



## ENGINEERING DEPARTMENT

**DATE:** December 7, 2016  
**FROM:** Gabe Schell, PE | City Engineer   
**ITEM:** Main Avenue 3-Lane Opinion of Costs for Improvements

### REQUEST

Present Opinion of Costs for Permanent Improvements to Main Avenue as a 3-Lane Roadway

Please place this item on the December 13, 2016 City Commission meeting.

### BACKGROUND INFORMATION

The following information is in response to the request of the Board on November 22, 2016 for additional cost information for improvements to Main Avenue.

#### **Permanent Pavement Marking and West-end Transition Configuration**

Concepts were previously developed for the west transition from a four-lane undivided roadway to the three-lane roadway section. These concepts focus on opportunities to develop a gateway treatment to help physically and visually introduce the lane transition. The transition was located near the current 40 to 25 mph speed transition, west of Washington Street. All striping costs assume a preformed patterned grooved marking. The striping costs include the entire corridor from the western starting point to 7th Street. Opinion of costs for these concepts range from \$121,000 for solely striping to \$329,500 for striping, a raised median, plantings and monuments at the west end transition.

#### **Signal System Improvements**

The 3-lane roadway initial demonstration period noted improved progression in the corridor and protected/permissive left turn phasing as improvements the public has requested.

To improve progression in the corridor, additional detection of pedestrian and vehicular traffic could optimize phasing of the traffic signals. This detection would be accomplished by pedestrian

pushbuttons and a video detection system. Our analysis indicates that the existing traffic signal controllers and cabinets would need to be replaced to allow for vehicular and pedestrian actuation. Please note improved progression could also be achieved by removing signals at lower volume intersections.

The addition of protected/permissive left turn phasing would require new signal heads and either a mast arm extension or a new mast arm for east/west traffic. Previous analysis indicated the existing signal poles and foundations were adequately sized for a longer mast arm. Our analysis indicates that the existing traffic signal controllers and cabinets are adequate to handle pre-timed protected/permissive left turn phasing but any vehicular actuation or flashing yellow arrows used on Bismarck Expressway and University Drive among other locations would require a new traffic signal controller and cabinet.

The costs are listed per location or per intersection and assume the existing foundation and pole do not need replacement. No modifications to the 7th Street traffic signal are recommended.

- New Traffic Signal Controller and Cabinet: required to accommodate vehicle and pedestrian actuation and/or flashing yellow arrow implementation (\$20,000 per intersection; 4 locations, Main Avenue/2<sup>nd</sup> Street would be adequate)
- Vehicular Actuation: Video detection system for vehicular traffic (\$35,000 per location; 4 locations, Main Avenue/2<sup>nd</sup> Street has vehicular actuation currently)
- Pedestrian Actuation: pedestrian pushbuttons (\$10,000 per location; 4 locations, Main Avenue/2<sup>nd</sup> Street has pedestrian actuation currently)
- Protective-Permissive: signal heads centered over lane with a five (5) foot mast arm extension and left signal head (\$6,500 per location; 10 locations)
- Protective-Permissive: signal heads centered over lane with a new mast arm and left signal head (\$10,000 per location; 10 locations)

### **Main Avenue – 8th Street Sign Structure**

Based on the proposed striping configuration, the existing Main Avenue overhead sign structure located at approximately 8th Street is recommended to be removed/modified. This is also in response to the NDDOT *Signing on Main Avenue/I-94 Business Loop* memorandum, dated January 21, 2009.

Other overhead signs along Main Avenue (east of 9th Street) and 7th Street (north of Main Avenue) were not impacted by the proposed 4-lane to 3-lane conversion and thus are not included.

- Remove Structure and Signing (\$7,500)
- Retrofit Structure and Replace Signing (\$12,500); will need to conduct a structural analysis to determine feasibility of this alternative.
- Remove Structure and add a New Structure with signing (\$75,000)
- Remove Structure and add a New Structure with Dynamic Message Signing (\$215,000)

### **Broadway Avenue Conversion to Two-Way Traffic**

Convert Broadway Avenue to two-way traffic from 4<sup>th</sup> Street to 6<sup>th</sup> Street will require a revision to the traffic signal at 5<sup>th</sup> Street, restriping the diagonal parking along the north side of Broadway and signage

- Traffic signal revision, stripping and signage (\$20,000)

### **Summary**

The cost for permanent improvements could range from \$121,000 for striping only; to \$481,000 for striping and signal improvements; to \$924,500 for striping, signal improvements, overhead sign replacement and Broadway Ave conversion. Many of these improvements are scalable and not mutually exclusive. The Board could elect appropriate options at the higher volume intersections and maintain the existing system configuration at lower volume intersections along Main Avenue if you so choose.

### **RECOMMENDED CITY COMMISSION ACTION**

Receive opinion of costs for permanent improvements to Main Avenue as a 3-Lane Roadway

### **STAFF CONTACT INFORMATION**

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