1.0 INTRODUCTION

The Southwest Light Rail Transit (SWLRT) project is a 14.4-mile LRT project with 15 new stations that will operate from downtown Minneapolis through St. Louis Park, Hopkins, Minnetonka, and Eden Prairie. The SWLRT line will serve as an extension of the METRO Green Line (Central Corridor) and will also connect to the METRO Blue Line (Hiawatha Corridor) in downtown Minneapolis. The traffic analysis was completed based on the SWLRT Revised Preliminary Design Plans for Municipal Consent (MC) dated July 8, 2015. This memorandum includes reductions in the length of the SWLRT line, the number of stations, and the number and size of park-and-ride facilities.

1.1 Purpose of Memorandum

This technical memorandum has been prepared in support of the SWLRT project preliminary engineering (PE) design and the Final Environmental Impact Statement (FEIS). The objective of the traffic analysis is to define the scope of the project improvements and evaluate the project’s potential traffic impacts, including the following:

- Evaluate the project’s impacts on traffic operations at existing and proposed intersections and at-grade rail crossings along or near the SWLRT alignment.
- Identify proposed improvements to address operational issues identified in the traffic analysis.

The methodology, assumptions, and results of the analysis are presented in the following sections.

1.2 Study Areas

The location of the overall SWLRT alignment and the East and West segments of the project are shown in Figure 1. The East segment of the SWLRT analysis includes all intersections and at-
grade crossings from east of 11th Ave in Hopkins to Target Field Station in Minneapolis. The West segment of the SWLRT analysis includes all intersections and at-grade crossings from SouthWest Station in Eden Prairie to east of 11th Ave in Hopkins. The proposed SWLRT guideway will be at-grade for most of its alignment and includes segments with the LRT operating in an exclusive guideway and semi-exclusive street running operation. In some portions of the East segment, the LRT guideway operates next to an active freight rail alignment.

1.3 Data Collection

Multiple data elements were collected for each of the areas analyzed:

- AM, Midday, and PM weekday counts at intersections including passenger vehicles, heavy vehicles, and pedestrians.
- On-site field survey to collect the following information:
  - Existing intersection geometry
  - Lane widths
  - Lane utilizations
  - Approximate peak hour queue lengths
  - Storage bay lengths to the nearest 10-ft increment
  - Approach speed limits
  - Traffic signal infrastructure, including emergency vehicle preemption
  - Relevant signage and pavement markings
- Timing and coordination plans for existing signalized intersections
- Bus routes, stops, and passenger loading/unloading

This data was used to assemble a comprehensive model of the existing conditions.

In addition, existing gate timings at station and non-station intersections were collected along the METRO Blue Line for use in the modeling of the future SWLRT operations.
Figure 1. SWLRT Project Study Area
2.0 METHODOLOGY

2.1 Key Intersections and At-Grade Crossings

To determine the impacts of the SWLRT project on the local roadway network, a traffic operations analysis was conducted for signalized and unsignalized intersections within the vicinity of the new SWLRT alignment or that would be expected to have increased traffic due to the SWLRT stations, such as stations with park-and-ride facilities. The analysis area included signalized intersections with an LRT crossing in the intersection, signalized or unsignalized intersections closest to an at-grade LRT crossing (both sides of the crossing), and the intersections that provide access to a LRT station park-and-ride facility. At least two intersections were analyzed for each at-grade LRT crossing. Grade separated crossings were not modeled because the LRT does not interact with pedestrian, bicycle, or vehicle traffic.

The intersections were analyzed using either VISSIM or SimTraffic microsimulation software. The decision on software program use was based on the location of the intersection and if LRT would either directly cross an intersection or impact the operation of the intersection. The PEC West traffic team was originally provided model files of much of the analysis area in Synchro format and that was the base starting point for the existing and future model scenarios. The Synchro and SimTraffic software packages are commonly used by agencies in Minnesota and provide an accepted methodology for analyzing signalized intersections and corridors. VISSIM models provide the capability of evaluating the impacts of transit movement in the corridor and at intersections (Synchro/SimTraffic does not have this capability).

2.2 Forecast Traffic Volumes

The development of 2040 traffic forecasts for use in the simulation modeling was based on the preliminary 2040 socioeconomic data prepared by local communities and consistent with the Metropolitan Council’s Thrive MSP 2040. This data was used as input to the Metropolitan Council’s Regional Travel Demand Model. The outputs from the 2040 Regional Travel Demand Model were then compared to existing and historic traffic counts, as well as to the previous 2030 forecast roadway volumes contained in the 2030 Comprehensive Plans of each city and Hennepin County. This information, combined with the expected changes in land use and density, was utilized at a localized level to develop growth rates for each roadway segment within the project area. This information was also reviewed in combination with anticipated developments within each city to determine if different annual growth rates should be applied in calculating the opening year forecast volumes compared to the 2040 forecast volumes. This would be done if, for example, more rapid growth were expected at the beginning or end of the forecast horizon. The growth rates were then applied to existing turning movement counts to generate opening year and 2040 No Build peak hour turning movement forecasts.

Following the development of the baseline No Build forecasts, forecast traffic volumes for the park-and-ride sites were added to produce the Build forecasts. The development of the park-and-ride trip generation rates is documented in the SWLRT technical memorandum Park-and-Ride Trip Generation dated August 25, 2014.
Sensitivity testing within the Regional Travel Demand Model showed that the SWLRT alignment would not be expected to significantly reduce traffic volumes on the roadways under study. Therefore, the traffic generated by the park-and-ride sites was added to the No Build forecasts to produce the Build forecasts, without any reduction in forecast traffic volumes due to LRT. This produces a conservative, worst case analysis in terms of the traffic volumes on the roadway network.

### 2.3 Traffic Analysis Methodology

The approach to the traffic operations analysis is derived from the established methodologies documented in the *Highway Capacity Manual* (HCM). The HCM contains a series of analysis techniques for evaluating the operations of transportation facilities under specified conditions. The models for the SWLRT analysis have been developed using Synchro/SimTraffic and VISSIM, software packages that implement the HCM methodologies. The inputs into the software include lane geometrics, traffic volumes, pedestrian volumes, transit stations, transit routes/headways and LRT alignments, freight and LRT volumes, intersection and grade crossing control devices, and signal phase and timing characteristics.

The output of the models are evaluated using the level of service thresholds as defined in the HCM, which are shown in *Table 2.1*. Based on standard practice in the traffic engineering industry, as well as guidance from the American Association of State Highway and Transportation Officials (AASHTO) and conformance with MnDOT practice, level of service D/E is considered to be the threshold of acceptable operations for an overall intersection in an urban or suburban area during peak hours. The results of intersection delay are shown in the table as seconds per vehicle (marked as “s”).

The analysis periods included the highest hour of traffic volume during the weekday AM peak period (6-9 AM) and PM peak period (3-7 PM). The AM peak hour was generally identified as 7:30-8:30 AM and the PM peak was generally identified as 4:30-5:30 PM. The Midday volumes were determined to be lower than PM peak hour and were not used in the analysis. There were also no specific traffic generators that impacted the Midday that required analysis.

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Signalized Intersection Delay (seconds per vehicle)</th>
<th>Unsignalized Intersection Delay (seconds per vehicle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤10</td>
<td>≤10</td>
</tr>
<tr>
<td>B</td>
<td>&gt;10 – 20</td>
<td>&gt;10 – 15</td>
</tr>
<tr>
<td>C</td>
<td>&gt;20 – 35</td>
<td>&gt;15 – 25</td>
</tr>
<tr>
<td>D</td>
<td>&gt;35 – 55</td>
<td>&gt;25 – 35</td>
</tr>
<tr>
<td>E</td>
<td>&gt;55 – 80</td>
<td>&gt;35 – 50</td>
</tr>
<tr>
<td>F</td>
<td>&gt;80</td>
<td>&gt;50</td>
</tr>
</tbody>
</table>

*Source: Highway Capacity Manual 2010*
2.4 Design Criteria and Assumptions

All full access intersections with the LRT guideway, where all vehicular movements are allowed across the guideway, were assumed to be signalized and/or be controlled with automatic gates to provide safe movement of LRT and vehicles. All at-grade roadway/LRT crossings where LRT speeds are expected to exceed 35 miles per hour (mph) were assumed to have automatic gates in accordance with the guidance and standards contained in the *Minnesota Manual on Uniform Traffic Control Devices* (MMUTCD) updated in January 2014. The operation of automatic gates was also based on the standards in the MMUTCD, which includes:

- Gate arms start lowering a minimum of 3 seconds after the flashing-light signals start to operate;
- Gate arms shall reach the horizontal position at least 5 seconds before the arrival of the rail traffic;
- Gate arms shall remain in the down position as long as the rail traffic occupies the grade crossing; and
- Gate arms should ascend to the upright position in 12 seconds or less.

For a typical LRT crossing, the time from the gates being activated until they return to the upright position is approximately 50 seconds.

Signalized intersections within 200 feet of an at-grade crossing, or signalized intersections where queues could potentially extend across an at-grade crossing, were identified for interconnection to the rail crossing. At these locations, the signal is proposed to be preempted by the rail crossing, in order to provide for clearance of queues from the tracks prior to the gate arms being lowered.

2.5 Measures of Effectiveness

The measures of effectiveness used to evaluate the operations results and identify a project impact in need of improvement were based on intersection delay (level of service) and queuing.

The level of service criteria used to identify a project impact were as follows:

- Overall intersection LOS E or F in Build conditions, if No Build intersection LOS D or better
- Approach or movement LOS E or F, if the movement negatively impacts upstream operations

Most intersections were mitigated to LOS D or better. If the overall intersection is LOS E or F in No Build Condition, the project mitigated the Build to match or be better than the No Build scenario. The criteria used to identify a queue issue were as follows:

- 95th percentile queue length that exceeds storage length, if any of the following are also met:
  - Average back-of-queue exceeds storage length
  - Movement operates at LOS E or LOS F
  - 95th percentile queue blocks upstream full-access intersection(s)
95\textsuperscript{th} percentile queue length exceeds 500 feet on a stop-controlled approach

Then, for locations where a queuing issue was identified, the need for mitigation was based on a comparison to the No Build conditions, the severity of the issue, the potential safety/operations implications at the study intersection, and what impacts the queue had on the larger roadway network. Where the need for queue mitigation was identified based on these criteria, improvements were added to the Build modeling and have been incorporated into the SWLRT project. The improvements are listed in Section 5.3, along with all improvements that have been identified as part of the SWLRT project.

3.0 EXISTING CONDITIONS ANALYSIS

The existing conditions models for the West segment were developed to assess the current key intersection operation and validate the simulation models to ground conditions. After calibrating the existing models, they would be used to build future year conditions models. The assumptions, methodology, and results of the existing conditions analysis are presented in the following sections.

3.1 Assumptions

The existing conditions analysis was based on traffic volumes, roadway geometrics, rail crossing treatments, and signal operations as existed in 2013 when the data collection was completed. No improvements were assumed in the existing analysis. The existing peak hour traffic volumes, which are based on the counts conducted in 2013, are provided in Appendix A. The geometrics and intersection control for the existing conditions are shown in the intersection layout tables provided in Appendix B.

The AM peak hour was assumed to be 7:30-8:30 AM and the PM peak hour was assumed to be 4:30-5:30 PM for all intersections, based on the turning movement data collected within the study area.

3.2 Traffic Modeling Overview and Results

The West study area includes segments in Eden Prairie, Minnetonka, and Hopkins where the SWLRT alignment crosses and/or impacts intersection operation. The intersections analyzed in the existing conditions analysis are detailed in this section. The following corridor areas/segments were analyzed for all alternatives for the West segment of the SWLRT project:

- Southwest Station Area
- Eden Road/Main Street Area
- Flying Cloud Drive Area
- Golden Triangle Area
- Bren Road Area
- Excelsior Boulevard Area

The existing conditions analysis results for each corridor area are presented in the following sections.
3.2.1 Southwest Station Area

The Southwest Station area includes the TH 212 ramp terminals, parts of Mitchell Road and Southwest Station access drives that are impacted by park-and-ride traffic. This area was modeled in Synchro/SimTraffic, as it will not include interaction with the future LRT. The results of the existing AM and PM peak hour analysis showed that all intersections currently operate at LOS D or better during the peak hour scenarios. The overall intersection results are shown in Table 3.1 below.

Table 3.1 Southwest Station Area – Existing Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Mitchell Road / WB TH 5 / TH 212 Ramp</td>
<td>13.9</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Mitchell Road / EB TH 5 / TH 212 Ramp</td>
<td>7.8</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Mitchell Road / Lone Oak Road</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Mitchell Road / Technology Drive</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station Bus Access *</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station West Access</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station East Access *</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Prairie Center Drive / Plaza Drive (&amp; WB TH 5/TH 212 Ramp)</td>
<td>22.3</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Prairie Center Drive / Technology Drive (&amp; EB TH 5/TH 212 Ramp)</td>
<td>24.9</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Technology Drive / Prairie Center Drive</td>
<td>18.2</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

No queuing issues were identified in the existing conditions.

The full table of existing conditions LOS and queuing analysis results can be found in Appendix C.

3.2.2 Eden Road/Main Street Area

The Eden Road and Main Street area includes a section of Eden Road from Flying Cloud Drive to Main Street and the additional intersection of Singletree Lane and Main Street. The intersection with Flying Cloud Drive is a key intersection for evaluation due to the high volumes on Flying Cloud Drive that may be impacted by future LRT on Eden Road.
The segment of Eden Road was modeled in VISSIM to account for the future LRT interaction. The Main Street and Singletree Lane intersection was modeled in Synchro/SimTraffic as it will not include interaction with the future LRT. The results of the existing AM and PM peak hour analysis showed that all intersections currently operate at LOS D or better during the peak hour scenarios. The overall intersection results are shown in Table 3.2 below.

**Table 3.2. Eden/Main Area – Existing Conditions Results**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Main Street / Singletree Lane *</td>
<td>0.9 A</td>
</tr>
<tr>
<td>Eden Road / Glen Lane*</td>
<td>0.6 A</td>
</tr>
<tr>
<td>Eden Road / Leona Drive / Flying Cloud Drive</td>
<td>9.4 A</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

No queuing issues were identified in the existing conditions.

The full table of existing conditions LOS and queuing analysis results can be found in Appendix C.

### 3.2.3 Flying Cloud Drive Area

Flying Cloud Drive is a major arterial corridor in Eden Prairie that includes the segment from Valley View Road to Singletree Lane. This segment includes the I-494 ramp terminals.

This area was modeled in VISSIM to account for the future LRT interaction at Viking Drive. The overall intersection results are shown in Table 3.3 below. The results of the Exiting Conditions AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios with the exception of the following:

- Flying Cloud Drive and Valley View Road in the AM peak hour. The area is generally congested, including the TH 212 ramps.
Table 3.3. Flying Cloud Drive Area – Existing Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay and LOS (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Flying Cloud Drive / Valley View Road</td>
<td>58.4 E</td>
</tr>
<tr>
<td>Flying Cloud Drive / Viking Drive *</td>
<td>3.6 A</td>
</tr>
<tr>
<td>Flying Cloud Drive / WB I-494 Ramp</td>
<td>15.4 B</td>
</tr>
<tr>
<td>Flying Cloud Drive / EB I-494 Ramp /</td>
<td>9.1 A</td>
</tr>
<tr>
<td>Technology Drive</td>
<td></td>
</tr>
<tr>
<td>Flying Cloud Drive / Eden Road / Leona</td>
<td>9.4 A</td>
</tr>
<tr>
<td>Drive</td>
<td></td>
</tr>
<tr>
<td>Flying Cloud Drive / Singletree Lane</td>
<td>13.3 B</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

Movements for which queuing issues were identified in one or more scenarios were as follows:

- Flying Cloud Drive and Valley View Road – AM peak hour Southbound left turn; PM peak hour Westbound left turn.
- Flying Cloud Drive and WB I-494 Ramp – PM peak hour Westbound right turn.
- Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn; Westbound left turn and through lanes.

The full table of existing conditions LOS and queuing analysis results can be found in Appendix C.

3.2.4 Golden Triangle Area

The Golden Triangle area includes intersections that are impacted by the future park-and-ride. The evaluation will compare the impacts of the existing intersection operation to both a future No Build and Build scenario to determine the impacts of changes in traffic.

This area was modeled in Synchro/SimTraffic, as it will not include interaction with the future LRT. The results of the existing AM and PM peak hour analysis showed that all intersections currently operate at LOS D or better during the peak hour scenarios. The overall intersection results are shown in Table 3.4 below.
Table 3.4. Golden Triangle Area – Existing Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Shady Oak Road / Valley View Road *</td>
<td>2.4 A</td>
</tr>
<tr>
<td>Shady Oak Road / W 70th Street *</td>
<td>1.3 A</td>
</tr>
<tr>
<td>Shady Oak Road / WB TH 62 Ramp</td>
<td>11.1 B</td>
</tr>
<tr>
<td>Shady Oak Road / EB TH 62 Ramp/W 62nd Street</td>
<td>12.9 B</td>
</tr>
<tr>
<td>Shady Oak Road / City West Parkway</td>
<td>21.1 C</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

No queuing issues were identified in the existing conditions.

The full table of existing conditions LOS and queuing analysis results can be found in Appendix C.

### 3.2.5 Bren Road Area

The Bren Road area includes intersections that area generally yield control and provide access to the Opus Campus.

This area was modeled in VISSIM for consistency with future LRT interaction. The overall intersection results are shown in Table 3.5 below.

The results of the Exiting Conditions AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios with the exception of the following:

- Bren Road East and Red Circle Drive in the AM peak hour. This is mainly at the merge point with the unsignalized single lane configuration.

Table 3.5. Bren Road Area – Existing Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Bren Road East / Red Circle Drive +</td>
<td>56.2 F</td>
</tr>
<tr>
<td>Bren Road East / Bren Road West +</td>
<td>2.8 A</td>
</tr>
</tbody>
</table>

+ Side street yield controlled intersection
Movements for which queuing issues were identified in one or more scenarios were as follows:

- Bren Road East and Red Circle Drive - AM peak hour Eastbound right turn.

The full table of existing conditions LOS and queuing analysis results can be found in Appendix C.

### 3.2.6 Excelsior Boulevard Area

The Excelsior Boulevard area includes intersections that may be impacted by the future LRT and park-and-ride.

The Excelsior intersections at Shady Oak and 17th Avenue S were modeled in Synchro/SimTraffic to evaluate the future impacts of a park and ride facility. The intersections on 11th Avenue S were modeled in VISSIM to account for the future interaction of LRT. The results of the existing AM and PM peak hour analysis showed that all intersections currently operate at LOS D or better during the peak hour scenarios. The overall intersection results are shown in Table 3.6 below.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Excelsior Boulevard / Shady Oak Road</td>
<td>31.6 C</td>
</tr>
<tr>
<td>Excelsior Boulevard / 17th Avenue S</td>
<td>9.3 A</td>
</tr>
<tr>
<td>Excelsior Boulevard / 11th Avenue S</td>
<td>18.5 B</td>
</tr>
<tr>
<td>11th Avenue S / 5th Street S</td>
<td>8.6 A</td>
</tr>
</tbody>
</table>

Movements for which queuing issues were identified in one or more scenarios were as follows:

- Excelsior Boulevard and Shady Oak Road – AM peak hour southbound left turn; PM peak hour Northbound left turn; Southbound left turn.

The full table of existing conditions LOS and queuing analysis results can be found in Appendix C.
3.3 Existing Conditions Summary

All intersections operate at LOS D or better in the existing AM and PM peak conditions, with the following exceptions:

- Flying Cloud Drive and Valley View Road (AM peak hour).
- Bren Road East and Red Circle Drive (AM peak hour).

Movements for which queuing issues were identified in one or more scenarios were as follows:

- Flying Cloud Drive and Valley View Drive – AM peak hour Southbound left turn; PM peak hour Westbound left turn.
- Flying Cloud Drive and WB I-494 Ramp – PM peak hour Westbound right turn.
- Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn; Westbound left turn and through lanes.
- Bren Road East and Red Circle Drive - AM peak hour Eastbound right turn.
- Excelsior Boulevard and Shady Oak Road –AM peak hour Southbound left turn; PM peak hour Northbound left turn; Southbound left turn.

4.0 NO BUILD ANALYSIS

The No Build modeling was conducted to identify the expected traffic operations at the Opening Year of the SWLRT project and for the forecast horizon year (2040). The assumptions, methodology, and results of the No Build conditions analysis are presented in the following sections.

4.1 Assumptions

Opening Year and 2040 forecast peak hour volumes were based on the forecast daily traffic volumes for key roadway segments within the study area. Table 4.1 shows the existing and forecast daily traffic volumes for the West segment.
Table 4.1 – West Segment Existing and Forecast Daily Traffic Volumes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prairie Center Drive</td>
<td>Valley View Road to TH 212 North Ramps</td>
<td>15,600</td>
<td>17,800</td>
<td>24,600</td>
<td>1.7%</td>
</tr>
<tr>
<td></td>
<td>TH 212 South Ramps to Technology Drive</td>
<td>33,000</td>
<td>35,600</td>
<td>44,300</td>
<td>1.1%</td>
</tr>
<tr>
<td></td>
<td>Technology Drive to Singletree Lane</td>
<td>31,500</td>
<td>33,700</td>
<td>41,400</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td>Valley View Road to Flying Cloud Drive</td>
<td>17,500</td>
<td>19,400</td>
<td>25,000</td>
<td>1.3%</td>
</tr>
<tr>
<td>Flying Cloud Drive</td>
<td>Fountain Place to Medcom Boulevard</td>
<td>26,000</td>
<td>29,800</td>
<td>39,000</td>
<td>1.5%</td>
</tr>
<tr>
<td></td>
<td>Prairie Center Drive to Middleset Road</td>
<td>22,000</td>
<td>24,600</td>
<td>31,000</td>
<td>1.3%</td>
</tr>
<tr>
<td></td>
<td>Leona Road to Technology Drive</td>
<td>31,400</td>
<td>33,600</td>
<td>40,900</td>
<td>1.0%</td>
</tr>
<tr>
<td></td>
<td>Viking Drive to Prairie Center Drive</td>
<td>20,700</td>
<td>24,000</td>
<td>32,700</td>
<td>1.7%</td>
</tr>
<tr>
<td>Valley View Road</td>
<td>Market Place Drive to TH 212 North Ramps</td>
<td>16,200</td>
<td>18,200</td>
<td>24,700</td>
<td>1.6%</td>
</tr>
<tr>
<td></td>
<td>Prairie Center Drive to Smetana Lane</td>
<td>8,400</td>
<td>9,800</td>
<td>13,000</td>
<td>1.6%</td>
</tr>
<tr>
<td></td>
<td>Golden Triangle Drive to Shady Oak Road</td>
<td>5,600</td>
<td>6,500</td>
<td>9,500</td>
<td>2.0%</td>
</tr>
<tr>
<td></td>
<td>Shady Oak Road to TH 169 West Ramps</td>
<td>11,400</td>
<td>12,500</td>
<td>15,800</td>
<td>1.2%</td>
</tr>
<tr>
<td>West 78th Street</td>
<td>Flying Cloud Drive to Prairie Center Drive</td>
<td>5,300</td>
<td>6,500</td>
<td>9,500</td>
<td>2.2%</td>
</tr>
</tbody>
</table>
Table 4.1 – West Segment Existing and Forecast Daily Traffic Volumes

<table>
<thead>
<tr>
<th>Route Description</th>
<th>Existing Traffic</th>
<th>Forecast Traffic</th>
<th>Change</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singletree Lane to Eden Road</td>
<td>9,600</td>
<td>10,900</td>
<td>1,300</td>
<td>17%</td>
</tr>
<tr>
<td>Technology Drive to Mitchell Road</td>
<td>4,100</td>
<td>5,500</td>
<td>1,400</td>
<td>34%</td>
</tr>
<tr>
<td>Mitchell Road to Treatment Plant Access</td>
<td>8,100</td>
<td>9,500</td>
<td>1,400</td>
<td>17%</td>
</tr>
<tr>
<td>Southwest Park and Ride to Prairie Center Drive</td>
<td>11,900</td>
<td>12,800</td>
<td>900</td>
<td>8%</td>
</tr>
<tr>
<td>Prairie Center Drive to Flying Cloud Drive</td>
<td>8,800</td>
<td>9,400</td>
<td>600</td>
<td>7%</td>
</tr>
<tr>
<td>Wallace Road to Mitchell Road</td>
<td>2,600</td>
<td>3,200</td>
<td>600</td>
<td>23%</td>
</tr>
<tr>
<td>TH 212 North Ramps to TH 212 South Ramps</td>
<td>2,300</td>
<td>3,700</td>
<td>1,400</td>
<td>61%</td>
</tr>
<tr>
<td>Scenic Heights Road to Mitchell Road</td>
<td>4,250</td>
<td>5,200</td>
<td>950</td>
<td>21%</td>
</tr>
<tr>
<td>Martin Road to TH 212 North Ramps</td>
<td>12,000</td>
<td>13,100</td>
<td>1,100</td>
<td>9%</td>
</tr>
<tr>
<td>TH 212 North Ramps to Lone Oak Road</td>
<td>19,300</td>
<td>21,700</td>
<td>2,400</td>
<td>12%</td>
</tr>
<tr>
<td>Lone Oak Road to Technology Drive</td>
<td>19,200</td>
<td>21,300</td>
<td>2,100</td>
<td>11%</td>
</tr>
<tr>
<td>Technology Drive to Anderson Lakes Parkway</td>
<td>14,000</td>
<td>14,800</td>
<td>800</td>
<td>6%</td>
</tr>
<tr>
<td>Anderson Lakes Parkway to Tamarack Trail</td>
<td>7,100</td>
<td>8,000</td>
<td>900</td>
<td>13%</td>
</tr>
<tr>
<td>Trunk Highway 7 to Lake Street Extension</td>
<td>10,700</td>
<td>12,100</td>
<td>1,400</td>
<td>13%</td>
</tr>
<tr>
<td>Main Street to Excelsior Boulevard</td>
<td>10,000</td>
<td>11,800</td>
<td>1,800</td>
<td>18%</td>
</tr>
<tr>
<td>Excelsior Boulevard to West 47th Street</td>
<td>11,300</td>
<td>12,800</td>
<td>1,500</td>
<td>13%</td>
</tr>
<tr>
<td>Red Circle Drive to TH 62</td>
<td>17,500</td>
<td>19,800</td>
<td>2,300</td>
<td>13%</td>
</tr>
<tr>
<td>TH 62 to City West Parkway</td>
<td>14,400</td>
<td>17,500</td>
<td>3,100</td>
<td>22%</td>
</tr>
<tr>
<td>West 70th Street to Valley View Road</td>
<td>4,700</td>
<td>6,300</td>
<td>1,600</td>
<td>34%</td>
</tr>
<tr>
<td>Church Lane to Shady Oak Road</td>
<td>10,400</td>
<td>11,300</td>
<td>900</td>
<td>9%</td>
</tr>
<tr>
<td>Shady Oak Road to 20th Avenue South</td>
<td>16,200</td>
<td>16,600</td>
<td>400</td>
<td>2%</td>
</tr>
</tbody>
</table>
Table 4.1 – West Segment Existing and Forecast Daily Traffic Volumes

<table>
<thead>
<tr>
<th>Road</th>
<th>Existing Segment</th>
<th>Forecast Year 1</th>
<th>Forecast Year 2</th>
<th>Forecast Year 3</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smetana Road</td>
<td>Shady Oak Road to Beachside Drive</td>
<td>4,300</td>
<td>5,800</td>
<td>9,300</td>
<td>2.9%</td>
</tr>
<tr>
<td></td>
<td>Feltl Court to 11th Avenue South</td>
<td>4,750</td>
<td>6,200</td>
<td>9,800</td>
<td>2.7%</td>
</tr>
<tr>
<td>Bren Road West</td>
<td>Bren Road East to Green Circle Drive</td>
<td>2,800</td>
<td>3,100</td>
<td>3,700</td>
<td>1.0%</td>
</tr>
<tr>
<td>Bren Road East</td>
<td>Yellow Circle Drive to Red Circle Drive</td>
<td>6,300</td>
<td>6,500</td>
<td>7,000</td>
<td>0.4%</td>
</tr>
<tr>
<td>11th Avenue South</td>
<td>1st Street South to Excelsior Boulevard</td>
<td>7,700</td>
<td>7,900</td>
<td>8,400</td>
<td>0.3%</td>
</tr>
<tr>
<td></td>
<td>Excelsior Boulevard to 5th Street South</td>
<td>15,700</td>
<td>16,100</td>
<td>17,200</td>
<td>0.3%</td>
</tr>
<tr>
<td></td>
<td>5th Street South to 6th Street South</td>
<td>10,900</td>
<td>11,200</td>
<td>11,900</td>
<td>0.3%</td>
</tr>
<tr>
<td>17th Avenue South</td>
<td>1st Street South to Excelsior Boulevard</td>
<td>3,200</td>
<td>3,300</td>
<td>3,500</td>
<td>0.3%</td>
</tr>
<tr>
<td>5th Street South</td>
<td>15th Avenue South to 11th Avenue South</td>
<td>3,050</td>
<td>3,100</td>
<td>3,300</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

The turning movement volumes for No Build AM and PM peak in the Opening Year and 2040 conditions are provided in Appendix A.

The No Build analysis was based on the future year No Build traffic volumes, existing roadway geometrics, and optimized signal operations. This also includes planned/programmed improvements listed below.

- West 70th Street and Shady Oak Road includes an Eastbound right turn lane and Northbound left turn lane.
- Shady Oak Road and Valley View Road includes a Southbound right turn lane and traffic signal (between 2030 and 2040).
- Main Street is extended from Eden Road to Technology Drive between 2020 and 2040 with traffic signal at Main Street and Singletree Lane.

The geometrics and intersection control for the No Build conditions are shown in the intersection layout tables provided in Appendix B.
4.2 Traffic Modeling Overview and Results

The same nine modeling areas created for the existing conditions modeling were used for the No Build analysis. The No Build operations results are presented by modeling area in the following sections.

4.2.1 Southwest Station Area

The results of the Opening Year No Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios.

The results of the 2040 No Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios with the exception of the following:

- Technology Drive and Southwest Station East Access Driveway in the PM peak hour. The intersection is signalized and the poor operation is for left turning vehicle delay from the driveway. This is caused by the poorly operating interchange area of TH 212 / TH 5 and Prairie Center Drive. The intersection would operate at LOS B without the congestion and queue spill-back caused by those intersections.
- Prairie Center Drive / Technology Drive (& WB TH 5/TH 212 Ramp) in the PM peak hour has high levels of congestion at the ramp terminals.
- Prairie Center Drive / Technology Drive (& EB TH 5/TH 212 Ramp) in the PM peak hour has high levels of congestion at the ramp terminals.
- Prairie Center Drive and Technology Drive in the PM peak hour is a generally congested intersection.

The overall intersection results for Opening Year are shown in Table 4.1 and the overall intersection results for 2040 are shown in Table 4.2 below.

Table 4.1. Southwest Station Area – Opening Year No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Mitchell Road / WB TH 5 / TH 212</td>
<td>14.3</td>
</tr>
<tr>
<td>Ramp</td>
<td>B</td>
</tr>
<tr>
<td>Mitchell Road / EB TH 5 / TH 212</td>
<td>8.5</td>
</tr>
<tr>
<td>Ramp</td>
<td>A</td>
</tr>
<tr>
<td>Mitchell Road / Lone Oak Road</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Mitchell Road / Technology Drive</td>
<td>24.6</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>
Table 4.1. Southwest Station Area – Opening Year No Build Conditions Results (cont.)

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Drive / Southwest Station Bus Access *</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station West Access</td>
<td>1.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station East Access *</td>
<td>7.3</td>
<td>10.5</td>
</tr>
<tr>
<td>Prairie Center Drive / Plaza Drive (&amp; WB TH 5/TH 212 Ramp)</td>
<td>23.9</td>
<td>36.3</td>
</tr>
<tr>
<td>Prairie Center Drive / Technology Drive (&amp; EB TH 5/TH 212 Ramp)</td>
<td>24.9</td>
<td>46.2</td>
</tr>
<tr>
<td>Technology Drive / Prairie Center Drive</td>
<td>17.5</td>
<td>33.4</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

Table 4.2. Southwest Station Area – 2040 No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Mitchell Road / WB TH 5/TH 212 Ramp</td>
<td>18.5</td>
</tr>
<tr>
<td>Mitchell Road / EB TH 5 / TH 212 Ramp</td>
<td>12.6</td>
</tr>
<tr>
<td>Mitchell Road / Lone Oak Road</td>
<td>6.9</td>
</tr>
<tr>
<td>Mitchell Road / Technology Drive</td>
<td>31.0</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station Bus Access *</td>
<td>0.7</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station West Access</td>
<td>1.7</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station East Access *</td>
<td>9.8</td>
</tr>
<tr>
<td>Prairie Center Drive / Plaza Drive (&amp; WB TH 5/TH 212 Ramp)</td>
<td>47.2</td>
</tr>
<tr>
<td>Prairie Center Drive / Technology Drive (&amp; EB TH 5/TH 212 Ramp)</td>
<td>27.1</td>
</tr>
<tr>
<td>Technology Drive / Prairie Center Drive</td>
<td>19.3</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection
Movements for which queuing issues were identified in one or more Opening Year No Build scenarios were as follows:

- Mitchell Road and Technology Drive – PM peak hour Eastbound left turn.
- Prairie Center Drive and Westbound TH 5/TH 212/Plaza Drive – PM peak hour Westbound left turn.
- Prairie Center Drive and Eastbound TH 5/TH 212/Technology – PM peak hour Northbound left turn and right turn; Southbound left turn, Eastbound left turn.

Movements for which queuing issues were identified in one or more 2040 No Build scenarios were as follows:

- Mitchell Road and Technology Drive – AM peak hour Southbound left turn; PM peak hour Westbound right turn; Southbound left turn and through lanes; Eastbound left turn.
- Technology Drive and Southwest Station East Drive – PM peak hour Southbound left turn.
- Prairie Center Drive and Westbound TH 5/TH 212/Plaza Drive – AM peak hour Eastbound right turn; PM peak hour Eastbound right turn; Southbound through lane and right turn; Westbound left turn and through lane.
- Prairie Center Drive and Eastbound TH 5/TH 212/Technology – PM peak hour Northbound left turn, through lanes and right turn; Eastbound left turn and through lanes; Southbound left turn, through lanes and right turn; Westbound through lane and right turn.
- Prairie Center Drive and Technology Drive – PM peak hour Northbound left turn; Eastbound left turn, through lanes and right turn; and Southbound right turn.

The full table of No Build conditions LOS and queuing analysis results can be found in Appendix C.

4.2.2 Eden Road/Main Street Area

The results of the Opening Year No Build AM and PM peak hour analysis showed that all intersections currently operate at LOS D or better during the peak hour scenarios.

The overall intersection results for Opening Year are shown in Table 4.3 and the overall intersection results for 2040 are shown in Table 4.4 below.
Table 4.3. Eden / Main Area – Opening Year No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Main Street / Singletree Lane</td>
<td>1.6</td>
</tr>
<tr>
<td>Eden Road / Glen Lane *</td>
<td>1.3</td>
</tr>
<tr>
<td>Eden Road/Leona Drive /Flying Cloud Drive</td>
<td>10.6</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

No queuing issues were identified in the Opening Year and 2040 No Build conditions.

The full table of No Build conditions LOS and queuing analysis results can be found in Appendix C.

4.2.3 Flying Cloud Drive Area

The results of the Opening Year No Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios.

The results of the 2040 No Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios with the exception of the following:

- Flying Cloud Drive and Valley View Road in the AM peak hour is a congested area in the vicinity of TH 212 and along Flying Cloud Drive.

The overall intersection results for Opening Year are shown in Table 4.5 and the overall intersection results for 2040 are shown in Table 4.6 below.
### Table 4.5. Flying Cloud Drive Area – Opening Year No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Flying Cloud Drive / Valley View Road</td>
<td>45.0</td>
</tr>
<tr>
<td></td>
<td>D</td>
</tr>
<tr>
<td>Flying Cloud Drive / Viking Drive *</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Flying Cloud Drive / WB I-494 Ramp</td>
<td>17.1</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Flying Cloud Drive / EB I-494 Ramp/Technology Drive</td>
<td>10.7</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Flying Cloud Drive / Eden Road/Leona Drive</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Flying Cloud Drive / Singletree Lane</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

### Table 4.6. Flying Cloud Drive Area – 2040 No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Flying Cloud Drive / Valley View Road</td>
<td><strong>60.1</strong></td>
</tr>
<tr>
<td></td>
<td>E</td>
</tr>
<tr>
<td>Flying Cloud Drive / Viking Drive *</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Flying Cloud Drive / WB I-494 Ramp</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Flying Cloud Drive / EB I-494 Ramp/Technology Drive</td>
<td>13.1</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Flying Cloud Drive / Eden Road/Leona Drive</td>
<td>11.8</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Flying Cloud Drive / Singletree Lane</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection
Movements for which queuing issues were identified in one or more Opening Year No Build scenarios were as follows:

- Flying Cloud Drive and Valley View Road – AM peak hour Eastbound through lanes; Southbound left turn; PM peak hour Westbound left turn.
- Flying Cloud Drive and Eastbound I-494 Ramp/Technology Drive – PM peak hour Northbound left turn.
- Flying Cloud Drive and Westbound I-494 Ramp – PM peak hour Westbound right turn.
- Flying Cloud Drive and Eden Road/Leona Drive – PM peak hour Southbound left turn.
- Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn; Westbound left turn and through lanes.

Movements for which queuing issues were identified in one or more 2040 No Build scenarios were as follows:

- Flying Cloud Drive and Valley View Road – AM peak hour Eastbound through lanes; Southbound left turn; PM peak hour Westbound left turn.
- Flying Cloud Drive and Viking Drive – AM peak hour Eastbound through lanes; PM peak hour Westbound right turn.
- Flying Cloud Drive and Westbound I-494 Ramp – AM peak hour Westbound right turn; PM peak hour Westbound right turn.
- Flying Cloud Drive and Eastbound I-494 Ramp/Technology Drive – PM peak hour Northbound left turn.
- Flying Cloud Drive and Eden/Leona – PM peak hour Northbound left turn and Eastbound left turn.
- Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn and through lanes; Westbound left turn and through lanes.

The full table of No Build conditions LOS and queuing analysis results can be found in Appendix C.

### 4.2.4 Golden Triangle Area

The results of the Opening Year No Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios.

The results of the 2040 No Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios with the exception of the following:
• Shady Oak Road and Valley View Road in the PM peak hour. This is an unsignalized intersection and the delay from southbound left turning vehicles is the source of the delay.
• Shady Oak Road and West 70th Street in the PM peak hour.

Anticipated growth in the Golden Triangle area causes 2040 No Build conditions to operate poorly. The overall intersection results for Opening Year are shown in Table 4.7 and the overall intersection results for 2040 are shown in Table 4.8 below.

### Table 4.7. Golden Triangle Area – Opening Year No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Shady Oak Road / Valley View Road</td>
<td>3.7 A</td>
</tr>
<tr>
<td>Shady Oak Road / West 70th Street *</td>
<td>2.6 A</td>
</tr>
<tr>
<td>Shady Oak Road / WB TH 62 Ramp</td>
<td>24.1 C</td>
</tr>
<tr>
<td>Shady Oak Road / EB TH 62 Ramp/W 62nd Street</td>
<td>41.7 D</td>
</tr>
<tr>
<td>Shady Oak Road / City West Parkway</td>
<td>16.6 B</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

### Table 4.8. Golden Triangle Area – 2040 No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Shady Oak Road / Valley View Road</td>
<td>13.5 B</td>
</tr>
<tr>
<td>Shady Oak Road / West 70th Street *</td>
<td>10.4 B</td>
</tr>
<tr>
<td>Shady Oak Road / WB TH 62 Ramp</td>
<td>27.0 C</td>
</tr>
<tr>
<td>Shady Oak Road / EB TH 62 Ramp/W 62nd Street</td>
<td>43.6 D</td>
</tr>
<tr>
<td>Shady Oak Road / City West Parkway</td>
<td>30.2 C</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection
Movements for which queuing issues were identified in one or more Opening Year No Build scenarios were as follows:

- Shady Oak Drive and Valley View Road – PM peak hour Southbound left turn, through lanes, and right turn.

Movements for which queuing issues were identified in one or more 2040 No Build scenarios were as follows:

- Shady Oak Drive and West 70th Street – PM peak hour Northbound through lanes; Eastbound left turn.

The full table of No Build conditions LOS and queuing analysis results can be found in Appendix C.

4.2.5 Bren Road Area

The results of the Opening Year No Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios with the exception of the following:

- Bren Road East and Red Circle Drive in the AM peak hour. This is an unsignalized intersection with yield control and the delay is from merging vehicles from a single lane.

The results of the 2040 No Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios with the exception of the following:

- Bren Road East and Red Circle Drive in the AM peak hour. This is an unsignalized intersection with yield control and the delay is from merging vehicles in a single lane.

The overall intersection results for Opening Year are shown in Table 4.9 and the overall intersection results for 2040 are shown in Table 4.10 below.

<table>
<thead>
<tr>
<th>Table 4.9. Bren Road Area – Opening Year No Build Conditions Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Bren Road East / Red Circle Drive +</td>
</tr>
<tr>
<td>Bren Road East / Bren Road West +</td>
</tr>
</tbody>
</table>

+ Side street yield controlled intersection
Table 4.10. Bren Road Area – 2040 No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Bren Road East / Red Circle Drive +</td>
<td>122.3 F</td>
</tr>
<tr>
<td>Bren Road East / Bren Road West +</td>
<td>3.2 A</td>
</tr>
</tbody>
</table>

+ Side street yield controlled intersection

Movements for which queuing issues were identified in one or more Opening Year No Build scenarios were as follows:

- Bren Road East and Red Circle Drive – AM peak hour Eastbound right turn.

Movements for which queuing issues were identified in one or more 2040 No Build scenarios were as follows:

- Bren Road East and Red Circle Drive – AM peak hour Eastbound right turn.

The full table of No Build conditions LOS and queuing analysis results can be found in Appendix C.

4.2.6 Excelsior Boulevard Area

The results of the Opening Year No Build AM and PM peak hour analysis showed that all intersections currently operate at LOS D or better during the peak hour scenarios.

The overall intersection results for Opening Year are shown in Table 4.11 and the overall intersection results for 2040 are shown in Table 4.12 below.

Table 4.11. Excelsior Boulevard Area – Opening Year No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Excelsior Boulevard / Shady Oak Road</td>
<td>33.2 C</td>
</tr>
<tr>
<td>Excelsior Boulevard / 17th Avenue S</td>
<td>9.4 A</td>
</tr>
<tr>
<td>Excelsior Boulevard / 11th Avenue S</td>
<td>18.8 B</td>
</tr>
<tr>
<td>11th Avenue S / 5th Street S</td>
<td>8.9 A</td>
</tr>
</tbody>
</table>
Table 4.12. Excelsior Boulevard Area – 2040 No Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Excelsior Boulevard / Shady Oak Road</td>
<td>37.7 D</td>
</tr>
<tr>
<td>Excelsior Boulevard / 17th Avenue S</td>
<td>9.7 A</td>
</tr>
<tr>
<td>Excelsior Boulevard / 11th Avenue S</td>
<td>20.2 C</td>
</tr>
<tr>
<td>11th Avenue S / 5th Street S</td>
<td>9.6 A</td>
</tr>
</tbody>
</table>

Movements for which queuing issues were identified in one or more Opening Year No Build scenarios were as follows:

- Excelsior Boulevard and Shady Oak Road – PM peak hour Northbound left turn.

Movements for which queuing issues were identified in one or more 2040 No Build scenarios were as follows:

- Excelsior Boulevard and Shady Oak Road – AM peak hour Southbound left turn; PM peak hour Northbound left turn.

The full table of No Build conditions LOS and queuing analysis results can be found in Appendix C.

4.3 No Build Conditions Summary

All intersections would be expected to operate at LOS D or better in the Opening Year No Build AM and PM peak conditions, with the following exceptions:

- Bren Road East and Red Circle Drive (AM peak hour).

All intersections would be expected to operate at LOS D or better in the 2040 No Build AM and PM peak conditions, with the following exceptions:

- Technology Drive and Southwest Station East Driveway (PM peak hour).
- Prairie Center Drive / Technology Drive & WB TH 5/TH 212 Ramp (PM peak hour).
- Prairie Center Drive / Technology Drive & EB TH 5/TH 212 Ramp (PM peak hour).
- Prairie Center Drive and Technology Drive (PM peak hour).
- Flying Cloud Drive and Valley View Road (AM peak hour).
• Shady Oak Road and West 70th Street (PM peak hour).
• Shady Oak Drive and Valley View Road (PM peak hour).
• Bren Road East and Red Circle Drive (AM peak hour).

Movements for which queuing issues were identified in one or more Opening Year No Build scenarios were as follows:

• Mitchell Road and Technology Drive – PM peak hour Eastbound left turn.
• Prairie Center Drive and Westbound TH 5/TH 212/Plaza Drive – PM peak hour Westbound left turn.
• Prairie Center Drive and Eastbound TH 5/TH 212/Technology – PM peak hour Northbound left turn and right turn; Southbound left turn, Eastbound left turn.
• Flying Cloud Drive and Valley View Road – AM peak hour Eastbound through lanes; Southbound left turn; PM peak hour Westbound left turn.
• Flying Cloud Drive and Westbound I-494 Ramp – PM peak hour Westbound right turn.
• Flying Cloud Drive and Eastbound I-494 Ramp/Technology Drive – PM peak hour Northbound left turn.
• Flying Cloud Drive and Eden Road/Leona Drive.
• Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn; Westbound left turn and through lanes.
• Bren Road East and Red Circle Drive – AM peak hour Eastbound right turn.
• Excelsior Boulevard and Shady Oak Road – PM peak hour Northbound left turn.

Movements for which queuing issues were identified in one or more 2040 No Build scenarios were as follows:

• Mitchell Road and Technology Drive – AM peak hour southbound left turn; PM peak hour Westbound right turn; Southbound left turn, through lanes; Eastbound left turn.
• Technology and Southwest Station East Drive – PM Southbound left turn.
• Prairie Center Drive and Westbound TH 5/TH 212/Plaza Drive – AM peak hour Eastbound right turn; PM peak hour Eastbound right turn; Southbound through lane and right turn; Westbound left turn and through lane.
• Prairie Center Drive and Eastbound TH 5/TH 212/Technology – PM peak hour Northbound left turn, through lanes and right turn; Eastbound left turn and through lanes; Southbound left turn, through lanes, and right turn; Westbound through lane and right turn.
• Prairie Center Drive and Technology Drive – PM peak hour Northbound left turn; Eastbound left turn, through lanes, and right turn; and Southbound right turn.
• Flying Cloud Drive and Valley View Road – AM peak hour Eastbound through lanes; Southbound left turn; PM peak hour Westbound right turn.
• Flying Cloud Drive and Viking Drive – AM Eastbound through lanes; PM peak hour Westbound right turn.
• Flying Cloud Drive and Westbound I-494 Ramp – AM peak hour Westbound right turn; PM peak hour Westbound right turn.
• Flying Cloud Drive and Eastbound I-494 Ramp/Technology Drive – PM peak hour Northbound left turn.
• Flying Cloud Drive and Eden/Leona – PM peak hour Northbound left turn and Eastbound left turn.
• Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn and through lanes; Westbound left turn and through lanes.
• Shady Oak Drive and West 70th Street – PM Northbound through lanes; Eastbound left turn.
• Shady Oak Drive and Valley View Road – PM Southbound left turn, through lanes, and right turn.
• Bren Road East and Red Circle Drive – AM peak hour Eastbound right turn.
• Excelsior Boulevard and Shady Oak Road – AM peak hour Southbound left turn; PM peak hour Northbound left turn.

5.0 BUILD ANALYSIS

The Build modeling was conducted to identify the expected traffic operations at the Opening Year of the SWLRT project and for the forecast horizon year (2040), with the LRT operating. The assumptions, methodology, and results of the Build conditions analysis are presented in the following sections. Several improvements were identified in order to provide LOS D or better operations at all intersections in the Build conditions and to provide safe and efficient traffic and LRT operations. These improvements are incorporated into the scope of the project and included in the Build Traffic Analysis in conjunction with the Intersection Layouts in Appendix B

5.1 Assumptions

Traffic volumes for the Build conditions were based on the same growth forecasts as the No Build conditions. At LRT stations, additional pedestrian volumes were incorporated into the modeling and additional vehicle traffic was added to the roadway network to account for traffic generated by park-and-ride facilities. The control of each of the LRT crossings was identified based on the proximity to the freight rail alignment and adjacent signalized intersections. Traffic signal control also provides the opportunity to implement transit signal priority (TSP) at intersections with no railroad gate control. TSP helps promote more efficient LRT operation by typically providing an early or extended green to LRT and vehicles if there is time available in the signal cycle. TSP is not pre-emption, so LRT will not get an automatic signal, but will instead get some priority for better operation. Table 5.1 below displays the existing and proposed control of the LRT crossings along the SWLRT alignment.
Table 5.1. West Segment LRT Crossing Treatments

<table>
<thead>
<tr>
<th>Crossing Location</th>
<th>Existing Control</th>
<th>Build Conditions Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eden Road and Main Street</td>
<td>No intersection, road segment</td>
<td>Year of opening is no intersection. 2040 conditions include Traffic Signal with Gates and Pre-empt, no LRT delay</td>
</tr>
<tr>
<td>Eden Road and Eden Extension/Redstone Driveway</td>
<td>No intersection</td>
<td>Traffic Signal with Gates and Pre-empt, no LRT delay</td>
</tr>
<tr>
<td>Eden Road and Glen Lane</td>
<td>Unsignalized intersection</td>
<td>Side street stop and no north approach</td>
</tr>
<tr>
<td>Flying Cloud Drive and Viking Drive</td>
<td>Unsignalized intersection</td>
<td>Traffic Signal with Gates and Pre-empt; no LRT delay</td>
</tr>
<tr>
<td>Flying Cloud Drive and EB I-494 Ramp / Technology Drive</td>
<td>Signalized intersection</td>
<td>Traffic Signal with Gates and Pre-empt; no LRT delay</td>
</tr>
<tr>
<td>West 70th Street</td>
<td>Road Segment</td>
<td>LRT at-grade crossing with gates</td>
</tr>
<tr>
<td>Bren Road East / Yellow Circle Drive</td>
<td>Reconfigured roadway</td>
<td>LRT at-grade crossing with gates</td>
</tr>
<tr>
<td>Bren Road West</td>
<td>Road segment</td>
<td>LRT at-grade crossing with gates</td>
</tr>
<tr>
<td>K-Tel Drive</td>
<td>Road segment</td>
<td>LRT at-grade crossing with gates</td>
</tr>
<tr>
<td>11th Avenue South</td>
<td>Road segment</td>
<td>LRT at-grade crossing with gates</td>
</tr>
</tbody>
</table>

Several improvements were identified as part of the scope of the project in order to provide control of the LRT at intersections and to provide adequate facilities for park-and-ride traffic. These project elements were incorporated into the Build conditions modeling and are listed in detail in Section 5.3.

Locally Requested Capital Investments (LRCIs) were also modeled at several locations, based on the improvement projects identified by the local agencies. The projects that were incorporated into the traffic modeling are included in Section 6.0.

Signal phasing was also modified at several locations to provide protected-only turn phasing for turn movements across the tracks and to provide the ability to run track clearance phases where signal preemption was modeled. Signal timing was assumed to be optimized for all traffic signals in the Build conditions.

The Build conditions modeled for each intersection and at-grade crossing, including all intersection control changes, are shown in the intersection layout tables in Appendix B.

As previously discussed in Section 2.2, vehicle traffic expected to be generated by the park-and-ride facilities was added to the base No Build volumes to produce the Build conditions peak hour volumes. The location and size of park-and-ride facilities included in the traffic modeling are summarized in Table 5.2 and were approved by the Metropolitan Council on July 8, 2015. The number of parking spaces analyzed correlate to the estimated demand of the facility. The
difference between the analyzed number of parking spaces and those in the plans would not impact the results of the analysis.

Table 5.2. Park-and-Ride Facility Summary

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Parking Spaces Analyzed</th>
<th>Parking Spaces in the Revised Preliminary Design Plans for Municipal Consent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest Station (additional spaces)</td>
<td>450</td>
<td>450</td>
</tr>
<tr>
<td>Golden Triangle Station</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>City West Station</td>
<td>300</td>
<td>160</td>
</tr>
<tr>
<td>Opus Station</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>Shady Oak Station</td>
<td>700</td>
<td>700</td>
</tr>
</tbody>
</table>

Additional vehicle and pedestrian volumes generated by the feeder bus network and the pedestrians at each station were also added into the peak hour modeling. The modeled AM and PM peak hour Build turning movement volumes for the Opening Year and 2040 conditions are provided in Appendix A.

Park-and-ride trip generation methodology was documented in the Park-and-Ride Trip Generation memorandum dated August 14, 2014. The following is the summary of the trips generated:

- AM Peak hour generates 55.2 trips per 100 parking stalls of which 88 percent are inbound and 12 percent are outbound.
- PM Peak hour generates 51.2 trips per 100 parking stalls of which 16 percent are inbound and 84 percent are outbound.
- Daily trip generation is 297.0 trips per 100 parking spaces.

Park-and-ride direction of approach is documented in the Park-and-Ride Sizing and Location memorandum dated September 30, 2014. The developed direction of approach is summarized below:

Southwest Station Park-and-Ride

SW Station is more complex because of the routing choices given to park-and-ride patrons coming from TH 212 and TH 5. The basic direction of approach is:

- 55 percent from TH 212 and TH 5 west of Mitchell Road (35 percent from TH 212 and 20 percent from TH 5).
- 18 percent on Mitchell Road south of Technology Drive.
- 9 percent on Flying Cloud Drive south of Prairie Center Drive.
- 6 percent on Prairie Center Drive east of Flying Cloud Drive.
- 4 percent on Mitchell Road north of TH 212/TH 5.
- 4 percent local trips within the immediate area.
• 3 percent on Prairie Center Drive north of TH 212/TH 5.
• 1 percent on Technology Drive west of Mitchell Road.

Detailed travel time analysis was completed to determine the routes to/from TH 212 and TH 5. The following were the results:

• TH 5 – AM Peak Hour
  o 95 percent use Prairie Center Drive
  o 5 percent use Mitchell Road
• TH 5 – PM Peak Hour
  o 50 percent use Prairie Center Drive
  o 50 percent use Mitchell Road
• TH 212 – AM Peak Hour
  o 80 percent use Prairie Center Drive
  o 15 percent use Wallace Road
  o 5 percent use Eden Prairie Road
• TH 212 – PM Peak Hour
  o 50 percent use Prairie Center Drive
  o 40 percent use Wallace Road
  o 10 percent use Eden Prairie Road

For the additional 450 parking spaces at Southwest Station, Technology Drive east of Mitchell Road is expected to carry 32 percent of the AM Peak Hour inbound trips (70 trips) and 50 percent of the PM Peak hour outbound trips (100 trips).

Golden Triangle Park-and-Ride

A vast majority of these park-and-ride patrons are destined for TH 169 south of I-494 and therefore a high directionality to the south and east.

• 90 percent would be going to the Shady Oak Road and Valley View Road intersection.
• 10 Percent would be going to the Flying Cloud Drive and Valley View Drive intersection.

City West Station Park-and-Ride

For the United Health Group (UHG) Site adjacent this station, a large-comprehensive traffic study was done for the development including assumptions of a park-and-ride facility. This analysis was completed using the UHG traffic volumes and the assumption of using 300 spaces. This is a conservative analysis since the current project scope approved on July 8, 2015 allows for 160 park-and-ride spaces at the City West Station site.

Opus Station Park-and-Ride

With the small park-and-ride facility at this location, these trips were not generated and added to the system for evaluation.
Shady Oak Station Park-and-Ride

The direction of approach changes from the original work with the removal of Mitchell Station; with more park-and-ride trips coming from the south and west. The direction of approach breaks down:

- 45 percent on Shady Oak Road, north of Excelsior Boulevard.
- 30 percent on Excelsior Boulevard, west of Shady Oak Road.
- 15 percent on Shady Oak Road, south of Excelsior Boulevard.
- 5 percent on 17th Avenue South, north of Excelsior Boulevard.
- 3 percent on 11th Avenue South, south of Excelsior Boulevard.
- 2 percent on 11th Avenue South, north of Excelsior Boulevard.

5.2 Build Traffic Modeling Overview and Results

The same nine modeling areas created for the existing and No Build conditions modeling were used for the Build analysis. All Build improvements are based on the Revised Preliminary Design Plans for Municipal Consent as approved by the Metropolitan Council on July 8, 2015. The Build operations results are presented by modeling area in the following sections.

5.2.1 Southwest Station Area

The results of the Opening Year Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios.

The results of the 2040 Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios, with the following exceptions:

- Technology Drive and Southwest Station East Access in the PM peak hour.
- Prairie Center Drive / Plaza Drive (& WB TH 5/TH 212 Ramp) in the PM peak hour has high levels of congestion at the ramp terminals.
- Prairie Center Drive / Technology Drive (& EB TH 5/TH 212 Ramp) in the PM peak hour has high levels of congestion at the ramp terminals.
- Prairie Center Drive and Technology Drive in the PM peak hour is a generally congested intersection.

The overall intersection results for Opening Year are shown in Table 5.3 and the overall intersection results for 2040 are shown in Table 5.4 below.
### Table 5.3 Southwest Station Area – Opening Year Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Mitchell Road / WB TH 5 / TH 212 Ramp</td>
<td>14.7 B</td>
</tr>
<tr>
<td>Mitchell Road / EB TH 5 / TH 212 Ramp</td>
<td>8.5 A</td>
</tr>
<tr>
<td>Mitchell Road / Lone Oak Road</td>
<td>4.4 A</td>
</tr>
<tr>
<td>Mitchell Road / Technology Drive</td>
<td>25.3 C</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station Bus Access *</td>
<td>0.6 A</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station West Access</td>
<td>1.8 A</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station East Access *</td>
<td>8.7 A</td>
</tr>
<tr>
<td>Prairie Center Drive / Plaza Drive (&amp; WB TH 5 / TH 212 Ramp)</td>
<td>18.7 B</td>
</tr>
<tr>
<td>Prairie Center Drive / Technology Drive (&amp; EB TH 5 / TH 212 Ramp)</td>
<td>24.9 C</td>
</tr>
<tr>
<td>Technology Drive / Prairie Center Drive</td>
<td>22.5 C</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

### Table 5.4 Southwest Station Area – 2040 Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Mitchell Road / WB TH 5 / TH 212 Ramp</td>
<td>18.8 B</td>
</tr>
<tr>
<td>Mitchell Road / EB TH 5 / TH 212 Ramp</td>
<td>13.1 B</td>
</tr>
<tr>
<td>Mitchell Road / Lone Oak Road</td>
<td>7.5 A</td>
</tr>
<tr>
<td>Mitchell Road / Technology Drive</td>
<td>32.6 C</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station Bus Access *</td>
<td>0.7 A</td>
</tr>
<tr>
<td>Technology Drive / Southwest Station West Access</td>
<td>2.7 A</td>
</tr>
</tbody>
</table>
Table 5.4. Southwest Station Area – 2040 Build Conditions Results (cont.)

<table>
<thead>
<tr>
<th>Intersection</th>
<th>LOS</th>
<th>2024</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Drive / Southwest Station East Access</td>
<td></td>
<td>12.5</td>
<td>66.2</td>
</tr>
<tr>
<td>Prairie Center Drive / Plaza Drive (&amp; WB TH 5/TH 212 Ramp)</td>
<td></td>
<td>20.5</td>
<td>91.9</td>
</tr>
<tr>
<td>Prairie Center Drive / Technology Drive (&amp; EB TH 5/TH 212 Ramp)</td>
<td></td>
<td>30.4</td>
<td>68.3</td>
</tr>
<tr>
<td>Technology Drive / Prairie Center Drive</td>
<td></td>
<td>25.4</td>
<td>73.6</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

Movements for which queuing issues were identified in one or more Opening Year Build scenarios were as follows:

- Mitchell Road and Technology Drive – AM peak hour Southbound left turn; PM peak hour Eastbound left turn.
- Prairie Center Drive and Westbound TH 5/TH 212 Ramp/Plaza Drive – PM peak hour Westbound left turn.
- Prairie Center Drive and Eastbound TH 5/TH 212 Ramp/Technology Drive – PM peak hour Southbound left turn.

Movements for which queuing issues were identified in one or more 2040 Build scenarios were as follows:

- Mitchell Road and Technology Drive – AM peak hour Southbound left turn; PM peak hour Eastbound left turn and through lanes; Westbound right turn.
- Technology Drive and Southwest Station East Drive – PM peak hour Eastbound through lanes; Southbound left turn lanes.
- Prairie Center Drive and Westbound TH 5/TH 212 Ramp/Plaza Drive – PM peak hour Southbound through lanes and right turn; Westbound left turn and through lanes.
- Prairie Center Drive and Eastbound TH 5/TH 212 Ramp/Technology Drive – PM peak hour Northbound left turn, through lanes, and right turn; Eastbound left turn; Southbound left turn, through lanes and right turn.
- Prairie Center Drive and Technology Drive – AM peak hour Southbound right turn; PM peak hour Northbound left turn; Eastbound left turn, through lanes and right turn; Southbound right turn; Westbound right turn.

The full table of Build conditions LOS and queuing analysis results can be found in Appendix C.
5.2.2 Eden Road /Main Street Area

The results of the Opening Year Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios.

The overall intersection results for Opening Year are shown in Table 5.5 and the overall intersection results for 2040 are shown in Table 5.6 below.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Street / Singletree Lane</td>
<td></td>
<td>1.7 A</td>
<td>7.0 A</td>
</tr>
<tr>
<td>Eden Road / Eden Extension/Redstone Driveway</td>
<td></td>
<td>19.7 B</td>
<td>23.0 C</td>
</tr>
<tr>
<td>Eden Road / Glen Lane</td>
<td></td>
<td>0.9 A</td>
<td>2.3 A</td>
</tr>
<tr>
<td>Eden Road/Leona Drive /Flying Cloud Drive</td>
<td></td>
<td>15.8 B</td>
<td>23.8 C</td>
</tr>
</tbody>
</table>

Table 5.6. Eden / Main Area – 2040 Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Street / Singletree Lane</td>
<td></td>
<td>6.9 A</td>
<td>20.4 C</td>
</tr>
<tr>
<td>Eden Road / Main Street</td>
<td></td>
<td>27.5 C</td>
<td>41.7 D</td>
</tr>
<tr>
<td>Eden Road / Eden Extension/Redstone Driveway</td>
<td></td>
<td>23.9 C</td>
<td>38.5 D</td>
</tr>
<tr>
<td>Eden Road / Glen Lane</td>
<td></td>
<td>1.0 A</td>
<td>5.2 A</td>
</tr>
<tr>
<td>Eden Road/Leona Drive /Flying Cloud Drive</td>
<td></td>
<td>19.1 B</td>
<td>27.8 C</td>
</tr>
</tbody>
</table>

No queuing issues were identified in the Opening Year and 2040 Build conditions.

The full table of Build conditions LOS and queuing analysis results can be found in Appendix C.
5.2.3 Flying Cloud Drive Area

The results of the Opening Year Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios.

The results of the 2040 Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios, with the following exceptions:

- Flying Cloud Drive and Valley View Road in the AM peak hour.

The overall intersection results for Opening Year are shown in Table 5.7 and the overall intersection results for 2040 are shown in Table 5.8 below.

### Table 5.7. Flying Cloud Drive Area – Opening Year Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Flying Cloud Drive / Valley View Road</td>
<td>48.7 D</td>
</tr>
<tr>
<td>Flying Cloud Drive / Viking Drive</td>
<td>18.0 B</td>
</tr>
<tr>
<td>Flying Cloud Drive / WB I-494 Ramp</td>
<td>21.5 C</td>
</tr>
<tr>
<td>Flying Cloud Drive / EB I-494 Ramp/Technology Drive</td>
<td>20.6 C</td>
</tr>
<tr>
<td>Flying Cloud Drive / Eden Road/Leona Drive</td>
<td>15.8 B</td>
</tr>
<tr>
<td>Flying Cloud Drive / Singletree Lane</td>
<td>15.4 B</td>
</tr>
</tbody>
</table>
Table 5.8. Flying Cloud Drive Area – 2040 Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Flying Cloud Drive / Valley View Road</td>
<td>55.6</td>
</tr>
<tr>
<td></td>
<td>E</td>
</tr>
<tr>
<td>Flying Cloud Drive / Viking Drive</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Flying Cloud Drive / WB I-494 Ramp</td>
<td>25.4</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Flying Cloud Drive / EB I-494 Ramp/Technology Drive</td>
<td>25.9</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Flying Cloud Drive / Eden Road/Leona Drive</td>
<td>19.1</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Flying Cloud Drive / Singletree Lane</td>
<td>18.8</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

Movements for which queuing issues were identified in one or more Opening Year Build scenarios were as follows:

- Flying Cloud Drive and Valley View Road – AM peak hour Eastbound through lanes and Southbound left-turn lane; PM peak hour Westbound left turn.
- Flying Cloud Drive and Eastbound I-494 Ramp/Technology Drive – PM peak hour Eastbound left turn.
- Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn; Westbound left turn and through lanes.

Movements for which queuing issues were identified in one or more 2040 Build scenarios were as follows:

- Flying Cloud Drive and Valley View Road – AM peak hour Westbound left turn; Eastbound through lanes; Southbound left turn; PM peak hour Northbound left turn; Westbound left turn.
- Flying Cloud Drive and Westbound I-494 Ramp – PM peak hour Westbound right turn.
- Flying Cloud Drive and Eastbound I-494 Ramp/Technology Drive – AM peak hour Eastbound left turn; PM peak hour Eastbound left turn and right turn.
- Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn and through lane; Westbound left turn and through lanes.

The full table of Build conditions LOS and queuing analysis results can be found in Appendix C.
5.2.4 Golden Triangle Area

The results of the Opening Year Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios.

The results of the 2040 Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios, with the following exceptions:

- Shady Oak Road and West 70th Street in the PM peak hour.

The overall intersection results for Opening Year are shown in Table 5.9 and the overall intersection results for 2040 are shown in Table 5.10 below.

Table 5.9. Golden Triangle Area – Opening Year Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Shady Oak Road / Valley View Road</td>
<td>6.9 A</td>
</tr>
<tr>
<td>Shady Oak Road / West 70th Street *</td>
<td>3.8 A</td>
</tr>
<tr>
<td>West 70th Street LRT Grade Crossing</td>
<td>3.5 A</td>
</tr>
<tr>
<td>Shady Oak Road / WB TH 62 Ramp</td>
<td>24.4 C</td>
</tr>
<tr>
<td>Shady Oak Road / EB TH 62 Ramp/W 62nd Street</td>
<td>40.7 D</td>
</tr>
<tr>
<td>Shady Oak Road / City West Parkway</td>
<td>18.2 B</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection
Table 5.10. Golden Triangle Area – 2040 Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
</tr>
<tr>
<td>Shady Oak Road / Valley View Road</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Shady Oak Road / West 70th Street *</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>West 70th Street LRT Grade Crossing</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Shady Oak Road / WB TH 62 Ramp</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Shady Oak Road / EB TH 62 Ramp/W 62nd Street</td>
<td>43.2</td>
</tr>
<tr>
<td></td>
<td>D</td>
</tr>
<tr>
<td>Shady Oak Road / City West Parkway</td>
<td>31.2</td>
</tr>
<tr>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>

* Side street stop controlled intersection

No queuing issues were identified in the Opening Year Build scenarios.

Movements for which queuing issues were identified in one or more 2040 Build scenarios were as follows:

- Shady Oak Road and Valley View Road – PM peak hour Southbound left turn.
- West 70th Street and Shady Oak Road – PM peak hour Southbound through lanes.

The full table of Build conditions LOS and queuing analysis results can be found in Appendix C.

5.2.5 Bren Road Area

The results of the Opening Year Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios. The Bren Road area included several improvements and changes in road operation. This included incorporating the City of Minnetonka’s “Red Circle Drive Traffic Flow Reversal” plan (a project to be completed by the City of Minnetonka in conjunction with SWLRT).

The overall intersection results for Opening Year are shown in Table 5.11 and the overall intersection results for 2040 are shown in Table 5.12 below.
Table 5.11. Bren Road Area – Opening Year Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Circle Drive / Red Circle Drive+</td>
<td>4.0 A</td>
<td>1.6 A</td>
<td></td>
</tr>
<tr>
<td>Bren Road East / Yellow Circle Drive LRT Grade Crossing</td>
<td>2.5 A</td>
<td>2.2 A</td>
<td></td>
</tr>
<tr>
<td>Yellow Circle Drive / Yellow Circle Drive +</td>
<td>0.0 A</td>
<td>0.0 A</td>
<td></td>
</tr>
<tr>
<td>Bren Road East / Bren Road West +</td>
<td>3.0 A</td>
<td>2.5 A</td>
<td></td>
</tr>
<tr>
<td>Bren Road West Grade Crossing</td>
<td>3.6 A</td>
<td>3.1 A</td>
<td></td>
</tr>
</tbody>
</table>

+ Side street yield control intersection

Table 5.12. Bren Road Area – 2040 Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s) and LOS</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Circle Drive / Red Circle Drive+</td>
<td>5.5 A</td>
<td>2.1 A</td>
<td></td>
</tr>
<tr>
<td>Bren Road East / Yellow Circle Drive LRT Grade Crossing</td>
<td>2.6 A</td>
<td>2.3 A</td>
<td></td>
</tr>
<tr>
<td>Yellow Circle Drive / Yellow Circle Drive +</td>
<td>0.0 A</td>
<td>0.1 A</td>
<td></td>
</tr>
<tr>
<td>Bren Road East / Bren Road West +</td>
<td>3.6 A</td>
<td>2.2 A</td>
<td></td>
</tr>
<tr>
<td>Bren Road West Grade Crossing</td>
<td>4.2 A</td>
<td>3.3 A</td>
<td></td>
</tr>
</tbody>
</table>

+ Side street yield control intersection

No queuing issues were identified in the Opening Year and 2040 Build conditions.

The full table of Build conditions LOS and queuing analysis results can be found in Appendix C.
5.2.6 Excelsior Boulevard Area

The results of the Opening Year Build AM and PM peak hour analysis showed that all intersections would be expected to operate at LOS D or better during the peak hour scenarios.

The overall intersection results for Opening Year are shown in Table 5.13 and the overall intersection results for 2040 are shown in Table 5.14 below.

Table 5.13. Excelsior Boulevard Area – Opening Year Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s)</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Street/ K-Tel Drive Crossing</td>
<td>3.3 A</td>
<td>2.7 A</td>
<td></td>
</tr>
<tr>
<td>Excelsior Boulevard / Shady Oak Road</td>
<td>34.9 C</td>
<td>32.9 C</td>
<td></td>
</tr>
<tr>
<td>Excelsior Boulevard / 17th Avenue S</td>
<td>11.9 B</td>
<td>17.9 B</td>
<td></td>
</tr>
<tr>
<td>Excelsior Boulevard / 11th Avenue S</td>
<td>19.2 B</td>
<td>23.7 C</td>
<td></td>
</tr>
<tr>
<td>11th Avenue S LRT Grade Crossing</td>
<td>4.1 A</td>
<td>4.7 A</td>
<td></td>
</tr>
<tr>
<td>11th Avenue S / 5th Street S</td>
<td>9.3 A</td>
<td>14.0 B</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.14. Excelsior Boulevard Area – 2040 Build Conditions Results

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Overall Intersection Delay (s)</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>5th Street/ K-Tel Drive Crossing</td>
<td>2.9 A</td>
<td>2.6 A</td>
<td></td>
</tr>
<tr>
<td>Excelsior Boulevard / Shady Oak Road</td>
<td>39.4 D</td>
<td>41.6 D</td>
<td></td>
</tr>
<tr>
<td>Excelsior Boulevard / 17th Avenue S</td>
<td>12.5 B</td>
<td>19.3 B</td>
<td></td>
</tr>
<tr>
<td>Excelsior Boulevard / 11th Avenue S</td>
<td>19.5 B</td>
<td>24.4 C</td>
<td></td>
</tr>
<tr>
<td>11th Avenue S LRT Grade Crossing</td>
<td>4.4 A</td>
<td>5.2 A</td>
<td></td>
</tr>
<tr>
<td>11th Avenue S / 5th Street S</td>
<td>9.8 A</td>
<td>15.2 B</td>
<td></td>
</tr>
</tbody>
</table>
Movements for which queuing issues were identified in one or more Opening Year Build scenarios were as follows:

- Excelsior Boulevard and Shady Oak Road – AM peak hour Southbound left turn; PM peak hour Northbound left turn.
- Excelsior Boulevard and 17th Avenue S – AM peak hour Southbound left turn; PM peak hour Southbound left turn.

Movements for which queuing issues were identified in one or more 2040 Build scenarios were as follows:

- Excelsior Boulevard and Shady Oak Road – AM peak hour Southbound left turn; PM peak hour Northbound left turn; Eastbound left turn.
- Excelsior Boulevard and 17th Avenue S – AM peak hour Southbound left turn; PM peak hour Southbound left turn; Eastbound left turn.

The full table of Build conditions LOS and queuing analysis results can be found in Appendix C.

5.3 Summary of Improvements

The traffic analysis team tested several scenarios to develop a proposed plan for LRT corridor. The items listed below summarize the improvements and are included in the Intersection Layouts in Appendix B.

**Technology Drive / SW Station Bus Access**

- Stripe to provide two Southbound lanes at approach

**Technology Drive / SW Station West Access**

- Convert intersection to full movement (existing is right-in / right-out).
- Add Southbound left-turn lane.
- Add Eastbound left-turn lane.

**Technology Drive / SW Station East Access**

- Add second Southbound left-turn lane.

**Prairie Center Drive / TH 212 WB Ramp / Plaza Drive**

- Convert second Eastbound thru lane to a second right-turn lane.
- Add right-turn overlap phase.
Prairie Center Drive / TH 212 EB Ramp / Technology Drive

- Add second Westbound right-turn lane with overlap phase.

Prairie Center Drive / Technology Drive

- Add second Eastbound right-turn lane with overlap phase.

Singletree Lane / Main Street

- LRCI for 2040 – Main Street from Singletree Lane to Eden Road.
- With Main Street extension to Technology Drive (future City project), Northbound and Southbound approaches should have two lanes of approach and intersection controlled by traffic signal.

Eden Road / Main Street

- LRCI for 2040 - New intersection.
- With Main Street extension to Technology Drive (future City project), one lane of approach for each direction and intersection would be controlled by traffic signal with Right-Turn-On-Red restricted for westbound right-turn movement.

Eden Road / Eden Road Extension/Redstone Driveway

- New signalized intersection with Redstone West Access.

Eden Road / Glen Road

- Convert intersection to a “T” configuration with side street stop with closure of Redstone Driveway.

Flying Cloud Drive (north-south roadway) / Viking Drive

- Add traffic signal.
- Add Eastbound left-turn lane.
- Re-configure Westbound lane assignment to an exclusive left-turn lane and a shared thru/right-turn lane.
- Right-Turn-On-Red restricted for Southbound and Eastbound right-turn movements.

Flying Cloud Drive / I-494 EB Ramp / Technology Drive

- Add second Northbound left-turn lane.
- Add Eastbound left-turn lane.
• Add Eastbound right-turn lane.
• Right-Turn-On-Red restricted for Southbound and Eastbound right-turn movements.

**Flying Cloud Drive / I-494 WB Ramp**

• Lengthen ramp shared left/right-turn lane.

**Shady Oak Road / West 70th Street**

• City project add eastbound right-turn lane.
• Add northbound left-turn lane and All-Way Stop control for 2040 analysis.

**Shady Oak Road / Valley View Road**

• Add All-Way Stop for opening year.
• City project adds southbound left turn lane and traffic signal (or roundabout) between opening year and 2040.

**5th Street / K-Tel Drive / 17th Avenue S**

• New signalized intersection (LRCI).

**Excelsior Boulevard / 17th Avenue S**

• Add Eastbound right-turn lane.
• Add Eastbound left-turn lane.
• Add Northbound approach (left turn lane and thru-right lane).
• Reconfigure Southbound approach to a left turn lane and thru-right lane.

### 5.4 Build Conditions Summary

The SWLRT traffic analysis goal was to mitigate all intersections to LOS D or better in the project area. The exceptions would be when No Build scenarios are either LOS E or F where the goal is to mitigate the intersections to meet the No Build scenario.

For the build conditions in the Opening Year AM and PM peak hours, all intersections would be expected to operate at LOS D or better. This includes any proposed operational and geometric changes incorporated into the PE Plans. The 2040 Build conditions resulted in improvements to the No Build operation based on the goal of mitigating to LOS D or meeting/exceeding the No Build LOS. All intersections would be expected to operate at LOS D or better in the 2040 Build AM and PM peak conditions, with the following exceptions:

• Technology Drive and Southwest Station East Driveway (PM peak hour).
• Technology Drive and Prairie Center Drive (PM peak hour).
• Prairie Center Drive / Technology Drive & EB TH 5/TH 212 Ramp (PM peak hour).
• Flying Cloud Drive and Valley View Road (AM peak hour).
• Shady Oak Road and West 70th Street (PM peak hour).

Overall, there are fewer failing intersections in the Build conditions than in the No Build conditions due to the improvements made as part of the SWLRT project. The intersections on Technology Drive and Prairie Center Drive experience congestion during the AM and PM peak hours during the existing and future No Build scenarios. The Flying Cloud Drive and Valley View Road intersection is also in a high congestion area under existing and No Build conditions. The Shady Oak and West 70th Street is primarily impacted by the park-and-ride traffic and increase in volumes caused by 2040 projected land use intensification. Movements for which queuing issues were identified in one or more Opening Year Build scenarios were as follows:

• Mitchell Road and Technology Drive – AM peak hour Southbound left turn; PM peak hour Eastbound left turn.
• Prairie Center Drive and Westbound TH 5/TH 212 Ramp/Plaza Drive – PM peak hour Westbound left turn.
• Prairie Center Drive and Eastbound TH 5/TH 212 Ramp/Technology Drive – PM peak hour Eastbound left turn.
• Prairie Center Drive and Technology Drive – PM peak hour Westbound left turn.
• Flying Cloud Drive and Valley View Road – AM peak hour Eastbound through lanes and Southbound left turn lane; PM peak hour Westbound left turn.
• Flying Cloud Drive and Eastbound I-494 Ramp/Technology Drive – PM peak hour eastbound left turn.
• Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn; Westbound left turn and through lanes.
• Excelsior Boulevard and Shady Oak Road – AM peak hour Southbound left turn; PM peak hour Northbound left turn.
• Excelsior Boulevard and 17th Avenue S – AM peak hour Southbound left turn; PM peak hour Southbound left turn.

Movements for which queuing issues were identified in one or more 2040 Build scenarios were as follows:

• Mitchell Road and Technology Drive – AM peak hour Southbound left turn; PM peak hour Southbound left turn and through lanes; Westbound right turn.
• Technology Drive and Southwest Station East Drive – PM peak hour Southbound left turn lanes; Eastbound through lanes.
• Prairie Center Drive and Westbound TH 5/TH 212 Ramp/Plaza Drive – PM peak hour Southbound through lanes and right turn; Westbound left turn and through lanes.
• Prairie Center Drive and Eastbound TH 5/TH 212 Ramp/Technology Drive – AM peak hour southbound right turn; PM peak hour Northbound left turn, through lanes, and right turn; Eastbound left turn; Southbound left turn, through lanes and right turn.
• Prairie Center Drive and Technology Drive – AM peak hour Southbound right turn; PM peak hour Northbound left turn; Eastbound left turn, through lanes and right turn; Southbound right turn; Westbound right turn.
• Flying Cloud Drive and Valley View Road – AM peak hour Eastbound through lanes; Westbound right turn; Eastbound through lanes; Southbound left turn; PM peak hour Northbound left turn; Westbound left turn.
• Flying Cloud Drive and Westbound I-494 Ramp – PM peak hour Westbound right turn.
• Flying Cloud Drive and Eastbound I-494 Ramp/Technology Drive – AM peak hour Eastbound left turn; PM peak hour Eastbound left turn and right turn.
• Flying Cloud Drive and Singletree Lane – PM peak hour Eastbound left turn and through lane; Westbound left turn and through lanes.
• Shady Oak Road and Valley View Road – PM peak hour Southbound left turn.
• West 70th Street and Shady Oak Road – PM peak hour Southbound through lanes.
• Excelsior Boulevard and Shady Oak Road – AM peak hour Southbound left turn; PM peak hour Northbound left turn; Eastbound left turn.
• Excelsior Boulevard and 17th Avenue S – AM peak hour Southbound left turn; PM peak hour Southbound left turn; Eastbound left turn.

6.0 SENSITIVITY TESTING

In addition to the Build modeling completed for the project, several additional scenarios were modeled for the purposes of sensitivity testing and to document the operations of alternatives. These additional analyses were conducted for the 2040 Build conditions only. The following sections present the assumptions and analysis results for the modeling of the alternative scenarios.

6.1 Locally Requested Capital Investment (LRCI) Analysis

LRCI improvements requested and funded by the local agencies were incorporated into the modeling of the Build scenarios presented in Section 5. The LRCI projects included the following improvements:

• LRCI #01 in Eden Prairie - Build Main Street from Singletree Lane to Eden Road.
• LRCI #12 in Hopkins/Minnetonka - 17th Avenue extension to K-Tel Drive includes new intersection of 17th Avenue S/5th Street S and K-Tel Drive.

LRCI #01 results in changes in volumes that are small and did not impact the measures of effectiveness results when incorporated into the models.

LRCI #12 results in a new intersection of 17th Avenue S / 5th Street S / K-Tel Drive. A traffic signal is proposed as a safety improvement based on the proximity of the LRT crossing to the new intersection, since it would be within 200 feet of the intersection. The intersection was modeled with one lane on each approach to the intersection and would result in acceptable LOS. This LRCI would also reduce the number of trips going through the Excelsior Boulevard intersections of 17th Avenue S and Shady Oak Road. This includes 15 percent of the park-and-ride trip generation.
6.2 Operations and Maintenance Facility (OMF)

A traffic/trip generation analysis was completed for a potential operations and maintenance facility (OMF) located in the southwest quadrant of the K-Tel Drive and 15th Avenue S intersection in City of Hopkins. The main objective of this analysis was to determine the existing trip generation of the existing land uses removed by the construction of the OMF and compare that to the trip generation of the proposed OMF. A traffic analysis would be completed if the OMF generated more than the existing land uses.

The existing buildings have been identified as an industrial park type land use. A trip generation estimate for the existing industrial park land uses was completed using the *ITE Trip Generation Manual, Ninth Edition*. This estimate assumed that all existing industrial park buildings would be fully occupied, with a total of 223,000 square feet. The trip generation for the proposed OMF was assumed to be similar to the trip generation of the existing OMF in Minneapolis, located along Franklin Avenue between MN 55 (Hiawatha Avenue) and I-94, currently operating for the Blue Line LRT. Data for the Minneapolis OMF was collected the week of July 29, 2013 over two full days.

A comparison between the existing industrial park land use and the proposed OMF facility is shown in Table 5.15. The OMF peak arrival and departure times occur prior to the adjacent street AM and PM peak hours of 7:30 AM to 8:30 AM and 4:30 PM to 5:30 PM. The OMF peak hours occurred at approximately 5:15 AM to 6:15 AM and 1:15 PM to 2:15 PM. Therefore, the comparison of the AM and PM peak for both the generator and of the adjacent street times was completed.
Table 5.15 Trip Generation Estimates –Adjacent Developments

<table>
<thead>
<tr>
<th>Land Use Type (ITE Code)</th>
<th>Size</th>
<th>AM Peak Hour Trips</th>
<th>PM Peak Hour Trips</th>
<th>Daily Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>In</td>
<td>Out</td>
<td>In</td>
</tr>
<tr>
<td>Existing Industrial Park</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Park (130) – Adjacent Street Peak Hour (7:30AM - 8:30 AM and 4:30 PM - 5:30 PM)</td>
<td>223,000 SF</td>
<td>150</td>
<td>33</td>
<td>40</td>
</tr>
<tr>
<td>Industrial Park (130) – AM and PM Peak Generator (Typically similar to adjacent street peak hour)</td>
<td>223,000 SF</td>
<td>155</td>
<td>23</td>
<td>39</td>
</tr>
<tr>
<td>Proposed Hopkins OMF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operations Maintenance Facility – Adjacent Street Peak Hour (7:30 AM - 8:30 AM and 4:30 PM - 5:30 PM)</td>
<td>--</td>
<td>16</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Operations Maintenance Facility – AM and PM Peak Generator (5:15 AM – 6:15 AM and 1:15 PM – 2:15 PM)</td>
<td>--</td>
<td>45</td>
<td>12</td>
<td>22</td>
</tr>
<tr>
<td>Trip Generation Comparison</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjacent Street Peak Hour</td>
<td>(134)</td>
<td>(27)</td>
<td>(33)</td>
<td>(134)</td>
</tr>
<tr>
<td>AM and PM Peak Generator</td>
<td>(110)</td>
<td>(11)</td>
<td>(17)</td>
<td>(107)</td>
</tr>
</tbody>
</table>

Based on the findings of the trip generation comparison, it is expected that during the adjacent street peak hours the OMF will generate 161 fewer AM peak hour, 177 fewer PM peak hour, and 873 fewer daily trips.

From the trip generation comparison results, it was determined that the proposed OMF facility is expected to generate significantly fewer trips than the existing land use and therefore a full traffic impact analysis is not needed for the OMF.
7.0 SUMMARY AND CONCLUSION

This technical memorandum has been prepared in support of the SWLRT project preliminary engineering (PE) design and the Final Environmental Impact Statement (FEIS). The objective of the traffic analysis is to define the scope of the project improvements and evaluate the project's potential traffic impacts of the project, including the following:

- Evaluate the project’s impacts on traffic operations at existing and proposed intersections and at-grade rail crossings along or near the SWLRT alignment.
- Identify proposed improvements to address operational issues identified in the traffic analysis.

The West segment of the SWLRT analysis includes all intersections and at-grade crossings from SouthWest Station in Eden Prairie to east of 11th Ave in Hopkins. The proposed SWLRT guideway will be at-grade for most of its alignment and includes segments with the LRT operating in an exclusive guideway and semi-exclusive street running operation.

The overall impact of the LRT crossings on the roadway systems has been mitigated by the roadway improvements at several locations in the corridor. This includes targeted intersection improvements that will improve overall intersection operation with the introduction of LRT in the corridor.
Appendix A – Existing and Forecast Traffic Volumes
<table>
<thead>
<tr>
<th>Scenario</th>
<th>2013</th>
<th>2018 No Build</th>
<th>2018 Build LRT</th>
<th>2040 No Build</th>
<th>2040 Build LRT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>AM</td>
<td>AM</td>
<td>AM</td>
<td>AM</td>
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<td>#</td>
<td></td>
<td>Volume</td>
<td>Volume</td>
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<td>LT</td>
<td>Th</td>
<td>RT</td>
<td>LT</td>
</tr>
<tr>
<td>1</td>
<td>Mitchell Road &amp; WB TH 5 / TH 212 Ramp</td>
<td>NB</td>
<td>110</td>
<td>405</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>368</td>
<td>2</td>
<td>199</td>
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<tr>
<td></td>
<td></td>
<td>SB</td>
<td>-</td>
<td>480</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EB</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Mitchell Road &amp; EB TH 5 / TH 212 Ramp</td>
<td>NB</td>
<td>-</td>
<td>442</td>
<td>388</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>-</td>
<td>-</td>
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<td></td>
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<td>SB</td>
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<td>698</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>EB</td>
<td>73</td>
<td>8</td>
<td>161</td>
</tr>
<tr>
<td>3</td>
<td>Mitchell Road &amp; Lone Oak Road</td>
<td>NB</td>
<td>54</td>
<td>812</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WB</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
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#### 10-Sep-15

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### Analysis Notes:

All intersections modeled in VISSIM unless otherwise noted

1. Intersection noted in Synchro/SimTraffic Software
2. Analysis of only existing and No Build conditions. With Red Circle Drive traffic flow reversal intersection converted from merge control to diverging roadways with no delay.
3. Analysis of only LRT build conditions. With Red Circle Drive traffic flow reversal this is a new intersection with merge or stop control in close proximity to the LRT crossing.
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PM Turning Movement Volumes

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### PM Turning Movement Volumes

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**Analysis Notes:**

All intersections modeled in VISSIM unless otherwise noted

1 - Intersection noted in Synchro/SimTraffic Software
2 - Analysis of only Existing and No Build conditions. With Red Circle Drive traffic flow reversal intersection converted from merge control to diverging roadways with no delay.
3 - Analysis of only LRT build conditions. With Red Circle Drive traffic flow reversal this is a new intersection with merge or stop control in close proximity to the LRT crossing.
Appendix B – Intersection Layout Tables
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<td>All scenarios have EB right turn overlap</td>
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**Legend**

- Traffic Signal
- Stop Control
- Lane Use
- Lane Use Change
- LRT
- No Turn on Red
- NTOR
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**Legend**

- Traffic Signal
- Lane Use
- Lane Use Change
- LRT
- Stop Control
- No Turn on Red
- NTOR

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**Legend**

- Traffic Signal
- Lane Use
- LRT
- Stop Control
- Lane Use Change
- No Turn on Red
- NTOR

VISSIM

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PEC West Intersection Layout Table - September 10, 2015

---

SimTraffic

---

2040 Opening Year Build has existing geometry with all-way stop

---

Existing geometries and volumes were collected prior to interchange reconstruction and UHG campus construction Existing analysis completed with this geometry
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**Legend**
- Traffic Signal
- Lane Use
- LRT
- Stop Control
- Lane Use Change
- No Turn on Red
- NTOR
### PEC West Intersection Layout Table - September 10, 2015

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**Legend**
- Traffic Signal
- Stop Control
- Lane Use
- Lane Use Change
- LRT
- No Turn on Red
- NTOR
Appendix C – Traffic Analysis Detailed Results
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**Analysis Notes:**

- All intersections modeled in VISSIM unless otherwise noted.

1 - Intersection modeled in Synchro/SimTraffic Software.

2 - Analysis of only Existing and No Build conditions. With Red Circle Drive traffic flow reversal intersection converted from merge control to diverging roadways with no delay.

3 - Analysis of only LRT build conditions. With Red Circle Drive traffic flow reversal this is a new intersection with merge or stop control in close proximity to the LRT crossing.
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### Analysis Notes:

All intersections modeled in VISSIM unless otherwise noted.

1. Intersection modeled in Synchro/SimTraffic Software.
2. Analysis of only Existing and No Build conditions. With Red Circle Drive traffic flow reversal intersection converted from merge control to diverging roadways with no delay.
3. Analysis of only LRT build conditions. With Red Circle Drive traffic flow reversal this is a new intersection with merge or stop control in close proximity to the LRT crossing.
4. Poor operations are a result of queue spillback from poor operations at the TH 212 / Prairie Center Drive interchange. Without queue spillback from the interchange, analysis results indicate LOS B for overall intersection operations under both 2040 No Build and Build scenarios.
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**Notes:**
- All intersections modeled in VISSIM unless otherwise noted.
- Storage Length for through lanes is measured to the nearest upstream full access public intersection, unless otherwise noted.

1. Intersection modeled in Synchro/SimTraffic Software.
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### Queuing Issues 9/10/2015

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<td>7</td>
<td>Technology Drive &amp; Southwest Station West Access</td>
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<td>No Average back of queue does not exceed storage length and movement operates at LOS D or better.</td>
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<td>No Queuing caused by adjacent intersections (Prairie Center Drive). Intersection would operate at LOS B without adjacent queues. Also, similar issues between No Build and Build, Build condition happens to includes a new full intersection at Southwest Station West Access.</td>
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<td>Queuing caused by adjacent intersections (Prairie Center Drive). Intersection would operate at LOS B without adjacent queues. Also, similar issues between No Build and Build. Project does include a 2nd southbound left-turn lane.</td>
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### Queuing Issues

**Movement Peak Period Scenario(s) with 95th Percentile Queue > Storage**

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<th>Scenario(s)</th>
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<th>Mitigation Proposed?</th>
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#### # Intersection Appr

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<td>Approach geometrics improved with two additional lanes and there is space to store vehicles in the through lane.</td>
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<td>Queuing has a potential to impact the upstream intersection. However, the modeling shows that the queue does not cause gridlock conditions and does not result in congestion spreading through the network. In addition, the intersection continues to have acceptable LOS. Therefore, the queue is not considered an operational deficiency in need of mitigation.</td>
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**Note:**
- Queuing has a potential to impact the upstream intersection. However, the modeling shows that the queue does not cause gridlock conditions and does not result in congestion spreading through the network. In addition, the intersection continues to have acceptable LOS. Therefore, the queue is not considered an operational deficiency in need of mitigation.
### Queuing Issues

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9 of 12
# Queuing Issues

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**Analysis Notes:**
Storage Length for through lanes is measured to the nearest upstream full access public intersection, unless otherwise noted.