#### **Existing Corridor Infrastructure** 3.0

An analysis was conducted of the existing I-526 highway facility infrastructure to serve as a baseline for consideration of future improvements. The detailed analysis for the I-526 corridor study is documented in the Existing Conditions Report for the I-526 Corridor Analysis, August 2011 for the project. A review of the roadway, interchange, and bridge structure infrastructure, as well as adjacent utilities and environmental issues is summarized herein.

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#### **Transportation Facilities** 3.1

This chapter provides a comprehensive overview of the current I-526 highway facility and serves as a baseline for consideration of future improvements that may be identified through the study of the I-526 corridor. The existing roadway, interchanges and bridges are assessed with regard to condition and potential remaining life.

#### 3.1.1 Roadway

The I-526 roadway section is a four-lane, divided expressway, generally having a 60-foot median measured between edges of the travel lanes that is illustrated in Exhibit 3-1. A cable median barrier separates both travel ways to prevent head-on collisions. The speed limit along I-526 is 60 mph from US 17/Savannah Highway to north of International Boulevard, 55 mph from north of International Boulevard to east of Rivers Avenue, and 60 mph east of Rivers Avenue. There are three geometric concerns with potential design issues that were identified: adequate clear zone, ramp lengths, and vertical curve speed. The locations of these potential issues are shown in the Environmental/Design Map series in the Existing Conditions Report for the I-526 Corridor Analysis.

#### Pavement

The existing pavement along I-526 is a 10-inch thick uniform concrete pavement from the bridges over International Boulevard eastward, which is in good condition. From International Boulevard to the western terminus at US 17, the pavement was constructed as approximately six inches of asphalt pavement over a 10-inch thick stabilized aggregate base course. The pavement quality index (PQI) for the various segments is 4.0 or higher in most locations, indicating that the pavement is in good condition.



Exhibit 3-1: Typical I-526 Cross-Section, west of Rivers Avenue

526 Between North Charleston and West Ashley

# ITS and Incident Management

SCDOT has an up-to-date Traffic Management Center (TMC) located adjacent to the District 6 office in North Charleston. There are currently nine traffic cameras monitoring the I-526 corridor. As incidents are detected, the TMC employees notify the Highway Patrol to dispatch the appropriate responders, SCDOT incident responders, Highway Patrol or other emergency providers. There are also five Dynamic Message Signs (DMS) along the I-526 corridor to provide information to the traveling public, three in the eastbound direction and two in the westbound direction.

### Signing

The signing for the study area was replaced and upgraded in 2004. In general the signing is in good condition. There are 19 existing overhead sign structures. The mainline signing meets the current standards with the exception of the signing for the I-526 eastbound ramp to I-26. There are 16 existing overhead sign structures on the crossing routes, not including I-26. No overhead structures are located along Sam Rittenberg Boulevard, Leeds Avenue, and Paramount Drive.

### 3.1.2 Existing Interchanges

There are eight interchanges in the project limits, including the I-26 & I-526 system-to-system interchange. The study interchanges are summarized herein, and Table 3-2 summarizes the cross-street AADTs and speed limits at the end of this section.

I-526 & US 52 (Rivers Avenue): This interchange is a partial cloverleaf design with loops in the southeast and northwest guadrants, as shown in Exhibit 3-2. The left turns from Rivers Avenue to I-526 in both directions are signalized to accommodate double left turns onto the ramps.

Rivers Avenue has a posted speed limit of 45 mph, and the 2011 AADT was 33,700 north of I-526 and 25,000 vpd south of I-526.

1-26 & 1-526: This interchange has a directional ramp from 1-526 eastbound to 1-26 westbound, and loop ramps in the other three quadrants of the interchange, as shown in Exhibit 3-2. There is a collectordistributor (CD) road on I-26 eastbound to accommodate the movements from I-26 eastbound to I-526 eastbound and from I-526 westbound to I-26 eastbound.

The posted speed limit along I-26 is 60 mph in the study area.

Exhibit 3-2: I-526 Interchanges with I-26 (left) and Rivers Avenue (right)



**I-526 & International Boulevard/Montague Avenue:** This interchange, shown in Exhibit 3-3, is essentially a split diamond with a CD between International Boulevard and Montague Avenue. Eastbound I-526 traffic to Montague Avenue and International Boulevard exits at Montague Avenue to a signalized intersection. Traffic to International Boulevard passes through the signal and continues on the CD road to International Boulevard. A similar situation exists for westbound traffic exiting to Montague Avenue. There is also a loop from I-526 eastbound to International Boulevard westbound towards Charleston International Airport.

International Boulevard has a posted speed limit of 45 mph, and the 2011 AADT was 33,300 west of I-526 and 22,800 east of I-526. Montague Avenue has a posted speed limit of 40 mph, and the 2011 AADT was 12,900.

I-526 & Dorchester Road/Paramount Drive: This interchange, shown in Exhibit 3-4, is a split diamond serving Dorchester Road and Paramount Drive. Eastbound I-526 traffic exits at Paramount Drive to a signalized intersection. Dorchester Road traffic proceeds through the signalized intersection to a signal at Dorchester Road. A similar situation exists for westbound traffic exiting to Paramount Drive. There is also a slip ramp onto the westbound ramp to I-526 from an adjacent subdivision.

Dorchester Road has a posted speed limit of 40 mph, and the 2011 AADT was 23,400 west of I-526 and 18,700 east of I-526. Paramount Drive has a posted speed limit of 30 mph.



Exhibit 3-3: I-526 Interchanges with International Boulevard (left) and Montague Avenue (right)



Exhibit 3-4: I-526 Interchange with Dorchester Road/Paramount Drive



I-526 & Leeds Avenue: This interchange, shown in Exhibit 3-5, is a diamond with signalized intersections at each ramp terminal. At this interchange, I-526 passes under Leeds Avenue. Leeds Avenue has a posted speed limit of 40 mph, and the 2011 AADT was 7,800 west of I-526 and 14,000 east of I-526.

I-526 & Paul Cantrell Boulevard: This interchange, shown in Exhibit 3-5, is a partial cloverleaf design with loops serving the movements from I-526 eastbound to Glenn McConnell Parkway northbound and I-526 westbound to Paul Cantrell Boulevard southbound. The ramp serving the movement from Paul Cantrell Boulevard to I-526 eastbound is two lanes for a short distance to accommodate double left turns.

Paul Cantrell Boulevard has a posted speed limit of 45 mph, and the 2011 AADT was 30,900 west of I-526 and 28,300 east of I-526.

Exhibit 3-5: I-526 Interchanges with Leeds Avenue (left) and Paul Cantrell Boulevard (right)



I-526 & Sam Rittenberg Boulevard: This interchange is a half diamond due to the close proximity to US 17 south, as shown in Exhibit 3-6. There is an on ramp from Sam Rittenberg Boulevard southbound to I-526 eastbound and an off ramp from I-526 westbound to Sam Rittenberg Boulevard, as all westbound I-526 traffic approaches Sam Rittenberg Boulevard at a signal controlled at-grade intersection. Sam Rittenberg Boulevard has a posted speed limit of 45 mph, and the 2011 AADT was 27,800.

I-526 & US 17/Savannah Highway: This interchange, shown in Exhibit 3-6, is a partial diamond with a loop serving the northbound US 17 to eastbound I-526 movement. US 17/Savannah has a posted speed limit of 45 mph, and the 2011 AADT was 43,300 west of I-526 and 38,100 east of I-526.



Exhibit 3-6: I-526 Interchange with Sam Rittenberg Boulevard and US 17/Savannah Highway



Table 3-1: Cross-street AADTs & Speed Limits

ROADWAY	SPEED LIMIT	2011 AADT
Rivers Avenue, north of I-526	45 mph	33,700
Rivers Avenue, south of I-526	45 mph	25,700
International Boulevard, west of I-526	45 mph	33,300
International Boulevard, east of I-526	45 mph	22,800
Montague Avenue	40 mph	12,900
Dorchester Road, west of I-526	40 mph	23,400
Dorchester Road, east of I-526	40 mph	18,700
Paramount Drive	30 mph	
Leeds Avenue, west of I-526	40 mph	7,800
Leeds Avenue, east of I-526	40 mph	14,000
Paul Cantrell Boulevard, west of I-526	45 mph	30,900
Paul Cantrell Boulevard, east of I-526	45 mph	28,300
Sam Rittenberg Boulevard	45 mph	27,800
US 17/Savannah Highway, west of I-526	45 mph	43,300
US 17/Savannah Highway, east of I-526	45 mph	38,100

# 3.1.3 Bridges

Along the length of the I-526 corridor from Rivers Avenue to US 17/Savannah Highway, there are a total of 35 bridge structures including one bridge over I-526 and one bridge length culvert, over 20 feet along the roadway, under the Interstate. Table 3-2 provides an overview of the structures along the corridor including year constructed, clearances, sufficiency ratings, and application of seismic design. The mainline bridges were constructed to carry two travel lanes and with a 39.5-foot roadway width, as shown in Exhibit 3-7.

The Leeds Avenue bridge over I-526 is the only bridge that presents horizontal clearance restrictions to the mainline of I-526. The horizontal clearances are 28 feet from the pier in the median to the edge of the existing travel lanes on both sides of the center pier.

The bridges in the I-526 corridor are generally in good condition. The bridges have sufficiency ratings ranging from a low of 74.3 to high of 96, with the average rating being approximately 90.





CORRIDOR ANALYSIS Between North Charleston and West Ashley



## Table 3-2: Bridge Summary

BRIDGE GROUP	BRIDGE TYPE	CROSSING/DESCRIPTION	Year Built	Remaining Life (Years)	Structure Length (Feet)	Roadway Width (Feet)	Min Vert Clear Under	RT. LATERAL UNDERCLEAR (FEET)	LT. LATERAL UNDERCLEAR (FEET)	SUFFICIENCY RATING WBL/EBL	FUNCT. Obsolete	STRUCT. DEFICIENT	SEISMIC DESIGN
1	Dual Bridges	Rivers Ave (US 52), Dutton Ave, N. Rhett Ave. (part of Urban Section)	1992	40	10,615	47.8	16.8	12.0	15.0	96.0	No	No	Yes
	Ramp Bridge	Rivers Ave (US 52) WB to I-526 EB	1992	40	600	33.0	N/A	N/A	N/A	88.8	No	No	Yes
	Ramp Bridge	I-526 WB to Rivers Ave (US 52)WB	1992	40	618	22.0	N/A	N/A	N/A	85.7	Yes	No	Yes
	Dual Overpasses	I-26, N-SRR, Bryant Street	1990	38	2,665	40.0	17.1	20.0/23.8	12.0/12.8	96	No	No	Yes
	Ramp Bridge	I-26EB to I-526 EB	1989	37	636	26.0	N/A	N/A	N/A	90.6	Yes	No	Yes
2	Ramp Bridge	I-526 EB to I-26WB	1989	37	218	25.8	N/A	N/A	N/A	86.3	Yes	No	Yes
	Ramp Bridge	I-26EB from I-526 EB	1989	37	310	25.8	N/A	N/A	N/A	91.6	Yes	No	Yes
	Ramp Bridge	I-26 WB to I-526 EB	1989	37	635	25.8	N/A	N/A	N/A	86.4	Yes	No	Yes
	Ramp Bridge	I-26 WB to I-526 WB	1989	37	372	25.8	N/A	N/A	N/A	85.5	Yes	No	Yes
	Ramp Bridge	I-26 WB from I-526 EB	1990	38	2,400	40.0	17.3	12.5	10.9	89.7	No	No	Yes
	Ramp Bridge	I-26 WB to I-526 WB	1990	38	348	25.8	N/A	N/A	N/A	91.7	Yes	No	Yes
	Ramp Bridge	EB I-526 to US 52 WB	1992	40	300	25.0	N/A	N/A	N/A	91.6	Yes	No	Yes
3	Dual Overpasses	International Blvd (S-1411)	1986	24	228	47.6	16.7	13.8	13.2	86.4/84.4	No	No	No
4	Twin Overpasses	Montague Ave. (S-62)	1986	24	184	39.6	17.0	11.8	10.0	87.0	No	No	No
5	Dual Overpasses	SC LRR near Dorchester Road (SC 642)	1986	24	233	51.6/39.6	23.0	12.0	N/A	91.1/87.0	No	No	No
5	Ramp Bridge	SC LRR near Dorchester Road (SC 642)	1986	24	233	26.0	23.0	12.0	N/A	85.4	Yes	No	No
6	Twin Overpasses	Dorchester Road (SC 642)	1986	24	232	39.6	16.7	10.0	N/A	88.1/88.1	No	No	No
7	Twin Overpasses	Paramount Drive (S-771)	1986	23	156	39.6	14.8	10.2	N/A	88.1/88.1	No	No	No
8	Underpass	Leeds Ave (S-475)	1980	18	257	74.0	17.6	16.0	12.0	89.2	No	No	No
9	Twin Bridges	Ashley River	1980	18	3,908	39.5	35.0	60.0	N/A	82.8/88.1	No	No	No
10	Twin Overpasses	Ashley River Road (SC 61)	1983	21	198	39.5	16.8	13.3	N/A	88.1/88.1	No	No	No
11	Twin Overpasses	Glenn McConnell Parkway (SC 461)	1982	20	261	47.5	16.9	21.7	27.8	87.6/87.6	No	No	No
12	Dual Overpasses	Savage Rd (S-1168)	1982	20	177	39.5	15.1	15.0	N/A	74.3/88.6	Yes	No	No
13	Culvert	St. Andrews Canal	1982	45	36	150.0	N/A	N/A	N/A	93.0	No	No	No
14	Ramp Bridge	US 17SB to I-526EB over SC 7	1999	47	126	27.6	17.8	7.6	N/A	85	Yes	No	No
15	Overpass	I-526EB over US 17 and SC 7	1999	47	741	53.0	17.8	7.6	N/A	89.0	No	No	No
WBL = SBI	_ EBL = NBL							1					



The concrete pavement from the bridges over International Boulevard eastward was constructed in 1989 and has been in service for approximately 23 years, and is in good condition. Concrete pavements typically have a service life of approximately 50 years before rehabilitation is required. The asphalt pavement, present from the bridges over International Boulevard to the western terminus at US 17, is also in good condition.

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The bridges along the corridor were constructed between 1980 and 1999 and have been in service from 13 to 32 years. The service life of the bridges varies from 50 to 60 years depending on concrete cover in the decks. Table 3-3 summarizes the remaining service life and renewal techniques for the pavements and bridges.

#### Table 3-3: Infrastructure Useful Remaining Life Summary

INFRASTRUCTURE	Remaining Life	RENEWAL TECHNIQUES
Concrete Pavement	27 years	Patch, seal, and overlay with asphalt
Asphalt Pavement		Mill and resurface on 10- to 12-year cycle
Bridges	18 to 47 years	Replace deck slabs, joints and bearings/Possible replacement

#### 3.3 **Design Criteria**

#### 3.3.1 Roadway

I-526 is a four-lane divided freeway facility with a 60-foot median and full control of access. The existing construction plans indicate a horizontal design speed of 60 mph, and the existing horizontal alignment meets or exceeds 60 mph design. The vertical alignment meets 60 mph except for several sag vertical curves identified in the Existing Conditions Report for the I-526 Corridor Analysis.

The existing acceleration and deceleration lengths were compared to minimum requirements in Section 16.4 of SCDOT's Highway Design Manual for 60 mph design speed. Ramp lengths and/or tapers for the acceleration or deceleration lanes should be modified in several locations to meet current design criteria, which are illustrated in the Existing Conditions Report for the I-526 Corridor Analysis.

#### 3.3.2 Bridges

All bridges were designed to carry a traffic loading of HS20-44, a standard truck loading for major highways; this loading is still adequate for these bridges.

The Charleston area is a high seismic zone. Current SCDOT design policy requires the first 150 feet of road embankment at each bridge end as well as the bridge to be designed for the seismic conditions. Many bridges along the corridor have major deficiencies with regard to seismic design, including inadequate shelf width (pier cap width) to support girder movement, inadequate lateral reinforcement in columns, footings supported on timber piles, no consideration of soil liquefaction, and no countermeasures for earthquake induced settlement of end fills. Any construction activities involving existing bridges should incorporate current seismic design requirements.

#### 3.3.3 Charleston International Airport Flight Paths

The Charleston Airport flight path clear zones and accident potential zones for Runway 33 currently include portions of the I-26 & I-526 interchange. Details of the clear zones and accident potential zones are documented in the Air Installation Compatible Use Zone (AICUZ) study conducted in 2004 and the Charleston Air Force Base Naval Weapons Station Joint Land Use Study conducted in 2008. Both studies identify obstruction height criteria in the form of imaginary surfaces for which natural or man-made structures are not allowed to protrude.

The west side of the I-26 & I-526 interchange falls within the "Approach-Departure Clearance Surface" which begins 400 feet beyond the end of Runway 33 of Charleston Airport. The surface is an inclined plane with a slope of 50:1 up to an elevation of 500 feet above the airfield elevation. The east side of the I-26 & I-526 interchange falls within the "Inner Horizontal Surface" that has an elevation of 150 feet and the "Transitional Surface" that connects the "Approach-Departure Clearance Surface" to the "Inner Horizontal Surface" at a slope of 7:1.

A schematic illustrating the Charleston International Airport imaginary surfaces affecting the I-26 & I-526 interchange is shown in Exhibit 3-8. The schematic indicates height restrictions from approximately 65-feet above the Runway 33 elevation in the northwest guadrant of the interchange to 150 feet on the eastern portion of the interchange area, which were considered in the development of conceptual improvements in the area.

# Exhibit 3-8: Charleston International Airport Imaginary Surfaces



#### 3.4 **Adjacent Utilities**

There are nine different utility providers located within the project area. A summary of the utility providers and their services is provided in Table 3-4. A composite map indicating utilities within the corridor is provided in the Existing Conditions Report for the I-526 Corridor Analysis.

#### Table 3-4: Utility Pro

UTILITY PROVIDER	SERVICE
AT&T	Telephone
COMCAST	Television
ITC DELTA COM	Telephone
KNOLOGY	Television
LEVEL 3 COMMUNICATIONS	Telephone
SCE&G	Gas/Transmission/Distribution
SCANA	Telephone/Communications
CHARLESTON CPW	Water/Sewer
NORTH CHARLESTON SEWER	Sewer

#### **Environmental Issues** 3.5

The project corridor extends through portions of Charleston County, the City of Charleston and the City of North Charleston. The corridor is bordered by a multitude of urbanized land uses that includes residential, commercial, industrial and municipal, which are mixed along the length of the corridor. The largest undeveloped areas along the corridor are forested tracts associated with the Charleston International Airport and Joint Base Charleston on the corridor's northern end and the Ashley River with its adjacent tidal marshes that bisects the corridor farther south.

## 3.5.1 Natural Environment

#### Wetlands and Streams

Wetland types found in the area include estuarine and deepwater, estuarine and marine wetlands, freshwater emergent wetlands, freshwater forested/shrub wetland, freshwater pond, and lake. The I-526 study corridor crosses Filbin Creek, Bulls Creek and the Ashley River. The Ashley River starting near Summerville and terminating at the I-526 bridge is designated a scenic river. The Ashley River and Filbin

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**CORRIDOR ANALYSIS** 

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Creek are both classified as freshwaters and are listed on the 303d list for elevated levels of fecal coliform bacteria.

## **Protected Species**

A listing of federally Threatened and Endangered (T&E) species as well as federally protected species, such as the Bald Eagle, for Charleston County as of May 2011 and files maintained by the SC Heritage Trust Program (SCHTP) were reviewed for potential habitat and documented sightings of state or federally listed species. While no federally protected species were identified within or immediately adjacent to the corridor by the SCHTP data base, two bald eagle nesting locations were noted approximately one half mile to the west of the project corridor.

## 3.5.2 Human Environment

### Communities

Numerous communities and neighborhoods along the corridor were identified. Low income and minority communities adjacent to the corridor include the Russelldale, Ferndale, and Highland Terrace communities near the Rivers Avenue interchange and Trailwood Mobile Home Park near the International Boulevard Interchange.

## Hazardous Material Site and Generators

The following were identified using SCDHEC's GIS database: one CERCLA site, six hazardous generator sites, eight leaking underground storage tanks, 15 underground storage tanks, and two dry cleaners.

## Cultural Resources

The presence of known and previously identified historical (above ground structures) and archaeological (below ground artifacts) resources were researched through the databases two primary state agencies: the South Carolina Department of Archives and History (SCDAH) and the South Carolina Institute of Archaeology and Anthropology.

One historic property listed on the National Register of Historic Places (NRHP) was identified adjacent to the project corridor: Ashley Hall Plantation was established in the 1670's on the banks of the Ashley River by Stephen Bull, an English settler. Six known and previously identified archaeological sites were noted within or adjacent to the project corridor. Five sites within or adjacent to the corridor are not eligible for inclusion on the NRHP; archaeological sites associated with the Ashley Hall Plantation are within the established NRHP boundary and are protected.

