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Appendix A

Existing Conditions Report

Memorandum

To: Russell Dalton
Town of Apex
73 Hunter Street
Apex, NC 27502

Date: June 2025

Project #: BO-2416 Tingen Road Bicycle and Pedestrian Crossing

From: VHB Engineering NC, P.C.

Re: Existing Conditions Review Memo

Project Overview

Project Purpose and Need

Project BO-2416 is referred to in the State Transportation Improvement Program (STIP) as "Tingen Road Bicycle and Pedestrian Bridge". Given that a tunnel has been identified through this study as a feasible option, the project will be referred to in this memo as "Tingen Road Bicycle and Pedestrian Crossing" to avoid confusion. Phase 1 of BO-2416 includes a feasibility study followed by alternatives development for the proposed Tingen Road Bicycle and Pedestrian Crossing. The crossing will traverse the CSX Transportation S-line railroad near the current alignment of the SR 1153 (Tingen Road) at-grade crossing. Per the 2011 Corridor Project Master Agreement TIP # Y-4805G between North Carolina Department of Transportation, CSX Transportation, and Town of Apex, the existing at-grade crossing is required to close upon completion of the South Apex Peakway grade separation of the S-line and opening of said roadway to traffic as an alternate route. That project (TIP # U-5928) is currently under construction and is expected to be open to traffic in fall 2027. The proposed bicycle and pedestrian crossing is intended to replace the existing Tingen Road at-grade vehicular crossing to

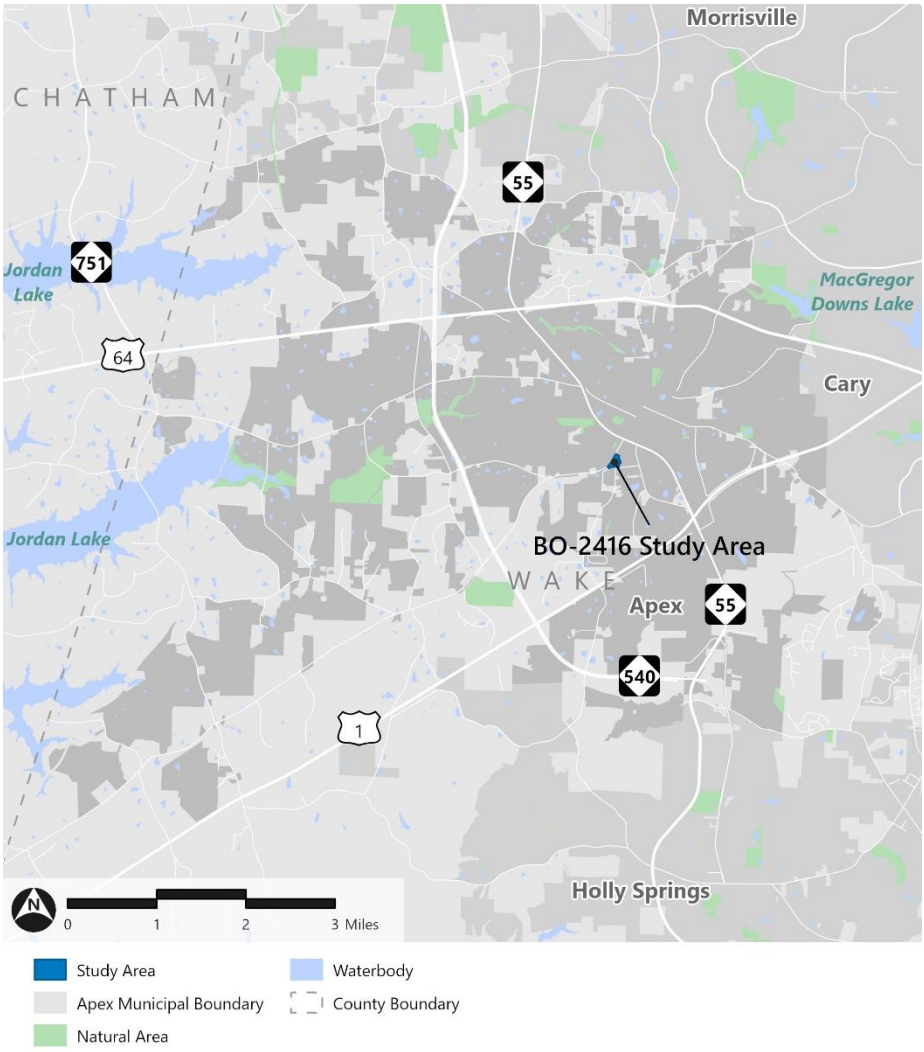

Figure 1: Project Vicinity, BO-2416

Source: Esri, NCDOT GIS Unit

Memorandum

maintain north-south connectivity for cyclists and pedestrians across the S-line between Apex Peakway to the southwest and NC 55 (Williams Street) to the northeast. Both bridge and tunnel options will be considered.

An at-grade option is not evaluated in this study because for previous Town projects, CSX would not entertain an at-grade Z-gate crossing (like that constructed between Center Street and Hunter Street) without the Town offering additional at-grade closures in trade. In previous discussions, CSX has conveyed to the Town an intent to install fencing to prevent at-grade pedestrian crossings in this location.

Study Area

The study area was derived from the boundaries of parcels adjacent to the segment of Tingen Road that crosses the railway tracks. Prominent design constraints include the CSX S-line railroad and a Town of Apex water tank site. Apex Elementary School, St. Mary African Methodist Episcopal Church, and Albright Funeral Home are notable adjacent community destinations.

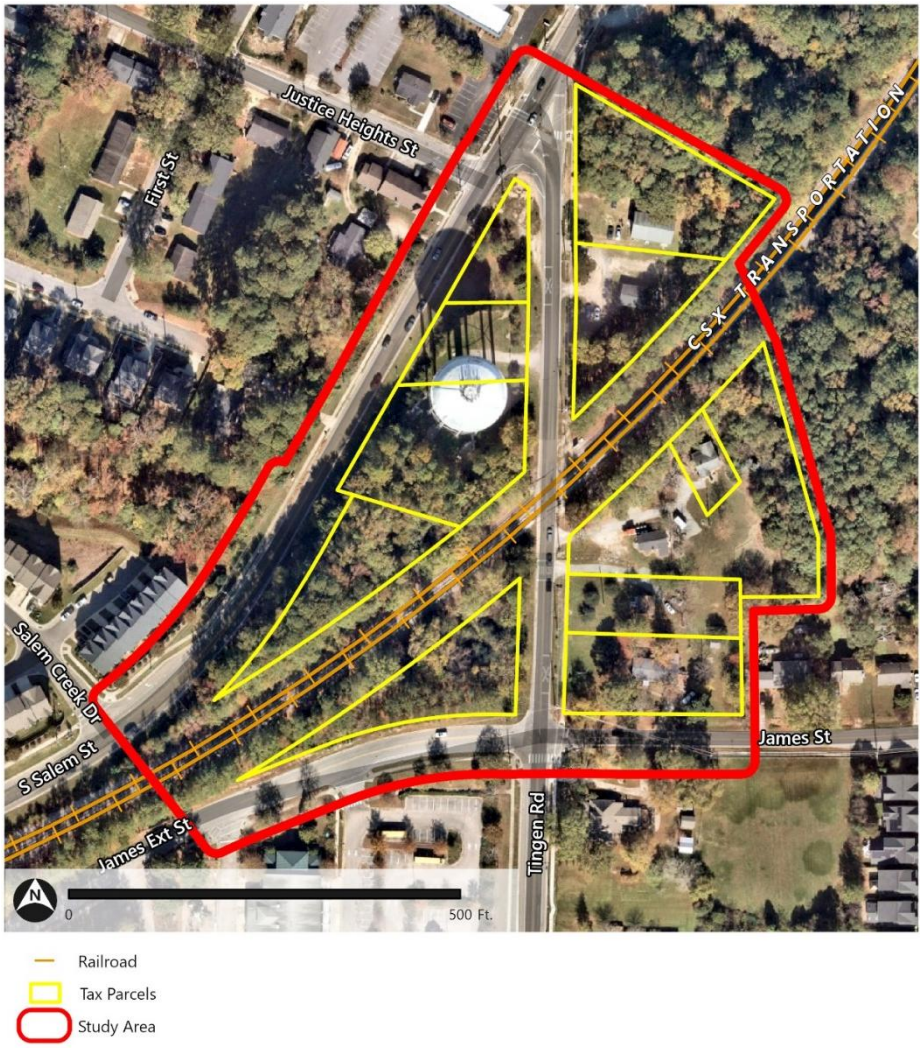

Figure 2: Study Area, BO-2416
Source: NCDOT GIS Unit, NCDOT Rail Division

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Local Plan Review

The proposed project and its associated study area are included in numerous local and state planning documents as overviewed in Table 1.

Table 1. Summary of Related Planning Documents

Adopted Year	Document Title	Recommendation
2019	Advance Apex: The 2045 Land Use Map Update	› The study area is included in the Town Center context area. › The study area contains future land classified as either "Commercial Services," "Office Employment," "Medium Density Residential", or "School.
2019	Advance Apex: The 2045 Transportation Plan (Apex Transportation Plan)	› Widen Tingen Road to three lanes between James Street and Sparta Lane › Proposed Grade-separated bike/ped crossing where Tingen Road intersects the CSX S-line › Proposed greenway connecting Apex Peakway and South Salem Street › Proposed side path on James Street between Williams Street and Apex Peakway › Proposed side path on Tingen Road between James Street and Apex Peakway › Proposed bicycle lanes on James Street between Apex Peakway and Tingen Road › Proposed shared lane markings on South Salem Street between Hunter Street and Apex Peakway › Existing local bus route along James Street and Tingen Road - GoApex Route 1 › Future local bus route on South Salem Street between Hunter Street and Kelly Road
2025	NCDOT 2026-2035 DRAFT State Transportation Improvement Program (STIP)[1]	› U-2901: Widen NC 55 (Williams Street) to multilane divided roadway; replace CSX railroad bridge over NC 55 › U-5928: Grade separated interchange for Apex Peakway at South Salem Street and the CSX railroad › **BO-2416: Construct a pedestrian bridge over CSX railroad within the existing alignment of Tingen Road (Preliminary Engineering phase funding only)**
2025	Apex Mobility Hub Study (NCDOT IMD)	› A mobility hub is recommended along the S-line corridor between Williams Street and Moore Street, north of the study area › Passenger rail is proposed to serve the mobility hub in the future › Grade-separated bicycle and pedestrian crossings connecting to the mobility hub are proposed over East Williams Street east of the S-Line and over the S-Line at East Moore Street

[1] The final NCDOT 2026-2035 STIP is expected to be adopted in June 2025.

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Existing Conditions Inventory and Review

This study considers both natural and human environmental conditions, identified through analysis of existing plans and policies, the transportation network, and growth trends that could constrain potential design alternatives for the proposed crossing. All data in this section is sourced from publicly available Geographic Information Systems (GIS) depositories, previous and concurrent planning efforts, and site visits.

Human Environment

The human environment is the context in which people live, work, and play. This section overviews the crossing's community context and the transportation network into which it would tie.

Existing and Planned Transportation Network

Roadways

South Salem Street and James Street form the western and southern study area boundaries, respectively; Tingen Road connects them, bisecting the study area and crossing the railroad tracks at grade. All three are state-maintained secondary routes. Local routes Salem Creek Drive and Justice Heights Street intersect South Salem Street at the study area boundary. Tingen Road between James Street and Sparta Lane is planned for widening from two lanes to three, per the Apex Transportation Plan. The intersection of South Salem Street and Tingen Road/Justice Heights Street is the only signalized intersection within the study area. This signal includes push button pedestrian signals, marked crosswalks and high-visibility signage to alert drivers to pedestrian presence. It was installed as a temporary traffic signal primarily to address traffic congestion and is subject to removal by NCDOT once the railroad crossing is closed. Therefore, alternative pedestrian accommodations will need to be evaluated with NCDOT if this signal is removed; these could range from warning signs exclusively to a pedestrian beacon system.

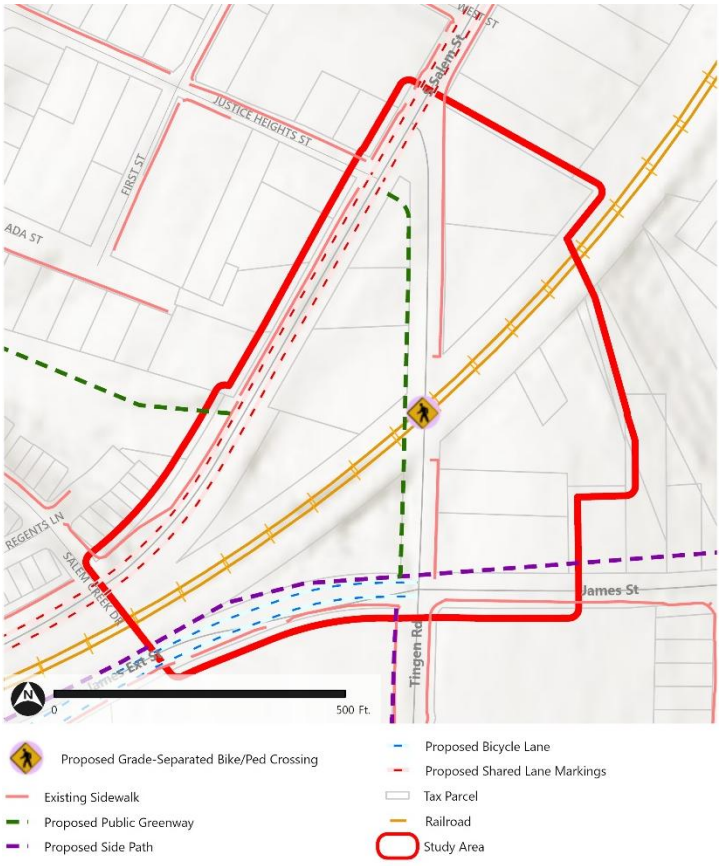

Figure 3: Existing Transportation Network, BO-2416
Source: Town of Apex Planning Department

Active Transportation

Sidewalks are present on the north side of South Salem Street, the south side of James Street, and the east side of Tingen Road (except within the railroad right-of-way). There are no existing side paths or marked bicycle facilities within the study area. A side path is proposed along the north side of James Street, and bicycle lanes are proposed along James Street, west of Tingen Road. Side path is planned along the west side of Tingen Road from James Street south, and an off-road greenway connection is planned to tie to South Salem Street

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between Salem Creek Drive and Ada Street. A grade-separated bicycle and pedestrian crossing is planned at the railroad tracks across Tingen Road. Shared lane markings are planned along South Salem Street through the study area. The Apex Mobility Hub Plan proposed grade-separated bicycle and pedestrian crossings connecting over East Williams Street east of the S-Line and over the S-Line at East Moore Street, but these have not yet been reflected in adopted plans.

There are marked crosswalks across the south and east legs of the Tingen Road and James Street intersection near Apex Elementary School. In general, there are marked crosswalks along the north side of South Salem Street for pedestrians to cross minor intersections like Salem Creek Drive and Justice Heights Street. Similarly, marked crosswalks connect the sidewalk along James Street across driveways serving Apex Elementary School. Figure 4 illustrates the existing and planned active transportation facilities in the project vicinity.

Transit

The GoApex Route 1 bus runs north on Tingen Road and east of James Street, stopping at the Wake Acres Apartments on James Street. An additional local bus route is proposed to run along South Salem Street. The GoCary Apex-Cary Express Route is anticipated to be converted to GoCary Route 12 in the near future and serves downtown Apex along South Salem Street. GoTriangle Route 305 runs east of the study area along South Hughes Street. Additional regional routes are proposed to serve this area in the ongoing Wake Transit Plan update. It is expected that transfers between these routes would mostly occur at the proposed mobility hub along the S-Line at East Moore Street.

Rail

CSX has two active railroad tracks in the right-of-way segment that crosses Tingen Road at grade. The crossing is installed with train-activated flashing lights, bells, and “entrance” gate arms (vertical mast). The northern track is a siding used for trains needing to pass each other and the southern track is the main line.

Most trains that use these tracks are freight services, the schedule for which varies daily. Amtrak currently operates its once-daily northbound and southbound Silver Star service through the study area, and additional passenger rail is planned for the corridor as part of NCDOT’s S-line program.

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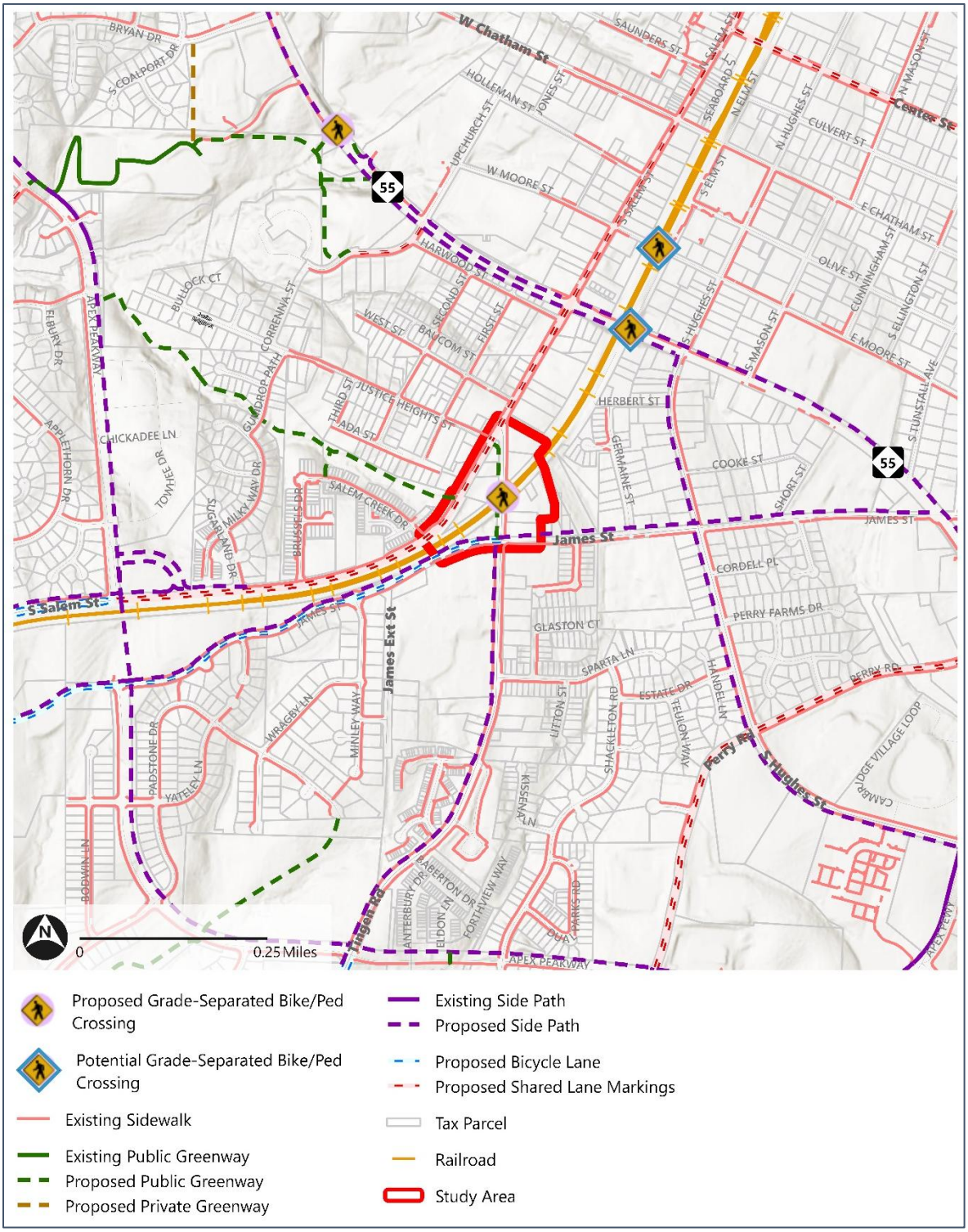

Figure 4: Existing Transportation Network, BO-2416 Vicinity

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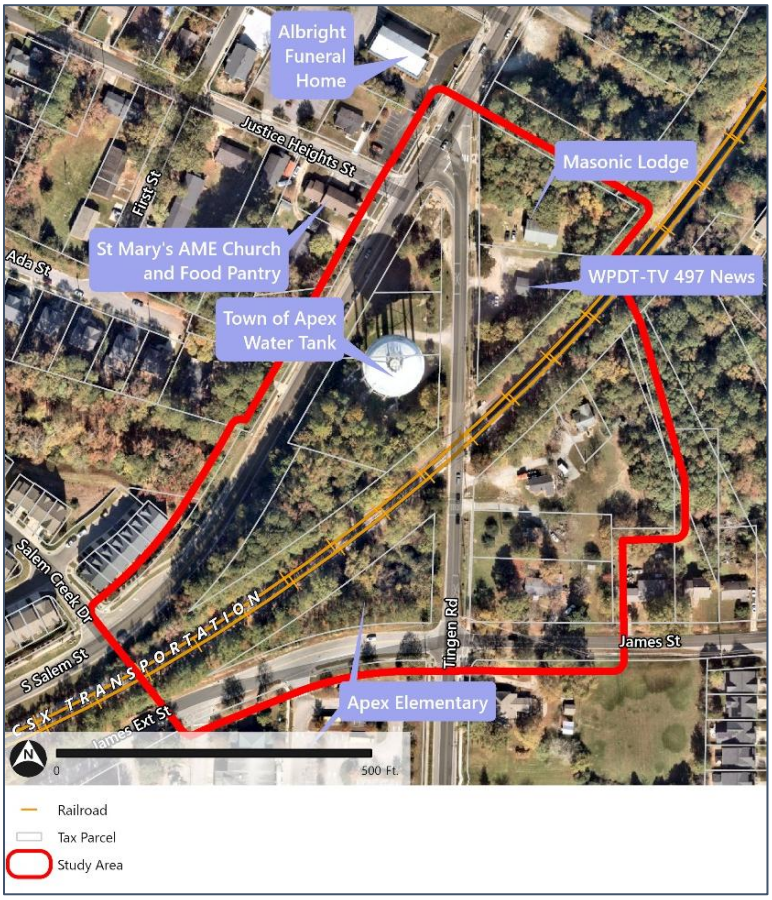

Figure 5: Community Resources, BO-2416
Source: NC One Map, NCDOT GIS Unit, NCDOT Rail Division

Land Use

The study area's largest landowner is the Town of Apex, which owns three parcels that comprise a water tank site bounded by Tingen Road, South Salem Street and the railroad tracks. Apex Elementary School is immediately south of the study area, which is a pedestrian and bicycle trip generator. Wake County Public School System also owns the vacant parcel in the southwestern quadrant of the study area.

The Wisdom Masonic Lodge and WPDT-TV 497 News television station are in the northeastern quadrant of the study area. A water tank is in the northwest quadrant of the study area. Land in the southeast quadrant is entirely occupied by single-family homes. Adjacent to South Salem Street to the north is Albright Funeral Home, Salem Creek Townhomes, Justice Heights neighborhood, and St. Mary's AME Church and Food Pantry.

The 2045 Land Use Map classifies the study area's land parcels as either "Commercial Services," "Office Employment," "Medium Density Residential", or "School".

Socioeconomic Context[2]

Apex is growing at an annualized rate of 4.9 percent, but the demographic study area (DSA) – Census Block Group 1, Census Tract 534.17 and Census Block Group 3, Census Tract 534.34 which intersect the study area, separated by the CSX railroad – is growing more slowly at 1.2 percent. The DSA is bounded by Bryan Drive, NC 55, Apex Peakway, James Street, S Salem Street, Apex Barbecue Road, and Town Side Drive.

The DSA is larger than the study area to provide understanding of the populations near, but not necessarily adjacent to, the proposed project area; this is considered representative of the population most likely to use the proposed facility.

The DSA meets the NCDOT Community Studies' threshold for an area of concern – somewhere with more concentrated environmental justice (EJ) populations than regional averages. EJ populations are those who historically have been disproportionately exposed to harm from planning projects. Persons below the poverty level represent 14.3 percent of the western Census Block Group, while persons under 50 percent of the poverty level represent 13.3

[2] US Census American Community Survey 5-year Estimates (2018-2022).

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percent; these proportions are greater than 5 percentage points above the average Wake County levels, thereby meeting the state threshold. Furthermore, the eastern Census Block Group is home to approximately 63 Spanish speakers who speak English less than very well according to US Census classifications, greater than the state's language assistance threshold of 50 people within a language group. Any impact seen to increase these populations' transportation burden should be mitigated accordingly. Additional demographic information is listed in Appendix A

Historic Preservation

In the study area, the Wisdom Masonic Lodge and WPDT-TV 497 News television station (as "Commercial Building") were surveyed, but deemed ineligible, for the National Register of Historic Places. The South Salem Street Historic District, which extends through the study area along South Salem Street, was also surveyed.

Adjacent to the study area, St. Mary's African Methodist Episcopal Church, which while not yet a recognized Historic Place, is designated as a study list location by the NC State Historic Preservation Office (NCSHPO). Any development towards the north of the study area could be constrained by preservation regulations.

Adjacent Development and Infrastructure Projects

The Draft NCDOT 2025-2036 State Transportation Improvement Program (STIP)[3] commits funding to three infrastructure projects in the study area's vicinity. Project U-5928, underway, is the construction of a grade separated interchange for Apex Peakway at South Salem Street and the CSX railroad, while U-2901B

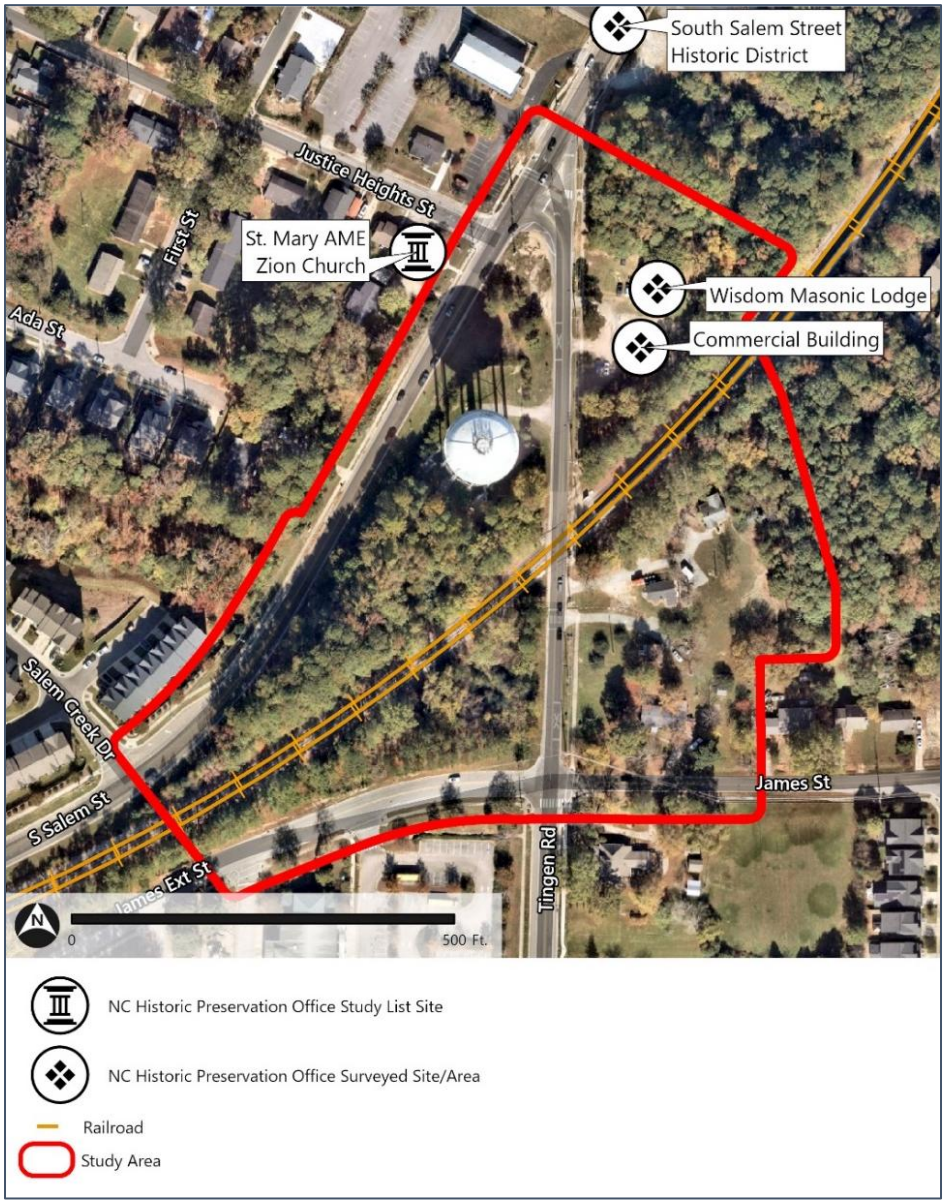

Figure 6: Historic Sites, BO-2416
Source: NC DNCR

[3] The final NCDOT 2026-2035 STIP is expected to be adopted in June 2025.

Memorandum

and U-2901A will widen NC 55 between Olive Chapel Road and US 1 and replace the CSX railroad bridge, respectively. Project BO-2422 will implement shared lane markings and bicycle lanes along South Salem Street between Chatham Street and Pleasant Plains Road.

NCDOT's Highway Maintenance Improvement Program includes resurfacing South Salem Street in 2026. NCDOT also funded a study to determine the feasibility of a mobility hub along the S-line within downtown Apex. The study proposes locating the mobility hub off E Moore Street, adjacent to the railroad tracks. Construction of the project is not currently funded. Aside from state funded projects, a privately developed office building is under construction on Justice Heights Street near the study area. There is a Town-funded project to extend Justice Heights Street to Apex Peakway.

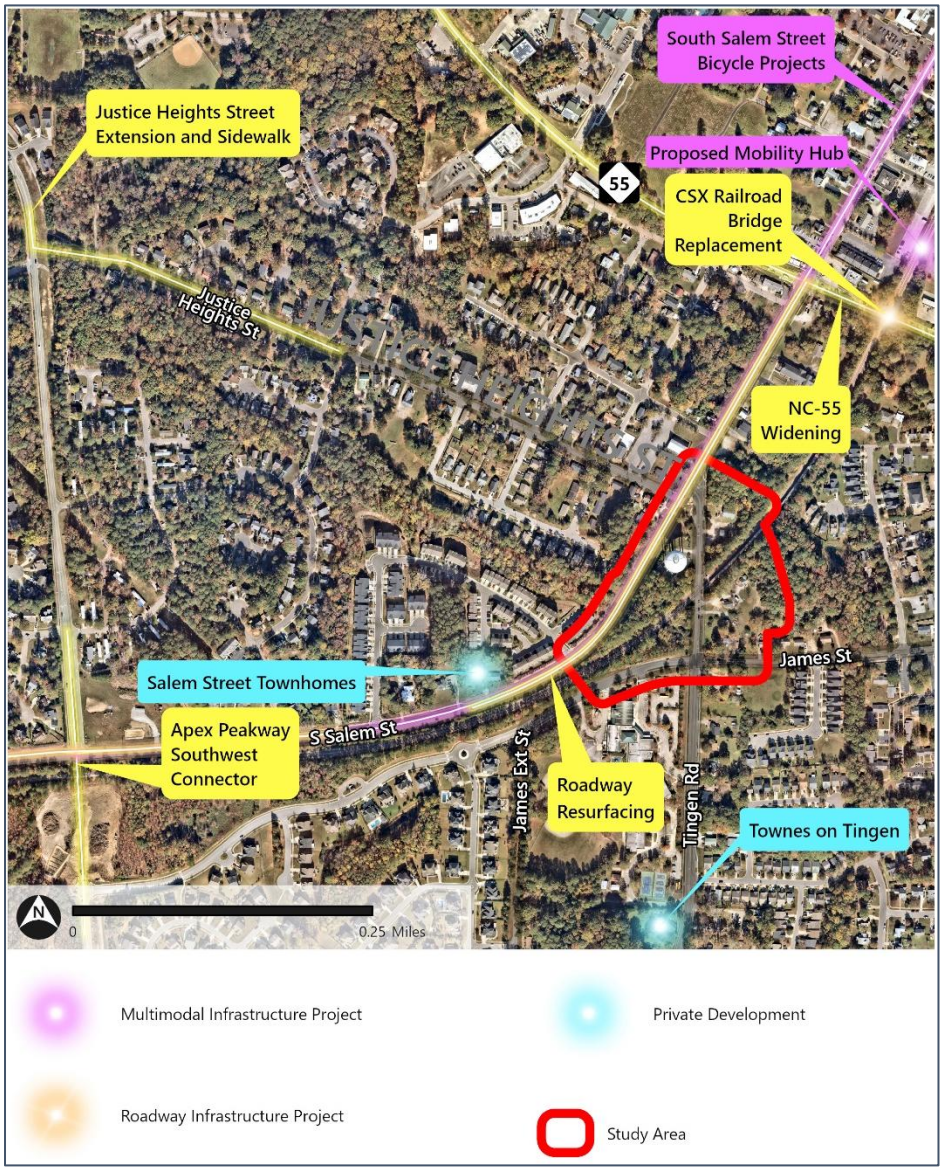

Figure 7: Adjacent Development and Infrastructure Projects, BO-2416

Source: Apex Development Dashboard, NCDOT GIS Unit

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Natural Environment

The site's environmental characteristics have implications for the viability of bridge and tunnel design alternatives. This section overviews the study area's natural features. A review of geoenvironmental concerns (such as underground storage tank facilities, brownfield locations, and hazardous waste sites) in the study area indicated one leaking UST incident site, which has previously been remediated.

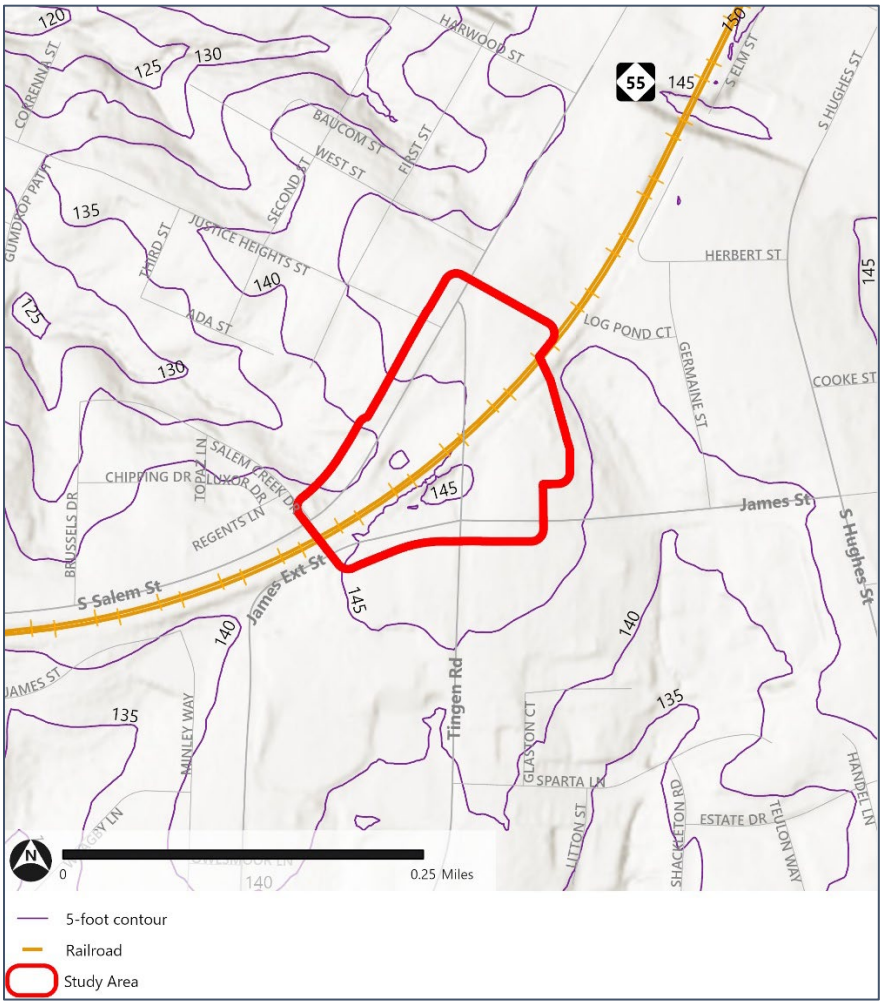

Figure 8: Topography, BO-2416
Source: US Geological Survey

Topography

From the at-grade crossing of Tingen Road and the CSX railroad, the study area slopes down to S Salem Street, dropping approximately 12 feet over approximately 350 feet. The site's topography is potentially conducive to tunnel alternatives.

Hydrology

No identified water resources or floodplains exist in the study area; however, per the NC Riparian Buffer Protection Program, a delineation must be conducted to determine the status of streams and other surface waters in the study area and to determine which Neuse riparian buffer rules may be applicable.[4] Additionally, NC Water Quality Standards require identifying mitigation measures to offset impacts on these hydrological features. These measures could include creating an on-site mitigation area, creating an off-site mitigation area, or paying an in-lieu fee to a private mitigation bank or the North Carolina Division of Mitigation Services (NCDMS).

Threatened and Endangered Species

Per a March 24, 2025 Information for Planning and Consultation (IPaC) screening through USFWS, no critical habits for threatened or endangered species exist within the project study area; however, the following threatened, endangered

[4] NCDOT ATLAS NC Hydrography, NC 24K Streams 2014 (both NCDOT GIS Unit), NC FEMA Effective Flood Zones (NCDPS), and USFWS National Wetland Inventory (USGS).

or proposed threatened species could be affected by project activities and should be evaluated further in future project phases:

- Tricolored bat (Perimyotis subflavus)
- Cape Fear shiner (Notropis mekistocholas
- Atlantic pigtoe (Fusconaia masoni)
- Monarch butterfly (Danaus Plexippus)
- Michaux's sumac (Rhus michauxii)

Tricolored bat

The tricolored bat is a very small member of the Vespertilionid bat family distinguished by its three-colored fur, which is dark at the base, light in the middle, and dark at the tip. On September 14, 2022, the U.S. Fish and Wildlife Service announced a proposal to list the tricolored bat as Endangered under the Endangered Species Act. In winter, tricolored bats are known to hibernate in caves and mines, and may also use culverts, tree cavities, or abandoned wells. During the active season, tricolored bats may be found in many parts of North Carolina and are known to roost in forested areas amongst leaves, as well as in bridges, culverts, and abandoned structures. The optimal survey window for this species is June 1 to August 15. An on-site evaluation of potential habitat within the project study area should be conducted prior to construction to determine if the project may affect the tricolored bat. If suitable habitat is identified, surveys or coordination with the USFWS may be needed.

Cape Fear shiner

The Cape Fear shiner is a North American species of freshwater fish in the minnow family. It is only found in the central part of North Carolina, in the Upper Cape Fear River Basin. Potential threats to the species and its habitat are caused by changes in streamflow and impoundments, runoff from agriculture and residential communities, road construction, wastewater discharge, and other development projects in the watershed that reduce the forested landscape. Surveys for this species may include visual and tactile methods. An on-site evaluation of potential habitat within the project study area should be conducted prior to construction to determine if the project may affect the Cape Fear shiner. If suitable habitat is identified, surveys may be needed.

Atlantic pigtoe

The Atlantic pigtoe is a freshwater mussel known from several Atlantic drainage river basins from Virginia to Georgia. Freshwater mussels rely on host fish species for the early stages of their life cycle. The Atlantic pigtoe and many other freshwater mussel species are highly susceptible to pollution, sedimentation, and stream impoundment. This species inhabits medium to large streams, creeks and rivers, typically preferring free-flowing waters with stable sand and/or gravel substrates. Surveys for this species may include visual and tactile methods. An on-site evaluation of potential habitat within the project study area should be conducted prior to construction to determine if the project may affect the Atlantic pigtoe. If suitable habitat is identified, surveys may be needed.

Monarch butterfly

On December 12, 2024, the U.S. Fish and Wildlife Service announced a proposal to list the Monarch butterfly (Danaus plexippus) as Threatened under the Endangered Species Act. Upon listing, USFWS is expected to provide habitat

description, area of influence/distribution range and limits of Critical Habitat for the Monarch butterfly. When this information is provided, it will help to inform NCDOT's determinations on habitat that could be impacted by NCDOT actions. If this species is formally listed and suitable habitat is identified, surveys may be needed.

Michaux's sumac

Michaux's sumac is a short, stout member of the cashew family. It can be differentiated from other, more common species of sumac by its densely pubescent stems and leaves and short stature. Michaux's sumac is restricted to open, rocky or sandy areas where some form of disturbance (fire, periodic clearing) maintains the open character and prevents succession. Typical areas inhabited by this species in North Carolina include fire-maintained forests, roadsides, field edges, and utility line rights-of-way. Surveys for this species are optimally conducted between May and October. An on-site plant-by-plant survey of potential habitat within the project study area should be conducted within the optimal survey window prior to construction to determine if the project may affect Michaux's sumac.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act is enforced by the USFWS. Golden eagles do not nest in North Carolina. Habitat for the bald eagle primarily consists of mature forests in proximity to large bodies of open water for foraging. Large, dominant trees are utilized for nesting sites, typically within 1 mile of open water. A bald eagle nest survey of suitable nesting habitat within the project study area and the area within 660 feet of the project limits should be conducted prior to construction to avoid impacts to this species or determine if a Bald and Golden Eagle Act permit may be required.

Memorandum

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Memorandum

Appendix A

Table A1. Community Profile

Demographic Parameter	DSA	Town of Apex	Wake County	North Carolina
Median age*	37.1	35.9	37.0	39.1
Unemployment rate	1.5%	4.1%	4.2%	5.1%
Commute alone by auto	91.8%	87.3%	87.2%	85.9%
Commute by carpool	7.6%	8.7%	8.5%	9.8%
Commute by public transportation	0.0%	0.1%	1.0%	0.9%
Commute by bike/ped	0.0%	2.8%	1.7%	2.0%
Commute by other mode	0.6%	1.1%	1.6%	1.4%
Median household income*	$88,795	$129,688	$96,734	$60,516
Occupied housing units	93.0%	94.4%	92.2%	86.6%
Vacant housing units	7.0%	5.6%	7.8%	13.4%
Median housing value*	$327,100	$458,200	$385,700	$234,900
Below Poverty Level	8.8%	2.9%	8.2%	13.3%
Under 50% of Poverty Level	3.4%	1.7%	4.0%	6.0%
Between 100% and 149% of Poverty Level	6.0%	3.6%	5.7%	9.1%
Total Persons Who Speak English Less than Very Well	6.3%	4.8%	6.1%	4.8%

*Medians reported as an average of the medians of the Census Block Groups comprising the DSA
Source: US Census Bureau, American Community Survey 5-year Estimates (2018-2022)

Appendix B

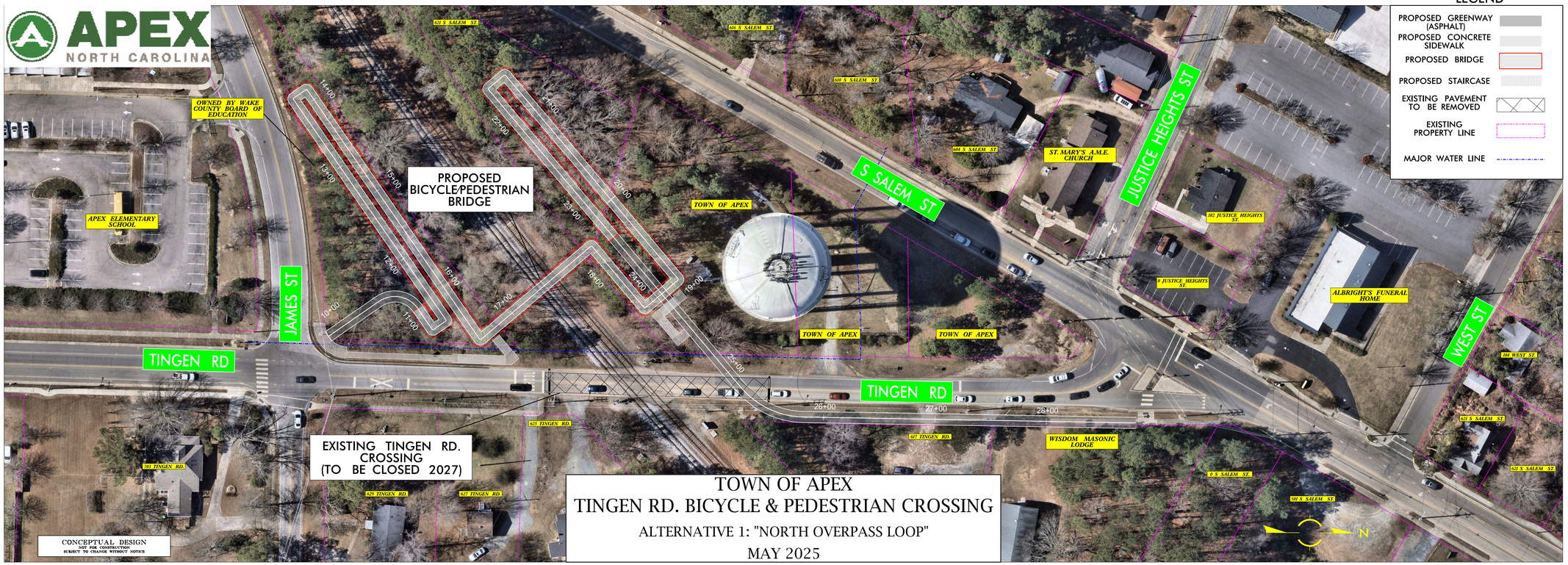
Concept Design Plans

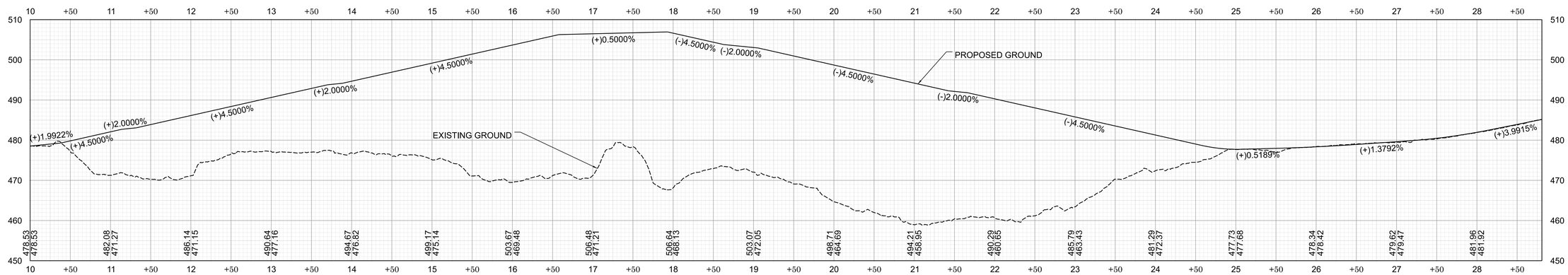
B1 – Alternative 1: North Overpass Loop
B2 – Alternative 2: Bridge Without Loops
B3 – Alternative 3: North and South Overpass Loops
B4 – Alternative 4: Tunnel

11/14/23

B1 - Alternative 1: North Overpass Loop

BD-2416
ALT | 1

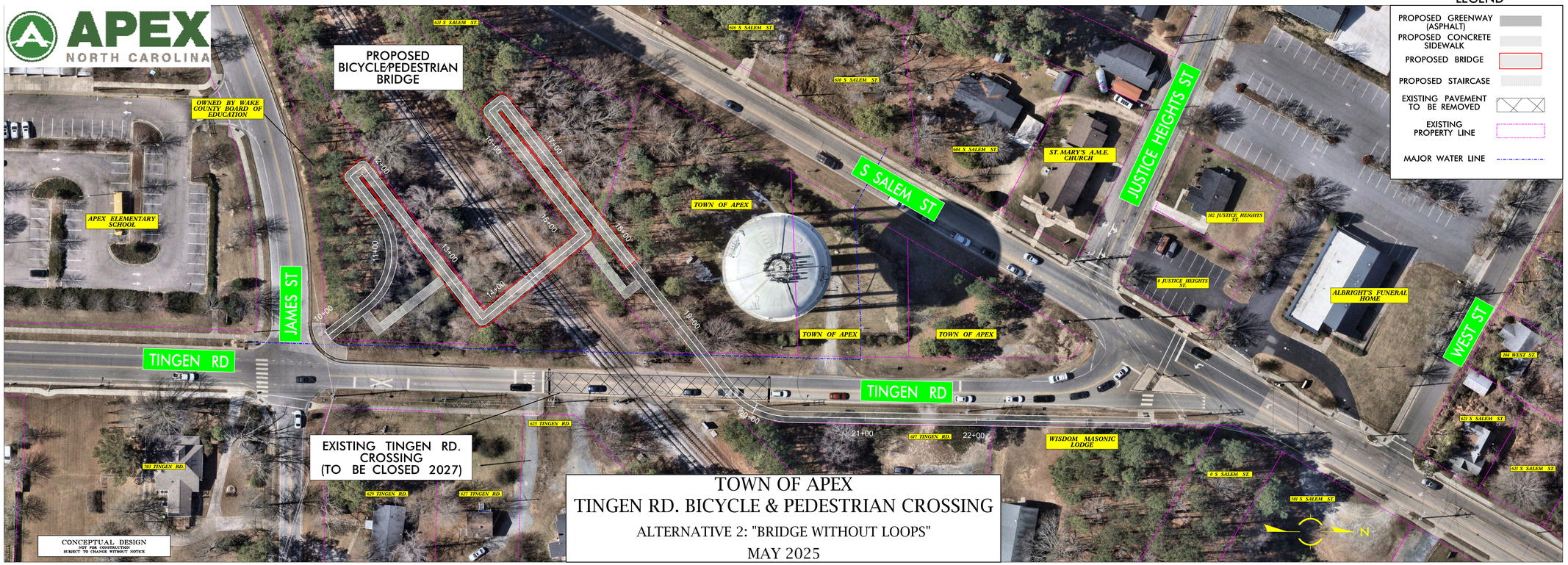


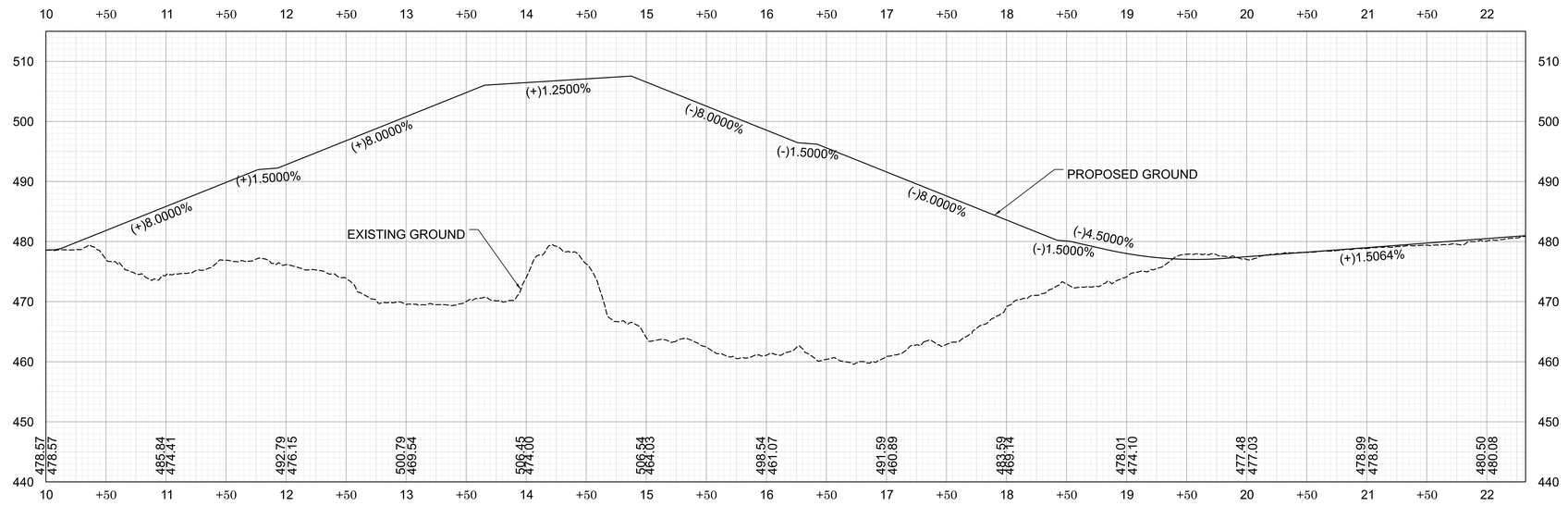


11/14/23

B2 - Alternative 2: Bridge Without Loops

BD-2416
ALT 2



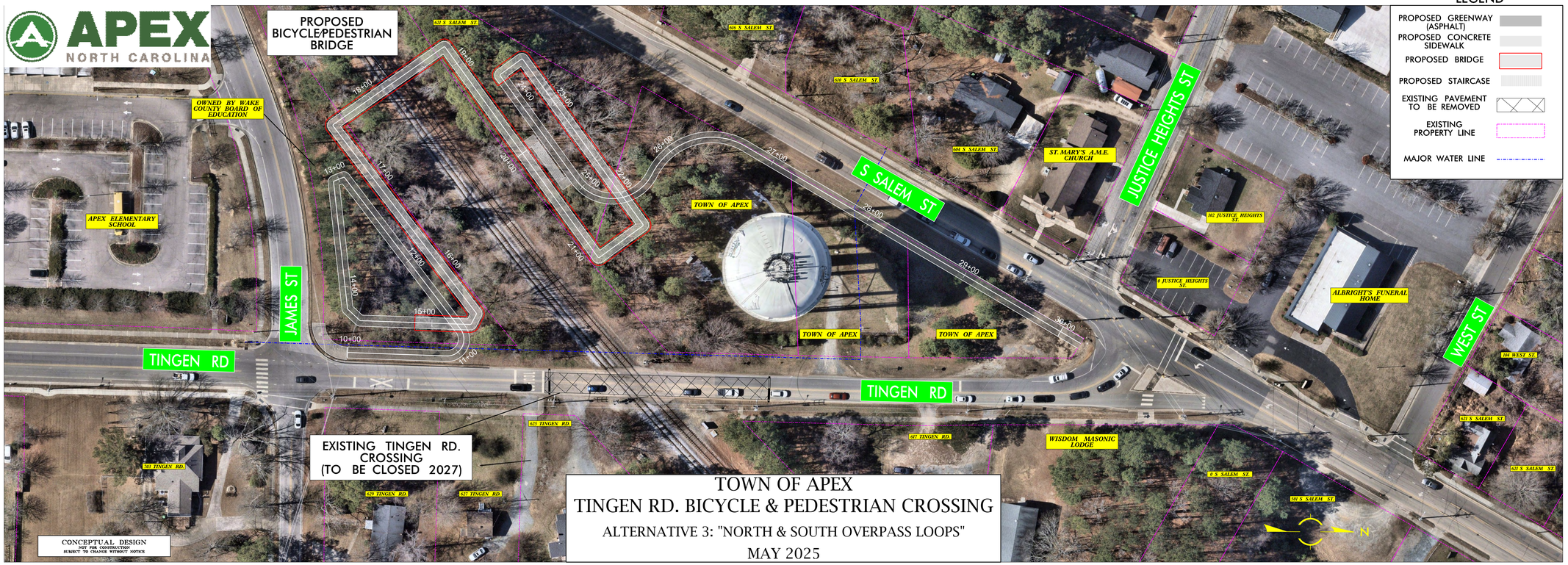


VHB/rsargent - 5/19/2025

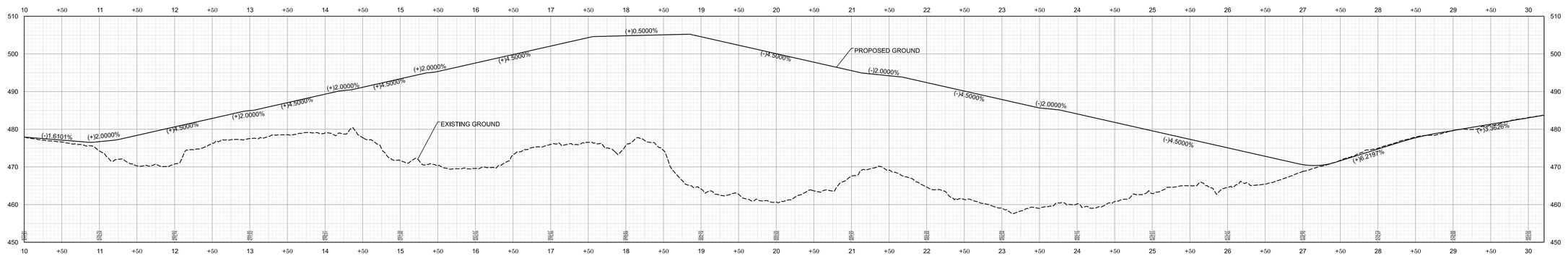
11/14/23

B3 - Alternative 3: North and South Overpass Loops

BD-2416
ALT 3



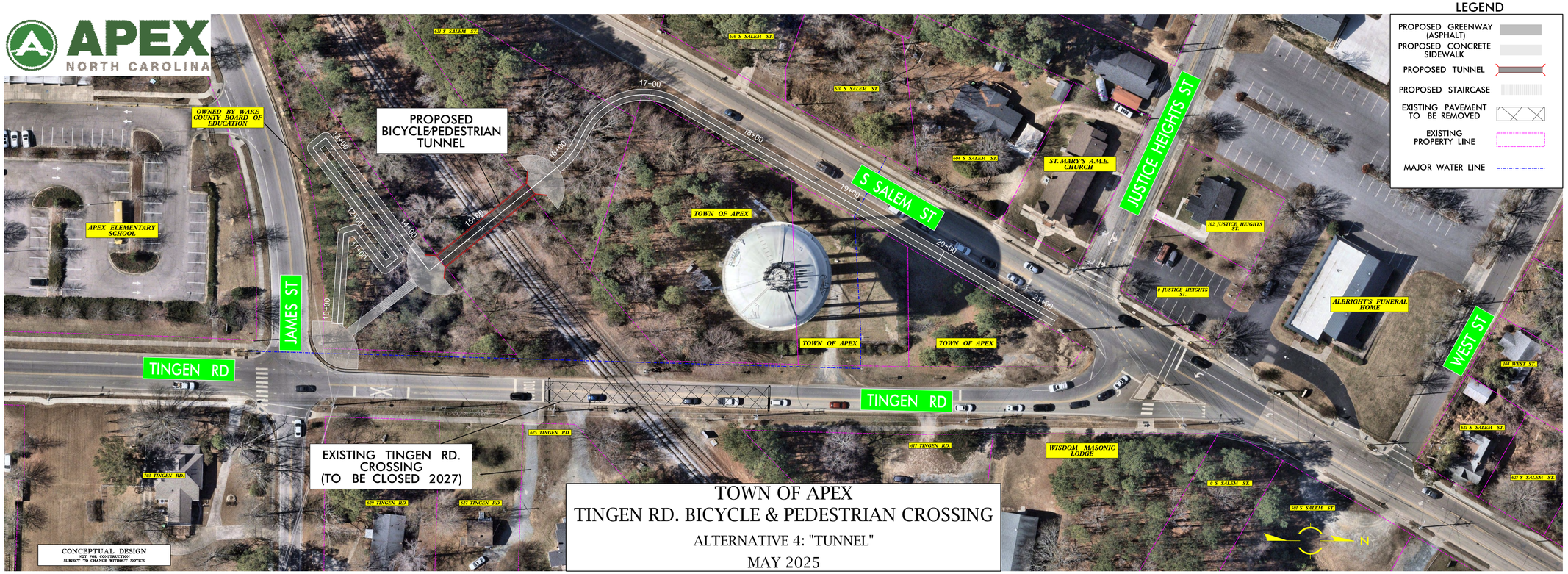
TOWN OF APEX
TINGEN RD. BICYCLE & PEDESTRIAN CROSSING
ALTERNATIVE 3: "NORTH & SOUTH OVERPASS LOOPS"
MAY 2025

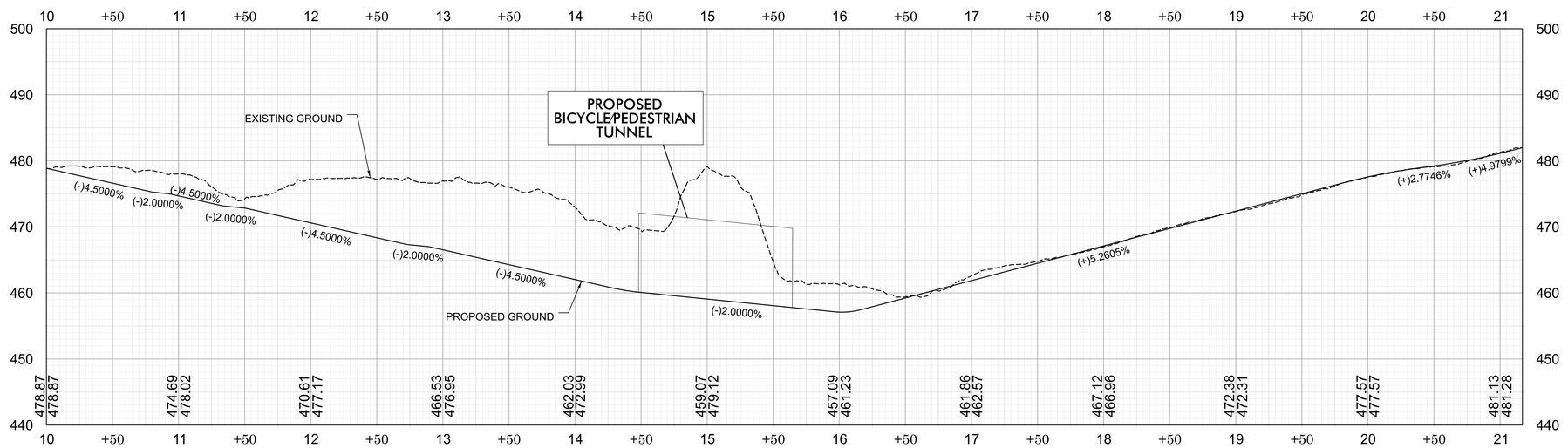


11/14/23

B4 - Alternative 4: Tunnel

BD-2416
ALT 4





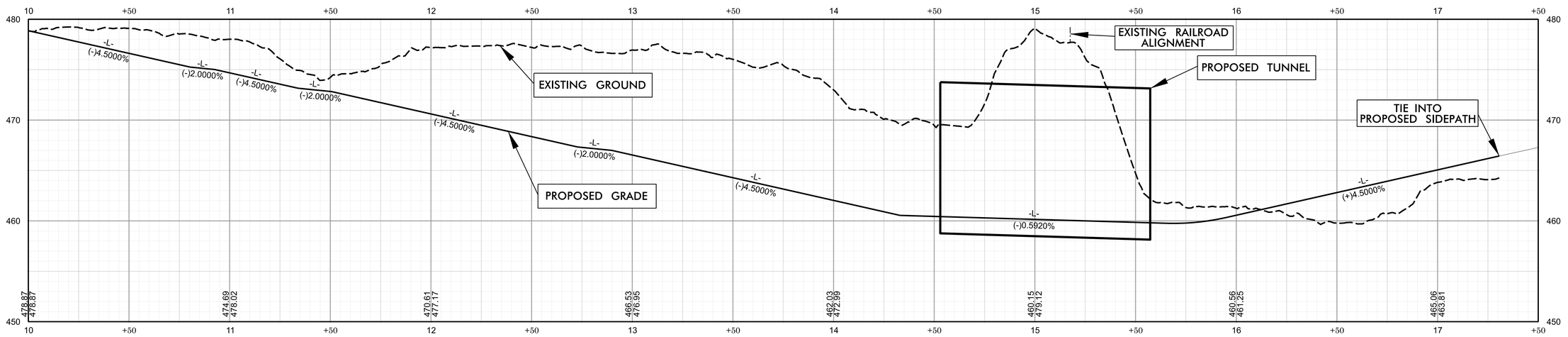
Appendix C

Preferred Alternative – Functional Design Plan

11/14/23

Preferred Alternative (Tunnel, refined)

BD-2416



Appendix D

Preferred Alternative – Visual Renderings

Tingen Road Bicycle & Pedestrian Crossing

From James Street, looking toward tunnel

Tingen Road Bicycle & Pedestrian Crossing

From James Street, looking toward tunnel

Tingen Road Bicycle & Pedestrian Crossing

From railroad, looking toward James Street

Tingen Road Bicycle & Pedestrian Crossing

Switchback detail, on James Street side

Tingen Road Bicycle & Pedestrian Crossing

From S. Salem Street, looking toward tunnel

Tingen Road Bicycle & Pedestrian Crossing

From railroad, looking toward S. Salem Street

Appendix E

Detailed Cost Estimate

North Carolina Department of Transportation
Preliminary Estimate

Feasibility County: **Wake**

Route Tingen Rd - Bike/Ped Tunnel
From

CONSTR. COST
$8,567,735

Drainage Type Curb & Gutter, Shoulder

Date 2/23/2026

Prepared By: VHB
Requested By: Town of Apex
Priced By:

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
M			Mobilization	1	LS		$ 283,165.25
M			Construction Surveying	1	LS	$ 100,000.00	$ 100,000.00
			Clearing and Grubbing	4.0	Acre	$ 45,000.00	$ 180,000.00
G			Supplemental Clearing and Grubbing	1	Acre	$ 16,500.00	$ 16,500.00
			Earthwork				
G			Unclassified Excavation	5,020	CY	$ 40.00	$ 200,800.00
G			Waste	3,880	CY	$ 15.00	$ 58,200.00
G			Removal of Existing Pavement (Asphalt or Concrete)	320	SY	$ 12.00	$ 3,840.00
G			Landscaping	1	LS	$ 50,000.00	$ 50,000.00
			Drainage				
D			Drainage New Location - Typical Section / C&G / Shoulder (L or Y Line)	0.20	Miles	$ -	$ 200,000.00
D			Drainage Existing Location - Typical Section / C&G / Shoulder (L or Y Line)	0.20	Miles	$ -	$ 25,000.00
			Pavement (Asphalt or Concrete)				
P1			Fine Grading	2,280	SY	$ 3.00	$ 6,840.00
P1			Aggregate Base Course (ABC)	738	TONS	$ 50.00	$ 36,900.00
P1			Asphalt Conc Base Course, Type B25.0C	20	TONS	$ 85.00	$ 1,700.00
P1			Asphalt Conc Intermediate Course, Type I19.0C	20	TONS	$ 75.00	$ 1,500.00
P1			Asphalt Conc Surface Course, Type S9.5C	40	TONS	$ 78.00	$ 3,120.00
P1			Asphalt Binder Plant Mix	5	TONS	$ 850.00	$ 4,250.00
P1			Subgrade Stabilization	10	TONS	$ 40.00	$ 400.00
P1			Incidental Milling	500	SY	$ 13.00	$ 6,500.00
P2			2'-6" Concrete Curb and Gutter	820	LF	$ 35.00	$ 28,700.00
P2			4" Concrete Sidewalk	575	SY	$ 90.00	$ 51,750.00
P2			6" Concrete Sidewalk	460	SY	$ 100.00	$ 46,000.00
P2			Curb Ramp	7	EA	$ 5,175.00	$ 36,225.00
P2			Bicycle Ramp	1	EA	$ 6,500.00	$ 6,500.00
			Fencing				
F			Chain Link (Black Vinyl Coated)	1,200	LF	$ 30.00	$ 36,000.00
F			Chain Link Line Posts (Black Vinyl Coated)	100	EA	$ 130.00	$ 13,000.00
F			Chain Link Terminal Posts (Black Vinyl Coated)	6	EA	$ 180.00	$ 1,080.00
			Handrail	600	LF	$ 100.00	$ 60,000.00
L			**Erosion Control**				
S			L or Y Line	4.00	Acres	$ 35,000.00	$ 140,000.00
			Signing				
S			L or Y Line	0.20	Miles	$ -	$ 75,000.00
			Traffic Control				
Y			(L or Y Line)	0.20	Miles	$ -	$ 75,000.00
			Pavement Markings				
PM			Thermo and Pavement Marking (Typical Section - L or Y)	0.20	Miles	$ -	$ 75,000.00
			Signals				
Z			Traffic Signal (New)	1	Each	$ 250,000.00	$ 250,000.00
Z			Traffic Signal (Removal)	1	Each	$ 50,000.00	$ 50,000.00
			Structures				
S			BOX CULVERT EXCAVATION	1	LS	$ 500,000.00	$ 500,000.00
S			FOUNDATION CONDITIONING MATERIAL	300	TON	$ 125.00	$ 37,500.00
S			CLASS A CONCRETE (CULVERT)	350.0	CY	$ 1,500.00	$ 525,000.00
S			REINFORCING STEEL (CULVERT)	60,000	LB	$ 3.00	$ 180,000.00
S			JUMP SPAN	1	LS	$ 1,500,000.00	$ 1,500,000.00
S			LIGHTING	1	LS	$ 75,000.00	$ 75,000.00
S			CSX CONSTRUCTION AGREEMENT	1	LS	$ 400,000.00	$ 400,000.00
			Walls				
W			Gravity Retaining Walls(Length x Avg Height)	5,150	SF	$ 140.00	$ 721,000.00
W			Handrail	300	LF	$ 400.00	$ 120,000.00
			Utility Construction				
U			Relocate Existing Water Line	200	LF	$ 275.00	$ 55,000.00
U			Relocate Existing Fire Hydrant	1	Each	$ 10,000.00	$ 10,000.00
U			Dry Utility relocation costs	1	LS	$ 100,000.00	$ 100,000.00

Lgth **0.2**

Contract Cost ..... $ 6,346,470.25
Contingency (35%) ..... $ 2,221,264.59
Construction Cost ..... **$ 8,567,734.84**

Appendix F

Public Engagement Summaries

Memorandum

To: Russell Dalton
Town of Apex
73 Hunter Street
Apex, NC 27502

Date: July 29, 2025

Project #: BO-2416 Tingen Road Bicycle and Pedestrian Crossing

From: VHB Engineering NC, P.C.

Re: Public Engagement Summary

Engagement Activities Summary

Public engagement for BO-2416 has included outreach to identified key stakeholders for targeted input and as well as a public meeting. This round of engagement solicited feedback on high-level design concepts for four crossing alternatives.

Project Website

The Town's Sidewalk, Bike, and Transit Projects website includes a project overview and notification of the public meeting, along with a link to the project specific information website which is also hosted by the Town within the Apex, NC Engagement Hub through PublicInput.com. The project website informed the public about the feasibility study, provided illustrations of the feasibility design alternatives, and included information about the design charrette. The website was advertised by postcards mailed to nearby property owners and current residents. The site also included project staff contact information and a digital comment form. The "Get Involved" page includes all materials that were used at the design charrette and public meeting, including an option to provide comments.

The online comment form was open from June 3 – June 17, 2025. 17 individuals submitted responses.

Stakeholder Design Charrette

In addition to the website, a Stakeholder Design Charrette was conducted on May 22, 2025 at the Town's Senior Center. The Town hosted a Design Charrette from 1-3 PM, inviting a group of key stakeholders to meet with the project team and provide input on the project and conceptual design options from the perspective of their role in the community. 17 people attended the meeting, including representatives from the Town, Apex Elementary School, NCDOT Rail Division, CAMPO and the Justice Heights neighborhood. The project team presented project background, conducted a virtual site visit, and held interactive discussions regarding project vision and design concept reviews. Attendees were also asked to complete a short input survey at the end of the formal meeting.

During an open discussion about the need and vision for the project from the standpoint of the key stakeholders, attendees discussed valuable benefits, potential impacts or burdens, as summarized below.

Valuable Benefits

- Maintenance of multimodal connectivity, both in the immediate project vicinity and as part of the regional greenway network
- Provision of a safe crossing of the railroad
- Act as a gateway to Downtown Apex, supporting local businesses
- Serve the local community that depends on multimodal travel options, not vehicles only
- Keep pedestrian/bicycle travel routes to Downtown Apex shorter, avoiding Apex Peakway or NC 55 options

Memorandum

Potential Impacts or Burdens

- A need to protect and secure the water supply infrastructure, given the proximity to the water tower
- Project cost implications, including construction and maintenance costs, as well as competing for priority with other projects for funding
- Design constraints in the area that could affect/dictate grade and accessibility
- Potential visual and property impacts affecting local neighborhood
- Need for safety and security considerations for future users
- Complexity of construction

Finally, stakeholders defined user experience, cost and safety as the primary evaluation criteria to be considered in selecting a preferred alternative.

Community Benefits & Public Art

Overall, the stakeholder group agreed that the crossing project was needed and would be a positive addition to the community and the overall active transportation network within Apex as well as regionally by providing a safe and consistent access option. The crossing could provide numerous benefits such as a parking demand reduction in Downtown if residents are choosing to walk or bike and the opportunity to create an inviting public space by incorporating art alongside a functional connective design. The public art could highlight the history and culture of the project area. Some stakeholders voiced a preference for a bridge option, which is likely more expensive, but could provide a greater visual impact, creating a "gateway" into Downtown from the project area.

Preliminary, relative cost comparisons show that the tunnel, Alternative 4, is likely to be the most cost-effective option, which was also appealing to the stakeholders.

Direct Route & Safety

During the stakeholder charrette, it was also discussed that the tunnel option would provide the most direct route with the shortest overall crossing distance and structure length. Comments were made about how people may decide to make an unsafe, at-grade option if a bridge with a long or steep path was constructed. While attempts would be made to block these unsanctioned crossings, such as bollards, guard rail or fencing, it is unlikely that all unsafe crossings would be prevented. It was also noted that a bridge may be perceived as a safer option by the public compared to a tunnel.

Pedestrian Crossings of S Salem Street at Tingen Road/Justice Heights Street

Another open discussion topic was the desire to maintain the pedestrian crossing features at the existing S. Salem Street/Tingen Road/Justice Heights Street intersection. There was a general consensus that some kind of signalized crossing was preferred at this location to maintain connectivity for underserved neighborhoods in the vicinity, connecting these neighborhoods with each other as well as destinations such as Downtown and West Street Park. It was noted that the existing pedestrian infrastructure could likely remain; but coordination with NCDOT should be pursued if the project moves forward. The eventual connection of Justice Heights Street to Apex Peakway may provide continued justification for signalized pedestrian crossings at this location, due to conflicts between pedestrian and vehicular movements.

Memorandum

Design Considerations

Regardless of the alternative chosen, it should be noted that there is a 16" waterline present in the project area, and coordination should be undertaken early and often to ensure the protection of that waterline and the overall security of the water tower as a primary source of water for the Town.

A few design specific comments were also offered, including the minimization of crossings needed for pedestrians to cross from the project to the west side of Salem Street and the suggestion to include "runnels" in the design which are channels designed alongside or within staircases to allow cyclists to easily wheel their bikes up or down the steps.

Key Takeaways & Next Steps

Input from the discussions as well as the survey was recorded, reviewed and is being incorporated into project development. In general, it is agreed the crossing is needed and is a viable project that will work in coordination with the overall greenway and pedestrian connectivity plans of the Town, with cost and safety implications being key considerations.

Public Design Charrette

Following the Stakeholder Design Charette, an open-house style public meeting was held from 4-6 PM. 46 people attended the meeting. The project team facilitated conversations at six information stations including:

- Sign-in/Welcome Table
- Project Overview
- Purpose and Vision
- Virtual Site Visit
- Alternative Designs
- Comment Table

These stations had a combination of hardcopy, large format information boards, digital visuals and options for attendees to provide input on the boards with markers, sticky notes and colored dots.

Specifically, at the Purpose and Vision station, attendees could write their thoughts on the same questions posed to the stakeholders at their meeting and tag them onto a board. These responses are summarized below.

<u>Valuable Benefits</u>

- Maintenance of multimodal connectivity, both in the immediate project vicinity and as part of the regional greenway network; connect multiple local neighborhoods to downtown and each other, creating a sense of community
- Provide safe access to Apex Elementary School and Downtown Apex
- Create an inviting space through visual interest using art
- Encourage an overall decrease in traffic if more people bike and walk due to the crossing
- Less noise from the trains as-grade crossings will no longer occur.

<u>Potential Impacts or Burdens</u>

- Need for safety and security considerations for future users; cleanliness of crossing structure
- Need connectivity to proposed side paths

Memorandum

- Potential visual and property impacts affecting local neighborhood; increased light at entrance points to a tunnel; maintain as many trees as possible
- Concern if the crossing produces a new roadway crossing that is not at a signal
- Concern that grades, even 5%, are too steep for bikers
- Cost, obtaining funding
- Construction impacts on traffic, particularly around Apex Elementary School

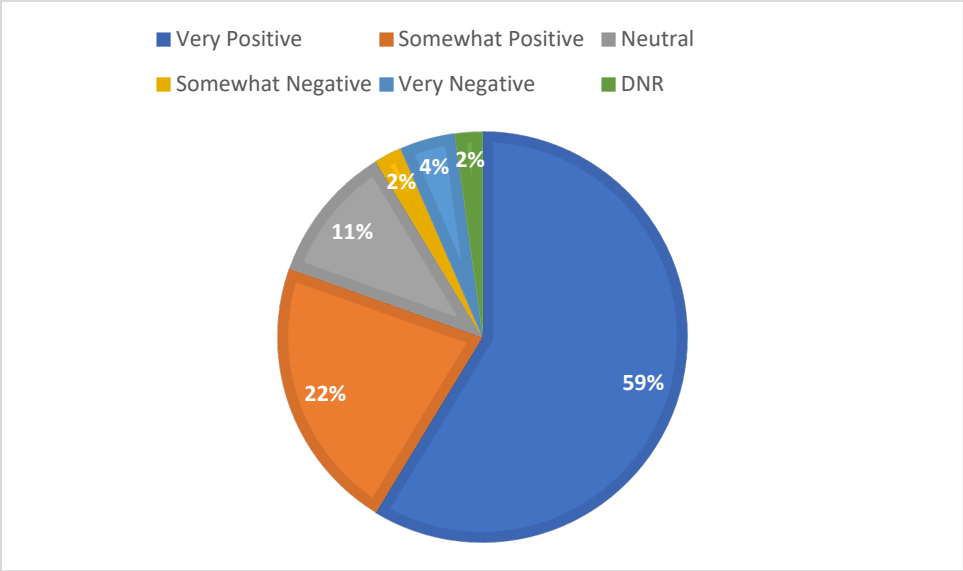
Attendees noted generally the same primary evaluation criteria that were important to be considered in selecting a preferred alternative as the stakeholders, including safety and cost.

Public Meeting Comments and Response to Comments

Of the 46 public meeting attendees, 30 completed comment forms at the meeting and 26 provided an open-ended comment form response. In addition to the comments received in person at the public meeting, comments were also received via the online comment form.

Respondents were asked to give their overall impression and support of the project. Of the 46 individual responses (30 from the in-person meeting and 17 online submittals), 81% responded with "very positive" or "somewhat positive" support for the project, as shown in Table 1.

Table 1 – Overall Impression of the Proposed Project



Respondents were also asked to rank their preference for the presented alternatives. In person meeting respondents ranked only their top preference, while those submitting via the website had the option to rank some or all alternatives in preference order. Table 2 summarizes the preference rankings received at the public meeting and via the website. Table 3 presents a summary of the top preference only for those rankings.

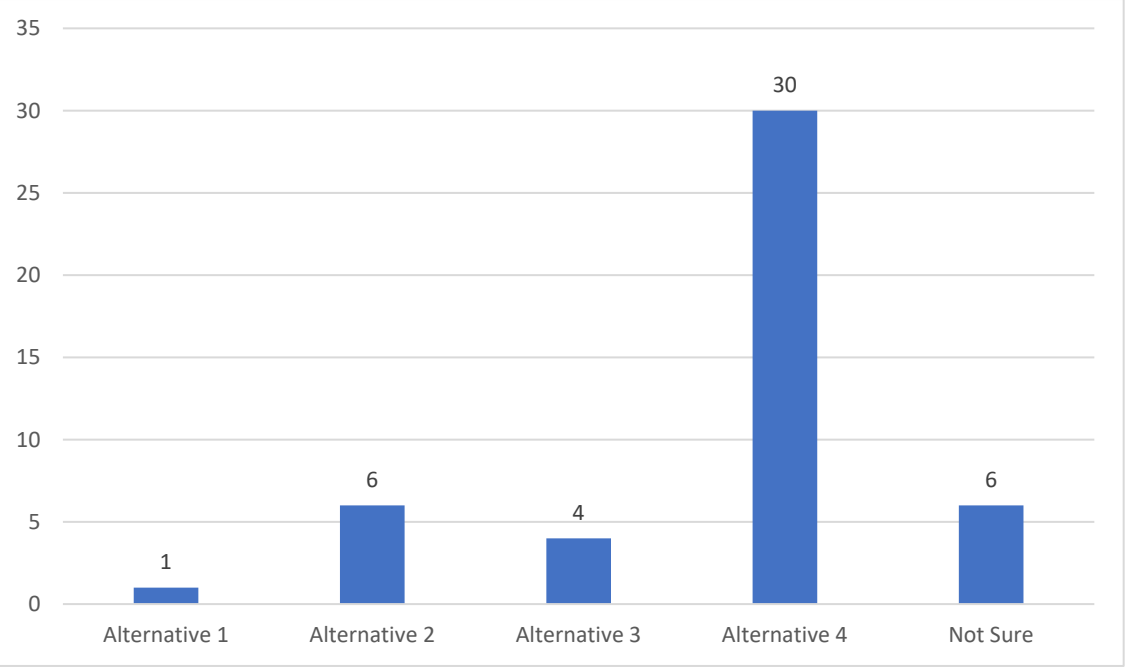
Memorandum

Table 2 – Alternative Preferences

Alternative	Public Meeting Responses (top preference)	Website Responses*			
		Rank 1	Rank 2	Rank 3	Rank 4
Alternative 1 - North Overpass Loop	1	0	3	3	1
Alternative 2 - Bridge without Loops	4	2	3	2	0
Alternative 3 - North and South Overpass Loops	3	1	1	2	3
Alternative 4 - Tunnel	19	11	2	0	2
Not sure/Did not respond	3	3	1	1	0
Total Respondents	**30**	**17**	**10***	**8***	**6***

*Some, but not all, respondents gave rankings to all alternatives. Every commentor provided at least a top choice, while some ranked 2, 3 or all 4 in preference order; thus, the total respondent counts per rank do not each add to 17.

Table 3 – Top Alternative Preference



Results taken from in-person and website responses to alternative ranking question

Table 4 summarizes of all open-ended comments received and responses to those comments, as needed. Comments were grouped into themes and sub-themes:

Memorandum

Table 4 – Public Comments and Responses

Comment	Frequency	Response
1. Project Costs		
a. Is the cost a good investment? Is the cost justified given the limited number of users?	4	The current at-grade crossing of the CSX railroad is required to be permanently closed, and CSX has indicated the intent to install fencing, which would sever pedestrian connectivity if left unaddressed. If Town Council recommends proceeding with final design, construction of the project would ultimately be subject to the Town's annual Capital Improvement Program (CIP) prioritization. The CIP prioritization process considers the availability of both local and non-local funding and compares against the needs for other capital projects based on a variety of factors. The project inventoried existing and planned active transportation infrastructure, pedestrian activity centers, and transit-oriented development within the study area. The area features an existing sidewalk network, crossing improvements at signalized intersection, an elementary school, and a planned mobility hub as part of the S-Line at E. Moore Street. Preserving north-south pedestrian connectivity aligns with the Town of Apex's Vision Zero, a commitment to eliminating traffic deaths and serious injuries, and the Advance Apex: The 2045 Transportation Plan's recommendation to provide sidewalks in areas within ½ mile of existing and planned schools, ensuring a safe route to school is available.
2. Pedestrian Network Connectivity and Safety Concerns		
a. Children should have safe access to Apex Elementary; if a bridge alternative is selected, ensure that children cannot jump.	5	The current at-grade crossing of the CSX railroad is required to be permanently closed, which would sever north-south pedestrian connectivity. The project team examined a quarter-mile walkshed and determined the neighborhoods north of the CSX railroad would lose efficient access to Apex Elementary School under the No-Action alternative, as the nearest railroad crossing would be along E. Williams Street. The construction of a pedestrian crossing would support a safer and more efficient route to Apex Elementary School. The bridge alternatives include a minimum railing height of 54 inches. The portion over the railroad and/or roadway could be fully enclosed if it is determined necessary by local officials and the community.
b. Avoid creating a space for panhandlers.	1	A key objective of the feasibility study is to enhance pedestrian and bicycle safety. The project includes landscaping, which promotes visibility and accessibility, an effective

Memorandum

Comment	Frequency	Response
		practice in crime prevention through environmental design (CPTED). The project will continue to work with local authorities to incorporate CPTED.
c. Requests that the tunnel alternative include adequate or abundant lighting and art to reduce crime, improve safety, visibility, and comfort for pedestrians and bicyclists. General tunnel safety concern.	10	The Town of Apex and the project design team are committed to developing a pedestrian crossing that is safe and welcoming to all users. The shortest feasible tunnel length would be used to allow pedestrians and bicyclists to see from end to end, ensure it feels open, and maximize the amount of natural light. To ensure the tunnel is inviting, Alternative 4 – Tunnel would include lighting and staff recommend that artwork either be included or accommodated for future installation in the tunnel design. Staff will work with the Public Art Committee to identify potential public art locations and process to incorporate art either as part of the project or following the project. In response to feedback from residents, the project team is examining motion-activated lighting. Lastly, regular maintenance of tunnels, including cleaning, repairing, and landscaping, is an effective practice of CPTED that has been shown to deter crime.
3.Design Comments, Concerns or Recommendations		
a. Will the project connect to the sidewalk or, better yet, a greenway? Will pedestrian access to Justice Heights Street be maintained?	4	The project would connect to the existing sidewalk network along S. Salem Street to the north, James Street to the south, and Tingen Road to the south. A pedestrian crossing would preserve north-south pedestrian connectivity, and in the long term, could provide a north-south connection for planned greenways in the vicinity of the railroad crossing. A map of the Town's existing and planned greenways is available online at: https://www.apexnc.org/DocumentCenter/View/31725/Bicycle-and-Pedestrian-System-Plan-Map-PDF. A sidewalk connection would be maintained to Justice Heights Street at the intersection with Tingen Road.
b. Repurpose Tingen Road to provide the pedestrian and bicycle path.	1	The current at-grade crossing of the CSX railroad is required to be permanently closed, and without a pedestrian crossing of the CSX railroad, any pedestrian and bicycle improvements along Tingen Road would lack north-south connectivity.
c. Utilize the existing right-of-way along Tingen Road, as it would shorten the crossing and save money.	1	The crossing of CSX railroad needs to be approximately perpendicular and that requires a shift either east or west of the existing crossing. The design team examined the nearest possible perpendicular crossing, minimizing impacts to homes, businesses, and utilities. Constructing the pedestrian crossing west of Tingen Road would avoid residential relocations and minimize utility relocations, thereby reducing construction costs. In addition, Alternative 2 – Bridge without Loops examined a direct approach and a limited

Memorandum

Comment	Frequency	Response
		bridge length. The resulting approach grade is 8 percent, which is considered steep and may be difficult for some users to travel.
d. Recommendations on where the project should connect to existing sidewalks. (1) A connection to the west side of S. Salem Street would provide better access and reduce the need for additional sidewalk construction. (2) A connection to Tingen Road instead of Salem Street would provide more direct access downtown.	5	(1) The project team examined a midblock crossing of S. Salem Street. It was determined that maintaining pedestrian crossings at Tingen Road and S. Salem Street, a signalized crosswalk, would be the safer option. (2) Under each alternative, pedestrian access to Tingen Road is maintained. Alternative 3 – North and South Overpass Loops and Alternative 4 – Tunnel would construct additional sidewalk along S. Salem Street that would connect pedestrians to Tingen Road.
e. Recommendation for the design to account for the high speeds encountered on grades, especially as related to braking and turning speeds for skateboards, rollerbladers and other users that do not have mechanical braking systems, noting that the tunnel alternative is safest for these users.	3	The design team will work to minimize the grades used in the design, especially for alternative user needs.
f. Concern regarding impacts on trees affecting wildlife, noise, and/or community character.	3	Construction of a pedestrian crossing would result in the removal of trees. The project team is working to minimize tree removal to the extent possible. If the design of the pedestrian crossing is advanced, the project will conduct ecological surveys to ensure that no adverse impacts on wildlife or essential/critical habitats occur. Following construction, the project would include tree replanting and landscaping to help reduce the number of trees removed.
g. Comments that expressed a preference for the shortest path.	5	The project team will consider travel distance as a major factor when selecting the preferred alternative. Path lengths from James St to S. Salem Street (Bicycle/ADA, Walk with staircase): • Alt 1 – North Overpass Loop: 1,880 ft, 850 ft • Alt 2 – Bridge without Loops: 1,355 ft, 880ft • Alt 3 – North and South Overpass Loops: 2,020 ft, 1,520 ft • Alt 4 – Tunnel: 1,115 ft, 780 ft
h. Comments that expressed project support.	11	Thank you for your comment.

Memorandum

Comment	Frequency	Response
i. Comments that are not related to design or funding of the potential pedestrian and bicycle crossing.	5	Thank you for your comment.

Table 5 outlines the reasons for support or opposition for each alternative as included in the written comments received at the public meeting and online submittals.

Table 5 – Public Comment on Reasons for Support or Opposition of Crossing Alternatives

Alternative	**Reasons to Support**	**Reasons to Oppose**
Alternative 1 - North Overpass Loop	n/a	Expensive (4) Long/steep crossing distance (4) User safety
Alternative 2 - Bridge without Loops	Shortest bridge option	Expensive (3) Long/steep crossing distance (3) User safety
Alternative 3 - North and South Overpass Loops	Enhances community character	Expensive (3) Long/steep crossing distance (3) User safety (3)
Alternative 4 - Tunnel	Lowest cost/cost effective (4) Positive visual impact, opportunity to incorporate art (3) Simplest solution (2) Lowest overall impact Most direct/shortest crossing option Safest option	User safety (3) Expensive (2) Long crossing distance Potential Vandalism Potential smell Negative visual impact Drainage concerns

(X) indicates total number of times reason was mentioned

BO-2416 Public Meeting #2 Summary

Town of Apex - Tingen Road Bicycle and Pedestrian Crossing Feasibility Study

Public Meeting #2

The public meeting was held on November 17, 2025 at the Town of Apex Senior Center, Salem Room, from 4-6 p.m. At the public meeting, project team facilitated conversations at four (4) information stations including:

- Sign-in/Welcome Table
- Project Overview/Background
- Preferred Design (plan view drawings, typical section details, model renderings)
- Comment Table (open ended form)

These stations had a combination of hardcopy, large format information boards and digital visuals.

26 people attended the meeting and five people completed a comment form. The online comment submission period was open from November 14 - 28, 2025 and 12 individuals submitted responses.

Public Meeting Comments and Responses

Below is a summary of all comments received and responses to comments, as needed.

Major discussion topics:

- Questions or concerns regarding the value of the project versus the cost/investment.
- Questions or concerns regarding pedestrian safety and access.
- Design comments, concerns and recommendations.
- General support for the preferred alternative.

Preferred Design Alternative:

1. **Project Costs**

a. Is the cost a good investment? Is the cost justified given the limited number of users?

The current at-grade crossing of the CSX railroad at Tingen Rd. is required to be permanently closed, which would sever pedestrian connectivity if left unaddressed. In part, the purpose of the feasibility study is to determine the need for the project and whether to proceed with final design plans for a pedestrian crossing.

The project inventoried existing and planned active transportation infrastructure, pedestrian activity centers, and transit-oriented development within the study area. The area features an existing sidewalk network, signalized pedestrian crossings, an elementary school, GoApex Route 1 bus stops, and a planned mobility hub as part of the S-Line at E. Moore St. Preserving north-south pedestrian connectivity aligns with the Town of Apex's Vision Zero, a commitment to eliminating traffic deaths and serious injuries, and the Advance Apex: The 2045 Transportation Plan's

recommendation to provide sidewalks in areas within ½ mile of existing and planned schools, ensuring a safe route to school is available.

2. Pedestrian Safety and Access Concerns

a. Children should have safe access to Apex Elementary

The current at-grade crossing of the CSX railroad is required to be permanently closed, which would sever north-south pedestrian connectivity. It was determined that neighborhoods north of the CSX railroad would lose efficient access to Apex Elementary School under the No-Action alternative, as the nearest railroad crossing would be along E. Williams St., adding approximately 1 mile to the route. The second closest pedestrian crossing adds approximately 1.4 miles to the trip via James St. to the Apex Peakway bridge. The construction of a pedestrian crossing would support a safer and more efficient route to Apex Elementary School.

b. Requests that the tunnel alternative include adequate or abundant lighting and art to reduce crime, improve safety and comfort for pedestrians and bicyclists. General tunnel safety concern.

The Town of Apex and the project design team are committed to developing a pedestrian crossing that is safe and welcoming to all users. The shortest feasible tunnel length would be used to allow pedestrians and bicyclists to see from end to end, ensure it feels open, and maximize the amount of natural light. To ensure the tunnel is inviting, it would include lighting. In response to feedback from residents, the project team is examining motion-activated lighting. Staff also recommend the tunnel design either include artwork or accommodations for future art installation. Staff plan to coordinate with the Culture and Arts Advisory Board on public art for this project. Lastly, regular maintenance of tunnels, including cleaning, repairing, and landscaping, is an effective practice that has been shown to deter crime.

c. Explain pedestrian access during construction.

Pedestrian access across the railroad on Tingen Rd. will be eliminated concurrent with the opening of the nearby Apex Peakway Southwest connector project; pedestrian and bicycle access will shift to the new bridge over S Salem St. at that time. During construction of the tunnel as well as the realignment of Tingen Rd. at Salem St., existing sidewalks along James St. and S Salem St. will be maintained or temporarily detoured. Disruption to pedestrian and bicycle movements would be minimized as possible during future stages of design/implementation plans.

d. Suggestion to direct pedestrian and bicycle traffic to James St. and S. Hughes St. (lower speed), rather than toward S. Salem St. and Williams St.

While some pedestrians and cyclists may choose to utilize other lower speed facilities to make their way into Downtown Apex, this project is specifically focused on providing a grade separated crossing of the railroad to replace the impending closure of the Tingen Rd. crossing. This connection will tie into the existing and planned ped/bike network in the area, as shown on the Town's Bicycle and Pedestrian System Plan Map.

e. Request for flashing pedestrian signal or similar safety measure at the Tingen Rd. and James St. intersection.

Apex Elementary students are not supposed to use this intersection for accessing the school. The mid-block crossing with flashing lights was constructed further south for student crossings, as was recommended by NCDOT and constructed by Apex. NCDOT only allowed the marked crossing to remain at James St. under the condition students would be guided to use the new mid-block crossing further south, and the one at James St. would be used exclusively for non-school crossings mostly outside carpool hours. In 2025, Town staff observed Apex Police Department (PD) using two crossing guards to cross students at both locations; however, that is not what NCDOT recommended, and Transportation and Infrastructure Development Department staff have since informed PD. There will not be lights installed for crossing Tingen Rd. at James St. Once Tingen is closed at the tracks, the Town will discuss with NCDOT the possibility of switching stop control to Tingen Rd., in which case crossing Tingen Rd. would be across a stopped approach. However, it may still be desirable to guide students exclusively to the mid-block crossing further south where they do not have to negotiate conflicts with turning vehicle traffic during carpool hours.

3. **Design Comments, Concerns or Recommendations**

a. Desire for more landscaping elements; tree protection

Construction of a pedestrian crossing would result in the removal of trees. The project team is working to minimize tree removal to the extent possible. Following construction, the project would include tree replanting and landscaping to help reduce the number of trees removed. Landscaping has been added to the project cost estimate.

b. Concern about water pooling in tunnel.

The tunnel design has taken the movement of water into consideration and drainage will be designed to avoid water pooling inside the tunnel.

c. Suggestion to improve the angle of entry from the bike lane to the side path between S Salem St. and the side path.

The design team reviewed this suggestion and revised the connection point between S Salem St. and the side path as suggested, making movements from all directions more comfortable for cyclists.

d. Comments that expressed support for the preferred alternative.

Thank you for your comment.