TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL **PLANNING DEPARTMENT**

DELIVERED VIA: ☒ *HAND* ☐ *MAIL* ☐ *FAX* ☒ *EMAIL*

To: **David Andrews, Town Manager**
Mayor and Board of Aldermen

From: **Zachary Hallock, Transportation Planner**

Date: **October 16, 2018**

Subject: **NC 54 West Corridor Study**

Summary

The NC 54 West widening project was previously submitted to NCDOT for funding in an attempt to anticipate future needs. The Town of Carrboro's liaisons to the DCHC MPO Board requested that a corridor study be performed to determine if widening is necessary. The MPO agreed to arrange a study and extended the corridor to Graham in order to accurately assess travel patterns to and from UNC, in particular to the hospital. Through a RFLOI process, the consulting firm VHB was selected to conduct the study focusing on future capacity needs. Based on current traffic counts, public outreach, and projected traffic volumes VHB's primary recommendation is to widen the corridor to a four lane divided section both to provide additional capacity (and relieve peak hour congestion) and improve safety issues associated with turning vehicles along the corridor. A multi-use path adjacent to the roadway is also recommended, but it remains unclear as to whether the sidepath would be constructed as an enhancement for the roadway project or a subsequent bike-ped project and how it would be funded (the local match requirement (percentage)). VHB recommended a timeline for the widening of the easternmost section (in Carrboro) with completion in the window of 2020 to 2030. Future implementation of the widening are dependent on scoring in the data-driven SPOT process and the allocation of local points by the DCHC MPO and TARPO. There may be additional costs with construction of a parallel bike-ped facility for right-of-way expansion and associated impacts to septic systems located on properties along the corridor. Staff continue to coordinate with Chapel Hill Transit to determine the feasibility of future transit service along this corridor to Burlington/Graham and investigating potential park and ride lot locations. Additionally, another corridor study is being performed on the section of NC 54 from W Main Street in Carrboro to Manning Drive in Chapel Hill, the results of which can be used to inform future decisions about this project. A more detailed summary of VHB's analysis of the corridor can be found below, which forms the bulk of the staff report.

Purpose

This document will provide the Board of Aldermen with a detailed status update on the NC 54 West Corridor Study (which was initiated by DCHC MPO in 2017) and its potential impacts on the Town of Carrboro. The engineering consulting firm VHB has been contracted by the DCHC MPO to perform technical analysis, forecast traffic volumes, and recommend improvements for the corridor; which starts at Old Fayetteville Road in Carrboro and extends west to Interstate 40 in Graham. The draft report, which has been provided to staff for comment, is also included as an attachment to the associated agenda item. This document will follow the chapters of the report, summarizing each one (and the sections within): Existing Conditions, Critical Issues, Public Input, Corridor Vision, and Implementation.

Existing Conditions

Physical Characteristics

The current configuration of NC 54 is a two-lane rural section from its intersection with Old Fayetteville Road in Carrboro to NC 119 in Graham. The remaining 3.2 mile segment is a 5-lane section with a center two-way left turn lane and curb and gutter. The majority of the commercial and residential development along the corridor is situated near both the east end (Carrboro) and west end (Graham) with the center of the corridor primarily consisting of agricultural and historical land uses. Pedestrian facilities are largely non-existent along the corridor, with the exception of a 320 foot long section of sidewalk adjacent to a retail strip development in Graham. The only Bicycle facilities along the corridor exist in Carrboro, these are bike lanes which extend approximately 500 feet west from Old Fayetteville Road. NC 54 serves as a direct route from Burlington/Graham to Carrboro/Chapel Hill, with few alternate routes. NC 87 parallels the western half of the corridor whereas Old Greensboro Road (SR 1005) parallels the eastern half. Interstate 40 provides the only major alternative, but its route lies significantly north of NC 54.

Traffic Characteristics

Daily traffic volumes along the NC 54 corridor take a sort of ‘dumbbell’ shape, with the highest volumes occurring at the west and east ends of the corridor. The central area of the corridor has the lowest volumes, which reflects its more rural character. Overall traffic volumes on NC 54 have seen a slight acceleration in recent years, based on data collected in 2017, however adjacent roadways have not mirrored this trend and in some cases have seen their volumes decline. Peak hour traffic volumes on the western end of the corridor are balanced, seeing a nearly 50/50 directional split between eastbound and westbound traffic. On the Carrboro end of the corridor, peak period traffic volumes are vastly more directional, closer to a 70/30 split which reflects the nature of traffic utilizing this route to access the UNC-Chapel Hill area.

Traffic Operations and Quality of Service

The majority of the NC 54 West corridor is a two-lane rural highway section. Level of service for these types of facilities are measured with a metric called Percent Time Spent Following (PTSF). This measures the amount of time which drivers are forced to follower a slower vehicle

due to the inability to pass. Current conditions indicate that from Mebane Oaks Road, through Dodsons Crossroads, to Old Fayetteville Road in Carrboro, the peak direction (during either the AM or PM peak) operates at Level of Service E. This indicates that while the roadway is not currently over capacity during the peak periods, it is expected that drivers may be following a slower vehicle more than 80% of the time.

Metrics for Bicycle Level of Service (BLOS) indicate that peak period conditions are poor for cyclists either BLOS of 'D' or 'E'. This is largely due to significant traffic volumes and speeds, lack of bicycle lanes and limited shoulder width.

Analysis of signalized intersections along the corridor indicate that while they may be operating at acceptable LOS (D or better), they can also be significant sources of travel delay during the peak hours due to queuing. Additionally, major side streets with unsignalized intersections (Mebane Oaks Rd, Orange Grove Rd, Bethel Hickory Grove Church Rd) experience substantial delay and degraded LOS during the peak periods.

Safety

Review and analysis of the 2013-2015 Crash data for the two-lane section of the corridor indicates that the Total, Non-fatal, and Wet Weather crashes were found to be occurring at a rate higher than the statewide rate with a statistically significant difference. Crashes at Old Fayetteville Road are primarily rear end crashes, which may reflect the nature of drives not anticipating the transition from a rural roadway to a more urban area as they enter Carrboro. Additionally, there have been nine crashes involving a Bicyclist or Pedestrian along the NC 54 corridor; and due to the high automobile speeds along this road more than half of those have resulted in either a fatality or disabling injury.

Environmental Context

Within the study area there are twelve named stream crossings, ten with designated floodplains along the corridor, which runs through two water supply watersheds (WSW), Cane Creek and Morgan Creek, which drain into municipal drinking water reservoirs. Both WSWs are classified as Class II high-quality waters, and are protected as nutrient-sensitive waters with watershed-specific nutrient loading rates. Portions of the corridor fall within the protected areas (upstream of intake) of both WSWs. The critical areas (adjacent to water intake) are located outside of the corridor and study area but within the study area vicinity. The corridor sections in Alamance and Orange Counties fall within the Jordan Lake Watershed. All roadway improvements and associated construction activities must follow stormwater management requirements set by the Jordan Lake Nutrient Strategy to reduce nutrients and improve water quality in the Jordan Lake Reservoir.

Natural resources important to state biodiversity conservation and recommended for protection within the study area were identified through the NC Natural Heritage Program (NHP). One natural heritage area, Lower Cane Creek Slopes and Bottom, is located within the project corridor. Additional NHP resources within the study area vicinity include: land easements

managed by county, state, and private agencies, a natural heritage area, two aquatic communities, three terrestrial communities (one of high significance), and one unnamed animal species.

Sources of hazardous materials within the corridor include ten gas stations with underground storage tanks, which may present complications during redevelopment and construction. In addition, an inactive landfill is located near the western edge of the study area. Historic resources within the study area are minimal, including one property on the National Register, and two properties and one district indicated on the Historic Study List.

Relevant Plans

The Town of Carrboro's Comprehensive Bicycle Transportation Plan indicates construction of a Sidepath from W Main Street to Anderson Park, along NC 54. Additional improvements in the area are the already constructed Bike Lanes along Old Fayetteville Road. The DCHC MPO's 2045 Metropolitan Transportation Plan (MTP) indicates Modernization of NC 54 from Old Fayetteville Road to the DCHC MPO boundary and is scheduled for completion in 2023. Potential improvements could include widened shoulders to better accommodate cyclists and addition of median to accommodate turning vehicles. Town of Carrboro Zoning indicates all properties along the NC 54 corridor within the Town limits fall under one of four watershed zones (Watershed Commercial, Watershed Residential, Watershed Light Industrial, and Conservation District). These zones all serve to limit the intensity of development in order to conserve water quality within the watershed.

Critical Issues

Safety and Access Management

NC 54 is classified as a Minor Arterial under the Federal Functional Classification System, which reflects that while it does serve commuter trips between UNC and points west, it also serves to provide access to adjacent land uses. The number of vehicles turning on to and off of NC 54 will cause increased delay for drivers, increased potential for collisions, and pose a significant hazard to cyclists and pedestrians. Access management can help alleviate some of these issues by eliminating redundant driveways, providing additional turn lanes and improving median storage the number of conflicts can be reduced. This can assist with improving travel speeds and increasing the available capacity without the same expense associated with a full roadway widening.

Congestion

Based on available travel demand models, Piedmont Triad Regional Model (PTRMv4.2), Triangle Regional Model (TRM v5 & v6), and the NC Statewide Travel Model (NCSTM) long range forecasts were developed to analyze the future traffic congestion along the corridor. The traffic patterns described in the existing conditions section are reflected in the growth rates determined by the model; the middle section of the corridor forecasts the lowest potential traffic volume growth, but at either end in Carrboro or in Graham the forecasted growth is more substantial. Analyzing the level of service for these forecasted volumes, the average peak hour

travel speeds drop to under 40 mph, Percent Time Spent Following approaches 100% in the peak directions, and the majority of corridor segments experience LOS E or F during the peak hour.

Bicycle and Pedestrian Issues

While future traffic demand is typically quantified through forecasts and capacity analyses, the lack of substantial bicycle and pedestrian traffic along the corridor and supporting data makes quantitative forecasts challenging. Instead, these issues tend to be described qualitatively, highlighting gaps in the network and other safety concerns. Based on input from community meetings, there is a strong support for a 'build it and they will come' strategy; but there is also a reasonable expectation that the volume of bicyclists and pedestrians along the corridor will increase simply due to population growth and the corridor's recreational assets. The specific details of bike-ped facilities are still up for deliberation: facility type: On-street vs off-street, multi-use path vs bike lane vs wide shoulders; facility location: one side of the road, the other, or both; and distance of separation the roadway. Additional consideration is needed in order to prevent construction of a bike-ped facility which may be impacted by other future improvement along the corridor (be it lane additions or otherwise).

Transit Issues

Much like the bike-ped elements of the study, there is not significant data to support a long-range forecast for transit demand along the NC 54 corridor. Any unmet demand is difficult to quantify, much less determine the appropriate service for a low-density, rural corridor. The most likely scenario coming from Chapel Hill Transit, is the currently unfunded recommendations to consider a park-and-ride lot near White Cross with associated transit service along NC 54 to UNC, which is one of the long term recommendations which came out of their Short Range Transit Plan.

Market Assessment

Land use analysis of parcels in close proximity to the corridor indicates Economic Nodes (where development should be focused and encouraged) and Heritage Nodes (where existing culture and land use should be maintained). The intersection of NC 54 and Old Fayetteville Road in Carrboro is indicated as the only Economic Node along the corridor in Orange County. The study recommends taking the following actions for economic nodes: encourage mixed-use development, coordinate transportation and land use planning, and provide enhanced bike-ped facilities within the node.

Public Input

Stakeholder Interviews

As part of the Public Involvement Plan, interviews were held with groups who had specialized knowledge about the NC 54 corridor; several key points came from these interviews. Morrow Mill Rd, Dodsons Crossing, and Mebane Oaks Rd were identified as locations of significant safety concern. Additionally, heavy congestion during the school peaks near Alexander Wilson Elementary School in Graham also conflicts with shift changes at nearby businesses.

Community Workshops

Two rounds of community workshops were held as drop-in sessions to solicit input from local citizen. The first round was held in January:

- Mid Corridor – Rigmor House, 1/23/18, 4:30 PM to 6:30 PM
- West Corridor – Graham Civic Center, 1/24/18, 6:30 PM to 8:30 PM
- East Corridor – Carrboro Town Hall, 1/25/18, 6:30 PM to 8:30 PM

Comments from the first round focused on preservation of the rural character in the center of the corridor, safety concerns due to high speed vehicles passing in no-pass-zones, and competing visions of multimodal roadway design.

The second round of workshops were held in May:

- Orange County – Rigmor House, 5/1/18, 4:30 PM to 6:30 PM
- East Corridor – Carrboro Century Center, 5/2/18, 6:30 PM to 8:30 PM
- West Corridor – Graham Civic Center, 5/3/18, 6:30 PM to 8:30 PM
- Alamance County – Swepsonville Fire Department, 5/10/18, 4:30 PM to 6:30 PM

Comments from this round highlighted skepticism of vehicle traffic forecasts, questions as to the interaction between roadway widening and new developments, and promotion of safety improvements.

Additional feedback was gathered from the interactive map which was featured on the project website. A plurality of the comments were related to current vehicular issues such as safety, visibility, speed, and passing.

Corridor Vision

Committed Improvements

- STIP #U-6071
  This project is a regional intersection improvement at Old Fayetteville Road and NC 54 in Carrboro and is directly impacted by the proposed development of the Lloyd Farm property. ROW is scheduled for 2024, with construction in 2026.
- STIP #R-5821A
  This project is a regional corridor operational improvement with bike-ped accommodations along NC 54 from Orange Grove Road to Old Fayetteville Road. ROW is scheduled for 2020, with construction in 2022.

Recommended Improvements

The results of the corridor study recommend a typical section with 2 travel lanes in each direction, a landscaped median of varying width, and a shared-use path. Details such as curb and gutter vs swale, and the amount of separation between the shared-use path and the edge of the roadway are dependent on the available right of way. This proposed improvement would increase the vehicular level of service to C or better at all segments along the corridor during

both AM and PM peak periods. Additionally, the provision of a shared-use path improves the environment for bicyclists, increasing the BLOS to C or better at all locations along the corridor.

General intersection improvements along the corridor include enhanced pedestrian crossings (crosswalks, signage, signals as appropriate), turn lanes (especially left turns), update signal timing and phasing, periodically assess unsignalized intersections to determine if signal is warranted, and enhanced lighting, pavement markings, and signage for visibility.

Implementation

Construction Phasing

Project phasing considering four time frames for implementation:

- Phase 1, 2020-30: From Old Fayetteville Road in Carrboro to Dodsons Crossroads in Orange County
- Phase 2, 2025-35: Dodsons Crossroads to Morrow Mill Road (Orange County) and Woody Drive to Wormranch Road (Graham/Alamance County)
- Phase 3, 2035-45: Wormranch Road to Mineral Springs Road (Alamance County)
- Phase 4, 2040-45+: Morrow Mill Road (Orange County) to Mineral Springs Road (Alamance County)

This widening schedule is preliminary and does not explicitly consider funding viability or constrains associated with prioritization and programming. Assuming a widening project is successfully submitted to SPOT 6.0 in 2019, completion is unlikely prior to 2030. And while the interim improvements (such as turn lanes or signal improvements) could be completed within phase 1, their cost effectiveness could be jeopardized if not coordinated with future widening.

Funding Pedestrian and Bicycle Facilities

Current NCDOT policy does not treat all facilities the same in terms of funding; it does allow for the Department to pay for and maintain all improvements within the curb or edge of pavement, such as bike lanes or wide shoulders. Any bike-ped improvement which is separated from the road by a curb, swale, or other vertical element may require the local jurisdiction to acquire additional ROW, share in construction costs, and maintain the facility. A local jurisdiction may choose to add these improvements in advance or separate from a roadway project, if there is a need for the associated bike-ped project sooner than the roadway construction would begin.

Estimates of Probable Costs

Cost breakdown for section 6 (Old Fayetteville Road to Dodsons Crossroads) is as follows:

$32,500,000 – Widening to 4-lane divided
$ 700,000 – Signalization and intersection improvements at Bethel Hickory Church Road
$ 400,000 – Intersection improvements at Neville Road
$ 800,000 – Intersection improvements at Hatch Road
$ 3,000,000 – Intersection improvements at Old Fayetteville Road
$ 5,800,000 – Shared-Use Path

$43,200,000 – Segment 6 Total

Currently, the DCHC MPO's 2045 MTP does not include any widening of NC 54 west of Old Fayetteville, so this improvement could not be submitted to the STIP without an MTP amendment. Interim improvements could be implemented as "operational improvements" currently included in the MTP, though funding would be limited. Improvements to the Old Fayetteville Road intersection are the most critical; both the proposed Lloyd Farm development and U-6071 provide opportunities to provide these, and ensuring proper coordination between development improvements and NCDOT improvements is critical. Other intersection improvements could be implemented by 2022 under STIP project R-5821A.

Local Ordinances and Statutes

The different jurisdictions along the corridor need to consider the careful coordination of land use and transportation planning together. Ensuring developments occur alongside/include programmed roadway improvements can help streamline the implementation process and minimize cost overruns. Any concession require should be rational and proportional to the scale of the development. Possible land use planning tools indicated are:

- Require traffic studies at Rezoning
- Require Traffic Management Plans for large developments
- Require CTP improvements at time of site or subdivision plan
- Transportation development fees
- Access Management District
- Driveway delineation/consolidation
- Require stub out streets for developments
- Consistent site design guidelines
- Shared Stormwater management
- Land Swaps