

Previous Studies

## Previous Studies

The purpose of this section is to analyze the applicability of recently completed studies to the current corridor conditions. Recently completed study recommendations that remain applicable will be maintained and analyzed further. Recommendations that no longer achieve their intended purpose will be discarded and noted as such. For example, a capacity specific improvement may no longer be applicable due to traffic pattern variation.

Three recent studies have been completed that include improvement recommendations within the study corridor. The first was a review completed by the GF-EGF MPO regarding each improvement alternative studied at the Washington Street and DeMers Avenue intersection. This study was completed in August 2007. The second study was the current 2035 Long Range Transportation Plan (LRTP), completed in January 2008, that included improvement recommendations at the intersections of Washington Street with DeMers Avenue and 17th Avenue South. Finally, in December 2010, a Grand Forks Signal Coordination study was completed that included signal timing and coordination improvements at each signalized intersections within the corridor.

According to Washington Street and DeMers Avenue Intersection Alternatives (1969-2007) prepared by the GF-EGF MPO, the Washington and DeMers intersection has been identified for improvements going back to the 1969 Urban Area Study (refer to TABLE 4.1). The first recommended improvements for this intersection in 1969 recommended the construction of a partial cloverleaf interchange at the intersection in addition to a DeMers Avenue Overpass that would span over the railroad tracks. The 1979 Transportation Study Update recommended an interchange at this location, as did the 1992 Transportation Plan Update. The 1999 Grand Forks/East Grand Forks Transportation plan identified the capacity problems associated with the intersection but did not provide any specific recommendations other than continued monitoring and surveillance. The 2004 Street and Highway plan update recommended adding a third, eastbound lane at the intersection coupled with a 32nd Avenue river crossing to help relieve the intersection of the current congestion. It is important to note that the need for additional southside river crossing between Grand Forks and East Grand Forks has been identified and recommended as far back as the 1969 Urban Area Study. The recommendation was reconfirmed in subsequent plan updates although the specific location varied at times.

**TABLE 4.1 – Previous Washington Street and DeMers Avenue Study Results**

Study Year	Recommendations for Washington Street and DeMers Avenue
1969	Partial Clover Leaf Interchange at Washington and DeMers
1969	DeMers Avenue Overpass of the Burlington Northern Railroad
1979	Interchange at Washington-DeMers
1992	Single Point Diamond Interchange
1999	Monitoring and Surveillance
2004	32nd Bridge with at-grade improvements to Washington-DeMers

Source: GF-EGF MPO, 2007

The current LRTP, adopted in 2007, considered a variety of alternatives to reduce traffic volumes and corresponding delay at the intersection of Washington Street and DeMers Avenue. Alternatives included several at grade expansion improvements, improvements to existing adjacent and complementary corridors, development of alternate corridors to divert traffic away from the oversaturated intersection and two grade-separated interchange alternatives. Each alternative was evaluated from a traffic engineering, social and land use, environmental and cost perspective.

During the first phase of alternative screening, the improvements to adjacent and complementary corridors were discarded due to the improvements inability to improve the LOS at the Washington-DeMers intersection. Additionally, these alternatives were anticipated to cause significant negative social and land use impacts to the improved corridors.

Similar to the 2004 LRTP update, the alternative corridor examined in the study was a 32nd Avenue South river crossing. A Red River crossing at 32nd Avenue would offer a more direct connection between the south side of Grand Forks to the south side of East Grand Forks. Currently, a significant portion of the traffic that would use a 32nd Avenue Bridge uses the DeMers Avenue corridor to access the Point and Sorlie Bridges. As a result, constructing a 32nd Avenue river crossing would divert traffic from this intersection, reducing traffic volumes by an estimated 3,000 vehicles per day and subsequent delays within the corridor.

Similar to previous studies, the current LRTP found interchange alternatives resulted in the most significant traffic delay improvements of the alternatives studied. However, neither interchange alternative was recommended due to the significant impacts to adjacent businesses and corresponding financial requirements associated with constructing an interchange at the intersection. Rather, an at-grade solution in conjunction with the 32nd Avenue river crossing was identified as the best alternative to balance traffic flow improvements while minimizing the level of impacts to surrounding property. The at-grade improvements included the addition of an eastbound and westbound through lane and northbound and southbound left-turn lane to the intersection.

The improvement was anticipated to operate at a LOS "D" through the planning horizon. However due to recent upgrades to the analysis software used in the study, the intersection is now anticipated to operate at a deficient LOS of "E" through the horizon year. Furthermore, intersection simulation reveals further deficiencies typical of an intersection that is at or beyond capacity that are anticipated to reduce the overall LOS to "F." Furthermore, the motorist delay nearly doubles if the 32nd Avenue river crossing is not established.

In general, the NDDOT requires that a LOS of "C" or better be achieved for projects that are to be constructed using federal or state funding. Due to the unique characteristics of the intersection, specifically the presence of high volumes of traffic and delay compounded by ROW constraints, the NDDOT has approved a lower threshold LOS value of "D" at this location. Based upon these standards, the current LRTP recommendation was discarded from further analysis.

The 2035 LRTP also studied minor improvements at the intersection of South Washington Street and 17th Avenue South due to forecasted congestion. Currently, the eastbound approach of the intersection is configured with one left-turn lane, one through lane and one right-turn lane with an additional left-turn turn for the South Washington frontage road (refer to FIGURE 4.1). The frontage road turn lane terminates after the frontage road and before South Washington Street. The current LRTP recommends that the frontage road left-turn lane be extended and converted into a turn-lane onto South Washington Street.

FIGURE 4.1 – Eastbound Approach of 17th Avenue South at Washington Street



Network signal timing and offset optimization improved the LOS at this intersection to “C” during the forecasted 2035 peak-hour. An additional left-turn lane on the eastbound approach of the intersection is anticipated to reduce the LOS from “C” to “E”. This is due to the additional green time required to accommodate a protected only left-turn at this approach. Currently, the movement is protected/permitted. An additional left-turn lane would also limit access to the Washington Street frontage road. As such, an additional left-turn lane was discarded from further analysis. It is important to note that the LRTP also discarded this improvement option based upon similar logic.

The traffic signal timing and coordination study recommended the reconstruction of Washington Street at 17th Avenue South to provide left turn lane improvements and traffic signal modifications to provide a northbound and southbound protected/permissive left turn phasing. Currently movements are protected-only. The improvement would allow motorists to turn left on a “green ball” to save delay. In addition to the left turn arrow modification, the study recommended narrowing the medians at the intersections to provide a positive left turn lane offset and extending existing turn lanes.

Based upon FHWA research data, the conversion from protected only to protected/permitted left-turn phasing may increase left-turn related crashes by 65 percent. Additionally, the current intersection configuration is anticipated to achieve an acceptable LOS “C”. Conversion to protected/permitted northbound and southbound left-turns is not anticipated to improve the overall LOS at this intersection. As such, conversion from protected to protected/permitted left-turn phasing was discarded from further analysis. Considering that crash concerns regarding to negatively offset turn-lanes are specific to permitted turning movements, left-turn lane offset realignment was also discarded. Finally, left-turn lane storage improvements remained an appropriate intersection improvement options. As result, the improvement alternative was carried forth during analysis.

The overall goal of the Signal Coordination Study was to provide improved traffic flow along multiple city corridors through optimized timing plans and upgraded traffic signal equipment. The study included all six of the signalized intersection locations within the Washington Street Corridor Study. Timing and coordination plans established for the study were used for the existing AM and PM peak-hour traffic operations analysis. It is important to note that in addition to delay benefits signal timing improvements may result in fewer dilemma zone and intersection clearance related traffic crashes. Recent signal coordination improvements within the study area may also reduce queues and associated rear-end crashes. Potential improvements were considered when evaluating solutions specific to rear-end or right angled crashes at signalized intersections within the corridor. TABLE 4.2 provides a summary of past recommendations and actions taken in this report.

**TABLE 4.2 – Summary of Currently Recommended Improvements**

Improvement	Document	Action	Reason
At Grade Improvements at DeMers Intersection	<i>Long Range Transportation Plan</i>	Discard	Inadequately meets capacity requirements
32nd Avenue River Crossing	<i>Long Range Transportation Plan</i>	Maintain	Divert traffic from DeMers Avenue Intersection
Convert 17th Avenue to Protected/Permitted NB and SB Left-Turn Phasing	<i>Traffic Signal Coordination Study</i>	Discard	Anticipated increase to crash rate versus minimal capacity benefits
Provide Positive NB and SB Left-Turn Offset at 17th Avenue South	<i>Traffic Signal Coordination Study</i>	Discard	Unnecessary safety measure if protected/permitted left-turn phasing is not adopted
Extend Turn-Lanes at 17th Avenue South	<i>Traffic Signal Coordination Study</i>	Maintain	Queue lengths at multiple 17th Avenue South through movements extend beyond turn-lanes