E Cherokee DR
Corridor Study – Summary Report

Prepared For:
Cherokee County

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1/21/2021

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1 Introduction and Purpose

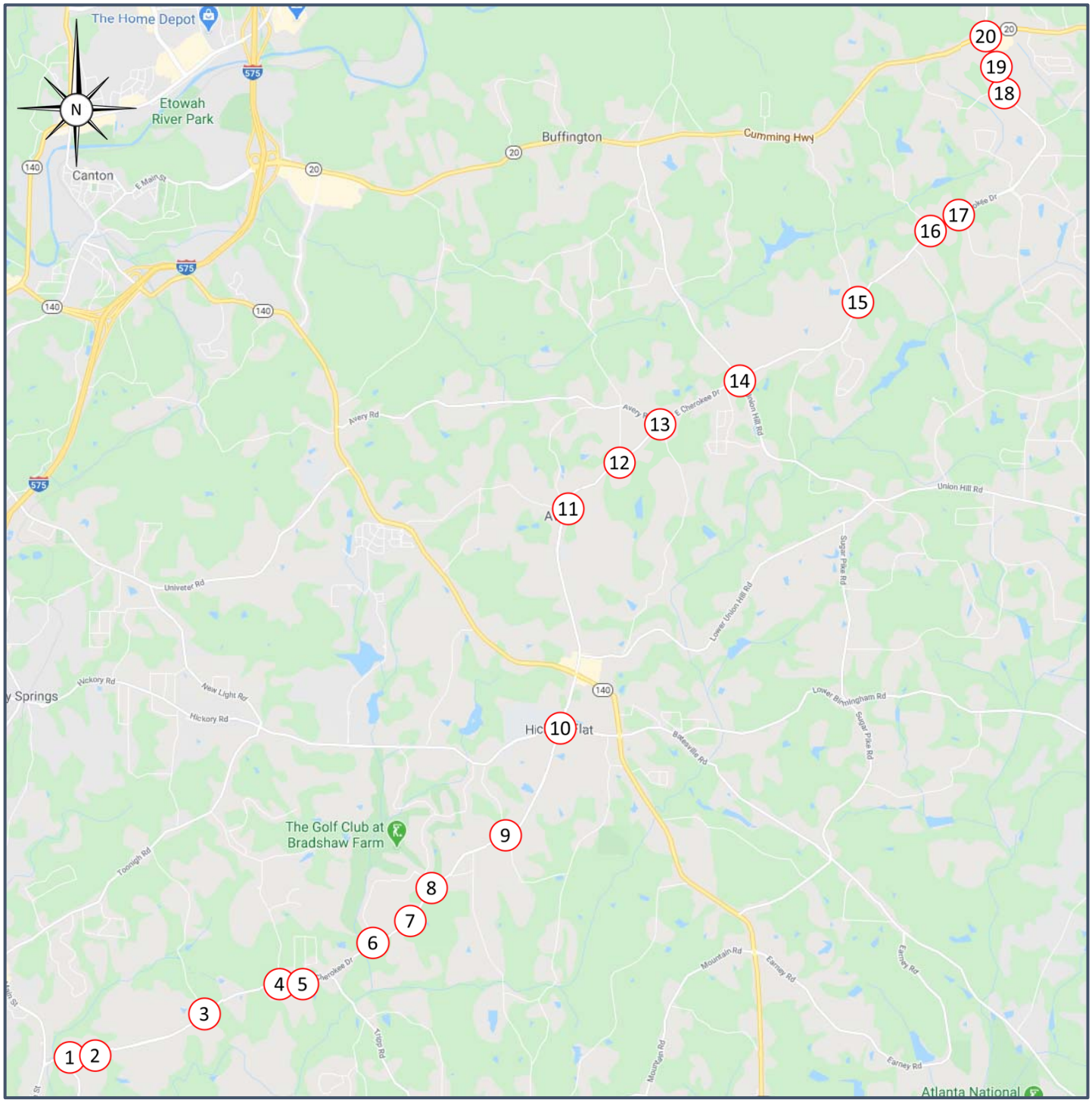
The E Cherokee Dr Corridor from Mill Creek Rd to SR 20 was identified by Cherokee County for investigation of improvement. The roadway snakes through eastern Cherokee County traveling primarily northeast / southwest and the typical roadway cross section consists of two lanes of travel, grassed shoulders, limited turn lanes, and limited sight distance in several areas. Most of the corridor is comprised of neighborhood driveways and unsignalized intersections with local and collector roads. The roadway serves as a connection from these residential zones to pockets of commercial developments consisting primarily of grocery stores, and restaurants. Six public schools are located along the corridor impacting off peak traffic flow.

Twenty intersections were identified for analysis and can be split into two continuous segments. Mill Creek Rd to Hickory Rd on the south segment and Bart Manous Rd to State Route (SR) 20 on the north segment. The corridor was analyzed for three scenarios, existing / short range (2019), mid-range (2029), and long range (2039). The study considered the anticipated population growth of the area and planned projects / improvements in the development of future year traffic volumes. The study recommends several improvements for the corridor along with a benefit / cost analysis for project prioritization to assist Cherokee County in project list development.

Traffic data and observations for the corridor were conducted in the fall of 2019 and early 2020 prior to any closures due to the COVID-19 pandemic.

Study intersections are shown in

Figure 1: Study Intersections



1. Mill Creek Rd / Johnson Elem. School
2. Copper Ridge Dr
3. Thornwood Dr / S Holly Springs
4. Ranchwood Trail
5. Village Ct / Little Brook Dr
6. Avery Creek Dr
7. New Castle Walk
8. Bradshaw Club Dr
9. Little Rd
10. Hickory Rd
11. Bart Manous Rd
12. Epperson Rd
13. Avery Rd
14. Union Hill Rd
15. Johnson Brady Rd
16. Beavers Rd
17. Haley Farm Rd
18. Water Tank Rd
19. Macedonia Elem. School
20. SR 20

2 Summary of Results

Figure 2: Intersection Summary

#	Intersection	Planned Project	Recommended Improvement		
			Short-Range	Mid-Range	Long-Range
1	Mill Creek Rd / Johnson Elem. School	-		Widen E Cherokee Dual NBL	-
2	Copper Ridge Dr	-	EBL Turn Lane		-
3	Thornwood Dr / S Holly Springs Rd (Improvements Under Construction)	-	EBL+R Turn Lane WBL+R Turn Lane SBL Turn Lane		-
4	Ranchwood Trail	-	EBL Turn Lane WBR Turn Lane SB Dual Lane	Signalization	-
5	Village Ct / Little Brook Dr	-	EBL Turn Lane EBR Turn Lane WBL Turn Lane	-	-
6	Avery Creek Dr	-	EBL Turn Lane		SB Dual Lane
7	Newcastle Walk	-	-	-	-
8	Bradshaw Club Dr	-	EBL Turn Lane		SB Dual Lane
9	Little Rd	Re-alignment shifting southern approach to match northern	EBL Turn Lane WBL Turn Lane	-	-
10	Hickory Rd	Sidewalk / Ped improvements			Widening Hickory Rd
11	Bart Manous Rd	-	NBL Turn Lane SBR Turn Lane	EB Dual Lane	-
12	Epperson Rd	-	-	-	-
13	Avery Rd	-	SBR Turn Lane	EB Dual Lane	Roundabout
14	Union Hill Rd	-	-	-	-
15	Johnson Brady Rd	-	-	-	NBL Turn Lane
16	Beavers Rd	-	-	SBR Turn Lane	NBL Turn Lane
17	Haley Farm Rd	-	-	EBR Turn Lane	-
18	Water Tank Rd	-	-	-	NBL Turn Lane
19	Macedonia Elem. School	-	SBL Turn Lane Fix Drwy alignment	-	-
20	SR 20	PI#0014133 - 2025 Widening SR 20 (6 lanes) - Restricted drwy access - Turn lane length improvements	-	-	-

Individual intersection summaries can be found in section 4 Intersection and Corridor Recommendations.

3 Methodology

3.1 Existing Conditions, Data Collection, and Field Observations

Traffic counts were performed at the study intersections on Thursday February 13th, 2020. Intersection peak hours were determined on a per intersection basis. Turning movement counts, 24-hour bi-directional volume counts, and vehicle speed counts were obtained at targeted locations. The peak hour turning movement volumes are shown graphically in Appendix A along with the full turning movement data collected.

Existing traffic signal timings were obtained from Cherokee County for use in analysis. Traffic signal timings used in analysis are presented along with the Synchro output files in Appendix B.

Field observations were conducted over the course of the analysis on multiple days. Traffic operations of the study network were observed for morning and afternoon peak hours, and school drop-off / pickup times. Observations for school operations can be found in Appendix C.

Over the course of this study the study network was impacted by the COVID-19 pandemic which closed schools and businesses. All data collection was performed prior to any closures due to the pandemic.

3.2 Crash History Analysis

Five-year crash history was obtained from the GDOT GEARS accident reporting system. Individual intersection crash histories were summarized by type and year. An analysis was performed to determine if a pattern of crashes emerged, and if any safety related mitigation was required. A full crash history summary including raw data can be found in Appendix D. Individual intersection crash summaries can be found on their related fact sheets section 4.

3.3 Growth Rate Development and Traffic Volume Projections

Background traffic growth is the analysis method of analyzing historic trends in traffic volumes / population growth, and future growth projections to determine an annual growth rate which is applied to the existing traffic counts on the study network. For the purposes of this study several sources were considered. Historic traffic volumes were available from GDOT at several locations on the study network. Population growth data was obtained from the US Census, Cherokee County Comprehensive Plan, and the Atlanta Regional Commission (ARC) Population data. A summary of the growth rate analysis is shown in Table 1 full growth rate data is provided in Appendix E.

Table 1: Growth Rate Summary

Source	Year Range	Growth Rate
E Cherokee Dr North of Haley Farm Rd	2017 - 2018	1.5%
	2016 - 2018	1.8%
	2015 - 2018	3.0%
E Cherokee Dr North of Lower Union Hill Rd	2017 - 2018	-13.4%
	2016 - 2018	-4.2%
	2015 - 2018	-2.7%
E Cherokee Dr South of Lower Union Hill Rd	2017 - 2018	0.0%
	2016 - 2018	2.9%
	2015 - 2018	4.4%
E Cherokee Dr East of Tripp Rd	2017 - 2018	0.0%
	2016 - 2018	8.0%
	2015 - 2018	9.6%
Cherokee County	2016 - 2017	2.5%
U.S. Census Bureau	2013 - 2017	2.5%
Canton	2016 - 2017	6.2%
U.S. Census Bureau	2013 - 2017	3.6%
Woodstock GA	2016 - 2017	2.4%
U.S. Census Bureau	2013 - 2017	4.4%
Cherokee County	2015 - 2020	2.8%
Cherokee Comp. Plan	2010 - 2020	2.3%
Woodstock	2015 - 2020	2.4%
Cherokee Comp. Plan	2010 - 2020	2.3%
Canton	2015 - 2020	1.8%
Cherokee Comp. Plan	2010 - 2020	1.8%
Cherokee County	2015 - 2050	1.3%
ARC Population		

The traffic and population growth were analyzed, and the Cherokee County Engineering department approved a proposed growth rate of 2.5% per year from 2019 to 2029, and 1.5% per year from 2029 to 2039 for use in analysis.

Existing traffic volumes were grown using the selected growth rate. On driveways and intersections where no growth is expected (i.e. fully developed neighborhoods, schools, etc.) the entering and exiting volumes for those approaches were not grown.

Future year traffic volumes are shown graphically in Appendix A.

3.4 Capacity Analysis

Intersection capacity analysis utilizes a grading system from A to F where the more delay that is incurred on the average vehicle over the course of the peak hour decreases the Level of Service (LOS). A LOS of A indicates free flow conditions with LOS F indicating severe congestion. Typically, LOS A through D is considered acceptable with LOS E and F is considered failing.

LOS thresholds vary by intersection control.

Table 2: Level of Service Thresholds

LOS	Signalized Delay (s/veh)	Unsignalized Delay (s/veh)
A	≤ 10	≤ 10
B	10-20	10-15
C	20-35	15-25
D	35-55	25-35
E	55-80	35-50
F	> 80	> 50

Intersection LOS and queueing was analyzed using a Synchro 10/ SimTraffic 10 model for signalized and unsignalized intersections. Roundabout capacity and queueing analysis were performed utilizing the GDOT Roundabout Tool v4.2. Roadway segments were analyzed with HCS 7 utilizing HCM 6th Edition methodology.

3.5 Cost Analysis

A cost analysis was performed for recommended improvements to the study network. The cost analysis utilized a modified version of the ARC Planning Level Cost Estimation Tool (2016). The cost estimate tool was updated to include current GDOT pay item costs, as well as an adjusted annual inflation.

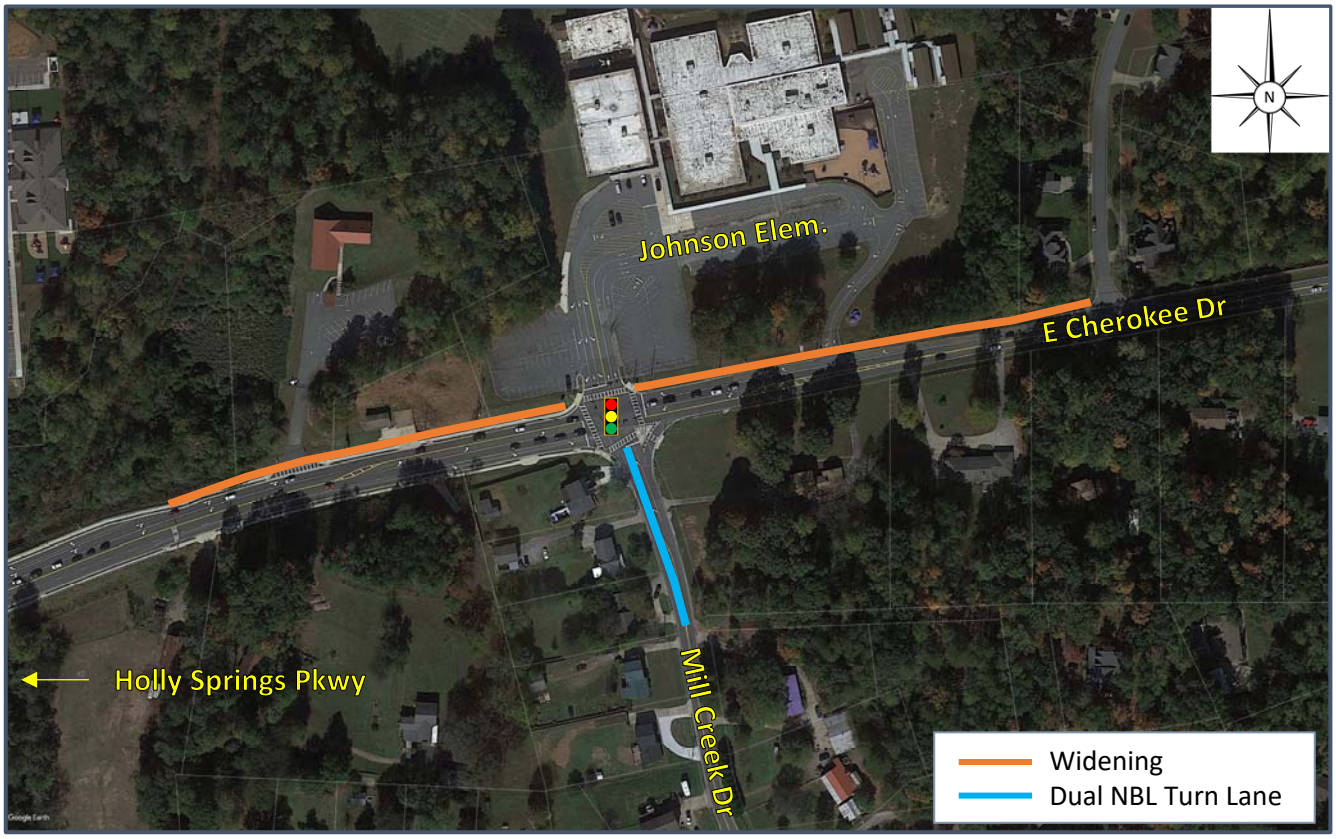
The cost estimate tool provides a planning level cost estimation and actual construction, and development costs will vary. In several cases extra contingency was added based on anticipated factors such as utility relocation, grading, ROW, etc. Project prioritization is not a direct result of cost, multiple factors such as need, safety, and capacity improvements were considered.

Cost analysis summary worksheets can be found in Appendix F.

4 Intersection and Corridor Recommendations

Intersection and corridor recommendations are summarized the following section. Each intersection has a separate fact sheet available summarizing analysis, results, and recommendations.

1. Mill Creek Dr / Johnson Elementary School



Intersection Needs Description:

Problem:
The intersection experiences a large volume of northbound left-turning vehicles. Additionally along this segment of E Cherokee Dr the intersection is at/over capacity.

Improvement:
Short Range:
- Signal Timing

Mid-Range / Long Range
- Widen E Cherokee From Copper Ridge Rd to existing right-turn lane to Holly Springs Pkwy
- Add second NBL from Mill Creek Dr

Capacity Analysis Summary

- **Background**
  - 2019: Intersection LOS E/D
  - 2029/2039: Intersection LOS F
- **Build**
  - With widening intersection LOS improves to D/E in 2039

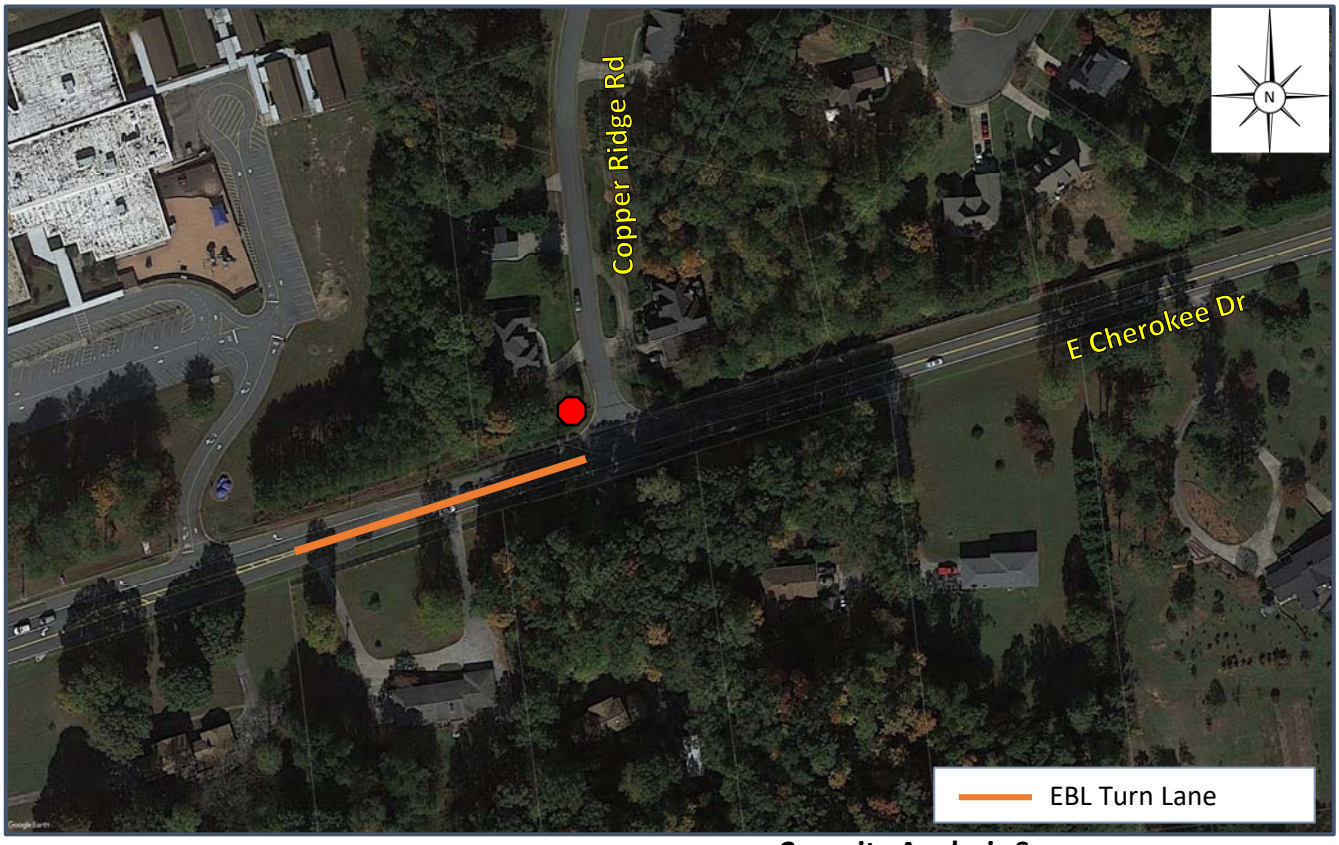
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	6	3	0	9
Head-On	0	1	0	1
Rear End	64	8	0	72
Sideswipe - Same	3	0	0	3
Sideswipe - Opposite	1	1	0	2
Not a Collision w/ Motor Veh	3	0	0	3

Cost Analysis

Planned Improvement		Cost	Year
NBL + Widen E Cherokee	$	2,934,000.00	2029

2. Copper Ridge Dr



Intersection Needs Description:

Problem:
Queueing from the west can queue past Copper Ridge Rd blocking intersection. Limited sight distance due to vertical curve to the west and roadside obstacles.

Improvement:
Short Range:
- EBL Turn Lane

Comment:
Consider combining with adjacent intersection widening project

Capacity Analysis Summary

- **Background**
  - 2019: Southbound LOS D/C
  - 2029: Southbound LOS E/E
  - 2039: Southbound LOS F/E
- **Build**
  - Addition of EBL reduces EB queueing from 468' (2039 PM) to 42' contained within proposed turn lane

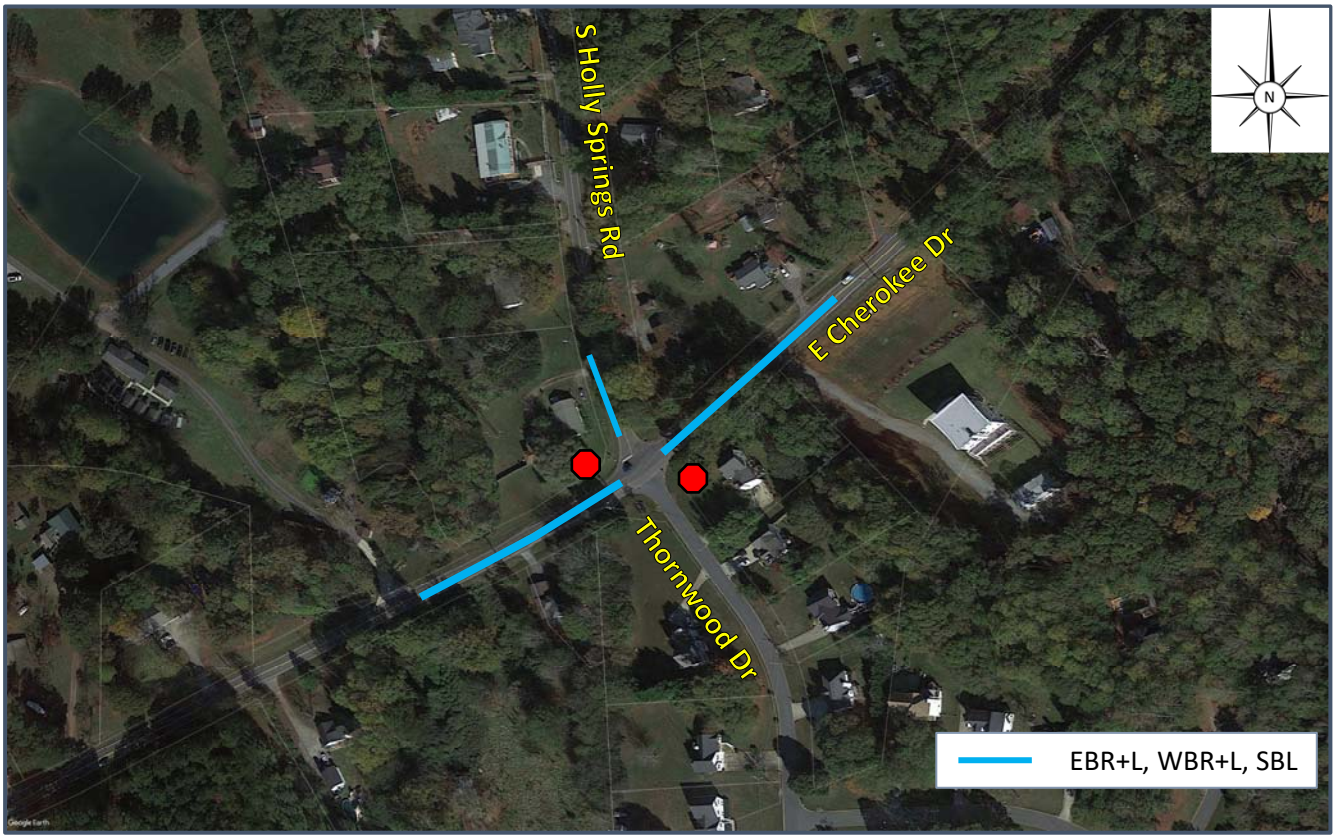
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	2	0	0	2
Head-On	0	0	0	0
Rear End	11	3	0	14
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	3	0	0	3
Not a Collision w/ Motor Veh	1	1	0	2

Cost Analysis

Planned Improvement	Cost	Year
EBL	$ 340,000.00	2019

3. Thornwood Dr / S Holly Springs Rd



Intersection Needs Description:

Problem:
Side-street stop-controlled approaches fail by 2029. The queueing in 2039 is around 2 vehicles NB and 3-4 vehicles SB.

A study was performed by AECOM in October of 2019 which recommended planned improvements of EBR+L, WBR+L , and SBL turn lanes, and is currently under construction

Improvement:
Short Range: (Under Construction
- EBR+L, WBR+L, SBL

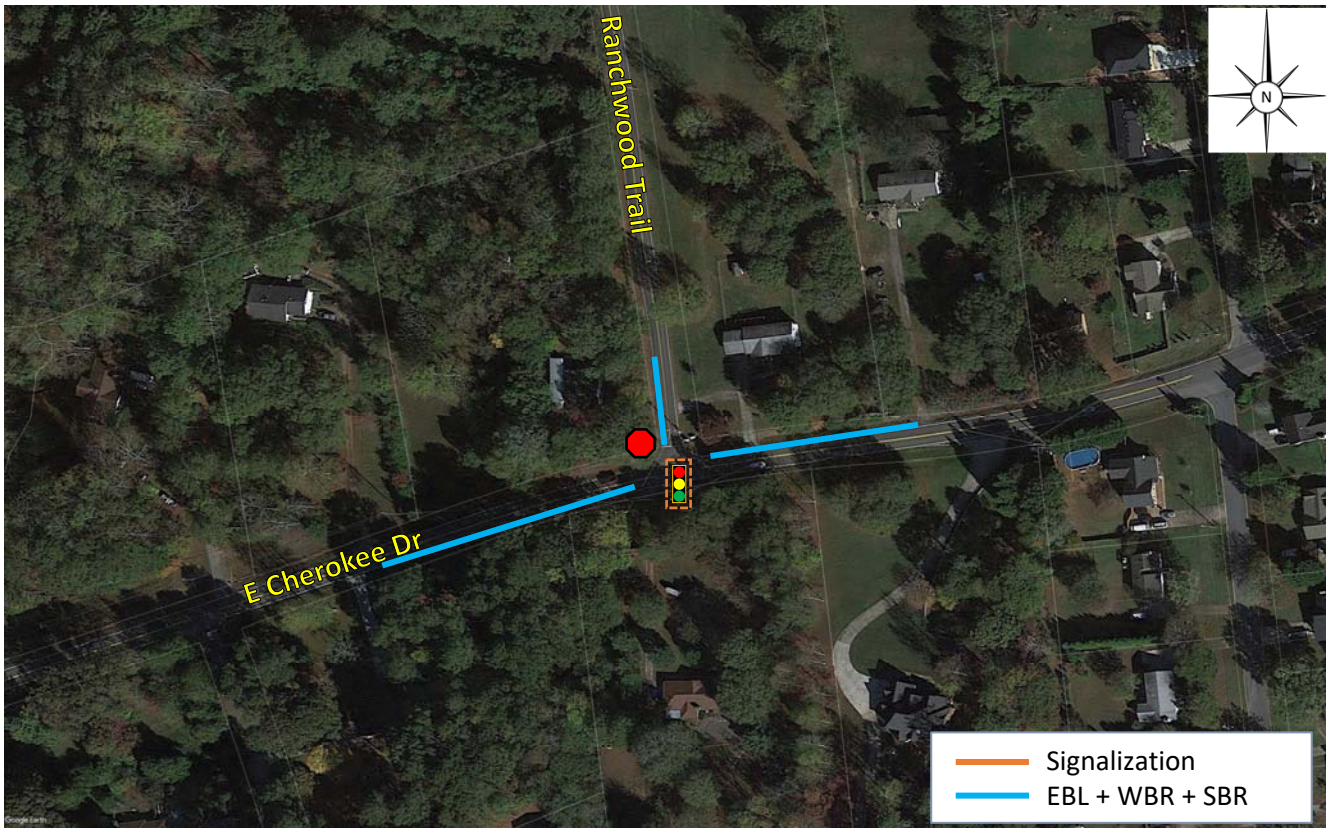
Capacity Analysis Summary

- **Background**
  - 2019: NB LOS C/F & SB D/C
  - 2029: NB LOS E/F & SB F/F
  - 2039: NB LOS F/F & SB F/F
    - Queueing 51' NB & 80' SB
- **Build**
  - Turn lanes reduce mainline queueing to be contained within proposed storage. SBR improved to LOS C (SBL still LOS F)

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	2	1	0	3
Head-On	0	0	0	0
Rear End	2	1	0	3
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	2	1	0	3

4. Ranchwood Trail



Intersection Needs Description:

Problem:

- The intersection is used as a cut-through route particularly during the AM peak hour. Vehicles queue on the southbound approach and there is poor site distance due to a vertical curve and large tree on the northwest corner.
- Utility bank on northeast corner makes improvements (i.e. roundabout difficult)
- Traffic signal does not meet warrants, however adding signalization may promote more left-turns
- Turn lane improvements do not substantially improve operation

Improvement:

- Signalization

Capacity Analysis Summary

- **Background**
  - Southbound approach is LOS F in 2019.
  - Queueing in 2029 increases to 527’ (AM)
  - Queueing in 2039 increases to 758’ (AM)
- **Build**
  - Signal Operates at LOS B in 2039
  - Roundabout Operates at LOS E in 2039 PM

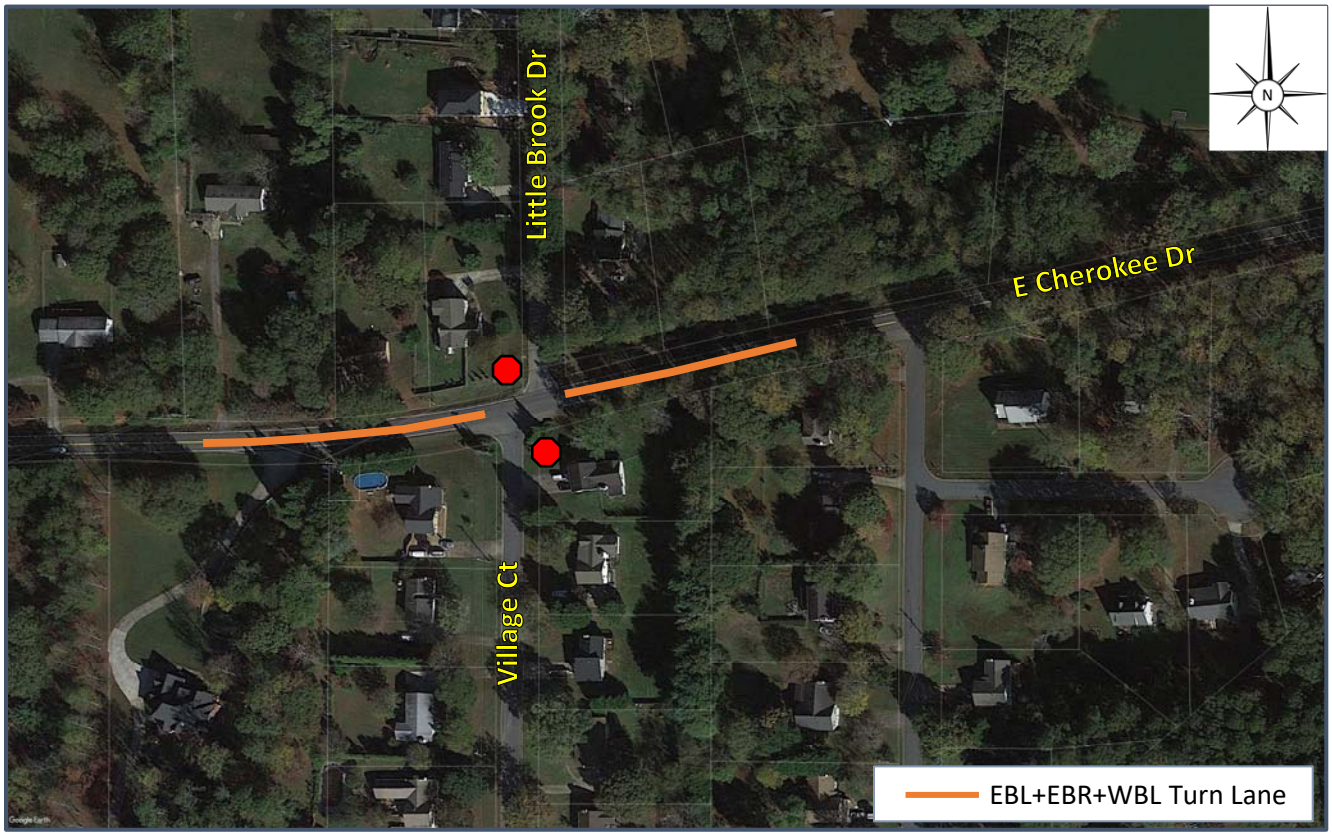
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	5	2	0	7
Head-On	0	0	0	0
Rear End	7	2	0	9
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	4	1	0	5

Cost Analysis

Planned Improvement	Cost	Year
Signal + Turn Lanes	$ 931,000.00	2029

5. Village Ct / Little Brook Dr



Intersection Needs Description:

Problem:
Side-streets offset and stop controlled. Due to nature of control and increasing mainline volume side-street approach LOS if failing by 2029. Queueing remains minimal at 2-4 vehicles in 2039.

Improvement:
Short Range:

- EBL+EBR+WBL Turn Lanes

Capacity Analysis Summary

- **Background**
  - 2019: NB LOS D/F & SB C/D
  - 2029: NB LOS E/F & SB D/E
  - 2039: NB LOS F/F & SB E/F
    - Queueing minimal 63' NB & 36' SB
- **Build**
  - 2039 side-street remains the same, E Cherokee turning movements safer in turn lanes

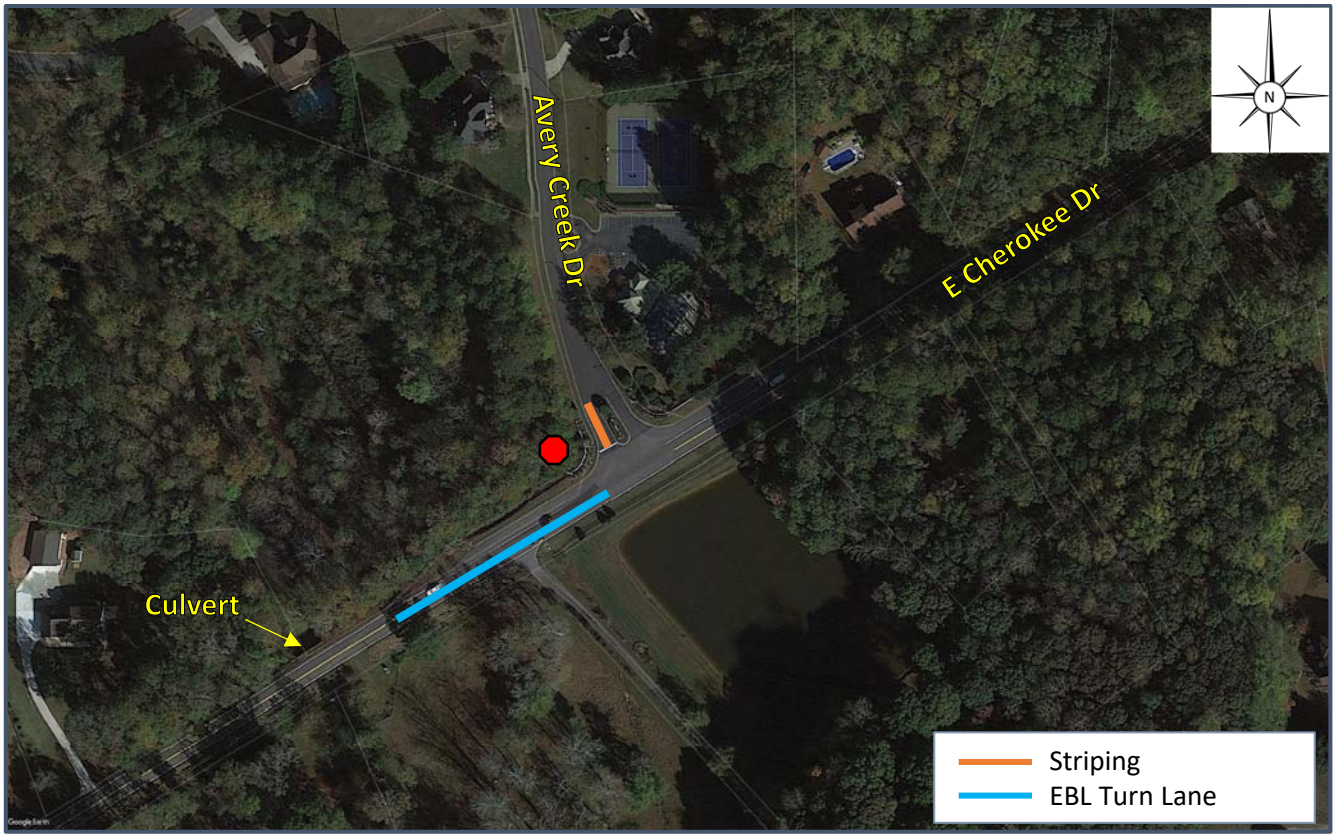
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	2	2	0	4
Head-On	1	0	0	1
Rear End	4	0	0	4
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	1	0	1
Not a Collision w/ Motor Veh	1	1	0	2

Cost Analysis

Planned Improvement	Cost	Year
EBL+EBR+WBL	$ 881,000.00	2019

6. Avery Creek Dr



Intersection Needs Description:

Problem:
Side-street stop control intersection. Detention pond and culvert make for geometric constraints, side-street stop sign is far back making it necessary for vehicles to pull past stop bar to see.

Reported fatality at culvert involving mower (non roadway related). Utilities / Water main run along roadway preventing guard rail installation

Improvement:
Short Range:
- EBL Turn Lane
- Re-stripe SB approach to two lanes
- Guardrail / bollards mounted directly to culvert.

Capacity Analysis Summary

- **Background**
  - 2019: Southbound LOS D
  - 2029: Southbound LOS F
  - 2039: Southbound LOS F
    - Queueing at 67’
- **Build**
  - EBL improves safety and queue contained in turn lane
  - Additional striping improves queue to 54’ for Southbound approach

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	1	0	0	1
Head-On	0	0	0	0
Rear End	7	3	0	10
Sideswipe - Same	1	0	0	1
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	4	1	0	5

Cost Analysis

Planned Improvement	Cost	Year
EBL + Striping	$ 340,000.00	2019

7. New Castle Walk

Intersection Needs Description:

Problem:
Intersection operates as a side-street stop. Delay is LOS E in 2029 and F in 2039. However queue remains at 1-2 vehicles. No improvements are necessary at the intersection

Improvement:
None Recommended

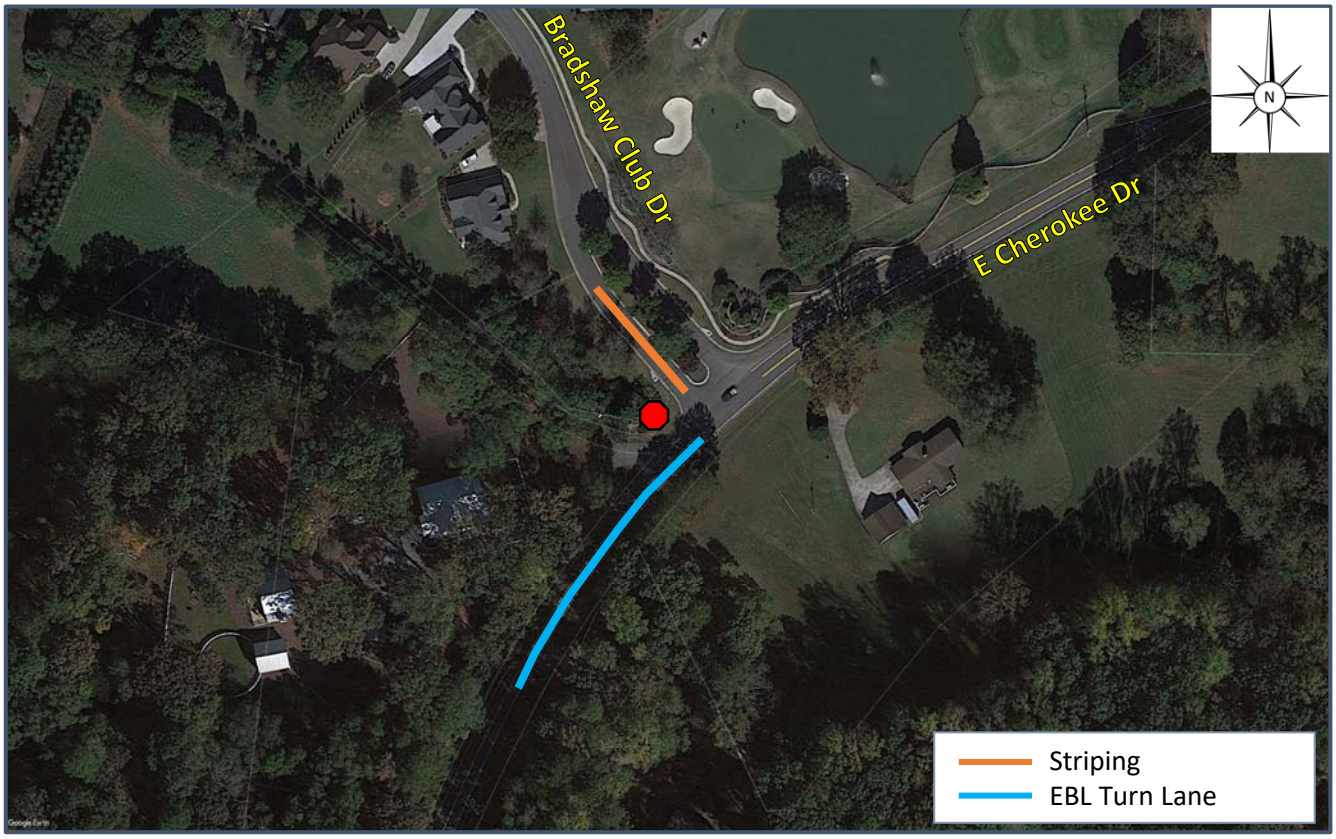
Capacity Analysis Summary

- **Background**
  - 2019: Northbound LOS D/C
  - 2029: Northbound LOS E/D
  - 2039: Northbound LOS F/E
    - Queueing minimal 37'
- **Build**
  - No build improvements were analyzed

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	0	0	0	0
Head-On	1	0	0	1
Rear End	2	0	0	2
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	3	0	0	3

8. Bradshaw Club Dr



Intersection Needs Description:

Problem:
Due to side-street stop on Bradshaw Club Dr, the side-street operates at LOS F in future conditions. By 2039 the queue is around 4 vehicles. Existing pavement width for southbound approach is approximately 20' allowing for two narrow lanes exiting the neighborhood.

Improvement:
Short Range:
- EBL Turn Lane
- Striping on southbound approach for two-lanes

Capacity Analysis Summary

- **Background**
  - 2019: Southbound LOS C/D
  - 2029: Southbound LOS E/F
  - 2039: Southbound LOS F/F
    - Queueing 91' SB
- **Build**
  - EBL queue reduced from 122' 2039 PM to 45' contained within turn lane
  - SB queue reduced to 54'

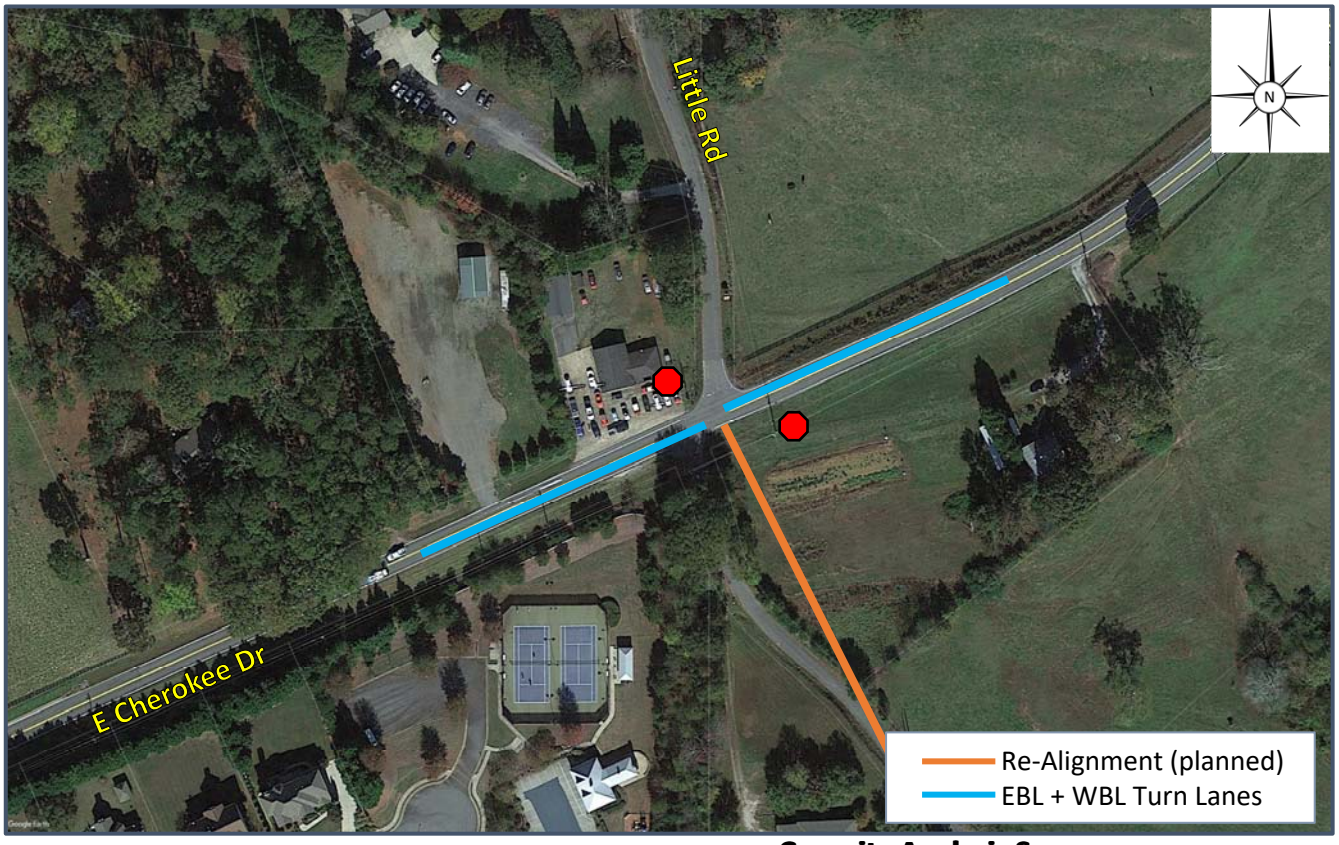
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	0	0	0	0
Head-On	0	0	0	0
Rear End	3	0	0	3
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	2	1	0	3

Cost Analysis

Planned Improvement		Cost	Year
EBL + Striping	$	340,000.00	2019

9. Little Rd



Intersection Needs Description:

Problem:
A planned project will address the offset intersection alignment. The southbound approach has an approach grade which limits sight distance in conjunction with a used vehicle / repair shop lot blocking line of sight as well.

Improvement:
Short Range:
- EBL and WBL turn-lanes

Capacity Analysis Summary

- **Background**
  - 2019: NB LOS C/B & SB LOS C/B
  - 2029: NB LOS F/C & SB LOS C/C
  - 2039: NB LOS F/C & SB LOS E/C
    - Queueing NB 40’ & SB 90’
- **Build**
  - Turn lanes improve EB queue from 339’ to 47’ and WB queue from 170’ to 17’ in 2039

Crash History Summary 2015-2019

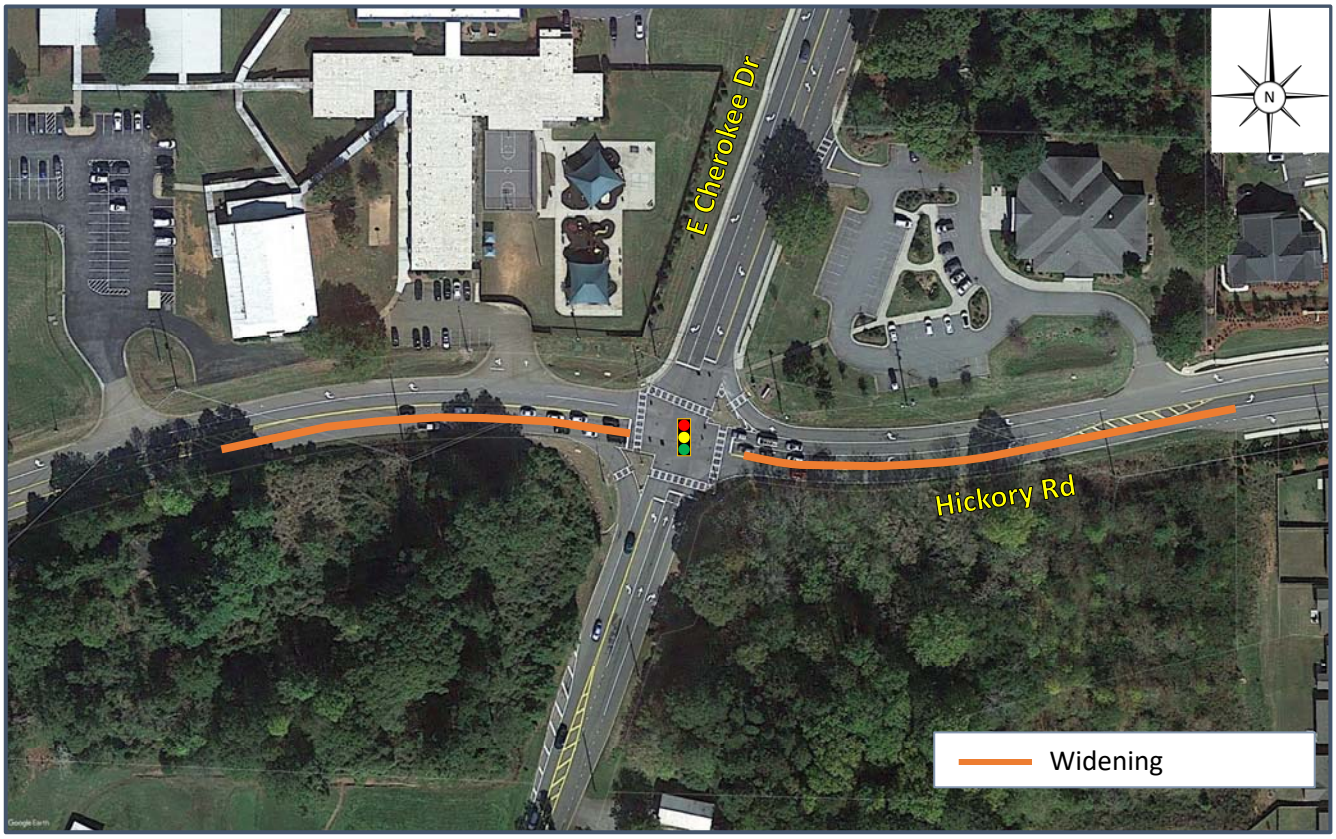
Type	PDO	Injury	Fatal	Total
Angle	2	0	0	2
Head-On	0	0	0	0
Rear End	9	3	0	12
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	2	0	0	2

Cost Analysis

Planned Improvement		Cost	Year
EBL + WBL	$	681,000.00	2019

At the time of data collection the northbound approach was closed to through traffic followed by COVID-19, actual delay and volumes likely larger than analyzed.

10. Hickory Rd



Intersection Needs Description:

Problem:
The existing intersection is nearing capacity on both Hickory Rd and E Cherokee Dr.. The eastbound approach has a vertical curve and horizontal curve making adding a right-turn lane difficult. Hickory Rd was selected for widening improvements due to other roadway improvements to the east.

A sidewalk / pedestrian improvement project is currently planned for the intersection.

Improvement:
- Long Range: Widen Hickory Rd

Capacity Analysis Summary

- **Background**
  - 2019: Intersection LOS D
  - 2029: Intersection LOS E/F
  - 2039: Intersection LOS F/F
- **Build**
  - With widening intersection LOS improves to D/E in 2039

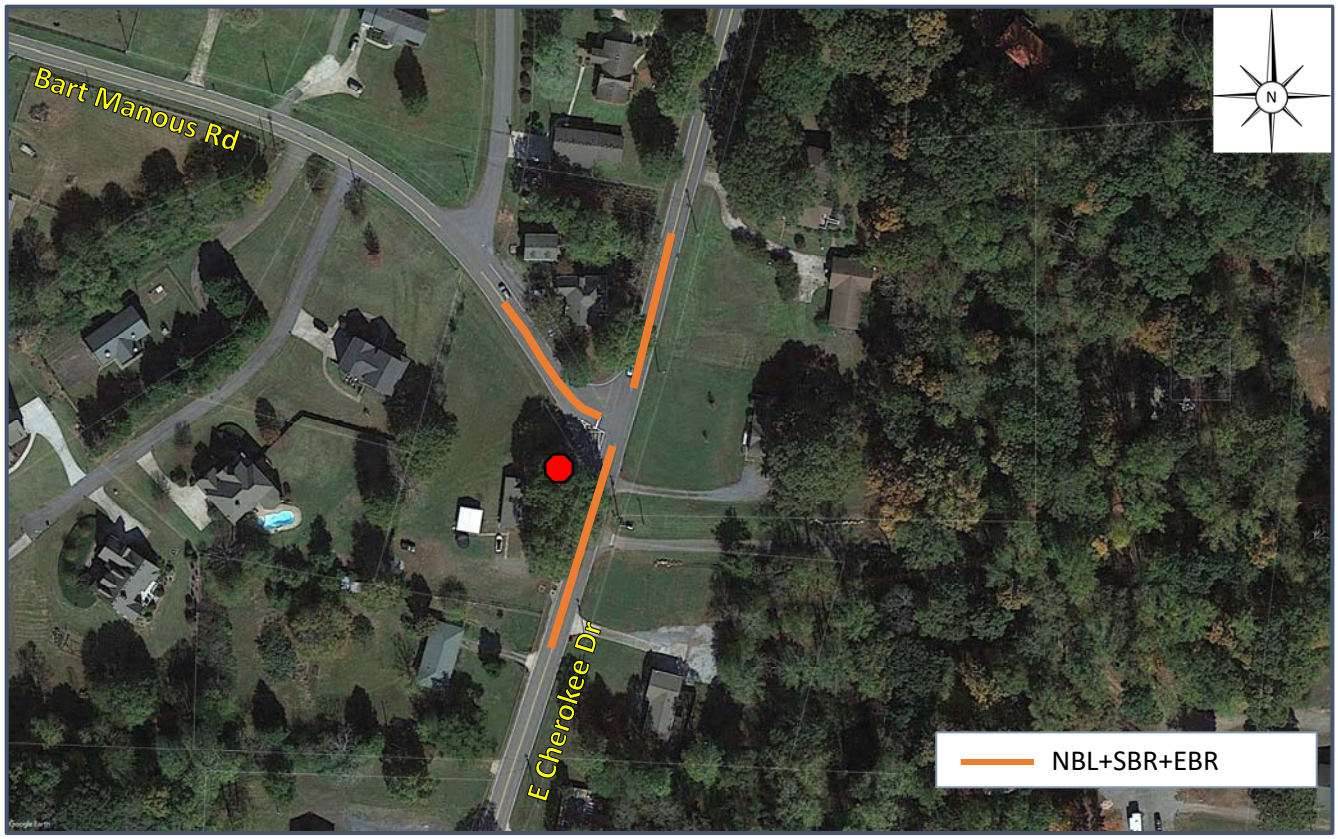
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	7	7	0	14
Head-On	1	3	0	4
Rear End	71	8	0	79
Sideswipe - Same	3	0	0	3
Sideswipe - Opposite	2	0	0	2
Not a Collision w/ Motor Veh	7	1	0	8

Cost Analysis

Planned Improvement		Cost	Year
Widening Hickory Rd	$	8,560,000.00	2039

11. Bart Manous Rd



Intersection Needs Description:

Problem:
The side-street stop will experience a LOS of F by 2029. The existing channelized right-turn as at a poor angle resulting in limited sight distance requiring the driver to look back over their shoulder.

Improvement:
Short Range:

- NBL + SBR + EBR Turn Lane

Capacity Analysis Summary

- **Background**
  - 2019: Eastbound LOS B/C
  - 2029: Eastbound LOS C/E
  - 2039: Eastbound LOS E/F
    - Queueing 288'
- **Build**
  - NB Queue reduced from 146' to 66'
  - EB queue reduced to 146'

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	2	1	0	3
Head-On	0	0	0	0
Rear End	5	0	0	5
Sideswipe - Same	1	0	0	1
Sideswipe - Opposite	1	0	0	1
Not a Collision w/ Motor Veh	2	1	0	3

Cost Analysis

Planned Improvement		Cost	Year
NBL+ SBR + EBR	$	399,000.00	2019

12. Epperson Rd

Intersection Needs Description:

Problem:
Intersection operates at LOS C or better in 2039 for all movements. A Left-turn lane is warranted based on volumes, however not recommended due to good LOS and geometric constraints with a steep grade into a culvert.

Improvement:
None

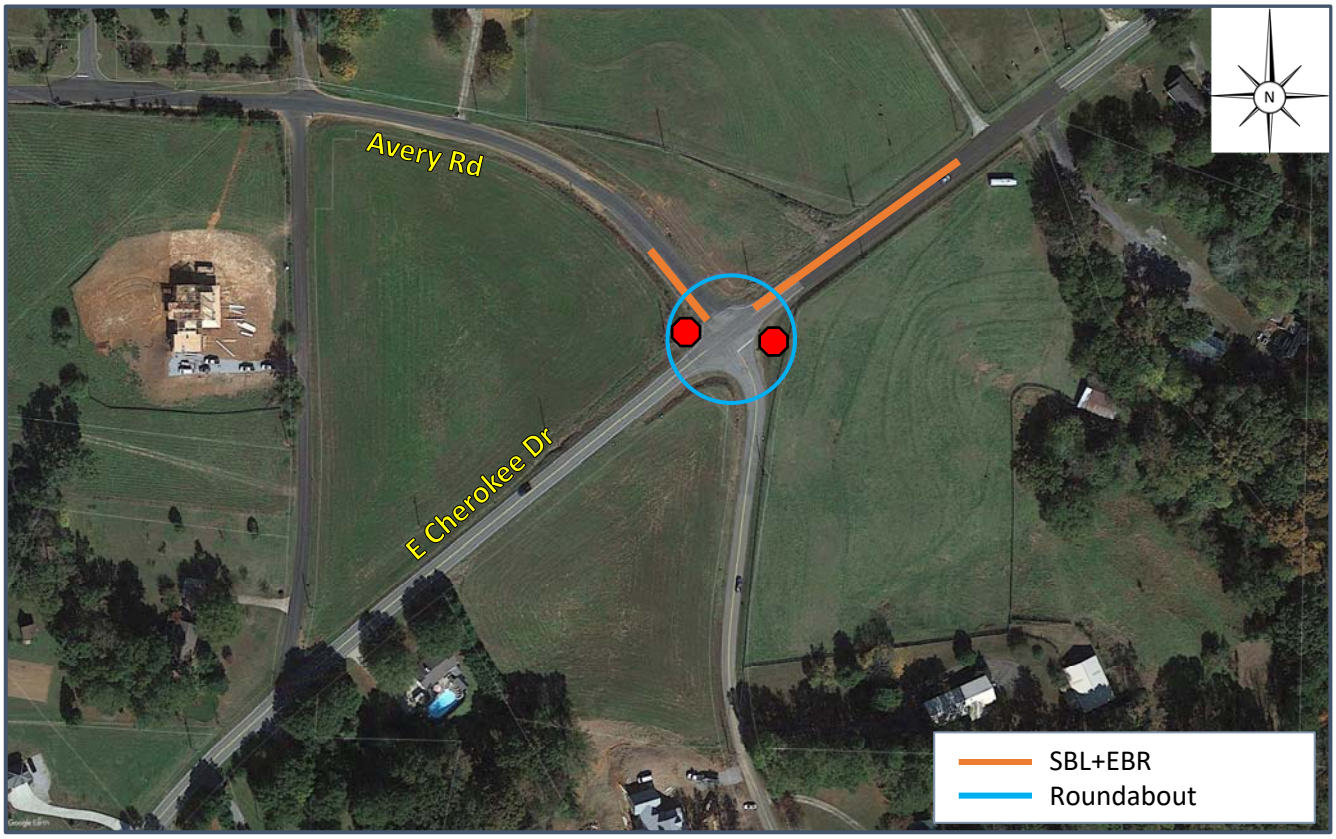
Capacity Analysis Summary

- **Background**
  - 2019: Southbound LOS B
  - 2029: Southbound LOS B
  - 2039: Southbound LOS B/C
    - Queueing minimal 57'
- **Build**
  - No build improvements were analyzed

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	0	0	0	0
Head-On	0	1	0	1
Rear End	0	0	0	0
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	2	0	0	2

13. Avery Rd



Intersection Needs Description:

Problem:
The existing 2019 LOS fails for Avery Rd in the PM peak hour. There are some sight distance issues due to hills on the corners of the intersection.

Improvement:
Mid-Range:
- SBL(E Cherokee)+EBR(Avery)

Long-Range:
- Roundabout (Alternative)

Capacity Analysis Summary

- **Background**
  - 2019: EB D/F & WB B/C
  - 2029: EB F/F & WB B/C
  - 2039: EB F/F & WB B/D
    - Queue EB 645' (PM) & WB 57' (PM)
- **Build**
  - Turn Lanes improve EB queue to 268'
  - Roundabout intersection LOS A/B in 2039
    - Longest approach queue 165' (SB)

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	7	0	0	7
Head-On	0	0	0	0
Rear End	0	0	0	0
Sideswipe - Same	0	1	0	1
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	1	0	0	1

Cost Analysis

Planned Improvement		Cost	Year
SBR+EBR	$	417,000.00	2029
Roundabout (2039)	$	1,172,000.00	2039

14. Union Hill Rd

Intersection Needs Description:

Problem:
The existing signalized intersection has turn lanes for all movements. With signal timing improvements the intersection will continue to operate at LOS D or better in 2039.

The existing signal equipment may be considered for an upgrade however is not needed based on operations.

Improvement:
None

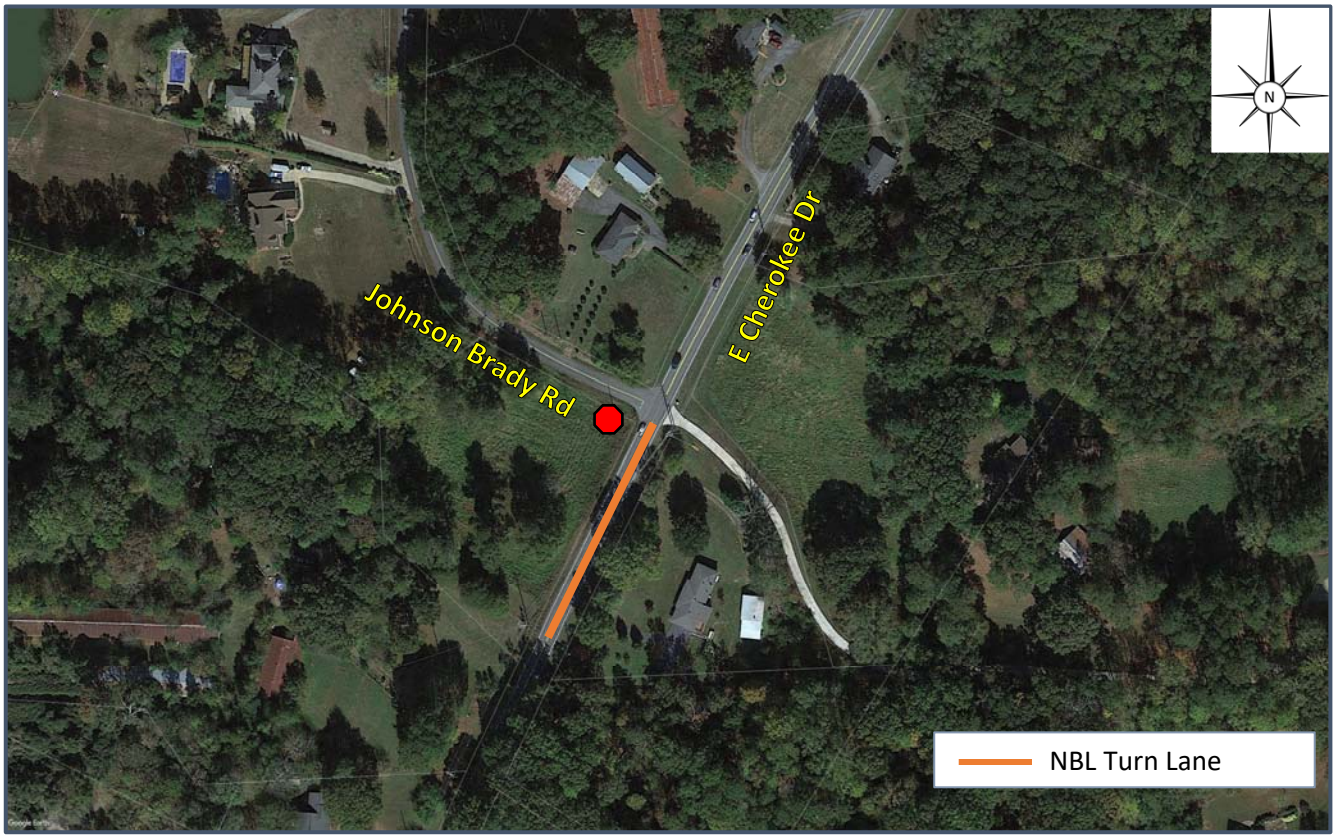
Capacity Analysis Summary

- **Background**
  - 2019: Intersection LOS C
  - 2029: Intersection LOS C
  - 2039: Intersection LOS D/C
- **Build**
  - No alternatives were analyzed

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	3	1	0	4
Head-On	0	0	0	0
Rear End	11	2	0	13
Sideswipe - Same	1	0	0	1
Sideswipe - Opposite	2	0	0	2
Not a Collision w/ Motor Veh	0	0	0	0

15. Johnson Brady Rd



Intersection Needs Description:

Problem:
The intersection operates without improvement as a LOS D or better in 2039. A northbound left-turn lane is warranted based on traffic volumes.

Improvement:
Long Range
- Northbound left-turn lane

Capacity Analysis Summary

- **Background**
  - 2019: Eastbound LOS C/B
  - 2029: Eastbound LOS C
  - 2039: Eastbound LOS D/C
    - EB Queueing minimal at 47'
- **Build**
  - NB turn lane reduces queue from 52' to 26'

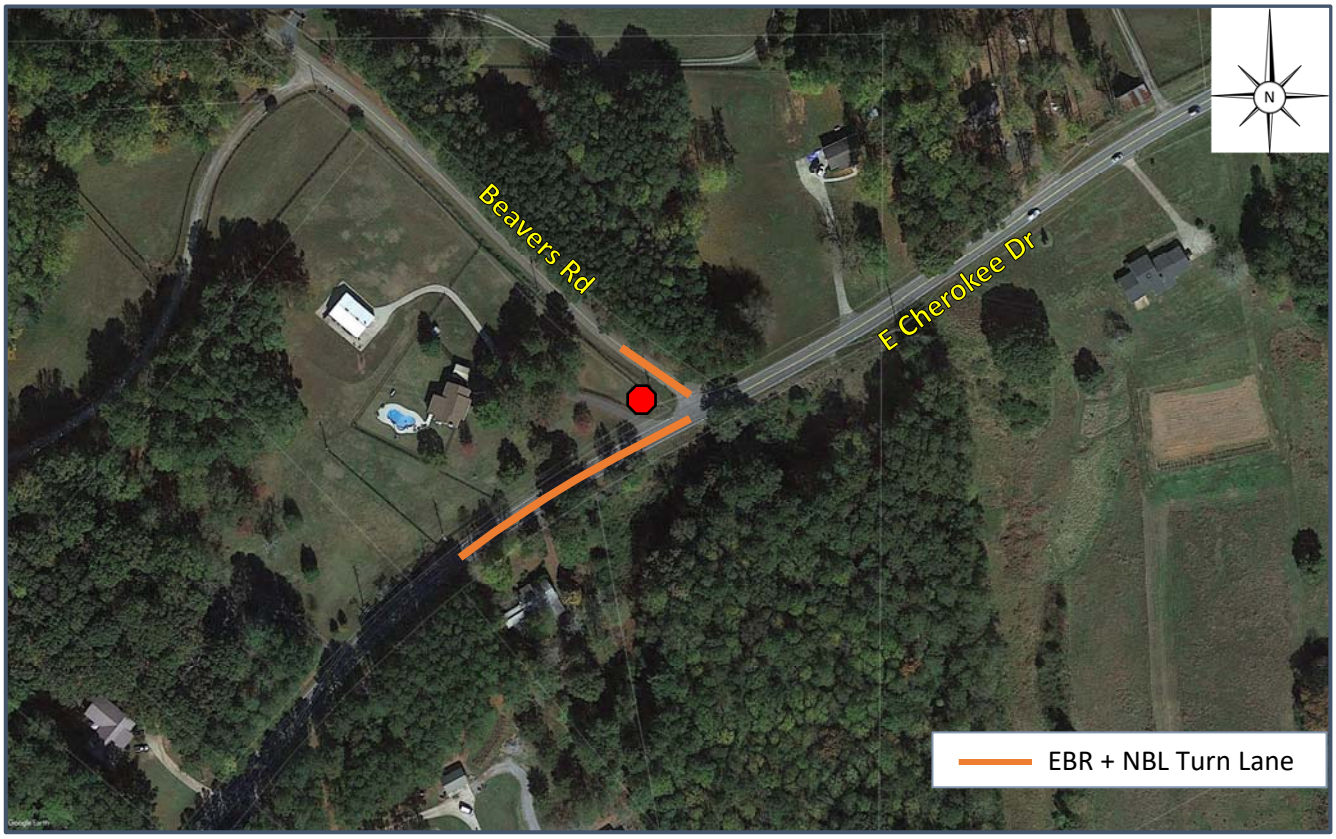
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	0	0	0	0
Head-On	0	1	0	1
Rear End	2	2	0	4
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	1	0	0	1

Cost Analysis

Planned Improvement	Cost	Year
NBL	$ 486,000.00	2039

16. Beavers Rd



Intersection Needs Description:

Problem:
Beavers Rd is used as a cut-through route from SR 20 to the north. Due to the side-street stop-controlled nature of the intersection the LOS drops to F in 2039, however, queuing remains minimal.

Improvement:
Mid-Range
- EBR + NBL Turn Lanes

Capacity Analysis Summary

- **Background**
  - 2019: Eastbound LOS C
  - 2029: Eastbound LOS E/D
  - 2039: Eastbound LOS F
    - EB Queueing minimal at 63'
- **Build**
  - NB turn lane reduces queue from 84' to 15'

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	1	0	0	1
Head-On	0	0	0	0
Rear End	4	0	0	4
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	4	0	0	4

Cost Analysis

Planned Improvement	Cost	Year
EBR + NBL	$ 598,000.00	2029

17. Haley Farm Rd

Intersection Needs Description:

Problem:
Due to side-street operation the stop-controlled approach drops to LOS E/F in 2039 with minimal queueing. There is some sight distance issues with vehicles making left-turns from Haley Farms Rd due to intersection skew, vertical curve and a small hill.

Improvement:
Mid-Range
- EBR turn lane

Capacity Analysis Summary

- **Background**
  - 2019: Northbound LOS C
  - 2029: Northbound LOS D
  - 2039: Northbound LOS E/F
    - NB Queueing at 80' (PM)
- **Build**
  - EBR turn lane is a safety improvement over capacity

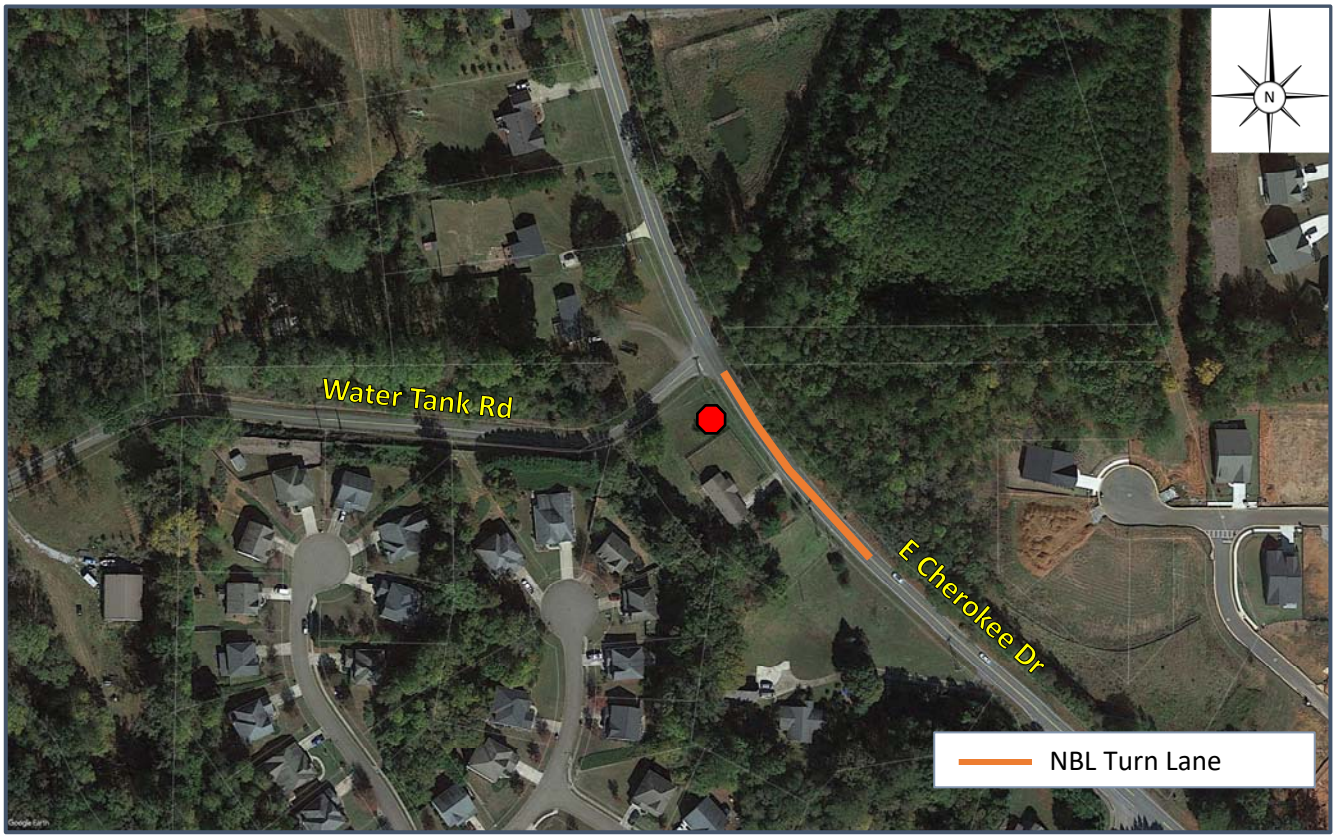
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	2	0	0	2
Head-On	0	0	0	0
Rear End	1	1	0	2
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	4	0	0	4

Cost Analysis

Planned Improvement	Cost	Year
EBR	$ 199,000.00	2029

18. Water Tank Rd



Intersection Needs Description:

Problem:
The intersection operates at LOS D in 2039 without improvements. A northbound left turn lane is warranted through traffic volumes. Queueing from Macedonia Elementary School to the north back to the intersection during the AM drop off.

Improvement:
Long Range
- NBL Turn Lane

Capacity Analysis Summary

- **Background**
  - 2019: Eastbound LOS C
  - 2029: Eastbound LOS C
  - 2039: Eastbound LOS D
    - EB Queueing at 118' (PM)
- **Build**
  - NBL turn lane reduces queue from 67' to 21'

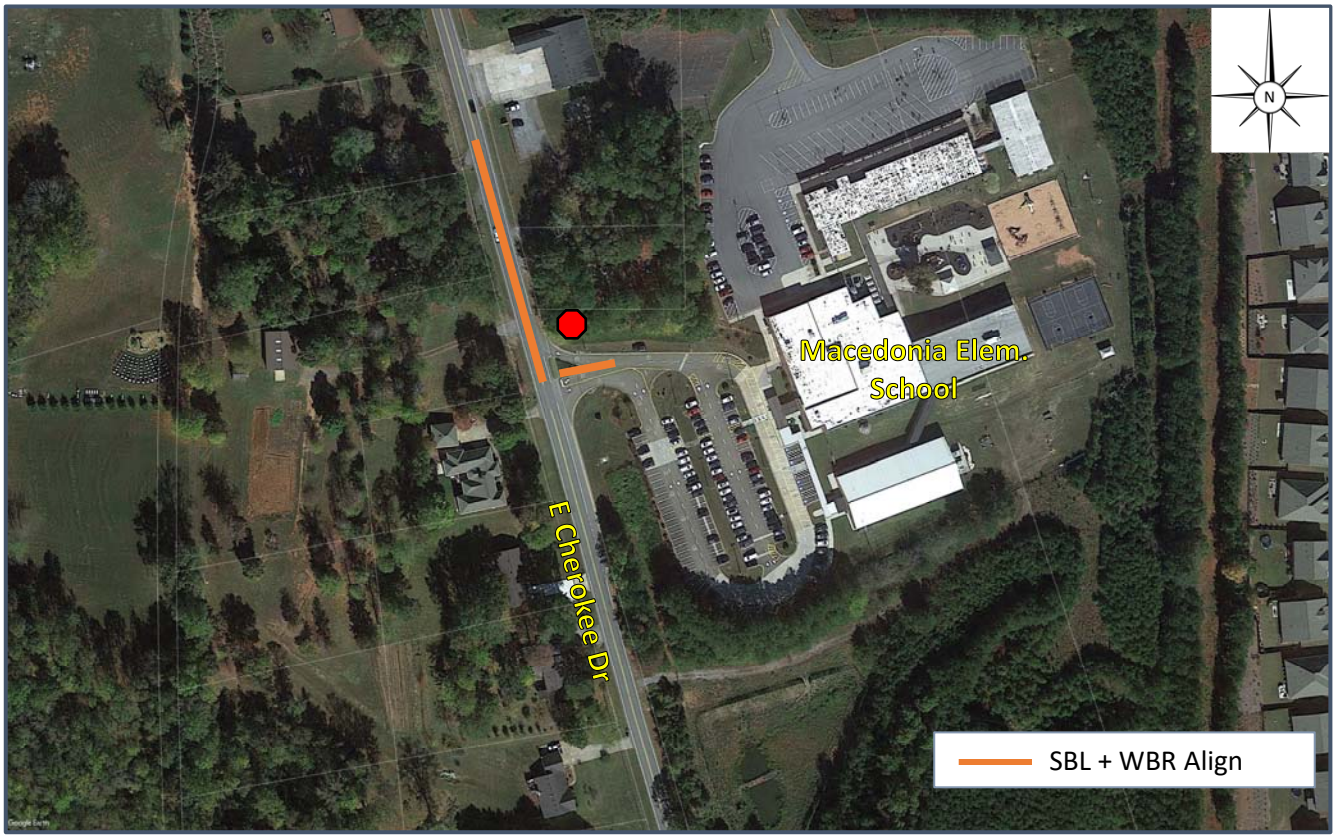
Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	1	0	0	1
Head-On	0	0	0	0
Rear End	0	0	0	0
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	3	1	0	4

Cost Analysis

Planned Improvement	Cost	Year
NBL	$ 486,000.00	2039

19. Macedonia Elementary School



Intersection Needs Description:

Problem:
The intersection fails in 2019 conditions. The right-turn exiting the school is channelized at a poor angle making it difficult to look back over the shoulder to see oncoming traffic. There is no left-turn lane on E Cherokee Dr to allow the crossing guard controlling traffic the ability to queue vehicles wishing to enter and maintain traffic flow. The crossing guard did not appear to properly prioritize traffic to reduce queueing on E Cherokee Dr.

Improvement:
Short Range:
- SBL + Right Turn Alignment
- Crossing Guard Training

Capacity Analysis Summary

- Intersection capacity analysis is impossible to accurately model due to crossing guard control.
- Adding a left turn lane will allow crossing guard to queue vehicles and improve through movements on E Cherokee to continue moving
- Adjusting the right-turn lane alignment will improve safety during off-peak operation

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	0	0	0	0
Head-On	0	0	0	0
Rear End	0	0	0	0
Sideswipe - Same	0	0	0	0
Sideswipe - Opposite	0	0	0	0
Not a Collision w/ Motor Veh	0	0	0	0

Cost Analysis

Planned Improvement	Cost	Year
SBL + Right-turn adjustment	$ 401,000.00	2019

20. SR 20

Intersection Needs Description:

Problem:
The intersection operates at LOS C in existing conditions, LOS D in 2029 and LOS F in 2039. A GDOT project PI0014133 is planned for the intersection and will address all deficiencies.

- Add capacity on SR 20 to 6 lanes
- Restrict driveway access on SR 20 and E Cherokee
- Extend turn lanes on all approaches

Improvement:
No additional improvements needed

Capacity Analysis Summary

- **Background**
  - 2019: Intersection LOS C/D
  - 2029: Intersection LOS D
  - 2039: Intersection LOS D/F
- **Build**
  - 2039: Intersection LOS D

Crash History Summary 2015-2019

Type	PDO	Injury	Fatal	Total
Angle	30	7	0	37
Head-On	0	0	0	0
Rear End	41	22	0	63
Sideswipe - Same	3	0	0	3
Sideswipe - Opposite	2	0	0	2
Not a Collision w/ Motor Veh	4	0	0	4

5 Summary and Conclusions

The following tables summarize recommended intersection / corridor improvements including cost and recommended priority. Project priority is based on multiple factors including cost, benefit of capacity improvement, benefit of safety improvement, and best use of funding. For example for the cost of a large widening project slightly increasing delay for a small segment multiple smaller projects can be completed improving safety and operations for more areas. Seventeen (17) projects were identified as part of this study, with three (3) alternative projects identified for consideration. For intersections requiring improvements over multiple ranges improvements were grouped into a single project to reduce mobilization and design cost.

Table 3: Summary of Results

#	Intersection	Planned Project	Recommended Improvement		
			Short-Range	Mid-Range	Long-Range
1	Mill Creek Rd / Johnson Elem. School	-		Widen E Cherokee Dual NBL	-
2	Copper Ridge Dr	-	EBL Turn Lane		-
3	Thornwood Dr / S Holly Springs Rd (Improvements Under Construction)	-	EBL+R Turn Lane WBL+R Turn Lane SBL Turn Lane		-
4	Ranchwood Trail	-	EBL Turn Lane WBR Turn Lane SB Dual Lane	Signalization	-
5	Village Ct / Little Brook Dr	-	EBL Turn Lane EBR Turn Lane WBL Turn Lane	-	-
6	Avery Creek Dr	-	EBL Turn Lane		SB Dual Lane
7	Newcastle Walk	-	-	-	-
8	Bradshaw Club Dr	-	EBL Turn Lane		SB Dual Lane
9	Little Rd	Re-alignment shifting southern approach to match northern	EBL Turn Lane WBL Turn Lane	-	-
10	Hickory Rd	Sidewalk / Ped improvements			Widening Hickory Rd
11	Bart Manous Rd	-	NBL Turn Lane SBR Turn Lane	EB Dual Lane	-
12	Epperson Rd	-	-	-	-
13	Avery Rd	-	SBR Turn Lane	EB Dual Lane	Roundabout
14	Union Hill Rd	-	-	-	-
15	Johnson Brady Rd	-	-	-	NBL Turn Lane
16	Beavers Rd	-	-	SBR Turn Lane	NBL Turn Lane
17	Haley Farm Rd	-	-	EBR Turn Lane	-
18	Water Tank Rd	-	-	-	NBL Turn Lane
19	Macedonia Elem. School	-	SBL Turn Lane Fix Drwy alignment	-	-
20	SR 20	PI#0014133 - 2025 Widening SR 20 (6 lanes) - Restricted drwy access - Turn lane length improvements	-	-	-

Table 4: Short Range B/C Project Prioritization

I. #	Cross Street	Planned Improvement	Cost	Priority
2	Copper Ridge Dr	EBL	$ 340,000.00	Low
3	Thornwood Dr / S Holly Springs	EBL	$ 340,000.00	Low
5	Village Ct / Little Brook Dr	EBL+EBR+WBL	$ 881,000.00	Low
6	Avery Creek Dr	EBL + Striping	$ 340,000.00	Medium
8	Bradshaw Club Dr	EBL + Striping	$ 340,000.00	Medium
9	Little Rd**	EBL + WBL	$ 681,000.00	Low
11	Bart Manous Rd	NBL+ SBR + EBR	$ 399,000.00	Medium
19	Macedonia Elem. School	SBL + Right-turn adjustment	$ 401,000.00	High
		Total	**$ 3,722,000.00**	

Table 5: Mid-Range B/C Project Prioritization

I. #	Cross Street	Planned Improvement	Cost	Priority
1	Mill Creek Rd / Johnson Elem. School	NBL + Widen E Cherokee	$ 2,934,000.00	Low / Medium
3	Thornwood Dr / S Holly Springs	WBL + WBR + EBR	$ 688,000.00	Low
4	Ranchwood Trail	Signal + Turn Lanes	$ 931,000.00	High
13	Avery Rd	SBR+EBR	$ 417,000.00	Medium
16	Beavers Rd	EBR + NBL	$ 598,000.00	Low
17	Haley Farm Rd	EBR	$ 199,000.00	Low
		Total	**$ 5,767,000.00**	

Table 6: Long-Range B/C Project Prioritization

I. #	Cross Street	Planned Improvement	Cost	Priority
10	Hickory Rd	Widening Hickory Rd	$ 8,560,000.00	Low/ Medium
15	Johnson Brady Rd	NBL	$ 486,000.00	Low
18	Water Tank Rd	NBL	$ 486,000.00	Low
		Total	**$ 18,132,000.00**	

Table 7: Alternative Projects for Consideration

I. #	Cross Street	Planned Improvement	Cost
4	Ranchwood Trail	EBL+ WBR+ SBR	$ 633,000.00
11	Bart Manous Rd	NBL+ SBR + EBR + Alignment	$ 1,888,000.00
13	Avery Rd	Roundabout (2039)	$ 1,172,000.00