CITY OF ORLANDO, FLORIDA

Report – Volume 1 of 2

JUNE 2026

Clean Water State Revolving Fund Facilities Plan

WRIGHT-PIERCE
Engineering a Better Environment

Clean Water State Revolving Fund Facilities Plan
City of Orlando, Florida

June 2026

Professional Certification

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Executive Summary

Objective

The objective of this Facilities Plan is to support the City of Orlando's request for funding through the Florida Department of Environmental Protection Clean Water State Revolving Fund (CWSRF) program for priority wastewater infrastructure improvements that address system reliability, regulatory compliance, and long-term service sustainability. The Plan evaluates existing conditions, documents infrastructure needs, and presents recommended alternatives for implementation consistent with CWSRF requirements.

The projects included in this Facilities Plan focus on rehabilitation and replacement of aging and critical collection and treatment system components that are approaching the end of their useful service life and present increasing operational risk. These include:

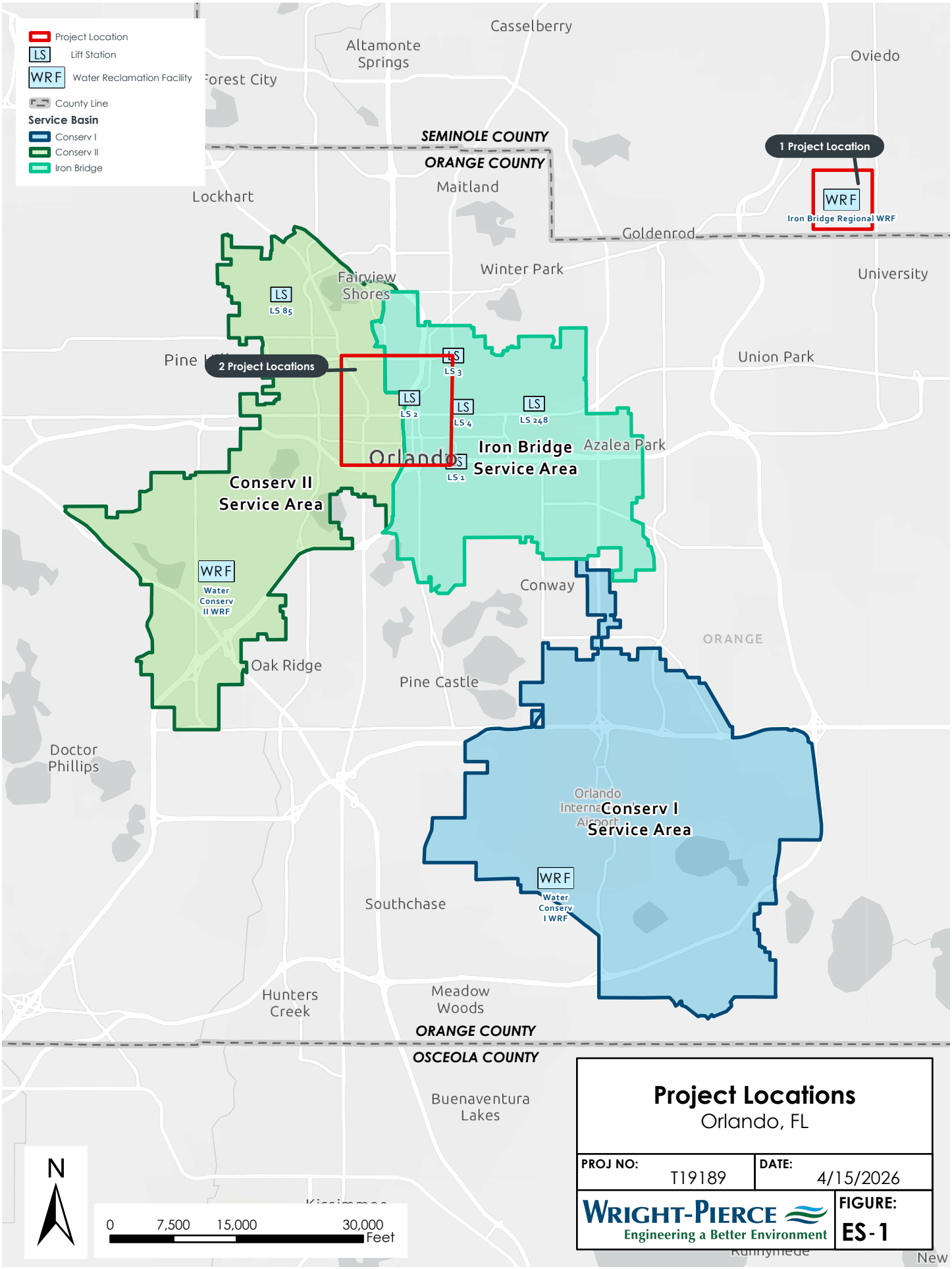
- Electrical system improvements at the Iron Bridge Regional Water Reclamation Facility
- Improvements associated with the Lift Station 2 force main
- Replacement of the South Parramore Avenue gravity sewer

Collectively, these projects are intended to reduce the likelihood of sanitary sewer overflows, improve system resiliency, maintain regulatory compliance, and support continued reliable wastewater service in areas experiencing infrastructure deterioration and capacity constraints.

Implementation of these improvements will reduce infiltration and inflow, address electrical deficiencies identified through condition assessments, improve operational reliability at critical conveyance and treatment facilities, and strengthen the City's ability to manage wet weather flows and future growth demands. These investments also support asset management objectives and protect public health and the environment by minimizing the risk of service interruptions and uncontrolled discharges.

Because of the scale and timing of the required improvements, the City is pursuing CWSRF assistance to advance these projects in a cost-effective manner while maintaining affordability for ratepayers. SRF funding will enable the City to implement these priority infrastructure upgrades within the required planning horizon and in alignment with state water quality protection goals.

A map of the proposed project locations is illustrated in **Figure ES-1**.



Project Locations
Orlando, FL

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T19189	4/15/2026

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FIGURE: ES-1

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Project Description & Justification

The projects identified for CWSRF funding involve the replacement or rehabilitation of equipment and infrastructure that has reached or exceeded its useful life or where permit compliance has become more challenging. In some cases, the City is using this opportunity to enhance reliability as well as expand capacity to meet future demands. The following is a brief description of each project and a summary of the project drivers.

Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements

The Iron Bridge Regional Water Reclamation Facility (WRF) is a City-owned facility that has provided wastewater treatment to the northeast section of Orlando and unincorporated portions of Orange and Seminole counties since 1982. The Iron Bridge facility operates a Bardenpho process for biological treatment which is critical for the facility to achieve its stringent effluent limits, including the removal of greater than 95% of influent total nitrogen and phosphorus loadings. The City of Orlando proposes electrical infrastructure improvements at the Iron Bridge Regional WRF to support continued reliable operation of the Bardenpho biological nutrient removal process.

The project will rehabilitate and modernize critical power distribution components serving the Bardenpho blower building and associated treatment processes including the replacement of two existing medium voltage transformers, installation of new switchgear, and installation of new generator docking station to enhance emergency power resiliency. An additional temporary generator connection and distribution board will maintain process operation during planned outages and unforeseen power interruptions. Electrical, instrumentation, and control system improvements will be implemented to support the upgraded equipment and improve monitoring, operability, and maintainability of the blower system infrastructure. Additional improvements include demolition and removal of obsolete electrical equipment; installation of new VFD feeders and conduit systems; grounding and surge protection upgrades; and structural modifications to support new electrical infrastructure. The new VFD feeders will resolve existing pump control issues associated with the current standard feeders. These improvements are necessary to address aging equipment, improve operational reliability, and maintain compliance with regulatory performance requirements for advanced wastewater treatment.

Lift Station 2 Force Main Phase I, Part B

The City has been conducting force main evaluations throughout the downtown and East Orlando tributary area. This area is expected to experience significant growth within a 50-year planning period and increased wastewater flows will result in increased operating pressures on the existing cast-iron force mains installed in the 1940s. Because there are no alternative force mains to transmit wastewater (and few operating isolation valves in the existing system), maintenance or rehabilitation would require shutting down the force mains and providing extensive bypass pumping, which is not feasible. In addition, if a break were to occur in a force main, it would pose public health and environmental hazards along with economic impacts to the community.

In 2017, the City completed a force main study that included a tributary flow analysis and future flow projections, hydraulic analysis, a review of rehabilitation or replacement alternatives, and an alternative route analysis for replacement of portions of the Lift Station (LS) 1/7, 2, 3, and 4 force mains. The City plans to advance the replacement, rehabilitation, and/or rerouting of the existing LS 2 force main, which currently conveys flow through approximately 7,700 feet of 20-inch cast iron pipe and connects to the 30-inch force main near LS 4. The proposed construction of Phase 1, Part B of the LS 2 force main is described in this Facilities Plan and will use State Revolving Fund loan funding. Refer to **Appendix C in Volume 2** for the *June 2017 City of Orlando Wastewater Force Main Evaluation*, which describes the results of the evaluation in additional detail.

It shall be noted that the City of Orlando's participation in this project is partial. The City of Orlando is responsible for approximately 26% of the cost. The City's participation is associated primarily with the portion of the work directly supporting the LS 2 wastewater force main transmission improvements, including installation of the new 20-inch force main segment, related fittings and appurtenances, and the connections required to integrate the new pipeline into the City's existing conveyance system. The remaining project costs correspond to corridor infrastructure and transmission improvements benefiting and paid by the Orlando Utilities Commission (OUC).

South Parramore Avenue Gravity Sewer Upgrade

The City of Orlando plans to improve the existing gravity sewer system in the Holden Parramore Neighborhood which is located in Orlando, FL as a part of the City's effort to address aging infrastructure to enhance resilience and support ongoing urban development. The City plans to rehabilitate and/or replace approximately 0.35 miles of 8-inch vitrified clay pipe (VCP) that runs between Gore Street and Long Street as described in this Facilities Plan and will use State Revolving Fund loan funding. The work includes removal and replacement of existing vitrified clay gravity sewer pipe segments identified through video inspection and condition assessment, along with reconstruction of manholes and service connections as required to meet current City standards. Closed-Circuit Television (CCTV) inspection is used to confirm pipe condition and support final design limits for replacement.

The Parramore Avenue Gravity Sewer Replacement Project is being implemented as a coordinated corridor improvement effort with cost participation from multiple agencies. Based on the current design phase construction cost allocation, approximately 59% of the cost is attributable to the City of Orlando Water Reclamation Division for gravity sewer replacement. The remaining costs are shared by the City Streets and Stormwater Division (19%), the Community Redevelopment Agency (19%), and Orlando Utilities Commission (3%) for associated corridor improvements within their respective infrastructure responsibilities.

Besides the gravity sewer replacement, other work primarily cost shared by the participating entities includes localized stormwater improvements consisting of inlet and conveyance modifications where drainage deficiencies coincide with sewer replacement. Roadway work is limited to pavement restoration associated with utility installation, with minor streetscape adjustments incorporated as part of corridor reconstruction. The project has advanced to the final design stage, and the scope described reflects the current understanding of the planned improvements at the time of preparation of this Facilities Plan.

Project Cost Summary

Construction costs presented in this Facilities Plan are planning level opinions of probable construction cost consistent with the level of project development typical of an SRF Facilities Plan. In accordance with standard estimating practice, two contingencies are applied. A design phase contingency is included within the opinion of probable construction cost to account for uncertainty in quantities and project definition prior to completion of final design and bidding. In addition, the City has identified a separate construction phase contingency to address potential unknown conditions and owner directed changes that may occur during construction. Separating these contingencies provides a clearer representation of expected bid costs versus implementation level budget needs and is consistent with the level of accuracy expected for planning stage evaluations submitted to FDEP.

The Total Project Construction Budget represents the estimated funding required for implementation of the project and includes the total estimated construction cost (bids) plus an allowance for construction phase contingency. This value reflects the City's anticipated financial commitment to deliver the project through completion.

Table ES-1 provides a summary of the project costs, including design phase contingency and construction phase contingency. A total of approximately **$24.0 million** in capital costs are anticipated to be funded through the CWSRF program. Detailed costs are provided in Section 6.

Table ES-1 Project Cost Summary

Project Name	Total Project Construction Budget (Rounded)	Funding Source	Fiscal Year
Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements	$11,704,800	State Revolving Fund (SRF)	FY 2027
Lift Station 2 Force Main Phase I, Part B	$9,576,120	State Revolving Fund (SRF)	FY 2027
South Parramore Avenue Gravity Sewer Upgrade	$2,699,225	State Revolving Fund (SRF)	FY 2027
Total Project Construction Budget	$23,980,145		

Project Schedule

Table ES-2 presents a proposed schedule for the selected alternatives of each project, including design and permit completion and construction start and end dates.

Table ES-2 Project Schedule

Project Name	Fiscal Year	Bid Documents Completed and Permits Issued	Construction Start	Construction End	Construction Period (estimated)
Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements	2027	June, 2026	January, 2027	May, 2028	16 Months
Lift Station 2 Force Main Phase I, Part B	2027	June, 2026	January, 2027	January, 2028	12 Months
South Parramore Avenue Gravity Sewer Upgrade	2027	June, 2026	January, 2027	January, 2028	12 Months

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Section 1 Introduction

1.1 Objective

This Facilities Plan was developed by Wright-Pierce, Inc., in collaboration with Barnes, Ferland and Associates, Inc., and Raftelis Financial Consultants, Inc., on behalf of the City of Orlando (City) to meet the Florida Department of Environmental Protection's (FDEP's) Clean Water State Revolving Fund (CWSRF) loan funding requirements for upcoming Water Reclamation Division infrastructure improvement projects. Specifically, the City has sanitary collection system, force main, and water reclamation facility (WRF) upgrade projects planned for Fiscal Years (FY) 2027. This Facilities Plan identifies three improvement projects within the City's wastewater service area, describes alternative methods and costs for addressing the project specific needs, and provides recommendations and costs for each project.

The Facilities Plan is intended to satisfy the CWSRF funding eligibility requirements, as summarized within Section 62-503.700(2) F.A.C. for the State Revolving Loan program. The City is interested in pursuing a CWSRF loan to finance the following three capital improvement projects:

- Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements
- Lift Station 2 Force Main Phase I, Part B
- South Parramore Avenue Gravity Sewer Upgrade

1.2 Project Location & Background

The City of Orlando is geographically located in Central Florida in Orange County. The City, which was incorporated in 1875, lies near Lake Apopka between Sanford and Kissimmee, and is intersected by U.S. Highway Interstate 4 (I-4) and State Route 408. The City provides a comprehensive range of municipal services including general government, public safety, community development, public works, planning, utilities, and parks and recreation. The City's Public Works Department provides wastewater and reclaimed water services through its Water Reclamation Division. All of the projects included within this Facilities Plan fall under the Water Reclamation Division's jurisdiction (gravity collection system and force mains, lift stations, and water reclamation facilities).

1.3 Existing Wastewater Management Systems & Service Area

The wastewater service area includes the municipal boundaries of the City of Orlando and portions of unincorporated Orange County. The City is responsible for the collection and treatment of wastewater as well as the distribution of reclaimed water for public-access and non-potable reuse. The wastewater service area is divided into three separate regions comprised of a network of collection and transmission/distribution piping and treatment facilities as follows:

- The central and eastern portions of the City's service area are pumped to the Iron Bridge Regional WRF, located in Oviedo in neighboring Seminole County.
- Treatment for the southeast portion of the City's service area is provided by the Water Conserv I WRF.
- The western portion of the City's service area is served by the Water Conserv II WRF.

Table 1-1 WRF Service Area Summary

WRF Service Area	Population Served [1]	Miles of Gravity Main [1]	Miles of Force Main [1]	WRF Permitted Capacity (MGD) [2]
Iron Bridge	165,909	325	53	40
Water Conserv I	64,935	93	66	7.5
Water Conserv II	159,826	230	59	25

Note:
1. Source: City of Orlando Service Population Projections from 2024 to 2050, Growth Management Plan, Updated 2024
2. Source: FDEP Operating Permit

An estimated 648 miles of public gravity lines, 178 miles of force mains, and 224 lift stations make up the City's sanitary collection and transmission system. The developed portions within the service area that are not served by sewer lines are assumed to be on septic tank systems.

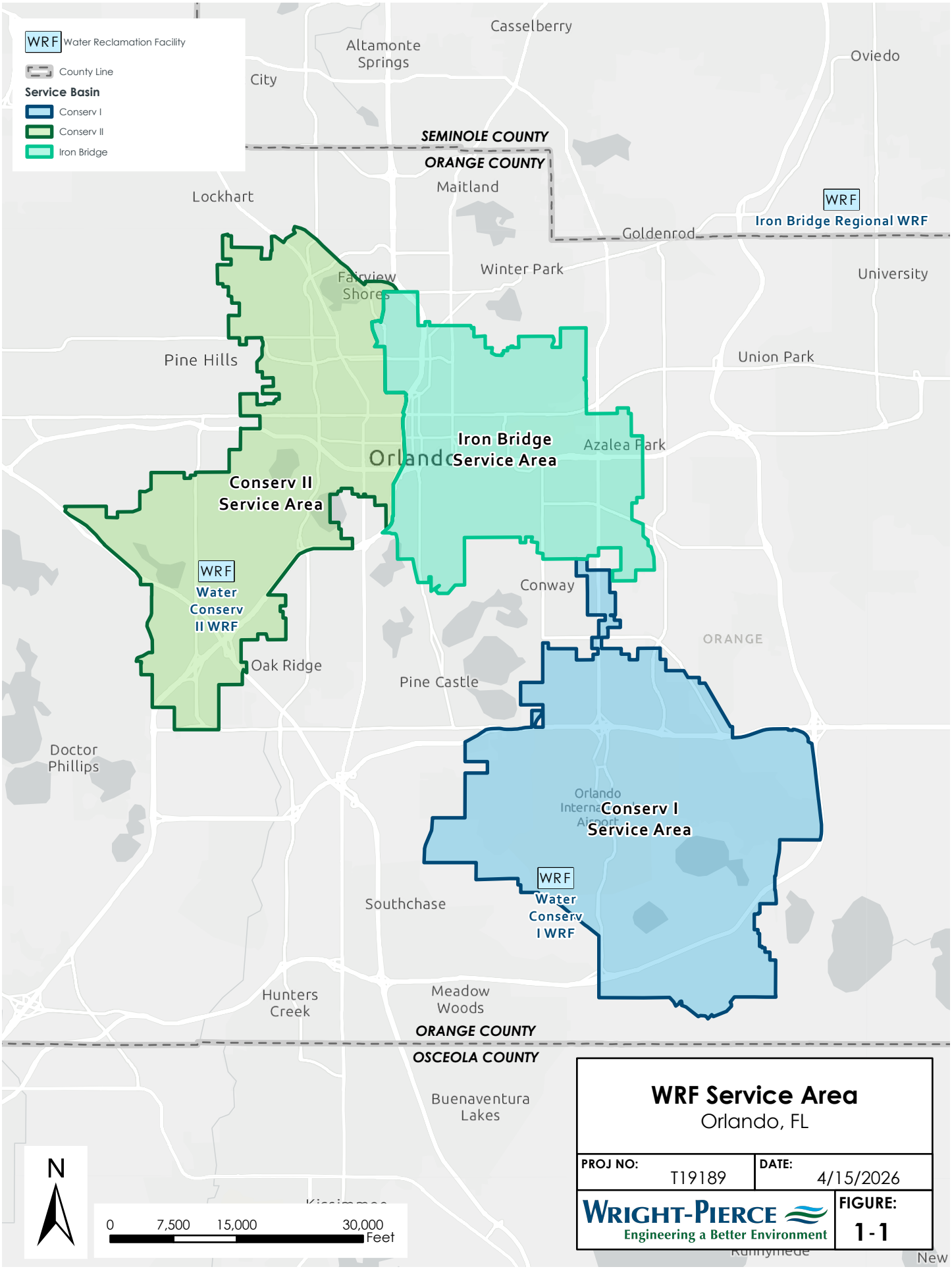
The City's wastewater service area and its three existing WRFs are shown on **Figure 1-1**. The combined capacity of City's three water reclamation facilities is 72.5 MGD.

1.3.1 Iron Bridge Regional Water Reclamation Facility

The Iron Bridge Regional WRF is located at 601 Iron Bridge Circle in Oviedo, FL. The treatment facility provides service to the cities of Orlando, Winter Park, Maitland, Casselberry, and unincorporated portions of Orange and Seminole Counties. The total permitted capacity of the Iron Bridge Regional WRF is 40.0 MGD on an annual average daily flow (AADF) basis, and it is the largest of the City's WRFs.

Raw sewage from the collection system is pumped to the Iron Bridge Regional WRF site from off-site lift stations. Wastewater enters the facility at the master pump station where it is pumped to an elevated screenings structure which includes two, 3-mm perforated plate mechanical screens and a screenings bypass channel. Solids removed by the screening process are dewatered and disposed at a landfill. The existing grit removal is provided by four induced vortex grit removal systems. Grit removed from the wastewater is also dewatered and disposed at a landfill.

The activated sludge process consists of four, 5-stage Bardenpho treatment trains. The first stage fermentation zone is an anaerobic zone conducive to growth of certain anaerobic species for phosphorus removal. The second stage is an anoxic zone where denitrification, or the conversion of nitrate to nitrogen gas, occurs. Internal recycle pumps convey nitrate-rich mixed liquor from the aeration zone back to the anoxic zone for denitrification. The third stage is an aerobic zone where heterotrophic bacteria oxidize organic matter to carbon dioxide and water and nitrifiers oxidize ammonia-nitrogen to nitrate-nitrogen. The fourth stage is a second anoxic zone for additional denitrification followed by the last stage, reaeration, which is used to strip residual nitrogen gas from solution, remove some remaining ammonia, minimize the release of phosphorous in the secondary clarifiers, and increase the dissolved oxygen in the final effluent.



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WRF Service Area

Orlando, FL

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FIGURE: 1-1

After the reaeration zone, mixed liquor flows by gravity to the clarifier splitter box where the mixed liquor is split among eight secondary clarifiers. In the secondary clarifiers, solids settle to the bottom of the clarifier and are either returned to the activated sludge process as return activated sludge (RAS) or removed from the system as waste activated sludge (WAS) and sent to the sludge holding tank.

Clarified or secondary effluent flows by gravity to the tertiary filters. The Iron Bridge Regional WRF has twelve deep bed filters which are used to reduce the total suspended solids content of the secondary effluent to less than 5 mg/L as required to meet high-level disinfection requirements. The filtered effluent is collected in the filters' underdrain system and flows by gravity to a splitter box which sends flow to disinfection and effluent disposal. Effluent produced by the Iron Bridge Regional WRF is reused for:

- Public access reuse, including irrigation, within the Eastern Regional Reclaimed Water Service Area.
- Surface water discharge to the Little Econlockhatchee River and St. Johns River (Class III freshwater body)
- A wetland treatment system (Orlando Easterly Wetlands) that covers 1,640 acres and consists of 18 cells that ultimately discharge to the St. Johns River.

1.3.2 Water Conserv II Water Reclamation Facility

The Water Conserv II WRF is located on L.B. McLeod Road and provides service to residential and commercial areas generally west of I-4. In 2021, the total permitted capacity of the facility was re-rated from 21.0 MGD to 25.0 MGD on an AADF basis.

Raw sewage from the collection system is pumped directly to the Water Conserv II WRF from off-site lift stations in the City's service area, as well as up to 1.0 MGD from the City of Winter Park. The raw sewage enters the facility at the master pump station where the wastewater is pumped to the elevated headworks structure which includes two influent mechanical screens and two induced vortex grit removal systems. Solids removed by the screening and grit removal equipment are dewatered and disposed of at a landfill. Offline flow equalization is provided upstream of the headworks to attenuate peak flows to the downstream processes.

From the headworks, wastewater bypasses two primary clarifiers and flows by gravity to the activated sludge process, which consists of two 4-stage treatment trains. The first stage, an anoxic zone, is where denitrification occurs. Internal recycle pumps convey nitrate-rich mixed liquor from an aerated internal recycle channel back to the anoxic zone for denitrification. The second stage is an aerobic zone where heterotrophic bacteria oxidize organic matter to carbon dioxide and water and nitrifiers oxidize ammonia-nitrogen to nitrate-nitrogen. The third stage is a second anoxic zone for additional denitrification followed by the final, reaeration stage which strips residual nitrogen gas from solution, removes some remaining ammonia, and increases the DO in the final effluent.

After the reaeration zone, mixed liquor flows by gravity to the secondary clarifier splitter box which divides the mixed liquor among four secondary clarifiers. Solids settle to the bottom of the clarifiers and are either returned to the activated sludge process as RAS or removed from the system as WAS and sent to the sludge holding tank.

Secondary effluent flows by gravity to six traveling bed tertiary sand filters. A secondary effluent equalization tank is used to attenuate flows to the filters. The filters reduce the total suspended solids content of the secondary effluent to less than 5 mg/L as required to meet high-level disinfection requirements. The filtered effluent flows by gravity to the chlorine contact tank for chlorine gas disinfection. Biosolids are dewatered and stabilized to EPA Class AEQ using a Bioset reactor and hauled off for land application and beneficial reuse.

Effluent produced by the Water Conserv II WRF is used for:

- Local public access reuse.
- Recharge of the aquifer through a series of RIBs at a regional reclaimed water distribution center in west Orange County.

1.3.3 Water Conserv I Water Reclamation Facility

The Water Conserv I WRF is located along Richard E. Johnson Boulevard near Boggy Creek Road and provides service to the City's southeast quadrant. The total permitted capacity of the facility is 7.5 MGD on an AADF basis. The City is planning to make several improvements to the Water Conserv I WRF in the near future to expand its capacity to an AADF of 15.0 MGD.

Raw sewage from the collection system is pumped directly to the Water Conserv I WRF site from off-site lift stations in the City's service area. The raw sewage enters the facility at an elevated headworks structure which includes influent screening and grit removal. Influent screening consists of two, 6-mm perforated plate mechanical screens. Solids removed by the screenings process are dewatered and disposed of at a landfill. Grit removal is provided by two induced vortex grit removal systems. Grit removed from the wastewater is dewatered and disposed of at a landfill. Currently, the grit removal equipment is not in service. Offline flow equalization is provided to attenuate peak flows to the secondary processes, which includes an activated sludge process and secondary clarification to provide biological nutrient removal.

The activated sludge process consists of a 2-stage activated sludge process. Before entering the aeration tanks, the screened wastewater is mixed with the RAS from the secondary clarifiers. Flow is split between the three process trains, each divided into two zones. The first stage, an anoxic zone, is where denitrification or the conversion of nitrate to nitrogen gas occurs. A small submersible pump returns a portion of nitrate-rich mixed liquor from the aeration zone back to the anoxic zone for denitrification. The second stage is an aerobic zone where heterotrophic bacteria oxidize organic matter to carbon dioxide and water and nitrifiers oxidize ammonia-nitrogen to nitrate-nitrogen.

After the aeration zone, mixed liquor flows by gravity to two secondary clarifiers. Solids settle to the bottom of the clarifier and are either returned to the sludge process as RAS or removed from the system as WAS.

Clarified or secondary effluent flows by gravity through denitrification tanks (which are currently not used as such) and bypasses the two final clarifiers to the tertiary filters. The Water Conserv I WRF has four deep bed filters which are used to reduce the total suspended solids content of the secondary effluent to less than 5 mg/L as required to meet high-level disinfection requirements. The filtered effluent is collected in the filters' underdrain system and flows by gravity to the chlorine contact tank for chlorine disinfection.

Effluent produced by the Water Conserv I WRF is reused for:

- Public access reuse
- Recharge of the aquifer through a series of rapid infiltration basins (RIBs)

WAS is pumped directly from the secondary clarifiers to a gravity belt thickener and thickened for transport to a lift station for eventual conveyance to the Iron Bridge Regional WRF for further treatment and disposal.

2

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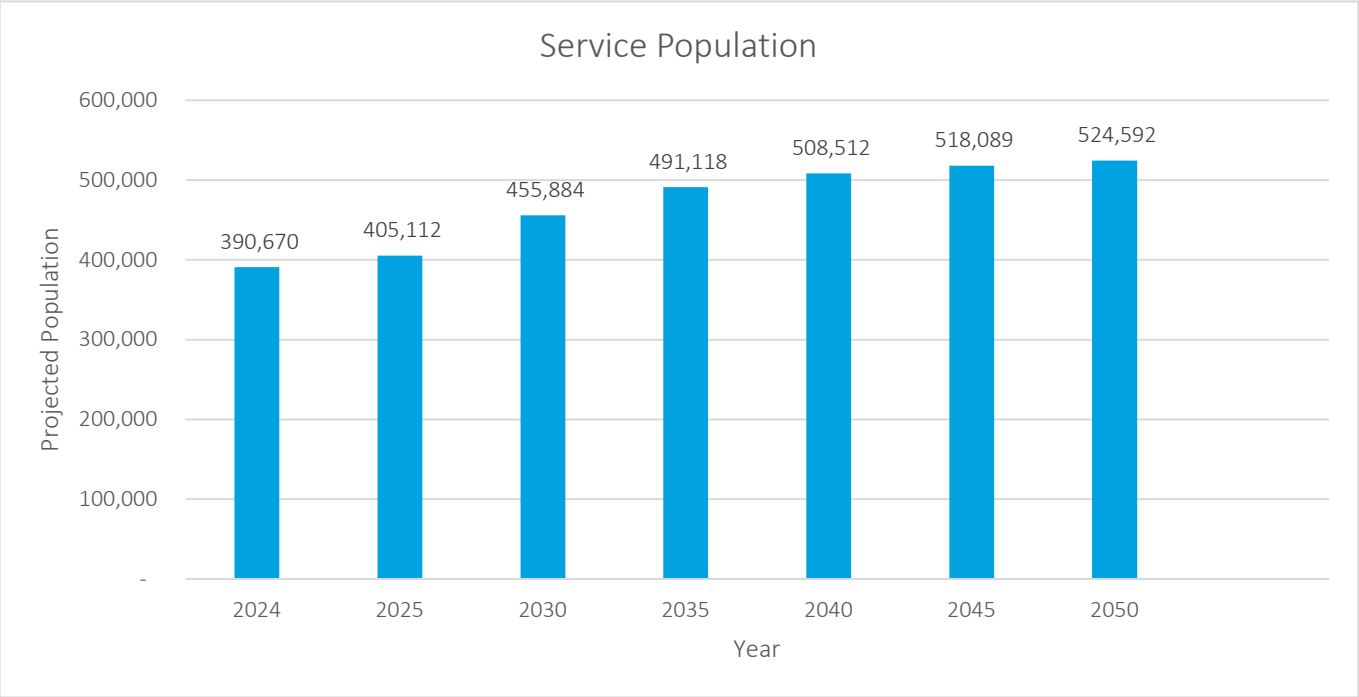
Section 2 Projections

This section discusses the future population and projected wastewater flows for the City of Orlando.

2.1 Population Projections

In 2024, the City of Orlando estimated its "service" population to be approximately 390,000. The service population is the effective population receiving City services and is greater than the base resident population because it also includes tourists, the homeless, and commuters from outside the City that travel for work. **Figure 2-1** shows the City's service population projections through 2050.

Figure 2-1 Wastewater Service Area Population Projections



Source: City of Orlando Service Population Projections from 2024 to 2050, Growth Management Plan (Updated 2024)

The population projections above are representative of the wastewater customers within the City limits only. Because the City provides wastewater services to customers outside its City limits and population data for each of these service areas is not directly available, Traffic Analysis Zones (TAZs), which are based on population, were used to estimate wastewater flows through 2050.

2.2 Wastewater Flow Projections

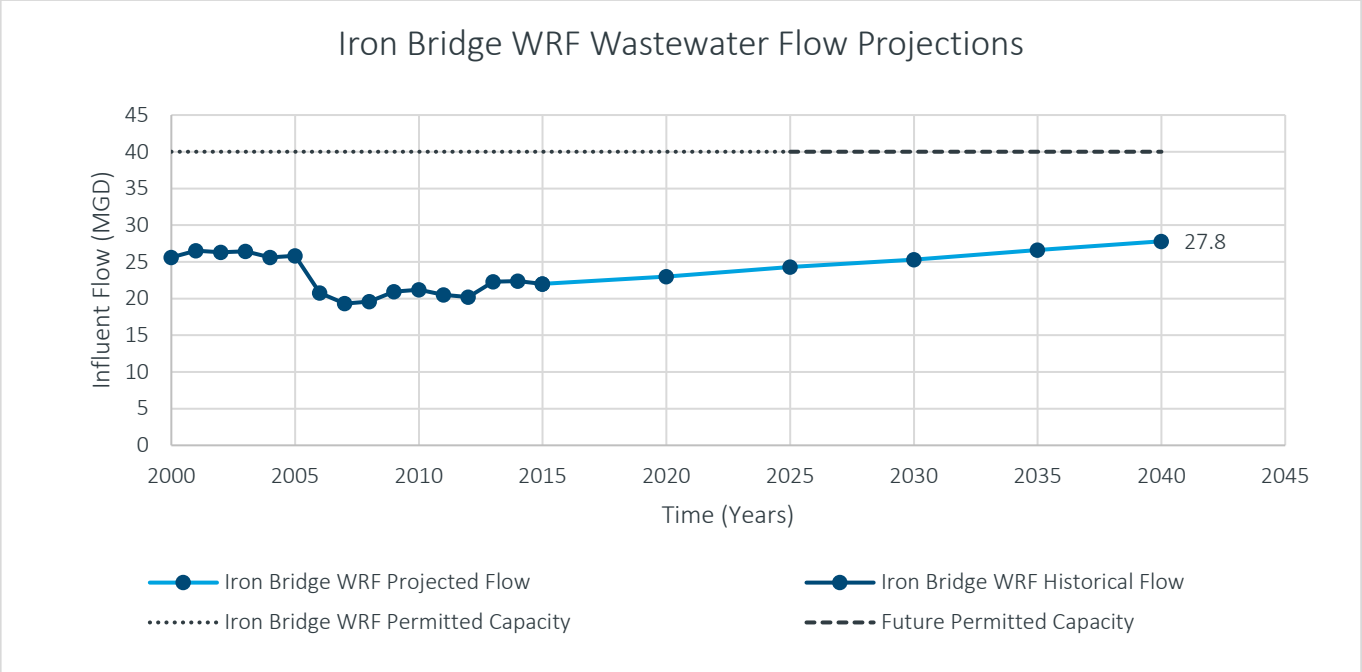
The City routinely updates its service population and flow projections. Wastewater flow projections consider the number and type of service connections (e.g. residential, commercial), future service connections, number of persons per connection and per capita wastewater production. A geospatial analysis of TAZ projections and service population from the City of Orlando Growth Management Plan was used to estimate future wastewater flow.

The approach for the wastewater flow projections uses both historical influent flow and population/level of service (LOS) projection methods. The population/LOS projection method uses wastewater generation rates for a given number of connections (or service population), as opposed to the actual wastewater flow that a service population generates. Because of this, the flows estimated by the population/LOS method are typically greater than the actual flow. However, the population/LOS method accounts for declining growth rates as the service area approaches build-out. Historical flow data provides actual flows generated by the service population. However, this approach does not account for slowing growth as the service area approaches build-out. To take advantage of the strengths of each method, the two methods are combined to produce an "adjacent" population/LOS that matches the actual flows generated within the service area. Future wastewater flows are then allowed to increase based on the growth rate of the service population.

Using the combined approach, **Figure 2-2** through **Figure 2-5** were developed to show the projected wastewater flows by service area, and the combined flows of the City's three WRFs. **Table 2-1** provides a summary of these projections.

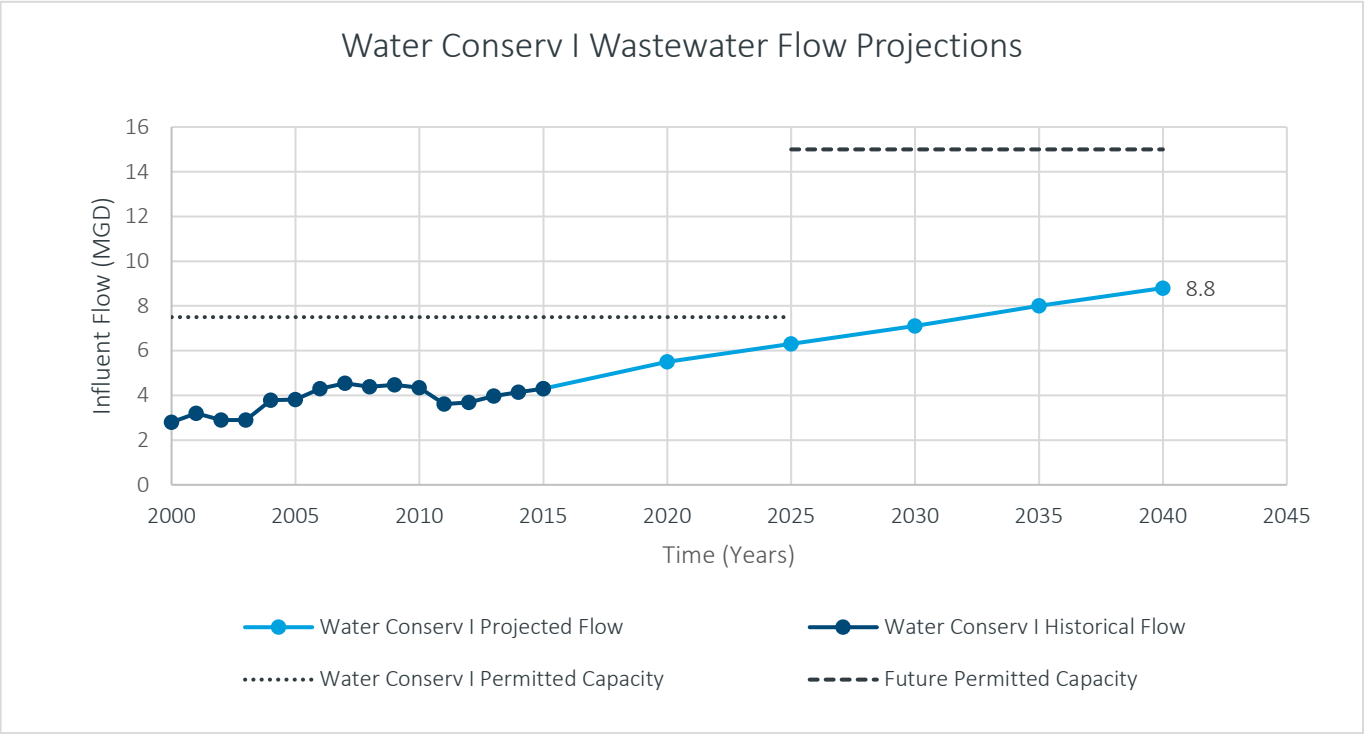
The historical flows for 2015 at the Iron Bridge, Water Conserv I, and Water Conserv II WRFs were 22.0 MGD, 4.3 MGD, and 14.2 MGD, respectively, for a total of 40.5 MGD. By the year 2040, total wastewater flows are expected to increase by approximately 12.2 MGD to a total of 52.7 MGD. In the future, the Water Conserv I WRF will be expanded from its current 7.5 MGD capacity to 15.0 MGD in order to meet the expected growth in the southeast portion of the City's service area. Additional details for this analysis can be found in the *September 2020, Water Reclamation System Asset Management Plan by Tetra Tech* (included as **Appendix C in Volume 2**) and is incorporated by reference within this section.

Figure 2-2 Iron Bridge WRF Wastewater Flow Projections



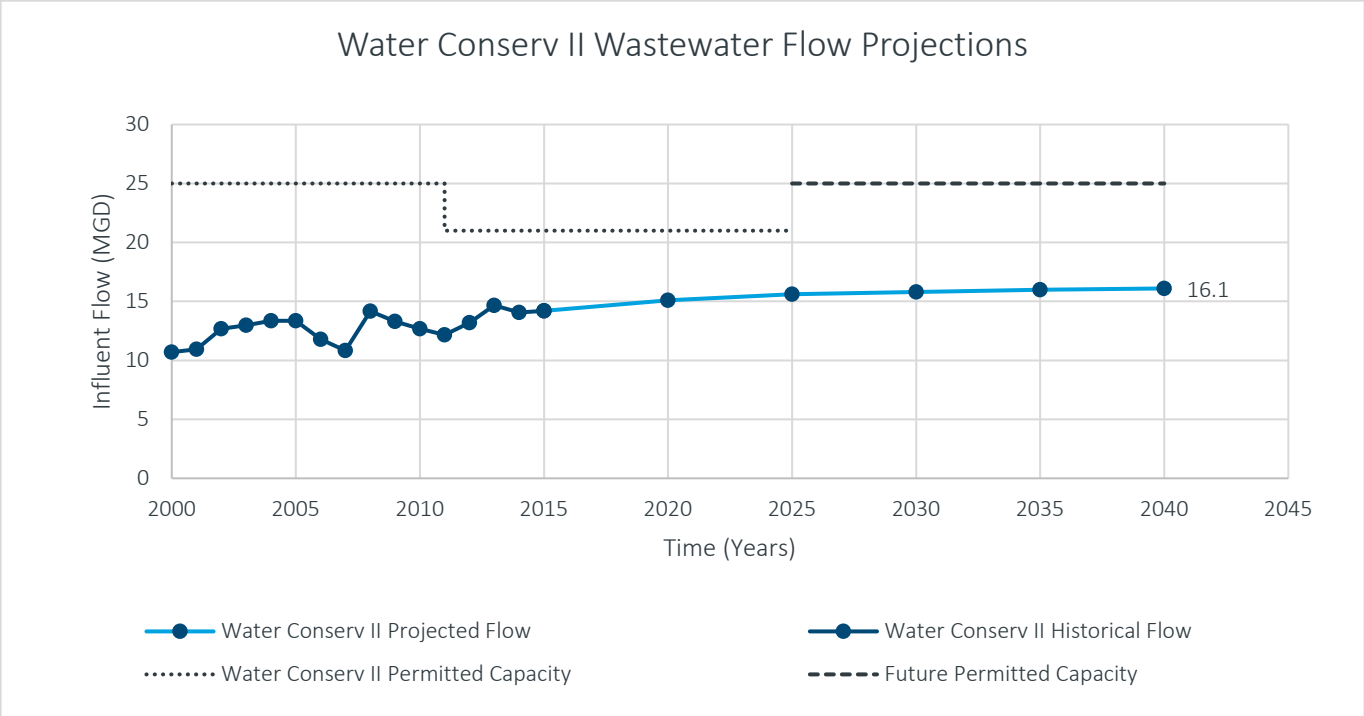
Source: City of Orlando SRF Asset Management Plan 2020 and Capacity Analysis Report 2025

Figure 2-3 Water Conserv I Wastewater Flow Projections



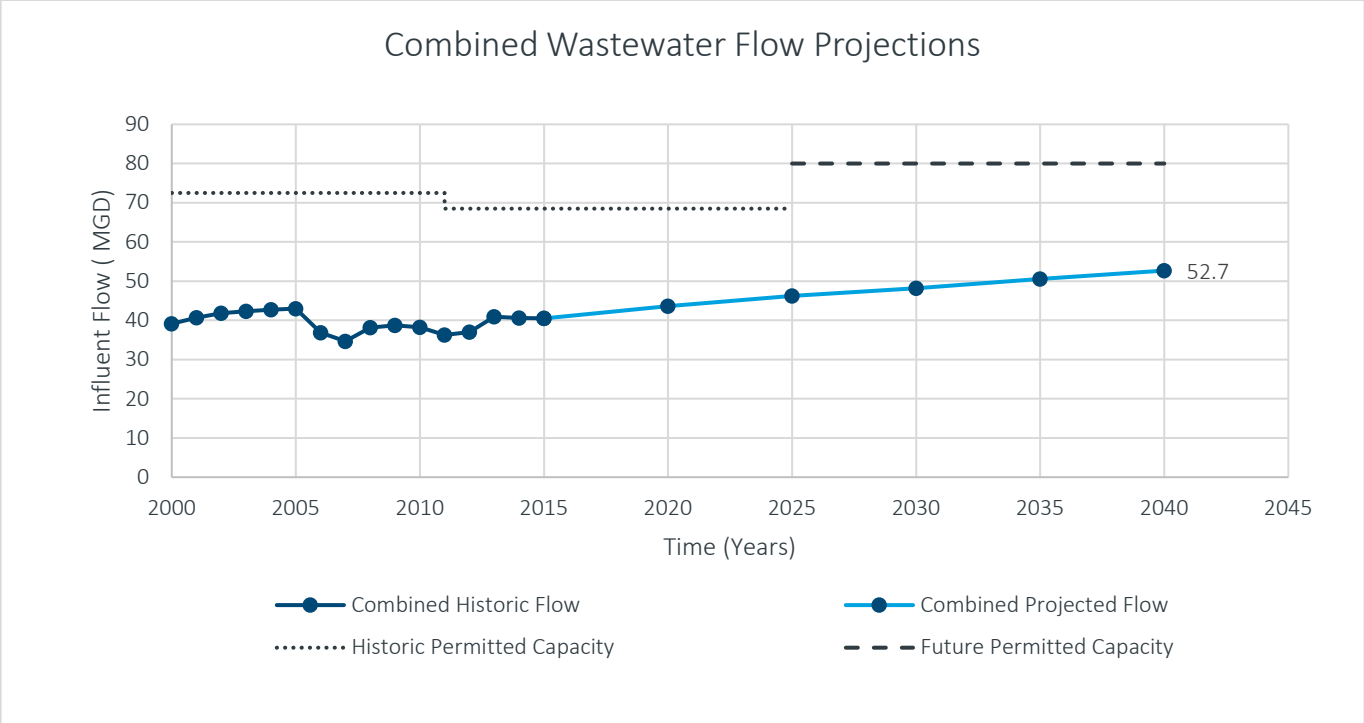
Source: City of Orlando SRF Asset Management Plan 2020 and Capacity Analysis Report 2021

Figure 2-4 Water Conserv II Wastewater Flow Projections



Source: City of Orlando SRF Asset Management Plan 2020 and Capacity Analysis Report 2021

Figure 2-5 Combined Wastewater Flow Projections



Source: City of Orlando SRF Asset Management Plan 2020 and Capacity Analysis Reports

Table 2-1 Wastewater AADF Projections (MGD)

Year	Iron Bridge WRF	Water Conserv I	Water Conserv II	Total Flow	Total Permitted Capacity
2015	22.0	4.3	14.2	40.5	68.5
2020	23.0	5.5	15.1	43.6	68.5
2025	24.3	6.3	15.6	46.2	72.5[1]
2030	25.3	7.1	15.8	48.2	80[1]
2035	26.6	8.0	16.0	50.6	80[1]
2040	27.8	8.8	16.1	52.7	80[1]

Source: City of Orlando SRF Asset Management Plan 2020

[1] Water Conserv II permitted capacity was rerated to 25.0 MGD from 22.0 MGD and values have been accordingly updated from the City of Orlando SRF Asset Management Plan 2020. Water Conserv I is anticipated to request authorization during the upcoming permit renewal process to increase its permitted treatment capacity from 7.5 MGD to 15 MGD.

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Section 3 Project Descriptions & Justification

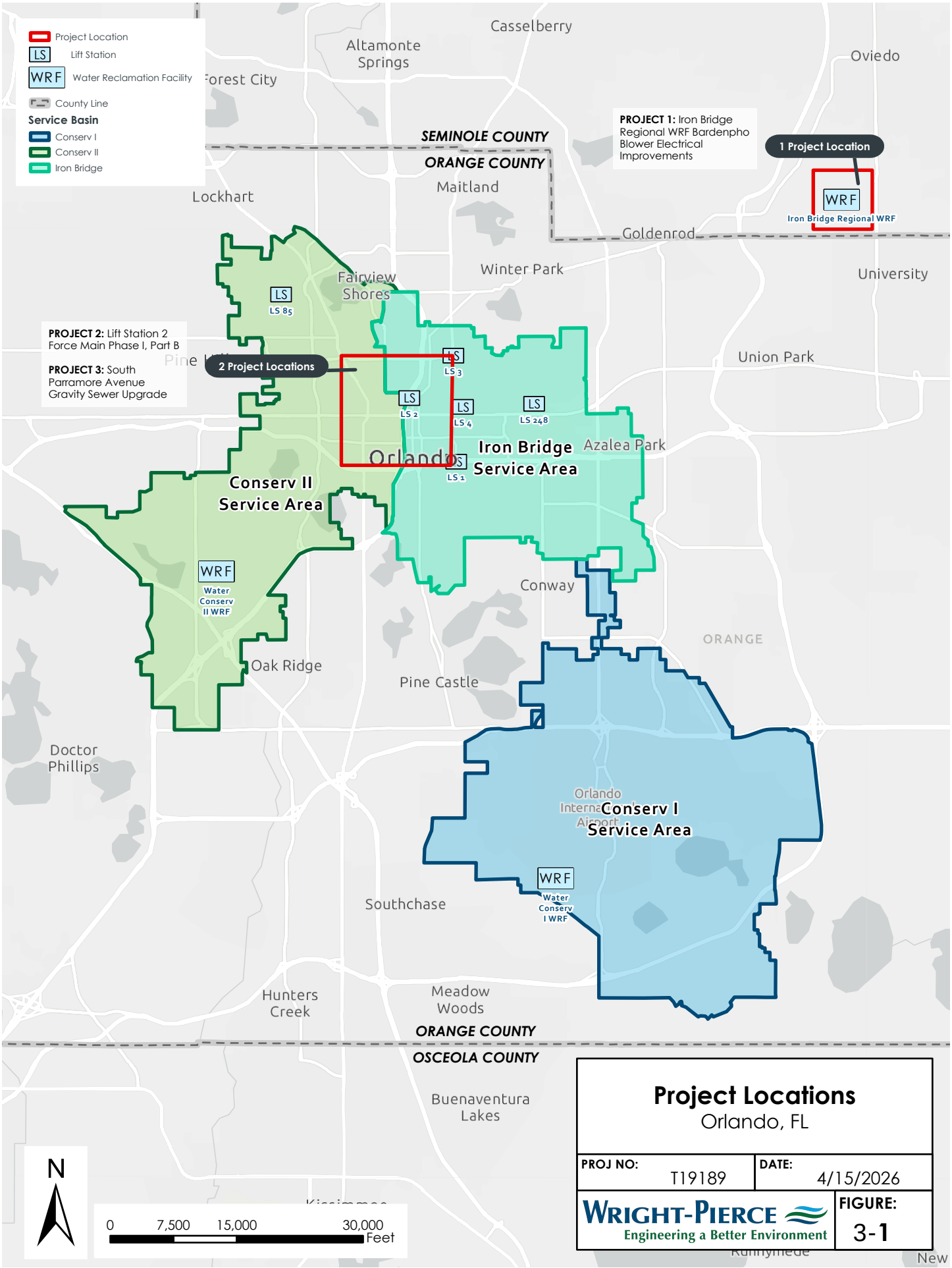
The projects identified for CWSRF funding involve the replacement or rehabilitation of equipment and infrastructure that has reached or exceeded its useful life or where permit compliance has become more challenging. In some cases, the City is using this opportunity to enhance reliability as well as expand capacity to meet future demands. The following is a brief description of each project and a summary of the project drivers. A map of the various project locations within the City's service areas is shown on **Figure 3-1**.

3.1 Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements

The Iron Bridge Regional Water Reclamation Facility (WRF) is a City-owned facility that has provided wastewater treatment to the northeast section of Orlando and unincorporated portions of Orange and Seminole counties since 1982. The Iron Bridge facility operates a Bardenpho process for biological treatment which is critical for the facility to achieve its stringent effluent limits, including the removal of greater than 95% of influent total nitrogen and phosphorus loadings. The City of Orlando proposes electrical infrastructure improvements at the Iron Bridge Regional WRF to support continued reliable operation of the Bardenpho biological nutrient removal process.

The project will rehabilitate and modernize critical power distribution components serving the Bardenpho blower building and associated treatment processes including the replacement of two existing medium voltage transformers, installation of new switchgear, and installation of new generator docking station to enhance emergency power resiliency. An additional temporary generator connection and distribution board will maintain process operation during planned outages and unforeseen power interruptions. Electrical, instrumentation, and control system improvements will be implemented to support the upgraded equipment and improve monitoring, operability, and maintainability of the blower system infrastructure. Additional improvements include demolition and removal of obsolete electrical equipment; installation of new VFD feeders and conduit systems; grounding and surge protection upgrades; and structural modifications to support new electrical infrastructure. The new VFD feeders will resolve existing pump control issues associated with the current standard feeders. These improvements are necessary to address aging equipment, improve operational reliability, and maintain compliance with regulatory performance requirements for advanced wastewater treatment.

The improvements included in this project were first identified in the *January 2014, Preliminary Design Report – Iron Bridge 480V Improvements*. The City implemented a phased approach to the required electrical upgrades, prioritizing other urgent electrical projects. The scope of this project was later separated from those earlier, larger efforts, and the City has now advanced implementation of the proposed improvements under this project. A map of the project location area is shown on **Figure 3-2**.



Project Locations
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FIGURE: 3-1

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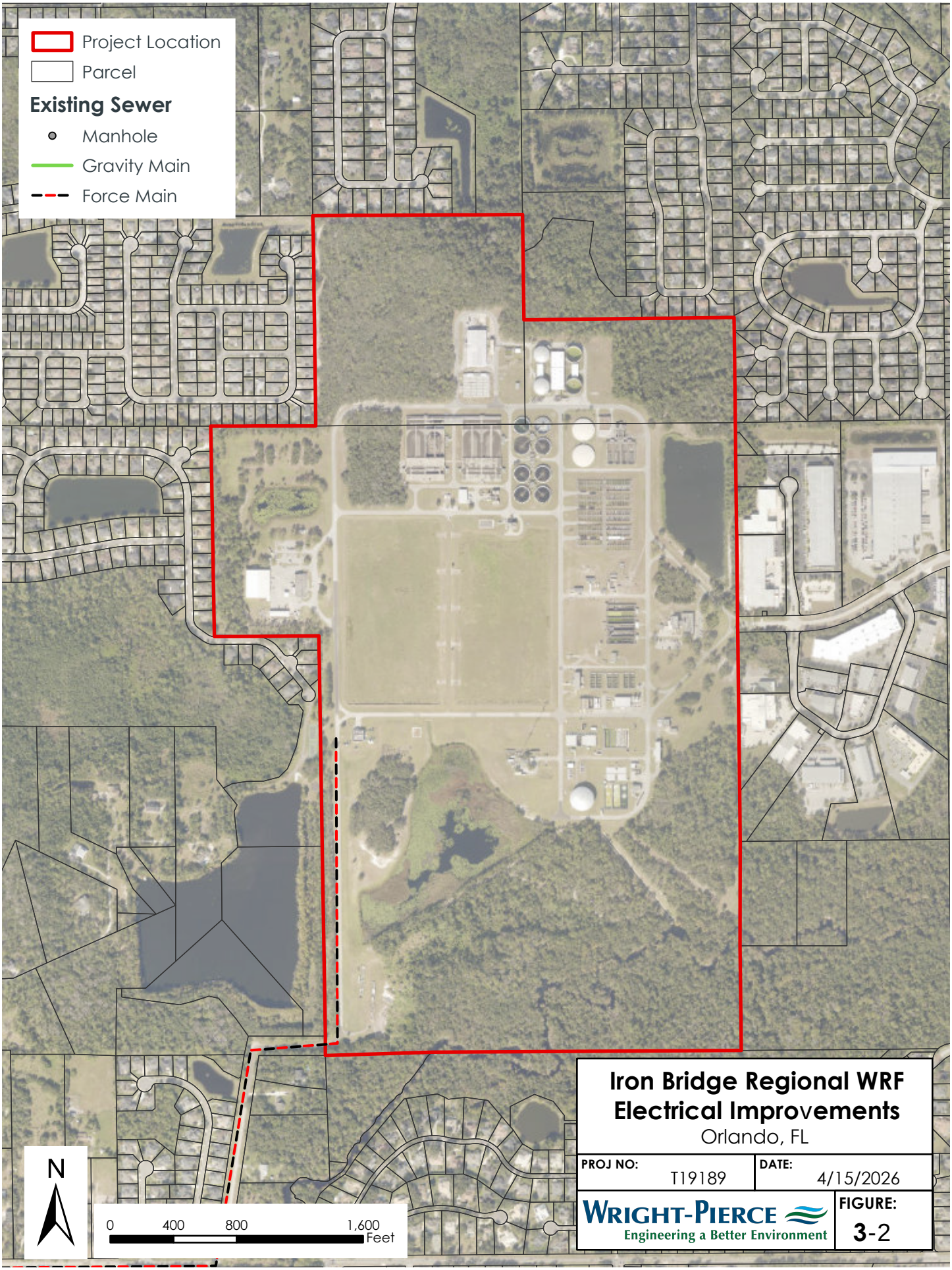

Iron Bridge Regional WRF Electrical Improvements

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FIGURE: 3-2

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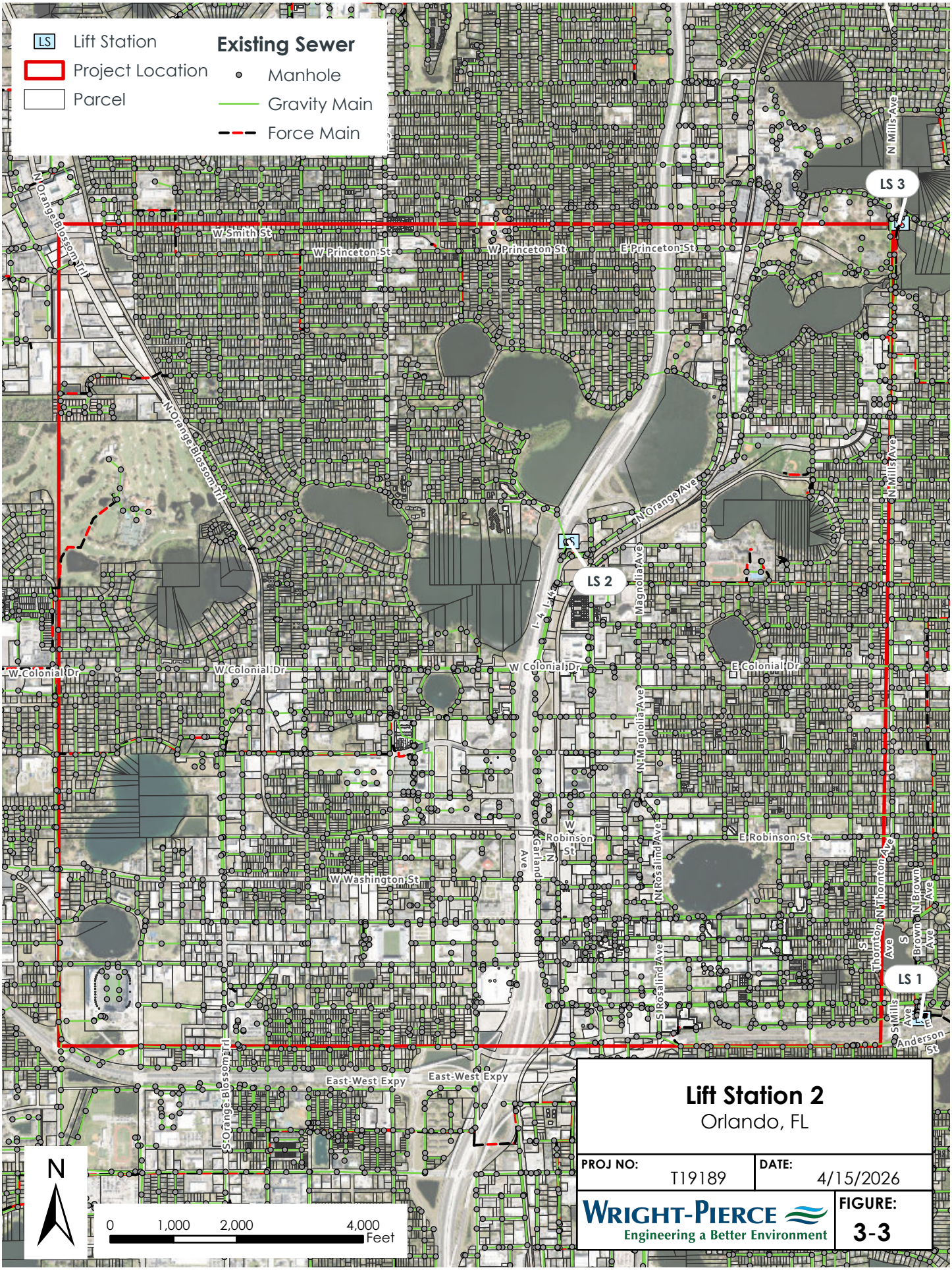
3.2 Lift Station 2 Force Main Phase I, Part B

The City has been conducting force main evaluations throughout the downtown and East Orlando tributary area. This area is expected to experience significant growth within a 50-year planning period and increased wastewater flows will result in increased operating pressures on the existing cast-iron force mains installed in the 1940s. Because there are no alternative force mains to transmit wastewater (and few operating isolation valves in the existing system), maintenance or rehabilitation would require shutting down the force mains and providing extensive bypass pumping, which is not feasible. In addition, if a break were to occur in a force main, it would pose public health and environmental hazards along with economic impacts to the community.

In 2017, the City completed a force main study that included a tributary flow analysis and future flow projections, hydraulic analysis, a review of rehabilitation or replacement alternatives, and an alternative route analysis for replacement of portions of the LS 1/7, 2, 3, and 4 force mains. The City plans to advance the replacement, rehabilitation, and/or rerouting of the existing Lift Station 2 force main, which currently conveys flow through approximately 7,700 feet of 20-inch cast iron pipe and connects to the existing 30-inch force main near LS 4. The proposed construction of Phase 1, Part B of the LS 2 force main is described in this Facilities Plan and will use State Revolving Fund loan funding. Refer to **Appendix C in Volume 2** for the *June 2017 City of Orlando Wastewater Force Main Evaluation*, which describes the results of the evaluation in additional detail.

A map of the project location area is shown on **Figure 3-3**.



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Lift Station 2

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FIGURE: 3-3

3.3 South Parramore Avenue Gravity Sewer Upgrade

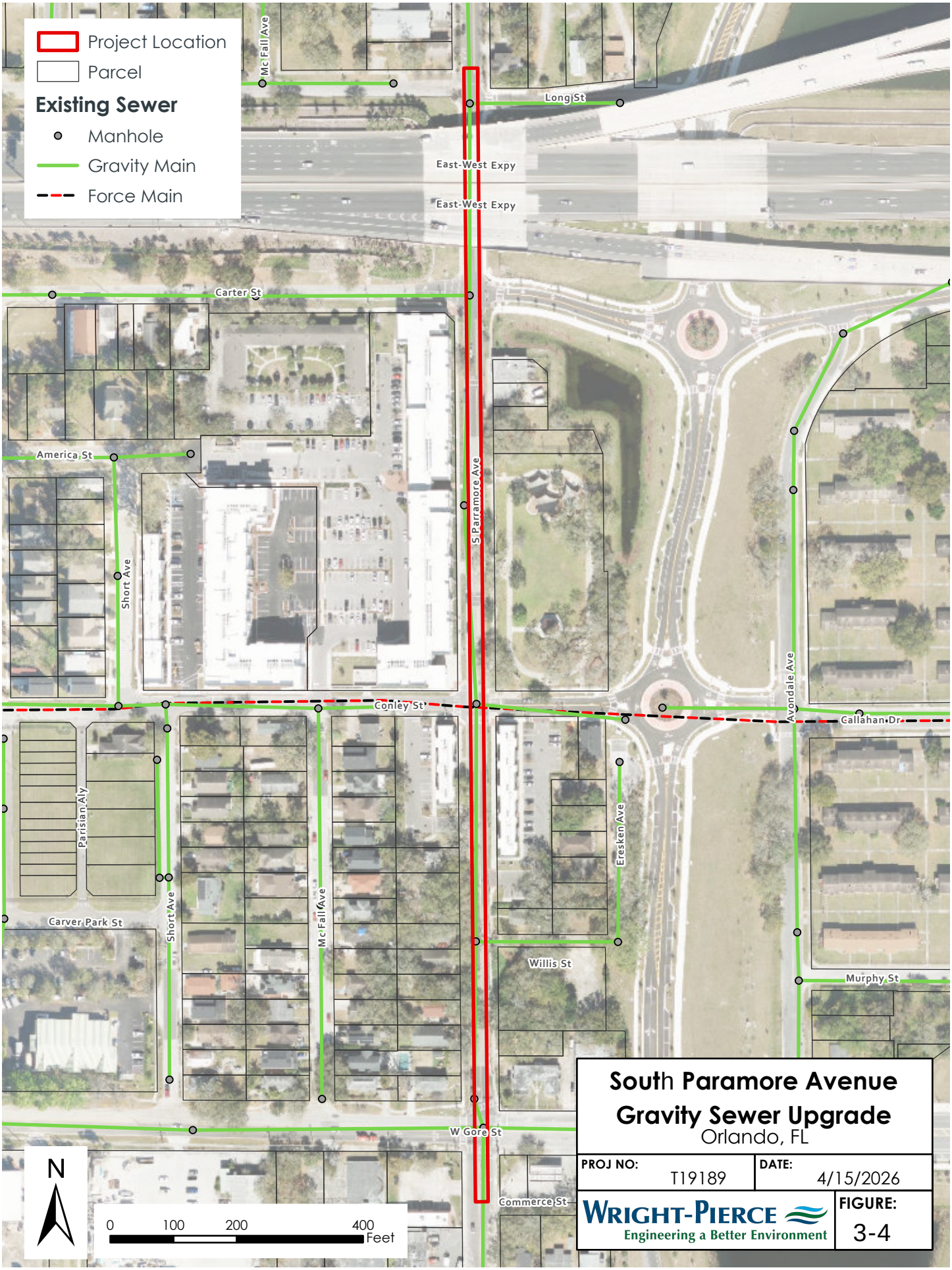
This project addresses deficiencies identified in the existing gravity sanitary sewer system along South Parramore Avenue between Gore Street and Long Street in the City of Orlando. The corridor is served by legacy vitrified clay pipe that has reached the end of its useful service life and is subject to structural deterioration, root intrusion, joint separation, and infiltration. These conditions increase the risk of sanitary sewer overflows, contribute to wet weather inflow and infiltration, and reduce overall conveyance reliability within a critical urban service area. In addition, localized drainage limitations within the corridor have historically resulted in standing water and reduced roadway performance during storm events.

To better define system condition and prioritize improvements, the City conducted field investigations including closed-circuit television (CCTV) inspection of the mainline gravity sewer and service laterals. These evaluations confirmed the presence of age-related deterioration and supported the need for replacement rather than spot repair or isolated rehabilitation. Supporting survey, subsurface utility engineering, and geotechnical investigations were also performed to characterize existing conditions and reduce construction uncertainty.

This project consists of replacement of deficient gravity sewer mains, reconstruction of manholes, and reconnection or replacement of service laterals as required to meet current City standards. Limited stormwater drainage upgrades are incorporated where deficiencies coincide with sewer replacement activities, and roadway restoration is included where necessary to support underground utility reconstruction. Collectively, these improvements restore structural integrity, reduce infiltration and inflow, improve hydraulic reliability, and extend the service life of wastewater infrastructure within the Parramore corridor.

The City's design consultant has advanced this project to the final design stage, and the scope described herein reflects the current understanding of the planned improvements based on available design information at the time of preparation of this Facilities Plan.

A map of the project location area is shown on **Figure 3-4.**



South Paramore Avenue Gravity Sewer Upgrade

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FIGURE: 3-4

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4

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Section 4 Alternatives Analysis

This Section provides a list of alternatives that were evaluated for each of the three identified projects along with a cost and effectiveness analysis. **Section 5** discusses the potential environmental impacts and considerations, and **Section 6** summarizes the recommended alternative and a detailed cost breakdown for each project.

4.1 Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements

The alternatives presented for this project are based on the information, descriptions, and data obtained from Hazen & Sawyer, the firm under contract with the City of Orlando to perform the planning and design work. The improvements included in this project were first identified in the *January 2014, Preliminary Design Report – Iron Bridge 480V Improvements*. The report documented deficiencies in the reliability, condition, and operational limitations of the existing medium voltage electrical distribution equipment serving the Bardenpho process facilities and recommended replacement of critical power infrastructure to support continued dependable biological nutrient removal performance.

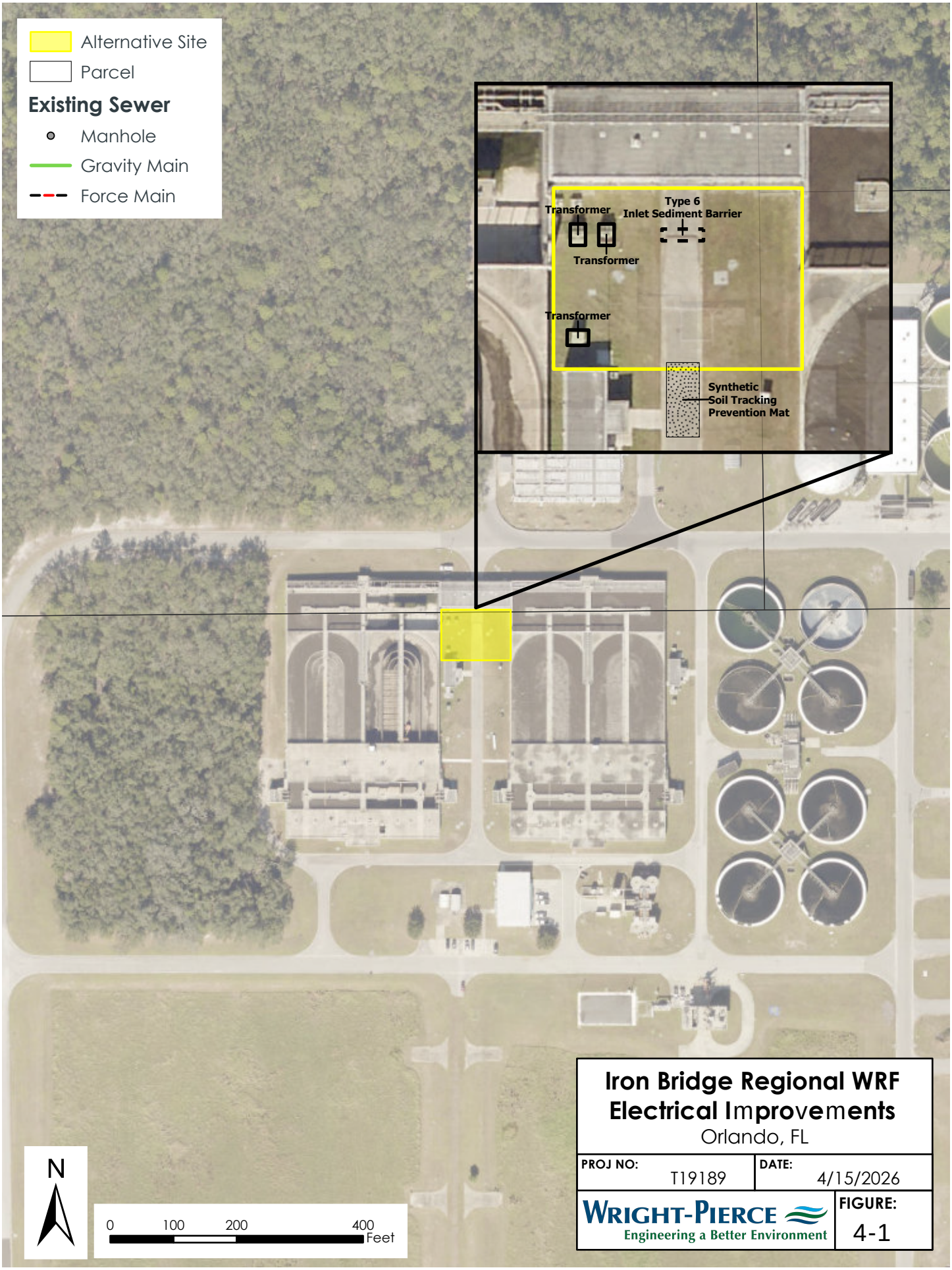
The current project advances those previously identified improvements and reflects the City's phased implementation strategy to address priority electrical infrastructure needs at the Iron Bridge Regional WRF while maintaining compliance with treatment performance requirements and long term operational reliability objectives.

4.1.1 Alternative Evaluation

The Iron Bridge facility is the City of Orlando's largest operating facility, with a permitted capacity of 40 MGD and has been operating since 1982. The Bardenpho process for biological treatment is critical for the facility to achieve its stringent effluent limits, including the removal of greater than 95% of influent total nitrogen and phosphorus loadings. Given the critical role of the Bardenpho process, the City sought to evaluate replacement of electrical equipment that has reached the end of its useful life. The following alternatives were considered:

- Alternative 1: No Action
- Alternative 2: New Electrical Equipment in New Electrical Building
- Alternative 3: New Electrical Equipment in Existing Electrical Building

Figure 4-1 shows the site plan and location for Alternative 3. Alternative 2 is not shown, as it was eliminated from further consideration during the preliminary evaluation stage. Refer to **Section 4.1.3** for additional details.



Iron Bridge Regional WRF Electrical Improvements

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FIGURE: 4-1

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4.1.2 Alternative 1: No Action

Under this alternative, the existing electrical equipment supporting the Bardenpho process would remain in service without replacement or rehabilitation. Much of this infrastructure has reached or is approaching the end of its useful life and would be expected to continue to deteriorate, increasing the likelihood of equipment failure, unplanned outages, and interruptions to blower operation and associated biological nutrient removal processes. Loss or degradation of reliable aeration system power would adversely affect treatment performance and process stability at the Iron Bridge Regional Water Reclamation Facility.

Continued operation under these conditions would increase the risk of non-compliance with effluent limitations established in the facility's FDEP permit, particularly with respect to nutrient removal performance. Reduced treatment reliability could also affect reclaimed water quality and availability for downstream users. In addition, insufficiently treated effluent could adversely impact receiving surface waters through nutrient enrichment, increased potential for algal blooms, and associated dissolved oxygen depletion, resulting in impacts to aquatic habitat and water quality.

The No Action alternative would not address known deficiencies in aging electrical infrastructure, would not improve system reliability or resiliency to power interruptions, and would not support continued dependable operation of the Bardenpho treatment process. It would also be inconsistent with maintaining compliance with applicable regulatory requirements and protecting the City's existing wastewater treatment capacity. For these reasons, the No Action alternative does not meet the project purpose and needs, and it was not considered a viable alternative for implementation.

4.1.3 Alternative 2: New Electrical Equipment in New Electrical Building

This alternative considered replacement of the existing electrical equipment within a newly constructed electrical building. While technically feasible, this option would require significant additional capital investment associated with construction of a new structure, equipment relocation, and expanded site work. Evaluation of the existing electrical building determined that it is structurally adequate and capable of accommodating the upgraded equipment with appropriate modifications. As such, construction of a new electrical building would not provide sufficient operational or functional benefits to justify the substantially higher cost. Due to its significantly higher cost and lack of proportional benefit, this alternative was not considered cost-effective and was eliminated from further consideration.

4.1.4 Alternative 3: New Electrical Equipment in Existing Electrical Building

This alternative includes replacement and modernization of the existing electrical equipment within the current electrical building serving the Bardenpho process. Based on the *2014 Preliminary Design Report (Iron Bridge 480V Improvements)*, the improvements associated with the Bardenpho blower electrical systems were developed around replacement and modernization of equipment within the existing electrical building, not construction of a new standalone facility. The existing structure was evaluated and determined to be in adequate condition to support the upgraded equipment with minor modifications, making it a practical and cost-effective solution. This approach allows the City to address aging and obsolete electrical infrastructure while maintaining the existing facility footprint and avoiding the additional costs associated with new building construction. Upgrades include replacement of medium voltage transformers, installation of new switchgear, and improvements to power distribution, instrumentation, and control systems to enhance reliability, operability, and maintainability. Construction will be phased to maintain continuous operation of the Bardenpho treatment process, minimizing service disruptions and ensuring compliance with regulatory requirements throughout the construction period.

Temporary power provisions, including generator connections, will be implemented as needed to support uninterrupted operations.

By leveraging the existing electrical building, this alternative provides the most efficient balance of cost, constructability, and operational continuity. It significantly reduces the risk of equipment failure, improves system resiliency, and supports continued compliance with stringent effluent limits. Accordingly, Alternative 3 was selected as the preferred alternative.

4.1.5 Cost Comparison

A detailed cost comparison of alternatives was not performed, as Alternative 3 (installation of new electrical equipment within the existing electrical building) was identified as the only practical and cost-effective solution. Although Alternative 2 is technically feasible, it is not considered an economical investment at this time due to the additional costs associated with constructing a new electrical building, deemed unnecessary. **Table 4-1** summarizes the estimated construction costs for the Iron Bridge Regional Water Reclamation Facility WRF Bardenpho Blower Electrical Improvements.

Table 4-1 Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements Alternative Cost Comparison

Alternative	Description	Construction Cost (FY 2027)
1	No Action	Infeasible; public health risk
2	New Electrical Equipment in New Electrical Building	Infeasible; cost-prohibitive
3	New Electrical Equipment in Existing Electrical Building	$9,754,000

A present worth lifecycle cost analysis was not performed since only one Alternative was considered a viable, long-term solution.

4.2 Lift Station 2 Force Main Phase I, Part B

The alternatives presented for this project are based on the information, descriptions, and data obtained from the *June 2017 City of Orlando Wastewater Force Main Evaluation* by Tetra Tech, included as **Appendix C in Volume 2** of this Facilities Plan.

4.2.1 Alternative Evaluation

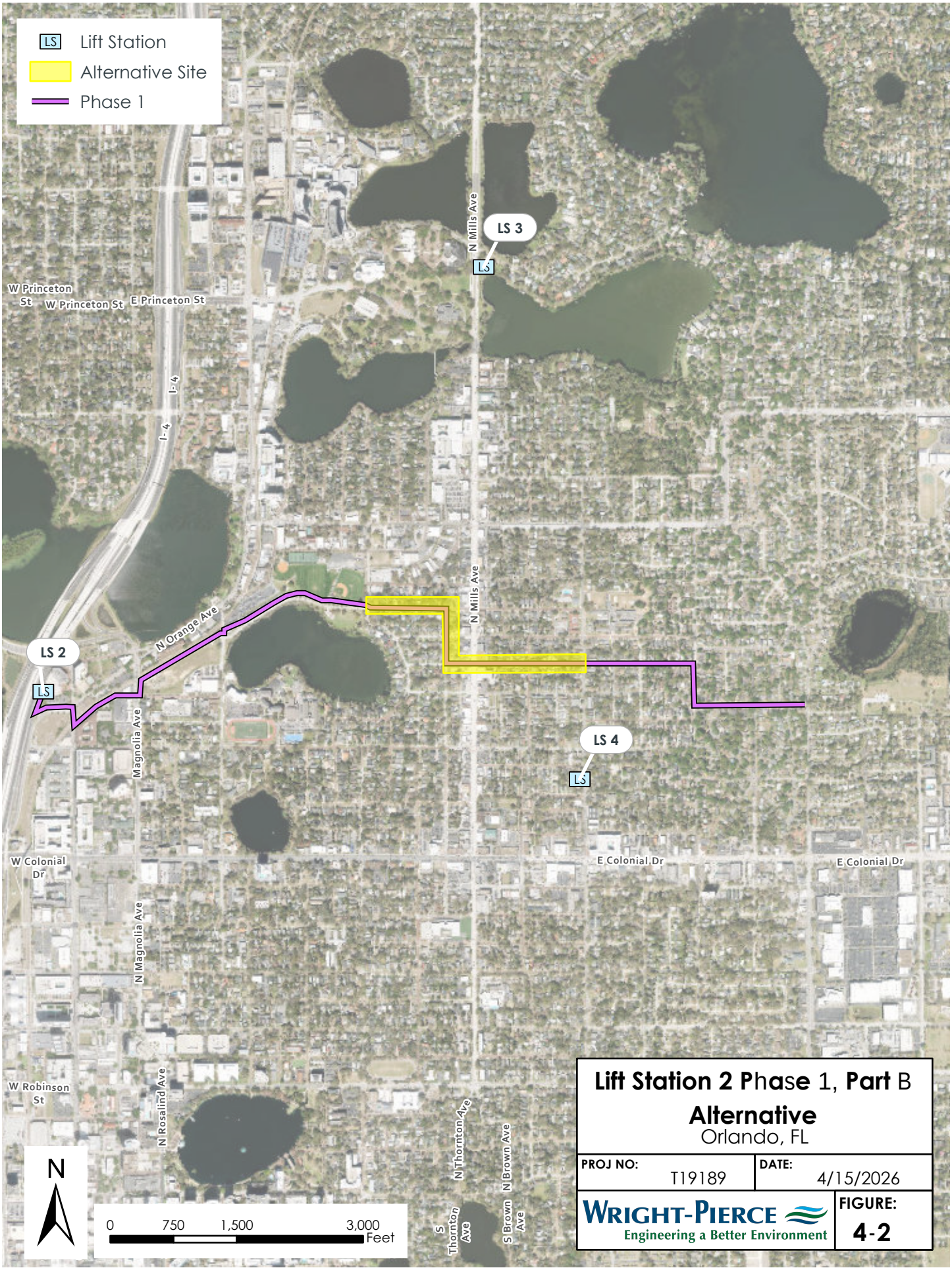
The wastewater collected at LS 2 is pumped through 7,700 feet of 20-inch cast iron force main that ultimately connects to the existing 30-inch force main near LS 4. To improve the wastewater force main from Lift Station 2, the alternatives considered consisted of replacing the existing force main along its current route versus establishing and installing a new pipe along a new pipe alignment. Therefore, the following alternatives were considered:

- Alternative 1: No Action
- Alternative 2: Force Main Replacement Along Existing Route
- Alternative 3: Force Main Replacement Along New Route

Figure 4-2 shows the approximate alignment of force main improvements for LS 2. Phase I includes improvements to the entire existing force main from LS 2; however, the City is requesting funding to construct only a portion of these improvements, identified herein as Phase I, Part B. The City's participation is associated primarily with the portion of the work directly supporting the LS 2 wastewater transmission improvements, including installation of approximately 3,300 linear feet of new 20-inch force main, related fittings and appurtenances, and the connections required to integrate the new pipeline into the City's existing conveyance system. Another component included in this request is the removal and replacement of approximately 2,600 linear feet of existing gravity sewer piping and fittings with new 8-inch PVC gravity sewer piping and fittings.

The following is a summary of the technical elements considered during the alternative selection process:

- Route Analysis: For new piping routes, a detailed study is necessary to select routes that minimize or avoid conflicts with existing infrastructure, reduce traffic disturbances, have little impact on the public, and minimize restoration costs. The *June 2017 Tetra Tech City of Orlando Wastewater Force Main Evaluation* (included as **Appendix C in Volume 2**), includes a preliminary route analysis for Phase 1 of LS 2 force main improvements. This evaluation concluded that the Phase 1 LS 2 force main improvements should prioritize construction of a new transmission segment from Lift Station 2 to Junction C, with provisions for future system integration at downstream connection points. This segment establishes the backbone for subsequent regional conveyance improvements and supports future tie-ins at Junctions A and B.
- Pipe replacement: Replacement may be completed using conventional open cut construction or trenchless installation methods, depending on site conditions and surface constraints. Open cut construction is widely understood and cost effective but may result in traffic disruption, utility conflicts, and dewatering requirements. Trenchless methods, including horizontal directional drilling, are appropriate in constrained areas such as roadway crossings and environmentally sensitive locations where minimizing surface disturbance is desirable. Pipe bursting was evaluated but is not recommended because the existing force main cannot be taken out of service. Similarly, lining technologies were considered infeasible due to required service interruptions and reductions in internal pipe diameter.



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Lift Station 2 Phase 1, Part B

Alternative

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FIGURE: **4-2**

4.2.2 Alternative 1: No Action

Under this No Action Alternative, no improvements would be made to the existing LS 2 force main and the pipeline would remain in service under current operating conditions. Continued aging and deterioration of the force main would increase the frequency of maintenance activities, emergency repairs, and operational disruptions over time. As the pipeline approaches the end of its service life, the probability of structural failure and loss of containment would increase, creating a significant risk of sanitary sewer overflows with potential impacts to public health, adjacent properties, and environmentally sensitive areas.

This alternative would not address existing transmission reliability concerns, would not improve system redundancy, and would not support long-term service demands within the LS 2 service area. In addition, continued reliance on the existing infrastructure would increase lifecycle costs due to reactive maintenance and emergency response while maintaining exposure to regulatory noncompliance risks associated with potential overflows and infrastructure failure. The alternative also does not meet the intent of maintaining reliable wastewater conveyance capacity consistent with FDEP asset management expectations and Clean Water State Revolving Fund planning objectives.

Accordingly, the No Action Alternative was determined to be technically and environmentally unacceptable and was eliminated from further consideration.

4.2.3 Alternative 2: Force Main Replacement Along Existing Route

This alternative consists of replacing the existing force main generally along its current route and alignment. Construction would primarily require installation within or immediately adjacent to the existing corridor using a combination of open cut and trenchless replacement methods, as warranted by site constraints, utility congestion, roadway crossings, and other surface features. Pipe materials would be selected based on the installation method and design requirements. PVC would generally be used for open cut construction, while restrained or fused pipe materials such as HDPE may be used for trenchless installations.

The principal advantages of this alternative are that it would generally follow an existing utility corridor, would minimize the need for new easements or property acquisition, and could simplify certain environmental and permitting considerations relative to a completely new alignment. In addition, maintaining the general existing alignment would preserve the current hydraulic configuration of the system.

The principal disadvantage of this alternative is constructability. Replacement along the active force main corridor would require maintaining wastewater service throughout construction. Because the existing force main conveys substantial flow through a heavily developed urban corridor, replacement would require extensive bypass pumping, likely in multiple phases and over long segments. For a force main of this size and service area, bypass pumping is operationally complex, high risk, and cost prohibitive. The June 2017 Tetra Tech evaluation similarly concluded that shutting down the force main and providing extensive bypass pumping for maintenance or rehabilitation was not feasible.

While the base cost for construction of Alternative 2 may be lower than that of a new force main, the associated constraints including extensive bypass pumping makes this alternative not a viable option for implementation. Although it offers some permitting and corridor continuity advantages, the operational burden, risk, and cost associated with system bypass during construction outweigh those benefits. Accordingly, this alternative should be eliminated from further consideration.

4.2.4 Alternative 3: Force Main Replacement Along New Route

This alternative consists of constructing a new force main through a new corridor. Although open-cut construction is expected to be utilized for some of the route, trenchless technologies such as horizontal directional drilling (HDD) or jack and bore will be needed for road crossing, railroad crossings, and other above ground conflicts. The majority of the new force mains would be constructed of PVC pipe material (including fusible PVC for the trenchless technologies).

The main advantage of utilizing a new force main route would be that the project can be constructed with minor impacts to the existing force main systems. No bypass pumping would be needed, and construction activities would not need to be coordinated with the City's pump station operation activities until tying into existing infrastructure. Another advantage is that the old force main could potentially remain in place and be used as a back-up to the primary, new force main. The disadvantages of this alternative would be the additional efforts needed to create a new corridor for the large diameter pipe. Securing new easements, right-of-way permitting, environmental permitting, route studies, and potential conflicts with other utilities could be challenging.

As discussed, the *June 2017 City of Orlando Wastewater Force Main Evaluation by Tetra Tech* (included as **Appendix C in Volume 2**) identified feasible routes for various phases and lift stations. The focus of this Facilities Plan was to evaluate the force main route from LS 2 ultimately connecting to the existing 30-inch force main near LS 4. Two alternative routes were evaluated in the June 2017 report, and a preferred route was identified. This preferred route was used as the basis for Alternative 3.

The detailed evaluation included the following considerations:

- Methods of Construction and Costs
- Avoidance and Minimization of Utility Conflicts
- Brick Streets
- Public Impacts
- Property or Easement Requirements
- Contaminated Sites

Alternative 3 is considered the most technically and economically feasible option and is the selected alternative. For construction sequencing, the force main is divided into three parts: Part A, Part B, and Part C. This Facilities Plan focuses only on Phase I, Part B, which follows the preferred routes E-1 and F-1 identified in the *June 2017 Tetra Tech City of Orlando Wastewater Force Main Evaluation* (included as **Appendix C in Volume 2**). Parts A and C are not addressed in this Facilities Plan.

4.2.5 Cost Comparison

A detailed cost comparison of alternatives was not performed, as Alternative 3: Force Main Replacement Along New Route was considered the only viable alternative. **Table 4-2** summarizes the estimated construction costs for Lift Station 2 Force Main Phase I, Part B; including considerations for the non-viable alternatives.

It shall be noted that the City of Orlando's participation in this project is partial. The Phase I, Part B estimated construction cost (bid) is anticipated to be $30,830,000, of which the City of Orlando is responsible for $7,980,100 (approximately 26%). The City's participation is associated primarily with the portion of the work directly supporting the LS 2 wastewater force main transmission improvements, including installation of the new 20-inch

force main segment, related fittings and appurtenances, and the connections required to integrate the new pipeline into the City's existing conveyance system. The remaining project costs correspond to corridor infrastructure and transmission improvements benefiting and paid by the Orlando Utilities Commission (OUC).

Table 4-2 Lift Station 2 Force Main Phase I, Part B Alternative Cost Comparison

Alternative	Description	Construction Cost (FY 2027)
1	No Action	Infeasible, public health risk, continued failure exposure
2	Force Main Replacement Along Existing Route	Infeasible; constructability constraints, cost-prohibitive
3	Force Main Replacement Along New Route	$7,980,100

A present worth life-cycle cost analysis was not performed since only one Alternative was considered a viable, long-term solution.

4.2.6 Additional Considerations

While Alternative 2: Force Main Replacement Along Existing Route may have a lower base construction cost than Alternative 3, the extensive bypass pumping required to maintain wastewater flow in a 20-inch force main within a heavily developed corridor makes implementation operationally complex and cost prohibitive. Constructing a new force main along a separate route avoids bypass pumping and allows the existing force main to potentially remain in service as a redundant conveyance route, improving overall system reliability.

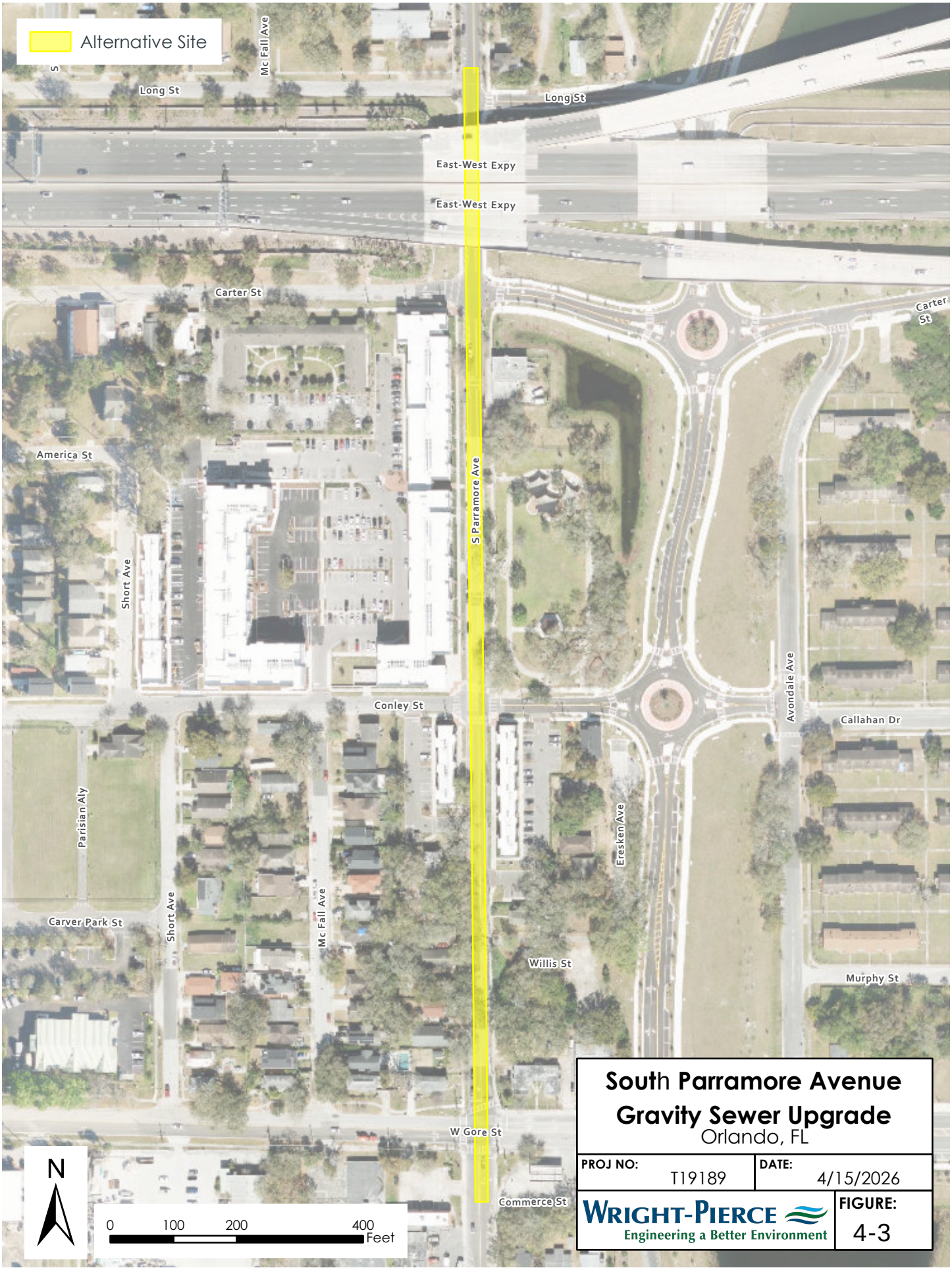
4.3 South Parramore Avenue Gravity Sewer Upgrade

4.3.1 Alternative Evaluation

The alternatives presented for this project are based on the information, descriptions, and data obtained from Keith and Associates, Inc., the firm under contract with the City of Orlando to perform the planning and design work. A Preliminary Design Report (PDR) is not currently available for this project and, therefore, is not included in the appendix of this Facilities Plan. The following alternatives were considered:

- Alternative 1: No Action
- Alternative 2: Cured-In-Place Pipe Lining
- Alternative 3: Gravity Sewer Replacement Along Existing Route

Figure 4-3 shows the approximately alignment and extent of the gravity sewer associated with this project.



South Parramore Avenue Gravity Sewer Upgrade
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FIGURE: 4-3

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4.3.2 Alternative 1: No Action

Under this alternative, the existing gravity sewer segment along Parramore Avenue would remain in service without repair or replacement. While this alternative would not require capital investment, it presents significant operational, regulatory, environmental, and public safety risks.

Documented structural deficiencies in the existing vitrified clay pipe would continue to allow groundwater infiltration and inflow into the collection system, increasing wet-weather peak flows and treatment costs and elevating the likelihood of sanitary sewer overflows (SSOs). Continued deterioration of the pipeline would increase the probability of localized failures, service interruptions, and roadway settlement or collapse associated with loss of pipe structural integrity and surrounding soil support.

This alternative would also increase the City's exposure to wastewater permit compliance risks. Additional infiltration and inflow and the potential for SSOs could contribute to violations of collection system performance expectations and regulatory requirements, particularly during wet-weather conditions. Continued operation of aging infrastructure in deteriorated condition would further reduce system reliability and limit the City's ability to manage peak flows within existing conveyance capacity.

From an asset management perspective, deferring rehabilitation would accelerate infrastructure degradation and result in higher lifecycle costs due to emergency repairs, reactive maintenance, and potential damage to adjacent infrastructure. These conditions would increase long-term financial burden compared to planned replacement.

Because this alternative does not address documented structural deficiencies and would increase the risk of service disruptions, regulatory exposure, environmental impacts, and public safety hazards, it was not considered a viable option and was eliminated from further consideration.

4.3.3 Alternative 2: Cured-In-Place Pipe Lining

With this type of repair, the interior of the pipeline is repaired with resin-saturated tubes that are inserted or pulled into the damaged pipe. CIPP lining utilizes a trenchless technology in which no excavation is required to rehabilitate the existing pipe. The pipe is typically accessed through a manhole or other existing access point. The liner is cured in place to form a tight-fitting, jointless, and corrosion resistant replacement pipe.

There are several limitations associated with this alternative. Installation of a CIPP liner requires temporary bypass pumping to maintain wastewater service while the liner is placed and cured. Existing service laterals must be reinstated following liner installation to restore connections to the rehabilitated main. In addition, successful application of CIPP depends on the structural stability of the host pipe. Where the existing carrier pipe exhibits significant deformation, joint separation, voids, or loss of bedding support, the liner may not achieve proper fit or long-term structural performance without supplemental point repairs or localized replacement. As a result, segments with advanced structural deterioration are not suitable candidates for rehabilitation using CIPP alone.

Further investigation of the existing gravity sewer pipe using CCTV footage revealed multiple blockages and cracks throughout the pipeline at roughly every 50 linear feet. These findings indicate significant structural deterioration. Therefore, although this alternative may be a viable rehabilitation technique for many pipelines, the existing gravity sewer has been assessed to be in a severely degraded condition and is not suitable for rehabilitation using this method. Accordingly, this alternative is not viable and was eliminated from further consideration.

4.3.4 Alternative 3: Gravity Sewer Replacement Along Existing Route

This alternative consists of removing and replacing the existing gravity sewer along its current alignment using open cut trench excavation. Replacement in place minimizes the complexity associated with rerouting flows and reconnecting upstream and downstream portions of the collection system, allowing the existing hydraulic configuration of the corridor to remain unchanged while restoring structural integrity and service reliability. For this alternative, polyvinyl chloride (PVC) pipe is recommended due to its corrosion resistance, smooth interior surface, watertight gasketed joints, and long service life. PVC also provides improved hydraulic capacity compared to existing vitrified clay pipe and reduces the potential for infiltration and root intrusion. These characteristics make PVC well suited for rehabilitation of aging gravity sanitary sewer infrastructure in urban corridors.

Additional advantages of replacing the gravity sewer along the existing route include streamlined environmental permitting, avoidance of new easements or property acquisition, and reduced impacts to adjacent utilities and developed properties. Maintaining the existing alignment also limits disruption to the broader collection system and simplifies tie ins to existing infrastructure.

Challenges of this (as for any rehabilitation method) alternative include the need for temporary bypass pumping to maintain wastewater service during construction and localized surface restoration within the corridor. Environmental impacts associated with this alternative are expected to be minor because replacement would occur within the existing corridor and along the current pipe alignment. This approach avoids impacts to undeveloped areas, wetlands, and sensitive resources, and eliminates the need for new easements or property acquisition. Temporary impacts would be limited to typical construction effects such as noise, dust, and short-term access disruptions. Maintenance of traffic represents the primary construction challenge. Open cut installation will require phased lane closures, access coordination, and temporary bypass pumping to maintain wastewater service during construction. However, replacing the sewer in place reduces overall construction complexity compared to alternatives involving rerouting or new alignments.

Based on the condition assessment, the City proposes to replace approximately 0.35 miles of existing 8-inch VCP with new 8-inch PVC pipe resulting in improved system capacity and reliability. This alternative provides the most practical solution, minimizing construction complexity associated with connecting new infrastructure to existing piping, and was therefore selected for implementation.

4.3.5 Cost Comparison

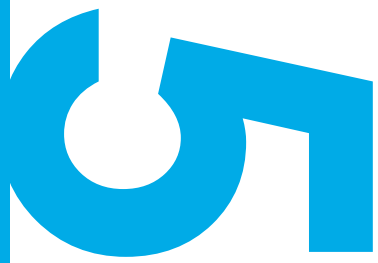
A detailed cost comparison of alternatives was not performed, as Alternative 3: Gravity Sewer Replacement Along Existing Route was considered the most practical alternative given the existing condition of the gravity sewer. Although Alternative 2 is technically feasible, it introduces more unnecessary construction complexity. **Table 4-3** shows construction costs and non-cost evaluation factors for the South Parramore Avenue Gravity Sewer Upgrade.

Table 4-3 South Parramore Avenue Gravity Sewer Upgrade Alternative Cost Comparison

Alternative	Description	Construction Cost (FY 2027)
1	No Action	Infeasible; public health risk
2	Cured-In-Place Pipe Lining	Infeasible; cost-prohibitive
3	Gravity Sewer Replacement Along Existing Route	$2,249,354

4.3.6 Additional Considerations

Alternative 2 – Cured-In-Place Pipe (CIPP) lining was evaluated as a potential rehabilitation approach; however, its applicability is limited by the structural condition and age of the existing gravity sewer. Sections of the corridor exhibit deterioration consistent with legacy vitrified clay pipe systems, which may require localized repairs or partial replacement prior to lining to achieve acceptable long-term performance. As a result, CIPP would not provide the same level of structural renewal, service life extension, or reliability as full pipe replacement. For these reasons, replacement of the gravity sewer along the existing alignment is considered the more appropriate long-term solution for this corridor.



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Section 5 Environmental Assessment

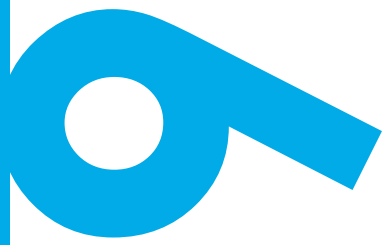
This Environmental Assessment (EA) was prepared in support of the City of Orlando's Clean Water Facilities Plan in accordance with the environmental review requirements of Rule 62-503.751, Florida Administrative Code (F.A.C.). Under this rule, the Florida Department of Environmental Protection (FDEP) conducts an environmental review for projects seeking funding to evaluate the environmental significance of proposed actions, consider project alternatives, and assess potential environmental impacts prior to approval.

This EA provides the supporting environmental documentation necessary for that review by identifying existing environmental conditions, evaluating ecological resources, and assessing the potential for project-related impacts. The findings presented herein are intended to inform FDEP's environmental determination (e.g., categorical exclusion or finding of no significant impact) and demonstrate that the proposed improvements are not expected to result in significant adverse environmental effects. The detailed EA was prepared by prepared by Barnes, Ferland and Associates, Inc. and is included in **Appendix B – Environmental Assessment Report**.

The EA included a review of potential impacts to wetlands, surface waters, floodplains, threatened and endangered species, and other environmental resources. The evaluation was based on desktop analyses using available regulatory and environmental databases (including but not limited to U.S. Fish and Wildlife Service, USGS National Wetland Inventory, Planning Consultation (IPaC), U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), Florida Land Cover and Classification System, and FEMA mapping), as well as a field investigation conducted on April 14, 2026. The project areas consist of existing utility facilities and urban rights-of-way that have been previously developed and significantly disturbed. As a result, ecological sensitivity within the project corridors is limited. Key findings of the Environmental Assessment include:

- **Threatened and Endangered Species Assessment:** No listed plant or animal species were observed during field investigations. Based on habitat conditions and available data, all federally listed species were determined to have "No Effect" from project implementation.
- **Wetlands and Surface Water Assessment:** No wetlands or surface waters were identified within the Iron Bridge Electrical Upgrades or Parramore Gravity Sewer Upgrades project areas. The Lift Station 2 project is located adjacent to Lake Highland; however, impacts to the lake are not anticipated. No Environmental Resource Permit (ERP) or Section 404 Clean Water Act permit is expected based on current project conditions.
- **Flood Zone Assessment:** The Iron Bridge and Parramore project areas are located within FEMA Flood Zone X (minimal flood hazard). The Lift Station 2 project is also primarily within Flood Zone X, with Lake Highland mapped as Zone AE; however, the project is not anticipated to involve work within the flood zone area.
- **Historical and Cultural Assessment:** A review by the Florida Division of Historical Resources (FDHR) found no cultural or historical resources within the Iron Bridge or Lift Station 2 project areas. Although historic resources exist near the Parramore project, work within the right-of-way are anticipated to not impact them.
- **Health or Environmental Effects on Minority or Low-Income Communities:** The projects fall within existing rights-of-way with no land acquisition required and no anticipated impacts to minority or low-income populations, while improving overall system reliability and public health.

Overall, the EA demonstrates that the proposed projects will result in minimal to no environmental impacts while improving infrastructure reliability and supporting public health and environmental protection goals. The findings support that the projects can proceed without substantial ecological constraints. For detailed analysis, supporting documentation, and figures, refer to **Appendix B – Environmental Assessment Report**.



WRIGHT-PIERCE
Engineering a Better Environment

Section 6 Selected Alternative

This section provides a description of the recommended alternative and a detailed cost estimate for each project's selected alternative.

6.1 Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements

6.1.1 Recommended Facilities

Alternative 3, replacement of existing electrical equipment within the Bardenpho blower electrical building, is recommended for implementation. This alternative modernizes critical medium voltage power infrastructure supporting the biological nutrient removal process while maintaining the use of the existing electrical building, which has been determined to be structurally adequate to accommodate the upgraded equipment with minor modifications.

The recommended improvements include replacement of aging medium voltage transformers, installation of new medium voltage switchgear, and upgrades to associated power distribution systems serving the Bardenpho blower facilities. The project also includes installation of a permanent generator docking station and a temporary generator connection with distribution board to maintain process operation during planned outages and unforeseen power interruptions. Electrical, instrumentation, and control system upgrades will improve monitoring capability, equipment operability, and maintainability of the blower system electrical infrastructure.

Additional improvements include demolition and removal of obsolete electrical equipment, installation of new variable frequency drive feeders and conduit systems, grounding and surge protection upgrades, and structural modifications necessary to support the new equipment configuration. Replacement of standard feeders with dedicated VFD feeders will correct existing pump control limitations and improve operational performance of process equipment. Construction sequencing will be implemented to maintain continuous operation of the Bardenpho treatment process throughout implementation.

Implementation of these improvements will restore reliability to critical aeration support infrastructure required for biological nutrient removal, reduce the likelihood of unplanned electrical failures affecting treatment performance, and support continued compliance with FDEP effluent limitations. Based on these considerations, Alternative 3 represents the most appropriate long-term solution and is recommended for inclusion in the SRF funding request.

6.1.2 Cost Estimate

A detailed cost estimate of the selected alternative for the Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements is presented in **Table 6-1.** The total anticipated construction cost is **$11,704,800** and includes a construction-phase contingency.

Table 6-1 Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements Probable Construction Cost

Item	Description	Construction Cost (FY 2027)
1	Medium Voltage Switchgear and Power Distribution Equipment	$3,901,000
2	Pad Mounted Transformers	$801,000
3	Wire, Conduit, and Electrical Feeders	$1,002,000
4	Temporary Power and Generator Docking Improvements	$147,000
5	Instrumentation, Disconnects, Enclosures, and Miscellaneous Electrical	$350,000
6	Demolition and Removal of Existing Electrical Equipment	$161,000
7	Structural and Building Modifications	$20,000
8	Erosion and Sediment Control	$157,000
9	Permitting	$58,000
10	Bonds, Insurance, Mobilization/Demobilization, Site Access, Restoration, and General Requirements	$1,114,067
	Subtotal	**$7,711,067**
11	Contractor OH&P (15%)	$1,156,660
	Subtotal (OPCC)	**$8,867,727**
12	Pre-bid Phase Contingency [1] (10% reflecting advanced design development)	$886,773
	Total Estimated Construction Cost (Rounded)	$9,754,000
13	Construction Phase Contingency [2] (20%)	$1,950,800
	Total Project Construction Budget [3] (Rounded)	$11,704,800

[1] Pre-bid Phase Contingency – Represents the expected variability in construction cost associated with the current level of project definition at the Facilities Plan stage. It accounts for uncertainty in the final configuration of improvements, refinement of quantities during subsequent design, and market adjustments anticipated prior to bidding. This contingency reflects the difference between the planning level opinion of probable construction cost at the time of preparation and expected bid prices.

[2] Construction Phase Contingency - Construction phase contingency represents an allowance for uncertainties that may occur after bidding and during construction. It is intended to address unforeseen site conditions, limited subsurface information, field conflicts, owner directed modifications, and other changes typically managed through change orders. It is not included in the base construction estimate but is carried separately for budgeting purposes.

[3] Total Project Construction Budget - The total project construction budget represents the estimated funding required for implementation of the project and includes the total estimated construction cost plus an allowance for construction phase contingency. This value reflects the City's anticipated financial commitment to deliver the project through completion.

6.2 Lift Station 2 Force Main Phase I, Part B

6.2.1 Recommended Facilities

The selected alternative consists of constructing a new segment of 20-inch wastewater force main along a new alignment between Lift Station 2 and the downstream regional transmission system, consistent with the preferred routing identified in the *June 2017 City of Orlando Wastewater Force Main Evaluation* prepared by Tetra Tech. This Facilities Plan requests funding for Phase I, Part B, which represents the portion of the overall LS 2 force main improvement program directly attributable to City of Orlando wastewater conveyance needs.

Phase I, Part B includes installation of approximately 3,300 linear feet of new 20-inch force main, associated fittings and appurtenances, and tie-ins required to integrate the new pipeline into the City's existing transmission system. Construction is anticipated to include a combination of open-cut installation and trenchless methods, including horizontal directional drilling and jack-and-bore at roadway, railroad, and utility crossings, in order to minimize surface disruption and avoid conflicts with existing infrastructure. The proposed force main will generally consist of PVC pipe for open-cut segments and fusible PVC for trenchless installations, subject to confirmation during final design.

In addition to the force main improvements, the selected alternative includes removal and replacement of approximately 2,600 linear feet of existing gravity sewer with new 8-inch PVC gravity sewer piping and fittings to address conflicts within the proposed corridor and maintain system reliability.

Construction along a new alignment allows the existing force main to remain in service during construction, eliminating the need for large-scale bypass pumping of a critical transmission facility within a heavily developed corridor. This approach significantly reduces construction risk, improves implementability, and maintains continuity of service during installation. Following completion, the existing force main may remain available to provide operational redundancy, subject to City evaluation.

This alternative was selected because it provides the most reliable and constructible solution for improving transmission capacity from Lift Station 2 while avoiding extended bypass pumping operations, minimizing risk to ongoing system operations, and implementing the preferred routing strategy previously identified through systemwide force main evaluation.

6.2.2 Cost Estimate

The total construction cost for Phase I, Part B is estimated (by others) at $30,830,000, of which the City of Orlando share is $7,980,100 (approximately 31%). The City's participation reflects the portion of the improvements directly supporting LS 2 wastewater transmission capacity and reliability, while the remaining project costs are associated with corridor infrastructure and transmission improvements benefiting Orlando Utilities Commission facilities within the shared installation corridor.

A planning opinion of probable construction cost of the selected alternative for the Lift Station 2 Force Main Phase I, Part B, is presented in **Table 6-2**. The total anticipated construction budget (City of Orlando participation) is **$9,576,120** and includes a construction-phase contingency.

Table 6-2 Lift Station 2 Force Main Phase I, Part B Probable Construction Cost

Item	Description	Construction Cost (FY 2027)
1	Mobilization and project setup	$290,000
2	Maintenance of traffic	$410,000
3	Installation of ~3,300 LF of 20-inch force main (open-cut)	$1,820,000
4	Trenchless crossings (HDD / jack-and-bore segments)	$1,050,000
5	Force main fittings, valves, and appurtenances	$520,000
6	Tie-ins and connections to existing transmission system	$460,000
7	Replacement of ~2,600 LF of 8-inch gravity sewer and appurtenances	$720,000
8	Utility coordination and conflict resolution	$180,000
9	Pavement restoration and surface improvements	$210,000
10	Erosion control, site restoration, and testing	$122,700
	Subtotal	**$5,782,700**
11	Contractor OH&P (15%)	$867,400
	Subtotal (OPCC)	**$6,650,100**
12	Pre-bid Phase Contingency [1] (20% reflecting preliminary design status)	$1,330,000
	Total Estimated Construction Cost	$7,980,100
13	Construction Phase Contingency [2] (20%)	$1,596,020
	Total Project Construction Budget [3] (Rounded)	$9,576,120

[1] Pre-bid Phase Contingency – Represents the expected variability in construction cost associated with the current level of project definition at the Facilities Plan stage. It accounts for uncertainty in the final configuration of improvements, refinement of quantities during subsequent design, and market adjustments anticipated prior to bidding. This contingency reflects the difference between the planning level opinion of probable construction cost at the time of preparation and expected bid prices.

[2] Construction Phase Contingency - Construction phase contingency represents an allowance for uncertainties that may occur after bidding and during construction. It is intended to address unforeseen site conditions, limited subsurface information, field conflicts, owner directed modifications, and other changes typically managed through change orders. It is not included in the base construction estimate but is carried separately for budgeting purposes.

[3] Total Project Construction Budget - The total project construction budget represents the estimated funding required for implementation of the project and includes the total estimated construction cost plus an allowance for construction phase contingency. This value reflects the City's anticipated financial commitment to deliver the project through completion.

6.3 South Parramore Avenue Gravity Sewer Upgrade

6.3.1 Recommended Facilities

Based on the condition assessment completed to date and evaluation of feasible rehabilitation strategies, Alternative 3: Gravity Sewer Replacement Along Existing Route is recommended for implementation. This alternative consists of removal and replacement of approximately 0.35 miles (1,848 LF) of existing 8-inch vitrified clay gravity sewer along Parramore Avenue using open cut construction methods. Replacement would occur within the existing corridor and alignment, minimizing impacts to the surrounding collection system while restoring structural integrity and long term service reliability.

The proposed improvements include installation of new PVC gravity sewer pipe, replacement of seven existing manholes, and reconnection of existing service laterals to the new main. Rehabilitation of private laterals is not included as part of this project. Maintaining the existing alignment preserves current hydraulic conditions and reduces the complexity associated with rerouting wastewater flows or modifying upstream and downstream infrastructure. In conjunction with the gravity sewer replacement, the project advances coordinated corridor improvements along this portion of Parramore Avenue, including correction of localized drainage deficiencies, replacement of the existing water main, and restoration of roadway and pedestrian facilities within the project limits.

The project is being implemented as a coordinated corridor improvement effort with cost participation from multiple agencies. Based on the current design-phase construction cost allocation totaling $2,249,354, approximately 59 % of the project cost is attributable to the City of Orlando Water Reclamation Division for gravity sewer replacement, with the remaining costs shared by the City Streets and Stormwater Division (19 %), the Community Redevelopment Agency (19 %), and Orlando Utilities Commission (3 %) for associated corridor improvements within their respective infrastructure responsibilities.

The City's design consultant has advanced this project to the final design stage, and the scope described herein reflects the current understanding of the planned improvements based on available design information at the time of preparation of this Facilities Plan.

6.3.2 Cost Estimate

The planning level opinion of probable construction cost of the selected alternative for the South Parramore Avenue Gravity Sewer Upgrade is presented in **Table 6-3**. The total anticipated construction budget is **$2,699,225** and includes a construction-phase contingency.

Table 6-3 South Parramore Avenue Gravity Sewer Upgrade Construction Cost

Item	Description	Construction Cost (FY 2027)
1	Mobilization and Maintenance of Traffic (MOT)	$195,000
2	Bypass Pumping and Flow Management	$210,000
3	Gravity Sewer Replacement (≈1,850 LF, incl. trenching, bedding, pipe installation)	$620,000
4	Manhole Replacement/Rehabilitation (7 ea)	$185,000
5	Service Lateral Reconnections	$145,000
6	Pavement Removal and Restoration	$165,000
7	Stormwater Adjustments and Utility Conflict Coordination	$55,000
8	Surface Restoration (sidewalk, landscape, signage, minor appurtenances)	$54,965
	Subtotal	**$1,629,965**
9	Contractor OH&P (15%)	$244,495
	Subtotal (OPCC)	**$1,874,460**
10	Pre-bid Phase Contingency [1] (20% reflecting planning stage status)	$374,894
	Total Estimated Construction Cost (Rounded)	$2,249,354
11	Construction Phase Contingency [2] (20%)	$449,871
	Total Project Construction Budget [3] (Rounded)	$2,699,225

[1] Pre-bid Phase Contingency – Represents the expected variability in construction cost associated with the current level of project definition at the Facilities Plan stage. It accounts for uncertainty in the final configuration of improvements, refinement of quantities during subsequent design, and market adjustments anticipated prior to bidding. This contingency reflects the difference between the planning level opinion of probable construction cost at the time of preparation and expected bid prices.

[2] Construction Phase Contingency - Construction phase contingency represents an allowance for uncertainties that may occur after bidding and during construction. It is intended to address unforeseen site conditions, limited subsurface information, field conflicts, owner directed modifications, and other changes typically managed through change orders. It is not included in the base construction estimate but is carried separately for budgeting purposes.

[3] Total Project Construction Budget - The total project construction budget represents the estimated funding required for implementation of the project and includes the total estimated construction cost plus an allowance for construction phase contingency. This value reflects the City's anticipated financial commitment to deliver the project through completion.

7

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Engineering a Better Environment

Section 7 Implementation Plan

This section presents the plan for implementing the City's recommended wastewater improvements, including a financial plan, implementation schedule, and public participation.

7.1 Implementation Schedule

Table 7-1 provides a schedule for the selected alternatives including design completion, permit completion, construction start and construction complete dates.

Table 7-1 Schedule for Selected Alternatives

Project Name	Fiscal Year	Bid Documents Completed and Permits Issued	Construction Start	Construction End	Construction Period (estimated)
Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements	2027	June, 2026	January, 2027	May, 2028	16 Months
Lift Station 2 Force Main Phase I, Part B	2027	June, 2026	January, 2027	January, 2028	12 Months
South Parramore Avenue Gravity Sewer Upgrade	2027	June, 2026	January, 2027	January, 2027	12 Months

7.2 Financial Plan

The City of Orlando will be responsible for financing its wastewater program over the next years. This program will be funded with a mix of cash-on-hand, rate revenues, bond issues, and other debt instruments, including the CWSRF program.

A Capital Financing Plan has been prepared in support of this Facilities Plan, providing detailed information on the City's strategy for repaying the requested SRF loan. This plan evaluates the project's anticipated costs, funding approach, and long-term financial sustainability. In addition, it demonstrates the City's ability to continue funding, operating, and maintaining the proposed facilities while meeting all associated debt obligations. The full Capital Financing Plan is included in **Appendix A.**

Based on the FY26 Capital Financing Plan, the proposed project has an estimated capital cost of approximately $23.98 million, as summarized in **Table 7-2**. Including loan service fees and capitalized interest, the total amount to be financed and amortized is approximately $24.63 million. The estimated annual debt service for the proposed SRF loan is approximately $1.62 million, inclusive of the required 1.15 coverage factor.

In addition, the City's *September 2020 Water Reclamation System Asset Management Plan* establishes the user rates for the wastewater system, which have been in effect since October 1, 2019. A copy of the Asset Management Plan is provided in **Appendix D in Volume 2**, and Section 3.4 of the Asset Management Plan summarizes the City's current user rates and charges.

Table 7-2 Project Cost Estimates and Funding Sources

Project Name	Total Project Construction Budget (Rounded) [1]	Funding Source	Fiscal Year
Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements	$11,704,800	State Revolving Fund (SRF)	FY 2027
Lift Station 2 Force Main Phase I, Part B	$9,576,120	State Revolving Fund (SRF)	FY 2027
South Parramore Avenue Gravity Sewer Upgrade	$2,699,225	State Revolving Fund (SRF)	FY 2027
Total Project Construction Budget	**$23,980,145**		

[1] Construction cost includes contingencies, as shown in the cost tables in **Section 6**.

7.3 DEP Permits Required

The following FDEP permits would be required for work to be completed on the projects included in this Facilities Plan:

- For the water reclamation facility project, it is anticipated that each project will require either a Substantial or Minor Modification permit application that would be accompanied by a Preliminary Design Report and Forms 1 and 2A (Forms #62-620.910(1) and (2)). A Notification of Construction Completion and Availability of Record Drawings and Final Operations and Maintenance Manual are also required (Forms #62-620.910(12) and (13)).
- For the force main and gravity sewer projects, it is anticipated that each project will require a Notification/Application for Constructing a Domestic Wastewater Collection/Transmission System (Form #62-604.300(8)(a)) and a Request for Approval to Place a Domestic Wastewater Collection/Transmission System into Operation (Form #62-604.300(8)(b)).
- For the Lift Station 2 Force Main project, portions of the selected alignment are expected to require new permanent and temporary construction easements. Preliminary routing was developed to maximize use of existing public rights-of-way; however, final easement limits and acquisition requirements will be determined during final design following detailed survey, utility coordination, and subsurface investigations.
- Stormwater permitting for each project would either be addressed by the Water Management District or the FDEP, depending on the location, permits already in place, and the type of modifications required.
- No Environmental Resource Permitting (ERP) is not anticipated based on environmental review of each project site, and no Section 404 Clean Water Act permit or compensatory mitigation is expected. See **Appendix B** for detailed discussion.

7.4 Public Participation and Adopting Resolution

An advertised public hearing is scheduled to be held on May 2026 to inform the public about this Facilities Plan and explain the proposed improvements, associated capital costs, and anticipated long-term impacts to customers. Citizens are encouraged to offer comments regarding the proposed programs. A record of this hearing and a copy of the advertisement will be kept for public record and review including a copy of the advertisement.

7.5 Asset Management Plan

In September 2020, the City completed a Water Reclamation System Asset Management Plan (Tetra Tech) to meet the Fiscal Sustainability Requirements of the Clean Water State Revolving Fund (CWSRF) Loan program (specifically, Florida Administrative Code (FAC) Chapter 62-503.700). A copy of the Plan is included in this Facilities Plan in **Appendix D in Volume 2** and is incorporated by reference in different sections.

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APPENDIX

WRIGHT-PIERCE
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A

Appendix A
Capital Financing Plan

CAPITAL FINANCING PLAN

City of Orlando
(Project Sponsor)

(Authorized Representative and Title)

(City, State, and Zip Code)

(Capital Financing Plan Contact, Title and Telephone Number)

(Mailing Address)

(Email Address)

(City, State, and Zip Code)

The Department needs to know about the financial capabilities of potential State Revolving Fund (SRF) loan applicants. Therefore, a financial capability demonstration (and certification is required well before the evaluation of the actual loan application).

The sources of revenues being dedicated to repayment of the SRF loan are Utility operating revenues
(Note: Projects pledging utility operating revenues should attach a copy of the existing /proposed rate ordinance)

Estimation of Proposed SRF Loan Debt Service

Capital Cost [1]	$	23,980,145
Loan Service Fee (2% of Capital Cost)	$	479,603
Subtotal	$	24,459,748
Capitalized Interest [2]	$	$172,600
Total Cost to be Amortized (Rounded)	$	24,632,348
Interest Rate [3]		1.34%
Annual Debt Service	$	1,408,114
Annual Debt Service Including Coverage Factor [4]	$	1,619,331

Notes:
[1] Capital Cost = Allowance + Construction Cost (including a 20% City contingency).
[2] Based on City's engineer cost estimates
[3] Based on SRF Fund Interest Rate Fact Sheet
[4] Coverage Factor is assumed at 1.15 recognizing that no impact fees are assumed within the Schedule of Revenue and Debt Service Coverage.

SERVICE AND DEBT EQUIVALENTS [1]

List annual debt service beginning two years before the anticipated loan agreement date and continuing at least fifteen fiscal years.
Use additional pages as necessary.
EACH OBLIGATION

#1 Wastewater Revenue Bonds, 2013	#2 Water Reclamation Revenue Bonds, 2024A	#3 Water Reclamation Refunding Bonds, 2024B	#4 SRF Loan - 65001S	#5 SRF Loan 65002P	#6 SRF Loan 65003P	#7 SRF Loan 650040
Coverage % [2] 125%	Coverage % [2] 125%	Coverage % [2] 125%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%
Revenue Pledge Lien Priority 1st	Revenue Pledge Lien Priority 1st	Revenue Pledge Lien Priority 1st	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd
Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes

#8 SRF Loan 650060	#9 SRF Loan 480400	#10 SRF Loan 480410	#11 SRF Loan 480420	#12 SRF Loan 480430	#13 SRF Loan 480460	#14 SRF Loan 480470
Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%
Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd
Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes

#15 SRF Loan 480440	#16 SRF Loan 480480	#17 SRF Loan 480490	#18 SRF Loan 4804A0	#19 SRF Loan 4804E (In Progress)	#20 SRF Loan 4804F (In Progress)	#21 SRF Loan 4804G (In Progress)
Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%
Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd
Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes

#22 (Proposed) Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements	#23 (Proposed) Lift Station 2 Force Main Phase I, Part B	#24 (Proposed) South Parramore Avenue Gravity Sewer Upgrade	#25	#26	#27	#28
Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%	Coverage % [2] 115%
Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd	Revenue Pledge Lien Priority 2nd
Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes	Insured (Yes/No) Yes

Fiscal Year	Annual Debt Service (Principal + Interest)																		Debt in Process		Proposed Debt				Total Non-SRF Debt Service w/coverage (Excludes Leases)	Total Current SRF Debt Service w/ coverage	Total Proposed S Service w/ covera
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
2024	2,848,775	-	-	1,871,319	102,287	75,644	487,276	1,106,141	773,311	284,028	156,421	150,363	386,824	882,437	-	418,967	384,026	-	-	-	-	-	-	-	3,560,969	8,140,902	-
2025	2,423,700	6,096,147	787,044	1,871,319	102,287	75,644	487,276	1,106,141	773,311	284,028	156,421	150,363	386,824	882,437	386,764	418,967	384,026	-	-	-	-	-	-	-	11,633,614	8,585,680	-
2026	-	6,853,500	2,613,500	1,871,319	102,287	75,644	487,276	1,106,141	773,311	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	-	-	-	-	-	-	-	11,833,750	9,030,459	-
2027	-	7,088,750	2,544,750	935,660	102,287	75,644	487,276	1,106,141	773,311	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	3,057,786	-	-	-	-	-	-	12,041,875	11,470,904	-
2028	-	7,087,750	2,541,250	-	102,287	75,644	487,276	1,106,141	773,311	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	3,057,786	-	-	-	343,912	281,055	79,089	12,036,250	10,394,895	809,665
2029	-	7,080,750	2,537,750	-	-	75,644	487,276	-	773,311	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	12,023,125	9,746,670	1,619,331
2030	-	7,087,000	2,529,250	-	-	75,644	487,276	-	773,311	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	12,020,313	9,746,670	1,619,331
2031	-	7,082,000	2,525,250	-	-	75,644	487,276	-	773,311	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	12,009,063	9,746,670	1,619,331
2032	-	7,080,500	2,520,500	-	-	-	-	-	773,311	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	12,001,250	9,099,312	1,619,331
2033	-	7,082,250	2,510,000	-	-	-	-	-	773,311	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,990,313	9,099,312	1,619,331
2034	-	9,585,500	-	-	-	-	-	-	-	284,028	156,421	150,363	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,981,875	8,210,004	1,619,331
2035	-	9,575,500	-	-	-	-	-	-	-	142,014	156,421	75,182	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,969,375	7,960,229	1,619,331
2036	-	9,566,750	-	-	-	-	-	-	-	-	78,210	-	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,958,438	7,620,513	1,619,331
2037	-	9,558,750	-	-	-	-	-	-	-	-	-	-	386,824	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,948,438	7,530,571	1,619,331
2038	-	9,546,250	-	-	-	-	-	-	-	-	-	-	-	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,932,813	7,085,723	1,619,331
2039	-	9,538,500	-	-	-	-	-	-	-	-	-	-	-	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,923,125	7,085,723	1,619,331
2040	-	9,525,250	-	-	-	-	-	-	-	-	-	-	-	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,906,563	7,085,723	1,619,331
2041	-	9,515,750	-	-	-	-	-	-	-	-	-	-	-	882,437	773,528	418,967	384,026	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,894,688	7,085,723	1,619,331
2042	-	9,504,500	-	-	-	-	-	-	-	-	-	-	-	-	773,528	209,484	-	3,057,786	331,312	118,576	194,866	687,825	562,111	158,179	11,880,625	5,388,384	1,619,331

Footnote:

[1] Reflects debt service schedules from outstanding bonds and in progress and active SRF loans. It should be noted that the SRF loans marked in progress have loan payments that are estimated by the City based on historical interest rates.
It should also be noted that the projections contained herein do not reflect any additional debt service that may be contemplated or required to fund future capital pursuant to the City's Capital Improvement Plan.

[2] Pursuant to the Bond Resolution authorizing the issuance of the outstanding Wastewater Revenue Bonds, Series 2024, the City must
generate sufficient Net Revenue equal to or greater than 125% of the annual debt service of the outstanding bonds in the Fiscal Year. Pursuant to Section 5.01 of the SRF Loan Agreements
the City must have pledged revenues equal to or exceeding 1.15 times the sum of the semiannual loan payments in such fiscal year.

[3] Amounts shown reflect estimates and are subject to change based on completion of actual project cost and timing of completion.

SCHEDULE OF ACTUAL REVENUES AND DEBT COVERAGE FOR PLEDGED REVENUE

(Provide information for the two fiscal years preceding the anticipated date of the SRF loan agreement)

		FY 23-24 [1]	FY 24-25 [2]
(a)	Operating Revenues (Identify)		
	Charges for Service [3]	$128,660,005	$134,326,770
	Other Operating Revenue	$145,928	$107,969
(b)	Interest Income	$15,412,319	$15,949,356
(c)	Other Incomes or Revenues	$2,479,005	3,305,533
(d)	Total Revenues	$146,697,257	$153,689,628
(e)	Operating Expenses (excluding interest on debt, depreciation and other non-cash items)	$99,245,571	$98,183,292
(f)	**Net Revenues (f = d - e)**	$47,451,686	$55,506,336
(g)	Debt Service (including coverage) Excluding SRF Loans [4]	$3,560,969	$11,633,614
(h)	Debt Service (including coverage) for Outstanding SRF Loans [4]	$8,140,902	$8,585,680
(i)	**Net Revenues After Debt Service (i = f - g - h)**	$35,749,816	$35,287,042

Notes:

[1] Unless otherwise noted, amounts shown are derived from the City's audited financial statements.

[2] This financial information is from a draft financial statement from the City and has not been audited and is the best available information at the time of this.

[3] The City has an annual indexing provision which allows an adjust of 5% annually for wastewater rates.

[4] Amounts shown reflect debt service as noted in the prior Schedule Of Debt Service And Debt Equivalents.

SCHEDULE OF PROJECTED REVENUES AND DEBT COVERAGE
FOR PLEDGED REVENUE

		2026	2027	2028	2029	2030
(a)	Operating Revenues Service Charges [1]	$144,737,706	$152,276,289	$160,168,931	$168,427,790	$177,065,133
(b)	Interest Income [2]	$816,702	$825,730	$726,200	$525,796	$238,203
(c)	Other Incomes or Revenues (Connection Fees)	$2,789,180	$2,636,930	$2,484,680	$2,332,430	$2,180,180
(d)	Total Revenues	$148,343,588	$155,738,949	$163,379,811	$171,286,015	$179,483,516
(e)	Operating Expenses (excluding interest on debt, depreciation and other non-cash items) [3]	$111,686,649	$117,098,585	$122,719,520	$128,559,106	$134,627,440
(f)	**Net Revenues** **(f = d - e)**	$36,656,939	$38,640,364	$40,660,292	$42,726,909	$44,856,076
(g)	Existing Debt Service on Non-SRF Projects (including coverage) [4]	$11,833,750	$12,041,875	$12,036,250	$12,023,125	$12,020,313
(h)	Existing SRF Loan Debt Service (including coverage)	$9,030,459	$11,470,904	$10,394,895	$9,746,670	$9,746,670
(i)	**Total Existing Debt Service** **(i = g + h)**	$20,864,209	$23,512,779	$22,431,145	$21,769,795	$21,766,982
(j)	Projected Debt Service on Non-SRF Future Projects (including coverage)	$0	$0	$0	$6,575,887	$6,575,887
(k)	Projected SRF Loan Debt Service (including coverage) [5]	$0	$0	$809,665	$1,619,331	$1,619,331
(l)	**Total Debt Service (Existing and Projected)** **(l = i + j + k)**	$20,864,209	$23,512,779	$23,240,811	$29,965,013	$29,962,200
(m)	**Net Revenues After Debt Service (m = f - l)**	$15,792,730	$15,127,585	$17,419,481	$12,761,896	$14,893,875

Notes:

[1] Revenue projection above is comprised of a 5% rate index (adopted by the City) with an assumed 0.8% – 1.1% growth rate during the forecast period.

[2] Includes interest income on unrestricted cash balances, which were calculated based on the projected cash balances of the system

[3] Amounts are based on the Financial Forecast Report recently completed by Raftelis for the City. This includes major maintenance and the dividend payment to the City

[4] Pursuant to the Bond Resolution authorizing the issuance of the outstanding Wastewater Revenue Bonds, Series 2024, the City must generate sufficient Net Revenue equal to or greater than 125% of the annual debt service of the outstanding bonds in the Fiscal Year. Pursuant to Section 5.01 of the SRF Loan Agreements the City must have pledged revenues equal to or exceeding 1.15 times the sum of the semiannual loan payments in such fiscal year.

[5] Amounts reflect the estimated annual debt service for the proposed SRF Loan.

CERTIFICATION

I, Utility Services Department Director, certify that I have reviewed the information included in the preceding capital financing plan worksheets, and to the best of my knowledge, this information accurately reflects the financial capability of the City of Orlando Local Government,

I further certify that City of Orlando Local Government

adequate construction, operation, and maintenance of the system, including this SRF project.

Signature

Date

livided by years of construction, times interest rate per year,
ments for the first year to the remaining years.

B

WRIGHT-PIERCE
Engineering a Better Environment

Appendix B
Environmental Assessment Report

CITY OF ORLANDO

Clean Water Facilities Plan

Ecological Assessment

Prepared for:

Wright-Pierce
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Maitland, FL 32751

Prepared by:

Barnes Ferland and Associates, Inc.
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April 2026

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1.0 Introduction

At the request of Wright-Pierce Inc., Barnes, Ferland, and Associates (BFA) Inc., prepared an Ecological Assessment (EA) in support of the City of Orlando's Clean Water Facilities Plan project. The Clean Water Facilities Plan will be submitted with a grant application to the Florida Department of Environmental Protection (FDEP)

The Clean Water Facilities Plan includes the three projects below:

1. Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements (Figure 1)
2. Lift Station 2 Force Main, Phase 1, Part B (Figure 2)
3. South Parramore Avenue Gravity Sewer Upgrade (Figure 3).

This EA includes an assessment of the three project areas to determine the presence of potentially jurisdictional wetlands and state and/or federally protected (listed) species and their associated habitats. BFA did not conduct subsurface soil, water quality or archaeological investigations as part of this EA.

Protected (listed) species and jurisdictional wetland and surface waters are regulated by State, and Federal agencies. This EA discusses potential environmental permitting obligations that may be required for the project and recommends actions, as necessary. The findings in this EA reflect conditions onsite at the time of the field investigation and do not preclude the possibility that conditions may change, or that protected wildlife species may occur in the area in the future.

2.0 Methodology

2.1 Threatened and Endangered Species Assessment

List of potential state and federal listed plants was compiled based on published data sources.

The Florida Fish and Wildlife Conservation Commission (FWC) is the state agency responsible for administering the State of Florida's wildlife protection program (Chapter 68A-27, F.A.C.), which provides regulatory protection for specific animals designated to be under threat of extinction. The FWC published lists of protected wildlife in *Florida's Imperiled Species Management Plan 2016-2026 (Oct 2016), and Florida's Endangered and Threatened Species list (May 2017)*. The Florid Department of Agricultural and Consumer Services (FDACS) is the state agency responsible for the regulation of protected plant species.

The U.S. Fish and Wildlife Service (USFWS) is the federal agency responsible for administering the Endangered Species Act (16 U.S.C. Section 1531-1544), which provides regulatory protection for specific animal and plant species designated to be under threat of extinction. The USFWS continually updates its lists of protected wildlife and provides site-specific list for planning purposes through the Information and Planning Consultation (IPaC) resource list. IPaC resource lists for each project are provided in Appendices A-C.

A field review of the study area was conducted on April 14, 2026. The field review served to ground-truth the current extent of wetlands or surface waters and record any observations of

wildlife or indicators of wildlife usage. Pedestrian transects were used to evaluate the project areas. The presence of listed species was evaluated through actual observation, signs of scat, prints, or other indications of their presence or utilization of the project areas. Vegetative community types and general observations were recorded on field data sheets and photographs taken of the area. A list of plant species encountered in the project areas was recorded. This list reflects representative species observed within the project areas and is not necessarily a complete floristic inventory. Habitats were classified and mapped using the *Florida Land Cover and Classification System* (FLCCS) (FWC 2018).

Statements regarding the occurrence of listed species are based on limited field observations and existing data records and they do not exclude the possibility that listed species may occur outside of the reviewed transects or may occasionally forage on-area or move onto the area on a later date.

2.2 Wetland Assessment

Potentially jurisdictional wetlands and surface waters were field delineated based on the methodologies detailed in Chapter 62-340 F.A.C for State of Florida including local jurisdictions, and the USACE Wetland Delineation Manual [Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region].

3.0 Existing Area Conditions

The following sections include summaries of location, soils, topography and drainage, and land use (habitat) database records for the three project areas.

3.1 Location

The Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements project is located at the Iron Bridge Regional Water Reclamation Facility (RWRF). The facility is Seminole County parcel 33-21-31-300-0010-0000 with street address of 601 Iron Bridge Circle, Oviedo, FL 32765. The site is in Section 33, Township 21S, Range 31E (Figure 1).

Lift Station 2 Force Main Phase 1, Part B project is in public right-of-way extending from east from the intersection of Lake Highland Dr and Ferris Ave/Terrace Blvd to N Thornton Ave, south to Canton St, then east to Fern Creek Ave. The site is in Section 24, Township 22S, Range 29E (Figure 2).

South Parramore Avenue Gravity Sewer Upgrade project is in Parramore Ave right-of-way from just north of State Road 408 south to West Gore St. The site is in Section 35, Township 22S, Range 29E (Figure 3).

3.2 Soils

Soil data was obtained from the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) web soil survey. The project sites have been developed and soils modified from the original mapped soil. The status of these soils may be different from the USDA

description due to development practices. The specific limitations and restrictions of the soils should be reviewed by a licensed engineer or a professional soil scientist.

3.2.1 Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements

The project site is mapped with the following soils (Figure 4).

- **Myakka and EauGallie fine sands** map unit is described as verry deep, very poorly or poorly drained, slowly permeable soils in flats, sloughs and depressional areas. The water table rises within 6 to 18 inches of the surface for periods of 1 to 4 months and is within 40 inches for more than 6 months. Depressional areas are covered with standing water for 3 to 6 months during most years.
- **Basinger, Samsula, and Hontoon soils, depressional** map unit is described as very deep, very poorly drained, rapidly permeable soils that formed in moderately thick beds of hydrophytic plant remains, often muck, and are underlain by sandy marine sediments. These soils are in swamps, poorly defined drainageways and flood plains. Slopes are less than 2 percent. Ponding is frequently under natural conditions for very long durations between for 6 to 9 months.
- **Pomello fine sand, 0 to 5 percent slopes** map unit, is described by the NRCS as very deep, moderately well to somewhat poorly drained soils that formed in sandy marine sediments. Pomello soils are on ridges, hills, and knolls in the flatwoods on marine terraces. Slopes range from 0 to 5 percent. Water table is between 18 to 48 inches.

3.2.2 Lift Station 2 Force Main Phase 1, Part B

The project site is mapped with the following soils (Figure 5).

- **Candler-Urban land complex, 0 to 5 percent slopes** area modified soils. The NRCS describes Candler soil series as very deep, excessively drained, very rapidly to rapidly permeable soils on uplands with a water table at depths greater than 80 inches.
- **Candler-Urban land complex, 5-12 percent slopes**. See above.
- **Tavares-Urban land complex, 0 to 5 percent slopes** is a highly modified soil. The NRCS describes the Tavares soil series as very deep, moderately well drained soils that formed in sandy marine or eolian deposits. Tavares soils are on hills, ridges and knolls of the lower Coastal Plain with slopes range from 0 to 5 percent. Depth to seasonal high water table is between depths of 42 to 72 inches for more than 6 to 10 months during most years but recedes to depths greater than 72 inches during periods of drought.

3.2.3 South Parramore Avenue Gravity Sewer Upgrade

The project site is mapped with the following soils (Figure 6).

- **Wabasso-Urban land complex** map unit is a highly modified soil type. The Wabasso soil series is described by the NRCS as very deep, very poorly and poorly drained, that

formed in sandy and loamy marine sediments. Wabasso soils are on flatwoods, low broad flats, sloughs, depressions, and flood plains. Slopes are linear to concave and range from 0 to 2 percent. Depth to seasonal high water table is at depths of 10 to 40 inches for more than 6 months, less than 10 inches for less than 60 days in wet seasons, and more than 40 inches during very dry seasons.

3.3 Topography and Drainage

Topographic data was obtained from the U.S. Geological Survey (USGS) survey.

3.3.1 Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements

The project site has been graded flat with an approximate elevation of 55 ft. The contractor lay down area is also nearly level with an elevation of 50 ft (Figure 4)

3.3.2 The Lift Station 2 Force Main Phase 1, Part B

The project site has varied elevations. The topography at the water's edge of Lake Highland is 80 ft, rises to between 90-95 ft at Lake Highland Dr, then increases gradually moving east to 110 ft at Mills Ave (Figure 5).

3.3.3 South Parramore Avenue Gravity Sewer Upgrade

The project site is nearly level between 100-105 ft (Figure 6).

3.4 Land Use and Vegetation Cover

Land use data was obtained from the FDEP's GIS data library and field verified (Figures 6-9). Habitats were classified and mapped using the *Florida Fish and Wildlife Conservation Commission* (FWC) database and *Florida Land Cover Classification System* (FLCCS) (Sep 2018) and are discussed below.

3.4.1 Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements

The project site includes an area for electrical upgrades, and the contractor lay down area on the Iron Bridge facility (Utilities 1860). Both areas are highly modified and maintained by staff. The vegetation is a mix of bahia grass (*Paspalum notatum*) and crabgrass (*Digitaria sp*), with scattered Florida pusley (*Richardia grandiflora*), ragweed (*Ambrosia artemisiifolia*), Southern plantain (*Plantago virginica*), matchweed (*Phyla nodiflora*), and spurge (*Euphorbia maculata*).

Site photographs are provided in Appendix D.

3.4.2 Lift Station 2 Force Main Phase 1, Part B

The project corridor is in the existing right-of way of Lake Highland Drive, Thornton Avenue, Mills Avenue, and Canton St and mapped as Transportation 1840 the surrounding neighborhoods are mapped as High Intensity Urban (1822) and includes

residential and commercial buildings (Figure 9). A lift station lies in a small park (Low-intensity Urban 1821) on the shore of Lake Highland (Lacustrine 3000).

Site photographs are provided in Appendix E.

3.4.3 South Parramore Avenue Gravity Sewer Upgrade

The project corridor is in the existing Parramore Ave right-of way and mapped as Transportation 1840 (Figure 9). Site photographs are provided in Appendix F.

4.0 Threatened and Endangered Species Assessment

Wildlife listed on the USFWS Information and Planning Consultation (IPaC) resource lists in Appendices A-C are discussed below with an explanation for an effect determination. Table 1 provides a summary of species effect determinations.

Consultation with the USFWS has not taken place and the opinions expressed are those of BFA based on the data presented in this EA.

4.1 Plants

No listed plant was found onsite, and no further action is anticipated.

The listed plants that occur in Seminole County occur in fire-controlled, xeric and pine flatwood habitats. The history of habitat disturbance on the project sites and the lack of periodic fire management precludes the presence of these plants. None were observed.

The following plants are listed on the IPac species lists:

- Pygmy Fringe-tree (*Chionanthus pygmaeus) – USFWS Endangered*
- Beautiful Pawpaw *(Deeringothamnus pulchellus) - USFWS Endangered*
- Pigeon Wings *(Clitoria fragrans) - USFWS Threatened*
- Papery Whitlow-wort (*Paronychia chartacea) – USFWS Threatened*
- Sandlace *(Polygonella myriophylla) – USFWS Endangered*

The project will have "***No effect***" on these plant species and no further action is recommended.

Table 1 Summary of Listed Species Effect Determinations

Common Name	Scientific Name	Federal Status[3]	Effect Determination
Plants			
Pygmy Fringe-tree	*Chionanthus pygmaeus*	E	No Effect
Beautiful Pawpaw	*Deeringothamnus pulchellus*	E	No Effect
Pigeon Wings	*Clitoria fragrans*	T	No Effect
Papery Whitlow-wort	*Paronychia chartacea*	T	No Effect
Sandlace	*Polygonella myriophylla*	E	No Effect
Mammals			
Florida Panther Puma	*Felis concolor coryi*	E	No Effect
Tricolored Bat	*Perimyotis subflavus*	Proposed E	No Effect
West Indian Manatee	*Trichechus manatus*	T	No Effect
Birds			
Crested Caracara	*Caracara plancus audubonii*	T	No Effect
Eastern Black Rail	*Laterallus jamaicensis*	T	No Effect
Everglade Snail Kite	*Rostrhamus sociabilis plumbeus*	E	No Effect
Whooping Crane	*Grus americana*	Experimental	No Effect
American bald eagle	*Haliaeetus leucocephalus*	BGEPA / MBTA	No Effect
Florida Scrub-jay	*Aphelocoma coerulescens*	T	No Effect
Red-cockaded Woodpecker	*Dryobates borealis*	T	No Effect
Reptiles			
Eastern Indigo Snake	*Drymarchon couperi*	T	No Effect
Southern Hognose Snake	*Heterodon simus*	Proposed T	No Effect
Gopher tortoise	*Gopherus polyphemus*	T[2]	None observed
Insects			
Monarch Butterfly	*Danaus plexippus*	Proposed T	No Effect

Notes:
1. Compiled from IPaC database reports.
2. Gopher tortoise is listed by state only. No effect designation required for state only listed species.
3. Status Abbreviations:
   T = Threatened
   E = Endangered
   BGEPA = Bald and Golden Eagle Protection Act
   MBTA = Migratory Bird Treaty Act

4.2 Animals

Specific species identified by the IPaC database for Seminole County in relation to the project sites are discussed below.

No USFWS listed Threatened or Endangered animals were observed on the project sites during the site reviews. The degree of site disturbance precludes the presence of most protected species.

The project sites do not overlap any USFWS designated critical habitat.

4.2.1 Tricolored Bat (TCB)

Tricolored bat (*Perimyotis subflavus*) is proposed in 2024 to be listed by the USFWS as Endangered and is in the USFWS Consultation Area. Tricolored bats in northern states overwinter in caves and abandoned mines. In the southern United States, where caves are sparse, tricolored bats often roost in road culverts where they exhibit shorter torpor bouts and forage during warm nights. During the spring, summer, and fall, tricolored bats are found in forested habitats where they roost in trees, primarily among leaves of live or recently dead deciduous hardwood trees, but may also be found in Spanish moss, pine trees, and occasionally human structures.

The project sites do not support roosting habitat such as large culvert or bridges or large trees for roosting. Similarly, the project sites lack significant wetlands to be an attractive foraging habitat for TCB. Project should have "**No effect"** determination.

4.2.2 Florida Panther / Puma

Florida Panther / Puma (*Puma concolor coryi*) is listed by the USFWS as Endangered. The project site is outside of the Panther Focus Area. The proposed project will not result in changes to traffic patterns that might have identifiable effects on panthers. The projects will have '**No effect**" on the Florida panther based on the Florida Panther Effect Determination Key dated February,19, 2007. None were observed on site.

4.2.3 West Indian Manatee

West Indian Manatee (*Trichechus manatus*) is a marine mammal that frequents Florida estuaries and seasonally use Florida freshwater springs. These habitats do not occur in the project areas. The projects will have '**No effect**" on the West Indian Manatee.

4.2.4 Crested Caracara

Crested Caracara *(Caracara plancus audubonii)* is listed by the USFWS as Threatened and is in the USFWS consultation area. Crested Caracara prefers rural landscapes with a mix of wetlands and uplands to forage and nest in tall cabbage palms (*Sabal palmetto*). The project sites lack cabbage palms suitable for nesting habitat and undeveloped pasture suitable for foraging habitat. Based on *Species Conservation Guidelines South Florida Audubon's Crested Caracara* (April 2004) the projects will have '***No effect***" on the crested caracara for lack of suitable nesting habitat.

4.2.5 Eastern Black Rail

Eastern Black Rail *(Laterallus jamaicensis)* is listed by the USFWS as Endangered. Eastern Black Rail prefer to nest and forage in shallow marsh margins. This habitat does not occur on the project sites. The projects will have '***No effect***" on the Eastern Black Rail for lack of suitable habitat.

4.2.6 Everglade Snail Kite

Everglade Snail Kite (*Rostrhamus sociabilis plumbeus)* is listed by the USFWS as Endangered. Everglade Snail Kite nest in tall grasses along lake margins and feed on aquatic apple snails. None of these habitats occur on the project sites. The projects will have '***No effect***" on the Everglade Snail Kite for lack of suitable habitat.

4.2.7 Whooping Crane

Whooping Crane (*Grus americana)* population in Florida is an experimental population protected by the USFWS. None were observed. There is no suitable aquatic nesting habitat in the project sites. The projects will have '***No effect***" on whooping Crane for lack of suitable habitat.

4.2.8 American bald eagle

American bald eagle (*Haliaeetus leucocephalus*) is protected under the USFWS Bald and Golden Eagle Act. This bird prefers to nest in large pine trees in proximity to open water feeding habitats, which do not occur in the project sites. The project sites are outside of the 660-ft nest protection zones of closest known bald eagle nests. The project will have '***No Effect***" on this species for lack of suitable nesting trees and suitable foraging habitat.

4.2.9 Florida Scrub-jay

Florida scrub jay (*Aphelocoma coerulescens*) occur in xeric oak habitats subject to routine fire management. This species is very habitat specific. The project site does not support his habitat. The project will have '***No Effect***" on this species for lack of suitable habitat.

4.2.10 Red-cockaded Woodpecker

Red-cockaded Woodpecker (Dryobates borealis) prefer old-growth long leaf (*Pinus palustris*) or slash pine (*Pinus elliottii*) flatwoods. Red-cockaded Woodpecker are very habitat specific. The projects will have '***No Effect***" on this species for lack of suitable habitat.

4.2.11 Eastern Indigo Snake

Eastern indigo snake (*Drymarchon couperi)* is listed by the USFWS as Threatened. Eastern indigo snakes inhabit a diversity of pine flatwoods, hardwood forests, moist hammocks, and uplands areas that surround cypress swamps. Often these snakes will associate with gopher tortoise burrows. None were observed.

The project sites are all in developed areas with no habitat for Eastern Indigo Snake. The projects will have '***No Effect***" on this species for lack of suitable habitat.

4.2.12 Southern Hognose Snake

The USFWS proposed the Southern Hognose Snake (*Heterodon simus*) to be listed as a Threatened species. No critical habitat or recovery plan has been adopted by USFWS. The Southern Hognose Snake is a fossorial species that lives in upland sandy soils typical of sandhill and scrub communities maintained by regular and periodic fire management. The history of site disturbance has resulted in compacted soils that preclude the presence of this species. The project sites' on-site habitat is unsuitable for Southern Hognose Snake, none were observed. Based on survey results and the lack of suitable habitat the projects should have "***No Effect***" on Southern Hognose Snake.

4.2.13 Monarch Butterfly

Monarch Butterfly (*Danaus plexippus)* is a proposed Threatened species by the USFWS. This species has a specialized relationship with milkweed plants. Milkweed was not observed on site nor were any monarch butterflies. The history of site disturbance may preclude their use of the site. The project will have '***No Effect***" on this species for lack of milkweed.

4.2.14 Gopher Tortoise

Gopher tortoise (*Gopherus polyphemus*) is listed by the FWC as a Threatened species and protected under Chapter 68A-27 F.A.C. No USFWS effect determination is required for state-listed species.

No gopher tortoise or burrow was found on the project sites. The upland habitat is not generally suitable for gopher tortoise.

5.0 Wetland and Surface Water Assessment

5.1 National Wetland Inventory

See Figures 7-9 for State land use database records for each project.

See Figures 10-12 for federal USGS National Wetland Inventory (NWI) records for each project.

The Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements (Figures 7 and 10) and the South Parramore Avenue Gravity Sewer Upgrade (Figures 9 and 12) projects do not show any wetlands or surface waters.

The Lift Station 2 Force Main Phase 1, Part B project is on the north shore of Lake Highland (Figures 8 and 11). Impacts to Lake Highland are not anticipated. The connection point for the force main is anticipated to be outside the lift station fence north of the lift station.

5.2 Chapter 62-330 F.A.C Environmental Resource Permitting (ERP)

The State of Florida requires all activities that occur in, on, or over wetlands or other surface waters and that require the construction of a stormwater management system to be authorized under and Environmental Resource Permitting (ERP) established in Part IV of Chapter 373, F.S and Chapter 62-330, F.A.C.

The Florida Department of Environmental Protection (FDEP) typically administers the ERP program for wastewater related projects. No impacts to Lake Highland are anticipated, No FDEP ERP should be required.

5.3 Section 404 Clean Water Act

The U.S. Army Corps of Engineers (USACE) regulates potential impacts to Waters of the US (WOTUS) per Section 404 Clean Water Act (CWA).

The definition of Waters of the US (40 C.F.R. 120) does not typically include isolated wetlands / surface waters, or waters connected by constructed stormwater systems.

No impacts to Lake Highland are anticipated, thus no federal; Section 404 CWA permit should be required.

5.4 Wetland Mitigation

The projects are not anticipated to require impacts to wetlands or surface waters. Thus, no compensatory mitigation is required.

6.0 Flood Zone Assessment

FEMA National Flood Hazard Layer 2024 database was used to assess current flood hazards in the project areas. Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA).

SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30.

Moderate flood hazard areas, labeled Zone B or Zone X (shaded) are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood.

The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent-annual-chance flood, are labeled Zone C or Zone X (unshaded).

The Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements project site is in unshaded minimal flood hazard Flood Zone X (Figures 13)

The Lift Station 2 Force Main Phase 1, Part B project is in unshaded minimal flood hazard Flood Zone X. The exception being Lake Highland itself is mapped as Flood Zone AE (Figure14). The project is not anticipated to involve work south of the lift station and thus not involved flood zone impact.

The South Parramore Avenue Gravity Sewer Upgrade project is in Flood Zone X (Figure 15).

7.0 Historical and Cultural Assessment

A request was made to the Florida Department of State Division of Historical Resources (FDHR) for a review of the Florida Master Site File for each of the projects.

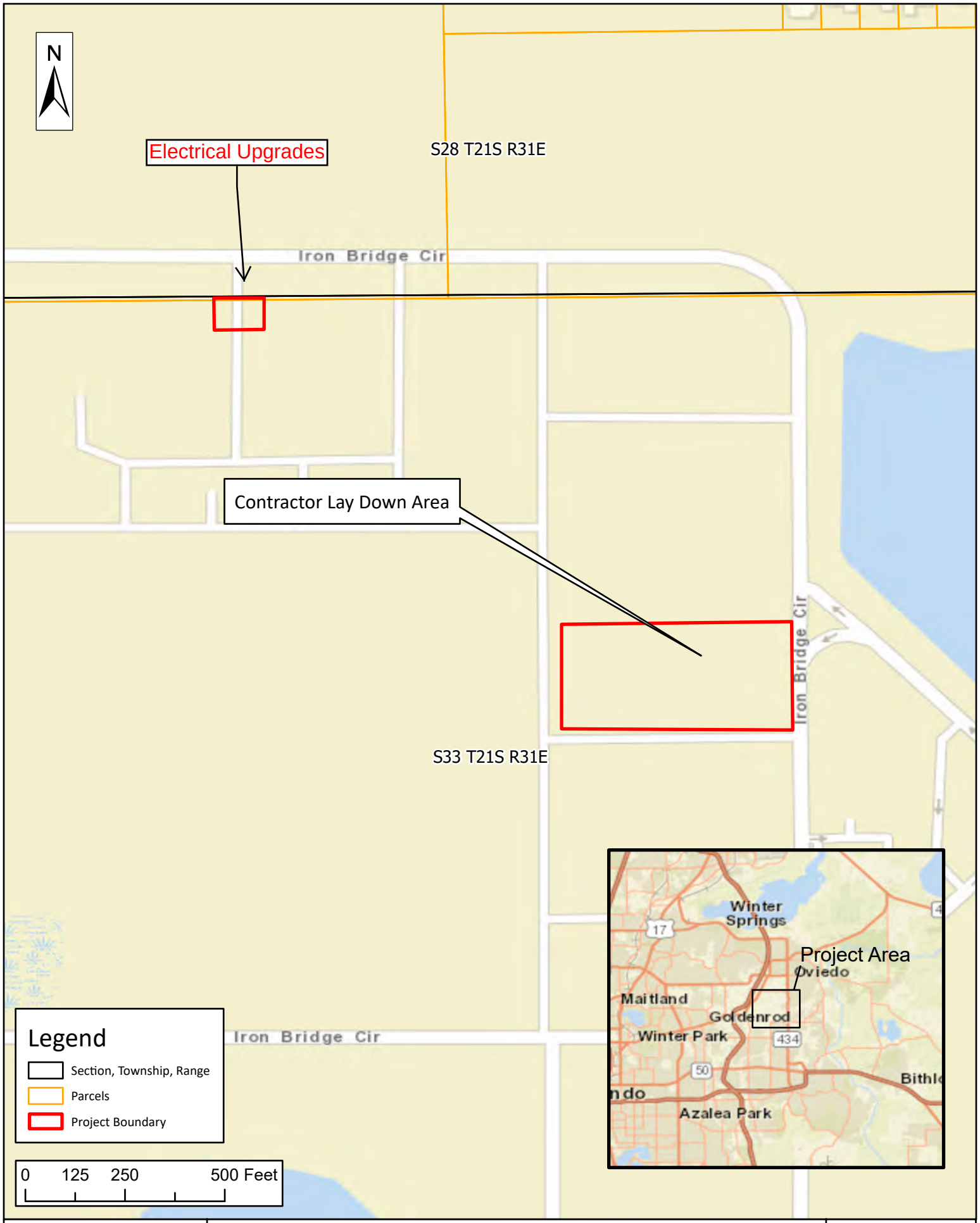
The FDHR has no record of cultural or historical resources on the Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements project site or the Lift Station 2 Force Main Phase 1, Part B project.

The FDHR report lists 26 cultural resources in the South Parramore Avenue Gravity Sewer Upgrade project (Appendix G). North of SR 408 is in the Holden-Parramore Historic District (OR06109). South of SR 408 is the Parramore Avenue and Conely St Historic District (OR08699). The remaining 24 listed resources are buildings on either side of Parramore Ave right-of way. Six (6) of these structures are reported to be destroyed.

The project is in Parramore Ave right-of-way and will not impact on any of the remaining structures.

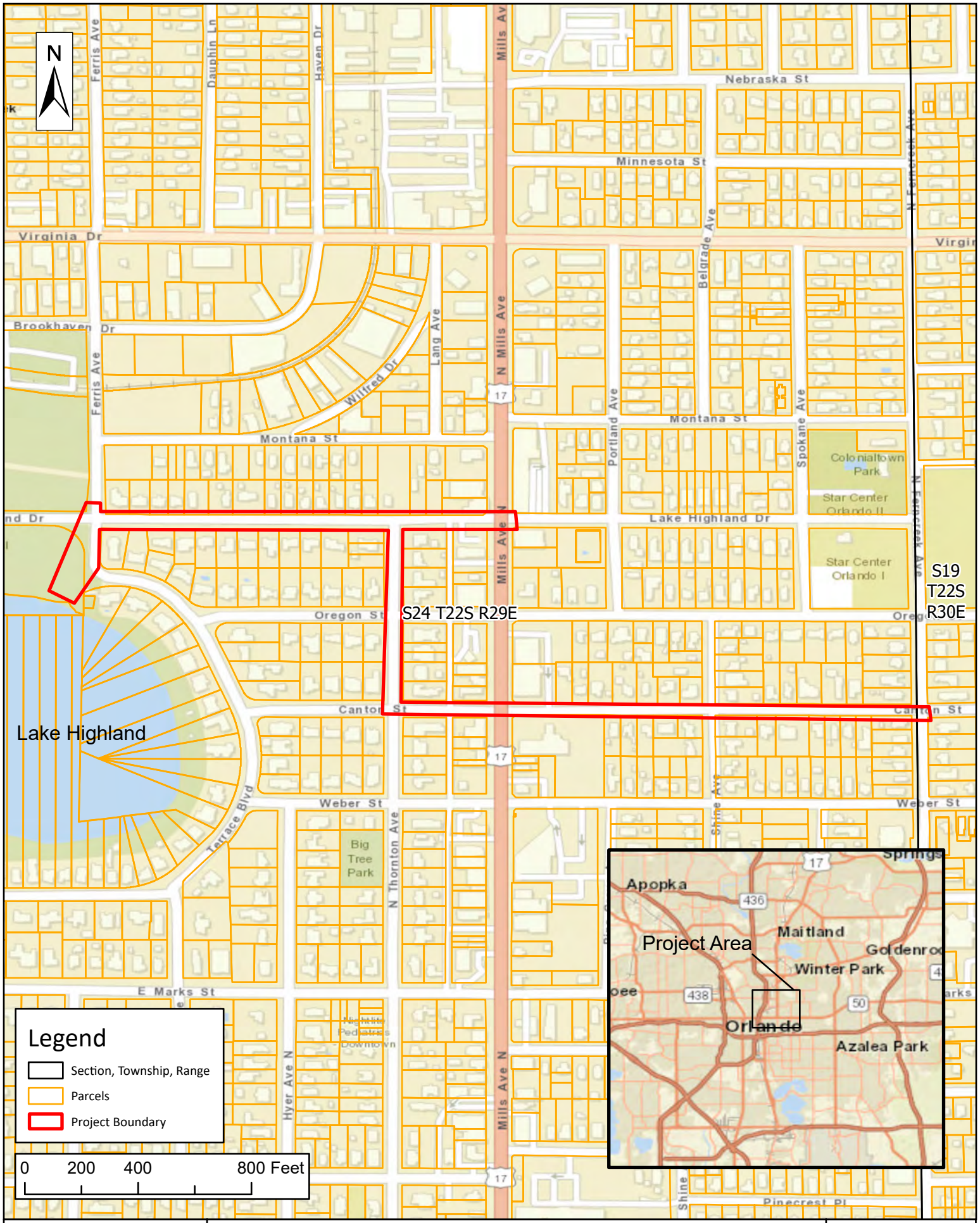
8.0 Health or Environmental Effects on Minority or Low-Income Communities

The projects include construction in existing rights-of-way and land owned by the city. No new acquisitions are required. There are no anticipated adverse health or environmental effects on minority or low-income populations. The project itself is an infrastructure project aimed at improving human health. Maintaining infrastructure and expanding/upgrading existing facilities, a more reliable sanitary system is provided for all communities in the City of Orlando.



Iron Bridge Regional WRF
Bardenpho Blower Electrical Improvements
Location

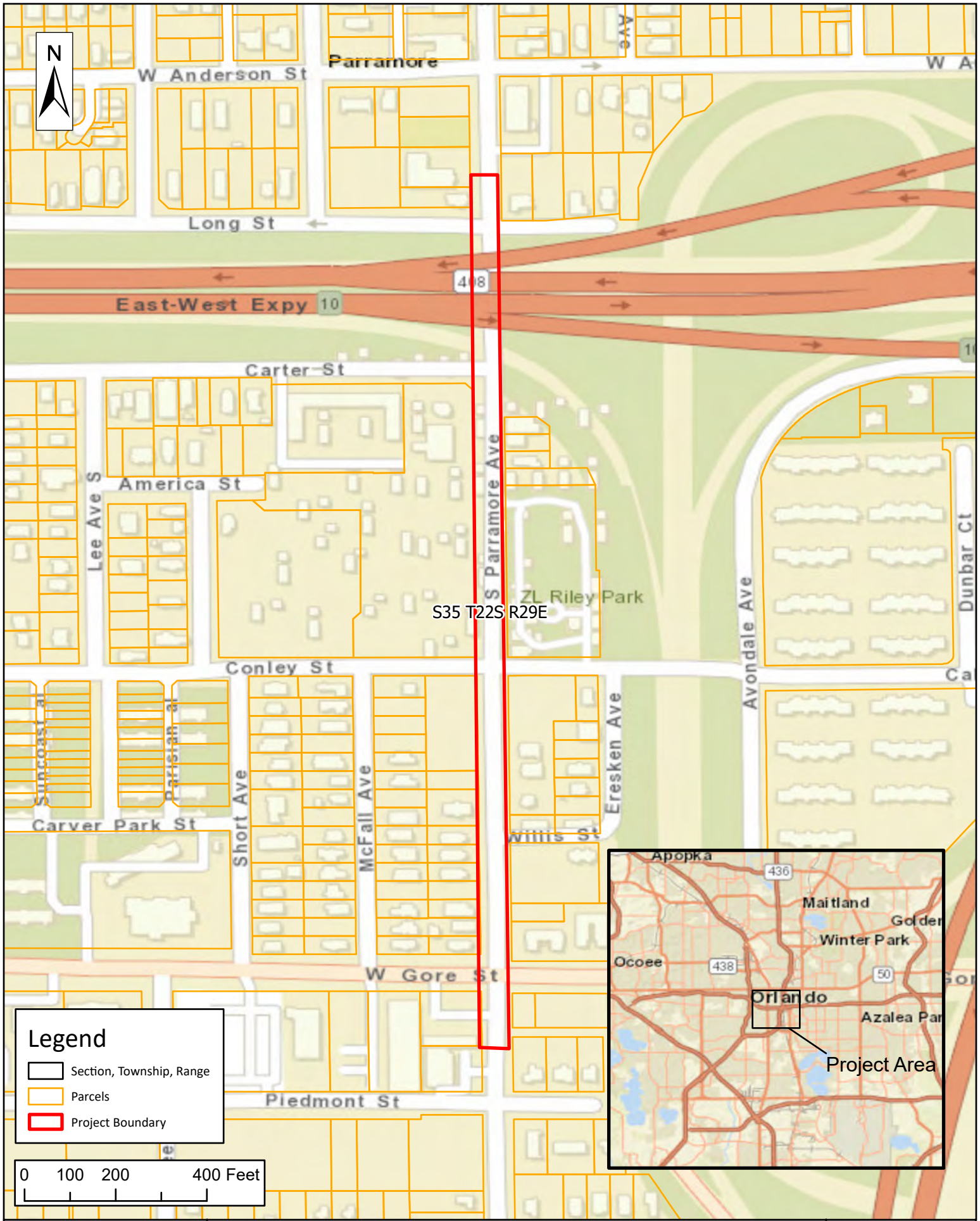
FIGURE 1



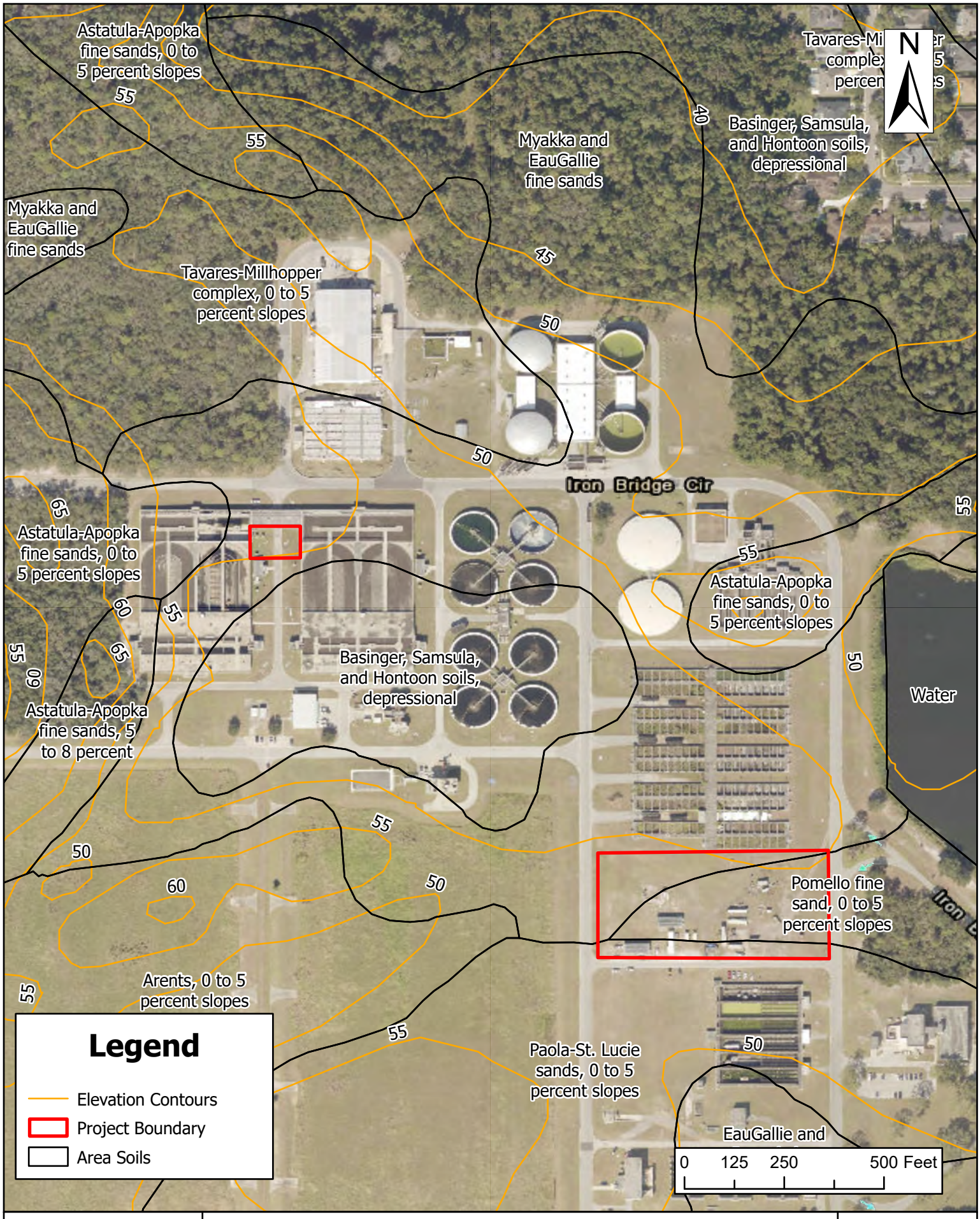
BFA

Lift Station 2 FM Phase 1, Part B
Location

FIGURE 2

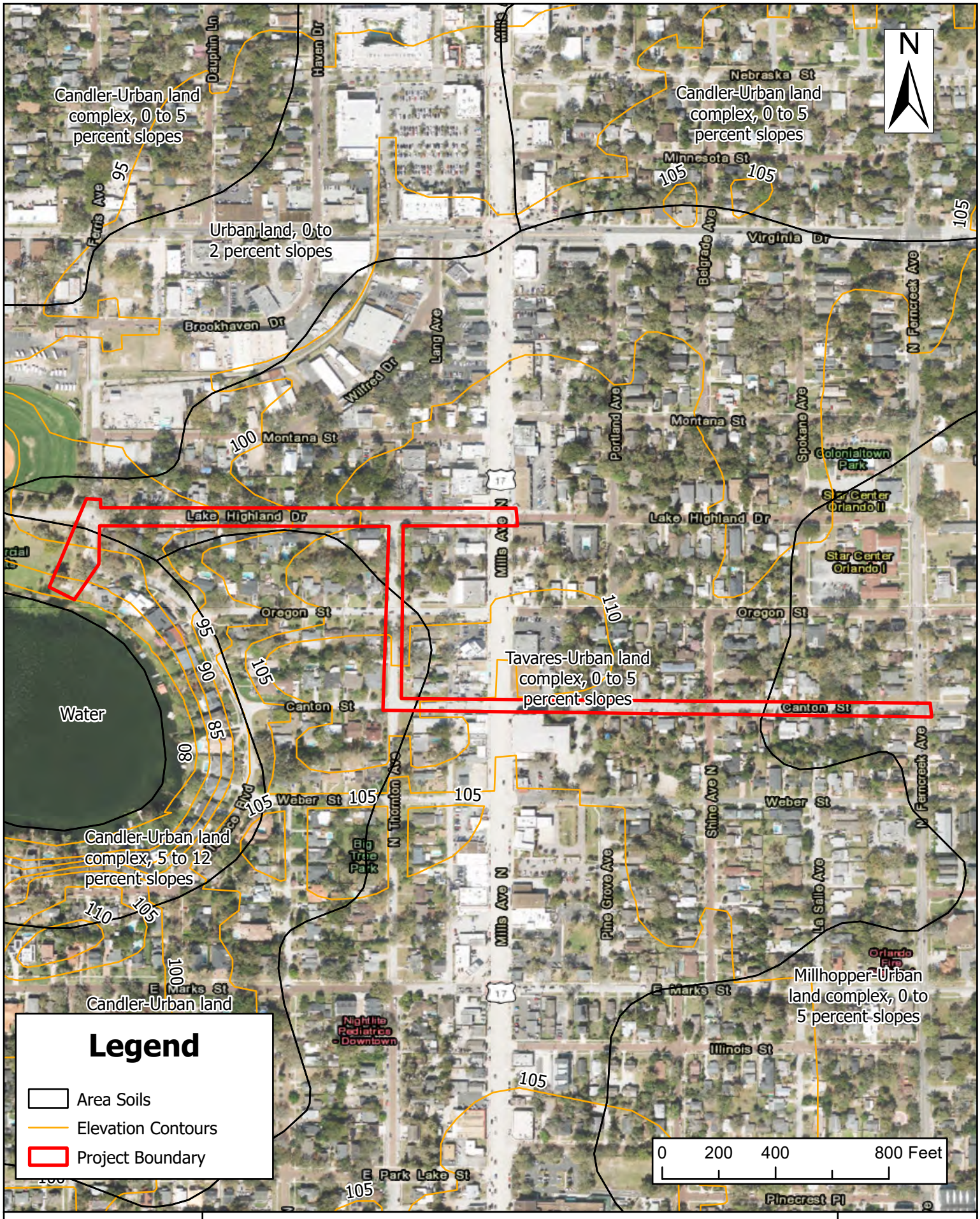


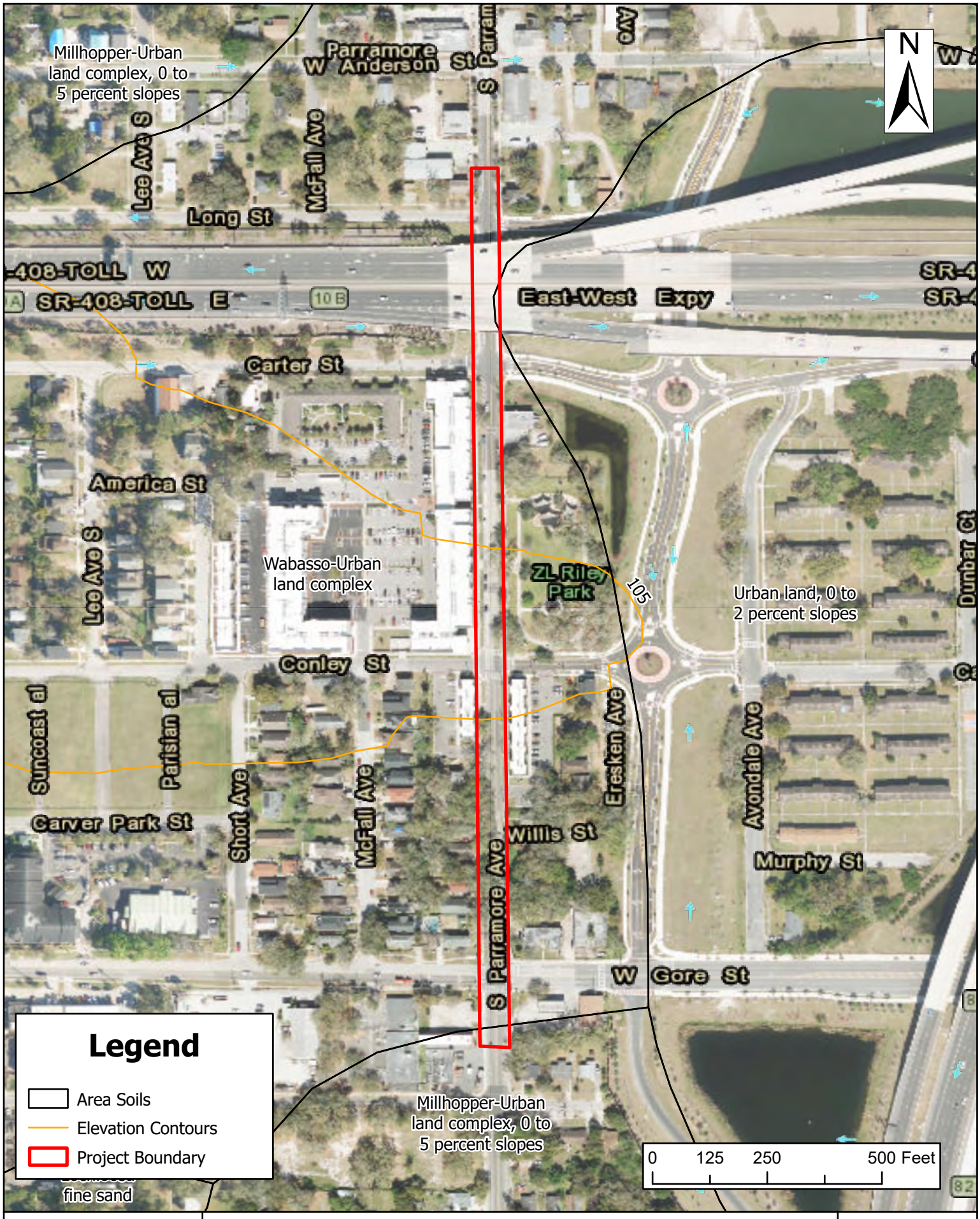
BFA	**South Parramore Ave Gravity Sewer Upgrade Location**	**FIGURE 3**



Iron Bridge Regional WRF
Bardenpho Blower Electrical Improvements
Soil & Topography

FIGURE 4

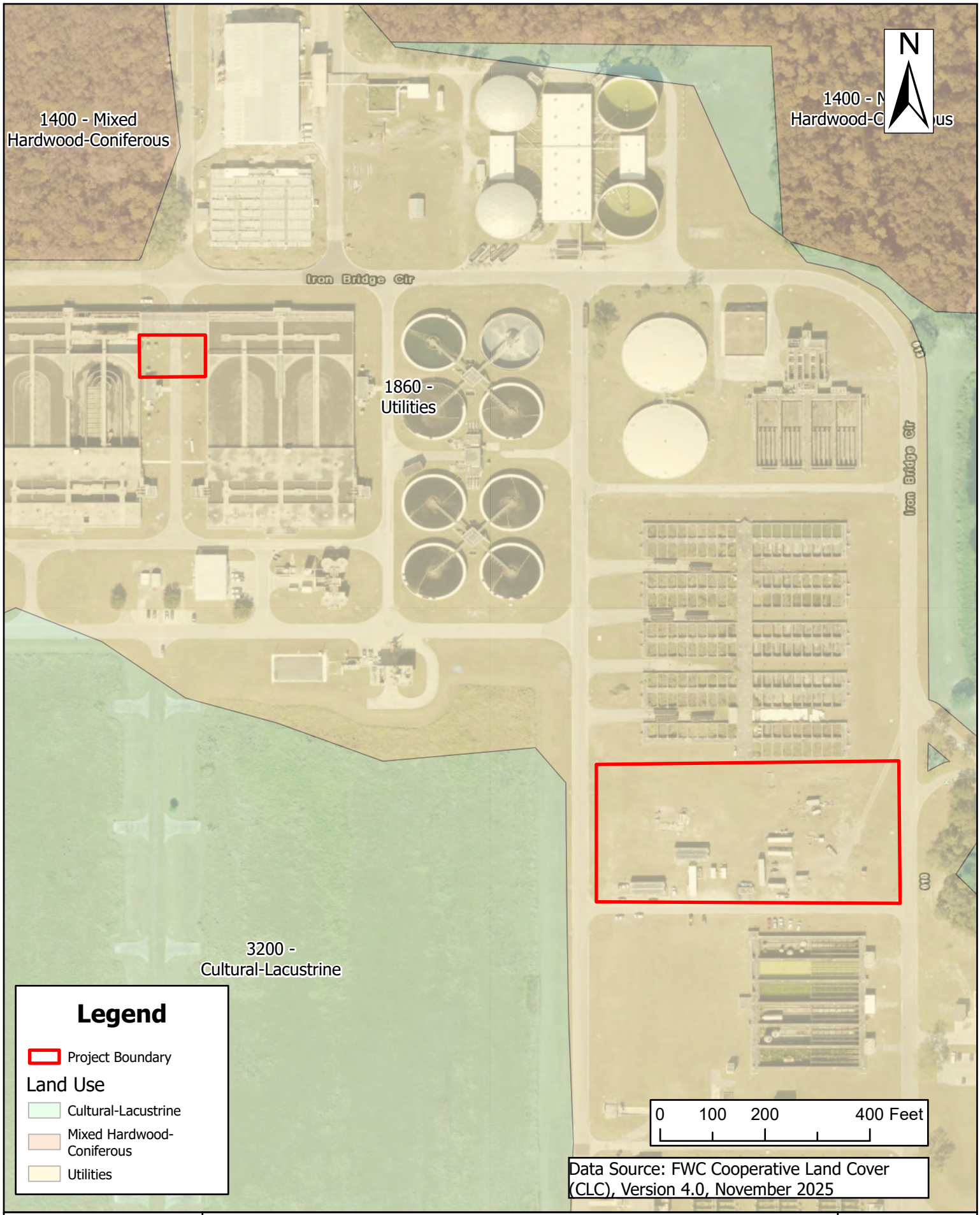

N
Candler-Urban land complex, 0 to 5 percent slopes
Candler-Urban land complex, 0 to 5 percent slopes
Urban land, 0 to 2 percent slopes
Tavares-Urban land complex, 0 to 5 percent slopes
Candler-Urban land complex, 5 to 12 percent slopes
Candler-Urban land
Millhopper-Urban land complex, 0 to 5 percent slopes
Water
Nebraska St
Minnesota St
Virginia Dr
Brookhaven Dr
Montana St
Lake Highland Dr
Oregon St
Canton St
Weber St
E Marks St
Illinois St
E Park Lake St
Pinecrest Pl
Dauphin Ln
Haven Dr
Ferris Ave
Wilfred Dr
Lang Ave
Belgrade Ave
Portland Ave
Spokane Ave
N Fernreek Ave
Mills Ave N
N Thornton Ave
Shine Ave N
Pine Grove Ave
La Salle Ave
Colonialtown Park
Star Center Orlando II
Star Center Orlando I
Big Tree Park
Nightlite Pediatrics - Downtown
Orlando Fire
95
90
85
80
100
105
110
0 200 400 800 Feet
Legend
Area Soils
Elevation Contours
Project Boundary
BFA
Lift Station 2 FM Phase 1, Part B
Soil & Topography
FIGURE 5



BFA

South Parramore Ave Gravity Sewer Upgrade
Soil & Topography

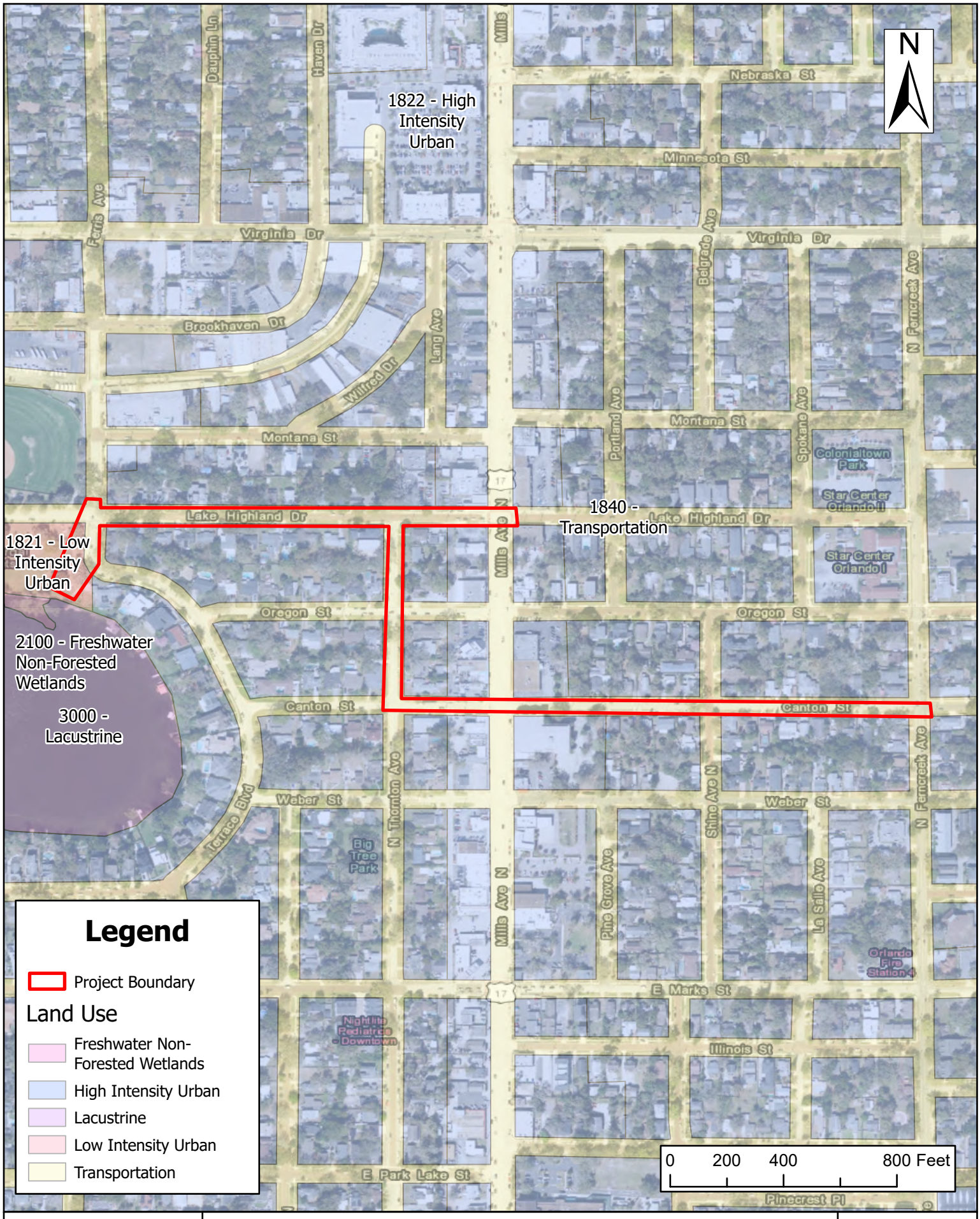
FIGURE 6



BFA

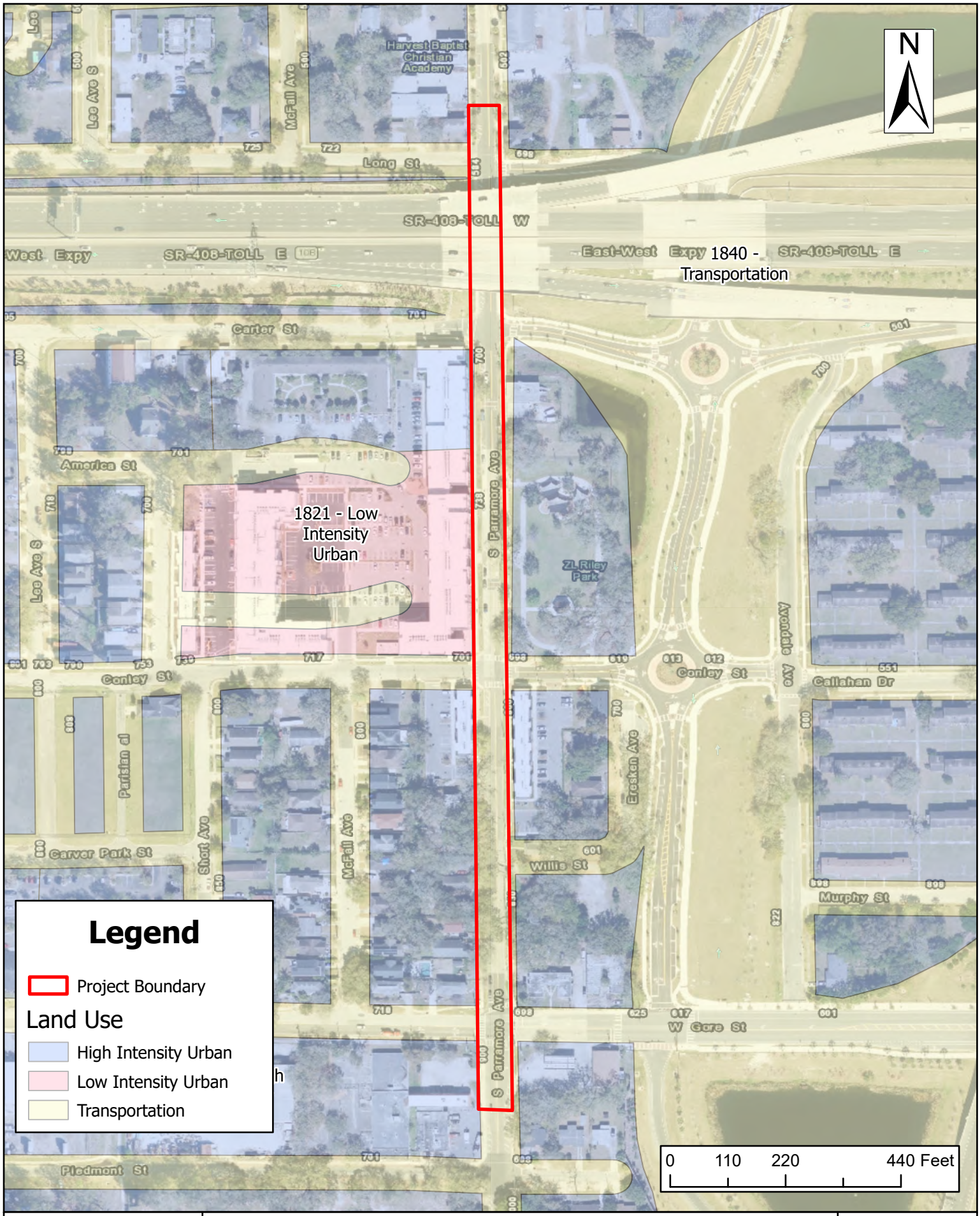
Iron Bridge Regional WRF
Bardenpho Blower Electrical Improvements
Land Use

FIGURE 7



Lift Station 2 FM Phase 1, Part B
Land Use

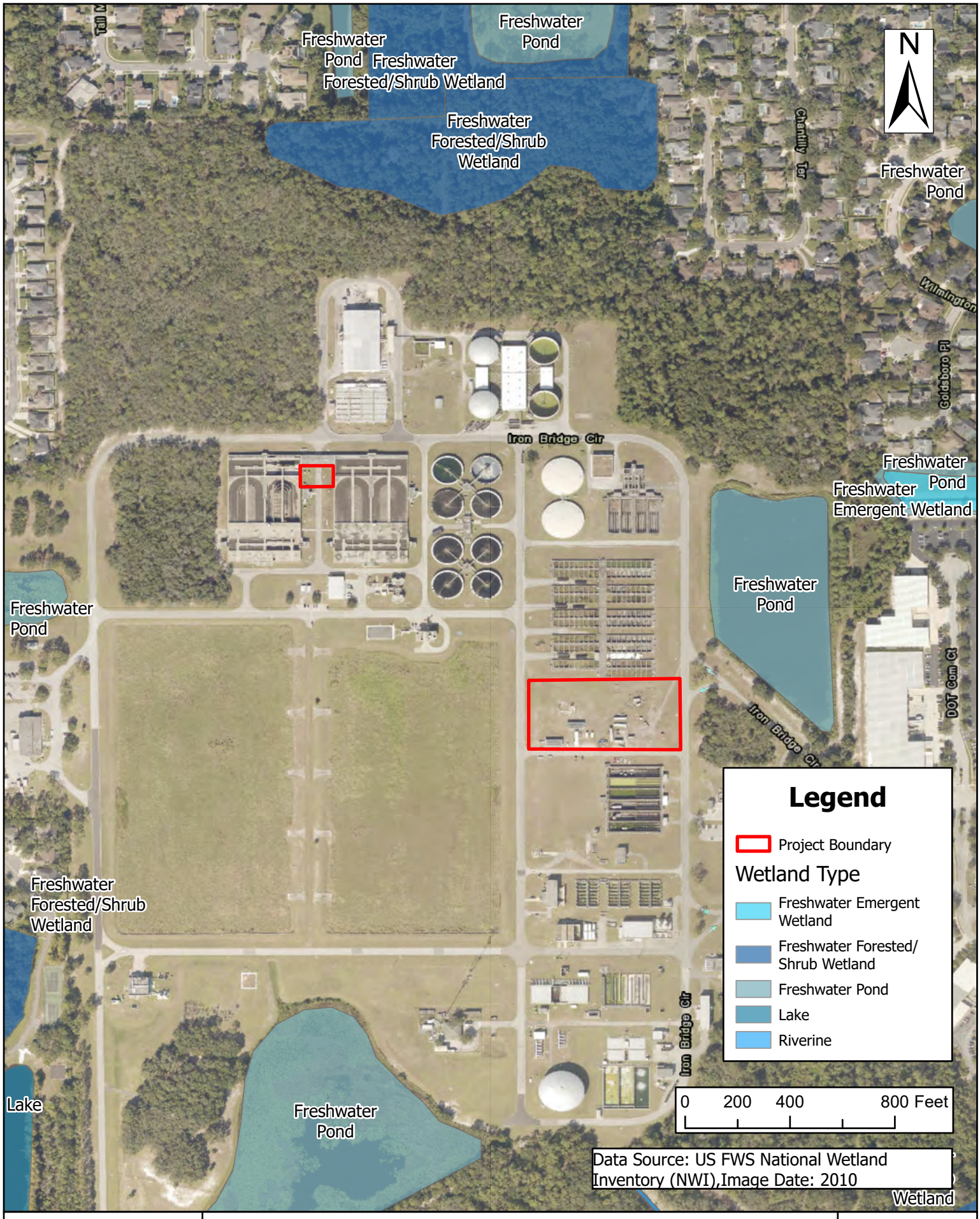
FIGURE 8



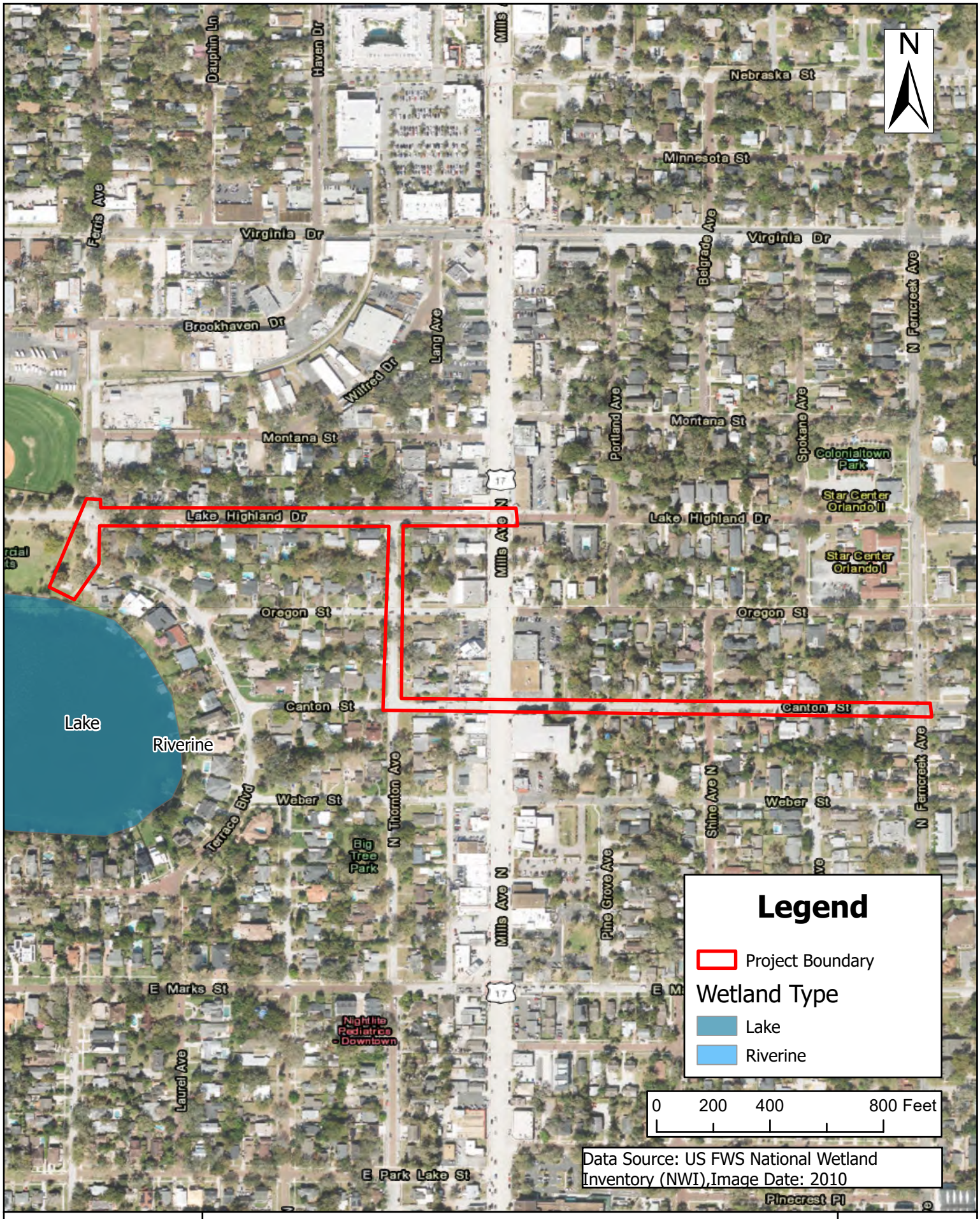
BFA

South Parramore Ave Gravity Sewer Upgrade
Land Use

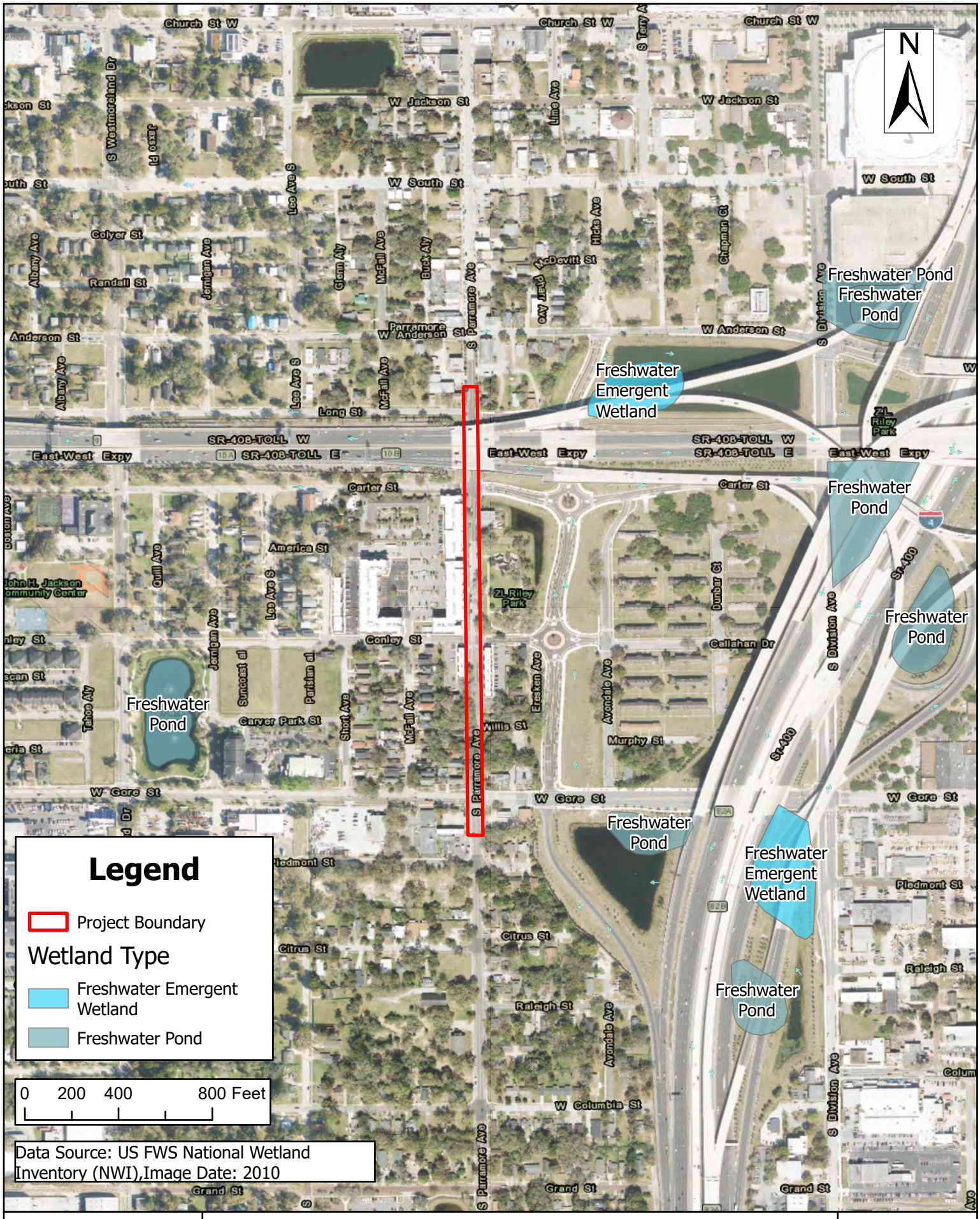
FIGURE 9



BFA	**Iron Bridge Regional WRF** **Bardenpho Blower Electrical Improvements** **National Wetland Inventory**	**FIGURE 10**



BFA	**Lift Station 2 FM Phase 1, Part B** **National Wetland inventory**	**FIGURE 11**



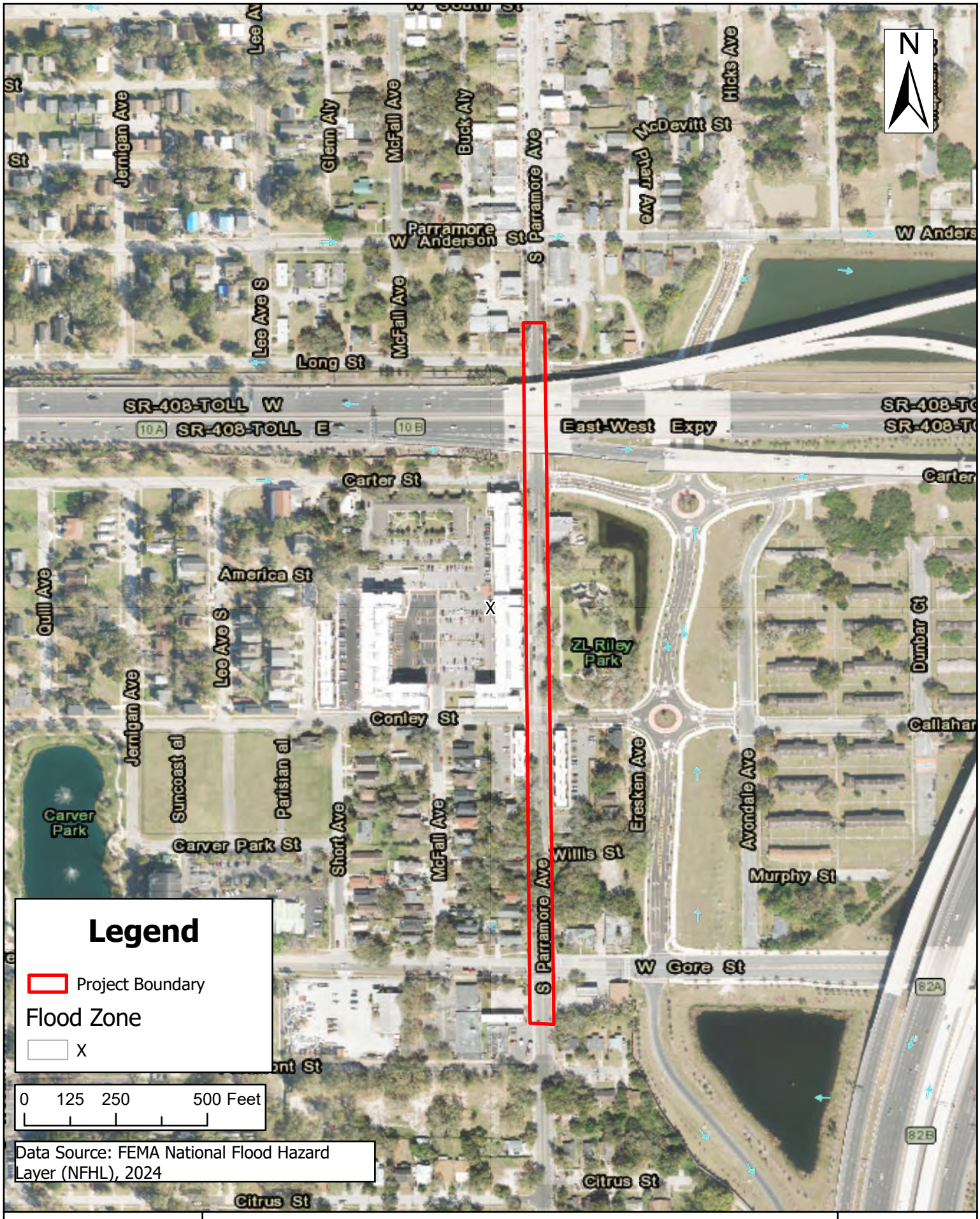
BFA

South Parramore Ave Gravity Sewer Upgrade
National Wetland Invnetory

FIGURE 12

BFA	**Iron Bridge Regional WRF** **Bardenpho Blower Electrical Improvements** **FEMA Flood Zone**	**FIGURE 13**

BFA	**Lift Station 2 FM Phase 1, Part B** **FEMA Flood Zone**	**FIGURE 14**



BFA	**South Parramore Ave Gravity Sewer Upgrade** **FEMA Flood Zone**	**FIGURE 15**

APPENDIX A

Information and Planning Consultation (IPaC) Resource List

Iron Bridge Regional WRF
Bardenpho Blower Electrical Improvements and Lay Down Areas

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Seminole County, Florida

Local office

Florida Ecological Services Field Office

(352) 448-9151
(772) 562-4288
fw4flesregs@fws.gov

777 37th St
Suite D-101
Vero Beach, FL 32960-3559

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Florida Panther Puma (=Felis) concolor coryi Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1763	Endangered
Tricolored Bat Perimyotis subflavus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Birds

NAME	STATUS
Crested Caracara (audubon's) [fl Dps] Caracara plancus audubonii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8250	Threatened
Eastern Black Rail Laterallus jamaicensis jamaicensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10477	Threatened

Everglade Snail Kite Rostrhamus sociabilis plumbeus — Endangered
Wherever found
There is **final** critical habitat for this species. Your location does not overlap the critical habitat.
https://ecos.fws.gov/ecp/species/7713

Florida Scrub-jay Aphelocoma coerulescens — Threatened
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/6174

Red-cockaded Woodpecker Dryobates borealis — Threatened
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/7614

Whooping Crane Grus americana — EXPN
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/758

Reptiles

NAME	STATUS
Eastern Indigo Snake Drymarchon couperi Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/646	Threatened
Southern Hognose Snake Heterodon simus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3248	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

Flowering Plants

NAME	STATUS
Pygmy Fringe-tree Chionanthus pygmaeus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1084	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs
The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

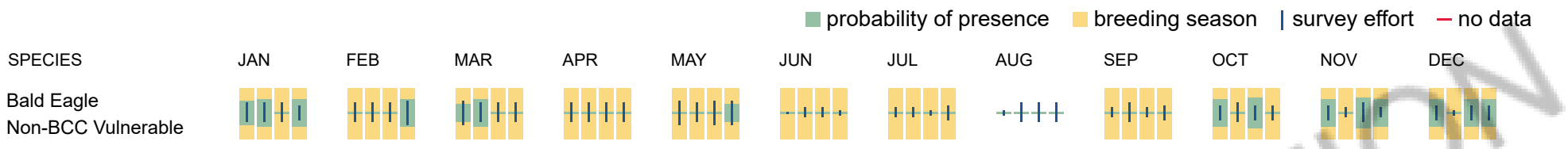
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs
The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
American Kestrel Falco sparverius paulus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
Bachman's Sparrow Peucaea aestivalis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6177	Breeds May 1 to Sep 30
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31
Chimney Swift Chaetura pelagica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Great Blue Heron Ardea herodias occidentalis This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Jan 1 to Dec 31

Gull-billed Tern Gelochelidon nilotica — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9501

Least Tern Sternula antillarum antillarum — Breeds Apr 25 to Sep 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Painted Bunting Passerina ciris — Breeds Apr 25 to Aug 15
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Pectoral Sandpiper Calidris melanotos — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prairie Warbler Setophaga discolor — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker Melanerpes erythrocephalus — Breeds May 10 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Semipalmated Sandpiper Calidris pusilla — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Short-billed Dowitcher Limnodromus griseus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Swallow-tailed Kite Elanoides forficatus — Breeds Mar 10 to Jun 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8938

Willet Tringa semipalmata — Breeds Apr 20 to Aug 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Worthington's Marsh Wren Cistothorus palustris griseus — Breeds Apr 10 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

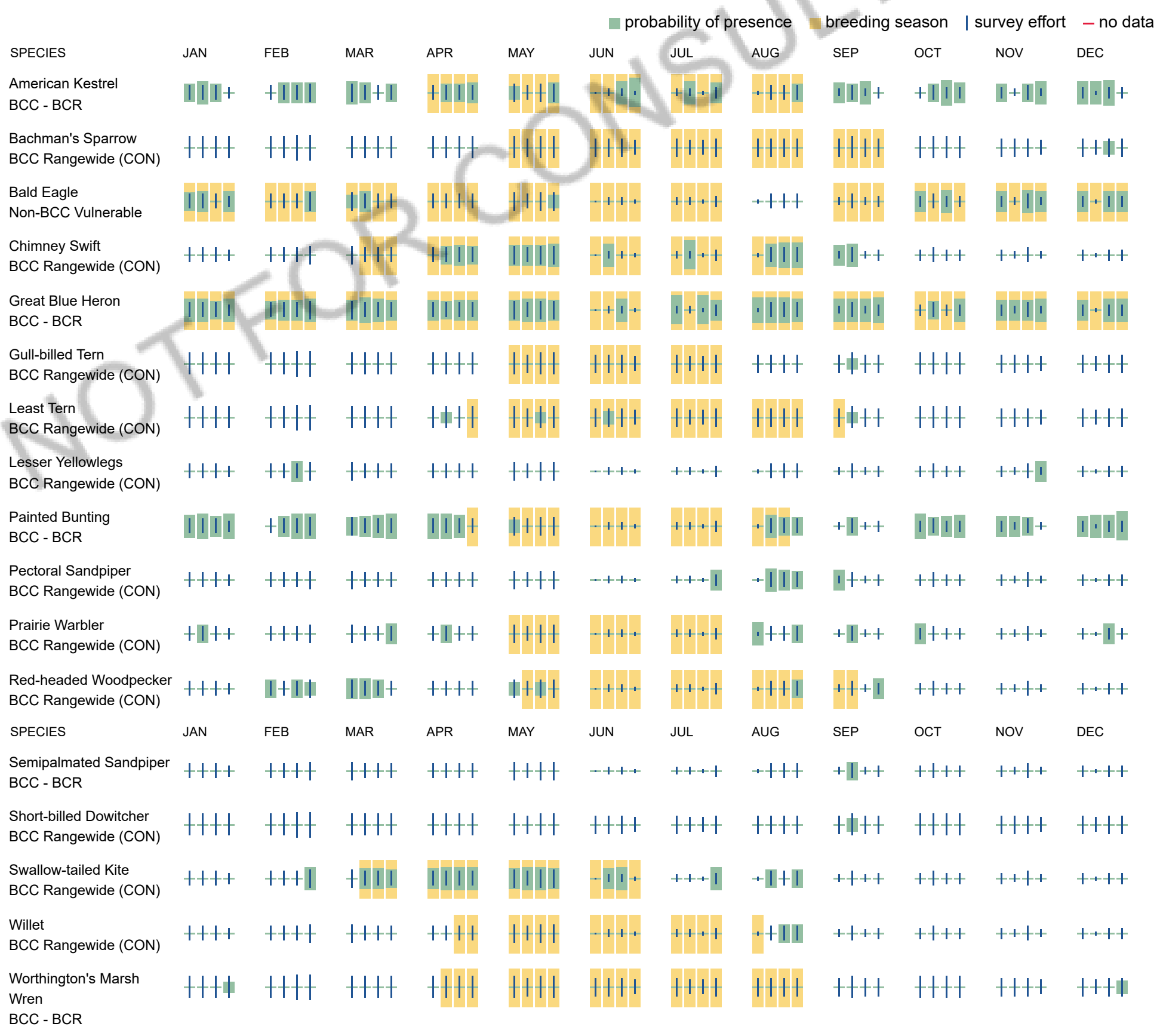
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as “Vulnerable”. See the FAQ “What are the levels of concern for migratory birds?” for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ “Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds”.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the

probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX B

Information and Planning Consultation (IPaC) Resource List

Lift Station 2 Force Main Phase 1, Part B

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Orange County, Florida

Local office

Florida Ecological Services Field Office

(352) 448-9151
(772) 562-4288
fw4flesregs@fws.gov

777 37th St
Suite D-101
Vero Beach, FL 32960-3559

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Florida Panther Puma (=Felis) concolor coryi Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1763	Endangered

Birds

NAME	STATUS
Crested Caracara (audubon's) [fl Dps] Caracara plancus audubonii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8250	Threatened
Eastern Black Rail Laterallus jamaicensis jamaicensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10477	Threatened
Everglade Snail Kite Rostrhamus sociabilis plumbeus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7713	Endangered

Whooping Crane Grus americana EXPN

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/758

Reptiles

NAME	STATUS
Eastern Indigo Snake Drymarchon couperi Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/646	Threatened
Southern Hognose Snake Heterodon simus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3248	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

Flowering Plants

NAME	STATUS
Beautiful Pawpaw Deeringothamnus pulchellus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4069	Endangered
Papery Whitlow-wort Paronychia chartacea No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1465	Threatened
Pigeon Wings Clitoria fragrans No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/991	Threatened
Sandlace Polygonella myriophylla No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5745	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs
The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

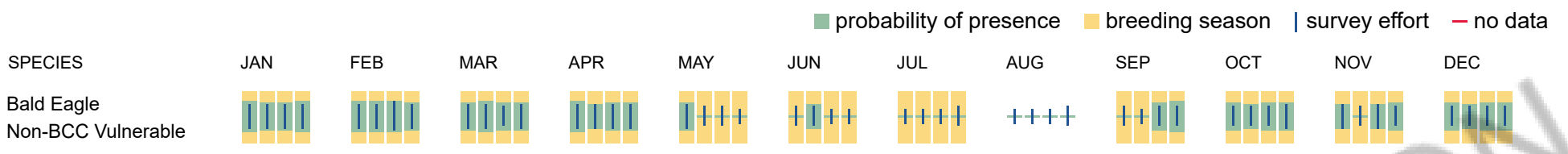
Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
American Kestrel Falco sparverius paulus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
Bachman's Sparrow Peucaea aestivalis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6177	Breeds May 1 to Sep 30
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31
Chimney Swift Chaetura pelagica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Great Blue Heron Ardea herodias occidentalis This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Jan 1 to Dec 31

Least Tern Sternula antillarum antillarum This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 25 to Sep 5
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Painted Bunting Passerina ciris This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 25 to Aug 15
Prairie Warbler Setophaga discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Swallow-tailed Kite Elanoides forficatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30
Worthington's Marsh Wren Cistothorus palustris griseus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

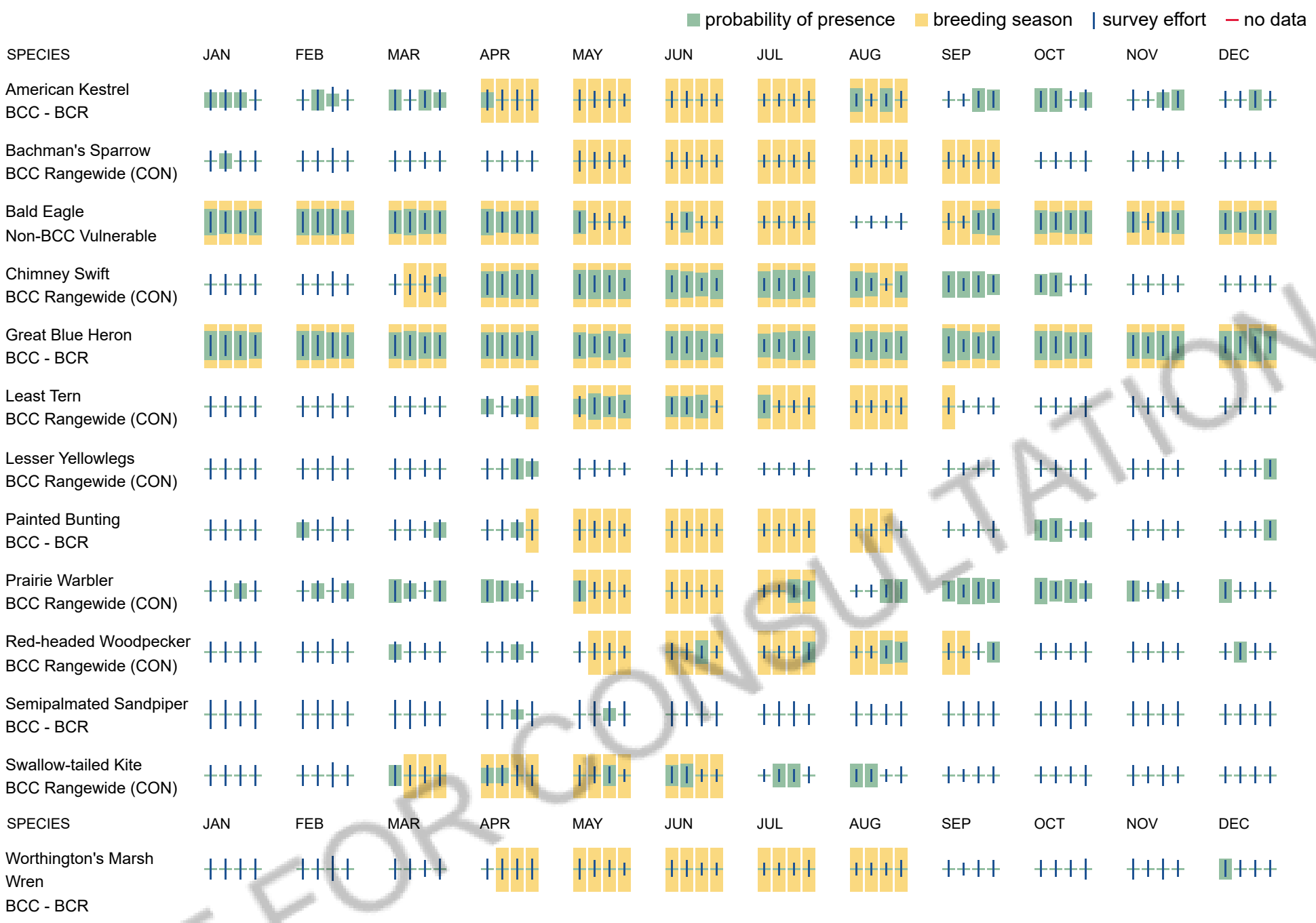
Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as “Vulnerable”. See the FAQ “What are the levels of concern for migratory birds?” for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ “Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds”.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

LAKE
L1UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

APPENDIX C

Information and Planning Consultation (IPaC) Resource List

South Parramore Avenue Gravity Sewer Upgrade

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Orange County, Florida

Local office

Florida Ecological Services Field Office

(352) 448-9151
(772) 562-4288
fw4flesregs@fws.gov

777 37th St
Suite D-101
Vero Beach, FL 32960-3559

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Florida Panther Puma (=Felis) concolor coryi Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1763	Endangered

Birds

NAME	STATUS
Crested Caracara (audubon's) [fl Dps] Caracara plancus audubonii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8250	Threatened
Eastern Black Rail Laterallus jamaicensis jamaicensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10477	Threatened
Everglade Snail Kite Rostrhamus sociabilis plumbeus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7713	Endangered

Whooping Crane Grus americana No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/758	EXPN

Reptiles

NAME	STATUS
Eastern Indigo Snake Drymarchon couperi Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/646	Threatened
Southern Hognose Snake Heterodon simus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3248	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened

Flowering Plants

NAME	STATUS
Beautiful Pawpaw Deeringothamnus pulchellus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4069	Endangered
Papery Whitlow-wort Paronychia chartacea No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1465	Threatened
Pigeon Wings Clitoria fragrans No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/991	Threatened
Sandlace Polygonella myriophylla No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5745	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs
The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

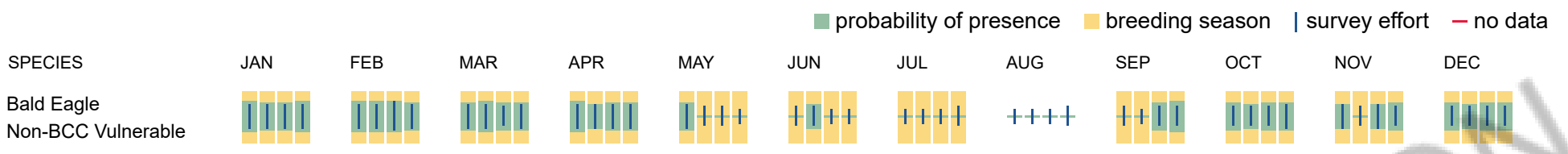
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
American Kestrel Falco sparverius paulus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
Bachman's Sparrow Peucaea aestivalis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6177	Breeds May 1 to Sep 30
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31
Chimney Swift Chaetura pelagica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Great Blue Heron Ardea herodias occidentalis This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Jan 1 to Dec 31

Least Tern Sternula antillarum antillarum This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 25 to Sep 5
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Painted Bunting Passerina ciris This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 25 to Aug 15
Prairie Warbler Setophaga discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Swallow-tailed Kite Elanoides forficatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30
Worthington's Marsh Wren Cistothorus palustris griseus This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

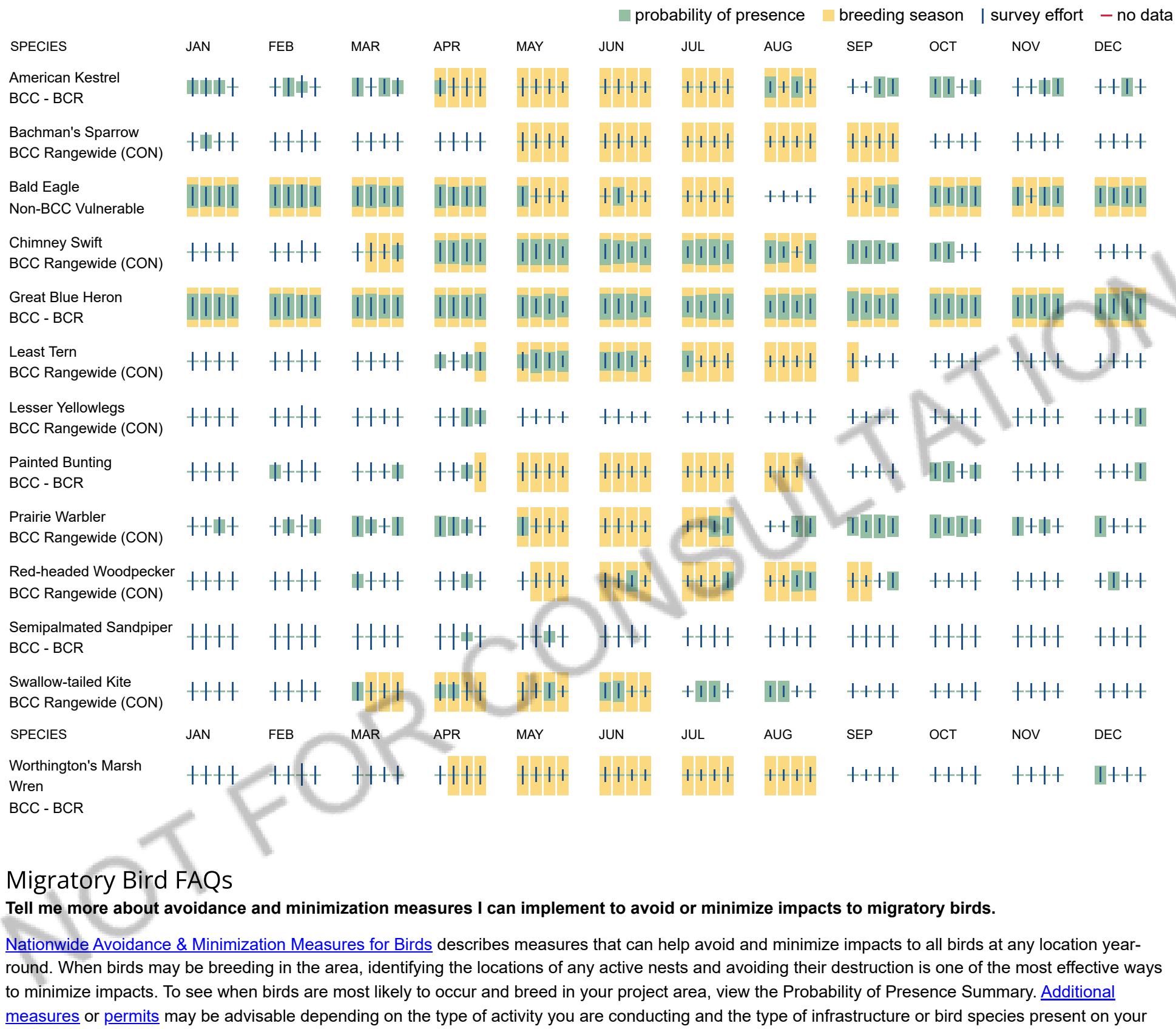
Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as “Vulnerable”. See the FAQ “What are the levels of concern for migratory birds?” for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your “IPaC PROBABILITY OF PRESENCE SUMMARY” at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ “Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds”.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

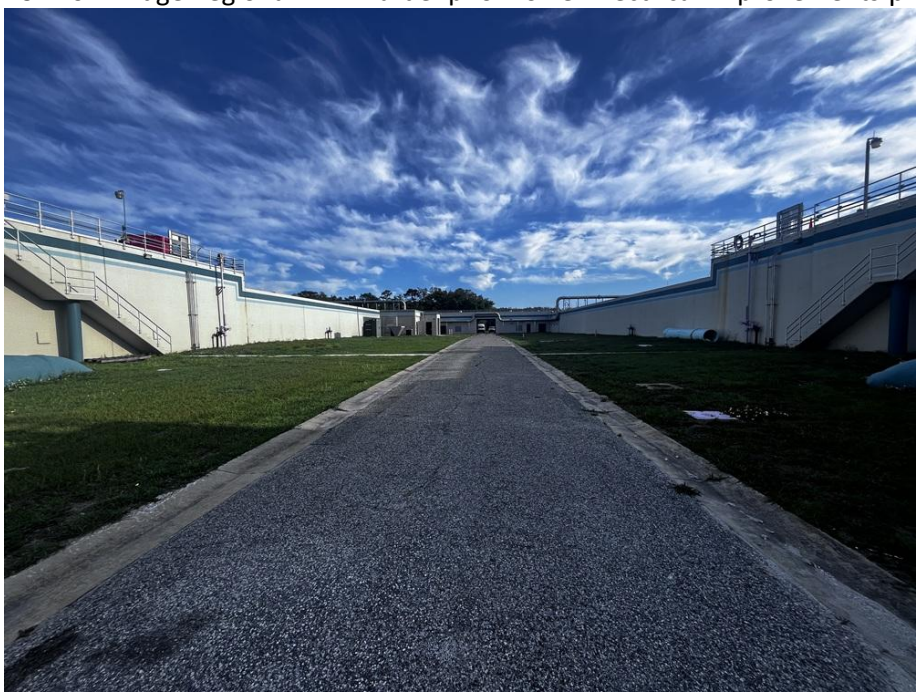
Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX D

Site Photographs

Iron Bridge Regional WRF
Bardenpho Blower Electrical Improvements and Lay Down Areas

View south of Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements project area.



View north of Iron Bridge Regional WRF Bardenpho Blower Electrical Improvements project area.

APPENDIX E

Site Photographs

Lift Station 2 Force Main Phase 1, Part B

View south of lift station at Lake Highland

View north from lift station at Lake Highland

View east of Lake Highland Dr and Ferris Ave

View south of Thornton Ave from Lake Highland Dr

View east Lake Highland Dr and Mills Ave

View east of Mills Ave and Lake Highland Dr Intersection

APPENDIX F

Site Photographs

South Parramore Avenue Gravity Sewer Upgrade

View south of SR 408 on Parramore Ave

View south of Parramore Ave from just south of SR 408 and Carter St.

View north of Parramore Ave from south of Piedmont St at Gore St intersection

APPENDIX G

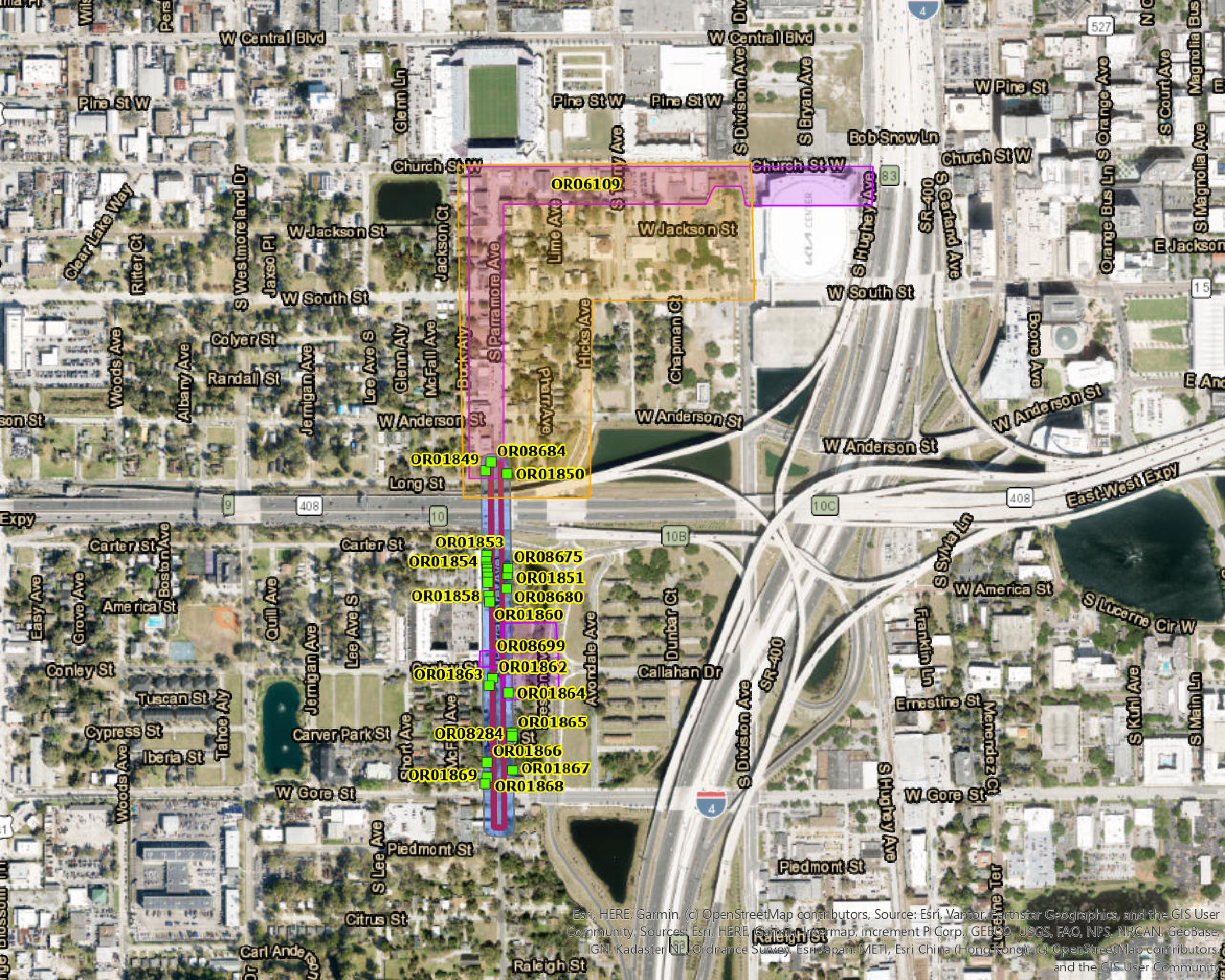
Florida Division of Historical Resources

South Parramore Avenue Gravity Sewer Upgrade

AR=0
SS=24
CM=0
RG=2
BR=0
Total=26

Cultural Resource Roster

SiteID	Type	Site Name	Address	Additional Info	SHPO Eval	NR Status
OR01849	SS	516 SOUTH PARRAMORE AVENUE	516 S Parramore AVE, Orlando	1952 Masonry Vernacular	Not Eligible	NR Contrib - OR06109
OR01850	SS	539 SOUTH PARRAMORE AVENUE	539 S Parramore AVE, Orlando	c1923 Masonry Vernacular	Eligible	NR Contrib - OR06109
OR01851	SS	709 SOUTH PARRAMORE AVE	711 S Parramore AVE, Orlando	c1923 Commercial	Not Eligible	
OR01853	SS	731 S PARRAMORE AVE	731 S PARRAMORE AVE, ORLANDO	c1928 Frame Vernacular	Eligible	
OR01854	SS	735 S PARRAMORE AVE	735 S Parramore AVE, Orlando	c1927 Frame Vernacular	Eligible	
OR01855	SS	737 S PARRAMORE AVE	737 S PARRAMORE AVE, ORLANDO	-RESOURCE DESTROYED- c1920 Frame Vernacular	Eligible	
OR01856	SS	741 S PARRAMORE AVE	741 S Parramore AVE, Orlando	c1920 Frame Vernacular	Eligible	
OR01857	SS	741.5 S PARRAMORE AVE	740 ERESKEN AVE, ORLANDO	c1925 Frame Vernacular	Eligible	
OR01858	SS	742 S PARRAMORE AVE	742 S Parramore AVE, Orlando	c1932 Frame Vernacular	Eligible	
OR01859	SS	743 S PARRAMORE AVE	743 S Parramore AVE, Orlando	c1927 Frame Vernacular	Eligible	
OR01860	SS	746 S PARRAMORE AVE	746-748 S PARRAMORE AVE, ORLANDO	-RESOURCE DESTROYED- c1925 Frame Vernacular	Eligible	
OR01861	SS	747 S PARRAMORE AVE	747 S Parramore AVE, Orlando	c1927 Frame Vernacular	Eligible	
OR01862	SS	801-03 S PARRAMORE AVE	801-803 S Parramore AVE, Orlando	c1930 Frame Vernacular	Eligible	
OR01863	SS	804 S PARRAMORE AVE	804 S PARRAMORE AVE, ORLANDO	-RESOURCE DESTROYED- 1923 Frame Vernacular		
OR01864	SS	805-07 S PARRAMORE AVE	805-807 S Parramore AVE, Orlando	c1930 Frame Vernacular	Eligible	
OR01865	SS	825 S PARRAMORE AVE	825 S PARRAMORE AVE, ORLANDO	-RESOURCE DESTROYED- c1930 Frame Vernacular		
OR01866	SS	838 PARRAMORE AVENUE	838 PARRAMORE AVE, ORLANDO	-RESOURCE DESTROYED- c1925 Frame Vernacular	Not Eligible	
OR01867	SS	841 PARRAMORE AVENUE	841 PARRAMORE AVE, ORLANDO	c1930 Frame Vernacular	Not Eligible	
OR01868	SS	842 PARRAMORE AVENUE	842 PARRAMORE AVE, ORLANDO	c1925 Masonry Vernacular	Not Eligible	
OR01869	SS	846 PARRAMORE AVENUE	846 PARRAMORE AVE, ORLANDO	-RESOURCE DESTROYED- c1925 Masonry Vernacular	Not Eligible	
OR06109	RG	Holden-Parramore Historic District	Orlando	Historical District - 82 Contrib Resources	Eligible	NR Listed - Sep 23, 2009
OR08284	SS	831 PARRAMORE AVENUE	831 S PARRAMORE AVE, ORLANDO	c1935 Frame Vernacular	Not Eligible	
OR08675	SS	707 SOUTH PARRAMORE AVENUE	707 S Parramore AVE, Orlando	c1948 Commercial	Not Eligible	
OR08680	SS	737 1/2-C SOUTH PARRAMORE AVENUE	737 1/2 S Parramore AVE, Orlando	c1927 Frame Vernacular	Eligible	
OR08684	SS	700+/- ANDERSON STREET	514B S Parramore AVE, Orlando	c1925 Frame Vernacular	Not Eligible	
OR08699	RG	PARRAMORE AVENUE & CONLEY ST HIST DIST	ORLANDO	Historical District - 16 Contrib Resources	Eligible	


OR06109
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W Central Blvd
Pine St W
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Church St W
Bob Snow Ln
W Jackson St
E Jackson St
W South St
Colyer St
Randall St
W Anderson St
Long St
East-West Expy
Carter St
America St
W America St
Conley St
Callahan Dr
Tuscan St
Cypress St
Carver Park St
Iberia St
W Gore St
Piedmont St
Citrus St
Raleigh St
Ernestine St
S Lucerne Cir W
S Parramore Ave
Hicks Ave
Lime Ave
Pharr Ave
Chapman Ct
Jackson Ct
Glenn Ln
S Division Ave
S Bryan Ave
S Hughey Ave
SR-400
S Garland Ave
S Orange Ave
Orange Bus Ln
S Court Ave
S Magnolia Ave
Boone Ave
Clear Lake Way
Ritter Ct
S Westmoreland Dr
Jaxso Pl
Woods Ave
Albany Ave
Jernigan Ave
Lee Ave S
Glenn Aly
McFall Ave
Easy Ave
Grove Ave
Boston Ave
Quill Ave
Avondale Ave
Dunbar Ct
Tahoe Aly
S Lee Ave
Franklin Ln
Menendez Ct
S Kuhl Ave
S Main Ln
S Sylvia Ln
408
10
10B
10C
83
4
527
15
9
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