

1.0 Executive Summary

The purpose of this Traffic Impact Analysis (TIA) is to review vehicular traffic impacts as a result of the proposed BullStreet mixed-use development. The objectives of the study are:

- To estimate trip generation and distribution for the proposed development.
- To perform capacity analyses for the identified study area.
- To determine the potential traffic impacts of the proposed development.
- To develop recommendations for needed roadway and operational improvements to accommodate the proposed development's traffic impacts while being sensitive to the existing land uses, roadway network and surrounding neighborhoods.

The proposed BullStreet mixed-use development is located in Columbia, South Carolina bound by Colonial Drive to the north, Harden Street to the east, Calhoun Street to the south, and Bull Street to the west. As currently envisioned, the proposed 181 acre site will be constructed in two initial phases with buildout of the site occurring as the site develops. Each phase is proposed to consist of the following:

Initial Project Development

- 8,500 seat sports venue
- 26,250 square feet of general retail space
- 78,750 square feet of general office space

The Commons at BullStreet Project Development

- 69,050 square feet of general office space
- 263,300 square feet of town center space
- 22,438 square feet of high turnover sit down restaurant space
- 55,4362 square feet of quality restaurant space
- 10 Screen movie theater
- 479 multi-family units
- 165 room hotel
- 25,000 square feet of health/fitness club space
- 25,000 square feet of sporting goods

Potential Project Buildout

- 500,000 square feet of research facility space
- 100,000 square feet of general retail space
- 300 units of continuing care facility
- 500,000 square feet of general office space
- 1,315 multi-family units

It should be noted that this phased analysis approach, specifically for project buildout (phase 3), is an endeavor to understand the future market demand and represents the potential buildout. The development scenario outlined above represents the development potential of the BullStreet project based on the market conditions and influencers known at this time. With any development that is built out to a horizon year, there is the potential for change to the development program, especially in the final buildout phase. The development scenario evaluated in this traffic impact analysis represents a comprehensive evaluation of the existing and projected traffic conditions as well as the traffic mitigation plan for this development.

The initial project development portion of this master planned development is expected to be completed (built-out) in 2016. Access to the site is proposed via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Colonial Drive at Boyce Street (proposed, unsignalized)
- Bull Street and Freed Street (existing, unsignalized)
- Bull Street and Williams Drive (existing, unsignalized)
- Calhoun Street and Barnwell Street (existing, unsignalized)

Under the initial project development and as the construction of The Commons at BullStreet is under development, final infrastructure will be brought on line such as Boyce Street and improved internal connectivity to Elmwood Avenue. During this time internal parking facilities for the sports venue may shift throughout the entirety of the project boundaries to accommodate construction. As such, the development will work with SCDOT and the City of Columbia to accommodate these changes as well as developing the necessary traffic management plan(s) for the sports venue to accommodate parking and traffic demand for events during construction as well as at buildout of the development.

The Commons at BullStreet portion of the development is expected to be completed (built-out) in 2018. Access to this phase of the development as well as for the initial development phase is projected to occur via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Calhoun Street and Barnwell Street (existing, unsignalized)
- Bull Street at Williams Drive (proposed signalized)
- Bull Street at Freed Drive (proposed unsignalized, right-in/right-out)
- Colonial Drive at Access #4 (proposed unsignalized, right-in/right-out)
- Colonial Drive at Department of Natural Resources Driveway/Access #5 (proposed unsignalized, full movement)
- Colonial Drive at Boyce Street/Access #6 (proposed unsignalized, full movement)

The potential buildout of the development is expected to be completed (built-out) in 2020. Access to the site is proposed via the following locations:

- Elmwood Avenue at Bull Street (existing signalized)
- Calhoun Street at Gregg Street (existing unsignalized)
- Colonial Drive at Gregg Street (existing unsignalized)
- Bull Street at Williams Drive (proposed signalized)
- Bull Street at Freed Drive (proposed unsignalized, right-in/right-out)
- Calhoun Street and Barnwell Street (existing, unsignalized)
- Colonial Drive at Access #4 (proposed unsignalized, right-in/right-out)
- Colonial Drive at Department of Natural Resources Driveway/Access #5 (proposed unsignalized, full movement)
- Colonial Drive at Boyce Street/Access #6 (proposed unsignalized, full movement)
- Colonial Drive at Access #7 (proposed unsignalized, full movement)
- Harden Street at Access #8 (proposed unsignalized, right-in/right-out)
- Harden Street at Access #9 (proposed unsignalized, left-over)
- Harden Street at Access #10 (proposed signalized)

- Harden Street at Access #11 (proposed unsignalized, right-in/right-out)
- Harden Street at Access #12 (proposed unsignalized, left-over)
- Calhoun Street at Barnwell Street/Access #13 (proposed unsignalized, full movement)

It is important to note that there are two additional points of access along Calhoun Street that will provide access to the proposed BullStreet development. These two access points are located within the historic wall surrounding the development along Calhoun Street and are only wide enough to accommodate a single lane of traffic (one-way). Considering that these access points cannot be modified to accommodate bi-directional (two-way) traffic because of the historic nature of the wall, they will most likely be used to accommodate active modes of transportation (bicycle and pedestrian) and not vehicular access.

The Richland County Transportation Penny Program currently has a programmed project to improve the intersection of Bull Street and Elmwood Avenue. At this time the specifics of the intersections improvements or configuration are not known. The schedule for the improvements is as follows:

- Preliminary Engineering (PE) – Calendar Year (CY) 2016
- Right of Way – CY 2017
- Construction – CY 2018

Currently the Richland Penny has \$2.5 million programmed for this intersection improvement.

Kimley-Horn was retained to determine the potential traffic impacts of this development (in accordance with the traffic study guidelines set forth by SCDOT and the City of Columbia) and to identify transportation improvements that may be required to accommodate future traffic conditions while being sensitive to the existing land uses, roadway network and surrounding neighborhoods. This report presents trip generation, distribution, capacity analyses, and recommendations for transportation improvements required to meet anticipated traffic demands.

Based on the capacity analyses contained herein, the following roadway improvements are recommended to mitigate impact of the proposed development on the adjacent street network. These improvements were developed based on the existing intersection configurations and projected intersection operations while being sensitive to the surrounding land uses and neighborhoods.

Initial Project Development

- Implement a traffic management plan for events at the sports venue to manage incoming and outgoing traffic. The traffic management plan should be created such that the plan adheres to any laneage, land-use, or travel pattern changes associated with the future development of The Commons at BullStreet and the potential final buildout of the project.
- Work with the City of Columbia and the South Carolina Department of Transportation on the development of a comprehensive wayfinding signage plan to provide guidance from SC 277 and I-126 to the development.

Calhoun Street at Barnwell Street (Node 30)

- Construction of a southbound driveway connection to the intersection of Calhoun Street and Barnwell Street
- The southbound approach should accommodate a dedicated left-turn lane and a shared through/right-turn lane.
- Restripe the existing approach of Calhoun Street to provide for a dedicated left-turn lane with 150 feet of storage into the proposed development.

Bull Street at Williams Drive (Node 20)

- Opening of the existing westbound driveway to accommodate vehicular traffic ingress and egress into the development.

Bull Street at Freed Drive (Node 4)

- Opening of the existing westbound driveway to accommodate vehicular traffic ingress and egress into the development.

Colonial Drive at Gregg Street (Node 11)

- Opening of the existing northbound driveway to accommodate vehicular traffic ingress and egress into the development.

Colonial Drive at Boyce Street (Node 23)

- Opening of the existing northbound driveway to accommodate vehicular traffic ingress and egress into the development.

It is important to note that the typical traffic loading pattern for the sports venue typically occurs outside of the traditional peak hours (AM 7-9 & PM 4-6) for the adjacent roadways. In addition, the majority of the playing season is outside USC’s typical academic calendar year with only small overlap occurring in April and the first weeks of May.

The Commons at BullStreet

Bull Street at Elmwood Avenue (Node 6)

- Convert the existing southbound right-turn lane to a channelized free flow movement from Bull Street to Elmwood Avenue.
- Install a second through lane on eastbound Elmwood Avenue.
- Install a second northbound through lane on Bull Street.
- Modify the existing signal timings, phasing and pavement markings at the intersection to accommodate the proposed geometric changes.

The additional roadway laneage at the intersection can be accommodated by:

- Utilize the available planting strip and extra wide lane width adjacent to the outside dual right-lane on the eastbound approach of Elmwood Avenue.
- Shift the existing inside northbound dual left-turn lane to the west, utilizing one of the three through lanes south of Elmwood Avenue, to add an additional northbound through lane.

A sketch of the proposed roadway improvements is attached in the Appendix. The proposed intersection improvements should be coordinated with the Richland County Transportation Penny Program due to overlap of the improvements and timing.

Boyce Street at Colonial Drive (Node 23)

- Construct a westbound left-turn lane on Colonial Drive with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a northbound exit driveway with dedicated left and right-turn lanes

Bull Street at Williams Street (Node 20)

- Construct a southbound left-turn lane on Bull Street with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a westbound exit driveway with dedicated left and right-turn lanes.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

BullStreet at Freed Drive (Node 4)

- Conversion of the existing full movement intersection to a Right-In/Right-Out (RIRO) intersection.

Bull Street at Jefferson Street (Node 5)

- Conversion of the existing full movement intersection to a Left-Over/RIRO intersection.

Colonial Drive at Access #4 (Node 21)

- Construct a northbound exit driveway with a dedicated right-turn lane.
- Construction of a driveway on Colonial Drive to restrict left turning movements from Colonial Drive and Access #4

Colonial Drive at Department of Natural Resources Driveway/Access #5 (Node 22)

- Construct a westbound left-turn lane on Colonial Drive with a minimum of 150 feet of storage and an appropriate taper length.
- Construct a northbound exit driveway with dedicated left and shared through/right-turn lanes

With the addition of the proposed signal on Bull Street at Williams Drive and the proposed intersection improvements at Bull Street and Elmwood Avenue, updated corridor timing plans should be developed for the Bull Street corridor. The addition of the traffic signal and geometric improvements at Bull Street and Elmwood Avenue will have a positive impact on mobility through the corridor and as such signal timings should be updated.

Potential Project Buildout

Bull Street at Williams Drive (Node 20)

- Modify the westbound approach to the intersection to include a dedicated left-turn lane and a shared left/right-turn lane.
- Modify the traffic signal, phasing and pavement markings to accommodate the proposed geometric changes.

Colonial Drive at Boyce Street (Node 23)

- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

Colonial Drive at Access #7 (Node 24)

- Construct a northbound exit driveway with dedicated right-turn lane
- Modify the existing median on Colonial Drive to accommodate a left-turn into Access #7 with a minimum of 150 feet of storage.

Colonial Drive at Gregg Street (Node 11)

- Construction of a westbound left-turn lane on Colonial Drive with 150 feet of storage and a left-turn lane.
- Construction of an eastbound left-turn lane on Colonial Drive with 75 feet of storage.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

The current width of Gregg Street is approximately 30 feet in width. Approximately 100 feet east of the intersection with Gregg Street is a single barrel culvert for Smith Branch. Given the close proximity of the intersection to Smith Branch and the existing width of the street, the City should work with the developer to determine an interim context sensitive solution for this intersection while working to develop a long term solution for Colonial Drive and the Smith Branch culvert.

Harden Street at Access 8 (Node 25)

- Construction of a RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns from and onto Harden Street.

Harden Street at Access 9 (Node 26)

- Construction of a Left-In/RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns onto Harden Street.

Harden Street at Access 10 (Node 27)

- Align the proposed driveway with the existing driveway on the eastside of Harden Street
- Construction of a full movement driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a NB left-turn lane with 150 feet of storage and appropriate taper.
- Installation of a traffic signal upon meeting MUTCD warrants and according to SCDOT/City of Columbia guidelines and specifications.

Harden Street at Access 11 (Node 28)

- Construction of a RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns from and onto Harden Street.

Harden Street at Access 12 (Node 29)

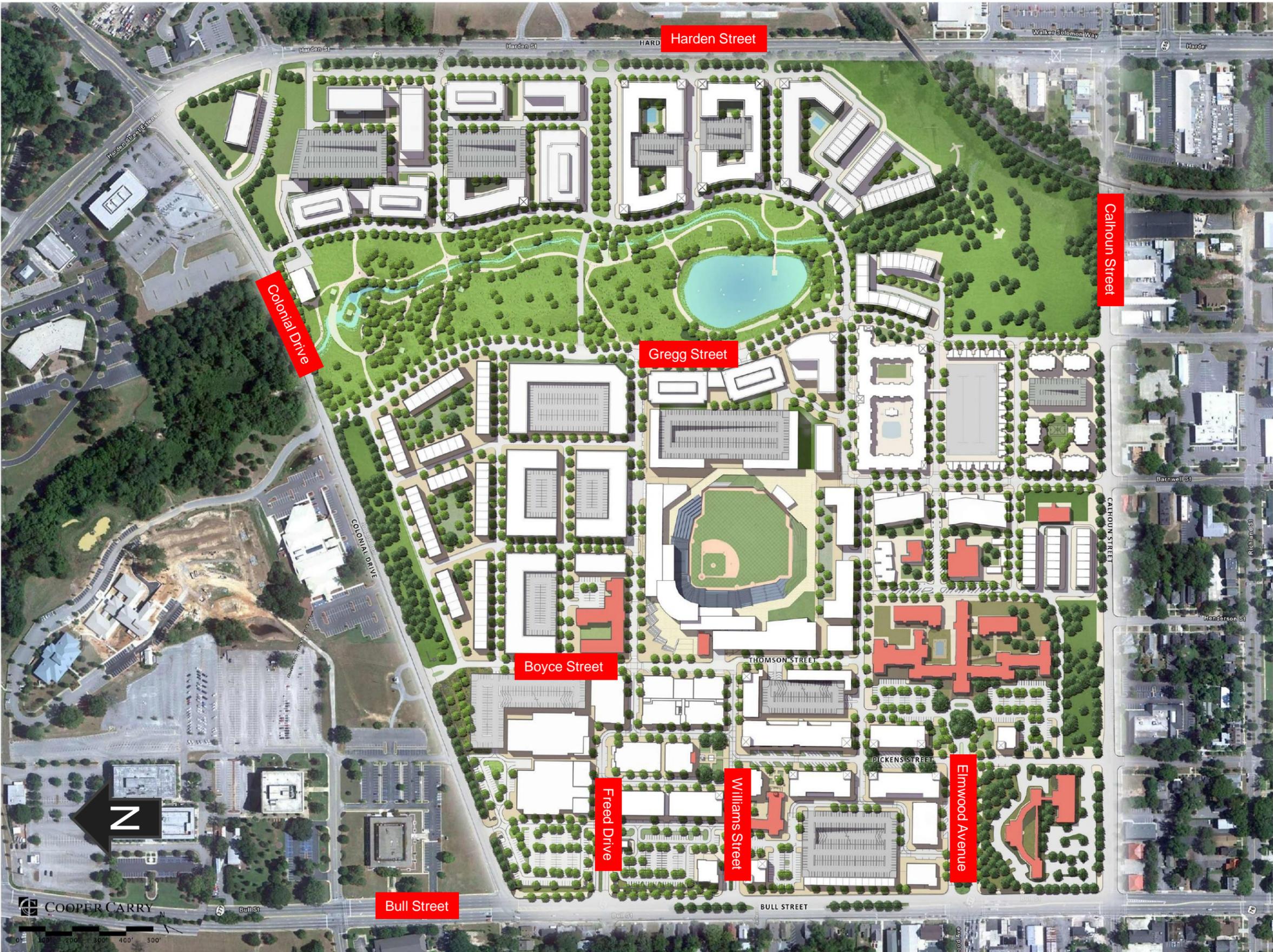
- Construction of a Left-In/RIRO driveway with Harden Street
- Construction of a SB right-turn lane with 100 feet of storage and appropriate taper.
- Construction of a concrete island to restrict left-turns onto Harden Street.

With the addition of the proposed signals on Colonial Drive and Harden Street in combination with the proposed intersection improvements for the corridors, updated corridor timing plans should be developed for the Harden Street and Colonial Drive corridors. The addition of the traffic signals and geometric improvements will have a positive impact on mobility through the corridor and as such signal timings should be updated.

The development scenario above represents a comprehensive evaluation of the proposed buildout (completion) of the BullStreet development and with any development is subject to change due to unforeseen market influencers. As the ultimate project build out occurs in phase 3, the mitigation measures presented in this TIA should be evaluated to determine if they are still applicable for the development that is ultimately constructed. Figure 14 shows the recommended laneage for the proposed development.

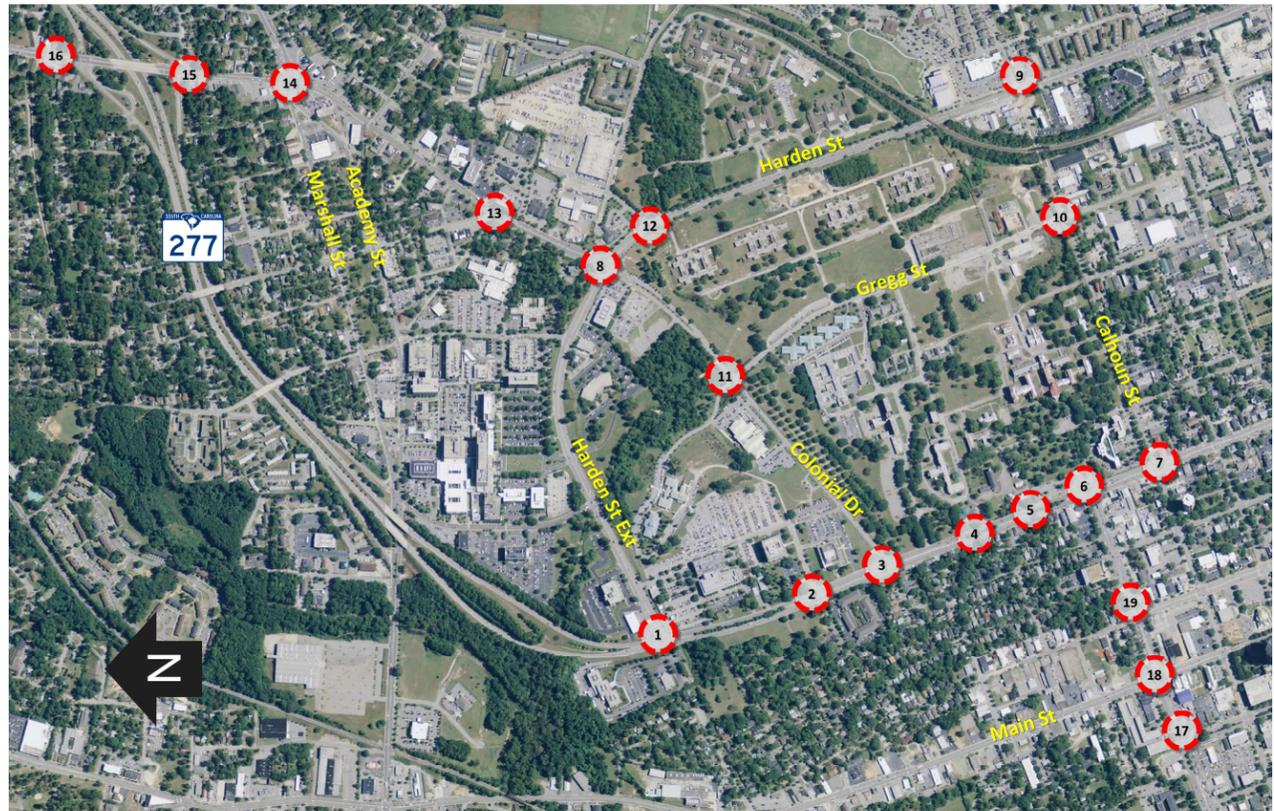
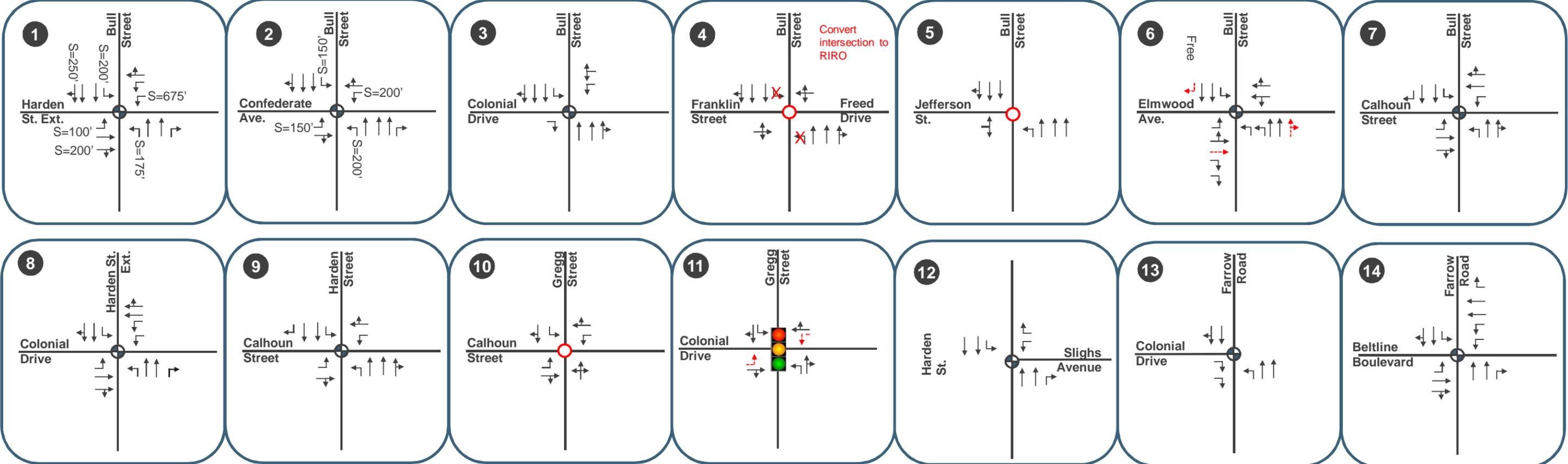
BullStreet Mixed-Use Development

Figure 2 – Site Plan



BullStreet Mixed-Use Development

Figure 14 – Recommended Laneage

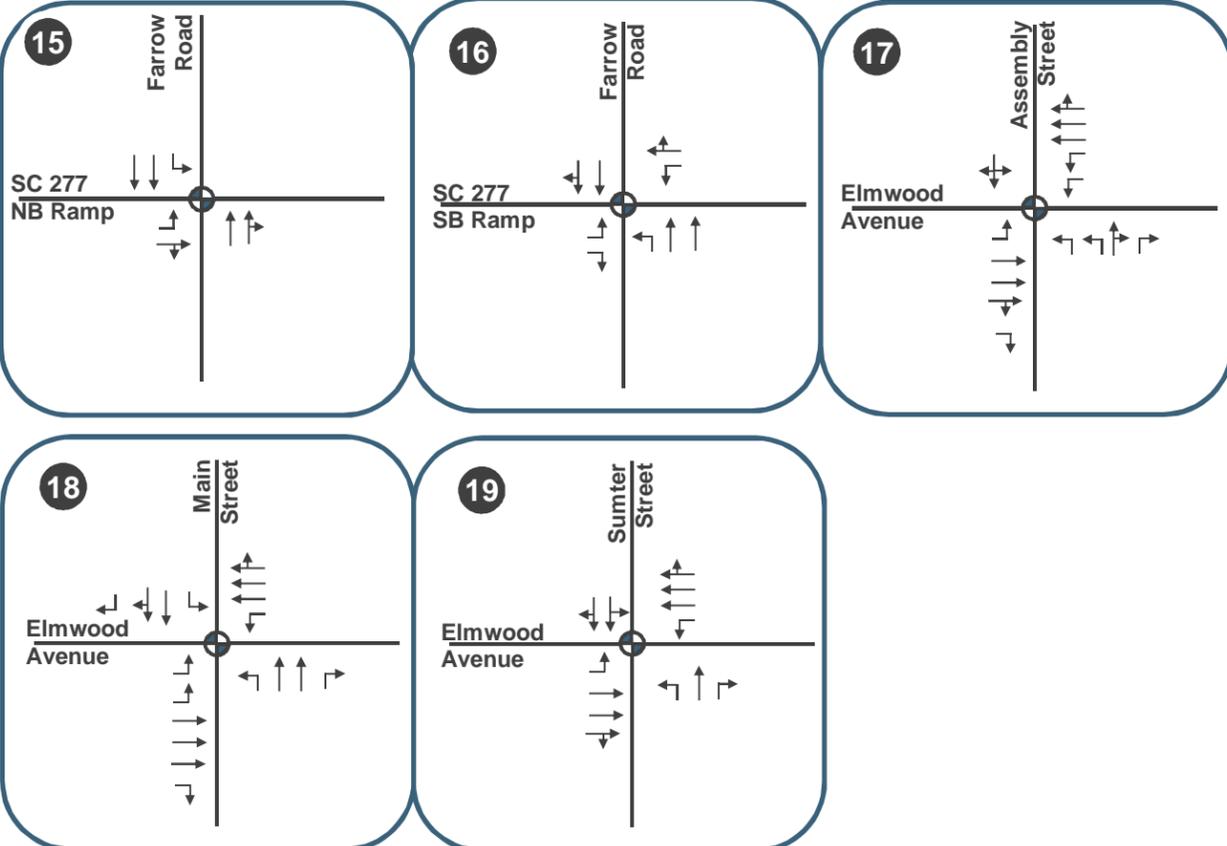


Legend

- X Study Intersection
- Existing Roadway Laneage
- Existing Traffic Signal
- Proposed Traffic Signal
- Existing Stop Control

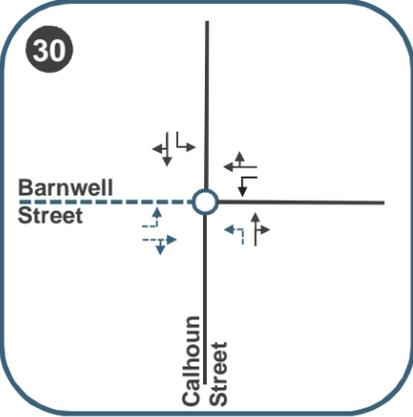
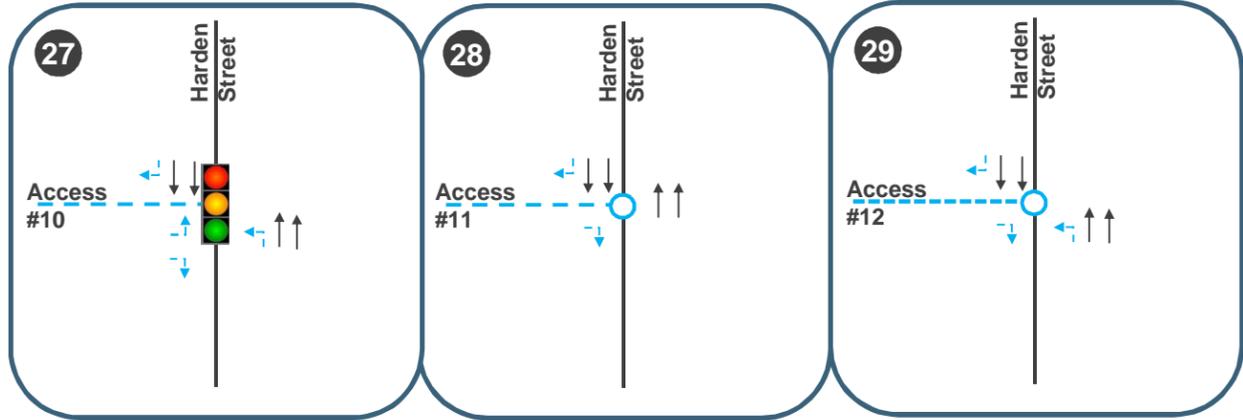
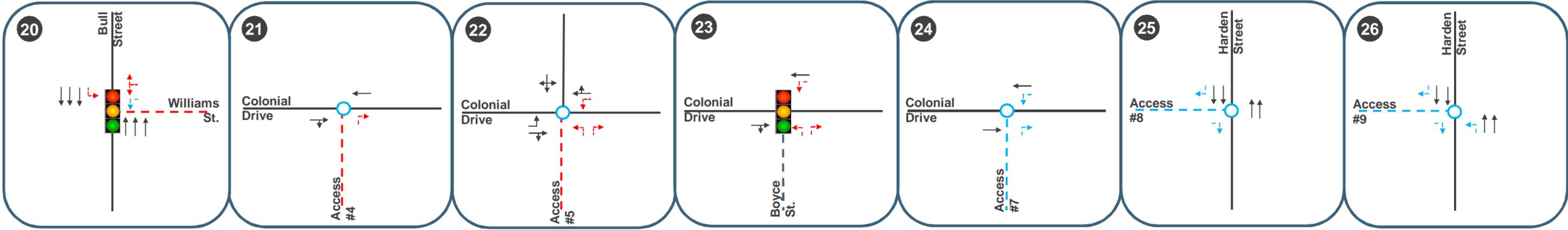
Phase Legend Improvements

- Phase 1
- Phase 2
- Phase 3



BullStreet Mixed-Use Development

Figure 14 (cont.) – Recommended Laneage at Site Driveways



Legend

- X Study Intersection
- Turning Movement
- 🚦 Proposed Traffic Signal
- Proposed stop control
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume

Phase Legend Improvements

- Phase 1
- Phase 2
- Phase 3