REPORT / RECOMMENDATION

To: Edina Transportation Commission

Agenda Item #: VI. A.

From: Mark K. Nolan, AICP, Transportation Planner

Action ☐
Discussion ☒
Information ☐

Date: August 20, 2015

Subject: Tracy Avenue/Valley View Road/Valley Lane Roundabout Update

Action Requested:

Feedback regarding the recommended layout option for the roundabout proposed at this location.

Information / Background:

This project is included in the 2015-2019 Capital Improvement Plan with construction scheduled for 2016. The project includes the realignment of lanes on Municipal State Aid designated Tracy Ave, Valley View Road, and Valley Lane, and the construction of a roundabout at their intersection. This includes replacement of the entire pavement surface, replacement of curb and gutter, alterations to bicycle lanes, sidewalk, and lighting, and upgrading public utilities (watermain, sanitary sewer, and storm sewer). This will ensure the utilities and roadway section meets current State Aid requirements, and improves traffic flow through the intersection.

Please recall at the ETC's March 19 meeting a preliminary layout was presented to commissioners by engineering staff. Since that meeting, our consultant (SEH) has looked more closely at traffic data and design options and will be on-hand to present findings and layout recommendations to commissioners for comment.

Attachments:

SEH Project Memorandum with Attachments

SEH

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DRAFT MEMORANDUM

TO: Chad Millner, City of Edina, Director of Engineering
Mark Nolan, City of Edina, Transportation Planner

FROM: Mike Kotila, PE
Senior Transportation Engineer

DATE: August 12, 2015

RE: Tracy Avenue/ Valley Lane Intersection Improvements BA-430
SEH No. EDINA-132802; 14.00

This memorandum summarizes the results of our evaluation of alternatives for safety improvements at the Tracy Avenue and Valley Lane intersection.

SEH has examined existing daily and peak period traffic volumes, anticipated traffic growth, historical crash history, and non-motorized user needs at the intersection including the proposed Three Rivers Park District Nine Mile Creek Regional Trail planned to cross Tracy Avenue at the Valley Lane intersection.

A single lane roundabout is recommended as the preferred alternative. Additional detail to support this recommendation is provided in the body of this memorandum and its attachments. It is also recommended that the design should accommodate potential future intersection capacity expansion on the northbound approach. In addition, recommended trail crossing safety features are described in the Design Considerations section of this memorandum.

Existing Conditions

Currently Tracy Avenue, Valley View Road and Valley lane converge to form a "T" intersection with Tracy Avenue and Valley View Road forming the uncontrolled north and south legs and Valley Lane forming the east leg controlled by a stop sign. A bike lane is present on northbound and southbound Tracy Avenue/Valley View Road through the intersection. All streets have posted or statutory speed limits of 30 mph.

Traffic Volumes and Speed

City staff performed traffic volume and speed counts in May 2015 while school was in session. Based on the speed data, the 85th percentile speeds (85% of vehicles are traveling at this speed or less) for northbound and southbound vehicles range from 37mph to 39 mph. The high speeds contribute to the concerns for intersection safety, especially for pedestrian and bicycle crossings.

Based on the volume data, Tracy Avenue north of the intersection has an ADT of 9300; Valley View Road south of the 66th Street served 7500 vehicles per day, and Valley Lane east of Tracy served 3700 vehicles per day. The morning peak period runs from 7-9 am with 7-8am representing the highest hour of traffic demand. The afternoon peak period runs from 3-6 pm. School dismissal occurs in the 3-4 pm hour, but the highest volume hour of the day is 5-6 pm which was used as the "design hour" to assess intersection capacity and performance.

Crash History

The crash rates and severity rates for the study intersection were compared to statewide system average crash rates and severity rates for similar intersections as well as the critical rate for the study intersection. At this intersection both the crash and severity rates were above the calculated critical crash rates.

The intersection of Tracy Avenue and Valley Lane has a crash rate of 0.43 crashes per million entering vehicles and a severity rate of 0.55 crashes per million entering vehicles from 2010 to 2014. These rates exceed the statewide average crash rate of 0.18 and average severity rate of 0.27 for an urban thru-stop intersection. The calculated crash rate is also above the calculated critical crash rate. From the MnDOT Traffic Safety Fundamentals Handbook, the concept of the critical crash rate is a rate that takes into account multiple variables that affect safety including the design of the facility, the type of intersection control, the amount of exposure, and the random nature of crashes. Due to this intersection having a crash rate that is above the calculated critical crash rate of 0.38 crashes per million entering vehicles, the intersection is considered unsafe due to the probability (90-95%) that conditions at this site are contributing to the higher crash rate.

Future User Demands

Traffic Growth Average Daily Traffic (ADT) forecasts for the 2016 year of opening and 2036 design year for both Tracy Avenue and Valley Lane were developed, based on analysis of historical traffic growth trends and the Met Council regional travel demand model outputs. Results yielded a 2036 forecast ADT of 11,300 vpd on Tracy Avenue and 3,900 vpd on Valley Lane. It is understood that an increase in enrollment of 200 students at Edina High School is anticipated. The traffic demand change from the school enrollment was not explicitly calculated within the forecast, but is within the overall increment of growth anticipated.

Intersection Alternatives Considered

Several potential intersection control types have been considered and evaluated including:

- No Build - Retain the existing side street stop control without any safety or capacity improvements.
- Trail Crossing Refuge Island - Retain the existing side street stop control, add a refuge island and trail crossing warning flasher system, but without any vehicular safety or capacity improvement
- All Way Stop Control – Add stop signs on the northbound and southbound approaches (Note: MMUTCD All-Way Stop Warrants are not satisfied. This was done for operational comparison only.)
- Traffic Signal Control – Signalize the intersection with the addition of a northbound right turn lane (Note: MMUTCD Traffic Signal Warrants are not satisfied. This was done for operational comparison only.)
- Single Lane Roundabout – Alt 1: See attached drawings. A single lane roundabout with trail crossing warning flasher systems.
- Single Lane Roundabout – Alt 2: See attached drawings. A single lane roundabout with trail crossing warning flasher systems and a northbound right turn bypass lane. Traffic demands entering the intersection are highest from the south, but they must yield to traffic in the circulatory roadway. Removing the right turns entering the circulatory road allows the northbound through traffic to utilize the available gaps more effectively.

A qualitative comparison of these alternatives follows.

<table>
<tr><th colspan="7">Alternatives Evaluation Summary</th></tr>
<tr><th rowspan="2">Alternative</th><th colspan="2">Intersection Performance (2036)</th><th rowspan="2">Speeds - Tracy Avenue</th><th rowspan="2">Vehicular Safety</th><th rowspan="2">Non-Motorized Safety</th><th rowspan="2">Other</th></tr>
<tr><th>PM Peak LOS</th><th>PM peak Queues</th></tr>
<tr><td>Do Nothing (Retain 1-way stop)</td><td rowspan="2">LOS F for WB Valley Lane approach;

LOS F for SB left turn</td><td rowspan="2">WB queue 7 cars;

SB left turn queue 27 cars</td><td>85th percentile speeds of 37-39 mph;</td><td>Crash rate exceeds “critical rate”</td><td>Inadequate number of gaps in traffic; inadequate pedestrian sight distance</td><td></td></tr>
<tr><td>1-Way Stop with Trail Crossing Refuge</td><td>Speeds may be slowed slightly</td><td>Little vehicular safety benefit anticipated</td><td>Crossing distance shortened; adequate for crossing</td><td>Trail crossing warning system</td></tr>
<tr><td>All-Way Stop Control</td><td>LOS F; Long delays on NB and SB Tracy Avenue</td><td>NB/SB queues 15 - 16 cars</td><td>Drivers slow but may roll through stop sign; Speeds may go up on adjacent segments</td><td>Driver non-compliance with stop; Crash rate similar to roundabout but higher severity rate</td><td>Safe trail crossing requires gaining attention of all conflicting drivers</td><td rowspan="2">Neither a signal nor an all-way stop are warranted based on approach volumes;</td></tr>
<tr><td>Traffic Signal (includes a NB right turn lane)</td><td>LOS B or better on all approaches:</td><td>NB queue 20 cars</td><td>Speeds on green through intersection are not slowed.</td><td>Higher crash rate (rear end crashes); Higher speeds and higher severity level</td><td>Conflicts with turning traffic</td></tr>
<tr><td>Roundabout - Alt 1 or 1A</td><td>Critical movement is northbound: LOS D

(2016 LOS B)</td><td>NB queue 29 cars

(10 cars in 2016)</td><td rowspan="2">Speeds slowed to 18-22 mph through intersection</td><td rowspan="2">Crash rate similar to all-way stop, but severity rate is greatly reduced.</td><td rowspan="2">Bikes and pedestrians cross 1 lane at a time against traffic from only 1 direction; Warning Flashers can be provided</td><td>Addresses speed, delays, motorized and non-motorized safety</td></tr>
<tr><td>Roundabout - Alt 2 (includes NB right turn bypass lane)</td><td>Critical movement is northbound: LOS A</td><td>NB queue 4 cars</td><td>Allows increase in traffic demand from the south</td></tr>
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Findings and Conclusions
Based upon the evaluation of alternatives described a single lane roundabout, Alternative 1A is recommended for the following reasons:

- Intersection capacity (delay and LOS) issues will be addressed at year of opening and will serve demands through the 2036 design year. The Alternative 1A design preserves space for northbound capacity improvement to serve unanticipated traffic growth, fluctuations or school related special event traffic if needed in the future.

- Traffic speed issues through the intersection will be addressed.

- Vehicular safety will be improved; the crash rate will be lowered and the likelihood of personal injury crashes will be greatly reduced.

- Non-motorized users can safely navigate the intersection. Trail crossings occur one lane at a time with conflicts coming from one direction at a time. The crossings can be equipped with warning flasher systems. Pedestrian crash survivability rates are greatly increased with lower speeds experienced in a roundabout.

- Bicyclists in bike lanes along Tracy Avenue have options. Bicyclists can stay in the traffic lane through the circle, or can use bike ramps to/from the bike lanes and utilize the roundabout crosswalks.

Design Considerations
A single lane roundabout recommended. Alternative 1A is identical to Alternative 1 except the trail along the east side is shifted away from the intersection to preserve width should the need for a northbound right turn bypass lane, as shown in Alternative 2, to be added at a future date if needed. The northbound approach volumes must yield to the circulatory

Crosswalks should be provided across all legs of the roundabout so that bicyclists suing the Tracy Avenue/Valley View Road bike lanes have the opportunity to leave the vehicular lane if they choose not to ride through the circulatory roadway. The regional trail route can be signed to the south crossing, but users may choose to cross the east and north legs instead. Therefore, if crosswalk warning flasher systems are considered, they should be considered at all crossings.

Crosswalk warning flasher systems. If used, should be the Rectangular Rapid Flashing Beacon type. These flasher systems have been shown to greatly increase the percentage of drivers that yield at the crosswalk.

C: Toby Muse, SEH Project Manager

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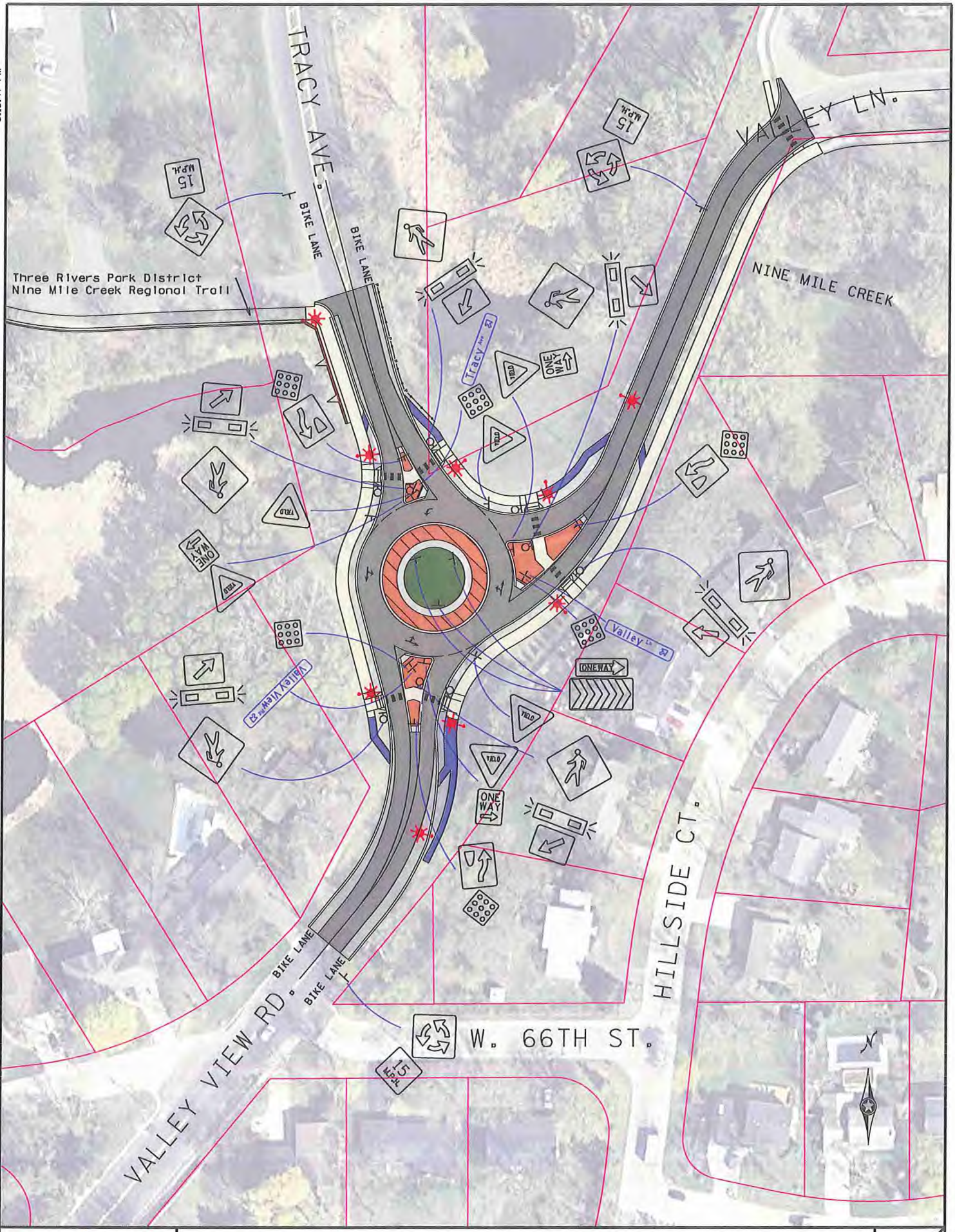
Attachments
Roundabout Alternative 1
Roundabout Alterative 1A
Roundabout Alternative 2
RJR Figure 2 – Existing Peak Hour Volumes
RJR Figure 3 – 2036 Peak Hour Volumes



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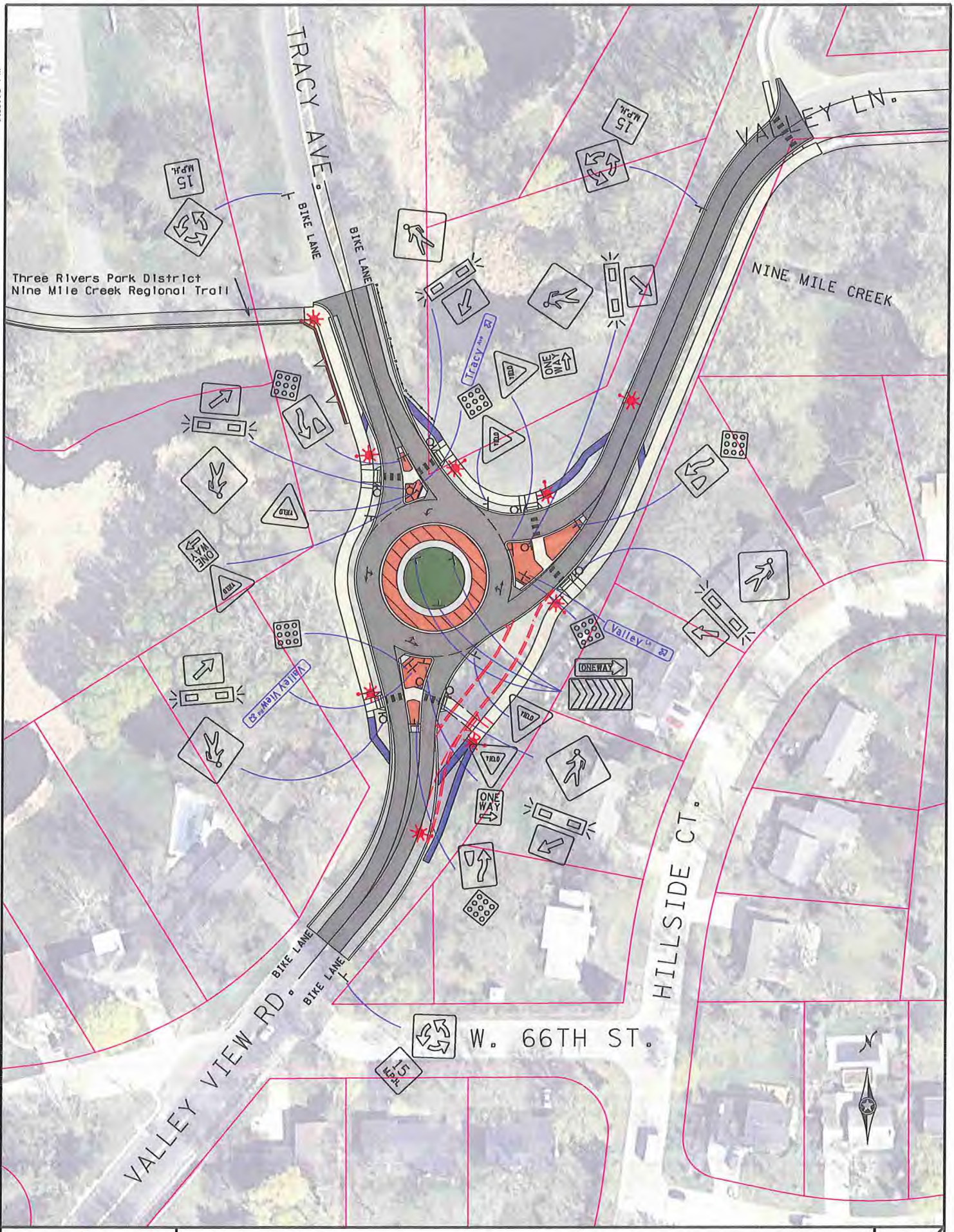
TRACY AVE./VALLEY LN. ROUNDABOUT ALT 1



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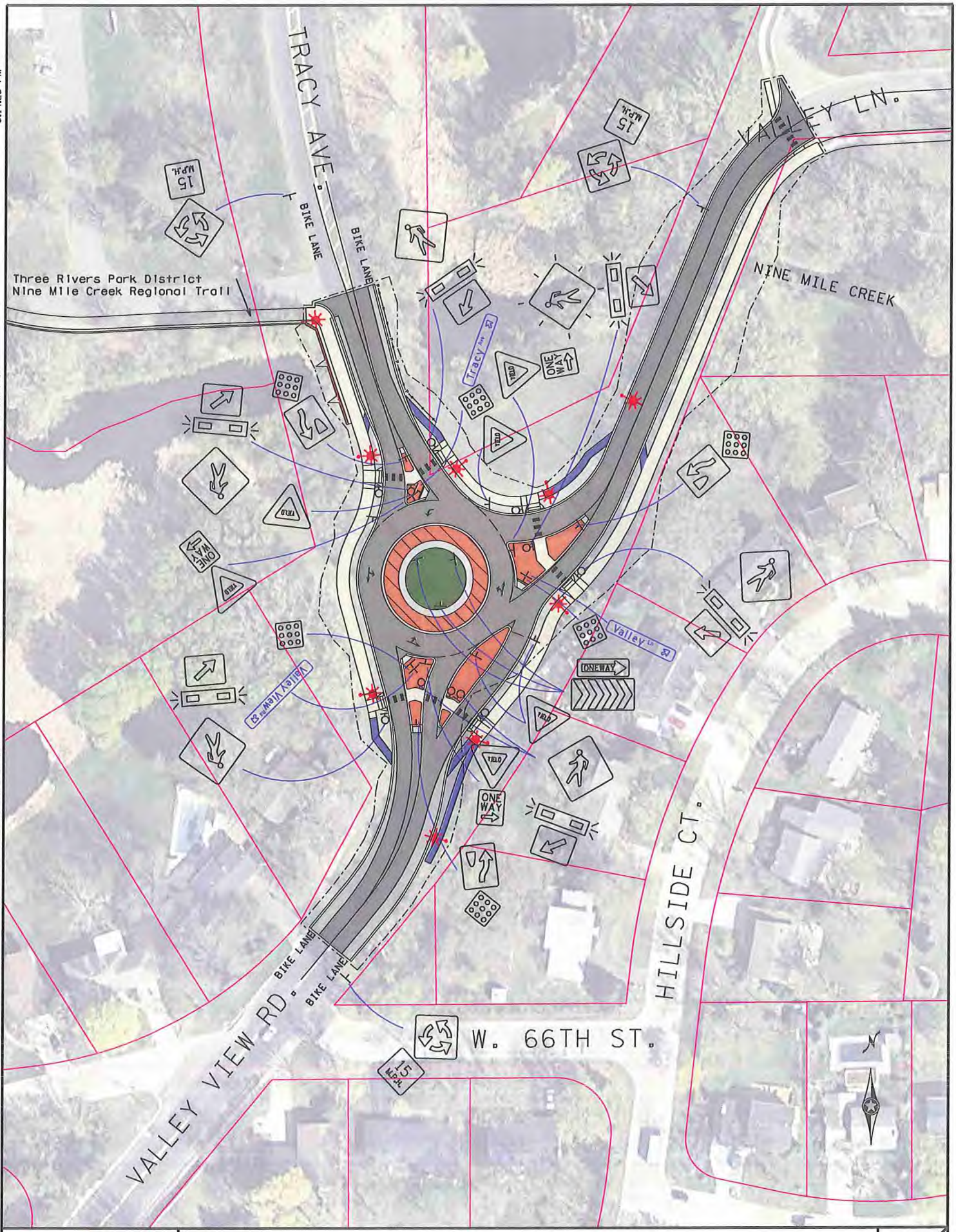
TRACY AVE./VALLEY LN. ROUNDABOUT ALT 1A



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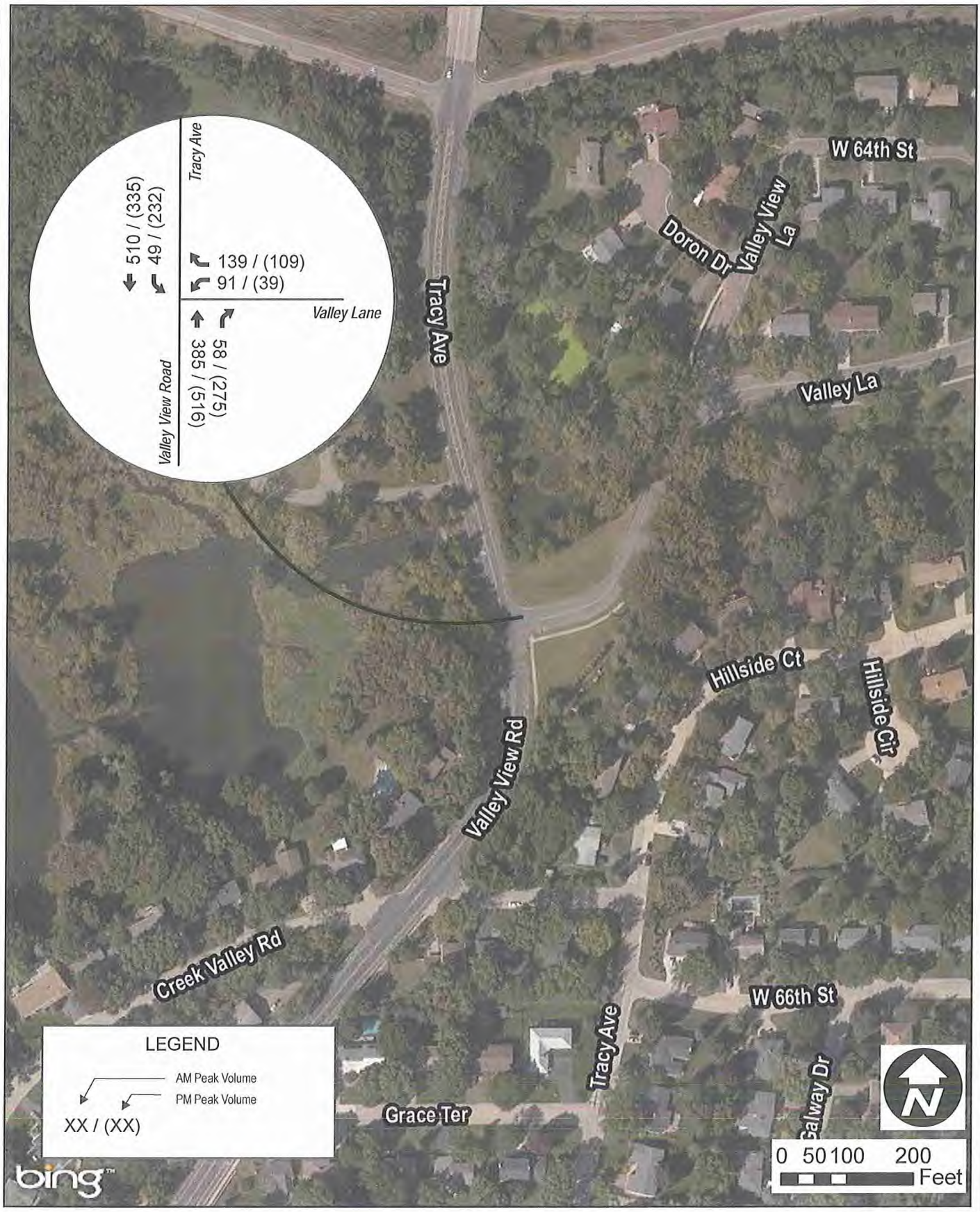
TRACY AVE./VALLEY LN. ROUNDABOUT ALT 2



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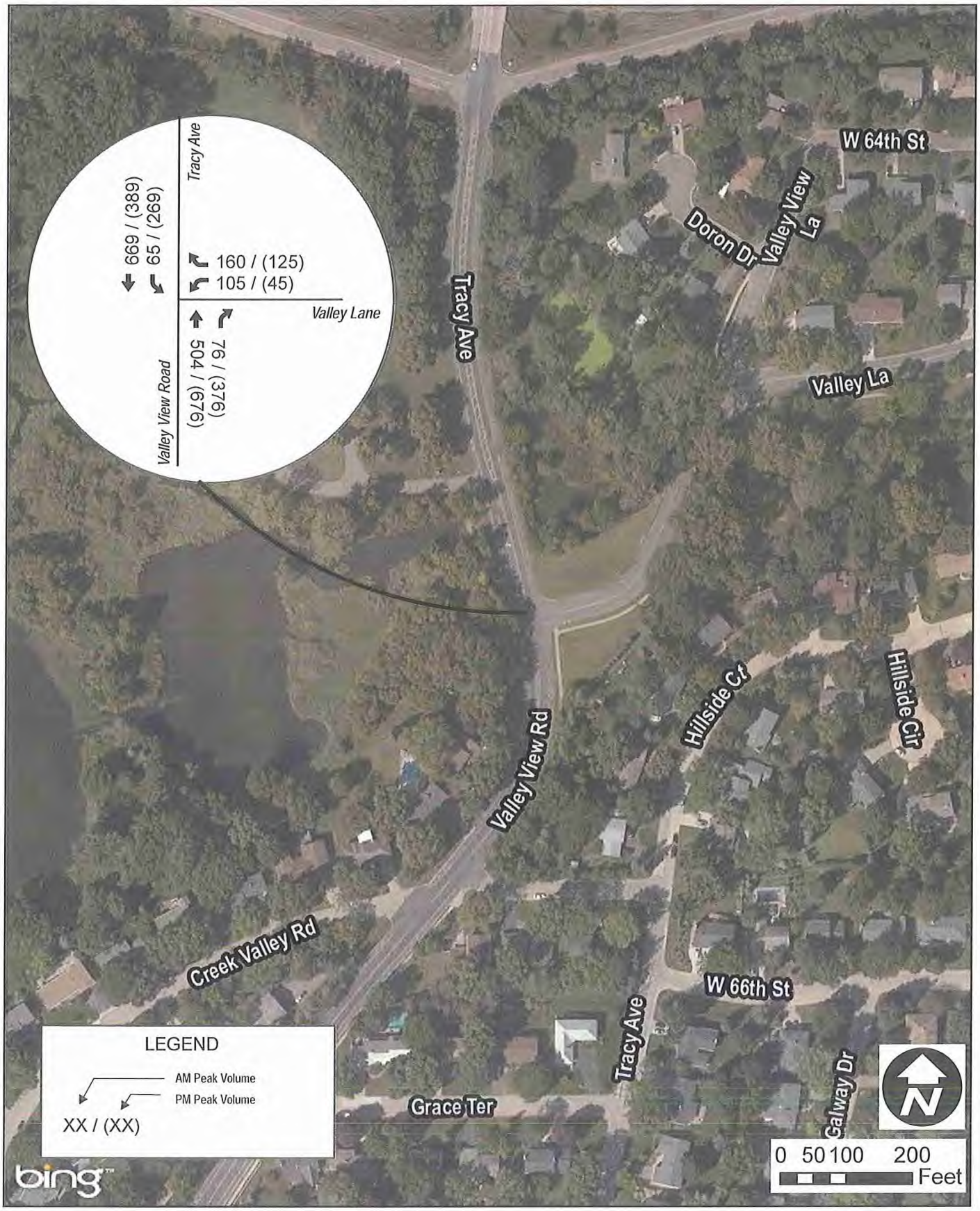
SEH	Project: EDINA 132802 Print Date: 8/12/2015 Map by: msteuernagel Projection: Hennepin County Coordinates Source:MnDOT, MnDNR, MnGeo	***Existing Peak Hour Volumes*** Roundabout Justification Report Tracy Avenue at Valley Lane Edina, MN	Figure 2



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Project: EDINA 132802
Print Date: 8/12/2015

Map by: msteuernagel
Projection: Hennepin County Coordinates
Source:MnDOT, MnDNR, MnGeo

2036 Peak Hour Volumes

Roundabout Justification Report
Tracy Avenue at Valley Lane
Edina, MN

Figure 3