

7.0 2030 Travel Demand and Capacity Analysis

The purpose of the future conditions travel analysis is to evaluate the ability of the roadway network within the Phase 2 study area to meet the 2030 travel demand and to determine if changes in the transportation system proposed by this study will accommodate that demand.

7.1 Travel Demand Forecasting

The 2030 daily and peak hour traffic volumes were developed from the Winston-Salem Regional Travel Demand Model maintained by the North Carolina Department of Transportation (NCDOT). The first step in the travel demand forecasting process was to validate the model projections. To accomplish this, the 2004 model AADT traffic estimates were compared with the 2003 ADT count data. The comparison indicated that two different methodologies for estimating future traffic volumes would be needed for the study area as explained below.

For Business I-40 and the study area roads south of Business I-40, a comparison of the travel demand model projections and ADT count data indicated that the 2004 AADT model projections and 2003 ADT count data were similar. Therefore, the 2030 model volumes were directly used for the future traffic projections.

For the US 52 corridor and for most study area roads north of Business I-40, the 2004 model projections were significantly higher than the 2003 ADT count data. Therefore, the 2030 ADT traffic projections were developed by applying growth rates from the model to 2003 ADT count data. The regional model indicated a growth rate of 1.0 percent per year for US 52, and a growth rate of 2.4 percent per year for the study area roads north of Business I-40.

There are several routes that are either new alignments or an extension of an existing route that would significantly change the future traffic patterns from current conditions:

- Martin Luther King, Jr. Drive between Northwest Boulevard and US 52 (extension of existing route)
- Salem Creek Connector (new route)
- Research Park Boulevard between Martin Luther King, Jr. Drive and Salem Creek Connector (new route)

For these routes, the 2030 model volumes were directly used for the future traffic analysis. Table 7-1 summarizes the comparison of the 2003 ADT count data and the 2004 AADT model projections and the annual growth rate calculated using the 2004 and 2030 model projections for the study area roads.

After developing the 2030 traffic projections, the peak hour intersection turning movement volumes were developed in a two-step process. In the first step, the directional design hour traffic volumes were calculated for each approach by multiplying the ADTs by the design hour factor (K) and directional distribution factor (D). The following K-and D- factors used for this study were developed from 2005 PM peak hour traffic counts and 2003 ADT count data: K factor -10 percent; D-factor factor - 60 percent.

In the second step, the directional design hour traffic volumes for each approach at every intersection were distributed into through, left and right turning movements as a proportion of the volumes on each exit leg of the intersection.

Table 7-1. Comparison of Winston-Salem Regional Travel Demand Model Projections and 2003 ADT Count Data

| Segment | From | To | Model Projections | | 2003 Count Data | Percent Difference (model/count) | Annual Growth Rate |
|-----------------|---------------------|---------------------|-------------------|--------|-----------------|----------------------------------|--------------------|
| | | | 2004 | 2030 | | | |
| Marshall Street | Salem Avenue | Business I-40 | 4,210 | 10,975 | 4,400 | 95.49% | 6.18% |
| | Business I-40 | Fifth Street | 3,457 | 5,454 | 11,400 | -129.77% | 2.22% |
| | Fifth Street | MLK, Jr. Drive | 3,719 | 6,365 | 10,000 | -68.89% | 2.74% |
| Cherry Street | Second Street | Fifth Street | 2,011 | 4,774 | 8,400 | -217.70% | 5.28% |
| | Fifth Street | MLK Jr. Drive | 1,968 | 4,029 | 7,400 | -176.02% | 4.03% |
| Old Salem Road | Salem Avenue | Academy Street | 13,501 | 14,976 | 5,700 | 157.78% | 0.42% |
| | Academy Street | Brookstown Avenue | 6,889 | 8,827 | 2,500 | 163.71% | 1.08% |
| Liberty Street | Brookstown Avenue | Fourth Street | 4,645 | 7,137 | 4,400 | 105.27% | 2.06% |
| | Fourth Street | MLK, Jr. Drive | 3,184 | 5,258 | 6,500 | -4.15% | 2.51% |
| Main Street | Second Street | Fifth Street | 4,806 | 6,194 | 11,700 | -43.45% | 1.11% |
| | Fifth Street | MLK, Jr. Drive | 2,023 | 3,702 | 4,400 | -17.50% | 3.19% |
| Salem Avenue | Old Salem Road | Stadium Drive | 1,500 | 10,418 | 5,000 | -133.33% | 22.87% |
| | Stadium Drive | Business I-40 | 2,159 | 8,729 | 3,600 | 33.26% | 11.70% |
| Linden Street | Third Street | Fifth Street | 6,311 | 20,930 | 754 | 188.05% | 8.91% |
| | Fifth Street | MLK, Jr. Drive | 9,687 | 24,639 | 1,200 | 187.61% | 5.94% |
| Stadium Drive | E Salem Avenue | US 52 | 26,983 | 6,880 | 9,000 | 166.65% | -2.87% |
| | US 52 | MLK, Jr. Drive | 12,151 | 6,880 | 18,000 | 51.86% | -1.67% |
| First Street | Marshall Street | Main Street | 2,499 | 7,743 | 5,200 | -8.08% | 8.07% |
| Second Street | Marshall Street | Cherry Street | 2,185 | 4,719 | 7,200 | -129.52% | 4.46% |
| | Cherry Street | Main Street | 2,237 | 6,606 | 4,700 | -10.10% | 7.51% |
| Third Street | Cherry Street | Liberty Street | 934 | 1,254 | 3,100 | -131.91% | 1.32% |
| | Liberty Street | US 52 | 2,489 | 4,483 | 4,600 | 15.19% | 3.08% |
| | US 52 | MLK, Jr. Drive | 11,150 | 19,635 | 4,400 | 160.54% | 2.93% |
| Fourth Street | Marshall Street | Church Street | 8,429 | 11,379 | 4,900 | 141.87% | 1.35% |
| | Church Street | US 52 | 2,998 | 5,943 | 5,200 | 26.55% | 3.78% |
| | US 52 | MLK, Jr. Drive | 1,333 | 1,957 | 2,600 | 4.95% | 1.80% |
| Fifth Street | Marshall Street | Trade Street | 4,946 | 5,983 | 8,400 | 30.17% | 0.81% |
| | Trade Street | US 52 | 2,411 | 4,323 | 6,300 | -61.30% | 3.05% |
| | US 52 | MLK, Jr. Drive | 3,723 | 3,035 | 6,400 | 28.10% | -0.71% |
| Sixth Street | Marshall Street | Liberty Street | 4,010 | 4,967 | 4,500 | 87.78% | 0.92% |
| | Liberty Street | Church Street | 2,687 | 4,828 | 1,700 | 136.73% | 3.06% |
| Seventh Street | Marshall Street | Liberty Street | 7,391 | 10,039 | 1,200 | 183.76% | 1.38% |
| | Liberty Street | Linden Street | 5,658 | 8,713 | 1,000 | 182.33% | 2.08% |
| MLK, Jr. Drive | Marshall Street | Patterson Avenue | 6,700 | 23,000 | 10,000 | 50.75% | 9.36% |
| | Patterson Avenue | US 52 | 13,155 | 43,079 | 10,000 | 123.98% | 8.75% |
| | US 52 | New Walkertown Road | 11,369 | 21,031 | 13,000 | 85.65% | 3.27% |
| | New Walkertown Road | Fifth Street | 10,098 | 15,007 | 20,000 | 1.94% | 1.87% |
| | Fifth Street | Business I-40 | 10,260 | 18,378 | 17,000 | 34.31% | 3.04% |
| | Business I-40 | Stadium Drive | 21,960 | 16,685 | 19,000 | 113.48% | -0.92% |
| | Stadium Drive | Argonne Blvd | 12,188 | 14,338 | 12,000 | 101.54% | 0.68% |

7.2 2030 Operational Analysis

As part of the US 52 Phase 2 study process, future transportation plans were considered including the existing and planned roadway improvements as listed in the 2030 Winston-Salem Urban Area Long Range Transportation Plan, which is defined as the 2030 No Build Conditions for this study. The proposed transportation improvements as described in Section 6.0 of this report are considered to be the 2030 Build Conditions scenario.

This analysis uses the 2000 Highway Capacity Manual, 2002 Florida Department of Transportation Quality/Level of Service Handbook and SYNCHRO analysis methodologies to evaluate the ability of the proposed transportation improvements to meet the future travel demand. The following describes the results of the capacity analyses for the 2030 No Build Conditions and the 2030 Build Conditions.

7.2.1 2030 No Build Conditions Capacity Analysis

The No Build Conditions assumed year 2030 travel conditions with no improvements to the existing transportation system beyond those approved and adopted by the 2030 Winston-Salem Urban Area Long Range Transportation Plan as described in Section 5.0 of this report. The 2030 No Build Conditions travel analysis included peak hour capacity analyses for freeway mainline, ramps, weaving segments, and arterial streets.

Freeway Mainline Capacity Analysis

The mainline capacity analysis of the 2030 No Build traffic flow conditions indicates that with the proposed improvements to US 52 in place, the traffic flow along US 52 between Business I-40 and Martin Luther King, Jr. Drive would function at Level of Service C or better throughout the day. Traffic flow along US 52 between Salem Creek Connector and Business I-40 would approach the capacity limits during at least one peak period of the day. Thus, it appears that the proposed improvements to US 52 would meet the expected travel demand on this facility for the next 25 years.

Traffic flow along Business I-40 within the Phase 2 study area would either approach or exceed the capacity limits (Level of Service E or F) of the facility during at least one peak period of the day which indicates a need for additional east-west freeway capacity.

Tables 7-2 and 7-3 show the results of AM and PM peak hour mainline capacity analysis on US 52 and Business I-40 for the 2030 No Build Conditions. Figure 7-1 shows the 2030 No Build Conditions mainline and ramp traffic volumes for US 52 and Business I-40.

Table 7-2. AM Peak Hour Mainline Capacity Analysis 2030 No Build Conditions

| Mainline | Corridor Crossroad | Volume | Capacity | Level of Service | Volume | Capacity | Level of Service |
|---------------|---|------------|----------|------------------|------------|----------|------------------|
| | | Southbound | | | Northbound | | |
| US 52 | From Salem Creek Connector to Business I-40 | 3985 | 6750 | C | 5725 | 6750 | E |
| | From Business I-40 to MLK, Jr. Drive | 4910 | 9000 | C | 4950 | 9000 | C |
| | | Westbound | | | Eastbound | | |
| Business I-40 | From Cherry Street to Liberty Street | 4365 | 4500 | E | 3160 | 4500 | D |
| | From Main Street to US 52 | 5775 | 4500 | F | 3470 | 4500 | D |
| | From US 52 to MLK, Jr. Drive | 4975 | 4500 | F | 4070 | 4500 | E |

Table 7-3. PM Peak Hour Mainline Capacity Analysis 2030 No Build Conditions

| Mainline | Corridor Crossroad | Volume | Capacity | Level of Service | Volume | Capacity | Level of Service |
|---------------|---|------------|----------|------------------|------------|----------|------------------|
| | | Southbound | | | Northbound | | |
| US 52 | From Salem Creek Connector to Business I-40 | 5725 | 6750 | E | 3985 | 6750 | C |
| | From Business I-40 to MLK, Jr. Drive | 4950 | 9000 | C | 4910 | 9000 | C |
| | | Westbound | | | Eastbound | | |
| Business I-40 | From Cherry Street to Liberty Street | 3225 | 4500 | D | 4145 | 4500 | E |
| | From Main Street to US 52 | 4375 | 4500 | E | 4870 | 4500 | F |
| | From US 52 to MLK, Jr. Drive | 4975 | 4500 | F | 4070 | 4500 | E |

Freeway Ramp Capacity Analysis

The 2030 No Build Conditions capacity analysis of peak hour ramp volumes indicates that traffic demand on all of the exit and entrance ramps on US 52 and Business I-40 would continue to be below the capacity limits with one exception which is the exit and entrance ramps on southbound and northbound US 52 at Martin Luther King, Jr. Drive. The traffic flow at this location could be improved by widening the one-lane ramps (as planned in the Phase 1 preliminary design plans) to two-lane ramps which would increase the ramp capacities from 1800 vehicles-per-hour (vph) to 3200 vph. With this improvement, traffic demand on all the exit and entrance ramps in the study area would function below the capacity limits. Table 7-4 and Table 7-5 show the results of AM and PM peak hour volumes and capacity analyses for ramps along US 52 and Business I-40 in the study area.

Freeway Weaving Segments Capacity Analysis

The 2030 No Build Conditions capacity analysis of the weaving segments indicates that the traffic along weaving segments on US 52 would flow at Levels of Service D or better throughout the day. Along Business I-40, the capacity analysis indicates that the weaving segments would fail in serving the 2030 travel demands during both AM and PM peak periods of the day.

Table 7-6 and Table 7-7 show the results of AM and PM peak hour weaving segments capacity analyses on US 52 and Business I-40.

Arterial Capacity Analysis

The arterial capacity analysis of the 2030 No Build traffic flow conditions in the Phase 2 study area indicates that of the 108 arterial segments analyzed, only four (4) segments with v/c ratios greater than 0.90 would be congested. Table 7-8 shows the peak hour traffic volumes and the corresponding v/c ratios for these four segments in the Phase 2 study area for the 2030 No Build Conditions.

Appendix A present a detailed table with the peak hour traffic volumes and the corresponding v/c ratios for all the segments analyzed in this study.

7.2.2 2030 Build Conditions Capacity Analysis

The 2030 Build Conditions represents future traffic flow conditions in the Phase 2 study area with the proposed transportation improvements as outlined in Section 6.0 added to the planned improvements assumed in the 2030 No Build Conditions. The proposed improvements described in detail in Section 6.0 are mostly minor roadway changes that would improve traffic circulation, street connectivity and provide for more pedestrian and transit oriented street environments.

The 2030 Build Conditions does not include any changes along the freeways in the study area and the capacity analysis for the freeways would be the same as under 2030 No Build Conditions including the need for additional capacity at the exit and entrance ramps on southbound and northbound US 52 at Martin Luther King, Jr. Drive. Widening these ramps would improve the traffic flow at this location but would not affect the traffic flow at any other locations along US 52. Therefore, under the 2030 Build Conditions, the capacity analysis was performed only for the arterials and intersections where roadway changes have been proposed as described in Section 6.0.

Arterial Capacity Analysis

The arterial capacity analysis of the 2030 Build traffic flow conditions in the Phase 2 study area indicates that of the 108 arterial segments analyzed, only three (3) segments with v/c ratios greater than 0.90 would be congested. Table 7-9 shows the peak hour traffic volumes and the corresponding v/c ratios for these three segments in the study area for the 2030 Build Conditions.

Table 7-4. AM Peak Hour 2030 No Build Conditions

| Corridor Crossroad | Ramp | Volume | Capacity | Over Capacity | Ramp | Volume | Capacity | Over Capacity |
|---------------------------|----------------|-------------------|----------|---------------|-------------------|----------------|----------|---------------|
| US 52 | | Southbound | | | Northbound | | | |
| Salem Creek Connector | Exit | 570 | 1800 | No | Entrance | 860 | 1800 | No |
| | Entrance | 285 | 1400 | No | Exit | 420 | 1400 | No |
| Business I-40 Eastbound | Exit | 1015 | 1800 | No | Entrance | 1060 | 1800 | No |
| | Entrance | 390 | 1800 | No | Exit | 1035 | 1800 | No |
| Business I-40 Westbound | Exit | 1590 | 1800 | No | Entrance | 675 | 1800 | No |
| | Entrance | 690 | 1400 | No | Exit | 575 | 1400 | No |
| Third Street/Fifth Street | Exit | Not Applicable | | | Entrance | Not Applicable | | |
| | Entrance | 600 | 1800 | No | Exit | 900 | 1800 | No |
| MLK, Jr. Drive | Exit | 1985 | 1800 | Yes | Entrance | 1765 | 1800 | No |
| | Entrance | 1535 | 1800 | No | Exit | 1915 | 1800 | Yes |
| Business I-40 | | Westbound | | | Eastbound | | | |
| Marshall Street | Entrance | 1015 | 1800 | No | Not Applicable | | | |
| Liberty Street | Not Applicable | | | | Exit | 270 | 1800 | No |
| Main Street | Not Applicable | | | | Exit | 570 | 1800 | No |
| | Exit | 1410 | 1800 | No | Entrance | 1150 | 1800 | No |
| US 52 Southbound | Entrance | 1590 | 1800 | No | Exit | 390 | 1800 | No |
| | Exit | 690 | 1400 | No | Entrance | 1015 | 1800 | No |
| US 52 Northbound | Entrance | 575 | 1400 | No | Exit | 1060 | 1800 | No |
| | Exit | 675 | 1800 | No | Entrance | 1035 | 1800 | No |
| MLK, Jr. Drive | Entrance | 420 | 1400 | No | Exit | 1005 | 1400 | No |
| | Exit | 190 | 1800 | No | Entrance | 700 | 1800 | No |

Table 7-5. PM Peak Hour Ramp Capacity Analysis 2030 No Build Conditions

| Corridor Crossroad | Ramp | Volume | Capacity | Over Capacity | Ramp | Volume | Capacity | Over Capacity |
|---------------------------|----------------|-------------------|----------|---------------|-------------------|----------------|----------|---------------|
| US 52 | | Southbound | | | Northbound | | | |
| Salem Creek Connector | Exit | 860 | 1800 | No | Entrance | 570 | 1800 | No |
| | Entrance | 420 | 1400 | No | Exit | 285 | 1400 | No |
| Business I-40 Eastbound | Exit | 675 | 1800 | No | Entrance | 1590 | 1800 | No |
| | Entrance | 575 | 1800 | No | Exit | 690 | 1800 | No |
| Business I-40 Westbound | Exit | 1060 | 1800 | No | Entrance | 1015 | 1800 | No |
| | Entrance | 1035 | 1400 | No | Exit | 390 | 1400 | No |
| Third Street/Fifth Street | Exit | Not Applicable | | | Entrance | Not Applicable | | |
| | Entrance | 900 | 1800 | No | Exit | 600 | 1800 | No |
| MLK, Jr. Drive | Exit | 1765 | 1800 | No | Entrance | 1985 | 1800 | Yes |
| | Entrance | 1915 | 1800 | Yes | Exit | 1535 | 1800 | No |
| Business I-40 | | Westbound | | | Eastbound | | | |
| Marshall Street | Entrance | 1165 | 1800 | No | Not Applicable | | | |
| Liberty Street | Not Applicable | | | | Exit | 220 | 1800 | No |
| Main Street | Not Applicable | | | | Exit | 465 | 1400 | No |
| | Exit | 1150 | 1800 | No | Entrance | 1410 | 1800 | No |
| US 52 Southbound | Entrance | 1060 | 1800 | No | Exit | 575 | 1800 | No |
| | Exit | 1035 | 1400 | No | Entrance | 675 | 1800 | No |
| US 52 Northbound | Entrance | 390 | 1400 | No | Exit | 1590 | 1800 | No |
| | Exit | 1015 | 1800 | No | Entrance | 690 | 1800 | No |
| MLK, Jr. Drive | Entrance | 470 | 1400 | No | Exit | 1370 | 1400 | No |
| | Exit | 130 | 1800 | No | Entrance | 605 | 1800 | No |

Table 7-6. AM Peak Hour Weaving Segment Analysis 2030 No Build Conditions

| Mainline Section Corridor Crossroad | Density* | Level of Service | Density* | Level of Service | |
|---|----------|-------------------|----------|-------------------|--|
| US 52 | | Southbound | | Northbound | |
| From MLK, Jr. Drive to Business I-40 | 21.48 | B | 19.81 | B | |
| From Business I-40 to Salem Creek Connector | 20.13 | C | 33.94 | D | |
| Business I-40 | | Westbound | | Eastbound | |
| From Main Street to US 52 | 73.28 | F | 41.42 | F | |
| From US 52 SB to US 52 NB (between the loops) | 62.72 | F | N/A | N/A | |
| From US 52 to MLK, Jr. Drive | 70.92 | F | 69.20 | F | |

* Density figures are passenger cars per mile per lane

Table 7-7. PM Peak Hour Weaving Segment Analysis 2030 No Build Conditions

| Mainline Section Corridor Crossroad | Density* | Level of Service | Density* | Level of Service | |
|---|----------|-------------------|----------|-------------------|--|
| US 52 | | Southbound | | Northbound | |
| From MLK, Jr. Drive to Business I-40 | 19.86 | B | 21.45 | C | |
| From Business I-40 to Salem Creek Connector | 31.60 | D | 21.46 | C | |
| Business I-40 | | Westbound | | Eastbound | |
| From Main Street to US 52 | 50.40 | F | 65.02 | F | |
| From US 52 SB to US 52 NB (between the loops) | 57.47 | F | N/A | N/A | |
| From US 52 to MLK, Jr. Drive | 66.88 | F | 64.12 | F | |

* Density figures are passenger cars per mile per lane

Table 7-8. Arterial Capacity Analysis 2030 No Build Conditions

| Segment | From | To | No. of Lanes | Peak Hour Volume (vph) | V/C Ratio |
|-----------------------|-----------------|---------------------|--------------|------------------------|-----------|
| Salem Creek Connector | Stadium Drive | US 52 | 4 | 3,200 | 0.93 |
| MLK, Jr. Drive | Marshall Street | Trade Street | 2 | 3,660 | 2.25 |
| | Linden Street | US 52 | 4 | 4,310 | 1.25 |
| | Business I-40 | New Walkertown Road | 4 | 3,300 | 0.96 |

Table 7-9. Arterial Capacity Analysis 2030 Build Conditions

| Segment | From | To | No. of Lanes | Peak Hour Volume (vph) | V/C Ratio |
|-----------------------|---------------|---------------------|--------------|------------------------|-----------|
| Salem Creek Connector | Stadium Drive | US 52 | 4 | 3,200 | 0.93 |
| MLK, Jr. Drive | Stadium Drive | Business I-40 | 2 | 1,670 | 1.02 |
| | Business I-40 | New Walkertown Road | 4 | 3,300 | 0.96 |

Intersection Capacity Analysis

Of the 32 intersections analyzed under the 2005 existing conditions, this study did not recommend any changes in the travel pattern at 21 intersections. Under the 2030 Build Conditions, the capacity analysis was performed at 14 intersections of which 11 intersections are proposed to be modified as described in Section 6.0, and three intersections had delays of Level of Service D or worse under the 2005 existing conditions. The 2005 existing conditions intersection capacity analysis indicated that during the AM and PM peak hours of the day, the PM peak hour travel conditions represent a heavier traffic flow in the study area. Therefore, under the 2030 Build Conditions, the intersection capacity analysis conducted for this study is only for the PM peak hour travel conditions.

The following is the list of the intersections analyzed for the 2030 Build Conditions and a summary of the capacity analyses and proposed lane configurations for these intersections. This study analyzed all of the following intersections as signalized intersections.

- Martin Luther King, Jr. Drive @ Reynolds Park Road
- Martin Luther King, Jr. Drive @ Stadium Drive
- Third Street @ Liberty Street
- Third Street @ Main Street
- Fourth Street @ Marshall Street
- Fourth Street @ Cherry Street
- Fifth Street @ Liberty Street
- Fifth Street @ Main Street
- Martin Luther King, Jr. Drive @ Fifth Street
- Martin Luther King, Jr. Drive @ New Walkertown Road
- Martin Luther King, Jr. Drive @ Cherry Street/Marshall Street
- Martin Luther King, Jr. Drive @ Research Park Boulevard
- Martin Luther King, Jr. Drive @ US 52 Ramps
- Martin Luther King, Jr. Drive @ Cleveland Avenue

Martin Luther King, Jr. Drive @ Reynolds Park Road: This study analyzed the possibility of reducing the existing four-lane section of Martin Luther King, Jr. Drive between Reynolds Park Road and Stadium Drive to a two-lane section through the Winston-Salem State University campus. Reynolds Park Road will remain as a two-lane, two-way street.

Proposed intersection lane configuration:

- On the eastbound driveway, one through-lane (shared with right-turning movement) and an exclusive left-turn lane
- On westbound Reynolds Park Road, one through lane (shared with right-turning movement) and an exclusive left-turn lane
- On northbound Martin Luther King, Jr. Drive, one through lane, an exclusive left-turn lane and an exclusive right-turn lane
- On southbound Martin Luther King, Jr. Drive, one through lane (shared with right-turning movement) and an exclusive left-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service C during the PM peak period, a good rate of traffic flow.

Martin Luther King, Jr. Drive @ Stadium Drive: This study analyzed the possibility of reducing the existing four-lane section of Martin Luther King, Jr. Drive between Reynolds Park Road and Stadium Drive, and Stadium Drive between Salem Avenue and Martin Luther King, Jr. Drive to a two-lane section.

Proposed intersection lane configuration:

- On eastbound Stadium Drive, one through-lane (shared with right-turning movement) and an exclusive left-turn lane
- On northbound Martin Luther King, Jr. Drive, one through lane (shared with right-turning movement) and an exclusive left-turn lane
- On southbound Martin Luther King, Jr. Drive, one through lane, an exclusive left-turn lane and an exclusive right-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service B during the PM peak period, a very good rate of traffic flow.

Third Street @ Liberty Street: This study analyzed the possibility of converting the existing two-lane, one-way section of Third Street between Cherry Street and Main Street to a two-lane, two-way east-west street with center turn lanes where necessary. Liberty Street will remain as a two/three-lane, one-way southbound street.

Proposed intersection lane configuration:

- On eastbound Third Street, one through-lane shared with right-turning movement
- On westbound Third Street, one through-lane and an exclusive left-turn lane
- On southbound Liberty Street, two through-lanes (one through-lane is shared with right-turning movement) and an exclusive left-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service D during the PM peak period, an acceptable rate of traffic flow.

Third Street @ Main Street: This study analyzed the possibility of converting the existing two-lane, one-way section of Third Street between Cherry Street and Main Street to a two-lane, two-way east-west street with center turn lanes where necessary. Main Street will remain as a two/three-lane, one-way northbound street.

Proposed intersection lane configuration:

- On eastbound Third Street, one through-lane and an exclusive left-turn lane
- On westbound Third Street, one through-lane and an exclusive right-turn lane
- On northbound Main Street, two through-lanes, an exclusive left-turn lane and an exclusive right-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service C during the PM peak period, a good rate of traffic flow.

Fourth Street @ Marshall Street: This study analyzed the possibility of converting the existing three-lane, one-way section of Fourth Street between Marshall Street and Main Street to a two-lane, two-way east-west street with center turn lanes where necessary. Marshall Street will remain as a two/three-lane, one-way southbound street.

Proposed intersection lane configuration:

- On eastbound Fourth Street, one through-lane and an exclusive right-turn lane
- On westbound Fourth Street, one through-lane and an exclusive left -turn lane
- On southbound Marshall Street, two through-lanes (one through-lane is shared with right-turning movement) and an exclusive left-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service D during the PM peak period, an acceptable rate of traffic flow.

Fourth Street @ Cherry Street: This study analyzed the possibility of converting the existing three-lane, one-way section of Fourth Street between Marshall Street, and Main Street to a two-lane, two-way east-west street with center turn lanes where necessary. Cherry Street will remain as a three-lane, one-way northbound street.

Proposed intersection lane configuration:

- On eastbound Fourth Street, one through-lane and an exclusive left -turn lane
- On westbound Fourth Street, one through-lane and an exclusive right -turn lane
- On northbound Cherry Street, two through-lanes, an exclusive left-turn lane and an exclusive right-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service C during the PM peak period, a good rate of traffic flow.

Fifth Street @ Liberty Street: This study analyzed the possibility of converting the existing three-lane, one-way section of Fifth Street between Liberty Street, and Martin Luther King, Jr. Drive to a two-lane two-way east-west street with center-turn lanes where necessary. Liberty Street will remain as a three-lane one-way southbound street.

Proposed intersection lane configuration:

- On eastbound Fifth Street, one through-lane and an exclusive right-turn lane
- On westbound Fifth Street, one through-lane and an exclusive left-turn lane
- On southbound Liberty Street, two through-lanes (one through-lane is shared with left-turning movement) and an exclusive right-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service B during the PM peak period, a very good rate of traffic flow.

Fifth Street @ Main Street: This study analyzed the possibility of converting the existing three-lane, one-way section of Fifth Street between Liberty Street and Martin Luther King, Jr. Drive to a two-lane, two-way east-west street with center-turn lanes where necessary. Main Street will remain as a three-lane, one-way northbound street.

Proposed intersection lane configuration:

- On eastbound Fifth Street, one through-lane and an exclusive left-turn lane
- On westbound Fifth Street, one through-lane and an exclusive right-turn lane
- On northbound Main Street, two through-lanes (one through-lane is shared with right-turning movement) and an exclusive left-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service C during the PM peak period, a good rate of traffic flow.

Martin Luther King, Jr. Drive @ Fifth Street: This study analyzed the possibility of converting the existing three-lane, one-way section of Fifth Street between Liberty Street and Martin Luther King, Jr. Drive to a two-lane, two-way east-west street with center turn lanes where necessary. The existing two-lane, two-way section of Fifth Street east of Martin Luther King, Jr. Drive, and Martin Luther King, Jr. Drive between US 52 and Business I-40 will remain as a four-lane, two-way street.

Proposed intersection lane configuration:

- On eastbound Fifth Street, one through-lane, an exclusive left-turn lane and an exclusive right-turn lane
- On westbound Fifth Street, one through-lane (shared with right-turning movement) and an exclusive left-turn lane
- On northbound Martin Luther King, Jr. Drive, two through-lanes, an exclusive left-turn lane and an exclusive right-turn lane
- On southbound Martin Luther King, Jr. Drive, two through-lanes (one through-lane is shared with right-turning movement) and an exclusive left-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service D during the PM peak period, an acceptable rate of traffic flow.

Martin Luther King, Jr. Drive @ New Walkertown Road: This study analyzed New Walkertown Road as a four-lane, two-way street and Martin Luther King, Jr. Drive between US 52 and Business I-40 as a four-lane, two-way street with no changes to the existing conditions.

Proposed intersection lane configuration:

- On the eastbound Driveway, an exclusive right-turn lane
- On westbound Fifth Street, one through-lane, two exclusive left-turn lanes and an exclusive right-turn lane
- On northbound Martin Luther King, Jr. Drive, two through-lanes, an exclusive left-turn lane and an exclusive right-turn lane
- On southbound Martin Luther King, Jr. Drive, two through-lanes (one through-lane is shared with right-turning movement) and two exclusive left-turn lanes

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service D during the PM peak period, an acceptable rate of traffic flow.

Martin Luther King, Jr. Drive @ Cherry Street/Marshall Street: This study analyzed re-aligning Marshall Street and Cherry Street to form a single signalized intersection with Martin Luther King, Jr. Drive. And also Martin Luther King, Jr. Drive is analyzed as six-lane facility between Marshall Street and US 52 with center turn lanes where needed.

Proposed intersection lane configuration:

- On eastbound Martin Luther King, Jr. Drive, three through-lanes, two exclusive left-turn lanes and an exclusive right-turn lane
- On westbound Martin Luther King, Jr. Drive, three through-lanes, one exclusive left-turn lane and an exclusive right-turn lane
- On northbound Cherry Street, three through-lanes, two exclusive left-turn lanes and an exclusive right-turn lane
- On southbound Marshall Street, three through-lanes, an exclusive left-turn lane and an exclusive right-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service D during the PM peak period, an acceptable rate of traffic flow.

Martin Luther King, Jr. Drive @ Research Park Boulevard: This will be a new ‘T’ intersection on Martin Luther King, Jr. Drive at the proposed Piedmont Triad Research Park entrance. This study analyzes the possibility of widening the section of Martin Luther King, Jr. Drive to a six-lane street between Marshall Street and US 52 with center turn lanes where needed, and assumes Research Park Boulevard as a four-lane street and installation of a traffic signal at this intersection. This study also analyzes the possibility of a jughandle ramp for the westbound left-turning traffic. Under this option, the westbound left-turning traffic would turn right onto a jughandle ramp before the intersection and pass through the intersection as a southbound through movement. This option would increase green time for east-west through traffic and would accommodate the high volume of left-turning traffic.

Proposed intersection lane configuration:

- On eastbound Martin Luther King, Jr. Drive, three through-lanes and two exclusive right-turn lanes
- On westbound Martin Luther King, Jr. Drive, three through-lanes, an exclusive right-turn lane (for the westbound left-turn jughandle)
- On northbound Research Park Boulevard, two exclusive left-turn lanes and three exclusive right-turn lanes
- On southbound Research Park Boulevard, two through lanes (Traffic from westbound jughandle)

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service D during the PM peak period, an acceptable rate of traffic flow.

Martin Luther King, Jr. Drive @ US 52 Ramps: The interchange was analyzed as a single-point urban diamond. This would be a new signalized intersection replacing the existing interchange at the US 52 Ramps on Martin Luther King, Jr. Drive.

Proposed intersection lane configuration:

- On eastbound Martin Luther King, Jr. Drive, two through-lanes, two exclusive left-turn lanes and two exclusive right-turn lanes
- On westbound Martin Luther King, Jr. Drive, two through-lanes, an exclusive left-turn lane and an exclusive right-turn lane
- On northbound US 52 ramps, two exclusive left-turn lanes and an exclusive right-turn lane
- On southbound US 52 ramps, two exclusive left-turn lanes and an exclusive right-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service C during the PM peak period, a good rate of traffic flow.

Martin Luther King, Jr. Drive @ Cleveland Avenue: This study analyzed re-aligning North Cleveland Avenue with Cleveland Avenue, forming a new four-legged intersection.

Proposed intersection lane configuration:

- On eastbound Martin Luther King, Jr. Drive, two through-lanes (one through-lane is shared with right-turning movement) and an exclusive left-turn lane
- On westbound Martin Luther King, Jr. Drive, two through-lanes (one through-lane is shared with left-turning movement and one through-lane shared with right-turning movement)
- On northbound Cleveland Avenue extension, one through-lane (shared with left and right-turning movements)
- On southbound Cleveland Avenue, one through-lane (shared with right-turning movement) and an exclusive left-turn lane

With the proposed improvements, the capacity analysis shows that this intersection as a whole would function at Level of Service C during the PM peak period, a good rate of traffic flow.

A summary of the results of the PM peak hour intersection capacity analyses for the 2030 Build Conditions is provided in Table 7-10. Figure 7-2 shows the 2030 Build Conditions mainline and ramp traffic volumes for US 52 and Business I-40. Figure 7-3 illustrates the PM peak hour intersection traffic volumes and the recommended intersection improvements (lane configurations) for the 2030 Build Conditions.

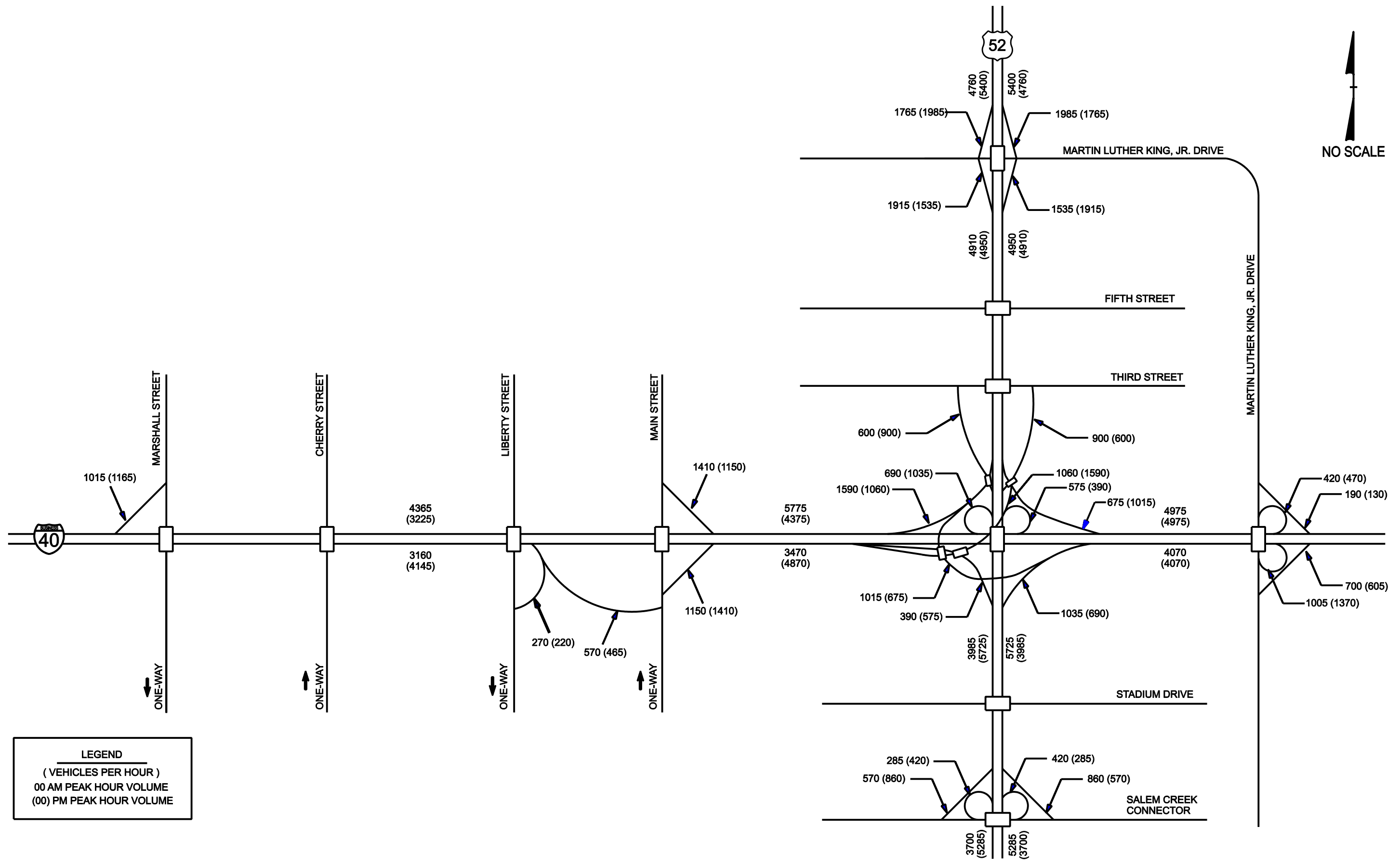
Table 7-10. PM Peak Hour Signalized Intersection Capacity Analysis 2030 Build Conditions

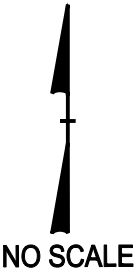
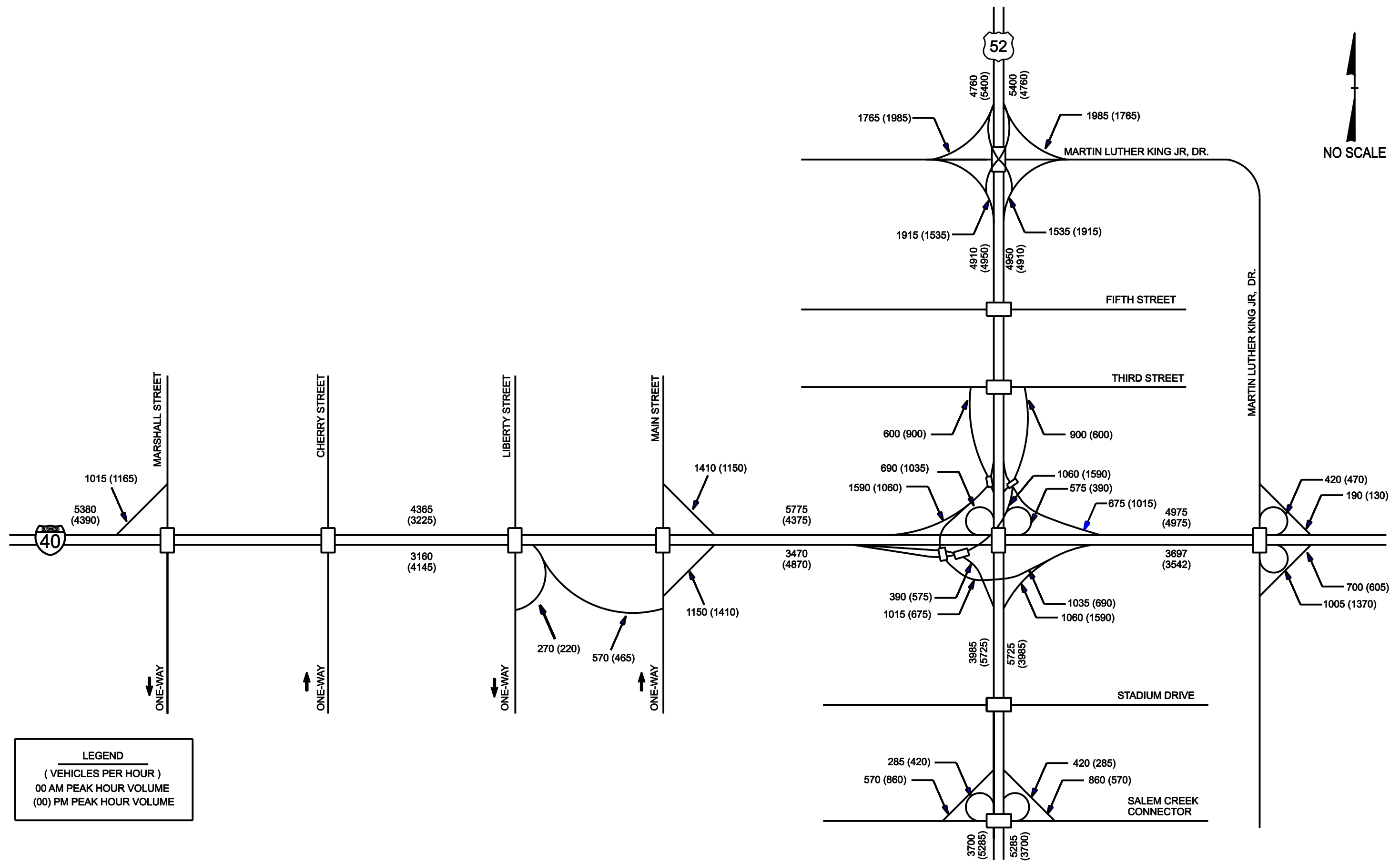
| Intersection Location | PM Peak | | |
|--|-----------------|-----|-----------|
| | Delay (Seconds) | LOS | V/C Ratio |
| MLK, Jr. Drive @ Reynolds Park Road | 26.0 | C | 0.66 |
| MLK, Jr. Drive @ Stadium Drive | 16.6 | B | 0.60 |
| Third Street @ Liberty Street | 36.0 | D | 0.55 |
| Third Street @ Main Street | 20.6 | C | 0.56 |
| Fourth Street @ Marshall Street | 37.6 | D | 0.85 |
| Fourth Street @ Cherry Street | 32.7 | C | 0.82 |
| Fifth Street @ Liberty Street | 11.1 | B | 0.43 |
| Fifth Street @ Main Street | 25.4 | C | 0.61 |
| MLK, Jr. Drive @ Fifth Street | 47.3 | D | 0.76 |
| MLK, Jr. Drive @ New Walkertown Road | 45.5 | D | 0.73 |
| MLK, Jr. Drive @ Cherry Street/Marshall Street | 54.9 | D | 0.92 |
| MLK, Jr. Drive @ Research Park Boulevard | 48.5 | D | 0.87 |
| MLK, Jr. Drive @ US 52 Ramps | 32.8 | C | 0.81 |
| MLK, Jr. Drive @ Cleveland Avenue | 20.4 | C | 0.73 |

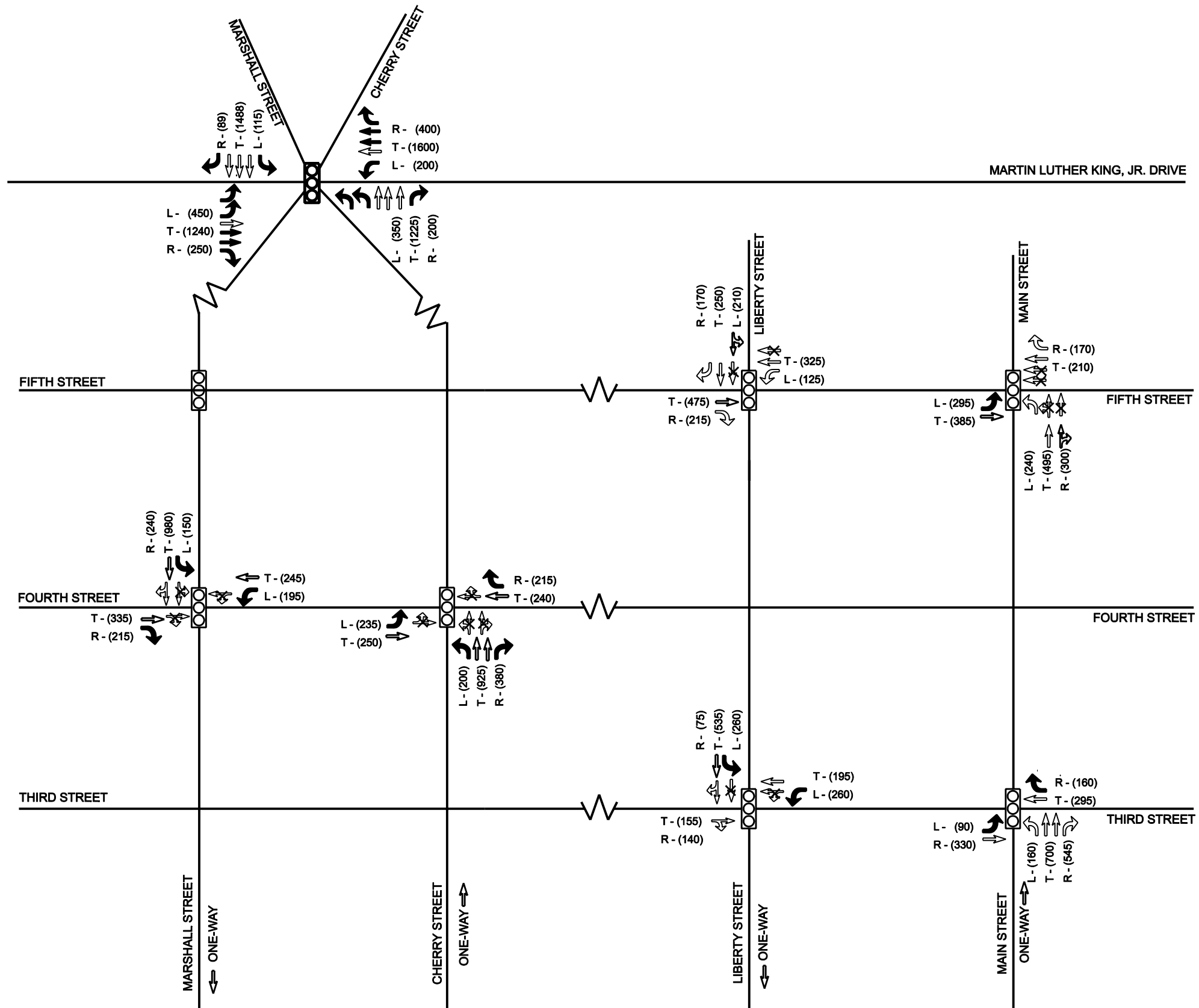
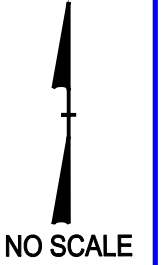
7.3 Summary of Capacity Analyses of Phase 2 Transportation Improvements

The following is a list of the most significant roadway improvements proposed for the Phase 2 study area that affect the future capacity and traffic flow conditions in the area.

- At the interchange of US 52 with Martin Luther King, Jr. Drive, a single-point urban diamond with two-lane ramps would best accommodate the 2030 traffic demand.
- The 2030 No Build Conditions weaving segment capacity analysis indicates the need for improvements along portions of the Business I-40 between Marshall Street and Martin Luther King, Jr. Drive to reduce the number of weaving segments along this facility. These improvements include reducing the number of entrance and exit ramps in the downtown area, construction of a westbound frontage road connecting Main Street to Liberty Street and Cherry Street, and the possible addition of east and westbound collector-distributor roads between US 52 and Martin Luther King, Jr. Drive.
- The new Salem Creek Connector will divert future traffic from Stadium Drive and Martin Luther King, Jr. Drive in the Winston-Salem State University campus area, thereby allowing Martin Luther King, Jr. Drive to be reduced to two through lanes. Although 2030 traffic volumes would be approaching capacity of a two-lane roadway, traffic flow through the intersection of Martin Luther King, Jr. Drive with Stadium Drive would not exceed its capacity. Amenities such as additional landscaping, on-street parking, medians and bicycle lanes could be incorporated into the streetscape.
- The extension of Martin Luther King, Jr. Drive to connect with Northwest Boulevard west of downtown will significantly increase traffic volumes on Martin Luther King, Jr. Drive, according to the 2030 regional transportation planning model. To accommodate the predicted traffic volume increase, Martin Luther King, Jr. Drive should be widened to six through lanes between Northwest Boulevard and US 52.
- At the future intersection of Research Park Boulevard and Martin Luther King, Jr. Drive, the high traffic volumes forecasted to be generated by the Piedmont Triad Research Park will require a unique treatment of the westbound-to-southbound left-turning movement, such as a jughandle ramp to accommodate this movement.
- At the intersection of Martin Luther King, Jr. Drive with New Walkertown Road, the 2030 traffic volumes will require additional turning lanes on all three approaches. Traffic flow out of the shopping center driveway should be limited to right-out movements only.
- Changing Third, Fourth and Fifth Streets from one-way to two-way streets within the areas of downtown Winston-Salem and East Winston will create a pedestrian-friendly environment and allow for the addition of on-street parking, bicycle lanes, additional landscaping, wider sidewalks and other amenities along these street corridors.
- Improved street connectivity is provided by the extension of Highland Avenue and East First Street and the realignment of Cleveland Avenue which will provide for more interconnected neighborhoods within East Winston.
- The effect of a reconnected grid system of two-way, two to four-lane local streets in East Winston will be to reduce traffic demand on Martin Luther King, Jr. Drive by providing alternative routes for circulation of local traffic.

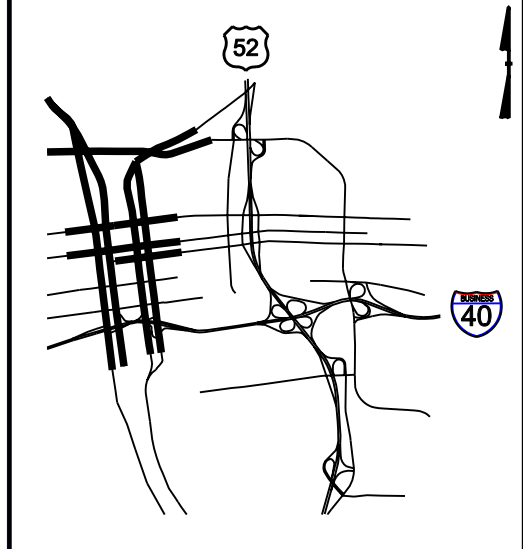


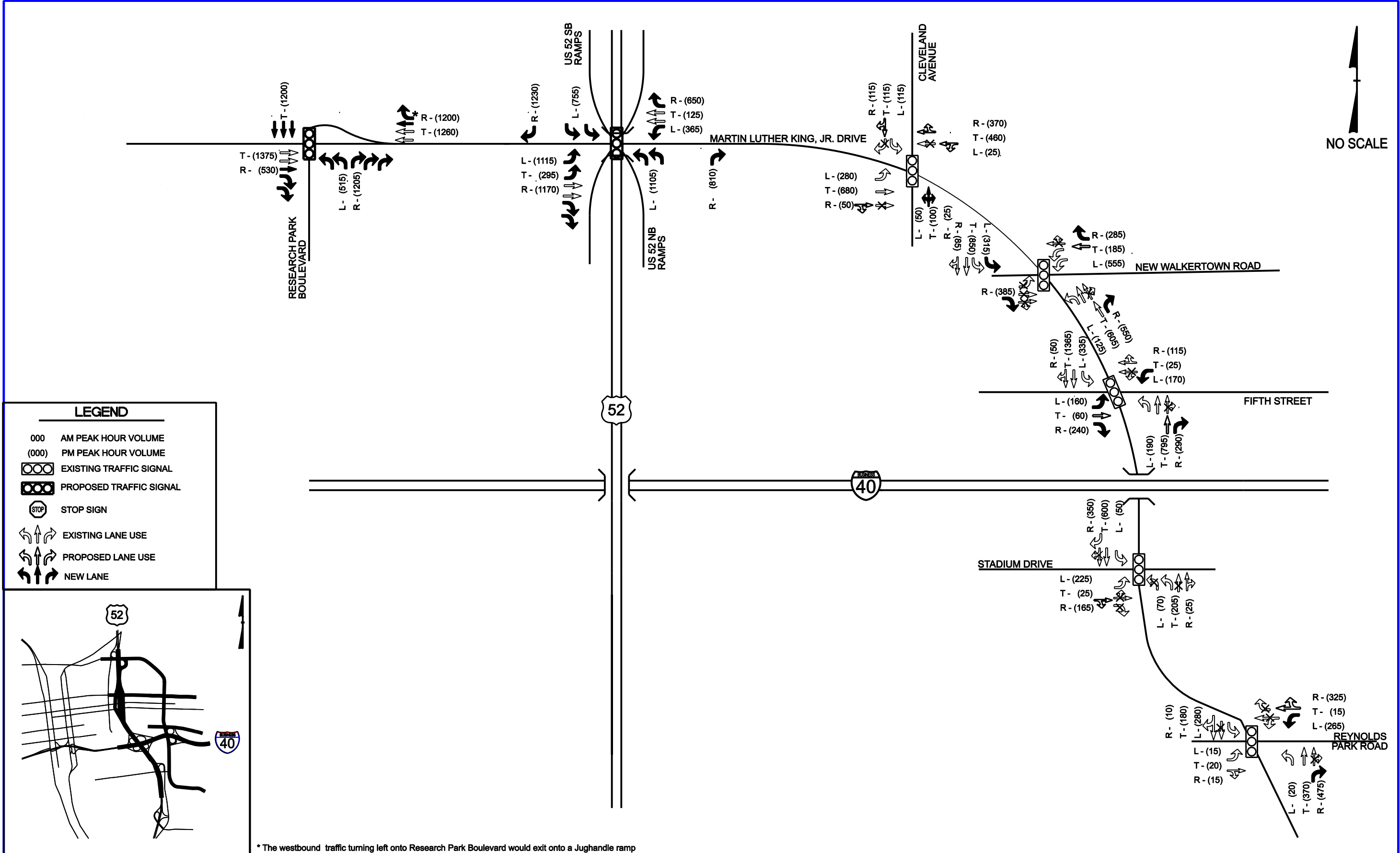
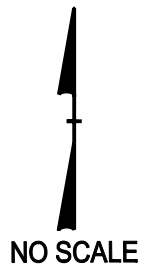




LEGEND

- 000 AM PEAK HOUR VOLUME
- (000) PM PEAK HOUR VOLUME
- ○ ○ EXISTING TRAFFIC SIGNAL
- ● ● PROPOSED TRAFFIC SIGNAL
- STOP STOP SIGN
- ↔ EXISTING LANE USE
- ↔ PROPOSED LANE USE
- ↔ NEW LANE





* The westbound traffic turning left onto Research Park Boulevard would exit onto a Jughandle ramp



PHASE 2 US 52 LAND USE & MULTIMODAL TRANSPORTATION CIRCULATION PLAN
City of Winston Salem, North Carolina



2030 BUILD CONDITIONS PM PEAK HOUR INTERSECTION TRAFFIC VOLUMES