E  Appendix E: Traffic Studies
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E.2  Traffic Impact Study for Alternative B
E.3  NCDOT Traffic Impact Analysis Review Report
E.1 Traffic Impact Study for Alternative A
TRAFFIC IMPACT STUDY FOR THE RALEIGH OUTPATIENT CLINIC – ALTERNATIVE A
WAKE COUNTY, NORTH CAROLINA

July 2020

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1.0 PROJECT OVERVIEW

Purpose
The United States Department of Veterans Affairs (VA) is proposing to construct an outpatient facility in Wake County, North Carolina. The project consists of two build alternatives and one no-build alternative currently under consideration. Alternative A is located southwest of the intersection of Rand Road and Benson Road, and is the subject of this traffic study. Alternative B is evaluated in a separate traffic study. The following Traffic Impact Study has been prepared to assist in the preparation of an Environmental Assessment (EA) document for the purposes of the National Environmental Policy Act (NEPA). This study will identify any traffic impacts of the proposed development compared to the no build scenario and if any exist, identify potential improvement measures to mitigate the impacts.

Proposed Site
The proposed site is located southwest of the intersection of Rand Road and Benson Road, north of Arbor Greene Drive. Figures 1A-C illustrate the vicinity of the proposed site. Figure 1D illustrates a conceptual layout of the site access points. Site plans are not available, but Figure 1D represents the access scenario evaluated in this study. While this might not represent the final conceptual design, the purpose of this study is to determine if there is a development scenario that may be built without negatively impacting traffic operations compared to the no build scenario.

The planned VA Outpatient Clinic is proposed to have 222,325 square feet of space with 1,300 parking spaces. The clinic is expected to have 350-400 employees and serve approximately 500 patients per day. The Alternative A site is approximately 16.76 acres based on GIS data.

Consultation
There were various meetings and consultations with NCDOT and Town of Garner staff to identify the various technical methodologies and assumptions. These consultations included a scoping meeting to identify the scope of work and primary methodologies, as well as additional, specific consultations regarding traffic data, trip generation, and trip distribution. These consultations are referenced in the appropriate sections of this document and the resulting memoranda are provided in the technical appendices as referenced in the document.
2.0 PROJECT AREA

The Memorandum of Understanding that resulted from a traffic study scoping meeting with representatives from North Carolina Department of Transportation (NCDOT) and the Town of Garner is provided in Appendix A.

As a result of that meeting, the following traffic study locations were identified as the study area:

- Benson Road and Timber Drive – signalized
- Benson Road and Rand Road – signalized
- Benson Road and Arbor Greene Drive – unsignalized
- Benson Road and Cleveland School Road – signalized
- Site access locations – unsignalized

Benson Road (Route 50) is generally a two lane undivided arterial that parallels I-40 through the study area. At the northern end of the study area near Timber Drive, the corridor connects to more commercial uses and the speed limit is 45 miles per hour (mph). Traversing south, the corridor character becomes more suburban / rural and the speed limit increases to 50mph and then 55 mph.

Timber Drive is primarily a four lane divided arterial that connects to major commercial areas just east of the study area as well as ultimately to I-40. The Benson Road and Timber Drive signalized intersection is mostly built out with two through lanes on all approaches except northbound and most turns served with exclusive turn lanes.

Rand Road is primarily a two lane, undivided, collector road that connects Benson Road with Ten Ten Road. The Benson Road and Rand Road signalized intersection includes exclusive eastbound lanes, an exclusive southbound right turn lane and an exclusive northbound left turn lane.

Arbor Greene Drive is a two lane, undivided, low volume road that primarily serves residential uses. The Benson Road and Arbor Greene Drive unsignalized intersection includes exclusive eastbound lanes, an exclusive southbound right turn lane and an exclusive northbound left turn lane.

Cleveland School Road is a two lane, undivided facility that provides a shorter connection from Benson Road to the commercial areas at Route 42 and ultimately to I-40. The Benson Road and Cleveland School Road signalized intersection includes exclusive left turn lanes from Benson Road and an exclusive westbound right turn lane.

The existing geometry at the study intersections is illustrated in the existing volume figures (Figures 2A and 2B).

Existing Traffic Volumes

With the pandemic impact to typical traffic volumes, obtaining traffic volume data for the study required a detailed process. The methodology was documented in a separate memorandum
provided in Appendix B. Count data provided by NCDOT / Town of Garner is provided in Appendix C. Count data that was field collected specifically for this study is provided in Appendix D.

Figure 2A illustrates the existing peak hour count data as provided or collected. Note that only the Rand Road intersection data is from 2020 pre-pandemic. The Timber Drive intersection and Cleveland School Road intersection data are from previous years. The Arbor Greene intersection was counted in May 2020, but represents post-pandemic traffic. Figure 2B illustrates the year 2020 existing volumes utilized for the study. See the memorandum in Appendix B for a detailed description of this methodology.
FIGURE 2A
EXISTING (VARIOUS YEARS)
PEAK HOUR VOLUMES

PROPOSED SITE

LEGEND
123 52 →
PM AM
(closest to the arrow is AM)
Arrows represent laneage

VA Outpatient Clinic Traffic Study - Alt A
(not to scale)
FIGURE 2B
EXISTING - FACTORED TO YEAR 2020
PEAK HOUR VOLUMES

Note
Volumes increased by 3% per year to year 2020 as necessary

PROPOSED SITE

LEGEND
123 52 PM AM (closest to the arrow is AM)
Arrows represent laneage

VA Outpatient Clinic Traffic Study - Alt A (not to scale)
3.0 FUTURE YEAR TRAFFIC VOLUMES

Background Traffic
It is assumed that the clinic will be operational by 2024. A standard three percent growth rate was utilized to determine the background traffic volume. The resulting 2024 background traffic volumes are illustrated in Figure 3A.

Online Traffic (Approved Developments Not Yet Constructed)
There is one nearby development (Circle K) that has been approved but not yet completed that will be evaluated as an online project. The associated site trips will be added directly to the study area network in addition to the general background traffic growth.

Town of Garner staff provided the traffic study for the Circle K development at the Benson Road and Cleveland School Road intersection. The related traffic volumes are illustrated in Figure 3B. The combined background traffic plus the online traffic results in the total no build volumes illustrated in Figure 3C.

Proposed Site Trip Generation
The VA does not have specific trip generation data for their outpatient clinics. As the ITE Trip Generation Manual does not provide ideally compatible data, an alternative methodology was documented in a separate memorandum provided in Appendix E. The summary is that the ITE code clinic based on employees is utilized with the exception of PM peak out. For the PM peak out value, the ITE generated clinic volume (218) was increased to 276 so that the PM peak out volume is 80 percent of the AM peak in volume. This ratio matches the clinic use based on square feet and provides a more conservative volume. The trip generation is summarized in Table 1.

<table>
<thead>
<tr>
<th>USE</th>
<th>ITE CODE</th>
<th>ADT</th>
<th>AM PEAK</th>
<th>PM PEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinic (based on employees - 400)</td>
<td>630</td>
<td>3700</td>
<td>345</td>
<td>122</td>
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</table>

ADT – Annual Daily Traffic, other volumes are vehicles per hour

Traffic Distribution
The general traffic distribution was also discussed during the traffic study scoping meeting. The final distribution was referenced in the memorandum provided in Appendix E. The site trips, distribution percentages, and resulting site trips are illustrated in Figure 4.

Build Year 2024 Traffic Volumes
The no build volumes and site trip volumes combine to generate the total build (year 2024) volumes. These volumes are illustrated in Figure 5.
Note
Volumes increased by
3% per year

LEGEND
123 PM
52 AM
(closest to the arrow is AM)
Arrows represent laneage

VA Outpatient Clinic Traffic Study - Alt A
(not to scale)
FIGURE 3B
ONLINE DEVELOPMENT
CIRCLE K (BENSON RD AND CLEVELAND SCHOOL RD)
PEAK HOUR VOLUMES

Notes
- Assumed trips along Benson Rd went all the way to Timber Dr
- At Timber Dr, distributed turns based on existing percentages

Legends:

<table>
<thead>
<tr>
<th>PM</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>123</td>
<td>52</td>
</tr>
</tbody>
</table>

Arrows represent laneage

VA Outpatient Clinic Traffic Study - Alt A
(not to scale)
4.0 INTERSECTION CAPACITY ANALYSES

Methodology

The intersection capacity analyses were performed using Synchro (version 9) per the methodology documented in the Highway Capacity Manual (HCM) (Transportation Research Board). The HCM based calculations are provided in this report, except when HCM limitations do not provide for a calculation, and Synchro values are provided.

Typically, actual peak hour factor (PHF) and truck percentage (HV%) data calculated from the manual turning movement count (TMC) is utilized for capacity analysis. However, as a result of the alternative methods required to obtain and derive existing traffic count data (described in Appendix B), NCDOT standard defaults were utilized. Also, the signal plan for the Benson Road and Timber Drive intersection was obtained from a development traffic study so that timing data was utilized for existing conditions analysis. However, signal timing information for the remaining signalized study intersections was not provided, so NCDOT standard defaults were utilized.

Capacity analyses are utilized to determine a Level of Service (LOS) for a given intersection operating under either signalized or unsignalized control. The LOS is based on estimated delay and range from LOS A, the best, to LOS F, the worst. In general LOS A and LOS B indicate little or no delay, LOS C indicates average delay, LOS D indicates delay is increasing and noticeable, LOS E indicates the limit of acceptable delay and F is characteristic of over saturated conditions. The actual delays associated with these levels of service are identified in Table 2.

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<tr>
<th>LOS</th>
<th>UNSIGNALIZED INT. DELAY (secs)</th>
<th>SIGNALIZED INT. DELAY (secs)</th>
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</tr>
<tr>
<td>B</td>
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<td>&gt; 10 – 20</td>
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<tr>
<td>C</td>
<td>&gt; 15 – 25</td>
<td>&gt; 20 – 35</td>
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<td>D</td>
<td>&gt; 25 – 35</td>
<td>&gt; 35 – 55</td>
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<tr>
<td>E</td>
<td>&gt; 35 – 50</td>
<td>&gt; 55 – 80</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 50</td>
<td>&gt; 80</td>
</tr>
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</table>

Source: Highway Capacity Manual

The analysis results (delay, LOS and 95th percentile queue) are summarized in Table 3 (comparing existing, no build and build) and Table 4 (comparing build to build mitigated). The results are also illustrated in Figures 6-9 (existing, no build, build and build mitigated respectively). The HCM based intersection capacity analysis worksheets from Synchro are provided in the appendix. The existing scenario is located in Appendix F, the no build is in Appendix G, the build is in Appendix H, and the mitigated build scenario is in Appendix I.
Study Intersections

Benson Road and Timber Drive - Signalized
The Benson Road and Timber Drive intersection analysis indicates operational issues in the existing and no build scenarios, with several movements operating at unsatisfactory levels of service (LOS E and LOS F). With the intersection already projected to operate unsatisfactorily in the no build condition, the build condition analysis projects minimal change. There are several individual movements similarly projected to operate at LOS E / LOS F, with an overall intersection level of service of LOS E like the no build PM condition.

Although the operational issues are related to existing and background volume growth, mitigation testing was conducted to determine what improvements would effectively improve operations. Given the no build operational issues, substantial improvements are required to improve operations. The improvements tested are adding a second northbound left turn lane, adding a second westbound left turn lane and adding a second northbound thru lane (shared with the right turn movement). Combined, these improvements result in satisfactory operational improvements.

Benson Road and Rand Road - Signalized
The Benson Road and Rand Road intersection analysis indicates operational issues in the existing and no build scenarios, with several movements operating at unsatisfactory levels of service (LOS E and LOS F). As the site trip distribution utilizes this intersection, especially for egress (left turn from Rand Road onto Benson Road), as expected, the build scenario results in additional operational issues. Therefore, a mitigation scenario that includes a second eastbound left turn lane (shared with the right turn movement) was evaluated. Given this mitigated improvement scenario, each individual movement is expected to operate at LOS D or better during the AM peak hour, and each individual movement is expected to operate at LOS D or better during the PM peak hour with one exception. The southbound through movement is projected to operate at a level of delay 3.7 seconds over the LOS D threshold.

Benson Road and Arbor Greene Drive - Unsignalized
The Benson Road and Arbor Greene Drive intersection analysis indicates operational issues in the existing and no build scenarios, with the eastbound left turn movement operating at unsatisfactory levels of service (LOS E and LOS F). With the intersection already projected to operate unsatisfactorily in the no build condition, the build condition analysis projects minimal change. The same unsatisfactory levels of service are projected, and the build scenario is expected to add less than one vehicle to the 95th percentile queue to the eastbound left turn movement.

Although the operational issues are related to existing and background volume growth, mitigation strategies were considered to improve operations. Even though the side street volume is very low at this intersection, the Benson Road traffic volume does not allow for enough gaps for the eastbound left turn movement to operate at a satisfactory level of service. Given the low side street volume, traffic signalization is not warranted and typical roundabout volume criteria are not met. The only potential mitigation strategy is to eliminate the eastbound left turn movement. This strategy was not evaluated further as the proposed site trip distribution does not utilize this movement.
Benson Road and Cleveland School Road - Signalized
The Benson Road and Cleveland School Road intersection analysis indicates the intersection operates satisfactorily and will continue to do so through the build scenario, with all individual movements operating at LOS D or better.

As the intersection is expected to operate satisfactorily, mitigation measures were not evaluated. However, one operational safety improvement was modeled. Given the high volume, the southbound left turn movement was modeled as a protected phase only.

Access Locations
Rand Road Access
The Rand Road Access location was modeled as right in only ingress and full egress allowed. The ingress right turn is shared.

Benson Road Access
The Benson Road access was modeled as right out only egress and full ingress allowed. The ingress includes exclusive right turn and left turn lanes (200’ storage).

Arbor Greene Drive Access
The Arbor Greene Drive access was modeled as full access. The ingress includes an exclusive right turn lane (150’ storage).
NOTE
Build improvements also include widening SB Benson Road to match the ultimate 4 lane divided cross section per the Garner Forward Transportation Plan.
**TABLE 3 - ALTERNATIVE A DELAY, LOS AND QUEUE SUMMARY**

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<th>Storage Length (ft)</th>
<th>EXISTING AM</th>
<th>EXISTING PM</th>
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<th>NO BUILD PM</th>
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<th>BUILD PM</th>
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<tr>
<td></td>
<td>Delay (sec/veh)</td>
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<td>Queue (ft)</td>
<td>Delay (sec/veh)</td>
<td>LOS</td>
<td>Queue (ft)</td>
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<td>BENOON ROAD AND TIMBER DRIVE - SIGNALIZED</td>
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<td></td>
<td>31.9 C 50.7</td>
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**BENSON ROAD AND RAND ROAD - SIGNALIZED**

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**BENSON ROAD AND ARBOR GREENE DRIVE - UNSIGNALIZED**

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**BENSON ROAD AND CLEVELAND SCHOOL ROAD - SIGNALIZED**

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<td>RAND ROAD ACCESS - UNSIGNALIZED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BENVSON ROAD ACCESS - UNSIGNALIZED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBL</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>ARBOR GREEENE ACCESS - UNSIGNALIZED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>SBL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**

In 95% Queue column, # denotes that volume exceeds capacity.
### Table 4 - Alternative A Delay, LOS and Queue Mitigation Summary

<table>
<thead>
<tr>
<th>Storage Length (ft)</th>
<th>BUILD AM</th>
<th></th>
<th>BUILD PM</th>
<th></th>
<th>MITIGATED BUILD AM</th>
<th></th>
<th>MITIGATED BUILD PM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay (sec/veh)</td>
<td>LOS</td>
<td>95% Queue (ft)</td>
<td></td>
<td>Delay (sec/veh)</td>
<td>LOS</td>
<td>95% Queue (ft)</td>
<td></td>
</tr>
<tr>
<td>BENSON ROAD AND TIMBER DRIVE - SIGNALIZED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBL 255</td>
<td>41.6</td>
<td>D</td>
<td>164</td>
<td>31.6</td>
<td>C</td>
<td>117</td>
<td>32.4</td>
<td>C</td>
</tr>
<tr>
<td>EBT 52.4</td>
<td>D</td>
<td></td>
<td></td>
<td>64.4</td>
<td>E</td>
<td></td>
<td>41.3</td>
<td>D</td>
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<tr>
<td>EBR 33.5</td>
<td>C</td>
<td></td>
<td></td>
<td>158.4</td>
<td>F</td>
<td></td>
<td>27.3</td>
<td>C</td>
</tr>
<tr>
<td>WBL 245</td>
<td>195.2</td>
<td>F</td>
<td>688#</td>
<td>115.5</td>
<td>F</td>
<td>662#</td>
<td>53.1</td>
<td>D</td>
</tr>
<tr>
<td>WBT 46.6</td>
<td>D</td>
<td></td>
<td></td>
<td>28.8</td>
<td>C</td>
<td></td>
<td>40.5</td>
<td>D</td>
</tr>
<tr>
<td>WBR 245</td>
<td>37.2</td>
<td>D</td>
<td>59</td>
<td>17.7</td>
<td>B</td>
<td>257</td>
<td>31.7</td>
<td>C</td>
</tr>
<tr>
<td>NBL 120</td>
<td>20.4</td>
<td>C</td>
<td>274</td>
<td>101.1</td>
<td>F</td>
<td>363#</td>
<td>49.0</td>
<td>D</td>
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<td>NBT 126.2</td>
<td>F</td>
<td></td>
<td></td>
<td>43.0</td>
<td>D</td>
<td></td>
<td>48.1</td>
<td>D</td>
</tr>
<tr>
<td>NBR 225</td>
<td>11.3</td>
<td>B</td>
<td>113</td>
<td>19.4</td>
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<td>225</td>
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<td>SBL 320</td>
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<td>E</td>
<td>61</td>
<td>65.9</td>
<td>E</td>
<td>175#</td>
<td>51.7</td>
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<td>SBT-R 30.5</td>
<td>C</td>
<td></td>
<td></td>
<td>92.0</td>
<td>F</td>
<td></td>
<td>26.2</td>
<td>C</td>
</tr>
<tr>
<td>Intersection 73.7</td>
<td>E</td>
<td></td>
<td>77.9</td>
<td>E</td>
<td></td>
<td>44.1</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>BENSON ROAD AND RAND ROAD - SIGNALIZED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBL 60</td>
<td>145.0</td>
<td>F</td>
<td>1077#</td>
<td>144.9</td>
<td>F</td>
<td>920#</td>
<td>48.8</td>
<td>D</td>
</tr>
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<td>C</td>
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<td>38.7</td>
<td>D</td>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>NBL 205</td>
<td>26.7</td>
<td>C</td>
<td>5</td>
<td>80.7</td>
<td>F</td>
<td>52#</td>
<td>5.5</td>
<td>A</td>
</tr>
<tr>
<td>NBT 105.9</td>
<td>F</td>
<td></td>
<td>13.4</td>
<td>B</td>
<td></td>
<td>52.7</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>SBT 18.7</td>
<td>B</td>
<td></td>
<td>94.9</td>
<td>F</td>
<td></td>
<td>9.5</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>SBR 215</td>
<td>0.4</td>
<td>A</td>
<td>0</td>
<td>0.6</td>
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<td>0.1</td>
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<tr>
<td>Intersection 90.8</td>
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<td></td>
<td>75.2</td>
<td>E</td>
<td></td>
<td>39.3</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

In 95% Queue column, # denotes that volume exceeds capacity.

*HCM methodology tends to overestimate delay for right turn movements near capacity.

The Synchro reported delay for this movement is 45.5 sec / LOS D.
5.0 SUMMARY OF IMPACTS AND MITIGATION

The resulting mitigation and improvements are summarized in four sections below. The first section summarizes the improvements necessary at the study intersections for the build scenario to not have negative traffic impacts compared to the no build scenario. The second section summarizes the improvements related to the proposed access locations. The third section summarizes additional mitigation strategies that will improve existing / no build traffic operations issues. The fourth section identifies improvements that will be provided to facilitate the future Benson Road corridor per the Garner Forward Transportation Plan.

Study Intersection Improvements to Mitigate Traffic Impacts of Build Scenario Compared to No Build Scenario
- Benson Road and Rand Road Intersection
  Provide a second eastbound left turn lane (shared with the right turn movement).

Improvements Related to Access Locations
- Benson Road Access
  Construct an exclusive right turn lane (200’ storage) and exclusive left turn lane (200’storage) for ingress.

- Arbor Greene Drive Access
  Construct an exclusive right turn lane (200’ storage) for ingress.

Additional Mitigation Strategies to Improve Existing / No Build Traffic Operations Issues
- Benson Road and Timber Drive
  Provide a second northbound left turn lane, a second westbound left turn lane and a second northbound thru lane (shared with the right turn movement).

- Benson Road and Cleveland School Road
  Modify the southbound left turn phasing to protected only.

Improvements to Facilitate the Future Benson Road Corridor per the Garner Forward Transportation Plan
- Widen southbound (proposed site side only) Benson Road to match the ultimate four lane divided cross section (this widening includes an additional through lane and half of the median).
E.2 Traffic Impact Study for Alternative B
TRAFFIC IMPACT STUDY FOR THE RALEIGH OUTPATIENT CLINIC – ALTERNATIVE B
WAKE COUNTY, NORTH CAROLINA

July 2020

Contract Number: GS-10F-0360T Order Number: 36C10F20F0039

Prepared for:
U.S. Department of Veterans Affairs
Office of Construction and Facilities Management

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Appendix B  Traffic Data Methodology Memorandum
Appendix C  Count Data Provided from Route 540 Project Website
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Appendix D  Count Data (Collected in May 2020)
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1.0 PROJECT OVERVIEW

Purpose
The United States Department of Veterans Affairs (VA) is proposing to construct an outpatient facility in Wake County, North Carolina. The project consists of two build alternatives and one no-build alternative currently under consideration. Alternative B is located southeast of the intersection of Ten Ten Road and Old Stage Road, and is the subject of this traffic study. Alternative A is evaluated in a separate traffic study. The following Traffic Impact Study has been prepared to assist in the preparation of an Environmental Assessment (EA) document for the purposes of the National Environmental Policy Act (NEPA). This study will identify any traffic impacts of the proposed development compared to the no build scenario and if any exist, identify potential improvement measures to mitigate the impacts.

Proposed Site
The proposed site is located in the southeastern quadrant of the Old Stage Road and Ten Ten Road intersection. Figures 1A-C illustrate the vicinity of the proposed site. Figure 1D illustrates a conceptual layout of the site access points. Site plans are not available, but Figure 1D represents the access scenario evaluated in this study. While this might not represent the final conceptual design, the purpose of this study is to determine if there is a development scenario that may be built without negatively impacting traffic operations compared to the no build scenario.

The planned VA Outpatient Clinic is proposed to have over 222,325 square feet of space with 1,300 parking spaces. The clinic is expected to have 350-400 employees and serve approximately 500 patients per day. The Alternative B site is approximately 32.88 acres based on GIS data.

Consultation
There were various meetings and consultations with NCDOT and Town of Garner staff to identify the various technical methodologies and assumptions. These consultations included a scoping meeting to identify the scope of work and primary methodologies, as well as additional, specific consultations regarding traffic data, trip generation, and trip distribution. These consultations are referenced in the appropriate sections of this document and the resulting memoranda are provided in the technical appendices as referenced in the document.
Site Location Alternatives and Complete 540 Preferred Alternative

Project Location Alternative A

Project Location Alternative B

Complete 540 Preferred Alternative
Triangle Expressway Southeast Extension

Figure 1C.
THIS SCENARIO WILL RESULT IN U-TURN MOVEMENTS.
2.0 PROJECT AREA
The Memorandum of Understanding that resulted from a traffic study scoping meeting with representatives from North Carolina Department of Transportation (NCDOT) and the Town of Garner is provided in Appendix A.

The future Route 540 Corridor is proposed to interchange with Old Stage Road just south of this proposed outpatient clinic location. As such, during the scoping meeting, two sets of study areas were recognized, related to a Pre Route 540 scenario and a Post Route 540 scenario. The following traffic study locations were identified as the study area for the two scenarios.

Pre Route 540 Scenario
-Old Stage Road and Ten Ten Road - signalized
-Ten Ten Road and Rand Road – unsignalized
-Site access locations – unsignalized

Post Route 540 Scenario
-Old Stage Road and Ten Ten Road - signalized
-Old Stage Road and Route 540 Interchange (two ramp intersections) - signalized
-Site access locations – unsignalized

Old Stage Road is generally a two lane undivided facility that is one of only two north-south corridors between Route 401 and I-40. In the project area, the facility primary serves residential neighborhoods and the posted speed limit is 45 miles per hour (mph).

Ten Ten Road is generally a two lane divided facility that is a primary east-west connection between Route 401 and Benson Road. In the project area, the facility primary serves residential neighborhoods and the posted speed limit is 45 mph.

Route 540 is a planned, four lane limited access facility that will serve as a regional highway in the general area.

The existing geometry at the study intersections is illustrated in the existing volume figures (Figures 2A and 2B).

Existing Traffic Volumes
With the pandemic impact to typical traffic volumes, obtaining traffic volume data for the study required a detailed process. The methodology was documented in a separate memorandum provided in Appendix B. Count data from the Route 540 project website is provided in Appendix C. The calculations and process to utilize the Route 540 volume data in this study is provided in Appendix C2. Count data that was field collected specifically for this study is provided in Appendix D.

Figure 2A illustrates the existing peak hour count data as factored to the year 2018. Figure 2B illustrates the year 2020 existing volumes utilized for the study. See the memorandum in Appendix B for a detailed description of this methodology.
FIGURE 2A
YEAR 2018
PEAK HOUR VOLUMES

Old Stage Rd
131 512 275
84 138 70
324 142
597 349
56 101
107 76
607 313
99 17
101 565 50
53 231 78

Ten Ten Rd

Rand Rd
224 9 15
189 8 6
14 16
765 361
0 0
220 161
727 268
13 4
23 12 0
7 2 0

PROPOSED
SITE

LEGEND
123 52 →
PM AM
(closest to the arrow is AM)
Arrows represent laneage

NORTH
(not to scale)

VA Outpatient Clinic Traffic Study - Alt B
FIGURE 2B
EXISTING - FACTORED TO YEAR 2020
PEAK HOUR VOLUMES

Old Stage Rd

139 543 292
89 146 74
344 151
633 370
59 107
114 81
644 332
105 18
107 599 53
56 245 83

Ten Ten Rd

Rand Rd

238 10 16
201 8 6
15 17
812 383
233 171
771 284
14 4
24 13
7 2
5 5

NOTE
These movements counted as 0 vph, but increased to 5 vph

PROPOSED SITE

LEGEND
123 52
PM AM
(closest to the arrow is AM)
Arrows represent laneage

NORTH
(not to scale)

VA Outpatient Clinic Traffic Study - Alt B
3.0 FUTURE YEAR TRAFFIC VOLUMES

Background Traffic
It is assumed that the clinic will be operational by 2024. A standard three percent growth rate was utilized to determine the background traffic volume. The resulting 2024 no build traffic volumes are illustrated in Figure 3A (Pre Route 540 Scenario) and Figure 3B (Post Route 540 Scenario).

Proposed Site Trip Generation
The VA does not have specific trip generation data for their outpatient clinics. As the ITE Trip Generation Manual does not provide ideally compatible data, an alternative methodology was documented in a separate memorandum provided in Appendix E. The summary is that the ITE code clinic based on employees is utilized with the exception of PM peak out. For the PM peak out value, the ITE generated clinic volume (218) was increased to 276 so that the PM peak out volume is 80 percent of the AM peak in volume. This ratio matches the clinic use based on square feet and provides a more conservative volume. The trip generation is summarized in Table 1.

<table>
<thead>
<tr>
<th>USE</th>
<th>ITE CODE</th>
<th>ADT</th>
<th>AM PEAK</th>
<th>PM PEAK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinic (based on employees - 400)</td>
<td>630</td>
<td>3700</td>
<td>345</td>
<td>103</td>
</tr>
</tbody>
</table>

ADT – Annual Daily Traffic, other volumes are vehicles per hour

Traffic Distribution
The general traffic distribution was also discussed during the traffic study scoping meeting. The final distribution was referenced in the memorandum provided in Appendix E. The site trips, distribution percentages, and resulting site trips are illustrated in Figure 4A (Pre Route 540 Scenario) and Figure 4B (Post Route 540 Scenario).

Build Year 2024 Traffic Volumes
The no build volumes and site trip volumes combine to generate the total build (year 2024) volumes. These volumes are illustrated in Figure 5A (Pre Route 540 Scenario) and Figure 5B (Post Route 540 Scenario).
FIGURE 3A
NO BUILD 2024 - PRE ROUTE 540 SCENARIO
PEAK HOUR VOLUMES

Old Stage Rd
156 611 328
100 165 84
67 121
713 417
128 91
725 374
118 20
63 276 93

Ten Ten Rd

Rand Rd
267 11 18
226 10 7
17 19
913 431
263 192
868 320
16 5
27 14 6
8 2 6

PROPOSED SITE

LEGEND
123 52 →
PM AM
(closet to the arrow is AM)
Arrows represent laneage

VA Outpatient Clinic Traffic Study - Alt B
FIGURE 3B
NO BUILD 2024 - POST ROUTE 540 SCENARIO
PEAK HOUR VOLUMES

Old Stage Rd
103 711 216
66 455 55
255 112
470 275
185 141

Ten Ten Rd
84 60
479 247
137 56
140 781 69
101 443 149

PROPOSED SITE

423 566
422 274
81 38
0 0
65 66
Rte 540 WB

646 908
313 656

Rte 540 EB

551 81
299 40

422 423
0 0
646 313
1131 66
547 65

LEGEND
123 52
PM AM
(closest to the arrow is AM)
Arrows represent laneage
Access locations

NORTH
(not to scale)

VA Outpatient Clinic Traffic Study - Alt B
FIGURE 4B
SITE TRIPS - POST ROUTE 540 SCENARIO
PEAK HOUR VOLUMES

PROPOSED SITE

NOTE
Access D includes egress movements that uturn

SITE TRIP GENERATION SUMMARY
AM | PM
In  Out | In  Out
345 103 | 122 276

NOTE
This distribution to/from Route 540
(65% to/from the west and 10% to/from the east)
is the distribution utilized in the Route 540 traffic study

LEGEND
123 52 →
PM  AM
(closest to the arrow is AM)
Arrows represent laneage
Access locations

NORTH
(not to scale)

EPRpc
VA Outpatient Clinic Traffic Study - Alt B
4.0 INTERSECTION CAPACITY ANALYSES

Methodology
The intersection capacity analyses were performed using Synchro (version 9) per the methodology documented in the Highway Capacity Manual (HCM) (Transportation Research Board). The HCM based calculations are provided in this report, except when HCM limitations do not provide for a calculation, and Synchro values are provided. SimTraffic calculations were utilized to evaluate the u-turn location on Old Stage Road.

Typically, actual peak hour factor (PHF) and truck percentage (HV%) data calculated from the manual turning movement count (TMC) is utilized for capacity analysis. However, as a result of the alternative methods required to obtain and derive existing traffic count data (described in Appendix B), NCDOT standard defaults were utilized. Similarly, signal plan information for the signalized intersections was not provided, so NCDOT standard defaults were utilized.

Capacity analyses are utilized to determine a Level of Service (LOS) for a given intersection operating under either signalized or unsignalized control. The LOS is based on estimated delay and range from LOS A, the best, to LOS F, the worst. In general LOS A and LOS B indicate little or no delay, LOS C indicates average delay, LOS D indicates delay is increasing and noticeable, LOS E indicates the limit of acceptable delay and F is characteristic of over saturated conditions. The actual delays associated with these levels of service are identified in Table 2.

<table>
<thead>
<tr>
<th>LOS</th>
<th>UNSIGNALIZED INT. DELAY (secs)</th>
<th>SIGNALIZED INT. DELAY (secs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0 – 10</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 10 – 15</td>
<td>&gt; 10 – 20</td>
</tr>
<tr>
<td>C</td>
<td>&gt; 15 – 25</td>
<td>&gt; 20 – 35</td>
</tr>
<tr>
<td>D</td>
<td>&gt; 25 – 35</td>
<td>&gt; 35 – 55</td>
</tr>
<tr>
<td>E</td>
<td>&gt; 35 – 50</td>
<td>&gt; 55 – 80</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 50</td>
<td>&gt; 80</td>
</tr>
</tbody>
</table>

Source: Highway Capacity Manual

The analysis results (delay, LOS and 95th percentile queue) for the Pre Route 540 scenario are summarized in Table 3 (comparing existing, no build and build) and Table 4 (comparing build to build mitigated) and for the Post Route 540 scenario are summarized in Table 5 (comparing existing, no build and build) and Table 6 (comparing build to build mitigated).

The results are also illustrated as follows:
- Figure 6 – Existing
- Figures 7-9 – Pre Route 540 (existing, no build, build and build mitigated respectively)
- Figures 10-12 – Post Route 540 (existing, no build, build and build mitigated respectively)
The HCM based intersection capacity analysis worksheets from Synchro are provided in the appendix. The existing scenario is located in Appendix F. The Pre Route 540 no build scenario is in Appendix G, the Pre Route 540 build is in Appendix H, and the Pre Route 540 mitigated build scenario is in Appendix I. The Post Route 540 no build is in Appendix J, the Post Route 540 build is in Appendix K, and the Post Route 540 mitigated build scenario is in Appendix L.

**Study Intersections**  
*Old Stage Road and Ten Ten Road - Signalized*

There is a committed and funded improvement project at this intersection to add an exclusive westbound right turn lane. This improvement has been included for all no build and build scenarios.

**Pre Route 540 Scenario**

For the Pre Route 540 scenario, the Old Stage Road and Ten Ten Road intersection analysis indicates operational issues in the existing and no build scenarios, with several movements operating at unsatisfactory levels of service (LOS E and LOS F). With the intersection already projected to operate unsatisfactorily in the no build condition, the build condition analysis projects minimal change. There are several individual movements similarly projected to operate at LOS E / LOS F, with an overall intersection level of service of LOS F like the no build condition.

Although the operational issues are related to existing and background volume growth, mitigation testing was conducted to determine what improvements would effectively improve operations. Given the no build operational issues, substantial improvements are required to improve operations. The improvements tested are adding a second eastbound through lane (shared with the right turn movement), adding a second northbound through lane, adding a second westbound through lane, adding an overlap signal phase to the westbound right turn movement, changing the northbound left turn phasing to protected-permitted, adding a second southbound through lane (shared with the right turn movement), and adding a second southbound left turn lane. Combined, these improvements result in satisfactory operational improvements.

**Post Route 540 Scenario**

For the Post Route 540 scenario, the analysis indicates the same basic results with operational issues in the existing and no build scenarios (several movements operating at unsatisfactory levels of service, LOS E and LOS F). Likewise, with the intersection already projected to operate unsatisfactorily in the no build condition, the build condition analysis projects minimal change. There are several individual movements similarly projected to operate at LOS E / LOS F, with an overall intersection level of service of LOS F like the no build condition.

Although the operational issues are related to existing and background volume growth, mitigation testing was conducted to determine what improvements would effectively improve operations. Given the no build operational issues, substantial improvements are required to improve operations, although with the Route 540 corridor impact, there are fewer improvements required. The improvements tested are adding an exclusive eastbound right turn lane, adding a second northbound through lane (shared with the right turn movement), adding a second westbound through lane, adding an overlap signal phase to the westbound right turn movement,
changing the northbound left turn phasing to protected-permitted, and adding a second southbound through lane (shared with the right turn movement). Combined, these improvements result in satisfactory operational improvements.

**Ten Ten Road and Rand Road (Pre Route 540 Scenario Only) - Unsignalized**
The Ten Ten Road and Rand Road intersection analysis indicates operational issues in the existing and no build scenarios, with the side street movements operating at LOS F. With the intersection already projected to operate unsatisfactorily in the no build condition, the build condition analysis projects minimal change with the same unsatisfactory levels of service projected.

Although the operational issues are related to existing and background volume growth, mitigation strategies were considered to improve operations. Even though the side street volume is very low at this intersection (with the exception of the southbound right turn movement), the Ten Ten Road traffic volume does not allow enough gaps for the side street movements to operate at a satisfactory level of service. Typical roundabout volume criteria are not met. An exclusive southbound right turn lane improves that one specific movement, but does not result in the other side street movements operating satisfactorily. This intersection does meet the Manual on Urban Traffic Control Devices (MUTCD) Signal Warrant 3 – Peak Hour Volume warrant utilizing no build traffic volumes (warrant graph provided in Appendix M). For this warrant evaluation, the eastbound left turn was utilized as the side street volume. Full signal warrants will need to be conducted in the future to better determine the appropriateness of signalization. With the addition of an exclusive southbound right turn lane and signalization, the intersection is expected to operate satisfactorily with all movements operating at LOS D or better.

**Old Stage Road and Route 540 Ramp Junction Intersections (Post Route 540 Scenario Only) - Signalized**
The Old Stage Road and Route 540 Ramp Junction (two separate ramp junctions) intersection analyses indicate both intersections operate satisfactorily in the no build and build scenarios, with all individual movements operating at LOS D or better.

**Access Locations**
There are three proposed access locations on Ten Ten Road (labeled A – C, from west to east). Access locations A and C are right in / right out only, while location B also allows for left in. Note that egress from Ten Ten Road does not provide for motorists to travel westbound on Ten Ten Road. Testing of both direct left turn egress movements and right out then u-turn maneuvers indicate unsatisfactory levels of service. The Old Stage Road access is also right in / right out only, but testing indicates that u-turn maneuvers north of the access would operate satisfactorily.

**Ten Ten Road Access A**
The Ten Ten Road Access A location was modeled as right in only ingress and right out only egress allowed. The ingress includes an exclusive right turn lane (200’ storage).

**Ten Ten Road Access B**
The Ten Ten Road Access B location access was modeled as right out only egress and full ingress allowed. The ingress includes exclusive right turn and left turn lanes (200’ storage).
Ten Ten Road Access C
The Ten Ten Road Access C location was modeled as right in only ingress and right out only egress allowed. The ingress includes an exclusive right turn lane (200’ storage).

Old Stage Road Access D
The Old Stage Road Access D location was modeled as right in only ingress and right out only egress allowed. The ingress includes an exclusive right turn lane (200’ storage). This access was also modeled with a northbound to southbound u-turn maneuver between this access and Old Stage Road. This movement includes an exclusive left turn lane (200’ storage).
LEGEND

C  B    ➔

PM  AM
(closest to the arrow is AM)
Arrows represent laneage
FIGURE 9
BUILD 2024 MITIGATED - PRE ROUTE 540 SCENARIO

NOTE
Build improvements also include widening EB Ten Ten Road and NB Old Stage Road to match the ultimate 4 lane divided cross section per the Garner Forward Transportation Plan.

LEGEND
C B ➔
PM AM
(current to the arrow is AM)
Rightarrow Current laneage
Rightarrow Mitigated improvements
Access locations

INTERSECTION LOS
AM C
PM D

VA Outpatient Clinic Traffic Study - Alt B
NOTE
Build improvements also include widening EB Ten Ten Road and NB Old Stage Road to match the ultimate 4 lane divided cross section per the Garner Forward Transportation Plan.

LEGEND
C B  →  Current laneage
PM AM  →  Mitigated improvements
Access locations
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Note
# 95th percentile volume exceeds capacity, queue may be longer.
^ Volume for 95th percentile queue is metered by upstream signal.
| Storage Length (ft) | BUILD AM |  | BUILD PM |  | MITIGATED AM |  | MITIGATED PM |  |
|---------------------|----------|----------------|----------|----------------|----------------|----------------|----------------|
|                     | Delay (sec/veh) | LOS | 95% Queue (ft) | Delay (sec/veh) | LOS | 95% Queue (ft) | Delay (sec/veh) | LOS | 95% Queue (ft) |
| OLD STAGE ROAD AND TEN TEN ROAD - SIGNALIZED |                     |                      |                     |                      |                     |                      |                     |                      |                     |
| EBL 75              | 47.7      | D | #123       | 36.8       | D | 134       |
| EBT-R 65            | 57.4      | E | #626       | 303.9      | F | #1576      |
| WBL 60              | 36.0      | D | 79         | 75.1       | E | #206       |
| WBT 100             | 210.2     | F | #1256      | 47.8       | D | 533        |
| WBR 100             | 60.4      | E | 401        | 37.5       | D | 102        |
| NBL 70              | 40.1      | D | 187        | 337.9      | F | #270       |
| NBT-R 100           | 285.7     | F | #1489      | 139.8      | F | #972       |
| SBL 100             | 237.3     | F | #693       | 368.7      | F | #883       |
| SBT-R 100           | 21.2      | C | 210        | 54.4       | D | #1057      |
| Intersection        | 162.7     | F |             | 172.4      | F |             |
|                     |           |                      |                     |                      |                     |                      |                     |                      |                     |
| TEN TEN ROAD AND RAND ROAD - UNSIGNALIZED |                     |                      |                     |                      |                     |                      |                     |                      |                     |
| EBL 80              | 13.1      | B | 35         | 9.8        | A | 30         |
| WBL 60              | 8.0       | A | 0          | 10.2       | B | 0          |
| NBL-T-R 100         | 14740.1   | F | 215        | 785.6      | F | 73         |
| SBL-T-R 100         | 273.5     | F | 435        | 340.3      | F | 548        |
|                     |           |                      |                     |                      |                     |                      |                     |                      |                     |
| OLD STAGE ROAD AND TEN TEN ROAD - SIGNALIZED |                     |                      |                     |                      |                     |                      |                     |                      |                     |
| EBL 75              | 20.0      | B | 58         | 18.5       | B | 83         |
| EBT-R 65            | 26.5      | C | 157        | 46.7       | D | #389       |
| WBL 60              | 17.3      | B | 45         | 22.1       | C | 79         |
| WBT 100             | 34.7      | C | #293       | 25.1       | C | 155        |
| WBR 100             | 23.5      | C | 177        | 14.2       | B | 37         |
| NBL 70              | 19.1      | B | 82         | 26.1       | C | 73         |
| NBT 70              | 45.7      | D | #332       | 37.1       | D | 207        |
| NBR 100             | 25.0      | C | 0          | 32.7       | C | 0          |
| SBL 100             | 51.7      | D | #175       | 44.0       | D | #207       |
| SBT-R 100           | 28.1      | C | 193        | 44.8       | D | #338       |
| Intersection        | 34.5      | C |             | 37.9       | D |             |
|                     |           |                      |                     |                      |                     |                      |                     |                      |                     |
| TEN TEN ROAD AND RAND ROAD - SIGNALIZED |                     |                      |                     |                      |                     |                      |                     |                      |                     |
| EBL 80              | 45.7      | D | #197       | 14.9       | B | #124       |
| EBT-R 60            | 4.2       | A | 88         | 19.7       | B | #538       |
| WBL 60              | 9.0       | A | 8          | 13.8       | B | 9          |
| WBT-T-R 80          | 48.4      | D | #885       | 30.2       | C | #304       |
| NBL-T-R 100         | 41.2      | D | 60         | 19.2       | B | 19         |
| SBL-T 100           | 38.6      | D | 31         | 24.8       | C | 31         |
| SBT-R 100           | 20.4      | C | #95        | 10.9       | B | 59         |
| Intersection        | 35.7      | D |             | 20.3       | C |             |

Note

# 95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal.
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TABLE 5 - ALTERNATIVE B POST ROUTE 540 DELAY, LOS AND QUEUE SUMMARY
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<th>NO BUILD AM</th>
<th>NO BUILD PM</th>
<th>BUILD AM</th>
<th>BUILD PM</th>
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<td>95%</td>
<td>95%</td>
<td>95%</td>
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<tr>
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<td>Delay (sec/veh)</td>
<td>LOS</td>
<td>Queue (ft)</td>
<td>Delay (sec/veh)</td>
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<td>45</td>
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<td></td>
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Note

# 95th percentile volume exceeds capacity, queue may be longer.
<table>
<thead>
<tr>
<th>Storage Length (ft)</th>
<th>BUILD AM</th>
<th>95% Delay (sec/veh)</th>
<th>LOS</th>
<th>Queue (ft)</th>
<th>BUILD PM</th>
<th>95% Delay (sec/veh)</th>
<th>LOS</th>
<th>Queue (ft)</th>
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<td>EBT-R</td>
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<td>F</td>
<td>#1020</td>
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<td>#308</td>
<td>91.1 F</td>
<td>#238</td>
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<table>
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<th>Storage Length (ft)</th>
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<th>LOS</th>
<th>Queue (ft)</th>
<th>MITIGATED PM</th>
<th>95% Delay (sec/veh)</th>
<th>LOS</th>
<th>Queue (ft)</th>
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</thead>
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<td>C</td>
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<td>C</td>
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<td>40.0 D</td>
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</table>

**Note**

# 95th percentile volume exceeds capacity, queue may be longer.
5.0 SUMMARY OF IMPACTS AND MITIGATION
The resulting mitigation and improvements are summarized in four sections below. The first section summarizes the improvements necessary at the study intersections for the build scenario to not have negative traffic impacts compared to the no build scenario. The second section summarizes the improvements related to the proposed access locations. The third section summarizes additional mitigation strategies that will improve existing / no build traffic operations issues. The fourth section identifies improvements that will be provided to facilitate the future Old Stage Road and Ten Ten Road corridors per the Garner Forward Transportation Plan.

Study Intersection Improvements to Mitigate Traffic Impacts of Build Scenario Compared to No Build Scenario
- None

Improvements Related to Access Locations
- Ten Ten Road Access (Locations A, B and C)
  Construct an exclusive right turn lane (200’ storage) for all three locations and an exclusive left turn lane (200’storage) for ingress at Access B.

- Old Stage Road Access D
  Construct an exclusive right turn lane (200’ storage) for ingress. Also provide a u-turn location between the access and Ten Ten Road with an exclusive left turn lane (200’ storage).

Additional Mitigation Strategies to Improve Existing / No Build Traffic Operations Issues
- Old Stage Road and Ten Ten Road (Pre Route 540 Scenario)
  Provide a second eastbound through lane (shared with the right turn movement), a second northbound through lane, a second westbound through lane, add an overlap signal phase to the westbound right turn movement, change the northbound left turn phasing to protected-permitted, add a second southbound through lane (shared with the right turn movement), and add a second southbound left turn lane.

- Old Stage Road and Ten Ten Road (Post Route 540 Scenario)
  Provide an exclusive eastbound right turn lane, a second northbound through lane (shared with the right turn movement), a second westbound through lane, add an overlap signal phase to the westbound right turn movement, change the northbound left turn phasing to protected-permitted, and add a second southbound through lane (shared with the right turn movement).

- Ten Ten Road and Rand Road
  Provide an exclusive southbound right turn lane and signalization.
Improvements to Facilitate the Future Old Stage Road and Ten Ten Road Corridors per the Garner Forward Transportation Plan

- Widen northbound (proposed site side only) Old Stage Road to match the ultimate four lane divided cross section (this widening includes an additional through lane and half of the median).
- Widen eastbound (proposed site side only) Ten Ten Road to match the ultimate four lane divided cross section (this widening includes an additional through lane and half of the median).
E.3 NCDOT Traffic Impact Analysis Review Report
August 12, 2020

Veterans Affairs Outpatient Clinic

Traffic Impact Analysis Review Report
Congestion Management Section

TIA Project: SC-2020-143
Division: 5
County: Wake

Doumit Y. Ishak, Regional Engineer
Clarence B. Bunting, IV, P.E. Project Engineer
Braden M. Walker, P.E. Project Design Engineer
Veterans Affairs Outpatient Clinic

SC-2020-143  Garner  Wake County

Per your request, the Congestion Management Section (CMS) of the Transportation Mobility and Safety Division has completed a review of the subject site. The comments and recommendations contained in this review are based on data for background conditions presented in the Traffic Impact Analysis (TIA) and are subject to the approval of the local District Engineer’s Office and appropriate local authorities.

<table>
<thead>
<tr>
<th>Date Initially Received by CMS</th>
<th>Date of Site Plan</th>
<th>Date of Complete Information</th>
<th>Date of Sealed TIA</th>
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<td>08/06/20</td>
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Proposed Development

The TIA assumes the development is to be completed by 2024 and consist of the following:

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<thead>
<tr>
<th>Land Use</th>
<th>Land Use Code</th>
<th>Size</th>
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<tbody>
<tr>
<td>Clinic</td>
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<td>400 Employees</td>
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Trip Generation - Unadjusted Volumes During a Typical Weekday

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<th>IN</th>
<th>OUT</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>AM Peak Hour</td>
<td>345</td>
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<tr>
<td>PM Peak Hour</td>
<td>122</td>
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<tr>
<td>Daily Trips</td>
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TIA Comments – The Following items vary from our recommended practices:

- TIA was not sealed by a professional engineer
- A recommendation diagram was not provided
- A site plan was not provided

General Reference

For reference to various documents applicable to this review please reference the following link: [http://www.ncdot.org/doh/preconstruct/traffic/teppl/Topics/C-37/C-37.html](http://www.ncdot.org/doh/preconstruct/traffic/teppl/Topics/C-37/C-37.html)

Once the driveway permit has been approved and issued, a copy of the final driveway permit requirements should be forwarded to this office. If we can provide further assistance, please contact the Congestion Management Section.

Improvements By Others

The analysis includes background improvements by others. If these improvements are not in place at the time of construction, the site should provide these improvements or analysis demonstrating mitigation is not necessary.
Alt B - without 540

Preferred spacing of at least 800' between signals

SITE

V A Outpatient Clinic
Garner, Wake County
SC-2020-143

- Existing Laneage
- Recommended Laneage
- Laneage Built By Others
- NCDOT Recommendation
- Existing Signal
- Signal Proposed By Others
- Developer Proposed Signal
- Monitor for Signal
- XXX Storage
- XXX NCDOT Recommended Storage
- <XXX> Distance Between Intersections
- IPS Internal Protected Stem

All Distances in Feet
Drawing Not to Scale
Alt B - with 540

Preferred spacing of at least 800' between signals

VA Outpatient Clinic
Garner, Wake County
SC-2020-143

- Existing Laneage
- Recommended Laneage
- Laneage Built By Others
- NCDOT Recommendation
- Existing Signal
- Signal Proposed By Others
- Developer Proposed Signal
- Monitor for Signal
- Storage
- NCDOT Recommended Storage
- Distance Between Intersections
- IPS Internal Protected Stem
- All Distances in Feet
- Drawing Not to Scale