



# DUCK TRAIL FEASIBILITY STUDY

November 29, 2023

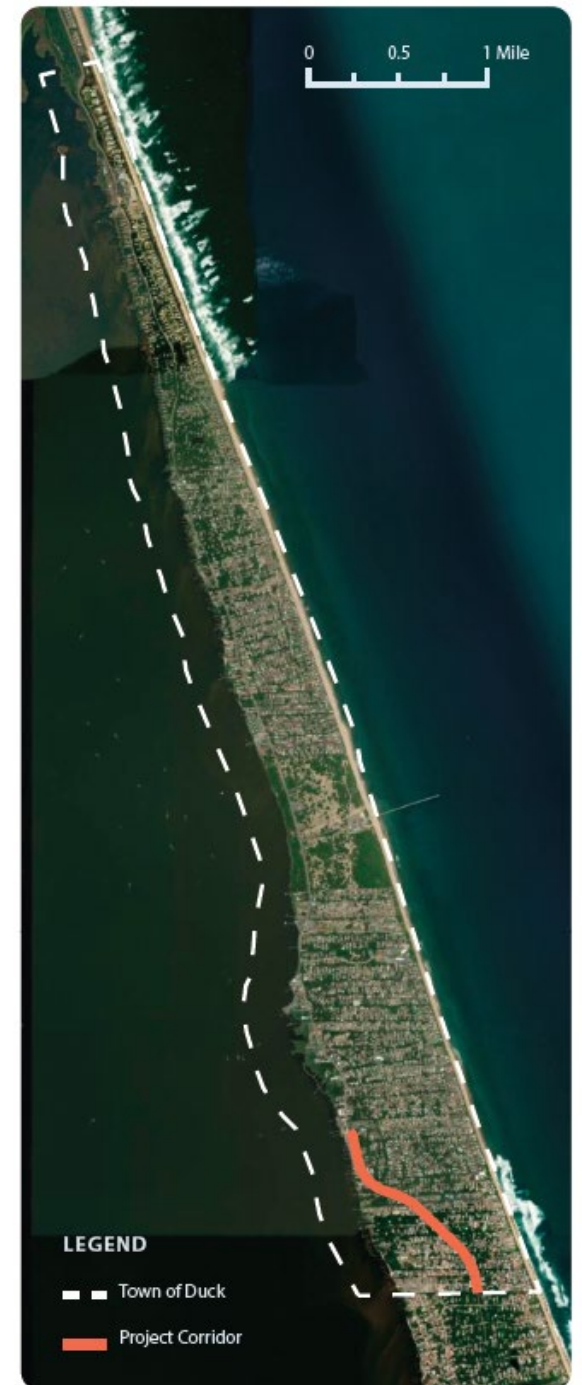


# Duck Trail Feasibility Study

## Overview:

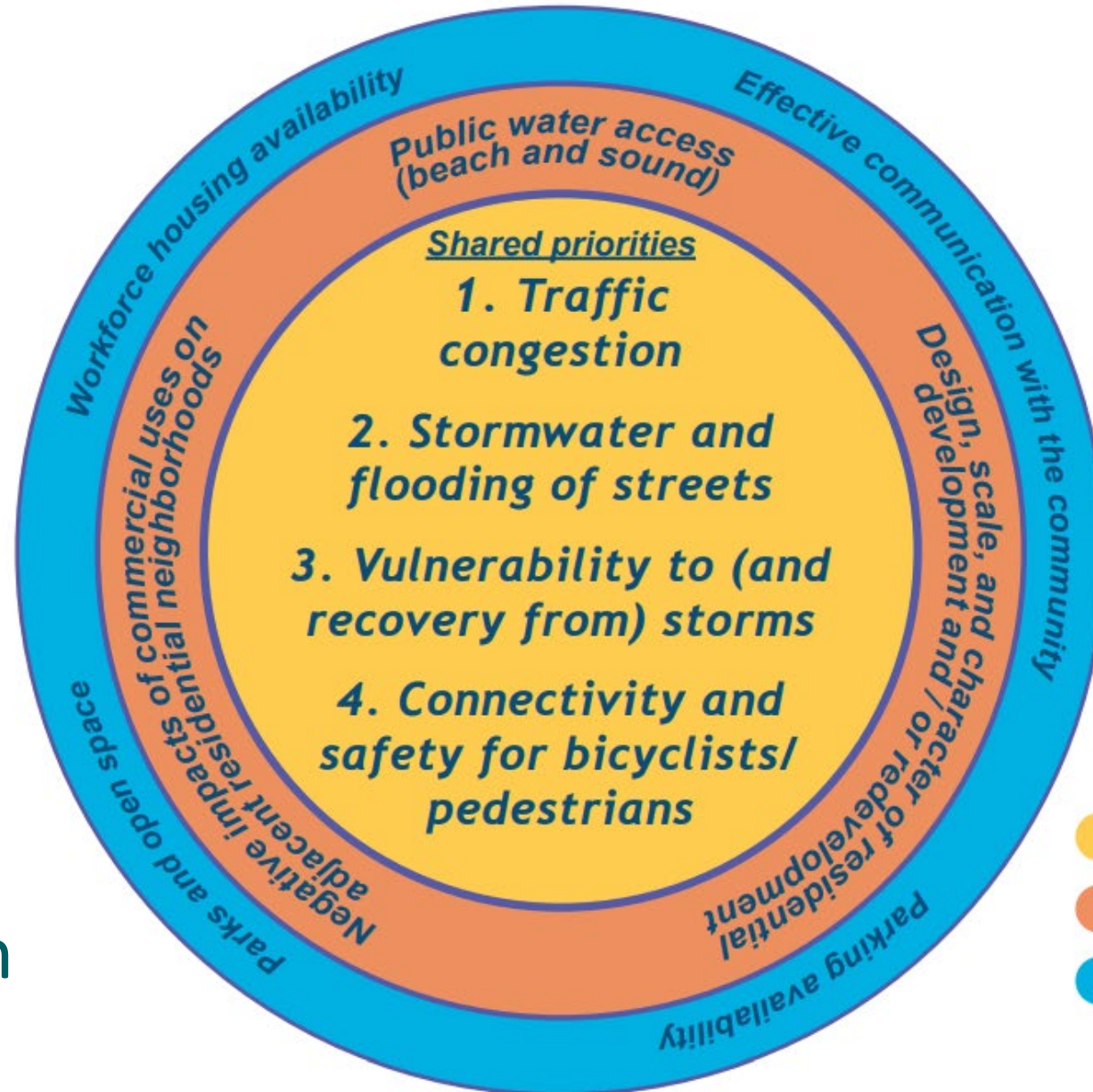
*The proposed shared use trail project is working to connect the Duck village to the Southern Shores border along the Route NC12 corridor.*

*This project will address missing infrastructure on the westbound side of Route NC12, and further promote pedestrian and bicycle connectivity as identified in the **2014 Comprehensive Pedestrian Plan**, the **2020 Comprehensive CAMA Land Use Plan**, and a stated goal in the **Duck 2032 Vision Statement**.*



Q4:

What are the top challenges for Duck?

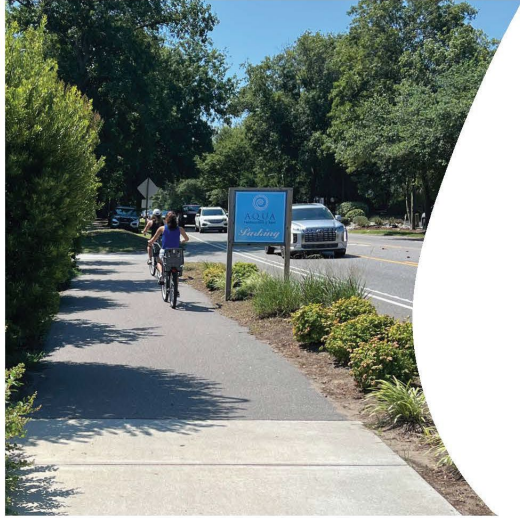


- Top Priority
- Second Priority
- Third Priority

2021 Comprehensive  
and CAMA Land Use Plan  
Polling Results



# Duck Trail Feasibility Study - Goals



- ✓ **Advance Roadway Safety.** Through the development of the shared use trail, pedestrians and bicyclists will be removed from the roadway and given a separate space. This will allow for safer mobility options for all users.
- ✓ **Improve Stormwater Management.** The multi-use trail alternatives have been designed to consider the environmental constraints along Route NC12. The overall designs strive to advance and improve stormwater management strategies.
- ✓ **Introduce Alternative Modes of Transit.** By developing the shared-use trail, residents will be provided with new infrastructure that will allow them to walk or bicycle to the village. Thus, creating more opportunities for increased mobility options that were unavailable before.
- ✓ **Provide Connectivity.** One of the primary objectives associated with the project is to provide Duck residents with a safe means to access the town village. Through providing this access, residents will have increased transit and mobility options.



# Duck Trail Feasibility Study: Design Criteria

**Table 1. General**

Facet	Reference
<ul style="list-style-type: none"> <li>Functional Classification NC 12: <ul style="list-style-type: none"> <li>Major Collector (for all of NC 12 north of Seahawk Dr.)</li> <li>ADT 3,900 vpd (2012)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><a href="http://ncdot.maps.arcgis.com/home/">http://ncdot.maps.arcgis.com/home/</a> (July 13, 2015)</li> </ul>
<ul style="list-style-type: none"> <li>Traffic Control</li> </ul>	<ul style="list-style-type: none"> <li>FHWA, 2009 Manual of Uniform Traffic Control Devices (MUTCD)<sup>1</sup></li> </ul>
<ul style="list-style-type: none"> <li>Drainage and Stormwater Management – BMP's sized to treat or by-pass 10 year, 24-hour storm</li> </ul>	<ul style="list-style-type: none"> <li>NCDOT, Roadway Design Manual, Chapter 5<sup>2</sup></li> <li>NCDENR</li> </ul>
<ul style="list-style-type: none"> <li>Inlet Tops and Grates- Grates need to be replaced so that openings are perpendicular to bike travel ways and sidewalks.</li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide<sup>3</sup></li> <li>ADA<sup>4</sup></li> </ul>

**Table 2. Shared-Use Path**

Criteria: Shared Use Path	Reference
<ul style="list-style-type: none"> <li>Design Speed (D) – Adjoining Street <ul style="list-style-type: none"> <li>25-35 mph</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>As Posted</li> </ul>
<ul style="list-style-type: none"> <li>Design Speed (D) - Path <ul style="list-style-type: none"> <li>20 mph</li> <li>20MPH (minimum) Grades &lt;4%</li> <li>30MPH (minimum) Grades &lt;4%</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide</li> </ul>
<ul style="list-style-type: none"> <li>Radius Horizontal Curve <ul style="list-style-type: none"> <li>107 feet minimum</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide</li> </ul>
<ul style="list-style-type: none"> <li>Superelevation/ Cross Slope <ul style="list-style-type: none"> <li>2%</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>ADA</li> </ul>
<ul style="list-style-type: none"> <li>Stopping Sight Distance <ul style="list-style-type: none"> <li>115 feet</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Road Design<sup>5</sup></li> </ul>
<ul style="list-style-type: none"> <li>Profile Grade <ul style="list-style-type: none"> <li>5% (or maximum of adjoining roadway)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>ADA</li> <li>PROWAG<sup>6</sup></li> </ul>
<ul style="list-style-type: none"> <li>Length Vertical Curve– for Bikes <ul style="list-style-type: none"> <li>Sag – 175 feet</li> <li>Crest – 50 feet</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Road Design</li> </ul>
<ul style="list-style-type: none"> <li>Typical Section <ul style="list-style-type: none"> <li>Pavement width 10 ft.</li> <li>Shoulder width 2 feet min, 3-5 feet ideal @1'V:6'H or flatter</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide</li> </ul>
<ul style="list-style-type: none"> <li>Clear Zone (for Path) <ul style="list-style-type: none"> <li>2 feet</li> <li>5 feet (inc. shoulder)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide</li> <li>NCDOT Complete Streets Planning and Design Guidelines<sup>7</sup></li> </ul>
<ul style="list-style-type: none"> <li>Clear Zone (for vehicle lane) <ul style="list-style-type: none"> <li>8 feet with curb</li> <li>14 feet without curb</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>NCDOT Complete Streets Planning and Design Guidelines</li> </ul>
<ul style="list-style-type: none"> <li>Vertical clearance <ul style="list-style-type: none"> <li>10 feet for bicyclists</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide, p. 3-3</li> </ul>
<ul style="list-style-type: none"> <li>Lateral Clearance, Horizontal Curves <ul style="list-style-type: none"> <li>2 feet</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide</li> </ul>
<ul style="list-style-type: none"> <li>Bridges <ul style="list-style-type: none"> <li>Width same as paved approach, plus 2 ft. clear area on each side</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide</li> </ul>
<ul style="list-style-type: none"> <li>Railing <ul style="list-style-type: none"> <li>54" high preferred, 48" min</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide</li> </ul>

**Table 3. Bike Lanes**

Location/Element	Style/Dimensions	Reference
<ul style="list-style-type: none"> <li>South of Aqua Crossing to 1168 Duck Road</li> </ul>	<ul style="list-style-type: none"> <li>Paved Shoulder – 4 feet min</li> </ul>	<ul style="list-style-type: none"> <li>AASHTO Bike Guide</li> <li>NCDOT Complete Streets Guidelines</li> <li>Duck Ped Plan</li> </ul>
<ul style="list-style-type: none"> <li>Markings</li> </ul>	<ul style="list-style-type: none"> <li>Add bike markings</li> </ul>	<ul style="list-style-type: none"> <li>Duck Ped Plan</li> </ul>

**Table 4. Crosswalks**

Location	Style/Dimensions	Reference
<ul style="list-style-type: none"> <li>Route 12 crossings with refuges</li> </ul>	<ul style="list-style-type: none"> <li>24 inch bar type- 24 inch space – 12 feet wide</li> <li>With lighting</li> </ul>	<ul style="list-style-type: none"> <li>MUTCD</li> <li>Duck Ped Plan</li> </ul>
<ul style="list-style-type: none"> <li>Route 12 crossings, no refuge</li> </ul>	<ul style="list-style-type: none"> <li>24 inch bar type- 24 inch space – 10 feet wide</li> <li>With lighting</li> </ul>	<ul style="list-style-type: none"> <li>MUTCD</li> <li>Duck Ped Plan</li> </ul>
<ul style="list-style-type: none"> <li>Side Streets</li> </ul>	<ul style="list-style-type: none"> <li>24 inch bar type- 24 inch space – 10 feet wide</li> <li>With lighting</li> </ul>	<ul style="list-style-type: none"> <li>MUTCD</li> <li>Duck Ped Plan</li> </ul>
<ul style="list-style-type: none"> <li>Driveways</li> </ul>	<ul style="list-style-type: none"> <li>Need pavement if a gravel driveway</li> <li>Otherwise – no treatment required</li> </ul>	<ul style="list-style-type: none"> <li>ADA</li> <li>NCDOT driveway aprons<sup>11</sup></li> </ul>

**Table 5. Driveways**

Location/Element	Style/Dimensions	Reference
<ul style="list-style-type: none"> <li>Plan view</li> </ul>	<ul style="list-style-type: none"> <li>Unique to each existing driveway</li> </ul>	
<ul style="list-style-type: none"> <li>Surface</li> </ul>	<ul style="list-style-type: none"> <li>Match existing pavement</li> <li>Concrete preferred for new.</li> </ul>	
<ul style="list-style-type: none"> <li>Slope crossing sidewalk</li> </ul>	<ul style="list-style-type: none"> <li>2% Max preferred</li> <li>5% Max in retro-fit areas with steep driveways</li> </ul>	<ul style="list-style-type: none"> <li>ADA</li> <li>PROWAG</li> </ul>
<ul style="list-style-type: none"> <li>Vertical Curves/Algebraic change (A)</li> </ul>	<ul style="list-style-type: none"> <li>No Vertical Curve if A&lt;7%</li> </ul>	<ul style="list-style-type: none"> <li>NCDOT Standard, Drawing 848.02, sheet 2 of 2</li> </ul>
<ul style="list-style-type: none"> <li>Curbs</li> </ul>	<ul style="list-style-type: none"> <li>Wipe down 2 feet from sidewalk on private property side</li> </ul>	<ul style="list-style-type: none"> <li>Sidewalk clear zone</li> </ul>

**Table 6. Retaining Walls**

Location/Element	Style/Dimensions	Reference
<ul style="list-style-type: none"> <li>Materials</li> </ul>	<ul style="list-style-type: none"> <li>Pressure treated timber</li> </ul>	<ul style="list-style-type: none"> <li>Matches existing</li> </ul>
<ul style="list-style-type: none"> <li>Construction type</li> </ul>	<ul style="list-style-type: none"> <li>Driven sheets with piles and wales exposed</li> </ul>	<ul style="list-style-type: none"> <li>Matches existing</li> </ul>



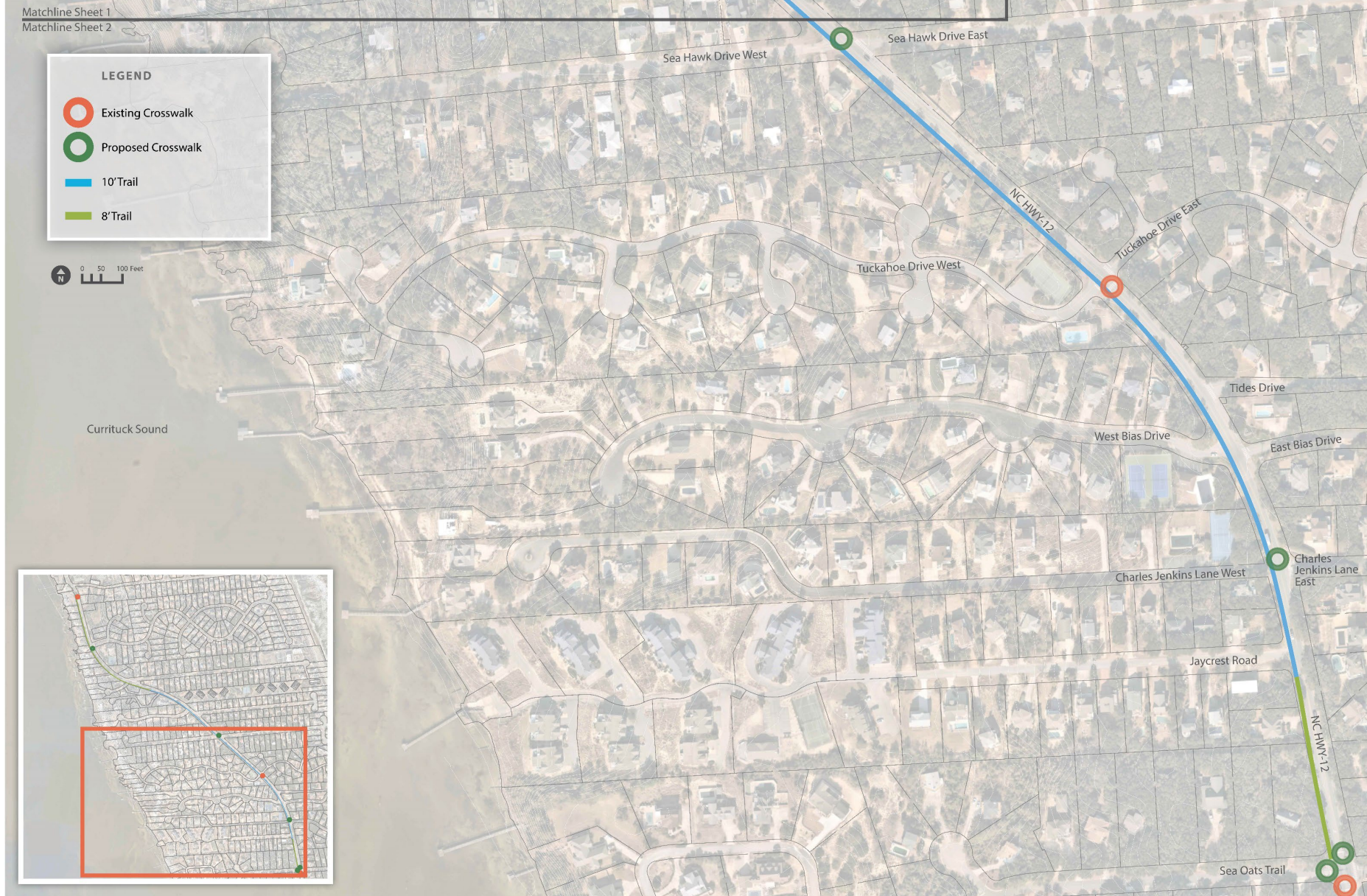
# Duck Trail Feasibility Study – Project Schedule

- *Project Initiation - Summer 2023*
- *Site Review and Constraints Analysis – Summer/Fall 2023*
- *Fall Public Open House – November 2023*
- *Individual Stakeholder Meetings – Winter 2023/2024*
- *Presentation to Town Council Retreat – February 2024*
- *Final Design and Construction – TBD by Funding Sources*











# Segment 1: Existing Conditions

Segment one, approximately 350 feet long, stretches from the crosswalk/sidewalk directly in front of Aqua to the residence located at 1170 Duck Rd. In total, this segment includes one commercial property and two residential adjacent properties.

## Sidewalk Connection

In front of Aqua there is an existing sidewalk that terminates at an intersection that crosses NC Hwy-12 to the east and guides guests to the business under ample shade. The sidewalk is bordered on both sides with retained landscape areas that contain trees and ornamental plantings.

## Visibility and Clearance

In front of Aqua, the existing shrubs may require removal. As one moves south past the residential properties, vegetation encroaching on the right-of-way may require clearing, pruning, or removal depending on the density and growth habit of the existing plants. Additionally, there exists a center turn lane in this segment that reduces the available width to design within the right-of-way.

## Utilities

Utility lines run parallel to NC Hwy-12 in the right-of-way.

## Immovable Objects

There is an existing structure on the corner of the Aqua property that must remain in place.

## Driveway Crossings

There are four driveway crossings in this segment of the study. One is for a commercial property, the other three are residential.

## Slope and Topography

Common to this segment are higher grades in the shoulder both in and outside of the right-of-way.



View looking north at the existing sidewalk and retained landscape areas in front of Aqua where the proposed trail would tie-in.



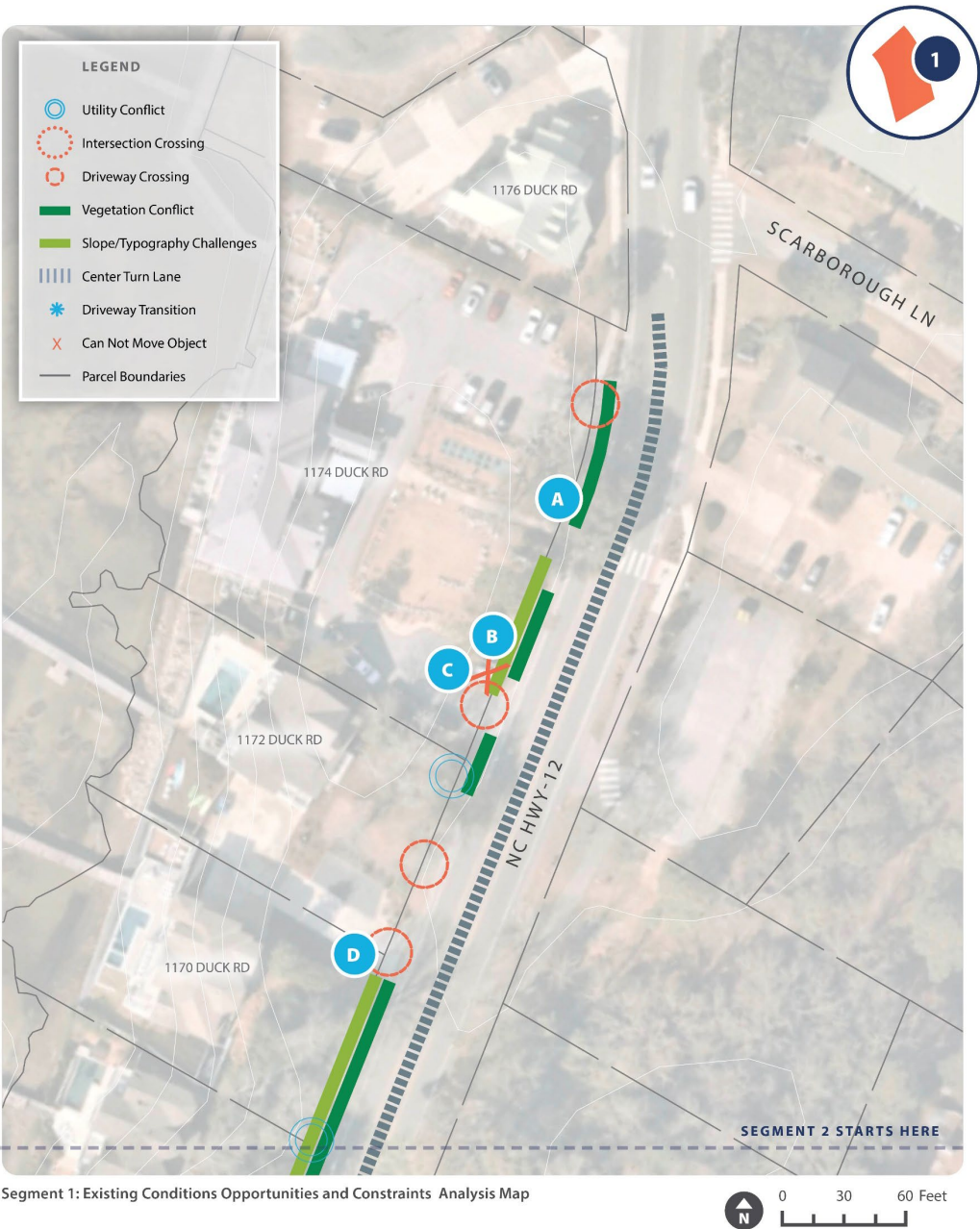
View looking south at the existing retained landscape area in front of Aqua.



View looking east at the existing immovable structure at the corner of Aqua's entrance drive and NC Hwy-12.



View looking south at the shoulder of NC Hwy-12 where the landform, which contains a hedge and canopy trees, rises away from the pavement.



Segment 1: Existing Conditions Opportunities and Constraints Analysis Map



## Segment 2: Existing Conditions

Segment two, approximately 550 feet in length, stretches from 1168 to 1158 NC Hwy-12. This segment contains five adjacent residential properties.

### Slope and Topography

Similarly to segment one, there are steeper slopes and areas of topography that rise away from the roadway. The existing driveways add complexity because their respective transitions to NC Hwy-12 will need to be considered for any proposed trail alignment.

### Visibility and Clearance

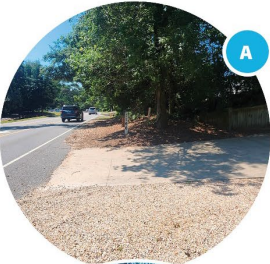
Several properties contained in this segment have ornamental trees, formal hedges and herbacious plantings either near the driveway aprons or in front of the residence. Many of these plantings are located in the right-of-way. There are also young canopy trees needing pruning or complete removal to accommodate the proposed trail alignment. This entire segment has a center turn lane that constrains available space for design interventions in the right-of-way.

### Utilities

As is true for segment one, there are several utilities running parallel to the roadway that will require relocation in response to the proposed path.

### Driveway/Street Crossings

There are five driveway crossings that will have to be considered and coordinated for any proposed trail alignment. Each varies in configuration, material, and slope. In addition, the Four Seasons Ln intersection with NC Hwy-12 and has existing crosswalks that carry pedestrians and cyclists parallel to the road. This is an opportunity to increase connectivity at a major intersection in the corridor.



A

View looking south at 1166 NC Hwy-12's driveway, parking area, and retained landscape area; lots to consider for adding a proposed trail alignment.



B

Typical arrangement of utility access in the right-of-way; present, but lightly screened by shrubs and other vegetation.



C

Looking south on NC Hwy-12, typical treatment of a fire hydrant in the right-of-way.



D

Driveway and right-of-way treatments vary. In this picture, a landscaped area is framed by stamped concrete driveway aprons transition to a gravel parking area.



Segment 2: Existing Conditions: Opportunities and Constraints Analysis Map



# Segment 3: Existing Conditions

Segment three, approximately 540 feet in length, stretches from 1156 to 1152 NC Hwy-12. This segment contains three adjacent residential properties, one vacant lot with water access, and one feeder street, Amy Ln.

## Immovable Objects

There is one telephone pole located in front of the 1154 residence and another located in front of the 1152 residence which may present challenges for design in these locations as they can be cost prohibitive to take down/relocate.

## Visibility and Clearance

Throughout this segment of the study, there is vegetation within the right-of-way. Some are ornamental plantings and others parts are just overgrown patches of vegetative buffer. The center turn lane of NC Hwy-12 continues through this segment which constrains design opportunities in the right-of-way.

## Utilities

Utilities run parallel to the right-of-way and will have to be located and considered for an proposed trail alignment.

## Slope and Topography

There are grade transitions in- and outside of the right-of-way that will require consideration. Most of these are swales that drop away from the roadway and the surrounding landscape.

## Driveway/Street Crossings

There are two driveway crossings in this segment. Amy Ln also terminates into NC Hwy-12. This intersection in particular has additional challenges as it is a low spot where ponding occurs after a storm event.



A

The intersection of Amy Ln and NC Hwy-12 has a low point that holds stormwater because it does not have positive drainage.



B

Typical treatment of utility screening/access in the right-of-way.



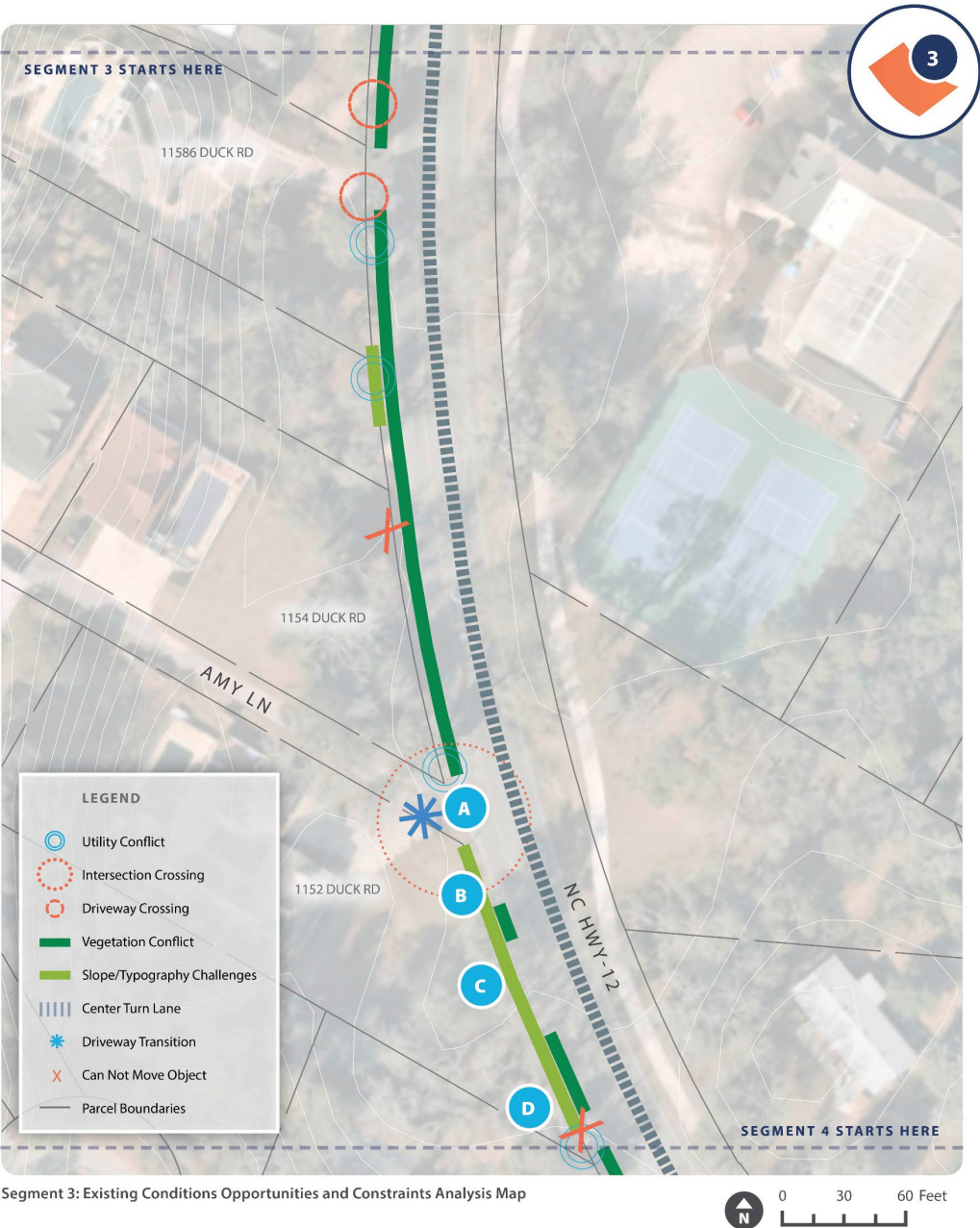
C

Looking south on NC Hwy-12, in some places, there are mature trees in the right-of-way that will have to be either removed or designed around.



D

Certain areas in the corridor have overgrown vegetation that needs to be cleared to accommodate the trail footprint in the right-of-way.



Segment 3: Existing Conditions Opportunities and Constraints Analysis Map



# Segment 4: Existing Conditions

Segment four, approximately 630 feet in length, stretches from 102 Nash Rd to just beyond Settlers Ln and includes about 40' of the corner of one residential parcel (101 Settlers Ln) which will be discussed in Segment 5. This segment contains 4 adjacent residential properties, two of which are vacant, and two feeder streets: Nash Rd, which is divided at the intersection by a retained landscape island and Settlers Ln. From north to south, is characterized by approximately 35' of center turn lane, a 400' length of transition to two-lane, and 197' of two-Ln Rd.

## Immovable Object

There is one existing telephone pole on the south side of the Nash Rd intersection.

## Intersections

This segment includes two intersections on the west side: Nash Rd and Settlers Ln, both of which would require crosswalks for the safety of path users and motorists.

## Visibility and Clearance

Vacant residential parcels immediately adjacent to NC Hwy-12 between the Nash Rd and Settlers Ln intersections are presenting with dense vegetation that extends into the right-of-way. Nearing the southern end of this segment, the center turn lane disappears and opens up more opportunity for design in the right-of-way.

## Utilities

Utillies run parallel to the right-of-way and will have to be located and considered for an proposed trail alignment.

## Slope and Topography

There are grade transitions in- and outside of the right-of-way that will require consideration. These transitions vary, but most are rising away from the grade of NC Hwy-12.



A

In the context of this study, telephone poles are considered immovable objects due to cost, thus the path should route around it.



B

View looking north at the intersection of NC Hwy-12 and Nash Street.



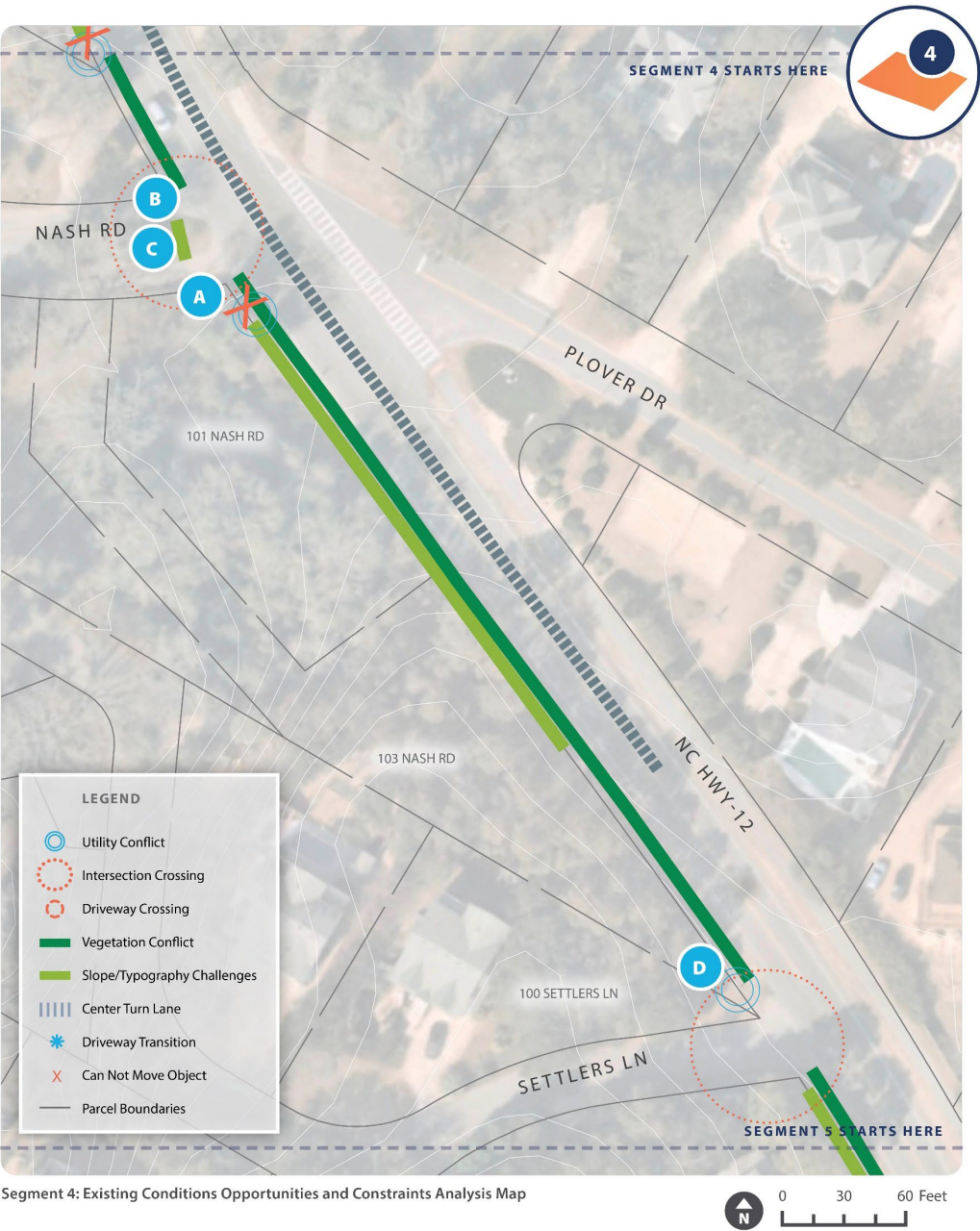
C

This is a view looking west toward the retained landscape area at the intersection of Nash Street and NC Hwy-12.



D

The intersection of Settlers Ln is vegetated with landform that rises away from NC Hwy-12 outside of the right-of-way.



Segment 4: Existing Conditions Opportunities and Constraints Analysis Map



# Segment 5: Existing Conditions

Segment five, approximately 555 feet in length, includes the residential properties from 101 Settlers Ln to 101 Osprey Ridge Rd. Notably, half of 101 Osprey Ridge Ln also falls in segment six.

## Slope and Topography

There are grade transitions in- and outside of the right-of-way that will require consideration. These transitions vary, but most are rising away from the grade of NC Hwy-12.

## Intersection

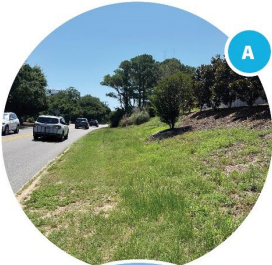
This segment includes the intersection with Osprey Ridge Rd on the west side. This intersection is characterized by a divided entrance and exit that is separated by a landscaped area that contains the Osprey Ridge neighborhood sign.

## Visibility and Clearance

For the most part, this segment of the corridor is relatively clear of vegetation that would impact a proposed trail alignment. There are some instances; however, where some select pruning and clearing may be required to accommodate a proposed trail alignment.

## Utilities

Utilities run parallel to the right-of-way and will have to be located and considered for an proposed trail alignment.



A

The landscape adjacent to NC Hwy-12 in this segment is generally open with gentle slopes up to the residential property at 101 Settlers Ln just beyond the row of magnolia trees.



B

As one approaches Osprey Ridge Rd, an existing fence and vegetation growing in the right-of-way becomes a physical and visual constraint.



C

The approach to the Osprey Ridge Rd intersection includes consideration for safety and visibility due to the existing fence.



D

Crossing Osprey Ridge Rd involves designing around the landscaped area and neighborhood sign. Additionally, there are many utilities and services that will need coordination about and around.



Segment 5: Existing Conditions Opportunities and Constraints Analysis Map



# Segment 6: Existing Conditions

Segment six, approximately 530 feet in length, extends from 101 Osprey Ridge Rd to 101 West Sea Hawk Drive, which includes three residential properties and the intersection of Sea Hawk Drive West and NC Hwy-12.

## Intersection

Sea Hawk Drive West terminates into NC Hwy-12. On the opposite side of the highway, the road extends to the east.

## Visibility and Clearance

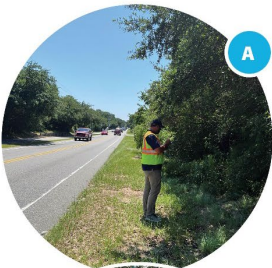
While much of the shoulder of this segment of the corridor is characterized by grasses, there is substantial vegetation that has been allowed to grow—primarily a mixture of young live oaks, pine trees, and coastal shrubs and understory, in the right-of-way.

## Utilities

Utilities run parallel to the right-of-way and will have to be located and considered for an proposed trail alignment. Additionally, this segment has existing stormwater infrastructure: a series of storm inlets and underground detention units in the right-of-way.

## Slope and Topography

There are grade transitions in- and outside of the right-of-way that will require consideration. These transitions vary, but most are rising away from the grade of NC Hwy-12.



A

This segment of the study corridor is characterized by a lot of overgrown vegetation that extends into the right-of-way.



B

Due to the overgrown vegetation, many of the utility markers are hidden within the foliage.



C

The Sea Hawk neighborhood sign, landscaped area, and utility access points will need to be considered for a proposed trail alignment.



D

In addition to existing utilities, there is stormwater infrastructure in this segment of the corridor (not pictured, just outside of view; yellow arrow).



Segment 6: Existing Conditions Opportunities and Constraints Analysis Map



# Segment 7: Existing Conditions

Segment seven is approximately 530 feet in length. It includes a private vacant lot at 1128 NC Hwy-12, 108 to 104 Jasmine Court, and half of 102 West Tuckahoe Drive.

## Enhance Visibility and Clearance

From the road, this segment is buffered by a nearly-continuous wall of vegetation extending its entire length. To ensure adequate clearance for the path, some vegetation will have to be cleared and pruned. Careful attention to the mature live oak trees will be considered so that impacting those specimens will be minimal.

## Utilities

Utilities run parallel to the right-of-way and will have to be located and considered for an proposed trail alignment. Additionally, this segment has existing stormwater infrastructure: a series of storm inlets and underground detention units in the right-of-way.

## Slope and Topography

The overall grade generally rises gently away from the grade of NC Hwy-12 in this segment of the study. The closer one gets to the Tuckahoe Dr W intersection, the more the grade rises. There is a gentle swale in the shoulder and depressions that need to be taken into consideration for optimal drainage and stormwater management.



Looking north towards West Sea Hawk Drive, a gentle swale exists in the shoulder and thus, the design should be responsive to stormwater management.



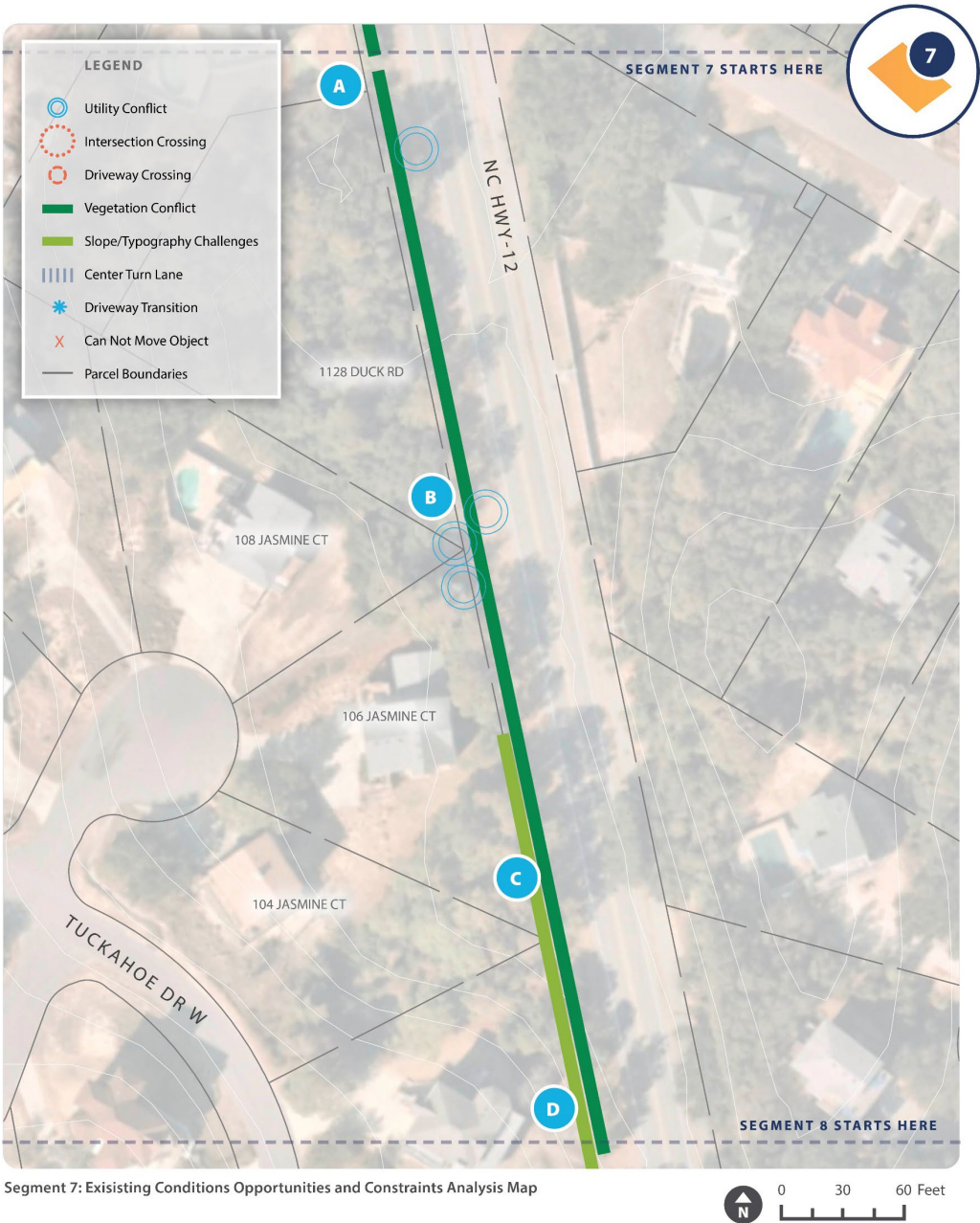
This segment of the study corridor contains existing stormwater infrastructure in the right-of-way that needs accommodation.



This view looking north shows how existing pines function as shade trees and are valuable assets for user comfort on the proposed trail.



Looking back to the north, the shoulder has been maintained with a short crop and a wide buffer of vegetation separates the residences from the right-of-way.





# Segment 8: Existing Conditions

Segment eight is approximately 525 feet in length. It extends from the southern half of 102 West Tuckahoe Drive and includes 100 and 101 W Tuckahoe Drive, and about half of 100 West Bias Drive. This segment of the corridor includes the intersection of Tuckahoe Drive West and NC Hwy-12.

## Intersection

The intersection of West Tuckahoe Drive and NC Hwy-12 will need a cross walk to direct path users parallel to NC Hwy-12.

## Slope and Topography

This segment of the study has a gentle swale immediately adjacent to NC Hwy-12 to convey stormwater to storm infrastructure located here. While much of the topography is generally flat, there are steeper slopes in the right-of-way that will require consideration to accommodate any proposed trail alignment.

## Visibility and Clearance

As with the previous segments discussed, there is considerable vegetative growth in the right-of-way adjacent to NC Hwy-12. Trees and shrubs will need to be pruned and possibly cleared entirely in places, to accommodate a proposed trail alignment.

## Utilities

Utilities run parallel to the right-of-way and will have to be located and considered for an proposed trail alignment. Additionally, this segment has existing stormwater infrastructure: a series of storm inlets and underground detention units in the right-of-way.



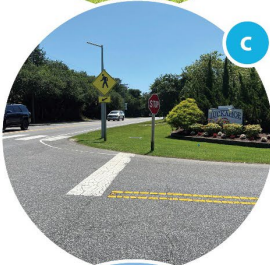
A

This existing non-formal path from this tennis court connecting to NC Hwy-12 is an opportunity to expand community connections.



B

The north side of the West Tuckahoe Drive intersection features a retained landscape area, stormwater infrastructure, and water utilities to be considered for the trail alignment.



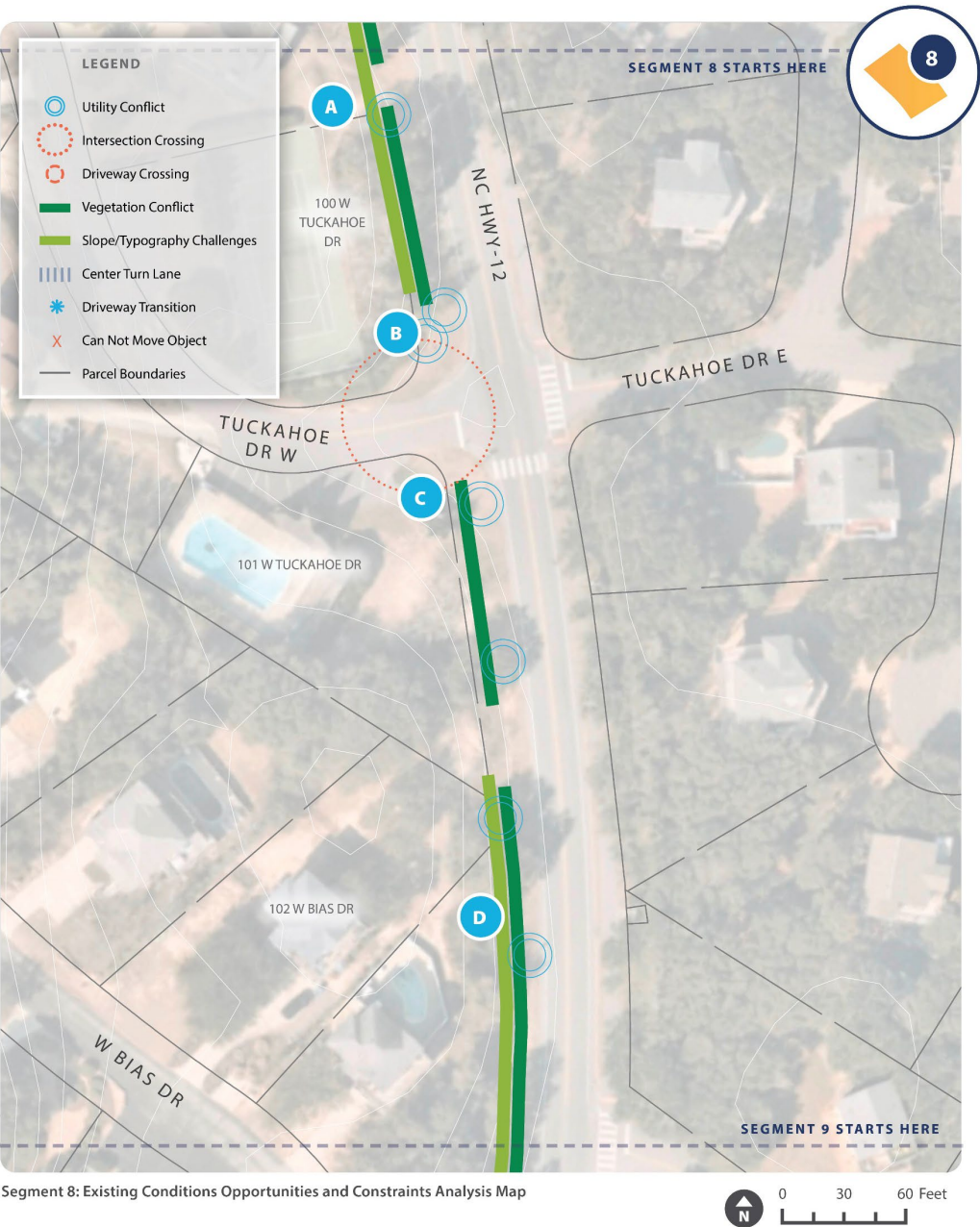
C

The south side of the West Tuckahoe Drive intersection also features a landscaped area around the neighborhood sign, stormwater infrastructure, and lighting to design in response to.



D

Much of the rest of this segment is characterized by a narrow shoulder, vegetation that has been allowed to encroach on the right-of-way, and slopes that rise up and away.





# Segment 9: Existing Conditions

Segment nine, approximately 540 feet in length, includes the corner of the 100 West Bias Dr residential parcel, 102 West Charles Jenkins Ln, and 1106 NC Hwy-12. This segment of the corridor study includes the West Bias Dr and NC Hwy-12 intersection as well as the West Charles Jenkins Ln and NC Hwy-12 intersection.

## Intersection

This segment has intersections with West Bias Dr and West Charles Jenkins Ln.

## Slope and Topography

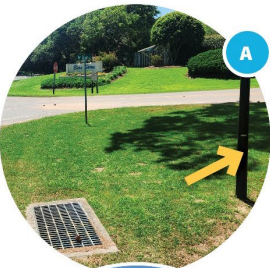
The grade is generally flat through most of the segment; however, notably, there is a gentle swale running parallel to NC Hwy-12. Close to West Charles Jenkins Ln, there is a stormwater retention area that falls away from the road to collect runoff during a storm event.

## Visibility and Clearance

Vegetation that encroaches on the right-of-way will need to be pruned and possibly cleared in order to accommodate the proposed trail alignment to ensure adequate sight lines and safety for path users.

## Utilities

Utilities within the right-of-way will need to be located and considered for any proposed design intervention. There is existing lighting at the West Bias Dr intersection. Existing stormwater infrastructure in this segment is located on the north and south sides of both West Bias Dr and West Charles Jenkins Ln.



The intersection of West Bias Drive has lighting (yellow arrow) on the north side, stormwater infrastructure on the north and south sides, and a neighborhood sign in a landscaped area on the south side.



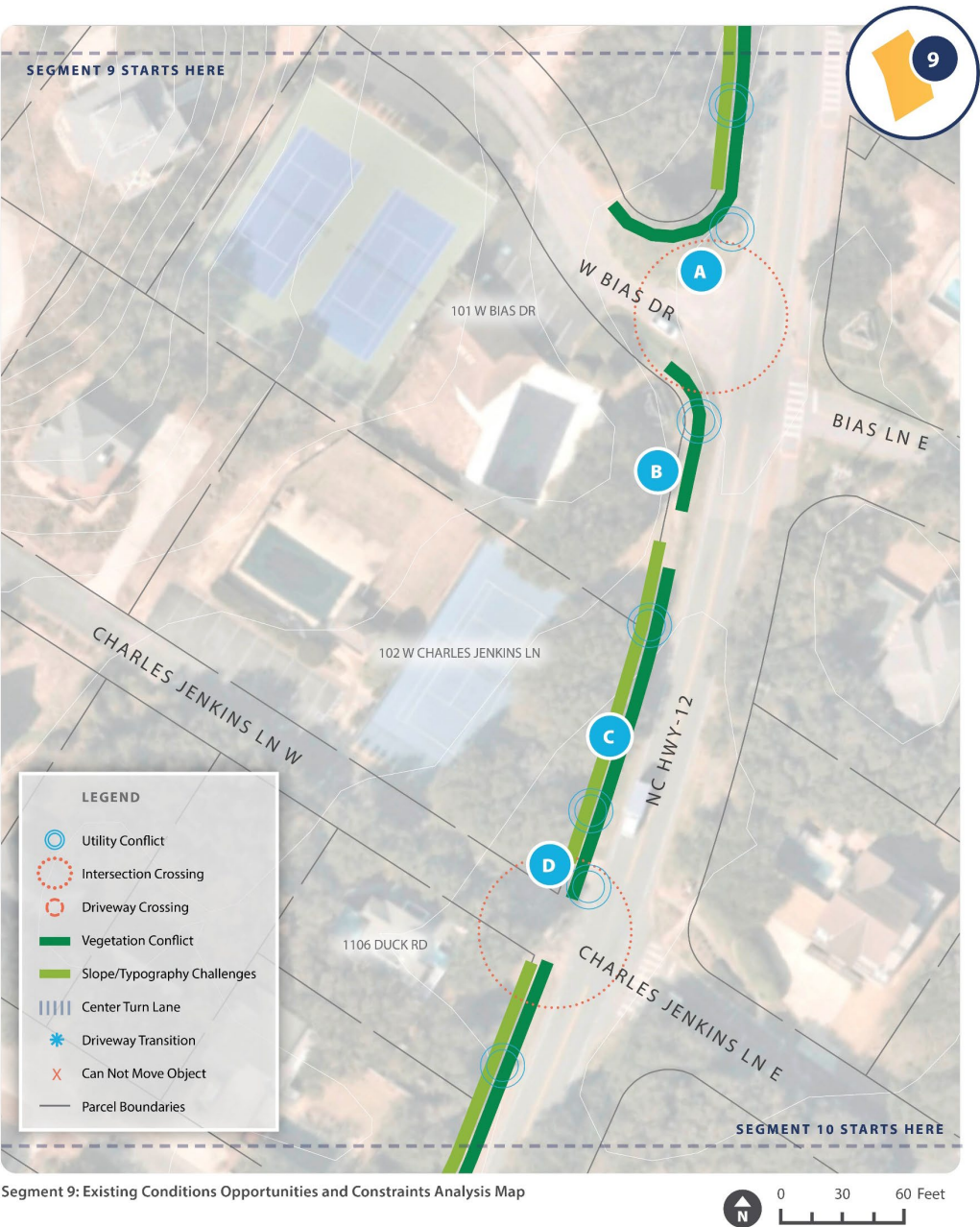
This view of the West Bias Drive intersection (looking north) shows a stormwater culvert, lined with riprap, and how the slope transitions from edge of pavement down to the swale and uphill beyond the neighborhood sign.



Massive live oak trees overhang an existing stormwater retention area. The yellow arrow points to a small footbridge that crosses a swale. Note the utility service boxes on the ridge outside of the retention area.



View looking north at the footbridge highlighted in the image to the left. In the existing condition, stormwater ponds in the Roadway.



Segment 9: Existing Conditions Opportunities and Constraints Analysis Map



# Segment 10: Existing Conditions

Segment ten is approximately 570 feet in length and comprises the south end of the Town of Duck to town limits and ends just before the signaled NC Hwy-12 intersection with Sea Oats Trail/13th Avenue. This segment includes part of the residential parcel at 100 Jay Crest Rd, 101 Jay Crest Rd, 1100 NC Hwy-12, and 393 Sea Oats Trail in the Town of Southern Shores, NC.

## New Crosswalk

As with all instances where the proposed trail alignment crosses an existing road in the study area, a new crosswalk is proposed to ensure the safety of path users and motorists alike. In the intersection with NC Hwy-12 and Sea Oats Trail/13th Ave, additional crosswalks and signaling would be necessary to ensure safe crossing for the path users and motorists.

## Visibility and Clearance

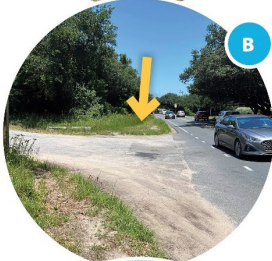
The shoulder of the corridor in this segment is lined with a dense vegetative buffer of young trees and scrubby underbrush. While there are moments where sight lines open up near the southernmost residential driveway that intersects with NC Hwy-12, overall this segment is characterized by long stretches of grassy shoulder that varies in width, becoming the most narrow near the intersection with Sea Oats Trail/13th Ave where there is a center turn lane.

## Utilities

Utilities within the right-of-way will need to be located and considered for any proposed design intervention.



The signaled intersection in Southern Shores is announced to motorists near the transition between segments 9 and 10 in the study between Charles Jenkins Ln West and Jay Crest Rd.



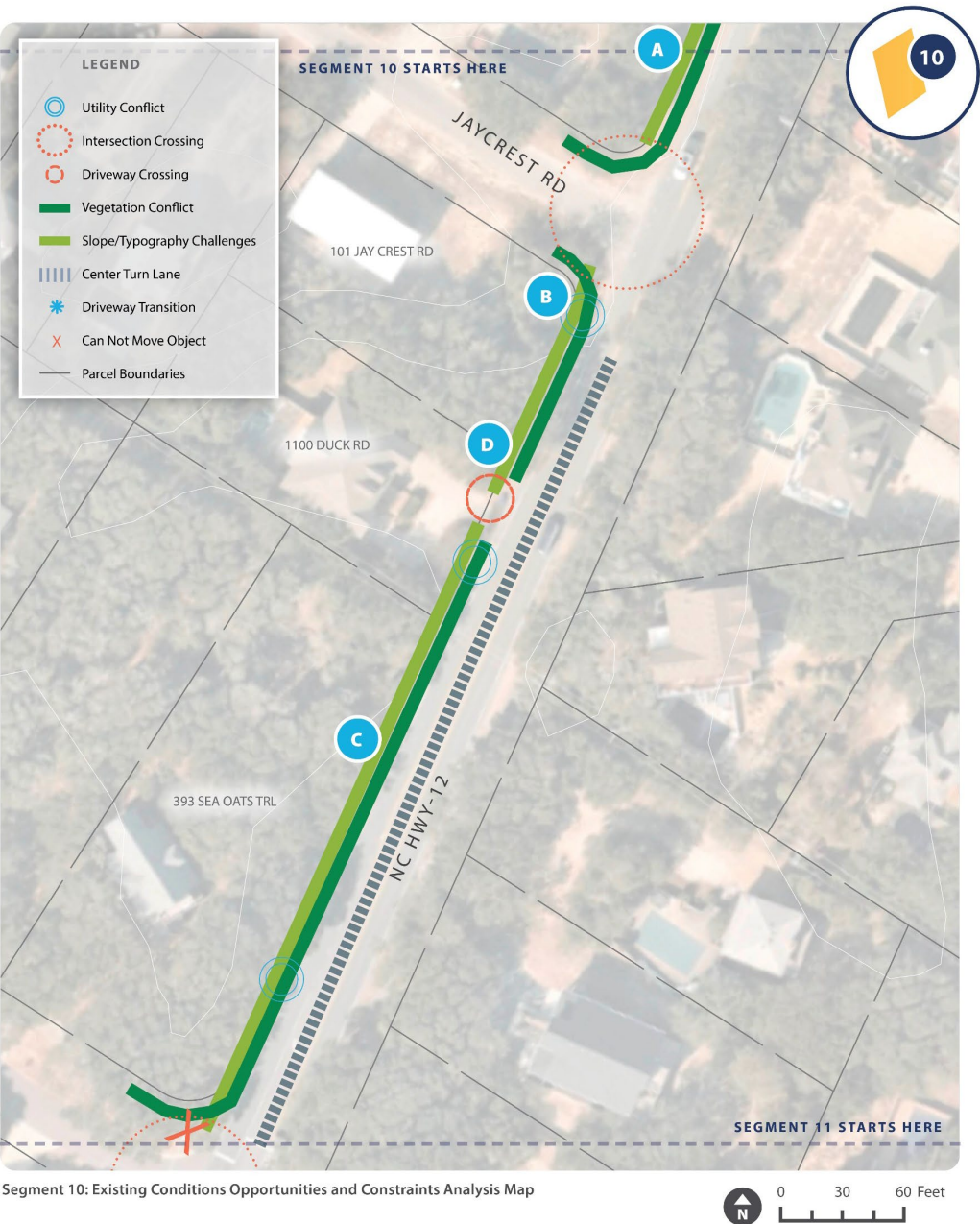
The intersection of West Bias Drive (looking north) is the last intersection before NC Hwy-12 widens for a center turn Ln. Note the informal trail (yellow arrow) in the shoulder where pedestrians walk.



Approaching the intersection of NC Hwy-12 and 13th Ave/Sea Oats Trail is a sign that warns motorists that the Rd is subject to flooding.



View of the residential driveway of 1100 NC Hwy-12. The existing landscaped area encroaches on the right-of-way and may require pruning/removal to accommodate the trail alignment. Note the "Welcome to Southern Shores" (yellow arrow) on the shoulder.





# Segment 11: Existing Conditions

Segment eleven, entirely in the Town of Southern Shores, is a focused consideration of what is happening at the NC Hwy-12 and Sea Oats Trail/13th Ave intersection. While it is obviously outside of the jurisdiction of the Town of Duck, the interfacing of the proposed shared-use path with the Town's neighbor to the south is important. A north-south connection on the west side of the highway could have many benefits for the residents of and tourists visiting the Town of Southern Shores as much as it benefits the residents of and tourists visiting Town of Duck.

**Increasing connections for multi-modal transportation and the quality of the experience in the landscape creates stronger communities, improves quality of life, and strengthens sense of place.**

## Intersection

This intersection has two existing crosswalks that carry users across NC Hwy-12 and 13th Ave. The crossing of 13th Ave is a connection for the existing trail that runs on the east side of NC Hwy-12. The crossing of NC Hwy-12 at this intersection connects 13th Ave to Sea Oats Trail; however, on the Sea Oats Trail side of the intersection, the crosswalk terminates into a patch of sand and an informal trail into the northernmost residential area of the Town of Southern Shores. Enhancing user access to multimodal transportation network on both sides of the road increases safety and the overall capacity of this corridor to serve the community and its users.

## Immovable Objects

The four signal posts are fixed in the landscape so any proposed trail connection would have to respond to these.

## Stormwater

There are low points at this intersection that hold stormwater after a storm event. 13th Ave floods at the approach to the intersection and in the crosswalk. The corner of Sea Oats Trail and NC Hwy-12 also ponds after a storm event. These issues have the potential to be resolved, at least in part, if the intersection were included in a proposed trail alignment.



View of the intersection with 13th Ave/Sea Oats Trail in Southern Shores. Note the crosswalk on the far end of the intersection connecting across NC Hwy-12.



The intersection of West Bias Drive (looking north) is the last intersection before NC Hwy-12 widens for a center turn lane. Note the informal trail (yellow arrow) in the shoulder where pedestrians walk.



View looking north up NC Hwy-12 from the Southern Shores intersection of 13th Ave/Sea Oats Trail.



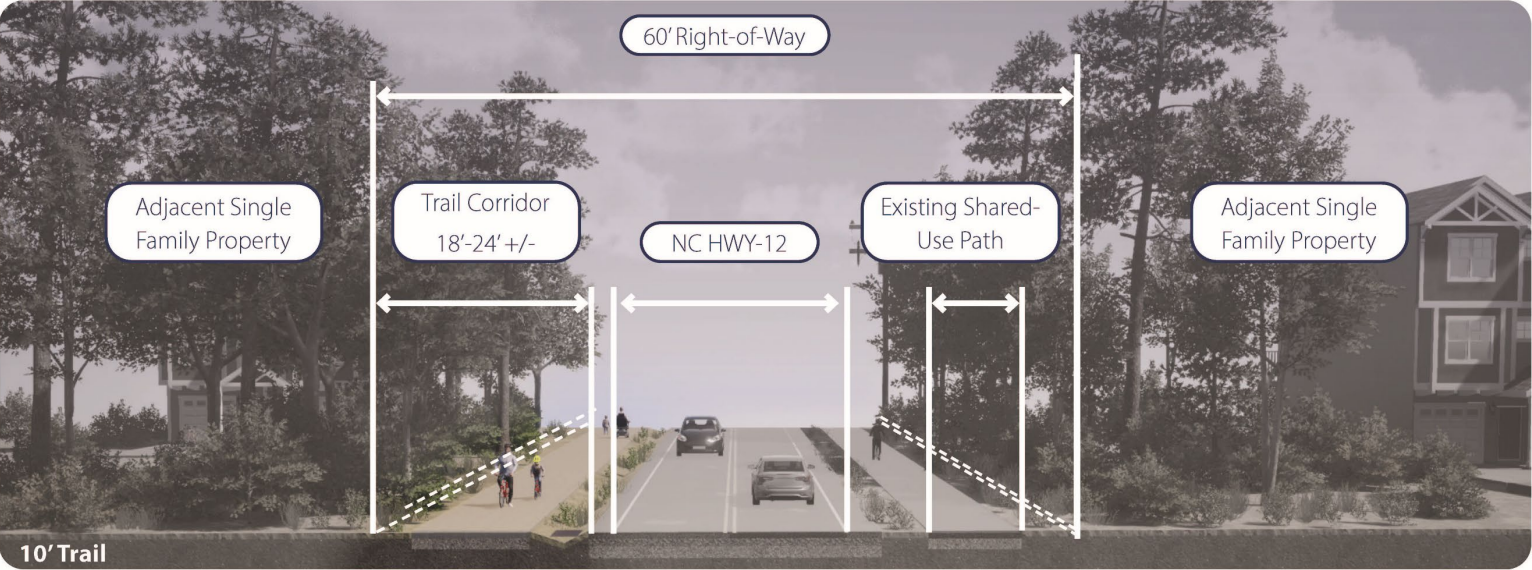
Close up of the corner of the intersection where the proposed trail could terminate.



Segment 11: Existing Conditions Opportunities and Constraints Analysis Map

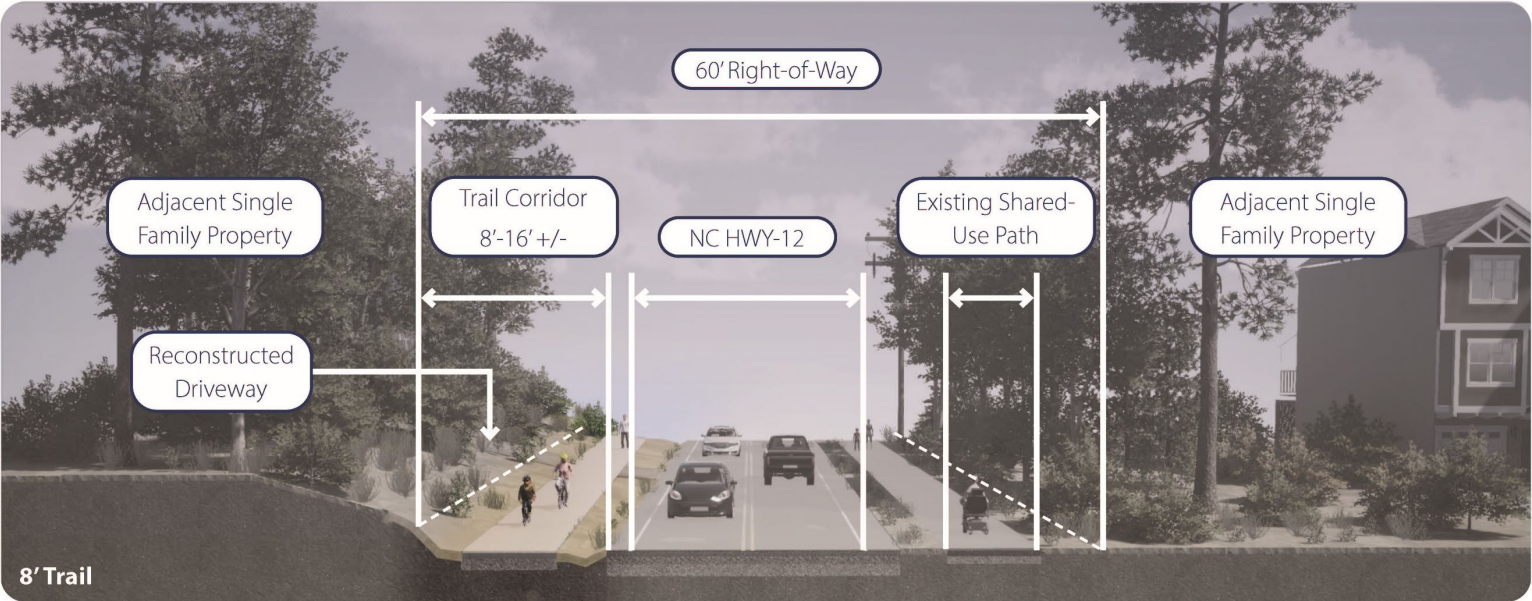


# Duck Trail Feasibility Study – Cross Sections



**Proposed Condition 1**

**10' Trail**

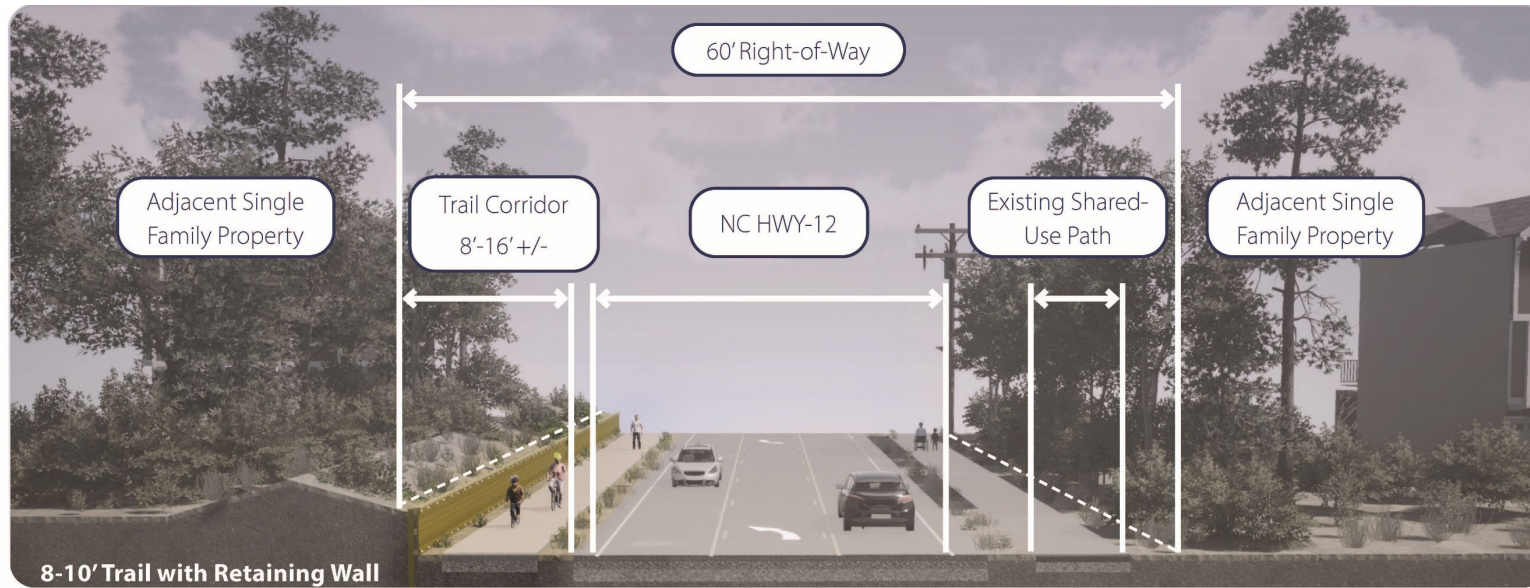


**Proposed Condition 2**

**8' Trail**

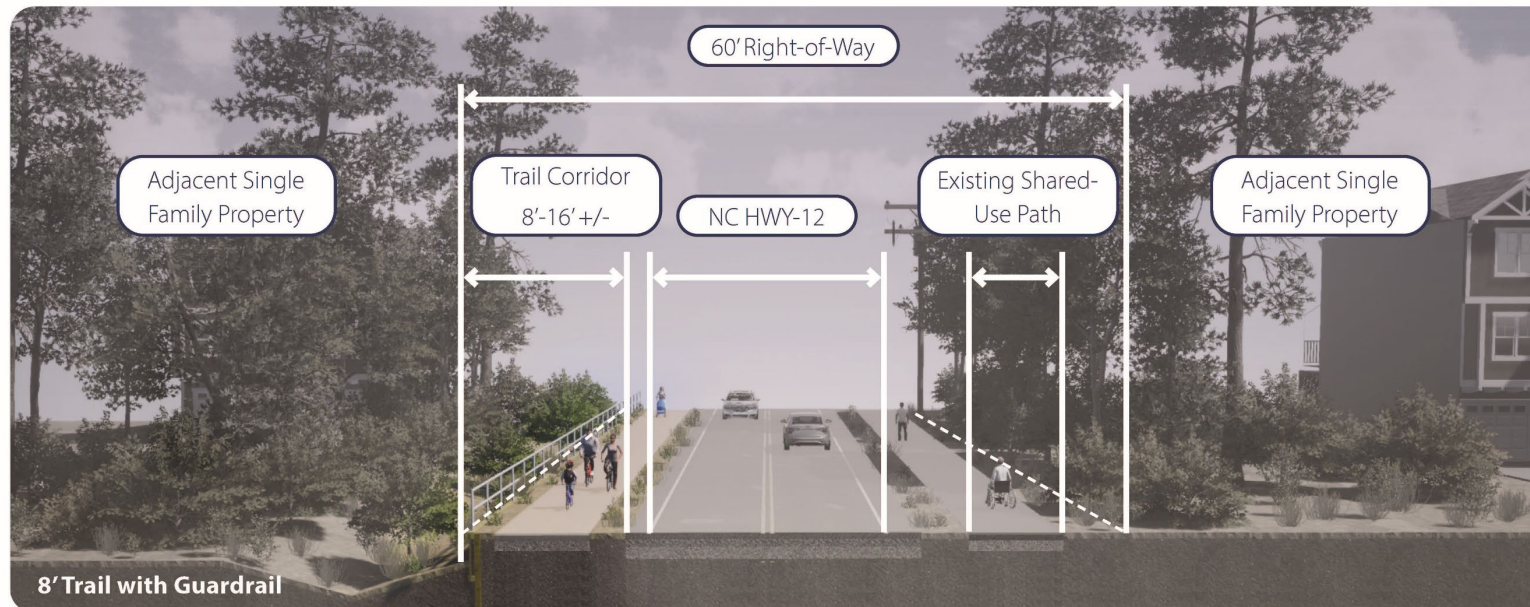


# Duck Trail Feasibility Study – Cross Sections



## Proposed Condition 3

**8-10' Trail  
with Retaining Wall**



## Proposed Condition 4

**8' Trail  
with Guardrail**



# Duck Trail Feasibility Study: Comments

***Additional comments can be  
submitted to the Town of Duck:***

***Sandy Cross***

***[scross@townofduck.com](mailto:scross@townofduck.com)***

***252-254-5954***



## Comment Form

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### OPTIONAL INFORMATION

Name: \_\_\_\_\_

Email Address: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

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Thank you!