



BOARD OF DIRECTORS MEETING

March 9, 2023

3:00 pm

City Commission Chambers

Chair: Curtis Richardson

Agenda: Blueprint Infrastructure Focused Meeting

I.	AGENDA MODIFICATIONS	PAGE
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II.	CITIZENS TO BE HEARD	
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In Person: Citizens desiring to speak must fill out a Speaker Request Form. The Chair reserves the right to limit the number of speakers or time allotted to each. Speakers are limited to 3 minutes.

Written Comments: Please provide written public comment by emailing Comments@BlueprintIA.org until 5 p.m. on March 8, 2023. This will allow ample time for comments to be provided to the IA Board in advance of the meeting. Comments submitted after this time will be accepted and included in the official record of the meeting.

Live Comments via WebEx: If you wish to provide comments live during the IA Board meeting via WebEx, please register to join at www.blueprintia.org by 5 p.m. on March 8, 2023, and WebEx meeting access information will be provided to you via email. Speakers are limited to 3 minutes.

III.	INFORMATIONAL ITEMS/PRESENTATIONS	
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- [Receipt and File:](#)
 - Blueprint Infrastructure Community Engagement Update
 - Draft Citizens Advisory Committee February 23, 2023 Minutes
 - Blueprint Infrastructure Q1 2023 Project Status Report

IV. CONSENT

- | | | |
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| 1. | Approval of the February 9, 2023 Blueprint Intergovernmental Agency Board Meeting Minutes | 3 |
| 2. | Authorization to Advertise and Award Construction Services for the Tallahassee-Leon County Animal Service Center Project | 11 |
| 3. | Acceptance of a Status Update on the Capital Circle Southwest Project | 41 |
| 4. | Approval of a Reappointment to the Blueprint Citizens Advisory Committee | 59 |

V. GENERAL BUSINESS/PRESENTATIONS

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| 5. | Acceptance of a Status Update on the Northwest Connector Corridor: Tharpe Street Project and Authorization to Advertise and Award a Contract for Planning and Design Services | 63 |
| 6. | Acceptance of a Report and Cost Estimate for a Preliminary Engineering Analysis to Construct a Large-Scale Treatment Facility at Lake Munson | 109 |

VI. DIRECTOR DISCUSSION ITEMS

VII. ADJOURN

NEXT BOARD OF DIRECTORS MEETING: May 11, 2023

- **Note:** The May 11 budget workshop and meeting shall focus upon both Blueprint Infrastructure and the Office of Economic Vitality.

In accordance with the Americans with Disabilities Act and Section 286.26, Florida Statutes, persons needing a special accommodation to attend this meeting should contact Shelonda Meeks, Blueprint Office Manager, 315 South Calhoun Street, Suite 450, Tallahassee, Florida, 32301, at least 48 hours prior to the meeting. Telephone: 850-219-1060; or 1-800-955-8770 (Voice) or 711 via Florida Relay Service.

**Blueprint Intergovernmental Agency
Board of Directors
Agenda Item #1**

March 9, 2023

Title: Approval of February 9, 2023, Blueprint Intergovernmental Agency Board of Directors Meeting Minutes

Category: Consent

Intergovernmental Management Committee: Vincent S. Long, Leon County Administrator
Reese Goad, City of Tallahassee Manager

Lead Staff / Project Team: Benjamin H. Pingree, Director, Department of PLACE
Autumn Calder, Director, Blueprint
Keith Bowers, Director, Office of Economic Vitality

STATEMENT OF ISSUE:

This agenda item presents the summary meeting minutes for the February 9, 2023 Blueprint Intergovernmental Agency Board of Directors (IA Board) meeting minutes and requests the IA Board’s review and approval of the minutes as presented.

FISCAL IMPACT

This item has no fiscal impact.

RECOMMENDED ACTION:

Option 1: Approve the February 9, 2023 Blueprint Intergovernmental Agency Board of Directors Meeting Minutes.

OPTIONS:

Option 1: Approve the February 9, 2023 Blueprint Intergovernmental Agency Board of Directors Meeting Minutes.

Option 2: IA Board Direction.

Attachment:

1. Draft Summary Minutes of the Blueprint Intergovernmental Agency Board of Directors Meeting on February 9 2023.

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Blueprint Intergovernmental Agency Board of Directors Meeting Minutes

Date: March 9, 2023
To: Board of Directors
From: Benjamin H. Pingree, PLACE Director
Subject: Summary Minutes to Board of Directors Meeting of February 9, 2023

MEMBERS PRESENT

COUNTY	CITY
Commissioner Nick Maddox	Mayor John Dailey
Commissioner Christian Caban	Commissioner Curtis Richardson, Chair
Commissioner Carolyn Cummings, Vice Chair	Commissioner Jeremy Matlow
Commissioner Brian Welch	Commissioner Jacqueline Porter
Commissioner Rick Minor	Commissioner Dianne Williams-Cox
Commissioner Bill Proctor	
Commissioner David O'Keefe	

I. AGENDA MODIFICATIONS

There were no agenda modifications.

Commissioner Maddox moved to allow Commissioners Cummings and O'Keefe to participate virtually. Motion was seconded by Commissioner Matlow. Motion passed.

Passed 9-0 (weighted: 50-0)

Commissioner Proctor was not present at the time of the vote.

II. CITIZENS TO BE HEARD ON NON-AGENDA ITEMS

Public comments were requested by email to Comments@BlueprintIA.org through 5:00 p.m. on February 8, 2023. All emails received were provided to the IA Board. Live comments were also taken in person and via WebEx during the meeting. The following comments were presented:

There were no comments from citizens.

III. INFORMATIONAL ITEMS/PRESENTATIONS

- Receipt and File:
 - Draft Economic Vitality Leadership Council, January 26, 2023, Meeting Minutes
 - Annual Competitiveness Report
 - November 2022 Quarterly Economic Dashboard
 - Status Update Workforce Talent Development/ Innovation

IV. CONSENT

Mayor Dailey moved to approve the Consent Items. The motion was seconded by Commissioner Welch.

Passed 11-0 (weighted 65-0)

Commissioner Proctor was absent at the time of the vote. Commissioners Cummings and O’Keefe voted via WebEx.

1. Approval of the December 8, 2022, Blueprint Intergovernmental Agency Board Meeting Minutes
2. Acceptance of the Report on Enhanced Engagement Between the Local Chambers of Commerce and OEV
3. Approval of the Revised 2023 Blueprint Intergovernmental Agency Meeting Schedule

V. GENERAL BUSINESS

4. Acceptance of the Disparity Study Update

Commissioner Maddox moved to accept the 2022 Disparity Study Update by MGT of America and direct staff to work with City Procurement and County Purchasing to further evaluate the 2022 Disparity Study Update recommendations for a future update to the Consolidated MWSBE Policy. The motion was seconded by Mayor Dailey.

PLACE Director Ben Pingree introduced the business item by explaining that a few years ago staff presented a five-year disparity to the IA Board and that this Updated Disparity Study was conducted pursuant to Board direction. Director Pingree then introduced OEV Director Keith Bowers who explained that the original Disparity Study captured data from 2012 through 2017 and that the Updated Disparity Study analyzes data from 2018 through 2022. Director Bowers summarized that the Updated Disparity Study includes six recommendations to further diversity, equity and inclusion. Next, Deputy Director Darryl Jones, Minority Women Small Business Enterprise Division, explained how the MWSBE Division uses the findings and recommendations from the disparity studies to inform the MWBE policy used by the City of Tallahassee, Leon County, and Blueprint. Deputy Director Jones then introduced Dr. Seamon and Attorney Bernal of MGT of America.

Dr. Fred Seamon and Attorney Andres Bernal provided an overview of the history and methodology done to collect and analyze the data necessary to complete the 2022 Disparity Study Update. Dr. Seamon explained that the study analyzed the data from the City of Tallahassee, Leon County, and Blueprint. Attorney Bernal highlighted the different recommendations included in the study and explained the methodology to ensure the legal defensibility of the study’s findings.

Darryl Jones, Deputy Director of the Minority Women Small Business Enterprise Division, explained the next steps if the 2022 Updated Disparity Study were

approved: he stated that the OEV would begin working to incorporate the recommendations from the study into updates for the Consolidated MWSBE Policy and that the OEV would work to facilitate the processes to capture P-Card transactions through B2Gnow.

Antonio Jefferson of the Big Bend Minority Chamber spoke in favor of the 2022 Disparity Study findings and thanked staff for engaging the chambers of commerce throughout the process.

Stanley Simms spoke in favor of the 2022 Disparity Study findings and requested that the OEV provide technical training to minority businesses for grant and proposal writing.

George Johnson, MWSBE CAC Co-chair, provided comment on behalf of the MWSBE CAC stating that the committee supported the findings and recommendations included in the study.

Katrina Tuggerson of the Capital City Chamber of Commerce spoke in favor of the 2022 Disparity Study findings and thanked staff for its collaboration amongst the multiple jurisdictions and the multiple chambers of commerce in the development of the study.

Tracey Cohen, MWSBE CAC Chair, spoke on behalf of the CAC and provided a summary of the CAC review and support of the 2022 Disparity Study findings. The MWSBE CAC recommended approval of the 2022 Disparity Study.

Pamala Jones Smith stated that she was the President and CEO of Burnette's Construction and Development. She stated that her business was a 100 percent woman-owned certified general contractor and inquired as to why her business was not able to be categorized as a Woman-owned business. Chair Richardson requested OEV staff to follow up with Ms. Smith regarding her question.

Christic Henry spoke on behalf of the Community Lift Institute and the Black Developer, Contractor, and Investor Alliance and she praised the OEV for their implementation of the mentor-protégé program that was initiated following the original disparity study.

Commissioner Maddox spoke in favor of acceptance of the 2022 Disparity Study findings and recommendations and thanked the chambers and the community for their work and input with the Updated Study. He praised staff and the Board for its support and implementation of the 10 Point Plan and the findings from the original Disparity Study. Finally, he highlighted the growth of the MWBE program and its community impacts.

Commissioner Proctor stated that he would not support the motion to accept the 2022 Disparity Study recommendations because of the lack of an African American specific aspirational goal. He also inquired as to how LGBTQ groups were reflected in the data. Attorney Bernal of MGT of America stated that there was not enough specific data on those groups to properly answer his question.

Commissioner O'Keefe spoke in support of the 2022 Disparity Study findings and recommendations and commended PLACE Director Ben Pingree, OEV Director Keith Bowers, and MWSBE Deputy Director Darryl Jones for the work they are doing with the study and throughout the community.

Commissioner Williams-Cox stated that she was looking forward to having more complete data on P-card purchasing across the different jurisdictions.

Commissioner Matlow asked for clarification as to how establishing race specific aspirational goals would reduce overall utilization. Attorney Bernal explained that race specific aspirational goals would be lower than current MBE aspirational goal of 14% and changing the overall goal would reduce the overall utilization. Commissioner Matlow asked why the City isn't seeing the same growth in minority utilization as Blueprint and the County. Darryl Jones explained that the City does not capture subcontractor data the same as Blueprint and the County and that the growth may be there but that the study was not able to fully analyze the data.

Commissioner Caban asked what would be the legal ramifications of setting race specific aspirational goals. Attorney Bernal stated that any goal or policy recommendation included in the study must be legally defensible and backed by the data. Attorney Bernal stated that the current goals and policies included in the study met those standards.

Commissioner Cummings thanked Dr. Seamon, Attorney Bernal, the chambers, and staff for their work on the Disparity Study. She then inquired as to whether staff could provide a workshop explaining the legal defensibility of the aspirational goals and the recommendations contained in the study. Director Pingree explained that staff intends to bring presentations before the City Commission, the County Commission, and the IA Board related to current spend data and policy update recommendations based on the findings in the study. He stated that if a workshop was still necessary following those presentations staff would follow Board direction.

Commissioners Richardson and Minor also spoke in support of the motion to accept the Disparity Study findings and recommendations.

**Motion Passed 11-1 (weighted 65 -5)
Commissioners Cummings and O'Keefe voted via WebEx. Commissioner Proctor voted in dissent.**

VI. DIRECTOR DISCUSSION

There was no further discussion by the directors.

VII. ADJOURN

The meeting adjourned at 4:45 p.m.

*The next Blueprint Intergovernmental Agency Board of Directors Meeting is scheduled for **March 9, 2023.***

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Blueprint Intergovernmental Agency Board of Directors Agenda Item #2

March 9, 2022

Title: Authorization to Advertise and Award Construction Services for the Tallahassee-Leon County Animal Service Center Project

Category: Consent

Intergovernmental Management Committee: Vincent S. Long, Leon County Administrator
Reese Goad, City of Tallahassee Manager

Lead Staff / Project Team: Benjamin H. Pingree, Director, Department of PLACE
Autumn Calder, Director, Blueprint
Daniel Scheer, Design and Construction Manager, Blueprint
Martha Hodgson, Project Manager, Blueprint

STATEMENT OF ISSUE:

This agenda item seeks authorization by the Blueprint Intergovernmental Agency Board of Directors (IA Board) to advertise and award a contract for construction services for the Tallahassee-Leon County Animal Service Center project. This project will renovate the dog kennel and shelter medicine areas, as well as construct quarantine dog yard. Construction services include the construction of the project and design services for the duration of the construction phase. The requested procurement is estimated to be \$3.5 million, which is within the IA Board approved Fiscal Year (FY) 2022 capital budget. This agenda complies with Blueprint Procurement Policy.

FISCAL IMPACT:

This agenda item does have a fiscal impact; however, funds necessary to proceed with the requested procurement activities have been approved by the IA Board in the FY 2022 Blueprint Capital Budget. The requested procurement is estimated to be \$3.5 million, and funding is currently available in the project account

RECOMMENDED ACTION:

Option 1: Authorize Blueprint to advertise and award a contract for construction services for the Tallahassee-Leon County Animal Service Center project.

SUPPLEMENTAL INFORMATION:

BACKGROUND

Consistent with Blueprint Procurement Policy and within the approved budgetary allocation for this project, this agenda item requests authorization to procure construction services for the Tallahassee-Leon County Animal Service Center Project. In March 2021, as commissioned by the City of Tallahassee Parks, Recreation, and Neighborhood Affairs Department, a Needs Assessment Report (Attachment #1) was completed by Animal Arts, Inc., which determined that key facility upgrades to the existing Animal Service Center were necessary in the near term. At the September 27, 2021 meeting, the Needs Assessment report was presented to the IA Board and Blueprint was directed to advance this project within the five-year work program and to present a budget amendment at the December 9, 2021 meeting to fund the Animal Service Center project in FY 2022. The Needs Assessment Report specifically identified three Priority #1 areas of needed improvements for the Animal Service Center:

- 1.) Renovations to dog kennels to fix critical operational and sanitation problems,
- 2.) Renovations to Shelter Medicine Area to improve functionality of the veterinary space,
- 3.) Addition of Quarantine Dog Yards.

Per the findings of the Needs Assessment Report and prior IA Board direction, these Priority #1 improvements, “will bring best value to the staff and animals in the short term, and create a more sanitary, functional, and lower-maintenance environment, while improving some of the aesthetics.” At the December 9, 2021 meeting, the IA Board approved funding for the three key Priority #1 improvements. The design phase of the project was initiated following the IA Board at that meeting using a Blueprint Continuing Services Contract with BKJ-Architecture.

ANALYSIS:

This agenda item requests authorization from the IA Board for the procurement of construction services for the Tallahassee-Leon County Animal Service Center Project. As described below, this project provides three priority improvements for the existing Animal Service Center: 1.) Renovations to dog kennels to fix critical operational and sanitation problems, 2.) Renovations to Shelter Medicine Suite to improve functionality of the veterinary space, and 3.) Addition of Quarantine Dog Yards.

Dog Kennel Renovations

The dog kennel renovations will improve the conditions for the animals housed there as well as for the animal care staff. Improvements include:

- Removal of the existing kennel enclosures, guillotine doors and associated components for replacement.
- Removal of existing concrete masonry dividing walls between individual kennels

- Replacement of existing fixtures with new LED fixtures and additional fixtures to provide enhanced lighting levels.
- Repairing and repainting of interior walls, interior structure, and exterior walls at the kennel runs.
- Installing a replacement drain system and demolition of kennel slabs and aisle slabs as needed to accommodate new drain and piping systems.
- Installation of a new trench drain system for each individual kennel with new cover grates, new waste and vent piping and replacement of floor drains at aisles.
- New sealed or urethane coated concrete slabs in the kennel areas.
- Replacement of existing, and adding additional hose reels for a total of 16, 4 at each kennel run.
- Installation of a new kennel run wall systems and new dual-side operation kennel doors, including modifications to the existing kennel door openings.
- Installation of sound reduction panels over the kennels in order to reduce the high decibel levels that exist inside the kennels.

Shelter Medicine Suite

The renovations in the shelter medicine suite will increase the usable area and functionality of the suite by expanding the clinic area into an adjacent available space and renovating that space to be a contiguous medicine suite. Improvement include:

- General demolition and removal of the masonry wall separating the existing Recovery and Exam rooms to expand the clinic area (existing x-ray equipment to be relocated prior to demolition work).
- Ceiling will be replaced with a new acoustic ceiling tile system.
- Relocation of the animal recovery cages.
- New laminate millwork and countertops to replace existing cabinetry.
- Additional millwork to be added in the existing exam room.
- Replacement of existing lighting throughout the suite with new 2x2 LED fixtures and relocation of existing return air and supply air diffusers to match the new space configuration.
- Finishes in the shelter medicine suite will match existing adjacent finishes.

Quarantine Dog Yards

This improvement includes the creation of two small fenced-in yards exterior to the quarantine kennels in order to provide outside exercise space for dogs in quarantine situations separate from other dogs. Improvements include:

- Located to avoid any impacts to existing trees on the site.

- Nominal grading to accommodate the new quarantine yards.
- A concrete paved walkway enclosed by a fence with direct access from the quarantine kennels to the quarantine yards.
- A 20 ft. x 15 ft. and 20 ft. x 20 ft. yard will be constructed with a concrete perimeter curb to prevent digging or escape and include isolated entrance access points.
- The walkway and yards will include 8 ft. tall solid panel architectural fencing and metal gates with expanded metal facing.
- All fencing and gates will include ‘coyote rollers’ at the top to avoid escape of quarantined dogs.
- The yard system will consist of pet-friendly artificial K9 grass designed specifically for dogs.
- A fabric shade-structure is proposed for the quarantine yards.

BLUEPRINT PROCUREMENT POLICY

This agenda item complies with Blueprint Procurement Policy and requests authorization to advertise and award a contract for construction services for the Tallahassee-Leon County Animal Service Center project. If authorized by the IA Board, Blueprint will issue an Invitation for Bids (IFB) for the construction services described herein and award to the lowest-price responsive bidder. The solicitation will comply with Blueprint Procurement Policy Section 101.07(3) and include collaboration with the Office of Economic Vitality and MWSBE Policy in identifying a project-specific goal for minority and women participation. Through the approval of Option #1, the IMC will have the authority to award the contract for construction services for Animal Service Center improvements.

NEXT STEPS

Upon IA Board authorization, Blueprint will finalize the scope of services for this project and work with the City of Tallahassee Procurement Division to issue the Invitation for Bids for construction services for the improvements to the Animal Service Center, as detailed herein.

Spring 2023:	Upon IA Board approval, procure construction services for the Animal Services Center improvements
Summer 2023:	Construction begins on the Quarantine Yards and Veterinary Medicine Area
Fall 2023:	Construction begins on the Large Dog Kennels
Winter 2024:	Construction complete

Action by the CAC: An update on the Animal Service Center project was presented to the CAC at their February 23, 2023 meeting.

OPTIONS:

- Option 1: Authorize Blueprint to advertise and award a contract for construction services for the Tallahassee-Leon County Animal Service Center project.
- Option 2: IA Board Direction.

RECOMMENDED ACTION:

- Option 1: Authorize Blueprint to advertise and award a contract for construction services for the Tallahassee-Leon County Animal Service Center project.

Attachment:

1. Animal Service Center Needs Assessment Report



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The City of Tallahassee Animal Services

Needs Assessment Report Addendum

March 2021



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1. Purpose

Animal Arts completed a needs assessment for a new animal shelter for the City of Tallahassee in April of 2019. Due to the extent of renovations that would need to be undertaken to allow the current animal shelter to serve the city for the next several decades, the needs assessment recommended the construction of a new animal shelter to serve the City of Tallahassee into the future. This recommendation still stands, but in the time since the report was completed, the City of Tallahassee weathered the global pandemic, which affected government budgets throughout the state of Florida.

Given that it might be some time before a new shelter is funded, Animal Arts was directed to provide recommendations for short-term, high-priority renovations for the current animal shelter facility. This addendum to the Needs Assessment Report covers the recommendations for short-term improvements to the facility. Recommendations are based on detailed conversations with animal services staff, as well as City of Tallahassee facilities personnel.



2. Executive Summary

After careful review of priorities, design ideas, and solutions with City of Tallahassee staff, Animal Arts has categorized the following potential short-term renovations to the shelter, along with the following ballpark costs.

Priority 1

Renovation to Dog Kennels to fix most major operational and sanitation problems

Scope of square footage: 8,014 square feet

Project Costs in 2021 Dollars: \$2,973,276

Options: The project can be reduced by renovating some but not all kennel areas

Renovation to Shelter Medicine Area to improve functionality of the veterinary space

Scope of square footage: 300 square feet

Project Costs in 2021 Dollars: \$195,750

Addition of Quarantine Dog Yards

Scope of square footage: 1,100 square feet exterior

Project Costs in 2021 Dollars: \$103,125

Priority 2

Addition of a New Community Outreach Center

Scope of square footage: 2,836 square feet

Project Costs in 2021 Dollars: \$1,865,170

Renovation of the Cat Adoption Area

Scope of square footage: 357 square feet

Project Costs in 2021 Dollars: \$359,346

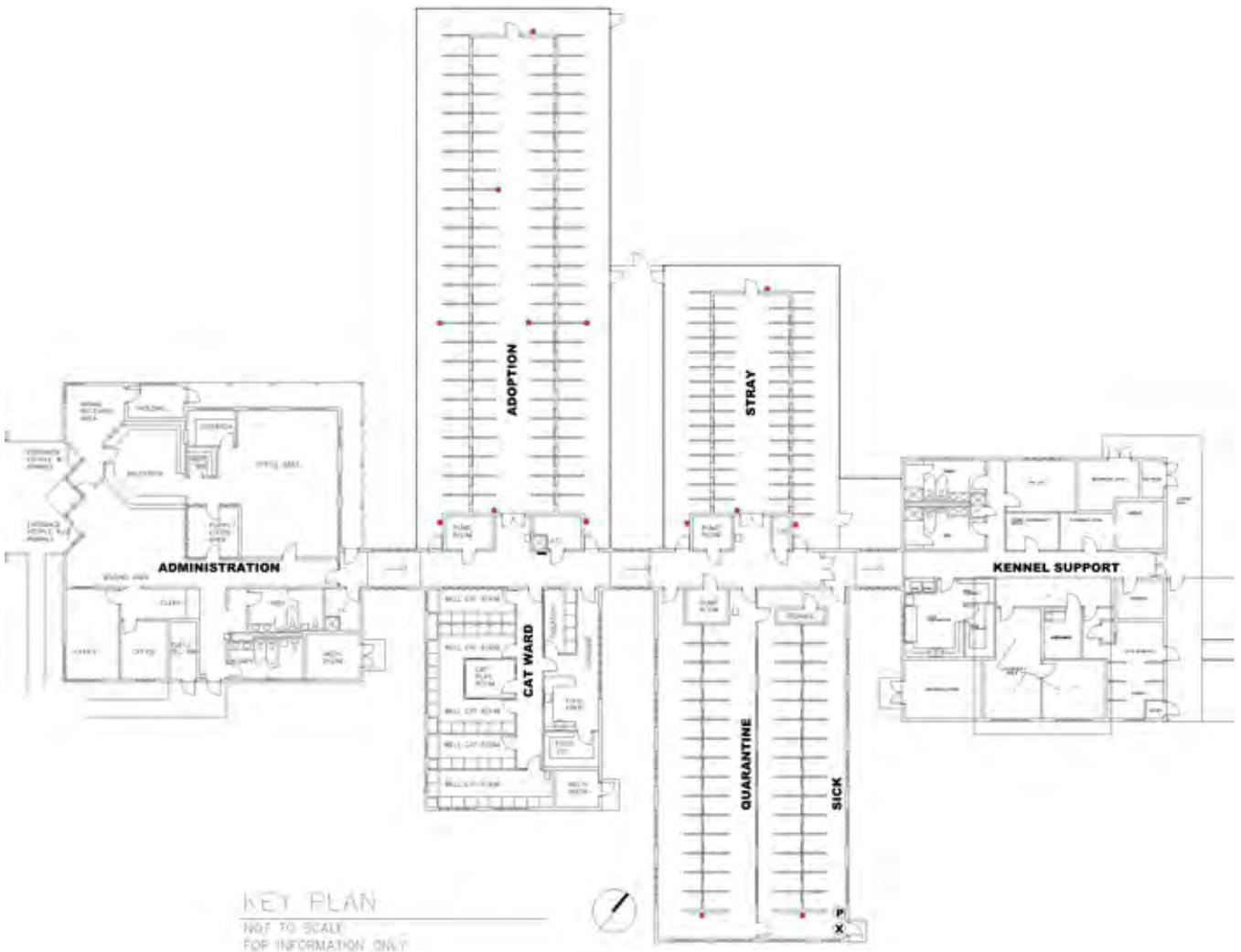
Full descriptions of these renovations are included in the enclosed report.



3. Summary of Process

Weekly meetings were held in November and December 2020. The work was finalized in January of 2021 and is documented below. This report represents the opinions of most urgent requirements for running the City of Tallahassee Animal Shelter, as well as programmatic priorities for the near future to address the issues in society that lead to animal homelessness, without large investments in facilities.

For purposes of this addendum, please refer to this overall floor plan of the existing facility. Parts of this plan will be enlarged and discussed, as they are identified as areas for improvement.



Programs and Recommendations

Priority 1 Renovation Recommendation - Kennel Renovations

The existing kennels are in poor condition and cause numerous operational hassles for animal care staff. Below are photos of existing conditions in the kennels. These are the primary concerns we wish to address with a short-term renovation:

- Kennel Components
 - Guillotine doors (doors between inside and outside) do not work.
 - Continuous drains require too much maintenance, do not work well, and allow for cross contamination between dogs, which is unsanitary and leads to diseases in the shelter. The drain covers were manufactured individually per kennel, which means they are difficult to maintain and repair.
 - The flush mechanism for the drains is inside the kennels; employees must enter the kennels to flush them.
 - The dog bowls that fit into the chain link run system are unnecessarily expensive.
 - The chain link is unsafe, hard to clean, and not durable enough.

- Infrastructure
 - In the past, ceilings were removed due to rodent issues in the kennels, and spray foam was added. The foam does help with noise control, but it is unsightly. Aesthetics matter because an animal shelter needs to be a comfortable and reasonably attractive environment for adopters to want to visit and take animals home.
 - Bare walls and floors are unsealed, which is not very sanitary nor is it attractive.
 - The lighting is over the aisles only, which means the kennels are dimly lit. Not only is this undesirable for adoption environments (adopters need to see the animals), but it is also not as safe for staff members who are caring for animals.
 - Exposed finishes need repainting.
 - The exterior of the kennel building desperately needs some drainage repair to the sidewalks, as well as new gutters for the building, because stormwater currently enters the existing kennels. ***It is our understanding that the City of Tallahassee is currently working on this project separately, and therefore it is not budgeted within this report.***





Considerations for Renovations

It must be understood that no matter what is done to renovate the kennels, not all existing problems can be remedied. For example, dogs will still face each other across an aisle, which is an undesirable way to house dogs in animal shelters, as it leads to increased stress and barking. The difficulty of renovating kennels in place is one of the most important reasons for recommending a new shelter in the initial needs assessment. Add to this the fact that kennel renovations are expensive. Thus, the recommendations in this report are not intended to fix everything (that would be a rebuild), nor are they intended to unnecessarily waste money on lower priority items, such as completely covering the exposed ceiling foam, which is not pretty but is reasonably functional.

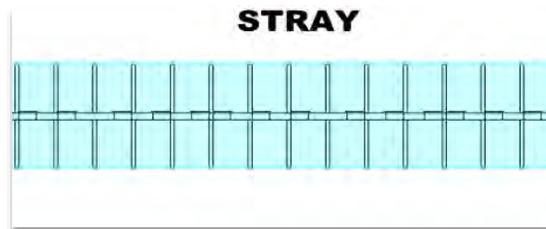
We are providing a list of renovations that we believe will bring best value to the staff and animals in the short term, and create a more sanitary, functional, and lower-maintenance environment, while improving some of the aesthetics.

Recommendations for Kennel Renovations

Below is an overall list of the renovations, as well as detailed descriptions of each line item.

Priority 1	Kennel Renovation
A	Repair Exterior Storm Drainage System So Rain Doesn't Drain into Kennels
B	Move Dogs, Demolish Kennel Chain Link + Guillotine Doors
C	Demolish All Walls, Flooring and Drainage
D	Install Drains for Kennels (no flushing system), Construct New Floor Slab, Seal Slab
F	Install Additional Lighting Over Kennels
E	Clean Thoroughly and Repaint the Walls/Ceilings
G	Install Additional Sound Control Panels (Select Areas, Rodent Proof)
H	Replace Hose Reels and Add New Reels
I	Install New Kennel System and Guillotine Doors with Dual Side Operations
J	Install Thresholds at Exterior Kennels to Prevent Water from Entering Kennels

- A. Repair exterior storm drainage. It is our understanding that the work is ongoing, separate from this project.
- B. Move Dogs, Demolish Kennel Chain Link + Guillotine Doors.
 - a. Renovations must be done per kennel area so animal care staff can move dogs to other kennels. Populations of animals have been lower since the start of the pandemic, and this allows for moving animals, provided that renovations commence quickly, as we do not know whether populations will rise again after the pandemic ends.
 - b. All chain link gates and guillotines, and other run components in the kennel to be renovated are to be demolished.
- C. Demolish all Walls, Flooring, and Drainage Systems
 - a. Existing bearing walls and foundations must remain, as well as underground piping to serve new drainage systems. Demolish all half concrete walls between kennels inside and outside, and demolish the slabs within the actual kennel, both inside and outside the buildings. Below is a diagram to show which area should be demolished, per kennel. It is acceptable for the contractor to demolish the aisle flooring in the kennel as well, if this will yield a cleaner installation.



- D. Install New Drains for Kennels (no flushing system), Construct New Floor Slab, Seal Slab
 - a. Prior to proceeding with the work, a schematic design should be completed to lay out new kennel partitions and drain locations, floor slopes, etc. Some kennels will be converted into double kennels for dogs that need more space.

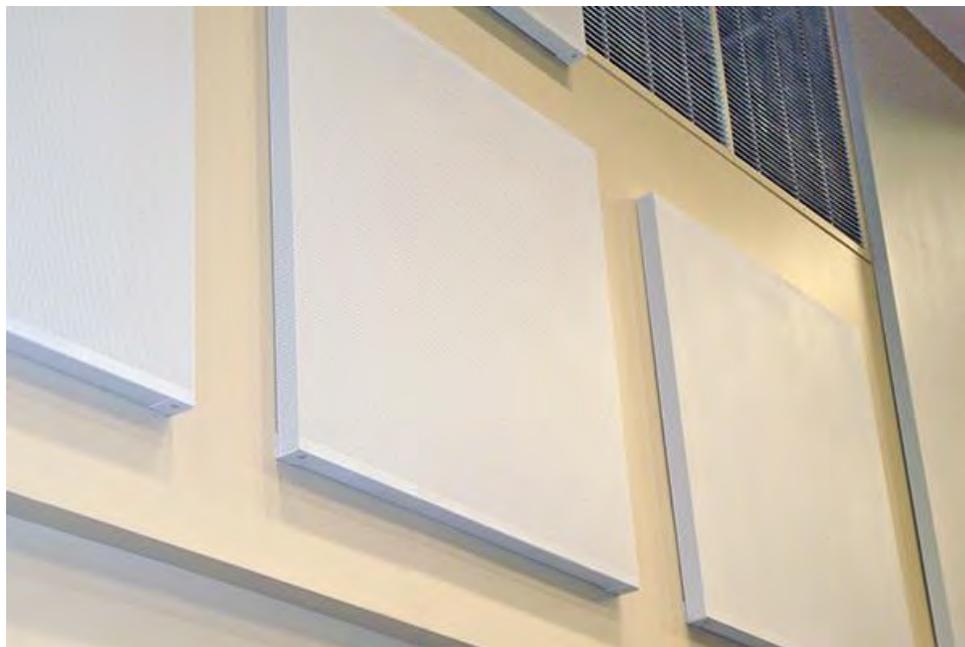
- b. Per review by a plumbing engineer with Animal Arts, the existing plumbing system is sufficient in size to have a new drain system installed. The new system would be an INDIVIDUAL trench per kennel (not a continuous trench), both inside and outside, so two trenches per each kennel. This is a typical design for Animal Arts. This system does not clog like the continuous trench because the drains collect very small amounts of hair and debris per kennel, and the connections are oversized to allow for any small hair and debris to pass through without clogging. The grate on top prevents large debris from entering the trench. Below is an example of this installation in another project.



- c. New floor slab requirements are as follows:
- i. Either entire slab is demolished, or aisle can remain.
 - ii. Aisle drainage can remain, and new slab should slope toward the drains. Drain bodies themselves could be replaced if desired.
 - iii. New drains at kennels to be placed so that concrete in kennel will slope at $\frac{1}{4}$ " per foot to the drain, then slope back up to meet exterior wall.
 - iv. Heavy duty vapor barrier to be installed at new slab areas. 15 mil Stego Wrap, or equal, is an acceptable product.
 - v. New slab to be 6" thick at thickest, tapering down to drain, reinforced with rebar reinforcing at 16" o.c.
 - vi. A .45 water/cement ratio is recommended. Water curing is recommended. Place control joints as recommended by local structural engineer.
 - vii. New slab to be finished as follows:
 1. Apply a densifier seven days prior to final sealant installation, such as Lithi-tek 4500.
 2. Apply a sealer to the slab such as Ghostshield penetrating concrete sealer.
 3. Apply flexible, chemical resistant sealant to control joints, construction joints, and any shrinkage cracks to obtain the most sanitary conditions.
 4. Protect sealer during remaining construction.

Please note, this solution is not what we would do for new construction, where we would use a resinous flooring product as the final installation. We are recommending a lower cost solution that will improve the conditions in the kennels.

- E. Install Additional Lighting Over Kennel
 - a. Install strip lights like existing aisle lights, over kennels.
- F. Clean Thoroughly and Repaint Walls/Ceilings
 - a. Clean and dry all walls, then install, according to manufacturer's strict written instructions and on-site supervision, the following system:
 - i. Prep as required (sand blast, etc.)
 - ii. Remove debris and then install two to three coats of Sherwin Williams Chem Kati-Coat Epoxy Block Filler/Sealer to completely fill pinholes. Then two to three coats of Sherwin Williams Sherloxane coating. This will yield a hard, glossy, sanitary coating that will last until a new building can be constructed. Nevertheless, proceeding without manufacturer participation will likely result in failure, so proper prep/supervision is essential.
 - iii. Paint ceiling with Sherwin Williams dry fall coating, including sprayed foam (if allowed by manufacturer of foam) and the rafters/exposed metal ducting, etc. Use a light grey to lighten up the interior while not being so light that dirt will show.
- G. Install Additional Sound Control Panels
 - a. While it will never be possible to reduce much noise in these kennel spaces, we recommend adding additional ceiling baffles where possible between the light fixtures/rafters. These need to be rodent proof. We recommend metal perforated baffles such as the ones shown below, achieving at least a .90 Noise Reduction Coefficient. These are a commodity product and can be ordered from several manufacturers.



- H. Replace Hose Reels and Add New Reels. A quantity of 15 replaced and new hose reels should be provided to serve the kennels. Confirm final locations with animal services. For a recommended specification, use a CoxReel EZCoil. These have a clutch to prevent the hose from snaking back quickly, and they are safer than other products.
- I. Install New Kennel System and Guillotine Doors with Dual Side Operations
 - a. We recommend products from Shor-Line. We are recommending their most durable stainless steel bar line, exterior and interior. We also recommend using their side panels rather than the concrete walls, as this provides more flexibility, and takes up less room. Kennel fronts can be outfitted with a combination of bars, glass, and solid to prevent dogs from staring at each other across the aisle. Shor-Line will need to provide dual side operation for guillotine doors, which will not be easy. Animal Arts can assist in putting together a formal quote; right now, we have included ballpark costs from other projects.
 - b. Below is an example of prefabricated stainless-steel kennels, similar to what is recommended.



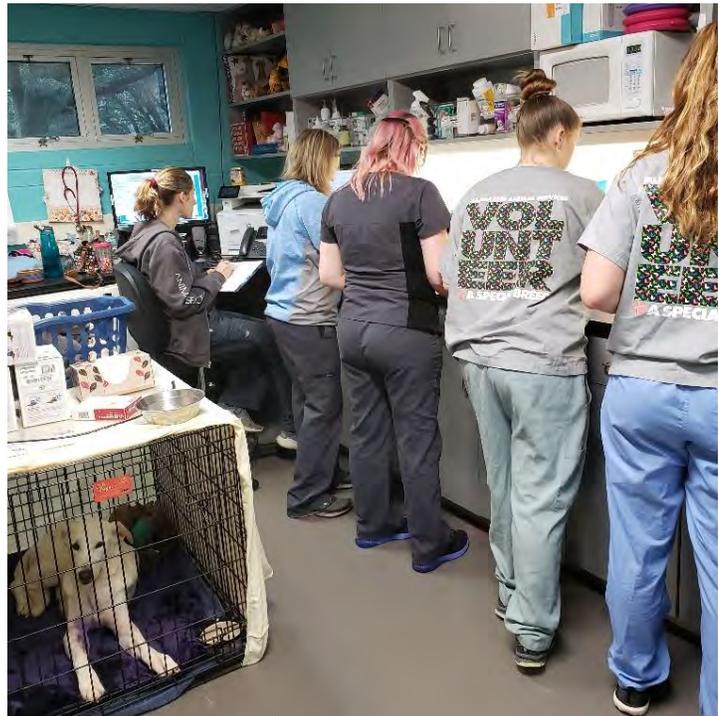
- J. Install Thresholds at Exterior Kennels to Prevent Water from Entering Kennels
 - a. The reason for this recommendation is that the city may be unable to fix all the exterior drainage issues (many of which also contributed to our recommendation to replace the building). An engineered stone threshold between exterior kennel and walkway, such as one like the product pictured below, would help.



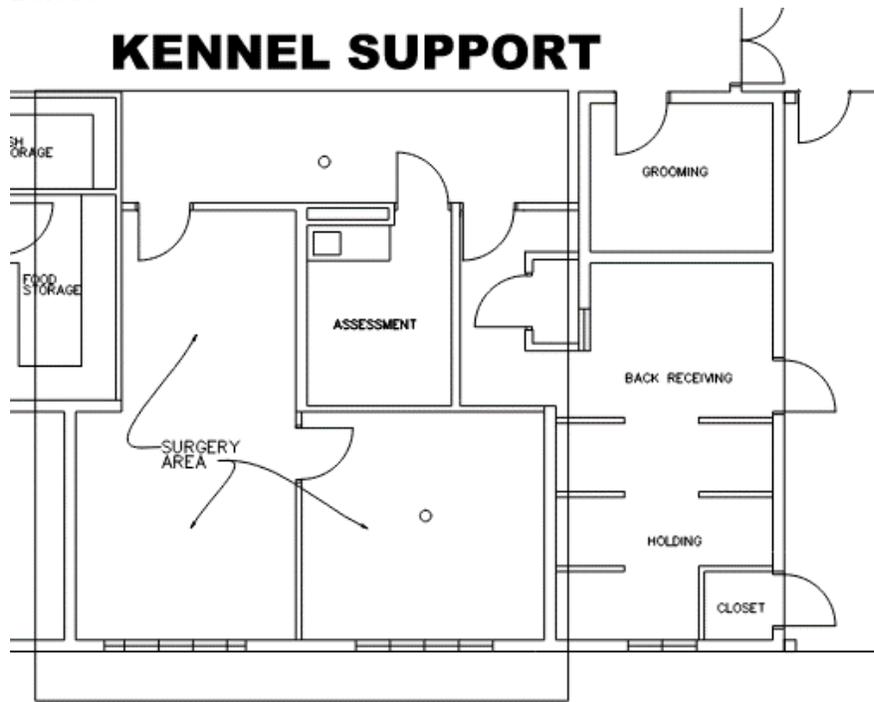
Priority 1 Recommendation - Shelter Medicine Expansion

The second priority 1 renovation relates to expansion of the shelter medicine area of the building. The existing clinic is absurdly undersized, as is evidenced by this photo.

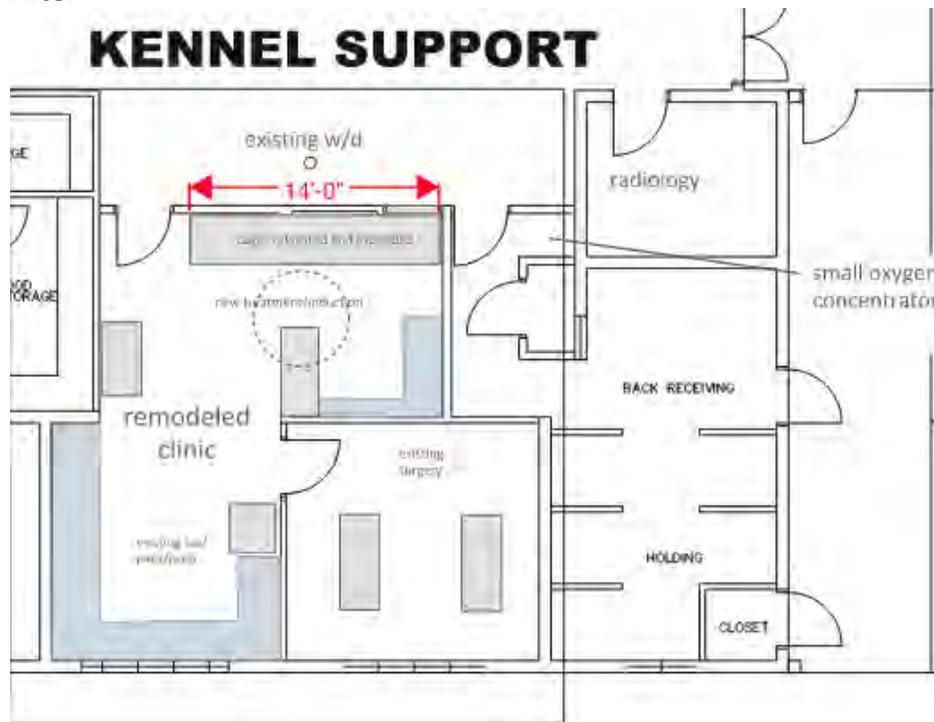
Unfortunately, there is VERY little space to expand (part of the reason we recommended a new building), and so we are proposing a very modest update to take over the assessment area of the plan to provide more space to the clinic. See before and after plan diagrams below.



Before



After

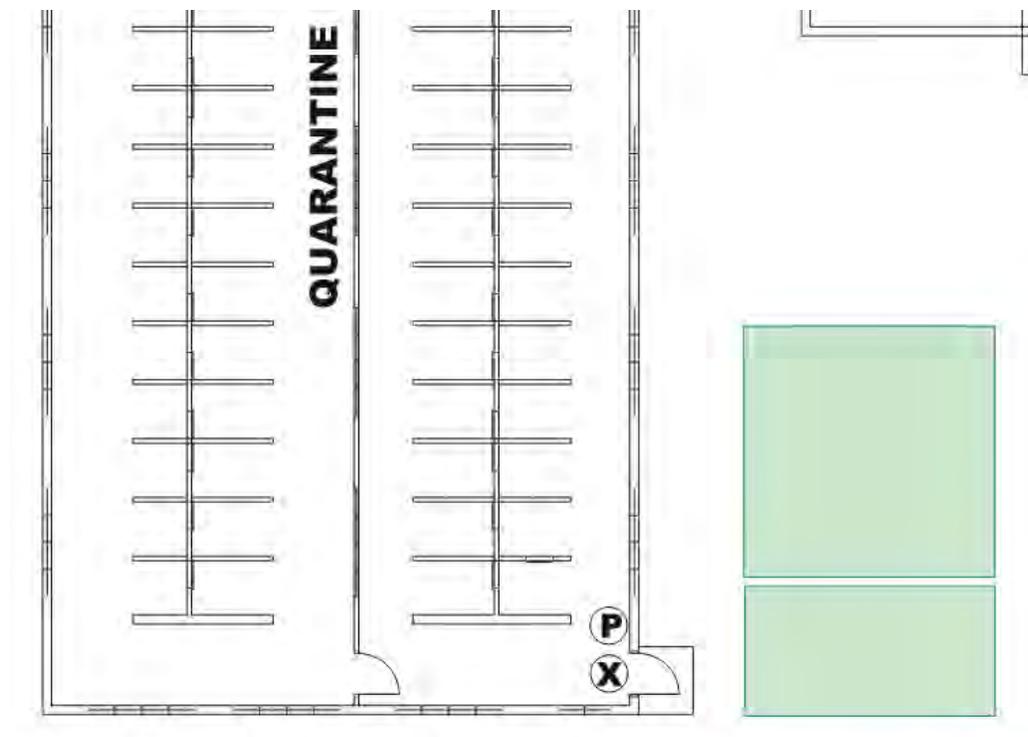


The project is described as follows:

- Demolish walls around assessment room.
- Match finishes to clinic, add new cabinets and a table for treatment/induction in expanded clinic area where former assessment room was. Relocate and expand animal caging.

Priority 1 Renovation Recommendation – New Quarantine Yards

This project is to create two small yards exterior to the quarantine kennels (south end of building, east side of kennels) for dogs in quarantine/court hold situations, separate from other dogs. This is a matter of safety for staff. The two yards would be approximately 15' x 20' and 20' x 20' respectively. Below is a diagram.



Recommended Materials are as follows:

- Solid fencing to a height of 8', such as the aluminum privacy fence shown. The fencing must be equipped with Coyote Rollers to prevent dogs from escaping.
- Provide a combination of concrete and hoseable turf such as K9Grass by Foreverlawn. Unfortunately, this must be shaded, so a canvas sail should be provided for each yard., stretched over yard from fence line to fence line.
- Provide a yard hydrant for hosing the yards.



Priority 2 Renovation Recommendation – Community Outreach Center

The animal sheltering industry is changing rapidly. Around our nation, proactive services such as spay/neuter programs and humane education have reduced the number of animals entering animal shelters every year. The future of animal sheltering for local governments will place less emphasis on animal holding and more emphasis on expanding services to communities to prevent animal homelessness; therefore, further driving down the number of animals entering shelters.

Because this project has had a pause in the funding, we have the opportunity to work on projects that may reduce the ultimate scope of the future shelter, which will be good for the City of Tallahassee. The most effective project for many communities is to provide affordable veterinary care. Lack of access to affordable veterinary care is one of the, if not THE, leading cause of animals being relinquished to shelters. Lack of access to affordable veterinary care is also a risk to pets, who will not otherwise see a veterinarian, and therefore may suffer from health conditions that can be addressed.

Animal Services staff strongly believe that adding a modest community center to the property at the City of Tallahassee existing animal shelter will provide much needed services and will reduce the burden of homeless animals over time. We agree based on experience with other communities. Therefore, as a second priority renovation to the building, we propose a community outreach center with the following program. This center could likely be constructed in as few as 2,400 s.f. if necessary. The property is large enough to accommodate a building of this size, and this clinic building could be constructed to meet Florida codes, but otherwise very modestly. Centers, such as this, generally cost \$100 less per square foot than shelters, as they do not have the same durability requirements.

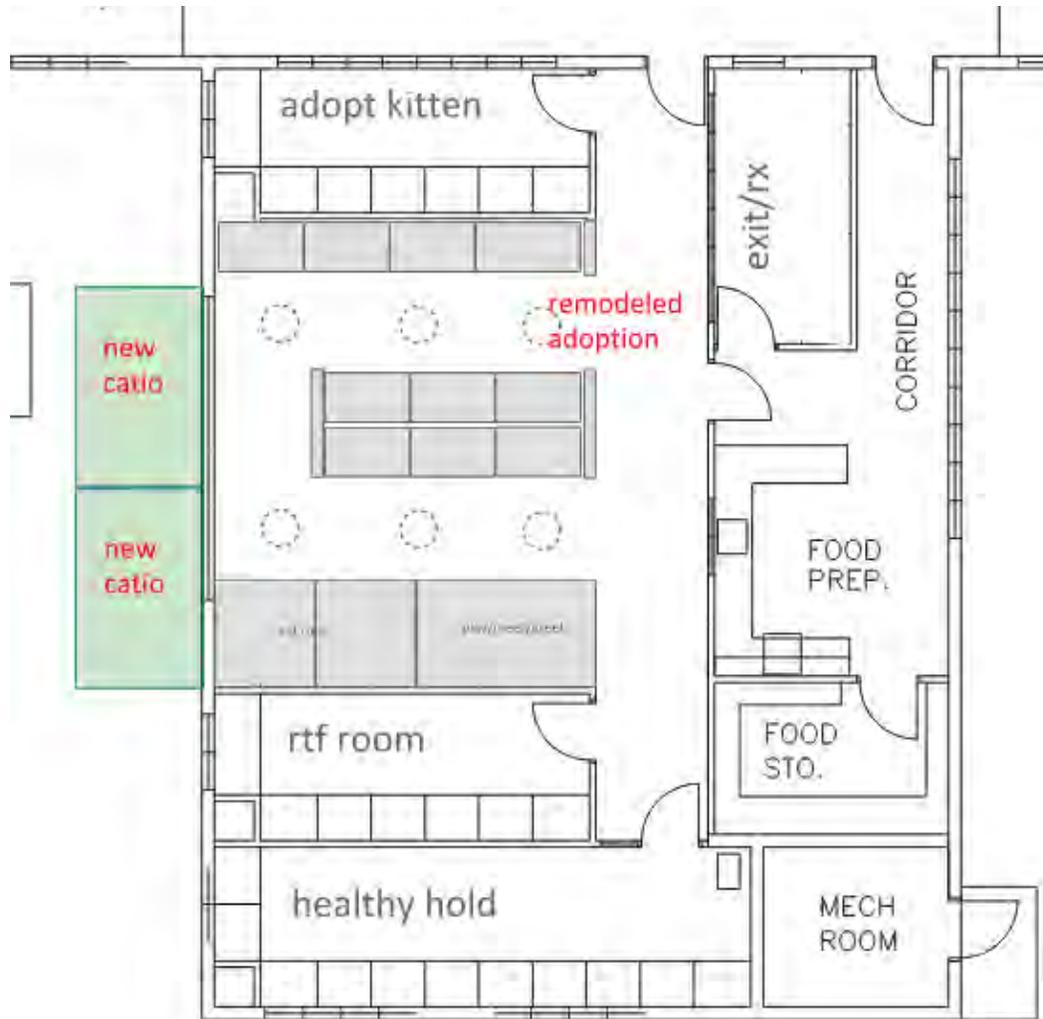
Waiting Porch	1	8	x	20	=	160	1.33	213
Vestibule	1	7	x	8	=	56	1.33	74
Waiting Room/Reception	1	15	x	20	=	300	1.33	399
Restrooms	2	7	x	8	=	112	1.33	149
Exam Rooms	3	9	x	10	=	270	1.33	359
Comfort Room	1	10	x	10	=	100	1.33	133
Lab/RX and Tech Station	1	10	x	14	=	140	1.33	186
Treatment	2	10	x	12	=	240	1.33	319
Dental	1	10	x	12	=	120	1.33	160
Dog Ward	1	10	x	20	=	200	1.33	266
Cat Ward	1	8	x	10	=	80	1.33	106
Storage/Utility	1	9	x	14	=	126	1.33	168
Office	1	10	x	10	=	100	1.33	133
Mini-Break	1	8	x	10	=	80	1.33	106
Electrical	1	6	x	8	=	48	1.33	64
								2,836 s.f.

Priority 2 Renovation Recommendation – Improve Cat Adoption

Improvements to Cat Adoption areas have been identified as a priority by Animal Care staff. Many of the cat housing units, while not poor, do not meet the quality that is expected in a modern animal shelter. Cats that are staying longer have no options other than stainless steel boxes to live in, and no access to the outside. We propose a very modest renovation to the cat adoption areas at the City of Tallahassee Animal Shelter, to provide some better housing and to provide outdoor areas known as catios, so the cats can get fresh air.

Below is a simple plan diagram of the renovations, showing new caging and walls in grey, and new fun light fixtures in the ceiling (the circles), as well as new catios, which will need to be accessed from new doors.





Below is a description of the recommendations for finishes and materials:

- Double-stacked, 4' or 5' cat "Euro" condos by Snyder Manufacturing.
 - While these condos can be double or triple stacked, double stacked is recommended. These condos can be built in or on wheels. For the short term, we recommend the City of Tallahassee purchase them on wheels. In the longer term, they can be relocated to the new shelter and built in. These can be ventilated or not ventilated. For flexibility, we recommend unventilated. Snyder offers many options for these condos, but we recommend:
 - Double compartment (two equal compartments).
 - Four- or five-foot sizing. Measure the existing spaces to maximize the size of these condos, using 4' as a minimum and 5' where a foot extra is offered by the size of the rooms. Animal Arts' floor plan diagram above can be a guide.
 - Quiet latches on the cages.
 - Bars on top and glass on the bottom.



- A bench in the clean/food side of the cage. Litter side is better without a bench to leave plenty of space for posturing at the litter box.



- Custom cat runs by Snyder Manufacturing.
 - The plan for the adoption area shows two custom cat runs by Snyder Manufacturing. These are products adapted from dog runs, that have climbing platforms and benches in them, which can be customized by the City of Tallahassee. Work with field measurements and Snyder to develop the options that are desirable for the runs. These will be great for two cats or one cat that needs more space.



- Catio to the Exterior
 - The plan shows two new catios. These should have concrete slabs and metal screen surrounds, with solid roofs. Please see the image below.



- Other elements of the cat adoption room:
 - Meet/Greet rooms. These should be custom constructed of glass storefront. If they do not go all the way to the ceiling, it will help with ventilation.
 - Glass doors. We recommend aluminum storefront.
 - Finishes:
 - Grind and polish the existing concrete – seal all cracks.

- Apply a porcelain tile to the walls for dressy appearance and durability up to 7'-2" (top of door jamb). Use epoxy grout. If the funding is not available for porcelain tile a porcelain tile base with Acrovyn panels (.40 mm PVC) on the walls above to at least 5' would be acceptable. Above this line, use an epoxy paint such as Sherwin Williams Precatalyzed Epoxy. Above is a photo of Acrovyn.



- Replace the ceiling in this room with a sanitary ceiling with noise reduction qualities—we recommend Rockfon Medical Plus, which is a cleanroom-quality ceiling tile that has noise reduction of .90 which means 90 percent absorption within tested frequency range. Armstrong Ultima High Washability is also acceptable.

- Provide some very fun lighting design in the space. We recommend LED lighting. The round hoop shapes in the plan can be drywall soffit clouds or lighting.



- Music for the cats. Sonos systems with standalone speakers are fine if there isn't the funding for a built-in speaker system.
- Cat climbing and play equipment. A budget for enrichments is included in the equipment portion of the budget.

5. Budget for the Work

Animal Arts developed the following ballpark recommended budgets for the work, based on the outline of recommended projects.

Priority 1: Critical Dog Kennel Renovations						
Hard Costs						
Dog Kennel Scope						
Demolition	8,014	s.f.	x	\$5	\$40,070	
New Slabs	8,014	s.f.	x	\$20	\$160,280	
New Drains	\$2,500	per drain		220	\$550,000	
New Cox Reels	\$4,000	reel	x	15	\$60,000	
Finishes and Lighting	8,014	s.f.	x	\$70	\$560,980	
General Conditions	8,014	s.f.	x	\$35	\$280,490	
Subtotal Hard Costs					\$1,651,820	
Soft Costs						
Professional	10%	=			\$165,182	
Equipment	55%	=			\$908,501	Covers new Dog Runs at +/- \$7,500 per run + Installation
Contingency	15%	=			\$247,773	
Subtotal Hard Costs					\$1,321,456	
Total Project Costs					\$2,973,276	
Inflation beyond early 2022					4.5% per year	

Note: Although this is a very expensive renovation, the City of Tallahassee has an option to simply renovate one out of three kennels, or two out of three kennels. This would result in proportional reductions in costs.

Priority 1: Shelter Medicine Renovation						
Hard Costs						
Construction	300	s.f.	x	\$450	\$135,000	
Subtotal Hard Costs					\$135,000	
Soft Costs						
Professional	10%	=			\$13,500	New Veterinary Equipment
Equipment	20%	=			\$27,000	
Contingency	15%	=			\$20,250	
Subtotal Hard Costs					\$60,750	



Total Project Costs					\$195,750	
Inflation beyond early 2022					4.5% per year	
Priority 1: Addition of Quarantine Yards						
Hard Costs						
	Construction	1,100	s.f.	x	\$75	\$82,500
Subtotal Hard Costs					\$82,500	
Soft Costs						
	Professional	10%		=		\$8,250
	Contingency	15%		=		\$12,375
Subtotal Hard Costs					\$20,625	
Total Project Costs					\$103,125	
Inflation beyond early 2022					4.5% per year	
Priority 2: Community Outreach Center						
Hard Costs						
Veterinary Clinic Construction						
	Site Cost Allowance					\$250,000
	Architectural	2,836	s.f.	x	\$375	\$1,063,500
Subtotal Hard Costs					\$1,313,500	
Soft Costs						
	Professional	10%		=		\$131,350
	Equipment	17%		=		\$223,295
	Contingency	15%		=		\$197,025
Subtotal Hard Costs					\$551,670	Covers Veterinary Equipment
Total Project Costs					\$1,865,170	
Inflation beyond early 2022					4.5% per year	

Priority 2: Cat Area Renovations

Hard Costs					
Cat Adoption					
Construction	657	s.f.	x	\$225	\$147,825
Catio Allowance					\$100,000
Subtotal Hard Costs					\$247,825
Soft Costs					
Professional	10%	=			\$24,783
Equipment	20%	=			\$49,565
Contingency	15%	=			\$37,174
Subtotal Hard Costs					\$111,521
Total Project Costs					\$359,346
Inflation beyond early 2022					4.5% per year

Cat Housing and Enrichment



6. Recommendations for Next Steps

We recommend the City of Tallahassee reviews funding and priorities to develop the confirmed list of short-term renovations. Once these are confirmed, we recommend proceeding into design. Animal Arts should be involved, at least as a consultant, to follow through on the recommendations and ensure they get implemented properly.

We look forward to seeing the implementation of short-term facility improvement projects that will provide a steppingstone for long-term success.



Blueprint Intergovernmental Agency Board of Directors Agenda Item #3

March 9, 2023

Title: Acceptance of a Status Update on the Capital Circle Southwest Project

Category: Consent

Intergovernmental Management Committee: Vincent S. Long, Leon County Administrator
Reese Goad, City of Tallahassee Manager

Lead Staff / Project Team: Benjamin H. Pingree, Director, Department of PLACE
Autumn Calder, Director, Blueprint
Daniel Scheer, Blueprint Design and Construction Manager

STATEMENT OF ISSUE:

As requested by the Blueprint Intergovernmental Agency Board of Directors (IA Board) at the December 8, 2022 meeting, this agenda item seeks acceptance of a status update regarding ongoing improvements to Capital Circle Southwest from Orange Avenue to Crawfordville Highway.

FISCAL IMPACT

This item has no fiscal impact. Based on previous expenditures, including the Florida Department of Transportation (FDOT) construction contract for the Orange Avenue to Springhill Road segment, and budget for the future phase of Capital Circle Southwest, the overall project represents a total investment of over \$187 million to the #1 priority Blueprint project with \$180 million by FDOT and \$7 million from Blueprint.

RECOMMENDED ACTION:

Option 1: Accept the status update for the Capital Circle Southwest Project.

SUPPLEMENTAL INFORMATION:

The Capital Circle Southwest Project from Orange Avenue to Crawfordville Highway is the final planned segment of Capital Circle to be widened to six-lanes and is approximately 5.8 miles long. This project was included in the original Blueprint 2000 list and in 2012, Blueprint completed the Preliminary Design and Environmental Study (PD&E). After completion of the PD&E by Blueprint, FDOT took the lead in the design and construction of the project.

Following approval of the referendum to extend the local option sales tax from January 2020 to December 2039, the City and County Commissions respectively adopted the Second Amended and Restated Interlocal Agreement, which identifies the Capital Circle Southwest project as a first priority project. On April 1, 2015, the IA Board identified the Capital Circle Southwest project as the top priority 2020 project and directed staff to focus efforts to move the project towards completion.

The Capital Circle SW improvements from Orange Avenue to Crawfordville Highway include:

- Widening the existing two-lane road to six lanes.
- Providing a multiuse path on the east, and a five-foot sidewalk on the west.
- Adding lighting, stormwater facilities, and improved intersections.
- Providing a new bridge over Munson Slough.

The project is divided into two segments. Segment 1 is approximately 2.3 miles in length and extends from Crawfordville Highway to Springhill Road. Segment 2 is 3.5 miles and extends from Springhill Road to Orange Avenue. The segments are shown in Figure 1. Attachment #1 is the FDOT overall project description and project map.

Figure 1. Capital Circle Southwest Segments



Based on the amounts previously expended, the current FDOT construction contract for the Orange Avenue to Springhill Road segment, and budgeted amount for Segment 1, the overall project represents a total investment of over \$187.4 million to the #1 ranked Blueprint 2020 project with \$180.1 million by FDOT and \$7.3 million from Blueprint. Blueprint's expenditure of \$7.3 million was expended over multiple budget cycles that started in FY 2005 for the PD&E Study completed in 2012. To date, FDOT has expended \$120.1 million on design, right of way and construction. The remaining \$60 million is for future construction of Segment 1 from Springhill Rd. to Crawfordville Highway, as discussed further in the sections below.

Orange Avenue to Springhill Road Status: Under Construction

FDOT's work-program allocated construction funding in their Five Year Work Plan for Segment 2 and awarded a contract to M of Tallahassee for \$62.7 million in 2022. This contract includes a DBE goal of 11.85% for construction and achieved a DBE participation rate of 12% during design. Notice to proceed was provided on August 29, 2022 and work started on October 17, 2022. Construction is estimated for completion in late fall 2026. Attachment #2 is the latest project update from FDOT. Photos of construction progress as of January 31, 2023 are included as Attachment #3.

As part of the Segment 2 contract, improvements are planned for the intersection of Springhill Road and Capital Circle Southwest including installing a new drainage system, new signalization and a revised roadway profile for Springhill Road. Springhill Road is one of the roadway segments to be improved as part of the Airport Gateway. Revisions to this intersection were identified early in the design process by Blueprint staff as part of the ongoing coordination efforts with FDOT associated with the Airport Gateway. FDOT has agreed to incorporate the intersection modification into the construction contract for Capital Circle Segment 2.

Various savings and efficiencies are achieved for Blueprint by implementing these revisions concurrent with the FDOT project. The need to redo work upon the start of construction on this segment of the Airport Gateway is minimized, the unit costs of the FDOT Segment 2 project will be extended to the revisions resulting in savings versus the cost of future construction, and disruption to the traveling public is minimized by doing the work one time.

Springhill Road to Crawfordville Highway Status: In Right of Way Acquisition

The Capital Circle Southwest segment from Crawfordville Highway to Springhill Road (Segment 1) is being performed by FDOT and currently in right of way acquisition. Partial right of way acquisition has occurred, but additional right of way is needed. This phase of the project is currently expected to be complete by FY2029, but if approved by the state to advance the project, as discussed below, this timeline will be significantly truncated. Construction of Segment 1, is currently not included within FDOT's 5 year work plan.

However, an opportunity to accelerate construction came on January 30, 2023, when Governor DeSantis announced the Moving Florida Forward initiative. This proposal, if approved by the State Legislature in 2023, is slated to invest \$7 billion to prioritize 20 critical infrastructure projects statewide in the existing FDOT Five-Year Work Program. The Moving Florida Forward proposal will help relieve congestion, enhance safety,

facilitate trade, promote economic growth, and provide a more resilient transportation infrastructure.

Segment 1 is one of the projects proposed to be funded. The total investment proposed for Segment 1 is \$90 million for construction. Attachment #4 provides additional information on Moving Florida Forward. If the Moving Florida Forward initiative is adopted by the State Legislature in the current 2023 legislative session, Segment 1 could be under construction within the next 5 years, however the exact timing will be determined upon approval of the initiative. Securing the funding for this final segment will complete all the planned widening for Capital Circle dating back more than 20 years in the Blueprint program of work.

Next Steps

Blueprint coordination with FDOT will continue as part of the Airport Gateway to ensure the seamless integration of the FDOT projects in this area. Blueprint will continue to pursue advancing the construction funding for the improvements to Capital Circle Southwest from Springhill Road to Crawfordville Highway as a part of future initiatives including Moving Florida Forward.

Action by the CAC: An update on the Capital Circle Southwest project was presented to the CAC at their February 23, 2023 meeting.

OPTIONS:

- Option 1: Accept the status update for Capital Circle Southwest.
- Option 2: IA Board Direction.

RECOMMENDED ACTION:

- Option 1: Accept the status update for Capital Circle Southwest.

Attachments:

1. FDOT State Road 263/Capital Circle Project Flyer
2. FDOT Update on the Capital Circle SW construction project
3. Segment 2 construction progress pictures as of January 31, 2023
4. Moving Florida Forward information



State Road (S.R.) 263 / Capital Circle Multi-Lane Reconstruction Leon County, FL

Segment 1: S.R. 263 (Capital Circle) from S.R. 61 (Crawfordville Road) to County Road (C.R.) 2203 (Springhill Road)
Financial Project Identification Number: 219749-2-52-01

Segment 2: S.R. 263 (Capital Circle) from C.R. 2203 (Springhill Road) to S.R. 371 (Orange Avenue)
Financial Project Identification Number: 415782-9-52-01



CONTACTS

Clay Hunter, P.E.

FDOT Project Manager
HNTB
777 Main Street
Chipley, FL 32428
(850) 415-9010
chunter@hntb.com

Ian Satter

Public Information Director
FDOT District 3
1074 Highway 90 East
Chipley, FL 32428
(888) 638-0250, ext. 1205
ian.satter@dot.state.fl.us

PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT) plans to widen State Road (S.R.) 263 (Capital Circle) from Crawfordville Road to Springhill Road and from Springhill Road to Orange Avenue, from two to six lanes. The project will add lighting, construct stormwater management facilities and improve intersections. A ten-foot multi-use path will be constructed on the east side of the roadway and a five-foot sidewalk on the west side of the roadway. A new bridge will be constructed over Munson Slough in Segment 1 from Crawfordville Road to Springhill Road. Noise barrier walls are included as part of the design of this segment which is funded for right-of-way acquisition and construction. Bids for construction will be received fall 2021. Segment 2, from Springhill Road to Orange Avenue is funded for right-of-way acquisition and construction. Bids for construction will be received fall 2020.

State Road (S.R.) 263 / Capital Circle Multi-Lane Reconstruction

MEETING INFORMATION:

Tuesday, October 24, 2017
5:30 p.m. to 6:30 p.m. EDT

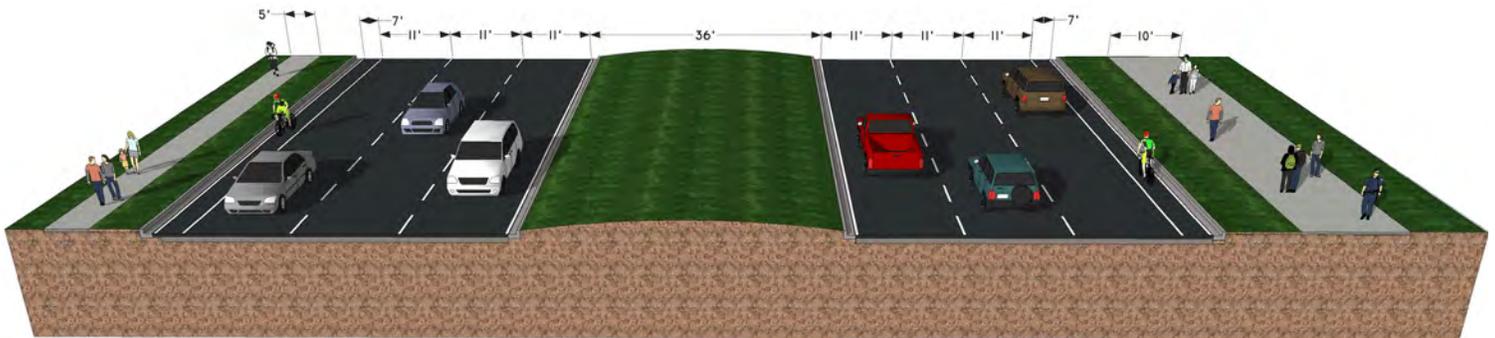
Center for Workforce
Development
Tallahassee Community
College

444 Appleyard Drive, Room
105, Building 38
Tallahassee, FL 32304



The meeting will provide participants with information pertaining to the multi-lane reconstruction of two segments of S.R. 263 / Capital Circle. The first section contains the segment from Crawfordville Road to Springhill Road. The second section contains the segment from Springhill Road to Orange Avenue. The meeting is being held in an open house format. There will be no formal presentation, however, FDOT representatives will be available to discuss the proposed projects, answer questions, and receive comments. Maps, drawings, and other information depicting the proposed changes will be on display. Your comments are welcomed and appreciated. Comment forms are provided and can be returned at the meeting, by U.S. mail or via email.

PROPOSED TYPICAL SECTION



The FDOT does not discriminate on the basis of race, color, national origin, age, sex, religion, disability or family status. Persons wishing to express concerns regarding Title VI may do so by contacting the FDOT, District 3 Title VI Coordinator, Colby Cleveland, 1074 Highway 90, Chipley, FL 32428, toll-free at (888) 638-0250, extension 1538 or via email at Colby.Cleveland@dot.state.fl.us.



VIRTUAL PROJECT UPDATE



**STATE ROAD (S.R.) 263 (CAPITAL CIRCLE) FROM
COUNTY ROAD (C.R.) 2203 (SPRINGHILL ROAD) TO S.R. 371
(ORANGE AVENUE) IMPROVEMENT PROJECT**

LEON COUNTY | OCTOBER 2022
FPID: 415782-9-52-01

S.R. 263 (CAPITAL CIRCLE) FROM C.R. 2203 (SPRINGHILL ROAD) TO S.R. 371 (ORANGE AVENUE) IMPROVEMENT PROJECT



TITLE VI

The Florida Department of Transportation is required to comply with various non-discrimination laws and regulations, in accordance with the Title VI of the Civil Rights Act of 1964.

Public participation is solicited without regard to race, color, national origin, sex, religion, disability or family status.

FOR QUESTIONS OR CONCERNS, CONTACT:

Alicia Bringer

District Three Title VI Coordinator

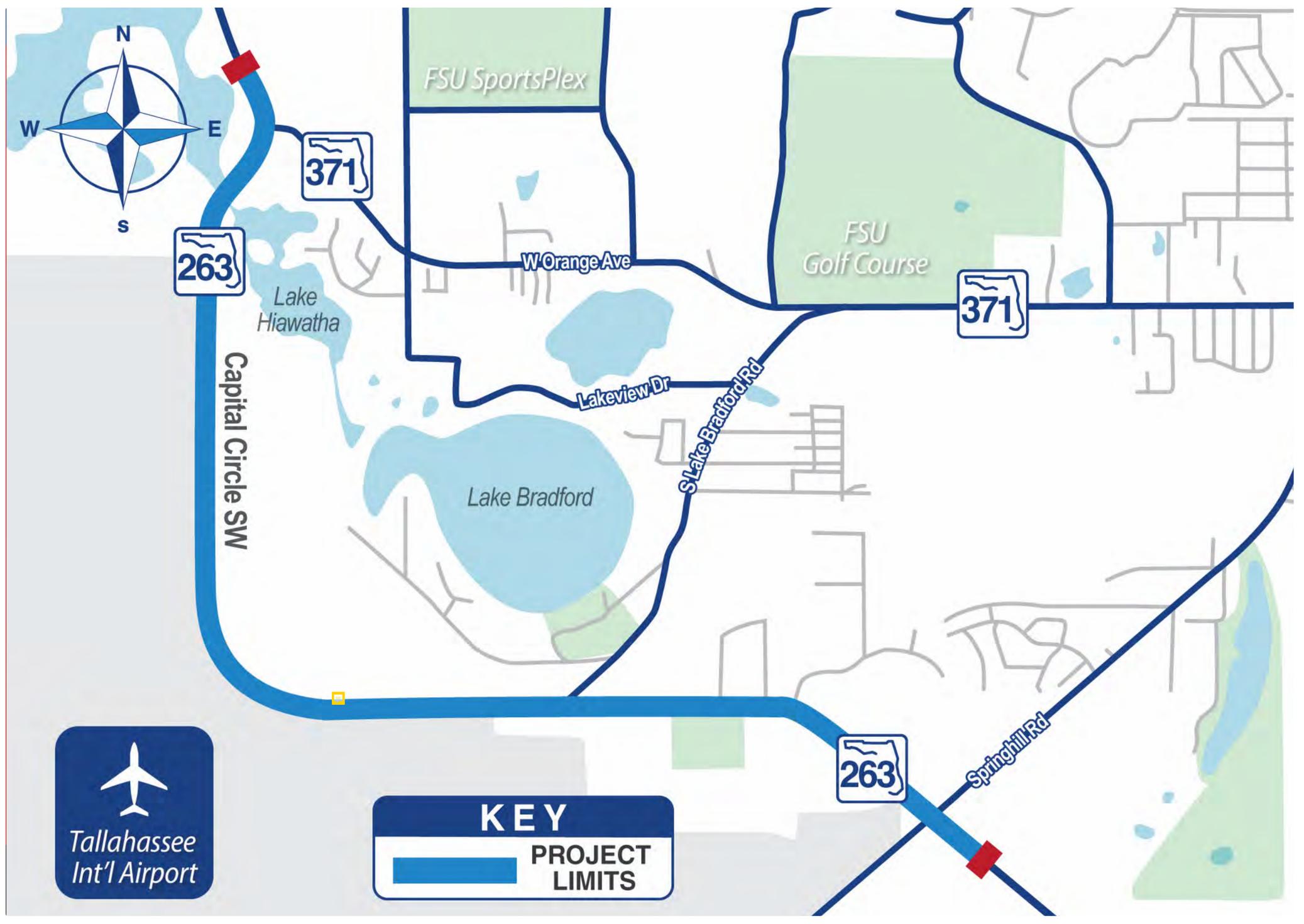
1074 U.S. 90 East Chipley, FL 32428

Toll-free at (888) 638-0250, ext. 1502

Alicia.Bringer@dot.state.fl.us



S.R. 263 (CAPITAL CIRCLE) FROM C.R. 2203 (SPRINGHILL ROAD) TO S.R. 371 (ORANGE AVENUE) IMPROVEMENT PROJECT



Construction Begins:
Mid-Fall 2022

Cost:
\$63.5 Million

Length:
3.9 Miles

Estimated Completion:
Late Fall 2026





PROJECT DESCRIPTION

This project will widen and improve 3.9 miles of S.R. 263 (Capital Circle) from a two-way roadway to an urban divided six-lane roadway.

OTHER IMPROVEMENTS INCLUDE:

- Intersection improvements
- New roadway lighting
- Drainage improvements with six new stormwater ponds
- 10-foot wide shared-use path
- Construction of two 42' long single-span bridges
- New water and sewer utility improvements



DRIVER, PEDESTRIAN AND OTHER IMPACTS

There are no traffic impacts associated with the construction of the ponds, but nearby residents and businesses may experience some noise during pond construction. When major roadway construction activities begin, drivers, pedestrians, bicyclists, and owners/tenants of nearby properties may experience the following construction impacts:

- Lane shifts and temporary changes in traffic pattern
- Intermittent lane closures and restrictions between 8:00 p.m. and 6:00 a.m.
- Increased congestion due to the presence of construction workers, vehicles and equipment
- Pedestrian and bicycle detours
- Dust, noise and vibration from construction activities



CONTACT US:

 info@capitalcircleproject.com

 nwflroads.com

 [@myfdot_nwfl](https://www.instagram.com/myfdot_nwfl)

 [Twitter.com/MyFDOT_NWFL](https://twitter.com/MyFDOT_NWFL)

 [Facebook.com/MyFDOTNWFL](https://www.facebook.com/MyFDOTNWFL)

**Florida Dept. of Transportation
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1074 U.S. 90 East
Chipley, FL 32428

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Capital Circle SW Segment 2 Construction Progress Pictures as of January 31, 2023







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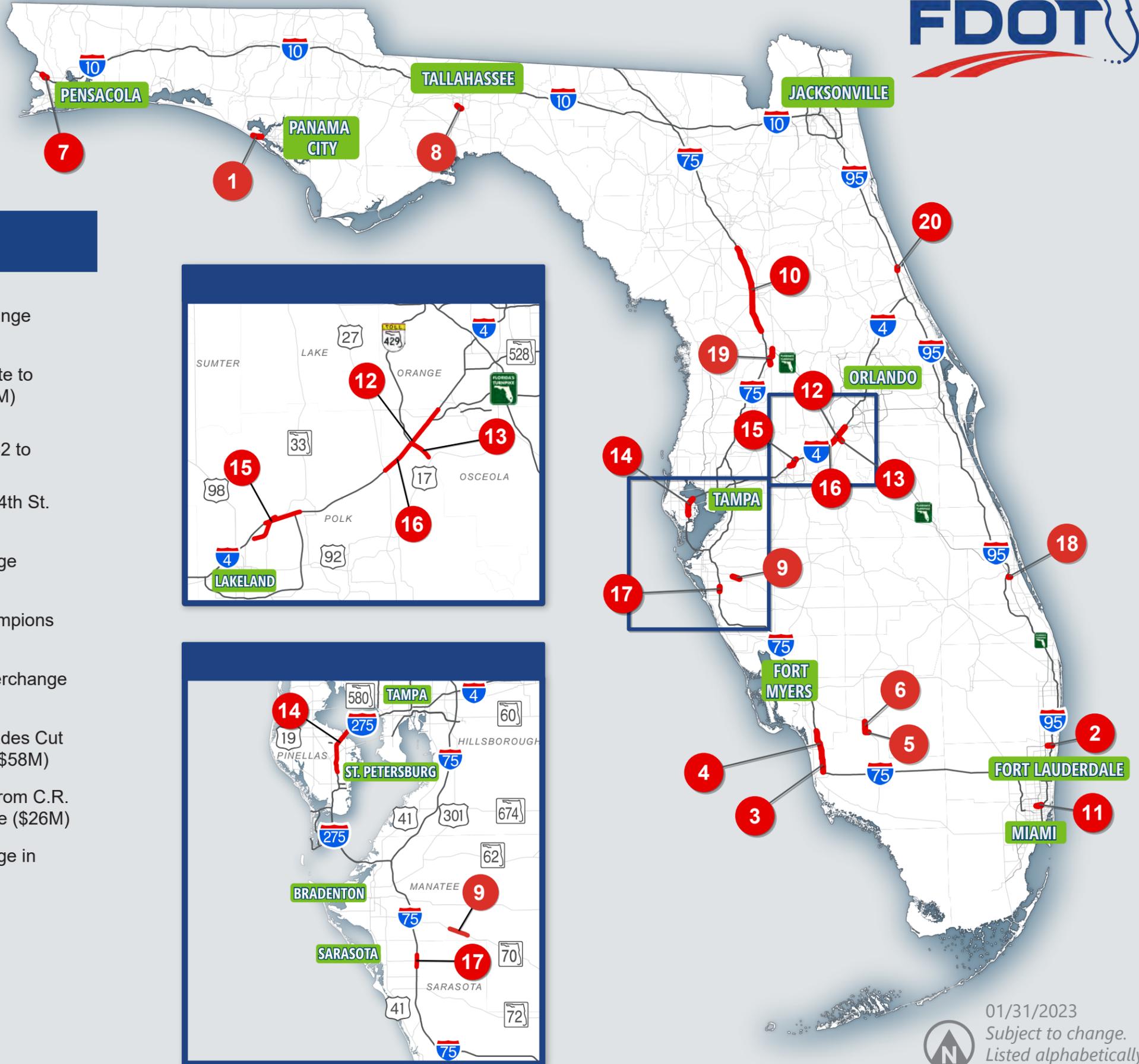
MOVING FLORIDA FORWARD

Infrastructure Initiative



CONGESTION RELIEF PROJECTS (FUNDING)

- 1** U.S. 98 from R. Jackson Blvd. to Hathaway Bridge (\$98M)
- 2** SW 10th St. (\$178M)
- 3** I-75 at Pine Ridge Rd. Interchange (\$23M)
- 4** I-75 from Golden Gate Pkwy. to Corkscrew Rd. (\$578M)
- 5** S.R. 29 from C.R. 846 E to New Market Rd. (\$85M)
- 6** S.R. 29 from New Market Rd. to S.R. 82 (\$44M)
- 7** I-10 from Eastbound weigh station to Nine Mile Rd. (\$162M)
- 8** S.R. 263 from S.R. 61 to C.R. 2203 (\$90M)
- 9** S.R. 70 from Bourdsie Blvd. to Waterbury Rd. (\$53M)
- 10** I-75 Auxiliary Lanes from S.R. 44 to S.R. 326 (\$479M)
- 11** Golden Glades Interchange (\$150M)
- 12** I-4 from Champions Gate to Osceola Pkwy. (\$1,451M)
- 13** Poinciana Parkway Ext. Connector from C.R. 532 to S.R. 429 (\$1,318M)
- 14** I-275 from 38th Ave. to 4th St. (\$354M)
- 15** I-4 at S.R. 33 Interchange (\$197M)
- 16** I-4 from U.S. 27 to Champions Gate (\$635M)
- 17** I-75 at Fruitville Rd. Interchange (\$192M)
- 18** W Midway Rd. from Glades Cut Off Rd. to Jenkins Rd. (\$58M)
- 19** U.S. 301 Realignment from C.R. 470 to Florida's Turnpike (\$26M)
- 20** I-95 at U.S. 1 Interchange in Volusia Co. (\$340M)



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01/31/2023
Subject to change.
Listed alphabetically
by county.



MOVING FLORIDA FORWARD

Infrastructure Initiative

REGION

North Florida

PROJECT LIMITS

State Road (S.R.) 263 from S.R. 61 to County Road (C.R.) 2203

FUNDING

\$90 Million

CONSTRUCTION YEAR

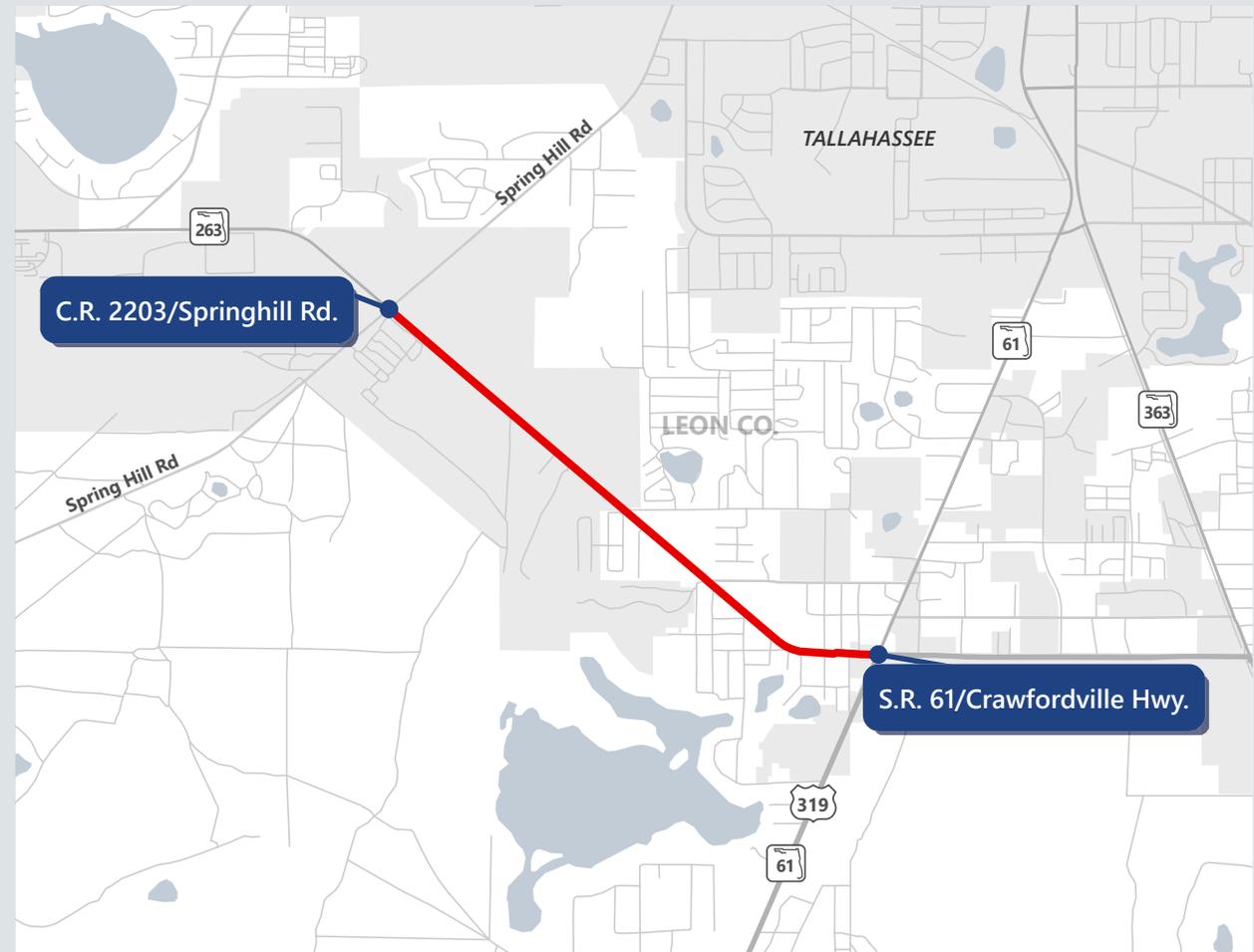
2026

PROJECT DESCRIPTION

This project will widen the existing roadway, add lighting, construct stormwater management facilities, and implement intersection improvements. A 10-foot multi-use path will be constructed on the east side of the roadway and a 5-foot sidewalk will be constructed on the west side of the roadway. For additional project details, please visit <https://nwflroads.com/projects/219749-2>.

8

S.R. 263 from S.R. 61 to C.R. 2203



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01/31/2023

Subject to change.

Listed alphabetically by county.

Blueprint Intergovernmental Agency Board of Directors Agenda Item #4

March 9, 2023

Title:	Approval of a Reappointment to the Blueprint Citizens Advisory Committee
Category:	Consent
Intergovernmental Management Committee	Vincent S. Long, Leon County Administrator Reese Goad, City of Tallahassee Manager
Lead Staff / Project Team:	Benjamin H. Pingree, Director, Department of PLACE Autumn Calder, Director, Blueprint Megan Doherty, Planning Manager, Blueprint Mike Alfano, Principal Planner, Blueprint

STATEMENT OF ISSUE:

Consistent with the Second Amended and Restated Interlocal Agreement, this agenda item seeks Blueprint Intergovernmental Agency Board of Directors (IA Board) approval of a reappointment to the Blueprint Citizens Advisory Committee (CAC). The current CAC roster is included as Attachment #1. Kathy Bell is recommended to be reappointed for a second, full three-year term as the representative of the Greater Tallahassee Chamber of Commerce.

FISCAL IMPACT

This item does not have a fiscal impact.

RECOMMENDED ACTION:

Option 1: Reappoint Kathy Bell to the Blueprint Citizens Advisory Committee to represent the Greater Tallahassee Chamber of Commerce.

SUPPLEMENTAL INFORMATION:

Blueprint CAC membership positions and terms are established in the Second Amended and Restated Interlocal Agreement and further defined in the CAC Bylaws. CAC members may serve two consecutive three-year terms. However, in the case of the fulfillment of partial terms, all members shall still be eligible to serve two full terms in addition to fulfillment of partial terms.

The Second Amended and Restated Interlocal Agreement requires 14 CAC members serving three year staggered terms, which shall be selected as follows:

1. Four members selected by the Blueprint Intergovernmental Agency Board from a list of applicants that shall include at least one from each of the following categories
 - a. At least one financial expert with bonding experience
 - b. At least one planner
 - c. At least one natural scientist/biologist
2. Three members shall be selected by the Board from a list of three names for each position provided by the CAC and shall include one member from the civil rights community, one member from the elderly community and one member from the disability community
3. The remaining seven members shall be selected as follows:
 - a. Board Member of the Greater Tallahassee Chamber of Commerce
 - b. Board Member of the Capital City Chamber of Commerce
 - c. Board Member of the Big Bend Minority Chamber of Commerce
 - d. Chairperson of the Planning Commission or Designee thereof
 - e. Representative from the Council of Neighborhood Associations
 - f. Representative from the Big Bend Environmental Forum
 - g. Representative from the Network of Entrepreneurs and Business Advocates in Tallahassee

Per the CAC Bylaws, CAC memberships are attained through the appointment of members by the Blueprint Intergovernmental Agency Board of Directors, with the exception of the member described in section (1)3.(d), which shall either be the Chairperson of the Planning Commission or a Designee selected by the Chairperson of the Planning Commission. Members are either nominated by organizations that hold a seat on the CAC or through direct application to the Agency. All prospective committee members, excepting the Planning Commission designee, are required to submit an application to the Agency, which is then reviewed by staff to ensure the application is consistent with the requirements of the CAC bylaws for that specific CAC seat. Applications are then provided to the CAC at a publicly noticed meeting for consideration and recommendation to the IA Board. Finally, CAC applications are submitted to the IA

Board as an agenda item, including the recommendation from the CAC, for their consideration and appointment.

Reappointment

Kathy Bell, the current CAC member representing the Greater Tallahassee Chamber of Commerce, is eligible to serve a second, three-year term on the Blueprint Citizens Advisory Committee. In February 2017, the Chamber of Commerce nominated Kathy Bell to serve the remainder of an outgoing CAC member’s term, which expired in November 2019. Per the terms established in the December 2015 update to the Blueprint Interlocal Agreement and further defined in the Blueprint Citizens Advisory Committee Bylaws, Ms. Bell is eligible to serve two full terms in addition to the partial term of the initial appointment. Ms. Bell was appointed to serve a full three-year term by the IA Board on March 12, 2020, which will end March 31, 2023.

Table 1, below, details the existing vacancy and proposed appointee to fill this CAC member seat.

Table 1. Blueprint Citizens Advisory Committee

Vacancy / Seat Category	Term Expiration	Eligible Applicant	Recommended Action
Kathy Bell/Greater Tallahassee Chamber of Commerce <i>Reappointment (Y)</i>	03/31/2023	1. Kathy Bell	Appoint Kathy Bell for a second, three-year term ending 03/31/2026.

Action by CAC: This item was presented to the CAC at their February 23, 2022 meeting.

OPTIONS:

- Option 1: Reappoint Kathy Bell to the Blueprint Citizens Advisory Committee to represent the Greater Tallahassee Chamber of Commerce.
- Option 2: IA Board Direction.

RECOMMENDED ACTION:

- Option 1: Reappoint Kathy Bell to the Blueprint Citizens Advisory Committee to represent the Greater Tallahassee Chamber of Commerce.

Attachment:

- 1. Current CAC Membership Roster



Citizens Advisory Committee

A Citizens Advisory Committee shall be established to serve in an advisory capacity to the Blueprint 2000 Intergovernmental Agency. In February 2001, the committee was expanded from nine members to twelve. In November 2007, a member from the Education Community was added to the Citizen Advisory Committee. In September 2016, three additional members from the Business Community were added to the Citizen Advisory Committee.

It is the responsibility of the Citizen Advisory Committee to review work plans, financial audits, and performance audits and to make recommendations to the Blueprint 2000 Intergovernmental Agency.

[Citizen's Advisory Committee Bylaws](#)

Membership (as of March 9, 2023)

LaRoderick McQueen, Chair Planning Commission Designee

Ashley Leggett, Vice-Chair, Financial Expert

Kathy Bell, Greater Tallahassee Chamber of Commerce

Christopher Daniels, At-Large Representative

Whitney Doyle, Disability Community Representative

Mary Glowacki, Planning Expert

Adner Marcelin, NAACP/Civil Rights Community Representative

Sean McGlynn, Big Bend Environmental Forum

Jim McShane, Big Bend Minority Chamber of Commerce

Hollie Myers, Network of Entrepreneurs and Business Advocates

Peter Okonkwo, Capital City Chamber of Commerce

Leroy Peck, Council of Neighborhood Associations

Elva Peppers, Natural Scientist/Biologist

Fred Varn, Tallahassee Senior Citizen Advisory Council

Blueprint Intergovernmental Agency Board of Directors Agenda Item #5

March 9, 2023

Title: Acceptance of a Status Update on the Northwest Connector Corridor: Tharpe Street Project and Authorization to Advertise and Award a Contract for Planning and Design Services

Category: General Business

Intergovernmental Management Committee: Vincent S. Long, Leon County Administrator
Reese Goad, City of Tallahassee Manager

Lead Staff / Project Team: Benjamin H. Pingree, Director, Department of PLACE
Autumn Calder, Director, Blueprint
Megan Doherty, Planning Manager, Blueprint
Mike Alfano, Principal Planner, Blueprint

STATEMENT OF ISSUE:

As requested by the Blueprint Intergovernmental Agency Board of Directors (IA Board) at the December 8, 2022 meeting, this agenda item presents a status update on the Northwest Connector Corridor: Tharpe Street (NW Connector) project. Consistent with IA Board direction at that meeting, this agenda item provides an analysis for an enhanced two-lane improvement on Tharpe Street, including a summary of recent traffic data indicating that widening to four-lanes may not be necessary. Based on the analysis discussed herein, this agenda item seeks IA Board direction to further explore the enhanced two vehicle travel lanes instead of four and prioritize sidewalk and operational improvements to improve safety, beautification, and accessibility. Lastly, this agenda item seeks authorization to advertise and award a contract for planning and design services, which will affirm the necessary improvements along the Tharpe Street corridor. If approved, staff will also prepare updated project funding and acceleration options that reflect this direction in the draft capital budget for the May 11, 2023 budget workshop.

FISCAL IMPACT

This agenda item does have a fiscal impact. The estimate for the recommended planning services is \$1,500,000, which can be completed within the existing IA Board approved project allocation. Moreover, construction of an enhanced two-lane roadway may reduce total costs from \$68.8 million to \$49.5 million, and enable the project construction to be accelerated.

RECOMMENDED ACTION:

- Option 1: Accept the status update and traffic analysis to explore an enhanced, two-lane Tharpe Street project.
- Option 2: Authorize Blueprint to advertise and award a contract for planning and design services.

EXECUTIVE SUMMARY

At the December 8, 2022 IA Board meeting, the IA Board directed staff to prepare an agenda item on the NW Connector: Tharpe Street project for IA Board consideration, including options for reducing the project scope and advancing implementation of improvements. This item provides an overview of the sales tax project, including project history, existing conditions along the 2.61 mile Tharpe Street corridor, and also details recent traffic data that indicate widening to four-lanes may not be necessary. As detailed herein, reducing the number of lanes constructed would enable the project to be implemented at a lower cost and on an expedited schedule.

The NW Connector project is one of 32 Blueprint infrastructure projects. As described in the Second Amended and Restated Interlocal Agreement, the NW Connector project provides, “Funding to widen Tharpe Street from Ocala Road to Capital Circle Northwest (includes ROW, construction, stormwater for roadway improvements, and land acquisition for future greenway). Also includes funding for Park Place Recreational Area and neighborhood connectivity.”

At its February 21, 2017 meeting, the IA Board approved a process for prioritizing the Blueprint 2020 Roadway and Gateways projects, and on June 21, 2018 approved a long-term implementation and funding plan that included initiating the NW Connector in FY 2024. The allocation for the NW Connector project is \$68.8 million. As included within the adopted FY 2023-2027 capital budget, \$1.5 million was allocated to the project in FY 2023 to support planning studies. The Blueprint Infrastructure Long-Term Project Funding Plan, updated annually and most recently presented at the September 29, 2022 budget hearing, notes the majority of funding for this project is scheduled to be allocated later in the Blueprint program, beginning in FY 2034.

This agenda item summarizes recent studies and current traffic data that support refining future roadway improvements to two-lanes with multimodal and aesthetic enhancements. Recent traffic analysis indicated that vehicular congestion and intersection failures forecasted almost two decades ago have not occurred. If directed by the IA Board, Blueprint will analyze the cost of similar local improvements that enhance two-lane roadways, such as the planned improvements along Bannerman Road from Preservation Road to Meridian Road, to develop a preliminary cost estimate and schedule. Funding recommendations for the NW Connector project that provide for the enhanced two-lanes with multimodal, aesthetic, and safety improvements and expedite the

project implementation schedule will be included in the draft capital budget for IA Board consideration at the May 11, 2023 budget workshop.

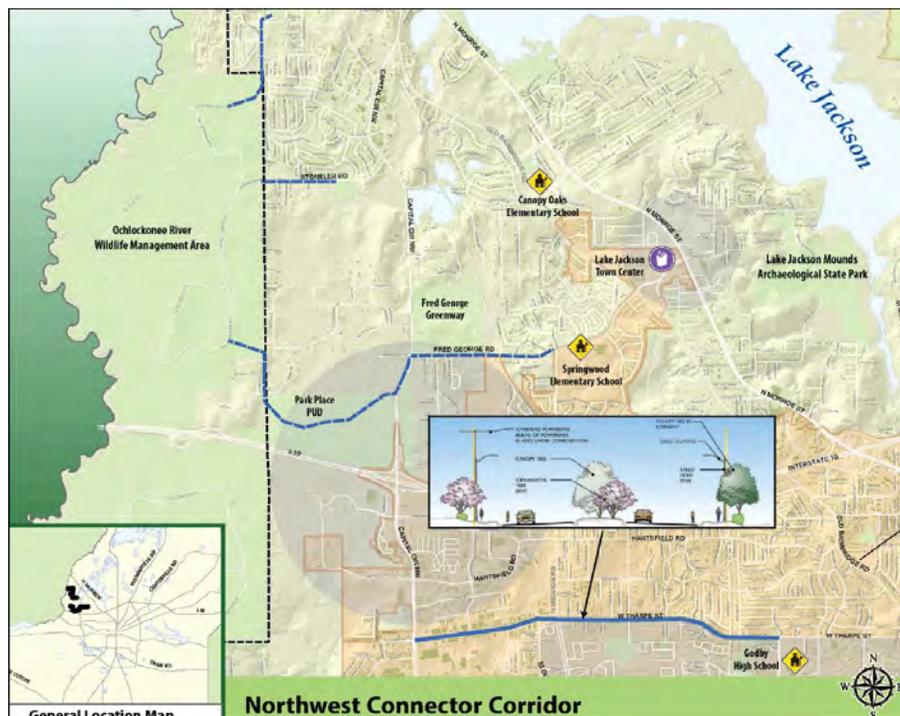
Lastly, this agenda item requests IA Board authorization to advertise and award a contract for planning and design services to analyze necessary roadway improvements, right-of-way impacts, and develop detailed cost estimates. The planning and design processes will update the 2005 Final Engineering Report and also identify opportunities to implement portions of improvements, such as sidewalks, ahead of the more substantial roadway improvements.

SUPPLEMENTAL INFORMATION

PROJECT OVERVIEW

Tharpe Street from Ocala Road to Capital Circle Southwest is a 2.61-mile, two-lane minor arterial roadway, maintained by Leon County (County Road 158). The NW Connector project, shown in Figure 1, below, builds upon the 2005 PD&E and subsequent design work by Leon County, and includes additional project elements. Attachment #1 provides an overview of these improvements.

Figure 1: Blueprint Northwest Connector Corridor Project



PREVIOUS IA BOARD ACTIONS

The IA Board has taken the following actions with respect to the NW Connector Project, and future project funding allocations.

- April 22, 2014:** Approved project list for Blueprint 2020 program, including NW Connector with associated initial cost estimate of \$53,184,800.
- April 1, 2015:** Approved elevating all capacity projects to a top tier priority within the CRTPA Regional Mobility Plan.
- Feb. 21, 2017:** Approved a process for prioritizing the Blueprint 2020 Roadway and Gateways project.
- June 21, 2018:** Approved a long-term implementation and funding plan that included initiating the NW Connector in FY 2024.
- May 27, 2021:** Approved 2021 Long Term Implementation Plan and Preliminary Project Funding Schedule through 2040 Scenario 1, which provided partial funding for the NW Connector project. Provided updated project cost estimate of \$67.5 million.
- May 19, 2022** Approved the FY 2023 update to the Infrastructure Long-Term Project Funding Plan, which provided partial funding for the NW Connector project. Provided updated project cost estimate of \$68.8 million.
- Sep. 29, 2022** Approved FY 2023 – 2027 Blueprint Infrastructure CIP. Includes allocating NW Connector \$1.5 million in FY 2023 and planned allocation of \$2 million in FY 2024.
- Dec. 8, 2022** IA Board Directs Blueprint to prepare NW Connector Agenda Item.

PROJECT BACKGROUND

Leon County Tharpe Street Project (2005)

The Tharpe Street Corridor Study Final Engineering Report was completed in February 2005 and formed the basis for the 2014 sales tax project. The preferred alternatives, as approved by the Board of County Commissioners (BOCC) included: Widening Tharpe Street to four lanes, with improvements at several major intersections along the route; 14.5 – 22 ft. medians in the center of the roadway, with landscaping, including tree plantings; four-foot bike lanes and 5 – 6 ft. sidewalks on both sides of the roadway, with transit stops integrated into the pedestrian facilities; drainage and stormwater improvements, including several stormwater ponds, and an increased box culvert at the Central Ditch Tributary to control flood elevations; and enhanced landscaping.

This preferred roadway concept would impact 68 parcels and would require additional right-of-way for stormwater ponds. This included three whole takings, two residential properties and one commercial property. At the March 14, 2006 BOCC meeting, it was highlighted that there was a future funding shortfall as the project cost estimates had increased. Due to increasing costs and the acceleration of the global economic recession, the project was discontinued during the County's FY 2008 budget cycle.

RECOMMENDATION TO EXPLORE TWO-LANES ON THARPE STREET

Based on the analysis discussed herein, this agenda item seeks IA Board direction to further explore an enhanced two travel lanes on Tharpe Street instead of four. The improvements would prioritize multimodal, aesthetic, and operational improvements to enhance safety and accessibility including a median, turn lanes, and sidewalks. Recent traffic and operations analysis detailed in Attachment #2, indicate that traffic patterns forecasted by the 2005 Study, which predicted several intersections failing, have not occurred. The 2019 CRTPA Traffic and Operations Analysis for Tharpe Street is included as Attachment #3, and this analysis identified safety and operational enhancements to improve Tharpe Street without the need to widen to four lanes. In fact, current vehicle levels of service reflect the same standards the widening of Tharpe Street to four lanes was intended to achieve. In summary, based on what is known today, widening to four lanes will likely not improve vehicle service. However, operational enhancements and adding pedestrian facilities can further improve safety and efficiency. The options recommended in this item pursue that objective, reduce project costs, and may expedite construction.

CORRIDOR IMPROVEMENTS

Based on the preceding and attached analyses of existing conditions, there is an opportunity to refine the corridor improvements to better match current and projected future conditions. For example, the recommendations outlined in the 2019 CRTPA study (adding a median with turn lanes to reduce congestion, adding multimodal facilities, and addressing stormwater) could reduce estimated project costs and enable the opportunity to fully fund the project within the Blueprint 2020 program. A comparable Blueprint project segment under design is Segment 1 of the Northeast Corridor Connector: Bannerman Road project, which provides a divided, two-vehicle lane corridor with median, which provides space for aesthetic landscaping and turn lanes to improve traffic flow. Multimodal facilities, such as a sidewalk and multi-use trail, are also provided to enhance safety and accessibility.

The latest Blueprint construction cost estimates for this project, as modified, is \$8.374 million per mile. Applying this cost estimate for Tharpe Street provides a current estimate of \$22 million for construction. The 79-foot right-of-way width required for these improvements is significantly less than the 123-foot needed for the recommended alternatives from the 2005 Study. Constructing a median to provide operational improvements and maintaining two vehicle lanes would result in a reduced project cost. Initial estimates for potential right-of-way needs, design costs, and construction, as well as other elements of the NW Connector including greenways, and sidewalks, and a park component, reduce the total estimated cost of the NW Connector project from \$68.8 million to \$49.5 million. Approval of Options #1 and #2 will direct staff to update the Final Engineering Report, finalize improvement plans, and update this cost estimate.

Leveraging Opportunities

In addition to the approved and planned future allocations to the NW Connector project, Blueprint staff continuously pursues leveraging opportunities to reduce the amount of sales tax funding required for full project implementation. Most recently, Blueprint collaborated with the CRTPA, City, and County on an application for the Reconnecting Communities Pilot Program for the NW Connector project, for \$2 million in funding to conduct an updated PD&E Study and complete 30% design for improvements to Tharpe Street from Ocala Road to Capital Circle NW. Blueprint was notified in late February that the Tharpe Street project was not selected for funding through this federal grant program. However, Blueprint will continue to seek leveraging opportunities for the NW Connector project.

NEXT STEPS

Upon IA Board acceptance of the status update and authorization to procure planning and design services, Blueprint will develop a scope of services for professional services and work with the City of Tallahassee Procurement Division to issue the Request for Qualifications. Other project activities to accelerate implementation of this project are as follows:

- May 11, 2023 Provide for IA Board consideration at the budget workshop an updated budget that includes a reduced cost for implementing the Tharpe Street improvements for two lanes and expedites project funding.
- Fall 2023 Initiate planning study.
- Spring/Fall 2025 Anticipated completion of planning study; recommendations presented for IA Board consideration and direction.

BLUEPRINT PROCUREMENT POLICY

This agenda item requests IA Board authorization to advertise and award for planning and design services for the NW Connector: Tharpe Street project. Upon the IA Board's authorization, Blueprint will develop a scope of services for professional services and work with the City of Tallahassee Procurement Division to issue the Request for Qualifications. Blueprint Procurement Policy Section 101.07(3) provides that the IA Board may exercise purchasing authority for expenditures over \$250,000. Further, the solicitation will follow Office of Economic Vitality and MWSBE Policy in identifying a project-specific goal for minority and women participation. This agenda item seeks IA Board authorization for procurement of services for the preliminary engineering services and to negotiate a contract with the most qualified (highest ranked), responsive consultant. Through the approval of Option #2, the IMC will have the authority to award the negotiated contracts. Accordingly, this agenda item complies with both Blueprint and City of Tallahassee Procurement Policies.

CONCLUSION

As directed by the IA Board at the December 8, 2022 meeting, this agenda item seeks acceptance of a status update for the NW Connector: Tharpe Street project (Option #1). As detailed in the analysis herein, this agenda item also provided consideration for reducing the number of lanes for the improvement from four to two, including an analysis of past planned improvements and recent traffic data that indicate widening to four-lanes is not necessary. This agenda item summarized recent studies and current traffic data that support refining future roadway improvements to two-lanes with multimodal and aesthetic enhancements to best match current and forecasted future conditions. Recent traffic analysis indicated that vehicular congestion and intersection failures forecasted almost two decades ago have not occurred. Lastly, to identify opportunities for short-term improvements and determine necessary corridor enhancements, this agenda item requests IA Board authorization to advertise and award planning and design services, pursuant to Blueprint's Procurement Policy. Funding recommendations that provide for a reduced project cost estimate aligning with enhancing the existing two-vehicle and options for expediting the project implementation schedule will be included in the draft capital budget for IA Board consideration at the May 11, 2023 budget workshop.

Action by the CAC: The CAC received a presentation on this project at their February 23, 2023 meeting.

OPTIONS:

- Option 1: Accept the status update and traffic analysis to explore an enhanced, two-lane Tharpe Street project.
- Option 2: Authorize Blueprint to advertise and award a contract for planning and design services.
- Option 3: IA Board Direction

RECOMMENDED ACTION:

- Option 1: Accept the status update and traffic analysis to explore an enhanced, two-lane Tharpe Street project.
- Option 2: Authorize Blueprint to advertise and award a contract for planning and design services.

Attachments:

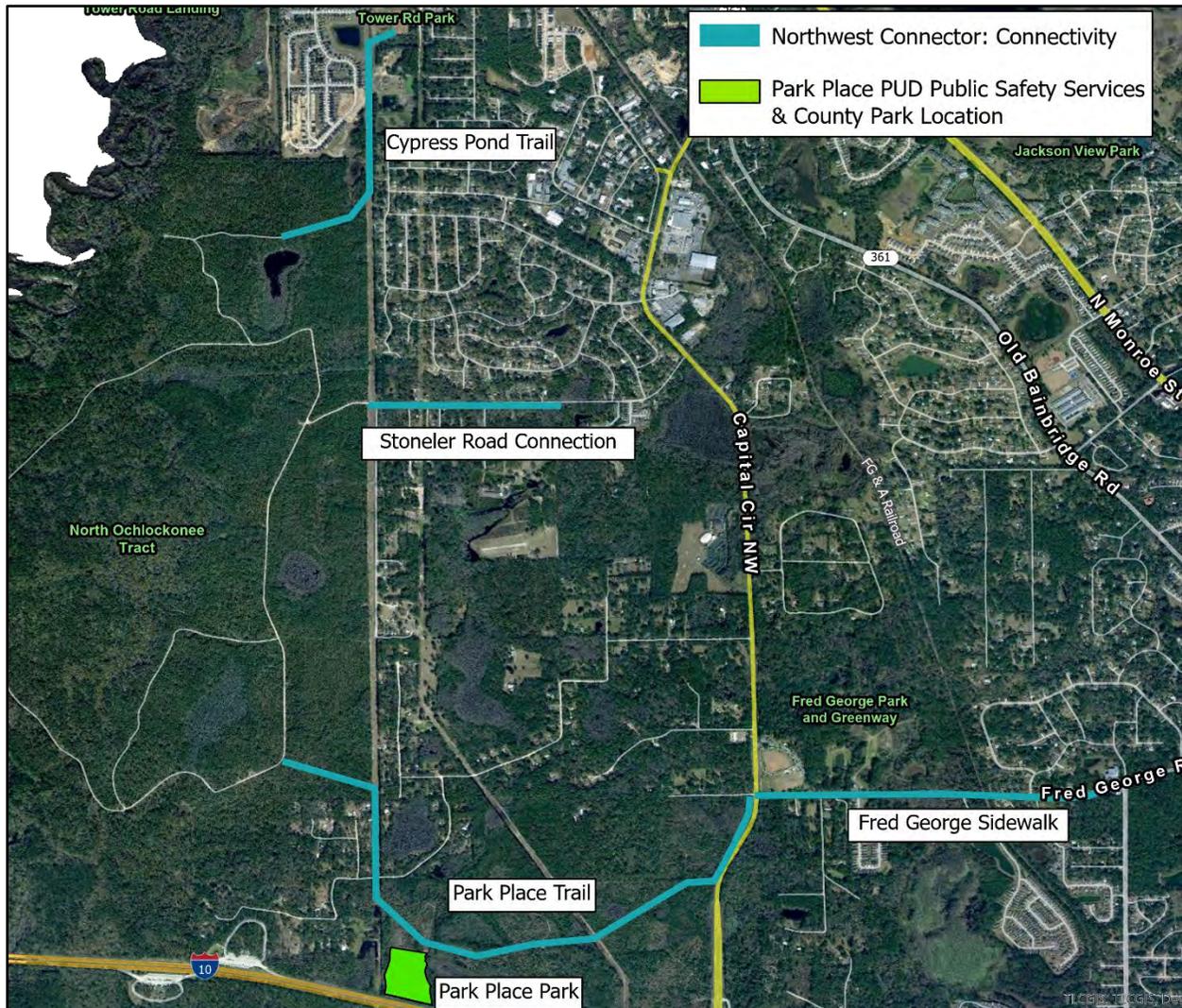
1. Northwest Connector Corridor: Tharpe Street - Project Connectivity and Park Creation Components
2. Tharpe Street Traffic Analysis and Data
3. 2019 CRTPA Tharpe Street Operational Analysis

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ATTACHMENT #2: NORTHWEST CONNECTOR CORRIDOR: PROJECT CONNECTIVITY AND PARK CREATION COMPONENTS

In addition to the widening of Tharpe Street, the Northwest Connector project has two other project components, Trail Connectivity and Park Creation. This section provides an overview and status of both these elements. Figure 1, below, shows the location of the improvements discussed in this section.

Figure 1. Northwest Connector Connectivity & Park Component Locations



Trail Connectivity

In addition to the Tharpe Street improvements, the NW Connector would provide funding to create neighborhood connectivity in northwest Leon County. Specifically, connections intended include two Tallahassee-Leon County Greenways Master Plan Northwest Greenway Project segments. A 0.85-mile portion of the Cypress Pond Trail that would connect Leon County Tower Road Park to Cypress Pond Road in the Northern Tract of

the Ochlocknee Wildlife Management Area, and the Park Place Trail, an approximately 2-mile trail that would connect the Fred George Basin Greenway west to the proposed County park in the Park Place PUD, then further west into the North Tract of the Ochlocknee Wildlife Management Area.

The project also includes a sidewalk connection along Fred George Road to connect the Fred George Greenway with Huntington Oaks Plaza and the Lake Jackson Branch Library. Leon County recently constructed a significant portion of this sidewalk, from Fred George Greenway to Mission Road; there is a narrow sidewalk from Mission Road to Huntington Oaks Plaza. Finally, the NW Connector project includes a connection from Stoneler Road Park to the North Tract of the Ochlocknee Wildlife Management Area; there is a 5 to 6-ft. sidewalk that completes this connection.

Park Creation

The NW Connector also provides funding for the Park Place Recreation Area. The Park Place Recreation Area is an area within the Leon County approved Park Place Planned-Unit Development (PUD) at the northwest corner of Capital Circle NW and Interstate-10. This PUD, which was re-approved by the BOCC in February 2022, will remain valid until January 2042. The PUD plan provides for a mix of Single-Family, townhome, and multi-family residential development, as well as commercial development, and significant acreage of conservation land. The PUD also includes a 10-acre dedication for Leon County to develop Public Safety Services Facilities and a County Park, as included in the NW Connector project description.

Per feedback from Leon County Development Support and Environmental Management (DSEM), there have been no formal site plan applications to develop the Park Place site. There has been one permitted use verification inquiry. The dedication of land for the Park Place PUD Park would not trigger until that portion of the property is proposed for development.

Tharpe Street – Traffic Analysis and Data

CRTPA Traffic and Operations Analysis Tharpe Street (2019)

In February 2018, the CRTPA Board directed its general consultant, RS&H, to initiate a corridor study for Tharpe Street. Tharpe Street was identified as needing capacity improvements (roadway widening) in the 2040 Regional Mobility Plan. The corridor studies were initiated to identify existing and projected future conditions along Tharpe Street, from Ocala Road to Capital Circle NW, and to identify potential projects to improve mobility and efficiency.

The CRTPA Study provided a number of recommendations for the Tharpe Street corridor, highlighted in Table 1, below. These improvements would be accomplished by restricting turning movements to reduce crashes, adding medians to eliminate spot congestion, and constructing bicycle and pedestrian facilities to connect to existing transit stops. Implementation costs for the recommended improvements were not included in this study.

Table 1. Tharpe Street Corridor Study Improvements by Segment

Table 1. Tharpe Street Corridor Study Improvements by Segment	
<u>Segment</u>	<u>Recommended Improvements</u>
East of Capital Circle NW to Mission Road	<ul style="list-style-type: none"> • Install 5-foot-wide concrete sidewalk with a 4-foot-wide utility strip on the north side; • Add shared lane markings (Sharrows); • Convert Blountstown Hwy and Tharpe Street to a “T” Intersection; • Install a Linear Park on Blountstown Hwy; and • Install an 8-foot-wide concrete sidewalk (curb and gutter) along the east side of Blountstown Hwy.
Mission Road to Ivan Drive & Devra Drive to West of Ocala Road	<ul style="list-style-type: none"> • Add 8-foot-wide concrete sidewalk, culvert system, and curb & gutter along north side of Tharpe Street; • Add 8-foot-wide pedestrian bridge over central drainage system; • Widen 10 feet along the south side of Tharpe Street for addition of medians; • Add two Jug handle U turns; • Install turnout bay; and • Re-stripe east side of Tharpe Street near Ocala Road to include bike lanes.
Ivan Drive to Devra Drive	<ul style="list-style-type: none"> • Add 8-foot-wide concrete sidewalk, culvert system, and curb & gutter along north side of Tharpe Street.

The study recommended improvements be made in the following priority order: 1) Sidewalks. 2) Medians. 3) Access management. 4) Multimodal intersection design. 5) Bicycle lanes. 6) Sharrows. 7) Bus pullouts. 8) Bus shelters. 9) Landscaping. The Tharpe Street Corridor Study was accepted by the CRTPA Board at their February 2019 meeting.

Recent Traffic Analysis

As shown in Table 2, below, the anticipated “failure” of several intersections forecast by the 2005 PD&E Study did not occur, and the vehicle level of service (LOS) forecasted to be achieved by widening Tharpe Street to four lanes was observed in the 2019 CRTPA Study. A vehicle LOS grade of “F” is indicative of congestion and delays; a desirable grade for roadway flow is LOS “E” or above. To calculate the level of service for a roadway, a mathematical equation is used where traffic volume is divided by the roadway capacity; the resultant value is then assigned a letter grade, with F indicating the roadway has more traffic than it is able to serve and is therefore failing.

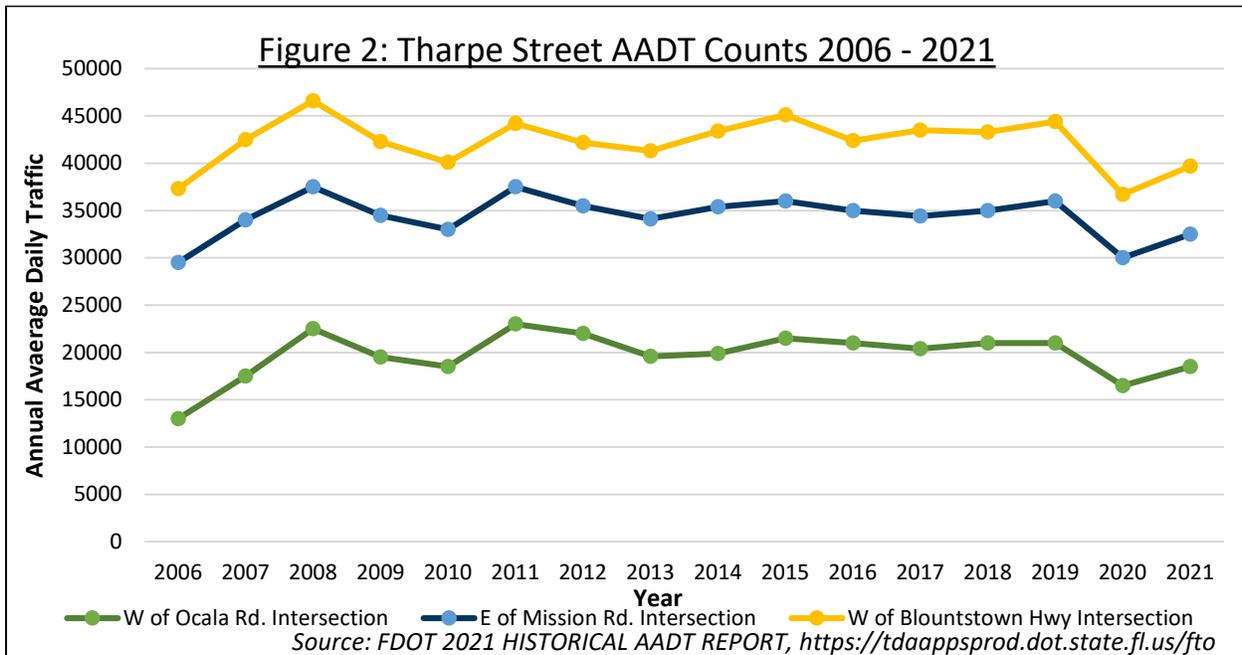
Table 2 compares the vehicle LOS observed for the 2005 PD&E, the forecasted 2020 LOS grades with and without widening to four lanes, and the LOS identified in the 2019 CRTPA Study (traffic observed in late 2017), for two key intersections along Tharpe Street. As the table shows, the forecasted “failure” of these intersections did not occur, and, in fact, the LOS forecasted to be achieved by widening Tharpe Street to four lanes was observed in the CRTPA Study. This analysis reveals that there may be opportunities to reduce the scale of roadway improvements to improve Tharpe Street and to prioritize pedestrian safety and connectivity.

Table 2. Level of Service Comparison for Tharpe Intersections

Table 2. Level of Service Comparison for Tharpe Intersections				
<u>Intersection</u>	<u>2005 PD&E LOS Observed</u>	<u>No Build Projected 2020 LOS</u>	<u>4-Lane Alt. Projected 2020 LOS</u>	<u>CRTPA Observed 2017 LOS</u>
Tharpe & Mission AM	C	F	D	D
Tharpe & Mission PM	D	F	E	E
Tharpe & San Luis AM	C	C	B	B
Tharpe & San Luis PM	C	C	B	B

As shown in Figure 2, Traffic counts along the Tharpe Street corridor, at several locations, have remained relatively constant since 2006 (earliest available data). This further suggests that there may be opportunities to improve the roadway at a lower scale, than widening it to four lanes.

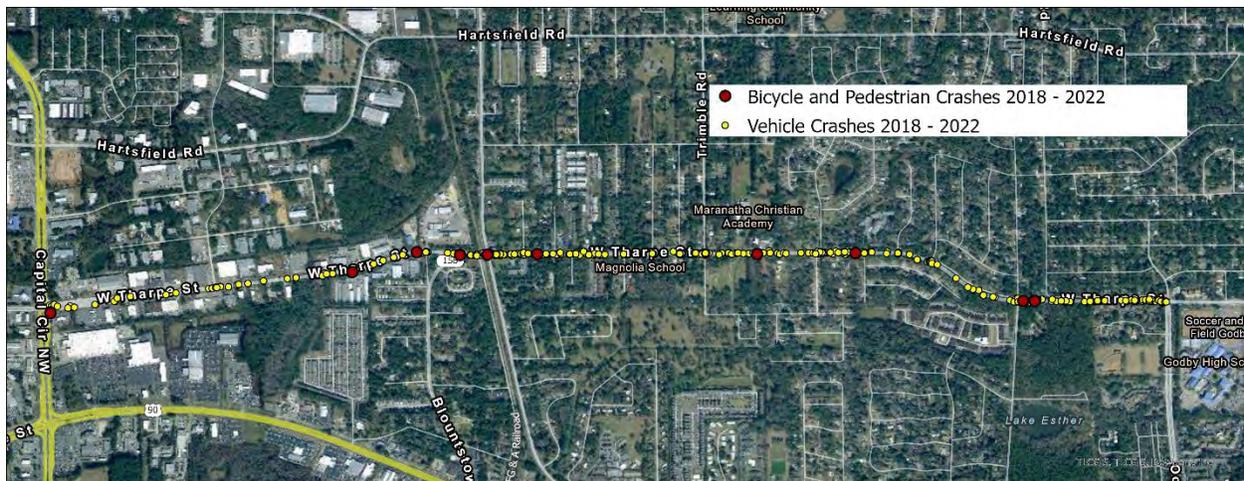
Figure 2. Tharpe Street Average Annual Daily Traffic (AADT) Counts 2006 - 2021



Roadway Safety

As highlighted in the CRTPA study, a total of 709 crashes were reported between 2012 to 2016; 333 crashes resulted in injury, including one fatality. Crash rates during this time (6.14 crashes per million) far exceeded the state average for this roadway type (0.299 crashes per million). More recently, there were 413 crashes from 2018 – 2022; 145 crashes resulted in injury, with 10 crashes involving a bicyclist or pedestrian. As illustrated in Figure 3, crashes primarily occurred east of Blountstown Highway.

Figure 3. Tharpe Street Crashes 2018 – 2022

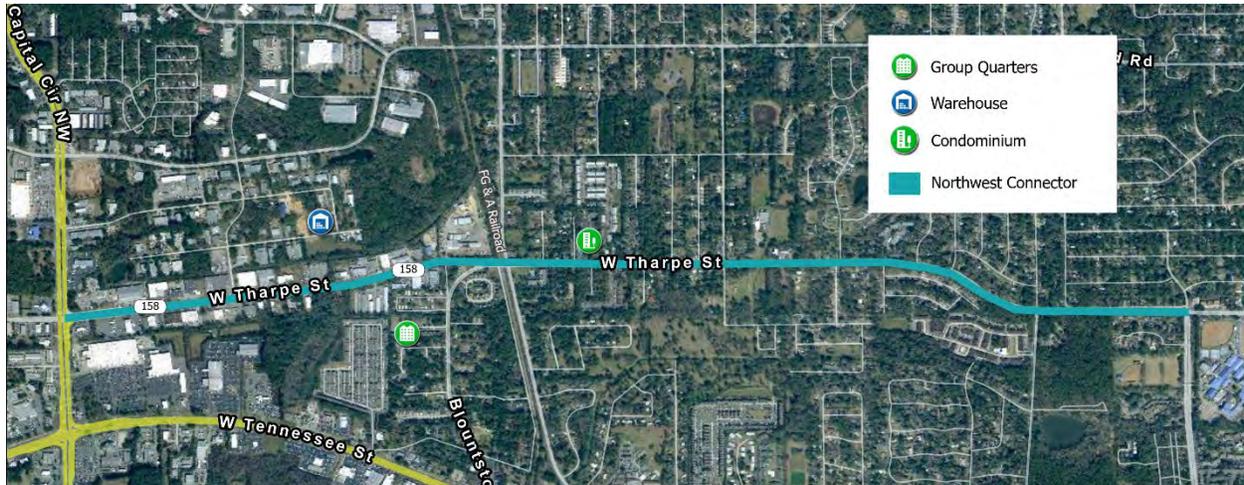


Corridor Development Analysis

Since 2005, there have been three major developments (20+ residential units and/or 10,000 sq. ft. commercial) along the Tharpe Street Corridor. These developments are displayed below in Figure 5. The 2005 PD&E Study projected that from 1997 to 2020, the

Tharpe Street area would grow by over 1,500 individuals, 616 employees, and 693 housing units, which would all contribute to increased traffic along the corridor. Not accounting for small-scale development, only 151 new residential units (approximately 22% of those forecasted by 2020) have been constructed along the Tharpe Corridor, since 2005.

Figure 5. Tharpe Street Major Developments Since 2005



An analysis by the Tallahassee-Leon County Planning Department focused on currently vacant lots and underdeveloped lots along the corridor has identified that the maximum future development potential is approximately 100 additional residential units and 78,400 sq. ft. of light industrial uses (or 197,000 sq. ft. of storage/warehousing). This indicates substantial increases of traffic on Tharpe Street predicted in the 2005 Study are not likely to occur. There have also been several significant relocations over the past two decades including the relocation of Tri-Eagle distribution facility to Midway and relocation of Leon County Development Services to the Frenchtown Renaissance Center.

Corridor Characteristics

As documented in the 2019 CRTPA Study, approximately 82% of the Tharpe Street corridor lacks bicycle and pedestrian facilities. Additionally, residents living in several census tracts along the Tharpe Street corridor commute using public transportation at rates over two to nearly five times the State of Florida and Leon County averages. StarMetro, the City of Tallahassee's transit agency, has one route that operates on the NW Connector Tharpe Street corridor (Evergreen), which services 11 stops. The most used stops between Mission Road and Ocala Road. According to the 2021 5-Year American Community Survey, two Census Tracts along the Tharpe Corridor have significantly higher incidences of no vehicle available to working individuals 16 or older than the County Average (3.3%). 5.8% of individuals 16 or older in Census Tract 21.05 do not have access to a vehicle; 7.1% of working individuals aged 16 and over in Census Tract 21.03 do not have access to a vehicle, more than twice the County average. The State of Florida average for this metric is 2.7%.

CRTPA
TRAFFIC AND OPERATIONS ANALYSIS
THARPE STREET

January 2019

PREPARED FOR:



PREPARED BY:



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Tharpe Street

BACKGROUND

The Capital Region Transportation Planning Agency (CRTPA) identified the need for additional capacity along Tharpe Street in the 2040 Regional Mobility Plan (RMP). The RMP proposes the widening of this corridor from Ocala Road to Capital Circle Northwest from two lanes to four lanes. The purpose of this study is to investigate existing conditions along Tharpe Street and identify potential projects to improve mobility and efficiency without major capacity expansions.

Existing conditions were established using the following data sources:

Table 1. List of Data Collection Sources

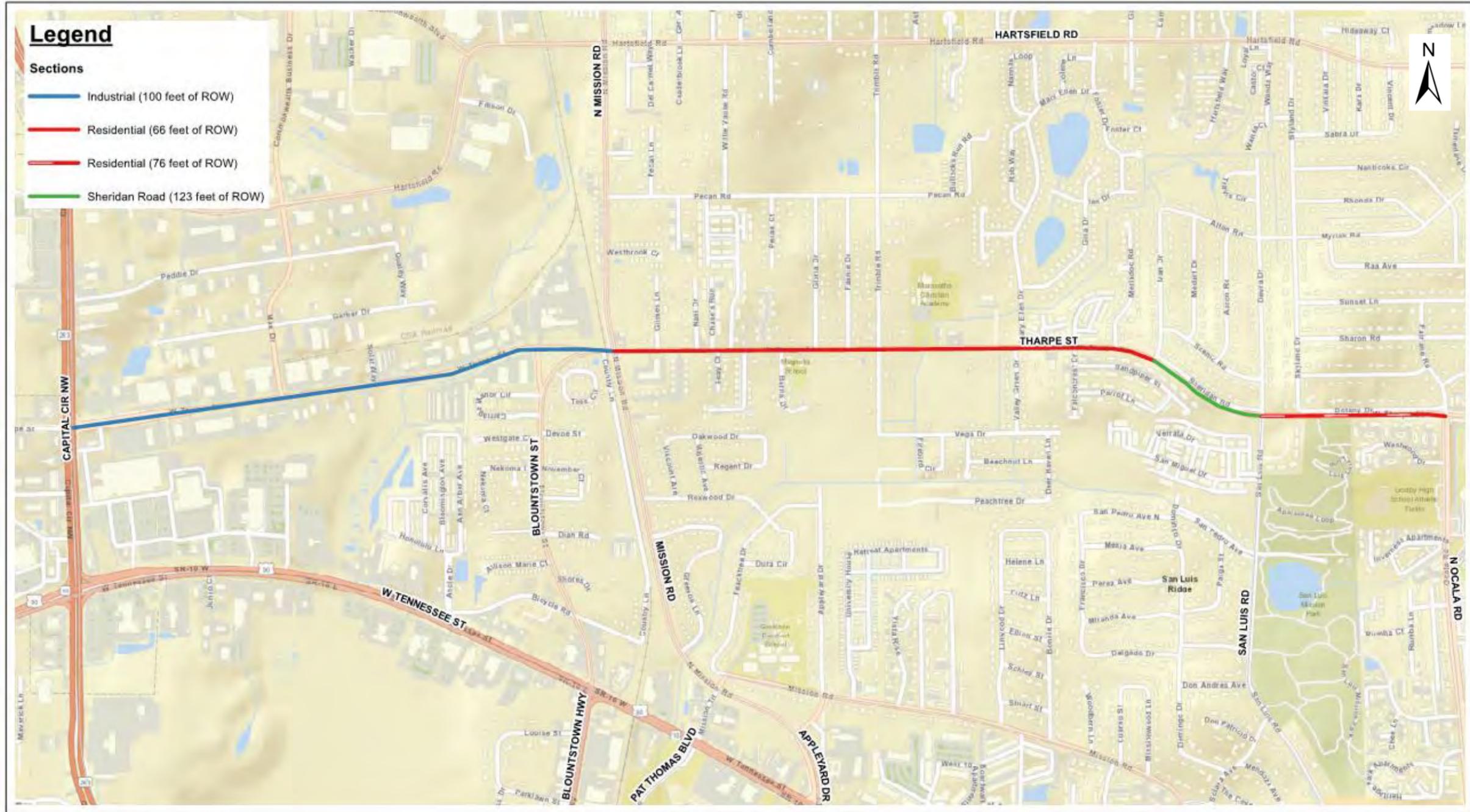
Data Source	Data Set	Dates of sources
Field Visit	Existing Issues	07-25-2018
City of Tallahassee	Operational Analysis	2017
StarMetro	Bus routes and schedules	2017
Congestion Management Plan Update (CMP)	Crash data	2012 – 2016
FDOT Transportation Data	Historical AADT (Annual Average Daily Traffic)	2012-2016
Tharpe Street Corridor Study by Kimley-Horn	Previous recommendations	2005

The corridor exhibits three distinct sections based on character and land use. These sections are identified as the Industrial Section, the Residential Section, and the Sheridan Road Section (see Figure 1). The Residential Section is divided into two sections: Mission Road to Ivan Drive and Devra Drive to west of Ocala Road. Number of lanes, travel lanes widths, and right-of-way (ROW) widths are shown in Table 2. The review of the existing conditions within the corridor resulted in the identification of five major issues and are discussed in the following sections.

Table 2. Tharpe Street Section Distinctions

Section	Number of Travel Lanes	Lane Width (Feet)	ROW Width (Feet)
Industrial (East of Capital Circle NW to Mission Road)	2	12	100
Residential (Mission Road to Ivan Drive)	2	12	66
Residential (Devra Drive to West of Ocala Road)	2	12	76
Sheridan (Ivan Drive to Devra Drive)	2	12	123

Figure 1. Project Overview



ISSUES

Issue #1 –Transit Accessibility

StarMetro serves as the public transit agency for the City of Tallahassee and Florida State University. Currently, bus stops along Tharpe Street are not compliant with the Americans with Disabilities Act (ADA) and offer limited information to passengers (see Figure 2). Current ADA compliance is only required when bus shelters and sidewalks already exist. StarMetro desires to make all public transit links adhere to current ADA standards and to provide schedule and route information, making the system more accessible and safer for all riders.

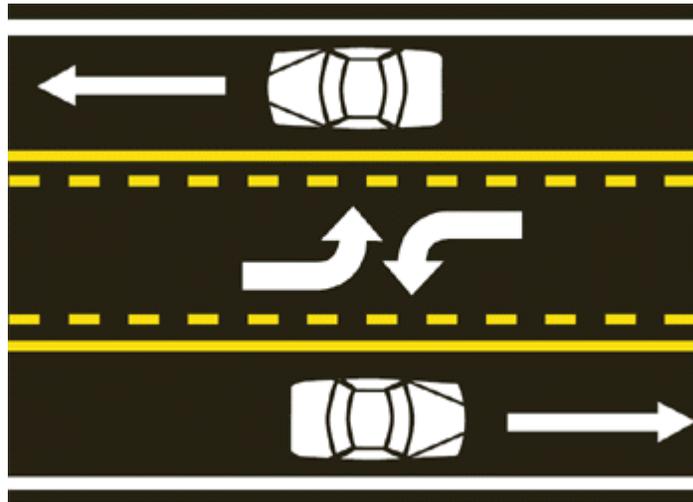
Figure 2. Typical Bus Stop Along Tharpe Street



Issue #2 – Spot Congestion

Spot congestion along Tharpe Street is primarily caused by routine traffic events such as bus pick up/drop off, trash collections, and left turn traffic. Some portions of the corridor have one through lane in each direction that is separated by a dual left turn lane (see Figure 3). Left turn traffic is especially common in the residential section of Tharpe Street where minor streets are clustered together. During routine bus stops, motorists often travel over painted medians due to the lack of maneuvering space provided by the current two-lane design as shown in Figure 4. With these left turn movements, spot congestion is especially prevalent in the residential section of Tharpe Street during peak AM/PM hours.

Figure 3. Existing Lane Design



Source: Florida Driver Handbook

Figure 4. Lack of Maneuvering Space Along Tharpe



Issue #3 – Lack of Bicycle/Pedestrian Facilities

Presently 90% of the land parcels along Tharpe Street have no access to sidewalks or bicycle facilities. For this reason, cyclists and pedestrians have no choice but to travel along grassed ditches to avoid interaction with motorists (see Figure 5). However, grassed ditches are not always made available. One area in particular, located 500 feet east of Trimble Road, poses a high-risk area for pedestrians as they are given no choice but to travel on the roadway with vehicular traffic (see Figure 6).

Figure 5. Pedestrian Travel Pattern



Figure 6. High Risk Area for Pedestrians



Issue #4 – Desire Lanes

Desire lanes are paths that result from on-going pedestrian foot traffic and can be found at multiple locations along Tharpe Street. This not only lacks pedestrian safety benefits but also uniformity throughout the corridor. Prevalence of desire lanes signify the need for sidewalks (see Figure 7).

Figure 7. Desire Lanes along Tharpe Street



Issue #5 – Flooding and Runoff

Evidence of roadside erosion can be observed throughout the corridor. Existing conditions show roadway drainage traveling to nearby roadside ditches that transports water runoff to the nearest outfall point (see Figure 8). Presently, no stormwater treatment is provided for the roadway other than the flow time in grassed ditches.

Figure 8. Slope Erosion Caused by Stormwater Runoff along Tharpe Street



ANALYSIS

Analysis Procedures

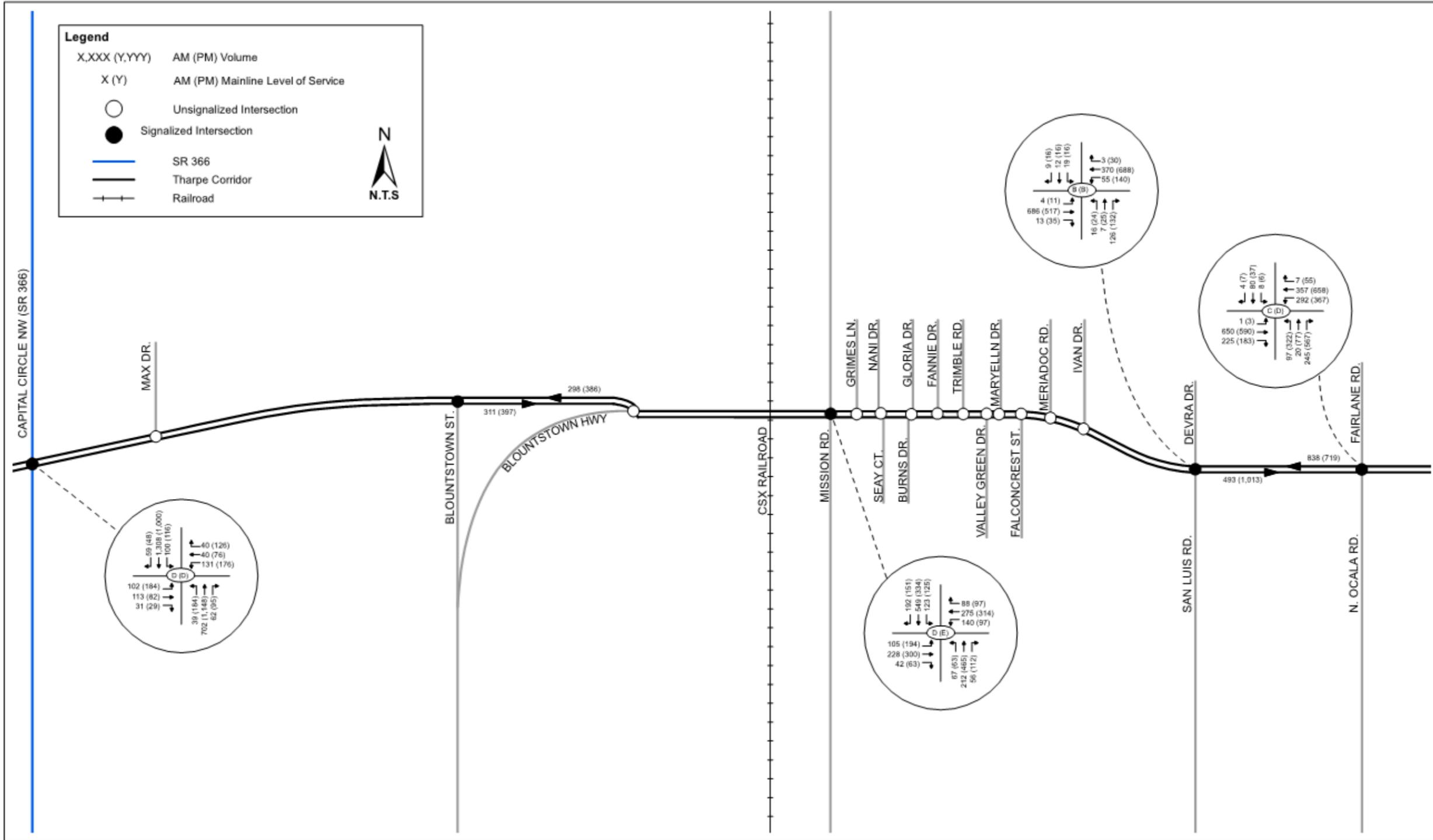
Analysis of traffic volumes is useful in understanding the general nature of traffic in an area, however, the volumes alone do not indicate the ability of the street network to carry additional traffic or the quality of service afforded by the street facilities. To fully understand the operations of the facility, Level of Service (LOS) is utilized to describe traffic performance. LOS can be measured at intersections and along key roadway segments. LOS categories are similar to report card ratings for traffic performance. LOS A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. LOS D and E are progressively worse operating conditions and LOS F conditions represent gridlock where demand exceeds the capacity of an intersection or roadway segment. Operational analysis for Tharpe Street was performed following the Highway Capacity Manual (HCM) 2000 methodologies using Synchro software. This was made available by The City of Tallahassee and reflects AM/PM traffic operations during October 2017.

Historical and county traffic sites provided the source of existing traffic for the Tharpe Street study area. Existing intersection analysis is summarized in Table 3 and shown in Figure 9. Under current conditions, the Mission Road intersection is not operating at an acceptable LOS for the peak hour. Mission Road operates at LOS E under existing traffic conditions, which does not meet established standards and identifies the need for capacity improvements.

Table 3. Existing Intersection Operation Analysis.

Intersection	AM	PM
CCNW (SR 366)	D	D
Mission Rd.	D	E
San Luis Rd./Devra Dr.	B	B
N. Ocala Rd. / Fairlane Rd.	C	D

Figure 9. Existing Peak Hour Volumes and Level of Service



Crash Rates

Crash rates are calculated values used in the comparison of crash experience of similar locations in the region. State agencies typically develop average crash rates for different types of intersections and roadway segment for statewide analyses. Incorporating crash rate with roadway information, such as traffic volume, aid in identifying roadway deficiencies.

Crash data was obtained from the recently updated Congestion Management Plan update. Sourced data encompassed the five-year period from 2012 to 2016. Crash data were then analyzed to determine types and locations of crashes that occurred along the corridor and at intersecting roadways. A total of 709 crashes were reported between 2012 to 2016. Of these, 333 were injury crashes, while only one reported fatality. Rear-end collisions were reported as the most common crash type in the residential section accounting for 50% total accidents. This number of rear-end collisions is likely due to driver response with the frequent spot congestion and left turning movements during AM/PM peak hours.

Currently Tharpe Street within the analysis segment has a crash rate of 6.14 per million vehicle miles of travel (MVMT). The state average for similar facilities consisting of undivided, two to three lanes with two-way traffic is 0.299.

Table 4. Tharpe Street (Ocala to Capital Circle) Crash Rate vs. State Average

	Tharpe Street	Florida's State Average
Crash Rate (MVMT)	6.14	0.299*

Source*: Florida's five-year average crash rate for 2-3 lane, 2-way, undivided roadway section.

RECOMMENDATIONS

The Street Design Priority Matrix, shown in Figure 10, is a tool used in the development of the Connections 2040 Regional Mobility Plan. This tool provides an understanding of the transportation facility elements and features and the connection to complete street components. The tool identifies priority features for different roadway classifications based on the overall character area. With Tharpe Street classified as an urban minor arterial, priority was placed on improving/installing the following roadway features:

1. Sidewalks
2. Medians
3. Access management
4. Multimodal intersection design
5. Bicycle lanes
6. Sharrows
7. Bus pullouts
8. Bus shelters
9. Landscaping

Figure 10. Street Design Priority Matrix

	Freeway	Principal Arterial			Minor Arterial			Collector			Local		
		Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural	Urban	Suburban	Rural
Shared Vehicle Zone													
Multiple travel lanes	H	H	H	H	M	M	M	M	M	L	L	L	L
Width of travel lanes	H	H	H	M	H	H	M	H	H	M	L	L	L
Vehicle capacity at intersections	M	H	H	H	H	H	M	H	M	M	L	L	L
Design for large vehicles	H	H	M	M	H	M	M	M	L	L	L	L	L
Multimodal intersection design	H	H	H	M	H	H	M	H	H	M	M	M	L
Bicycle Zone													
Bicycle lanes	L	M	M	L	H	M	L	H	H	L	L	L	L
Wide lanes / paved shoulders	L	H	H	M	M	M	M	M	M	M	L	L	L
Sharrows	L	L	L	L	M	M	L	H	M	L	L	L	L
Parking/Transit Zone													
On-street parking	L	L	M	L	M	M	L	H	H	L	H	L	L
Bus pullouts	L	H	M	L	M	M	L	M	L	L	L	L	L
Green Zone													
Landscaping	H	H	H	M	H	H	L	H	H	L	H	M	L
Lighting	H	H	H	L	H	H	L	H	H	L	H	M	L
Street furniture	L	M	M	L	M	M	L	M	M	L	L	L	L
Bus shelters	L	H	H	L	H	H	L	H	H	L	L	L	L
Sidewalk Zone													
Wide sidewalks	L	H	M	L	H	M	L	M	M	L	L	L	L
Standard sidewalks	L	M	H	L	H	H	L	H	H	L	H	M	L
Multituse Paths	L	L	M	M	M	M	L	L	M	L	L	L	L
Median Zone													
Narrow medians	L	H	M	L	H	M	L	H	M	L	L	L	L
Wide medians	H	L	M	H	L	M	H	L	M	L	L	L	L
Other Elements													
Access management	H	H	H	M	H	H	M	M	M	M	L	L	L

H High Priority M Medium Priority L Low Priority

Source: Connections 2040 Regional Mobility Plan

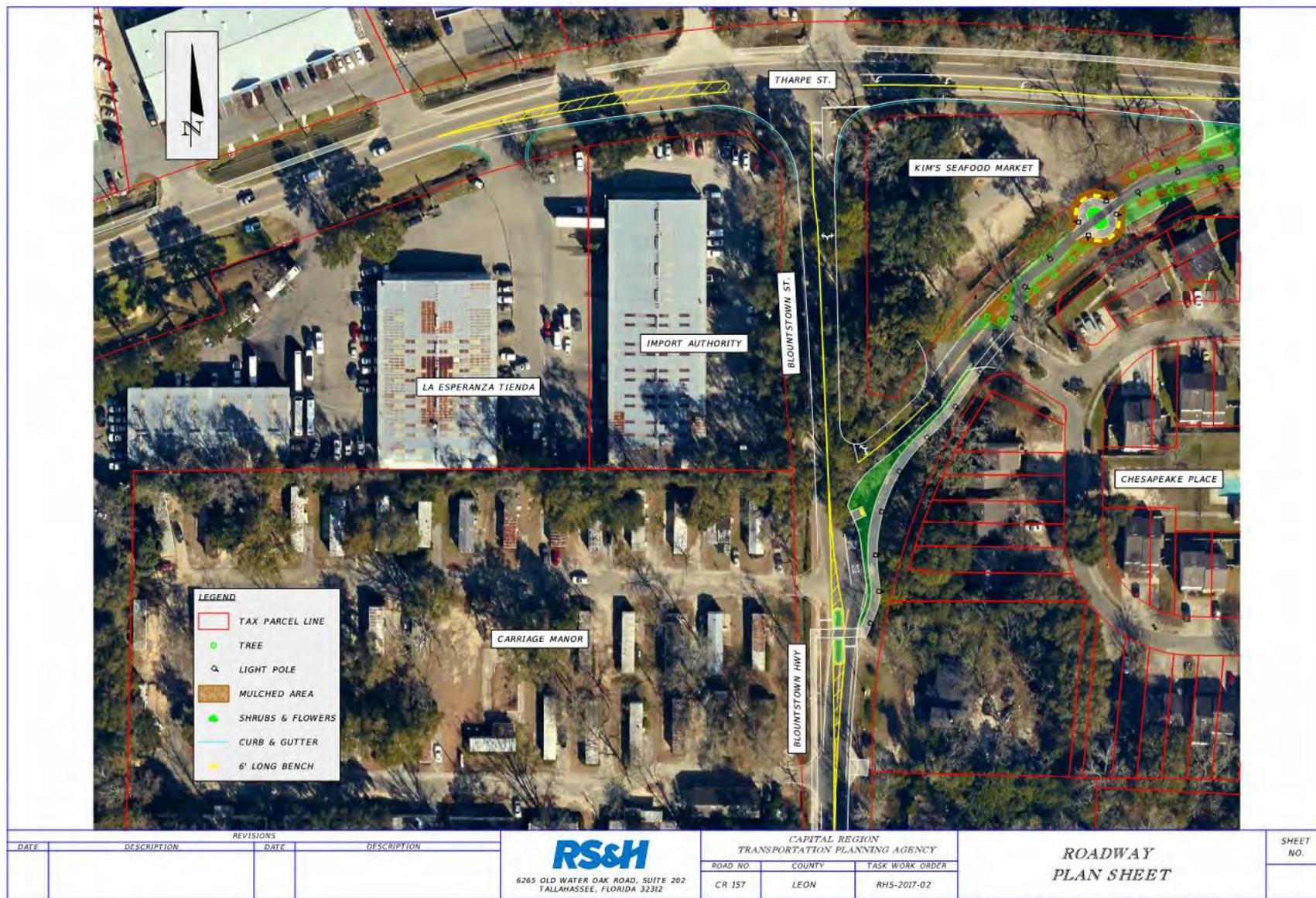
Industrial Section Recommendations

Proposed recommendations for the Industrial section of Tharpe Street:

- Install 5-foot wide concrete sidewalk with a 4-foot wide utility strip on the north side.
- Addition of shared lane markings (Sharrows).
- Conversion of Blountstown Hwy and Tharpe Street to a “T” intersection.
- Install 8-foot wide concrete sidewalk and curb and gutter along east side of Blountstown Hwy.

Figure 11 displays the recommended conversion of the Blountstown Highway and Tharpe Street intersection.

Figure 11. Blountstown Highway and Tharpe Street Intersection



Residential Section Recommendations

Proposed for the Residential section of Tharpe Street:

- Addition of 8-foot wide concrete sidewalk, culvert system, and curb and gutter along north side of Tharpe Street.
- Addition of 8-foot wide pedestrian bridge over central drainage system.
- Widen 10 feet along the south side of Tharpe Street for addition of medians from Mission Road to Trimble Road.
- Addition of two Jug handle U turns allowing U-turn for vehicles needing left turn access
- Install turnout bays.
- Re-stripping east side of Tharpe Street near Ocala Road to include bike lane.

Figures 12 through 16 display the recommendations identified for this section.

Figure 12. Mission Road at Tharpe Street



Figure 13. Nani Drive to Burns Drive



Figure 14. Gloria Drive to Trimble Road

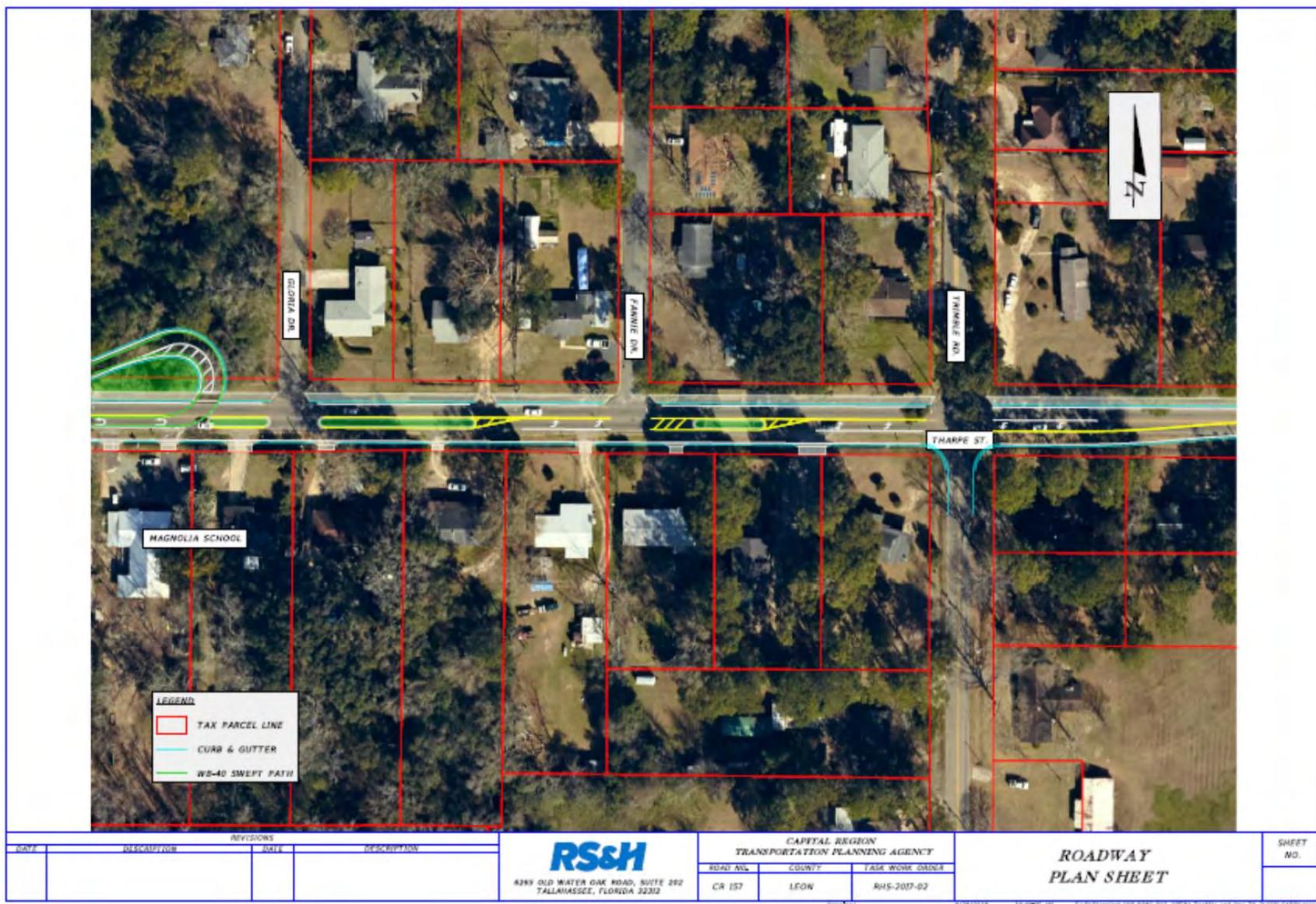


Figure 15. Pedestrian Bridge

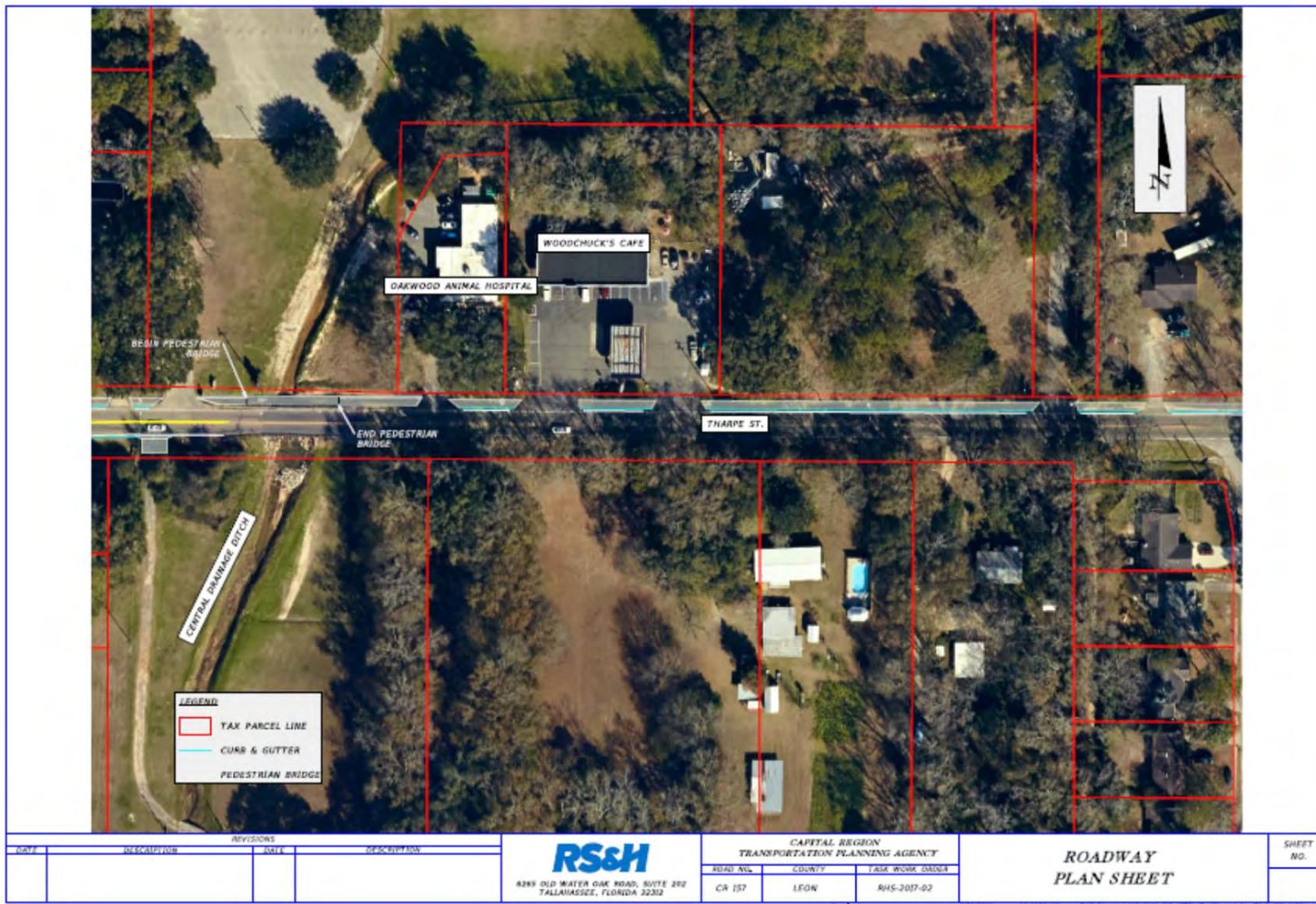


Figure 16. Valley Green Drive to Meriadoc Drive



Sheridan Section Recommendations

- Addition of 8-foot wide concrete sidewalk, culvert system, and curb and gutter along north side of Tharpe Street.

Figures 17 and 18 display the Ivan Drive and Devra Drive areas.

Figure 17. Ivan Drive



Figure 18. Devra Drive



Summary of Recommendations

Restricting allowed turning movements on the residential segments between Mission and Trimble Road may benefit traffic operations with the use of restrictive medians. By limiting the number of allowed turning movements, this segment would experience reduced crashes caused by crossover traffic from minor streets along the residential segment. Medians would eliminate spot congestion in the area by removing traffic events that block through movements. As a result, this would improve operational efficiency. Addressing the issue of congestion would have the added benefit of eliminating the need for additional lanes. Furthermore, medians provide a refuge for pedestrian crossing Tharpe Street allowing them to be more visible to drivers, hence improving pedestrian safety.

In addition to safety and operations benefits, medians would improve the appearance of Tharpe Street. With a more unified street design a better sense of community is to be expected. Further details including supporting data, project limits, pros and cons for proposed recommendations can be found in Table 5 and Table 6.

Table 5. Summary of Industrial Section Recommendations

Tharpe Street (CR 185)					
Section	Potential Improvement	Supporting Data	Pro	Con	Project Limits
Industrial	Addition of 5' concrete sidewalk with a 4' utility strip on the north	Addresses lack of Bicycle/Pedestrian facilities and runoff issue. Satisfies Street Design Priority Matrix	<ul style="list-style-type: none"> Connects sidewalk network. Improves pedestrian safety. Reduces friction associated with drivers navigating between opposing flow and pedestrians. Addresses pedestrian facility needs. Improved visibility for motorists. Encourages walking and biking 	<ul style="list-style-type: none"> Requires about 100' of gravity wall, and the extension of box culvert cross drains. 	East of Capital Circle NW to Mission Road
	Addition of shared lane markings (Sharrows)	Address lack of bicycle facilities and satisfies Street Design Priority Matrix	<ul style="list-style-type: none"> Facilitates advanced cyclists who prefer shared roadways in lieu of striped bike lanes and paths (represent about 20% of adult cyclists but account for nearly 80% of bicycle miles). Keep the road as narrow as possible 	<ul style="list-style-type: none"> May cause spot congestion from cyclists. 	East of Capital Circle NW to Mission Road
	Conversion of Blountstown Hwy and Tharpe Street to T intersection	Higher than average segmental crash rate (see Table 3)	<ul style="list-style-type: none"> Reduce conflict points that exist with current roadway geometry thus improving segmental crash rate in this area. 	<ul style="list-style-type: none"> Limits access to Kim Seafood Market and adjacent mobile home development. Requires removal of 600' of existing Blountstown Hwy roadway. Possible right of way impacts StarMetro bus routes will have to be redirected to Blountstown St. Encroaches on submitted (TAP) project --Blountstown Street Sidewalk Improvement. 	Blountstown Hwy at Tharpe St intersection
	Addition of 8' wide concrete sidewalk and curb and gutter along east side of Blountstown Hwy.	-Addresses lack of Bicycle/Pedestrian facilities and runoff issue. Street Design Priority Matrix	<ul style="list-style-type: none"> Connects sidewalk network. Improves pedestrian safety. Reduces friction associated with drivers navigating between opposing flow and pedestrians. Addresses unsightly travel walkways along corridor created by pedestrian traffic. Improved visibility for motorists. Encourages walking and biking. Control drainage and rainwater 	<ul style="list-style-type: none"> Drainage impact. Converting the open flow ditch to a closed flowing culvert system. 	Intersection of Blountstown Hwy and Blountstown Street

Table 6. Summary of Residential Section Recommendations

Tharpe Street (CR 185)					
Section	Potential Improvement	Supporting Data	Pro	Con	Project Limits
Residential	Addition of 8' concrete sidewalk, culvert system, and curb & gutter along north side of Tharpe Street	Addresses lack of Bicycle/Pedestrian facilities and runoff issue.	<ul style="list-style-type: none"> • Connects sidewalk network. • Improves pedestrian safety. • Benefits pedestrian safety. • Addresses unsightly travel walkways along corridor created by pedestrian traffic. • Improved visibility for motorists. • Encourages walking and biking. • Control drainage and rainwater. 	<ul style="list-style-type: none"> • Drainage impact. Converting the open flow ditch to a closed flowing culvert system. 	Mission Road to Falconcrest Street
	Addition of 8' wide pedestrian bridge over central drainage system	Addresses lack of Bicycle/Pedestrian facilities	<ul style="list-style-type: none"> • Avoid extension of box culvert over central drainage ditch. • Pre-fabricated bridges are an affordable building option. • Can be quickly constructed. 	<ul style="list-style-type: none"> • Drainage impact. Converting the open flow ditch to a closed flowing culvert system. • Sign and utility pole might need to be relocated with the addition of pedestrian bridge. • Weaken as they get older. • Maintenance cost. 	Box culvert over central drainage ditch
	Widen 10' along the south side of Tharpe Street for addition of medians	Addresses lack of Bicycle/Pedestrian facilities and runoff issue.	<ul style="list-style-type: none"> • Benefits safety, and operational efficiency. • Landscaped medians prevent crossover and head on accidents, • Provide refuge for pedestrians. • Addition of turn lanes increases the capacity of the roadway. 	<ul style="list-style-type: none"> • Restricts single home owners from left turn access to their property. • Drainage impacts. Converting the open flow ditch to a closed flowing culvert system. • 12 Driveways will be impacted for residents living on this section of Tharpe Street 	Mission Road to Trimble Road
	Addition of two Jug handle U turns	Solution to accessibility issue with addition of proposed medians	Resolves accessibility issue for single homeowners unable to make left turns to their properties.	<ul style="list-style-type: none"> • Right of way acquisition is required. • Proposed recommendation encroaches three land parcels. 	At Mission Road and West of Gloria Drive
	Install turnout bays	Addresses spot congestion caused by truck traffic.	<ul style="list-style-type: none"> • Provide queue space for left turning vehicles allowing greater capacity. • Removes stopped vehicle from travel lane, reduces delay and increases vehicle capacity. • Reduced risk of rear-end crashes generally • Potential to consolidate and more clearly define StarMetro stops. • Locates riders awaiting pickup further from fast moving traffic. • Serves as safe pull off location for incapacitated vehicles. 	<ul style="list-style-type: none"> • Buses utilizing turnout may have trouble re-entering travel lane, potentially effecting StarMetro schedules. • Increased risk of sideswipe crashes. • Creates additional paving and may require right-of-way acquisition. 	West of Mission Road to West of Meriadoc Road
	Re-striping east side of Tharpe near Ocala Road to include bike lane	Evidence of desire lanes.	<ul style="list-style-type: none"> • Facilitates advanced cyclists who prefer shared roadways in lieu of striped bike lanes and paths (represent about 20% of adult cyclists but account for nearly 80% of bicycle miles). • Keep the road as narrow as possible 	<ul style="list-style-type: none"> • May cause increase congestion. 	Ocala Road to 800' West of Ocala Road

Summary of Recommendations					
Tharpe Street (CR 185)					
Section	Potential Improvement	Supporting Data	Pro	Con	Project Limits
Sheridan Road	Addition of 8' concrete sidewalk, culvert system, and curb & gutter along north side of Tharpe Street	Pedestrians and bicyclists travel through the grass alongside roadway.	<ul style="list-style-type: none"> • Connects sidewalk network. • Improves pedestrian safety. • Reduces friction associated with drivers navigating between opposing flow and pedestrians. • Addresses unsightly travel walkways along corridor created by pedestrian traffic. • Improved visibility for motorists. • Encourages walking and biking. 	<ul style="list-style-type: none"> • Drainage impact. Converting the open flow ditch to a closed flowing culvert system. • Relocation of 9 COT Utility poles 	Ivan Drive to Devra Drive

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Blueprint Intergovernmental Agency Board of Directors Agenda Item #6

March 9, 2023

Title: Acceptance of a Report and Cost Estimate for a Preliminary Engineering Analysis to Construct a Large-Scale Treatment Facility at Lake Munson

Category: General Business

Intergovernmental Management Committee: Vincent S. Long, Leon County Administrator
Reese Goad, City of Tallahassee Manager

Lead Staff / Project Team: Benjamin H. Pingree, Director, Department of PLACE
Autumn Calder, Director, Blueprint
Daniel Scheer, Blueprint Design and Construction Manager
Abraham Prado, Senior Project Manager

STATEMENT OF ISSUE:

As directed by the Intergovernmental Agency Board of Directors (IA Board) at their September 29, 2022 meeting, this agenda item provides analysis of, and a fee estimate for, the preliminary engineering analysis of a citizen initiated concept for a new large-scale treatment facility at Lake Munson, Attachment #1. The citizen proposal is to construct a new 165 acre+/- stand-alone wetland treatment facility, on approximately 40 acres of City owned property and 125+/- acres of federal land within the Apalachicola National Forest (that would need to be acquired), that includes pumps to send water from Lake Munson to the proposed facility and treat it through a constructed wetland before returning it to the lake. As reflected in Option #1, staff does not recommend pursuit of this proposal. The proposed facility is intended to treat water with higher nutrient levels than exist at Lake Munson. Therefore, the proposed project is not expected to provide improvements to warrant the significant investment needed to design and construct this facility. The item provides a comprehensive summary of the \$285 million of improvements made in the Lake Munson Basin, as well as information on the Board of County Commissioners recent direction to implement the Lake Munson Action Plan on October 11, 2022 based on the improved water quality in the lake and recommendations from the Science Advisory Committee. This Plan includes the November 2022 drawdown of the lake, which is expected to help immediately address the algae, nutrient, and aquatic vegetation conditions. The drawdown combined with other future actions Leon County included within the Lake Munson Action Plan are meant to enhance long term water quality conditions.

FISCAL IMPACT

This item does not have a fiscal impact. Should the IA Board provide direction to add this project to the Blueprint Interlocal Agreement work program, the estimated fee for the preliminary engineering analysis required to study the feasibility of such a new project is estimated to be \$150,000 to \$300,000. The design and permitting could amount to approximately \$1.5-\$2 million. Cost estimates to construct a new facility as well as the cost estimate to acquire an additional 125+/- acres of pine forest owned by the United States of America as part of the Apalachicola National Forest for the proposed project site are unknown but estimated to be substantial millions of dollars. Budget allocations for any potential new project do not currently exist and would have to be identified by the IA Board at a future date.

RECOMMENDED ACTION:

Option 1: Accept the report and take no further action.

SUPPLEMENTAL INFORMATION:

As directed by the IA Board at their September 29, 2022 meeting, this agenda item provides an analysis and fee estimate for the preliminary engineering analysis of a citizen initiated concept for a large-scale treatment facility on the west side of Lake Munson. A location map for Lake Munson is included as Attachment #2. This item makes a recommendation to take no further action on this large-scale treatment facility concept for Lake Munson, provides a comprehensive summary of the \$285 million of improvements made to date in the Lake Munson Basin, and includes the Board of County Commissioners direction to implement the Lake Munson Action Plan on October 11, 2022 based on the improved water quality in the lake and recommendations from the Science Advisory Committee.

The citizen proposed facility is envisioned to be constructed on 40 acres of City owned land and 125+/- acres of existing pine forested land owned the United States of America as part of the Apalachicola National Forest. As detailed below, the City land is activated as a part of the Thomas P Smith Water Reclamation Facility. Acquisition and relocation costs are unknown. The Federal land is current forest. The citizen concept, as identified in Attachment #1, is for a new stand-alone large-scale treatment facility that pumps water from Lake Munson and treats it through a constructed wetland before reentering the lake. A pumping system is proposed, and would be required to realize the project, that would recirculate water from Lake Munson through the proposed treatment facility to ultimately be returned to Lake Munson. This system is typically referred to as a 'kidney system' designed to remove nutrients from impaired water.

The 2015 Second Amended and Restated Interlocal Agreement (Interlocal Agreement), provides a list of all Blueprint projects on which sales tax funds can be expended. It does not include a project at Lake Munson. Should the IA Board desire to create a Blueprint water quality project at Lake Munson as proposed by the citizen, a substantial

amendment to the Interlocal Agreement is required. Details on how to create a new project are also included in this item.

PROJECT BACKGROUND

Lake Munson is an approximately 288-acre, cypress-rimmed lake located south of the City of Tallahassee. It is a state-managed waterbody with a documented history of chronic water quality and ecological problems including fish kills, algal blooms, exotic vegetation and snails, high nutrient levels, low game fish productivity, sediment contamination, and depressed oxygen levels. Today, Lake Munson is designated by the Florida Department of Environmental Protection (FDEP) as a Class III waterbody suitable for fish consumption and recreational activities. However, the shallow and stagnant nature of the waterbody makes it susceptible to the growth of algae in the lake resulting sporadic algal bloom development. These blooms are attributed to nutrient recycling, in particular nitrogen and phosphorus, from the existing lake bottom sediment into the lake water.

Lake Munson has historically been subjected to a large drainage basin with high nutrient loads and other discharges from the tributary system, which has most likely resulted in the embedding of legacy nutrients in the lake-bottom soil. The lake receives surface water flow from a 39,000-acre basin much of which is an urban environment constructed prior to the establishment of stormwater standards. In the early 1980s the effluent from the City of Tallahassee T.P. Smith Water Reclamation Facility was redirected from Munson Slough to the Tram Road Sprayfields and since then, effluent from T.P. Smith no longer discharges into Lake Munson (neither directly nor indirectly).

Decades of development in the Tallahassee red-clay hills, wastewater treatment facilities discharging to the tributary system, and drainage activities focused on flood reduction contributed to historically high nutrient loads entering Lake Munson resulting in poor water quality. These historical activities created the problem.

In contrast, and with substantial, focused public investment, efforts to improve the water quality and reduce the nutrient loading in Lake Munson via the contributing watershed have been ongoing since the 1990s with proven results detailed below, including \$285 million in projects to improve water quality.

Water quality data from sampling indicates that over the past several decades, the water quality in the Lake has been improving. The data indicates that the upstream improvements since the 1990s have resulted in the quality of incoming water being better than the water in Lake Munson. Indicative of the surface water protection efforts of the City, Leon County and Blueprint Intergovernmental Agency, Munson Slough (above Lake Munson) was deemed by the Florida Department of Environmental Protection (FDEP) in 2022 to have met the total maximum daily load (TMDL) for nutrients. In addition, as a result of the most recent water quality data, Lake Munson is no longer considered impaired for nutrients based on the FDEP 2020-2022 Biennial Assessment of Impaired Waters. Since the 1990s, nearly \$285 million has been invested by the City, County, and Blueprint to improve the water quality and reduce the nutrient loading in Lake Munson. A further breakdown is provided in Table 1.

Table 1. Summary of Capital Improvements in Lake Munson Basin

Entity	Number of Projects	Estimated Investment
Blueprint	8	\$102 Million
City of Tallahassee	6	\$113 Million
Leon County	12	\$70 Million
Total	26	\$285 Million

As part of the October 11, 2022 Leon County Board of County Commissioners (BOCC) Agenda Item #26, County staff prepared a comprehensive summary of the history of Lake Munson including the data contained in Table 1. A copy of that agenda item is provided as Attachment #3 for reference purposes. At that meeting, the BOCC voted unanimously to accept the Status Report on Best Management Practices for Lake Munson and approved the Lake Munson Action Plan including the immediate drawdown plan, which is expected to help immediately address the algae, nutrient, and aquatic vegetation challenges in the Lake. The drawdown commenced in November 2022. The drawdown combined with other future actions Leon County included within the Lake Munson Action Plan are meant to enhance long term water quality conditions.

The efforts initiated in the 1990s were guided by the Stormwater Management Plan (SMP) for Lake Munson completed in 1991 and the 1994 Lake Munson Action Plan. In 1991, the Northwest Florida Water Management District (NFWFMD), under a joint contract through the County and City, completed the SMP for Lake Munson. The SMP included structural (capital improvements) and non-structural (preservation, land use, and regulatory) recommendations. The 1994 Lake Munson Action Plan was written by the Lake Munson Action Team, a twelve-member group created by the BOCC in the early 1990s. The Action Team included a technical staff representative from County departments, state agencies, and private citizens with an interest and concern for Lake Munson. During that period, the Action Team reviewed the problems of the Lake and possible solutions before developing an overall strategy for restoration. The 1994 Lake Munson Action Plan incorporated three major strategies to restore Lake Munson, they are: (1) watershed management, (2) in-lake restoration, and (3) community action. The Action Team recommended commencing the watershed management and community action strategies immediately.

From the Lake Munson SMP crafted in 1991 to the 1994 Lake Munson Action Plan, the implementation of the SMP and Action Plan demonstrates ongoing support for projects that enhance water quality in Lake Munson. These plans guided the strategy, efforts, and investments to enhance water quality by recognizing and prioritizing the need for upstream improvements to ensure that clean water was going into the lake before undertaking a proposed in-lake dredging project that would disturb the existing sediment.

Upstream Improvements

Since the 1990s, Blueprint, the City, and County have dedicated \$285 million dollars and implemented 26 projects upstream of Lake Munson to provide water quality treatment, reduce sediment transport, and collect trash. Trash racks have been installed east of Jake Gaither Golf Course on the East Drainage Ditch, west of Lake Bradford Road on the Central Drainage Ditch (CDD), on the St. Augustine Branch prior to the confluence with the CDD, and upstream of Lake Henrietta. The City's Erosion Control and South City/Country Club Creek Drainage projects, both with the Lake Munson basin, reduce the amount of sediment flowing to Lake Munson by protecting the channel banks. Notable water quality improvement projects include Gum Swamp Restoration and Cascades Park as well as the San Luis Park, Broadmoor, Martha Wellman, Carter-Howell-Strong, Bond, Tallahassee Junction, Cascade Trail Segment 3 stormwater pond, and Coal Chute stormwater management facilities (SWMFs). Many of these projects are water quality enhancements to larger projects such as the addition of Broadmoor SWMF with the widening of Capital Circle NW/SW and the creation of Coal Chute Pond, Segment 3 SWMF, and Tallahassee Junction SWMF expansion with the FAMU Way project. Blueprint has completed a substantial number of stormwater improvements along the Capital Cascades Trail corridor improving both water quality and reducing area flooding. Upon completion of the Capital Cascades Trail with Segment 4, these stormwater improvements represent a total investment of more than \$70 million and stretch approximately 4.25 miles. Another major upstream restoration project was the Lake Munson Restoration Project which constructed the Lake Henrietta stormwater facility, made improvements to Munson Slough, removed trash and the sediment delta from Lake Munson, and restored wetlands around Lake Henrietta and Lake Munson.

Lake Munson Water Quality

The 1994 Lake Munson Action Plan has been used as the basis to guide watershed and stormwater improvements, regular testing and monitoring of water quality, and regulatory actions to limit pollutants and protect natural resources. Water quality data indicates that over the past several decades, the water quality in the lake has been improving. The data indicates that the upstream improvements since the 1990s have resulted in the quality of incoming water being better than the water in Lake Munson.

An Innovative Stormwater Technologies paper prepared by Jones-Edmunds, an environmental engineering firm, as part of the preliminary engineering for Capital Cascades Segment 4, included as Attachment #4, similarly concluded that nutrient levels within the Central Drainage Ditch (CDD) near the convergence to Munson Slough are near the lower limit of what is achievable from traditional, low-impact, green stormwater infrastructure, and even most advanced innovative technologies. The decreasing trend in nutrient concentrations suggests that the stormwater retrofit projects implemented upstream have been effective at reducing the ambient nutrient load within the CDD. As a result of the most recent water quality data, Lake Munson is no longer considered impaired for nutrients based on the FDEP 2020-2022 Biennial Assessment of Impaired Waters.

See Figures 1 and 2 for graphics showing the decreasing trends over the last eight years of total nitrogen and phosphorous within Lake Munson. The Figures show that the Lake has a baseline concentration of total nitrogen that is below the TMDL and approaching the TMDL for total phosphorous.

Figure 1. Lake Munson, Total Nitrogen

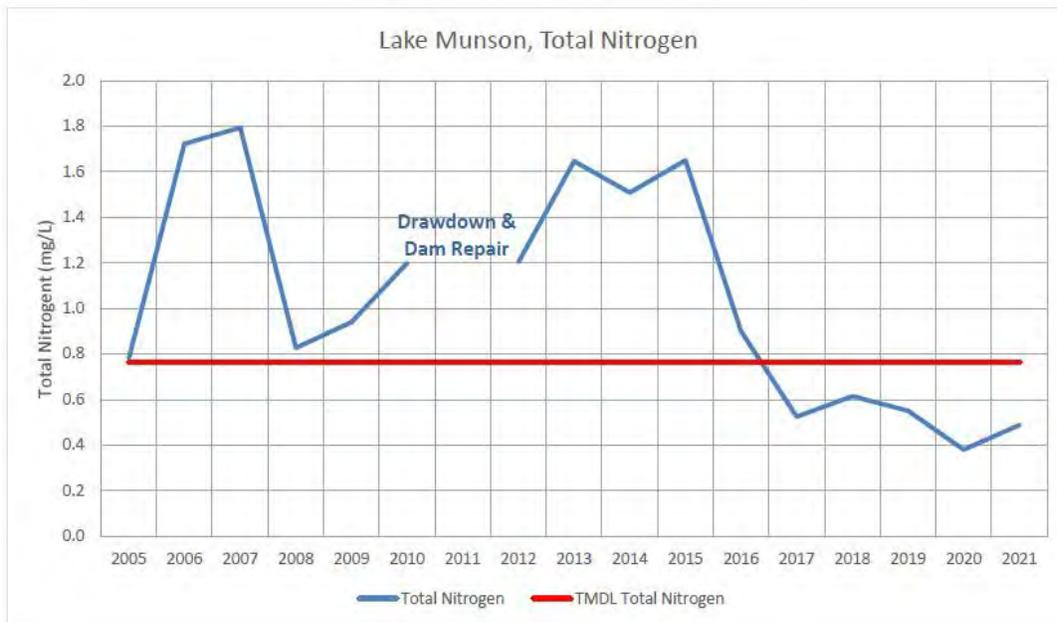
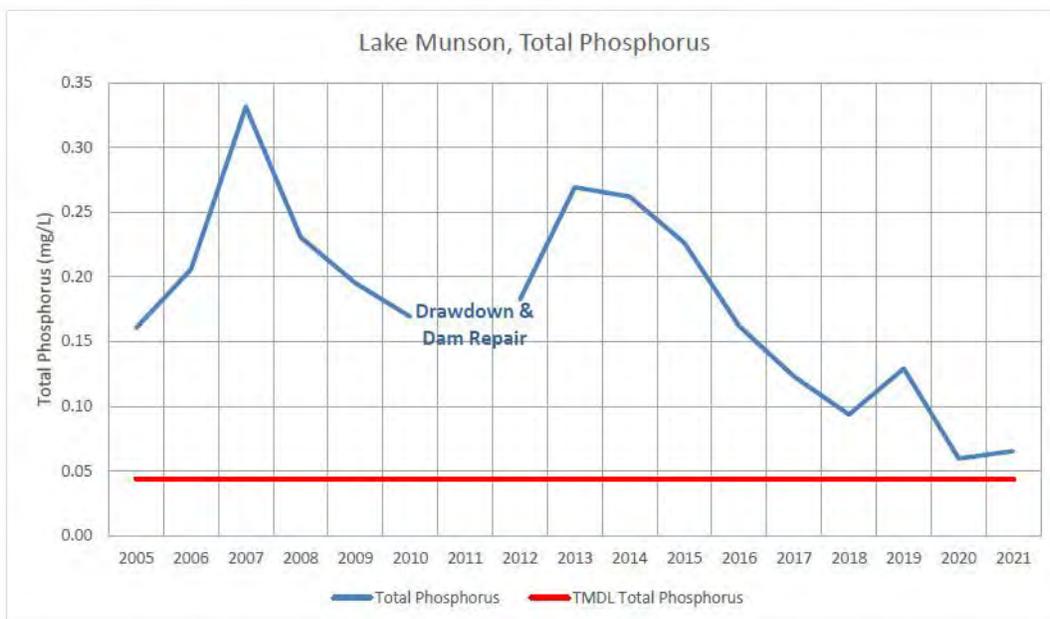


Figure 2. Lake Munson, Total Phosphorus



Despite the better water quality experienced, in-lake mitigation activities, and substantial investments in upstream infrastructure, Lake Munson continues to experience occurrences of algal blooms, invasive vegetation and snails, and depressed oxygen levels. This is because the shallow and stagnant nature of the waterbody makes it susceptible to growth of algal in the lake. In addition, during drier periods water flow through the system will be reduced and therefore create conditions more conducive to algae blooms. In November 2022, Leon County commended the drawdown of Lake Munson, which is expected to help immediately address the algae, nutrient, and aquatic vegetation challenges in the Lake. The drawdown combined with other future actions Leon County included within the Lake Munson Action Plan are meant to enhance long term water quality conditions.

The water entering Lake Munson is significantly 'cleaner' than the water that resides in the lake itself. The internal recycling of nutrients, particularly nitrogen and phosphorus, in Lake Munson indicates that there are persistent nutrients within the lake bottom that impact the water quality of Lake Munson itself.

It is important to note that removing the sediments may cause more harm to the Lake by inadvertently releasing contaminants into the water column that could be transported downstream to Wakulla Springs. Due to contaminants bound to the soils in the lake bottom, the 2019 Florida Geological Survey Sediment Study did not recommend any activities that disturb the lake bottom, like dredging. The Science Advisory Committee and leading environmental firms have also concluded that dredging is not a preferred mitigation method at this time. The contaminants are bound to the sediment so dredging the lake would disturb the sediment resulting in greater harm to the lake and downstream. It is unclear how the citizen proposal would mitigate against any such occurrence.

Proposed Large-Scale Treatment Facility

The citizen proposed concept, included as Attachment #1, is for a stand-alone large-scale treatment facility on the west side of Lake Munson. This facility is proposed to be constructed on 40 acres City of Tallahassee owned land and an additional 125+/- acres within the Apalachicola National Forest owned by the United States of America. The facility, as identified in Attachment #1, would pump water from Lake Munson and treat it through a constructed, or man-made, wetland before reentering the lake. This system is typically referred to as a 'kidney system'. The citizen proposed treatment facility is intended to reduce nutrients in the water that resides within Lake Munson, through the recirculation of water within the lake.

A common comparison project referenced by the citizen seeking the proposed large-scale treatment facility is the Sweetwater Branch Treatment Wetland in Alachua County. This project was designed by Jones-Edmunds and is a \$26 million project constructed in 2015 that was a component of the Paynes Prairie Sheetflow Restoration Project. It is a gravity-fed, in-line, retrofit project that prevents low-quality water in Sweetwater Branch from flowing directly to Alachua Sink and the Floridan Aquifer. The citizen proposed concept

for a large-scale treatment facility is not a gravity fed, in-line, retrofit project, a very different and non-comparable concept to what exists at the Sweetwater Branch project.

The Sweetwater Branch was, in part, a restoration project that began as a way to reduce pollution to Alachua Sink by restoring the prairie's natural sheetflow and creating a wetland habitat. The current citizen proposed concept entails construction of wetlands where none presently exist. Establishment of wetlands in entirely new areas is often more challenging than wetland restoration as an appropriate hydraulic cycle and soil conditions are needed to establish a self-sustaining vegetative community. Without proper hydraulic conditions, wetlands plants can die which can result in non-native species establishing. Similarly, without proper wetlands soils, plants often die. Reestablishment of vegetation and eradication of non-native plant species is often a costly and a long-term undertaking. Likewise, the transport and placement of wetland suitable soil can be costly, in particular to the scale of what is being considered.

The success of Sweetwater Branch has been used as a basis for this citizen proposed project. However, there are significant differences between the Sweetwater Branch system and the proposed treatment facility indicate that a Sweetwater type system is not applicable for Lake Munson.

First, the Sweetwater Branch treats impaired water. As details below, Lake Munson is not impaired. Sweetwater simultaneously treats wastewater treatment plant effluent that is mixed in with storm flows, meaning incoming nutrient concentrations are higher than typical storm flow. In order to efficiently remove nutrients from a wetland system, initial high nutrient levels are required. As previously noted, the current ambient conditions of the water entering Lake Munson have nutrients levels near the lower limit, least potential nutrients, of what is achievable from stormwater treatment. Essentially, the water entering Lake Munson has already been effectively treated upstream, through the many investment detailed earlier, and thus the nutrients it contains are already low. The citizen proposed wetland features for improving Lake Munson will therefore have substantially less nutrients to capture, and the expected results for a similar facility at Lake Munson would be significantly less efficient.

When a watershed approaches or meets the TMDL limits, the water quality in the system is at a point where the waterbody of interest is able to function effectively without outside intervention. Due to efforts by the County, City, and Blueprint, previously identified in the item, the water from the Munson watershed that is entering Lake Munson is not impaired. The non-impaired water entering Lake Munson is then impaired due to a process called 're-absorption' that occurs within the lake. This is where nutrients from the lake sediments migrate into the cleaner water once it enters the lake. Therefore, the approach of recirculating water from the lake to remove nutrients is not an efficient method based on the existing low concentrations of nutrients in the water today.

Next, the Sweetwater Branch treatment wetland footprint was over 150 acres and serves an urban watershed of approximately 3 square miles. By comparison, the Lake Munson watershed is approximately 60 square miles. To maintain a treatment scale ratio, this

would require a facility over twenty times larger, or 3,000 acres, in size than the citizen proposed facility.

In addition to 40 acres of City owned land, the citizen proposal requires the acquisition 125+/- acres of lands with the Apalachicola National Forest, the subsequent removal of the existing pine forest tree canopy, and the excavation of a significant quantity of virgin soils to install the water treatment feature. This pine forest area has a highly porous soil profile, therefore, it may be possible that the water pumped from Lake Munson to this facility may percolate through the soils before the nutrients in the water are removed through a biological process and therefore inadvertently carry the nutrients to an unconfined groundwater feature below the constructed wetland. Because Lake Munson retains water as a lake feature, the bottom surface soils of Lake Munson most certainly serve as liner and retain the water (regardless of nutrient level) within the lake system.

The City of Tallahassee currently uses the land around Lake Munson for the Thomas P Smith Water Reclamation Facility. Any acquisition would first have to accommodate relocation of that use. The National Forest land is under the purview of the Federal government and requires extensive and long-term coordination to potentially acquire and modify the entire acreage.

In addition to vegetation maintenance, the ongoing cost of maintenance requirements of a pumping system need to be considered. Traditionally, mechanical systems are not a preferred component within stormwater treatment design because of the potential for failure and adverse impacts such as inadvertent local flooding, illicit discharges, and possible surcharging of adjacent stormwater management facilities. To minimize this failure, mechanical systems often require redundancy and increased maintenance.

As reflected in Option #1, below, and for all the scientific and fact-based reasons and analysis presented above, staff does not recommend pursuit of this proposal. Upon staff analysis by technical experts at Blueprint, City of Tallahassee, and Leon County, the alleged benefits and removal of nutrients are not anticipated to occur at meaningful levels to warrant the level of investment needed for this facility and would likely harm adjacent pine forest land and/or potentially harm the existing groundwater in the area, as detailed above.

BLUEPRINT INTERLOCAL AGREEMENT

A large-scale treatment facility at Lake Munson is not included in the list of projects identified in the Blueprint Interlocal Agreement. The Interlocal Agreement provides a list of all Blueprint projects on which sales tax funds can be expended. Should the IA Board desire to create a Blueprint project for the citizen proposed large-scale treatment facility at Lake Munson, a substantial amendment to the Interlocal Agreement is required. The following section outlines the process to amend the 2015 Second Amended and Restated Interlocal Agreement.

The Interlocal Agreement was executed in 2015 by the City of Tallahassee and Leon County Government to establish the process and procedures to govern the Blueprint Intergovernmental Agency, including the process for adding new projects to the original

list of approved projects to be funded from the revenue generated by the one-cent local government surtax.

The Blueprint infrastructure projects listed in the Interlocal Agreement does not include a Lake Munson large-scale treatment facility project. In addition, as Lake Munson is not a Blueprint project, staff would seek guidance from the IA Board on project prioritization and funding priority to provide the required resources for the study should the IA Board vote to substantially amend the Interlocal Agreement.

Blueprint surtax funds cannot be expended on infrastructure projects not on the approved list without a substantial amendment to the Interlocal Agreement. Section 212.055(2)(c), Florida Statutes, requires that surtax proceeds must be distributed in accordance with an existing interlocal agreement. Should the IA Board desire to add a project at Lake Munson, a substantial amendment to the Interlocal Agreement would be required. Pursuant to Part V, Section 10, of Blueprint's Interlocal Agreement, any addition, deletion, or amendment to a substantial degree of any Blueprint project in Exhibit I or II of the Interlocal Agreement requires the IA Board to hold two public hearings and consider recommendations of the Citizen Advisory Committee (CAC), Technical Coordinating Committee (TCC), and Intergovernmental Management Committee (IMC) before a super-majority vote of both the IA Board members who are County Commissioners, and the IA Board members who are City Commissioners.

LAKE MUNSON LARGE-SCALE TREATMENT FACILITY SCOPE AND FEE

The general scope and fee estimate presented in this item is for a consultant to conduct preliminary engineering on the citizen initiated stand-alone large-scale treatment facility at Lake Munson. The large-scale treatment facility is proposed by the citizen to be constructed on the west side of Lake Munson on City of Tallahassee owned land and land within the Apalachicola National Forest. The citizen proposed large-scale treatment facility is intended to passively treat the water from Lake Munson to improve the water quality of the lake water. The citizen proposal contemplates a pump system to recirculate water from Lake Munson through the proposed wetland treatment facility and then be returned to Lake Munson, creating a type of 'kidney' treatment system. The citizen proposed treatment facility is intended to reduce nutrients in the water within Lake Munson, through the recirculation of water within the lake.

The general tasks that would be included within the scope of the study would be data gathering, tabletop review, coordination meetings, and concept(s) development. A more detailed explanation of each task is provided below.

Data Gathering

This task would focus on collecting previously completed reports, plans, documents, and data describing the existing conditions and characteristics of the project area. This data may include past studies and permits on Lake Munson, available water quality data, and previously completed surveys, among other relevant available data on the project area.

Tabletop Review

This process would involve a desktop level review of the project area to include, at minimum, Cultural Resources, Natural Features, Geotechnical Features, and Contamination. As part of the tabletop review, applicable case studies will be provided with a focus on projects in the southeastern United States.

Coordination Meetings

Because of the complexity of this project, extensive multiagency coordination would be necessary. Some of the agencies that would be coordinated with include the Northwest Florida Water Management District and Florida Department of Environmental Protection as regulatory agencies who will have state-level permitting jurisdiction. Coordination with various County and City departments would be necessary to coordinate local permitting requirements and the various other projects planned in this area, including the Lake Munson Action Plan activities. Because of the proximity to the Tallahassee International Airport, direction would be sought from Airport staff on any necessary approvals.

As the citizen proposed project is contemplated within the Apalachicola National Forest, coordination with the US Forest Service would be necessary to establish the process needed to secure interest in the land to allow for the construction and maintenance of the proposed system. Based on the guidance received from the US Forest Service, coordination with the Federal Highway Administration and the Florida Department of Transportation may also be necessary.

Feasibility Assessment

A component of the preliminary engineering will be a feasibility review of the citizen proposed facility to evaluate its efficiency to meet the IA Board directed project goals. Available water quality data and storm flow data will be utilized to review the applicability, effectiveness, and efficiency of the proposed concept(s). Included in the feasibility review will be the aforementioned pump/wetland concept to evaluate the performance requirements.

Concept Development

If directed by the IA Board, the preliminary engineering efforts will conclude with the development of a concept(s) plan for the citizen proposed facility on the west side of Lake Munson. Budget level construction cost estimates, ongoing maintenance costs, and a project schedule, to include land acquisition, will be provided with that final concept plan.

Estimated Costs

The total estimated cost for this large-scale treatment facility concept is unknown but estimated at multiple tens of millions. The fee for the above summarized scope is \$150,000 to \$300,000. This range allows flexibility in finalizing the scope and fee as additional modeling or sampling may be needed to complete the effort. Should the citizen proposed facility be approved by the IA Board for implementation, design and permitting are estimated to cost approximately \$1.5-\$2 million. Future funding for property

acquisition and construction will be required. An estimate for property acquisition and construction would be developed for future consideration. A reliable project cost estimate cannot be developed prior to completion of the preliminary engineering as specific details related to the final concept for the citizen proposed facility is not currently available. For scale purposes, and as previously noted, the 150-acres Sweetwater Branch project was constructed in 2015 at a cost of \$26 million dollars. Cost estimates to acquire the project site proposed in the Apalachicola National Forest owned by the United States of America and/or to construct a new facility are unknown but estimated to be substantial millions of dollars.

SUMMARY

As directed by the IA Board at their September 29, 2022 meeting, this agenda item provides a scope and fee estimate for the preliminary engineering analysis of a citizen initiated concept for a stand-alone large-scale treatment facility on the west side of Lake Munson. The item also provides a comprehensive summary of the improvements made to date in the Lake Munson Basin as well as the reporting of the improved water quality in the lake.

Since the 1990s, nearly \$285 million dollars of investment has been made by the City, County, and Blueprint to improve the water quality and reduce the nutrient loading in Lake Munson. The decreasing trend in nutrient concentrations suggests that the stormwater retrofit projects implemented upstream have been effective at reducing the ambient nutrient load within Lake Munson. As a result of the most recent water quality data, Lake Munson is no longer considered impaired for nutrients based on the FDEP 2020-2022 Biennial Assessment of Impaired Waters. In addition, on October 11, 2022 the Leon County Board of County Commissioners voted unanimously to accept the Status Report on Best Management Practices for Lake Munson and approved the Lake Munson Action Plan including the immediate drawdown plan, which commenced in November 2022. The drawdown of Lake Munson is expected to help immediately address the algae, nutrient, and aquatic vegetation challenges in the lake. The drawdown combined with other future actions included within the Lake Munson Action Plan are meant to address long term water quality concerns.

The estimated fee for the scope of the citizen proposal provided in this item is \$150,000 to \$300,000. It is estimated that to proceed from preliminary engineering to design and permitting, additional funding in the amount of \$1.5 to \$2 million would be necessary. If the IA Board pursued construction of the project, cost estimates to acquire the project site and to construct a new facility are estimated to be substantial millions of dollars. Presently within the Blueprint work program, there is no project identified with a treatment facility at Lake Munson and all costs related to any new project would need to be identified by the IA Board. A substantial amendment to the Interlocal Agreement will be required to add this project and a budget amendment would be necessary to fund the project in the current fiscal-year.

Staff recommends Option #1, which is accept the report and take no further action on this citizen request to create a new “kidney filtration” treatment facility for Lake Munson

Upon staff analysis by technical experts at Blueprint, City of Tallahassee, and Leon County, the proposed concept is costly, not predicted to remove nutrients at meaningful levels, and would likely harm adjacent pine forest land and/or potentially harm the existing groundwater in the area, as detailed above.

Action by the TCC and CAC: This item was not presented to the Blueprint Technical Coordinating Committee or the Citizens Advisory Committee.

OPTIONS:

- Option 1: Accept the report and take no further action.
- Option 2: IA Board Direction.

RECOMMENDED ACTION:

- Option 1: Accept the report and take no further action.

Attachments:

1. Concept of Citizen Proposed Large-Scale Treatment Facility at Lake Munson
2. Lake Munson Location Map
3. October 11, 2022, Board of County Commissioner's Meeting Agenda Item #26.
4. Innovative Stormwater Technologies Paper

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From: [Max Epstein](#)
To: [Autumn Calder](#)
Cc: [Abe Prado](#)
Subject: Re: Lake Munson meeting
Date: Monday, December 5, 2022 11:03:18 AM

Hello Autumn,

Yes, that is the general concept, except there is most likely 200-300 acres available in that area, about 125 city-owned already that could facilitate such a project.

It could treat passively, as well as actively outside of storm flows by pumping Lake Munson water.

The white paper is really excellent, and mentions such a setup that Jones Edmonds designed in South Florida.

I'm just surprised the CC4 draft masterplan and the white paper don't have their own agenda item to discuss on Thursday, especially since the schedule is so light.

Thanks a lot,
Max

On Wed, Nov 30, 2022 at 4:28 PM Autumn Calder <autumn.calder@blueprintia.org> wrote:

Hi Max,

Thanks for reaching out. I don't anticipate having an agenda item on Lake Munson for next week's IA meeting. Given that there will not be an agenda item, would you like to set something up for after the Board meeting? Schedules will be more flexible.

We have been going back through old emails and comments at Board meetings to narrow down your concept to the following. Can you confirm that this is accurate?

A wetland treatment system (approximately 100-125 acres in size) on the west side of Lake Munson to treat stormwater coming into Lake Munson. In addition, the system may be able to function as a "kidney" system and treat the water in the Lake itself. Precedent projects include: a project on Lake Okeechobee that DEP recently funded and Sweetwater Branch in Gainesville, FL.

Thank you!

-Autumn

From: Max Epstein <max.epstein@gmail.com>
Sent: Monday, November 28, 2022 12:48 PM
To: Autumn Calder <autumn.calder@Blueprintia.org>
Subject: Lake Munson meeting

Hi Autumn,

Sorry for the short notice, but I was wondering if we may be able to schedule that meeting with the Lake Munson residents before next week's meeting?

I know you reached out after the county meeting you attended, but the residents were not too excited. Now hearing there will be an agenda item, it would be a good time to meet.

Hope you had a nice Thanksgiving!

Sincerely,

Max

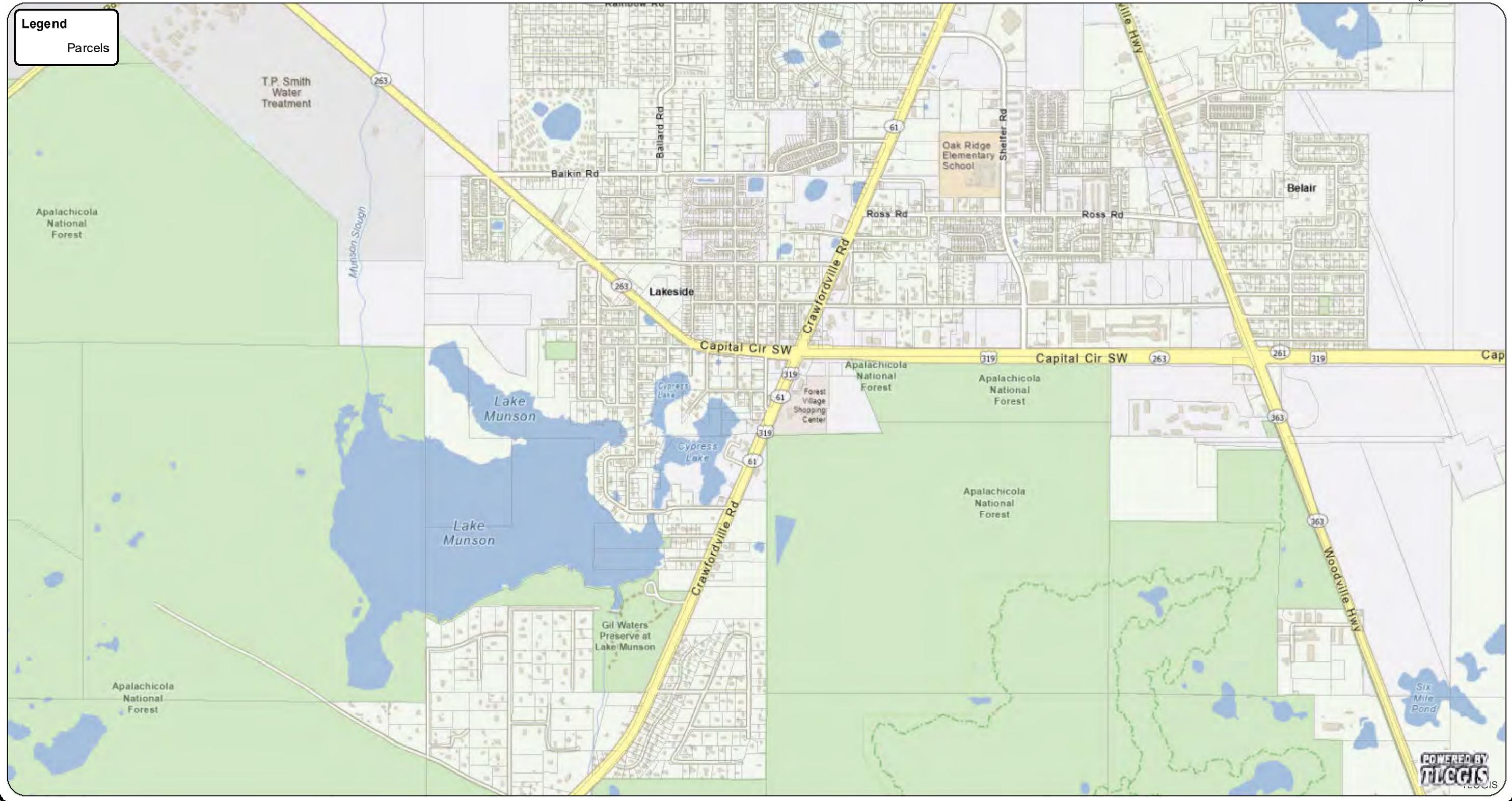
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Legend
Parcels



Lake Munson

DISCLAIMER

This product has been compiled from the most accurate source data from Leon County, the City of Tallahassee, and the Leon County Property Appraiser's Office. However, this product is for reference purposes only and is not to be construed as a legal document or survey instrument. Any reliance on the information contained herein is at the user's own risk. Leon County, the City of Tallahassee and the Leon County Property Appraiser's Office assume no responsibility for any use of the information contained herein or any loss resulting therefrom.



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Tallahassee/Leon County GIS	
Scale:	Management Information Services Leon County Courthouse 301 S. Monroe St, P3 Level Tallahassee, FL 32301 850/606-5504 http://www.tlccgis.org
Not To Scale	
Date Drawn:	
March 2, 2023	

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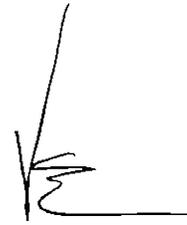
Leon County Board of County Commissioners

Agenda Item #26

October 11, 2022

To: Honorable Chairman and Members of the Board

From: Vincent S. Long, County Administrator



Title: Status Report on Best Management Practices for Lake Munson

Review and Approval:	Vincent S. Long, County Administrator
Department/ Division Review:	Alan Rosenzweig, Deputy County Administrator Ken Morris, Assistant County Administrator Brent Pell, Director, Public Works Charles Wu, Director, Engineering Services
Lead Staff/ Project Team:	Anna Padilla, Stormwater Management Coordinator

Statement of Issue:

This item provides a status update on the natural conditions and past contamination of Lake Munson, the progress made in water quality as a result of cooperative actions, strategic investments and prioritization in capital improvements, present day challenges, and best management practices for the ongoing and planned enhancements to Lake Munson. For the mitigation of recent algal blooms and rapid growth of an invasive aquatic plant (hydrilla), the item seeks Board approval to implement an Action Plan for Lake Munson which includes an immediate and temporary drawdown of the water level to coincide with enhanced water quality monitoring, and an aerial topographic survey of the lake bottom. The Action Plan includes long-term strategies to supplement the State's in-lake restoration activities and provides a higher level of service to County residents including the use of hydrogen peroxide to treat algal blooms, implementing an invasive vegetation management program, ongoing engagement over the next two years to evaluate the Lake's response to the drawdown, and regular status updates to the Board every six months.

As requested at the Board's September 13, 2022 meeting, this item also includes an analysis of the requests brought forward by the Lake Munson citizen group.

Fiscal Impact:

This item has a fiscal impact. The drawdown plan and treatments for Lake Munson are estimated to cost \$130,000 in FY 2023. Funding is included in a separate agenda item as a carry-forward for these purposes.

Title: Status Report on Best Management Practices for Lake Munson
October 11, 2022
Page 2

Staff Recommendation:

- Option #1: Accept the Status Report on Best Management Practices for Lake Munson.
- Option #2: Approve the Lake Munson Action Plan, presented herein, including the immediate drawdown plan.

Title: Status Report on Best Management Practices for Lake Munson
October 11, 2022
Page 3

Report and Discussion

Background:

This item provides a status update on the natural conditions and past contamination of Lake Munson, the progress made in water quality as a result of cooperative actions, strategic investments and prioritization in capital improvements, present day challenges, and best management practices for the ongoing and planned enhancements to Lake Munson. For the mitigation of recent algal blooms and rapid growth of an invasive aquatic plant (hydrilla), the item seeks Board approval to implement an Action Plan for Lake Munson which includes an immediate and temporary drawdown of the water level to coincide with enhanced water quality monitoring and an aerial topographic survey of the lake bottom. The Action Plan also presents long-term initiatives based on best management practices for Lake restoration.

On September 13, 2022, the County Administrator advised the Board that staff was preparing an agenda item for the October 11th meeting that would seek Board approval to proceed with a temporary drawdown of Lake Munson and provide recommendations for any additional short- and long-term best management practices that may be advisable for the Lake. At that time, the Board directed staff to meet with a Lake Munson citizens group (Workgroup) to address their concerns about the Lake, and to bring back an analysis of the Workgroup's ten requests submitted to the County in writing as part of this agenda item.

The Workgroup is made up of residents who live near Lake Munson and other stakeholders. Based on the Board's direction, staff immediately contacted the Workgroup to schedule meetings and coordinate with the appropriate subject matter experts across County departments, Blueprint, State agencies, and the County's Science Advisory Committee (SAC). While the proposed Lake Munson Action Plan addresses some of the issues raised by the Workgroup as described throughout this agenda item, specific responses for each of the ten requests begin on page 23 of the Analysis section.

This status report advances the following FY2022-FY2026 Strategic Initiative:

- *Ensure County's water quality and stormwater regulations, programs and projects are evaluated and implemented holistically to advance the County's adopted strategic priority: to protect the quality and supply of our water. (2022-16)*

This particular Strategic Initiative aligns with the Board's Environment Strategic Priorities:

- *(EN1) Protect the quality and supply of our water.*
- *(EN2) Conserve and protect environmentally sensitive lands and our natural ecosystems.*

This item provides a background on Lake Munson including the millions of dollars the County has made and continues to make in investments in watershed planning, major project implementation, and follow-up studies throughout the basin since the 1990s. Despite the better water quality, in-lake mitigation, and the magnitude of investments in upstream infrastructure, Lake Munson continues to experience occurrences of fish kills, algal blooms, invasive vegetation and snails, low game fish productivity, and depressed oxygen levels. This item presents ongoing and additional best practices to these challenges with the County has been performing or will be implementing,

Title: Status Report on Best Management Practices for Lake Munson
October 11, 2022
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including a planned drawdown with more frequent water quality testing, an aerial topographic survey of Lake Munson to measure elevations of compacted sediment to evaluate for future in-lake mitigation strategies, a new vegetation management program for treating invasive plants, and implementing periodic drawdowns in consultation with FWC to reduce the need to mechanically remove organic-rich sediment. And finally, this item provides information on the County's cooperative efforts with a group of local residents to address their concerns surrounding present day lake challenges.

Lake Munson is an approximately 288-acre, cypress-rimmed lake located south of the City of Tallahassee. It is a state-managed waterbody with a history of chronic water quality and ecological problems including fish kills, algal blooms, exotic vegetation and snails, high nutrient levels, low game fish productivity, sediment contamination, and depressed oxygen levels. The Lake is believed to have originally been a cypress swamp but has since been impounded and now functions as a shallow man-made lake. This description of the Lake is not a value statement, rather the origin and mode of formation of the Lake is important to understand how it functions ecologically. Today, Lake Munson is designated by the Florida Department of Environmental Protection (FDEP) as a Class III waterbody suitable for fish consumption and recreational activities. However, the shallow and stagnant nature of the waterbody makes it susceptible to the growth of algal in the Lake resulting in a bloom.

Lake Munson has historically been subjected to drainage with high nutrient loads and wastewater discharges to the tributary system, which has resulted in the embedding of legacy nutrients in the lake-bottom soil. The Lake receives surface water flow from a 32,000-acre basin, much of which is located in the City of Tallahassee (Attachment #1). All flow enters Lake Munson through Munson Slough, from Lake Henrietta which receives upstream flow from the east and from the north (Attachment #2). In the early 1980s the effluent from the City of Tallahassee T.P. Smith Water Reclamation Facility was redirected from Munson Slough to the Tram Road Sprayfields and since then, effluent from T.P. Smith does not discharge into Lake Munson (neither directly nor indirectly). Decades of development in the Tallahassee red-clay hills, wastewater treatment facilities discharging to the tributary system, and drainage activities focused on flood reduction contributed high nutrient loads entering Lake Munson resulting in poor water quality. Efforts to improve the water quality and reduce the nutrient loading in Lake Munson have been ongoing since the 1990s, including hundreds of millions of dollars of capital investment by the County, City, and Blueprint, and requires the continuous coordination among governmental partners with respect to each's responsibilities to protect natural resources.

1991 Stormwater Management Plan

In 1991, the Northwest Florida Water Management District (NFWFMD), under a joint contract through the County and City of Tallahassee (City), completed a Stormwater Management Plan (SMP) for Lake Munson. The SMP included structural (capital improvements) and non-structural (preservation, land use, and regulatory) recommendations. The 1991 Lake Munson SMP identified stormwater management improvements designed to provide flood control and water quality enhancements in the Lake Munson basin and along major drainage branches. The non-structural recommendations were primarily preservation and restoration initiatives through regulatory and land management programs.

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The structural improvements recommended in the 1991 SMP included the creation of seven regional wet detention stormwater management facilities along the major tributaries to the Lake to address flooding as well as capture a significant portion of nutrients, suspended solids, and other contaminants. Importantly, over the next three decades, the regional stormwater management facilities were constructed throughout the basin including the Carter Howell Strong Park in Frenchtown at the headwaters of the FSU Branch, the FSU stormwater facility (known as Lake Elberta) along the Central Drainage Ditch, the Jim Lee Road and East Branch facilities along the East Drainage Ditch. Also constructed were the Vega Drive and Eisenhower Avenue facilities on the West Drainage Ditch and the Orange Avenue facility on the East Drainage Ditch (Attachment #3).

All non-structural recommendations in the 1991 Lake Munson SMP were prioritized and completed over this time. Major restoration efforts included the Gum Swamp wetland restoration, the North Ridge Road wetland and Silver Lake restoration, and the Lake Munson Restoration project including the construction of the Lake Henrietta stormwater facility, Munson Slough restoration, sediment removal from the Lake Munson delta, Lake Henrietta wetlands restoration, and Lake Munson wetlands restoration. The Gum Creek Watershed Management Program and the Hopkins Crossing wetland preservation have also been completed. Additionally, regulatory measures have been implemented to preserve wetlands and floodplains.

The 1991 SMP examined the entirety of the Lake Munson Basin for deficiencies and developed basin-wide recommendations. Based on a desire to improve the Water Quality of Lake Munson, an action team was assembled to develop a management plan specific to Lake Munson with recommendations that would directly benefit the Lake.

1994 Lake Munson Action Plan

The 1994 Lake Munson Action Plan was written by the Lake Munson Action Team, a twelve-member group created by the County Commission in the early 1990s. The Action Team included a technical staff representative from County departments, state agencies, and private citizens with an interest and concern for Lake Munson.

Over the course of 18 months, the Action Team reviewed the problems of the Lake and possible solutions before developing an overall strategy for restoration. The 1994 Lake Munson Action Plan incorporated three major strategies to restore Lake Munson: watershed management, in-lake restoration, and community action. The Action Team recommended commencing the watershed management and community action strategies immediately. The in-lake restoration was recommended to follow the watershed management so that resources would be directed toward upstream improvements to ensure that clean water was entering the Lake. Much like a leaky pipe, it is important to first stop what is coming out of the pipe before cleaning up what spilled. The plan also recommended specific projects in each of these categories.

Watershed Management

The watershed management component of the 1994 Action Plan consisted of upstream improvements to reduce the nutrients and sediment entering the Lake. Facilities farthest upstream were prioritized since the design and performance of downstream alternatives would be adversely affected by a lack of upstream control. The Action Team determined that implementation of the

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1991 SMP was the top priority and was crucial for the Lake's restoration. In addition to the 1991 SMP stormwater and restoration projects, the Action Team recommended trash racks be installed upstream of Lake Munson and the creation of a water quality monitoring program. Since the 1994 Action Plan, the County, City, and Blueprint Intergovernmental Agency (Blueprint) prioritized and completed these upstream improvements and infrastructure projects.

In-Lake Restoration

The 1994 Action Plan recommended in-lake restoration including sediment removal, drawdowns, dam refurbishment, and invasive exotic plant control with herbicide treatment. The Plan identified dredging as a cost-effective method but cited turbidity problems (e.g., disturbing sediment and resuspending it in the water) and the proximity of disposal sites as prohibitive challenges, so exploring additional alternatives was recommended. The Plan also recommended fall and winter drawdowns as part of a well-coordinated restoration plan. To control the invasive exotic vegetation, which at the time was hyacinth and hydrilla, the Action Team recommended the continued, judicious use of herbicides to suppress water hyacinth, and for control alternatives to be implemented for hydrilla. Since the Plan was adopted, the County conducted a drawdown in 2000 and again in 2010, reconstructed the Lake Munson dam, and continues to coordinate with the Florida Fish and Wildlife Conservation Commissioner (FWC) for herbicide treatment of the exotic vegetation.

Community Action

The final component of the 1994 Action Plan involved community and political action on a broad range of issues. The Plan recommended a strategy that built on the attributes of the area and promoted a positive image, one based on environmental education and natural area-based recreation. It called for the creation of lakefront parks with boat ramps, picnic areas, and adequate parking and further recommended the parks be part of a greenway system of public land along watercourses. The Action Team also emphasized the importance of educating the public about the proper design and maintenance of septic systems, best management practices for construction and lawncare, and the need for individuals to take personal responsibility for reducing soil erosion, nutrients, and other types of pollution. This strategy resulted in the opening of Gil Waters Park Preserve at Lake Munson which was constructed in 2000 and includes a boat ramp and landing, picnic areas, a scenic overlook, trails, and paved parking. Additional parks created in the basin include Anita Davis Preserve at Lake Henrietta Park, Broadmoor Pond Park, Martha Wellman Park, Orange Avenue – Meridian Street Park, and Blueprint's Debbie Lightsey Nature Park. Still in design, Blueprint's Capital Circle SW Greenway will connect neighborhoods in south and southwest Tallahassee, will connect users to several parks and greenways and the Apalachicola National Forest. Fulfilling the call for better septic systems and personal responsibility for reducing nutrient pollution, later sections of this item highlight the County's focus on eliminating conventional septic tanks and regulatory actions to protect our natural resources including restrictions on the use fertilizer.

The 1994 Lake Munson Action Plan provided a comprehensive approach to lake and watershed restoration and preservation. It prioritized the implementation of the 1991 SMP structural (capital improvement) projects and non-structural recommendations (land use and regulatory actions) within the basin, which represent the early efforts to restore Lake Munson, and identified additional upstream improvements. Structural projects included repairing the Lake Munson Dam,

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implementation of the 1991 SMP, installing trash racks, land acquisition projects to preserve wetlands and waterbodies, aquatic plan control, and a water quality monitoring program. The non-structural recommendations included regulations changes for land use and density limits, surface water quality protection, trash and sediment reduction requirements for new development, and special protection zone regulations. The recommendations also included community outreach initiatives and education programs, lake clean up events, information on septic tank maintenance, and periodic drawdowns of the Lake.

From the Lake Munson SMP crafted in 1991 to the 1994 Lake Munson Action Plan, the implementation of both plans demonstrates the County's and City's ongoing support of projects that enhance water quality in Lake Munson. These plans guided the community strategy, efforts, and investments to enhance water quality by recognizing and prioritizing the need for upstream improvements to ensure that clean water was going into the Lake before undertaking an in-Lake dredging project that would disturb the existing sediment.

Continuous Investment in the Lake Munson Basin

Since the 1990s, the County, City, and Blueprint have dedicated hundreds of millions of dollars and completed numerous projects upstream of Lake Munson to provide water quality treatment, reduce sediment transport, and collect trash. Trash racks have been installed east of Jake Gaither Golf Course on the East Drainage Ditch, west of Lake Bradford Road on the Central Drainage Ditch, and upstream of Lake Henrietta. The City's Erosion Control and South City/Country Club Creek Drainage projects, both with the Lake Munson basin, reduce the amount of sediment flowing to Lake Munson by protecting the channel banks. Notable water quality improvement projects include Gum Swamp Restoration and Cascades Park as well as the San Luis Park, Broadmoor, Martha Wellman, Bond, Carter-Howell-Strong, Bond, Tallahassee Junction, and Coal Chute stormwater management facilities (SWMFs). Many of these projects were water quality enhancements to larger projects such as the addition of Broadmoor SWMF with the widening of Capital Circle NW/SW and the creation of Coal Chute Pond and Tallahassee Junction SWMF expansion with the FAMU Way project. Blueprint has completed a substantial number of stormwater improvements along the Capital Cascades Trail corridor improving both water quality and reducing area flooding. In all, these stormwater improvements represent a total investment of more than \$130 million and stretch approximately 2.5 miles. Another major upstream restoration project designed to enhance water was the Lake Munson Restoration Project which constructed the Lake Henrietta stormwater facility, made improvements to Munson Slough, removed trash and the sediment delta from Lake Munson, and restored wetlands around Lake Henrietta and Lake Munson.

The strategies from the 1994 Lake Munson Action Plan have facilitated the continuous investment in the Lake Munson basin and have been broadened over the years to include new technologies and methods in lake management and restoration best practices which are explored further in the Analysis section. For the mitigation of current conditions on the Lake including recent algal blooms and rapid growth of hydrilla, this item seeks Board approval to implement an Action Plan for Lake Munson which includes an immediate and temporary drawdown of the water level to coincide with enhanced water quality monitoring and an aerial topographic survey of the lake bottom. The Action Plan also presents long-term actions to enhance the Lake based on best management practices.

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Analysis:

Leon County Government, the City of Tallahassee, and the Blueprint Intergovernmental Agency have dedicated hundreds of millions of dollars for projects in the Lake Munson basin and prioritized upstream improvements which reduce the transport of sediment and benefit the Lake water quality. While the Lake continues to improve, undoing decades of damage will take continuous commitment. The 1994 Lake Munson Action Plan has been used as the basis to guide watershed and stormwater improvements, regular testing and monitoring of water quality, and regulatory actions to limit pollutants and protect natural resources. Since 2019, two studies have been completed on sediment contamination in Lake Munson which will guide the evaluation and analyses of future restoration projects. As a result of these studies, in-lake sediment removal is no longer a viable mitigation option to reduce nutrient levels in Lake Munson at this time; however, as new technologies and information become available, dredging may become a viable option in the future.

In preparing this item, staff sought input from the Leon County Science Advisory Committee on the current water conditions, quality and ecology of Lake Munson. The SAC has a great deal of institutional knowledge on Lake Munson and has provided input to the Board over the years on lake management best practices. On September 2, 2022, SAC reviewed the County's water quality data and concurred with staff that over the past several decades, the water quality in the Lake has been improving; Munson Slough and Lake Munson are exceeding their State-mandated nutrient levels for nitrogen while phosphorus levels have declined significantly over the last ten years and are now approaching the target levels. The SAC finds that the upstream improvements since the 1990s have resulted in lower concentrations of nitrogen and phosphorus flowing into the Lake meaning that the quality of incoming water is better than the water in Lake Munson.

Despite the better water quality, in-lake mitigation, and investments in upstream infrastructure, Lake Munson continues to experience occurrences of fish kills, algal blooms, invasive vegetation and snails, low game fish productivity, and depressed oxygen levels. Several of these conditions were experienced by Lake Munson residents this summer, providing an opportunity to hear directly from residents and other stakeholders. This item articulates not only all that Leon County has done to enhance water quality in the Lake Munson basin, but also describes the three decades of strategies which informed and prioritized the infrastructure investments by cooperative local governments. And finally, the item details the County's next steps to address these recent conditions including those that were planned and, in some cases, those which came out of the meetings with the Workgroup. These next steps are hereafter referred to as the Lake Munson Action Plan (Action Plan) throughout the agenda materials.

For the continued improvement of Lake Munson and consideration of future in-Lake restoration projects, the County will continue to utilize the SAC and engage State agency partners for their resources and expertise. State agencies, water management districts, and local governments each have a unique role in watershed, stormwater, and lake management. The continuous coordination between local governments and State agencies is necessary to address water quality in Lake Munson as described throughout this item. However, it is important to clearly understand the roles and responsibilities of each jurisdiction with regard to planning improvements to a State waterbody.

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Roles and Responsibilities

The management of waterbodies is governed by the Federal Clean Water Act which establishes the basic structure for regulating discharges of pollutants into the waters of the United States, establishes quality standards for surface waters, and delegates much of the regulatory enforcement to the states. At the state level, the FDEP is responsible for the administration of water resources along with the enforcement of federal and state laws and programs. This includes monitoring and responding to red tide on the coast, algal blooms in freshwater, and fish kill investigations conducted by FWC. According to FDEP's website:

It is a policy of the Legislature that the State's water resources be managed at a state and regional level.

The FDEP is responsible for the administration of the water resources at the state level and exercises general supervisory authority over the state's five water management districts which are responsible for the administration of the water resources at the regional level. The state's five water management districts include the Northwest Florida Water Management District, the Suwannee River Water Management District, the St. Johns River Water Management District, the Southwest Florida Water Management District, and the South Florida Water Management District. The core mission of Florida's five water management districts is water supply, water quality, flood protection and floodplain management, and natural systems management. For waterbodies within their regions, the water management districts construct or help fund the construction of water quality projects to benefit our state's waterbodies. In addition, the districts administer regulatory programs designed to achieve the protection of the state's water quality.

The FWC is the lead State agency for managing fish and wildlife, and their habitats on Florida's aquatic resources. The agency develops comprehensive Lake Management Plans detailing its management activities which can include, but are not limited to, habitat protection, restoration and enhancement, fish management, and invasive plant management such as herbicide treatments, biological controls, and mechanical removal. The FWC supports Lake Munson through its Aquatic Plan Management Program which chemically treats invasive exotic aquatic vegetation. FWC's program is currently the only aquatic plant management strategy for lakes in Leon County and is subject to available State funding.

FWC also has a history of lake restoration projects on state-managed waterbodies in Leon County. This includes sediment removal projects on Lakes Iamonia and Miccosukee and, in 2001, State funds were programmed for an in-Lake and upstream restoration project to benefit Lake Munson. Following delays to begin the project, in 2003 the Board adopted a Resolution urging FWC to begin the in-Lake removal of sediment. The project never commenced and FWC notified the County in 2007 that it was no longer a priority project.

The County is responsible for regularly collecting and reporting water quality data, administering the stormwater management program, and developing policies or regulatory measures to protect water resources in the unincorporated areas of our community. County staff monitors the quality of our water resources through field sampling to analyze the chemical makeup and assess the biological health of our waterbodies to ensure that waterbodies are within acceptable nutrient levels. Should a waterbody exceed the water quality thresholds established by the State, FDEP and the County would prepare a restoration plan to identify programs and improvements designed

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to reduce nutrient levels to meet the state standards. The following section describes this exact scenario from 2013 related to Lake Munson.

FDEP Environmental Assessment and Restoration

Lake Munson has a long history of poor water quality and not meeting the State minimum water quality standards. In 2010, a Total Maximum Daily Load (TMDL) was in development for Wakulla Springs and because Lake Munson contributes to Wakulla Springs, it was necessary to reduce nutrient levels at Lake Munson. Through the FDEP environmental assessment program, individual parameters within a waterbody are analyzed to determine if the waterbody is meeting its designated uses. Lake Munson was impaired for nitrogen and phosphorus. FDEP adopted a TMDL for Lake Munson and Munson Slough in 2013. The TMDL set limits for nutrients that must be achieved by the County and City for Lake Munson.

As part of the Water Quality Monitoring Program, Leon County samples Lake Munson quarterly. This data is summarized in the Annual Water Quality Report that presents the previous calendar year's data. Leon County has water quality data dating back to 2001 when the program began. County staff reviews and analyzes the data for trends in the system. The water quality in Lake Munson has been below the TMDL limit for nitrogen since 2017 and has been steadily declining in phosphorus (24% reduction since 2013) that it is now approaching the TMDL limit. Graphs of Lake Munson's nitrogen and phosphorus concentrations are included in Attachment #4.

The lack of stability in the nitrogen and phosphorus levels through time reflects the changing nature of Lake Munson. For example, the explosion of apple snails in 2004-2005 and the resultant elimination of aquatic plants caused an extensive algal bloom and the Lake to change. The crash of the apple snail population further perturbed the system.

The ups and downs in the nutrient values also represent the Lake trying to reach some sort of stability. A lake dominated by algae takes a very long time to stabilize, if ever. The algae will take up the nutrients and prevent other higher-level plants from establishing or reestablishing. The quarterly samples in recent years show much greater stability of nutrient levels which means the Lake appears to have stabilized.

After the drawdown in 2010, the nutrient level dramatically fluctuated. This was in part caused by the plants in the lake bottom dying off, and in part due to FWC's aggressive chemical treatment for the water hyacinth that emerged at that time. Some variability in the nutrient values after the Lake is refilled and tries to restabilize can be expected. The proposed Action Plan described later in this analysis includes more frequent chemical treatment of the invasive exotic species in an effort to reduce this instability.

The changes to nitrogen and phosphorus levels over the last seven years are most certainly a result of the ongoing upstream improvements. The submersed aquatic plants in the Lake decrease the nitrogen and phosphorus levels in the water column; however, aquatic vegetation alone would not result in such a drastic drop in concentrations.

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2019 FGS Sediment Study

While the upstream improvements significantly reduced the nutrient levels in the lake, in-lake restoration was part of the recommended improvement strategies from the 1994 Action Plan. In order to dredge the lake, information on how much material needed to be removed and determine if there were any contaminants in the material. In order to determine this, a sediment study was needed. This study would remove material from the lake, test the material for contaminants, and determine how dangerous the levels of any detected contaminants are. The report prepared though this study would be used to guide future decisions on in-lake restoration strategies. As a State-managed waterbody, staff consulted with FDEP for guidance and the agency offered to conduct a sediment study.

The Florida Geological Survey (FGS), a division of FDEP, together with the Bureau of Laboratories under the Florida Department of Health, had the staff, expertise, knowledge, and equipment to investigate the Lake Munson sediments. The purpose of the Sediment Study was to determine the depth to and thickness of organic muck, native sand, and clay beneath the waterbodies; determine if hazardous wastes occur and their location and depth within the sediment muck layer; determine the nutrient concentrations in the sediment muck layer; and investigate two known karst features and attempt to identify unknown karst features within Lake Munson.

Between September and November 2018, FGS collected vibracore sediment samples from 37 sample sites, 32 in Lake Munson, 2 in Lake Henrietta, and 3 in Munson Slough. The sediment samples were analyzed for a suite of heavy metals and other containments. The final report was completed in February 2019 (2019 FGS Sediment Study). In short, the study found polychlorinated biphenyls (PCBs) and heavy metals in the sediment samples.

The samples with the highest concentrations of contaminants were further analyzed. This analysis indicated that the contaminants are tightly bound to the sediment and do not leach under simulated rainfall, so they are not soluble in overlying water. These types of contaminants are attracted to sediment particles and when they find a particle they latch on; the chemicals are then moved around through sediment transport or movement. The FGS testing indicates that when the exposed particles are rained on, they remain stuck to the sediment and does not run-off. This suggests that contaminants were transported at some point to Lake Henrietta and Lake Munson attached to the sediment particles, from somewhere upstream and not flowing downstream in the water from a leak or other source. The FGS testing also suggests that once the sediment particles settle to the bottom within the Lake, the contaminants are not releasing off the sediment into the water; therefore, the sediment on the bottom is stable and not releasing toxins. The SAC accepted the findings but shortly thereafter, the City of Tallahassee hired a consultant to review the results of the 2019 FGS Sediment Study.

The City of Tallahassee hired Terracon, a national engineering consulting firm specializing in environmental, geotechnical and materials services, to provide recommendations in response to the FGS Sediment Study. Completed in 2021, the Terracon Report found that the use of PCBs has been banned since 1979 and the use of heavy metals are regulated such that they are only allowed in small concentrations. The Terracon Report determined that the contaminated sediment accumulated from activities prior to the mid-1990s and are still detectable due to how slowly they

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break down. The report also determined that upstream source sampling for historical sources is unnecessary because they are unlikely to be contributing new contamination to Lake Munson.

The PCBs found in the sediment are likely relic contaminants prior to current regulations or may have been transported downstream or downwind during development activity decades ago. Significant development and construction activity have occurred upstream of Lake Munson which provided ample opportunities for potentially contaminated soil to be exposed, rained upon, and carried downstream. Based on these recent reports and findings from experts in the public and private sectors, it is unlikely the sediment contributes to water column contamination to which people, pets, and fish would be exposed. After consultation with the FDEP on the results of the analysis and the known conditions of the basin, no upstream source sampling for PCBs and/or heavy metals had been pursued.

The purpose of the 2019 FGS Sediment Study was to obtain new information that could be used to guide future lake management strategies. The Sediment Study provided new information on the extent of contaminated sediments in the Lake. Analysis by staff, the SAC, and leading environmental firms the County has on contract of these studies have concluded that dredging is not a preferred mitigation method at this time. The PCBs are not causing harm to the water, fish, or Wakulla Springs because they are bound to the sediment so dredging the Lake at this time would disturb the sediment resulting in greater harm to the Lake and downstream.

Present Day Challenges

In May 2022, Lake Munson experienced an algal bloom which are a common and natural occurrence in Florida's fresh waters, including Lake Munson, and are attributed to environmental factors such as sunny days, warm water temperatures, low rainfall amounts, still water conditions, and a plentiful supply of nutrients in the water which cause blue-green algae (cyanobacteria) to rapidly accumulate and result in an algal bloom. At that time, staff was working closely with State agency partners FDEP, FWC, and the FDOH to ensure the health of our water bodies and residents. For context as to the prevalence of these blooms, FDEP is currently monitoring nearly 200 active algal blooms across the state. While algal blooms can occur with or without toxins, FDOH determined that Lake Munson's algal bloom earlier this summer produced a microcystin toxin and issued a health alert for residents to avoid contact with the water.

On May 23rd, FDOH issued a health alert specifically advising residents to not drink, swim, wade, use a personal watercraft, or boat in Lake Munson and warned residents to keep pets away from the area. At the urging of FDOH, the County closed the boat ramps due to the anticipated Memorial Day Weekend traffic and shared FDOH's alerts across the County's digital platforms. At that time, the Board received an email with a comprehensive summary of the issue and a status report was placed on the Board's July 12th meeting agenda detailing the progression of the algal bloom and toxicity. The next week, on July 21st, FDOH lifted the health alert for blue-green algal toxins at Lake Munson based on water samples collected by FDEP. FDOH advised the public may resume water-related activities and to continue to exercise caution on the lake as algae blooms can move around, subside, and reappear when conditions are favorable. At that time, the County reopened the Lake Munson boat ramps for recreational use.

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In late August 2022, residents living near Lake Munson brought forward additional concerns related to a fish kill, people experiencing adverse health conditions, and a call-to-action for the County to address these issues. In addition, staff had observed the rapid growth of aquatic vegetation (hydrilla) which requires mitigation. As these issues arose, staff consulted with the appropriate State agencies and sought input from the County's SAC to assess mitigation options, where appropriate, for Lake Munson.

There is a consensus among staff, State agency partners, and the SAC that immediate mitigation is needed, and a drawdown of Lake Munson will help address the algal, nutrient, and aquatic vegetation challenges in the Lake. In consultation with State agency partners and the SAC, staff began developing the drawdown plan as well as short- and long-term best management practices. On September 13, 2022, the County Administrator advised the Board that an agenda item would be brought back at the October 11th meeting seeking Board approval to proceed with the drawdown.

Lake Munson Action Plan

The proposed Lake Munson Action Plan provides an opportunity to better articulate ongoing and long-term infrastructure projects to benefit the basin, the planned drawdown with more frequent water quality testing, an aerial topographic survey of Lake Munson to measure elevations of compacted sediment to evaluate for future in-lake mitigation strategies, a new vegetation management program for treating invasive plants, and implementing periodic drawdowns in consultation with FWC to reduce the need to mechanically remove organic-rich sediment. The Action Plan captures recommendations sought by the Workgroup including the deployment of hydrogen peroxide to treat algal blooms, point-source testing for PCBs, ongoing engagement over the next two years to evaluate the Lake's response to the drawdown, and regular status updates to the Board every six months. This holistic approach will allow the immediate strategies to quickly mitigate the rapid growth of hydrilla and eliminate the algal bloom while the long-term actions will supplement the State's in-lake activities and provide a higher level of service to County residents. Consistent with the management strategies adopted by the 1994 Lake Munson Action Team, this Action Plan was developed with input from State agency partners, citizen stakeholders on the SAC and with the Workgroup, and industry best practices for lake management to include the following components:

- Lake Munson Drawdown & Enhanced Monitoring
 - Water Quality Study
 - Aerial Topographic Survey
 - Point-Source Testing for PCBs
- Ongoing and Planned Infrastructure Projects
- Long-Term Lake Management Actions
 - Invasive Exotic Vegetation Management Program
 - Hydrogen Peroxide to Treat Algal Blooms
 - Reoccurring Drawdown Schedule
 - Innovative Technology Exploration

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Drawdown and Enhanced Monitoring

This summer Lake Munson experienced algal blooms, a fish kill, and most recently an abundance of aquatic vegetation. While the nutrient levels in the Lake have been steadily declining, these issues pose a need for immediate mitigation. A drawdown will help address the algal, nutrient, and aquatic vegetation challenges in the Lake. The drawdown will kill off the hydrilla and algae and will form a “cap” on the sediment to reduce the nutrients leaving the sediment. In addition to the immediate benefit, drawdowns provide long-term benefits to the nutrient-rich sediment. A drawdown is most efficient during the “dry” season, which in Leon County is starting now. An optimal start of the drawdown in October, coupled with a minimum length of time the Lake is down during the dry season create an urgency to start the drawdown right away. If a drawdown were to be deferred to next fall/winter, it is possible many of the current issues in the Lake will continue through the fall or will return next summer.

Drawdowns are a proven technique in lake management and are beneficial to the Lake by allowing the sediments to de-water, oxidize, and form a hardened crust over the lake bottom. A drawdown would serve to “cap” the underlying sediment which would provide habitat for fish spawning and reduce nutrient recycling once the Lake is reflooded. A complete drawdown is planned to provide the maximum benefit.

The Lake drawdown is anticipated to start at the beginning of November, or sooner if possible, and would last for 3-5 months, depending on the weather through the winter. A warm and wet winter would require a longer drawdown to allow the lake bottom to dry out; whereas, a cool and dry winter could allow for a shorter drawdown period.

The drawdown starts by opening the gate on the Lake Munson dam to allow more water out than is flowing into the Lake, slowly lowering the water level of the Lake until most of the lake bottom is exposed and the amount of water flowing into the Lake is the same as the amount of water flowing out. The amount of water released through the gate is a balance. Enough water should be let out to lower the lake level in a reasonable amount of time, but not so much water that the increased flow causes erosion or flooding problems downstream. Like the drawdown in 2010, the increased discharge of the Lake downstream is not anticipated to cause adverse impacts.

A majority of the bottom of the Lake will be exposed when the drawdown is complete, but several areas such as the north lobe (bunny ear) and the southwest portion (back foot) are anticipated to still have water in them, although at a lower depth. This is due to the differences in the elevation of the lake bottom, as it relates to the elevation of the dam gate. These two areas have a lower lake bottom elevation creating pools of water that cannot drain. Also, these areas are located off the main flow through channel line, making it more difficult for the water to flow out of them to the dam. Once the water has drained from the Lake, the gate at the dam will remain open so that any water that comes into the Lake passes directly through. If the Lake Munson drainage basin were to receive a large rain event, the Lake could fill up for a short period of time.

A complete drawdown exposes the most sediments and would force fish and other biota into the sinkhole in the southwest corner of the Lake. Many fish and other organisms would not survive a complete drawdown; however, the Lake biota would recover quickly upon refill. The fish populations could be re-established from those that survived in the sinkhole, from upstream, and

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from re-stocking by FWC. Staff will coordinate with FWC to minimize the death of fish and other creatures during the complete drawdown. It is important to remember that the primary goal of the drawdown is to improve sediment quality, and thereby water quality, improving the long-term health of the entire lake ecosystem. Creatures that live naturally in Lake Munson have recovered from past drawdowns. The current condition of the Lake, including an abundance of hydrilla and warm temperatures, threaten the entire fish population and can cause fish kills like the one experienced in August 2022.

With the water drained from the Lake, the bottom can begin to dry out. The submerged aquatic vegetation in the Lake will slowly die. The sun will begin to dry out the sediments and muck on the bottom of the Lake will begin compressing. The aquatic vegetation will be replaced with terrestrial plants, which are plants that live on land, and the sediments will continue to dry out. During the drawdown there can be some unpleasant smells as the vegetations die off and the wet lake bottom begins to dry.

The length of time needed to dry out the sediments is dependent on nature and the weather. Staff will work closely with FWC and FDEP to determine the optimal time to begin refilling the Lake. When it is time to complete the drawdown, Leon County will slowly begin closing the gates to allow water to remain in the Lake. Much like lowering the Lake level, refilling the Lake is a balancing act. The goal is to hold enough water back in the Lake, without adversely impacting downstream wetlands and waterbodies by not sending enough water downstream. The time it takes to refill the Lake is also weather dependent. If it is a wet spring the Lake will refill quickly, but a drier spring would mean a longer refill period. The sediments in the bottom of the Lake serve as a seed bank. When the Lake refills, the terrestrial plants will be drowned, providing fish habitat, and will be replaced with the aquatic vegetation that grows from the seed bank.

The drawdown of the Lake will necessitate a large public information component, including coordination with various divisions within FWC, FDEP, and NFWMD as well as the SAC and the Water Resources Committee. Staff will also communicate with the Wakulla Springs Alliance, the Friends of Wakulla Springs State Park, and other concerned citizen and/or citizen groups in advance of, and during the drawdown.

The drawdown also provides an excellent opportunity for citizen engagement through lake clean-up events. These events have multiple benefits including actively engaging citizens with our natural resources, providing educational opportunities alongside nature, and improving the water quality and ecology of the Lake by removing garbage and debris from the lakebed. The County has held numerous successful lake clean-up events including for past drawdowns of Lake Munson. Staff from Public Works is coordinating with Community & Media Relations to explore dates for early next year to host a clean-up event on Lake Munson during the dry season.

The planned drawdown also does not include any vegetation removal from the lake bottom. Immediately after drawdown, the lake bottom will be too wet to support the equipment necessary to remove the vegetation that remains. After the sediments begin to harden, the vegetation will be left in place so as not to disturb the sediment, potentially allowing the sediment to resuspend and mix into the water column when the Lake refills. Cutting or mowing down the vegetation is a management strategy but the vegetation could not be harvested without sediment disturbance so

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the cut vegetation would be left to flow downstream. In some cases, vegetation can be burned during a drawdown; however, this method was previously discussed by the County during a natural drawdown on Upper Lake Lafayette and it was determined the associated liability far outweighed the benefit.

In recent meetings with the Lake Munson Workgroup on the proposed Action Plan, the Workgroup was supportive of the planned drawdown but felt very strongly about the need to pair it with sediment removal efforts while the Lake was dry. Lake drawdowns often present an opportunity to dredge a waterbody or, at times, remove the top layer of sediment from the lakebed. However, the planned drawdown for Lake Munson does not include any dredging or removal of muck and sediments due to the known contaminants identified in the 2019 Florida Geological Survey (FGS) Sediment Study. While dredging and the removal of sediments have been advised in the historically accepted mitigation strategies for the Lake and advised in the 1994 Lake Munson Action Plan, these methods are not recommended at this time as recent studies and data analyses indicate that removing the sediments may cause more harm to the Lake. If the Lake were to be dredged these contaminants could be released into the water column and be transported downstream to Wakulla Springs. However, future technologies could make dredging a viable option.

Lake Munson is also believed to contain sinkholes. Data collected as part of the 2019 FGS Sediment Study indicates several areas of high karst potential. A major concern with dredging the Lake is the potential for inadvertently opening a sinkhole. Heavy equipment, digging too deep or removing too much material could create a sinkhole. If a sinkhole were to open on the Lake, it could completely change the hydrology and ecosystem. Much like Lake Jackson, the Lake could drain and stay down until the sinkhole naturally filled.

During conversations with the Workgroup, the removal of sediment in Lake Munson was improperly compared to other dredging projects in the community and around the State. For example, Lake Munson is a natural lake system upstream of a first-magnitude spring so dredging of the lakebed poses the risk of the releasing relict contaminants. Directly upstream, Lake Henrietta is a constructed stormwater facility designed to collect sediment for periodic removal, to redirect or bypass the water flow during construction to minimize impacts downstream, and is fully accessible to construction equipment. For these reasons, Lake Henrietta has an upcoming sediment removal project that will benefit Lake Munson.

Over the summer months, a member of the Workgroup shared information on water quality and sediment removal projects in other parts of the State including Lake Apopka, bordering Orange and Lake Counties, and a project just north of Lake Okeechobee which straddles several counties along the Kissimmee River. In addition to all the aforementioned risks of dredging Lake Munson directly upstream of Wakulla Springs following the findings of the 2019 FGS Sediment Study, there are additional factors which distinguish these projects.

One of the primary differences between Lake Munson and Lakes Apopka and Okeechobee is the sheer size of these waterbodies. Lake Munson is 288 acres (0.45 square miles) with an average depth of 5 feet; whereas Lake Apopka is 48 square miles with an average depth of approximately 15 feet and Lake Okeechobee is 730 square miles with an average depth of approximately 9 feet.

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Removal of aquatic vegetation in the larger lakes has less of an impact because it is less of a shock to the system as within a smaller lake such as Lake Munson. On Lake Munson, all of the vegetation in the lake could be removed in a matter of days, which would be a drastic change in a short period of time. Conversely, on a lake like Okeechobee, the amount of vegetation that could be removed in the same period of time is very small compared to the total size of the lake, making the change much less noticeable. Lakes Apopka and Okeechobee do not have the widespread sediment contamination as Lake Munson which would require disposal far away from the basin or at a managed site like a landfill so it does not return to the ground or water. The muck that is dredged from Lakes Apopka and Okeechobee can be land applied nearby the project based on the known types of contaminants in those waterbodies.

A common thread between the Lakes Apopka and Okeechobee projects which happen to impact multiple jurisdictions is that these complex water quality projects in State-managed waterbodies are, in fact, led by the State. Being responsible for the management of these waterbodies, the State determined, often through the regional water management districts, to initiate the improvements to these waterbodies.

Water Quality Study

Water quality sampling pre- and post-drawdown is an excellent opportunity to monitor and quantify the effects of the drawdown on water and quality in Lake Munson. As part of the drawdown, a water quality study will be conducted using samples collected both upstream and downstream of the Lake, at up to four locations, and will be analyzed for the County's standard water quality parameters. An initial sample event will be collected prior to drawdown to provide pre- and post-drawdown comparison. After the Lake has started to refill, samples will be collected monthly for a period of two years. Between the County and City, samples are collected upstream and downstream of the Lake on a quarterly basis; however, this sampling frequency does not provide the level of detail needed to follow the evolution of the Lake as it re-stabilizes after refill. The sampling plan was developed incorporating suggestions from the SAC.

The Action Plan calls for the SAC to receive an update on the drawdown and monthly water quality data on a quarterly basis, to include the Workgroup for participate in the quarterly SAC updates to discuss the available sampling data and drawdown progress, and for staff to prepare six-month status reports to the Board on the progress at Lake Munson throughout the drawdown phase.

Aerial Topographic Survey

Additional data collection includes an aerial topographic survey of the lake bottom. The survey will be conducted immediately after the lake bottom has been fully exposed and again immediately prior to refilling the Lake. This information will provide data on how much the sediment compacted, as well as information on the elevations of the current lake bottom. Data quantifying the amount of compaction is useful in evaluating the effectiveness of the drawdown. It also provides information on the responsiveness of the Lake during a drawdown which is beneficial in determining future drawdown timing. A current lake bottom survey is useful for evaluating future in-lake mitigation strategies. Topographic survey of the lake bottom was not collected during the drawdown in 2010 but staff noted this would have been valuable information to have acquired at that time.

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Point-Source Testing for PCBs

At its September meeting, the SAC discussed sampling the water flowing into Lake Munson for dissolved concentrations of contaminants. Point-source testing would validate the 2019 FGS Sediment Study and the Terracon Report to show that the sediment contaminants are not resulting in water column contamination. Based on the SAC discussion, County staff have developed an event sampling plan for point-source testing. Samples will be collected from four sites, including upstream of the Lake, in Lake Munson, and downstream of the Lake. The samples will be collected during a high flow event and tested for the suite of contaminants in 2019 FGS Sediment Study. In the unlikely event that elevated dissolved concentrations are found, additional sampling or an investigation into the upstream sources may be warranted.

The Lake Munson Workgroup welcomed the point-source testing for PCBs but sought for the County to conduct ongoing tests. The reason the County seeks to conduct the point-source testing for PCBs is to validate the findings from the recent studies by FGS and Terracon. The 2019 FGS Sediment Study, which the Workgroup relies upon as the basis to perform testing, states that, “Upstream sampling may help to identify the source(s) of those contaminations” (emphasis added). Should the testing at the four locations confirm that the sediment contaminants are not resulting in water column contamination, ongoing testing would be unnecessary. Future tests may be warranted and performed by the County based on new information or the conditions of the Lake.

Ongoing and Planned Infrastructure Improvements

Earlier sections of this item documented the hundreds of millions of dollars invested by the County, City, and Blueprint to enhance the water quality in Lake Munson dating back to the 1990s. At present, there are several ongoing and planned infrastructure projects within the Lake Munson Basin which are described in this section (Attachment #5).

The County’s Lake Henrietta Sediment Removal project is anticipated to commence in 2023 and will reduce the amount of sediments transported into Lake Munson, thereby improving water quality. Managed by Blueprint, the first two segments of the Capital Cascades Trail and network of stormwater facility projects have already been completed and Segment 3, which includes a regional stormwater facility (3D-B Stormwater Facility) along the FAMU Way Corridor, is currently under construction. Capital Cascades Trail Segment 4 will remove sediment and trash and improve downstream water quality in the Lake Munson basin. The Segment 4 improvements will begin at the convergence of two stormwater conveyance systems (Central Drainage Ditch and St. Augustine Branch) near FAMU Way and extend south to Lake Henrietta at Springhill Road. Blueprint staff anticipates bringing an agenda item back to the Intergovernmental Agency Board in March 2023 seeking acceptance of the design concepts so that the project can proceed to the final design and permitting phase. Capital Cascades Trail Segment 4 will complete the 4.25-mile stormwater treatment and recreational improvements, stretching from Leon High School south to the Lake Henrietta stormwater facility, as provided in the Capital Cascades Master Plan approved by the Blueprint Intergovernmental Agency Board (IA Board) on January 31, 2005.

As our community has continued to make so many investments on these upstream improvements to ensure that clean water is flowing downstream, the priority has shifted to include millions of dollars in resources allocated to address water quality in the basin through the reduction of household septic systems. Consistent with the third strategy in the 1994 Lake Munson Action Plan

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calling for community actions such as emphasizing the importance of educating the public on the proper design and maintenance of septic systems so that individuals can take personal responsibility in reducing pollution, the County and the State have prioritized the proliferation of advanced septic systems and septic to sewer projects in recent years.

Based on the shared desire to enhance water quality in our region through nitrogen reduction projects, Leon County and FDEP jointly adopted the Leon County Water Quality and Springs Protection Infrastructure Improvement Plan (Springs Improvement Plan) in FY 2018. This first of its kind multi-year agreement between the State and a county was the result of Leon County's strong commitment to reducing nitrogen levels in the primary springs protection zone and FDEP's willingness to provide a dollar-for-dollar match toward projects in Leon County. Lake Munson, and portions of the Munson basin, are within the primary springs protection zone which allows residents to be eligible for the voluntary wastewater projects. Both parties committed over \$32 million through FY 2024 for water quality and springs protection infrastructure projects, subject to annual appropriation by the Board and Florida Legislature.

The Springs Improvement Plan includes funding for the County's Northeast Lake Munson Septic to Sewer project and two programs that financially support homeowners who wish to voluntarily upgrade their septic systems to advanced nitrogen-reducing systems. As the County has done upstream of the Lake, the County is also actively addressing over \$12 million dollars in bringing sewer to the neighborhoods immediately adjacent to the Lake and removing up to 220 septic tanks. Downstream of the Lake Munson basin, millions of dollars have been committed to bring sewer to Woodville which will be vital to Wakulla Springs. The plan also includes future commitments to broadening the Comprehensive Wastewater Treatment Facilities Plan by funding future studies on the best methods of wastewater treatment for reducing nitrogen County-wide.

Based the City of Tallahassee's shared commitment to improving the water quality in Lake Munson, the City and County entered a Water and Sewer agreement in 1993 and revised in 2005, whereby the City commits to maintain or improve its sewer system so it can provide capacity to jointly identified target areas. This agreement helped make the NE Lake Munson Septic to Sewer Project possible.

Long-Term Lake Management Actions

The Action Plan calls for an expanded role for the County in managing Lake Munson as it continues to coordinate with State agencies on long-term restoration opportunities. As upstream contributors to the Lake, the County and City have focused on stormwater improvements to reduce the nutrient loading and sediment entering the system and monitoring the water quality for system trends. At the State's request, the County provided assistance in managing previous drawdowns on Lake Munson. As a State-managed waterbody, the County relies on the State for in-lake management such as the treatment of aquatic vegetation and sediment removal projects. The Action Plan proposes supplementing the State's lake-management efforts and responsibilities related to Lake Munson by implementing an enhanced vegetation management program, periodic drawdowns in consultation with FWC to reduce the need to mechanically remove organic-rich sediment, algal bloom treatments, and exploring new and innovative methods for in-lake management including potential opportunities through FDEP's Innovative Technologies Grant. The cost for these supplemental lake-management services is estimated to be \$60,000 in FY 2023.

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Invasive Exotic Vegetation Management Program

The Action Plan calls for the County to implement an Invasive Exotic Vegetation Management Program to supplement the State's treatment efforts on Lake Munson. Invasive exotic plants adversely impact native plant communities and, if left untreated, will rapidly colonize and take over a waterbody. Native species create a healthier ecosystem; they allow a variety of plants to grow and serve as food and nesting habitat for fish and wildlife. As a State-managed waterbody, the County relies on FWC's Aquatic Plant Management Program for treatment of exotic vegetation for area lakes.

FWC's service area covers the entire Florida panhandle, from Escambia to Jefferson County, so County Water Resources staff often identifies areas of exotic vegetation growth and notifies the State. FWC spot treats the areas of concern with a chemical herbicide subject to the availability of personnel and funding.

Leon County has a small vegetation management program that is limited to treating stormwater facilities. This item proposes enhancing the Invasive Exotic Vegetation Management Program to better manage the aquatic vegetation in area waterbodies by supplementing the State's plant management services to prevent the rapid growth of invasive exotic species and facilitate the growth of native aquatic vegetation. When an area is identified for treatment, staff will coordinate with FWC to determine its availability to respond before reaching out to the private contractor. This supplemental program is anticipated to provide a quicker response time and more frequent mitigation of the aquatic vegetation. More frequent treatment in smaller areas is better for lake ecology because less product is generally needed.

The Invasive Exotic Vegetation Management Program will be an in-lake mitigation tool the County can utilize as a long-term strategy to manage area lakes. This program will be implemented for Lake Munson later this year following the drawdown and anticipates county-wide expansion in FY 2024.

Algal Blooms Management Program

One of the requests by the Workgroup was a peroxide treatment of the algal blooms. Peroxide treatment methods on algal blooms are very new to Florida. As more information becomes available, staff will continue to review the results peroxide treatment on algal blooms state-wide and will evaluate the use on future blooms on Lake Munson, as well as continuing to explore the best treatment method for Lake Munson. The proposed long-term initiatives include an algal bloom management program.

A peroxide treatment immediately in advance of the drawdown would not provide significant benefits to the lake. The algae need water to grow, so when the lake is drawn down, the algae are removed with the water leaving the lake. Therefore, peroxide treatment this fall has not been included in the proposed action plan.

The peroxide treatment recommended by the Workgroup was Lake Guard, which was developed by BlueGreen Water Technologies (BlueGreen), that can be used to treat algal blooms. This method of treatment has been used in other areas of the world but is very new to the United States and Florida; prior to 2020, peroxide treatments had never been applied to Florida waterbodies.

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The Lake Guard is a granular chemical product that floats on the surface of the water and can be transported by current or wind to the location of the algal blooms. The Lake Guard can be applied by hand or by boat or airplane. When the Lake Guard mixes with water it changes into a hydrogen peroxide chemical. The hydrogen peroxide mixture stresses the blue-green algae, breaking down their cells, and causing them to die. The product is intended to be applied (and is most effective) in the early stages of a bloom. According to BlueGreen, there needs to be an active bloom for the product to be effective.

Lake Guard is designed to treat the cyanobacteria in the waterbody; the cyanobacteria in Lake Munson have been limited and the predominant algae type is the filamentous algae (the stringy stuff on top of the water). There is little information on the effectiveness of the product on the filamentous algae and the BlueGreen has not utilized it in this manner. There is also little information available on any adverse impacts to the waterbody after treatment with Lake Guard. Staff asked BlueGreen for this information but have not received the requested information.

Lake Guard can provide real relief from the side effects of toxic algae because the cyanobacterial toxins produced by the active bloom in the treatment area will die off and sink. Because Lake Munson is not the normal conditions Lake Guard is designed for (open water with cyanobacteria actively blooming) it is unknown what level of relief may be achieved on Lake Munson.

Normally, Lake Guard is used in open water where the chemical can be added to the water, and the current moves the product to the location of the algal bloom. This would not work in Lake Munson due to the large amounts of hydrilla. In the case of Lake Munson, because of the large amounts of hydrilla and the lack of flowing water, the product would need to be applied evenly throughout the application zone. During the meeting with the Workgroup on Monday, BlueGreen stated they would need to develop an alternative application plan, which staff have not received. BlueGreen did state the application may require the use of a helicopter.

BlueGreen stated they can deploy to treat an area within approximately 72 hours of receiving a contract and a purchase order. Under normal conditions (open water), an application can be completed relatively quick. Because the alternative application plan has not been developed it is unclear how long application on Lake Munson would take. After application, under normal conditions the algae die off within 24 to 48 hours; a second application is suggested after 48 to 72 hours. Since the Lake is topped out with aquatic vegetation, it is not clear if the product will treat the algae in the same length of time. BlueGreen also recommended the County stockpile a supply of Lake Guard to spot treat the algae in the future.

BlueGreen was contracted by the St. John's River Water Management District (SJRWMD) for a pilot project on Lake Minneola and by the South Florida Water Management District (SFWMD) to conduct a test project on the C-43 Canal/ Caloosahatchee River, both using Lake Guard. Because they are state-managed waterbodies, the FDEP and Water Management Districts paid for and oversaw the projects. The Lake Minneola has been plagued with cyanobacteria, so this pilot project was developed to test Lake Guard's ability to prevent algal blooms. Water samples were tested to determine algal bloom prone areas, which were then treated with Lake Guard. The Pilot Project lasted a year and a half. From this project, the SJRWMD is developing a rapid response plan to take on algal blooms before they overwhelm lakes and rivers. The C-43 Canal/

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Caloosahatchee River is a mixture of natural and manmade canal networks that have a history of heavy cyanobacteria issues. The project was intended to mitigate the effects of the blooms through treatment and test the products ability to in treating heavy blooms and maintaining the system in a bloom-free condition. Both scenarios are different than Lake Munson. In both cases, the Lake Guard was applied in an open water situation, and where the product could flow to and with the cyanobacteria. Also, both waterbodies have long histories of significant cyanobacteria issues, whereas, Lake Munson has primarily had issues with filamentous algae this summer. It's also important to note that like Lake Munson, both waterbodies are state-managed and hence the Water Management Districts sponsored the projects.

Lake Guard is a very new method of treatment in Florida. Little information is available on how the peroxide mixes and disperses in the water. During the meeting with the Workgroup, a question was raised on if Lake Guard left enough vegetation in the system to allow the fish and other wildlife to survive. More research is needed to determine optimal levels needed to suppress blooms, while not affecting fish or other wildlife.

The use of Lake Guard is a management and mitigation strategy. The product can treat active blooms and may be able to prevent future blooms. In both cases, the use of Lake Guard would be an on-going treatment method and would require continual use to achieve the algal management.

Reoccurring Drawdown Schedule

Periodic and reoccurring drawdowns are not a new concept and have previously been used on lakes in Leon County. Drawdowns are beneficial to the health of the Lake, especially on lakes that do not experience natural drawdowns. Episodic drawdowns reduce the need to remove nutrient and organic-rich sediment. Drawdowns should be reasonably frequent with timing that mimics the natural draining and refill cycle that keeps lakes in a healthy state. Based on recommendations from the SAC and FWC, Leon County Public Works will implement a planned drawdown cycle of every 5-10 years which allows flexibility of more frequent drawdowns if needed. The exact period of time between drawdowns will be determined by the conditions and health of the Lake, and in consultation with FWC and the SAC. On average, the driest months in Tallahassee are October through January. Drawdowns beginning in October and lasting through the winter are ideal. Complete lake drawdowns will be utilized to provide the maximum benefit to the Lake, unless the health of the Lake dictates otherwise, as determined by FWC and the SAC. Staff will prepare an agenda item seeking Board approval of future drawdowns and will provide ample notice to the public through Community and Media Relations.

Innovative Technology Exploration

And finally, staff will continue to explore new and innovative methods for lake management and any potential strategies and technologies will be presented to the SAC and State agency partners for discussion and analysis. On August 15th, the County applied for an FDEP Innovative Technologies Grant for a pilot project on Lake Munson utilizing Biochar, a charcoal-like substance capable of removing the dissolved nutrients that facilitate algal blooms. This grant will explore the effectiveness of the Biochar and determine scalability if implemented in a larger setting. The successful outcome from this and other Innovative Technologies Grants could be used on Lake Munson in the future. As more FDEP Innovated Technology grants are awarded, the best practices

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in lake management and restoration will continue to evolve as these projects are completed and new strategies are proven to be effective.

Lake Munson Workgroup

This summer, residents living near Lake Munson joined with local environmental advocates and brought forward concerns related to algal blooms, people experiencing adverse health conditions, a fish kill, aquatic vegetation, and a proposal for an FDEP grant. Through phone calls, emails, news advisories, as well as large public and small neighborhood meetings, the County was responsive to the concerns brought forward about the Lake which often required coordination with State agency partners at FDEP, FWC, and FDOH.

County employees strive to always be receptive to new ideas and innovative solutions to complex problems such as the continuous efforts to enhance water quality in Lake Munson, an examination of the County's role versus the State in lake management, or the County's response to algal blooms in state-managed waterbodies. As these issues arose, staff consulted with the appropriate state agencies and sought input from the County's Science Advisory Committee, where appropriate, for additional guidance and expertise. Unsatisfied with the information provided by the County, the Lake Munson Workgroup provided ten specific requests in writing for the Board's consideration. On September 13, 2022, the Board directed staff to meet with the Workgroup to address their concerns about the Lake and to bring back an analysis of the Workgroup's ten requests as part of this agenda item.

Based on the Board's direction, staff immediately contacted the Workgroup to schedule meetings and coordinate with the appropriate subject matter experts across County departments, Blueprint, state agencies, and the County's Science Advisory Committee. Over the course of a week, the Workgroup convened twice for a total of approximately five hours to discuss the ten requests, listen to residents' experiences and concerns, and engage subject matter experts on issues related to water quality conditions, marine life, prudent health precautions related to algal blooms, and the projects and programs designed to enhance Lake Munson. The proposed Action Plan for Lake Munson presented in this agenda item addresses the issues raised by the Workgroup, and identifies where there is agreement on certain mitigation techniques and best practices for Lake Munson.

As submitted by the Workgroup, several of the requests touch on multiple subject areas which require extensive responses. Other requests refer back to previous sections of this agenda item for a greater level of detail on an issue. It is important to note that a few of the requests and issues raised in the Workgroup meetings will be familiar to the Board as these County-wide policy matters have been considered in recent agenda items but continue to be pursued by the environmental advocate members of the Workgroup whom do not live near Lake Munson. Specifically, the Lake Munson Workgroup requested the following:

- 1. We want a 2 year plan to clean the lake and remove sediments. This includes short, intermediate, and long term objectives, as well as identifying funding sources, disposal sites, etc. That means starting work in 2 years.*

Response: Leon County has made continuous efforts to enhance the water quality in the Lake since the 1990s through upstream capital improvements and, in recent years, nitrogen reduction wastewater projects including a sewer project in NE Lake Munson and providing

residents of the basin financial incentives to upgrade their conventional septic systems. In addition to the ongoing and long-term infrastructure projects that benefit the basin, the Action Plan describes the planned drawdown with more frequent water quality testing, an aerial topographic survey of Lake Munson to measure elevations of compacted sediment to evaluate for future in-Lake mitigation strategies, a new vegetation management program for treating invasive plants, and implementing periodic drawdowns in consultation with FWC to reduce the need to mechanically remove organic-rich sediment. This holistic approach will allow the immediate strategies to quickly mitigate the rapid growth of hydrilla and eliminate the algal bloom while the long-term actions will supplement the State's in-lake activities and provide a higher level of service to County residents.

As described on page 13 of this analysis, in-lake sediment removal is not included in the plan.

The purpose of the 2019 FGS Sediment Study was to obtain new information that could be used to guide future lake management strategies. The Sediment Study provided new information on the extent of contaminated sediments in the Lake. Analysis by staff, the SAC, and leading environmental firms the County has on contract of these studies have concluded that dredging is not a preferred mitigation method at this time. The PCBs are not causing harm to the water, fish, or Wakulla Springs because they are bound to the sediment so dredging the Lake would disturb the sediment resulting in greater harm to the Lake and downstream. In the future as more information is known and technologies change and become safer or more cost-effective, dredging may become a viable option.

The Lake continues to improve; however, Lake Munson's water quality issues date back decades and undoing this damage will take continuous commitment. The County will continue to explore new and innovative methods for lake management and any potential strategies and technologies. As more FDEP Innovated Technology grants are awarded, the best practices in lake management and restoration will continue to evolve as these projects are completed and new strategies are proven to be effective.

2. *We want our group involved in this plan and decisions that affect our health and property, along with scientists from our group on any committee formed by the county to consult on remedies, similar to how the 1994 Munson Management Plan was devised.*

Response: The Action Plan captures recommendations sought by the Workgroup including the deployment of hydrogen peroxide to treat algal blooms, point-source testing for PCBs, ongoing engagement over the next two years to evaluate the Lake's response to the drawdown, and regular status updates to the Board every six months.

During the first Workgroup meeting, Mr. Terry Ryan proposed convening the Workgroup and County staff on a quarterly basis through the end of the drawdown. Staff concurred with the frequency of meetings but insisted that the SAC host the future meetings to evaluate the progress of the drawdown and enhanced water quality sampling. The Action Plan calls for the SAC to receive an update on the drawdown and monthly water quality

data on a quarterly basis, to include the Workgroup for participate in the quarterly SAC updates to discuss the available sampling data and drawdown progress, and for staff to prepare six-month status reports to the Board on the progress at Lake Munson throughout the drawdown phase.

3. *Short Term: We want a drawdown ASAP and if taking too long -- peroxide treatments to kill the cyanobacteria. Staff is indicating the drawdown will occur this fall after hurricane season.*

Response: A drawdown is proposed for November 1st, or sooner if possible, following adequate public notice. A drawdown will mitigate the current algae and hydrilla challenges as well as form a “cap” over the sediments to prevent nutrients from leaving the sediment in the future. Refer to Page 9 for additional details.

A peroxide treatment immediately in advance of the drawdown would not provide a drastic benefit to the lake. The algae need water to grow, so when the lake is drawdown, the algae go away. During the September 26th meeting with the Workgroup, FWC staff stated that peroxide algae treatment prior to the drawdown was not likely worth the investment. Staff consulted with BlueGreen Water Technologies (BlueGreen), the developer of the peroxide treatment the Workgroup referenced, and requested a scope to spray in an area around the homes but have not received a response.

As more information becomes available, peroxide treatments may become a worthwhile management strategy to mitigate and manage algal blooms. Staff will continue to review the results of the Pilot Studies and will seek funding opportunities to use Lake Guard in the future. Peroxide treatment for algal blooms has also been incorporated into the long-term initiatives for the lake.

4. *Short Term: We want an emergency declaration regarding the condition of the lake and acknowledgment of the potential human health impacts to city and county residents.*

Response: As has been said, Lake Munson presents significant challenges with past contamination but will continue to receive attention and resources as evidenced by all of the previous, planned, and ongoing water quality infrastructure projects within the basin and all the ongoing and planned best management practices addressed herein, including, the planned drawdown of the Lake in a few weeks. The current conditions at Lake Munson do not meet the definition of an emergency as defined in the County’s Emergency Management Ordinance nor do the proposed courses of action to remediate the current conditions support the issuance of a local state of emergency. Local states of emergency enable the County to take emergency measures pursuant to the disaster recovery plans of the County. They can be a mechanism for the County to qualify for funding that would not otherwise available absent an emergency. Local states of emergency may also be issued to enable the County to take emergency measures on an expedited basis in circumstances where the County would otherwise be limited or without authority to act, such as establishing curfews, directing persons to shelter-in-place during incidents involving the release of hazardous waste, suspending otherwise applicable state and local

procurement and contracting requirements, and in some instances directing and compelling the evacuation of all or some portion of the County population.

It is undisputed that the Lake has a history of chronic water quality and ecological problems. However, according to surface water quality testing conducted by the County and the City of Tallahassee, the water quality of the Lake currently meets the Total Maximum Daily Load levels set by the FDEP for nutrients. Moreover, algal blooms are a common and natural occurrence in Florida's fresh waters, including the Lake, and are attributed to environmental factors such as sunny days, warm water temperatures, low rainfall amounts, still water conditions, and nutrients in the water which cause blue-green algae to accumulate. Additionally, FDOH has a process and procedures in place for assessing public health conditions related to algal blooms, with a dedicated web page providing information on the natural occurrence of algal blooms in Florida and precautions residents should take for themselves and their pets. While exposure to such blooms may result in temporary respiratory issues and irritations of the eyes, nose, and skin, the FDOH has taken the position that such occurrences are a nuisance, and do not pose a serious health risk to most people.

For the Board to issue a local state of emergency, the purpose and requirements of the Emergency Management Ordinance, codified in Chapter 2, Article VIII of the Code of Laws of Leon County, Florida (Leon County Code), must be met. An "emergency" is defined in Sec. 2-305. of the Leon County Code to mean:

"any occurrence, or threat thereof . . . which results or may result in substantial injury or harm to the population or substantial damage to or loss of property."

As a threshold matter, an occurrence or event that cannot objectively and scientifically meet this definition fails to constitute an emergency. Accordingly, a local state of emergency is not necessary or appropriate at this time for a state-managed waterbody, based upon current objective and scientific data gathered by state and local governments.

5. *We oppose the county's tea bag grant proposal. This is a giant, missed funding opportunity.*

Response: On July 12, 2022 the Board provided direction for staff to evaluate opportunities to enhance Lake Munson through the FDEP Innovative Technologies Grant. Mr. Max Epstein presented staff with a proposal that included dredging the lake bottom by relocating and harvesting the organic matter. As detailed in the response to Request #1 by the Workgroup, professional engineers at Public Works explained the risks associated with sediment removal but continued to work with Mr. Epstein to evaluate his proposal, troubleshoot operational challenges, and gather information from state and federal agencies as well as the private sector to evaluate new innovative technologies that could benefit Lake Munson.

In addition to the sediment and aquatic vegetation removal, there were several other prohibitive obstacles with Mr. Epstein's proposal for the County to endorse the application to FDEP for grant funding including:

- Securing a location destination to land apply the organic materials.
- Determining the costs associated with transporting said materials, often the most expensive component of sediment removal projects, without knowing the final destination to calculate roundtrip distances and needing to anticipate those costs during a period of high inflation with rising gasoline prices.
- Reliability of the cost estimates to ensure the County secures funding for the full project costs.
- Supposition that FDEP would award a \$2.5 million grant, despite concerns about the reliability of the cost estimates, given the allocation of grant awards last cycle. In FY 2022, most of the 16 grants awarded were between \$200k - \$300k. The two highest grants were slightly less than \$1 million. While there is a larger pool of funding available to consider grant awards this year, FDEP is seeking to provide a greater volume of awards to water management districts and local governments across the state.

After working with Mr. Epstein for several weeks on his proposal, staff presented a new innovative technology for the County to seek funding. Since that time, the County has been accused of “failing to apply for a \$2.5 million grant,” being unwilling to invest in Lake Munson, and “pulling a “bait and switch” on its grant application. This undermines the many hours of collective work put forth by both Mr. Epstein and County staff throughout this process, which requires the County to endorse the grant application and take on the responsibility of managing/implementing the project.

The County submitted an Innovative Technologies Grant application to FDEP on August 15th. Awards are anticipated to be announced by spring 2023. The grant application was developed after consultation with AECOM, a leading engineering consulting firm with an extensive portfolio in lake management and algae technologies, for a pilot project using Biochar, a charcoal like substance, evaluating its effectiveness at taking up dissolved nutrients to prevent harmful algal blooms. The Biochar will be suspended in mesh-bags and placed at specific areas around the Lake at different heights within the water column, within the first 12 inches below the surface and approximately 12 inches above the bottom. If successful, the pilot project results will provide valuable information on how to scale-up the technology for future use. This approach will not disturb the sediment in Lake Munson, is non-invasive, and does not affect the submerged aquatic vegetation. Biochar is an established product; however, it has not been used in a small lake setting and there are no robust studies demonstrating its ability to remove nutrients in a lake such as Lake Munson. The use of Biochar in Lake Munson is a prime candidate for the grant since it is applying a known technology in a new way.

6. *Short/Intermediate Term: We want an agenda item back for increased water testing, including point-source testing as recommended by the county's own 2019 report for contaminants suspected to be actively entering the lake.*

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Response: The Action Plan calls for point-source testing to validate the 2019 FGS Sediment Study and the Terracon Report and show that the sediment contaminants are not resulting in water column contamination. An event sampling plan for point-source testing was provided during the meetings with the Workgroup. Samples will be collected from four sites, including upstream of the Lake, in Lake Munson, and downstream of the Lake. The samples will be collected during a high flow event and tested for the suite of contaminants in 2019 FGS Sediment Study. In the unlikely event that elevated dissolved concentrations are found, additional sampling or an investigation into the upstream sources may be warranted.

This request pre-dates the summer algal bloom on Lake Munson as Mr. Terry Ryan, a member of the Workgroup, has been advocating for point-source contaminate testing based on the 2019 FGS Sediment Study. Since the algal bloom this summer, some members of the Workgroup have conflated the contaminated sediment in the lakebed with the toxicity of the algae and the algal blooms. However, the 2019 Sediment Study contradicts this assertion. Algae grows when there is an abundance of nitrogen in the system and blooms occur when the algae grow rapidly. Environmental factors such as sunny days, warm water temperatures, low rainfall amounts, still water conditions can also cause algae to rapidly grow and accumulate, resulting in an algal bloom. While the sediments may release nutrients into the water column, this is not the case for the contaminants in the sediment. The contaminants are tightly bound to sediment and are not releasing into the water column.

The Lake Munson Workgroup welcomed the point-source testing for PCBs but sought for the County to conduct ongoing tests. The 2019 FGS Sediment Study, which the Workgroup relies upon as the basis to perform testing, states that, “Upstream sampling may help to identify the source(s) of those contaminations” (emphasis added). Should the testing at the four locations confirm that the sediment contaminants are not resulting in water column contamination, it would confirm the recent studies and ongoing testing would be unnecessary. Future tests may be warranted and performed by the County based on new information or changes to the conditions of the Lake.

Upstream sampling generally refers to the stormwater conveyance systems owned and maintained primarily by the City of Tallahassee. The East Drainage Ditch and Munson Slough enter City limits just east and just north of Lake Henrietta. The point-source testing requested by the Workgroup include water column or sediment testing starting at Lake Henrietta and continuing upstream in every direction until the contaminants are no longer detected, indicating the location the contaminants entered the system.

The Workgroup continues to reference one paragraph in the summary of the Sediment Study which states, “Lake Henrietta was constructed in 2000 and is periodically dredged, thus its sediments were recently deposited. The contaminants detected in Lake Henrietta’s sediments are therefore from continuing sources. Upstream sampling may help to identify the source(s) of those contaminants.”

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There are issues with not interpreting the Sediment Study and the Terracon Report holistically. This paragraph contains an error that was inadvertently not corrected prior to final publication. Lake Henrietta has not been dredged since construction in 2000; therefore, deposited sediments are unlikely to be recent. The Workgroup is neglecting to look at the prior two paragraphs of the Sediment Study which provides data that suggests the contaminants are tightly attached to the sediment and will not leach off into the water column. While upstream sampling *may* help to identify the source, the necessity for upstream sampling was challenged in the Terracon Report. The Terracon report states, “This information indicates that upstream sampling is unwarranted as the data suggests the system is working as intended and serving as a filter for Lake Munson.”

The use of PCBs has been banned since 1979 and the use of heavy metals are regulated such that they are only allowed in small concentrations. The Terracon Report determined that the contaminated sediment accumulated from activities prior to the mid-1990s and are still detectable due to how slowly they break down. The PCBs found in the sediment are likely relic contaminants prior to current regulations or may have been transported from upstream and upwind during development activity in the last few decades. Significant development and construction activity have occurred upstream of Lake Munson, which provided ample opportunities for potentially contaminated soil to be exposed, rained upon, and carried downstream. The 2019 FGS report was provided to, and discussed with FDEP, and no recommendations for further sampling were made.

During the September SAC meeting, the environmental advocates’ request for upstream point-source sampling was discussed. The SAC suggested sampling the water flowing into Lake Munson for dissolved concentrations of contaminants. This testing would validate the 2019 FGS Sediment Study and the Terracon Report to prove the contaminants are not contributing to water column contamination. County staff have developed a single event sampling plan. Samples will be collected from four sites, including upstream of the Lake, in Lake Munson, and downstream of the Lake. The samples will be collected during a high flow event and tested for the suite of contaminants in 2019 FGS Sediment Study. In the unlikely event that elevated dissolved concentrations are found, additional sampling or an investigation into the upstream sources may be warranted. This sampling plan is not in conjunction with the drawdown or any lake management plans, because the contaminants are a different issue than the current lake concerns.

The County plan includes water column testing instead of sediment testing. The sediment in Lake Munson and Lake Henrietta has been sampled and is known to contain PCBs and other contaminants. Additional sampling in these areas provides no worthwhile information. While sediment samples could be tested upstream of Lake Henrietta, only one sample could be taken before entering the city limits. One sample would also not provide useful information and does not accomplish the upstream point-source tracing desired by the environmental advocates.

Based on conversations with the Workgroup and the environmental advocates, it appears the root of the issue in the requests for the upstream sampling is the concern that the contaminants are producing the toxic algae. By testing the water column, worthwhile

information can be provided demonstrating contaminants are staying bound to the sediment and do not pose a threat to people, pets, or wildlife.

This contaminant sampling plan was discussed with the Workgroup during the meetings. The Workgroup does not approve of the County's plan. They would like year-round testing, similar to the County's water quality monitoring program. The Workgroup is also adamant about the upstream point-source tracing of the contaminants, despite being provided information suggesting it is not necessary.

Although at this time only a single sampling event is planned, the County is receptive to one or more follow-up sampling events after the lake refills, and under different lake and flow conditions.

7. *Intermediate Term: We would like a workshop on cyanobacteria, its health effects, and how to combat this problem going forward, and create policies for blooms county-wide.*

Response: As described throughout the agenda materials, FDOH is the lead agency to address the health effects of cyanobacteria algal blooms throughout the state. FDOH has procedures in place for assessing public health conditions related to algal blooms and a dedicated web page providing information their natural occurrence in Florida, precautions residents should take for themselves and their pets, and FAQs. FDOH-Leon was able to participate in one of the meetings with the Lake Munson Workgroup and respond to specific questions about the health effects of algal blooms and the agency's procedures. At that time, FDOH-Leon had only been made aware of two residents experiencing exposure-related symptoms and agreed to mail out educational materials to residents living near the Lake. Since the algal bloom is no longer toxic, FDOH-Leon did not find the requests for door-to-door outreach or a town hall meeting to be warranted at this time.

Lake Munson Workgroup members specifically requested both FDOH-Leon and Leon County Government provide financial assistance to residents having incurred medical expenses and/or experiencing physical ailments associated with the algal blooms. Both FDOH-Leon and Leon County Government denied consideration of the request for financial compensation and reiterated that algal blooms are naturally occurring events which tend to formulate in warm and stagnant waters. Further, the County maintains that Lake Munson, as a waterbody of the State, is the legal responsibility of the State of Florida under the administrative and regulatory auspices of the FDEP. The County is responsible for its conveyance systems to the Lake and, at times, has coordinated the State's in-Lake mitigation efforts (drawdowns, etc.).

While FDOH's position at this time is that exposure to algal blooms may result in nuisance health effects including temporary respiratory issues and irritations of the eyes, nose, and skin, it is important to note that additional research is underway at the federal and state levels to better understand this issue. The U.S. Centers for Disease Control is conducting surveillance studies on human and animal illnesses that are associated with exposures to cyanobacteria algal blooms and the State of Florida is utilizing four universities to improve the understanding of potential human health impacts of algal blooms and red tide. Through

FDOH, the State provided \$650,000 to four universities in 2019 for ongoing studies on the prevention of toxic algal blooms, treatment for exposed individuals, health disparities related to the exposure of toxins, and better screening to quickly detect toxic blooms.

Based on FDOH's role as the lead agency to address the health effects of cyanobacteria algal blooms throughout the state and the ongoing academic research in environmental and human health, this analysis finds that a Board workshop would not be a productive venue to address the health effects of cyanobacteria.

The Workgroup also requested the County explore the creation of policies and response protocols for algal blooms including the closure of Gil Waters Preserve at Lake Munson. The County closed the boat ramps at Gil Waters Preserve to prevent access to Lake Munson, however, the park remained open to the public with signage advising patrons about the algal bloom. Since the algal bloom toxins can be aerosolized and blow onshore, the Workgroup is seeking the closure of County parks which may be adjacent to future toxic blooms.

Red tide is a saltwater algal bloom that can also be aerosolized and blown onshore resulting in the same temporary symptoms freshwater algal blooms. Both are generally considered seasonal and people with preexisting respiratory conditions are advised to avoid proximity with both types of algal blooms. However, the beaches remain fully open during a red tide and there is no prohibition for swimming.

The best course of action related to County parks is to rely on the subject matter experts at FDEP and FDOH to determine the necessary precautions associated with an algal bloom and respond as needed on a case-by-case basis. The State agencies responsible for testing and interpreting the lab data are charged with identifying the level of toxicity and issuing caution advisories or alerts based on their findings. As with any potential danger in a County facility, including parks, the County facilities would be closed to the public.

8. *Intermediate Term: We want the county to bring back another fertilizer ordinance agenda item to consider wet-season bans as instituted by other counties on the forefront of water quality issues.*

Response: On May 11, 2021, the Board adopted an amendment to the County's Fertilizer Ordinance modeled after the State Model Fertilizer Ordinance. The County's Fertilizer Ordinance includes a provision that goes beyond the Model Ordinance and imposes a "fertilizer time-out" in advance of storms forecasted to produce a certain amount of rain. The Workgroup's request seeks the Board's reconsideration of the County's Fertilizer Ordinance which was adopted less than 18 months ago at a Public Hearing.

By prohibiting the use of fertilizer in advance of a storm, the Ordinance prevents fertilizer from washing off lawns and into waterbodies when it rains. The Workgroup is seeking a months-long wet-season ban to use fertilizer. This alternative was included in the agenda materials and discussed by the Board prior to the adoption of the existing Ordinance. The Board preferred the targeted approach of the "fertilizer time-out" before a rainfall event

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instead of the full wet-season ban during the summer months. Of the 67 counties in Florida, only 17 counties have a fertilizer ordinance that includes the requested wet season ban. The Workgroup did not provide any new information to support the need to revisit the Ordinance. Revision of the fertilizer ordinance is not recommended.

9. *Intermediate Term: We want public education about cyanobacteria, including involving the health department, mailers, and/or door to door outreach, and to catalogue human health effects. Tackling this problem is multifaceted and will include strengthening testing and changing development regulations.*

Response: Staff has been working in close coordination with FDOH-Leon since the presence of algal blooms (without toxins) was discovered in Lake Munson in early May. While algal blooms can occur with or without toxins, a laboratory analysis from a subsequent water sample found “low level toxins present” in Lake Munson. The state determined that the algal bloom produced a microcystin toxin and FDOH-Leon issued a health alert for residents to avoid contact with the water. The health alert specifically advised residents to not drink, swim, wade, use a personal watercraft, or boat in Lake Munson. It also warned residents to keep pets away from the area and offered FAQs including, “Is blue-green algae harmful?” The FAQs provided links to state agency websites for additional information. For broader dissemination of this important alert, Leon County Community and Media Relations disseminated the FDOH-Leon alert across the County’s digital platforms.

Algae blooms including red tide and blue green algae are generally considered health nuisances. The smell can cause temporary respiratory issues and irritations of the eyes, nose, and skin. The World Health Organization considers the presence of low-level toxins (under 10 micrograms/liter) to represent a low-level risk for adverse health outcomes from short-term recreational exposure; however, certain sensitive populations (e.g., children, the elderly and immunocompromised populations) may still be at risk even at low concentrations and should avoid any exposure. During the algal blooms this summer that with microcystin toxins detected, most of the samples collected had levels less than 0.5 micrograms/liter. One sample in mid-May detected toxin at 1.1 micrograms/liter. The State has processes and procedures for assessing public health conditions related to algal blooms. Physicians and medical laboratories in Florida are required to report conditions of public health importance to FDOH. Should physicians observe and report dangerous medical conditions, epidemiologists at FDOH will determine the appropriate public health response (public educational outreach, further medical assessment, isolation, etc.).

During the summer months while the toxins were still present, members of the Lake Munson Workgroup requested FDOH-Leon to mail educational materials to residents about cyanobacteria, conduct door-to-door outreach, and gather information from residents on their symptoms related to the algal blooms. FDOH-Leon was not responsive to the Workgroup’s initial requests until the newly appointed FDOH-Leon Health Officer, Ms. Brandi Knight, was contacted by the Workgroup in mid-July. Upon looking into the matter further, Ms. Knight found that FDOH-Leon had only been made aware of two residents reporting exposure-related symptoms which, by definition, are not generally considered

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harmful to a person's health. Further, FDOH-Leon lifted the health alert for blue-green algal toxins a few days later which negated any consideration of door-to-door efforts since Lake Munson no longer had an active toxic bloom.

Ms. Knight participated in a Workgroup meeting hosted by the County and agreed to mail out educational materials this month to residents living near Lake Munson. Ms. Knight also informed the Workshop that FDOH-Leon would consider door-to-door outreach in the future if there were enough reports of adverse health impacts and the toxic bloom was still ongoing. The purpose of the outreach would be to educate residents, perform epidemiologic investigations, and provide general medical guidance to avoid the water, wear long sleeves for sensitive skin, and remain indoors if necessary.

FDOH and FDEP have dedicated web pages and educational materials providing information on the natural occurrence of algal blooms in Florida and the precautions residents should take for themselves and their pets. Attachment #6 provides a sample of the online educational materials available through multiple state agencies. At the time of this writing, the toxins have not been present in Lake Munson for 2.5 months. On July 21st, FDOH-Leon lifted the health alert for blue-green algal toxins at Lake Munson based on water samples collected by FDEP. FDOH-Leon advised the public may resume water-related activities and to continue to exercise caution on the lake as algae blooms can move around, subside, and reappear when conditions are favorable.

With regard to the Workgroup's request to change development regulations, no specific suggestions were immediately offered to enhance water quality, so a brief overview of the County's Land Development Code (LDC) was provided at the subsequent meeting. The County can enact regulatory measures which help reduce the amount of nutrients entering waterbodies. The County's Environmental Services Director provided an overview of the County's LDC which provides for the regulations, procedures, and standards for the review and approval of all development and use of land in the unincorporated portions of the County.

Staff addressed concerns from the Workgroup regarding perceptions that the LDC and Environmental Management Act (EMA) are not as stringent as other Florida counties with regard to stormwater protection standards. Specifically, the question arose about whether the EMA should be amended to require preservation of 40% of the vegetation on-site for proposed developments within the County. The County's Environmental Services Director informed the Workgroup that the LDC already contains open space/landscape area standards with some requiring as much as 60% set-aside open space for certain development in Lake Protection, and 50% of set-aside in perpetual conservation easement for conservation subdivisions. Staff provided additional information on the County's EMA requirements related to landscape and natural minimum areas which can be mitigated if projects are designed in a manner that account for the natural features on-site.

Members of the Workgroup were pleasantly surprised upon learning of the existing land development regulations in place and moved on to discuss other issues.

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10. Intermediate/Long Term: We want to involve Blueprint's Capital Cascades 4 as a solution to fixing the lake going forward. There needs to be an active, ongoing discussion about these environmental issues and how to address Munson at the BPIA. This includes the board requesting an agenda item for discussion.

Response: The Capital Cascades Trail is a multi-faceted network of stormwater and recreation facility projects separated into physically distinct segments stretching from Leon High School south to the Lake Henrietta stormwater facility. Managed by Blueprint, the first two segments have already been completed and Segment 3, which includes Coal Chute Pond along the FAMU Way Corridor, is currently under construction. Capital Cascades Trail Segment 4 will remove sediment and trash and improve downstream water quality in the Lake Munson water basin. The improvements will begin at the convergence of two stormwater conveyance systems (Central Drainage Ditch and St. Augustine Branch) near FAMU Way and extend south to Lake Henrietta at Springhill Road. Blueprint staff anticipates bringing an agenda item back to the Intergovernmental Agency Board in March 2023 seeking acceptance of the design concepts so that the project can proceed to the final design and permitting phase. Capital Cascades Trail Segment 4 is funded at approximately \$19 million and will complete the 4.25-mile stormwater treatment and amenity improvements as contemplated in the Capital Cascades Master Plan approved by the Blueprint Intergovernmental Agency Board (IA Board) on January 31, 2005.

As noted previously in this item, staff met with Mr. Epstein over the summer to evaluate opportunities for an FDEP Innovative Technologies Grant to support water quality projects for Lake Munson. In addition to dredging the Lake bottom, Mr. Epstein has advocated for the acquisition of 125 acres of U.S. Forest Service property for the construction of a wetland on the western bank of the Lake to filter stormwater, similar to the Sweetwater Branch Sheetflow Restoration Project in Alachua County. As presented, neither of these two concepts are viable water quality projects for Lake Munson. For reasons explained throughout this item related to the FGS Sediment Study, in-lake sediment removal is no longer considered a mitigation option to reduce nutrient levels in Lake Munson. Disturbance of the existing sediment poses a contamination risk to the water and aquatic life. The concept to construct a 125-acre wetland was based on a project in Alachua County serving a smaller stormwater basin. The Lake Munson basin is about twenty times larger so a constructed wetland similar to the Sweetwater Branch system would have to be several times the size of the proposed 125-acre facility.

During the Lake Munson Workgroup meetings in recent weeks, Mr. Epstein suggested expanding the scope of the upcoming Capital Cascades Trail Segment 4 project to include additional downstream improvements to benefit Lake Munson. Mr. Epstein was advised that the Segment 4 project area was established along the Central Drainage Ditch nearly 20 years ago, the improvements extend as far south as Lake Henrietta, and that his proposed improvements along the western bank of Lake Munson are more than two miles from the project terminus. The Capital Cascades Trail stormwater improvements were intended to address water quality and flood concerns in the heavily urbanized drainage system comprised of the St Augustine Branch and the southern end of the Central Drainage Ditch,

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both of which are in the Lake Munson basin. All the modeling, analysis, designed and built projects to date have focused on these two stormwater conveyance systems.

On September 29, 2022, Mr. Epstein provided written and verbal comments to the IA Board seeking to extend the study area for Capital Cascades Trail Segment 4 to include a wetland treatment area along Lake Munson. The IA Board directed Blueprint staff to bring back an agenda item to develop a scope and estimated fee for a study that would consider a treatment facility on the west side of Lake Munson. The IA Board made it clear that it does not intend to slow down the conceptual design process for the Segment 4 project. The Lake Munson analysis agenda item will be brought back to the IA Board at its next meeting on December 8, 2022.

Conclusion

Lake Munson is a state-managed waterbody with a history of chronic water quality and ecological problems including fish kills, algal blooms, exotic vegetation and snails, high nutrient levels, low game fish productivity, sediment contamination, and depressed oxygen levels. The shallow and stagnant nature of the waterbody makes it susceptible to the growth of algal in the Lake resulting in this summer's bloom. The Lake receives surface water flow from a 32,000-acre basin, much of which is located in the City of Tallahassee, and has historically been subjected to drainage with high nutrient loads and wastewater discharges to the tributary system which has resulted in the embedding of legacy nutrients in the lake-bottom soil.

Significant efforts to improve the water quality and reduce the nutrient loading in Lake Munson have been ongoing since the 1990s and requires the continuous coordination among governmental partners with respect to our respective responsibilities to protect natural resources. The 1994 Lake Munson Action Plan has been used as the basis to guide watershed and stormwater improvements, regular testing and monitoring of water quality, and regulatory actions to limit pollutants and protect natural resources. Leon County Government, the City of Tallahassee, and the Blueprint Intergovernmental Agency have dedicated hundreds of millions of dollars for projects in the Lake Munson basin and prioritized upstream improvements which reduce the transport of sediment and benefit the Lake water quality. The County's SAC finds that the upstream improvements have resulted in lower concentrations of nitrogen and phosphorus flowing into the Lake meaning that the quality of incoming water is better than the water in Lake Munson. Munson Slough and Lake Munson are exceeding their State-mandated nutrient levels for nitrogen while phosphorus levels have declined significantly over the last ten years and are now approaching the target levels.

In recent years, the County, City and FDEP have invested millions of dollars and allocated future resources to address water quality through the reduction of household septic systems. In 2018, Leon County and FDEP jointly adopted a Springs Improvement Plan with both parties committing \$32 million through FY 2024 for water quality and springs protection infrastructure projects. Lake Munson, and portions of the Munson basin, are within the primary springs protection zone which allows residents to be eligible for these voluntary wastewater projects which remove or upgrade conventional septic systems.

Despite the better water quality, in-lake mitigation, and investments in upstream infrastructure, Lake Munson continues to experience occurrences of fish kills, algal blooms, invasive vegetation

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and snails, low game fish productivity, and depressed oxygen levels. Several of these conditions were experienced by Lake Munson residents this summer, resulting in concerns expressed by from residents and other stakeholders. On September 13, 2022, the Board directed staff to meet with a Workgroup made up of residents who live next to Lake Munson and other stakeholders to address their concerns about the Lake and to bring back an analysis of the Workgroup's ten requests posed to the County in writing. This information on the County's next steps to address the recent Lake conditions including those that were planned and, in some cases, those which came out of the meetings with the Workgroup are presented as the Lake Munson Action Plan.

This item and the proposed Action Plan provides an opportunity to better articulate the magnitude and duration of the past, ongoing, and long-term infrastructure projects to benefit the basin, the planned drawdown with more frequent water quality testing, an aerial topographic survey of Lake Munson to the measure elevations of compacted sediment to evaluate for future in-Lake mitigation strategies, a new vegetation management program for treating invasive plants, and implementing periodic drawdowns in consultation with FWC to reduce the need to mechanically remove organic-rich sediment. The Action Plan captures recommendations sought by the Workgroup including the deployment of hydrogen peroxide to treat algal blooms, point-source testing for PCBs, ongoing engagement over the next two years to evaluate the Lake's response to the drawdown, and regular status updates to the Board every six months. This holistic approach will allow the County to quickly mitigate the rapid growth of hydrilla and eliminate the algal bloom while the long-term lake management actions will supplement the State's chemical treatment services and provide a higher level of service to County residents.

The drawdown plan and treatments for Lake Munson are estimated to cost \$130,000 in FY 2023. Funding is included in a separate agenda item as a carry-forward for these purposes. The annual recurring costs for FY 2024 will be included in the Public Works Operating Budget.

While the Lake continues to improve, undoing decades of damage will take continuous commitment. Over the next two years, the Action Plan calls for the SAC to receive an update on the drawdown and review the available enhanced sampling data on a quarterly basis, invite the Workgroup to participate in the quarterly SAC meetings to discuss the available sampling data and drawdown progress, and for staff to prepare six-month status reports to the Board on the progress at Lake Munson throughout the drawdown phase. The drawdown is proposed for November 1st, or sooner if possible, following adequate notice to the public.

Options:

1. Accept the Status Report on Best Management Practices for Lake Munson.
2. Approve the Lake Munson Action Plan, presented herein, including the immediate drawdown plan.
3. Board direction.

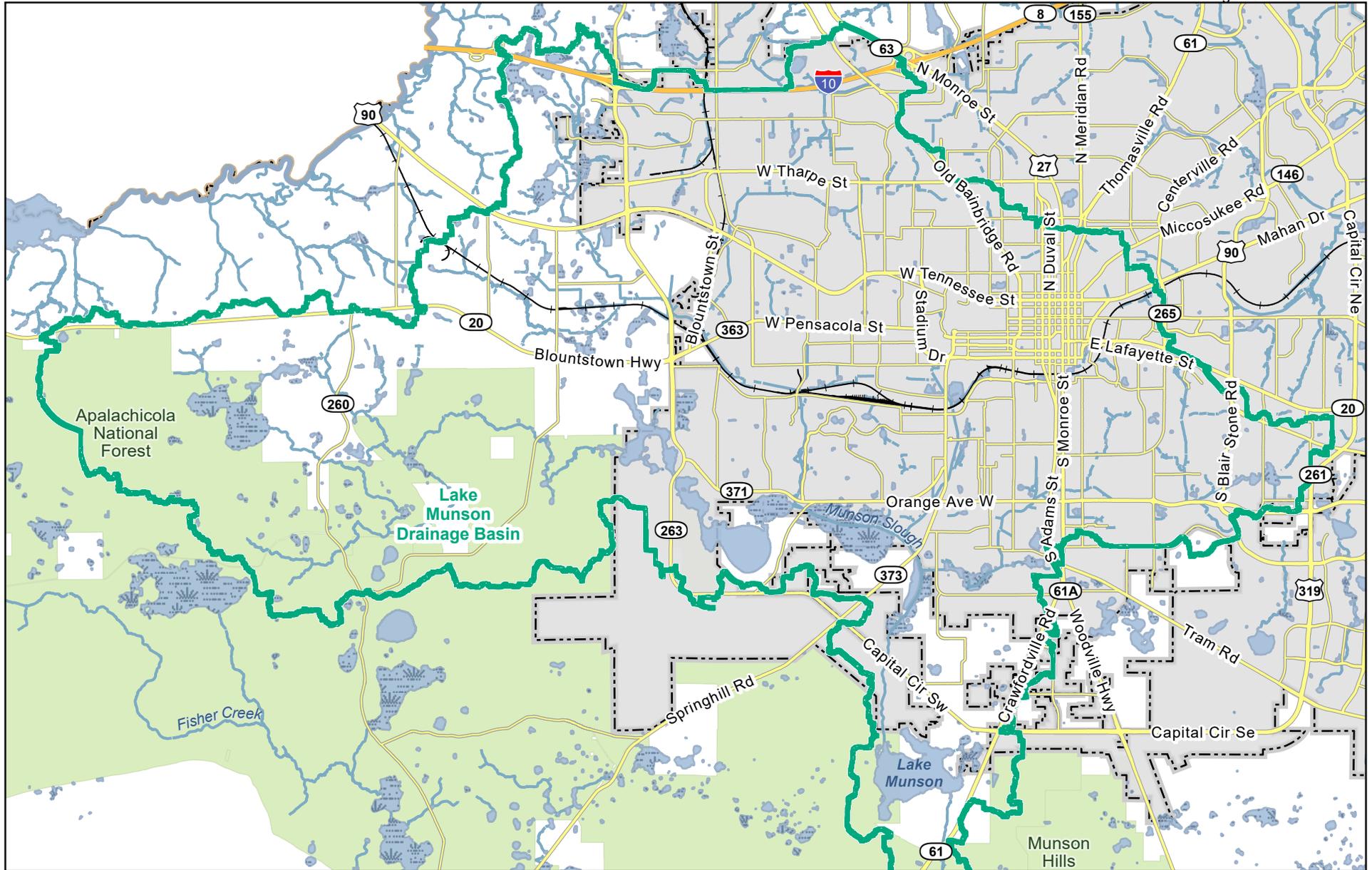
Recommendation:

Options #1 and #2

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Attachments:

1. Lake Munson Drainage Basin Map
2. Lake Munson Map
3. Projects List and map
4. Graphs of Nitrogen and Phosphorous concentrations
5. Ongoing and planned infrastructure projects within the Lake Munson Basin
6. FDOH and FDEP educational material



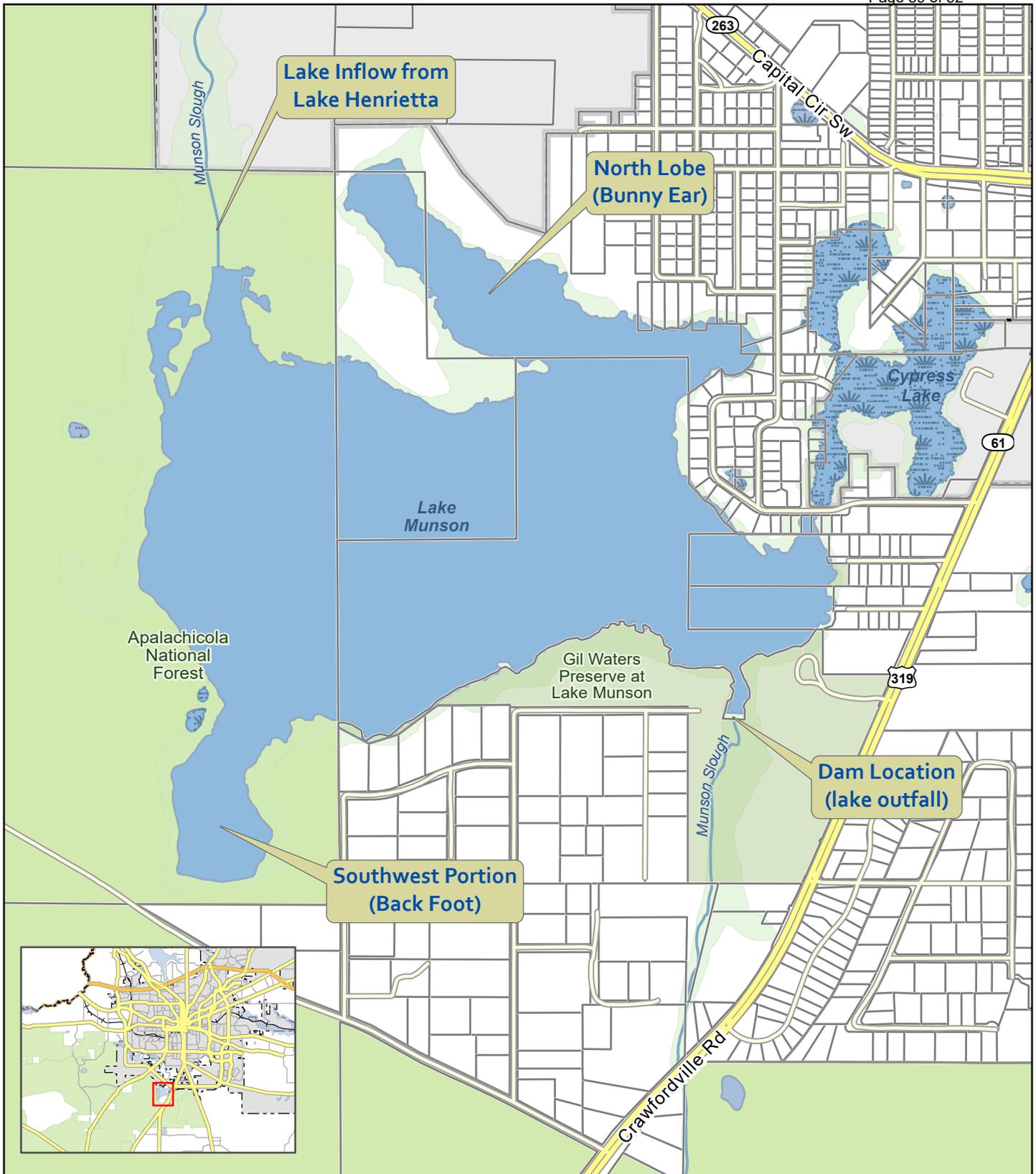
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- Lake Munson Basin
- Wetland
- Lake
- Tallahassee City Limit



Lake Munson Drainage Basin

Date Drawn: 9/20/2022



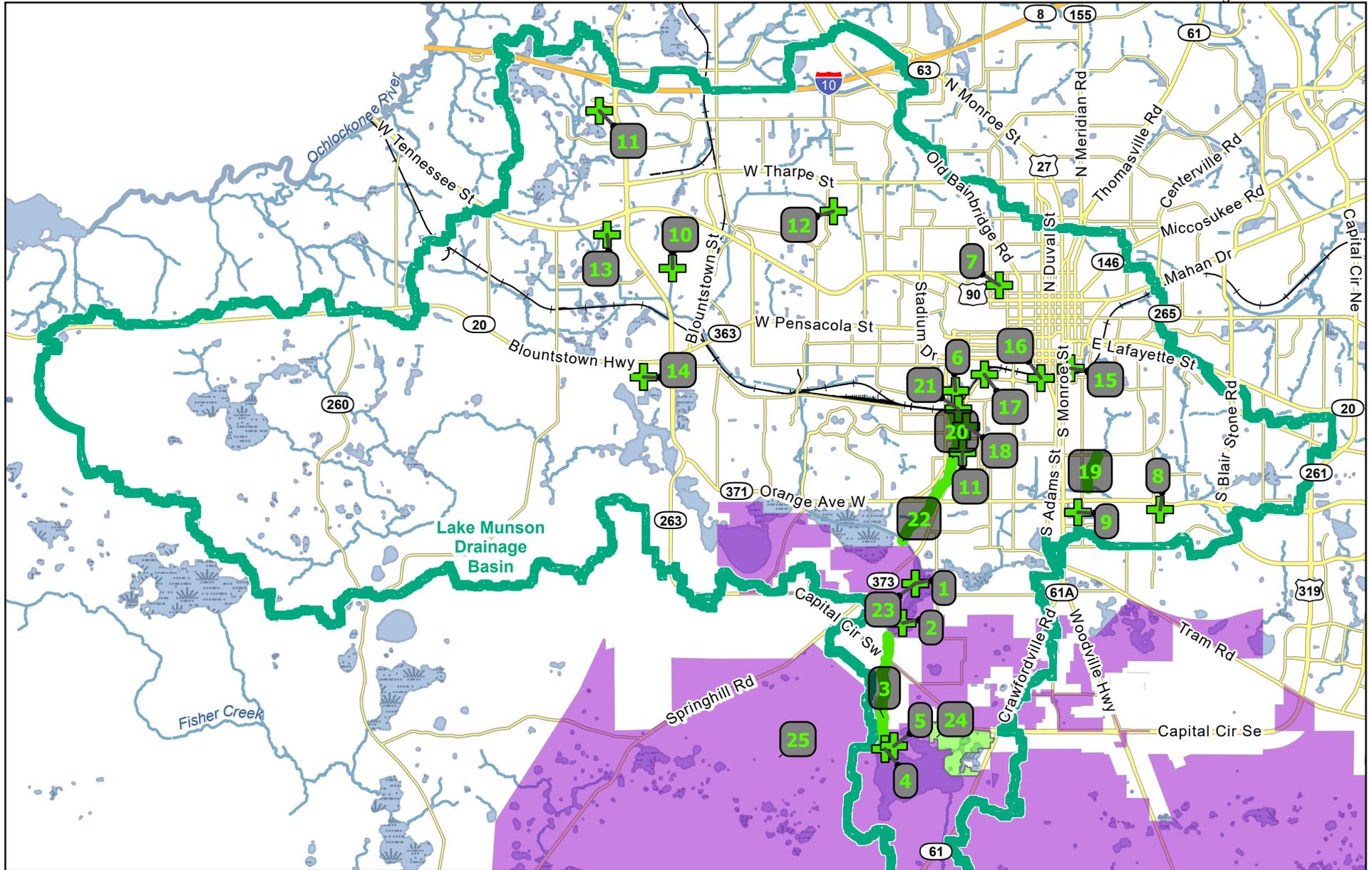
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Lake Munson

Date Drawn: 9/19/2022

Past Projects in Lake Munson Drainage Basin		
Map Number	Project Name	Agency
1	Lake Henrietta Restoration	Leon County
2	Lake Henrietta Wetlands Restoration	Leon County
3	Munson Slough Restoration	Leon County
4	Lake Munson Delta Sediment Removal	Leon County
5	Lake Munson Wetlands Restoation	Leon County
6	Lake Elberta	Tallahassee
7	Carter-Howell-Strong Park	Tallahassee
8	Jim Lee Road Facility	Tallahassee
9	Orange Avenue Facility	Leon County
10	Gum Creek Watershed Management Program	Leon County
11	Hopkins Crossing Wetland Preservation	Leon County
11	Bond Stormwater Facility	Blueprint
12	San Luis Park	Tallahassee
13	Martha Wellman Facility	Leon County
14	Broadmoor Stormwater Facility	Blueprint
15	Cascades Park	Blueprint
16	Lake Anita	Blueprint
17	Coal Chute Stormwater Facility	Blueprint
18	Tallahassee Junction Facility	Blueprint
19	Country Club Creek Drainage Improvements	Tallahassee
20	Lower CDD Erosion Control	Tallahassee
Ongoing and Future Projects in Lake Munson Drainage Basin		
Map Number	Project Name	Agency
21	3D-B Regional Stormwater Facility	Blueprint
22	Capital Cascades Segment 4	Blueprint
23	Lake Henrietta Sediment Removal	Leon County
24	NE Lake Munson Sewer	Leon County
25	Advanced Septic Incentive Program	Leon County



This product has been compiled from the most accurate source data from Leon County, the City of Tallahassee, and the Leon County Property Appraiser's Office. However, this product is for reference purposes only and is not to be construed as a legal document or survey instrument. Any reliance on the information contained herein is at the user's own risk. Leon County, the City of Tallahassee, and the Leon County Property Appraiser's Office assume no responsibility for any use of the information contained herein or any loss resulting therefrom.

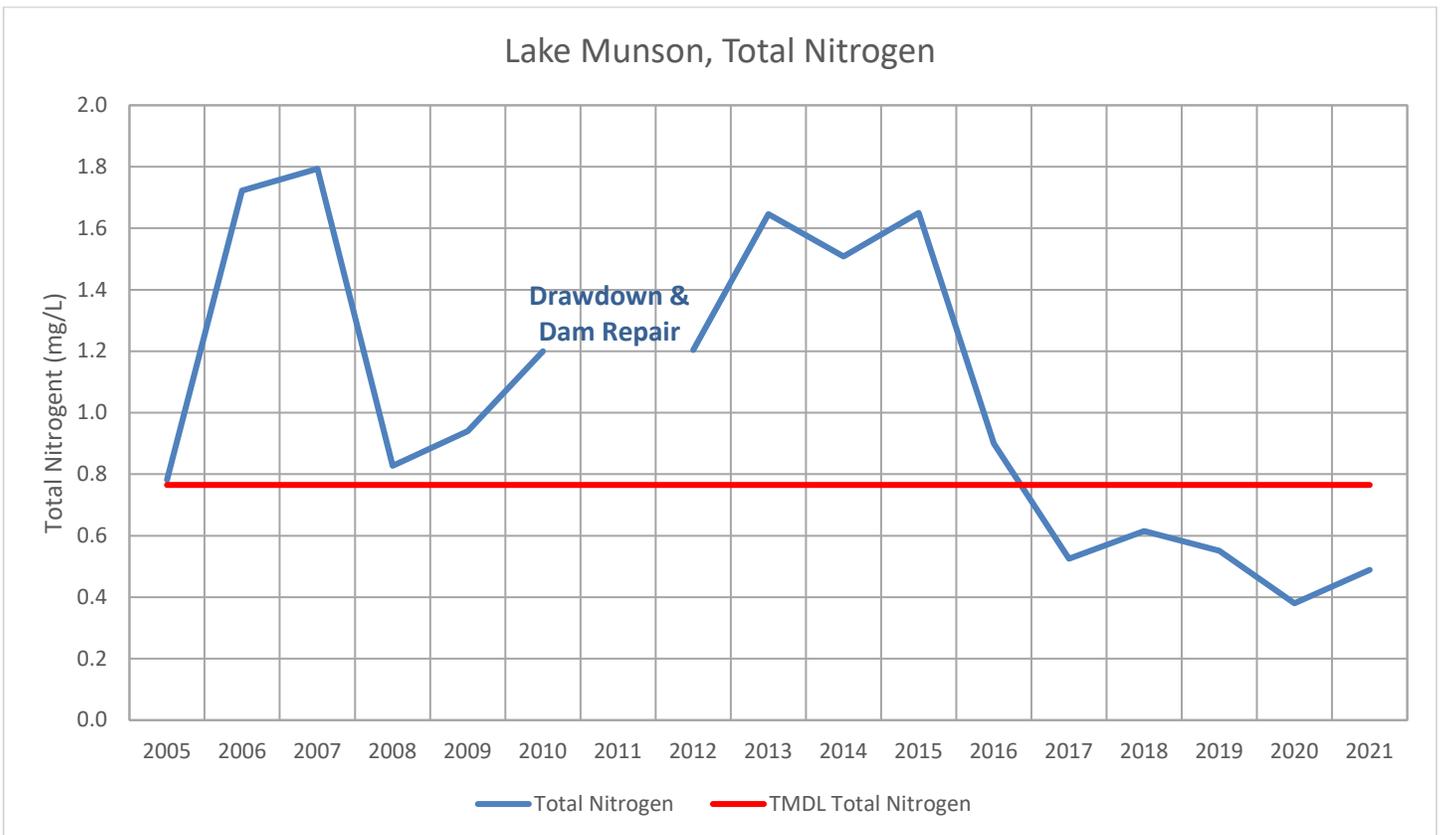
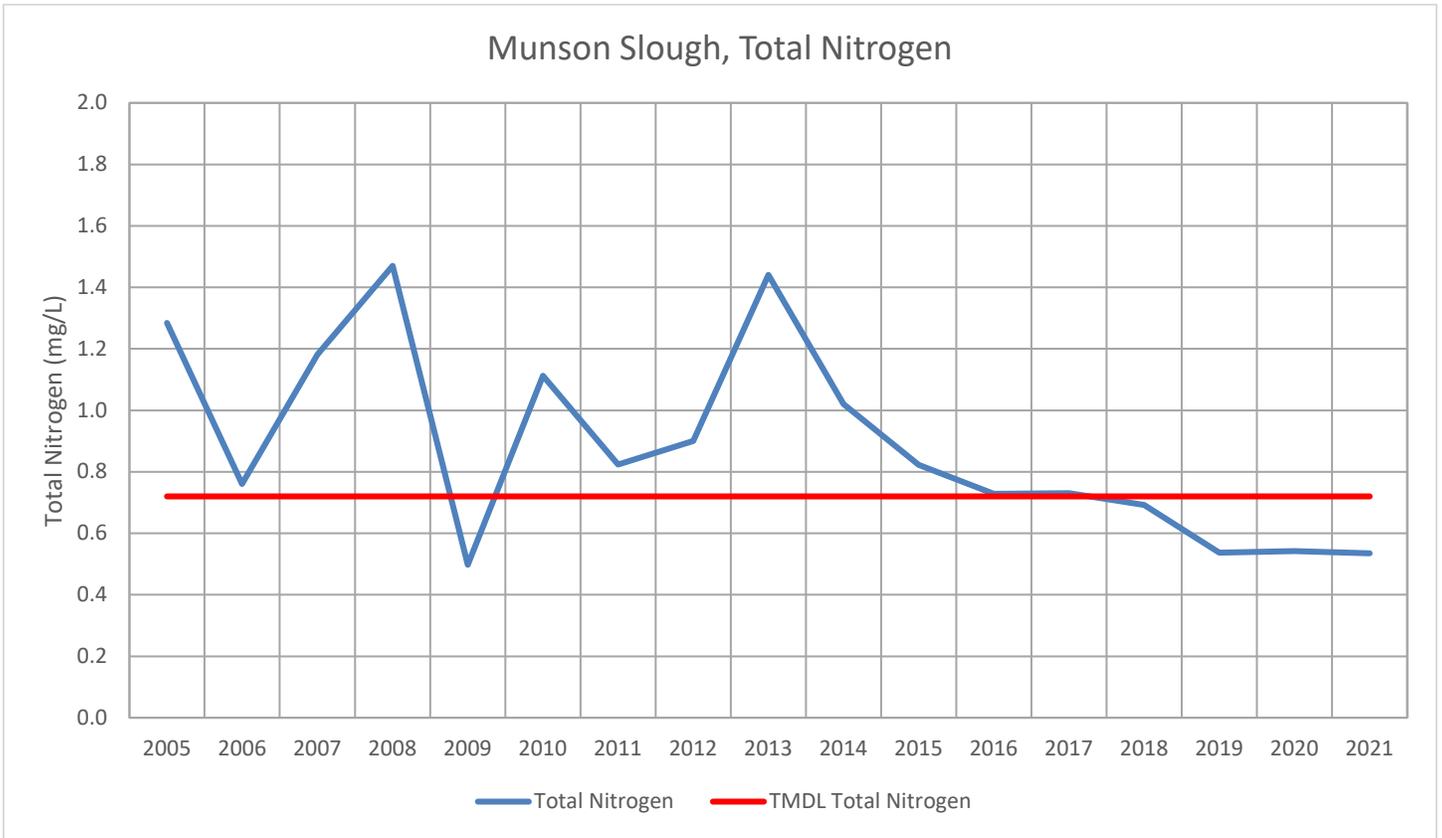
- NE Lake Munson Sewer Project (24)
- Septic Upgrade Projects (25)
- Munson Projects (Line)



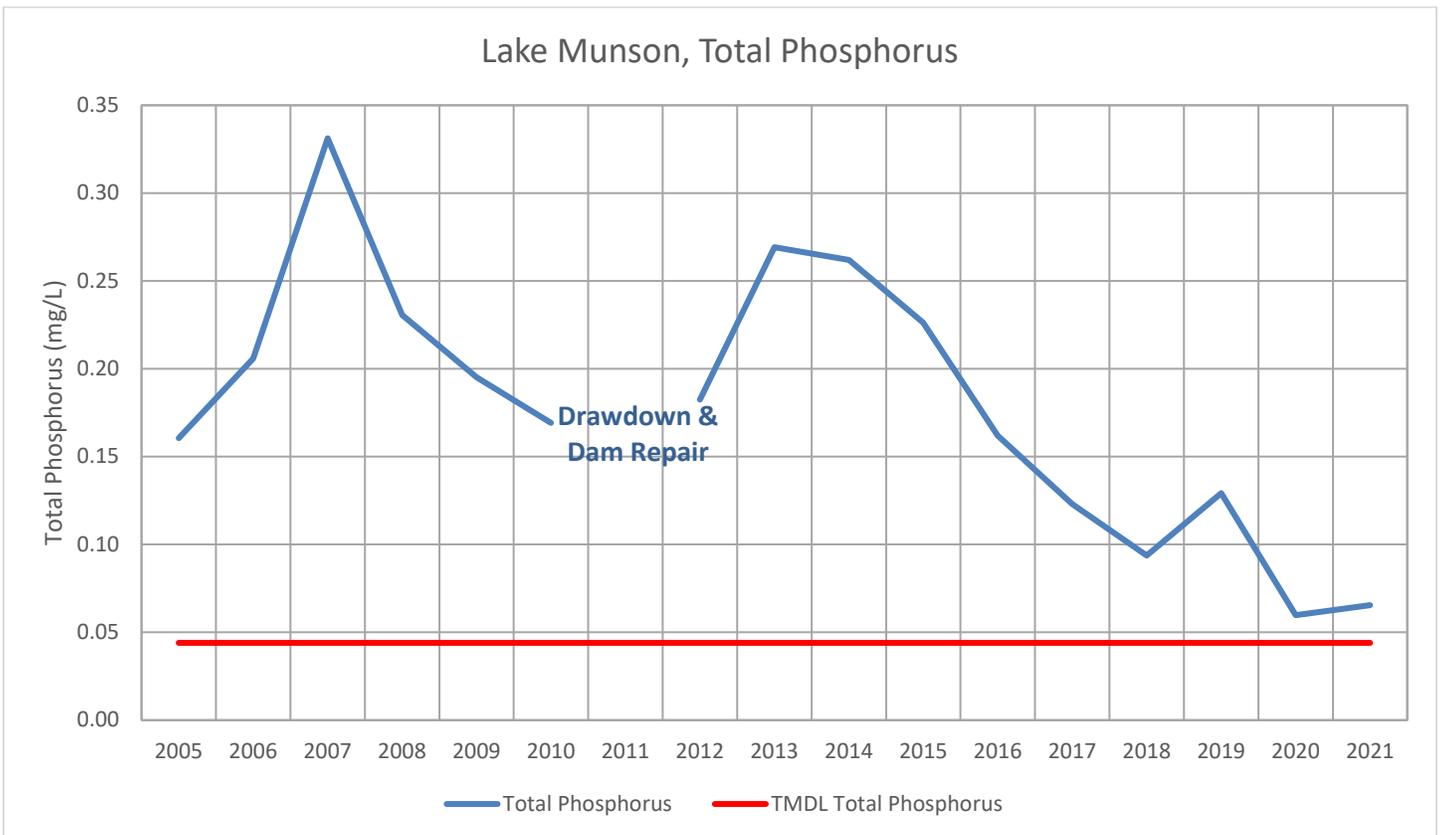
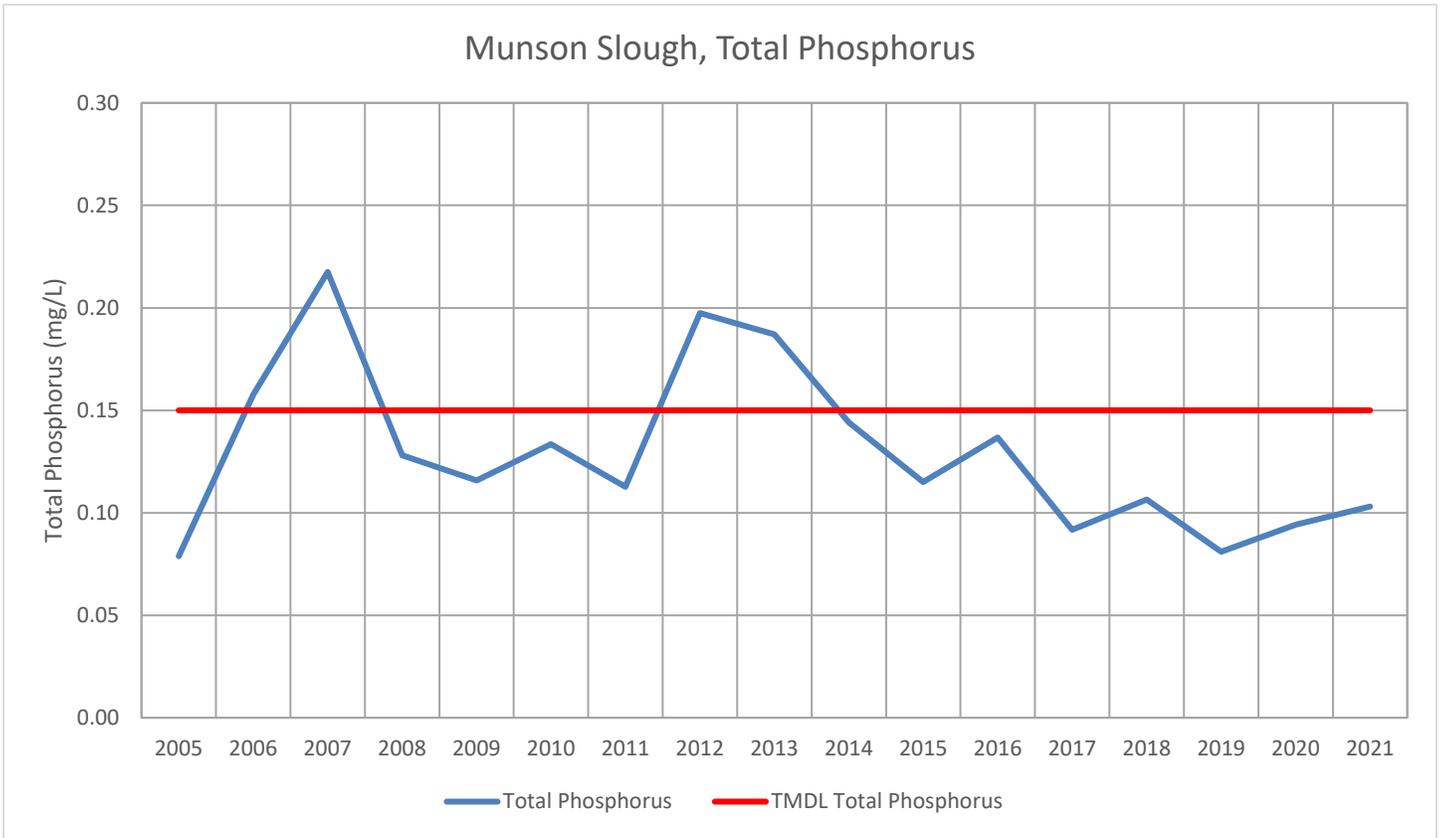
Lake Munson Drainage Basin Past, Ongoing, and Future Projects

Date Drawn: 10/5/2022

Annual Average Nitrogen Concentrations



Annual Average Phosphorus Concentrations



ONGOING AND PLANNED LEON COUNTY INFRASTRUCTURE PROJECTS



ADVANCED SEPTIC PILOT PROJECT

- \$1.5 million FDEP grant
- Design and construction
- Wakulla Springs PFA
- Upgrade existing septic systems to INRB systems
- 49 sites complete – Anticipate 35 more



LOWER CENTRAL DRAINAGE DITCH EROSION CONTROL

- Over \$9.1 million
- Springhill Road upstream to the FAMU Way extension
- Armors channel banks and protects adjacent properties from erosion
- Eliminates ditch erosion
- Reduces phosphorus in Lake Munson
- Completed Spring 2020



COMPREHENSIVE WASTEWATER TREATMENT FACILITIES PLAN

- \$500,000 FDEP grant
- Study on best type of advanced nitrogen-reducing treatment
- County-wide
- Identifies target areas for future projects
- Provides treatment recommendations on a parcel by parcel basis



SOUTH CITY/COUNTRY CLUB DRAINAGE IMPROVEMENTS

- Country Club Creek upstream of the East Drainage Ditch
- Improve conveyance and reduce sediment
- Decreased flooding
- Completed in Spring 2020
- Over \$2.5 million

SEPTIC UPGRADE INCENTIVE PROGRAM

- \$1.11 million FDEP grant
- Design and construction
- Wakulla Spring PFA
- Upgrade existing septic systems to advanced nitrogen removing technology
- Nearly 150 sites

NE LAKE MUNSON SEPTIC TO SEWER

- \$12.1 million (\$4.6 FDEP grant / \$7.5 local match)
- Design and construction
- Central sewer in neighborhoods adjacent to Lake Munson
- 220 properties
- Construction to start this Fall

LAKE HENRIETTA SEDIMENT REMOVAL

- \$2 million (\$1.6 million Federal grant / \$400,000 local match)
- Design and construction
- Remove approximately 20,000 cubic yards of sediment
- Restore to original design
- Design to start this fall
- Construction anticipated in 2023

BLUEPRINT CAPITAL CASCADES SEGMENT 4

- Includes water quality and stormwater improvements
- Currently in design
- Construction anticipated in Spring 20224
- Estimated \$20 million total project cost

BLUEPRINT 3D-B REGIONAL STORMWATER MANAGEMENT FACILITY

- Regional stormwater management facility
- Water quality treatment
- Trash capture
- Estimated completion end of 2022

FDEP INNOVATIVE TECHNOLOGIES GRANT (If Awarded)

- \$186,000 FDEP grant
- Design, implementation, after-action report
- Pilot project to test capability of BioChar at removing dissolved nitrogen
- Anticipate grant agreement spring 2023
- Implementation anticipated summer 2023

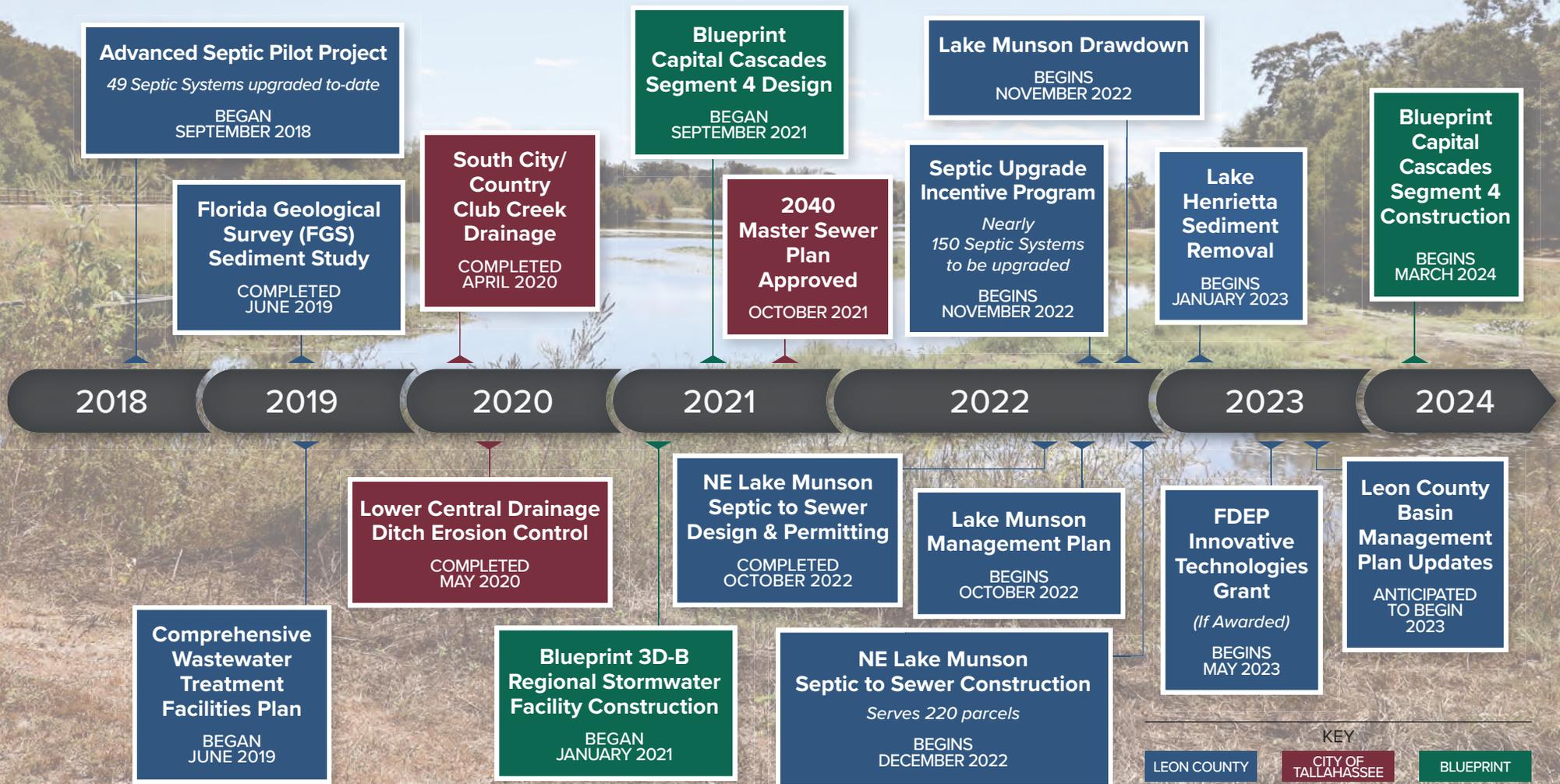
KEY

LEON COUNTY

CITY OF TALLAHASSEE

BLUEPRINT

LAKE MUNSON BASIN PROJECTS 2018-2024



Keep Your Pet Safe From Harmful Algal Blooms in Florida

What are algal blooms?

Algal blooms occur when algae, which are usually found in water, multiply very quickly. In Florida, algal blooms can be found in our fresh water, salt water and brackish water bodies. Algal blooms are temporary and can occur at any time but tend to occur most commonly in Florida in late summer and early fall.

An algal bloom may have the following features:

- Discoloration of the water such as green, blue, brown or red
- Look like foam, scum, mats or paint on the surface of the water
- Smell bad
- Have dead fish in or around the water

What are harmful algal blooms?

Harmful algal blooms occur when there is rapid growth of certain types of algae which can cause harm to people, animals or the local environment. The harmful algal blooms of most concern to human and animal health are those that produce toxins. It is not possible to tell if there are toxins associated with the bloom just by looking at it.

In fresh water such as lakes and rivers, the most common harmful algal blooms are caused by cyanobacteria, sometimes called blue-green algae. In salt water, an example of a harmful algal bloom is red tide that may be found in the Gulf of Mexico.

Why are harmful algal blooms important to my pet's health?

Toxins can be produced by harmful algal blooms which can cause serious illness and death in animals. Illness and death in Florida dogs have been linked to exposure to harmful algal blooms.

How can my pet get sick from harmful algal blooms?

Dogs can be exposed by swimming in or drinking water that contains harmful algal bloom toxins. Some dogs may also be attracted to the smell and taste of algae. They may eat scum, foam or dead fish in or around the water that contains toxins. In addition, dogs may also lick algae off their fur after swimming.

What symptoms might my pet have?

Symptoms in dogs normally occur within a few minutes to days of exposure to toxins from harmful algal blooms. Symptoms in dogs can include:

- Lack of energy
- Not eating
- Vomiting
- Diarrhea
- Yellow eyes or gums
- Bruising
- Dark urine
- Weakness, stumbling
- Tremors, seizures
- Difficulty breathing
- Excessive drooling

What should I do if I suspect my pet has been exposed to harmful algal blooms?

If your dog swam in an algal bloom, wash your dog off with clean water immediately. If your dog drank any water with an algal bloom or has eaten any material near the algal bloom, please call a veterinarian immediately, especially if they are showing any signs of illness. You may also call the ASPCA Animal Poison Control Center at 1-888-426-4435 or the Pet Poison Helpline at 1-855-764-7661 if you have questions about your pet (there is a fee for these calls).

How should I prevent my pet from getting sick from harmful algal blooms?

If you see signs of an algal bloom as described above:

- Keep your dog on a leash and away from the water.
- Do not let your dog wade or swim in the water.
- Do not let your dog drink the water or eat any material (e.g. dead fish, scum) nearby.
- Do not let your dog lick their fur until they have been bathed if they have been in contact with an algal bloom.

If there is health signage present, follow the signs to keep your dog safe.

Remember, you cannot tell if a bloom is toxic just by looking at it. If in doubt, keep out!

Learn more about harmful algal blooms at [FloridaHealth.gov/environmental-health/aquatic-toxins](https://www.floridahealth.gov/environmental-health/aquatic-toxins)



UNDERSTANDING BLUE-GREEN ALGAE

WHAT ARE BLUE-GREEN ALGAE?

Blue-green algae are a type of bacteria that occur frequently in Florida's freshwater environments.



Blue-green algae, like plants, use light energy from the sun and nutrients acquired from the environment to help them grow.



A bloom occurs when rapid growth of algae leads to an accumulation of individual cells that discolor water and often produce floating mats that emit unpleasant odors. Blooms may negatively impact fish and other aquatic animals.



Some environmental factors that contribute to blue-green algae blooms are sunny days, warm water temperatures, still water conditions and a plentiful supply of nutrients.



Reducing the supply of nutrients, particularly nitrogen and phosphorus, can help decrease the intensity and duration of blue-green algal blooms.

ARE BLUE-GREEN ALGAE HARMFUL?

Many types of blue-green algae can produce toxins. Algal blooms can result in high toxin concentrations. Unfortunately, there are no visual signs that might indicate definitively when blue-green algae are producing toxins.



Ingestion of water with high concentrations of algal toxins can result in serious health effects.



Direct contact or breathing airborne droplets containing high levels of algal toxins can cause irritation of the skin, eyes, nose and throat.



In addition to health effects on people, blue-green algae blooms can cause health impacts in animals.



People and pets should not drink or swim in water where blue-green algae blooms are present. Children, the elderly, and those who are immunocompromised may be at risk even at low concentrations and should avoid any exposure.



DEP tests water samples regularly to determine the type of blue-green algae present. If the algae identified are known to produce toxins, additional testing is carried out to determine if toxins are present and how concentrated they are.



The presence and level of toxins produced by a bloom can vary. Therefore, recurring and persistent blooms are routinely monitored and retested.

WHERE CAN I REPORT A BLUE-GREEN ALGAL BLOOM?

Report algal blooms through:

ReportAlgalBloom.com
or 1-855-305-3903

PROTECTING  TOGETHER

ProtectingFloridaTogether.gov



FRESHWATER ALGAL BLOOMS FREQUENTLY ASKED QUESTIONS

What is blue-green algae?

Blue-green algae, or cyanobacteria, is a type of algae found naturally in freshwater environments. This algae is a microorganism that functions like a plant in that it feeds through photosynthesis and derives its energy from the sun.

Blue-green algae can be found all over the world, and occur in Florida's freshwater and brackish habitats, such as lakes, rivers and estuaries.

What causes an algal bloom?

Although blue-green algae are found naturally, increases in nutrients can exacerbate the extent, duration and intensity of blooms. Other factors that contribute to blooms include warm temperatures, reduced water flow, and lack of animals that eat algae. Although they can occur at any time, blue-green algae are most common in Florida during the summer and early fall, with high temperatures and abundant sunlight. The summer also brings storms that have the potential to deliver nutrients into waterways through stormwater runoff.

Are all types of blue-green algae harmful?

Some – not all – blue-green algae can produce toxins that can contribute to environmental problems and affect public health. Little is known about exactly what environmental conditions trigger toxin production. Over time, these toxins are diluted and eventually break down and disappear.

Non-toxic blooms can also harm the environment by depleting oxygen levels in the water column and reducing the amount of light that reaches submerged plants.

Are algal blooms predictable?

The nature of most freshwater algal bloom events makes it difficult to predict where and when a bloom will occur or how long it will last. However, lessening the negative effects of algal blooms is possible through restoration work to improve water quality by reducing nutrients. Reducing nitrogen and phosphorous levels can help decrease the intensity and duration of algal blooms.

Can you identify algal type or if it is producing toxins by looking at it?

No, this is why the Florida Department of Environmental Protection (DEP) coordinates with the water management districts and the Florida Fish and Wildlife Conservation Commission to routinely sample observed and reported algal blooms and test for algal identification and toxicity.

What are the health risks associated with algal blooms?

The Florida Department of Health (DOH) takes the lead in determining if a harmful algal bloom presents a risk to human health. DOH issues health advisories for recreational waters where there is a risk of the public coming into contact with an existing algal bloom as it deems appropriate.

The World Health Organization considers toxin levels under 10 micrograms/liter to represent a low-level risk for adverse health outcomes from short-term recreational exposure; however, certain sensitive populations (e.g., children, the elderly and immunocompromised populations) may still be at risk even at low concentrations and should avoid any exposure.

continued

What should I do if I see an algal bloom in a freshwater system?

The state's bloom response team encourages everyone to be on the lookout for blooms and report them.

Residents statewide can now easily report algal blooms to the department 24 hours a day, 7 days a week. Information can be reported online through at www.reportalgalbloom.com, as well as through a new toll-free number at 1-855-305-3903.

To report fish that are either dead or in poor physical condition, residents should contact the Fish Kill Hotline 1-800-636-0511.

People experiencing symptoms or illnesses should contact the Florida Poison Control Center at 1-800-222-1222.

What happens when an algal bloom is reported?

The department collects detailed information such as location, description and size of the bloom. The reports are then evaluated and prioritized for inclusion in near-term sampling plans based on severity of the bloom and potential for human exposure.

How can I stay updated on algal blooms in my area?

To ensure the health and safety of our state's residents and visitors, DEP is committed to keeping Floridians updated on current algal blooms and how the state is responding to protect human health, water quality and the environment.

DEP is placing sampling results, monitoring and testing information and latest actions by DEP, the water management districts and other local, state and federal response team partners on our [website](#).

Where are algal bloom samples tested?

Most algal bloom samples are processed in DEP's nationally recognized lab in Tallahassee.

What does DEP's lab test for?

Algal samples are tested to identify the type of algae present. If the algae is a type that is capable of producing toxins, it is then tested to determine if it is producing toxin and if so, at what level. The toxins typically tested for include microcystin, cylindrospermospin and anatoxin-a.

How long does it take to test samples?

All samples will still be shipped to DEP's laboratory in Tallahassee for formal algal identification and toxin analysis, which can take approximately three to five days.

Who collects samples?

DEP and Florida's water management districts collect samples when algal blooms are observed during their routine water quality monitoring as well as when blooms are reported. FWC samples nearshore marine waters.

How often are samples collected?

DEP and Florida's water management districts frequently monitor Florida's water quality, and routinely collect algal bloom samples as soon as they are observed as part of this effort. In addition, staff can be deployed to take additional samples in response to reported blooms – whether from a citizen, other response team agencies or other sources.

If a specific site or bloom is tested, is there a need for retesting?

Yes, because whether a bloom is producing toxins and the levels of toxins produced can vary, recurring and persistent blooms are routinely monitored and retested.

Who should I contact about beach closures?

For the most up-to-date information regarding public beach closures, residents and visitors are encouraged to contact the counties directly as they have information on the latest actions.

- » Martin County: 772-320-3112
- » St. Lucie County: 772-229-2850
- » Palm Beach County
 - North Palm Beach County (Juno Beach and north): 561-624-0065
 - South Palm Beach County (Riviera Beach and south): 561-629-8775
- » Visit www.floridastateparks.org for state park beach closure alerts

PROTECTING TOGETHER

JOIN US IN PROTECTING AND RESTORING FLORIDA'S WATERS

BE MINDFUL OF BLUE-GREEN ALGAE

Blue-green algae can produce toxins, which can be harmful to humans and pets.



Blooms are often green in color.



Blooms may appear on the surface of the water as scum or a floating mat.



Blooms may produce unpleasant odors.

CHECK RECENT BLOOM ACTIVITY



ProtectingFloridaTogether.gov/StayInformed

- Sign up for alerts.
- Find volunteer opportunities.
- Learn what the state is doing to protect and restore our waters.

IF YOU SEE A BLUE-GREEN ALGAL BLOOM

People and pets should stay out of the water.



Do not swim, wade or walk in the water.



Do not let pets swim or go near the water.



Rinse fish with tap water. Throw out guts.



Do not use water from this site for drinking or cooking.



Do not eat shellfish.

Report blooms at ReportAlgalBloom.com or 1-855-305-3903



CAPITAL CASCADES TRAIL SEGMENT 4

Innovative Stormwater Technologies

A White Paper on Stormwater Management System Design Practice in Florida

BLUEPRINT  
INTERGOVERNMENTAL AGENCY

INNOVATIVE STORMWATER TECHNOLOGIES
A WHITE PAPER ON
STORMWATER MANAGEMENT SYSTEM DESIGN PRACTICE IN FLORIDA

Prepared for:



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November 2022

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PREFACE

Blueprint Intergovernmental Agency is committed to creating holistic infrastructure solutions to improve the local community. Since the IA Board's approval of the Capital Cascades Master Plan in 2005, Blueprint has completed a substantial number of stormwater improvements along the Cascades Trail corridor improving both water quality and reducing area flooding. In all, these stormwater improvements represent a total investment of more than \$57,000,000 and stretch approximately 2.5 miles. The improvements along Cascades Trail have won numerous awards and received accolades from many professional organizations. Cascades Park has won two national awards, one in 2015 from the American Public Works Association, and the second in 2016 from the American Planning Association. Franklin Boulevard, Cascades Park, the Cascades Connector pedestrian bridge, and Segment 3 have won many awards over the last 10 years from local and state sections from organizations such as the Urban Land Institute, Florida Landmarks Council and the National Association for the Preservation of African-American History and Culture, American Public Works Association, American Planning Association, and the American Institute of Architects. Continuing on this success, Capital Cascades Trail Segment 4 will complete the Master Plan by finishing the 4.25-mile trail system that stretches from Leon High to Lake Henrietta, providing amenities, water quality enhancements, and flood mitigation. With the completion of Segment 4, the Capital Cascades Trail will represent a final investment of over \$71,000,000 extending recreational amenities and stormwater enhancement from downtown to south Tallahassee.

As part of the George and Associates project team for Capital Cascades Trail Segment 4, Jones Edmunds developed this White Paper on behalf of Blueprint to provide a common level of understanding of potential stormwater management system designs for the project by overviewing the practice of stormwater design in Florida. The overview of stormwater design practice in Florida is followed by a summary of known stormwater characteristics for the Capital Cascades Trail Segment 4 project watershed and a discussion of potential stormwater improvements that are most relevant to the project based on the established characteristics.

The paper also contains a summary of the water quality sampling data in the Central Drainage Ditch near the convergence to Munson Slough. The data shows a decreasing trend in nutrient concentrations suggesting that although relatively limited on-site stormwater treatment is provided within the project watershed, the stormwater retrofit projects implemented upstream by the City and Blueprint are effective at reducing the ambient nutrient load within the CDD. Moreover, the most immediate downstream waterbody, Munson Slough, is no longer considered impaired for nutrients based on the Florida Department of Environmental Protection (FDEP) 2020-2022 Biennial Assessment of Impaired Waters. Munson Slough includes the area between the Segment 4 project and Lake Munson.

Readers may not be aware of all the traditional stormwater designs discussed in this White Paper, meaning definitions of innovative will likely vary by individual experience. As presented here, we define traditional stormwater designs as those that have most commonly been implemented throughout Florida and are considered standard stormwater design practice.

The practice of stormwater design is evolving such that low-impact design (LID), green stormwater infrastructure (GSI), and other innovative stormwater technologies are becoming more commonplace. But we recognize that while LID, GSI, and some innovative technologies continue to gain in popularity, they are often still collectively considered to be innovative by most readers.

The breadth of potential material to be covered in this White Paper is immense. For simplicity, this White Paper presents a comprehensive, but not exhaustive, overview of the current state of stormwater design in Florida including engineering stormwater design criteria, traditional designs, LID, GSI, and innovative stormwater technologies. Any one of these overviews could be expanded to include more detail than presented here.

Specific to the Capital Cascades Trail Segment 4 project, further study of the project's stormwater characteristics is planned, including the development of a new stormwater model to aid in preliminary engineering of the project. This White Paper is not intended as a substitute for Capital Cascades Trail Segment 4 preliminary engineering, which needs to be completed before more definitive stormwater management system design recommendations are appropriate than presented here.

GLOSSARY

Stormwater Management System	The appurtenances, facilities, and designed features that collect, convey, channel, hold, treat, detain, or divert stormwater runoff. These systems may include traditional stormwater design components, LID techniques, GSI, and/or innovative stormwater technologies.
Land Development	A site improvement such as construction, reconstruction, demolition conversion, structural alteration, relocation, or enlargement of any structure, whether residential, commercial, industrial, office, professional, institutional, or recreational. This term is also generally used to include any use or extension of the use of land beyond its current state, including redevelopment. Stormwater management systems for land development are typically designed based on presumptive criteria.
Presumptive Criteria	Stormwater design criteria, which are presumed to meet regulatory goals and objectives based on prior studies and industry-accepted assumptions. A presumptive approach provides reasonable assurance that systems operate as expected without requiring monitoring or burdensome amounts of site-specific information.
Stormwater Retrofit	Stormwater management systems, or portions of a system that append an existing system and that do not serve land development but are focused on community improvement. These systems may include traditional stormwater design components, LID techniques, GSI, and/or innovative stormwater technologies. Stormwater retrofits may be focused on flood control, pollutant removal, or both.

	Stormwater retrofits are typically designed based on demonstrative criteria.
Demonstrative Criteria	Stormwater design criteria that are directly demonstrated to meet regulatory goals and objectives via detailed engineering calculations, monitoring, and/or performance testing.
Stormwater Attenuation	Stormwater attenuation is the capture and release of floodwaters, typically controlled via an engineered control structure, to protect downstream waters. Attenuation volume based on existing-condition discharge is required for stormwater designs to meet presumptive criteria.
Stormwater Treatment	Stormwater treatment is the removal of pollutants from stormwater runoff by physical, chemical, or biological means. Stormwater treatment is synonymous with water-quality improvement and is typically focused on nutrient and sediment removal. Treatment volume based on the proposed-condition rainfall-runoff-response is required for stormwater designs to meet presumptive criteria.
Control Structure	Control structures regulate discharge of stormwater runoff and are used to establish stormwater attenuation and treatment volumes.
Existing Condition	The drainage condition of the project site before activities related to land development have been constructed.
Proposed Condition	The drainage condition of the project site after activities and construction related to proposed land development have been completed.
Low-impact Design (LID)	A land development practice that strives to maintain green space, existing condition hydrology, and natural habitats to the greatest extent practical. LID stormwater management systems commonly include GSI in a treatment train but may also include traditional stormwater design components or innovative stormwater technologies.
Green Stormwater Infrastructure (GSI)	Stormwater design components intended to mimic nature by providing stormwater attenuation and treatment near the runoff source. GSI is commonly considered as an alternative to traditional stormwater design but is often coupled with traditional stormwater design and/or innovative stormwater technologies to meet design criteria.
Treatment Train	A series of complementary stormwater designs when combined meet or exceed stormwater treatment goals. A treatment train may include multiple traditional stormwater designs, GSIs, and/or innovative technologies.

1 BACKGROUND

Blueprint Intergovernmental Agency is a joint City of Tallahassee-Leon County agency within the Department of Planning, Land Management and Community Enhancement. Blueprint is committed to holistic infrastructure planning and community redevelopment. These efforts are highlighted by the Capital Cascades Trail (CCT) projects, which include multi-use stormwater and recreation facilities and a connected trail network. The CCT projects are divided into four segments and the final segment, Segment 4, is currently being developed. Goals for the Segment 4 project include flood protection, water-quality improvement, habitat restoration, and creation of park-like areas for public recreation.

Blueprint contracted George & Associates, Consulting Engineers, Inc. (GAC) to complete Task 1 of CCT Segment 4, which includes stormwater analysis and the development of preliminary design concepts. Jones Edmunds is part of the GAC project team for Task 1 and will be primarily responsible for stormwater analysis and the stormwater design portion of concept development.

Before developing stormwater design concepts for CCT Segment 4, Blueprint has requested this White Paper to overview to current state of stormwater design practice in Florida and discuss stormwater design components and innovative technologies that are applicable to the CCT Segment 4 project.

2 PURPOSE

This White Paper will provide readers with a common level of understanding of the current state of stormwater design practice in Florida, followed by a summary of stormwater characteristics for the Capital Cascades Trail Segment 4 project, and lastly a discussion of the most relevant potential stormwater improvements based on these characteristics.

The breadth of potential material to be covered in this White Paper is immense. For simplicity, this White Paper presents a comprehensive, but not exhaustive, overview of the current state of stormwater design in Florida including engineering stormwater design criteria, traditional designs, low-impact design (LID) and green stormwater infrastructure (GSI), and innovative stormwater technologies. Any one of these overviews could be expanded to include more detail than presented here. Instead, focus throughout is given to topics most applicable for



the CCT Segment 4 project, and was based on our judgment and understanding of the project goals at the time of this White Paper.

This White Paper is organized as follows:

- Section 3 provides the basics of stormwater design criteria in Florida.
- Section 4 overviews traditional stormwater design components and approaches.
- Section 5 overviews LID techniques and GSI.
- Section 6 overviews innovative stormwater technologies.
- Section 7 summarizes the CCT Segment 4 watershed characteristics to establish potential limitations of the project design.
- Section 8 discusses potential stormwater designs, technologies, and techniques that are most relevant to the CCT Segment 4 project.
- Section 9 concludes with the CCT Segment 4 key findings.

3 STORMWATER DESIGN CRITERIA

In general, a stormwater management system design should consider service life, cost, public safety, and ease of maintenance. Stormwater management systems must comply with local, state, and federal stormwater design (permit) criteria. For land development, including redevelopment, these permit criteria are often presumptive and due to their prescriptive nature, highly dependent on traditional stormwater designs for compliance. Importantly, improving the watershed is not a goal of presumptive criteria. Instead, presumptive criteria in Florida were established with two goals:

1. Minimizing flooding and subsequent damage to life and property by providing adequate flood control.
2. Reducing 85 percent or more of pollutant loading from land development.

Demonstrating compliance with presumptive criteria requires stormwater analysis of existing and proposed conditions but does not require direct calculation of project impacts at the community level, such as flood-risk reduction or pollutant-load reduction.

By comparison, stormwater management systems that do not serve land development and are designed to improve the community, also known as *stormwater retrofits*, are typically held to design criteria that demonstrate net improvement to the community, either through flood-risk reduction or pollutant-load reduction. This so-named demonstrative approach requires more complex analyses to demonstrate project impacts at the community level.

The CCT Segment 4 project's stormwater management system is expected to serve proposed project improvements and as a stormwater retrofit for the project watershed. The project's ability to provide a net improvement to the community will be dictated by watershed characteristics and site constraints, which include the land available for improvements and hydraulic conditions at the site. Simplistically, the watershed characteristics dictate what type of stormwater improvements are warranted while the site constraints dictate what level of stormwater improvement is practical. The combination of watershed characteristics and site

constraints places a practical limit on the net improvement to the community the CCT Segment 4 project can be reasonably expected to achieve.

The CCT Segment 4 project's stormwater management system will be regulated at the state level by the Northwest Florida Water Management District (NFWFMD) through the Environmental Resource Permitting Rules in the Florida Administrative Code, Chapter 62-330, and at the local level by City Growth Management through the City's Land Development Code. The project's stormwater management system will be regulated at the federal level by the United States Army Corps of Engineers (USACE) and Federal Emergency Management Agency (FEMA) per the Federal Register.

4 TRADITIONAL STORMWATER DESIGNS

Traditional stormwater designs that use wet detention or infiltration for stormwater treatment have well-established presumptive criteria in Florida. Although wet detention is almost always associated with a wet-detention pond, several varieties of infiltration-based designs exist. The appropriateness of these two practices to a site are usually dictated by soils and depth to the groundwater table. Presumptive design criteria typically include:

1. Limiting discharge of attenuation volumes to the existing condition peak discharge or less from infrequent, large storms.
2. Providing treatment volumes based on the proposed condition rainfall-runoff-response from more frequent, smaller storms.
3. Requiring discharge of these volumes within prescribed recovery times.

A few traditional stormwater designs exist that are not as commonly used to support land development but that do have established presumptive design criteria. Two notable examples are constructed wetlands and stormwater harvesting. These stormwater designs can be designed to serve only stormwater treatment goals, not stormwater attenuation, and operate as variations on wet-detention or infiltration-based designs.

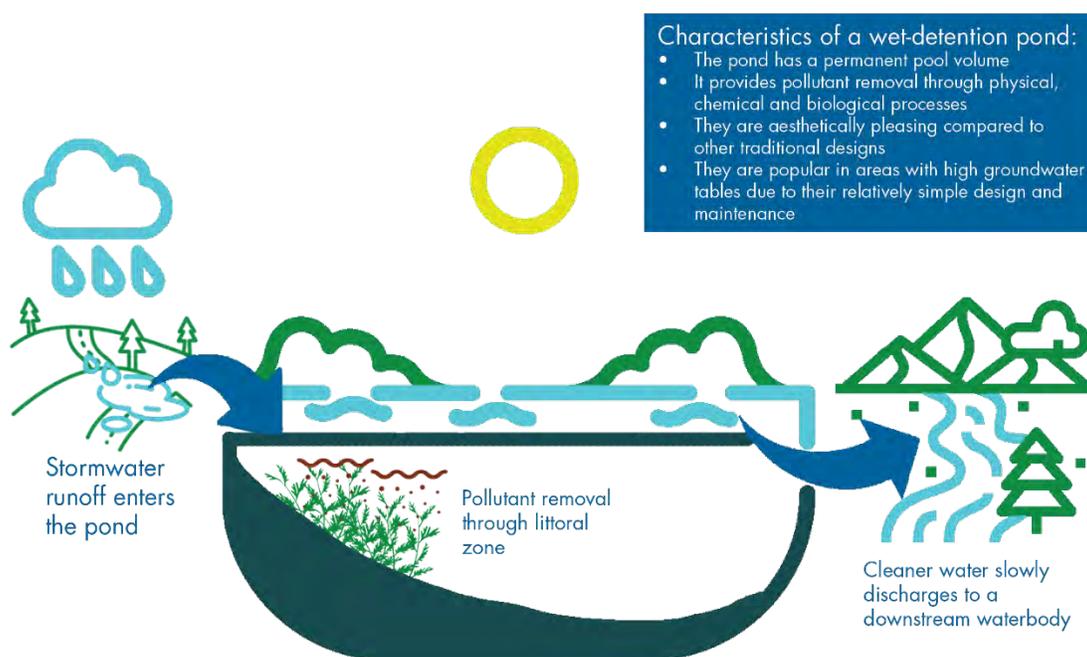
Several more traditional stormwater designs exist that are not typically used to support land development because they do not have associated presumptive criteria and do not provide stormwater attenuation. These designs include but are not limited to sediment traps, trash traps, chemical treatment, and erosion control. These stormwater designs are used to only provide stormwater treatment.

While the most common application of traditional stormwater design components is a single component serving a single site, other stormwater design approaches worthy of mention are over design, off-site design, and combination designs. These stormwater design approaches rely on one or more of the previously mentioned traditional stormwater designs to meet project goals. Overviews of the most relevant traditional stormwater designs are provided in this Section.

4.1 WET DETENTION

Wet-detention designs are typically a man-made pond that receives stormwater runoff from a storm-drain or swaled system and slowly discharges the captured runoff through a control structure to a downstream waterbody as shown in Figure 1. The pond volumes and control structure discharge rates are engineered to meet presumptive design criteria. The *wet* portion of the pond is also known as the permanent pool volume.

Figure 1 Wet Detention Pond Example



Wet-detention ponds often incorporate a littoral zone to further facilitate pollutant removal. The littoral zone is a portion of the pond that is designed to be shallow and contain rooted aquatic plants. The aquatic plants promote nutrient removal primarily by providing a habitat for microorganism activity and provide limited direct nutrient uptake. However, several studies have shown most pollutant removal from wet-detention ponds occurs within the permanent pool volume and that pollutant-removal potential is well correlated to the hydraulic residence time of this volume. Simply stated, the bigger the wet-detention pond the higher potential pollutant removal.

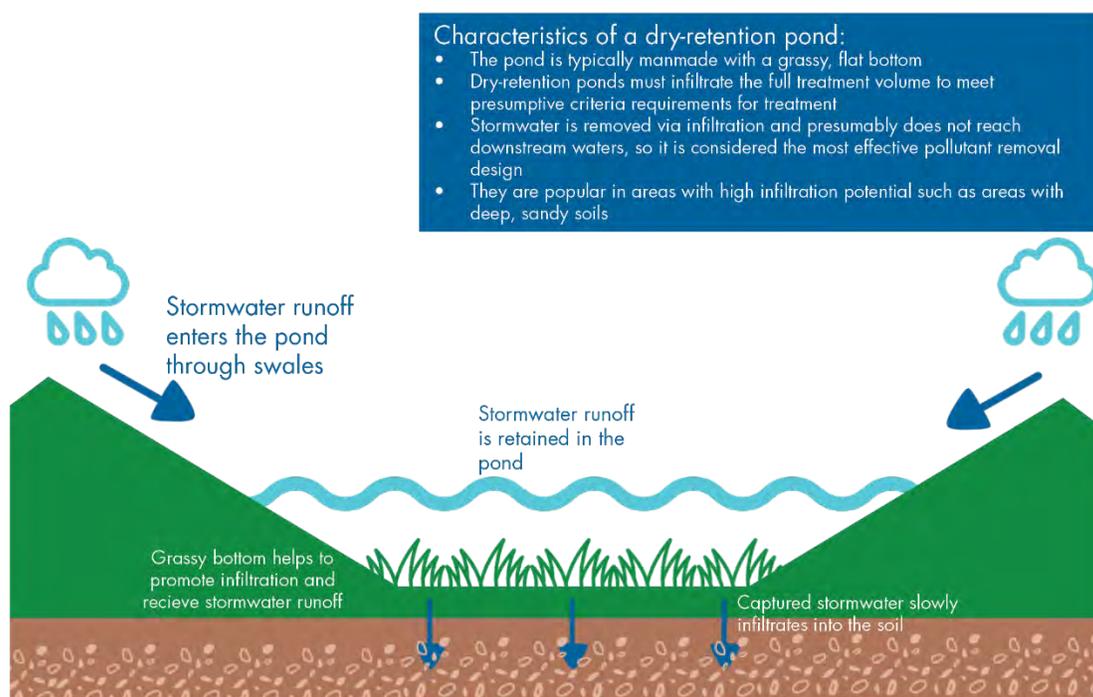
4.2 RETENTION

The most common infiltration-based design is a dry-retention pond. These ponds are typically manmade with a grassy flat bottom to promote infiltration as shown in Figure 2 and receive stormwater runoff from a storm drain or swaled system. Dry-retention ponds typically

infiltrate the full volume of runoff received from smaller storm events and slowly release the attenuation volume through an engineered control structure to meet presumptive criteria requirements for attenuation for larger storm events.

Since volumes discharged via infiltration and their associated pollutant load presumably do not reach downstream waters, retention is traditionally considered the most effective pollutant-removal design. These designs are popular in areas with high infiltration potential such as areas with deep, sandy soils. However, these designs must consider potential localized impervious layers or high groundwater tables that would limit the infiltration potential.

Figure 2 Dry Retention Pond Example



4.3 EXFILTRATION

An exfiltration system is another infiltration-based design and performs similarly to a dry-retention pond, except that the system is entirely subsurface. Exfiltration systems include perforated drainage pipes that are surrounded underground by porous aggregate or media to promote infiltration. The main advantage of exfiltration systems is that they are completely subsurface, which makes these systems popular in areas that are very space limited. Exfiltration systems may be designed to infiltrate the full storm volume or discharge the attenuation volume to downstream waters. However, periodic replacement of the aggregate is required due to sediment accumulation within the system to maintain infiltration rates and can often be expensive compared to maintenance of other traditional stormwater designs.

4.4 SWALES AND VEGETATED STRIPS

Swales and vegetated strips are two more infiltration-based designs. These designs slowly convey stormwater runoff through a small channel (swale) or via sheet flow (vegetated strip) over grassy areas with high-infiltration potential. For these designs, the attenuation volume is typically discharged overland or through a storm pipe at the system's outfall to downstream waters. The treatment volume is discharged via infiltration. These designs are popular when only a small amount of runoff needs to be managed or as pre-treatment components within a stormwater treatment train.

4.5 DETENTION WITH FILTRATION

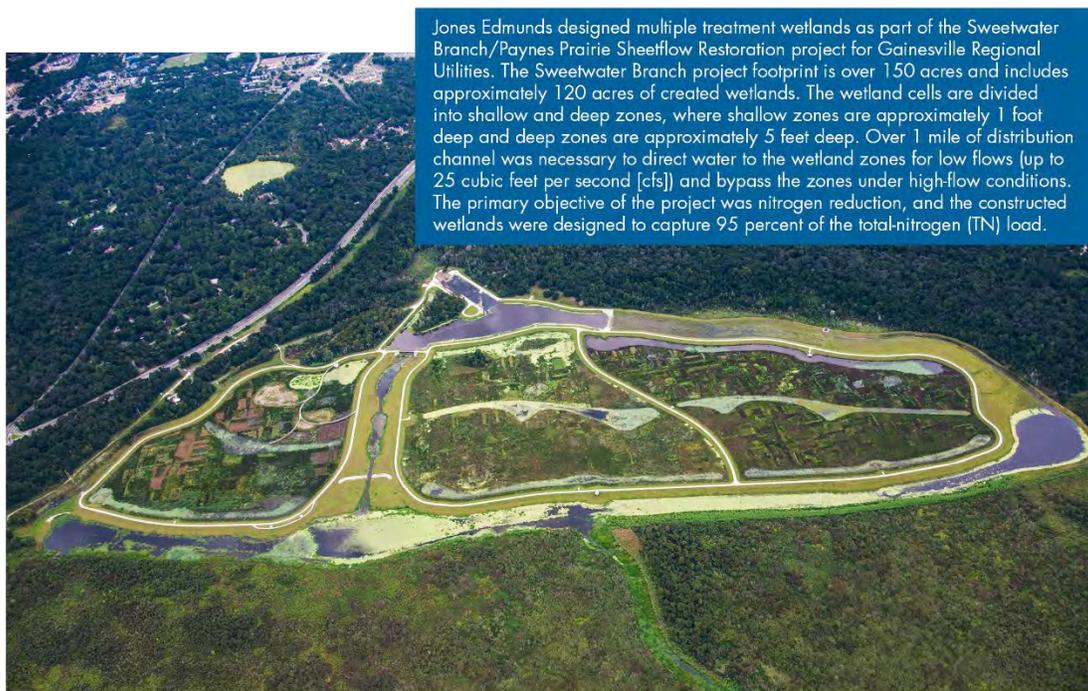
Some dry-pond designs include under-drains or side-drains to facilitate infiltration. These drains are perforated drainage pipes that are installed in a bed of porous media, most commonly sand. The drains collect and convey stormwater flows from underneath or the side of the pond. Stormwater collected by the drain system is not infiltrated to a groundwater system but is filtered before discharge to downstream waters. For this reason, these systems are considered detention systems since the full treatment volume is not discharged via infiltration. Discharge of filtered flows and the attenuation volume typically occurs through an engineered control structure and then to downstream waters.

In practice, these systems often operate as hybrid systems where some of the treatment volume is infiltrated and some filtered and discharged downstream. Although some pollutant removal is provided during filtration between the pond and the drains, studies show pollutant removal from the filtration process to be limited and unreliable, particularly for dissolved pollutants like nitrogen. Accordingly, these designs are not as effective at pollutant removal as retention systems unless coupled with engineered media. These stormwater designs also typically require more maintenance.

4.6 CONSTRUCTED WETLANDS

Constructed wetlands use wetland vegetation, soils, and associated microbial activity to improve water quality. These systems are sometimes referred to as treatment wetlands or created wetlands and are as varied as the available vegetation, including surface flow, subsurface flow, and combination systems. When properly designed, constructed wetland are very effective at stormwater treatment. An example of a large-scale constructed wetland is the Sweetwater Branch treatment wetland, which was designed by Jones Edmunds and is pictured in Figure 3. The Sweetwater Branch treatment wetland serves an urban watershed of approximately 3 square miles and was designed to primarily treat inflows less than 10 cfs and can capture storm flows up to 25 cfs. Sweetwater Branch also has the relative benefit of treating WWTP effluent that is mixed in with storm flows, meaning incoming nutrient concentrations higher than typical storm flow, which allows the wetland components to remove nutrient loads very efficiently.

Figure 3 Constructed Wetland Example – Sweetwater Branch



However, inflow and velocity through a constructed wetland are typically limited to avoid damaging vegetation, to avoid resuspending captured pollutants, and to allow time for the rate-dependent biological treatment processes to occur. In short, properly designed constructed wetlands are excellent for stormwater treatment of the accepted flows when sufficient nutrient concentrations are present, but often bypass a significant portion of flow from larger storm events. In comparison to other types of stormwater treatment types, constructed wetlands require a much larger area to achieve a similar pollutant load reduction.

4.7 STORMWATER HARVESTING

From a stormwater design perspective, stormwater harvesting (or stormwater reuse) is an improvement to wet detention for stormwater treatment, but typically does not directly provide stormwater attenuation since stormwater is harvested between storm events. Unlike a traditional wet-detention pond where the treatment volume is slowly released downstream, stormwater harvesting removes some or all of the treatment volume for another non-potable use, most commonly irrigation. In this way, the concept is very similar to residential rainwater harvesting.

Stormwater harvesting is slowly gaining popularity to increase pollutant removal and to offset potable supply demands from non-potable uses, such as on-site irrigation needs. However, the timing of storm flows needs to be considered when stormwater harvesting is used as an alternative irrigation source. Seasonal rainfall patterns often necessitate a backup irrigation source or a very large storage volume.

4.8 SEDIMENT TRAPS

Sediment traps promote sediment deposition by sufficiently reducing flow velocity to allow time for most of the sediment to settle before stormwater flows and their sediment load are released downstream. An example of a large sediment trap is shown in Figure 4.

Figure 4 Sediment Trap Example



Sediment deposition also occurs in other stormwater designs, but with sediment traps the focus is on sediment removal. Accordingly, sediment traps typically do not provide stormwater attenuation. Sediment traps differ from sediment sumps, which are manmade pits to temporarily store runoff commonly associated with construction activities and designed to last only as long as the construction activities. By comparison, sediment traps are designed as permanent improvements and typically hardened so that maintenance activities can easily remove accumulated sediment over time without damaging the trap.

Baffle boxes are a type of self-contained sediment trap. They are so-named since the prefabricated boxes include a series of sediment settling chambers separated by baffles. Baffle boxes are typically positioned at outfalls and though simple, can be difficult to maintain due to access issues.

4.9 TRASH TRAPS

The most effective method of anthropogenic (human-caused) trash reduction is source reduction or collection nearest the source as practical. However, larger trash collection designs can be engineered to serve large stormwater conveyance systems. The design components

are commonly referred to as trash traps. An example of a large trash trap is shown in Figure 5 and as seen in the figure, trash traps are commonly supplemented with a floating boom that directs trash on the surface to the trap. Baskets and bags typically float and capture trash directly. By comparison, a trash screen typically does not float and captures trash within most or all of the water column.

Figure 5 **Trash Trap Example**



Simply stated, trash traps are capture points for trash that allow relatively easy removal and maintenance compared to removing trash from a larger stormwater system, such as an open channel or pond. Trash traps do not provide stormwater attenuation. Two primary complicating factors exist with all trash traps:

1. Trash traps, particularly screens, are inherent hydraulic constrictions and commonly require bypass designs to allow high storm flows without adverse impacts. This hydraulic need will increase the footprint of the design or limit its function.
2. Trash traps will capture more than just anthropogenic trash. Trash traps will capture any large debris carried by storm flows. Accordingly, trash traps are more appropriately named *gross pollutant* removal designs since the anthropogenic trash is likely to be mixed with organic debris and, depending on the characteristics of the system, may only be a small portion of the captured load, even in urban watersheds where tree cover can potentially generate high loads of leaf litter.

4.10 EROSION CONTROL

One of the most common improvement goals for an urban stream is erosion control. Permanent erosion control measures come in several varieties including but not limited to concrete, sheet pile, geotextile, and gabion designs. These types of stormwater designs eliminate or greatly reduce the erosive potential of an urban stream segment, but do not by themselves remove sediment loads that are conveyed through the segment to downstream waters, improve water quality downstream relative to upstream, or provide attenuation. These designs do provide stormwater treatment by preventing degradation of water quality within the improved segment. An example of erosion control for an urbanized system is just upstream of CCT Segment 4 in the City's *Lower Central Drainage Ditch Improvements*, which is a gabion design.

4.11 OVER DESIGN, OFF-SITE DESIGN, AND COMBINATION DESIGNS

In some situations, physical limitations such as property availability or access points make construction of a single traditional stormwater design component impractical. In other situations, one design component is not sufficient to meet permit criteria. To address these limitations, a few approaches have become more commonplace to stormwater design, but are all dependent on one or more of the traditional stormwater designs.

One approach is to provide stormwater attenuation or stormwater treatment to a greater extent than required by rule, commonly known as over design. This approach uses the over design of one element to offset the under design of another. For example, some communities have capitalized on the over design provided by stormwater retrofits to support a single site development, such as coupling a stormwater retrofit project with a community park, or supporting multiple future developments, such as stormwater design that provides enhanced attenuation and/or treatment of the watershed's existing condition but also provides credits for future land development so that future on-site stormwater designs are minimized or potentially not required. In these cases, the stormwater management system is over designed relative to permit criteria.

A similar approach is to design a stormwater management system off site, commonly known as off-site compensation. In our experience, off-site compensation for land development is typically not allowed by regulatory agencies unless coupled with over design so that a net community improvement is demonstrated. Accordingly, although over design does not require off-site compensation, off-site compensation typically does require over design. A stormwater retrofit project that also serves future land development would be considered over design and off-site compensation for future development.

The last approach is a combination system, which is a very popular option for stormwater retrofit projects and is gaining popularity to support land development. A combination system approach uses multiple design components in a treatment train to meet permit criteria. A LID stormwater management system is an example of a combination system.

5 LOW-IMPACT DESIGNS

The concept of LID was popularized almost 30 years ago and for most of that time was commonly known as *low-impact development*. Recently, *low-impact design* has replaced *low-impact development* as the more accepted term for LID within the industry. LID as a planning or engineering approach is often used synonymously with other terms such as smart development, sustainable development, and new-urbanism. As related to stormwater management system design, we have defined LID as a design practice that strives to maintain existing-condition hydrology and natural habitats to the greatest extent practical and is therefore distinct from traditional stormwater design practice. GSI design components are commonly included in LID stormwater management systems.

5.1 WHAT IS LID?

A LID stormwater design typically uses GSI design components integrated as a treatment train to replicate stormwater treatment and attenuation provided by the natural landscape. Although traditional stormwater designs collect, control, and treat stormwater runoff to meet presumptive criteria using an *end-of-pipe* solution, such as a stormwater pond, a LID stormwater management system includes nature-based retention, detention, treatment, and harvesting design components, i.e., GSI, distributed across the site to promote stormwater attenuation and treatment at or near the source of stormwater runoff. LID goals include:

- Preserve or conserve existing site features as much as possible to mimic existing conditions.
- Distribute stormwater attenuation and treatment design components, typically GSI, across the project site and as near to large sources of runoff (typically an impervious area) as possible.
- Reuse captured rainwater or stormwater on site.
- Minimize potential soil compaction from site development and promote stormwater infiltration.

LID and GSI are also well known for benefits beyond stormwater attenuation and treatment. Preserving natural areas creates aesthetically pleasing environments, provides wildlife habitat, and can limit landscape maintenance needs. GSI design components also make use of natural features, which helps maintain connectivity of green spaces on site and within the community. The source control provided by GSI can also reduce capital costs compared to traditional stormwater design.

However, including GSI within a stormwater management system typically does not completely offset the need for a traditional stormwater design to meet project goals or regulatory objectives. Also, a significant difference between GSI and traditional stormwater design components is that from a regulatory perspective, well-established design criteria may not be available for GSI design components. Although improved in recent years, these limitations of GSI have slowed the adoption of LID stormwater management systems as standard practice. To promote LID and GSI, some local communities have provided guidance for LID and developed design criteria for GSI, commonly within community manuals. Some examples of these include the *Pinellas County Stormwater Manual*, *Duval County LID Design*

Manual, Alachua County LID Manual, and the Sarasota County LID Guidance Document. Readers interested in learning more about LID and GSI are encouraged to review those manuals.

5.2 WHAT IS GSI?

GSI design components are intended to mimic nature by providing stormwater attenuation and treatment near the runoff source. GSI is commonly considered as an alternative to traditional stormwater design but in practice GSI is often coupled with traditional stormwater design and/or innovative stormwater technologies to meet permit criteria. Some of the most well-known GSI design components are the various forms of bioretention and permeable pavement. Other design components considered to be GSI when associated with LID stormwater management systems were previously discussed in this document, including swales, baffle boxes, and exfiltration systems.

The potential confusion between GSI and traditional stormwater design regarding LID is an artifact of LID being an approach-based practice that is not limited by design components. Any number of stormwater design components may be included in a LID stormwater management system if they help meet the fundamental goals of LID. To help the reader, we offer the following simplified distinction. The difference between a traditional stormwater design and LID is often a matter of the design component(s) size, location, and vegetation. Smaller, nature-based design components are often considered GSI and when GSI design components are included in the treatment train, the stormwater management system is often considered to be LID.

Table 1 provides a list of stormwater design components that are commonly considered to be GSI when associated with LID stormwater management systems, along with the Section of this White Paper where the design component is more fully discussed. Overviews of potential GSI design components not previously discussed are provided in this section. Furthermore, many innovative stormwater technologies, which are discussed in Section 6, are also often considered GSI.

Table 1 Previously Mentioned GSI Design Components

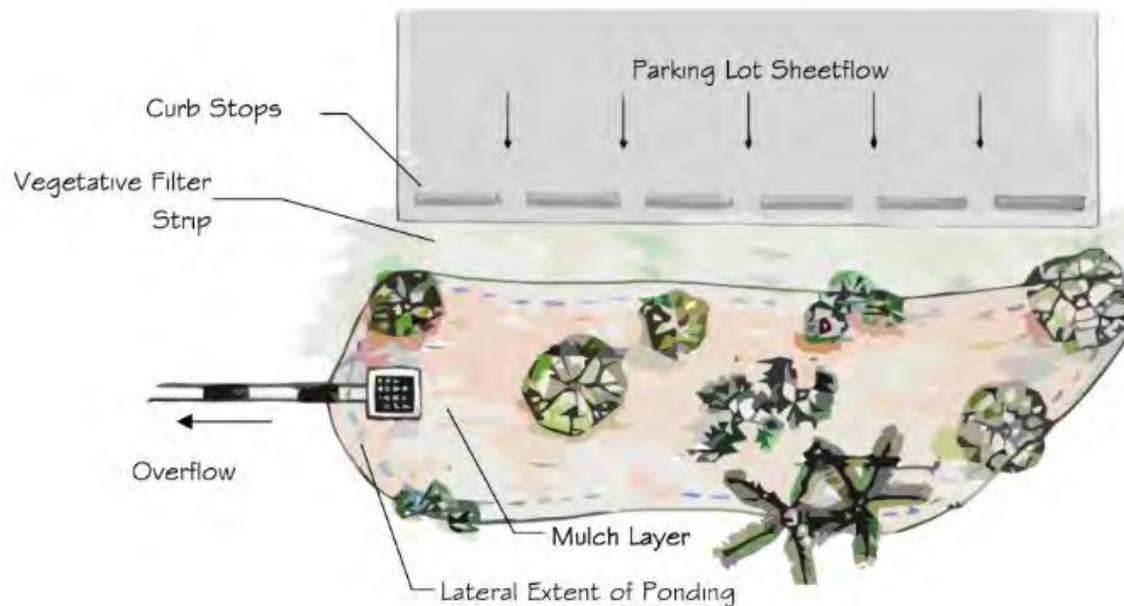
Design Component	Document Reference
Exfiltration	Section 4.3
Swales	Section 4.4
Vegetated Strips	Section 4.4
Constructed Wetlands	Section 4.6
Stormwater Harvesting	Section 4.7
Baffle Boxes	Section 4.8

5.2.1 BIORETENTION

Bioretention is an infiltration-based design component that provides the same engineering function as a retention design, but instead of only grass within the retention area, bioretention

includes engineered media, soils, mulch, and/or native plants to facilitate infiltration and enhance pollutant removal. An example of a bioretention system is shown in Figure 6.

Figure 6 Bioretention Example



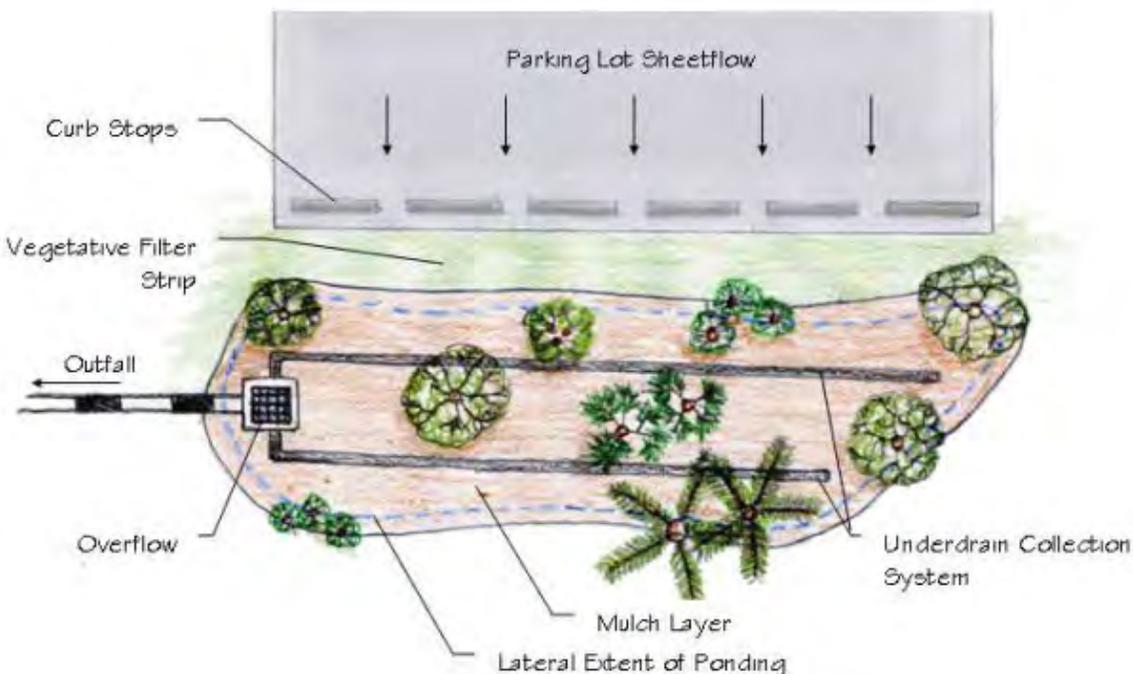
When stormwater attenuation is solely provided through infiltration, these systems are sometimes referred to as shallow bioretention. When properly designed, bioretention systems are more effective than conventional retention systems due to the increased interaction of stormwater runoff with soil, microbes, and vegetation enhancing biogeochemical processes that remove pollutant loads.

Bioretention is often used synonymously with a bioswale, rain garden, or planter box. The distinction typically is in the size and service area. In practice, bioretention areas usually refer to systems of relative size serving a large parking lot or building. Bioswales are bioretention systems that also serve as a swale conveyance, typically associated with a road or pedestrian path. Rain gardens are bioretention systems that serve a smaller parking lot or building, such as a single-family home. Planter boxes are bioretention areas that serve a very small area. A specific example of a planter box is a tree box, which uses a tree for uptake.

5.2.2 DETENTION WITH BIOFILTRATION

Like detention with filtration (Section 4.5), biofiltration systems can be designed to function in areas with high ground water tables by using underdrains to facilitate infiltration via filtration from the surface to the drain. An example of a biofiltration system is shown in Figure 7.

Figure 7 Detention with Biofiltration Example



The difference between detention with filtration and with bioretention is in the filtration process and design filtration rates. Like bioretention, biofiltration systems increase interaction of stormwater runoff with soil, microbes, and vegetation, which enhances biogeochemical processes that remove pollutant loads. Detention with biofiltration systems have much lower infiltration (filtration) rates compared to bioretention and therefore typically include vegetation that thrive in wet conditions for prolonged periods. In biofiltration systems, stormwater is intentionally slowly filtered through the system to maximize pollutant-load reductions from the biogeochemical process.

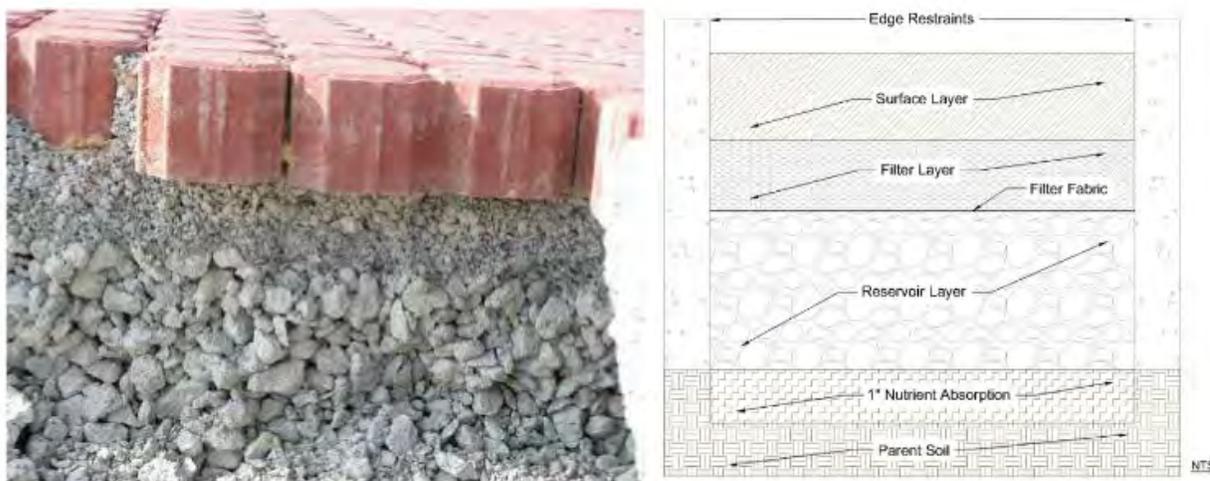
Due to the slow rate of filtration, detention with biofiltration systems typically provide relatively high levels of stormwater treatment but can capture only small volumes and provide only limited stormwater attenuation. As with bioretention systems, detention with biofiltration is often used synonymously with a bioswale, rain garden, or planter box and the distinction typically is in the size and service area.

5.2.3 PERMEABLE PAVEMENT

Permeable pavement is an infiltration-based design component that uses gray infrastructure. The pavement, concrete, pavers, turf, or other manufactured surface type is porous and allows runoff to infiltrate through the surface to a below-grade system where stormwater attenuation and treatment are provided. Accordingly, permeable pavement systems are more than just the manufactured surface and typically include multiple layers that make a modular system, such as permeable pavement, filter layer(s), reservoir, and subgrade/parent soil as

shown in Figure 8. Permeable pavement is most applicable in areas with infrequent traffic and light loads.

Figure 8 Permeable Pavement Example



Permeable pavement systems may also include underdrains, where the system will perform like detention with filtration. Stormwater that passes through the permeable pavement system but is ultimately discharged to downstream waters via underdrains typically receives only minimal treatment unless the modular system includes engineered media.

5.2.4 RAINWATER HARVESTING

Rainwater harvesting serves the same engineering function as stormwater harvesting except that the harvesting occurs close to the source collection. Harvested rainwater typically comes from a building rooftop and is stored in a cistern near landscaping that will be the benefactor of the harvested rainwater via irrigation. These systems are typically small but are also popular primarily to offset potable supply demands for irrigation. However, seasonal rainfall patterns may necessitate a backup irrigation source depending on the landscaping.

5.2.5 GREEN ROOFS

A green roof functions as a specialized detention system with biofiltration that is on the roof of a building and is typically coupled with a cistern or other storage design component. Green roofs are quickly gaining popularity in heavily urbanized areas where other green spaces are limited due to their aesthetic appeal and long design life, which is commonly twice that of traditional roofing material. However, green roof design can be quite complex due to structural considerations especially when public access is allowed.

6 INNOVATIVE STORMWATER TECHNOLOGIES

For this White Paper, innovative technologies are improvements on traditional stormwater and GSI design components. These technologies are commonly associated with stormwater retrofit projects but have also been used to support land development.

6.1 ENGINEERED MEDIA

Engineered media, sometimes called green media, is incorporated into stormwater designs to enhance pollutant removal through a filtration-like process that also includes biological treatment. The most well-known engineered media for stormwater design is biosorption-activated media (BAM). BAM is generally designed to remove nitrogen and phosphorus and is commonly customized to site-specific conditions for incoming nutrient loads and design flows. Like filtration processes, the design flux rate through BAM is limited; therefore, treatment of even moderately high flows requires a very large BAM surface area.

BAM is perhaps best known for application within a modified baffle box where BAM is used within an upflow filter, the baffles collect sediment, and a trash trap collects floatable debris. This type of combined system design is very popular since it is prefabricated, but it is also limited to relatively low treatment flows through the upflow filter for a single unit. These systems are also often considered to be GSI even though they are not nature-based. A similar BAM system is planned as part of the CCT Segment 3D-B project.

BAM is also commonly incorporated into infiltration-based designs such as dry-retention ponds, exfiltration trenches, permeable pavement, or bioretention. The stated design life of a BAM system varies from a few years to over 20 years depending on the site-specific application; however, since the technology is still relatively new, the upper end of design life has not been fully tested for many applications.

6.2 CHEMICAL TREATMENT

Chemical treatment of stormwater typically refers to an alum system designed to remove nutrients, although there are other chemical treatment methods besides alum. These systems are typically an improvement on wet-detention ponds where the chemical treatment is applied to pond inflow to promote nutrient removal within the pond.

Chemical treatment systems that use alum are very effective at phosphorus removal but are relatively expensive and require significant maintenance. They are most applicable immediately upstream of a protected waterbody and are often considered as a last resort when all other treatment options have been exhausted. The City operates multiple alum treatment facilities, including one of the largest facilities in Florida, in the Upper Lake Lafayette watershed, known as the Upper Lake Lafayette Nutrient Reduction Facility (ULLNRF) and pictured in Figure 9.

Figure 9 Chemical Treatment Example – ULLNRF Contact Chambers



6.3 FLOATING ORIFICES

Floating orifices, sometimes called self-skimmers, have traditionally been associated with temporary sediment sumps, since the design can significantly decrease sediment discharge to downstream waters. From an engineering perspective, a floating orifice provides a few advantages over a more traditional static orifice, most notable being maintenance of a single discharge rate over a wide range of operating conditions and reduced potential for sediment discharge. Although this type of stormwater design is not commonly used to support land development, these designs are increasing in popularity in Florida as a stormwater retrofit to an existing wet-detention pond, since the retrofit from a static orifice to a floating orifice can provide significant gains in pollutant-load reduction for a relatively low cost. These benefits are most demonstrable for existing wet-detention ponds with relatively short residence times and/or relatively high sediment loads.

6.4 FLOATING WETLANDS

Floating wetlands, sometimes called managed aquatic plant systems (MAPS), improve on traditional designs of wet-detention ponds. Floating wetlands are named appropriately, since these systems are floating mats strategically planted with wetland plants. From an engineering perspective, the floating wetland will increase pollutant-load removal from the pond through nutrient uptake from the plants and nutrient removal from increased biological activity within the root zone. Although this type of stormwater design is not commonly used to support land development, these designs are increasing in popularity in Florida as a stormwater retrofit to an existing wet-detention pond. However, these systems may carry a high maintenance burden depending on site constraints impacting the wetland function.

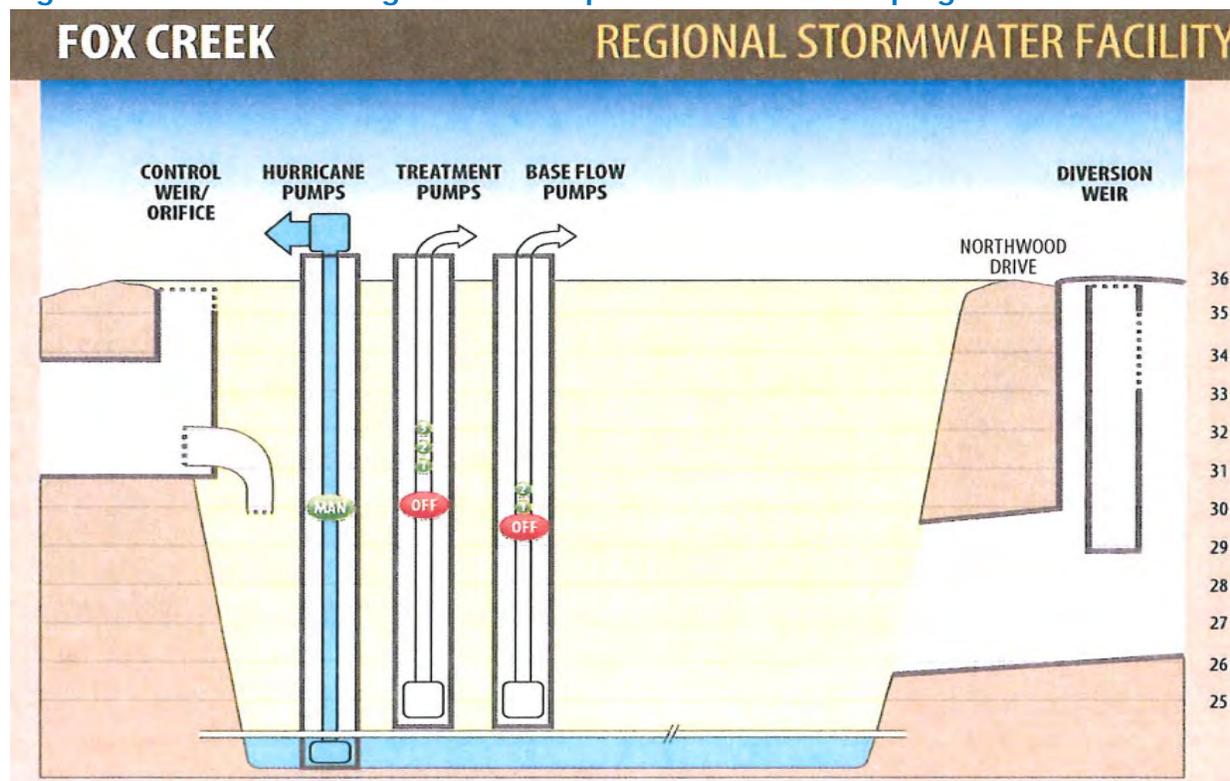
6.5 ACTIVE MANAGEMENT

Most stormwater designs use passive infrastructure components, such as ponds, pipes, and channels. The passive infrastructure is intended to only require maintenance between storm events so that the system is prepared to function as designed when a storm begins, will function similarly throughout the storm, and continue to function when the next storm begins, regardless of when the storm events occur. By comparison, active stormwater infrastructure components change how the system performs during a storm, from storm-to-storm, between storms, or during maintenance activities. The most common active components are pumps, which are typically designed to actively control water levels within the system or convey storm flows against gravity.

Active control of water levels can enhance treatment volume recovery, provide additional attenuation volume before large rainfall events, and/or allow more effective maintenance. For example, Jones Edmunds helped St. Johns County optimize the design of the *Fox Creek Regional Stormwater Treatment Facility*, which is an over 30-acre wet-detention pond that uses pump stations to control base flow, control the release of treatment volume, and to draw down water levels over 15 feet within 72 hours before large storms – also known as *hurricane pumps*. Figure 10 provides a schematic sketch of how the pumps actively manage water levels for the Fox Creek facility.

Pumps can also be used to increase wet-detention pond inflow and treatment. For example, Jones Edmunds designed a new pump system to increase inflow to the St. Johns River Water Management District's Deep Creek West facility (a wet-detention pond) from an adjacent below-grade agricultural ditch, which in turn increased the annual pollutant-load reduction through capture and treatment of previously untreated runoff.

Figure 10 Active Management Example – Fox Creek Pumping Schematic



A more unique implementation of stormwater pumps is recirculation of captured flow to provide inter-event or low-flow treatment. For example, Jones Edmunds recently designed a retrofit treatment project for Volusia County, known as the Ariel Canal Treatment Facility, that uses inter-event treatment. This facility diverts stream flows that occur following up to a 1-inch storm event to a wet detention pond. The permanent pool volume within the pond is continuously pumped through a BAM treatment system, which establishes a much lower nutrient concentration within the pond when compared to a typical wet detention pond. The low-concentration (permanent pool) volume is discharged at the start of the next storm event and replaced with new stream flow. The inter-event treatment significantly and cost-effectively increases the pollutant load reduction of the system.

Jones Edmunds, in conjunction with Pegasus Engineering, also designed the Gabordy Canal Treatment Facility for Volusia County, which continuously pumps low flows from the canal into a BAM treatment system before discharging the flows into a flood compensation pond for additional reaeration prior to discharge back to the Canal. This facility eliminates nearly 6,000 pounds of phosphorous per year using only a 1-acre facility footprint, which is very efficient compared to more traditional stormwater designs of similar size and associated pollutant load inflow.

Another example of an active management system is a mechanical rake designed to self-clean a trash trap. The City operates a mechanical rake for a trash trap near the Florida State University/City of Tallahassee (FSU-COT) Regional Stormwater Facility (RSF) and Blueprint has included a mechanical rake with the trash trap currently being constructed as part of CCT

Segment 3D-B. These mechanical rakes help remove trash collected on a screen to a more convenient location for disposal (such as a dumpster). They also help maintain storm flows through the trash trap by cleaning the collection screen automatically during and after storm events.

6.6 REAL-TIME ADAPTIVE CONTROLS

Stormwater technology has advanced during the past decade commensurate with advancements and cost reductions of novel sensors, wireless communications, rainfall forecasting, and data management platforms. The merging of active management designs with real-time, adaptive control technology has resulted in *smart* stormwater designs. Smart systems can be included in a new stormwater design or retrofitted into an existing system. Smart systems are most often associated with wet-detention and chemical treatment systems in Florida but have many applications. Some of the potential benefits include, but are not limited to:

- Increasing available attenuation volume before storm events.
- Increasing pollutant-load reduction between storm events by extending residence times.
- Improving stormwater-harvesting potential by retaining more water after storms.
- Recreating a more natural hydroperiod and flow characteristics to support natural systems.

Smart systems are commonly controlled through a supervisory control and data acquisition (SCADA) system. The City operates a SCADA system that controls existing active management stormwater systems, such as the ULLNRF, FSU-COT RSF mechanical rake, and planned CCT Segment 3D-B mechanical rake. Although the capital cost for these types of technologies has become more affordable, they carry unique maintenance and operation needs compared to traditional stormwater design components. Therefore, the operation and maintenance of smart systems needs to be strongly considered before implementation and is one reason why the industry has been slow to adopt these technologies.

Though more complex, the advantages of stormwater management systems that can adapt in real-time are too numerous to ignore when considered against the increasing scarcity of water resources. Smart systems are widely acknowledged to be the future of community-wide stormwater management.

7 SEGMENT 4 WATERSHED EVALUATION

The CCT Segment 4 project footprint is near the downstream end of the Central Drainage Ditch (CDD). The watershed (area of contributing stormwater flows) for the project includes the CDD watershed and the historical Saint Augustine Branch (SAB) watershed.

The SAB drains to the CDD and has been enclosed within large box culverts as part of prior CCT projects. The project watershed covers approximately 8 square miles and is sandwiched between the aptly named West Ditch and East Ditch. These three urban ditch systems converge near Lake Henrietta to form the headwaters of Lake Munson (also known as Munson Slough); however, the CCT Segment 4 watershed is only a small portion (approximately 10 percent) of the headwaters by area.

The project watershed is generally depicted in Figure 11, which includes a color ramp of ground surface elevations, roadway map, an outline of the project watershed, and some notable locations.

The physical landscape of the project watershed is best described as heavily urbanized and includes much of downtown Tallahassee, FSU, Florida A&M University (FAMU), and surrounding residential and commercial areas. Much of the urbanized area was developed before modern stormwater regulations; therefore, relatively little on-site stormwater attenuation or treatment is provided at the watershed scale. The stormwater runoff and pollutant-load potential for this type of watershed is relatively high. The community has invested in several stormwater retrofit projects in the area that provide stormwater attenuation and treatment.

Significant stormwater retrofit facilities include the FSU-COT RSF, Coal Chute Pond, Smokey Hollow Pond and Boca Chuba Pond in Cascades Park, and Lake Anita to name a few. Blueprint is also currently constructing a new stormwater retrofit facility as part of the CCT Segment 3D-B project, which includes a wet-detention pond, trash trap, and BAM treatment system. A summary listing of municipal projects that included stormwater improvements within the project watershed is provided in Table 2. Figure 12 presents the projects on a map. The total capital cost of the projects listed is approximately \$144 Million, though many of the projects were multipurpose including roadway improvements, parks, etc, and presented costs are not adjusted to 2022 dollars.

Table 2 Summary of Municipal Projects within the Project Watershed

Project	Responsible Agency	Year Completed	Approximate Capital Cost
Capital Cascades Trail Segment 1 (Franklin Blvd)	Blueprint	2015	\$13.3 Million
Capital Cascades Trail Segment 2 (Cascade Park)	Blueprint	2015	\$33.8 Million
Capital Cascades Trail Segment 3 (Lake Anita and Coal Chute Pond)	Blueprint	2022	\$4.8 Million
Capital Cascades Trail Segment 3 (3D RSF)	Blueprint	2022	\$5.7 Million

Project	Responsible Agency	Year Completed	Approximate Capital Cost
Tallahassee Junction Stormwater Management Facility	City	2018	\$3.0 Million
Bond Community Stormwater Management Facility	City	2006	\$2.0 Million
Lower Central Drainage Ditch Erosion Control Project	City	2020	\$11.5 Million
Lake Munson Restoration (Lake Henrietta)	County	2001	\$13.6 Million
FSU-COT Regional Stormwater Facility	City	1998	\$10.5 Million
Whitehall and Chapel Drive Stormwater Improvements	City	2008	\$0.3 Million
Campus Circle Drainage Improvements	City	2005	\$3.5 Million
Frenchtown Watershed Stormwater Improvements	City	2023	\$15.4 Million
Madison-Gaines Street Supplemental Stormwater Outfall	City	2018	\$5.2 Million
Downtown Stormwater Outfall	City	1998	\$2.3 Million
Call-Cadiz Street Drainage Improvements	City	2006	\$1.8 Million
Lafayette Park Stormwater Improvements	City	2012	\$1.3 Million
Pensacola Street Outfall	City	2020	\$2.0 Million
Capital Cascade Trail Segment 4	Blueprint	2025	\$14.0 Million
Total			\$144 Million

7.1 FLOOD RISK

As common to heavily urbanized watersheds, stormwater runoff generated within the project watershed is rapidly conveyed to the primary drainage features, which include the SAB, CDD, and large storm drain systems. This type of watershed is commonly referred to as *flashy* since peak storm flows and stages occur within only a few hours after peak rainfall and recede just as quickly. Based on previous modeling efforts, peak flows through the CDD near the CCT Segment 4 location will exceed 3,000 cfs during large storm events or approximately one semi-trailer full of stormwater every second.

The ability of a stormwater management system to manage flood risk is defined through peak stage and commonly referred to as the system's level-of-service. The level-of-service provided is the designed frequency of flood risk occurrence. For example, most urban drainage systems constructed before modern stormwater standards, like many within the project watershed, provide an approximate 10-year level-of-service. This means these systems are expected to fail (result in flooding) once every 10 years. Statewide presumptive stormwater attenuation criteria are based on a 25-year level-of-service. Meanwhile, FEMA flood maps are developed to reflect the flood risk that occurs once every 100 years.

Figure 11 Project Watershed

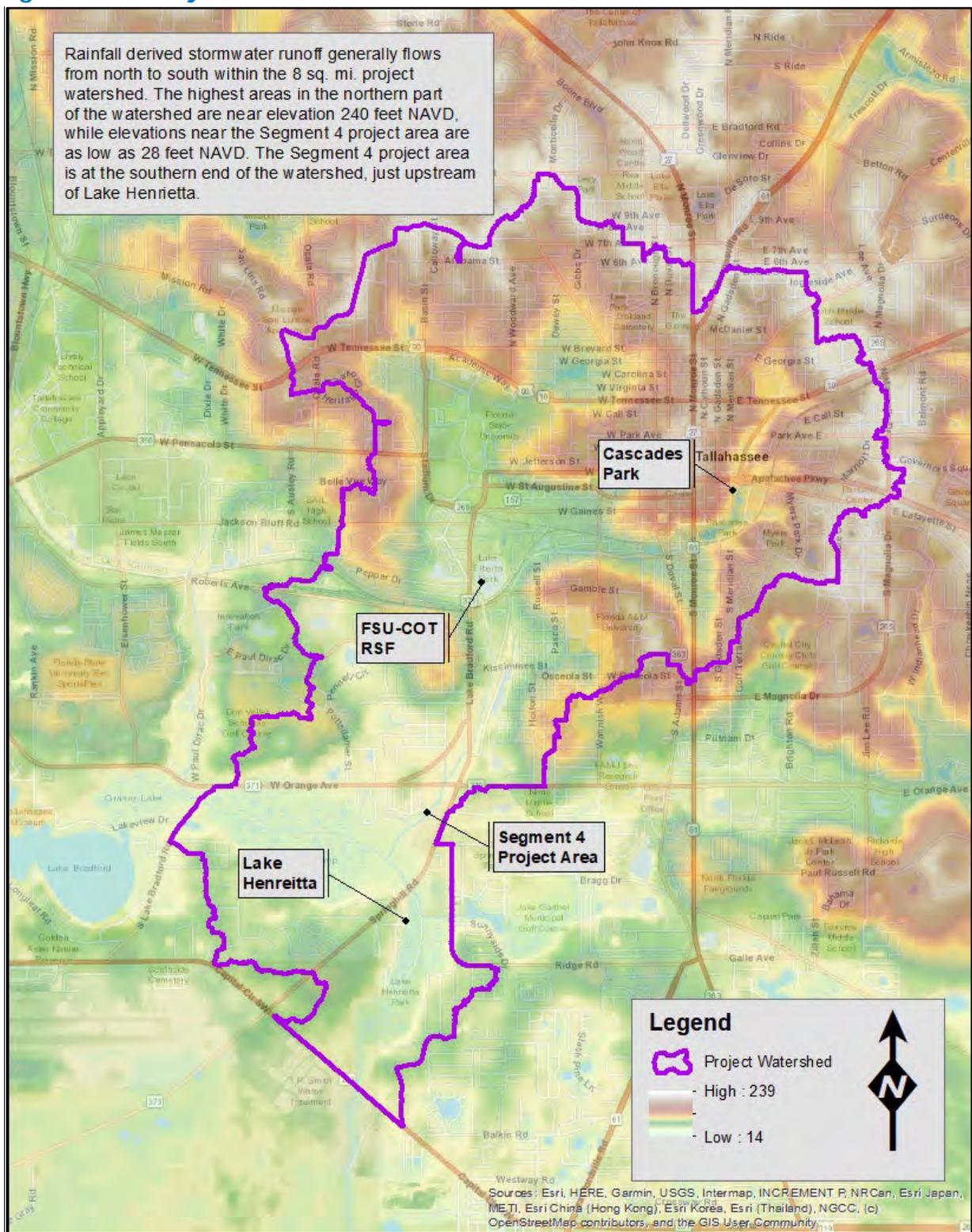
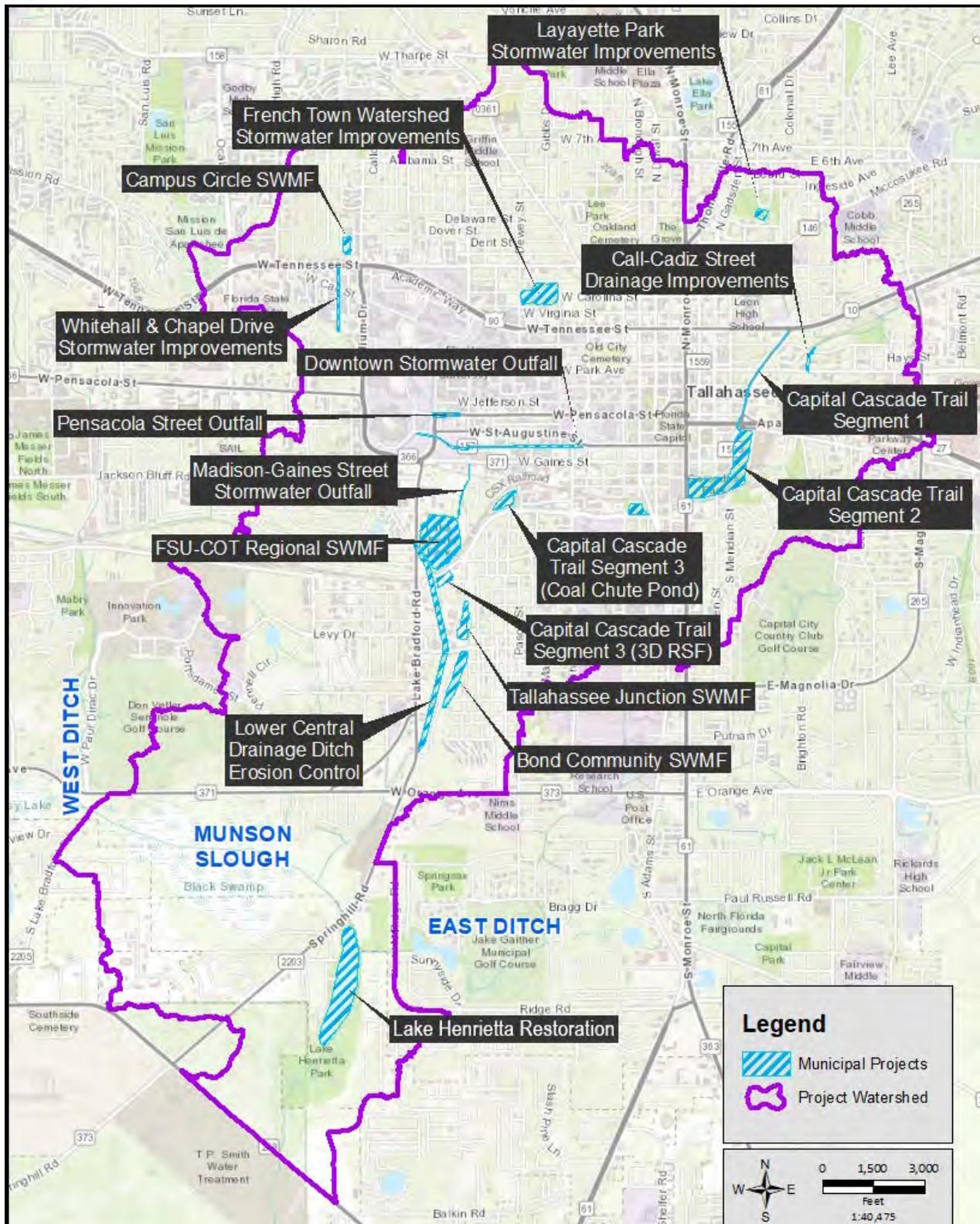


Figure 12 Municipal Projects in Central Drainage Ditch Watershed



When discussing flood risk within the project watershed, it is important to define what level of risk is being considered. Areas at risk of flooding following frequently occurring storm events, such as only a few inches of rain, can be located anywhere within the watershed when local drainage systems are under-designed or in need of maintenance. This type of flooding is common in residential areas developed before modern stormwater regulations, but not common for the watershed's major stormwater conveyance systems. Areas at risk of flooding from infrequent storms events, such as once in a 25-year or 100-year occurrence, are commonly more widespread and may include major conveyance systems.

Residential areas near the downstream portion of the CDD, near the CCT Segment 4 project, are known to be susceptible to flooding. Flood conditions in this area are exemplified by the homes along McPhearson Drive, which are elevated on stilts as shown in Figure 13. Residents in Liberty Park have also experienced flood conditions in the past.

Figure 13 Flood Protection Example – Elevated Homes Along McPhearson Drive



The NFWFMD has recorded 15-minute stage data since 1989 for the CDD at Orange Avenue, which is within the CCT Segment 4 project footprint. The highest recorded stage during the period of record is 40.7 feet North American Vertical Datum of 1988 (NAVD88), and only two dates recorded stages above 40 feet – June 12, 2001, and March 3, 2002. CDD stages near 40 feet are approximately 3 feet below the CDD top-of-bank and 4 feet below Orange Avenue. The available stage data suggest that the CDD has not exceeded its banks near Orange Avenue during the last 30 years. However, prior stormwater analyses have suggested the CDD will exceed its banks during a 100-year storm event upstream of Orange Avenue.

Additionally, we can reasonably assume that downstream conditions within Munson Slough associated within the recorded stages within the CDD near 40 feet are likely indicative of flood conditions in Liberty Park, where some home finished-floor elevations appear below 39 feet, and along McPhearson Drive where the roadway elevation is below 35 feet in stretches. This assumption is based on the limited predicted headloss (peak stage reduction) from Orange Avenue to Munson Slough from past stormwater analyses.

It is also known that during large storms the timing of stormwater flows from the three urban ditch systems that converge at Munson Slough can cause flows to reverse direction, from south to north. This *backwater effect* has been observed in real-time by City and County staff but has not been well studied during prior stormwater analyses.

Based on available stage gauge data, past modeling efforts, and observations relayed by City and County staff, the known flood conditions in Liberty Park and along McPhearson Drive are more likely driven by hydraulic conditions within Munson Slough rather than hydraulic conditions within the CDD. A more robust stormwater analysis will be performed as part of the CCT Segment 4 project to better understand the potential backwater effect from Munson Slough on the project and adjacent residential areas.

Based on available information it appears that while the CDD is characterized by very high flows following storm events, the existing flood conditions present near the project are mostly controlled by peak water-surface elevations in Munson Slough. Ultimately, the project watershed is a relatively small contributor (10 percent by area) to Munson Slough and improvements associated with the project are unlikely to demonstrably impact future peak stages within Munson Slough.

7.2 WATER QUALITY

Stormwater runoff naturally collects and conveys pollutants downstream. Given that the watershed is mostly urbanized with development predominately occurring prior to modern stormwater treatment requirements, potentially high dissolved nutrient loads from over fertilization and high anthropogenic trash loads may be generated across the watershed. Since the project watershed is known to be a flashy system, a high potential for erosive conditions within natural conveyances also exists, which generates high sediment loads and particle-bound nutrient loads like phosphorus.

To better understand the potential pollutant load carried by the CDD through the CCT Segment 4 project area, we reviewed water-quality sampling data collected by the City to support their municipal separate storm sewer system (MS4) program. The most relevant available data are ambient water samples collected near the terminus of the CDD, which is in the downstream portion of the CCT Segment 4 project area. Ambient conditions are generally defined as the normal operating condition for the system and are more reflective of base flow than of storm flow.

Annual geometric means (AGMs) of ambient conditions over the last five reporting periods at this location are shown in Figure 14 and suggest that the nutrient load within the CDD is limited. The current ambient conditions of the CDD include total nitrogen (TN) concentrations near 0.5 milligram per liter (mg/L) and total phosphorus (TP) concentrations near 0.05 mg/L. The TN and TP AGMs for the CDD within the CCT Segment 4 project area are near the lower limit, least potential nutrients, of what is achievable from traditional stormwater designs, LID and GSI, and even most innovative stormwater technologies. We also observed a decreasing trend for TN and TP AGMs over time. Nutrient concentrations at this level and the decreasing trends over time suggest that although relatively limited on-site stormwater treatment is provided within the project watershed, the stormwater retrofit projects implemented

upstream by the City and Blueprint are effective at reducing the ambient nutrient load within the CDD.

Figure 14 Nutrient Concentrations Trend in CDD near Munson Slough Convergence



We also observed ambient total suspended solids (TSS) concentrations to be similarly low, generally near 5 mg/L, and exhibit the same decreasing trend. Although the cause-and-effect relationship of TSS with stormwater retrofits of the watershed is complex and often takes multiple years after project completion to manifest completely, we can logically infer from the reported TSS concentrations that the 2+ miles of ditch enclosure completed by Blueprint and 1 mile of gabion improvements completed by the City have significantly reduced the in-stream erosion potential of the watershed.

The anthropogenic trash load of any watershed is difficult to estimate, limited data are available, and available data may not be transferable from one location to another. We assume that some amount of anthropogenic trash load will be present at the project due to the urban characteristics of the watershed. However, we are also aware of multiple trash traps within the watershed, including a boom and screen within the CDD near Eppes Drive, a mechanical trash trap recently constructed at the FSU-COT RSF, and a mechanical trash trap currently being constructed as part of the CCT Segment 3D-B project.

Given the collective recency of these improvements, we can reasonably expect the downstream trash load from the watershed will follow a similar decreasing trend in the coming years as observed in the water quality monitoring data.

Based on available information, nutrient concentrations and suspended sediments will be very limited under ambient and low flow conditions, which are typically the focus of retrofit treatment systems. Moreover, the most immediate downstream waterbody, Munson Slough, is no longer considered impaired for nutrients based on the Florida Department of Environmental Protection (FDEP) 2020–2022 Biennial Assessment of Impaired Waters. Munson Slough includes the area between the Segment 4 project and Lake Munson.

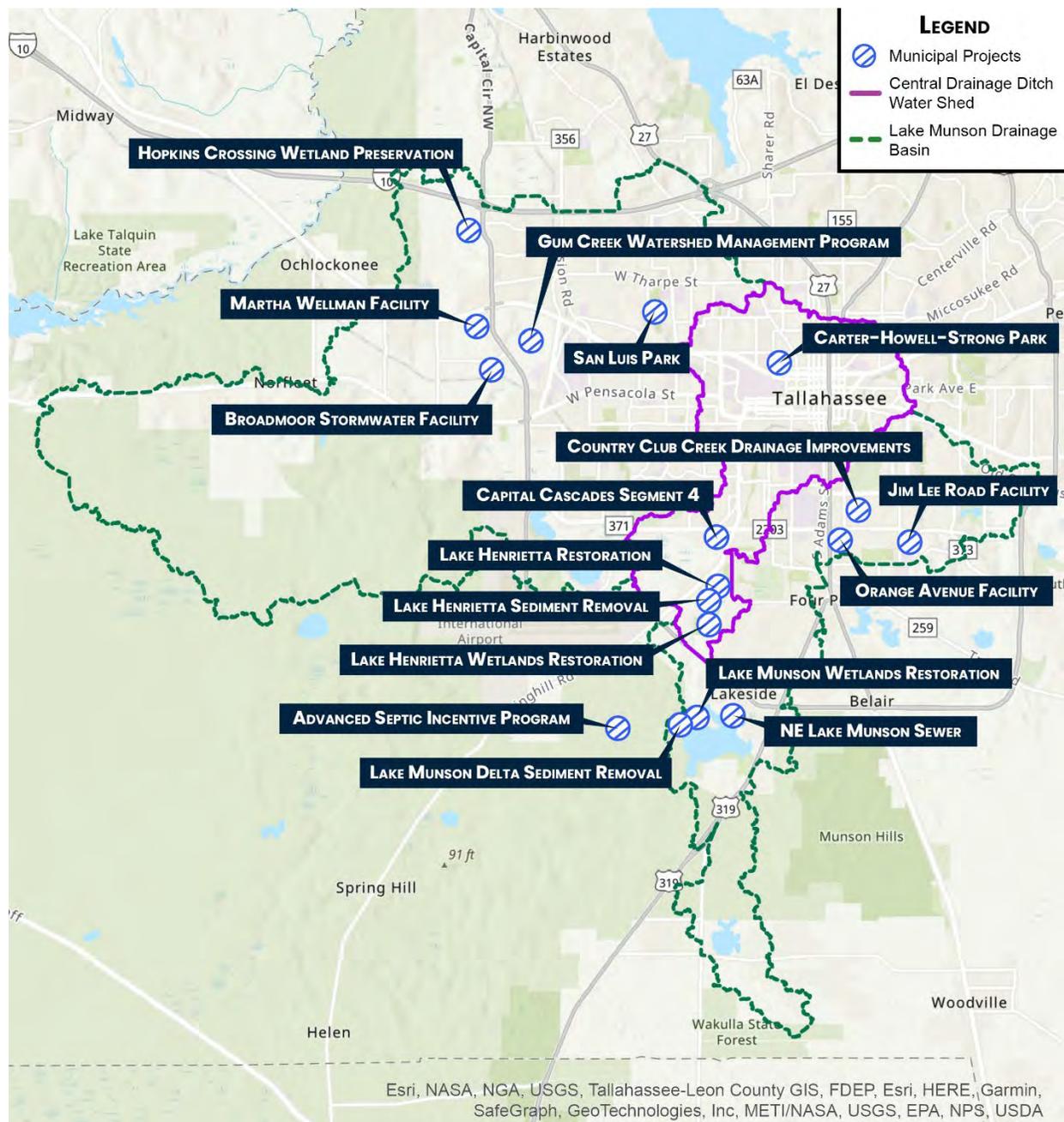
Unfortunately, Lake Munson itself continues to exhibit poor water quality and experience recurring algal blooms that limit the lake's function for extended periods of time. The earliest well known compressive effort to analyze Lake Munson was the NFWMD *Water Quality Evaluation of Lake Munson* (1988). As described in the evaluation, Lake Munson was cypress swamp land that became recognizable as a lake after impoundment in 1950 and likely became impaired from anthropogenic sources shortly thereafter with algal blooms and fish kills reported in the mid-1950s. In the early 1980s, Lake Munson was considered one of the most degraded lakes in the state; however, between 1984 when wastewater effluent discharge to the lake was eliminated and the evaluation in the late 1980s, NFWMD observed that Lake Munson *significantly improved*. At the time of the evaluation, two primary sources of nutrient loading to the lake remained: stormwater runoff inflow from Munson Slough and in-lake sediments.

Following NFWMD's work, the City of Tallahassee and Leon County jointly created the *Lake Munson Stormwater Management Plan* (1991). The County subsequently completed the *Lake Munson Action Plan* (1994) and included structural (capital improvements) and non-structural improvements designed to provide flood control and water quality enhancements in the Lake Munson basin and along major drainage branches. The non-structural recommendations were primarily preservation and restoration initiative through regulatory and land management programs. The structural improvements included the creation of seven regional wet detention stormwater management facilities along the major tributaries to the Lake to address flooding as well as capture a significant portion of nutrients, suspended solids, and other contaminants. The plan again identified inflow from Munson Slough and in-lake sediments as the main sources of nutrient loading to the lake and proposed a combination of solutions that would address both sources.

Setting aside the \$ 71,000,000 Capital Cascades Trail investment, over the past 20 years Leon County, City of Tallahassee, and Blueprint implemented thirteen Lake Munson Action Plan projects representing stormwater management facilities to improve water quality reaching Munson Slough and multiple efforts have occurred at Lake Munson, including drawdowns and sediment removal. These capital improvements represent \$73,000,000 in infrastructure improvements. Two future Lake Munson Basin projects, Lake Henrietta Sediment Removal and NE Lake Munson Sewer and the on-going Advanced Septic Tank Incentive Program add an additional \$15,000,000 investment for a combined capital expenditures of \$159,000,000.

During this same period, multiple studies have shown that improvements to Munson Slough may significantly improve the inflow from Munson Slough going into Lake Munson.

Figure 15 Municipal Projects in Lake Munson Drainage Basin



During workshops facilitated by the Leon County Science Advisory Committee in 2016, FDEP discussed results of a biogeochemical study conducted during the 2011 lake drawdown as part of the *Lake Munson: Spatial and Temporal Changes in Nutrient Characteristics of Sediments During a Drawdown Event* presentation. Nutrient concentration data collected as part of the study showed in-lake TN and TP was 10 to 15 times higher than inflow or outflow concentrations and that inflow concentrations were below outflow concentrations, which is a pattern indicative of significant nutrient recycling (from lake sediments to lake water) occurring at Lake Munson. The study also suggested that while sediment TN could potentially be reduced through future optimized lake drawdowns, the 2011 drawdown did not significantly reduce sediment TP.

Also presented during the 2016 workshops was results of the Evaluation of the Feasibility of Sediment Nutrient Inactivation in Lake Munson by Environmental Research and Design (ERD) on behalf of the City of Tallahassee.

The ERD study evaluated data collected since the 1988 NFWFMD Evaluation, including data related to water depth, water quality, fish and wildlife, and lake sediments. The study concluded that the observed algal blooms at Lake Munson were most likely due to elevated levels of TP (not TN) from high sediment presumably from the accumulation of nutrient-rich inflow from urban areas and wastewater treatment facilities prior to the 1980s.

Although Capital Cascades Trail Segment 4, as defined in the 2005 Master Plan, focuses on improvements along the St. Augustine Branch and the lower Central Drainage Ditch to provide water quality benefits upstream of Lake Munson, it is located more than two miles away from Lake Munson and represents a small portion of the entire Lake Munson watershed. Capital Cascades Trail Segment 4 is one more component within the overall system. Information on past projects within the Lake Munson watershed is included to show the scope of investment by the community not only within the St. Augustine Branch and Central Drainage Ditch but across the entire Lake Munson watershed. A comprehensive summary of past studies and projects in the Lake Munson watershed were provided to the Leon County Board of Commissioners on October 11, 2022, as part of agenda item number 26. At that meeting, the Board unanimously approved the action plan as presented in the item.

8 DISCUSSION

Based on the goals for CCT Segment 4, the project's stormwater management system will serve proposed project improvements and create a net stormwater improvement for the community. The stormwater management system design should also consider service life, cost, public safety, and ease of maintenance.

8.1 CURRENT PROJECT UNDERSTANDING AND CONSIDERATIONS

The permit criteria for the CCT Segment 4 project will be established in coordination with City Growth Management and NFWFMD during future project stages but we expect the project will need to demonstrate a net stormwater improvement for the community. At this time, we

can judge the potential to provide a net stormwater improvement for the community based on the watershed characteristics, site constraints, and our experience developing stormwater management solutions throughout Florida.

Based on the available CDD stage records near Orange Avenue, previous stormwater analyses, and City/County staff accounts, it is unlikely that the CCT Segment 4 project's stormwater management system can be feasibly designed to significantly mitigate flood conditions at the project or within adjacent neighborhoods. To better assess flood conditions near the project, Jones Edmunds is developing a stormwater model, which will build upon stormwater analyses completed by others as part of past Blueprint projects and will be developed with particular attention to the known backwater effects from Munson Slough that can impact flood conditions near the project.

Based on available information, it appears that existing flood conditions present near the project are mostly controlled by peak water-surface elevations in Munson Slough. Given the relatively small project footprint compared to Munson Slough and the relatively small contribution from the project watershed (10 percent by area) to Munson Slough, it is likely that future analysis using the stormwater model being developed for this project will also demonstrate that potential stormwater management system designs for this project are not capable of mitigating peak water-surface elevations in Munson Slough sufficiently to mitigate existing flood conditions. For comparison, the FSU-COT RSF is over 25 acres, Lake Henrietta is over 40 acres, and Black Swamp within Munson Slough is over 300 acres. Meanwhile, within the CCT Segment 4 project area less than 5 acres are available for potential stormwater improvements north of Orange Ave and less than 10 acres south of Orange Avenue.

Based on the available water-quality data for the CDD near the project location, which is representative of ambient conditions, insufficient nutrient concentrations appear to be available for the project's stormwater management system design to reasonably achieve relatively large nutrient load reductions from CDD flows under ambient and low-flow conditions. Moreover, the most immediate downstream waterbody, Munson Slough, is no longer considered impaired for nutrients based on the FDEP 2020–2022 Biennial Assessment of Impaired Waters. The ambient sample results and change in impairment status for Munson Slough are representative of a healthy project watershed and are a credit to past stormwater improvement efforts.

The relatively healthy project watershed and change in impairment for Munson Slough are also representative of the limited impact CCT Segment 4 is likely to have on Lake Munson. While Lake Munson continues to exhibit high TN and TP levels, recent studies suggest that the continued algal blooms at the lake are related to high sediment TP levels in-lake, not TN and/or TP loading from stormwater inflow through Munson Slough. Weather patterns such as extended heat or dry conditions can contribute to algal blooms. The combined water quality characteristics of the project watershed, Munson Slough, and Lake Munson indicate that the most effective solutions to improve water quality at Lake Munson will be focused on treatment and/or removal of in-lake sediments.

There are also significant site constraints for large scale design components within the CCT Segment 4 project area beyond low inflow concentrations. These additional constraints include

very large peak flows within the CDD, current flood conditions upstream, potential hydraulic depth within the CDD (i.e., the vertical distance from the CDD hydraulic grade line to adjacent land), and available land for engineering improvements. Given the site constraints and improved downstream condition for nutrients, we can reasonably assume large scale design components focused on nutrient-load reduction will carry a prohibitively high cost per pound of removal.

Design components that are commonly used to maximize nutrient load reductions include stormwater ponds, constructed wetlands, engineered media (such as BAM), and chemical treatment. All these design components would require very large footprints to achieve large nutrient load reductions for CCT Segment 4. A constructed wetland would likely require the largest footprint of these components to achieve a similar pollutant load reduction since flows and velocities through a constructed wetland are intentionally limited to avoid damaging vegetation, to avoid resuspending captured pollutants, and to allow time for the rate-dependent biological treatment processes to occur. All these design components would need to bypass a significant portion of flow from larger storm events, meaning most storm flows carrying sufficiently high nutrient concentrations for removal will bypass the treatment system by hydraulic necessity.

To help overcome hydraulic constraints, stormwater management systems that provide treatment can be designed as offline systems. Offline systems divert low flows from the primary conveyance system but allow moderate and high flows to bypass the treatment system. The treatment volume for offline systems typically needs to be below the existing hydraulic grade line, such that flow diversion can occur by gravity and not adversely impact upstream flood conditions, and typically requires a large available footprint to achieve significant load reductions.

For CCT Segment 4, a gravity-based diversion system would require extensive land excavation and the pollutant load removal effectiveness of the offline treatment system will still likely be limited by low inflow nutrient concentrations.

A relevant out-of-watershed treatment system comparison that illustrates these constraints is the Sweetwater Branch treatment wetland, which was designed by Jones Edmunds. The Sweetwater Branch treatment wetland serves an urban watershed of approximately 3 square miles and was designed to primarily treat inflows less than 10 cfs. The service area is less than 50% of the CCT Segment 4 project watershed and yet the required treatment wetland footprint was over 150 acres or 10 times larger than the CCT Segment 4 area available for stormwater improvements. Sweetwater Branch also has the relative benefit of treating WWTP effluent that is mixed in with the storm flows, meaning incoming nutrient concentrations are much higher than those expected for the CDD.

However, smaller scale nutrient-focused design components deserve consideration for inclusion in the project's treatment train. Small scale examples include the traditional stormwater design components mentioned above but also many GSI design components. In all cases, the achievable nutrient load reduction is limited according to the scale and site constraints. To reduce land excavation cost for a smaller scale system that treats CDD flows,

low flows could be diverted from the CDD via a small stormwater pump instead of gravity. However, stormwater pump systems will carry a higher recurring maintenance cost.

Similar to nutrient concentrations, the potential for project inflow to include high sediment concentration appears limited. Furthermore, past projects within the project watershed that either enclosed or hardened open-cut ditches make it very likely that historically occurring in-stream erosion has also been greatly reduced. On the other hand, unlike the demonstrated improving condition for nutrients downstream, the County continues to experience sedimentation issues at Lake Henrietta. In our opinion, design components focused on sediment-load reduction deserve consideration for inclusion in the project's treatment train, but achievable sediment load reduction will be limited by site constraints.

Due to the lack of representative data, the potential to reduce anthropogenic trash load is the least certain of the water-quality constituents reviewed. Multiple trash collection improvements have been constructed upstream, which should significantly reduce the downstream trash load, but it is likely that a trash load will continue to be present at the project. Design components focused on trash-load reduction deserve consideration for inclusion in the project's treatment train, but the achievable trash load reduction is uncertain and will be limited by site constraints.

8.2 DESIGN COMPONENT APPLICABILITY

In our opinion, the most effective stormwater management system designs include multiple design components in a treatment train. For this reason, our recommendation is that the CCT Segment 4 project stormwater management system be based on a LID-like approach, including traditional design components, GSI, and innovative stormwater technologies to achieve a net stormwater improvement for the community.

Based on our current understanding of the project watershed, existing site constraints will prohibit capture of moderate and high storm flows and therefore significantly limit the net stormwater improvement achievable by the project. Moreover, it is very unlikely that mitigation of existing flood conditions or large nutrient load reductions are achievable through this project given the site constraints. Instead, our recommendation is that the project's stormwater management system should focus on potential trash, sediment, and nutrient load reductions that can be reasonably achieved under low flow conditions.

Several traditional stormwater designs, GSIs, and innovative technologies were mentioned in this White Paper that could be incorporated into the project's treatment train. All the design components mentioned in this White Paper are categorized in Table 3 based on their applicability to the watershed characteristics and site constraints.

Table 3 Project Applicable Design Components

Design Component	Most Likely Applicable	Least Likely Applicable
Wet Detention		X
Retention		X
Exfiltration		X
Swales	X	
Vegetated Strips	X	
Detention w/Filtration		X
Constructed Wetlands		X
Stormwater Harvesting		X
Sediment Traps	X	
Trash Traps	X	
Erosion Control	X	
Bioretention	X	
Detention w/Biofiltration	X	
Permeable Pavement	X	
Rainwater Harvesting		X
Green Roofs		X
Engineered Media		X
Chemical Treatment		X
Floating Orifices		X
Floating Wetlands		X
Active Management	X	
Real-time Adaptive Controls		X

Preliminary engineering needs to be completed before more definitive stormwater management system design recommendations are appropriate.

9 CONCLUSION

To sum up, below is a list of key findings as it relates to the current water quality and flood mitigation of the watershed and potential innovative stormwater design applicable at the project area.

- The community has invested \$130M in stormwater retrofit facilities to provide attenuation and treatment. The most immediate downstream waterbody, Munson Slough, is no longer considered impaired for nutrients based on FDEP 2020-2022 Biennial Assessment of Impaired Waters.
- Recent studies suggest that the continued algal blooms at the lake are related to high sediment TP levels in-lake, not TN and/or TP loading from stormwater inflow through Munson Slough.
- Based on the relatively low nutrient concentrations observed in the available water-quality data under ambient condition for the CDD near the project location, stormwater retrofit treatment of the flows would not result in large nutrient load reductions and would be costly in terms of dollars per pound of nutrient removed.

- Given the relatively small project footprint, the potential stormwater management system designs for this project will be insufficient to mitigate existing flood conditions or significantly reduce nutrient load reductions.
- Likely design components include traditional design components, GSI, and innovative stormwater technologies at the project program sites and along the trail. Erosion control, sediment traps, and trash traps should also be considered.