# APPENDIX J

Traffic

# H

# Surface Transportation

## H.1 Regulatory Setting

Surface transportation is not directly addressed in the Federal Aviation Administration's (FAA) National Environmental Policy Act (NEPA) guidance but is included as an aspect of public services in the Socioeconomics analysis. No methodology has been established by the FAA for surface transportation analysis; hence, the evaluations and analyses described in this section were conducted in accordance with North Carolina Department of Transportation (NCDOT) Congestion Management and Transportation Planning Branch Guidance, as published by NCDOT. The City of Charlotte (the City) accepts the NCDOT protocols as acceptable analysis methods for facilities maintained by the City.

## H.2 Methodology and Data Sources

Data for use in the Affected Environment evaluation was gathered from various sources. Charlotte Douglas International Airport (CLT) provided intersection-level turning movement counts for eight intersections within the Study Area. 16-hour intersection turning movement counts were collected at an additional 23 locations. These additional counts were collected using MioVision video data recording equipment and were processed at 15-minute intervals for analysis. Two-way daily link volumes were also collected at three locations, using the same process as the 16-hour intersection turning movement counts. All collected data were used to establish a standard NCDOT Travel Demand Forecast report. **Table H-1** shows a summary of turning movement and class count data collected.

## Table H-1 Turning Movement and Class Count Location and Date

| ID | Location | Type | Data Source | Date(s) | Duration | County |
|---|---|---|---|---|---|---|
| 101A | US 29/US 74 (Wilkinson Boulevard) at I-485 SB Ramps/Fieldridge Road | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 101B | US 29/US 74 (Wilkinson Boulevard) at I-485 NB Ramps/ Tuckaseegee Road | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 102 | US 29/US 74 (Wilkinson Boulevard) at Marshall Drive | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 103 | US 29/US 74 (Wilkinson Boulevard) at Barry Drive | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 104 | US 29/US 74 (Wilkinson Boulevard) at SR 1981 (Little Rock Road) | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 105 | US 29/US 74 (Wilkinson Boulevard) at N. Josh Birmingham Parkway | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 106 | US 29/US 74 (Wilkinson Boulevard) at Stafford Drive/Harlee Avenue | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 107 | US 29/US 74 (Wilkinson Boulevard) at SR 1656 (Boyer Street) | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 108 | Josh Birmingham Parkway Ramps at Harlee Avenue | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 109 | Old Dowd Road at SR 1656 (Boyer Street) | TMC | VHB | Tuesday, July 17, 2018 | 16-hours; 6:00 AM-10:00 PM | Mecklenburg |
| 201 | SR 5901 (Billy Graham Parkway) at Boyer Street | TMC | VHB | Thursday, July 19, 2018 | 16 Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 202 | SR 5901 (Billy Graham Parkway) at SR 1490 (Josh Birmingham Parkway) | TMC | VHB | Thursday, July 19, 2018 | 16 Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 203 | SR 5901 (Billy Graham Parkway) at Morris Field Drive | TMC | VHB | Thursday, July 19, 2018 | 16 Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 204 | SR 5901 (Billy Graham Parkway) at NC 160 (West Boulevard) | TMC | VHB | Thursday, July 19, 2018 | 16 Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 205 | SR 5901 (Billy Graham Parkway) at SR 1576 (West Tyvola Road) | TMC | CLT | Thursday, September 14, 2017 | 13 Hour; 6:00 AM-7:00 PM | Mecklenburg |
| 206 | NC 160 (West Boulevard) at Airport Drive | TMC | VHB | Thursday, July 19, 2018 | 16 Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 207 | NC 160 (West Boulevard) at Horseshoe Lane | TMC | VHB | Thursday, July 19, 2018 | 16 Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 301 | SR 1156 (Yorkmont Road) at SR 1576 (West Tyvola Road) | TMC | CLT | Thursday, September 14, 2017 | 13-Hour; 6:00 AM-7:00 PM | Mecklenburg |
| 302 | SR 1156 (Yorkmont Road) at Oak Lake Boulevard | TMC | VHB | Thursday, July 19, 2018 | 16-Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 303 | SR 1156 (Yorkmont Road) at Water Ridge Parkway | TMC | VHB | Thursday, July 19, 2018 | 16-Hour; 6:00 AM-10:00 PM | Mecklenburg |

**Table H-1 Turning Movement and Class Count Location and Date (Continued)**

| ID | Location | Type | Data Source | Date(s) | Duration | County |
|---|---|---|---|---|---|---|
| 304 | SR 1156/SR 1177 (Yorkmont Road) at Beam Road | TMC | CLT | Thursday, September 14, 2017 | 13-Hour; 6:00 AM-7:00 PM | Mecklenburg |
| 305 | SR 1177 (Yorkmont Road) at Oak Lake Boulevard | TMC | VHB | Thursday, July 19, 2018 | 16-Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 306 | SR 1177 (Yorkmont Road) at Piper Lane/SR 1255 (Byrum Drive) | TMC | CLT | Thursday, September 14, 2017 | 13-Hour; 6:00 AM-7:00 PM | Mecklenburg |
| 307 | NC 160 (West Boulevard) at SR 1177 (Yorkmont Road) | TMC | CLT | Thursday, September 14, 2017 | 13-Hour; 6:00 AM-7:00 PM | Mecklenburg |
| 308 | NC 160 (West Boulevard/ Steele Creek Road) at SR 1255/ SR 5936 (Byrum Drive/West Boulevard) | TMC | CLT | Thursday, September 14, 2017 | 13-Hour; 6:00 AM-7:00 PM | Mecklenburg |
| 309 | SR 5936 (West Boulevard) at SR 1195 (Wallace Neel Road) | TMC | CLT | Thursday, September 14, 2017 | 13-Hour; 6:00 AM-7:00 PM | Mecklenburg |
| 310 | SR 5936 (West Boulevard) at I-485 | TMC | CLT | Thursday, September 14, 2017 | 13-Hour; 6:00 AM-7:00 PM | Mecklenburg |
| 311 | West Tyvola Road at North Falls Road | TMC | VHB | Thursday, July 19, 2018 | 16-Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 312 | West Tyvola Road at South Stream Boulevard | TMC | VHB | Thursday, July 19, 2018 | 16-Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 313 | NC 160 (West Boulevard) at Piney Top Drive | TMC | VHB | Tuesday, April 30, 2019 | 16-Hour; 6:00 AM-10:00 PM | Mecklenburg |
| 314 | SR 1255 (Byrum Drive) at Piney Top Drive | TMC | VHB | Tuesday, April 30, 2019 | 16-Hour; 6:00 AM-10:00 PM | Mecklenburg |
| A | I-485, South of US 29/US 74 (Wilkinson Boulevard) | Class | VHB | July 17, 2018 - July 18, 2018 | 48-hours; 12:00 AM-12:00 AM | Mecklenburg |
| B | SR 5901 (Billy Graham Parkway), North of Boyer Street | Class | VHB | July 17, 2018 - July 18, 2018 | 48 Hour; 12:00 AM-12:00 AM | Mecklenburg |
| C | SR 5901 (Billy Graham Parkway), South of NC 160 (West Boulevard) | Class | VHB | July 17, 2018 - July 18, 2018 | 48 Hour; 12:00 AM-12:00 AM | Mecklenburg |

The Charlotte Regional Model was used to develop a baseline evaluation of the existing surface transportation system on and around CLT. Daily volume estimates were converted to intersection turning movement volumes using the NCDOT Intersection Analysis Utility Tool. These volumes were then analyzed using Synchro 10 to determine existing intersection levels of service, vehicle delay, and average queue estimates.

According to NCDOT procedures, the base year analysis is conducted for the latest year in which data was collected. Therefore, although the overall baseline year for this Environmental Assessment (EA) is 2016, all surface transportation analyses were conducted for a baseline year of 2018.

Intersection levels of service (LOS) are defined in accordance with the Highway Capacity Manual (Transportation Research Board, Special Report 209, 2000). LOS is a measure of intersection delay that is expressed using the letters A through F, with levels E and F generally considered to be unacceptable or "failing." For signalized intersections, LOS is

defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. LOS criteria for signalized intersections, as described in the Highway Capacity Manual, are summarized below. For unsignalized intersections, LOS are associated with slightly lower degrees of delay at each level:

- LOS A (delay of less than 10 seconds): Free flow
- LOS B (delay of 10-20 seconds): Stable flow (slight delays)
- LOS C (delay of 20-35 seconds): Stable flow (acceptable delays)
- LOS D (delay of 35-55 seconds): Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
- LOS E (delay of 55-80 seconds): Unstable flow (intolerable delay)
- LOS F (delay of more than 80 seconds): Forced flow (jammed)

## H.3 Surface Transportation Study Area

The Study Area (**Figure H-1**) is bounded by SR 5901 (Billy Graham Parkway) to the east, I-485 to the west, US 29/US 74 (Wilkinson Boulevard) to the north, and NC 160 (West Boulevard) to the south. The following roadways are included in the base year analysis:

- **I-485.** I-485 is predominantly a six-lane divided freeway that has a posted speed limit of 70 miles per hour (mph) through the Study Area. The interstate is the beltway for the City and provides direct access to Interstates 77 and 85 within a few miles of the Study Area. There are two interchanges along I-485 within the Study Area: one at US 29/US 74 (Wilkinson Boulevard) and one at West Boulevard.
- **US 29/US 74 (Wilkinson Boulevard).** US 29/US 74 (Wilkinson Boulevard) is a six-lane divided facility east of Marshall Drive and a four-lane divided facility west of Marshall Drive. The roadway has a posted speed limit of 45 mph throughout the Study Area. US 29/US 74 is a major east-west arterial that provides direct access to downtown Charlotte to the east and I-485 to the west. The roadway also provides direct access to CLT via N. Josh Birmingham Parkway.
- **SR 5901 (Billy Graham Parkway).** SR 5901 (Billy Graham Parkway) is a four-lane divided roadway with a posted speed limit of 55 mph throughout the Study Area. The arterial travels from the interchange with I-85 (approximately 0.5 mile north of US 29/US 74) and ends at the interchange with I-77 (approximately 2 miles south of W. Tyvola Road). The land uses along this roadway are primarily institutional and commercial. CLT can be accessed directly from Billy Graham Parkway via the freeway ramps to Josh Birmingham Parkway.
- **NC 160 (West Boulevard/Steele Creek Road).** NC 160 (West Boulevard/Steele Creek Road) is a two-lane roadway west of Horseshoe Lane and a four-lane divided roadway east of Horseshoe Lane. The roadway has a posted speed limit of 45 mph throughout the Study Area. The roadway provides direct access to I-485 and Billy Graham Parkway, as well as facilities operated by CLT. The other land uses along NC 160 are primarily industrial, residential, and commercial.

- **W. Tyvola Road.** W. Tyvola Road is a six-lane undivided roadway between the interchange with Billy Graham Parkway and the signalized intersection with SR 1156 (Yorkmont Road) and transitions to a four-lane divided roadway south of the intersection with Yorkmont Road. Between Yorkmont Road and S. Stream Boulevard, the two travel lanes in each direction are divided by striping placed through the center lane of the roadway. Vehicles are still able to access the center lane like a two-way left-turn lane, but there are not driveways to utilize within this section of the road. W. Tyvola Road has a posted speed limit of 45 mph throughout the Study Area. The roadway provides direct access to I-77 east of the Study Area. The land uses along W. Tyvola Road are primarily commercial and institutional.
- **SR 1177/SR 1156 (Yorkmont Road).** SR 1177/SR 1156 (Yorkmont Road) is a four-lane divided roadway facility between W. Tyvola Road and Beam Road as well as between SR 1255 (Byrum Drive) and NC 160 (West Boulevard). The road transitions to a two-lane roadway between Byrum Drive and Beam Road. The roadway has a posted speed limit of 35 mph throughout the Study Area. Yorkmont Road provides direct access to facilities operated by CLT, as well as those operated by airlines and distribution centers. The land uses along Yorkmont Road are primarily commercial and institutional.
- **SR 1255 (Byrum Drive).** SR 1255 (Byrum Drive) is a two-lane roadway facility that extends from the NC 160 at Steele Creek Road intersection to Yorkmont Road, paralleling NC 160 along most of its length. The roadway has a posted speed limit of 45 mph throughout the Study Area. Byrum Drive provides direct access to predominantly industrial facilities along its length.

Traffic forecasts were developed for several key locations in the Study Area, as shown in **Table H-2**. **Figure H-1** shows the locations of these intersections.

**Table H-2 Study Corridors and Forecast Locations**

| Intersection ID | Location |
|---|---|
| 101A | US 29/US 74 (Wilkinson Boulevard) at I-485 Southbound Ramps/Fieldridge Road |
| 101 | I-485 Mainline at US 29/US 74 (Wilkinson Boulevard) |
| 101B | US 29/US 74 (Wilkinson Boulevard) at I-485 Northbound Ramps/Tuckaseegee Road |
| 102 | US 29/US 74 (Wilkinson Boulevard) at Marshall Drive |
| 103 | US 29/US 74 (Wilkinson Boulevard) at Barry Drive |
| 104 | US 29/US 74 (Wilkinson Boulevard) at SR 1981 (Little Rock Road) |
| 105 | US 29/US 74 (Wilkinson Boulevard) at N. Josh Birmingham Parkway |
| 106 | US 29/US 74 (Wilkinson Boulevard) at Stafford Drive/Harlee Avenue |
| 107 | US 29/US 74 (Wilkinson Boulevard) at SR 1656 (Boyer Street) |
| 108 | Josh Birmingham Parkway Ramps and Harlee Avenue |
| 109 | Old Dowd Road at SR 1656 (Boyer Street) |
| 201 | SR 5901 (Billy Graham Parkway) at SR 1656 (Boyer Street) |
| 202 | SR 5901 (Billy Graham Parkway) at SR 1490 (Josh Birmingham Parkway) |
| 203 | SR 5901 (Billy Graham Parkway) Parkway at Morris Field Drive |
| 204 | SR 5901 (Billy Graham Parkway) at NC 160 (West Boulevard) |
| 205 | Billy Graham Parkway Southbound at SR 1576 (West Tyvola Road) |
| 206 | NC 160 (West Boulevard) at Airport Drive |
| 207 | NC 160 (West Boulevard) at Horseshoe Lane/Driveway |
| 301 | SR 1177 (Yorkmont Road) at SR 1256 (West Tyvola Road) |
| 302 | SR 1177 (Yorkmont Road) at Oak Lake Boulevard/Driveway |
| 303 | SR 1177 (Yorkmont Road) at Water Ridge Parkway |
| 304 | SR 1177 (Yorkmont Road) at Beam Road |
| 305 | SR 1177 (Yorkmont Road) at Oak Lake Boulevard/Driveway |
| 306 | SR 1177 (Yorkmont Road) at Piper Lane/SR 1255 (Byrum Drive) |
| 307 | SR 1177 (Yorkmont Road) at NC 160 (West Boulevard) |
| 308 | NC 160 (West Boulevard/Steele Creek Road) at SR 5936 (West Boulevard)/SR 1255 (Byrum Drive) |
| 309 | SR 5936 (West Boulevard) at SR 1195 (Wallace Neal Road) |
| 310 | I-485 at SR 5936 (West Boulevard/SR 1148 (Garrison Road) |
| 311 | SR 1576 (West Tyvola Road) at North Falls Road |
| 312 | SR 1576 (West Tyvola Road) at South Stream Boulevard/Driveway |
| 313 | NC 160 (West Boulevard) at Piney Top Drive |
| 314 | SR 1255 (Byrum Drive) at Piney Top Drive |

## H.4 Existing Conditions

As shown in **Table H-3**, multiple intersections throughout the Study Area operate at failing levels of service during the AM and PM peak hour. Four out of fifteen signalized intersections operate at LOS E or F during at least one peak hour; the intersection of SR 5901 (Billy Graham Parkway) at NC 160 (West Boulevard) operates at LOS F during both peak hours, with an average delay of 129.4 seconds per vehicle. Eleven out of seventeen unsignalized intersections in the Study Area include at least one stop-controlled approach that operates at LOS E or F during either the AM or PM peak hour. The majority of these intersections are located along Yorkmont Road or West Boulevard. The complete output of capacity analysis results can be found in Attachment 1. Existing Conditions Forecast and Capacity Analysis.

At this time, mitigation was not identified for intersections that currently operate at LOS E or LOS F. Since this analysis only covers existing conditions, the impacts of future growth at the airport cannot be accurately determined to decide what level of improvements would be appropriate at Study Area intersections. This analysis can be used as a baseline to identify which locations already do not operate acceptably and which locations would deteriorate to unacceptable conditions due to future expansion at the airport.

**Table H-3 Base Year (2018) LOS Results**

| ID | Intersection and Approach | Traffic Control | Base Year (2018) No-Action Peak Hour LOS and Delay AM | Base Year (2018) No-Action Peak Hour LOS and Delay PM |
|---|---|---|---|---|
| 101A | **Wilkinson Boulevard (US Route 29/74) at I-485 SB Ramps/Fieldridge Road** | Signalized | **D (51.1 sec/veh)** | **C (29.6 sec/veh)** |
| | Eastbound | | B-19.4 | C-27.2 |
| | Westbound | | C-20.5 | C-22.7 |
| | Northbound | | F-139.0 | E-57.8 |
| | Southbound | | D-41.6 | D-38.4 |
| 101B | **Wilkinson Boulevard (US Route 29/74) at I-485 NB Ramps/ Tuckaseegee Road (SR 1914)** | Signalized | **D (39.4 sec/veh)** | **C (30.8 sec/veh)** |
| | Eastbound | | C-25.3 | B-17.1 |
| | Westbound | | D-46.7 | C-25.0 |
| | Northbound | | E-71.2 | D-53.5 |
| | Southbound | | D-53.7 | D-52.3 |
| 102 | **Wilkinson Boulevard (US Route 29/74) at Marshall Drive** | Unsignalized | - | - |
| | Northbound | | F-691.8 | F-103.3 |
| 103 | **Wilkinson Boulevard (US Route 29/74) at Barry Drive** | Signalized | **B (10.1 sec/veh)** | **B (12.9 sec/veh)** |
| | Eastbound | | A-5.9 | B-10.9 |
| | Westbound | | A-4.6 | A-5.6 |
| | Northbound | | F-90.1 | E-75.9 |
| | Southbound | | E-67.3 | E-73.5 |
| 104 | **Wilkinson Boulevard (US Route 29/74) at Little Rock Road (SR 1981)** | Unsignalized | - | - |
| | Southbound | | B-14.8 | D-33.2 |

**Table H-3 Base Year (2018) LOS Results (Continued)**

| ID | Intersection and Approach | Traffic Control | Base Year (2018) No-Action Peak Hour LOS and Delay AM | PM |
|---|---|---|---|---|
| 105 | **Wilkinson Boulevard (US Route 29/74) at Josh Birmingham Parkway** | Signalized | **D (41.7 sec/veh)** | **D (43.8 sec/veh)** |
| | Eastbound | | C-27.7 | C-28.5 |
| | Westbound | | C-32.5 | C-34.1 |
| | Northbound | | E-64.0 | E-64.3 |
| | Southbound | | D-48.5 | D-50.4 |
| 106 | **Wilkinson Boulevard (US Route 29/74) at Stafford Drive/ Harlee Avenue** | Signalized | **B (19.4 sec/veh)** | **C (26.5 sec/veh)** |
| | Eastbound | | B-13.3 | A-9.9 |
| | Westbound | | B-14.9 | B-19.4 |
| | Northbound | | E-55.5 | E-76.9 |
| | Southbound | | D-46.2 | D-47.0 |
| 107 | **Wilkinson Boulevard (US Route 29/74) at Boyer Street (SR 1656)** | Signalized | **A (8.8 sec/veh)** | **B (15.2 sec/veh)** |
| | Eastbound | | A-6.0 | A-9.6 |
| | Westbound | | A-5.1 | B-10.9 |
| | Northbound | | D-53.2 | D-53.5 |
| | Southbound | | D-44.6 | C-33.3 |
| 108 | **Harlee Avenue at Josh Birmingham Parkway (SR 1490) Off-Ramp** | Unsignalized | - | - |
| | Westbound | | B-10.5 | B-11.1 |
| 109 | **Boyer Street (SR 1656) at Old Dowd Road** | Unsignalized | - | - |
| | Northbound | | B-13.8 | B-13.9 |
| | Southbound | | E-42.4 | D-25.9 |
| 201 | **Billy Graham Parkway (SR 5901) at Boyer Street (SR 1656)** | Signalized | **E (64.2 sec/veh)** | **D (49.6 sec/veh)** |
| | Eastbound | | F-280.3 | F-223.3 |
| | Westbound | | F-128.5 | E-68.5 |
| | **Northbound** | | **D-52.6** | **C-25.0** |
| | Southbound | | C-26.3 | C-31.8 |
| 203 | **Billy Graham Parkway (SR 5901) at Morris Field Drive** | Signalized | **D (42.7 sec/veh)** | **F (80.7 sec/veh)** |
| | Eastbound | | F-98.5 | E-68.1 |
| | Westbound | | F-143.8 | F-173.5 |
| | Northbound | | C-29.8 | F-101.8 |
| | Southbound | | C-34.4 | C-27.8 |
| 204 | **Billy Graham Parkway (SR 5901) at West Boulevard (NC 160)** | Signalized | **F (86.1 sec/veh)** | **F (129.4 sec/veh)** |
| | Eastbound | | E-65.4 | F-93.7 |
| | Westbound | | F-174.9 | F-178.3 |
| | Northbound | | D-51.5 | F-199.6 |
| | Southbound | | F-88.7 | D-38.2 |

**Table H-3 Base Year (2018) LOS Results (Continued)**

| ID | Intersection and Approach | Traffic Control | Base Year (2018) No-Action Peak Hour LOS and Delay AM | PM |
|---|---|---|---|---|
| 205A | **West Tyvola Road at Billy Graham Parkway (SR 5901) NB Ramps** | **Unsignalized** | - | - |
| | Westbound | | B-13.1 | C-16.2 |
| 205B | **West Tyvola Road at Billy Graham Parkway (SR 5901) SB Ramps** | **Signalized** | **A (7.1 sec/veh)** | **B (10.3 sec/veh)** |
| | Eastbound | | C-31.5 | F-81.6 |
| | Northbound | | A-7.2 | A-8.9 |
| | Southbound | | A-3.7 | A-2.7 |
| 206 | **West Boulevard (NC 160) at Airport Drive** | **Unsignalized** | - | - |
| | Southbound | | C-20.8 | C-20.4 |
| 207 | **West Boulevard (NC 160) at Horseshoe Lane** | **Unsignalized** | - | - |
| | Northbound | | F-355.9 | F-556.3 |
| | Southbound | | F-149.4 | F-134.6 |
| 301 | **Yorkmont Road (SR 1177) at West Tyvola Road (SR 1256)** | **Signalized** | **E (57.0 sec/veh)** | **F (82.6 sec/veh)** |
| | Eastbound | | D-53.4 | D-44.5 |
| | Westbound | | E-76.5 | E-67.6 |
| | Northbound | | E-73.4 | F-114.3 |
| | Southbound | | D-43.8 | F-82.4 |
| 302 | **Yorkmont Road (SR 1177) at Oak Lake Boulevard (E)** | **Unsignalized** | - | - |
| | Northbound | | F-52.0 | F-56.4 |
| | Southbound | | F-407.6 | F-235.0 |
| 303 | **Yorkmont Road (SR 1177) at Water Ridge Parkway** | **Unsignalized** | - | - |
| | Northbound | | F-1105.3 | F-946.3 |
| | Southbound | | F-109.4 | F-51.4 |
| 304 | **Yorkmont Road (SR 1177/SR 1156) at Beam Road** | **Signalized** | **C (20.4 sec/veh)** | **B (19.8 sec/veh)** |
| | Eastbound | | C-20.4 | B-17.9 |
| | Westbound | | B-11.8 | B-17.4 |
| | Northbound | | C-30.7 | C-26.2 |
| 305 | **Yorkmont Road (SR 1177) at Oak Lake Boulevard (W)** | **Unsignalized** | - | - |
| | Eastbound | | F-70.7 | F-74.2 |
| | Westbound | | F-57.7 | F-59.8 |
| 306 | **Yorkmont Road (SR 1177) at Byrum Drive (SR 1255)/Piper Lane** | **Unsignalized** | - | - |
| | Eastbound | | F-149.9 | - |
| | Westbound | | - | F-999.8 |

**Table H-3 Base Year (2018) LOS Results (Continued)**

| ID | Intersection and Approach | Traffic Control | Base Year (2018) No-Action Peak Hour LOS and Delay AM | PM |
|---|---|---|---|---|
| 307 | **Yorkmont Road (SR 1177) at West Boulevard (NC 160)** | Signalized | **D (45.2 sec/veh)** | **C (30.1 sec/veh)** |
| | Eastbound | | C-33.0 | C-32.6 |
| | Westbound | | D-38.9 | B-19.1 |
| | Northbound | | F-85.4 | D-50.1 |
| | Southbound | | E-55.2 | C-29.5 |
| 308 | **Byrum Drive (SR 1255) at West Boulevard (NC 160)** | Signalized | **C (33.2 sec/veh)** | **D (36.0 sec/veh)** |
| | Eastbound | | C-28.9 | C-32.0 |
| | Westbound | | C-27.2 | D-38.3 |
| | Northbound | | C-34.6 | C-27.8 |
| | Southbound | | D-42.3 | D-42.8 |
| 309 | **West Boulevard (SR 5936) at Wallace Neel Road (SR 1195)** | Unsignalized | - | - |
| | Southbound | | F-370.5 | F-192.2 |
| 310A | **West Boulevard (SR 5936) at I-485 NB Ramps** | Unsignalized | - | - |
| | Northbound | | D-27.0 | B-11.8 |
| 310B | **West Boulevard (SR 5936)/Garrison Road at I-485 SB Ramps** | Unsignalized | - | - |
| | Southbound | | F-161.6 | F-144.3 |
| 311 | **West Tyvola Parkway (SR 1256) at North Falls Road** | Signalized | **C (20.0 sec/veh)** | **C (22.7 sec/veh)** |
| | Eastbound | | E-70.9 | E-55.2 |
| | Westbound | | D-53.1 | D-40.2 |
| | Northbound | | B-10.4 | B-16.7 |
| | Southbound | | B-17.5 | B-12.2 |
| 312 | **West Tyvola Parkway (SR 1256) at South Stream Boulevard** | Unsignalized | - | - |
| | Eastbound | | B-14.0 | E-37.2 |
| | Westbound | | C-15.0 | B-11.9 |
| 313 | **NC 160 (West Boulevard) at Piney Top Drive** | Unsignalized | - | - |
| | Northbound | | D-26.4 | C-24.7 |
| | Southbound | | E-47.9 | F-52.4 |
| 314 | **SR 1255 (Byrum Drive) at Piney Top Drive** | Unsignalized | - | - |
| | Northbound | | C-19.8 | C-20.4 |
| | Southbound | | C-18.3 | C-17.8 |

X (X sec/veh) = **Overall intersection LOS (average delay), X-XX = Approach LOS and average delay, red indicates LOS E/LOS F**

## H.5 Supporting Technical Information

Attachment 1: Existing Conditions Forecast and Capacity Analysis

- Attachment A: Forecast Comparison
- Attachment B: NCDOT Historical AADT Data
- Attachment C: Turning Movement and Class Count Location and Date
- Attachment D: 2018 Class Counts, Applied Seasonal Factors and Calculated AADT
- Attachment E: 2018 Base Year Counts and No-Build Forecast- Scenario 1
- Attachment F: Design Data (Peak Hour Factor and Directional Distribution)
- Attachment G: Design Data (Truck Percentages)
- Attachment H: Base Year (2018) No-Build Forecast
- Attachment I: Signal Plan Sheets and Timings
- Attachment J: Crash Data
- Attachment K: NCDOT IAU Sheets
- Attachment L: Capacity Analysis Results

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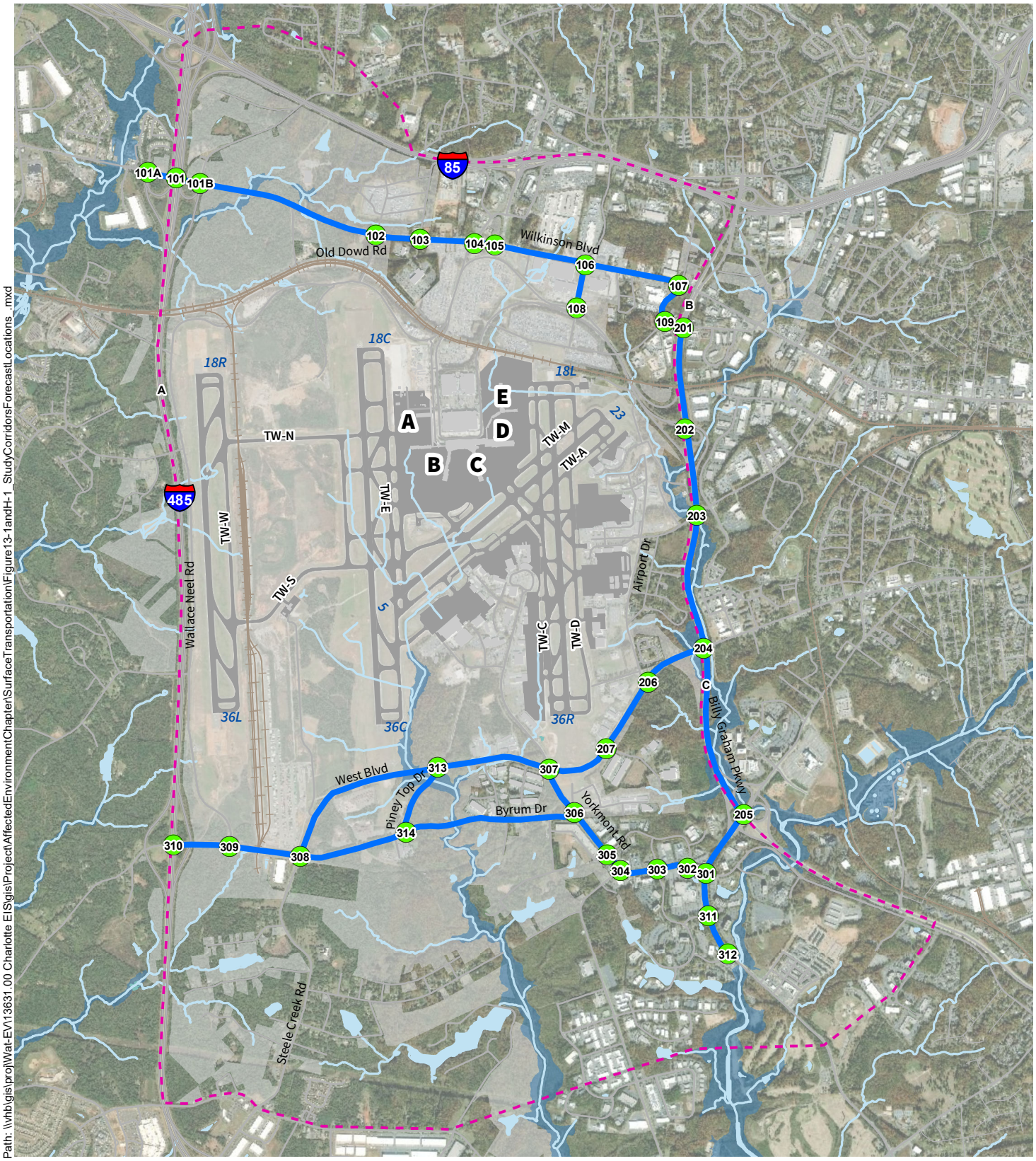



Path: \\vhb\gis\proj\Wat-EV\13631.00 Charlotte EIS\gis\ProjectAffectedEnvironmentChapter\SurfaceTransportation\Figure13-1andH-1_StudyCorridorsForecastLocations_.mxd

0 0.5 1 Miles

Study Area
Airport Property
Forecast Location
Impacted Corridor

Figure H-1
Study Corridors and Forecast Locations

**Charlotte Douglas International Airport**
Improvement Program EIS

Source: Mecklenburg County GIS, North Carolina 2017

# Proposed Capacity Enhancements at Charlotte Douglas International Airport

# National Environmental Policy Act Environmental Assessment

# Traffic Analysis

**February 2021**

PREPARED FOR
Charlotte Douglas International Airport

## Contents



## List of Tables



## List of Exhibits

# List of Acronyms

| | |
|---|---|
| ARFF | Aircraft Rescue and Fire Fighting |
| C.F.R. | Code of Federal Regulations |
| CDOT | City of Charlotte Department of Transportation |
| CLT | Charlotte Douglas International Airport |
| CRTPO | Charlotte Regional Transportation Planning Organization |
| EA | Environmental Assessment |
| FAA | Federal Aviation Administration |
| HAP | Hazardous Air Pollutant |
| HCM | Highway Capacity Manual |
| LOS | Level of Service |
| Mph | Miles per hour |
| MPO | Metropolitan Planning Organization |
| MTP | Metropolitan Thoroughfare Plans |
| NAAQS | National Ambient Air Quality Standards |
| NBR | Northbound-right |
| NC | North Carolina |
| NCDOT | North Carolina Department of Transportation |
| RPZ | Runway Protection Zone |
| SEAT | south end-around taxiway |
| SR | State Route |
| USEPA | U.S. Environmental Protection Agency |

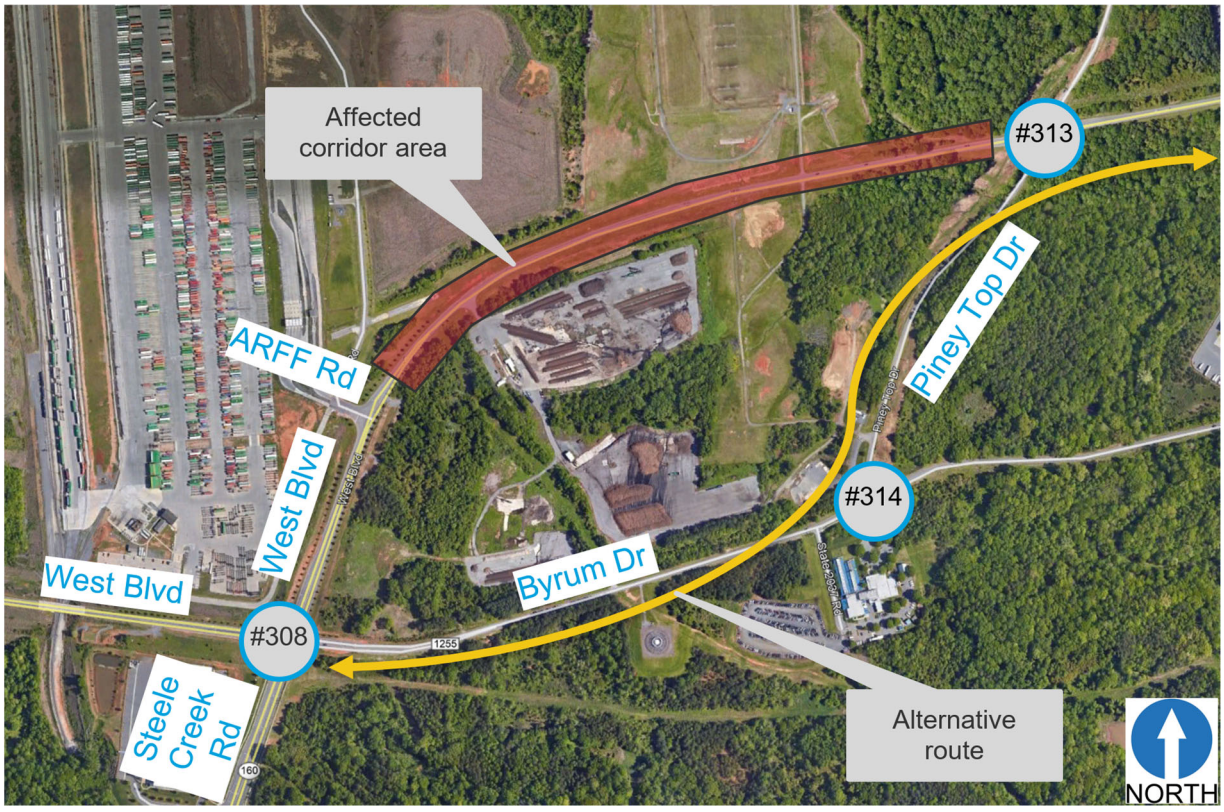
# 1 Introduction

L&B conducted a traffic analysis of three intersections that would be affected with the implementation of Alternative 1 (Proposed Action) or its alternatives at the Charlotte Douglas International Airport (CLT). The implementation of Alternative 1 (Proposed Action) and its alternatives would require the relocation of an approximately one-mile segment of West Boulevard on existing roadways outside of the footprint of the Runway Protection Zone (RPZ) of proposed Runway 19/01 and the south end-around taxiway (SEAT). This segment of West Boulevard currently provides unimpeded access for vehicles traveling to and from Byrum Drive (State Route [SR] 1255) and Yorkmont Road (SR 1177). The proposed West Boulevard relocation would require traffic to navigate a longer route by approximately 0.04 miles (211 feet) along the existing Byrum Drive and Piney Top Drive (see **Exhibit 1-1**). This analysis analyzed the impact of the proposed West Boulevard relocation on the Level of Service (LOS) and delays of three intersections:

- Intersection #308: West Boulevard (North Carolina [NC] 160)/Steele Creek Road at Byrum Drive (SR 1255);
- Intersection #313: West Boulevard at Piney Top Drive; and,
- Intersection #314: Byrum Drive at Piney Top Drive.

This traffic analysis considered the impact of build (with the proposed relocation) and no-build (no relocation) scenarios for the years 2018 and 2028 for both AM and PM peak hour conditions at each of the three intersections.

**EXHIBIT 1-1, PROPOSED WEST BOULEVARD RELOCATION**




Source: Landrum & Brown analysis, 2020

## 1.1 Existing Conditions

West Boulevard is located immediately south of the Airport. The existing roadways are adjacent to Airport property surrounded by industrial land uses. The roadways of interest for the purpose of this study include West Boulevard, Byrum Drive, and Piney Top Drive.

**West Boulevard/Steele Creek Road** is a two-lane undivided roadway with a posted speed limit of 45 miles per hour (mph). It provides direct access to Interstate 485 to the west and Yorkmont Road and Billy Graham Parkway to the east. Numerous facilities at CLT, including the Aircraft Rescue and Fire Fighting (ARFF) facility, are accessed via West Boulevard. The roadway is recognized as Steele Creek Road immediately south of the signalized intersection at Byrum Drive.

**Byrum Drive** is a two-lane undivided roadway with a posted speed limit of 45 mph. It spans from the West Boulevard/Steele Creek Road intersection to Yorkmont Road to the east. Byrum Drive provides direct access to numerous industrial developments.

**Piney Top Drive** is a two-lane undivided roadway with a speed limit of 45 mph situated approximately half-way between West Boulevard/Steele Creek Road and Yorkmont Road. The roadway spans through undeveloped areas between West Boulevard to the north and Byrum Drive to the south. A segment of the roadway also spans north of West Boulevard onto the Airport midfield, which is Airport-operated. Approaches at both intersections are stop-controlled.

# 2 Methodology and Assumptions

Coordination with the North Carolina Department of Transportation (NCDOT) and City of Charlotte (CDOT) was conducted to establish the baseline conditions and growth rates used for the purposes of this traffic analysis. Modeling software inputs for this analysis, including equivalent traffic counts, geometric conditions/layouts, and signal timings, were developed based on information provided by CDOT and VHB, available in this Appendix J, *Traffic*.

## 2.1 Baseline (2018)

Baseline (2018) levels were developed based on coordination with CDOT and data received from VHB. December 2017 counts provided by CDOT were used for developing peak volumes at Intersection #308. Counts developed by VHB in 208 were used to establish peak volumes at Intersections #314 and #313.

## 2.2 Growth Rates

Growth rates to estimate future traffic volumes in 2028 based on 2018 levels were based on the Charlotte Regional Transportation Planning Organization's (CRTPO) adopted 2040 and 2045 Metropolitan Thoroughfare Plans (MTP). According to the 2040 MTP, the Steele Creek sub-county district of Mecklenburg County was predicted have employment growth projections of 1.74 percent[1] per year. Similarly, the 2045 MTP predicts the Mecklenburg County overall population to grow approximately 2.03 percent[2] per year. Based on the surrounding land uses of the roadways of interest, a conservative growth rate of 2 percent per year for all turning movement counts was used to project to future traffic volumes in 2028. CDOT concurred with this growth rate in an email dated June 10, 2020.

1 CRTPO 2040 MTP, Population and Land Use, page 9-8, Table 9-5
2 CRTPO 2045 MTP, Regional Trends and Travel Patterns, page 54, Table 3-1

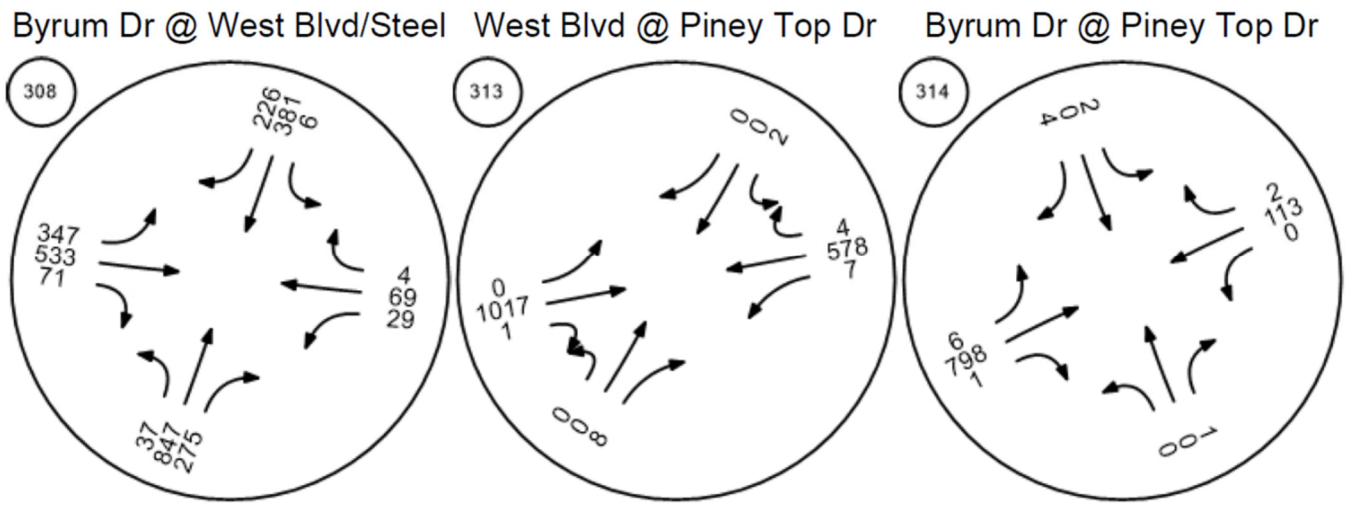
No other significant background growth or widening projects are expected for West Boulevard according to CRTPO before 2028.

## 2.3 Proposed West Boulevard Relocation

**Exhibit 2-1** and **Exhibit 2-2** presents 2018 peak hour volumes no build (without relocation) and build-out (with the proposed West Boulevard relocation). Similarly, **Exhibit 2-3** and **Exhibit 2-4** compare 2028 peak hour volume projections that reflect the applied 2 percent annual growth factor. All displaced volumes were assumed to utilize Piney Top Drive. Furthermore, all approaches for 2028 were modeled at 45 mph, with the exception of the section east of Piney Top Drive at West Boulevard (Intersection 313) and the northbound approach at Intersection 314 (Animal Shelter Driveway).

**EXHIBIT 2-1, 2018 AM PEAK HOUR VOLUMES**

**No-Build Conditions**




**Build-Out Conditions**

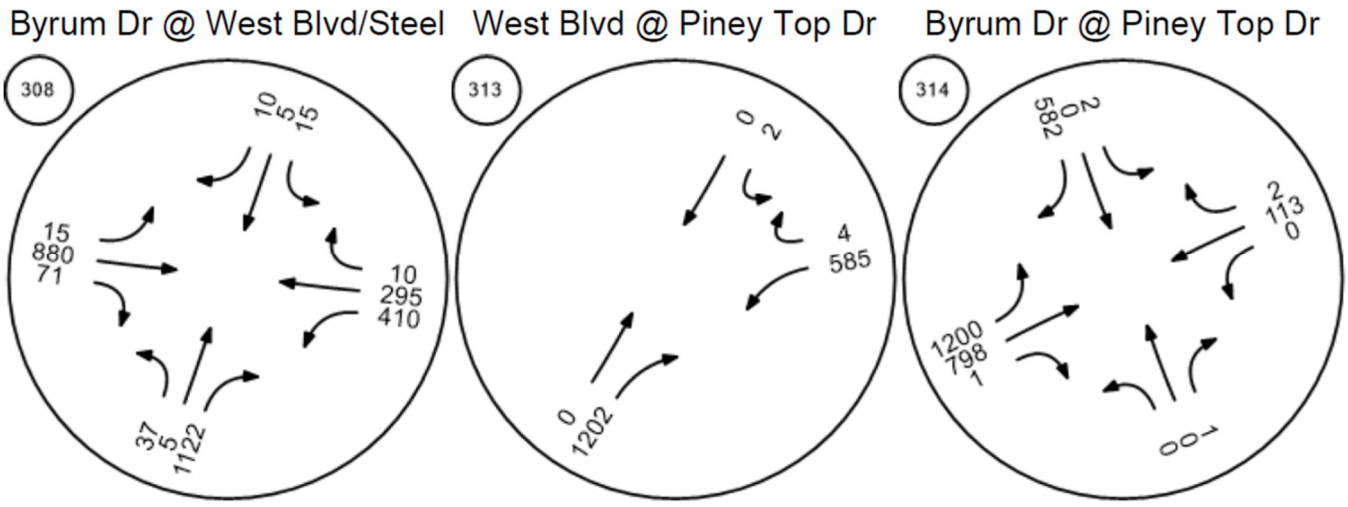
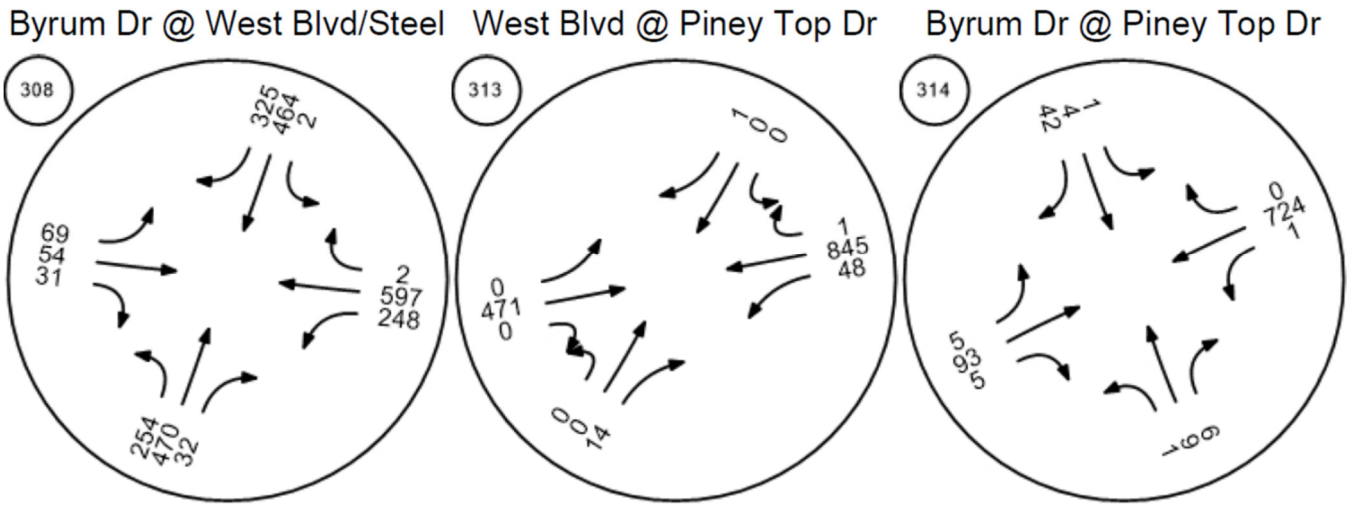


**EXHIBIT 2-2, 2018 PM PEAK HOUR VOLUMES**

**No-Build Conditions**




**Build Out Conditions**

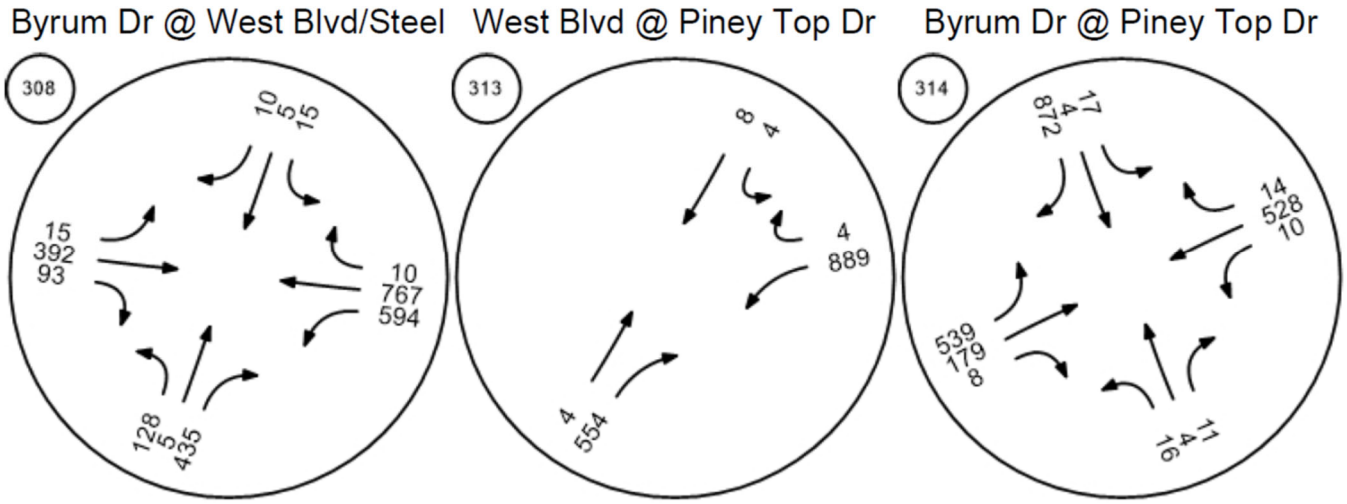
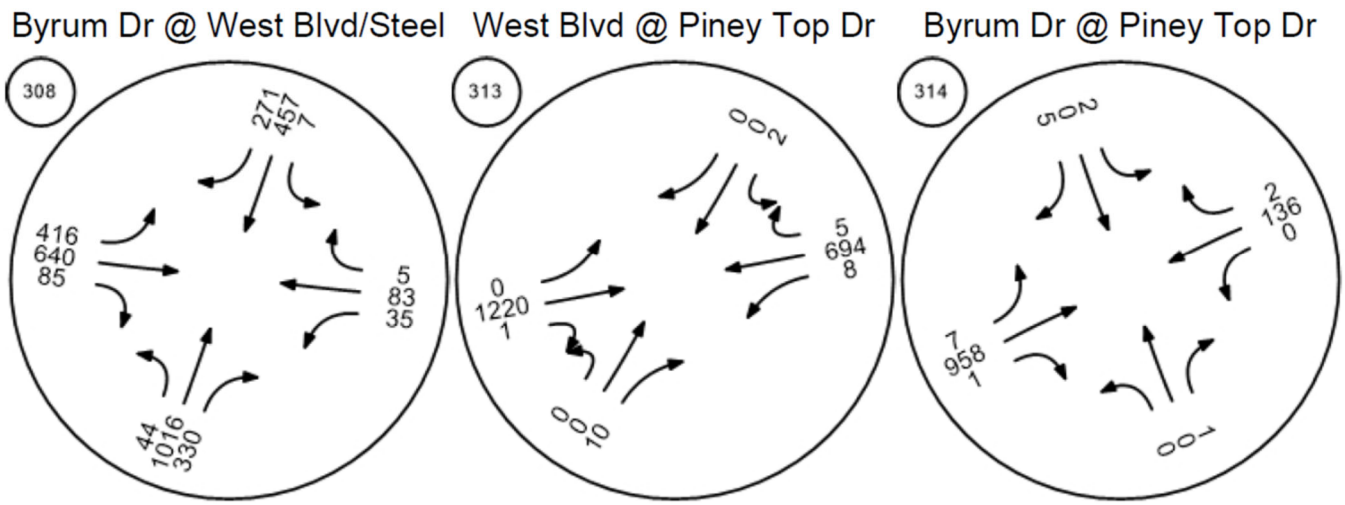


**EXHIBIT 2-3, 2028 AM PEAK HOUR VOLUMES**

**No-Build Conditions**




**Build-Out Conditions**

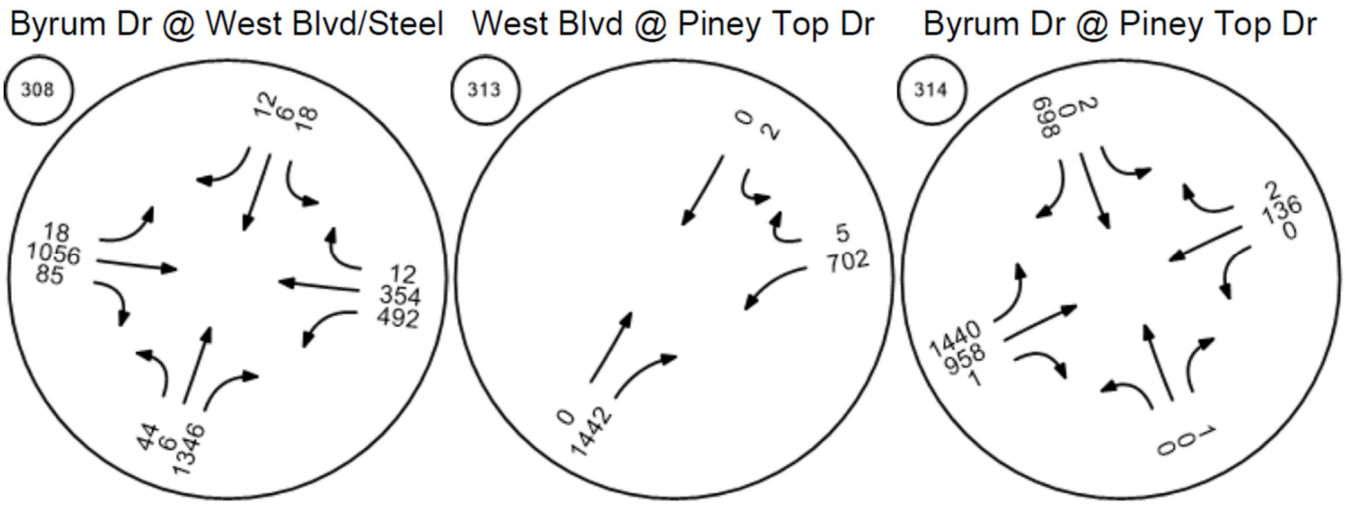
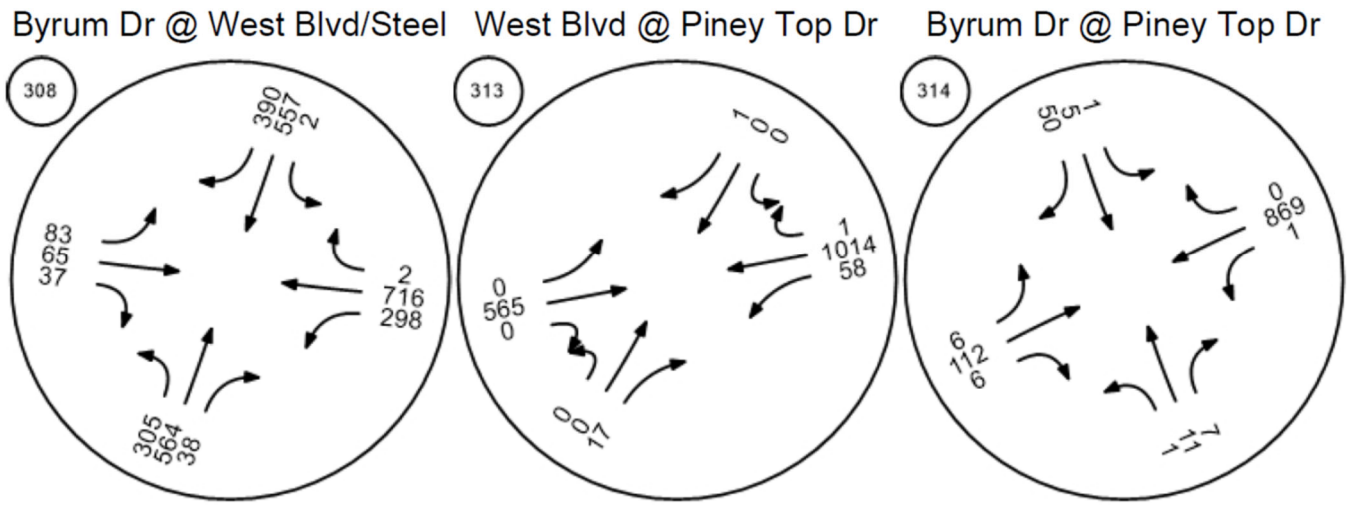
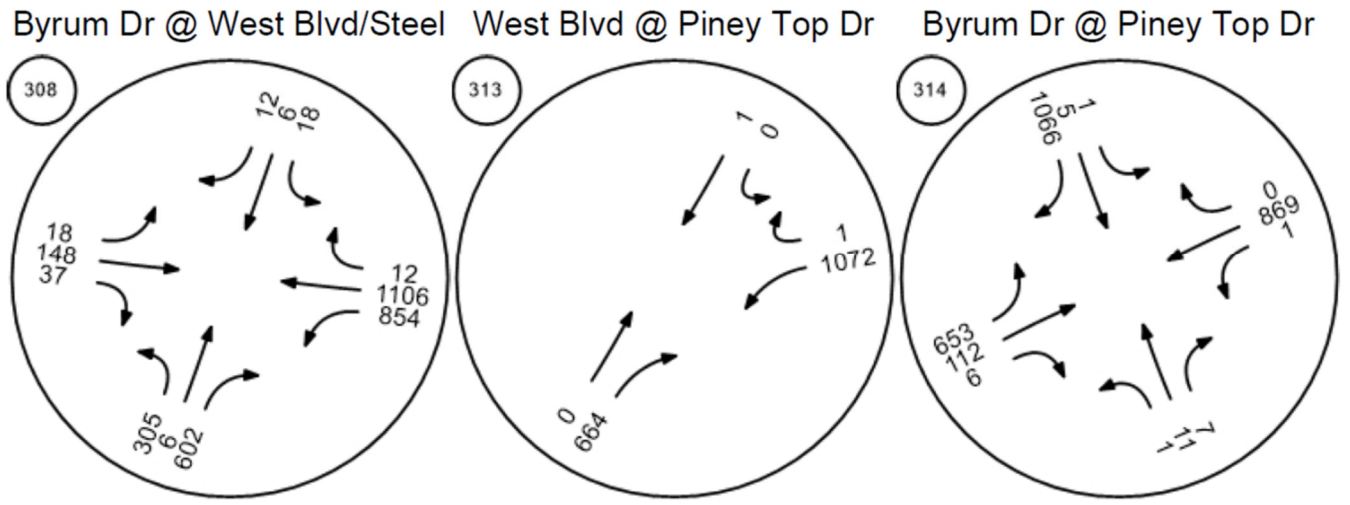


**EXHIBIT 2-4, 2028 PM PEAK HOUR VOLUMES**

**No-Build Conditions**




**Build Out Conditions**



## 2.4 Level of Service

The impact of peak hour traffic was measured by determining level of service (LOS) and vehicle delays. LOS is a measure that evaluates quality of traffic conditions at an intersection or specific approach. Ranging from A through F, LOS is based on the average time a driver's movement is impeded to navigate a desired traffic movement. This time, referred as delay, is a comparison between the actual travel time and free-flow travel time. Delay is influenced not only by traffic volumes but also the intersection control (signalization, stop-controlled, etc.).

Based on CDOT and NCDOT coordination, an overall LOS of D (or higher) is considered an acceptable condition for signalized intersections. An overall LOS of E or F indicates the intersection is experiencing long delays and congestion. Conversely, unsignalized intersection approaches are typically evaluated per approach and can carry unique caveats. An unsignalized intersection approach with LOS E, and sometimes F, is acceptable under unique circumstances when side street volumes are low. In these cases, the warrant of mitigation is ultimately determined by the intersection's residing jurisdiction. **Table 2-1** describes LOS and the various delay thresholds for signalized and unsignalized intersections. The delay amounts are taken from the Highway Capacity Manual (HCM) version 6. For this study, the LOS for each intersection was found using *PTV Vistro, Version 20* traffic software.

**TABLE 2-1, LEVEL OF SERVICE CONDITIONS**

| LOS | Traffic Conditions | Signalized Intersection Delay (sec/vehicle) | Unsignalized Intersection Delay (sec/vehicle) |
|---|---|---|---|
| A | Little to no delay | <= 10 sec | <= 10 sec |
| B | Short delay | >10 – 20 sec | >10 – 15 sec |
| C | Typical delay | >20 – 35 sec | >15 – 25 sec |
| D | Long delay | >35 – 55 sec | >25 – 35 sec |
| E | Very long delay | >55 – 80 sec | >35 – 50 sec |
| F | Unacceptable delay, failure | >80 sec | >50 sec |

Source: Landrum & Brown analysis, 2021

## 2.5 V/C Ratio

The impact of peak hour traffic was also measured by determining volume to capacity, or v/c ratio. The v/c ratio represents the adequacy of an intersection to accommodate vehicular demand. Typically, a v/c ratio of less than 0.85 indicates that the capacity of an intersection is expected to sufficiently handle the volume demand without significant queues or delays. Ratios greater than 1.0 would indicate that the intersection is saturated with the volume exceeding the available capacity. Heavy congestion with long queues and delay would be expected. Based on CDOT and NCDOT coordination, a v/c ratio would be an acceptable ratio with the implementation of the proposed West Boulevard relocation.

# 3 Traffic Capacity Results

Four model sets were prepared to represent existing and future build and no-build scenarios to compare the LOS impact to the roadways of interest. **Table 3-1** and **Table 3-2** compare 2018 and 2028 LOS conditions, respectfully. **Table 3-3** compares the overall volume to capacity (v/c) ratio at West Boulevard and Byrum Drive. No mitigation measures were incorporated as a result of the proposed West Boulevard relocation with the exception of Intersection #313 (West Boulevard and Piney Top Drive). The northbound-right (NBR) approach volumes, currently stop-controlled at West Boulevard at Piney Top Drive, were analyzed as a free movement to accommodate the high-volume

demand. As a result of the West Boulevard relocation, the NBR approach becomes an unimpeded movement and can operate freely without other conflicting approaches. Detailed results of the traffic analysis are located following this traffic analysis.

**TABLE 3-1, EXISTING (2018) NO-BUILD COMPARED TO BUILD SCENARIO RESULTS**

| ID#* | Intersection | Traffic Control | Approach | No-Build (2018) AM, (PM) | | Build-Out (2018) AM, (PM) | |
|---|---|---|---|---|---|---|---|
| | | | | LOS | Delay (seconds/vehicle) | LOS | Delay (seconds/vehicle) |
| 308 | West Blvd/Steele Creek Rd at Byrum Dr | Signal | Overall | **E**, (D) | **79.7**, (51.9) | **F, (F)** | **$, (168.4)** |
| | | | NB | **F**, (D) | **143.8**, (39.0) | **F**, (D) | **$**, (43.7) |
| | | | SB | D, (D) | 38.2, (42.8) | C, (C) | 29.5, (23.3) |
| | | | EB | C, (C) | 32.7, (23.3) | **F**, (D) | **174.4**, (47.4) |
| | | | WB | C, **(E)** | 27.7, **(71.8)** | **F, (F)** | **271.0, (267.6)** |
| 313 | West Blvd at Piney Top Dr | Side-Street Stop | NB | C, (B) | 21.4, (11.6) | *, (*) | *, (*) |
| | | | SB | **F**, (C) | **84.8**, (16.0) | **F**, (D) | **60.8**, (26.4) |
| 314 | Byrum Dr at Piney Top Dr | Side-Street Stop | NB | C, (C) | 15.2, (15.2) | **F, (F)** | **$, ($)** |
| | | | SB | B, (C) | 13.6, (17.7) | **F, (F)** | **$, ($)** |
| | | | EB | -, (-) | 0.1, (0.6) | C, (B) | 15.3, (10.7) |

* - Analyzed as free-movement for alternative analysis
$ - Delay exceeds 300 seconds

Note: Results in bold denote exceedances in LOS and delay
Source: Landrum & Brown analysis, 2021

**TABLE 3-2, FUTURE (2028) NO-BUILD COMPARED TO BUILD SCENARIO RESULTS**

| ID# | Intersection | Traffic Control | Approach | No-Build (2028) AM, (PM) | | Build-Out (2028) AM, (PM) | |
|---|---|---|---|---|---|---|---|
| | | | | LOS | Delay (seconds/vehicle) | LOS | Delay (seconds/vehicle) |
| 308 | West Blvd/Steele Creek Rd at Byrum Dr | Signal | Overall | **F, (F)** | **161.2, (91.9)** | **F, (F)** | **$, (285.0)** |
| | | | NB | **F, (E)** | **$, (75.0)** | **F, (F)** | **$, (92.8)** |
| | | | SB | **F, (F)** | **96.4, (80.4)** | C, (C) | 29.7, (23.6) |
| | | | EB | D, (C) | 41.7, (24.1) | **F**, (C) | **287.7**, (29.5) |
| | | | WB | C, **(F)** | 28.1, **(131.5)** | **F, (F)** | **$, ($)** |
| 313 | West Blvd at Piney Top Dr | Side-Street Stop | NB | D, (B) | 28.7, (12.6) | *, (*) | *, (*) |
| | | | SB | **F**, (C) | **186.1**, (19.1) | **F**, (C) | **107.0**, (24.3) |
| 314 | Byrum Dr at Piney Top Dr | Side-Street Stop | NB | C, (C) | 17.9, (18.6) | **F, (F)** | **$, ($)** |
| | | | SB | C, (C) | 15.1, (23.1) | **F, (F)** | **$, ($)** |
| | | | EB | A, (A) | 0.1, (0.7) | **E, (F)** | **47.8, (52.9)** |

* - Analyzed as free-movement for alternative analysis
$ - Delay exceeds 300 seconds

Note: Results in bold denote exceedances in LOS and delay
Source: Landrum & Brown analysis, 2021

**TABLE 3-3, V/C RATIO RESULTS**

| ID# | Intersection | V/C Ratio AM, (PM) | | |
|---|---|---|---|---|
| | | No-Build (2018) | No-Build (2028) | Build-Out (2028) |
| 308 | West Blvd/Steele Creek Rd at Byrum Dr | 0.77, (0.78) | **0.93, (0.92)** | **1.80, (1.14)** |

Note: Results in bold denote exceedances in v/c ratio
Source: Landrum & Brown analysis, 2021

*West Boulevard at Byrum Drive (#308)*

With the proposed West Boulevard relocation, the shift in volume traffic affects both eastbound and westbound approaches. The eastbound-left approach volume lessens as vehicles are forced to take the single through-lane toward Piney Top Drive. The westbound approach is hindered from the additional through and left turning traffic. Most of these volumes originated as southbound-right and southbound-through movements under the no-build scenario. Similarly, the northbound-through traffic under existing conditions, will shift and overwhelm the northbound-right turning lane under the build-out scenario. When comparing v/c ratios, the current geometry comfortably yields results under 0.85 for existing conditions. The future no-build scenario ratios indicate congested, but not saturated conditions. The future build-out conditions reveal over-saturation at the intersection, which would lead to heavy congestion.

*West Boulevard at Piney Top Drive (#313)*

Under a no-build scenario, the analysis reveals that this intersection would yield LOS D or worse with organic growth by 2028. However, implementing the proposed relocation would negate the entire eastbound approach which would permit the northbound-right movement to become a free-movement. This allows greater overall progression at the intersection. Although the southbound approach appears to have high delays, the volumes for this movement are typically very low. Furthermore, the southbound approach is an access road to the Airport and is anticipated to be closed by 2028. The alternative scenario also allows southbound volumes to exit quicker due to one less intersection approach and fewer conflict points to navigate.

*Byrum Drive at Piney Top Drive (#314)*

With the proposed West Boulevard relocation, vehicles on the southbound approach along Piney Top Drive are constrained by the stop control. Queues during peak hours are likely to extend as far back as West Boulevard. Concurrently, the single eastbound lane along Byrum Drive would develop higher delays as a result of the increased eastbound-left volumes.

# 4 Mitigations

All three intersections experienced deficiencies with the implementation of the West Boulevard relocation. Mitigation measures were introduced for each intersection to reach a LOS (D or better) and v/c ratios (≤0.85).

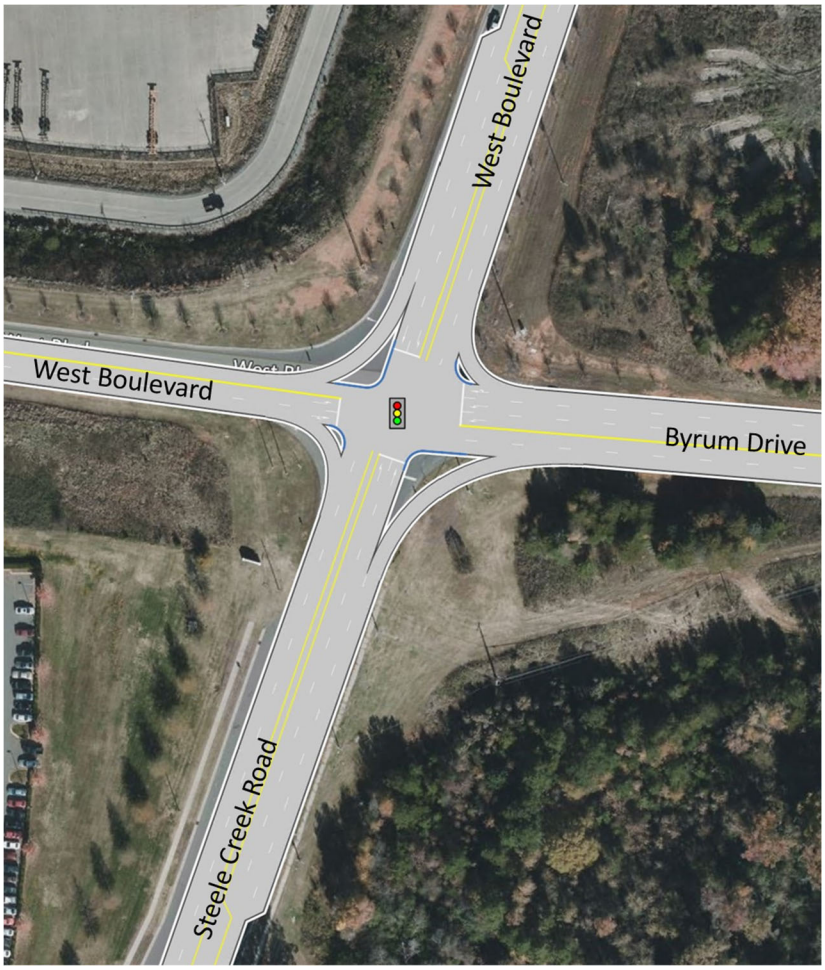
## 4.1 Corridor Improvements

- Improve the Byrum Drive corridor between West Boulevard and Piney Top Drive, and east of Piney Top Drive, to become a 4-lane roadway.
- Improve the Steele Creek Road corridor south of West Boulevard/Byrum Drive to become a 4-lane roadway.

## 4.2 West Boulevard/Steele Creek Road and Byrum Drive intersection (#308):

- Re-time the traffic signal to coordinate with the signal recommended to be installed at the Byrum Drive and Piney Top Drive intersection (#314).
- Restripe and construct a free channelized movement for northbound-right volumes turning on to Byrum Drive. Ensure the eastbound-through and southbound-left movements are channeled strictly to the left lane to prevent unsafe weaving with the northbound-right volumes.
- Provide two dedicated westbound-left turn lanes (one auxiliary) and phase as protected movement.
- The northbound right lane is recommended to become a dedicated right-turn lane. The left lane would become a dedicated through movement and the northbound-left auxiliary storage lane shall remain as existing (see **Exhibit 4-1**).

**EXHIBIT 4-1, WEST BOULEVARD/STEELE CREEK ROAD AND BYRUM DRIVE INTERSECTION (#308) WITH MITIGATIONS**




Source: Landrum & Brown analysis, 2021

## 4.3 West Boulevard and Piney Top Drive intersection (#313):

- Reconfigure the intersection to become a free movement by creating a gentle horizontal curve to allow seamless transition between Piney Top Drive and West Boulevard (see **Exhibit 4-2**). The existing north leg of Piney Top would be eliminated (based on Airport's recommendation). *As a result, further evaluation of this intersection is not required.*

**EXHIBIT 4-2, WEST BOULEVARD AND PINEY TOP DRIVE INTERSECTION (#313) WITH MITIGATIONS**


Source: Landrum & Brown analysis, 2021

## 4.4 Byrum Drive and Piney Top Drive intersection (#314),

Three alternatives for Intersection #314 were proposed to analyze and are as followed:

- Signalized the intersection while keeping the existing 4-leg alignment (**Exhibit 4-3**).
- Shift the Byrum Drive alignment to allow an EB through movement on to Piney Top Drive (**Exhibit 4-4**).
- Convert the intersection into a roundabout design (**Exhibit 4-5**).

Improvements proposed at intersections #308 and #314 will remain constant for all three alternatives tested at #314.

### *4.4.1 Intersection #314 Alternative 1*

- Install a traffic signal system and coordinate with the signal at the West Boulevard/Steele Creek Road and Byrum Drive intersection (#308). The free southbound-right movement will overlap with the eastbound-left movement to allow simultaneous movement.
- The eastbound approach was modeled to include a single dedicated through-right lane and a dedicated left approach lane.
- The southbound approach is proposed to have a channelized free right turn lane and dedicated left-through auxiliary lane.
- The westbound approach along Byrum Drive is proposed to have a dedicated left auxiliary lane and one through-right lane configuration.

**EXHIBIT 4-3, INTERSECTION (#314) WITH ALTERNATIVE 1 MITIGATIONS**


Source: Landrum & Brown analysis, 2021

### *4.4.2 Intersection #314 Alternative 2*

- Shift the Byrum Drive alignment and convert the intersection to allow the former eastbound left volumes to become a dedicated through movement onto Piney Top Drive. The existing Byrum Drive westbound approach now becomes the intersecting approach. The Animal Shelter Driveway location is shifted east of the intersection.

- Install a traffic signal system and coordinate with the signal at the West Boulevard/Steele Creek Road and Byrum Drive intersection (#308).
- The east/northeast approach includes a dedicated through lane onto Piney Top and right lane to continue on Byrum Drive.
- The south/southwest approach along Piney Top Drive includes a dedicated through and shared through/left lane.
- The westbound approach includes a dedicated left and shared left-right lane.

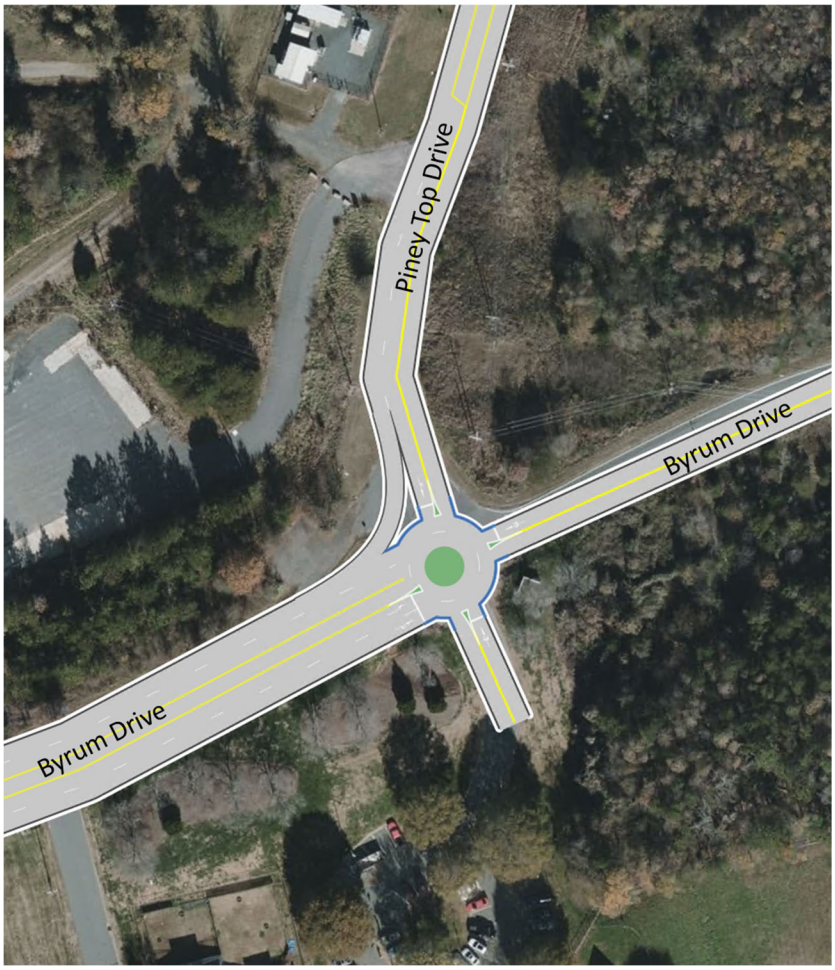
**EXHIBIT 4-4, INTERSECTION (#314) WITH ALTERNATIVE 1 MITIGATIONS**


Source: Landrum & Brown analysis, 2021

### *4.4.3 Intersection #314 Alternative 3*

- Analyze the intersection as a roundabout.
- The SBR approach along Piney Top will have a channelized free movement on to Byrum Drive.
- The eastbound approach will have a dedicated left turn lane onto Piney Top Drive and dedicated through-right lane on to Byrum Drive.
- Access to the Animal Rescue Driveway is maintained.

**EXHIBIT 4-5, INTERSECTION (#314) WITH ALTERNATIVE 3 MITIGATIONS**




Source: Landrum & Brown analysis, 2021

## 4.5 Mitigation Results

**Tables 4-1 through 4-4** detail the AM and PM peak hour traffic analysis after incorporating these mitigations at intersections #308 and #314, respectively. Detailed results of the traffic analysis with mitigations are provided following this traffic analysis.

**TABLE 4-1, FUTURE (2028) BUILD SCENARIO RESULTS WITH MITIGATIONS, INTERSECTION #308**

| ID# | Intersection | Approach | AM, (PM) Peak Hour | | |
|---|---|---|---|---|---|
| | | | LOS | Delay (seconds/vehicle) | V/C Ratio |
| 308 | West Blvd/Steele Creek Rd at Byrum Dr | Overall | **F, (E)** | **98.46, (67.83)** | **0.88, (0.86)** |
| | | NB | **E, (F)** | **56.46, (89.47)** | |
| | | SB | **F, (E)** | **84.93, (79.98)** | |
| | | EB | **F**, (C) | **115.88**, (31.76) | |
| | | WB | **E, (E)** | **77.97, (67.90)** | |

Note: Results in bold denote exceedances in LOS, delay, and v/c ratio
Source: Landrum & Brown analysis, 2021

**TABLE 4-2, FUTURE (2028) BUILD SCENARIO ALTERNATIVE 1 RESULTS, INTERSECTION #314**

| ID# | Intersection | Mitigation | Approach | AM, (PM) Peak Hour | | |
|---|---|---|---|---|---|---|
| | | | | LOS | Delay (seconds/vehicle) | V/C Ratio |
| 314 | Byrum Dr at Piney Top Dr | Signalize | Overall | **E, (F)** | **75.94, (122.6)** | 0.59, **(0.88)** |
| | | | NB | C, (C) | 29.88, (34.87) | |
| | | | SB | C, (C) | 29.84, (33.97) | |
| | | | EB | **E, (F)** | **78.56, (123.4)** | |
| | | | WB | **E, (F)** | **75.94, (122.6)** | |

Note: Results in bold denote exceedances in LOS, delay, and v/c ratio
Source: Landrum & Brown analysis, 2021

**TABLE 4-3, FUTURE (2028) BUILD SCENARIO ALTERNATIVE 2 RESULTS, INTERSECTION #314**

| ID# | Intersection | Mitigation | Approach | AM, (PM) Peak Hour | | |
|---|---|---|---|---|---|---|
| | | | | LOS | Delay (seconds/vehicle) | V/C Ratio |
| 314 | Byrum Dr at Piney Top Dr | Alignment Shift | Overall | C, (B) | 29.24, (16.12) | **0.98**, (0.67) |
| | | | SB | A, (B) | 2.54, (13.07) | |
| | | | EB | D, (B) | 37.04, (13.41) | |
| | | | WB | C, (C) | 29.11, (22.04) | |

Note: Results in bold denote exceedances in LOS, delay, and v/c ratio
Source: Landrum & Brown analysis, 2021

**TABLE 4-4, FUTURE (2028) BUILD SCENARIO ALTERNATIVE 3 RESULTS, INTERSECTION #314**

| ID# | Intersection | Mitigation | Approach | AM, (PM) Peak Hour | | |
|---|---|---|---|---|---|---|
| | | | | LOS | Delay (seconds/vehicle) | V/C Ratio |
| 314 | Byrum Dr at Piney Top Dr | Roundabout | Overall | **E, (F)** | **46.57, (87.68)** | -, (-) |
| | | | NB | **E**, (A) | **43.19**, (6.78) | |
| | | | SB | A, (A) | 0.01, (0.03) | |
| | | | EB | **F**, (A) | **60.78**, (7.34) | |
| | | | WB | **E, (F)** | **35.95, (267.81)** | |

Note: Results in bold denote exceedances in LOS, delay, and v/c ratio
Source: Landrum & Brown analysis, 2021

**West Boulevard at Byrum Drive (#308)** – The proposed mitigation would not reach the LOS D or better or v/c ratio. Additional studies during design and coordination will occur to determine more suitable mitigations to maintain LOS D or better in the design of the intersection.

**Byrum Drive at Piney Top Drive (#314)** – The proposed Alternative 1 and Alternative 3 mitigations for this intersection would not reach the LOS D or better or the desired v/c ratio. While Alternative 2 would

reach the desired LOS, the v/c ratio exceeds the desired ratio. Overall, Alternative 2 performs the best in terms of LOS.

Comparing the three different alternatives for this intersection revealed that Alternative 2 would perform the best. Despite a high v/c ratio in the AM peak, the LOS results for both peak hours would still perform with moderate traffic. Allowing the rerouted vehicles from West Boulevard to perform a through movement, as opposed to a turning movement, also allows for greater throughput and safer operation. Further refinement of the layout during design could improve the v/c ratio.

Although Alternative 1 would require the least amount of geometric intervention, the overall demand is too great to overcome during both peak hours for the eastbound and westbound movements. Similarly, the roundabout proposed for Alternative 3 revealed that eastbound and westbound movements would also overwhelm the intersection with heavy delays and long queuing.

# 5 Final Discussion

Implementing the proposed West Boulevard relocation without the implementation of mitigations would reduce LOS and increase delays at all three intersections. Additional mitigations will be studied during design and coordinated to ensure an acceptable LOS and v/c ratio is met.

| | |
|---|---|
| **From:** | Leathers, Amber |
| **To:** | Canipe, Brett D; Littlefield, Jeffrey S; Basham, Stuart L; Grzymski, Andrew; Sarah Potter; Gaby Elizondo |
| **Cc:** | Wiebke, Mark; Watson, Ashton |
| **Subject:** | DOT-Discussion-4-21-2020 GAE (002).pptx |
| **Date:** | Thursday, April 23, 2020 1:19:05 PM |
| **Attachments:** | DOT-Discussion-4-21-2020 GAE (002).pptx |



Good afternoon,

Thank you to everyone for attending Tuesday's call. I've attached the presentation from the meeting. Please forward as you see appropriate.

Attendees:

- NCDOT: Brett Canipe, Stuart Basham, Jeff Littlefield
- CDOT: Andy Grzymski
- Landrum & Brown (L&B): Sarah Potter, Gaby Elizondo
- Airport: Mark Wiebke, Ashton Watson, Amber Leathers

Notes:

- Conversion of the EIS to EA changed the West Blvd relocation to existing roads (Byrum, Piney Top, to West Blvd). This change does not impact the Western Parkway previously adopted in the CRTPO.
- Western Parkway- Horizon Year 2045 will remain as the primary east/west connection. The West Blvd relocation will be supplemental/temporary to the long term solution.
- Changes to 485 interchange to support Western Parkway. Andy to provide Airport Area and River District study. (Received 4/21, thank you Andy!)
- CDOT to model the proposed changes
- The Airport and L&B will revisit the previous work completed in the EIS for their traffic analysis. Once the impacts are known, we will regroup to understand what roadway improvements must occur.

Thanks,

**AMBER LEATHERS, A.A.E., ACE** | **PLANNING & ENVIRONMENTAL MANAGER**

**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT**

**m** 704.560.1820

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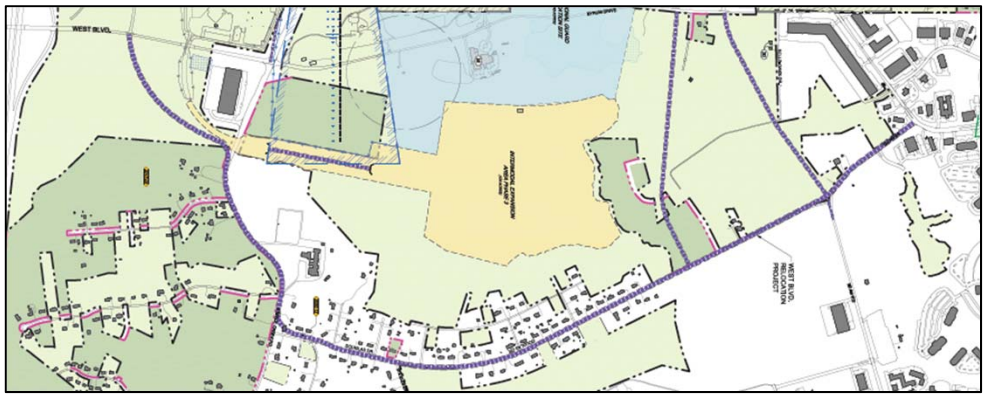
# Environmental Assessment (EA)

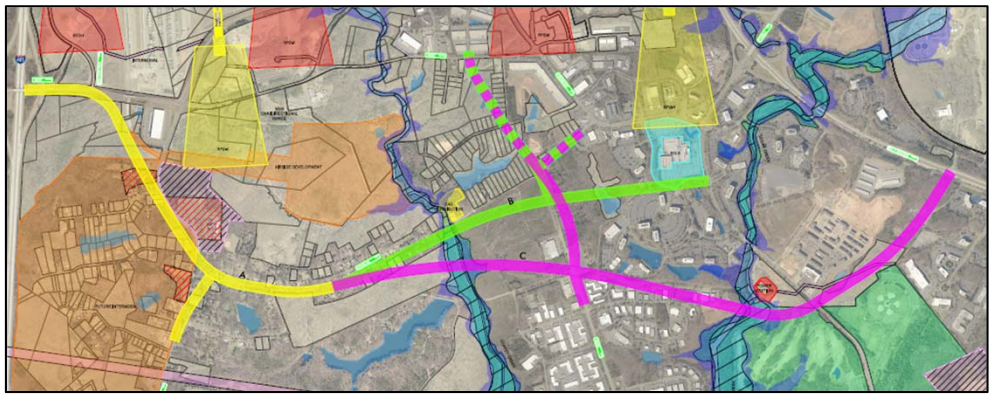
- The CLT Environmental Impact Statement (EIS) that the Federal Aviation Administration (FAA) began was cancelled on February 27, 2019.
- The FAA cancelled the EIS because a runway length analysis determined only a 10,000 foot runway is required to meet the purpose and need.
- The FAA determined that this was a sufficient change to warrant cancellation of the EIS and conversion to an Environmental Assessment (EA).
- The City of Charlotte (Airport Sponsor) is responsible for preparing the EA.
- FAA is still the lead agency.
- Similar to the EIS, the EA will evaluate the potential direct, indirect, and cumulative environmental impacts that may result from the Proposed Action.

# History of Alignments/Previous Coordination with DOT

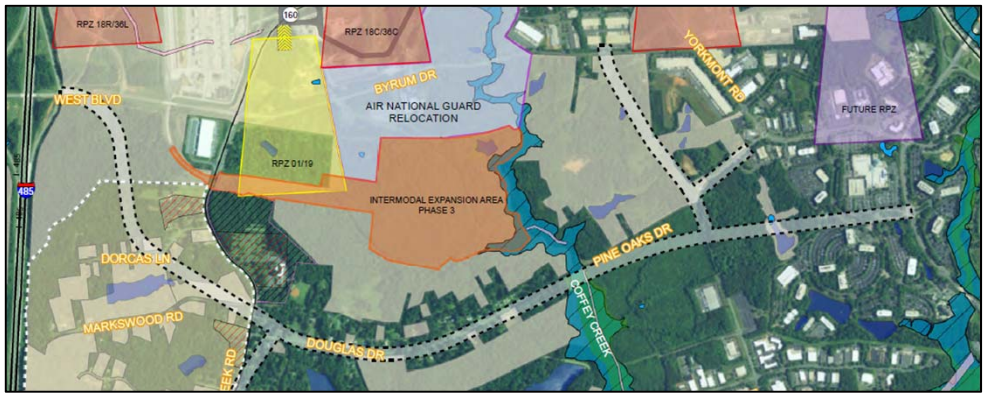
## 2016 Airport Layout Plan



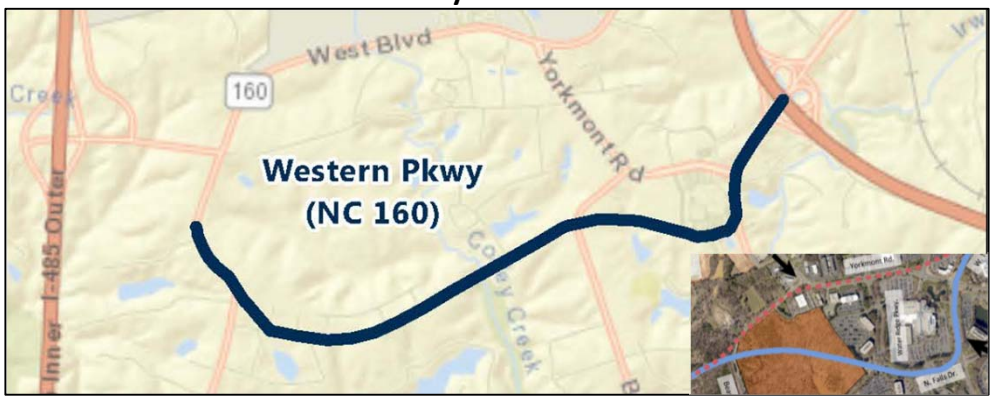

## STV - EIS



## VHB - EIS

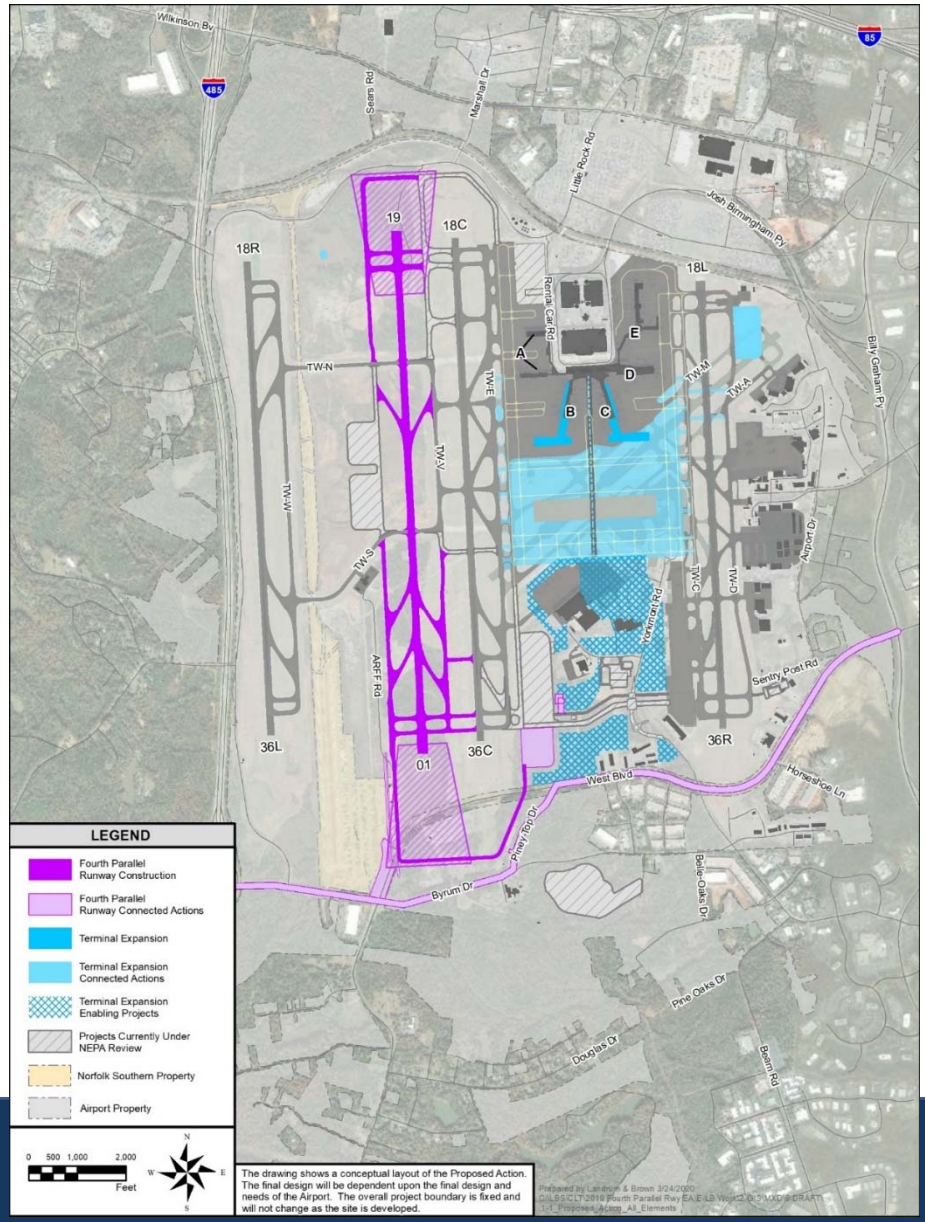


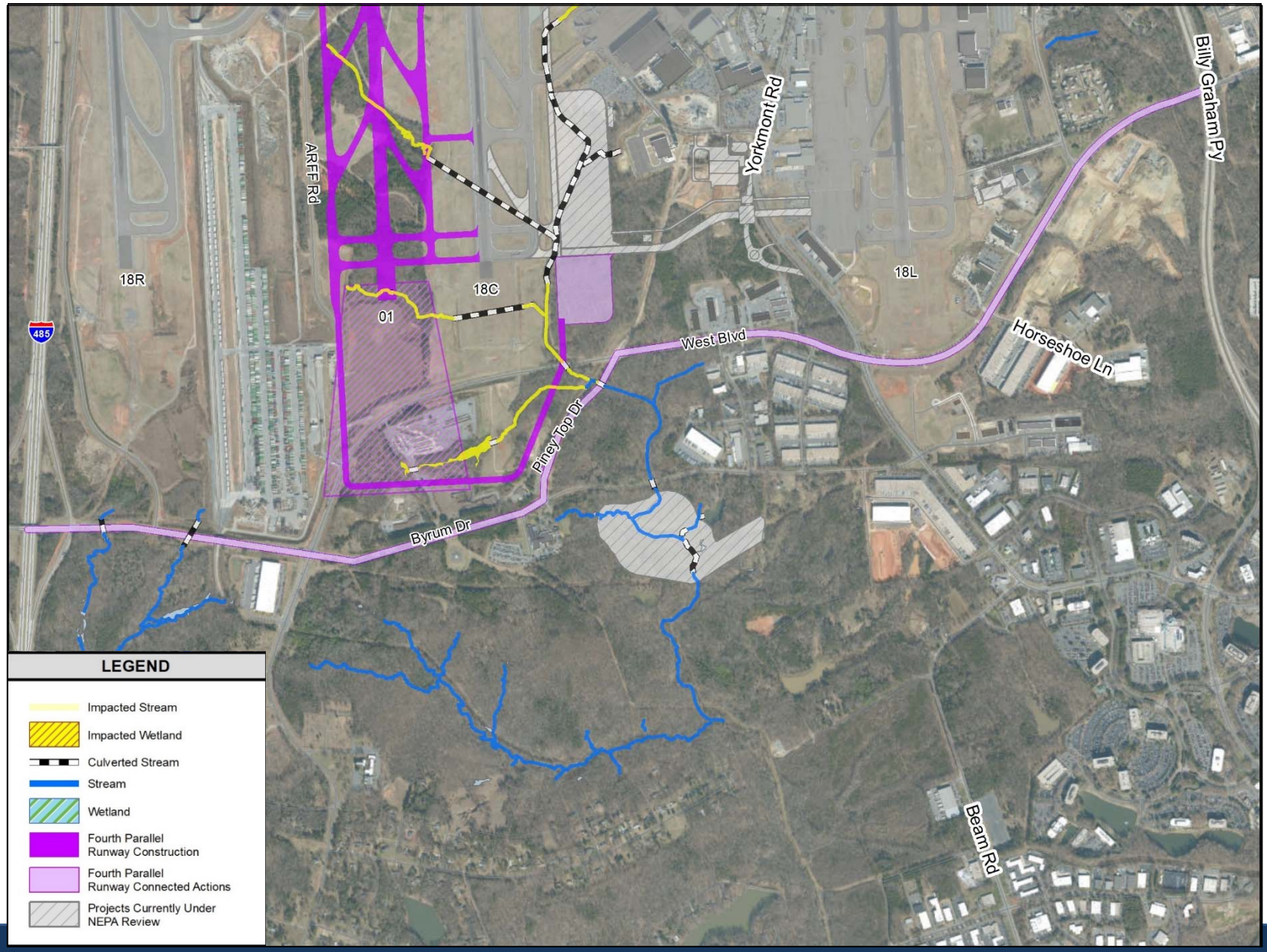

## Western Parkway: Horizon Year 2045

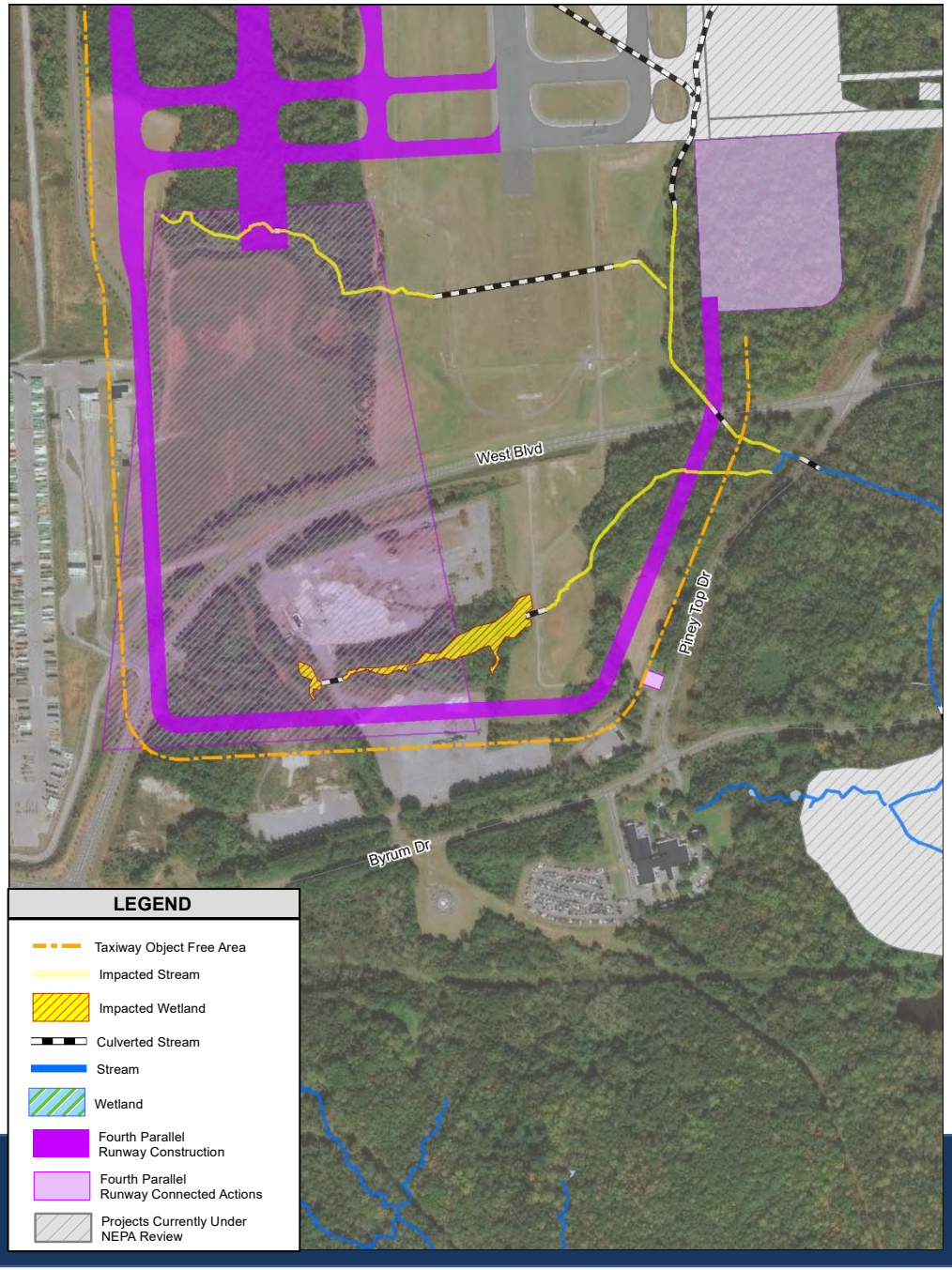


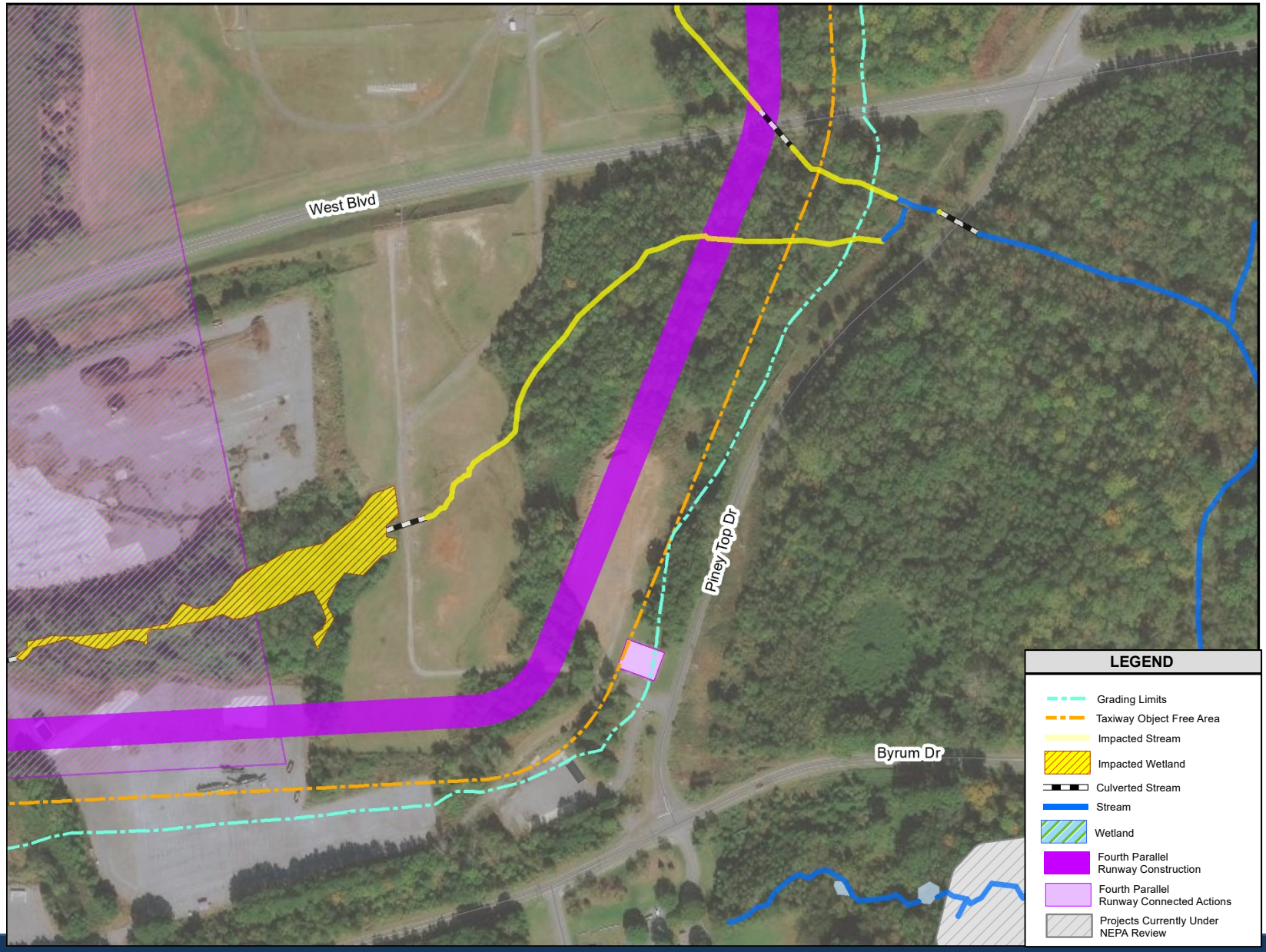
# Environmental Assessment (EA) – Proposed Action

- 4th Parallel Runway (10,000 feet long)
  - Construct North and South End Around Taxiways (EAT), taxiway connectors, hold pad
  - Relocate a one-mile portion of West Boulevard to an existing road in the footprint of the Runway Protection Zone (RPZ) of proposed Runway 01/19 and the south EAT
- Extensions of Concourse B and C
  - Decommissioning Runway 5/23
  - South apron development




ARFF Rd
Yorkmont Rd
Billy Graham Py
18R
18C
18L
01
485
West Blvd
Horseshoe Ln
Piney Top Dr
Byrum Dr
Beam Rd
LEGEND
Impacted Stream
Impacted Wetland
Culverted Stream
Stream
Wetland
Fourth Parallel Runway Construction
Fourth Parallel Runway Connected Actions
Projects Currently Under NEPA Review


West Blvd
Piney Top Dr
Byrum Dr
LEGEND
Taxiway Object Free Area
Impacted Stream
Impacted Wetland
Culverted Stream
Stream
Wetland
Fourth Parallel Runway Construction
Fourth Parallel Runway Connected Actions
Projects Currently Under NEPA Review


West Blvd
Piney Top Dr
Byrum Dr
LEGEND
Grading Limits
Taxiway Object Free Area
Impacted Stream
Impacted Wetland
Culverted Stream
Stream
Wetland
Fourth Parallel Runway Construction
Fourth Parallel Runway Connected Actions
Projects Currently Under NEPA Review

**From:** Kinnamon, Martin
**To:** Leathers, Amber
**Cc:** Gallup, Anna; Kaddoumi, Mohamed; Grzymski, Andrew; Sarah Potter; Gaby Elizondo
**Subject:** RE: Airport Area Road Network
**Date:** Wednesday, June 10, 2020 12:11:07 PM

---

Hi Amber,

CDOT has reviewed the growth rate used for the analysis and the diversion of traffic. We found both the growth factor of 1.2 (to 2028 volumes) and the diversion to be reasonable and acceptable.

However, we do have concerns with the baseline volumes that were used in the analysis. These were developed by factoring and balancing counts, converting to 24-hour volumes using NCDOT protocols, and then converted back to peak hour volumes, with the AM volumes mirroring the PM volumes. This results in quite different peak hour volumes from the actual counts (at least from the latest CDOT count in Dec. 2017). We would like to see analysis using the actual counts as a baseline. We have the 12/2017 count at the West/Byrum/Steele Creek intersection, but we don't have counts for the two Piney Top intersections. VHB should be able to provide you with the counts they took for these intersections.

Let me know if you have any questions or want to discuss.

Martin

---

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Friday, June 5, 2020 3:22 PM
**To:** Kinnamon, Martin <mkinnamon@ci.charlotte.nc.us>
**Cc:** Gallup, Anna <agallup@ci.charlotte.nc.us>; Kaddoumi, Mohamed <mkaddoumi@ci.charlotte.nc.us>; Grzymski, Andrew <agrzymski@ci.charlotte.nc.us>; s potter <spotter@landrum-brown.com>; Elizondo, Gaby <gelizondo@landrum-brown.com>
**Subject:** Re: Airport Area Road Network

Martin,

After further searching, we don't have the actual counts.

Thanks,
Amber

> On Jun 5, 2020, at 14:27, Kinnamon, Martin <mkinnamon@ci.charlotte.nc.us> wrote:
>
> The volumes used in that analysis are the factored and balanced counts. It would be helpful to have the actual counts, but understand if you don't have them.
>
> ---
>
> **From:** Leathers, Amber <amber.leathers@cltairport.com>

**Sent:** Friday, June 5, 2020 12:34 PM
**To:** Kinnamon, Martin <mkinnamon@ci.charlotte.nc.us>; Gallup, Anna <agallup@ci.charlotte.nc.us>; Kaddoumi, Mohamed <mkaddoumi@ci.charlotte.nc.us>
**Cc:** Grzymski, Andrew <agrzymski@ci.charlotte.nc.us>; s potter <spotter@landrum-brown.com>; Elizondo, Gaby <gelizondo@landrum-brown.com>
**Subject:** RE: Airport Area Road Network

Hi Martin,

Gaby helped find the attached from VHB's support documentation that includes the 2018 counts in Attachment D (Thanks Gaby!). We don't think we have the raw counts. Does this work?

Thanks,
Amber

---

**From:** Kinnamon, Martin <mkinnamon@ci.charlotte.nc.us>
**Sent:** Friday, June 5, 2020 11:57 AM
**To:** Leathers, Amber <amber.leathers@cltairport.com>; Gallup, Anna <agallup@ci.charlotte.nc.us>; Kaddoumi, Mohamed <mkaddoumi@ci.charlotte.nc.us>
**Cc:** Grzymski, Andrew <agrzymski@ci.charlotte.nc.us>; s potter <spotter@landrum-brown.com>; Elizondo, Gaby <gelizondo@landrum-brown.com>
**Subject:** RE: Airport Area Road Network

Hi Amber,

Can we get access to the traffic counts that were collected for this study? If there are too many, we can provide a more critical list that would me most helpful to us.

Thanks,
Martin

**Martin Kinnamon, PE**
Senior Travel Demand Modeler
City of Charlotte
w: 704-336-3921
c: 980-721-8273

---

**From:** Leathers, Amber <alleathers@cltairport.com>
**Sent:** Thursday, May 28, 2020 3:27 PM
**To:** Gallup, Anna <agallup@ci.charlotte.nc.us>; Kaddoumi, Mohamed <mkaddoumi@ci.charlotte.nc.us>; Kinnamon, Martin <mkinnamon@ci.charlotte.nc.us>

**Cc:** Grzymski, Andrew <agrzymski@ci.charlotte.nc.us>; s potter <spotter@landrum-brown.com>; Elizondo, Gaby <gelizondo@landrum-brown.com>
**Subject:** FW: Airport Area Road Network

Hello,
Please see attached for the information discussed in today's call. Let me know if you have trouble downloading the documents.

Thanks,

**AMBER LEATHERS, A.A.E., ACE** | **PLANNING & ENVIRONMENTAL MANAGER**

**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT**

**m** 704.560.1820

cltairport.com

---

**From:** Leathers, Amber
**Sent:** Tuesday, May 12, 2020 1:28 PM
**To:** Grzymski, Andrew <agrzymski@ci.charlotte.nc.us>; Canipe, Brett D (bdcanipe@ncdot.gov) <bdcanipe@ncdot.gov>; slbasham@ncdot.gov; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; Potter, Sarah <spotter@landrum-brown.com>; Elizondo, Gaby <gelizondo@landrum-brown.com>
**Subject:** RE: Airport Area Road Network

Hi, good afternoon

Please see attached for the following:

- CLT_00095_Appendix H: This is a summary report from the EIS, completed by VHB.
- AppendixH_Supporting_Doc: this is the technical report that is referenced in the summary
- Capacity EA- LB Traffic: L&B analysis based on the previous document. See below for their summary.

L&B analyzed the potential impact of the relocating a segment of West Boulevard on three intersections (Intersections ID numbers are taken directly from the 2019 VHB traffic study) in the project's opening year 2028 by utilizing information from the traffic study completed by VHB in May 2019. The intersections evaluated include:

– Intersection #308: West Boulevard (NC 160)/Steele Creek Road at Byrum Drive (SR 1255);
– Intersection #313: West Boulevard at Piney Top Drive; and,
– Intersection #314: Byrum Drive at Piney Top Drive.

The Charlotte Regional Transportation Planning Organization's adopted 2040 and 2045

Metropolitan Thoroughfare Plans (MTP) were used to determine growth rates to estimate future traffic volumes in 2028 from VHB's 2018 traffic data. According to the 2040 MTP, the Steele Creek sub-county district of Mecklenburg County was predicted have employment growth projections of 1.74% per year. Similarly, the 2045 MTP projects the Mecklenburg County overall population to grow a calculated annual amount of approximately 2.03%. Considering the study area is primarily industrial in nature and void of residential zoning, it was decided for this analysis that the future 2028 models would incorporate a conservative annual growth rate of 2% for all turning movement counts. To conform to required FAA clearance regulations upon the construction of proposed runway, volumes were redirected to avoid sections of West Boulevard between ARFF Road and Piney Top Drive. It was assumed all displaced volumes due to the closure would utilize Piney Top Drive.

Andy, I know you were going to take the information to model. Do you need additional information from the Airport?

Let me know if you have questions on the reports. Once everyone has had a chance to review, I will set up another conference call for this group to discuss the next steps. I'd like to target the first week of June. For the NCDOT group, I'll work with Kim Rabon to get availability. Andy, if you can send your availability, I'll coordinate with everyone else's schedules.

Thanks again,
Amber

---

**From:** Wiebke, Mark <mdwiebke@cltairport.com>
**Sent:** Tuesday, April 21, 2020 11:45 AM
**To:** Grzymski, Andrew <agrzymski@ci.charlotte.nc.us>; Leathers, Amber <alleathers@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; s potter <spotter@landrum-brown.com>
**Cc:** Canipe, Brett D (bdcanipe@ncdot.gov) <bdcanipe@ncdot.gov>; slbasham@ncdot.gov; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>
**Subject:** RE: Airport Area Road Network

Thanks Andy!

**MARK D. WIEBKE, P.E., A.A.E.** | **PLANNING DIRECTOR**

**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT**

**o** 704.359.4025
**m** 704.507.2982
**f** 704.359.4885

cltairport.com

---

**From:** Grzymski, Andrew <agrzymski@ci.charlotte.nc.us>

**Sent:** Tuesday, April 21, 2020 11:01 AM
**To:** Leathers, Amber <alleathers@cltairport.com>; Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; s potter <spotter@landrum-brown.com>
**Cc:** Canipe, Brett D (bdcanipe@ncdot.gov) <bdcanipe@ncdot.gov>; slbasham@ncdot.gov; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>
**Subject:** Airport Area Road Network

All-

Attached are what I believe are the latest conceptual designs for the roadway network in the airport area. I've also attached an overall map of the area. If you have any questions, please ask. Thanks.

Andy

**Andy Grzymski, AICP**
CIP & REGIONAL COORDINATION SECTION MANAGER

CHARLOTTE DEPARTMENT OF TRANSPORTATION
Planning & Design Division

600 E. Fourth Street, Room 627
Charlotte, NC 28202-2816
PH: 704-336-3928 FAX: 704-336-4400

<image001.jpg>

## Gaby Elizondo

**Subject:** West Boulevard Planning Meeting
**Location:** Webex

**Start:** Fri 10/30/2020 10:00 AM
**End:** Fri 10/30/2020 11:00 AM

**Recurrence:** (none)

**Meeting Status:** Not yet responded

**Organizer:** Pilarski, Michael

-- Do not delete or change any of the following text. --

**When it's time, join your Webex meeting here.**

Meeting number (access code): 172 818 1201
Meeting password: NCdYDnhp968

Join meeting

**Tap to join from a mobile device (attendees only)**
+1-650-479-3207,,1728181201## Call-in toll number (US/Canada)
1-855-244-8681,,1728181201## Call-in toll-free number (US/Canada)

**Join by phone**
1-650-479-3207 Call-in toll number (US/Canada)
1-855-244-8681 Call-in toll-free number (US/Canada)
Global call-in numbers | Toll-free calling restrictions

**Join from a video system or application**
Dial 1728181201@charlotte.webex.com
You can also dial 173.243.2.68 and enter your meeting number.

**Join using Microsoft Lync or Microsoft Skype for Business**

Dial 1728181201.charlotte@lync.webex.com

If you are a host, click here to view host information.

Need help? Go to http://help.webex.com

## Gaby Elizondo

**From:** Sarah Potter
**Sent:** Tuesday, December 1, 2020 8:03 AM
**To:** Gaby Elizondo
**Subject:** FW: West Blvd Relocation Meeting 11/20: Follow Up
**Attachments:** 3-CLT Capacity EA - West Blvd Conditions 11-25-2020.pptx; CLT-Traffic-Summary-Queue-Length-Results-11-20-2020.docx

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

**Sarah Potter**
Associate Vice President

**Landrum & Brown**
Global Aviation Planning & Development
T +1 513 530 1271 M +1 513 658 6325
landrum-brown.com



---

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Monday, November 30, 2020 6:23 PM
**To:** Canipe, Brett D <bdcanipe@ncdot.gov>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; Sarah Potter <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** West Blvd Relocation Meeting 11/20: Follow Up



Good evening,

Hope everyone had a good Thanksgiving break! See attached for the PPT along with the requested queue lengths. We have made some changes to the PPT based on the comments. Changes include:

- Slide 6: additional AADT information
- Slide 19: summary slide to include all alternatives and their LOS
- Slide 20: acknowledgement of pre-COVID conditions

I understand that this information will be shared with other groups. I'd like to set a target of December 18 for any comments. We are looking for a preference of the proposed alternatives or additional ideas for improvements. At this point in the EA, we are seeking concurrence with the modeling approach with a general idea of what the improvements could look like knowing that the formal design of the relocation will have further coordination. Hope this helps. Let me know if you have questions.

Please forward to anyone I may have missed.

Thanks,

**AMBER LEATHERS, A.A.E., ACE** | **PLANNING & ENVIRONMENTAL MANAGER**

**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT**

**m** 704.560.1820

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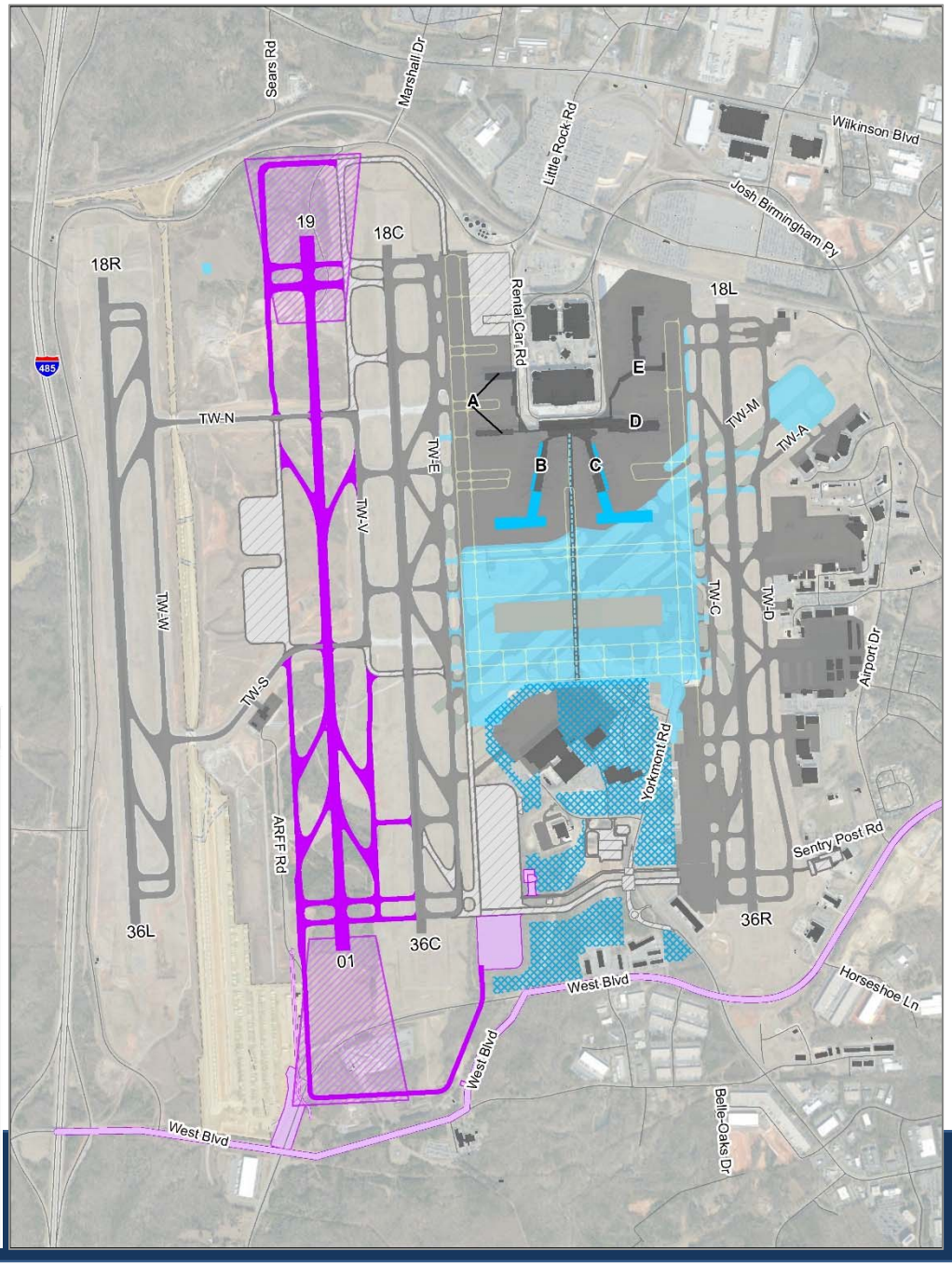
# PROPOSED WEST BOULEVARD RELOCATION

**CAPACITY ENHANCEMENTS**
**ENVIRONMENTAL ASSESSMENT (EA)**
**AT**
**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT (CLT)**

November 20, 2020

# PROPOSED ACTION

- ✓ Construction of a new Fourth Parallel Runway 01/19 (including partial North End-Around Taxiway [EAT] and full South EAT)
- ✓ Terminal and Ramp Expansion



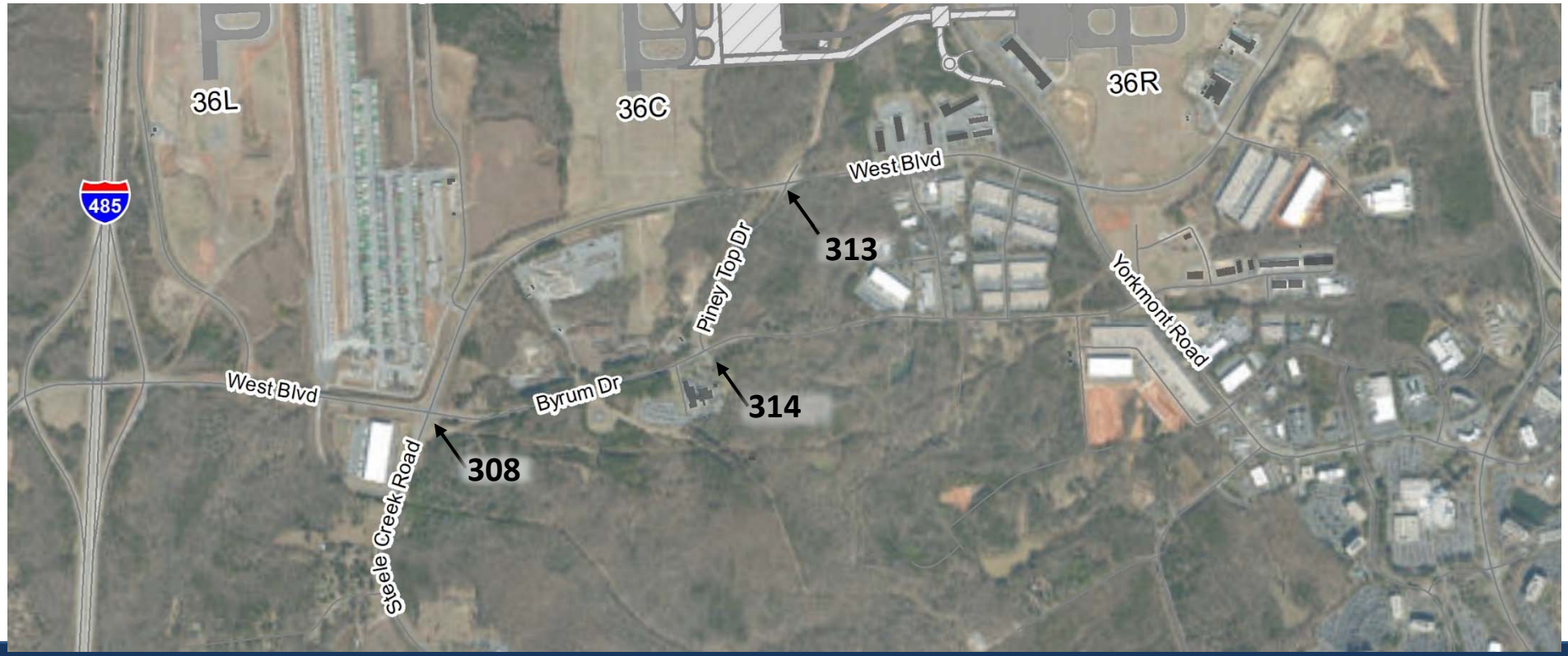

**LEGEND**

- Fourth Parallel Runway Construction
- Fourth Parallel Runway Connected Actions
- Terminal Expansion
- Terminal Expansion Connected Actions
- Terminal Expansion Enabling Projects
- Projects Currently In Design / Under Construction
- Norfolk Southern Property
- Airport Property

# PROPOSED ACTION

–The new runway and taxiway would require the relocation of a one-mile segment of West Boulevard utilizing existing roadways (West Boulevard, Byrum Drive, and Piney Top Drive)

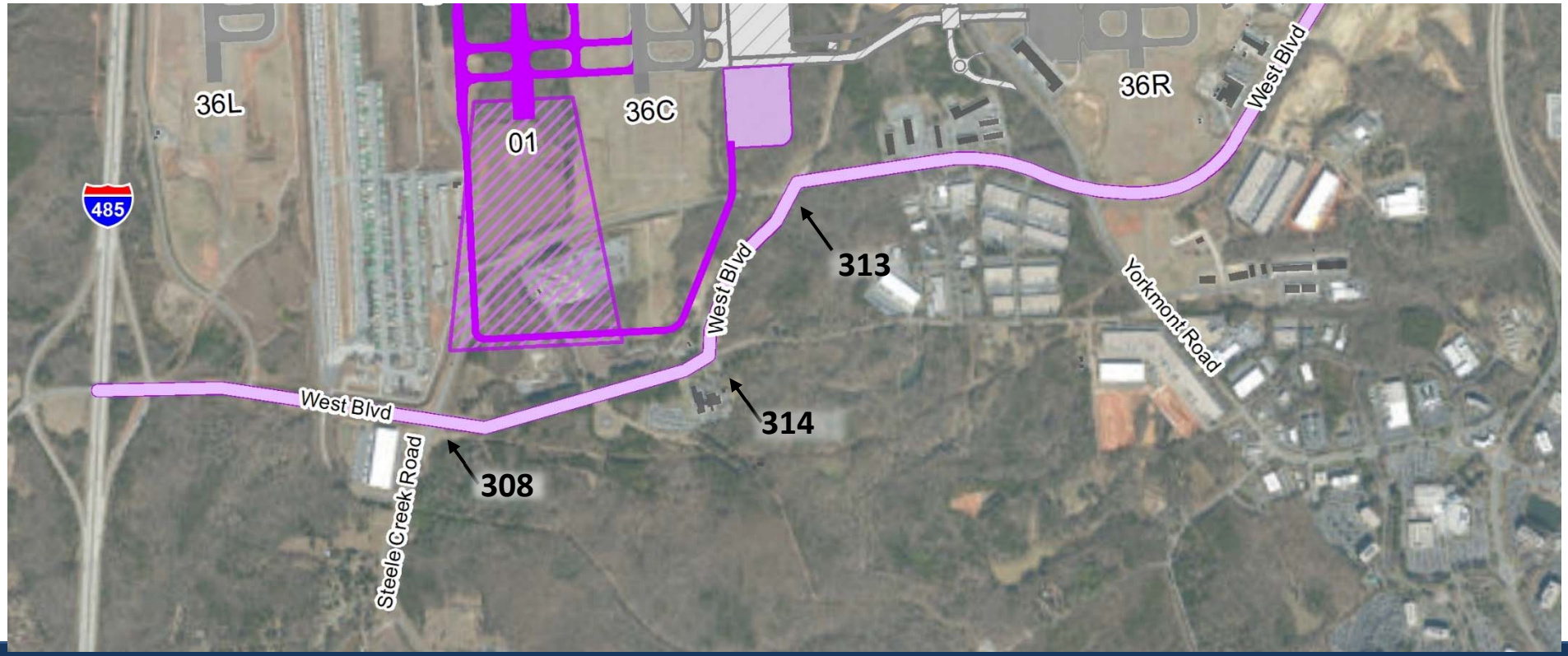
**Existing Roadways at CLT**



# PROPOSED ACTION

–The new runway and taxiway would require the relocation of a one-mile segment of West Boulevard utilizing existing roadways (West Boulevard, Byrum Drive, and Piney Top Drive)

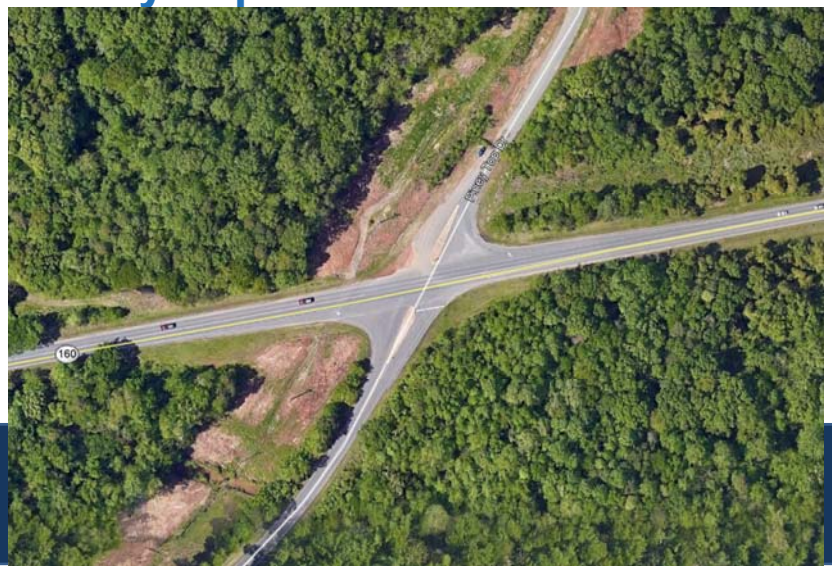
**Proposed Action**



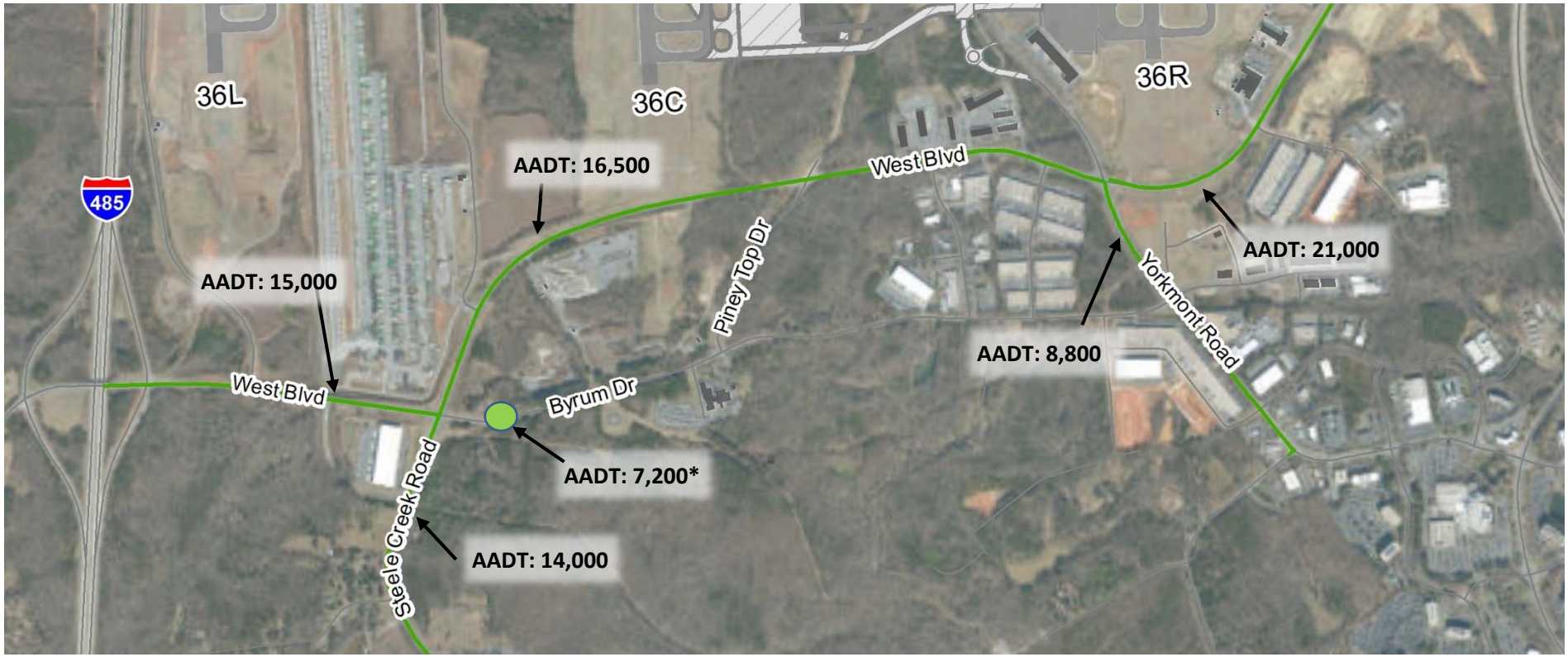
## #308:
## Byrum Road at West Boulevard


## #314:
## Byrum Road at Piney Top


## #313:
## Piney Top at West Boulevard

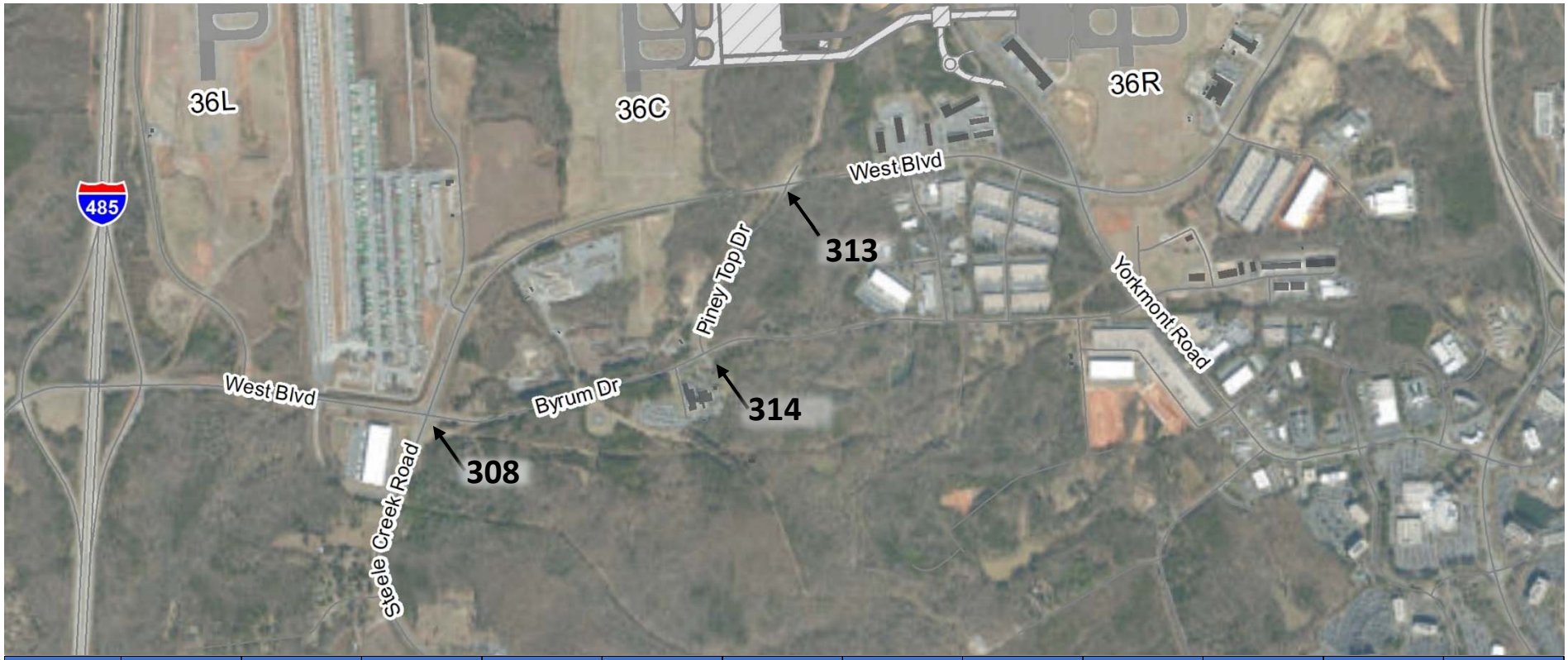


# EXISTING ANNUAL AVERAGE DAILY TRAFFIC (AADT)




*Single AADT point data available for 2016 on Byrum Drive between West Boulevard and Piney Top Drive
Note: 2019 Annual Average Daily Traffic (AADT) link data was retrieved for corridors highlighted in green
Source: NDCOT AADT mapping application, available online:
https://www.arcgis.com/apps/webappviewer/index.html?id=5f6fe58c1d90482ab9107ccc03026280

# EXISTING (2018) VOLUMES




| ID | NBL | NBT | NBR | SBL | SBT | SBR | EBL | EBT | EBR | WBL | WBT | WBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EXISTING AM PEAK** | | | | | | | | | | | | |
| **308** | 37 | 847 | 275 | 6 | 381 | 226 | 347 | 533 | 71 | 29 | 69 | 4 |
| **313** | - | - | 8 | 2 | - | - | - | 1,017 | 1 | 7 | 578 | 4 |
| **314** | - | - | 1 | 2 | - | 4 | 6 | 798 | 1 | - | 113 | 2 |
| **EXISTING PM PEAK** | | | | | | | | | | | | |
| **308** | 254 | 470 | 32 | 2 | 464 | 325 | 69 | 54 | 31 | 248 | 597 | 2 |
| **313** | - | - | 14 | - | - | 1 | - | 471 | - | 48 | 845 | 1 |
| **314** | 1 | 9 | 6 | 1 | 4 | 42 | 5 | 93 | 5 | 1 | 724 | - |

# EXISTING (2018) VS PROPOSED ACTION (NO MITIGATION)


| ID# | Intersection | Traffic Control | Approach | LEVEL OF SERVICE | |
|---|---|---|---|---|---|
| | | | | No Action AM, (PM) | Proposed Action AM, (PM) |
| **308** | West Blvd at Byrum Drive | Signal | Overall | E, (D) | F, (F) |
| | | | NB | F, (D) | F, (D) |
| | | | SB | D, (D) | C, (C) |
| | | | EB | C, (C) | F, (D) |
| | | | WB | C, (E) | F, (F) |
| **313** | West Blvd at Piney Top Dr | Side-Street Stop | NB | C, (B) | *, (*) |
| | | | SB | F, (C) | F, (D) |
| **314** | Byrum Dr at Piney Top Dr | Side-Street Stop | NB | C, (C) | F, (F) |
| | | | SB | B, (C) | F, (F) |
| | | | EB | -, (-) | C, (B) |

*** - Analyzed as free-movement for alternative analysis**

# FUTURE (2028) NO ACTION VS PROPOSED ACTION (NO MITIGATION)


| ID# | Intersection | Traffic Control | Approach | LEVEL OF SERVICE | |
|---|---|---|---|---|---|
| | | | | No Action AM, (PM) | Proposed Action AM, (PM) |
| **308** | West Blvd at Byrum Drive | Signal | Overall | F, (F) | F, (F) |
| | | | NB | F, (E) | F, (F) |
| | | | SB | F, (F) | C, (C) |
| | | | EB | D, (C) | F, (C) |
| | | | WB | C, (F) | F, (F) |
| **313** | West Blvd at Piney Top Dr | Side-Street Stop | NB | D, (B) | *, (*) |
| | | | SB | F, (C) | F, (C) |
| **314** | Byrum Dr at Piney Top Dr | Side-Street Stop | NB | C, (C) | F, (F) |
| | | | SB | C, (C) | F, (F) |
| | | | EB | A, (A) | E, (F) |

*** - Analyzed as free-movement for alternative analysis**

## OCTOBER 30, 2020 MEETING COMMENTS AND FEEDBACK

–Continue to strive for LOS D or better
–NCDOT recommended a speed of 45 mph on approaches (posted speed limit)
–Evaluate further mitigation measures

## ADDITIONAL MODELING

–Increase speed to 45 mph
–Model three new alternatives provided by the Airport

# Alternative Intersection Design Mitigation
# ALTERNATIVE #1

## Corridor Improvements

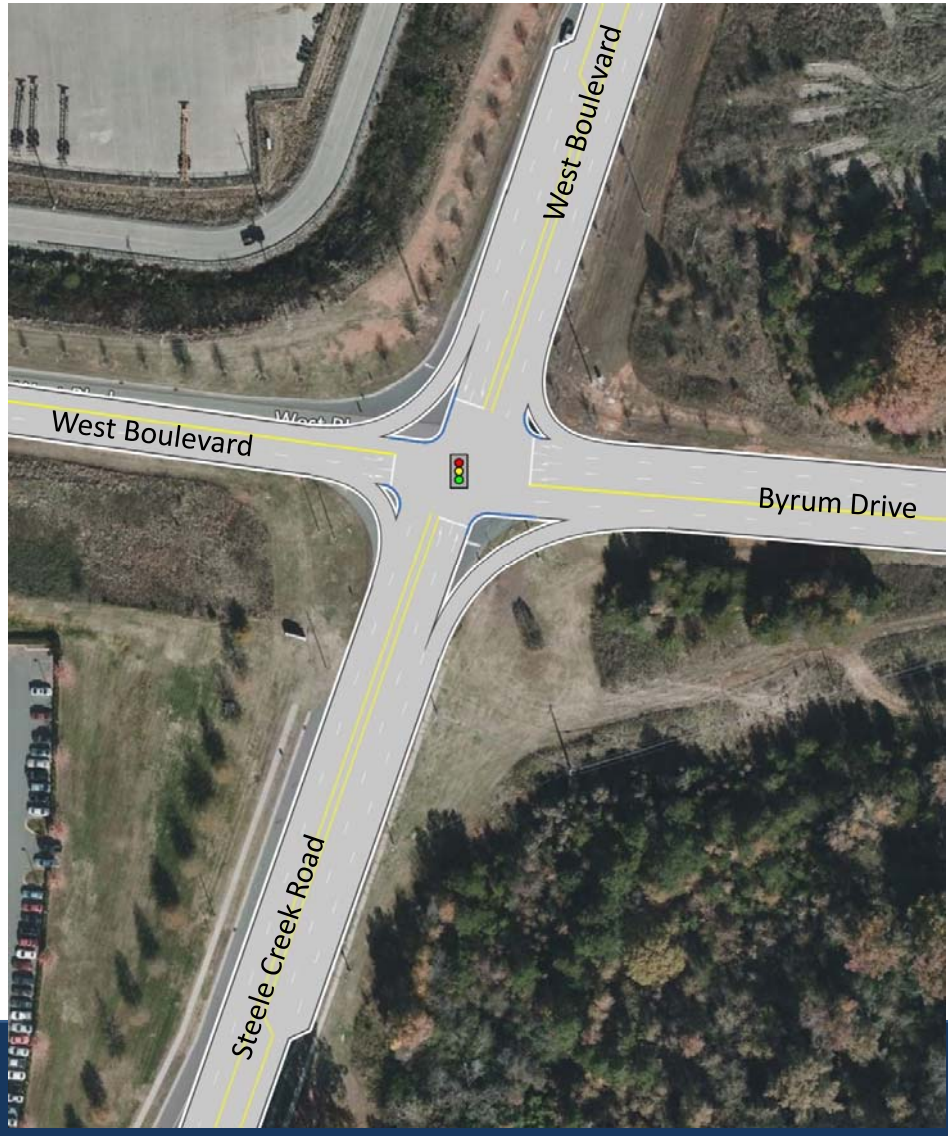
– Widen Byrum Drive to become a 4-lane roadway from Steele Creek Road to Piney Top Drive

## West Boulevard at Byrum Drive (#308)

– Reconfigure the intersection for dual WBL turn lanes onto Steele Creek Road (also configured with two through lanes) analyzed with protective control movement

– Create a free-flowing NBR turn lane on to Byrum Drive that is unimpeded from the EBT volumes (dual-protected turn lane)


West Boulevard at Byrum Drive (#308)



# Alternative Intersection Design Mitigation
# ALTERNATIVE #1

## West Boulevard at Piney Top Drive (#313)

– Reconfigured to become a free movement (eliminated the southern Piney Top approach based on Airport's recommendation)

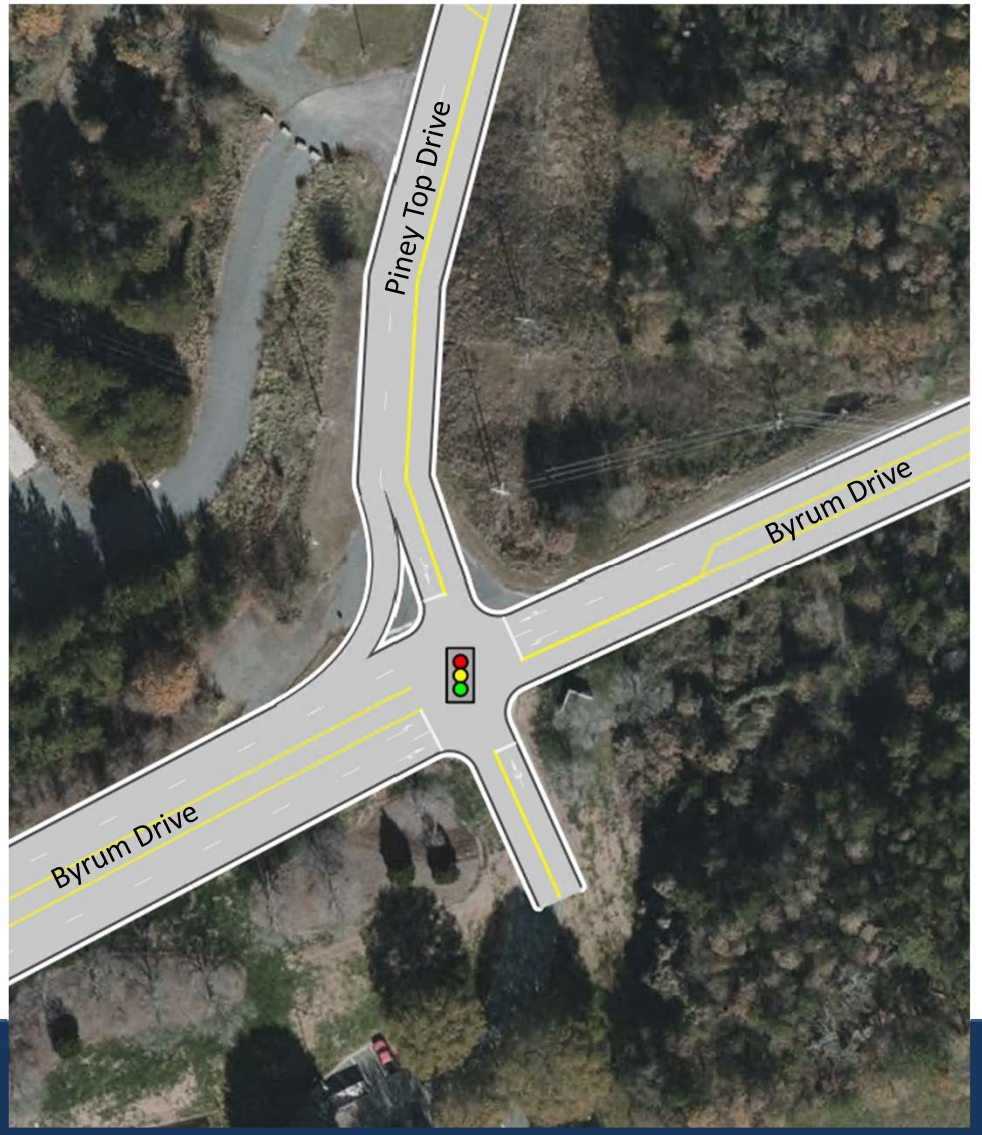

West Boulevard at Piney Top Drive (#313)

# Alternative Intersection Design Mitigation
# ALTERNATIVE #1

## Byrum Drive at Piney Top Drive (#314)

- Install a traffic signal system and coordinate with the signal at the West Boulevard/Steele Creek Road and Byrum Drive intersection (#308)
- The eastbound approach includes a dedicated left and through lane approach
- The southbound approach includes a channelized free right turn lane and dedicated left-through auxiliary lane
- The westbound approach includes a dedicated left auxiliary and single through lane approach


Byrum Drive at Piney Top Drive (#314)



# RESULTS - ALTERNATIVE #1


| ID# | Intersection | Traffic Control | Approach | AM, (PM) Peak Hour | | |
|---|---|---|---|---|---|---|
| | | | | LOS | Delay (s/veh) | V/C Ratio |
| **308** | West Blvd at Byrum Dr | Signal | **Overall** | **F, (E)** | **96.75, (68.05)** | **0.88, (0.86)** |
| | | | NB | E, (F) | 56.46, (89.14) | |
| | | | SB | F, (E) | 84.93, (79.97) | |
| | | | EB | F, (C) | 108.59, (33.75) | |
| | | | WB* | F, (E) | 83.63, (68.03) | |
| **314** | Byrum Dr at Piney Top Dr | Signal | **Overall** | **E, (F)** | **75.94, (122.56)** | **0.59, (0.88)** |
| | | | NB | C, (C) | 29.88, (34.87) | |
| | | | SB** | C, (C) | 29.84, (33.97) | |
| | | | EB | E, (F) | 78.56, (123.41) | |
| | | | WB | C, (F) | 31.11, (123.72) | |

*** Dual WBL lanes analyzed with protective control movement**

**** Analyzed with free SBR movement**

Note: Intersection #313 would be converted to a free movement, so no LOS analysis is provided for this intersection

# Alternative Intersection Design Mitigation
# ALTERNATIVE #2

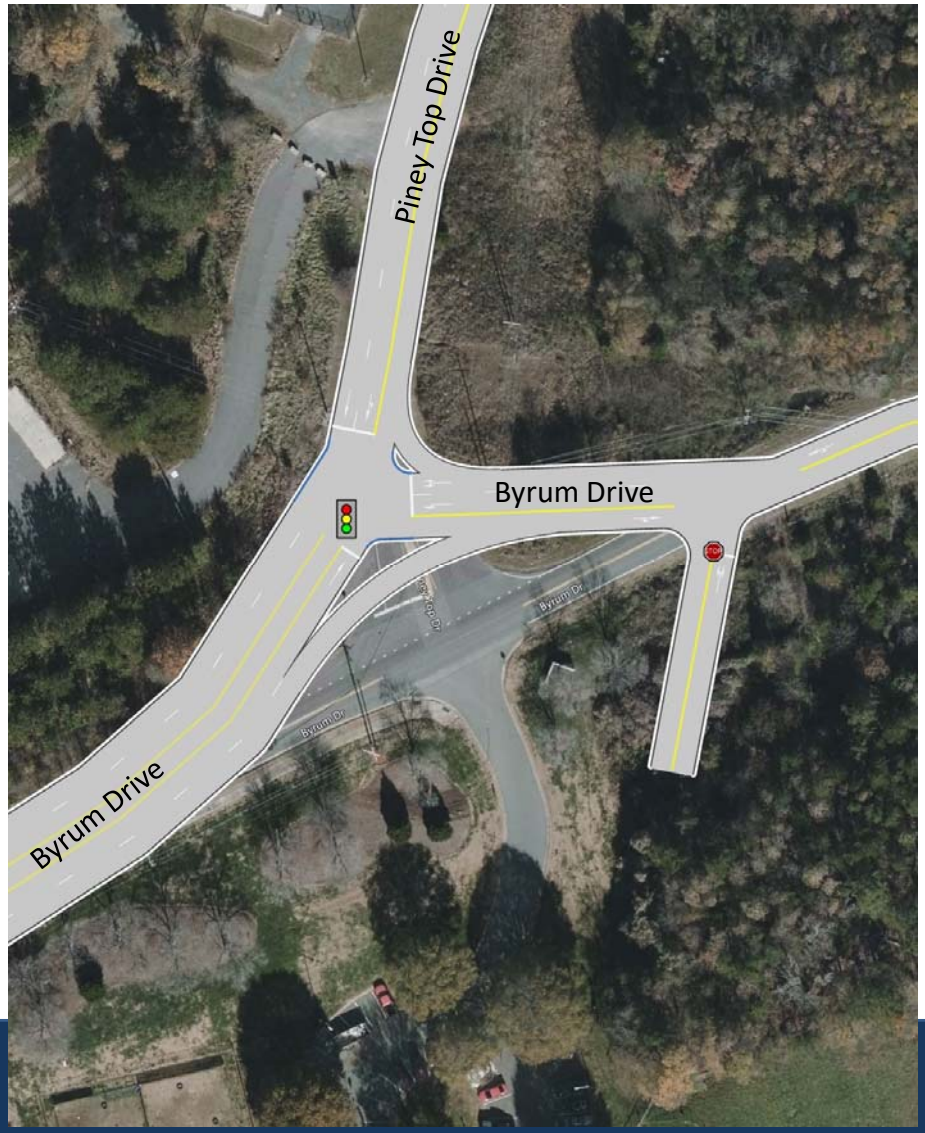
## Same improvements as Alternative #1:

- ✓Corridor Improvements (widens Byrum Drive)
- ✓West Boulevard at Piney Top Drive (#313)
- ✓West Boulevard at Byrum Drive (#308)

## Byrum Drive at Piney Top Drive (#314):

- – Shift the Byrum Drive alignment and convert the intersection to allow the former eastbound left volumes to become a dedicated through movement onto Piney Top Drive. The existing Byrum Drive westbound approach now becomes the intersecting approach. The Animal Shelter Driveway location is shifted east of the intersection
- – Install a traffic signal system and coordinate with the signal at the West Boulevard/Steele Creek Road and Byrum Drive intersection (#308)
- – The east/northeast approach includes a dedicated through lane onto Piney Top and right lane to continue on Byrum Drive
- – The south/southwest approach along Piney Top Drive includes a dedicated through and shared through/left lane
- – The westbound approach includes a dedicated left and shared left-right lane


### Byrum Drive at Piney Top Drive (#314)



# RESULTS - ALTERNATIVE #2


| ID# | Intersection | Traffic Control | Approach | AM, (PM) Peak Hour | | |
|---|---|---|---|---|---|---|
| | | | | LOS | Delay (s/veh) | V/C Ratio |
| **308** | West Blvd at Byrum Dr | Signal | **Overall** | **F, (E)** | **96.75, (68.05)** | **0.88, (0.86)** |
| | | | NB | E, (F) | 56.46, (89.14) | |
| | | | SB | F, (E) | 84.93, (79.97) | |
| | | | EB | F, (C) | 108.59, (33.75) | |
| | | | WB* | F, (E) | 83.63, (68.03) | |
| **314** | Byrum Dr at Piney Top Dr | Signal (Shifted Intersection) | **Overall** | **C, (B)** | **29.24, (16.12)** | **0.98, (0.92)** |
| | | | NB* | D, (B) | 37.04, (13.41) | |
| | | | SB | A, (B) | 2.54, (13.07) | |
| | | | WB | C, (C) | 29.11, (22.04) | |

*** Dual WBL lanes analyzed with protective control movement**

**** Analyzed with free SBR movement**

Note: Intersection #313 would be converted to a free movement, so no LOS analysis is provided for this intersection

# Alternative Intersection Design Mitigation
# ALTERNATIVE #3

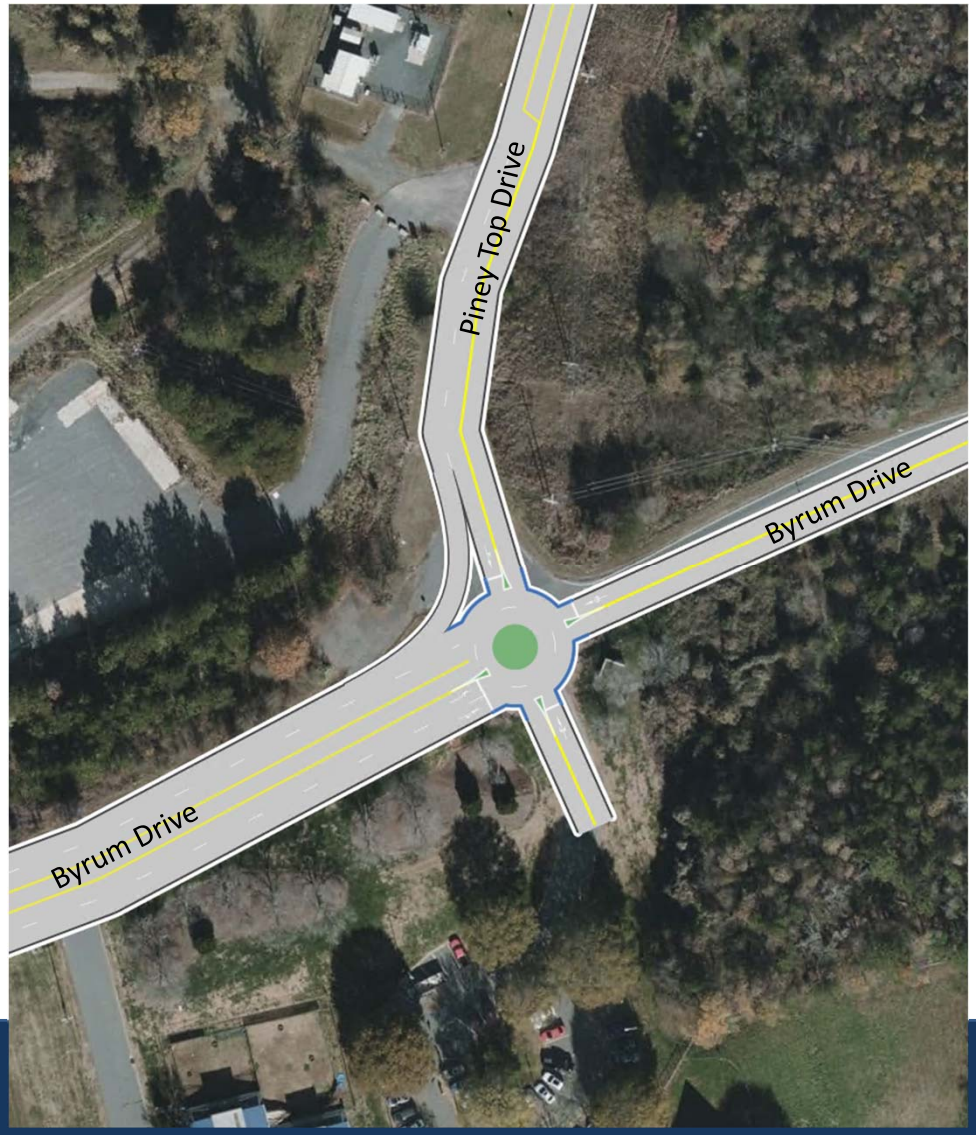
## Same improvements as Alternative #1:

- ✓Corridor Improvements (widens Byrum Drive)
- ✓West Boulevard at Piney Top Drive (#313)
- ✓West Boulevard at Byrum Drive (#308)

## Byrum Drive at Piney Top Drive (#314):

- – Convert the intersection to become a roundabout
- – The SBR approach along Piney Top will have a channelized free movement on to Byrum Drive
- – The eastbound approach will have a dedicated left turn lane onto Piney Top Drive and dedicated through-right lane on to Byrum Drive
- – Access to the Animal Rescue Driveway is maintained


### Byrum Drive at Piney Top Drive (#314)



# RESULTS - ALTERNATIVE #3


| ID# | Intersection | Traffic Control | Approach | AM, (PM) Peak Hour | | |
|---|---|---|---|---|---|---|
| | | | | LOS | Delay (s/veh) | V/C Ratio |
| **308** | West Blvd at Byrum Dr | Signal | **Overall** | **F, (E)** | **96.75, (68.05)** | **0.88, (0.86)** |
| | | | NB | E, (F) | 56.46, (89.14) | |
| | | | SB | F, (E) | 84.93, (79.97) | |
| | | | EB | F, (C) | 108.59, (33.75) | |
| | | | WB* | F, (E) | 83.63, (68.03) | |
| **314** | Byrum Dr at Piney Top Dr | Roundabout | **Overall** | **E, (F)** | **46.57, (87.68)** | **-, (-)** |
| | | | NB | E, (A) | 43.19, (6.78) | |
| | | | SB* | A, (A) | 0.01, (0.03) | |
| | | | EB | F, (A) | 60.78, (7.34) | |
| | | | WB | E, (F) | 35.95, (267.81) | |

*** Dual WBL lanes analyzed with protective control movement**

**** Analyzed with free SBR movement**

Note: Intersection #313 would be converted to a free movement, so no LOS analysis is provided for this intersection

# 2028 SUMMARY

| ID | NBL | NBT | NBR | SBL | SBT | SBR | EBL | EBT | EBR | WBL | WBT | WBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2028 AM PEAK** | | | | | | | | | | | | |
| **308** | 45 | 1,032 | 335 | 7 | 464 | 275 | 423 | 650 | 87 | 35 | 84 | 5 |
| **313** | - | - | 10 | 2 | - | - | - | 1,240 | 1 | 9 | 705 | 5 |
| **314** | - | - | 1 | 2 | - | 5 | 7 | 973 | 1 | - | 138 | 2 |
| **2028 PM PEAK** | | | | | | | | | | | | |
| **308** | 310 | 573 | 39 | 2 | 566 | 396 | 84 | 66 | 38 | 302 | 728 | 2 |
| **313** | - | - | 17 | - | - | 1 | - | 574 | - | 59 | 1,030 | 1 |
| **314** | 1 | 11 | 7 | 1 | 5 | 51 | 6 | 113 | 6 | 1 | 883 | - |

| ID# | Intersection | Approach | LEVEL OF SERVICE | | | | |
|---|---|---|---|---|---|---|---|
| | | | No Action AM, (PM) | Proposed Action AM, (PM) | Alternative #1 AM, (PM) | Alternative #2 AM, (PM) | Alternative #3 AM, (PM) |
| **308** | West Blvd at Byrum Drive | Overall | F, (F) | F, (F) | **F, (E)** | **F, (E)** | **F, (E)** |
| | | NB | F, (E) | F, (F) | E, (F) | E, (F) | E, (F) |
| | | SB | F, (F) | C, (C) | F, (E) | F, (E) | F, (E) |
| | | EB | D, (C) | F, (C) | F, (C) | F, (C) | F, (C) |
| | | WB | C, (F) | F, (F) | F, (E) | F, (E) | F, (E) |
| **313** | West Blvd at Piney Top Dr | NB | D, (B) | *, (*) | N/A | N/A | N/A |
| | | SB | F, (C) | F, (C) | N/A | N/A | N/A |
| **314** | Byrum Dr at Piney Top Dr | NB | C, (C) | F, (F) | C, (C) | D, (B) | E, (A) |
| | | SB | C, (C) | F, (F) | C, (C) | A, (B) | A, (A) |
| | | EB | A, (A) | E, (F) | E, (F) | N/A | F, (A) |
| | | WB | N/A | N/A | C, (F) | C, (C) | E, (F) |

*** - Analyzed as free-movement for alternative analysis**

**N/A: not available for the alternative**

## Further Thoughts and Considerations

- Further refinements and/or configurations should be considered for Intersection #308
- Alternative #2 Intersection #314 configuration performs the best based on LOS results as well as operational and safety reasons. However, further refinements and/or configurations could be considered to improve v/c ratio. LOS may also be improved based upon refinement of the alternative and design.
- The intersections were conservatively analyzed with volumes grown to 2028 assuming pre-COVID conditions (2018). Given the unknown timeline of returning to pre-COVID conditions, it is likely the 2028 build-out volumes will occur later in time.

# Alternative #1 Results

| ID# | Intersection | Traffic Control | Approach | AM, (PM) Peak Hour | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | LOS | Delay (s/veh) | 95th-Percentile Queue Length | | V/C Ratio |
| 308 | West Blvd/Steele Creek Rd at Byrum Dr | Signal | Overall | F, (E) | 96.75, (68.05) | Length (ft/ln) | Approach | 0.88, (0.86) |
| | | | NB | E, (F) | 56.46, (89.14) | 77, (520) | NBL, (NBL) | |
| | | | SB | F, (E) | 84.93, (79.97) | 48, (49) | SBR, (SBR) | |
| | | | EB | F, (C) | 108.59, (33.75) | 1822, (204) | EBT, (EBT | |
| | | | WB* | F, (E) | 83.63, (68.03) | 488, (1589) | WBL, (WBT) | |
| 314 | Byrum Dr at Piney Top Dr | Signal | Overall | E, (F) | 75.94, (122.56) | Length (ft/ln) | Approach | 0.59, (0.88) |
| | | | NB | C, (C) | 29.88, (34.87) | 1, (13) | NB, (NB) | |
| | | | SB* | C, (C) | 29.84, (33.97) | 1, (4) | SBTL, (SBTL) | |
| | | | EB | E, (F) | 78.56, (123.41) | 1044, (857) | EBL, (EBL) | |
| | | | WB | C, (F) | 31.11, (123.72) | 98, (1226) | WBT, (WBT) | |

- Dual WBL lanes analyzed with protective control movement
- Analyzed with free SBR movement

# Alternative #2 Results

| ID# | Intersection | Traffic Control | Approach | AM, (PM) Peak Hour | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | LOS | Delay (s/veh) | 95th-Percentile Queue Length | | V/C Ratio |
| 314 | Byrum Dr at Piney Top Dr | Signal (Shifted intersection) | Overall | C, (B) | 29.24, (16.12) | Length (ft/ln) | Approach | 0.98, (0.92) |
| | | | NB* | D, (B) | 37.04, (13.41) | 796, (265) | NBT, (NBT) | |
| | | | SB | A, (B) | 2.54, (13.07) | 40, (207) | SBT, (SBT) | |
| | | | WB | C, (C) | 29.11, (22.04) | 48, (247) | WB, (WB) | |

* - Formerly EB approach under existing conditions

# Alternative #3 Results

| ID# | Intersection | Traffic Control | Approach | AM, (PM) Peak Hour | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | LOS | Delay (s/veh) | 95th-Percentile Queue Length | | V/C Ratio |
| 314 | Byrum Dr at Piney Top Dr | Roundabout | Overall | E, (F) | 46.57, (87.68) | Length (ft/ln) | Approach | -, (-) |
| | | | NB | E, (A) | 43.19, (6.78) | 1, (3) | NB, (NB) | |
| | | | SB* | A, (A) | 0.01, (0.03) | <1, (<1) | SBTL, (SBTL) | |
| | | | EB | F, (A) | 60.78, (7.34) | 1024, (80) | EBL, (EBL) | |
| | | | WB | E, (F) | 35.95, (267.81) | 88, (1239) | WB, (WB) | |

* - Analyzed with free-movement for SBR approach

**Gaby Elizondo**

| | |
|---|---|
| **Subject:** | CLT Capacity EA - West Boulevard Relocation Follow-Up |
| **Location:** | Microsoft Teams Meeting |
| **Start:** | Fri 11/20/2020 8:00 AM |
| **End:** | Fri 11/20/2020 9:00 AM |
| **Recurrence:** | (none) |
| **Meeting Status:** | Meeting organizer |
| **Organizer:** | Gaby Elizondo |
| **Required Attendees:** | Gaby Elizondo; Leathers, Amber; Pilarski, Michael; Sarah Potter |
| **Optional Attendees:** | Watson, Ashton; Grzymski, Andrew; Kaddoumi, Mohamed; Wiebke, Mark; Gallup, Anna; Kinnamon, Martin; Canipe, Brett D; Miller, Jerome S; Steve Carver |

---

# Microsoft Teams meeting

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---

## Gaby Elizondo

**From:** Tagliaferri, Anthony <atagliaferri@ncdot.gov>
**Sent:** Wednesday, December 9, 2020 9:23 AM
**To:** Canipe, Brett D; Leathers, Amber; Grzymski, Andrew; Littlefield, Jeffrey S; Basham, Stuart L; Gallup, Anna; Kaddoumi, Mohamed
**Cc:** Wiebke, Mark; Watson, Ashton; Sarah Potter; Gaby Elizondo; Pilarski, Michael
**Subject:** RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

All,

I had a chance to review this information and have the following observations:

Since this is a higher-level planning analysis, it looks like there are probably some chances to look at some more options. For instance, I prefer the idea of keeping what will be NC Highway 160 as the through movement throughout the realignment to keep most traffic as through traffic. This will help from a delay/level of service standpoint as well.

Also, perhaps some of the driveways can be shifted - for instance maybe the entrance to Animal Control can be taken off the other side road just west of Piney Top, and the piece of existing West Blvd could be shifted so that the signal at West/Steele Creek could be reduced to 3 legs and allow for a snappier signal with fewer phases and less delay. This may be more feasible if the airport owns some of the land around this area but something to consider if that is so. This shifting could allow further reductions of congestion and delay at the main intersections.

Thank you,

**----------**
**Tony Tagliaferri, PE**
Division 10 Traffic Engineer
North Carolina Department of Transportation

704 983 4400 Office
atagliaferri@ncdot.gov

---

**From:** Canipe, Brett D <bdcanipe@ncdot.gov>
**Sent:** Tuesday, December 1, 2020 9:42 AM
**To:** Leathers, Amber <amber.leathers@cltairport.com>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>; Tagliaferri, Anthony <atagliaferri@ncdot.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; s potter <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

Amber,

I've copied in our Division Traffic Engineer Tony Tagliaferri to ask that he weigh in here. Since he was not part of the past meetings he may need some additional context to appropriately evaluate, so we may ask for a quick follow up meeting with your core team.

Thanks,

Brett D. Canipe, PE
NCDOT Division 10 Engineer

704-983-4400 office
bdcanipe@ncdot.gov

716 West Main Street
Albemarle NC 28001

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Monday, November 30, 2020 6:23 PM
**To:** Canipe, Brett D <bdcanipe@ncdot.gov>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; s potter <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** [External] West Blvd Relocation Meeting 11/20: Follow Up



Good evening,

Hope everyone had a good Thanksgiving break! See attached for the PPT along with the requested queue lengths. We have made some changes to the PPT based on the comments. Changes include:

- Slide 6: additional AADT information
- Slide 19: summary slide to include all alternatives and their LOS
- Slide 20: acknowledgement of pre-COVID conditions

I understand that this information will be shared with other groups. I'd like to set a target of December 18 for any comments. We are looking for a preference of the proposed alternatives or additional ideas for improvements. At this point in the EA, we are seeking concurrence with the modeling approach with a general idea of what the improvements could look like knowing that the formal design of the relocation will have further coordination. Hope this helps. Let me know if you have questions.

Please forward to anyone I may have missed.

Thanks,

**AMBER LEATHERS, A.A.E., ACE** | **PLANNING & ENVIRONMENTAL MANAGER**

**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT**

**m** 704.560.1820

cltairport.com



Email correspondence to and from this sender is subject to the N.C. Public Records Law and may be disclosed to third parties.

## Gaby Elizondo

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Thursday, December 10, 2020 12:47 PM
**To:** a tagliaferri; Canipe, Brett D; Grzymski, Andrew; Littlefield, Jeffrey S; Basham, Stuart L; Gallup, Anna; Kaddoumi, Mohamed
**Cc:** Wiebke, Mark; Watson, Ashton; Sarah Potter; Gaby Elizondo; Pilarski, Michael
**Subject:** RE: [EXT] RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

Hi Tony,

Thank you for your comments. I'd like to confirm your observations so I can provide the appropriate guidance to the consultant team. By keeping the through movement of Highway 160, you are leaning toward Alternative #2 for point 314? Additional analysis and refinement of this alternative can come with the coordination of the prelim engineering phase. In response to your second observation, the driveways can be relocated for the improvement of the operation of the signalized intersections. This would be something else that would be further refined with the coordination of the prelim engineering.

Please let me know if I've misstated your assumptions.

Thanks again,
Amber

**From:** Tagliaferri, Anthony <atagliaferri@ncdot.gov>
**Sent:** Wednesday, December 9, 2020 9:23 AM
**To:** Canipe, Brett D <bdcanipe@ncdot.gov>; Leathers, Amber <amber.leathers@cltairport.com>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; s potter <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** [EXT] RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

All,

I had a chance to review this information and have the following observations:

Since this is a higher-level planning analysis, it looks like there are probably some chances to look at some more options. For instance, I prefer the idea of keeping what will be NC Highway 160 as the through movement throughout the realignment to keep most traffic as through traffic. This will help from a delay/level of service standpoint as well.

Also, perhaps some of the driveways can be shifted - for instance maybe the entrance to Animal Control can be taken off the other side road just west of Piney Top, and the piece of existing West Blvd could be shifted so that the signal at West/Steele Creek could be reduced to 3 legs and allow for a snappier signal with fewer phases and less delay. This may be more feasible if the airport owns some of the land around this area but something to consider if that is so. This shifting could allow further reductions of congestion and delay at the main intersections.

Thank you,

---
**Tony Tagliaferri, PE**
Division 10 Traffic Engineer
North Carolina Department of Transportation

704 983 4400 Office
atagliaferri@ncdot.gov

**From:** Canipe, Brett D <bdcanipe@ncdot.gov>
**Sent:** Tuesday, December 1, 2020 9:42 AM
**To:** Leathers, Amber <amber.leathers@cltairport.com>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>; Tagliaferri, Anthony <atagliaferri@ncdot.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; s potter <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

Amber,

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NCDOT Division 10 Engineer

704-983-4400 office
bdcanipe@ncdot.gov

716 West Main Street
Albemarle NC 28001

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**m** 704.560.1820

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## Gaby Elizondo

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**Sent:** Thursday, December 10, 2020 1:55 PM
**To:** Leathers, Amber; Canipe, Brett D; Grzymski, Andrew; Littlefield, Jeffrey S; Basham, Stuart L; Gallup, Anna; Kaddoumi, Mohamed
**Cc:** Wiebke, Mark; Watson, Ashton; Sarah Potter; Gaby Elizondo; Pilarski, Michael
**Subject:** RE: [EXT] RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

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**To:** a tagliaferri; Leathers, Amber; Canipe, Brett D; Grzymski, Andrew; Littlefield, Jeffrey S; Basham, Stuart L; Gallup, Anna
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**Subject:** RE: [EXT] RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

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**Sent:** Monday, January 4, 2021 1:09 PM
**To:** Kaddoumi, Mohamed; a tagliaferri; Canipe, Brett D; Grzymski, Andrew; Littlefield, Jeffrey S; Basham, Stuart L; Gallup, Anna
**Cc:** Wiebke, Mark; Watson, Ashton; Sarah Potter; Gaby Elizondo; Pilarski, Michael
**Subject:** RE: [EXT] RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

Hi Mohammed,

Thanks for your comments. I apologize for the delayed response. The evaluation of the main movement for intersection 308 can be evaluated as part of the coordination of the prelim engineering phase, similar to how the driveways will be relocated to optimize the efficiency of the intersection. For the possible spillbacks into adjacent lanes, the intersection improvements can be designed to accommodate a longer queue length. If removing West Blvd north of Intersection 308, the queue would be in consideration for the northbound left turn for the relocated driveway. For the recommendation to use SIDRA software for Alternative 3, the EA would consider this to be evaluated with the early coordination for the prelim engineering when determining between Alternative 2 and 3.

For the group, I'll be sending an email to summarize the received comments and next steps.

Thanks!

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**From:** Canipe, Brett D <bdcanipe@ncdot.gov>
**Sent:** Tuesday, December 1, 2020 9:42 AM
**To:** Leathers, Amber <amber.leathers@cltairport.com>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>; Tagliaferri, Anthony <atagliaferri@ncdot.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; s potter <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** RE: [External] West Blvd Relocation Meeting 11/20: Follow Up

Amber,

I've copied in our Division Traffic Engineer Tony Tagliaferri to ask that he weigh in here. Since he was not part of the past meetings he may need some additional context to appropriately evaluate, so we may ask for a quick follow up meeting with your core team.

Thanks,

Brett D. Canipe, PE
NCDOT Division 10 Engineer

704-983-4400 office
bdcanipe@ncdot.gov

716 West Main Street
Albemarle NC 28001

---

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Monday, November 30, 2020 6:23 PM
**To:** Canipe, Brett D <bdcanipe@ncdot.gov>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>;

Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; s potter <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** [External] West Blvd Relocation Meeting 11/20: Follow Up



Good evening,

Hope everyone had a good Thanksgiving break! See attached for the PPT along with the requested queue lengths. We have made some changes to the PPT based on the comments. Changes include:

- Slide 6: additional AADT information
- Slide 19: summary slide to include all alternatives and their LOS
- Slide 20: acknowledgement of pre-COVID conditions

I understand that this information will be shared with other groups. I'd like to set a target of December 18 for any comments. We are looking for a preference of the proposed alternatives or additional ideas for improvements. At this point in the EA, we are seeking concurrence with the modeling approach with a general idea of what the improvements could look like knowing that the formal design of the relocation will have further coordination. Hope this helps. Let me know if you have questions.

Please forward to anyone I may have missed.

Thanks,

**AMBER LEATHERS, A.A.E., ACE** | **PLANNING & ENVIRONMENTAL MANAGER**

**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT**

**m** 704.560.1820

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## Gaby Elizondo

**From:** Sarah Potter
**Sent:** Tuesday, February 9, 2021 8:13 AM
**To:** Gaby Elizondo
**Subject:** FW: West Blvd Relocation Meeting 11/20: Follow Up

Can you save the following as a pdf with the traffic analysis in the Appendix? I can't print to pdf from my email for some reason. Delete Amber's message to us below.

**Sarah Potter**
Associate Vice President

**Landrum & Brown**
Global Aviation Planning & Development
T +1 513 530 1271 M +1 513 658 6325
landrum-brown.com



---

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Monday, February 8, 2021 4:34 PM
**To:** Sarah Potter <Sarah.Potter@landrumbrown.com>; Gaby Elizondo <Gaby.Elizondo@landrumbrown.com>
**Subject:** FW: West Blvd Relocation Meeting 11/20: Follow Up

Hi- I've sent a note to both CDOT and NCDOT. Waiting on Brett, but Andy has replied for CDOT.
Thanks!

---

**From:** Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>
**Sent:** Monday, February 8, 2021 4:30 PM
**To:** Leathers, Amber <amber.leathers@cltairport.com>
**Subject:** Re: West Blvd Relocation Meeting 11/20: Follow Up

I concur with the coordination that has occurred thus far and see no reason to not move forward. If you need anything else, please ask. Thanks.

Andy Grzymski
CDOT

> On Feb 8, 2021, at 4:27 PM, Leathers, Amber <amber.leathers@cltairport.com> wrote:
>
> Hi Andy,
>
> Just wanted to follow up on the previous email. I apologize for the lack of direction for next steps. If you concur with the coordination that's been completed as part of the West Blvd Relocation for the Environmental Assessment, would you be able to provide a confirmation of the efforts and that it is suitable to move forward? An email would be fine. I recognize there is a

lot of future coordination to come but wanted to conclude the prelim planning efforts in the EA documentation. Please let me know if you'd like to discuss.

Thanks!

---

**From:** Leathers, Amber
**Sent:** Thursday, January 14, 2021 10:47 AM
**To:** 'Canipe, Brett D' <bdcanipe@ncdot.gov>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; 'Littlefield, Jeffrey S' <jslittlefield@ncdot.gov>; 'Basham, Stuart L' <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>; a tagliaferri <atagliaferri@ncdot.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; Potter, Sarah <spotter@landrum-brown.com>; 'Gaby Elizondo' <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** RE: West Blvd Relocation Meeting 11/20: Follow Up

Hello,
I'd like to provide a summary of the responses received from our last meeting on November 20, 2020. Since that meeting, we received two sets of comments: one from NCDOT Engineering and the other from CDOT Modeling and Analysis. Summary of comments include:

1. To evaluate options to maintain through movement of Highway 160 depicted through options 2 and 3
2. Driveway relocations associated with the CMPD Animal Shelter and the Norfolk Southern will be further evaluated during the coordination of the preliminary design. This will allow intersection 308 to have a main through movement and the other road would provide a t-intersection.
3. Confirm the appropriate space for queueing bays to avoid spillback into the lanes
4. When evaluating the roundabout, request to use SIDRA software

While modeling the proposed options, we were able to meet the goal of LOS D for all intersections except at Intersection 308. With the second comment, further refinement of this intersection may achieve the desired LOS.

The coordination between the NCDOT, CDOT, and the Airport that has occurred over the past year has served as planning analysis, to incorporate into the Environmental Assessment, and is not considered the final design. The involved parties mutually agree that improvements to the three intersections can accommodate the relocation of West Blvd that will be impacted by the future construction of the South End Around Taxiway. Finalization of design, geometry, and nomenclature will be determined with the coordination of the preliminary and final design. This group also recognized that there are other planned future road improvements that will address future long-term needs of having an east/west connection.

Unless there are no major concerns, the Environmental Assessment will continue with its analysis. We appreciate your participation in this effort.

Thanks,

**AMBER LEATHERS, A.A.E., ACE** | **PLANNING & ENVIRONMENTAL MANAGER**

**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT**

**m** 704.560.1820

cltairport.com

---

**From:** Leathers, Amber
**Sent:** Monday, November 30, 2020 6:22 PM
**To:** 'Canipe, Brett D' <bdcanipe@ncdot.gov>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; Potter, Sarah <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** West Blvd Relocation Meeting 11/20: Follow Up

Good evening,

Hope everyone had a good Thanksgiving break! See attached for the PPT along with the requested queue lengths. We have made some changes to the PPT based on the comments. Changes include:

- Slide 6: additional AADT information
- Slide 19: summary slide to include all alternatives and their LOS
- Slide 20: acknowledgement of pre-COVID conditions

I understand that this information will be shared with other groups. I'd like to set a target of December 18 for any comments. We are looking for a preference of the proposed alternatives or additional ideas for improvements. At this point in the EA, we are seeking concurrence with the modeling approach with a general idea of what the improvements could look like knowing that the formal design of the relocation will have further coordination. Hope this helps. Let me know if you have questions.

Please forward to anyone I may have missed.

Thanks,

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**m** 704.560.1820

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**From:** Sarah Potter
**To:** Gaby Elizondo
**Subject:** FW: [EXT] RE: [External] FW: West Blvd Relocation Meeting 11/20: Follow Up
**Date:** Monday, February 22, 2021 11:28:46 AM
**Attachments:** image001.png

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NCDOT Response

**Sarah Potter**
Associate Vice President

**Landrum & Brown**
Global Aviation Planning & Development

T +1 513 530 1271 M +1 513 658 6325

landrum-brown.com



---

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Monday, February 22, 2021 11:28 AM
**To:** Canipe, Brett D <bdcanipe@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; a tagliaferri <atagliaferri@ncdot.gov>
**Cc:** Watson, Ashton <abwatson@cltairport.com>; Sarah Potter <Sarah.Potter@landrumbrown.com>
**Subject:** RE: [EXT] RE: [External] FW: West Blvd Relocation Meeting 11/20: Follow Up

Thank you, Brett for your team's response and participation in this effort!

---

**From:** Canipe, Brett D <bdcanipe@ncdot.gov>
**Sent:** Monday, February 22, 2021 11:12 AM
**To:** Leathers, Amber <amber.leathers@cltairport.com>; Basham, Stuart L <slbasham@ncdot.gov>; a tagliaferri <atagliaferri@ncdot.gov>
**Cc:** Watson, Ashton <abwatson@cltairport.com>
**Subject:** RE: [EXT] RE: [External] FW: West Blvd Relocation Meeting 11/20: Follow Up

Amber,

Please consider this email as NCDOT's concurrence with the steps and coordination of this effort to date.

Thanks,

Brett D. Canipe, PE
NCDOT Division 10 Engineer

704-983-4400 office
bdcanipe@ncdot.gov

716 West Main Street
Albemarle NC 28001

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Friday, February 19, 2021 11:01 AM
**To:** Canipe, Brett D <bdcanipe@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Tagliaferri, Anthony <atagliaferri@ncdot.gov>
**Cc:** Watson, Ashton <abwatson@cltairport.com>
**Subject:** RE: [EXT] RE: [External] FW: West Blvd Relocation Meeting 11/20: Follow Up



Hi Brett,
No worries, thanks for following up! I'm good with your approach to hear back from Stuart and Tony and we'll go from there.

I appreciate it! Look forward to hearing from you and your team. Let me know if you have questions.

Thanks!

**From:** Canipe, Brett D <bdcanipe@ncdot.gov>
**Sent:** Friday, February 19, 2021 10:01 AM
**To:** Leathers, Amber <amber.leathers@cltairport.com>; Basham, Stuart L <slbasham@ncdot.gov>; a tagliaferri <atagliaferri@ncdot.gov>
**Cc:** Watson, Ashton <abwatson@cltairport.com>
**Subject:** [EXT] RE: [External] FW: West Blvd Relocation Meeting 11/20: Follow Up

Amber,

I'm sorry to have missed these emails. I have to confirm with the rest of the team to make sure we have our bases covered. I haven't tracked this item close enough to provide the final comment. I may have an opening for a call around 11:45ish if you want to try me then. I know you guys are probably up against the clock, so I will try to help expedite our respone.

Tony/Stuart,

Can you confirm that we are comfortable with the conceptual plans identified in the study?

Thanks,

Brett D. Canipe, PE
NCDOT Division 10 Engineer

704-983-4400 office
bdcanipe@ncdot.gov

716 West Main Street
Albemarle NC 28001

---

**From:** Leathers, Amber <amber.leathers@cltairport.com>
**Sent:** Friday, February 19, 2021 6:56 AM
**To:** Canipe, Brett D <bdcanipe@ncdot.gov>
**Subject:** [External] FW: West Blvd Relocation Meeting 11/20: Follow Up



Hi Brett,

Sorry to keep reaching out. Do you have some time to talk?

Thanks!

---

**From:** Leathers, Amber
**Sent:** Monday, February 8, 2021 4:25 PM
**To:** 'Canipe, Brett D' <bdcanipe@ncdot.gov>
**Subject:** FW: West Blvd Relocation Meeting 11/20: Follow Up

Hi Brett,

Just wanted to follow up on the previous email. I apologize for the lack of direction for next steps. If you concur with the coordination that's been completed as part of the West Blvd Relocation for the Environmental Assessment, would you be able to provide a confirmation of the efforts and that it is suitable to move forward? An email would be fine. I recognize there is a lot of future coordination to come but wanted to conclude the prelim planning efforts in the EA documentation. Please let me know if you'd like to discuss.

Thanks!

**From:** Leathers, Amber
**Sent:** Thursday, January 14, 2021 10:47 AM
**To:** 'Canipe, Brett D' <bdcanipe@ncdot.gov>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; 'Littlefield, Jeffrey S' <jslittlefield@ncdot.gov>; 'Basham, Stuart L' <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>; a tagliaferri <atagliaferri@ncdot.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; Potter, Sarah <spotter@landrum-brown.com>; 'Gaby Elizondo' <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** RE: West Blvd Relocation Meeting 11/20: Follow Up

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**CHARLOTTE DOUGLAS INTERNATIONAL AIRPORT**

**m** 704.560.1820

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**From:** Leathers, Amber
**Sent:** Monday, November 30, 2020 6:22 PM
**To:** 'Canipe, Brett D' <bdcanipe@ncdot.gov>; Grzymski, Andrew <Andrew.Grzymski@charlottenc.gov>; Littlefield, Jeffrey S <jslittlefield@ncdot.gov>; Basham, Stuart L <slbasham@ncdot.gov>; Gallup, Anna <Anna.Gallup@charlottenc.gov>; Kaddoumi, Mohamed <Mohamed.Kaddoumi@charlottenc.gov>
**Cc:** Wiebke, Mark <mdwiebke@cltairport.com>; Watson, Ashton <abwatson@cltairport.com>; Potter, Sarah <spotter@landrum-brown.com>; Gaby Elizondo <GElizondo@landrum-brown.com>; Pilarski, Michael <mwpilarski@cltairport.com>
**Subject:** West Blvd Relocation Meeting 11/20: Follow Up

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**m** 704.560.1820

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