MAIN AVE RECONSTRUCTION

Intersections with Traffic Signals

25th Street, 18th Street, University Drive

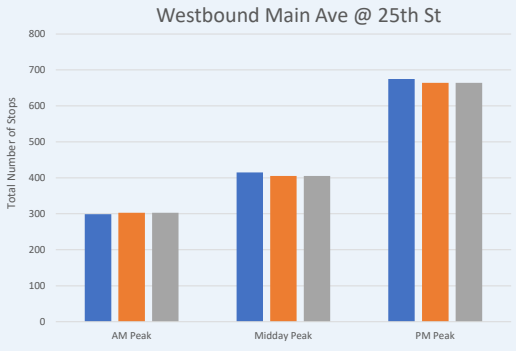
Corridor Travel Times

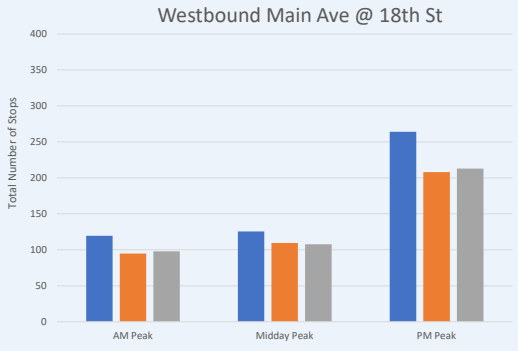
Travel times for trips passing through the project corridor were evaluated for each of the proposed design alternatives. Eastbound travel times reflect trips starting west of 25th Street all the way through the University Drive signalized intersection. Westbound travel times reflect trips starting east of University Drive all the way through the 25th Street signalized intersection. Travel times shown here reflect the worst-case conditions that would be expected to occur throughout the day. Most times of day will have shorter travel times.

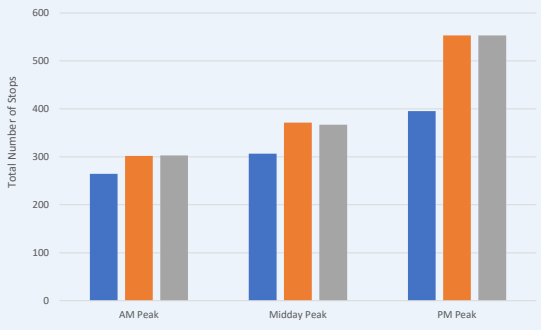
	Alternative A	Alternative C	Alternative D
Westbound Travel Times	3 min 42 sec	3 min 54 sec	3 min 54 sec
Eastbound Travel Times	3 min 42 sec	3 min 42 sec	3 min 54 sec

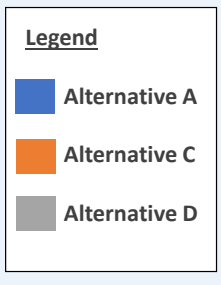
Number of Stops

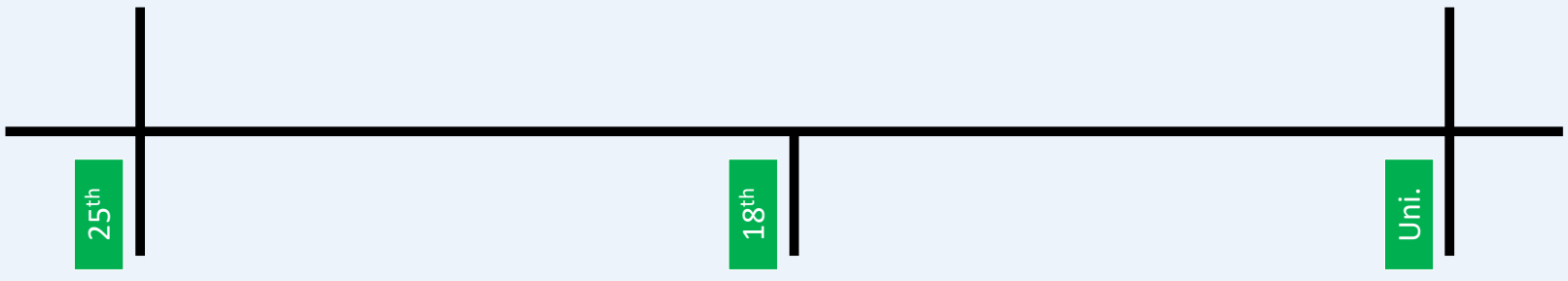
Trips traveling eastbound or westbound on Main Avenue must pass through three traffic signals at 25th Street, 18th Street, and University Drive. The number of those trips that must stop at each signal is an outcome of the number of lanes, amount of traffic, and signal timing. The total number of vehicles that must stop at each signal is summarized for each alternative in the charts below.

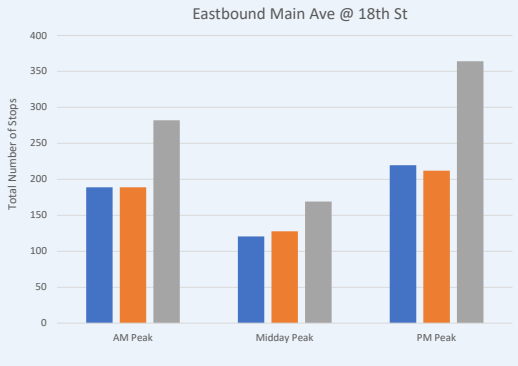


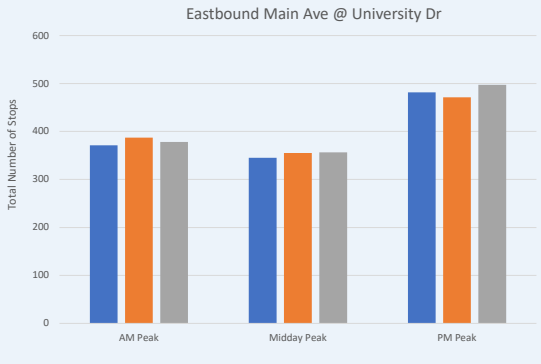












MAIN AVE RECONSTRUCTION

Intersections without Traffic Signals

17th Street, 16th Street, 15th Street, 14th Street

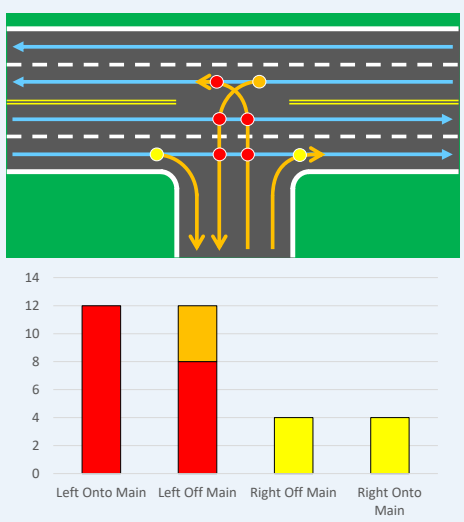
Number of Conflicts when Turning Off and On Main Avenue

Vehicles turning off and on Main Avenue create conflicts with vehicles traveling through on Main Avenue. The number of conflicts and the risk associated with each conflict depend on the design of Main Avenue. The number of through lanes and whether the design has a left turn lanes results in different numbers of conflicts and risk levels. The results for each alternative are illustrated and summarized for intersections with 17th, 16th, 15th, and 14th Streets. Intersections with 23rd, 22nd, and 21st Streets are not included because all alternatives are the same.

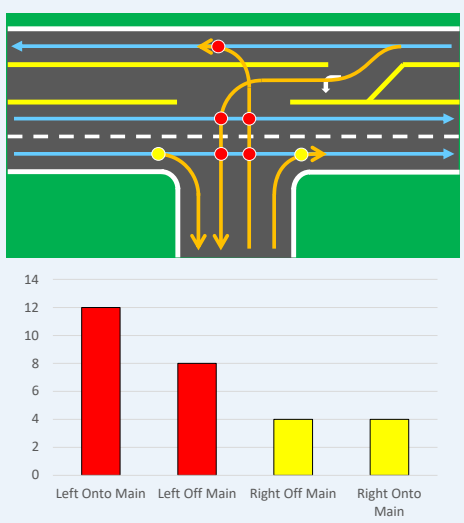
Type of Turn	Conflicts and Risks
Turning Left Onto Main Avenue	**High risk** conflict with the potential for right-angle (T-bone) collisions from the left. Drivers must also watch for traffic from both directions.
Turning Left Off Main Avenue	**High risk** conflict with the potential for right-angle (T-bone) collisions from opposing direction. **Without left turn lane: Moderate risk** for rear-end collision by following vehicle if left-turning vehicle must wait to turn.
Turning Right Off Main Avenue	**Lower risk** conflict for rear-end collision by following vehicle when right-turning vehicle slows to turn or must wait for a crosswalk user.
Turning Right Onto Main Avenue	**Lower risk** conflict for sideswipe collision if right-turning pulls out in front of a vehicle traveling through the intersection from the left.

Conflict Risks
- High
- Moderate
- Lower

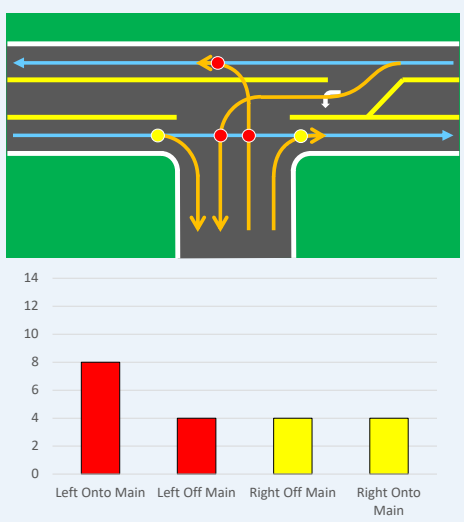
Alternative A



Alternative C



Alternative D



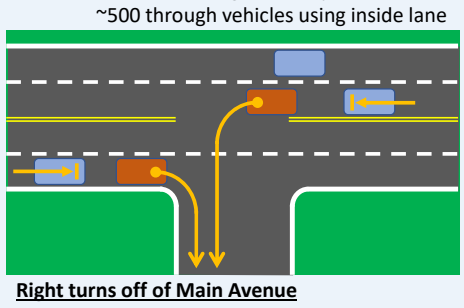
Likelihood of Being Stopped by Turning Vehicle

Vehicles turning off Main Avenue must slow down to make their turn and may have to come to a completed stop to wait for opposing vehicles or crosswalk users. Vehicles traveling along Main Avenue in the same lane must also slow down or stop behind a turning vehicle. The likelihood that this will occur depends on the number of lanes and whether there is a left turn lane. The illustrations below show how this would occur for vehicles turning right and left off Main Avenue for each alternative. The approximate number of vehicles is summarized for afternoon peak hour.

Vehicle Types
- Turning Vehicle
- Through Vehicle

Alternative A

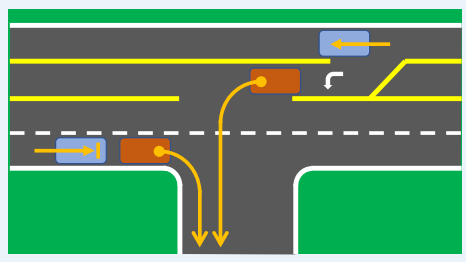
Left turns off of Main Avenue
10 to 30 turning vehicles per hour
~500 through vehicles using inside lane



Right turns off of Main Avenue
10 to 30 turning vehicles per hour
~500 through vehicles using outside lane

Alternative C

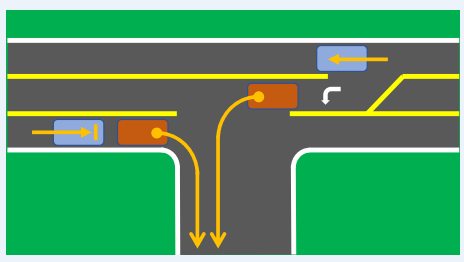
Left turns off of Main Avenue
Left turning vehicles use center left turn lane



Right turns off of Main Avenue
10 to 30 turning vehicles per hour
~500 through vehicles using outside lane

Alternative D

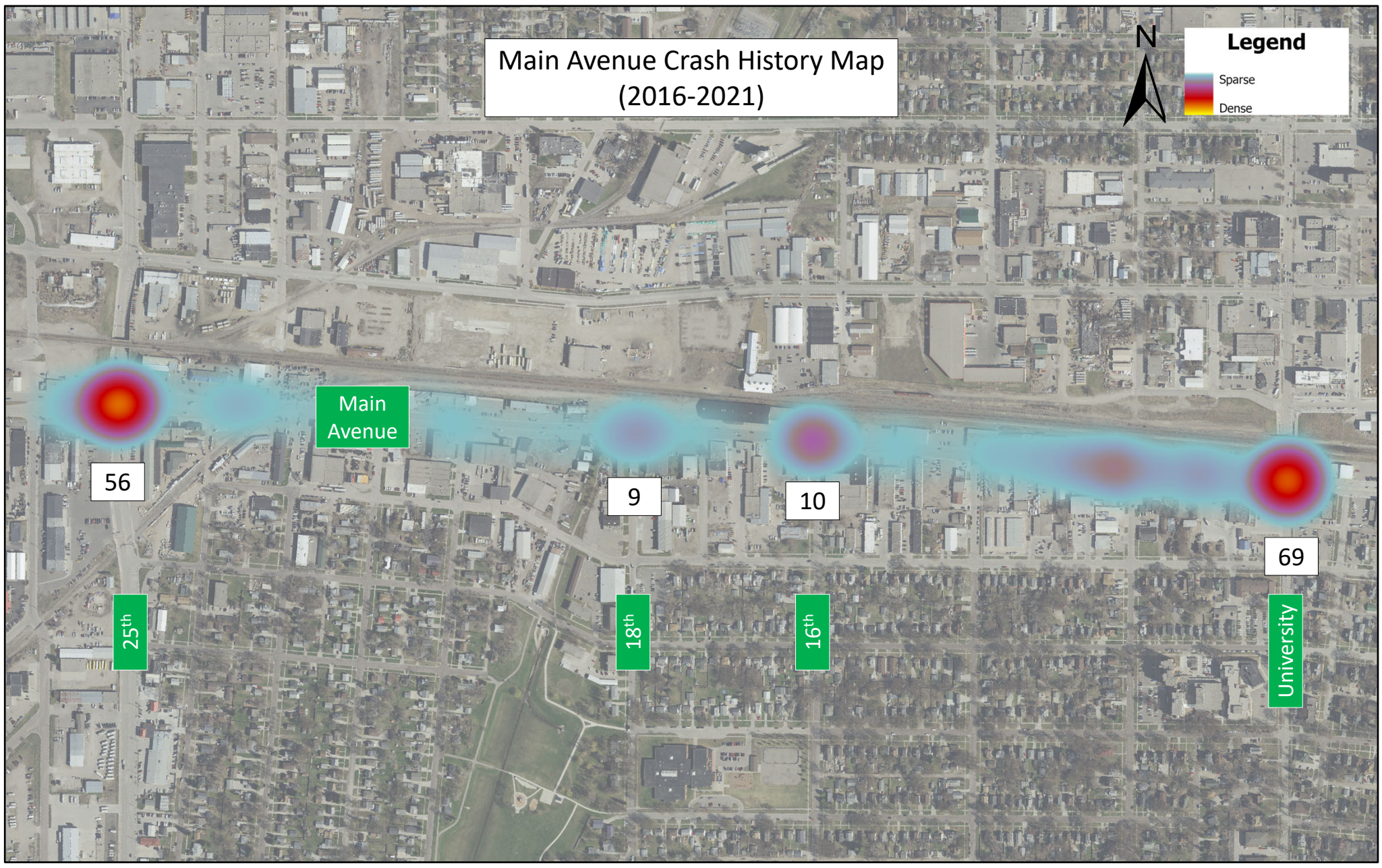
Left turns off of Main Avenue
Left turning vehicles use center left turn lane



Right turns off of Main Avenue
10 to 30 turning vehicles per hour
~1,000 through vehicles using single lane

MAIN AVE RECONSTRUCTION

Crash Analysis



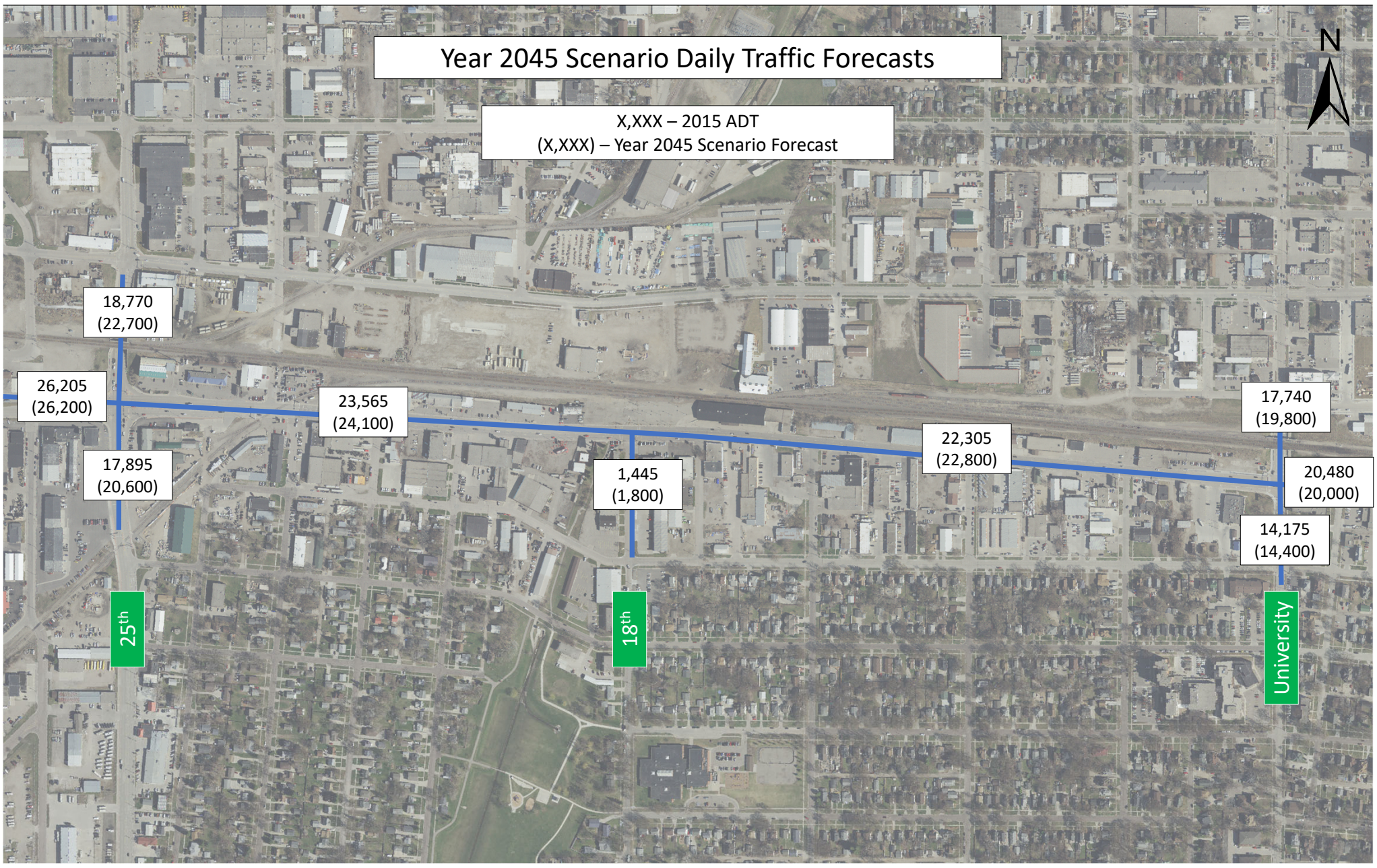
Crash Analysis

A crash analysis was performed using five years of crash data along Main Avenue to identify any major safety concerns. Crash data from October 1, 2016 through September 30, 2021 was evaluated. The corridor analysis showed the majority of the crashes occurred at the signalized intersections at 25th Street and University Drive. In response. a crash rate analysis was conducted for these two intersections to determine if these locations have significant crash problems. The intersection of Main Avenue and University Drive was reconstructed within the timeframe of the crash analysis, so this intersection was analyzed for the previous intersection configuration as well as the current intersection configuration to capture the safety impacts of the intersection reconstruction.

Intersection	Total Number of Crashes	Calculated Crash Rate (Million Entering Vehicles)	Average Crash Rate for Similar Intersection	Critical Crash Rate per MEV
Main Avenue & 25th Street	56	0.73	0.70	0.96
Main Avenue & University Drive	69	1.02	0.70	0.97
Main Avenue & University Drive Previous Configuration	*45*	*1.34*	*0.70*	*0.97*
Main Avenue & University Drive Current Configuration	*24*	*0.71*	*0.70*	*0.97*

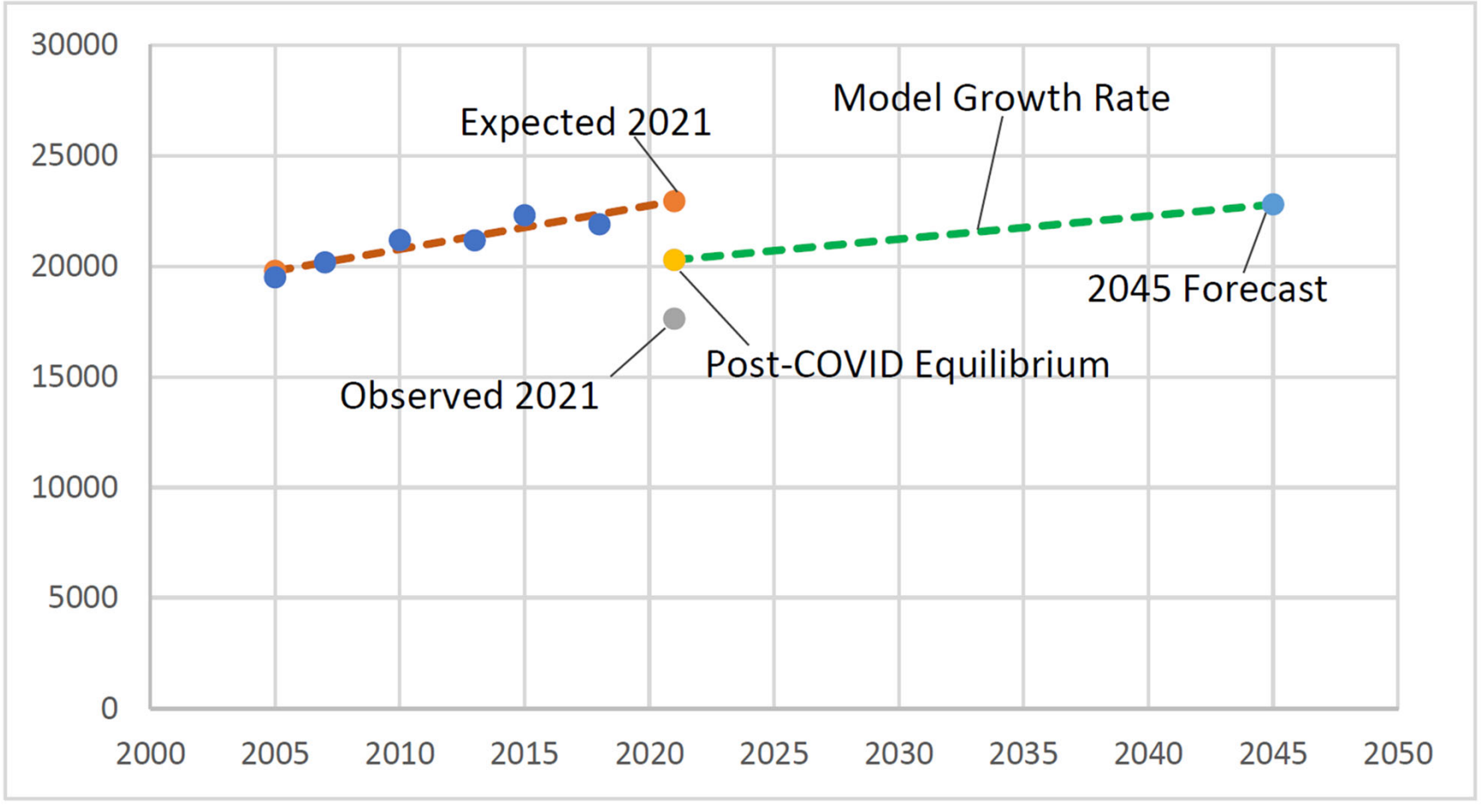
MAIN AVE RECONSTRUCTION

Traffic Forecasts



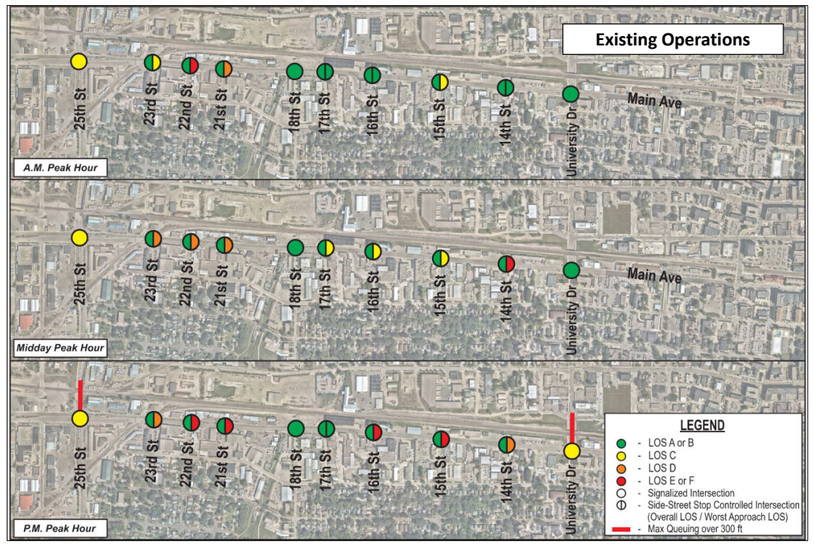
Year 2045 Scenario Daily Traffic Forecasts

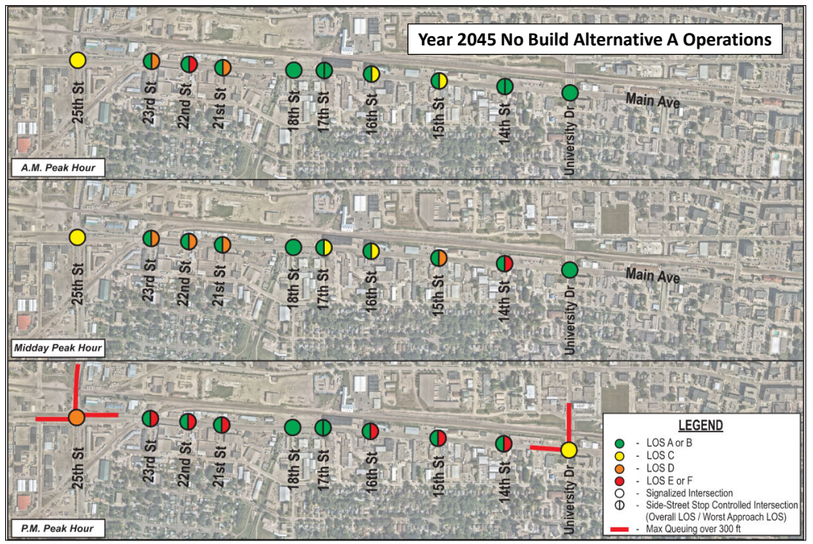
The Year 2045 Scenario represents year 2045 conditions along Main Avenue in the project area. Year 2045 traffic forecasts were developed using the Fargo-Moorhead Metropolitan Council of Government's travel demand model and adjusted to account for the impacts of the COVID-19 pandemic on travel patterns.

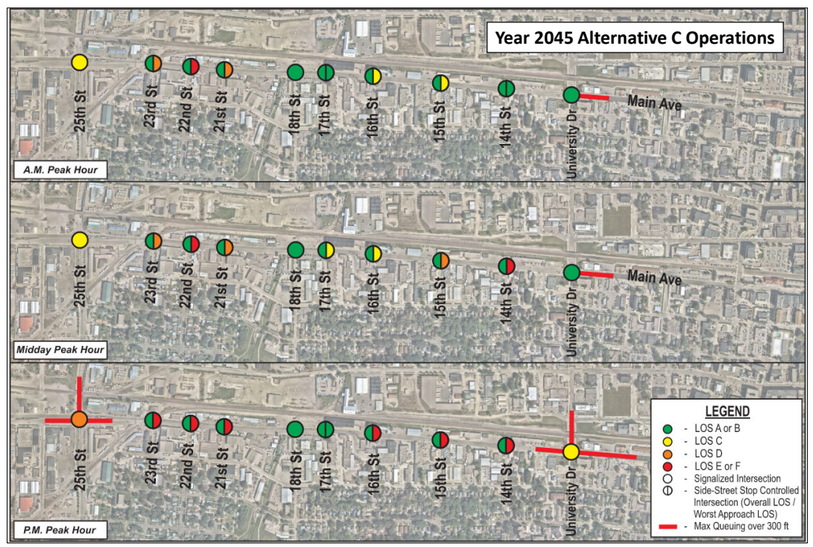


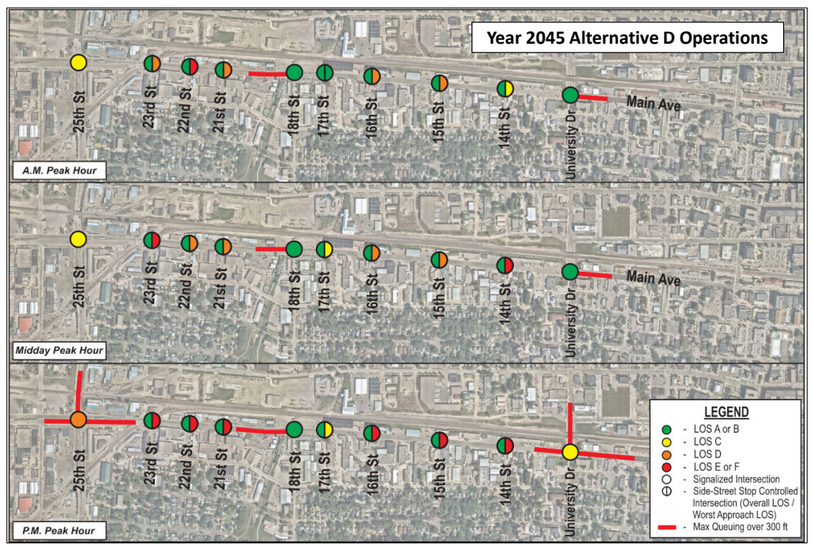
MAIN AVE RECONSTRUCTION

Traffic Operations Results









Traffic Operations

Traffic simulation analysis was completed for existing and future year conditions for the a.m., midday, and p.m. peak hours through the project corridor. These analysis results are expressed as Level of Service (LOS) which is based on the average delay of vehicles using an intersection. NDDOT guidance is to meet or exceed overall LOS D for an intersection.