



Department Source: Public Works

To: City Council

From: City Manager & Staff

Council Meeting Date: October 2, 2023

Re: Report. Providing a study of the Chapel Hill/Fairview intersection and a study of the Rollins/Fairview intersection and seeking Council guidance on the construction of improvements at each intersection.

Executive Summary

As directed at the June 20, 2016 City Council meeting, Staff has completed a detailed study of the congestion issues at the Chapel Hill and Fairview intersection and a safety evaluation of the Rollins Road and Fairview Road mini-roundabout. An improvement project at the intersection of Chapel Hill Road and Fairview Road was included in the list of proposed projects to be completed for the 10-year CIP sales tax ballot renewal in 2015. Staff is providing the studies for information and requesting Council guidance on how to move forward with improvements at each intersection.

Discussion

An improvement at the intersection of Chapel Hill and Fairview was included in the list of proposed projects to be completed for the 10-year CIP sales tax ballot renewal. This sales tax renewal was voted on in August of 2015. Currently, the Chapel Hill and Fairview intersection is an all-way stop. The proposed improvements consist of constructing a 110-foot diameter single-lane roundabout to improve traffic movement and safety. This roundabout design also includes splitter islands and sidewalks on all four sides which will link to existing sidewalks in the area. Extensive street right of way already exists on the northwest corner of the intersection. (See Roundabout layout and similar roundabouts diagrams).

A public hearing for the Chapel Hill and Fairview improvement project was held at the June 20, 2016 City Council meeting to discuss the proposed roundabout for the intersection. At the public hearing many residents voiced concerns about the roundabout and Council voted not to move forward with final plans. The "Residents' concerns and responses" exhibit included with this council memo summarizes the concerns residents had with the proposed roundabout and the City's response to address the concerns. At the public hearing, 2016 Ward 4 Councilman, Ian Thomas, directed staff to complete a detailed study of the congestion issues at the Chapel Hill and Fairview intersection and also to complete a safety evaluation of the existing Rollins Road and Fairview Road mini-roundabout.

Intersection Studies:

Completion of the two intersection studies were put on hold until 2022 in order to allow additional road improvement projects to be completed in the area and then to allow traffic to even-out after the improvements were completed. These road improvement projects included the construction of the roundabout at Forum & Green Meadows (2019), the road widening along Forum between Green Meadows and Nifong (2020), the road widening



along Nifong between Providence and Willowcreek (2020-2021), the roundabout at Nifong & Sinclair (2020), and the roundabout at Nifong and Old Mill Creek (2020).

A local engineering firm, Allstate Consultants, was hired in February of 2022 to complete the traffic study at each intersection. The objectives of the study were to analyze the existing and anticipated traffic flow through the intersections and to evaluate options for traffic control and/or geometric improvements to reduce the intersection delay and improve safety. Allstate Consultants completed the field study in March 2022 and finalized the report in May 2023. The following summarizes each of the intersection studies.

Chapel Hill Road and Fairview Road intersection study:

The Chapel Hill and Fairview intersection study included analyzing the intersection for existing conditions (Year 2022) and for projecting anticipated future traffic flow through the intersection (Year 2042). The study looked at both the existing condition and the future condition to compare keeping the intersection as an existing all-way stop, constructing a roundabout, or constructing a traffic signal.

The study found that with the existing conditions, there is an undesirable delay and this delay will increase as traffic increases over the next 20 years. The conversion of the intersection to a single-lane roundabout or to a signal-controlled intersection will reduce the delay time. The study also looked at signal warrants (conditions that an intersection must meet to justify a signal installation), safety, intersection geometry, constructability, and impacts to surrounding properties. Based on the considerations for safety, intersection geometry, and operational impacts to surrounding properties, the study recommended the construction of a roundabout to improve the intersection.

Rollins Road and Fairview Road roundabout study:

The Fairview and Rollins intersection study looked at both the existing condition and the future condition to compare keeping the intersection as a mini-roundabout, converting the intersection to a 4-way stop, or constructing a traffic signal. In addition, the study looked at existing vehicle speeds through the intersection and compliance issues.

The study found that as modeled the existing roundabout works well in the present and in the projected 20-year future conditions. In analyzing the conversion to a signalized intersection, the intersection did not meet any warrants necessary for signalization. In analyzing the intersection for conversion to a 4-way stop controlled intersection, the intersection would work with current traffic conditions, but would fail with the future traffic projections. The field observation did note some compliance issues with the mini-roundabout in its current condition. These observations include unnecessary stopping/yielding, proceeding without the right of way, standard vehicles traversing the center island, and differential speeds.



The report also looked at improvements that could be made to the existing roundabout. First, the roundabout could be re-constructed as a full-sized single-lane roundabout. Due to the terrain and proximity of the buildings at the intersection, one of the properties would most likely need to be bought and removed in order to construct a full-sized roundabout. Second, horizontal adjustments could be made to the mini-roundabout by incorporating a small amount of horizontal deflection. This could be accomplished by reconstructing the curbs and the splitter islands. Finally, the report recommended a combination of education and enforcement to improve compliance in driving through the roundabout.

This summer the City's BeHeard CoMo website was used to request residents to post what they thought of the roundabout at Forum and Green Meadows compared to the all-way stop that was previously at the intersection. The roundabout project at the Forum and Green Meadows intersection was a similar project in that there were concerns voiced by many of the adjacent residences about if the roundabout would work as intended. The survey requesting citizens to post comments ran from July 3 to July 15, 2023. Fifty-five comments were posted on the website. Almost all comments were positive about the roundabout with ideas for locations to construct other roundabouts, or improvements that can be made to existing roundabouts.

Recommended Improvements:

For the Chapel Hill and Fairview intersection, staff proposes moving forward with design of a roundabout for the long-term improvement for the intersection because of the safety features of a roundabout for pedestrians and motor vehicles, for traffic flow improvements, and for maintenance reasons.

The favorable features of the roundabout in comparison to a 4-way stop or a signalized intersection include the following:

- For the existing all-way stop intersection there are a total of 32 vehicle conflict points. For the proposed roundabout, there would be a total of 8 vehicle conflict points. A conflict point is any location in the intersection where vehicles' paths merge, diverge, or cross. These are the most likely locations for collisions to occur. (See Conflict point diagram.)
- A pedestrian crossing a leg of the 4-way stop intersection faces six potential vehicular conflicts, each coming from different movements and different directions for those movements. A pedestrian crossing a leg of a roundabout will face two potential vehicular conflicts and each conflict point will be at a separate time from only one direction of traffic. For the roundabout the first potential conflict point for the pedestrian will be coming from the left, with a refuge on the median island, before facing the other potential conflict, which will be coming from the right.
- The roundabout geometry changes movement through the intersection in a way that forces drivers to slow down and adjust their direction. This results in fewer and less severe collisions. With roundabouts the most severe types of crashes (right-angle, left-turn, and head-on) are unlikely to occur because of this geometry.



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- The vehicular speeds are lower and the crosswalks are set back at the roundabout to allow drivers more time to react to pedestrians and other vehicles while merging into or out of the roundabout. Generally, a driver can drive much faster through a signalized intersection in comparison to the speed a driver can maneuver a roundabout (Think about a driver speeding up to get through an intersection as the signal changes to yellow or red).
- Roundabouts bring conflicting traffic streams into a steady flow and allow vehicles to merge without the stop-and-go conditions. It keeps traffic flowing during non-peak periods since vehicles would not have to wait at a red light when little or no traffic is coming from the conflicting direction.
- Long-term maintenance costs are lower for a roundabout than a signal due to the electrical cost and operation/maintenance cost of a signal.

The favorable features of the roundabout specifically for the Chapel Hill and Fairview intersection include the following:

- A signal at the intersection would need to be “split-phase” (one direction of Chapel Hill would proceed and then the other would proceed) or protected only left turn phasing for the eastbound and westbound lefts given the available sight distance in all directions. The left turn lanes would need to be significantly extended, which would increase impacts to adjacent properties.
- To allow for westbound traffic to see the signal at the intersection, the tree line would need to be removed along the southeast side of Chapel Hill Road.
- The hill on the east leg of Chapel Hill Road is problematic for queuing vehicles during winter weather conditions. A roundabout will allow vehicles to more easily keep moving slowly instead of coming to a complete stop on the hill as would be required with a 4-way stop or signal.
- The existing curve of Chapel Hill Road through the intersection would allow for an eastbound vehicle driving too fast through the intersection to potentially lose control and cross into the westbound lane.

For the Chapel Hill and Fairview intersection, staff is proposing to move forward with the design of the roundabout for the intersection. Staff will hold a second interested parties meeting and a second public hearing to present the additional information to the public.

For the Rollins and Fairview intersection, staff is proposing to consider the proposed horizontal alignment improvements to the existing roundabout to be considered a future project to be constructed as funding becomes available. The proposed improvement would also follow the City's public improvement process by holding an interested parties meeting and public hearing for the project.

Staff is providing this information for Council consideration. In addition, Staff is seeking Council guidance on the proposed design and construction of improvements at each intersection.



Fiscal Impact

Short-Term Impact: The estimated total project cost for the construction of the Chapel Hill and Fairview roundabout is \$1,085,000.

Long-Term Impact: Maintenance of the intersection.

Strategic & Comprehensive Plan Impact

[Strategic Plan Impacts:](#)

Primary Impact: Reliable and Sustainable Infrastructure, Secondary Impact: Secondary, Tertiary Impact: Tertiary

[Comprehensive Plan Impacts:](#)

Primary Impact: Infrastructure, Secondary Impact: Secondary, Tertiary Impact: Tertiary

Legislative History

Date	Action
05/02/2016	R34-16 A-Setting a Public Hearing for June 20, 2016 for construction of the Fairview Road & Chapel Hill Road intersection improvements.
04/04/2016	R34-16 Setting a Public Hearing for May 2, 2016 for construction of the Fairview Road & Chapel Hill Road intersection improvements project (Tabled).

Suggested Council Action

Following review of the study for the Chapel Hill/Fairview intersection and for the Rollins/Fairview intersection, staff is seeking Council guidance on the design and construction of improvements at each intersection.