES MII Version 4.2

Chickasaw Pond

Estimated by Crawford Consulting Services, Inc. Designed by Prepared by Damion Deringer

Preparation Date 1/20/2016 Effective Date of Pricing 1/20/2016 Estimated Construction Time Days

Time 08:02:00 Library Properties Page i

Design Document

Document Date 1/20/2016 District USACE

Contact Damion Deringer

Budget Year 2016 UOM System Original

Timeline/Currency

Preparation Date 1/20/2016 Escalation Date 1/20/2016 Eff. Pricing Date 1/20/2016 Estimated Duration 0 Day(s)

> Currency US dollars Exchange Rate 1.000000

Costbook CB12EB-b: MII English Cost Book 2012-b

Labor JEFF: Jefferson County (Louisville) KY 11-30-15 **Note: General Decision Number: KY150100**

Labor Rates

LaborCost1 LaborCost2 LaborCost3 LaborCost4

Designed by

Estimated by

Prepared by

LaborCost

EQCost

MatlCost SubBidCost

Damion Deringer

Direct Costs

Crawford Consulting Services, Inc.

02 MIDEAST Sales Tax 6.00 Working Hours per Year 1,450 Labor Adjustment Factor 1.02 Cost of Money 2.13 Cost of Money Discount 25.00 Tire Recap Cost Factor 1.50 Tire Recap Wear Factor 1.80 Tire Repair Factor 0.15 Equipment Cost Factor 1.00 Standby Depreciation Factor 0.50

Equipment EP14R02: MII Equipment 2014 Region 02

Fu	ıel	Shipping Rates
Electricity	0.095	Over 0 CWT 10.54
Gas	3.760	Over 240 CWT 9.81
Diesel Off-Road	3.490	Over 300 CWT 8.84
Diesel On-Road	4.050	Over 400 CWT 7.94
		Over 500 CWT 5.17
		Over 700 CWT 5.17
		Over 800 CWT 8.64

Time 08:02:00 Project : Chickasaw Pond

Markup Properties Page ii

Direct Cost Markups Productivity		Category Productivity		Method Productivity		
Overtime Standard Actual	Days/Week 5.00 5.00	Overtime Hours/Shift 8.00 8.00	Shifts/Day 1.00 1.00	Overtime 1st Shift 8.00 8.00	2nd Shift 0.00 0.00	3rd Shift 0.00 0.00
Day Monday Tuesday Wednesday Thursday Friday Saturday Sunday	OT Factor 1.50 1.50 1.50 1.50 1.50 2.00	ν	Vorking Yes Yes Yes Yes Yes No		OT Percent 0.00	FCCM Percent 0.00
Sales Tax MatlCost		TaxAdj		Running % on Select	ed Costs	
Contractor Markups JOOH HOOH Profit Bond Sub Overhead Sub Profit Estimating Contingency		Category JOOH HOOH Profit Bond JOOH Allowance Allowance		Method Direct % Running % Running % Running % Running % Running % Running %		
12/1/2	tDate /2015	Category Escalation StartIndex 2,790.00	EndDate 12/1/2020	Method Escalation	EndIndex 3,070.00	Escalation 10.04
Contingency SIOH		Contingency SIOH		Running % Running %		

Summary Report Page 1

Description	Quantity	<u>UOM</u>	ContractCost	Contingency	SIOH	ProjectCost
Summary Report			1,901,680	104,630	125,243	2,322,482
Chickasaw Pond	1.00	LS	1,901,680	104,630	125,243	2,322,482
Erosion Control	1.00	LS	79,730	4,387	5,251	97,372
Demolition	1.00	LS	24,742	1,361	1,629	30,217
Earthwork	1.00	LS	1,256,532	69,134	82,754	1,534,576
Utilities	1.00	LS	71,553	3,937	4,712	87,386
Site Improvements	1.00	LS	469,123	25,811	30,896	572,930

Detail Report Page 2

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	CostToPrime	ContractCost	Contingency	SIOH	ProjectCost
Detail Report			355,509	178,689	465,878	1,216,886	1,901,680	104,630	125,243	2,322,482
Chickasaw Pond	1.00	LS	355,509	178,689	465,878	1,216,886	1,901,680	104,630	125,243	2,322,482
Erosion Control	1.00	LS	3,596	109	2,196	51,019	79,730	4,387	5,251	97,372
Silt Fence, 3' high, includes 7.5' posts	400.00	LF	613	0	332	1,178	1,841	101	121	2,248
Soil preparation, mulching, hay, 1" deep, hand spread	1,500.00	SY	1,368	0	520	2,355	3,680	202	242	4,494
Orange Construction Fence, 4' high, includes 7.5' posts	1,000.00	LF	1,531	0	315	2,303	3,599	198	237	4,396
Construction Entrance	135.00	SY	84	109	1,029	1,524	2,382	131	157	2,909
Water Quality Monitoring and Sampling	5.00	MO	0	0	0	43,659	68,228	3,754	4,493	83,325
Demolition	1.00	LS	9,048	3,645	0	15,832	24,742	1,361	1,629	30,217
Demolish, remove pavement & curb, remove bituminous pavement, 4" to 6" thick, excludes hauling and disposal fees	1,500.00	SY	7,153	3,300	0	13,039	20,376	1,121	1,342	24,885
Selective demolition, water & sewer piping & fittings, ductile iron pipe, 2", diameter, excludes excavation	131.00	LF	1,110	314	0	1,777	2,777	153	183	3,392
Selective demolition, water & sewer piping & fittings, plastic Pipe, 6"-8", diameter, excludes excavation	333.00	LF	614	0	0	766	1,197	66	79	1,462
Selective demolition, overflow structure	1.00	EA	170	30	0	250	391	22	26	477
Earthwork	1.00	LS	174,491	151,945	318,150	804,056	1,256,532	69,134	82,754	1,534,576
Rough grading, open site, large area, 300 H.P., dozer	24,000.00	BCY	21,091	51,439	0	90,474	141,388	7,779	9,312	172,674
Fine grading, for roadway, base or leveling course, large area, 6,000 S.Y. or more	2.43	ACR	4,915	3,232	0	10,163	15,881	874	1,046	19,396
Landscape Allowance	1.00	EA	20,431	0	78,750	123,718	193,339	10,638	12,733	236,121
Hauling, excavated or borrow material, loose cubic yards, 6 mile round trip @ 40 MPH (2.1 cycles/hour), 8 C.Y. truck, highway haulers, excludes loading	24,000.00	LCY	80,509	66,400	0	183,255	286,381	15,757	18,861	349,751
Excavating, bulk bank measure, 3 C.Y. capacity = 130 C.Y./hour, front end loader, track mounted, excluding truck loading	16,000.00	BCY	10,816	12,117	0	28,606	44,704	2,460	2,944	54,596
Dewatering, pumping, 8 hr., attended 8 hours per day, 6" centrifugal pump, includes 20 L.F. of suction hose and 100 L.F. of discharge hose	28.00	DAY	19,685	11,944	0	39,454	61,657	3,392	4,061	75,301
Backfill, structural, common earth, 80 H.P. dozer, 300' haul, from existing stockpile, excludes compaction	8,000.00	LCY	17,043	6,813	0	29,758	46,504	2,559	3,063	56,794
Fill, granular fill	8,000.00	LCY	0	0	239,400	298,628	466,678	25,677	30,735	569,944
Utilities	1.00	LS	8,003	1,749	26,953	45,787	71,553	3,937	4,712	87,386
Storm Water Outlet Control Structure	2.00	EA	1,486	215	6,019	9,629	15,048	828	991	18,378
(Note: Assembly Item Includes Excavation, Concrete Manhole, & Backfill)										
Backflow preventer, double check principle, corrosion resistant, automatic operation, ball valves, threaded, 2" pipe size, includes valves and four test cocks	1.00	EA	111	0	646	943	1,474	81	97	1,801
Valves, stainless steel, gate, OS&Y, flanged, 600 lb., 2"	1.00	EA	111	0	641	937	1,464	81	96	1,788
Water supply meter, detector, serves dual systems such as fire and domestic or process water, wide range capacity, 400 GPM, 3" mainline x 2" by-pass, UL and FM approved	1.00	EA	371	0	7,166	9,403	14,694	808	968	17,945
2" PVC Piping - Waterline	95.00	LF	955	212	1,974	3,919	6,124	337	403	7,479
Excavating, trench or continuous footing, common earth, 1/2 C.Y. excavator, 4' to 6' deep, excludes sheeting or dewatering	38.00	BCY	159	48	0	258	403	22	27	493
Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	38.00	ECY	33	64	0	121	189	10	12	231
Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	1.76	LCY	14	2	48	80	125	7	8	152
(Note: 6" Bedding)										
Excavating, trench, shoring, SF, 4' width, loose material SF protected wall, excludes installation & dewatering, rent per week after first day	1,520.00	SF	553	98	1,708	2,942	4,598	253	303	5,616
Polyvinyl chloride, pipe, 2", schedule 40 pipe, excludes excavation or backfill	95.00	LF	196	0	218	517	808	44	53	987

Time 08:02:00

Detail Report Page 3

Description	Quantity	UOM	DirectLabor	DirectEQ	DirectMatl	CostToPrime	ContractCost	Contingency	SIOH	ProjectCost
12" RCP Storm Sewer	286.00	LF	4,970	1,322	10,507	20,956	32,749	1,802	2,157	39,995
Public Storm Utility Drainage Piping, reinforced concrete pipe (RCP), 12" diameter, class 4, excludes excavation or backfill	286.00	LF	2,107	394	4,820	9,132	14,271	785	940	17,428
Backfill, bulk, 6" to 12" lifts, dozer backfilling, compaction with vibrating roller	205.92	ECY	181	346	0	657	1,027	56	68	1,254
Fill by borrow and utility bedding, for pipe and conduit, crushed or screened bank run gravel, excludes compaction	20.02	LCY	155	28	547	910	1,422	78	94	1,737
(Note: 24" Bedding)										
Excavating, trench, shoring, SF, 4' width, loose material SF protected wall, excludes installation & dewatering, rent per week after first day	4,576.00	SF	1,665	295	5,141	8,858	13,843	762	912	16,906
Excavating, trench or continuous footing, common earth, 1/2 C.Y. excavator, 4' to 6' deep, excludes sheeting or dewatering	205.92	BCY	862	260	0	1,399	2,186	120	144	2,670
Site Improvements	1.00	LS	160,372	21,242	118,579	300,192	469,123	25,811	30,896	572,930
Park benches, hardwood, with back, steel frame, portable, 8' long	4.00	EA	536	0	6,090	6,626	10,355	570	682	12,646
Base course drainage layers, stone base, compacted, 3/4" stone base, to 9" deep	400.00	SF	30	20	416	466	729	40	48	890
(Note: Fish Spawning Areas)										
Pond and Reservoir Liners, membrane lining systems HDPE, 100,000 S.F. or more, 120 mil thick	106,511.00	SF	83,997	0	40,261	124,259	194,184	10,684	12,789	237,153
Piers, municipal with framing and decking, wood piles and cross bracing, 3" x 12" framing and 3" decking	752.00	SF	69,082	21,173	65,537	155,792	243,462	13,395	16,034	297,335
Hard Surface Fishing Area and Canoe Launch	2,680.00	SF	6,726	49	6,275	13,050	20,393	1,122	1,343	24,906
Sidewalks, driveways, and patios, sidewalk, concrete, cast-in-place with 6 x 6 - W1.4 x W1.4 mesh, broomed finish, 3000 psi, 4" thick, excludes base	2,680.00	SF	5,849	0	4,784	10,633	16,617	914	1,094	20,294
Sidewalks, driveways, and patios, sidewalks, concrete, excludes base, for 4" thick bank run gravel base, add	2,680.00	SF	876	49	1,491	2,416	3,776	208	249	4,612

Time 08:02:00

Table of Contents

Description Page **Library Properties** ii **Markup Properties Summary Report** Chickasaw Pond **Detail Report** Chickasaw Pond Erosion Control Demolition Earthwork Utilities 2" PVC Piping - Waterline 12" RCP Storm Sewer 12" RCP Storm Sewer Site Improvements Hard Surface Fishing Area and Canoe Launch

APPENDIX H – PARK RIVER TRAIL ALIGNMENT

APPENDIX H - PARK RIVER TRAIL ALIGNMENT MAP



Chickasaw Park - River Trail Alignment Notes

Alternate Launch Access

Continue prode difference this area no access to shelf from loop trail

Fishing Access

Alternate Launch Access

OHIO RIVER

150 sandy balling beach

Woodla Traits:

Shawnee Park - River Trail Alignment Notes

Chickasaw - upper park trail

- many river view opportunities -
- accessible route
- paved surface optional
- shaded, cooler trail
- possible stepped connection to northern terminus of lower shelf trail at northern overlook
- connections to park road path = •

Ohio River Water level note:

- 408.5 is ordinary high water level
- area between contours 424.0 and 426.0 require flooding maintenance approximately 2 times per year
- flooding is rare above contour 426.0

Shawnee - sandy fishing beach

- 150 foot long sandy beach area
- access from Louisville loop mile marker 7.0
- grade change acceptable for soft surface trail construction, with 25' long set of steps

Shawnee - extreme grade change

- soils extremely unstable
- groundwater seepage in numerous locations throughout noted area
- shelf separation in numerous locations throughout noted area
- no fishing access should be constructed this area due to unstable soils and lack of accessibility

Shawnee - Louisville loop connecting trail

coordinate with masterplan image
for connecting trail alignment

UNITED STATES ARMY CORPS OF ENGINEERS

JEFERSON COUNTY, KENTOKY

WEST LOUISVILLE RECREATION INITIATIVE

WEST COUISVILLE RECREATION INITIATIVE

TETRA TECH

Project No.: 200-11652-15
Designed By:
Drawn By:
Checked By:

Day Managuran 1 inch

APPENDIX I – PARK RIVER TRAIL ALIGNMENT PHOTOGRAPHS

APPENDIX I – PARK RIVER TRAIL ALIGNMENT PHOTOGRAPHS



Figure I-1: Louisville Loop Mile Marker 7 – Trail to Fishing Access Point at Shawnee Park



Figure I-2: View of Sand Beach looking North at Shawnee Park



Figure I-3: View of Sand Beach looking South at Shawnee Park



Figure I-4: View of Shelf Separation at Shawnee Park

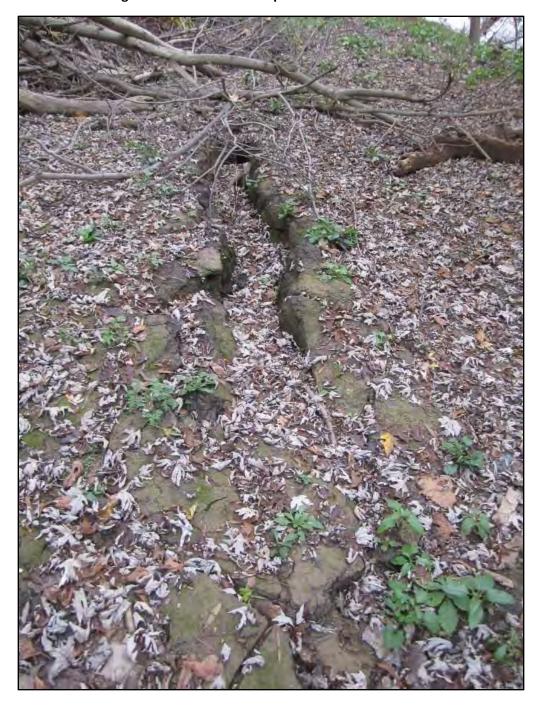


Figure I-5: View of Groundwater Seepage along shelf at Shawnee Park



Figure I-6: View of Flood Debris along Shelf and Rubble on Slopes at Shawnee Park



Figure I-7: View of Severly Eroded Edge – Former Road at Chickasaw Park

Figure I-8: View of Severly Eroded Edge – Former Road at Chickasaw Park



Figure I-9: View of Steep Bank from Main Activity Area at Chickasaw Park





Figure I-11: View of River from Master Plan View Point at Chickasaw Park

Figure I-12: View of River from Master Plan Lodge Lookout at Chickasaw Park





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