LAKE SPRINGFIELD PLAN

APPENDICES

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Engagement

LAKE SPRINGFIELD PLAN

Resident Meeting & Project Kickoff
Engagement Summary
November 2, 2022

CMT

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EXECUTIVE SUMMARY

The Lake Springfield area is a key natural asset to Springfield and the surrounding region. Lake Springfield was identified in the Forward SGF as a distinct area within the community that exhibits the potential for significant change. While the subarea framework in the Comprehensive Plan highlighted key concepts and potential strategies, the plan is a more holistic vision for the area. This process will thoroughly define the objectives and strategies to achieve the goals of the area as identified in the EDA grant application. The outcome of this process will be a plan that has a clear path to implementation and built with the community needs at the center of the work.

The engagement framework around the Lake Springfield plan is critical. The project is truly a once in a lifetime opportunity to re-invest in a beloved natural asset within the community, while at the same time becoming a more accessible and inclusive space for everyone to enjoy. Additionally, the significant opportunity for economic development and job creation are key. Understanding this, the engagement process will be collaborative across multiple city departments and regional agencies, as well as inclusive and transparent for the public.

The Lake Springfield Park Plan is funded by an $800,000 grant from the U.S. Department of Commerce’s Economic Development Administration, with a $200,000 local match from the Hatch Foundation, City Utilities, and the City of Springfield’s Environmental Services Department. The goal of the plan is to serve as a catalyst for new economic development and recreational opportunities for the Lake Springfield area.

The Lake Springfield Plan kickoff happened on October 12 and 13 at the Lake Springfield Park Boathouse. Local neighbors and residents were invited to attend an informational kickoff meeting on October 12. It was important to immediately engage the adjacent neighbors at the very start of the process because the lake is an important natural asset to the region. Over 3,000 invitations were sent to residents within a 2-mile radius of the lake, and over 100 participants attended the meeting in person or virtually watched via Zoom.

The consultant team kicked off the project on October 13, with a full day retreat that consisted of site tours, interactive visioning exercises, goal setting and risk assessments. The day retreat culminated in next steps and action items as the planning process gets underway. Each team member from the consultant team attended the retreat, as well as representatives from several city departments, local planning partners, peer planning agencies and other regional stakeholders. In total, 30 partner organizations participated in the retreat as the planning process kickoff.

This engagement summary outlines input received from the neighbor open house, as well as reports on the retreat. Activities are outlined with key themes. The conclusion of this report is key takeaways that will be important to understand during the planning process. Presentations, imagery from the retreat, detailed notes, and a full risk analysis are included as an appendix to this document.

100+ neighbors	30 partner organizations	Site tours, visioning exercises & risk assessment	Lake Springfield Plan Vision

Project Kickoff – ABOUT

The Lake Springfield area is an important space within the Springfield area and presents a once-in-a-lifetime opportunity to focus on innovative economic development and resilient job creation. Due to the important scope of the work to be done in the plan, a robust kick-off to the project was necessary. The project kickoff was structured in two parts.

PART 1: Resident Meeting

For residents immediately surrounding Lake Springfield, there is sensitivity to change in the area that has existed a certain way for so long. Economic development can conjure many differing emotions among different people, and thus we knew it was important to connect with the adjacent community at the very start of our planning process. Plans are meant to embrace the community's vision. The goal of the resident meeting was to demonstrate that our team was starting with a blank slate. The resident meeting was held on Wednesday, October 12 from 4:30 – 6:30pm at the Lake Springfield Park Boathouse. Formal remarks were at 5:30pm.

The meeting intentionally did not show any drawings or ideas. Maps of the project area were displayed, along with some historical pictures. Residents were free to give input to the project team. City staff and elected officials welcomed the residents and gave background on the Plan Project, as well as the funding. The consultant team was introduced as being there to listen and hear ideas. Approximately 100 people attended the meeting in person and virtually.

PART 2: Project Team Retreat

The team retreat took place mostly on October 13, 2022. Due to scheduling needs, two project tours took place on October 12, 2022 (Economic Development Team & Watershed Team). Attendees at the team kickoff retreat included representatives from all the consulting firms on the project team, as well as representatives from several agencies within the City of Springfield and other local and regional peer planning agencies.

Lake Springfield Park – Planning Area

Goals of LakeSGF Plan

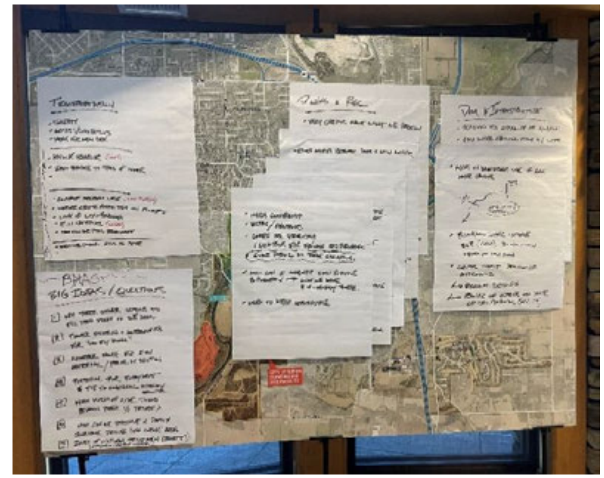
Economic Development	Attract innovative development & resilient job creation that is In line with regional vision and priorities
Sustainability	Develop a strategy for sustainable water quality & green infrastructure improvements
Adaptive Reuse	Establish an adaptive reuse strategy for the James River Power Station
Transportation Upgrades	Focus on transportation enhancements that are accessible and equitable to Lake Springfield and the surrounding communities
Recreation	Embrace active and passive recreational opportunities as a regional economic development catalyst
Community Consensus	Build community consensus that is inclusive of divers and multi-cultural perspective

The goal of the project team retreat was to first understand input received from the neighbors at the local public meeting. Next, the vision for the project was re-introduced, including the inception of the Lake Springfield Subarea from the Forward SGF plan, as well as information and goals included in the EDA grant. The kickoff retreat included additional site tours (Transportation, Parks & Recreation, and Dam & Utility infrastructure). Information on observations from the tours was shared with the entire group.

Following initial observations about the project needs and opportunities, the second half of the day was spent completing interactive visioning exercises. These exercises included goal setting and discussing what a successful plan looks like when finalized. Small groups spent time thinking about the vision for the project within the community, and how to deliver a plan that had community buy-in and was feasible. Following the goal setting and visioning, teams stayed in small groups to examine risks associated with the project. Risks are defined as things that may potentially go wrong during the planning process and are critical to identify early on so the risks may be assessed during each project phase.

The retreat concluded with team members sharing their immediate next steps for work, including rough timelines. The day ended with a presentation from the City of Springfield Public Information Officer on key talking points for the project moving forward.

An initial public meeting is scheduled for November 17, and city officials estimate attendance of nearly 300 people.



RESIDENT MEETING – INPUT

ABOUT

The resident meeting was held on Wednesday 1October 12 from 4:30 – 6:30pm at the Springfield Lake Park Boat House. The meeting was an open house style set up to garner input from the residents in the adjacent neighborhoods. An intentional decision was made to show only the map of the study area, and not any renderings or imagery about what the area could look like in the future. It was important for neighbors to know their voice is important in the planning process and that our team was starting with a blank slate.

As people signed in, consultant team members were available around the room to get input and hear about concerns, needs and opportunities within the planning area. Formal remarks about the project were made at 5pm. Olivia Hough with the economic vitality department kicked off the meeting with information about the project, including funding components of the work being done. Olivia reiterated the importance of the local voice within the planning process as the reason for having a separate meeting for neighbors before the planning process started. Other individuals from the City of Springfield gave remarks following Olivia, including:

- Brian Ash, neighborhood representative
- Ken McClure, Mayor of Springfield
- Steve Stodden, City Utilities

The final presentation of the evening was given by the consultant team. Steve Prange introduced the planning team and their






respective disciplines. He went through a brief presentation about the project and the planning process. Included in this presentation were key components of the planning process, as well as past performance of the team. Reviewing past projects was intended to demonstrate the expertise of the team, as well as set the stage for some visioning to take place at the next public meeting in November.

Key elements of the Lake SGF Plan include:

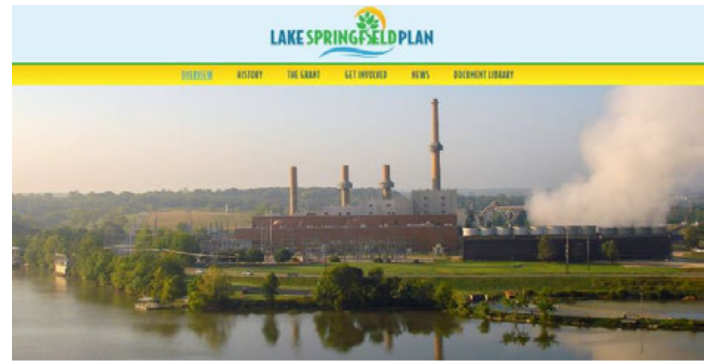
- Recreational expansion opportunities
- Adaptive reuse planning for the decommissioned power station
- Hydrological studies
- Water quality and ecological preservation planning
- Economic development and workforce development opportunities
- Transportation, access and wayfinding
- Land use recommendations

KEY TAKEAWAYS

For the most part, people who attended the public meeting for neighbors seemed cautiously excited about the project. Several participants at the meeting indicated they were excited to see change, but wanted a better understanding of how that change will impact their quality of life, or their day to day happenings as residents adjacent to the planning area. Several participants discussed the need for enhanced access, including safe routes to access the lake and the park on bike or foot. We heard that because the park only feels accessible by driving, people who are already taking a trip in their car choose to go to other parks within the area, such as Nathaniel Greene Park. Residents also discussed a need for better pedestrian connectivity across Kissick and to the neighborhoods directly north of the lake.

Other key discussion items at the neighborhood meeting included concern over the future of the dam, the desire to be able to travel around the entire lake, by foot or bike; as well as the need for a better east/west connection to the hospital south of the lake as many residents see people using Kissick for that connection. People indicated the playground is an important amenity for children, and we also heard several times how much people love the frisbee golf course.

The final component of the resident meeting was a survey geared specifically to the residents in the local neighborhoods. Comment cards were also distributed and these items were accepted at the meeting. The project website was provided to participants to encourage participation in the process. The project website is lakesgfplan.com/engagement. Key takeaways are included in this report, with summarized survey and comment inputs included next.



COMMENT CARDS


Access & connectivity – already need to drive so go elsewhere


Frisbee golf course is a major asset


Water quality of the lake and concern over vegetation as well as future of the dam


Cautiously optimistic, interested in development but at what cost?


Would like to be able to bike or walk around the entire lake


Design with nature – preserve the natural environment

To gauge specific input from residents at the neighbor meeting, comment cards and surveys were provided. Comment cards were picked up at the meeting that evening. Over 100 people participated in the neighbor meeting, with several neighbors leaving comments about their concerns and priorities for the Lake Springfield Area. Comments were categorized into seven categories, with one category for more general comments. These categories are included below with some bulleted items about themes heard from residents at the neighbor meeting.

Neighbor Comment Card Feedback

1. **Recreation & Other Amenities**
    - Like frisbee golf
    - Want to see more investment in water activities
    - Family activities (walking, biking)
    - More space in general for walking and biking
    - Add drinking water across the park

2. **Trails**
    - Difficult to get to on bike
    - Would like to see mountain bike trails
    - Bridge crossing over river
    - Explore regional connections with safe trails
    - Connect Trail of Honor to power plant

3. **Access & Safety**
    - Kissick should be wide enough to have space for walking and biking
    - Need improved safety for people walking and biking
    - Entrance and exit from Kissick is a hazard
    - Need additional entry/exit point
    - Better wayfinding to parking areas

4. **Lily Pads & Algae**
    - Would like to see lily pads cleared out
    - Dredge lake and add more depth

5. **Personal Impact**
    - Concern over what bringing more people to the area means to them as they live nearby
    - Limit cut through traffic on residential streets
    - Need to advertise how much space is available at the next meeting location

6. **Landscaping/Maintenance/Natural Ambiance**
    - Dredge lake
    - Minimal maintenance species

7. **Dam**
    - Do not want to see removal
    - Enhanced bike/ped

8. **General**
    - We love the lake
    - Thank you for your work – very glad to see this happening
    - Please keep Lake Springfield

LOCAL SURVEY

In addition to the comment cards and the neighbor specific meeting, a survey was given to neighbors, which is open through October 2022. To date 19 surveys have been completed.

The survey asked questions about how people would describe their neighborhood, why they chose to live where they live, what is special about their neighborhood, and several other questions to gauge the feelings of the audience about the general project area.

Most respondents described their neighborhood in the Lake Springfield area as peaceful, ideal, beautiful and great. People like living there because of the natural beauty, the great location, and the country feel. People chose to stay in their current location because they truly love it and feel like they have good connections to what they need with local access to other amenities via US 65.

When asked what they would like to be able to walk or bike to, several residents responded with the boathouse, the park, the Nature Center, and the lake. The most popular desire to have close to their neighborhood was more dining (31%).

When asked what they would like to see included in the plan many people answered with enhanced biking connectivity, more dining options, and water recreation. Results are compiled and included as an appendix to this document.

PROJECT TEAM KICKOFF RETREAT

ABOUT

Insert general information here about the format of the kickoff meeting and list who was invited to attend.

GENERAL INORMATION SESSION

The kickoff retreat started with introductions to all of the participants, as well as background information on the project. Several City departements particiated in the kickoff reatreat, as well as local partner planning agencies and others with a vested interest in the Lake Springfield Planning Area. Key components of the general informations session of the retreat included:

- Background information on the Lake Springfield Plan.
- Information on the Lake Springfield subarea for ForwardSGF
- Information from the EDA grant secured to fund the planning effort.
- General opinions from the neighbor meeting held the night before.

Following the general information session, teams separated by planning focus for site tours.

RETREAT PARTICIPANTS

- Economic Vitality Department
- Quality of Place
- Springfield-Greene County Park Board
- Special Facilities
- General Services
- Outdoor Initiatives
- Director of Diversity, Equity & Inclusion
- Director of Workforce Development
- Public Information & Civic Engagement
- Environmental Services
- Stormwater management
- Planning department
- Public Works

PRATT Consulting

Native American Tribes and the American Indian Center at Fairbanks

RETREAT TOURS

Site investigations were planned for the project area during the kickoff retreat. These tours were separated by various key disciplines engaged in the planning effort. The purpose of structuring tours by key disciplines was to allow for more focused discussions around needs and opportunities associated with that discipline within the planning process. These tours were organized by:

- Economic Development
- Watershed Team
- Parks & Recreation
- Dam & Utility Infrastructure
- Transportation

Key themes from each tour are included below:

Economic Development

The economic development team toured the site from the lens of where new development or redevelopment may occur. The power station presents a large opportunity for re-use, but several other areas adjacent to the Lake also present opportunities for redevelopment. A significant issue related to any new or redevelopment within the study area includes access to the site for all modes of transportation. This team also viewed the area from a lens of culture to make sure voices were from cultures that may have used the area previously and stopped as well as accessibility for individuals with disabilities. After initial investigation, as well as the public meeting, a workshop on product ideas received should take place so ideas are vetted thoroughly for feasibility on the site. Additionally, any adjacent land use plans should be incorporated in the final review of what development or redevelopment opportunities are available.

Watershed Team

The watershed team consisted of experts on the team completing the hydrology study. The lens of this tour focused on water quality and impacts of uses surrounding the lake and within the lake on water quality. The tour stopped at six locations along the James River starting at the tailwater access below the dam and extending 9 miles upstream to the Old State Highway D bridge. Stops along the way included the boat access ramp south of US Highway 65, the Galloway Creek Greenway bridge south of US 60, the Crighton Beach Access, and the Blackman Water Intake Structure. The watershed to the lake is approximately 270 square miles and consists of rural land east of US Highway 65 which contains large sections of pastureland and cattle farms. James River water appeared clear and deeper upstream of US 60 where City Utilities pumps water from the James River to the Blackman Treatment plant which is approximately 1 mile to the west. Approximately 30% of CU's water during an average year comes from the James River. With the water being deeper upstream of the lake people find floating easier however, it was noted that many boaters still like to float from the base of the dam to Campbell Ave. approximately 3 miles downstream of the dam. There's a low water crossing at the CU landfill approximately 0.5 miles downstream of the dam which requires kayakers to get out the water and maneuver around the structure. Another item observed which has been an ongoing struggle is the invasive vegetation within the lake. Lotus plant has consumed large sections of the lake. In the past, agencies have tried to kill the plants to keep them from consuming all of the lake however the plants have persisted.

Parks & Recreation

The lens of the parks and recreation team focused on the park element of the planning area, as well as park space. The team considered a variety of issues related to park usage and potential recreation opportunities that exist. The main takeaway from this tour was the park area lacked a narrative and visual identity. There are very few places within the study area where one can just sit with nature and enjoy. The access points to water are limited, and it was mentioned the lake gives off a 'look but don't touch vibe'.

Another key observation from this group was the very vehicular centric nature of the park and access to the Lake Springfield area. Very few safe connections currently exist for people on foot or bike, and significant ADA challenges exist due to the terrain of the area. In addition to better connections to the park, there needs to be better bike and connectivity within the Lake Springfield area. A strong desire exists to be able to travers around the entire lake (a bike/ped loop), and no safe crossing of Kissick currently exists from the power plant to the lake, which will be important for any future redevelopment on the site.

Additional discussion surrounding the recreation opportunities within the study area focused on the regional draw of the Lake Springfield area, and how well the community is situated with respect to sports tourism for tournaments, etc. Springfield is very well positioned to be a regional draw for these types of events, if the facilities exist. The frisbee golf course has received several positive reviews and it is a very welcome and popular addition to the park.

Ultimately any recommendations for park programming and recreation opportunities must consider the long-term funding and maintenance strategy. The parks board is already stretching resources to provide Springfield residents the recreation opportunities they need. Additionally, there is a park deficit in the east side of town, which will need to be considered with any proposed changes to the park area.

A final comment from this tour group pointed to the fact that the lake was designed to cool the power plant. For this reason, the some of the amenities added previously such as boat ramps were not maintained and little attention has been given to the future of the area, or how to harness the natural resources that exist. This plan has an immense opportunity to change that moving forward.

Dam & Utility Infrastructure

The dam and utility infrastructure team explored various areas of the site thinking toward utility needs in the area as well as the future of the dam. Discussion was framed around the functionality of certain parts of the site and areas of opportunity that exist within the context of functionality.

There were several key observations the team reported. First, there is Native American Cultural Resources site within the vicinity of the site, and this is important context when thinking about preserving history. With respect to the power plant, the team indicated the beautiful viewsheds of the area from the roof are nice, as well as the fact that there is no potable water within the power plant.

There is a low water crossing of the river near the dam, as well as a landfill within the area. City Utilities has an important perspective that their services need to remain affordable for all City residents. Development in any of these areas should be considered an amenity for everyone with a range of accessible options to all Springfield residents.

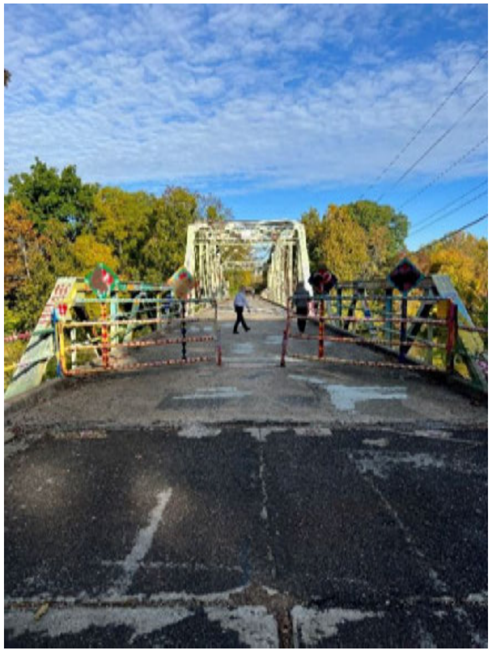
Transportation

Many transportation challenges exist both within and connecting to the Lake Springfield Area. The focus of this tour group was to look at access and connectivity of the transportation system both within the study area, as well as just outside the study limits to better understand how people get to the lake and the park. Before the neighborhood meeting, a team member on this tour heard from a family that lives in Springfield, they had not visited the Lake Springfield area in some time because 'it was just too hard to get to,' which was a central theme of this tour.

The transportation group separated observations into three categories. These categories are (1) safety, (2) accessibility & connectivity, and (3) infrastructure needs associated with future development.

Safety

The entrance to Lake Springfield Park off of Kissick is a skewed intersection that presents difficult sight challenges for those trying to access the park. A driver approaches the turn very quickly when entering. For those exiting, it is challenging to see oncoming traffic. Kissick presents several safety challenges. There is no facility for people to walk or bike along Kissick, or even cross Kissick from the Power Plant and adjacent neighborhoods on the west side of Kissick.



Another main safety concern is along Timbercrest near the bike/ped bridge. While this is a lower volume street, no space for walking or biking exists and local neighbors would like to be able to walk from their house to the Trail of Honor or to access the water near the Trail of Honor Trailhead.

Accessibility and Connectivity

Many observations were made about the accessibility and connectivity within the planning area. Significant ADA challenges exist due to the topography of the site. These ADA considerations are important when designing an inclusive space that is built for everyone in Springfield.

Access to the Nature Center is challenging, as there is only one access point direction off the US-60. Bikes are not allowed within the Nature Center, which essentially turns that area of the park into a vehicular destination. We understand that it is a Missouri Department of Conservation policy to not allow bikes within MDC properties. This statewide policy will need addressed if bike access to the Nature Center is a priority.

The entire area will benefit from enhanced wayfinding and branding. When a person enters Lake Springfield Park, there is one sign indicating the person has arrived at the park. However, once in the park it is very difficult for a person to find their way around and understand where they are within the park. As mentioned in the parks section, there is no way to connect by foot or bike all around the lake or cross the lake. When a person is standing just north of the boat house they can see the opposite side of the lake and the Trail of Honor, but it is very challenging to access. There are no bike and pedestrian connections for the houses just north of the lake, which deters a lot of visitors from that neighborhood.

Vehicular access is minimal too and is located at one main point off Kissick. There is a need for an additional east/west (E/W) connection from US-65 and there is a planned E/W arterial near River Bluff roundabout. However, there is a very steep drop-off which presents several design challenges and funding needs for such a complex problem.

Infrastructure needs for development

There are several areas for new development within and adjacent to the study area. Infrastructure needs associated with these developments are important. The land just south of Briar is one key development opportunity. The re-use of the power plant and site surrounding the lake present another development opportunity. Just south of the lake near Mercy hospital is 100+ acres of land available for development.

We know the development potential for the area is significant. Lake Springfield is the geographic center of Springfield, Ozark and Nixa, which is important for infrastructure planning associated with transportation needs.

BIG QUESTIONS BY TOPIC

After the group reports on the site visits, a segment of the retreat focused on big questions by topic. These questions were posed to look at significant challenges that may exist, as well as ways to overcome those challenges. To allow for maximum visioning potential, participants were encouraged to think of the best-case scenario if money was no object. This framework is helpful for focusing on outcomes and goals as well as limitations up front.

The four topics discussed included:

1. Power Station & utilities needs
2. Parks needs
3. Transportation needs & E/W arterial planning
4. History and culture of the place?

If money is not a factor, what is your vision for Lake Springfield?

- Power Station & Utilities

  The landfill presents challenges for development opportunities as it is not at the end of its 30-year lifecycle yet. Even if the landfill is capped, options for the top of it are limited and include no structural building. However, there may be the potential for a golf course or soccer field. The substation could be moved and there is nothing about the location that it needs to remain intact there.

- Parks

  The potential for relocating the park within the study area has limited challenges, such as the City being in a deficit for park space and thus the entire space would need to be relocated. Waterfront and access are key as well as the need to be an inclusive space for everyone. The frisbee golf course is important to Springfield, but not necessarily the lake area.

- Transportation

  The main goal of the E/W arterial is that it must serve and E/W route within the transportation network. Access to 65 is important, and ideally legal battles over land should be avoided.

- History and culture

  The vision should talk about the history and culture of the place, while creating new jobs and economic opportunity. New opportunities should be designed in a context sensitive manner that celebrates the rich history of the area.

THE VISION – PLANNING GOALS & SUCCESS

The next part of the retreat focused on goal setting and defining success of the planning process. For this exercise, four distinct groups were formed by expertise or agency representative. These groups were located around the room and had a focused discussion on the goals of the project. Groups were asked to identify goals from their agency perspective (for example, goals of the CVB, or City Utilities), as well as overall community goals of the planning process.

Following the small group discussions, each group was asked to report to the wider retreat audience on their goals. First from the agency perspective, and then from the community perspective. These goals are identified here.

Agency Specific Goals:

- Self-sustaining
- Matches the regional vision
- Water quality enhancement (nut just meeting compliance)
- Maintain power station use and security
- Successful to everyone
- Environmental Compliance
- Create Quality & Resilience
- Shape regional transportation plans
- Embrace change, but understand what that means
- Open & active blueway
- History preservation
- Use as tool to educate the public
- Vegetative management plan
- Branding the area
- Attracting outside funding

Community Goals:

- Self-sustaining
- Regional context
- Inclusive
- Improve connectivity
- Job creation
- Changing mindset of water quality initiative
- Economic development for tourists
- Embrace housing options
- Development of property
- Nearby economic development activity

Key themes of goals for the project emerged from this session. For the larger community, goals several emerge as priorities. First, it is important that the future Lake Springfield is one that is self-sustaining. New development should support the community and associated infrastructure needs with the project, and not drain local budgets or stretch departments thin. Additionally, there is also a vision for creating a place that is inclusive for everyone. This is seen from the focus accessibility, job creation, and embracing diverse housing options. Finally, the location of Lake Springfield within the region is important for promoting a regional destination and tourism to the Springfield community.

From a more focused agency perspective, goals were in line with key aspects of the planning process. First, the need to provide more recreational opportunities within the area is apparent. There is also the need for enhanced water quality and focus on the management of vegetation. In terms of identifying the place there is a need for enhanced branding and wayfinding, as well as more access that is in line with existing transportation plans. From a utility perspective there is a need to ensure remaining utility uses within the site are secure and safe.

Retreat participants are excited at the opportunity associated with the project, but at the same time understand the importance of the need for a maintainable place that gives back to the local community.

RISK ASSESSMENT

A risk assessment process is vital to the success of any project. The owners open review of risk, risk assignment, and risk probability particularly as viewed by the project proposers is crucial. Outcomes of a risk assessment process are:

- Establish risk categories that are critical to the project
- Include individuals with knowledge of Lake Springfield along with experts in various disciplines and people with experience on similar projects to identify risks and determine the level of risk
- Include stakeholders with area knowledge and a desire to have their concerns be a part of the risk assessment process
- Achieve a better understanding of risks and opportunities for the Lake Springfield Area
- Understand which risks are of higher concern to prioritize mitigation strategies
- Consider cost and schedule contingency to assist in Development Inquiries
- Organize allocation, mitigation and acceptance strategies for high-level risks to prioritize mitigation strategies
- Help identify the Development Community Perspective to risk and how it will impact the submittals/cost

The risk assessment process is broken down into 5 steps. These 5 steps are included here, but the retreat participated in the first of the five steps, risk/opportunity identification and brainstorming.

Risk Assessment Process

1. Risk/opportunity identification and brainstorming session
2. Qualitative risk assessment
3. Risk analysis
4. Risk mitigation and risk allocation/acceptance
5. Tracking, monitoring and updating

After learning about the risk assessment process, retreat participants met in small groups to brainstorm risks of the project. These risks are included in this report, and the matrix of risk assessment is included as an attachment to this summary.

Retreat participants did not have the chance to complete the qualitative risk assessment or analyze the risks. For purposes of understanding the next steps in the risk assessment brief information on that topic is included next.

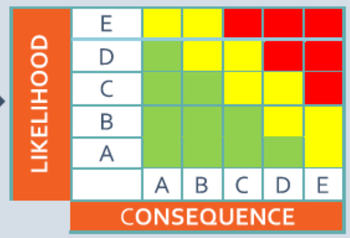
The qualitative risk assessment determines the likelihood of the risk of occurring (risk frequency) as well as the impact of the risk if it should occur (consequences severity). The output is a risk matrix that outlines the likelihood and consequence occurrence of each risk.

Information on this is detailed on the next page.

RISK MATRIX

LEVEL	LIKELIHOOD
A	Remote
B	Unlikely
C	Likely
D	Highly Likely
E	Near Certainty

ASSESSMENT GUIDE



RISK ASSESSMENT

High (Red). Unacceptable. Major disruption likely. Different approach required. Priority management required.

Moderate (Yellow) Some disruption. Different approach may be required. Additional management attention may be needed.

Low (Green) Minimal impact. Minimal oversight needed to ensure risk remains low.

LEVEL	SCHEDULE	COST	OTHER
A	Minimal or no impact	Minimal or no impact	Minimal or no impact
B	< 1 month	< $200,000	Minor impact
C	1 – 2 months	$100,000 - $250,000	Significant Impact
D	2 – 4 months	$250,000 - $500,000	Major impact
E	>4 months	>$500,000	Critical impact

Low-level risks

- Accept risk because impact to project is low
- Move to step 4 to develop mitigation strategy

Moderate-level risks

- High likelihood/low consequence risk – review to see what combinations pose high risks
- What trigger events exist to make high level risk?
- Other moderate risks – move to step 4

High-level risks

- Carry forward to step 3 to determine cost and schedule contingency values and quantify individual impacts
- Move to step 4 to develop mitigation strategies

Risks brainstormed by groups are included below. Note that these were only developed in the brainstorming portion of the risk assessment and the teams have not reviewed thoroughly for the next steps.

Parks & Recreation

1. Support for vision without support for operational maintenance and upkeep fund
2. Liability and safety issues with water activities
3. Unrealistic and unreliable plan that we cannot achieve
4. Development where you lose public opportunity for recreation
5. Fiscal negative
6. Destroy the natural sanctuary of the lake and park
7. Plan fails to attract buy-in
8. Citizen mistrust
9. City colleagues lose interest
10. City leaders are uninspired
11. Chance in elected positions
12. Inaction leads to losing opportunities
13. Sub surface conditions that prevent implementation
14. No funding to maintain
15. Risk of nonsupport from Greene County commissioners
16. Dangerous situations for pedestrians
17. Lack of public support
18. Losing native habitat
19. Making water quality worse
20. What is determined as the best use does not align with the public
21. Sensitivity to adjacent neighborhoods
22. Unrealistic expectations
23. Reduced water access
24. Plan fails to attract funding partners
25. Limited engagement from partners for programming (SPS, nonprofits, higher ed. Etc.)
26. Bike and ped connectivity reduced
27. Citizens become angry over changes to the natural environment
28. Mother nature – natural flooding that can occur
29. Programming input not representative of all community (intersectional)
30. Over programming
31. More park amenities to an already affluent area of town

Economic Development

32. Doing nothing
33. Unfundable plans – inconsistent plans for market
34. Financial sustainability – operational + capital
35. Sufficient revenue streams
36. Build too much for capacity to maintain
37. Human health & safety
    a. Still a power plant
38. Unable to use power plant and need to demo instead of reuse
39. Duplicate nearby efforts
40. Working with private development community
41. Complete failed development
42. Trying to one up something that already exists in region
43. Narrow scope of development potential
44. Not phasing enough or phasing too much
45. Poor communication
46. Not preparing for administrative hurdles
47. Not having a strong framework in place
    - Operationally
    - Ex. Draft development agreement attached to RFP

Transportation & Engagement

48. Stranding infrastructure
49. Lack of structured implementation plan
50. Constituent unrest
51. Leading to distrust
52. Negative rumors/stigma
53. Loss of a once in a lifetime opportunity
54. City staff and elected official turnover
55. Loss of momentum
56. Development interrupting the transportation network
57. Change in federal funding requirements
58. Future transportation trends
59. Cultural resources impact
60. Finding something sensitive we don't know about
61. E/W Arterial
62. ADA accessibility
63. Questioning the process
64. Taxpayer $ should be spent elsewhere
65. Public transit access (lack of) and how inclusive does that make this plan and area
66. Lack of users if good, safe connections are not sequentially made
67. Bringing more people to the area increases the chances of crime
68. Infrastructure terrorism associated with the dam
69. Climate change
70. Trail user conflicts
71. Inflation
72. Unanticipated roadway needs

Utilities

73. Loss of service
74. Security of assets
75. Increased cost of service
76. Affordability to customers
77. Chance of regulations
78. Nitro limits down
79. Time
80. Bigger safety buffers
81. Remediation surprises
82. Lake sediment (compliance)
83. Public comments/nuisance
84. Park land without utilities

Dam

85. Maintenance costs
86. Integrity
87. Natural disaster
88. Modification affecting hydrology
89. Climate change (flood/drought)
90. Increase in flood frequency and magnitude
91. Upstream development impact water quality
92. Public safety
93. Sedimentation
94. Biological or endangered species impact
95. Potential archaeological find
96. Impact to downstreet development and water quality
97. Ownership of the dam
98. Cost and supply chain

Environmental

99. Must address upstream to avoid
- Algae bloom
- Sedimentation
- Impaired waterway
- Public health
- Drinking water quality

100. Upstream land use changes
101. Risk of doing nothing
102. Could lose our control
103. If the economic development on the lake prop not done sensitively
104. Losing James River as a regional amenity
105. Permitting issues
106. Invasive species
107. Eagle habitat
108. Human interaction = pollution

Utilities

109. Timeline
110. Inflation
111. Workforce
112. Recession

In total, 112 risks were identified with the project.

DISCIPLINE WORK PLAN & SCHEDULE

Following the interactive exercises, the larger group gathered for formal presentations by subconsultants on the CMT team to talk about next steps for the plan. Representatives from three of the consulting firms gave brief presentations about the next steps and the schedule of events.

- Geosyntec – is responsible for the hydrology study of the lake. Their team plans to collect water samples in November with some early results in February. A lot of this up-front water quality work will determine uses and recreational opportunities around the lake.
- SWT Design – gave an update to what their team will be looking at from a parks and recreation lens, and how that will fit into the entire process.
- Johnson Consulting – is responsible for the market analysis and planning for potential development opportunities around the lake. Much of their work will be done in an iterative process as ideas are formed and tested about what is feasible within the planning area.

The first public meeting is scheduled for November 17 at the Springfield Art Museum. This public meeting will introduce the project to the public as well as start gauging interest in potential opportunities within the planning area.

PUBLIC TALKING POINTS

ABOUT
The final presentation of the retreat was given by the City of Springfield Public Information Office, Cora Scott.

As an engaged participant of the retreat process, Cora kept her planning lens focused on messaging to the community to ensure a successful planning process. As she listened and participated in the process, Cora developed a list of talking points to be used when speaking with the public about the process.

As identified in the risk assessment, several risks exist around rumors, the spread of misinformation, and constituents that are upset. These talking points are developed so that these risks are minimal the messaging around the Lake Springfield Plan is clear.

PUBLIC TALKING POINTS

1. **The James River Power Plant has served the Springfield community well for 65 years! It is exciting to think about the reuse of this important component of our community.**
2. **The study is being completed by experts within the boundaries of the study area and the vision of the EDA grant.**
3. **Understanding the water quality is a key component to the planning process.**
4. **No funding has been identified for implementation of the plan.**
5. **This plan will serve as a great resource for this area of the City, as well as for the entire Springfield community.**
6. **The concept for this plan was brought forward as a subarea plan in the ForwardSGF comprehensive plan.**
7. **Desire to preserve the natural amenities of the lake while fostering economic development.**
8. **Significant opportunity to open the waterfront up for more access.**
9. **The process is transparent. We want your input, and it is critical to the process.**
10. **Lake Springfield has the unique opportunity to be developed as more of a destination.**

KEY THEMES

ABOUT

During the two-day kickoff process, 10 key takeaways emerged as critical to the planning process. These takeaways will work in conjunction with the project goals as the planning team develops strategies and objectives for an implementable plan that enhances the Lake Springfield Area. These 10 key themes are:

1. **Protect the natural environment while embracing change (must develop with a sensitivity to nature).**
   People love the natural beauty of the lake, as they should. During identification of programming and development opportunities, consideration for the natural environment must remain a key priority.

2. **Access and connectivity (how do people get here & it has to be inclusive).**
   The lake and surrounding park area are hard to access. Vehicular access is not direct, and no facilities exist in the way of walking and biking. Focusing on a plan that includes several access points for all modes of transportation is important. We heard several times this is considered a park you have to drive to access it.

   In addition to general access to the Lake and surrounding park areas, access to the waterfront is important. It is a very much look but don't touch area, and those experiences need to change.

3. **Identify plan for maintenance and funding.**
   The final product must be self-sustaining and contribute to the local economy, and as an inclusive asset for the community.

4. **Boost area as a regional destination.**
   The location is the geographic center of Springfield, Nixa and Ozark. The plan must focus on the area as a destination with a sensitivity to nearby neighbors and the natural environment. Additionally, is there opportunity to create a stronger axis here as a relationship with Branson and Crystal Bridges (nature, activities, arts & culture)?

5. **Job creation important.**
   The plan should focus on resilient jobs that provide economic opportunity to the residents of Springfield.

6. **Inclusive place for everyone.**
   Springfield Lake and the Park are beautiful, and free natural amenity that everyone should be able to enjoy. The plan should focus on inclusive access for everyone regardless of age, ability, socioeconomic status, etc.

7. **Foster a sense of pride and ownership.**
   The lake is beautiful and the natural amenities abundant, but lack of ownership is problematic. The plan should assist in identifying ownership of the area for increased sense of pride.

8. **Develop an identity.**
   The current area needs a visual identity. With a more focused vision, this identity should be clear and present branding opportunities at the lake.

9. **Consider how utility needs play a part in the future vision.**
   The plan should respect the mission of City Utilities and incorporate the mission of their work within the programming framework.

10. **Big, but implementable Vision**.
    Plan should be developed in a way that is visionary, yet at the same time provide a clear path to implementation. Economic development and job creation are pillars of the work, and a clear path towards those goals should be included.

The Lake Springfield Plan Kickoff retreat was a successful and collaborative process. Several times throughout the effort representatives from various agencies indicated how nice it was to be in person and collaborate. The site visits sparked conversations and imagination that is key to the final plan. This information is developed as a summary of a snapshot of the takeaways from the kickoff process and is incorporated into the materials to be used at the first public meeting on November 17th.

Lake Springfield Plan Community Engagement Update

February 28, 2023

Overview

Three major events took place last year focused on community engagement and project educational outreach. All events received similar baseline information with the same Power Point presentation for consistency in information sharing. Below, are the results of the three events:

October 12, 2022

This event was a forum exclusive for residents in the Lake Springfield area to hear their concerns and share information with them about the project. Meeting attendees were able to complete a comment card or respond to an online survey. This event had 88 attendees with several couples (**over 100 attendees**).

November 15, 2022

The Community Advisory Team help their first meeting with **32 attendees**. The attendees reviewed similar materials presented at the October 12 event and their comment cards. The CAT represented various Springfield (and surrounding areas) intersectional groups and populations. The CAT provided input on materials and concepts for the official public kick off on November 17.

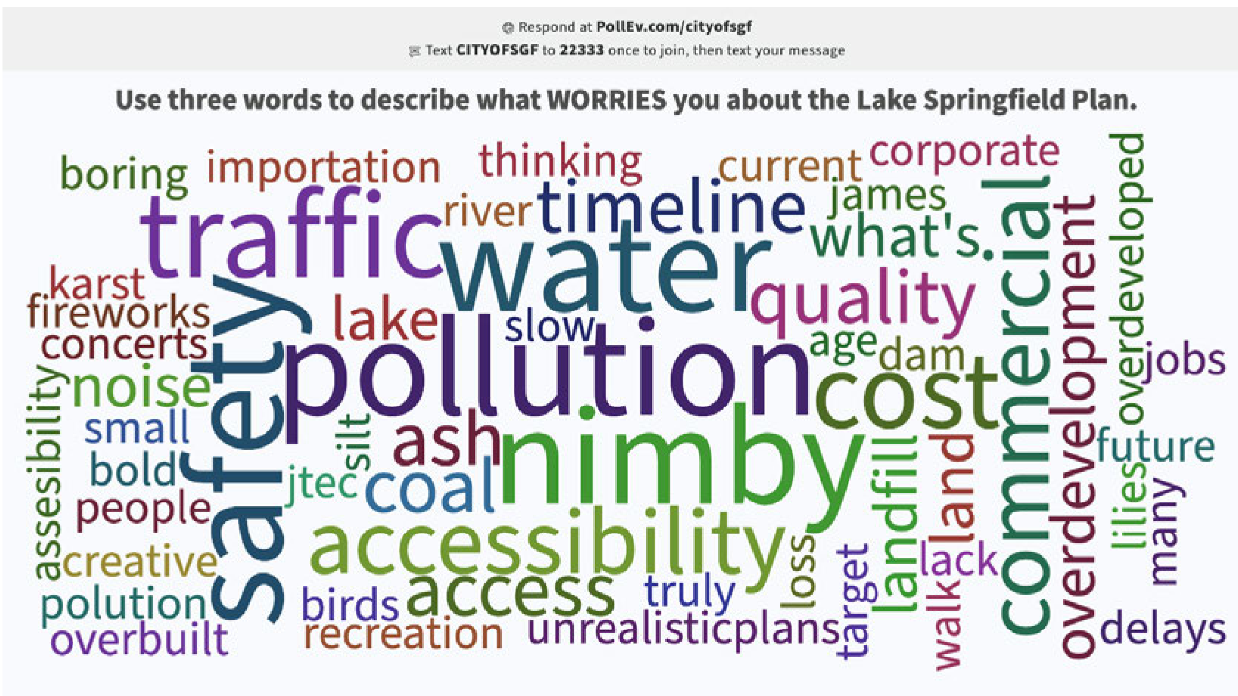
November 17, 2022

The City of Springfield conducted the public kick-off of the project at the Springfield Art Museum and provided an online survey. The survey was accessible with a QR Code and for community members who could not attend in person, they could participate online for two weeks after the event. Below, please find the self-reporting results of the online survey:

- **264 Total Responses with 727 Total Views**
- 148 Survey Completions (116 Incompletes Surveys)

Race/Ethnicity	Gender	With a Disability	Ages
129 – White 2 – Hispanic/Latinx 2 – Other Race 1 – Asian 1 – Native Hawaiian or Other Pacific Islander	79 – Men 58 – Women 2 – Another Identity	11	36 – Ages 31 to 40 29 – Ages 49 -to 50 29 – Ages 61+ 22 – Ages 22 to 30 21 – Ages 51 to 60

A couple of responses from the online survey:

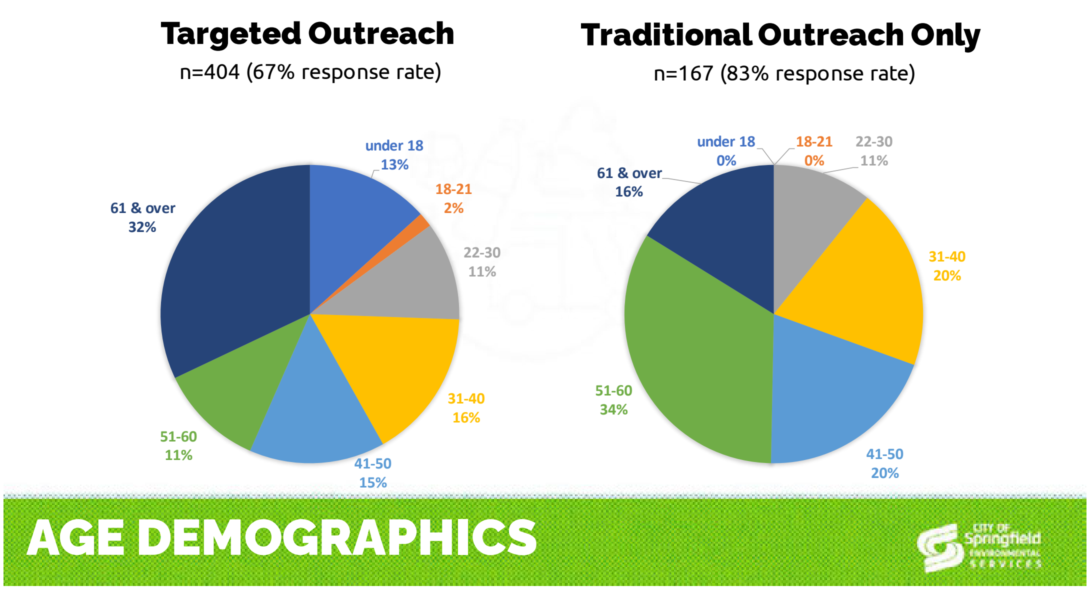


January 2023

The City of Springfield's Department of Environmental Services, Saki Urushidani finalized a survey started August 2022 for a project to improve and protect the area air, water and land resources. The survey was conducted by Saki Urushidani, a professional engineer with the City of Springfield, with oversight of the water resource use project. She met with several community leaders for input on the survey questions and identification of various focused groups.

The survey included three questions about how local water resources are used in Springfield or reasons why the resources may not be used. She used traditional outreach (e.g., social media posts, emailed surveys to groups and organizations, news release and articles) and focused outreach (e.g., paper surveys at various events, door hangers in specific communities, group discussions at schools and with specific organizations, emailed surveys to specific organizations and advertisements with focused newspapers).

She received 200 survey responses through traditional outreach and 602 responses through focused outreach. The responses to this survey provide additional community input for consideration in the Lake Springfield project. The demographics for the final survey with the traditional and focused outreach responses is available from Saki Urushidani. Some key results from her survey are below:

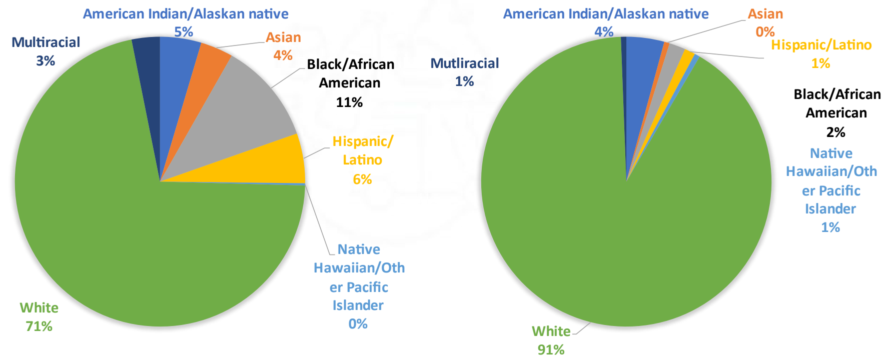


Targeted Outreach

n=413 (69% response rate)

Traditional Outreach Only

n=166 (83% response rate)



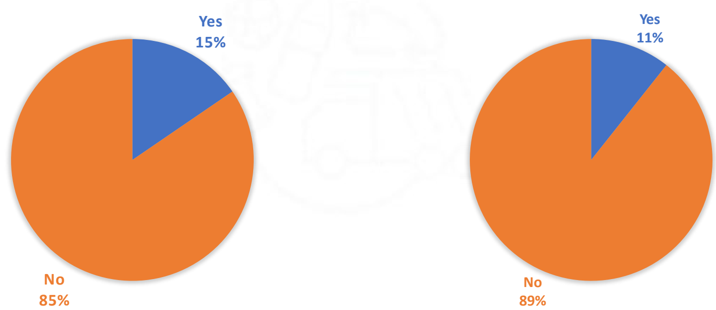
RACE/ETHNICITY

Targeted Outreach

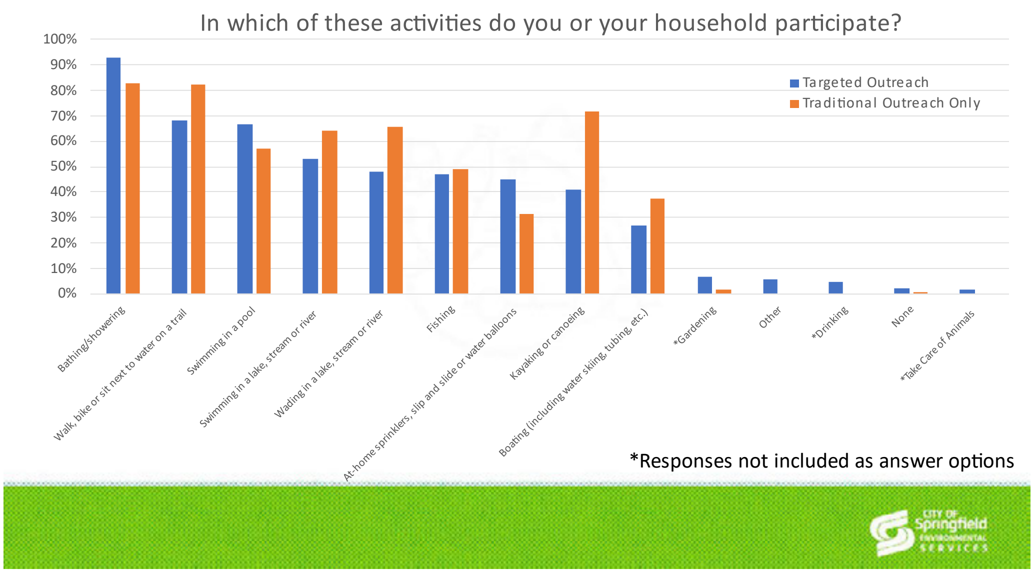
n=324 (54% response rate)

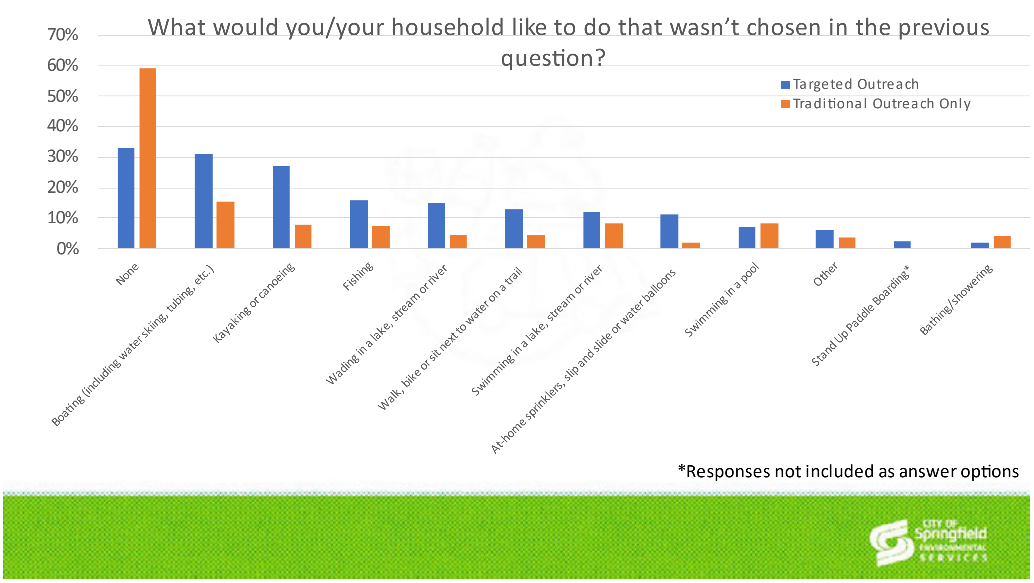
Traditional Outreach Only

n=169 (85% response rate)



DISABILITY STATUS

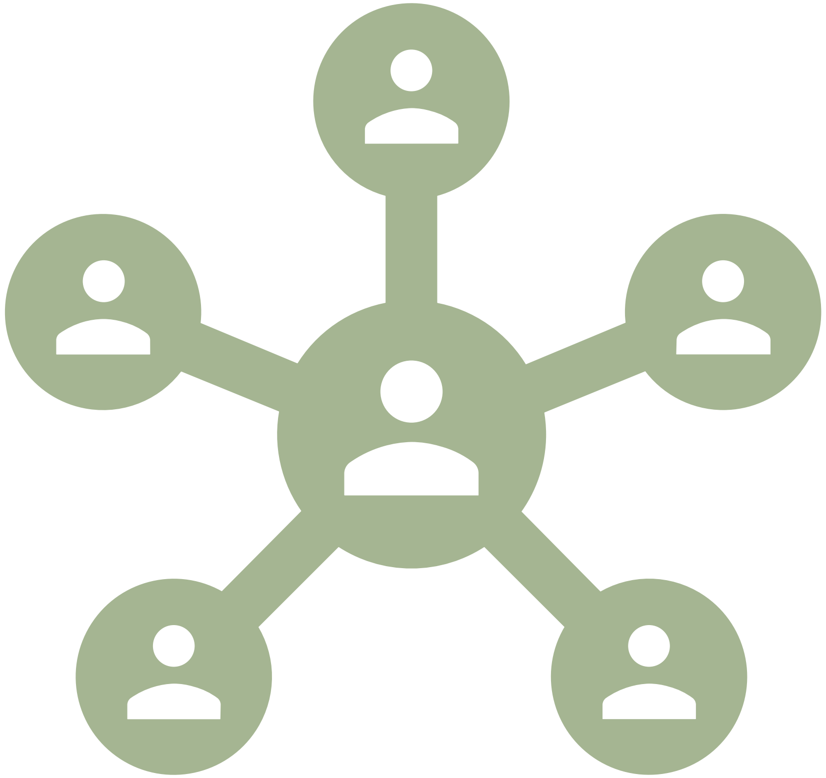

In which of these activities do you or your household participate?
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Targeted Outreach
Traditional Outreach Only
Bathing/showering
Walk, bike or sit next to water on a trail
Swimming in a pool
Swimming in a lake, stream or river
Wading in a lake, stream or river
Fishing
At-home sprinklers, slip and slide or water balloons
Kayaking or canoeing
Boating (including water skiing, tubing, etc.)
*Gardening
Other
*Drinking
None
*Take Care of Animals
*Responses not included as answer options


What would you/your household like to do that wasn't chosen in the previous question?
70%
60%
50%
40%
30%
20%
10%
0%
Targeted Outreach
Traditional Outreach Only
None
Boating (including water skiing, tubing, etc.)
Kayaking or canoeing
Fishing
Wading in a lake, stream or river
Walk, bike or sit next to water on a trail
Swimming in a lake, stream or river
At-home sprinklers, slip and slide or water balloons
Swimming in a pool
Other
Stand Up Paddle Boarding*
Bathing/showering
*Responses not included as answer options

Lake Springfield Plan Community Engagement Update

Cora Scott & Francine Pratt

March 31, 2023



Overview

6 Major Events in 5 Months!

- Events focused on community engagement and project educational outreach.
- All events provided similar information for consistency in information sharing.

Oct 12, 2022 – Neighborhood Forum

This forum was just for residents in the Lake Springfield area to hear their concerns and share information about the project. Participants completed comment cards and/or respond to an online survey.

88 attendees with several couples (**over 100 attendees**)!

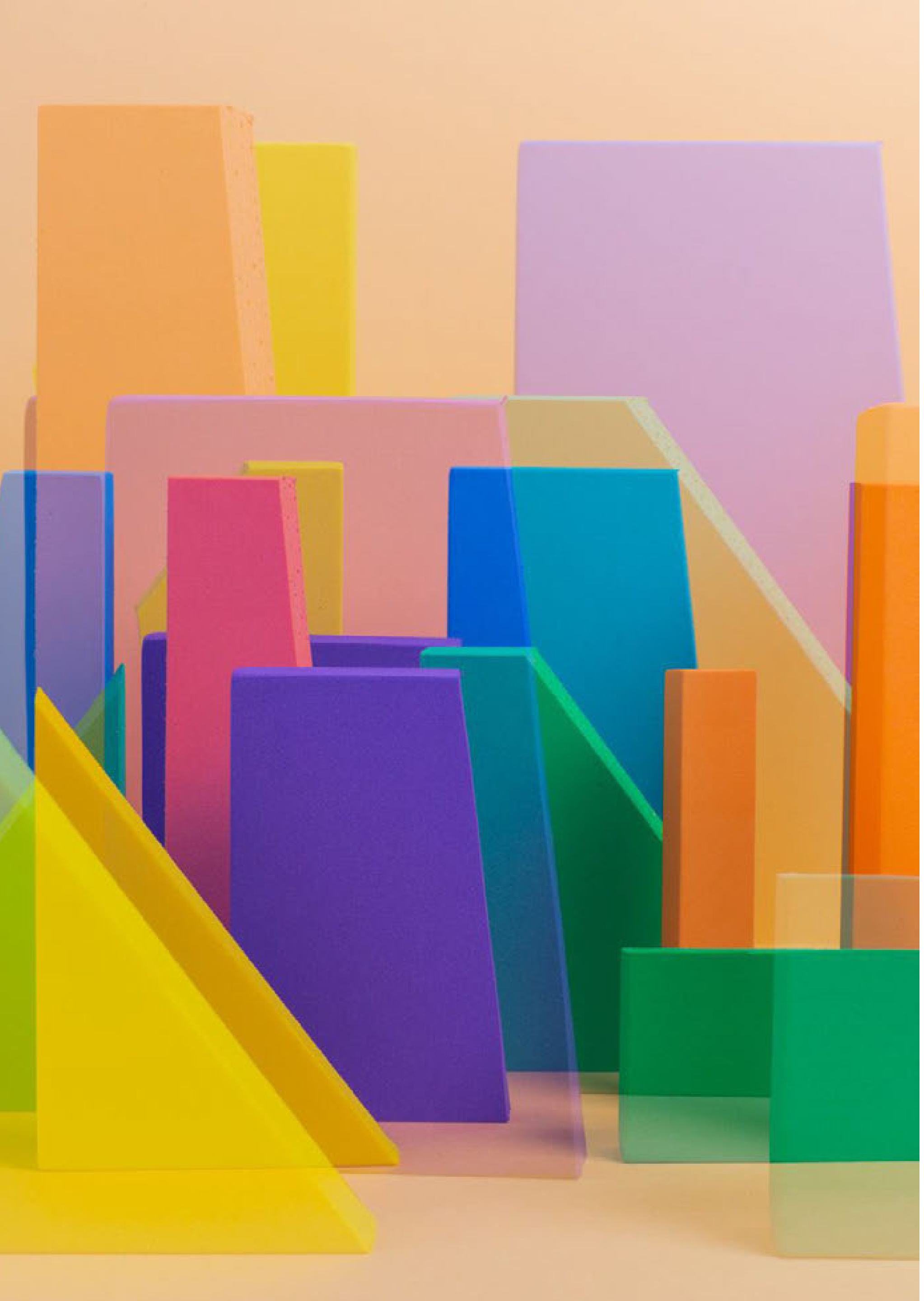
Nov 15, 2022 – CAT Meeting No. 1

Community Advisory Team held their first meeting with **32 attendees**.

Attendees reviewed similar materials presented at the October 12 event and the comment cards.

The CAT represents various Springfield (and surrounding areas) intersectional groups and populations.

The CAT provided input on materials and concepts for the official public kick off on November 17.



Nov 17, 2022 – Public Kick-Off Meeting

- City of Springfield conducted the public kick-off of the project at the Springfield Art Museum and provided an online survey.

- Survey was accessible with a QR Code and for community members who could not attend in person, they could participate online for two weeks after the event.

264 Total Responses with 727 Total Views - 148 Survey Completions (116 Incompletes Surveys)

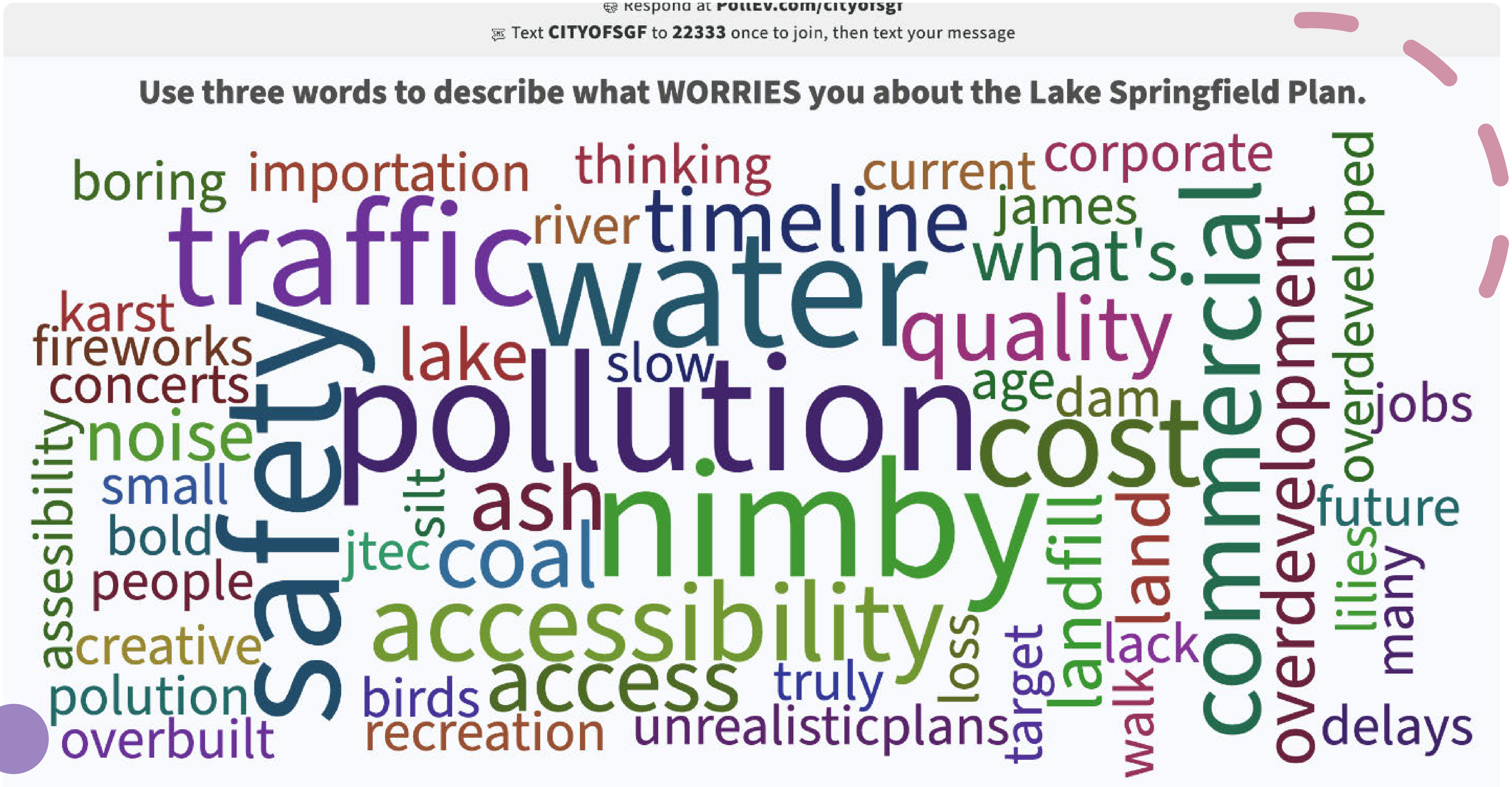
Public Community Meeting No. 1
Inclusivity – With Self Identification

Race/Ethnicity	Gender	With a Disability	Ages
129 – White **2 – Hispanic/Latinx** **2 – Other Race** **1 – Asian** **1 – Native Hawaiian or Other Pacific Islander**	79 – Men 58 – Women 2 – Another Identity	11	36 – Ages 31 to 40 29 – Ages 49 -to 50 29 – Ages 61+ 22 – Ages 22 to 30 21 – Ages 51 to 60

A032

What Excites You About the Lake SGF Plan?

A033


Respond at PollEv.com/cityofsgf
Text CITYOFSGF to 22333 once to join, then text your message
Use three words to describe what WORRIES you about the Lake Springfield Plan.
boring
importation
thinking
current
corporate
traffic
river
timeline
james
what's.
commercial
overdeveloped
karst
fireworks
water
quality
lake
slow
concerts
pollution
age
dam
jobs
safety
cost
development
assesibility
noise
small
silt
ash
nimby
future
bold
jtec
coal
landfill
land
people
lilies
many
creative
accessibility
loss
lack
overdevelopment
polution
access
truly
target
walk
birds
overbuilt
recreation
unrealisticplans
delays

Jan 2023 – Local Water Resources Survey

Dept. of Environmental Services shared data from six-month survey project. Their survey responses provided additional community input for this project with **200** traditional and **602** focused outreach responses.

- ❑Three questions asked related to how local water resources are used in Springfield or reasons why the resources may not be used.
- ❑Traditional outreach- Social media posts, emailed surveys to groups and organizations, news release and articles.
- ❑Focused outreach - Paper surveys at various events, door hangers, group discussions at schools, emailed surveys to specific organizations and advertisements with focused newspapers.

Mar 21, 2023 – CAT Meeting No. 2 (47 Attendees)

Mar 23, 2023 – Lake Ridge Estates Neighborhood Meeting (43 Attendees)

Mar 30, 2023 – City Utilities (77 Attendees in Person – 00 Online)

What's Next?

Technical Advisory Team Meeting No. 2

20 Apr

Public Meeting and Open House with Tours of Power Station

4 May

A039

Lake Springfield Public Meeting No. 2

May 4, 2023

Tent Board Choices and Online Survey Results

Tent Board data provided by Jacque Knight, CMT

Online survey data and graphs prepared by Chris Akins, City of Springfield

Report developed by Francine Pratt, Pratt Consultants, LLC

Updated June 30, 2023

Table of Contents

Survey Results Overview

The survey results are responses from participants who attended the Lake Springfield Public Meeting on May 4, 2023 and/or participated in the online survey. The online survey may include participants who attended the public meeting. The overall results serve as a baseline to hear their thoughts, concerns, likes and dislikes. The survey results should not be considered conclusive because of the complexity of this project. For example, in person participants at the public meeting were able to interact with experts and ask questions before making selections on the "Tent Boards" whereas online survey participants did not have this option. Also, the complexity of some of the suggestions (e.g., dam modifications, how water is used, etc.) require environmental and scientific studies for the team to make recommendations for the final plan.

The survey results are very helpful to the planning process to know the types of amenities and usage of the lake area from the public. The next public meeting will include suggestions for land use based on the feasibility of how the land and water can be used. This will provide an opportunity to conduct additional outreach for increased participation from community members representative of the Springfield area populations and intersectional subgroup populations.

Overall survey response information:

- 779 Individuals reviewed survey.
- 53.49% completion rate of survey – 301 started survey and 161 completed survey.
- 21 minutes was the average time to complete the survey.
- Participants at the public meeting may have shared their thoughts on the "Tent Boards" and through the online survey.

Survey Results

The numbers in front of each theme reflect the number of “votes” in response to the questions.

Q1. Station 4: Board 3:

Please choose 3 investment themes in which you are most interested for Lake Springfield, and rank them in order of interest. If 'OTHER' is in your top 3, please elaborate.

Tent Board Order of Interest - Top 5 of Top 3 Themes	Online Survey Order of Interest – Top 5 of Top 3 Themes
19 - Passive Recreation	164 - Passive Recreation
17 - Environmental Preservation	146 - Environmental Preservation
10 - Power Plant Reuse	56 - Power Plant Reuse
10 - Cultural Hub	50 - Active Recreation
10 - Education	40 - Cultural Hub

Q2. Station 4, Board 6: Please choose 5 program opportunities in which you are most interested for Lake Springfield, and rank them in order of interest. If 'OTHER' is in your top 5, please elaborate.

Tent Board Order of Interest - Top 5	Online Survey Order of Interest - Top 5
24 - Water Recreation	176 - Trails
22 - Trails	156 - Water Recreation
13 - Commercial Leasing	130 - Community Events
11 - Community Events	106 - Lakefront Event Venue
12 - Restaurant/Bar	102 - Park Amenities

TENT BOARD STATION 4 Economic Development Potential Activities - Not Included in online survey.

Interested	Neutral	Uninterested
Active Recreation • Bike/skate park (6) • Outdoor sports & fitness (5) • Watercraft rentals (5) • Playground (3) • Adventure/rock climbing/ziplines (3) • Indoor sports (1) **Nature/Culture/Education** • Environment preservation/restoration (7) • Indoor/outdoor classroom (7) • Endangered species preservation (6) • Native American cultural center (2) • STEAM center (2) • Observation tower (2) • Science/history/art museum (1)	**Passive Recreation** • Trails (15) • Bird watching/photography (7) • Public art/murals/sculpture garden (5) • Fishing/boardwalks/overlooks (4) • Park amenities (2) • Dog park (2) **Entertainment/Hospitality** • Hotel (5) • Lakefront event venue (4) • Water feature (fountain, splash pad) (3) • Amphitheater (2) • Rooftop venue (2) • Signage/wayfinding/branding (2) • Camping/glamping/RV (1)	**Retail/Commercial** • Community events (10) • Restaurants/bars (5) • Cafes/coffee shops (5) **Activity Category** • Active recreation (6) • Nature/culture education (3) • Entertainment/hospitality (2) • Passive recreation (2)

TENT BOARD STATION 4: Economic Development Case Studies - Not Included in online survey.

Tent Board - Top Options in Order of Preference
4 - Optimist Hall – Charlotte, NC 4 - Origins Park – Jeffersonville, IN 1 - Greylock Glen Resort – Adams, MA 0 - RecPlex – West Des Moines, IA

Q3. Station 5, Board 2: Please share any comments you have about the proposed zone uses - Please see page 17 of this document.

Q4. Station 5, Board 3: Zone 1 - South Activity » Please choose 3 preferred themes in which you are most interested for Zone 1, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
16 - Amenities – Trails 14 - Education Trails and Boardwalks 14 - River Access 13 - Adventure Recreation – Bike Park 4 - Athletic Fields & 4 - Hospitality Event Space	130 - Education Trails & Boardwalks 119 - Amenities – Trails 107 - River Access 70 - Eco Playground 52 - Adventure Recreation – Bike Park

Q5. Station 5, Board 3: Zone 2 - Capped Landfill » Please choose 3 preferred themes in which you are most interested for Zone 2, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
19 - Nature Landscape with Trails (19) 16 - River Overlook (16) 6 - Astronomy Viewing Area 6 - Practice Fields 5 - River Edge Tree Houses 5 - Fitness Trails 5 - Public Art	114 - Native Landscape with Trails 108 - River Overlook 63 - Fitness Trails 62 - Astronomy 61 - Small Pavilions/Picnic Areas

Q6. Station 5, Board 4: Zone 3: Power Station - Please choose 3 preferred themes in which you are most interested for Zone 3-Power Station, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
9 - Iconic Walk / Bridge Overlook 8 - Education and Demonstration Areas 8 - Sky Tram 7 - Amphitheater 7 - Waterfront Amphitheater	88 - Iconic Walk/Bridge Overlook 87 - Education & Demonstration Areas 72 - Waterfront Amphitheater 71 - Amphitheater 63 - District (lodging, dining, retail event, transit, etc.)

Q7. Station 5, Board 4: Zone 3: Dam Modifications - Please choose 3 preferred themes in which you are most interested for Zone 3-Dam Modifications, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
8 - Recreation and Wildlife Ladder – Shallow 8 - Section Removal with Open Flow 8 - Open Channel Bypass 7 - Recreation and Wildlife Ladder – Edge 4 - Section Removal with Overlook & 4 - Natural Vertical Bypass	84 - Nature Vertical Bypass 77 - Open Channel Bypass 75 - Removal with Exposed Structure & Remnants 67 - Section Removal with Overlook 60 - Recreation and Wildlife Ladder – Edge

Q8. Station 5, Board 5: Zone 4 - Lake & Park » Please choose 3 preferred themes in which you are most interested for Zone 4, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
18 - Wetland Boardwalks 10 - Outdoor Education 7 - Destination Playground 6 - Group Camping 6 - Boat Rentals	128 - Wetland Boardwalks 85 - Overlooks/Education 79 - Boat Rentals 74 - Fishing 47 - Destination Playground

Q9. Station 5, Board 5: Zone 5 - North Activity » Please choose 3 preferred themes in which you are most interested for Zone 5, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
18 - River Access 16 - Pedestrian Bridge Crossing 7 - Trailhead Parking 6 - Themed Bridge w/Views 5 - Gathering Space/Pavilions	124 - River Access 113 - Pedestrian Bridge Crossing 72 - Trailhead Parking 56 - Trailhead Play Amenities 54 - Gathering Space/Pavilions

Q10. Station 6, Board 4: Choose your preferred option for modifications to the dam.

Tent Board - Top 5	Online Survey - Top 5
6 - Earthen Dam Modification: A.C 5 - Full Dam Removal: A.1 2 - Partial Dam Removal: A.2 2 - Concrete Dam Modification: A.B 1 - No Modification: A.D	53 - Full Dam Removal: A.1 37 - Partial Dam Removal: A.2 37 - Earthen Dam Modification: A.C 32 - No Modification: A.D 26 - Concrete Dam Modification: A.B

Q11. Station 7, Board 1: Please rank the proposed access & gateway options in order of your preference.

Tent Board – In Order of First Preference	Online Survey – In Order of First Preference
10 - Option 2: Lake Springfield Drive Construction - No cars on Kissick 7 - Option 3: Kissick Improvements – Cars Remain on Kissick 4 - Option 1: JRPS Entry from Kissick – Cars Remain on Kissick	82 - Option 2: Lake Springfield Drive Construction – No cars on Kissick 37 - Option 3: Kissick Improvements – Cars Remain on Kissick 0 - Option 1: JRPS Entry from Kissick – Cars Remain on Kissick

Q12. Station 7, Board 2: Please rank the proposed boat ramp access options in order of your preference.

Tent Board – In Order of First Preference	Online Survey - In Order of First Preference
5 - Option 2: New Boat Ramp from Lake Springfield Park 3 - Option 3: New Boat Ramp Requiring New Facility 0 - Option 1: New Boat Ramp Entry from Kissick	68 - Option 2: New Boat Ramp from Lake Springfield Park 52 - Option 1: New Boat Ramp Entry from Kissick 44 - Option 3: New Boat Ramp Requiring New Facility

Station 7, Transportation & Mobility (Walking and Rolling) priorities in which you are most interested for Lake Springfield, and rank them in order of interest – Not included in online survey.

Tent Board - Walking and Rolling Priorities
8 - Option 2: ○ Kissick over lake becomes ped/bike only ○ 2 new lake crossings 6 - Option 3: ○ Wide sidewalks or SUP along roadway improvements ○ Trail of Honor Connection 1 – Option 1: ○ Kissick road widening ○ Chadwick flyer trail bridge

Station 7, Transportation & Mobility General Needs) priorities in which you are most interested for Lake Springfield, and rank them in order of interest – Not included in online survey.

Tent Board - General Needs
12 - Trails 6 - River/lake Crossings 3 - Boat Ramp Access 1 - Vehicular Access/Entry 1 - Public transit

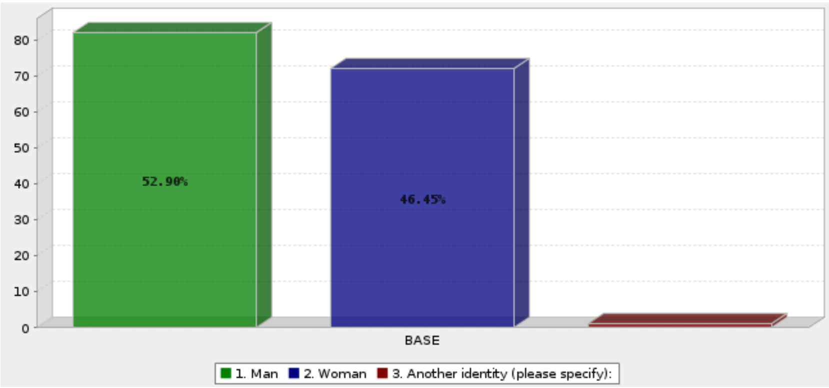
Q14. Station 7, Board 4: Please choose 3 transportation & mobility priorities in which you are most interested for Lake Springfield, and rank them in order of interest. If 'OTHER' is in your top 3, please elaborate (Worded as Walking & Mobility on Tent Board).

Online Survey – Top 5 Priorities
141 -Trails 109 - River/lake Crossings 69 - Boat Ramp Access 54 - Sidewalks & ADA 54 - Parking

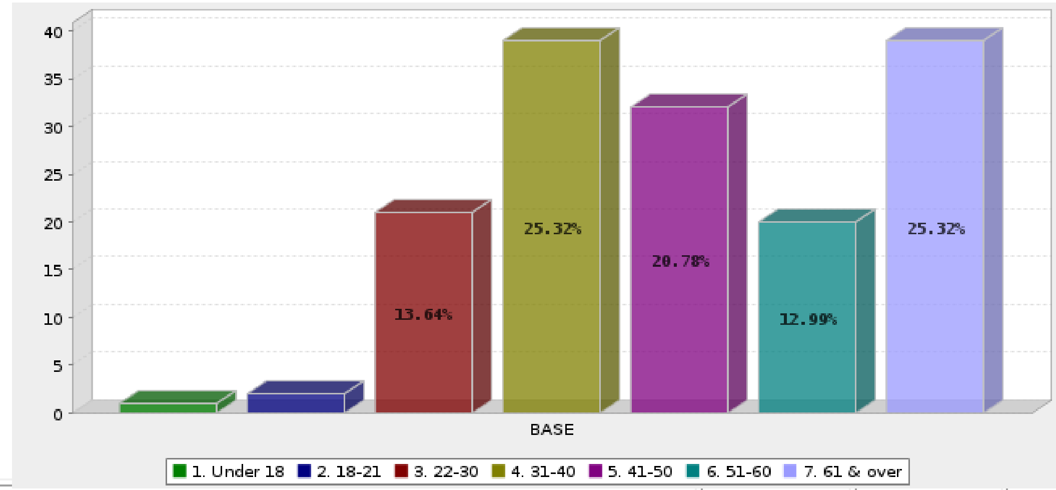
Q15. Station 7, Board 5: Choose your preferred option for Kissick improvements.

Tent Board – Preferred Options	Online Survey – Preferred Options
17 - Bicycle & Pedestrians - No Vehicular Traffic 6 - Roadway Improvements – Accommodate More Car Trips	107 - Bicycle & Pedestrians - No Vehicular Traffic 55 - Roadway Improvements – Accommodate More Car Trips

Q16. Gender (choose all that apply)



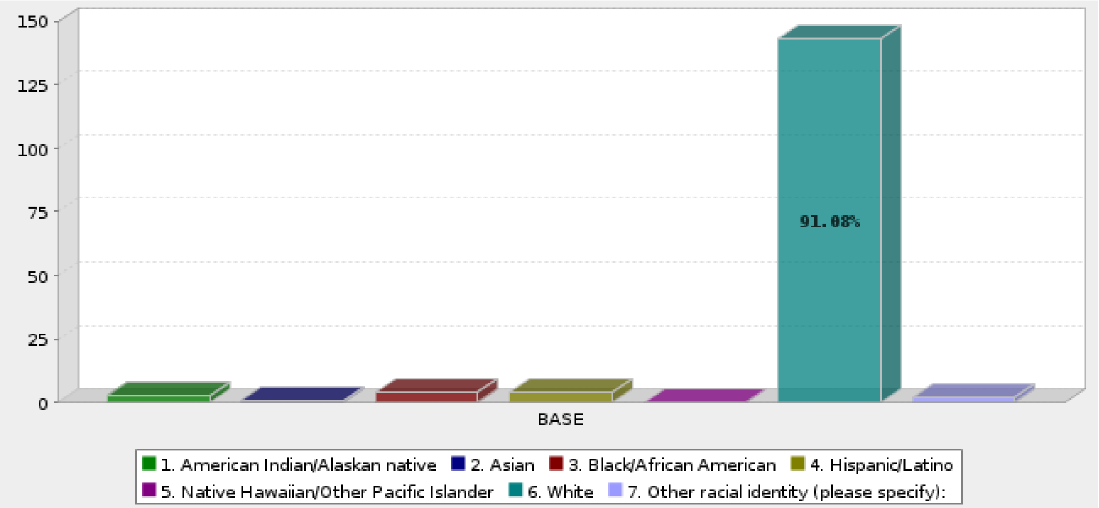
Q17. Age category



	Answer	Count	Percent
1.	Under 18	1	0.65%
2.	18-21	2	1.30%
3.	22-30	21	13.64%
4.	31-40	39	25.32%
5.	41-50	32	20.78%
6.	51-60	20	12.99%
7.	61 & over	39	25.32%
	Total	154	100%

Mean : **5.045**	Confidence Interval @ 95% : **[4.813 - 5.278]**	Standard Deviation : **1.475**	Standard Error : **0.119**

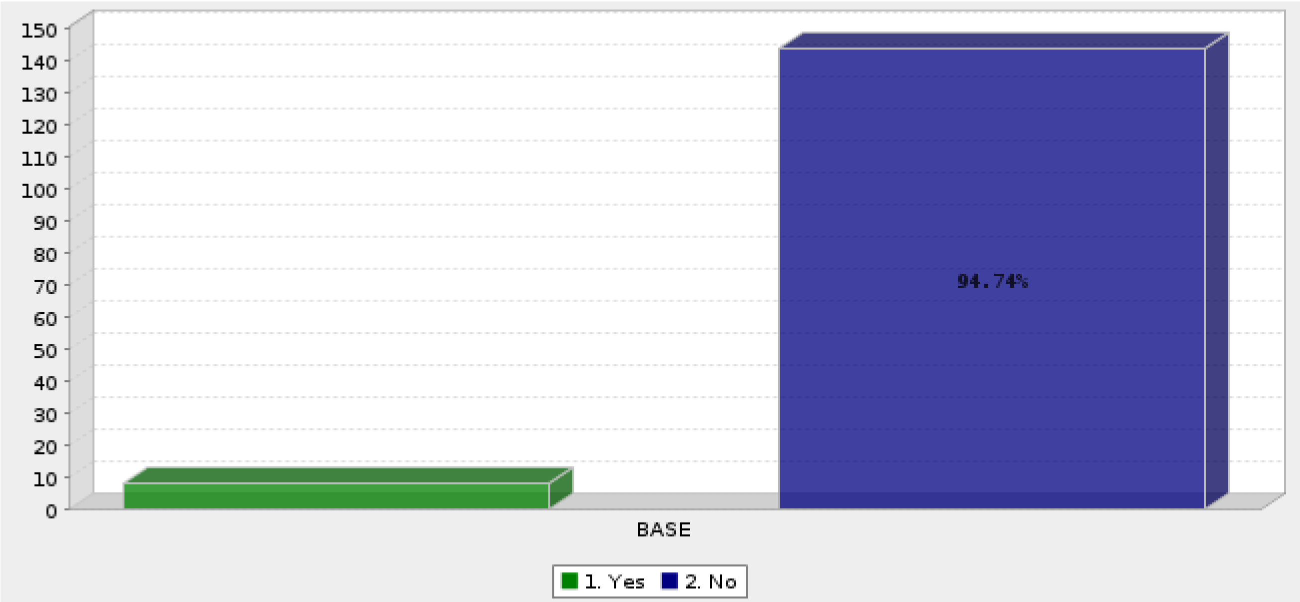
Q18. Please specify your race and/or ethnicity (please check all that apply):



	Answer	Count	Percent
1.	American Indian/Alaskan native	3	1.91%
2.	Asian	1	0.64%
3.	Black/African American	4	2.55%
4.	Hispanic/Latino	4	2.55%
5.	Native Hawaiian/Other Pacific Islander	0	0.00%
6.	White	143	91.08%
7.	Other racial identity (please specify):	2	1.27%
	Total	157	100%
Mean : **5.764**	Confidence Interval @ 95% : **[5.618 - 5.911]** Standard Deviation : **0.935**	Standard Error : **0.075**	

*The City of Springfield's population percentages are provided to demonstrate comparable populations who participated in survey: **1.** American Indian 0.67%; **2.** Asian 1.81%; **3.** Black/African American 4.28%; **4.** Hispanic/Latino 4.33%; **5.** Native Hawaiian/Other Pacific Islander 0.04%; **6.** White 87.65%,*

Q19. Are you a person with a disability?



	Answer	Count	Percent
1.	Yes	8	5.26%
2.	No	144	94.74%
	Total	152	100%
Mean : **1.947**	Confidence Interval @ 95% : **[1.912 - 1.983]** Standard Deviation : **0.224**	Standard Error : **0.018**	

Over 12% of Springfield's population self identifies with a disability.

All Survey Data with Comments

This section contains additional information related to survey questions for responses with more than the top five ratings and/or additional comments. The question with the ratings is repeated again to make it easier to review the information together with the additional data and comments.

Q1. Station 4: Board 3:

Please choose 3 investment themes in which you are most interested for Lake Springfield, and rank them in order of interest. If 'OTHER' is in your top 3, please elaborate.

Tent Board Order of Interest - Top 5 of Top 3 Themes	Online Survey Order of Interest – Top 5 of Top 3 Themes
19 - Passive Recreation 17 - Environmental Preservation 10 - Power Plant Reuse 10 - Cultural Hub 10 - Education	164 - Passive Recreation 146 - Environmental Preservation 56 - Power Plant Reuse 50 - Active Recreation 40 - Cultural Hub

Tent Board Data with Write-in Comments

1. **Passive recreation (19)**
2. **Environmental preservation (17)**
3. **Power plant reuse (10)** (Wedding Event Venue – Industrial Theme, Indoor Rock Climb, Adventure Center, Zipline Natural History Museum)
4. **Education (10)**
5. **Cultural Hub (10)**

- Native American heritage (6)
- Active recreation (6)
- Entertainment district (6)
- Camping (6)
- Upscale lodging (6)
- Outdoor sports (3)
- Commercial district (5)
- Event venue (2)
- Indoor sports complex (2)

Online Survey Data – Comments about Investment Themes

Natural Preservations

- Leave the area alone, and let it grow natural.
- Let’s keep it green! Habitat preservation. This is an important stopover for migratory and nesting birds. Let’s choose recreation that isn’t at odds with enjoying nature. Kayaking and frisbee golf have been nice additions and those of us who have enjoyed bird watching and photography can still do that with these types of activities. Too much “development” or large activities or venues would be a downer. We need green spaces to enjoy that are not too far from town.
- Please don’t make it Airbnb gentrification paradise. The fate of America is at stake. We need nature.

Economic Development

- Indoor market like in Kansas City.
- A trade school/something similar to the SPARC program (3 semesters, for those who don't attend the school. By opening it to the public you can allow for things like Girl Scouts, reenactment group, SPARC, while also offering an education. Artists could display their art, and there's enough space for things like welding, graffiti, or woodworking.

Trails

- Biking trails - gravel or paved.
- Mountain/Hiking Trails

Sports

I would just clarify my opinion on "indoor" sports... I think that as a community we have basketball, soccer, and volleyball somewhat covered for indoor sports. I chose to rank this high to encourage an indoor Olympic size pool to support the community.

Other

Plant a forest.

Q2. Station 4, Board 6: Please choose 5 program opportunities in which you are most interested for Lake Springfield, and rank them in order of interest. If 'OTHER' is in your top 5, please elaborate.

Tent Board Order of Interest - Top 5	Online Survey Order of Interest - Top 5
24 - Water Recreation 22 - Trails 13 - Commercial Leasing 12 - Community Events 12 - Restaurant/Bar	176 - Trails 156 - Water Recreation 130 - Community Events 106 - Lakefront Event Venue 102 - Park Amenities

Tent Board Data and Comments

1. **Water recreation (24**) (White water feature)
2. **Trails (22)**
3. **Commercial leasing (13)**
4. **Community events (12)**
5. **Restaurant/bar (12)**

- Lakefront event venue (10)
- Park amenities (9)
- Education center/museum (8)
- Indoor entertainment (8)
- Outdoor sports fields/courts (6) (Pickleball)
- Playground (6)
- Solar farm (7)
- Public art (5)
- Rooftop feature (4)

Online Survey Data - Program Opportunities Comments

Natural Preservation

- Please leave the area alone to go back to its natural state.
- Leave it alone.
- Managing what we already have. We increasingly are seeing graffiti on rocks. Lack of respect for what we have. Is there a way to patrol or do something that discourages graffiti and cigarette smoking and butts?

Non-Water Opportunities

- Camping areas for homeless population to give them a space that is accessible for them.
- Trails

Water Opportunities

Sailing - Would require dredging and lily removal to deepen the Lake for center board clearance.

Q3. Station 5, Board 2: Please share any comments you have about the proposed zone uses.

Natural Preservation

- I love these innovative, ideas! However… My concern with the activity area is the wildlife that is surrounding the area along with the nature center. Putting in the wrong type of event/activity space could be detrimental to the nature preservation and wildlife.
- Please just allow the area to go back to its natural state. Giant economic projects would destroy the natural environment. What is the point? Money? Shame on you.
- Zone 4 Lake Park area. ELIMINATE the idiotic frisbee golf course! LS used to be my favorite quiet walkabout park, to walk quietly, to view the beautiful lake, to view deer and beautiful lake waterfowl. But ever since the loud clanging groups traipsing through the grounds, you no longer see deer, and other wildlife is minimal as well. What a huge loss! NO destination recreational sports use! Please! We do NOT need another Cooper Complex…traffic is awful as is whenever there are HS cross country events. Please restore and maintain LS as a naturally beautiful park space. Please!
- Not another Branson- no , no. We need natural habitats and spaces
- I used to love going to LS to walkabout the quiet and beautiful trails and see the lake waterfowl. That all changed with the MORONIC IDEA to install a frisbee golf course! Now there are people tromping all over, clanging the chains…and I do NOT see deer anymore! Please restore and emphasize the natural setting and wildlife! NO destination recreational area!

We do NOT need another Cooper Complex…traffic is bad enough when there are HS cross country events! Please do NOT drain the lake…we love the waterfowl!

- Please preserve the existing park.
- I feel very strongly that the beauty of Lake Springfield lies in its peaceful setting within nature. It would be a travesty to upset such a unique and beautiful place in our city with a commercial development! Don't do it!
- If the dam is altered or removed there will be no lake, therefore no Lake Springfield.
- Why do we still have the dam? Why not restore the river?
- Springfield does not have very many preserved natural settings. Springfield Lake is perfect for this.

Economic Development

- Need to collect taxes for use.
- I think Zone 1 is great for some sort of outdoor sports activity complex. We need to get access to these areas and create a connected trail system.
- Money making ventures Prioritize natural space and minimize large footprint development (such as sports fields).
- Prioritize reuse of the power plant for restaurant, brewery, art, office space etc.... The old power plant has the potential to be the economic driver and the hub of activity given the location next to the future Chadwick flier trail. Prioritize the rail to trail completion into Galloway. Developing the ability to walk or ride a bike around the lake would be awesome - would require a bridge by the boathouse and improvements to the dam to make passage safer. The new trails at Fellows lake are a great addition - more of that as the land permits would be great here. A 4-6 mile multiuse course would get a lot of use especially if it could interconnect with the nature center. Zone 3 to me seems be a logical location for a big community attractor to the park (THE WOW, think large indoor facility, or unique outdoor space like gathering in Tulsa), then the other zones can be more passive and build off of the larger attractor in Zone 3.
- Bolted routes for rock climbing on bluff in zone 5.
- Mixed use like Galloway seems to be popular. Needs to accentuate the natural views of the lake with coffee shops and eateries, but a modern playground is desperately needed.

Trail Systems

- More for outdoor recreation like trails to better our local growth. Zone 1: Hiking trails, wildlife viewing, plant natives!!; Zone 2: Reestablish the riparian corridor along the river, remove the low water bridge, keep people away from the coal ash landfill and/or have the landfill be an educational opportunity for future generations (what not to do next to a riverway/floodplain); Zone 3: Remove the dam for aquatic wildlife passage; Zone 4: Reinstall a boat ramp, connect the trail system to the Nature Center; Zone 5: Additional bike/foot trails, river access up stream of US65.

- Springfield lake would be a fantastic site for Mountain bike trails and a progressive/learning bike park (Such as the initial design for Lone Pine). Springfield Metro needs a trail system - look at how much they have benefited Bentonville/NWA.
- Would love to see a bridge from trails in the Boathouse area to a Nature Center trail connection.
- Zone 5 is almost entirely in the floodplain and should remain undeveloped land focused on environmental preservation, trails, and water activities. The park is currently the only place to go on the south side where there are non-paved nature trails besides the Nature Center, which doesn't allow dogs. The experience of these trails as a place to connect with the quiet of nature has already been significantly changed with the addition of frisbee golf. More non-paved nature trails are needed.
- Multi-use pathways that connect to existing trials for walking/biking. Mixed use districts (live, work, play). Water recreation. Walkable community.

Noise and Traffic Impacts

- We recently bought a home in Wildwood Estates. We are now extremely concerned about the traffic impact of each of these plans. We purchased our home because we love the quiet neighborhood and how close it is to Springfield Lake.
- As a resident of the Lake Ridge neighborhood, I have a lot of concerns about increased traffic to the area. Currently, hundreds of cars cut through our subdivision from National to Kissick and they come through the neighborhood at a high rate of speed and without caution.
- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town!
- This is our home! Don’t bring a bunch of loud, party venue crap to our area. We moved here for quiet and nature, don’t mess up our part of town!
- Since it is a natural area, I would be concerned with noise, lights I.e. sports.

Non-Water Activities

- Please not more active recreation. We don't need more courts and fields in this unique feature. Springfield lacks unique geography to be developed but being that we are on a plateau there is plenty of space for fields - build them elsewhere.
- Would love to see access to outdoor rock climbing on bluff beside existing dam.

Water Activities

- Please keep large boats and motors from Lake areas. Prefer quiet sports i.e. kayaking, electric motors, etc.
- River access for fishing as far downstream as possible.

Other Comments:

- No comments, seems logical.
- I mean, is Zone 2 already a landfill? If not, please don't put one there. If it is, then disregard and this looks like a good plan.
- I don't understand what these labels mean.
- N/A
- No RV park please.
- A place where water is stored, filtered and distributed throughout the park.
- Acceptable. I don't like how close Zones 1 and 2 are.

Q4. Station 5, Board 3: Zone 1 - South Activity » Please choose 3 preferred themes in which you are most interested for Zone 1, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
16 - Amenities – Trails	130 - Education Trails & Boardwalks
14 - Education Trails and Boardwalks	119 - Amenities – Trails
14 - River Access	107 - River Access
13 - Adventure Recreation – Bike Park	70 - Eco Playground
4 - Athletic Fields & 4 - Hospitality Event Space	52 - Adventure Recreation – Bike Park

Zone 1 Tent Board Data

1. **Amenities – Trails (16)**
2. **Education Trails and Boardwalks (14)**
3. **River Access (14)**
4. **Adventure Recreation – Bike Park (13)**
5. **RV Park (5)**

- Athletic Fields (4)
- Hospitality Event Space (4)

- Eco Playground (3)
- Eco Cabin (1)

Q4b. If you have any comments about the Zone 1 - South Activity options, please share them below.

Economic Development

- Also like the bike park and trail idea. Event space is neat too if it could be used for food trucks/brewery and live music?!
- Need more entertainment item for tax revenue
- Entertainment

Noise and Traffic

- Concerned about traffic through the residential areas.
- This is our home! Don't bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don't mess up our part of town!

Water Activities

- River access for kayaks is welcome. I don't want to see people swimming and drinking and leaving trash.
- Clean up and celebrate the area along the river with a outfitter for floating to the south with a old time swimming hole.

Non-Water Activities

I would love in some area to have a park/playground similar to The Gathering Place in Tulsa. It is a tourism driver and wonderful for local families.

Q5. Station 5, Board 3: Zone 2 - Capped Landfill » Please choose 3 preferred themes in which you are most interested for Zone 2, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
19 - Nature Landscape with Trails 16 - River Overlook 6 - Astronomy Viewing Area 6 - Practice Fields 5 - River Edge Tree Houses; 5 - Fitness Trails & 5 - Public Art	114 - Native Landscape with Trails 108 - River Overlook 63 - Fitness Trails 62 - Astronomy 61 - Small Pavilions/Picnic Areas

Zone 2 - Tent Board Data

1. **Nature Landscape with Trails (19)**
2. **River Overlook (16)**
3. **Astronomy Viewing Area (6)**
4. **Practice Fields (6)**
5. **River Edge Tree Houses (5)**

- Fitness Trail (5)
- Public Art (5)
- Small Pavilions / Picnic Areas (2)
- (Write-in) Dark Sky Area and Lighting (1)
- Open Lawn (1)

Q5b. If you have any comments about the Zone 2 options, please share them below.

Non-Water Activities

- I fear there is too much light pollution for astronomy.
- I do not want to see sports facilities. We have enough of those around town.
- Cycling confidence course in grand prix style.
- Good area also for Dark Sky certified lighting Good location for Solar Farm

Economic Development

- Need more tax revenue.
- Need more entertainment item for tax revenue.
- Entertainment.

Noise and Traffic

- Concerned about increased traffic throughout the residential neighborhoods.
- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town!
- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town! (not a duplicate).

Water Activities

- The low-water bridge across the James River is a hazard to paddlers and should be rebuilt. If it were removed, then there would be more potential opportunities for paddling from Tailwaters Access to Rivercut Golf Course on the James.
- Clean up and celebrate the area along the river with a outfitter for floating to the south with a old time swimming hole

Natural Preservation

Consider any opportunity to support native plants and animal life.

Q6. Station 5, Board 4: Zone 3: Power Station - Please choose 3 preferred themes in which you are most interested for Zone 3-Power Station, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
9 - Iconic Walk / Bridge Overlook 8 - Education and Demonstration Areas 8 - Sky Tram 7 - Amphitheater 7 - Waterfront Amphitheater	88 - Iconic Walk/Bridge Overlook 87 - Education & Demonstration Areas 72 - Waterfront Amphitheater 71 - Amphitheater 63 - District (lodging, dining, retail event, transit, etc.)

Zone 3 - Tent Board Data

1. **Iconic Walk / Bridge Overlook (9)**
2. **Sky Tram (8)**
3. **Education and Demonstration Areas (8)**
4. **Amphitheater (7)**
5. **Waterfront Amphitheater (7)**

- Outdoor Activities Center (5)
- Indoor Fields / Courts (4)
- District (4)
- (Write-in) Rock Climbing – Bluff line below dam (3)
- Skate Park / Adventure Activities (2)

Q6b. If you have any comments about the Zone 3 - Power Station options, please share them below.

Noise and Traffic Impacts

- Not crazy about the choices. I don't understand the need for MORE sports facilities in this town. Part of this area is in the county which is why I moved here. I'm kit(not) interested in anything that is going to produce a lot of noise from sports.
- We recently bought a home in Wildwood Estates. We are now extremely concerned about the traffic and noise impact of each of these plans. We purchased our home because we love the quiet neighborhood and how close it is to Springfield Lake for kayaking/canoeing.
- I'm neutral on this. Would want the options to fit within the environment. Doing a big stage/event/commercial use could lead to serious traffic challenges/ road widening/etc. adventure activities could be a zip line or treetop adventure?!
- This is our home! Don't bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don't mess up our part of town!
- None of these options are good! DO NOT put in something that will be loud! No one who frequents Lake Springfield wants that!
- This is our home! Don't bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don't mess up our part of town! (Not a duplicate)

Non-Water Activities

- No skatepark but indoor adventure facility with rock climbing and ropes courses.
- Birdwatching area.
- I would like to see the power station reused similar to the City Museum in St. Louis. I also think a high ropes course would be fun here.
- Go and tour the Dewey Short Visitors Center that has been called the "crown jewel" of Table Rock Lake. That on steroids is what is possible with the conversion to the power plant...
- Turn it back into a power supply source, not a mercenary developer's dream.
- If it could become an interpretive center with the history of the power station and lake preserved. That would be great.

Natural Preservation

- Leave the area to go back to its natural state.
- Natural History of the Ozarks Plateau. Chase Studio designed.
- Let connecting with Nature be the utmost priority in the largest scale possible: our natural world is the attraction, the specific reason people come to enjoy and experience; everything man-made needs to allow an expanse of it and focus on carrying for it.

Economic Development

- For me this is the go big area, that should anchor the rest of the park.
- Indoor market.

Other:

- Mostly horrible Ideas here.
- N/A
- Focus high intensity uses here.

Q7. Station 5, Board 4: Zone 3: Dam Modifications - Please choose 3 preferred themes in which you are most interested for Zone 3-Dam Modifications, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
8 - Recreation and Wildlife Ladder – Shallow 8 - Section Removal with Open Flow 8 - Open Channel Bypass 7 - Recreation and Wildlife Ladder – Edge 4 - Section Removal with Overlook & 4 - Natural Vertical Bypass	84 - Nature Vertical Bypass 77 - Open Channel Bypass 75 - Removal with Exposed Structure & Remnants 67 - Section Removal with Overlook 60 - Recreation and Wildlife Ladder – Edge

Top 5 Tent Board Data

1. **Recreation and Wildlife Ladder – Shallow (8)**
2. **Section Removal with Open Flow (8)**
3. **Open Channel Bypass (8)**
4. **Recreation and Wildlife Ladder – Edge (7)**
5. **Section Removal with Overlook (4)**

- Natural Vertical Bypass (4)
- Removal with Exposed Structure and Remnants (3)
- Recreation and Wildlife Ladder – Strap (1)
- Walled Channel Bypass (1)

Q7b. If you have any comments about the Zone 3 - Dam Modification options, please share them below.

No Modifications

- Alternative D: No modification. Avoid modification to dam, focus on lake body enhancements.
- These options are TERRIBLE! Keep the bridge and repair or replace it, if needed. There is no reason to disrupt the migration of our local wildlife. Is there a “leave it untouched as is” choice?
- Leave the current dam.
- I would have left comment ONLY but had to choose 3 items above. I'm not convinced modifications to the dam is necessary. I support several of the concepts presented to improve access/utility of the Lake. In addition to the concepts presented, more focus is needed on Lake Preservation & water quality improvements. The contractor evaluating dam modifications has not discussed the impact on the James River & footprint should such modifications be undertaken. Lastly, any dam modifications which IMPACT CURRENT resident water view/access will need to be compensated for any losses.
- Do NOT destroy this beautiful lake! Please! Why destroy the dam?!
- Don't remove the dam and close the road unless you're going to build a new bridge.
- Removal of the dam eliminates the lake in Lake Springfield. I feel strongly that the lake should stay with allowances made for alternate access around. If the dam is removed, residents on the water will lose exceptional property value and should be compensated accordingly.

Full Dam Removal

- If we totally get rid of the dam, then we will need to do something about Kissick street, because it goes over the dam.
- While I would prefer to see the dam be removed entirely, and the James River restored, some sort of ladder/bypass is a more realistic proposal, which will allow for more paddling opportunities on the James.
- If you take out the dam won’t you need a bridge? Would rather keep a viable lake.
- Just removal.

Natural Water Flow

- I would like to see the river restored to its natural beauty without breaking the bank. I would like to see it safe for families kayaking and canoeing.
- Prioritize safe pedestrian crossing of the lake/river to facilitate access to the old power station from the north. Returning the river to a natural state should be an option.
- Anything that can be done to restore natural flow to the river by way of dam removal followed with some riparian restoration would seem ideal while keeping in mind the importance of human access for recreation purposes.
- Should not have walled sections. Should be open and as natural as possible. An additional white water course should be considered with movable structures to simulate natural white water for training of Water Rescue personnel and to hold competitive events.

Roadways

- What will happen to Kissick Ave?
- The current road over the dam would remain correct?
- Kissick is narrow. Better access desired through National Ave and other streets.

Noise and Traffics Impacts

- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town!
- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town! (not duplication)

Partial Dam Removal

I like the idea of partial removal. For me I know my family loves to load up our kayaks and head over to Lake Springfield because its convenient, so the thought of not being able to do that in a lake is concerning. However, I would love a better water connection to the river.

Other:

- Looks good.
- I'm not really sure what these mean.
- Done correctly could make the area a destination spot.
- I have seen man-made rapids in other cities as a tourist destination. They have been a lot of fun.

Q8. Station 5, Board 5: Zone 4 - Lake & Park » Please choose 3 preferred themes in which you are most interested for Zone 4, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
18 - Wetland Boardwalks 10 - Outdoor Education 7 - Destination Playground 6 - Group Camping 6 - Boat Rentals	128 - Wetland Boardwalks 85 - Overlooks/Education 79 - Boat Rentals 74 - Fishing 47 - Destination Playground

Q8b. If you have any comments about the Zone 4 - Lake & Park options, please share them below.

Natural Preservation

- Restore river. Allow kayak access. Do NOT bring in a kayak outfitter/rental- it will just lead to drunks on the river.
- ELIMINATE frisbee golf! It has completely destroyed the natural serenity of this area. Deer are gone, replaced by loud frisbee kids and their clanging when they hit the holes. Please make them go away! The lake, waterfowl and wildlife make this the most critical area to save the natural state of LS.
- Please no dredging/large power boat usage. Natural habitat for flora and fauna.
- We love the park as it is with the trails, boat rentals, and easy access to the lake and trails.
- Restoring river flow would seem most important environmentally. Man made lakes are inviting to invasive species which is becoming a bigger problem year after year all over the world.
- Leave the area alone to go back to its natural state.
- Disc golf has already changed the feel of the park as a nature-based place and should not be expanded if the intent is to have the park theme be connection with natural amenities. Disc golf is something that could go anywhere in the City.
- River channel should be restored and if need be dredged.
- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town!
- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town! (not duplicated).

Lake and Park Enhancements

- Finally, some peaceful and family-friendly choices! That’s what locals love about Lake Springfield park! Give us a few more options, without disturbing the beauty and peacefulness of the park.
- My wife liked the idea of canoe access from the lake down to the river.
- Total beatification of the Lake with trails along the edge (Some are already there) with clean up to the water line along the Chadwick Flyer, Greenway and Trail of Honor.
- Would be nice if there was a "Gathering Place" much like Tulsa's.
- Dredge and keep lake.
- Activate Lake Edge with Access
- Disc golf already exists. Fishing and water sports are already a hit! Group activities and education are additional great things to consider adding!
- To me this is a great location for some outdoor active space that supplements what takes place in the power plant zone. My dream would be to have something similar to the Gathering in Tulsa or Shelby Farms Woodland Discovery park in Memphis.

Q9. Station 5, Board 5: Zone 5 - North Activity » Please choose 3 preferred themes in which you are most interested for Zone 5, and rank them in order of interest.

Tent Board - Top 5 of 3 Preferred Themes	Online Survey - Top 5 of 3 Preferred Themes
18 - River Access	124 - River Access
16 - Pedestrian Bridge Crossing	113 - Pedestrian Bridge Crossing
7 - Trailhead Parking	72 - Trailhead Parking
6 - Themed Bridge w/Views	56 - Trailhead Play Amenities
5 - Gathering Space/Pavilions	54 - Gathering Space/Pavilions

Q9b. If you have any comments about the Zone 5 - North Activity options, please share them below.

Water Options

- Add a kayak docking station. They help keep people out of muddy areas in order to launch their kayaks. In addition they are easier to get in and out of and help prevent damage to kayaks.
- River access for non-motorized boats.
- Access, Access, Access.... As a cyclist I think this area should remain passive, but work to connect to the greater trail network as a whole and the park itself. As a kayaker, access to the water is important as well.
- Keep Southwood River access and re-engineer to deal with future heavy rain incidents.

Non-Water Options

- For outdoor events, pavilions and wide dally grass-covered expanses are necessary Not a huge fan of the bridge over the lake idea. If it’s a bridge over Kissick then count me in.
- Take the Jefferson Avenue Footbridge to the Lake with restoration and ADA compliance from the Trail of Honor to the Boathouse NO MORE PARKING LOTS
- Bolted rock-climbing routes along bluff in Zone 5.
- Say NO to big parking lots! This area is close enough for people to bike, bus, or walk. Go greenways!

Natural Preservation

- I'm not convinced modifications to the dam is necessary. I support several of the concepts presented to improve access/utility of the Lake. In addition to the concepts presented, more focus is needed on Lake Preservation & water quality improvements. The contractor evaluating dam modifications has not discussed the impact on the James River & footprint should such modifications be undertaken. Lastly, any dam modifications which IMPACT CURRENT resident water view/access will need to be compensated for any losses.
- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town!
- This is our home! Don’t bring a bunch of loud, party venues to our area. We moved here for nature and quiet, don’t mess up our part of town! (not duplication)

Economic Development

NA... need tax revenue.

Noise and Traffic Impacts
Still concerned about increased traffic though residential areas.

Trails
Ensure trails are multi-use. Walk, Bike etc... Natural surface (unpaved) trails would be good to have as well.

Q14. Station 7, Board 4: Please choose 3 transportation & mobility priorities in which you are most interested for Lake Springfield, and rank them in order of interest. If 'OTHER' is in your top 3, please elaborate (Worded as Walking & Mobility on Tent Board).

Online Survey – Top 5 Priorities
141 - Trails 109 - River/lake Crossings 69 - Boat Ramp Access 54 - Sidewalks & ADA 54 - Parking

Lake Springfield Plan Public Involvement - Summary of Events

August 11, 2023

Overview

Several events have taken place since last year – 10 major events in 8 months! The events are listed in order of the most recent large-scale events. A general slide presentation was completed to use at all events for consistency in information. Meetings also took place with the following entities to discuss possible project impacts: Dept. of Conservation, Morris Family, Bass Pro Shops, Ozarks Greenways, empower: abilities, S. W. Missouri Indian Center, American Indian Center, Springfield Convention and Visitors Bureau, Steampuck, ACEC Midwest, and others. This list does not include individual meetings, text messages, emails and telephone conversations with the public and members of the project team.

Summary of Events

May 10, 2023 - Missouri State University, Practicum Planning Students conducted a Lake Springfield research project this semester.

- 6 Students Presented
- 50 to 60 College Students Participated in Project
- 35 College Students Completed Assessment

May 4, 2023 - Project consultants participated in a tour of the Nature Center Trail to gain a better understanding of how the trails are utilized.

May 4, 2023 - Public Involvement Meeting No. 2 and Open House with tours of the Power Plant.

- 294 – Attendees at the Public Meeting
- 89 – Tour Participants
- 779 – Reviewed Online Survey
- 301 – Started Online Survey
- 161 – Completed Survey

April 20, 2023 - Technical Advisory Team Meeting No. 2 – virtual meeting. Information was shared about the public engagement process, all aspects of the project, and comments from the S. W. Missouri Indian Center and the American Indian Center.

43 Attendees

March 23, 2023 - Meeting at the Boat House with Lake Ridge Estate Community members to discuss their traffic concerns.

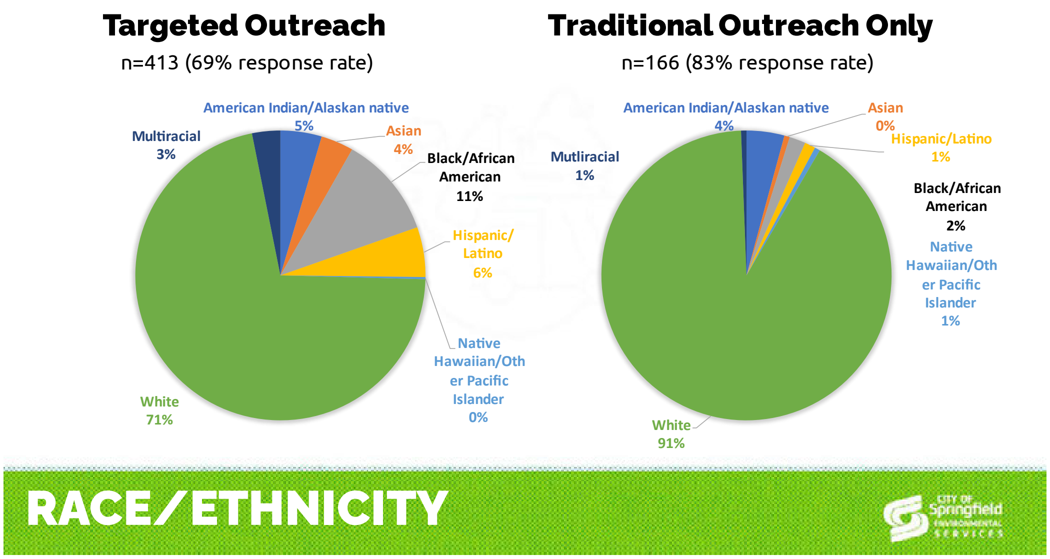
- 20 – Attendees in person
- 15 – Virtual attendees
- 10 – Project Team members including Public Works staff

March 21, 2023 - Community Advisory Team Meeting No. 2 at the Boat House.

47 Attendees

January 2023 - City of Springfield's Department of Environmental Services survey for a project to improve and protect the area air, water and land resources. The survey included three questions about how local water resources are used in Springfield or reasons why the resources may not be used.

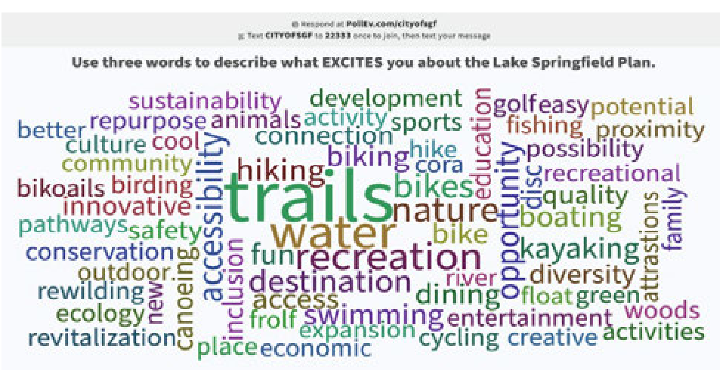
- 200 survey responses through traditional outreach
- 602 survey responses through focused outreach



November 17, 2022 - Public Involvement Kick Off Meeting No. 1 at the Springfield Art Museum with an online survey. The survey was accessible with a QR Code and for community members who could not attend in person, they could participate online for two weeks after the event.

- 264 Total responses with 727 total views
- 148 Survey completions (116 incomplete surveys)

Below, please find a couple of responses from the online survey:



November 15, 2022 - Community Advisory Team Meeting No. 1. The attendees reviewed similar materials and comment cards from the October 12 event. The CAT represented various Springfield (and surrounding areas) intersectional groups and populations. The CAT provided input on materials and concepts for Public Involvement Meeting No. 1 on November 17.

32 Attendees

October 12, 2022 - Community engagement forum exclusive for residents in the Lake Springfield area to hear their concerns and share information with them about the project. Meeting attendees were able to complete a comment card or respond to an online survey.

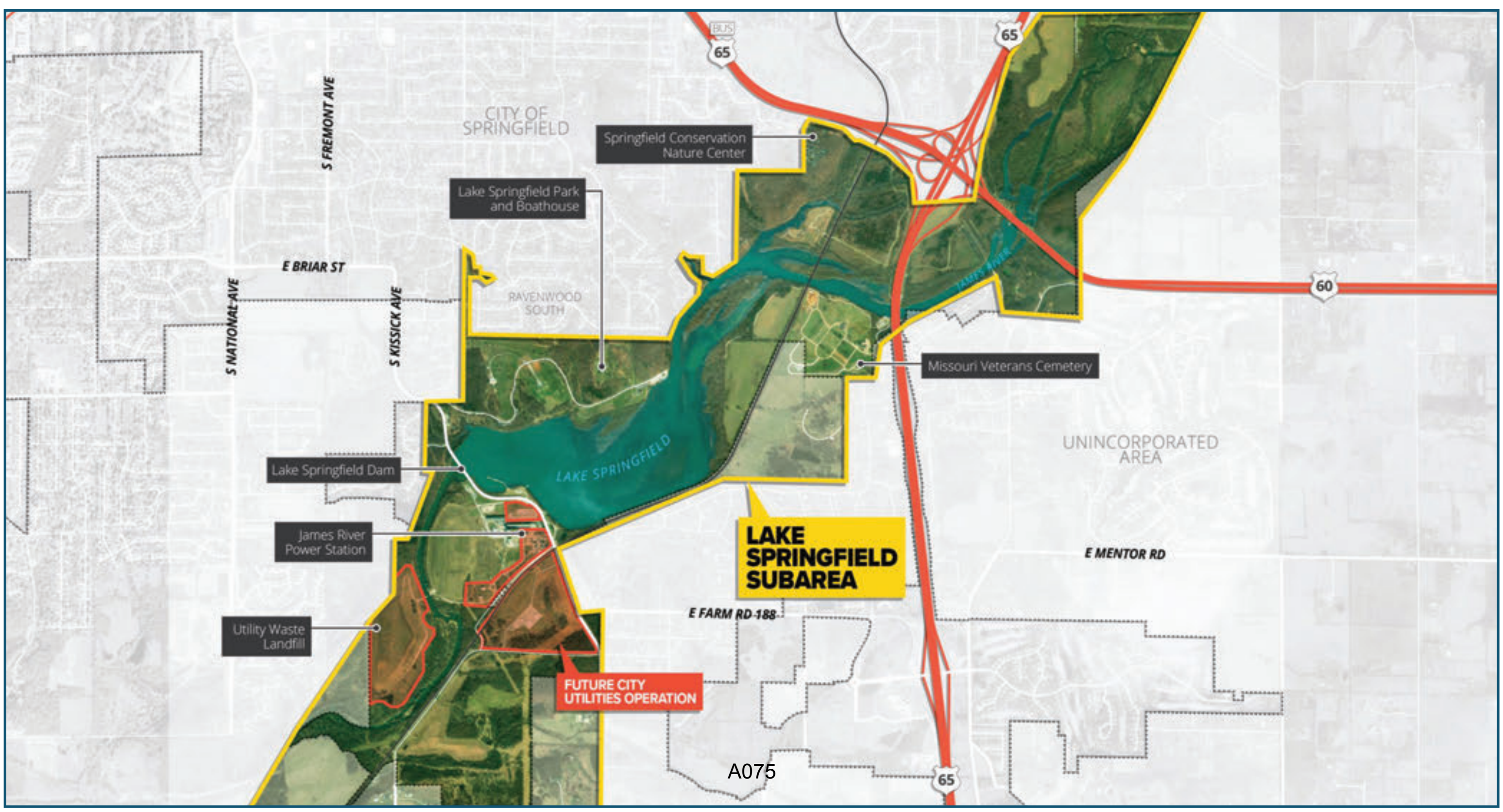
100+ Attendees

PROJECT SUMMERY FALL 2023

By Fall of 2023, more than 1,000 people have participated in visioning sessions about the future of Lake Springfield. This input is vital to the creation of the proposed plan, created by a partnership between the City of Springfield, City Utilities and a consulting team led by Crawford, Murphy & Tilly. The plan is funded by a substantial grant from the federal government's Economic Development Administration.

Nestled on Springfield's southeast side, Lake Springfield a key natural asset to the community and surrounding region. While it currently offers a variety of recreational amenities, there is significant opportunity to enhance the area into a recreational focal point of the region. The decommissioning of the James River Power Station presents a unique opportunity for adaptive reuse of the facility, repurposing part of the larger site for active recreation and making a lasting impact on the James River Basin.

The proposed Plan includes adaptive reuse planning for the decommissioned Power Station and a Plan for the Lake Springfield area encompassing approximately 1,000 acres of publicly owned land.



A075

The as-of yet unfunded plan, projected to be complete by summer 2024, will be a catalyst for new economic development and recreational opportunities. Components will include:

- recreational expansion opportunities
- adaptive reuse planning for the decommissioned power station
- hydrological studies
- water quality and ecological preservation planning
- economic development and workforce development opportunities
- transportation, access and wayfinding
- land use recommendations.

BACKGROUND

Through an $800,000 grant from the U.S. Department of Commerce's Economic Development Administration (EDA), and $200,000 from the Hatch Foundation, City Utilities of Springfield and the City of Springfield's Environmental Services Department is funding the development of a master plan for the area, including and surrounding the former coal-powered plant (James River Power Station). Redevelopment will complement Lake Springfield Park and Boathouse, which are jointly operated by CU and the Springfield-Greene County Park Board.

NEW RENDERING

Presentations

LAKE SPRINGFIELD
SUBAREA OVERVIEW

HISTORY

Lake Springfield was originally designed in 1957 by City Utilities to support the James River Power Plant. The lake was created by damming the James River to serve the Power Plant cooling needs. In the early 1990s, the Missouri Department of Conservation partnered with City Utilities to construct a boat ramp, fishing dock, and several fishing platforms at Clay Henshaw Memorial and Southwood Accesses. Lake Springfield Park and Boathouse are part of the Springfield-Greene County Park System due to a long-term lease with City Utilities. Access to water-based activities predominantly takes place from Lake Springfield Park. Today, the lake provides opportunities for boating, fishing, and water sports, in addition to picnicking in Lake Springfield Park, hiking along trails, and enjoying the scenic views.

VISION

The Lake Springfield subarea is a key natural asset to the Springfield community and the surrounding region. While it currently offers a variety of recreational amenities, such as trails, fishing docks, and boat access, there is significant opportunity to enhance the area into a recreational focal point of the region. This includes expanding water sports opportunities through improved water access and drop-off points, connecting the trail system to the regional network, and exploring new creative and cutting-edge recreational activities. The decommissioning of the James River Power Station also presents a unique opportunity for adaptive reuse of the facility and repurposing part of the larger site for active recreation.

ENHANCED PUBLIC SPACE

Over the last 60-years, Lake Springfield has evolved into a local landmark and convenient place to escape the busy city. The popularity of the Nature Center, Galloway Village, trails, and other amenities in the area have sparked the imagination of many who see the Lake as an opportunity to be so much more. During the community input phase of *Forward SGF*, the desire to capitalize on the beauty of the Ozarks and focus planning efforts on placemaking have risen as top initiatives to be championed in the Plan. Lake Springfield and the sizable land reserve adjoining it have become a logical place of focus.

Together with improving the Lake and surrounding amenities, there are great opportunities to make a lasting impact on the overall James River basin. Future planning efforts must be done with utmost care in protecting and preserving the waterway, surrounding tributaries, and more extensive watershed. This includes considering the input of impacted property owners and organizations whose missions support the protection of the river, watershed, and restoration of the riparian zone and urban forest.

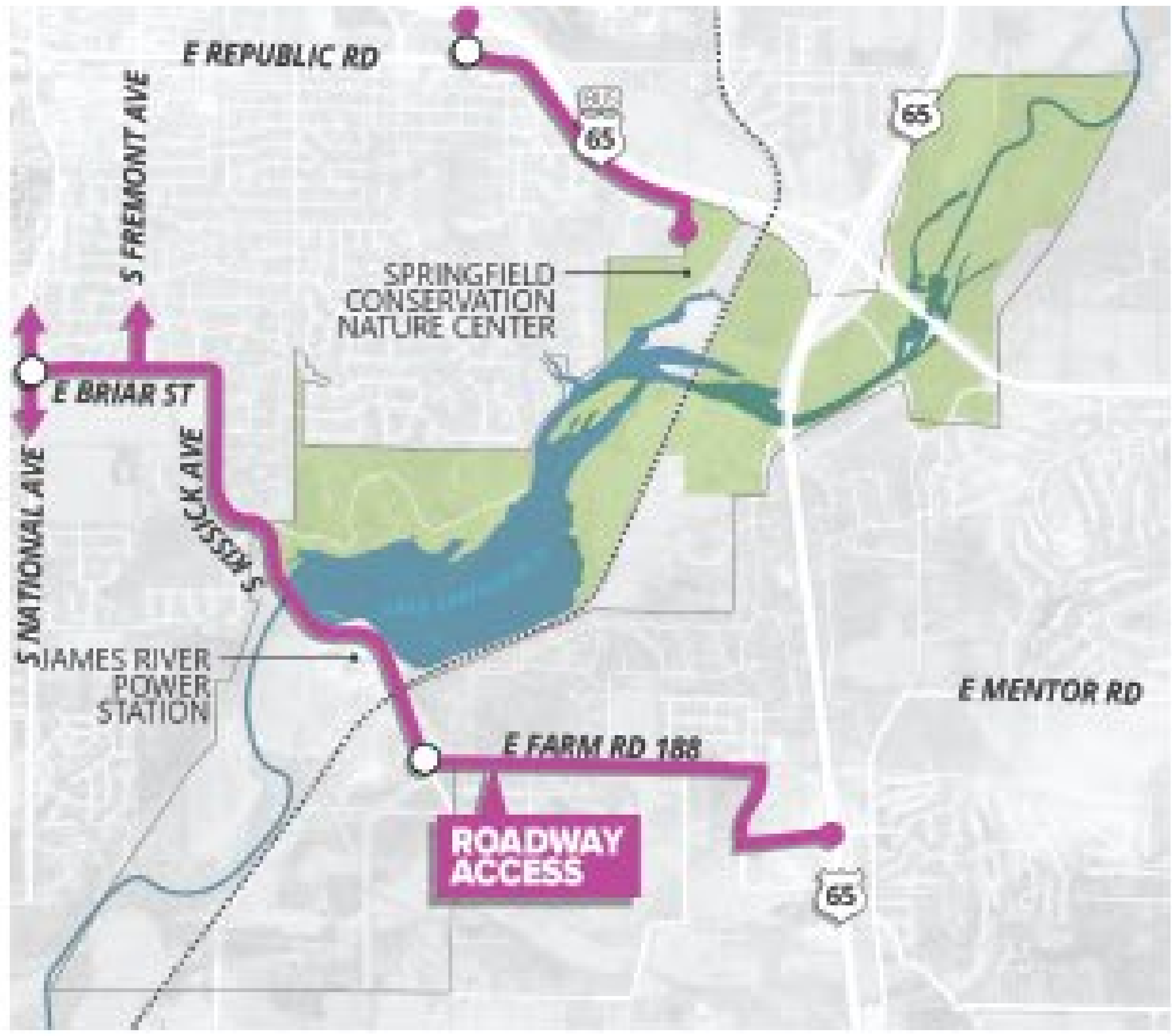
NEED FOR A MASTER PLAN

The Lake Springfield subarea covers an expansive amount of property, from north of U.S. Route 60 downstream to south of the James River Power Station. Considering this, the subarea framework provides a high-level overview of existing conditions and highlights important issues and opportunities for improvement. It sets the foundation for undertaking key improvements as well as developing a more detailed study.

In 2022, the City received an $800,000 grant from the from the U.S. Department of Commerce's Economic Development Administration (EDA) to plan for the redevelopment of the Lake Springfield area. The first to be awarded in the region, the grant will help fund a master plan and development feasibility study to determine appropriate land uses for the area. The master plan should fully assess limitations, environmental constraints, viable improvements, recreational opportunities, and funding sources necessary to implement subarea improvements.

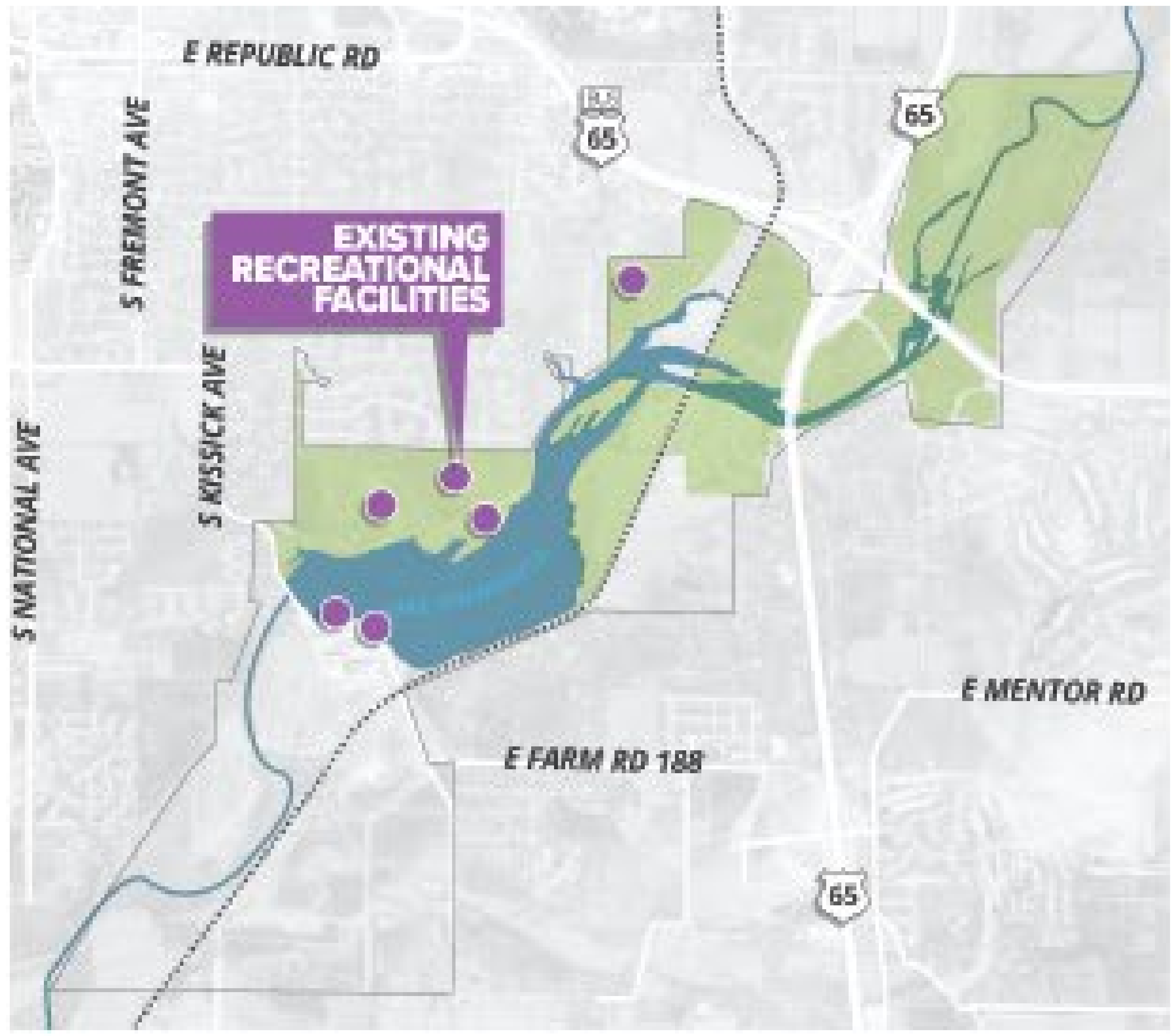
LAKE SPRINGFIELD
EXISTING CONDITIONS

DEVELOPMENT TYPE



ROADWAY ACCESS

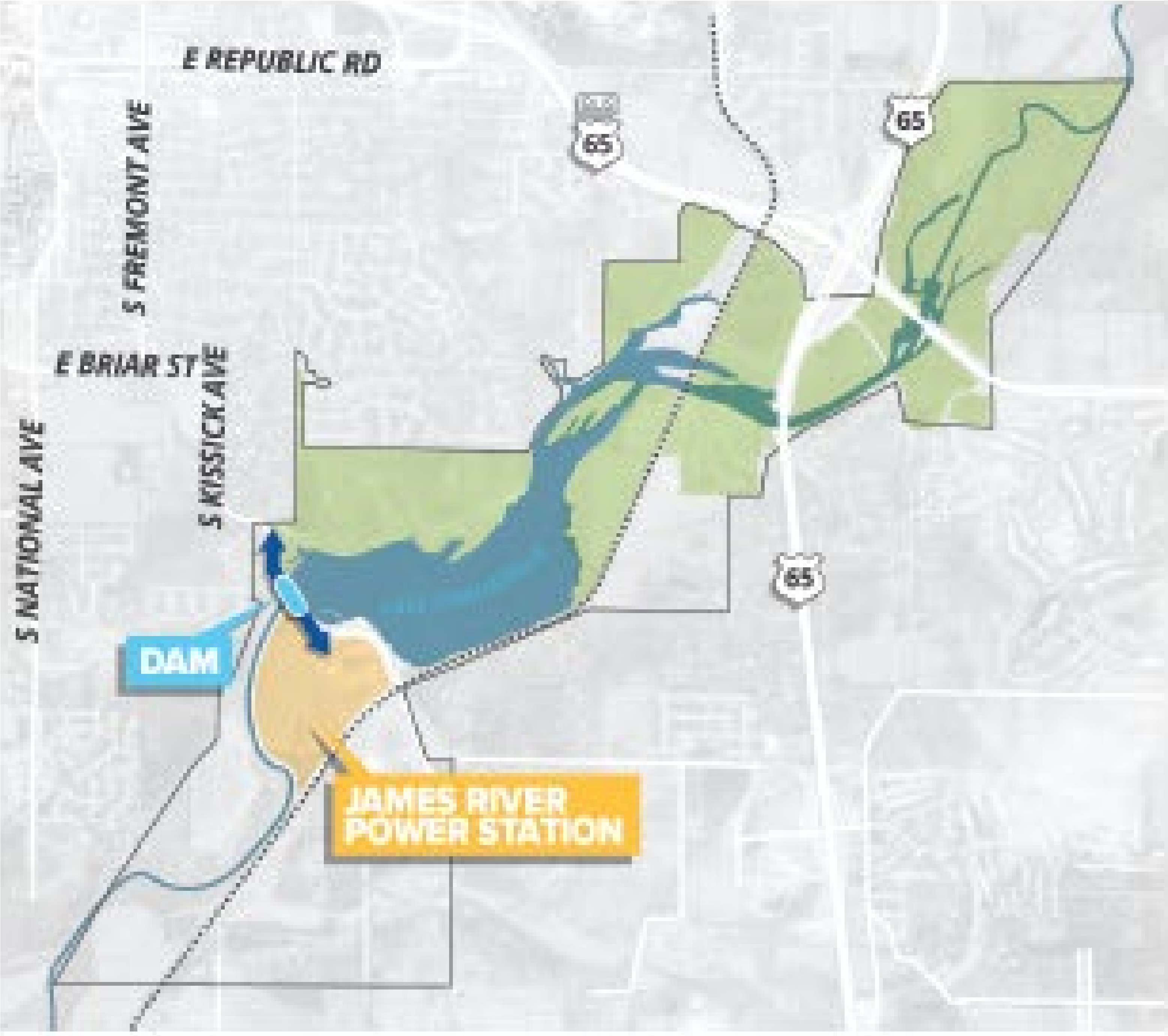
TRAIL SYSTEM



RECREATIONAL FACILITIES

LAKE SPRINGFIELD

SUBAREA FRAMEWORK



DAM

DEVELOPMENT FEASIBILITY STUDY

JAMES RIVER POWER STATION

- Open house @ boathouse and virtual option
- Engagement Opportunities:
  - Focus Groups
  - Tours
  - Online surveys
  - Submit ideas to
  - Reports & Studies

www.LakeSGFMasterPlan.com

GET INVOLVED

A community visioning process for the future of Lake Springfield is planned and will include public engagement events, a presentation tour and a city-wide survey.

The community engagement process will outline what the community sees for this area of Lake Springfield. Residents, neighbors, business owners, developers, schools, parks, non-profit agencies and more will collectively take part in identifying the areas of opportunity and concern in the area. This process will help the team zero in on a list of specific goals for the project to achieve.

WANT MORE INFO OR HAVE AN IDEA/COMMENT? TELL US ABOUT IT!

First Name *

First Name

Last Name *

Last Name

Email *

Email Address

Phone *

Address

Street Address *

Apt., etc.

City *

City

State *

State

UPCOMING MEETINGS & EVENTS

Check back for information about public meetings and events.

SUBSCRIBE FOR UPDATES

If you would like to receive updates about this project, please complete and submit the form on this page.

EDA U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

Hatch

City Utilities Connecting Our Community

CITY OF Springfield

The PARK SPRINGFIELD-GREENE COUNTY PARK BOARD


REIMAGINE
THE INTERSECTION OF NATURE, RECREATION AND ECONOMIC DEVELOPMENT
CMT
Geosyntec consultants
SWT DESIGN
HL HOUSEAL LAVIGNE ASSOCIATES
JOHNSON CONSULTING
Recreation Engineering & Planning
PRATT CONSULTING

Introducing the Lake Springfield Team
Local Leaders with National Expertise

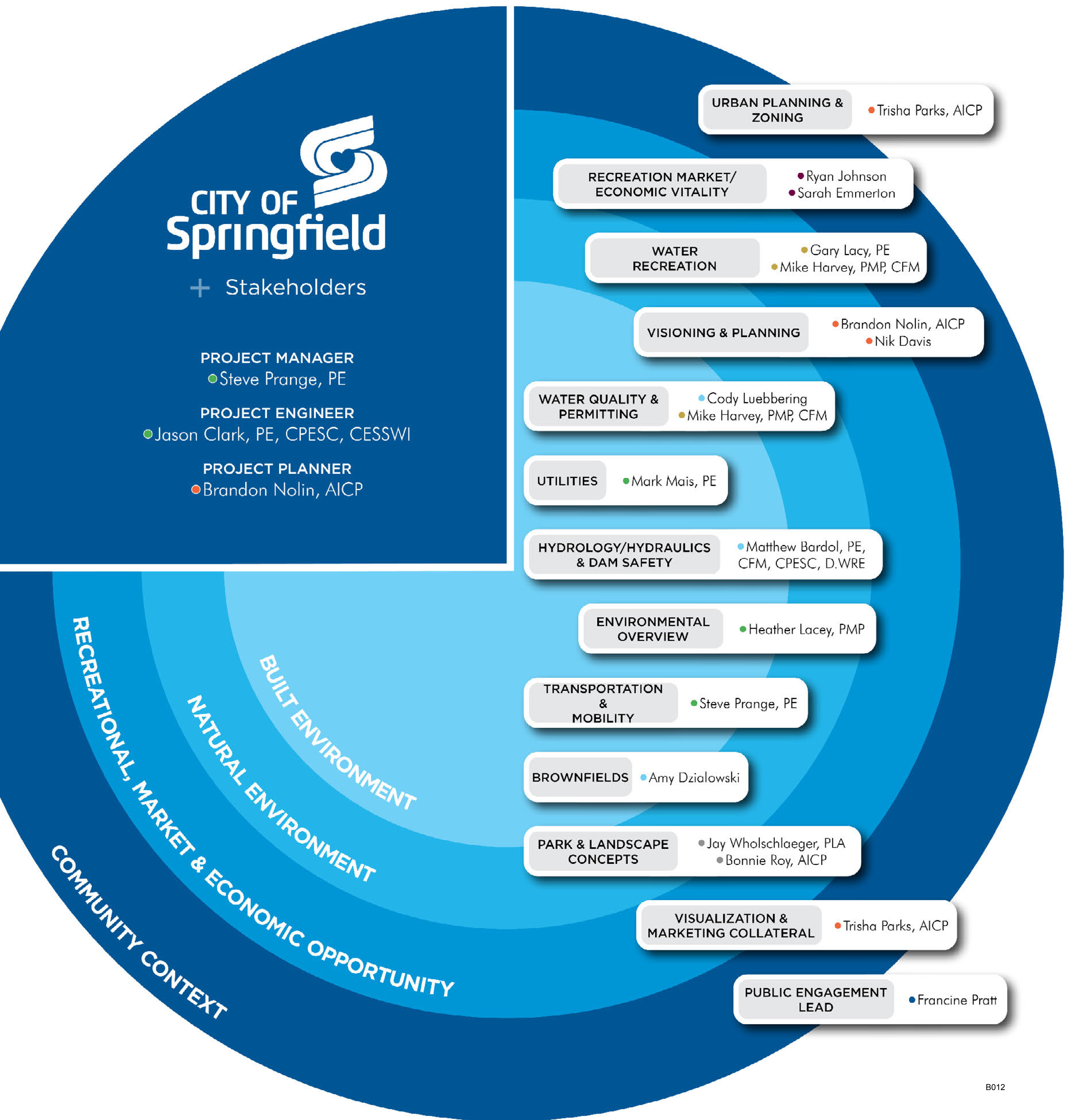
With the same level of service, expertise, and responsiveness you've come to expect from us.

Our **Multi-Disciplined** Approach

Our **Multi-Disciplined** Approach

Our **Multi-Disciplined** Approach

Our **Multi-Disciplined** Approach



CMT

Nationally ranked professional company providing planning, engineering and construction services, as well as strong record of delivery for the City of Springfield.

Geosyntec consultants

Industry leader in dam modification, water quality and brownfields.

HOUSEAL LAVIGNE ASSOCIATES

Comprehensive familiarity with Springfield's vision and planning.

SWT DESIGN

Regional leader in innovative park master planning and landscape design.

Recreation Engineering & Planning

National leader in natural water recreational planning and design.

JOHNSON CONSULTING

Specialists in market-based information to inform decision making.

PRATT CONSULTING

A proven Springfield leader in community engagement.

CREATING A
COMMUNITY-FOCUSED PLAN

VISION STATEMENT

The Lake Springfield subarea is a key **natural asset** to the Springfield community and the surrounding region. While it currently offers a variety of recreational amenities, such as trails, fishing docks, and boat access, there is significant opportunity to enhance the area into the **recreational focal point of the region**. This includes **expanding water sports opportunities** through improved water access and drop-off points, **connecting the trail system** to the regional network, and exploring **new creative and cutting-edge recreational activities**. The decommissioning of the James River Power Station also presents a unique **opportunity for adaptive reuse** of the facility and repurposing part of the larger site for active recreation.


E REPUBLIC RD
BUS 65
65
CITY OF SPRINGFIELD
S FREMONT AVE
Springfield Conservation Nature Center
Lake Springfield Park and Boathouse
E BRIAR ST
S NATIONAL AVE
S KISSICK AVE
RAVENWOOD SOUTH
JAMES RIVER
60
Missouri Veterans Cemetery
UNINCORPORATED AREA
LAKE SPRINGFIELD
Lake Springfield Dam
James River Power Station
LAKE SPRINGFIELD SUBAREA
E MENTOR RD
E FARM RD 188
Utility Waste Landfill
FUTURE CITY UTILITIES OPERATION
65
B015

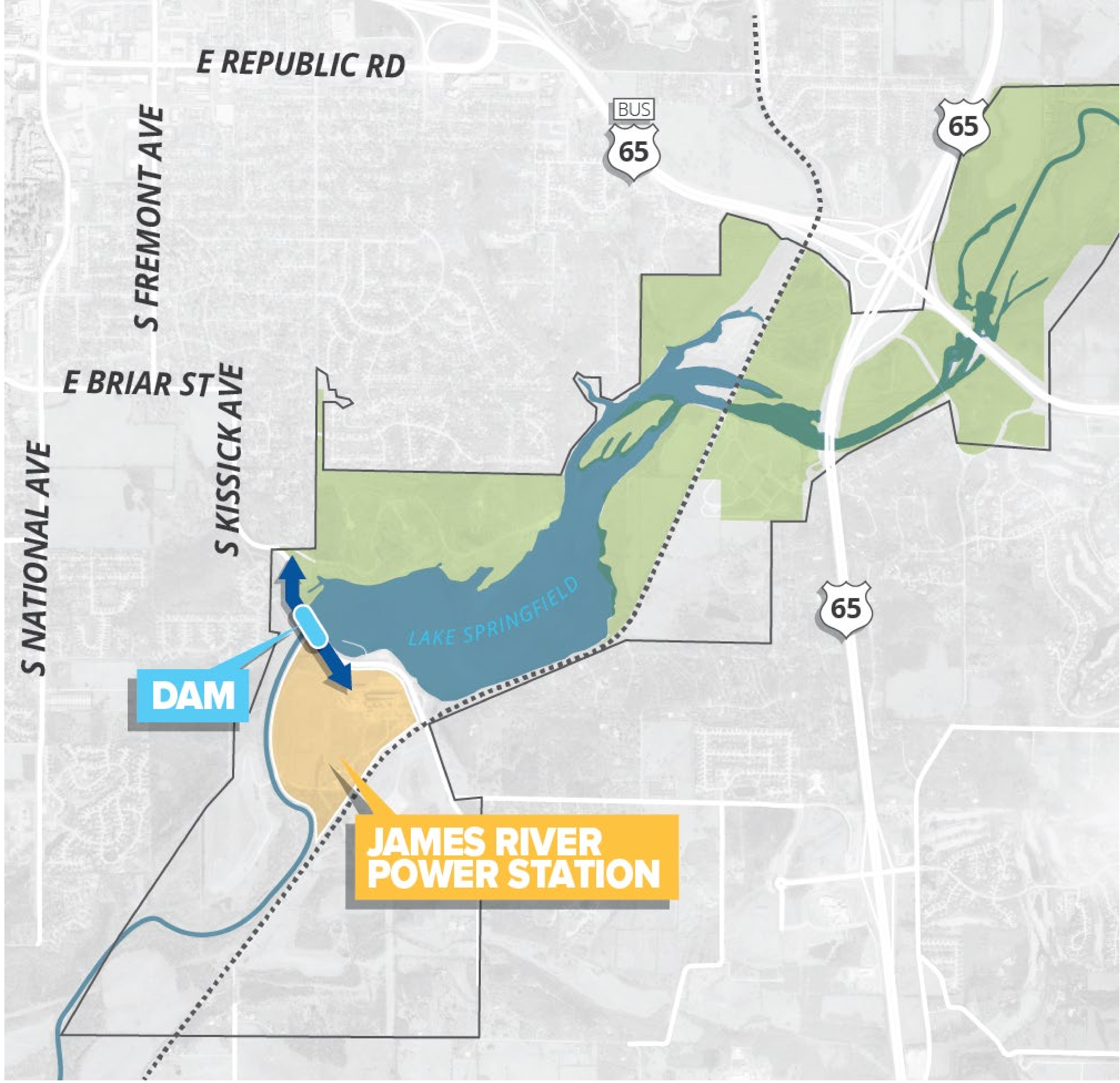
Rail-to-Trail Opportunity

- Extend the James River Water Trail south of dam
- Create solution for watercraft passage as the existing low water bridge connects to the Utility Waste Landfill and acts as a barrier

Dam

The dam is a critical component of the Lake Springfield subarea

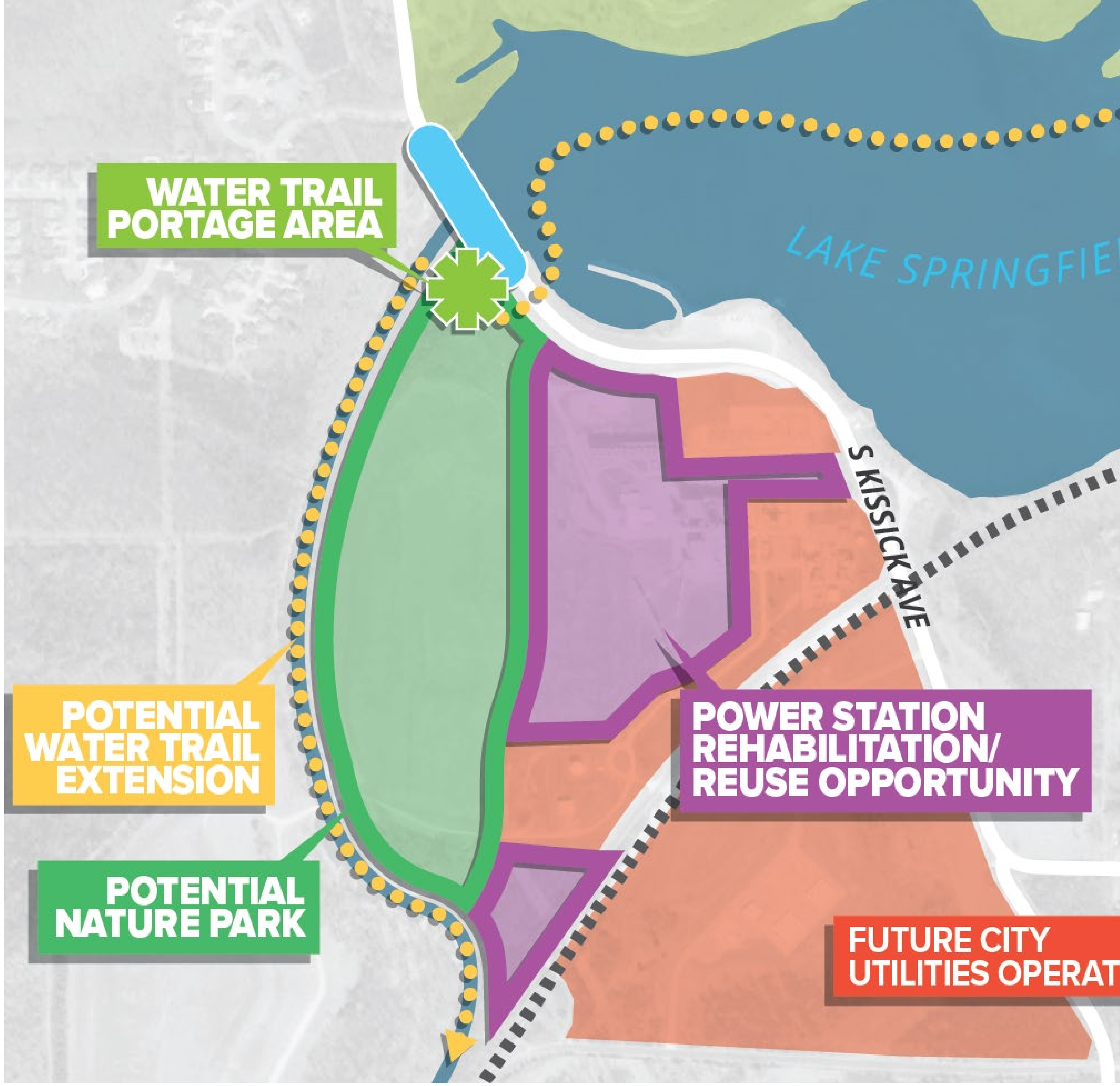
- Need for detailed hydrological study to evaluate dam
- Work with City Utilities to ensure regular maintenance
- Construct trails leading to and from dam and connect to surrounding trails
- Continue water access along the James River with development of a portage area at the James River Power Station



James River Power Station

The decommissioned James River Power Plant occupies a significant amount of space and provides an opportunity through adaptive reuse.

- Explore new recreation center or museum
- Consider office or meeting area uses
- Review options for small dining, concessions, bike rentals, or other amenities
- Assess feasibility of redeveloping the adjacent detention pond
- Assess need for environmental remediation for public recreational use



The Boathouse

- Enhance the Lake Springfield Park boathouse as a “trailhead” for water-based activities
- Explore opportunities for new recreational activities

Swift Water Rescue Training

- Consider creating a swift water rescue training facilities with a possible river renewal plan
- Engineered white water features could provide a training facility for emergency responders
- Would address the need for swift water and flood rescue during area flood events, which continues to be a priority

THE **BUILT AND NATURAL** ENVIRONMENTAL ASSESSMENT

Watershed Characterization
Dam Infrastructure
Waterbody, Water Quality, & Sediment Characterization
Brownfield & Reuse
E REPUBLIC RD
S FREMONT AVE
CITY OF SPRINGFIELD
Springfield Conservation Nature Center
Lake Springfield Park and Boathouse
E BRIAR ST
S NATIONAL AVE
S KISSICK AVE
RAVENWOOD SOUTH
JAMES RIVER
Missouri Veterans Cemetery
LAKE SPRINGFIELD
Lake Springfield Dam
James River Power Station
Utility Waste
LAKE SPRINGFIELD SUBAREA
E MENTOR RD
E FARM RD 188
FUTURE CITY UTILITIES OPERATION
AREA
BUS
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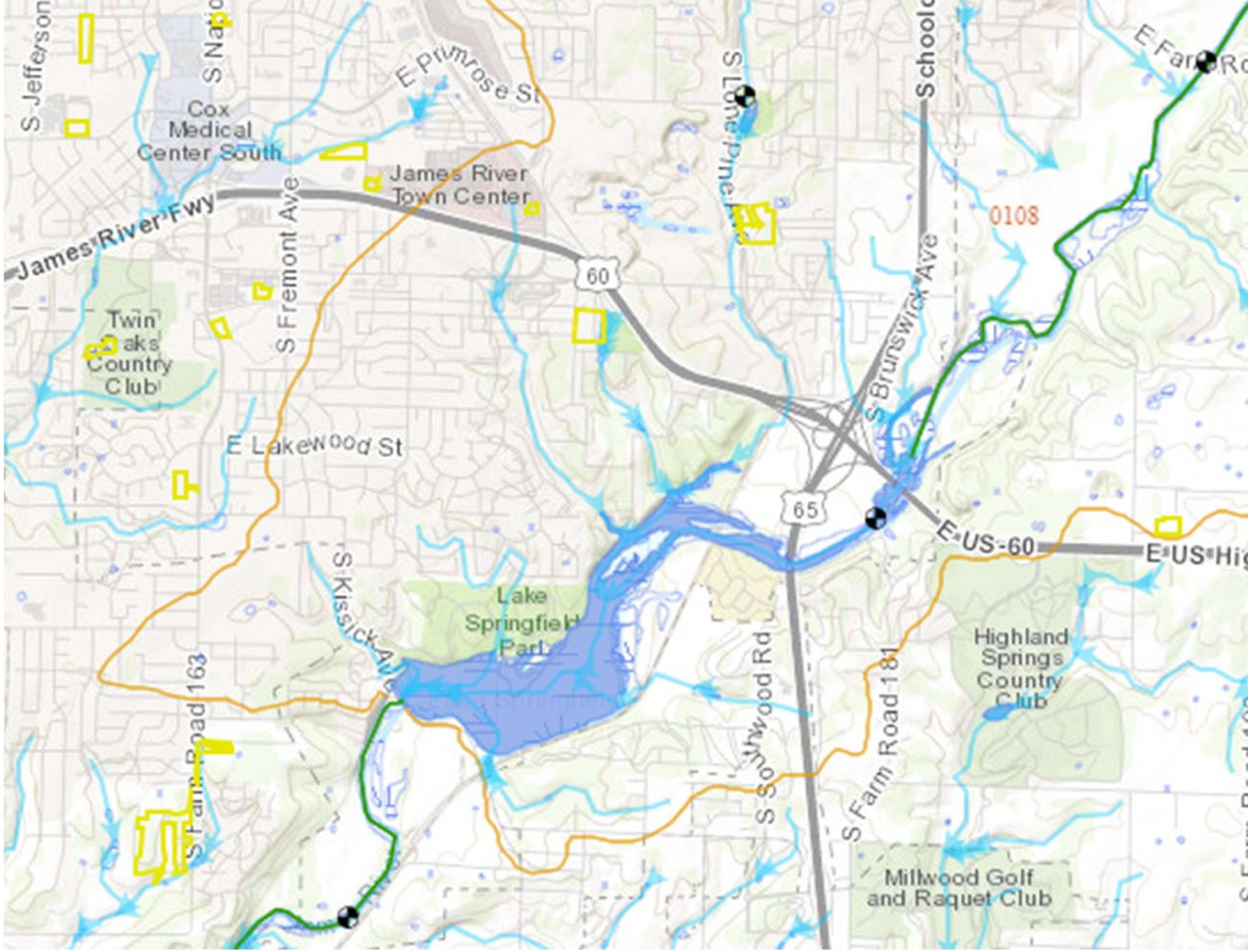
B022

Watershed Characterization

- Watershed Hydrologic & Hydraulic Study
- Climate Assessment
- Purpose & Foundation



Waterbody Characterization

- Water Quality
- Sediment Quality
- Env. Regulatory Compliance
- Watershed Collaboration

Dam Infrastructure

- Risk & Data Assessment
- Regulatory Compliance
- Safety Considerations
- Modification Alternatives

USEPA Brownfields Grant- Stone Lock Facility in West Sacramento, CA

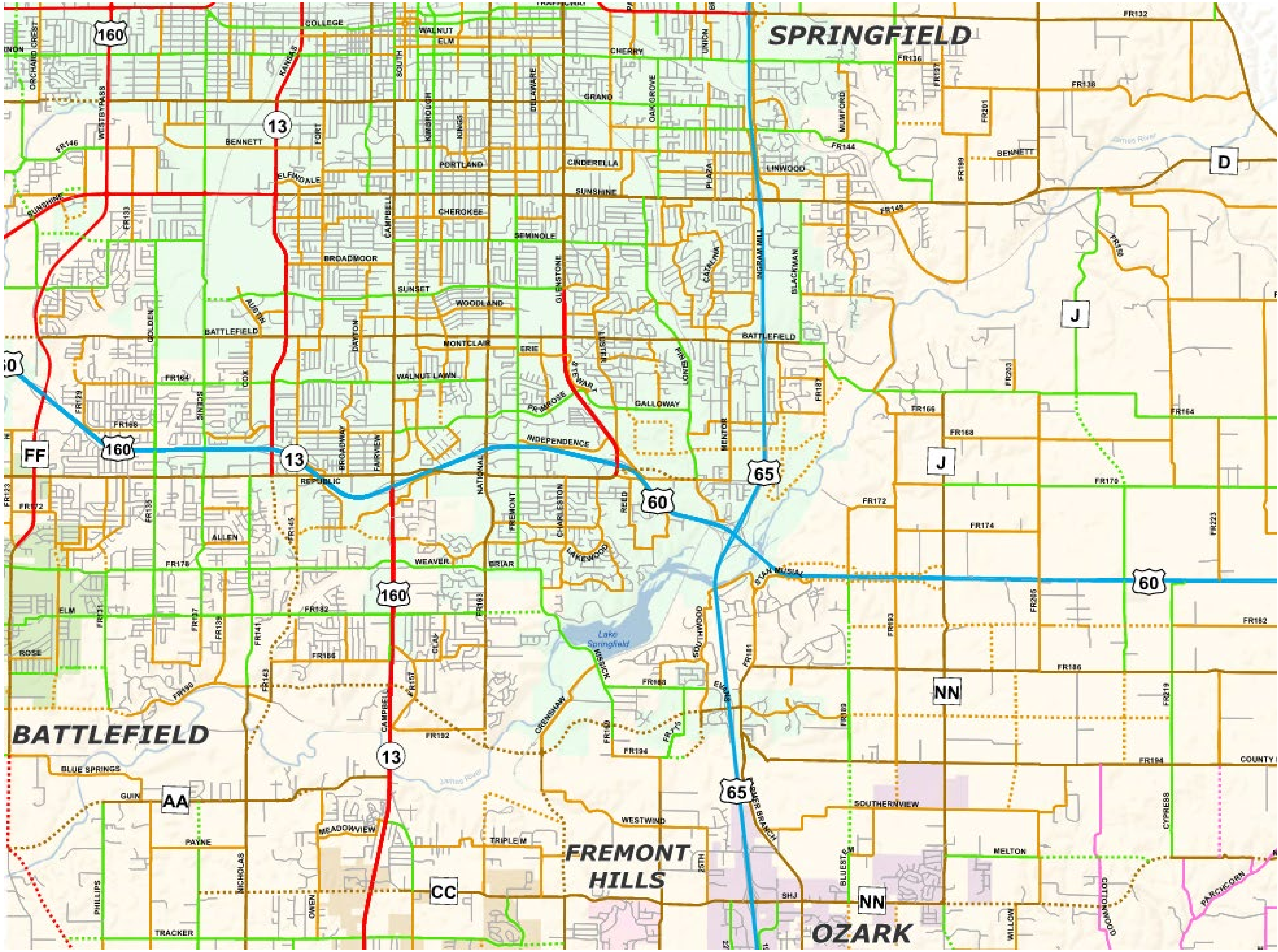
Boomer Lake Station – Lakeview Landing in Stillwater, OK

Scissortail Park, OKC
Power Plant Conversion in Port Washington, WI

CMT

GEOSYNTEC | HOUSEAL LAVIGNE | SWT DESIGN | RECREATION ENGINEERING & PLANNING | JOHNSON CONSULTING | PRATT CONSULTING

The Lake Springfield Plan Extends Beyond the Waters Edge and Impacts the Regional Road, Trail and Utility Network.



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ACTIVATING
RECREATIONAL OPPORTUNITIES

Inject innovative & transformative ideas

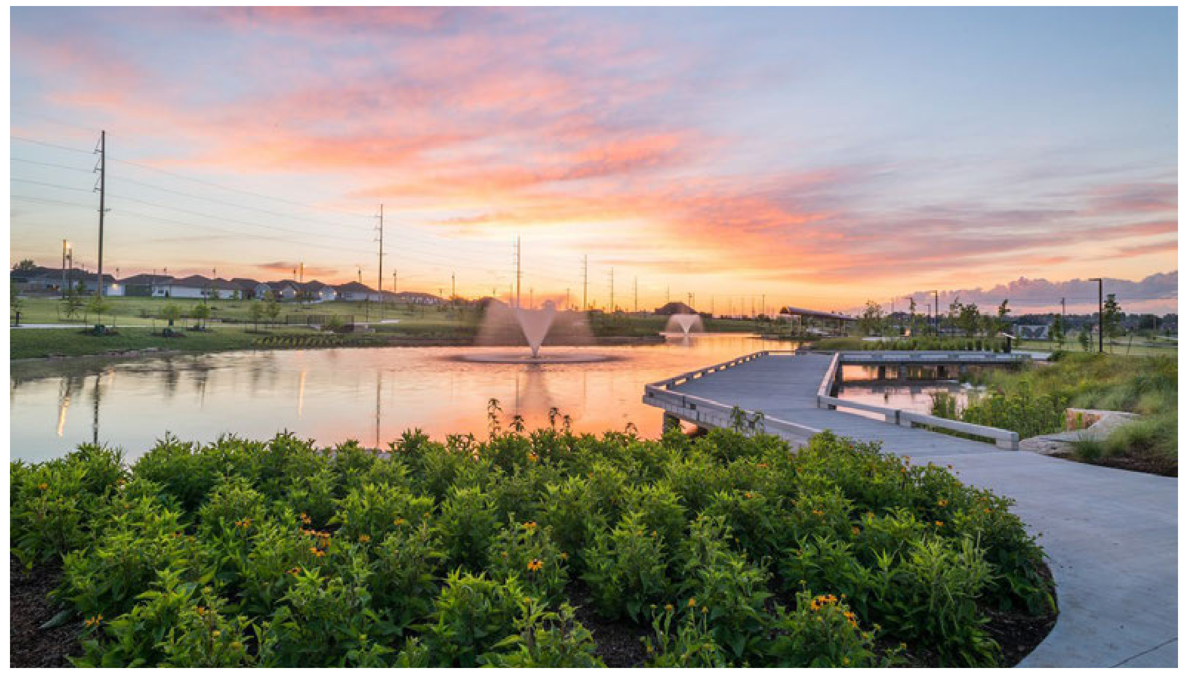
create diverse places for people

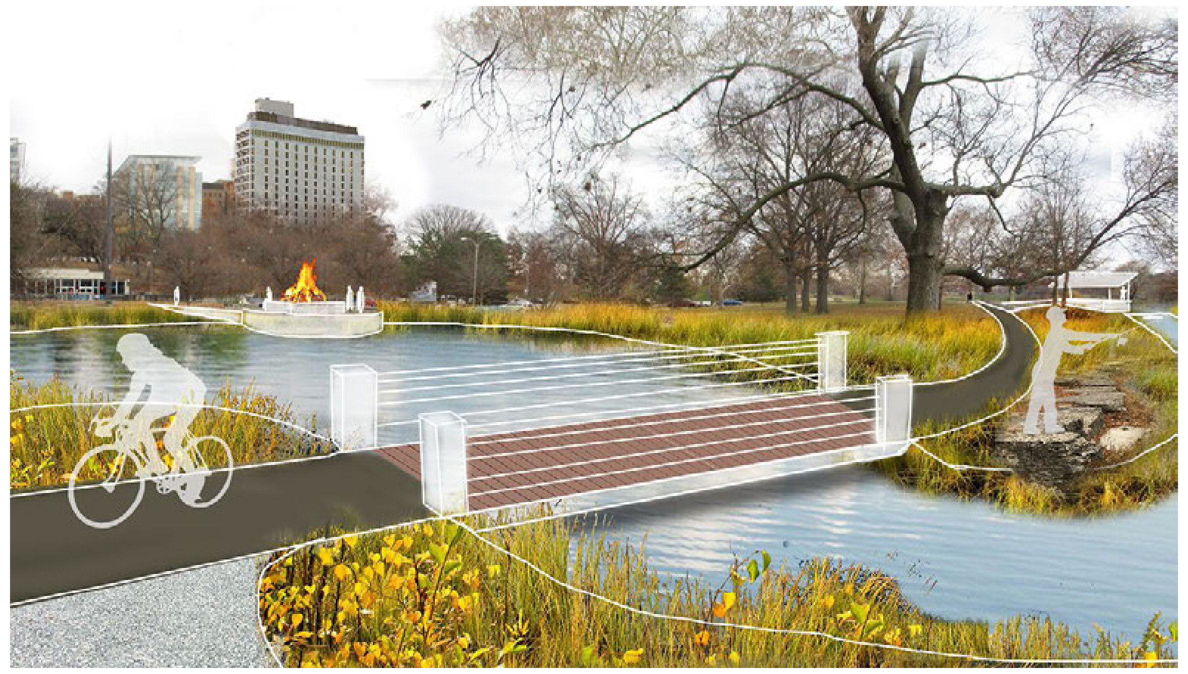
emphasize & enhance natural resources

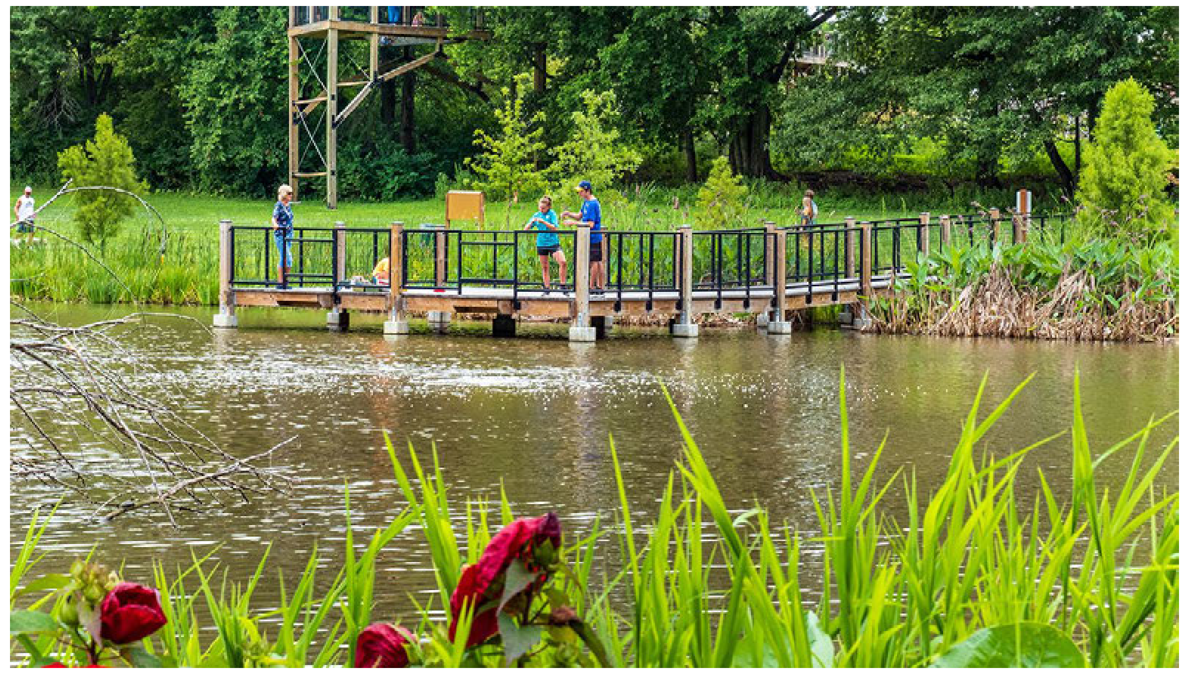
CMT | GEOSYNTEC | HOUSEAL LAVIGNE | SWT DESIGN | RECREATION ENGINEERING & PLANNING | JOHNSON CONSULTING | PRATT CONSULTING

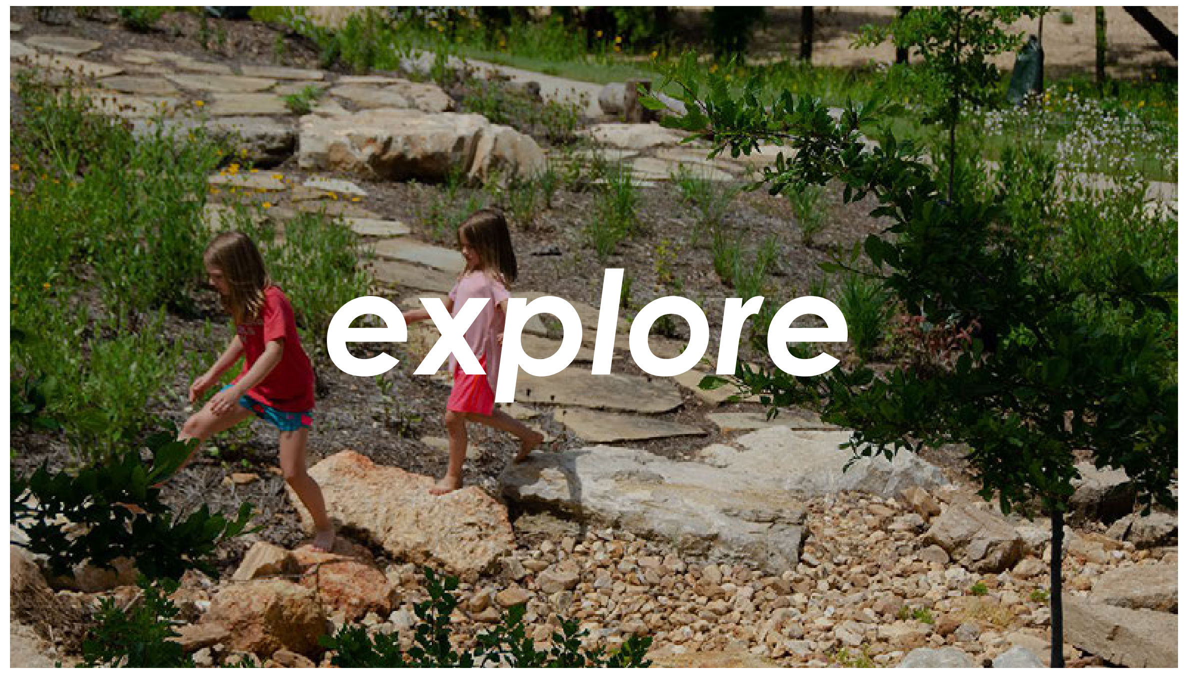
promote equitable spaces & unique destinations

Building a Destination by Creating Experiences










Explore
Explore
Activate
Activate
Preserve
Educate
LAKE SPRINGFIELD
Connect
Reimagine
Educate
Activate
Activate
E BRIAR ST
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S KISSICK AVE
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E FARM RD 188
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Activate


EST THE 2019
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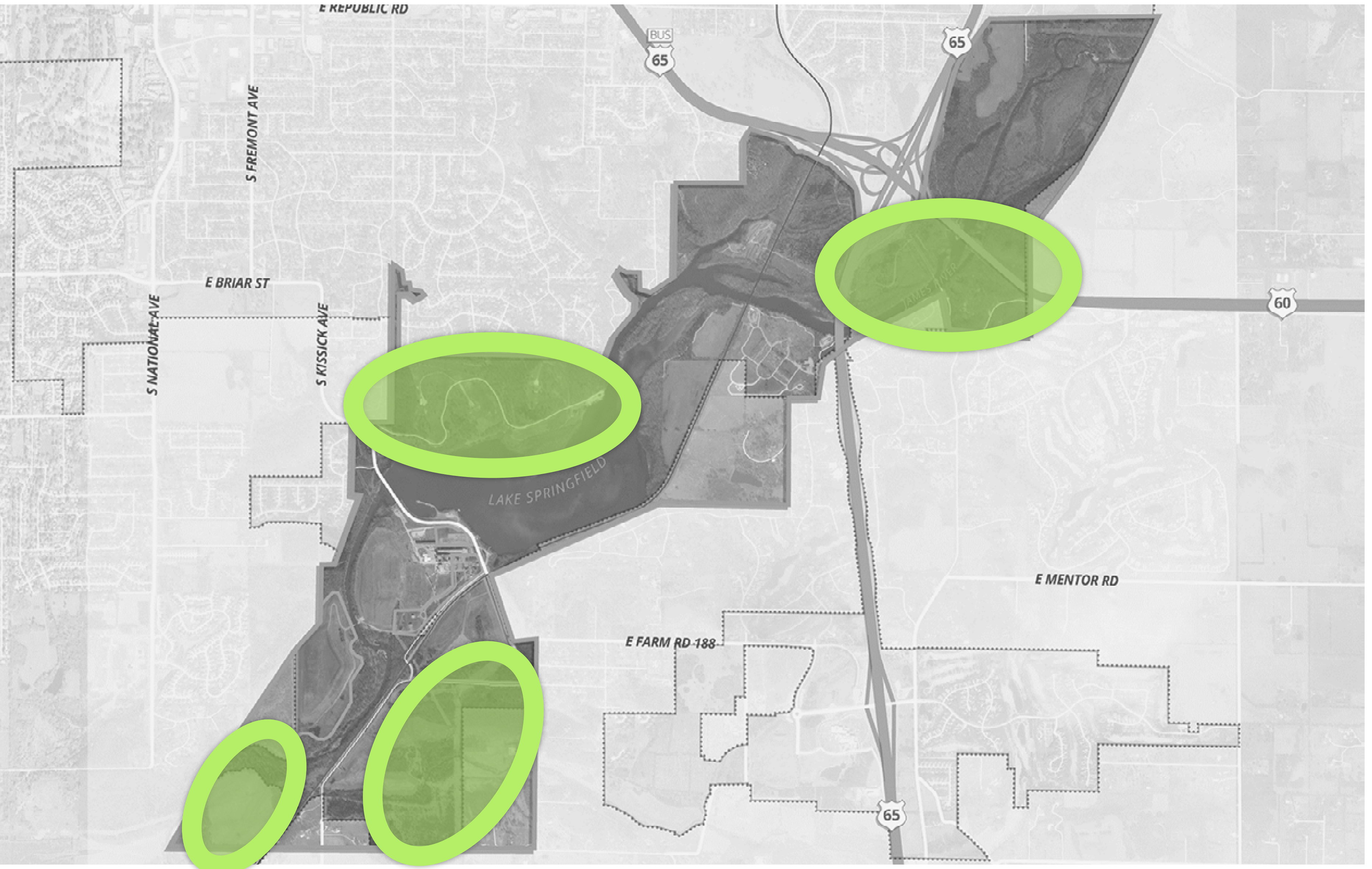
FOOD & FRIENDS
NOW HIRING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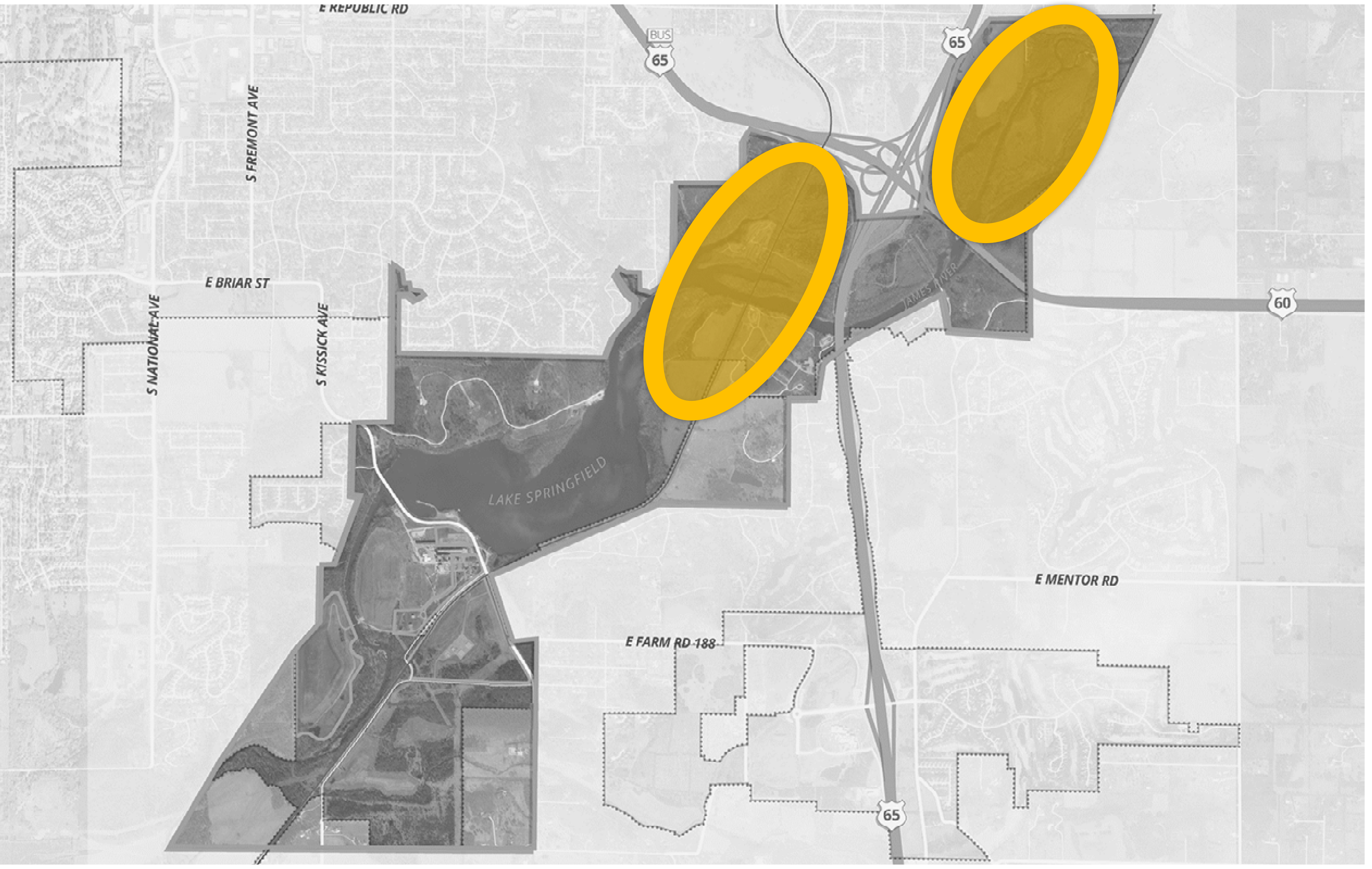
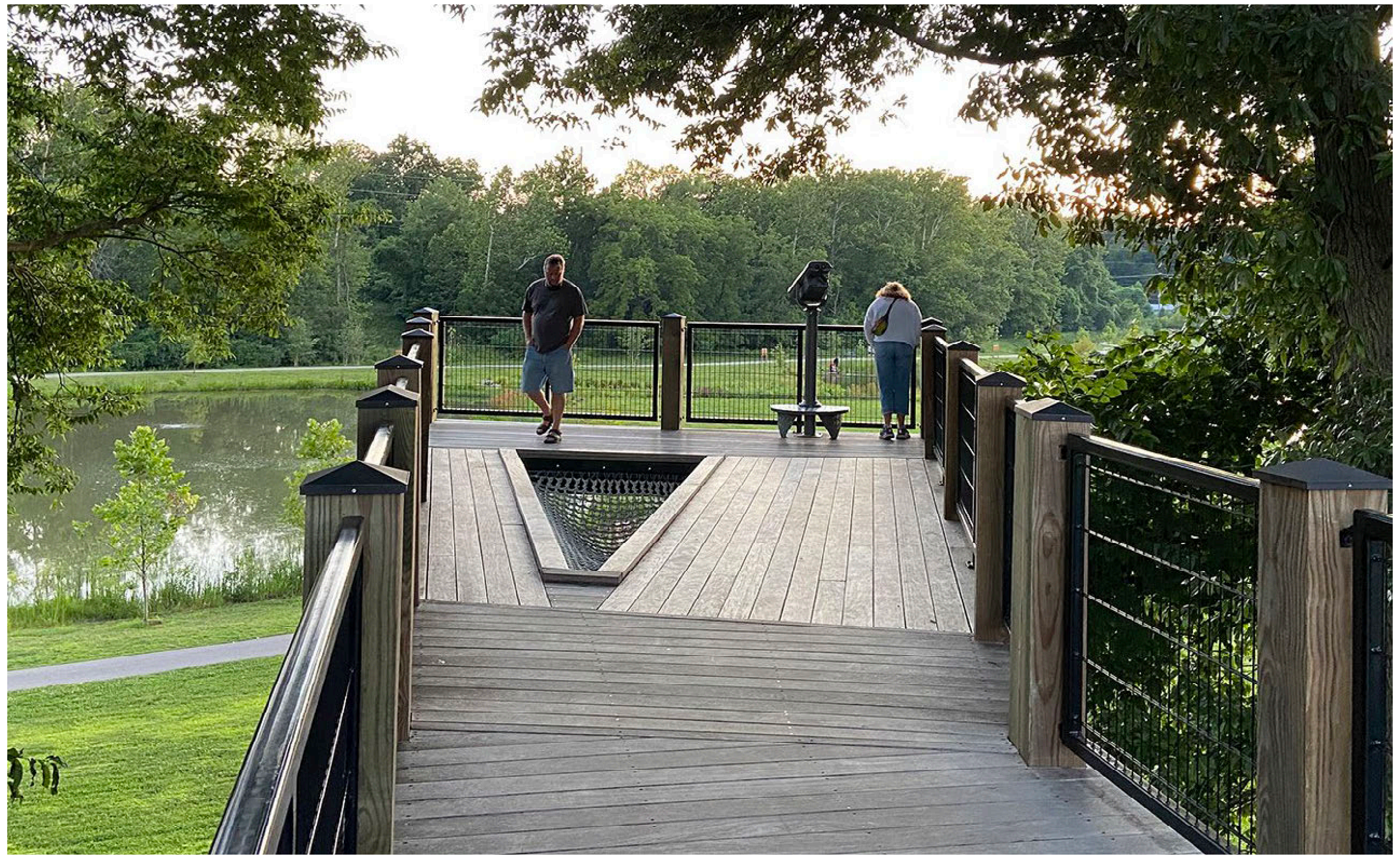
Explore





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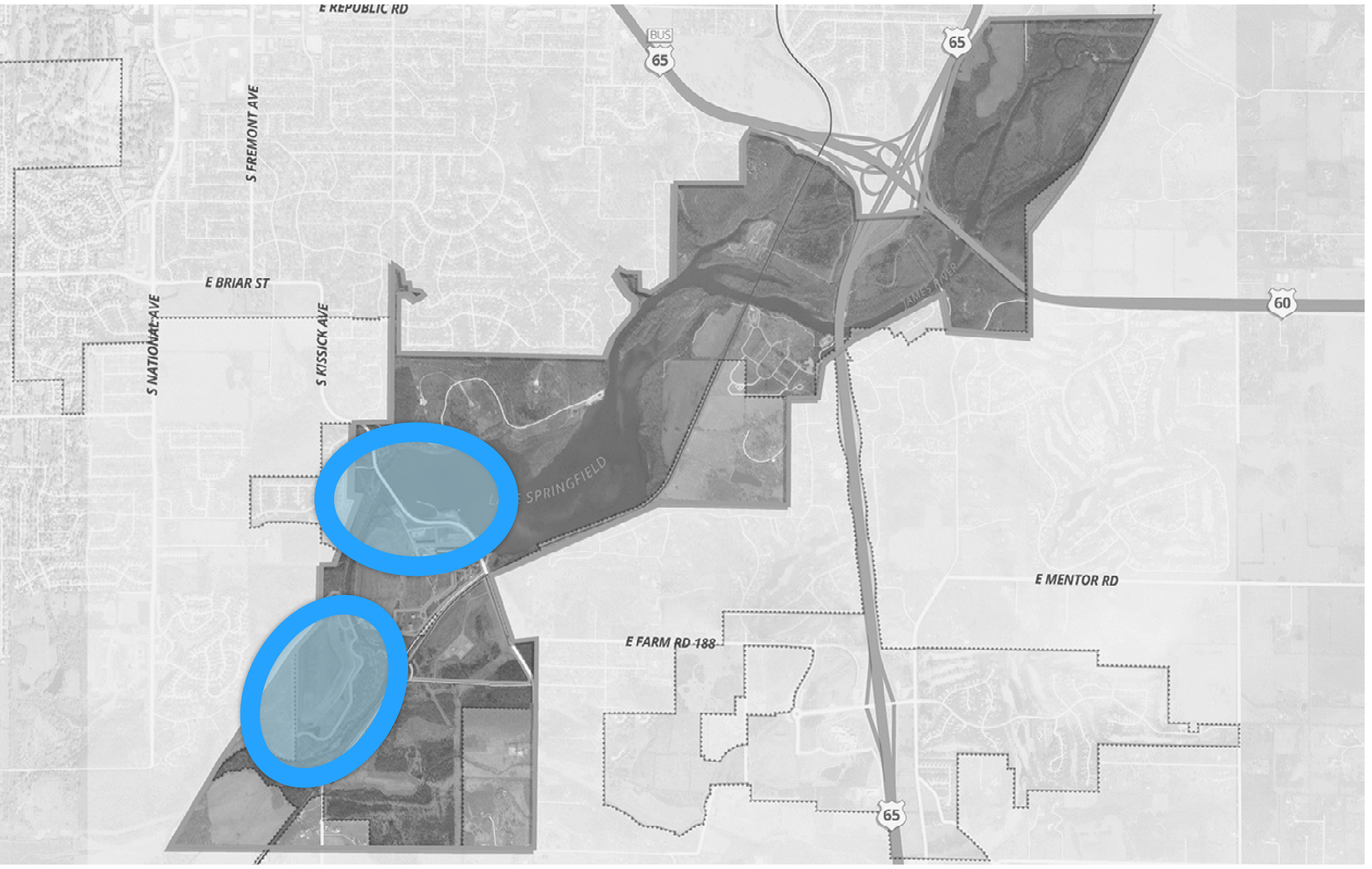
Educate



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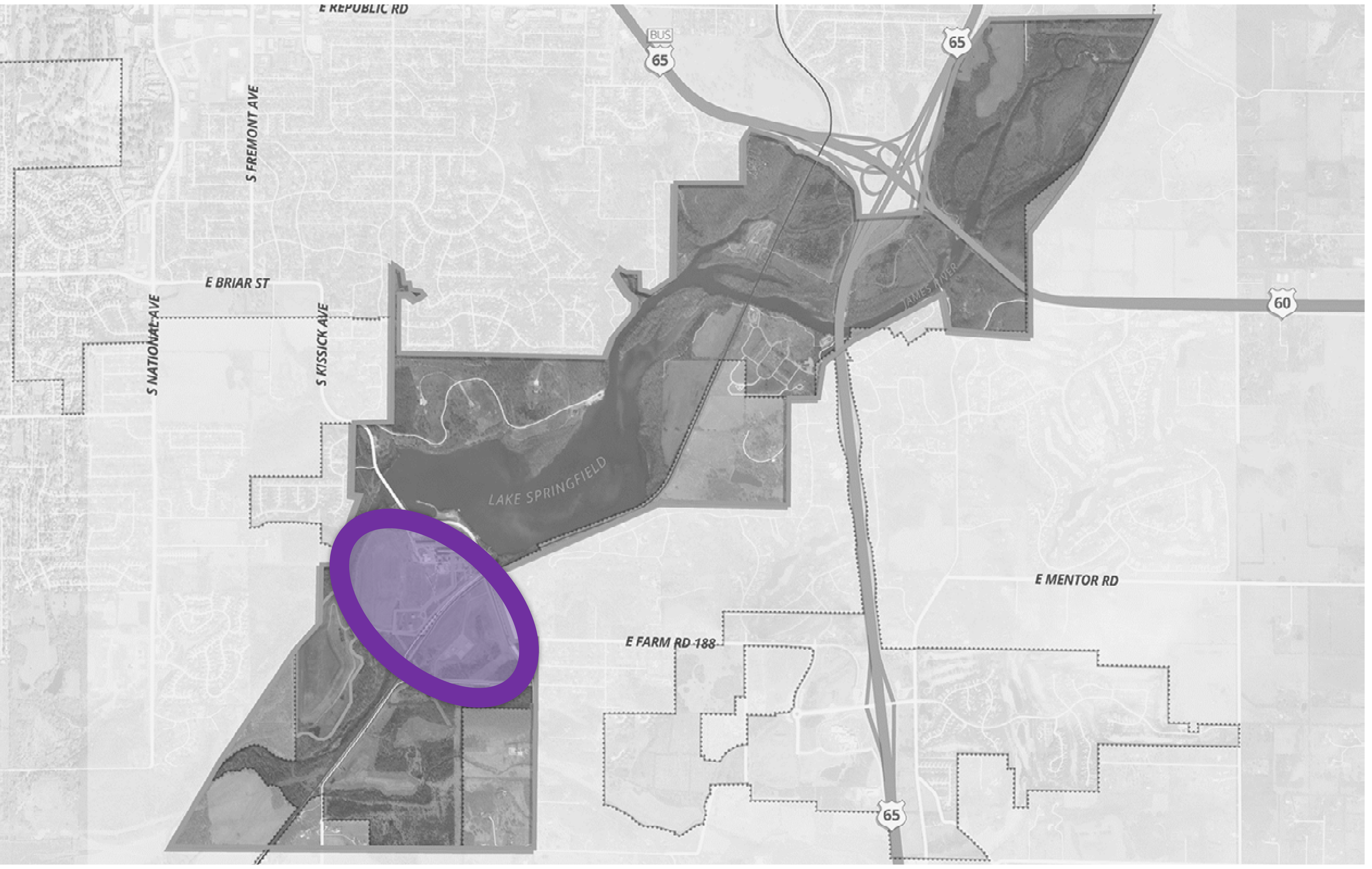
Reimagine



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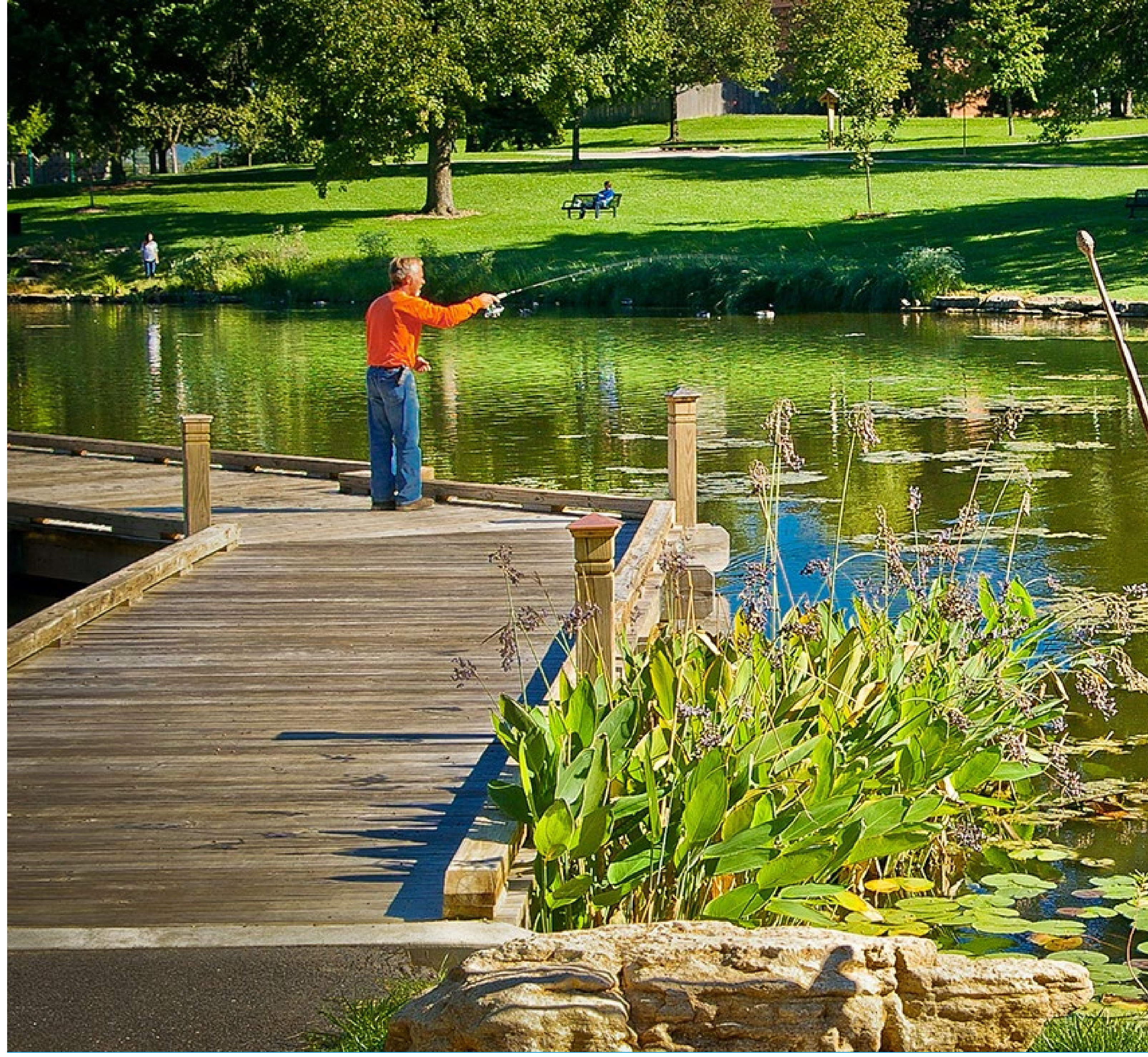
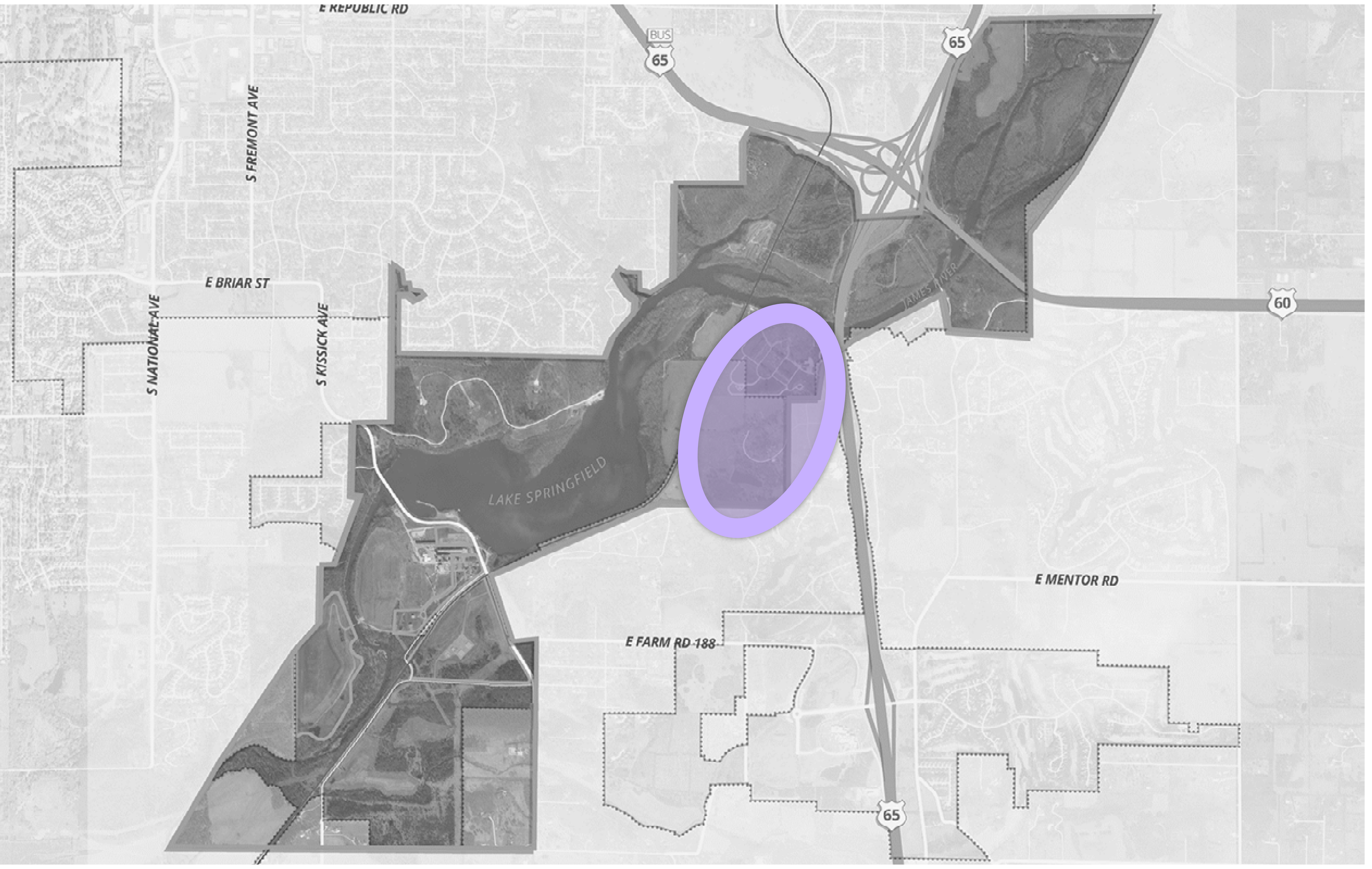
Preserve





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JAMES RIVER
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LAKE SPRINGFIELD
E MENTOR RD
E FARM RD 188
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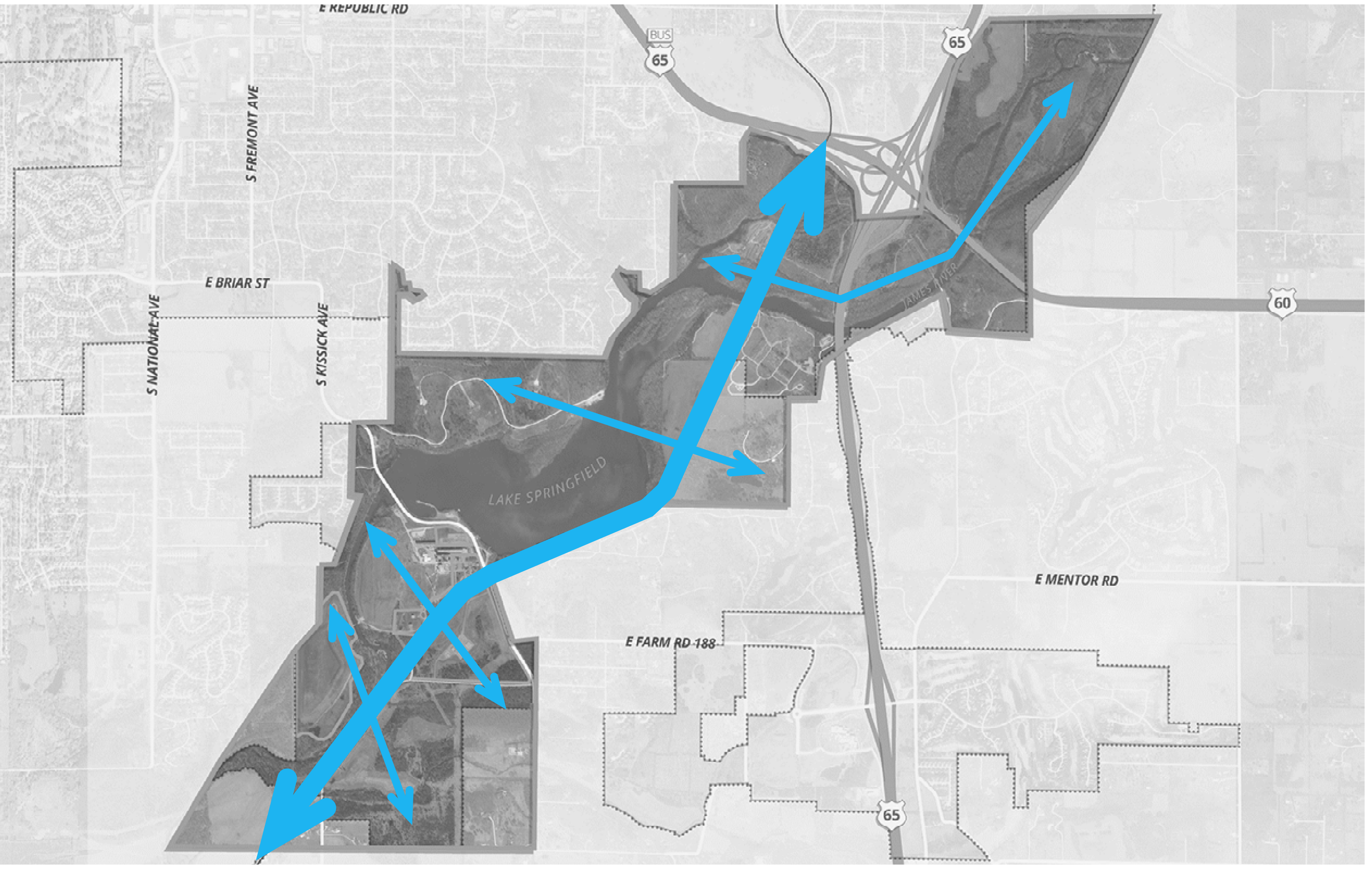
Connect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E BRIAR ST
S NATIONAL AVE
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LAKE SPRINGFIELD
E MENTOR RD
E FARM RD 188
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60

San Marcos, TX - After

Manchester, IA - Before

Manchester, IA - After

Ann Arbor, MI

Siloam Springs, AR

Longmont, CO

Lake Springfield

Great Potential for a Unique Amenity

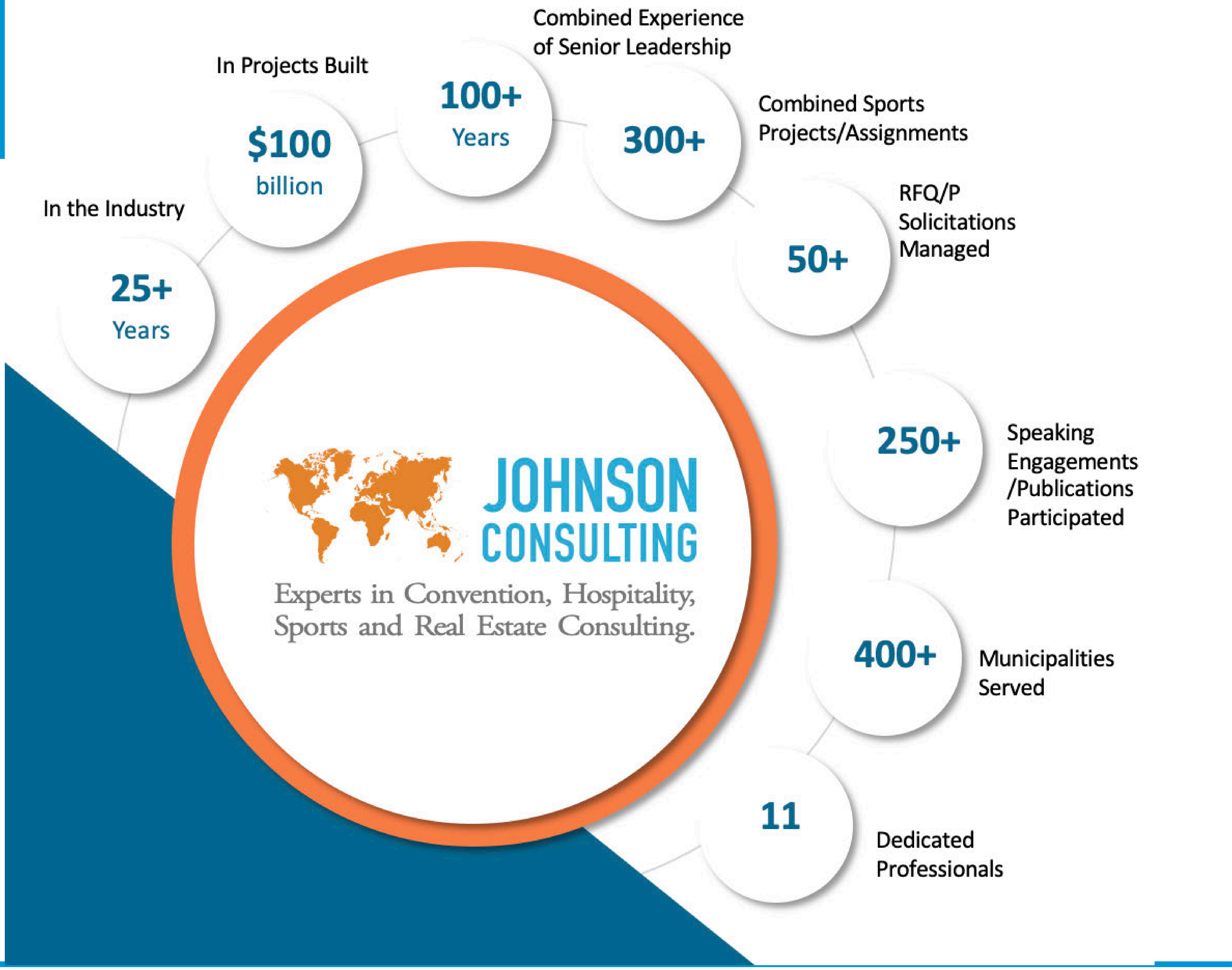
EXPLORING **ECONOMIC DEVELOPMENT** OPPORTUNITIES

ABOUT

Johnson Consulting

Services

- MARKET & DEMAND ANALYSIS
- FEASIBILITY STUDIES
- SITE ANALYSIS
- ECONOMIC AND FISCAL IMPACT STUDIES
- PROFORMA/FINANCIAL ANALYSIS
- FUNDING STRATEGIES
- STRATEGIC MASTER PLANNING
- OWNER'S REPRESENTATIONS
- PUBLIC/PRIVATE PARTNERSHIP ADVISORY
- RFQ/P SOLICITATIONS MANAGEMENT
- OPERATIONAL AUDITS & EXECUTIVE SEARCH



FOSTERING **CONSENSUS**

Community Engagement

- ✓ Engagement Collaboration Beyond the Outreach (Regular PIO Coordination)
- ✓ Responsive to Community Interest & Exposure (Response Team Coordination)
- ✓ Added Value on Community Advisory Team
- ✓ Vested Interest in Protecting the City's Brand & Reputation
- ✓ Engagement Documentation & Compliance
- ✓ Customized Engagement Tools

FRANCINE PRATT
Chair of the Springfield Equity & Prosperity Commission

City's New Principles of Diversity

Mayor's Initiative on Equity & Equality

5 Pillars of Change

1. Dialogue and Understanding
2. Cultural Consciousness
3. Advocacy and Partnerships
4. Structural and Systemic Barriers
5. Personal and Organizational Accountability

Minorities in Business
Insight into Economic Expansion for Minority Owned Businesses

Minorities In Business
Capacity Building
Advocacy &
Networking

SW Missouri Indian Center
Key Partner in Cultural Resources Study and Integral for Visioning Native American Heritage Elements


Q&A
CMT
Geosyntec consultants
SWTDESIGN
HL HOUSEAL LAVIGNE ASSOCIATES
JOHNSON CONSULTING
Recreation Engineering & Planning
PRATT CONSULTING

REIMAGINE

THE INTERSECTION OF **NATURE, RECREATION AND ECONOMIC DEVELOPMENT**

CMT

Geosyntec consultants

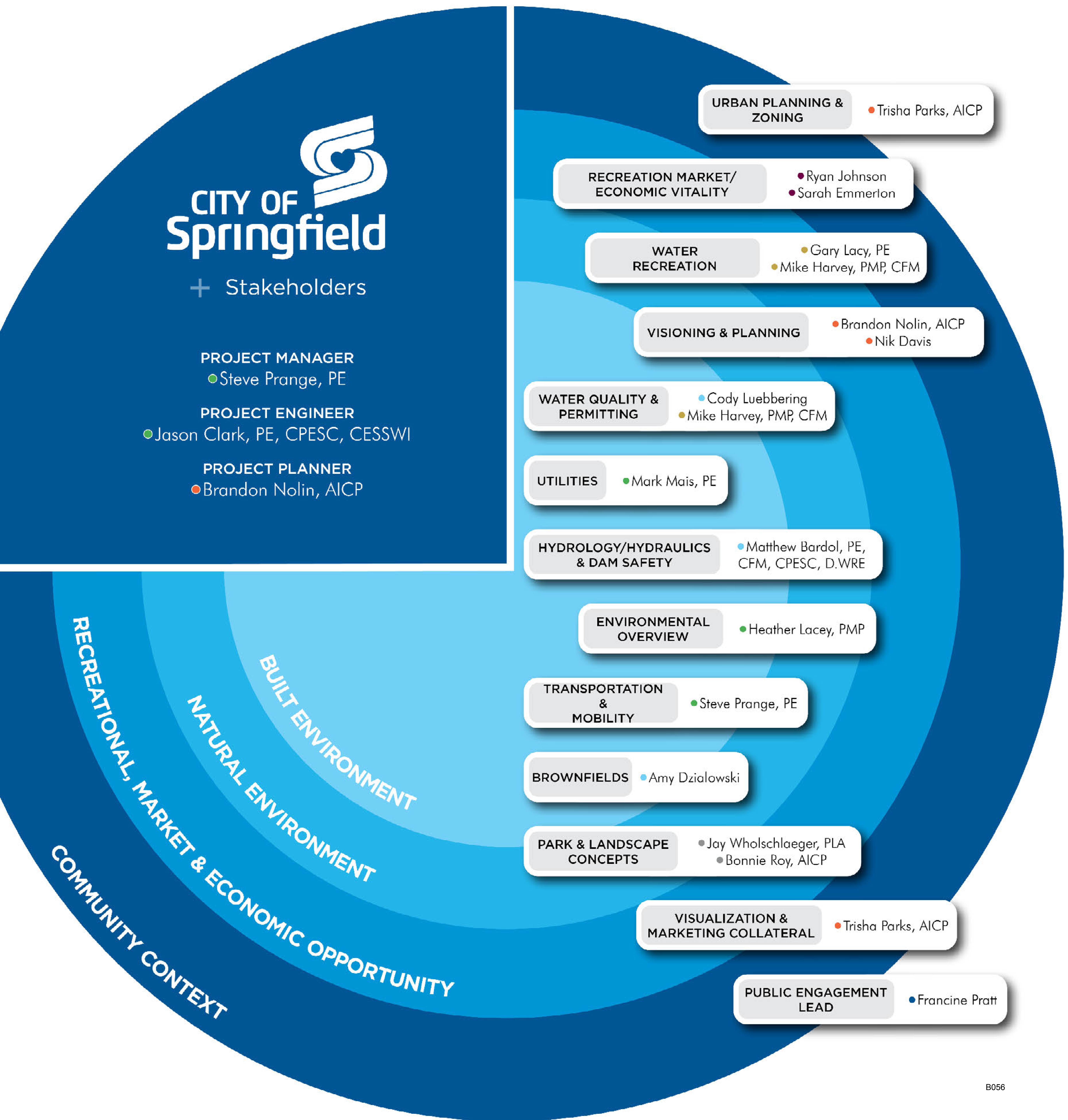
SWT DESIGN

HL HOUSEAL LAVIGNE ASSOCIATES

JOHNSON CONSULTING

Recreation Engineering & Planning

PRATT CONSULTING



B056

CMT

Nationally ranked professional company providing planning, engineering and construction services, as well as strong record of delivery for the City of Springfield.

Geosyntec consultants

Industry leader in dam modification, water quality and brownfields.

HOUSEAL LAVIGNE ASSOCIATES

Comprehensive familiarity with Springfield's vision and planning.

SWT DESIGN

Regional leader in innovative park master planning and landscape design.

Recreation Engineering & Planning

National leader in natural water recreational planning and design.

JOHNSON CONSULTING

Specialists in market-based information to inform decision making.

PRATT CONSULTING

A proven Springfield leader in community engagement.

CREATING A
COMMUNITY-FOCUSED PLAN

Planning Goals

1. Attract Innovative **Economic Development & Resilient Job Creation** within the study area that complements Regional Vision and Priorities.
2. Develop a Strategy for **Sustainable Water Quality & Green Infrastructure** Improvements.
3. Establish an **Adaptive Reuse Strategy** for the James River Power Station.
4. Focus on **Transportation enhancements** that are accessible and equitable to Lake Springfield and the Surrounding Communities.
5. Embrace **Active and Passive Recreational Opportunities** as a Regional Economic Development Catalyst.
6. Engage the Community in a way that is Inclusive of a **Diverse and Multi-Cultural Perspective**.

E REPUBLIC RD
BUS 65
65
60
CITY OF SPRINGFIELD
S FREMONT AVE
Springfield Conservation Nature Center
Lake Springfield Park and Boathouse
E BRIAR ST
S NATIONAL AVE
S KISSICK AVE
RAVENWOOD SOUTH
JAMES RIVER
Missouri Veterans Cemetery
UNINCORPORATED AREA
Lake Springfield Dam
LAKE SPRINGFIELD
James River Power Station
LAKE SPRINGFIELD SUBAREA
E MENTOR RD
E FARM RD 188
Utility Waste Landfill
FUTURE CITY UTILITIES OPERATION
65
B059

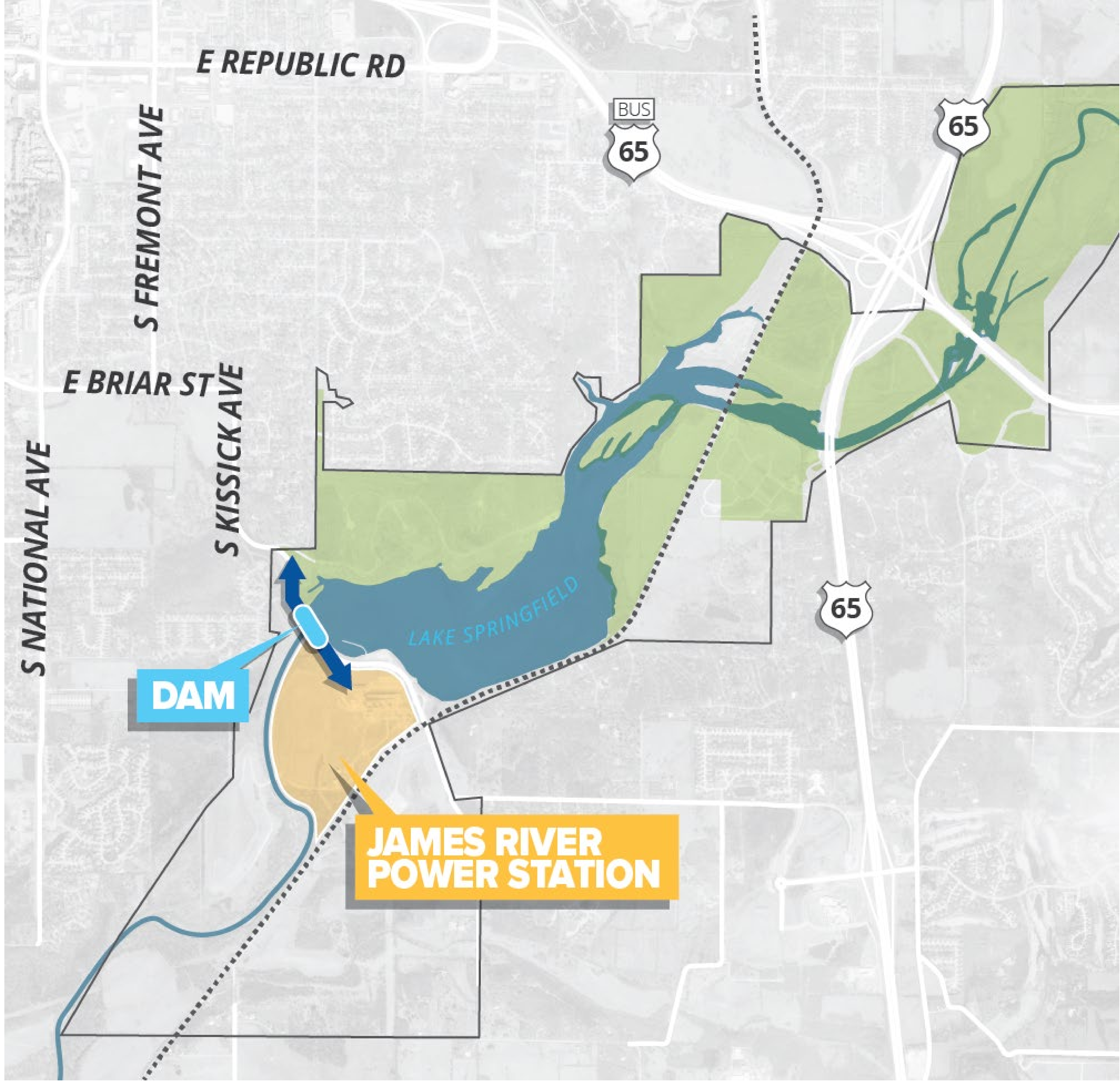
Rail-to-Trail Opportunity

- Extend the James River Water Trail south of dam
- Create solution for watercraft passage as the existing low water bridge connects to the Utility Waste Landfill and acts as a barrier

Dam

The dam is a critical component of the Lake Springfield subarea

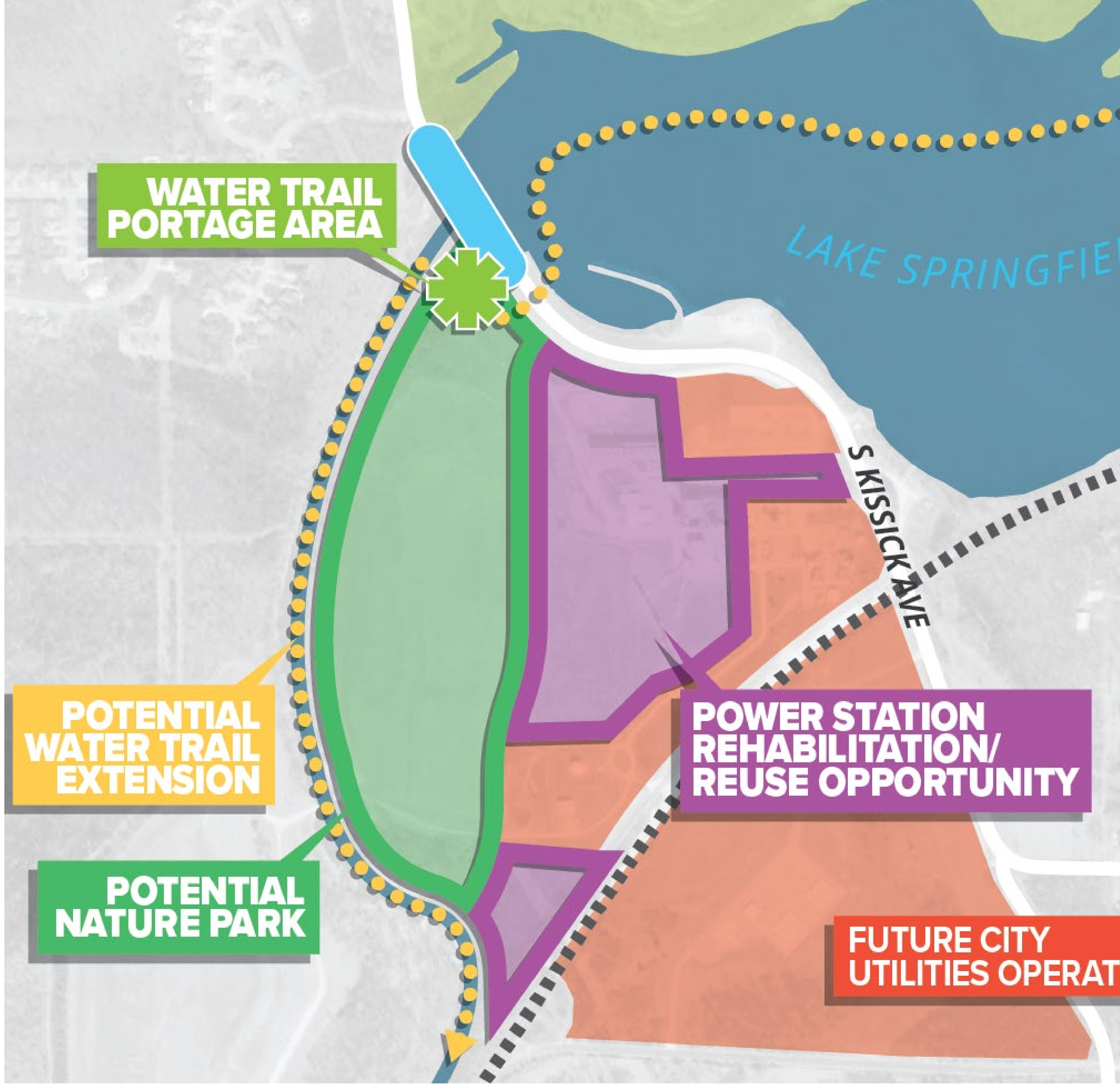
- Need for detailed hydrological study to evaluate dam
- Work with City Utilities to ensure regular maintenance
- Construct trails leading to and from dam and connect to surrounding trails
- Continue water access along the James River with development of a portage area at the James River Power Station



James River Power Station

The decommissioned James River Power Plant occupies a significant amount of space and provides an opportunity through adaptive reuse.

- Explore new recreation center or museum
- Consider office or meeting area uses
- Review options for small dining, concessions, bike rentals, or other amenities
- Assess feasibility of redeveloping the adjacent detention pond
- Assess need for environmental remediation for public recreational use



The Boathouse

- Enhance the Lake Springfield Park boathouse as a “trailhead” for water-based activities
- Explore opportunities for new recreational activities

THE **BUILT AND NATURAL** ENVIRONMENTAL ASSESSMENT

Watershed Characterization
Dam Infrastructure
Waterbody, Water Quality, & Sediment Characterization
Brownfield & Reuse
E REPUBLIC RD
S FREMONT AVE
CITY OF SPRINGFIELD
Springfield Conservation Nature Center
Lake Springfield Park and Boathouse
E BRIAR ST
S NATIONAL AVE
S KISSICK AVE
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Lake Springfield Dam
James River Power Station
LAKE SPRINGFIELD SUBAREA
E MENTOR RD
E FARM RD 188
FUTURE CITY UTILITIES OPERATION
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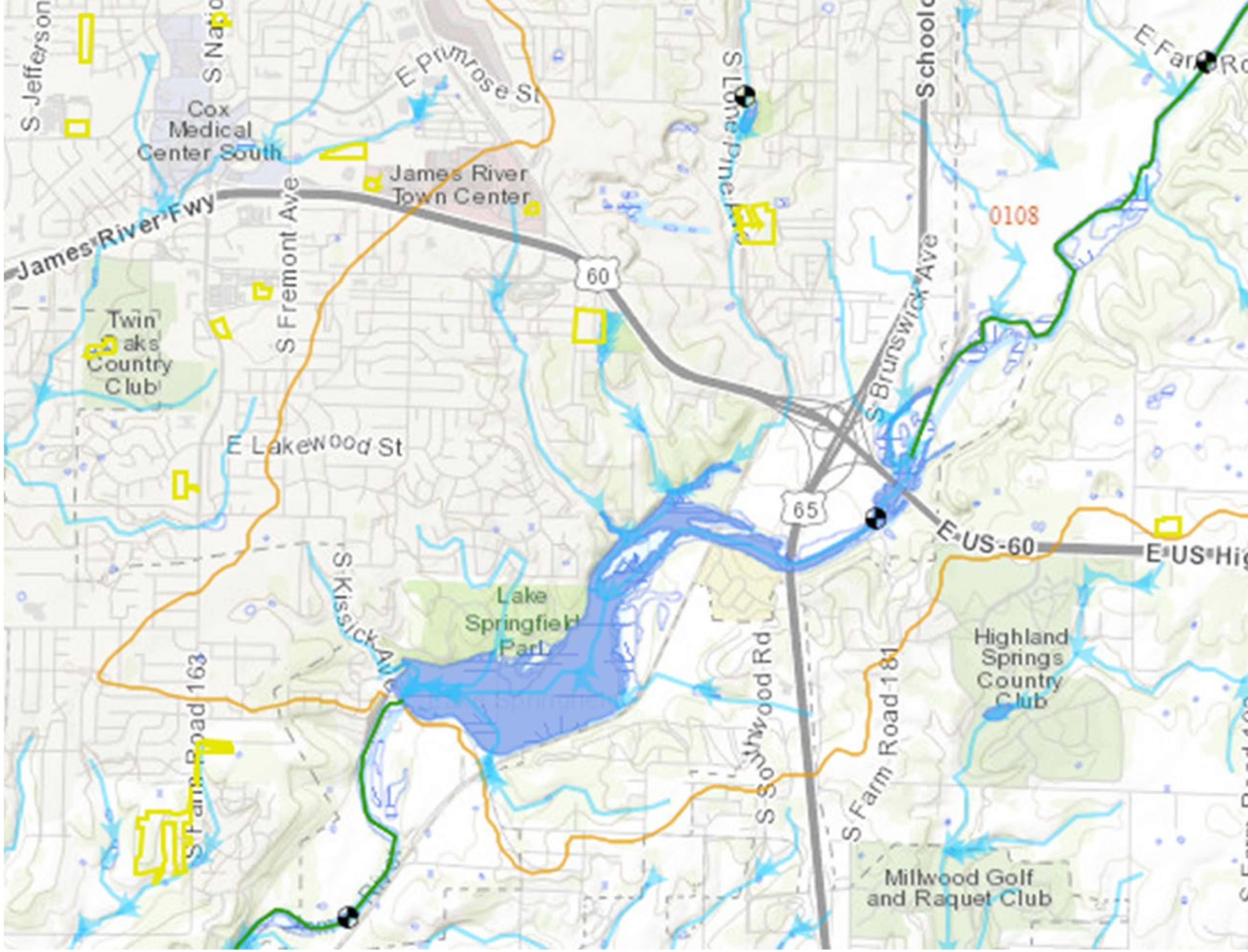
Watershed Characterization

- Watershed Hydrologic & Hydraulic Study
- Climate Assessment
- Purpose & Foundation



Waterbody Characterization

- Water Quality
- Sediment Quality
- Env. Regulatory Compliance
- Watershed Collaboration

Dam Infrastructure

- Risk & Data Assessment
- Regulatory Compliance
- Safety Considerations
- Modification Alternatives

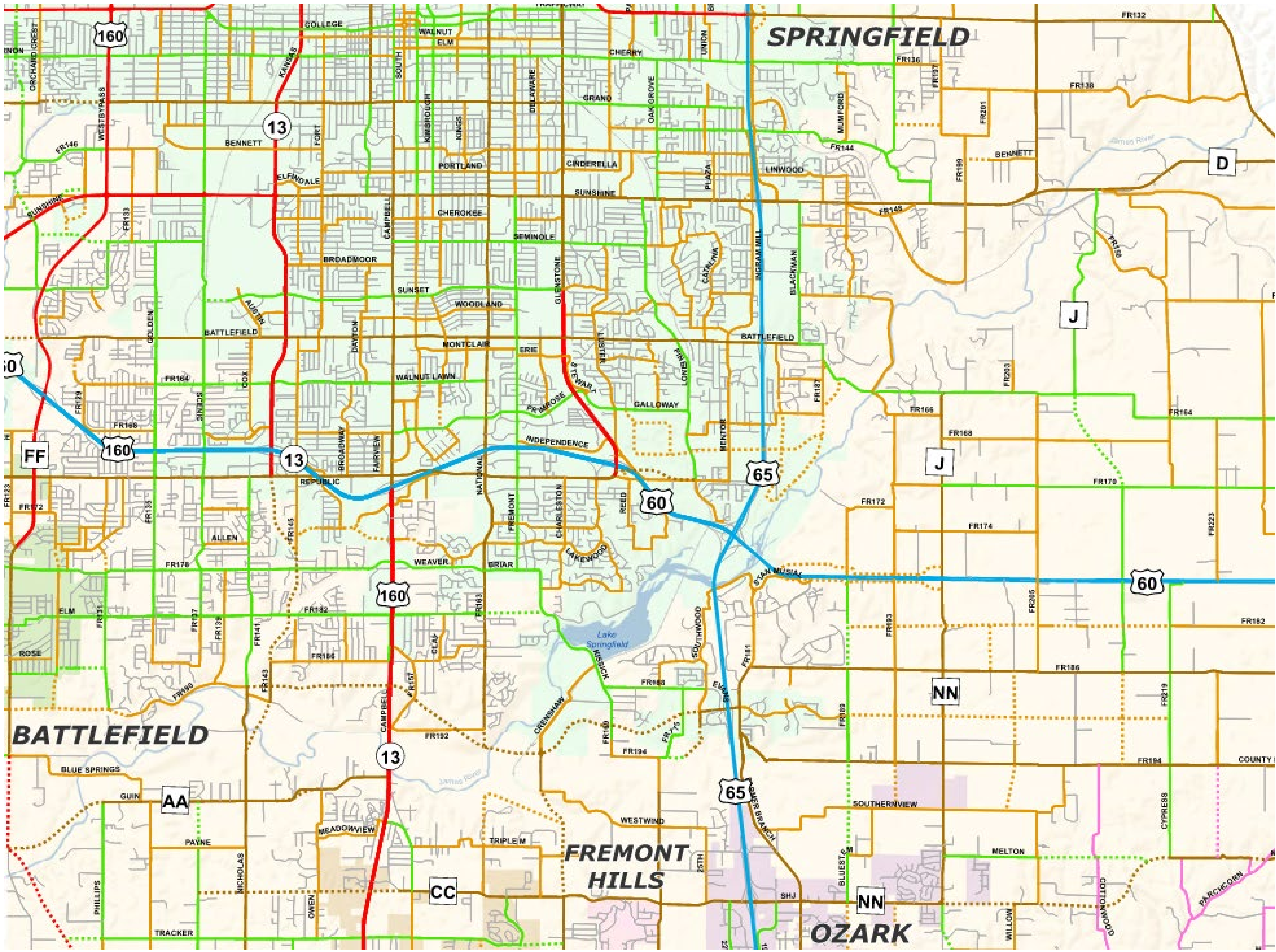
USEPA Brownfields Grant- Stone Lock Facility in West Sacramento, CA

Boomer Lake Station – Lakeview Landing in Stillwater, OK

Scissortail Park, OKC
Power Plant Conversion in Port Washington, WI

CMT | GEOSYNTEC | HOUSEAL LAVIGNE | SWT DESIGN | RECREATION ENGINEERING & PLANNING | JOHNSON CONSULTING | PRATT CONSULTING

The Lake Springfield Plan Extends Beyond the Waters Edge and Impacts the Regional Road, Trail and Utility Network.



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ACTIVATING
RECREATIONAL OPPORTUNITIES

Inject innovative & transformative ideas

CMT

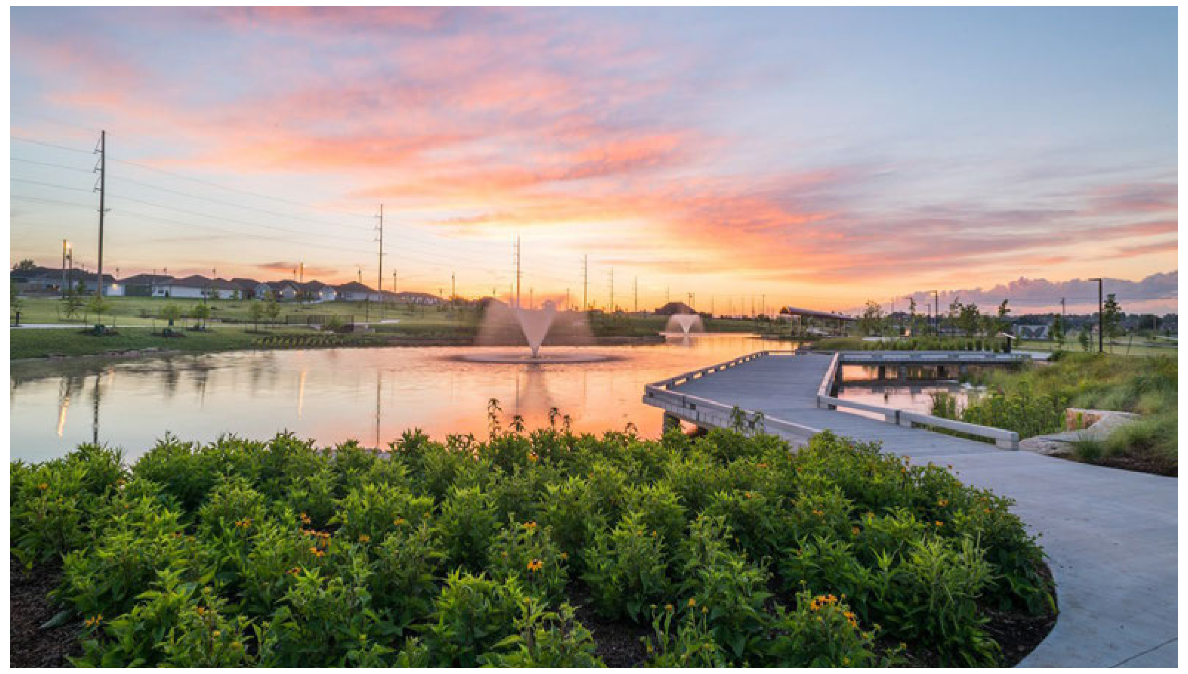
GEOSYNTEC | HOUSEAL LAVIGNE | SWT DESIGN | RECREATION ENGINEERING & PLANNING | JOHNSON CONSULTING | PRATT CONSULTING

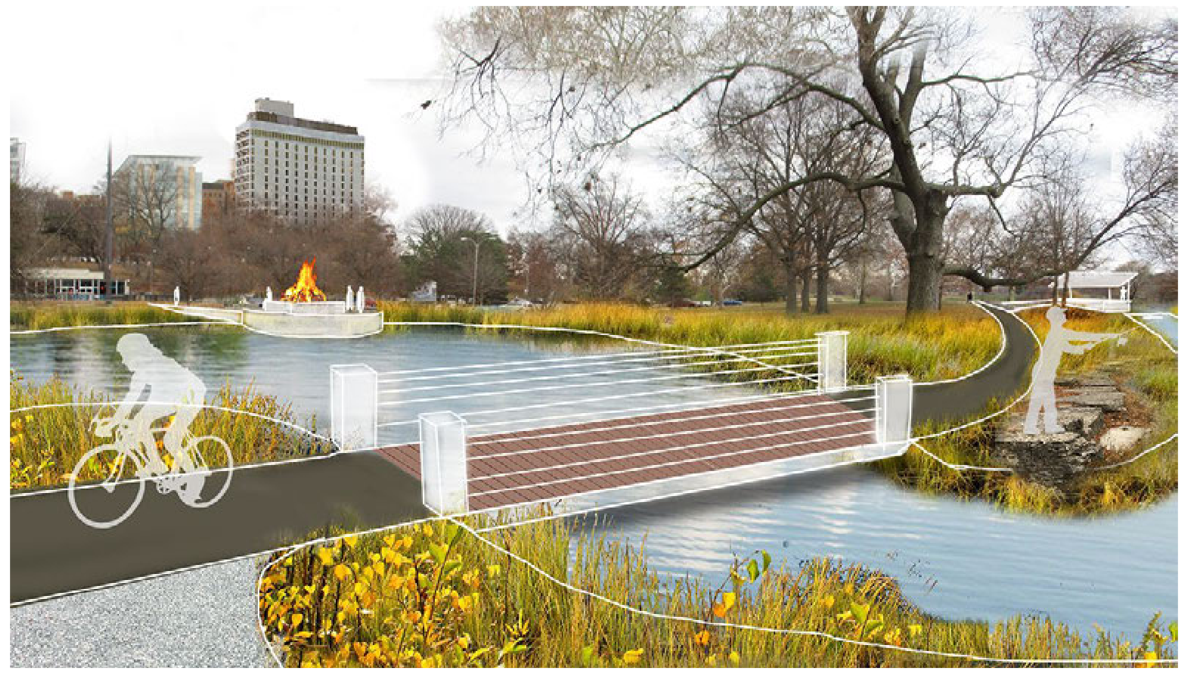

create diverse places for people

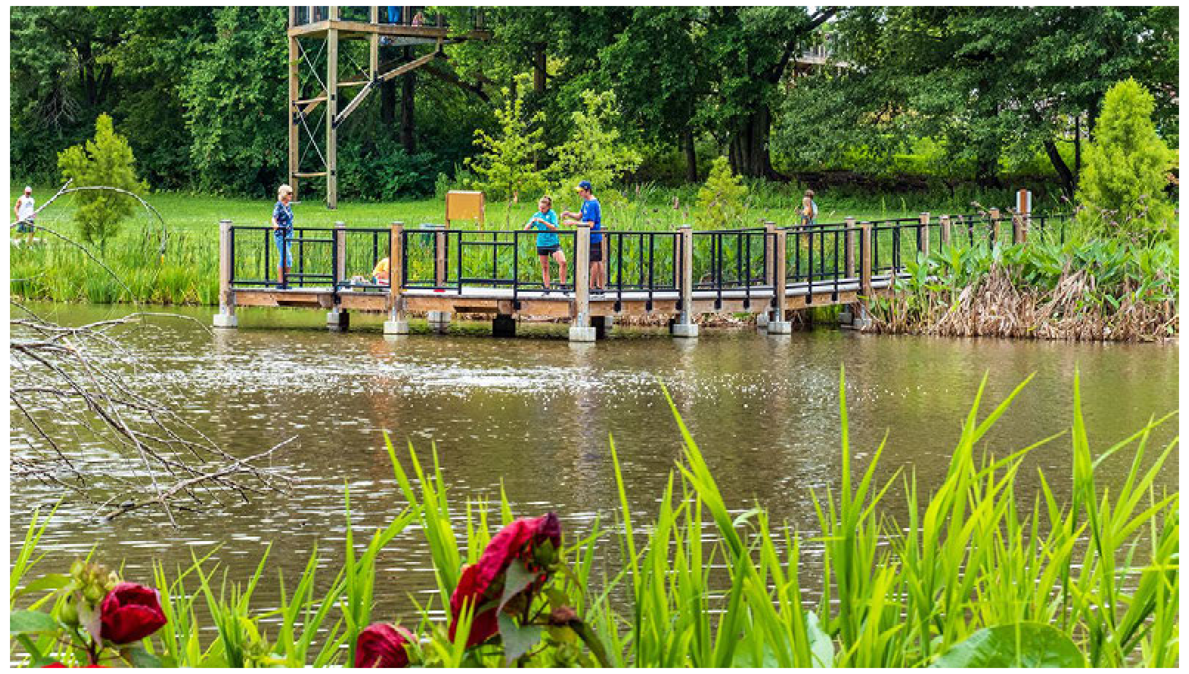

emphasize & enhance
natural resources

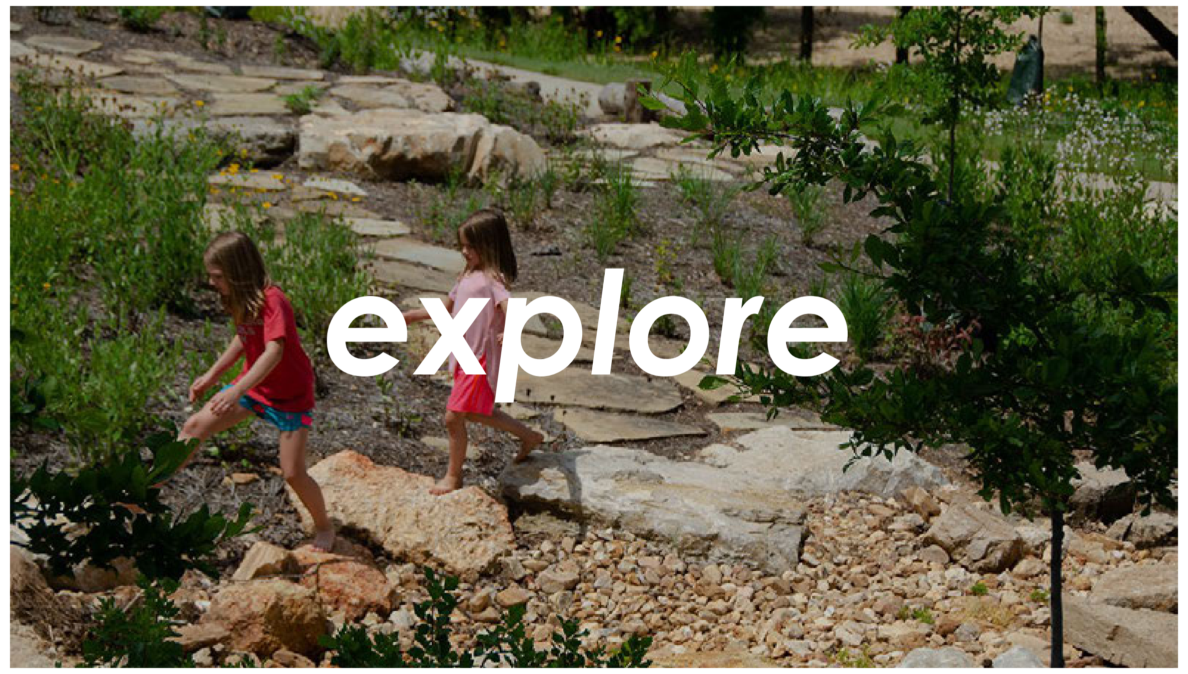
promote equitable spaces & unique destinations

Building a Destination by Creating Experiences









Great Potential for a Unique Amenity

EXPLORING **ECONOMIC DEVELOPMENT** OPPORTUNITIES

ABOUT

Johnson Consulting

Services

- MARKET & DEMAND ANALYSIS
- FEASIBILITY STUDIES
- SITE ANALYSIS
- ECONOMIC AND FISCAL IMPACT STUDIES
- PROFORMA/FINANCIAL ANALYSIS
- FUNDING STRATEGIES
- STRATEGIC MASTER PLANNING
- OWNER'S REPRESENTATIONS
- PUBLIC/PRIVATE PARTNERSHIP ADVISORY
- RFQ/P SOLICITATIONS MANAGEMENT
- OPERATIONAL AUDITS & EXECUTIVE SEARCH

JOHNSON CONSULTING

Experts in Convention, Hospitality, Sports and Real Estate Consulting.

25+ Years — In the Industry

$100 billion — In Projects Built

100+ Years — Combined Experience of Senior Leadership

300+ — Combined Sports Projects/Assignments

50+ — RFQ/P Solicitations Managed

250+ — Speaking Engagements /Publications Participated

400+ — Municipalities Served

11 — Dedicated Professionals

FOSTERING **CONSENSUS**

Community Engagement

- ✓ Engagement Collaboration Beyond the Outreach (Regular PIO Coordination)
- ✓ Responsive to Community Interest & Exposure (Response Team Coordination)
- ✓ Added Value on Community Advisory Team
- ✓ Vested Interest in Protecting the City's Brand & Reputation
- ✓ Engagement Documentation & Compliance
- ✓ Customized Engagement Tools

FRANCINE PRATT
Chair of the Springfield Equity & Prosperity Commission

City's New Principles of Diversity

Mayor's Initiative on Equity & Equality

5 Pillars of Change

1. Dialogue and Understanding
2. Cultural Consciousness
3. Advocacy and Partnerships
4. Structural and Systemic Barriers
5. Personal and Organizational Accountability

Minorities in Business
Insight into Economic Expansion for Minority Owned Businesses

Minorities In Business
Capacity Building
Advocacy &
Networking

SW Missouri Indian Center
Key Partner in Cultural Resources Study and Integral for Visioning Native American Heritage Elements


Q&A
CMT
Geosyntec consultants
SWT DESIGN
HL HOUSEAL LAVIGNE ASSOCIATES
JOHNSON CONSULTING
Recreation Engineering & Planning
PRATT CONSULTING

LAKE SPRINGFIELD PLAN

Public Meeting No. 2
05.04.2023

CMT

CITY OF Springfield

City Utilities
Connecting Our Community

The PARK
SPRINGFIELD-GREENE COUNTY PARK BOARD

Hatch

E·D·A
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

LAKE SPRINGFIELD PLAN

COMMUNITY ENGAGEMENT UPDATE

Cora Scott & Francine Pratt

CMT
CITY OF Springfield
City Utilities Connecting Our Community
The PARK SPRINGFIELD-GREENE COUNTY PARK BOARD
Hatch
E·D·A U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

Overview

6 Major Events in 5 Months!

- Events focused on community engagement and project educational outreach.
- All events provided similar information for consistency in information sharing.

Oct. 12, 2022 – Neighborhood Forum

This forum was just for residents in the Lake Springfield area to hear their concerns and share information about the project. Participants completed comment cards and/or respond to an online survey.

88 attendees with several couples (**over 100 attendees**)!

Nov 15, 2022 – CAT Meeting No. 1

- Community Advisory Team held their first meeting with **32 attendees**.
- Attendees reviewed similar materials presented at the October 12 event and the comment cards.
- The CAT represents various Springfield (and surrounding areas) intersectional groups and populations.
- The CAT provided input on materials and concepts for the official public kick off on November 17.

Nov. 17, 2022 – Kick-Off Meeting

- City of Springfield conducted the public kick-off of the project at the Springfield Art Museum and provided an online survey.

- Survey was accessible with a QR Code and for community members who could not attend in person, they could participate online for two weeks after the event.

- **264 Total Responses with 727 Total Views** – 148 Survey Completions (116 Incomplete Surveys)

Public Community Meeting No. 1
Inclusivity – With Self Identification

Race/Ethnicity	Gender	With a Disability	Ages
129 – White 2 – Hispanic/Latinx 2 – Other Race 1 – Asian 1 – Native Hawaiian or Other Pacific Islander	79 – Men 58 – Women 2 – Another Identity	11	36 – Ages 31-40 29 – Ages 49-50 29 – Ages 61+ 22 – Ages 22-30 21 – Ages 51-60

What Excites You About the Lake SGF Plan?

Use three words to describe what WORRIES you about the Lake Springfield Plan.

Jan 2023 – Local Water Resources Survey

Department of Environmental Services shared data from six-month survey project. Their survey responses provided additional community input for this project with **200** traditional and **602** focused outreach responses.

- Three questions asked related to how local water resources are used in Springfield or reasons why the resources may not be used.
- Traditional Outreach – Social media posts, emailed surveys to groups and organizations, news release and articles
- Focused Outreach – Paper surveys at various events, door hangers, group discussions at schools, emailed surveys to specific organizations and advertisements with focused newspapers.

March 21, 2023 – CAT Meeting No. 2 (47 Attendees)

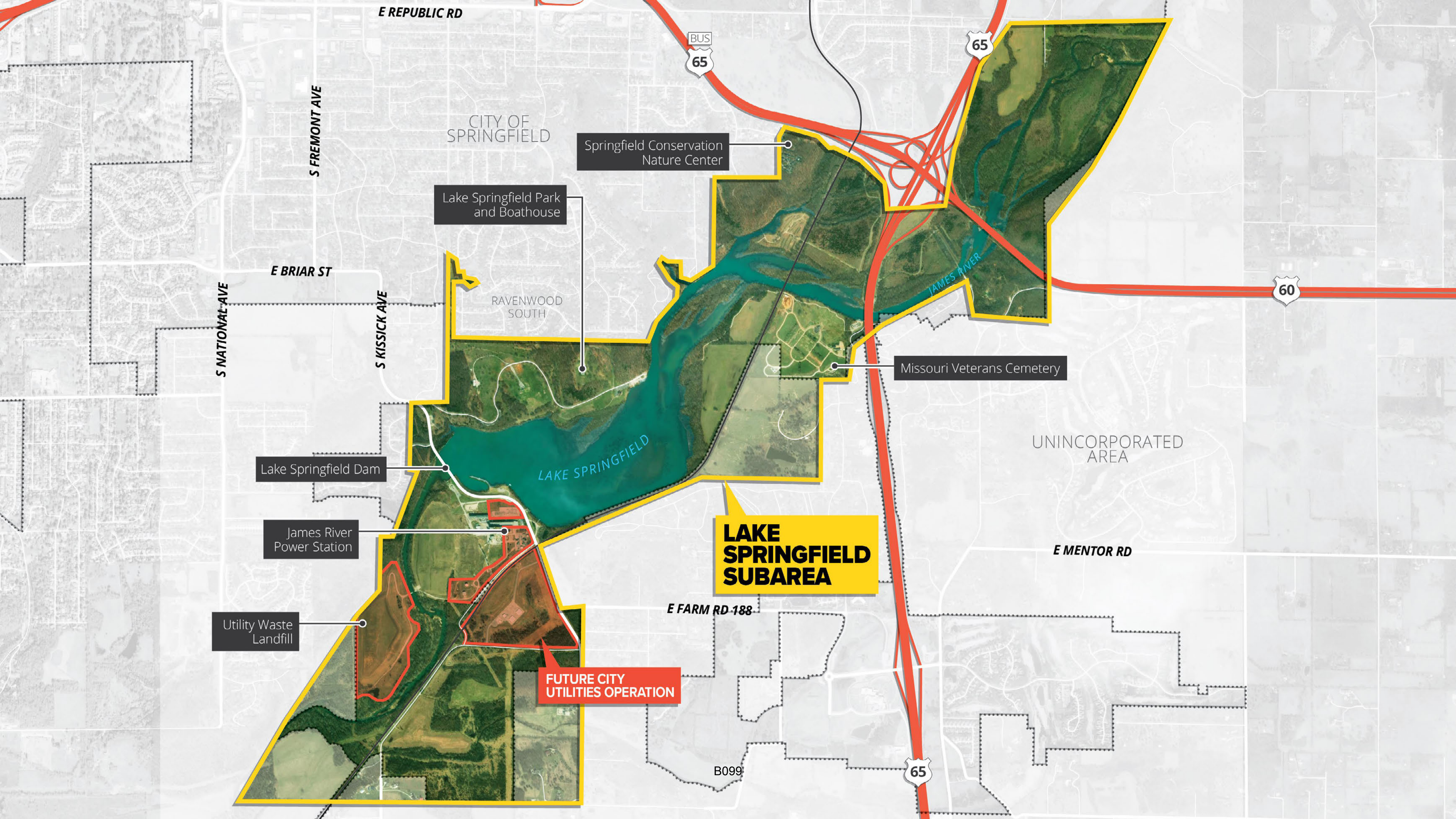
March 23, 2023 – Lake Ridge Estates Neighborhood Meeting (43 Attendees)

CMT
CITY OF Springfield
City Utilities Connecting Our Community
The PARK SPRINGFIELD-GREENE COUNTY PARK BOARD
Hatch
E·D·A U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

March 30, 2023 – City Utilities
(77 Attendees in Person – 00 Online)

PLANNING OVERVIEW


REIMAGINE
THE INTERSECTION OF NATURE, RECREATION AND ECONOMIC DEVELOPMENT
CMT
Geosyntec consultants
SWT DESIGN
HL HOUSEAL LAVIGNE ASSOCIATES
JOHNSON CONSULTING
Recreation Engineering & Planning
PRATT CONSULTING



E REPUBLIC RD
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CITY OF SPRINGFIELD
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E FARM RD 188
Utility Waste Landfill
FUTURE CITY UTILITIES OPERATION
B099
65

Planning Goals

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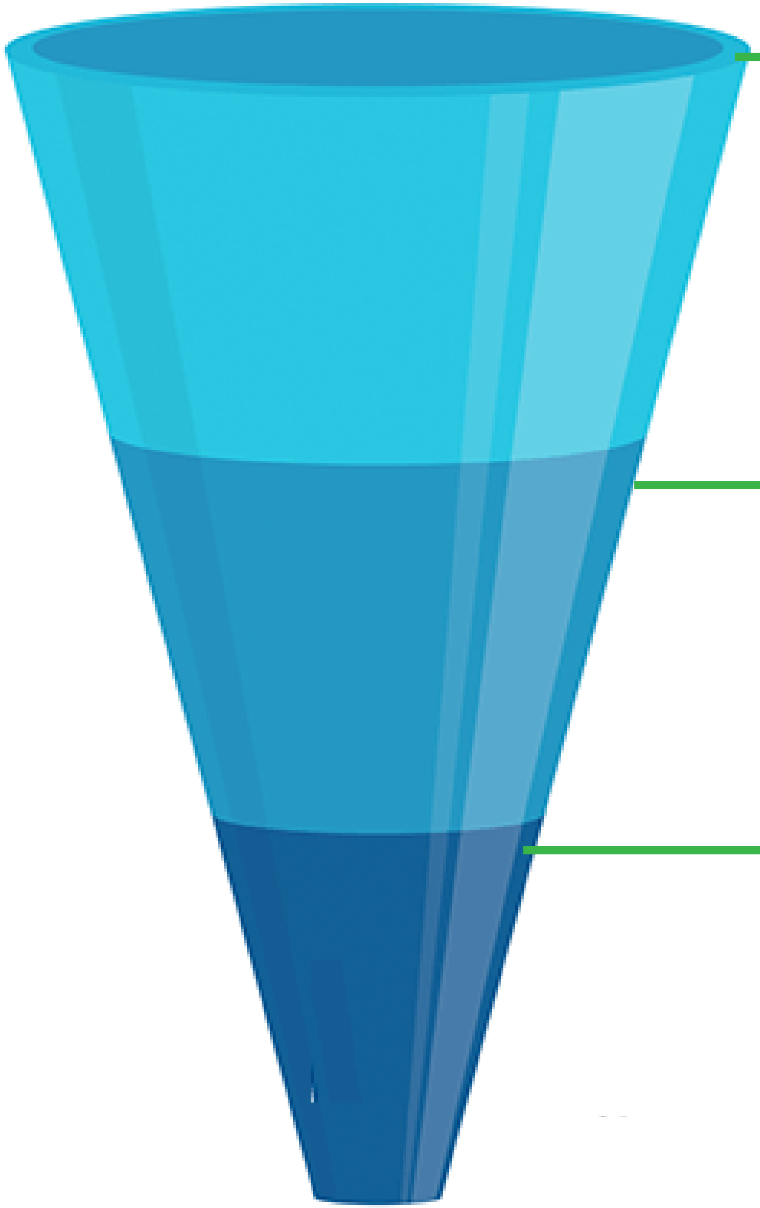
Planning Process



PUBLIC MEETING 02

Overview of Lake Springfield 1,000 acres

Dam Modification & Lake / River Preferences (*Geosyntec*)

Community Desired Amenities / Activities (*Johnson*)

Preferred Access / Circulation (*CMT*)

Community Preferred Character / Identity (*SWT Design)*

PUBLIC MEETING 03

Refined list of Amenities / Activities Design Concepts

Preferred Items from Public (*SWT & CMT*)

Impact Evaluation of Amenities / Activities (*Johnson*)

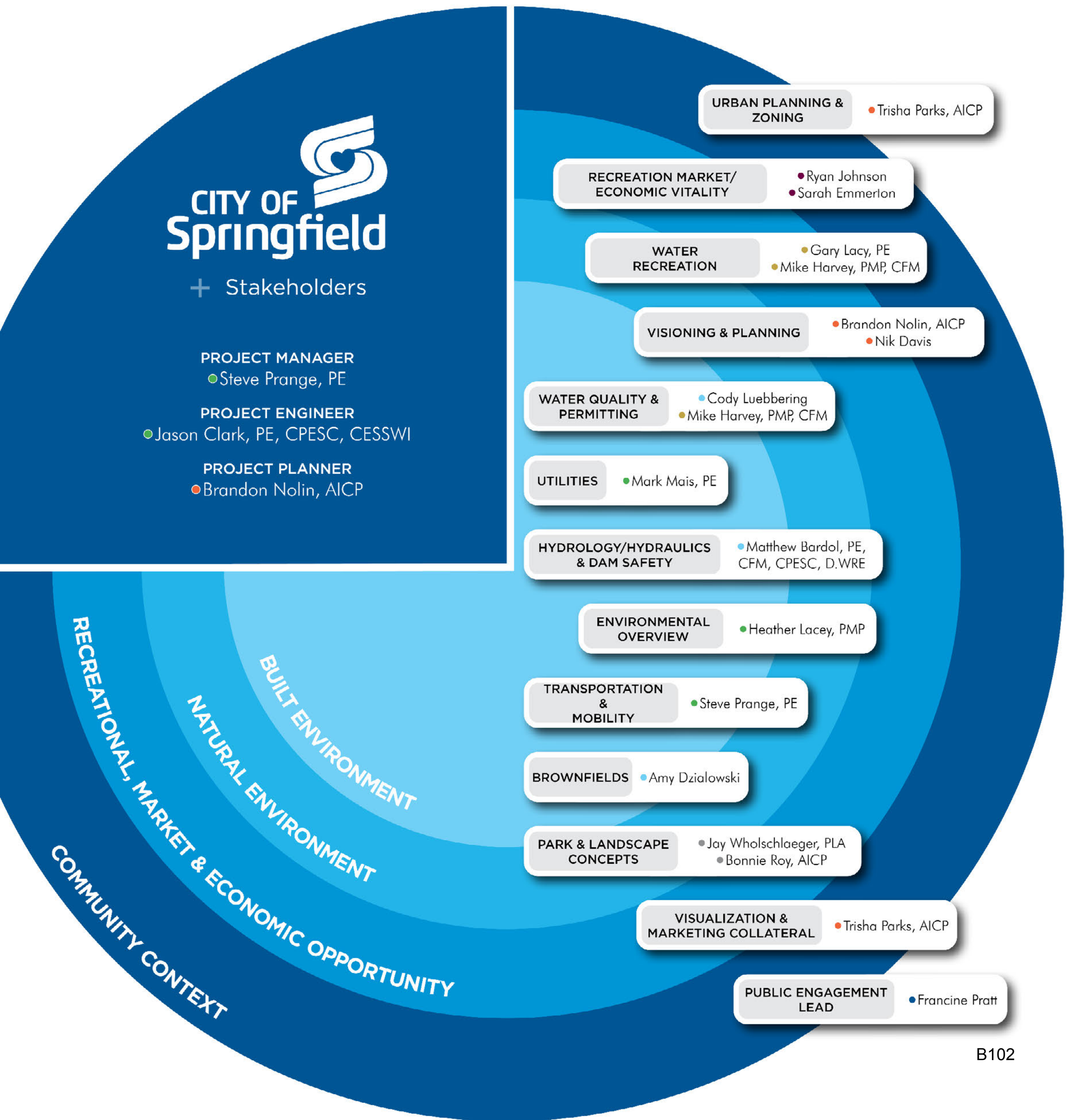
Community Preference Input - Concept Review with Project Criteria

FINAL PLAN PRESENTATION

Final Plan Concept

Final Amenities / Activities Impact Summary (*Johnson & SWT*)

LAKE SPRINGFIELD PLAN



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Tonight's Stations

1. **Welcome & Check In**
   (get the survey link at this station!)
2. **Planning Overview**
   (project background, goals, etc.)
3. **What You Said**
   (engagement summary)
4. **Economic Development**
   (potential lake activities, new uses & concepts, economic drivers)
5. **Site Concepts & Uses/Recreation**
   (parks & recreation, site layout & theme considerations)
6. **Hydraulics, Potential Dam Alternatives & Water Quality**
7. **Transportation & Mobility**
   (vehicular access & connectivity, trails, parking & regional access, public transportation)

Don't forget to take our online survey as you complete the stations. QR code found at station 1!

LAKE SPRINGFIELD PLAN

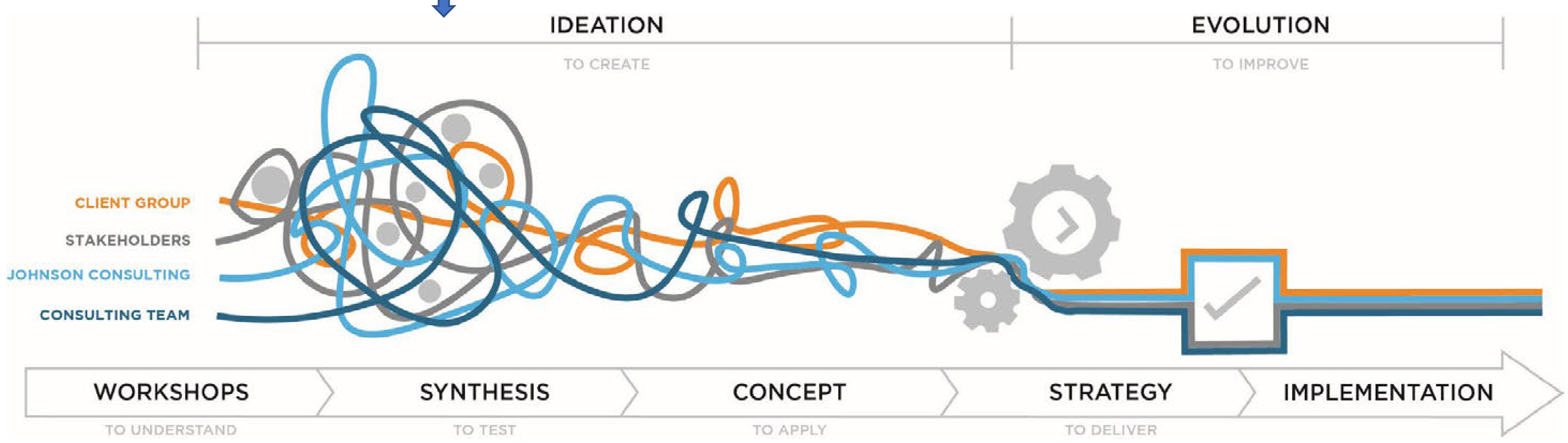
ECONOMIC DEVELOPMENT

JOHNSON CONSULTING

LAKE SPRINGFIELD PLAN

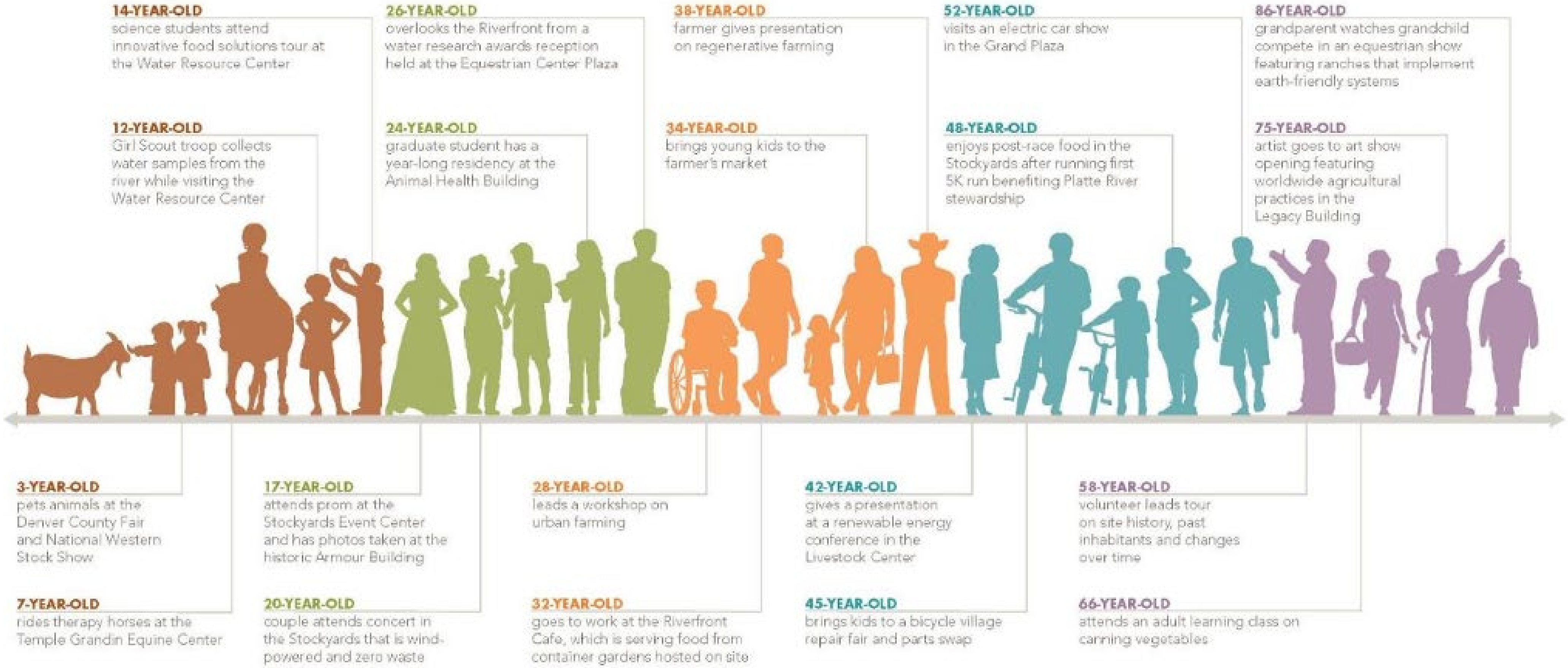
Project Process

We are here



LAKE SPRINGFIELD PLAN

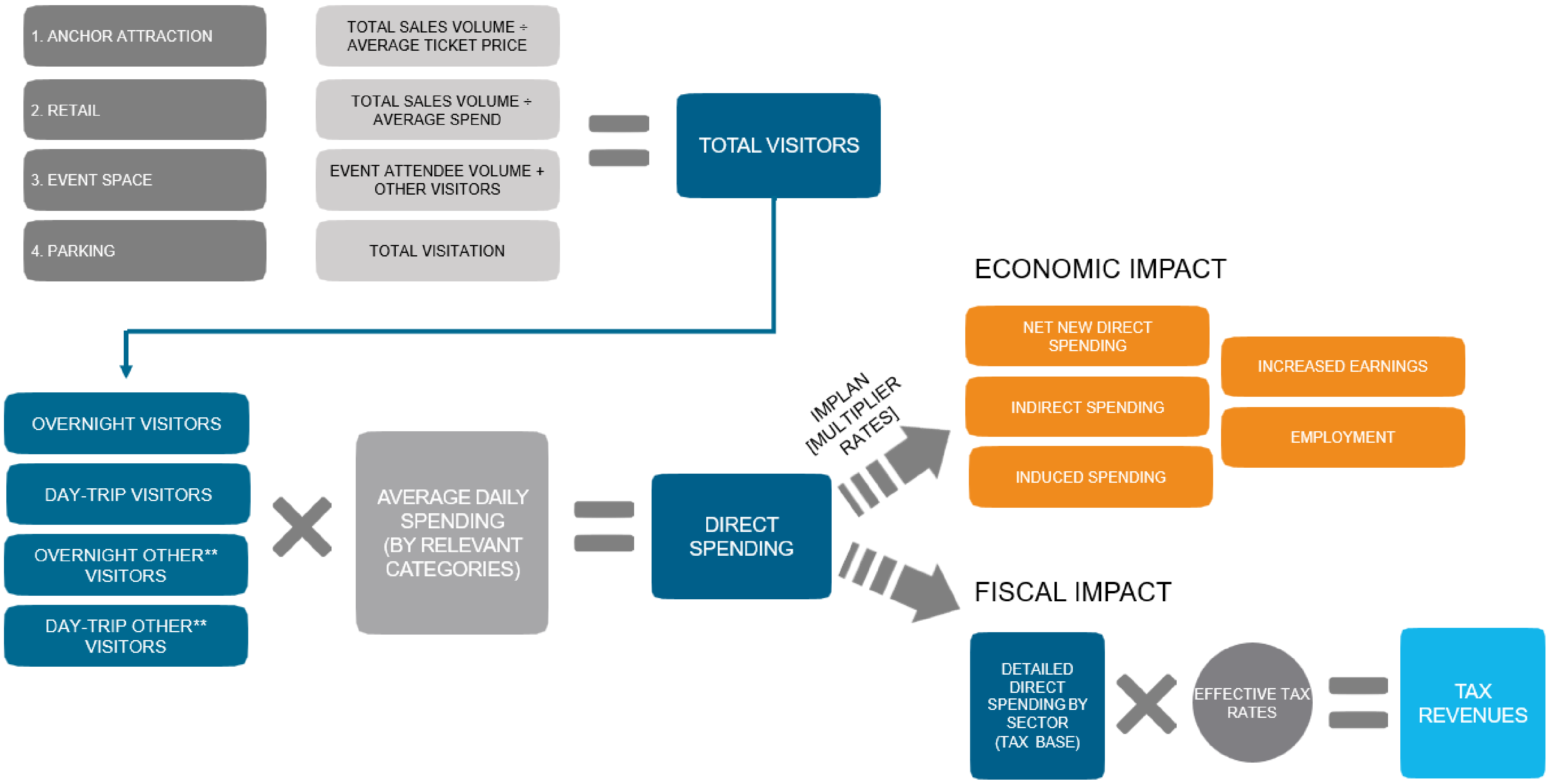
Planning for All



LAKE SPRINGFIELD PLAN

ECONOMIC DEVELOPMENT

Economic Impact Methodology



Springfield, MO - Market SWOT Analysis

S W O T

Strengths

- Easily accessible by air and vehicle transit
- Low unemployment rates
- Healthy and growing hotel supply
- Rated # 1 by the Wall Street Journal as work from home location in the nation
- Already seen as an outdoor recreation hub for region- Gateway to the Ozarks

Weakness

- Slow population growth
- Low average household income rate
- Competition among priorities- Convention Center, many other initiatives;
- Project implementation plan must follow in overall community economic picture

Opportunities

- Improve public transit access
- Large proportion of a well-educated, younger family-oriented
- Fill asset supply gaps
- Provide regional asset at scale to be a meaningful economic engine

Threats

- No action at Lake Springfield
- Considering a higher risk scenario
- Inability to organize funding, especially as it relates to other parties- Fed, State and benefactor support

ECONOMIC DEVELOPMENT

Gap Analysis – Area of Opportunity

→Destination hub between the Gateway to Ozarks (Springfield), Branson and Crystal Bridges

→Lake can bring Springfield one step closer to a "complete tourism package."

→Need to concentrate on create hubs of recreation, outdoor sports, indoor sports

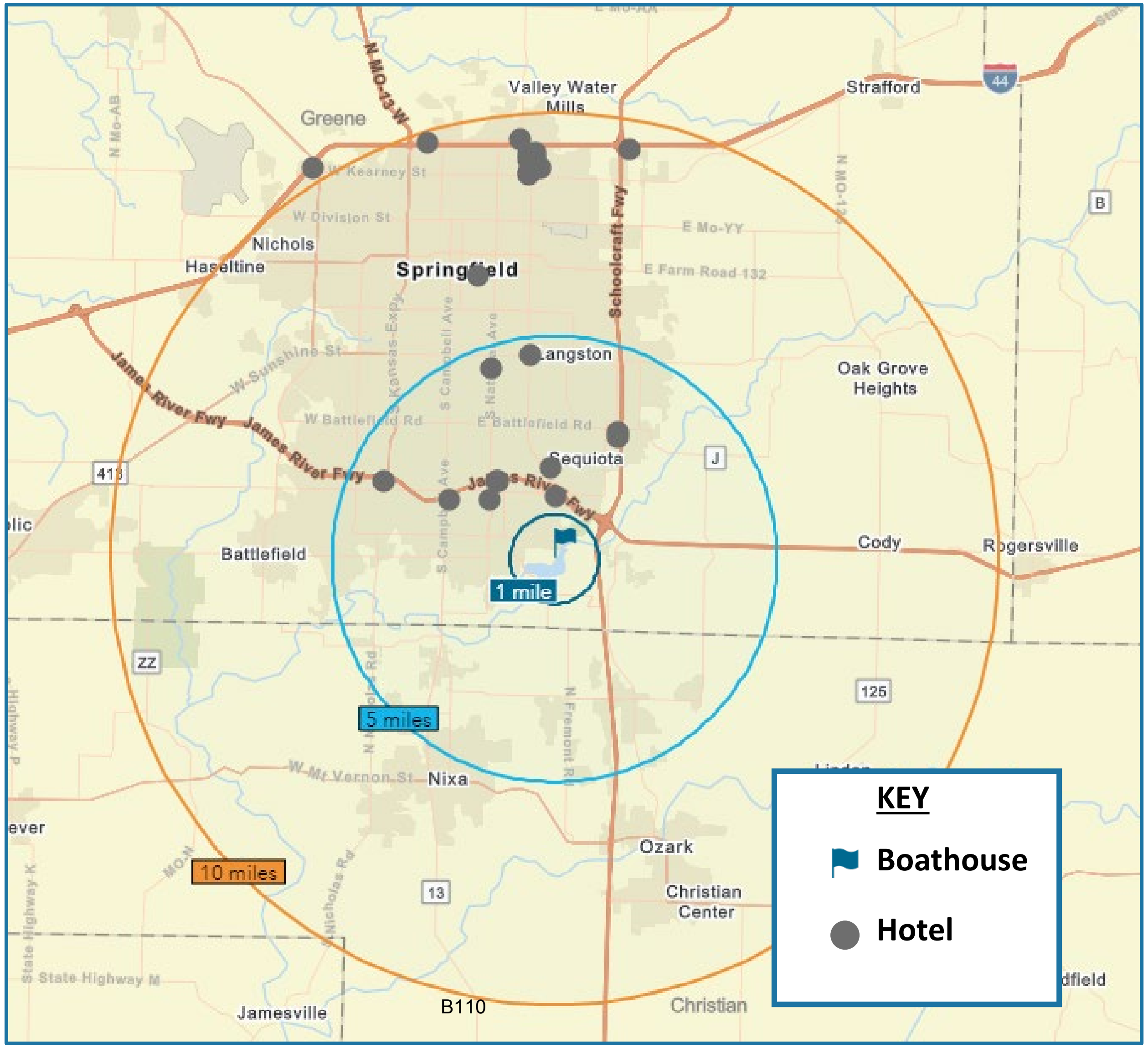
→Needs critical mass and acclaim/ traditional to move needle; smaller improvement scale is great regionally, but will still be market amenity but not a driver.

LAKE SPRINGFIELD PLAN

ECONOMIC DEVELOPMENT

Gap Analysis – Hotel Inventory

Hotel Supply
<1 mile = 0
Between 1 and 5 miles = 1,267
Between 5 and 10 miles = 2,271



Gap Analysis – Hotel Market- Leading Indicator for Tourism Economic Development- Just one measure

Existing Market Conditions	
Existing Rooms	6,000
Under Construction	300
Total Rooms	6,300
Required Room Nights @ 70% Occupancy	1,609,650
Current Rooms @ 65% Occupancy	1,423,500
Room Nights Needed for Overall Market Health	**186,150**

Source: CoStar, Johnson Consulting

Optimal Market Lift Targets		
Sports Toursim	93,075	50%
Leisure	46,538	25%
Business Growth	9,308	5%
Conventions and Conferences	37,230	20%
Total	**186,150**	**100%**

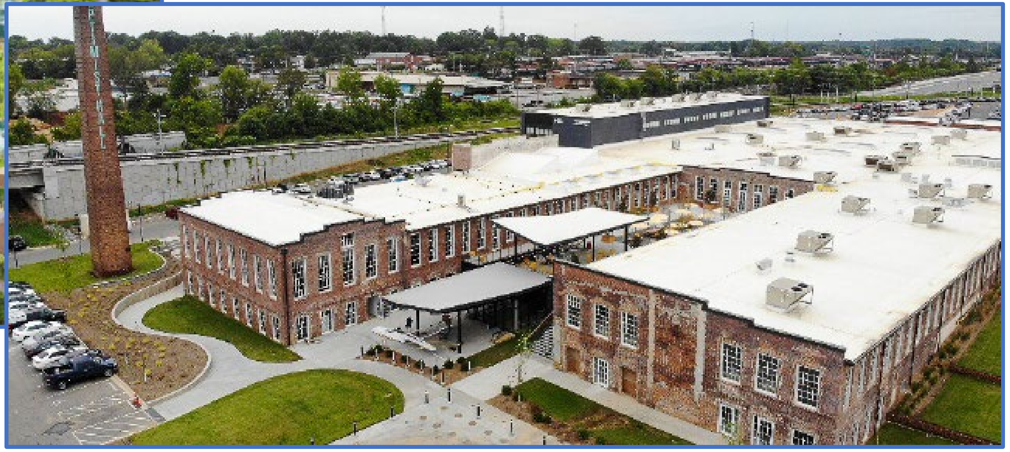
Source: Johnson Consulting

LAKE SPRINGFIELD PLAN

Case Studies

- Origins Park - Jeffersonville, IN
  - **Theme:** Scale, history; activity areas and center of large population base access to river that has not existed
- Optimist Hall – Charlotte, NC
  - **Theme:** redeployment of building with character, nature of building (brick loft) and location- immediately next to downtown

Origins Park



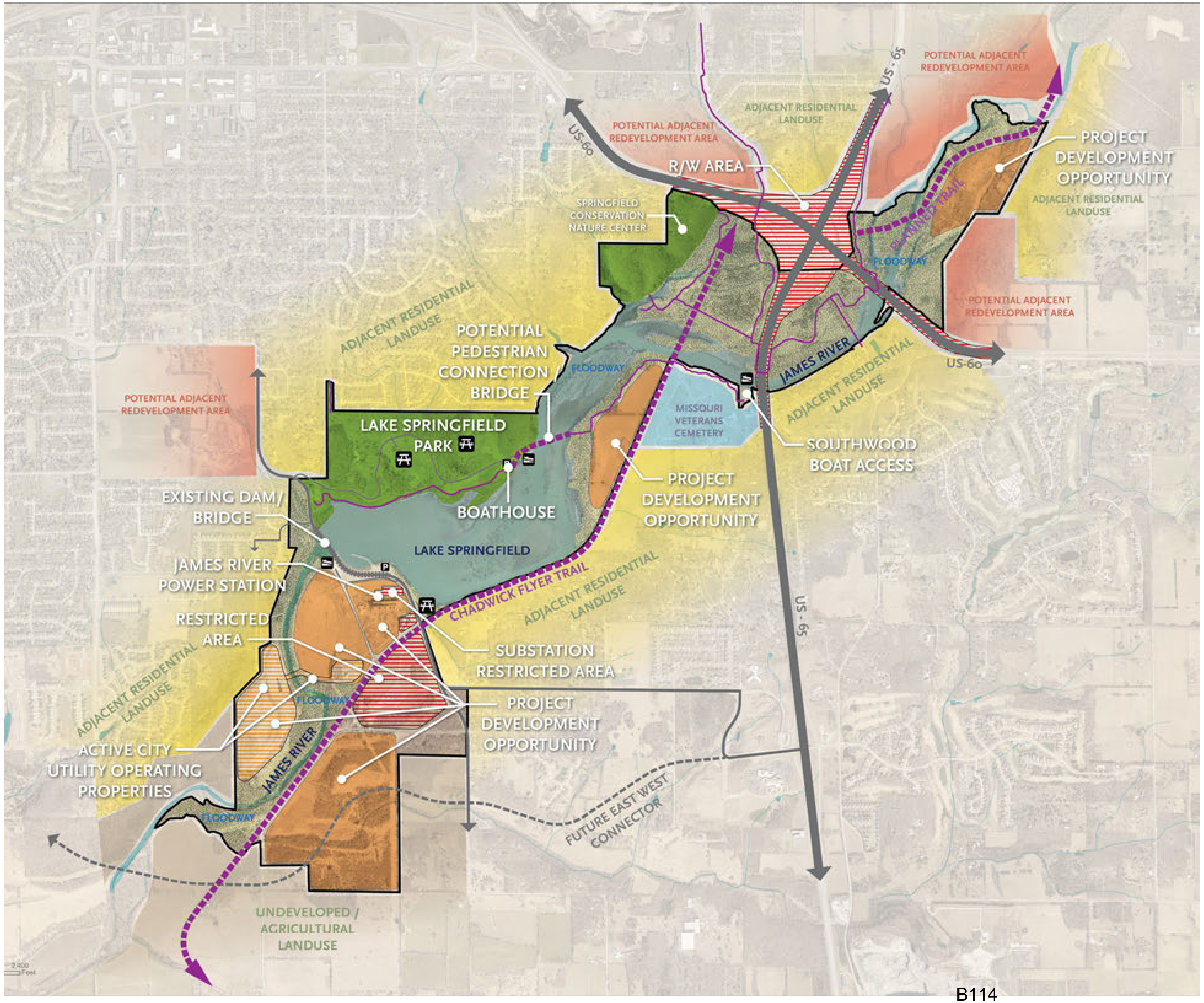
Optimist Hall

SITE CONCEPTS & USES/ RECREATION

SWT DESIGN

LAKE SPRINGFIELD PLAN

Site Concepts & Uses/Recreation



SITE ANALYSIS & THEMES

ECO TOURISM - OZARK (PLACE)

RECREATION DESTINATION (PLACE/EVENT)

ENTERTAINMENT DISTRICT (EVENT)

LAKE SPRINGFIELD PLAN

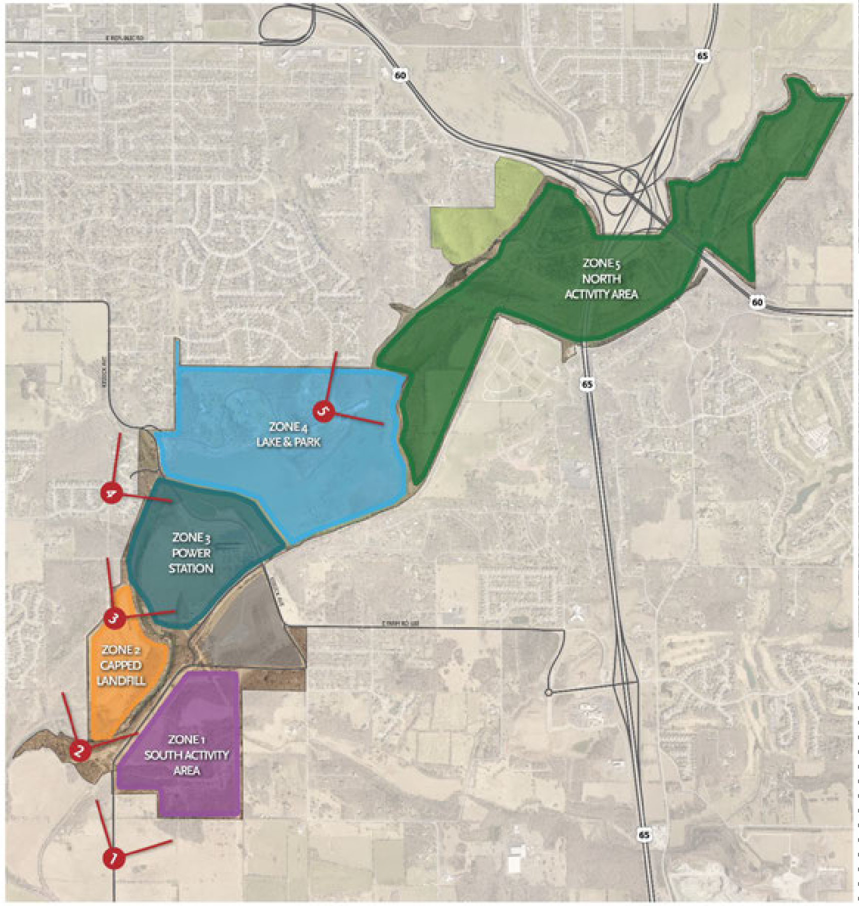
Site Concepts & Uses/Recreation

ACTIVITY ZONES

ZONE 1 - South Activity Area

ZONE 2 - Capped Landfill Area

ZONE 3 - Power Station/Dam Area



1 VIEWSHED FROM OBSERVER'S LOCATION

ZONE 4 - Lake/Park Area

ZONE 5 - North Activity Area

LAKE SPRINGFIELD PLAN

Site Concepts & Uses/Recreation

WE NEED YOUR INPUT

- **What character images for each zone excite you?** (*Place stickers under your top* **three**)
- **What are your thoughts on each Zone?** (*Use sticky notes to provide your thoughts and* input)

Activity Zone Site Features:

- *Approximately 130 acres in size*
- *Open fields and woodlands covering rolling topography*
- *Utilities and creek are development considerations*
- *Adjacent to the Chadwick Flyer Trail and James River*
- *South access point for Lake Springfield*
- *Potential for a destination activity*

Possible Activities Include:

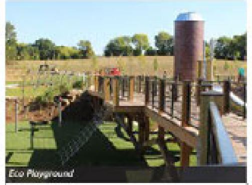
- *Lodging (cabins / camping)*
- *Lake with Amenities*
- *Playgrounds*
- *Trails / Trailhead*
- *Athletic Field Complex / Unique Sports*
- *Adventure Recreation (bike/skate park, lake, etc.)*
- *Woodland Restoration*
- *River Access*

ZONE 1 - South Activity

ECOLOGICAL


Eco Cabin

PREFERENCE DOTS HERE


Eco Playground

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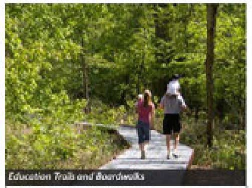
Education Trails and Boardwalks

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RECREATION


Athletic Fields

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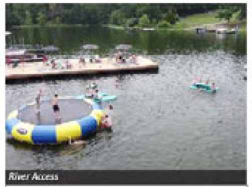
River Access

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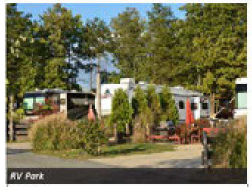
Adventure Recreation - Bike Park

PREFERENCE DOTS HERE

ENTERTAINMENT


RV Park

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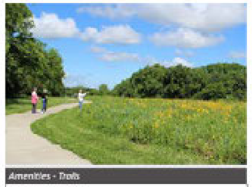

Amenities - Trails

PREFERENCE DOTS HERE


Hospitality Event Space

PREFERENCE DOTS HERE

INCLUDE COMMENTS HERE

Activity Zone Site Features:

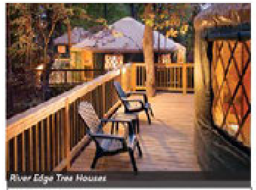
- *Approximately 50 acres in size*
- *Requires coordination and planning for use*
- *Flat and open space for use as a passive or light active recreation amenity area*
- *Access requires crossing the James River*
- *Access to the Chadwick Flyer Trail, South Amenity Zone, and the James River*
- *Views of the power station and dam*

Possible activities include:

- *Native Landscape, Art, & Education (site & ecology)*
- *Astronomy Viewing Area*
- *Fitness Course*
- *Practice / Open Play Turf Fields*
- *River Edge Tree Houses*
- *Trails*

ZONE 2 - Capped Landfill

ECOLOGICAL


River Edge Tree Houses

PREFERENCE DOTS HERE


Astronomy Viewing Area

PREFERENCE DOTS HERE

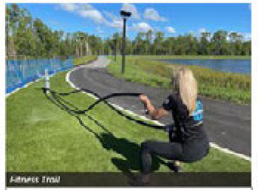

Native Landscape with Trails

PREFERENCE DOTS HERE

RECREATION


Practice Fields

PREFERENCE DOTS HERE


Fitness Trail

PREFERENCE DOTS HERE


Open Lawn

PREFERENCE DOTS HERE

ENTERTAINMENT


Public Art

PREFERENCE DOTS HERE


Small Pavilions / [illegible]

PREFERENCE DOTS HERE

PREFERENCE DOTS HERE

INCLUDE COMMENTS HERE

LAKE SPRINGFIELD PLAN

Site Concepts & Uses/Recreation

WE NEED YOUR INPUT

- **What character images for each zone excite you?** (*Place stickers under your top* **three**)
- **What are your thoughts on each Zone?** (*Use sticky notes to provide your thoughts and* input)

Activity Zone Site Features:

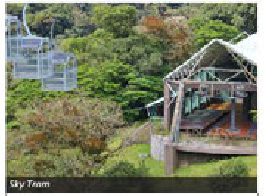
- Signature space at Lake Springfield
- Several surrounding areas remain in service for CU
- Redevelopment of the Power Station as a catalyst for economic, employment and recreation opportunities
- Consider the identity, character, and visitor experience

Possible activities include:

- Themed Lodging
- Museum / Skills Training
- Day Trip Outpost
- Trailhead / Transit Station
- Indoor Athletics / Adventure Recreation / Event Space
- Midway / Outdoor Education / Gardens
- River Access / Overlook
- Amphitheater / Demonstration Areas

ZONE 3 - Power Station

ECOLOGICAL


Sky Tram

PREFERENCE DOTS HERE


Eduction and Demonstration Areas

PREFERENCE DOTS HERE

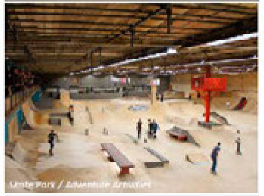

Amphitheater

PREFERENCE DOTS HERE

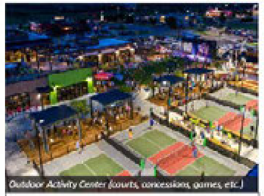
RECREATION


Indoor Fields / Courts

PREFERENCE DOTS HERE

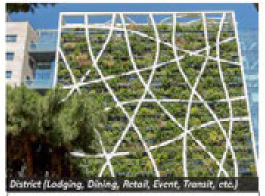

Skate Park / Adventure Activities

PREFERENCE DOTS HERE


Outdoor Activity Center (courts, concessions, games, etc.)

PREFERENCE DOTS HERE

ENTERTAINMENT


District (Lodging, Dining, Retail, Event, Transit, etc.)

PREFERENCE DOTS HERE


Iconic Walk/Bridge Overlook

PREFERENCE DOTS HERE


Waterfront Amphitheater

PREFERENCE DOTS HERE

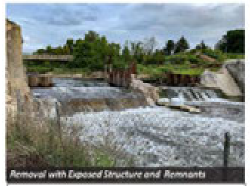
INCLUDE COMMENTS HERE

Activity Zone Site Features:

- Possible dam modifications have been identified by Geosyntec (station #6)
- Images on this board represent the character and opportunities each of the modification possibilities could provide
- Please identify your preferences for possible dam modification aesthetics
- Following review of these images you will continue to Station #6 and provide input on the dam and lake modification scenarios.

ZONE 3 - Dam Modification Options

ECOLOGICAL (PARTIAL REMOVAL)


Removal with Exposed Structure and Remnants

PREFERENCE DOTS HERE


Section Removal with Open Flow

PREFERENCE DOTS HERE

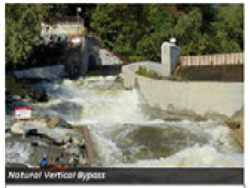

Section Removal with Overlook

PREFERENCE DOTS HERE

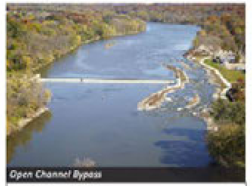
RECREATION (BYPASS CHANNEL)


Walled Channel Bypass

PREFERENCE DOTS HERE

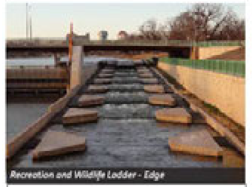

Natural Vertical Bypass

PREFERENCE DOTS HERE

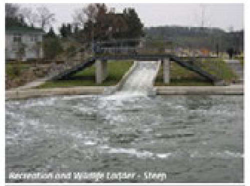

Open Channel Bypass

PREFERENCE DOTS HERE

ENTERTAINMENT (LOWER SPILLWAY)


Recreation and Wildlife Ladder - Edge

PREFERENCE DOTS HERE


Recreation and Wildlife Ladder - Steep

PREFERENCE DOTS HERE


Recreation and Wildlife Ladder - Shallow

PREFERENCE DOTS HERE

INCLUDE COMMENTS HERE

LAKE SPRINGFIELD PLAN

Site Concepts & Uses/Recreation

Activity Zone Site Features:

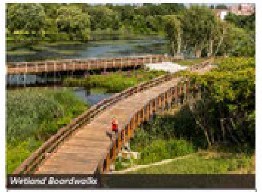
- Approximately 330 acres of existing public park and water based amenity area.
- Located north of the Power Station and dam.
- Opportunity to expand on its existing offerings or
- Opportunity to be re-imagined based on the redeveloped Power Station and modified dam.

Possible activities include:

- Restore River Channel and Create Wetland
- Dredge Lake for Deeper Water
- Activate Lake Edge with Access
- Group Camping / Nature Based Education
- Nature Center / Marina
- Expanded Disc Golf and Day Use Amenities
- Expand Pedestrian Access to Park
- New Vehicular Entry and Park Access
- Cabins / Lodges with Amenities along Lake Edge

ZONE 4 - Lake & Park

ECOLOGICAL


Wetland Boardwalks

PREFERENCE DOTS HERE


Overlooks / Education

PREFERENCE DOTS HERE


Group Camping

PREFERENCE DOTS HERE

RECREATION


Fishing / Classes

PREFERENCE DOTS HERE


Disc Golf

PREFERENCE DOTS HERE


Event Lawn

PREFERENCE DOTS HERE

ENTERTAINMENT


Boat Rentals

PREFERENCE DOTS HERE


Destination Playground

PREFERENCE DOTS HERE


Lake Edge Tree Houses

PREFERENCE DOTS HERE

INCLUDE COMMENTS HERE

WE NEED YOUR INPUT

- **What character images for each zone excite you?** (*Place stickers under your top* **three**)
- **What are your thoughts on each Zone?** (*Use sticky notes to provide your thoughts and* input)

Activity Zone Site Features:

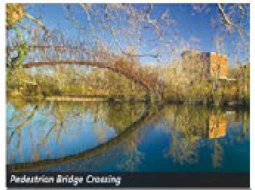
- Approximately 450 acres in size
- Along the James River north of Lake Springfield
- I-des the Nature Center, Southwood Access, and 65/60 interchange
- A significant amount of the area is located within the James River floodway and flood plain.
- Existing trails provide connection over the James River, under the highways, and connect to the Nature Center and Galloway Creek Greenway.

Possible activities include:

- Bridge Crossing North of Lake Springfield
- Loop Trail Development with Chadwick Flyer
- Branding and Identity at 65/60 Interchange
- North side trailhead and river access
- E. Timbercrest Road trail connection

ZONE 5 - North Activity

ECOLOGICAL


Pedestrian Bridge Crossing

PREFERENCE DOTS HERE

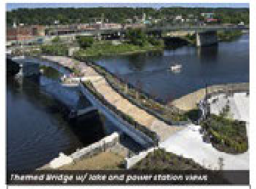

Trailhead Play Amenities

PREFERENCE DOTS HERE


Gathering Space / Pavilions

PREFERENCE DOTS HERE

RECREATION


Themed Bridge w/ lake and power station views

PREFERENCE DOTS HERE

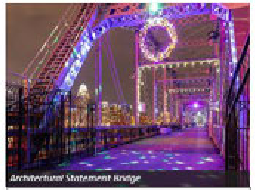

Landmark / Signature Art

PREFERENCE DOTS HERE


River Access

PREFERENCE DOTS HERE

ENTERTAINMENT


Architectural Statement Bridge

PREFERENCE DOTS HERE


Trailhead / Parking

PREFERENCE DOTS HERE


Camping

PREFERENCE DOTS HERE

INCLUDE COMMENTS HERE

LAKE SPRINGFIELD PLAN

TRANSPORTATION & MOBILITY

TRANSPORTATION & MOBILITY

GOAL:

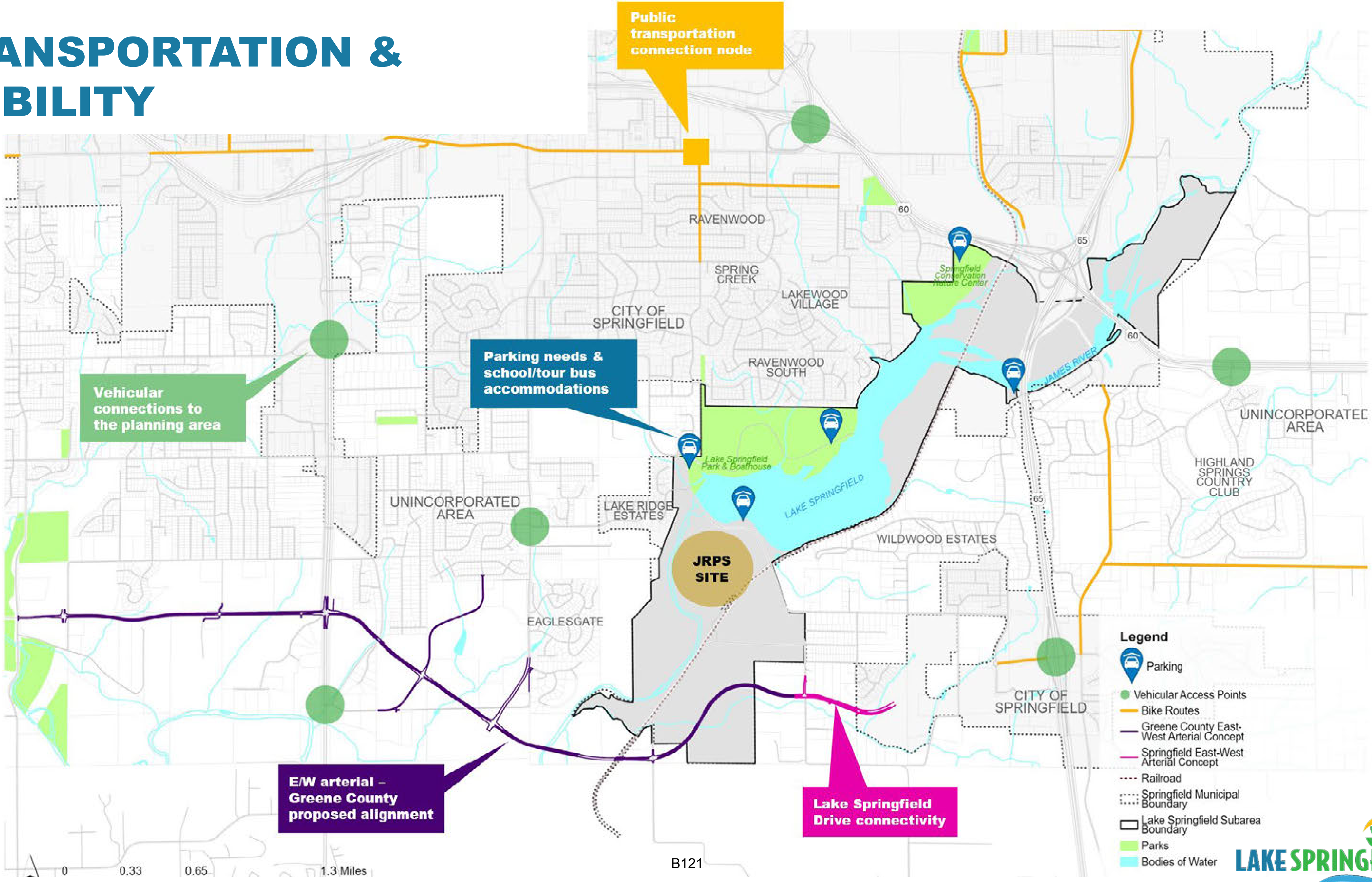
Focus on Transportation Enhancements that are accessible and equitable to Lake Springfield and the Surrounding Communities

AREAS OF FOCUS:

- Vehicular connections & access (roadway improvements)
- Bike/ped connectivity & safety (trails, sidewalks, etc.)
- Boat ramp access
- Public transportation
- Parking
- Cross-lake connectivity
- E/W connection (Lake Springfield Drive)

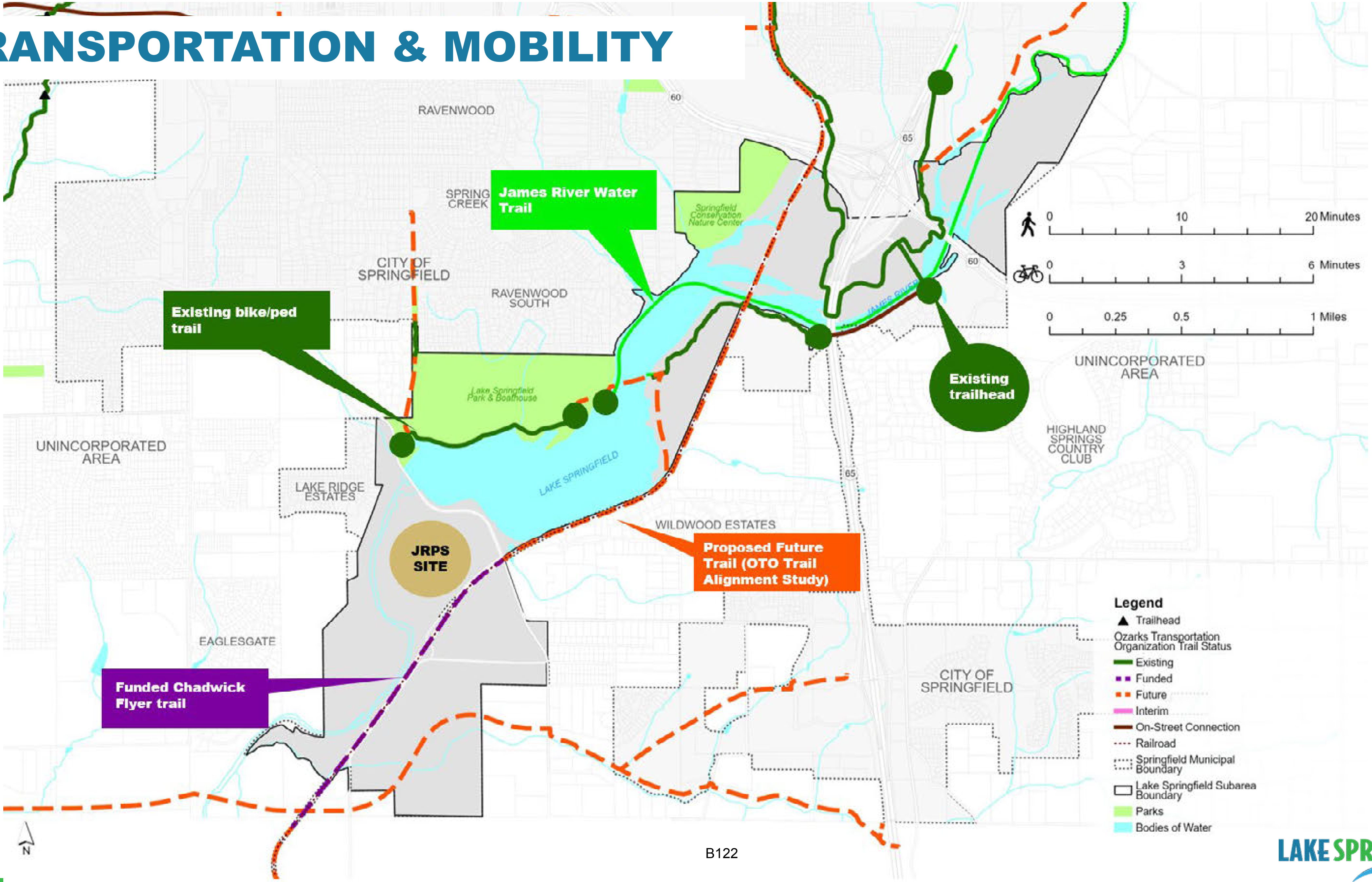
LAKE SPRINGFIELD PLAN

TRANSPORTATION & MOBILITY



LAKE SPRINGFIELD PLAN

TRANSPORTATION & MOBILITY



TRANSPORTATION & MOBILITY

Rank access & circulation options

- Vehicular & Gateways
- Boat Ramp
- Walking & Rolling

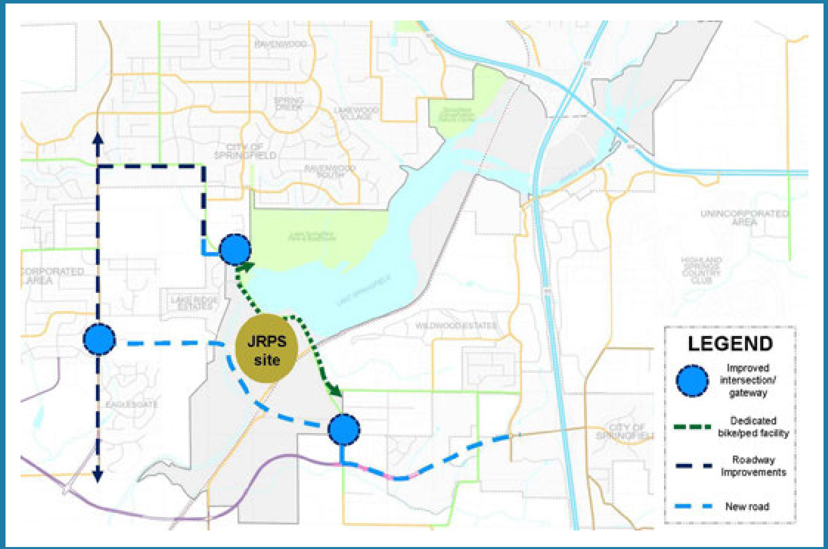
Rank transportation priorities for Lake Springfield Plan

Pick your preferred Kissick alternative

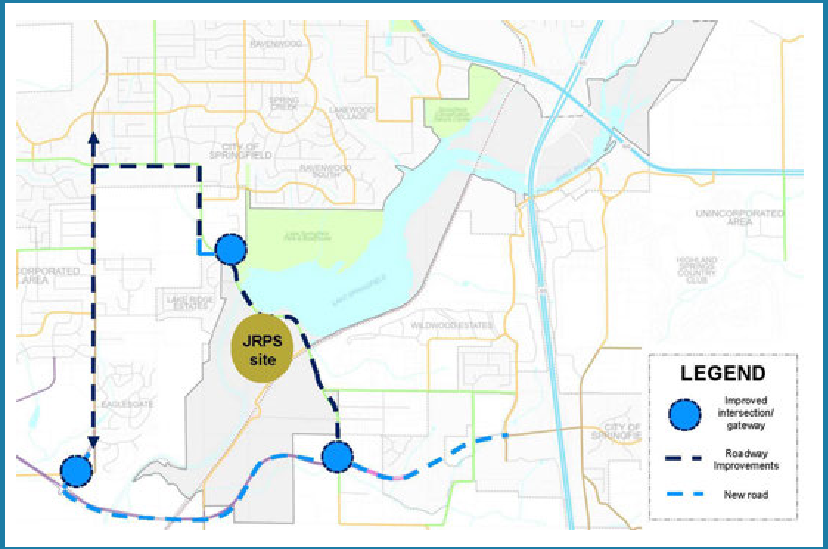
- Take cars off Kissick – open to bikes & peds only
- Keep cars on Kissick – main access to JRPS Site

LAKE SPRINGFIELD PLAN

TRANSPORTATION & MOBILITY



OPTION 1



OPTION 2

LAKE SPRINGFIELD PLAN

TRANSPORTATION & MOBILITY

Parking

Trails

Vehicular Access/Entry

Public Transit

Boat Ramp Access

Sidewalks & ADA

River/lake crossings

Place comments here

OTHER

LAKE SPRINGFIELD PLAN

TRANSPORTATION & MOBILITY

Kissick for bicycles & pedestrians only; no vehicular traffic

Kissick: roadway improvements to accommodate more car trips; main entry to JRPS

Hydraulics & Water Quality

Geosyntec consultants

LAKE SPRINGFIELD PLAN

Gravitational End Points & Associated Drivers

Dam Modification

- Remove to eliminate liability
- Re-establish free flowing river
- Provide fish & kayak passage

Sediment Dredging or Management

- Create deeper pools for habitat & water quality
- Address potential legacy contaminants
- Extend life of lake

Water Quality

- Water uses (e.g. swimming vs kayaking)
- Maintain aesthetics

Potential Dam Modification Alternatives

Re-establish River Ecosystem
Remove or reduce liability of maintaining a Dam

- Full Dam Removal
- Partial Dam Removal

Provide Kayak and Fish Passage

- Concrete Dam Modification
- Earth Embankment Modification

Avoid modification
Provide Lake Enhancements

- No Modification

Tonight's Stations

1. **Welcome & Check In**
   (get the survey link at this station!)
2. **Planning Overview**
   (project background, goals, etc.)
3. **What You Said**
   (engagement summary)
4. **Economic Development**
   (potential lake activities, new uses & concepts, economic drivers)
5. **Site Concepts & Uses/Recreation**
   (parks & recreation, site layout & theme considerations)
6. **Hydraulics, Potential Dam Alternatives & Water Quality**
7. **Transportation & Mobility**
   (vehicular access & connectivity, trails, parking & regional access, public transportation)

Don't forget to take our online survey as you complete the stations. QR code found at station 1!

LAKE SPRINGFIELD PLAN

Q&A

CMT

CITY OF Springfield

City Utilities
Connecting Our Community

The PARK
SPRINGFIELD-GREENE COUNTY PARK BOARD

Hatch

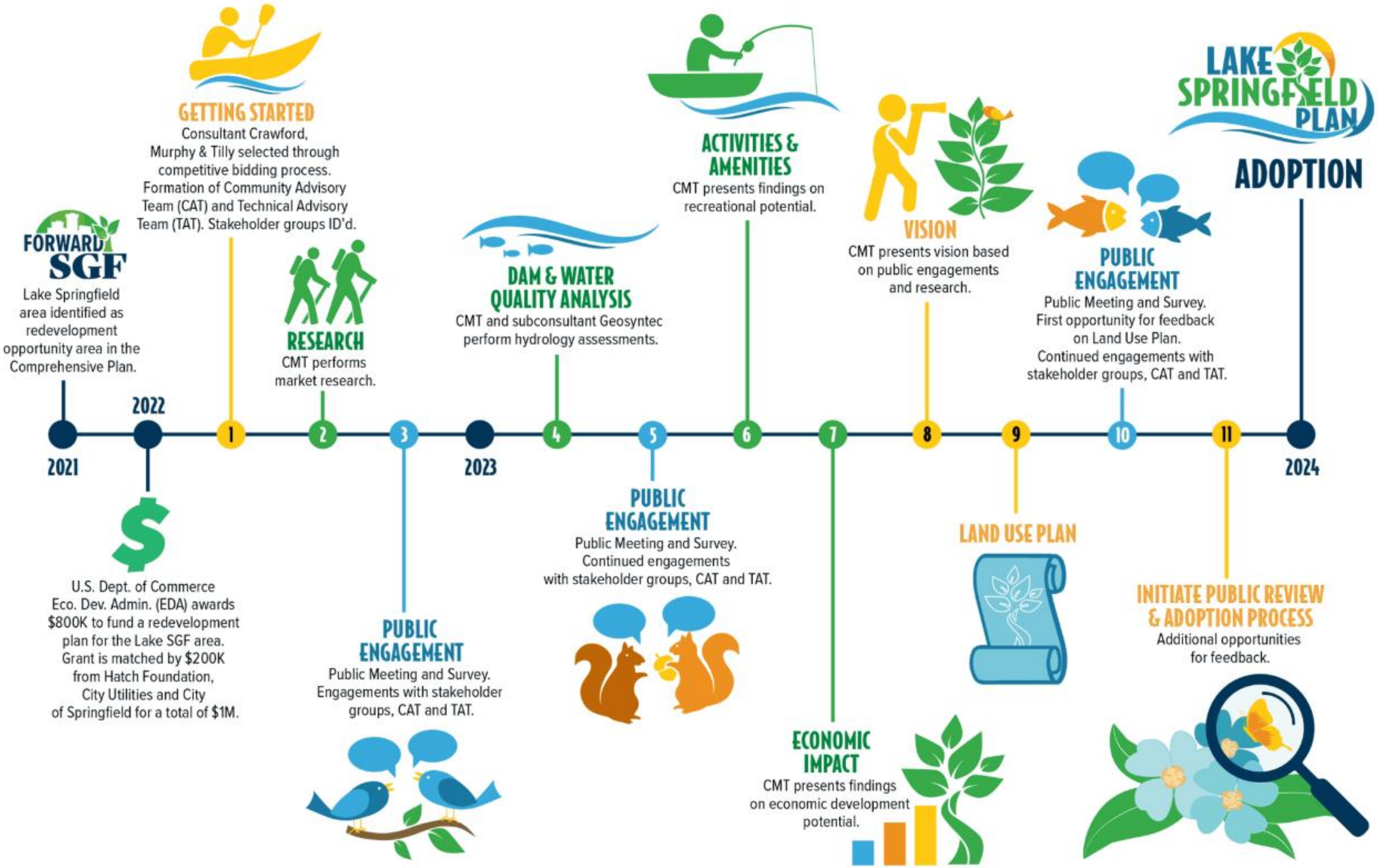
E·D·A
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

LAKE SPRINGFIELD PLAN

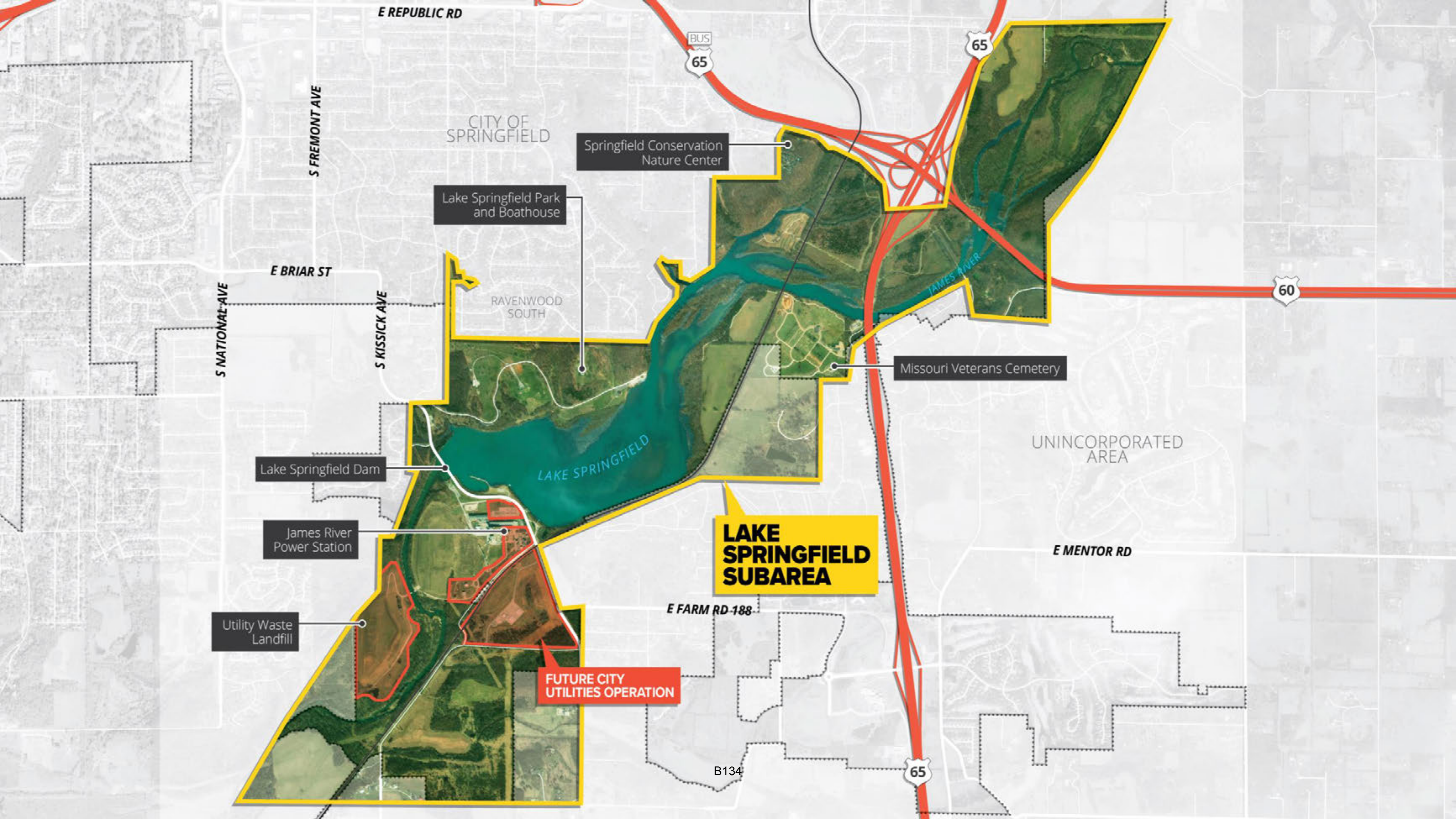
CAT & TAT Meeting No. 3
09.14.2023

CMT
CITY OF Springfield
City Utilities
Connecting Our Community
The PARK
SPRINGFIELD-GREENE COUNTY PARK BOARD
Hatch
E·D·A
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

Timeline



FORWARD SGF
Lake Springfield area identified as redevelopment opportunity area in the Comprehensive Plan.
2021
2022
U.S. Dept. of Commerce Eco. Dev. Admin. (EDA) awards $800K to fund a redevelopment plan for the Lake SGF area. Grant is matched by $200K from Hatch Foundation, City Utilities and City of Springfield for a total of $1M.
1
GETTING STARTED
Consultant Crawford, Murphy & Tilly selected through competitive bidding process. Formation of Community Advisory Team (CAT) and Technical Advisory Team (TAT). Stakeholder groups ID'd.
2
RESEARCH
CMT performs market research.
3
PUBLIC ENGAGEMENT
Public Meeting and Survey. Engagements with stakeholder groups, CAT and TAT.
2023
4
DAM & WATER QUALITY ANALYSIS
CMT and subconsultant Geosyntec perform hydrology assessments.
5
PUBLIC ENGAGEMENT
Public Meeting and Survey. Continued engagements with stakeholder groups, CAT and TAT.
6
ACTIVITIES & AMENITIES
CMT presents findings on recreational potential.
7
ECONOMIC IMPACT
CMT presents findings on economic development potential.
8
VISION
CMT presents vision based on public engagements and research.
9
LAND USE PLAN
10
PUBLIC ENGAGEMENT
Public Meeting and Survey. First opportunity for feedback on Land Use Plan. Continued engagements with stakeholder groups, CAT and TAT.
11
INITIATE PUBLIC REVIEW & ADOPTION PROCESS
Additional opportunities for feedback.
2024
LAKE SPRINGFIELD PLAN
ADOPTION



E REPUBLIC RD
BUS 65
65
S FREMONT AVE
CITY OF SPRINGFIELD
Springfield Conservation Nature Center
Lake Springfield Park and Boathouse
E BRIAR ST
S NATIONAL AVE
S KISSICK AVE
RAVENWOOD SOUTH
JAMES RIVER
60
Missouri Veterans Cemetery
UNINCORPORATED AREA
Lake Springfield Dam
LAKE SPRINGFIELD
James River Power Station
LAKE SPRINGFIELD SUBAREA
E MENTOR RD
E FARM RD 188
Utility Waste Landfill
FUTURE CITY UTILITIES OPERATION
65

Planning Goals

1. Attract Innovative **Economic Development & Resilient Job Creation** within the study area that complements Regional Vision and Priorities.
2. Develop a Strategy for **Sustainable Water Quality & Green Infrastructure** Improvements.
3. Establish an **Adaptive Reuse Strategy** for the James River Power Station.
4. Focus on **Transportation enhancements** that are accessible and equitable to Lake Springfield and the Surrounding Communities.
5. Embrace **Active and Passive Recreational Opportunities** as a Regional Economic Development Catalyst.
6. Engage the Community in a way that is Inclusive of a **Diverse and Multi-Cultural Perspective**.

CMT
CITY OF Springfield
City Utilities
Connecting Our Community
The PARK
SPRINGFIELD-GREENE COUNTY PARK BOARD
Hatch
E·D·A
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

PUBLIC INPUT PROCESS TO DATE

OCT-NOV 2022 | JAN 2023 | MARCH 2023 | MAY 2023

Public Engagement

- **October 12, 2022** Neighborhood Forum
- **November 17, 2022** Public Community Meeting #1
- **March 23, 2023** Lake Ridge Estates Neighborhood Meeting
- **March 30, 2023** City Utilities Meeting
- **May 4, 2023** Public Community Meeting #2

Survey

- **October 12, 2022** Online Survey
- **November 17, 2022** Online Survey
- **Jan 2023** Survey Traditional & Focused Outreach
- **May 4, 2023** Online Survey

C.A.T.

- **November 15, 2022** CAT Meeting #1
- **March 21, 2023** CAT Meeting #2

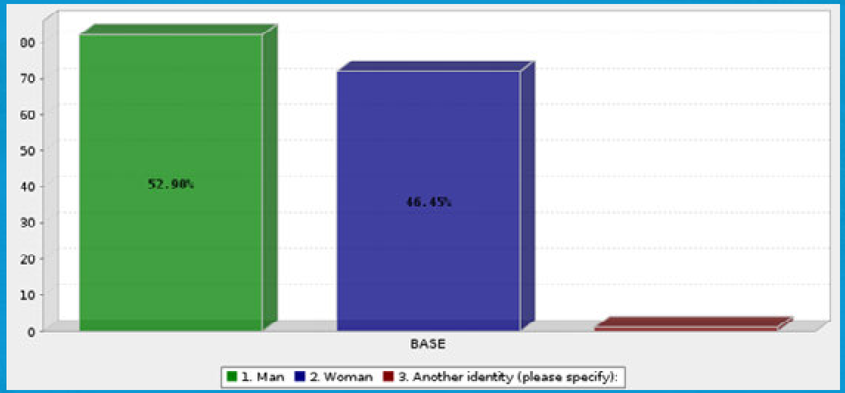
T.A.T.

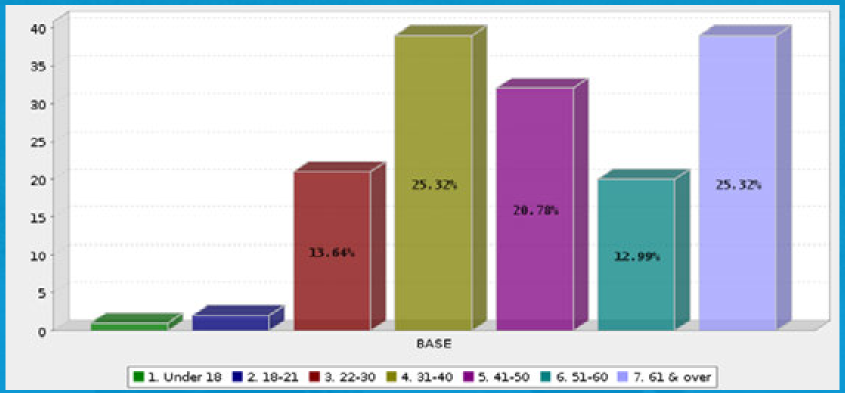
- **October 13, 2022** TAT Meeting #1
- **April 20, 2023** TAT Meeting #2

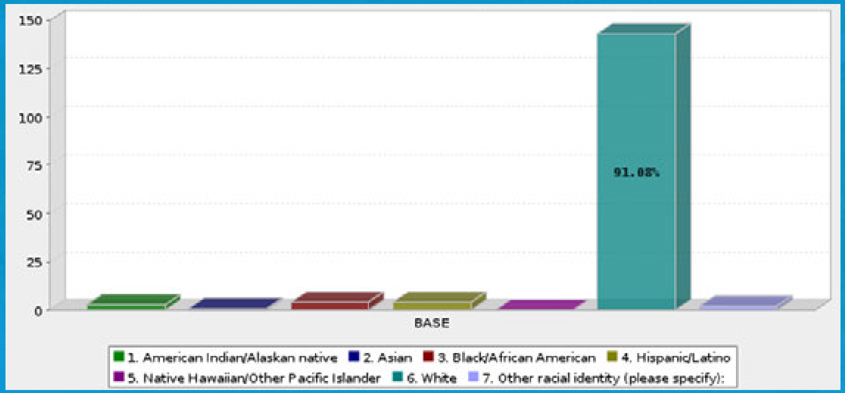
LAKE SPRINGFIELD PLAN

Public Input - Survey Respondent Summary

- **100+ Survey Respondents** – Online Survey
- **264 Survey Respondents + 727 Total Views** (148 Survey Completions,116 Incomplete) – Online Survey
- **200 Traditional + 602 Focused Respondents** – Local Water Resources Survey
- **462 Survey Respondents + 779 Total Views** (161 Survey Completions, 301 Incomplete) – Online Survey







Data Summary – Economic Development

Tent Board - Order of Interest

Investment Themes (Top 5 of Top 3)

1. Passive Recreation (19)
2. Environmental Preservation (17)
3. Power Plant Reuse (10)
4. Education (10)
5. Cultural Hub (10)

Program Opportunities (Top 5)

1. Water Recreation (24)
2. Trails (22)
3. Commercial Leasing (13)
4. Community Events (11)
5. Restaurant/Bar (12)

Case Studies

1. Optimist Hall – Charlotte, NC (4)
2. Origins Park – Jeffersonville, IN (4)
3. Greylock Glen Resort – Adams, MA (1)
4. RecPlex – West Des Moines, IA (0)

Online Survey - Order of Interest

Investment Themes (Top 5 of Top 3)

1. Passive Recreation (164)
2. Environmental Preservation (146)
3. Power Plant Reuse (56)
4. Active Recreation (50)
5. Cultural Hub (40)

Program Opportunities (Top 5)

1. Trails (176)
2. Water Recreation (156)
3. Community Events (130)
4. Lakefront Event Venue (106)
5. Park Amenities (102)

Data Summary – Economic Development

Tent Boards: Potential Activities

INTERESTED

Active Recreation

- Bike/skate park (6)
- Outdoor sports & fitness (5)
- Watercraft rentals (5)
- Playground (3)
- Adventure/rock climbing/ziplines (3)
- Indoor sports (1)

Nature/Culture/Education

- Environment preservation/restoration (7)
- Indoor/outdoor classroom (7)
- Endangered species preservation (6)
- Native American cultural center (2)
- STEAM center (2)
- Observation tower (2)
- Science/history/art museum (1)

NEUTRAL

Passive Recreation

- Trails (15)
- Bird watching/photography (7)
- Public art/murals/sculpture garden (5)
- Fishing/boardwalks/overlooks (4)
- Park amenities (2)
- Dog park (2)

Entertainment/Hospitality

- Hotel (5)
- Lakefront event venue (4)
- Water feature (fountain, splash pad) (3)
- Amphitheater (2)
- Rooftop venue (2)
- Signage/wayfinding/branding (2)
- Camping/glamping/RV (1)

UNINTERESTED

Retail/Commercial

- Community events (10)
- Restaurants/bars (5)
- Cafes/coffee shops (5)

Activity Category

- Active recreation (6)
- Nature/culture education (3)
- Entertainment/hospitality (2)
- Passive recreation (2)

Data Summary – Investment Themes
Tent Boards: Proposed Zones

ZONE 1: South Activity
1. Amenities - Trails (16)
2. Education Trails & Boardwalks (14)
3. River Access (14)
4. Adventure Recreation – Bike Park (13)
5. RV Park (5)

ZONE 3: Dam Modifications
1. Recreation & Wildlife Ladder – Shallow (8)
2. Section Removal with Open Flow (8)
3. Open Channel Bypass (8)
4. Recreation & Wildlife Ladder – Edge (7)
5. Section Removal with Overlook &
– Natural Vertical Bypass (4)

ZONE 2: Capped Landfill
1. Nature Landscape with Trails (19)
2. River Overlook (16)
3. Astronomy Viewing Area (6)
4. Practice Fields (6)
5. River Edge Tree Houses/Fitness Trails/Public Art (5)

ZONE 4: Lake & Park
1. Wetland Boardwalks (18)
2. Outdoor Education - (10)
3. Destination Playground (7)
4. Group Camping (6)
5. Boat Rentals (6)

ZONE 3: Power Station
1. Iconic Walk/Bridge Overlook (9)
2. Education & Demonstration Areas (8)
3. Sky Tram (8)
4. Amphitheater (7)
5. Waterfront Amphitheater (7)

ZONE 5: North Activity
- River Access (18)
- Full Dam Removal: A.1 (5)
- Partial Dam Removal: A.2 (2)
- Concrete Dam Modification: A.B (2)
- No Modification (1)

LAKE SPRINGFIELD PLAN

Data Summary – Investment Themes
Online Survey: Proposed Zones

ZONE 1: South Activity
1. Education Trails & Boardwalks (130)
2. Amenities (119)
3. River Access (107)
4. Eco Playground (70)
5. Adventure Recreation – Bike Park (52)

ZONE 3: Dam Modifications
1. Nature Vertical Bypass (84)
2. Open Channel Bypass (77)
3. Removal with Exposed Structure & Remnants (75)
4. Section Removal with Overlook (67)
5. Recreation & Wildlife Ladder – Edge (60)

ZONE 2: Capped Landfill
1. Native Landscape with Trails (114)
2. River Overlook (108)
3. Fitness Trails (63)
4. Astronomy (60)
5. Small Pavilions– Bike Park (61)

ZONE 4: Lake & Park
1. Wetland Boardwalks (128)
2. Overlooks/Education (85)
3. Boat Rentals (79)
4. Fishing (74)
5. Destination Playground (47)

ZONE 3: Power Station
1. Iconic Walk/Bridge Overlook (88)
2. Education & Demonstration Areas - (87)
3. Waterfront Amphitheater (72)
4. Amphitheater (71)
5. District (63)

ZONE 5: North Activity
1. River Access (124)
2. Pedestrian Bridge Crossing (113)
3. Trailhead Parking (72)
4. Trailhead Play Amenities (56)
5. Gathering Space/Pavilions (54)

LAKE SPRINGFIELD PLAN

Data Summary – Hydraulics, Potential Dam Alternatives, & Water Quality

Dam Modifications

Tent Board (Top 5)

1. Earthen Dam Modification: A.C (6)
2. Full Dam Removal: A.1 (5)
3. Partial Dam Removal: A.2 (2)
4. Concrete Dam Modification: A.B (2)
5. No Modification: A.D (1)

Online Survey (Top 5)

1. Full Dam Removal: A.1 (53)
2. Partial Dam Removal: A.2 (37)
3. Earthen Dam Modification: A.C (37)
4. No Modification: A.D (32)
5. Concrete Dam Modification: A.B (26)

LAKE SPRINGFIELD PLAN

Data Summary – Transportation & Mobility

Tent Board

Access & Gateway Options

- Option 2: Lake Springfield Drive Construction - No cars on Kissick (10)
- Option 3: Kissick Improvements – Cars Remain on Kissick(7)
- Option 1: JRPS Entry from Kissick – Cars Remain on Kissick (4)

Boat Access Options

- Option 2: New Boat Ramp from Lake Springfield Park (68)
- Option 1: New Boat Ramp Entry from Kissick (52)
- Option 3: New Boat Ramp Requiring New Facility (44)

General Priorities (Top 5)

1. Trails (14)
2. River/lake Crossings (6)
3. Boat Ramp Access (3)
4. Vehicular Access/Entry (1)
5. Public transit (1)

Kissick Improvements

- Bicycle & Pedestrians - No Vehicular Traffic (17)
- Roadway Improvements – Accommodate More Car Trips (6)

Walking & Rolling Priorities

- Option 2: (8) Kissick over lake becomes ped/bike only + New lake crossings
- Option 3: (6) Wide sidewalks or SUP along roadway improvements +Trail of Honor Connection
- Option 1: (1) Kissick road widening + Chadwick flyer trail bridge

Online Survey

Access & Gateway Options

- Option 2: New Boat Ramp from Lake Springfield Park (5)
- Option 3: New Boat Ramp Requiring New Facility (3)
- Option 1: New Boat Ramp Entry from Kissick (0)

Boat Access Options

- Option 2: Lake Springfield Drive Construction – No cars on Kissick (82)
- Option 3: Kissick Improvements – Cars Remain on Kissick (37)
- Option 1: JRPS Entry from Kissick – Cars Remain on Kissick (0)

General Priorities (Top 5)

1. Trails (141)
2. River/lake Crossings (109)
3. Boat Ramp Access (69)
4. Sidewalks & ADA (54)
5. Parking (54)

Kissick Improvements

- Bicycle & Pedestrians - No Vehicular Traffic (107)
- Roadway Improvements – Accommodate More Car Trips (55)

LAKE SPRINGFIELD PLAN

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U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

Overview of Hydrology Study Phase 1

Chapter 3: Water Quality Assessment

Chapter 4: Watershed Assessment

Chapter 5: Sediment Management

Chapter 6: Dam Assessment and Regulatory Compliance Review

Chapter 7: Dam Modification Alternatives Assessment

Chapter 8: Envision Sustainability Planning

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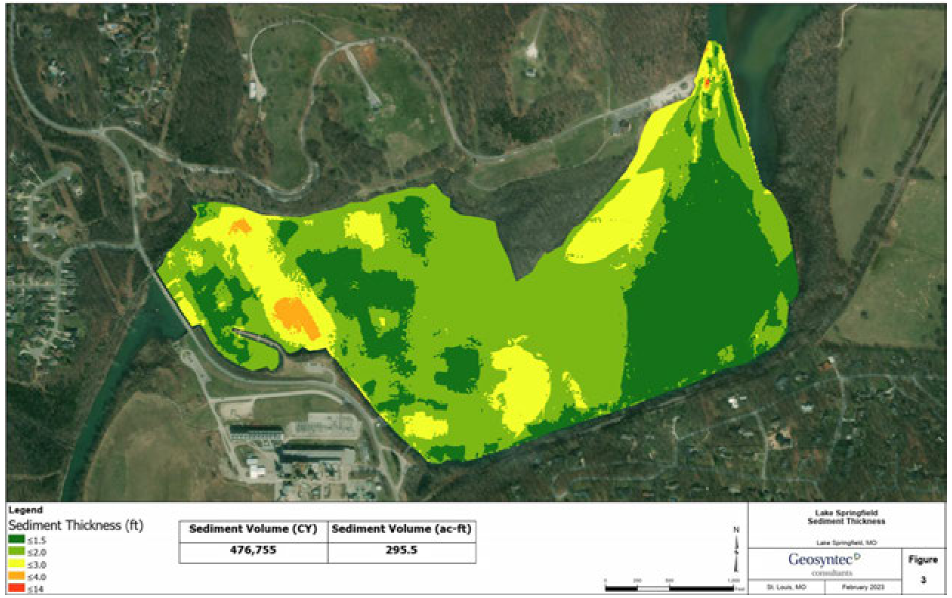
Appendix A2: U.S. Fish and Wildlife Service (Information for Planning and Consultation Resource List)

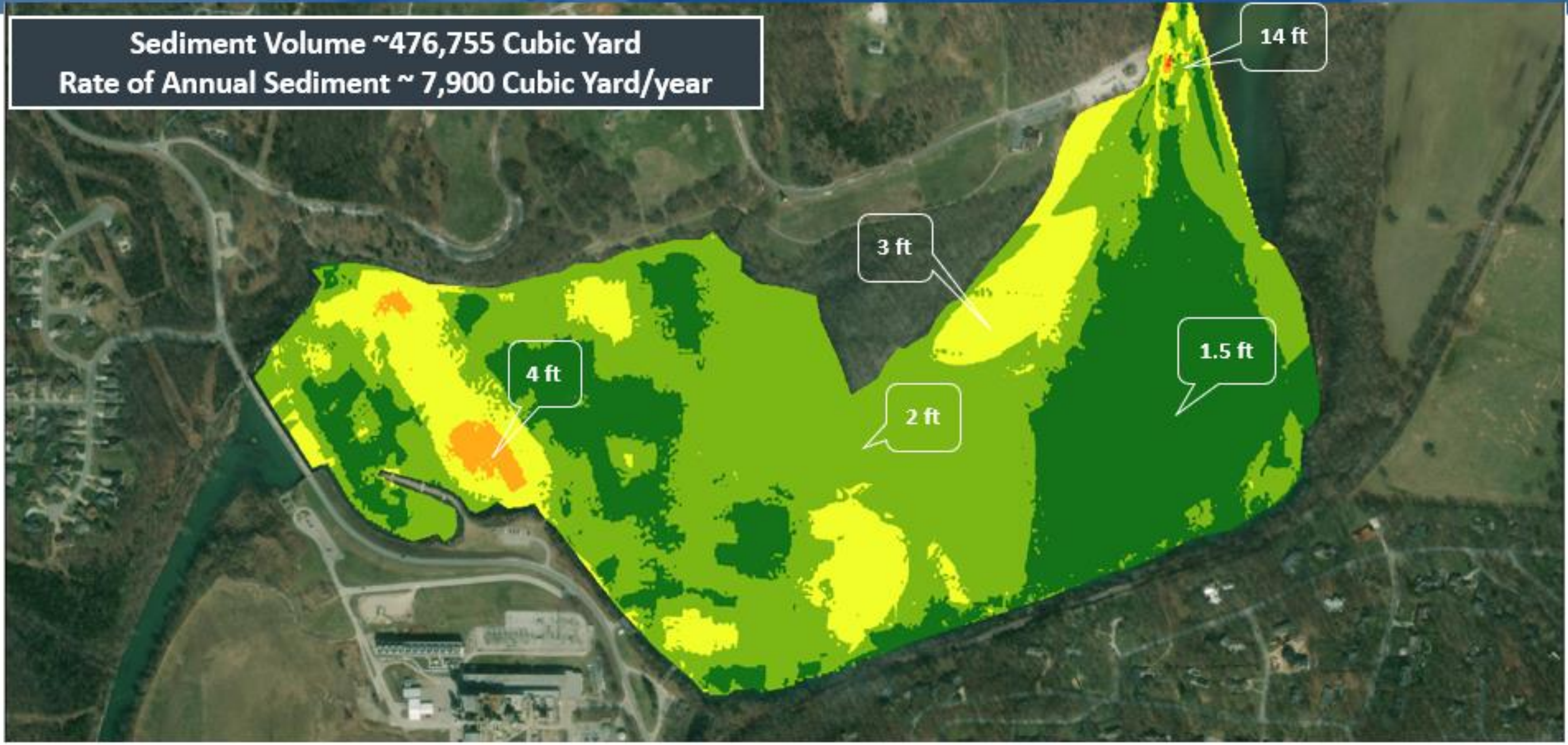
Appendix B: Dam Inspection Photo Log

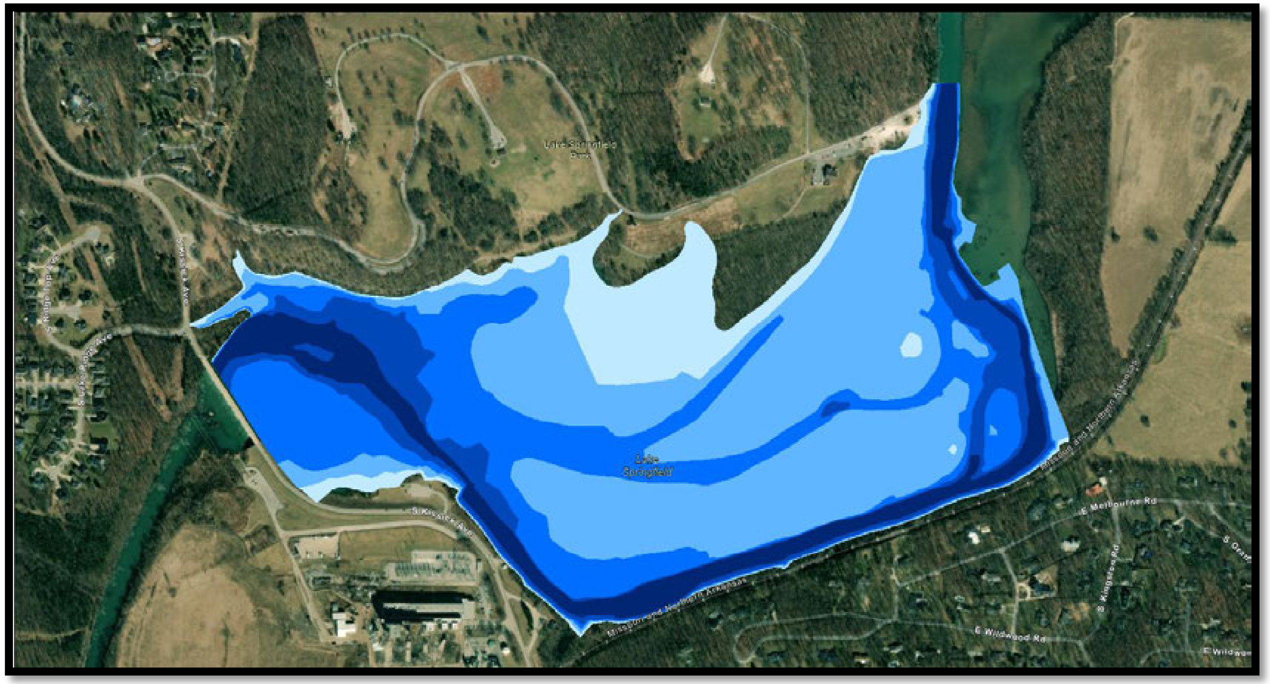
Appendix C: Dam Modification Alternatives Concept Figures



Predicted Annual Rate of Sediment from the watershed ~ 7,900 Cubic Yard

Bathymetry and Sediment sampling



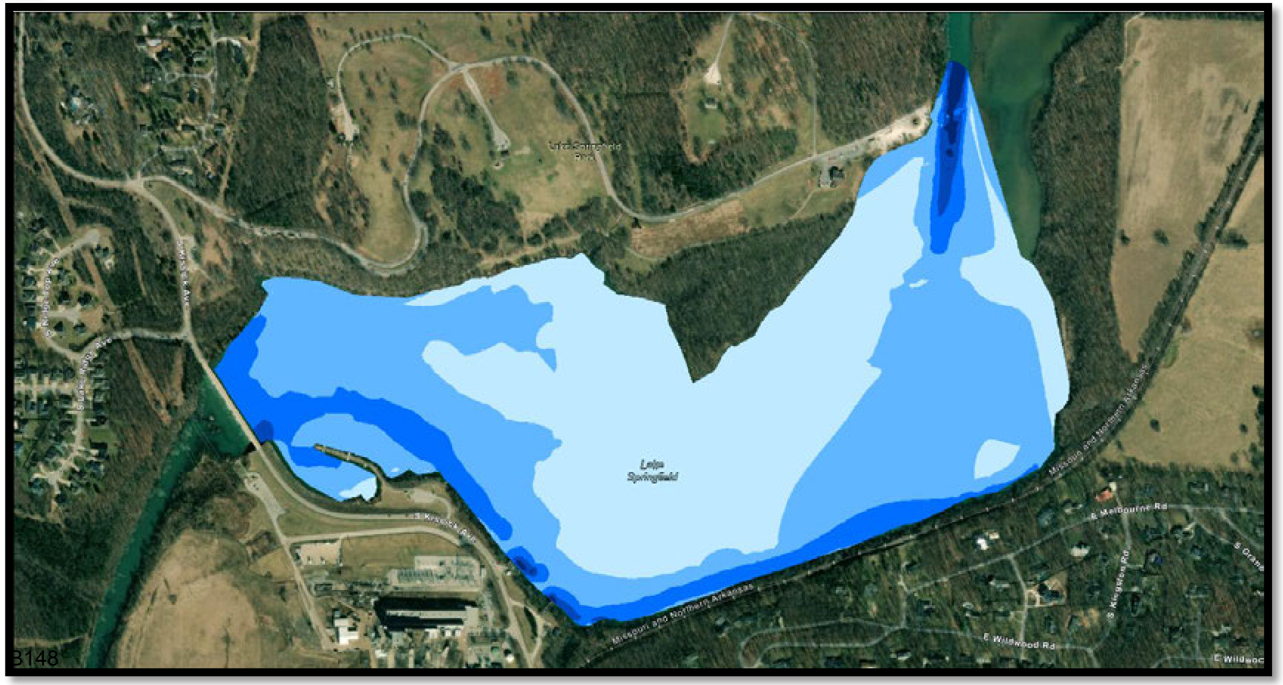


←1955 Topo WSE below 1140’

Depth (ft)

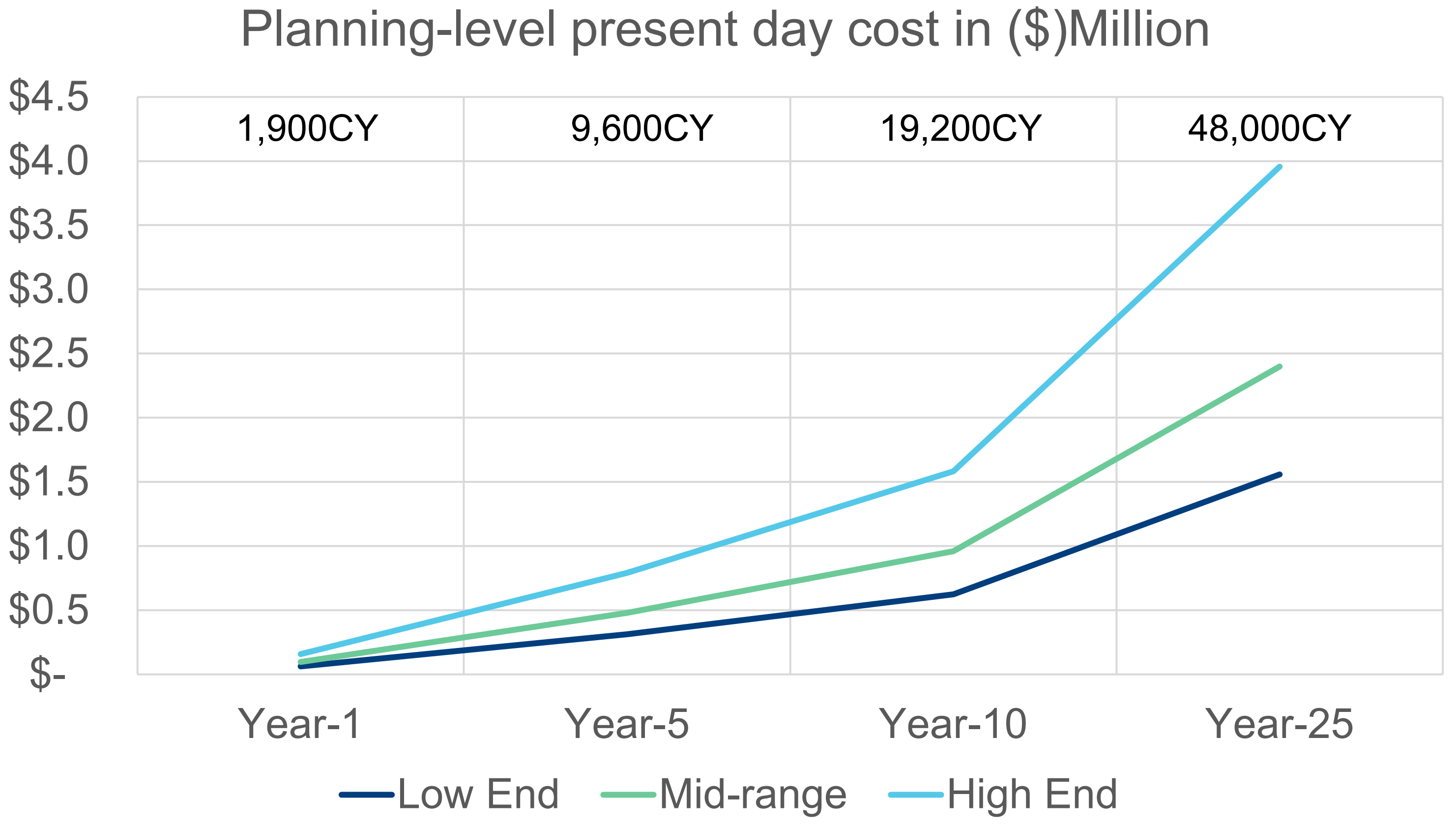
- ≤4
- ≤8
- ≤12
- ≤16
- ≤20

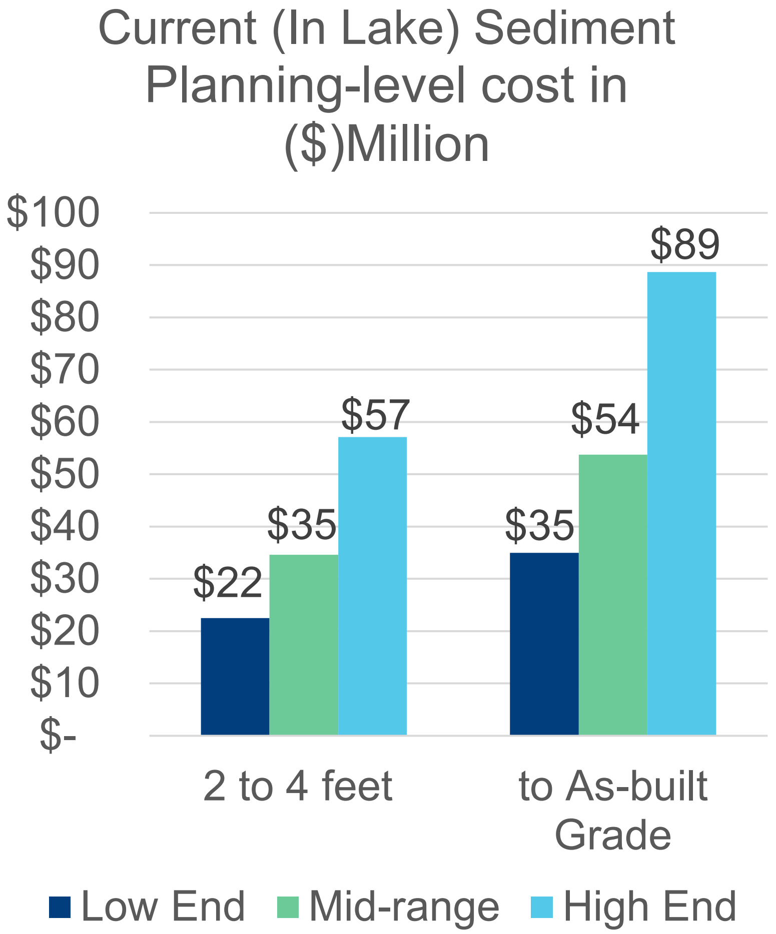
Present Lake Springfield Bathymetry at WSE 1140’→



Sediment Management

Scenario 1: Manage All (Could apply to all Dam Mod Alt)





Assumption

- Sediment loading only from the immediate 3 upstream watersheds

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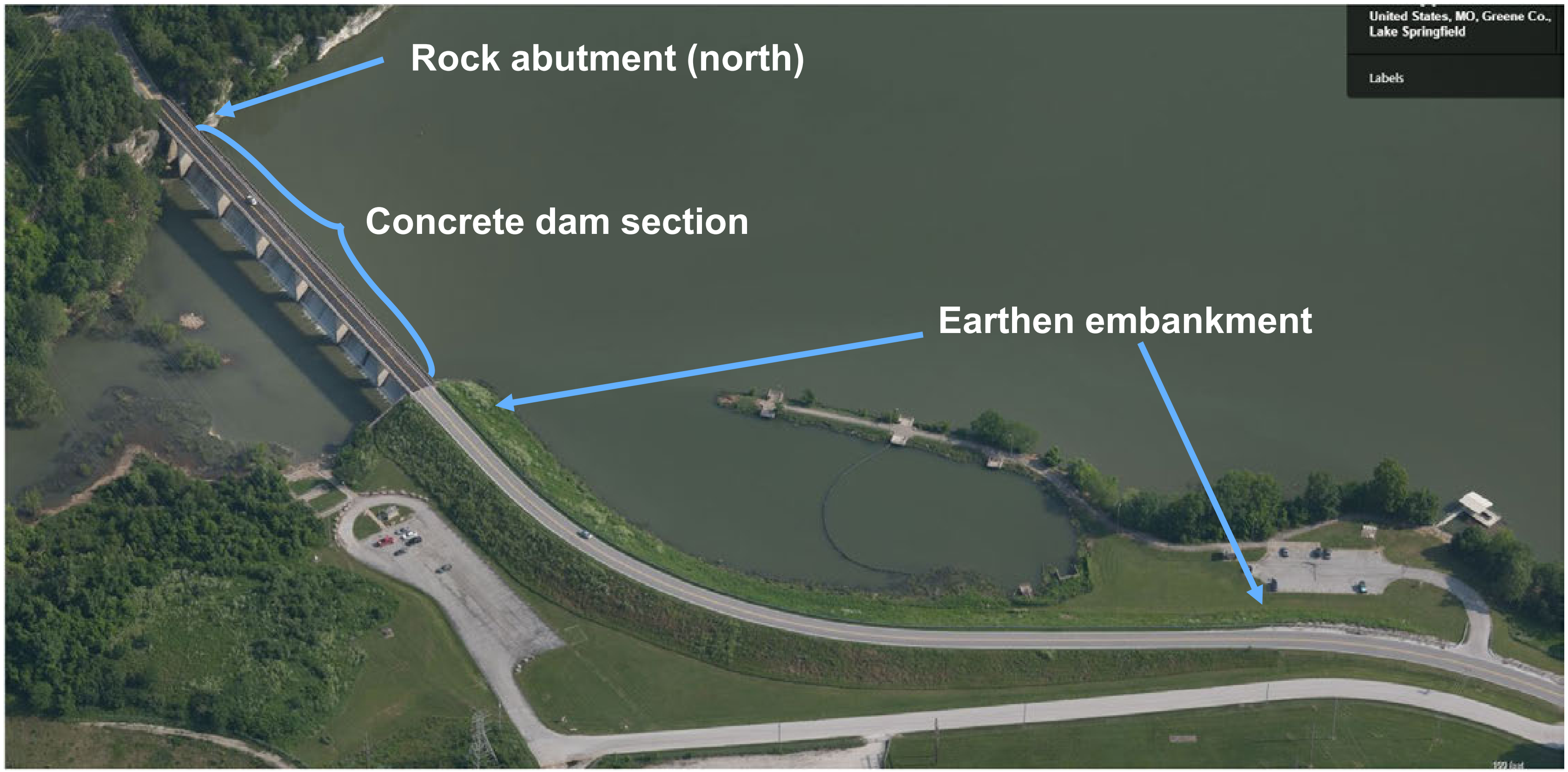
Dam Assessment



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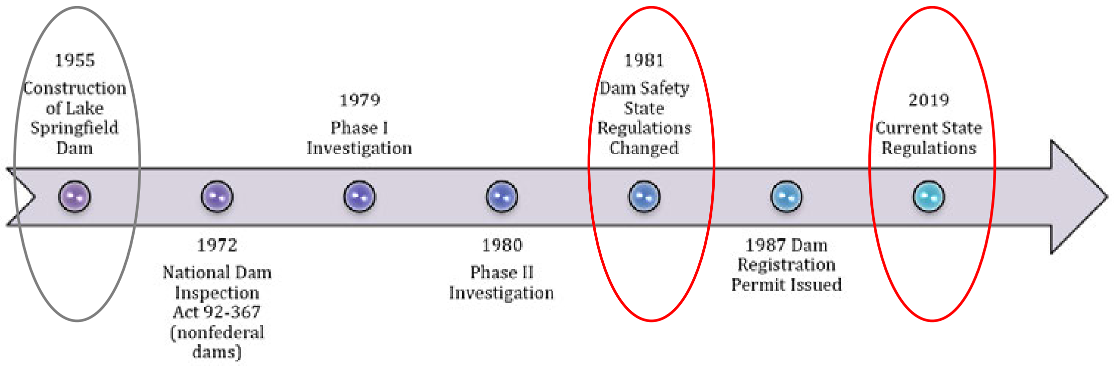

Figure 3: Historic Congressional and State Regulatory Updates on Dam Safety

Dam O&M costs (standard care)

Standard of care needed for operation and maintenance of Lake Springfield Dam whether modified or not modified.

	1st year/Annual	1-10 years	10-20 years	20-30 years
Routine Maintenance	$4,000	$47,000	$63,000	$84,000
Capital Maintenance Programming	$24,000	$316,000	$515,000	$935,000
Total	$28,000	$363,000	$578,000	$1,019,000
Cumulative	**$28,000**	**$391,000**	**$969,000**	**$1,988,000**

Notes:

- Capital maintenance cost includes minor concrete repair.
- Inflation rate of 3% is included in the cost projection.

Potential Dam Modification Alternatives

Re-establish River Ecosystem
Remove or reduce liability of maintaining a Dam

- Full Dam Removal
- Partial Dam Removal

Provide Kayak and Fish Passage

- Concrete Dam Modification
- Earth Embankment Modification

Avoid modification
Provide Lake Enhancements

- No Modification

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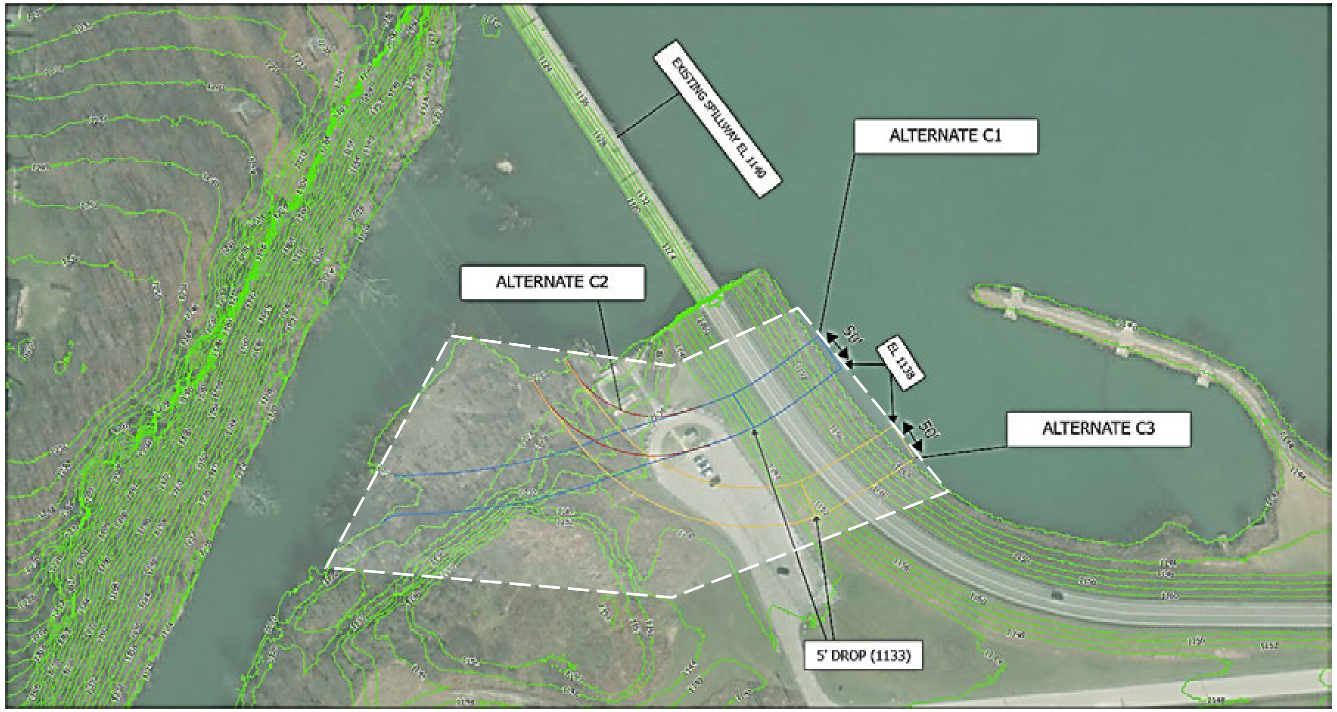
Planning-level costs for Alternative C3

Alternate C3: Earth Embankment Modification. Lower Impoundment by 2 feet.



Higher End

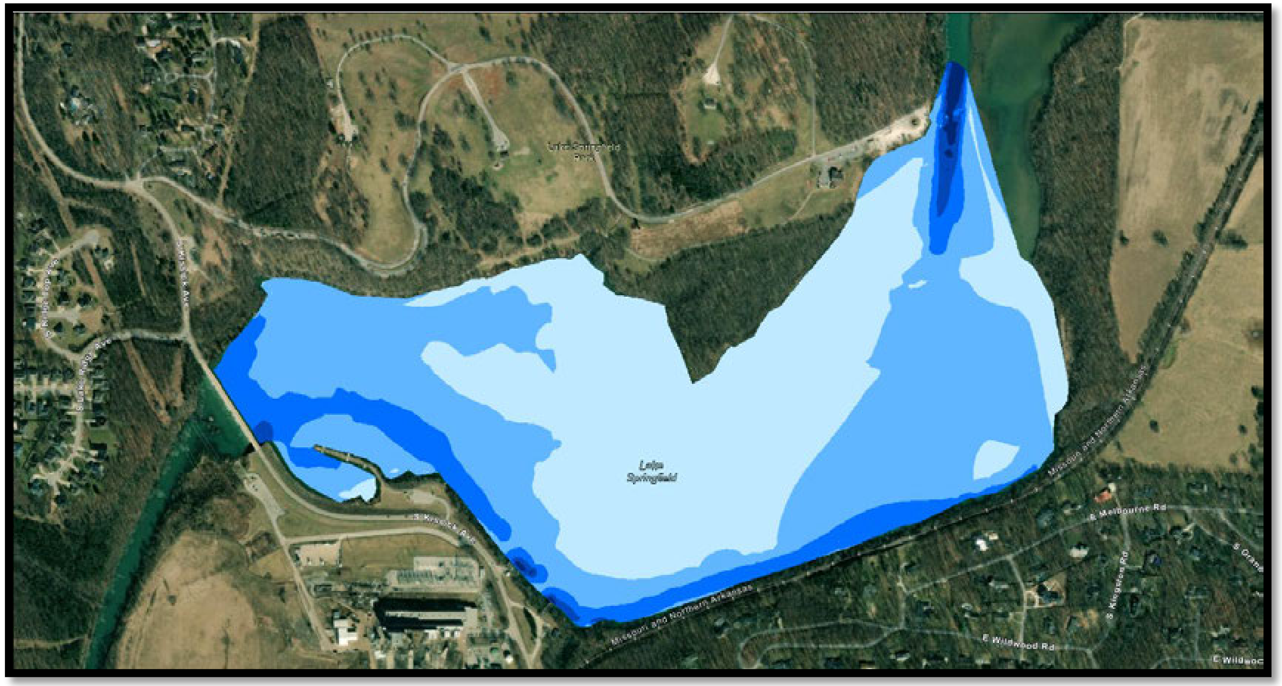
$11 Million	$5 Million

Lower End

Average $7 Million

Items **not** included:

- Sediment management
- Restoration of natural stream as a result of dam modifications.
- Engineering and construction oversight
- Full removal of the dam feature
- Maintenance or reconstruction of existing bridge



←**Present Lake Springfield Bathymetry at WSE 1140'**

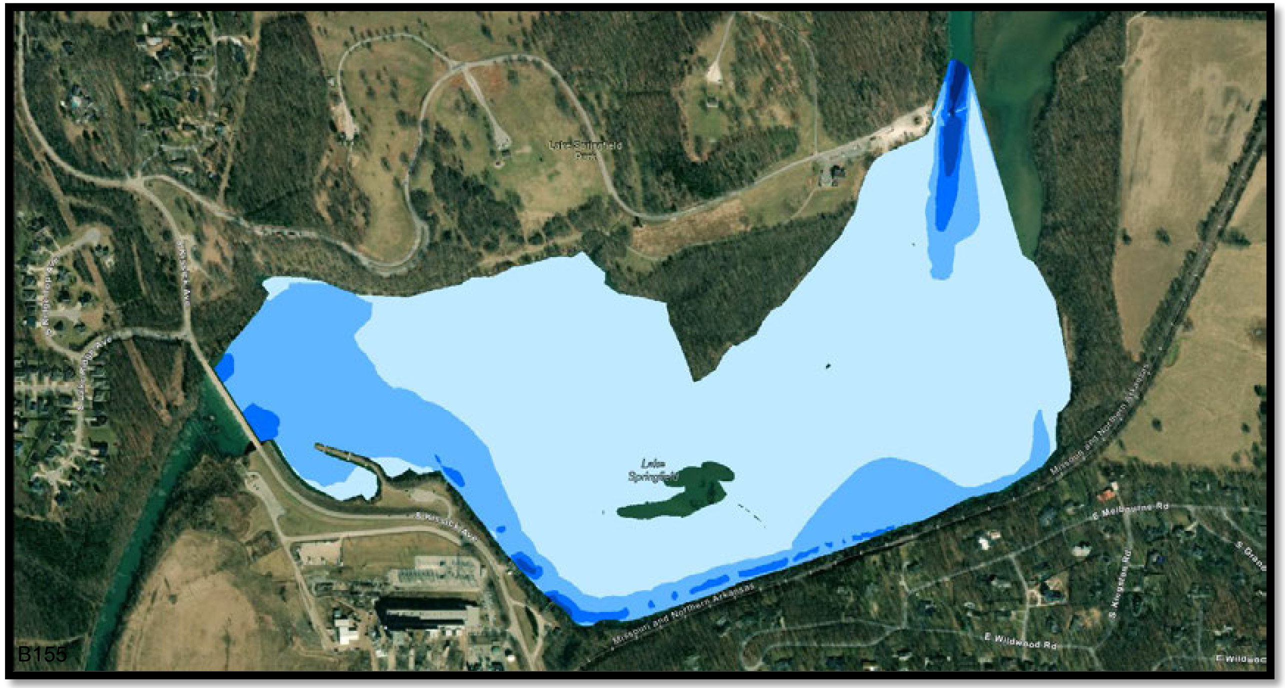
Depth (ft)

- ≤4
- ≤8
- ≤12
- ≤16
- ≤20

Present Lake Springfield Bathymetry at WSE 1138'→

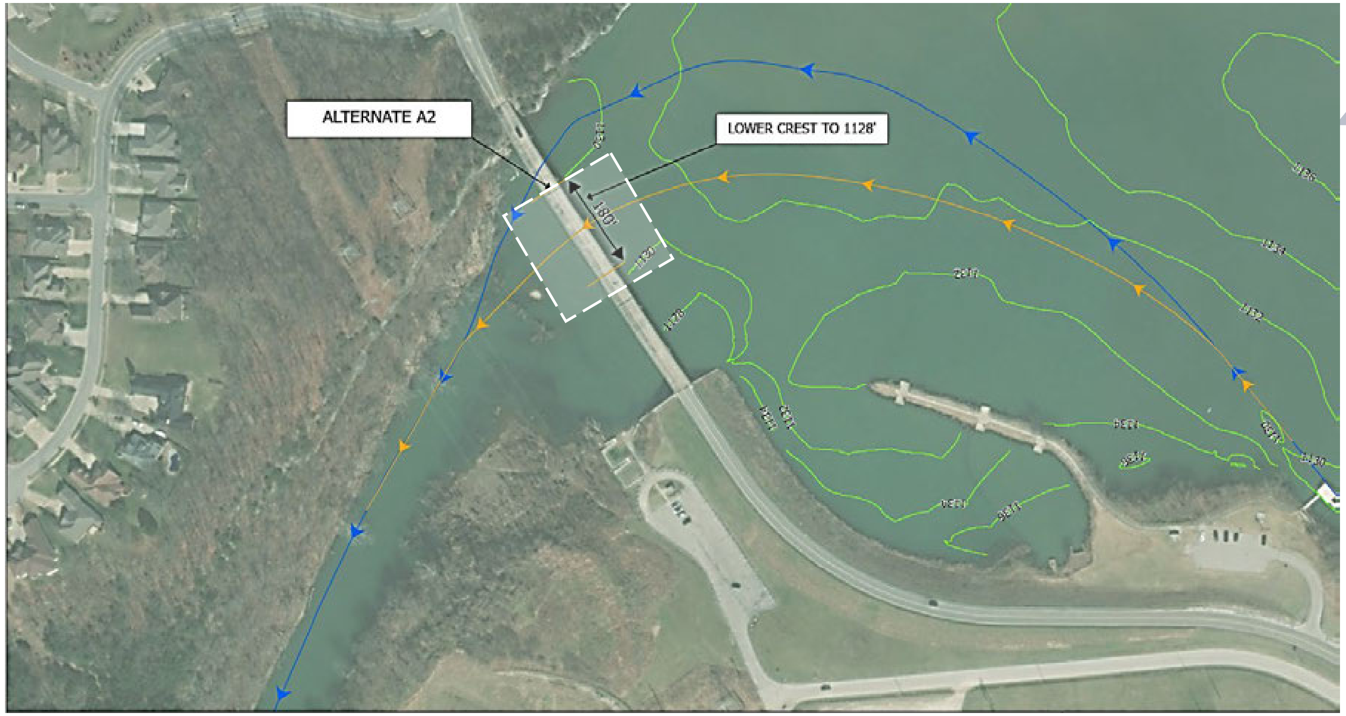
Depth (ft)

- ≤4
- ≤8
- ≤12
- ≤16
- ≤20



Planning-level costs for Alternative A2

Alternate A2: Partial Dam Removal. Lower Impoundment by 12 feet.



Higher End

$20 Million	$8 Million

Lower End

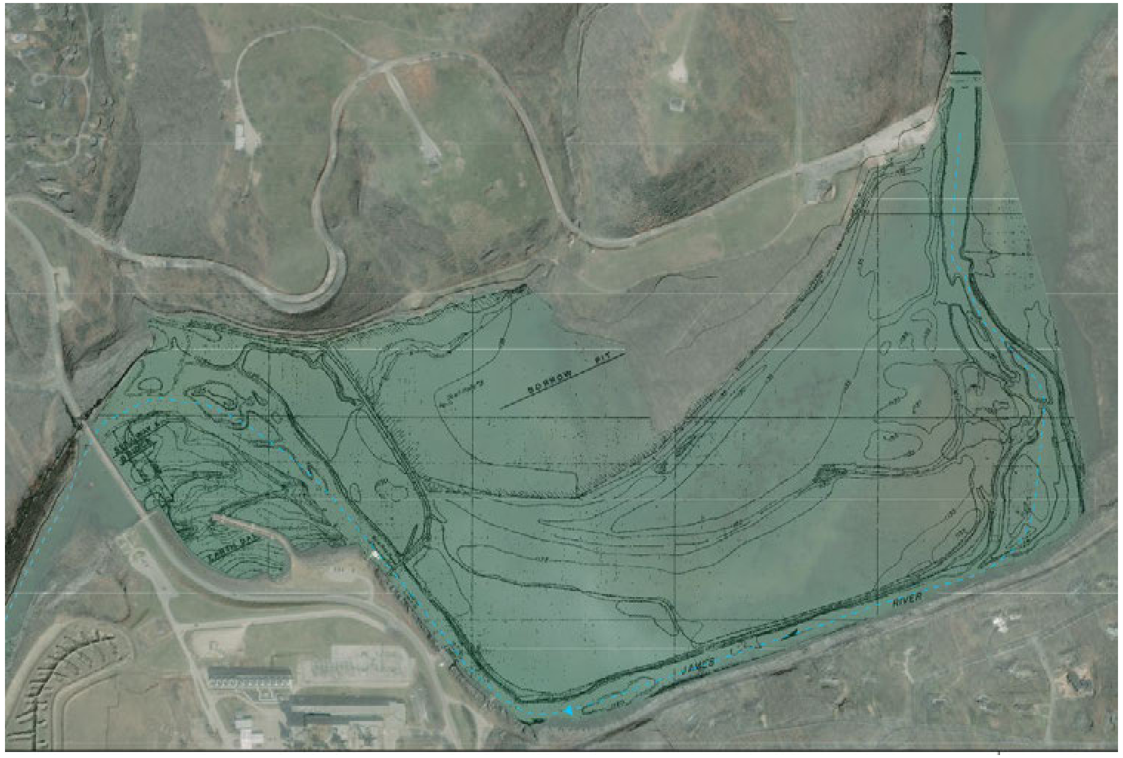
Average $12 Million

Items **not** included:

- Restoration of natural stream as a result of dam modifications.
- Engineering and construction oversight
- Full removal of the dam feature
- Maintenance or reconstruction of existing bridge
- Full removal of weir features
- Downstream cofferdam (assumed can access by laying riprap)

Planning-level costs for Alternative A1

Alternate A1: Dam Removal (to EL 1124)



Higher End

$44 Million

$17 Million

Lower End

Average $27 Million

Items **not** included:

- Restoration of natural stream as a result of dam modifications.
- Engineering and construction oversight
- Full removal of the dam feature
- Maintenance or reconstruction of existing bridge
- Full removal of weir features
- Downstream cofferdam (assumed can access by laying riprap)

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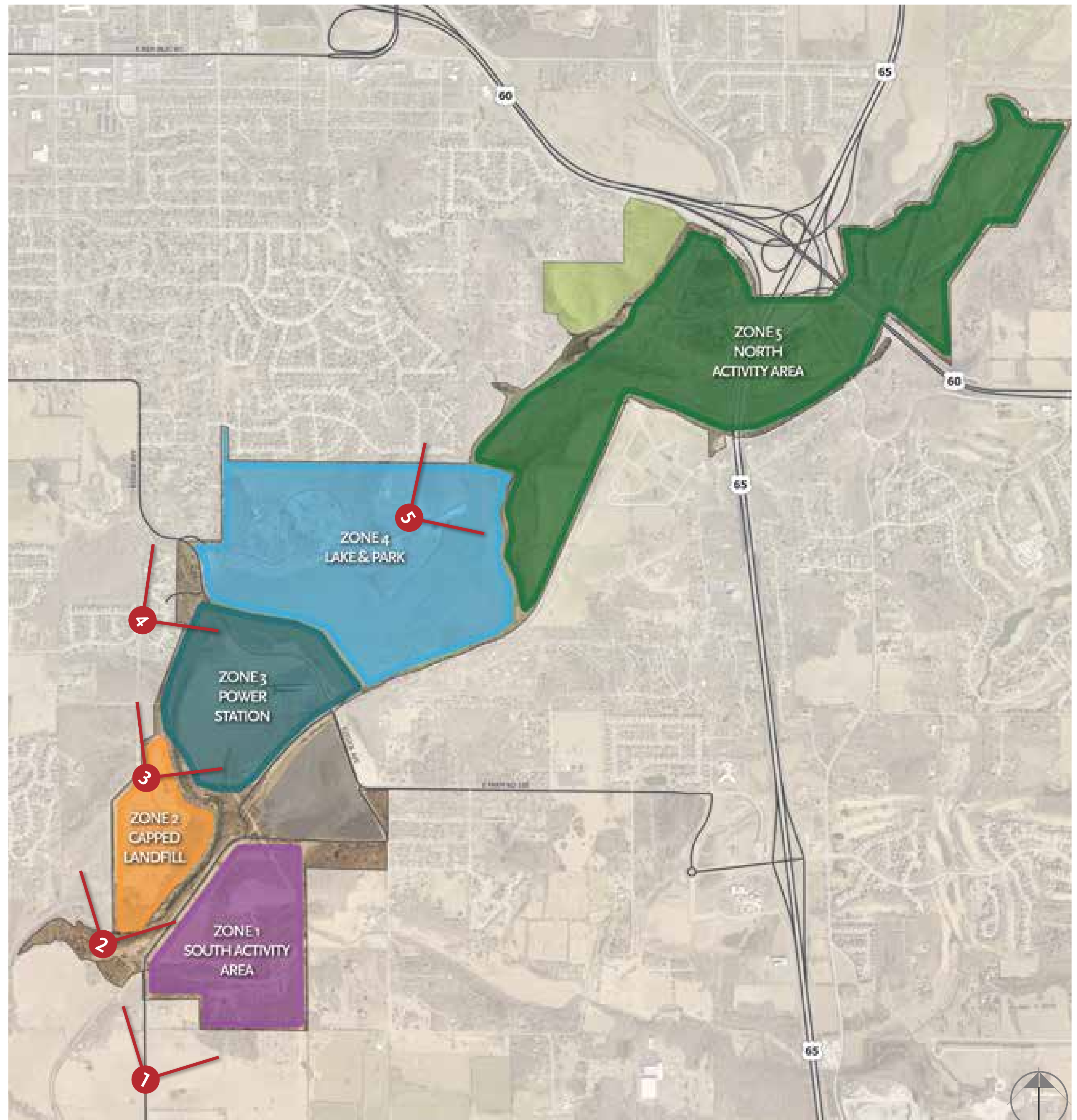
INITIAL CONCEPT ZONES

ZONE 1 - South Activity Area

ZONE 2 - Capped Landfill Area

ZONE 3 - Power Station/Dam Area

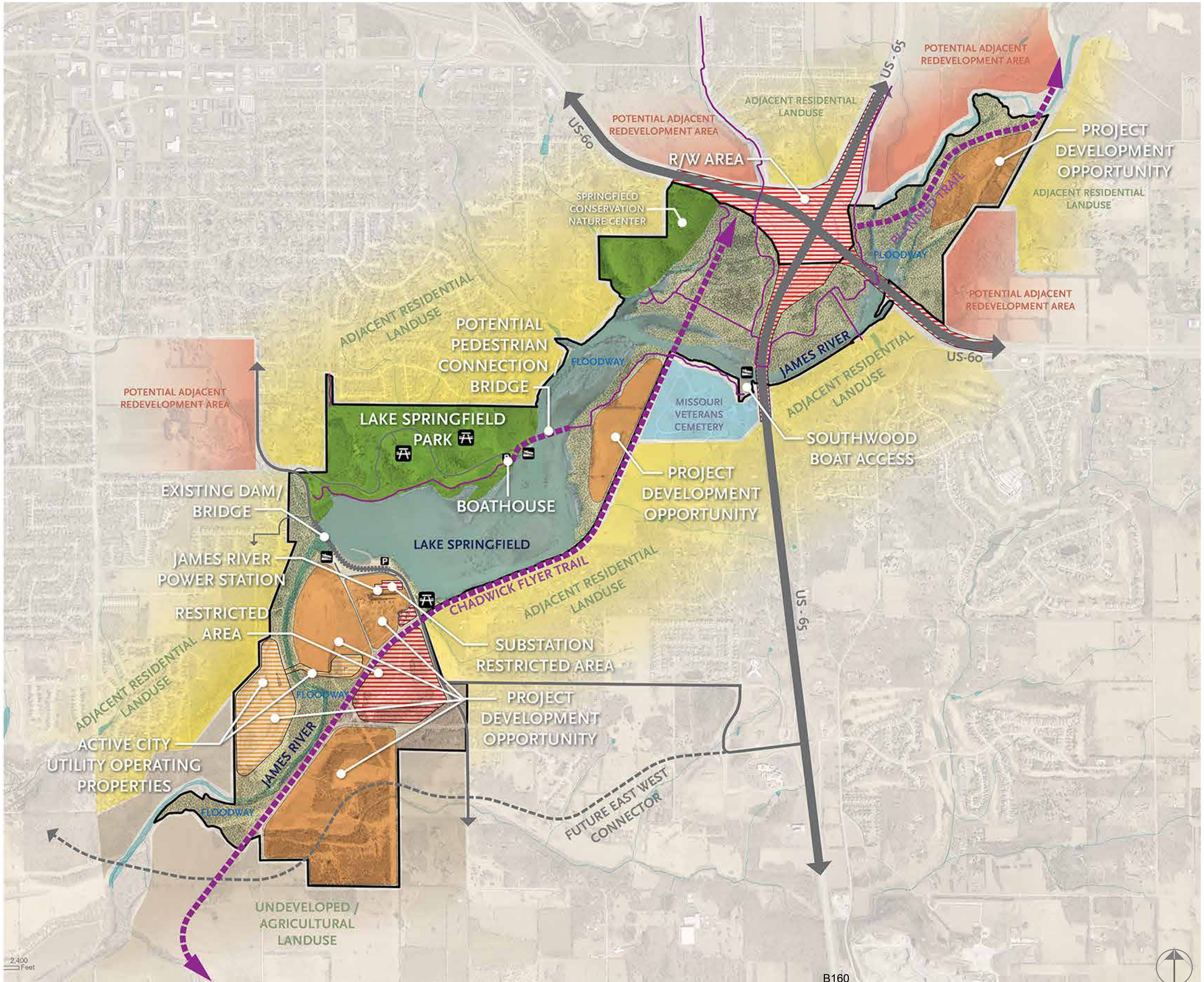


1 VIEWSHED FROM OBSERVER'S LOCATION

ZONE 4 - Lake/Park Area

ZONE 5 - North Activity Area

SITE ANALYSIS & PRELIMINARY CONCEPTS



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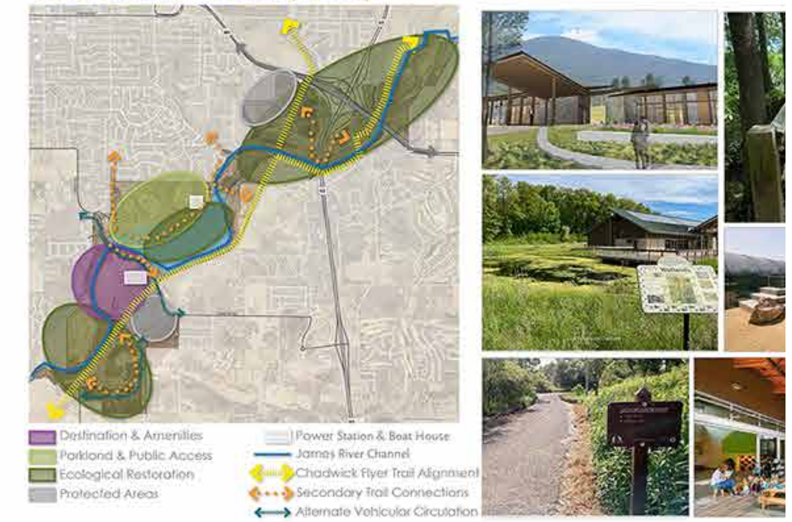
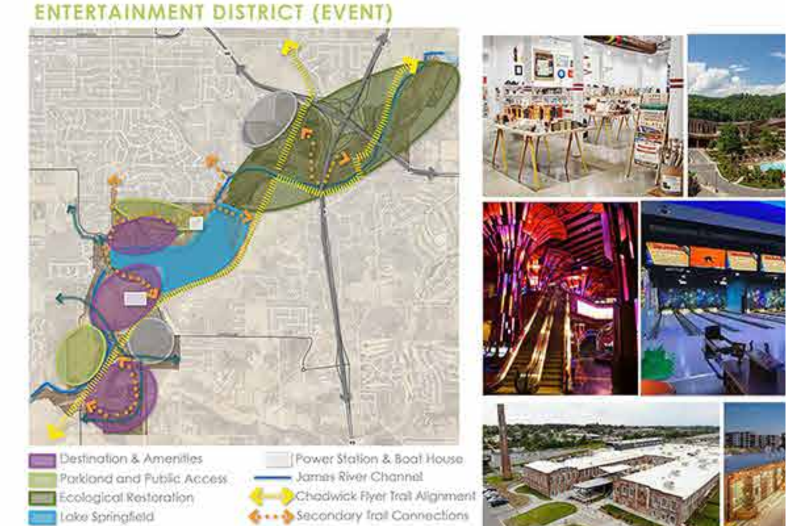
ECO TOURISM - OZARK (PLACE)

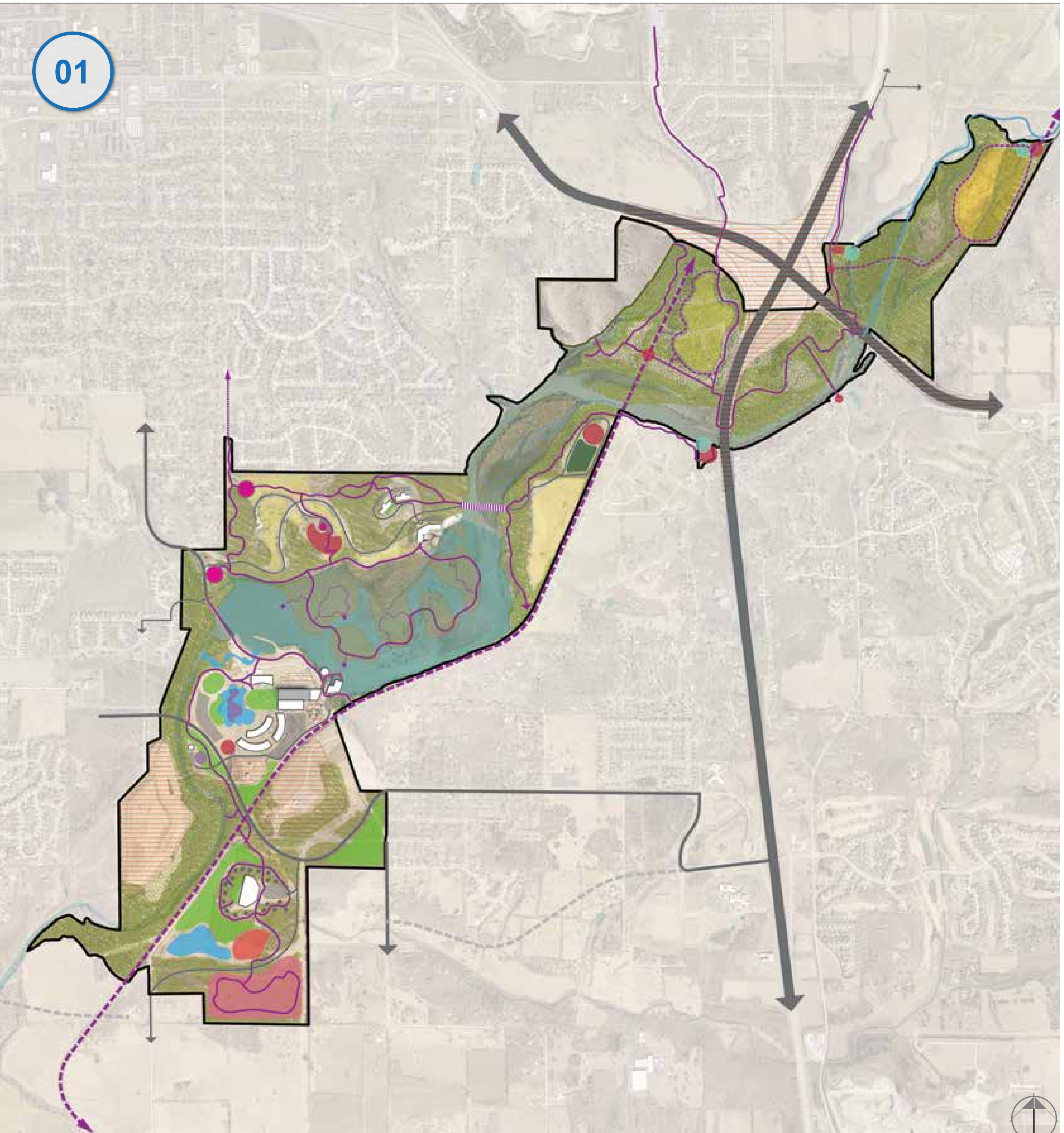


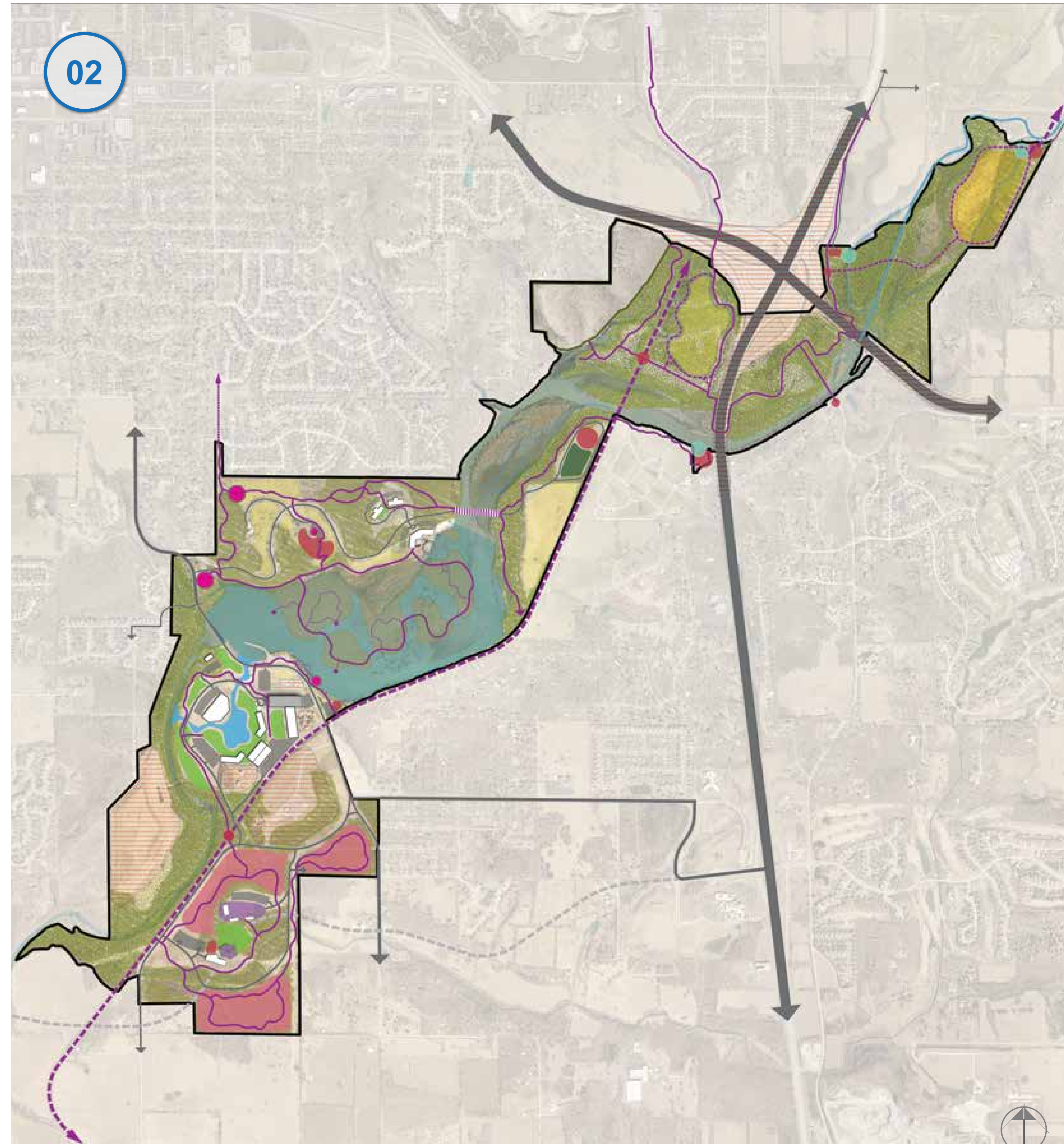
RECREATION DESTINATION (PLACE/EVENT)

ENTERTAINMENT DISTRICT (EVENT)



LAND-USE CONCEPTS





CONCEPTS

01

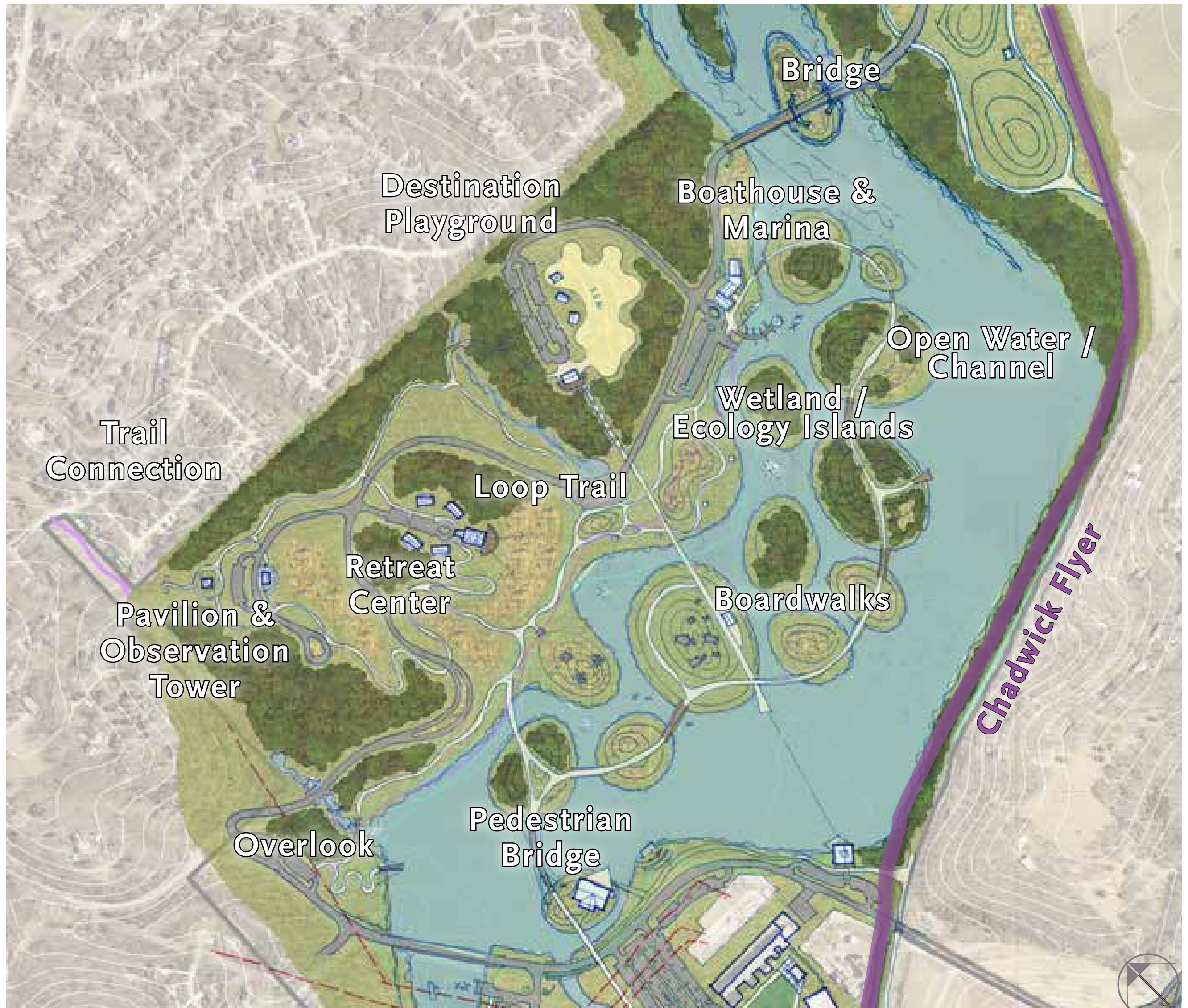
02

Experience

NORTH

- Wetland Preservation
- Trails / Trailheads
- Nature Amenity Area
- River Access
- Bird Meadow
- Culture Center/Lawn
- Culture Meadow
- Nature Center Access

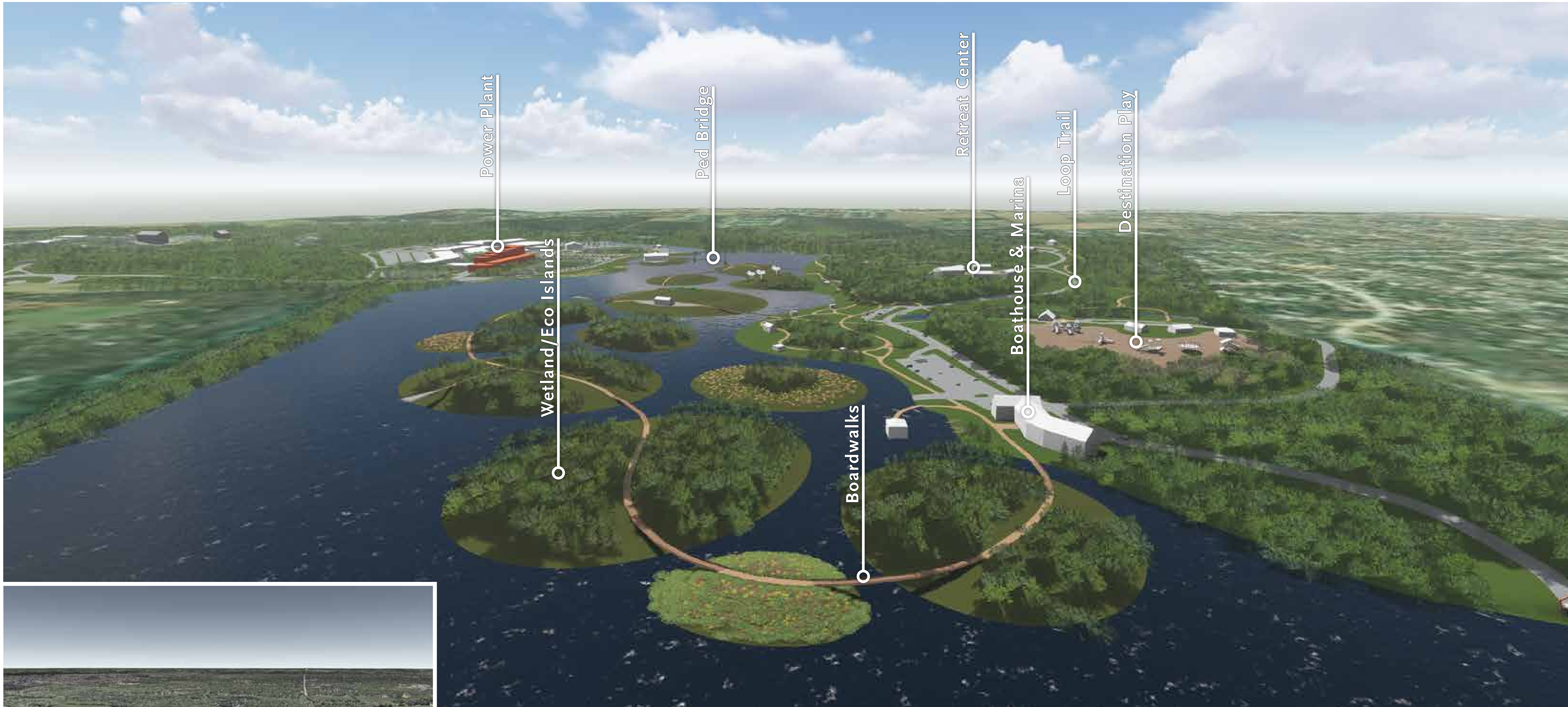
PARK & LAKE



- Expanded Boathouse/ Ecology Center
- Marina
- Wetland Boardwalk
- Retreat Center
- Destination Play
- Overlooks
- Park Entry Amenities

B165

PARK & LAKE

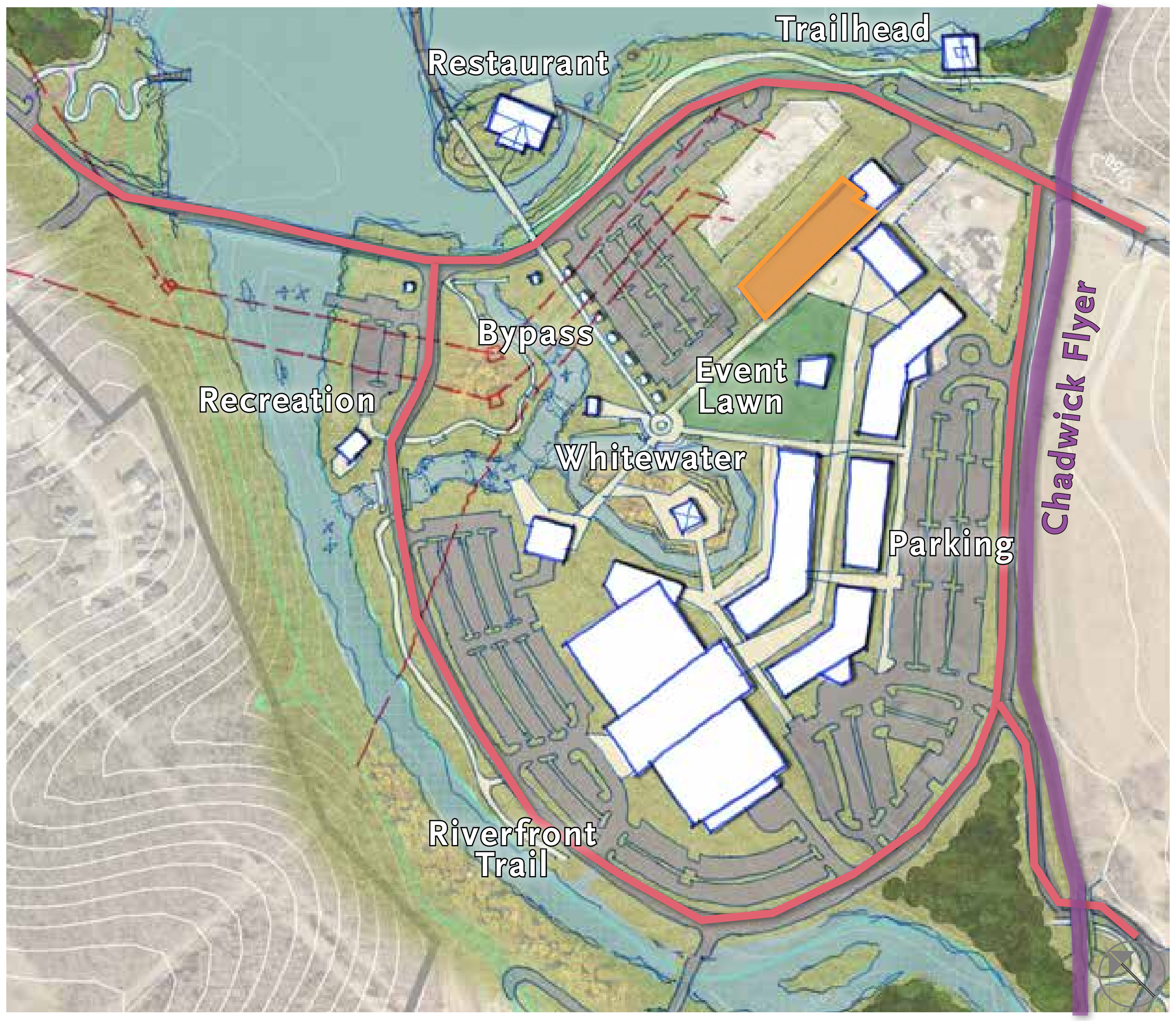


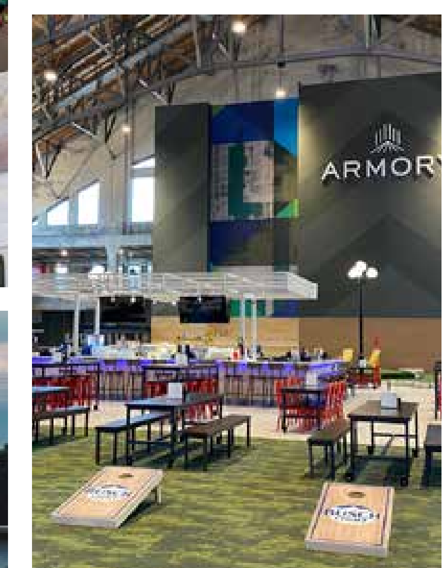
Power Plant
Wetland/Eco Islands
Ped Bridge
Boardwalks
Retreat Center
Boathouse & Marina
Loop Trail
Destination Play

BEFORE

POWER PLANT + SOUTH ACTIVITY AREA

POWER PLANT - ENTERTAINMENT DISTRICT

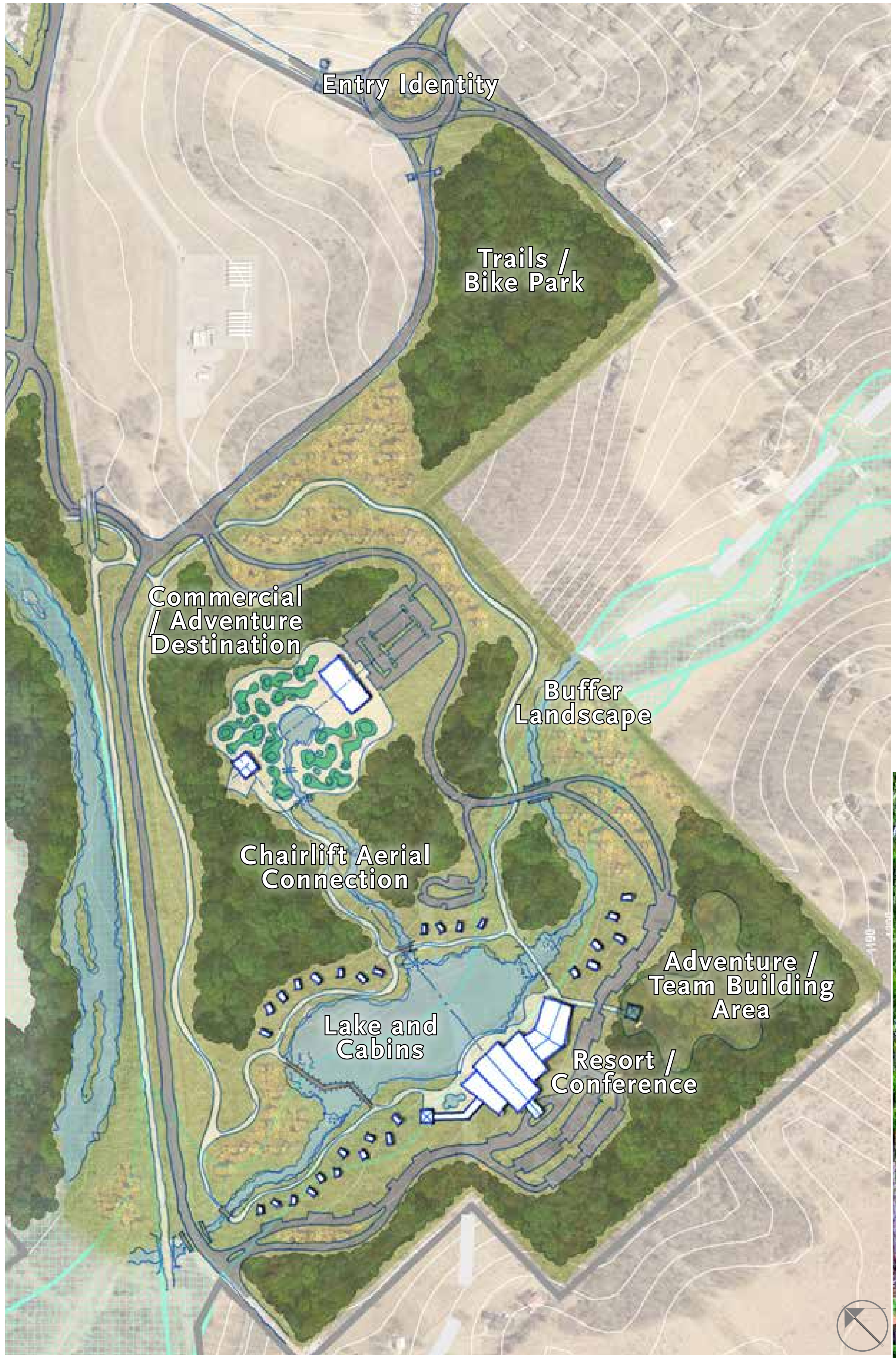




- Power Plant Reuse
- Anchor Entertainment
- Retail / Commercial
- Residential / Offi
- Restaurant / Overlook
- Riverfront Recreation
- Event Lawn/ Pavilion
- Bypass Channel
- Whitewater Adventure
- Ropes Course

POWER PLANT - ENTERTAINMENT DISTRICT

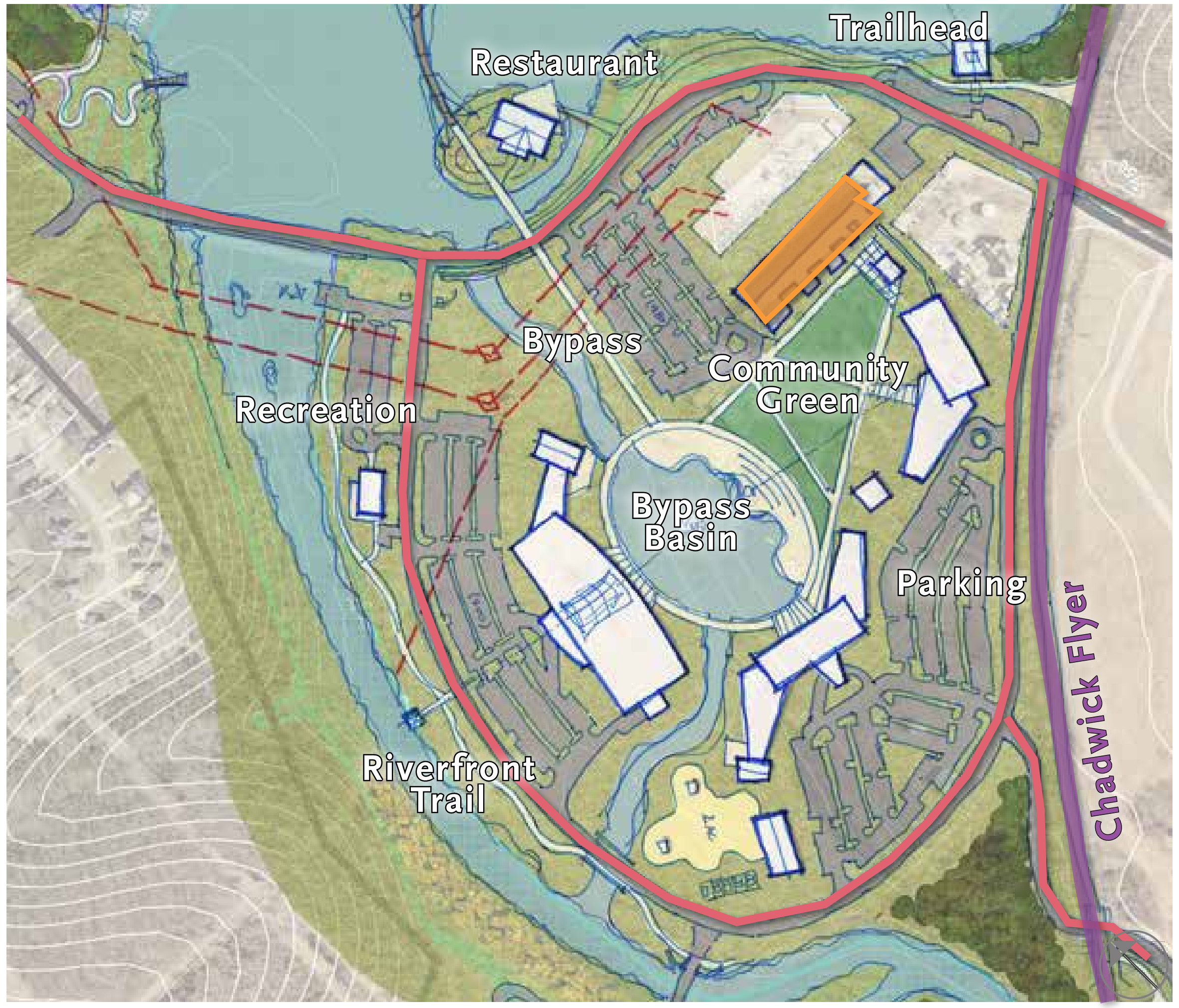
SOUTH ACTIVITY - RESORT / ADVENTURE

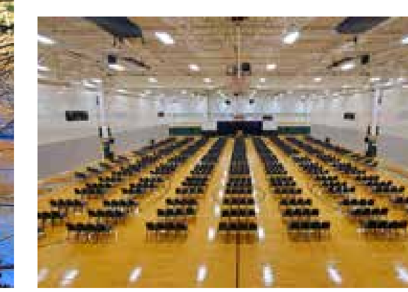


- Conference / Resort
- Retreat Cabins/Yurts
- Adventure Course
- Destination Recreation
- Lake
- Bike Park

SOUTH ACTIVITY - CONFERENCE / ADVENTURE

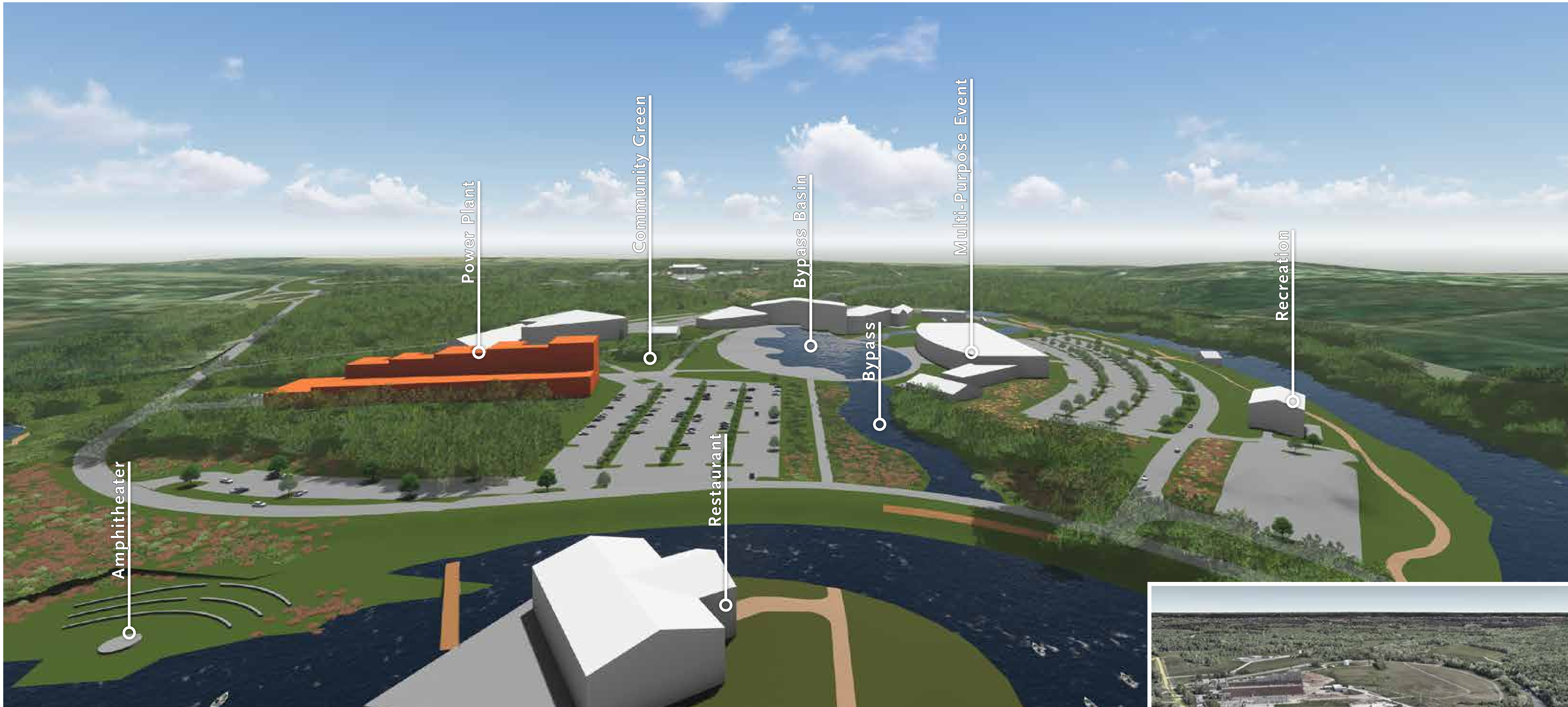
POWER PLANT - MIXED USE EVENT VENUE





- Power Plant Reuse
- Mixed-use Event Venue
- Hospitality
- Restaurants
- Integrated Bypass Channel
- Community Green
- Water Adventure

POWER PLANT - MULTI-PURPOSE EVENT



SOUTH ACTIVITY - DESTINATION ADVENTURE PARK

02B

- Canopy Ropes / Zipline
- Bike Park
- Lake / Water Adventure
- Archery Range
- Amphitheater
- Trails
- RV Camping
- Retail Building / Support









SOUTH ACTIVITY - DESTINATION ADVENTURE PARK

CONCEPTS

01

02

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PARK + LAKE - GOAL ALIGNMENT SAMPLE

Hilltop Overlook

N3 N4 N5 S1 S4 S5

Economic Impact ●○○○○
Social Impact ●●●○○

Destination Play

E4 E5 N3 N4 N5 S1 S4 S5

Economic Impact ●○○○○
Social Impact ●●●●○

Park Entry

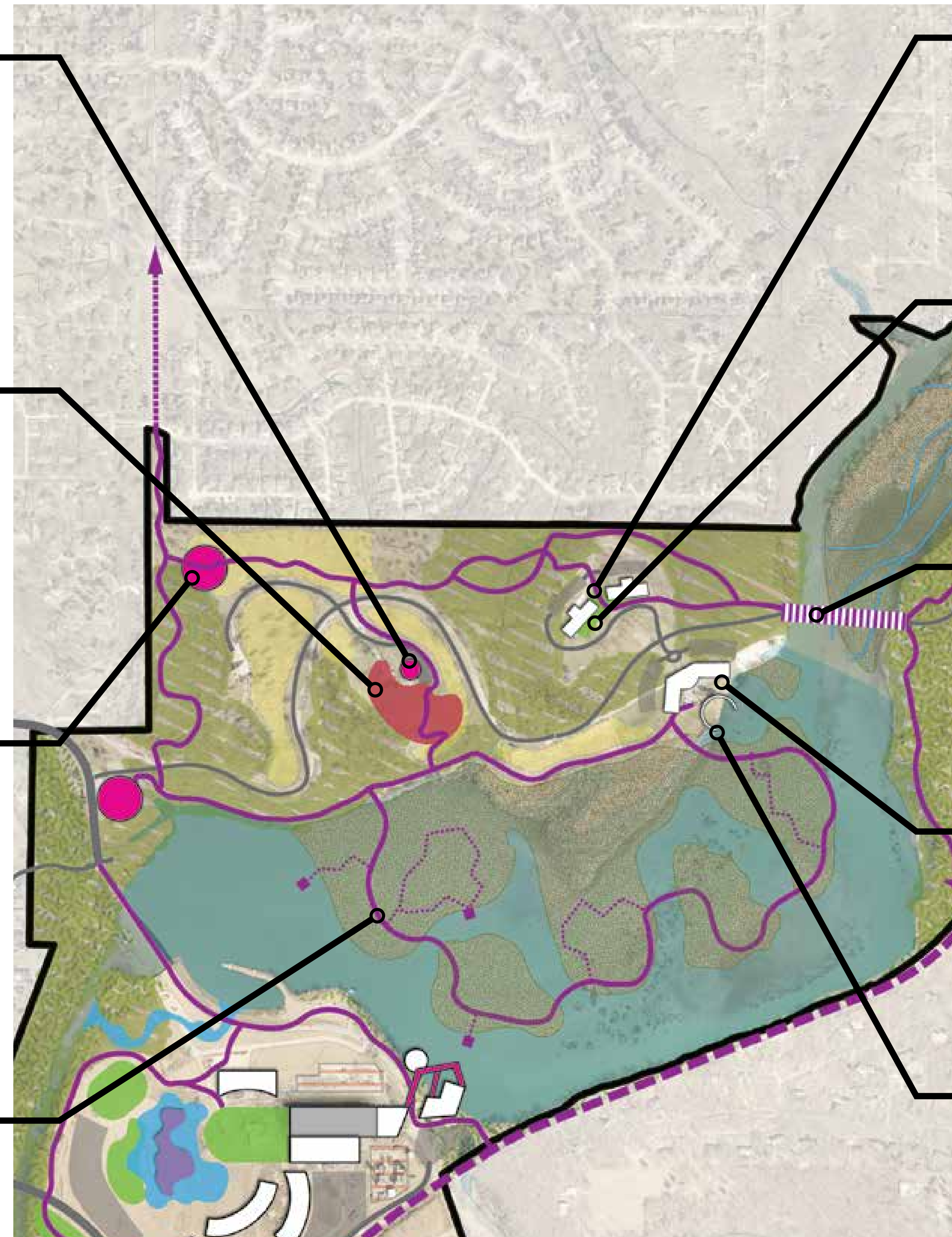
N1 N3 N4 S1 S2 S4

Economic Impact ●○○○○
Social Impact ●●●○○

Wetland Boardwalk

N1 N3 N4 S1 S2 S4

Economic Impact ●○○○○
Social Impact ●●●○○



Eco Retreat Bldgs

E1 E2 E3 E4 S5

Economic Impact ●●●○○
Social Impact ●●○○○

Eco Retreat Support

E1 E2 E3 E4 S5

Economic Impact ●●●○○
Social Impact ●●○○○

Bridge

N1 N3 N4 S1 S2 S4

Economic Impact ●○○○○
Social Impact ●●●○○

Boathouse/Eco Center

E1 E2 N4 N5 S4 S5

Economic Impact ●●●○○
Social Impact ●●●○○

Marina

E1 E4 N1 N2 N3 N4 S1 S2 S3 S4 S5

Economic Impact ●●●○○
Social Impact ●●●●○

Code	Goal
E1	Innovative Economic Opportunities
E2	New Funding Allocations
E3	New Business Development
E4	Attract Private Investment
E5	Resilient Job Creation
N1	New/Green Infrastructure
N2	Sustainable Water Quality
N3	Appealing Outdoor Amenities
N4	Identity - Gateway to the Ozarks
N5	Unique Adaptive Reuse
S1	Innovative Recreation Opportunities
S2	Access / Equitable Transportation
S3	Water Access for Recreation
S4	Elevate the Quality of Live
S5	Regional Draw

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ECONOMIC - CONCEPT 1 IMPACTS

01

Lake Springfield, Missouri Estimated Direct Visitor Spending and Employment Concept 01	Assumptions	Year 1	Year 5	Year 10
Visitation				
Entertainment District (Power Plant)		287,500	311,199	343,589
Conference Center Lodge		40,000	43,297	47,804
South Adventure Area		165,000	178,601	197,190
North Activity Area		210,000	227,311	250,969
Park		178,000	192,673	212,726
Lake		30,000	32,473	35,853
Total		**910,500**	**985,554**	**1,088,132**
Possible Visitation Overlap	*20%*	(182,100)	(197,111)	(217,626)
Net Total		**728,400**	**788,444**	**870,505**
Room Nights				
Entertainment District (Power Plant)	*7%*	20,125	21,784	24,051
Conference Center Lodge	*40%*	16,000	17,319	19,121
South Adventure Area	*5%*	8,250	8,930	9,860
North Activity Area	*2%*	4,200	4,546	5,019
Park	*2%*	3,560	3,853	4,255
Lake	*1%*	300	325	359
Total		**52,435**	**56,757**	**62,665**
Direct Visitor Spending ($ Million)				
On Lodging	*$151.66*	$8.0	$9.7	$12.4
On Food and Beverage	*50.91*	46.3	56.5	72.3
On Car Rental	*49.01*	2.6	3.1	4.0
On Retail	*15.00*	13.7	16.6	21.3
Total	***$266.58***	**$70.5**	**$85.9**	**$110.0**
Economic Impact ($ Million)				
Direct Spending		$70.5	$85.9	$110.0
Indirect and Induced Spending	*0.796*	56.1	68.4	87.5
Total Spending		**$126.6**	**$154.3**	**$197.5**
Increased Earnings	*0.586*	$41.3	$50.3	$64.4
Employment (Estimated Supported # of Jobs)	***12.946***	**913**	**988**	**1,091**
Fiscal Impact ($ Million)				
Sales Tax	*8.10%*	$5.7	$7.0	$8.9
Hotel/Motel Tax	*5.00%*	0.4	0.5	0.6
Total		**$6.1**	**$7.4**	**$9.5**
Inflation Rate	*3.00%*			

Source: Johnson Consulting

ECONOMIC - CONCEPT 2 IMPACTS

02

Lake Springfield, Missouri Estimated Direct Visitor Spending and Employment Concept 02				
	Assumptions	Year 1	Year 5	Year 10
Visitation				
Recreation (Power Plant)		230,000	248,959	274,871
Conference Center		40,000	43,297	47,804
Amphitheater/Bike Park (South Activity Area)		151,000	163,447	180,459
North Activity Area		210,000	227,311	250,969
Park		178,000	192,673	212,726
Lake		30,000	32,473	35,853
Total		**839,000**	**908,161**	**1,002,683**
Possible Visitation Overlap	*20%*	(167,800)	(181,632)	(200,537)
Net Total		**671,200**	**726,528**	**802,146**
Room Nights				
Recreation (Power Plant)	*3%*	6,900	7,469	8,246
Conference Center	*30%*	12,000	12,989	14,341
Amphitheater/Bike Park (South Activity Area)	*4%*	6,040	6,538	7,218
North Activity Area	*1%*	2,100	2,273	2,510
Park	*1%*	1,780	1,927	2,127
Lake	*1%*	300	325	359
Total		**29,120**	**31,520**	**34,801**
Direct Visitor Spending ($ Million)				
On Lodging	*$151.66*	$4.4	$5.4	$6.9
On Food and Beverage	*50.91*	42.7	52.0	66.6
On Car Rental	*49.01*	1.4	1.7	2.2
On Retail	*15.00*	12.6	15.3	19.6
Total	***$251.58***	**$61.1**	**$74.5**	**$95.3**
Economic Impact ($ Million)				
Direct Spending		$61.1	$74.5	$95.3
Indirect and Induced Spending	*0.796*	48.6	59.3	75.8
Total Spending		**$109.8**	**$133.7**	**$171.2**
Increased Earnings	*0.586*	$35.8	$43.6	$55.9
Employment (Estimated Supported # of Jobs)	***12.946***	**791**	**857**	**946**
Fiscal Impact ($ Million)				
Applicable Tax Rates	*8.10%*	$5.0	$6.0	$7.7
City	*5.00%*	0.2	0.3	0.3
Total		**$5.2**	**$6.3**	**$8.1**
Inflation Rate	*3.00%*			

Source: Johnson Consulting

ECONOMIC - IMPACTS - KEY TAKEAWAYS

Highest Overall Impact: Concept 1

Note: Phasing not yet integrated into economic projections

YEAR 10 ESTIMATIONS

Jobs

Concept 01	1,091
Concept 02	946

Direct Visitor Spending ($ Million)

Concept 01	$197.5
Concept 02	$171.2

Room Nights

Concept 01	62,665
Concept 02	34,801

Taxes Generated ($ Million)

Concept 01	$9.5
Concept 02	$8.1

Lake Springfield, Missouri
Estimated Direct Visitor Spending and Employment
Concept 01

	Assumptions	Year 1	Year 5	Year 10
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Possible Visitation Overlap	*20%*	(182,100)	(197,111)	(217,626)
Net Total		**728,400**	**788,444**	**870,505**
Room Nights				
Entertainment District (Power Plant)	*7%*	20,125	21,784	24,051
Conference Center Lodge	*40%*	16,000	17,319	19,121
South Adventure Area	*5%*	8,250	8,930	9,860
North Activity Area	*2%*	4,200	4,546	5,019
Park	*2%*	3,560	3,853	4,255
Lake	*1%*	300	325	359
Total		**52,435**	**56,757**	**62,665**
Direct Visitor Spending ($ Million)				
On Lodging	*$151.66*	$8.0	$9.7	$12.4
On Food and Beverage	*50.91*	46.3	56.5	72.3
On Car Rental	*49.01*	2.6	3.1	4.0
On Retail	*15.00*	13.7	16.6	21.3
Total	***$266.58***	**$70.5**	**$85.9**	**$110.0**
Economic Impact ($ Million)				
Direct Spending		$70.5	$85.9	$110.0
Indirect and Induced Spending	*0.796*	56.1	68.4	87.5
Total Spending		**$126.6**	**$154.3**	**$197.5**
Increased Earnings	*0.586*	$41.3	$50.3	$64.4
Employment (Estimated Supported # of Jobs)	***12.946***	**913**	**988**	**1,091**
Fiscal Impact ($ Million)				
Sales Tax	*8.10%*	$5.7	$7.0	$8.9
Hotel/Motel Tax	*5.00%*	0.4	0.5	0.6
Total		**$6.1**	**$7.4**	**$9.5**
Inflation Rate	*3.00%*			

Source: Johnson Consulting

Lake Springfield, Missouri
Estimated Direct Visitor Spending and Employment
Concept 02

	Assumptions	Year 1	Year 5	Year 10
Visitation				
Recreation (Power Plant)		230,000	248,959	274,871
Conference Center		40,000	43,297	47,804
Amphitheater/Bike Park (South Activity Area)		151,000	163,447	180,459
North Activity Area		210,000	227,311	250,969
Park		178,000	192,673	212,726
Lake		30,000	32,473	35,853
Total		**839,000**	**908,161**	**1,002,683**
Possible Visitation Overlap	*20%*	(167,800)	(181,632)	(200,537)
Net Total		**671,200**	**726,528**	**802,146**
Room Nights				
Recreation (Power Plant)	*3%*	6,900	7,469	8,246
Conference Center	*30%*	12,000	12,989	14,341
Amphitheater/Bike Park (South Activity Area)	*4%*	6,040	6,538	7,218
North Activity Area	*1%*	2,100	2,273	2,510
Park	*1%*	1,780	1,927	2,127
Lake	*1%*	300	325	359
Total		**29,120**	**31,520**	**34,801**
Direct Visitor Spending ($ Million)				
On Lodging	*$151.66*	$4.4	$5.4	$6.9
On Food and Beverage	*50.91*	42.7	52.0	66.6
On Car Rental	*49.01*	1.4	1.7	2.2
On Retail	*15.00*	12.6	15.3	19.6
Total	***$251.58***	**$61.1**	**$74.5**	**$95.3**
Economic Impact ($ Million)				
Direct Spending		$61.1	$74.5	$95.3
Indirect and Induced Spending	*0.796*	48.6	59.3	75.8
Total Spending		**$109.8**	**$133.7**	**$171.2**
Increased Earnings	*0.586*	$35.8	$43.6	$55.9
Employment (Estimated Supported # of Jobs)	***12.946***	**791**	**857**	**946**
Fiscal Impact ($ Million)				
Applicable Tax Rates	*8.10%*	$5.0	$6.0	$7.7
City	*5.00%*	0.2	0.3	0.3
Total		**$5.2**	**$6.3**	**$8.1**
Inflation Rate	*3.00%*			

Source: Johnson Consulting

ECONOMIC - DEVELOPMENT COSTS

Lake Springfield, Missouri Estimated Construction Cost Concept 01			
	Actual Area (SF, rounded)	Area (acres)	Estimated Cost ($000)
North Area			$15,480,000
Subtotal	**13,593,000**	**312.05**	**$15,480,000**
MP Contingency (40%)			$6,192,000
Site Infrastructure (20%)			3,096,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			8,668,800
Master Plan Order-of-Magnitude			**$33,436,800**
Park & Lake			$114,504,600
Subtotal	**4,237,800**	**97**	**$114,504,600**
MP Contingency (40%)			$45,801,840
Site Infrastructure (20%)			22,900,920
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			64,122,576
Master Plan Order-of-Magnitude			**$247,329,936**
Entertainment District (Power Plant)			
Power Plant	80,000	1.84	$51,500,000
Restaurant/Overlook	20,000	0.46	13,000,000
Entertainment Bldg A-B	37,000	0.85	24,050,000
Mixed Use Bldg A-D	226,000	5.19	113,000,000
Riverfront Hospitality Bldg	5,000	0.11	3,250,000
Multi-Purpose Event Center	270,000	6.20	81,000,000
Event Lawn	130,000	2.98	3,250,000
Bypass Channel	110,000	2.53	9,550,000
Water Adventure	159,000	3.65	31,625,000
Riverfront Destination Amenity Area	140,000	3.21	4,900,000
Site Improvements & Modifications			33,030,000
Subtotal	**1,177,000**	**27.02**	**$368,155,000**
MP Contingency (40%)			$147,262,000
Site Infrastructure (20%)			73,631,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			206,166,800
Master Plan Order-of-Magnitude			**$795,214,800**
Conference / Supporting Adventure (South Activity Area)			
Conference Center Lodge	102,000	2.34	$40,000,000
Retreat Cabins/Yurts	40,600	0.93	10,500,000
Ropes / Adventure Course / Destination Play	230,000	5.28	10,000,000
Bike Park	700,000	16.07	2,000,000
Green Space Trails	1,840,000	42.24	1,080,000
Lake	390,000	8.95	1,000,000
Green Space Buffer	930,000	21.35	1,000,000
Site Improvements & Modifications			9,100,000
Subtotal	**4,232,600**	**97.17**	**$74,680,000**
MP Contingency (40%)			$29,872,000
Site Infrastructure (20%)			14,936,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			41,820,800
Master Plan Order-of-Magnitude			**$161,308,800**
Total Concept 01	**23,240,400**	**534**	**$1,237,290,336**

Source: SWT, Johnson Consulting

Lake Springfield, Missouri Estimated Construction Cost Concept 02			
	Actual Area (SF, rounded)	Area (acres)	Estimated Cost ($000)
North Area			$15,080,000
Subtotal	**13,593,000**	**312.05**	**$15,080,000**
MP Contingency (40%)			$6,032,000
Site Infrastructure (20%)			3,016,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			8,444,800
Master Plan Order-of-Magnitude			**$24,128,000**
Park & Lake			$114,079,600
Subtotal	**4,237,800**	**97**	**$114,079,600**
MP Contingency (40%)			$45,631,840
Site Infrastructure (20%)			22,815,920
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			63,884,576
Master Plan Order-of-Magnitude			**$246,411,936**
Recreation (Power Plant)			
Power Plant	80,000	1.84	$51,500,000
Mixed Use Bldg A-B	162,000	3.72	81,000,000
Entertainment Bldg	7,200	0.17	4,680,000
Conference Center	155,000	3.56	54,250,000
Overlook Restaurant	20,000	0.46	13,000,000
Riverfront Hospitality	5,000	0.11	3,250,000
Recreation / Entertainment Destination	180,000	4.13	63,000,000
Event Lawn	280,000	6.43	7,000,000
Lake / Water Feature / Bypass Channel	330,000	7.58	17,550,000
Riverfront Green / Parks Space	460,000	10.56	1,380,000
Site Improvements & Modifications			30,421,500
Subtotal	**1,679,200**	**38.55**	**$327,031,500**
MP Contingency (40%)			$130,812,600
Site Infrastructure (20%)			65,406,300
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			183,137,640
Master Plan Order-of-Magnitude			**$706,388,040**
Amphitheater/Bike Park (South Activity Area)			
Amphitheater	70,000	1.61	$2,500,000
Multi-Use Lawn	95,000	2.18	850,000
Amenities Plaza	29,000	0.67	360,000
Amenities Plaza Bldgs	40,000	0.92	5,000,000
RV Camping Area A-B	1,830,000	42.01	2,137,500
Bike Park	905,000	20.78	2,500,000
Bike Park Support Bldg	4,500	0.10	562,500
Adventure Park / Ropes Course	387,000	8.88	5,000,000
Archery Range	95,000	2.18	500,000
Lake	1,340,000	30.76	5,100,000
Green Space Buffer / Trails	1,040,000	23.88	2,160,000
Site Improvements & Modifications			7,600,000
Subtotal	**5,835,500**	**133.96**	**$34,270,000**
MP Contingency (40%)			$13,708,000
Site Infrastructure (20%)			6,854,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			19,191,200
Master Plan Order-of-Magnitude			**$74,023,200**
Total Concept 02	**25,345,500**	**582**	**$1,050,951,176**

Source: SWT, Johnson Consulting

CMT

CITY OF Springfield

City Utilities
Connecting Our Community

The PARK
SPRINGFIELD-GREENE COUNTY PARK BOARD

Hatch

E·D·A
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

MOBILITY CONSIDERATIONS

TRIP GENERATORS:

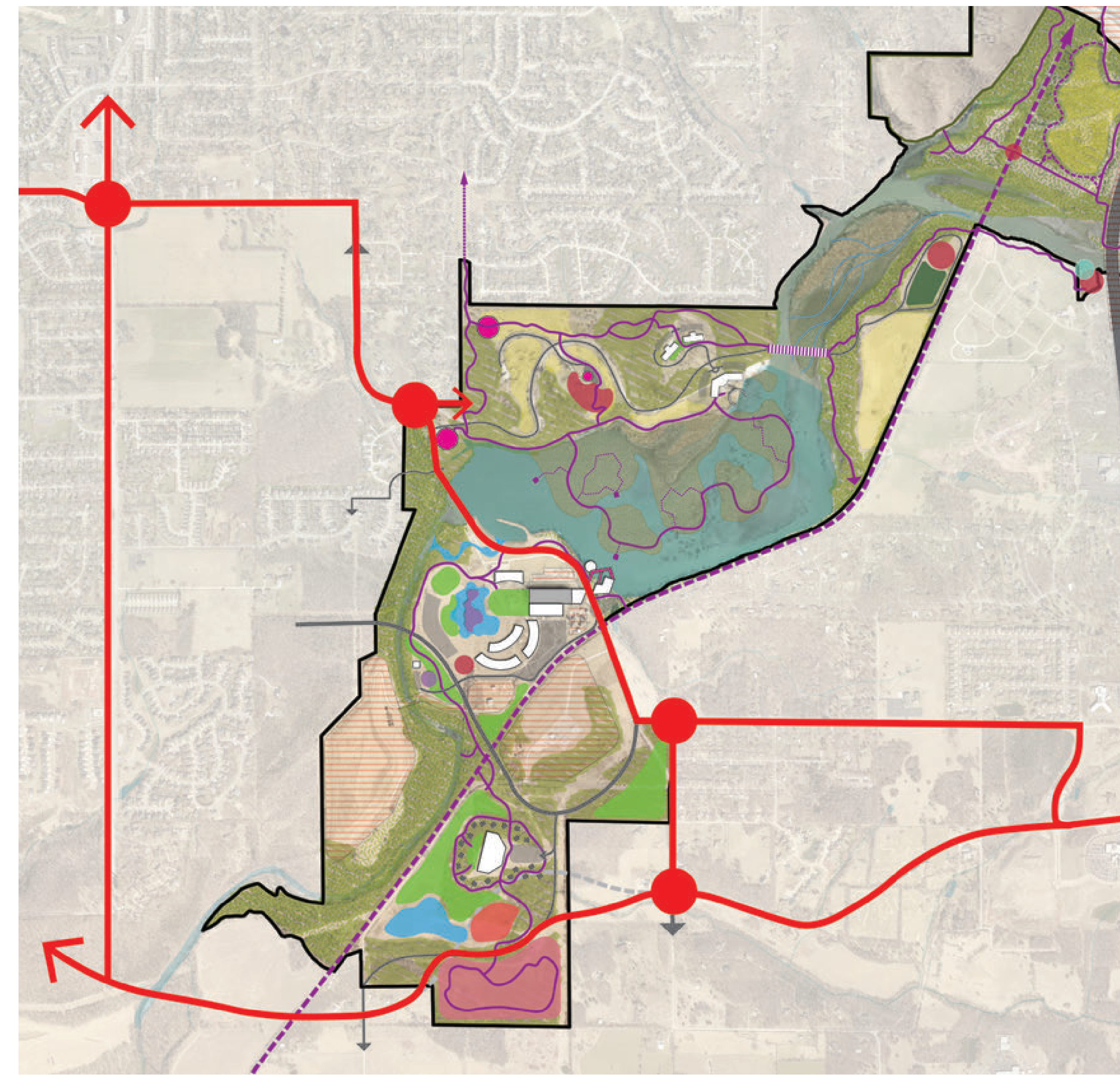
- Power Plant
- South Activity Area
- 20,000 trips/day (2,000 peak hour)

LONG RANGE PLAN:

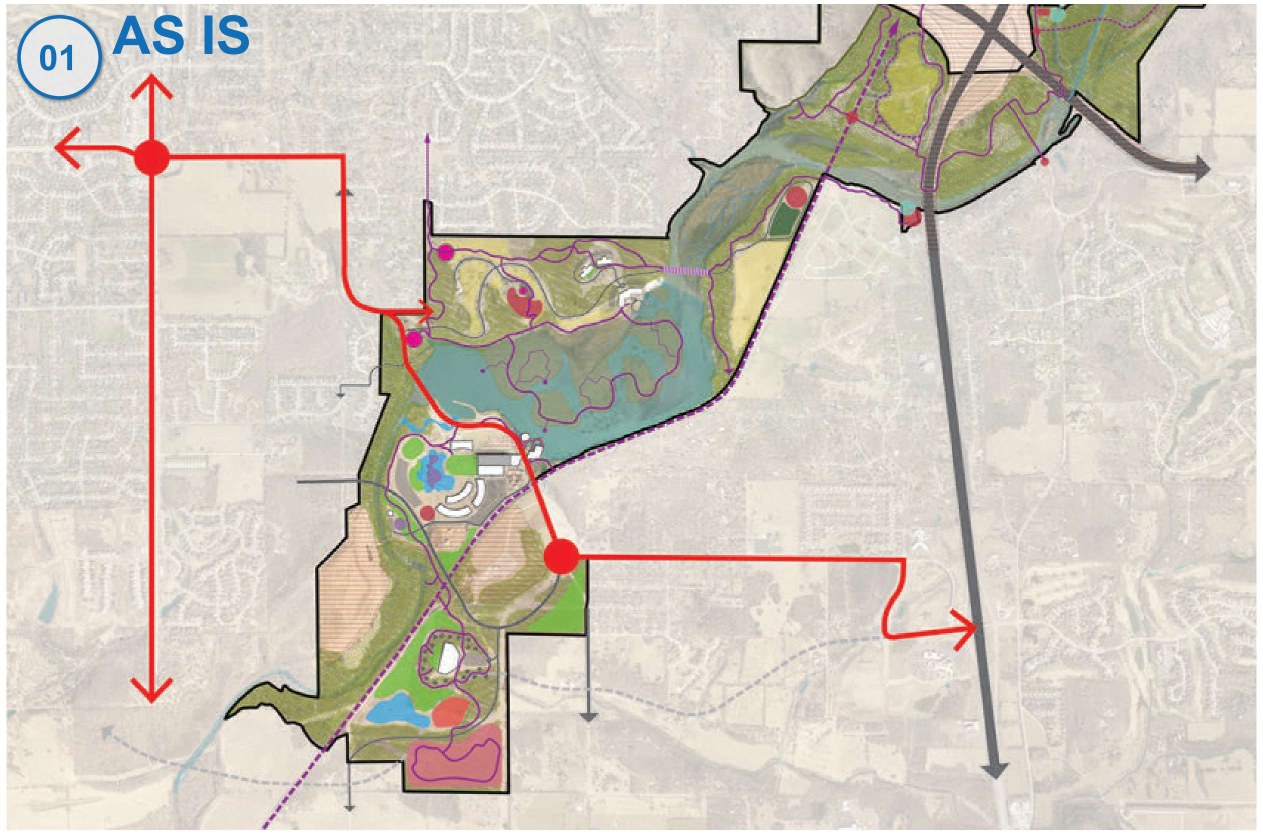
- E/W Arterial
- Typical sections for improvement

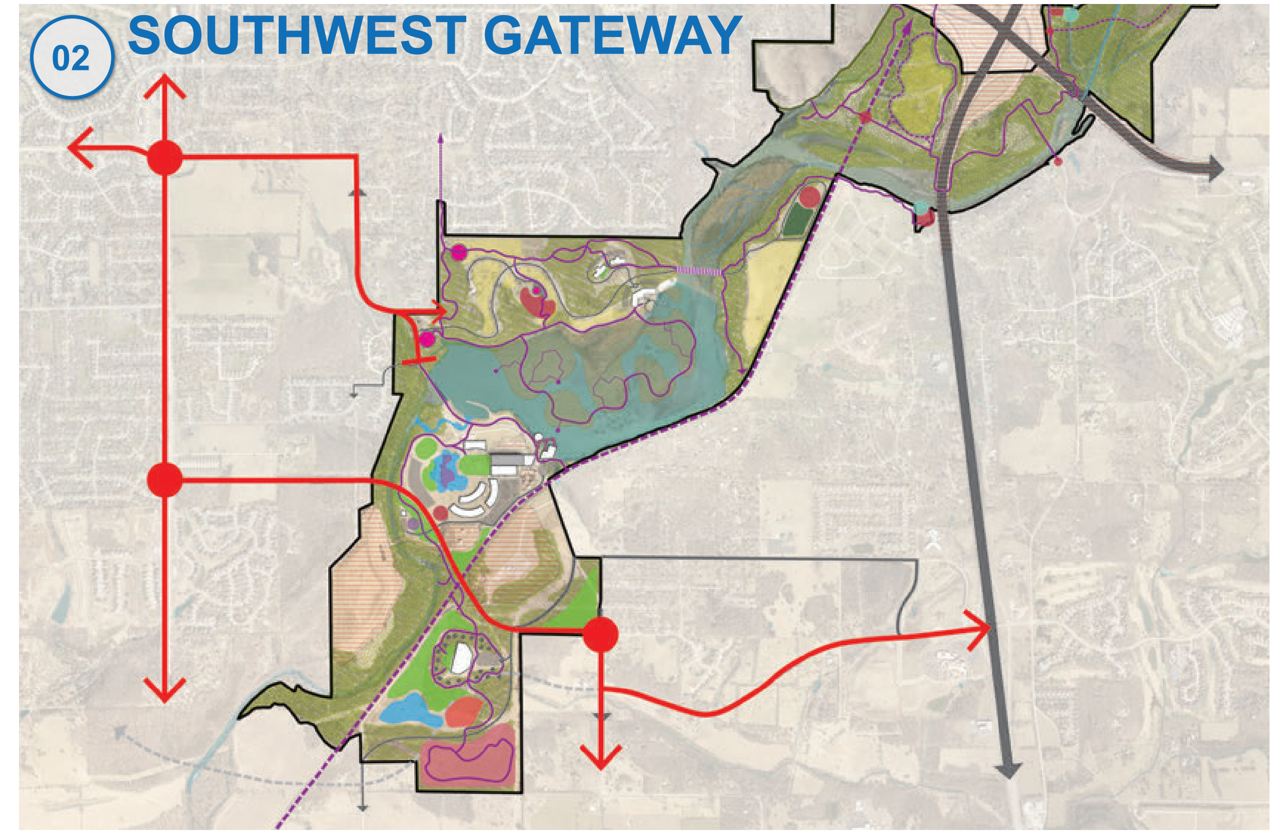
MULTIMODAL CONNECTIONS:

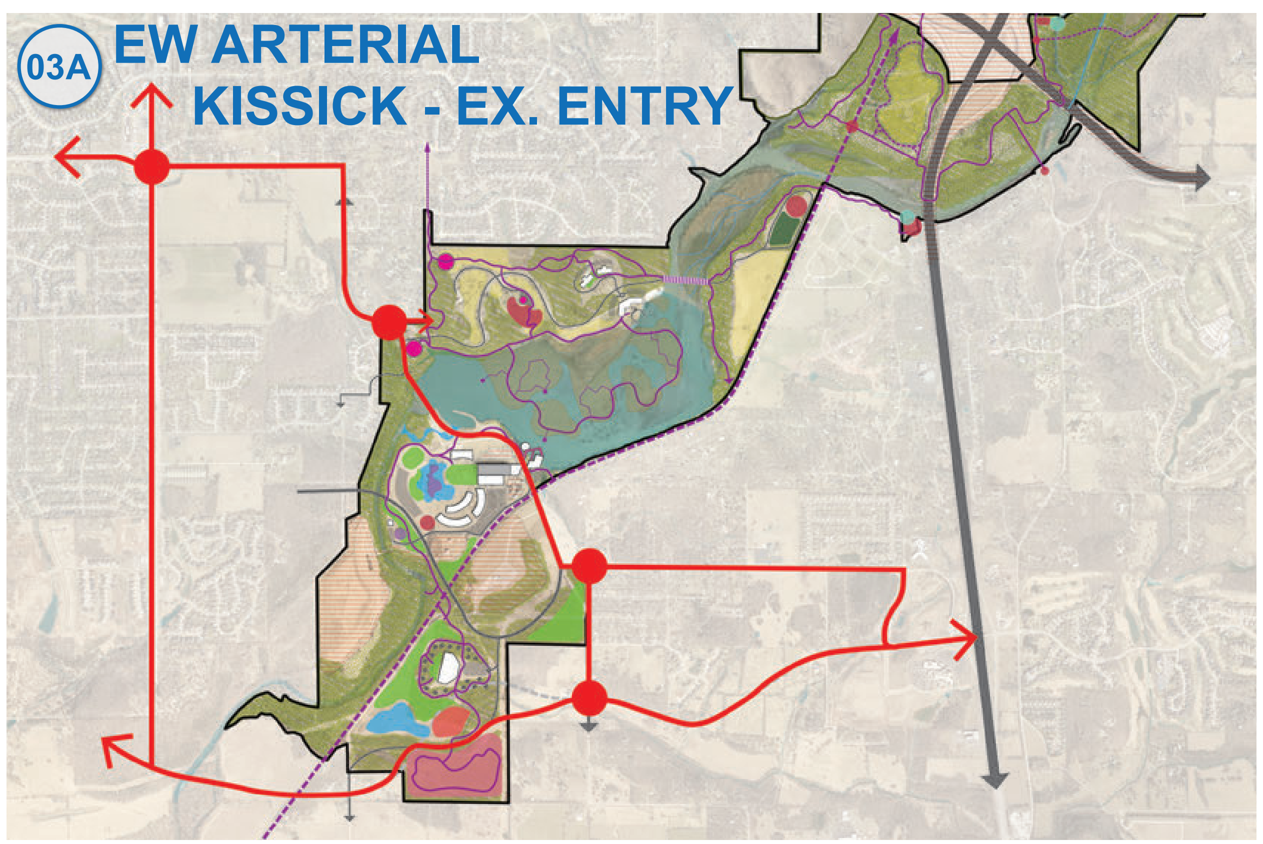
- Public transit on Republic/ Lake Springfield connector trai
- CFT Trail connection
- Trail system in site plan

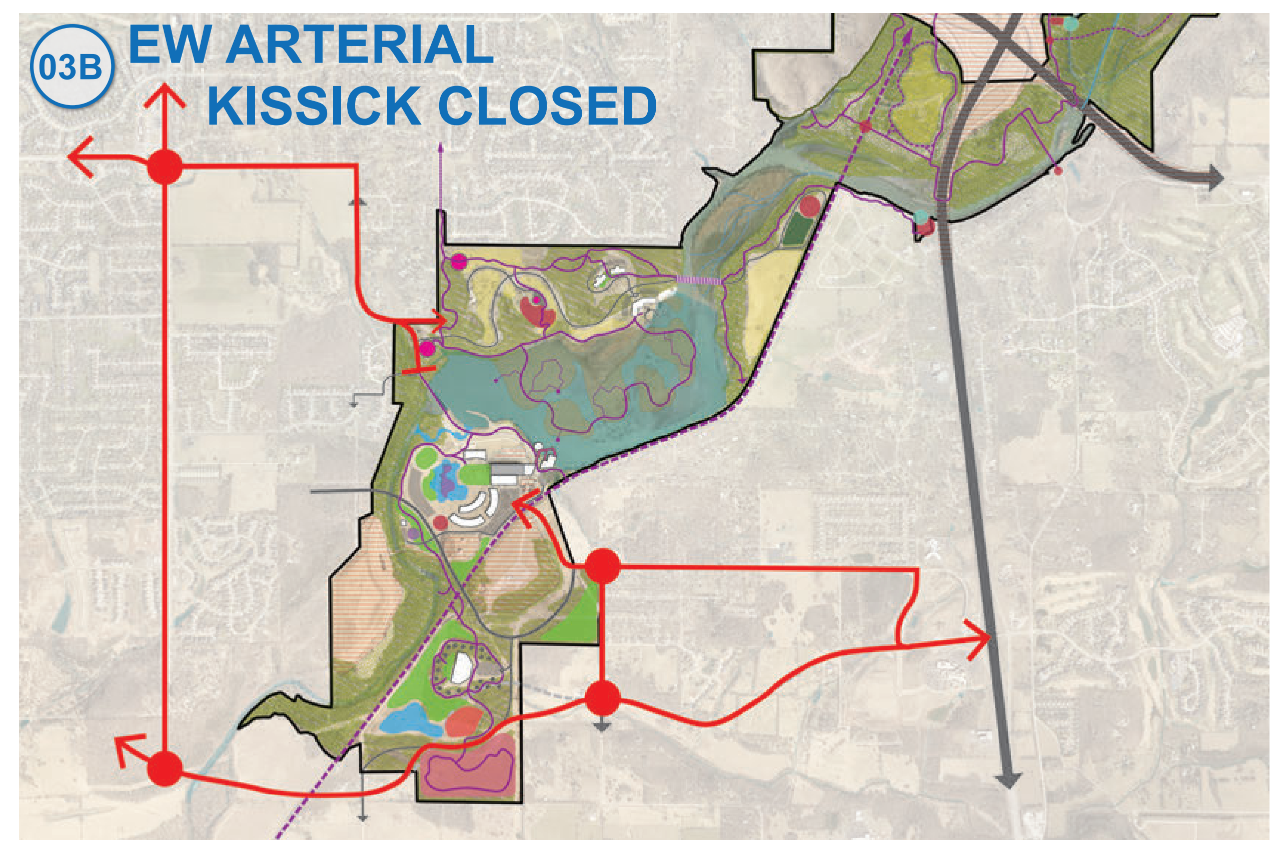


ACCESS OPTIONS









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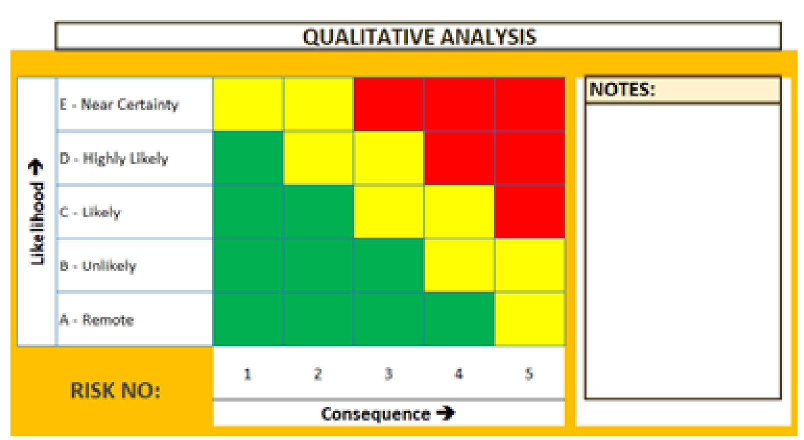
The PARK
SPRINGFIELD-GREENE COUNTY PARK BOARD

Hatch

E·D·A
U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

RISK ASSESSMENT

- **Initial risk assessment completed at retreat kickoff (109 risks)**
- **Reviewed and risk register included 62 risks**
- **Categories:**
  - *Parks & Recreation*
  - *Economic Development*
  - *Transportation*
  - *Public Relations*
  - *Dam*
  - *Environmental*
  - *Utilities*
  - *General*
- **Risk Register review - July 2023 (after 2nd public meeting May 4)**
- **Two risks added (total on register at 64)**
- **High Risks - 5**
- **Moderate Level - 52**
- **Low Level - 7**



Lake Springfield

August 23, 2023

Land-Use Concepts

City Manger Update

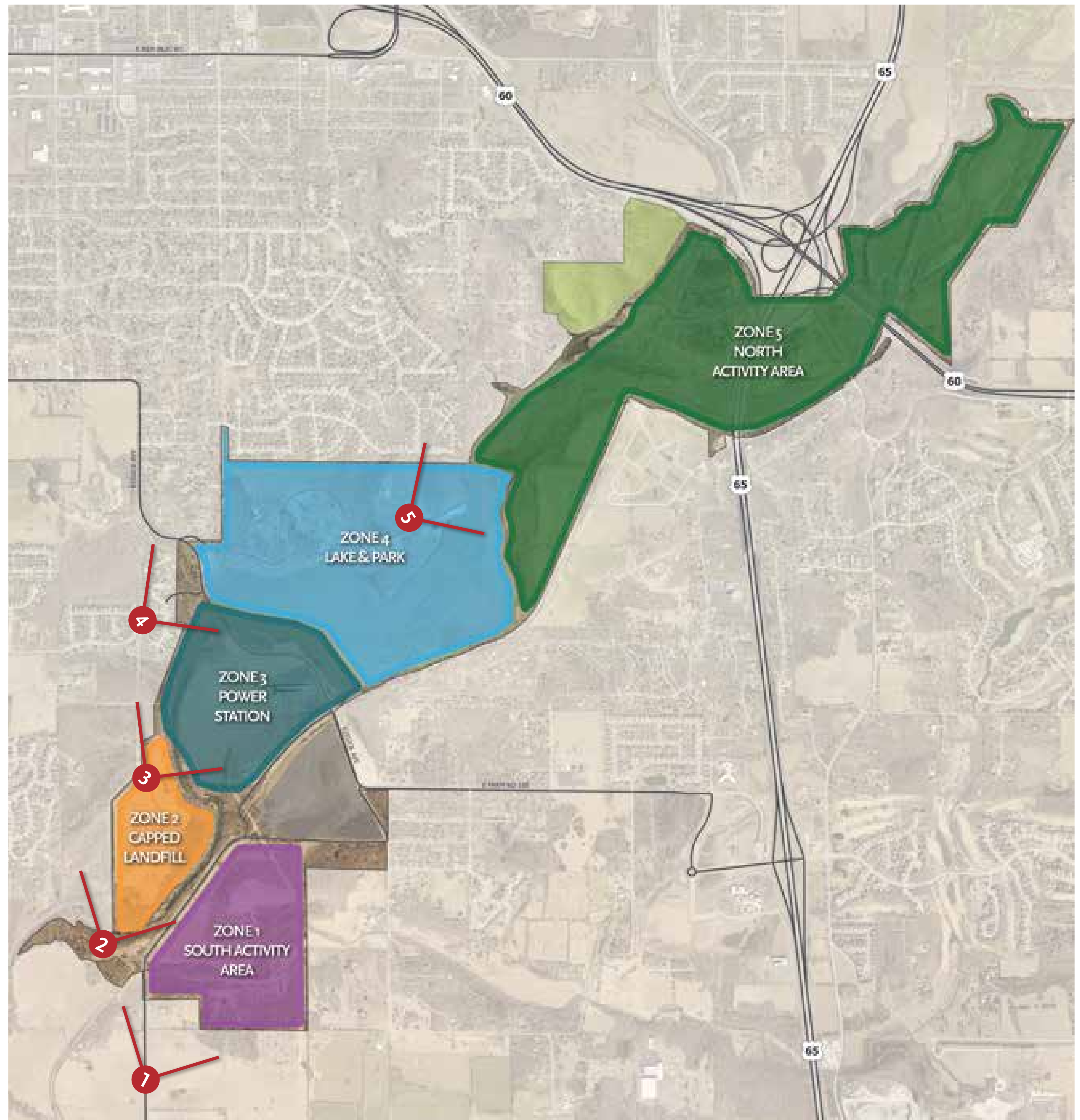
SWTDESIGN

INITIAL CONCEPT ZONES

ZONE 1 - South Activity Area

ZONE 2 - Capped Landfill Area

ZONE 3 - Power Station/Dam Area



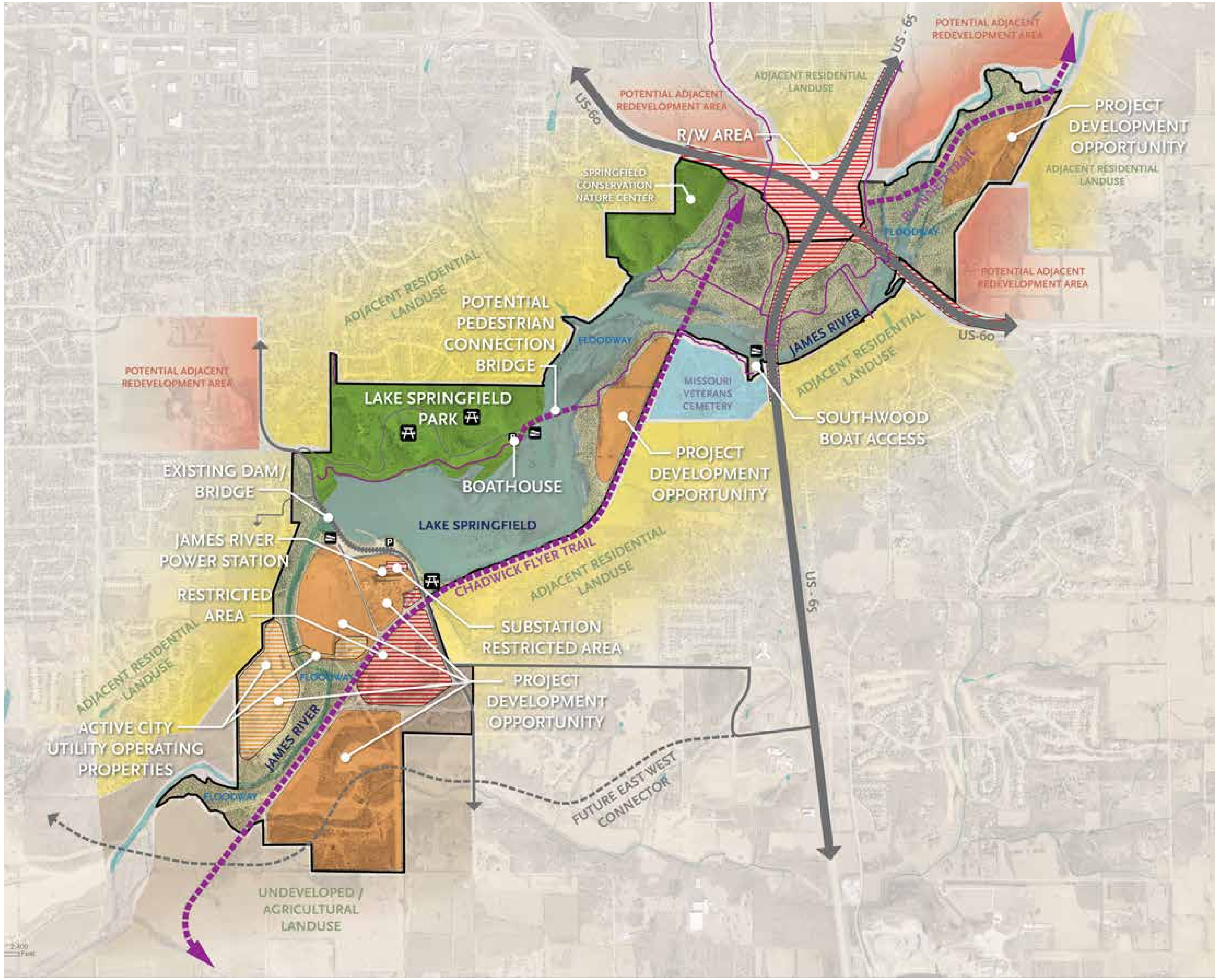
1 VIEWSHED FROM OBSERVER'S LOCATION

ZONE 4 - Lake/Park Area

ZONE 5 - North Activity Area

PLACE COMMENTS HERE

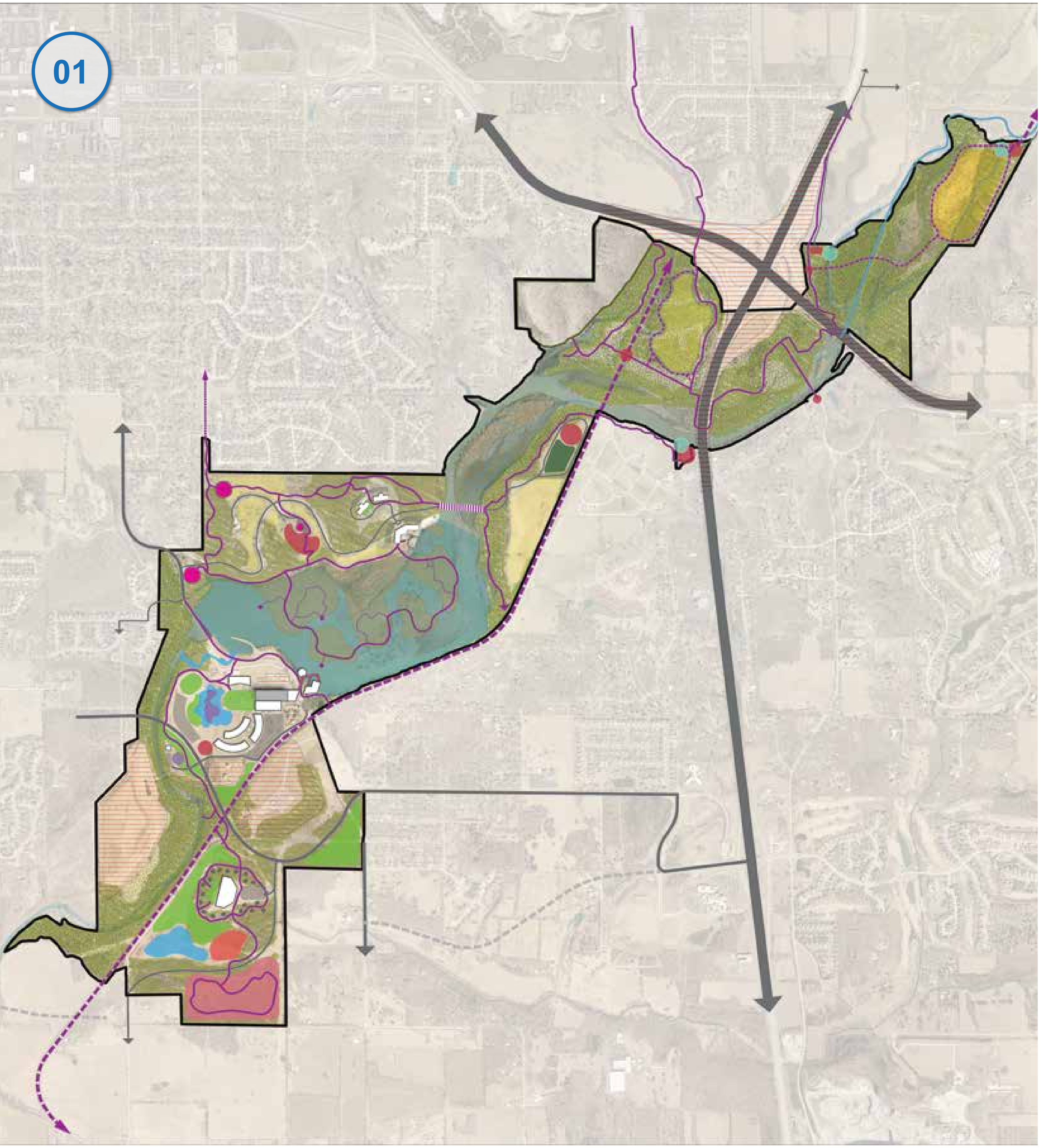
SITE ANALYSIS & PRELIMINARY CONCEPTS

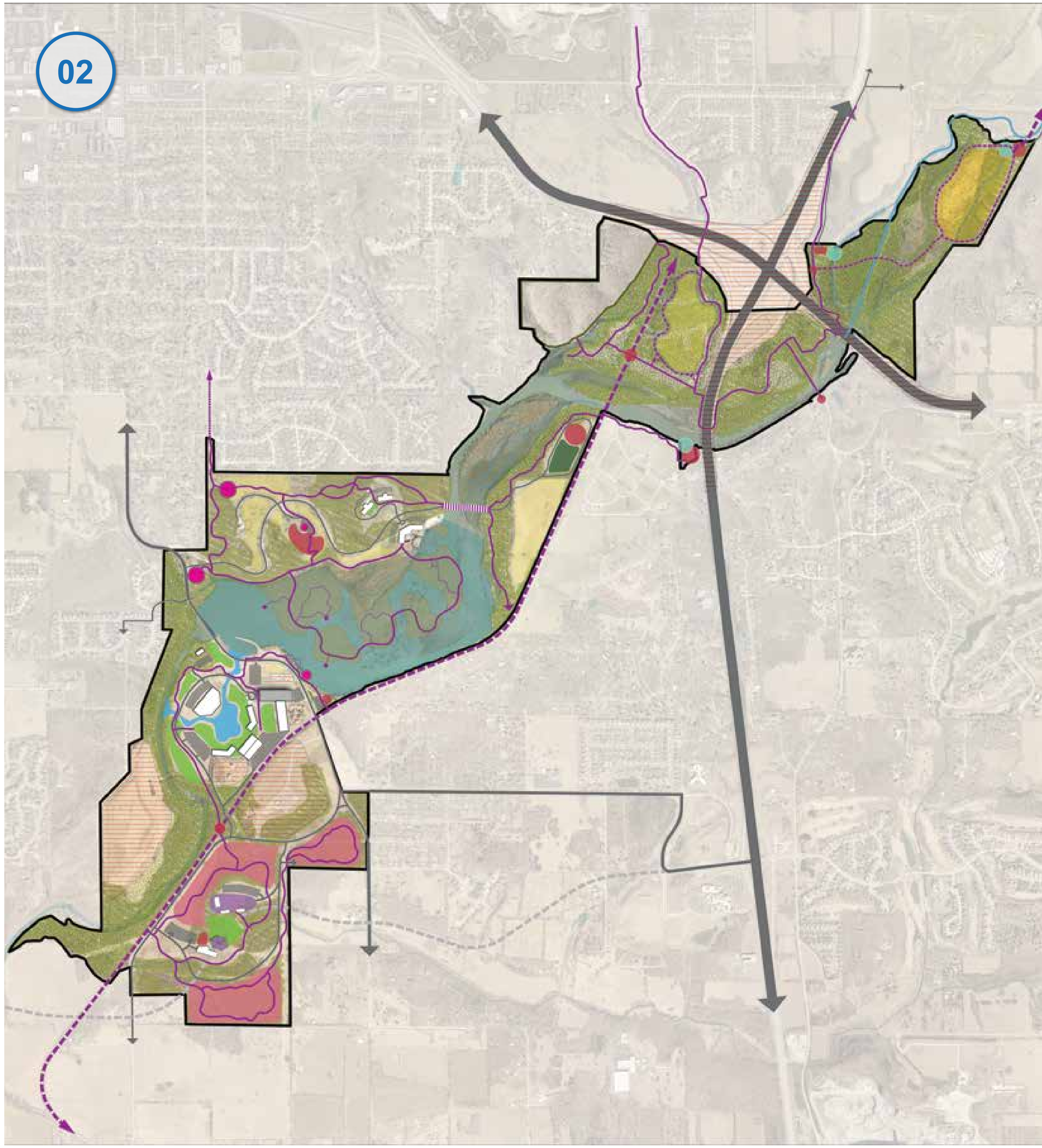


RECREATION DESTINATION (PLACE/EVENT)

ENTERTAINMENT DISTRICT (EVENT)

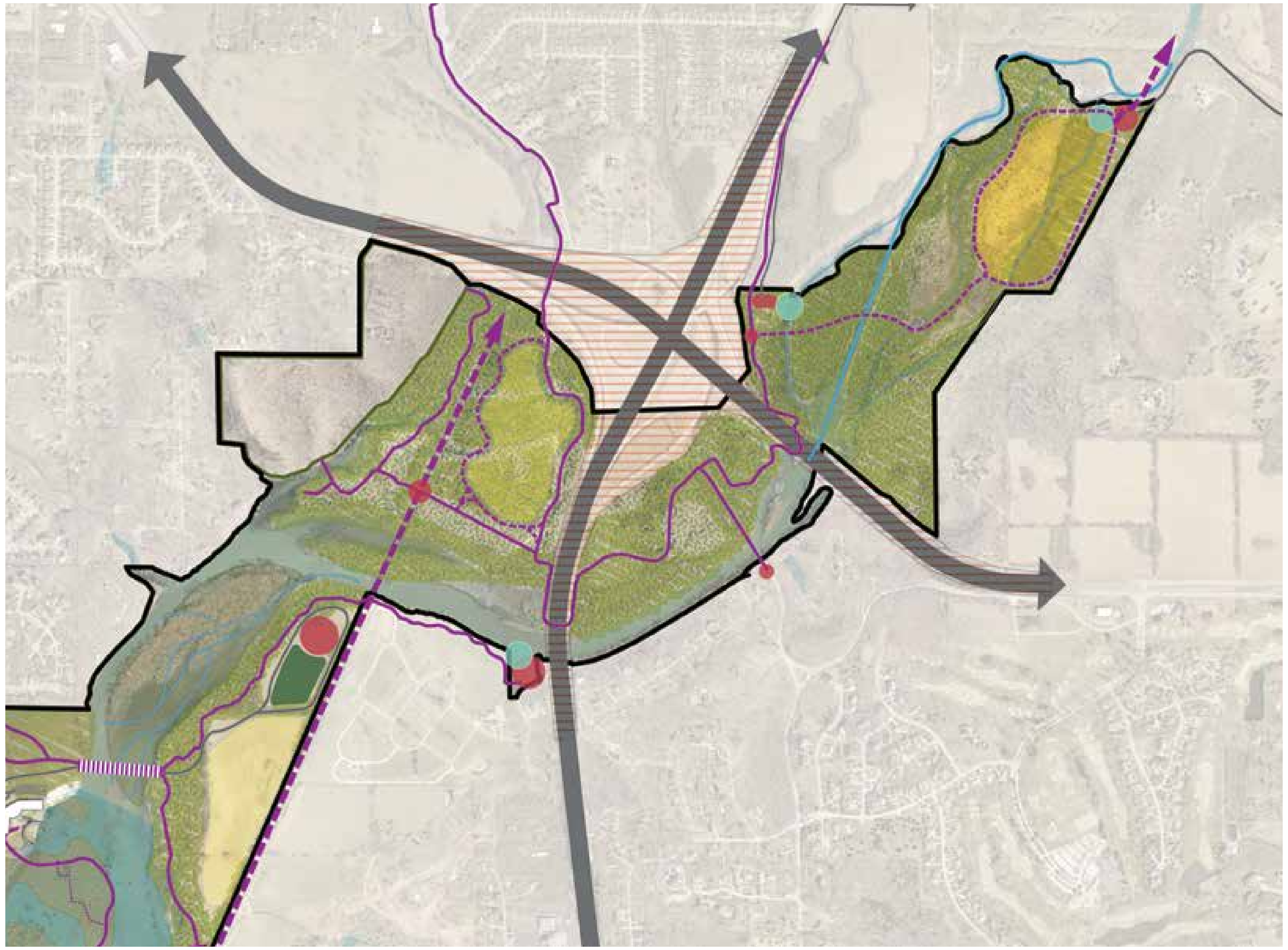
LAND-USE CONCEPTS





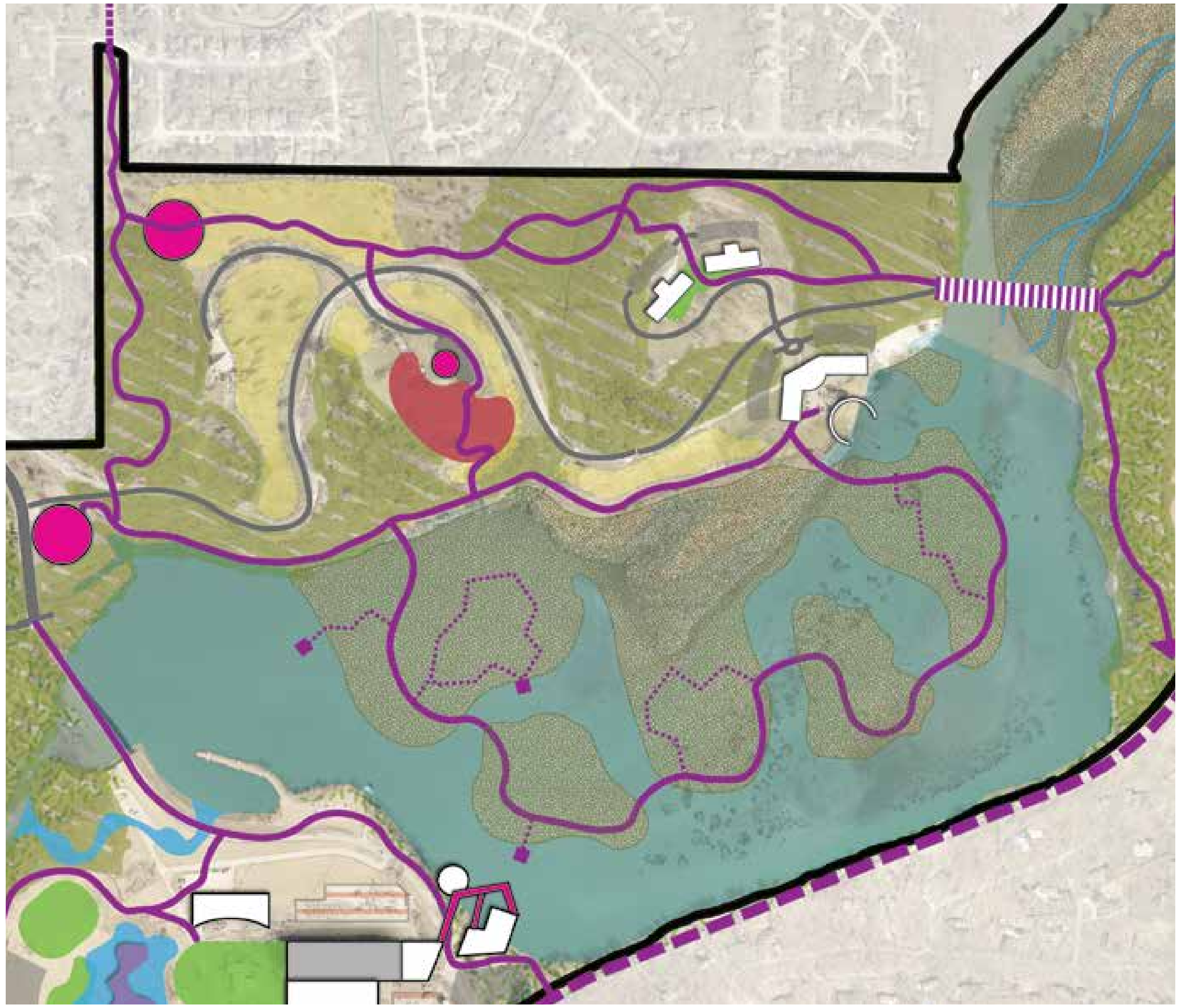
Experience

NORTH

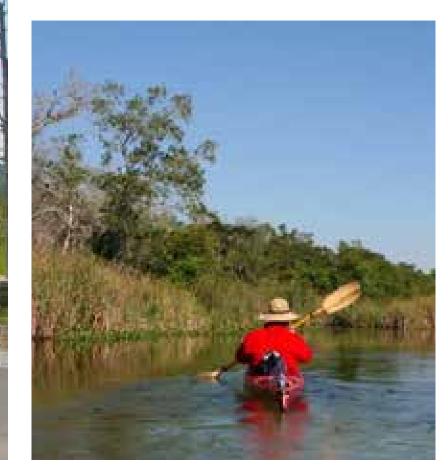


Wetland Preservation
Trails
Nature Amenity Area
River Access/Trailheads
Bird Meadow
Culture Center/Lawn
Culture Meadow

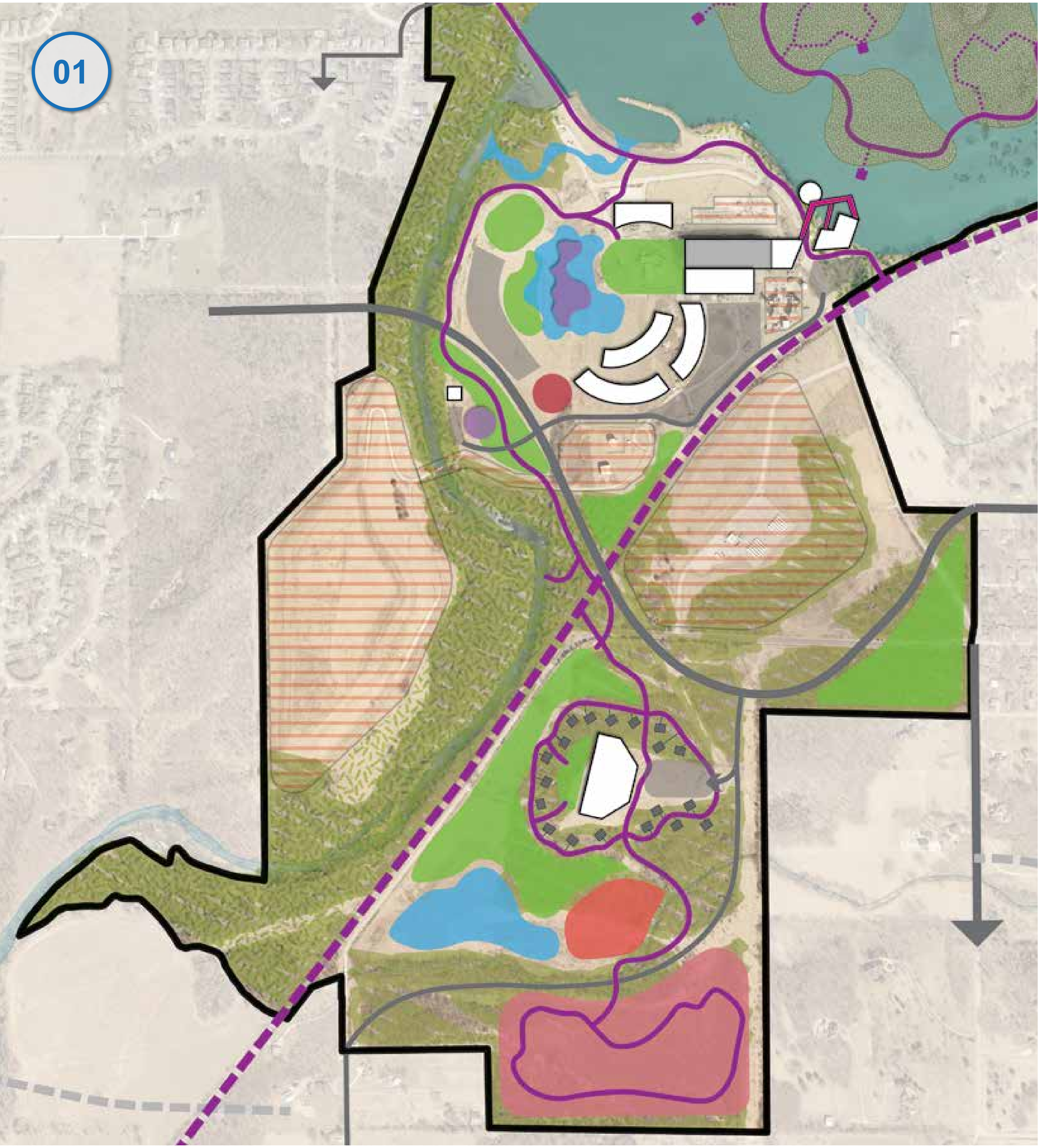
PARK & LAKE

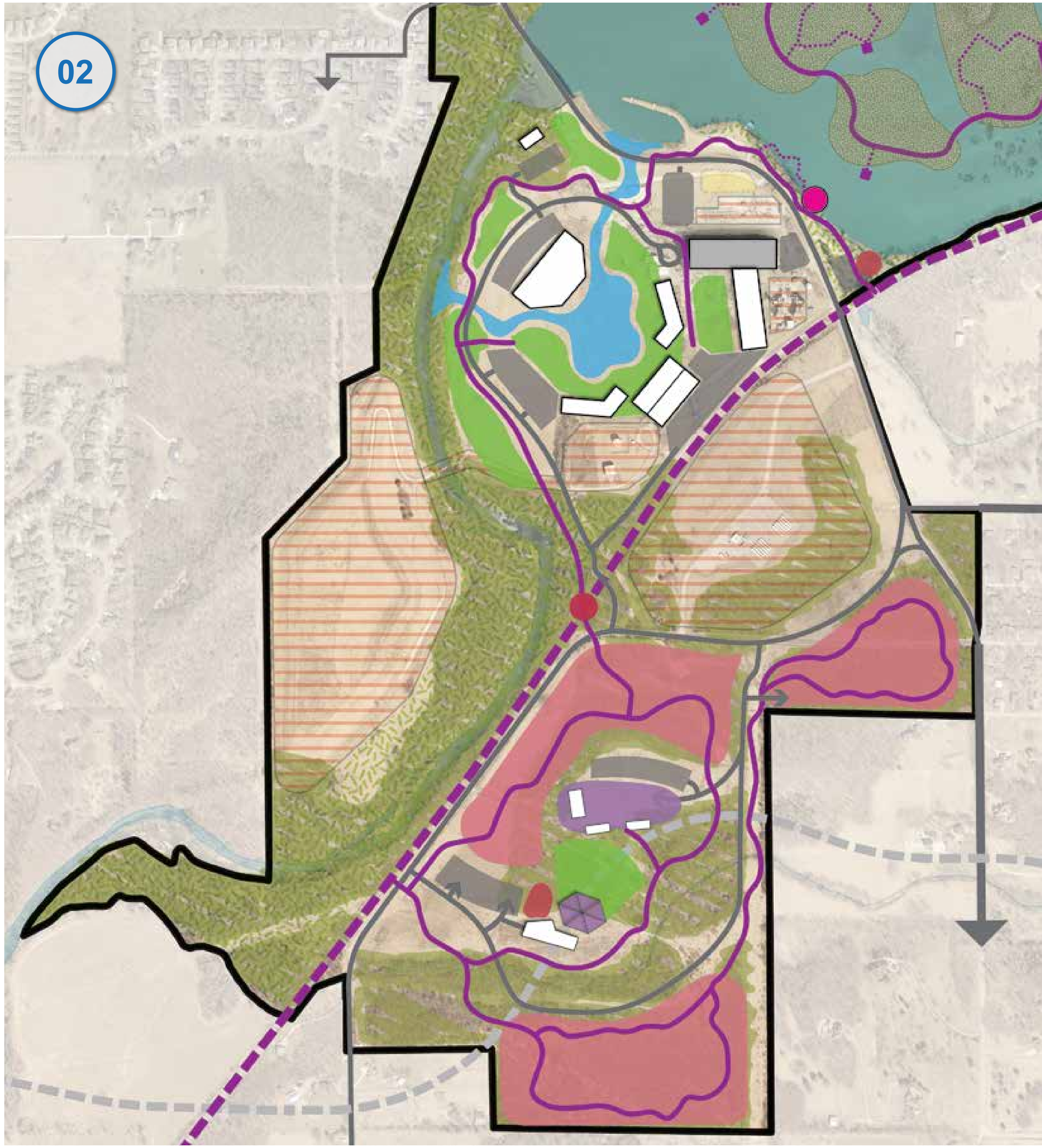


Boathouse/Eco Center
Marina
Wetland Boardwalk
Eco Retreat Center
Destination Play
Overlooks
Park Entry Amenities

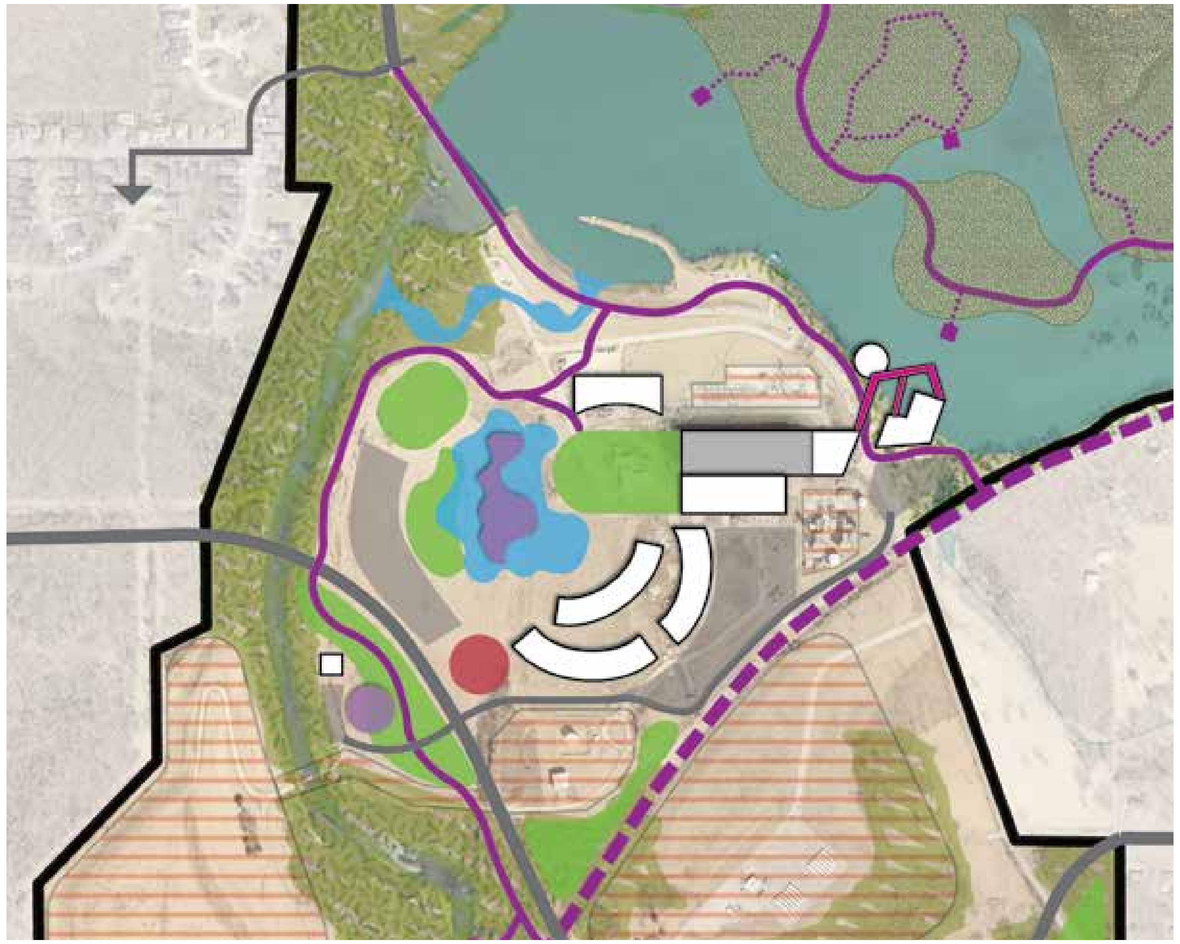


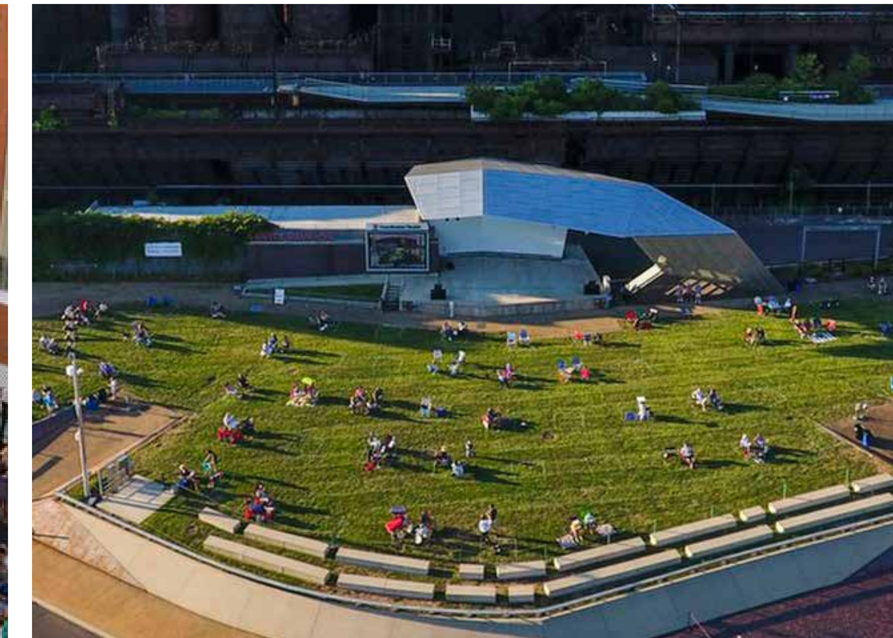
POWER PLANT + SOUTH ACTIVITY AREA

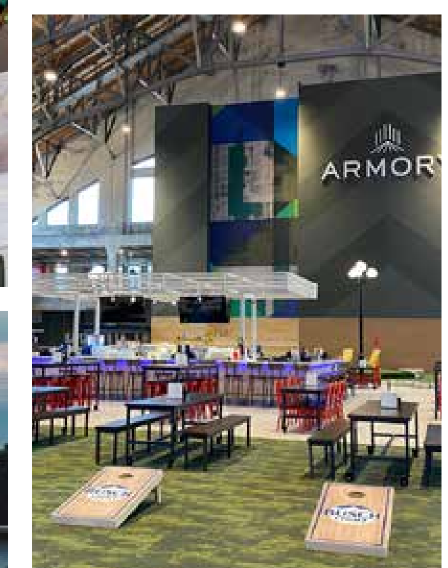




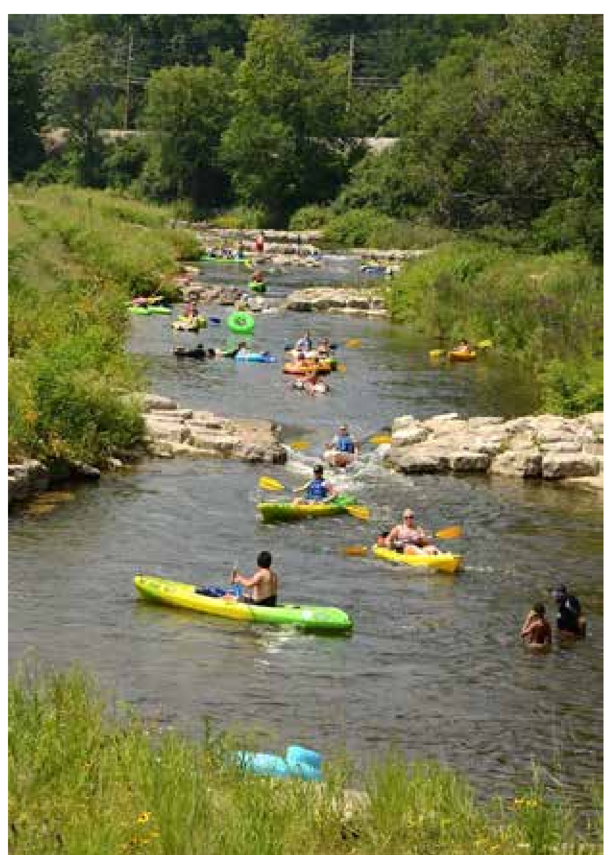
POWER PLANT - ENTERTAINMENT DISTRICT







Power Plant + Expansion
Restaurant/Overlook
Mixed Use Bldg
Entertainment Bldg
Riverfront Hospitality
Event Lawn
Bypass Channel
Water Adventure
Adventure Island
Ropes Course
Destination Play
Riverfront Play Area



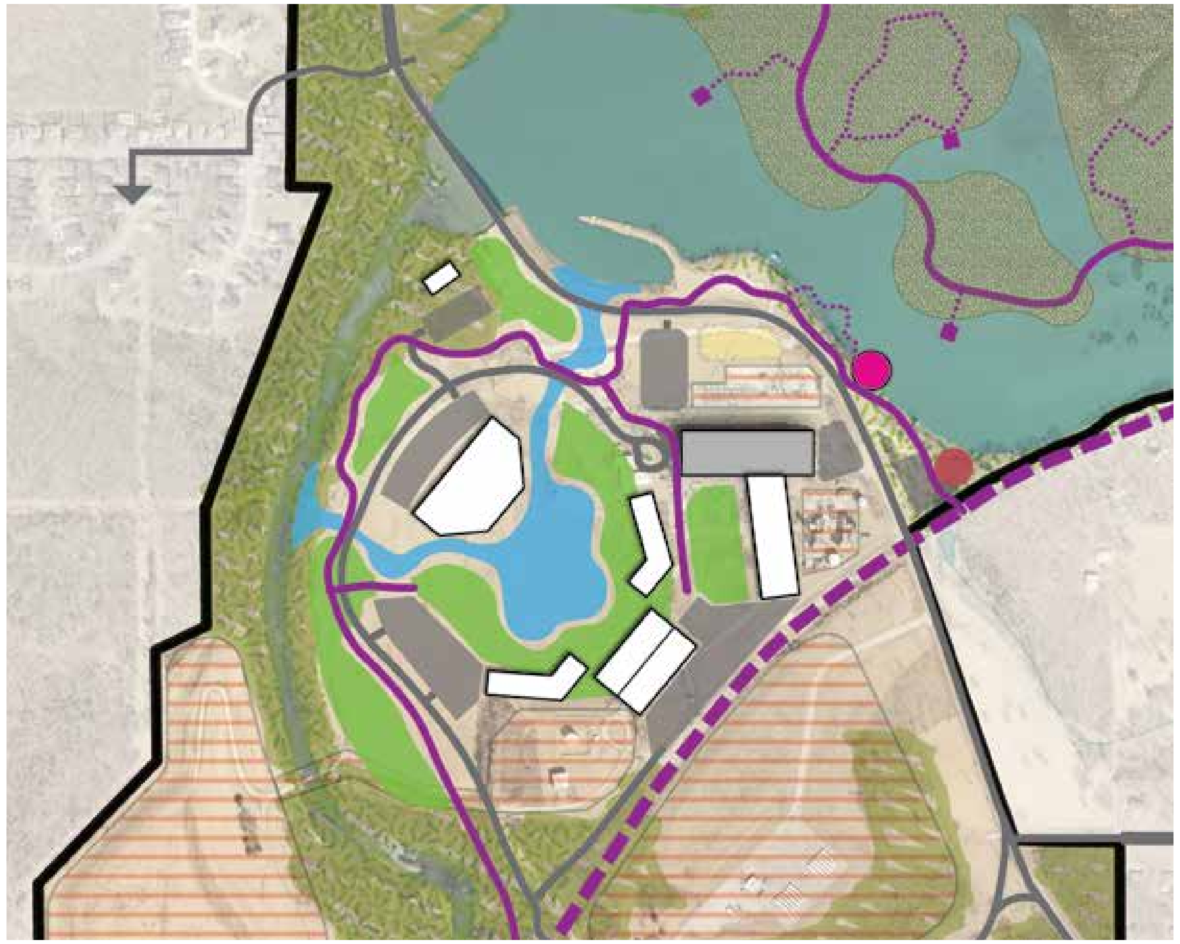
SOUTH ACTIVITY - CONFERENCE / ADVENTURE





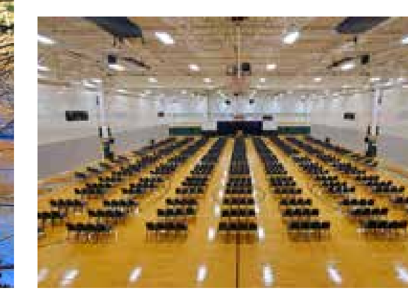

Retreat/Conference Bldg
Retreat Green
Retreat Cabins/Yurts
Destination Play
Lake
Bike Park
Green Space TBD


POWER PLANT - MULTI-PURPOSE EVENT









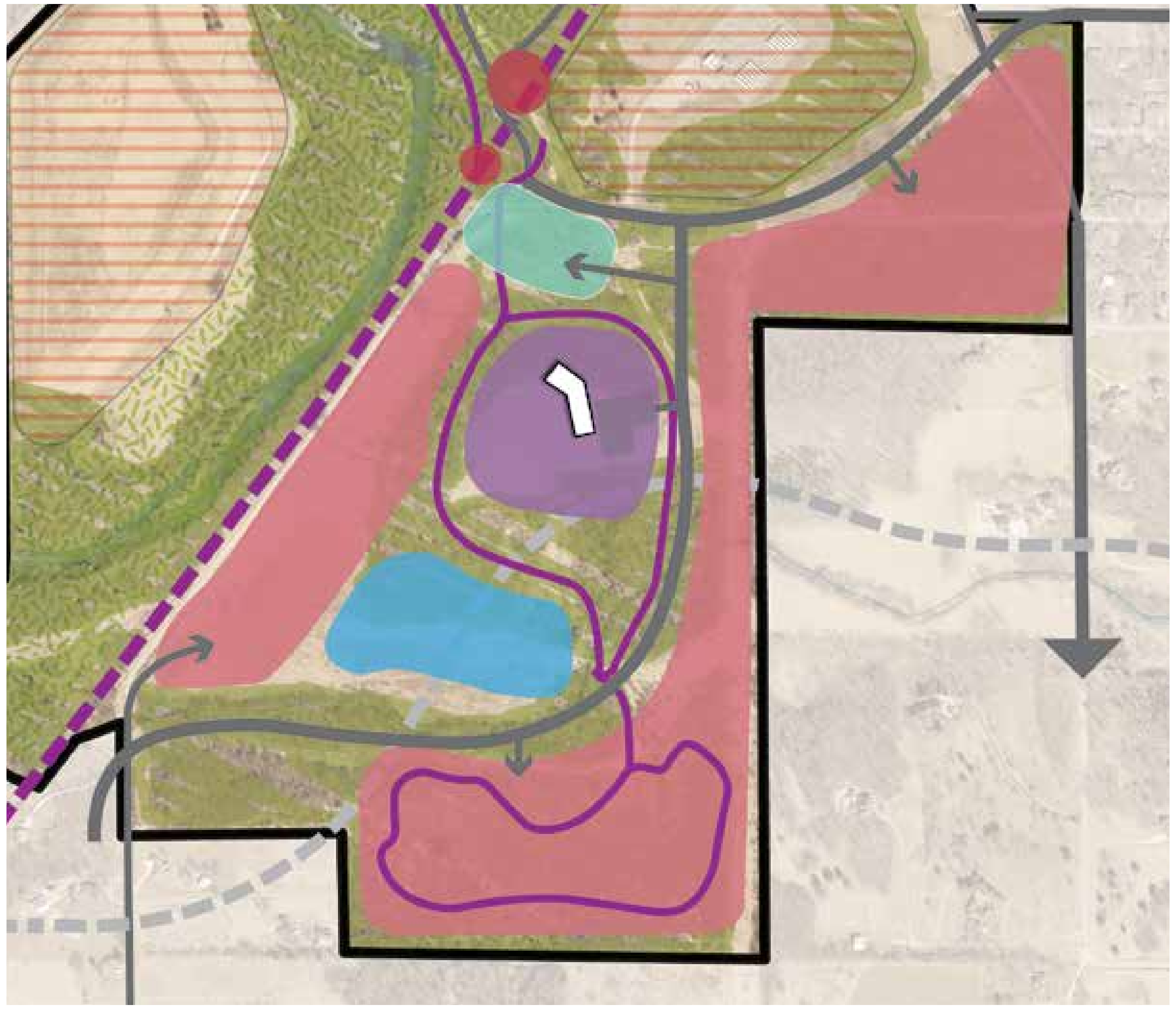
Power Plant + Expansion
Sports Complex
Mixed Use Bldg
Conference Center
Overlook Amenity
Riverfront Dining
Event Lawn
Community Green
Water Adventure
Riverfront Green


SOUTH ACTIVITY - AMPHITHEATER / BIKE PARK

02A

Amphitheater
Multi-Use Lawn
Amenities Plaza
Amenities Bldg
Destination Play
RV Camping
Bike Park
Bike Park Expansion

SOUTH ACTIVITY - DESTINATION ADVENTURE PARK



Canopy Ropes / Trail
Ziplines
River Access
Destination Building
Destination Support Area
Amenity Area
Lake / Water Adventure
Adventure Play
Archery Range
Event Lawn / Stage
Food Truck Plaza

Economic Impact

POWER PLANT

01

Destination Play

E1 E2 E3 **E4** **E5** N1 N2 **N3** **N4** **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●●○

Water Adventure

E1 **E2** **E3** E4 E5 **N1** **N2** **N3** **N4** **N5** **S1** S2 **S3** **S4** **S5**

Economic Impact ●●○○○
Social Impact ●●○○○

Ropes Course

E1 **E2** **E3** E4 E5 N1 N2 **N3** **N4** N5 **S1** S2 S3 **S4** **S5**

Economic Impact ●●○○○
Social Impact ●●○○○

Adventure Island

E1 **E2** **E3** **E4** **E5** N1 N2 **N3** **N4** N5 **S1** S2 S3 **S4** **S5**

Economic Impact ●●○○○
Social Impact ●●○○○

Riverfront Hospitality

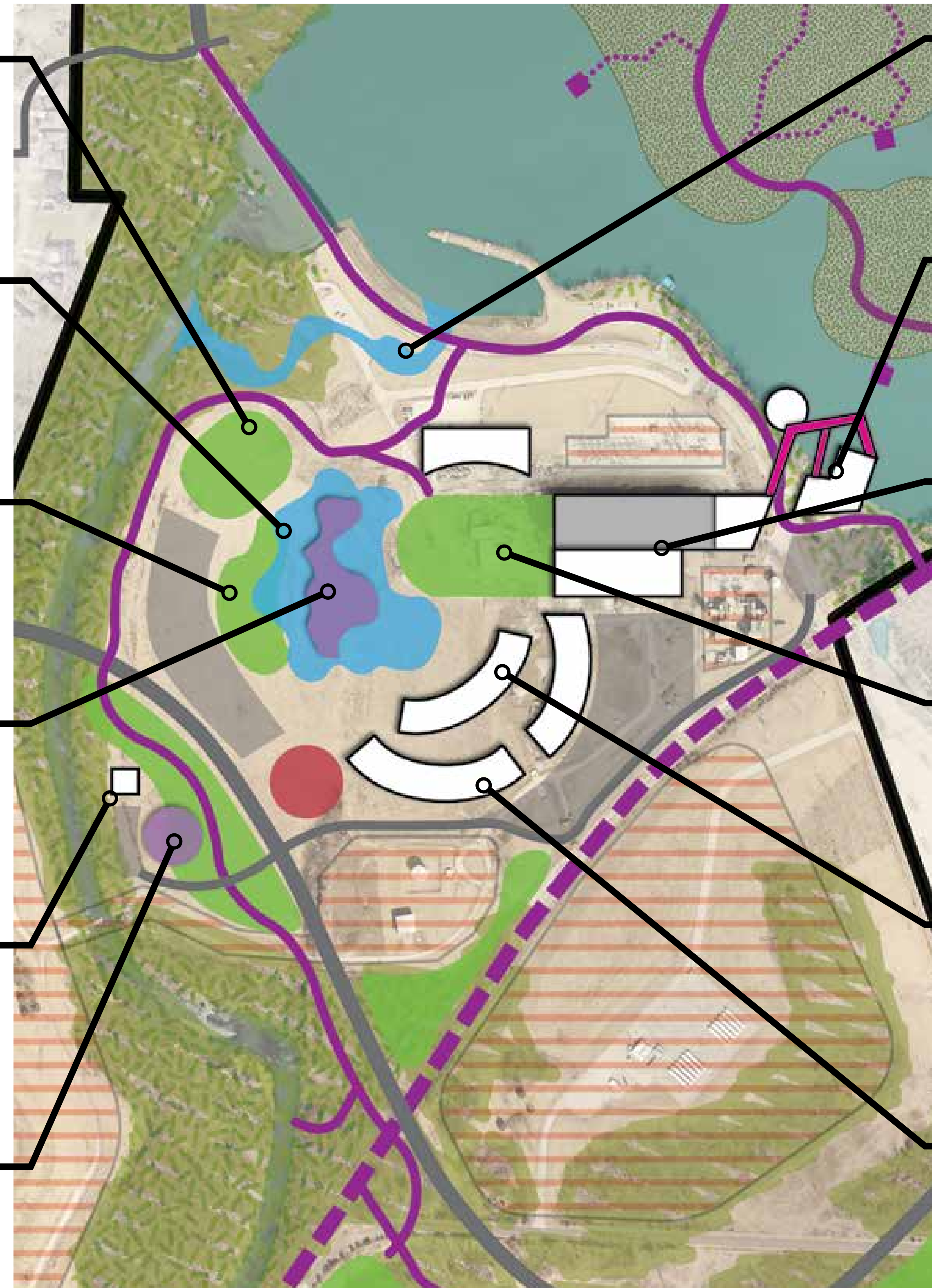
E1 **E2** E3 E4 E5 N1 N2 N3 N4 N5 S1 S2 S3 **S4** **S5**

Economic Impact ●●○○○
Social Impact ●●●○○

Riverfront Play Area

E1 **E2** E3 E4 E5 **N1** N2 **N3** **N4** N5 **S1** S2 S3 **S4** **S5**

Economic Impact ●●○○○
Social Impact ●●●○○



Bypass Channel

E1 E2 E3 E4 E5 **N1** **N2** **N3** **N4** N5 **S1** S2 **S3** **S4** S5

Economic Impact ●○○○○
Social Impact ●●○○○

Restaurant/Overlook

E1 E2 **E3** **E4** **E5** **N1** N2 N3 N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●●●○○
Social Impact ●●●●○

Powerplant + Addition

E1 **E2** **E3** **E4** **E5** **N1** N2 N3 N4 **N5** S1 S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●●○

Event Lawn

E1 E2 E3 E4 E5 **N1** N2 **N3** N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●○○

Entertainment Bldg

E1 **E2** **E3** **E4** **E5** N1 N2 N3 N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●●○○○
Social Impact ●●○○○

Mixed Use Bldgs

E1 **E2** **E3** **E4** **E5** N1 N2 N3 N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●○○

Innovative Economic Opportunities E1
New Funding Allocations E2
New Business Development E3
Attract Private Investment E4
Resilient Job Creation E5
New/Green Infrastructure N1
Sustainable Water Quality N2
Appealing Outdoor Amenities N3
Identity - Gateway to the Ozarks N4
Unique Adaptive Reuse N5
Innovative Recreation Opportunities S1
Access / Equitable Transportation S2
Water Access for Recreation S3
Elevate the Quality of Live S4
Regional Draw S5

CMT GEOSYNTEC | HOUSEAL LAVIGNE | SWT DESIGN | JOHNSON CONSULTING | PRATT CONSULTING

POWER PLANT

Riverfront Amenity

E1 E2 E3 **E4** E5 **N1** **N2** N3 N4 N5 **S1** S2 **S3** **S4** **S5**

Economic Impact ●●○○○
Social Impact ●●●○○

Riverfront Dining

E1 E2 **E3** **E4** **E5** N1 N2 N3 N4 N5 S1 S2 S3 **S4** S5

Economic Impact ●●●○○
Social Impact ●●●○○

Multi-Purpose Event

E1 **E2** **E3** **E4** E5 N1 N2 N3 N4 **N5** S1 S2 S3 **S4** **S5**

Economic Impact ●●●○○
Social Impact ●●○○○

Water Adventure

E1 **E2** **E3** E4 E5 **N1** **N2** **N3** **N4** **N5** **S1** S2 **S3** **S4** **S5**

Economic Impact ●●○○○
Social Impact ●●○○○

Surrounding Green

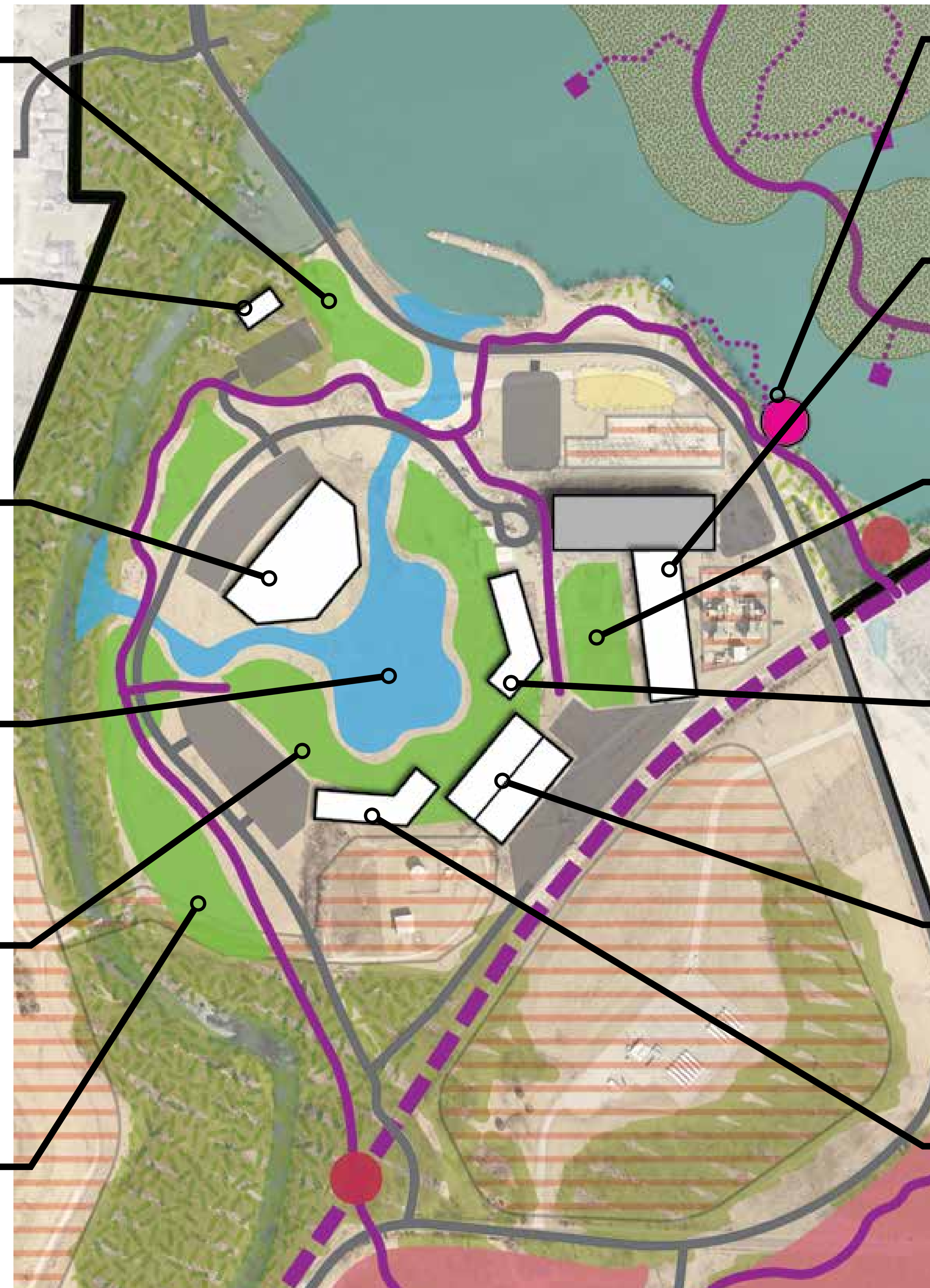
E1 E2 E3 E4 E5 **N1** **N2** **N3** N4 N5 **S1** S2 S3 **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○

Riverfront Green TBD

E1 E2 E3 E4 E5 **N1** **N2** **N3** N4 N5 **S1** S2 S3 **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○



Overlook Amenity

E1 E2 E3 E4 E5 N1 N2 **N3** **N4** **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●○○

Powerplant + Addition

E1 **E2** **E3** **E4** **E5** **N1** N2 N3 N4 **N5** S1 S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●●○

Event Lawn

E1 E2 E3 E4 E5 **N1** N2 **N3** N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●○○

Mixed Use Bldg

E1 **E2** **E3** **E4** **E5** N1 N2 N3 N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●○○

Mixed Use Bldg

E1 **E2** **E3** **E4** **E5** N1 N2 N3 N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●○○

Mixed Use Bldg

E1 **E2** **E3** **E4** **E5** N1 N2 N3 N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●○○

- Innovative Economic Opportunities E1
- New Funding Allocations E2
- New Business Development E3
- Attract Private Investment E4
- Resilient Job Creation E5
- New/Green Infrastructure N1
- Sustainable Water Quality N2
- Appealing Outdoor Amenities N3
- Identity - Gateway to the Ozarks N4
- Unique Adaptive Reuse N5
- Innovative Recreation Opportunities S1
- Access / Equitable Transportation S2
- Water Access for Recreation S3
- Elevate the Quality of Live S4
- Regional Draw S5

SOUTH ACTIVITY AREA

01

Retreat Cabins/Yurts

E1 E3 E4 N1 N3 N4 S1 S4 S5

Economic Impact ●●○○○
Social Impact ●●○○○

Green Space TBD

N1 N2 N3 S1 S4

Economic Impact ●○○○○
Social Impact ●●●○○

Retreat Green

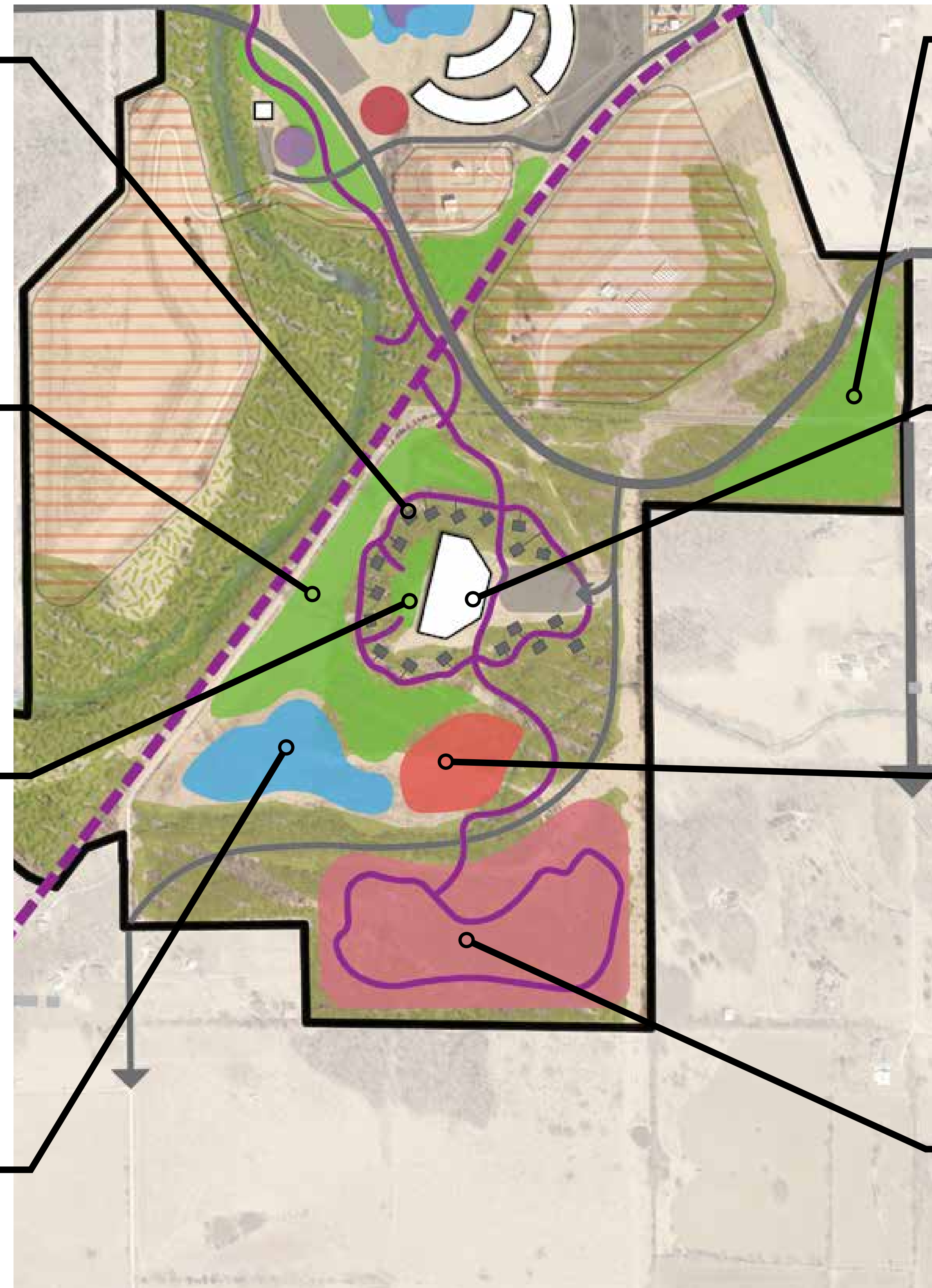
N1 N2 N3 S1 S4

Economic Impact ●○○○○
Social Impact ●●●○○

Lake

N1 N2 N3 S3 S4

Economic Impact ●○○○○
Social Impact ●●○○○



Green Space TBD

N1 N2 N3 S1 S4

Economic Impact ●○○○○
Social Impact ●●●○○

Retreat Center

E1 E2 E3 E4 S5

Economic Impact ●●●○○
Social Impact ●●○○○

Destination Play

E4 E5 N3 N4 N5 S1 S4 S5

Economic Impact ●○○○○
Social Impact ●●●●○

Bike Park

E1 E3 E4 E5 N1 N3 N4 S1 S4 S5

Economic Impact ●●●○○
Social Impact ●●●○○

Innovative Economic Opportunities	E1
New Funding Allocations	E2
New Business Development	E3
Attract Private Investment	E4
Resilient Job Creation	E5
New/Green Infrastructure	N1
Sustainable Water Quality	N2
Appealing Outdoor Amenities	N3
Identity - Gateway to the Ozarks	N4
Unique Adaptive Reuse	N5
Innovative Recreation Opportunities	S1
Access / Equitable Transportation	S2
Water Access for Recreation	S3
Elevate the Quality of Live	S4
Regional Draw	S5

SOUTH ACTIVITY AREA

02A

RV Camping Area

E1 E2 **E3** **E4** E5 N1 N2 **N3** **N4** N5 **S1** S2 S3 S4 **S5**

(highlighted: E1, E3, E4, N3, N4, S1, S5)

Economic Impact ●●○○○
Social Impact ●●○○○

Amenities Plaza

E1 E2 E3 E4 E5 **N1** N2 **N3** N4 N5 S1 S2 S3 **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○

Amenity Plaza Bldgs

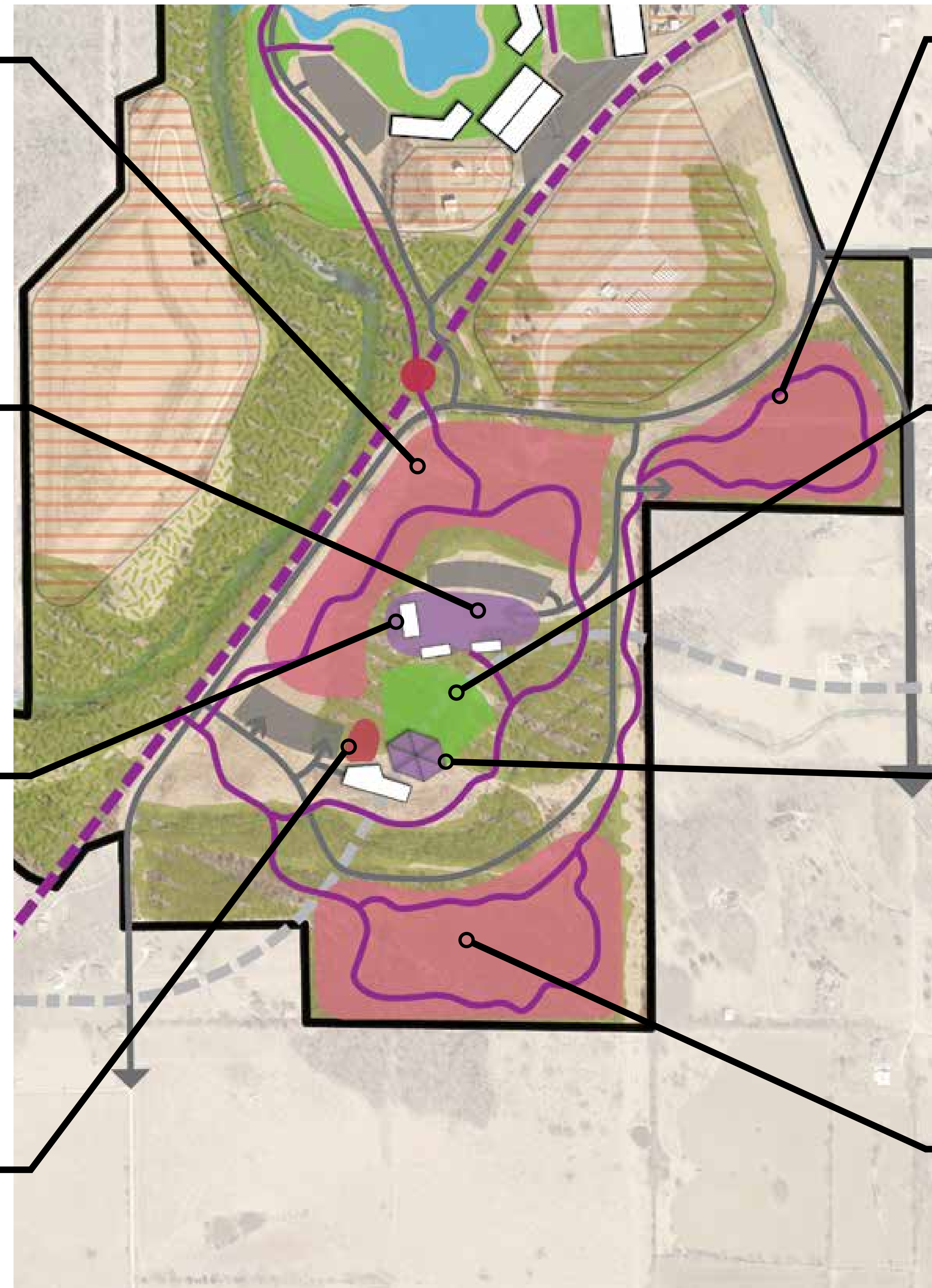
E1 E2 E3 E4 E5 **N1** N2 **N3** N4 N5 S1 S2 S3 **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○

Destination Play

E1 E2 E3 **E4** **E5** N1 N2 **N3** **N4** **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●●○



Bike Park Expansion

E1 E2 **E3** **E4** **E5** **N1** N2 **N3** **N4** N5 **S1** S2 S3 **S4** **S5**

Economic Impact ●●●○○
Social Impact ●●●○○

Multiuse Lawn

E1 E2 E3 E4 E5 **N1** N2 **N3** N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●○○

Amphitheater

E1 E2 E3 **E4** E5 N1 N2 **N3** **N4** N5 **S1** S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●○○

Bike Park

E1 E2 **E3** **E4** **E5** **N1** N2 **N3** **N4** N5 **S1** S2 S3 **S4** **S5**

Economic Impact ●●●○○
Social Impact ●●●○○

Innovative Economic Opportunities	E1
New Funding Allocations	E2
New Business Development	E3
Attract Private Investment	E4
Resilient Job Creation	E5
New/Green Infrastructure	N1
Sustainable Water Quality	N2
Appealing Outdoor Amenities	N3
Identity - Gateway to the Ozarks	N4
Unique Adaptive Reuse	N5
Innovative Recreation Opportunities	S1
Access / Equitable Transportation	S2
Water Access for Recreation	S3
Elevate the Quality of Live	S4
Regional Draw	S5

SOUTH ACTIVITY AREA

02B

River Access

E1 E2 E3 E4 E5 **N1** **N2** **N3** **N4** N5 **S1** S2 **S3** **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○

Amenity Area

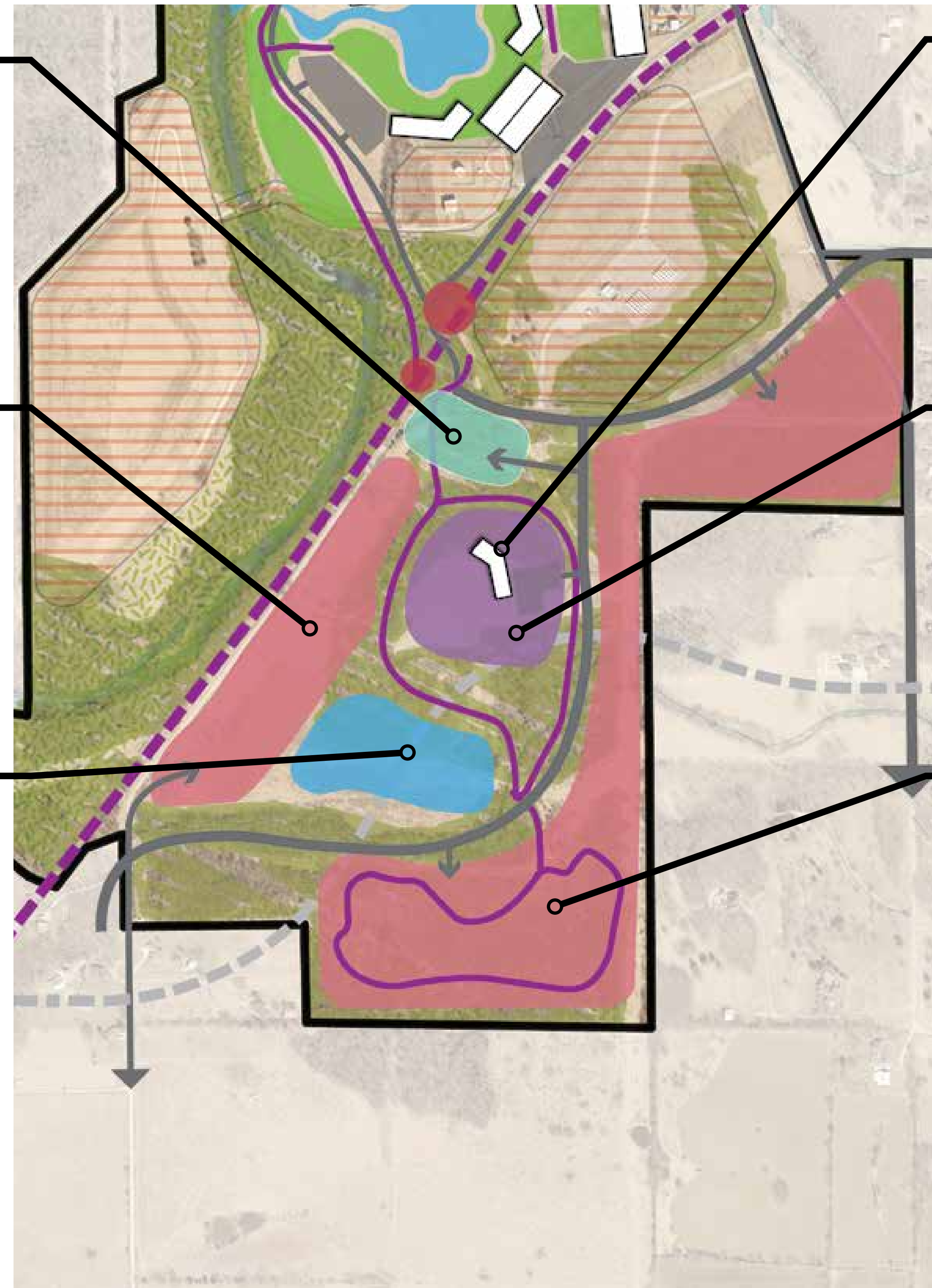
E1 E2 E3 E4 E5 **N1** N2 **N3** N4 N5 S1 S2 S3 **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○

Lake

E1 E2 E3 E4 E5 **N1** **N2** **N3** N4 N5 S1 S2 **S3** **S4** S5

Economic Impact ●○○○○
Social Impact ●●○○○



Destination Bldg

E1 **E2** **E3** **E4** **E5** N1 N2 N3 N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●○○

Destination Support

E1 **E2** **E3** **E4** **E5** N1 N2 N3 N4 **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●●●●○
Social Impact ●●●○○

Adventure Play

E1 E2 E3 **E4** **E5** N1 N2 **N3** **N4** **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●●○

Innovative Economic Opportunities E1
New Funding Allocations E2
New Business Development E3
Attract Private Investment E4
Resilient Job Creation E5
New/Green Infrastructure N1
Sustainable Water Quality N2
Appealing Outdoor Amenities N3
Identity - Gateway to the Ozarks N4
Unique Adaptive Reuse N5
Innovative Recreation Opportunities S1
Access / Equitable Transportation S2
Water Access for Recreation S3
Elevate the Quality of Live S4
Regional Draw S5

PARK + LAKE

Hilltop Overlook

E1 E2 E3 E4 E5 N1 N2 **N3** **N4** **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●○○

Destination Play

E1 E2 E3 **E4** **E5** N1 N2 **N3** **N4** **N5** **S1** S2 S3 **S4** **S5**

Economic Impact ●○○○○
Social Impact ●●●●○

Park Entry

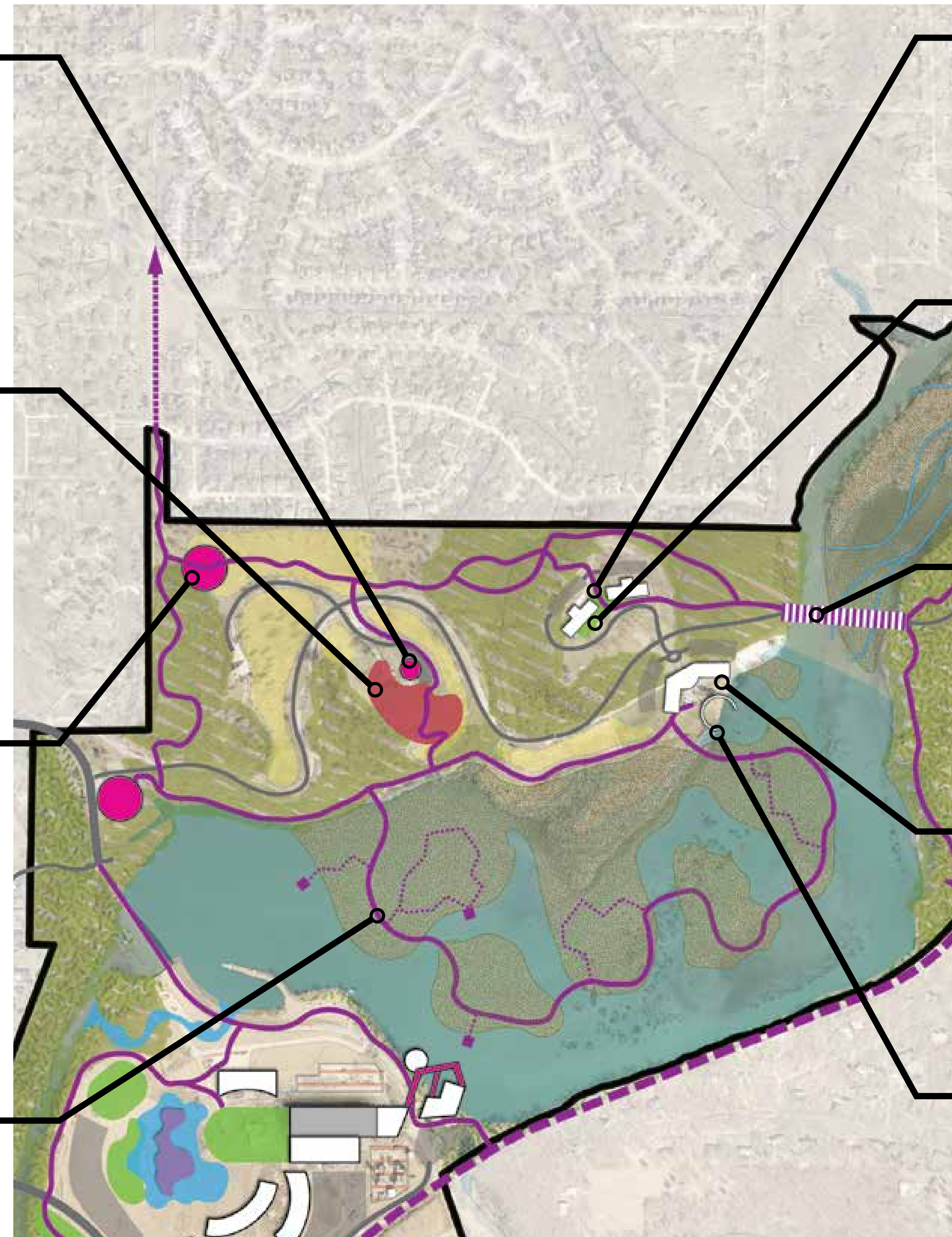
E1 E2 E3 E4 E5 **N1** N2 **N3** **N4** N5 **S1** **S2** S3 **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○

Wetland Boardwalk

E1 E2 E3 E4 E5 **N1** N2 **N3** **N4** N5 **S1** **S2** S3 **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○



Eco Retreat Bldgs

E1 **E2** **E3** **E4** E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 **S5**

Economic Impact ●●●○○
Social Impact ●●○○○

Eco Retreat Support

E1 **E2** **E3** **E4** E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 **S5**

Economic Impact ●●●○○
Social Impact ●●○○○

Bridge

E1 E2 E3 E4 E5 **N1** N2 **N3** **N4** N5 **S1** **S2** S3 **S4** S5

Economic Impact ●○○○○
Social Impact ●●●○○

Boathouse/Eco Center

E1 **E2** E3 E4 E5 N1 N2 N3 **N4** **N5** S1 S2 S3 **S4** **S5**

Economic Impact ●●●○○
Social Impact ●●●○○

Marina

E1 E2 E3 **E4** E5 **N1** **N2** **N3** **N4** N5 **S1** **S2** **S3** **S4** **S5**

Economic Impact ●●●○○
Social Impact ●●●●○

Innovative Economic Opportunities E1
New Funding Allocations E2
New Business Development E3
Attract Private Investment E4
Resilient Job Creation E5
New/Green Infrastructure N1
Sustainable Water Quality N2
Appealing Outdoor Amenities N3
Identity - Gateway to the Ozarks N4
Unique Adaptive Reuse N5
Innovative Recreation Opportunities S1
Access / Equitable Transportation S2
Water Access for Recreation S3
Elevate the Quality of Live S4
Regional Draw S5

NORTH

Bird Meadow

E1 E2 E3 E4 E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 S5

Economic Impact ●○○○○
Social Impact ●●●●○

Culture Center

E1 E2 E3 E4 E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 S5

Economic Impact ●●●○○
Social Impact ●●○○○

Culture Center Lawn

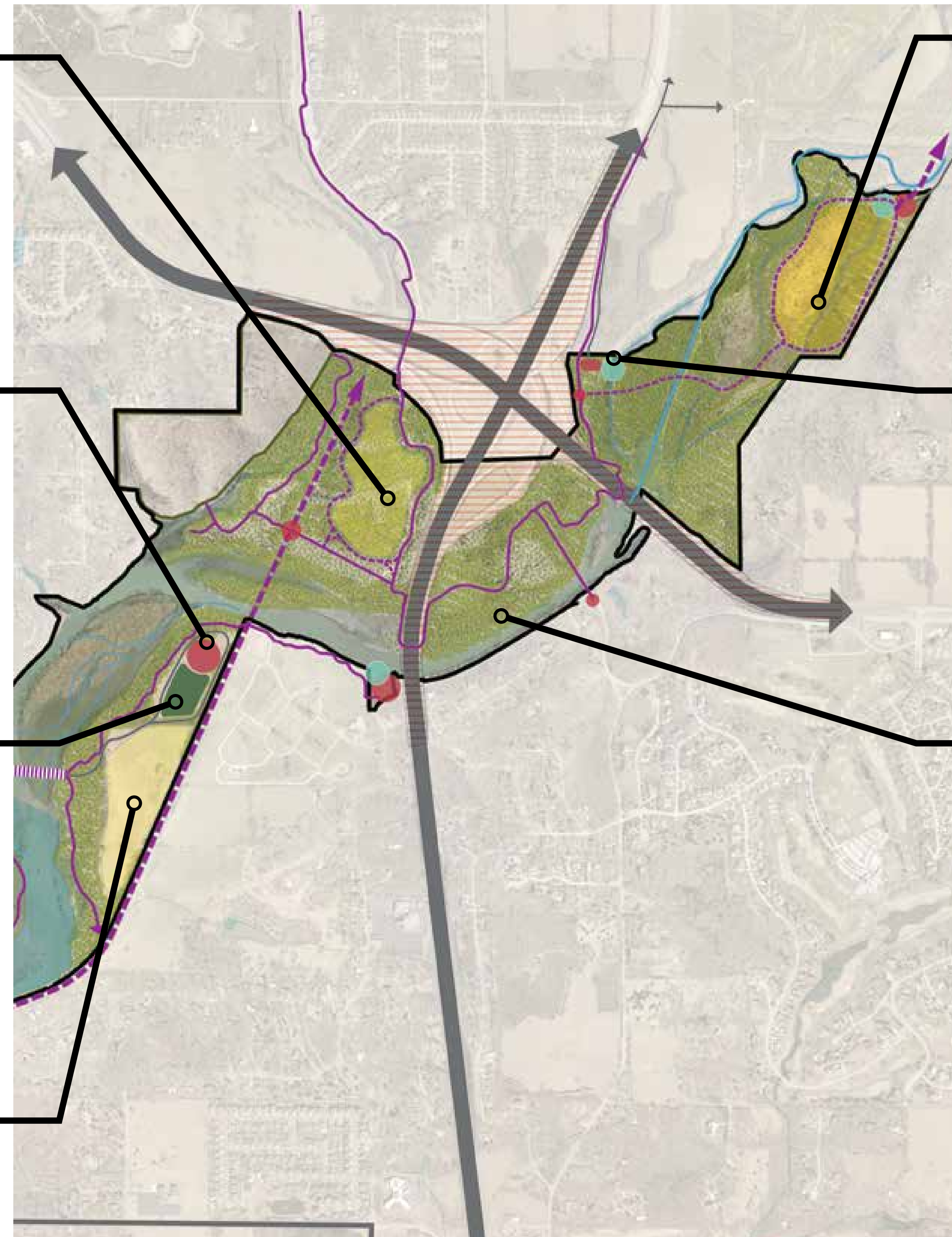
E1 E2 E3 E4 E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 S5

Economic Impact ●○○○○
Social Impact ●●●○○

Culture Meadow

E1 E2 E3 E4 E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 S5

Economic Impact ●○○○○
Social Impact ●●●●○



Nature Amenity Area

E1 E2 E3 E4 E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 S5

Economic Impact ●○○○○
Social Impact ●●●●○

River Access/Trailhead

E1 E2 E3 E4 E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 S5

Economic Impact ●○○○○
Social Impact ●●●●○

Preserved Nature/Trail

E1 E2 E3 E4 E5 N1 N2 N3 N4 N5 S1 S2 S3 S4 S5

Economic Impact ●○○○○
Social Impact ●●●●○

Innovative Economic Opportunities E1

New Funding Allocations E2

New Business Development E3

Attract Private Investment E4

Resilient Job Creation E5

New/Green Infrastructure N1

Sustainable Water Quality N2

Appealing Outdoor Amenities N3

Identity - Gateway to the Ozarks N4

Unique Adaptive Reuse N5

Innovative Recreation Opportunities S1

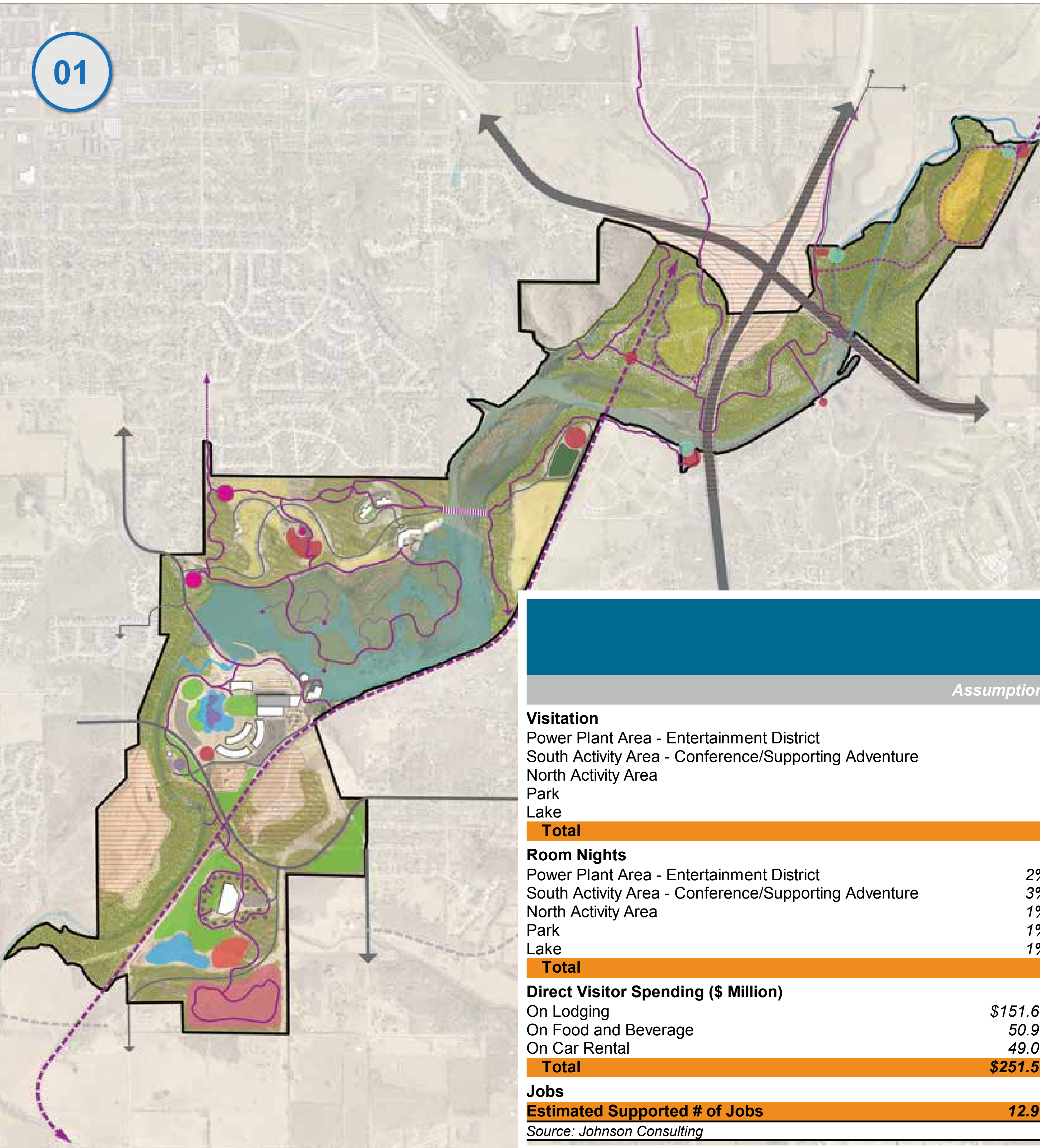
Access / Equitable Transportation S2

Water Access for Recreation S3

Elevate the Quality of Live S4

Regional Draw S5

ECONOMIC - VISITOR SPENDING AND EMPLOYMENT

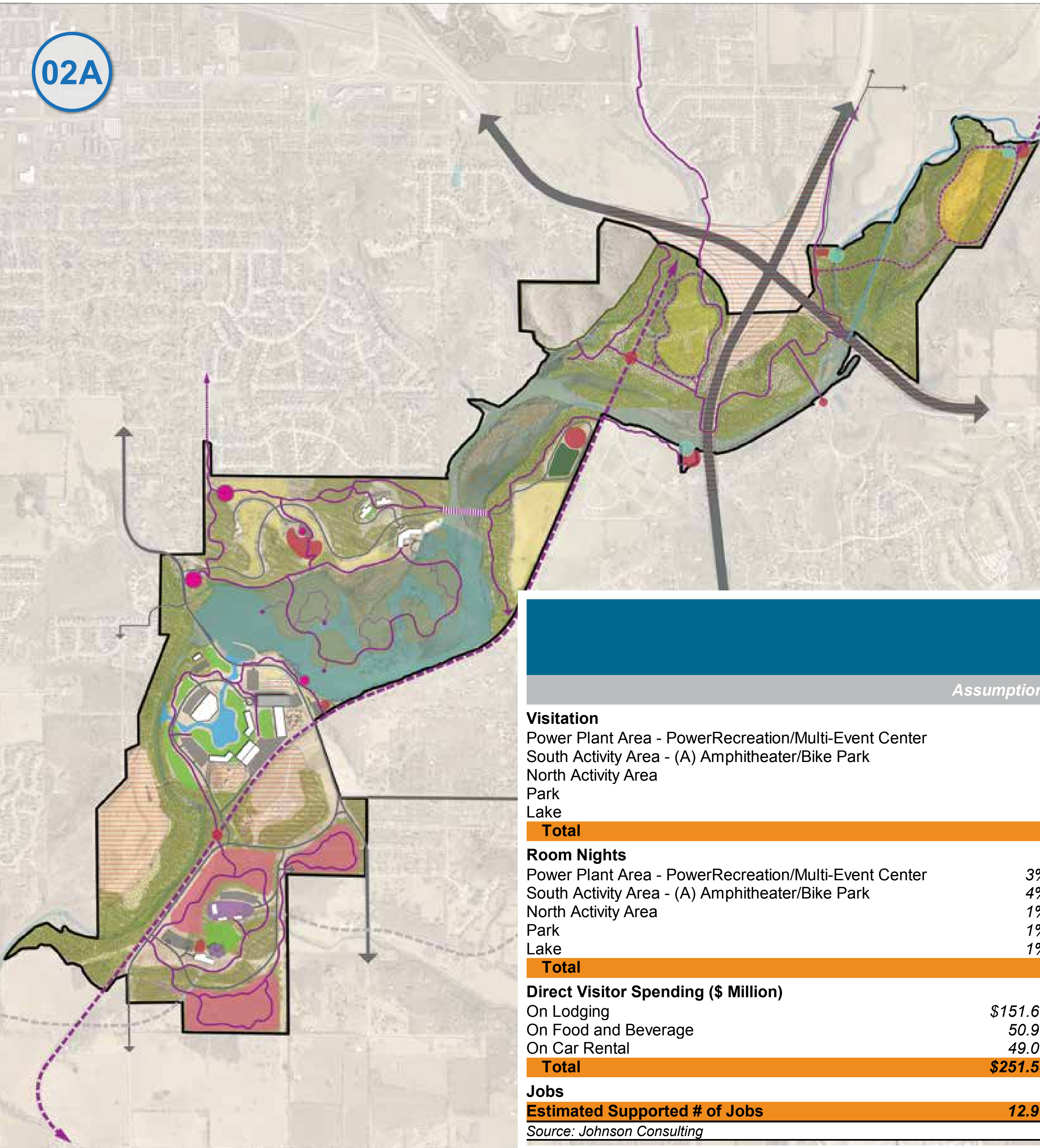


Lake Springfield, Missouri
Estimated Direct Visitor Spending and Employment
Concept 01

	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Visitation											
Power Plant Area - Entertainment District		225,000	229,500	234,090	238,772	243,547	248,418	253,387	258,454	263,623	268,896
South Activity Area - Conference/Supporting Adventure		550,000	561,000	572,220	583,664	595,338	607,244	619,389	631,777	644,413	657,301
North Activity Area		210,000	214,200	218,484	222,854	227,311	231,857	236,494	241,224	246,048	250,969
Park		250,000	255,000	260,100	265,302	270,608	276,020	281,541	287,171	292,915	298,773
Lake		30,000	30,600	31,212	31,836	32,473	33,122	33,785	34,461	35,150	35,853
Total		**1,265,000**	**1,290,300**	**1,316,106**	**1,342,428**	**1,369,277**	**1,396,662**	**1,424,595**	**1,453,087**	**1,482,149**	**1,511,792**
Room Nights											
Power Plant Area - Entertainment District	*2%*	4,500	4,590	4,682	4,775	4,871	4,968	5,068	5,169	5,272	5,378
South Activity Area - Conference/Supporting Adventure	*3%*	16,500	16,830	17,167	17,510	17,860	18,217	18,582	18,953	19,332	19,719
North Activity Area	*1%*	2,100	2,142	2,185	2,229	2,273	2,319	2,365	2,412	2,460	2,510
Park	*1%*	2,500	2,550	2,601	2,653	2,706	2,760	2,815	2,872	2,929	2,988
Lake	*1%*	300	306	312	318	325	331	338	345	351	359
Total		**25,900**	**26,418**	**26,946**	**27,485**	**28,035**	**28,596**	**29,168**	**29,751**	**30,346**	**30,953**
Direct Visitor Spending ($ Million)											
On Lodging	*$151.66*	$3.9	$4.1	$4.3	$4.6	$4.8	$5.0	$5.3	$5.5	$5.8	$6.1
On Food and Beverage	*50.91*	64.4	67.7	71.1	74.7	78.5	82.4	86.6	91.0	95.6	100.4
On Car Rental	*49.01*	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.0
Total	***$251.58***	**$69.6**	**$73.1**	**$76.8**	**$80.7**	**$84.8**	**$89.1**	**$93.6**	**$98.3**	**$103.3**	**$108.5**
Jobs											
Estimated Supported # of Jobs	***12.95***	**901**	**919**	**937**	**956**	**975**	**995**	**1,015**	**1,035**	**1,056**	**1,077**

Source: Johnson Consulting

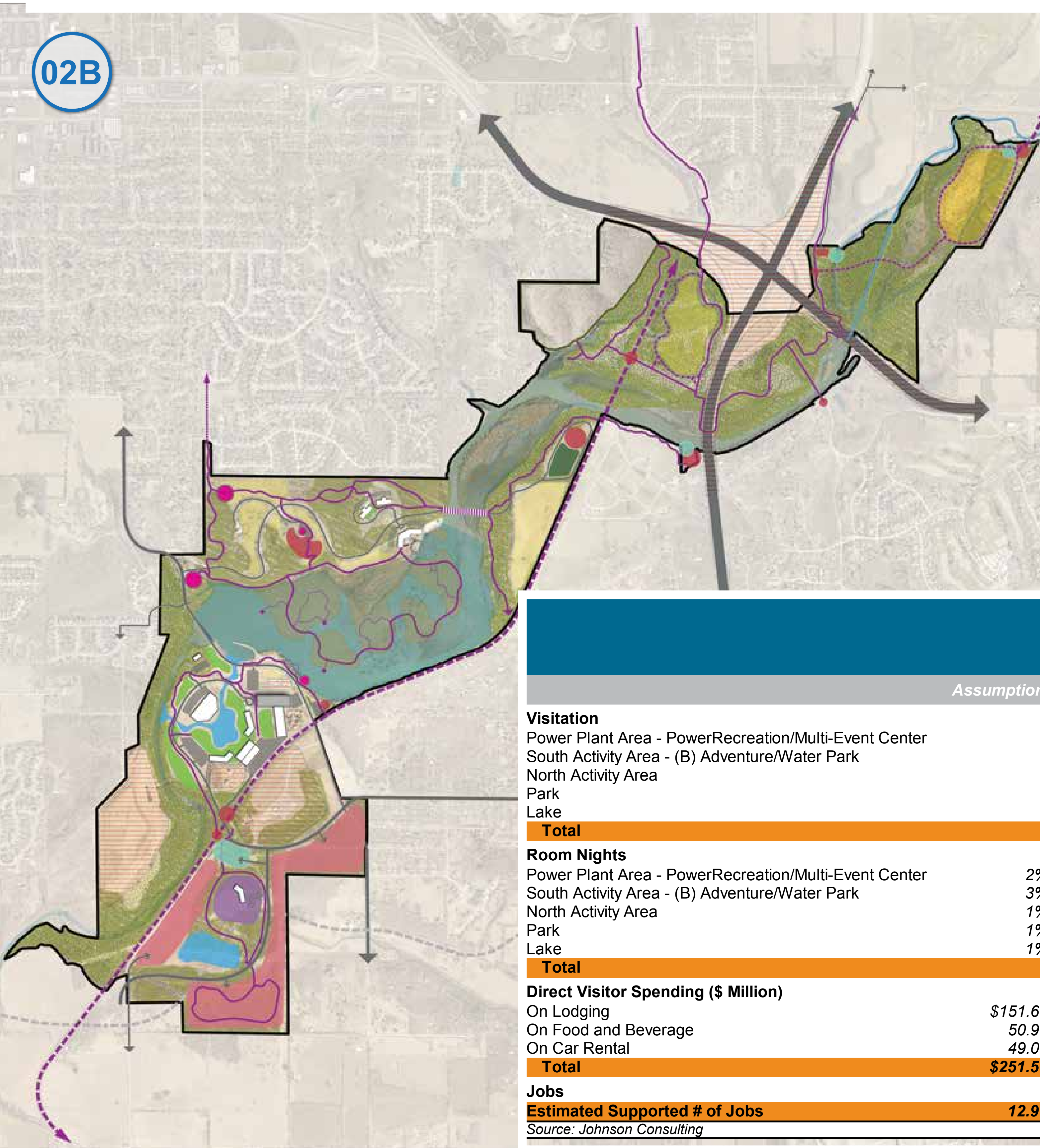
ECONOMIC - VISITOR SPENDING AND EMPLOYMENT



Lake Springfield, Missouri Estimated Direct Visitor Spending and Employment Concept 02 (A)											
	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Visitation											
Power Plant Area - PowerRecreation/Multi-Event Center		280,000	270,300	275,706	281,220	286,845	292,581	298,433	304,402	310,490	316,700
South Activity Area - (A) Amphitheater/Bike Park		135,000	112,200	114,444	116,733	119,068	121,449	123,878	126,355	128,883	131,460
North Activity Area		210,000	214,200	218,484	222,854	227,311	231,857	236,494	241,224	246,048	250,969
Park		250,000	255,000	260,100	265,302	270,608	276,020	281,541	287,171	292,915	298,773
Lake		30,000	30,600	31,212	31,836	32,473	33,122	33,785	34,461	35,150	35,853
Total		**905,000**	**882,300**	**899,946**	**917,945**	**936,304**	**955,030**	**974,130**	**993,613**	**1,013,485**	**1,033,755**
Room Nights											
Power Plant Area - PowerRecreation/Multi-Event Center	*3%*	8,400	8,109	8,271	8,437	8,605	8,777	8,953	9,132	9,315	9,501
South Activity Area - (A) Amphitheater/Bike Park	*4%*	5,400	4,488	4,578	4,669	4,763	4,858	4,955	5,054	5,155	5,258
North Activity Area	*1%*	2,100	2,142	2,185	2,229	2,273	2,319	2,365	2,412	2,460	2,510
Park	*1%*	2,500	2,550	2,601	2,653	2,706	2,760	2,815	2,872	2,929	2,988
Lake	*1%*	300	306	312	318	325	331	338	345	351	359
Total		**18,700**	**17,595**	**17,947**	**18,306**	**18,672**	**19,045**	**19,426**	**19,815**	**20,211**	**20,615**
Direct Visitor Spending ($ Million)											
On Lodging	*$151.66*	$2.8	$2.7	$2.9	$3.0	$3.2	$3.3	$3.5	$3.7	$3.9	$4.1
On Food and Beverage	*50.91*	46.1	46.3	48.6	51.1	53.6	56.4	59.2	62.2	65.4	68.7
On Car Rental	*49.01*	0.9	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.3	1.3
Total	***$251.58***	**$49.8**	**$49.9**	**$52.4**	**$55.1**	**$57.9**	**$60.8**	**$63.9**	**$67.1**	**$70.5**	**$74.1**
Jobs											
Estimated Supported # of Jobs	***12.95***	**645**	**627**	**640**	**652**	**666**	**679**	**692**	**706**	**720**	**735**

Source: Johnson Consulting

ECONOMIC - VISITOR SPENDING AND EMPLOYMENT



Lake Springfield, Missouri Estimated Direct Visitor Spending and Employment Concept 02 (B)											
	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Visitation											
Power Plant Area - PowerRecreation/Multi-Event Center		280,000	270,300	275,706	281,220	286,845	292,581	298,433	304,402	310,490	316,700
South Activity Area - (B) Adventure/Water Park		540,000	530,400	541,008	551,828	562,865	574,122	585,604	597,317	609,263	621,448
North Activity Area		210,000	214,200	218,484	222,854	227,311	231,857	236,494	241,224	246,048	250,969
Park		350,000	357,000	364,140	371,423	378,851	386,428	394,157	402,040	410,081	418,282
Lake		30,000	30,600	31,212	31,836	32,473	33,122	33,785	34,461	35,150	35,853
Total		**1,410,000**	**1,402,500**	**1,430,550**	**1,459,161**	**1,488,344**	**1,518,111**	**1,548,473**	**1,579,443**	**1,611,032**	**1,643,252**
Room Nights											
Power Plant Area - PowerRecreation/Multi-Event Center	*2%*	5,600	5,406	5,514	5,624	5,737	5,852	5,969	6,088	6,210	6,334
South Activity Area - (B) Adventure/Water Park	*3%*	16,200	15,912	16,230	16,555	16,886	17,224	17,568	17,919	18,278	18,643
North Activity Area	*1%*	2,100	2,142	2,185	2,229	2,273	2,319	2,365	2,412	2,460	2,510
Park	*1%*	3,500	3,570	3,641	3,714	3,789	3,864	3,942	4,020	4,101	4,183
Lake	*1%*	300	306	312	318	325	331	338	345	351	359
Total		**27,700**	**27,336**	**27,883**	**28,440**	**29,009**	**29,589**	**30,181**	**30,785**	**31,400**	**32,028**
Direct Visitor Spending ($ Million)											
On Lodging	*$151.66*	$4.2	$4.3	$4.5	$4.7	$5.0	$5.2	$5.5	$5.7	$6.0	$6.3
On Food and Beverage	*50.91*	71.8	73.5	77.3	81.2	85.3	89.6	94.1	98.9	103.9	109.1
On Car Rental	*49.01*	1.4	1.4	1.4	1.5	1.6	1.7	1.8	1.9	1.9	2.0
Total	***$251.58***	**$77.3**	**$79.2**	**$83.2**	**$87.4**	**$91.8**	**$96.5**	**$101.4**	**$106.5**	**$111.9**	**$117.5**
Jobs											
Estimated Supported # of Jobs	***12.95***	**1,001**	**995**	**1,015**	**1,035**	**1,056**	**1,077**	**1,099**	**1,121**	**1,143**	**1,166**

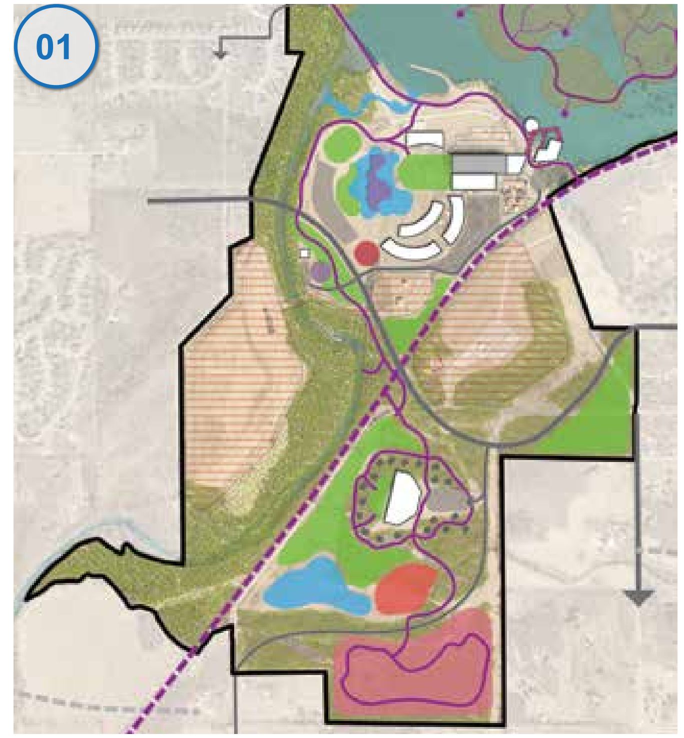
Source: Johnson Consulting

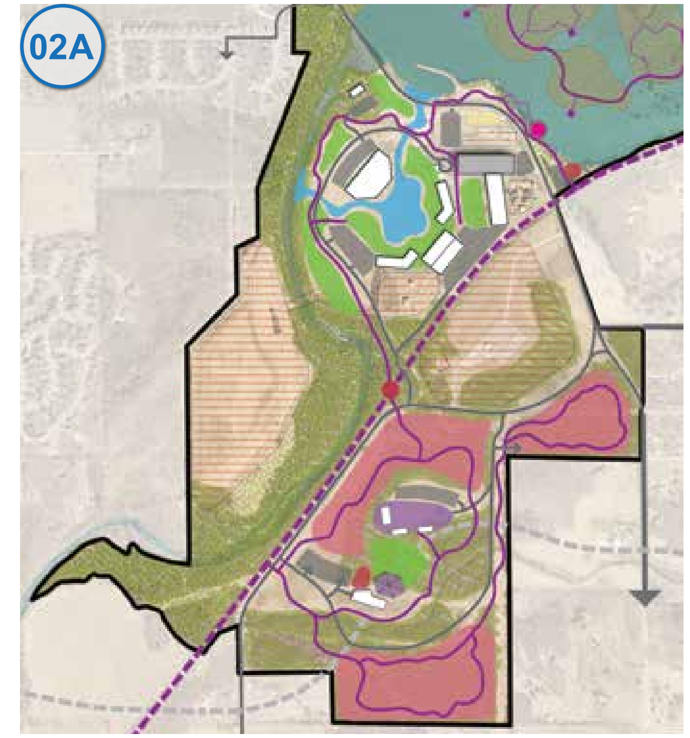
ECONOMIC IMPACT SUMMARY

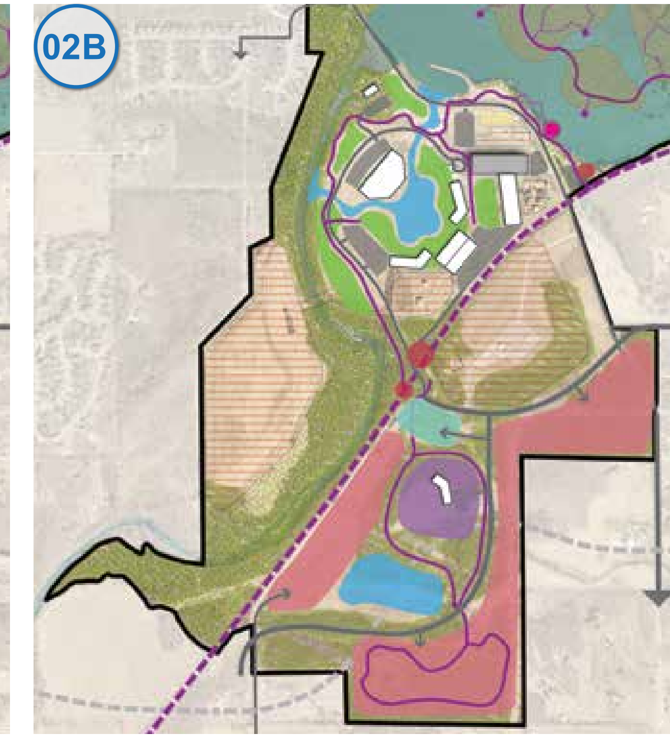
KEY TAKEAWAYS

Highest Overall Impact - 02B

Lowest Overall Impact - 02A







Note: Taxes and Phasing not yet integrated into economic projections

YEAR 10 ESTIMATIONS

Jobs

Concept 01	1,077
Concept 02A	735
Concept 02B	1,166

Direct Visitor Spending ($ Million)

Concept 01	109
Concept 02A	74
Concept 02B	118

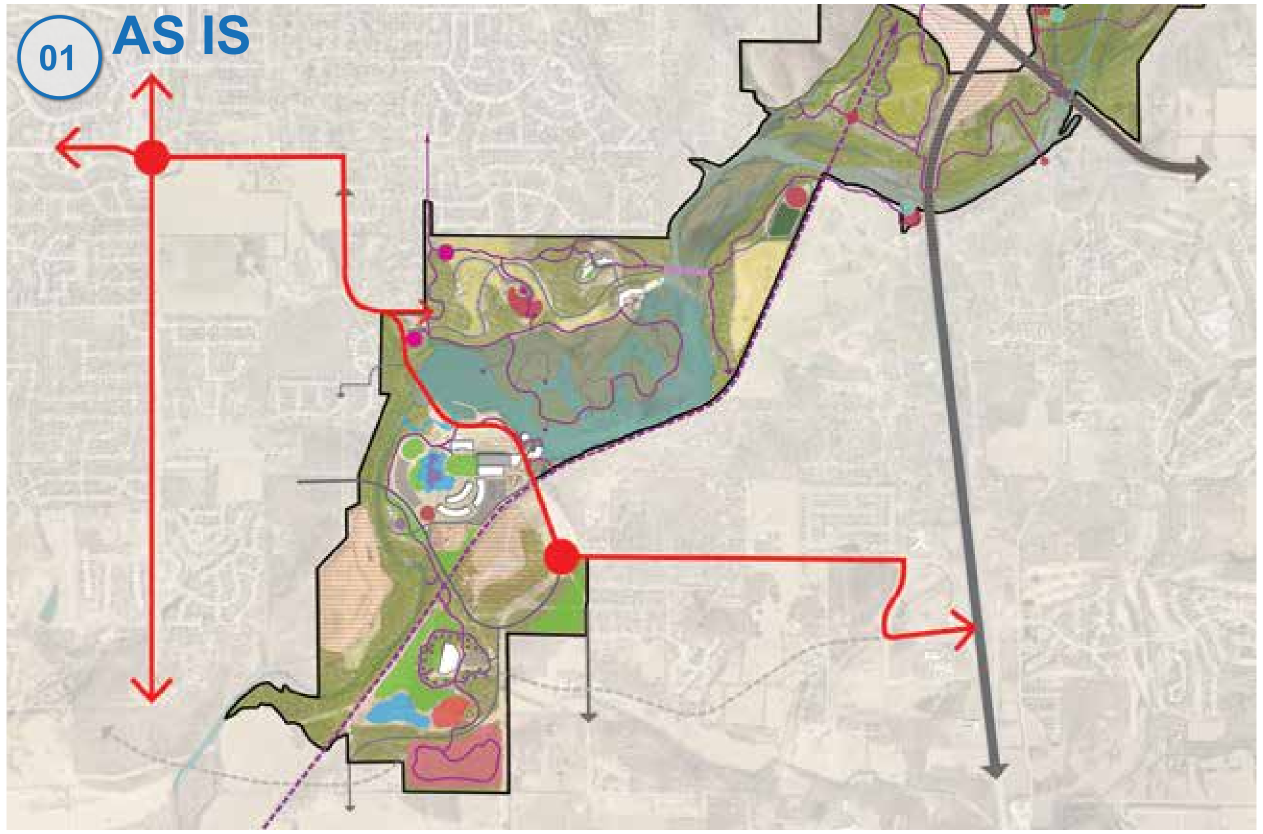
Lake Springfield, Missouri
Estimated Direct Visitor Spending and Employment Summary

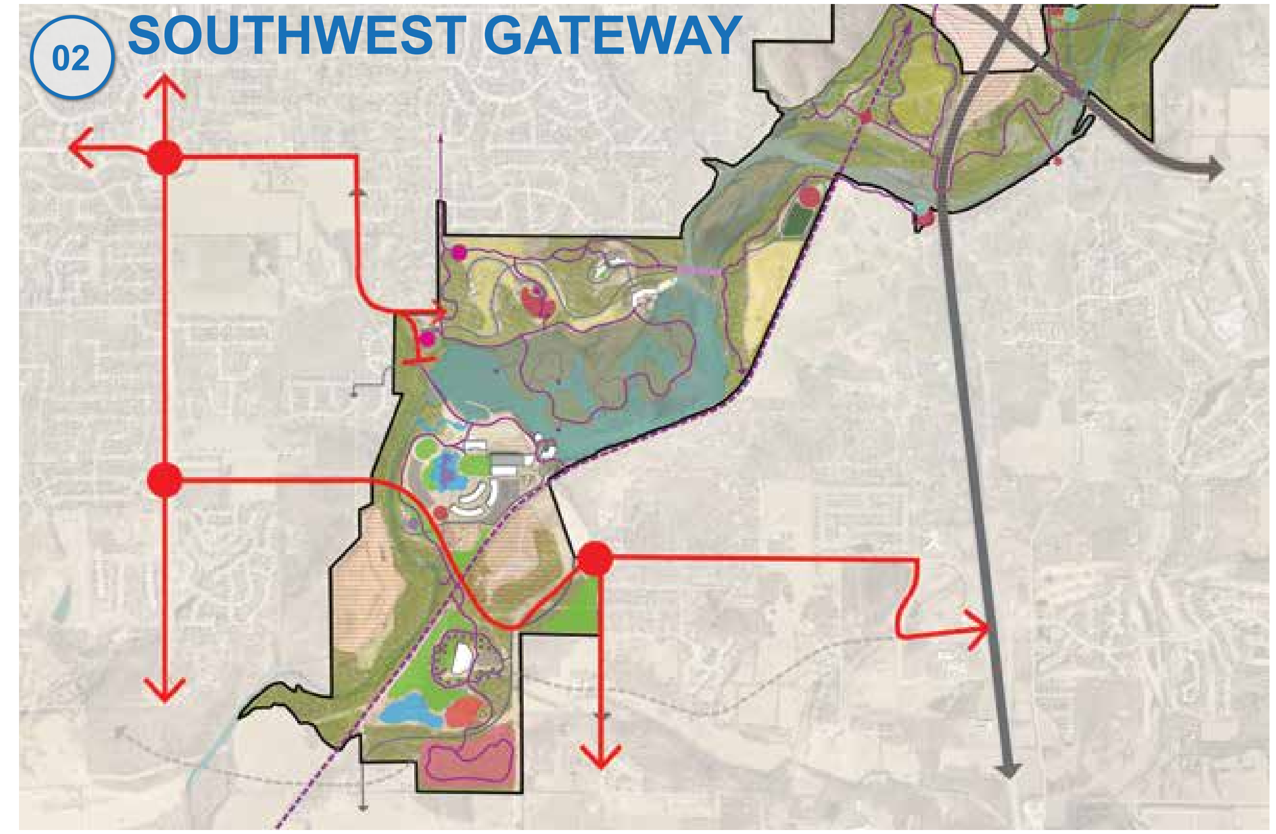
	Concept 01				Concept 02 (A)				Concept 02 (B)			
	Assumptions	Year 1	Year 5	Year 10	*Assumptions*	Year 1	Year 5	Year 10	*Assumptions*	Year 1	Year 5	Year 10
Visitation												
Power Plant Area - Entertainment District		225,000	243,547	268,896		280,000	286,845	316,700		280,000	286,845	316,700
South Activity Area - Conference/Supporting Adventure		550,000	595,338	657,301		135,000	119,068	131,460		540,000	562,865	621,448
North Activity Area		210,000	227,311	250,969		210,000	227,311	250,969		210,000	227,311	250,969
Park		250,000	270,608	298,773		250,000	270,608	298,773		350,000	378,851	418,282
Lake		30,000	32,473	35,853		30,000	32,473	35,853		30,000	32,473	35,853
Total		**1,265,000**	**1,369,277**	**1,511,792**		**905,000**	**936,304**	**1,033,755**		**1,410,000**	**1,488,344**	**1,643,252**
Room Nights												
Power Plant Area - Entertainment District	*2%*	4,500	4,871	5,378	*3%*	8,400	8,605	9,501	*2%*	5,600	5,737	6,334
South Activity Area - Conference/Supporting Adventure	*3%*	16,500	17,860	19,719	*4%*	5,400	4,763	5,258	*3%*	16,200	16,886	18,643
North Activity Area	*1%*	2,100	2,273	2,510	*1%*	2,100	2,273	2,510	*1%*	2,100	2,273	2,510
Park	*1%*	2,500	2,706	2,988	*1%*	2,500	2,706	2,988	*1%*	3,500	3,789	4,183
Lake	*1%*	300	325	359	*1%*	300	325	359	*1%*	300	325	359
Total		**25,900**	**28,035**	**30,953**		**18,700**	**18,672**	**20,615**		**27,700**	**29,009**	**32,028**
Direct Visitor Spending ($ Million)												
On Lodging	*$151.66*	$3.93	$4.79	$6.13	*$151.66*	$2.84	$3.19	$4.08	*$151.66*	$4.20	$4.95	$6.34
On Food and Beverage	*50.91*	64.39	78.45	100.41	*50.91*	46.07	53.64	68.66	*50.91*	71.78	85.27	109.14
On Car Rental	*49.01*	1.27	1.55	1.98	*49.01*	0.92	1.03	1.32	*49.01*	1.36	1.60	2.05
Total	***$251.58***	**70**	**85**	**109**	***$251.58***	**50**	**58**	**74**	***$251.58***	**77**	**92**	**118**
Jobs												
Estimated Supported # of Jobs	***12.95***	**901**	**975**	**1,077**	***12.95***	**645**	**666**	**735**	***12.95***	**1,001**	**1,056**	**1,166**

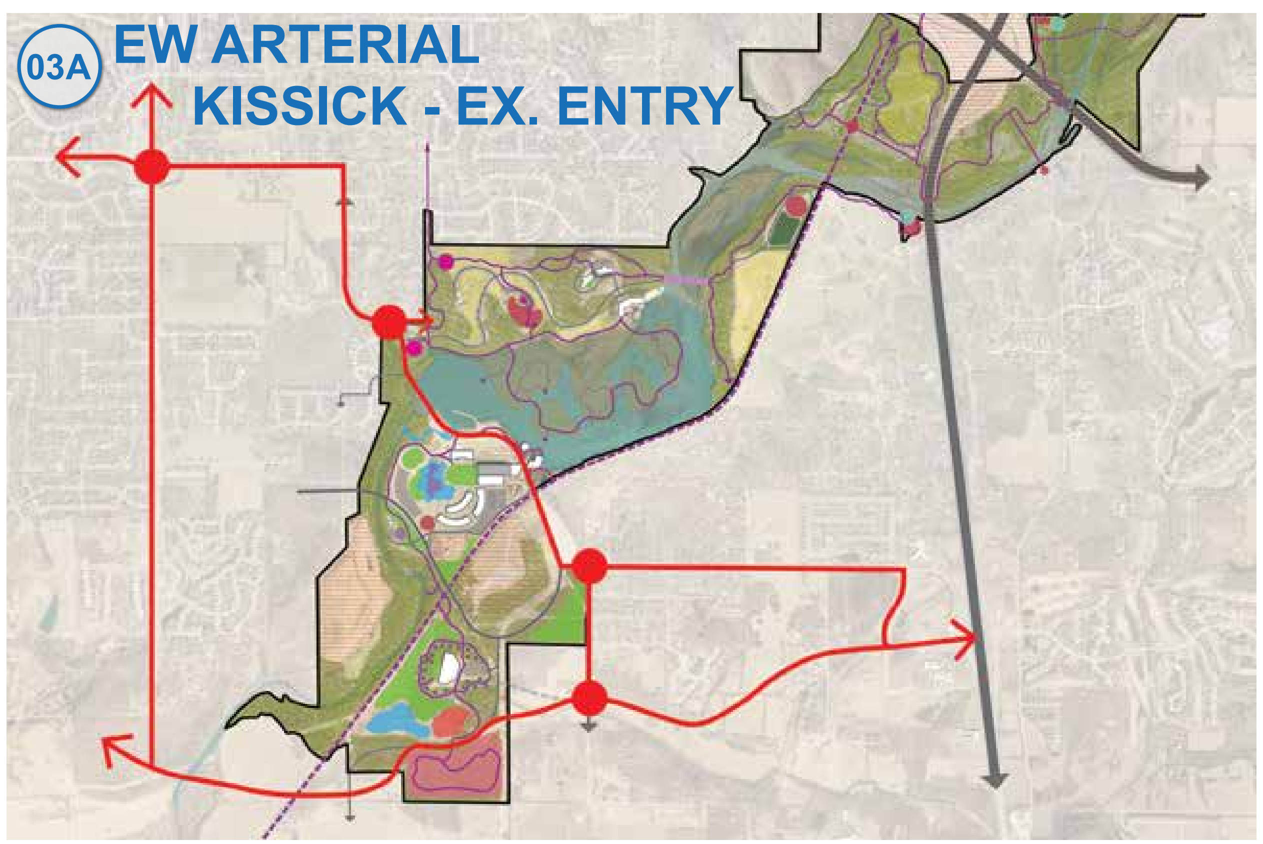
Source: Johnson Consulting

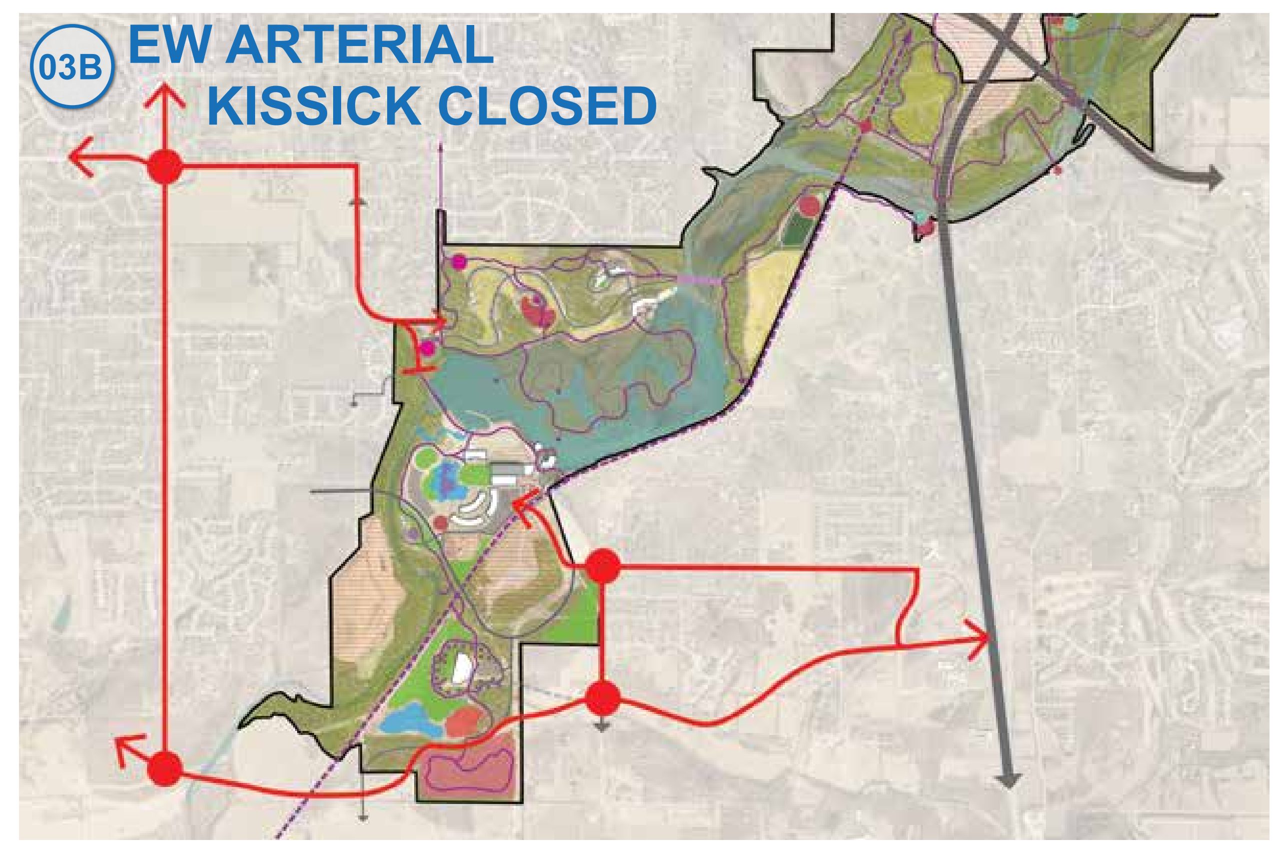
Transportation / Access

ACCESS OPTIONS





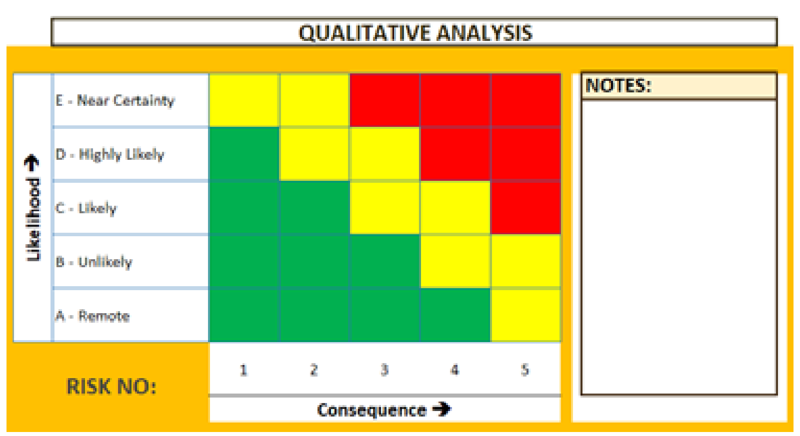




Risk Assessment

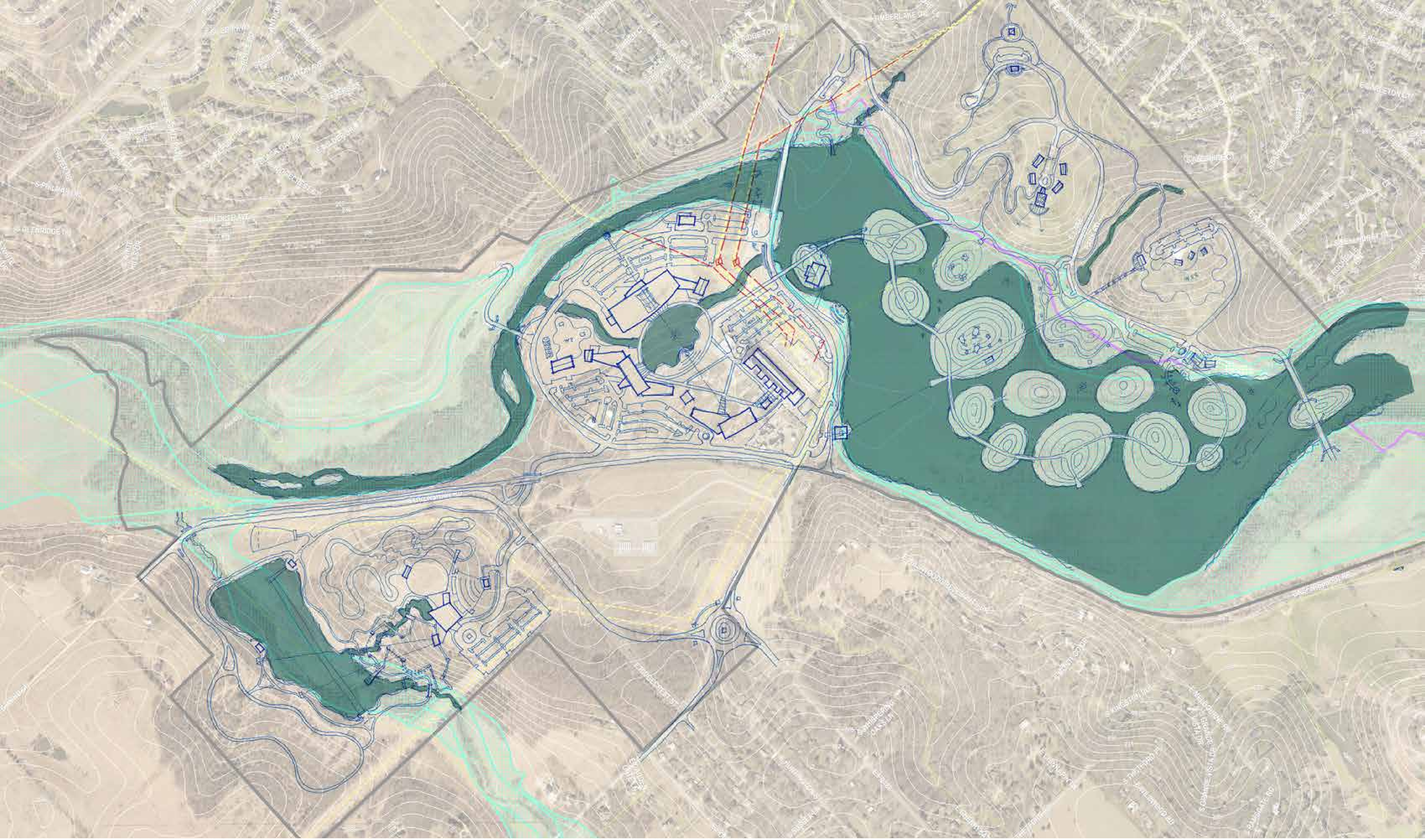
RISK ASSESSMENT

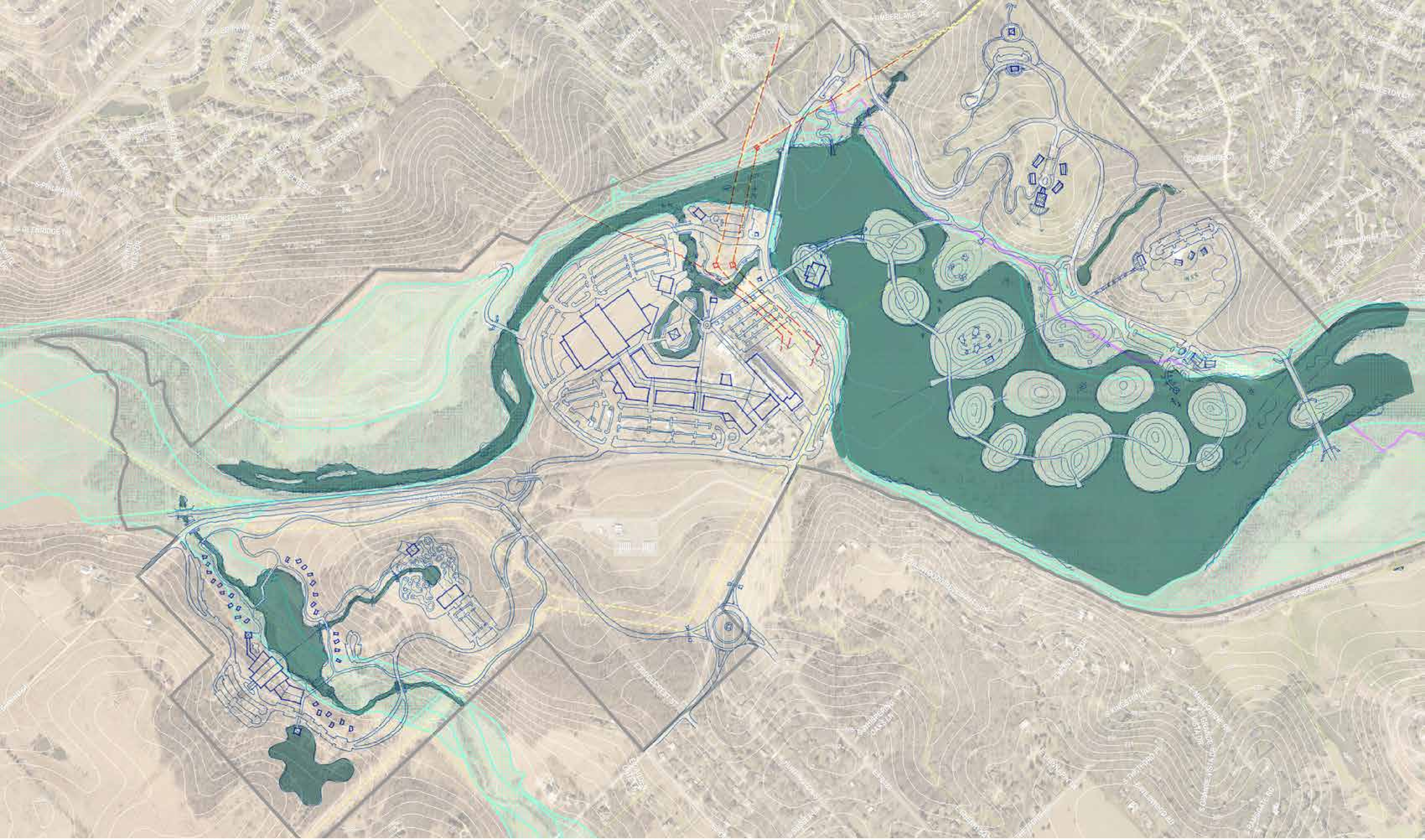
- **Initial risk assessment completed at retreat kickoff (109 risks)**
- **Reviewed and risk register included 62 risks**
- **Categories:**
  - *Parks & Recreation*
  - *Economic Development*
  - *Transportation*
  - *Public Relations*
  - *Dam*
  - *Environmental*
  - *Utilities*
  - *General*
- **Risk Register review - July 2023 (after 2nd public meeting May 4)**
- **Two risks added (total on register at 64)**
- **High Risks - 5**
- **Moderate Level - 52**
- **Low Level - 7**



Discussion

Concept Refinement (Internal only)





LAKE SPRINGFIELD PLAN

Public Meeting No. 3

10.12.2023

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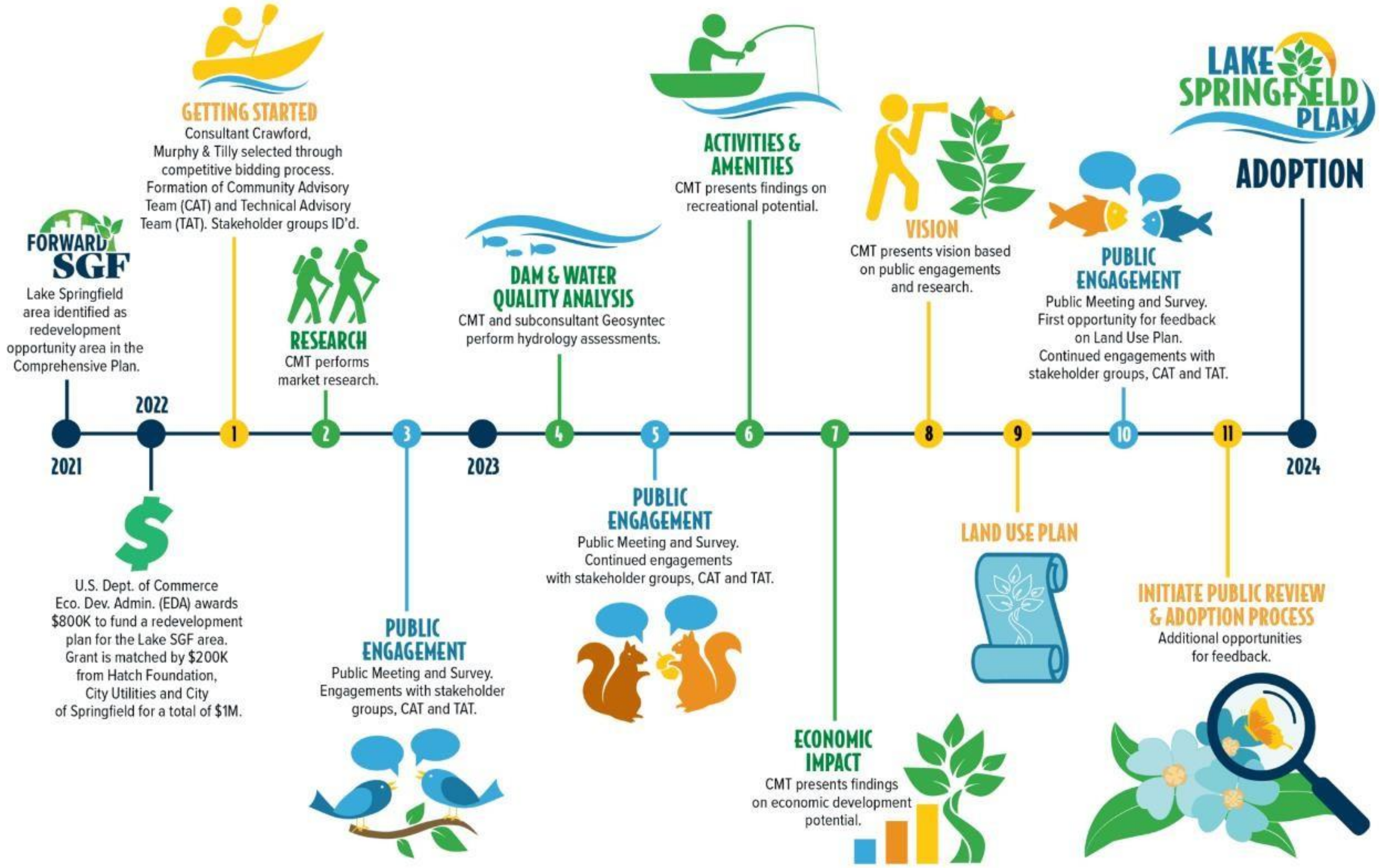
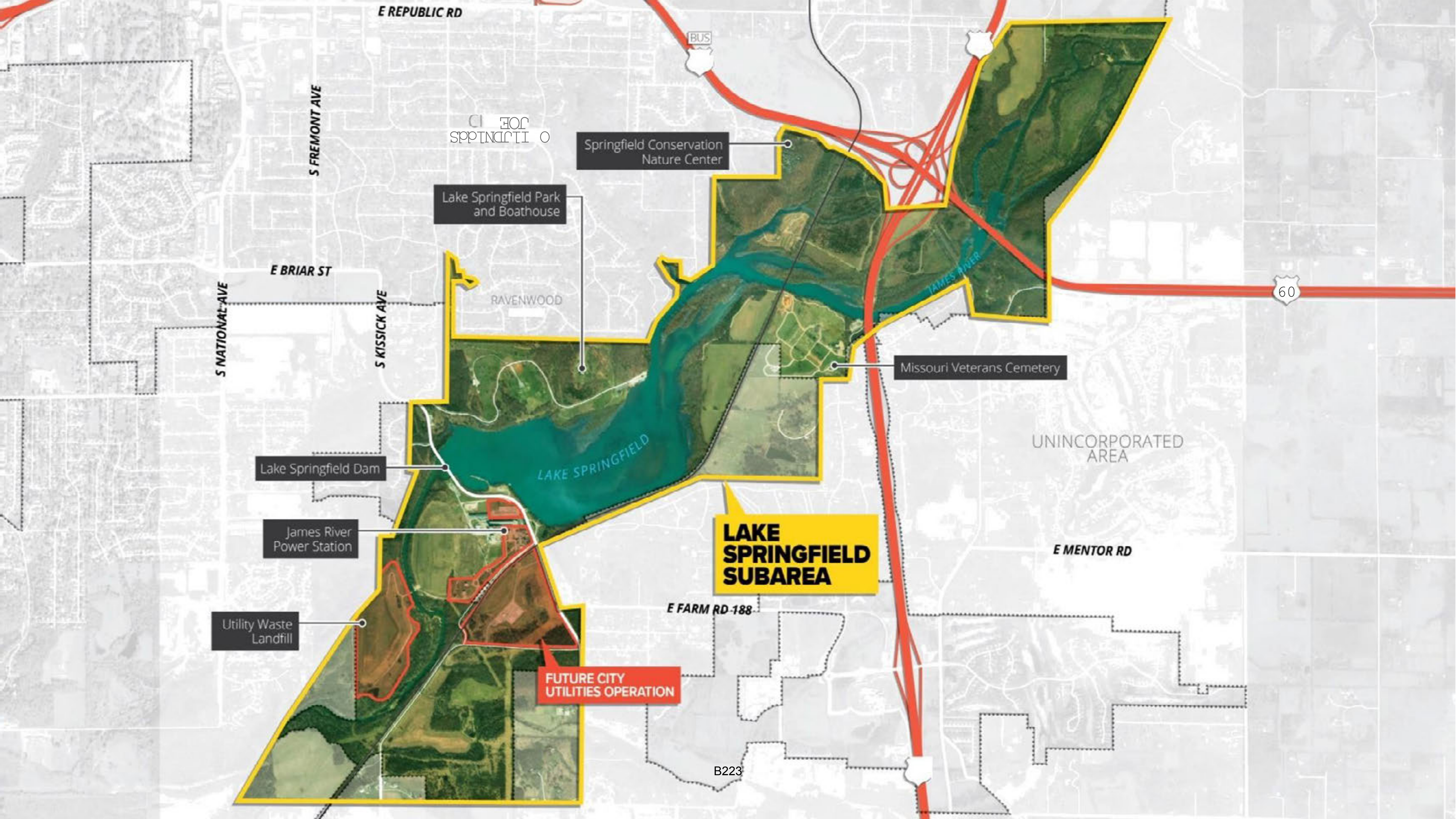
Timeline


FORWARD SGF
Lake Springfield area identified as redevelopment opportunity area in the Comprehensive Plan.
2021
2022
U.S. Dept. of Commerce Eco. Dev. Admin. (EDA) awards $800K to fund a redevelopment plan for the Lake SGF area. Grant is matched by $200K from Hatch Foundation, City Utilities and City of Springfield for a total of $1M.
1
GETTING STARTED
Consultant Crawford, Murphy & Tilly selected through competitive bidding process. Formation of Community Advisory Team (CAT) and Technical Advisory Team (TAT). Stakeholder groups ID'd.
2
RESEARCH
CMT performs market research.
3
PUBLIC ENGAGEMENT
Public Meeting and Survey. Engagements with stakeholder groups, CAT and TAT.
2023
4
DAM & WATER QUALITY ANALYSIS
CMT and subconsultant Geosyntec perform hydrology assessments.
5
PUBLIC ENGAGEMENT
Public Meeting and Survey. Continued engagements with stakeholder groups, CAT and TAT.
6
ACTIVITIES & AMENITIES
CMT presents findings on recreational potential.
7
ECONOMIC IMPACT
CMT presents findings on economic development potential.
8
VISION
CMT presents vision based on public engagements and research.
9
LAND USE PLAN
10
PUBLIC ENGAGEMENT
Public Meeting and Survey. First opportunity for feedback on Land Use Plan. Continued engagements with stakeholder groups, CAT and TAT.
11
INITIATE PUBLIC REVIEW & ADOPTION PROCESS
Additional opportunities for feedback.
2024
LAKE SPRINGFIELD PLAN
ADOPTION


E REPUBLIC RD
BUS
S FREMONT AVE
Springfield Conservation Nature Center
Lake Springfield Park and Boathouse
E BRIAR ST
S NATIONAL AVE
S KISSICK AVE
RAVENWOOD
JAMES RIVER
60
Missouri Veterans Cemetery
UNINCORPORATED AREA
Lake Springfield Dam
LAKE SPRINGFIELD
James River Power Station
LAKE SPRINGFIELD SUBAREA
E MENTOR RD
E FARM RD 188
Utility Waste Landfill
FUTURE CITY UTILITIES OPERATION

Planning Goals

1. Attract Innovative **Economic Development & Resilient Job Creation** within the study area that complements Regional Vision and Priorities.
2. Develop a Strategy for **Sustainable Water Quality & Green Infrastructure** Improvements.
3. Establish an **Adaptive Reuse Strategy** for the James River Power Station.
4. Focus on **Transportation enhancements** that are accessible and equitable to Lake Springfield and the Surrounding Communities.
5. Embrace **Active and Passive Recreational Opportunities** as a Regional Economic Development Catalyst.
6. Engage the Community in a way that is Inclusive of a **Diverse and Multi-Cultural Perspective**.

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PUBLIC INPUT PROCESS TO DATE

OCT-NOV 2022 | JAN 2023 | MARCH 2023 | MAY 2023

Public Engagement

- **October 12, 2022** Neighborhood Forum
- **November 17, 2022** Public Community Meeting #1
- **March 23, 2023** Lake Ridge Estates Neighborhood Meeting
- **March 30, 2023** City Utilities Meeting
- **May 4, 2023** Public Community Meeting #2

Survey

- **October 12, 2022** Online Survey
- **November 17, 2022** Online Survey
- **Jan 2023** Survey Traditional & Focused Outreach
- **May 4, 2023** Online Survey

C.A.T.

- **November 15, 2022** CAT Meeting #1
- **March 21, 2023** CAT Meeting #2

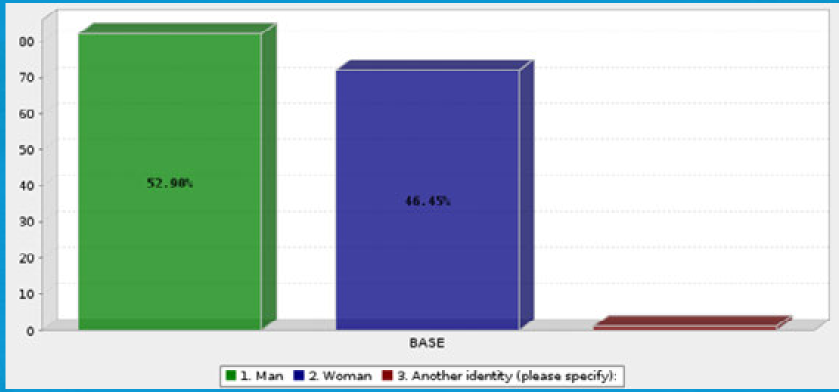
T.A.T.

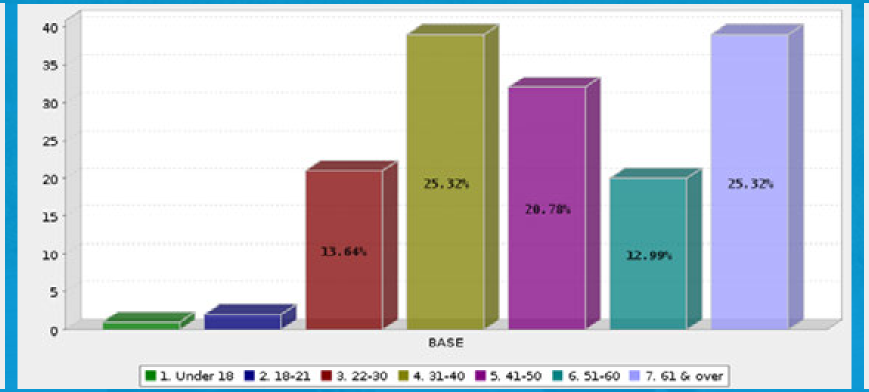
- **October 13, 2022** TAT Meeting #1
- **April 20, 2023** TAT Meeting #2

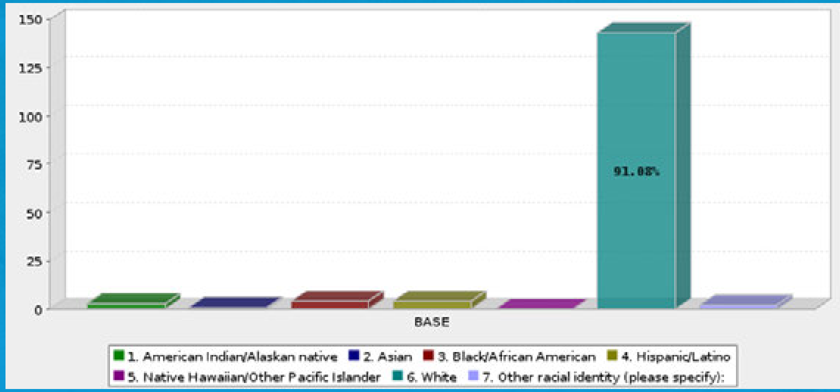
LAKE SPRINGFIELD PLAN

Public Input - Survey Respondent Summary

- **100+ Survey Respondents** – Online Survey
- **264 Survey Respondents + 727 Total Views** (148 Survey Completions,116 Incomplete) – Online Survey
- **200 Traditional + 602 Focused Respondents** – Local Water Resources Survey
- **462 Survey Respondents + 779 Total Views** (161 Survey Completions, 301 Incomplete) – Online Survey







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Overview of Hydrology Study Phase 1

Chapter 3: Water Quality Assessment

Chapter 4: Watershed Assessment

Chapter 5: Sediment Management

Chapter 6: Dam Assessment and Regulatory Compliance Review

Chapter 7: Dam Modification Alternatives Assessment

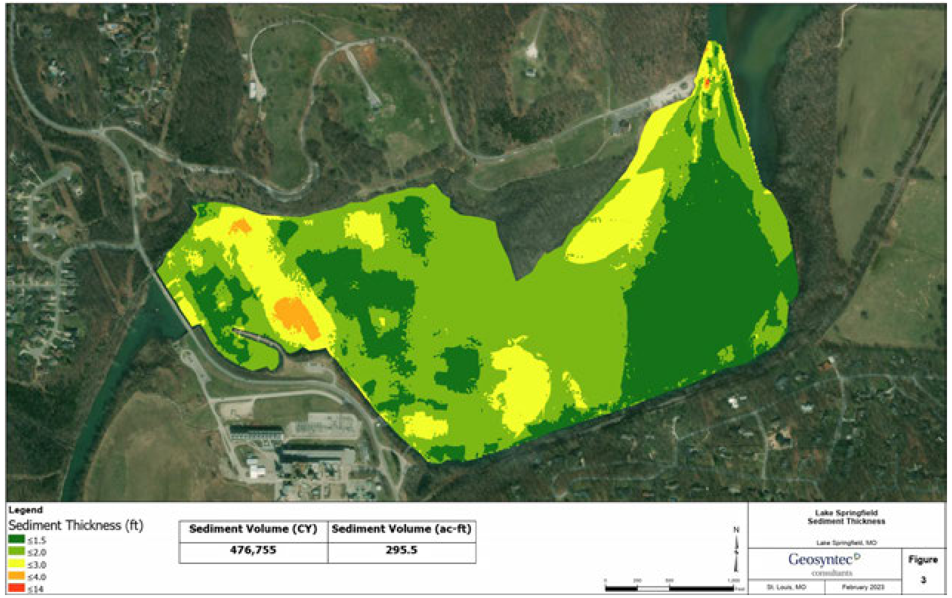
Chapter 8: Envision Sustainability Planning

Appendix A1: Field data Collection Methods Results

Appendix A2: U.S. Fish and Wildlife Service (Information for Planning and Consultation Resource List)

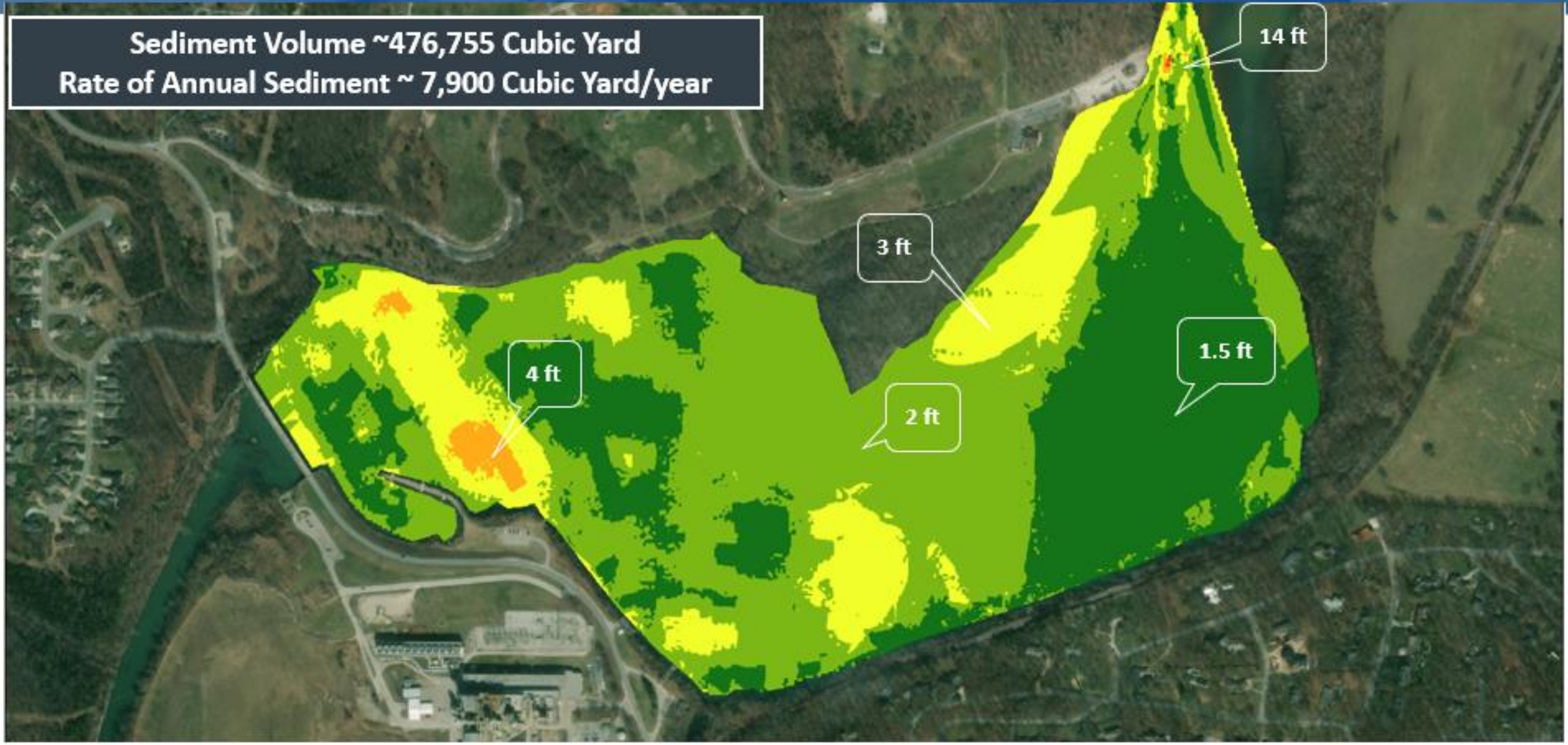
Appendix B: Dam Inspection Photo Log

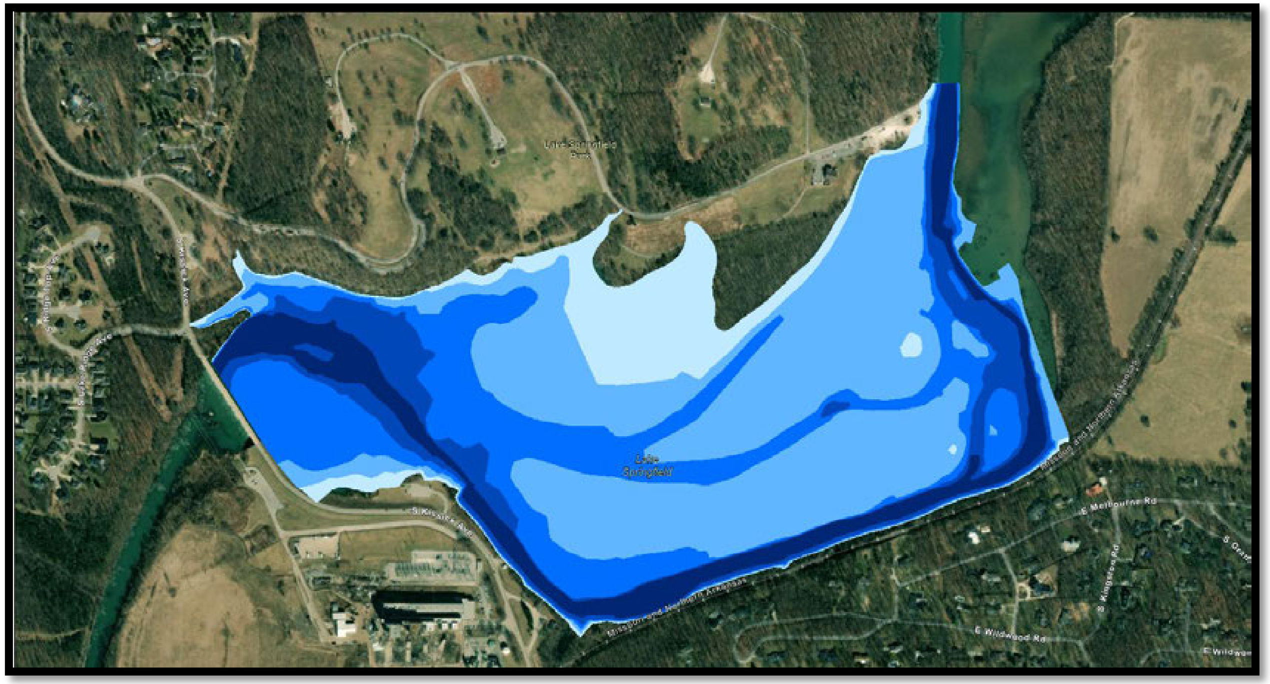
Appendix C: Dam Modification Alternatives Concept Figures



Predicted Annual Rate of Sediment from the watershed ~ 7,900 Cubic Yard

Bathymetry and Sediment sampling





←1955 Topo WSE below 1140’

Depth (ft)

≤4

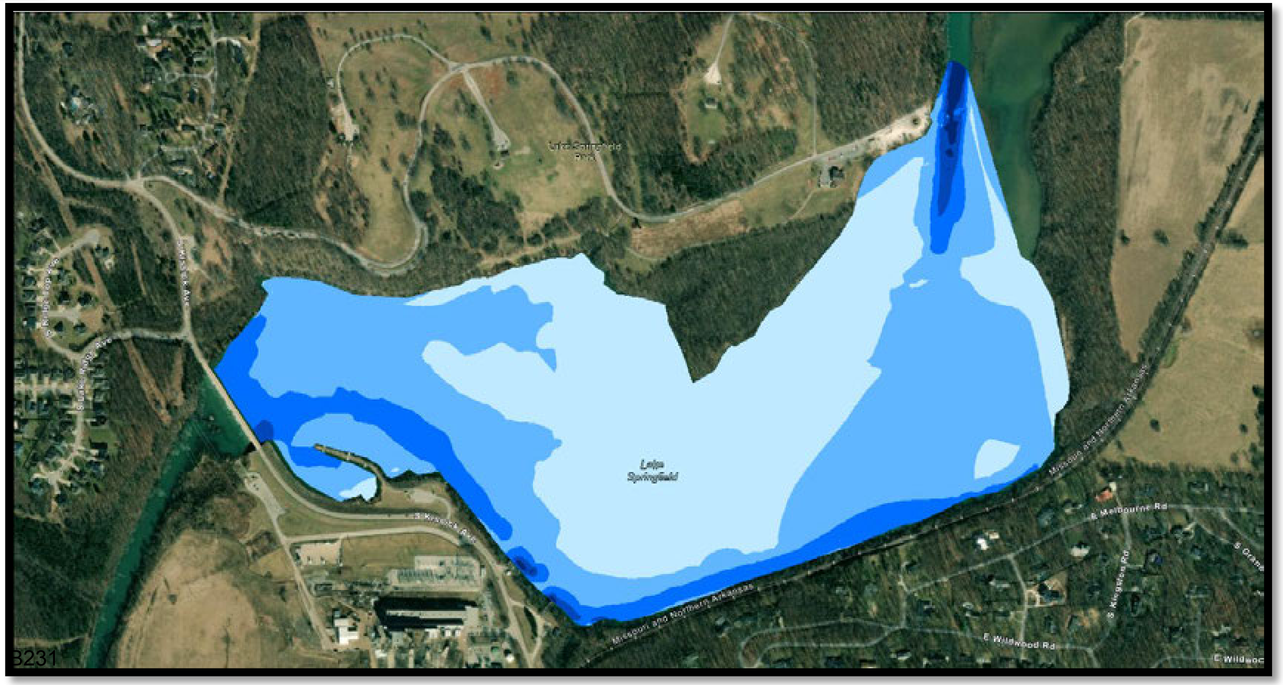
≤8

≤12

≤16

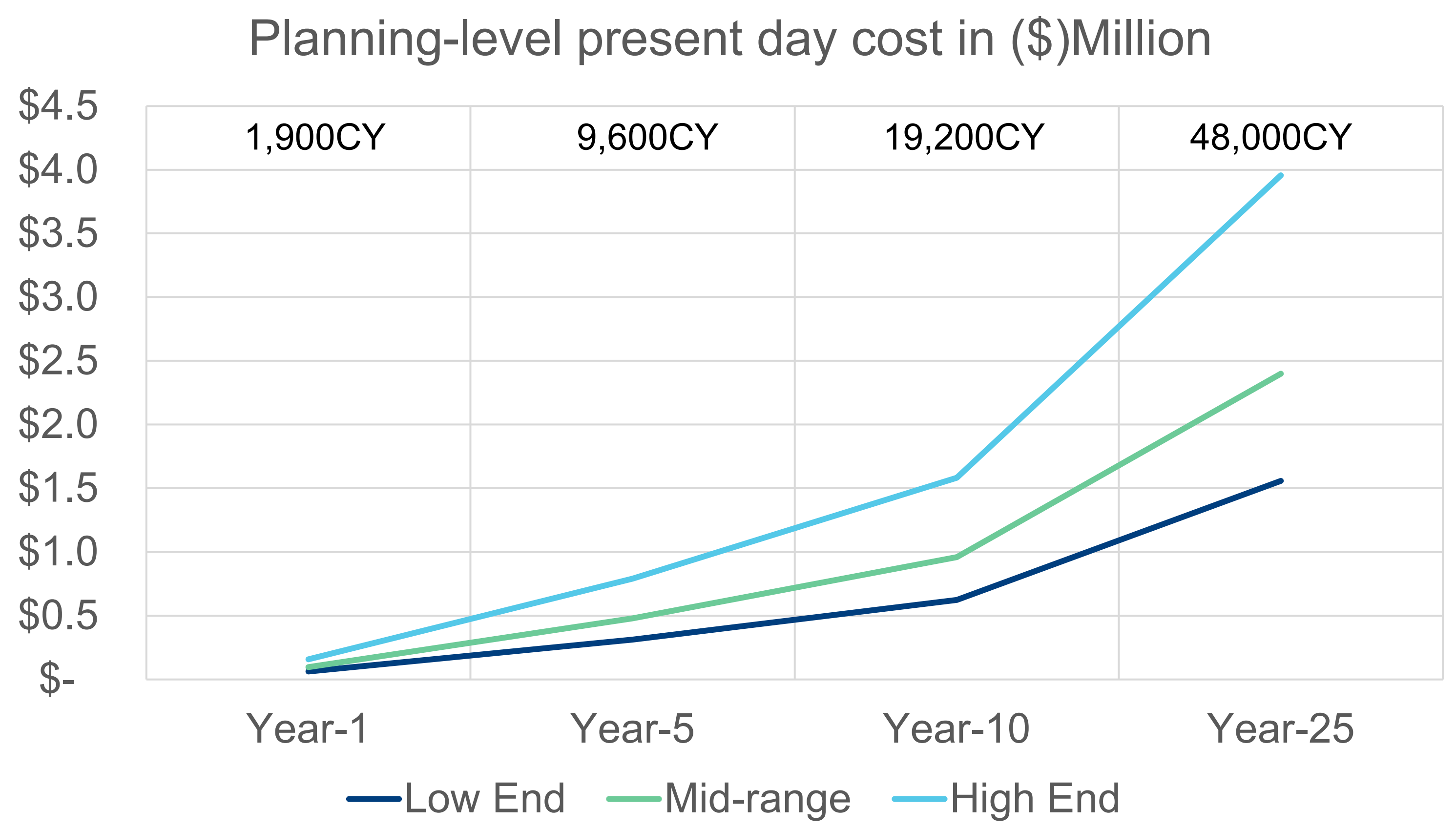
≤20

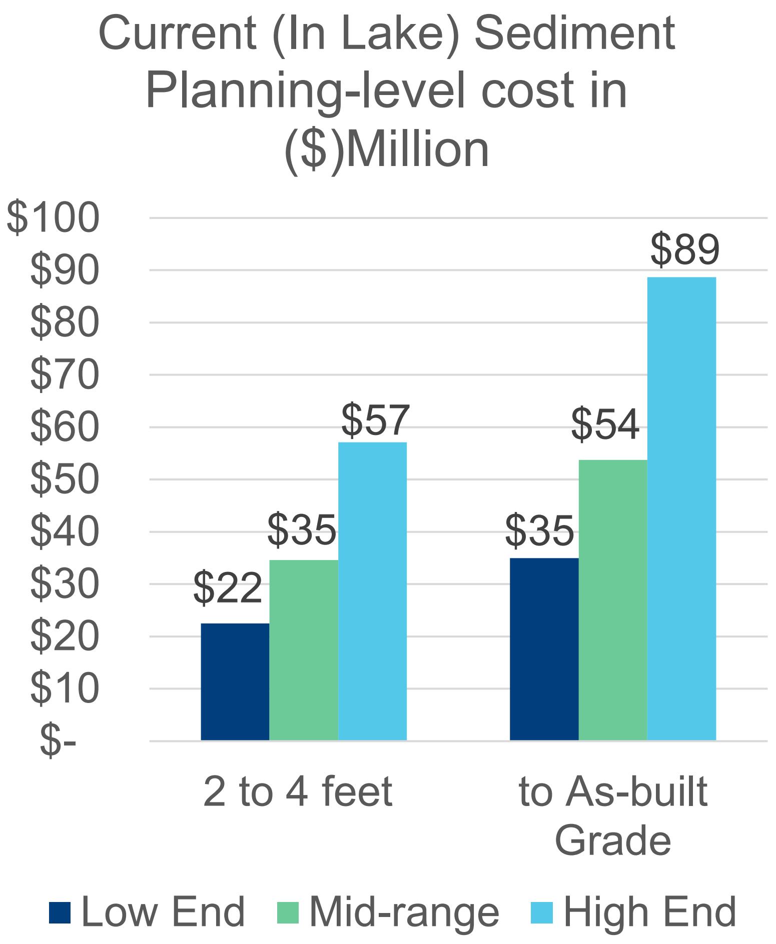
Present Lake Springfield Bathymetry at WSE 1140’→



Sediment Management

Scenario 1: Manage All (Could apply to all Dam Mod Alt)

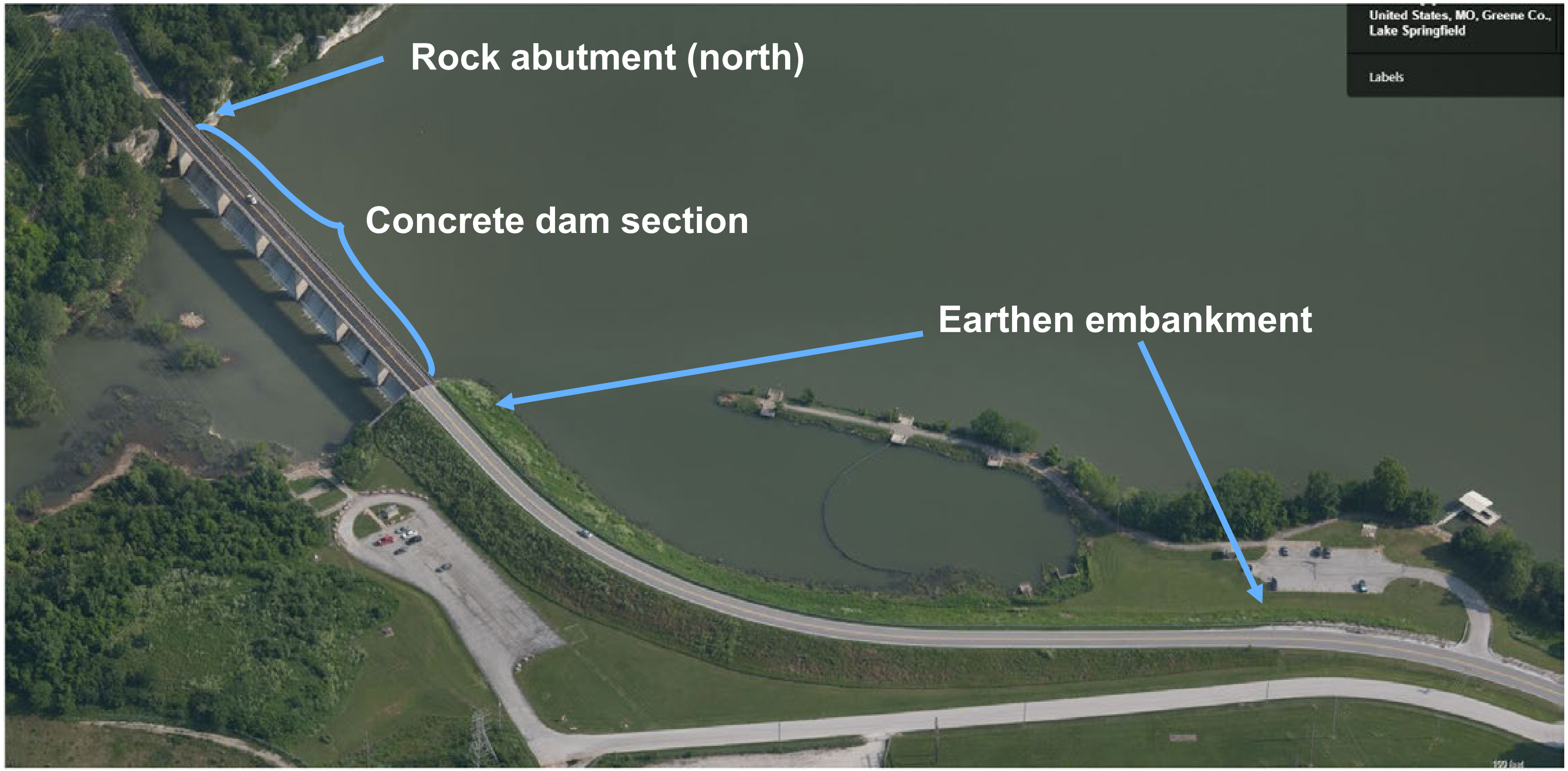




Assumption

- Sediment loading only from the immediate 3 upstream watersheds

Dam Assessment



GEOSYNTEC CONSULTANTS

Overview of Hydrology Study Phase 1

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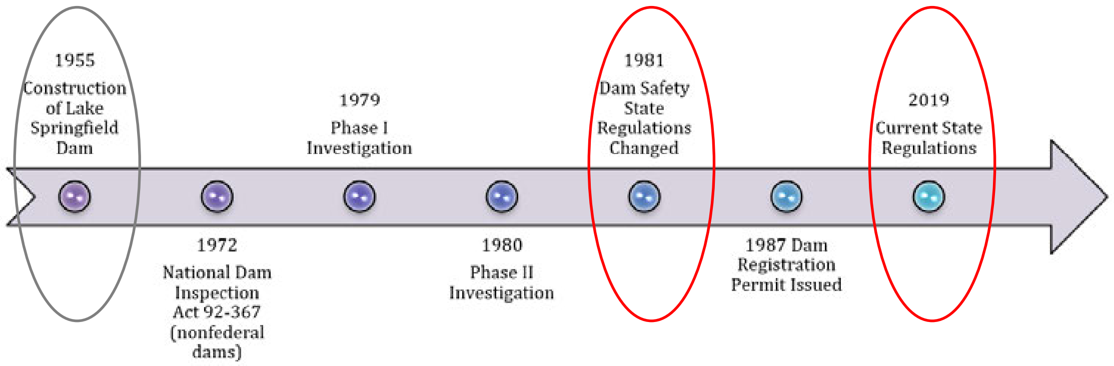


Figure 3: Historic Congressional and State Regulatory Updates on Dam Safety

Dam O&M costs (standard care)

Standard of care needed for operation and maintenance of Lake Springfield Dam whether modified or not modified.

	1st year/Annual	1-10 years	10-20 years	20-30 years
Routine Maintenance	$4,000	$47,000	$63,000	$84,000
Capital Maintenance Programming	$24,000	$316,000	$515,000	$935,000
Total	$28,000	$363,000	$578,000	$1,019,000
Cumulative	**$28,000**	**$391,000**	**$969,000**	**$1,988,000**

Notes:

- Capital maintenance cost includes minor concrete repair.
- Inflation rate of 3% is included in the cost projection.

Potential Dam Modification Alternatives

Re-establish River Ecosystem
Remove or reduce liability of maintaining a Dam

- Full Dam Removal
- Partial Dam Removal

Provide Kayak and Fish Passage

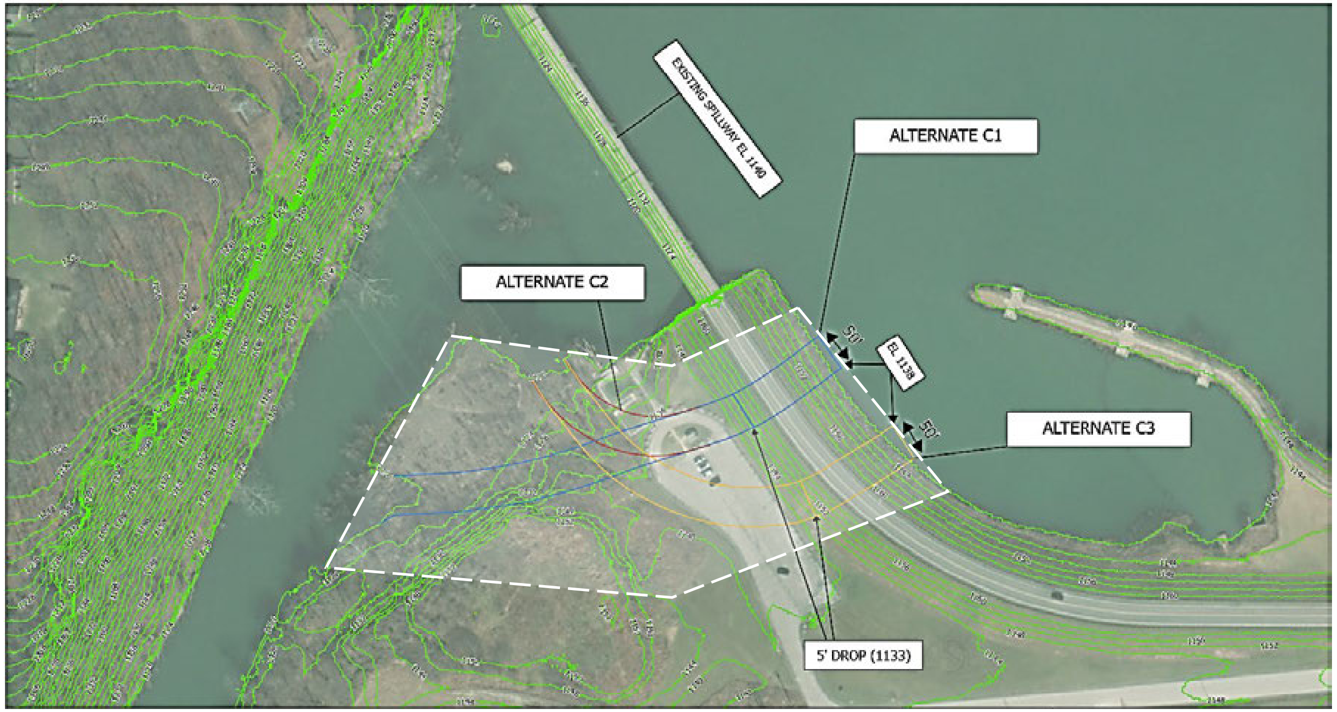
- Concrete Dam Modification
- Earth Embankment Modification

Avoid modification
Provide Lake Enhancements

- No Modification

Planning-level costs for Alternative C3

Alternate C3: Earth Embankment Modification. Lower Impoundment by 2 feet.



Higher End

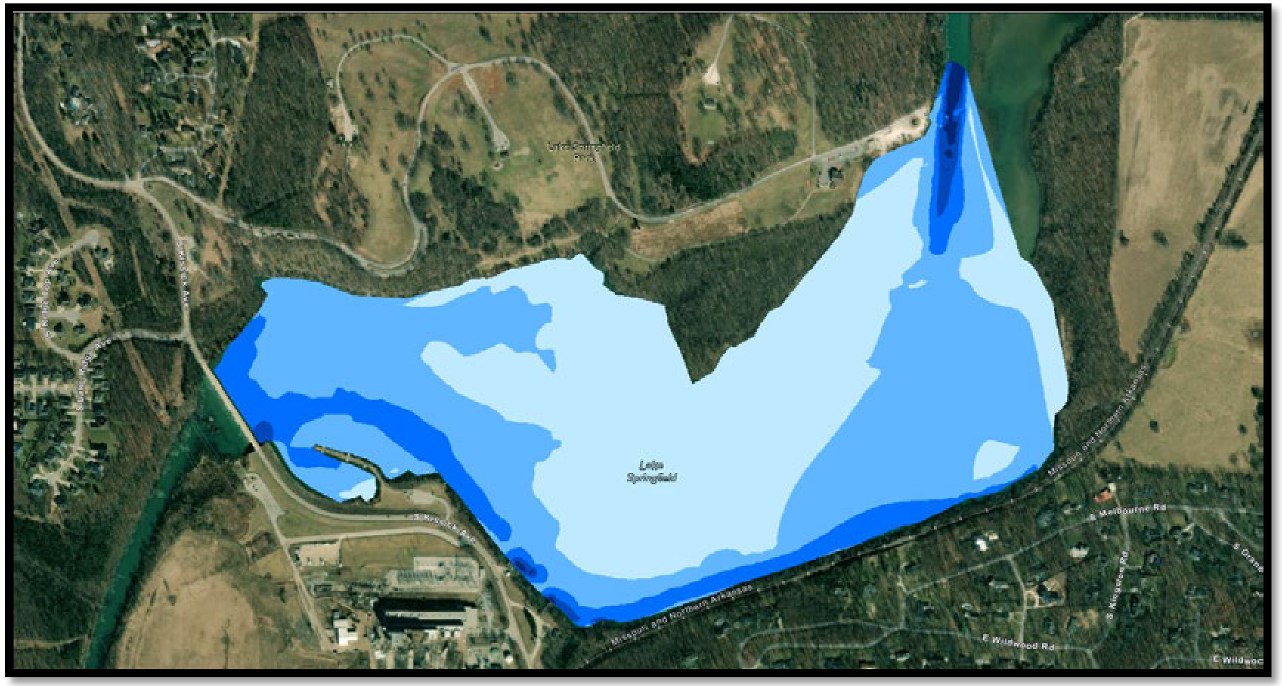
$11 Million	$5 Million

Lower End

Average $7 Million

Items **not** included:

- Sediment management
- Restoration of natural stream as a result of dam modifications.
- Engineering and construction oversight
- Full removal of the dam feature
- Maintenance or reconstruction of existing bridge



←**Present Lake Springfield Bathymetry at WSE 1140’**

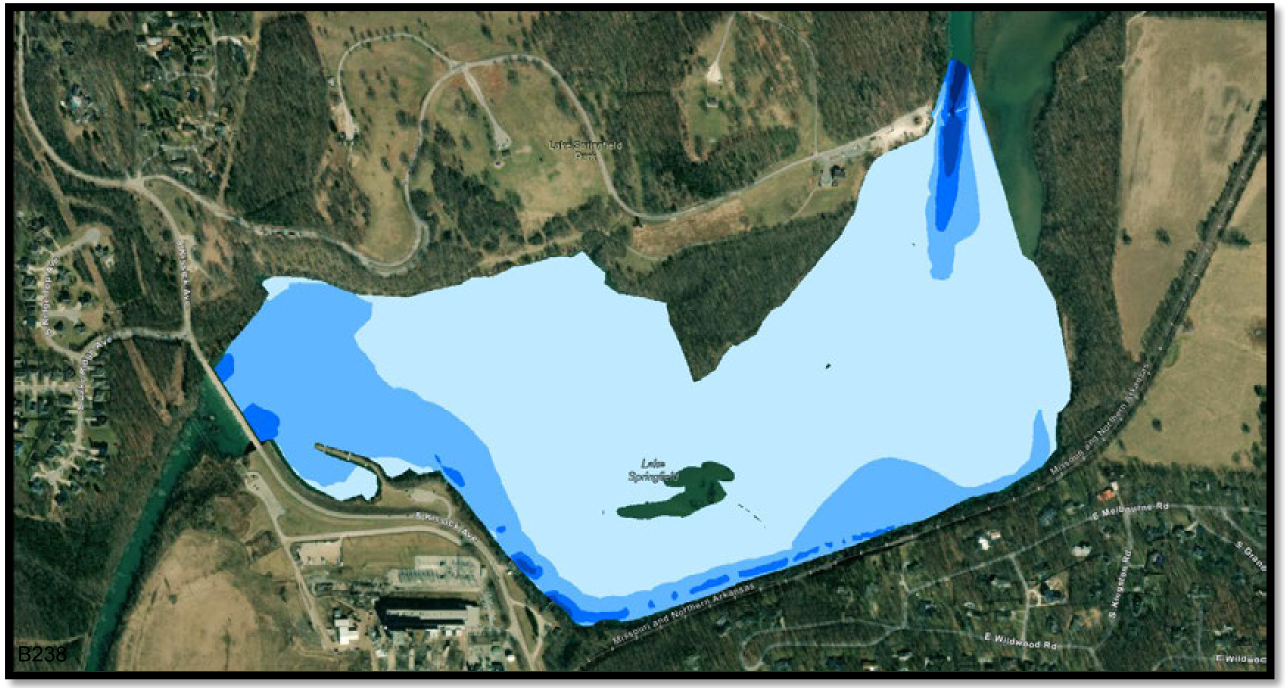
Depth (ft)

- ≤4
- ≤8
- ≤12
- ≤16
- ≤20

Present Lake Springfield Bathymetry at WSE 1138’→

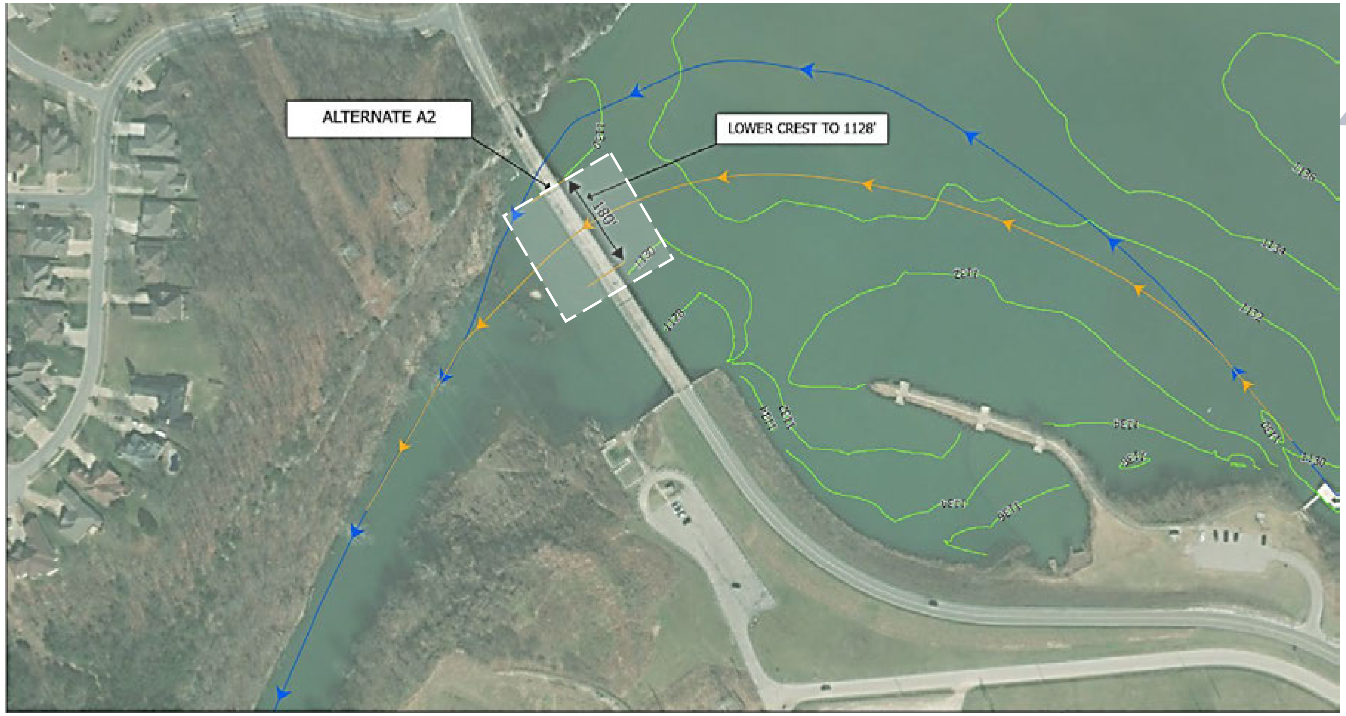
Depth (ft)

- ≤4
- ≤8
- ≤12
- ≤16
- ≤20



Planning-level costs for Alternative A2

Alternate A2: Partial Dam Removal. Lower Impoundment by 12 feet.



Higher End

$20 Million

$8 Million

Lower End

Average $12 Million

Items **not** included:

- Restoration of natural stream as a result of dam modifications.
- Engineering and construction oversight
- Full removal of the dam feature
- Maintenance or reconstruction of existing bridge
- Full removal of weir features
- Downstream cofferdam (assumed can access by laying riprap)

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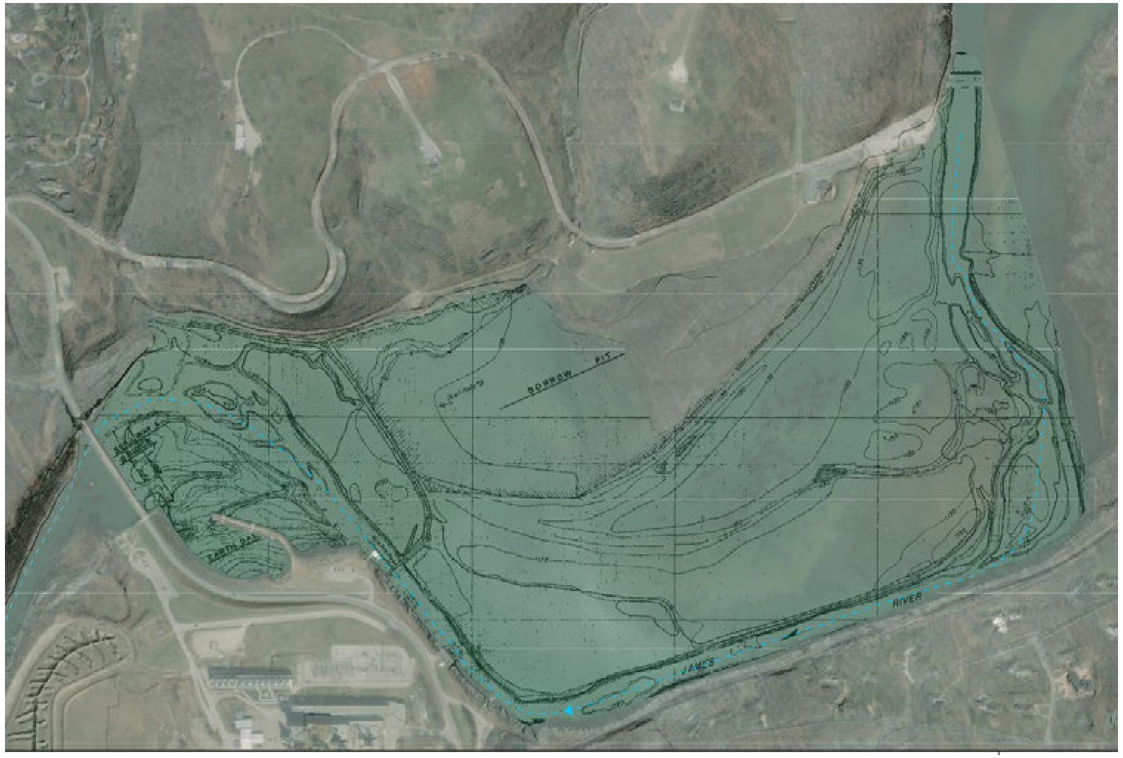
Planning-level costs for Alternative A1

Alternate A1: Dam Removal (to EL 1124)



Higher End

$44 Million | **$17 Million**

Lower End

Average $27 Million

Items **not** included:

- Restoration of natural stream as a result of dam modifications.
- Engineering and construction oversight
- Full removal of the dam feature
- Maintenance or reconstruction of existing bridge
- Full removal of weir features
- Downstream cofferdam (assumed can access by laying riprap)

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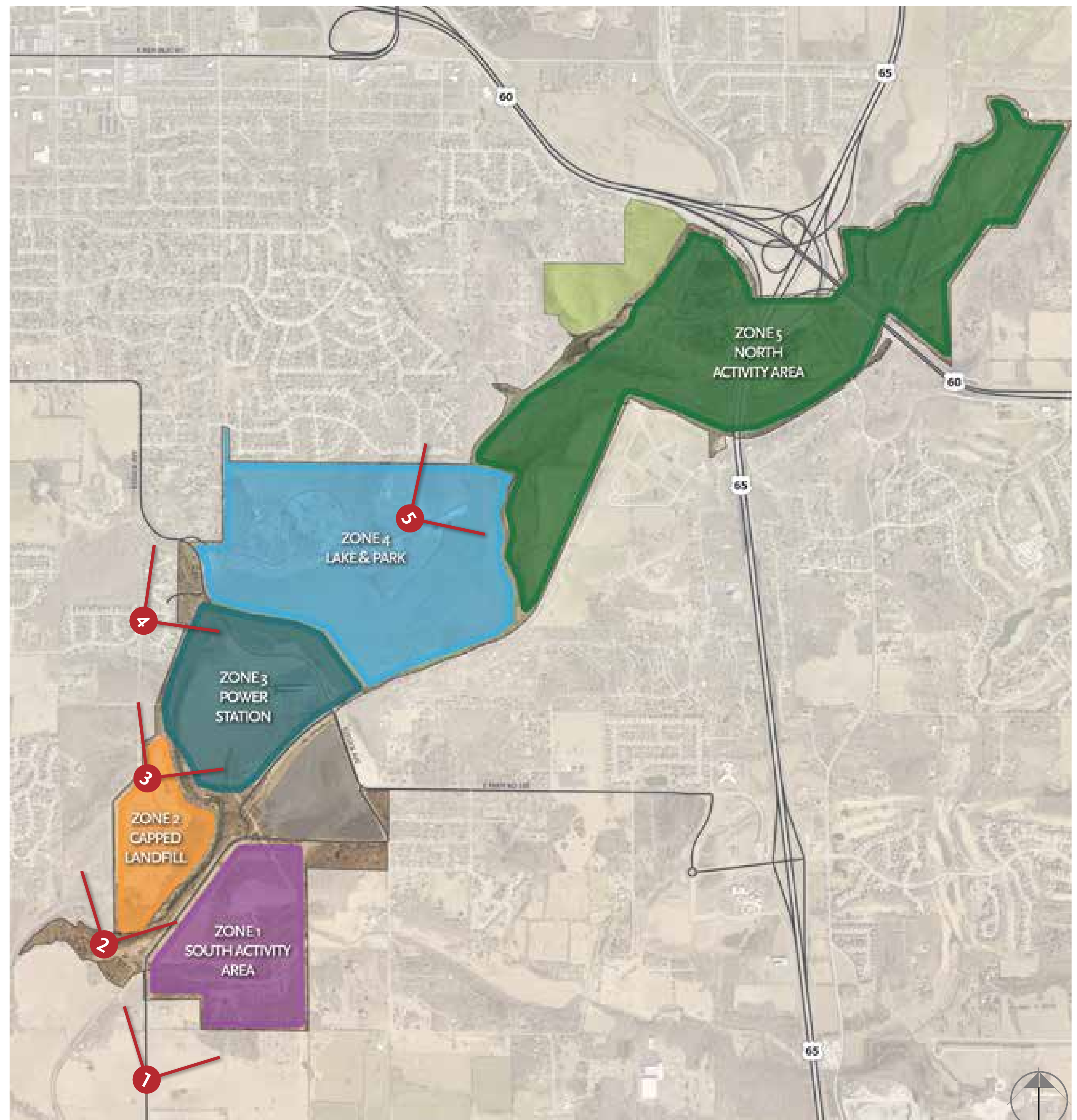
INITIAL CONCEPT ZONES

ZONE 1 - South Activity Area

ZONE 2 - Capped Landfill Area

ZONE 3 - Power Station/Dam Area

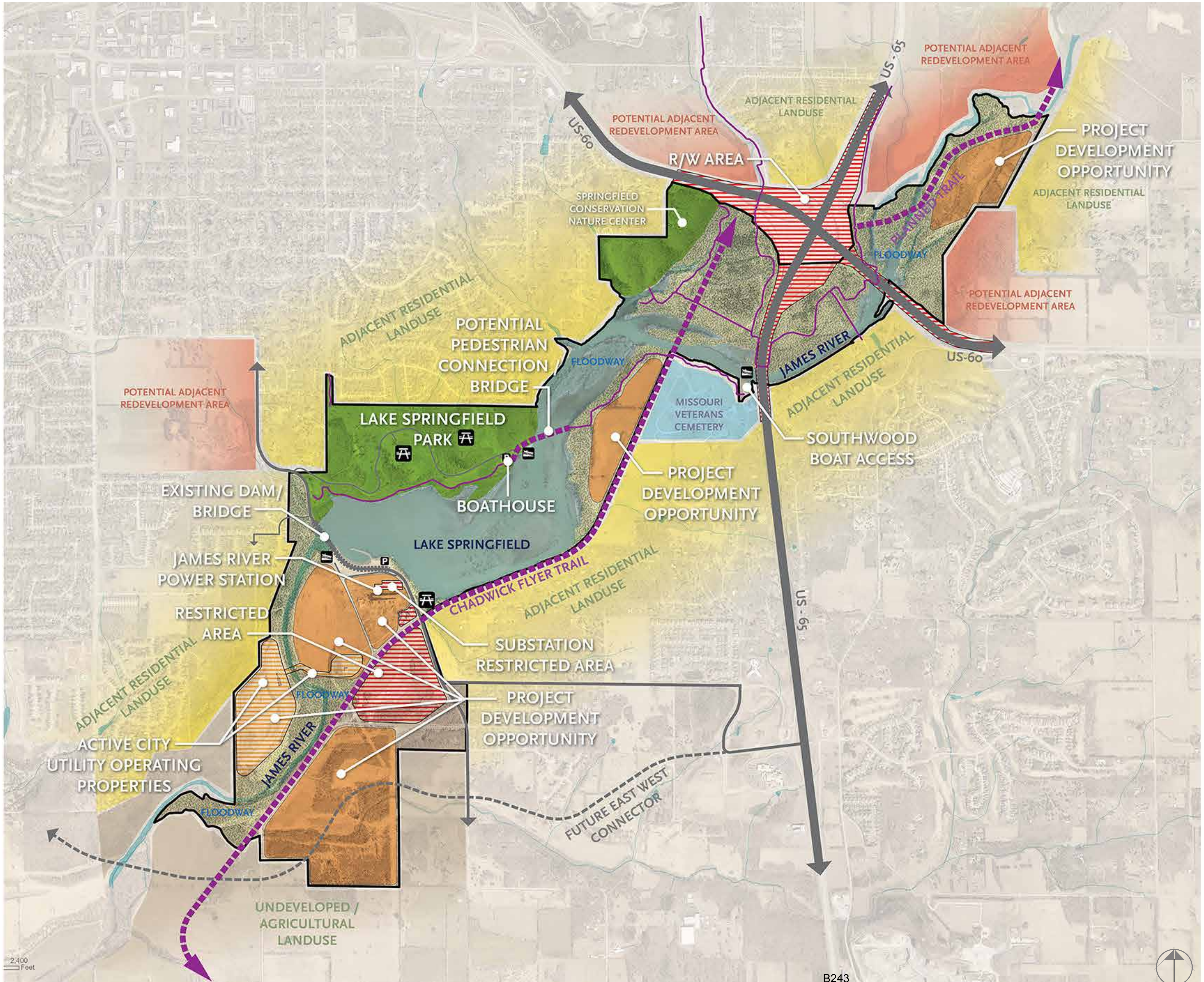


VIEWSHED FROM OBSERVER'S LOCATION

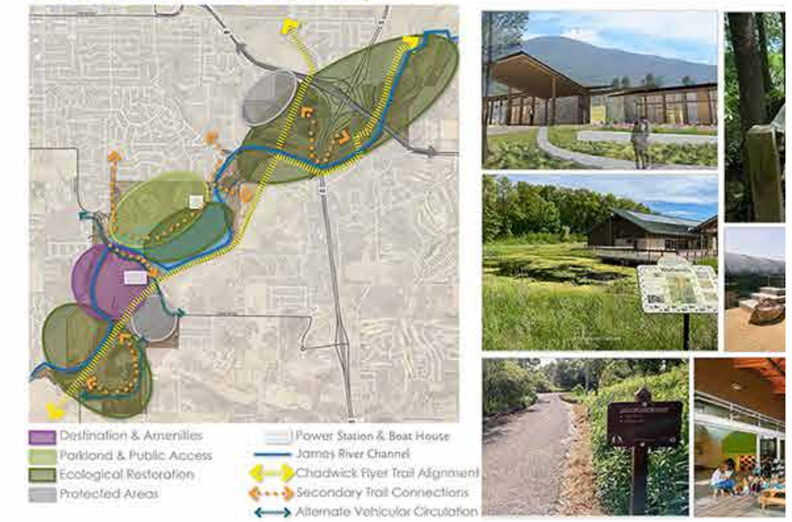
ZONE 4 - Lake/Park Area

ZONE 5 - North Activity Area

SITE ANALYSIS & PRELIMINARY CONCEPTS

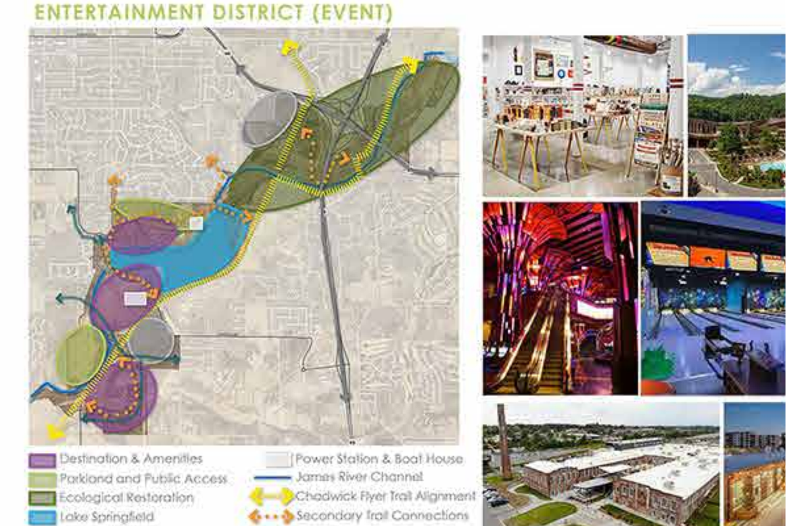


ECO TOURISM - OZARK (PLACE)

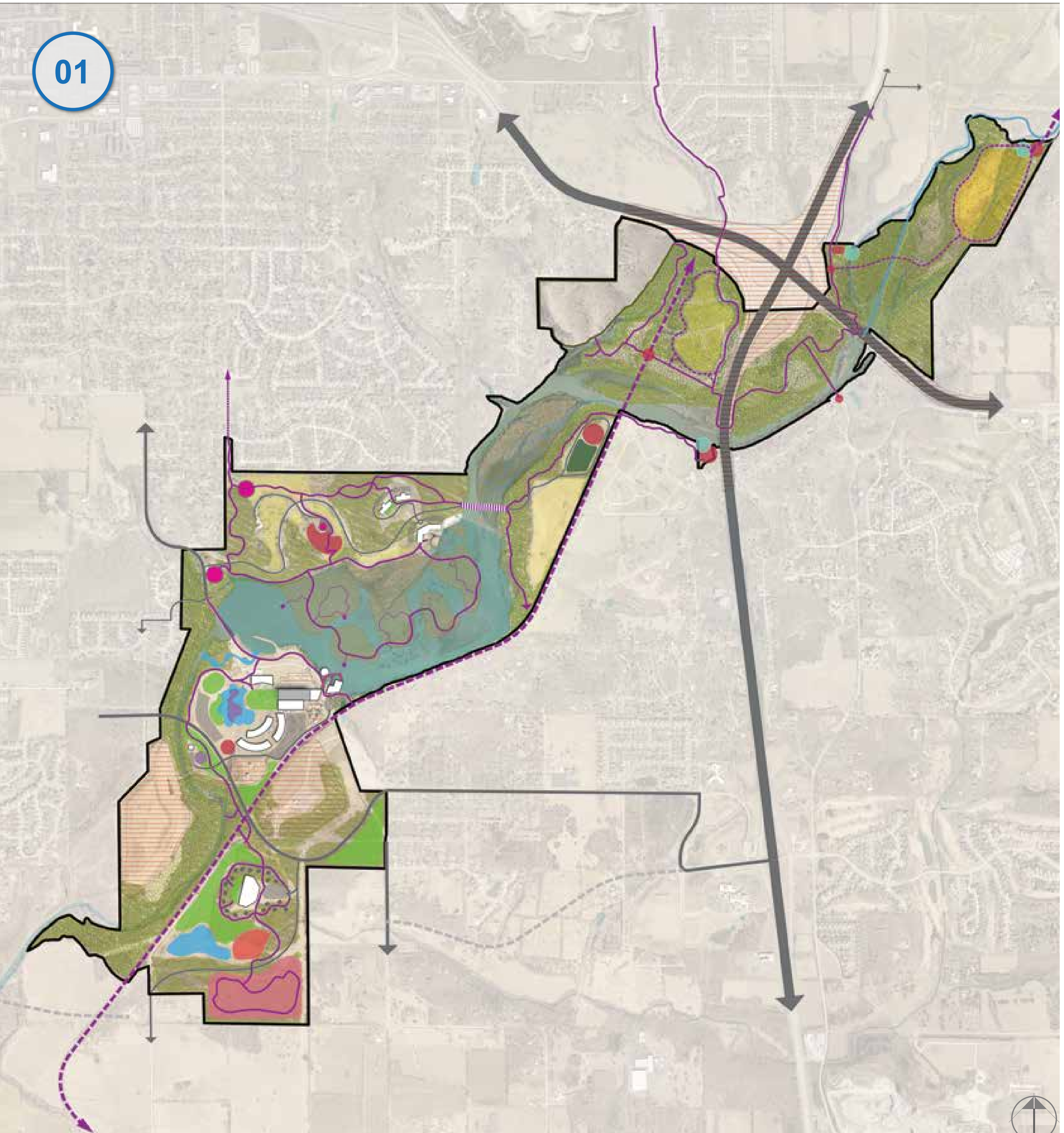


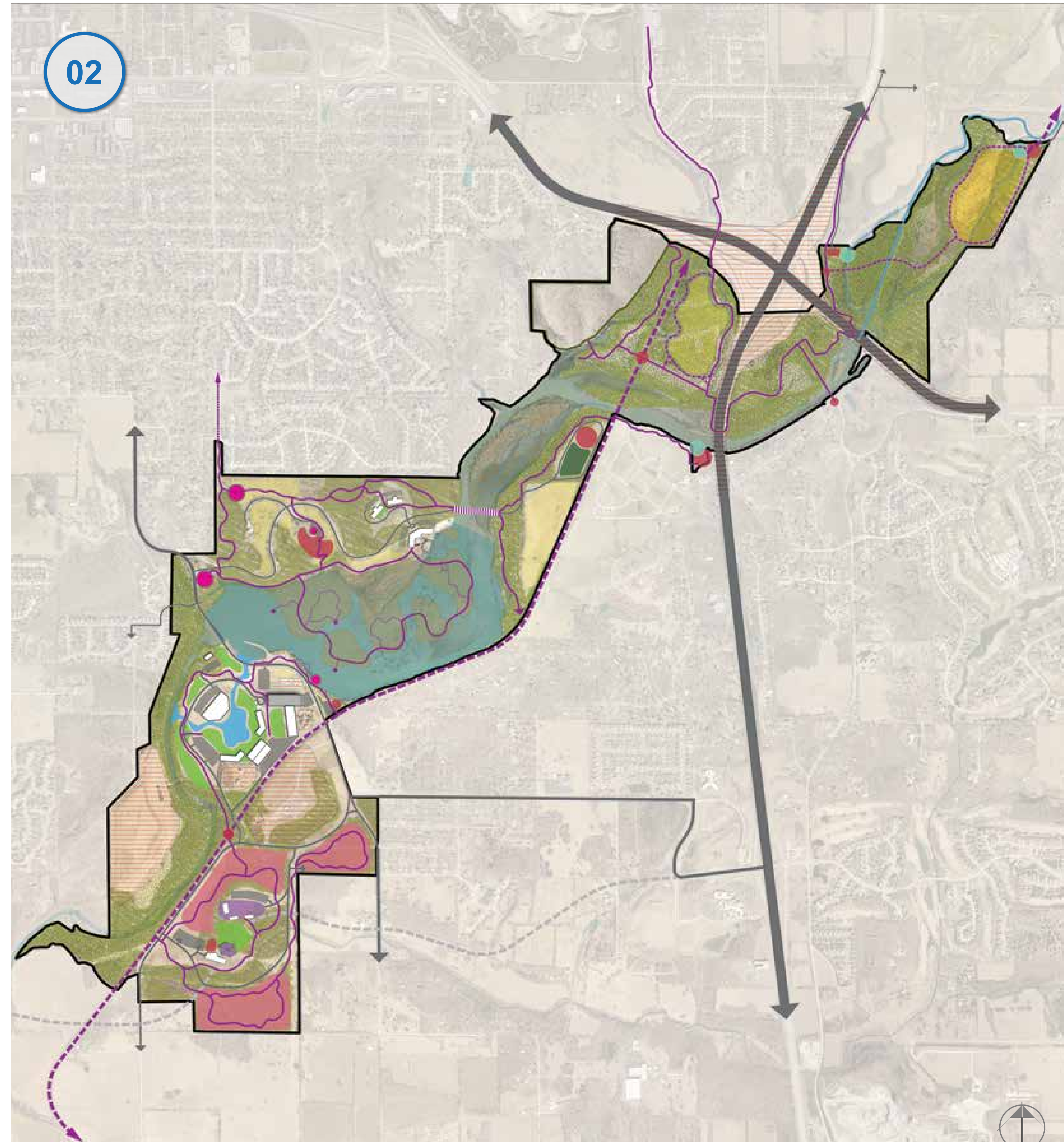
RECREATION DESTINATION (PLACE/EVENT)

ENTERTAINMENT DISTRICT (EVENT)



LAND-USE CONCEPTS



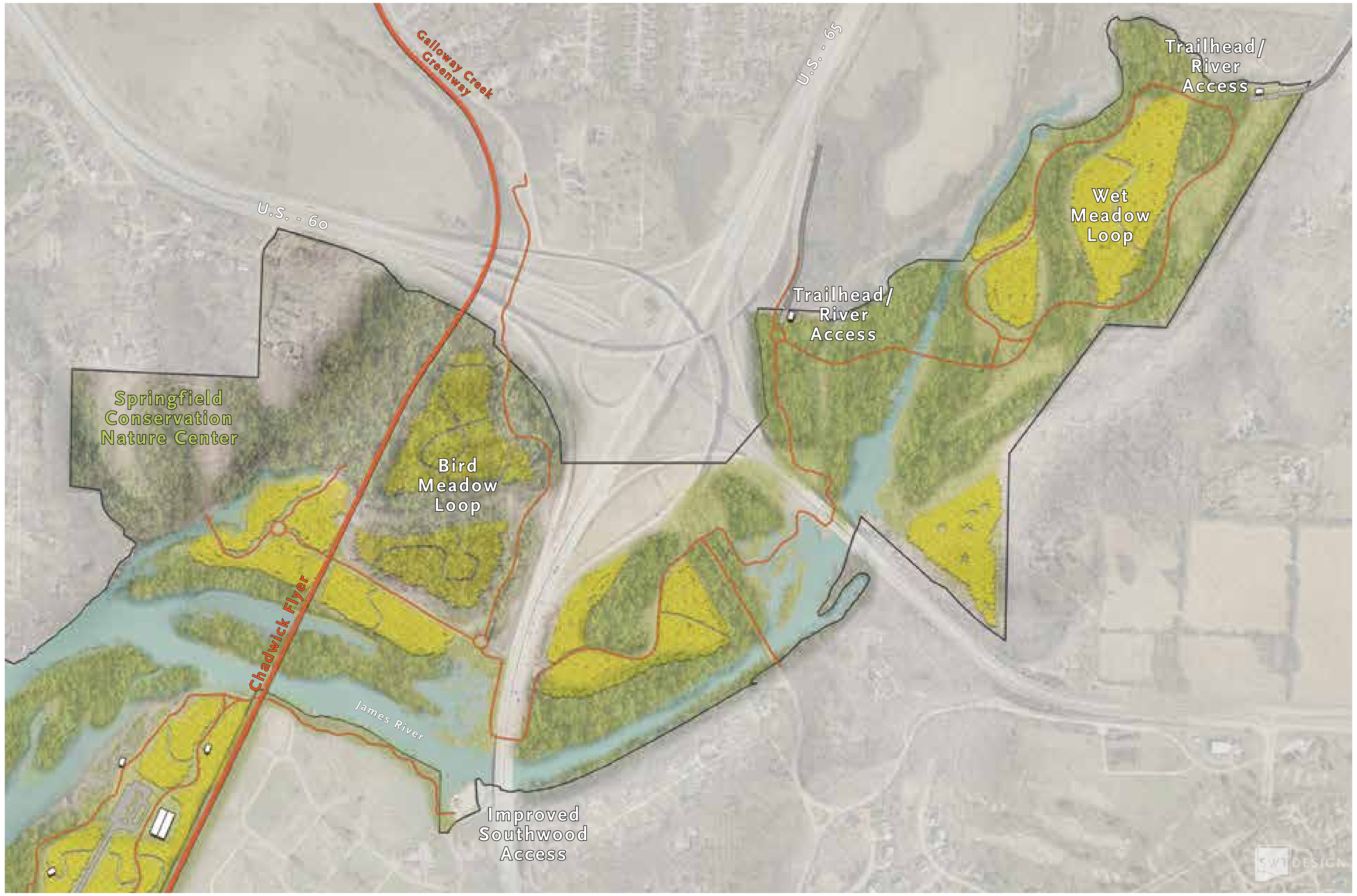


SITE CONCEPTS

01

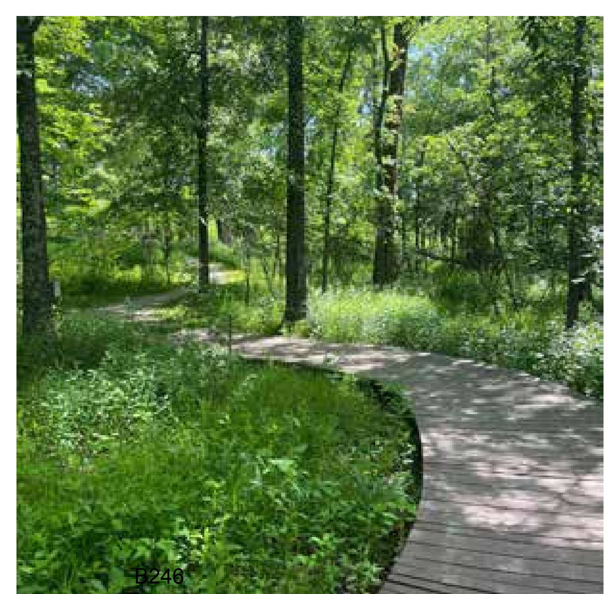
02

NORTH - ACCESS AND CONNECTIVITY



ZONE AMENITIES

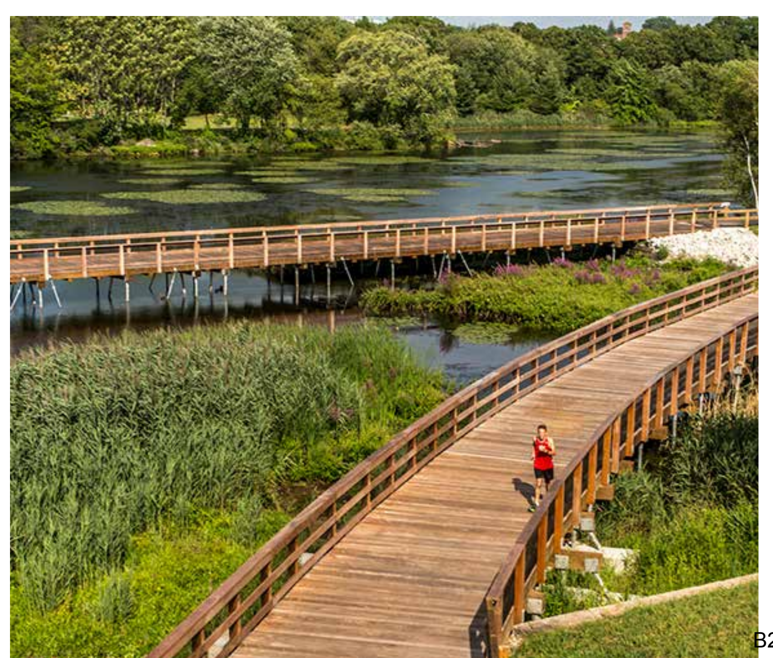
- Wetland Preservation
- Nature Amenity Area
- Meadows
- Trails / Trailheads
- River Access
- Culture Education / Event Lawn
- Nature Center Access



PARK & LAKE ACTIVATION

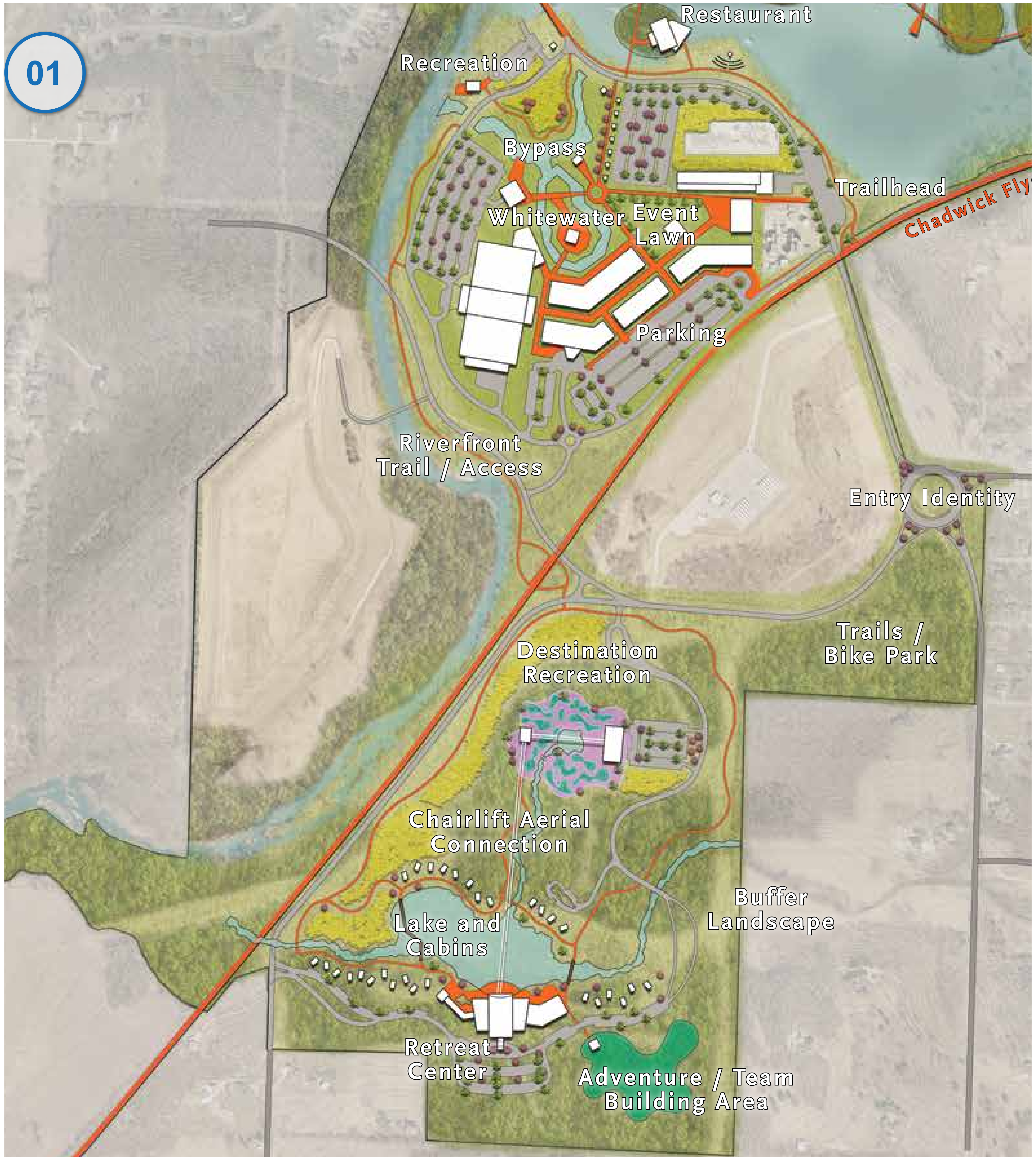
ZONE AMENITIES

- Boathouse / Ecology Center
- Marina / Wetland Boardwalk
- Retreat Center
- Destination Play
- River Crossings / Overlooks
- Disc Golf
- Neighborhood Trail Connection
- Renovated Park Entry



PARK & LAKE ACTIVATION

POWER PLANT + SOUTH ACTIVITY AREA REDEVELOPMENT



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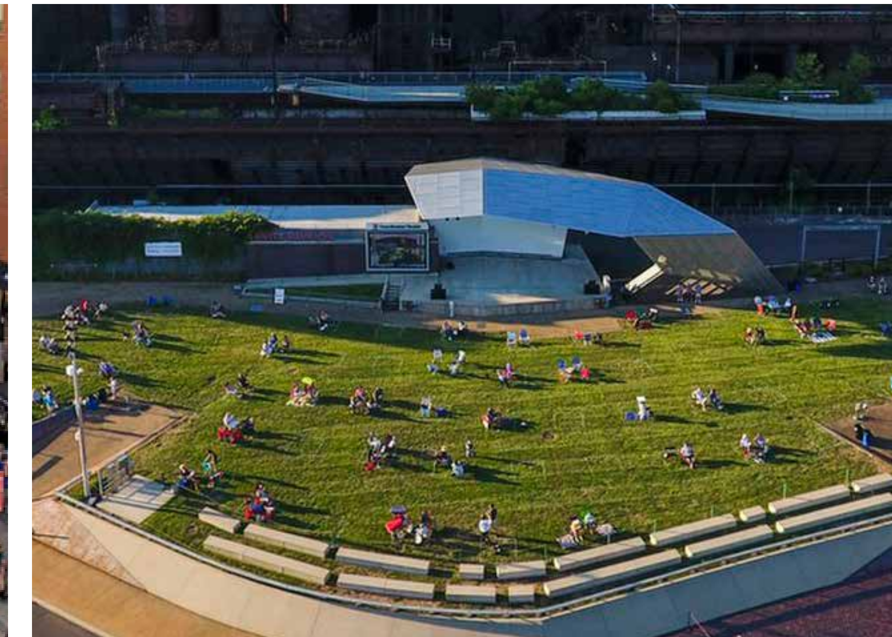
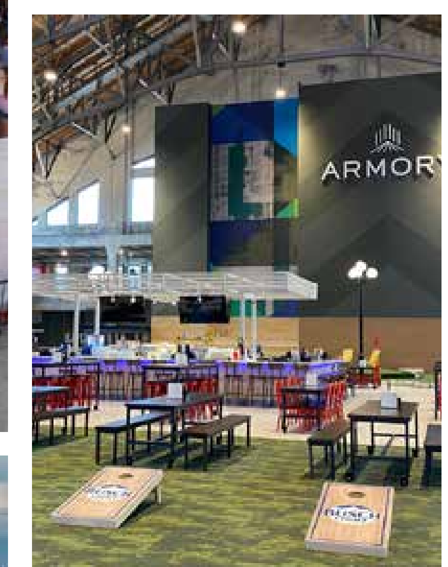
POWER PLANT - ENTERTAINMENT DISTRICT

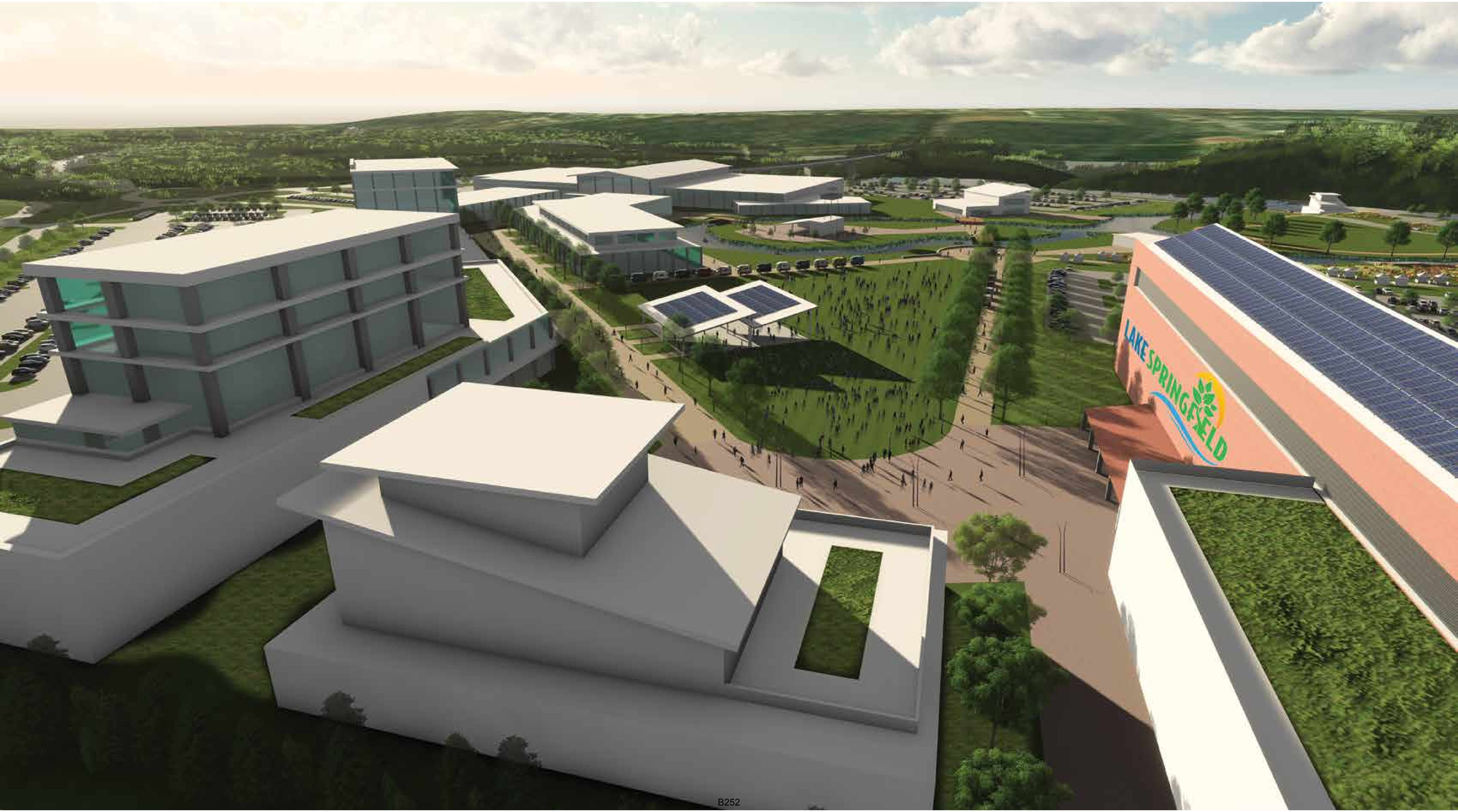




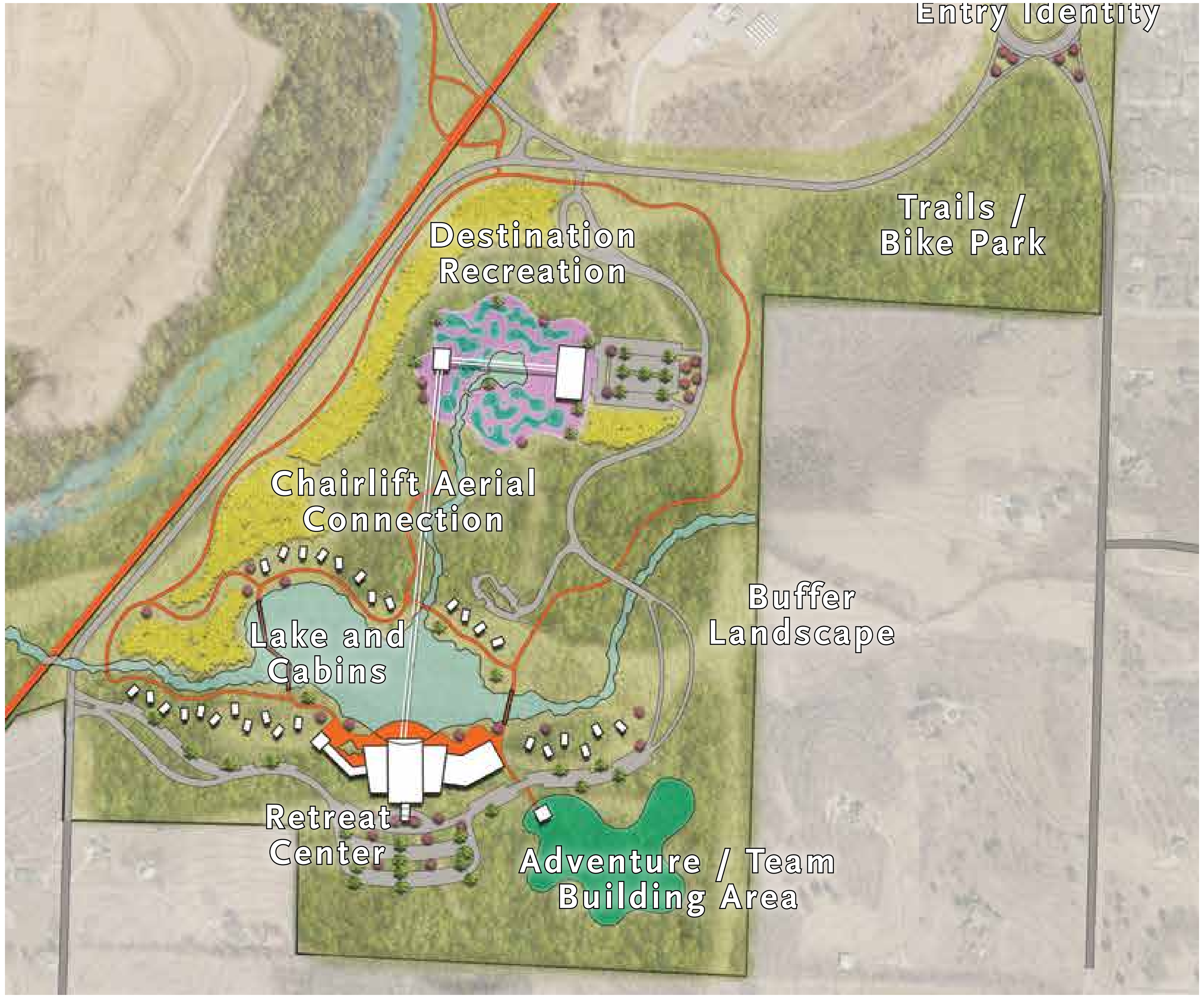
ZONE AMENITIES

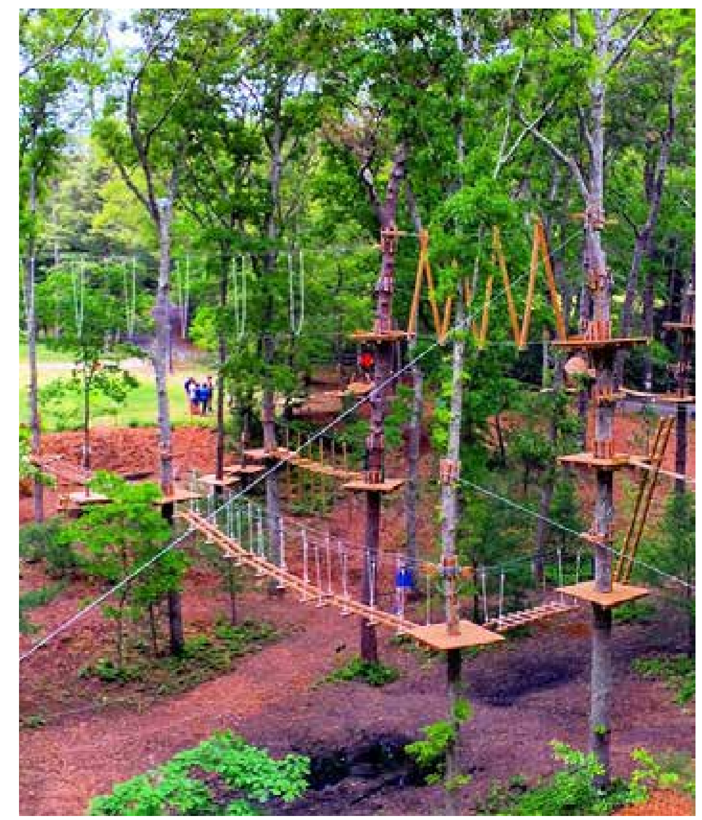
- Power Plant Entertainment
- Multi-use Event Venue
- Retail / Residential / Offic
- Restaurant / Overlook
- Riverfront Recreation
- Event Lawn/ Pavilion
- Bypass Channel
- Whitewater Adventure
- Chadwick Trailhead

POWER PLANT - ENTERTAINMENT DISTRICT



SOUTH ACTIVITY - ECO RETREAT

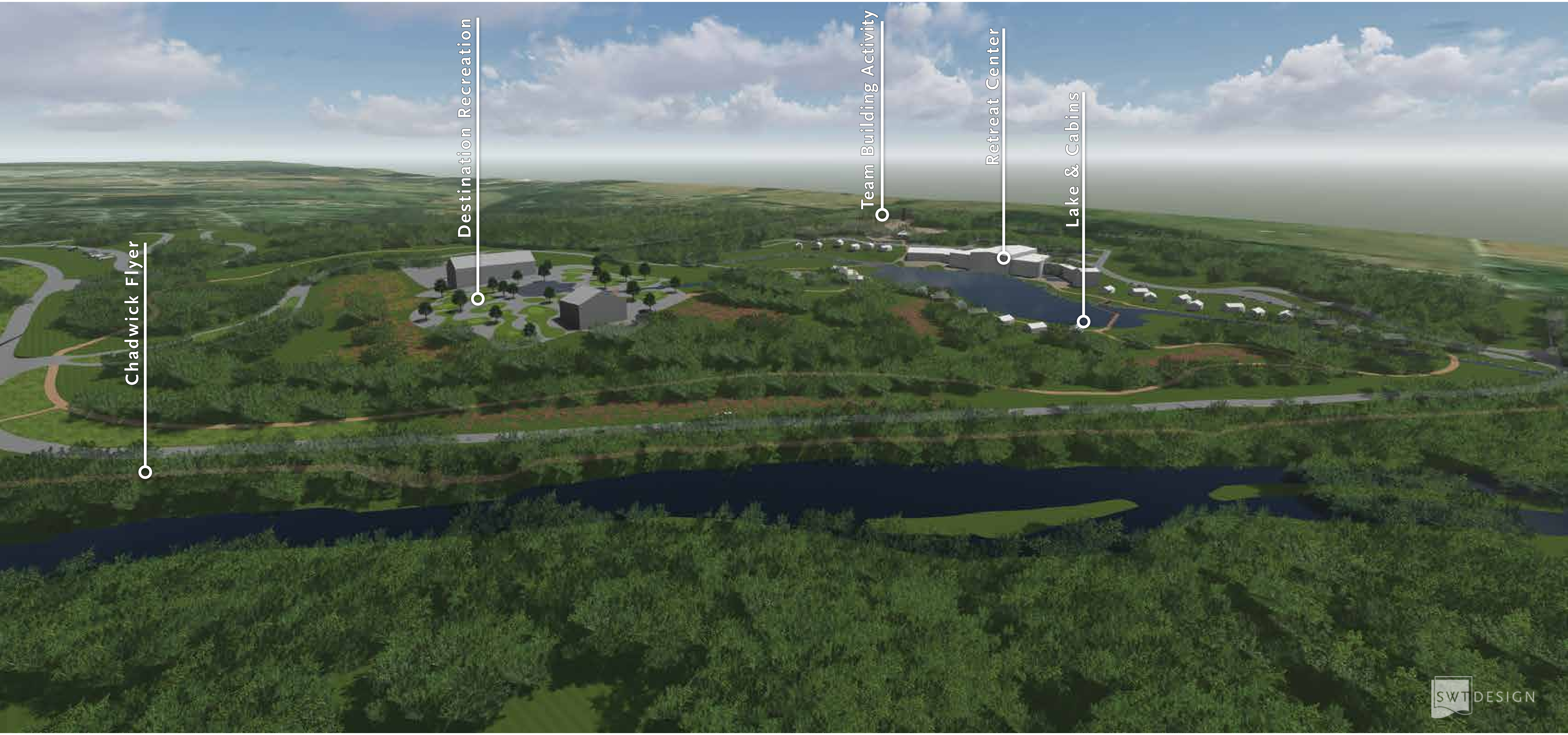




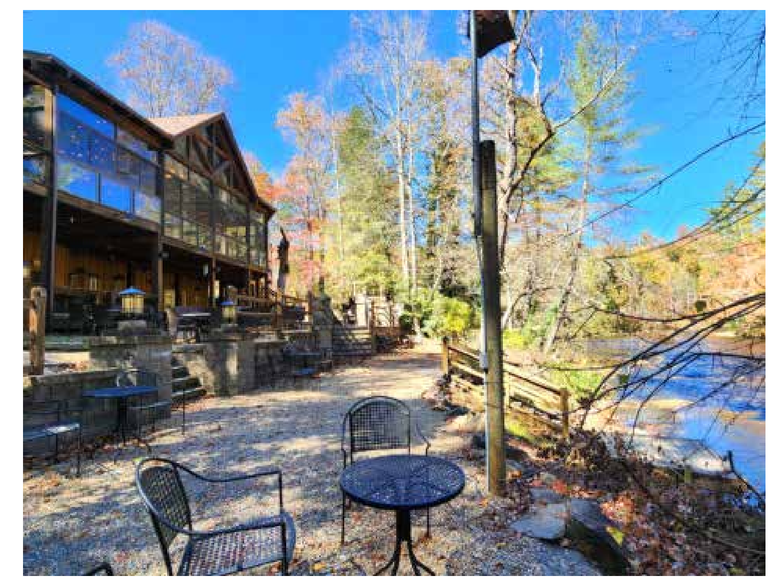
ZONE AMENITIES

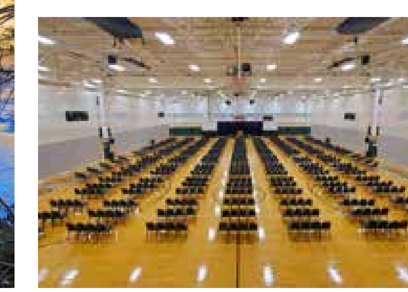
- Retreat Center
- Retreat Cabins/Yurts
- Adventure Course
- Destination Recreation
- Lake / Amenities
- Bike Park

SOUTH ACTIVITY - ECO RETREAT



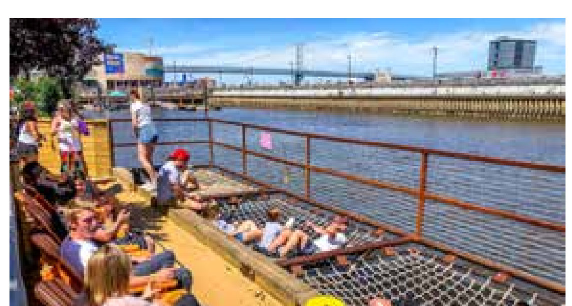
POWER PLANT - ADVENTURE HUB





ZONE AMENITIES

- Power Plant Reuse
- Conference Center
- Hospitality
- Restaurants
- Integrated Bypass Channel
- Kayak Basin
- Community Green
- Water Adventure



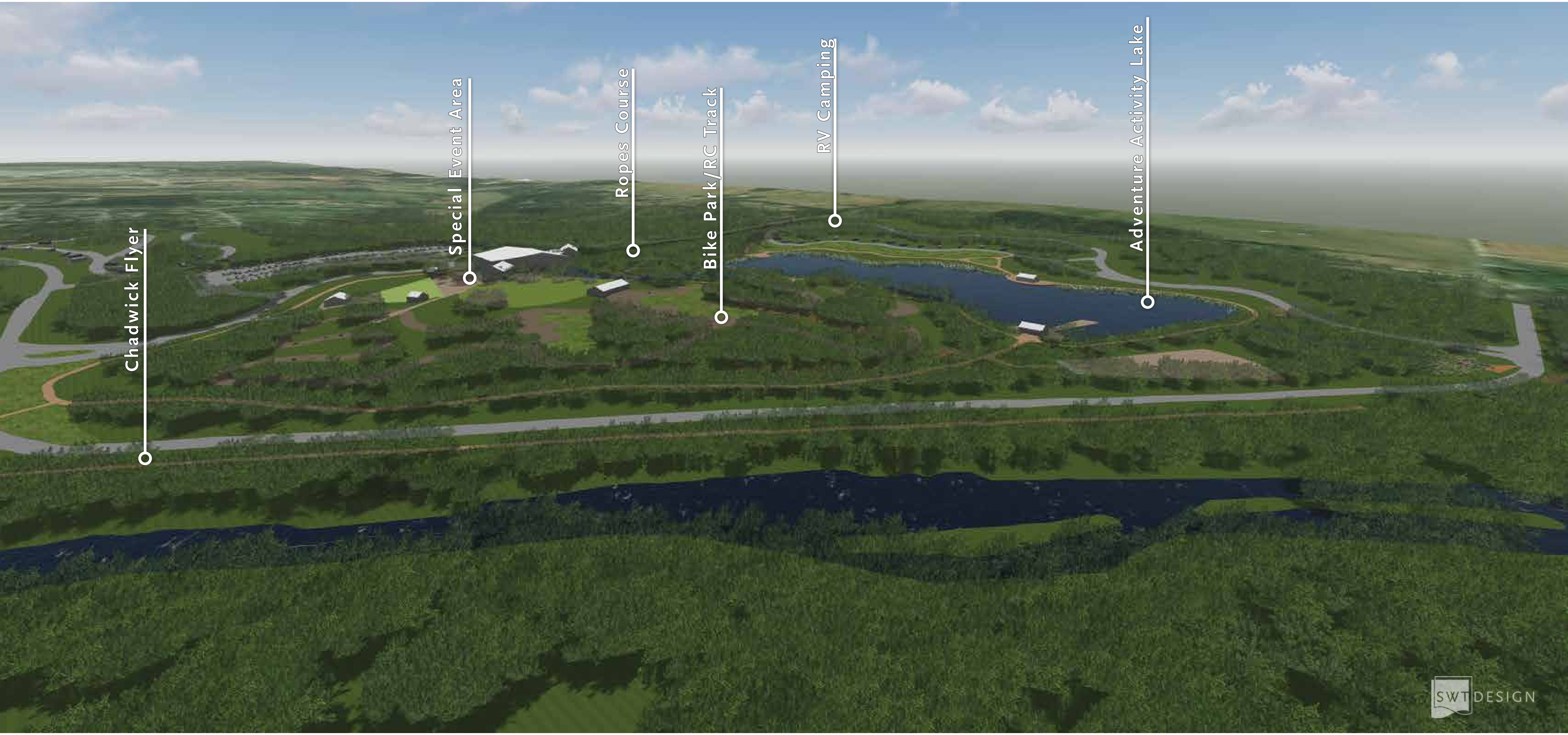
POWER PLANT - ADVENTURE HUB

SOUTH ACTIVITY - DESTINATION ADVENTURE PARK

ZONE AMENITIES

- Canopy Ropes / Zipline
- Lake / Water Adventure
- Bike Park / Archery
- Trails
- RV Camping
- Amphitheater
- Retail / Food & Beverage

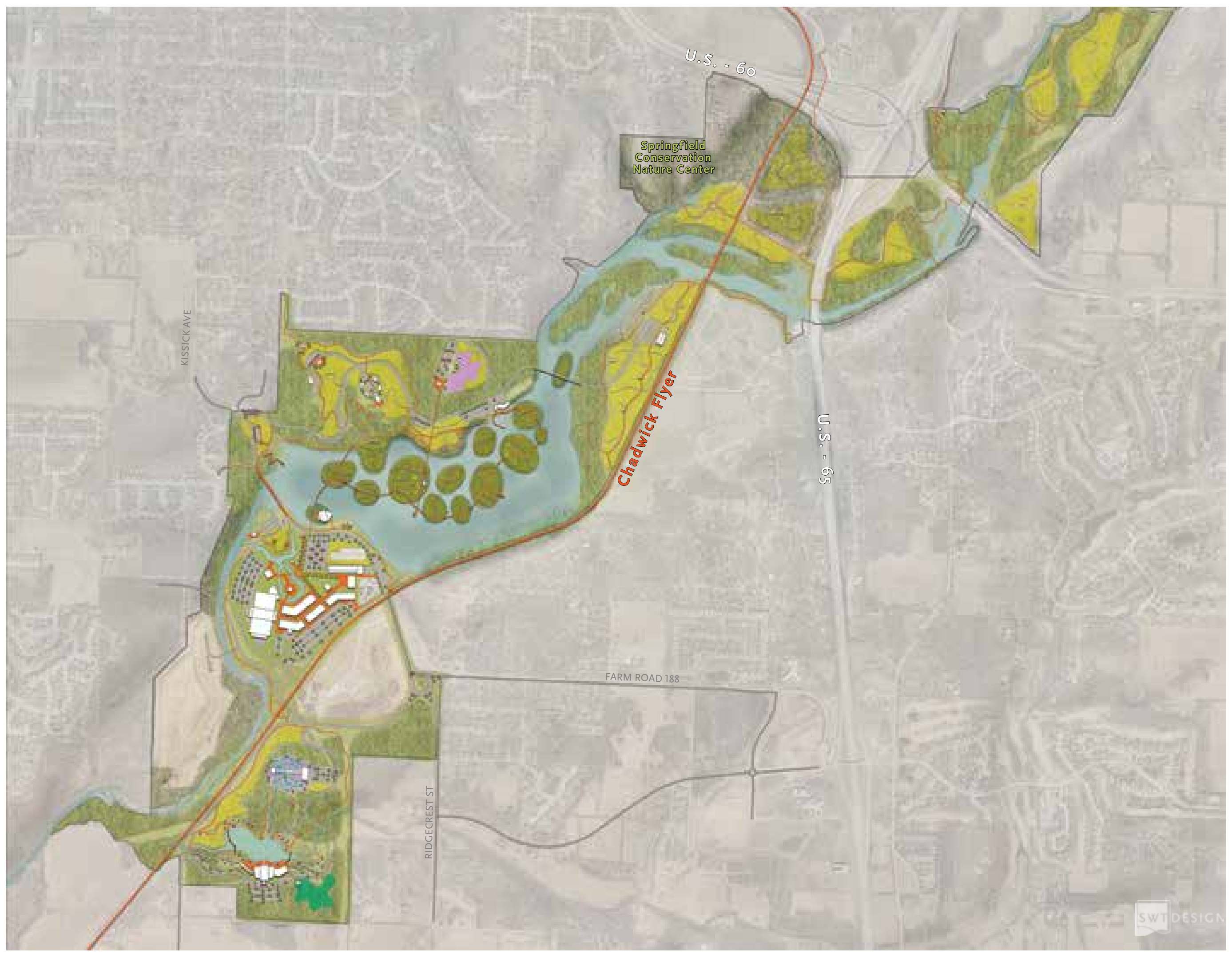
SOUTH ACTIVITY - DESTINATION ADVENTURE PARK



CONCEPTS

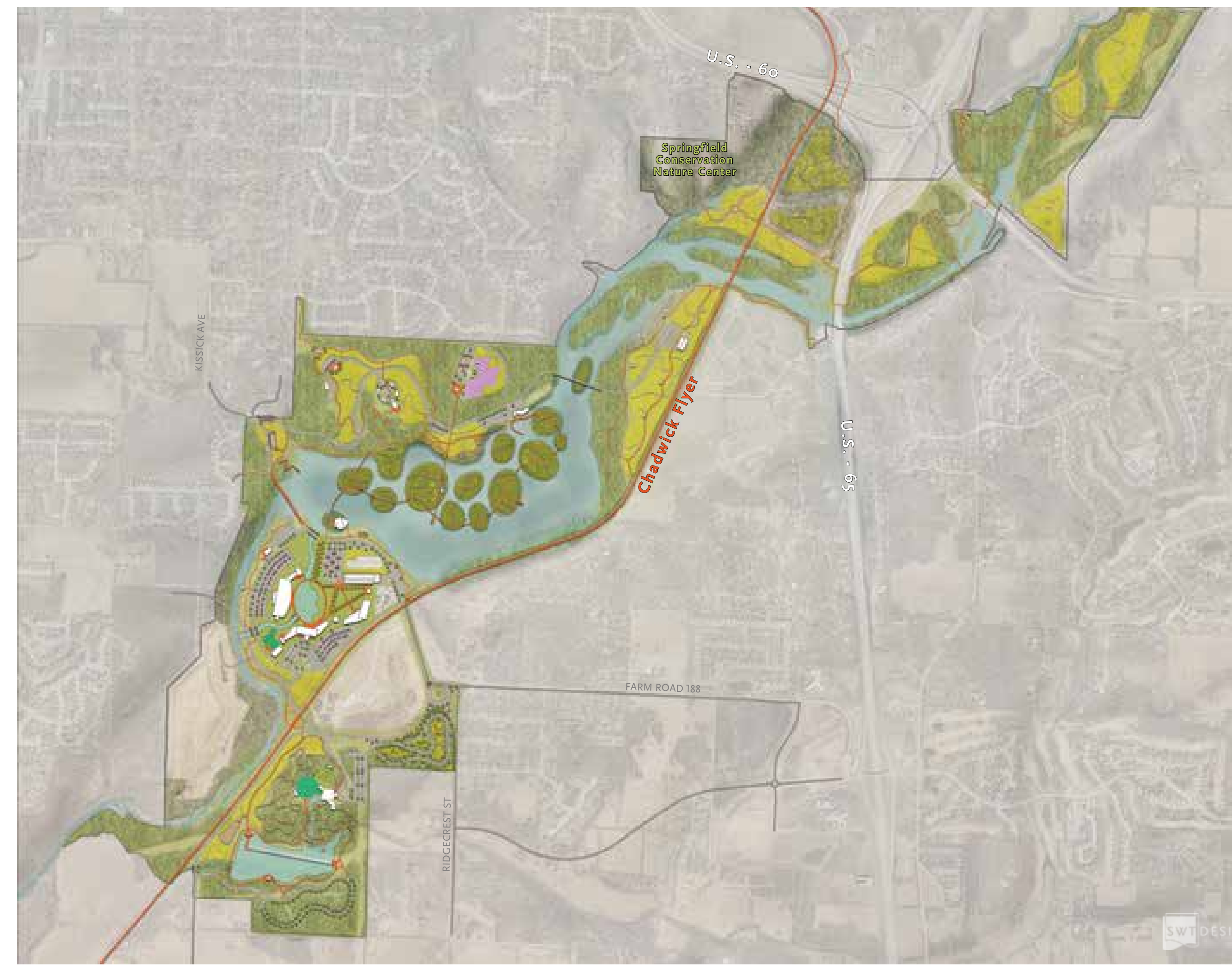
01

LAKE SPRINGFIELD - ENTERTAINMENT DISTRICT



02

LAKE SPRINGFIELD - ADVENTURE HUB



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PARK + LAKE - GOAL ALIGNMENT SAMPLE

Hilltop Overlook

N3 N4 N5 S1 S4 S5

Economic Impact	●○○○○
Social Impact	●●●○○

Destination Play

E4 E5 N3 N4 N5 S1 S4 S5

Economic Impact	●○○○○
Social Impact	●●●●○

Park Entry

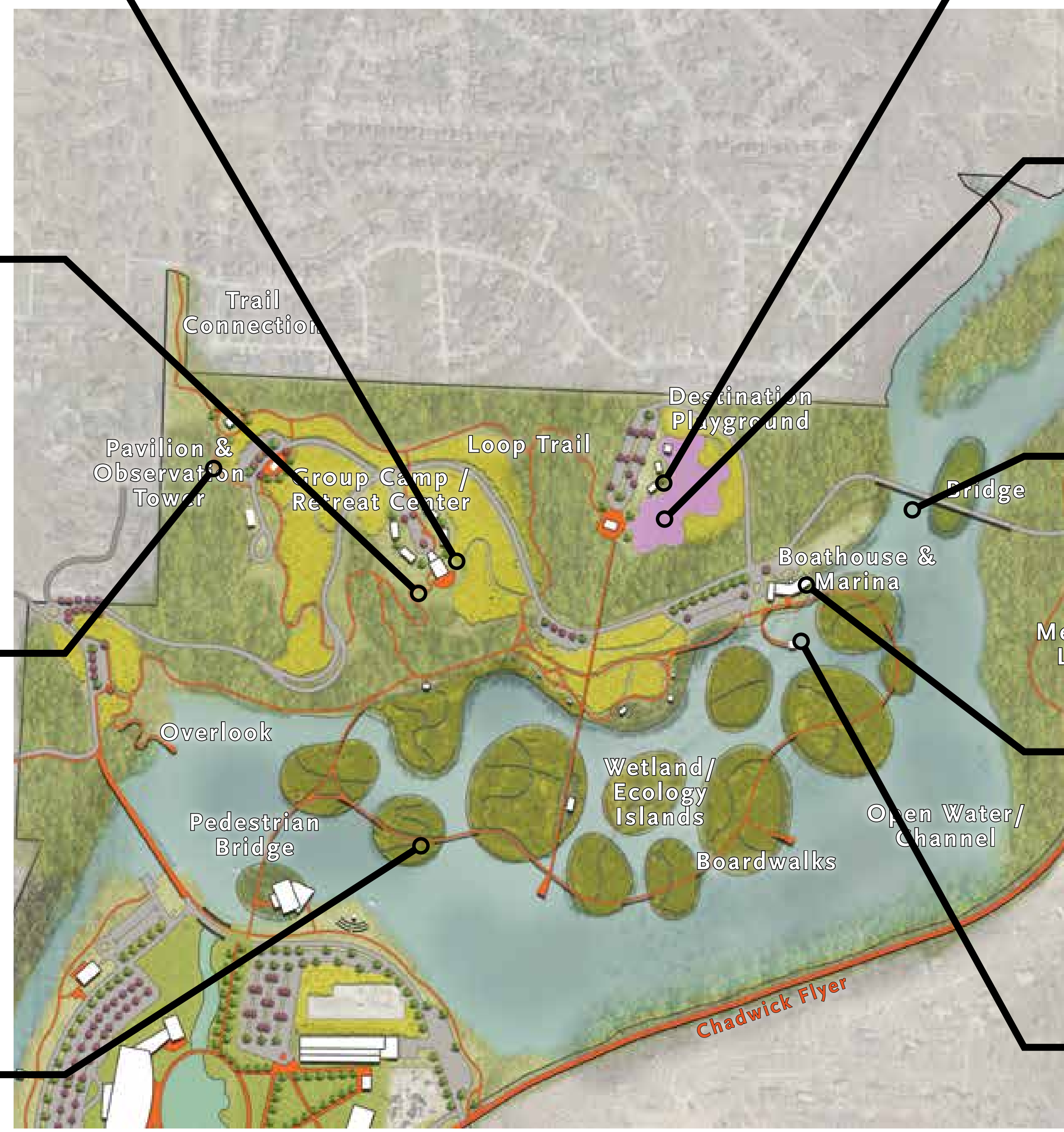
N1 N3 N4 S1 S2 S4

Economic Impact	●○○○○
Social Impact	●●●○○

Wetland Boardwalk

N1 N3 N4 S1 S2 S4

Economic Impact	●○○○○
Social Impact	●●●○○



Eco Retreat Bldgs

E1 E2 E3 E4 S5

Economic Impact	●●●○○
Social Impact	●●○○○

Eco Retreat Support

E1 E2 E3 E4 S5

Economic Impact	●●●○○
Social Impact	●●○○○

Bridge

N1 N3 N4 S1 S2 S4

Economic Impact	●○○○○
Social Impact	●●●○○

Boathouse/Eco Center

E1 E2 N4 N5 S4 S5

Economic Impact	●●●○○
Social Impact	●●●○○

Marina

E1 E4 N1 N2 N3 N4 S1 S2 S3 S4 S5

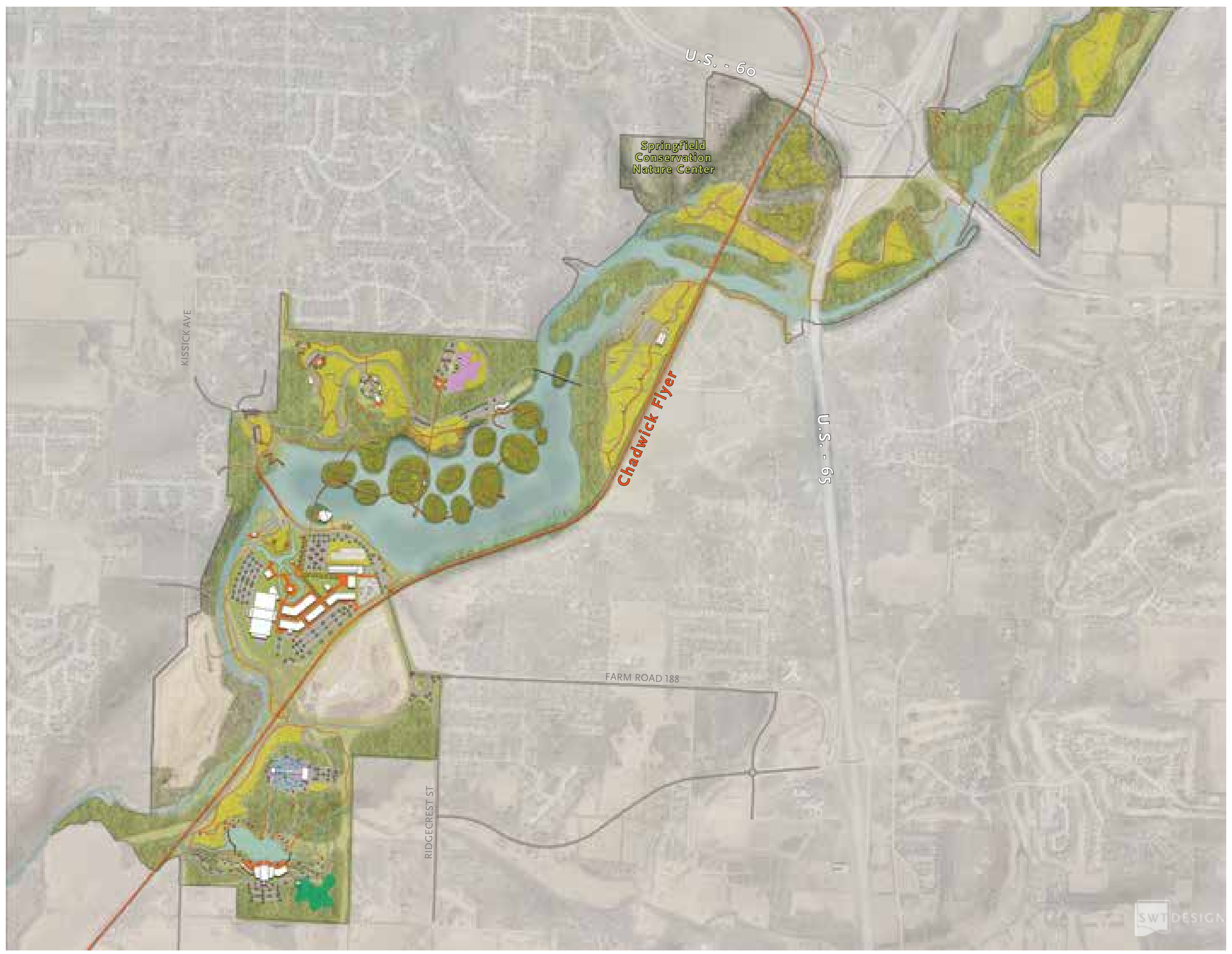
Economic Impact	●●●○○
Social Impact	●●●●○

Goal	Code
Innovative Economic Opportunities	E1
New Funding Allocations	E2
New Business Development	E3
Attract Private Investment	E4
Resilient Job Creation	E5
New/Green Infrastructure	N1
Sustainable Water Quality	N2
Appealing Outdoor Amenities	N3
Identity - Gateway to the Ozarks	N4
Unique Adaptive Reuse	N5
Innovative Recreation Opportunities	S1
Access / Equitable Transportation	S2
Water Access for Recreation	S3
Elevate the Quality of Live	S4
Regional Draw	S5

ECONOMIC - CONCEPT 1 IMPACTS

01

LAKE SPRINGFIELD - ENTERTAINMENT DISTRICT



Lake Springfield, Missouri Estimated Direct Visitor Spending and Employment Concept 01	Assumptions	Year 1	Year 5	Year 10
Visitation				
Entertainment District (Power Plant)		287,500	311,199	343,589
Conference Center Lodge		40,000	43,297	47,804
South Adventure Area		165,000	178,601	197,190
North Activity Area		210,000	227,311	250,969
Park		178,000	192,673	212,726
Lake		30,000	32,473	35,853
Total		**910,500**	**985,554**	**1,088,132**
Possible Visitation Overlap	*20%*	(182,100)	(197,111)	(217,626)
Net Total		**728,400**	**788,444**	**870,505**
Room Nights				
Entertainment District (Power Plant)	*7%*	20,125	21,784	24,051
Conference Center Lodge	*40%*	16,000	17,319	19,121
South Adventure Area	*5%*	8,250	8,930	9,860
North Activity Area	*2%*	4,200	4,546	5,019
Park	*2%*	3,560	3,853	4,255
Lake	*1%*	300	325	359
Total		**52,435**	**56,757**	**62,665**
Direct Visitor Spending ($ Million)				
On Lodging	*$151.66*	$8.0	$9.7	$12.4
On Food and Beverage	*50.91*	46.3	56.5	72.3
On Car Rental	*49.01*	2.6	3.1	4.0
On Retail	*15.00*	13.7	16.6	21.3
Total	***$266.58***	**$70.5**	**$85.9**	**$110.0**
Economic Impact ($ Million)				
Direct Spending		$70.5	$85.9	$110.0
Indirect and Induced Spending	*0.796*	56.1	68.4	87.5
Total Spending		**$126.6**	**$154.3**	**$197.5**
Increased Earnings	*0.586*	$41.3	$50.3	$64.4
Employment (Estimated Supported # of Jobs)	***12.946***	**913**	**988**	**1,091**
Fiscal Impact ($ Million)				
Sales Tax	*8.10%*	$5.7	$7.0	$8.9
Hotel/Motel Tax	*5.00%*	0.4	0.5	0.6
Total		**$6.1**	**$7.4**	**$9.5**
Inflation Rate	*3.00%*			

Source: Johnson Consulting

ECONOMIC - CONCEPT 2 IMPACTS

02

LAKE SPRINGFIELD - ADVENTURE HUB

Lake Springfield, Missouri Estimated Direct Visitor Spending and Employment Concept 02				
	Assumptions	Year 1	Year 5	Year 10
Visitation				
Recreation (Power Plant)		230,000	248,959	274,871
Conference Center		40,000	43,297	47,804
Amphitheater/Bike Park (South Activity Area)		151,000	163,447	180,459
North Activity Area		210,000	227,311	250,969
Park		178,000	192,673	212,726
Lake		30,000	32,473	35,853
Total		**839,000**	**908,161**	**1,002,683**
Possible Visitation Overlap	*20%*	(167,800)	(181,632)	(200,537)
Net Total		**671,200**	**726,528**	**802,146**
Room Nights				
Recreation (Power Plant)	*3%*	6,900	7,469	8,246
Conference Center	*30%*	12,000	12,989	14,341
Amphitheater/Bike Park (South Activity Area)	*4%*	6,040	6,538	7,218
North Activity Area	*1%*	2,100	2,273	2,510
Park	*1%*	1,780	1,927	2,127
Lake	*1%*	300	325	359
Total		**29,120**	**31,520**	**34,801**
Direct Visitor Spending ($ Million)				
On Lodging	*$151.66*	$4.4	$5.4	$6.9
On Food and Beverage	*50.91*	42.7	52.0	66.6
On Car Rental	*49.01*	1.4	1.7	2.2
On Retail	*15.00*	12.6	15.3	19.6
Total	***$251.58***	**$61.1**	**$74.5**	**$95.3**
Economic Impact ($ Million)				
Direct Spending		$61.1	$74.5	$95.3
Indirect and Induced Spending	*0.796*	48.6	59.3	75.8
Total Spending		**$109.8**	**$133.7**	**$171.2**
Increased Earnings	*0.586*	$35.8	$43.6	$55.9
Employment (Estimated Supported # of Jobs)	***12.946***	**791**	**857**	**946**
Fiscal Impact ($ Million)				
Applicable Tax Rates	*8.10%*	$5.0	$6.0	$7.7
City	*5.00%*	0.2	0.3	0.3
Total		**$5.2**	**$6.3**	**$8.1**
Inflation Rate	*3.00%*			

Source: Johnson Consulting

ECONOMIC - DEVELOPMENT COSTS

Lake Springfield, Missouri Estimated Construction Cost Concept 01	Actual Area (SF, rounded)	Area (acres)	Estimated Cost ($000)
North Area			$15,480,000
Subtotal	**13,593,000**	**312.05**	**$15,480,000**
MP Contingency (40%)			$6,192,000
Site Infrastructure (20%)			3,096,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			8,668,800
Master Plan Order-of-Magnitude			**$33,436,800**
Park & Lake			$114,504,600
Subtotal	**4,237,800**	**97**	**$114,504,600**
MP Contingency (40%)			$45,801,840
Site Infrastructure (20%)			22,900,920
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			64,122,576
Master Plan Order-of-Magnitude			**$247,329,936**
Entertainment District (Power Plant)			
Power Plant	80,000	1.84	$51,500,000
Restaurant/Overlook	20,000	0.46	13,000,000
Entertainment Bldg A-B	37,000	0.85	24,050,000
Mixed Use Bldg A-D	226,000	5.19	113,000,000
Riverfront Hospitality Bldg	5,000	0.11	3,250,000
Multi-Purpose Event Center	270,000	6.20	81,000,000
Event Lawn	130,000	2.98	3,250,000
Bypass Channel	110,000	2.53	9,550,000
Water Adventure	159,000	3.65	31,625,000
Riverfront Destination Amenity Area	140,000	3.21	4,900,000
Site Improvements & Modifications			33,030,000
Subtotal	**1,177,000**	**27.02**	**$368,155,000**
MP Contingency (40%)			$147,262,000
Site Infrastructure (20%)			73,631,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			206,166,800
Master Plan Order-of-Magnitude			**$795,214,800**
Conference / Supporting Adventure (South Activity Area)			
Conference Center Lodge	102,000	2.34	$40,000,000
Retreat Cabins/Yurts	40,600	0.93	10,500,000
Ropes / Adventure Course / Destination Play	230,000	5.28	10,000,000
Bike Park	700,000	16.07	2,000,000
Green Space Trails	1,840,000	42.24	1,080,000
Lake	390,000	8.95	1,000,000
Green Space Buffer	930,000	21.35	1,000,000
Site Improvements & Modifications			9,100,000
Subtotal	**4,232,600**	**97.17**	**$74,680,000**
MP Contingency (40%)			$29,872,000
Site Infrastructure (20%)			14,936,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			41,820,800
Master Plan Order-of-Magnitude			**$161,308,800**
Total Concept 01	**23,240,400**	**534**	**$1,237,290,336**

Source: SWT, Johnson Consulting

Lake Springfield, Missouri Estimated Construction Cost Concept 02	Actual Area (SF, rounded)	Area (acres)	Estimated Cost ($000)
North Area			$15,080,000
Subtotal	**13,593,000**	**312.05**	**$15,080,000**
MP Contingency (40%)			$6,032,000
Site Infrastructure (20%)			3,016,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			8,444,800
Master Plan Order-of-Magnitude			**$24,128,000**
Park & Lake			$114,079,600
Subtotal	**4,237,800**	**97**	**$114,079,600**
MP Contingency (40%)			$45,631,840
Site Infrastructure (20%)			22,815,920
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			63,884,576
Master Plan Order-of-Magnitude			**$246,411,936**
Recreation (Power Plant)			
Power Plant	80,000	1.84	$51,500,000
Mixed Use Bldg A-B	162,000	3.72	81,000,000
Entertainment Bldg	7,200	0.17	4,680,000
Conference Center	155,000	3.56	54,250,000
Overlook Restaurant	20,000	0.46	13,000,000
Riverfront Hospitality	5,000	0.11	3,250,000
Recreation / Entertainment Destination	180,000	4.13	63,000,000
Event Lawn	280,000	6.43	7,000,000
Lake / Water Feature / Bypass Channel	330,000	7.58	17,550,000
Riverfront Green / Parks Space	460,000	10.56	1,380,000
Site Improvements & Modifications			30,421,500
Subtotal	**1,679,200**	**38.55**	**$327,031,500**
MP Contingency (40%)			$130,812,600
Site Infrastructure (20%)			65,406,300
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			183,137,640
Master Plan Order-of-Magnitude			**$706,388,040**
Amphitheater/Bike Park (South Activity Area)			
Amphitheater	70,000	1.61	$2,500,000
Multi-Use Lawn	95,000	2.18	850,000
Amenities Plaza	29,000	0.67	360,000
Amenities Plaza Bldgs	40,000	0.92	5,000,000
RV Camping Area A-B	1,830,000	42.01	2,137,500
Bike Park	905,000	20.78	2,500,000
Bike Park Support Bldg	4,500	0.10	562,500
Adventure Park / Ropes Course	387,000	8.88	5,000,000
Archery Range	95,000	2.18	500,000
Lake	1,340,000	30.76	5,100,000
Green Space Buffer / Trails	1,040,000	23.88	2,160,000
Site Improvements & Modifications			7,600,000
Subtotal	**5,835,500**	**133.96**	**$34,270,000**
MP Contingency (40%)			$13,708,000
Site Infrastructure (20%)			6,854,000
Professional and Contractor Services (35% of Subtotal + Infrastructure and Contingency)			19,191,200
Master Plan Order-of-Magnitude			**$74,023,200**
Total Concept 02	**25,345,500**	**582**	**$1,050,951,176**

Source: SWT, Johnson Consulting

ECONOMIC - IMPACTS - KEY TAKEAWAYS

Highest Overall Impact: Concept 1

Note: Phasing not yet integrated into economic projections

YEAR 10 ESTIMATIONS

Jobs

Concept 01 1,091
Concept 02 946

Direct Visitor Spending ($ Million)

Concept 01 $197.5
Concept 02 $171.2

Room Nights

Concept 01 62,665
Concept 02 34,801

Taxes Generated ($ Million)

Concept 01 $9.5
Concept 02 $8.1

Lake Springfield, Missouri
Estimated Direct Visitor Spending and Employment
Concept 01

	Assumptions	Year 1	Year 5	Year 10
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Entertainment District (Power Plant)		287,500	311,199	343,589
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Total		**$6.1**	**$7.4**	**$9.5**
Inflation Rate	*3.00%*			

Source: Johnson Consulting

Lake Springfield, Missouri
Estimated Direct Visitor Spending and Employment
Concept 02

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Total Spending		**$109.8**	**$133.7**	**$171.2**
Increased Earnings	*0.586*	$35.8	$43.6	$55.9
Employment (Estimated Supported # of Jobs)	***12.946***	**791**	**857**	**946**
Fiscal Impact ($ Million)				
Applicable Tax Rates	*8.10%*	$5.0	$6.0	$7.7
City	*5.00%*	0.2	0.3	0.3
Total		**$5.2**	**$6.3**	**$8.1**
Inflation Rate	*3.00%*			

Source: Johnson Consulting

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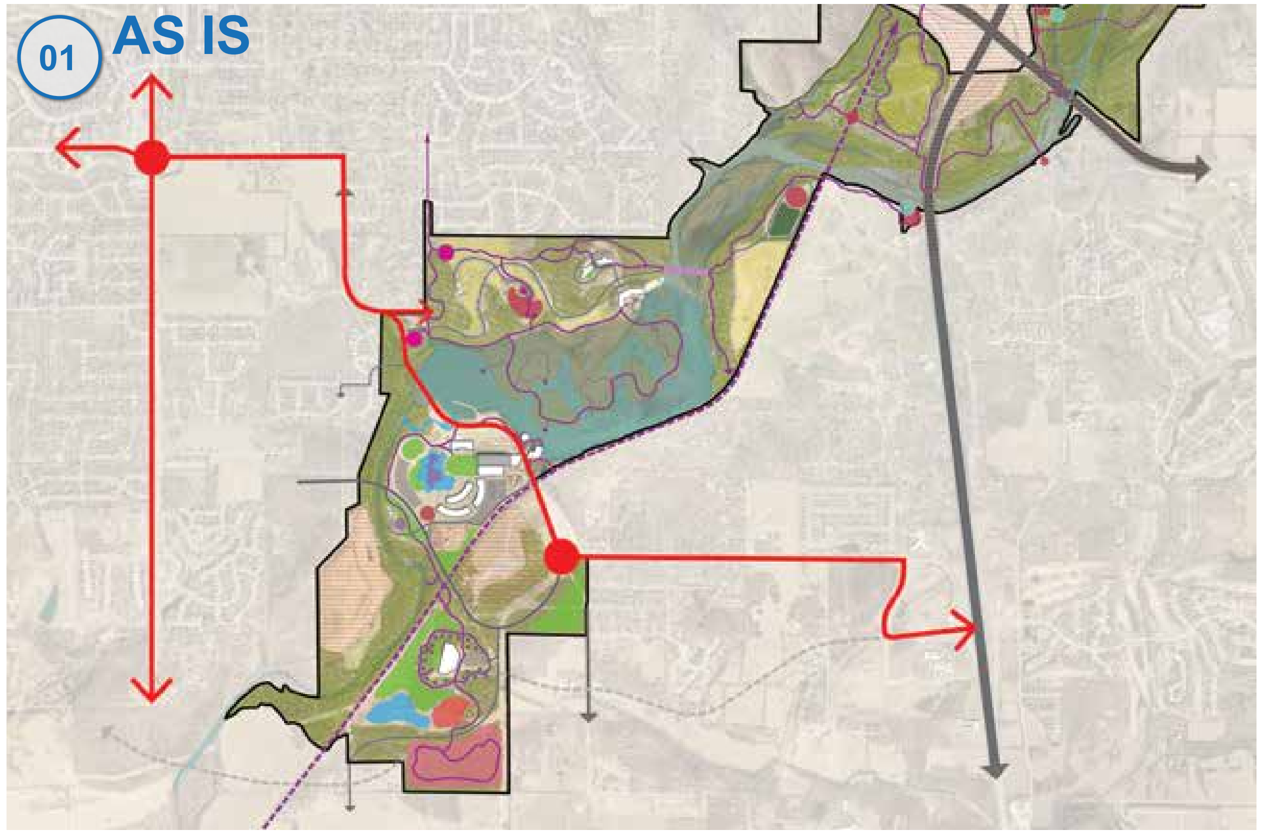
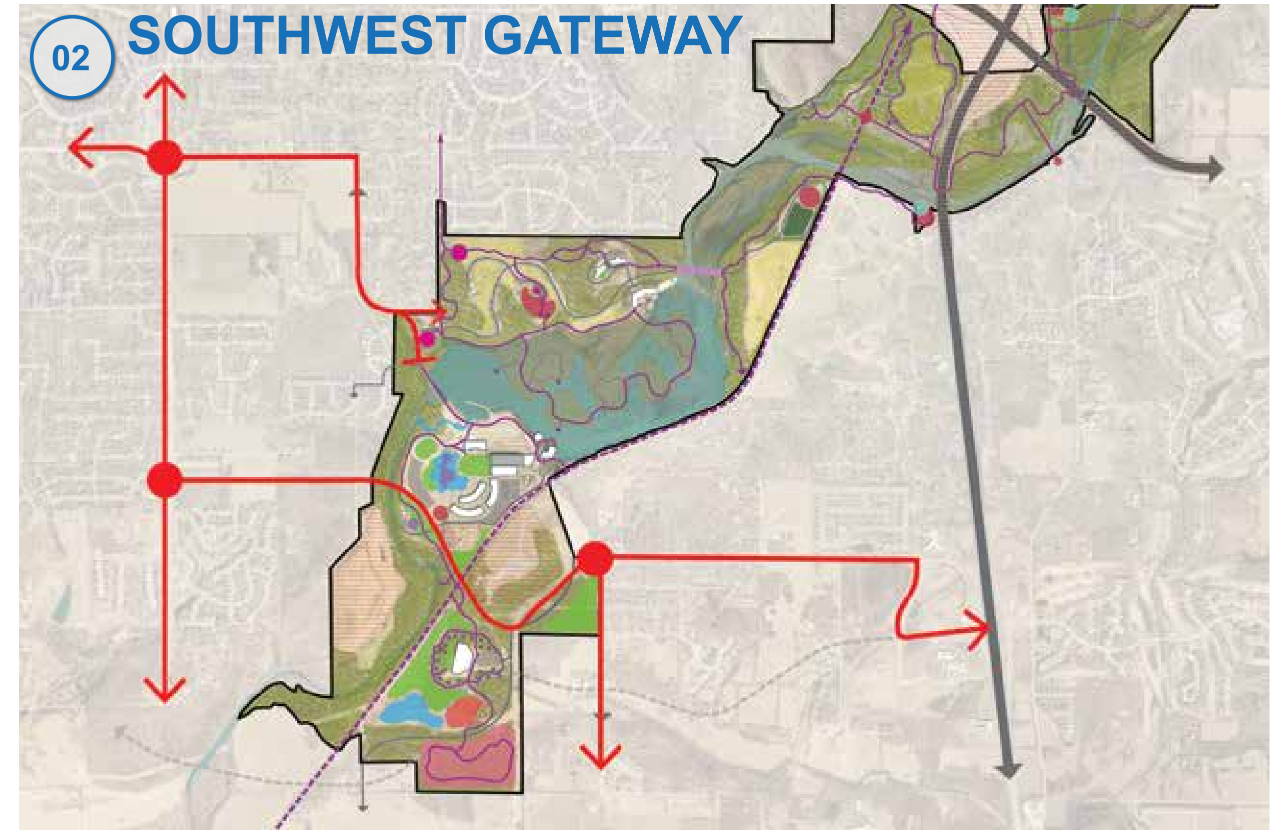
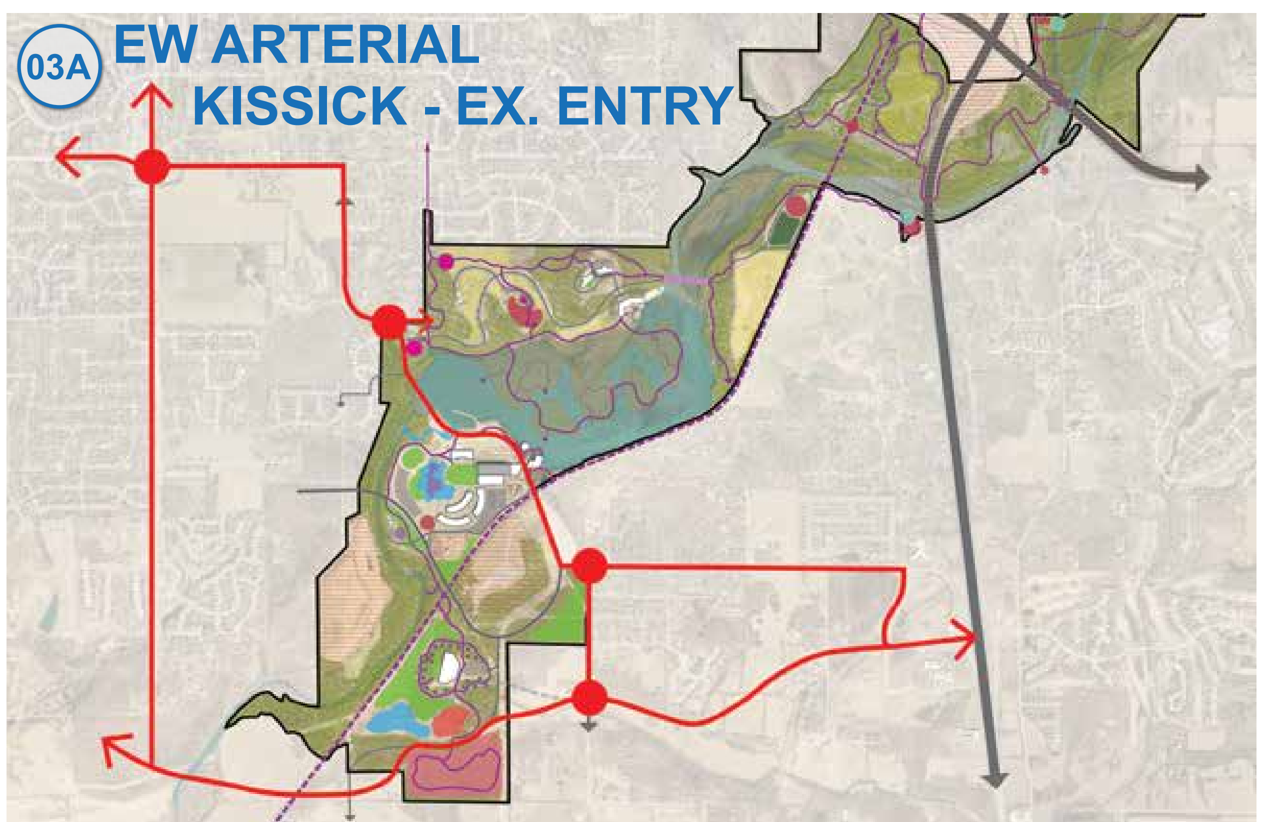
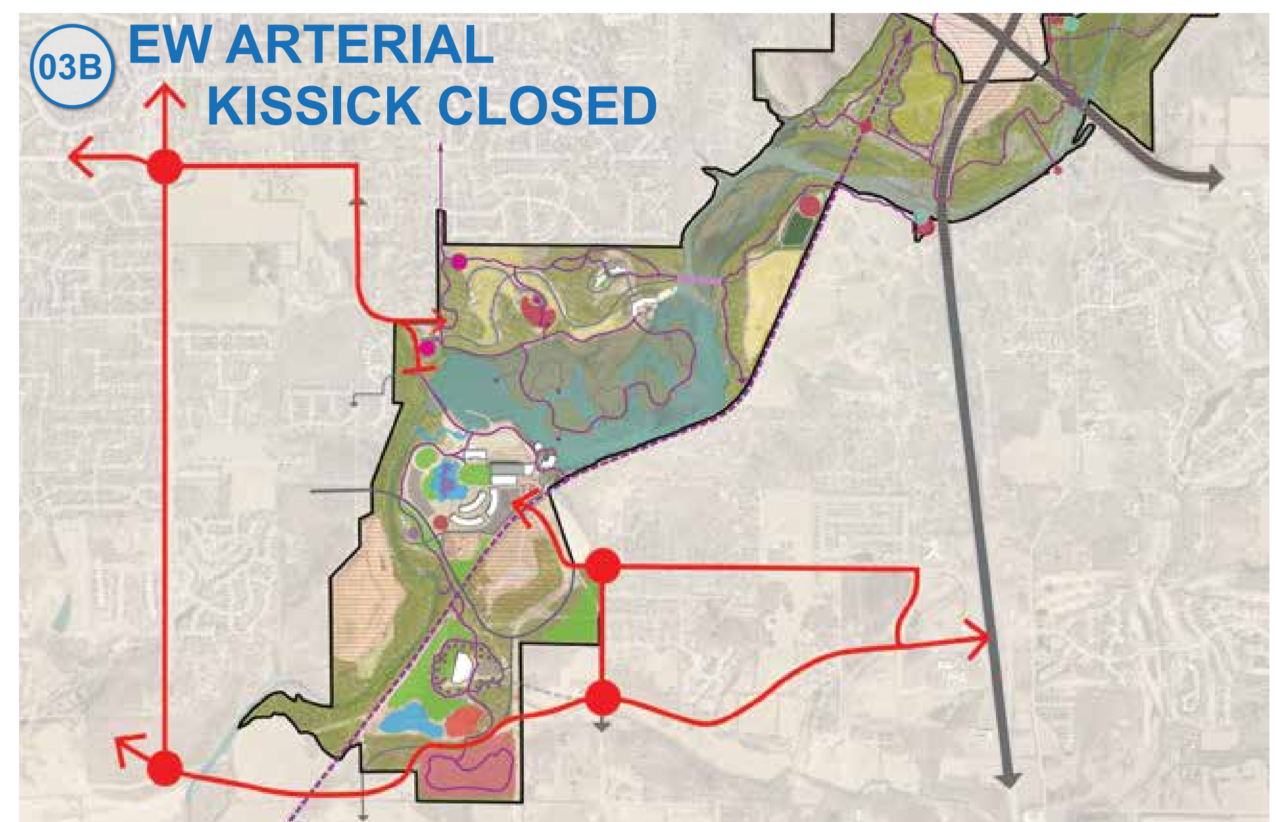
ACCESS OPTIONS









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Technical

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CITY OF Springfield

HYDROLOGY STUDY

In support of the Lake Springfield Plan
Springfield, Missouri

Prepared for

Client: City of Springfield, Department of Economic Vitality
840 Boonville, P.O. Box 8368
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&

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ACRONYMS AND ABBREVIATIONS

AQL	aquatic life
CFU	colony-forming units
cfs	cubic feet per second
CSR	Code of State Regulations
the Dam	Lake Springfield Dam
DWS	drinking water supply
FEMA	Federal Emergency Management Agency
FS	factor of safety
Geosyntec	Geosyntec Consultants, Inc.
IND	industrial water supply
IRR	irrigation
LMVP	Lakes of Missouri Volunteer Program
LWP	livestock and wildlife protection
MDC	Missouri Department of Conservation
MoDNR	Missouri Department of Natural Resources
ml	milliliter(s)
PCB	polychlorinated biphenyl
PMP	probable maximum precipitation
SCR	secondary contact recreation
SLAP	Statewide Lake Assessment Program
SPF	standard project flood
TMDL	total maximum daily load
µg/L	microgram(s) per liter
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
WBC	whole body contact
WBID #	waterbody identification number
WWH	warm water habitat

1. EXECUTIVE SUMMARY

The Lake Springfield Dam (the Dam) was originally constructed in the 1950s to supply cooling water to the James River Power Plant. Damming the Upper James River formed Lake Springfield, an underutilized recreation asset for the City of Springfield, Missouri, and the surrounding communities (**Figure 1**). Because of the power plant being decommissioned in 2021, the Dam purpose and function is now being reconsidered.

The City of Springfield is developing the Lake Springfield Plan to enhance the area into a recreational focal point of the region, improve water quality, and spur economic development around the lake. Currently, the lake is impaired for aquatic life (AQL) use due to elevated levels of chlorophyll-a, which is simply a measure of algae that could reduce dissolved oxygen levels vital for aquatic life. Due to a higher level of bacteria (*E. Coli*) upstream of the lake in the James River, it is impaired for whole body contact recreation category A (WBC-A), which means recreation activity such as swimming is not recommended.

Predominantly comprising of agricultural areas, the Upper James River drains an area of 270 square miles into Lake Springfield. Vast patches of nuisance aquatic vegetation within the lake are noticeable, which may have formed over the years due to continued accumulation of sediment transported by the James River. The lake exhibits a "transitional zone" in its upper portion where the riverine characteristics of the James River transition to lacustrine (lake-like) characteristics, as evidenced by shallow, sediment-rich areas supporting emergent and submerged aquatic vegetation. There are several permitted wastewater point source discharges within the watershed authorized by the Missouri Department of Natural Resources (MoDNR). Additionally, there are permitted direct stormwater discharges to the lake, and historically the James River Power Plant discharged domestic/industrial water to Lake Springfield (before being decommissioned in 2021).

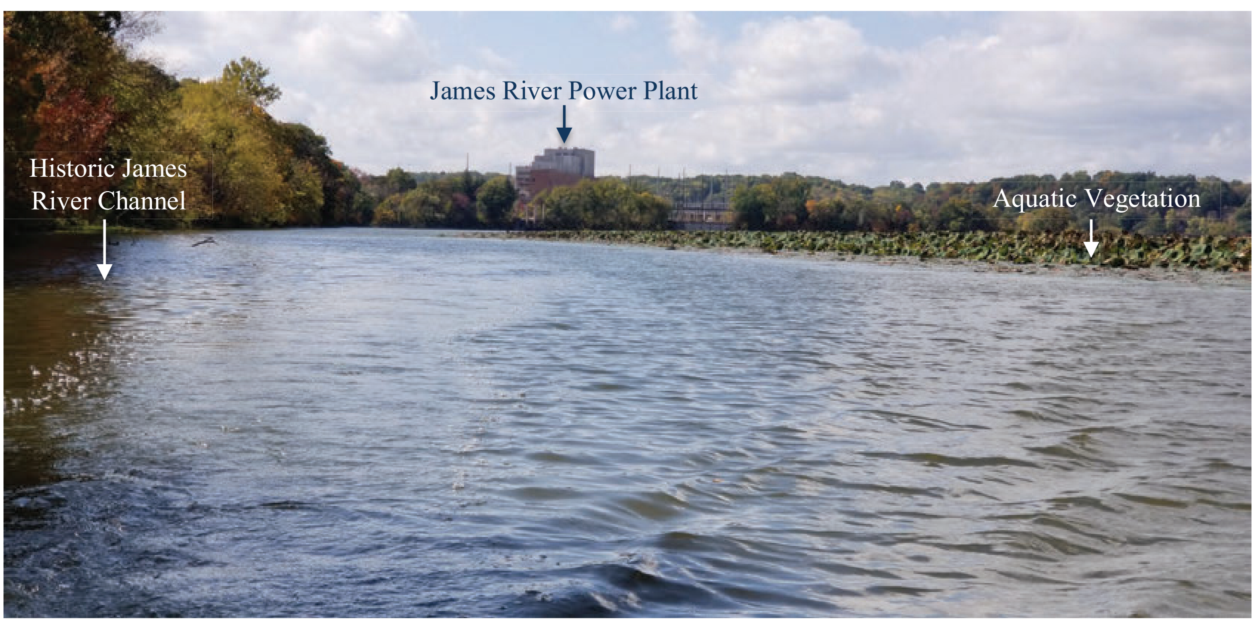

Figure 1: Lake Springfield, Missouri (Looking West)

This study includes three primary elements: water quality and sediment assessment, characterization of the watershed, and an assessment of the Dam and potential modification alternatives.

1.1. Water Quality and Sediment Assessment

Geosyntec collected field data in November and December 2022, which included a bathymetric survey and a sediment profiling of the lake, 41 sediment grab samples, and 11 water quality grab samples. This brief window during which water quality samples were collected provided useful but limited information regarding long-term water quality conditions for Lake Springfield. The water quality standards in Missouri are set by MoDNR, in accordance with the federal Clean Water Act. These standards establish specific goals for a specific water body and describe desired conditions and how those conditions will be protected or reached. Specifically, the standards contain core components such as designated use(s) of a water body, criteria necessary to protect the designated use(s), and antidegradation requirements.

Designated uses are an expression of goals for a body of water, such as supporting AQL, allowing for human recreation, or functioning as a public water supply; in addition, designated uses help to establish water quality management. In other words, a "use" is an elucidation of a body of water's role in both human and aquatic environments. All waters are designated for protection of AQL and further classified based on the type of aquatic habitat they provide. The following designated uses apply to Lake Springfield:

1. Lake Springfield's designated AQL use is as a warm water habitat (WWH)—that is, waters in which naturally occurring water quality and habitats allow the maintenance of a wide variety of warm water biota.

2. Human health criteria (HHP) is set in place to limit the use of fish consumption on a long-term basis and protect recreators from harmful water quality conditions.

3. Recreational uses are assigned to the lake as part of the HHP criteria. There are three categories of recreational uses applicable from April 1 through October 31 each year. Lake Springfield is designated for two of the three recreational categories:

    a. Whole body contact recreation category B (WBC-B), which applies to waters designated for whole body contact recreation not contained within category A.

    b. Secondary contact recreation (SCR), which involves activities that do not typically result in complete submergence of the body.

4. Other designated uses include irrigation (IRR), industrial water supply (IND), and livestock and wildlife protection (LWP).

Note: Lake Springfield is currently not designated for whole body contact recreation category A (WBC-A), which applies to waters that have been established as public swimming areas.

Figure 2: Potential Pollutants of Concern for Future Development

Based on the impaired designated uses in the upstream James River and Lake Springfield, nutrients, bacteria (*E. coli*), and polychlorinated biphenyls (PCBs) are the known pollutants of concern for future planning purposes (**Figure 2**).

Nutrients: Total phosphorus and total nitrogen concentrations are typically higher upstream of the lake compared to near the Dam, while chlorophyll-a concentrations are higher in the lake compared to upstream. This is likely a pattern related to the transition from riverine ecosystem of the James River (flow water with shaded riparian) compared to the open water lacustrine (lake-like) ecosystem of Lake Springfield.

***E. coli*:** From previous studies, *E. coli* data in the James River upstream of Lake Springfield indicates nonattainment of WBC-A water quality criteria, but immediately downstream of Lake Springfield, WBC-A water quality criteria is attained. In other words, higher concentration of bacteria is present in the upstream James River than immediately downstream of the lake. However, there is not enough *E. coli* data available to make a conclusive assessment on this water quality criteria for the lake itself. (Springfield-Greene County 2017)

Polychlorinated Biphenyls: The impact to aquatic life and recreators can be assessed by investigating more recent sediment deposition (top 0 to 6.0 inches) compared to legacy sediments (below 6 inches). Sediment sampling conducted by Geosyntec in 2022 indicates PCBs are not accumulating in detectable concentrations in more recent sediment deposits. However, due to elevated PCB levels found in fish tissue, the Department of Health and Senior Services (DHSS) has issued a fish tissue consumption advisory for Lake Springfield. (MDC 2011)

Any future sediment dredging activity must consider investigating beyond the top 6.0-inch horizon for sediment characterization, and for sediment handling and disposal.

Lake Depth: Results from the bathymetric survey and sediment profiling of the lake reveal that the lake is relatively shallow outside of the historic James River channel, which hugs the southern shoreline of the lake, with varying sediment thicknesses. Since the construction of the Dam, the lake's depth has largely decreased, ranging from 1.0 to 4.0 feet outside of the historic James River channel, and 7.0 to 8.0 feet within the historic James River channel.

1.2. Watershed Assessment Summary

Streamflow across the United States has generally increased as published by the United States Environmental Protection Agency (USEPA 2022) For Lake Springfield, analysis performed on 68 years of stream flow data demonstrates that the frequent and infrequent flows have increased over the years along with the rise in extreme events—rate and frequency of flows. Change in land cover data in the last 20 years demonstrates a decrease in forest areas and an increase in pastureland and development. If this trend continues, it is more likely that the stream flows will experience extreme events. The City of Springfield, as part of their integrated water quality management plan, is undertaking implementation of a riparian corridor within 100 feet of the creek section in approximately 156 acres of city-owned land (City of Springfield, Missouri 2020). The James River Watershed Management Plan outlines a 5-to-20-year goal to improve water quality in the James

River. Community benefits could be realized through continued collaboration and implementation of these outlined goals. (SMCOG 2012)

1.2.1. Sediment Management Summary

From visual observations, bathymetric and sediment profiling, and watershed-based predictive modeling, it is clear that sediment deposits are present in the lake, and the lake continues to receive more sediment load from the upstream watershed. In-lake sediment volume of approximately 476 thousand cubic yards equates to about 35% of the estimated lake volume. The rate of incoming annual sediment load could significantly change in the future based on watershed land use changes. Not only is the amount of sediment load an important factor to consider when planning for future site improvements, but also the characteristic pattern of accumulation within the lake and the quality of sediment are critical factors when planning for strategic management of present and future sediment.

1.3. Dam Assessment and Regulatory Compliance Review

MoDNR was identified as the sole regulatory authority for the Dam, and Geosyntec researched MoDNR's current (2019) state-level dam rules and regulations. The Dam was built in 1955 and owned by City Utilities. An initial registration permit for the Dam was completed in 1987 following the change in dam safety state regulations. This permit package was used as the main source of information to assess hydrologic and hydraulics, geotechnical, and structural engineering components of the dam. A graphical representation of historic congressional and state regulatory updates in relation to the dam is provided in **Figure 3.**

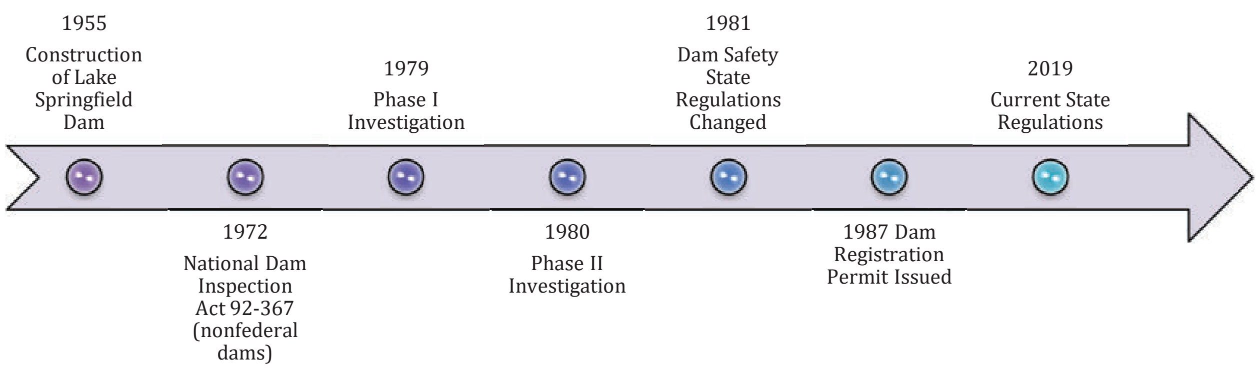

Figure 3: Historic Congressional and State Regulatory Updates on Dam Safety

The Dam does not conform with the current 2019 regulations. The following engineering analyses require updates to qualify the Dam as compliant with the standing MoDNR Dam and Reservoir Safety Program:

1. Geotechnical slope stability analysis of the earthen embankment for static loading conditions with steady seepage and the maximum reservoir
2. Geotechnical slope stability analysis of the earthen embankment for the drawdown case going from full (i.e., normal reservoir pool elevation) to empty reservoir conditions
3. Structural stability analysis of the concrete spillway using an updated seismic design acceleration of 0.15 g (gravity constant).

However, before performing any updates, a discussion with the MoDNR Dam and Reservoir Safety Program may reveal that the previously performed analyses fulfill the active program's requirements.

1.3.1. Dam Modification Alternatives Assessment

The Lake Springfield Plan presents an opportunity to modify the Dam to enhance recreational opportunities, spur economic growth while preserving the environment, and improve the quality of water and aquatic habitat. The following modification alternatives were assessed:

1. **Dam Removal:** Full or partial Dam removal with the intent of restoring the historic James River alignment.

2. **Concrete Dam Modification:** Lowering either the south or center concrete bay by 2 feet and creating a kayak and/or fish ladder at the downstream face of the Dam.

3. **Earth Dam Modification:** Grading a channel in the earthen Dam/embankment by creating a 50-foot-wide opening at an elevation 2-feet deeper than the primary spillway.

4. **No Modification:** No structural modification to the Dam's components, but an update to engineering analysis using current practices based on current state regulations.

Any significant structural modification that changes the original function of the dam will require associated engineering analyses and a construction permit from MoDNR. A sediment management plan for present and future sediment load would be critical, regardless of the selected alternative, as it would impact what recreational amenities or activities are planned. The implementation cost of each alternative should consider an itemized sequence of construction, permit application, associated engineering analysis, and sediment management.

2. INTRODUCTION

This report assesses the Lake Springfield watershed, its water quality, and its sediment, as well as an assessment of the Lake Springfield Dam. The report also provides an assessment of conceptual Dam modification alternatives for the concrete and earthen dam.

An outline of this document by section is provided as follows:

- Water quality assessment focusing on recreational-based usage of the waterbody, current state of Lake Springfield's bathymetry and sediment profiling, and future recreational season monitoring.
- Watershed assessment and analysis of stream gage data dating back to 1955 when the Dam was constructed.
- An overview of potential lake sediment management strategies and challenges, as well as future design considerations and detailed sampling.
- Dam compliance assessment per current standing regulations, including a review of inspections, engineering analysis, and compliance action and recommendations.
- An assessment of the concrete and earthen Dam modification alternatives, including design, cost, and risk considerations, with the objective of improving water quality and allowing for Kayaking and fish passage.
- Finally, an introductory summary of the Envision® Sustainability framework to assist with infrastructure planning and decision-making processes.

3. WATER QUALITY ASSESSMENT

This section presents an overview of the Lake Springfield's current recreational use, limitations in expanding the uses and its physical characteristics and changes.

3.1. Description of the Waterbody and Designated Uses

Lake Springfield is an approximately 293-acre reservoir situated in the southeastern portion of the City of Springfield, Missouri, located in Greene County. In the mid-1950's, the James River was impounded (dammed) to create a cooling water lake for the coal-fired power plant, which is owned and operated by City Utilities of Springfield, Missouri, thus creating Lake Springfield. The lake exhibits a "transitional zone" in its upper portion where the riverine characteristics of the James River transition to lacustrine (lake-like) characteristics, as evidenced by shallow, sediment-rich areas supporting emergent and submerged aquatic vegetation. Lake Springfield's immediate surrounding topography includes park land, limestone bluffs, forest, open land, and urbanized/developed areas to the north. Lake Springfield and its contributing watershed are in the ecological drainage unit Ozark/White of the Ozark Highlands ecoregion. The Dam is run-of-the-river style, in that the flow of water in the river downstream of the Dam is the same as the flow of water upstream of the dam.

Within the Lake Springfield watershed are several MoDNR-issued permitted discharges. There are no permitted direct discharges to the lake, and the only historical direct domestic/industrial discharge to the lake was the James River power plant, which was recently decommissioned.

According to the United States Geologic Survey (USGS)[1], Lake Springfield is predominantly sourced by the James River, averaging approximately 90% of the total lake outflow during varying hydrologic conditions (drought and flood) with other tributaries making up the remaining 10%. Therefore, upstream James River water quality data is critical to inform the status of current and future potential designated uses.

3.1.1. Current Designated Uses

According to MoDNR, Lake Springfield is currently classified as an L3 waterbody and assigned the waterbody identification number (WBID) 7312. Class L3 lakes are publicly and privately owned lakes for which a substantial portion of the surrounding lands are publicly owned or managed.

MoDNR assigned Lake Springfield's current designated uses (**Table 1**). All waters are designated for the protection of aquatic life (AQL), and each waterbody is further classified based on the type of aquatic habitat it provides. Based on limnological characteristics and the biological community, Lake Springfield's designated AQL use is as a warm water habitat (WWH). A WWH is defined as waters in which naturally occurring water quality and habitat allow the maintenance of a wide variety of warm water biota.

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[1] StreamStats flow model, a web-based application that publishes an assortment of analytical tools and data to support water-resources planning and engineering.

Furthermore, Lake Springfield has human health protection (HHP) criteria set in place to limit fish consumption on a long-term basis and to protect recreators from harmful water quality conditions. Protection of this use includes compliance with the Food and Drug Administration limits for fish tissue, maximum water concentrations corresponding to the cancer risk level, and other human health fish consumption criteria. Irrigation (IRR) is also included in the designated uses of Lake Springfield. Irrigation can be outlined as the application of water to a cropland or directly to cultivated plants that may be used for human or livestock consumption. Industrial water supply (IND) is another designated use of the lake. This water can be used to support various industrial uses, but quality needs will vary by industry. Therefore, no specific numeric criteria are set for IND uses. The lake is also designated for the use of livestock and wildlife protection (LWP), which requires the maintenance of conditions in water to support health of livestock and wildlife.

Table 1:Applicable Designated Uses Upstream, at, and Downstream Lake Springfield

Designated Use	Upstream Lake, James River WBID #2365	Lake Springfield WBID #7312	Downstream Lake, James River WBID #2362
WWH AQL	Yes	Yes	Yes
CLH AQL	Yes	No	Yes
WBC-A	Yes	No	Yes
WBC-B	No	Yes	No
SCR	Yes	Yes	Yes
HHPC	Yes	Yes	Yes
IRR	Yes	Yes	Yes
IND	No	Yes	No
LWP	Yes	Yes	Yes
DWS	Yes	No	No

Notes:
CLH: cool-water habitat (waters in which naturally occurring water quality and habitat conditions allow the maintenance of a wide variety of cool-water biota [i.e., smallmouth bass, rock bass])
DWS: drinking water supply

3.1.1.1. Recreational Uses

Recreational uses are assigned to Lake Springfield as part of the HHP criteria. There are three categories of recreational uses applicable from April 1 through October 31 each year, including whole body contact recreation category A (WBC-A), whole body contact recreation category B (WBC-B), and secondary contact recreation (SCR). WBC-A applies to waters that have been established as public swimming areas welcoming access by the public for swimming purposes and other recreational activities. WBC-B applies to waters designated for whole body contact recreation not contained within category A, which involves activities that do not typically result in complete submergence of the body.

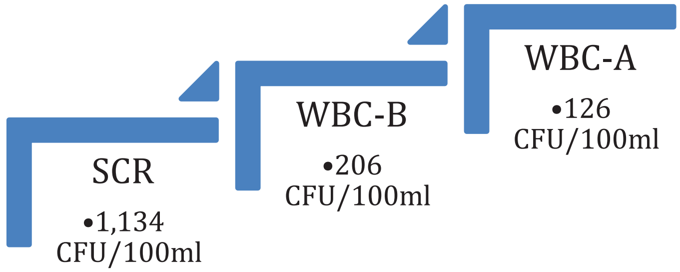

Figure 4: Numeric Water Quality Criteria to Maintain Recreational Uses

Lake Springfield is designated as a WBC-B and SCR, which includes recreational activities such as fishing and boating. These activities may result in contact with the water, but the probability of ingesting substantial quantities of water is unlikely. Numeric water quality limits (**Figure 4**) required to maintain these recreational designated uses are 126 colony-forming units (CFU) per 100 milliliters (ml) for WBC-A; 206 CFU/100 ml for WBC-B; and 1,134 CFU/100 ml for SCR.

Recently promulgated in the water quality standards (2018), lake nutrient criteria related to AQL/WWH apply to Lake Springfield. These criteria, 10 Code of State Regulations (CSR) 20-7.031(5)(N), include ecoregional chlorophyll-a response impairment thresholds and nutrient screening thresholds. Lake Springfield is in the Ozark Highlands ecoregion, which includes the most stringent of these thresholds. The chlorophyll-a response threshold applied to Lake Springfield is 15 micrograms per liter (µg/L), and nutrient screening thresholds for total phosphorus, total nitrogen, and chlorophyll-a are 16 µg/L , 401 µg/L , and 6 µg/L, respectively. The response and screening thresholds represent the annual geometric means of samples collected from May through September. These criteria, if exceeded regularly, can lead to impairment of the waterbody per MoDNR's 303(d) listing methodology.

3.1.1.2. Designated Uses That Do Not Align with Lake Springfield

Designated uses that do not align with Lake Springfield's limnological characteristics and biotic community are as follows:

- The lake is currently not designated for WBC-A.
- Additionally, the designated AQL uses of Lake Springfield do not include cool-water habitats or cold-water habitats. Both cool-water habitats and cold-water habitats consist of waters in which naturally occurring water quality and habitat conditions provide livable conditions for a wide range of cool water biota.
- The lake's designated uses do not include ephemeral aquatic habitat, which consists of waters that sustain a surface flow or pools in response to precipitation events for a limited period of time.
- Two other designated uses that do not pertain to Lake Springfield are modified aquatic habitat, or limited aquatic habitat. These uses refer to aquatic habitats that have been altered physically, chemically, or biologically.
- The lake does not include the designated use of being a drinking water supply (DWS). DWS is a water supply which will yield potable water after treatment by public water treatment facilities.

- Lake Springfield does not act as an overflow or storage for flood or storm events and therefore is not considered a storm and flood water attenuation.
- Lake Springfield is not considered for the use of a habitat for resident and migratory wildlife species, including rare and endangered species.
- The lake is not considered to provide recreational, cultural, educational, scientific, and natural aesthetic values and uses.
- Lastly, Lake Springfield is not considered a hydrologic cycle maintenance, which refers to wetlands and other waters that are hydrologically connected to rivers and streams that serve to maintain flow during periods of drought.

3.2. Historic Data and Current Status of Designated Uses

A number of studies have been conducted on Lake Springfield and within the upper James River watershed, including water quality investigations, aquatic vegetation surveys, fish community and tissue surveys, and sediments (**Table 2**). These data sources were also reviewed for their applicability to assist with identifying potential data gaps that would need to be filled before redevelopment or development on and around Lake Springfield and to inform existing and potential future designated uses to protect recreators and fish and wildlife.

Many of these studies were conducted on the upper James River, including the 2016 and 2019 snapshot monitoring, which contain useful water quality data, including *E. coli* bacterial concentrations. The use of the data collected on the James River is limited in applicability to Lake Springfield because of the differences between still or standing water (lentic) and flowing water (lotic) systems. Data from the University of Missouri Statewide Lake Assessment Program, and the Lakes of Missouri Volunteer Program (LMVP), collected at Lake Springfield provide valuable insight into lake water quality because of the number of samples collected over time. These data were used to assess the lake's compliance with numeric lake nutrient criteria, as well as chlorophyll-a impairments. Fish tissue analyses from the Missouri Department of Conservation (MDC) provides a somewhat recent (2016–2017) insight into the bioaccumulation of PCBs in fish tissues in Lake Springfield, which is useful when evaluating human health protection.

Table 2: Previous Water Quality Studies in the Lake Springfield Watershed

Document Name	Report Date	Nutrients	Sediment	Fish	Aquatic Vegetation	Physical	Metals	Bacteria	Algal toxins	Number of Samples	Time Period of Data Collection
2015 Lake Springfield Vegetation Management Plan	November 2015				X					N/A	N/A
Snapshot Report October 2019	October 2019	X				X		X		210 samples	July 2013, July 2016, July 2019
Snapshot results 2016	July 2016	X				X		X		70 samples	July 2016
Snapshot results 2019	July 2019	X				X		X		70 samples	July 2019
Suitable Return on Investment Scope	January 2022									N/A	N/A
Suitable Return on Investment Integrated Planning Opportunities Alternatives Analysis Riparian Restoration	June 2020	X	X		X					N/A	N/A
Springfield Multi-Criteria Decision Analysis Appendices (small)	June 2017	X					X			N/A	2000–2017
Database Population Guidance 060116	June 2016	X					X			N/A	N/A
Final Database Recommendations Memo	January 2016									N/A	N/A
SpfdlP_WQDB_083117[1]	N/A			X		X	X			342 samples	January 1950–October 2016
As-builts for sewer crossings	November 1978									N/A	N/A
2011 Lake Springfield Fishery Management Plan (MDC)	February 2011			X						N/A	January 1991–February 2011
2016 Lake Springfield Report (MDC)	March 2016			X	X		X			N/A	January 2014–December 2015
2018 Lake Springfield Report (MDC)	March 2018			X	X		X			N/A	January 2016–December 2017
Heavy metal concentrations in the waters of the Springfield Area	1973						X			106 samples	October 1971–August 1972
Heavy metal analysis of stream sediments in the James River Basin	1973		X				X			53 samples	N/A

University of Missouri SLAP and LMVP Data	October 2022	X							X	150 samples	May 2003–Sept. 2021
Missouri State University Sediment Study	2002		X							N/A	N/A
MoDNR Missouri Clean Water Information System Data	October 2022	X		X			X	X	X	829 samples	August 1964–March 2021

1.Lake Springfield integrated water plan quality database
SLAP: Statewide Lake Assessment Program
SROI: suitable return on investment
N/A: Not applicable

3.2.1. Current Use Attainment

Most of Lake Springfield's and the James River's designated uses discussed in this section have corresponding numeric water quality standards that must be met to maintain and protect the continuance of those uses. Missouri's narrative and numeric water quality standards are presented in Title 10, CSR, Division 20, Chapter 7—Water Quality, §7.030—Water Quality Standards.

When a waterbody is not meeting a designated use as determined by MoDNR through credible data collection and assessment efforts, the waterbody is included on the state's 303(d) list of impaired waters and assigned a priority for Total Maximum Daily Load (TMDL) development.

A TMDL is a regulatory term that describes a plan for restoring impaired waters that identifies the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards. **Table 3** summarizes the current attainment of the James River (upstream and downstream of Lake Springfield) and Lake Springfield as determined by the MoDNR.

Table 3: Current Designated Use Attainment for Upstream, at, and Downstream of Lake Springfield

Designated Use	Upstream Lake, James River WBID #2365	Lake Springfield	Downstream Lake, James River WBID #2362
WWH/AQL	✓	**X**	✓
CLH/AQL	✓	NA	✓
WBC-A	**X**	NA	✓
WBC-B	NA	✓	NA
SCR	✓	✓	✓
HHP	✓	✓*	✓
IRR	✓	✓	✓
IND	NA	✓	NA
LWP	✓	✓	✓
DWS	✓	NA	NA

✓: meeting use standards
X: not meeting use standards
NA: not applicable use
*: human health fish consumption advisory for mercury (statewide) and PCBs specific to Lake Springfield
CLH: cool-water habitat

Currently, MoDNR lists Lake Springfield as impaired for WWH/AQL due to elevated chlorophyll-a concentrations from nonpoint source nutrient pollutants with a low priority (>10 years) TMDL schedule (MoDNR 2020), meaning that a TMDL is not expected to be developed in the next 10 years. LMVP and SLAP, operating through the University of Missouri Columbia Limnology Laboratory, have historically monitored nutrient and chlorophyll-a concentrations in Lake Springfield.

Geosyntec obtained the long-term dataset for Lake Springfield through a request directly to the University of Missouri Columbia Limnology Laboratory. Chlorophyll-a data collected from Lake Springfield exceeded the Ozark Highlands numeric lake nutrient criterion (15 µg/L annual geometric mean from May through September) in 2018 and 2020, and chlorophyll-a concentrations typically increase from upstream to downstream in all recent years of data (**Table 4**).

Table 4: Lake Springfield LMVP Chlorophyll-a Data (May–September)

Date	Geomean (mg/L)		Minimum (mg/L)		Maximum (mg/L)	
	James River Hwy 60	Near Dam[1]	James River Hwy 60	Near Dam	James River Hwy 60	Near Dam
2018	5.8	24.8*	1.1	13.2	25.2	44.3
2019	3.1	7.7	0.6	4.0	20.2	17.1
2020	2.6	17.5*	1.5	11.1	4.9	26.6
2021	1.1	3.8	0.5	0.1	1.9	18.5

1. Water Quality Standard criterion compliance location
*: exceeds numeric lake nutrient criteria

Total nitrogen concentrations and ranges are similar in the upstream James River compared to near the Lake Springfield dam, while total phosphorus concentrations and ranges are slightly higher at the dam compared to the upstream James River (**Table 5** and **Table 6**).

Table 5: Lake Springfield LMVP Total Nitrogen Data

Date	Geomean (mg/L)		Minimum (mg/L)		Maximum (mg/L)	
	James River Hwy 60	Near Dam	Hwy 60	Near Dam	Hwy 60	Near Dam
2018	1.03	0.84	0.74	0.61	1.44	1.24
2019	1.02	0.91	0.57	0.50	1.42	1.30
2020	0.85	0.91	0.47	0.48	1.27	1.32
2021	0.88	0.78	0.71	0.48	1.13	1.15

Table 6: Lake Springfield LMVP Total Phosphorus Data

Date	Geomean (mg/L)		Minimum (mg/L)		Maximum (mg/L)	
	James River Hwy 60	Near Dam	Hwy 60	Near Dam	Hwy 60	Near Dam
2018	0.03	0.04	0.01	0.03	0.07	0.07
2019	0.03	0.04	0.02	0.02	0.05	0.08

2020	0.02	0.05	0.02	0.03	0.03	0.08
2021	0.04	0.08	0.02	0.05	0.09	0.10

Alongside nutrient monitoring, LMVP and SLAP collect water quality information related to harmful algal blooms. Currently, there are no recreational use water quality criteria for algal toxins; however, there will likely be future numeric water quality criteria for algal toxins, as USEPA has issued national recommended criteria for recreational uses, and MoDNR is currently conducting related stakeholder meetings to incorporate those criteria in the Missouri's Water Quality Standards. A review of LMVP and SLAP microcystins and cylindrospermopsin (algal toxins) data indicate the proposed USEPA recreational use water quality criteria of 8 µg/L and 15 µg/L, respectively, have not been exceeded from 2017 through 2021 in Lake Springfield.

Recent *Escherichia coli* (*E. coli*) data collected by MoDNR from the James River upstream of Lake Springfield (WBID #2365) indicate nonattainment of the WBC-A recreation criterion (Table 7), which has resulted in 303(d) listing of this waterbody segment as impaired. MoDNR has not included a known source for bacterial loads to the James River, and TMDL development is assigned low priority. Relevant to source water protection, the James River (WBID #2365) is also designated as a drinking water resource. Immediately downstream of Lake Springfield, the James River is attaining the WBC-A criterion based on MoDNR data collection. These data suggest that the immediate areas surrounding Lake Springfield are likely not contributing excess bacterial loads to Lake Springfield (**Table 7**).

Table 7: MoDNR Missouri Clean Water Information System James River Upstream and Downstream of Lake Springfield, *E. coli* Data Assessing Compliance with Recreation Criteria

Date	Geomean (#/100ml)	
	Upstream	Downstream
2016	**260.2***	64.4
2017	158.5*	37.9
2018	166.2*	52.9
2019	**231.3***	63.0

1. bolded values exceed Lake Springfield WBC-B recreation criterion (240 CFU/100 mL)
*: Exceeds applicable WBC-A recreation criterion (120 CFU/100mL)

Additionally, Lake Springfield is currently under a Missouri DHSS advisory to limit the fish consumption due to elevated concentrations of polychlorinated biphenyls (PCBs) in fish tissue. Fish tissue data supporting this advisory were collected by MDC in 2016 from carp and channel catfish. However, the fish consumption advisory does not constitute nonattainment of any of the lake's designated uses, such as HHP.

3.2.2. Designated Use Impairments Summary

Data from the above-mentioned studies were reviewed to inform the Lake Springfield Plan. Based on identified impaired designated uses in the upstream James River and within Lake Springfield, nutrients, bacteria, and PCBs are the known pollutants of potential concern for future planning purposes.

3.3. 2022 Data Collection

To supplement previous studies, Geosyntec collected additional data, including water quality sampling, bathymetric mapping and sediment thickness profiling, and sediment sampling of Lake Springfield during November and December of 2022. A detailed discussion on the method, results, and data gap assessment are provided in Appendix A-1. Bacterial concentrations were not evaluated as the data collection period was outside the MpDNR-established recreation season.

3.3.1. Water Quality

The brief window during which water quality samples were collected provides useful but limited information regarding long-term water quality conditions for Lake Springfield. Water quality samples collected in November and December 2022 provide insight to lake homogeneity and upstream to downstream water quality changes. For the water quality parameters analyzed, several have applicable water quality standards to the lake.

11 water quality samples were collected from 5 selected locations: one upstream of Lake Springfield at Crighton beach access, one immediately downstream of the Dam at Tailwater public access, and three in Lake Springfield. The rationale for these sampling locations was to understand upstream inputs, downstream outputs, and water quality gradients within the lake itself.

3.3.2. Bathymetry

Bathymetric mapping and sediment thickness profiling were conducted in early November within the boatable portions (>2.0 feet water depth) of Lake Springfield from the Dam to upstream of the Lake Springfield Boat House launch. Transects approximately 100 feet apart were established across the boatable portions of the lake where data was collected using a sub-bottom profiler, as described in Appendix A. These data were interpolated, and a raster surface was created in a geographic information system to illustrate sediment thickness across the lake. Further details on sediment thickness and volume are discussed in Section 5.

3.3.3. Sediment Quality

Lake Springfield sediment samples were collected at 41 locations from the top 6.0 inches of substrate using a Ponar grab sampler in early December 2022. Sampling locations were selected for maximum lake coverage in readily accessible areas. Bathymetric mapping and sediment thickness profiling determined that adequate sediment was present for sampling throughout the boatable portions of the lake. Sediment samples were used to assess sediment quality spatially throughout the lake, and targeted samples were collected in areas of potential concern, including near the historic cooling water discharge pipe and at the Dam. These data are further discussed below. The sediment sampling equipment used provided useful information on a specific area, for example, near a discharge pipe, and insight into the overall lake sediment quality.

3.4. Summary Discussion and Data Gaps

The below subsections discuss additional considerations and data gaps for designated uses (current/future) of Lake Springfield.

3.4.1. Recreational Uses

E. coli data have been collected in the James River upstream (WBID #2365) and downstream (WBID #2362) of Lake Springfield, which allows for characterization of compliance with the recreational use criteria for WBC-A, WBC-B, and SCR. *E. coli* data has not historically been collected on Lake Springfield during the recreational season (April 1–October 31). Bacteria concentration during the recreational season should be obtained and assessed during the recreational season before any future planning that promotes new WBC-A (public swim beach) and additional WBC-B recreational uses. Additional monitoring should occur for one or more recreational seasons at focused locations to verify maintenance and protection of the recreational use. Because the MoDNR has not determined the source of upstream James River bacterial loads and the reach serves as DWS, microbial source tracking tools could be used to identify the source of bacterial pollution and aid the development of a plan to mitigate any identified source(s).

Continued monitoring of Lake Springfield for microcystin and cylindrospermopsin (algal toxins) is recommended as the lake likely continues to receive excess nutrients from unregulated, upstream nonpoint sources. SLAP and LMVP collected the minimum number of samples each year required to assess impairment of a waterbody, so more robust sampling frequency would provide greater insight into the climatic conditions and temporal variations among these parameters throughout the recreational season. Although algal toxin criteria are not currently promulgated in Missouri’s water quality standards, pending state regulation is being developed and national criteria are recommended by USEPA.

3.4.2. Aquatic Life Uses

Continued monitoring of nutrients (total phosphorus, total nitrogen, and chlorophyll-a) near the Dam and upstream James River is recommended to improve long-term understanding of local and watershed nutrient concentrations and trends. Presently, the LMVP or SLAP infrequently monitor the lake at two locations (approximately five times each) per summer season (May–September). The existing data set, while sufficient to assess numeric water quality criteria, is of relatively small sample size. Total phosphorus and total nitrogen concentrations are typically higher upstream compared to at the Dam, while chlorophyll-a concentrations are higher at the Dam compared to upstream, which suggests that chlorophyll-a responds to nutrient inputs differently in the lake as opposed to the river. This is likely a pattern related to the transition from riverine ecosystems of the James River (flow water with shaded riparian) compared to the open water lacustrine (lake-like) ecosystem of Lake Springfield.

3.4.3. Bathymetry and Sediment

The sediment sampling performed in 2022 examined more recent sediment deposition versus potential legacy sediment quality. Recent (0 to 6.0 inches) sediment deposition is more likely to impact aquatic life and recreators compared to legacy sediments. As noted by DHSS’s fish tissue consumption advisory due to elevated PCB levels in fish tissue, legacy sediment may contain elevated concentrations of PCBs. Sediment sampling from 2022 indicates that PCBs are not accumulating in detectable concentrations in more recent sediment deposits. Future Lake Springfield projects requiring dredging of sediment beyond the top 6.0-inch horizon should perform additional sediment characterization for handling, management and disposal.

Bathymetric sounding throughout the current navigable portions of Lake Springfield yielded predominantly shallow areas with moderate fine sediment deposition. Based on current lake depths, opportunities for enhanced recreation, such as powerboating, are limited to areas near the historic James River channel with greater water depths and safe distances from the Dam.

3.4.4. Local Environmental Considerations

Expansion of recreational opportunities in and surrounding Lake Springfield must consider potential impacts to sensitive habitats (i.e., wetlands, cultural) and sensitive species (threatened or endangered bald/golden eagles). A preliminary United States Fish and Wildlife Service Information for Planning and Consultation was used to evaluate potential threatened and/or endangered species and sensitive habitats near and surrounding Lake Springfield (Appendix A-2). The United States Fish and Wildlife Service Information for Planning and Consultation provides an initial list of critical habitats, migratory birds, and other natural resources that could be impacted by a project.

Since construction in the 1950s, the Dam has created an impassable barrier for upstream movement of native aquatic life. Since the late 1990s, regulatory agencies and managers such as the United States Fish and Wildlife Service and MDC have partnered with communities and tribes to restore riverine ecosystems by removing or bypassing barriers to benefit aquatic life and people through resource avenues like the National Fish Passage Program. Additional funding opportunities for the National Fish Passage Program were incorporated in the 2021 Bipartisan Infrastructure Law.

3.4.5. Watershed Considerations

Lake Springfield's inclusion on the 303(d) list of impaired waters for AQL impairment from excess nutrients from nonpoint source contributions, and the James River WBC-A impairment from unknown source(s), should likely be addressed at the watershed scale. Watershed land uses of urban areas, pastureland, unsewered Karst topography, and other agriculture practices could be contributing these pollutants and could be addressed through local soil and water conservation partnerships and watershed planning efforts. In addition, several permitted point sources of industrial and domestic wastewater are known to discharge to tributaries of the James River upstream of Lake Springfield. Opportunities for eliminating wastewater discharges or combining to a more advanced regional provider would improve water quality.

4. WATERSHED ASSESSMENT

4.1. Watershed Characteristics

About 270 square miles of the Upper James River basin drains to Lake Springfield. Eight sub-watersheds—Headwaters, Dry Creek, Panther Creek, Turnbo Creek, Sawyer Creek, Pearson Creek, Turner Creek and Lake Springfield—make up the Upper James River basin and cover portions of Greene and Webster County.

Agricultural uses, primarily cattle on pastures, predominate in the basin, covering over 47% of the basin. About 13% of land use comprises developed areas largely in the City of Springfield and urbanized Greene County. Areas dominated by trees, generally greater than 16 feet tall, cover about 35% of the basin. The change in land cover composition per the USGS National Land Cover Database estimates an increase in developed areas by about 2,020 acres and a decrease in forest land about 850 acres since 2001 (**Figure 5**).

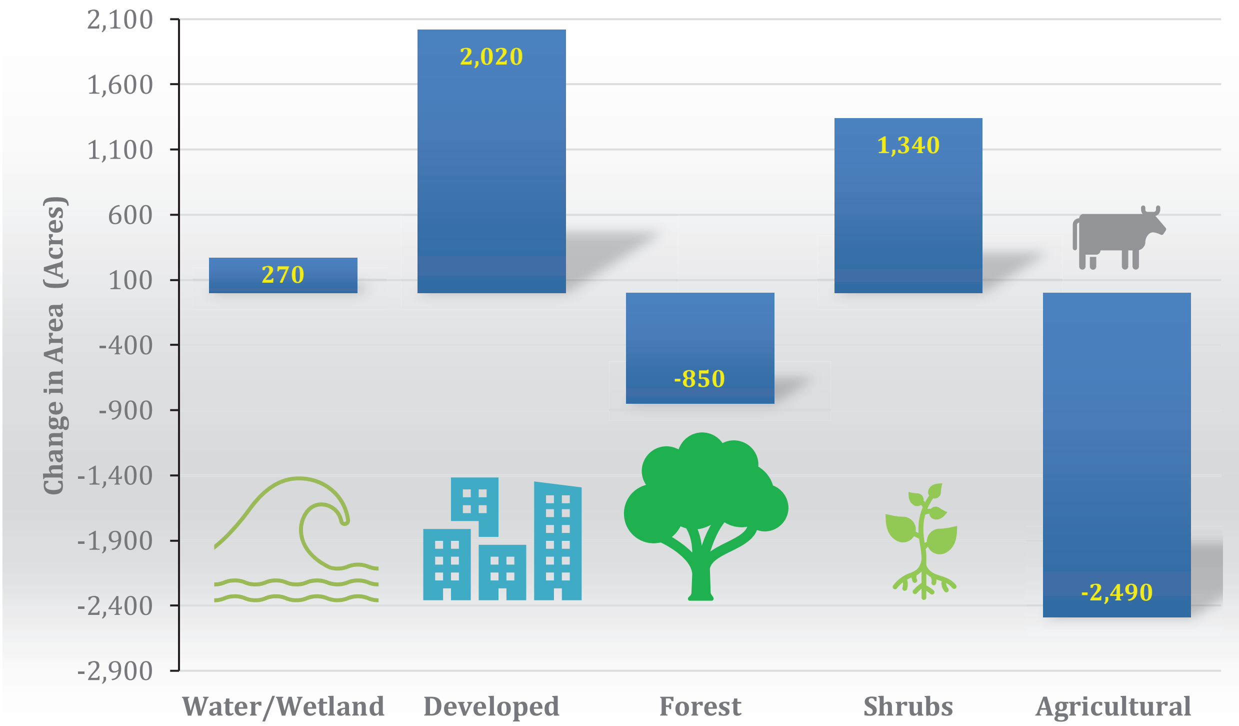

Figure 5: Land Cover Change between 2001 and 2019

Land cover changes influence environmental conditions in many ways, such as altering hydrologic regimes, runoff patterns, and flood buffering in watersheds. Changes can also affect water quality, habitat and species composition, climate, and carbon storage. If this trend of an increase in imperviousness along with a decrease in forested areas observed in the past 20 years continues, the lake will experience increased stream flows during wet weather conditions.

4.2. Watershed Studies

The Federal Emergency Management Agency's (FEMA's) Flood Insurance Study report revises and updates information on the existence and severity of flood hazards for study areas. The Flood Insurance Study for Greene County dated 2016 uses statistical gage analyses for the James River near the City of Springfield. Over 100 years (1909 to 2015) of recorded gage data was utilized to compute peak annual chance flows. The peak annual flows for the respective probability of exceedances documented in the Flood Insurance Study report is presented in **Table 8**: Peak Annual Discharges Computed by FEMA. The Flood Insurance Study and the Flood Insurance Rate Map are currently being updated by Greene County. Geosyntec reviewed a preliminary Hydrologic Engineering Center's River Analysis System (HEC-RAS) model and noted that the model uses the same flows from the 2016 Flood Insurance Study report.

Table 8: Peak Annual Discharges Computed by FEMA

Annual Exceedance Probability[1]	Peak Annual Chance Discharges (cfs)[2]
10.0%	26,740
4.0%	34,010
2.0%	39,190
1.0%	44,160
0.2%	54,950

1. Annual Exceedance Probability (AEP) is the probability that a flood of a given magnitude will occur within a period of one year.
2. Selected gage was USGS 0705700 (James River near City of Springfield) that picks up flows from 246 square miles of upstream drainage area. Statistical analysis performed by FEMA uses weighted skew. cfs: cubic feet per second

As part of the hydrologic assessment, Geosyntec reviewed the USGS StreamStats data. StreamStats allows users to select a location along a stream and obtain annual exceedance probability discharge estimates that are computed through regression analyses for ungagged stream sites. **Table 9** presents annual exceedance probability discharge estimates for the 245 square miles of watershed just upstream of the USGS gage 07050700.

Table 9: Peak Discharge from USGS StreamStats

Annual Exceedance Probability	Peak Annual Chance Discharges (cfs)
10.0%	13,200
4.0%	18,600
2.0%	23,600
1.0%	28,800
0.2%	43,700

The two sources of information discussed above differ significantly in their computed peak discharges due to the use of a different methodologies/approach. FEMA relies on the use of historical gage data, whereas the StreamStats relies upon regional regression equations. Both sets of information are presented for comparison and for completeness to support future decisions as part of the Lake Springfield Plan.

4.3. Streamflow Analysis

The USGS 07050700 stream gage is located about 2.5 miles northeast from US Highway 60 and downstream of the confluence with Pearson Creek near Springfield, Missouri. This gage has been in place since 1909. Nearly 90% of the watershed draining to the lake, approximately 245 square miles, is measured by this gage. The remaining 25 square miles of the watershed draining to the lake is ungaged. Geosyntec analyzed streamflow from gage data collected over the last 68 years since the river was dammed to assess seasonal and annual variations. For the ungagged portion of the watershed, the drainage-area ratio method was used. The drainage-area ratio method equates the ratio of streamflow at two stream locations to the ratio of the respective drainage areas (USGS 2006).

4.3.1. Seasonal Variation

A statistics-based approach on daily average discharges between 1955 and 2022 was performed to compute mean, median, maximum, and minimum flows (**Figure 6**). This could inform the flow regime needed for a specific recreational activity to achieve the desired flow depth in the main channel.

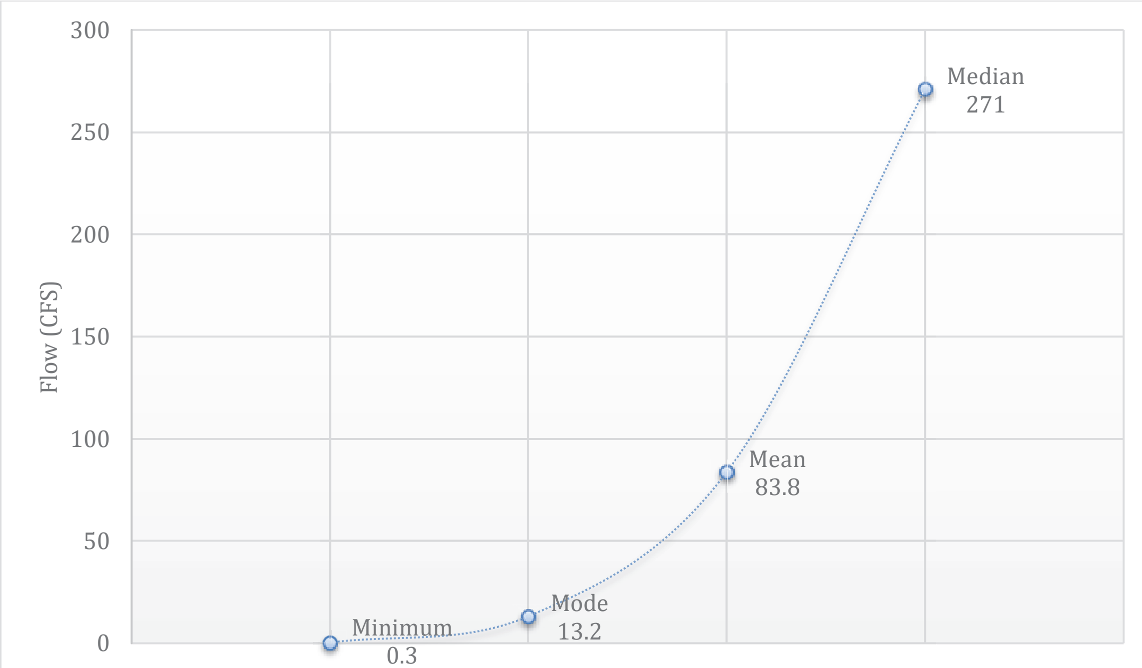

Figure 6: Statistical Analysis on 67 years of Daily Average Flow Data

In the spring and fall season, streams typically experience more frequent flows, which is evident in **Figure 7** where an overlay of daily average annual flow data for the last 10 years shows a dense cloud between March and May. Additionally, **Table 10** provides a monthly and seasonal summary for the entire 68-year period. The spring flow regime could increase circulation (if free flowing), likely benefiting water quality due to higher lake turnover. The summer season would likely be more popular for recreators when flow regimes drop during late summer.

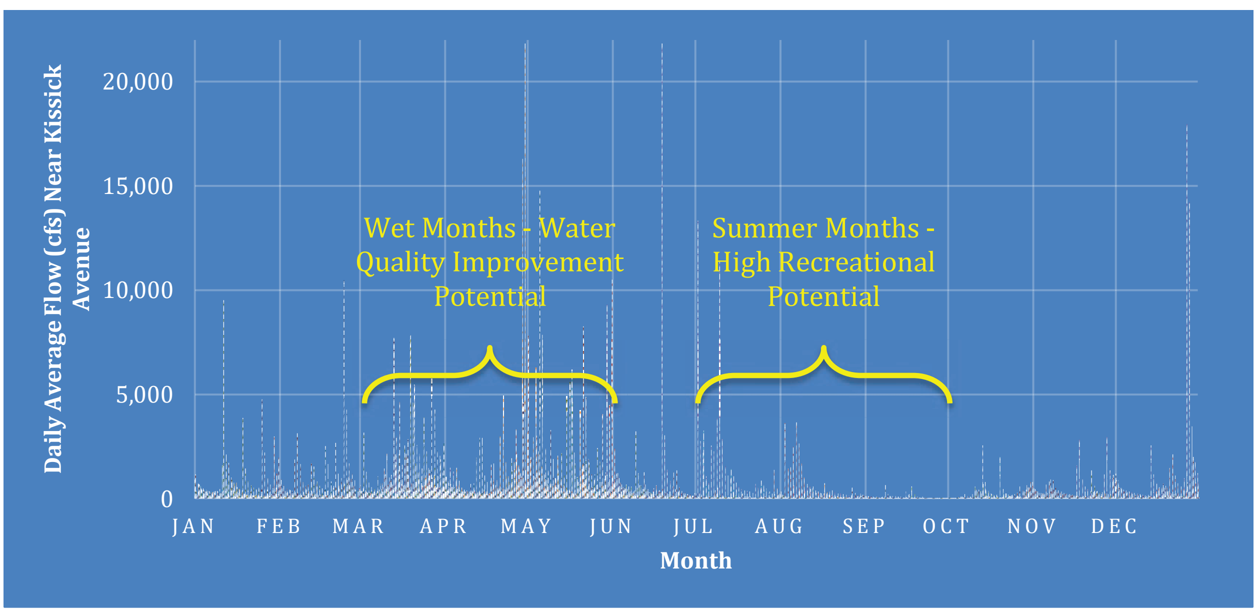

Figure 7: Daily Average Flows in a Typical Year (period of record 2012 -2022)

Table 10: Seasonal Variation (Period of Record 1955–2022)

Season	Month	Daily Flows (cfs) Exceeded Given % of Time		
		90%	50%	10%
Wet	March	66	253	1,025
	April	67	239	906
	May	56	188	981
Transition	June	33	93	474
Dry	July	16	45	203
	August	8	21	94
	September	6	20	162
	October			
Transition	November–February	-	-	-
Year	**All**	**13.2**	**83.8**	**560.9**

4.3.2. Annual Variations and Extreme Events

One of the resulting factors attributed to climate change is an increase in heavy precipitation. Heavy precipitation refers to instances during which the amount of rain and snow experienced in a location substantially exceeds what is normal. What constitutes a period of heavy precipitation varies by location and season. Warmer oceans increase the amount of water that evaporates into the air. When more moisture-laden air moves over land it can produce more intense precipitation (USEPA 2022).

The potential impacts of heavy precipitation include increased stream flows in rivers and streams. A flow duration analysis illustrates that the more frequent storms, or storms with 90% exceedance probability, have increased by 24%, while infrequent storms, or storms with 10% exceedance probability, have increased by 16% (**Figure 8**). A similar flow duration curve comparison was performed to assess decadal change (1960–1970 and 2000–2020) in stream flows (**Figure 9**). This also showed increases by 36% and 29% for exceedance probability of 90% and 10%, respectively.

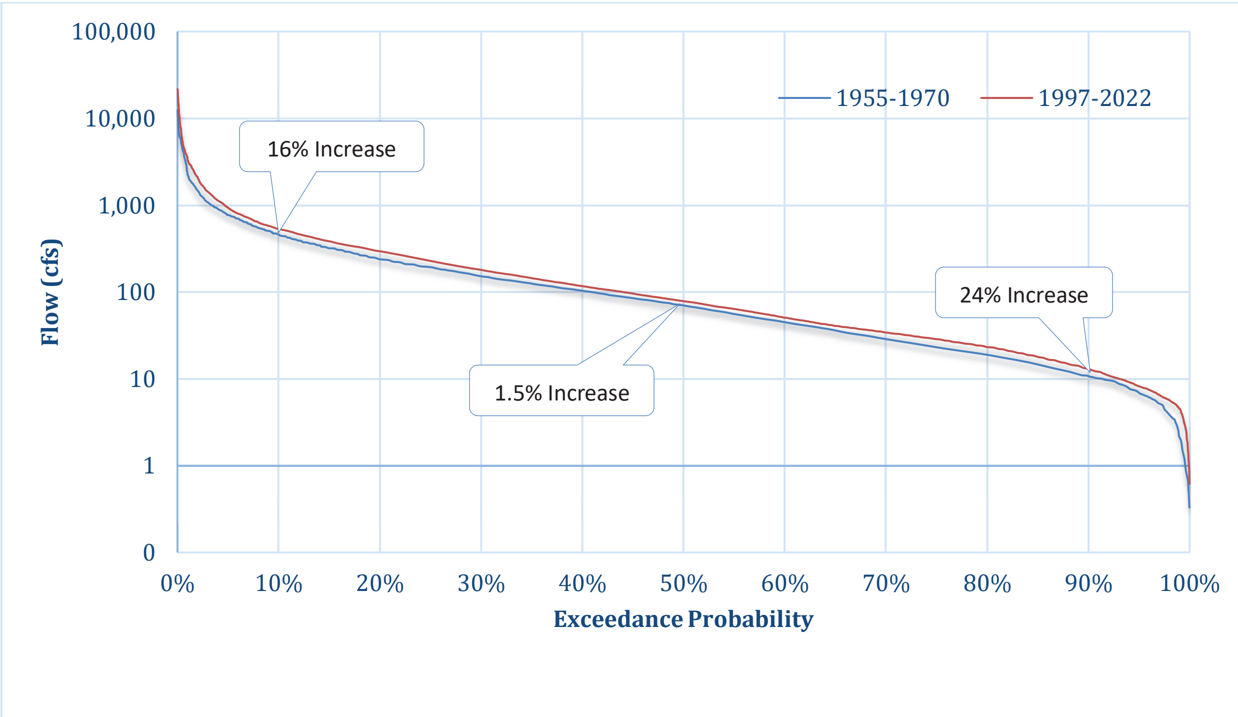

Figure 8: Increase in Flows Due to Potential Climate Change Impact

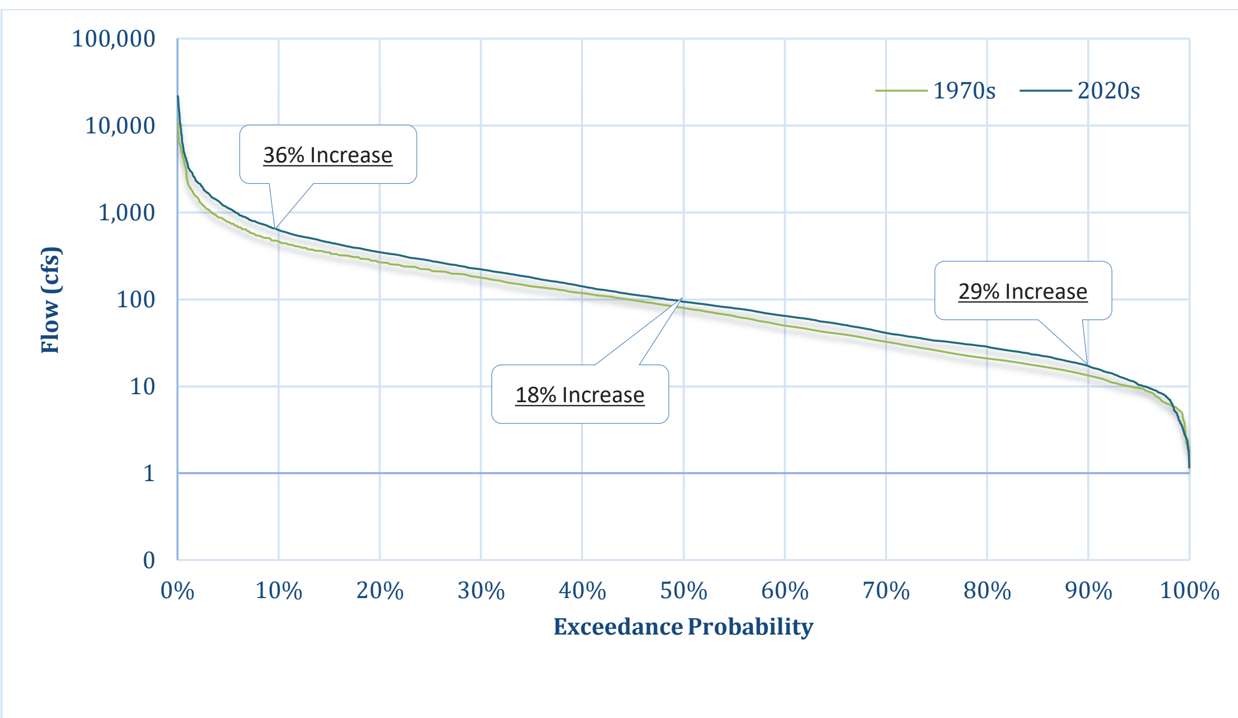

Figure 9: Decadal Change

Extreme events can comprise heavy precipitation and the frequency in which it occurs. More frequent extreme events have occurred since 2001 (**Figure 10**). This could be due to land use changes, watershed management practices, and climate change impact.

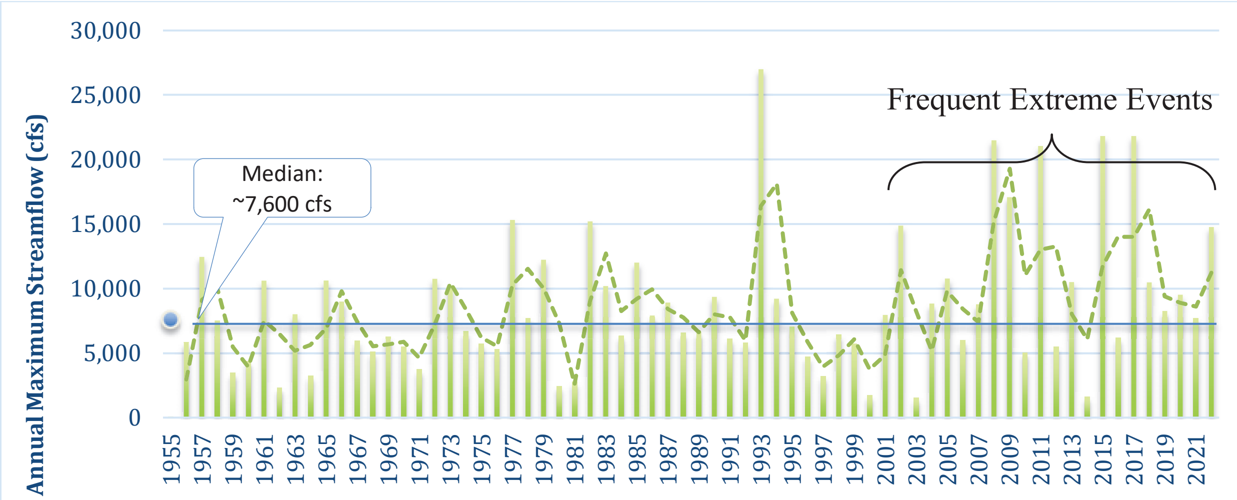

Figure 10: Annual Maximum Series

5. SEDIMENT MANAGEMENT

This section provides an initial assessment of sediment management challenges, potential sediment management alternatives, and potential order of magnitude costs for representative sediment management scenarios relevant to Lake Springfield. Sediment management strategies, implementation techniques, and costs are highly dependent on on-site-specific conditions, sediment characteristics, and available resources. The information presented within this section is based on the limited available data and our professional experience and is intended to provide planning level conceptual strategies to guide the Lake Springfield Plan.

5.1. Sediment Management Challenges

The proposed dam modification alternatives presented in this report would impact the hydrodynamics and by extension, the sedimentation characteristics, of Lake Springfield. If the existing lake sediment is not appropriately managed, structural modifications or the removal of the Dam could lead to sediment releases with potential negative consequences to the downstream environment. Management of the sediment within Lake Springfield should be considered and performed as part of any dam modification.

Lake Springfield receives continuous inputs of sediment because of the transportation of material from the James River and the tributary watershed. Portions of this sediment will continue to deposit in Lake Springfield, with the exact patterns and quantities subject to both the hydrodynamic conditions of the river/lake system and localized conditions within the lake itself. Developing sediment management plans that consider and account for future deposition within Lake Springfield is critical to achieving the desired goals for the lake. Additionally, this plan should consider sediment transport and deposition as a result of future dam modification, and impacts to the stream geomorphology and aquatic habitat downstream of the lake.

Lake Springfield is a complex system with many factors influencing the depositional characteristics of sediment within the lake. The recently obtained lake bathymetry, sediment samples, and watershed sediment loading data can be used to provide a planning-level assessment of potential sediment management strategies. Additional data (e.g., deep sediment core samples) and analytics (e.g., hydrodynamic and sediment transport models) would be required to provide a full characterization to support engineering design and permitting.

5.1.1. Management of Current Lake Sediment Inventory

Sediment thickness across the lake varies, likely because of the geomorphology of the historic James River channel. Depositional areas were observed approximately 500 feet upstream of the Dam across the entire lake, where sediment thicknesses ranged from 2.0 to 6.4 feet, and near the center of the lake, where aquatic macrophytes and shallow water are present and sediment thickness ranged from 1.5 to 2.3 feet. Total sediment volume in the lake was estimated using a geographic information system and is approximately 476,000 cubic yards.

5.1.2. Management of Future Lake Sediment Deposition

To understand the annual sediment loading rate from the 270-square-mile Upper James River basin, a watershed-based sediment load analysis was performed using USEPA's Pollutant Load Estimation Tool. This model computes watershed surface runoff, nutrient loading, and sediment delivery based on land uses and watershed management practices. **Table 11** presents computed annual sediment load from the Upper James River basin along with projected cumulative sediment loads (assuming the loading rate does not change) over 5-, 10-, and 25-year periods.

Table 11: Estimated Watershed-Scale Sediment Load Projections

Period	**1-year**	**5-year**	**10-year**	**25-year**
Cumulative sediment volume in cubic yards	7,900	39,500	79,000	197,500

At an annual loading rate of 7,900 cubic yards over a 67 year-period, cumulative sediment volume equates to 529,300 cubic yards, which is only about 11% higher compared to the sediment volume present in the lake now. This may be the case because it is unlikely that the areas farther upstream in the James River basin would contribute to the lake's sediment load.

5.2. Sediment Management Approaches

Proactive management of unwanted sediment loading can be achieved by reducing erosion in the upstream watershed through, for example, applying stormwater best management practices as source controls. However, this is not always controllable by downstream stakeholders. Some degree of control of sedimentation may also be achieved by the regulating reservoir levels. Lowering the lake during winter and early spring when many of the larger floods occur can carry sediments deposition into the narrow "ribbon" several feet below the normal pool level. However, based on the alternatives chosen for the Dam, this may not be achievable for Lake Springfield in the future. Once sediment has deposited in an area, the typical approach for the managing this sediment involves excavation in the form of dredging to maintain sediment inventory at the desired quantity and locations. Applied regularly, some combination of the above approaches can result in the management of the Lake Springfield sediment inventory consistent with the goals for the lake.

As removal of some amount of current Lake Springfield sediment inventory is expected to be required to achieve the goals for the lake, the following sections outline typical key elements related to the process of removal of sediment. Before selecting an approach, however, additional evaluation would be warranted to evaluate method feasibility, regulatory requirements, and options for the ultimate disposition of the sediment.

5.2.1. Sediment Removal via Dredging

Dredging approaches used as part of the physical management of sediment inventory are typically classified as mechanical or hydraulic dredging, with the distinction being in the way they achieve excavation and removal. Both methods are used extensively for the management of sediment inventory for a wide range of waterbodies, including lakes and rivers. Variables influencing the selection of dredging techniques include the physical properties of the sediment; size, shape, and water depth of the waterbody being dredged; available space for staging and equipment setup; and the presence or absence of significant debris.

A wide variety of mechanical dredging techniques can be explored, including land-side and water-side work setups. The common element between the array of mechanical dredging processes is the use of some form of a bucket (e.g., excavator bucket, clamshell bucket) to excavate and raise the bottom material. In some cases, the dredged material can be deposited directly in the water or on the bank immediately adjacent to the dredging area. Traditionally, the mechanical dredge deposits material into a barge or scow that transports it to a separate area for further processing.

Hydraulic dredges are characterized by using a centrifugal pump to dredge sediment and transport it, in a liquid slurry form, to a discharge area. Given the size and water depth of Lake Springfield, a cutterhead suction dredge would be the most suitable equipment for hydraulic dredging in this setting. One of the benefits of hydraulic dredging includes the direct transfer of materials to the processing plant. During the hydraulic dredging process, the dredged material is transported to the processing area as a slurry through piping without the need for multiple handling steps involving barges or scows. However, this process also generates more dredge process water, which must be managed along with the solid materials.

5.2.2. Dredged Material Dewatering and Management

After the removal of the sediment from the waterbody, the material must typically be dewatered and otherwise prepared for its ultimate disposal (Section 5.2.3). Various methods exist for sediment dewatering, with each providing benefits in various settings. Variables influencing the selection of a dewatering approach include the physical composition of the dredged material itself, dredged material water content, and the physical space available for the project. Examples of dewatering techniques include drying by "working" the material on a dewatering pad; dewatering within specially designed textile bags, such as Geotubes®; and mechanical dewatering approaches, like belt filter presses or plate and frame presses. Depending on the dewatering technique selected, chemical additives may be considered to improve the efficiency of the dewatering.

Regardless of the technique, the management and disposal of dredged process water must be considered during the planning stages of a dredging program. If dewatering is occurring near the waterbody being dredged and significant contamination is not present, it may be most efficient to discharge this water into the waterbody after appropriate treatment. This process would require specific permitting (e.g., under the National Pollutant Discharge Elimination System, Nationwide Permit etc.), which should be considered in the project scope and schedule. Discharge to a publicly owned treatment works has similar advantages and requirements but may ultimately be more feasible if the dewatering location is not near an appropriate water body. Other approaches typically involve off-site disposal of the dredged process water; this option is not reliant on the location of the dewatering area but is likely to be comparatively expensive relative to other options.

5.2.3. Dredged Material Disposal

Planning a dredging program must include the ultimate disposal of the dredged material. A variety of options are available, with variables including the physical and chemical properties of the dredged material being key factors. If the dredged material is contaminated, disposal may be the only option. However, in settings where significant contamination is not present, beneficial re-use alternatives can be considered. Dredged clean material may have potential benefits in agricultural land applications; exploring this potential use would likely involve analyzing nutrient parameters including nitrogen and phosphorus to determine the appropriateness of this application. Other beneficial uses for dredged sediment have included use as landfill daily cover or as fill in various construction projects. Regardless of the selected disposal method of the dredged material, it is necessary to understand the requirements of the entity taking the material.

5.3. Sediment Management as a Design Strategy

The following beneficial use alternatives of dredged material could be considered as a design strategy for the lake:

- Dredge and place material in study area for land contouring. Detailed sampling analysis would be needed to verify there are not elevated levels of contaminants or pollutants of concern. Adding dredged material to marginally characteristic soil could alter the physical and chemical characteristics to make water and nutrients more available for crop growth.

- Dredge or reposition sediment within the lake to create deeper pools, islands, and habitat features. Use of dredged material as the substrate for habitat development is one of the most common and important beneficial categories (USEPA 2004). Similar to the above option, a detailed sampling analysis would be needed.

- Dredge and remove off-site (disposal). Particularly appropriate if sediment has elevated levels of contaminants or pollutants of concern.

6. DAM ASSESSMENT AND REGULATORY COMPLIANCE REVIEW

The Dam, registered with the National Inventory of Dams as MO.20023, is owned and operated by City Utilities of Springfield, Missouri. The Dam is an earth fill dam with a concrete ogee spillway section located on the right (north) abutment (**Figure 11**). Construction of the Dam was completed in 1955 to function as a cooling water impoundment for the adjacent James River Power Station. Until January 28, 2021, when the power plant was decommissioned, the Dam was under the jurisdiction of the Federal Energy Regulatory Commission. Currently considered a recreational dam, the Dam is regulated by MoDNR and registered as a Class 1 dam (high hazard potential classification).

The earth embankment section is approximately 1,400 feet long with a maximum height of approximately 45 feet. The earth embankment is primarily founded on rock and is comprised of low plasticity clays for the core and coarser materials on the upstream and downstream slopes. A rock toe is present along the embankment. Upstream and downstream slopes of the earth embankment were designed to be 2-horizontal to 1-vertical (2H:1V). A paved road (S Farm Road 169/S Kissick Avenue) is atop the crest of the dam.

The spillway consists of a concrete gravity ogee section, with a maximum height of 30 feet. A 10-foot-deep cutoff is present on the upstream toe of the gravity section. The upstream slope of the Dam is vertical. A 30-foot-long concrete apron extends below the toe of the gravity sections with a 4-foot-deep cut off. The spillway is 563 feet long and contains six concrete piers which support the roadway bridge superstructure.

Figure 11: Lake Springfield Dam

Table 12 presents the list of documents Geosyntec reviewed as part of the Compliance Assessment task.

Table 12: Collected and Reliance Data

Item No.	Document "Title" and/or Description	Author and Date
1.	Lake Springfield Dam construction "as-built drawings"	Burns and McDonnell 1957
2.	Lake Springfield Dam construction photographs	Burns and McDonnell 1955
3.	*Phase I Dam Safety Inspection Report.* Prepared by Kimball and Associates Engineering per the National Dam Safety Program established in 1972 under USACE St. Louis District direction.	USACE 1979
4.	*Lake Springfield Dam Phase II Studies.* Prepared per the National Dam Safety Program established in 1972.	USACE 1981
5.	"Registration Permit"	City Utilities of Springfield, Missouri, 1987
6.	*Emergency Action Plan for Lake Springfield Dam.* Prepared in 1981 and most recently revised in 2020.	City Utilities of Springfield, Missouri, 2020
7.	"Lake Springfield Dam Breach Analysis"	MoDNR 2011
8.	*Registration Permit Renewal Inpsections Report*	MoDNR 2016, 2018, and 2020
9.	*Annual Inspection Report*	City Utilities of Springfield, Missouri, 2019; 2020; and 2021
10.	National Inventory of Dams Website. National Inventory of Dams (army.mil)	USACE 2020
11.	Rules of Department of Natural Resources, Division 22–Dam and Reservoir Safety Council, Chapter 1–Definitions, Chapter 2–Permits, and Chapter 3–Permit Requirements	MoDNR 2019
12	*Best Practices in Dam and Levee Safety Risk Analysis, Best Practices Manual,* Chapter D-5, "Embankment Slope Instability"	United States Bureau of Reclamation and USACE 2019

1. Phase 1 dam safety inspections are not intended to provide detailed hydrologic and hydraulic analyses of dam and reservoir capabilities. Phase II provides refinement of the hydrological analyses from Phase I. Updated hydrological results used to update dam and spillway stability analyses.
2. The National Inventory of Dams is a congressionally authorized database that documents more than 91,000 dams across the U.S. and its territories. It is a web-based platform maintained and published by USACE since the 1990s in cooperation with the Association of State Dam Safety Officials, the states, terrotories, and federal agencies.
USACE: United States Army Corps of Engineers

6.1. Current Applicable Regulations and Definitions

The MoDNR is the sole regulatory agency for the Dam. The rules and regulations are promulgated by MoDNR's Dam and Reservoir Safety Council, which are contained in Title 10, CSR, Division 22—Dam and Reservoir Safety Council. The regulations are grouped within three chapters: Chapter 1–Definitions, Chapter 2–Permits, and Chapter 3–Permit Requirements

Provided below are excerpts from the three chapters that are applicable to the Dam's compliance review. Certain excerpts below are used to assess current/non-modification permit compliance, while others shown will be critical to understand while in the decision-making process of analyzing modification alternatives for the Dam. All text in italics represent direct quotes or excerpts from the regulations. A few notes and comments are inserted below to provide clarity with respect to applicability to the Dam; these notes and comments are indented and underlined.

6.1.1. Title 10 CSR Chapter 1, § 1.020. Definitions (2019)

§1.020(13). "Dam" means any artificial or man-made barrier which does or may impound water and which impoundment has or may have a surface area of fifteen (15) or more acres of water at the water storage elevation or which is thirty-five feet (35') or more in height from the natural bed of the stream or watercourse or lowest point on the toe of the dam (whichever is lower) up to the crest elevation, together with appurtenant works.

§1.020(43). "Registration permit" means a permit issued for a period not to exceed five (5) years by the council to the owner of a dam or reservoir in existence or in the progress of construction on August 13, 1981 or which becomes subject to the law for the dams and reservoirs by a change in factors or circumstances subsequent to that date.

6.1.2. Title 10 CSR Chapter 2, §2.020. Types of Permits (2019)

§2.020(1). There are three (3) types of permits—registration permits, construction permits, and safety permits and each one is intended to regulate different type of activity. A dam and reservoir will have only one type of permit in effect at any given time although they may have more than one type of permit during their existence.

§2.020(2). Registration permits are required for the continued operation of a dam and reservoir that was in existence or in the process of being constructed on the effective date of this section, August 13, 1981. Registration permits may be issued for a time period up to five (5) years.

§2.020(3). Construction permits apply to the construction of a new dam and reservoir, the alteration, enlargement, reduction, repair, or removal of a new or existing dam, reservoir, or appurtenances. A construction permit may be issued for any reasonable length time period in order to complete construction. At the conclusion of construction, a safety or registration permit shall be obtained by the owner.

§2.020(4). Safety permits apply to the operation of a dam and reservoir constructed pursuant to a construction permit. The safety permit is not a guarantee of the dam and reservoir's safety and does not alter the owner's liability; it is simply an operating permit. If a dam and reservoir were not subject to the provisions of the law when they were constructed but subsequently become subject to the provisions of the law, the owner shall obtain a registration permit, not a safety permit. Safety permits may be issued for a time period up to five (5) years, and they may contain appropriate conditions for the operation and safety of the dam and reservoir.

6.1.3. Title 10 CSR Chapter 2, §2.040. Classes of Downstream Environment

§2.040(1). The downstream environment zone is the area downstream from a dam that would be affected by inundation in the event the dam failed. Inundation is defined as water, two feet (2') or

more deep over the general level, in the event the dam failed. Based on the content of the downstream environment zone, three (3) environmental classes are defined. Class I, which contains ten (10) or more permanent dwellings or any public building; Class II, which contains one to nine (1-9) permanent dwellings, or one (1) or more campgrounds with permanent water, sewer and electrical services or one (1) or more industrial buildings; and Class III, which is everything else.

6.1.4. Title 10 CSR Chapter 3, §3.020. General Requirements

§3.020(2). The owner must provide a determination of an environmental class for each dam and reservoir. The method, data and assumptions used by the owner to determine environmental class shall conform to practices reputable and in current use in the engineering, geologic and construction professions.

§3.020(3). The anticipated consequences of a dam failure with respect to public safety, life and property damage are important considerations in establishing acceptable methods for specific investigations and sites. Methods used in exploration design, construction and maintenance must be in accordance with good engineering practices reputable and in current use in the engineering, geologic and construction professions.

§3.020(4). When the owner is applying for a construction permit, the design factors of safety for slope stability for earth and rock conventional dams which are given in Table 1 shall be met. The required design factors of safety for concrete conventional dams are given in Table 2. Owners shall also meet these requirements when substantial changes are proposed to the height or slope of an existing conventional dam or structure prior to the issuance of the construction permit.

§3.020(7). The required spillway design flood, which shall allow for flood storage in the reservoir, is to be derived by using the precipitation values given in Table 5 and shall apply to both new and existing dams.

6.1.5. Title 10 CSR Chapter 3, §3.030. Registration Permit Requirements

§3.020(1). In addition to the basic requirements for all permits listed in 10 CSR 22-3.020(1), (2), (3), and (7), the registration permit application for a conventional dam and reservoir must include certification by an experienced professional engineer or an agency engineer that the dam and reservoir have been inspected in accordance with the law and that the owner has complied with the engineer's recommendations to correct the observed defects and an inspection report, as required by the law. The engineer must further show that the spillway can safely pass the spillway design flood derived from Table 5 and submit a report describing the correction of all observed defects and the description of an operation and maintenance program to be followed while the registration permit is in effect.

- *§3.020(1)(A). The inspection of a dam and reservoir for a registration permit is intended to detect observable defects. The procedure to determine observable defects normally will be a surface examination by an experienced professional engineer or an agency engineer. The inspection must include all surface examinations necessary to determine if observable defects exist that affect the stability of the dam and reservoir or the adequacy of the spillway. Judgement of the structural stability and an evaluation* *of the spillway capacity must be made. Judgment shall be based on the engineer's experience, training and knowledge of similar dams in accordance with practices reputable and in current use in the engineering, geologic and construction professions.*

- *§3.020(1)(B). Proper maintenance and operation of a dam and reservoir are critical to the continuing safety of a dam and reservoir and to public safety, life and property. A maintenance program is required and shall include the following items: erosion control on the embankment; monitoring emergency spillway flow rates; vegetation control; spillway maintenance; emergency action plans; maintenance and monitoring of seepage observation devices, if any; and maintenance and monitoring of instruments used, if any, to observe the stability of the dam.*

6.1.6. Title 10 CSR Chapter 3, §3.040. Construction Permit Requirements

§3.040(1). In addition to the basic requirements for all permits listed in 10 CSR 22-3.030, the construction permit application for a conventional dam and reservoir shall be prepared under the direction of and certified by an experienced professional engineer and shall be in accordance with practices reputable and appropriate in the engineering, geologic, and construction professions.

A construction permit is required when modifications are to be made to an existing dam. A likely condition of approving the construction permit to modify an existing dam is demonstrating the dam meets all current regulations and requirements, which may include updating supporting technical analyses.

6.1.7. Title 10 CSR Chapter 3, §3.050. Safety Permit Requirements

§3.050(1). In addition to the basic requirements for all permits listed in 10 CSR 22-3.020, the safety permit application for a conventional dam and reservoir shall include:

- *§3.050(1)(A). Notification of the completion of construction and application for the first safety permit for the dam and reservoir shall be provided by the owner. If revisions have been made which vary considerably from the provisions of the construction permit, it must be shown that the revisions do not endanger public safety, life or property.*

- *§3.050(1)(B). Notification of completion shall be within two (2)-months' time after completion of construction; and*

- *§3.050(1)(C). As-built drawings shall be submitted.*

6.1.8. Consultation with MoDNR

On November 11, 2022, Mr. Matt Bardol from Geosyntec contacted Mr. Ryan Stack, P.E., from MoDNR to clarify elements of MoDNR regulations. Mr. Stack is the Dam and Reservoir Safety Program Director and Chief Engineer for the department's Missouri Geological Survey. Mr. Stack and the MoDNR staff were extremely helpful, polite, and eager to assist. A summary of the key elements of the discussion are as follows:

- MoDNR performs inspections every two years that comply with the state's requirements. In the past, City Utilities staff performed additional inspections to supplement MoDNR inspections.

- Regulations changed in 1981 that required existing dams to request a permit or register existing dams within five years. The 1987 registration permit was prepared in response to this requirement.

- An updated slope stability analysis was not performed as part of the permit application and was grandfathered in.

- Significant modifications to the Dam would require a permit, which potentially would result in a full review of the Dam's regulatory compliance to current standards. Current standards would include design or performance standards (e.g., stability and factors of safety) and analytical methods (e.g., spillway rating curves or hydraulic models).

6.2. Engineering Analysis Review

A summary of the required engineering analysis per Title 10 CSR Chapter 3, §3.020, specific to geotechnical, structural, and hydrologic and hydraulics engineering, is presented in the following section. The basic requirements itemized in §3.020(4), (5), and (6) were not required for registration permits, such as the permit obtained for the Dam.

6.2.1. Geotechnical

For slope stability of earth and rock conventional dams, target design factors of safety (FS) within Table 1 (Section 6.1.4) for the different loading conditions are as follows:

FS = 1.5 for static loading conditions with steady seepage and a full reservoir[2]
FS = 1.3 for static loading conditions with steady seepage and the maximum reservoir[3]
FS = 1.2 for sudden draw down conditions, from full to empty reservoir
FS = 1.0 for earthquake loading conditions, with steady seepage and a full reservoir

Earthquake loading will vary according to a dam's location in relation to seismic source zones and downstream environmental zones.

The recommended design factor of safety for conventional earth dams according to the *Best Practices Manual* (United States Bureau of Reclamation and USACE 2019) are as follows:

FS = 1.3 for flood loading with the reservoir at the crest of the dam
FS = 1.2 for sudden draw down conditions of the reservoir from full reservoir to empty

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[2] Full reservoir means the water is at the storage level elevation.
[3] Maximum reservoir means water level is at maximum water level attained during the spillway design flood or at the dam crest elevation.

Guidance for seismic stability analysis within the *Best Practices Manual* is under preparation at the time of this compliance assessment (United States Bureau of Reclamation and USACE 2019).

6.2.2. Structural

For concrete dams, design structural FS within Table 2 (Section 6.1.4) under different loading conditions are as follows:

FS = 1.5 for overturning check under static loading and a full reservoir
FS = 1.3 for overturning check under static loading and a maximum reservoir
FS = 1.5 for sliding check under static loading and a full reservoir
FS = 1.3 for overturning check under static loading and a maximum reservoir
FS = 1.5 for structural integrity check under static loading and a full reservoir
FS = 1.3 for structural integrity check under static loading and a maximum reservoir
FS = 1.0 for earthquake loading conditions and a maximum reservoir

6.2.3. Seismic

Estimates of bedrock accelerations for seismic analyses are provided in Title 10 CSR Chapter 3, §3.020, General Requirements, within Table 4. For a conventional dam less than 50 feet in height with an Environmental Class I, the bedrock acceleration is estimated as 75% of the probable maximum acceleration.[4] The Dam is located in Greene County, which falls within Zone E and, thus, is expected to have a probable maximum acceleration of 0.20 g. So, the required design acceleration for any seismic analyses of the Dam is 0.15 g (75% of 0.20 g).

Guidance on slope stability during earthquake loading is provided in Title 10 CSR Chapter 3, §3.020(5) and (6). §3.020(6) is applicable to the earth embankment, as the embankment is comprised of clayey materials. The embankment is also founded on bedrock and, because of this, it can be expected to withstand significant earthquake shaking if other design factors of safety for slope stability are satisfied. The earth embankment does not need to meet the requirements for slope stability during earthquake loading per §3.020(6) because it is located in Greene County and because it is comprised of cohesive, clayey materials.

Even though seismic slope stability analyses are not required for the earth embankment due to the Dam's composition and location, the concrete spillway and the bridge substructure (piers) need to satisfy the requirements for stability during earthquake loading and any other governing regulations pertaining to the bridge superstructure.

6.2.4. Hydrologic/Hydraulics

Guidance on spillway design for existing dams built by August 1981 is provided in Table 5 of §3.020. The Springfield Dam is a conventional, Environmental Class I dam that was constructed prior to 1981. The spillway is required to pass the 75% probable maximum precipitation (PMP) event.

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[4] Probable Maximum Acceleration of bedrock is determined as a function of the acceleration of gravity (g=32.2 fps2).

6.3. Compliance Assessment

Geosyntec assessed compliance of the Dam against the current 2019 MoDNR regulations. The following presents a summary of the assessment.

6.3.1. Permit Background and Assessment Evaluation

USACE performed a Phase 1[5] Inspection in 1979. In 1981, the dam safety regulations in Missouri changed. Existing dams had five years to submit a registration permit to become registered under the updated regulations. Existing design analyses (e.g., slope stability analyses of the earthen embankment) were not required to be updated for existing dams under the new regulations. The initial registration permit for the Dam was completed in 1987 and included supporting analyses by Harza Engineering Company. Following approval of the initial registration permit, the MoDNR Dam and Reservoir Safety Program indicated that they have performed an inspection of the Dam every two years to comply with the state regulations. City Utilities performed supplemental inspections annually in addition to those performed by MoNDR. Inspection records prepared by City Utilities are available from 2019 through 2021.

6.3.2. Geotechnical Engineering Analysis

While not required, slope stability analysis of the earth embankment was performed by Harza Engineering Company as part of the initial registration permit. No additional slope stability analyses have been performed since 1987. For the earth fill, the following properties were considered in the analysis:

- Moist and saturated unit weights of 125 and 130 pounds per cubic foot, respectively
- Internal friction angles of 28 degrees for earth fill and 35 degrees for rockfill
- Saturated cohesion of 250 pounds per square foot

These numbers are reasonable for the geotechnical parameters based on the available geotechnical information and Geosyntec's professional experience. The method of slices and calculations used by Harza Engineering Company in the slope stability analyses appears to be appropriate for the methods available at the time of analysis. Three cases were analyzed for the earth embankment in the slope stability analysis:

1. Static loading conditions with a full reservoir
2. Sudden (rapid) draw down conditions, from the reservoir at the probable maximum flood to the full reservoir
3. Earthquake loading conditions with a full reservoir

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[5] Phase 1 Dam Safety Inspections were not intended to provide detailed hydrologic and hydraulic analysis of dam and reservoir capabilities.

The calculated FS for the analyzed cases satisfies the required regulatory FS; however, a static loading condition with the maximum reservoir was not analyzed. Additionally, the analysis for the sudden draw down conditions considered a different change in the reservoir level (i.e., maximum reservoir to full reservoir) that may not be as critical as the draw down from the full reservoir to the empty reservoir. There are modern methods and computer programs (e.g., Slide2) available in the industry to perform slope stability analyses that have superseded the hand calculations performed by Harza Engineering Company.

6.3.3. Structural Engineering Analysis

As stated in the registration permit report from 1987, the original spillway design accounted for a head of 10 feet with zero negative pressure on the downstream face. The original design did not consider the location of the drainage curtain in determining the uplift under the spillway. According to the guidelines and accepted practice applicable for the time when this study was conducted (Engineering Regulations 1110-1-103), the Dam is located in Seismic Zone 2, and the ground acceleration was taken as 0.05 g.

The original studies prepared by the designer did not consider the silt load. Soundings taken in July of 1980 show the silt level to be between Elevation. 1122.3 and 1125.8. For the registration permit report by Harza Engineering Company, engineers used a silt load beginning at Elevation. 1125.0 to a depth of 15.0 feet, the top of rock upstream of the spillway.

The stability analysis based on the assumption of full uplift at the base is as follows:

- Case I: Normal operation elevations within middle third of base
    - FS=1.78 against overturning, while FS=27.3 against sliding
- Case II: Case I plus earthquake loadings within middle third of base
    - FS=1.69 against overturning, while FS=22.6 against sliding
- Case III: probable maximum flood elevations, within middle third of base:
    - FS=1.35 against overturning, while FS=18 against sliding

These safety factors against sliding were computed with an assumed shear value of 150 pounds per square inch for concrete and a friction coefficient of 1.0 between the concrete base and the rock foundation.

The safety factors were satisfied comparing to the followed regulations at the time of this study using the estimated values for concrete shear capacity and friction coefficient which need a detailed study when performing any future evaluations.

6.3.4. Seismic Analysis

In the initial registration permit, seismic analyses were performed for the concrete spillway and earth embankment using an earthquake loading of 0.05g in the horizontal direction. The calculated

FS for the seismic stability analysis of the spillway and the earth embankment satisfied the required FS.

Based on the information presented in this report, a seismic assessment of the concrete spillway is required based on current regulations using the adopted design acceleration of 0.15g instead of the previously used acceleration of 0.05g.

Section 22-3.020(6) is applicable to the Dam’s earth embankment because the embankment is comprised of clayey materials and founded on rock, so it can be expected to withstand significant earthquake shaking if other design factors of safety for slope stability are satisfied. The Dam is located in Greene County, so the earth embankment does not need to meet the requirements for slope stability during earthquake loading per Section 22-3.020(6) of the Title 10, CSR.

6.3.5. Hydrologic/Hydraulics Analysis

The latest hydrologic and hydraulic study is the Lake Springfield Dam Phase II study with a cover letter dated November 5, 1980. This study builds upon the Phase I inspection report dated September 1979. Both studies are included as attachments within the registration permit report for the Dam (MO. 20023) dated 1987.

The presented information and analyses indicate the Dam and spillway capacity is sufficient to pass the 75% PMP as per the current regulations. The design capacity meets current regulatory requirements; however, the supporting analytical methods and documentation are not consistent with current industry standards. The design analyses would need to be updated to meet current analytical methods for approval of any modification to the Dam. Even without proposed dam modifications that necessitate updating hydrologic and hydraulic analysis, updating the analytical methods to meet current industry standards is recommended. Below is a summary of the current analyses, with comments for potential updates or revisions.

- Phase II study (November 1980) Intensity Duration and Frequency (IDF) rainfall source, calculations, and results:
  - Probable Maximum Precipitation (PMP) derived from Hydro Meteorological Report 51.
  - Calculations performed with HEC-1
  - Probable Maximum Flood peak inflow was calculated as 205,000 cfs
  - Spillway capacity calculated at 205,000 cfs has a freeboard of 1.7 feet to minimum earthen-dam crest elevation.
- Previous IDF analyses (1980) appear to meet minimum regulatory requirements:
  - Hydro Meteorological Report 51 is still relevant for obtaining PMP depth
  - Regulations do not prescribe a specific freeboard for depth above the IDF peak elevation from the Dam crest. However, it may be required that the freeboard at

peak of the spillway IDF (75% PMP) must be greater than the wave height (wind, fetch length, prevailing wind direction, etc.). We did not find this in the previous analyses.

  - Updates to the IDF analysis are recommended through using more current modeling software and accounting for changes in the watershed and lake storage. The rainfall runoff approach did not have much detail, and there are several review comments in *1987 Inspection: Appendix 5 (Vol 4)* on the hydrologic/hydraulic parameters used, in particular that the spillway rating curve used in the 1980 IDF was overly conservative.

- Standard project flood (SPF) is used in the 1980 spillway stability analysis:
  - Based on the annual average peak flow of 12,900 cfs
  - The annual average peak flows will likely change if they updated to be derived from current data and methods; these updates would impact the resultant SPF along with the spillway stability analysis.
  - It is recommended that the SPF be updated using current data and methodology, with the corresponding results used to update the spillway stability analysis.

- Dam breach analysis and maps:
  - Published by MoDNR (Dated November 1, 2011) and appears sufficient to meet minimum regulatory requirements since they are published by MoDNR.
  - Supporting breach analysis calculations and modeling have not been obtained, so they could not be reviewed for adequacy.
  - Recommend updates to breach analysis and maps with current analytical methods, including sunny and wet weather breaches.

6.3.6. Inspection History

6.3.6.1. Permit Inspections

As of this report, documentation of bi-annual inspections is available for 2016, 2018, and 2020. A state inspection was scheduled for 2022 but is not currently available. The state inspections were supplemented by annual inspections performed by City Utilities. Annual inspections are available from 2019 through 2021. No major deficiencies (e.g., slope instabilities) have been noted during these inspections. The bi-annual state inspections in 2016, 2018, and 2020 did make note of seepage approximately 200 feet downstream of the left-wing wall of the Dam.

6.3.6.2. Geosyntec 2022 Visual Inspection

A visual inspection of the Dam was conducted by Geosyntec on December 1, 2022. The previously observed seepage location approximately 200 feet downstream of the left-wing wall was not inspected by Geosyntec. Observations and recommendations from the inspection are listed below. A photograph log with comments is provided in Appendix B.

Observations from Geosyntec's visual inspection are as follows:

- Concrete structural components of the Dam are in overall good condition (Photographs 1, 3, and 5).
- Some debris (logs and branches) has accumulated on the upstream side of the concrete spillway (Photograph 4).
- The left (south) abutment of the spillway adjacent to the earth embankment is experiencing noticeable soil erosion along the length of the abutment wingwall (Photographs 6 and 11).
- The downstream side of the earth embankment is well-vegetated and maintained. No erosion, depressions, or cracks were observed (Photograph 7).
- The upstream side of the earth embankment has been armored with gravel and riprap, though some areas of the armoring have been slightly eroded (Photographs 8 and 12). No erosion, depressions, or cracks were observed in the unarmored portions of the upstream side.
- The paved road atop the earth embankment was in good condition with no observed low spots or cracks.
- Post holes from a previous guardrail were observed on the crest of the earth embankment (Photograph 9).
- No visible damage was observed in the roadway above the spillway.

Recommendations based on this visual inspection are as follows:

- Perform a LiDAR survey of the earth embankment. This will help verify the observed conditions from the visual inspection (i.e., no significant settlement) and available documentation (i.e., slopes of the embankment).
- Remove debris that has accumulated within the spillway.
- Perform maintenance on the armoring for the upstream side of the earth embankment (e.g., clear any vegetation, replace eroded riprap).
- Restore eroded soil adjacent to the south abutment on the downstream side of the earth embankment. Consider also removing the concrete stairs.
- Fill post holes on the crest of the earth embankment to limit water infiltration into the earth embankment.

6.3.7. Summary of Regulation Compliance Assessment

The Dam is not fully in conformance with the current MoDNR regulations for conventional dams constructed prior to 1981 (Title 10 CSR 22). The Dam fails to meet the current MoDNR standards for certain geotechnical and structural stability engineering analyses.

The initial registration permit in 1987 met MoDNR requirements at the time and received approval. The engineering analyses that were included in the initial registration permit were performed by Harza Engineering Company in 1987, and USACE Phase I (1979) and Phase II (1980) studies indicate that the concrete spillway and earthen embankment meet or exceed the Title 10 CSR 22 required factors of safety for a Class I Environment Dam. However, the Dam's engineering analyses have not been updated since and are out of compliance with current regulations. The Dam has met inspection requirements as indicated by the MoDNR Dam and Reservoir Safety Program and requirements for renewal registration permits.

For any future proposed substantial dam modifications to be approved by MoDNR, further engineering analyses will need to be updated as part of a construction permit application per MoDNR Title 10 CSR 22-2: Chapter 2—Permits. The updated engineering analyses will require application of current dam safety analysis methods and updated engineering software technologies to assess proposed dam modification conditions. Even if there are no proposed modifications to the Dam, engineering analyses may be required to make the Dam compliant with current MoDNR regulations and reflect any physical/operational changes to the Dam, its reservoir, or adjacent areas that have occurred since 1987 that could impact the analyses. Details of the necessary engineering analyses and our recommendations are provided above in Section 6.4.2 and summarized below in Section 6.4.5.

6.3.8. Compliance Action Plan and Recommendations

6.3.8.1. Current Dam Compliance Requirements

Per Geosyntec's compliance assessment review, the following engineering analyses require updates to keep the Dam in compliance with the MoDNR Dam and Reservoir Safety Program:

1. Geotechnical slope stability analysis of the earthen embankment for static loading conditions with steady seepage and the maximum reservoir

2. Geotechnical slope stability analysis of the earthen embankment for drawdown case going from full (i.e., normal reservoir pool elevation) to empty reservoir conditions

3. Structural stability analyses of the concrete spillway using an updated seismic design acceleration of 0.15g

The results of the above engineering analyses will identify whether the Dam meets current MoDNR factor of safety requirements or if further action, by way of modifications to the Dam, is necessary to achieve compliance. Geosyntec proposes to review the above noted analyses with the MoDNR Dam and Reservoir Safety Program to verify if compliance can be achieved without performing updated analyses.

6.3.8.2. Potential Dam Modifications

If substantial improvements or modifications are made to the Dam, a construction permit will be required from MoDNR per 10 CSR 22-2: Chapter 2—Permits. The Dam's design requirements and supporting calculations would need to fully comply with current regulations to be eligible for construction permit application. In addition to design engineering to support the modification, existing analyses considered compliant under current regulations would likely need to be updated to use current analytical methods and technologies. Engineering analyses potentially requiring updates to meet current analytical methods as part of the construction permit application may include the following:

1. Hydrologic analysis to determine the required critical in-flow design IDF hydrograph based on the required PMP (75% of PMP for Environmental Class I dams). PMP values can be obtained from the Hydrometeorological Report No. 51 or the latest published values by NOAA.

2. Use current analytical methods to compare the required design storm outflow hydrograph derived by reservoir routing through the spillway.

3. Riverine and spillway hydraulic analysis with HEC-RAS that is consistent with current FEMA practices (10-year, 50-year, 100-year, and 500-year flood return intervals).

4. A full assessment of the bedrock on the north abutment of the spillway to assess the capacity before applying any modification to the Dam's structure.

5. Slope stability analyses of the earth embankment to use updated analytical methods and available computer programs.

6.3.8.3. Recommendations

In the event no substantial improvement or modifications are proposed for the Dam, Geosyntec still recommends updating the following list of engineering analyses per our assessment findings even though the following updates are not currently required by MoDNR as part of their renewal registration permit for the Dam. Some of the following updates may be updated in concert with the required engineering analyses:

- Update the IDF analysis utilizing current hydrologic data, analytical methods and modeling software to develop and route the hydrograph.

- Update the SPF with current data and analytical methods/software.

- Update breach analysis and inundation maps with current analytical methods, including sunny and rainy-day breach scenarios.

- Update geotechnical stability analyses using modern methods and computer programs. May be included as part of required updated analyses.

- Update spillway structural stability analyses with updated SPF or full reservoir conditions, current silt build-up, and drainage curtain impacts to uplift pressures. This may be included as part of required updated analyses.

- Geosyntec also recommends obtaining LiDAR and making minor repairs per our visual inspection findings.

7. DAM MODIFICATION ALTERNATIVES ASSESSMENT

The Dam components comprise a concrete dam section approximately 598 feet in length between the rock abutment on the north end and concrete abutment on the south end, as well as an earthen embankment approximately 1,753 feet in length from the concrete abutment to before the Dam transitions to a lower elevation (<1,162 feet per the National Geodetic Vertical Datum of 1929) near the cooling water intake structure on the southwest corner of the lake (City Utilities 1955).

This section provides an initial assessment of four primary dam modification alternatives with the objective of enhancing current recreational use, habitat conditions, and fish passage.

7.1. Design Objectives and Considerations

Different water quality standards may apply to different types of recreational water activities, depending on the potential health risks associated with exposure to pathogens or other contaminants in the water. The design of improvements must begin with identifying design objectives. A few high-level objectives that may be interdependent are presented below:

Improve Water Quality. Selective withdrawal, run-of-the-river releases, variable minimum flows, temperature management, and routing of sediments are some of the potential considerations that could address water quality—that would accumulate slowly but become quite substantial over time. Water quality releases for downstream management have both quantitative and qualitative aspects. The stream and reservoir water temperature annual cycle of warming in the spring and cooling in the fall is an important consideration as it is critical to life cycles in the aquatic community. Dissolved oxygen is related to temperature, and aquatic communities require continuous supplies of dissolved oxygen (USACE 2017).

Create Kayak Passage. Recreational users of both upstream and downstream areas of the reservoir generally prefer constant water levels (USACE 1987). Recreational use of reservoirs may extend throughout the year. Under most circumstances, reservoirs yield optimal recreational use when they are at or near full pool depth during the recreational season, which is generally from April through October (USACE 2017). Design considerations should include an assessment of flow rate and volume of water; gradient and shape of the riverbend; presence and location of rocks, eddies, waves, holes, and other features; and safety and accessibility of the river run.

Create Fish Passage. There are many benefits to providing fish passage. It restores river ecosystems and enhances biodiversity by allowing fish to access their historical spawning and rearing grounds; improves water quality and reduces sedimentation by reconnecting natural flow regimes and increase riparian vegetation; and enables fish or other aquatic species to move through an aquatic system among all habitats necessary to complete their life cycle (NOAA). Fish and wildlife conservation and enhancement in the reservoir may include features such as the following:

- Intake structures to minimize entrapment and entrainment of fish and other aquatic species.
- Outlet and emergency spillway structures to minimize contact of aquatic species with waters supersaturated with dissolved gases and to provide appropriate release water quality.

- Fish ladders, fish bypasses, and other pertinent facilities to permit fish passage around structures.

Fish and Wildlife passage at these reservoirs is improved by retaining standing vegetation during construction, as well as providing conditions conducive to growth of suitable aquatic and wetland vegetation. Low-flow augmentation reservoirs provide releases that increase flow in the downstream channel for downstream fish and wildlife purposes or, for downstream water quality control (USACE 1987).

Remove Owner's Liability. Studies show that dam removal has sustainable long-term environmental and water quality benefits. (National Oceanic and Atmospheric Association 2021). Dams not only impede flow of water, but also trap sediments, which can be physically managed before the dam removal and then maintained periodically.

In summary, design considerations should include 1) optimal water level throughout the year, 2) steady supply and routing of sediments, 3) circulation of water to manage temperature and dissolved oxygen supply, and 4) appropriate passage across the Dam spillway. The James River Power Station Landfill and the downstream low-bridge water crossing was not included in this assessment and should be assessed in future detailed designs.

7.2. Alternatives Assessment[6]

The complexity of the Dam's structure allows for an array of potential modifications within the four primary alternatives. Any modification to the Dam's components will trigger a construction permit and associated engineering analysis as presented in Section 6. For each alternative presented below, engineering and geological design considerations will be required by a fully coordinated team of structural, material, geotechnical, hydrological and hydraulics engineers and geologists.

Note: Prior to any physical modification to the dam, a sediment management plan must be executed to properly manage accumulated sediment and the annual sediment inflow from the watershed.

(Note: stationing and elevations discussed in this section are based on construction as-built records and National Geodetic Vertical Datum of 1929.)

7.2.1. Dam Removal

The objective of removing the Dam would mainly be to restore free flowing stream and remove the liability of maintaining the Dam structure. Aging dams are increasingly removed in the United States and elsewhere because they no longer serve the intended uses, and because removing dams benefit river health, public safety and climate resilience. (American Rivers 2022) Generally, the physical transition in a river due to dam removal is going from a wider, deeper, and slower flow that resembles a pond or a lake to a narrower, shallower and faster flow of a river (National Oceanic and Atmospheric Association 2017).

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[6] Stationing and elevations presented in the Alternatives Assessment section are based on construction as-built records and National Geodetic Vertical Datum of 1929

Two alternatives, A-1 and A-2 were assessed under the dam removal category.

7.2.1.1. Alternative A1-Full Removal

The concrete dam is deconstructed all the way to the toe with the intent of restoring the historic James River channel alignment **(Appendix C-1).** The earthen embankment would remain in place. The roadway bridge going across the channel would be reconstructed, thus extending its design life. Once the Dam is removed, the river flow would match the characteristics of the James River upstream of the lake.

Design concept: The concrete dam would be deconstructed between stations 23+10 and 29+08 approximately 598 feet down to the toe at 1,120 feet. Once the concrete dam is removed and materials hauled off the site, the channel must be restored, graded, and stabilized with riprap or other appropriate stabilizing products to prevent erosion and dissipate energy. The concrete footing will remain in place while the channel alignment is adjusted and graded to provide appropriate drop height for fish and/or kayak passage.

7.2.1.2. Alternative A2-Partial removal

The two center concrete bays are deconstructed all the way to the toe with the intent of restoring the historic James River alignment **(Appendix C-2).** The routing of the historic James River alignment may need to be adjusted and stabilized. This alternative will minimize permanent impoundment of water that forms the lake without removing the entire concrete section described above. It will also help improve the quality of water over time and allow for a steady sediment supply to support the downstream habitat.

Design concept: Two bays near the center of the concrete dam from station 24+74 to 26+54 approximately 180 feet would be deconstructed to the toe at 1,128 feet elevation. Partial reconstruction of the roadway bridge along with bridge pier #3 at station 25+54 may be needed. The concrete footing will remain in place while the channel alignment is adjusted and graded to provide appropriate drop height for fish and/or kayak passage.

7.2.2. Concrete Dam Modification

The primary objective of this alternative would be to create fish and/or kayak passage. When dam removal is not feasible, lowering the primary spillway elevation along with modifying the downstream facing dam section with a flatter slope could still improve water quality and also provide for fish and kayak passage. Length of downstream passage run may be different. The primary spillway elevation would be lowered by approximately 2 feet and the downstream facing dam section would be modified to meet the design requirements of kayak and/or fish ladder.

Two alternatives, B-1 and B-2 were assessed under the concrete dam modification category (**Appendix C-3**).

7.2.2.1. Alternative B1-Center Bay

The location of the modification would be near the center of the Dam to align close to the historic James River and have relatively less scour potential. This is also the same location where an opening existed during construction of the Dam. In this case, both sides of the wall would be exposed to water, which is a concern.

Design concept: Saw cut a 2 feet deep concrete section between bridge pier #3 at station 25+64 and bridge pier#4 at station 26+54 approximately 50 feet wide. No modification to earth embankment and the abutment. Since this only lowers the impounded water by 2 feet, minimum sediment management may be required then compared to the dam removal alternative. A kayak passage or a fish ladder may be constructed on the downstream face of the Dam with a 10H:1V slope tying at 1,123 feet. Energy dissipation must be considered along with appropriate channel grading at the tie-in points.

7.2.2.2. Alternative B2-Southern Bay

The location of this modification would be adjacent to the earthen embankment. This will provide for a better design (geometry), as only one side of the wall would be exposed to the water. Scour flow, however, could be an issue.

Design concept: Saw cut an approximately 50 feet wide and 2 feet deep concrete section between bridge pier #6 at station 28+34 and the earth abutment at station 29+08. Protect earth embankment and the abutment. Since this only lowers the impounded water by 2 feet, minimum sediment management may be required then compared to the dam removal alternative. A kayak or fish ladder may be constructed on the downstream facing of the Dam with a 10H:1V slope tying at 1,123 feet. Energy dissipation must be considered along with appropriate channel grading at the tie-in points.

7.2.3. Earthen Dam Modification

In this alternative, a section of the earthen portion of the Dam would be modified with the objective of creating fish and kayak passage across the dam and reducing cost of removing or modifying the concrete section. A new roadway bridge would be constructed across this opening. This modification would include constructing a passage with an upstream invert elevation near the elevation of accumulated sediments. The passage run alignment may vary depending on the requirements for the type of passage desired. Alternatively, this could also be used to provide bypass for any of the above presented concrete modification alternatives.

Three alternatives, C-1, C-2 and C-3 were assessed under the earthen dam modification category (**Appendix C-4**).

7.2.3.1. Alternative C1

The location of the modification would be about 120 feet from the bridge abutment. Channel alignment with a mild bend will follow existing grade and tie into the downstream channel.

Design concept: Excavate an approximately 22-foot-deep channel, 50 feet wide between station 30+28 and 30+78. Grade a channel with a 5-foot drop and tie grade at 1,120 feet. Retaining walls will be needed.

7.2.3.2. Alternative C2

The location of the modification would be about 265 feet from the bridge abutment. Channel alignment with a 90° bend will follow existing grade but encroach into the parking area more than alternative C1.

Design concept: Excavate approximately 22-foot-deep channel, 50 feet wide between station 31+73 and 32+23. Grade a channel with a 5-foot drop and tie grade at 1,120 feet. Retaining walls will be needed.

A third alternative (Alternative C-3) could be a hybrid of alternate 1 and 2. This alignment may require more robust energy dissipation feature due to a short channel length.

7.2.4. No Modification

Lastly, with no modifications to the structural components of the Dam, physical features would remain functionally the same, but engineering analysis would be updated to current practices. Minor structural repairs would be performed, such as restoring riprap armor on the upstream side of the earth embankment and restoring grade adjacent to left (south) abutment (**Appendix C-5**). All physical elements and the hydraulic performance of the Dam will remain the same.

Though a construction permit is not required, this alternative would provide a bookend analysis of the current condition for a range of flows, lake conditions, and interventions. Potential evaluation components should include structure, hydrology and hydraulics, lake management, and regulatory compliance. Even with no modifications to the structural components of the Dam's infrastructure, an engineering analysis using current analytical methodologies should be performed to evaluate slope stability, concrete loading, seismic stability, and hydrologic and hydraulics.

7.2.4.1. Operation and Maintenance

A dam owner is responsible for its safety. Liability can be imposed upon a dam owner for failure to maintain, repair, or operate the dam in a safe and proper manner. This liability can apply not only to the dam owner, but also to any company/agency that leases the land upon which the dam sets, or any person who operates or maintains the dam. To meet the responsibility of maintaining a dam in a reasonable and safe condition, every jurisdiction will require a dam owner to conduct regular inspections (by a registered engineer) of the dam and maintain and/or repair deficient items.

7.3. Drinking Water Intake Impact Assessment

Geosyntec reviewed the existing HEC-RAS model (Version 4.1.0). An initial assessment was performed to check if there would be any changes to the water surface elevation due to potential dam modifications. This assessment included HEC-RAS model runs for two scenarios where the elevation of the inline structure (Dam) was adjusted to 1120 and 1138 feet as summarized in **Table 13**.

Table 13: Summary of Drinking Water Intake Impact Assessment Using HEC-RAS

HEC-RAS 6.2 (FEMA Model)		
Run Date: August 1, 2023		
Geometric Data Edits to Inline Structure STA 48143.6 (Dam)		
Scenario	**Edits**	
1. Earth Embankment Mod	Reduced Gate Opening from 1140 FT to 1138 FT	
2. Dam Removal	Reduced Gate Opening from 1140 FT to 1120 FT	
Output - Water Surface Elevation (WSE) Change		
STA 82150.7 (James River Intake Structure)	**100yr.**	**2yr.**
Existing Model	1169.67	1162.88
Earth Embankment Mod	1169.67	1162.88
Dam Removal	1169.67	1162.88

STA 76743.2 (Downstream of Intake)		
Existing Model	1164.67	1157.98
Earth Embankment Mod	1164.65	1157.98
Dam Removal	1164.65	1157.97
STA 48183.6 (Dam)		
Existing Model	1149.19	1143.92
Earth Embankment Mod	1147.16	1141.92
Dam Removal	1143.8	1132.6

The location of the drinking water intake in relation to the Lake Springfield is presented in **Appendix D.**

8. COST CONSIDERATIONS

Geosyntec developed cost predictions for the select dam modification alternatives (**Table 14**); cost of standard of care needed for the operation and maintenance of the Dam whether modified or not modified (**Table 15**); and prediction of cost for removing sediment deposited in the lake and future deposition from the watershed (**Table 16**). Line items considered in developing cost range for dam modification alternatives are presented in **Appendix E**.

For dam modification alternatives, assumptions[7] included general contractor mobilization, site access, temporary water retention structures, dewatering inside cofferdam, demolition of concrete weir features, finishing of concrete to remain, removal of temporary water retention structures, and site restoration.

Table 14: Dam Modification Cost Prediction Summary

Alternative	Description	Cost Range Prediction (2023 Dollars in Millions)		
		Lower	Middle	Upper
Alternative A-1	Complete dam removal	\$17M	\$27M	\$44M
Alternative A-2	Partial dam removal	\$8M	\$12M	\$20M
Alternative C-1, C-2 or C-3	Earthen embankment bypass	\$5M	\$7M	\$11M

Note: Cost of replacement or rehabilitation of the Kissick Roadway bridge is not included in this cost summary.

To achieve a standard of care for the operation and maintenance of the existing dam, two main categories are presented in **Table 15**. A routine maintenance is assumed to include monthly and annual inspection and mowing of the earth embankment. While capital maintenance is assumed to include periodic inspection (every 5 years), seeding of eroded areas, backfill of settlement and animal borrow areas, clearing of large vegetation, riprap replacement, debris removal from the spillway, and minor concrete repairs.

[7] Currently, for this nature of scope, there is limited market data available to develop a cost estimate. It is also difficult to predict market volatility and sensitivity, especially post-2020/2021. Developing cost estimates based on an expected sequence of construction reduces some of these market-based risks in evaluating a true cost of construction.

Table 15: Operation and Maintenance Cost Summary

	1st year/Annual	1-10 years	10-20 years	20-30 years
Routine Maintenance	$4,000	$47,000	$63,000	$84,000
Capital Maintenance Programming	$24,000	$316,000	$515,000	$935,000
Total	$28,000	$363,000	$578,000	$1,019,000
Cumulative	$28,000	$391,000	$969,000	$1,988,000

As of the date of this report, no additional sediment investigation has been performed to determine whether sediment below the top six inches is polluted or clean, hence cost prediction summary presented in **Table 16** assumes dredging and haul off operations. The unit cost assumed based on Geosyntec's professional judgement is $50 per cubic yard of sediment removed.

Table 16: Sediment (in Lake) Management Cost Summary

		Cost Range Prediction (2023 Dollars in Million)		
	Volume (Cubic Yard)	Lower	Middle	Higher
Loose or unconsolidated sediment	0.7 million	$22.5M	$34.6M	$57M
Restore lake to as-built grades	1.08 million	$35M	$53.8M	$88.7M

Figure 11 presents cost to remove incoming annual sediment volume of 7,900 cubic yard (estimate based on PLET model) from the Upper James River watershed.

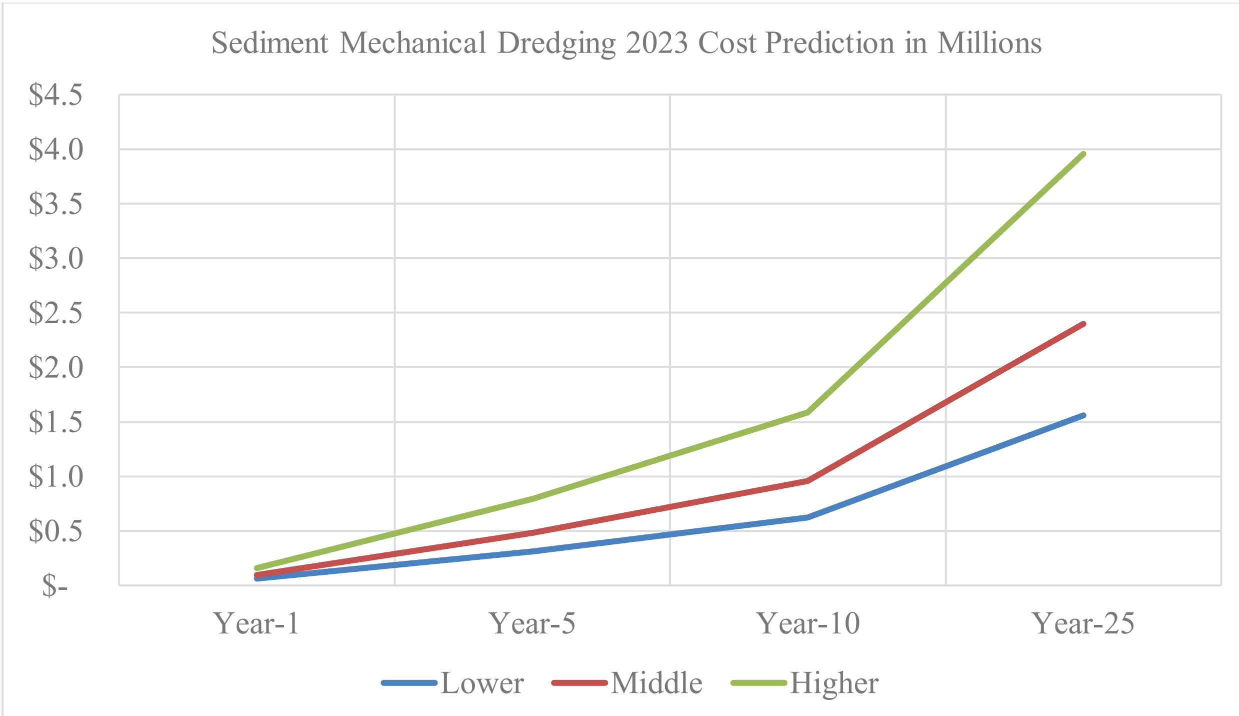

Figure 12: Sediment (from Watershed) Management Cost Summary

The following elements must be considered when developing detailed project costs:

- Sediment management plan including investigation, analysis, treatment (if needed), reuse and disposal alternatives.
- Wetlands identification, delineation and restoration or preservation.
- Riverine or lake reservoir restoration.
- Fish passage and kayak passage design alternatives.
- Water pump and treat system design alternatives.
- Continuous water quality monitoring for public health and safety
- Operation and preventative maintenance of the Dam structure and the lake.
- Drawdown operation of impoundment and earth embankment bypass feature.
- Extent of revegetation of the formerly inundated area and long-term maintenance
- Engineering analysis and design.
- Local, state and federal permitting and compliance requirements.
- Construction and oversight

9. RISKS CONSIDERATIONS

The service life of a well-designed, well-monitored, and maintained dam could last about 100 years. Factors affecting the lifespan of dams are as follows:

- Changes in the design criteria (hydrology and seismic hazard) based on new information obtained since the initial design of the dam
- Changes in methods of analysis and new safety concepts
- Results of risk assessments
- Aging of construction and foundation materials and components

In addition, it maybe drastic to adapt an old dam to a new seismic design and flood safety criteria than the rather more long-term changes in the floods. Evaluating risks associated with the alternatives presented can be summarized under two main features: the waterbody/Lake and the Dam structure.

9.1.1. Waterbody/Lake

Regulatory compliance: As it stands today, the waterbody is impaired for AQL due to chlorophyll-a and has nuisance vegetation forming on sediment deltas within the lake.

The City of Springfield is supportive of undertaking a nutrient management strategy through a watershed-based approach to:

- Improve the river's water quality; and
- Provide a cost-effective alternative to additional nutrient removal at their Wastewater Treatment Plants.

The approach includes installation of a riparian corridor along the James River. When implemented, this would help reduce the amount of nutrients transported by the stream. If updated to WBC-A, the designated use of the lake would need to maintain more stringent water quality criteria to stay in compliance. Managing this risk would include continued coordination of efforts with the city's water quality integrated plan and the James River Basin Partnership.

Eutrophication: If no passage is created for movement of incoming sediments, continued accumulation from upstream watershed would ultimately result in reduced lake volume, thus leading to less options for recreational usage.

Maintenance: If nuisance vegetation continues to spread over time, it could encroach areas that are currently boatable. Removal of nuisance vegetation is important to maintain and/or improve water quality along with installing aquatic vegetation that could support a healthy warm water biota. This could also compliment the city's watershed-based approach for nutrient management.

Climate Change: Increase in stream flows due to extreme events could impact the flow velocity and its water surface elevation in the lake. Seasonal and annual changes could impact how the lake is used. Continuous monitoring of weather and stream flows just upstream of the lake could help manage risks in real time.

Land Use Management: As presented in this report, land use changes in the last 20 years indicate an increase in developed areas and a decrease in forest land. The direct impact that this has on water quality is that instead of percolating into the ground, stormwater runs off impervious surfaces transporting pollutants and essentially polluting the waterbody. Stormwater management is an important aspect of infrastructure planning process as it could deteriorate water quality significantly and increase flooding risks downstream, if not managed properly.

9.1.2. Dam Structure

Regulatory Compliance: Regulations change over time based on many factors. Keeping up with the changing regulations, along with managing safety risks to downstream life and property, could become a burden.

Infrastructure Failure: As with anything, an engineered structure has a service design life. Once the design life has exceeded, structure failure could occur if not maintained or restored to meet its original design intent.

Maintenance and Rehabilitation: Preventative maintenance and repairs/rehabilitation must occur in a timely manner. There is risk of increase in repair costs as infrastructure ages.

Sediment Management: Dams are barriers to the flow of water that transports sediment from the watershed. Sediment will continue to accumulate upstream of the Dam that could deprive appropriate sediment supply to the river downstream of the Dam and negatively impact a healthy stream geomorphology and habitat.

Existing Utility Infrastructure Impacts: Under the water surface elevation of the lake, there are two 30-to-40-inch sewer crossings that may need repair or replacement in the future. Access to these sewer lines could be challenging and costly due to impounded water.

10. ENVISION SUSTAINABILITY PLANNING

Selecting the appropriate dam modification alternatives based on the relative cost of construction could be ambiguous by itself, but stakeholder input on risk management associated with a high hazard dam, coupled with long-term vision for the community, could enable a holistic planning process.

Many cities, towns, public agencies, and academic institutions both globally and across the United States recognize or use Envision to guide infrastructure development. It can provide a consistent, consensus-based framework for broadly assessing sustainability, resiliency, and equity in civil infrastructure.

The use of Envision can benefit projects in many ways, including the following:

- Long-term viability through increased resiliency and preparedness
- Lower costs through management and stakeholder collaboration
- Reduced negative impacts on the community and the environment
- Potential to save owners money over time through efficiency
- Credibility of a third-party rating system
- Increased public confidence and involvement in decision-making

Envision is used to assess project factors under five categories of suitability and resilience:

1. **Quality of Life:** Quality of Life assesses whether infrastructure projects align with community goals, are incorporated into existing community networks, and will benefit the community in the long term.

2. **Leadership:** Successful sustainable projects require a new way of thinking about how projects are developed and delivered. Project teams are most successful if they communicate and collaborate early in the project's development; involve a wide variety of people in creating ideas for the project; and understand the long-term, holistic view of the project and its life cycle. The city has demonstrated superior leadership in bringing different stakeholders to the table to discuss project risks and align with the long-term vision for the lake.

3. **Resource Allocation:** Resources are the assets needed to build infrastructure and keep it running. Resource allocation concerns itself with the quantity, source, and characteristics of these resources and their impacts on the overall sustainability of the project.

4. **Natural World:** Infrastructure projects have an impact on the natural world around them, including habitats, species, and nonliving natural systems. The natural systems

perform critical functions called ecosystem services that provide us with clean air, clean water, healthy food, and hazard mitigation.

5. **Climate and Resilience:** The scope of Climate and Resilience is two-fold: minimizing emissions that may contribute to climate change and other short- and long-term risks and ensuring that infrastructure projects are resilient. To be resilient, infrastructure must be informed, resourceful, robust, redundant, flexible, integrated, and inclusive.

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Appendix A-1

Field Data Collection, Methodology and Results

Field Data Collection, Methodology and Results

Methodology

The following subsections prescribe the methods for collection of water quality, bathymetry, and sediment characterization of Lake Springfield.

Water Quality Data

A total of 11 water quality samples were collected throughout November and December including quality assurance and quality control (QA/QC) samples.

Riverine samples were collected at the center of the channel as grab samples via wading using a DH-81 depth integrated sampler. Lake samples were collected at the lake surface via boat as surface grabs. Samples were collected with composite sample jars and then distributed into pre-labeled laboratory bottles and placed on ice. Samples were transported to Pace Analytical in Springfield, Missouri, for analysis. Laboratory parameters included biological oxygen demand (BOD), chl-a, nitrate/nitrite, total phosphorus, dissolved orthophosphorus, ammonia, total Kjeldahl nitrogen (TKN), total nitrogen, and total suspended solids (TSS). Samples were filtered in the field for chl-a and dissolved orthophosphorus. Field blanks (DI water) and field duplicates were collected for QA/QC purposes and water quality readings of water temperature, dissolved oxygen, conductivity, and pH were also collected at each location.

Bathymetry Data

Bathymetric mapping and sediment thickness profiling were conducted in early November within the boatable portions (>2.0 feet water depth) of Lake Springfield from the dam to upstream of the Lake Springfield Boat House launch. Data were collected using a small john boat equipped with a Specialty Devices Inc. BSS+ sub-bottom profiler, which includes multiple acoustic depth sounders and a sub-meter global positioning system (GPS). This device uses three acoustic frequencies to continuously collect water depth and sediment thickness measurements. The highest frequency (200khz) represents the water depth to the lake bottom. The lower frequencies (50khz and 12khz) penetrate fine sediment and the difference between the highest and lower frequencies represents the thickness of unconsolidated lake sediments.

The boat was piloted slowly along transects approximately 100 feet apart back and forth across the boatable portions of the lake, including the historic James River channel, which lies on the southern edge of the lake (See **Figure 1** in this Appendix). The data collected were then reviewed and corrected for sensor depth and anomalies (i.e., submerged woody debris) using Specialty Devices Inc. DepthPic software and exported to an excel database, which included depth (water and sediment), latitude, and longitude of each acoustic sounding. These data were interpolated using GIS software to generate maps for lake bathymetry and the thickness of fine sediment deposits (see **Figure 2** in this Appendix).

Sediment Data

Lake Springfield sediment samples were collected at 41 locations in early December. Sediment sampling locations are also depicted on **Figure 2**. Sampling locations were selected for maximum lake coverage in readily accessible areas. It was determined through bathymetric mapping and sediment thickness profiling that adequate sediment was present for sampling throughout the boatable portion of the lake.

Field Data Collection, Methodology and Results

Sediment samples were collected using a Ponar sampler, which collects lake sediment to a depth of approximately six inches at a given location. Sediment samples ranged from a single Ponar grab to a composite of up to five lake locations. A single ponar grab is useful for collecting information of a specific area (i.e., near a discharge pipe), while lake composites inform overall lake sediment quality. Ponar samples were composited using stainless steel bowls and stainless mixing implements and transferred to pre-labelled laboratory bottles for analysis. The sample nearest the cooling water discharge was collected as a single ponar grab, and a land-based soil sample was also collected as a single grab. A total of 9 composite samples and 2 grab samples were collected and transported to Pace Analytical in Hazelwood, Missouri for analysis. Laboratory parameters included particle size, total solids, solids-moisture, organic carbon, nutrients, pesticides, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and total metals.

Results and Discussion

The following sections summarize the results from field investigations conducted by Geosyntec in 2022 and their relevance to Lake Springfield Master Planning efforts.

Water Quality Data

Surface water samples were collected in November and December of 2022 and analyzed for nutrients, chl-a, BOD, and TSS. 11 total samples were collected, two of which were QA/QC samples. In general, nutrient, BOD, and chl-a concentrations were low at all sites. Given samples were collected during the late fall, results are likely not representative of worst-case conditions, as biological activity and nutrient concentrations are expected to be higher during the spring and summer months. A water quality data table including the analytical methods, reporting limits, and results from the laboratory and field are included as part of this Appendix.

Data collected in November and December do not provide relevant information to assess compliance with the summertime nutrient water quality standards. However, it is worth noting that the highest chlorophyll-a value observed occurred below the dam at 6.8 µg/L and that none of the in-lake samples exceeded 2.8 µg/L. Chl-a concentrations were below applicable criterion but detectable across most samples.

All ammonia nitrogen samples were below laboratory reporting limit of 0.3 mg/L and well below applicable water quality standards. Acute and chronic water quality criteria related to AQL/WWH for ammonia nitrogen are temperature and pH dependent. During sampling, pH values ranged from 7.7 to 8.1 S.U. and water temperature ranged from 14.6 to 14.8 °C (Table X). Under these conditions, the acute and chronic ammonia nitrogen water quality standards would be approximately 6.9 and 2.0 mg/L, respectively.

All samples were below the reporting limit for total phosphorus (0.05 mg/L). There was only one detection for dissolved orthophosphorus on the James River upstream of the lake (Crighton Beach) of 0.038 mg/L. Total nitrogen values ranged from 1.0 mg/L (the reporting limit) to 2.6 mg/L (Crighton Beach). All collected samples had detections for nitrate/nitrate above the laboratory reporting limit. Nitrate/nitrate values ranged from 0.46 mg/L (near dam) to 2.6 mg/L (Crighton

Beach), with higher concentrations typically occurring upstream of the lake (Crighton Beach). Many of the samples were below the reporting limit for TKN (1.0 mg/L), except for the 3 lake samples collected on November 9th where TKN was 1.2 mg/L.

There are no numeric water quality standards specific to BOD and TSS in Missouri, however, point sources commonly have effluent BOD and TSS limitations that must be met. At 10 CSR 20-7.015(4)(A) discharges from publicly owned treatment works to lakes must conform to BOD and TSS monthly averages of 20 mg/L and 30 mg/L, respectively. None of the TSS concentrations exceeded these point source thresholds. TSS concentrations were generally low, ranging from 4.0 (reporting limit) to 16.0 mg/L. BOD was generally below the reporting limit (4.0 mg/L) for most samples. However, the November 9th and December 14th BOD samples upstream of Lake Springfield in James River (Crighton Beach) were 26.0 mg/L and 4.4 mg/L, respectively.

Bathymetry and Sediment Data

Bathymetric survey and sediment profiling of the lake, discussed herein, indicate that the lake is relatively shallow outside of the historic James River channel, with varying sediment thicknesses. The majority of the lake ranges between 4.0 to 6.0 feet of water outside of the historic James River channel, which hugs the southern shoreline of the lake (**Figure 2**). The historic James River channel exhibited water depths between 6.0 to 12.0 feet, although in some areas depths of up to 22.0 feet were observed.

Sediment thickness varied throughout the lake, likely as a result of the geomorphology of the historic James River channel (**Figure 3**). Depositional areas were observed approximately 500 feet upstream of the dam across the entire lake, where sediment thicknesses ranged from 2.0 to 6.4 feet. There is also a large depositional area near the center of the mapped area, where aquatic macrophytes and shallow water are present, with sediment thickness of 1.5 to 2.3 feet thick.

Some portions of the lake were not traversed via boat due to insufficient water depth and the presence of aquatic vegetation, which compromises the equipment used to collect these data. Therefore, water depth and sediment thickness data described above were interpolated in GIS.

Of the sediment samples collected, none had detections above the laboratory reporting limits for pesticides, PCBs, PAHs, or semi-volatile organics. Commonly detected above laboratory reporting limits were physical, metals, and nutrients parameters. It is important to note that the sediment Ponar sampling method collects more recently deposited sediments (i.e. top 6 inches) and that while these constituents were not detected at the top of the sediment profile, they could be present at lower horizons. Based on the sediment profiling data discussed above, sediment thicknesses were generally over 6.0 inches throughout the lake. A sediment data table including the analytical methods, reporting limits, and laboratory results are included as part of this Appendix.

Based on the sediment profiling data discussed above, sediment thicknesses were generally over 6.0 inches throughout the lake. A sediment data table including the analytical methods, reporting limits, and laboratory results are included as Attachment X.

Field Data Collection, Methodology and Results

Metals were detected in most lake sediment samples and the upland background sample. Metals analyses included silver, arsenic, barium, cadmium, mercury (dissolved), nickel, lead, selenium, zinc, chromium, and copper. **Table 1** below summarizes the range of metals concentration detected above laboratory reporting limits within Lake Springfield compared to the upland background soils. Location 8 in Lake Springfield is commonly associated with the lowest metals concentrations and below upland background concentrations, and locations 1 (single Ponar), 5 and 6 are commonly associated with the highest metals concentration. Lake Springfield nutrient concentrations are similarly distributed with previously described metals concentration. Sediment sampling location 1 is near the former cooling water discharge and locations 5 and 6 are along the historic James River channel.

The U.S. EPA has not yet established federal guidelines for toxic chemicals in lake sediments. However, MDNR assesses waterbodies using an approach developed by D. McDonald et.al (2000), which assesses the synergistic effects of multiple metals on aquatic life by developing a "probable effects concentration quotient" (PEC-Q) for streams. The PEC-Q indicates the likelihood that that metals concentration in a waterbody would have a negative effect on aquatic life, with values exceeding 0.5 indicating toxicity to sensitive aquatic life and 0.75 indicating impairment of the waterbody. PEC-Q is determined by calculating a geomean across all samples and comparing to PEC values from peer reviewed literature.

MDNR considered arsenic, cadmium, chromium, copper, mercury, lead, zinc, and nickel, all in their total forms, during a recent investigation at nearby Wilson Creek. Using these parameters across all samples and the same PECs as MDNR, the PEC-Q at Lake Springfield is 0.19, which indicates that the lake is not causing toxicity to aquatic life based on the samples collected. In addition, Lake Springfield sediment metals concentrations were well below the Missouri Tier 1 Risk Based Target Levels for residential silty soils ingestion pathway prescribed in Appendix B of *Missouri Risk-Based Corrective Action Technical Guidance*.

Field Data Collection, Methodology and Results

Table 1: Lake Springfield Detected Metals Concentration Ranges Compared to Upland Background Soils (mg/kg dry)

Parameter	Maximum		Minimum		Upland Soils Concentration	Tier 1 RBTL
	Location	Conc.	Location	Conc.		
Barium	5 and 6	137	8	11	109	1.56E+0
Chromium	1	24.6	8	7.0	16.8	1.17E+05
Copper	1	54.5	8	1.5	10.9	3.13E+03
Lead	5	36.7	8	ND	18.7	NA
Nickel	5	16.8	8	2.0	11.4	1.56E+03
Zinc	6	136.0	8	14.4	48.2	2.35E+04
Nitrate/Nitrite	1	1.3	ML	ND	3.3	NA
Total Phosphorus	3	530	8	210	290	NA
TKN	5	3,600	8	390	1,800	NA
Total Organic Carbon	9	7,790	8	4,430	9,770	NA
Particle Size*	6	92	8	44	76	NA
Solids Moisture*	1	63	8	47	21	NA
Total Solids*	5	31	8	55	82	NA

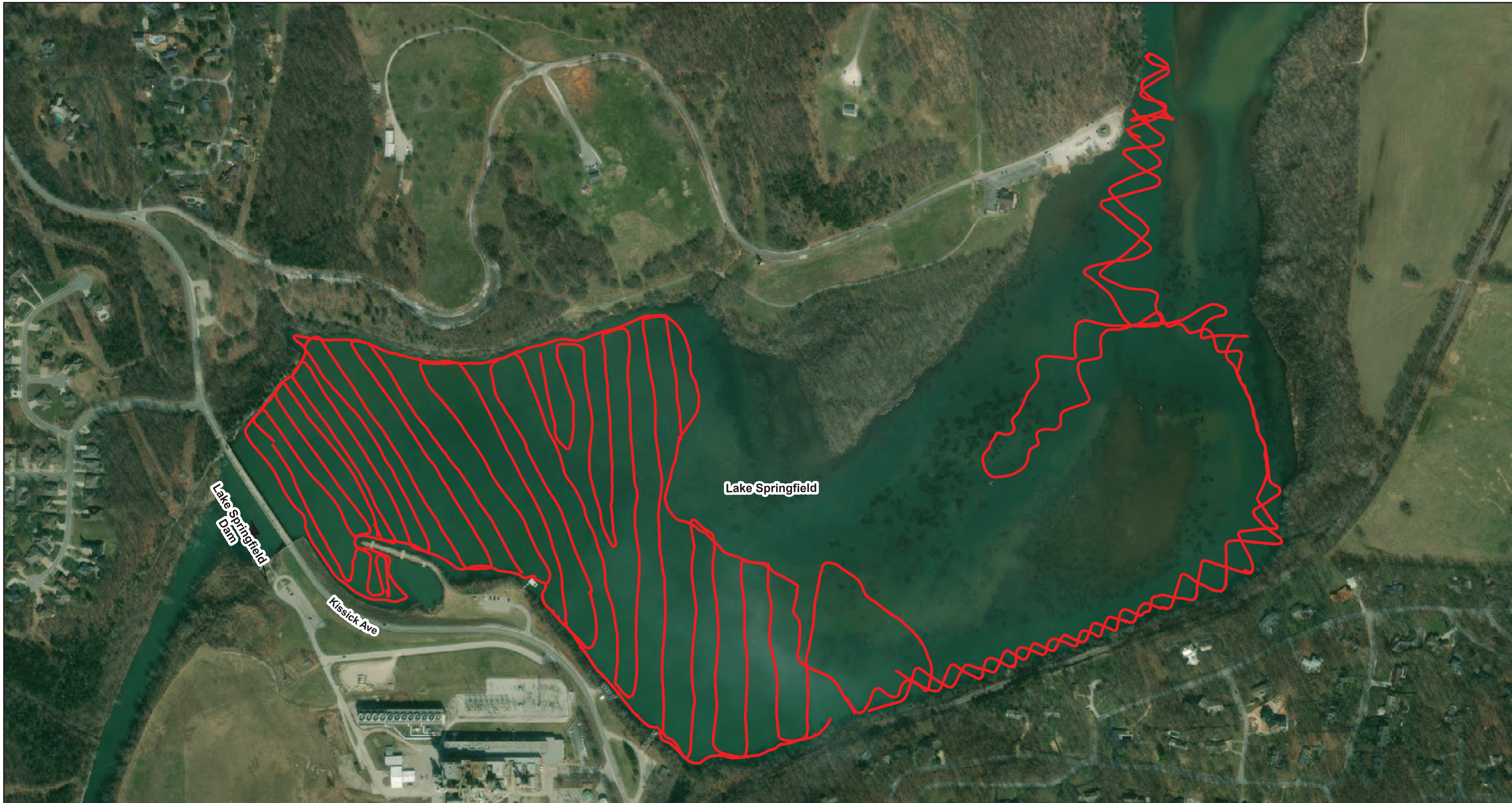
Notes: Conc. = concentration; RBCA = risk based target levels residential land use silty soils ingestion pathway; concentrations in mg/kg unless otherwise noted; ND = non-detect; ML = multiple locations; * = %.

This planning efforts must consider the existing condition of the lake, contributing pollutant sources, and current/future regulatory designated uses and attainment of those uses. Altering the existing lake or the immediate surroundings has the potential to impact the attainment of an existing uses or create new beneficial uses to Lake Springfield. To assess future opportunities for the Lake Springfield Plan, Geosyntec has prepared a Data Gap Assessment Matrix (**Table 2**). This matrix has been designed to provide decision makers with information to assess whether or not a planning option would impact the lake's designated uses, and if so, what data collection efforts are recommended prior to undertaking a given planning option.

Table 2: Data gap assessment matrix

Item of Concern	Key Water Quality Standards	Useful Existing Data	Data Gap	Data Gap Priority*	Timing
E. Coli	WBC-A and WBC-B threshold criteria	Upstream and downstream snapshot monitoring and MDNR James River data	Recreational season bacterial monitoring	High	Minimum 1 year, recommend 2 years to assess potential future WBC-A use or expanded WBC-B uses
Chlorophyll-a	Lake numeric nutrient criteria	SLAP and LMVP	More robust sampling frequency during recreational season	Medium	Minimum 1 year, recommend 2 years to assess existing impairment seasonally
Sediment at Depth	N/A, consider disposal requirements	N/A	Legacy sediment chemistry	High	Prior to dredging, disposal, or disturbance of sediments
Fish Tissue	HHP criteria	MDC 2017	Recent fish tissue data	Medium	To assess DHSS fish consumption advisory currently. Previous report from 5 years ago. Sediment data showed low PCBs in surface sediments
Fish Passage	NFPP	N/A	Understand benefits and gauge agency interest of re-establishing fish passage	Low	As Lake Planning efforts develop, based on public input.
Algal Toxins	Future promulgation of USEPA standards	SLAP and LMVP	More robust sampling frequency during recreational season	Low	Minimum 1 year, recommend 2 years to assess existing impairment seasonally

* A rating of High indicates data suggested for collection prior to initiating further planning efforts. Medium indicates data that would aid in planning efforts, but it not essential to protecting existing or new uses. Low indicates a data gap that could be filled if planning efforts and public involvement indicate concern or interest in a specific development option.



Legend

Flight Path

N

0 250 500 1,000 Feet

Lake Springfield
Bathymetric Flight Path

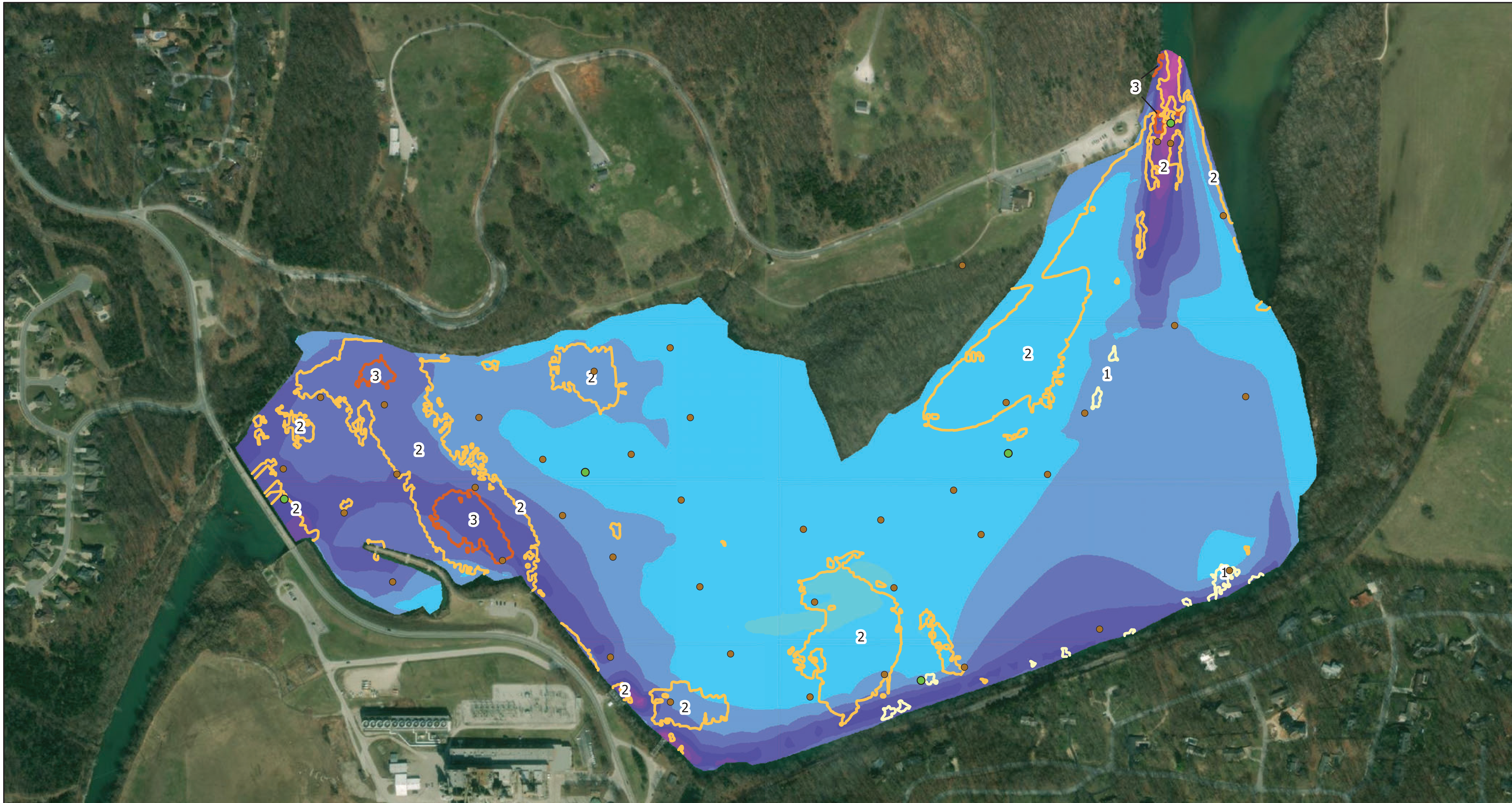
Lake Springfield, MO

Geosyntec consultants

St. Louis, MO | February 2023

Figure

1



Legend

- Water Quality Sample
- Sediment Sample

Sediment Thickness (ft)

- 1
- 2
- 3

Lake Bathymetry (ft)

- ≤1120
- ≤1122
- ≤1124
- ≤1126
- ≤1128
- ≤1130
- ≤1132
- ≤1134
- ≤1136
- ≤1138
- ≤1140

Lake Springfield Dam Data Collection

Lake Springfield, MO

Geosyntec consultants

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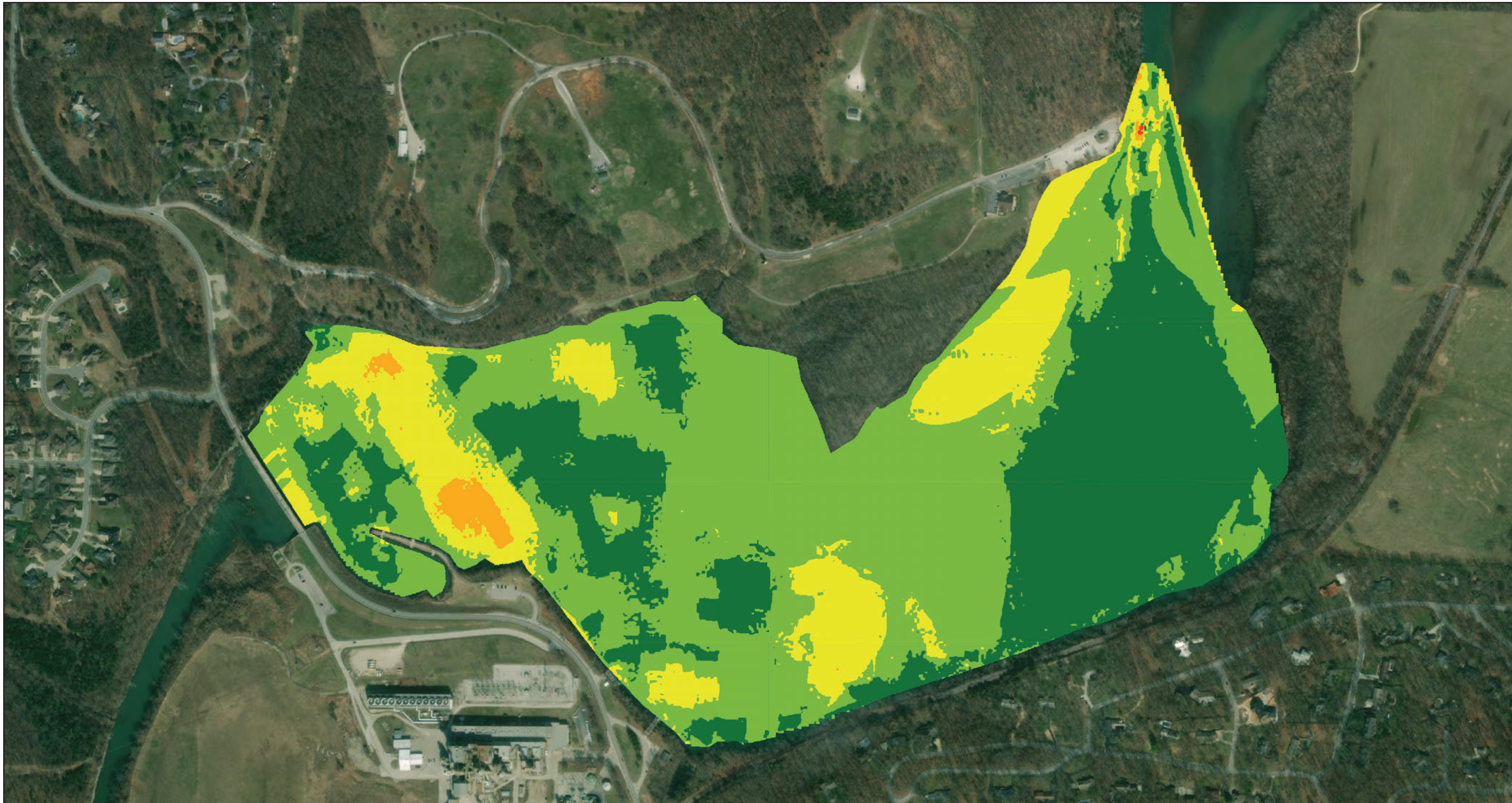
Figure 2

C074

P:\GIS\GISProjects\MOW5628 - Lake Springfield\Projects\2022(1214)LakeMap.aprx\2023(0127) Depth & Thickness 2/15/2023 12:28 PM (avandermus)



Legend

Sediment Thickness (ft)

- ≤1.5
- ≤2.0
- ≤3.0
- ≤4.0
- ≤14

Sediment Volume (CY)	Sediment Volume (ac-ft)
476,755	295.5

N

0 250 500 1,000 Feet

C075

Lake Springfield
Sediment Thickness

Lake Springfield, MO

Geosyntec consultants

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Figure 3

P:\GIS\GISProjects\MOW5628 - Lake Springfield\Projects\2022(1214)LakeMap.aprx\2023(0103) Sediment Volume 2/15/2023 12:12 PM (avandermus)

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PH (913) 224-1056
www.geosyntec.com

Geosyntec consultants

Date: January 11, 2023

To: Olivia Hough, City of Springfield
Dan Hedrick, City Utilities
Steve Prange, Crawford Murphy and Tilly

Copies to: Jason Clark, Crawford Murphy and Tilly

From: Priya Iyengar, Geosyntec Consultants

Subject: Water Quality Data Submittal

Geosyntec Consultants (Geosyntec) collected water quality grab samples on November 9th, 17th and December 14th from the Lake Springfield at 5 locations. Of the 5 locations, 3 were in the lake, one was upstream of the lake at Crighton Beach Access, and one was immediately downstream of the Lake Springfield Dam. Quality assurance/quality control samples were also collected, including a field duplicate and a field blank. Collected samples were delivered to Pace Analytical Services LLC on the same day to analyze for the following water quality parameters:

1. Ammonia, Nitrogen, Total
2. Biological Oxygen Demand (BOD)
3. Chlorophyll-a
4. Nitrate/Nitrite-N
5. Total Phosphorus
6. Phosphorous-ortho as P
7. Solids – total suspended solids (TSS)
8. Total Kjeldahl Nitrogen (TKN)
9. Total Nitrogen

Lab results from Pace Lab along with the compiled results prepared by Geosyntec are attached here for reference and use. It should be noted that a detailed review of these results is in progress by Geosyntec and will be documented in a future report. In addition to the water quality samples, Geosyntec also collected sediment samples and delivered to Pace Labs in Hazelwood, Missouri on December 15, 2023 and is still awaiting results. If you have any questions regarding the compiled data, please contact Mike Hogan at (636) 812-0821.

Attachments:

-Compiled Water Quality Data Sheets prepared by Geosyntec
-Copies of Lab Results from Pace Analytic Services LLC

Lake Springfield Water Quality Data from 11/9, 11/17, and 12/14

Sample Name	Sample Location	Date	Analyte	Result	Reporting Limit	Units	Qualifier	Method	Dilutution
LS-CB-01	James R. Crighton Access	11/09/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-JR-01	James R. below dam	11/09/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-01-01	L. Springfield near dam	11/09/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-02-01	L. Springfield-mid lake	11/09/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-03-01	L. Springfield marsh	11/09/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-FB-01	Field Blank (DI Water)	11/09/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-DUP-01	James R. below dam	11/09/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-JR-02	James R. below dam	11/17/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-CB-02	James R. Crighton Access	11/17/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-CB-03	James R. Crighton Access	12/14/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-JR-03	James R. below dam	12/14/2022	Ammonia, nitrogen, Total	0.3	0.3	mg/L	<	OIA/PAI-DK03 & EPA 350.1 REV 2	1
LS-CB-01	James R. Crighton Access	11/09/2022	BOD	26	4	mg/L	Mbod	SM 5210B 2001	1
LS-JR-01	James R. below dam	11/09/2022	BOD	4	4	mg/L	<	SM 5210B 2001	1
LS-01-01	L. Springfield near dam	11/09/2022	BOD	4	4	mg/L	<	SM 5210B 2001	1
LS-02-01	L. Springfield-mid lake	11/09/2022	BOD	4	4	mg/L	<	SM 5210B 2001	1
LS-03-01	L. Springfield marsh	11/09/2022	BOD	4	4	mg/L	<	SM 5210B 2001	1
LS-FB-01	Field Blank (DI Water)	11/09/2022	BOD	4	4	mg/L	<	SM 5210B 2001	1
LS-DUP-01	James R. below dam	11/09/2022	BOD	4	4	mg/L	<	SM 5210B 2001	1
LS-JR-02	James R. below dam	11/17/2022	BOD	4	4	mg/L	<	SM 5210B	1
LS-CB-02	James R. Crighton Access	11/17/2022	BOD	4	4	mg/L	<	SM 5210B	1
LS-CB-03	James R. Crighton Access	12/14/2022	BOD	4.4	4	mg/L		SM 5210B	1
LS-JR-03	James R. below dam	12/14/2022	BOD	4	4	mg/L	<	SM 5210B	1
LS-DUP-01	James R. below dam	11/09/2022	Chlorophyll a	2.7	1	mg/m3		SM 10200H	1
LS-CB-01	James R. Crighton Access	11/09/2022	Chlorophyll a	2.1	1	mg/m3		SM 10200H	1
LS-JR-01	James R. below dam	11/09/2022	Chlorophyll a	5	1	mg/m3		SM 10200H	1
LS-01-01	L. Springfield near dam	11/09/2022	Chlorophyll a	2.8	1	mg/m3		SM 10200H	1
LS-02-01	L. Springfield-mid lake	11/09/2022	Chlorophyll a	1	1	mg/m3	<	SM 10200H	1
LS-03-01	L. Springfield marsh	11/09/2022	Chlorophyll a	1	1	mg/m3	<	SM 10200H	1
LS-FB-01	Field Blank (DI Water)	11/09/2022	Chlorophyll a	1	1	mg/m3	<	SM 10200H	1
LS-JR-02	James R. below dam	11/17/2022	Chlorophyll a	6.8	1	mg/m3		SM 10200H	1
LS-CB-02	James R. Crighton Access	11/17/2022	Chlorophyll a	1.7	1	mg/m3		SM 10200H	1
LS-DUP-01	James R. below dam	11/09/2022	Nitrate/Nitrite-N	0.49	0.02	mg/L		EPA 353.2 REV 2	1
LS-CB-01	James R. Crighton Access	11/09/2022	Nitrate/Nitrite-N	1.1	0.02	mg/L		EPA 353.2 REV 2	1

Qualifiers: < = result below method reporting limit, Mbod = test replicates show more than 30% between high and low values

Lake Springfield Water Quality Data from 11/9, 11/17, and 12/14

LS-JR-01	James R. below dam	11/09/2022	Nitrate/Nitrite-N	0.48	0.02	mg/L		EPA 353.2 REV 2	1
LS-01-01	L. Springfield near dam	11/09/2022	Nitrate/Nitrite-N	0.46	0.02	mg/L		EPA 353.2 REV 2	1
LS-02-01	L. Springfield-mid lake	11/09/2022	Nitrate/Nitrite-N	0.54	0.02	mg/L		EPA 353.2 REV 2	1
LS-03-01	L. Springfield marsh	11/09/2022	Nitrate/Nitrite-N	0.65	0.02	mg/L		EPA 353.2 REV 2	1
LS-FB-01	Field Blank (DI Water)	11/09/2022	Nitrate/Nitrite-N	0.02	0.02	mg/L	<	EPA 353.2 REV 2	1
LS-JR-02	James R. below dam	11/17/2022	Nitrate/Nitrite-N	0.83	0.2	mg/L		EPA 353.2 REV 2	10
LS-CB-02	James R. Crighton Access	11/17/2022	Nitrate/Nitrite-N	1.1	0.2	mg/L		EPA 353.2 REV 2	10
LS-CB-03	James R. Crighton Access	12/14/2022	Nitrate/Nitrite-N	2.6	0.1	mg/L		EPA 353.2 REV 2	5
LS-JR-03	James R. below dam	12/14/2022	Nitrate/Nitrite-N	2.5	0.1	mg/L		EPA 353.2 REV 2	5
LS-DUP-01	James R. below dam	11/09/2022	Phosphorus	1	1	mg/L	<	EPA 200.8 REV 5.4	10
LS-CB-01	James R. Crighton Access	11/09/2022	Phosphorus	1	1	mg/L	<	EPA 200.8 REV 5.4	10
LS-JR-01	James R. below dam	11/09/2022	Phosphorus	1	1	mg/L	<	EPA 200.8 REV 5.4	10
LS-01-01	L. Springfield near dam	11/09/2022	Phosphorus	1	1	mg/L	<	EPA 200.8 REV 5.4	10
LS-02-01	L. Springfield-mid lake	11/09/2022	Phosphorus	1	1	mg/L	<	EPA 200.8 REV 5.4	10
LS-03-01	L. Springfield marsh	11/09/2022	Phosphorus	1	1	mg/L	<	EPA 200.8 REV 5.4	10
LS-FB-01	Field Blank (DI Water)	11/09/2022	Phosphorus	1	1	mg/L	<	EPA 200.8 REV 5.4	10
LS-JR-02	James R. below dam	11/17/2022	Phosphorus	0.05	0.05	mg/L	<	EPA 200.7 REV 4.4	1
LS-CB-02	James R. Crighton Access	11/17/2022	Phosphorus	0.05	0.05	mg/L	<	EPA 200.7 REV 4.4	1
LS-CB-03	James R. Crighton Access	12/14/2022	Phosphorus	0.05	0.05	mg/L	<	EPA 200.7 REV 4.4	1
LS-JR-03	James R. below dam	12/14/2022	Phosphorus	0.05	0.05	mg/L	<	EPA 200.7 REV 4.4	1
LS-DUP-01	James R. below dam	11/09/2022	Phosphorus - ortho as P	0.02	0.02	mg/L	<	SM 4500P E 1999	1
LS-CB-01	James R. Crighton Access	11/09/2022	Phosphorus - ortho as P	0.02	0.02	mg/L	<	SM 4500P E 1999	1
LS-JR-01	James R. below dam	11/09/2022	Phosphorus - ortho as P	0.02	0.02	mg/L	<	SM 4500P E 1999	1
LS-01-01	L. Springfield near dam	11/09/2022	Phosphorus - ortho as P	0.02	0.02	mg/L	<	SM 4500P E 1999	1
LS-02-01	L. Springfield-mid lake	11/09/2022	Phosphorus - ortho as P	0.02	0.02	mg/L	<	SM 4500P E 1999	1
LS-03-01	L. Springfield marsh	11/09/2022	Phosphorus - ortho as P	0.02	0.02	mg/L	<	SM 4500P E 1999	1
LS-FB-01	Field Blank (DI Water)	11/09/2022	Phosphorus - ortho as P	0.02	0.02	mg/L	<	SM 4500P E 1999	1
LS-CB-03	James R. Crighton Access	12/14/2022	Phosphorus - ortho as P	0.038	0.02	mg/L		SM 4500P E 1999	1
LS-JR-03	James R. below dam	12/14/2022	Phosphorus - ortho as P	0.02	0.02	mg/L	<	SM 4500P E 1999	1
LS-DUP-01	James R. below dam	11/09/2022	Solids - total suspended solids (TSS)	9.6	4	mg/L		SM 2540 D 1997	1
LS-CB-01	James R. Crighton Access	11/09/2022	Solids - total suspended solids (TSS)	4	4	mg/L	<	SM 2540 D 1997	1
LS-JR-01	James R. below dam	11/09/2022	Solids - total suspended solids (TSS)	11	4	mg/L		SM 2540 D 1997	1
LS-01-01	L. Springfield near dam	11/09/2022	Solids - total suspended solids (TSS)	4.8	4	mg/L		SM 2540 D 1997	1
LS-02-01	L. Springfield-mid lake	11/09/2022	Solids - total suspended solids (TSS)	6.4	4	mg/L		SM 2540 D 1997	1

Qualifiers: < = result below method reporting limit, Mbod = test replicates show more than 30% between high and low values

Lake Springfield Water Quality Data from 11/9, 11/17, and 12/14

LS-03-01	L. Springfield marsh	11/09/2022	Solids - total suspended solids (TSS)	4.4	4	mg/L		SM 2540 D 1997	1
LS-FB-01	Field Blank (DI Water)	11/09/2022	Solids - total suspended solids (TSS)	4	4	mg/L	<	SM 2540 D 1997	1
LS-JR-02	James R. below dam	11/17/2022	Solids - total suspended solids (TSS)	4.8	4	mg/L		SM 2540D	1
LS-CB-02	James R. Crighton Access	11/17/2022	Solids - total suspended solids (TSS)	4	4	mg/L	<	SM 2540D	1
LS-CB-03	James R. Crighton Access	12/14/2022	Solids - total suspended solids (TSS)	16	4	mg/L		SM 2540D	1
LS-JR-03	James R. below dam	12/14/2022	Solids - total suspended solids (TSS)	10	4	mg/L		SM 2540D	1
LS-DUP-01	James R. below dam	11/09/2022	Total Kjeldahl Nitrogen (TKN)	1.2	1	mg/L		OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-CB-01	James R. Crighton Access	11/09/2022	Total Kjeldahl Nitrogen (TKN)	1	1	mg/L	<	OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-JR-01	James R. below dam	11/09/2022	Total Kjeldahl Nitrogen (TKN)	1	1	mg/L	<	OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-01-01	L. Springfield near dam	11/09/2022	Total Kjeldahl Nitrogen (TKN)	1.2	1	mg/L		OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-02-01	L. Springfield-mid lake	11/09/2022	Total Kjeldahl Nitrogen (TKN)	1.2	1	mg/L		OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-03-01	L. Springfield marsh	11/09/2022	Total Kjeldahl Nitrogen (TKN)	1.2	1	mg/L		OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-FB-01	Field Blank (DI Water)	11/09/2022	Total Kjeldahl Nitrogen (TKN)	1.2	1	mg/L		OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-JR-02	James R. below dam	11/17/2022	Total Kjeldahl Nitrogen (TKN)	1	1	mg/L	<	OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-CB-02	James R. Crighton Access	11/17/2022	Total Kjeldahl Nitrogen (TKN)	1	1	mg/L	<	OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-CB-03	James R. Crighton Access	12/14/2022	Total Kjeldahl Nitrogen (TKN)	1	1	mg/L	<	OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-JR-03	James R. below dam	12/14/2022	Total Kjeldahl Nitrogen (TKN)	1	1	mg/L	<	OIA/PAI-DK03 & EPA 351.2 REV 2	1
LS-DUP-01	James R. below dam	11/09/2022	Total Nitrogen	1.6	1	mg/L		Calculated	1
LS-CB-01	James R. Crighton Access	11/09/2022	Total Nitrogen	1.1	1	mg/L		Calculated	1
LS-JR-01	James R. below dam	11/09/2022	Total Nitrogen	1	1	mg/L	<	Calculated	1
LS-01-01	L. Springfield near dam	11/09/2022	Total Nitrogen	1.6	1	mg/L		Calculated	1
LS-02-01	L. Springfield-mid lake	11/09/2022	Total Nitrogen	1.7	1	mg/L		Calculated	1
LS-03-01	L. Springfield marsh	11/09/2022	Total Nitrogen	1.8	1	mg/L		Calculated	1
LS-FB-01	Field Blank (DI Water)	11/09/2022	Total Nitrogen	1.2	1	mg/L		Calculated	1
LS-JR-02	James R. below dam	11/17/2022	Total Nitrogen	1	1	mg/L	<	Calculated	10
LS-CB-02	James R. Crighton Access	11/17/2022	Total Nitrogen	1.1	1	mg/L		Calculated	10
LS-CB-03	James R. Crighton Access	12/14/2022	Total Nitrogen	2.6	1	mg/L		Calculated	5
LS-JR-03	James R. below dam	12/14/2022	Total Nitrogen	2.5	1	mg/L		Calculated	5

Qualifiers: < = result below method reporting limit, Mbod = test replicates show more than 30% between high and low values

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/8!+68$0!:+#8)1 Ä$8+$/6@

4) Ä$A1)5-80)5$FÄ#=0 Ä6$)::#Ä 0)8Ä6$89Ä$+::+#8/108-$8+$$#+/$0,089$)1)5-80)5$ÄE:Ä#80$Ä$)#Ä$)5>)-6$8#-012$8+$
0!:#+=Ä$+/#$ /68+!Ä#$6Ä#=0 Ä$)1,$>Ä$>Ä5 +!Ä$-+/$8+$ +18) 8$9Ä#Ä$8+#$+7$*50Ä18$FÄ#=0 Ä6'$.06)$K#)18'$>089$)1-$
7ÄÄ,") ?$-+/$9)=Ä$)"+/8$-+/#$ÄE:Ä#0Ä1 Ä$>089$+/#$5)"+#)8+#-$)8$LMNOPLNQROS$+#$506)@2#)18T:) Ä5)"6@ +!@

Paul g Schindler

K)05$F 901,5Ä#
4#+HÄ 8$U)1)2Ä#
;L%M<$OM(NMOPP$EQRQO
2)05@6 901,5Ä#T:) Ä5)"6@ +!

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SAMPLE RECEIPT CHECK LIST

Items not applicable will be marked as in compliance

J +#?$X#,Ä#][%((MP

ZYF	F)!:5Ä6$#Ä Ä0=Ä,$>08901$8Ä!:Ä#)8/#Ä$ +!:50)1 Ä$>9Ä1$)::50)"5Ä
ZYF	*X*$:#Ä6Ä18$/:+1$6)!:5Ä$#Ä Ä0:8
ZYF	*X*$ +!:5Ä8Ä,$_$5Ä20"5Ä
ZYF	F)!:5Ä#$1)!Ä$_$6021)8/#Ä$:#Ä6Ä18
ZYF	`10G/Ä$6)!:5Ä$DĀ6$)66021Ä,
ZYF	F)!:5Ä$ +55Ä 80+1$5+)80+1$#Ä +#,Ä,
ZYF	Ā)8Ä$_$80!Ä$ +55Ä 8Ä,$#Ä +#,Ä,$+1$*X*
ZYF	\Ä501G/069Ä,$"-$ 50Ä18$6021)8/#Ä$+1$*X*
ZYF	*X*$_$5)"Ä56$!)8 9
ZYF	F)!:5Ä$5)"Ä56$)#Ä$5Ä20"5Ä
ZYF	A::#+:#0)8Ä$"+885Ä;6<$#Ä Ä0=Ä,
ZYF	F/770 0Ä18$6)!:5Ä$=+5/!Ä$#Ä Ä0=Ä,
ZYF	F)!:5Ä$ +18)01Ä#6$#Ä Ä0=Ä,$/1,)!)2Ä,
CX	aÄ#+$9Ä),6:) Ä'$bO$!$:#Ä6Ä18$01$cXÄ$=0)56
CX	B#0:$"5)1?6<$#Ä Ä0=Ä,
ZYF	A55$1+1N70Ä5,$)1)5-6Ä6$#Ä Ä0=Ä,$>08901$9+5,012$80!Ä6
ZYF	F9+#8$9+5,$80!Ä$)1)5-606
ZYF	*/##Ä18$4Ā*$*X*$6/"!088Ä,
CX	*)6Ä$1)##)80=Ä$:#+=0,Ä,

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ANALYTICAL RESULTS

Sample:][%((MPN%Q
Name: .FN*WN%Q
Matrix: F/#7) Ä$J)8Ä#$N$K#)"

Sampled: QQd%Md(($%O3S&
Received: QQdQ%d(($Q%3L%

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
WXĀ	(O	!2d.	U"+,	QQdQ%d(($QO3SQ	Q	S@%	QQdQ%d(($QO3SQ	W.\d*\Ā	FU$&(Q%W$(%%Q
F+50,6N8+8)5$6/6:Ä1,Ä,$ 6+50,6$;BFF<	b$S@%	!2d.		QQdQd(($%M3(S	Q	S@%	QQdQd(($QQ3(L	*4F	FU$(&S%$Ā$QMMR
B+8)5$C08#+2Ä1	Q@Q	!2d.		QQdQ&d(($Q(3%P	Q	Q@%	QQdQOd(($QO3&&	1>8	*)5 /5)8Ä,NFÄÄ$ C+8Ä6
Microbiology - PIA									
*95+#+:9-55$)	(@Q	!2d!L		QQdQ%d(($QO3L%	Q	Q@%	QQdQPd(($QO3%%	FĀJ	FU$Q%(%%ef
Nutrients - PIA									
A!!+10)NC	b$%@L%	!2d.		QQdQRd(($Q3&L	Q	%@L%	QQdQRd(($Q3&L	CJB	XDAdADNĀ[%L$_$ Y4A$L&%@Q$\Yc$(
C08#)8ÄdC08#08ÄNC	Q@Q	!2d.		QQdQd(($%M3(%	Q	%@%(%	QQdQd(($%M3(%	*\FQ	Y4A$L&L@($\Yc$(
B+8)5$[HÄ5,)95$C08#+2Ä1$;B[C<	b$Q@%	!2d.		QQdQ&d(($Q(3%P	Q	Q@%	QQdQOd(($QO3&&	1>8	XDAdADNĀ[%L$_$ Y4A$L&Q@($\Yc$(
Soluble Nutrients - PIA									
49+6:9+#/6N+#89+$)6$4	b$%@%(%	!2d.		QQdQ%d(($QO3SO	Q	%@%(%	QQdQ%d(($QR3(S	*K.	FU$S&%%$Y$QMMM
Total Metals - PIA									
49+6:9+#/6	b$Q@%	!2d.		QQdQ&d(($%M3%O	Q%	Q@%	QQdQOd(($Q&3&P	[U*	Y4A$(%%@P$\Yc$ &@Sf

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ANALYTICAL RESULTS

Sample:][%((MPN%(
Name: .FNg\N%Q
Matrix: F/#7) Ä$J)8Ä#$N$K#)"

Sampled: QQd%Md(($%R3(&
Received: QQdQ%d(($Q%3L%

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
WXĀ	b$S@%	!2d.		QQdQ%d(($QO3SQ	Q	S@%	QQdQ%d(($QO3SQ	W.\d*\Ā	FU$&(Q%W$(%%Q
F+50,6N8+8)5$6/6:À1,À,$ 6+50,6$;BFF<	QQ	! 2d		QQdQd(($%M3(S	Q	S@%	QQdQd(($QQ3(L	*4F	FU$(&S%$Ā$QMMR
B+8)5$C08#+2À1	b$Q@%	!2d.		QQdQ&d(($Q(3%P	Q	Q@%	QQdQOd(($QO3&R	1>8	*)5 /5)8À,NFÀÀ$ C+8À6
Microbiology - PIA									
*95+#+:9-55$)	&@%	!2d!L		QQdQ%d(($QO3L%	Q	Q@%	QQdQPd(($QO3%%	FĀJ	FU$Q%(%%ef
Nutrients - PIA									
A!!+10)NC	b$%@L%	!2d.		QQdQRd(($Q3&M	Q	%@L%	QQdQRd(($Q3&M	CJB	XDAdADNĀ[%L$_$ Y4A$L&%@Q$\Yc$(
C08#)8ÀdC08#08ÀNC	%@SP	!2d.		QQdQd(($Q%3%R	Q	%@%(%	QQdQd(($Q%3%R	*\FQ	Y4A$L&L@($\Yc$(
B+8)5$[HÀ5,)95$C08#+2À1$;B[C<	b$Q@%	!2d.		QQdQ&d(($Q(3%P	Q	Q@%	QQdQOd(($QO3&R	1>8	XDAdADNĀ[%L$_$ Y4A$L&Q@($\Yc$(
Soluble Nutrients - PIA									
49+6:9+#/6N+#89+$)6$4	b$%@%(%	!2d.		QQdQ%d(($QO3SO	Q	%@%(%	QQdQ%d(($QR3(O	*K.	FU$S&%%$Y$QMMM
Total Metals - PIA									
49+6:9+#/6	b$Q@%	!2d.		QQdQ&d(($%M3%O	Q%	Q@%	QQdQOd(($QO3%(	[U*	Y4A$(%%@P$\Yc$ &@Sf

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ANALYTICAL RESULTS

Sample:][%((MPN%L
Name: .FN%QN%Q
Matrix: F/#7) Ä$J)8Ä#$N$K#)"

Sampled: QQd%Md(($%P3S&
Received: QQdQ%d(($Q%3L%

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
WXĀ	b$S@%	!2d.		QQdQ%d(($QO3SQ	Q	S@%	QQdQ%d(($QO3SQ	W.\d*\Ā	FU$&(Q%W$(%%Q
F+50,6N8+8)5$6/6:À1,À,$ 6+50,6$;BFF<	S@P	!2d.		QQdQd(($%M3(S	Q	S@%	QQdQd(($QQ3(L	*4F	FU$(&S%$Ā$QMMR
B+8)5$C08#+2À1	Q@O	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3SR	CJB	*)5 /5)8À,NFÀÀ$ C+8À6
Microbiology - PIA									
*95+#+:9-55$)	(@P	!2d!L		QQdQ%d(($QO3L%	Q	Q@%	QQdQPd(($QO3%%	FĀJ	FU$Q%(%%ef
Nutrients - PIA									
A!!+10)NC	b$%@L%	!2d.		QQdQRd(($Q(3%Q	Q	%@L%	QQdQRd(($Q(3%Q	CJB	XDAdAADNĀ[%L$_$ Y4A$L&%@Q$\Yc$(
C08#)8ÀdC08#08ÀNC	%@SO	!2d.		QQdQd(($%M3(S	Q	%@%(%	QQdQd(($%M3(S	*\FQ	Y4A$L&L@($\Yc$(
B+8)5$[HÀ5,)95$C08#+2À1$;B[C<	Q@(	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3SR	CJB	XDAdAADNĀ[%L$_$ Y4A$L&Q@($\Yc$(
Soluble Nutrients - PIA									
49+6:9+#/6N+#89+$)6$4	b$%@%(%	!2d.		QQdQ%d(($QO3SO	Q	%@%(%	QQdQ%d(($QR3(R	*K.	FU$S&%%$4Y$QMMM
Total Metals - PIA									
49+6:9+#/6	b$Q@%	!2d.		QQdQ&d(($%M3%O	Q%	Q@%	QQdQOd(($QO3QR	[U*	Y4A$(%%@P$\Yc$ &@Sf

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ANALYTICAL RESULTS

Sample:][%((MPN%S
Name: .FN%(N%Q
Matrix: F/#7) Ä$J)8Ä#$N$K#)"

Sampled: QQd%Md(($%M3%%
Received: QQdQ%d(($Q%3L%

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
WXÃ	b$S@%	!2d.		QQdQ%d(($QO3SO	Q	S@%	QQdQ%d(($QO3SO	W.\d*\Ã	FU$&(Q%W$(%%Q
F+50,6N8+8)5$6/6:Ä1,Ä,$ 6+50,6$;BFF<	O@S	!2d.		QQdQd(($%M3(S	Q	S@%	QQdQd(($QQ3(L	*4F	FU$(&S%$Ã$QMMR
B+8)5$C08#+2Ä1	Q@R	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3&(	CJB	*)5 /5)8Ä,NFÄÄ$ C+8Ä6
Microbiology - PIA									
*95+#+:9-55$)	b$Q@%	!2d!L		QQdQ%d(($QO3L%	Q	Q@%	QQdQPd(($QO3%%	FÃJ	FU$Q%(%%ef
Nutrients - PIA									
A!!+10)NC	b$%@L%	!2d.		QQdQRd(($Q(3%(	Q	%@L%	QQdQRd(($Q(3%(	CJB	XDAdAADNÃ[%L$_$ Y4A$L&%@Q$\Yc$(
C08#)8ÄdC08#08ÄNC	%@&S	!2d.		QQdQd(($%M3(&	Q	%@%(%	QQdQd(($%M3(&	*\FQ	Y4A$L&L@($\Yc$(
B+8)5$[HÄ5,)95$C08#+2Ä1$;B[C<	Q@(	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3&(	CJB	XDAdAADNÃ[%L$_$ Y4A$L&Q@($\Yc$(
Soluble Nutrients - PIA									
49+6:9+#/6N+#89+$)6$4	b$%@%(%	!2d.		QQdQ%d(($QO3SO	Q	%@%(%	QQdQ%d(($QR3L%	*K.	FU$S&%%$Y$QMMM
Total Metals - PIA									
49+6:9+#/6	b$Q@%	!2d.		QQdQ&d(($%M3%O	Q%	Q@%	QQdQOd(($QO3(Q	[U*	Y4A$(%%@P$\Yc$ &@Sf

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ANALYTICAL RESULTS

Sample:][%((MPN%&

Name: .FN%LN%Q

Matrix: F/#7) Ä$J)8Ä#$N$K#)"

Sampled: QQd%Md(($%M3Q%

Received: QQdQ%d(($Q%3L%

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
WXÃ	b$S@%	!2d.		QQdQ%d(($QO3SO	Q	S@%	QQdQ%d(($QO3SO	W.\d*\Ã	FU$&(Q%W$(%%Q
F+50,6N8+8)5$6/6:Ä1,Ä,$ 6+50,6$;BFF<	S@S	!2d.		QQdQd(($%M3(S	Q	S@%	QQdQd(($QQ3(L	*4F	FU$(&S%$Ã$QMMR
B+8)5$C08#+2Ä1	Q@P	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3&L	CJB	*)5 /5)8Ä,NFÄÄ$ C+8Ä6
Microbiology - PIA									
*95+#+:9-55$)	b$Q@%	!2d!L		QQdQ%d(($QO3L%	Q	Q@%	QQdQPd(($QO3%%	FÃJ	FU$Q%(%%ef
Nutrients - PIA									
A!!+10)NC	b$%@L%	!2d.		QQdQRd(($Q(3%S	Q	%@L%	QQdQRd(($Q(3%S	CJB	XDAdADNÃ[%L$_$ Y4A$L&%@Q$\Yc$(
C08#)8ÄdC08#08ÄNC	%@O&	!2d.		QQdQd(($%M3(O	Q	%@%(%	QQdQd(($%M3(O	*\FQ	Y4A$L&L@($\Yc$(
B+8)5$[HÄ5,)95$C08#+2Ä1$;B[C<	Q@(	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3&L	CJB	XDAdADNÃ[%L$_$ Y4A$L&Q@($\Yc$(
Soluble Nutrients - PIA									
49+6:9+#/6N+#89+$)6$4	b$%@%(%	!2d.		QQdQ%d(($QO3SO	Q	%@%(%	QQdQ%d(($QR3L%	*K.	FU$S&%%$Y$QMMM
Total Metals - PIA									
49+6:9+#/6	b$Q@%	!2d.		QQdQ&d(($%M3%O	Q%	Q@%	QQdQOd(($QO3(&	[U*	Y4A$(%%@P$\Yc$ &@Sf

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ANALYTICAL RESULTS

Sample:][%((MPN%O
Name: .FN]WN%Q
Matrix: F/#7) Ä$J)8Ä#$N$K#)"

Sampled: QQd%Md(($%M3L%
Received: QQdQ%d(($Q%3L%

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
WXĀ	b$S@%	!2d.		QQdQ%d(($QO3SO	Q	S@%	QQdQ%d(($QO3SO	W.\d*\Ā	FU$&(Q%W$(%%Q
F+50,6N8+8)5$6/6:Ä1,Ä,$ 6+50,6$;BFF<	b$S@%	!2d.		QQdQd(($%M3(S	Q	S@%	QQdQd(($QQ3(L	*4F	FU$(&S%$Ā$QMMR
B+8)5$C08#+2Ä1	Q@(	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3&&	CJB	*)5 /5)8Ä,NFÄÄ$ C+8Ä6
Microbiology - PIA									
*95+#+:9-55$)	b$Q@%	!2d!L		QQdQ%d(($QO3L%	Q	Q@%	QQdQPd(($QO3%%	FĀJ	FU$Q%(%%ef
Nutrients - PIA									
A!!+10)NC	b$%@L%	!2d.		QQdQRd(($Q(3%&	Q	%@L%	QQdQRd(($Q(3%&	CJB	XDAdADNĀ[%L$_$ Y4A$L&%@Q$\Yc$(
C08#)8ÄdC08#08ÄNC	b$%@%(%	!2d.		QQdQd(($%M3(R	Q	%@%(%	QQdQd(($%M3(R	*\FQ	Y4A$L&L@($\Yc$(
B+8)5$[HÄ5,)95$C08#+2Ä1$;B[C<	Q@(	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3&&	CJB	XDAdADNĀ[%L$_$ Y4A$L&Q@($\Yc$(
Soluble Nutrients - PIA									
49+6:9+#/6N+#89+$)6$4	b$%@%(%	!2d.		QQdQ%d(($QO3SO	Q	%@%(%	QQdQ%d(($QR3LQ	*K.	FU$S&%%$Y$QMMM
Total Metals - PIA									
49+6:9+#/6	b$Q@%	!2d.		QQdQ&d(($%M3%O	Q%	Q@%	QQdQOd(($QO3(P	[U*	Y4A$(%%@P$\Yc$ &@Sf

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ANALYTICAL RESULTS

Sample:][%((MPN%R
Name: .FNÃ`4N%Q
Matrix: F/#7) Ä$J)8Ä#$N$K#)"

Sampled: QQd%Md(($%M3L%
Received: QQdQ%d(($Q%3L%

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
WXÃ	b$S@%	!2d.		QQdQ%d(($Q%3L(	Q	S@%	QQdQ%d(($QO3SM	W.\d*\Ã	FU$&(Q%W$(%%Q
F+50,6N8+8)5$6/6:Ã1,Ã,$ 6+50,6$;BFF<	M@O	!2d.		QQdQd(($%M3(S	Q	S@%	QQdQd(($QQ3(L	*4F	FU$(&S%$Ã$QMMR
B+8)5$C08#+2Ã1	Q@O	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3&O	CJB	*)5 /5)8Ã,NFÃÄ$ C+8Ä6
Microbiology - PIA									
*95+#+:9-55$)	(@R	!2d!L		QQdQ%d(($QO3L%	Q	Q@%	QQdQPd(($QO3%%	FÃJ	FU$Q%(%%ef
Nutrients - PIA									
A!!+10)NC	b$%@L%	!2d.		QQdQRd(($Q(3%R	Q	%@L%	QQdQRd(($Q(3%R	CJB	XDAdÃADNÃ[%L$_$ Y4A$L&%@Q$\Yc$(
C08#)8ÄdC08#08ÄNC	%@SM	!2d.		QQdQd(($%M3LL	Q	%@%(%	QQdQd(($%M3LL	*\FQ	Y4A$L&L@($\Yc$(
B+8)5$[HÄ5,)95$C08#+2Ä1$;B[C<	Q@(	!2d.		QQdQ&d(($QL3LR	Q	Q@%	QQdQPd(($%M3&O	CJB	XDAdÃADNÃ[%L$_$ Y4A$L&Q@($\Yc$(
Soluble Nutrients - PIA									
49+6:9+#/6N+#89+$)6$4	b$%@%(%	!2d.		QQdQ%d(($QO3SO	Q	%@%(%	QQdQ%d(($QR3L(	*K.	FU$S&%%$4Y$QMMM
Total Metals - PIA									
49+6:9+#/6	b$Q@%	!2d.		QQdQ&d(($%M3%O	Q%	Q@%	QQdQOd(($QO3L(	[U*	Y4A$(%%@P$\Yc$ &@Sf

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NOTES

F:Ä 070)80+16$#Ä2)#,012$!Ä89+,$#Ä=060+16'$!Ä89+,$!+,070 '$0)+$16 /5)80+16$/6Ä,$7+#$)1)5-606$)#Ä$)=)05)"5Ä$/:+1$#Ä@$Ä65Ä)6Ä$ +18) 8$ -+/#$:#+HÄ 8$!)1)2Ä#@

fC+8BCD) #Ä,08Ä,$)1)5-8Ä$$$$$$$$$$$$$$$$$$$$

Certifications

eDNU eÄ1#-'BNSLQS$N@$#-68)5$.)?Ä$\+),'$U eÄ1#-'$D%%&%
BCD$ #Ä,08)80+1$7+#$Ā#01?08Ä$)1,$J)68Ä>)8Ä#$]0Ä5,6$BÄ68012$89#+/29$D4A$$ #Ä,08)80+1$C@$Q%%(RM
D5501+06$ĀÄ:)#8!Ä18$+7$4/"50 $eÄ)589$W)185-80)5$01$Ā#012$J)8Ä#$::#+=Ä,$.)"+#)8+#-$\Ä2068#-$C@$QR&&O

4DAN4Ä+#0)D((LQ$J@$A58+#7Ä#$Ā#0=Ä'$$Ö-H0C$D.
BCD$ #Ä,08)80+1$7+#$Ā#01?08Ä$'$J)68Ä>)8Ä#'$F+50,$)1,$e)h#,+/6$U)8Ä#0)5$]0Ä5,6$BÄ68012$89#+/29$D4A$$ #Ä,08)80+1$
C+@$Q%%(L%
D5501+06$ĀÄ:)#8!Ä18$+7$4/"50 $eÄ)589$W)185-80)5$01$Ā#012$J)8Ä#$::#+=Ä,$.)"+#)8+#-$\Ä2068#-$C@$QR&&L
Ā#01?012$J)8Ä#$*Ä#8070)80+16dA #Ä,08)80+163$D+>)$;(S%<i$[)16)6$;YNQ%LLP<i$U066+/#0$;PR%<
J)68Ä>)8Ä#$*Ä#8070)80+16dA #Ä,08)80+163$A#?)16)6$;PPN%ORR<i$[)16)6$;YNQ%LLP<
F+50,$)1,$e)h)#,+/6$U)8Ä#0)5$*Ä#8070)80+16dA #Ä,08)80+163$A#?)16)6$;PPN%ORR<i$D+>)$;(S%<i$[)16)6$;YNQ%LLP<

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D5501+06$ĀÄ:)#8!Ä18$+7$4/"50 $eÄ)589$W)185-80)5$01$Ā#012$J)8Ä#$::#+=Ä,$.)"+#)8+#- '$\Ä2068#-$C+@$QRQ%&%
U066+/#0$ĀÄ:)#8!Ä18$+7$C)8/#)5$\Ä6+/# Ä6N*Ä#8070)80+1$+7$7+#$U0 #+"0+5+20)5$.)"+#)8+#-$FÄ#=0 Ä6$C+@$Q%&%

Qualifiers

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Gail g Schindler

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PACE ANALYTICAL SERVICES
WWW.PACELABS.COM

REGULATORY PROGRAM (CIRCLE):	NPDES
MORBCA	RCRA
CCDD	TACO: RES or IND/COMM

CHAIN OF CUSTODY RECORD

SAMPLE COLLECTED IN THE STATE OF MO

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT)

GeoSyntec Consultants

1 CLIENT: Lake Springfield

PROJECT NUMBER: MOW5628 | PROJECT LOCATION: Springfield, MO | PURCHASE ORDER #:

ADDRESS: 2009 E. McCarty St., Suite 1

PHONE NUMBER: 573-499-5443 | E-MAIL: mhogan@geosyntec.com | DATE SHIPPED:

CITY STATE ZIP: Jefferson City MO 65101

SAMPLER (PLEASE PRINT): Mike Hogan

SAMPLER'S SIGNATURE:

CONTACT PERSON: Mike Hogan

MATRIX TYPES: WW-WASTEWATER, DW-DRINKING WATER, GW-GROUND WATER, WWSL-SLUDGE, NAS-NON AQUEOUS SOLID, LCHT-LEACHATE, OIL-OIL, SO-SOIL, SOL-SOLID

3 ANALYSIS REQUESTED (Field Filtered)

4 (FOR LAB USE ONLY)
LOGIN # FK02298
LOGGED BY: 0/S
CLIENT:
PROJECT:
PROJ. MGR.:
CUSTODY SEAL #:

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	GRAB	COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE CLIENT PROVIDED	Nitrate plus nitrite	Total Kjeldahl Nitrogen	Ammonia	Total Phosphorus	Dissolved Reactive Phosphorus	BOD5 and TSS	Chl-a	REMARKS
LS-CB-01	11/9	0645	X	~~X~~	Surface Water	5	2, 3, 6	X	X	X	X	X	X	X	Note 48 hr. hold times
LS-JR-01	11/9	0725	X	~~X~~ MW	Surface Water	5	2, 3, 6	X	X	X	X	X	X	X	Note 48 hr. hold times
LS-01-01	11/9	0845	X	~~X~~	Surface Water	5	2, 3, 6	X	X	X	X	X	X	X	Note 48 hr. hold times
LS-02-01	11/9	0900	X	~~X~~	Surface Water	5	2, 3, 6	X	X	X	X	X	X	X	Note 48 hr. hold times
LS-03-01	11/9	0910	X		Surf Water	5	2,3,6	X	X	X	X	X	X	X	
LS-FB-01	11/9	0930	X		Surf Water	5	2,3,6	X	X	X	X	X	X	X	
LS-DUP-01	11/9	0725	X		Surf Water	5	2,3,6	X	X	X	X	X	X	X	

CHEMICAL PRESERVATION CODES: 1 – HCL | 2 – H2SO4 | 3 – HNO3 | 4 – NAOH | 5 – NA2S2O3 | 6 – UNPRESERVED | 7 – OTHER

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH TAT IS SUBJECT TO PACE LABS APPROVAL AND SURCHARGE) NORMAL RUSH

DATE RESULTS NEEDED: Normal

RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL PHONE

EMAIL IF DIFFERENT FROM ABOVE: PHONE # IF DIFFERENT FROM ABOVE:

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*

PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS) mlh

7 RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	DATE / TIME
[signature]	DATE 11/9/22 TIME 1430	Stacey Wolf	DATE 11-9-22 TIME 1430
Stacey Wolf	DATE 11-9-22 TIME 1600		DATE TIME
	DATE TIME	[signature]	DATE 11/10/22 TIME 1030

8 COMMENTS: (FOR LAB USE ONLY)
4.6 ~~7.2~~ 11/9/22

SAMPLE TEMPERATURE UPON RECEIPT ~~7.2~~ 7.2 11/9/22 °C
TEMPERATURE GUN ID
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT REPORT IS NEEDED Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE

C091

Pace Analytical Services, LLC
2231 W. Altorfer Drive
Peoria, IL 61615
(800)752-6651

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Daxl g Schindler

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Peoria, IL 61615
(800)752-6651

SAMPLE RECEIPT CHECK LIST

Items not applicable will be marked as in compliance

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Peoria, IL 61615
(800)752-6651

ANALYTICAL RESULTS

Sample: \]&%XQ%M&P
Name: .FMeYM&(
Matrix: F/#7) Ä$J)8Ä#$M$*+!:+608Ä

Sampled: PPdPQd(($P%3R&
Received: PPdPQd(($PR3%O

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
B+8)5$C08#+2Ä1	a$P@&	!2d.		P(d&Pd(($PO3(&	P&	P@&	P(d&(d(($PP3(L	CJB	*)5 /5)8Ä,MFÄÄ$ C+8Ä6
General Chemistry - SPMO									
VWĀ	a$R@&	!2d.		PPdPOd(($P%3X&	P	R@&	PPdPOd(($P%3X&	e*A	FT$X(P&Vf
F+50,6M8+8)5$6/6:Ä1,Ä,$ 6+50,6$;BFF<	R@O	!2d.		PPdPOd(($PX3%R	P	R@&	PPdPOd(($PX3%R	.*V	FT$(XR&Āf
Microbiology - PIA									
*95+#+:9-55$)	N@O	!2d!%		PPdPOd(($PP3(&	P	P@&	PPd(%d(($PR3%&	FĀJ	FT$P&(&&gf
Nutrients - PIA									
A!!+10)MC	a$&@%&	!2d.		PPd(%d(($P(3%O	P	&@%&	PPd(%d(($P(3%O	CJB	WDAd4DMĀ]&%$^$ Z4A$%X&@P$YZb$(
C08#)8ÄdC08#08ÄMC	&@O%	!2d.		P(d&Pd(($PO3(&	P&	&@(&	P(d&(d(($PP3(L	JeT	Z4A$%X%@($YZb$(
B+8)5$]HÄ5,)95$C08#+2Ä1$;B]C<	a$P@&	!2d.		PPd(Pd(($P&3&N	P	P@&	PPd(%d(($PN3(Q	CJB	WDAd4DMĀ]&%$^$ Z4A$%XP@($YZb$(
Total Metals - PIA									
49+6:9+#/6	a$&@&X&	!2d.		PPd(Od(($&O3PX	P	&@&X&	PPd(Od(($PN3P&	Bee	Z4A$(&&@Q$YZb$R@F

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2231 W. Altorfer Drive
Peoria, IL 61615
(800)752-6651

ANALYTICAL RESULTS

Sample: \]&%XQ%M&(
Name: .FM*VM&(
Matrix: F/#7) Ä$J)8Ä#$M$*+!:+608Ä

Sampled: PPdPQd(($PR3&X
Received: PPdPQd(($PR3%O

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
B+8)5$C08#+2Ä1	P@P	!2d.		P(d&Pd(($PO3(&	P&	P@&	P(d&(d(($PP3%&	CJB	*)5 /5)8Ä,MFÄÄ$ C+8Ä6
General Chemistry - SPMO									
VWÃ	a$R@&	!2d.		PPdPOd(($P%3X&	P	R@&	PPdPOd(($P%3X&	e*A	FT$X(P&Vf
F+50,6M8+8)5$6/6:Ä1,Ä,$ 6+50,6$;BFF<	a$R@&	!2d.		PPdPOd(($PX3%R	P	R@&	PPdPOd(($PX3%R	.*V	FT$(XR&Ãf
Microbiology - PIA									
*95+#+:9-55$)	P@Q	!2d!%		PPdPOd(($PP3(&	P	P@&	PPd(%d(($PR3%&	FÃJ	FT$P&(&&gf
Nutrients - PIA									
A!!+10)MC	a$&@%&	!2d.		PPd(%d(($P(3R&	P	&@%&	PPd(%d(($P(3R&	CJB	WDAdA4DMÃ]&%$^$ Z4A$%X&@P$YZb$(
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Total Metals - PIA									
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2231 W. Altorfer Drive
Peoria, IL 61615
(800)752-6651

NOTES

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Gail g Schindler

*Ä#8070Ä,$"-3K)05$F 901,5Ä$#+HÄ 8$T)1)2Ä#

PACE ANALYTICAL SERVICES
WWW.PACELABS.COM

REGULATORY PROGRAM (CIRCLE):	NPDES
MORBCA	RCRA
CCDD	TACO: RES or IND/COMM

CHAIN OF CUSTODY RECORD

SAMPLE COLLECTED IN THE STATE OF MO

Geosyntec Consultants

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT)

1 CLIENT: Lake Springfield
PROJECT NUMBER: MOW5628
PROJECT LOCATION: Springfield, MO
PURCHASE ORDER #:
ADDRESS: 2009 E. McCarty St., Suite 1
PHONE NUMBER: 573-499-5443
E-MAIL: mhogan@geosyntec.com
DATE SHIPPED:
CITY STATE ZIP: Jefferson City MO 65101
SAMPLER (PLEASE PRINT): Joshua Horne
SAMPLER'S SIGNATURE: [signature]
CONTACT PERSON: Mike Hogan

MATRIX TYPES: WW- WASTEWATER, DW- DRINKING WATER, GW- GROUND WATER, WWSL- SLUDGE, NAS- NON AQUEOUS SOLID, LCHT- LEACHATE, OL- OIL, SO- SOIL, SOL- SOLID

3 ANALYSIS REQUESTED

4 (FOR LAB USE ONLY)
LOGIN # FK03573
LOGGED BY: SMW
CLIENT:
PROJECT:
PROJ. MGR.:
CUSTODY SEAL #:

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE CLIENT PROVIDED	Nitrate plus nitrite	Total Kjeldahl Nitrogen	Ammonia	Total Phosphorus	~~Dissolved Reactive Phosphorus~~	BOD5 and TSS	Chlor a	REMARKS
LS-JR-02	11-17-22	1340		X	Surface Water	4	2, 3, 6	X	X	X	X	X	X	X	Note 48 hr. hold times
LS-CB-02	11-17-22	1405		X	Surface Water	4	2, 3, 6	X	X	X	X	X	X	X	Note 48 hr. hold times
				~~X~~	~~Surface Water~~		~~2, 3, 6~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~Note 48 hr. hold times~~
				~~X~~	~~Surface Water~~		~~2, 3, 6~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		~~Note 48 hr. hold times~~
															Each Site:
															1-A, P, U, IL, Unp
															1-P, IL, Unp
															1-P, 250mL, H_2SO_4
															1-P, 250mL, HNO_3

C097

CHEMICAL PRESERVATION CODES: 1 – HCL 2 – H2SO4 3 – HNO3 4 – NAOH 5 – NA2S2O3 6 – UNPRESERVED 7 – OTHER

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) NORMAL RUSH
(RUSH TAT IS SUBJECT TO PACE LABS APPROVAL AND SURCHARGE)
DATE RESULTS NEEDED: Normal
RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL PHONE
EMAIL IF DIFFERENT FROM ABOVE: PHONE # IF DIFFERENT FROM ABOVE:

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*
PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS) mlh

7 RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	DATE / TIME
[signature]	DATE 11-17-22 TIME 1438	Lauren Burrell	DATE 11-17-22 TIME 1438
RELINQUISHED BY: (SIGNATURE)	DATE TIME	RECEIVED BY: (SIGNATURE)	DATE TIME
RELINQUISHED BY: (SIGNATURE)	DATE TIME	RECEIVED BY: (SIGNATURE)	DATE TIME

8 COMMENTS: (FOR LAB USE ONLY)
SAMPLE TEMPERATURE UPON RECEIPT 2.7 °C
TEMPERATURE GUN ID
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT REPORT IS NEEDED Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE

SUBCONTRACT ORDER
Transfer Chain of Custody

Pace Analytical Services, LLC
FK03573

ARH
11-18-22

SENDING LABORATORY	**RECEIVING LABORATORY**
PDC Laboratories, Inc. 1805 West Sunset Street Springfield, MO 65807 (417) 864-8924	Pace Analytical Services, LLC - Peoria 2231 W Altorfer Dr Peoria, IL 61615 (309) 692-9688

Sample: FK03573-01
Name: LS-JR-02

Sampled: 11/17/22 13:40
Matrix: Surface Water
Preservative: H2SO4, cool <6

Analysis	Due	Expires	Comments
Ammonia GD	12/01/22 16:00	12/15/22 13:40	
Chlor a	12/01/22 16:00	12/08/22 13:40	
Environmental Fee - Liquid	12/01/22 16:00	03/17/23 13:40	
NO3 + NO2	12/01/22 16:00	12/15/22 13:40	
P 200.7 WWTot	12/01/22 16:00	05/16/23 13:40	
Sample Disposal Fee	12/01/22 16:00	03/17/23 13:40	
TKN GD	12/01/22 16:00	12/15/22 13:40	

Sample: FK03573-02
Name: LS-CB-02

Sampled: 11/17/22 14:05
Matrix: Surface Water
Preservative: H2SO4, cool <6

Analysis	Due	Expires	Comments
Ammonia GD	12/01/22 16:00	12/15/22 14:05	
Chlor a	12/01/22 16:00	12/08/22 14:05	
Environmental Fee - Liquid	12/01/22 16:00	03/17/23 14:05	
NO3 + NO2	12/01/22 16:00	12/15/22 14:05	
P 200.7 WWTot	12/01/22 16:00	05/16/23 14:05	
Sample Disposal Fee	12/01/22 16:00	03/17/23 14:05	
TKN GD	12/01/22 16:00	12/15/22 14:05	

SUBCONTRACT ORDER
Transfer Chain of Custody

Pace Analytical Services, LLC
FK03573

Please email results to Gail Schindler at gail.schindler@pacelabs.com

Date Shipped: 11-17-22 Total # of Containers: 6 Sample Origin (State): MO PO #: —

Turn-Around Time Requested [X] NORMAL [ ] RUSH Date Results Needed: —

Relinquished By	Date/Time	Received By	Date/Time		
Stacey Wolf	11-17-22 1600			Sample Temperature Upon Receipt	3.1 °C
				Sample(s) Received on Ice	Y or N
				Proper Bottles Received in Good Condition	Y or N
				Bottles Filled with Adequate Volume	Y or N
			11/18/22 10:15	Samples Received Within Hold Time	Y or N
				Date/Time Taken From Sample Bottle	Y or N

C099

Pace Analytical Services, LLC
2231 W. Altorfer Drive
Peoria, IL 61615
(800)752-6651

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Peoria, IL 61615
(800)752-6651

SAMPLE RECEIPT CHECK LIST

Items not applicable will be marked as in compliance

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ANALYTICAL RESULTS

Sample: \.&(QQLM&P
Name: .FM*VM&%
Matrix: F/#7) Ä$J)8Ä#$M$K#)"

Sampled: P(cPRc(($P%3P&
Received: P(cPRc(($P%3XP

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
B+8)5$C08#+2À1	(@N	!2c.		P(cPNc(($P3RL	X	P@&	P(c((c(($P&3%L	CJB	*)5 /5)8À,MFÀÀ$ C+8À6
General Chemistry - SPMO									
VWĀ	R@R	!2c.		P(cPRc(($PQ3&X	P	R@&	P(cPRc(($PQ3&X	.*V	FT$X(P&Vd
F+50,6M8+8)5$6/6:À1,À,$ 6+50,6$;BFF<	PN	!2c.		P(cPNc(($PN3(&	P	R@&	P(cPNc(($PN3(&	e*A	FT$(XR&Ād
Nutrients - PIA									
A!!+10)MC	`$&@%&	!2c.		P(c(Pc(($PR3%L	P	&@%&	P(c(Pc(($PR3%L	CJB	WDAc4DMĀf&%$]$ Z4A$%X&@P$YZa$(
C08#)8ÀcC08#08ÀMC	(@N	!2c.		P(cPNc(($P3PN	X	&@P&	P(cPNc(($P3PN	*YFP	Z4A$%X%@($YZa$(
B+8)5$fHÀ5,)95$C08#+2À1$;BfC<	`$P@&	!2c.		P(cPNc(($P3RL	P	P@&	P(c((c(($P&3%L	CJB	WDAc4DMĀf&%$]$ Z4A$%XP@($YZa$(
Soluble Nutrients - PIA									
49+6:9+#/6M+#89+$)6$4	&@&%O	!2c.		P(cPXc(($PQ3&X	P	&@&(&	P(cPXc(($PQ3%R	YWe	FT$RX&&4$Z$PLLL
Total Metals - PIA									
49+6:9+#/6	`$&@&X&	!2c.		P(c(&c(($&O3%O	P	&@&X&	P(c(Qc(($PX3(N	Bee	Z4A$(&&@Q$YZa$R@F

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ANALYTICAL RESULTS

Sample: \.&(QQLM&(
Name: .FMeYM&%
Matrix: F/#7) Ä$J)8Ä#$M$K#)"

Sampled: P(cPRc(($P(3R&
Received: P(cPRc(($P%3XP

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
B+8)5$C08#+2Ä1	(@X	!2c.		P(cPNc(($P3RL	X	P@&	P(c((c(($P&3RP	CJB	*)5 /5)8Ä,MFÄÄ$ C+8Ä6
General Chemistry - SPMO									
VWÃ	`$R@&	!2c.		P(cPRc(($PQ3&X	P	R@&	P(cPRc(($PQ3&X	.*V	FT$X(P&Vd
F+50,6M8+8)5$6/6:Ä1,Ä,$ 6+50,6$;BFF<	P&	!2c.		P(cPNc(($PN3(&	P	R@&	P(cPNc(($PN3(&	e*A	FT$(XR&Ãd
Nutrients - PIA									
A!!+10)MC	`$&@%&	!2c.		P(c(Pc(($PR3RP	P	&@%&	P(c(Pc(($PR3RP	CJB	WDAo4DMÃf&%$]$ Z4A$%X&@P$YZa$(
C08#)8ÄcC08#08ÄMC	(@X	!2c.		P(cPNc(($P3PQ	X	&@P&	P(cPNc(($P3PQ	*YFP	Z4A$%X%@($YZa$(
B+8)5$fHÄ5,)95$C08#+2Ä1$;BfC<	`$P@&	!2c.		P(cPNc(($P3RL	P	P@&	P(c((c(($P&3RP	CJB	WDAo4DMÃf&%$]$ Z4A$%XP@($YZa$(
Soluble Nutrients - PIA									
49+6:9+#/6M+#89+$)6$4	`$&@&(&	!2c.		P(cPXc(($PQ3&X	P	&@&(&	P(cPXc(($PQ3%N	YWe	FT$RX&&4$Z$PLLL
Total Metals - PIA									
49+6:9+#/6	`$&@&X&	!2c.		P(c(&c(($&O3%O	P	&@&X&	P(c(Qc(($PX3R&	Bee	Z4A$(&&@Q$YZa$R@F

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NOTES

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PACE ANALYTICAL SERVICES
WWW.PACELABS.COM

REGULATORY PROGRAM (CIRCLE):	NPDES
MORBCA	RCRA
CCDD	TACO: RES OR IND/COMM

CHAIN OF CUSTODY RECORD

SAMPLE COLLECTED IN THE STATE OF MO

Geosyntec Consultants

ALL HIGHLIGHTED AREAS *MUST* BE COMPLETED BY CLIENT (PLEASE PRINT)

1 CLIENT: Lake Springfield	PROJECT NUMBER: MOW5628	PROJECT LOCATION: Springfield, MO	PURCHASE ORDER #:	
ADDRESS: 2009 E. McCarty St., Suite 1	PHONE NUMBER: 573-499-5443	E-MAIL: mhogan@geosyntec.com	DATE SHIPPED:	
CITY STATE ZIP: Jefferson City MO 65101	SAMPLER (PLEASE PRINT): Joshua Horne		MATRIX TYPES: WW- WASTEWATER, DW- DRINKING WATER, GW- GROUND WATER, WWSL- SLUDGE, NAS- NON AQUEOUS SOLID, LCHT- LEACHATE, OL-OIL, SO-SOIL, SOL-SOLID	
CONTACT PERSON: Mike Hogan	SAMPLER'S SIGNATURE: [signature]			

3 ANALYSIS REQUESTED

4 (FOR LAB USE ONLY)
LOGIN #: FL02779
LOGGED BY: SMW
CLIENT:
PROJECT:
PROJ. MGR.:
CUSTODY SEAL #:

2 SAMPLE DESCRIPTION (UNIQUE DESCRIPTION AS IT WILL APPEAR ON THE ANALYTICAL REPORT)	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	PRES CODE (CLIENT PROVIDED)	Nitrate plus nitrite	Total Kieldahl Nitrogen	Ammonia	Total Phosphorus	Dissolved Reactive Phosphorus	BOD5 and TSS		REMARKS
LS-CB-03	12-14-22	1310		X	Surface Water	4	2, 3, 6	X	X	X	X	X	X		Note 48 hr. hold times
LS-JR-03	12-14-22	1240		X	Surface Water	4	2, 3, 6	X	X	X	X	X	X		Note 48 hr. hold times
				X	Surface Water		2, 3, 6	X	X	X	X	X	X		Note 48 hr. hold times
				X	Surface Water		2, 3, 6	X	X	X	X	X	X		Note 48 hr. hold times
															Each Site:
															1-P, 1L, Unp
															1-P, 500ml, Dis
															1-P, 250ml, H2SO4
															1-P, 250ml, HNO3

C105

CHEMICAL PRESERVATION CODES: 1 – HCL | 2 – H2SO4 | 3 – HNO3 | 4 – NAOH | 5 – NA2S2O3 | 6 – UNPRESERVED | 7 – OTHER

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) NORMAL RUSH
(RUSH TAT IS SUBJECT TO PACE LABS APPROVAL AND SURCHARGE)
RUSH RESULTS VIA (PLEASE CIRCLE) EMAIL PHONE
EMAIL IF DIFFERENT FROM ABOVE: PHONE # IF DIFFERENT FROM ABOVE:

DATE RESULTS NEEDED: Normal

6 *I understand that by initialing this box I give the lab permission to proceed with analysis, even though it may not meet all sample conformance requirements as defined in the receiving facility's Sample Acceptance Policy and the data will be qualified. Qualified data may NOT be acceptable to report to all regulatory authorities.*

PROCEED WITH ANALYSIS AND QUALIFY RESULTS: (INITIALS) mlh

7 RELINQUISHED BY: (SIGNATURE)	DATE / TIME	RECEIVED BY: (SIGNATURE)	DATE / TIME
[signature]	DATE 12-14-22 TIME 1349	Stacey Wolf	DATE 12-14-22 TIME 1351
RELINQUISHED BY: (SIGNATURE)	DATE TIME	RECEIVED BY: (SIGNATURE)	DATE TIME
RELINQUISHED BY: (SIGNATURE)	DATE TIME	RECEIVED BY: (SIGNATURE)	DATE TIME

8 COMMENTS: (FOR LAB USE ONLY)
SAMPLE TEMPERATURE UPON RECEIPT 6.0 °C
TEMPERATURE GUN ID
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
SAMPLE ACCEPTANCE NONCONFORMANT REPORT IS NEEDED Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE

SUBCONTRACT ORDER
Transfer Chain of Custody

Pace Analytical Services, LLC

FL02779

A&H
12-15-22

SENDING LABORATORY	RECEIVING LABORATORY
PDC Laboratories, Inc. 1805 West Sunset Street Springfield, MO 65807 (417) 864-8924	Pace Analytical Services, LLC - Peoria 2231 W Altorfer Dr Peoria, IL 61615 (309) 692-9688

Sample: **FL02779-01**
Name: LS-CB-03

Sampled: 12/14/22 13:10
Matrix: Surface Water
Preservative: H2SO4, cool <6

Analysis	Due	Expires	Comments
Ammonia GD	12/27/22 16:00	01/11/23 13:10	
Environmental Fee - Liquid	12/27/22 16:00	04/13/23 13:10	
NO3 + NO2	12/27/22 16:00	01/11/23 13:10	
P 200.7 WWTot	12/27/22 16:00	06/12/23 13:10	
PO4 ortho-P Sol	12/27/22 16:00	12/16/22 13:10	— Short Hold
Sample Disposal Fee	12/27/22 16:00	04/13/23 13:10	
TKN GD	12/27/22 16:00	01/11/23 13:10	

Sample: **FL02779-02**
Name: LS-JR-03

Sampled: 12/14/22 12:40
Matrix: Surface Water
Preservative: H2SO4, cool <6

Analysis	Due	Expires	Comments
Ammonia GD	12/27/22 16:00	01/11/23 12:40	
Environmental Fee - Liquid	12/27/22 16:00	04/13/23 12:40	
NO3 + NO2	12/27/22 16:00	01/11/23 12:40	
P 200.7 WWTot	12/27/22 16:00	06/12/23 12:40	
PO4 ortho-P Sol	12/27/22 16:00	12/16/22 12:40	— Short Hold
Sample Disposal Fee	12/27/22 16:00	04/13/23 12:40	
TKN GD	12/27/22 16:00	01/11/23 12:40	

SUBCONTRACT ORDER
Transfer Chain of Custody

Pace Analytical Services, LLC

FL02779

Please email results to Gail Schindler at gail.schindler@pacelabs.com

Date Shipped: 12-14-22 Total # of Containers: 6 Sample Origin (State): MO PO #: —

Turn-Around Time Requested [X] NORMAL [ ] RUSH Date Results Needed: —

Relinquished By	Date/Time	Received By	Date/Time		
Stacey Wolf	12-14-22			Sample Temperature Upon Receipt	1.9 °C
				Sample(s) Received on Ice	Y or N
				Proper Bottles Received in Good Condition	Y or N
		Vanna Wagner	12-15-22 1050	Bottles Filled with Adequate Volume	Y or N
				Samples Received Within Hold Time	Y or N
				Date/Time Taken From Sample Bottle	Y or N

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Peoria, IL 61615
(800)752-6651

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45+Ä6+$71 .$+ 85-6+.$9:+$Ä Ä5#918Ä5$"+6!596$17$69,<$+=6>$9:+$5Ä0-"Ä9-"#$"+8+1?+8$ **12/15/22 5:14 pm** Ä .$
5-22+.$1 $! .+"$@-"A$-".+"$ **FL03235** B$C55$9+691 2$16$<+"7-";+.$Ä88-".1 2$9-$-!"$8DEF$9$88"+9Ä91- 6$! 5+66$
-9:+"@16+$ -9+.B$D:16$"+<-"9$8Ä -9$0+$"+<"-.!8+.'$+G8+<9$55$@7!9:-!9$9:+$@"199+ $<+";1661- $-7$4ÄG6#918Ä5$
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Peoria, IL 61615
(800)752-6651

SAMPLE RECEIPT CHECK LIST

Items not applicable will be marked as in compliance

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[ZH	H!77181+ 9$6Ä;<5+$?-5!;+$"+8+1?+.
[ZH	HÄ;<5+$8- 9Ä1 +"6$"+8+1?+.$! .Ä;Ä2+.
[ZH	b+"-$:+Ä.6<Ä8+'$cP$;$<"+6+ 9$1 $dXC $?1Ä56
[ZH	D"1<$05Ä=6>$"+8+1?+.
[ZH	C55$ - O71+5.$Ä Ä5#6+6$"+8+1?+.$@19:1 $:-5.1 2$91;+6
[ZH	H:-"9$:-5.$91;+$Ä Ä5#616
[ZH	,!""+ 9$4*,$,X,$6!0;199+.
EX	,Ä6+$ Ä""Ä91?+$<"-?1.+.

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ANALYTICAL RESULTS

Sample: ^/&)()YO&% | **Sampled:** %(e%(e(($&R3&&
Name: % | **Received:** %(e%Ye(($%R3%S
Matrix: H+.1;+ 9OM"Ä0

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ä5$X"2Ä 18$,Ä"0- $⇒D,>	R(S&W8	;2eA2			%	)&&			HU$Y)%&,$(&&&

Sample: ^/&)()YO&(| **Sampled:** %(e%(e(($&R3SN
Name: (| **Received:** %(e%Ye(($%R3%S
Matrix: H+.1;+ 9O,-;<-619+

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ä5$X"2Ä 18$,Ä"0- $⇒D,>	PN(&W8	;2eA2			%	)&&			HU$Y)%&,$(&&&

Sample: ^/&)()YO&) | **Sampled:** %(e%(e(($&Q3)Q
Name:) | **Received:** %(e%Ye(($%R3%S
Matrix: H+.1;+ 9O,-;<-619+

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ä5$X"2Ä 18$,Ä"0- $⇒D,>	P&Y&W8	;2eA2			%	)&&			HU$Y)%&,$(&&&

Sample: ^/&)()YO&S | **Sampled:** %(e%(e(($&N3(Q
Name: S | **Received:** %(e%Ye(($%R3%S
Matrix: H+.1;+ 9O,-;<-619+

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ä5$X"2Ä 18$,Ä"0- $⇒D,>	PSR&	;2eA2			%	)&&			HU$Y)%&,$(&&&

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ANALYTICAL RESULTS

Sample: ^/&)()YO&Y
Name: Y
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%&3%&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ä5$X"2Ä 18$,Ä"0- $⇒D,>	PQ)&	;2eA2			%	)&&			HU$Y)%&,$(&&&

Sample: ^/&)()YO&P
Name: P
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%(3%P
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ä5$X"2Ä 18$,Ä"0- $⇒D,>	P%Q&	;2eA2			%	)&&			HU$Y)%&,$(&&&

Sample: ^/&)()YO&R
Name: N
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%%3))
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ä5$X"2Ä 18$,Ä"0- $⇒D,>	RRN&	;2eA2			%	)&&			HU$Y)%&,$(&&&

Sample: ^/&)()YO&Q
Name: R
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%)3(&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ä5$X"2Ä 18$,Ä"0- $⇒D,>	P)Q&	;2eA2			%	)&&			HU$Y)%&,$(&&&

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Sample: ^/&)()YO&N
Name: Q
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%S3(S
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ȁ5$X"2Ȁ 18$,Ȁ"0- $⇒D>	SS)&	;2eA2			%	)&&			HU$Y)%&,$(&&&

Sample: ^/&)()YO%&
Name: %&
Matrix: H+.1;+ 9OM"Ȁ0

Sampled: %(e%(e(($%Y3)&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ȁ5$X"2Ȁ 18$,Ȁ"0- $⇒D>	NRR&	;2eA2			%	)&&			HU$Y)%&,$(&&&

Sample: ^/&)()YO%%
Name: %)
Matrix: H+.1;+ 9

Sampled: %(e%(e(($&&3&&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - Eurofins Eaton Analytical, Inc. - Lancaster, PA									
D-9Ȁ5$X"2Ȁ 18$,Ȁ"0- $⇒D>	PRQ&	;2eA2			%	)&&			HU$Y)%&,$(&&&

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Sample: ^/&)()YO&%
Name: %
Matrix: H+.1;+ 9OM"Ä0

Sampled: %(e%(e(($&R3&&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	QS	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	SY	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	P)	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	%B)	;2eA2$."#		%(e)&e(($%3(Q	%	&BSY	%(e)&e(($%3(Q	,]H%	Z4C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	)Q&	;2eA2$."#		%(e(&e(($%R3)R	%	%%	%(e(%e(($%3&%	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	(Y&&	;2eA2$."#		&%e&)e()$%Y3&%	%	%&	&%e&)e()$%Y3&%	DDi	Z4C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
C5<:ÄOWi,	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
W+9ÄOWi,	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
*+59ÄOWi,	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$)(N	!2eA2$."#		%(e(&e(($&N3((	%	)(N	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
S'SjO***	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
S'SjO**Z	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
S'SjO**D	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Ne(($%&3&P	HWM	Z4C$Q&Q%C
*1+5."1	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
Z .-6!57Ä $F	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
Z .-6!57Ä $FF	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
Z ."1	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
Z ."1 $A+9- +	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Ne(($%&3&P	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Ne(($%&3&P	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Qe(($(&3SN	HWM	Z4C$Q&Q%C
U+9:-G#8:5-"	c$((B&	!2eA2$."#		%(e(&e(($&N3((	%	((B&	%(e(Ne(($%&3&P	HWM	Z4C$Q&Q%C
D-GÄ<:+ +	c$QRQ	!2eA2$."#		%(e(&e(($&N3((	%	QRQ	%(e(Ne(($%&3&P	HWM	Z4C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&%
Name: %
Matrix: H+.1;+ 9OM"Ä0

Sampled: %(e%(e(($&R3&&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$SS&	!2eA2$."#		%(e(&e(($&N3((	%	SS&	%(e(Ne(($%&3&P	HWM	Z4 C$$Q&Q(
C"-85-"$%((%	c$SS&	!2eA2$."#		%(e(&e(($&N3((	%	SS&	%(e(Ne(($%&3&P	HWM	Z4 C$$Q&Q(
C"-85-"$%()(	c$SS&	!2eA2$."#		%(e(&e(($&N3((	%	SS&	%(e(Ne(($%&3&P	HWM	Z4 C$$Q&Q(
C"-85-"$%(S(	c$SS&	!2eA2$."#		%(e(&e(($&N3((	%	SS&	%(e(Ne(($%&3&P	HWM	Z4 C$$Q&Q(
C"-85-"$%(SQ	c$SS&	!2eA2$."#		%(e(&e(($&N3((	%	SS&	%(e(Ne(($%&3&P	HWM	Z4 C$$Q&Q(
C"-85-"$%(YS	c$SS&	!2eA2$."#		%(e(&e(($&N3((	%	SS&	%(e(Ne(($%&3&P	HWM	Z4 C$$Q&Q(
C"-85-"$%(P&	c$SS&	!2eA2$."#		%(e(&e(($&N3((	%	SS&	%(e(Ne(($%&3&P	HWM	Z4 C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
C8+ Ä<:9:#5+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
C 9:"Ä8+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
W+ h-=Ä><#"+ +	c$&BQ&&	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BQ&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
,:"#6+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&BQ&&	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BQ&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
^5!-"Ä 9:+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
^5!-"+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
EÄ<:9:Ä5+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
4:+ Ä 9:"+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
4#"+ +	c$SB&&	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&&	%(e%Ne(($%R3&R	H,F	Z4 C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&QN(	;2eA2$."#		%(e%Pe(($%S3%R	%	&B&QN(	%(e%Ne(($%S3)N	\CU	HL$RSR%
C"6+ 18	c$NBRQ	;2eA2$."#		%(e%Ne(($%P3)(	%	NBRQ	%(e(&e(($%S3(Q	*CH	Z4 C$P&%&W
WÄ"1!;	N&BS	;2eA2$."#	kÄ	%(e%Ne(($%P3)(	%	%BNP	%(e(&e(($%S3(Q	*CH	Z4 C$P&%&W
,Ä.;1!;	c$&BNRQ	;2eA2$."#		%(e%Ne(($%P3)(	%	&BNRQ	%(e(&e(($%S3(Q	*CH	Z4 C$P&%&W
,:"-;1!;	(SBP	;2eA2$."#	k	%(e((e(($&Q3)P	%	&BY&&	%(e()e(($%&3&&	*CH	Z4 C$P&%&W
,-<<+"	YSBY	;2eA2$."#	k	%(e((e(($&Q3)P	%	&BY&&	%(e()e(($%&3&&	*CH	Z4 C$P&%&W
/+Ä.	((B%	;2eA2$."#		%(e%Ne(($%P3)(	%	RBQ(	%(e(&e(($%S3(Q	*CH	Z4 C$P&%&W
E18A+5	%%BR	;2eA2$."#		%(e%Ne(($%P3)(	%	%BNP	%(e(&e(($%S3(Q	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&%
Name: %
Matrix: H+.1;+ 9OM"Ȁ0

Sampled: %(e%(e(($&R3&&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$RBQ(	;2eA2$."#		%(e%Ne(($%P3)(	%	RBQ(	%(e(&e(($%S3(Q	*CH	Z4C$P&%&W
H15?+"	c$&BNRQ	;2eA2$."#		%(e%Ne(($%P3)(	%	&BNRQ	%(e(&e(($%S3(Q	*CH	Z4C$P&%&W
b1 8	QSBY	;2eA2$."#	kȀ	%(e%Ne(($%P3)(	%	)BN%	%(e(&e(($%S3(Q	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&(
Name: (
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&R3SN
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	QQ	f	i	%(e(%e(($%&3Y(	%	& B&Y&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	)N	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	P%	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	%B%	;2eA2$."#		%(e)&e(($%3(N	%	&BY(	%(e)&e(($%3(N	,]H%	Z4 C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	S)&	;2eA2$."#		%(e(&e(($%R3)R	%	%)	%(e(%e(($%3&(	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	(Y&&	;2eA2$."#		&%e&)e()$%Y3&(	%	%)&	&%e&)e()$%Y3&(	DDi	Z4 C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
C5<:ÄOWi,	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
W+9ÄOWi,	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
*+59ÄOWi,	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$)QN	!2eA2$."#		%(e(&e(($&N3((	%	)QN	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
S'SjO***	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
S'SjO**Z	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
S'SjO**D	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Ne(($%&3)(	HWM	Z4 C$Q&Q%C
*1+5."1	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $F	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $FF	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
Z ."1	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
Z ."1 $A+9- +	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Ne(($%&3)(	HWM	Z4 C$Q&Q%C
i+<9Ä8:5-"	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Ne(($%&3)(	HWM	Z4 C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Qe(($(%3%(	HWM	Z4 C$Q&Q%C
U+9:-G#8:5-"	c$(PB&	!2eA2$."#		%(e(&e(($&N3((	%	(PB&	%(e(Ne(($%&3)(	HWM	Z4 C$Q&Q%C
D-GÄ<:+ +	c$%&S&	!2eA2$."#		%(e(&e(($&N3((	%	%&S&	%(e(Ne(($%&3)(	HWM	Z4 C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&(
Name: (
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&R3SN
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$Y%N	!2eA2$."#		%(e(&e(($&N3((	%	Y%N	%(e(Ne(($%&3)(	HWM	Z4 C$$Q&Q(
C"-85-"$%((%	c$Y%N	!2eA2$."#		%(e(&e(($&N3((	%	Y%N	%(e(Ne(($%&3)(	HWM	Z4 C$$Q&Q(
C"-85-"$%()(	c$Y%N	!2eA2$."#		%(e(&e(($&N3((	%	Y%N	%(e(Ne(($%&3)(	HWM	Z4 C$$Q&Q(
C"-85-"$%(S(	c$Y%N	!2eA2$."#		%(e(&e(($&N3((	%	Y%N	%(e(Ne(($%&3)(	HWM	Z4 C$$Q&Q(
C"-85-"$%(SQ	c$Y%N	!2eA2$."#		%(e(&e(($&N3((	%	Y%N	%(e(Ne(($%&3)(	HWM	Z4 C$$Q&Q(
C"-85-"$%(YS	c$Y%N	!2eA2$."#		%(e(&e(($&N3((	%	Y%N	%(e(Ne(($%&3)(	HWM	Z4 C$$Q&Q(
C"-85-"$%(P&	c$Y%N	!2eA2$."#		%(e(&e(($&N3((	%	Y%N	%(e(Ne(($%&3)(	HWM	Z4 C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
C8+ Ä<:9:#5+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
C 9:"Ä8+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
W+ h-=Ä><#"+ +	c$&BN%)	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BN%)	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
,:"#6+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&BN%)	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BN%)	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
^5!-"Ä 9:+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
^5!-"+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
EÄ<:9:Ä5+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
4:+ Ä 9:"+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
4#"+ +	c$SBYP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBYP	%(e%Ne(($%R3)Q	H,F	Z4 C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&NP(	;2eA2$."#		%(e%Pe(($%S3%R	%	&B&NP(	%(e%Ne(($%S3)N	\CU	HL$RSR%
C"6+ 18	c$%%B(	;2eA2$."#		%(e%Ne(($%P3)(	%	%%B(	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W
WÄ"1!;	%(R	;2eA2$."#		%(e%Ne(($%P3)(	%	(B(S	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W
,Ä.;1!;	c$%B%(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%(	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W
,:"-;1!;	(&BP	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%(	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W
,-<<+"	)SB(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%(	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W
/+Ä.	)%BY	;2eA2$."#		%(e%Ne(($%P3)(	%	QBNY	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W
E18A+5	%PB&	;2eA2$."#		%(e%Ne(($%P3)(	%	(B(S	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&(
Name: (
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&R3SN
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$QBNY	;2eA2$."#		%(e%Ne(($%P3)(	%	QBNY	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W
H15?+"	c$%B%(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%(	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W
b1 8	%%)	;2eA2$."#		%(e%Ne(($%P3)(	%	SBSQ	%(e(&e(($%S3SP	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&)
Name:)
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&Q3)Q
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	N%	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	)P	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	YQ	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	&BPP	;2eA2$."#		%(e)&e(($%&3(S	%	&BYP	%(e)&e(($%&3(S	,]H%	Z4 C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	Y)&	;2eA2$."#		%(e(&e(($%R3)R	%	%S	%(e(%e(($%%3&(	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	(Q&&	;2eA2$."#		&%e&)e()$%Y3&)	%	%S&	&%e&)e()$%Y3&)	DDi	Z4 C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
C5<:ÄOWi,	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
W+9ÄOWi,	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
*+59ÄOWi,	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$S%)	!2eA2$."#		%(e(&e(($&N3((	%	S%)	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
S'SjO***	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
S'SjO**Z	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
S'SjO**D	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Ne(($%3()	HWM	Z4 C$Q&Q%C
*1+5."1	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $F	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $FF	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
Z ."1	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
Z ."1 $A+9- +	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Ne(($%3()	HWM	Z4 C$Q&Q%C
i+<9Ä8:5-"	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Ne(($%3()	HWM	Z4 C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Qe(($(%3)P	HWM	Z4 C$Q&Q%C
U+9:-G#8:5-"	c$(RBP	!2eA2$."#		%(e(&e(($&N3((	%	(RBP	%(e(Ne(($%3()	HWM	Z4 C$Q&Q%C
D-GÄ<:+ +	c$%&&	!2eA2$."#		%(e(&e(($&N3((	%	%&&	%(e(Ne(($%3()	HWM	Z4 C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&)
Name:)
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&Q3)Q
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$YY(	!2eA2$."#		%(e(&e(($&N3((	%	YY(	%(e(Ne(($%3()	HWM	Z4 C$$Q&Q(
C"-85-"$%((%	c$YY(	!2eA2$."#		%(e(&e(($&N3((	%	YY(	%(e(Ne(($%3()	HWM	Z4 C$$Q&Q(
C"-85-"$%()(	c$YY(	!2eA2$."#		%(e(&e(($&N3((	%	YY(	%(e(Ne(($%3()	HWM	Z4 C$$Q&Q(
C"-85-"$%(S(	c$YY(	!2eA2$."#		%(e(&e(($&N3((	%	YY(	%(e(Ne(($%3()	HWM	Z4 C$$Q&Q(
C"-85-"$%(SQ	c$YY(	!2eA2$."#		%(e(&e(($&N3((	%	YY(	%(e(Ne(($%3()	HWM	Z4 C$$Q&Q(
C"-85-"$%(YS	c$YY(	!2eA2$."#		%(e(&e(($&N3((	%	YY(	%(e(Ne(($%3()	HWM	Z4 C$$Q&Q(
C"-85-"$%(P&	c$YY(	!2eA2$."#		%(e(&e(($&N3((	%	YY(	%(e(Ne(($%3()	HWM	Z4 C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
C8+ Ä<:9:#5+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
C 9:"Ä8+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
W+ h-=Ä><#"+ +	c$&BNN(	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BNN(	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
,:"#6+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&BNN(	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BNN(	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
^5!-"Ä 9:+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
^5!-"+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
EÄ<:9:Ä5+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
4:+ Ä 9:"+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
4#"+ +	c$SBNP	;2eA2$."#		%(e%Ne(($&P3%(	%	SBNP	%(e%Ne(($%Q3&N	H,F	Z4 C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&NNQ	2eA2$."#		%(e%Pe(($%S3%R	%	&B&NNQ	%(e%Ne(($%S3)N	\CU	HL$RSR%
C"6+ 18	c$%)B(	;2eA2$."#		%(e%Ne(($%P3)(	%	%)B(	%(e(&e(($%S3SN	*CH	Z4 C$P&%&W
WÄ"1!;	%(Q	;2eA2$."#		%(e%Ne(($%P3)(	%	(BP)	%(e(&e(($%S3SN	*CH	Z4 C$P&%&W
,Ä.;1!;	c$%B)(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B)(	%(e(&e(($%S3SN	*CH	Z4 C$P&%&W
,:"-;1!;	%NBR	;2eA2$."#		%(e%Ne(($%P3)(	%	%B)(	%(e(&e(($%S3SN	*CH	Z4 C$P&%&W
,-<<+"	(RBN	;2eA2$."#		%(e%Ne(($%P3)(	%	%B)(	%(e(&e(($%S3SN	*CH	Z4 C$P&%&W
/+Ä.	))B%	;2eA2$."#		%(e%Ne(($%P3)(	%	%&BY	%(e(&e(($%S3SN	*CH	Z4 C$P&%&W
E18A+5	%SBN	;2eA2$."#		%(e%Ne(($%P3)(	%	(BP)	%(e(&e(($%S3SN	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&)
Name:)
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&Q3)Q
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$%&BY	;2eA2$."#		%(e%Ne(($%P3)(	%	%&BY	%(e(&e(($%S3SN	*CH	Z4C$P&%&W
H15?+"	c$%B)(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B)(	%(e(&e(($%S3SN	*CH	Z4C$P&%&W
b1 8	%(S	;2eA2$."#		%(e%Ne(($%P3)(	%	YB(R	%(e(&e(($%S3SN	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&S
Name: S
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&N3(Q
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	QN	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	SS	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	YP	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	&BYP	;2eA2$."#		%(e)&e(($%&3(S	%	&BSP	%(e)&e(($%&3(S	,]H%	Z4 C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	()&	;2eA2$."#		%(e(&e(($%R3)R	%	%%	%(e(%e(($%%3&)	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	((&&	;2eA2$."#		&%e&)e()$%Y3&N	%	%%	&%e&)e()$%Y3&N	DDi	Z4 C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
C5<:ÄOWi,	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
W+9ÄOWi,	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
*+59ÄOWi,	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$))Y	!2eA2$."#		%(e(&e(($&N3((	%	))Y	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
S'SjO***	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
S'SjO**Z	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
S'SjO**D	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Ne(($%3SQ	HWM	Z4 C$Q&Q%C
*1+5."1	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $F	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $FF	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
Z ."1	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
Z ."1 $A+9- +	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Ne(($%3SQ	HWM	Z4 C$Q&Q%C
i+<9Ä8:5-"	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Ne(($%3SQ	HWM	Z4 C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Qe(($(%3YN	HWM	Z4 C$Q&Q%C
U+9:-G#8:5-"	c$((BS	!2eA2$."#		%(e(&e(($&N3((	%	((BS	%(e(Ne(($%3SQ	HWM	Z4 C$Q&Q%C
D-GÄ<:+ +	c$QNS	!2eA2$."#		%(e(&e(($&N3((	%	QNS	%(e(Ne(($%3SQ	HWM	Z4 C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&S
Name: S
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&N3(Q
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$SSQ	!2eA2$."#		%(e(&e(($&N3((	%	SSQ	%(e(Ne(($%3SQ	HWM	Z4C$$Q&Q(
C"-85-"$%((%	c$SSQ	!2eA2$."#		%(e(&e(($&N3((	%	SSQ	%(e(Ne(($%3SQ	HWM	Z4C$$Q&Q(
C"-85-"$%()(	c$SSQ	!2eA2$."#		%(e(&e(($&N3((	%	SSQ	%(e(Ne(($%3SQ	HWM	Z4C$$Q&Q(
C"-85-"$%(S(	c$SSQ	!2eA2$."#		%(e(&e(($&N3((	%	SSQ	%(e(Ne(($%3SQ	HWM	Z4C$$Q&Q(
C"-85-"$%(SQ	c$SSQ	!2eA2$."#		%(e(&e(($&N3((	%	SSQ	%(e(Ne(($%3SQ	HWM	Z4C$$Q&Q(
C"-85-"$%(YS	c$SSQ	!2eA2$."#		%(e(&e(($&N3((	%	SSQ	%(e(Ne(($%3SQ	HWM	Z4C$$Q&Q(
C"-85-"$%(P&	c$SSQ	!2eA2$."#		%(e(&e(($&N3((	%	SSQ	%(e(Ne(($%3SQ	HWM	Z4C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
C8+ Ä<:9:#5+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
C 9:"Ä8+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
W+ h-=Ä><#"+ +	c$&BQ&%	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BQ&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
,:"#6+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&BQ&%	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BQ&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
^5!-"Ä 9:+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
^5!-"+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
EÄ<:9:Ä5+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
4:+ Ä 9:"+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
4#"+ +	c$SB&%	;2eA2$."#		%(e%Ne(($&P3%(	%	SB&%	%(e%Ne(($%Q3S&	H,F	Z4C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&N%Y	;2eA2$."#		%(e(%e(($%(3&N	%	&B&N%Y	%(e(%e(($%Y3%Q	W,i	HL$RSR%
C"6+ 18	c$%&BQ	;2eA2$."#		%(e%Ne(($%P3)(	%	%&BQ	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W
WÄ"1!;	N%B&	;2eA2$."#		%(e%Ne(($%P3)(	%	(B%P	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W
,Ä.;1!;	c$%B&Q	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&Q	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W
,:"-;1!;	%PB)	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&Q	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W
,-<<+"	()BP	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&Q	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W
/+Ä.	((B(	;2eA2$."#		%(e%Ne(($%P3)(	%	QBP)	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W
E18A+5	%(B&	;2eA2$."#		%(e%Ne(($%P3)(	%	(B%P	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&S
Name: S
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($&N3(Q
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$QBP)	;2eA2$."#		%(e%Ne(($%P3)(	%	QBP)	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W
H15?+"	c$%B&Q	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&Q	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W
b1 8	QQB)	;2eA2$."#		%(e%Ne(($%P3)(	%	SB)(	%(e(&e(($%S3Y%	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&Y
Name: Y
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%&3%&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	QP	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	)%	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	YY	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	c$&BPS	;2eA2$."#		%(e)&e(($%&3(Q	%	&BPS	%(e)&e(($%&3(Q	,]H%	Z4C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	SP&	;2eA2$."#		%(e(&e(($%R3)R	%	%P	%(e(%e(($%%3&N	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	)P&&	;2eA2$."#		&%e&)e()$%Y3%&	%	%P&	&%e&)e()$%Y3%&	DDi	Z4C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
C5<:ÄOWi,	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
W+9ÄOWi,	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
*+59ÄOWi,	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$SRN	!2eA2$."#		%(e(&e(($&N3((	%	SRN	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
S'SjO***	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
S'SjO**Z	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
S'SjO**D	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Ne(($%(3%)	HWM	Z4C$Q&Q%C
*1+5."1	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
Z .-6!57Ä $F	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
Z .-6!57Ä $FF	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
Z ."1	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
Z ."1 $A+9- +	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Ne(($%(3%)	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Ne(($%(3%)	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Qe(($((3((	HWM	Z4C$Q&Q%C
U+9:-G#8:5-"	c$)(B&	!2eA2$."#		%(e(&e(($&N3((	%	)(B&	%(e(Ne(($%(3%)	HWM	Z4C$Q&Q%C
D-GÄ<:+ +	c$%(Q&	!2eA2$."#		%(e(&e(($&N3((	%	%(Q&	%(e(Ne(($%(3%)	HWM	Z4C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&Y
Name: Y
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%&3%&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$PS&	!2eA2$."#		%(e(&e(($&N3((	%	PS&	%(e(Ne(($%(3%)	HWM	Z4 C$$Q&Q(
C"-85-"$%((%	c$PS&	!2eA2$."#		%(e(&e(($&N3((	%	PS&	%(e(Ne(($%(3%)	HWM	Z4 C$$Q&Q(
C"-85-"$%()(	c$PS&	!2eA2$."#		%(e(&e(($&N3((	%	PS&	%(e(Ne(($%(3%)	HWM	Z4 C$$Q&Q(
C"-85-"$%(S(	c$PS&	!2eA2$."#		%(e(&e(($&N3((	%	PS&	%(e(Ne(($%(3%)	HWM	Z4 C$$Q&Q(
C"-85-"$%(SQ	c$PS&	!2eA2$."#		%(e(&e(($&N3((	%	PS&	%(e(Ne(($%(3%)	HWM	Z4 C$$Q&Q(
C"-85-"$%(YS	c$PS&	!2eA2$."#		%(e(&e(($&N3((	%	PS&	%(e(Ne(($%(3%)	HWM	Z4 C$$Q&Q(
C"-85-"$%(P&	c$PS&	!2eA2$."#		%(e(&e(($&N3((	%	PS&	%(e(Ne(($%(3%)	HWM	Z4 C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
C8+ Ä<:9:#5+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
C 9:"Ä8+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
W+ h-=Ä><#"+ +	c$%B%S	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	%B%S	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
,:"#6+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$%B%S	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	%B%S	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
^5!-"Ä 9:+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
^5!-"+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
EÄ<:9:Ä5+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
4:+ Ä 9:"+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
4#"+ +	c$YBR%	;2eA2$."#		%(e%Ne(($&P3%(	%	YBR%	%(e%Ne(($%N3%	H,F	Z4 C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B%&R	;2eA2$."#		%(e(%e(($%(3&N	%	&B%&R	%(e(%e(($%Y3%Q	W,i	HL$RSR%
C"6+ 18	c$%SBQ	;2eA2$."#		%(e%Ne(($%P3)(	%	%SBQ	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W
WÄ"1!;	%)R	;2eA2$."#		%(e%Ne(($%P3)(	%	(BNR	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W
,Ä.;1!;	c$%BSQ	;2eA2$."#		%(e%Ne(($%P3)(	%	%BSQ	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W
,:"-;1!;	((BY	;2eA2$."#		%(e%Ne(($%P3)(	%	%BSQ	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W
,-<<+"	(SBQ	;2eA2$."#		%(e%Ne(($%P3)(	%	%BSQ	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W
/+Ä.	)PBR	;2eA2$."#		%(e%Ne(($%P3)(	%	%BN	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W
E18A+5	%PBQ	;2eA2$."#		%(e%Ne(($%P3)(	%	(BNR	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&Y
Name: Y
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%&3%&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$%%BN	;2eA2$."#		%(e%Ne(($%P3)(	%	%%BN	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W
H15?+"	c$%BSQ	;2eA2$."#		%(e%Ne(($%P3)(	%	%BSQ	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W
b1 8	%)%	;2eA2$."#		%(e%Ne(($%P3)(	%	YBNS	%(e(&e(($%S3YS	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&P
Name: P
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%(3%P
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	N(	f	i	%(e(%e(($%&3Y(	%	& B&Y&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	)Y	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	YS	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	c$&BYR	;2eA2$."#		%(e)&e(($%&3(N	%	&BYR	%(e)&e(($%&3(N	,]H%	Z4C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	()&	;2eA2$."#		%(e(&e(($%R3)R	%	%S	%(e(%e(($%%3%&	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	(S&&	;2eA2$."#	K)	&%e&)e()$%Y%3%	%	%S&	&%e&)e()$%Y%3%	DDi	Z4C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
C5<:ÄOWi,	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
W+9ÄOWi,	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
*+59ÄOWi,	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$S%%	!2eA2$."#		%(e(&e(($&N3((	%	S%%	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
S'SjO***	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
S'SjO**Z	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
S'SjO**D	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Ne(($%(3)N	HWM	Z4C$Q&Q%C
*1+5."1	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
Z .-6!57Ä $F	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
Z .-6!57Ä $FF	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
Z ."1	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
Z ."1 $A+9- +	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Ne(($%(3)N	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Ne(($%(3)N	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Qe(($((3SP	HWM	Z4C$Q&Q%C
U+9:-G#8:5-"	c$(RBS	!2eA2$."#		%(e(&e(($&N3((	%	(RBS	%(e(Ne(($%(3)N	HWM	Z4C$Q&Q%C
D-GÄ<:+ +	c$%%&&	!2eA2$."#		%(e(&e(($&N3((	%	%%&&	%(e(Ne(($%(3)N	HWM	Z4C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&P
Name: P
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%(3%P
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$YSN	!2eA2$."#		%(e(&e(($&N3((	%	YSN	%(e(Ne(($%(3)N	HWM	Z4 C$$Q&Q(
C"-85-"$%((%	c$YSN	!2eA2$."#		%(e(&e(($&N3((	%	YSN	%(e(Ne(($%(3)N	HWM	Z4 C$$Q&Q(
C"-85-"$%()(	c$YSN	!2eA2$."#		%(e(&e(($&N3((	%	YSN	%(e(Ne(($%(3)N	HWM	Z4 C$$Q&Q(
C"-85-"$%(S(	c$YSN	!2eA2$."#		%(e(&e(($&N3((	%	YSN	%(e(Ne(($%(3)N	HWM	Z4 C$$Q&Q(
C"-85-"$%(SQ	c$YSN	!2eA2$."#		%(e(&e(($&N3((	%	YSN	%(e(Ne(($%(3)N	HWM	Z4 C$$Q&Q(
C"-85-"$%(YS	c$YSN	!2eA2$."#		%(e(&e(($&N3((	%	YSN	%(e(Ne(($%(3)N	HWM	Z4 C$$Q&Q(
C"-85-"$%(P&	c$YSN	!2eA2$."#		%(e(&e(($&N3((	%	YSN	%(e(Ne(($%(3)N	HWM	Z4 C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
C8+ Ä<:9:#5+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
C 9:"Ä8+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
W+ h-=Ä><#"+ +	c$%B&(	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	%B&(	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
,:"#6+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$%B&(	;2eA2$."#	U"5	%(e%Ne(($&P3%(	%	%B&(	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
^5!-"Ä 9:+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
^5!-"+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
EÄ<:9:Ä5+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
4:+ Ä 9:"+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
4#"+ +	c$YB&Q	;2eA2$."#		%(e%Ne(($&P3%(	%	YB&Q	%(e%Ne(($%N3S(	H,F	Z4 C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B%S	;2eA2$."#		%(e(%e(($%(3&N	%	&B%S	%(e(%e(($%Y3%Q	W,i	HL$RSR%
C"6+ 18	c$%BQ	;2eA2$."#		%(e%Ne(($%P3)(	%	%BQ	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W
WÄ"1!;	%)R	;2eA2$."#		%(e%Ne(($%P3)(	%	(B)P	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W
,Ä.;1!;	c$%B%Q	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%Q	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W
,:"-;1!;	((B%	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%Q	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W
,-<<+"	(&BR	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%Q	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W
/+Ä.	)SBN	;2eA2$."#		%(e%Ne(($%P3)(	%	NBSP	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W
E18A+5	%PBR	;2eA2$."#		%(e%Ne(($%P3)(	%	(B)P	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&P
Name: P
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%(3%P
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$NBSP	;2eA2$."#		%(e%Ne(($%P3)(	%	NBSP	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W
H15?+"	c$%B%Q	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%Q	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W
b1 8	%)P	;2eA2$."#		%(e%Ne(($%P3)(	%	SBR)	%(e(&e(($%S3YP	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&R
Name: N
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%%3))
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	QQ	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	)N	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	Y)	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	c$&BY(	;2eA2$."#		%(e)&e(($%&3)&	%	&BY(	%(e)&e(($%&3)&	,]H%	Z4C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	)N&	;2eA2$."#		%(e(&e(($%R3)R	%	%)	%(e(%e(($%%3%	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	YQ&	;2eA2$."#		&%e&Pe()$%(3))	%	%)&	&%e&Pe()$%(3))	DDi	Z4C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
C5<:ÄOWi,	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
W+9ÄOWi,	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
*+59ÄOWi,	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$)R)	!2eA2$."#		%(e(&e(($&N3((	%	)R)	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
S'SjO***	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
S'SjO**Z	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
S'SjO**D	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Ne(($%)3&S	HWM	Z4C$Q&Q%C
*1+5."1	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
Z .-6!57Ä $F	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
Z .-6!57Ä $FF	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
Z ."1	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
Z ."1 $A+9- +	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Ne(($%)3&S	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Ne(($%)3&S	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Qe(($()3&N	HWM	Z4C$Q&Q%C
U+9:-G#8:5-"	c$(SBN	!2eA2$."#		%(e(&e(($&N3((	%	(SBN	%(e(Ne(($%)3&S	HWM	Z4C$Q&Q%C
D-GÄ<:+ +	c$NNP	!2eA2$."#		%(e(&e(($&N3((	%	NNP	%(e(Ne(($%)3&S	HWM	Z4C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&R
Name: N
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%3))
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$SNN	!2eA2$."#		%(e(&e(($&N3((	%	SNN	%(e(Ne(($%)3&S	HWM	Z4C$$Q&Q(
C"-85-"$%((%	c$SNN	!2eA2$."#		%(e(&e(($&N3((	%	SNN	%(e(Ne(($%)3&S	HWM	Z4C$$Q&Q(
C"-85-"$%()(	c$SNN	!2eA2$."#		%(e(&e(($&N3((	%	SNN	%(e(Ne(($%)3&S	HWM	Z4C$$Q&Q(
C"-85-"$%(S(	c$SNN	!2eA2$."#		%(e(&e(($&N3((	%	SNN	%(e(Ne(($%)3&S	HWM	Z4C$$Q&Q(
C"-85-"$%(SQ	c$SNN	!2eA2$."#		%(e(&e(($&N3((	%	SNN	%(e(Ne(($%)3&S	HWM	Z4C$$Q&Q(
C"-85-"$%(YS	c$SNN	!2eA2$."#		%(e(&e(($&N3((	%	SNN	%(e(Ne(($%)3&S	HWM	Z4C$$Q&Q(
C"-85-"$%(P&	c$SNN	!2eA2$."#		%(e(&e(($&N3((	%	SNN	%(e(Ne(($%)3&S	HWM	Z4C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
C8+ Ä<:9:#5+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
C 9:"Ä8+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
W+ h-=Ä><#"+ +	c$&BQQQ	2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BQQQ	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
,:"#6+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&BQQQ	2eA2$."#	U"5	%(e%Ne(($&P3%(	%	&BQQQ	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
^5!-"Ä 9:+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
^5!-"+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
EÄ<:9:Ä5+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
4:+ Ä 9:"+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
4#"+ +	c$SBSS	;2eA2$."#		%(e%Ne(($&P3%(	%	SBSS	%(e%Ne(($(&3%)	H,F	Z4C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&NP%	2eA2$."#		%(e(%e(($%(3&N	%	&B&NP%	%(e(%e(($%Y3%Q	W,i	HL$RSR%
C"6+ 18	c$%B(	;2eA2$."#		%(e%Ne(($%P3)(	%	%%	%(e(&e(($%S3YN	*CH	Z4C$P&%&W
WÄ"1!;	%&N	;2eA2$."#		%(e%Ne(($%P3)(	%	(B(S	%(e(&e(($%S3YN	*CH	Z4C$P&%&W
,Ä.;1!;	c$%B%(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%(	%(e(&e(($%S3YN	*CH	Z4C$P&%&W
,:"-;1!;	%QB%	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%(	%(e(&e(($%S3YN	*CH	Z4C$P&%&W
,-<<+"	%YB(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%(	%(e(&e(($%S3YN	*CH	Z4C$P&%&W
/+Ä.	)&BS	;2eA2$."#		%(e%Ne(($%P3)(	%	QBNY	%(e(&e(($%S3YN	*CH	Z4C$P&%&W
E18A+5	%SBQ	;2eA2$."#		%(e%Ne(($%P3)(	%	(B(S	%(e(&e(($%S3YN	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&R
Name: N
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%%3))
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$QBNY	;2eA2$."#		%(e%Ne(($%P3)(	%	QBNY	%(e(&e(($%S3YN	*CH	Z4C$P&%&W
H15?+"	c$%B%(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B%(	%(e(&e(($%S3YN	*CH	Z4C$P&%&W
b1 8	%(S	;2eA2$."#		%(e%Ne(($%P3)(	%	SBSR	%(e(&e(($%S3YN	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&Q
Name: R
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%)3(&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	PP	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	S%	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	Y&	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	c$&BSN	;2eA2$."#		%(e)&e(($%&3)%	%	&BSN	%(e)&e(($%&3)%	,]H%	Z4C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	)%&	;2eA2$."#		%(e(&e(($%R3)R	%	%(	%(e(%e(($%3%	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	Y%&	;2eA2$."#		&%e&Pe()$%(3)S	%	%(&	&%e&Pe()$%(3)S	DDi	Z4C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
C5<:ÄOWi,	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
W+9ÄOWi,	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
*+59ÄOWi,	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$)S%	!2eA2$."#		%(e(&e(($&N3((	%	)S%	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
S'SjO***	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
S'SjO**Z	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
S'SjO**D	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Ne(($%)3)&	HWM	Z4C$Q&Q%C
*1+5."1	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
Z .-6!57Ä $F	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
Z .-6!57Ä $FF	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
Z ."1	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
Z ."1 $A+9- +	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Ne(($%)3)&	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Ne(($%)3)&	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Qe(($()3))	HWM	Z4C$Q&Q%C
U+9:-G#8:5-"	c$((BQ	!2eA2$."#		%(e(&e(($&N3((	%	((BQ	%(e(Ne(($%)3)&	HWM	Z4C$Q&Q%C
D-GÄ<:+ +	c$N%&	!2eA2$."#		%(e(&e(($&N3((	%	N%&	%(e(Ne(($%)3)&	HWM	Z4C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&Q
Name: R
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%)3(&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$SYP	!2eA2$."#		%(e(&e(($&N3((	%	SYP	%(e(Ne(($%)3)&	HWM	Z4 C$$Q&Q(
C"-85-"$%((%	c$SYP	!2eA2$."#		%(e(&e(($&N3((	%	SYP	%(e(Ne(($%)3)&	HWM	Z4 C$$Q&Q(
C"-85-"$%()(	c$SYP	!2eA2$."#		%(e(&e(($&N3((	%	SYP	%(e(Ne(($%)3)&	HWM	Z4 C$$Q&Q(
C"-85-"$%(S(	c$SYP	!2eA2$."#		%(e(&e(($&N3((	%	SYP	%(e(Ne(($%)3)&	HWM	Z4 C$$Q&Q(
C"-85-"$%(SQ	c$SYP	!2eA2$."#		%(e(&e(($&N3((	%	SYP	%(e(Ne(($%)3)&	HWM	Z4 C$$Q&Q(
C"-85-"$%(YS	c$SYP	!2eA2$."#		%(e(&e(($&N3((	%	SYP	%(e(Ne(($%)3)&	HWM	Z4 C$$Q&Q(
C"-85-"$%(P&	c$SYP	!2eA2$."#		%(e(&e(($&N3((	%	SYP	%(e(Ne(($%)3)&	HWM	Z4 C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
C8+ Ä<:9:#5+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
C 9:"Ä8+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
W+ h-=Ä><#"+ +	c$&B%SP	;2eA2$."#	U"5	%(e((e(($%&3SN	%	&B%SP	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
,:"#6+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&B%SP	;2eA2$."#	U"5	%(e((e(($%&3SN	%	&B%SP	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
^5!-"Ä 9:+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
^5!-"+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
EÄ<:9:Ä5+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
4:+ Ä 9:"+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
4#"+ +	c$&BR)%	;2eA2$."#		%(e((e(($%&3SN	%	&BR)%	%(e()e(($%Y3((	H,F	Z4 C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&N&)	;2eA2$."#		%(e(%e(($%(3&N	%	&B&N&)	%(e(%e(($%Y3%Q	W,i	HL$RSR%
C"6+ 18	c$%&B(	;2eA2$."#		%(e%Ne(($%P3)(	%	%&B(	%(e(&e(($%Y3&%	*CH	Z4 C$P&%&W
WÄ"1!;	Q)B%	;2eA2$."#		%(e%Ne(($%P3)(	%	(B&)	%(e(&e(($%Y3&%	*CH	Z4 C$P&%&W
,Ä.;1!;	c$%B&(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&(	%(e(&e(($%Y3&%	*CH	Z4 C$P&%&W
,:"-;1!;	%PB(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&(	%(e(&e(($%Y3&%	*CH	Z4 C$P&%&W
,-<<+"	%SB)	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&(	%(e(&e(($%Y3&%	*CH	Z4 C$P&%&W
/+Ä.	(SB%	;2eA2$."#		%(e%Ne(($%P3)(	%	QB%(	%(e(&e(($%Y3&%	*CH	Z4 C$P&%&W
E18A+5	%%B%	;2eA2$."#		%(e%Ne(($%P3)(	%	(B&)	%(e(&e(($%Y3&%	*CH	Z4 C$P&%&W

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(800)752-6651

ANALYTICAL RESULTS

Sample: ^/&)()YO&Q
Name: R
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%)3(&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$QB%(	;2eA2$."#		%(e%Ne(($%P3)(	%	QB%(	%(e(&e(($%Y3&%	*CH	Z4C$P&%&W
H15?+"	c$%B&(	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&(	%(e(&e(($%Y3&%	*CH	Z4C$P&%&W
b1 8	QQB)	;2eA2$."#		%(e%Ne(($%P3)(	%	SB&P	%(e(&e(($%Y3&%	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&N
Name: Q
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%S3(S
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	SS	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	YY	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	SR	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	c$&B)P	;2eA2$."#		%(e)&e(($%&3)(	%	&B)P	%(e)&e(($%&3)(	,]H%	Z4C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	(%&	;2eA2$."#		%(e(&e(($%R3)R	%	NB&	%(e(%e(($%%3%(	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	)N&	;2eA2$."#		&%e&Pe()$%(3)Y	%	N&	&%e&Pe()$%(3)Y	DDi	Z4C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
C5<:ÄOWi,	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
W+9ÄOWi,	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
*+59ÄOWi,	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$(SY	!2eA2$."#		%(e(&e(($&N3((	%	(SY	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
S'SjO***	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
S'SjO**Z	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
S'SjO**D	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Ne(($%)3YY	HWM	Z4C$Q&Q%C
*1+5."1	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
Z .-6!57Ä $F	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
Z .-6!57Ä $FF	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
Z ."1	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
Z ."1 $A+9- +	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Ne(($%)3YY	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Ne(($%)3YY	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Qe(($()3YP	HWM	Z4C$Q&Q%C
U+9:-G#8:5-"	c$%PBS	!2eA2$."#		%(e(&e(($&N3((	%	%PBS	%(e(Ne(($%)3YY	HWM	Z4C$Q&Q%C
D-GÄ<:+ +	c$PYY	!2eA2$."#		%(e(&e(($&N3((	%	PYY	%(e(Ne(($%)3YY	HWM	Z4C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO&N
Name: Q
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%S3(S
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$)(Q	!2eA2$."#		%(e(&e(($&N3((	%	)(Q	%(e(Ne(($%)3YY	HWM	Z4C$$Q&Q(
C"-85-"$%((%	c$)(Q	!2eA2$."#		%(e(&e(($&N3((	%	)(Q	%(e(Ne(($%)3YY	HWM	Z4C$$Q&Q(
C"-85-"$%()(	c$)(Q	!2eA2$."#		%(e(&e(($&N3((	%	)(Q	%(e(Ne(($%)3YY	HWM	Z4C$$Q&Q(
C"-85-"$%(S(	c$)(Q	!2eA2$."#		%(e(&e(($&N3((	%	)(Q	%(e(Ne(($%)3YY	HWM	Z4C$$Q&Q(
C"-85-"$%(SQ	c$)(Q	!2eA2$."#		%(e(&e(($&N3((	%	)(Q	%(e(Ne(($%)3YY	HWM	Z4C$$Q&Q(
C"-85-"$%(YS	c$)(Q	!2eA2$."#		%(e(&e(($&N3((	%	)(Q	%(e(Ne(($%)3YY	HWM	Z4C$$Q&Q(
C"-85-"$%(P&	c$)(Q	!2eA2$."#		%(e(&e(($&N3((	%	)(Q	%(e(Ne(($%)3YY	HWM	Z4C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
C8+ Ä<:9:#5+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
C 9:"Ä8+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
W+ h-=Ä><#"+ +	c$&B%&Q	2eA2$."#	U"5	%(e((e(($%&3SN	%	&B%&Q	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
,:"#6+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&B%&Q	2eA2$."#	U"5	%(e((e(($%&3SN	%	&B%&Q	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
^5!-"Ä 9:+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
^5!-"+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
EÄ<:9:Ä5+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
4:+ Ä 9:"+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
4#"+ +	c$&BYS(	;2eA2$."#		%(e((e(($%&3SN	%	&BYS(	%(e()e(($%R3(P	H,F	Z4C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&PSY	;2eA2$."#		%(e(%e(($%(3&N	%	&B&PSY	%(e(%e(($%Y3%Q	W,i	HL$RSR%
C"6+ 18	c$QB)P	;2eA2$."#		%(e%Ne(($%P3)(	%	QB)P	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W
WÄ"1!;	%B&	;2eA2$."#		%(e%Ne(($%P3)(	%	%BPR	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W
,Ä.;1!;	c$&BQ)P	;2eA2$."#		%(e%Ne(($%P3)(	%	&BQ)P	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W
,:"-;1!;	PBNQ	;2eA2$."#		%(e%Ne(($%P3)(	%	&BQ)P	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W
,-<<+"	%BY(	;2eA2$."#		%(e%Ne(($%P3)(	%	&BQ)P	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W
/+Ä.	c$PBPN	;2eA2$."#		%(e%Ne(($%P3)(	%	PBPN	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W
E18A+5	(B&&	;2eA2$."#		%(e%Ne(($%P3)(	%	%BPR	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO&N
Name: Q
Matrix: H+.1;+ 9O,-;<-619+

Sampled: %(e%(e(($%S3(S
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$PBPN	;2eA2$."#		%(e%Ne(($%P3)(	%	PBPN	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W
H15?+"	c$&BQ)P	;2eA2$."#		%(e%Ne(($%P3)(	%	&BQ)P	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W
b1 8	%SBS	;2eA2$."#		%(e%Ne(($%P3)(	%	)B)S	%(e(&e(($%Y3&S	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO%&
Name: %&
Matrix: H+.1;+ 9OM"Ä0

Sampled: %(e%(e(($%Y3)&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	RP	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	Q(	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	(%	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	)B)	;2eA2$."#	K%	%(e)&e(($%&3))	%	&B(Y	%(e)&e(($%&3))	,]H%	Z4C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	(N&	;2eA2$."#		%(e(&e(($%R3)R	%	PB%	%(e(%e(($%%3%)	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	%Q&&	;2eA2$."#		&%e&Pe()$%(3)P	%	P%	&%e&Pe()$%(3)P	DDi	Z4C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
C5<:ÄOWi,	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
W+9ÄOWi,	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
*+59ÄOWi,	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$)&BR	!2eA2$."#		%(e(&e(($&N3((	%	)&BR	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
S'SjO***	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
S'SjO**Z	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
S'SjO**D	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($%S3(%	HWM	Z4C$Q&Q%C
*1+5."1	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
Z .-6!57Ä $F	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
Z .-6!57Ä $FF	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
Z ."1	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
Z ."1 $A+9- +	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($%S3(%	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($%S3(%	HWM	Z4C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($&&3(&	HWM	Z4C$Q&Q%C
U+9:-G#8:5-"	c$(B&Y	!2eA2$."#		%(e(&e(($&N3((	%	(B&Y	%(e(Ne(($%S3(%	HWM	Z4C$Q&Q%C
D-GÄ<:+ +	c$Q%BQ	!2eA2$."#		%(e(&e(($&N3((	%	Q%BQ	%(e(Ne(($%S3(%	HWM	Z4C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO%&
Name: %&
Matrix: H+.1;+ 9OM"Ä0

Sampled: %(e%(e(($%Y3)&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$S&BN	!2eA2$."#		%(e(&e(($&N3((	%	S&BN	%(e(Ne(($%S3(%	HWM	Z4 C$$Q&Q(
C"-85-"$%((%	c$S&BN	!2eA2$."#		%(e(&e(($&N3((	%	S&BN	%(e(Ne(($%S3(%	HWM	Z4 C$$Q&Q(
C"-85-"$%()(	c$S&BN	!2eA2$."#		%(e(&e(($&N3((	%	S&BN	%(e(Ne(($%S3(%	HWM	Z4 C$$Q&Q(
C"-85-"$%(S(	c$S&BN	!2eA2$."#		%(e(&e(($&N3((	%	S&BN	%(e(Ne(($%S3(%	HWM	Z4 C$$Q&Q(
C"-85-"$%(SQ	c$S&BN	!2eA2$."#		%(e(&e(($&N3((	%	S&BN	%(e(Ne(($%S3(%	HWM	Z4 C$$Q&Q(
C"-85-"$%(YS	c$S&BN	!2eA2$."#		%(e(&e(($&N3((	%	S&BN	%(e(Ne(($%S3(%	HWM	Z4 C$$Q&Q(
C"-85-"$%(P&	c$S&BN	!2eA2$."#		%(e(&e(($&N3((	%	S&BN	%(e(Ne(($%S3(%	HWM	Z4 C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
C8+ Ä<:9:#5+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
C 9:"Ä8+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
W+ h-=Ä><#"+ +	c$&B&R)P	;2eA2$."#	U"5	%(e((e(($%&3SN	%	&B&R)P	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
,:"#6+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&B&R)P	;2eA2$."#	U"5	%(e((e(($%&3SN	%	&B&R)P	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
^5!-"Ä 9:+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
^5!-"+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
EÄ<:9:Ä5+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
4:+ Ä 9:"+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
4#"+ +	c$&B)PQ	;2eA2$."#		%(e((e(($%&3SN	%	&B)PQ	%(e()e(($%Y3Y)	H,F	Z4 C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&S()	;2eA2$."#		%(e(%e(($%(3&N	%	&B&S()	%(e(%e(($%Y3%Q	W,i	HL$RSR%
C"6+ 18	PB((	;2eA2$."#		%(e%Ne(($%P3)(	%	YB)Q	%(e(&e(($%Y3&P	*CH	Z4 C$P&%&W
WÄ"1!;	%&N	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&Q	%(e(&e(($%Y3&P	*CH	Z4 C$P&%&W
,Ä.;1!;	c$&BY)Q	;2eA2$."#		%(e%Ne(($%P3)(	%	&BY)Q	%(e(&e(($%Y3&P	*CH	Z4 C$P&%&W
,:"-;1!;	%PBQ	;2eA2$."#		%(e%Ne(($%P3)(	%	&BY)Q	%(e(&e(($%Y3&P	*CH	Z4 C$P&%&W
,-<<+"	%&BN	;2eA2$."#		%(e%Ne(($%P3)(	%	&BY)Q	%(e(&e(($%Y3&P	*CH	Z4 C$P&%&W
/+Ä.	%QBR	;2eA2$."#		%(e%Ne(($%P3)(	%	SB)&	%(e(&e(($%Y3&P	*CH	Z4 C$P&%&W
E18A+5	%%BS	;2eA2$."#		%(e%Ne(($%P3)(	%	%B&Q	%(e(&e(($%Y3&P	*CH	Z4 C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO%&
Name: %&
Matrix: H+.1;+ 9OM"Ä0

Sampled: %(e%(e(($%Y3)&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$SB)&	;2eA2$."#		%(e%Ne(($%P3)(	%	SB)&	%(e(&e(($%Y3&P	*CH	Z4C$P&%&W
H15?+"	c$&BY)Q	;2eA2$."#		%(e%Ne(($%P3)(	%	&BY)Q	%(e(&e(($%Y3&P	*CH	Z4C$P&%&W
b1 8	SQB(	;2eA2$."#		%(e%Ne(($%P3)(	%	(B%Y	%(e(&e(($%Y3&P	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO%%
Name: %)
Matrix: H+.1;+ 9

Sampled: %(e%(e(($&&3&&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
General Chemistry - PIA									
4Ä"9185+$H1h+	QQ	f	i	%(e(%e(($%&3Y(	%	& BY&	%(e(%e(($%&3Y(	,]*	CHDU$*%%S&$ U-.171+.g
H-51.6O9-9Ä5$6-51.6$=DH>	S)	f		%(e%Pe(($%S3&Q	%	&B&Y&	%(e%Pe(($%S3)P	i]^	HU$(YS&Mg
General Chemistry - STL									
H-51.6O;-169!"+	YS	f		%(e%Pe(($%R3YQ	%	&B&Y&	%(e%Ne(($%S3))	]HW	HU$(YS&W$%NN%g
Nutrients - PIA									
E19"Ä9+eE19"19+OE	c$&BSP	;2eA2$."#		%(e)&e(($%&3)Y	%	&BSP	%(e)&e(($%&3)Y	,]H%	Z4 C$)Y)B($]Zd$(
4:-6<:-"!6O9-9Ä5$Ä6$4	)Q&	;2eA2$."#		%(e(&e(($%R3)R	%	%(	%(e(%e(($%&3%)	,]H%	HU$SY&&$^$%NNNg
D-9Ä5$\J+5.Ä:5$E19"-2+ $ =D\E>	NP&	;2eA2$."#		&%e&Pe()$%(3)R	%	%(&	&%e&Pe()$%(3)R	DDi	Z4 C$)Y%B($]Zd$(g
Pesticides - STL									
C5."1	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
C5<:ÄOWi,	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
W+9ÄOWi,	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
*+59ÄOWi,	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
2Ä;;ÄOWi,$=/1 .Ä +>	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
C5<:ÄO,:5-".Ä +	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
2Ä;;ÄO,:5-".Ä +	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
,:5-".Ä +$=9+8: 18Ä5>	c$YRBQ	!2eA2$."#		%(e(&e(($&N3((	%	YRBQ	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
S'SjO***	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
S'SjO**Z	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
S'SjO**D	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($%S3SP	HWM	Z4 C$Q&Q%C
*1+5."1	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $F	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $FF	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
Z .-6!57Ä $6!57Ä9+	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
Z ."1	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
Z ."1 $Ä5.+:#.+	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
Z ."1 $A+9- +	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($%S3SP	HWM	Z4 C$Q&Q%C
i+<9Ä8:5-"	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($%S3SP	HWM	Z4 C$Q&Q%C
i+<9Ä8:5-"$+<-G1.+	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($&%3YS	HWM	Z4 C$Q&Q%C
U+9:-G#8:5-"	c$)BQP	!2eA2$."#		%(e(&e(($&N3((	%	)BQP	%(e(Ne(($%S3SP	HWM	Z4 C$Q&Q%C
D-GÄ<:+ +	c$%YS	!2eA2$."#		%(e(&e(($&N3((	%	%YS	%(e(Ne(($%S3SP	HWM	Z4 C$Q&Q%C

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ANALYTICAL RESULTS

Sample: ^/&)()YO%% **Sampled:** %(e%(e(($&&3&&
Name: %) **Received:** %(e%Ye(($%R3%S
Matrix: H+.1;+ 9

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
Polychlorinated Biphenyls (PCBs) - STL									
C"-85-"$%&%P	c$RRB&	!2eA2$."#		%(e(&e(($&N3((	%	RRB&	%(e(Ne(($%S3SP	HWM	Z4C$$Q&Q(
C"-85-"$%((%	c$RRB&	!2eA2$."#		%(e(&e(($&N3((	%	RRB&	%(e(Ne(($%S3SP	HWM	Z4C$$Q&Q(
C"-85-"$%()(	c$RRB&	!2eA2$."#		%(e(&e(($&N3((	%	RRB&	%(e(Ne(($%S3SP	HWM	Z4C$$Q&Q(
C"-85-"$%(S(	c$RRB&	!2eA2$."#		%(e(&e(($&N3((	%	RRB&	%(e(Ne(($%S3SP	HWM	Z4C$$Q&Q(
C"-85-"$%(SQ	c$RRB&	!2eA2$."#		%(e(&e(($&N3((	%	RRB&	%(e(Ne(($%S3SP	HWM	Z4C$$Q&Q(
C"-85-"$%(YS	c$RRB&	!2eA2$."#		%(e(&e(($&N3((	%	RRB&	%(e(Ne(($%S3SP	HWM	Z4C$$Q&Q(
C"-85-"$%(P&	c$RRB&	!2eA2$."#		%(e(&e(($&N3((	%	RRB&	%(e(Ne(($%S3SP	HWM	Z4C$$Q&Q(
Semivolatile Organics - STL									
C8+ Ä<:9:+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
C8+ Ä<:9:#5+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
C 9:"Ä8+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
W+ h-=Ä>Ä 9:"Ä8+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
W+ h-=0>75!-"Ä 9:+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
W+ h-=A>75!-"Ä 9:+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
W+ h-=2':'1><+"#5+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
W+ h-=Ä><#"+ +	c$&B%)N	;2eA2$."#	U"5	%(e((e(($%&3SN	%	&B%)N	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
,:"#6+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
*10+ h-=Ä':>Ä 9:"Ä8+ +	c$&B%)N	;2eA2$."#	U"5	%(e((e(($%&3SN	%	&B%)N	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
^5!-"Ä 9:+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
^5!-"+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
F .+ -=%'(')O8.><#"+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
EÄ<:9:Ä5+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
4:+ Ä 9:"+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
4#"+ +	c$&BPNS	;2eA2$."#		%(e((e(($%&3SN	%	&BPNS	%(e()e(($%P3(S	H,F	Z4C$Q(R&,
Total Metals - STL									
U+"8!"#	c$&B&QYR	;2eA2$."#		%(e(%e(($%(3&N	%	&B&QYR	%(e(%e(($%Y3%Q	W,i	HL$RSR%
C"6+ 18	c$NBQ&	;2eA2$."#		%(e%Ne(($%P3)(	%	NBQ&	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W
WÄ"1!;	N(BY	;2eA2$."#		%(e%Ne(($%P3)(	%	%BNP	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W
,Ä.;1!;	c$&BNQ&	;2eA2$."#		%(e%Ne(($%P3)(	%	&BNQ&	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W
,:"-;1!;	%PB%	;2eA2$."#		%(e%Ne(($%P3)(	%	&BNQ&	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W
,-<<+"	%PBP	;2eA2$."#		%(e%Ne(($%P3)(	%	&BNQ&	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W
/+Ä.	(YB(	;2eA2$."#		%(e%Ne(($%P3)(	%	RBQS	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W
E18A+5	%%BS	;2eA2$."#		%(e%Ne(($%P3)(	%	%BNP	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W

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ANALYTICAL RESULTS

Sample: ^/&)()YO%%
Name: %)
Matrix: H+.1;+ 9

Sampled: %(e%(e(($&&3&&
Received: %(e%Ye(($%R3%S

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
H+5+ 1!;	c$RBQS	;2eA2$."#		%(e%Ne(($%P3)(	%	RBQS	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W
H15?+"	c$&BNQ&	;2eA2$."#		%(e%Ne(($%P3)(	%	&BNQ&	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W
b1 8	NPB(	;2eA2$."#		%(e%Ne(($%P3)(	%	)BN(	%(e(&e(($%Y3%N	*CH	Z4C$P&%&W

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NOTES

H<+81718Ä91- 6$"+2Ä".1 2$;+9:-.$"+?161- 6'$;+9:-.$;-.1718Ä91'$Ä .$8Ä58!5Ä91- 6$!6+.$7-"$Ä Ä5#616$Ä"+$Ä?Ä15Ä05+$!<-B$4+5+69+$8- 9Ä89$ #-!"$<"-J+89$;Ä Ä2+"B

gE-9$ÄF$Ä88"+.19+.$Ä Ä5#9+$$$$$$$$$$$$$$$$$

Certifications

,iFOU8i+ "#'$F/$O$S)%S$LB$,"#69Ä5$/ÄA+$]-Ä.'$U8i+ "#'$P&&Y&
DEF$88"+.19Ä91- $7-"$*"1 A1 2$L+"$Ä .$LÄ69+@Ä9+"$^1+5.6D+691 2$9:"-!2:$F$Z4C$88"+.19Ä91- $E-B$%&&(RN
F551 -16$*+<Ä"9;+ 9$-7$4!0518$i+Ä59:$WÄ69Ä5#Ä56$1 $*"A1 2$LÄ9+"$<<"-?+.$/Ä0-"Ä9-"#$]+2169"#$E-B$%RYYP

4FGO4+-"1Ä'D(()%LBC59-"7+"$*"1?+'$4+-"1Ä'$P%Y
DEF$88"+.19Ä91- $7-"$*"1 A1 2$L+"'$LÄ69+@Ä9+"'$H-51.$Ä .$iÄh-!6$UÄ9+"1Ä5$^1+5.6D+691 2$9:"-!2:FZ4C$88"+.19Ä91$ E-B$%&&()&
F551 -16$*+<Ä"9;+ 9$-7$4!0518$i+Ä59:$WÄ69Ä5#Ä56$1 $*"A1 2$LÄ9+"$<<"-?+.$/Ä0-"Ä9-"#$]+2169"#$E-B$%RYY)
*"1 A1 2$LÄ9+"$,+"91718Ä91- 6eC88"+.19Ä91- 63$F-@Ä$=(S&>I$Z%&))Q>I$U166-!"1$=QR&>
L Ä69+@Ä9+"$,+"91718Ä91- 6eC88"+.19Ä91- 63$C"AÄ 6Ä6$=QQO&PRR>I$F6Ä6$=ZO%&))Q>
H-51.$Ä .$iÄhÄ".-!6$UÄ9+"1Ä5$,+"91718Ä91- 6eC88"+.19Ä91Ä 63$C"AQQO&PRR>I$F-@Ä$=(S&>I$\Ä 6Ä6$=ZO%&))Q>

H4UXOH<"1 271+5.'UXO$%Q&Y$L$H! 6+9$H9"++9'$H<"1 271+5.'$UX$P&R
aHZ4 C$*U]OKC $4"-2"Ä;

HD/OiÄh+5@--.'UXO$NCS2$;$].'$iÄh+5@--.'UXP)&S(
DEF$88"+.19Ä91- $7-"$L69+@Ä9+"'$H-51.$Ä .$iÄhÄ".-!6$UÄ9+"1Ä5$6$-D+691 2$9:"-!2:$\H$*iZ$,+"91718Ä91- $E-B$ZO%&)QN
DEF$88"+.19Ä91- $7-"$L69+@Ä9+"'$H-51.$Ä .$iÄhÄ".-!6$UÄ9+"1Ä5$6$-D+691 2$$9:"-!2:FZ4C$88"+.19Ä91- $E-B$O$(&&&Q&
F551 -16$*+<Ä"9;+ 9$-7$4!0518$i+Ä59:$WÄ69Ä5#Ä56$1 $*"A1 2$LÄ9+"$<<"-?+.$/Ä0-"Ä9-"#'$]+2169"#$E-B$%R%&Y&
U166-!"1$*+<Ä"9;+ 9$-7$EÄ9!"Ä5$]+6-!"8+6O,+"91718Ä9+-7Ä5$7-"$U18"-01-5-218Ä5$/Ä0-"Ä9-"#$H-O$E-B$%&Y&

Qualifiers

i D+69$<+"7-";+.$Ä79+"$9:+$+G<1"Ä91- $-7$9:+$Ä<<"-<"1Ä9+$:-5.$9Ä;+B$#$;ÄG1;!;$Ä55-@Ä05+$:-5.$91;+B
U"5]+<-"91 2$51;19$6+9$0+9@++ $/XK$Ä .$U*/
K% UÄ9"1G$H<1A+$7Ä15+.f"+8-?+"#$Ä88+<9Ä 8+$51;196B$9:+$.$05Ä A$6<1A+$"+8-?+"#$@Ä6$Ä88+<9Ä05+B
K) UÄ9"1G$H<1A+eUÄ9"1G$H<1A+$*!<518Ä9+$0-9:$7Ä15+.$f$"+8-?+"#$Ä 8+$51;196B$Ä66-81Ä9+.$05Ä A$6<1A+$"+8-?+"#$@Ä6$Ä88+<9
k F 8- 6169+ 9$"+6!596$Ä;- 2$;!591<5+$<"+<6'$:12:+69$"+6!59$"+<-
kÄ UHe*$"+8-?+"#$-!961.+$Ä88+<9Ä 8+$8"19+"1ÄB$UÄ9"1G$1 9+"7+"+18+.$0#$<-69$.12+691- $6<1A+

Gail g Schindler

,+"9171+.$0#3MÄ15$H8:1 .5+"'$4"-J+89$UÄ Ä2+"

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ANALYTICAL REPORT

PREPARED FOR

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PDC (Pace) Laboratories, Inc.
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Peoria, Illinois 61615

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JOB DESCRIPTION

FL03235

JOB NUMBER

410-109774-1

Eurofins Lancaster Laboratories Environment Testing, LLC
2425 New Holland Pike
Lancaster PA 17601

See page two for job notes and contact information.

my EOL

Eurofins Lancaster Laboratories Environment Testing, LLC

Job Notes

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Authorization

Marrissa Williams

Authorized for release by
Marrissa Williams, Project Manager
Marrissa.Williams@et.eurofinsus.com
(717)556-7246

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Eurofins Lancaster Laboratories Environment Testing, LLC

Compliance Statement

Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.
· QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
· Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
· Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.
Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied, except as otherwise agreed. We disclaim any other warranties, expressed or implied, including a warranty of fitness for particular purpose and warranty of merchantability. In no event shall Eurofins Lancaster Laboratories Environmental, LLC be liable for indirect, special, consequential, or incidental damages including, but not limited to, damages for loss of profit or goodwill regardless of (A) the negligence (either sole or concurrent) of Eurofins Lancaster Laboratories Environmental and (B) whether Eurofins Lancaster Laboratories Environmental has been informed of the possibility of such damages. We accept no legal responsibility for the purposes for which the client uses the test results. Except as otherwise agreed, no purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Marissa Williams

Table of Contents

Client: PDC (Pace) Laboratories, Inc. Job ID: 410-109774-1
Project/Site: FL03235

Qualifiers

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
cn	Refer to Case Narrative for further detail
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 410-109774-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Narrative

Job Narrative
410-109774-1

Receipt

The samples were received on 12/20/2022 9:20 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.6°C

General Chemistry

Method Lloyd_Kahn: The method blank for analytical batch 410-329874 contained a hit above the method detection limit (MDL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: PDC (Pace) Laboratories, Inc.
Project/Site: FL03235

Job ID: 410-109774-1

Client Sample ID: FL03235-01 — Lab Sample ID: 410-109774-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	7240	B cn	300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-02 — Lab Sample ID: 410-109774-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	6920	B cn	300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-03 — Lab Sample ID: 410-109774-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	6050	B cn	300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-04 — Lab Sample ID: 410-109774-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	6470		300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-05 — Lab Sample ID: 410-109774-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	6830		300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-06 — Lab Sample ID: 410-109774-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	6180		300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-07 — Lab Sample ID: 410-109774-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	7790		300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-08 — Lab Sample ID: 410-109774-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	6380		300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-09 — Lab Sample ID: 410-109774-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	4430		300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-10 — Lab Sample ID: 410-109774-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	9770		300	100	mg/Kg	1		Lloyd Kahn	Total/NA

Client Sample ID: FL03235-11 — Lab Sample ID: 410-109774-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Organic Carbon	6780		300	100	mg/Kg	1		Lloyd Kahn	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: PDC (Pace) Laboratories, Inc.
Project/Site: FL03235

Job ID: 410-109774-1

Client Sample ID: FL03235-01
Date Collected: 12/12/22 07:00
Date Received: 12/20/22 09:20

Lab Sample ID: 410-109774-1
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	7240	B cn	300	100	mg/Kg			12/22/22 03:25	1
Percent Moisture (EPA Moisture)	60.0		1.0	1.0	%			12/20/22 11:26	1
Percent Solids (EPA Moisture)	40.0		1.0	1.0	%			12/20/22 11:26	1

Client Sample ID: FL03235-02
Date Collected: 12/12/22 07:49
Date Received: 12/20/22 09:20

Lab Sample ID: 410-109774-2
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	6920	B cn	300	100	mg/Kg			12/22/22 03:37	1
Percent Moisture (EPA Moisture)	59.4		1.0	1.0	%			12/20/22 11:26	1
Percent Solids (EPA Moisture)	40.6		1.0	1.0	%			12/20/22 11:26	1

Client Sample ID: FL03235-03
Date Collected: 12/12/22 08:38
Date Received: 12/20/22 09:20

Lab Sample ID: 410-109774-3
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	6050	B cn	300	100	mg/Kg			12/22/22 03:50	1
Percent Moisture (EPA Moisture)	57.5		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	42.5		1.0	1.0	%			12/20/22 12:54	1

Client Sample ID: FL03235-04
Date Collected: 12/12/22 09:28
Date Received: 12/20/22 09:20

Lab Sample ID: 410-109774-4
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	6470		300	100	mg/Kg			12/22/22 04:29	1
Percent Moisture (EPA Moisture)	52.2		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	47.8		1.0	1.0	%			12/20/22 12:54	1

Client Sample ID: FL03235-05
Date Collected: 12/12/22 10:10
Date Received: 12/20/22 09:20

Lab Sample ID: 410-109774-5
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	6830		300	100	mg/Kg			12/22/22 04:41	1
Percent Moisture (EPA Moisture)	54.4		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	45.6		1.0	1.0	%			12/20/22 12:54	1

Client Sample ID: FL03235-06 **Lab Sample ID: 410-109774-6**
Date Collected: 12/12/22 12:16 **Matrix: Solid**
Date Received: 12/20/22 09:20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	6180		300	100	mg/Kg			12/22/22 04:54	1
Percent Moisture (EPA Moisture)	50.9		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	49.1		1.0	1.0	%			12/20/22 12:54	1

Client Sample ID: FL03235-07 **Lab Sample ID: 410-109774-7**
Date Collected: 12/12/22 11:33 **Matrix: Solid**
Date Received: 12/20/22 09:20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	7790		300	100	mg/Kg			12/22/22 05:07	1
Percent Moisture (EPA Moisture)	49.7		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	50.3		1.0	1.0	%			12/20/22 12:54	1

Client Sample ID: FL03235-08 **Lab Sample ID: 410-109774-8**
Date Collected: 12/12/22 13:20 **Matrix: Solid**
Date Received: 12/20/22 09:20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	6380		300	100	mg/Kg			12/22/22 05:20	1
Percent Moisture (EPA Moisture)	49.9		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	50.1		1.0	1.0	%			12/20/22 12:54	1

Client Sample ID: FL03235-09 **Lab Sample ID: 410-109774-9**
Date Collected: 12/12/22 14:24 **Matrix: Solid**
Date Received: 12/20/22 09:20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	4430		300	100	mg/Kg			12/22/22 05:33	1
Percent Moisture (EPA Moisture)	37.5		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	62.5		1.0	1.0	%			12/20/22 12:54	1

Client Sample ID: FL03235-10 **Lab Sample ID: 410-109774-10**
Date Collected: 12/12/22 15:30 **Matrix: Solid**
Date Received: 12/20/22 09:20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	9770		300	100	mg/Kg			12/22/22 05:45	1
Percent Moisture (EPA Moisture)	27.8		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	72.2		1.0	1.0	%			12/20/22 12:54	1

Client Sample ID: FL03235-11
Date Collected: 12/12/22 00:00
Date Received: 12/20/22 09:20

Lab Sample ID: 410-109774-11
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (EPA Lloyd Kahn)	6780		300	100	mg/Kg			12/22/22 05:58	1
Percent Moisture (EPA Moisture)	52.3		1.0	1.0	%			12/20/22 12:54	1
Percent Solids (EPA Moisture)	47.7		1.0	1.0	%			12/20/22 12:54	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Client: PDC (Pace) Laboratories, Inc.
Project/Site: FL03235

Job ID: 410-109774-1

Method: Lloyd Kahn - Organic Carbon, Total (TOC)

Lab Sample ID: MB 410-329874/33
Matrix: Solid
Analysis Batch: 329874

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	107.3	J	300	100	mg/Kg			12/22/22 00:26	1

Lab Sample ID: MB 410-329874/5
Matrix: Solid
Analysis Batch: 329874

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		300	100	mg/Kg			12/21/22 18:31	1

Lab Sample ID: MB 410-329874/61
Matrix: Solid
Analysis Batch: 329874

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	ND		300	100	mg/Kg			12/22/22 06:24	1

Lab Sample ID: LCS 410-329874/32
Matrix: Solid
Analysis Batch: 329874

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	4690	3433		mg/Kg		73	36 - 163

Lab Sample ID: LCS 410-329874/4
Matrix: Solid
Analysis Batch: 329874

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	4690	3741		mg/Kg		80	36 - 163

General Chemistry

Analysis Batch: 328986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-109774-1	FL03235-01	Total/NA	Solid	Moisture	
410-109774-2	FL03235-02	Total/NA	Solid	Moisture	

Analysis Batch: 329031

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-109774-3	FL03235-03	Total/NA	Solid	Moisture	
410-109774-4	FL03235-04	Total/NA	Solid	Moisture	
410-109774-5	FL03235-05	Total/NA	Solid	Moisture	
410-109774-6	FL03235-06	Total/NA	Solid	Moisture	
410-109774-7	FL03235-07	Total/NA	Solid	Moisture	
410-109774-8	FL03235-08	Total/NA	Solid	Moisture	
410-109774-9	FL03235-09	Total/NA	Solid	Moisture	
410-109774-10	FL03235-10	Total/NA	Solid	Moisture	
410-109774-11	FL03235-11	Total/NA	Solid	Moisture	

Analysis Batch: 329874

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-109774-1	FL03235-01	Total/NA	Solid	Lloyd Kahn	
410-109774-2	FL03235-02	Total/NA	Solid	Lloyd Kahn	
410-109774-3	FL03235-03	Total/NA	Solid	Lloyd Kahn	
410-109774-4	FL03235-04	Total/NA	Solid	Lloyd Kahn	
410-109774-5	FL03235-05	Total/NA	Solid	Lloyd Kahn	
410-109774-6	FL03235-06	Total/NA	Solid	Lloyd Kahn	
410-109774-7	FL03235-07	Total/NA	Solid	Lloyd Kahn	
410-109774-8	FL03235-08	Total/NA	Solid	Lloyd Kahn	
410-109774-9	FL03235-09	Total/NA	Solid	Lloyd Kahn	
410-109774-10	FL03235-10	Total/NA	Solid	Lloyd Kahn	
410-109774-11	FL03235-11	Total/NA	Solid	Lloyd Kahn	
MB 410-329874/33	Method Blank	Total/NA	Solid	Lloyd Kahn	
MB 410-329874/5	Method Blank	Total/NA	Solid	Lloyd Kahn	
MB 410-329874/61	Method Blank	Total/NA	Solid	Lloyd Kahn	
LCS 410-329874/32	Lab Control Sample	Total/NA	Solid	Lloyd Kahn	
LCS 410-329874/4	Lab Control Sample	Total/NA	Solid	Lloyd Kahn	

Lab Chronicle

Client: PDC (Pace) Laboratories, Inc. Job ID: 410-109774-1
Project/Site: FL03235

Client Sample ID: FL03235-01 Lab Sample ID: 410-109774-1

Date Collected: 12/12/22 07:00 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 03:25
Total/NA	Analysis	Moisture		1	328986	UVJN	ELLE	12/20/22 11:26

Client Sample ID: FL03235-02 Lab Sample ID: 410-109774-2

Date Collected: 12/12/22 07:49 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 03:37
Total/NA	Analysis	Moisture		1	328986	UVJN	ELLE	12/20/22 11:26

Client Sample ID: FL03235-03 Lab Sample ID: 410-109774-3

Date Collected: 12/12/22 08:38 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 03:50
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Client Sample ID: FL03235-04 Lab Sample ID: 410-109774-4

Date Collected: 12/12/22 09:28 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 04:29
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Client Sample ID: FL03235-05 Lab Sample ID: 410-109774-5

Date Collected: 12/12/22 10:10 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 04:41
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Client Sample ID: FL03235-06 Lab Sample ID: 410-109774-6

Date Collected: 12/12/22 12:16 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 04:54
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Client: PDC (Pace) Laboratories, Inc. Job ID: 410-109774-1
Project/Site: FL03235

Client Sample ID: FL03235-07 **Lab Sample ID: 410-109774-7**
Date Collected: 12/12/22 11:33 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 05:07
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Client Sample ID: FL03235-08 **Lab Sample ID: 410-109774-8**
Date Collected: 12/12/22 13:20 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 05:20
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Client Sample ID: FL03235-09 **Lab Sample ID: 410-109774-9**
Date Collected: 12/12/22 14:24 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 05:33
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Client Sample ID: FL03235-10 **Lab Sample ID: 410-109774-10**
Date Collected: 12/12/22 15:30 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 05:45
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Client Sample ID: FL03235-11 **Lab Sample ID: 410-109774-11**
Date Collected: 12/12/22 00:00 **Matrix: Solid**
Date Received: 12/20/22 09:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Lloyd Kahn		1	329874	P684	ELLE	12/22/22 05:58
Total/NA	Analysis	Moisture		1	329031	UVJN	ELLE	12/20/22 12:54

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Illinois	NELAP	200027	01-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
Lloyd Kahn		Solid	Total Organic Carbon
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: PDC (Pace) Laboratories, Inc.
Job ID: 410-109774-1
Project/Site: FL03235

Method	Method Description	Protocol	Laboratory
Lloyd Kahn	Organic Carbon, Total (TOC)	EPA	ELLE
Moisture	Percent Moisture	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: PDC (Pace) Laboratories, Inc. Job ID: 410-109774-1
Project/Site: FL03235

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
410-109774-1	FL03235-01	Solid	12/12/22 07:00	12/20/22 09:20
410-109774-2	FL03235-02	Solid	12/12/22 07:49	12/20/22 09:20
410-109774-3	FL03235-03	Solid	12/12/22 08:38	12/20/22 09:20
410-109774-4	FL03235-04	Solid	12/12/22 09:28	12/20/22 09:20
410-109774-5	FL03235-05	Solid	12/12/22 10:10	12/20/22 09:20
410-109774-6	FL03235-06	Solid	12/12/22 12:16	12/20/22 09:20
410-109774-7	FL03235-07	Solid	12/12/22 11:33	12/20/22 09:20
410-109774-8	FL03235-08	Solid	12/12/22 13:20	12/20/22 09:20
410-109774-9	FL03235-09	Solid	12/12/22 14:24	12/20/22 09:20
410-109774-10	FL03235-10	Solid	12/12/22 15:30	12/20/22 09:20
410-109774-11	FL03235-11	Solid	12/12/22 00:00	12/20/22 09:20

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

410-109774 Chain of Custody

SENDING LABORATORY:

Pace Analytical Services, LLC
2231 West Altorfer Drive
Peoria, IL 61615
Phone: (309) 692-9688
Fax: (309) 692-9689
Project Manager: Gail Schindler

RECEIVING LABORATORY:

Eurofins Eaton Analytical, Inc. - Lancaster, PA
2425 New Holland Pike
Lancaster, PA 17601
Phone :(717) 656-2300
Fax:

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-01	**Solid**	**Sampled: 12/12/22 07:00**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 07:00		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-02	**Solid**	**Sampled: 12/12/22 07:49**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 07:49		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-03	**Solid**	**Sampled: 12/12/22 08:38**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 08:38		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-04	**Solid**	**Sampled: 12/12/22 09:28**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 09:28		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-05	**Solid**	**Sampled: 12/12/22 10:10**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 10:10		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-06	**Solid**	**Sampled: 12/12/22 12:16**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 12:16		30 g plastic
Containers Supplied: 1				

Released By	Date	Received By	Date
[signature]	12/13/22 1210		
Released By	Date	Received By	12/20/22 0920

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SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-07	**Solid**	**Sampled: 12/12/22 11:33**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 11:33		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-08	**Solid**	**Sampled: 12/12/22 13:20**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 13:20		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-09	**Solid**	**Sampled: 12/12/22 14:24**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 14:24		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-10	**Solid**	**Sampled: 12/12/22 15:30**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 15:30		30 g plastic
Containers Supplied: 1				
Sample ID: FL03235-11	**Solid**	**Sampled: 12/12/22 00:00**		**On cart is soil cooler**
01-TOC - Total Organic Carbon	12/29/22 16:00	01/09/23 00:00		30 g plastic
Containers Supplied: 1				

Released By	Date	Received By	Date
	12/18/22 1210		
Released By	Date	Received By	Date
			12/20/22 0920

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Login Sample Receipt Checklist

Client: PDC (Pace) Laboratories, Inc. Job Number: 410-109774-1

Login Number: 109774
List Number: 1
Creator: Ballard, Megan

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Pace Analytical Services, LLC	Pace Analytical Services, LLC - Hazelwood
2231 West Altorfer Drive	944 Anglum Road
Peoria, IL 61615	Hazelwood, MO 63042
Phone: (309) 692-9688	Phone :(314) 432-0550
Fax: (309) 692-9689	Fax: -
Project Manager: Gail Schindler	

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-01	**Solid**	**Sampled:12/12/22 07:00**		
04-Solids-MOIST	12/29/22 16:00	12/19/22 07:00		1 g
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 07:00		1 g
06-M8270C PNA	12/29/22 16:00	12/26/22 07:00		30 g
06-M8082	12/29/22 16:00	12/26/22 07:00		30 g
06-M8081	12/29/22 16:00	12/26/22 07:00		30 g
04-TKN GD	12/29/22 16:00	01/09/23 07:00		
04-Se 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-As 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-Metals Prep charge	12/29/22 16:00	04/11/23 07:00		
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 07:00		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 07:00		
04-Hg solids	12/29/22 16:00	01/09/23 07:00		

Containers Supplied: ~~8~~ 4

12/15/22 1817			12-16 720
Released By	Date	Received By	Date
12-16 1030			12/16/22
Released By	Date	Received By	Date

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SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-02	**Solid**	**Sampled: 12/12/22 07:49**		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 07:49		
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 07:49		
06-M8082	12/29/22 16:00	12/26/22 07:49		30 g
06-M8081	12/29/22 16:00	12/26/22 07:49		30 g
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 07:49		
04-TKN GD	12/29/22 16:00	01/09/23 07:49		
04-Solids-MOIST	12/29/22 16:00	12/19/22 07:49		1 g
04-Se 6010 Tot	12/29/22 16:00	06/10/23 07:49		
06-M8270C PNA	12/29/22 16:00	12/26/22 07:49		30 g
04-As 6010 Tot	12/29/22 16:00	06/10/23 07:49		
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 07:49		
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 07:49		1 g
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 07:49		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 07:49		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 07:49		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 07:49		
04-Hg solids	12/29/22 16:00	01/09/23 07:49		
04-Metals Prep charge	12/29/22 16:00	04/11/23 07:49		

Containers Supplied: 5

Released By	Date	Received By	Date
[signature]	12/15/22 1817	[signature]	12-16 720
[signature]	12-16 1030	Jill Clark	12/16/22

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SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-03	**Solid**	**Sampled:12/12/22 08:38**		
04-Hg solids	12/29/22 16:00	01/09/23 08:38		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 08:38		
06-M8082	12/29/22 16:00	12/26/22 08:38		30 g
06-M8081	12/29/22 16:00	12/26/22 08:38		30 g
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 08:38		
04-TKN GD	12/29/22 16:00	01/09/23 08:38		
04-Solids-MOIST	12/29/22 16:00	12/19/22 08:38		1 g
04-Se 6010 Tot	12/29/22 16:00	06/10/23 08:38		
06-M8270C PNA	12/29/22 16:00	12/26/22 08:38		30 g
04-As 6010 Tot	12/29/22 16:00	06/10/23 08:38		
04-Metals Prep charge	12/29/22 16:00	04/11/23 08:38		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 08:38		
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 08:38		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 08:38		
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 08:38		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 08:38		
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 08:38		1 g
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 08:38		

Containers Supplied: 5

Released By	Date	Received By	Date
12/15/22 1817		12-16 1120	
Released By	12-16 1030	Received By	12/16/22

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SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-04	**Solid**	**Sampled: 12/12/22 09:28**		
06-M8081	12/29/22 16:00	12/26/22 09:28		30 g
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 09:28		
04-TKN GD	12/29/22 16:00	01/09/23 09:28		
04-Solids-MOIST	12/29/22 16:00	12/19/22 09:28		1 g
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 09:28		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 09:28		
06-M8082	12/29/22 16:00	12/26/22 09:28		30 g
04-As 6010 Tot	12/29/22 16:00	06/10/23 09:28		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 09:28		
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 09:28		1 g
06-M8270C PNA	12/29/22 16:00	12/26/22 09:28		30 g
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 09:28		
04-Se 6010 Tot	12/29/22 16:00	06/10/23 09:28		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 09:28		
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 09:28		
04-Metals Prep charge	12/29/22 16:00	04/11/23 09:28		
04-Hg solids	12/29/22 16:00	01/09/23 09:28		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 09:28		

Containers Supplied: 5

Released By	Date	Received By	Date
[signature]	12/15/22 1817	[signature]	12-16 720
[signature]	12-16 1030	Jill Clark	12/16/22

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SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-05	**Solid**	**Sampled:12/12/22 10:10**		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 10:10		
04-Solids-MOIST	12/29/22 16:00	12/19/22 10:10		1 g
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-Metals Prep charge	12/29/22 16:00	04/11/23 10:10		
06-M8270C PNA	12/29/22 16:00	12/26/22 10:10		30 g
06-M8082	12/29/22 16:00	12/26/22 10:10		30 g
06-M8081	12/29/22 16:00	12/26/22 10:10		30 g
04-TKN GD	12/29/22 16:00	01/09/23 10:10		
04-Se 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-As 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 10:10		1 g
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 10:10		
04-Hg solids	12/29/22 16:00	01/09/23 10:10		

Containers Supplied: 5

Released By	Date	Received By	Date
[illegible]	12/15/22 1817	[illegible]	12-16 720
[illegible]	12-16 1030	Jill Clark	12/16/22

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-06	**Solid**	**Sampled:12/12/22 12:16**		
04-Hg solids	12/29/22 16:00	01/09/23 12:16		
06-M8270C PNA	12/29/22 16:00	12/26/22 12:16		30 g
06-M8082	12/29/22 16:00	12/26/22 12:16		30 g
06-M8081	12/29/22 16:00	12/26/22 12:16		30 g
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 12:16		
04-TKN GD	12/29/22 16:00	01/09/23 12:16		
04-Solids-MOIST	12/29/22 16:00	12/19/22 12:16		1 g
04-Se 6010 Tot	12/29/22 16:00	06/10/23 12:16		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 12:16		
04-Metals Prep charge	12/29/22 16:00	04/11/23 12:16		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 12:16		
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 12:16		1 g
04-As 6010 Tot	12/29/22 16:00	06/10/23 12:16		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 12:16		
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 12:16		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 12:16		
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 12:16		
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 12:16		

Containers Supplied: 5

Released By	Date	Received By	Date
[signature]	12/15/22 1817	[signature]	12-16 720
[signature]	12-16 1330	Joe Clark	12/16/22

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-07	**Solid**	**Sampled: 12/12/22 11:33**		
06-M8081	12/29/22 16:00	12/26/22 11:33		30 g
06-M8082	12/29/22 16:00	12/26/22 11:33		30 g
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 11:33		1 g
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 11:33		
04-As 6010 Tot	12/29/22 16:00	06/10/23 11:33		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 11:33		
06-M8270C PNA	12/29/22 16:00	12/26/22 11:33		30 g
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 11:33		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 11:33		
04-Hg solids	12/29/22 16:00	01/09/23 11:33		
04-Metals Prep charge	12/29/22 16:00	04/11/23 11:33		
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 11:33		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 11:33		
04-Se 6010 Tot	12/29/22 16:00	06/10/23 11:33		
04-Solids-MOIST	12/29/22 16:00	12/19/22 11:33		1 g
04-TKN GD	12/29/22 16:00	01/09/23 11:33		
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 11:33		
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 11:33		

Containers Supplied: 5

Released By	Date	Received By	Date
[illegible]	12/15/22 1817	[illegible]	12-16 720
[illegible]	12-16 1030	Jill Clark	12/16/22

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-08	**Solid**	**Sampled:12/12/22 13:20**		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 13:20		
04-Se 6010 Tot	12/29/22 16:00	06/10/23 13:20		
04-Solids-MOIST	12/29/22 16:00	12/19/22 13:20		1 g
04-TKN GD	12/29/22 16:00	01/09/23 13:20		
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 13:20		
06-M8270C PNA	12/29/22 16:00	12/26/22 13:20		30 g
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 13:20		
06-M8082	12/29/22 16:00	12/26/22 13:20		30 g
06-M8081	12/29/22 16:00	12/26/22 13:20		30 g
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 13:20		1 g
04-Metals Prep charge	12/29/22 16:00	04/11/23 13:20		
04-As 6010 Tot	12/29/22 16:00	06/10/23 13:20		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 13:20		
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 13:20		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 13:20		
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 13:20		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 13:20		
04-Hg solids	12/29/22 16:00	01/09/23 13:20		

Containers Supplied: 5

Released By	Date	Received By	Date
[illegible] 12/15/22 1817		[illegible]	12-16 720
[illegible]	12-16 1030	[illegible]	12/16/22

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SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-09	**Solid**	**Sampled:12/12/22 14:24**		
04-Metals Prep charge	12/29/22 16:00	04/11/23 14:24		
04-Se 6010 Tot	12/29/22 16:00	06/10/23 14:24		
06-M8270C PNA	12/29/22 16:00	12/26/22 14:24		30 g
06-M8082	12/29/22 16:00	12/26/22 14:24		30 g
06-M8081	12/29/22 16:00	12/26/22 14:24		30 g
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 14:24		
04-TKN GD	12/29/22 16:00	01/09/23 14:24		
04-Solids-MOIST	12/29/22 16:00	12/19/22 14:24		1 g
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 14:24		1 g
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 14:24		
04-Hg solids	12/29/22 16:00	01/09/23 14:24		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 14:24		
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 14:24		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 14:24		
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 14:24		
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 14:24		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 14:24		
04-As 6010 Tot	12/29/22 16:00	06/10/23 14:24		

Containers Supplied: S

Released By	Date	Received By	Date
[signature]	12/15/22 1817	[signature]	12-16 720
[signature]	12-16 1030	Gil Clark	12/16/22

Released By / Date / Received By / Date

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SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-10	**Solid**	**Sampled: 12/12/22 15:30**		
04-Se 6010 Tot	12/29/22 16:00	06/10/23 15:30		
04-Solids-MOIST	12/29/22 16:00	12/19/22 15:30		1 g
06-M8270C PNA	12/29/22 16:00	12/26/22 15:30		30 g
04-TKN GD	12/29/22 16:00	01/09/23 15:30		
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 15:30		
06-M8082	12/29/22 16:00	12/26/22 15:30		30 g
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 15:30		
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 15:30		
06-M8081	12/29/22 16:00	12/26/22 15:30		30 g
04-Metals Prep charge	12/29/22 16:00	04/11/23 15:30		
04-Hg solids	12/29/22 16:00	01/09/23 15:30		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 15:30		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 15:30		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 15:30		
04-As 6010 Tot	12/29/22 16:00	06/10/23 15:30		
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 15:30		1 g
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 15:30		
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 15:30		

Containers Supplied:

Released By	Date	Received By	Date
[signature]	12/15/22 1817	[signature]	12-16 720
[signature]	12-16 1030	[signature]	12/16/22

C176

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-11	**Solid**	**Sampled:12/12/22 00:00**		
06-M8082	12/29/22 16:00	12/26/22 00:00		30 g
04-Pb 6010 Tot	12/29/22 16:00	06/10/23 00:00		
04-Se 6010 Tot	12/29/22 16:00	06/10/23 00:00		
04-Solids-MOIST	12/29/22 16:00	12/19/22 00:00		1 g
04-TKN GD	12/29/22 16:00	01/09/23 00:00		
04-Ni 6010 Tot	12/29/22 16:00	06/10/23 00:00		
06-M8081	12/29/22 16:00	12/26/22 00:00		30 g
04-Cd 6010 Tot	12/29/22 16:00	06/10/23 00:00		
04-Zn 6010 Tot	12/29/22 16:00	06/10/23 00:00		
04-Metals Prep charge	12/29/22 16:00	04/11/23 00:00		
04-Hg solids	12/29/22 16:00	01/09/23 00:00		
04-Environmental Fee - Solid	12/29/22 16:00	04/11/23 00:00		
04-Cr 6010 Tot	12/29/22 16:00	06/10/23 00:00		
04-Ba 6010 Tot	12/29/22 16:00	06/10/23 00:00		
04-As 6010 Tot	12/29/22 16:00	06/10/23 00:00		
04-Ag 6010 Tot	12/29/22 16:00	06/10/23 00:00		1 g
06-M8270C PNA	12/29/22 16:00	12/26/22 00:00		30 g
04-Cu 6010 Tot	12/29/22 16:00	06/10/23 00:00		

Containers Supplied:

Released By	Date	Received By	Date
[signature] 12/15/22 1817		[signature]	12-16 720
[signature]	12-16 1030	Jill Clark	12/16/22

C177

ASH 12-20-22

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

SENDING LABORATORY:	RECEIVING LABORATORY:
Pace Analytical Services, LLC	Pace Analytical Services, LLC - Peoria
2231 West Altorfer Drive	2231 W Altorfer Dr
Peoria, IL 61615	Peoria, IL 61615
Phone: (309) 692-9688	Phone :(309) 692-9688
Fax: (309) 692-9689	Fax: (309) 692-9689
Project Manager: Gail Schindler	

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-01	**Solid**	**Sampled: 12/12/22 07:00**	[redacted]	**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 07:00		
Containers Supplied:				
Sample ID: FL03235-02	**Solid**	**Sampled: 12/12/22 07:49**	[redacted]	**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 07:49		
Containers Supplied:				
Sample ID: FL03235-03	**Solid**	**Sampled: 12/12/22 08:38**	[redacted]	**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 08:38		
Containers Supplied:				
Sample ID: FL03235-04	**Solid**	**Sampled: 12/12/22 09:28**	[redacted]	**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 09:28		
Containers Supplied:				
Sample ID: FL03235-05	**Solid**	**Sampled: 12/12/22 10:10**	[redacted]	**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 10:10		
Containers Supplied:				
Sample ID: FL03235-06	**Solid**	**Sampled: 12/12/22 12:16**	[redacted]	**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 12:16		
Containers Supplied:				

11 containers total

Released By	Date	Received By	Date
[signature]	12/16/22	[signature]	12-19 1030
[signature]	12/19 1400	[signature]	12/19/22 1450

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-07	**Solid**	**Sampled:12/12/22 11:33**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 11:33		
Containers Supplied:				
Sample ID: FL03235-08	**Solid**	**Sampled:12/12/22 13:20**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 13:20		
Containers Supplied:				
Sample ID: FL03235-09	**Solid**	**Sampled:12/12/22 14:24**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 14:24		
Containers Supplied:				
Sample ID: FL03235-10	**Solid**	**Sampled:12/12/22 15:30**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 15:30		
Containers Supplied:				
Sample ID: FL03235-11	**Solid**	**Sampled:12/12/22 00:00**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 00:00		
Containers Supplied:				

Released By	Date	Received By	Date
Released By	Date	Received By	Date

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-07	**Solid**	**Sampled:12/12/22 11:33**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 11:33		
Containers Supplied:				
Sample ID: FL03235-08	**Solid**	**Sampled:12/12/22 13:20**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 13:20		
Containers Supplied:				
Sample ID: FL03235-09	**Solid**	**Sampled:12/12/22 14:24**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 14:24		
Containers Supplied:				
Sample ID: FL03235-10	**Solid**	**Sampled:12/12/22 15:30**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 15:30		
Containers Supplied:				
Sample ID: FL03235-11	**Solid**	**Sampled:12/12/22 00:00**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 00:00		
Containers Supplied:				

Released By	Date	Received By	Date
Released By	Date	Received By	Date

ASH
12-20-22

SUBCONTRACT ORDER

Pace Analytical Services, LLC

FL03235

SENDING LABORATORY:	**RECEIVING LABORATORY:**
Pace Analytical Services, LLC	Pace Analytical Services, LLC - Peoria
2231 West Altorfer Drive	2231 W Altorfer Dr
Peoria, IL 61615	Peoria, IL 61615
Phone: (309) 692-9688	Phone :(309) 692-9688
Fax: (309) 692-9689	Fax: (309) 692-9689
Project Manager: Gail Schindler	

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: FL03235-01	**Solid**	**Sampled: 12/12/22 07:00**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 07:00		
Containers Supplied:				
Sample ID: FL03235-02	**Solid**	**Sampled: 12/12/22 07:49**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 07:49		
Containers Supplied:				
Sample ID: FL03235-03	**Solid**	**Sampled: 12/12/22 08:38**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 08:38		
Containers Supplied:				
Sample ID: FL03235-04	**Solid**	**Sampled: 12/12/22 09:28**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 09:28		
Containers Supplied:				
Sample ID: FL03235-05	**Solid**	**Sampled: 12/12/22 10:10**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 10:10		
Containers Supplied:				
Sample ID: FL03235-06	**Solid**	**Sampled: 12/12/22 12:16**		**On cart is soil cooler**
TKN	12/29/22 16:00	01/09/23 12:16		
Containers Supplied:				

Total
11 containers

Dez Clark	12/16/22		12-19 1030
Released By	Date	Received By	Date
	12-19 1450	Jonathan Offeit	12/19/22 1450
Released By	Date	Received By	Date

APPENDIX B

Visual Inspection Photograph log

LAKE SPRINGFIELD DAM – DECEMBER 2022 INSPECTION
Photographic Record

Client: City Utility — **Project Number:** MOW5628

Site Name: Lake Springfield Dam — **Site Location:** Springfield, MO

Photograph 1

Date: 12/1/2022

Direction: North

Comments:
Concrete spillway from the downstream side. Concrete piers and bridge on top of are shown too from the south side of the dam.

Photograph 2

Date: 12/1/2022

Direction: South

Comments:
Penstock pipe entrance on the upstream side of the embankment dam.

LAKE SPRINGFIELD DAM – DECEMBER 2022 INSPECTION

Photographic Record

Client: City Utility | **Project Number:** MOW5628

Site Name: Lake Springfield Dam | **Site Location:** Springfield, MO

Photograph 3

Date: 12/1/2022

Direction: Northwest

Comments:
North side of the bridge and its pier shown supported directly by the existing bedrock.

Photograph 4

Date: 12/1/2022

Direction: West

Comments:
Accumulated debris on the upstream side of the concrete spillway.

Lake Springfield Dam – December 2022 Inspection
Photographic Record

Client: City Utility	**Project Number:** MOW5628
Site Name: Lake Springfield Dam	**Site Location:** Springfield, MO

Photograph 5

Date: 12/1/2022

Direction: West

Comments: General picture of the dam, spillway, and road taken from the peninsula in Lake Springfield.

Photograph 6

Date: 12/1/2022

Direction: Northeast

Comments: Dam/Bridge concrete abutment on the south side of the structure. Some erosion is observed adjacent to the abutment.

Lake Springfield Dam – December 2022 Inspection
Photographic Record

Client: City Utility	**Project Number:** MOW5628
Site Name: Lake Springfield Dam	**Site Location:** Springfield, MO

Photograph 7

Date: 12/1/2022

Direction: Southeast

Comments: Downstream side of embankment dam. Good vegetation and no erosion/cracks/settlement were observed.

Photograph 8

Date: 12/1/2022

Direction: West

Comments: Upstream side of embankment dam. Erosion and vegetation were observed within the riprap armor.

LAKE SPRINGFIELD DAM – DECEMBER 2022 INSPECTION
Photographic Record

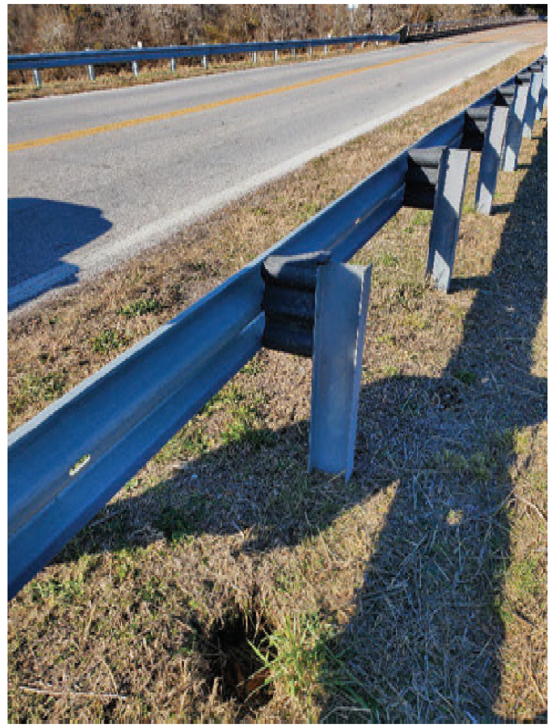
Client: City Utility	**Project Number:** MOW5628
Site Name: Lake Springfield Dam	**Site Location:** Springfield, MO

Photograph 9

Date: 12/1/2022

Direction:

Comments:
Post holes from a previous guardrail were observed on the crest of the earth embankment.

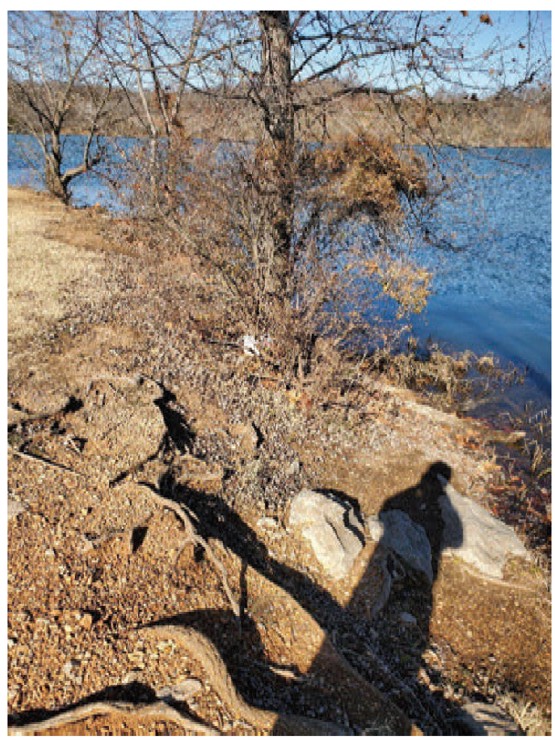


Photograph 10

Date: 12/1/2022

Direction: West

Comments:
Upstream side of peninsula with minor erosion observed.



Client: City Utility	**Project Number:** MOW5628
Site Name: Lake Springfield Dam	**Site Location:** Springfield, MO

Photograph 11

Date: 12/1/2022

Direction:

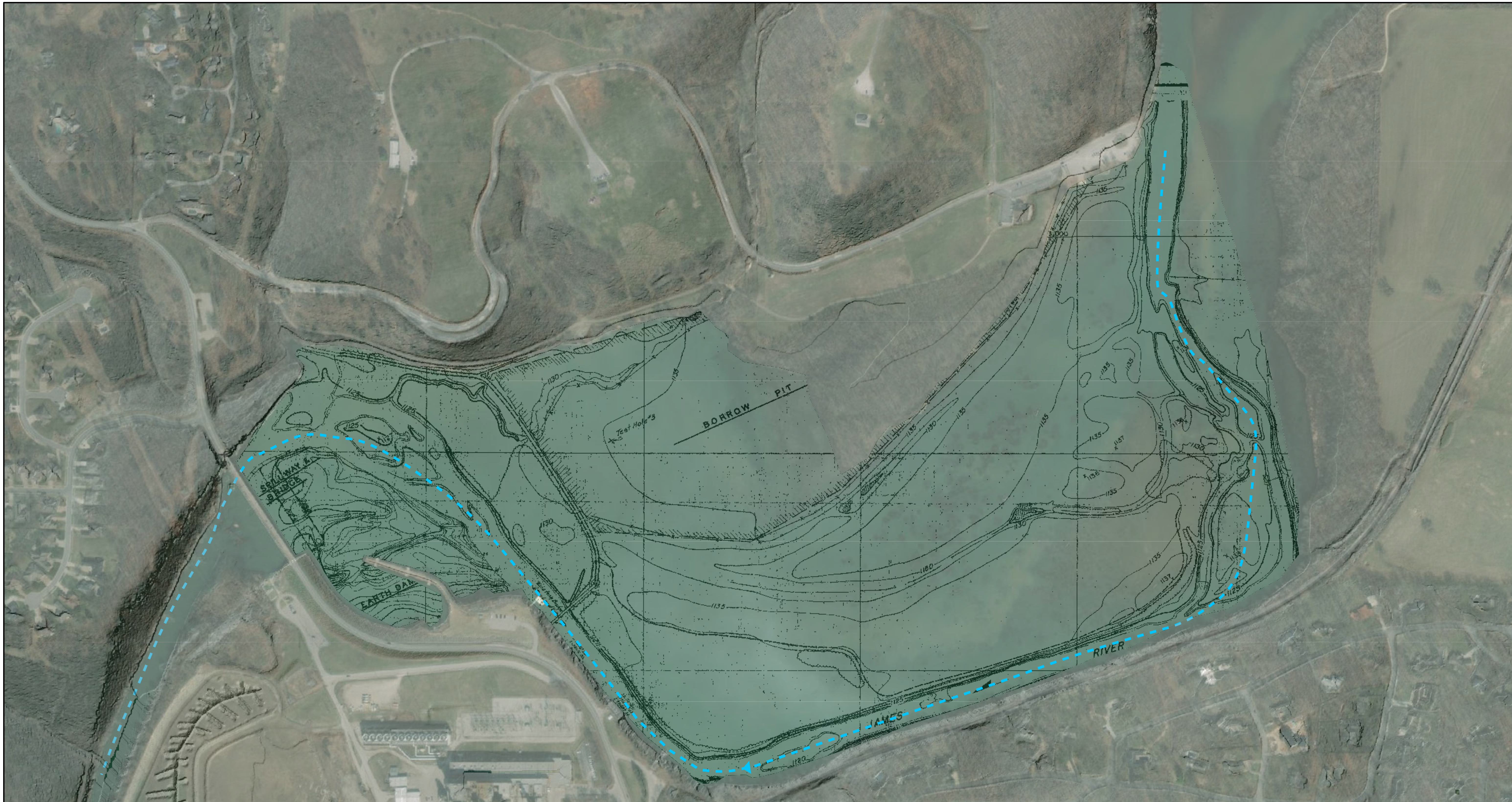
Comments:
Downstream side of the dam access stairs. Minor erosion observed around the concrete stairs. Maintenance required for stairs.

Photograph 12

Date: 12/1/2022

Direction: East

Comments:
Upstream side of the embankment dam shows that maintenance is required to clear vegetation and replace eroded riprap within the upstream armor.



Legend

Original Stream Alignment

Site Plan Source: James River Power Station As-Built, 1955

N

0 250 500 1,000 Feet

Lake Springfield Dam
Original Stream Alignment

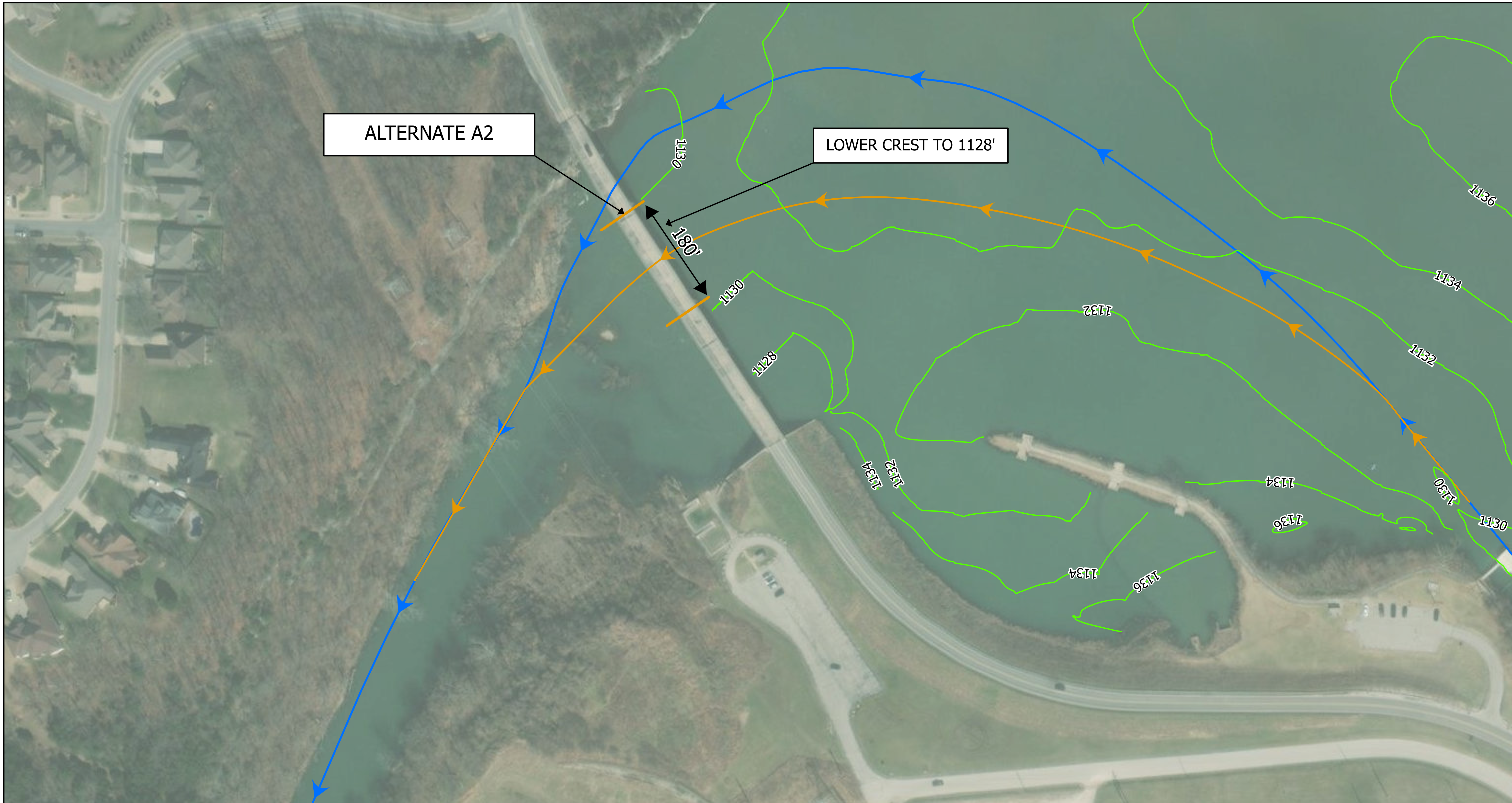
Lake Springfield, MO

Geosyntec consultants

St. Louis, MO	February 2023	**Figure** 1

C189

P:\GIS\GISProjects\MOW5628 - Lake Springfield\Projects\2022(1214)LakeMap.aprx\2023(0209) As Built & Alignment 2/15/2023 10:57 AM (avandermus)



Legend

- Top of Sediment Contour 2ft
- Original Stream Alignment
- New Stream Alignment Post-Stabilization

*Note: Orthometric elevations were determined for all points using the National Geodetic Vertical Datum of 1929 (NGVD29).

NAVD88 = NGDV29 + 0.449 (ft)

N

0 50 100 200 Feet

C190

Dam Removal

Lake Springfield, MO

Geosyntec consultants

St. Louis, MO | February 2023

Figure 2

P:\GIS\GISProjects\MOW5628 - Lake Springfield\Projects\2022(1214)LakeMap.aprx\2023(0214) Alternate A2 2/15/2023 2:30 PM (avandermus)

Legend

Contours 10-ft

Contours 10-ft

*Note: Orthometric elevations were determined for all points using the National Geodetic Vertical Datum of 1929 (NGVD29).

NAVD88 = NGDV29 + 0.449 (ft)

N

0 50 100 200 Feet

Concrete Dam Modification

Lake Springfield, MO

Geosyntec consultants

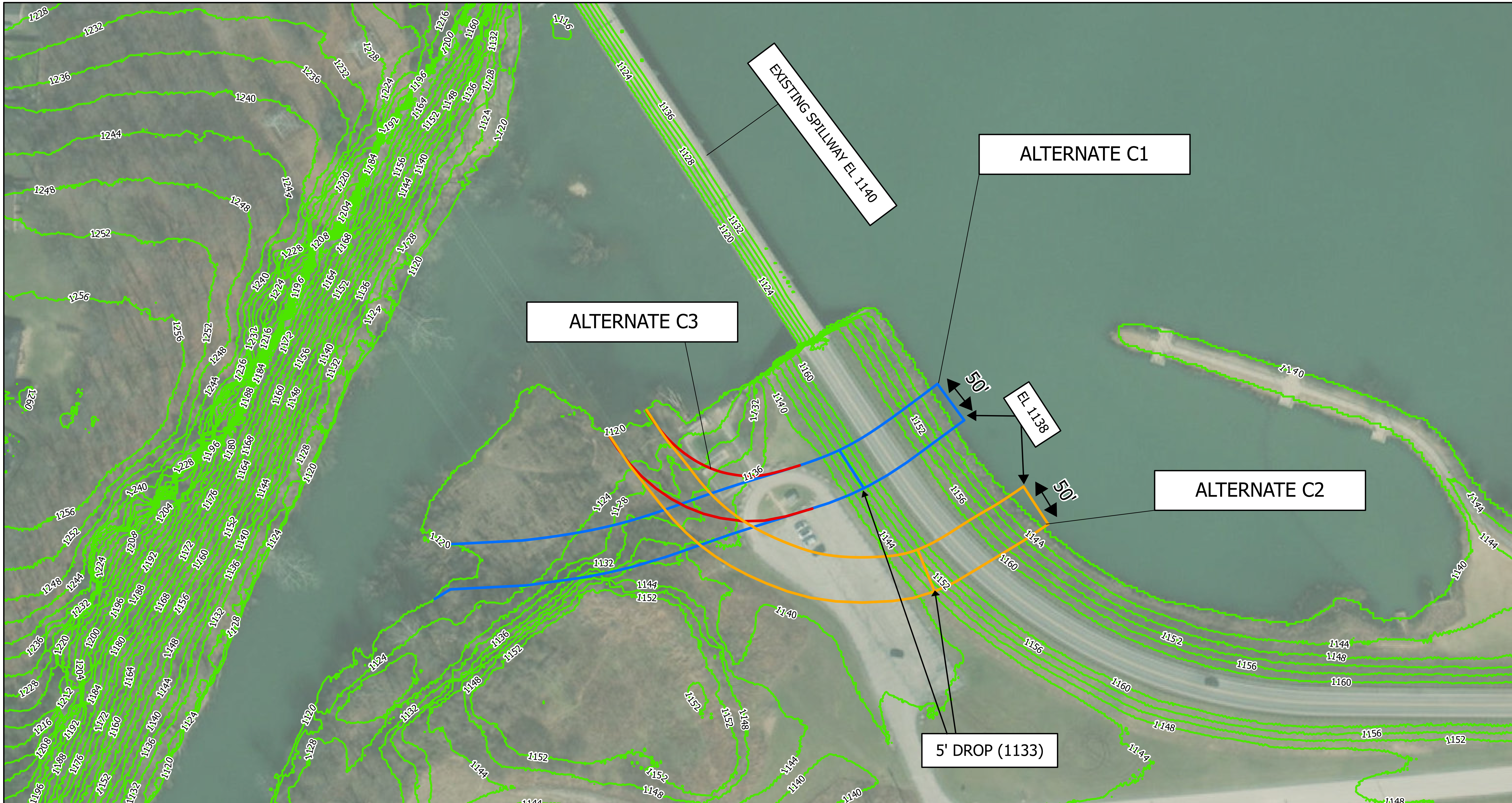
St. Louis, MO | February 2023

Figure

3

C191

P:\GIS\GISProjects\MOW5628 - Lake Springfield\Projects\2022(1214)LakeMap.aprx\2023(0214) Alternate B1 and B2 2/15/2023 2:30 PM (avandermus)



Legend

Contours 4ft

Alternate

C1

C2

C3

*Note: Orthometric elevations were determined for all points using the National Geodetic Vertical Datum of 1929 (NGVD29).

NAVD88 = NGDV29 + 0.449 (ft)

N

0 50 100 200 Feet

Earthen Dam Modification

Lake Springfield, MO

Geosyntec consultants

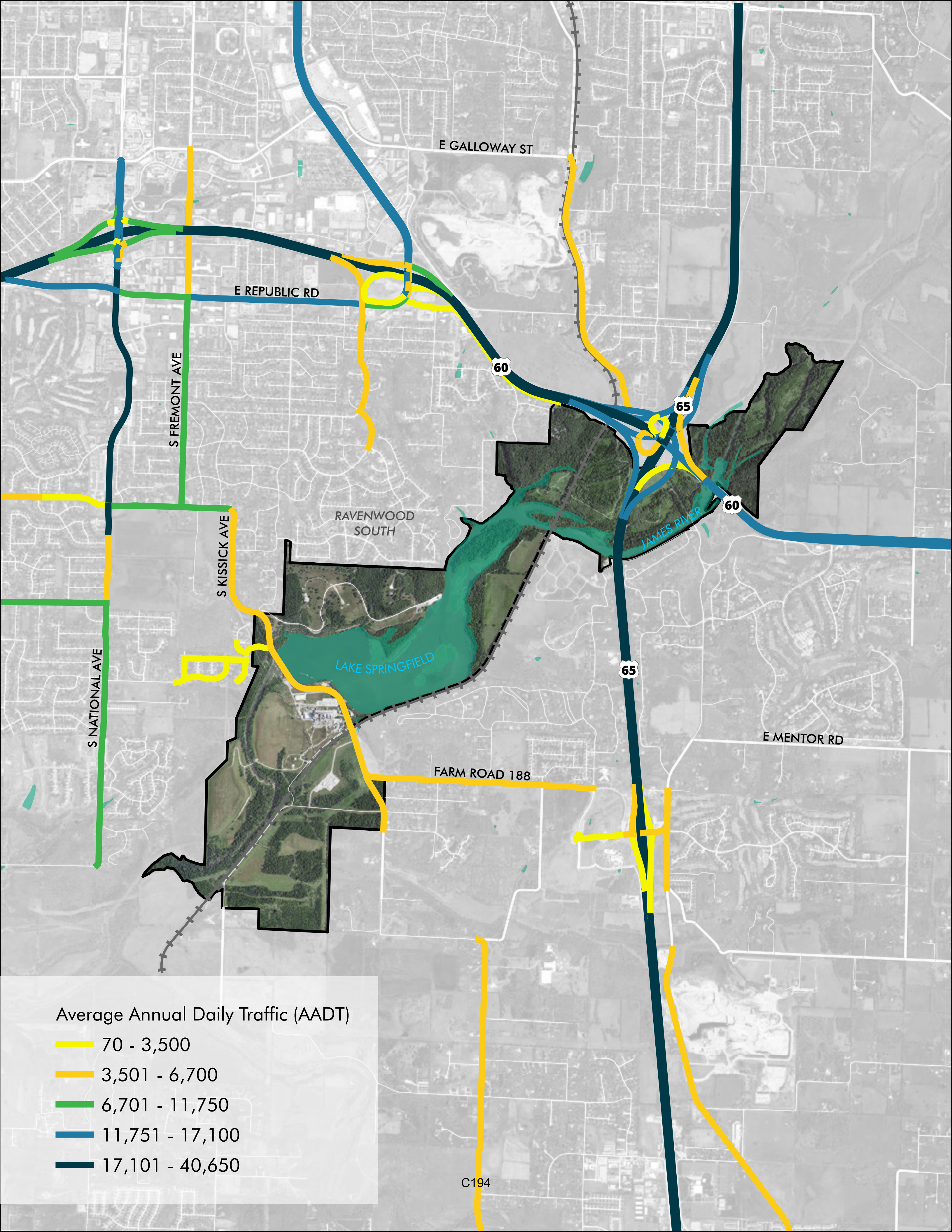
St. Louis, MO | February 2023

Figure 4

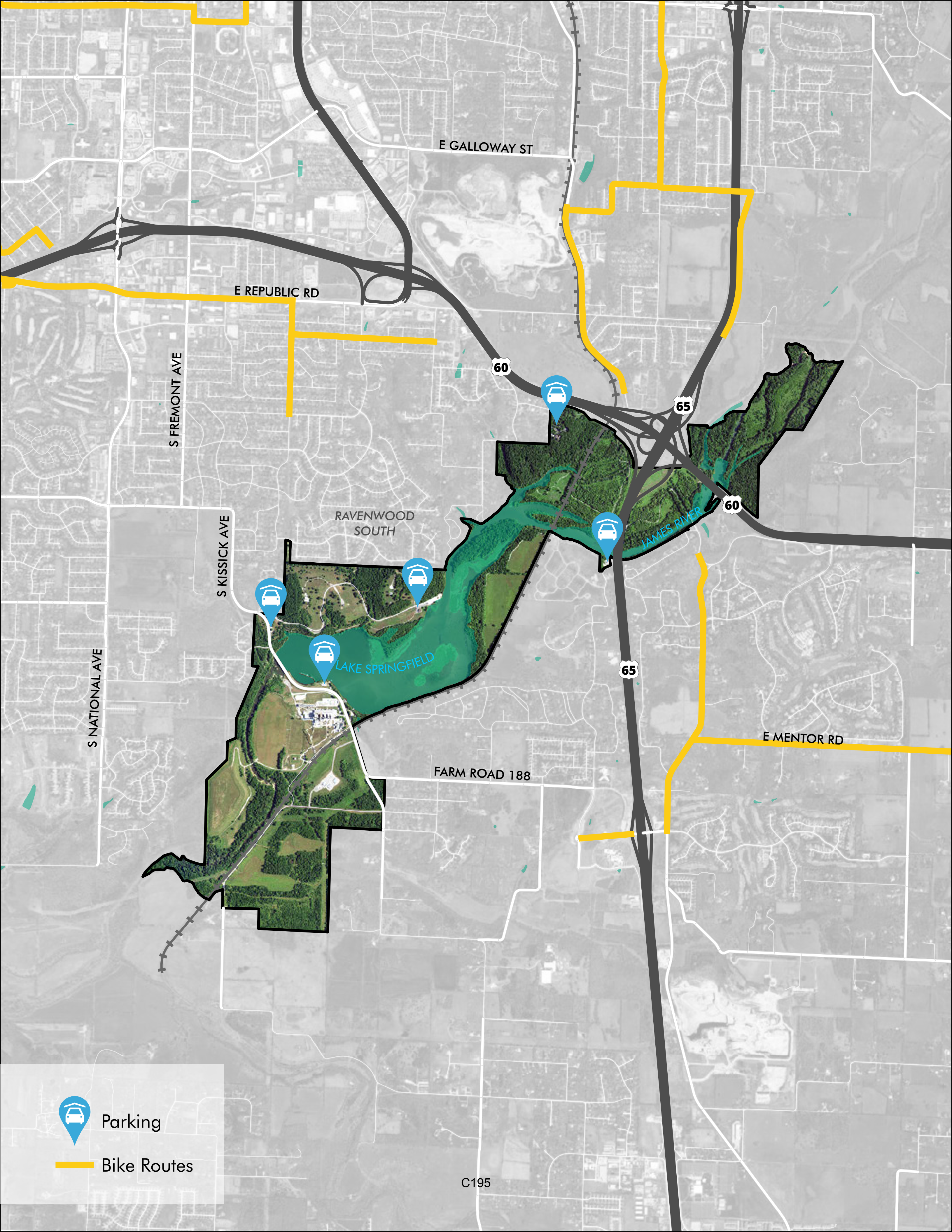
C192

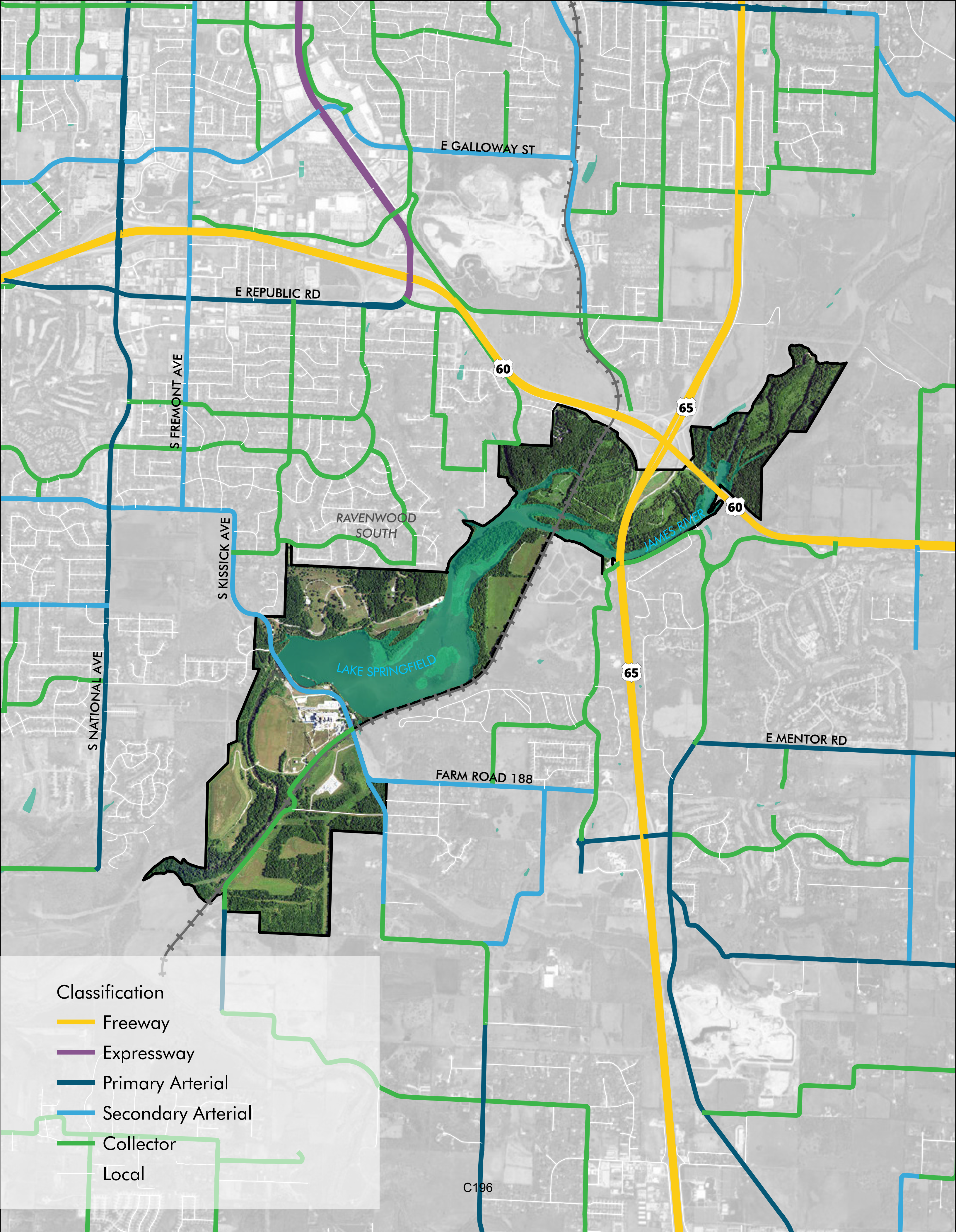
P:\GIS\GISProjects\MOW5628 - Lake Springfield\Projects\2022(1214)LakeMap.aprx\2023(0214) Alternate C 2/15/2023 2:30 PM (avandermus)

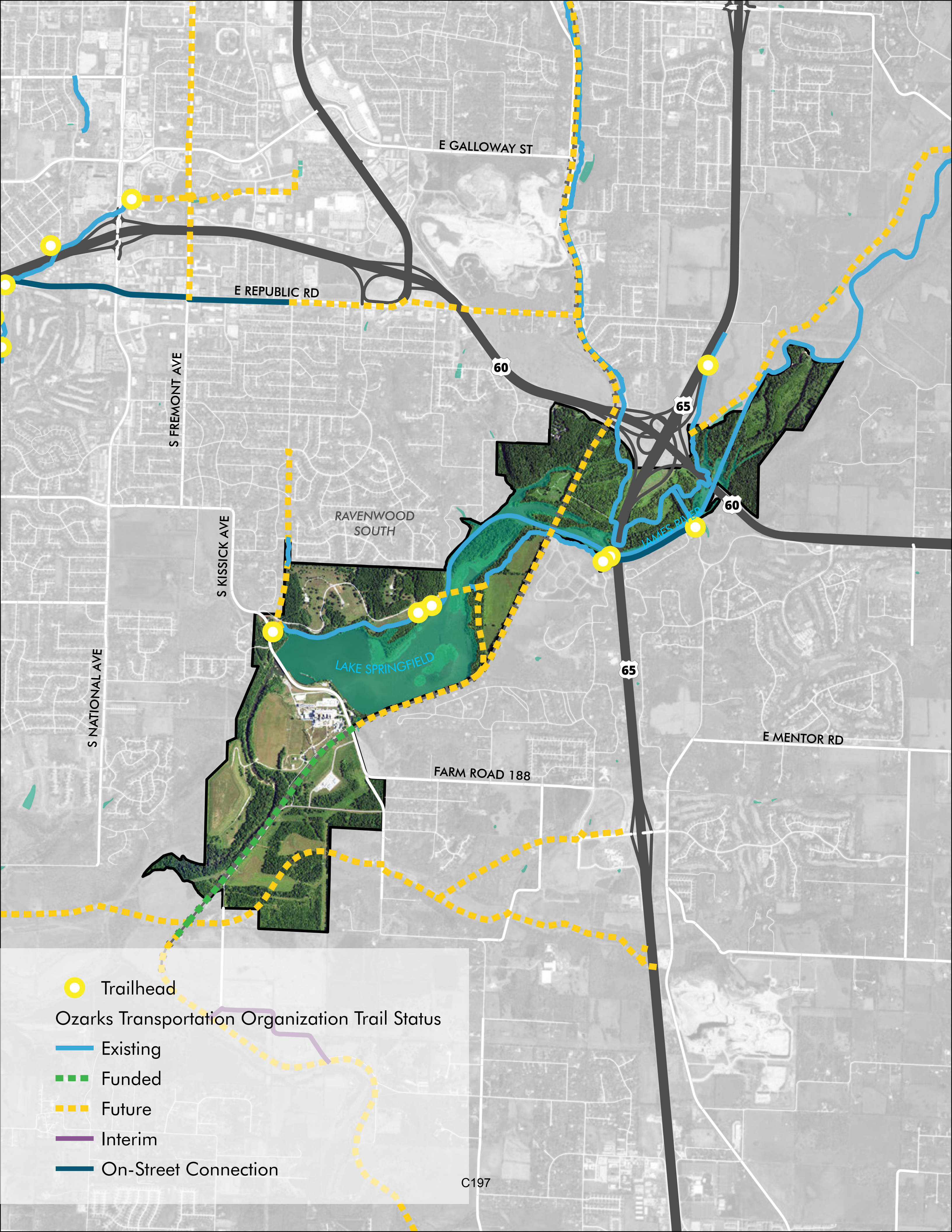
ACCESS AND MOBILITY



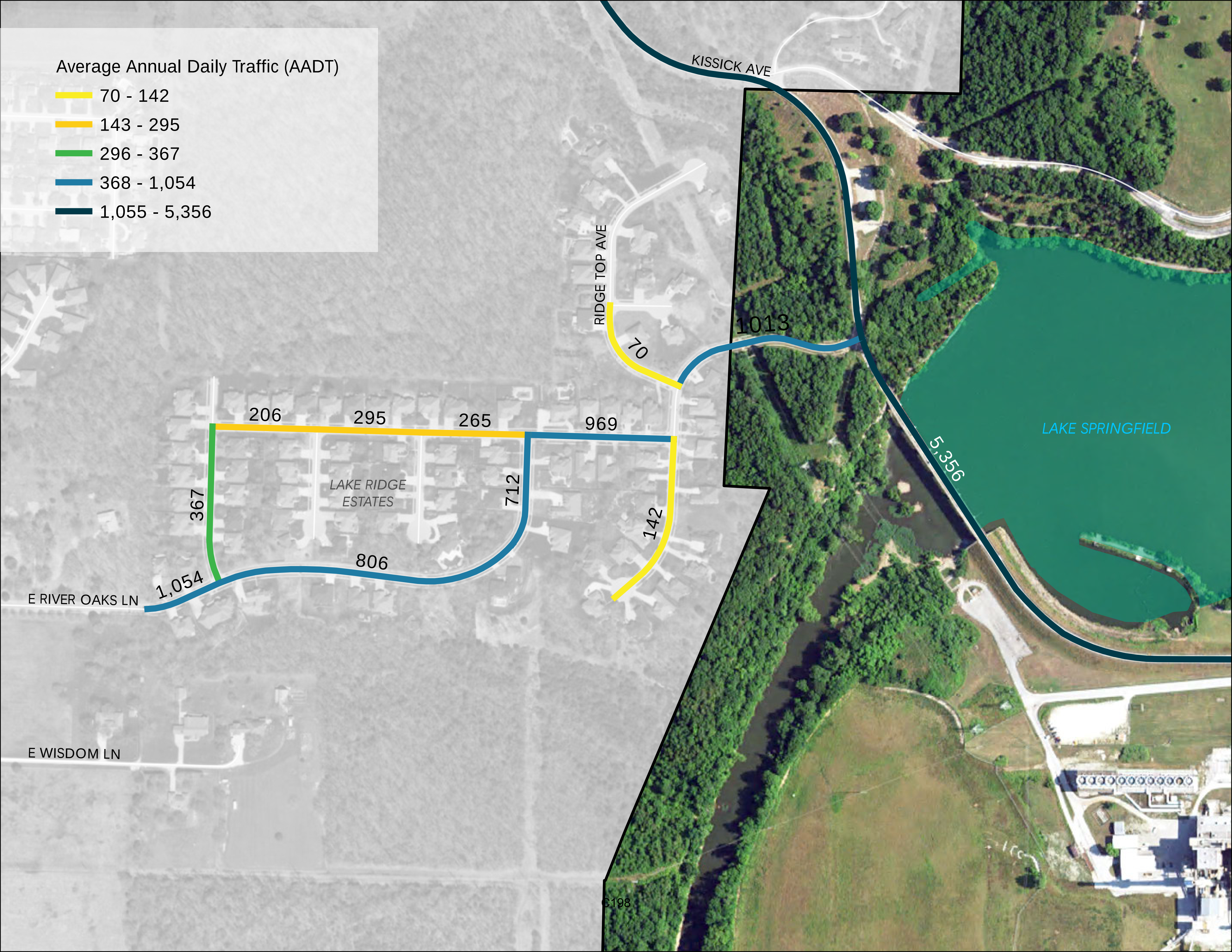
E GALLOWAY ST
E REPUBLIC RD
S FREMONT AVE
60
65
RAVENWOOD SOUTH
S KISSICK AVE
JAMES RIVER
LAKE SPRINGFIELD
S NATIONAL AVE
E MENTOR RD
FARM ROAD 188
C194
Average Annual Daily Traffic (AADT)
70 - 3,500
3,501 - 6,700
6,701 - 11,750
11,751 - 17,100
17,101 - 40,650


E GALLOWAY ST
E REPUBLIC RD
S FREMONT AVE
60
65
RAVENWOOD
SOUTH
S KISSICK AVE
JAMES RIVER
60
LAKE SPRINGFIELD
65
S NATIONAL AVE
E MENTOR RD
FARM ROAD 188
Parking
Bike Routes


E GALLOWAY ST
E REPUBLIC RD
60
65
S FREMONT AVE
S KISSICK AVE
S NATIONAL AVE
RAVENWOOD SOUTH
JAMES RIVER
LAKE SPRINGFIELD
E MENTOR RD
FARM ROAD 188
Classification
Freeway
Expressway
Primary Arterial
Secondary Arterial
Collector
Local



E GALLOWAY ST
E REPUBLIC RD
60
65
S FREMONT AVE
RAVENWOOD SOUTH
S KISSICK AVE
JAMES RIVER
LAKE SPRINGFIELD
S NATIONAL AVE
E MENTOR RD
FARM ROAD 188
Trailhead
Ozarks Transportation Organization Trail Status
Existing
Funded
Future
Interim
On-Street Connection


Average Annual Daily Traffic (AADT)
70 - 142
143 - 295
296 - 367
368 - 1,054
1,055 - 5,356
KISSICK AVE
RIDGE TOP AVE
1013
70
206
295
265
969
367
LAKE RIDGE ESTATES
712
142
806
1,054
E RIVER OAKS LN
5,356
LAKE SPRINGFIELD
E WISDOM LN
C198

Transportation & Mobility

Public Works Meeting
Friday, 8/18. 2023

LAKE SPRINGFIELD PLAN

Today:

- Review project goals – transportation related
- Existing conditions
- Proposed planning scenarios
  - Lake zones
  - Project Identity
  - Ozark Experience (option 1)
  - Recreation (option 2)
- Transportation Improvements
  - Estimated vehicles per day
  - Transportation Scenarios

LAKE SPRINGFIELD PLAN

Transportation & Mobility Goals

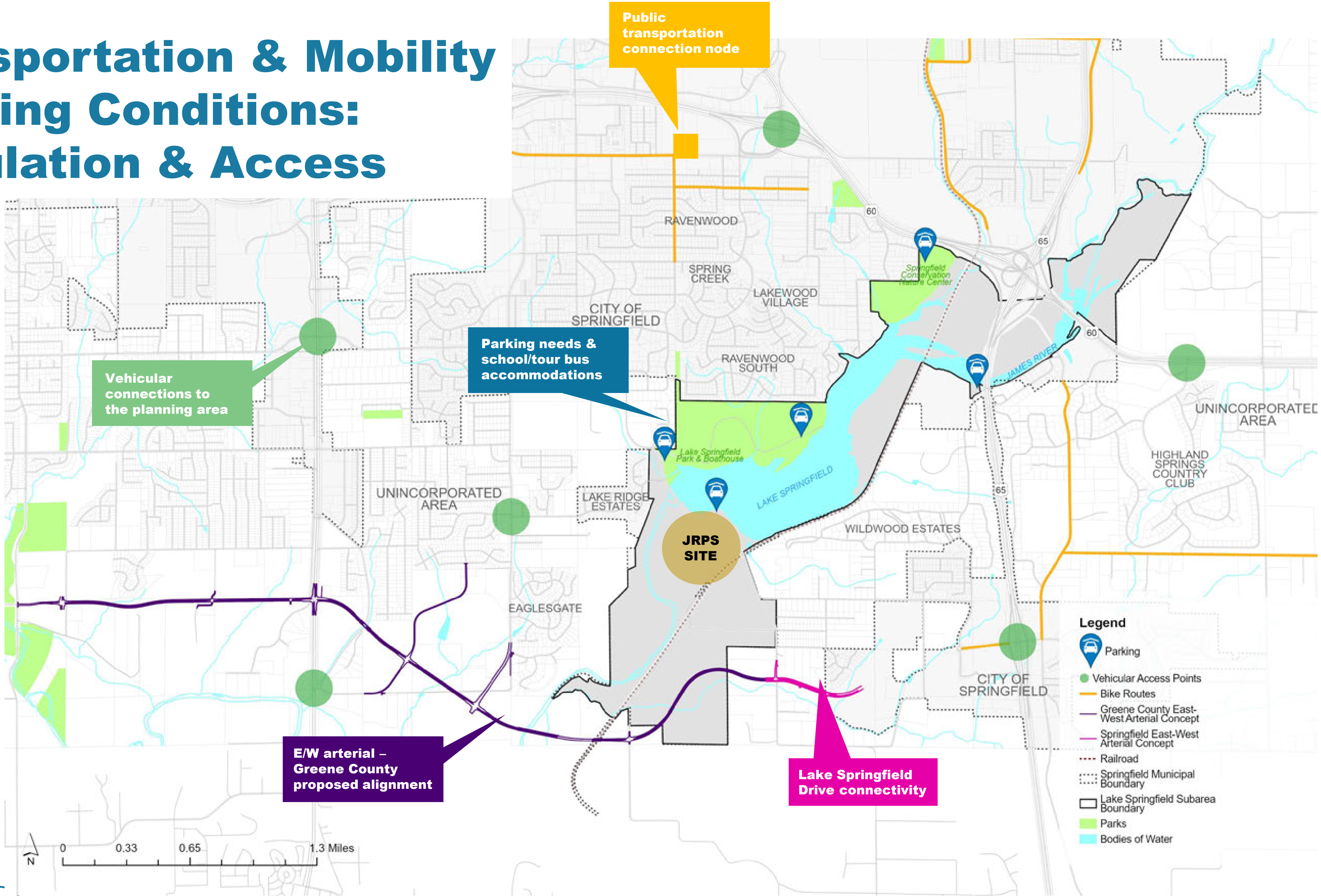
GOAL:

Focus on Transportation enhancements that are accessible and equitable to Lake Springfield and the surrounding communities

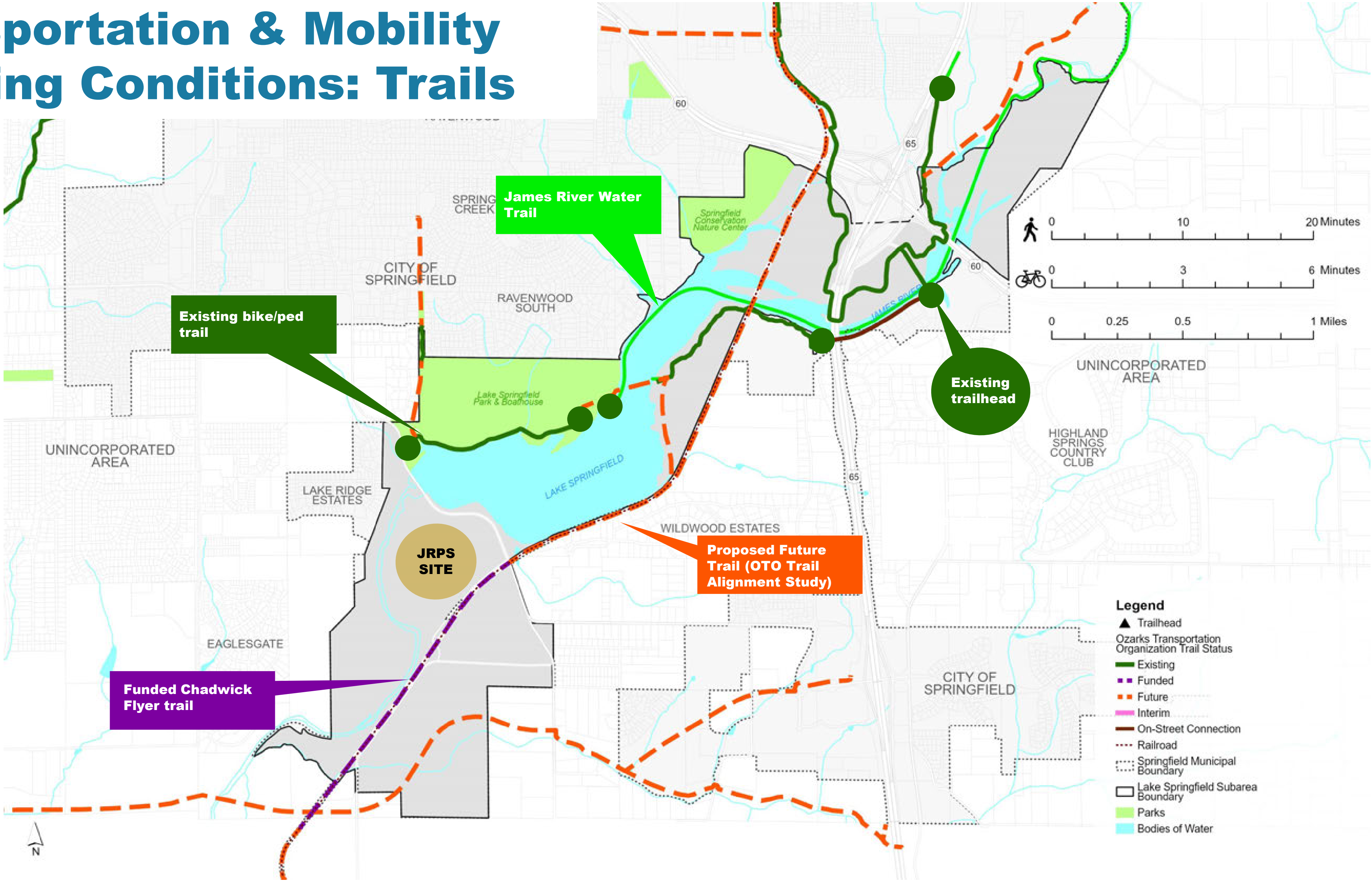
AREAS OF FOCUS:

- Vehicular connections & access (roadway improvements)
- Bike/ped connectivity & safety (trails, sidewalks, etc.)
- Boat ramp access
- Public transportation
- Parking
- Cross-lake connectivity
- E/W connection (Lake Springfield Drive)

Transportation & Mobility Existing Conditions: Circulation & Access

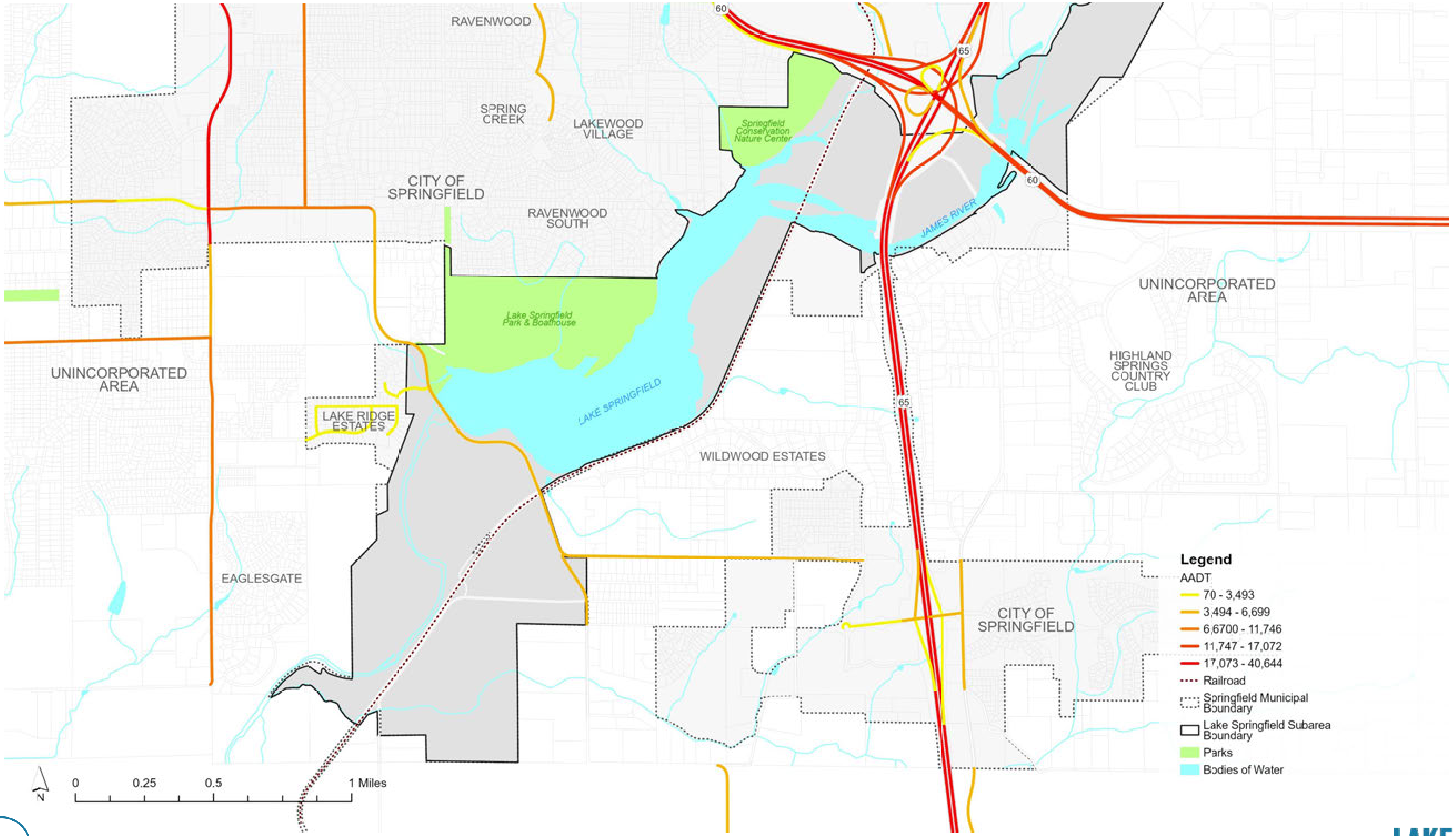


Transportation & Mobility Existing Conditions: Trails



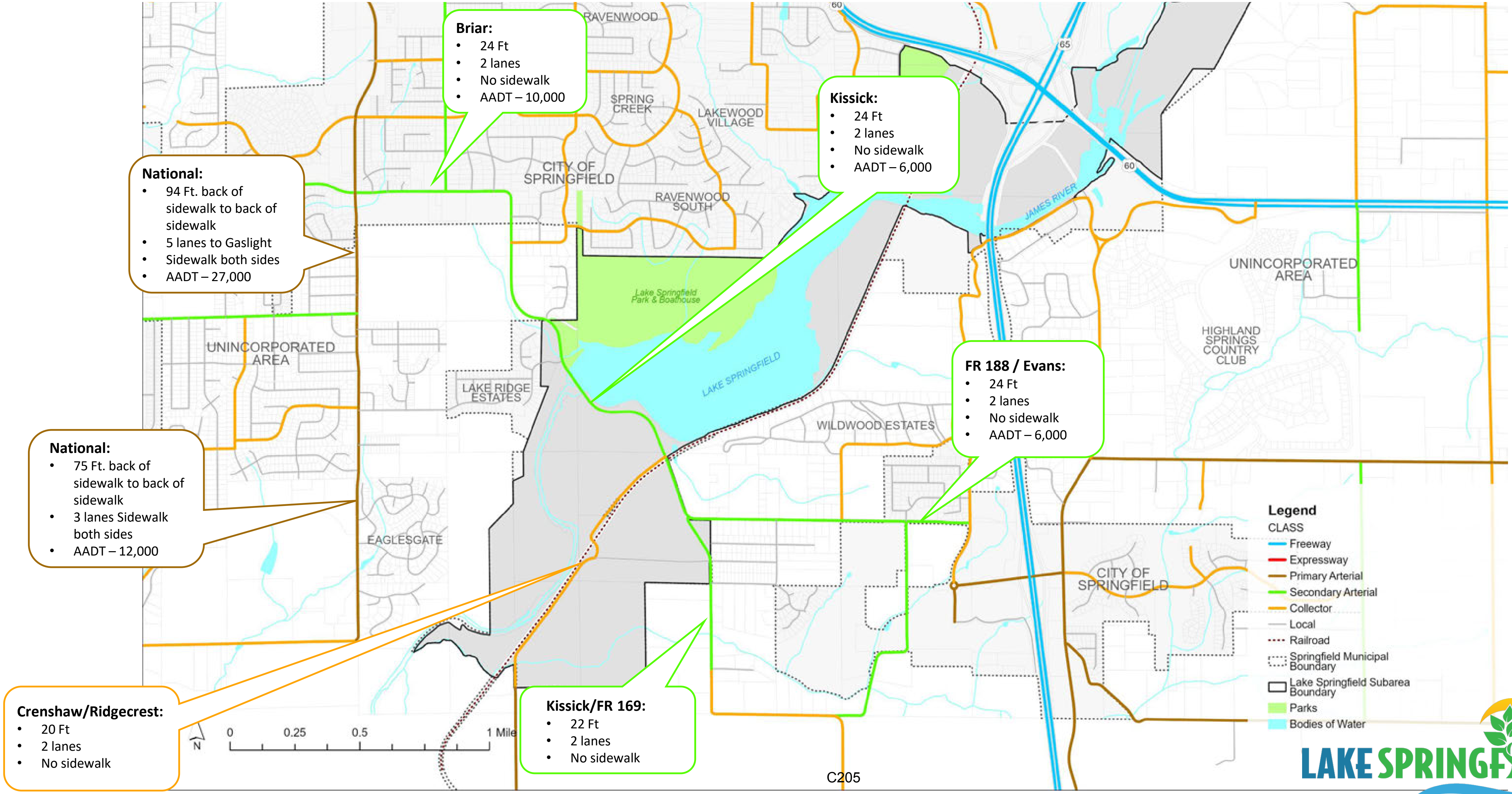
LAKE SPRINGFIELD PLAN

Transportation & Mobility
Existing Conditions: Lake Ridge Estates



LAKE SPRINGFIELD PLAN

Transportation & Mobility
Existing Conditions: Current Roadway Sections



C205

LAKE SPRINGFIELD PLAN

Proposed Planning Scenarios
Lake Zones

North - Access and Connectivity

Lake - "Ozark Experience"

- wetland with boardwalks and education
- maintain channel and limited open water
- explore connections to power station
- Dam (DNR) - concrete remain and modify earthen dam for bypass

Park - "Ozark Experience"

- Retreat with Cultural Center / Camp
- Bridge Access over James River
- Expanded Trails and Water Access

Power Plant - consolidate to two options

- Entertainment District
- Ozark Experience with Conference Center or Indoor Recreation

South Activity - consolidate to two options

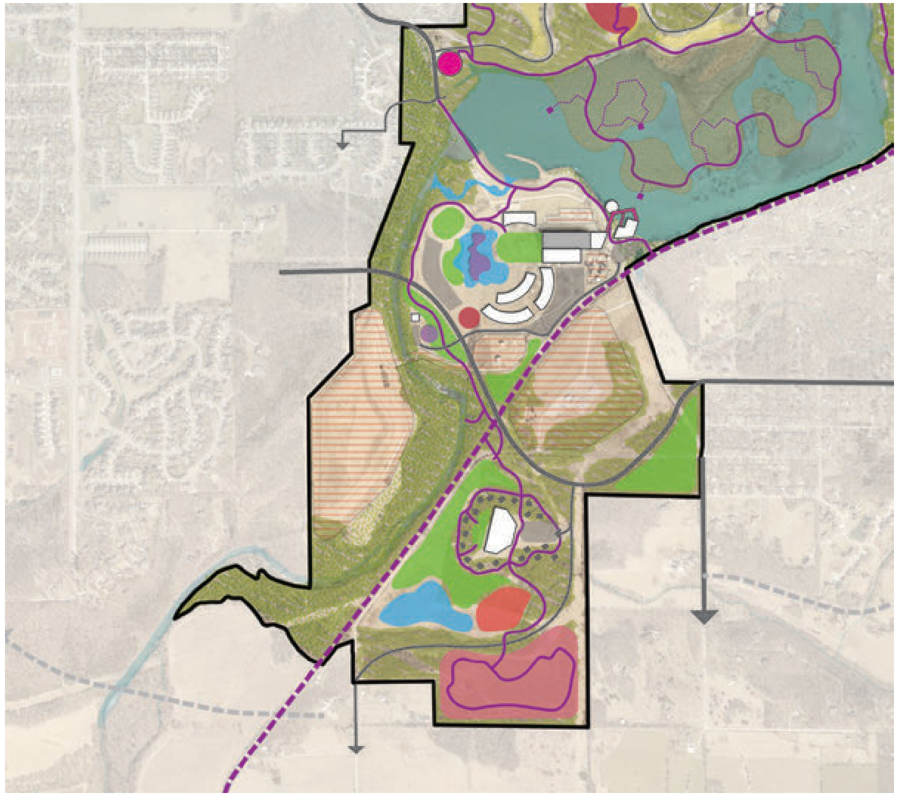
- Conference Center /small Adventure Recreation (Entertainment PP)
- Adventure Park - scale of amenities and focus

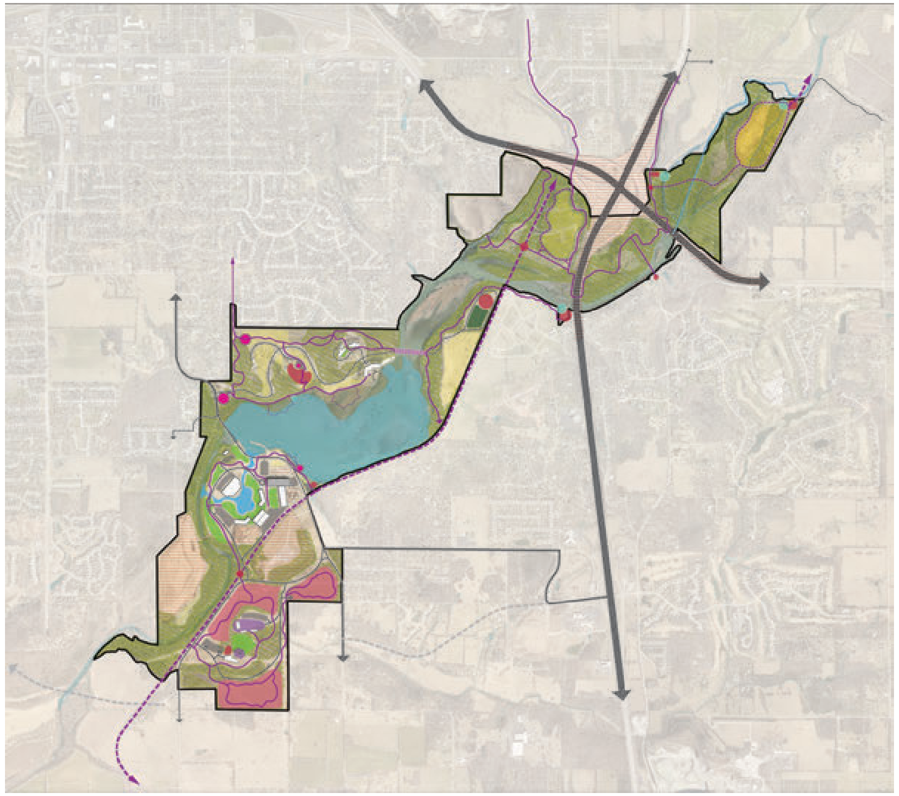
Proposed Planning Scenarios

Project Identity = Gateway to the Ozarks

LAKE SPRINGFIELD PLAN

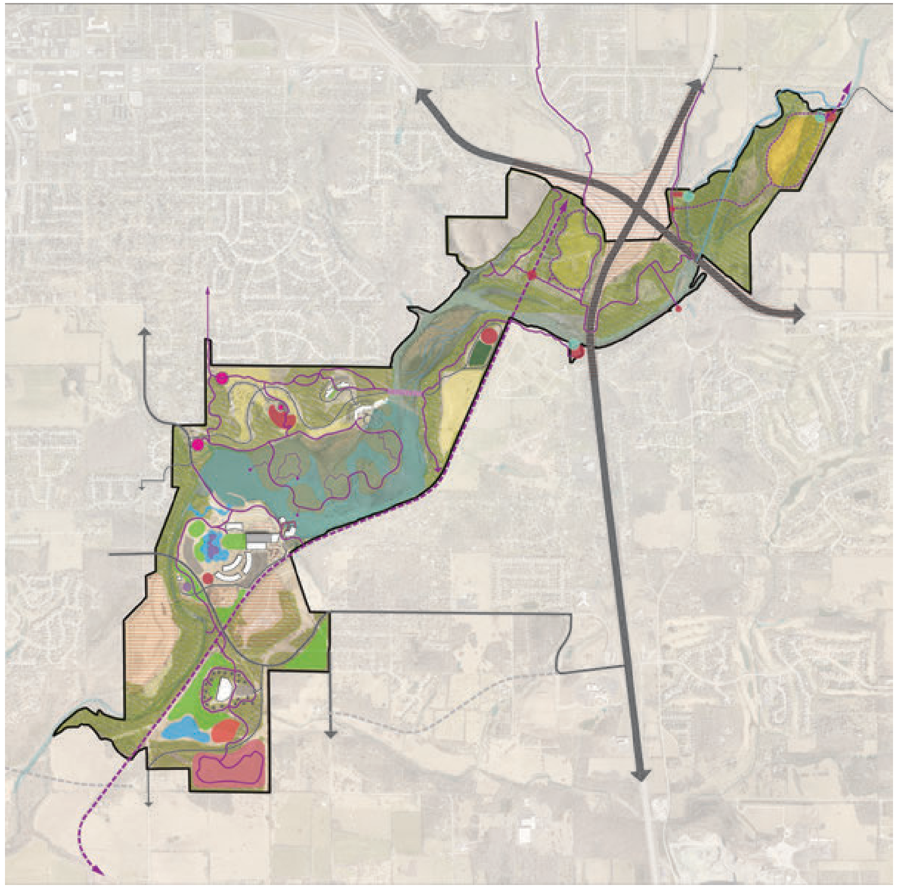
Proposed Planning Scenarios

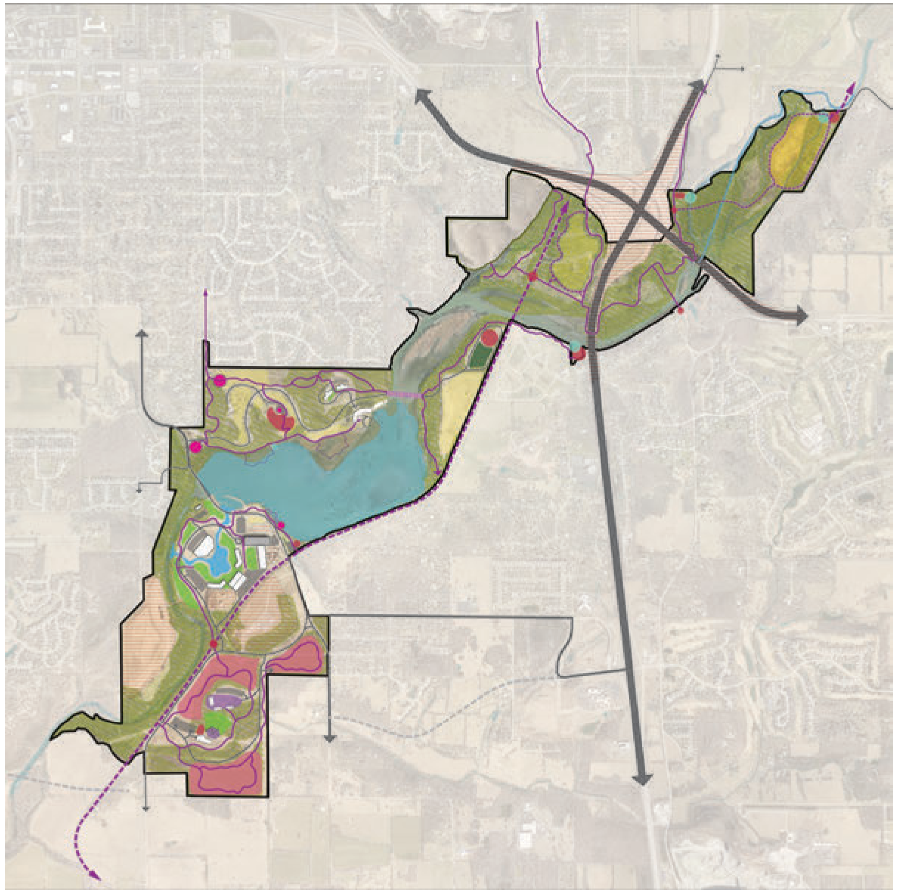




LAKE SPRINGFIELD PLAN

Proposed Planning Scenarios



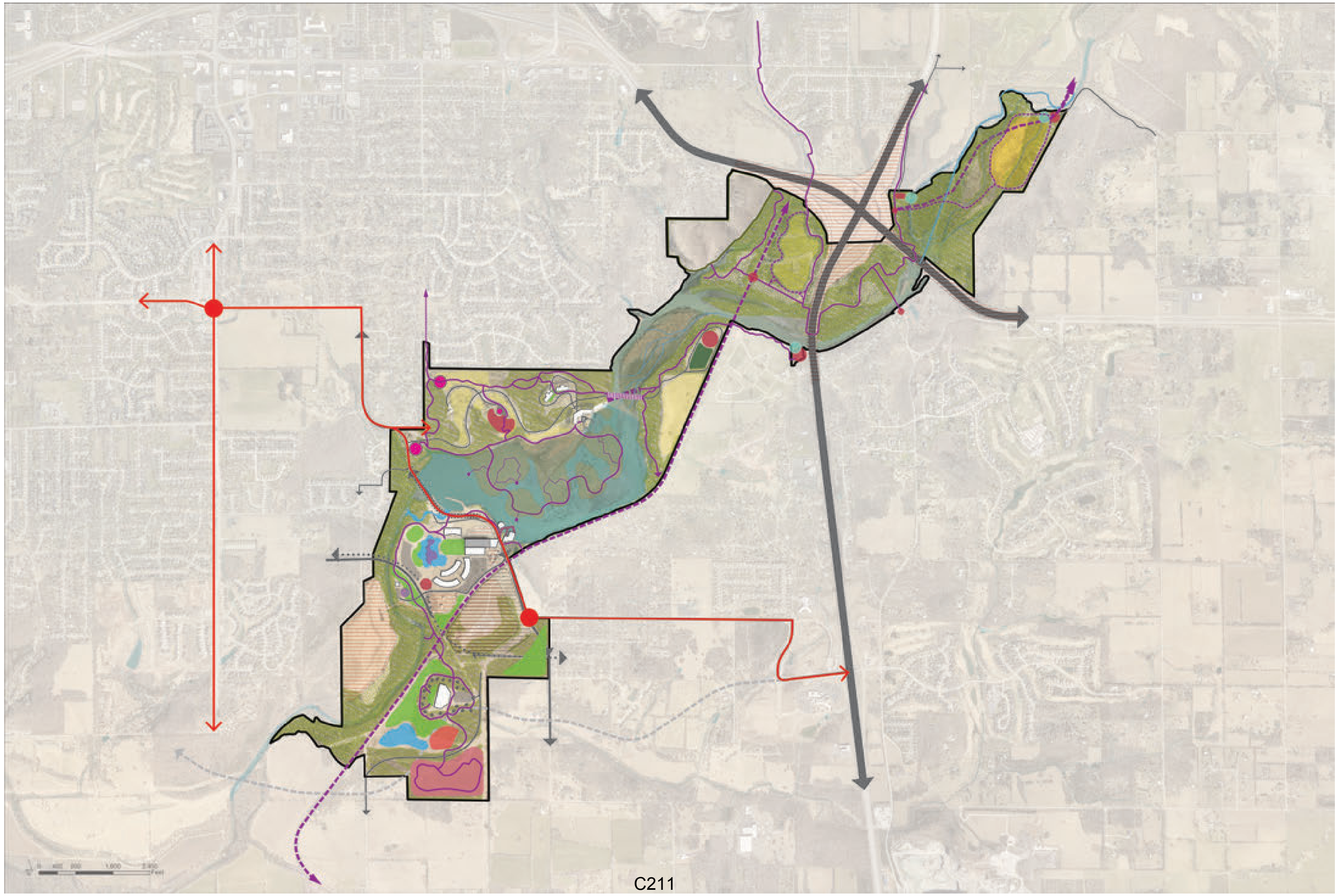


LAKE SPRINGFIELD PLAN

Transportation Improvements

- **Major Trip generators:**
  - Power Plant
  - South Activity Area
- **North, Lake & Park zones remain largely the same in terms of expanded vehicular trips**
- **Proposed scenario trip generation**
  - 20,000 trips/day
  - 2,000 peak hour
- **Necessary Improvements in current conditions:**
  - Doable on roadways as they stand today, with minor improvements (turn lanes, intersection improvements)
  - Challenges in looking at turn lanes for vehicular entry
  - Entry points need to be considered (parking, gateways, etc.)
  - Values & priorities for mobility within the lake planning area

Transportation Improvements Proposed – As is

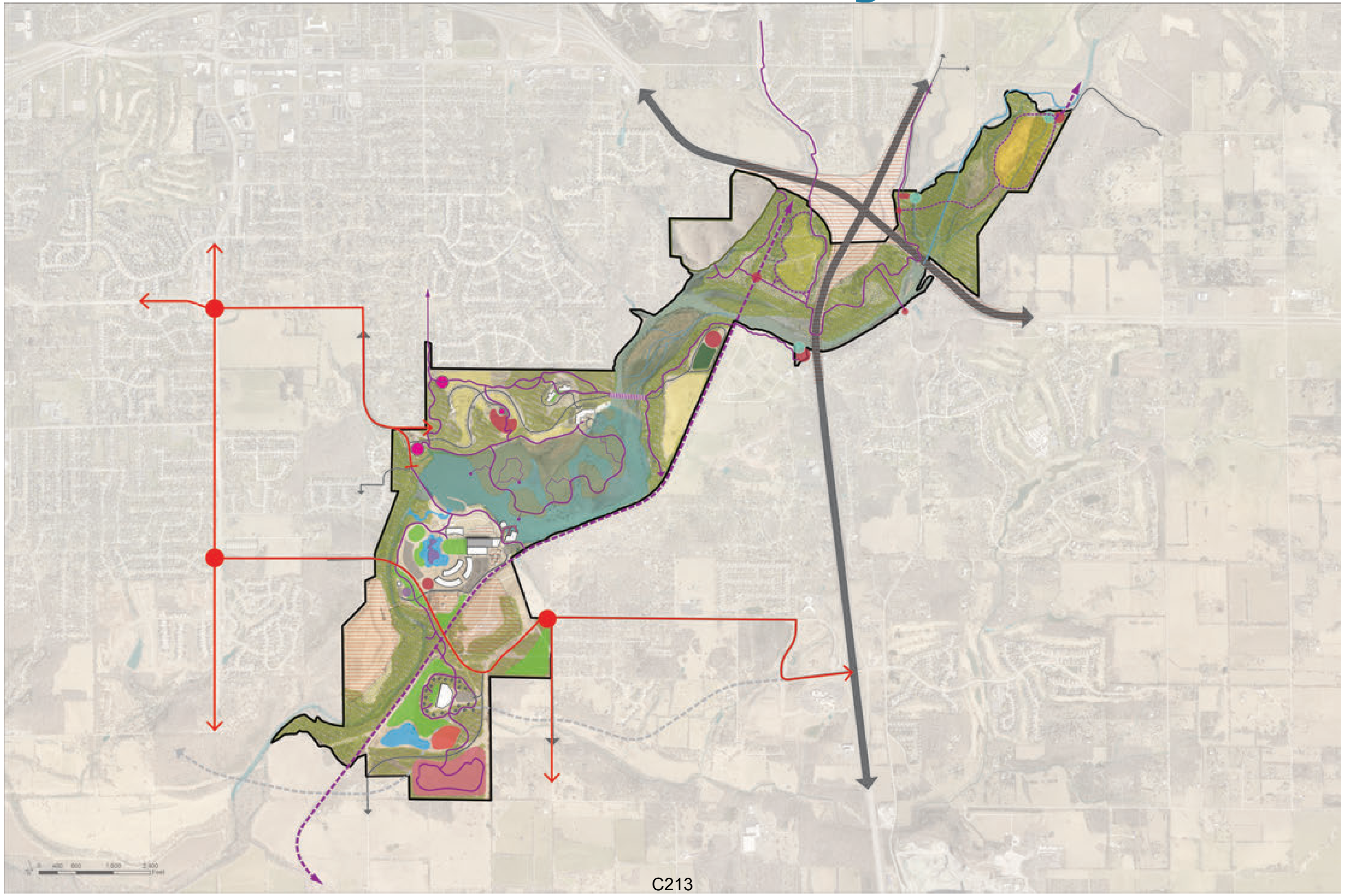


C211

Transportation Improvements Proposed

- **Option 1**
  - Remain as is
  - Improvements to Briar, Kissick, FR 188
  - Need to consider parking, vehicular entry/gateway locations, bike & pedestrian connectivity, safety for all modes in conflict zones
  - Impact on existing road network and communities – roadway functional but quality of life impacts on local neighbors

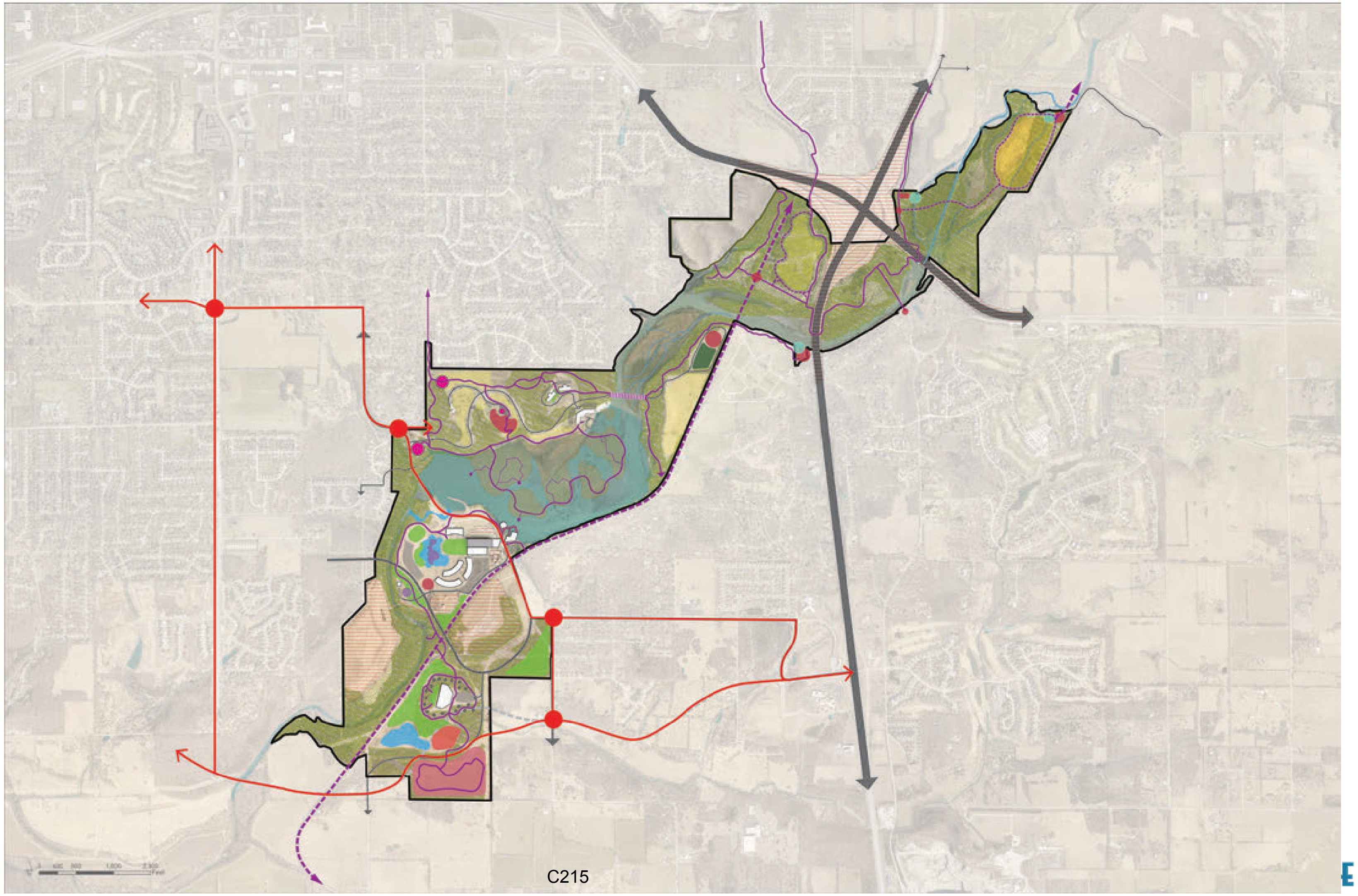
Transportation Improvements Proposed – Southwest Gateway



Transportation Improvements Proposed

- **Option 2**
  - New road from National to south if power plant site, connects to FR 188
  - Kissick closed to vehicular traffic
  - Need to consider, parking, Chadwick flyer separation, vehicular entry/gateway locations, bike/ped connectivity
  - Connection (cars, foot bike) from Boathouse to Powerplant Site

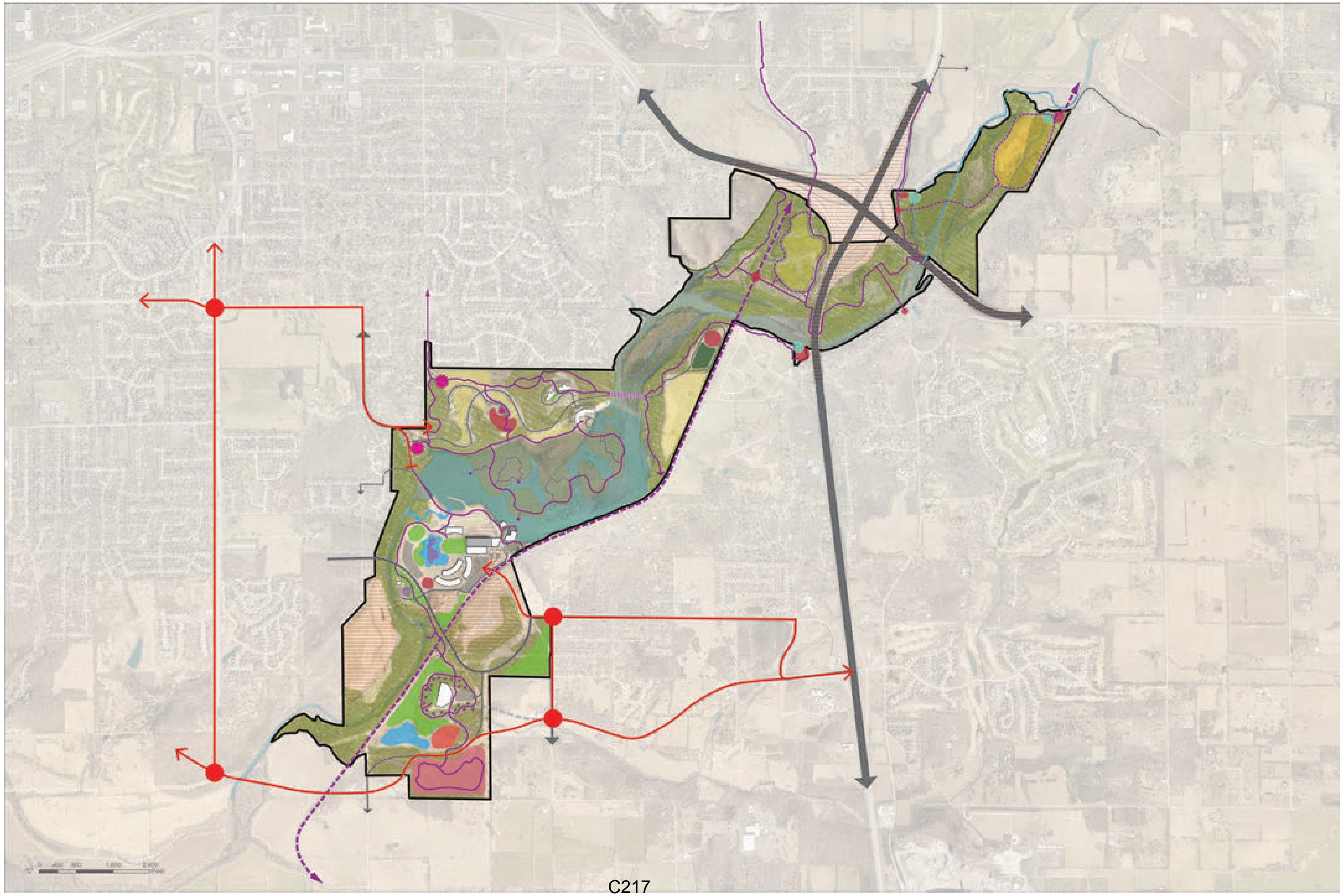
Transportation Improvements Proposed – EW Arterial – existing entry on Kissick



Transportation Improvements Proposed

- **Option 3a**
  - Remain as is with addition of E/W arterial
  - Improvements to Briar, Kissick, FR 188
  - Priority of EW arterial E. of National
  - Funding for EW Arterial
  - JRPS Site entry locations that make the most sense
  - Need to consider parking, vehicular entry/gateway locations, bike & pedestrian connectivity, safety for all modes in conflict zones

Transportation Improvements Proposed – EW Arterial – Kissick closed to cars



C217

LAKE SPRINGFIELD PLAN

Transportation Improvements Proposed

- **Option 3b**
  - Addition of E/W arterial & Kissick closed to vehicular traffic
  - Improvements to Briar
  - Priority of EW arterial E. of National
  - Funding for EW Arterial
  - JRPS Site entry locations that make the most sense
  - Need to consider parking, vehicular entry/gateway locations, bike & pedestrian connectivity, safety for all modes in conflict zones

SPRINGFIELD, MO

LAKE SPRINGFIELD

CMT

SHEET 1

CMT Job No.: 22001445-00


LIMITS OF SCOPE
PAVILION
PARK AND BOATHOUSE
LAKE SPRINGFIELD PARK RD
S KISSICK AVE
LAKE SPRINGFIELD
JAMES RIVER POWER STATION
LEGEND:
PROPOSED SCOPE LIMITS (2013 ACRES)
EXISTING SANITARY SEWER
EXISTING OVERHEAD ELECTRIC
2" EXISTING WATER
6" EXISTING WATER
8" EXISTING WATER
12" EXISTING WATER
16" EXISTING WATER
1 1/4" EXISTING GAS
2" EXISTING GAS
4" EXISTING GAS
6" EXISTING GAS
8" EXISTING GAS
12" EXISTING GAS
16" EXISTING GAS
ABANDONED GAS/WATER
N
PLAN VIEW
1" = 400'
0 200 400 800

CMT

SHEET 2

Lake Springfield

July 26, 2023

Land-Use Concepts

SWT DESIGN

LAND-USE CONCEPT - ENTERTAINMENT

Development Areas Snapshot

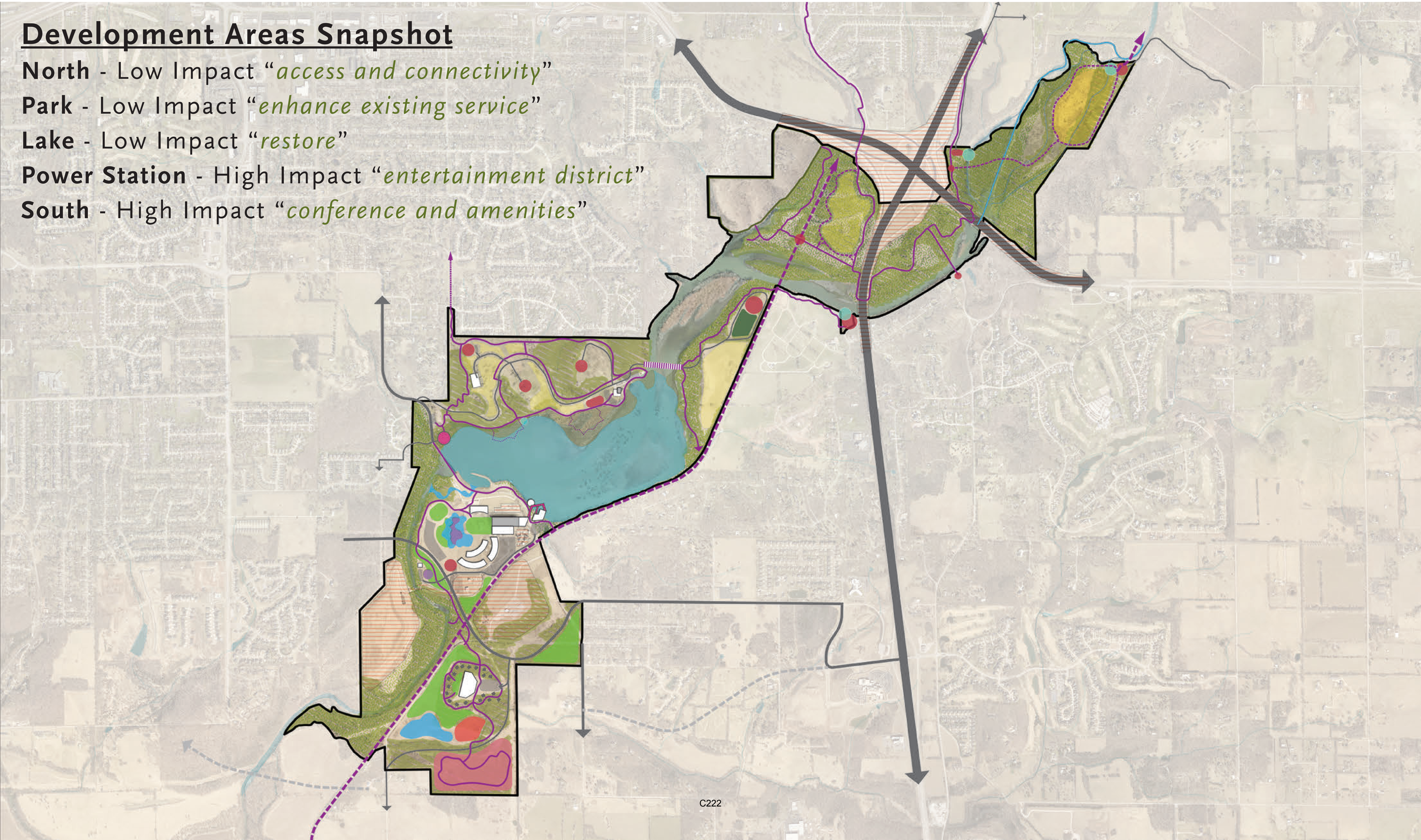
North - Low Impact "*access and connectivity*"

Park - Low Impact "*enhance existing service*"

Lake - Low Impact "*restore*"

Power Station - High Impact "*entertainment district*"

South - High Impact "*conference and amenities*"



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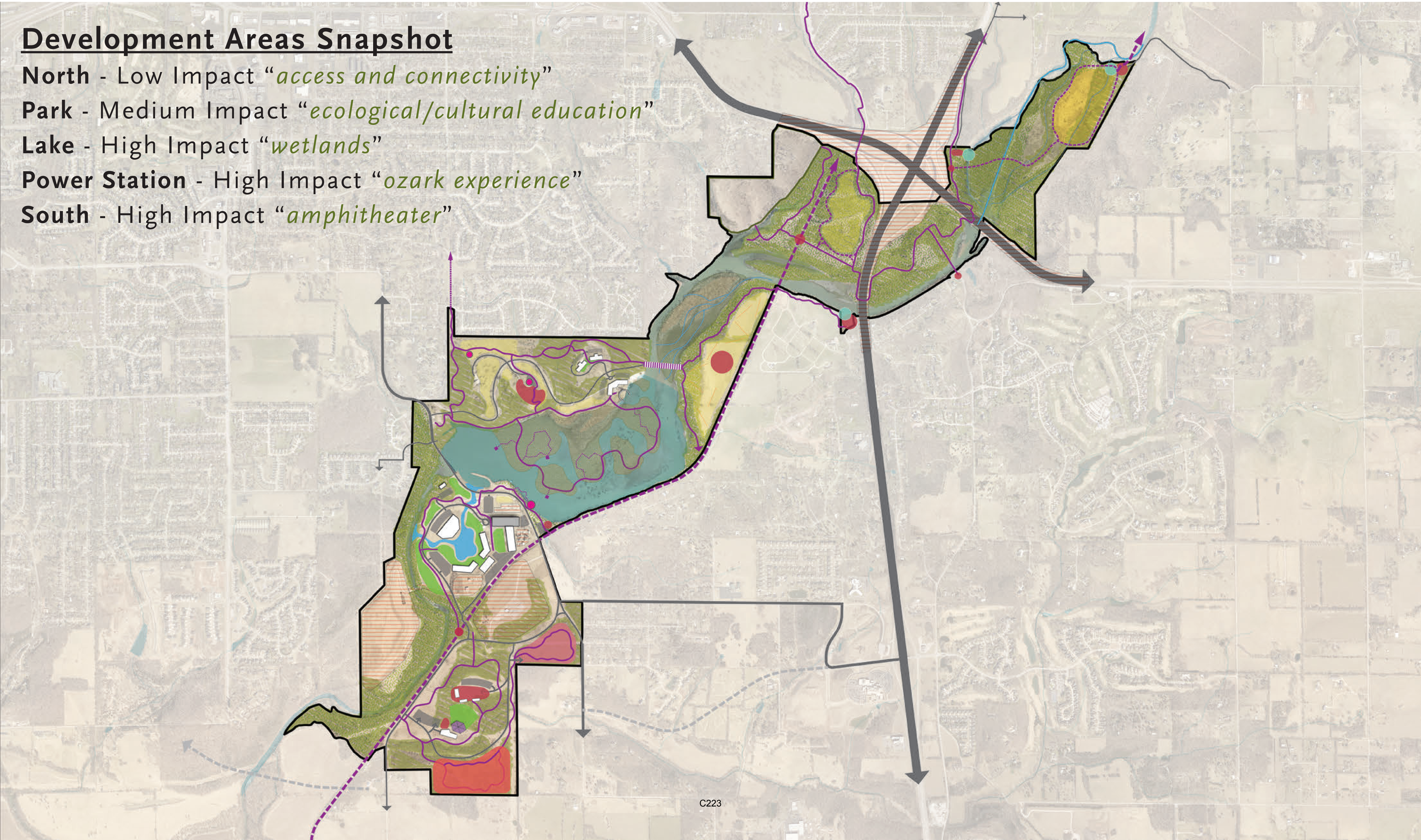
LAND-USE CONCEPT - OZARK EXPERIENCE



LAND-USE CONCEPT - RECREATION

Development Areas Snapshot

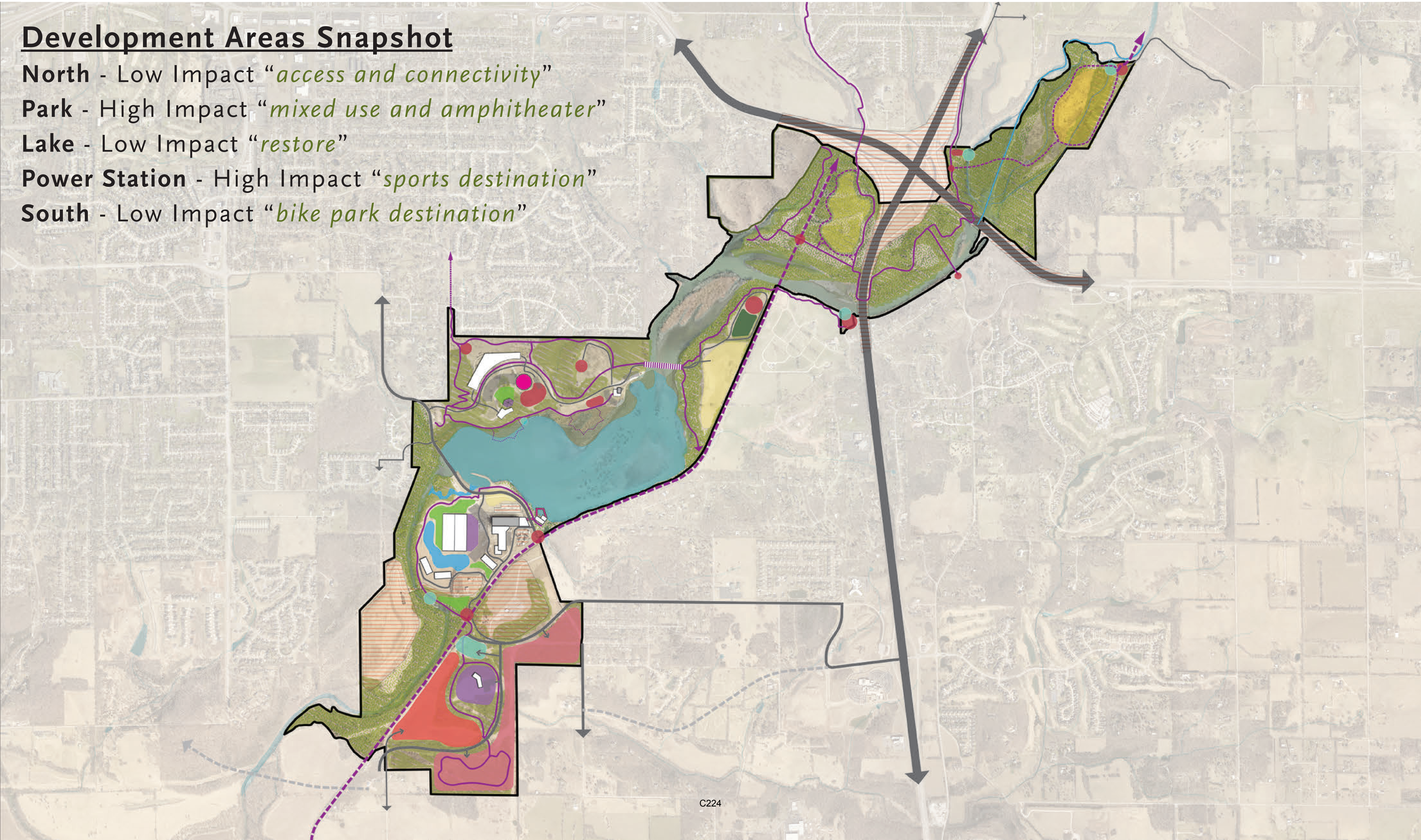
North - Low Impact "*access and connectivity*"

Park - High Impact "*mixed use and amphitheater*"

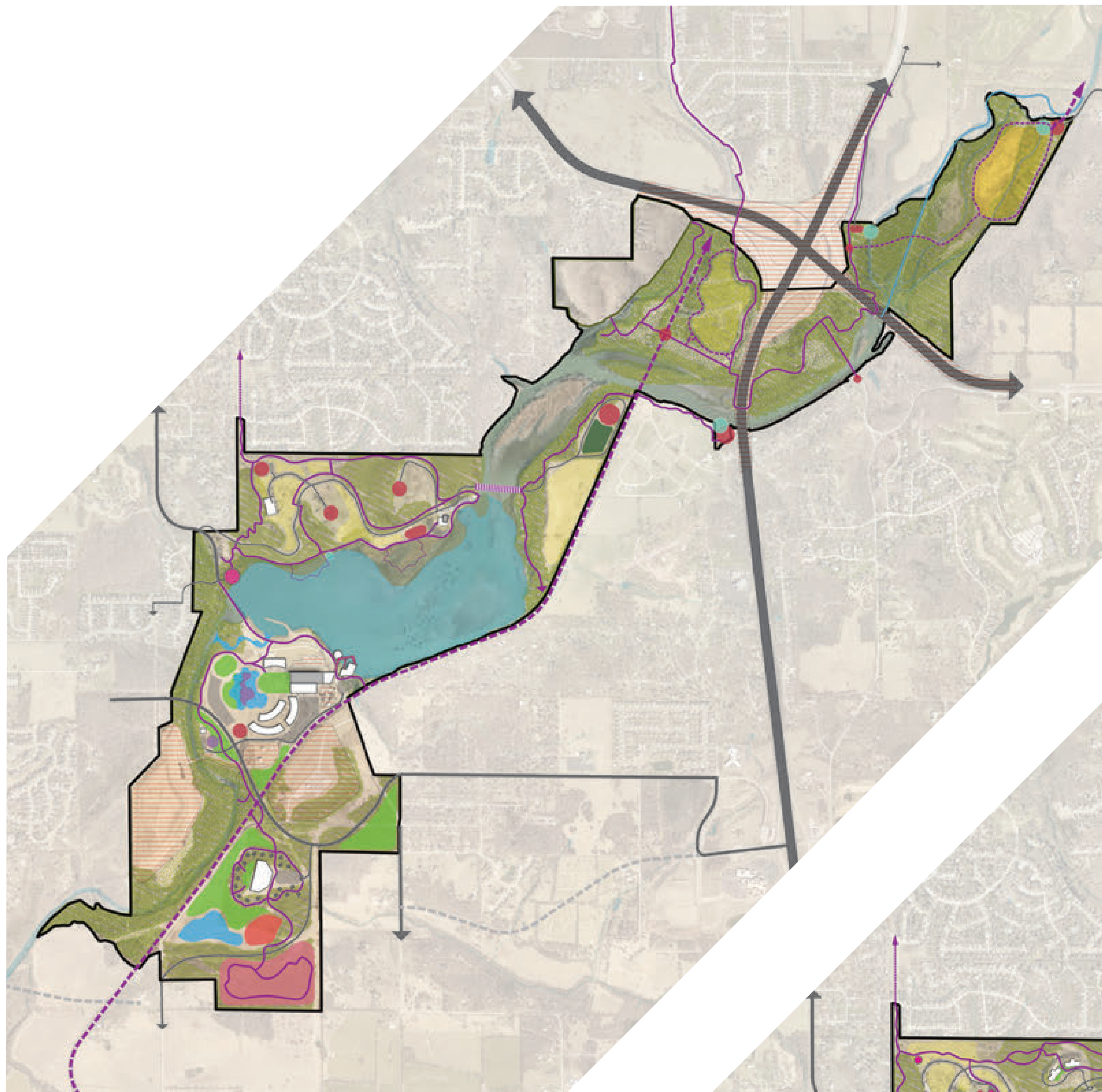
Lake - Low Impact "*restore*"

Power Station - High Impact "*sports destination*"

South - Low Impact "*bike park destination*"



LAND-USE CONCEPTS



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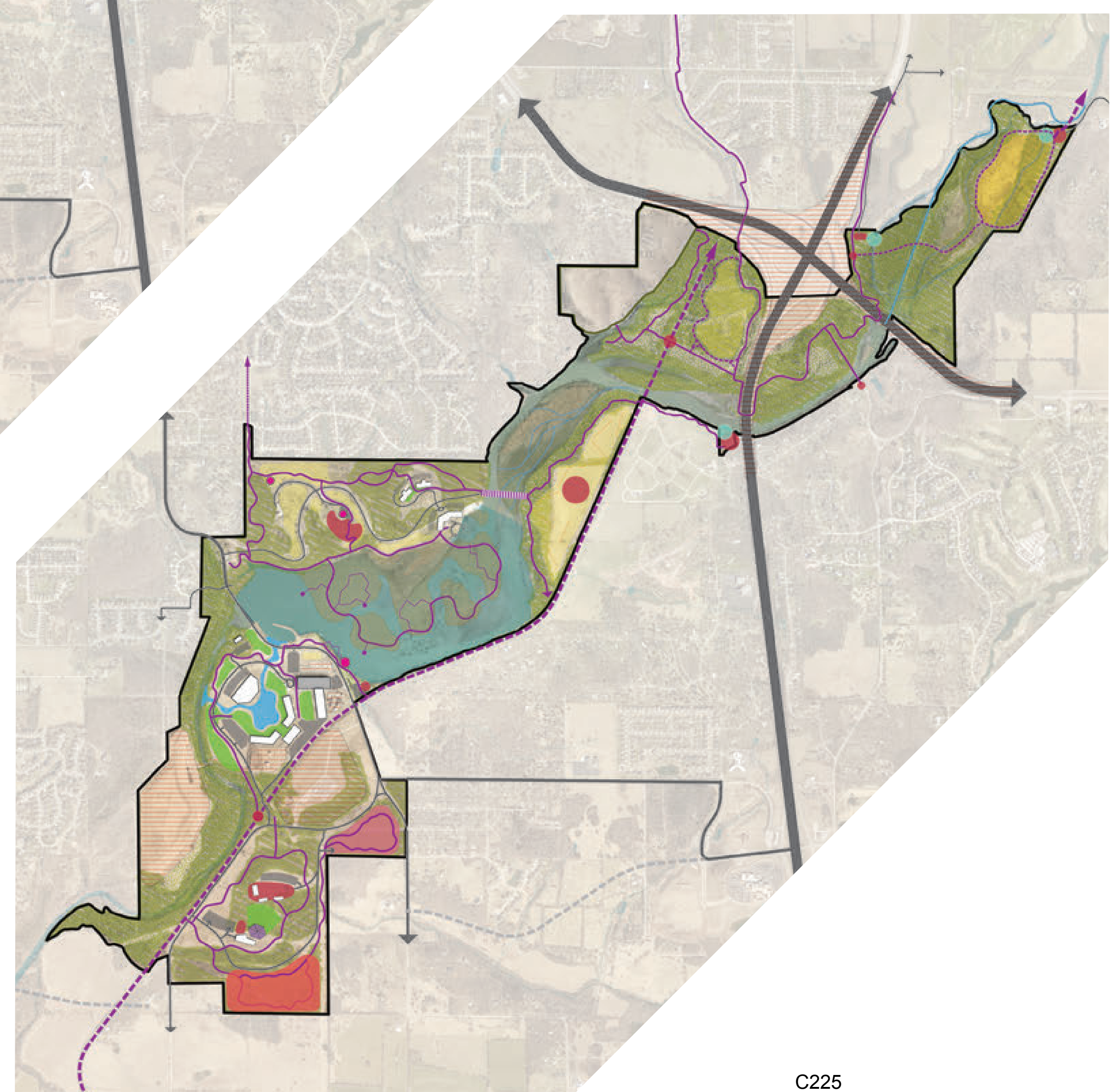

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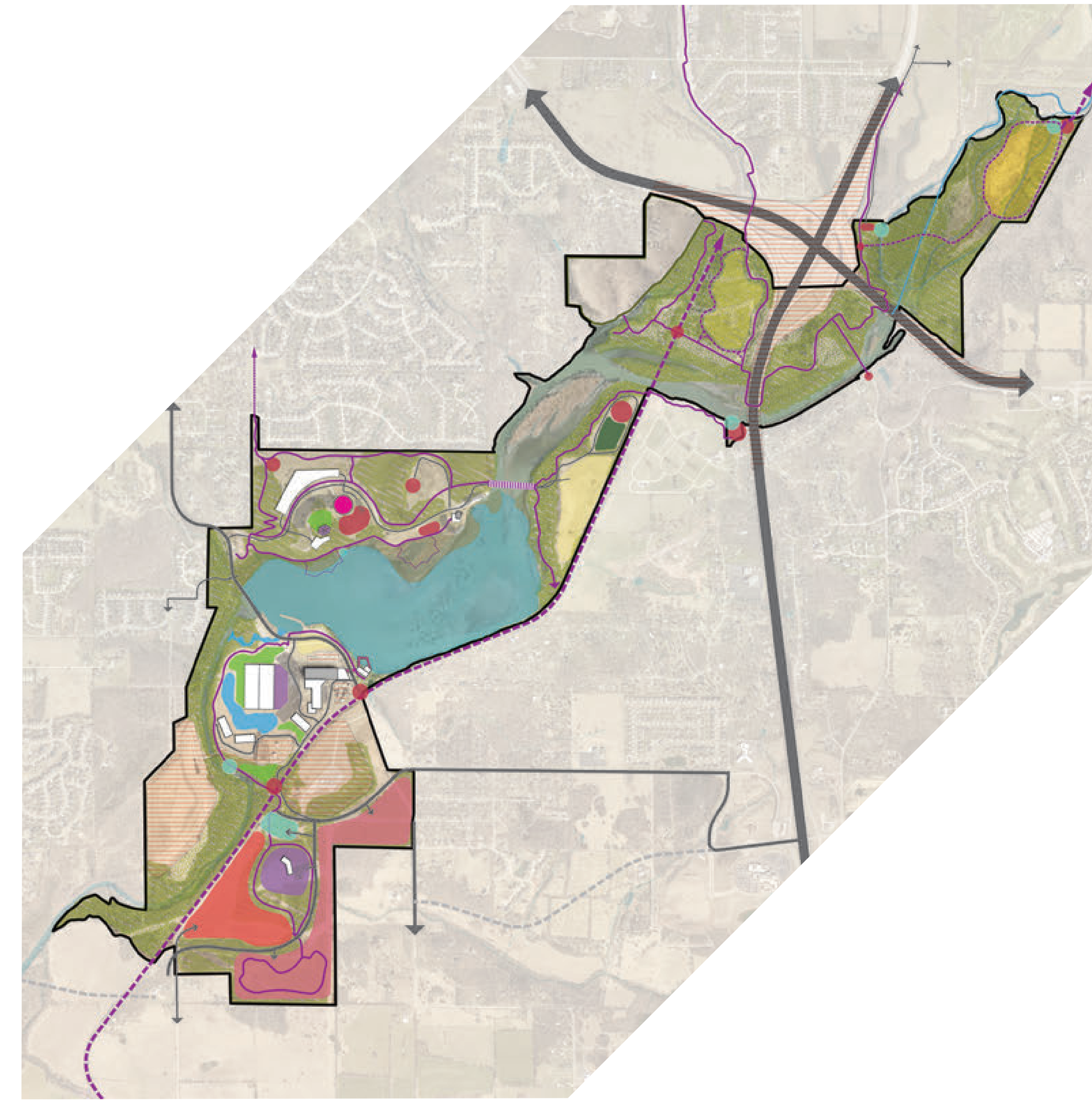
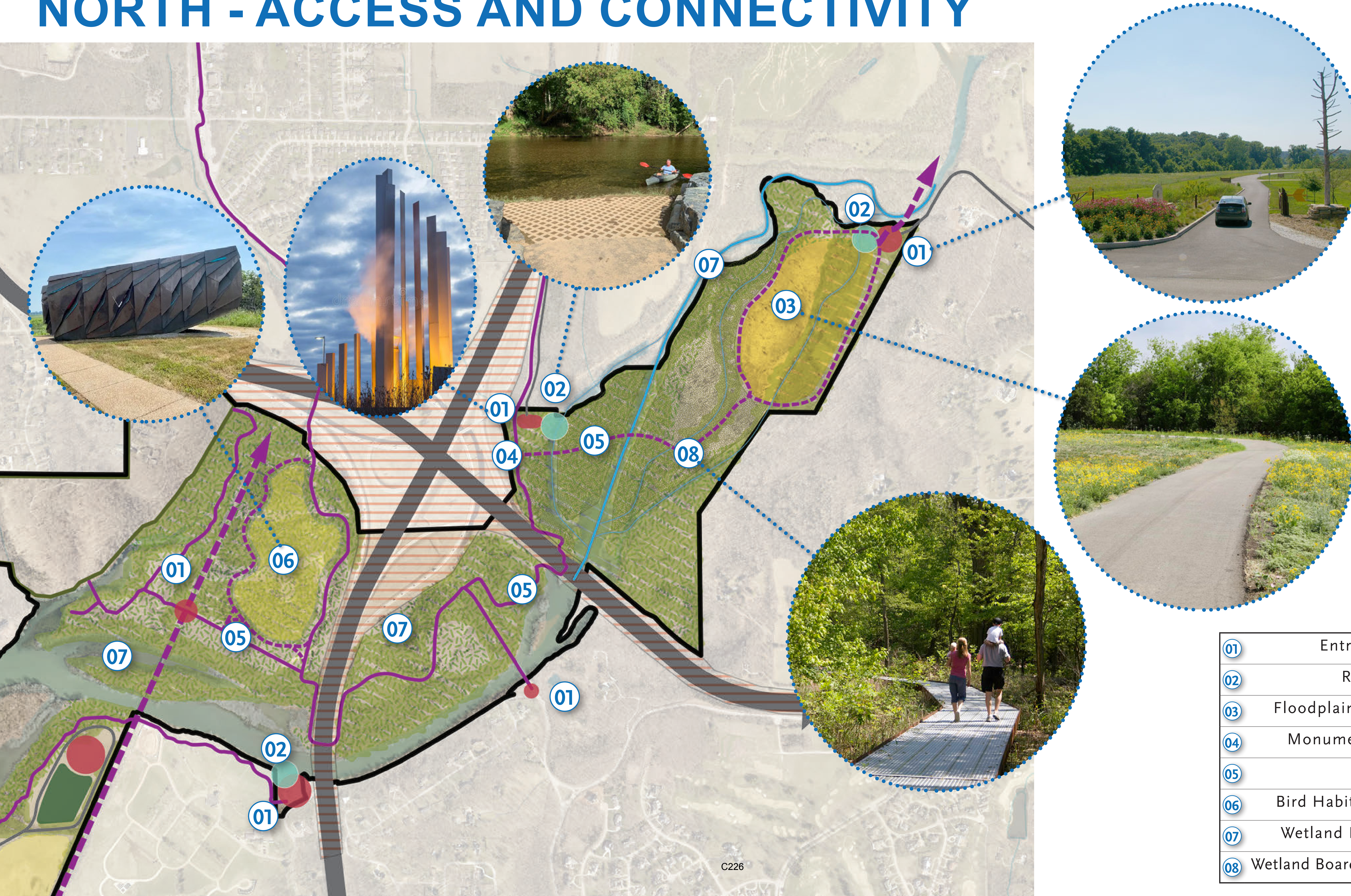


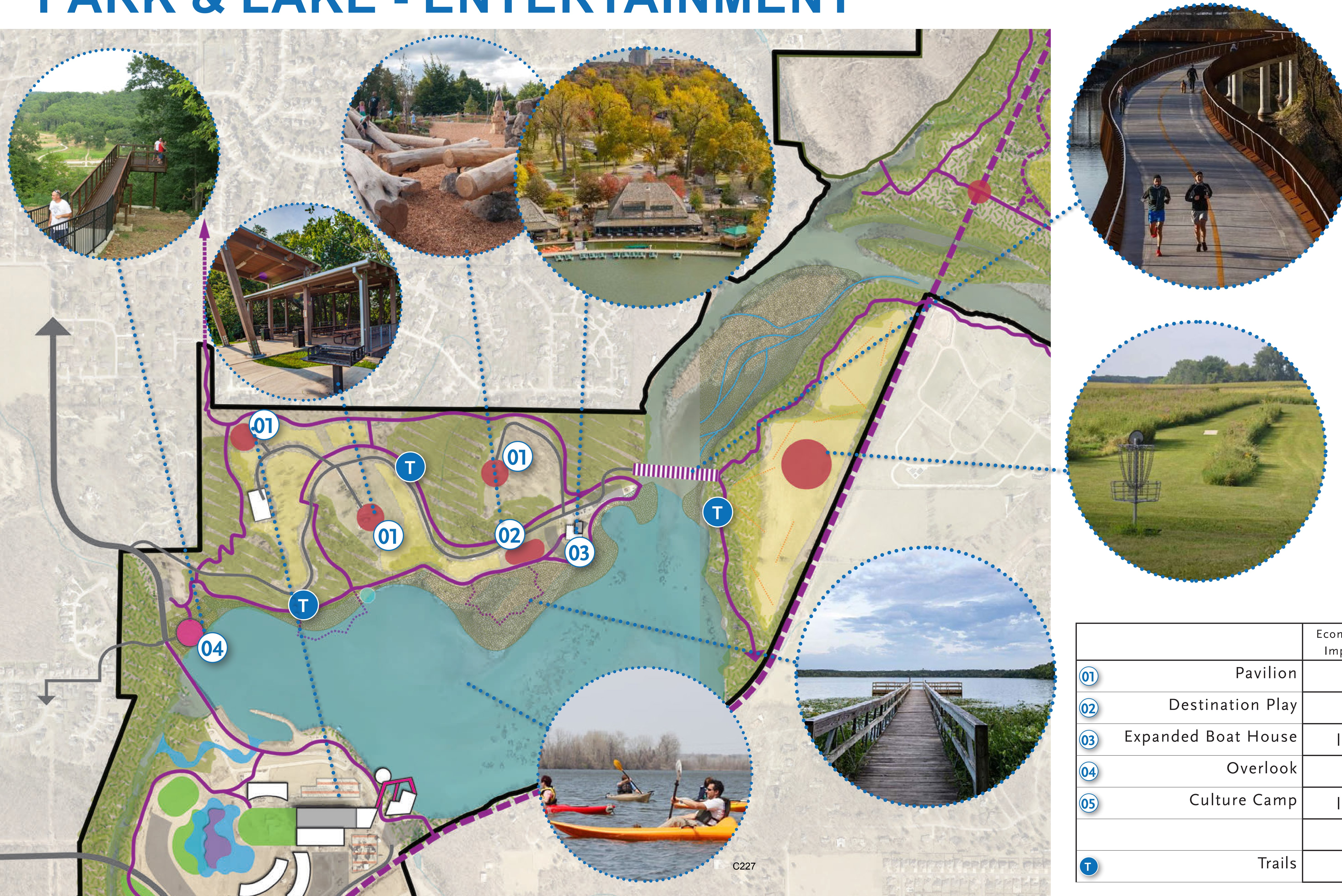
03

NORTH - ACCESS AND CONNECTIVITY



01	Entry/Trailhead
02	River Access
03	Floodplain Loop Trail
04	Monument Signage
05	Paved Trail
06	Bird Habitat Meadow
07	Wetland Restoration
08	Wetland Boardwalk / Trail

PARK & LAKE - ENTERTAINMENT

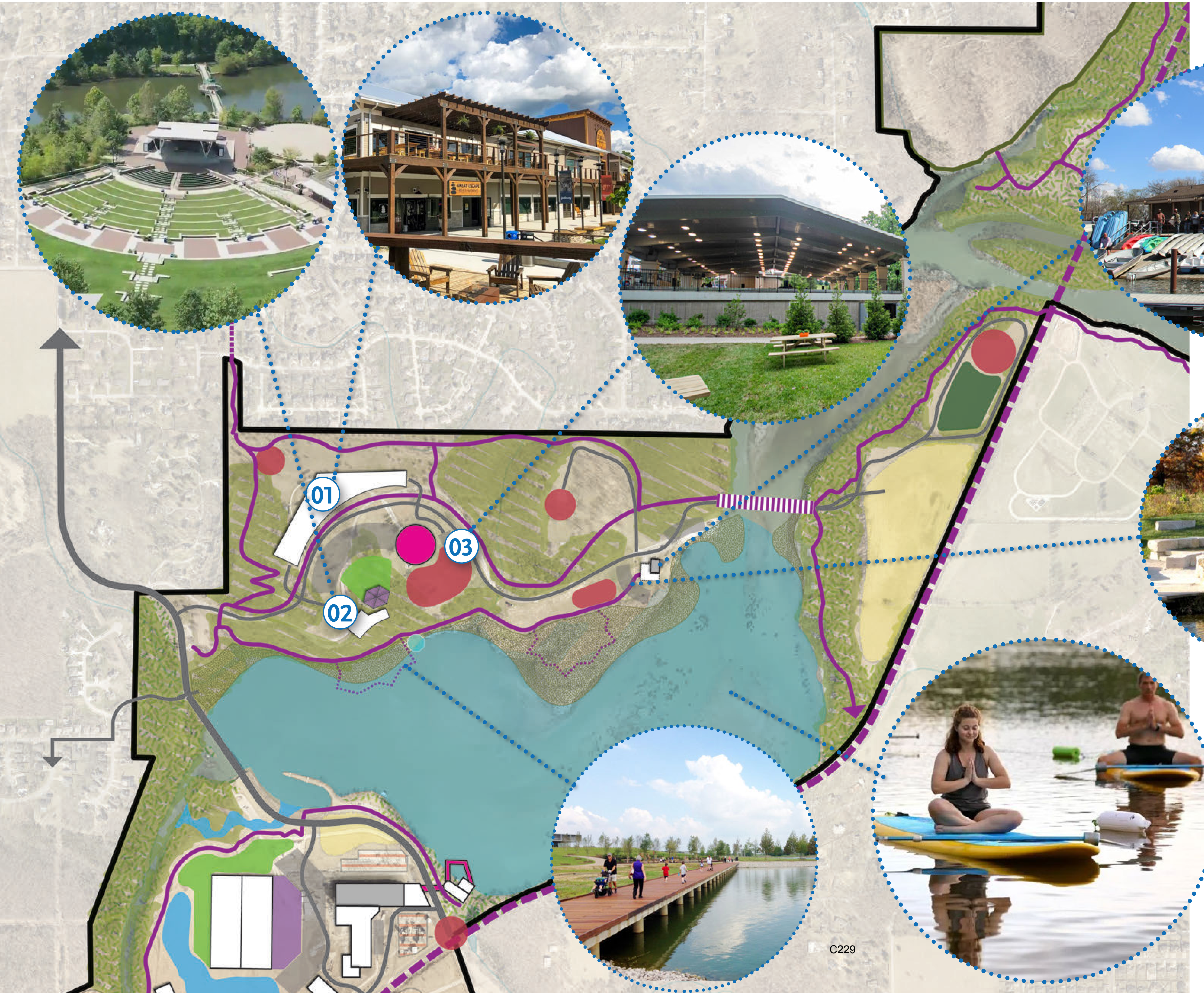


	Economic Impact	Social Impact
01 Pavilion	I	III
02 Destination Play	I	IIII
03 Expanded Boat House	III	III
04 Overlook	I	II
05 Culture Camp	III	II
T Trails		

PARK & LAKE - OZARK EXPERIENCE

	Economic Impact	Social Impact
01 Destination Play	III	IIII
02 Lodge/Camp	III	III
03 New Eco Center	I	III
04 Marina	I	IIII
T Trails		

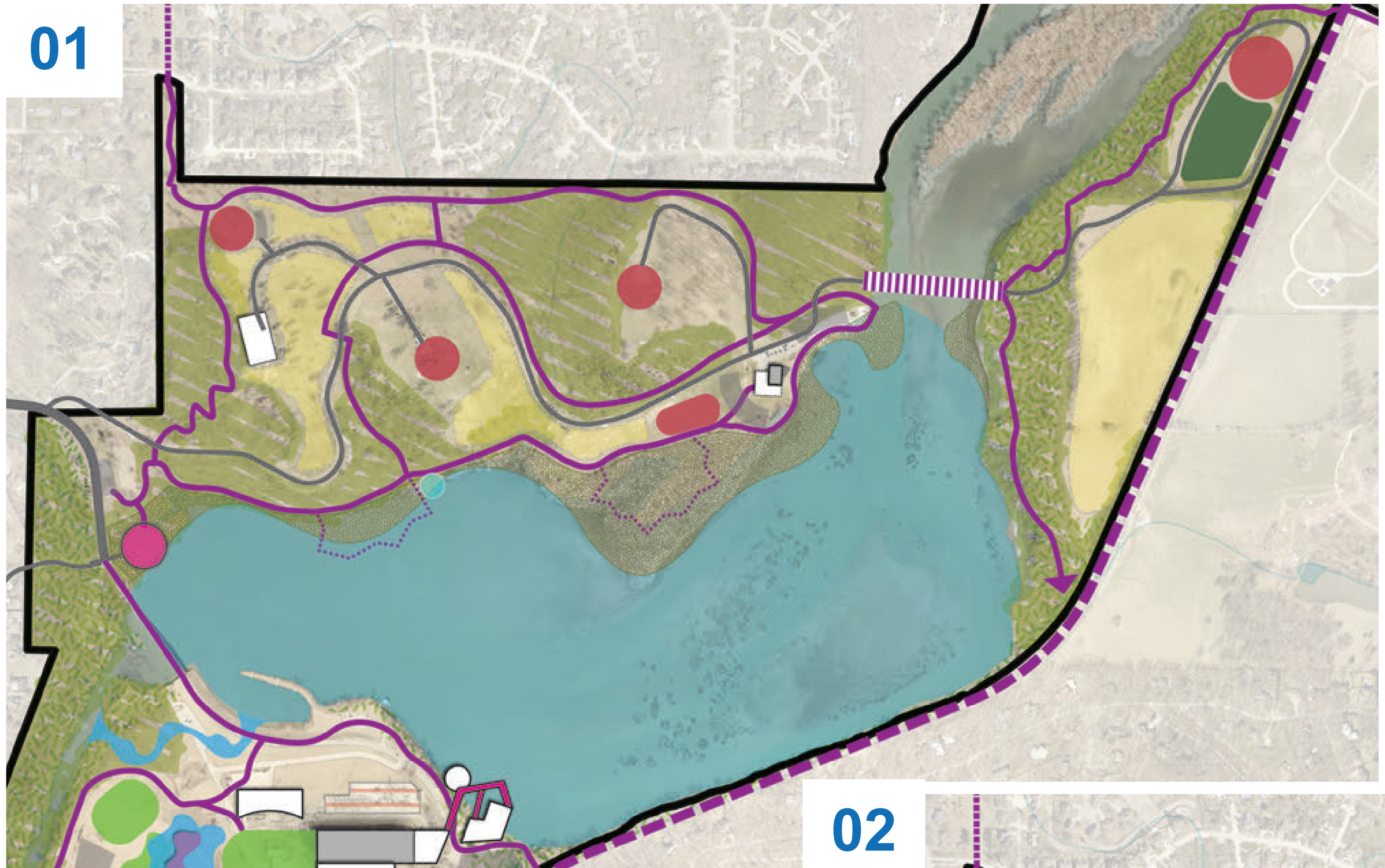
PARK & LAKE - RECREATION



	Economic Impact	Social Impact
01 Conference Center	III	II
02 Amphitheater	IIII	III
03 Destination Play	I	IIII
T Trails		

LAND-USE CONCEPT - LAKE

01



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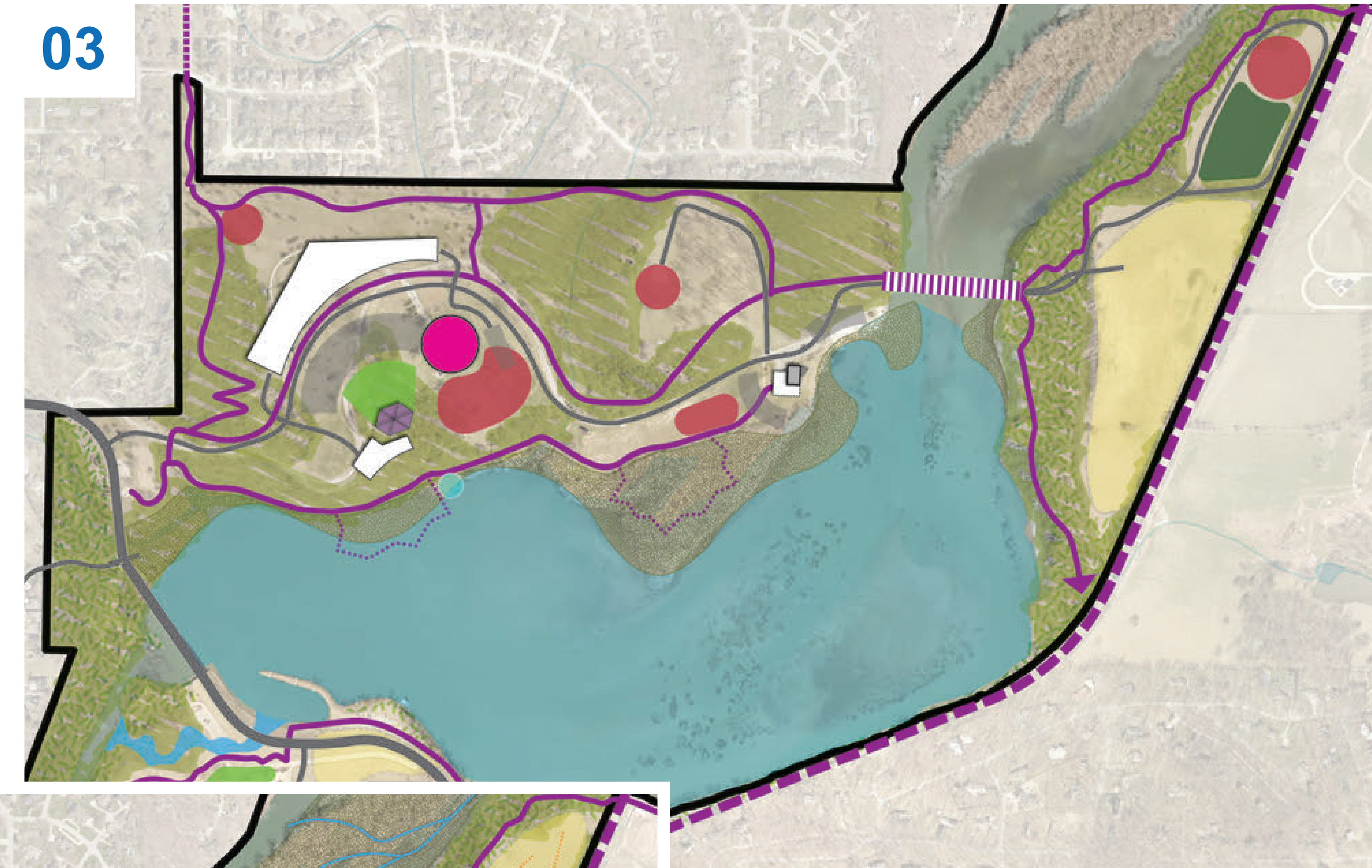


02

SOUTH - ENTERTAINMENT

	Economic Impact	Social Impact
01 Mixed Use Bldg	II	II
02 Mixed Use Bldg	II	II
03 Entertainment Bldg	II	II
04 Mixed Use Bldg	II	II
05 Power Plant + Addition		
06 Restaurant/Overlook	III	III
07 Water/Adven. Play Area	IIII	IIII
08 Shelter/Hosp Bldg	I	IIII
09 Destination Play	I	IIII
10 Event Lawn	I	IIII
11 Dam Bypass		
12 Conference Center	III	II
13 Amenity Area	I	IIII
14 Cabins/Yurts	II	II
15 Destination Play	I	IIII
16 Bike Park/Adventure Amenity	III	III
17 Trailhead		
T Trails		
A1 Kissick - Ped only		
A2 EW connect to National		
A3 Crenshaw - Closed		
A4 EW Arterial - As Planned		

Note: Future phase to include conference center/hotel

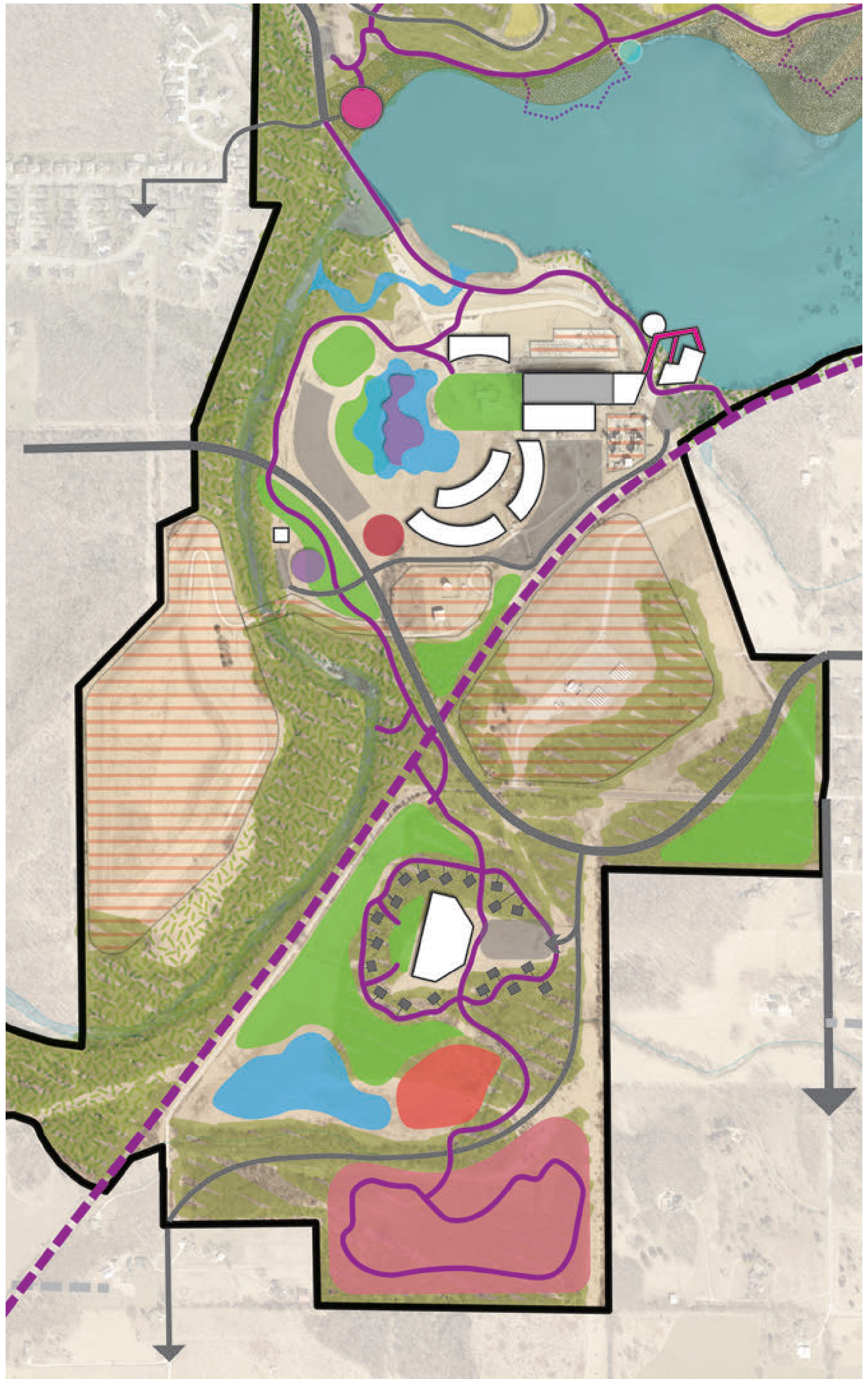
SOUTH - OZARK EXPERIENCE

		Economic Impact	Social Impact
01	Conference Center	III	II
02	Hotel/Apartments	I	I
03	Mixed Use 02 (PER LEVEL)	II	II
04	Mixed Use 03 (PER LEVEL)	II	II
05	Power Plant + Addition	?	?
06	Event Lawn	I	IIII
07	Restaurant/ River Access	III	III
08	Water Play	IIII	IIII
09	Adventure Play	I	IIII
10	Amphitheater	IIII	III
11	Plaza Space	I	III
12	Food Truck/Amenity Space	I	III
13	Bike Park	III	III
14	Camping South	I	II
15			
16			
17			
T	Trails		
A1	Kissick - Ped only		
A2	EW connect to National		
A3	Crenshaw - Closed		
A4	EW Arterial - As Planned		

SOUTH - RECREATION

	Economic Impact	Social Impact
01 Indoor Sports	IIII	IIII
02 Outdoor Courts/Activity Space	IIII	IIII
03 Power Plant	?	?
04 Hotel (PP Expansion)	IIII	II
05 Mixed Use 01	II	II
06 Mixed Use 02	II	II
07 Hotel 02	I	I
08 Adventure Play	IIII	IIII
09 Restaurant/Overlook	IIII	IIII
10 Dam Bypass		
11 Water Play	IIII	IIII
12 River Access	I	III
13 RV Camping	II	II
14 Destination Play	I	IIII
15 Events Bldg	II	III
16 Bike Park	III	III
17		
T Trails		
A1 Kissick - Ped only**		
A2 Reroute Ridgecrest/ PP Access/ to National		
A3 Crenshaw - Closed		
A4 EW Arterial - Reroute		

LAND-USE CONCEPT - SOUTH



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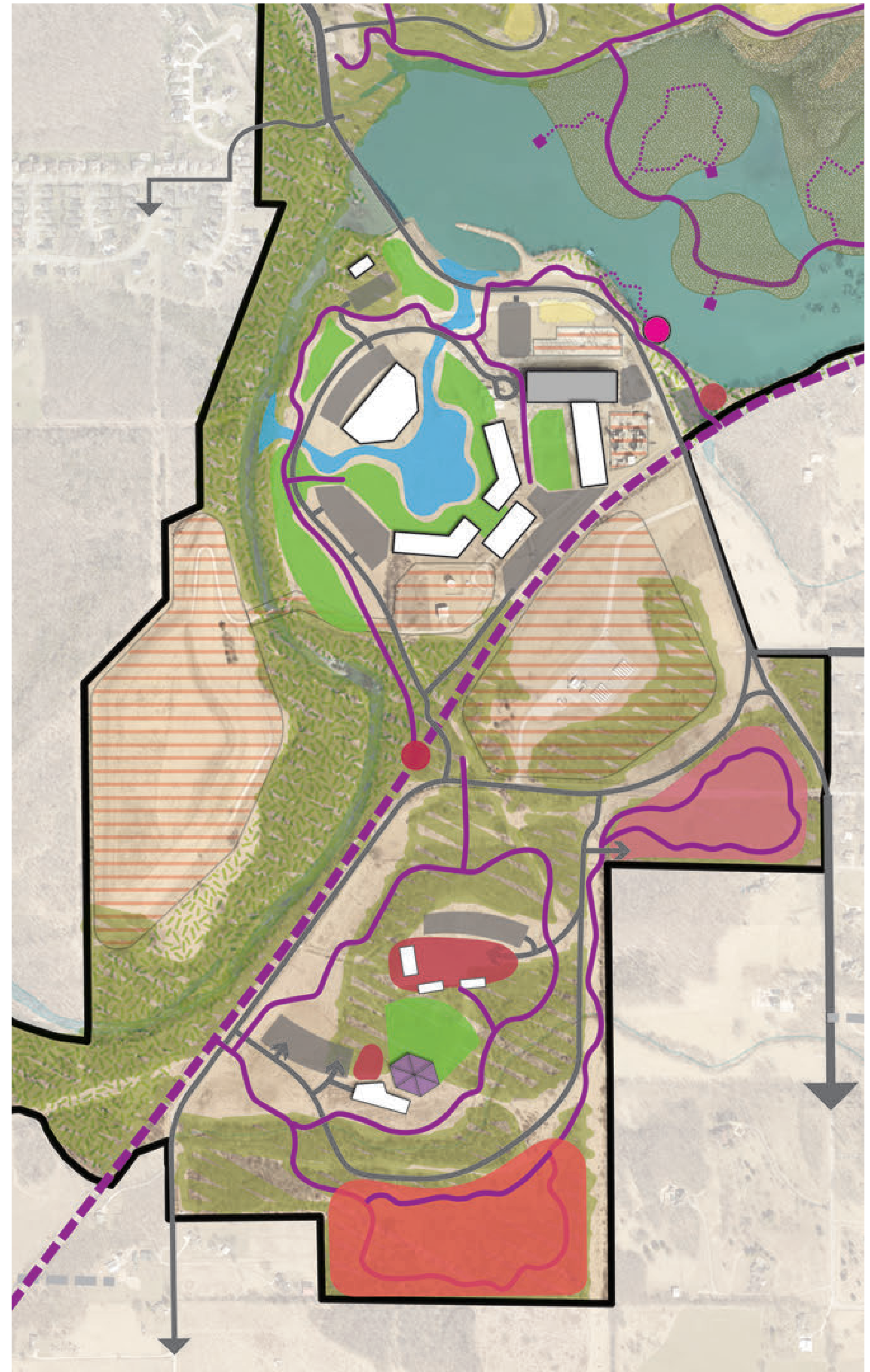

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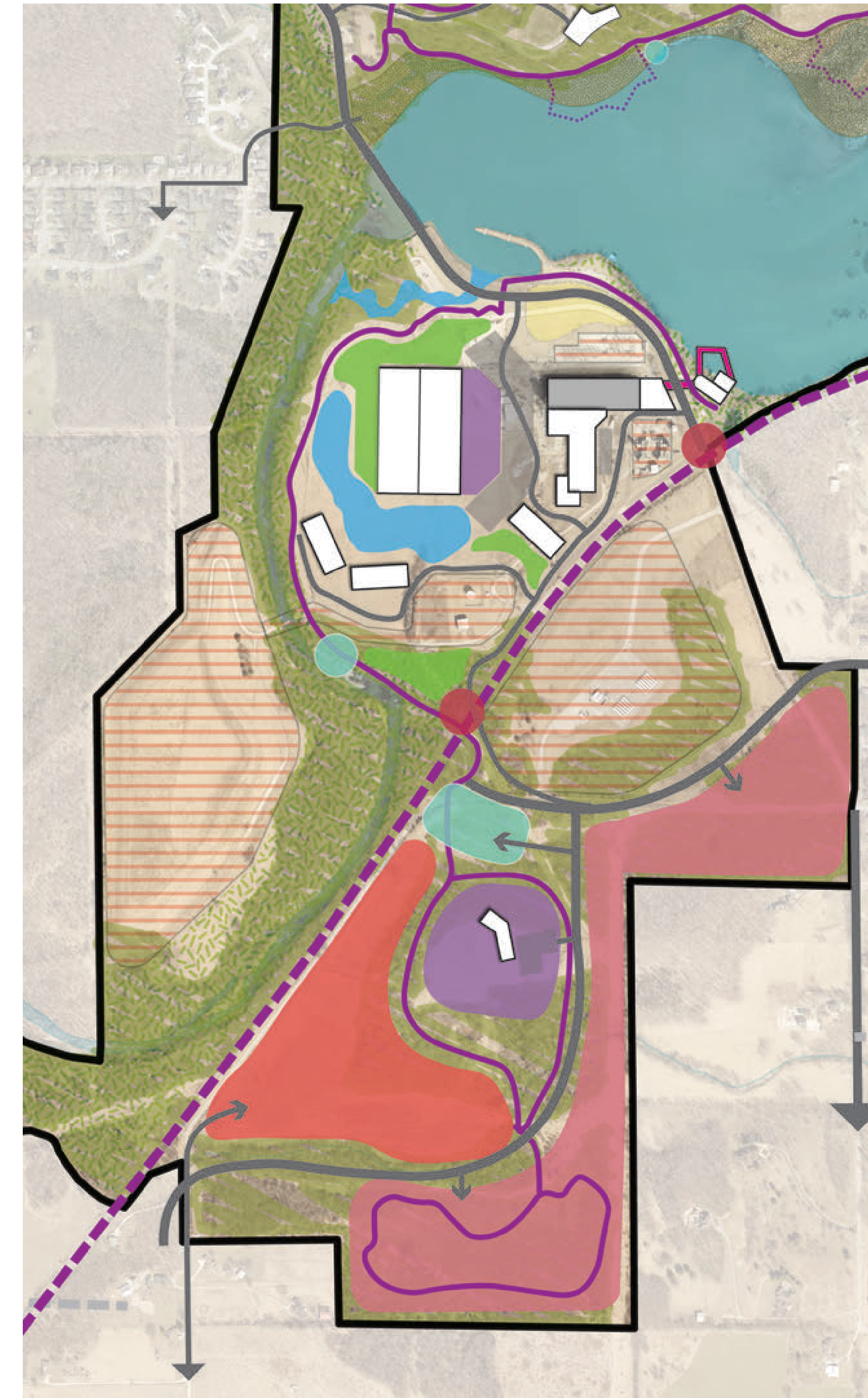

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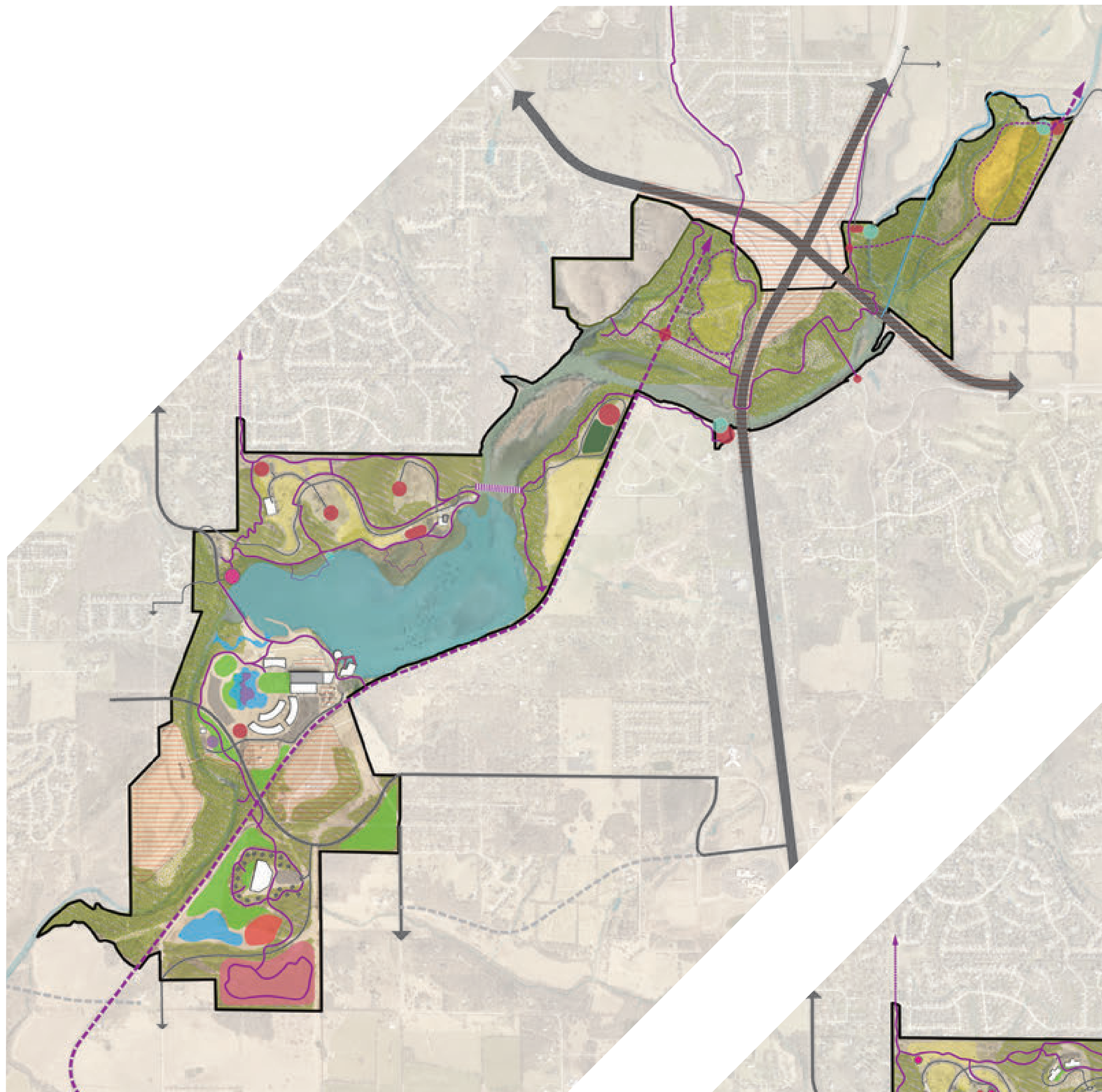
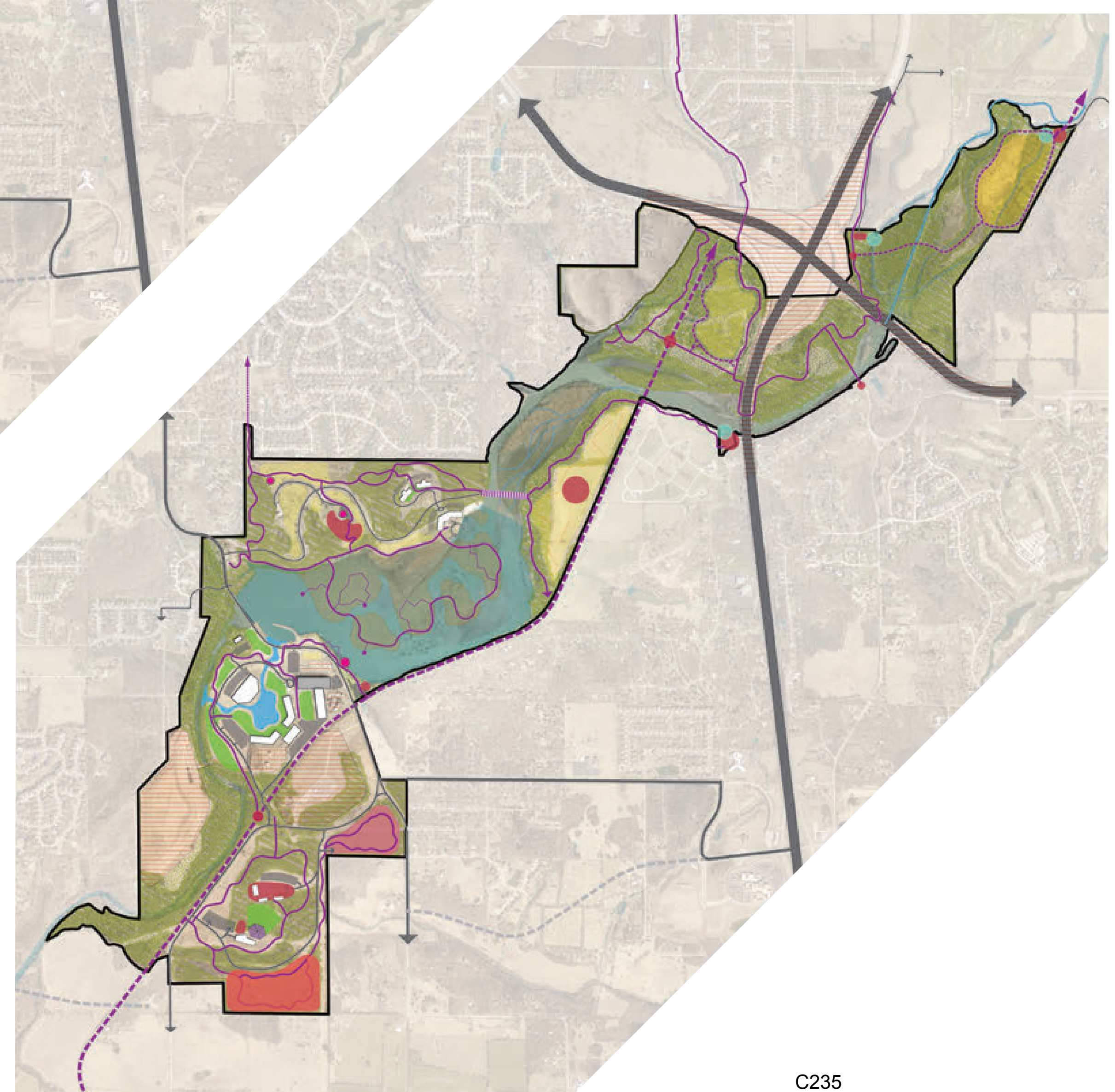
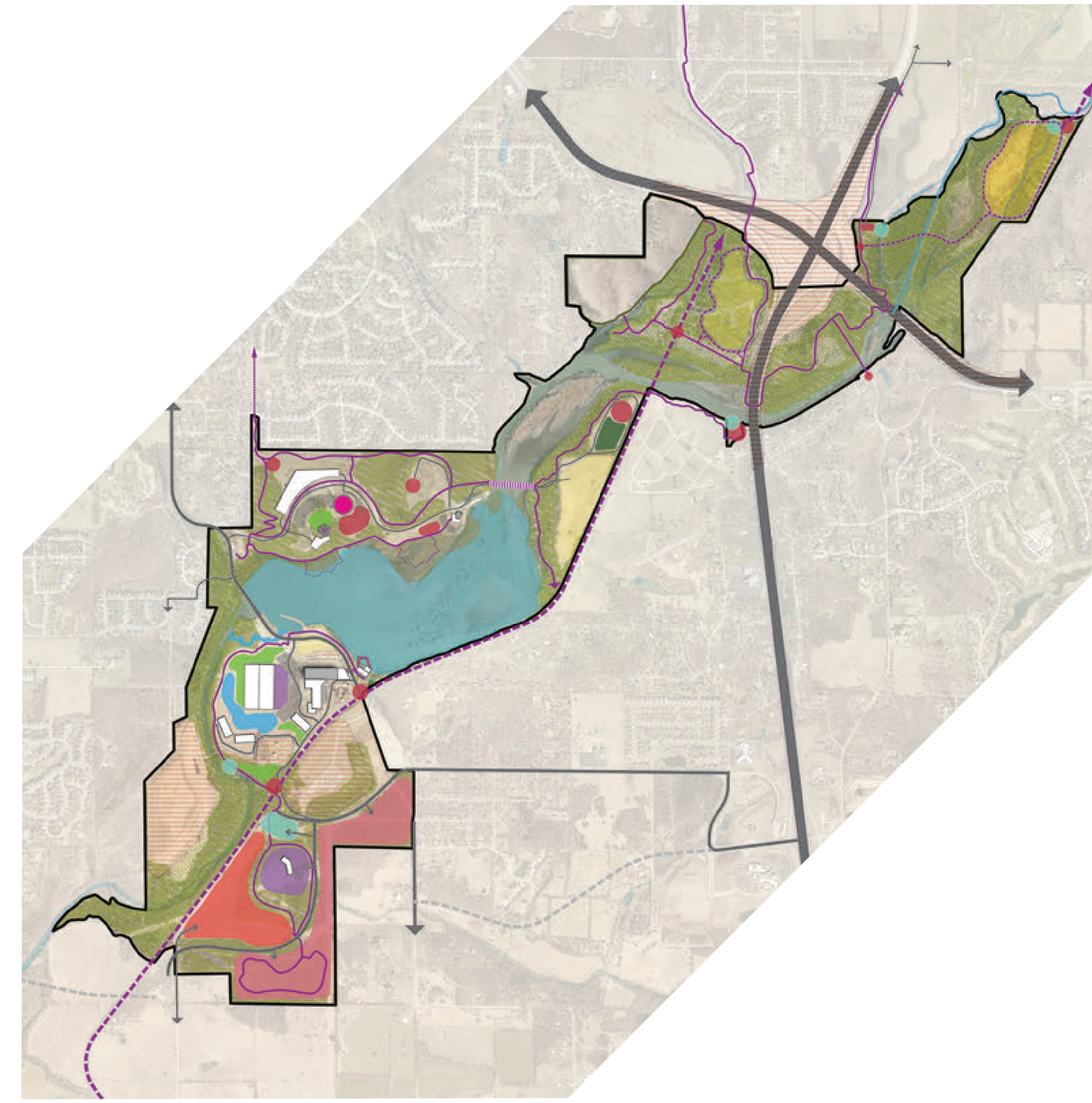
LAND-USE CONCEPTS



01

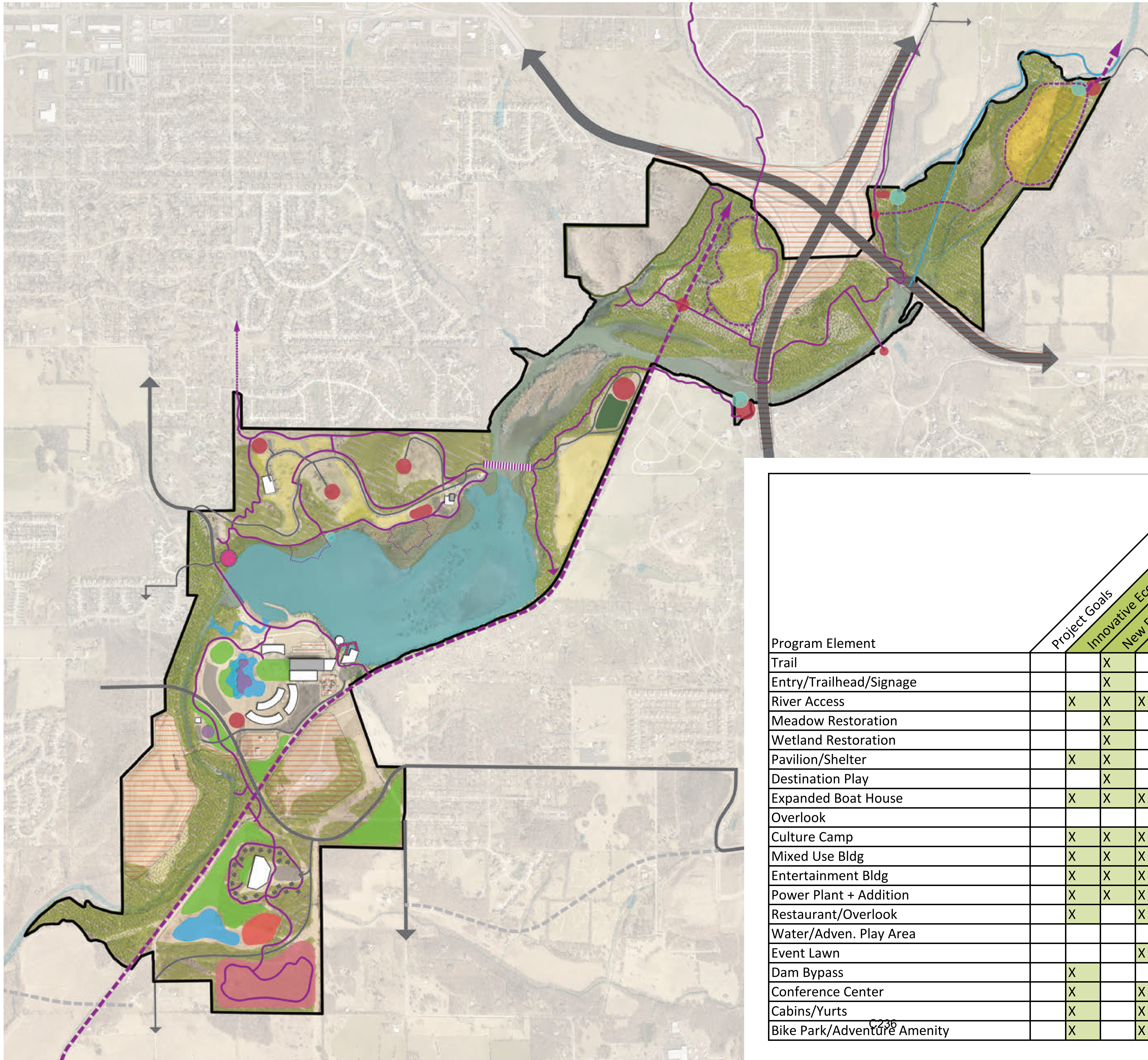
02





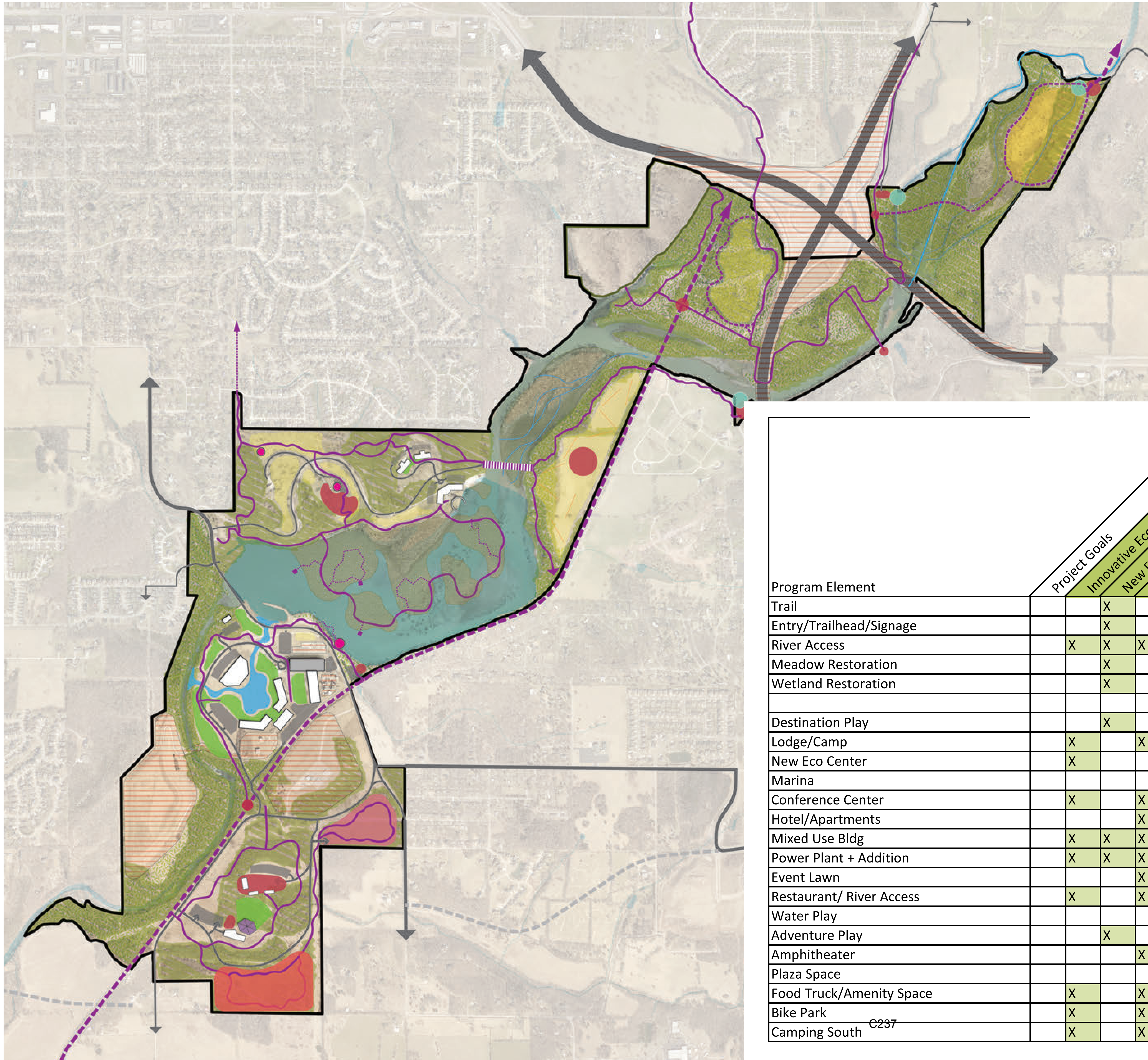
03

LAND-USE CONCEPT ENTERTAINMENT



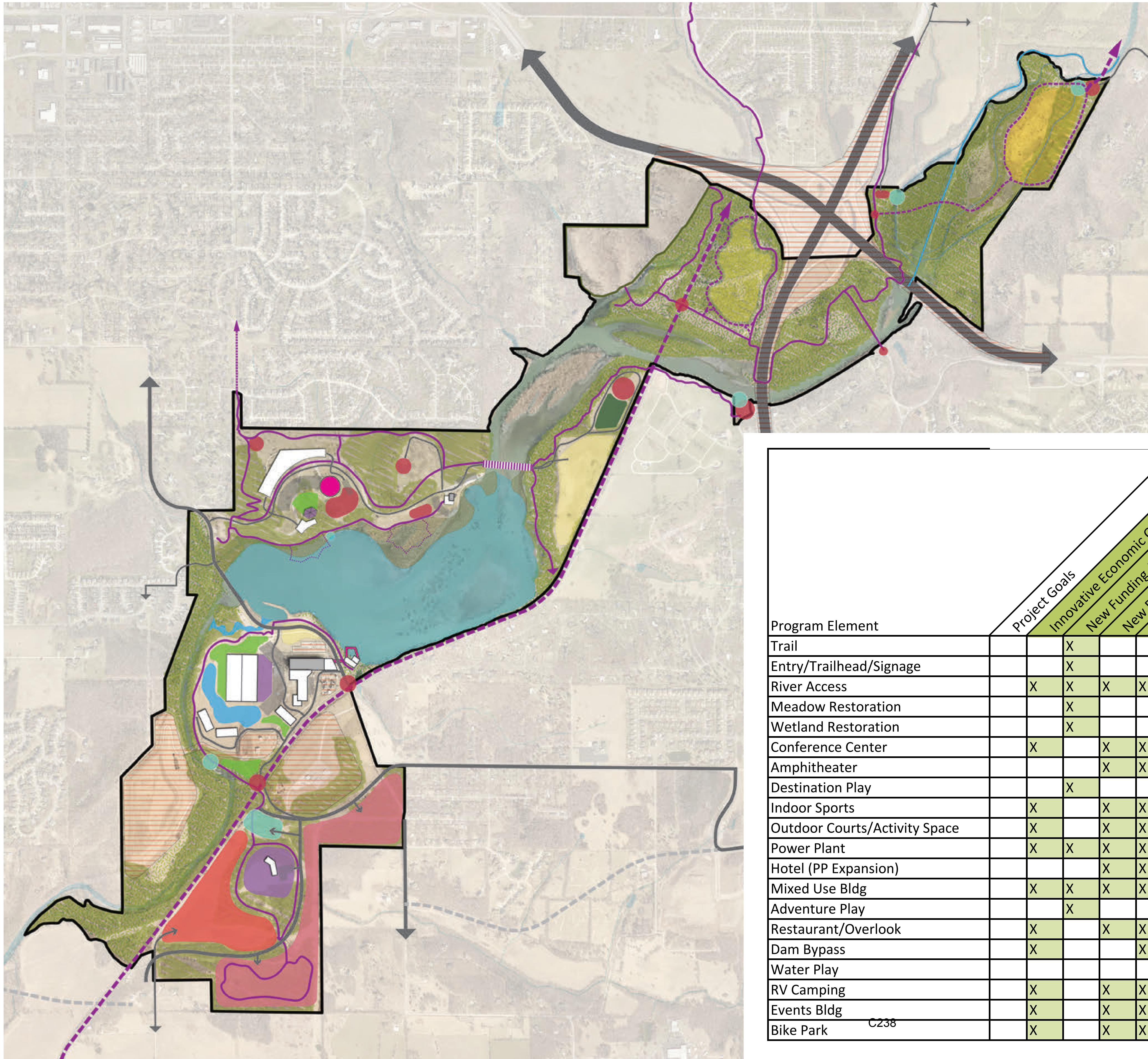
Program Element	Project Goals	Innovative Economic Opportunities	New Funding Allocations	New Business Development	Attract Private Investment	Resilient Job Creation	New/Green Infrastructure	Sustainable Water Quality	Appealing Outdoor Amenities	Identity - "Basecamp of the Ozarks"	Unique Adaptive Reuse Opportunities	Innovative Recreation Opportunities	Access/Multi-modal Transportation	Water Access for Recreation	Elevate the Quality of Life	Regional Draw
Trail			X			X	X		X	X		X	X		X	X
Entry/Trailhead/Signage			X			X	X		X	X			X		X	
River Access		X	X	X	X	X		X	X	X		X	X	X	X	X
Meadow Restoration			X			X	X	X		X					X	
Wetland Restoration			X			X	X	X	X	X		X		X	X	X
Pavilion/Shelter		X	X		X	X			X	X					X	X
Destination Play			X				X		X	X	X	X			X	X
Expanded Boat House		X	X	X	X	X			X	X	X	X		X	X	X
Overlook									X	X	X					X
Culture Camp		X	X	X	X	X			X	X	X	X			X	X
Mixed Use Bldg		X	X	X	X	X				X	X	X				X
Entertainment Bldg		X	X	X	X	X			X	X	X	X			X	X
Power Plant + Addition		X	X	X	X	X			X	X	X	X			X	X
Restaurant/Overlook		X		X	X	X				X						X
Water/Adven. Play Area						X	X	X	X	X		X		X	X	X
Event Lawn				X	X	X			X	X						X
Dam Bypass		X			X	X	X	X	X	X		X		X		X
Conference Center		X		X	X	X										X
Cabins/Yurts		X		X	X	X			X	X	X	X			v	X
Bike Park/Adventure Amenity		X		X	X	X			X	X		X			X	X

LAND-USE CONCEPT OZARK EXPERIENCE



Program Element	Project Goals	Innovative Economic Opportunities	New Funding Allocations	New Business Development	Attract Private Investment	Resilient Job Creation	New/Green Infrastructure	Sustainable Water Quality	Appealing Outdoor Amenities	Identity - "Basecamp of the Ozarks"	Unique Adaptive Reuse Opportunities	Innovative Recreation Opportunities	Access/Multi-modal Transportation	Water Access for Recreation	Elevate the Quality of Life	Regional Draw
Trail			X			X	X		X	X		X	X		X	X
Entry/Trailhead/Signage			X			X	X		X	X			X		X	
River Access		X	X	X	X	X		X	X	X		X	X	X	X	X
Meadow Restoration			X			X	X	X		X					X	
Wetland Restoration			X			X	X	X	X	X		X		X	X	X
Destination Play			X				X		X	X	X	X			X	X
Lodge/Camp		X		X	X	X			X	X	X	X			X	X
New Eco Center		X				X			X	X						X
Marina					X		X	X	X	X		X	X	X	X	X
Conference Center		X		X	X	X										X
Hotel/Apartments				X	X	X				X					X	X
Mixed Use Bldg		X	X	X	X	X				X	X	X				X
Power Plant + Addition		X	X	X	X	X			X	X	X	X			X	X
Event Lawn				X	X	X			X	X						X
Restaurant/ River Access		X		X	X	X				X				X		X
Water Play						X	X	X	X	X		X		X	X	X
Adventure Play			X				X		X	X	X	X			X	X
Amphitheater				X	X				X	X						X
Plaza Space					X	X			X	X		X			X	X
Food Truck/Amenity Space		X		X	X	X			X	X						X
Bike Park		X		X	X	X			X	X		X			X	X
Camping South		X		X	X	X			X	X	X	X			X	X

LAND-USE CONCEPT RECREATION



Program Element	Project Goals	Innovative Economic Opportunities	New Funding Allocations	New Business Development	Attract Private Investment	Resilient Job Creation	New/Green Infrastructure	Sustainable Water Quality	Appealing Outdoor Amenities	Identity - "Basecamp of the Ozarks"	Unique Adaptive Reuse Opportunities	Innovative Recreation Opportunities	Access/Multi-modal Transportation	Water Access for Recreation	Elevate the Quality of Life	Regional Draw
Trail			X			X	X		X	X		X	X		X	X
Entry/Trailhead/Signage			X			X	X		X	X			X		X	
River Access		X	X	X	X	X		X	X	X		X	X	X	X	X
Meadow Restoration			X			X	X	X		X					X	
Wetland Restoration			X			X	X	X	X	X		X		X	X	X
Conference Center		X		X	X	X										X
Amphitheater				X	X				X	X						X
Destination Play			X				X		X	X	X	X			X	X
Indoor Sports		X		X	X	X			X	X		X				X
Outdoor Courts/Activity Space		X		X	X	X			X	X		X				X
Power Plant		X	X	X	X	X			X	X	X	X			X	X
Hotel (PP Expansion)				X	X	X				X					X	X
Mixed Use Bldg		X	X	X	X	X				X	X	X				X
Adventure Play			X				X		X	X	X	X			X	X
Restaurant/Overlook		X		X	X	X				X						X
Dam Bypass		X			X	X	X	X	X	X		X		X		X
Water Play						X	X	X	X	X		X		X	X	X
RV Camping		X		X	X	X			X	X	X	X			X	X
Events Bldg		X		X	X	X				X						X
Bike Park		X		X	X	X			X	X		X			X	X

C238

JOHNSON CONSULTING

LAKE SPRINGFIELD PROGRAMMING HIERARCHY

Level of Investment

Scale of investment correlates with visitation and spend

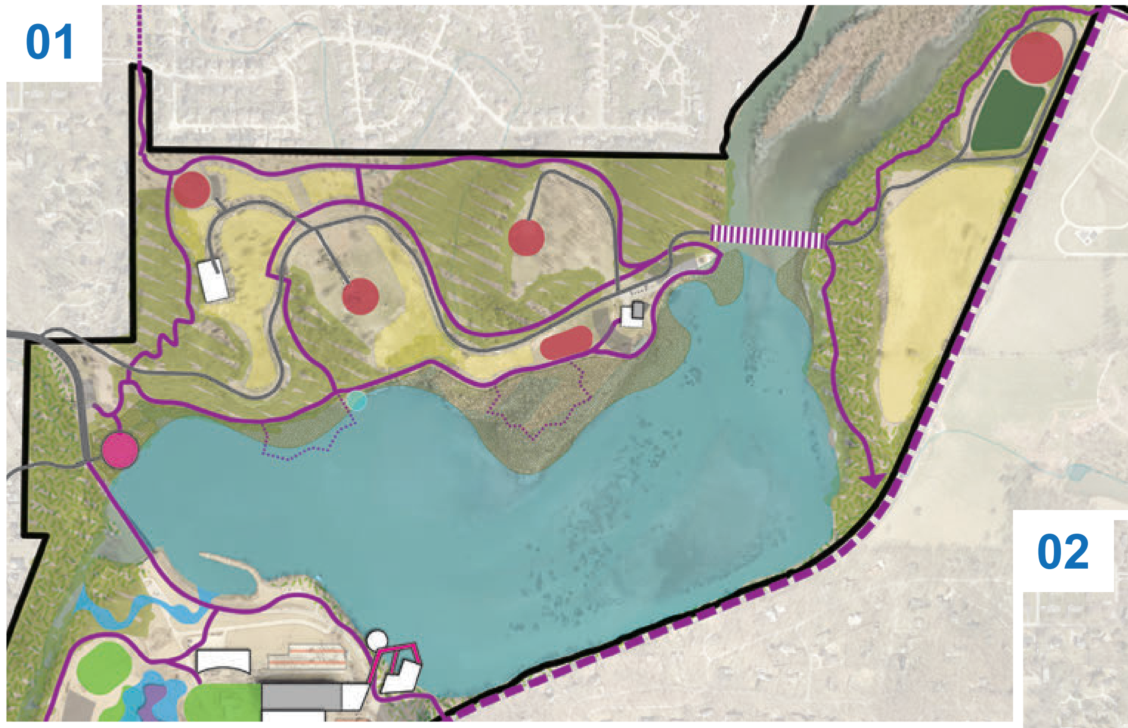
$ — 1X- Hypothetical 25% increase over current attendance - modest increase in spend — **Local Market**

$$ — 2X - Hypothetical 2-3x current visitation- quadruple daily spend ($5 vs. $20) — **Regional Market**

$$$$ — 4X- Hypothetical 4-5x current visitation - Substantive increase in spend ($100) — **National Market**

LAND-USE CONCEPT - LAKE

01



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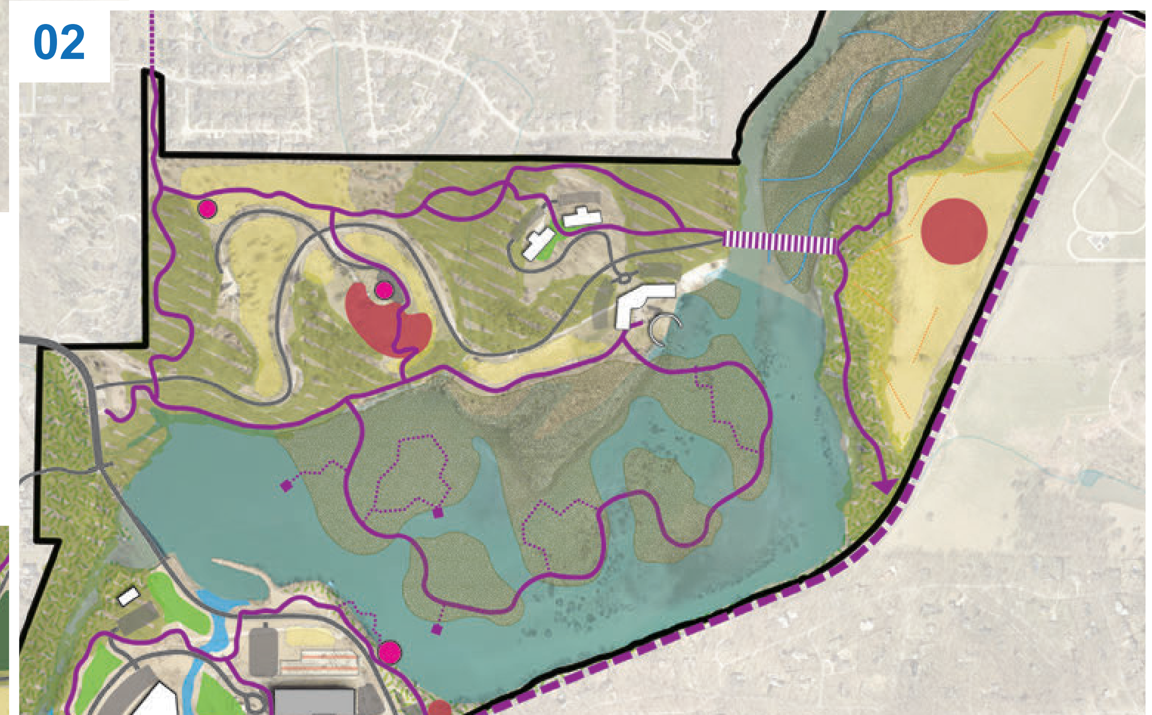

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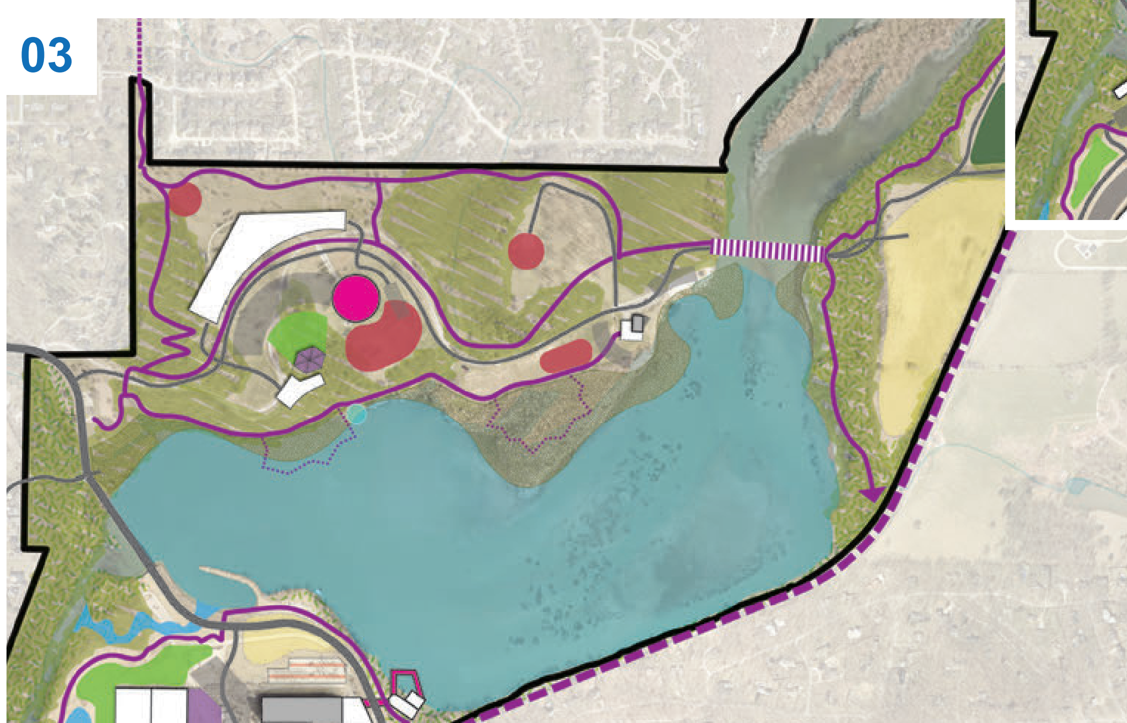
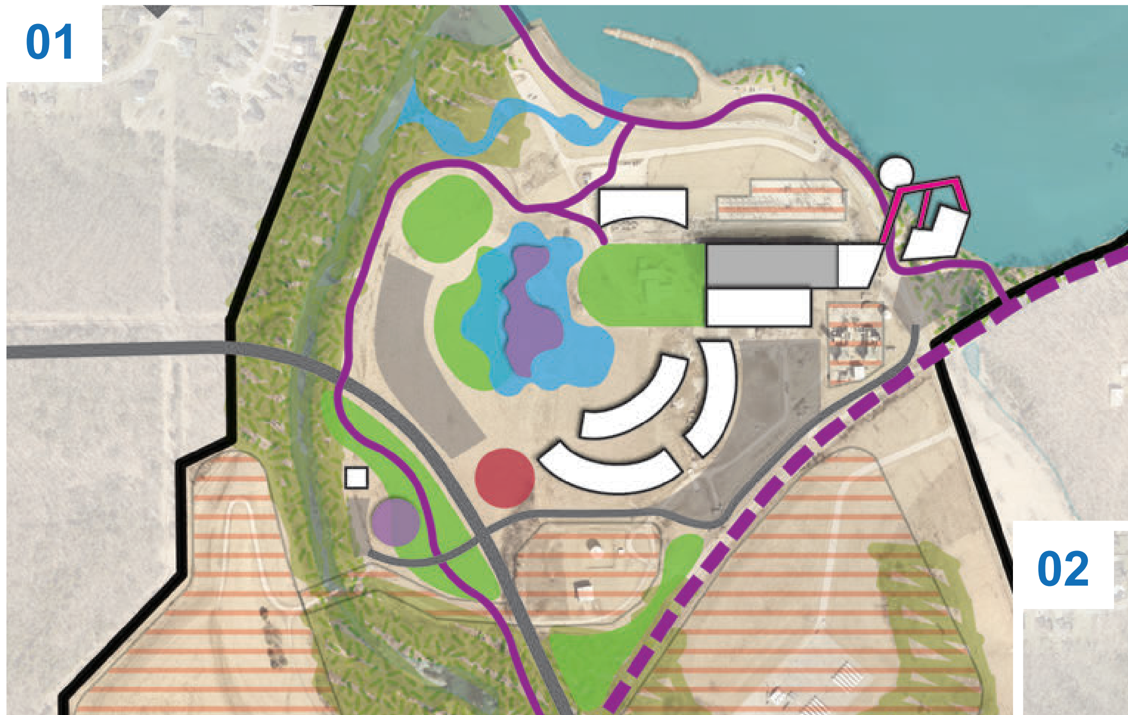


PARK	Economic Impact	Social Impact	
Option 01			
Pavilion	●	●●●	
Destination Play	●	●●●●	
Expanded Boat House	●●●	●●●	
Overlook	●	●●	
Culture Camp	●●●	●●	
TOTAL	9	14	23
Option 02			
Destination Play	●	●●●●	
Lodge/Camp	●●●	●●	
New Eco Center	●	●●●	
Marina	●	●●●	
TOTAL	6	12	18
Option 03			
Conference Center	●●●	●●	
Amphitheater	●●●●	●●●	
Destination Play	●	●●●●	
TOTAL	8	9	17

LAND-USE CONCEPT - POWER PLANT

01



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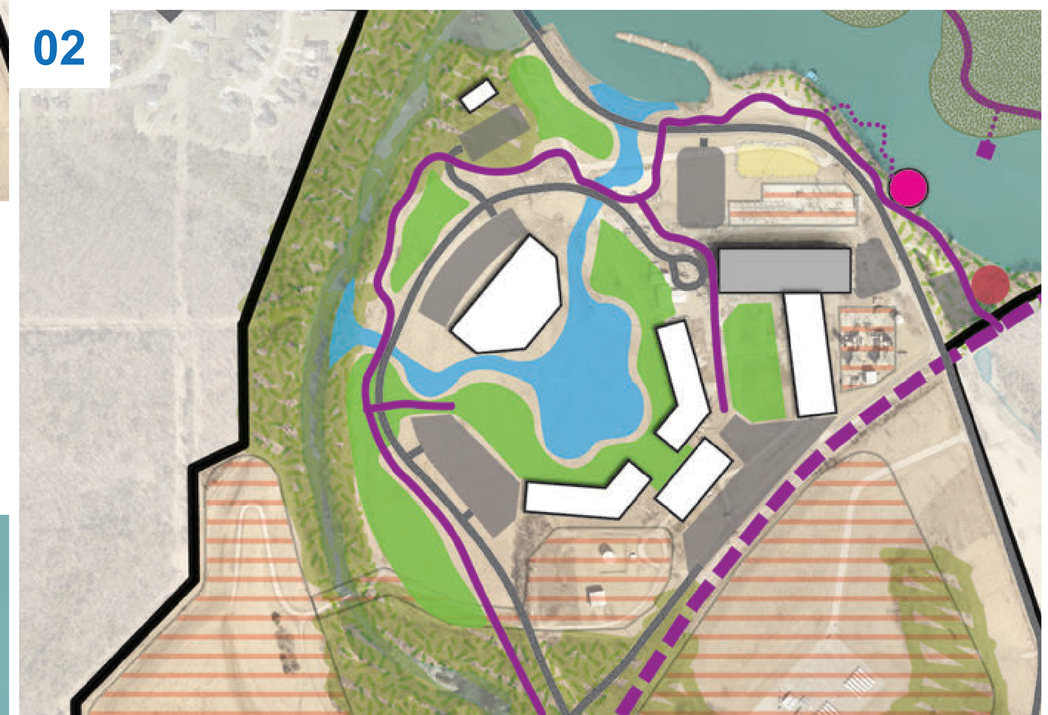
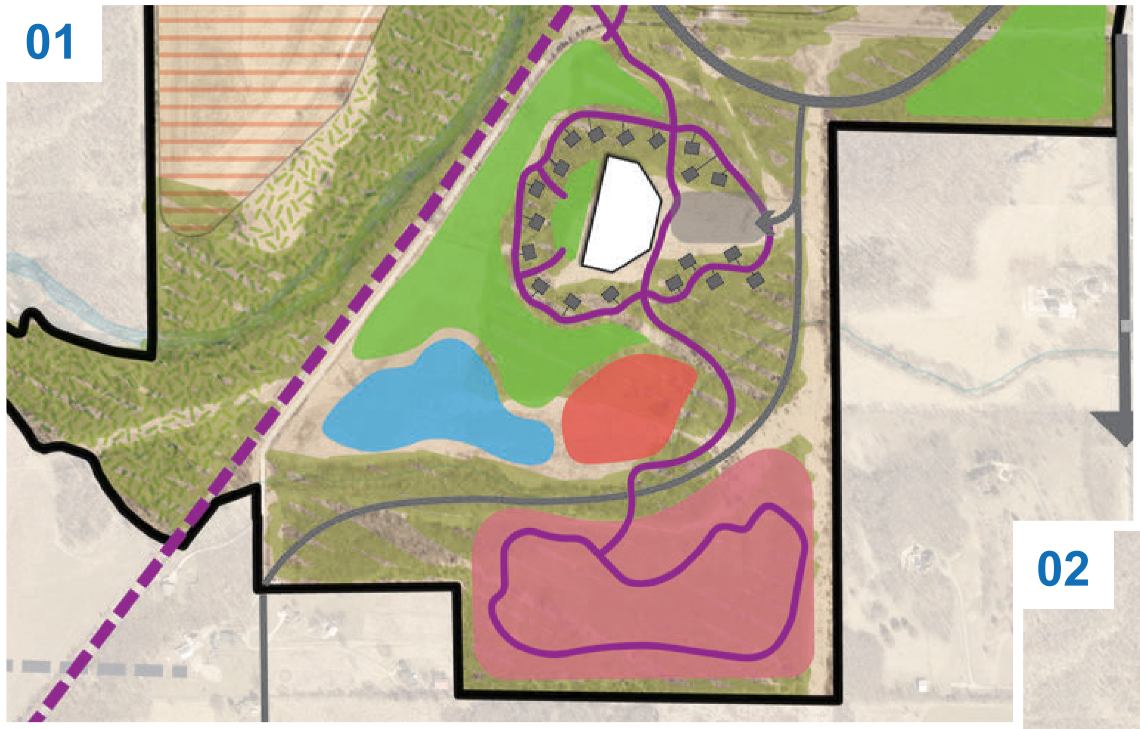


03

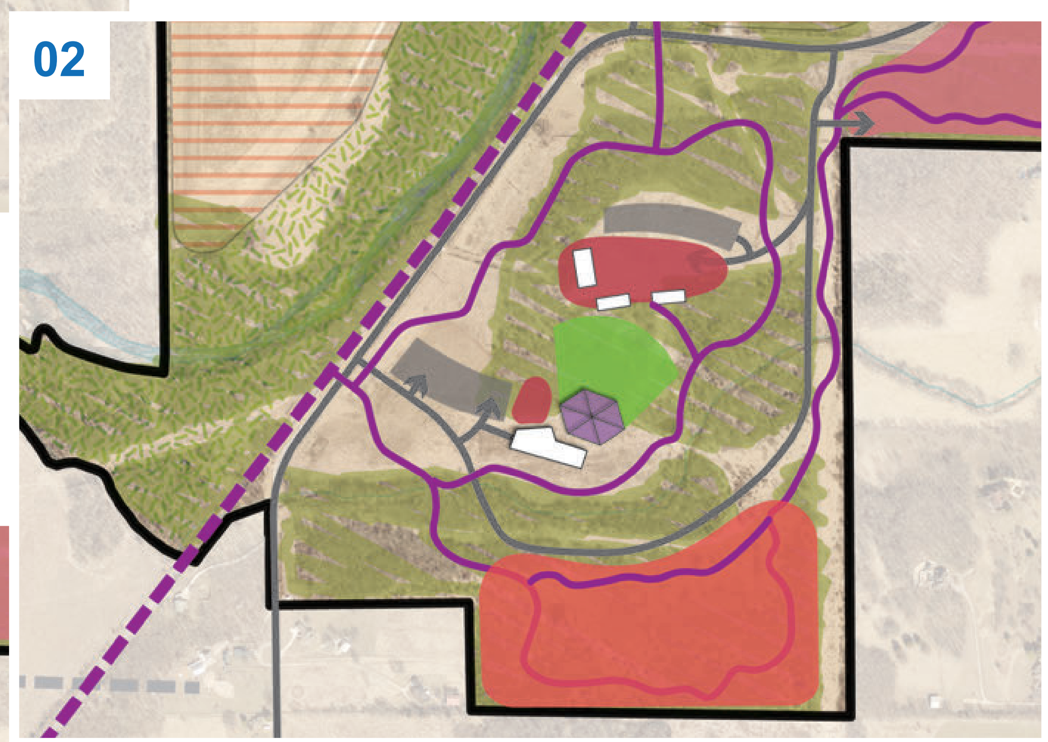
POWER STATION	Economic Impact	Social Impact	
Option 01			
1 Mixed Use 01 (PER LEVEL)	●●	●●	
2 Mixed Use 02 (PER LEVEL)	●●	●●	
3 Entertainment (PER LEVEL)	●●	●●	
4 Mixed Use 04 (PER LEVEL)	●●	●●	
5 Power Plant + Addition	?	?	
6 Adventure Play Area	●●●●	●●●●	
7 Shelter/Hosp Bldg	●	●●●●	
8 Destination Play	●	●●●●	
9 Event Lawn	●	●●●●	
TOTAL	15	24	39
Option 02			
1 Conference Center (PER LEVEL)	●●●	●●	
2 Hotel/Apartments*	●	●	
3 Mixed Use 02 (PER LEVEL)	●●	●●	
4 Mixed Use 03 (PER LEVEL)	●●	●●	
5 Power Plant + Addition	?	?	
6 Event Lawn	●	●●●●	
7 Restaurant/River Access	●●●	●●●	
TOTAL	12	14	26
*future phase			
Option 03			
1 Indoor Sports	●●●●	●●●●	
2 Outdoor Courts/Activity Space	●●●●	●●●●	
3 Power Plant	?	?	
4 Hotel (PP Expansion)	●●●●	●●	
5 Mixed Use 01	●●	●●	
6 Mixed Use 02	●●	●●	
7 Hotel 02*	●	●	
8 Adventure Play	●●●●	●●●●	
9 Restaurant/Overlook	●●●●	●●●●	
TOTAL	25	23	48
*future phase			

LAND-USE CONCEPT - SOUTH

01



02



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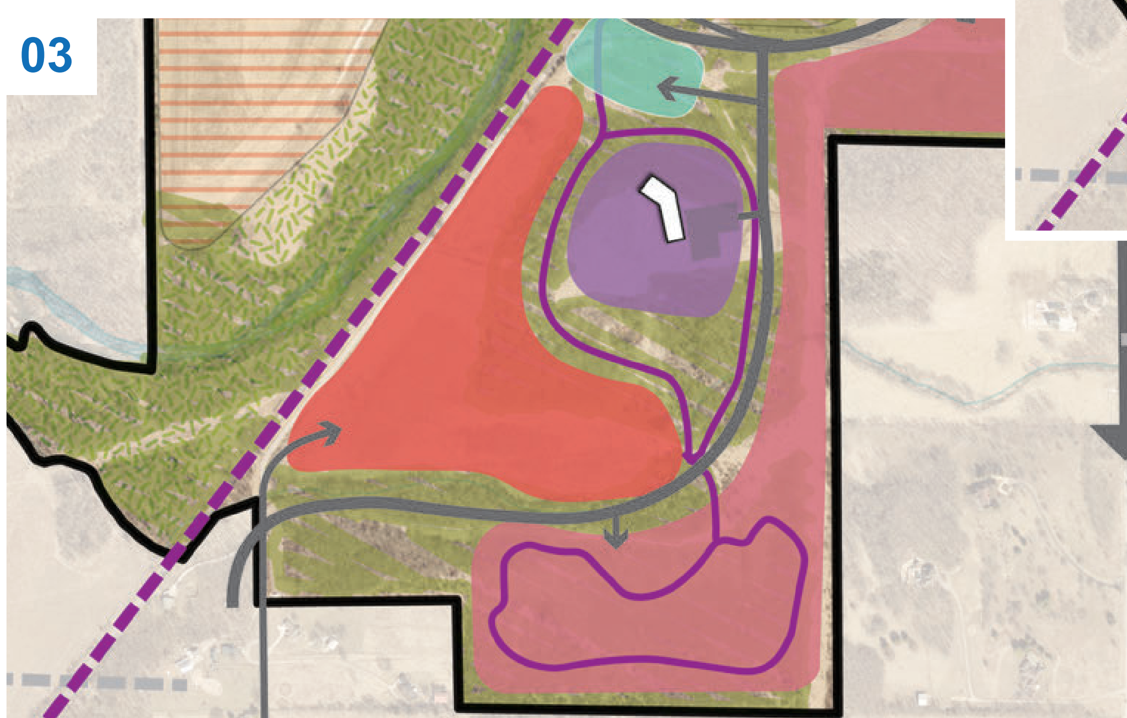

SOUTH END	Economic Impact	Social Impact	
Option 01			
1 Conference Center	●●●	●●	
2 Amenity Area	●	●●●●	
3 Cabins/Yurts	●●	●●	
4 Destination Play	●	●●●●	
5 Bike Park/Adventure Amentity	●●●	●●●	
TOTAL	10	15	25
Option 02			
1 River Access	●	●●●	
2 RV Camping (West)	●●	●●	
3 Camping (East)	●	●	
4 Destination Play	●	●●●●	
5 Events Bldg	●●	●●●	
6 Bike Park	●●●	●●●	
TOTAL	10	16	26
Option 03			
1 Amphitheater	●●●●	●●●	
2 Plaza Space	●	●●●	
3 Food Truck/Amenity Space	●	●●●	
4 Camping North	●	●●	
5 Camping South	●	●●	
TOTAL	8	13	21

Johnson Consulting – Case Studies

Introduction

To understand the market opportunity for the Lake Springfield site, the team reviewed several case study profiles on a variety of different land uses that exist in comparable markets. Full case study reviews are included in a technical appendix at the end of this plan.

The following profiles were analyzed:

- Active and Passive Recreational Parks
  - Origins Park – Jeffersonville, Indiana
  - Forest Park – St. Louis, Missouri
- Reclaimed Mills & Power Plants
  - Optimist Hall – Charlotte, North Carolina
  - Falls Park – Sioux Falls, South Dakota
  - Hollywood Sports – Bellflower, California
- Outdoor Recreation Resort
  - Greylock Glen Resort – Adams, Massachusetts
  - Camp Aramoni – Tonica, Illinois
- Multi-Purpose Event Centers
  - CenterPlace Regional Event Center – Spokane Valley, Washington
  - The Gathering Place & River Parks – Tulsa, Oklahoma
  - Gumbo Limbo Nature Center – Boca Raton, Florida
  - The Grand Experience & RecPlex – West Des Moines, Iowa
- Casinos
  - Harrah's Cherokee Casino – Maggie Valley, North Carolina
  - Mohegan Sun – Uncasville, Connecticut

The case studies present information about each use, as well as market comparisons to Springfield. The goal of these reviews was to present both visionary options to what might work within the Springfield community, as well as understand realistic impacts to proposed ideas.

Additionally, using case studies for the second public meeting gave public participants a chance to see real ideas of what the are could be when fully implemented.

The following profiles outline information on programming, operations, size, and character of spaces, demand profile, and other characteristics and key attributes will be summarized. Below are the 5 types of land uses.

Land Uses

- Active and Passive Recreational Parks
    - Origins Park – Jeffersonville, Indiana
    - Forest Park – St. Louis, Missouri
- Reclaimed Mills & Power Plants
    - Optimist Hall – Charlotte, North Carolina
    - Falls Park – Sioux Falls, South Dakota
    - Hollywood Sports – Bellflower, California
- Outdoor Recreation Resort
    - Greylock Glen Resort – Adams, Massachusetts
    - Camp Aramoni – Tonica, Illinois
- Multi-Purpose Event Centers
    - CenterPlace Regional Event Center – Spokane Valley, Washington
    - The Gathering Place & River Parks – Tulsa, Oklahoma
    - Gumbo Limbo Nature Center – Boca Raton, Florida
    - The Grand Experience & RecPlex – West Des Moines, Iowa
- Casinos
    - Harrah's Cherokee Casino – Maggie Valley, North Carolina
    - Mohegan Sun – Uncasville, Connecticut

Active & Passive Recreational Parks

ORIGIN PARK – JEFFERSONVILLE, INDIANA

Origin Park is a proposed, unique, urban park set in over 400 acres on the north shore of the Ohio River where people can relax, explore, and enjoy the amenities offered around the park. With 1.2 million people within a 30-minute drive, the location of this park is unmatched. The park plan features an outdoor adventure center, an event center, a tree house, a base camp lawn for community programming, two pavilions, a children's play area, a sledding hill, and other greenspaces including trails and meadows, including the 2.8-mile infinity loop trail. The first phase of the plan focuses on the southeast quadrant of the site, about one-third of the master plan, and includes the River Arts House, ravine bridge, the event center and lawn, an event pavilion, the Mill Creek overlook, trails, and Silver Creek paddling access. The River House building will eventually become an artist studio, but will first serve as the headquarters for the River Heritage Conservancy. In an article published in September 2022, the Executive Director of the park reported that they want to provide a complete park experience in the first phase that includes all necessary amenities, and states they are unsure of the timeline but hope to have the park completed in the next 10 to 15 years.

Similar to Lake Springfield, there is a low-head dam on Silver Creek that will need to be removed to safely utilize the waterway, but the City is appealing the removal. The City wants to ensure the removal of the dam will not damage surrounding ecosystems. The park team reports that the removal of the dam would improve safety for paddlers and enhance wildlife along the creek.

43_OriginPark

FOREST PARK – ST. LOUIS, MISSOURI

Forest Park is a 1,326-acre public park located in western St. Louis. Opened in 1876, Forest Park hosted several historical events such as the Louisiana Purchase Exposition of 1904 and the 1904 Summer Olympics, and now serves as a civic center. The park, known as the "Heart of St. Louis," features the St. Louis Zoo, the St. Louis Art Museum, the Missouri History Museum, and the St. Louis Science Center. Over the last couple of decades, the park has undergone a $100M restoration through a public-private partnership. Founded in 1986, Forest Park Forever is a private nonprofit conservancy that works in partnership with the City of St. Louis and the Department of Parks, Recreation, and Forestry to restore, maintain, and sustain Forest Park. In 2017, the organization raised $139M for park restoration projections. Forest Park is also supported by private donors, including its 7,000 members and 1,100 volunteers. In addition to the museums and landmarks, the park is also home to The Muny, officially known as the Municipal Theatre Association of St. Louis, the Jewel Box (pictured below), a 7,500 SF greenhouse, Turtle Park, Dwight Davis Tennis Center, the Boathouse, the Dennis and Judith Jones Visitor and Education Center, the Steinberg Skating Rink, the World's Fair Pavilion, a golf course, and more, in addition to the plentiful greenspace and water features.

Forest Park is owned and operated by the City of St. Louis and attracts 13 million visitors each year, making it the sixth most visited urban park in the United States. There are a total of 10 entrances around the border of the park, allowing for easy accessibility. People can come and visit the cultural institutions, utilize the trails, relax in the plentiful green space, or attend one of the festivals or events occurring on a weekly basis. Several venues, both indoor and outdoor, are available for private event rentals as well.

44_ForestPark

45_ForestPark

Reclaimed Mills & Power Plants

OPTIMIST HALL – CHARLOTTE, NORTH CAROLINA

Previously Highland Park Gingham Mill and Highland Park Mill #1, Optimist Hall was originally home to Charlotte's largest textile mill, built in 1891, and was in operation until 2015. In 2016, White Point Paces Partners purchased the property with the vision of an adaptive reuse project. The project transformed into Charlotte's first food hall, which opened in 2019 and also provides modern office space available for lease and a home for Duke's Energy Innovation Center.

Optimist Hall is a 147,000 SF building that features retail and restaurant tenants ranging from authentic cuisine and crafted cocktails to local artisans. The food hall is open 7 days a week and hosts public events throughout the year and weekly specials such as live music and Taco Tuesday. Currently, space is not available for private event rentals, but on-site restaurants may offer rental opportunities within their spaces.

The venue is accessible by car, rail, bike, scooter, or even walking as the hall is located off of Charlotte's multi-use rail trail. This redevelopment project transformed a turn-of-the-century textile mill into a mixed-use development that appeals to employers, employees, retailers, and customers alike. Optimist Hall maintained the original industrial character while providing a modern amenity to the Charlotte region.

46_OptimistHall

47_OptimistHall

48_OptimistHall

FALLS PARK – SIOUX FALLS, SOUTH DAKOTA

This public park is 128 acres located just north of downtown Sioux Falls, along the Big Sioux River. An average of 7,400 hallows on water drop 100 feet over the course of the Falls each second. The Falls, first visited by Native Americans, has been the center of recreation and industry since the founding of the city of Sioux Falls in 1856. The park includes a café, an observation tower, and the remains of an old mill. There are also picnic shelters with electricity, bike trail access, a visitor center, historic displays, sculptures, playgrounds, and walking paths. Forest Park is also the home to local and regional attractions such as the Falls Park Farmer's Market and the Stockyards Ag Experience.

The Stockyards Ag Experience Plaza and Barn transformed from what history suggests was an old dairy/creamery operation, is a museum and learning center meant to communicate the story of agriculture in the economy and society and showcase the impact it has had on the region.

The Queen Bee Mill is a ruined mill complex located in Falls Park. The mill was built in 1880 and could process 1200 barrels of grain per day and was connected to all five city rail lines. Unfortunately, the business could not meet capacity and the mill closed two years after opening due to bankruptcy. The building eventually became a warehouse until it was destroyed in 1956 in a fire. The building foundations and the grain elevator are all that remain on site and the landmark was added to the National Register of Historic Places in 1984.

49_FallsPark

50_FallsPark

HOLLYWOOD SPORTS – BELLFLOWER, CALIFORNIA

Hollywood Sports is a paintball, airsoft, laser tag, BMX, Futsal, and Rockwall theme park spread over 28 acres, centrally located to Los Angeles in the city of Bellflower. The paintball fields are made and designed from actual movie sets from such classics as Starship Troopers, The Haunting, Saving Private Ryan, Godzilla, Supernova, and Water World. This case study was included as an alternative for an adaptive reuse project for the decommissioned power plant at Lake Springfield. Hollywood Sports Park also features a pro shop, a sports bar and restaurant, as well as a banquet space for private events with a maximum capacity of 200 guests.

This venue is attractive to all ages for events such as birthday parties family outings to corporate events. An attraction such as this would not only provide an option for the use of the power plant at Lake Springfield, it would add to the destination for locals and tourists alike. Paintball and similar venues are also great options for groups, such as tour groups or camping groups already coming to Lake Springfield. Also, as paintball parks are typically privately owned, this could open up opportunities for a public-private partnership for the City of Springfield.

51_HollywoodSports

52_HollywoodSports

Outdoor Recreation Resort

GREYLOCK GLEN RESORT – ADAMS, MASSACHUSETTS

Today, Greylock Glen is full of beautiful scenery that highlights the natural environment and has numerous outdoor recreational activities. In the coming years, the site is planned to be enhanced by adding educational programs, camping, an outdoor amphitheater, an event space, and more while preserving natural and scenic resources. Most recently, the Commonwealth of Massachusetts fully funded the Greylock Glen Outdoor Center, and construction began in 2022.

Greylock Glen encompasses 1,063 acres of fields, wetlands, ponds, trails, and an 18-hole golf course. The Greylock Glen Resort will provide a new visitor experience to a new outdoor recreation destination through sustainable development. New activities include educational programming, biking, bird watching, camping, concerts, dining, festivals, films, hiking, hunting, ice skating, skiing, rock climbing, and other passive and active recreational activities.

The master plan concept includes a trail system, a 140-site four-season campground, the Thunderbolt Lodge and Conference Center with 170 guest rooms that will support full-service meeting events, an amphitheater, an environmental art garden, and the 10,000 SF outdoor center, shown below, that is currently under construction.

53_GreylockGlen

54_GreylockGlen

CAMP ARAMONI – TONICA, ILLINOIS

Camp Aramoni is a family-owned boutique campground located on a 96-acre site in Tonica, Illinois. Once home to Ristokrat Clay Products Company, a former brickyard, was restored by a husband and wife team with the help of their family and local partners, creating a glamping destination in the Midwest. The Ristokrat Clay Products Company opened in 1870 and closed in 1981, leaving a profound impact on the community. Most of the site was bulldozed, but the remaining structures have since been restored with the construction of Camp Aramoni, including kilns, a blacksmith shop, and railroad tracks. Camp Aramoni has incorporated historical elements throughout the site. The camp itself is named after the Vermilion River, originally known as the Aramoni, used by the Miami-Illinois Native Americans.

The main draw to Camp Aramoni is the upscale camping. There are 11 safari-style tents that guests can choose from, each inspired by native Illinois wildflowers. Each tent can accommodate 2-6 guests and includes air conditioning, heat, a private bathroom, a mini fridge, a personal firepit, and more. Guests can experience nature in luxury with inclusive meals and activities on-site. The Barn offers space for dining and relaxing and is also home to the site's General Store, Gertie's.

Bricks and Stones is the historical event space at Camp Aramoni. The 150-year-old building has been preserved and renovated and now serves as a venue for weddings, corporate retreats, and large outdoor functions. With a total occupancy of 48 in the tents, this is a unique locale for intimate weddings and other private events.

55_Aramoni

56_ Aramoni

Multi-Purpose Event Centers

CENTERPLACE REGIONAL EVENT CENTER – SPOKANE VALLEY, WASHINGTON

The CenterPlace Regional Event Center is located on the west side of the Spokane River, just south of Mirabeau Point Park. Downtown Spokane is about 11 miles west of CenterPlace. In 2003, an Interlocal

Agreement for the development of what is now the CenterPlace, and two other regional destinations, was approved. The agreement helped to gather the resources to construct the three regional projects.

The venue is currently owned and operated by the City of Spokane Valley. CenterPlace offers 54,000 SF of conference space, including two banquet rooms, a 100-seat auditorium, and other meeting spaces. There are also three large outdoor spaces, often used for ceremonies and receptions. While this is a popular venue for private events such as weddings, there are numerous community events hosted on-site as well. For example, there are community festivals, food truck events, and outdoor vendor markets. In 2022, there were a total of 820 hosted at CenterPlace.

Spokane Valley offers recreational activities, retail shopping, and restaurants within a short distance of CenterPlace. However, there are only two hotels located within a ½-mile radius of CenterPlace, totaling 192 rooms, likely due to the majority of urban density being located in Spokane, rather than Spokane Valley.

57_Centerplace

58_Centerplace

59_Centerplace

THE GATHERING PLACE & RIVER PARKS – TULSA, OKLAHOMA

Voted Best New Attraction in 2019 and USA Today's Best City Park in 2021, The Gathering Place is a 66.5-acre park along the Arkansas River that was funded by over 80 corporate and philanthropic organizations – the largest privately funded park project in the United States. Construction began in 2014 and the park, designed by opened in 2018. Once Phase II and Phase III are complete, the Gathering Place will be 100 acres in total. The main features of the park include five sports courts, a skate park, a swing hill, gardens, multifunctional lawns for events or relaxation, a pond for boating, a 5-acre playground, public art, the Discovery Lab, Mist Mountain, Williams Lodge, which is home to cafes, indoor event spaces, restrooms, and other amenities, and lastly the ONEOK Boathouse. The Boathouse is a central event venue in the community fit for corporate events and social gatherings. The three-level, 21,000 SF ONEOK Boathouse is home to the Vista at the Boathouse, offering a seasonal menu based on park activities. Visitors can also rent kayaks, canoes, and pedal boats for free on the first floor. In addition to the event hall, the boathouse also serves as an administrative office for the park. Accessibility is a landmark of this project. The park is built to full ADA compliance, offers sensory processing support, and is completely free including educational activities and a full week of family-friendly programming over Spring Break. Visitors can also download the Gathering Place App for free to find daily activities, schedules, maps, and more.

The Gathering Place is situated just north of the Tulsa River Parks. River Parks offers 26 miles of asphalt trails that weave past gathering areas, playgrounds, fountains, and sculptures. Outdoor events occur throughout the year such as concerts, festivals, and athletic competitions. Visitors can also take advantage of seasonal recreational activities such as fishing, rowing, kayaking, disc golf, and hiking. River Parks was established as a public-private partnership in 1974, with Tulsa County and the City of Tulsa providing the majority of operational funding, supplemented by private benefactors.

60_Gathering

61_Gathering

GUMBO LIMBO NATURE CENTER – BOCA RATON, FLORIDA

The Gumbo Limbo Environmental Complex, commonly known as the Gumbo Limbo Nature Center, is a nature center operated by the City of Boca Raton in conjunction with the Gumbo Limbo Coastal Stewards and the Greater Boca Raton Beach and Park District. Gumbo Limbo sits on 20 acres of protected barrier island between the Intracoastal Waterway and the Atlantic Ocean. The name of the center comes from the Bursera Simaruba tree, commonly known as gumbo limbo, which is abundant in the park.

The center has free admission and includes an indoor museum, small aquariums, and a gift shop. Outside, there are several larger aquariums, a boardwalk trail through adjacent woods, and a garden designed for butterfly observation. There are organized events at the nature center as well, such as sea turtle observation during nesting season. The nature center is also home to a research facility for Florida Atlantic University's Department of Biological Sciences. Research is focused on turtles, sharks, and seagrass. Visitors can view the facility and speak with researchers. The nature center has other educational opportunities as well such as scholarships, internships, and virtual learning options.

62_Gumbo

63_Gumbo

THE GRAND EXPERIENCE & RECPLEX – WEST DES MOINES, IOWA

West Des Moines, Iowa recently opened a $62M sports complex covering 66 acres, the MidAmerican Energy Company RecPlex. The facility features a 150,000 SF corporate-sponsored turf and hardcourt fieldhouse, 2 indoor ice arenas, 20,000 SF of exhibit space, and 30,000 SF of additional meeting and programming space. The fieldhouse can be set up for three basketball courts or six volleyball courts. There is also a fourth multi-purpose court, pickleball courts, warm-up and batting cage area, and a 3,500 SF Esports Center. The Esports center can be used for gaming, private parties, and can be used as a computer lab for classes. The RecPlex opened in early 2022 and was fully booked out in the first year, with a projected $3.1M in revenues for the first year of operation.

Across the street from the RecPlex, a planned development dubbed "The Grand Experience" will add a 405-room hotel, an indoor/outdoor waterpark, a family entertainment center, a conference center, and a parking garage. Ancillary development will also include a residential district and an entertainment district. The Grand Experience will be a product of a public-private partnership with a private developer and the City of West Des Moines. With both the RecPlex and The Grand Experience within the same node, the City of West Des Moines will be able to offer a complete destination package at this recreation and entertainment hub.

64_WDM

65_WDM

Casinos

HARRAH’S CHEROKEE CASINO RESORT – MAGGIE VALLEY, NORTH CAROLINA

Harrah’s Cherokee Casino Resort is a casino and hotel on the Qualla Boundary in Cherokee, NC owned by the Eastern Band of Cherokee Indians (EBCI) and operated by Caesars Entertainment. Harrah’s Cherokee Casino Resort offers luxury hotel accommodations, excitement at the casino, celebrity chef restaurants, world-class golf, shows and events, bowling, arcade games, shopping, pools, a spa, and more, all while taking in the sights of the Great Smoky Mountains. The 1,800-room upscale hotel is attached to the casino and offers over 121,000 SF of conference and event space throughout the property, capable of hosting over 3,000 guests. The 150,000 SF casino itself provides a classic casino experience with a 90’ Sportsbook screen, 3,000 slots, and over 160 table games.

Since its opening in 1997, the site has undergone a number of renovations. Most recently, the fourth renovation costing $250M added the fourth hotel tower with 725 rooms, a new 2-story lobby, pool, fitness center, and the 83,000 SF convention center and ballroom. This latest renovation made the hotel the largest in North Carolina.

The casino greatly improved the living standards on the Qualla Boundary including a new school, a hospital, public housing, and upgrades to public safety services such as police, fire, and EMS. Additionally, a portion of the casino’s revenues is distributed directly to all members of the EBCI as a form of basic income. In 2012 when the casino began offering live table games, officials reported that an estimated 500 new jobs were created due to the table games. Numbers provided by the tribe's Office of Budget & Finance show that gaming revenue from Harrah's totaled more than $393 million in 2018.

66_Harrah

67_Harrah

MOHEGAN SUN CASINO & RESORT – UNCASVILLE, CONNECTICUT

Located on the Thames River on the Mohegan Reservation, created by the Mohegan Tribe of Connecticut, is Mohegan Sun, sitting on 240 acres. This national destination includes two casinos, a family entertainment center, two spas, 375,000 SF of meeting facilities, major entertainment venues including an arena and a comedy club, 130,000 SF of retail, over 45 bars and restaurants, 2 indoor pools, a seasonal golf course, and more. The 145,000 SF Earth Expo & Convention Center and the 10,000-seat Mohegan Sun Arena are both on-site, providing large event space from conferences to concerts to WNBA games. There is also the 300-seat Wolf Den and a 350-seat Cabaret Theatre. The casinos boast more than 300 table games, nearly 400 slot machines, a state-of-the-art Poker Room, and over 300,000 SF of gaming. Mohegan Sun has also partnered with FanDuel Sportsbook for sports betting, complemented by 39 betting kiosks on-site, in addition to the 140’ video wall streaming games at all times located in Casino of the Earth.

As of 2022, Mohegan Sun was voted “Best Casino Hotel” for the fifth year in a row. The two-tower hotel features 1,563 luxury guest rooms with over 175 suites and 5 hospitality suites. At the end of the 2018 fiscal year, it was reported that Mohegan Sun’s net revenue was $1.07 billion. An article published in October 2022 reports that Mohegan Sun delivers more than $2.2 billion in local economic activity to Connecticut.

68_Mohegan

69_Mohegan