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8 Existing Traffic Conditions

Traffic conditions along the proposed LCRT corridor were assessed in 2018 by evaluating the signalized and unsignalized peak hour level of service (LOS) at 192 intersections along the corridor; 105 intersections are signalized and 87 are unsignalized. Eight unsignalized intersections are free which means traffic moves in a free-flow state. A free-flow stream of traffic will not experience control delays related to traffic signals or stop signs. To evaluate operational traffic conditions on the LCRT corridor and its alternative routes, the proposed LCRT route was broken down into smaller sections. Traffic counts were collected at all intersections along the LCRT route during the months of November and December, 2018 during the AM and PM peak hour. The AM counts were collected in fifteen-minute blocks between the hours of 7:00 and 9:00 AM and the PM counts were collected in fifteen-minute blocks between the hours of 4:00 and 6:00 PM. Given the large sample size of traffic counts, an assumption of the system-wide AM and PM peak hour was made based on which individual hour within the two-hour collection period yielded the highest frequency of peak volume occurrences. The AM peak hour was selected to be 7:00-8:00 AM and the PM peak hour was selected to be 4:45-5:45 PM. Data collected at each of the 192 intersections also included the volume of pedestrians and bicyclists crossing motorized traffic. The LCRT Existing Conditions Traffic Report, prepared in February, 2019 for the BCDCOG (Appendix D), contains an inventory of each intersection, the control type, and vehicle, bicycle, and pedestrian volumes by turning movement.

An intersection's LOS is a measure of how well or how poorly the intersection is performing. LOS is a concept that makes use of a range of grades, LOS A through LOS F, to quantify this performance through one or more calculable service measures. Intersection LOS is determined primarily through control delay, which is measured in seconds per vehicle and represents how much time a driver is delayed by a traffic control device (signal or stop sign). A signalized intersection is described by a single hourly LOS weighted by movement volumes. An unsignalized intersection (i.e., a minor street stop sign) is given multiple LOS for each movement with conflicting traffic streams, which are typically major street left turns and all side-street movements. This method is defined in detail within the Transportation Research Board (TRB) publication known as the Highway Capacity Manual 2010 (HCM 2010) and is the standard measure of automobile operations at intersections for SCDOT and local municipalities. Table 8.1 summarizes the delay thresholds for each grade of LOS.

Table 8.1 HCM 2010 LOS Thresholds for Signalized and Unsignalized Intersections

Traffic flow conditions	LOS	Delay (sec/veh) at Intersections	
		Signalized	Unsignalized
Progression is extremely favorable and most vehicles do not stop at all	A	0-10	0-10
Good progression, some delay	B	10-20	10-15
Fair progression, some delay	C	20-35	15-25
Unfavorable progression, congestion becomes apparent	D	35-55	25-35
Poor progression, significant delay	E	55-80	35-50
Poor progression, extreme delay	F	>80	>50

Note that delay thresholds associated with LOS at an intersection differs between those that are signalized and unsignalized. The HCM 2010 explains that drivers expect to be serviced in a systematic and orderly pattern at a signalized intersection and are therefore willing to accept greater thresholds of delay associated with LOS. Conversely, service at an unsignalized intersection generally depends on gap acceptance and driver aggression, which are latently random. As a result, drivers at unsignalized intersections are expected to exhibit lower thresholds of delay associated with LOS.

8.1 Vehicular Peak Hour Level of Service

The LCRT Existing Conditions Traffic Report provides extensive documentation on the AM and PM peak hour level of service at each intersection using 2018 turning movement counts, which is also referred to as the Existing Conditions scenario. Areas of congestion are identified as intersections, primarily signalized locations, where the existing LOS is at E or F during one or both of the peak hours.

- There are 3 signalized intersections at LOS E or LOS F during the AM peak
- There are 2 signalized intersections at LOS E or LOS F during the PM peak
- There are 24 unsignalized intersection approaches at LOS E or LOS F during the AM peak
- There are 25 unsignalized intersection approaches at LOS E or LOS F during the PM peak

There are several intersections along the LCRT corridor where traffic signals are currently functioning at or below LOS E during AM and PM peak periods. LOS E and LOS F conditions are indicative of high volumes of intersecting traffic and generally mean that conditions are near to or exceed a signal’s capacity. This can lead to locations of congestion, reduced vehicle throughput, and longer delays for drivers. These areas of congestion are displayed on Figure 8.1. The signalized intersections with an AM/PM peak hour LOS E or LOS F are also reported in Table 8.2.

These locations of high congestion levels are on US 78 and US 52/78/Rivers Avenue. The intersection of US 78 and Ladson Road is an intersection where AM LOS is currently at an F.

Nearby, the intersection of US 78 and Ingleside Boulevard is also at an LOS F during the AM peak.

The US 52/78/Rivers Avenue corridor experiences PM LOS E at intersections with Ashley Phosphate Road and Remount Road. The intersection of US 52/78/Rivers Avenue and Remount Road also experiences LOS E during the AM peak period.

Table 8.2 Signalized Intersections with a 2018 AM/PM Peak Hour LOS E or LOS F

Intersection	ID#	Peak hour LOS/delay (veh./sec.)*	
		AM	PM
US 78 & Ladson Rd/Ancrum Rd	23	F/86.6	D/50.9
US 78/University Blvd & Ingleside Blvd/Shipleigh St	27	F/82.3	D/51.5
US 52/78/Rivers Ave & Ashley Phosphate Rd	52	D/46.6	E/58.2
US 52/78/Rivers Ave & Remount Rd	70	E/64.0	E/56.2

*Results are from Table 3.2–Table 3.10 in the BCDCOG LCRT Existing Conditions Traffic Report, prepared by Stantec Consulting Services Inc.

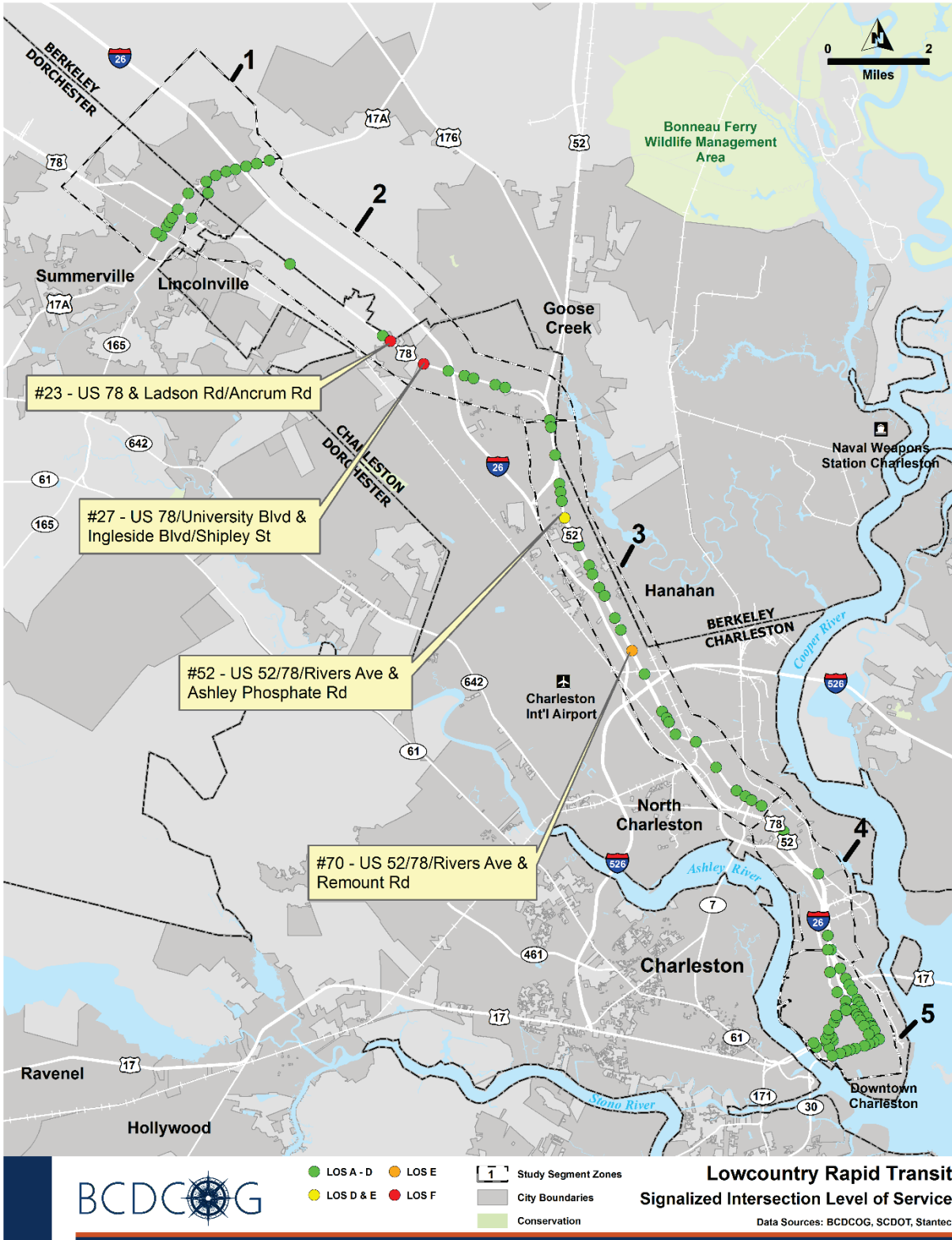


Figure 8.1 Signalized Intersection Level of Service

8.2 Bicycle and Pedestrian Activity

The proposed LCRT route runs along several corridors which exhibit high volumes of pedestrian traffic. These corridors are primarily located on the Charleston Peninsula.

The Meeting Street corridor between Lee Street and Calhoun Street consists of six intersections with pedestrian volume between 60 and 150 pedestrians per hour during at least one peak period. Additionally, there are three intersections on Meeting Street between Mary Street and Calhoun Street where pedestrian volumes exceed 150 per hour. The intersection at Calhoun Street exceeds 300 pedestrians in the PM peak, which is equivalent to an hourly average crossing rate of five pedestrians per minute.

The Calhoun Street corridor between Meeting Street and the hospital district is also characterized by a high volume of pedestrian activity. The 0.33-mile section between Meeting Street and Coming Street, which lies within both the historic downtown district as well as the College of Charleston campus, was observed to have the highest hourly volume of foot traffic on the entire LCRT corridor. The four signalized intersections each were observed to have more than 150 pedestrians per hour during both peak periods. During the afternoon peak, pedestrian volume on this section ranges between 324 and 1,288 pedestrian crossings per hour. The intersection with the highest pedestrian activity (1,288 peds/hr) lies in this section, located at the intersection of Calhoun Street and St. Phillips Street.

Both the street network internal to the hospital district, and the section of Calhoun Street between Coming Street and the hospital district are characterized by high pedestrian volumes, exceeding 100 pedestrians per hour at several intersections. Volumes in this area are likely driven by the number of employees and patients traveling to and from the hospitals located here.

The alternate LCRT route that utilizes King Street between the intersections at Mt. Pleasant Street and Calhoun Street is also observed to be a high-volume pedestrian corridor, with pedestrian volume reaching 610 peds/hr at the intersection with John Street/Warren Street just north of Marion Square.

Intersections which exhibited pedestrian volumes greater than 150 pedestrians in an hour are summarized Table 8.3.

Bike traffic is consistent along the entire LCRT corridor and peak hour intersection counts range between 0 and 11 cyclists per hour. The intersection with the highest bicycle activity is at US 52/78/Rivers Avenue and Cosgrove Avenue.

Table 8.3 Intersections of High-Volume Pedestrian Activity (greater than 150 pedestrians per hour)

Intersection	ID#	Peak hour pedestrian/bicycle volume*	
		AM	PM
Meeting St & Mary St	126	159/2	152/6
Meeting St & John St	129	58/2	162/4
Meeting St & Calhoun St	130	152/3	324/5
Calhoun St & King St	131	314/1	985/5
Calhoun St & St Phillips St	132	328/0	1288/6
Calhoun St & Coming St	133	151/3	634/5
Calhoun St & Jonathan Lucas St/Barre St	137	152/0	139/4
Jonathan Lucas St & President St	138	452/8	423/6
President St & Bee St	139	518/6	722/3
Bee St & Courtenay Dr	140	655/2	552/6
Courtenay Dr & Doughty St	141	159/2	246/4
Courtenay Dr & Ralph Johnson Dr	141A	283/2	126/4
King St & Cannon St	177	41/1	181/2
King St & Morris St	178	141/1	482/2
King St & Ann St	179	63/0	389/1
King St & John St/Warren St	180	102/2	610/2

*Results are from Table 3.2–Table 3.10 in the BCDCOG LCRT Existing Conditions Traffic Report, prepared by Stantec Consulting Services Inc.