



## Appendix S: Other Concepts Considered

# I-95/I-64 Overlap Study



## Proposed Franklin Street Area Improvements (Page 1 of 2)

The final Franklin Street area Six-Year Improvement Program (SYIP) projects agreed to by the study team are shown in **Section 6.2** under SYIP #7. Improvements 1 – 3 described in **Table S1** were proposed in addition to the final SYIP projects at Franklin Street; but were eliminated during the screening process. These improvements were specifically developed to mitigate issues 4 and 5 defined below. Proposed improvements 1 – 3 were eliminated based on the operational and safety concerns summarized in **Table S1**:

The following operational and safety issues were identified at the I-95/Franklin Street interchange area:

1. The existing southbound I-95 off-ramp to Franklin Street experiences queuing during the peak hours, particularly during the AM peak hour.
2. The existing ramp length is approximately 380 feet, which is an insufficient length to store queues during the AM peak hour. Vehicles queuing onto mainline I-95 create a safety issue due to the speed differential between exiting and mainline traffic.
3. Geometric conditions on the off-ramp, which include the change in grade, provide poor intersection visibility to exiting drivers approaching the signalized intersection at the base of the intersection.
4. Vehicles on Franklin Street were observed during the AM peak hour stopping to drop off passengers at the Monroe Building located in the northwest quadrant of the intersection. This operation negatively impacted westbound through traffic on Franklin Street contributing to the queuing issue on the ramp.
5. The pedestrian crossing on the west leg of the intersection in combination with the existing signal timing, contributes to the queuing issue on the ramp.

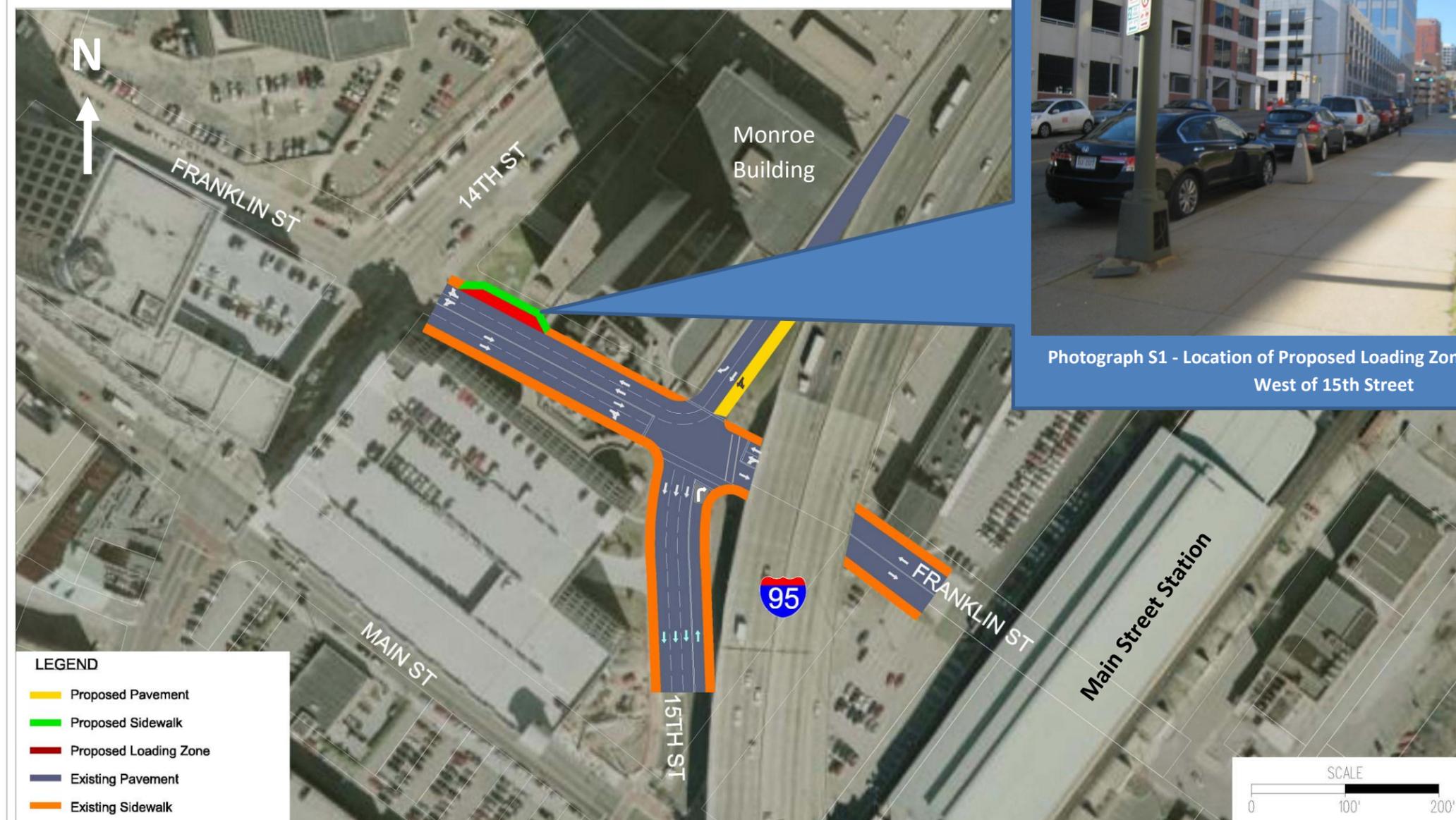
**Table S1: Eliminated Improvements at Franklin Street**

Proposed Improvement #1	Proposed Improvement #2	Proposed Improvement #3
<p>Construct a passenger loading zone on the north side of Franklin Street to provide a designated location to drop-off/pick-up passengers to/from the Monroe Building located on the northwest quadrant of the Franklin Street and southbound I-95 exit ramp/15th Street intersection (refer to <b>Figure S1</b>).</p> <p><b>Concerns</b></p> <ul style="list-style-type: none"> <li>▪ There were safety concerns over pedestrian and vehicle conflicts due to the proposed circular pedestrian drop off shown in <b>Figure S1</b>.</li> <li>▪ This improvement will impact parking in the area and require right-of-way and relocation of the existing sidewalk.</li> <li>▪ The proposed pedestrian drop-off area would require the removal of the five parking spaces shown in <b>Photograph S1</b> and interfere with the aesthetics and pedestrian connectivity between Main Street Station and 14th Street. The City of Richmond has a streetscape project planned for Franklin Street between 14th and 18th Streets as part of their plan to revitalize Main Street Station located just east of 15th Street. In addition, there are plans for future bus rapid transit to use this segment of Franklin Street to access Main Street Station.</li> <li>▪ It was proposed to relocate the five parking spaces identified for removal to adjacent roadways. However, this option was ruled out because the City of Richmond plans to convert every possible parking spot in that area to support local businesses, e.g., including along Franklin Street east of 15th Street. Therefore, there is no place to relocate the parking spaces without effectively taking them away.</li> </ul>	<p>Remove the pedestrian crosswalk on the north and west legs of the Franklin Street and southbound I-95 exit ramp/15th Street intersection. This would reduce conflicts with the heavy southbound right-turn movement during the AM peak hour and allow for more efficient signal timing operations resulting in reduced queues on the southbound I-95 exit ramp.</p> <p><b>Concerns</b></p> <ul style="list-style-type: none"> <li>▪ Based on input from the City of Richmond, pedestrians currently utilize the existing crosswalks and pedestrian signals on every approach of the intersection at Franklin Street and southbound I-95 exit ramp/15th Street. The City of Richmond prefers to continue this practice and therefore, is not in favor of removing the crosswalk on the west leg of the intersection. For example, it was determined impractical to expect pedestrians traveling eastbound on Franklin Street to cross Franklin Street, then 15th Street, and then Franklin Street again to reach the parking lots north of Franklin Street or to other destinations north.</li> <li>▪ There was also opposition against removing the crosswalk on the west leg of the intersection because it is anticipated to be a major pedestrian crossing into Main Street Station in the future after planned multimodal improvements are completed.</li> </ul>	<p>Restrict the northbound left-turn movement at the intersection of Franklin Street and southbound I-95 exit ramp/15th Street. The portion of the signal timing used to accommodate this low volume movement could be reallocated to serve heavier vehicular and pedestrian movements in an effort to reduce the existing queues on the southbound I-95 exit ramp.</p> <p><b>Concerns</b></p> <ul style="list-style-type: none"> <li>▪ Restricting the northbound left turn movement at Franklin Street and southbound I-95 exit ramp/15th Street would redistribute traffic volumes to adjacent intersections. Concern of the operational impacts this would have at adjacent intersections was not addressed as part of this study.</li> <li>▪ The ability to effectively sign the restricted northbound movement on Main Street prior to vehicles accessing 15th Street was a concern. The concern was that vehicles would access 15th Street from Main Street and be required to turn around in the Main Street Station parking lot.</li> </ul>

# I-95/I-64 Overlap Study



## Proposed Franklin Street Area Improvements (Page 2 of 2)



Photograph S1 - Location of Proposed Loading Zone on Franklin Street West of 15th Street



### I-95 FRANKLIN INTERCHANGE - SB LANE AND PASSENGER LOADING ZONE

VDOT Overlap Safety and Operations Study I-95 and I-64  
City of Richmond and Henrico County, VA

Figure S1

# I-95/I-64 Overlap Study



## Proposed Lane Re-Designation - Northbound I-95

### Operational and Safety Issues

The Bryan Park Interchange currently experiences heavy eastbound I-64/northbound I-195 to northbound I-95 interstate-to-interstate traffic volumes during the AM and PM peak hours, as shown in **Table S2**, on a one-lane ramp. During the AM peak hour there is more demand on the one-lane ramp (2,463 vehicles) than on the three northbound I-95 travel lanes (1,913 vehicles). Similarly, during the PM peak hour there is equal demand on the one-lane ramp (2,711 vehicles) and the northbound I-95 travel lanes (2,906 vehicles). The over-capacity on-ramp results in a queuing issue that extends upstream on both eastbound I-64 and northbound I-195. This issue is compounded by a short merging distance of 500 feet which is limited by the Hermitage Bridge over I-95.

**Table S2: Lane Re-Designation – Northbound I-95 - Traffic Volumes**

Map ID	Roadway/Ramp	# of Lanes	2011 Peak Hour Traffic Volumes	
			AM (7:30 to 8:30)	PM (4:30 to 5:30)
1	WB I-64/SB I-195 Off-Ramp	2	3,798	4,106
2	NB I-95 Mainline	3	1,913	2,906
3	EB I-64/NB I-195 On-Ramp	1	2,463	2,711

Vehicles were observed during peak hour observations positioning themselves upstream of the merge from eastbound I-64/northbound I-195 due to the short merging distance. Vehicles are primarily in the two leftmost lanes of northbound I-95 as shown in **Photograph S2**. **Photograph S2** also shows the AM peak hour queuing on the eastbound I-64/northbound I-195 on-ramp and the unbalanced lane utilization on the northbound I-95 travel lanes.

### Proposed Improvement

This improvement suggests shifting northbound I-95 from three travel lanes to two travel lanes by dropping the rightmost lane at the diverge to westbound I-64/southbound I-195 as shown in **Figure S2**. It also restricts travel in the rightmost lane between the diverge to westbound I-64/southbound I-195 and the merge from eastbound I-64/northbound I-195 (shown as the dashed red line on **Figure S2**). This improvement could be accomplished through pavement markings and signing. The proposed improvement would allow traffic from the eastbound I-64/northbound I-195 on-ramp to merge into a dedicated lane, improving traffic flow and reducing upstream queues.

### Concerns

The proposed lane re-designation was eliminated during the second screening process due to the following concerns expressed by the study work group:

- The minimal peak hour improvement (between 4% and 10% based on the 2022 and 2035 VISSIM operational analysis) does not outweigh the daily capacity loss on northbound I-95.
- The proposed improvement would create a safety issue resulting in crashes where the rightmost lane on northbound I-95 merges to the left.
- Difficulty providing effective signing of the proposed improvement due to existing signing throughout the I-95/I-64 corridor was a concern.
- The ability of the proposed improvement to meet weekend demands was a concern. The study focused on the weekday peak hour conditions. Therefore, this concern was not investigated.
- The study work group requested additional lane utilization data to confirm field observations of the unbalanced lane utilization.



Photograph S2: EB I-64/NB I-195 On-Ramp to NB I-95



**NORTHBOUND I-95 - LANE RE-DESIGNATION**  
I-95/I-64 Overlap Study  
City of Richmond and Henrico County, VA

**Figure S2**

# I-95/I-64 Overlap Study



## Proposed Lane Re-Designation - Southbound I-95

### Operational and Safety Issues

The Bryan Park Interchange currently experiences heavy eastbound I-64/northbound I-195 to southbound I-95/I-64 interstate-to-interstate traffic volumes during the AM and PM peak hours, as shown in **Table S3**, on a two-lane ramp. During the AM and PM peak hours there is more demand on the two-lane ramp (3,492 and 3,626 vehicles, respectively) than on the three southbound I-95 travel lanes (2,957 and 1,723 vehicles, respectively). The over capacity on-ramp results in a queuing issue that extends upstream on both eastbound I-64 and northbound I-195. This issue is compounded by the merging movement into a shared lane with southbound I-95 and the lane drop of the rightmost lane downstream at the off-ramp to Boulevard.

**Table S3: Lane Re-Designation – Southbound I-95 - Traffic Volumes**

Map ID	Roadway/Ramp	# of Lanes	Peak Hour Traffic Volumes	
			AM (7:30 to 8:30)	PM (4:30 to 5:30)
1	WB I-64/SB I-195 Off-Ramp	2	3,122	2,770
2	SB I-95 Mainline	3	2,957	1,723
3	EB I-64/NB I-195 On-Ramp	2	3,492	3,626

Vehicles were observed during peak hour observations positioning themselves upstream of the merge from eastbound I-64/northbound I-195. Because of this and the traffic volume demand vehicles are primarily in the two leftmost lanes creating unbalanced lane utilization on the southbound I-95 travel lanes.

### Proposed Improvement

This improvement suggests shifting southbound I-95 from three travel lanes to two travel lanes by dropping the rightmost lane at the diverge to westbound I-64/southbound I-195 as shown in **Figure S3**. It also restricts travel in the rightmost lane between the diverge to westbound I-64/southbound I-195 and the merge from eastbound I-64/northbound I-195 (shown as the dashed red line on **Figure S3**). This improvement could be accomplished through pavement markings and signing. The proposed improvement would allow traffic from the eastbound I-64/northbound I-195 on-ramp to merge into dedicated lane, improving traffic flow and reducing upstream queues.

### Concerns

The proposed lane re-designation was eliminated during the second screening process due to the following concerns expressed by the study work group:

- The minimal peak hour improvement (between 4% and 9% based on the 2022 and 2035 VISSIM operational analysis) does not outweigh the daily capacity loss on southbound I-95.
- The proposed improvement will create a safety issue resulting in crashes where the rightmost lane on southbound I-95 merges to the left.
- Difficulty providing effective signing of the proposed improvement due to existing upstream signing.
- The ability of the proposed improvement to meet weekend summer demands was a concern. The study focused on the weekday peak hour conditions. Therefore, this concern was not investigated.
- The study work group requested additional lane utilization data to confirm field observations of the unbalanced lane utilization.

