

Sturgeon Creek Park Master Plan

Town of Leland, North Carolina
2020





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Town of Leland

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1 INTRODUCTION

PROJECT PURPOSE

Through diligent planning, strategic acquisitions and creative visioning, the Town of Leland had positioned itself to have the opportunity to develop a new park with the potential to serve as a landmark for the community. Situated along a tributary of the Brunswick River, Sturgeon Creek park will allow access to pristine natural areas, as well as serve as an anchor for the vibrant Gateway District.

In order to ensure that this vision is achieved, this master plan process is intended to guide the development of Sturgeon Creek Park through a systematic method of research, site analysis and stakeholder input. Because of this Park's importance to the Gateway District, this approach extends beyond the specific property lines of the park in an effort to develop a cohesive plan that connects the Park to the surrounding communities. Sturgeon Creek Park is the result of the Town of Leland's good stewardship through cohesive planning, and this process will help ensure that this important asset continues to provide a quality nature-based recreation experience for future generations to come.

PROJECT PROCESS

Research is the first step in the park planning process. Considering the extensive planning conducted by the Town in recent years, this step included a review of previous planning documents and policy updates. The project team also conducted a physical inventory of existing conditions of the Park and surrounding area, as well as a technical evaluation and delineation of existing wetlands. Research for potential programming also included the analysis of facility and program precedents that were consistent with stakeholder input.

The next step involved a synthesis of information to develop a list of opportunities and challenges for the Park and surrounding area. These include elements such as better circulation and pedestrian connections, water access, programming needs and sustainable practices. These opportunities and challenges, along with precedent images, were presented to the Parks and Recreation Advisory Board and the public at an initial public meeting, in order to establish the programming basis for concept alternatives.

In addition to the initial public meeting, the project team utilized similar techniques to engage with the public during Leland's Founders Day Celebration. The informational tent included displays of all site analysis findings, park programming precedent images, and initial form and function ideas for the park. At both these engagement events, participants were given the opportunity to provide written comments, draw ideas on park maps, and provide input on the types of amenities they would like to see at Sturgeon Creek Park.

Consensus building on programming and park development is the most important outcome of public involvement, ideally resulting in a more refined preferred alternative for each park. This method of engagement provided effective public involvement, ensuring that community's input was present in the planning process. The process employed during this project provides transparency of the research and analysis with stakeholders and the general public to insure the needs of the public are met. Community input is integrated throughout the process and helped in the development of a cohesive park plan.

After receiving input from the first two events, the project team began developing concept alternatives for the park. This began by refining form, function and programming for the Park through a concept development process that considered multiple alternatives. Refinement of these concept alternatives focused on more detailed components that required site work, environmental considerations, pedestrian

Founders Day Information Tent

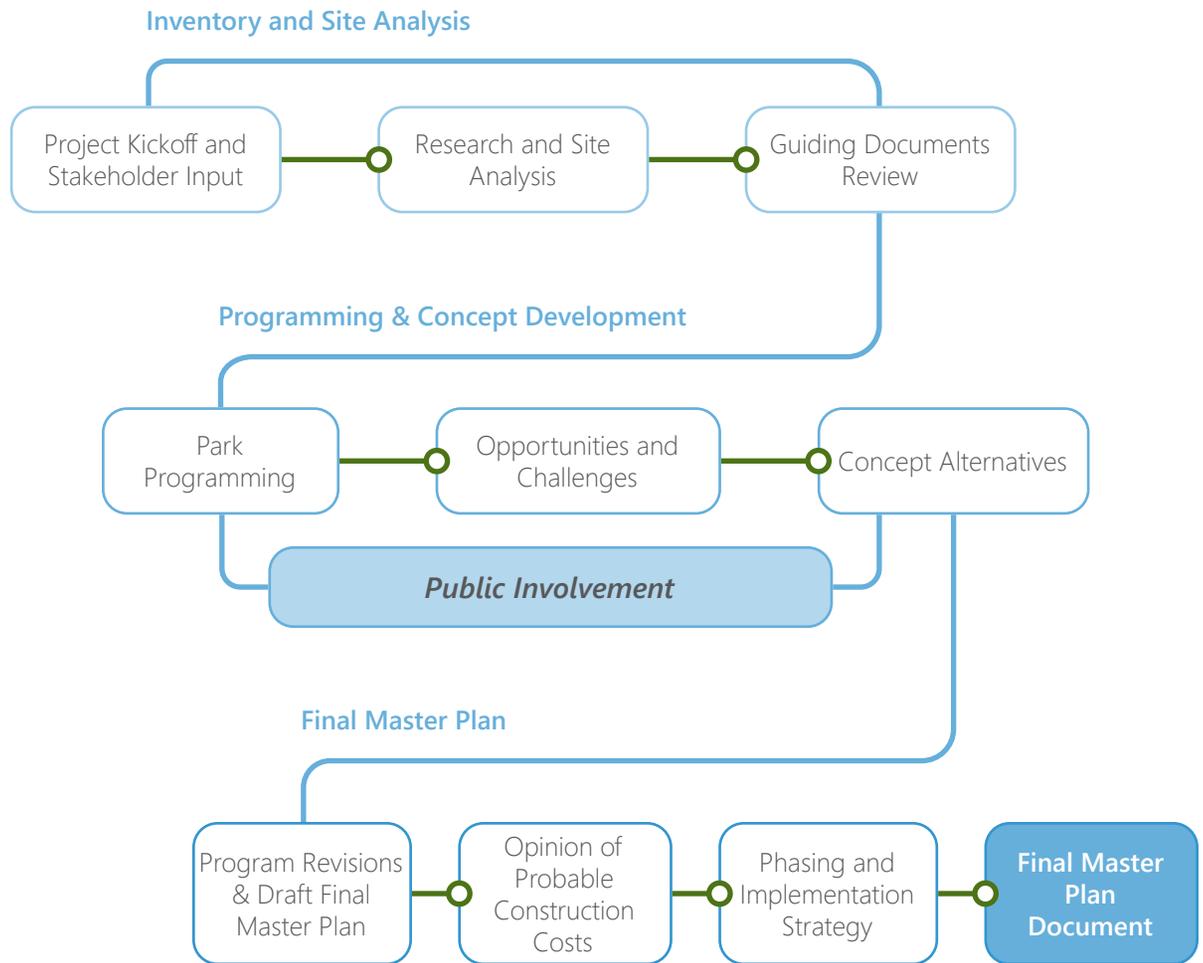


circulation, parking layouts, and locations of various amenities. The project team then met with Town representatives to review the concepts and provide feedback prior to the final public engagement.

After receiving public input on the concept alternatives at the final public meeting, the project team used input from the public and stakeholders to develop a preferred alternative concept for the Sturgeon Creek Park. This preferred alternative was then again reviewed by the Advisory Board prior to the finalization of the master plan.

The final step is the preparation of a Final Park Master Plan. This began with further development of the preferred alternative based on public comment and included construction cost estimates. During this process, an implementation meeting was held with Town representatives to discuss funding priorities, implementation strategies, and proposed phasing. This document will then be presented to Town Council for final adoption.

Project Process Diagram





2 SITE INVENTORY & ANALYSIS

Site Observations and Existing Conditions

Site Context

The properties that will become Sturgeon Creek Park are located along Navassa Road in Leland, North Carolina just south of Sturgeon Creek. The park site is approximately three-quarters of a mile north of Leland's primary commercial center, and the same distance from the Town of Navassa across Sturgeon Creek. Downtown Wilmington is approximately three miles east of the park across the Brunswick and Cape Fear Rivers, which anchors the Cape Fear Region and a population of over 400,000 residents.

In total, the park properties currently included in the study area comprise approximately 37 acres. The parcels included in this study can be found in the site data table to the right. There are also several parcels adjacent to the park site that are currently not included in this study, but may be of interest to the Town if they were to come available in the future. These parcels will likely be utilized for additional connectivity, park expansion, or developed as part of the Gateway Rezoning initiative Leland is currently undertaking.

Site Data

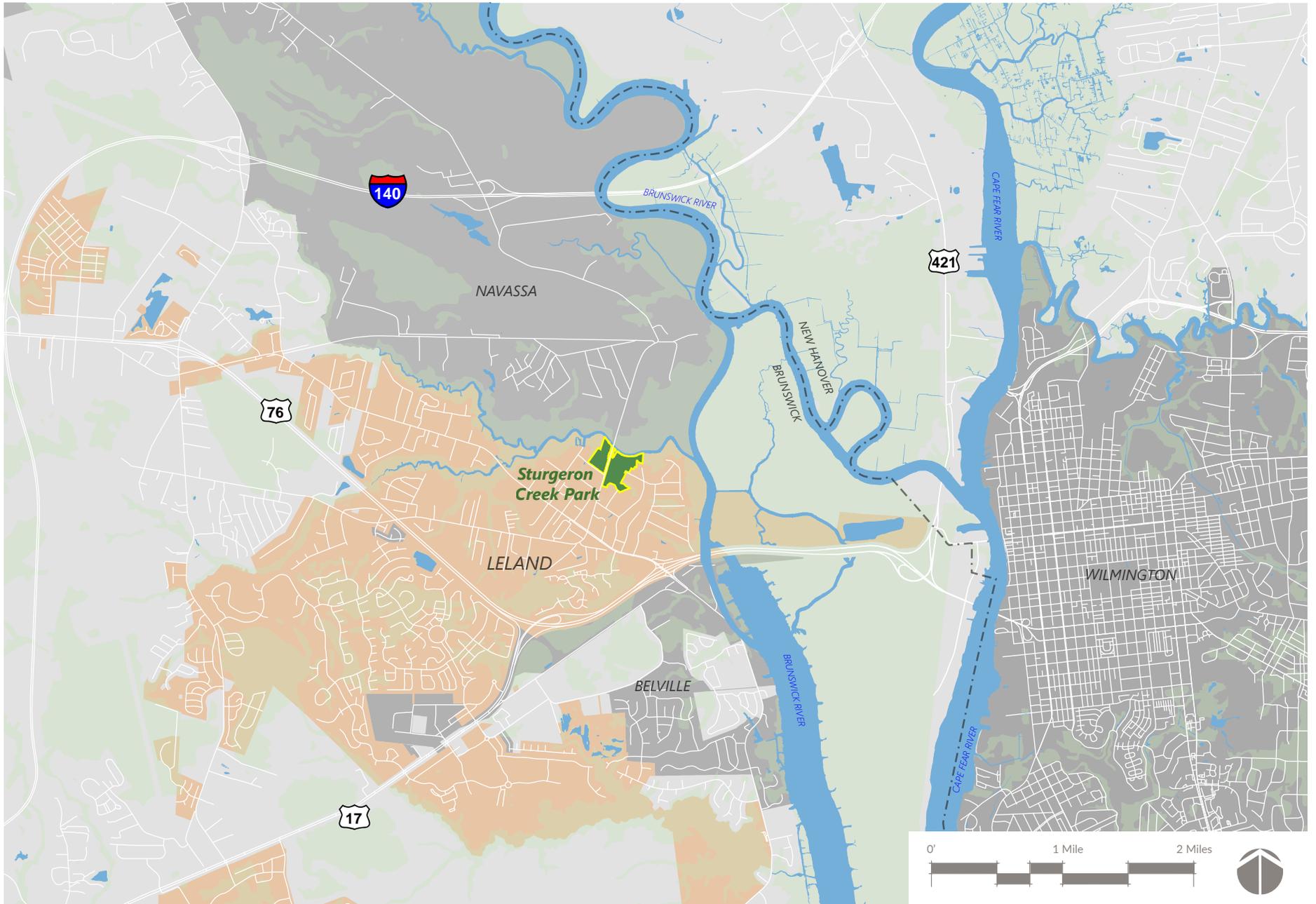
Acreage: 36.9 acres

Existing Structures:

- Single-family homes
- Concrete foundations of homes or buildings that have been demolished
- Fishing pier (damaged and roped off)
- Power substation
- Lift stations (2)
- Site is divided by Navassa Road

Existing Utilities:

- Water wells
- Overhead power lines
- Sanitary sewer
- Storm pipes
- CATV structures



The park site's unique location also provides water access to a wealth of environmental and aquatic resources. Sturgeon Creek feeds into the Brunswick River, which in turn merges with the Cape Fear River south of Wilmington. The river then flows south towards South Port, providing access to the Atlantic ocean at Snow's Cut, and further south at Bald Head Island. Along these waterways are numerous creeks, islands, marshlands, and recreation areas. A map of the park's regional context and surrounding natural features can be found on the left, and a map of the project area context can be found on the following page.

Site Observations

The following is a description of the project team's observations developed through a preliminary analysis of available data, as well as multiple visits to the Sturgeon Creek Park site and the surrounding areas. The project team also

conducted an aerial topographic survey using a survey drone, a wetlands delineation, and a review of prior planning efforts. Results from these analyses can be found in sections following the site observations.

East Side of Site

The parcels that will become Sturgeon Creek Park are divided by Navassa Road, creating an east and a west side of the park. The east side is considerably larger, but also contains a significant amount of wetlands and heavily wooded areas. The upland areas of the east side primarily consist of properties that formerly housed a junkyard, and a church. At the time of this master plan, both of these properties have been cleared, with several concrete foundations remaining on site. Environmental assessments of the junkyard parcels are currently underway. East of these parcels, the site begins to slope significantly towards wetlands

and a heavily wooded area. There are two lift stations east of the wooded wetland area, with one at the end of Live Oak Road and the other on a residential property at the end of Lake Drive. The Town is currently not pursuing acquisition of the two residential properties at the east end of the study area, but considers them a priority.

Moving north towards Sturgeon Creek, the site begins to rapidly slope down towards the marsh areas. The property north of the former church site was recently acquired by the town, and used to contain a single-family residence with a dock. These structures were heavily damaged at the time of acquisition and have since been demolished. Along this section of the creek is an area that has the potential to provide motorized boat access. North Carolina Wildlife Resources Commission has expressed a desire to provide a motorized boat ramp for the Town at this location as part of this park project, and had prepared preliminary

Former Church and Remaining Concrete



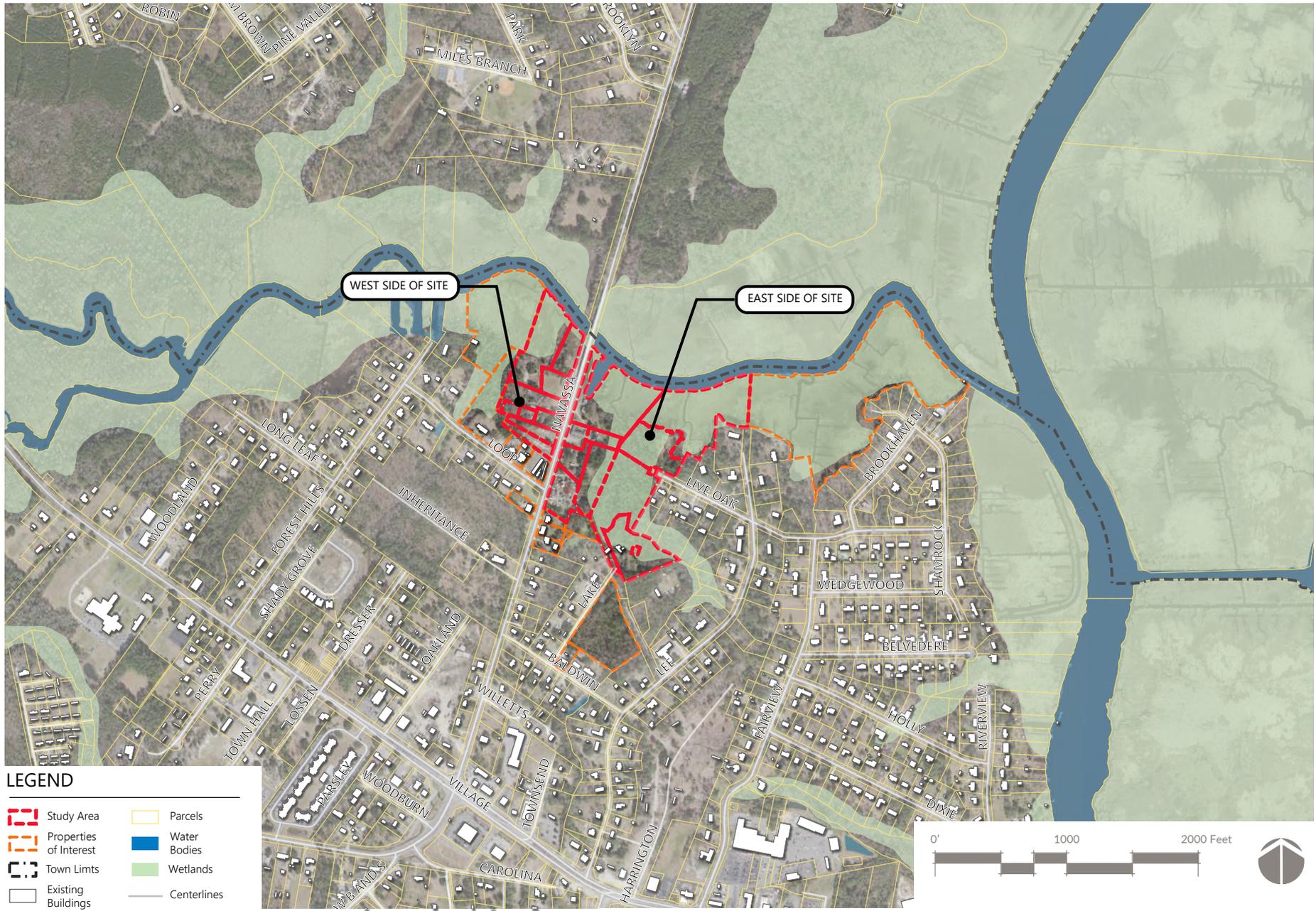
Former Junkyard Site



Sloped Area on Church Site



Project Area Context Map



Upland Area Near Church Site



Open Space Area



Former Church Driveway



Residential Property



Home on Residential Property Prior to Demolition



Inlet Adjacent to Navassa Road Bridge



Inlet Adjacent to Navassa Road Bridge



Inlet Adjacent to Navassa Road Bridge



View of Sturgeon Creek



design concepts at the time of this Master Plan. There is small path that leads to the bank of the creek adjacent to the bridge, however this area was substantially saturated at the time of the project teams visit, and dense vegetation prevents access to the area under the bridge. East of this access area, the site is entirely marshland.

The eastern side of the study area ends at Lee Drive. In the area between Lee Drive and Live Oak Drive, the parcels consist of marshland near the creek, and small upland area just north of Live Oak Drive. In the upland area, there is an old log-cabin style shed that has not been demolished and could be preserved or restored. There is a large property east of this area that is currently owned by the Brookhaven HOA and consists entirely of marshland. While the town has not expressed

interest in acquiring this site, the HOA has voiced support for connectivity to the neighborhood or the development of a boardwalk system.

West Side of Site

The west side of the site stretches from just north of the self storage facility on Loop Road all the way to Sturgeon Creek, and contains more upland areas than the east side. This area consists of

Navassa Road Bridge



Lift Station on Live Oak Road



Existing Cabin Structure



View of Marshland from East Properties



Open Space on East Side of Site



Open Space on East Side of Site



several town-owned parcels that were formerly residential properties. There is direct access to the creek from the west side that can be reached by foot on dry ground, as well as an existing pier and a canoe/kayak launch. The pier is heavily damaged and has been roped off, however the launch appeared to still be accessible. The area underneath the existing bridge can be accessed from the west side of the site, as the vegetation growth is significantly lower than the east side.

Moving south from the creek, the upland area consists of a mix of open grassy areas and groves of trees, including some significant live oaks. Because of the former residential nature of these parcels, there are remnants from the homes that used to occupy this areas. This includes concrete pads, telephone poles and lines, and guy wires. There is also a lift station that is fenced in and partially screened adjacent to Navassa road.

West Side of Site from Navassa Road



West Side of Side Upland Area



Lift Station on West Side of Site



Live Oaks



Bridge on West Side of Site



Area Under Bridge



Existing Canoe/Kayak Launch and Dock



View of Bridge from Dock



Existing Canoe/Kayak Ramp



View of Sturgeon Creek from the Dock



Open Space on West Side of Site



Pathway to Creek on West Side of Site



Upland Open Space



Remnants of Residential Concrete Slab



View of Loop Road from West Side of Site



TOPOGRAPHIC SURVEY

Survey Process

Given the large area of the park site, as well as the limited access to some of the ecologically sensitive areas required a creative approach to conducting the topographic survey. The project team utilized an Unmanned Aircraft System (UAS), commonly referred to as a drone, to collect data through standard remote sensing. Technological advancements in UAS systems and capabilities allow for accurate data collection, without the risks and costs associated with traditional methods. The UAS is able to provide high-resolution aerial photography, as well as photogrammetry and/or LiDAR to identify on-site structures and topography. This data is then processed and geo-referenced to produce an accurate survey of the site that can be used throughout the planning process.

Topographic Profile

The topographic survey provided the project team with a better understanding of the changes in elevation throughout the site, and helped identify areas that present significant challenges to construction. In general the site is relatively flat in the wetlands and upland areas, however the transition areas between the two can often be steep- exceeding 20% in some locations. The high point of the site, at the southern end of the study area is at an elevation of 21 feet. The flat upland areas gradually slope north from this

elevation and end around the 12-14 feet, before the site begins to slope rapidly towards the creek. The lowest elevation recorded, prior to entering the marsh areas, is 2 feet.

The survey also identified utilities present on site. Overhead electrical lines run along the east side of Navassa Road, crossing the road in several locations to provide service to the houses that have since been demolished. Communication lines (telephone and cable) run along the west side of the road, beginning at a crossing near the old church remains, and heading north. Both sets of lines cross the creek into Navassa.

A sanitary sewer line runs north along the west side of the site, ending at a sanitary sewer manhole adjacent to the power substation. A stormwater ditch also runs along the west side of the site, beginning south of an abandoned driveway and ending at an outfall just south of the Navassa bridge. The southern end of the ditch is fed by a culvert running under the road from the old church site. There are also two drop inlets that feed into this ditch on the road just south of the beginning of the bridge. Also present in the area are five wells that served the abandoned properties in the area. The topographic and utility findings are shown in the map on the following page.

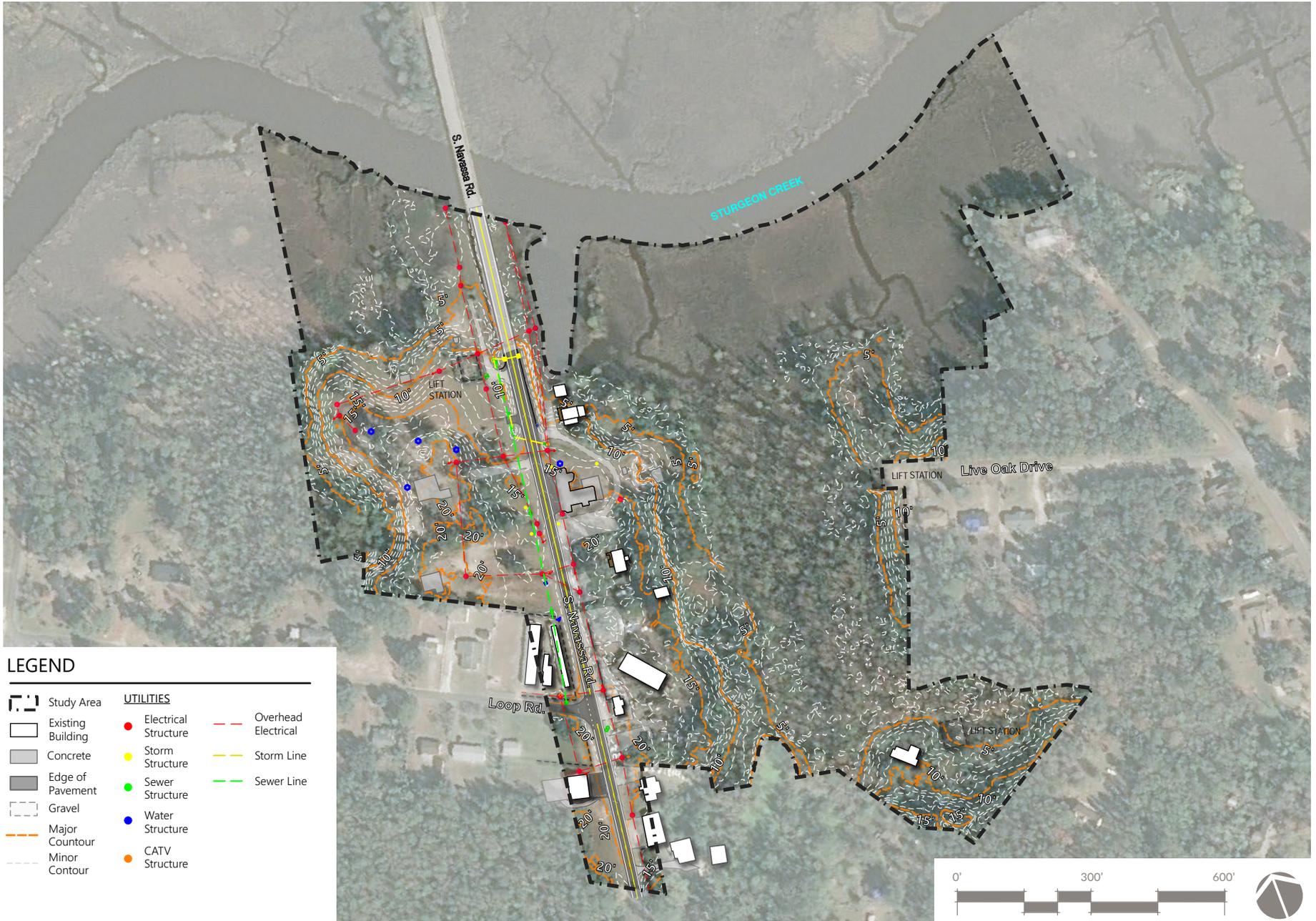
WETLANDS ANALYSIS & DELINEATION

Overview

In anticipation of future development at the Sturgeon Creek Park, the project team conducted a wetlands analysis and delineation. This included the delineation of jurisdictional wetlands and or streams using criteria set forth in the 1987 US Army Corps of Engineers (USACA) Wetlands Delineation Manual and applicable Regional Supplement, the delineation of all coast wetlands subject to Division of Coastal Management (DCM) jurisdiction under the Coastal Area Management Act (CAMA), and delineation of the Normal High Water (NHW) line within the coastal wetlands based on biological indicators.

Wetland delineation on the west side of the site was previously completed by SEPI Engineering and Construction, and their data was provided f to be included in this report. The WithersRavenel wetlands team performed the delineation on the east side of the site, locating wetlands, coastal wetlands, and NHW flags using a Trimble mapping grade GPS unit. This data was then used to prepare a Preliminary Delineation Exhibit for preliminary planning purposes.

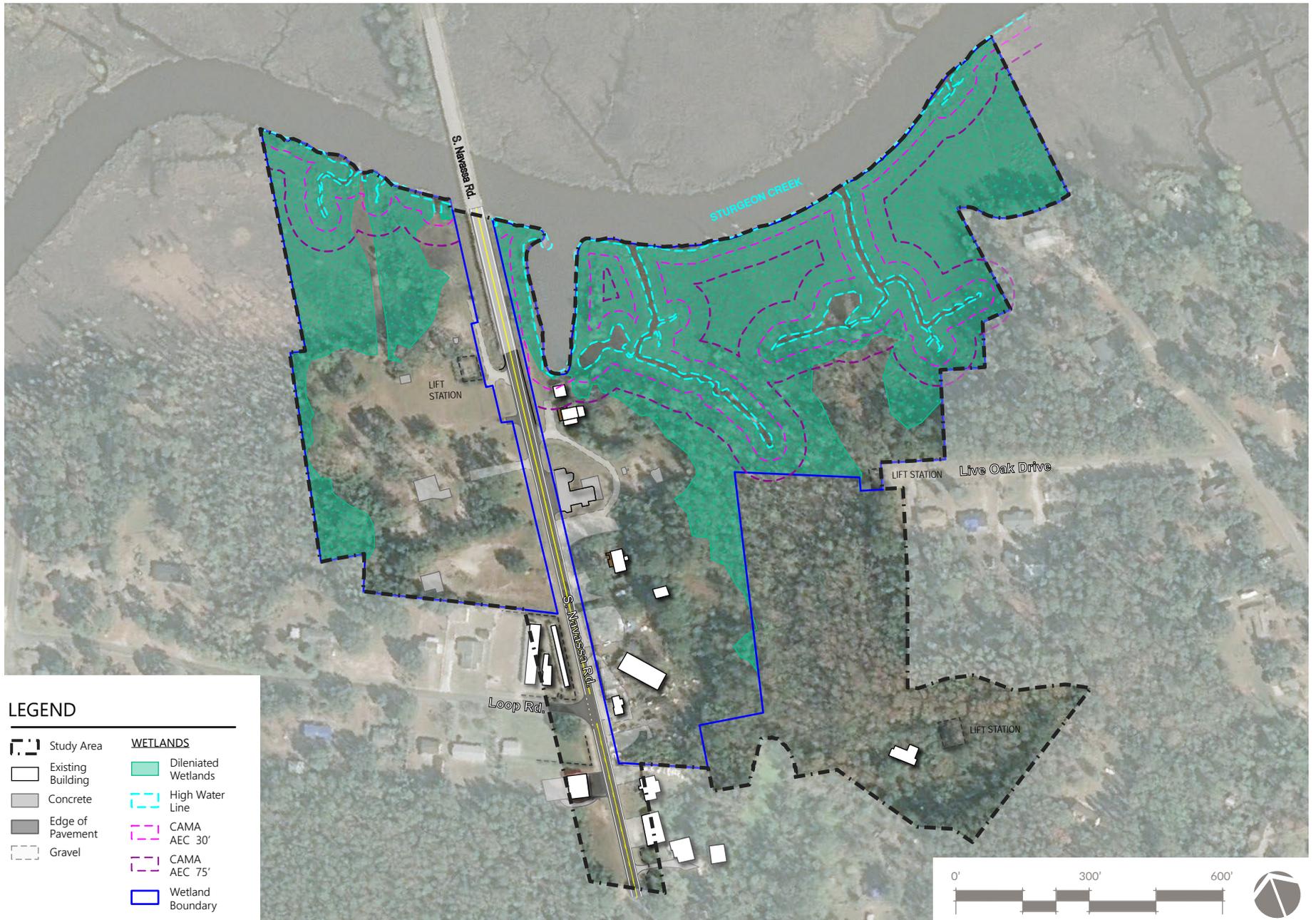
Findings from the wetland delineation can be found in the map on the following page. It should be noted that the area identified outside the wetland boundary on the east side of the site was



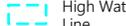
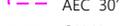
LEGEND

UTILITIES		
Study Area	Electrical Structure	Overhead Electrical
Existing Building	Storm Structure	Storm Line
Concrete	Sewer Structure	Sewer Line
Edge of Pavement	Water Structure	
Gravel	CATV Structure	
Major Contour		
Minor Contour		

Delineated Wetlands Map



LEGEND

- | | |
|---|---|
|  Study Area | WETLANDS |
|  Existing Building |  Delineated Wetlands |
|  Concrete |  High Water Line |
|  Edge of Pavement |  CAMA AEC 30' |
|  Gravel |  CAMA AEC 75' |
| |  Wetland Boundary |

private property at the time of the delineation, but most likely contains wetland areas.

In addition to the delineation of the wetlands, the project team also prepared a Jurisdictional Determination Request in support of the wetland delineation and submitted this to the USACE. The team also prepared a request and submission to the NCDQM and the designated Brunswick County CAMA local permitting officer to verify the delineation of coastal wetland line and the NHW line. These submissions were reviewed and the requests are expected to be completed by summer 2020.

GUIDING DOCUMENTS & PREVIOUS PLAN REVIEW

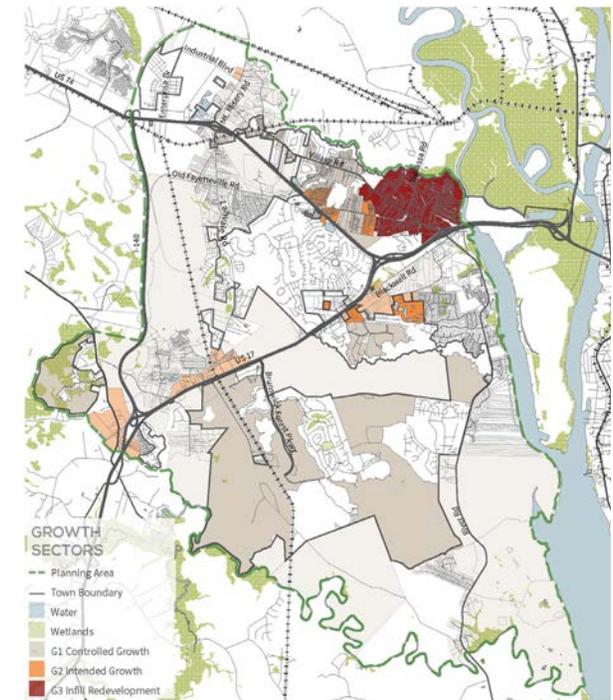
Due to Sturgeon Creek Park's location at one of the primary gateways to Leland and its potential to impact infill development efforts on the surrounding areas, it is important for this master to plan to provide a continuation of previously adopted plans and studies. Careful review and analysis of previous work ensures coordination with other adopted plans that could influence the development of Sturgeon Creek Park. The planning team has researched multiple sources of information, which includes documents pertaining to parks and recreation, transportation, land use, and small area plans. A listing, though not exhaustive, of significant influencing plans or documents include (in chronological order):

- Town of Leland Master Plan (Adopted 2009, Updated 2016)
- Leland Parks, Recreation and Open Space Master Plan (Adopted 2009, Updated 2018)
- Leland Comprehensive Bicycle Plan (2009)
- FlexCode Adoption/ Leland Gateway Plan and Rezoning (2012)
- Town of Leland Pedestrian Plan (2016)
- Navassa Conceptual Master Plans and Initiatives (Ongoing)

Town of Leland Master Plan (2009, 2016)

The development of the Town of Leland Master Plan centers around applying the TransectMap methodology to Leland's 61-square mile planning area. This effort created a framework for future land use and development by focusing on the Rural-Urban Transect, and encouraging development types and intensities that are associated with the surrounding land use context. The plan also places a strong emphasis on conserving critical wetlands and other environmentally sensitive areas, while still accommodating for intense development in the appropriate areas. This is accomplished by the establishment of growth sections that range from Preserved Open Space (S-1), to Infill Development (S-6). The area around Sturgeon Creek Park is critical to the realization of this plan, as it contains Preserved Open Space, Reserved Open Space, and a significant amount of Infill Development. Careful planning of the Sturgeon Creek Park site will be critical to ensure that this planning framework

Growth Sector Map from 2016 Master Plan Update



is realized and the appropriate development is facilitated in the adjacent area.

The Master Plan was updated in 2016 and renamed Leland 2020. The plan update is a response to Leland's rapid growth during the previous decade and focuses on immediate actions to best accommodate future growth in a manner that builds value for the community. The plan is organized into three components: Citizens, Community, and Commerce. This new focus considers the impacts that growth has on the people in the community as well as the desire to continue development and attract new economic

opportunity. The 2020 Plan establishes Growth Sectors with levels of investment priority ranging from G1-G3, with G3 being infill development. An extensive area around the Sturgeon Creek Park Site is assigned the G3 status, again placing an emphasis on the importance of the park as an anchor for this priority area.

Town of Leland Parks, Recreation and Open Spaces Master Plan (2009, 2016)

The Town of Leland's Parks, Recreation, and Open Space Master Plan is intended to clearly define the role of the Town in providing parks and recreation facilities for its citizens for the

next ten to twenty years. The purpose of the plan is to develop parks, creation of an open space planning tool to assist in the expansion, promotion and funding of safe park facilities, and programs and initiatives throughout the locality. Ultimately, the plan generated an Implementation Framework which serves as a guide for Leland staff and officials to reference when securing funds, guiding development, establishing programs and budgeting and allocating local resources for parks and open spaces within the Town.

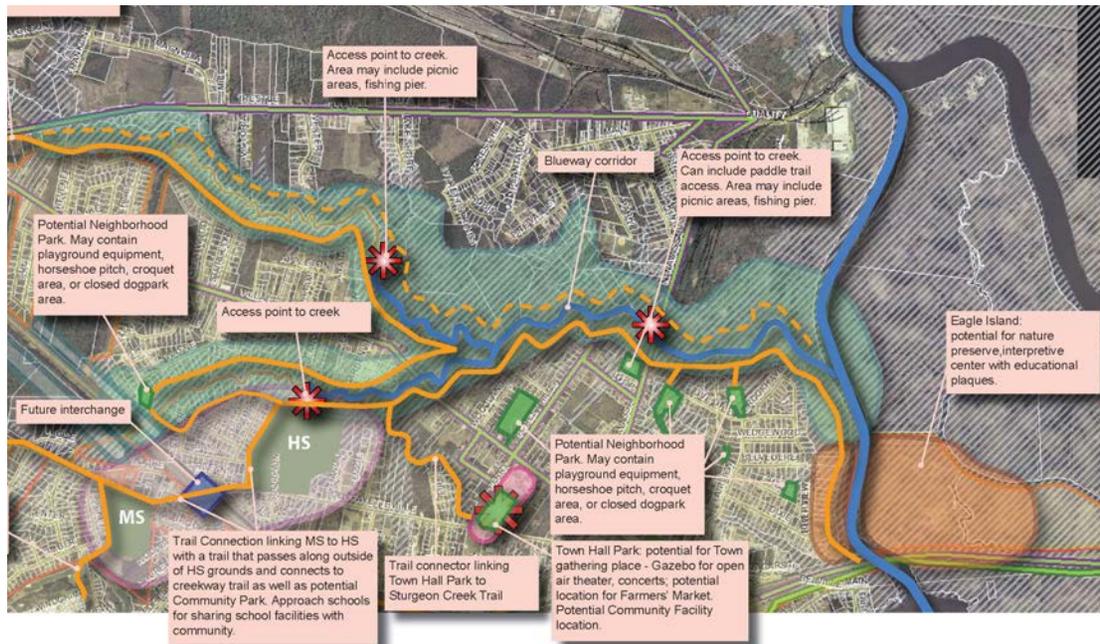
In this document the Town established a vision for parks and facilities that reads as follows:

To promote, enhance and create a parks, recreation and open space partnership with developers, the County, adjacent municipalities and the public that embraces the Town's unique resources and position as the "Gateway to Brunswick County" and includes intelligent growth ideals with a future perspective.

Overall goals for the plan are to diversify the parks system, acquire and develop new parkland, maintain and manage existing and future parkland, and preserve and protect natural resources. With regard to Sturgeon Creek Park, the plan identifies several opportunity areas for future park and recreation facilities. The park site is identified as a potential area for creek access and connectivity to future trails. The park is also identified as a potential picnic area with a fishing pier, and a neighborhood park is proposed at the end of Live Oak Road. Short range projects recommended include creating the Sturgeon Creek Paddle Trail, the Sturgeon Creek Greenway Trail, and developing a neighborhood park east of Navassa Road at the end of Live Oak Drive.

An update to this plan was completed in 2018 with a strong emphasis on the recent demographic changes in Leland as well as an analysis of recreation trends. The population in Leland has nearly tripled in the last two decades, and expected to reach almost 30,000 people by 2032. Recreation needs and priorities are also changing, with public input efforts indicating a desire for trails and bike paths, water access, and access to open spaces and natural areas. This plan also proposes

Proposed Recreation Facility Map from 2009 Parks and Recreation Master Plan

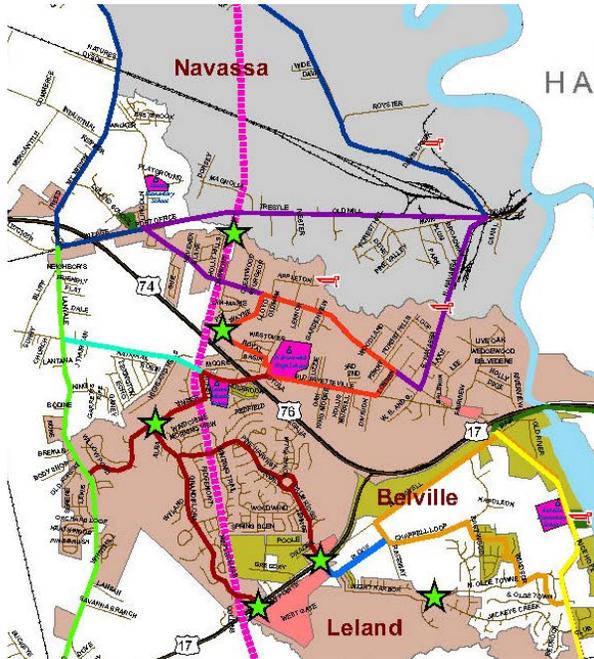


master planning and developing parkland along Sturgeon Creek, with the master plan phase included as a short-term priority project.

Leland Comprehensive Bicycle Plan (2009)

Conducted through a 2006 Bicycle Planning Grant from NCDOT, the purpose of this Comprehensive Bicycle Plan was to establish a framework for future bicycle planning and the development bicycle facilities and programs. The primary goals of the plan are to increase safety; enhance public awareness; promote connectivity, coordination and continuity; enhance quality of life; and develop a maintenance and implementation plan.

Proposed Village Road Loop (Shown in Purple)



Ultimately, the plan envisions establishing bicycling as a viable, convenient and safe transportation choice throughout Leland.

The plan proposes several new bicycle routes throughout the Town, including the Village Road Loop that connects Village Road in Leland to Old Mill Road through Navassa, and back to Leland on Navassa Road. This loop will pass directly through the Sturgeon Creek Park and could potentially link cyclists on this route to future greenways and trail networks in the Sturgeon Creek Area. Planning for the park should take in account proposed Village Road Loop and provide infrastructure that enhances the bicycling experience in accordance with the goals of the plan.

FlexCode Adoption / Leland Gateway Plan and Rezoning (2011/2012)

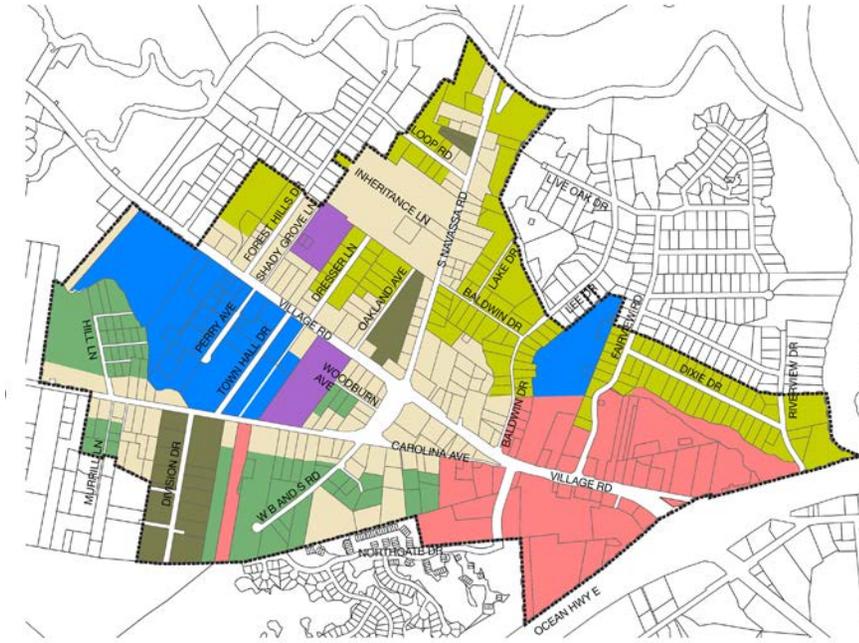
In an effort to construct the planning framework established by the Leland Master Plan, the Town adopted its new FlexCode zoning Ordinance in 2011. FlexCode is type of ordinance that focuses more on form and place-making that with regulation through building uses. The code emphasizes standards and parameters for form with predictable results and requires private buildings to shape public space through the use of building form and placement standards. The ordinance builds off the Transect Model used in the Master Plan, and established new zoning classifications that are based on the character of an areas. These classifications are:

- T1-Natural
- T2-Rural
- T3-Sub-Urban
- T4-General Urban
- T4O – General Urban Open (Higher Densities)
- T5-Urban Center

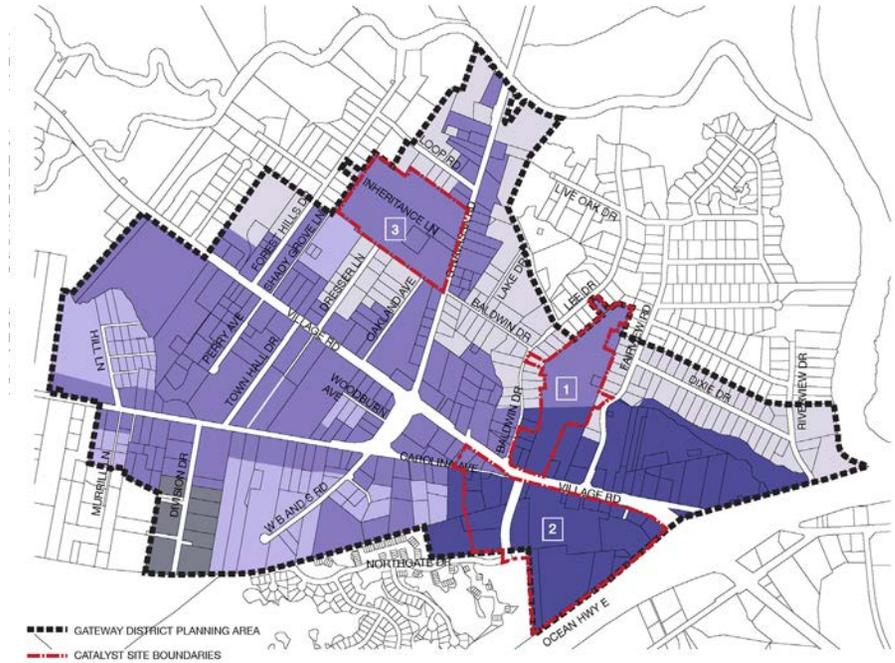
The code also promotes interconnected street with smaller, pedestrian scale blocks and access to public open space. Leland’s FlexCode accomplishes this by defining and laying out the parameters for the Neighborhood, as well as for the block and building. These parameters place a strong emphasis on livability, connectivity, walkable access to a variety of services, and the inclusion of a wide range of parks, open spaces and natural areas.

Using this FlexCode, Leland launched a Gateway Plan and Rezoning effort in 2011. The plan focused on Leland’s Gateway District, which runs north and south of Village Road, west of the Highway 17 / Ocean Highway exit, along Old Fayetteville Road, Carolina Avenue, and South Navassa Road. Also included in the Gateway District is the Sturgeon Creek Park site at the district’s northern terminus. The Vision for the Gateway district was developed during a four-day workshop where the project team applied FlexCode rezoning to the gateway district, and explored placemaking ideas such as building forms, new street networks, and public open spaces. Recognizing that a transformation like this wont happen overnight,

Existing Zoning in Gateway District



FlexCode Zoning in Gateway District



Village Road Gateway District Sketch



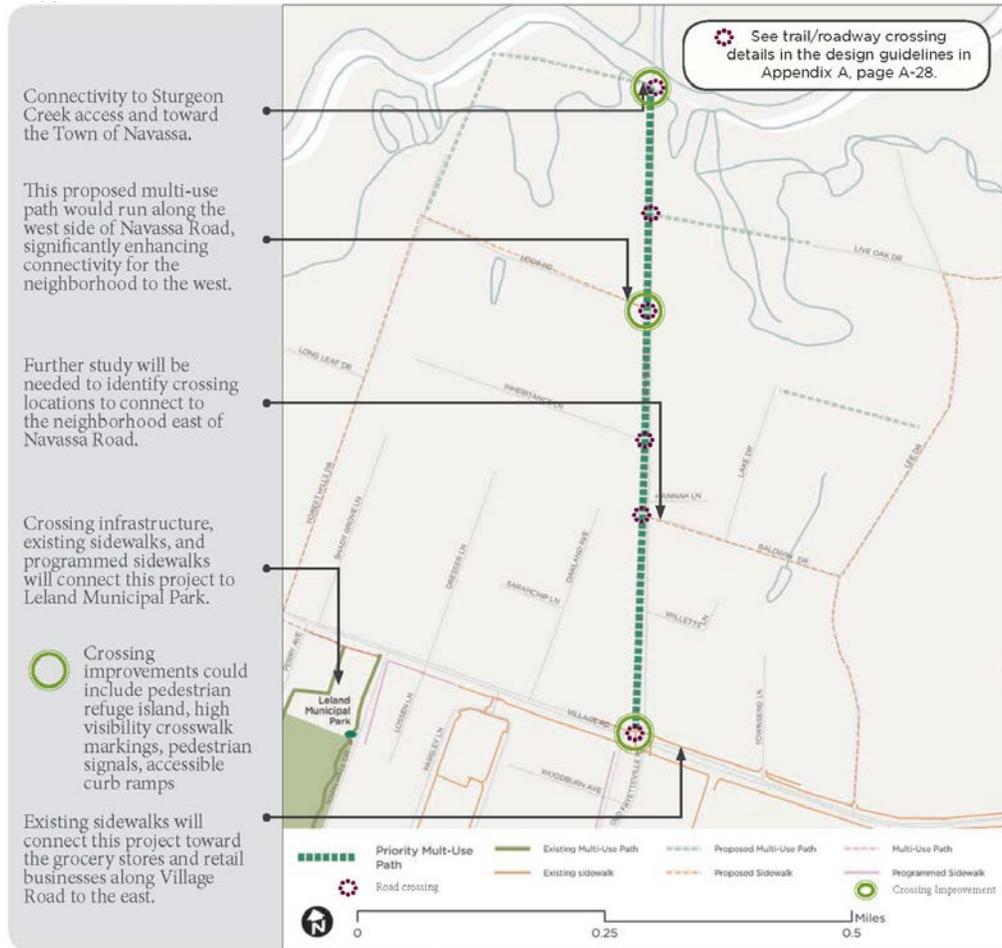
Cut-sheet Information for the Navassa Road Multi-use Path

the plan established three Catalyst Zones to help demonstrate changes that can occur using the Regulations in the FlexCode.

One of these Catalyst Zones is just south of Sturgeon Creek Park along Navassa Road. This area, along with areas along Navassa Road are zoned, T4O. This indicates a potential for higher-density corridor where Sturgeon Creek Park has the potential to create a welcoming transition to the area, as well serve as a primary gateway into Leland. As an anchor for his corridor and as a primary node of the Gateway District, master planning efforts for the Park will need to consider connectivity to surrounding neighborhoods, as well as integrating the desired forms that will help influence the character of these areas.

Town of Leland Pedestrian Plan (2016)

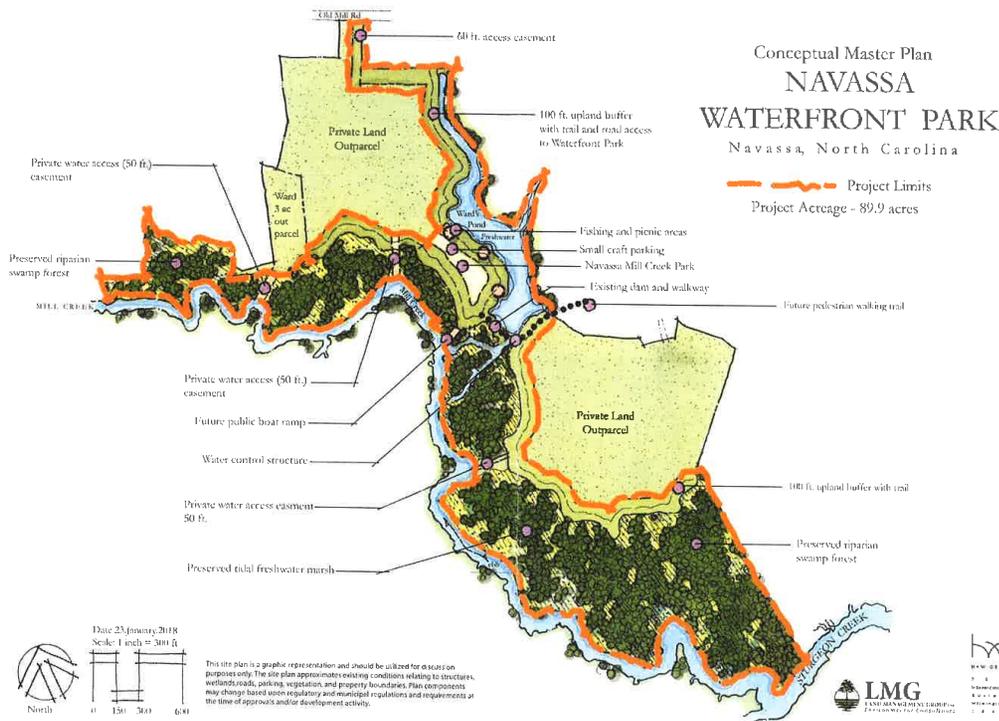
Like the 2009 Bicycle Plan, the Pedestrian plan was also born out of a Bicycle and Pedestrian Grant from NCDOT. Through the plan, the Town aims to improve pedestrian safety, provide safe and convenient access to and within Leland, stimulate economic development, create opportunities for active and healthy lifestyles, and enhance overall quality of live. Recommendations focused on addressing gaps in the sidewalks, particularly to critical areas in Town, and also to provide multi-use paths along key corridors. This includes a multi-use path along Navassa Road that would connect from Sturgeon Creek to Village Road.



This multi-use path, called the Navassa Road, Multi-use Path, would ultimately connect through Sturgeon Creek Park and to any trail networks present in the park, providing safe bicycle and pedestrian access from a key town center to Sturgeon Creek.

The plan also includes a project cut-sheet detailing the Navassa Road Multi-use Path including the proposed route, pedestrian trip generators, and a planning level cost estimate. Highlights of the route include: connection to Sturgeon Creek; potential neighborhood improvements west of

Navassa Waterfront Park



Navassa Road; the opportunity for crossings into the neighborhoods east of Navassa Road; access from these neighborhoods to Village Road businesses; and an eventual connection to Leland Municipal Park.

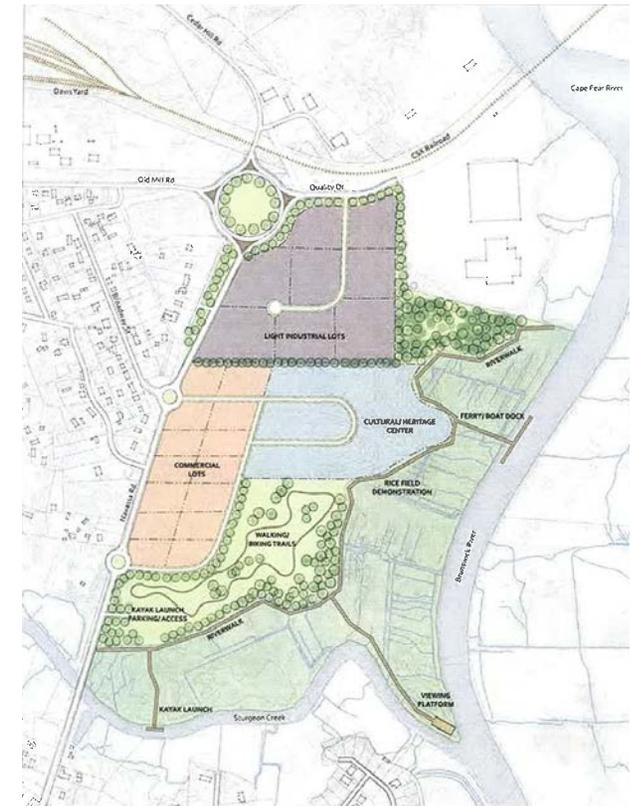
Navassa Conceptual Master Plans and Initiatives

Because of its location across the creek from Sturgeon Creek Park, pedestrian and bicycle connection opportunities from Leland to Navassa are of interest to both towns. Navassa is currently undergoing two planning projects that could have

a significant impact on Sturgeon Creek Park. The first, is a conceptual master plan for the creek-front properties west of Sturgeon Creek along Mill creek. The plan includes residential development of two tracts of land surrounding Ward's Pond that are connected by preserved natural lands along Mill Creek. There is a strong desire to create a pedestrian trail network around these natural lands, that could potentially include a boardwalk connection to Sturgeon Creek.

A second planning effort currently underway in Navassa is a remediation and mixed-use development project on the Kerr-McGee Chemical

Kerr-McGee Superfund Site Redevelopment



Corp. Superfund Site. This project is an effort to remediate creosote-related SVOC contamination on approximately 140 acres of a 240-acre former industrial site, in order to develop a mixed-use community that includes commercial, light industrial, a cultural heritage center, parkland, and boardwalks. This site sits directly across from Sturgeon Creek Park, and a potential connection across the creek and to the trail network is desired by Leland and Navassa. The project is currently in the final stages of the feasibility study.

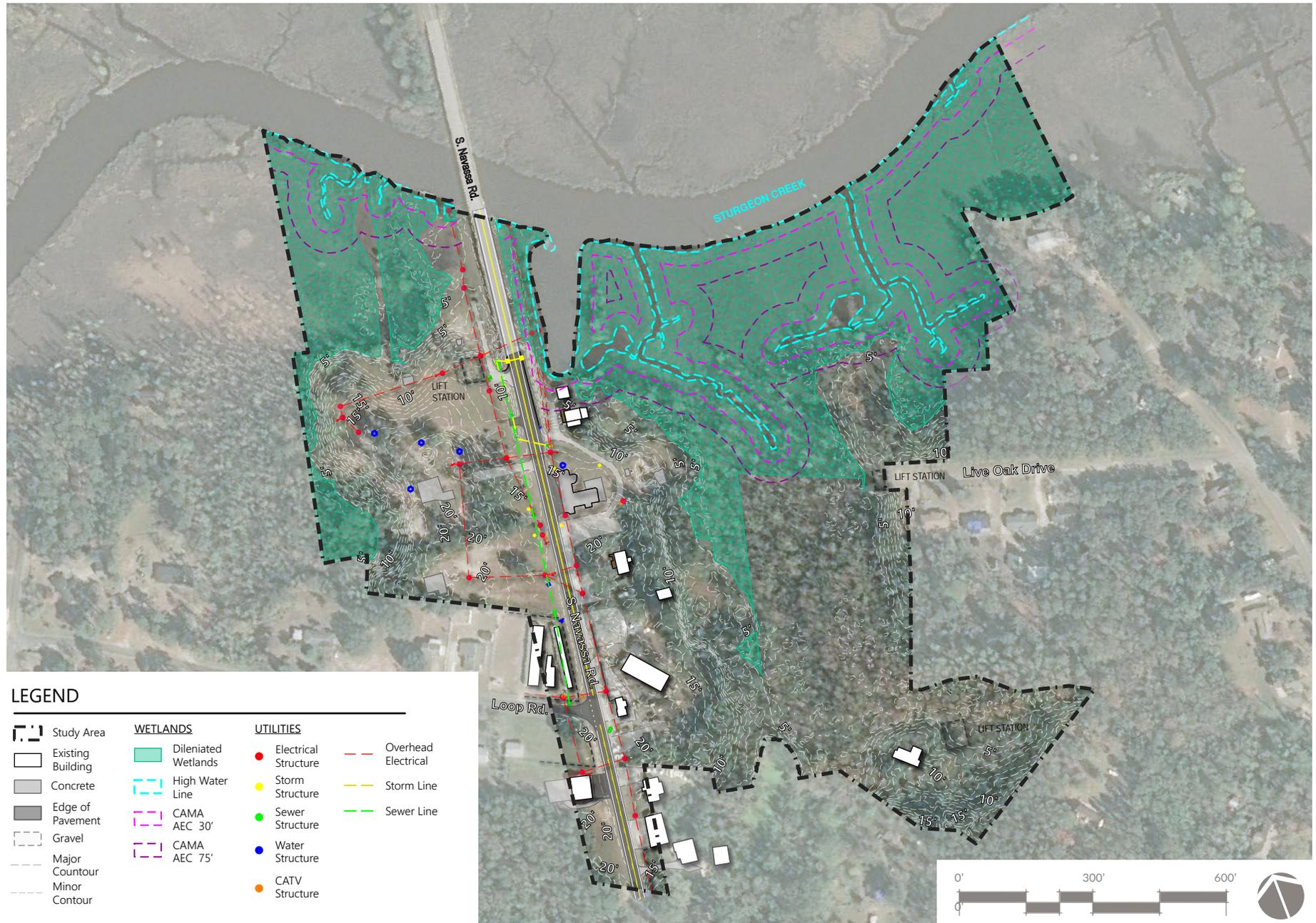
SITE INVENTORY & ANALYSIS SUMMARY

The Inventory and Analysis of Sturgeon Creek Park identified physical conditions of the properties that present the opportunity for the creation of a waterfront park with unique natural features. The information obtained during this phase provided the project team with a comprehensive understanding of the existing site conditions, environmental considerations, the surrounding context of the park site. The guiding documents and previous plan review also provided the project team with a thorough understanding of the comprehensive effort that has already gone into creating the framework necessary to support a park in this area. Due to diligent planning by the Town, this site will be well connected to the surrounding natural areas, it will help facilitate access between neighborhoods and commercial areas, and it will serve as an important gateway to Leland.

Based on the site observations, the topographic survey, and the wetland analysis and delineation, the project team was able to identify areas of the park that could potentially be developed, areas that may present challenges, and additional features that could be incorporated into the park to utilize the wealth of natural resources. The next chapter will expand on this synthesis, and begin to identify opportunities, constraints, potential programmatic elements, and eventually park concept alternatives.



Sturgeon Creek Existing Conditions Map







3 CONCEPT DEVELOPMENT

OPPORTUNITIES & CONSTRAINTS

This information obtained during the Site Analysis helps to establish a base for identifying opportunities and constraints, as well as programming and initial concept development. Sturgeon Creek Park's unique location presents many opportunities for recreation experiences desired by Town of Leland Residents, particularly when considering access to water and natural resources. However, these natural features also present constraints and challenges to development due to the environmental sensitivity of the area.

Based on the findings from the opportunities and constraints analysis, as well as conversations with Town staff, the following opportunities, constraints, and preliminary program elements were identified for Sturgeon Creek Park. Coupled with the Opportunities and Constraints map found on the following page, these preliminary findings serve as the foundation for the development of concept alternatives and program elements.

Opportunities

- Upland areas with generally flat topography allow for potential development and programmed spaces
- Proximity to the creek with existing pedestrian routes to the water
- Existing boat ramp and dock with potential for repair or replacement
- Inlet on the west side with the potential for use as a motorized boat launch
 - NC Wildlife has expressed interest in providing a motorized boat launch and parking for the Town at the site, with preliminary concepts already completed
- Potential for bike/ped connections from Sturgeon Creek Park to Village Road
- Potential connections to neighborhoods via Loop Road and Live Oak Drive
- Paddle trail on Sturgeon Creek presents the opportunity to connect canoe/kayak users to a larger, extensive paddle network
- A boardwalk system in the area can connect to natural areas and adjacent neighborhoods
- Proximity to planned parks and facilities across Sturgeon Creek in Navassa create the potential to connect across the creek and extend the trail/greenway network
- Planning for the Gateway District places the park as the anchor of a primary entrance

into Leland, creating the potential for iconic gateway signage and the facilitation of further development in the district

Constraints

- Presence of significant wetland areas on site limit development
- Bisection of the site by Navassa Road creates the need for a safe pedestrian crossing from one side to the other
- The existing utilities may require relocation
- The junkyard could present environmental constraints that limit the potential for that area
- Dredging required for the motorized boat ramp could be significant and increase project costs
- Presence of the boat ramp and associated parking could create circulation challenges on site
- Potential need to relocate the lift station on the west side of the site

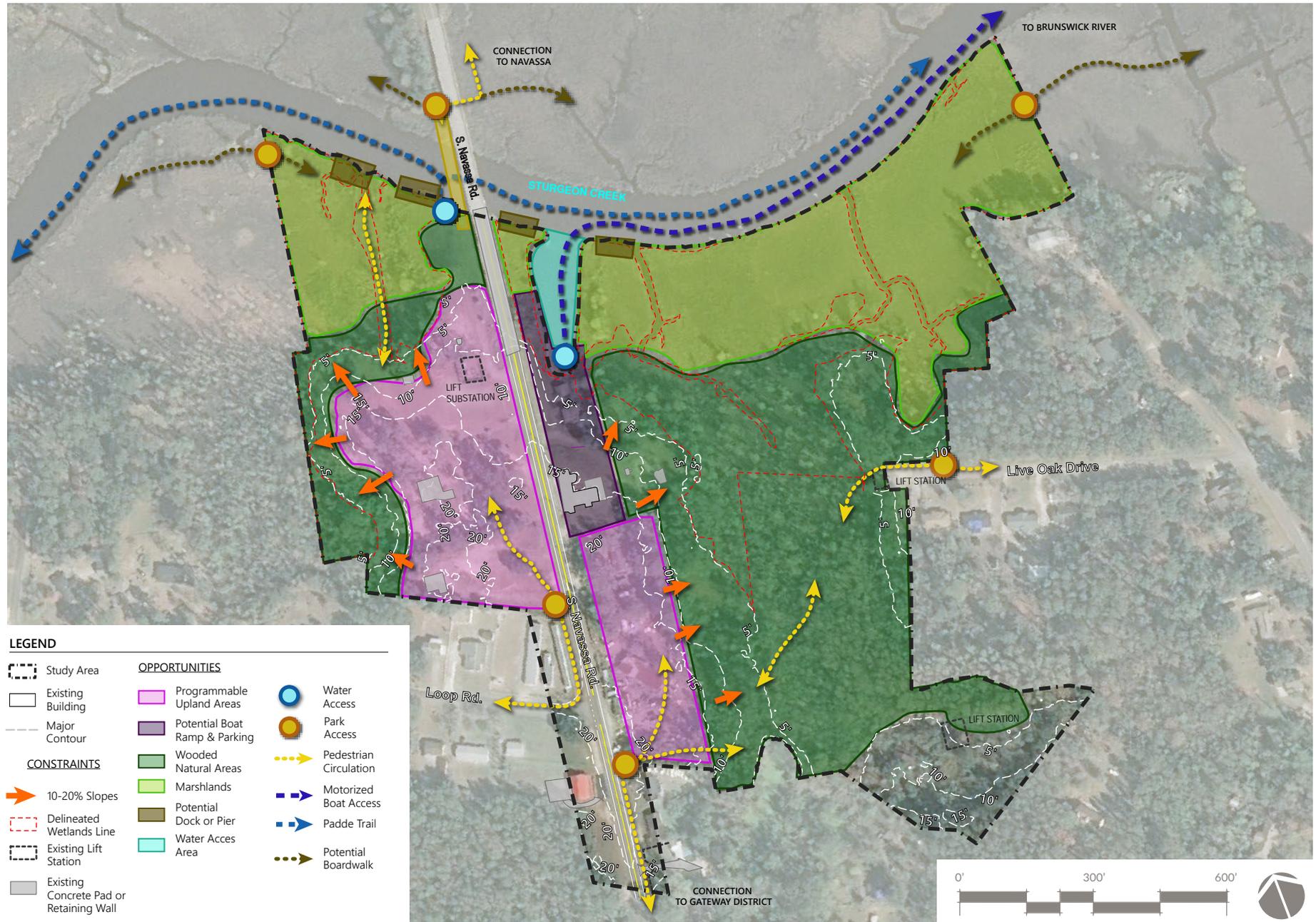
Park Programming Elements

The Town of Leland intends for Sturgeon Creek Park to serve as nature-based park that preserves the pristine natural areas found at the site, while also providing access to these areas for park users. Using information from the discussions with the Town, site analysis, guiding document review

and public input, the preliminary programming was developed to ensure broad appeal while responding to site conditions and context. Based on the findings from the opportunities and constraints analysis, the following design program elements were identified for Sturgeon Creek Park:

- Natural area preservation
- Walking trails through natural areas
- Paved multi-use trails with connections to adjacent neighborhoods
- Boardwalks through marshlands with viewing areas
- NC Wildlife motorized boat launch with trailer parking
- Canoe/kayak launch - ADA accessible
- Fishing piers
- Open green spaces
- Nature center
- Outdoor education areas
- Playground
- Picnic shelters
- Parking
- Gateway elements and signage into Leland

Sturgeon Creek Opportunities and Constraints Map



FORM & FUNCTION CONCEPTS

Form & Function Development

The form and function concepts for Sturgeon Creek Park represent the results of the extensive analysis, town input, opportunities and constraints and program development for the park. These concepts were also built through the public input process, with the public being introduced first to the opportunities and constraints diagram, and then presented with progressively refined form and function diagrams as input was collected. Because of this process, these form and function concepts are the result of the shared-community vision built on a solid foundation of analysis and research.

Form & Function Concept Alternatives

Shown on the following pages, the two final two form and function concepts were presented at the final public meeting for additional input prior to the development of the final concept. Both concepts contain the following elements:

- NC Wildlife motorized boat access and boat trailer parking
- Extensive network of walking trails through natural areas

- Boardwalk system with future connections to adjacent areas
- Pedestrian bridge across Sturgeon Creek into Navassa
- Paved multi-use path connecting south to the Gateway District
- High-visibility crosswalks for pedestrians
- Canoe/Kayak launch with drop-off area
- Nature center with outdoor education / event area with parking
- Relocation of existing lift station
- Playground with shelter
- Marsh viewing areas
- Fishing piers
- Observation tower
- Flexible open spaces
- Overflow parking
- Gateway signage
- Improved landscape elements and street trees

Form & Function Concept 1

Form & Function Concept 1 contained the following unique elements:

- NC Wildlife “small” alternative for motorized boat ramp and boat trailer parking (+/- 35 spaces)
- Nature center located in the center of the west side of the site
- Playground located behind the nature center with parking lot between the two elements
- Pedestrian bridge to Navassa located on the west side of the existing vehicular bridge

Form & Function Diagrams at Final Public Meeting



Sturgeon Creek Form & Function Concept 1



Sturgeon Creek Form & Function Concept 2



Form & Function Concept 2

Form & Function Concept 2 contained the following unique elements that differ from Concept 1:

- NC Wildlife "large" alternative for motorized boat ramp and boat trailer parking (+/- 60 spaces)
- Nature center located closer to Navassa Road, with parking located further in the interior of the site.
- Playground located immediately west of the nature center with parking lot behind both elements
- Pedestrian bridge to Navassa located on the east side of the existing vehicular bridge
- Additional crosswalk adjacent to nature center
- Modified circulation network and location of open spaces and recreation amenities

PUBLIC INVOLVEMENT

Methodology

Public involvement is the cornerstone of any successful planning effort, representing the qualitative side of the investigation and research upon which successful master plans are built. For the Sturgeon Creek Park Master Plan, a multi-faceted approach to public involvement was developed in order to obtain as much public input as possible in a limited time-frame. The primary goals of the plan's public participation were to raise awareness of the project, garner support for the park development, and obtain input from residents on ideas for park programming and concepts.

The first element of the public involvement included conducting two community meetings to introduce the Parks and Recreation Advisory Board and the public to the project, obtain preliminary ideas for programming, and gather comments on preliminary form and function concepts. The second element consisted of an open house that coincided with the annual Leland Founders Day Celebration to raise awareness and support for the project and obtain additional input. This also provides the opportunity to distribute project information and links to an online survey. The following are summaries of findings for each method.

Public Meetings

First Public Meeting

The first public meeting was held on August 28th, 2019 at Leland Town Hall. This meeting was held in conjunction with The Town of Leland Parks and Recreation Advisory Board, who met at 6:00 PM in the council chambers. Following the Board Meeting, board members were invited to participate in an open house input session that was open to the public. The open house information included an overview of the project process, the existing conditions of the park site, and an opportunities and constraints diagram. Those in attendance were asked to visit stations set up around the room to view the presented material and participate in a dot placement visual preference exercise, as well as draw out ideas on a blank site map. Town of Leland and WithersRavenel staff were available at each station to answer questions and encourage participants to provide comments. Approximately 25 people attended the first public meeting.

Comments below were gathered from comment boards and comment cards:

- Overnight camping by reservation, especially for kayak and powerboats, maybe sailboats.
- Kayak and Canoe launches (make ADA accessible)

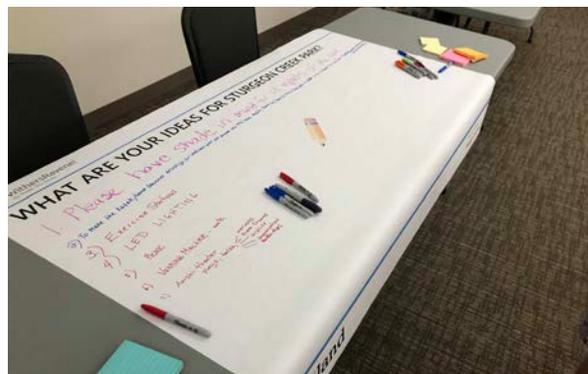
- Exercise Stations
- LED Lighting
- Picnic Area
- Vending Machine (Water)
- Amphitheater (Plays, talks – wetlands, river streams, wildlife, conservation, butterflies)

Second Public Meeting

The second public meeting was held on September 25th, 2019, and followed a similar format as the first meeting. The Town of Leland Parks and Recreation Advisory Board met at 6:00 PM, however public participants began showing up around 5:30. Like the first meeting, the open house information included an overview of the project process, and the existing conditions of

the park site. New information provided at this meeting included two form and function concept diagrams showing potential elements in the park. Those in attendance were asked to visit stations set up around the room to view the presented material and participate in a dot placement visual preference exercise, as well as draw out ideas on a blank site map. Town of Leland and WithersRavenel staff were available at each station to answer questions and encourage participants

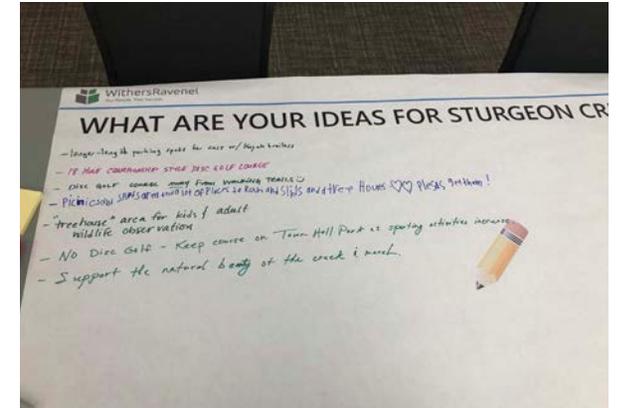
Public Meeting Photos



to provide comments. Approximately 15 people attended this meeting, and support for the park concepts was favorable.

Comments below were gathered from comment boards and comment cards:

- Longer-length parking spots for cars w/kayak trailers
- 18-hole championship style disc golf course
- Disc golf course away from walking trails
- Picnic and sports areas- open spaces, slides and tree houses
- "Tree house area for kids & adults", wildlife observation
- No disc golf – keep course on Town Hall Park as sporting activities increase
- Support the natural beauty of the creek & marsh



Founders Day

Due to the timing of the Master Plan effort, the project team was provided with a unique opportunity to engage a substantial portion of the community in a special event setting. On September 14, 2019, the Town of Leland Hosted their annual Founders Day to celebrate the Town's birthday. The event, which drew approximately 5,000 people, featured live music, food trucks, arts and crafts, business vendors, and fireworks.

This special event and the large number of attendees provide an ideal setting to engage with members of the community who may otherwise not participate in the public involvement process. The project team was provided with a tent close

to the main stage of the event, and set up from 3:00 PM (the start of the event) until 6:00 PM. Information available included an overview of the project process, the existing conditions of the park site, and a preliminary form and function diagram. Event attendees were able to walk through the tent displays as they made their way around the exhibit area and view the presented material, as well as participate in a visual preference exercise. There was also a station set up for children to draw out ideas on a blank site map. WithersRavenel staff were available to answer questions and encourage participants to provide comments.

Based on the amount of dots placed on the visual preference boards and observations from the project team, it is estimated that approximately

250-300 people participated in the exercises or stopped by the tent. Most visitors to the tents expressed support for the park and its development. Many visitors felt that additional water access, as well as walking trails and boardwalks would be great additions to the Town's recreation options. Comments below were gathered from comment boards and comment cards:

- Disc golf
- Dog park
- Basketball / volleyball courts
- Splash pad
- Swings that overlook the area







Visual Preference Results

In addition to comments, participants at each engagement event were given an opportunity to participate in a visual preference exercise where they were given a set of dots and asked to place them on precedent images in a series of categories that they might want to see in Sturgeon Creek Park. The following is a summary of the results of this exercise by category. Images of the boards with the totals from all events can be found on the right

- **Walking/Biking Trails**
 - The image receiving the most dots was a mulch trail in a wooded area with plant identification signage. The image of a paved multi-use trail also received a significant number of dots.
- **Boardwalks**
 - The image receiving the most dots was a wooden boardwalk with railings winding through a marshy area. The image of concrete boardwalk with railings also received a moderate number of dots.
- **Fishing Piers**
 - The option receiving the most dots was an image of a traditional fishing pier extended out into the water. The image of fishing area on the banks of creek boardwalk with railings also received a large number of dots.
- **Marsh Viewing Areas**
 - The option receiving the most dots was an image of a fishing pier with a covered pavilion. The image of a multi-story tower also received a large number of dots.
- **Shelters/Restrooms**
 - The image receiving the most dots was a large picnic shelter with tables attached to a small restroom building. This image received more dots than any image in any category.
- **Boat Access**
 - The image receiving the most dots was a dock and an ADA accessible canoe/kayak launch. The image of double boat ramp with wooden docks also received a large number of dots.
- **Nature Center**
 - The option receiving the most dots was a building that included both indoor and outdoor features.
- **Town Gateways and Monuments**
 - The image receiving the most dots was a monument with vertical elements but no overhang. The image of a vertical gateway monument with an overhang that spans the road also received a significant number of dots.

PLACE COLORED DOTS ON TOP 3 PREFERRED ELEMENTS

PREFERENCES - WALKING/BIKING TRAILS



PREFERENCES - BOARDWALKS



PREFERENCES - FISHING PIERS



PREFERENCES - MARSH VIEWING AREAS



PREFERENCES - SHELTERS/RESTROOMS



Town of Leland
Sturgeon Creek Park Master Plan

PLACE COLORED DOTS ON TOP 3 PREFERRED ELEMENTS

PREFERENCES - BOAT ACCESS



PREFERENCES - NATURE CENTER



PREFERENCES - TOWN GATEWAYS/MONUMENTS



PREFERENCES - PLAYGROUNDS



PREFERENCES - RECREATION ACTIVITIES



Town of Leland
Sturgeon Creek Park Master Plan

- **Playgrounds**

- The image receiving the most dots was a nature-based playground with climbing features. The image of a modern playground with resilient surfacing and climbing elements received one fewer dot.

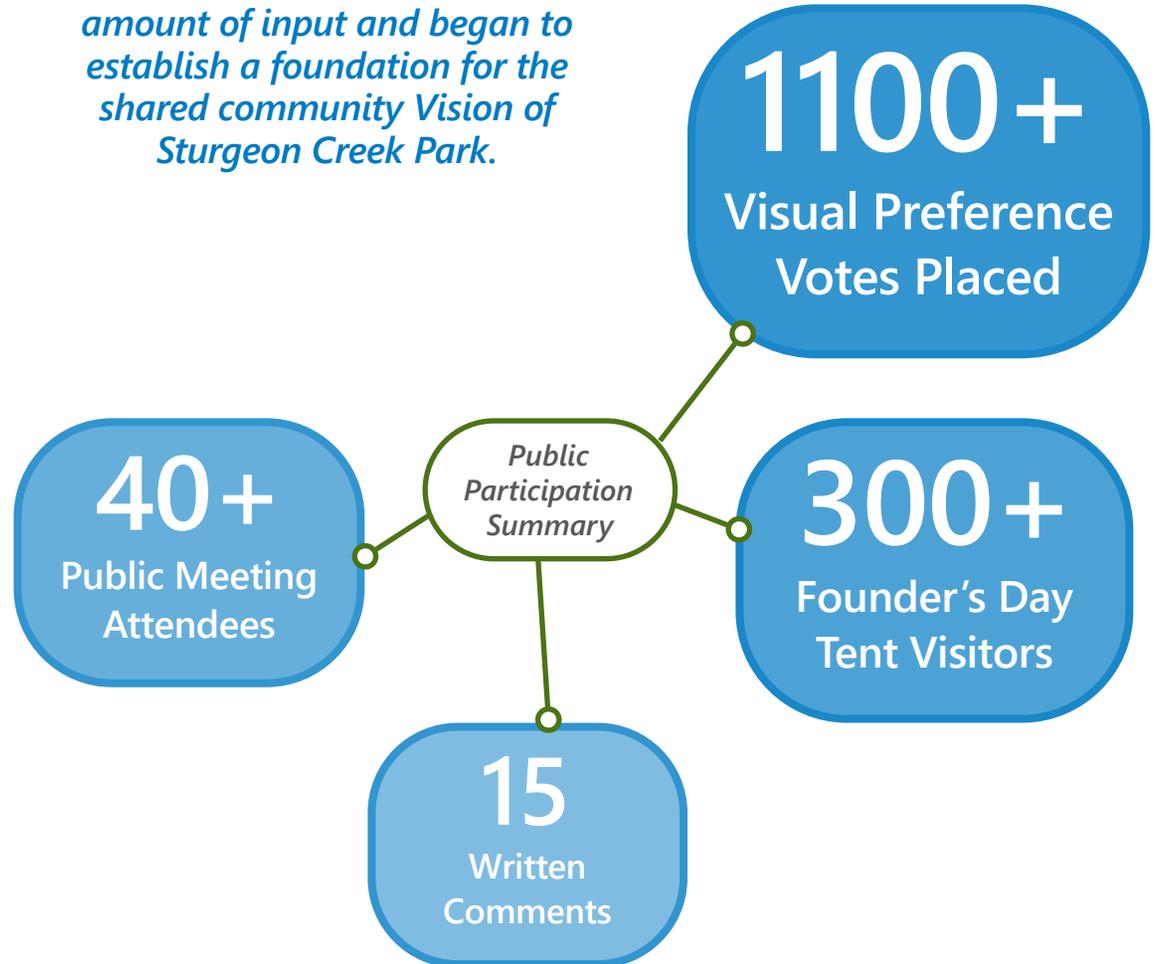
- **Recreation Activities**

- The image receiving the most dots was a picnic area next to a water feature. Also receiving a moderate number of dots was an image of a disc golf hole.

With interaction of over 350 residents through public meetings, special events, and online interaction, the project team was able to receive a substantial amount of input and began to establish a foundation for the shared community Vision of Sturgeon Creek Park.

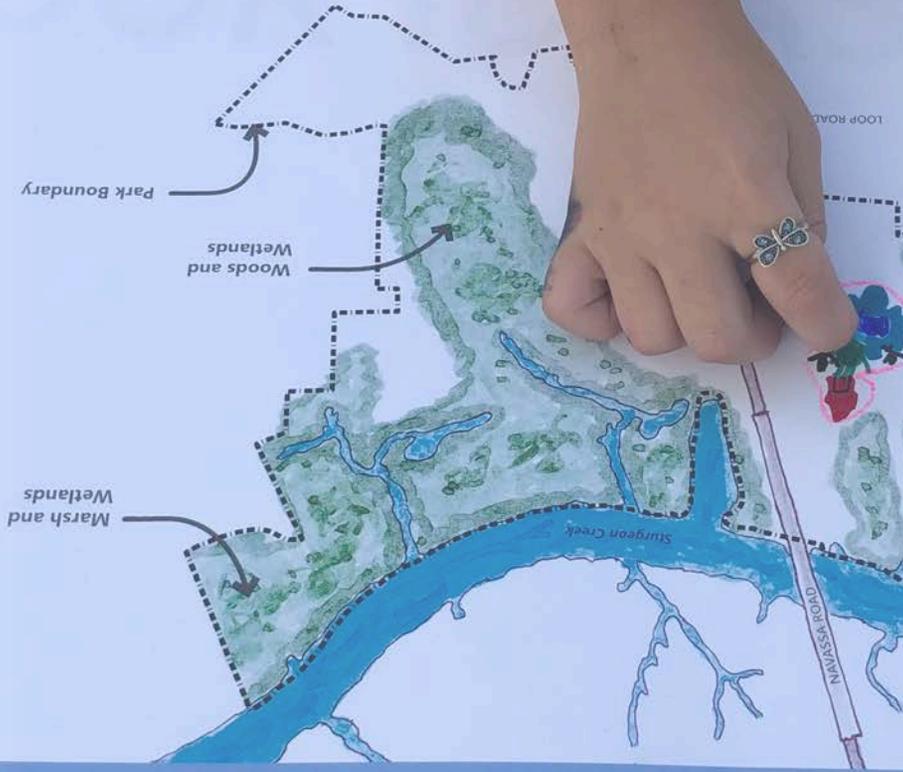
Engagement Summary

Forming the foundation of qualitative research, the public involvement effort of the Sturgeon Creek Park Master Plan process provides a snapshot of residents', stakeholders' and Town Officials' views of needs and priorities for the Sturgeon Creek Park.



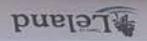
ARE

Town of Leland
Sturgeon Creek Park Master Plan



STURGEON CREEK PARK MASTER PLAN

DESIGN YOUR PARK !!
 Use the Crayons to Color What You
 Want to See Here



FINAL CONCEPT

Once the Public Involvement Phase was completed, the project team summarized all written comments, the results from the green dot exercises, and any notes taken during conversations with stakeholders and public participants. It was determined through the concept development process and discussions with Town Staff that the final concept should be based off of Form and Function Concept #1, with some modification.

After these discussions, the project team then developed a draft final concept, and presented this refined master plan to Town staff. The discussion also included insight into probable construction costs, necessary permits and regulatory concerns, and next steps to implementation of the motorized boat ramp element.

The project team also met with representatives from the NC Wildlife Resources Commission in order to discuss the feasibility of the master plan concept and the compatibility of the boat ramp design alternative within the plan. A copy of the draft concept was also sent to NCDOT for review. NCDOT provided guidance for the location of potential crosswalks and driveway cuts for park access.

Once all parties reviewed the concept and provided feedback, the project team proceeded with the final park concept for Sturgeon Creek Park.

The draft final concept includes the following programmatic and design elements:

- NC Wildlife motorized boat ramp and boat trailer parking (+/- 40 spaces), including a restroom and wash-down station adjacent to the boat ramp
- Nature center located closer to marshland area, with parking located further in the interior of the site
- Deck area adjacent to nature center with outdoor exhibits, seating space, and an outdoor education area
- Extensive network of walking trails through natural areas, utilizing boardwalks in wetlands and park areas and paved asphalt in upland areas
- Boardwalk system connected to the trail system, with potential future connections to adjacent areas
- Pedestrian bridge across Sturgeon Creek into Navassa on the east side of the bridge, connecting to Navassa's planned multi-use trail
- Paved multi-use path connecting south to the Gateway District along the west side of Navassa Road
- High-visibility crosswalk for pedestrians (Design to be determined by NCDOT pending traffic engineering study)
- Canoe/Kayak launch
- Relocation of existing lift station
- Playground with shelter adjacent to the nature center
- Marsh viewing areas, fishing piers, and an observation tower connected to the boardwalk system
- Flexible open spaces
- Gateway signage south of the bridge along Navassa Road
- Mural wall along Navassa Road to screen Nature Center parking
- Improved landscape elements and street trees throughout the site





4 IMPLEMENTATION PLAN

In order to advance the shared vision for Sturgeon Creek Park developed through the project process, implementation strategies must be defined and priorities established. The Implementation Plan for the park intends to provide the foundation to move this effort forward and realize the ideas for Leland's next Park. The Implementation Plan includes: an estimate of probable cost; achievable phasing strategies for construction; an evaluation of funding sources, including potential sources of alternative funding and strategic partnerships; and next steps for the implementation of Phase 1.

ESTIMATE OF PROBABLE COST

Cost Considerations

The cost estimates are based on current market trends, similar projects, and project-specific research conducted by the project team. The project team utilized all of its available resources and technical expertise to provide order-of-magnitude cost estimates that are for planning purposes only.

The vision for Sturgeon Creek Park may be modified over time in response to actual costs, future Town objectives, and available funding sources. Additionally, it is recommended that proposed improvements undergo a detailed feasibility and costs analysis prior to physical implementation.

Cost Estimates

The tables two the following page detail the overall estimate of probable cost for Sturgeon Creek Park, including design and permitting fees, contingency and estimated probable cost of the motorized boat ramp provided by NC Wildlife



STURGEON CREEK PARK MASTER PLAN

Order of Magnitude Estimate of Probable Capital Improvement Costs December 2019)

	Unit	Quantity	Unit Cost	Subtotal	Description	
Sturgeon Creek Park - 7 Acres Disturbed						
A. Site Work						
1	Mobilization and General Conditions	lump sum	1	\$50,000.00	\$50,000	total for all phases of construction
2	Survey and Layout	lump sum	1	\$30,000.00	\$30,000	
3	Site Clearing	acre	7.0	\$8,000.00	\$56,000	clear and grub - approximately 7 Acres of site
4	Site Grading Including On-Site Balancing	acre	7.0	\$12,000.00	\$84,000	grading, balancing, fine grading
5	Erosion Control / Wattle / Diversions	each	5	\$8,000.00	\$40,000	silt fence, control wattle, diversions, total for all phases of construction
6	Erosion Control / Skimmer Basin	each	5	\$8,000.00	\$40,000	total for all phases of construction
7	Construction Entrance	each	5	\$5,000.00	\$25,000	total for all phases of construction
8	Demolition	allowance	1	\$10,000.00	\$10,000	existing concrete pads
	Subtotal:				\$335,000	
B. Utilities						
1	Sanitary Service Supply	allowance	2	\$25,000.00	\$50,000	new 6" service, manholes, pipes, testing
2	Water Service Supply - New Main	allowance	2	\$50,000.00	\$100,000	new 4" main, valves, pipes, testing, taps
3	Water Service Supply - New Domestic	allowance	2	\$26,000.00	\$52,000	new 2" dom serv, hydrants, rbbp (2), new 8" fire serv
4	Electrical Service Supply	allowance	2	\$20,000.00	\$40,000	transformers, conduits, meters, upgrades & relocations
5	Stormwater System	allowance	1	\$100,000.00	\$100,000	inlets, boxes, piping, outfalls, culverts, misc. rock liners
6	Lighting- Pedestrian	each	20	\$6,500.00	\$130,000	12' lamp height, decorative poles, foundation, conduit
7	Lighting - Parking	each	4	\$12,500.00	\$50,000	14-16' lamp height, decorative poles, foundation, conduit
	Subtotal:				\$522,000	
C. Buildings and Structures						
1	Picnic Shelter - Family	each	2	\$25,000	\$50,000	12' x 12' prefabricated (or comparable)
2	Picnic Shelter - Group	each	1	\$40,000	\$40,000	12' x 24' prefabricated (or comparable)
3	Picnic Shelter w/Restroom	allowance	1	\$180,000	\$180,000	800 SF, restrooms and pavilion
	Subtotal:				\$270,000	
D. NC Wildlife Boat Ramp						
1	Option A: Conventional Asphalt Parking	each	1	\$540,000	\$540,000	ramp, dock, vinyl walls, dredging, and parking lot
2	Option B: 50% Pervious Pavement	each	1	\$740,000	\$740,000	ramp, dock, vinyl walls, dredging, and parking lot
	Subtotal:				See options	
E. Nature Center						
1	Nature Center Building	sq ft	2,500	\$300.00	\$750,000	2,500 SF, deck and outdoor exhibits, office, classroom, restrooms
	Subtotal:				\$750,000	
F. Park Elements						
1	Playground	allowance	1	\$80,000.00	\$80,000	inclusive, nature or climbing based
2	Resilient Surfacing	sq ft	5,000	\$13.00	\$65,000	poured in place, rubber, decorative pattern
3	Wayfinding and Signage	allowance	1	\$75,000.00	\$75,000	informational, directional, regulatory, trail
4	Site Furnishings	allowance	1	\$60,000.00	\$60,000	tables, benches, trash receptacles, drinking fountains, etc.
5	High Boardwalk	ln ft	3,000	\$750.00	\$2,250,000	14' wide with railings
6	Low Boardwalk	ln ft	350	\$450.00	\$157,500	10' wide, no railings
7	Canoe Kayak Launch	allowance	1	\$20,000.00	\$20,000	new concrete or comparable material, accessible launch
8	Fishing Piers	sq ft	2,600	\$40.00	\$104,000	deck on pilings with railings
9	Observation Tower	allowance	1	\$250,000.00	\$250,000	2-3 stories, wooden structure, design TBD
10	Public Art	allowance	1	\$75,000.00	\$75,000	mural wall
	Subtotal:				\$3,136,500	
G. Hardscape						
1	Sidewalks	sq ft	12,750	\$5.00	\$63,750	6' wide concrete
2	Parking / Vehicle Paving	sq yd	3,000	\$25.00	\$75,000	asphalt parking and new access drive
3	Curb & Gutter	ln ft	1,500	\$18.00	\$27,000	6" curb, 18" gutter
4	Concrete Pad	sq ft	1,000	\$8.00	\$8,000	benches, shelters, seating area
5	Multi-Use Trail	ln ft	4,200	\$20.00	\$84,000	10' wide asphalt
	Subtotal:				\$257,750	

H. Landscape						
1	General Landscape Improvements	allowance	1	\$50,000.00	\$50,000	trees, shrubs and ornamental plantings
		Subtotal:			\$50,000	
Sturgeon Creek Park Project Subtotal					\$5,321,250	
With Boat Ramp Option A Subtotal					\$5,861,250	
With Boat Ramp Option B Subtotal					\$6,061,250	
Construction Fees and Contingency		Base	A	B		
	Contingency (20%)	\$1,064,250	\$1,172,250	\$1,212,250		
	Design, Permitting & Inspection (18%)	\$957,825	\$1,055,025	\$1,697,150		
Construction Fees and Contingency Subtotal:		\$2,022,075	\$2,227,275	\$2,909,400		
TOTAL (Town of Leland Park):					\$7,343,325	
Total With NC Wildlife Boat Ramp Option A:					\$8,088,525	
Total With NC Wildlife Boat Ramp Option B:					\$8,970,650	

PHASING STRATEGIES

Overview

After the completion of the cost estimates, the project team met with Town staff to discuss the implementation and phasing strategies for Sturgeon Creek Park. During the implementation discussions, the Town was presented with graphic plans, overall cost estimates, and cost estimates for the each phase of the park. Discussions with Town Staff resulted in the development of five phases for the implementation of Sturgeon Creek Park.

The phases are intended to utilize current and future funding and be implemented as this funding becomes available. Phase 1 will be initiated upon completion of this Master Plan Study, and provide the Town with meaningful improvements that accomplish short-term goals while also setting the foundation for future park improvements. These five phases, along with their associated cost estimates, can be found on the following pages.

STURGEON CREEK PARK MASTER PLAN - PHASE 1
 Order of Magnitude Estimate of Probable Capital Improvement Costs December 2019)

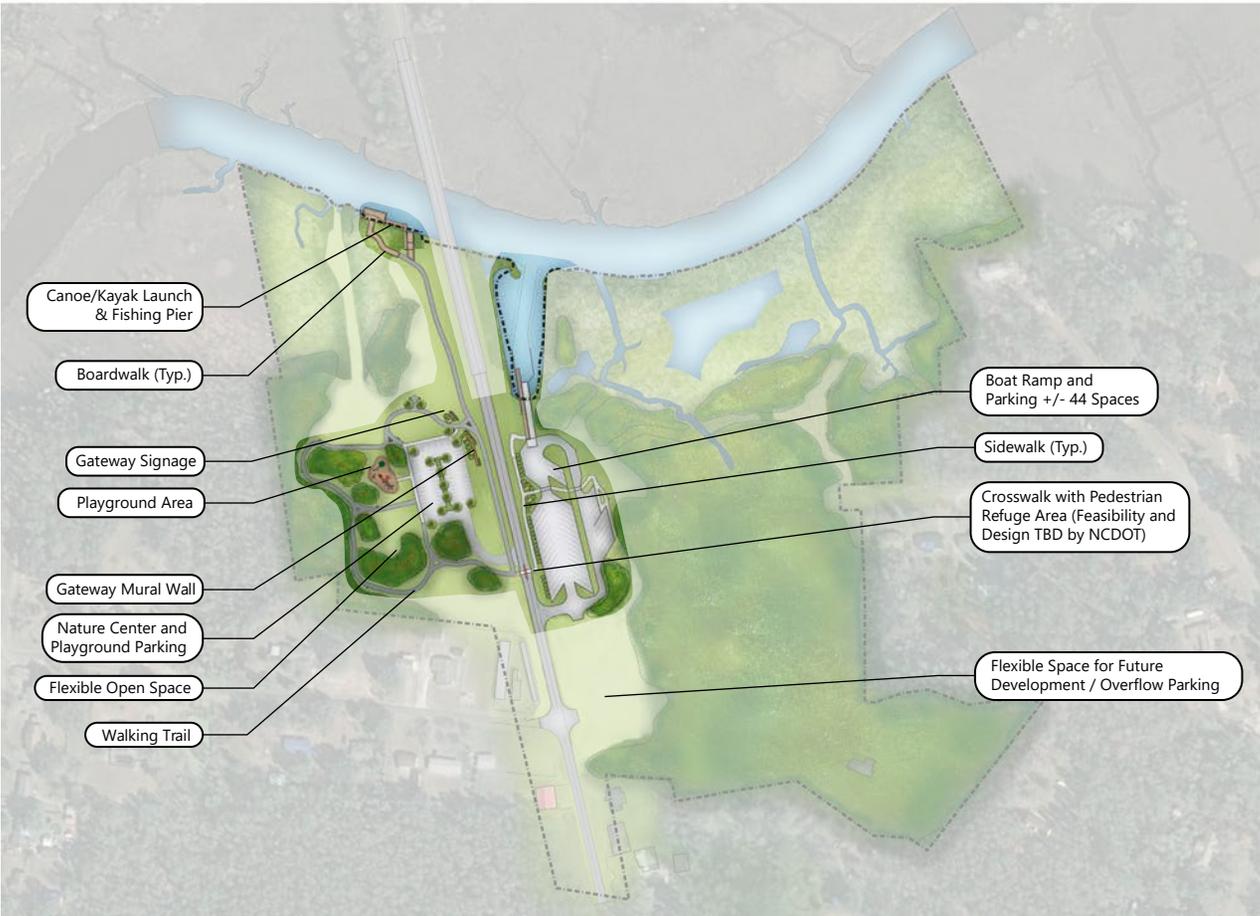
	Unit	Quantity	Unit Cost	Subtotal	Description
Sturgeon Creek Park - 2 Acres Disturbed					
A. Site Work					
1	Mobilization and General Conditions	lump sum	1	\$10,000.00	
2	Survey and Layout	lump sum	1	\$10,000.00	
3	Site Clearing	acre	2.0	\$8,000.00	clear and grub - approximately 2 Acres of site
4	Site Grading Including On-Site Balancing	acre	2.0	\$12,000.00	grading, balancing, fine grading
5	Erosion Control / Wattle / Diversions	allowance	1	\$8,000.00	silt fence, control wattle, diversions
6	Erosion Control / Skimmer Basin	each	1	\$8,000.00	
7	Construction Entrance	each	1	\$5,000.00	
8	Demolition	allowance	1	\$10,000.00	existing concrete pads
	Subtotal:			\$91,000	
B. Utilities					
1	Sanitary Service Supply	allowance	1	\$25,000.00	new 6" service, manholes, pipes, testing
2	Water Service Supply - New Main	allowance	1	\$50,000.00	new 4" main, valves, pipes, testing, taps
3	Water Service Supply - New Domestic	allowance	1	\$26,000.00	new 2" dom serv, hydrants, rbbp (2), new 8" fire serv
4	Electrical Service Supply	allowance	1	\$20,000.00	transformers, conduits, meters, upgrades & relocations
5	Stormwater System	allowance	1	\$30,000.00	inlets, boxes, piping, outfalls, culverts, misc. rock liners
	Subtotal:			\$151,000	
D. NC Wildlife Boat Ramp					
1	Option A: Conventional Asphalt Parking	each	1	\$540,000	ramp, dock, vinyl walls, dredging, and parking lot
2	Option B: 50% Pervious Pavement	each	1	\$740,000	ramp, dock, vinyl walls, dredging, and parking lot
	Subtotal:			See options	
F. Park Elements					
1	Playground	allowance	1	\$80,000.00	inclusive, nature or climbing based
2	Resilient Surfacing	sq ft	5,000	\$13.00	poured in place, rubber, decorative pattern
3	Wayfinding and Signage	allowance	1	\$8,000.00	informational, directional, regulatory, trail
4	Site Furnishings	allowance	1	\$12,000.00	benches, trash receptacles
5	High Boardwalk	ln ft	115	\$750.00	14' wide with railings
7	Canoe Kayak Launch	allowance	1	\$20,000.00	new concrete or comparable material, accessible launch
8	Fishing Piers	sq ft	1,300	\$40.00	deck on pilings with railings
9	Mural Wall - Phase 1	allowance	1	\$40,000.00	mural wall, north pieces
	Subtotal:			\$363,250	
G. Hardscape					
1	Sidewalks	sq ft	4,000	\$5.00	6' wide concrete
2	Parking / Vehicle Paving	sq yd	3,000	\$25.00	asphalt parking and new access drive
3	Curb & Gutter	ln ft	1,500	\$18.00	6" curb, 18" gutter
4	Concrete Pad	sq ft	140	\$8.00	benches
5	Multi-Use Trail	ln ft	2,300	\$20.00	10' wide asphalt
	Subtotal:			\$169,120	
H. Landscape					
1	General Landscape Improvements	allowance	1	\$10,000.00	trees, shrubs and ornamental plantings
	Subtotal:			\$10,000	
Sturgeon Creek Park Project Subtotal				\$784,370	
With Boatramp Option A Subtotal				\$1,324,370	
With Boatramp Option B Subtotal				\$1,524,370	

Construction Fees and Contingency	Base	A	B
Contingency (20%)	\$156,874	\$264,874	\$304,874
Design, Permitting & Inspection (18%)	\$141,187	\$238,387	\$426,824
Construction Fees and Contingency Subtotal:	\$298,061	\$503,261	\$731,698

TOTAL PHASE 1 (Town of Leland Park):	\$1,082,431
Total With NC Wildlife Boat Ramp Option A:	\$1,827,631
Total With NC Wildlife Boat Ramp Option B:	\$2,256,068

The **Phase 1** improvements for Sturgeon Creek Park include site work and demolition that begins to lay the foundation for future improvements and additions. Elements of Phase 1 include:

- NC Wildlife motorized Boat Ramp
- Utility service supply to the east side of the site in preparation for future additions
- Stormwater improvements
- Playground on west side of the site
- Walking trails throughout west side of the site
- Canoe/kayak launch
- Fishing pier on west side of the site with boardwalk connections
- Phase 1 of mural wall
- Sidewalk connections to major park elements
- Wayfinding, site amenities, and landscape improvements



STURGEON CREEK PARK MASTER PLAN - PHASE 2
 Order of Magnitude Estimate of Probable Capital Improvement Costs December 2019)

	Unit	Quantity	Unit Cost	Subtotal	Description
Sturgeon Creek Park - 1 Acre Disturbed					
A. Site Work					
1	Mobilization and General Conditions	lump sum	1	\$10,000.00	
2	Survey and Layout	lump sum	1	\$20,000.00	
3	Site Clearing	acre	1.0	\$8,000.00	clear and grub - approximately 7 Acres of site
4	Site Grading Including On-Site Balancing	acre	1.0	\$12,000.00	grading, balancing, fine grading
5	Erosion Control / Wattle / Diversions	allowance	1	\$8,000.00	silt fence, control wattle, diversions
6	Erosion Control / Skimmer Basin	each	1	\$8,000.00	
7	Construction Entrance	each	1	\$5,000.00	
Subtotal:				\$71,000	
B. Utilities					
5	Stormwater System	allowance	1	\$10,000.00	inlets, boxes, piping, outfalls, culverts, misc. rock liners
Subtotal:				\$10,000	
C. Buildings and Structures					
1	Picnic Shelter - Family	each	2	\$25,000	12' x 12' prefabricated (or comparable)
3	Picnic Shelter w/Restroom	allowance	1	\$180,000	800 SF, restrooms and pavilion
Subtotal:				\$230,000	
F. Park Elements					
3	Wayfinding and Signage	allowance	1	\$8,000.00	informational, directional, regulatory, trail
4	Site Furnishings	allowance	1	\$10,000.00	tables, benches, trash receptacles, drinking fountains, etc.
5	High Boardwalk	ln ft	500	\$750.00	14' wide with railings
8	Fishing Piers	sq ft	1,300	\$40.00	deck on pilings with railings
10	Public Art	allowance	1	\$35,000.00	mural wall
Subtotal:				\$480,000	
G. Hardscape					
5	Multi-Use Trail	ln ft	250	\$20.00	10' wide asphalt
Subtotal:				\$5,000	
H. Landscape					
1	General Landscape Improvements	allowance	1	\$10,000.00	trees, shrubs and ornamental plantings
Subtotal:				\$10,000	
Sturgeon Creek Park Project Subtotal				\$806,000	
Construction Fees and Contingency					
			Base		
Contingency (20%)				\$161,200	
Design, Permitting & Inspection (18%)				\$145,080	
Construction Fees and Contingency Subtotal:				\$306,280	
TOTAL PHASE 2:				\$1,112,280	

The **Phase 2** improvements for Sturgeon Creek Park continue the improvements in Phase 1 by adding the following elements:

- Restroom and shelter at the motorized boat launch
- Stormwater improvements
- Fishing pier and boardwalk connection on the east side of the site
- Covered pavilion on both fishing piers
- Completion of the mural wall on the west side of the site
- Wayfinding, site amenities, and landscape improvements





STURGEON CREEK PARK MASTER PLAN - PHASE 3

Order of Magnitude Estimate of Probable Capital Improvement Costs December 2019)

		Unit	Quantity	Unit Cost	Subtotal	Description
Sturgeon Creek Park - 1 Acre Disturbed						
A. Site Work						
1	Mobilization and General Conditions	lump sum	1	\$10,000.00	\$10,000	total for all phases of construction
3	Site Clearing	acre	1.0	\$8,000.00	\$8,000	clear and grub - approximately 7 Acres of site
4	Site Grading Including On-Site Balancing	acre	1.0	\$12,000.00	\$12,000	grading, balancing, fine grading
5	Erosion Control / Wattle / Diversions	each	1	\$8,000.00	\$8,000	silt fence, control wattle, diversions, total for all phases of construction
6	Erosion Control / Skimmer Basin	each	1	\$8,000.00	\$8,000	total for all phases of construction
7	Construction Entrance	each	1	\$5,000.00	\$5,000	total for all phases of construction
Subtotal:					\$51,000	
B. Utilities						
1	Sanitary Service Supply	allowance	1	\$25,000.00	\$25,000	new 6" service, manholes, pipes, testing
2	Water Service Supply - New Main	allowance	1	\$50,000.00	\$50,000	new 4" main, valves, pipes, testing, taps
3	Water Service Supply - New Domestic	allowance	1	\$26,000.00	\$26,000	new 2" dom serv, hydrants, rbbp (2), new 8" fire serv
4	Electrical Service Supply	allowance	1	\$20,000.00	\$20,000	transformers, conduits, meters, upgrades & relocations
5	Stormwater System	allowance	1	\$40,000.00	\$40,000	inlets, boxes, piping, outfalls, culverts, misc. rock liners
Subtotal:					\$161,000	
E. Nature Center						
1	Nature Center Building	sq ft	2,500	\$300.00	\$750,000	2,500 SF, deck and outdoor exhibits, office, classroom, restrooms
Subtotal:					\$750,000	
F. Park Elements						
3	Wayfinding and Signage	allowance	1	\$5,000.00	\$5,000	informational, directional, regulatory, trail
4	Site Furnishings	allowance	1	\$10,000.00	\$10,000	tables, benches, trash receptacles, drinking fountains, etc.
Subtotal:					\$15,000	
G. Hardscape						
5	Multi-Use Trail	in ft	100	\$20.00	\$2,000	10' wide asphalt
Subtotal:					\$2,000	
H. Landscape						
1	General Landscape Improvements	allowance	1	\$5,000.00	\$5,000	trees, shrubs and ornamental plantings
Subtotal:					\$5,000	
Sturgeon Creek Park Project Subtotal					\$984,000	
Construction Fees and Contingency						
				Base		
				Contingency (20%)	\$196,800	
				Design, Permitting & Inspection (18%)	\$177,120	
Construction Fees and Contingency Subtotal:					\$373,920	
TOTAL PHASE 3:					\$1,357,920	

The **Phase 3** improvements for Sturgeon Creek Park focus primarily on the construction of the Nature Center, including:

- Utility service supply to the west side of the site
- Nature Center building
- Wayfinding, site amenities, and landscape improvements





STURGEON CREEK PARK MASTER PLAN - PHASE 4

Order of Magnitude Estimate of Probable Capital Improvement Costs December 2019)

	Unit	Quantity	Unit Cost	Subtotal	Description	
Sturgeon Creek Park - 1 Acre Disturbed						
A. Site Work						
1	Mobilization and General Conditions	lump sum	1	\$10,000.00	\$10,000	total for all phases of construction
3	Site Clearing	acre	1.0	\$8,000.00	\$8,000	clear and grub - approximately 7 Acres of site
4	Site Grading Including On-Site Balancing	acre	1.0	\$12,000.00	\$12,000	grading, balancing, fine grading
5	Erosion Control / Wattle / Diversions	each	1	\$8,000.00	\$8,000	silt fence, control wattle, diversions, total for all phases of construction
6	Erosion Control / Skimmer Basin	each	1	\$8,000.00	\$8,000	total for all phases of construction
7	Construction Entrance	each	1	\$5,000.00	\$5,000	total for all phases of construction
Subtotal:					\$51,000	
B. Utilities						
5	Stormwater System	allowance	1	\$20,000.00	\$20,000	inlets, boxes, piping, outfalls, culverts, misc. rock liners
6	Lighting - Pedestrian	each	20	\$6,500.00	\$130,000	12' lamp height, decorative poles, foundation, conduit
7	Lighting - Parking	each	4	\$12,500.00	\$50,000	14-16' lamp height, decorative poles, foundation, conduit
Subtotal:					\$200,000	
C. Buildings and Structures						
2	Picnic Shelter - Group	each	1	\$40,000	\$40,000	12' x 24' prefabricated (or comparable)
Subtotal:					\$40,000	
F. Park Elements						
3	Wayfinding and Signage	allowance	1	\$25,000.00	\$25,000	informational, directional, regulatory, trail
4	Site Furnishings	allowance	1	\$15,000.00	\$15,000	tables, benches, trash receptacles, drinking fountains, etc.
5	High Boardwalk	ln ft	400	\$750.00	\$300,000	14' wide with railings
6	Low Boardwalk	ln ft	350	\$450.00	\$157,500	10' wide, no railings
Subtotal:					\$497,500	
G. Hardscape						
1	Sidewalks	sq ft	8,750	\$5.00	\$43,750	6' wide concrete
4	Concrete Pad	sq ft	860	\$8.00	\$6,880	benches, shelters, seating area
5	Multi-Use Trail	ln ft	1,550	\$20.00	\$31,000	10' wide asphalt
Subtotal:					\$81,630	
H. Landscape						
1	General Landscape Improvements	allowance	1	\$25,000.00	\$25,000	trees, shrubs and ornamental plantings
Subtotal:					\$25,000	
Sturgeon Creek Park Project Subtotal					\$895,130	
Construction Fees and Contingency						
			Base			
			Contingency (20%)	\$179,026		
			Design, Permitting & Inspection (18%)	\$161,123		
Construction Fees and Contingency Subtotal:					\$340,149	
TOTAL PHASE 4:					\$1,235,279	

The **Phase 4** improvements for Sturgeon Creek Park complete a the majority of the park, providing additional amenities and pedestrian connections to the adjacent neighborhoods. Elements of Phase 4 include:

- Large group shelter at playground
- Stormwater improvements
- Completion of all sidewalks and multi-use trails
- Boardwalk connection from Nature Center to fishing pier
- Lighting in parking lot and along trails
- Wayfinding, site amenities
- Completion of landscaping installation

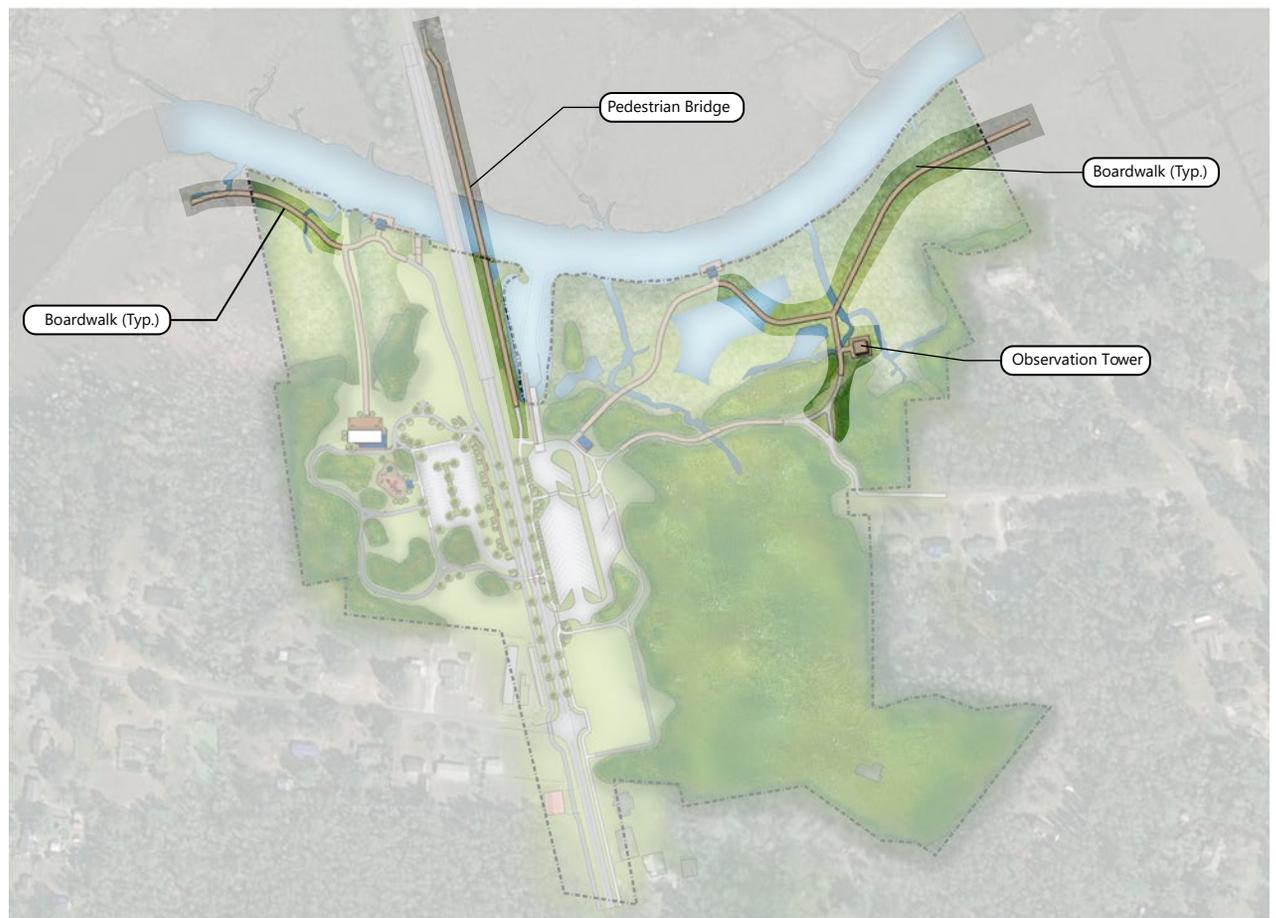


STURGEON CREEK PARK MASTER PLAN - PHASE 5
 Order of Magnitude Estimate of Probable Capital Improvement Costs December 2019)

	Unit	Quantity	Unit Cost	Subtotal	Description	
Sturgeon Creek Park - 2 Acres Disturbed						
A. Site Work						
1	Mobilization and General Conditions	lump sum	1	\$10,000.00	\$10,000	total for all phases of construction
3	Site Clearing	acre	2.0	\$8,000.00	\$16,000	clear and grub - approximately 7 Acres of site
4	Site Grading Including On-Site Balancing	acre	2.0	\$12,000.00	\$24,000	grading, balancing, fine grading
5	Erosion Control / Wattle / Diversions	each	1	\$8,000.00	\$8,000	silt fence, control wattle, diversions, total for all phases of construction
6	Erosion Control / Skimmer Basin	each	1	\$8,000.00	\$8,000	total for all phases of construction
7	Construction Entrance	each	1	\$5,000.00	\$5,000	total for all phases of construction
Subtotal:					\$71,000	
F. Park Elements						
3	Wayfinding and Signage	allowance	1	\$29,000.00	\$29,000	informational, directional, regulatory, trail
4	Site Furnishings	allowance	1	\$13,000.00	\$13,000	tables, benches, trash receptacles, drinking fountains, etc.
5	High Boardwalk	ln ft	1,985	\$750.00	\$1,488,750	14' wide with railings
9	Observation Tower	allowance	1	\$250,000.00	\$250,000	2-3 stories, wooden structure, design TBD
Subtotal:					\$1,780,750	
Sturgeon Creek Park Project Subtotal					\$1,851,750	
Construction Fees and Contingency						
			Base			
			Contingency (20%)	\$370,350		
			Design, Permitting & Inspection (18%)	\$333,315		
Construction Fees and Contingency Subtotal:					\$703,665	
TOTAL PHASE 5:					\$2,555,415	

The **Phase 5** improvements for Sturgeon Creek Park include long-range visionary elements such as:

- Additional boardwalk connections to park boundaries and adjacent areas
- Pedestrian bridge to Navassa
- Observation tower
- Additional site furnishings, wayfinding and signage for new elements



FUNDING RECOMMENDATIONS

Next Steps

The Implementation of the Sturgeon Creek Park Master Plan, and in particular Phase 1, will require coordination between multiple agencies. The inclusion of the NC Wildlife motorized boat ramp, and the presence of an NCDOT road through the two halves of the site will make coordination between these two agencies critical to the success of Phase 1. In order to initiate the implementation of Phase 1 and leverage the most available funding possible, the project team recommends the following next steps for the Sturgeon Creek Park Project:

- Continue to coordinate with NC Wildlife to secure funding and establish construction schedule for motorized boat ramp.
- Complete Brownfields Program application and begin cleanup of the area of the park that previously housed the junkyard site.
- Explore options for available grants that could be used towards Phase 1 improvements at Sturgeon Creek Park. Potential grants that could be applied for to assist with this particular project include:
 - Parks and Recreation Trust Fund Grant (PARTF)
 - Land and Water Conservation Fund Grant (LWCF)
 - Clean Water Management Trust Fund
- NC Department of Environmental Quality (DEQ) Clean Water State Revolving Fund (SRF)
- DEQ Water Resource Development Grant Program
- US Department of Agriculture (USDA) Urban and Community Forestry Assistance Program
- USDA Watershed Protection and Flood Prevention
- USDA Wetlands Reserve Program
- Potential grants to be used for the dredging and installation of the boat ramp (coordinate with NC wildlife)
- Explore partnership and funding opportunities for environmental education facilities and programs that focus on wetlands, conservation, water quality, and other elements unique to the Sturgeon Creek Park context.
- Continue to garner support for the implementation of Sturgeon Creek Park by keeping key stakeholders updated on the process and engaging the public as major milestones are achieved.





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