SCDOT

INTERSTATE 85

I-85 Widening Phase 1 & 2




2015 ACEC
American Council of Engineering Companies
100 Years of Excellence

Presented by:

INFRASTRUCTURE CONSULTING & ENGINEERING

DESIGN TEAM

Primary Firms

INFRASTRUCTURE CONSULTING & ENGINEERING

Mead & Hunt

STV 100 Years

Specialty Subconsultants

Three Oaks Engineering

olh INC.

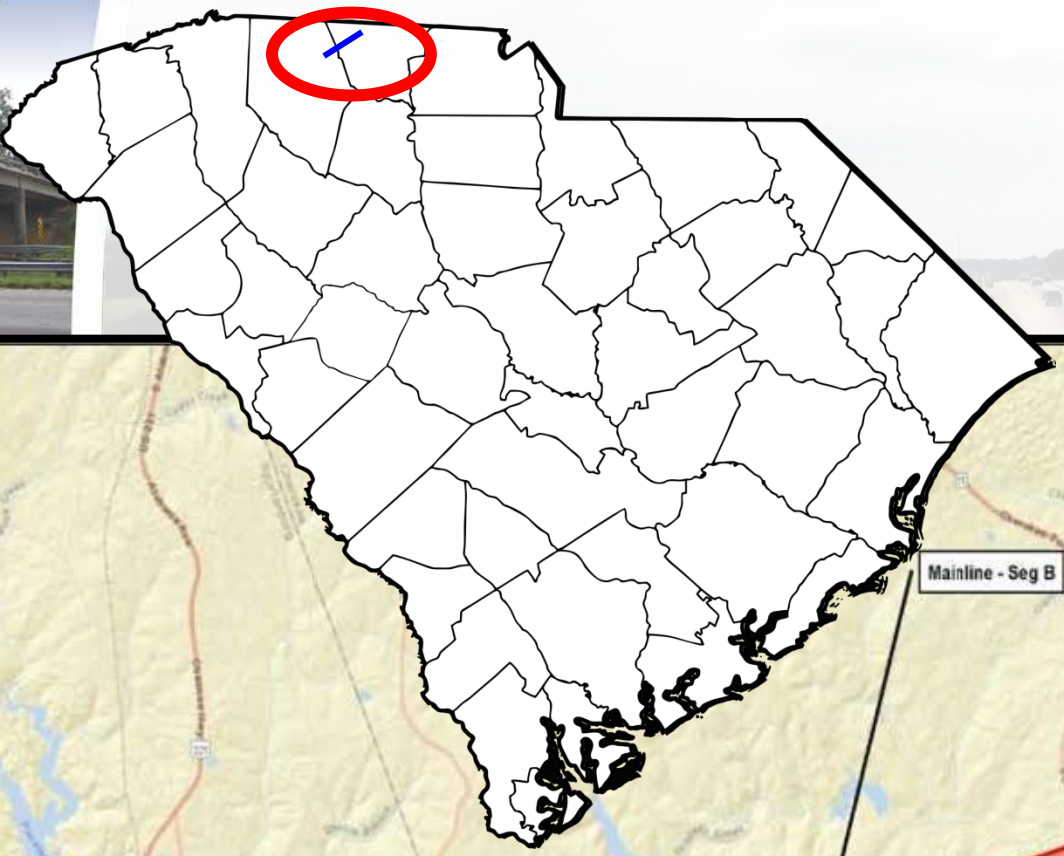
Construction Support Services CSS A Full Service Land Surveying Company

CH ENGINEERING

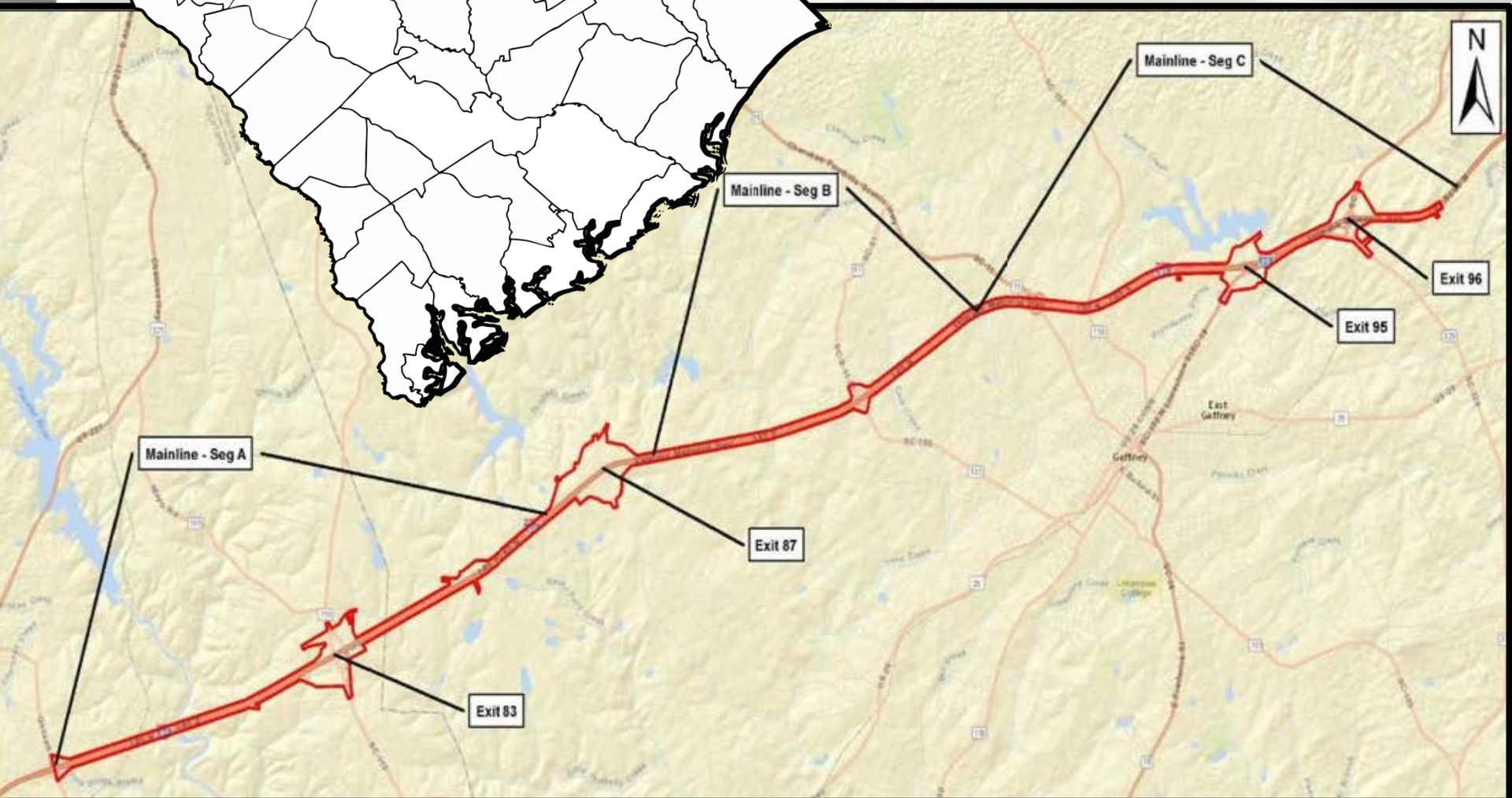
S&ME

BIHL ENGINEERING

PROJECT LIMITS



Just North Exit 80 to the Broad River

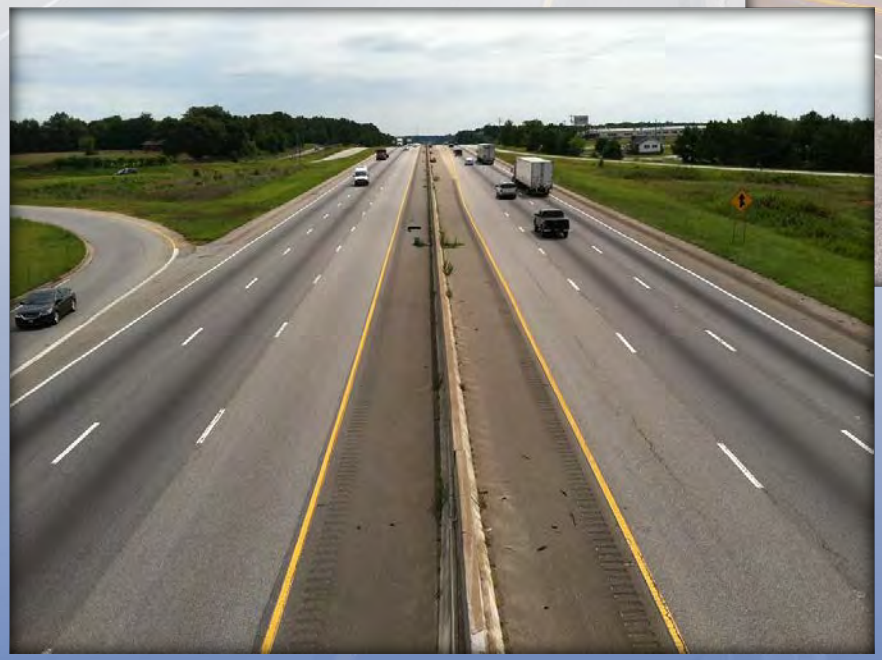


PROJECT HISTORY

- Late 1920's 2-lane ***US29 was constructed*** which ran from GA through northern SC into NC.
- Late 1950's US29 was widened to four lanes, interchanges and slip ramps and ***designated as I-85.***
- Only limited improvements since designated as I-85
  - 1998 - Bridge Replacement over Pacolet River
  - 2002 - Bridge Replacement over Thicketty Creek
  - 2003 - Bridge Replacement over Cherokee Creek
  - 2003 - Interchange Rehab at Exit 90 & Exit 92
  - 2004 - Bridge Replacement over Broad River
  - 2011 – Emergency Bridge Replacement at SC 150 (below)

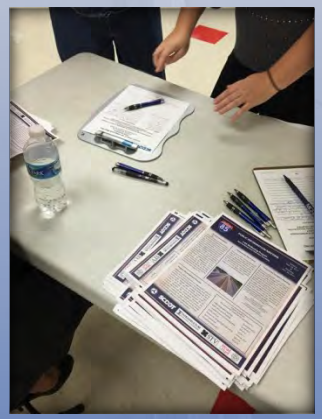
PROJECT PURPOSE/GOAL

- Widen I-85 from four lanes to six lanes to increase capacity for 18.2 miles
- Interchange Improvements (4 Interchanges)
- Safety Improvements
  - Eliminate Slip Ramps
  - Improve geometrics

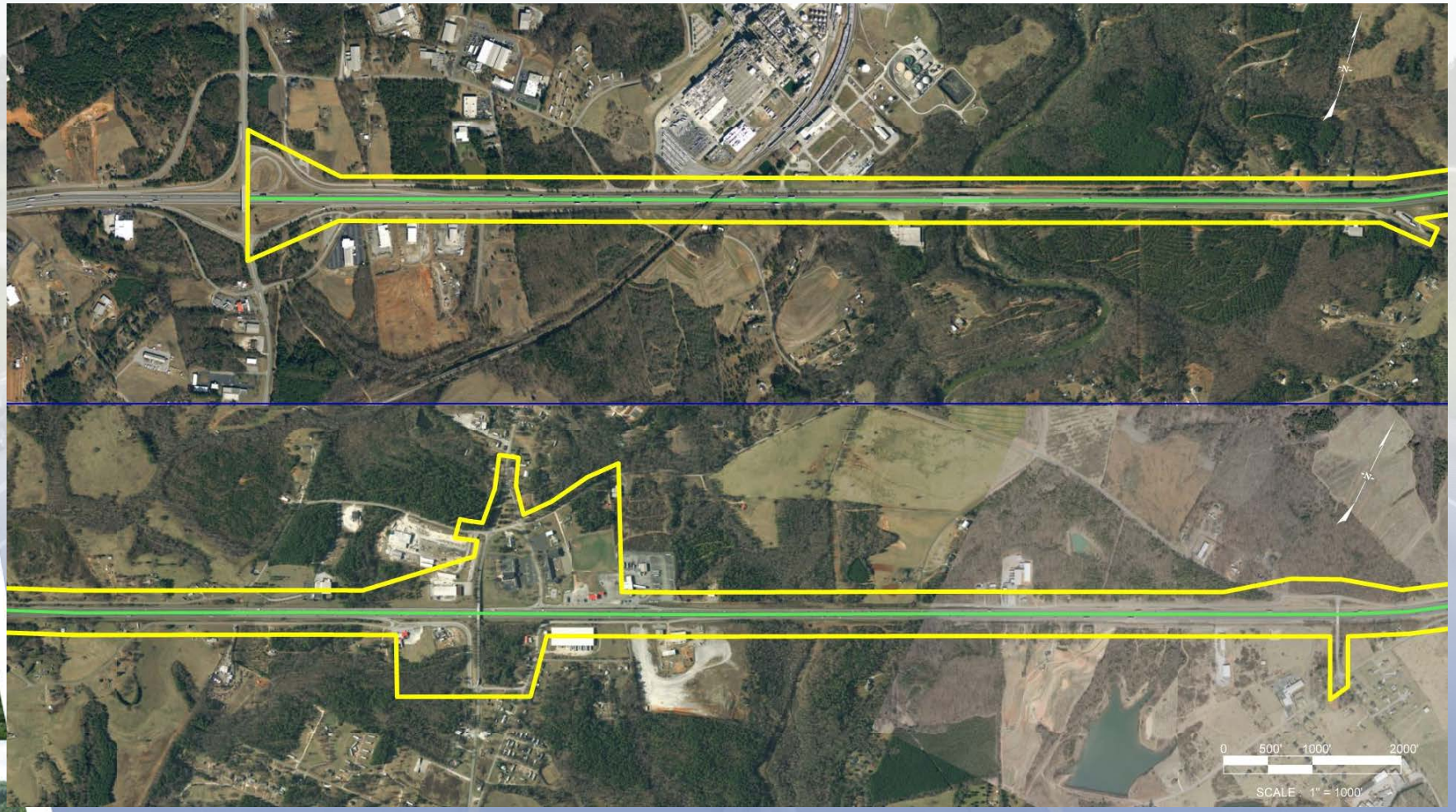


MILESTONES TO DATE

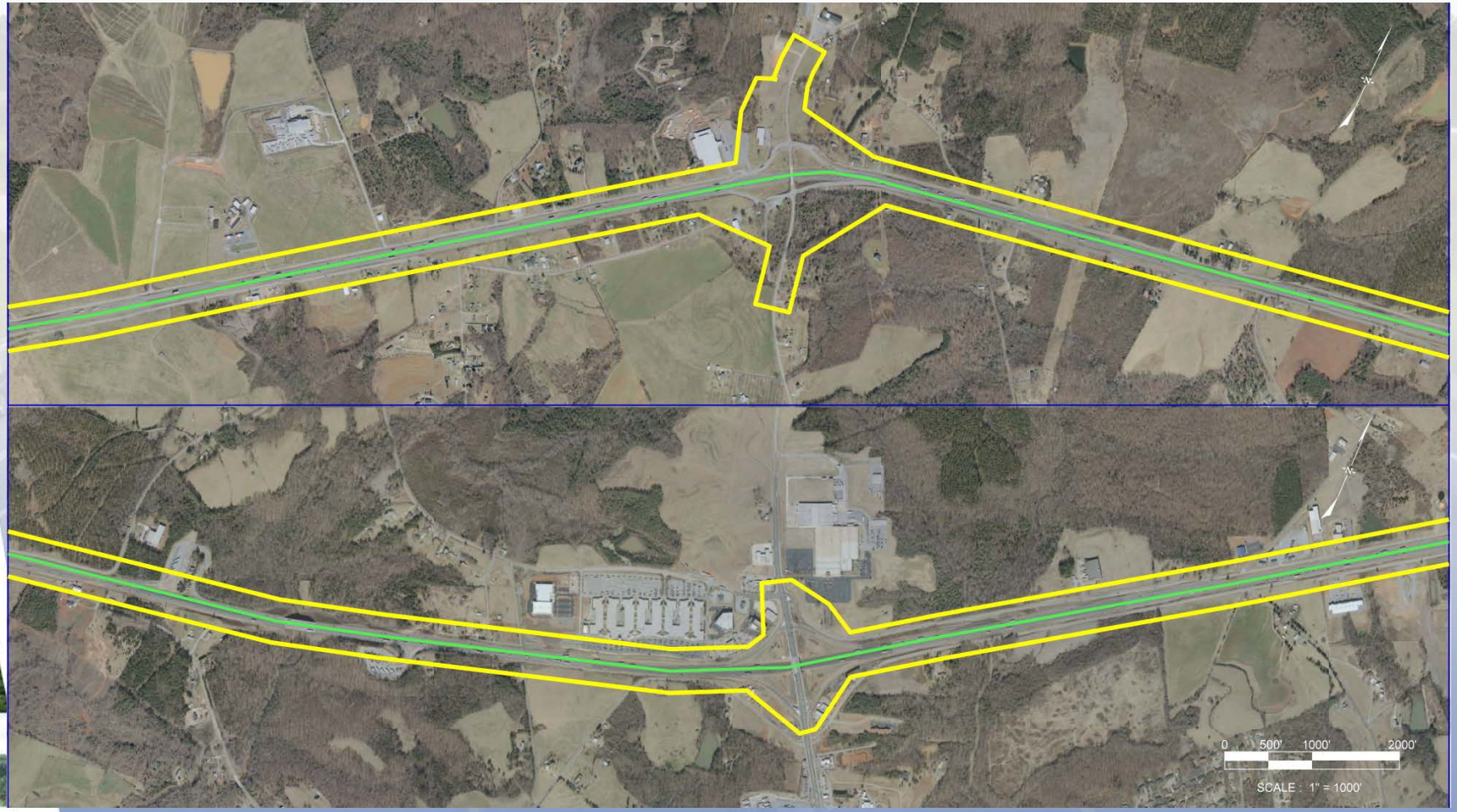
Limited NTP	August 2014
1st Public Information Meeting	November 2014
Full NTP	December 2014
2nd public Information Meeting	March 2015
Selected Preferred Alignments	July 2015
Design Field Review	September 2015
Submit EA for Review	September 2015
Signed Draft EA	October 2015
Public Hearing Scheduled	December 2015



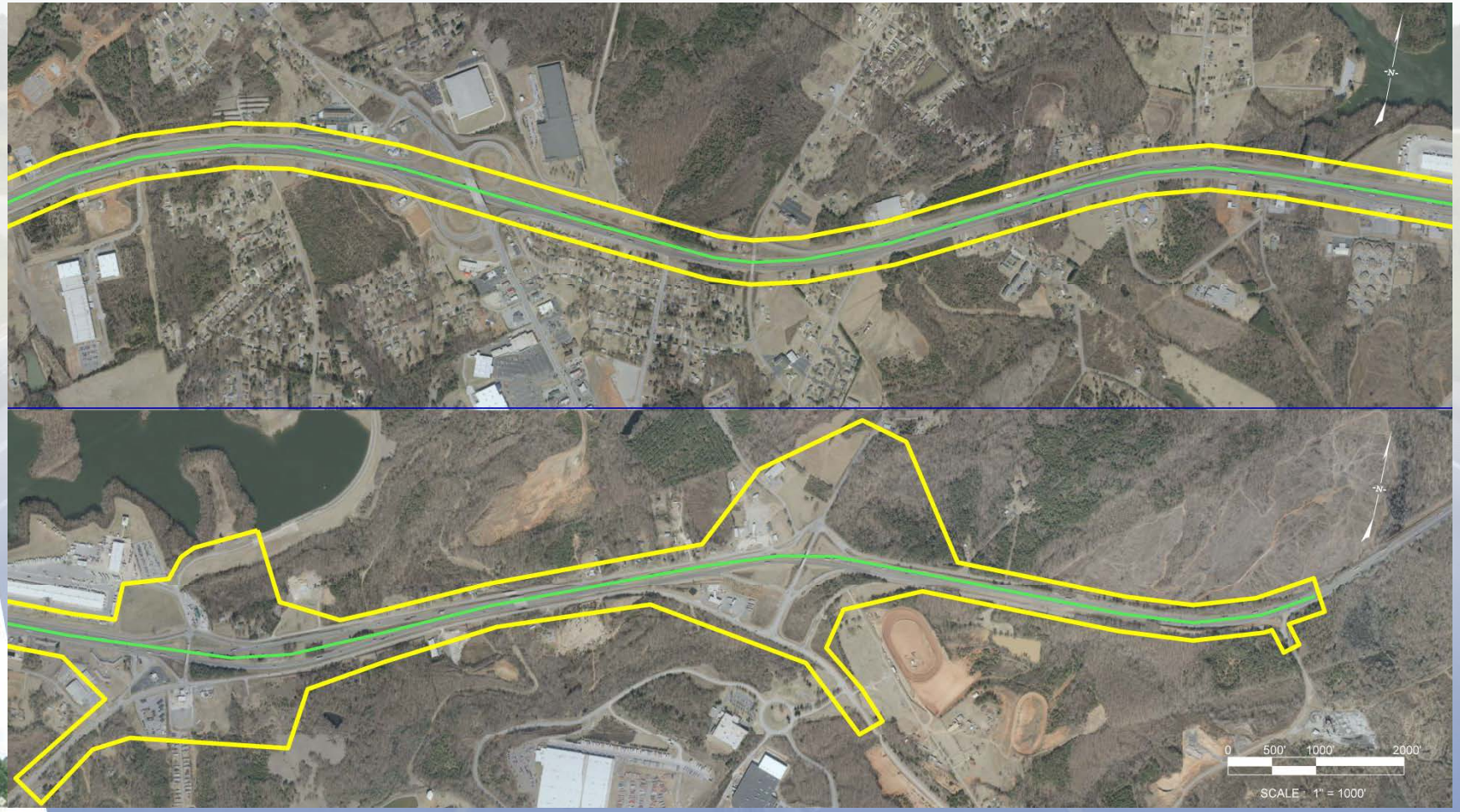
STUDY AREA



STUDY AREA



STUDY AREA



EXISTING CONDITIONS

Posted Speed

Design Speed

As low as 45 MPH

Grades

0.32% - 6.32%

Median Width

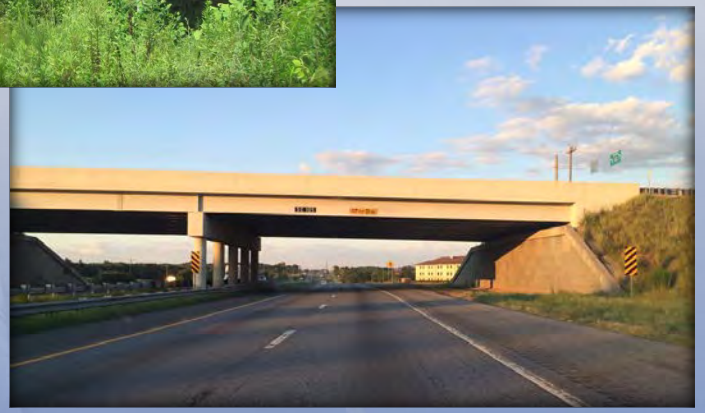
Predominantly 36’

Parallel Frontage Roads

On over 50% of Project

EXISTING CONDITIONS

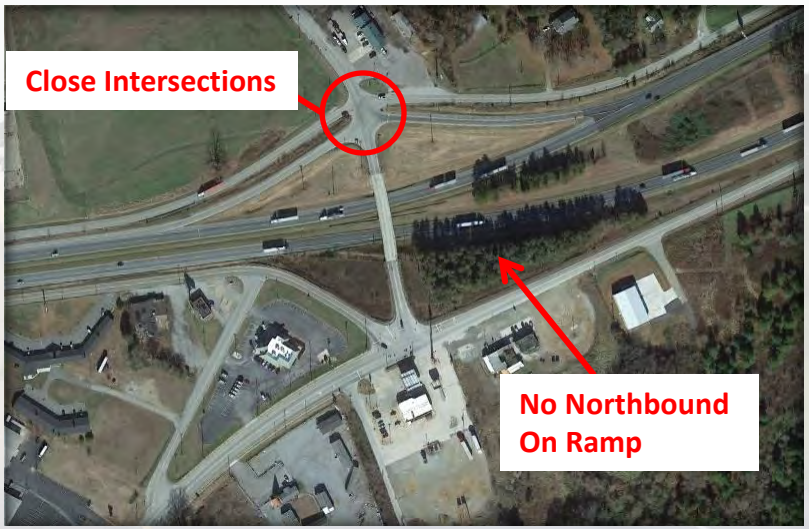
- The existing right-of-way is approximately 100 feet to either side of the center line (200 feet total).
- Six interchanges and 15 major bridge structures, including one railroad bridge



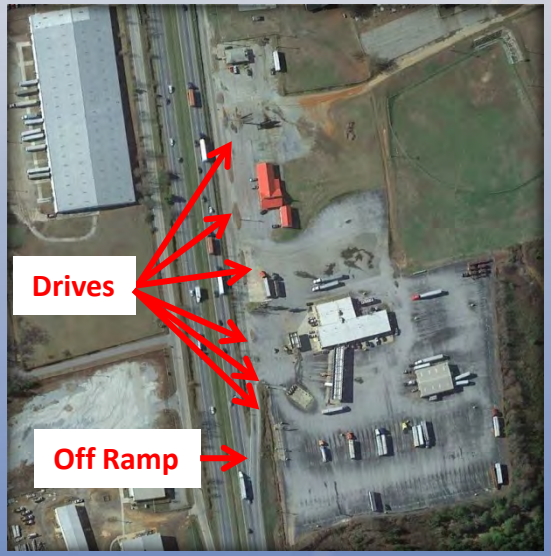
EXISTING CONDITIONS

Exit 87 – Two Way Ramps

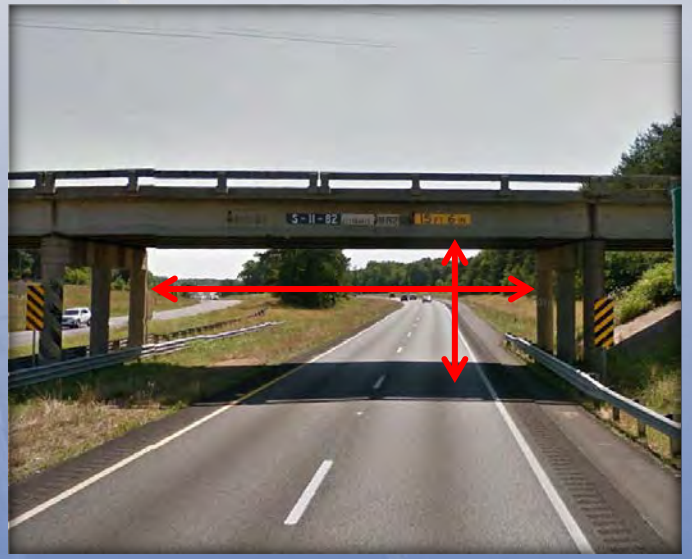
Exit 95 – Unconventional Diamonds



Exit 83 – Direct Driveway Access



Substandard Bridge Clearances



CSX Railroad Bridge

EXISTING CONDITIONS

Recent Bridge Replacement

EXIT 82 SLIP RAMP

EXISTING CONDITIONS

EXIT 83 (SC110)

EXISTING CONDITIONS

EXIT 87 (S-39)

Northbound Off-Ramp

Southbound Off-Ramp

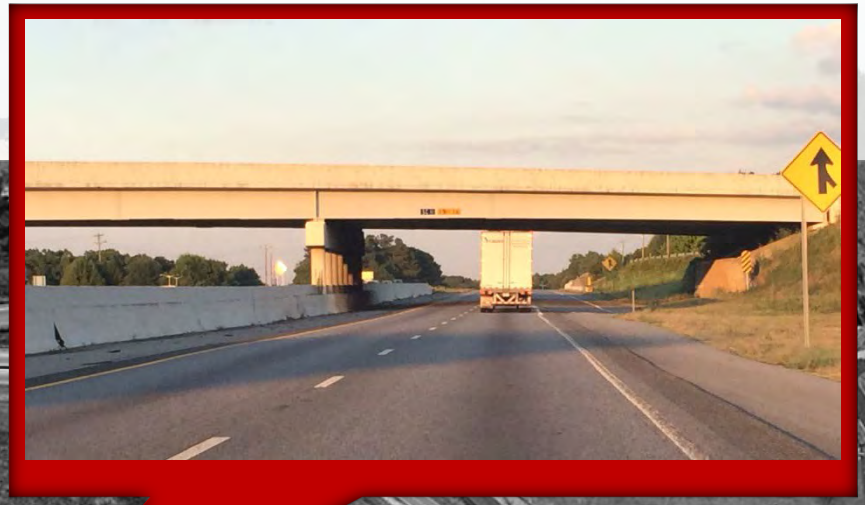
Southbound On-Ramp

Northbound On-Ramp

EXIT 90 (SC105 Bridge over I-85)

EXISTING CONDITIONS

EXIT 92 (SC11 Bridge over I-85)



EXISTING CONDITIONS

SC 150 Bridge over I-85

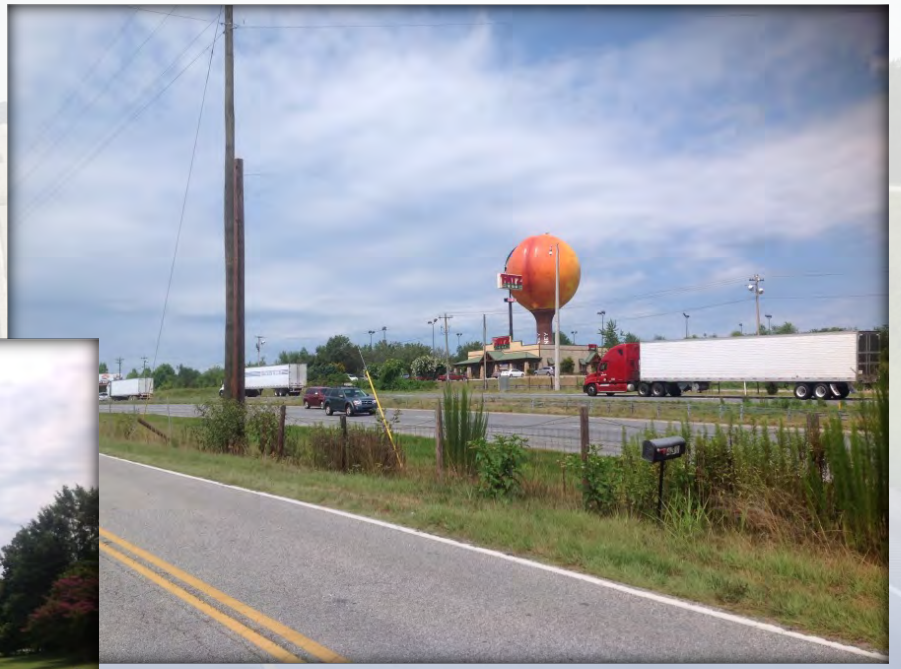
EXIT 95 SLIP RAMP

EXIT 95 SLIP RAMP

EXIT 95 (S-82 Bridge over I-85)

EXIT 96 (SC18/SC329 Bridge over I-85)

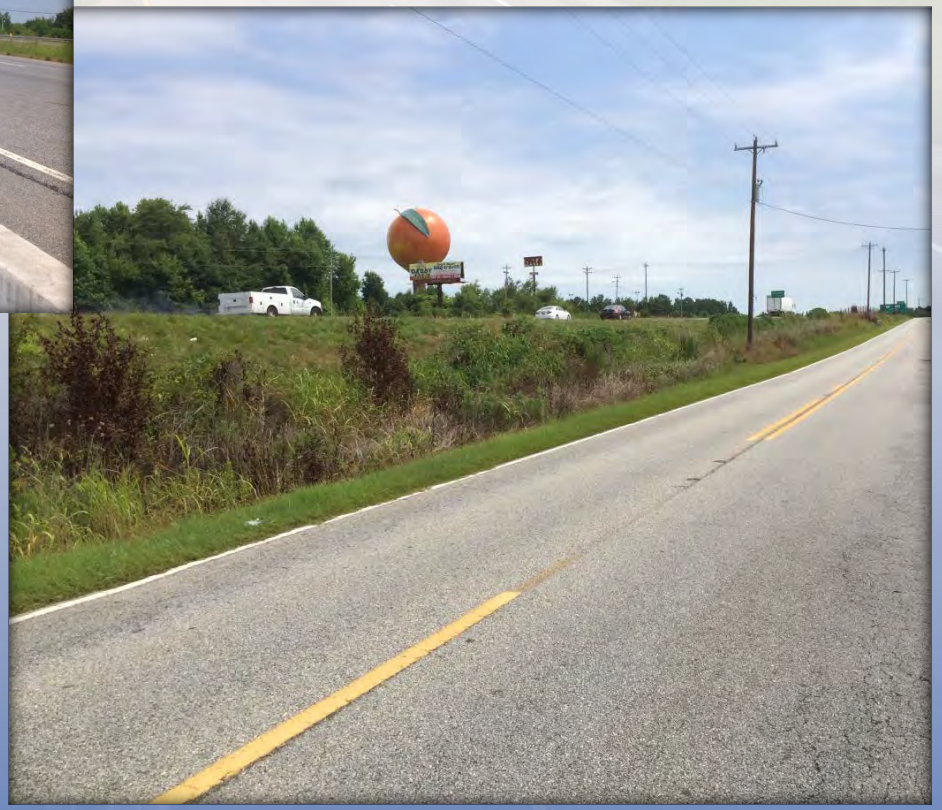
I-85 & FRONTAGE ROAD SPACING



I-85 & FRONTAGE ROAD SPACING

I-85 & FRONTAGE ROAD SPACING

I-85 & FRONTAGE ROAD SPACING



ACCIDENT ANALYSIS

Table 1.3
Accident Summary for I-85 Between Mile Markers 80 and 96
January 2011 through December 2013

Location on I-85	Total Crashes	Injuries	Fatalities	Rear End	Angle	Side	Other*
Between Mile Marker 80 and Exit 87	117	17	0	50	7	14	26
Exit 95	56	10	0	11	0	17	28
Exit 96	112	19	1	18	9	14	71
Total Interstate & Interstate Ramp crashes	902	155	6	248	59	132	460
Surrounding Roadways	117	n/a	n/a	n/a	n/a	n/a	n/a
Total	1,019	155	6	248	59	132	460

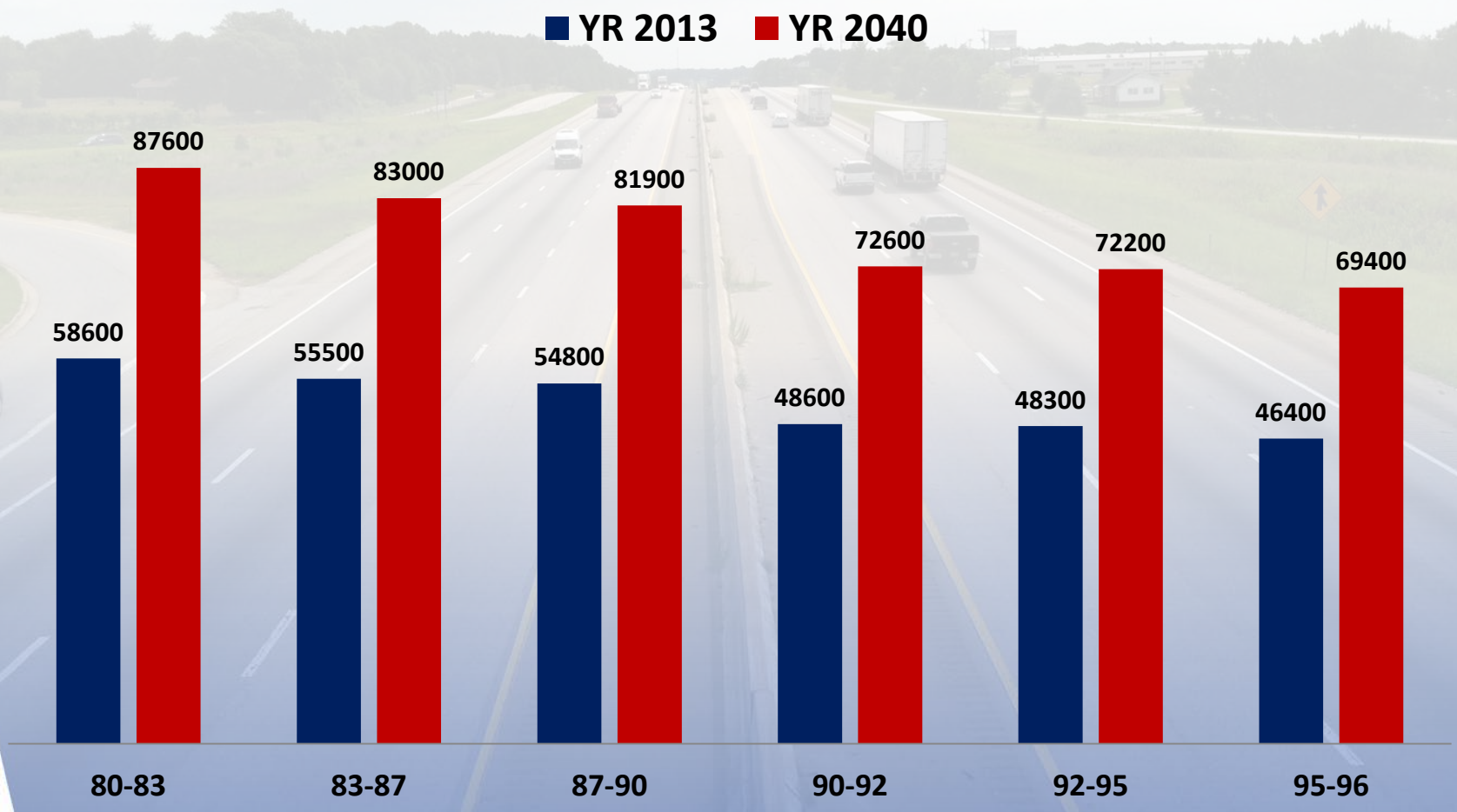
*includes "not a collision with a motor vehicle," head-on, rear-to-rear
n/a – data not available
Source: Accident Analysis Report I-85 Widening Project MM 80 to MM 96 Spartanburg and Cherokee Counties, S

Total Crashes	Injuries	Fatalities	Rear End	Angle	Side	Other*
1,019	155	6	248	59	132	460

EXISTING CONDITIONS




I-85 ADT BETWEEN EXITS



30% Truck Traffic

LOS ANALYSIS

Table 1.2
Existing and Future Conditions for Segments

Segment	2014 Existing AM Peak LOS/Density	2040 Build AM Peak LOS/Density (6 lanes)	2040 Build PM Peak LOS/Density (6 lanes)	Last Year at LOS D
Exit 80 – 82	C / 22.3	C / 22.3 *	E / 43.1*	2031
Exit 82 – 83	C / 22.0			
Exit 83 – 87	C / 21.1	C / 21.0	E / 38.4	2036
Exit 87 – 90		C / 21.1	E / 36.4	2036
Exit 90 – 87		C / 20.5	E / 39.7	2035
Exit 87 – 83		C / 21.8	E / 40.4	2034
Exit 83 – 80	C / 25.2	C / 25.2	E / 43.2	2032

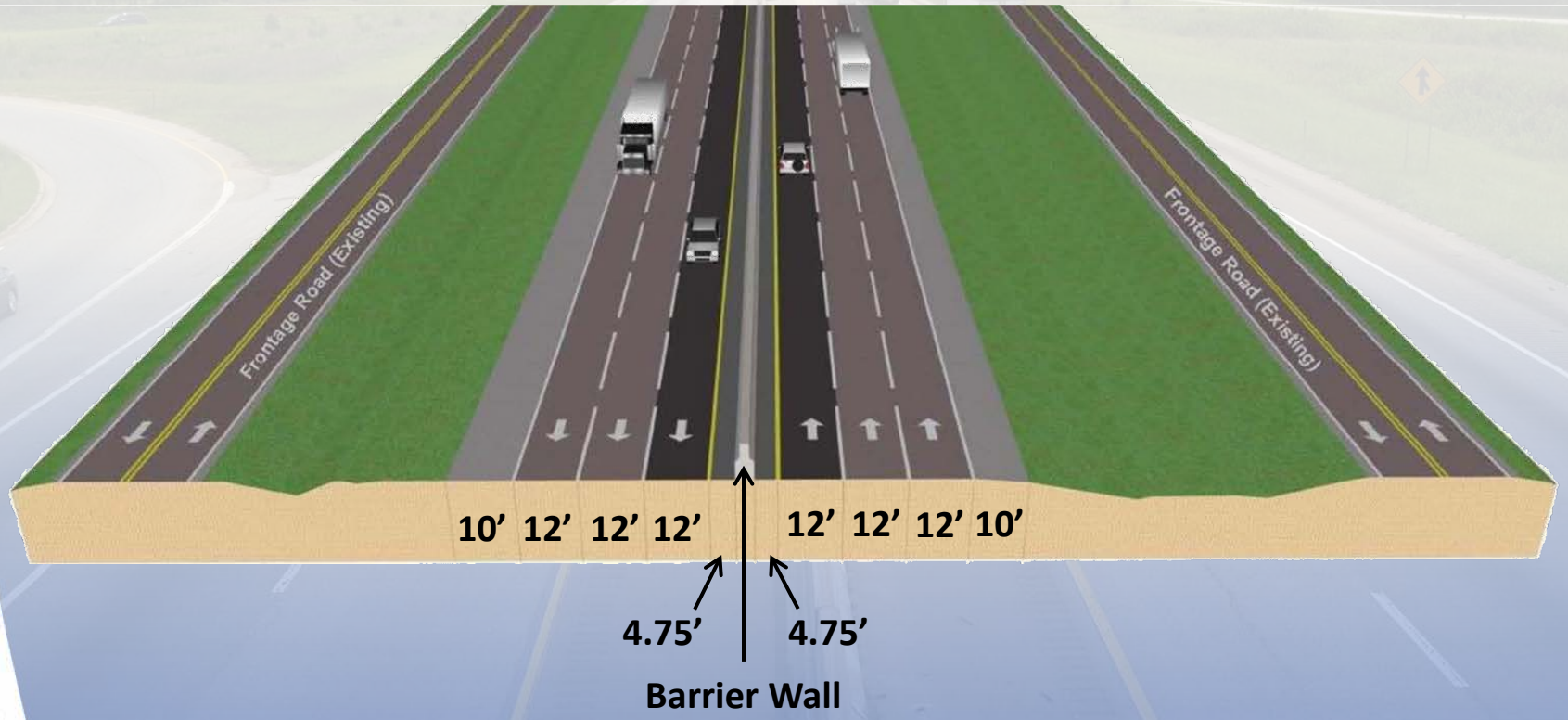
* Northbound slip ramps have been eliminated, creating a single segment

Source: Interstate 85 Widening Traffic Analysis Report

I-85 DESIGN CRITERIA

- 65 MPH
- Widening in Median with Concrete Barrier
- 12’ lanes
- 12’ outside shoulder
- 4.75’ inside shoulder Minimum, (variance of 4.0’ allowed at bridge piers)
- Grades – Match existing

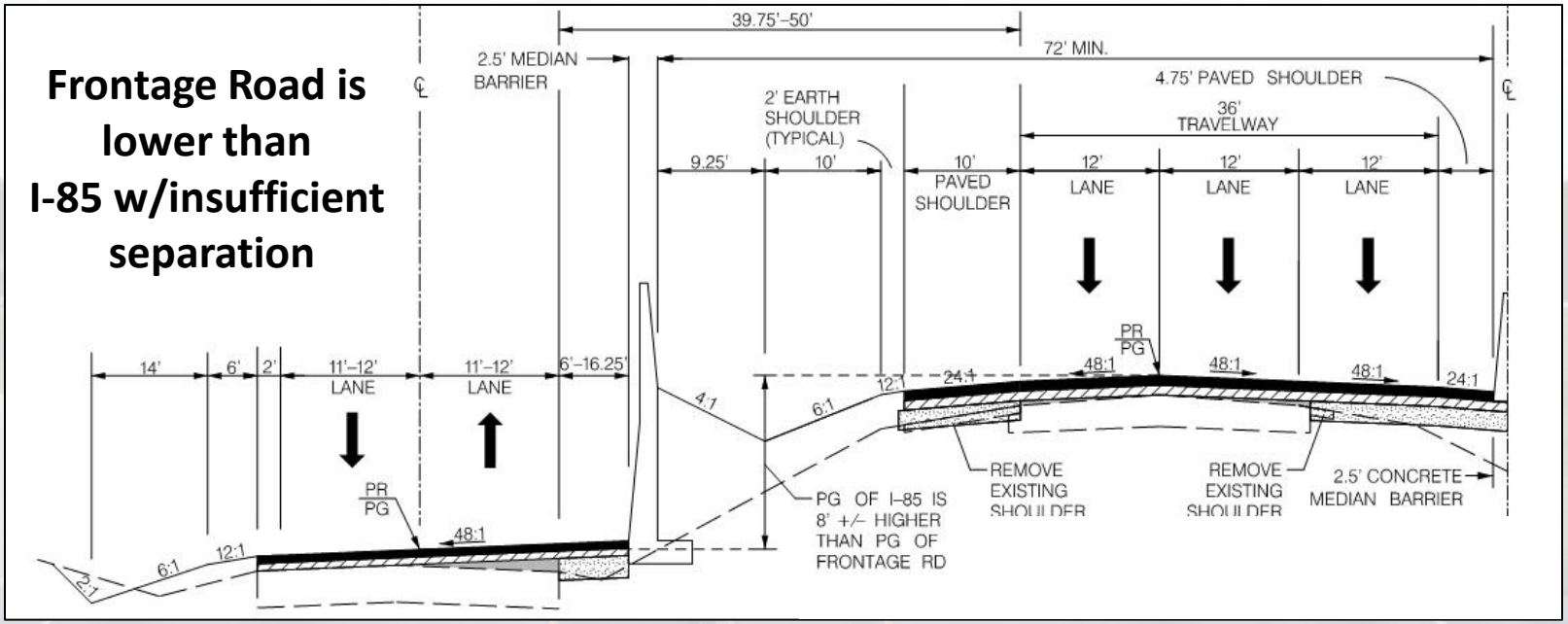
I-85 TYPICAL SECTION



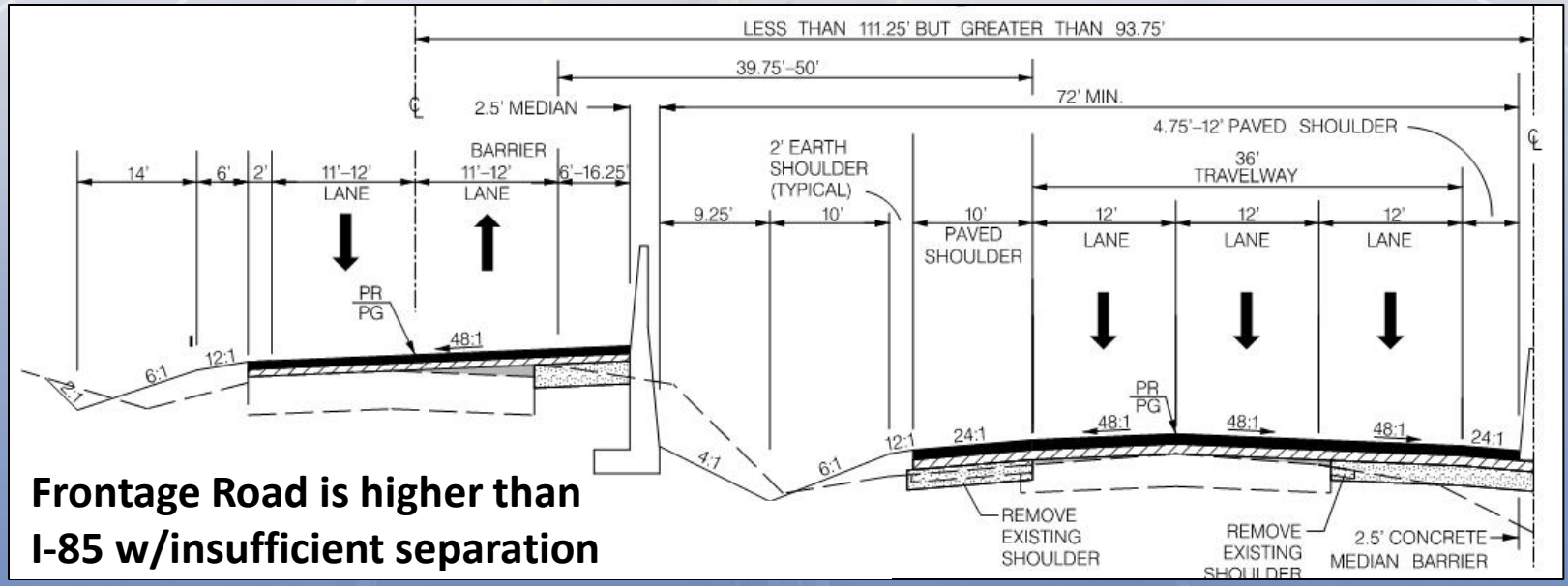
I-85 SPECIAL DESIGN CRITERIA

- Concrete Barrier Wall will be required where edge of **travelway (EOT)of I-85 is less than 50’ from EOT of Frontage Road**
- Walls must **accommodate for a future 8-lane facility**
- Bridges Design Requirements:
  - **Long enough** to accommodate for a future 8-lane facility
  - **High enough** to maintain 17’ clearance with future widening
  - Drainage designs must accommodate for a future 8-lane facility

Frontage Road is lower than I-85 w/insufficient separation



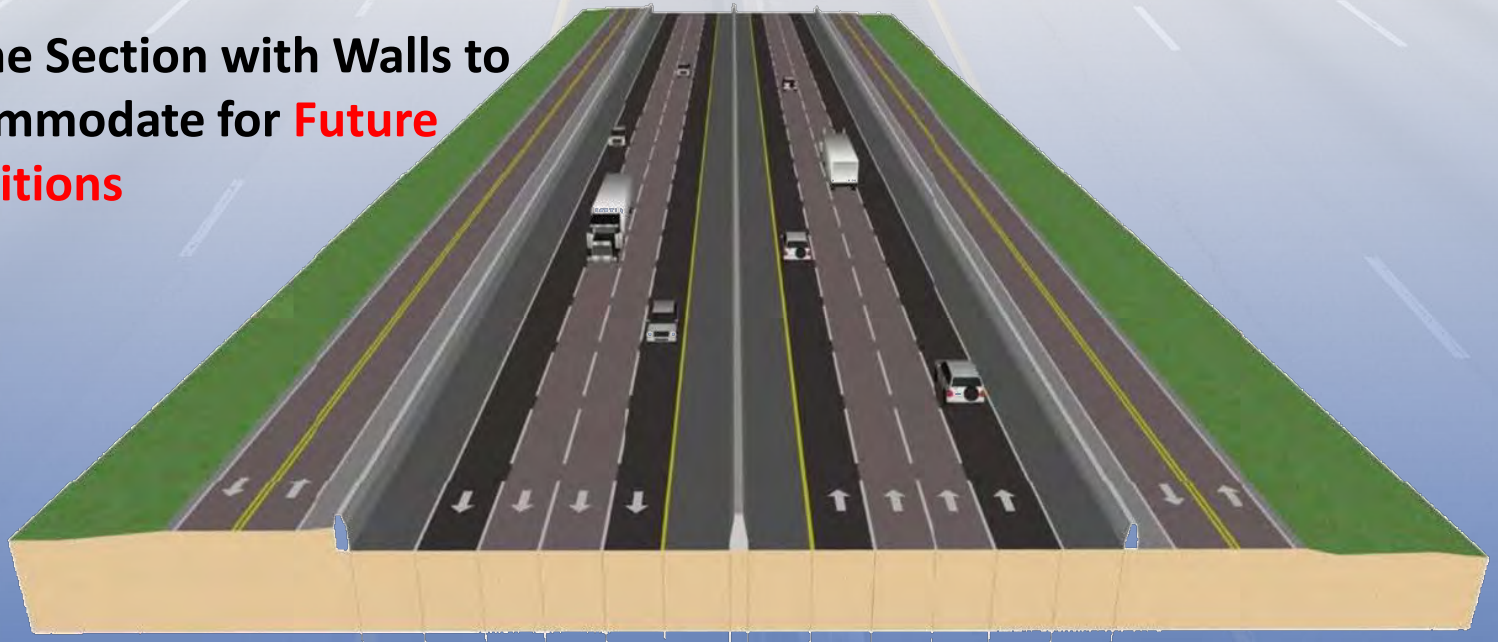
Frontage Road is higher than I-85 w/insufficient separation



BARRIER WALL SECTION

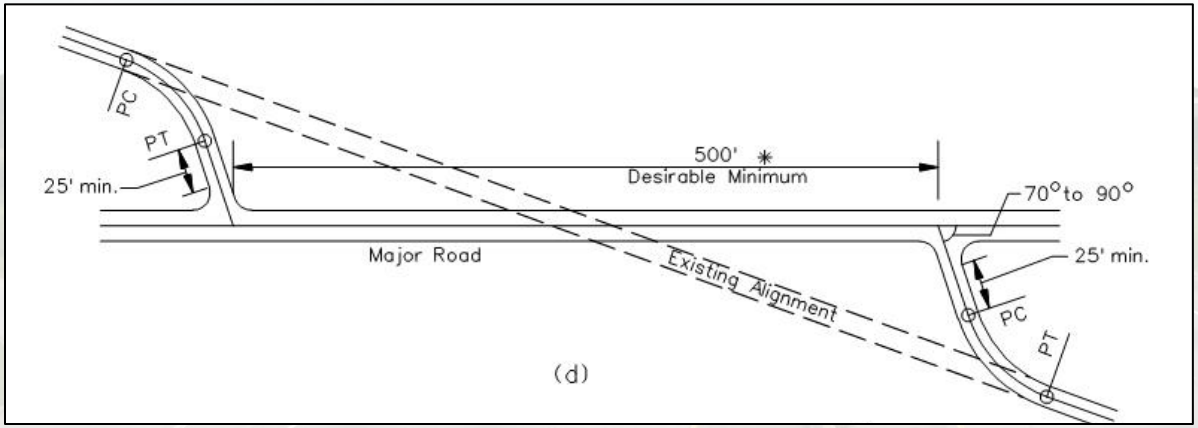
6-Lane Section with Walls

8-Lane Section with Walls to Accommodate for Future Conditions



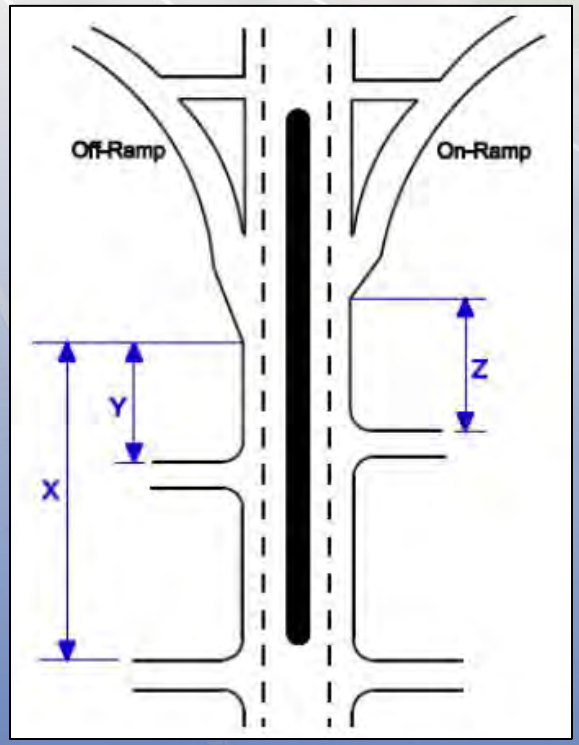

FORTIS
COLLEGE

HDM INTERSECTION SPACING

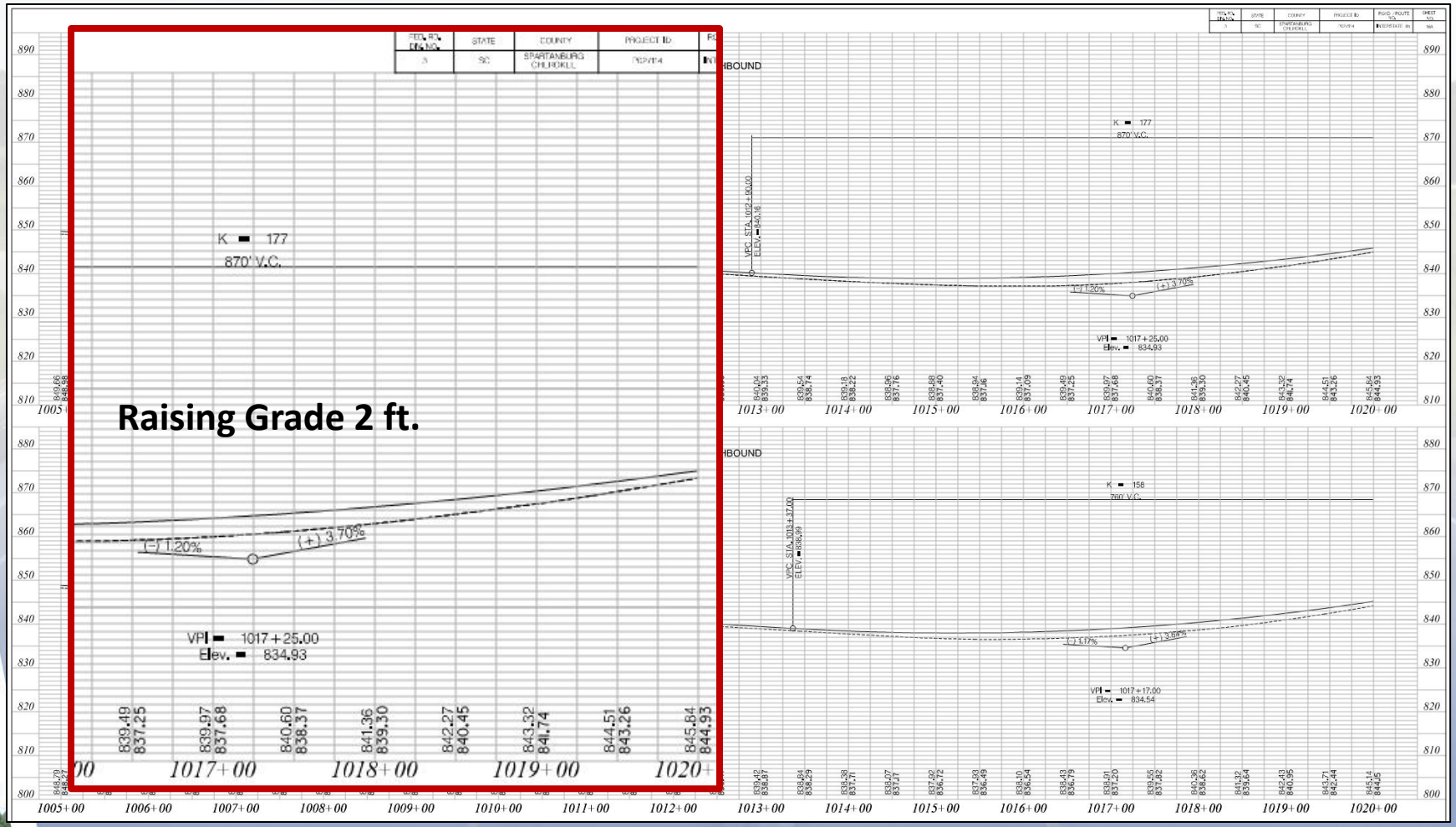


ARMS INTERSECTION SPACING

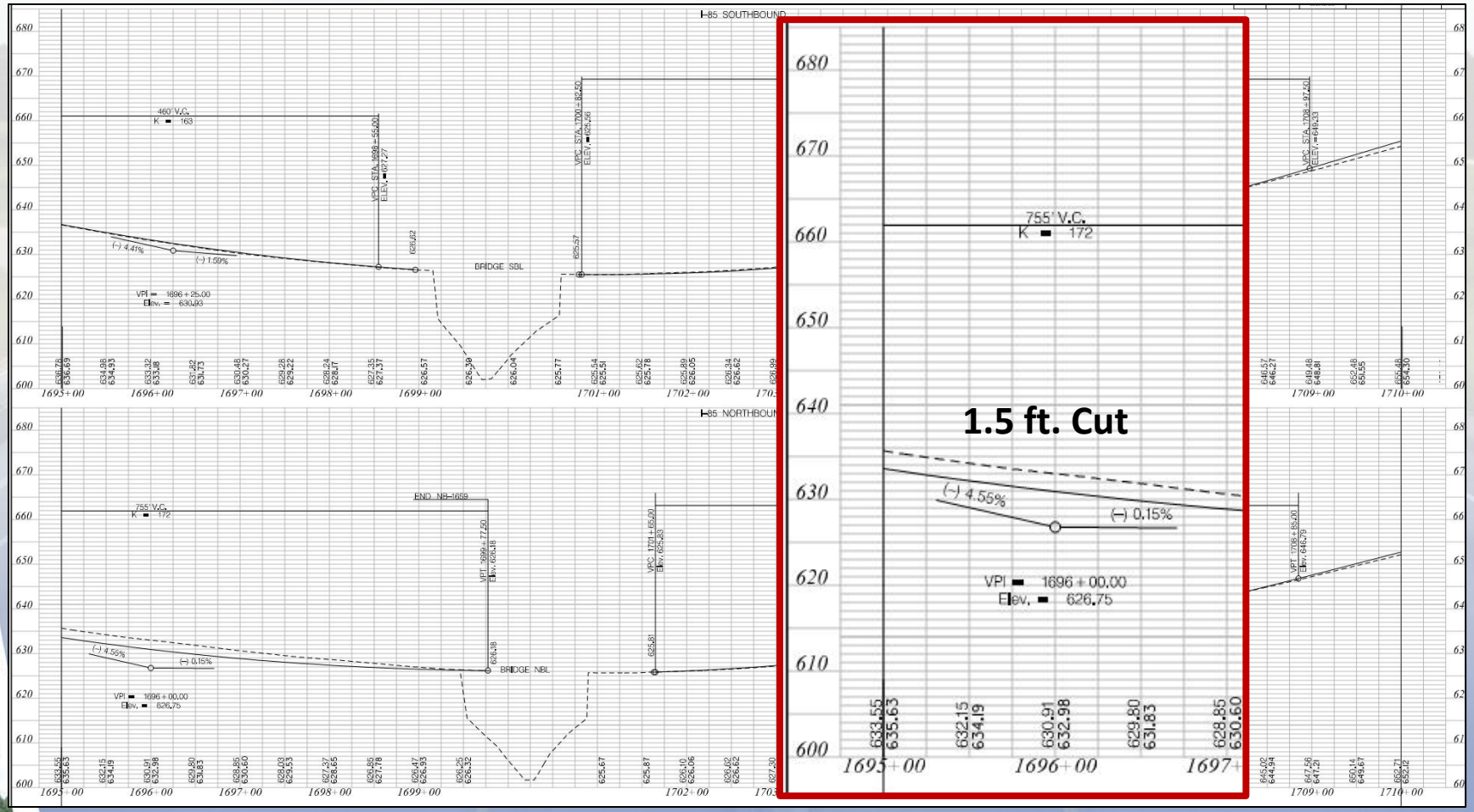
	Distance (ft)	Description
X	750	Distance from the closest interchange ramp to the first full access intersection



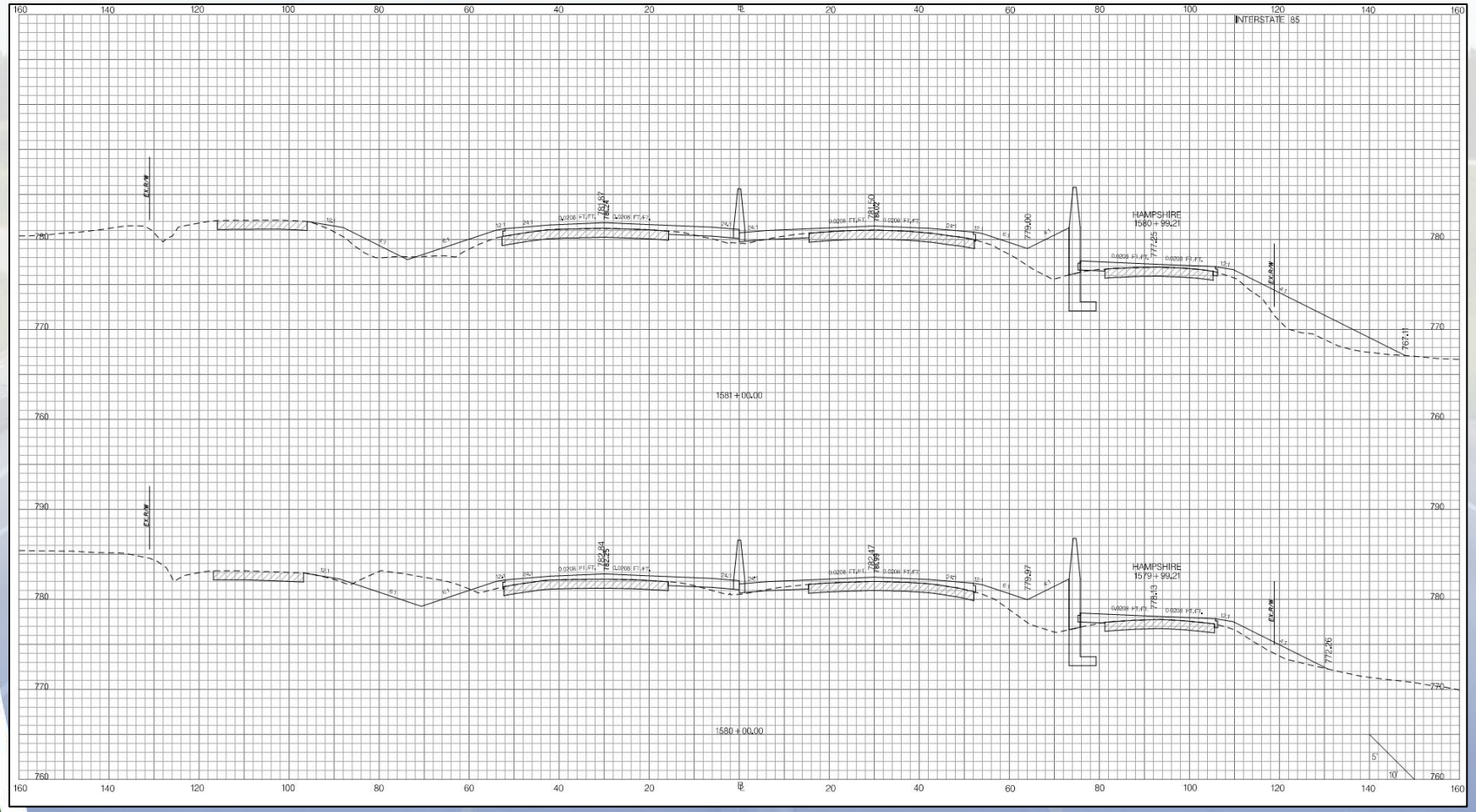
RAISED PROFILE



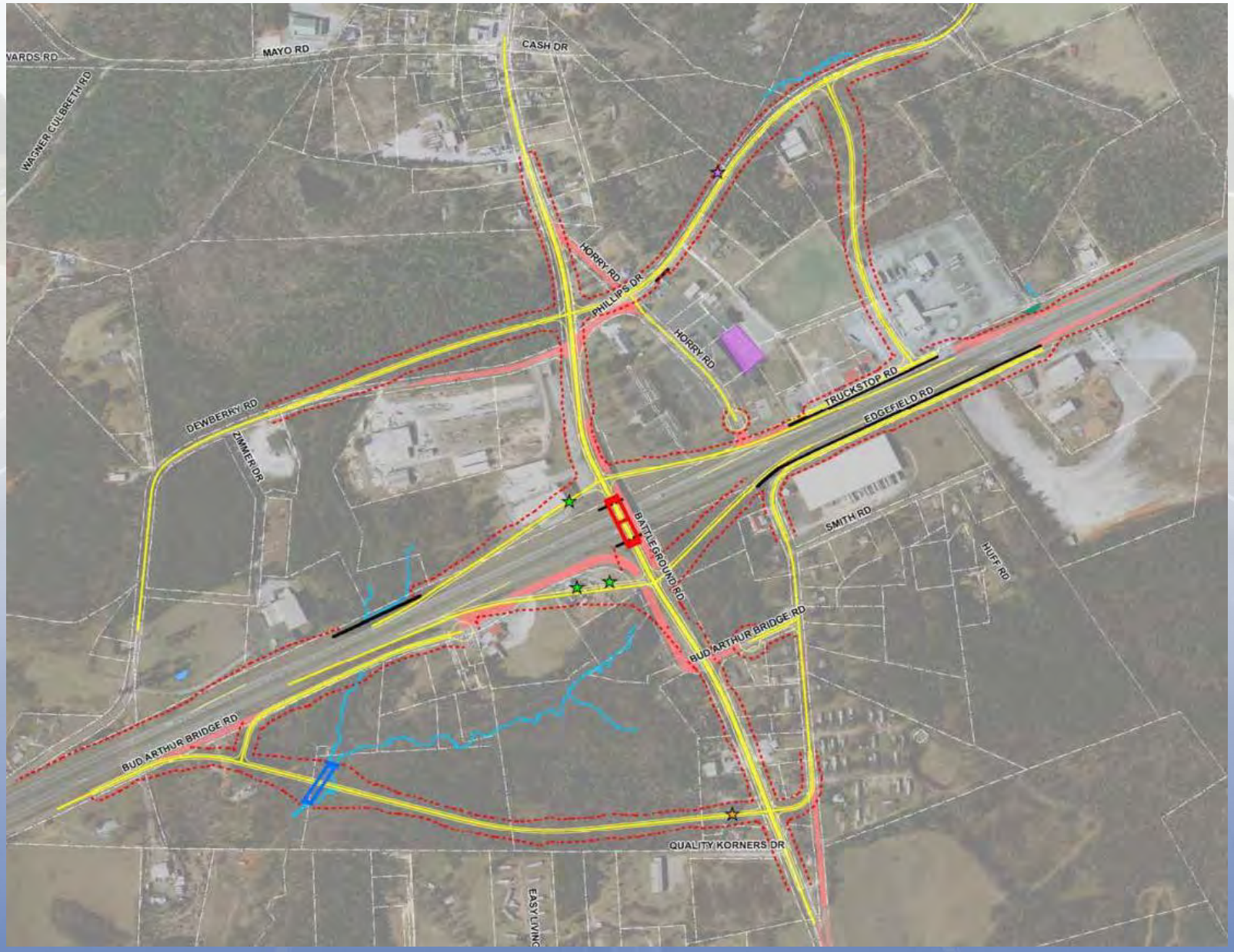
CUT PROFILE


I-85 SOUTHBOUND
460' V.C.
K = 163
(-) 4.41%
(-) 1.59%
VPI = 1696+25.00
Elev. = 630.93
BRIDGE SBL
I-85 NORTHBOUND
755' V.C.
K = 172
END NB-1659
(-) 4.55%
(-) 0.15%
VPI = 1696+00.00
Elev. = 626.75
BRIDGE NBL
1.5 ft. Cut
755' V.C.
K = 172
(-) 4.55%
(-) 0.15%
VPI = 1696+00.00
Elev. = 626.75
1695+00
1696+00
1697+00
1698+00
1699+00
1702+00
1709+00
1710+00

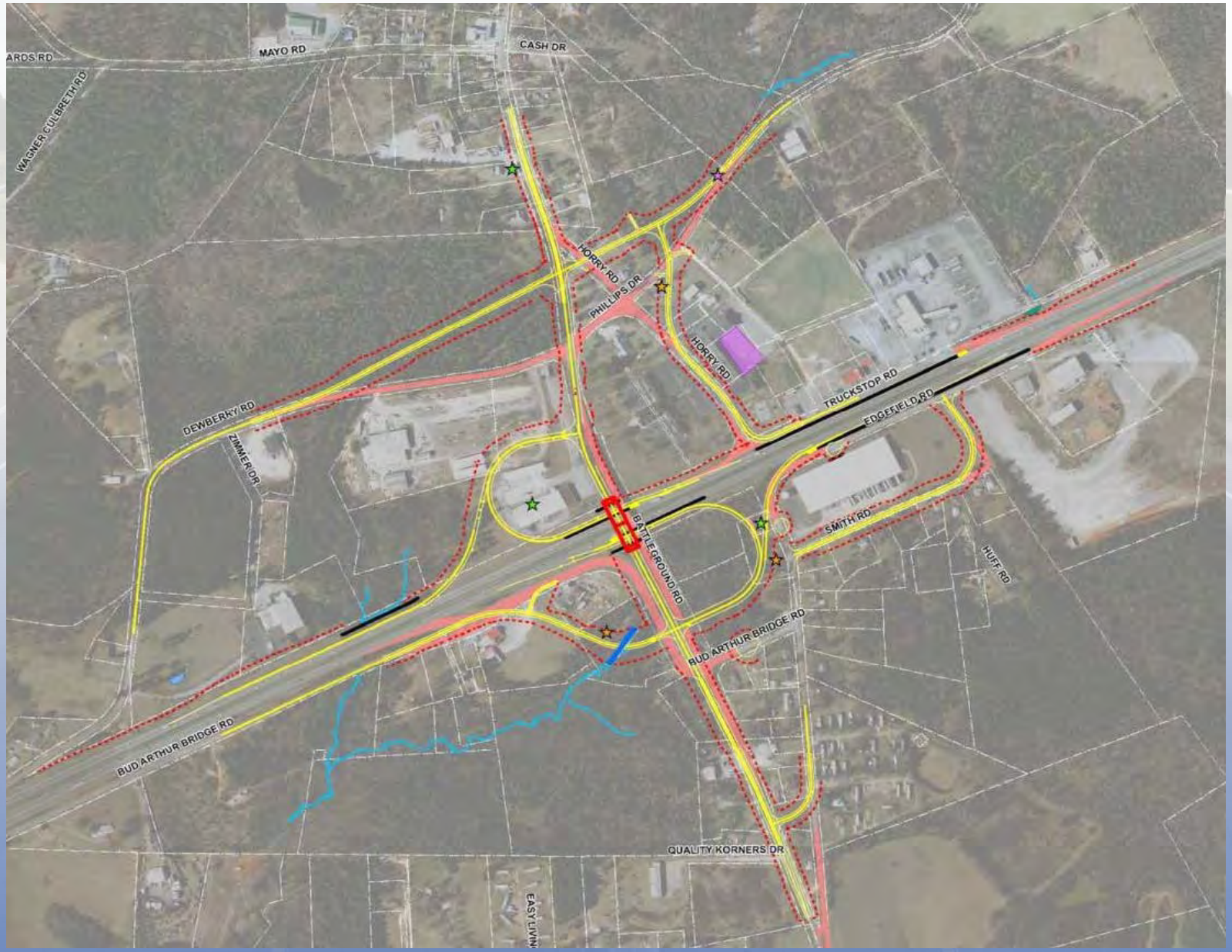
CROSS SECTION WITH BARRIER/WALL



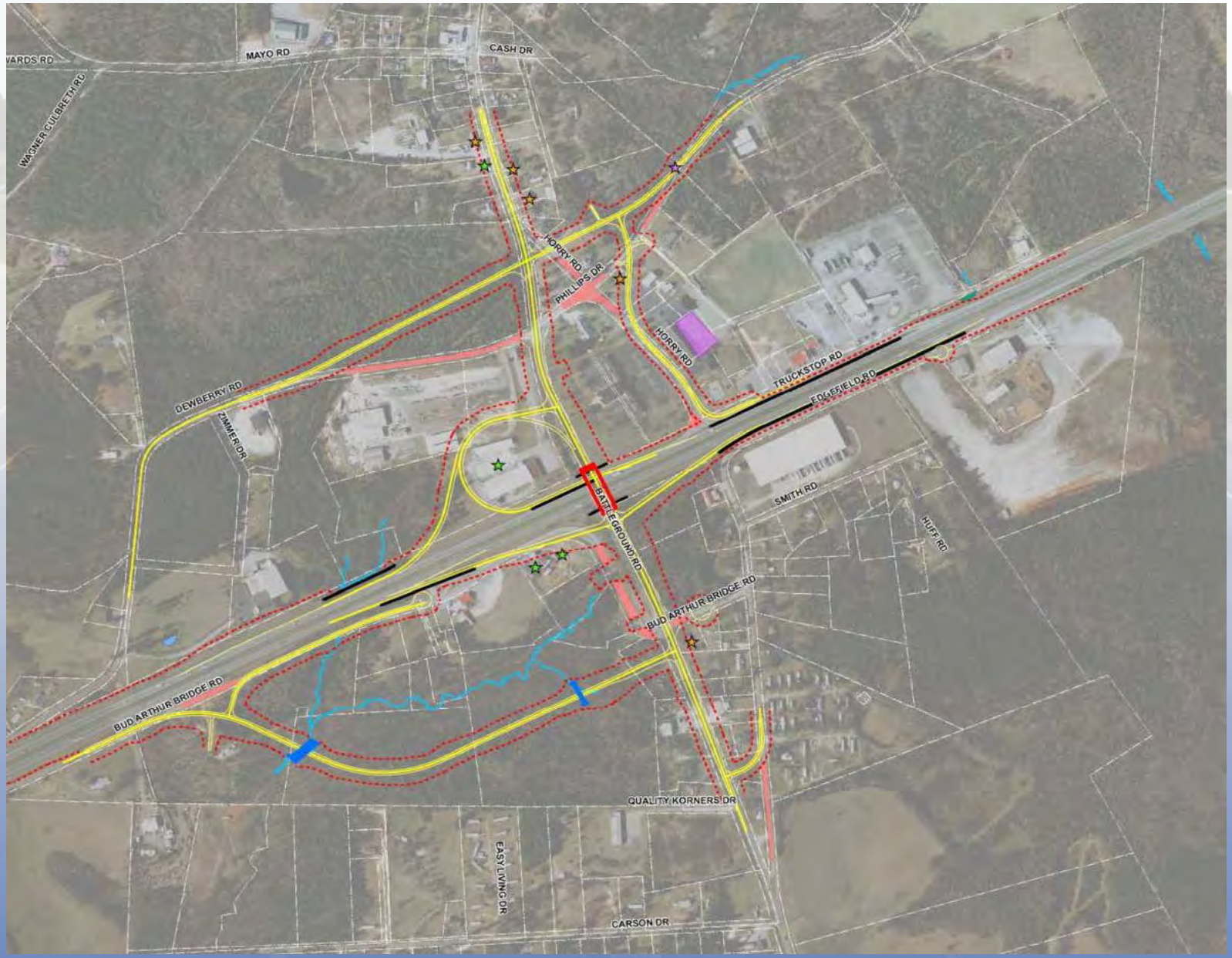
EXIT 83 (SC110) – Alternative 1



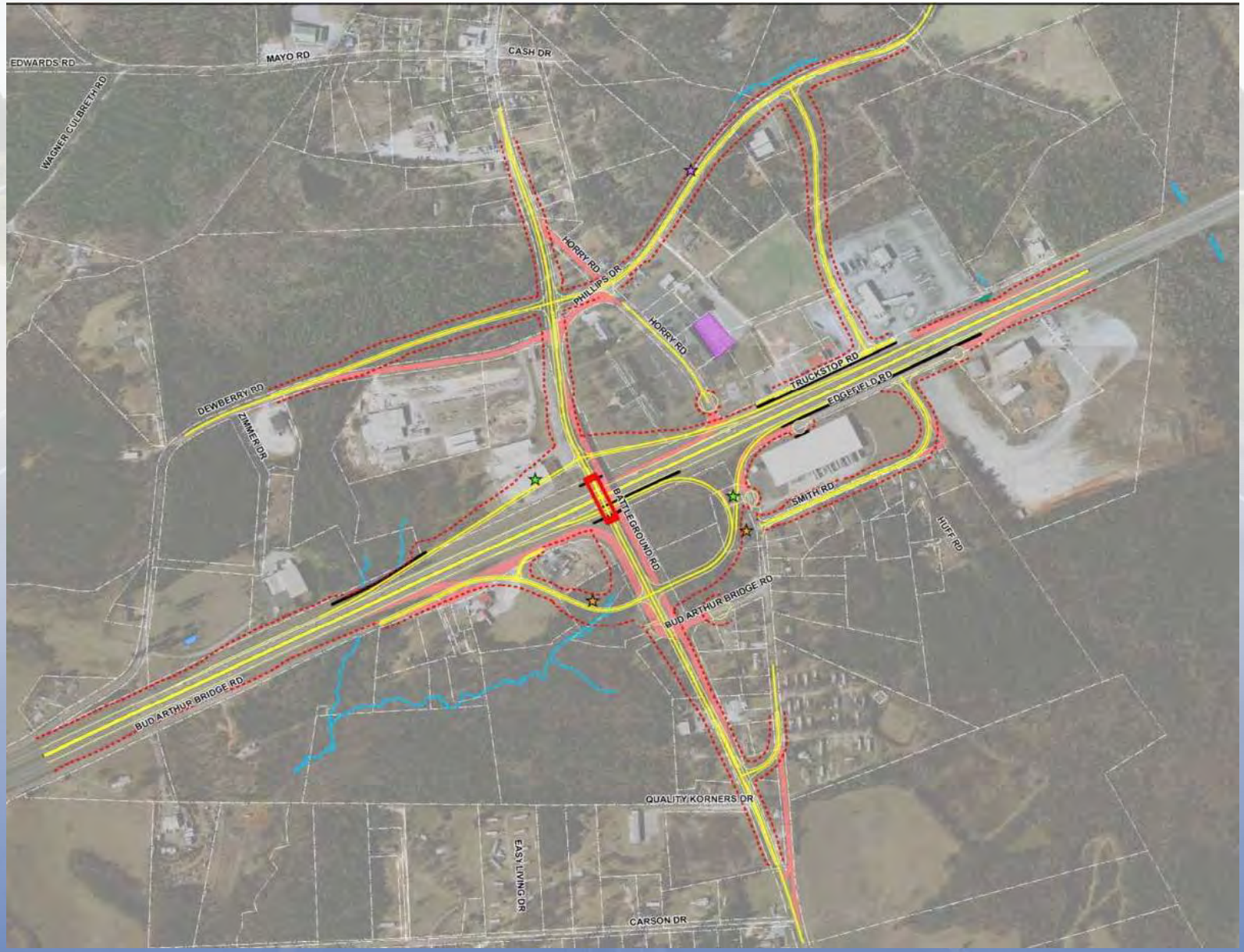
EXIT 83 (SC110) – Alternative 2



EXIT 83 (SC110) – Alternative 3

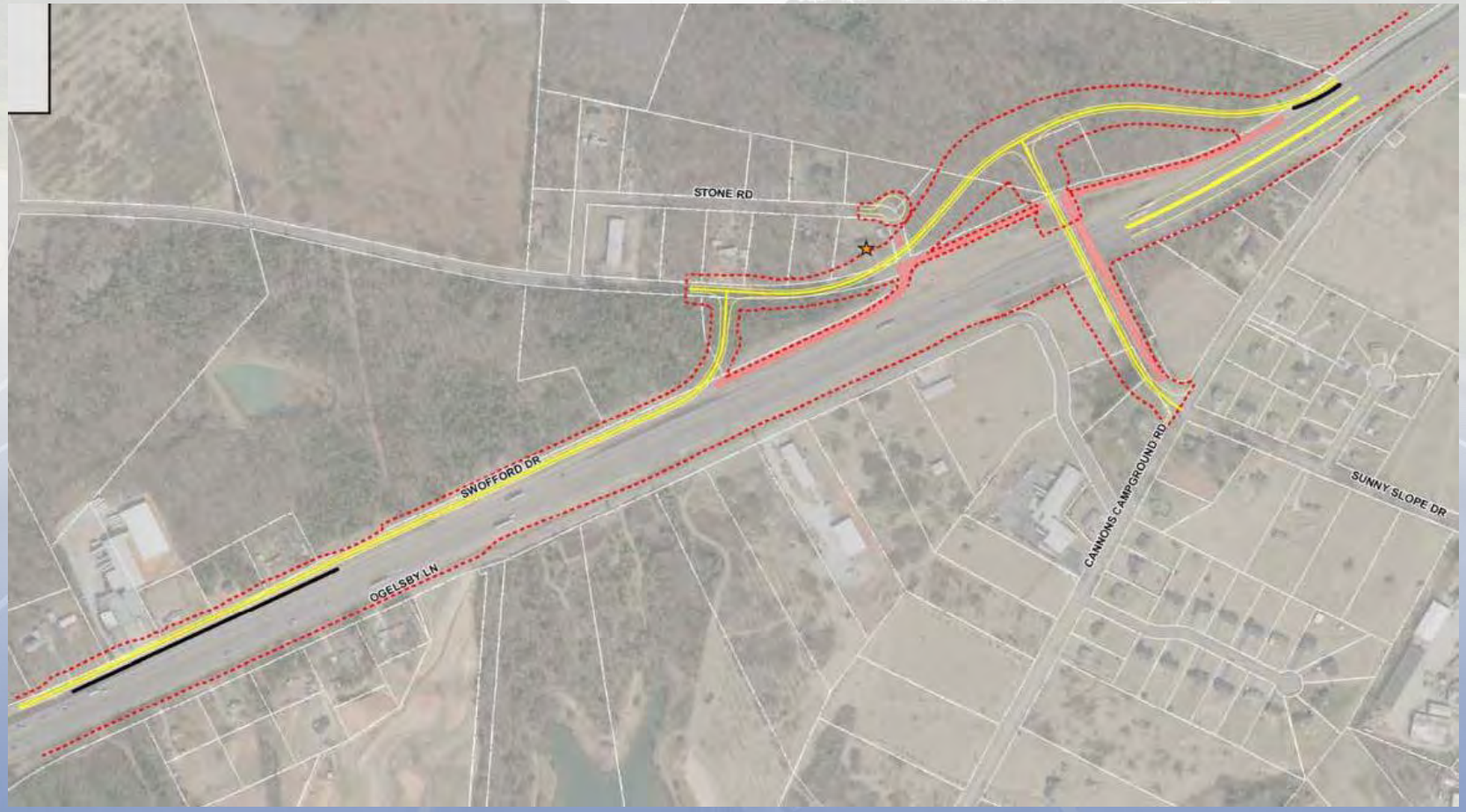


EXIT 83 (SC110) – Alternative 4

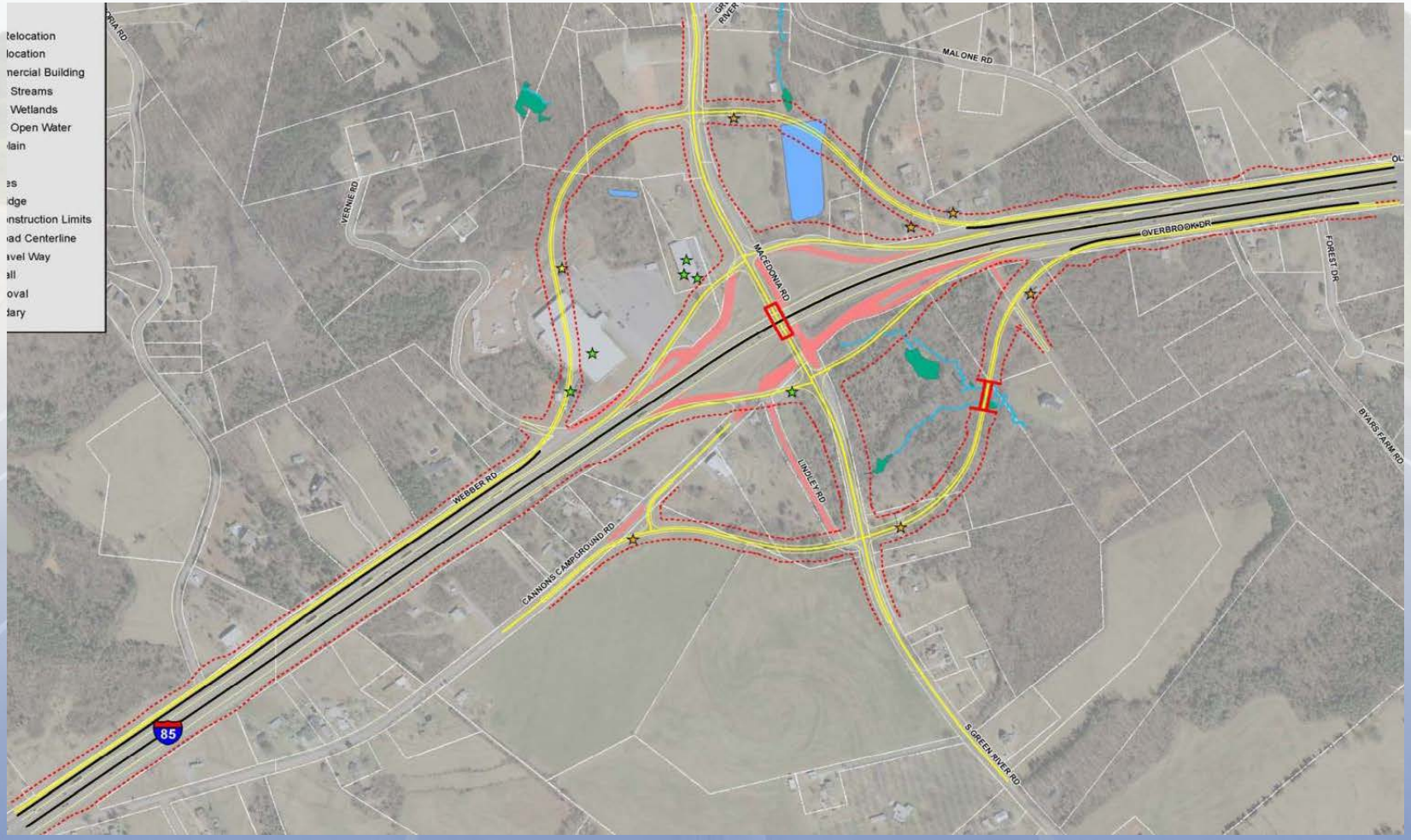


SUNNY SLOPE DRIVE – Alternative 1

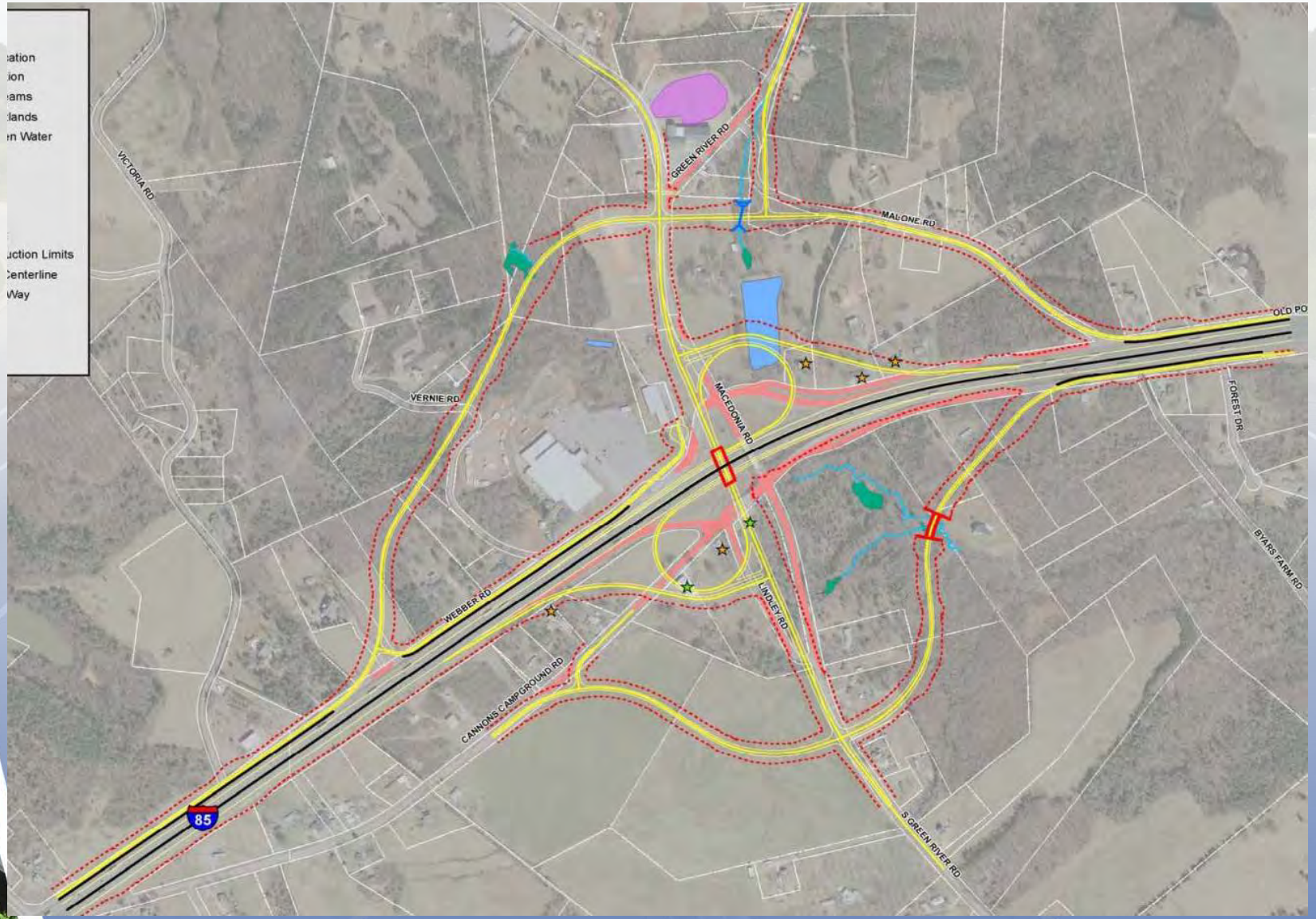
SUNNY SLOPE DRIVE - Alternative 2



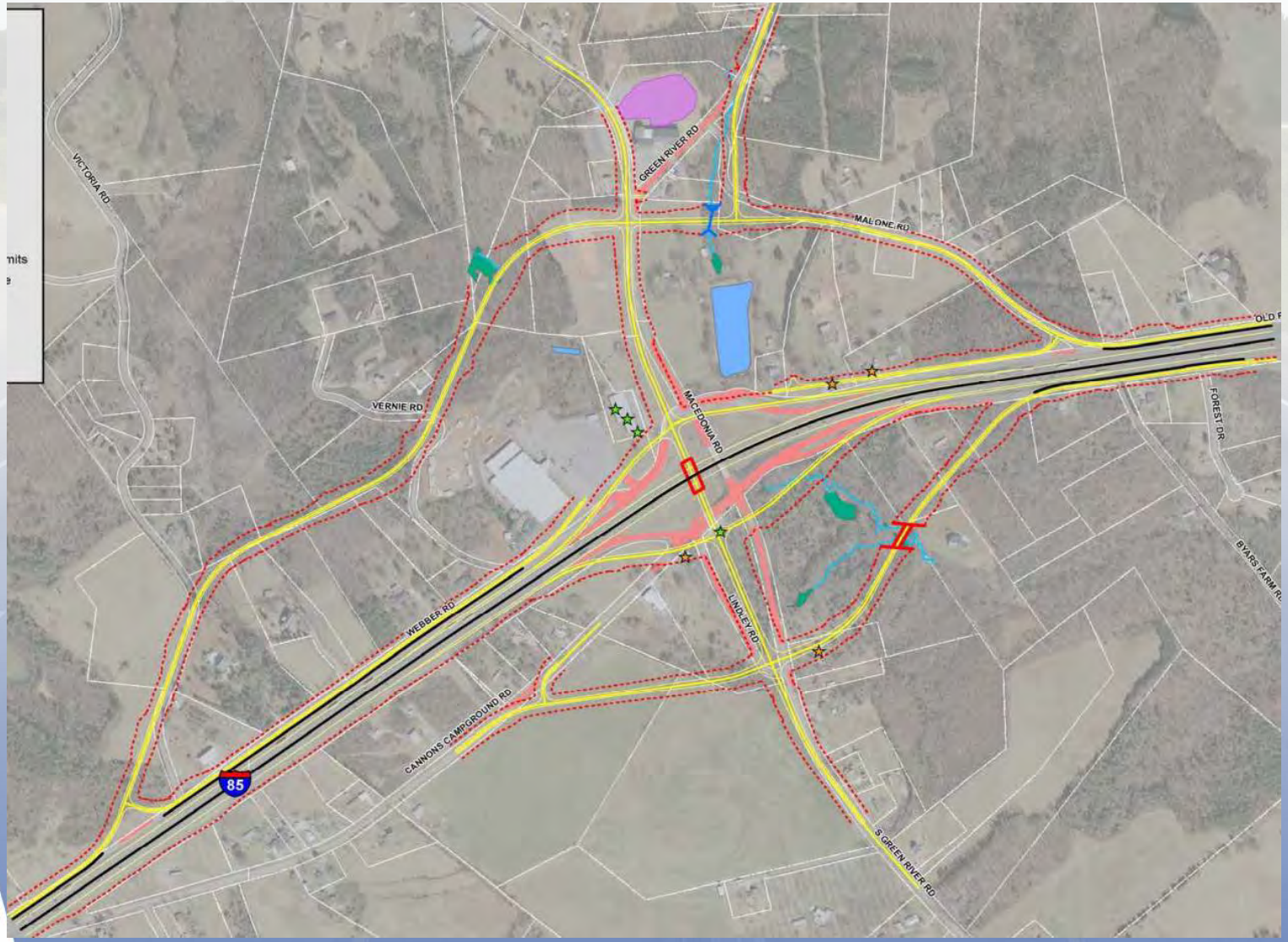
EXIT 87 (S-39) – Alternative 1



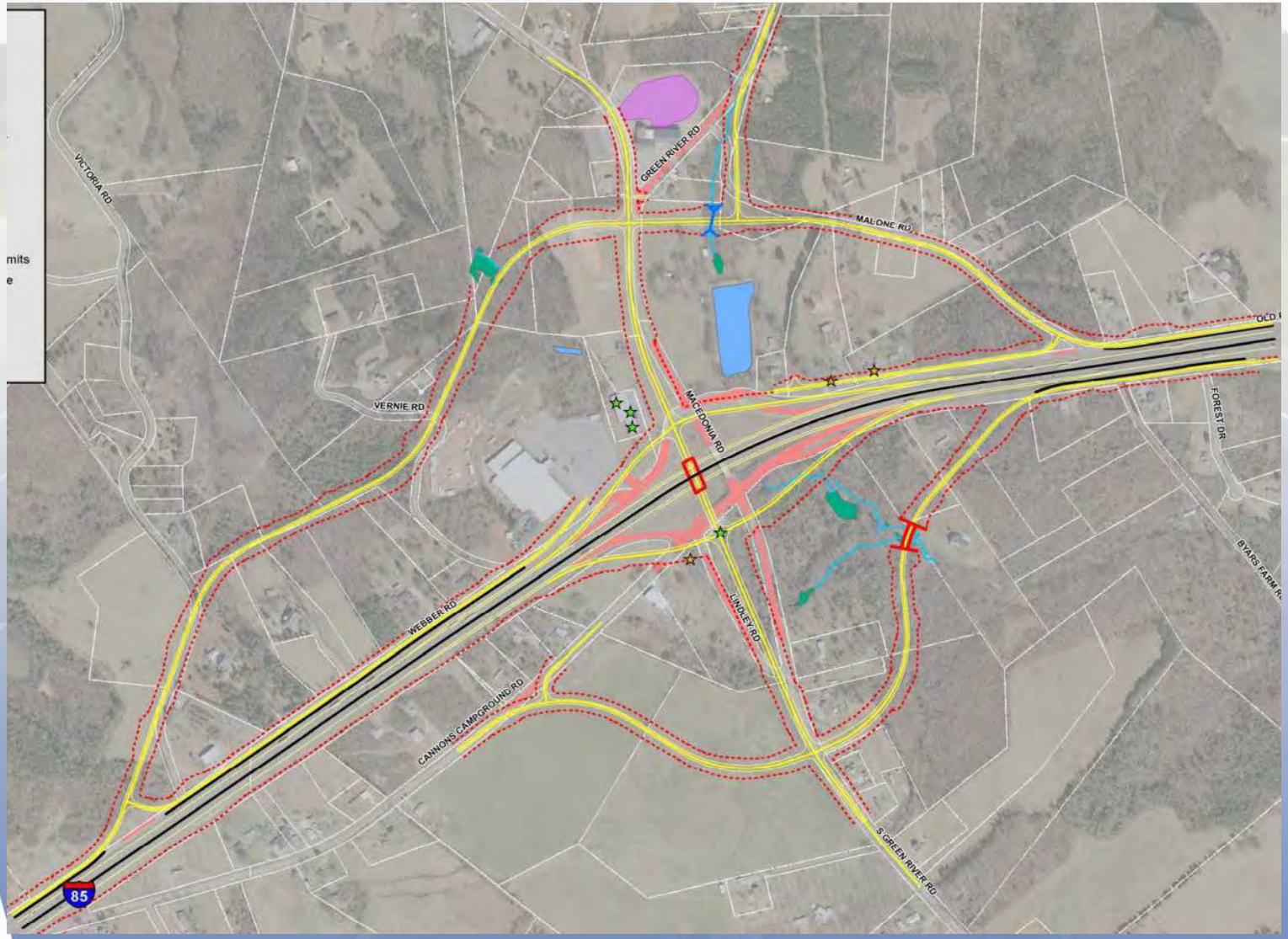
EXIT 87 (S-39) – Alternative 2



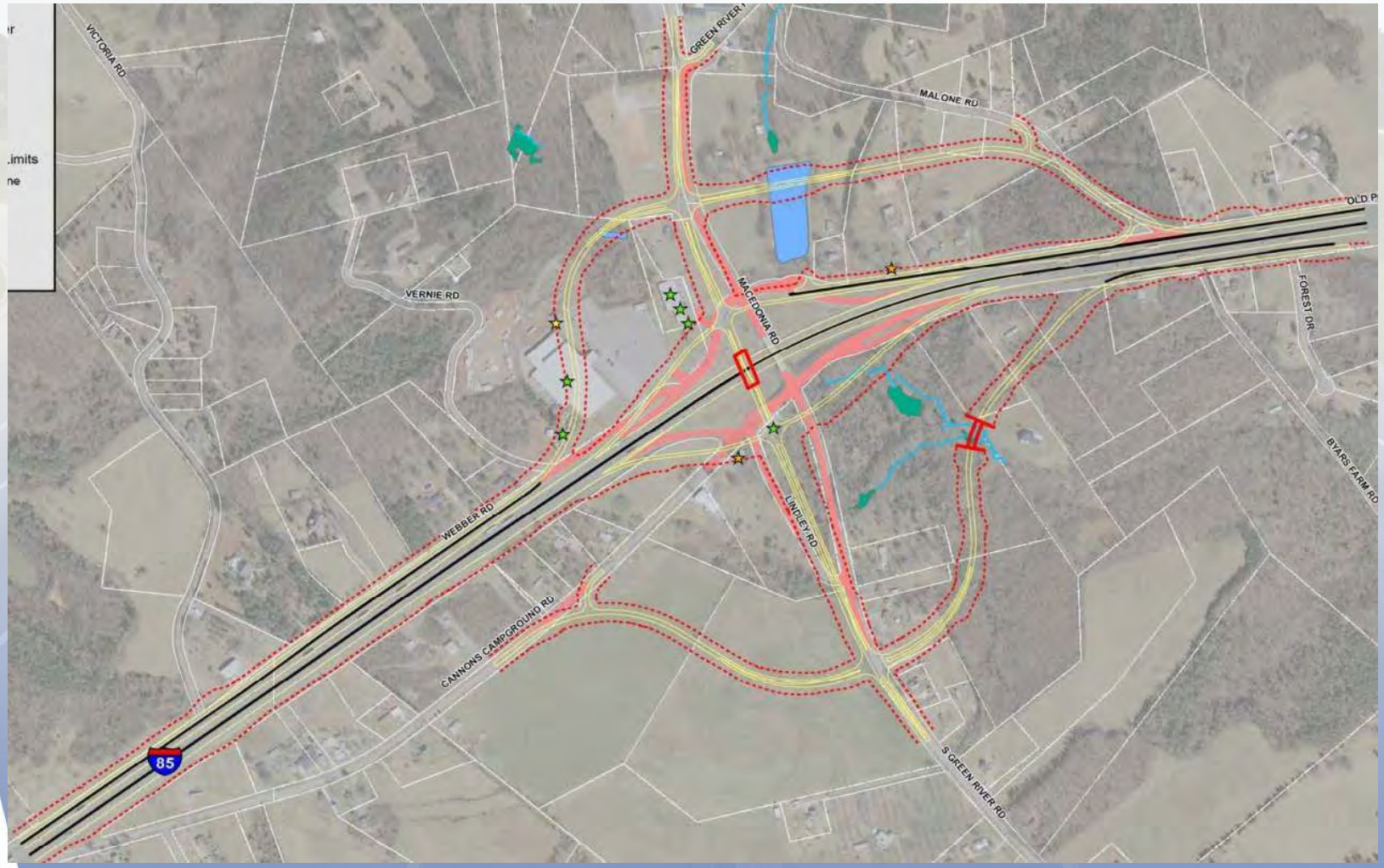
EXIT 87 (S-39) – Alternative 3



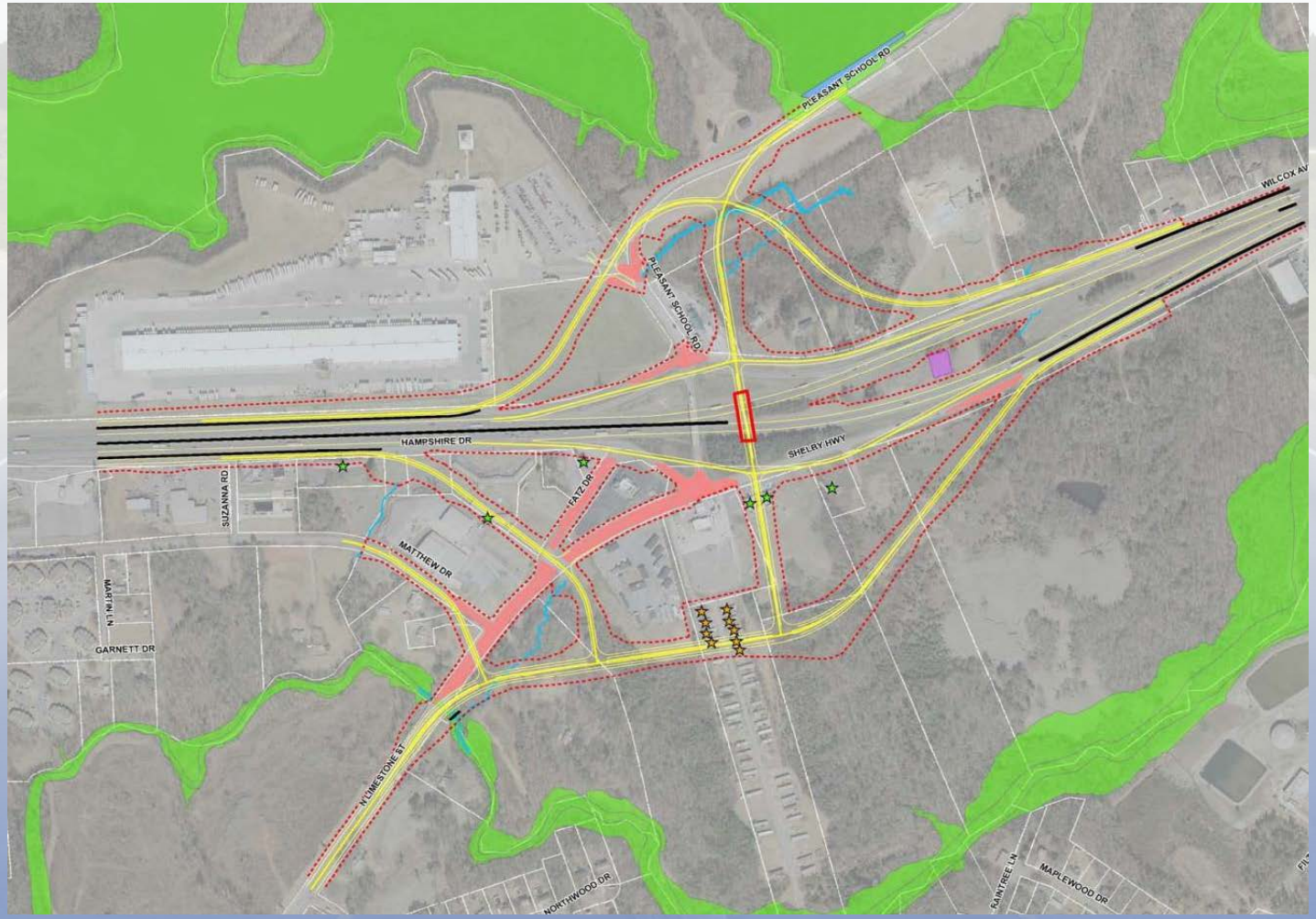
EXIT 87 (S-39) – Alternative 4



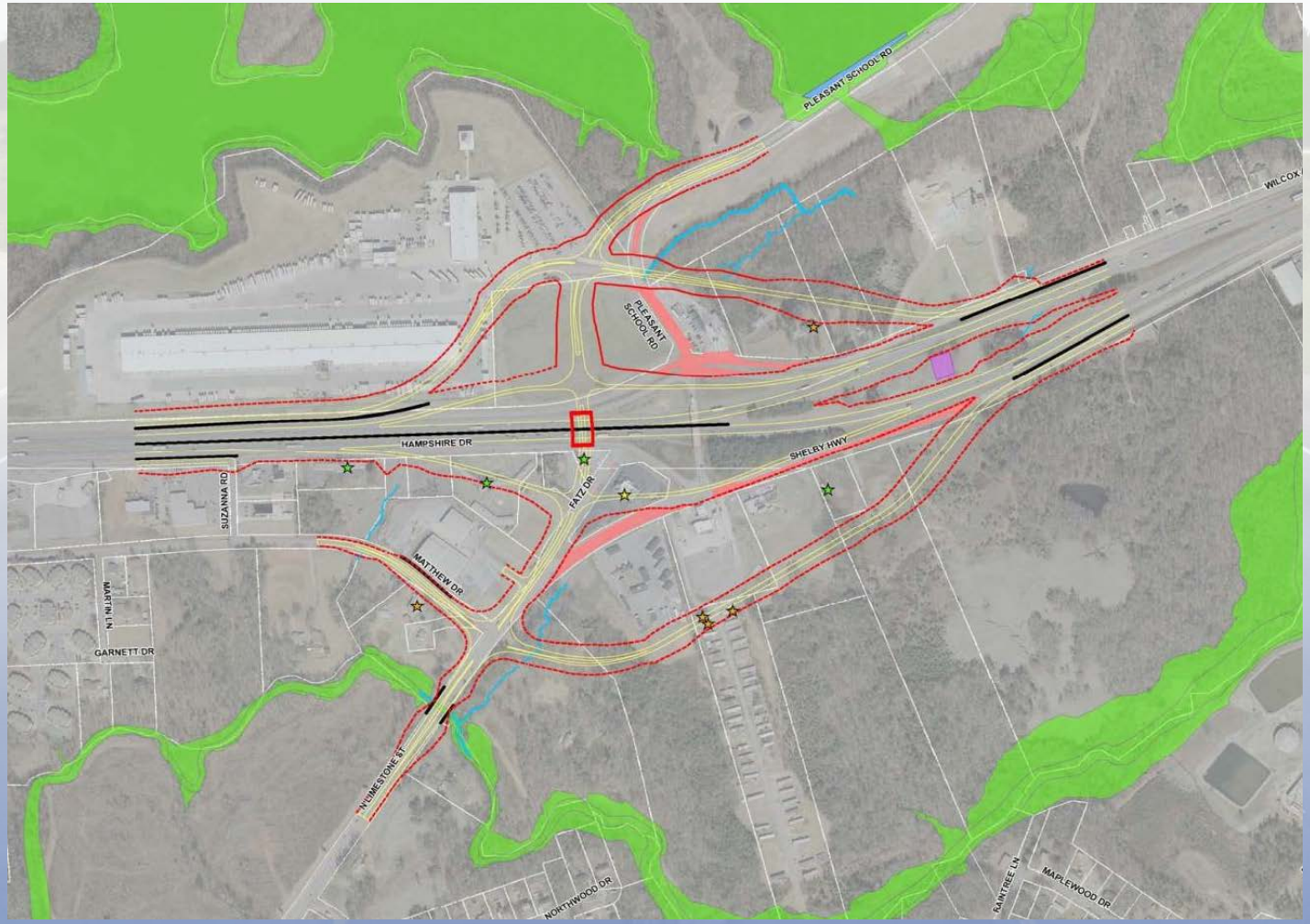
EXIT 87 (S-39) – Alternative 5



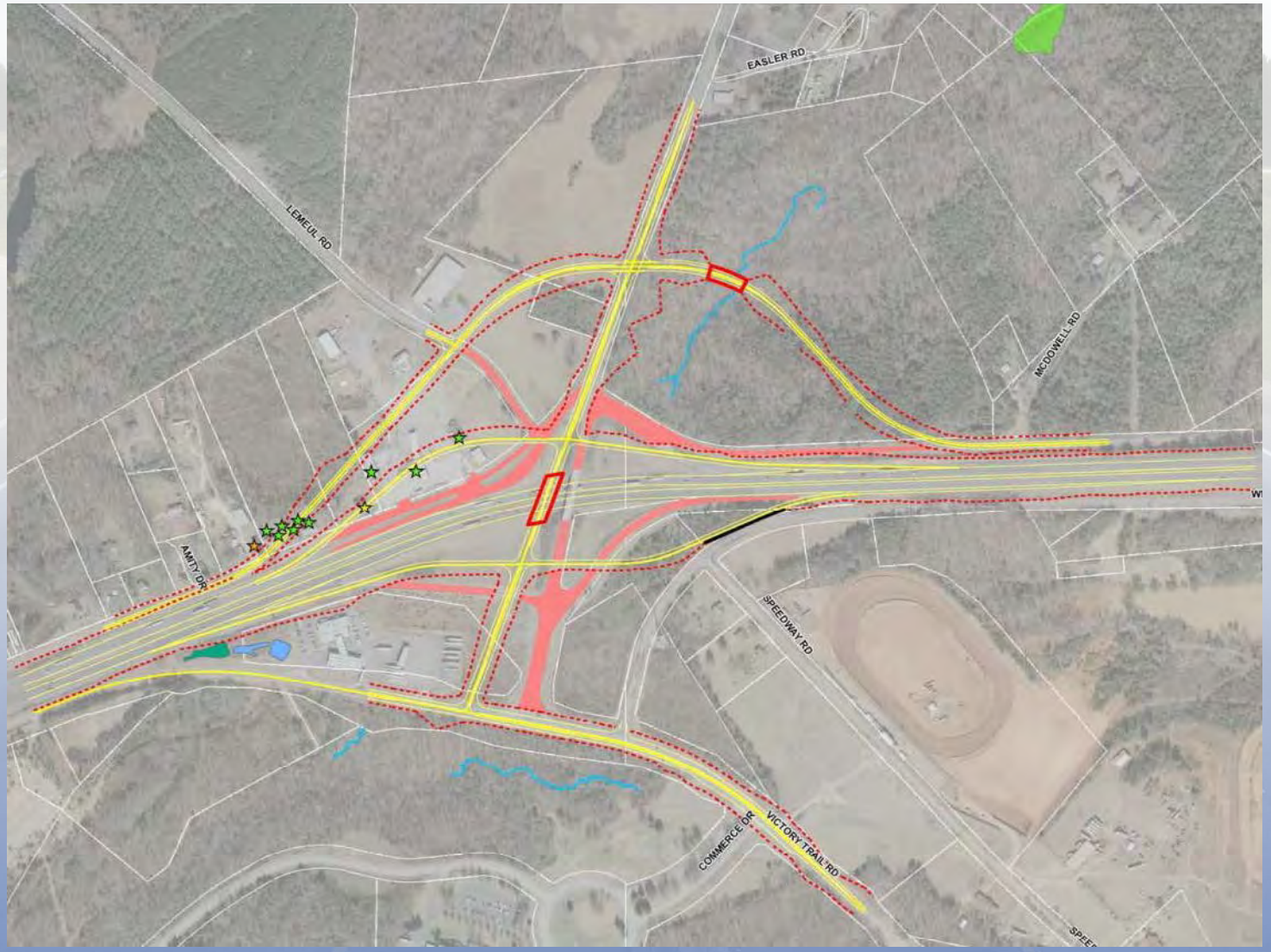
EXIT 95 (S-82) - Alternative 1



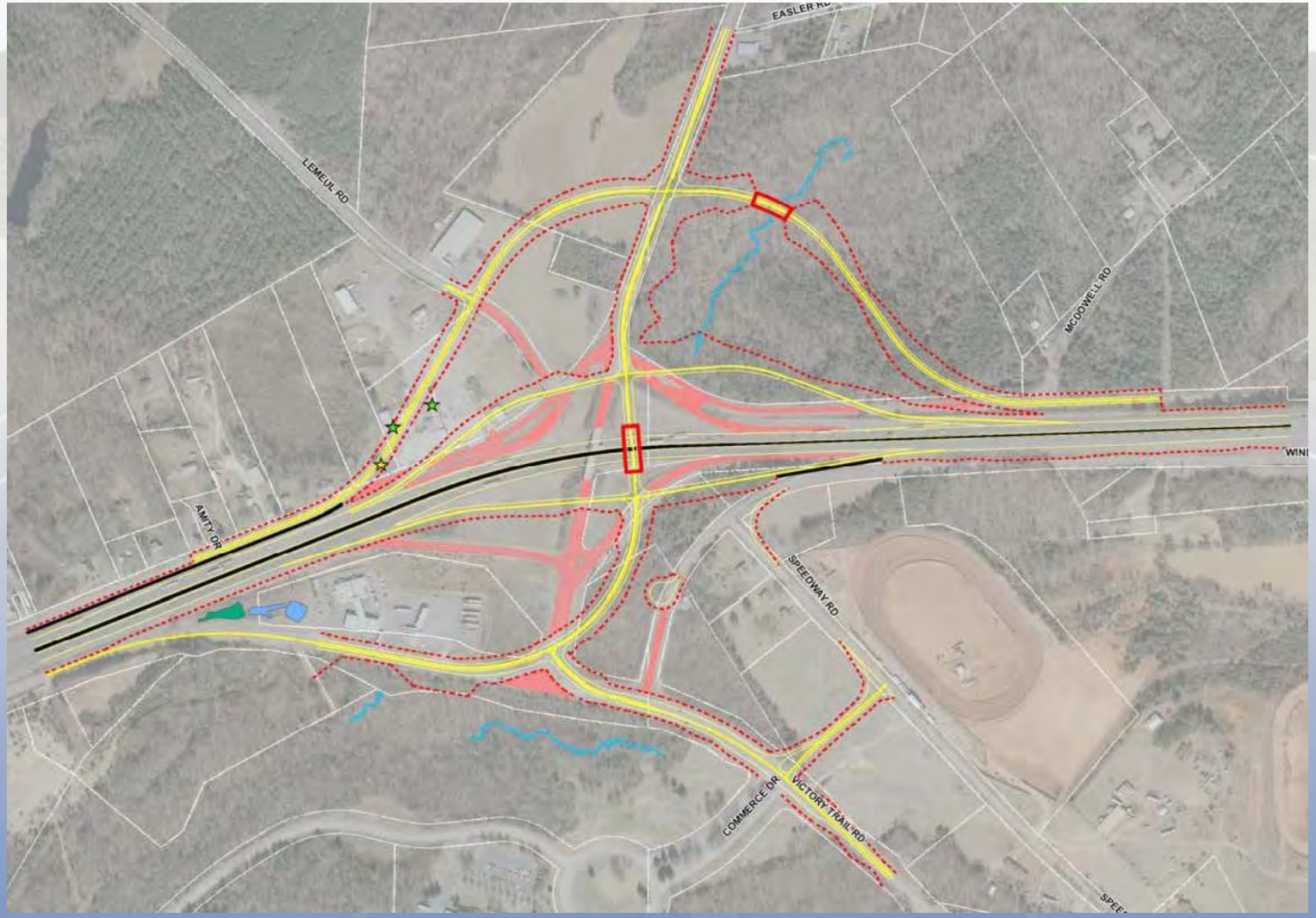
EXIT 95 (S-82) - Alternative 2



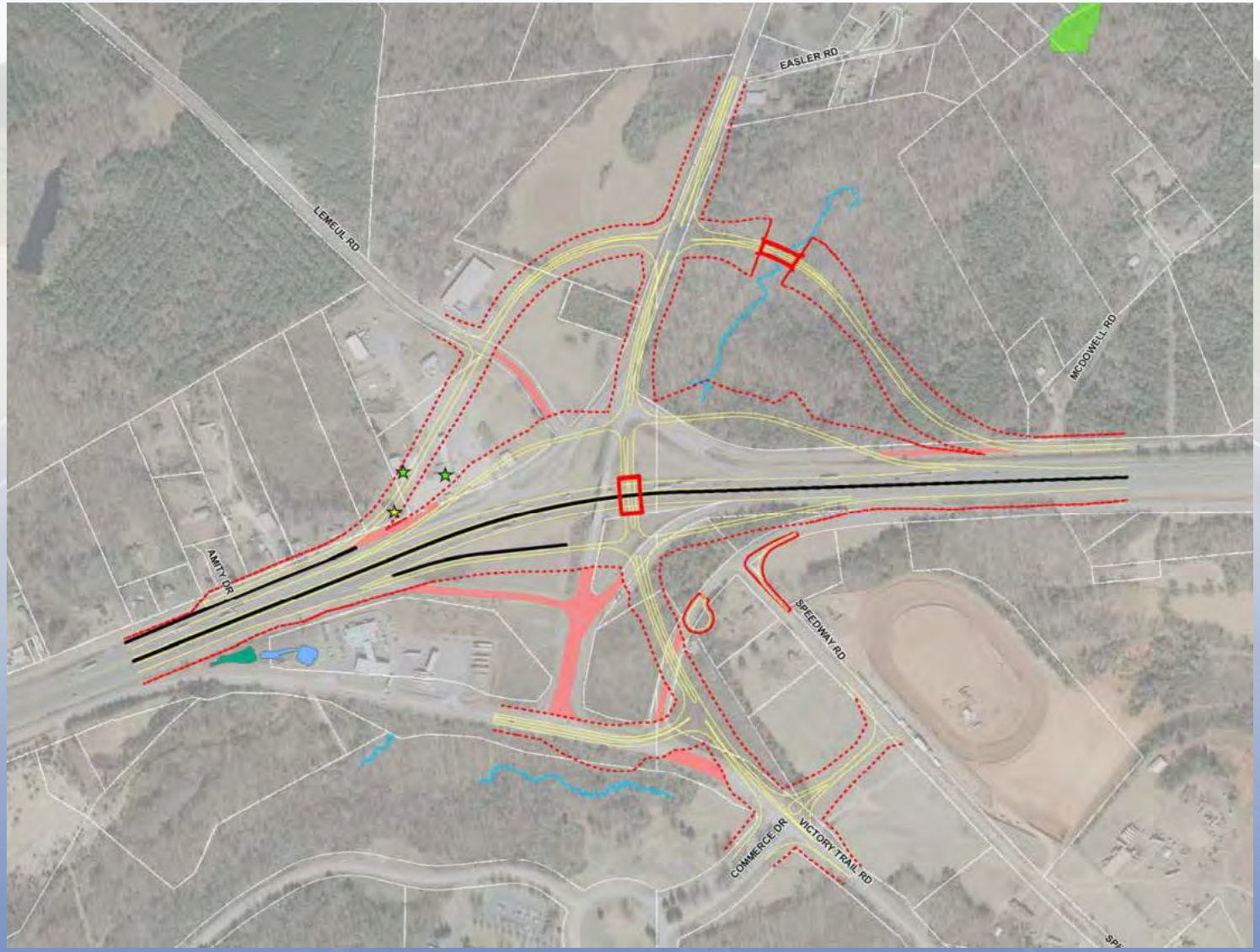
EXIT 96 (SC18/SC329) – Alternative 1



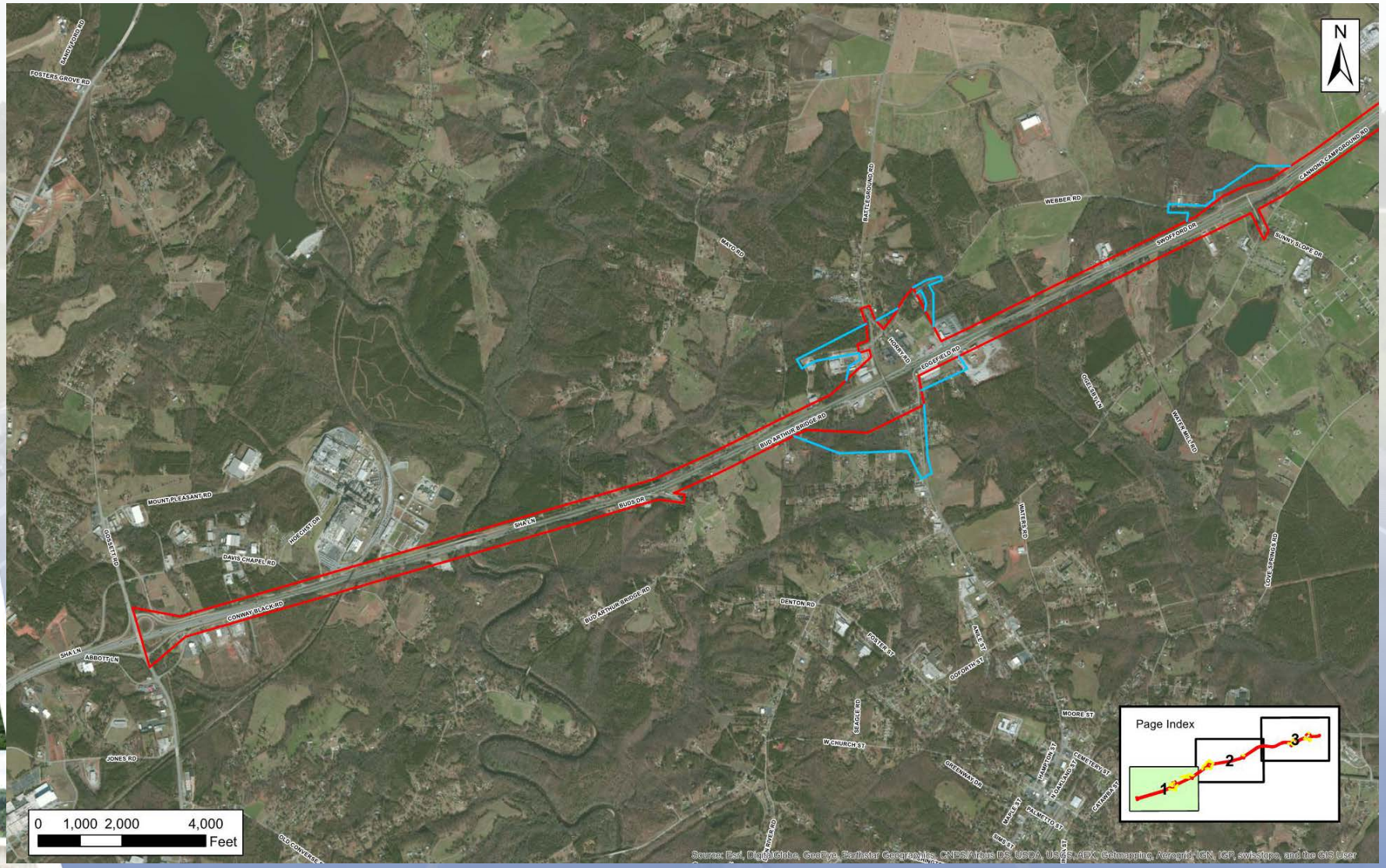
EXIT 96 (SC18/SC329) – Alternative 2



EXIT 96 (SC18/SC329) – Alternative 3

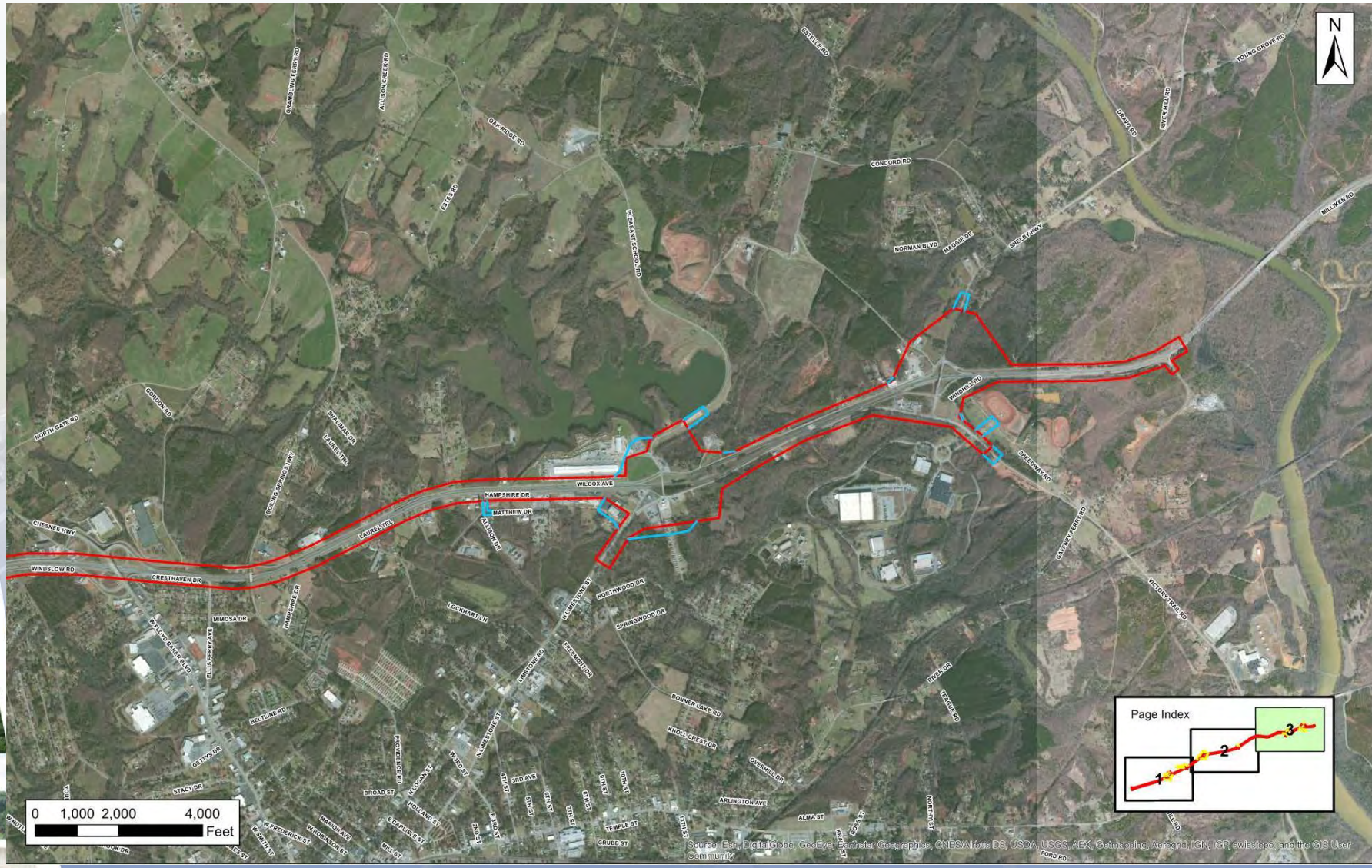


EXPANDED STUDY AREA



EXPANDED STUDY AREA

EXPANDED STUDY AREA



ENDANGERED SPECIES

CULTURAL IMPACT
Canty Way, Gaffney SC

CUMULATIVE ENVIRONMENTAL IMPACT MATRIX

Table 2.1
Reasonable Alternatives Analysis Matrix

Categories	Mainline Alt 1	Sunny Slope Alt 1	Sunny Slope Alt 2	Exit 83 Alt 1	Exit 83 Alt 2	Exit 83 Alt 3	Exit 83 Alt 4	Exit 87 Alt 1	Exit 87 Alt 2	Exit 87 Alt 3	Exit 87 Alt 4	Exit 87 Alt 5b	Exit 95 Alt 1	Exit 95 Alt 2	Exit 96 Alt 1	Exit 96 Alt 2	Exit 96 Alt 3
Meets P&N		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constructability*		VC	VC	VC	VC	D	VC	E	VC	D	D	D	VC	VC	VC	VC	VC
Cost (Millions)		$13.5	$15.9	$24.9	$22.8	$25.2	$23.4	$32.7	$37.4	$38.4	$38.3	$38.4	$26.8	$27.3	$24.2	$23.7	$22.6
Wetlands (acres)			0.00	0.00	0.00	0.00	0.00	0.03	0.17	0.17	0.17	0.00	0.00	0.00	0.02	0.00	0.00
Streams (linear feet)			0	454	312	480	312	369	611	970	970	369	1,613	399	0	226	226
Ponds (acres)			0	0	0	0	0	0.54	0.91	0	0	0.84	0	0	0	0	0
Floodplains	2 Zone A Floodplains, Irene Creek & Broad River	No	No	No	No	No	No	No	No	No	No	No	2 Zone AE Floodplains, Providence Branch & Lake Whelchel	1 Zone AE Floodplain at Providence Branch	No	No	No
T and E Species	No**	No**	No**	No**	No**	No**	No**	No**	No**	No**	No**	No**	No**	No**	No**	No**	No**
Historical Sites	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Archaeological Sites	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Section 4(f) Sites				No	No	No	No	No	No	No	No	No	No	No	No	No	No
Relocations																	
- Business				3	3	4	2	6	2	4	4	6	6	4	9	2	2
- Residential	3	1	1	1	3	5	2	6	5	4	3	2	9	5	1	0	0
- Vacant Commercial	1	0	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1
- Other***	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
Noise Impacted Receptors	377			116	115	116	116	31	33	35	35	31	116	77	14	15	16
-Residential (NAC B)	178			17	16	17	17	21	22	24	24	21	91	73	14	15	16
-Schools & Churches (NAC C)	75			98	98	98	98	10	10	10	10	10	4	4	0	0	0
-Hotels (NAC E)	124			1	1	1	1	0	1	1	1	0	21	0	0	0	0
Hazardous Material Sites	2	0	0	3	2	2	2	0	0	0	0	0	3	3	1	1	1
Farmlands (acres)	209.3	12.2	11.2	13	10.2	14.4	8.9	22	34.4	34.1	35.8	28.4	8.5	10.2	13.4	12.7	12.1

*"Constructability" is defined as Very Constructible (VC), Difficult (D), and Extremely Difficult (E, Closure of entire interchange for extended period during construction).
**The Northern long-eared bat (NLEB) may occur in the study area. Avoidance and Minimization Measures will be implemented to avoid impacts to the NLEB.
***"Other" refers to utility facility.

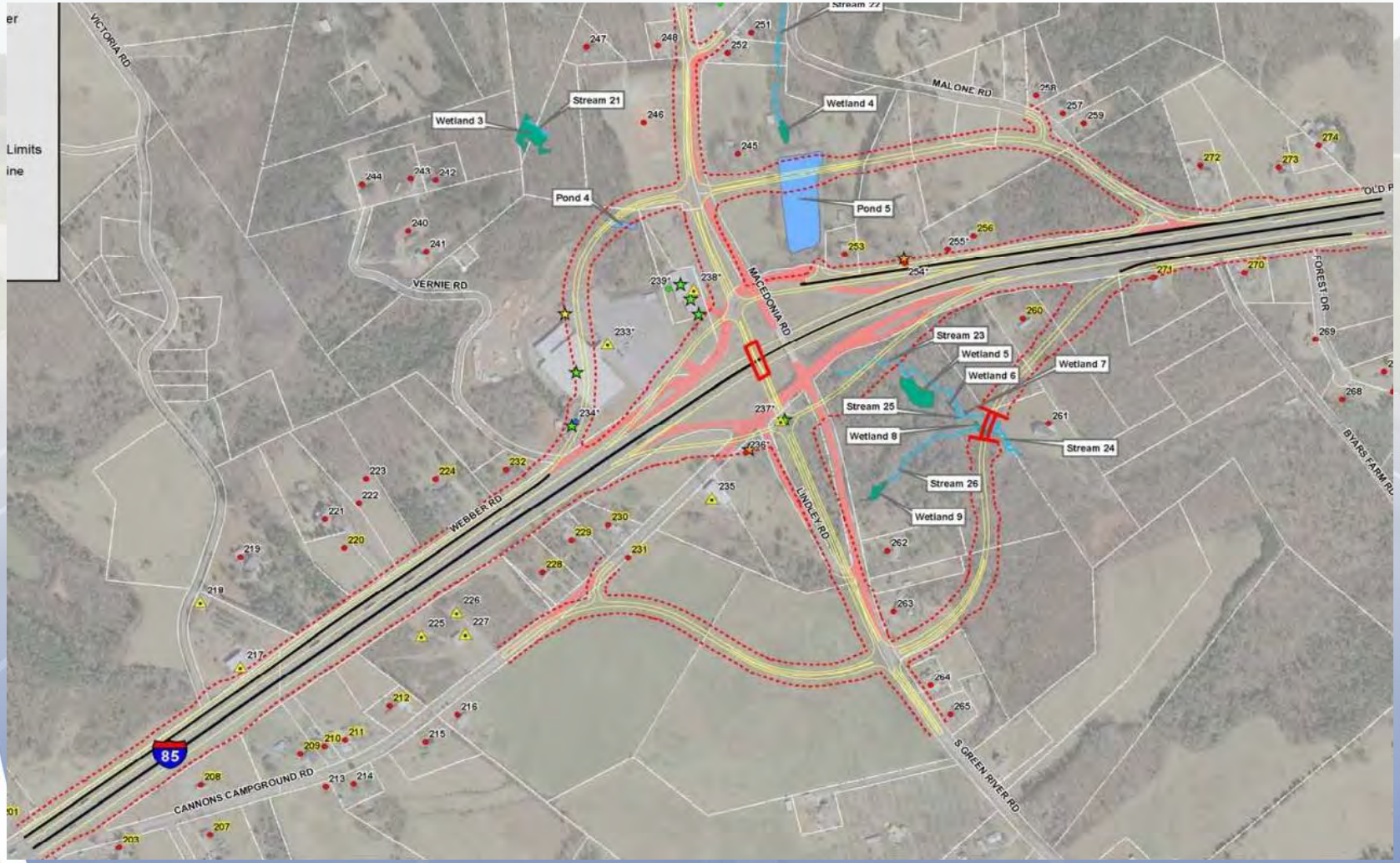
Cost

Streams

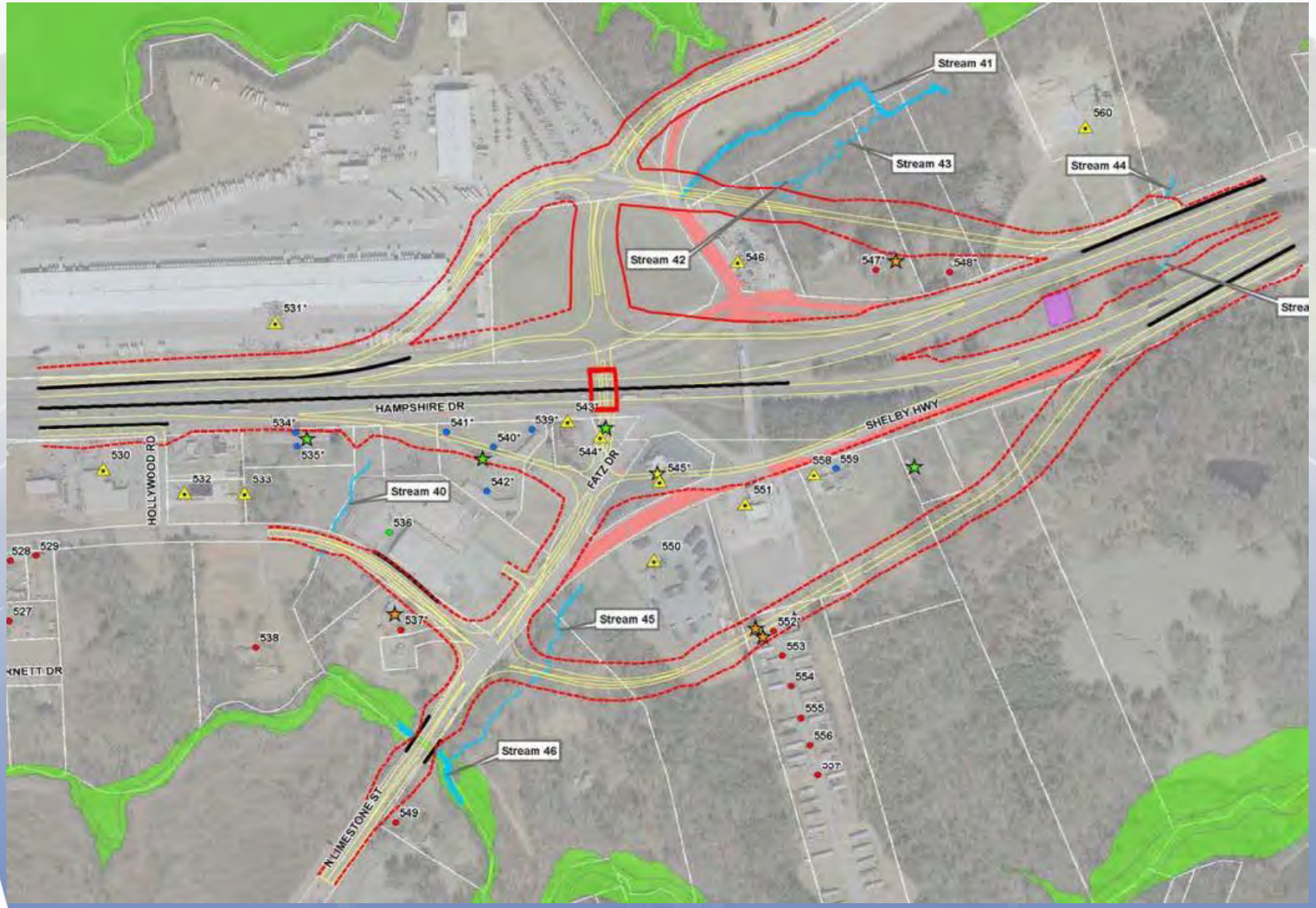
Relocations

EXIT 83 (SC110) – Preferred Alternative

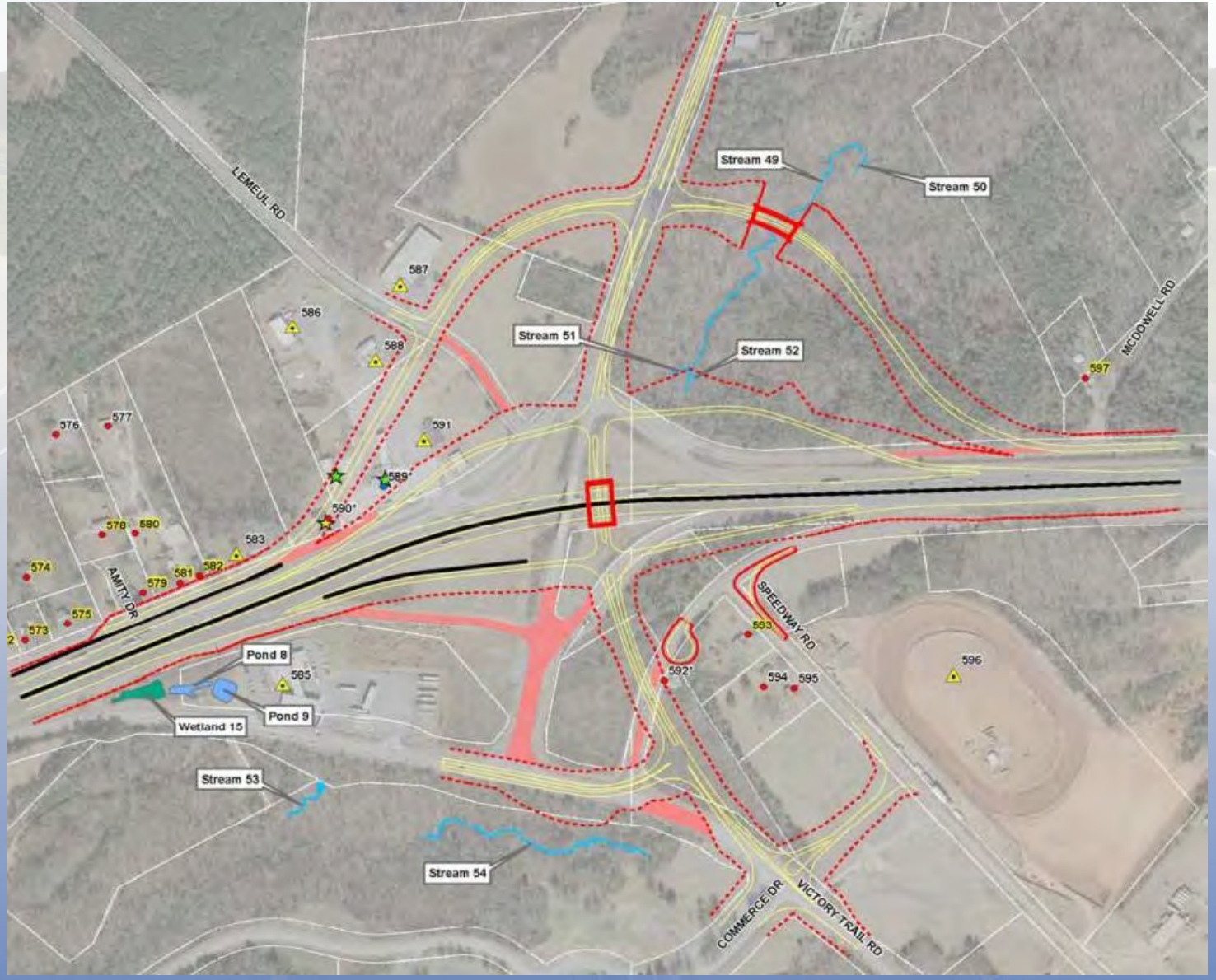
EXIT 87 (S-39) – Preferred Alternative



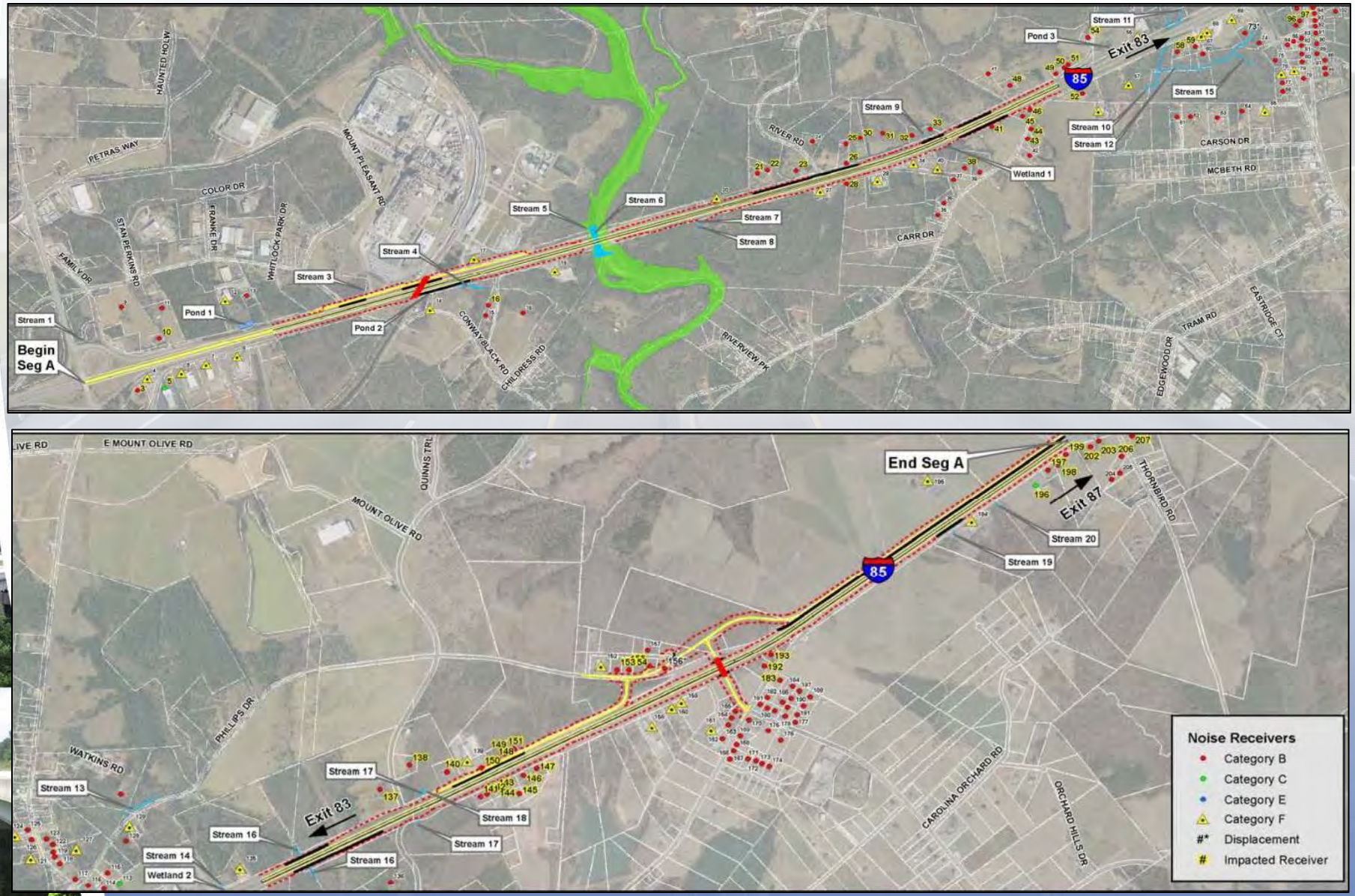
EXIT 95 (S-82) – Preferred Alternative



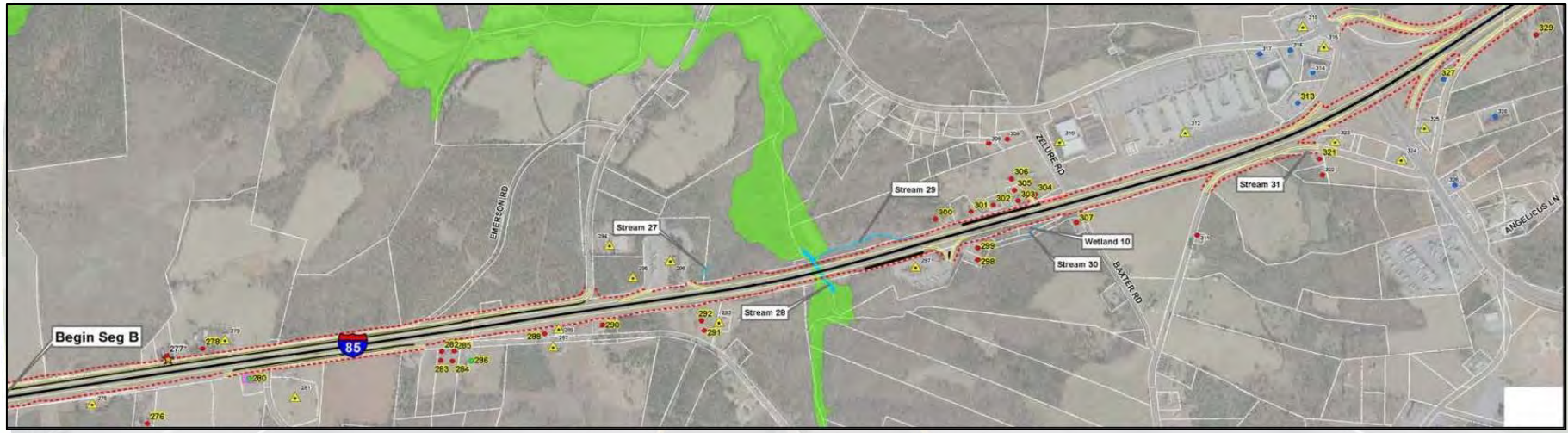
EXIT 95 (SC18/SC329) – Preferred Alternative



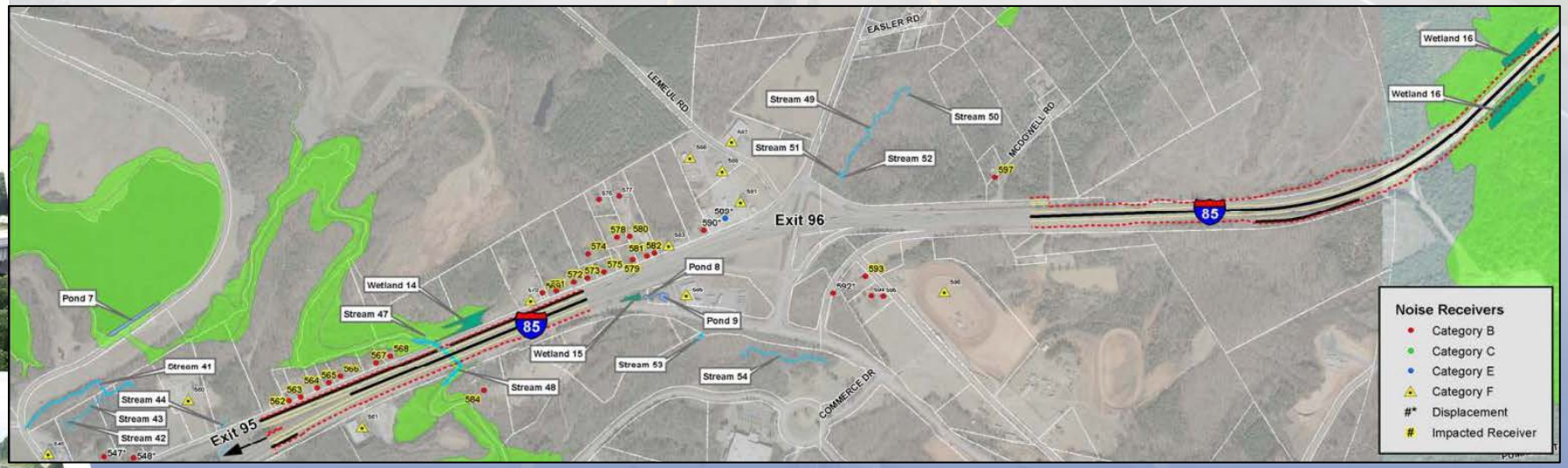
NOISE RECEPTORS – Segment A



NOISE RECEPTORS – Segment B



NOISE RECEPTORS – Segment C



IMPACTS OF PREFERRED ALTERNATIVES

Residential Relocations	13
Business Relocations	15
Endangered Species	0


Thank you!

IMPACTS OF PREFERRED ALTERNATIVES

Residential Relocations	13
Business Relocations	15
Endangered Species	0
Stream Impacts	1279 LF
Wetland Impacts	.25 Acres
Pond Impacts	.84 Acres
Floodplain Impacts	2 locations
Cultural Impacts	1 Location

Estimated Construction Cost **$245 Million**

ROADWAY DESIGN CHALLENGE

DRAINAGE ANALYSIS

- Analyzed 176 cross line pipes
- All crossline pipes were surveyed and videoed
- HY-8 was used to analyzed cross line pipe
- 103 capacity needs to be increased based on HY-8 analysis

SUE/UTILTIY COORDINATION

- Performed Level B & C SUE for entire project
- Utilities are in the process of verifying SUE and determining prior rights

GEOTECHNICAL

- Pavement borings (SCDOT performing pavement design)
- Bridge borings
- Retaining wall borings
- Culvert extension borings

DESIGN EXCEPTIONS BEING PREPARED

- 5 crest vertical curves DS 55=/>65 mph (Would require 7'-10' of cut to achieve 65 mph DS)
- 10 sag vertical curves DS 55=/>65 mph (Would require 7' – 10' of buildup or replace bridged to achieve 65 mph DS)
- 5 locations have grades that exceed 5%

REMAINING PROJECT MILESTONES

Public Hearing Comments	January 2016
Design-Build RFQ	January 2016
FONSI	February 2016
Finalize Preliminary Plans	February 2016
Design-Build RFP	Summer 2016
NTP Design-Build Contract	Fall 2016
Complete Construction	Fall 2020 to Early 2021

Thank you!

QUESTIONS