



Memorandum

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Department of Public Works
110 Western Avenue
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Date: May 21, 2021

Project #: 13960.01

From: Erin L. Thompson, PE, IMSA III
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Re: Edgell Road at Edmands Road/Water Street Intersection (PW-429)
Community Feedback

Introduction

On March 18, 2021, the City of Framingham held a public informational meeting for the reconstruction of the Edgell Road at Edmands Road and Water Street intersection. The lack of an exclusive right-turn lane on the northbound approach of Edgell Road was raised as a concern by several members of the community. Residents stated they had previously been shown that the intersection would have a northbound right-turn lane and had not been informed of the decision to remove it. The purpose of this memorandum is to explain how the design currently under construction was reached.

Project Goals

Prior to the COVID-19 pandemic, Edgell Road averaged approximately 15,850 vehicles per day. Edmands Road carried approximately 5,785 vehicles per day and the traffic volume on Water Street is estimated around 12,000 vehicles per day. The intersection experiences typical commuter peak flows, processing approximately 1,700 vehicles during the morning peak hour and 2,000 vehicles during the evening peak hour. The four corners of the intersection are developed with commercial/retail businesses; however, land use near this intersection is primarily residential with an elementary school and library nearby on Water Street.

The reconstruction of the intersection of Edgell Road at Edmands Road and Water Street had several goals: improve pedestrian walkability, reduce traffic congestion, increase safety for all users, upgrade the traffic signal system, and encourage community-based business development, all without significant impacts to abutting properties. A context-sensitive approach balances those goals without creating a "superhighway" or degrading the character of the area.

Basis of Design

There are many factors to consider during the design of roadway and intersection improvements. Existing roadway characteristics, abutting and surrounding land use, motor vehicle crash history, traffic volumes, and available right of way are several of these factors. In determining the number, type, and width of travel lanes at an intersection a variety of design elements are reviewed. Much of this design process focusses on traffic operations under peak conditions; typically, those that occur during the weekday morning and late afternoon hours when commuter traffic is at its greatest. Traffic operations are evaluated using "capacity analyses" which report delays, queuing, and other measurable conditions. However, the intersection also needs to be designed considering conditions throughout the entire day and week, and not just the absolute busiest times. In doing so, it is important that the intersection be designed to accommodate representative conditions without detracting from the overall environment of the surrounding area. Analysis results at most intersections in a developed area could be improved with additional travel lanes. However, while some benefits can be achieved from this under peak conditions, the livability, safety, and

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general environment should not be discarded with the design being based solely on numeric analysis results. The following sections discuss how some of the quantifiable elements were reviewed before also weighing these other less technical elements.

Travel Lanes

Edgell Road and Water Street are Urban Minor Arterials and Edmands Road is an Urban Major Collector. Edgell Road and Edmands Road are also designated Scenic Roads. With speed limits of 25 miles per hour (mph) and 30 mph, 13-foot travel lanes were selected to meet the needs of commercial traffic but also to allow shared lanes with cyclists per the City's Complete Streets policy.

Turn Lanes

Except for Edmands Road, each approach had a 9- to 10-foot wide left-turn lane adjacent to a 9- to 10-foot wide shared through-right lane. The proposed design standardized the width of the left-turn lanes to 10-feet. A narrower width may cause larger tractor-trailers to encroach into the adjacent lane and a wider lane was not deemed necessary based on minimal side-swipe collision history. The widths of all travel lanes were carefully evaluated so that vehicle traffic would be safely and efficiently processed, while not creating excess pavement width which could result in conditions not in keeping with the goals for this area. There is a heavy left-turn volume from Edgell Road southbound and Water Street, which retain protected phasing with the new traffic signal system. The left-turn lane on Edgell Road northbound and a new left-turn lane on Edmands Road will allow turning traffic to wait for gaps in oncoming traffic without holding up traffic behind them.

As part of the City's review of the 30% Design Submission, an exclusive right-turn lane for Edgell Road northbound was evaluated. While there would be some benefit during the peak hours, the operational improvements would only be achieved if the turn lane was at least as long as the northbound through movement queue. With an average queue of over 350 feet during the morning peak period, the turn lane would need to extend to the plaza at 861 Edgell Road (Gianni's/Honey Dew) to be effective. While the Nobscot Plaza redevelopment team was open to providing the needed right of way, extensive property takings would have been required from other abutters. Without that extra length being provided, access to the right-turn lane typically would be blocked by queued traffic in the adjacent through lane. Besides resulting in frustration for drivers unable to access the lane, the additional lane would create a significantly wider roadway. Even if entry to this lane was not blocked, the added width still would result in a longer pedestrian crossing at the intersection. To allow pedestrians to safely cross the intersection, a longer pedestrian crossing time within the signal operation would be needed. Some efficiency could be gained with a right-turn lane, if it could be readily accessed, but those benefits would be partly offset by the additional delays created by the longer pedestrian signal phase.

Focusing strictly on analysis results, providing a right-turn lane on the northbound Edgell Road approach would have some benefits during peak traffic conditions. However, the northbound approach now would feature an exclusive left-turn lane, a through-lane, and right-turn lane, with a single southbound lane departing from the intersection. With this four-lane cross section there would be an increased amount of shifting into turn lanes and vehicles queued adjacent to each other in multiple lanes. While this is not an uncommon occurrence, it inherently increases the amount of potential conflicts. This could result in a greater potential for crashes in this area, though it is difficult to quantify that compared to current conditions. Regardless, providing additional lanes could more readily process traffic under peak-hour conditions, but the environment created throughout the remainder of the day may not be in keeping with the long-term goals of the surrounding area.

Corner Radii

The southeast corner of the intersection currently has an extremely small radius that has contributed to the existing traffic signal control cabinet being struck by large vehicles several times over the years. As shown in the photo to the right, the vehicle crossed fully into the Water Street approach lane and still mounted the sidewalk. A standard tractor-trailer (WB-50) was selected as the controlling design vehicle based on existing usage and conversation with the Nobscot Plaza redevelopment team. Proposed corner geometry balances the need for these large vehicles to make right turns without significant encroachment into adjacent lanes while minimizing the length of the pedestrian crosswalks.



Sidewalks

Sidewalks exist on both sides of Edmands Road, Water Street, and Edgell Road north of the intersection, and on the east side of Edgell Road south of the intersection. Existing sidewalks are 5 to 6 feet wide. There is no crosswalk on Edmands Road currently. Once the intersection is reconstructed, there will be 8-foot wide sidewalks on both sides of all roadways. Wider sidewalks improve pedestrian usability and allows for more lighting. Accessible pedestrian curb ramps will provide mobility-challenged pedestrians access to four wider, yet shorter, crosswalks.

Traffic Signal System

The existing traffic signal system is antiquated and operates under the same timing plan all day despite fluctuating traffic demand. The exclusive pedestrian phase is currently the only actuated movement and is timed per outdated guidelines. The new traffic signal system fully-actuates the intersection, increasing the efficiency during lighter traffic conditions. The new system will also be equipped with emergency vehicle detection, allowing first responders to navigate through the intersection more easily. Vehicle signal heads will be LED, larger, and located more prominently for motorists to see. Pedestrian signal heads will be equipped with countdown modules and audible/tactile push buttons for the visually-impaired. The proposed pedestrian phase will also conform to current guidelines which recommend a slower walking speed to accommodate children, the elderly, and mobility-challenged persons.

Conclusion

The proposed design of the intersection achieves the goals of the project. While additional lanes could have improved operations during peak periods, the improvements as proposed create a safer and more appealing environment for the overall use of this intersection throughout the day. Achieving this balance is critical for pedestrians to access local businesses and the school without worsening conditions for motorists, accommodates tractor-trailers movements while maintaining short crosswalks, and contributes to calming vehicle speeds to provide a more comfortable experience for cyclists. Through the detailed analysis conducted for this project and a continuous review and understanding of conditions in this area, the plan as proposed meets the ultimate goals of this area.