Twin Cities Army Ammunition Plant (TCAAP)

AUAR UPDATE

Adopted August 12, 2024

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1. Introduction

The Twin Cities Army Ammunition Plant (TCAAP) Alternative Urban Areawide Review (AUAR) study area is 429 acres located within the broader TCAAP site in Arden Hills. Ramsey County purchased 427 acres of the site in 2013, and Ramsey County Parks & Recreation owns the remaining 2 acres. The AUAR study area is bounded by County State Aid Highway (CSAH) 96 on the south, by US Highway 10 and Interstate 35W (I-35W) on the west, by State of Minnesota property on the north, and by the National Guard's Arden Hills Army Training Site (AHATS) property on the east (see Figure 1).

As the Responsible Governmental Unit (RGU), the City of Arden Hills adopted the TCAAP Final AUAR and Mitigation Plan on July 28, 2014. Pursuant to Minnesota Rules, part 4410.3610, subpart 7, an AUAR and plan for mitigation must be revised every five years until all development in the study area has received final approval. The City of Arden Hills adopted an AUAR Update on August 26, 2019. Since the study area has not been fully developed, the purpose of this document is to provide another update to the TCAAP AUAR pursuant to Minnesota Rules.

This report is intended to serve as an update to the 2014 AUAR and 2019 AUAR Update and includes information on development to date, an update to the environmental analysis where necessary, and a review of mitigation measures.

2. Existing Conditions

No residential, retail, or commercial development has occurred within the AUAR study area. Since the AUAR was published in 2014, the following environmental remediation work and adjacent infrastructure improvement projects were completed and were documented in the 2019 AUAR Update:

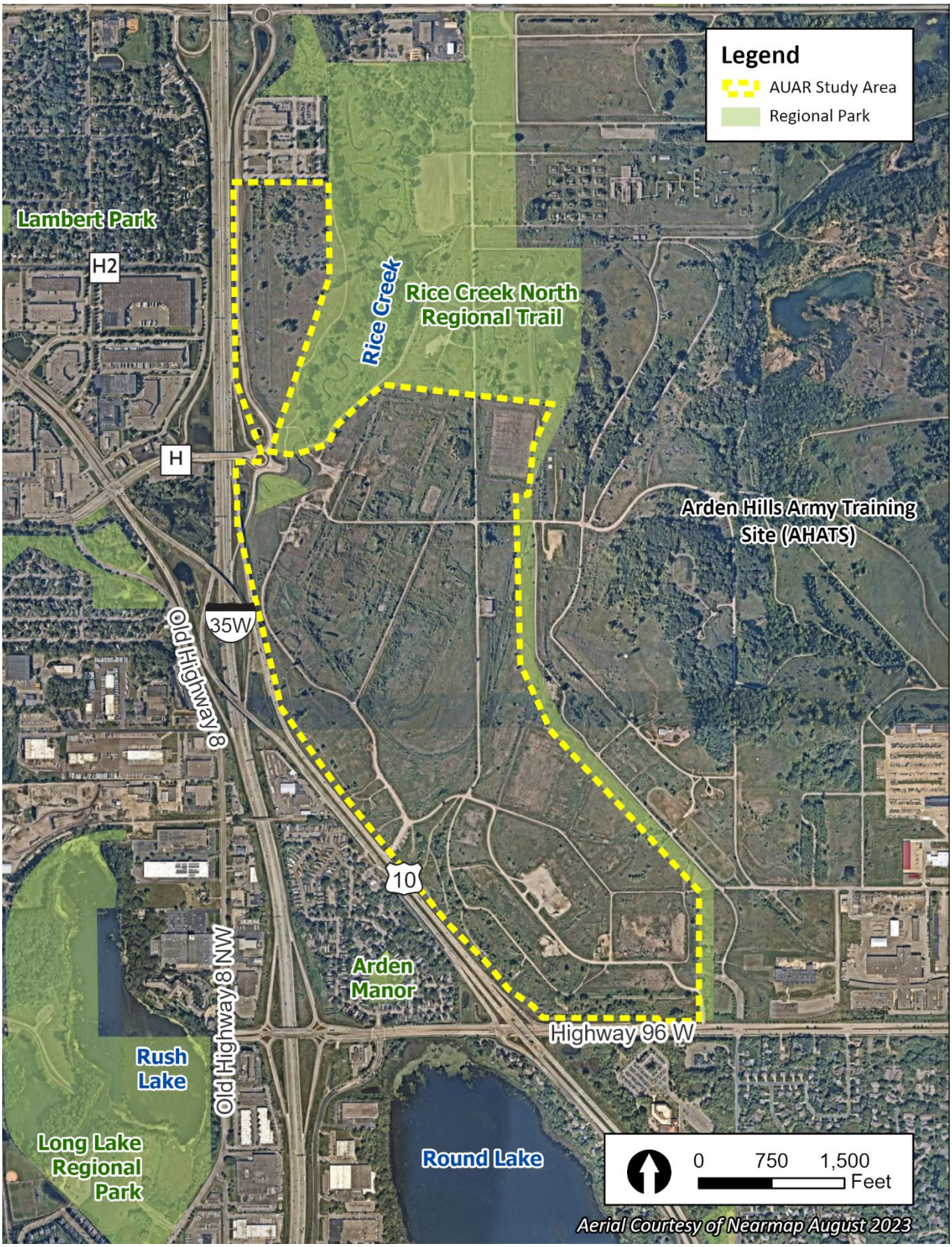
- 2015:
  - Demolition and remediation within the AUAR study area was completed.
  - The new interchange at I-35W and CSAH 96 was opened to traffic, including a new bridge with accommodations for pedestrians and bicycles.
- 2016:
  - Meanders were reintroduced within a portion of Rice Creek between County Road I and County Road H to facilitate the reconstruction of the County Road H and I-35W interchange. The new creek alignment was evaluated in a separate Environmental Assessment Worksheet completed by Ramsey County.
- 2017:
  - Construction of the County Road H and I-35W interchange was completed. County Road H now includes a new wider bridge over I-35W with two traffic lanes in each direction and a regional trail for bicycles and pedestrians. An off-ramp from I-35W northbound directly to County Road H was constructed. The US Highway 10 westbound ramp to I-35W northbound was reconstructed

to go over the new County Road H ramp. The project also included construction of a new pedestrian bridge over Rice Creek and a noise wall along I-35W southbound between County Road I and County Road H2. Two roundabouts, one at each ramp terminal on either side of I-35W, were constructed.
    - Construction of the County Road I, Rice Creek Parkway, and Old Highway 8 interchange was completed. Improvements included a roundabout, trail access, raised medians, and a new stretch of roadway between County Road H and County Road I referred to as the Thumb Road.
    - A portion of the watermain and sanitary sewer needed for future development was installed along the western edge of the AUAR study area as part of the County Road I ramp reconstruction project. The watermain that was installed is located within the Thumb Road alignment, crosses Rice Creek, extends along the western edge of the study area to where it crosses US Highway 10 near Prior Avenue North and the Highway 10 Frontage Road, and connects to the existing Arden Hills watermain. The sanitary sewer is also located within the Thumb Road alignment and extends from County Road H to the northern boundary of the AUAR study area.

Since the 2019 AUAR Update, the following adjacent infrastructure projects were completed:

- 2019
    - Improvements on eastbound US Highway 10 between I-35W and CSAH 96 were completed in 2019. This project included construction of a third eastbound lane, a two lane exit from I-35W, noise walls, and storm sewer and watermain improvements.
- 2020
    - Construction of the Rice Creek North Regional Trailhead began in October 2019 and also included the addition of an access road from the intersection of County Road I and Fairview Avenue to the entrance of the Arden Hills Army Training Site (AHATS), fencing modifications, stormwater management, landscaping, and signage. This construction was completed in the summer of 2020.
- 2021
    - An additional E-ZPass express lane was installed on I-35W between County Road C in Roseville and County Road 53 in Lino Lakes.

Figure 1: AUAR Study Area



3. Development Scenarios

There have been no changes to the development scenarios since the 2014 AUAR. The two development scenarios are outlined in Table 1.

Table 1: Development Scenarios

Component	Zoning Scenario	Maximum Development Scenario
Residential Units	1,500	2,500
Retail (square feet)	500,000	550,000
Non-Retail Commercial (square feet)	1,700,000	1,950,000

4. Impact Analysis

Analysis of the development scenarios focuses on cover types; land use; water resources; contamination, hazardous materials, and solid wastes; fish, plant communities, and sensitive ecological resources; visual; and transportation. These are the issues that required specific mitigation measures as noted in the 2014 Final AUAR, that had changes in applicable regulations, or that had changes occur in the study area. For other issue areas, the analysis that was completed in 2014 and 2019 remains valid. The issue areas with no anticipated changes in impacts or mitigation are listed in Section 4.1. Areas with updates are included in Section 4.2.

4.1. Areas of No Anticipated Change

No changes are anticipated for the following areas:

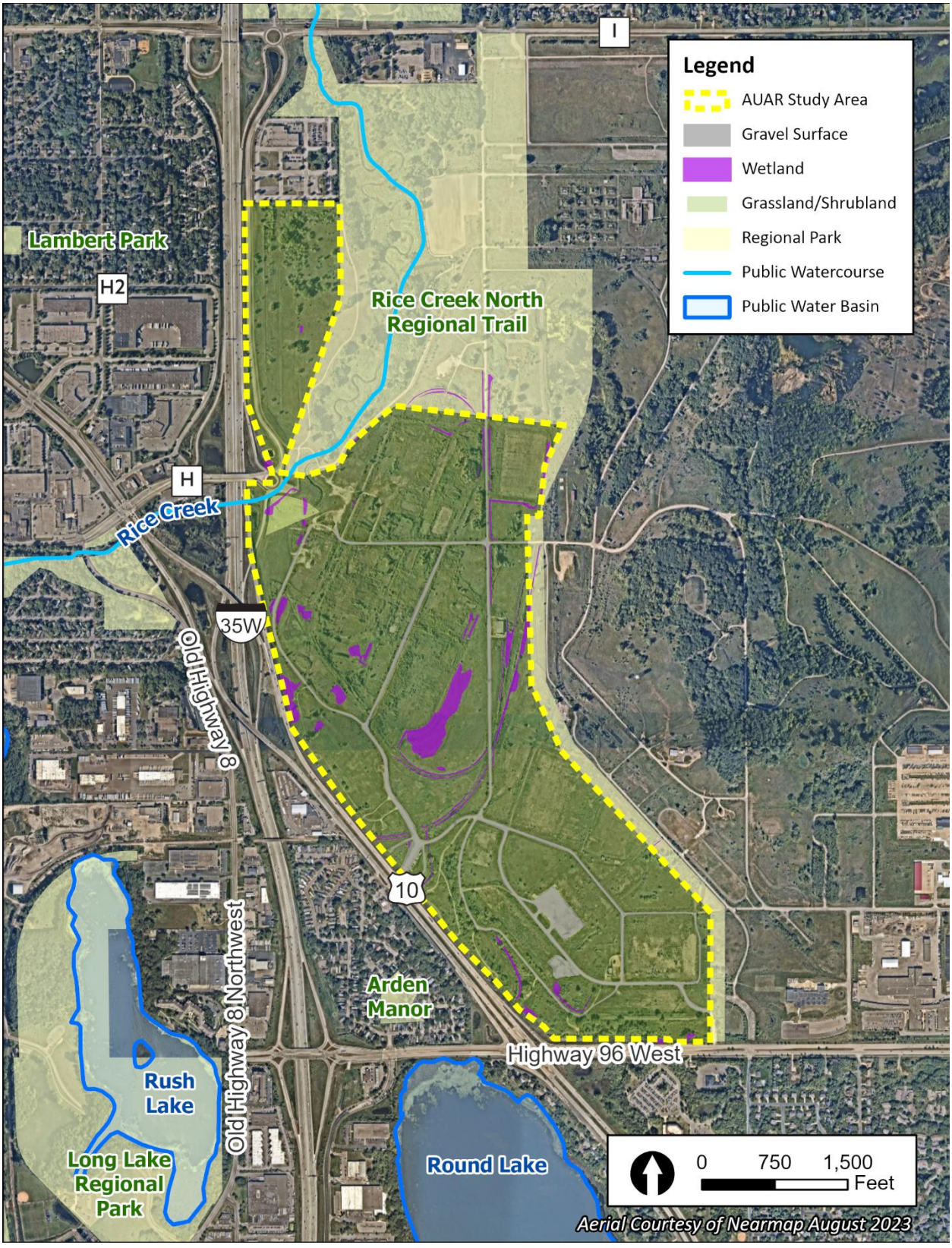
- Geology, soils, and topography/land forms
- Historic properties
- Air
- Noise
- Cumulative potential effects
- Other potential environmental effects

4.2. Areas Requiring Updates

4.2.1. Cover Types

See Figure 2 for a map of existing cover types within the AUAR study area. All structures have been demolished within the AUAR study area, and remaining cover types include grassland, wetland, and gravel surfaces formerly used as roads and sites of buildings.

Figure 2: Cover Types Within the AUAR Study Area



4.2.2. Land Use

The Arden Hills City Council adopted the 2040 Comprehensive Plan on November 25, 2019. The 2040 Comprehensive Plan identifies the existing land use within the AUAR study area as undeveloped. Table 2 includes the 10 future land uses identified for the AUAR study area.[1] Table 2 also links the future land uses to the corresponding development scenario components. The current 2040 future land use map is included in Attachment A.

Table 2: Future Land Uses Identified in the AUAR Study Area

Future Land Use	Description in the 2040 Comprehensive Plan	Corresponding Development Scenario Component
Neighborhood Residential (NR)	Provides for a range of attached and detached single-family and multi-family uses at a density of 1.5 to 21 units per acre. The Neighborhood Residential land use designation is further grouped into sub-categories based generally on lot and home styles. Neighborhood Residential One (NR-1) provides for detached single family homes on traditional suburban lots at a density of 1.5 to 2.5 units per acre. Neighborhood Residential Two (NR-2) provides for detached single family homes on narrow lots with alleys at a density of 2.5 to 4 units per acre. Neighborhood Residential Three (NR-3) provides for attached single family homes, duplexes, or townhomes on lots either with or without alleys and small multi-family uses at a density of 4 to 8 units per acre. Neighborhood Residential Four (NR-4) provides for attached single family homes, duplexes, or townhomes on lots either with or without alleys and multi-family uses at a density of 5 to 21 units per acre.	Residential
Town Center (TC)	Provides for a range of commercial and residential uses that offer housing, assisted living, senior housing, office, retail, restaurant, and civic uses. Medium and large residential uses are permitted at a density of 15 to 67 units per acre. The expected share of uses within this area are as follows: 5% to 25% Retail; 0% to 25% Office; and Residential will occupy the entire 15.9 acres. A development intensity of up to 6.0 building to land floor area ratio (FAR) may be allowed.	Residential, retail, and non-retail commercial
Campus Commercial (CC)	Provides for multiple, single tenant buildings or campuses within a business park atmosphere. Development intensity of up to 4 FAR may be allowed.	Non-retail commercial

[1] The descriptions in Table 2 reflect the comprehensive plan amendment that was approved by City Council on January 8, 2024.

Future Land Use	Description in the 2040 Comprehensive Plan	Corresponding Development Scenario Component
Retail Mixed-Use (RMU)	Promotes retail as a primary use and allows for other commercial uses to be incorporated as vertical mixed-use buildings. A development intensity of up to 0.8 FAR may be allowed. The expected share of uses within this area are as follows: 50% to 100% Retail and 0% to 50% Office.	Retail and non-retail commercial
Office Mixed-Use (OMU)	Focuses on office as a primary use, but also permits other commercial uses to be incorporated as vertical mixed-use buildings. A development intensity of up to 2 FAR may be allowed. The expected share of uses within this area are as follows: 0% to 50% Retail and 50% to 100% Office.	Retail and non-retail commercial
Flex Office (FO)	Permits large scale development for employment and light manufacturing uses that take advantage of highway frontage and automobile access. A development intensity of up to 1.5 FAR may be allowed.	Non-retail commercial
Public & Institutional (P/I)	Areas designated for uses such as government buildings, colleges, schools, and religious uses, but not medical uses. A development intensity of up to 0.8 FAR may be allowed.	Non-retail commercial
Utility (UTL)	Public or private land occupied by a power substation, water tower, municipal well, pumping station, drainage infrastructure, or similar use.	Not applicable
Park and Open Space (P/OS)	Areas designated as public parks.	Not applicable
Right-of-Way	Public vehicular, transit, and/or pedestrian rights-of-way	Not applicable

Since the 2014 AUAR was published, building height standards in the city code have increased within the AUAR study area. Changes for additional building height were approved in 2016. Maximum building height for the Campus Commercial portion of the site is 15 stories and maximum building height for the Town Center portion of the site is 10 stories.

On January 8, 2024, the Arden Hills City Council approved a comprehensive plan amendment for the TCAAP site. The comprehensive plan amendment separated the NR-3 and NR-4 zoning subcategories, increased number of dwellings per unit, and allowed for multi-family homes within the NR-4 zoning subcategory.[2, 3] This increased the density of the site to up to 1,960 residential units.

[2] NR-3 provides for attached single family homes, duplexes, or townhomes on lots either with or without alleys and small multi-family uses at a density of 4 to 8 units per acre.

[3] NR-4 provides for attached single family homes, duplexes, or townhomes on lots either with or without alleys and multi-family uses at a density of 5 to 21 units per acre.

Following the comprehensive plan amendment, the TCAAP Redevelopment Code (TRC) and TCAAP Regulating Plan were updated with the following zoning changes:

- 12.9 acres rezoned from NR-4 to NR-3
- 21 acres rezoned from Flex Office to NR-3
- 11.4 acres rezoned from Flex Office to NR-4

The TRC Ordinance amendment to reflect the rezoning was approved on January 8, 2024, and the updated Regulating Plan is included in Attachment A.

Both development scenarios would be compatible with the future land uses identified in the 2040 Comprehensive Plan and with the TRC. No mitigation measures are necessary.

4.2.3. Water Resources

Wetlands

In the 2014 AUAR, 14.4 acres of wetland were identified within the study area. All 14.4 acres were assumed to be jurisdictional. Later in 2014, the US Army Corps of Engineers (USACE) issued an Approved Jurisdictional Determination (AJD) for the site, concluding that only three wetlands within the site are regulated by the USACE. The Rice Creek Watershed District (RCWD) also provided a notice of determination (NOD) under the state Wetland Conservation Act. The AJD and NOD have been extended since the 2019 AUAR: the AJD expires in January 2025 and the NOD expires in November 2025. Permits to be obtained from the USACE and RCWD are included in Table 7.

No additional mitigation measures are needed based on this updated information.

4.2.4. Contamination/Hazardous Materials/Solid Wastes

On September 23, 2019, the soil and surface water at the TCAAP site were removed from the federal Superfund list (National Priorities List). The TCAAP soil and surface water were removed from the state Superfund list (Permanent List of Priorities) on April 22, 2020. The groundwater on the site, however, remains listed on the National Priorities List and Permanent List of Priorities. The US Army's cleanup efforts under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) are ongoing.

Historical releases of hazardous substances from the former TCAAP site into Round Lake, located south of the AUAR study area, resulted in sediment contamination in the lake. An evaluation of impacts to Round Lake sediment concluded in 2021, and a Record of Decision (ROD) for the Proposed Plan for cleanup at Round Lake was finalized in 2022. The US Army is responsible for these cleanup activities. The proposed staging area for the Round Lake cleanup activities is located within the southwest corner of AUAR study area, and this area is anticipated to be restored by the end of 2026. Within the TCAAP site, the US Army also completed optimization of the TCAAP Groundwater Recovery System in 2022.[4]

[4] Additional information on remediation of the broader TCAAP site is available at https://webapp.pca.state.mn.us/cleanup/search/superfund?siteId=47112-AREA0000000014 and https://www.tcaaprab.org/

In 2023, the US Army completed a preliminary assessment and site inspection on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) at the TCAAP site in accordance with CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan, and Army/Department of Defense policy and guidance. PFAS was detected at concentrations greater than the risk-based screening levels, and the assessment identified a need for further study in a CERCLA remedial investigation.[5]

The US Army will continue groundwater treatment at the site until approximately 2040. No additional mitigation measures are needed.

4.2.5. Fish, Plant Communities, and Sensitive Ecological Resources

State Listed Species

The AUAR study area has undergone extensive demolition and remediation activities, and the site contains sandy and sparse ground cover, which can provide habitat for some rare species. The Minnesota Department of Natural Resources (DNR) completed a Natural Heritage Review for the AUAR study area in May 2024 (see Attachment C). Table 3 lists the state-listed species that may be impacted by development within the AUAR study area, as identified by the DNR.

There may be osprey nests present within the AUAR study area. An Osprey Nest Removal Permit would need to be obtained from the DNR if osprey nests are encountered and planned to be removed.

[5] Additional information on the US Army's preliminary assessment and site inspection is available at https://aec.army.mil/PFAS/MN/tcaap.

Table 3: State-Listed Species That May Be Impacted by Development Within the AUAR Study Area

Common Name	Scientific Name	Status	Habitat[6]	Mitigation Measures
Big brown bat	*Eptesicus fuscus*	Special concern	Winter roosts are located in caves and mines, though this species also regularly hibernates in buildings, cellars, and tunnels. Summer foraging areas are usually forested habitats near water sources. Warm season roosts can consist of human structures such as buildings and bridges; trees that are hollow, have crevices, loose bark, or cavities are also used.	The DNR recommends that tree removal be avoided from June 1 through August 15.
Lark sparrow	*Chondestes grammacus*	Special concern	Short and/or sparse grasses (usually native) in areas of sand or gravel soils, with at least some bare ground and widely-scattered or patchy trees	The DNR recommends avoiding disturbance to grassland areas and tree/shrub removal from May 15 through August 15 to avoid disturbance of nesting birds.
Little brown myotis	*Myotis lucifugus*	Special concern	Winter roosts are located in caves, cellars, tunnels, and other underground structures. Summer habitat includes human structures such as bridges, buildings, and attics as well as forested habitats near water.	The DNR recommends that tree removal be avoided from June 1 through August 15.
Plains pocket mouse	*Perognathus flavescens*	Special concern	Open, well-drained areas, typically on sandy soils with sparse, grassy or brushy vegetation	The DNR recommends that the use of erosion control mesh, if any, be limited to wildlife-friendly materials.

[6] Source: DNR Rare Species Guide. Available at https://www.dnr.state.mn.us/rsg/index.html.

Common Name	Scientific Name	Status	Habitat[6]	Mitigation Measures
Trumpeter swan	*Cygnus buccinator*	Special concern	During the breeding season, small ponds and lakes or bays on larger water bodies with extensive beds of emergent vegetation such as cattails, bulrushes, and sedges. Ideal habitat includes about 100 meters of open water for take-off, stable levels of unpolluted fresh water, emergent marsh vegetation, low levels of human disturbance, and the presence of muskrat houses and North American beaver lodges for use as nesting platforms.	The DNR recommends avoiding construction activities during the nesting season, late April through early June, near suitable nesting habitat.
Blanding's turtle	*Emydoidea blandingii*	Threatened	Wetland complexes and adjacent sandy uplands; calm, shallow waters, including wetlands associated with rivers and streams with rich aquatic vegetation.	A Blanding's turtle avoidance plan is required.
Seaside three-awn	*Aristida tuberculosa*	Threatened	Dry and loose sand in sand savannas, sand prairies, and dunes where vegetation is sparse	To demonstrate avoidance, a qualified surveyor will need to determine if suitable habitat exists within the activity impact area and, if so, conduct a survey prior to any project activities.
Ghost tiger beetle	*Cicindela lepida*	Threatened	Steep, open, blowing sand dunes	Coordination with the MN DNR Central Region Nongame Specialist and an avoidance plan are required.
Henslow's sparrow	*Ammodramus henslowii*	Endangered	Grasslands with tall vegetation and substantial litter layer.	Disturbance of suitable nesting habitat for Henslow's sparrows should not occur between May 15 and July 15. If avoidance during breeding season is not feasible, areas that will be disturbed that contain suitable nesting habitat will need to be surveyed for active nests prior to any project disturbance.

Federally-Listed Species

The US Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool was used to identify federally-listed species in the vicinity of the AUAR study area. Five species were identified and are listed in Table 4.

The AUAR study area is within a USFWS-identified Rusty Patched Bumble Bee High Potential Zone. The rusty patched bumble bee is likely to be present in suitable habitat within the High Potential Zone. The rusty patched bumble bee may be impacted by a variety of land management activities including, but not limited to, prescribed fire, tree-removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. Ramsey County, as the landowner, or developers who propose projects within the AUAR study area will be responsible for compliance with the Endangered Species Act.

Table 4: Federally-Listed Species

Common Name	Scientific Name	Status	Habitat
Northern Long-eared Bat (NLEB)	*Myotis septentrionalis*	Endangered	During summer, these bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. This species roosts in trees and has also been found to roost in structures such as barns and sheds. NLEBs spend winter hibernating in caves and mines. Suitable summer habitat for the NLEB consists of a wide variety of forested/wooded habitats where they roost, forage, and travel. NLEB habitat may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures.
Tricolored Bat	*Perimyotis subflavus*	Proposed endangered	Tricolored bats, also known as the eastern pipistrelle, are known to colonize along the banks and caves of the Mississippi River. During the winter, tricolored bats hibernate in caves and mines, although in areas where caves are sparse, tricolored bats may hibernate in culverts, tree cavities, or abandoned water wells.
Salamander Mussel	*Simpsonaias ambigua*	Proposed endangered	The salamander mussel can be found in rocky rivers and streams where its host species, the mudpuppy salamander, is found. According to the USFWS, threats to the salamander mussel include contamination, landscape alteration, invasive species, and risks to its host species, the mudpuppy salamander.

Common Name	Scientific Name	Status	Habitat
Monarch Butterly	*Danaus plexippus*	Candidate	The monarch butterfly requires grassland habitats where milkweed and flowers are present.
Rusty Patched Bumble Bee	*Bombus affinis*	Endangered	The species prefers grasslands with flowering plants from April through October, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, and undisturbed soil for hibernating queens to overwinter. The proposed project is within a USFWS identified Rusty Patched Bumble Bee High Potential Zone.

4.2.6. Visual

All structures within the AUAR study area have been demolished. The study area is not near any unique scenic views or vistas and is surrounded by interstate and county roads as well as residential properties. Since the 2014 AUAR was published, building height standards in the city code have increased within the AUAR study area. Maximum building height for the Campus Commercial portion of the site is 15 stories, and maximum building height for the Town Center portion of the site is 10 stories. Future development would conform with the zoning regulations for building height and form and lighting would be in conformance with city ordinances. Views would be similar to those experienced currently, and no visual impacts are anticipated.

Future development designs could consider the use of MnDOT Approved Products for luminaries to minimize blue light, which can be harmful to birds, insects, and fish.

4.2.7. Transportation

A traffic analysis was completed for Existing (2024), Year 2040 No-Build conditions, Year 2040 Zoning Scenario build conditions, and Year 2040 Maximum Development Scenario build conditions. An additional scenario was also analyzed that included the Maximum Development Scenario build conditions with some of the retail space being replaced with a discount retail superstore. The 2014 AUAR analyzed Existing (2014) conditions, 2030 No-Build conditions, 2030 Zoning Scenario Build conditions, and 2030 Maximum Development Build conditions. The 2014 AUAR was used as a baseline when determining the site distribution and the proposed mitigations. A detailed traffic analysis has been performed to address the traffic related issues with the proposed TCAAP development and is provided in Attachment B.[7] The following provides a summary of the anticipated traffic generation of the proposed

[7] The traffic volumes were developed based on turning movement counts collected by Kimley-Horn on Tuesday, March 12, 2024. There was some discrepancy between these counts and the counts collected in October 2023 for Ramsey County's Rice Creek Commons Traffic Study, with the March 2024 turning movement counts showing lower traffic volumes along CSAH 96 than in October 2023. MnDOT Seasonal Adjustment Factors were reviewed, and it was determined that turning movement counts collected on a Tuesday in March are a good representation of a typical weekday. Because of this difference in traffic volumes along CSAH 96, the results may differ from the results of the Rice Creek Commons Traffic Study.

TCAAP development and mitigation measures identified to ensure acceptable level of service (LOS).

Trip Generation

Though the development scenarios are unchanged from the 2014 AUAR, trip generation was updated to reflect updates in the source data (the Institute of Traffic Engineers (ITE) *Trip Generation Manual*). Trip generation for this AUAR Update was based on the 11th Edition of the *Trip Generation Manual* (published September 2021), while the 2014 AUAR traffic analysis utilized the newest version available at the time (the 9th Edition). Changes in the data resulted in an overall slight decrease in the number of trips anticipated to the site. A comparison of the updated trip generation numbers to the trip generation numbers used in the 2014 AUAR is shown below in Table 5.

Table 5: Trip Generation Summary

Scenario	Daily Trips	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
2014 AUAR Trip Generation							
Zoning Scenario	41,550	2,130	945	3,075	1,630	2,710	4,340
Maximum Development Scenario	51,140	2,440	1,350	3,790	2,120	3,185	5,305
2024 AUAR Update Trip Generation							
Zoning Scenario	38,048	2,058	853	2,911	1,500	2,541	4,041
Maximum Development Scenario	47,849	2,456	1,188	3,644	1,901	3,049	4,950

Capacity Analysis

The capacity analysis was updated to reflect new traffic counts. Due to the large amount of roadway improvements that have been constructed since the 2014 AUAR traffic analysis, the study area has been reduced to include only the most heavily impacted intersections. The analysis was performed for weekday AM and PM peak hour conditions at the following intersections:

- Mounds View Boulevard & County Road H (signalized)
- CSAH 96 & US Highway 10 Southbound (SB) Ramp (signalized)
- CSAH 96 & Northern Heights/TCAAP South Access (side-street stop)
- County Road H & I-35W SB Ramp (roundabout)
- County Road H & I-35W Northbound (NB) Ramp (roundabout)

Capacity analysis was carried out using Synchro 11 (SimTraffic) at signalized and stop-controlled intersections, while analysis of roundabouts was carried out using roundabout analysis software Rodel. A summary of the LOS results of the network is shown below in Table 6. The overall intersection LOS is reported at signalized and roundabout intersections, while the worst side-street LOS is reported for side-street stop-controlled intersections. Roundabout results shown below are 50% confidence level results from Rodel. Note that the baseline

build geometry at CSAH 96 & Northern Heights/TCAAP South Access included an installed traffic signal, two southbound left turn lanes, a southbound right turn lane, a southbound through lane, two eastbound left turn lanes, and a westbound right turn lane.

LOS is a quantitative measure used by traffic engineers to describe the operations of an intersection or along a roadway segment. It ranges from A to F, with A being the best and F being the worst level of operation. LOS A conditions are characterized by minimal vehicle delay and free-flow conditions, while LOS F is characterized by long vehicle delay – usually when demand exceeds available roadway capacity. Although LOS E is defined as at-capacity, LOS D is generally the minimum acceptable level of operation at an intersection in the Twin Cities metro area.

Table 6: 2040 Peak Hour Traffic Analysis Results

Intersection	Level of Service (LOS)							
	Existing (2024) Conditions		2040 No Build		2040 Zoning Scenario		2040 Maximum Development Scenario	
	AM	PM	AM	PM	AM	PM	AM	PM
Mounds View Boulevard & County Road H	C	C	C	D	D	E	D	E
CSAH 96 & US Highway 10 SB Ramp	C	B	C	B	C	C	D	C
CSAH 96 & Northern Heights	A	A	A	A	C	C	C	C
County Road H & I-35W SB Ramp	A	A	A	A	A	A	A	A
County Road H & I-35W NB Ramp	A	A	A	A	A	A	A	B

As previously mentioned, many improvements to the transportation network in the vicinity of the AUAR study area have been completed. Both roundabout intersections (County Road H & I-35W SB Ramp and County Road H & I-35W NB Ramp) are anticipated to operate at LOS C or better during the AM and PM peak hours of all scenarios, based on the 50% confidence results. The intersection of CSAH 96 & US Highway 10 SB Ramp is anticipated to operate at LOS D or better during the AM and PM peak hours of all scenarios.

The intersection of Mounds View Boulevard & County Road H is anticipated to operate at LOS E during the PM peak hour in the build scenarios. The intersection is anticipated to see some congestion due to the added site traffic and the number of through movements along Mounds View Boulevard. Queues are not anticipated to impact adjacent intersections; therefore, it is recommended to monitor the intersection as development occurs to see if traffic volumes, delays, and queues are realized.

At the intersection of CSAH 96 & Northern Heights/TCAAP South Access, the baseline build geometry is anticipated to be sufficient from an operational standpoint, but it is anticipated that there would be queueing issues for the southbound right turn movement in all build scenarios. Because of this, it is proposed that the through lane should be striped as a shared

through/right turn lane to allow right turns from two lanes.[8] Alternatively, a channelized right turn lane could be a viable solution to this issue but would require a larger right-of-way.

Results of the 2040 Maximum Development Scenario with the discount retail superstore are generally in-line with the results of the 2040 Maximum Development Scenario, with the only change in LOS being at the County Road H & I-35W NB Ramp intersection, which is anticipated to operate at LOS C during the PM peak hour instead of LOS B.

5. Mitigation Summary and Update

The mitigation measures from the 2014 AUAR and 2019 AUAR Update are outlined below in Table 7 and Table 8 along with a status update and any additional mitigation identified based on the information in Section 4.2.

Table 7: Permits and Approvals Required

Unit of Government	Type of Application/Approval	Status
US Army Corps of Engineers	Section 404 Permit	To be applied for
Minnesota Pollution Control Agency	National Pollutant Discharge Elimination System Stormwater Permit for Construction Activities	To be applied for
	Sanitary Sewer Extension Permit	To be applied for
	Soil and Groundwater Remediation Plan Approval	To be applied for, if needed
	Section 401 Certification	To be applied for, if needed
Minnesota Department of Health	Abandonment of Water Wells	To be applied for
	Watermain Installation Permit	To be applied for, if needed
Minnesota Department of Natural Resources	Water Appropriation Permit	To be applied for, if needed
	General Permit for Temporary Appropriation	To be applied for, if needed
	Public Waters Work Permit	To be applied for, if needed
	Osprey Nest Removal Permit	To be applied for, if needed
	Endangered or Threatened Species Take Permit	To be applied for, if needed
	Blanding's Turtle Avoidance Plan	To be completed
	Ghost Tiger Beetle Avoidance Plan	To be completed
Minnesota Department of Transportation	Right-of-Way Permit	To be applied for, if needed

[8] This recommendation is consistent with the mitigation proposed in Ramsey County's 2024 Rice Creek Commons Traffic Study.

Unit of Government	Type of Application/Approval	Status
Metropolitan Council	2030 Comprehensive Plan Amendment	Completed
	2040 Comprehensive Plan Amendment	Completed
	Sanitary Sewer Extension Permit	To be applied for
Rice Creek Watershed District	Stormwater Management, Erosion Control, Floodplain Alteration, Wetland Alteration	To be applied for
Joint Development Authority	Preliminary and Final Plat Approvals Development Reviews/Approvals	Pending, by developers
Ramsey County	Utility Permits in County Road Right-of-Way	To be applied for
	Access Permits (Connection to County Road)	To be applied for
	Hazardous Waste Permits	Approved
City of Arden Hills	Boundary Plat Approval	Completed
	AUAR Approval	Completed
	2030 Comprehensive Plan Amendment	Completed
	2040 Comprehensive Plan Amendment	Completed
	Zoning Change Approval	Completed
	Grading and Erosion Control Permits	To be applied for
	Building and Utility Permits	To be applied for

Table 8: Mitigation Measures and Status Update

Resource Area	Applicable Scenarios	Mitigation	Status			
			Ongoing	Completed	New	No Longer Valid
Water Resources	All	A lift station will be required depending on future uses for sanitary sewer, but the system will primarily be gravity-based.	X			
	All	Stormwater will be managed on-site, maintaining the current drainage patterns and utilizing the current outfalls to Rice Creek and Round Lake.	X			
	All	Stormwater will be conveyed to Round Lake and Rice Creek by means of underground storm sewer, vegetated swales, and wetlands. Conveyance systems will be designed in accordance with acceptable industry standards and in conformance with jurisdictional requirements.	X			
	All	The runoff rate will be reduced to 80% of the existing rate because the study area is located within a Flood Management Zone as defined by the RCWD.	X			
	All	The primary method of stormwater treatment will be the use of multiple ponds for the removal of total phosphorous and total suspended solids. Water reuse, bio-filtration, filtration, and stormwater wetlands are also suitable for treatment within the study area.	X			
	All	No discharge water will be directed to surface waters without prior retention in a temporary settling basin and a determination that no contamination exists. The developer will determine if groundwater is contaminated as a basis for determining discharge to storm sewer, sanitary sewer, or through a treatment process such as the existing groundwater treatment facilities. Temporary construction dewatering will require a Temporary Water Appropriations General Permit 1997-0005 if less than 50 million gallons per year and less than one year in duration.	X			

Resource Area	Applicable Scenarios	Mitigation	Status			
			Ongoing	Completed	New	No Longer Valid
	All	Wetland impacts will be replaced at a 2:1 ratio through a combination of on- and off-site replacement through plans/permit approved by the RCWD and USACE	X			
	All	The new crossing of Rice Creek would be via a bridge that spans the creek, wetlands and floodplain, and would allow wildlife to cross underneath. A trail crossing at this location may also be considered (under the creek bridge). The bridge will be designed to avoid impact on the floodplain.		X		
	All	Proposed development will follow the approach outlined in the Comprehensive Stormwater Management Plan (CSMP) to meet RCWD's Water Quality Treatment and Peak Stormwater Runoff Control requirements.	X			
Contamination/ Hazardous Materials/ Wastes	All	Handling of site contaminants is addressed in the overall Response Action Plan (RAP) approved for the site and/or within the 4 subarea RAPs addressing key hot spot remediation.	X			
	All	In areas of previous volatile organic compound (VOC) contamination, testing or abatement measures for VOC vapors may be required by the City to avoid potential impacts of VOC vapors in new building spaces.	X			
	All	Construction materials would be either recycled or disposed in the proper facilities.	X			
	All	Solid waste recycling will be required by city code for residential users and may be added to city code in the future for commercial users.	X			
Fish, Wildlife, Plant Communities, and Sensitive	All	DNR recommendations for minimizing impacts to turtles during construction will be required for all development activities.	X			
	All	A Blanding's turtle avoidance plan will be completed and submitted to the DNR.			X	

Resource Area	Applicable Scenarios	Mitigation	Status			
			Ongoing	Completed	New	No Longer Valid
Ecological Resources (Rare Features)	All	Creation of a green corridor through the AUAR study area will provide habitat elements for turtles, birds, and other wildlife. This corridor will provide an important link to the Rice Creek corridor and the County's adjacent wildlife corridor and is compatible with the Regionally Significant Ecological Area (RSEA) and Important Bird Area (IBA) designations.	X			
	All	The City may also consider building guidelines that minimize the amount or type of glass used on multi-story building to minimize bird strikes.	X			
	All	The osprey nesting platform at the water treatment building will be avoided by development.	X			
	All	Disturbance of suitable nesting habitat for Henslow's sparrows, which includes uncultivated and unmowed grasslands, and old fields with standing, dead vegetation, and a substantial litter layer, will not occur between May 15 and July 15. If avoidance during that timeframe is not feasible, areas that will be disturbed that contain suitable nesting habitat will be surveyed for active nests prior to any project disturbance.			X	
	All	A qualified surveyor will determine if suitable habitat for the seaside three-awn exists within the AUAR study area, and if so, conduct a survey prior to any project activities.			X	
	All	Coordination with the DNR Central Region Nongame Specialist and a ghost tiger beetle avoidance plan will be completed.			X	
	All	Disturbance to grassland areas and tree/shrub removal will be avoided if practicable from May 15 through August 15 to avoid disturbance of nesting lark sparrows.			X	
	All	Tree clearing will be avoided from June 1 through August 15 if practicable to avoid impacts to the little brown bat and big brown bat.			X	

Resource Area	Applicable Scenarios	Mitigation	Status			
			Ongoing	Completed	New	No Longer Valid
	All	Construction activities near suitable trumpeter swan nesting habitat will be avoided if practicable from late April through early June.			X	
	All	Erosion control mesh will be limited to wildlife friendly materials to limit impacts to the plains pocket mouse.			X	
	All	Disturbed soils will be reseeding with native species or grasses and forbs using BWSR Seed Mixes or MnDOT Seed Mixes where practicable.			X	
	All	Ramsey County or developers who propose projects within the AUAR study area will be responsible for compliance with the Endangered Species Act.			X	
Visual	All	MnDOT Approved Products and Audubon Society's Lights Out Program will be considered to the extent practicable to prevent avoidable impacts to wildlife.			X	
Transportation	All	CSAH 96 westbound auxiliary lane from east of the project boundary to US Highway 10.	X			
	All	Redesign the I-35W/CSAH 96 interchange to accommodate anticipated future traffic, including the TCAAP development.		X		
	All	At the intersection of County Road H and Mounds View Boulevard, an additional eastbound left turn lane is recommended.		X		
	All	Re-introduction of County Road H southbound loop access to I-35W (removed as part of the baseline scenarios), which remains barrier separated from I-35W southbound exit ramp to US Highway 10 southbound and enters I-35W after joining the US Highway 10 southbound access ramp to I-35W southbound.[9]				X

[9] This mitigation measure is no longer valid due to reconstruction of the County Road H and I-35W interchange.

Resource Area	Applicable Scenarios	Mitigation	Status			
			Ongoing	Completed	New	No Longer Valid
	All	At the intersection of Round Lake Road W at CSAH 96, the lane use of the northbound center lane is recommended to be re-striped from an existing shared left/through lane to a shared left/through/right lane.[10]				X
	All	The intersection of Mounds View Boulevard and County Road H is recommended to be monitored as development occurs to see if traffic volumes, delays, and queues are realized.			X	
	All	The southbound through lane at the intersection of CSAH 96 and Northern Heights/TCAAP South Access is recommended to be restriped as a shared through/right turn lane. Alternatively, a channelized right turn lane could be a viable solution but would require a larger right-of-way.			X	
	Maximum Development Scenario	The addition of a new northbound I-35W exit to County Road H, with a single lane approach to the roundabout on County Road H.		X		
	Maximum Development Scenario	An additional southbound left turn lane at the southbound exit from I-35W to County Road H.		X		

[10] This mitigation measure is no longer valid because the lanes were restriped after publication of the 2014 AUAR to include a left-turn lane, a center through lane, and a right-turn lane.

6. AUAR Update Review

Pursuant to Minnesota Rules, part 4410.3610, subpart 7, this AUAR Update was available for a comment period of 10 business days. Comments were submitted by the Metropolitan Council and DNR, which are included in Attachment C. Responses to the comments received are provided in Attachment D, and revisions to the AUAR Update have been made as part of the response to comments.

No objections were filed by state agencies or the Metropolitan Council. The TCAAP AUAR will remain valid for an additional five years from the date of adoption of the AUAR Update by the City of Arden Hills.

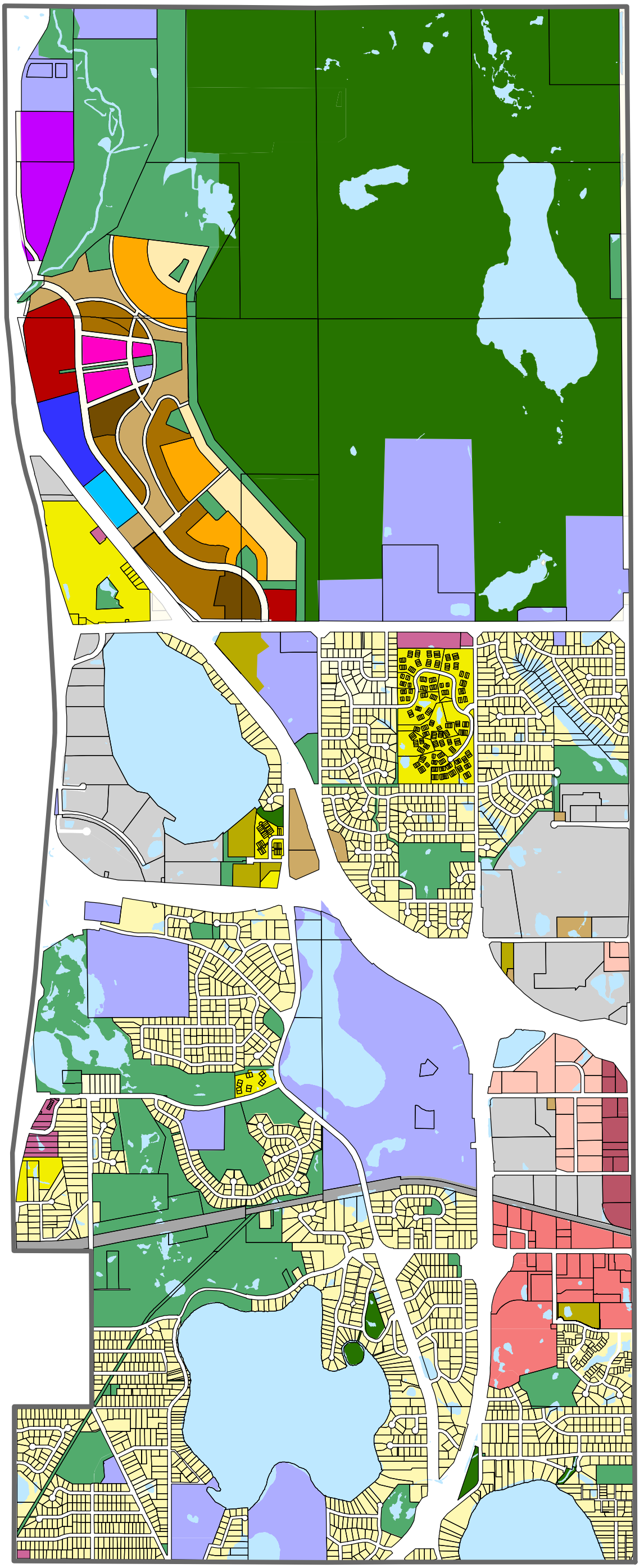
Attachment A

Land Use and Zoning Maps

TCAAP AUAR Update
July 2024

ARDEN HILLS

2040 Future Land Use



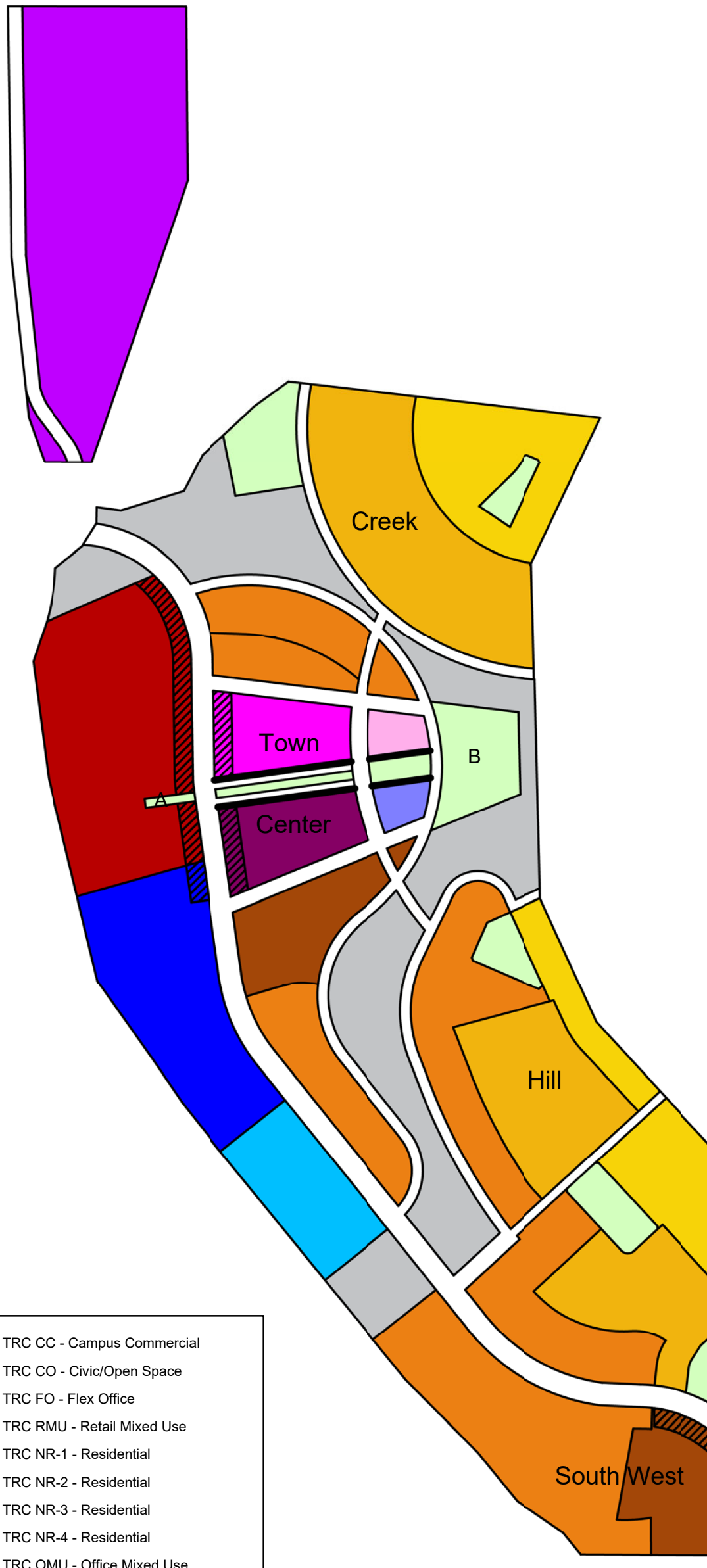
- VLDR - Very Low Density Residential
- LDR - Low Density Residential
- MDR - Medium Density Residential
- HDR - High Density Residential
- NR-1 - Neighborhood Residential
- NR-2 - Neighborhood Residential
- NR-3 - Neighborhood Residential
- NR-4 - Neighborhood Residential
- TC - Town Center
- NB - Neighborhood Business
- MB - Mixed Business
- COM - Commercial
- CMU - Community Mixed Use
- CC - Campus Commercial
- RMU - Retail Mixed Use
- OMU - Office Mixed Use
- FO - Flex Office
- IND - Light Industrial & Office
- PI - Public & Institutional
- UTL - Utility
- POS - Park & Open Space
- PP - Park Preserve
- WAT - Water
- RR - Railroad
- ROW - Right of Way

Updated: January, 2024
Source: City of Arden Hills

2040 Comprehensive Plan

0 2,500 5,000 Feet

TCAAP Regulating Plan



	Parcel	Acreage
1	Campus Commercial	40.0
2	Mixed Use Retail - West	28.4
3	Mixed Use Retail - East	6.0
4	Office Mixed Use	20.0
5	Flex Business	9.5
6	Civic	1.6
7	Water Infrastructure	45.6
8	Open Space A	0.3
9	Open Space B	5.9
10	**Creek**	42.5
11	NR -1	13.1
12	NR -2	23.7
13	Open Space	5.7
14	**Hill**	92.5
15	NR -1	29.8
16	NR -2	27.8
17	NR -3	24.5
18	Open Space	10.4
19	**Town**	45.3
20	NR -3	18.7
21	NR -4	8.7
22	TC-1	1.8
23	TC-2	6.9
24	TC-3	7.2
25	Open Space	2.0
26	**South West**	32.4
27	NR -3	21.0
28	NR -4	11.4
29	**Total**	**369.9**

Maximum Residential Units				
	Zone	Gross Density Range	Acreage	Maximum Units
Creek	NR-1	0.00 - 1.98	13.1	26
	NR-2	2.50 - 4.05	23.7	96
	Subtotal		**36.8**	**122**
Hill	NR-1	0.00 - 2.52	29.8	75
	NR-2	2.50 - 3.45	27.8	96
	NR-3	4.00 - 5.60	24.5	137
	Subtotal		**82.1**	**308**
Town Center	NR-3	4.00 - 5.66	18.6	108
	NR-4	4.00 - 21.0	8.7	183
	TC - 1	0.00 - 68.16	1.8	120
	TC - 2	0.00 - 67.02	6.9	460
	TC - 3	0.00 - 41.64	7.2	300
	Subtotal		**43.6**	**1171**
South West	NR-3	4.00 - 5.66	21.0	119
	NR-4	5.00 - 21.0	11.4	240
	Subtotal		**32.4**	**359**
	Total		**194.9**	**1960**

- TRC CC - Campus Commercial
- TRC CO - Civic/Open Space
- TRC FO - Flex Office
- TRC RMU - Retail Mixed Use
- TRC NR-1 - Residential
- TRC NR-2 - Residential
- TRC NR-3 - Residential
- TRC NR-4 - Residential
- TRC OMU - Office Mixed Use
- TRC OS - Open Space
- TRC TC-1 - Town Center
- TRC TC-2 - Town Center
- TRC TC-3 - Town Center
- TRC - Water Infrastructure
- Right of Way
- Gateway Overlay District
- Pedestrian Priority Frontage
- Pedestrian Friendly Frontage
- Property Boundary

Adopted 01-08-24

Attachment B

Traffic Analysis

TCAAP AUAR Update
July 2024

Traffic Analysis

Twin Cities Army Ammunition Plant (TCAAP)

AUAR Update

ARDEN HILLS, MINNESOTA

APRIL 2024

Prepared By:

Kimley»Horn

Contents

EXHIBITS (SEE APPENDIX A)

1.0 INTRODUCTION

This report serves as an updated traffic analysis for the Twin Cities Army Ammunition Plant (TCAAP) Alternative Urban Areawide Review (AUAR) which was originally completed in 2014. The traffic analysis was not updated as part of the 2019 AUAR Update. The TCAAP site is located east of US Highway 10 and north of Ramsey County State Aid Highway (CSAH) 96 in the City of Arden Hills, Minnesota. The development is known as Rice Creek Commons and is anticipated to include a variety of residential and commercial land uses. The location of the development is provided in **Exhibit 1**.

The forthcoming traffic analysis focused on two analysis years: the existing conditions (2024), and a long term date (2040) which will demonstrate the effects of the fully completed development on the adjacent roadway system with future growth. No interim period is included in this analysis.

1.1 REPORT PURPOSE AND OBJECTIVES

The purpose of this study is to address traffic and transportation impacts of the proposed development on surrounding streets and intersections. This traffic impact study was prepared based on criteria set forth by the AUAR guidelines. The following specific information, per AUAR recommended content, should be provided:

- *A description and map of the existing and proposed roadway system, including state, regional, and local roads to be affected by the development of the AUAR area. This information should include existing and proposed roadway capacities and existing and projected background (i.e. without the AUAR development) traffic volumes;*
- *Trip generation data – trip generation rates and trip totals – for each major development scenario broken down by land use zones and/or other relevant subdivisions of the area. The projected distributions onto the roadway system must be included;*
- *Analysis of impacts of the traffic generated by the AUAR area on the roadway system, including: comparison of peak period total flows to capacities and analysis of Level of Service and delay times at critical points (if any);*
- *A discussion of structural and non-structural improvements and traffic management measures that are proposed to mitigate problems.*

Note: in the above analyses the geographical scope must extend outward as far as the traffic to be generated would have a significant effect on the roadway system and traffic measurements and projections should include peak days and peak hours, or other appropriate measures related to identifying congestion problems, as well as ADTs (average daily traffic).

2.0 PROPOSED DEVELOPMENT

2.1 SITE LOCATION

The TCAAP site is located in the city of Arden Hills, Minnesota, and bordered by CSAH 3 (County Road I) to the north, I-35W and US Highway 10 to the west, CSAH 96 to the south, and CSAH 51 (Lexington Avenue) to the east. The AUAR study area is located in the western portion of the TCAAP site in the area that is owned by Ramsey County and is planned for redevelopment. The study area (shown in **Exhibit 1**) is approximately 429 acres in area.

2.2 SITE CIRCULATION

Access to the site will be provided primarily by two access points: County Road H east of I-35W, and a future site access which will be located opposite the church access on CSAH 96, approximately 1,500 feet east of the SB US Highway 10 Ramps. The site will have a network of internal roadway connections providing access to businesses and residential developments within the study area.

2.3 EXISTING AND FUTURE LAND USE

The traffic analysis for the 2014 AUAR included two development plans, a minimum development scenario (referred to as the Zoning Scenario) and a maximum density scenario, based on the City's TCAAP Redevelopment Code. Both scenarios included a mix of retail, residential, and non-retail commercial land uses. **Table 1** provides a summary of the two development scenarios used for this analysis, which are the same as the scenarios that were considered in the 2014 AUAR.

TABLE 1: DEVELOPMENT SCENARIOS

Zoning Scenario	
Residential	1,500 Dwelling Units
Retail	500,000 Square Feet
Non-retail commercial	1,700,000 Square Feet
Maximum Development Scenario	
Residential	2,500 Dwelling Units
Retail	550,000 Square Feet
Non-retail commercial	1,950,000 Square Feet

As of this AUAR Update, no development has occurred at the site. The full development buildout will be analyzed in the Horizon Year (2040).

3.0 EXISTING CONDITIONS

3.1 PHYSICAL CHARACTERISTICS

The existing roadway network within the study area includes I-35W, US Highway 10, CSAH 96, County Road H, and Mounds View Boulevard. Several streets that compose the existing roadway network will

carry trips generated by the AUAR development. Major characteristics of these roadways are summarized in **Table 2**.

I-35W is a north-south Interstate Highway that runs along the western boundary of the AUAR study area. Since the 2014 AUAR, there have been multiple changes to I-35W's ramps near the site. Among the changes, roundabouts were constructed at the ramps to County Road H, a roundabout was constructed at the northbound I-35W ramp to CSAH 3, and the interchange with CSAH 96 was converted to a Diverging Diamond Interchange (DDI).

US Highway 10 is an east-west United States Highway that runs along the southwest boundary of the AUAR study area. Since the previous AUAR, no major changes have taken place to the geometry of US Highway 10 near the AUAR study area.

CSAH 96 is an east-west County roadway that runs along the southern boundary of the AUAR study area. The roadway has seen no major changes since the 2014 AUAR traffic analysis besides the aforementioned DDI with I-35W.

CSAH 9 (County Road H) is an east-west county roadway that serves as one of two major access roadways to the proposed development. As previously mentioned, two roundabouts have been constructed at the I-35W ramps. The intersection of County Road H & Mounds View Boulevard was also reconstructed with significant lane changes including the expansion of County Road H to a four-lane roadway from two-lanes.

CSAH 10 (Mounds View Boulevard) is a roadway which runs generally in a northwest/southeast direction. For the purposes of this analysis, the road is considered a north-south roadway. The road ends south of the County Road H intersection where it splits off to I-35 and US Highway 10.

TABLE 2: SUMMARY OF EXISTING ROADWAY CONDITIONS

STREET NAME	STREET NUMBER	FUNCITONAL CLASSIFICATION	NUMBER OF LANES	POSTED SPEED	MEDIAN
I-35W	I-35	Principal Arterial (1)	8-12 (2)	60 mph	Yes
US Highway 10	US 10	"A" Minor Reliever (1)	4	60 mph	Yes
County Road 96 W	CSAH 96	"A" Minor Expander (1)	4	50 mph	Yes
County Road H	CSAH 9	"A" Minor Expander (1)	4	40 mph	Yes
Mounds View Boulevard	CSAH 10	"A" Minor Reliever (1)	4	50 mph	Yes

(1) City of Arden Hills – 2040 Comprehensive Plan

(2) I-35W has twelve lanes north of the US 10 interchange and eight lanes south of the interchange.

3.2 STUDY AREA

Based on discussion with City staff, the updated traffic analysis will focus on key intersections and omit fringe intersections that were originally studied as part of the 2014 AUAR Traffic Study. This is because many of the proposed mitigations from the 2014 AUAR have been implemented. The existing roadway network geometry and intersection control is shown in **Exhibit 2**. Based on the changes to geometry and the anticipated effects of the site generated traffic on the roadway network, it was determined that the following intersections would be included in this traffic study:

- County Road H & Northbound I-35W Ramps
- County Road H & Southbound I-35 W Ramps
- County Road H & Mounds View Boulevard
- CSAH 96 & Southbound US Highway 10 Ramp
- CSAH 96 & Church Access/Future Site Access

3.3 EXISTING TRAFFIC VOLUMES

Average Annual Daily Traffic (AADT) volumes were obtained from the Minnesota Department of Transportation's (MnDOT's) *Transportation Data and Analysis Traffic Volume Maps*. Daily volumes for existing roadways within the study area are summarized in **Table 3**. It should be noted that these volumes vary in year from 2011 to 2022.

TABLE 3: EXISTING AADT VOLUMES

ROADWAY	FROM	TO	AADT VOLUME (Year of Data)
I-35W	CSAH 3	CSAH 9	131,800 *(2022)*
	CSAH 96	US Highway 10	83,700 *(2022)*
US Highway 10	I-694	CSAH 96	55,000 *(2022)*
	CSAH 96	I-35W	60,200 *(2022)*
CSAH 96	I-35	US Highway 10	11,200 *(2021)*
	US Highway 10	CSAH 50	17,300 *(2021)*
	CSAH 103/CSAH 103	East of CSAH 103/CSAH 103	8,200 *(2019)*
Mounds View Boulevard	County Road H	County Road H2	19,900 *(2020)*
	County Road H	South of County Road H	23,100 *(2014)*
County Road H	Old US Highway 8	Mounds View Boulevard	9,500 *(2020)*
	Mounds View Boulevard	I-35W Southbound Ramp	5,600 *(2011)*

Kimley-Horn collected turning movement counts (TMCs) at the following study intersections on Thursday, March 7, 2024:

- County Road H & Mounds View Boulevard (AM and PM Peak Hour Counts)
- CSAH 96 & Southbound US Highway 10 Ramp (AM and PM Peak Hour Counts)
- CSAH 96 & Church Access/Future Site Access (through volumes collected from count at CSAH 96 & Snelling Avenue)

Note that at the church access, traffic volumes were determined from a count at the nearby CSAH 96 & Snelling Avenue (since there are no access points between these two intersections) and the turning volumes were taken from Ramsey County's 2024 Rice Creek Commons Traffic Study. These counts were conducted on Tuesday, October 24, 2023. Note that this count was collected for the purposes of traffic signal warrant analysis to be completed at the intersection and the existing turning volumes to and from the Northern Heights Access are anticipated to be insignificant compared to the site generated traffic.

Turning movement counts at the two roundabout intersections were collected on Tuesday, March 12, 2024.

MnDOT seasonal adjustment factors were reviewed, with most of the roadways being classified as High Weekday/Commuter roads. Counts Taken on Tuesdays and Thursdays in March both represent typical weekdays, with net adjustment factors of 1.01 and 0.97, respectively. Based on this, the collected traffic data is anticipated to be a good representation of a typical weekday and no seasonal adjustment factor was applied.

The AM peak hour of the network was determined to be 7:30 AM to 8:30 AM while the network PM peak hour was determined to be 4:15 to 5:15 PM. **Exhibit 3** provides a summary of the 2023 Existing weekday AM and PM peak hour turning movement volumes.

4.0 FUTURE CONDITIONS

4.1 FUTURE BASELINE GEOMETRY AND INTERSECTION CONTROL

Similar to the 2014 AUAR traffic analysis, some baseline conditions are assumed to be in place for all build scenarios. The only intersection with changes of geometry for the opening of the TCAAP site is the CSAH 96 & North Heights/TCAAP South Access intersection. The same baseline geometry that was assumed for the 2014 traffic analysis was utilized for this traffic analysis. The improvements include:

- Signal installed at CSAH 96 & Northern Heights/TCAAP South Access.
- Dual eastbound left turn lanes installed. (Already built but would need to be striped)
- Westbound right turn lane installed. (Already built but would need to be striped)
- Southbound approach is assumed to include dual left turn lanes, a through lane, and a right turn lane.

No further improvements from the existing geometry are anticipated at any of the study area intersections. The future build scenario baseline geometry and intersection control is shown in **Exhibit 4**.

4.2 FUTURE TRAFFIC FORECASTING

Background traffic volumes were developed for the study intersections during the weekday AM and PM peak hours for the 2040 No-Build traffic conditions. The following provides a summary of the background volume development.

Based on a review of the Metropolitan Council traffic forecasts included in the Arden Hills 2040 Comprehensive Plan, daily traffic growth is anticipated to be relatively low, with the majority of growth anticipated likely being due to the TCAAP redevelopment. **Table 4** below shows the AADTs from 2015 (existing year of the Metropolitan Council forecasts), the AADTs from 2040, and the implied growth rate.

TABLE 4: AADT GROWTH ANALYSIS

Roadway	Location	2015 AADT	2040 AADT	Growth
I-35W	North of County Road H	137000	155000	0.5%
	South of CSAH 96	102000	107000	0.2%
CSAH 96	East of US 10	18500	24000	1.0%
	East of Hamline Road	27500	28000	0.1%
US 10	North of I-694	43500	60500	1.3%
I-694	East of Silver Lake Road	115000	121000	0.2%
	East of I-35W	77000	79500	0.1%
Average Growth Rate				0.5%

The average growth rate anticipated for the study roadways is 0.5%. This growth rate is identical to the growth rate which was determined in the 2024 Rice Creek Commons Traffic Study. The determined growth rate of 0.5% was therefore applied to all study intersections to grow the traffic from 2024 to 2040. No external developments are anticipated to have a significant impact on the traffic of the study roadways.

Exhibit 5 provides the 2040 No-Build turning movement volumes at the study intersections for weekday AM and PM peak hours.

4.3 ANTICIPATED TRIP GENERATION

Trip generation for the 2014 AUAR was calculated based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual* 9th Edition. **Table 5** provides a summary of the anticipated trips generated by each development scenario included in the 2014 AUAR. These trip estimates are provided for the long-term development plans.

TABLE 5: TRIP GENERATION FORECAST (2014 AUAR)

Development Scenario	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Minimum Development	41,550	2,130	945	3,075	1,630	2,710	4,340
Maximum Development	51,140	2,440	1,350	3,790	2,120	3,185	5,305

Updated trip generation forecasts for the proposed development are based on the ITE *Trip Generation Manual* 11th Edition. Based on a comparison of **Table 5** to **Tables 6-8**, total network trip generation for the full buildout of TCAAP AUAR study area is anticipated to be slightly lower in the AM and PM peak hours than what was determined in the 2014 AUAR due to the updates to the Trip Generation Manual, despite the land development scenarios remaining unchanged.

The trip generation for the Zoning Scenario is shown below in **Table 6**. The Zoning Scenario is anticipated to generate 38,048 daily trips, including 2,911 in the AM peak hour and 4,041 in the PM peak hour.

TABLE 6: TRIP GENERATION SUMMARY – ZONING SCEANRIO

Land Use Description	ITE LUC	Intensity / Units	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Senior Adult Attached Housing	252	150 Units	486	10	20	30	21	17	38
Condominium/Townhome	230	300 Units	1,032	30	102	132	77	31	108
Rental Townhome	215	225 Units	1,620	27	81	108	76	53	128
Apartments	220	300 Units	2,022	29	91	120	96	57	153
Single Family Detached	210	525 Units	4,951	92	276	368	311	183	494
Shopping Center	820	500 kSF	18,505	260	160	420	816	884	1,700
General Office	710	1450 kSF	15,718	1,940	264	2,204	355	1,733	2,088
Building Warehousing	150	250 kSF	428	33	10	43	13	32	45
Gross Development Trips			**44,762**	**2,421**	**1,004**	**3,425**	**1,765**	**2,990**	**4,754**
Multi-Use Reduction (15%)			*-6,714*	*-363*	*-151*	*-514*	*-265*	*-449*	*-713*
Net Development Trips			**38,048**	**2,058**	**853**	**2,911**	**1,500**	**2,541**	**4,041**

The trip generation for the Maximum Density Scenario is shown below in **Table 7**. The Maximum Density Scenario is anticipated to generate 47,849 daily trips, including 3,644 in the AM peak hour and 4,950 in the PM peak hour.

TABLE 7: TRIP GENERATION SUMMARY – MAXIMUM DENSITY SCENARIO

Land Use Description	ITE LUC	Intensity / Units	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Senior Adult Attached Housing	252	150 Units	486	10	20	30	21	17	38
Condominium/Townhome	230	300 Units	1,032	30	102	132	77	31	108
Rental Townhome	215	725 Units	5,220	87	261	348	244	169	413
Apartments	220	800 Units	5,392	77	243	320	257	151	408
Single Family Detached	210	525 Units	4,951	92	276	368	311	183	494
Shopping Center	820	550 kSF	20,356	286	176	462	898	972	1,870
General Office	710	1700 kSF	18,428	2,274	310	2,584	416	2,032	2,448
Building Warehousing	150	250 kSF	428	33	10	43	13	32	45
Gross Development Trips			**56,293**	**2,889**	**1,398**	**4,287**	**2,237**	**3,587**	**5,824**
Multi-Use Reduction (15%)			*-8,444*	*-433*	*-210*	*-643*	*-336*	*-538*	*-874*
Net Development Trips			**47,849**	**2,456**	**1,188**	**3,644**	**1,901**	**3,049**	**4,950**

The trip generation for the Maximum Density Scenario with a Discount Retail Superstore is shown below in **Table 8**. The Maximum Density with Discount Retail scenario is anticipated to generate 49,686 daily trips, including 3,783 in the AM peak hour and 5,077 in the PM peak hour.

TABLE 8: TRIP GENERATION SUMMARY – MAXIMUM DENSITY SCENARIO WITH DISCOUNT RETAIL

Land Use Description	ITE LUC	Intensity / Units	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Senior Adult Attached Housing	252	150 Units	486	10	20	30	21	17	38
Condominium/Townhome	230	300 Units	1,032	30	102	132	77	31	108
Rental Townhome	215	725 Units	5,220	87	261	348	244	169	413
Apartments	220	800 Units	5,392	77	243	320	257	151	408
Single Family Detached	210	525 Units	4,951	92	276	368	311	183	494
Shopping Center	820	390 kSF	14,434	203	124	328	636	690	1,326
General Office	710	1700 kSF	18,428	2,274	310	2,584	416	2,032	2,448
Building Warehousing	150	250 kSF	428	33	10	43	13	32	45
Wholesale Retail	813	160 kSF	8,083	167	131	298	339	353	693
Gross Development Trips			**58,454**	**2,973**	**1,477**	**4,451**	**2,314**	**3,658**	**5,973**
Multi-Use Reduction (15%)			*-8,768*	*-446*	*-222*	*-668*	*-347*	*-549*	*-896*
Net Development Trips			**49,686**	**2,527**	**1,255**	**3,783**	**1,967**	**3,109**	**5,077**

4.4 PROPOSED TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of site traffic for the proposed development onto the surrounding roadway network was based on review of the study area, turning movement counts, the 2014 AUAR Traffic Analysis, and the 2024 Rice Creek Commons Traffic Impact Study. The distribution applied is similar to the two aforementioned traffic studies, with one notable change. Based on the likelihood of some level of congestion at the three County Road H intersections, it is believed that slightly more trips would utilize the south TCAAP site access than was previously estimated, and therefore 5% of the traffic originating from the south along I-35W was shifted from the north access to the south access. As a result, 55% of the total site trips would utilize the north site access and 45% would utilize the south site access, as opposed to the previous 60%/40% split between the two accesses.

Site traffic was assigned to/from the site using the same global distribution as the 2014 AUAR and the Rice Creek Commons Traffic Study with the exception of the changes described above. The following overall global distribution was applied:

- 25% to/from the north on I-35W
- 25% to/from the south on I-35W
- 20% to/from the east on CSAH 96
- 10% to/from the north on Mounds View Boulevard
- 10% to/from the north on Old US Highway 8
- 5% to/from the west on County Road H

- 5% to/from the south on US Highway 10

Proposed site traffic was assigned to the surrounding roadway network and study intersections by applying the trip distribution provided in **Exhibit 6** to the trip generation forecast for the development scenario as provided in **Tables 6, 7, and 8** for each respective scenario. **Exhibit 7** provides the project trip assignment for the Minimum Density Build (2040) scenario. **Exhibit 8** provides the project trip assignment for the Maximum Density Build (2040) scenario. **Exhibit 9** provides the project trip assignment for the Maximum Density Build with Discount Retail (2040) scenario.

4.5 TOTAL TRAFFIC

The future year (2040) build traffic volumes were calculated by adding the Year 2040 No-Build traffic volumes (**Exhibit 5**) to the site trips for the Zoning, Maximum Density, and Maximum Density with Discount Retail scenarios, which are shown in **Exhibits 8, 9, and 9**, respectively. The resultant build (2040) traffic volumes for the Zoning, Maximum Density, and Maximum Density with Discount Retail scenarios are shown in **Exhibits 10, 11, and 12**, respectively.

5.0 INTERSECTION CAPACITY ANALYSIS

5.1 ANALYSIS SCENARIOS

As part of the 2014 AUAR, the traffic analysis studied Existing (2013) conditions and Horizon Year (2030) conditions. As part of this update to the traffic analysis, the study focused on Existing (2024) and Horizon Year (2040) conditions. **Table 9** describes the conditions analyzed for the updated AUAR traffic analysis.

TABLE 9: ANALYSIS CONDITION SUMMARY

CONDITION	VOLUME AND ROADWAY NETWORK ASSUMPTIONS
Condition 1 2024 Existing	**VOLUMES:** Existing traffic volumes, as counted in April 2024.
	ROADWAY NETWORK: Existing Roadway Network
Condition 2 2040 No-Build	**VOLUMES:** Condition 1 traffic volumes grown at 0.5% annually to 2040.
	ROADWAY NETWORK: Existing Roadway Network.
Condition 3 2040 Build Zoning Scenario	**VOLUMES:** Condition 2 traffic volumes; addition of Zoning Density development site traffic.
	ROADWAY NETWORK: Existing Roadway Network plus baseline build changes to the CSAH 96 & North Heights/TCAAP access intersection (**Exhibit 4**).
Condition 4 2040 Build Maximum Development Scenario	**VOLUMES:** Condition 2 Traffic Volumes; addition of Maximum Density development site traffic.
	ROADWAY NETWORK: Existing Roadway Network plus baseline build changes to the CSAH 96 & North Heights/TCAAP access intersection (**Exhibit 4**).
Condition 5 2040 Build Maximum Development Variation	**VOLUMES:** Condition 2 Traffic Volumes; addition of Maximum Density with discount retail development site traffic.
	ROADWAY NETWORK: Existing Roadway Network plus baseline build changes to the CSAH 96 & North Heights/TCAAP access intersection (**Exhibit 4**).

5.2 LEVEL OF SERVICE OVERVIEW

An intersection capacity analysis was performed at the study intersections for the five (5) scenarios listed in **Table 9**. The capacity analysis was performed for the weekday AM and PM peak hours, and traffic modeling software was used to determine intersection delay and level of service (LOS).

LOS is a quantitative measure used by traffic engineers to describe the operations of an intersection or along a roadway segment. It ranges from A to F, with A being the best and F being the worst level of operation. LOS A conditions are characterized by minimal vehicle delay and free-flow conditions, while LOS F is characterized by long vehicle delay – usually when demand exceeds available roadway capacity. Although LOS E is defined as at-capacity, LOS D is generally the minimum acceptable level of operation at an intersection in the Twin Cities Metro area. Each study signalized and stop-controlled intersection was analyzed based on the *Highway Capacity Manual using Synchro 11/SimTraffic software.* For unsignalized intersections, LOS was reported for the worst approach and the overall intersection. This was done to ensure that the mainline LOS did not hide any potential issues on the minor street. The overall intersection LOS was reported for signalized intersections. Roundabout intersections were analyzed using roundabout analysis software *Rodel*, with results reported at 50% confidence levels.

Table 10 provides the LOS grading criteria for unsignalized and signalized intersections. For the purposes of this traffic analysis, it was assumed that acceptable level of service for the overall intersection is LOS D or better and the acceptable level of service for an individual movement is LOS E or better.

TABLE 10: LEVEL OF SERVICE GRADING CRITERIA

Level of Service	Average Control Delay (seconds/vehicle) at:	
	Unsignalized Intersections	Signalized Intersections
A	0 – 10	0 – 10
B	> 10 – 15	> 10 – 20
C	> 15 – 25	> 20 – 35
D	> 25 – 35	> 35 – 55
E	> 35 – 50	> 55 – 80
F	> 50	> 80

5.3 EXISTING (2024) CONDITIONS LEVEL OF SERVICE ANALYSIS

A capacity analysis was performed for 2024 Existing traffic conditions at the study intersections to determine existing operating conditions. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes provided in **Exhibit 3**. Existing intersection control and geometry was assumed for this analysis, as shown in **Exhibit 2**.

Table 11 provides a summary of the capacity analysis at the study intersections. Based on the analysis, all movements operate at an acceptable LOS except for the northbound left turns at Northern Heights which operates at LOS E during the PM peak hour due to the high number of through trips along CSAH 96. This movement sees a volume of less than 10 vehicles during the PM peak hour. At Mounds View Boulevard &

County Road H, some movements are anticipated to operate at LOS E during each peak hour. This is typical at high volumes intersections.

TABLE 11: EXISTING (2024) CONDITIONS DELAY AND LOS SUMMARY

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		DELAY (Sec/Veh)	LOS	DELAY (Sec/Veh)	LOS
Mounds View Boulevard & County Road H	Signal	29.0	C	33.5	C
CSAH 96 & US Highway 10 SB Ramp	Signal	24.6	C	18.2	B
CSAH 96 & Northern Heights	Side Street Stop	13.4 / 1.8	B / A	**36.9** / 2.3	**E** / A
County Road H & I-35W SB Ramp	Roundabout	3.5	A	3.0	A
County Road H & I-35W NB Ramp	Roundabout	2.8	A	4.0	A

Note 1: Overall intersection delay and LOS reported for signal control. For side-street stop control, delay and LOS are reported for the worst movement followed by the overall intersection delay and LOS.

The 95th percentile queue lengths were reviewed, and the following movements are anticipated are anticipated to be at or near capacity in the Existing (2024) conditions:

- Northbound left at Mounds View Boulevard & County Road H (AM and PM Peak Hours)
- Southbound left at US Highway 10 Ramps & CSAH 96 (AM Peak Hour)
- Eastbound left at Mounds View Boulevard & County Road H (PM Peak Hour)

5.4 NO-BUILD (2040) LEVEL OF SERVICE ANALYSIS

A capacity analysis was conducted for Year 2040 No-Build traffic conditions at the study intersections to determine baseline conditions for the study area. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes provided in **Exhibit 5**. Analysis was carried out with intersection geometry and control, as shown in **Exhibit 2**.

Table 12 provides a summary of the capacity analysis at the study intersections. Based on the analysis, all intersections are anticipated to operate at an overall LOS C or better in the AM and PM peak hours. The northbound left turn movement at CSAH 96 & Northern Heights is anticipated to worsen to LOS F during the AM peak hour, though the movement is not anticipated to see an increase in volume and is inconsequential because of this. At Mounds View Boulevard & County Road H, the northbound left turn movement is anticipated to operate at LOS F during the AM peak hour with multiple other movements at this intersection operating at LOS E during the AM and PM peak hours. Both roundabout intersections are anticipated to see negligible increases in traffic levels and delays.

TABLE 12: NO-BUILD CONDITIONS (2040) DELAY AND LOS SUMMARY

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		DELAY (Sec/Veh)	LOS	DELAY (Sec/Veh)	LOS
Mounds View Boulevard & County Road H	Signal	33.3	C	36.6	D
CSAH 96 & US Highway 10 SB Ramp	Signal	25.4	C	19.3	B
CSAH 96 & Northern Heights	Side Street Stop[1]	**55.9** / 1.9	**F** / A	31.5 / 2.4	D / A
County Road H & I-35W SB Ramp	Roundabout[2]	3.5	A	3.1	A
County Road H & I-35W NB Ramp	Roundabout[2]	2.9	A	4.0	A

Note 1: Overall intersection delay and LOS reported for signal control. For side-street stop control, delay and LOS are reported for the worst movement followed by the overall intersection delay and LOS.

The 95th percentile queue lengths were reviewed, and the following movements are anticipated are anticipated to be at or near capacity in the No-Build (2040) conditions:

- Northbound left at Mounds View Boulevard & County Road H (AM and PM Peak Hours)
- Southbound left at US Highway 10 Ramps & CSAH 96 (AM Peak Hour)
- Eastbound left at Mounds View Boulevard & County Road H (PM Peak Hour)

All movements listed above are the same as the Existing (2024) conditions. No significant queueing issues are anticipated to occur in the No-Build (2040) scenario.

5.5 ZONING SCENARIO BUILD (2040) LEVEL OF SERVICE ANALYSIS

A capacity analysis was performed for Year 2040 Zoning Scenario traffic conditions at the study intersections to determine the low-end impacts of the proposed development. The Baseline build geometry was assumed to be in place, as shown by **Exhibit 4**. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes provided in **Exhibit 10**. These volumes were calculated by adding together the following:

- Horizon Year (2040) No-Build Traffic Volumes (**Exhibit 5**)
- Zoning Scenario Site Trips (**Exhibit 7**)

Table 13 provides a summary of the capacity analysis at the study intersections. Based on the analysis, all intersections are operating LOS D or better with the exception of Mounds View Boulevard & County Road H which is anticipate to operate at LOS E during the PM peak hour. The intersection is anticipated to see generally poor operations due to the amount of site traffic added to an already busy intersection. Since the intersection has dual left turn lanes for all except for the northbound approach and right turn lanes at all approaches, there is very little potential for further improvements at this intersection and the only way to improve operations would likely be diverting traffic away from it. It was previously proposed in the 2014 AUAR that access to I-35W south be added to the southbound ramp intersection. However, changes along I-35W and the implementation of the roundabout have made this improvement an unlikelihood. The intersection should be monitored, and if the operations of the intersection are concerning, mitigations to reduce congestion at Mounds View Boulevard & County Road H should be explored.

TABLE 13: ZONING SCENARIO (2040) BUILD DELAY AND LOS SUMMARY

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		DELAY (Sec/Veh)	LOS	DELAY (Sec/Veh)	LOS
Mounds View Boulevard & County Road H	Signal	40.0	D	**63.1**	**E**
CSAH 96 & US Highway 10 SB Ramp	Signal	33.0	C	21.7	C
CSAH 96 & Northern Heights	Signal	26.5	C	23.2	C
County Road H & I-35W SB Ramp	Roundabout[1]	5.2	A	4.6	A
County Road H & I-35W NB Ramp	Roundabout[1]	4.1	A	8.5	A

Note 1: At Roundabouts, Overall delay is reported at 85% / 50% confidence. Total intersection delay is reported, including bypasses. Level of service is reported based on unsignalized LOS guidelines.

The 95th percentile queue lengths were reviewed, and NB, EB, and WB left turning movements at Mounds View Boulevard & County Road H are anticipated to have 95th percentile queues that are approaching their storage capacity or have through movement queues that extend beyond the turn lanes which prevents vehicles from getting into the turn lane until through queues dissipate. It is not anticipated that queuing at the intersection would impact adject intersections.

At the CSAH 96 & US Highway 10 SB Ramps, the southbound left is anticipated to see 95th percentile queues exceed their storage length, but the queues are not anticipated to impact traffic along the freeway. The westbound left turn lane is nearing its capacity during the AM peak hour.

At the south TCAAP access (CSAH 96 & Northern Heights), queueing of the added southbound approach is anticipated to be sufficient with the proposed layout.

5.6 MAXIMUM DENSITY SCENARIO BUILD (2040) LEVEL OF SERVICE ANALYSIS

A capacity analysis was performed for Year 2040 Maximum Density Scenario build traffic conditions to determine mitigation measures necessary to ensure acceptable LOS at the study intersections for the high-end development scenario. The baseline build geometry is assumed to be in place, as is shown in **Exhibit 4**. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes provided in **Exhibit 11**. These volumes were calculated by adding together the following:

- Design Year (2040) No-Build Traffic Volumes (**Exhibit 5**)
- Maximum Density Scenario Total Site Trips (**Exhibit 8**)

Table 14 provides a summary of the capacity analysis at the study intersections. In general, delays are anticipated to be slightly higher than the Zoning Build (2040) scenario, with all intersections continuing to operate at LOS D or better with the exception of the aforementioned Mounds View Boulevard & County Road H intersection which is anticipated to continue to operate at LOS E during the PM peak hour.

TABLE 14: MAXIMUM DENSITY SCENARIO (2040) BUILD DELAY AND LOS SUMMARY

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		DELAY (Sec/Veh)	LOS	DELAY (Sec/Veh)	LOS
Mounds View Boulevard & County Road H	Signal	41.2	D	**67.3**	**E**
CSAH 96 & US Highway 10 SB Ramp	Signal	35.2	D	21.7	C
CSAH 96 & Northern Heights	Signal	27.7	C	23.2	C
County Road H & I-35W SB Ramp	Roundabout	6.1	A	5.9	A
County Road H & I-35W NB Ramp	Roundabout	4.8	A	14.8	B

Note 1: Overall intersection delay and LOS reported for signal control. For side-street stop control, delay and LOS are reported for the worst movement followed by the overall intersection delay and LOS.

Similar to the zoning density scenario, NB, EB, and WB left turning movements at Mounds View Boulevard & County Road H are anticipated to have 95th percentile queues that are approaching their storage capacity or have through movement queues that extend beyond the turn lanes which prevents vehicles from getting into the turn lane until through queues dissipate. It is not anticipated that queuing at the intersection would impact adject intersections.

At the CSAH 96 & US Highway 10 SB Ramps, the southbound left is anticipated to see 95th percentile queues exceed their storage length, but the queues are not anticipated to impact traffic along the freeway. The westbound left turn lane is nearing its capacity during the AM peak hour.

At the south TCAAP access (CSAH 96 & Northern Heights), queueing of the added southbound approach is anticipated to be sufficient with the proposed layout if the southbound through lane is striped as a shared through/right turn lane. The southbound left turn storage lanes may need to be extended to 400' in length, to accommodate anticipated queues.

5.7 MAXIMUM DENSITY SCENARIO WITH DISCOUNT RETAIL (2040) LEVEL OF SERVICE ANALYSIS

A capacity analysis was performed for Maximum Density Scenario Build (2040) traffic conditions at the study intersections to determine the traffic impacts of the highest intensity scenario of the proposed alternatives. The roadways were modeled with future baseline geometry and signal, as shown in **Exhibit 4**. The analysis was performed for weekday AM and PM peak hours and is based on the traffic volumes provided in **Exhibit 12**. These volumes were calculated by adding together the following:

- Design Year (2040) No-Build Traffic Volumes (**Exhibit 5**)
- Maximum Density Scenario Total Site Trips (**Exhibit 9**)

Table 15 provides a summary of the capacity analysis at the study intersections. Based on the analysis, the roadway network is anticipated to see a significant decline in operations compared to the 2040 No-Build scenario, with some intersections being at or near capacity. The intersection of Mounds View Boulevard & County Road H is anticipated to operate at LOS E during the PM peak hour with over 70

seconds of delay per vehicle. The eastbound through, westbound left, northbound left, and southbound left movements are all anticipated to operate at LOS F during the PM peak hour.

TABLE 15: MAXIMUM DENSITY WITH DISCOUNT RETAIL (2040) CONDITIONS DELAY AND LOS SUMMARY

INTERSECTION	TRAFFIC CONTROL	AM PEAK HOUR		PM PEAK HOUR	
		DELAY (Sec/Veh)	LOS	DELAY (Sec/Veh)	LOS
Mounds View Boulevard & County Road H	Signal	38.8	D	**74.1**	**E**
CSAH 96 & US Highway 10 SB Ramp	Signal	40.1	D	22.4	C
CSAH 96 & Northern Heights	Signal	31.7	C	25.3	C
County Road H & I-35W SB Ramp	Roundabout	6.8	A	6.4	A
County Road H & I-35W NB Ramp	Roundabout	6.3	A	19.3	C

Note 1: Overall intersection delay and LOS reported for signal control. For side-street stop control, delay and LOS are reported for the worst movement followed by the overall intersection delay and LOS.

Mounds View Boulevard & County Road H are anticipated to have multiple 95th percentile queues that extend past their storage. While many of the queues at this intersection will exceed their storage, none are anticipated extend into major intersections or restrict the flow of traffic. The northbound approach is anticipated to see 95th percentile queues of over 1,000' in length but this is still far from long enough to affect I-35W or US Highway 10.

At the CSAH 96 & US Highway 10 SB Ramps, the southbound left is anticipated to see 95th percentile queues exceed their storage length, but the queues are still far from impacting traffic along the freeway. The westbound left turn lane is nearing its capacity during the AM peak hour.

At the TCAAP access (CSAH 96 & Northern Heights), queueing of the added southbound approach is anticipated to be sufficient with the proposed layout, if the through lane is striped as a shared through/right turn lane. The southbound left turn storage lanes may need to be in excess of 300' in length, based on the results. Note that this intersection is anticipated to operate better than what was anticipated by the Rice Creek Commons Traffic Study and the 2014 AUAR Traffic Analysis due to the existing traffic counts showing significantly lower through volumes along CSAH 96 than either of those traffic studies. The turning movement counts collected for this study are anticipated to be a good representation of a typical weekday, based on review of MnDOT seasonal adjustment factors.

Based on a sensitivity test, the County Road H & I-35W NB Ramp is nearing its capacity in this scenario. A confidence level of 50% shows the northbound approach operating at LOS D. If this level of development occurred, the roundabout would most likely operate acceptably but some operational and queueing issues would likely be present, particularly at the westbound approach exiting the TCAAP site. The intersection should be monitored if this level of development is realized.

5.8 SIGNAL WARRANT ANALYSIS

A signal warrant analysis was conducted at the TCAAP south access point of CSAH 96 & North Heights to determine if the proposed development will justify a signal in the build conditions of year 2040. Volumes were developed using the time of day distributions given by the ITE Trip Generation Manual 11th Edition. The analysis was conducted using the Minnesota Manual on Uniform Traffic Control Devices methodologies. Side-street right turns were fully excluded since there will be (at least one) separated right turn lane for the southbound approach. Results of the signal warrant analysis of the Zoning Build (2040) scenario is shown below in **Table 16**.

TABLE 16: SIGNAL WARRANT RESULTS SUMMARY

Warrant	Description	Hours Met	Hours Required	Satisfied/ Not Satisfied
Zoning Build Scenario (2040)				
Warrant 1A	Eight-Hour (Min. Vehicular Volume)	**12**	8	**Satisfied**
Warrant 1B	Eight-Hour (Interruption of Continuous Traffic)	**13**	8	**Satisfied**
Warrant 1C	Eight-Hour (Combination of 1A and 1B)	**12**	8	**Satisfied**
Warrant 2	Four-Hour	**13**	4	**Satisfied**
Warrant 3	Peak Hour	**12**	1	**Satisfied**

Results of the signal warrant analysis for the Zoning Build Scenario(2040) shows that the intersection is anticipated to satisfy all analyzed signal warrants. It is anticipated that a signal would be built as parcels start to develop on the site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The TCAAP AUAR has been updated based on the current development plans and updated traffic counts. The 2014 AUAR traffic analysis provided a review of Existing (2014) Conditions, project traffic forecasts based on multiple development scenarios, and an analysis of future operating conditions to assist in developing a mitigation plan for Long-Term (2030) conditions. Below is a summary of the current (2024) traffic analysis.

6.1 EXISITNG LEVEL OF SERVICE ANALYSIS SUMMARY

A capacity analysis was performed for the Existing (2024) traffic conditions at the study intersections to determine existing operating conditions. The analysis was performed for weekday AM and PM peak hours. Existing intersection control and geometry was assumed for this analysis. Based on the analysis, all intersections operate at LOS C or better, except for CSAH 96 & North Heights, at which the northbound left turn movement operates at LOS E during the PM peak hour. Because this is a very minor movement and the intersection will be signalized in the future, no mitigation is proposed.

The 95th percentile queue lengths were reviewed, and the following movements are anticipated are anticipated to be at or near capacity in the Existing (2024) conditions:

- Northbound left at Mounds View Boulevard & County Road H (AM and PM Peak Hours)
- Southbound left at US Highway 10 Ramps & CSAH 96 (AM Peak Hour)
- Eastbound left at Mounds View Boulevard & County Road H (PM Peak Hour)

6.2 TRIP GENERATION & TRAFFIC DEVELOPMENT

The development plans have not seen any major changes since the 2014 AUAR analysis. The trip generation was reevaluated using the latest 11th Edition of the Trip Generation Manual. The 2014 AUAR analysis analyzed two (2) scenarios, with the trip generation ranging from 41,550 daily trips in the Zoning Scenario to 51,140 daily trips in the Maximum Density Scenario.

For the 2024 traffic analysis, a modified Maximum Density Scenario was analyzed, in addition to the Zoning and Maximum Density Scenarios, which replaced some of the general retail space with a discount superstore. This land use typically generates significantly more trips than other retail land uses. Trip generation ranged from 38,048 daily trips in the Zoning Scenario to 49,686 in the Maximum Density Scenario with discount retail, both of which are slightly lower than what was analyzed in the 2014 AUAR Traffic Analysis. The Maximum Density Scenario with discount retail is anticipated to generate 3,783 trips during the AM peak hour and 5,077 trips during the PM peak hour.

6.3 YEAR 2040 NO-BUILD LEVEL OF SERVICE ANALYSIS SUMMARY

A capacity analysis was performed for Year 2040 No-Build traffic conditions at the study intersections to determine baseline conditions for the 2040 analysis year. Existing intersection control and geometry was assumed for this analysis.

Based on the analysis, all intersections are anticipated to operate at acceptable LOS except for the northbound left turns at CSAH 96 & North Heights which are anticipated to operate at LOS F. No mitigation is proposed, as this is a very minor movement with a volume of less than 20 vehicles during each peak hour.

The 95th percentile queue lengths were reviewed, and the following movements are anticipated are anticipated to be at or near capacity in the No-Build (2040) conditions:

- Northbound left at Mounds View Boulevard & County Road H (AM and PM Peak Hours)
- Southbound left at US Highway 10 Ramps & CSAH 96 (AM Peak Hour)
- Eastbound left at Mounds View Boulevard & County Road H (PM Peak Hour)

6.4 ZONING BUILD (2040) LEVEL OF SERVICE ANALYSIS SUMMARY

A capacity analysis was performed for the Zoning Scenario Build (2040) traffic conditions at the study intersections to determine if the addition of project traffic significantly impacts operating conditions of the study intersections. The baseline build geometry was assumed at the CSAH 96 & North Heights/TCAAP Access intersection which included signalization, dual eastbound and southbound left turn lanes, and a westbound and southbound right turn lane.

Based on the analysis, all intersections are operating at acceptable LOS with the exception of Mounds View Boulevard & County Road H which is anticipated to operate at LOS E during the PM peak hour. Some of the individual movements including eastbound through and all left turn movements are anticipated to

operate at LOS F during this time. The intersection is not anticipated to impact adjacent intersections or the highways. No mitigation is proposed.

6.5 MAXIMUM DENSITY BUILD (2040) LEVEL OF SERVICE ANALYSIS SUMMARY

A capacity analysis was performed for Maximum Density Scenario Build (2040) traffic conditions at the study intersections to determine baseline conditions for the 2040 analysis year. The baseline build geometry was assumed at the CSAH 96 & North Heights/TCAAP Access intersection.

Based on the analysis, all intersections are operating at acceptable LOS with the exception of Mounds View Boulevard & County Road H which is anticipated to operate at LOS E during the PM peak hour, with higher delays than in the Zoning Scenario. Some of the individual movements including eastbound through and all left turn movements are anticipated to operate at LOS F during this time. The intersection is not anticipated to impact adjacent intersections or the highways, but it is recommended to monitor the intersection.

At the CSAH 96 & North Heights/TCAAP South Access intersection, southbound right turns are anticipated to see queues extend beyond the storage capacity. It is recommended that the southbound through lane be striped as a shared through/right turn lane to allow two lanes for right turns.

6.6 MAXIMUM DENSITY BUILD WITH DISCOUNT RETAIL (2040) LEVEL OF SERVICE ANALYSIS SUMMARY

A capacity analysis was performed for Maximum Density Build with Discount Retail (2040) traffic conditions at the study intersections to determine baseline conditions for the 2040 analysis year. The baseline build geometry was assumed at the CSAH 96 & North Heights/TCAAP South Access intersection.

Based on the analysis, all intersections are operating at acceptable LOS with the exception of Mounds View Boulevard & County Road H which is anticipated to operate at LOS E during the PM peak hour, with the overall delay nearing LOS F. Many of the individual movements are anticipated to operate at LOS F during the PM peak hour. The intersection is not anticipated to impact adjacent intersections or the highways, but it is recommended to monitor the intersection.

At the CSAH 96 & North Heights/TCAAP South Access intersection, southbound right turns are anticipated to see queues extend beyond the storage capacity. It is recommended that the southbound through lane be striped as a shared through/right turn lane to allow two lanes for right turns.

6.7 MITIGATION PLAN

The following provides a summary of mitigation improvements that were identified as part of the traffic analysis for the TCAAP development. All mitigation improvements that are recommended were previously identified in the 2014 AUAR. The year 2040 geometry, traffic control, and mitigations are shown in **Exhibit 14**.

2030 No-Build Conditions (Recommendations from 2014 AUAR)

- Mounds View Boulevard & County Road H – Construct separate westbound left and through lanes.

- **2024 AUAR Update – Dual left turns and through lanes have been constructed for the westbound approach.**

2030 Minimum Development Build Conditions (Recommendations from 2014 AUAR)

- Mounds View Boulevard & County Road H – Construct dual eastbound left turn lanes.
  - **2024 AUAR Update – Dual left turn lanes have been constructed for the eastbound approach.**
- CSAH 96 & North Heights/TCAAP South Access – Install additional through lane in the westbound direction.
  - **2024 AUAR Update – Based on the results of the traffic analysis, this is no longer believed to be a necessary mitigation.**

2030 Maximum Development Build Conditions (Recommendations from 2014 AUAR)

- Install I-35W northbound ramp connecting to the roundabout along County Road H.
  - **2024 AUAR Update – Northbound I-35W exit was constructed along with the construction of the roundabout on County Road H.**

2040 Build Conditions (New Mitigations Proposed)

- CSAH 96 & North Heights/TCAAP Access – Change the lane use of the southbound through lane to allow right turns as well.

APPENDICIES

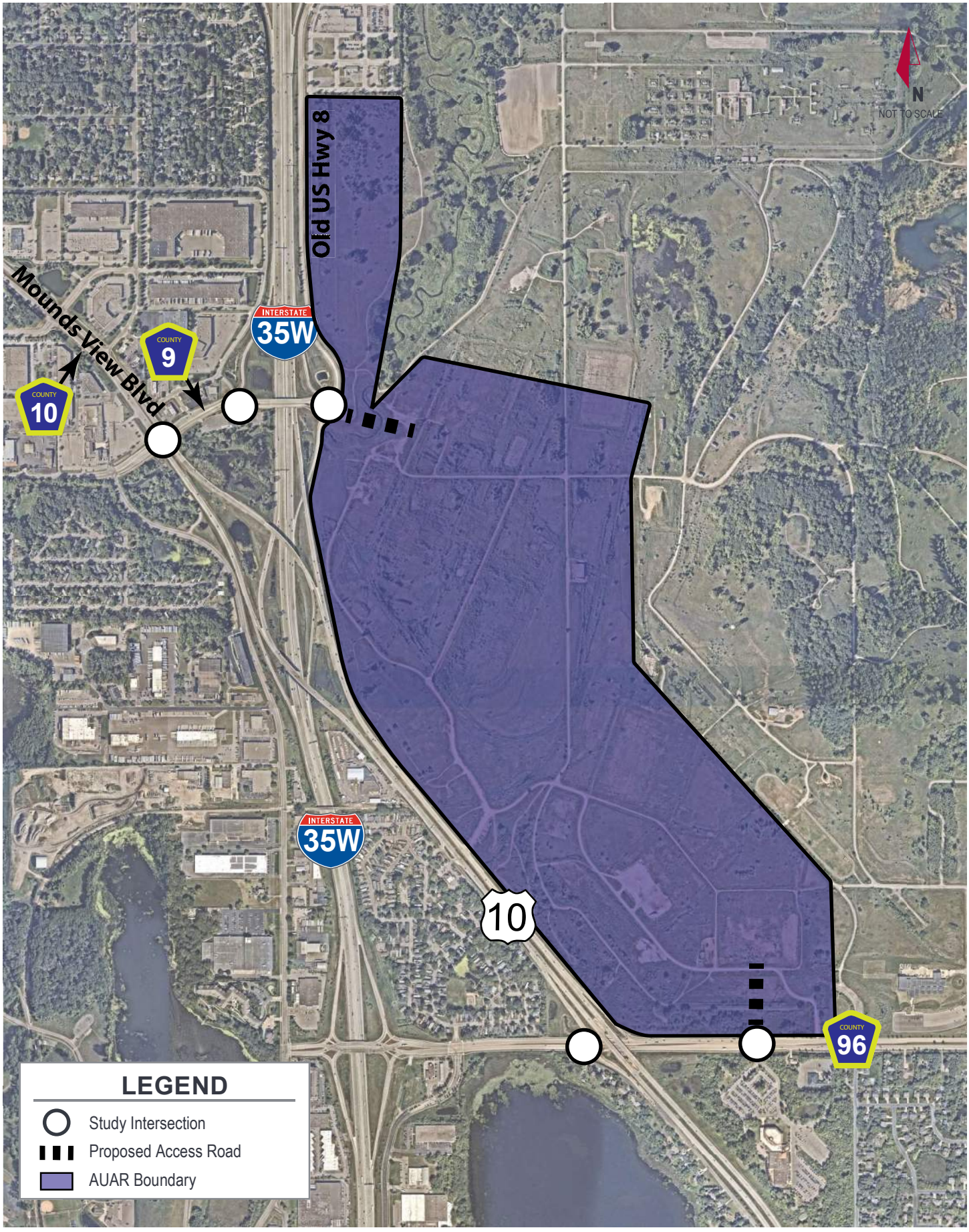
APPENDIX A: EXHIBITS

APPENDIX B: TURNING MOVEMENT COUNTS

APPENDIX C: SIMTRAFFIC AND RODEL REPORTS

I. EXISTING TRAFFIC REPORTS
II. 2040 NO-BUILD TRAFFIC REPORTS
III. 2040 MINIMUM DENSITY BUILD TRAFFIC REPORTS
IV. 2040 MAXIMUM DENSITY BUILD TRAFFIC REPORTS
V. 2040 MAXIMUM DENSITY ALTERNATE BUILD TRAFFIC REPORTS
VI. 2040 MAXIMUM DENSITY ALTENRATE BUILD TRAFFIC REPORTS (MITIGATED)

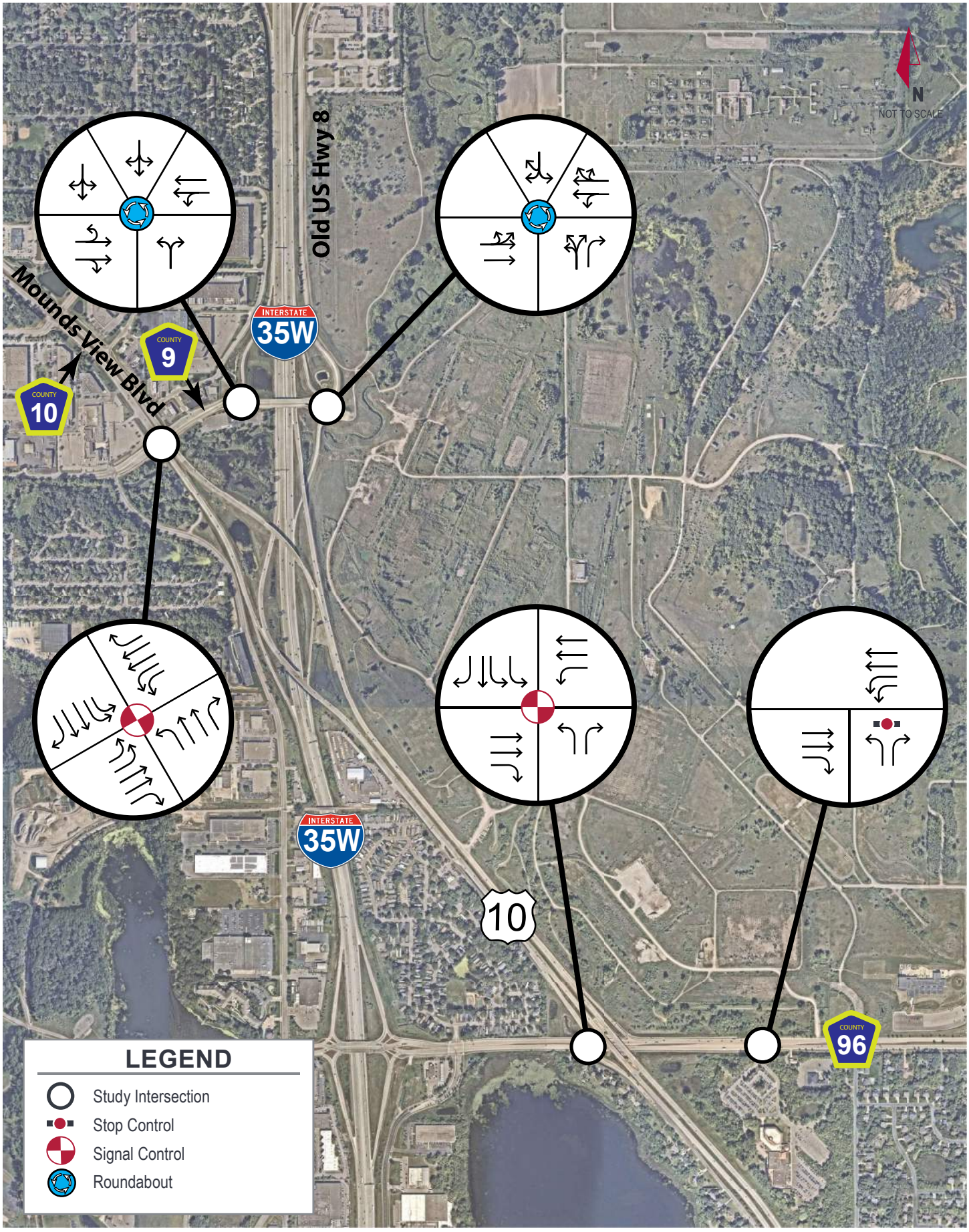
Appendix A: Exhibits



Kimley»Horn

EXHIBIT 1

PROJECT LOCATION MAP



Kimley»Horn

EXHIBIT 2

EXISTING YEAR (2024) GEOMETRY AND INTERSECTION CONTROL

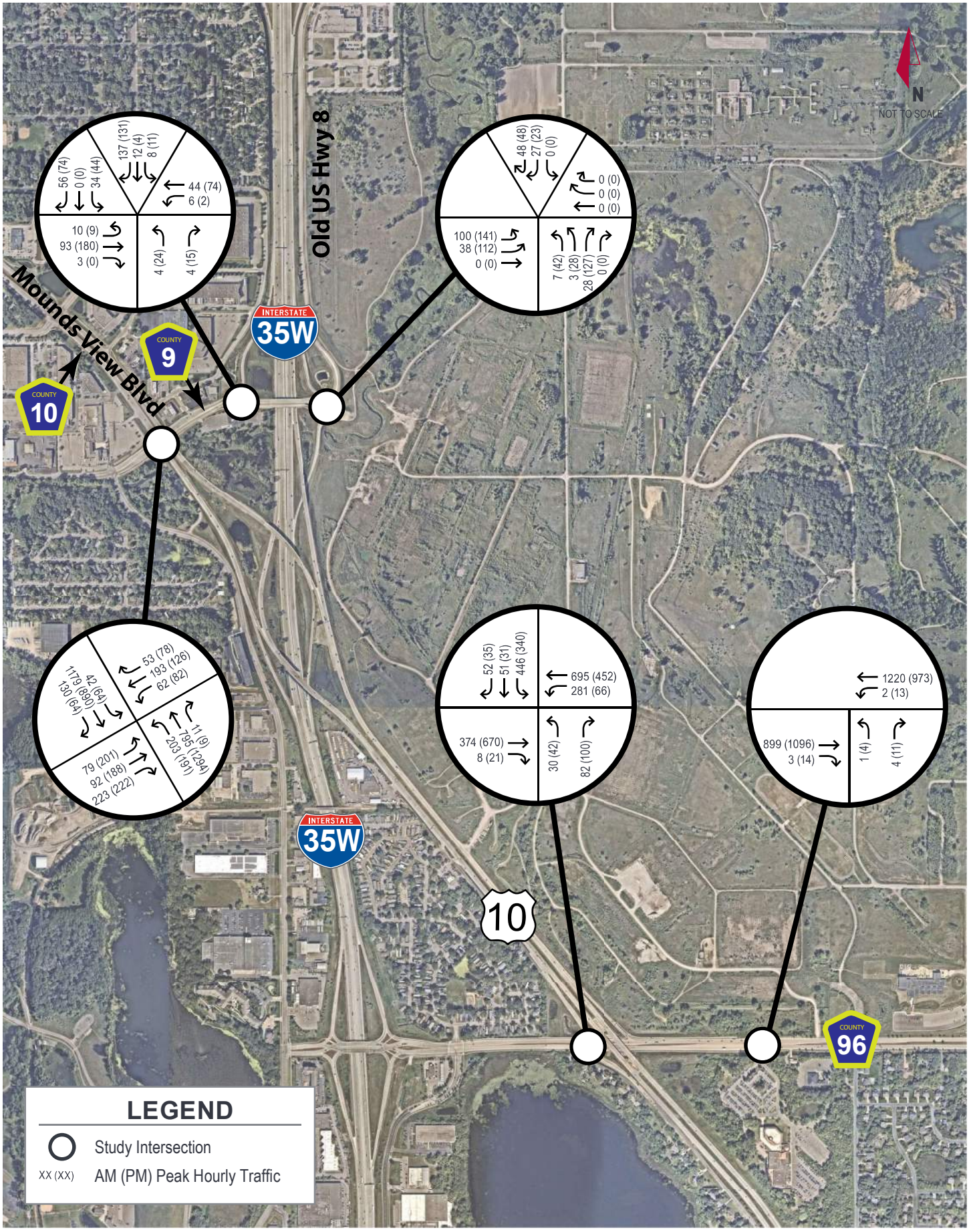


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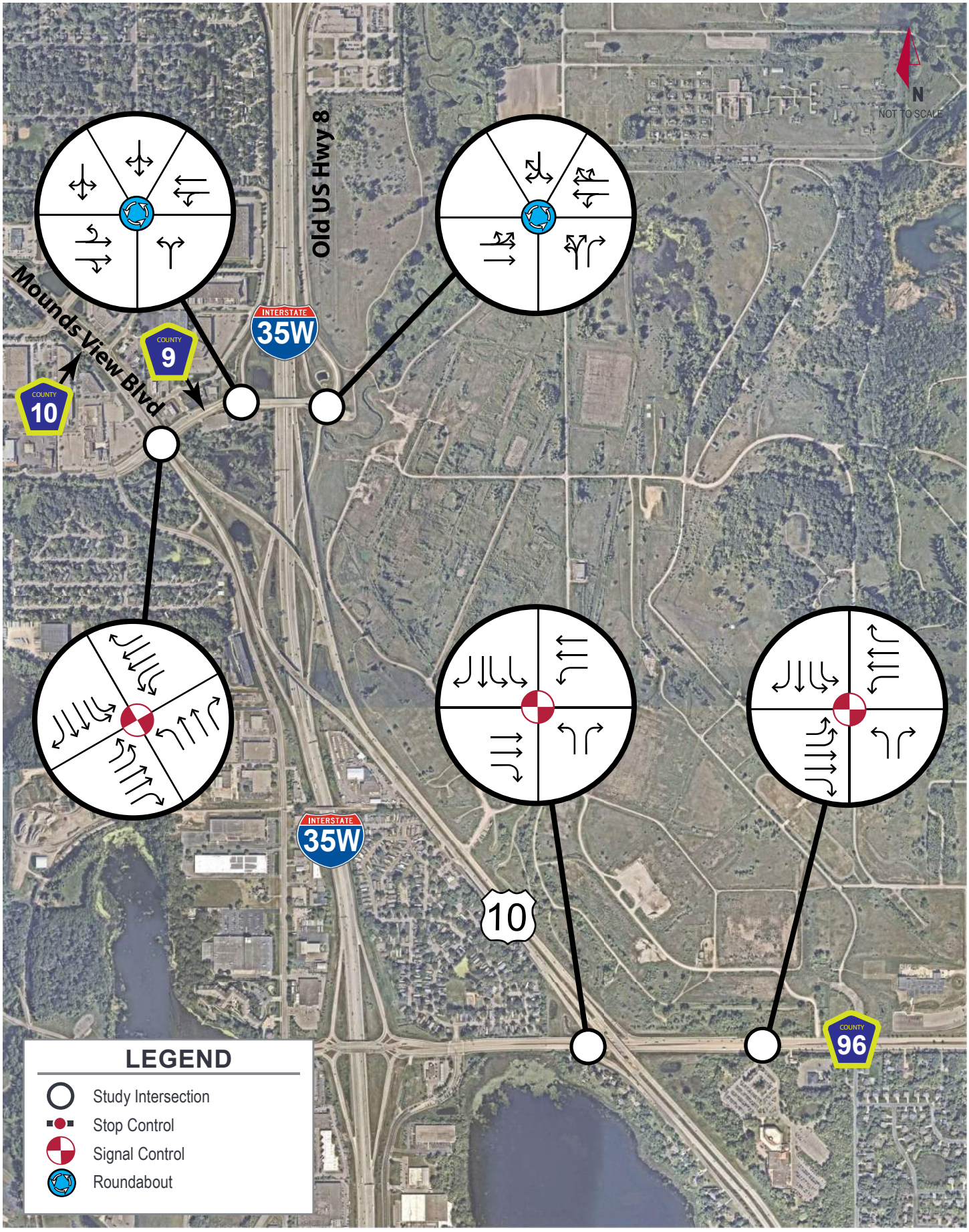
EXHIBIT 3

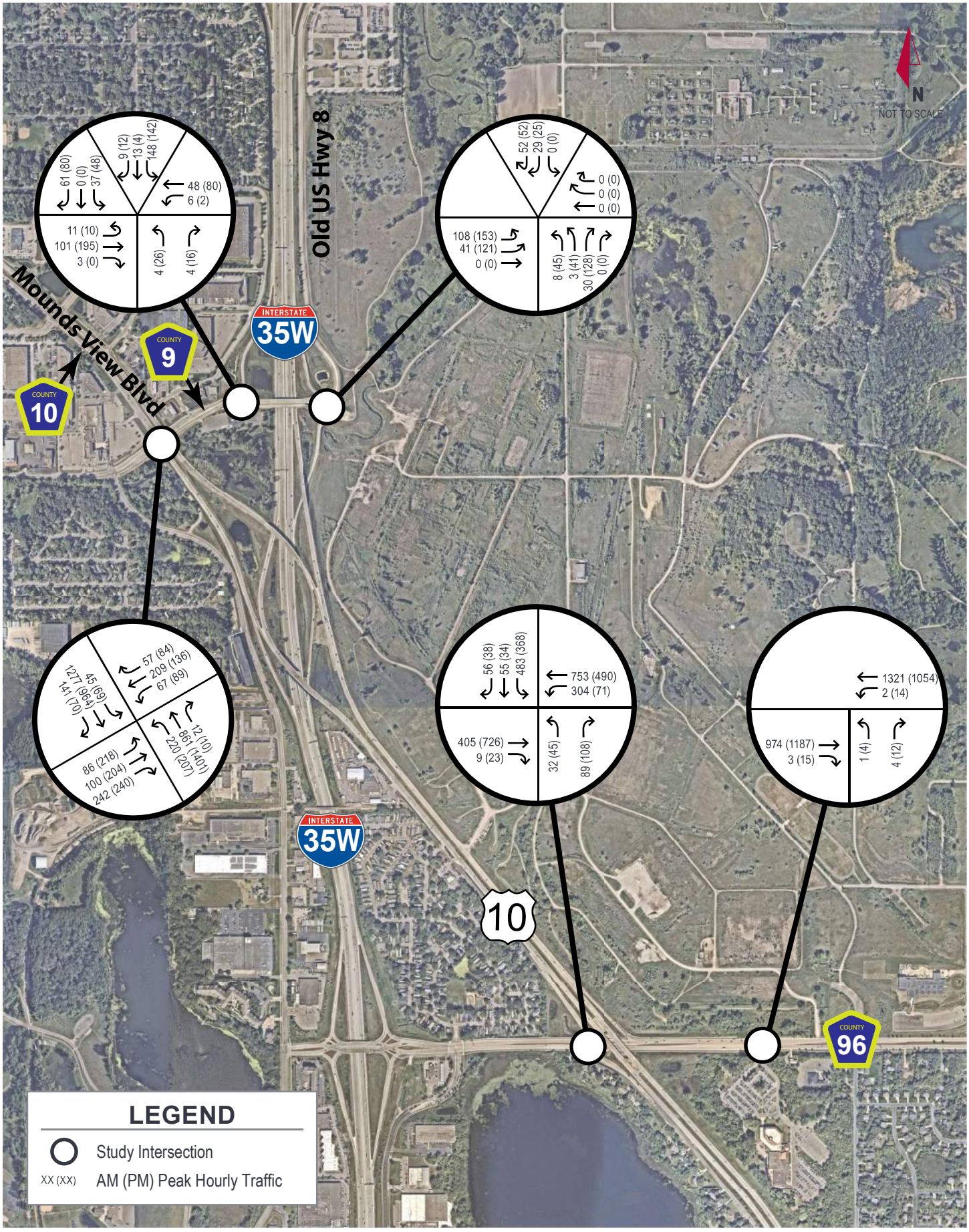
EXISTING YEAR (2024) TRAFFIC VOLUMES



Kimley»Horn

EXHIBIT 4

BASELINE BUILD (2040) GEOMETRY AND INTERSECTION CONTROL



Kimley»Horn

EXHIBIT 5

HORIZON YEAR (2040) NO-BUILD TRAFFIC VOLUMES

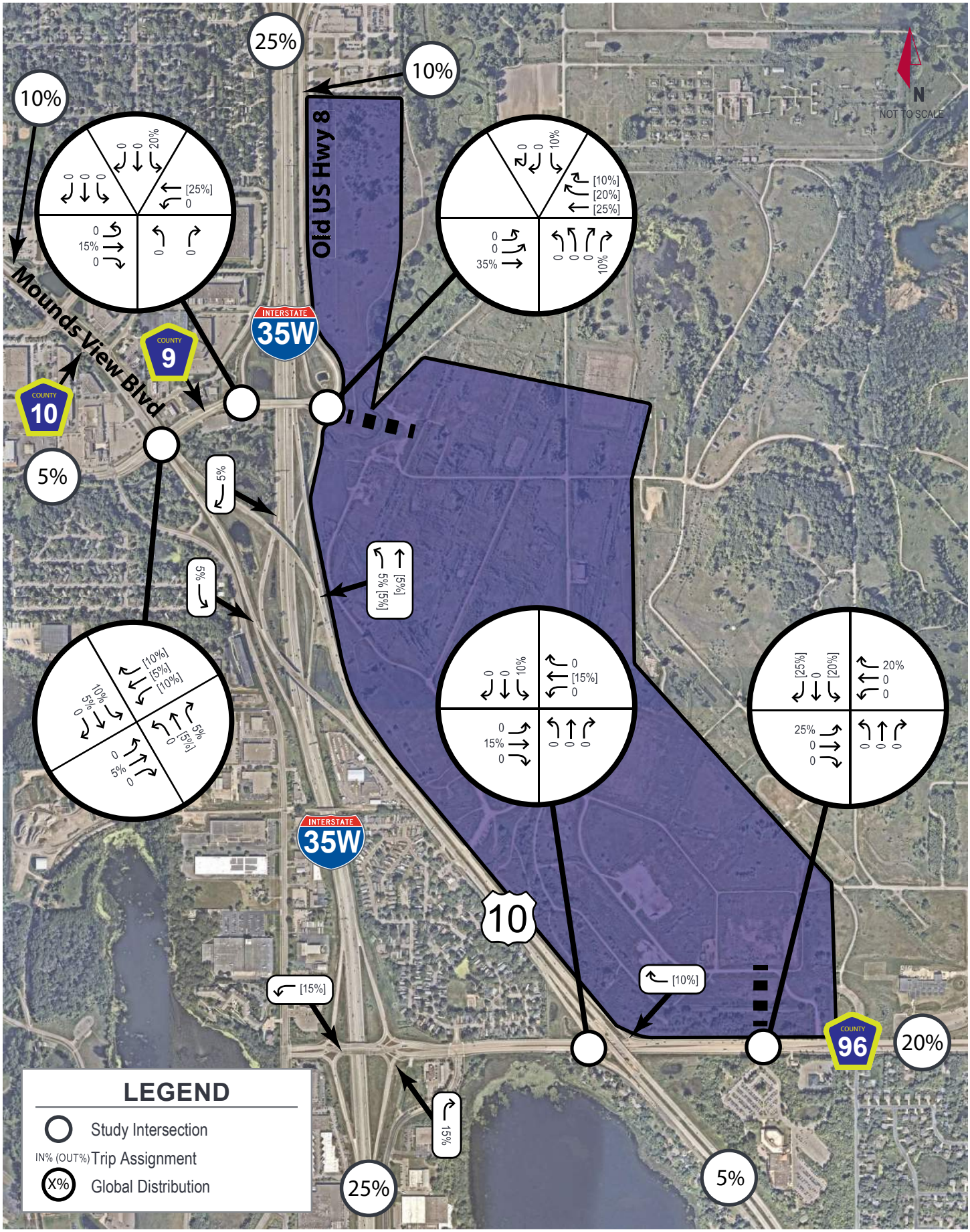


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EXHIBIT 6
TRIP DISTRIBUTION

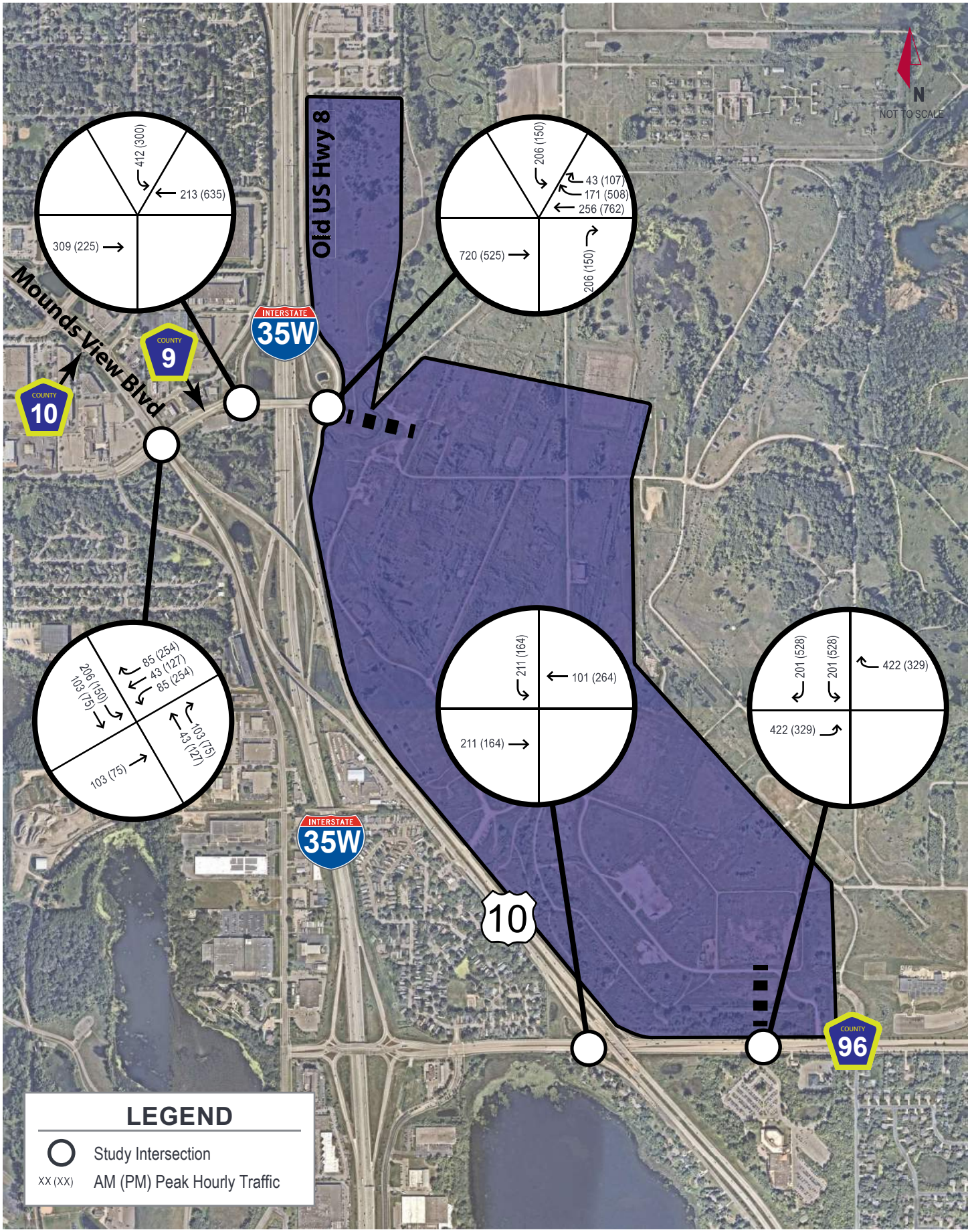

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EXHIBIT 7

SITE TRAFFIC - ZONING SCENARIO

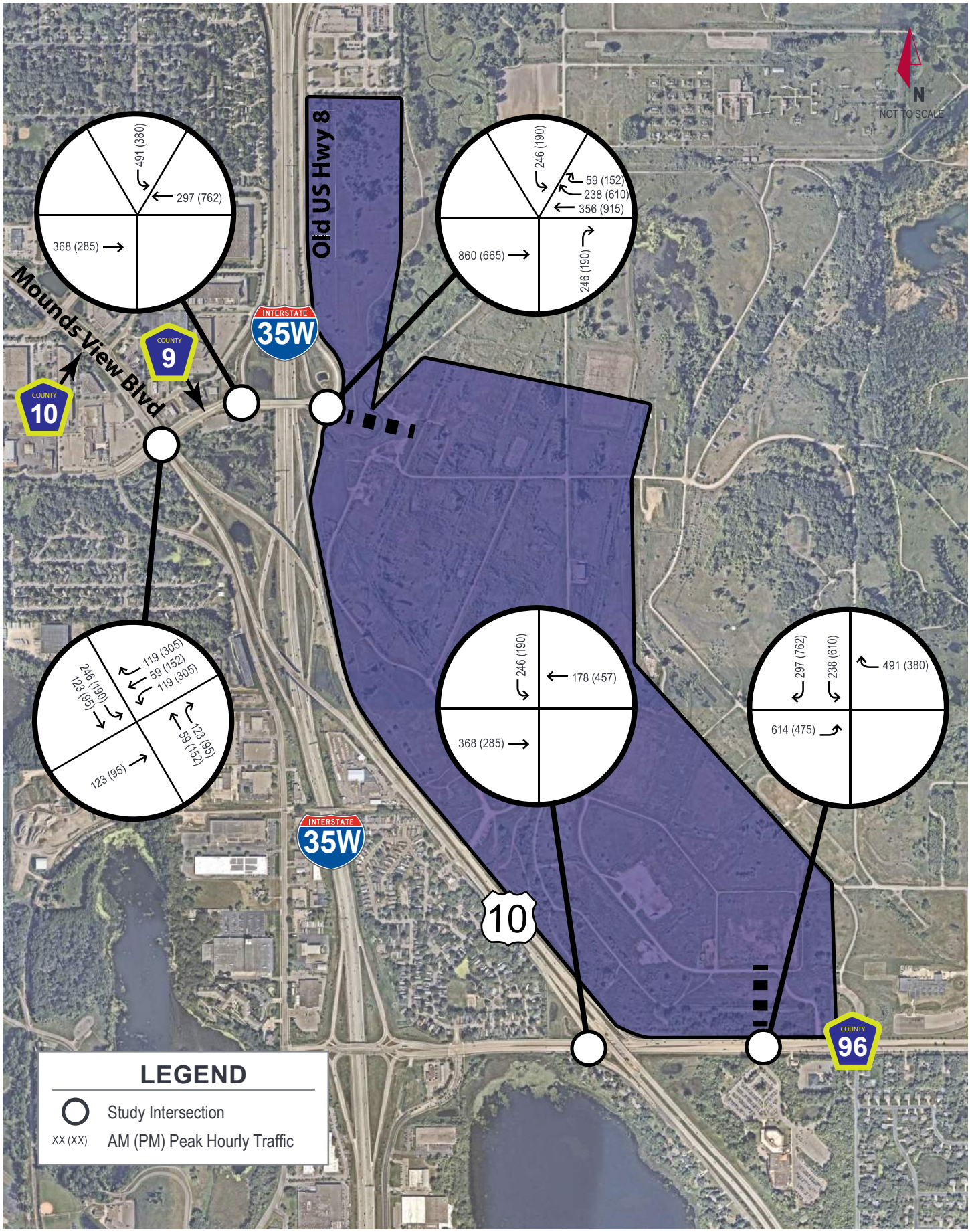

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EXHIBIT 8

SITE TRAFFIC - MAXIMUM DENSITY SCENARIO

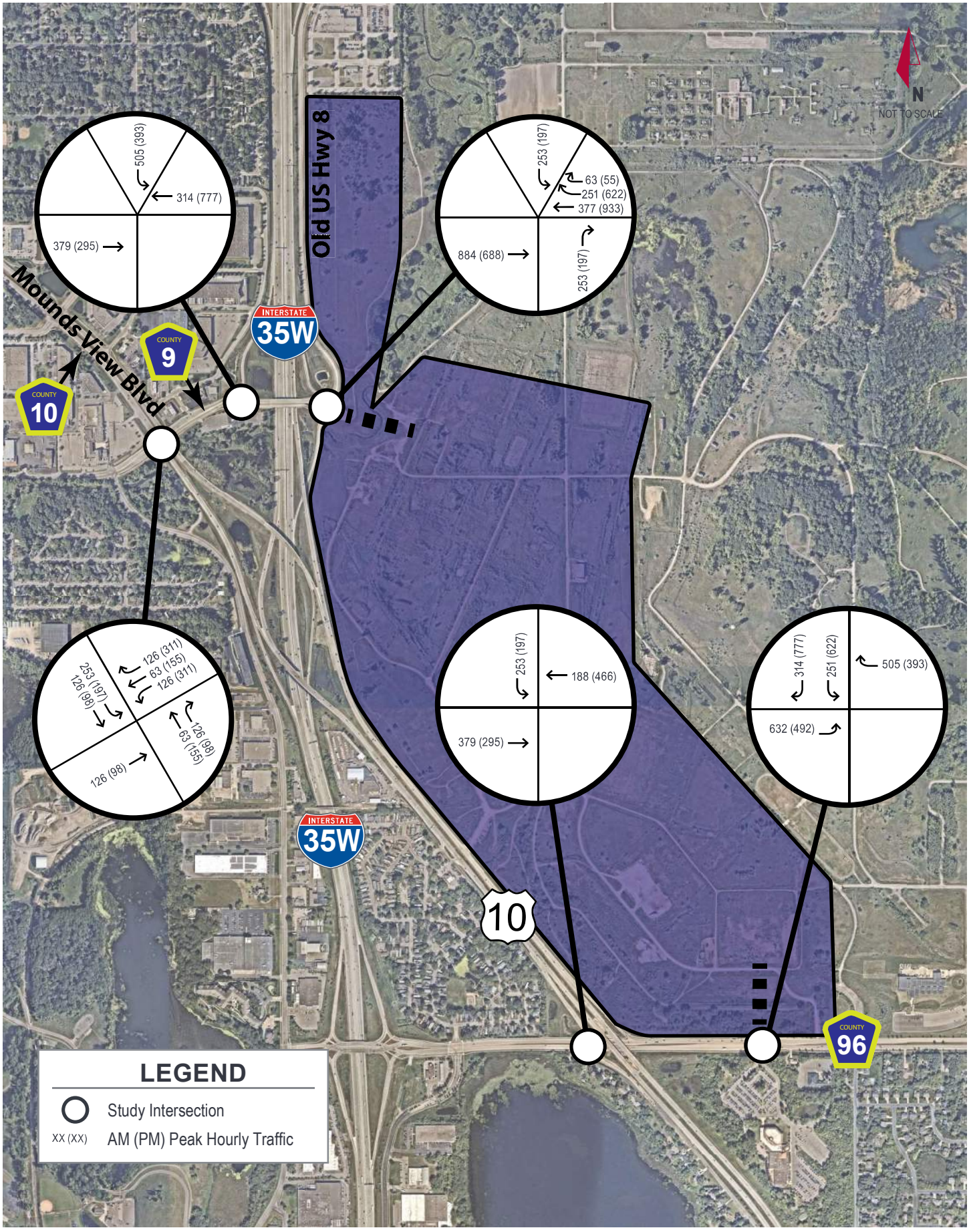

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EXHIBIT 9

SITE TRAFFIC - MAXIMUM DENSITY SCENARIO (WITH DISCOUNT SUPERSTORE)

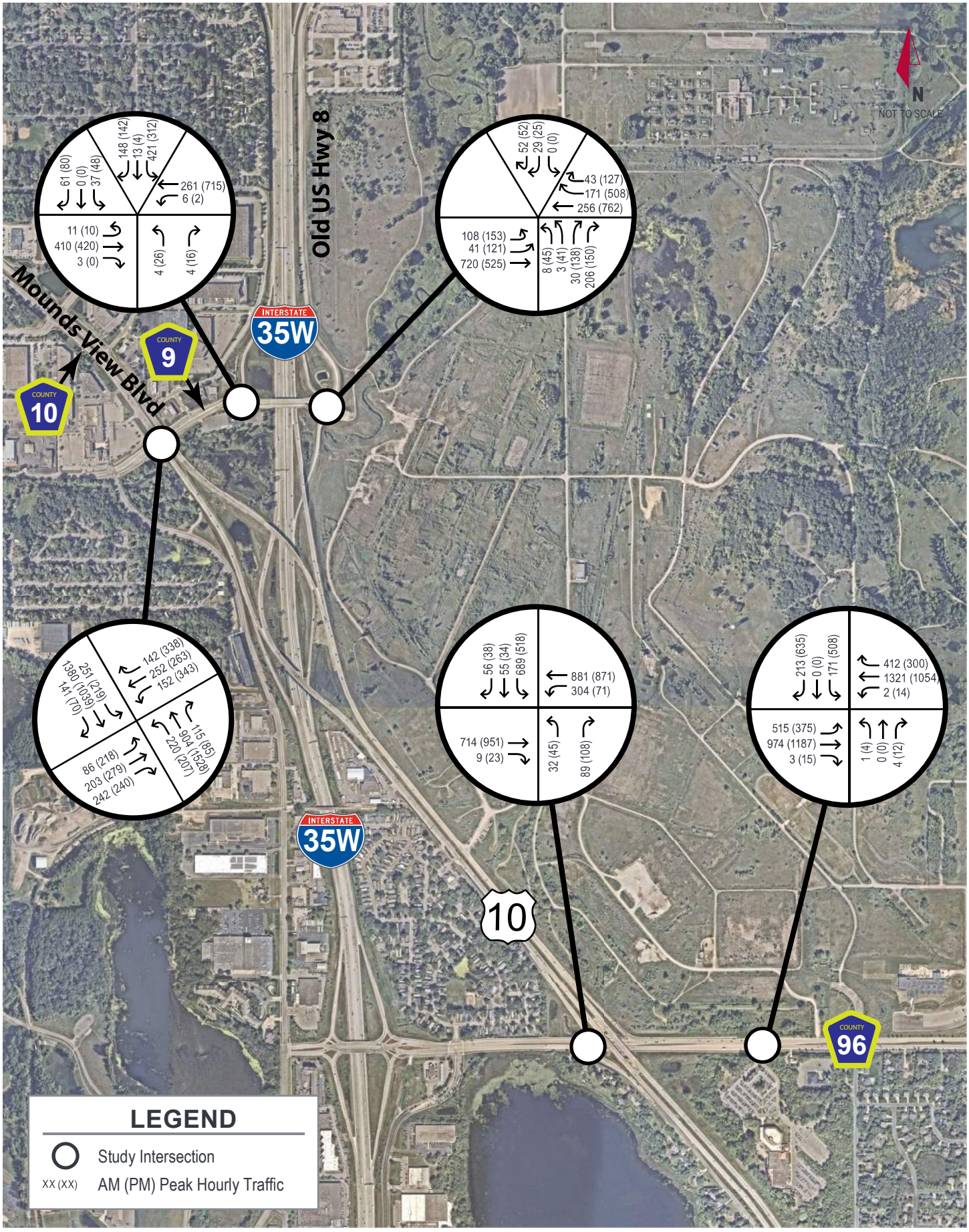

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EXHIBIT 10

HORIZON YEAR (2040) ZONING DENSITY BUILD TRAFFIC VOLUMES

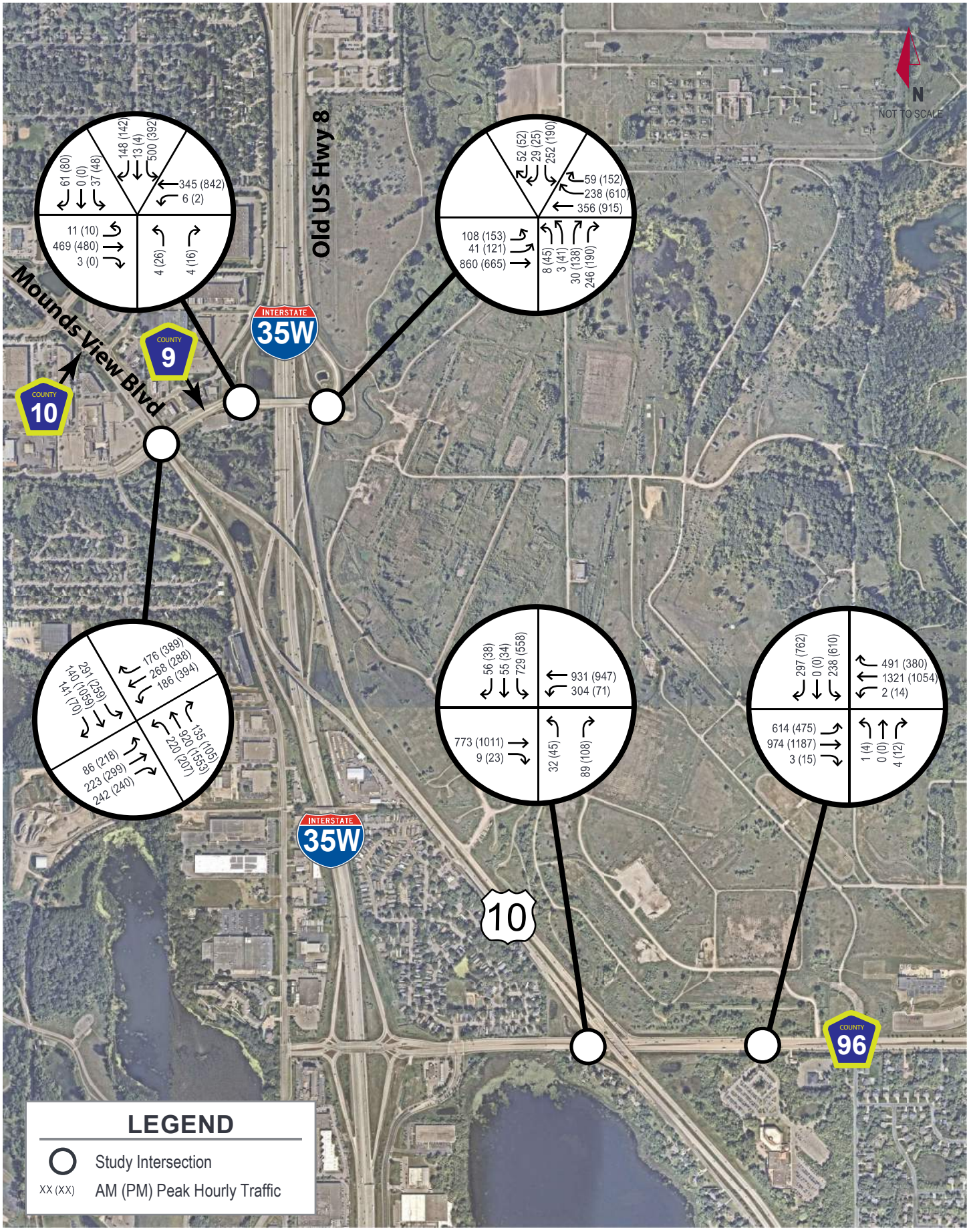

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EXHIBIT 11

HORIZON YEAR (2040) MAXIMUM DENSITY BUILD TRAFFIC VOLUMES

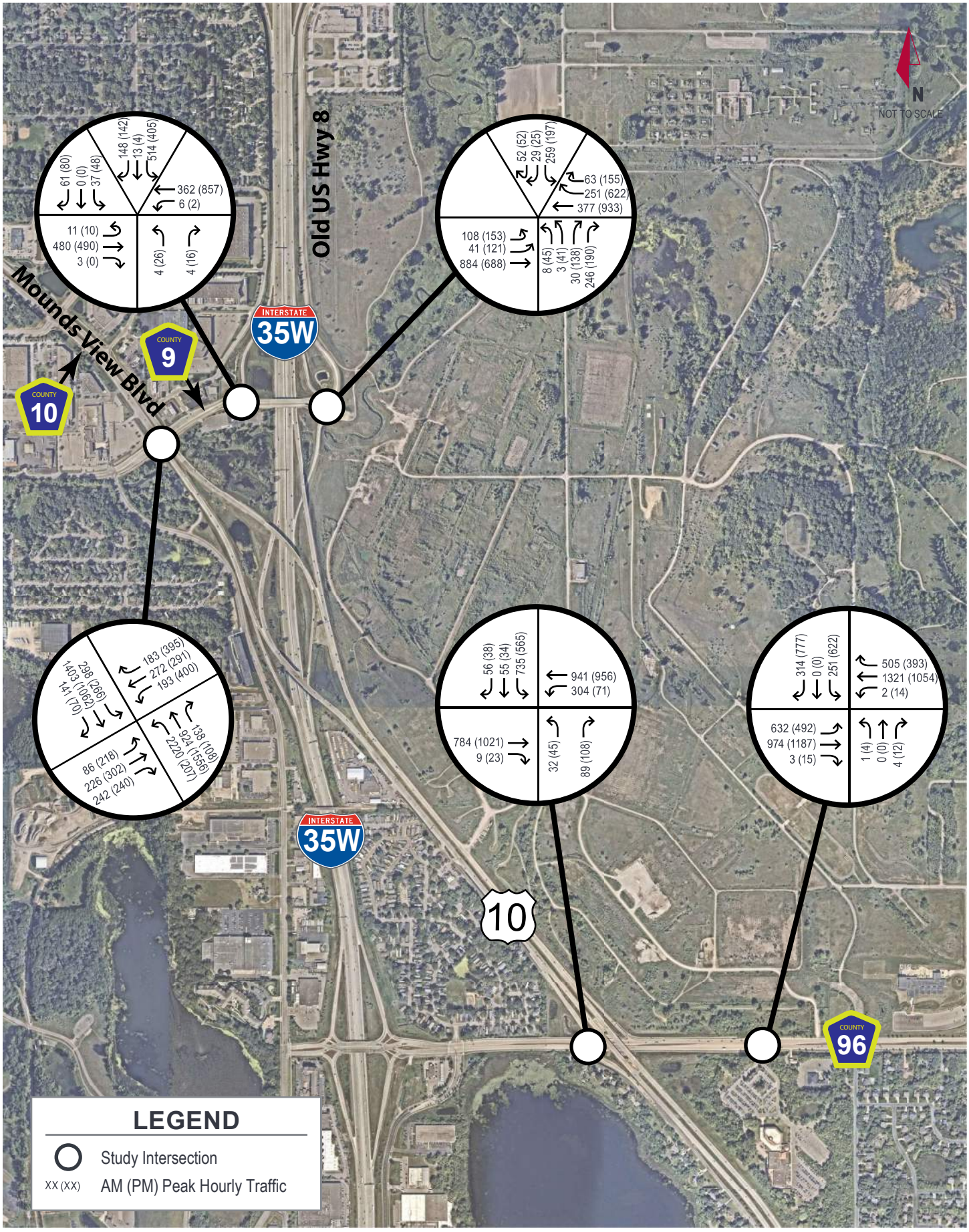

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EXHIBIT 12

HORIZON YEAR (2040) MAXIMUM DENSITY WITH DISCOUNT RETAIL BUILD TRAFFIC VOLUMES

Appendix B: Turning Movement Counts

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Old Hwy 10
Site Code:
Start Date: 03/07/2024

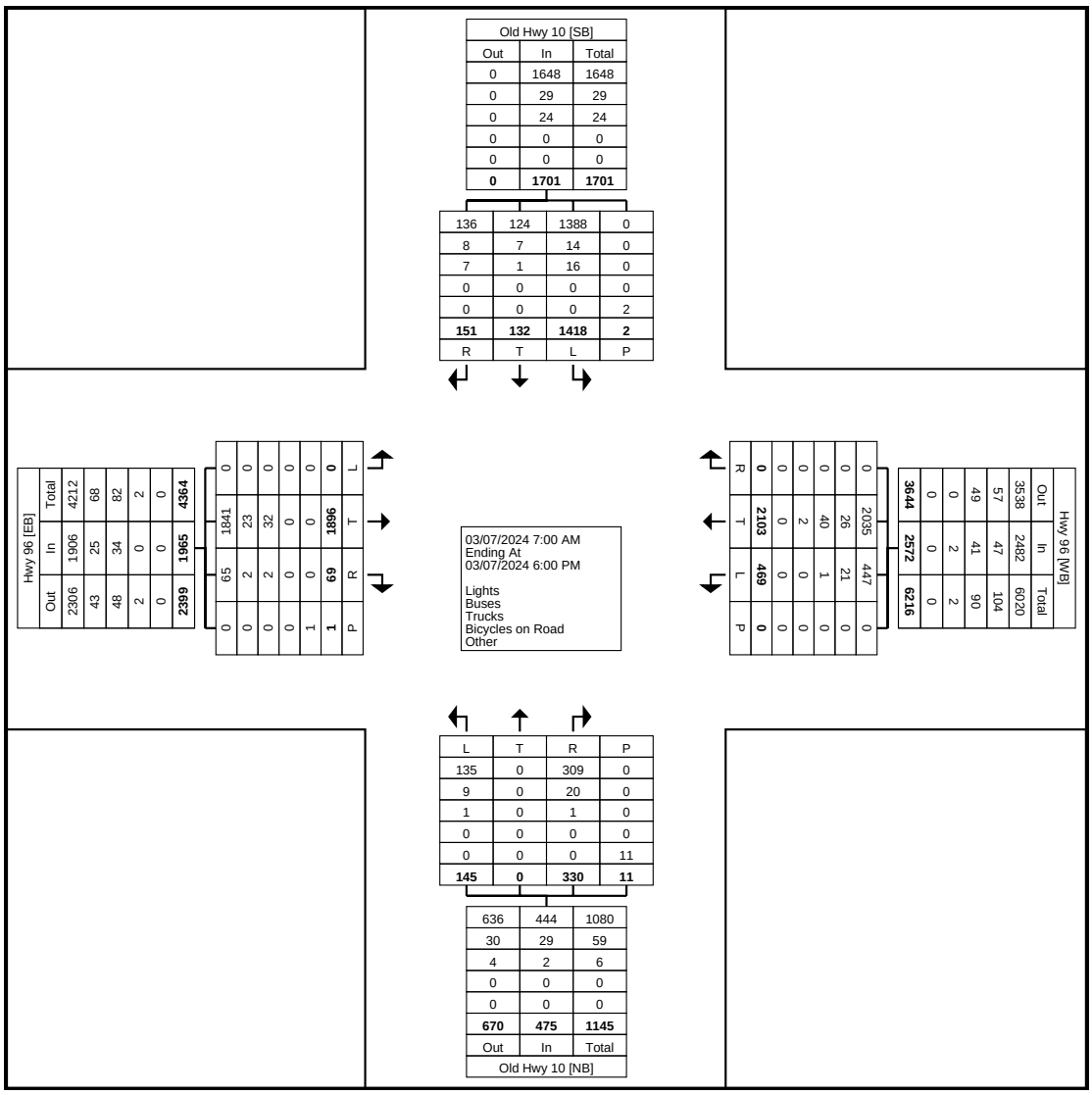
Turning Movement Data

Start Time	Hwy 96 Westbound					Hwy 96 Eastbound					Old Hwy 10 Southbound					Old Hwy 10 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
7:00 AM	4	137	0	0	141	0	55	1	0	56	75	6	8	0	89	3	0	2	0	5	291
7:15 AM	18	166	0	0	184	0	96	2	0	98	94	5	7	0	106	4	0	13	0	17	405
7:30 AM	19	170	0	0	189	0	93	1	0	94	123	4	14	0	141	6	0	6	0	12	436
7:45 AM	71	189	0	0	260	0	107	3	1	110	129	21	17	0	167	7	0	15	1	22	559
Hourly Total	112	662	0	0	774	0	351	7	1	358	421	36	46	0	503	20	0	36	1	56	1691
8:00 AM	87	155	0	0	242	0	91	2	0	93	112	13	17	0	142	8	0	22	0	30	507
8:15 AM	104	181	0	0	285	0	83	2	0	85	82	13	4	1	99	9	0	39	1	48	517
8:30 AM	33	130	0	0	163	0	87	4	0	91	95	4	8	0	107	7	0	31	0	38	399
8:45 AM	17	124	0	0	141	0	76	9	0	85	88	10	7	0	105	3	0	10	0	13	344
Hourly Total	241	590	0	0	831	0	337	17	0	354	377	40	36	1	453	27	0	102	1	129	1767
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	8	108	0	0	116	0	141	7	0	148	76	7	7	0	90	17	0	24	0	41	395
4:15 PM	22	127	0	0	149	0	149	7	0	156	95	6	11	0	112	10	0	21	2	31	448
4:30 PM	13	116	0	0	129	0	178	7	0	185	82	12	13	0	107	10	0	27	0	37	458
4:45 PM	16	116	0	0	132	0	183	4	0	187	86	8	3	0	97	12	0	31	0	43	459
Hourly Total	59	467	0	0	526	0	651	25	0	676	339	33	34	0	406	49	0	103	2	152	1760
5:00 PM	15	93	0	0	108	0	160	3	0	163	77	5	8	0	90	10	0	21	4	31	392
5:15 PM	15	116	0	0	131	0	144	10	0	154	84	7	13	1	104	16	0	22	0	38	427
5:30 PM	12	96	0	0	108	0	129	3	0	132	60	7	7	0	74	7	0	24	3	31	345
5:45 PM	15	79	0	0	94	0	124	4	0	128	60	4	7	0	71	16	0	22	0	38	331
Hourly Total	57	384	0	0	441	0	557	20	0	577	281	23	35	1	339	49	0	89	7	138	1495
Grand Total	469	2103	0	0	2572	0	1896	69	1	1965	1418	132	151	2	1701	145	0	330	11	475	6713
Approach %	18.2	81.8	0.0	-	-	0.0	96.5	3.5	-	-	83.4	7.8	8.9	-	-	30.5	0.0	69.5	-	-	-
Total %	7.0	31.3	0.0	-	38.3	0.0	28.2	1.0	-	29.3	21.1	2.0	2.2	-	25.3	2.2	0.0	4.9	-	7.1	-
Lights	447	2035	0	-	2482	0	1841	65	-	1906	1388	124	136	-	1648	135	0	309	-	444	6480
% Lights	95.3	96.8	-	-	96.5	-	97.1	94.2	-	97.0	97.9	93.9	90.1	-	96.9	93.1	-	93.6	-	93.5	96.5
Buses	21	26	0	-	47	0	23	2	-	25	14	7	8	-	29	9	0	20	-	29	130
% Buses	4.5	1.2	-	-	1.8	-	1.2	2.9	-	1.3	1.0	5.3	5.3	-	1.7	6.2	-	6.1	-	6.1	1.9
Trucks	1	40	0	-	41	0	32	2	-	34	16	1	7	-	24	1	0	1	-	2	101
% Trucks	0.2	1.9	-	-	1.6	-	1.7	2.9	-	1.7	1.1	0.8	4.6	-	1.4	0.7	-	0.3	-	0.4	1.5
Bicycles on Road	0	2	0	-	2	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.1	-	-	0.1	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	8	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	72.7	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	2	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	27.3	-	-

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Old Hwy 10
Site Code:
Start Date: 03/07/2024



Turning Movement Data Plot

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Old Hwy 10
Site Code:
Start Date: 03/07/2024

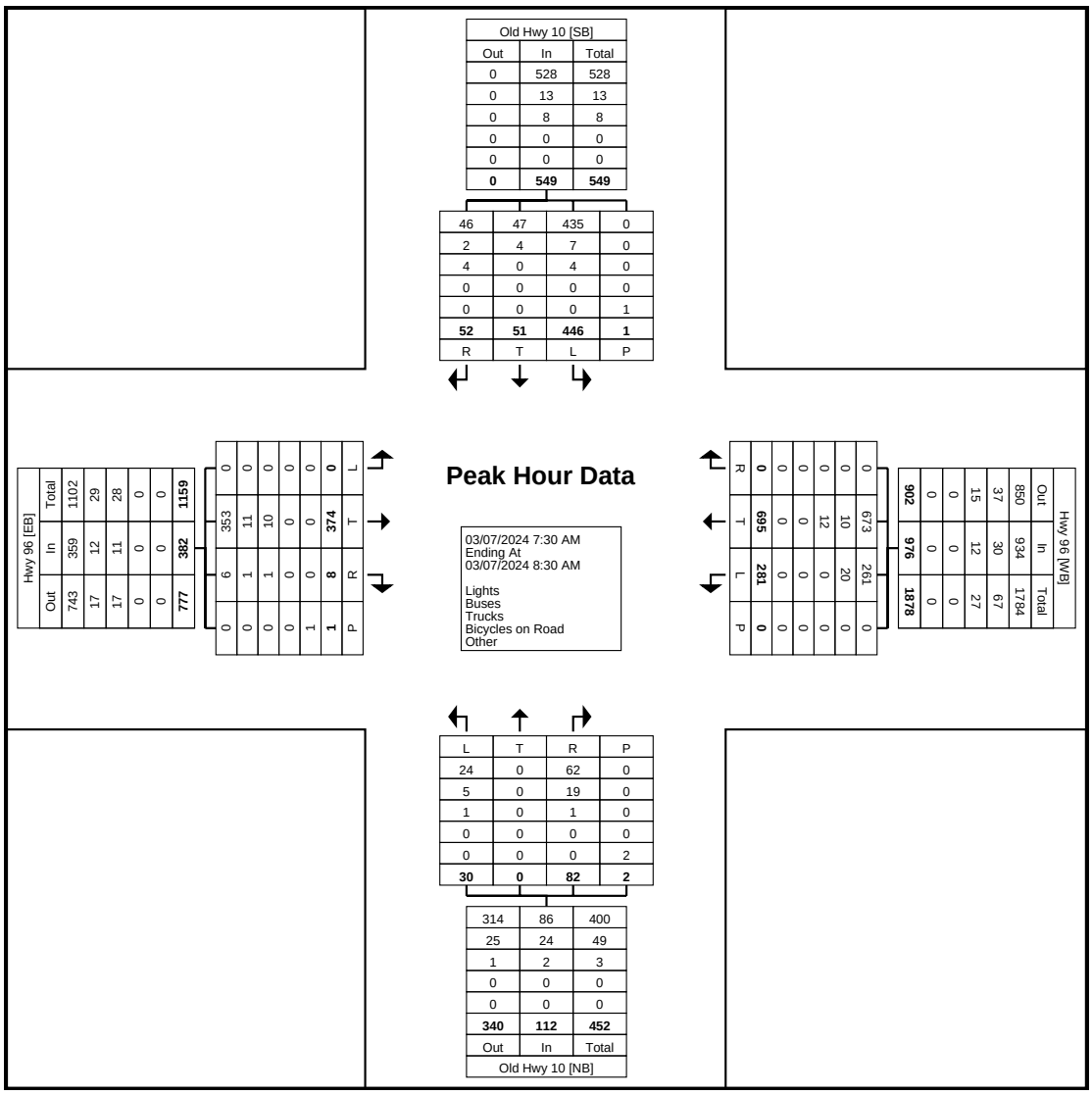
Turning Movement Peak Hour Data (7:30 AM)

Start Time	Hwy 96 Westbound					Hwy 96 Eastbound					Old Hwy 10 Southbound					Old Hwy 10 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
7:30 AM	19	170	0	0	189	0	93	1	0	94	123	4	14	0	141	6	0	6	0	12	436
7:45 AM	71	189	0	0	260	0	107	3	1	110	129	21	17	0	167	7	0	15	1	22	559
8:00 AM	87	155	0	0	242	0	91	2	0	93	112	13	17	0	142	8	0	22	0	30	507
8:15 AM	104	181	0	0	285	0	83	2	0	85	82	13	4	1	99	9	0	39	1	48	517
Total	281	695	0	0	976	0	374	8	1	382	446	51	52	1	549	30	0	82	2	112	2019
Approach %	28.8	71.2	0.0	-	-	0.0	97.9	2.1	-	-	81.2	9.3	9.5	-	-	26.8	0.0	73.2	-	-	-
Total %	13.9	34.4	0.0	-	48.3	0.0	18.5	0.4	-	18.9	22.1	2.5	2.6	-	27.2	1.5	0.0	4.1	-	5.5	-
PHF	0.675	0.919	0.000	-	0.856	0.000	0.874	0.667	-	0.868	0.864	0.607	0.765	-	0.822	0.833	0.000	0.526	-	0.583	0.903
Lights	261	673	0	-	934	0	353	6	-	359	435	47	46	-	528	24	0	62	-	86	1907
% Lights	92.9	96.8	-	-	95.7	-	94.4	75.0	-	94.0	97.5	92.2	88.5	-	96.2	80.0	-	75.6	-	76.8	94.5
Buses	20	10	0	-	30	0	11	1	-	12	7	4	2	-	13	5	0	19	-	24	79
% Buses	7.1	1.4	-	-	3.1	-	2.9	12.5	-	3.1	1.6	7.8	3.8	-	2.4	16.7	-	23.2	-	21.4	3.9
Trucks	0	12	0	-	12	0	10	1	-	11	4	0	4	-	8	1	0	1	-	2	33
% Trucks	0.0	1.7	-	-	1.2	-	2.7	12.5	-	2.9	0.9	0.0	7.7	-	1.5	3.3	-	1.2	-	1.8	1.6
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	50.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	50.0	-	-

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Old Hwy 10
Site Code:
Start Date: 03/07/2024



Turning Movement Peak Hour Data Plot (7:30 AM)

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Old Hwy 10
Site Code:
Start Date: 03/07/2024

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Hwy 96 Westbound					Hwy 96 Eastbound					Old Hwy 10 Southbound					Old Hwy 10 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
4:00 PM	8	108	0	0	116	0	141	7	0	148	76	7	7	0	90	17	0	24	0	41	395
4:15 PM	22	127	0	0	149	0	149	7	0	156	95	6	11	0	112	10	0	21	2	31	448
4:30 PM	13	116	0	0	129	0	178	7	0	185	82	12	13	0	107	10	0	27	0	37	458
4:45 PM	16	116	0	0	132	0	183	4	0	187	86	8	3	0	97	12	0	31	0	43	459
Total	59	467	0	0	526	0	651	25	0	676	339	33	34	0	406	49	0	103	2	152	1760
Approach %	11.2	88.8	0.0	-	-	0.0	96.3	3.7	-	-	83.5	8.1	8.4	-	-	32.2	0.0	67.8	-	-	-
Total %	3.4	26.5	0.0	-	29.9	0.0	37.0	1.4	-	38.4	19.3	1.9	1.9	-	23.1	2.8	0.0	5.9	-	8.6	-
PHF	0.670	0.919	0.000	-	0.883	0.000	0.889	0.893	-	0.904	0.892	0.688	0.654	-	0.906	0.721	0.000	0.831	-	0.884	0.959
Lights	59	446	0	-	505	0	645	25	-	670	337	33	32	-	402	46	0	103	-	149	1726
% Lights	100.0	95.5	-	-	96.0	-	99.1	100.0	-	99.1	99.4	100.0	94.1	-	99.0	93.9	-	100.0	-	98.0	98.1
Buses	0	8	0	-	8	0	3	0	-	3	1	0	2	-	3	3	0	0	-	3	17
% Buses	0.0	1.7	-	-	1.5	-	0.5	0.0	-	0.4	0.3	0.0	5.9	-	0.7	6.1	-	0.0	-	2.0	1.0
Trucks	0	11	0	-	11	0	3	0	-	3	1	0	0	-	1	0	0	0	-	0	15
% Trucks	0.0	2.4	-	-	2.1	-	0.5	0.0	-	0.4	0.3	0.0	0.0	-	0.2	0.0	-	0.0	-	0.0	0.9
Bicycles on Road	0	2	0	-	2	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.4	-	-	0.4	-	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

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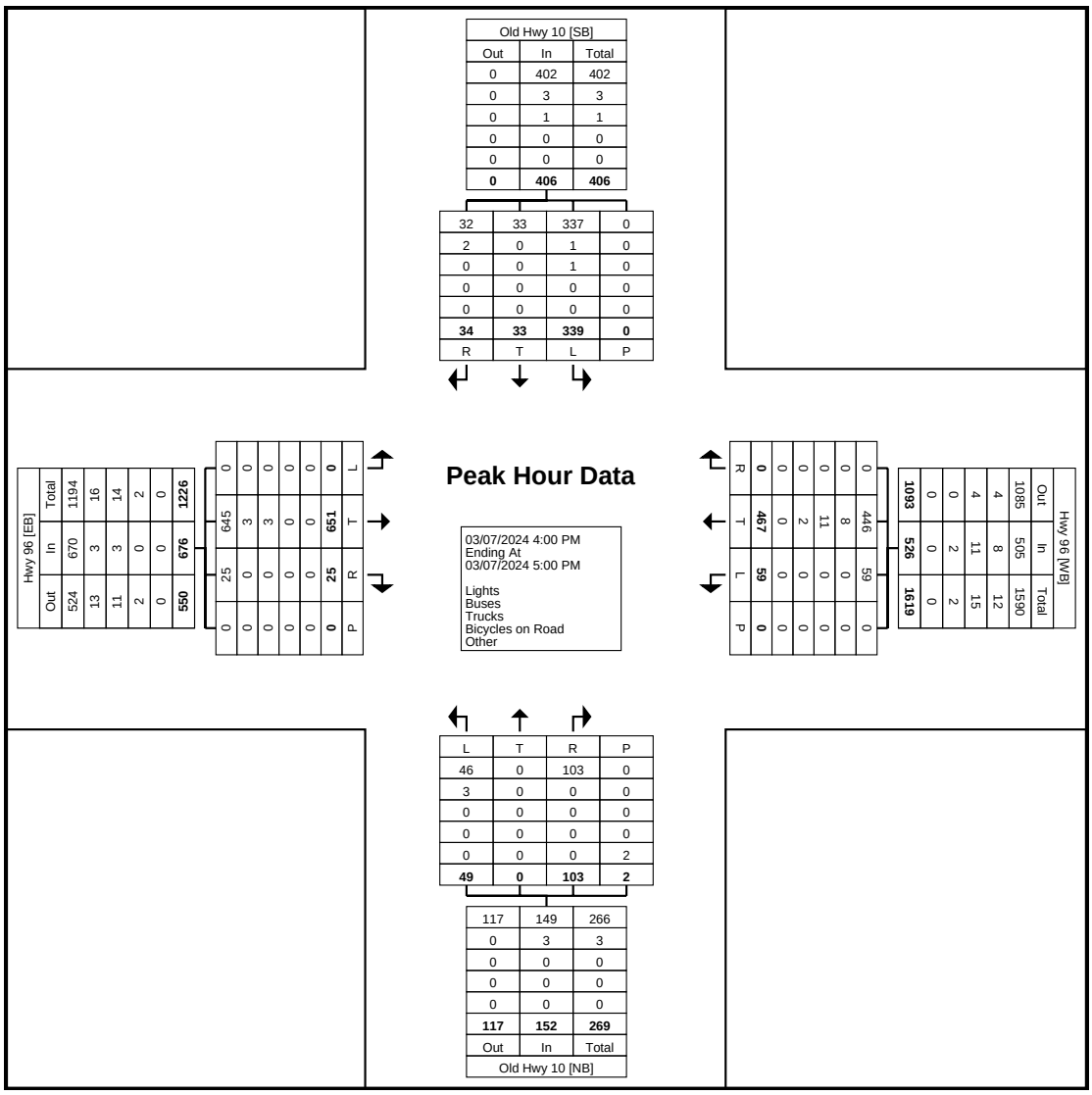
Count Name: County Hwy 96 & Old Hwy 10
Site Code:
Start Date: 03/07/2024



Turning Movement Peak Hour Data Plot (4:00 PM)

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Snelling Ave N
Site Code:
Start Date: 03/07/2024

Turning Movement Data

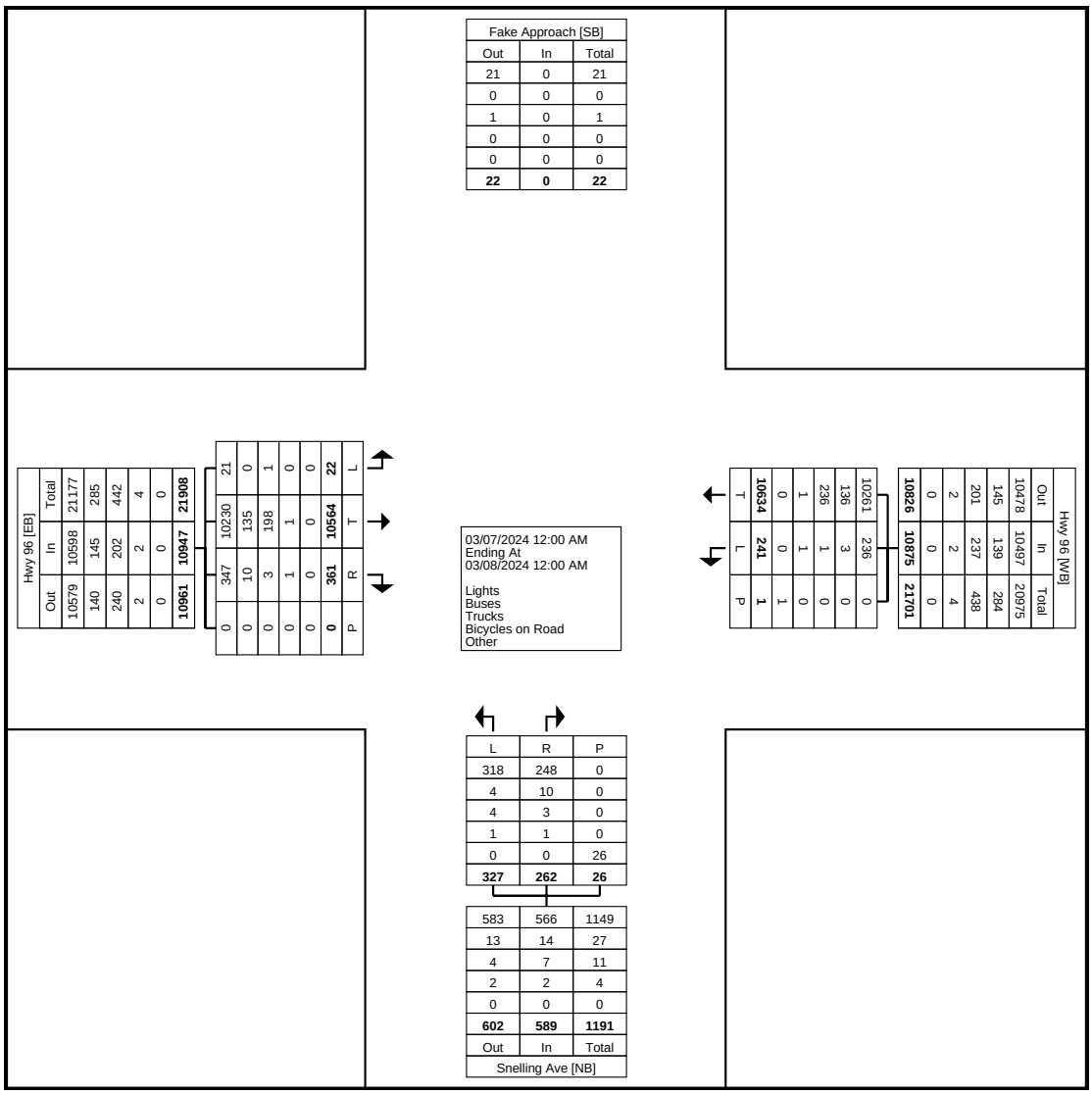
Start Time	Hwy 96 Westbound				Hwy 96 Eastbound					Snelling Ave Northbound				
	Left	Thru	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
12:00 AM	1	1	0	2	0	10	0	0	10	0	0	0	0	12
12:15 AM	0	7	0	7	0	6	0	0	6	0	0	0	0	13
12:30 AM	0	9	0	9	0	14	0	0	14	0	0	0	0	23
12:45 AM	0	2	0	2	0	8	0	0	8	0	0	0	0	10
Hourly Total	1	19	0	20	0	38	0	0	38	0	0	0	0	58
1:00 AM	0	2	0	2	0	4	0	0	4	0	0	0	0	6
1:15 AM	0	3	0	3	0	5	0	0	5	0	0	0	0	8
1:30 AM	0	8	0	8	0	3	0	0	3	0	0	0	0	11
1:45 AM	0	5	0	5	0	5	0	0	5	0	0	0	0	10
Hourly Total	0	18	0	18	0	17	0	0	17	0	0	0	0	35
2:00 AM	0	4	0	4	0	3	0	0	3	0	0	0	0	7
2:15 AM	0	2	0	2	0	5	0	0	5	0	0	0	0	7
2:30 AM	0	8	0	8	0	5	0	0	5	0	0	0	0	13
2:45 AM	0	6	0	6	0	5	2	0	7	0	1	1	1	14
Hourly Total	0	20	0	20	0	18	2	0	20	0	1	1	1	41
3:00 AM	0	7	0	7	0	3	0	0	3	0	0	0	0	10
3:15 AM	0	3	0	3	0	6	1	0	7	1	0	0	1	11
3:30 AM	1	7	0	8	0	9	0	0	9	0	1	0	1	18
3:45 AM	0	7	0	7	0	13	0	0	13	0	0	0	0	20
Hourly Total	1	24	0	25	0	31	1	0	32	1	1	0	2	59
4:00 AM	0	9	0	9	0	10	0	0	10	0	0	0	0	19
4:15 AM	0	13	0	13	0	16	0	0	16	0	0	0	0	29
4:30 AM	0	24	0	24	0	27	0	0	27	1	0	0	1	52
4:45 AM	0	27	0	27	0	40	0	0	40	1	0	0	1	68
Hourly Total	0	73	0	73	0	93	0	0	93	2	0	0	2	168
5:00 AM	0	34	0	34	0	26	1	0	27	0	0	0	0	61
5:15 AM	0	44	0	44	0	61	0	0	61	1	1	0	2	107
5:30 AM	0	72	0	72	0	94	0	0	94	1	0	0	1	167
5:45 AM	0	57	0	57	0	116	0	0	116	0	0	1	0	173
Hourly Total	0	207	0	207	0	297	1	0	298	2	1	1	3	508
6:00 AM	1	88	0	89	0	62	0	0	62	1	1	1	2	153
6:15 AM	0	95	0	95	0	83	0	0	83	0	0	0	0	178
6:30 AM	0	157	0	157	0	141	1	0	142	4	2	0	6	305
6:45 AM	2	157	0	159	0	162	0	0	162	5	0	0	5	326
Hourly Total	3	497	0	500	0	448	1	0	449	10	3	1	13	962
7:00 AM	0	199	0	199	1	127	2	0	130	8	2	0	10	339
7:15 AM	1	252	0	253	1	191	4	0	196	8	5	0	13	462
7:30 AM	2	272	0	274	0	219	1	0	220	6	4	0	10	504
7:45 AM	5	281	0	286	0	251	3	0	254	14	4	0	18	558
Hourly Total	8	1004	0	1012	2	788	10	0	800	36	15	0	51	1863
8:00 AM	1	326	0	327	1	216	4	0	221	12	4	1	16	564
8:15 AM	0	301	0	301	0	190	9	0	199	10	3	3	13	513
8:30 AM	1	224	0	225	0	203	5	0	208	5	4	0	9	442
8:45 AM	7	194	0	201	0	164	4	0	168	10	4	0	14	383
Hourly Total	9	1045	0	1054	1	773	22	0	796	37	15	4	52	1902
9:00 AM	11	161	0	172	1	134	2	0	137	10	8	0	18	327
9:15 AM	5	179	0	184	0	124	4	0	128	6	2	0	8	320
9:30 AM	4	134	0	138	0	137	1	0	138	5	2	0	7	283
9:45 AM	17	130	0	147	0	141	3	0	144	4	4	0	8	299
Hourly Total	37	604	0	641	1	536	10	0	547	25	16	0	41	1229
10:00 AM	10	111	0	121	1	120	5	0	126	4	1	0	5	252
10:15 AM	11	110	0	121	0	132	1	0	133	8	3	0	11	265
10:30 AM	1	130	0	131	0	126	2	0	128	3	1	0	4	263
10:45 AM	0	132	0	132	2	132	9	0	143	7	2	0	9	284
Hourly Total	22	483	0	505	3	510	17	0	530	22	7	0	29	1064
11:00 AM	2	127	0	129	0	132	4	0	136	5	2	0	7	272
11:15 AM	1	138	0	139	0	109	2	0	111	4	1	1	5	255
11:30 AM	1	177	0	178	1	108	3	0	112	7	4	0	11	301
11:45 AM	4	150	0	154	0	147	9	0	156	7	1	0	8	318
Hourly Total	8	592	0	600	1	496	18	0	515	23	8	1	31	1146
12:00 PM	1	145	0	146	0	128	9	0	137	5	2	0	7	290

12:15 PM	0	157	0	157	0	140	3	0	143	3	3	1	6	306
12:30 PM	3	138	0	141	1	127	5	0	133	9	9	0	18	292
12:45 PM	2	132	0	134	2	176	2	0	180	4	8	1	12	326
Hourly Total	6	572	0	578	3	571	19	0	593	21	22	2	43	1214
1:00 PM	2	124	0	126	0	141	4	0	145	5	5	0	10	281
1:15 PM	2	127	0	129	0	124	3	0	127	1	4	0	5	261
1:30 PM	1	152	0	153	1	151	3	0	155	4	4	2	8	316
1:45 PM	1	137	0	138	0	159	6	0	165	3	2	0	5	308
Hourly Total	6	540	0	546	1	575	16	0	592	13	15	2	28	1166
2:00 PM	2	181	0	183	0	145	5	0	150	1	1	0	2	335
2:15 PM	2	192	0	194	0	212	8	0	220	9	7	0	16	430
2:30 PM	6	190	0	196	1	183	4	0	188	4	3	0	7	391
2:45 PM	2	195	0	197	0	166	6	0	172	3	2	0	5	374
Hourly Total	12	758	0	770	1	706	23	0	730	17	13	0	30	1530
3:00 PM	1	224	0	225	1	205	6	0	212	10	5	2	15	452
3:15 PM	3	212	0	215	0	268	15	0	283	2	3	1	5	503
3:30 PM	6	242	0	248	0	266	15	0	281	6	5	0	11	540
3:45 PM	10	222	1	232	1	264	13	0	278	3	7	3	10	520
Hourly Total	20	900	1	920	2	1003	49	0	1054	21	20	6	41	2015
4:00 PM	8	235	0	243	0	238	7	0	245	4	3	0	7	495
4:15 PM	5	247	0	252	0	251	8	0	259	5	5	1	10	521
4:30 PM	9	266	0	275	0	252	11	0	263	2	5	2	7	545
4:45 PM	8	237	0	245	0	285	11	0	296	7	17	0	24	565
Hourly Total	30	985	0	1015	0	1026	37	0	1063	18	30	3	48	2126
5:00 PM	12	220	0	232	0	277	9	0	286	2	10	1	12	530
5:15 PM	2	234	0	236	0	245	15	0	260	5	12	1	17	513
5:30 PM	6	170	0	176	1	201	5	0	207	8	4	1	12	395
5:45 PM	6	158	0	164	1	211	9	0	221	3	8	0	11	396
Hourly Total	26	782	0	808	2	934	38	0	974	18	34	3	52	1834
6:00 PM	6	137	0	143	0	167	2	0	169	7	2	0	9	321
6:15 PM	10	166	0	176	0	140	10	0	150	4	6	2	10	336
6:30 PM	2	136	0	138	0	120	2	0	122	9	6	0	15	275
6:45 PM	7	109	0	116	0	99	3	0	102	6	3	0	9	227
Hourly Total	25	548	0	573	0	526	17	0	543	26	17	2	43	1159
7:00 PM	6	93	0	99	0	94	3	0	97	5	4	0	9	205
7:15 PM	0	104	0	104	0	82	10	0	92	6	4	0	10	206
7:30 PM	2	64	0	66	0	87	10	0	97	0	1	0	1	164
7:45 PM	8	60	0	68	0	69	3	0	72	4	2	0	6	146
Hourly Total	16	321	0	337	0	332	26	0	358	15	11	0	26	721
8:00 PM	3	61	0	64	1	109	7	0	117	3	13	0	16	197
8:15 PM	2	77	0	79	1	99	10	0	110	4	5	0	9	198
8:30 PM	2	56	0	58	1	79	3	0	83	1	1	0	2	143
8:45 PM	0	43	0	43	0	58	5	0	63	0	4	0	4	110
Hourly Total	7	237	0	244	3	345	25	0	373	8	23	0	31	648
9:00 PM	0	46	0	46	0	74	7	0	81	2	1	0	3	130
9:15 PM	1	55	0	56	0	77	9	0	86	2	6	0	8	150
9:30 PM	1	49	0	50	0	61	7	0	68	1	0	0	1	119
9:45 PM	0	42	0	42	0	66	2	0	68	0	1	0	1	111
Hourly Total	2	192	0	194	0	278	25	0	303	5	8	0	13	510
10:00 PM	2	65	0	67	0	52	1	0	53	1	1	0	2	122
10:15 PM	0	36	0	36	0	51	1	0	52	1	1	0	2	90
10:30 PM	0	22	0	22	1	28	1	0	30	2	0	0	2	54
10:45 PM	0	20	0	20	0	22	0	0	22	3	0	0	3	45
Hourly Total	2	143	0	145	1	153	3	0	157	7	2	0	9	311
11:00 PM	0	17	0	17	0	24	1	0	25	0	0	0	0	42
11:15 PM	0	20	0	20	1	16	0	0	17	0	0	0	0	37
11:30 PM	0	20	0	20	0	16	0	0	16	0	0	0	0	36
11:45 PM	0	13	0	13	0	14	0	0	14	0	0	0	0	27
Hourly Total	0	70	0	70	1	70	1	0	72	0	0	0	0	142
Grand Total	241	10634	1	10875	22	10564	361	0	10947	327	262	26	589	22411
Approach %	2.2	97.8	-	-	0.2	96.5	3.3	-	-	55.5	44.5	-	-	-
Total %	1.1	47.4	-	48.5	0.1	47.1	1.6	-	48.8	1.5	1.2	-	2.6	-
Lights	236	10261	-	10497	21	10230	347	-	10598	318	248	-	566	21661
% Lights	97.9	96.5	-	96.5	95.5	96.8	96.1	-	96.8	97.2	94.7	-	96.1	96.7
Buses	3	136	-	139	0	135	10	-	145	4	10	-	14	298
% Buses	1.2	1.3	-	1.3	0.0	1.3	2.8	-	1.3	1.2	3.8	-	2.4	1.3
Trucks	1	236	-	237	1	198	3	-	202	4	3	-	7	446
% Trucks	0.4	2.2	-	2.2	4.5	1.9	0.8	-	1.8	1.2	1.1	-	1.2	2.0
Bicycles on Road	1	1	-	2	0	1	1	-	2	1	1	-	2	6
% Bicycles on Road	0.4	0.0	-	0.0	0.0	0.0	0.3	-	0.0	0.3	0.4	-	0.3	0.0
Bicycles on Crosswalk	-	-	1	-	-	-	-	0	-	-	-	16	-	-
% Bicycles on Crosswalk	-	-	100.0	-	-	-	-	-	-	-	-	61.5	-	-
Pedestrians	-	-	0	-	-	-	-	0	-	-	-	10	-	-
% Pedestrians	-	-	0.0	-	-	-	-	-	-	-	-	38.5	-	-

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Snelling Ave N
Site Code:
Start Date: 03/07/2024



Turning Movement Data Plot

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Snelling Ave N
Site Code:
Start Date: 03/07/2024

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Hwy 96 Westbound				Hwy 96 Eastbound					Snelling Ave Northbound				
	Left	Thru	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
7:30 AM	2	272	0	274	0	219	1	0	220	6	4	0	10	504
7:45 AM	5	281	0	286	0	251	3	0	254	14	4	0	18	558
8:00 AM	1	326	0	327	1	216	4	0	221	12	4	1	16	564
8:15 AM	0	301	0	301	0	190	9	0	199	10	3	3	13	513
Total	8	1180	0	1188	1	876	17	0	894	42	15	4	57	2139
Approach %	0.7	99.3	-	-	0.1	98.0	1.9	-	-	73.7	26.3	-	-	-
Total %	0.4	55.2	-	55.5	0.0	41.0	0.8	-	41.8	2.0	0.7	-	2.7	-
PHF	0.400	0.905	-	0.908	0.250	0.873	0.472	-	0.880	0.750	0.938	-	0.792	0.948
Lights	8	1129	-	1137	1	829	13	-	843	42	14	-	56	2036
% Lights	100.0	95.7	-	95.7	100.0	94.6	76.5	-	94.3	100.0	93.3	-	98.2	95.2
Buses	0	34	-	34	0	33	4	-	37	0	1	-	1	72
% Buses	0.0	2.9	-	2.9	0.0	3.8	23.5	-	4.1	0.0	6.7	-	1.8	3.4
Trucks	0	17	-	17	0	14	0	-	14	0	0	-	0	31
% Trucks	0.0	1.4	-	1.4	0.0	1.6	0.0	-	1.6	0.0	0.0	-	0.0	1.4
Bicycles on Road	0	0	-	0	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	0	-	-	-	-	0	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	25.0	-	-
Pedestrians	-	-	0	-	-	-	-	0	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	75.0	-	-

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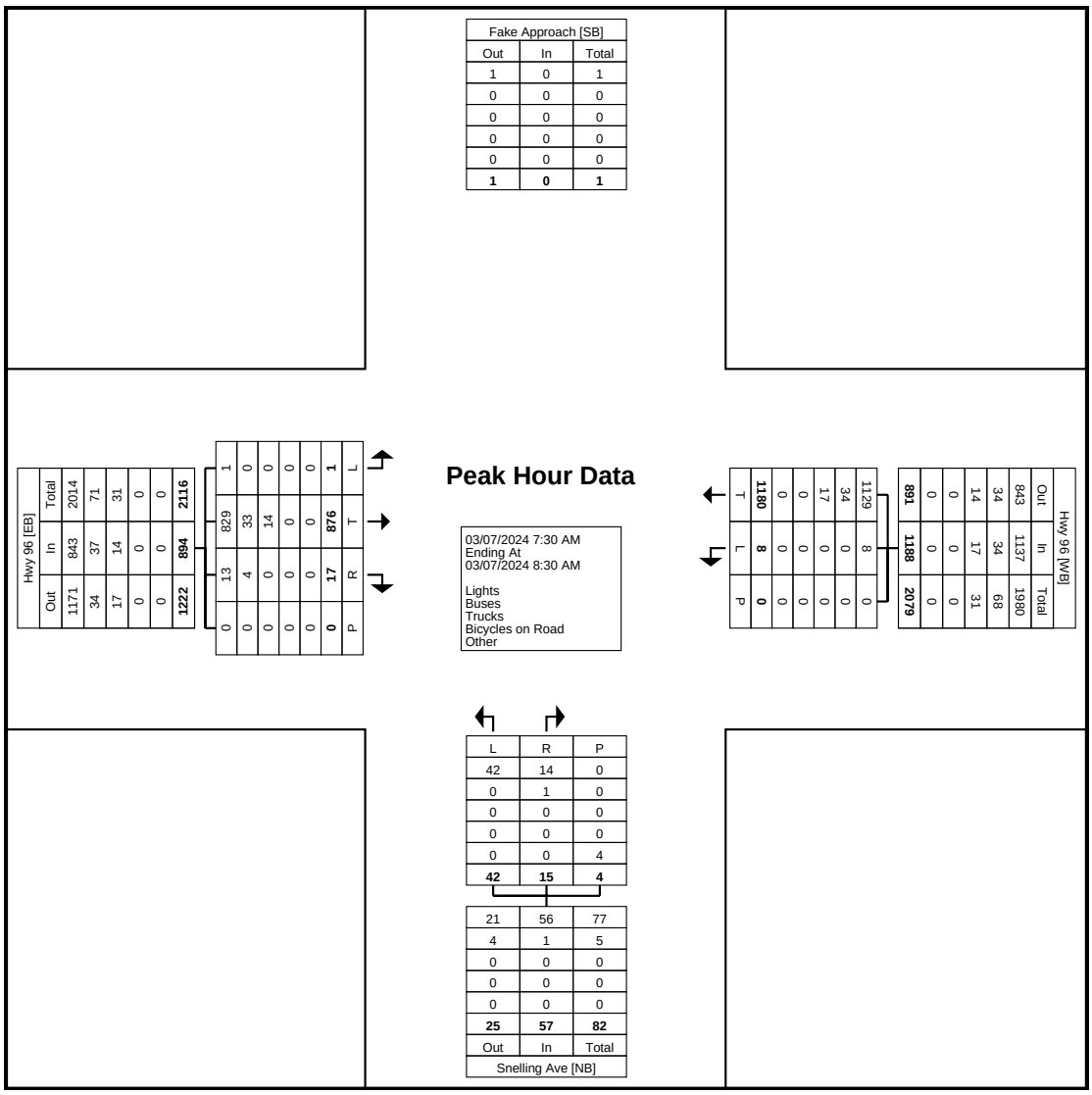
Count Name: County Hwy 96 & Snelling Ave N
Site Code:
Start Date: 03/07/2024



Turning Movement Peak Hour Data Plot (7:30 AM)

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Hwy 96 & Snelling Ave N
Site Code:
Start Date: 03/07/2024

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Hwy 96 Westbound				Hwy 96 Eastbound					Snelling Ave Northbound				
	Left	Thru	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
4:15 PM	5	247	0	252	0	251	8	0	259	5	5	1	10	521
4:30 PM	9	266	0	275	0	252	11	0	263	2	5	2	7	545
4:45 PM	8	237	0	245	0	285	11	0	296	7	17	0	24	565
5:00 PM	12	220	0	232	0	277	9	0	286	2	10	1	12	530
Total	34	970	0	1004	0	1065	39	0	1104	16	37	4	53	2161
Approach %	3.4	96.6	-	-	0.0	96.5	3.5	-	-	30.2	69.8	-	-	-
Total %	1.6	44.9	-	46.5	0.0	49.3	1.8	-	51.1	0.7	1.7	-	2.5	-
PHF	0.708	0.912	-	0.913	0.000	0.934	0.886	-	0.932	0.571	0.544	-	0.552	0.956
Lights	34	941	-	975	0	1056	39	-	1095	14	36	-	50	2120
% Lights	100.0	97.0	-	97.1	-	99.2	100.0	-	99.2	87.5	97.3	-	94.3	98.1
Buses	0	14	-	14	0	3	0	-	3	2	1	-	3	20
% Buses	0.0	1.4	-	1.4	-	0.3	0.0	-	0.3	12.5	2.7	-	5.7	0.9
Trucks	0	15	-	15	0	6	0	-	6	0	0	-	0	21
% Trucks	0.0	1.5	-	1.5	-	0.6	0.0	-	0.5	0.0	0.0	-	0.0	1.0
Bicycles on Road	0	0	-	0	0	0	0	-	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	0.0	-	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	0	-	-	-	-	0	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	75.0	-	-
Pedestrians	-	-	0	-	-	-	-	0	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	25.0	-	-

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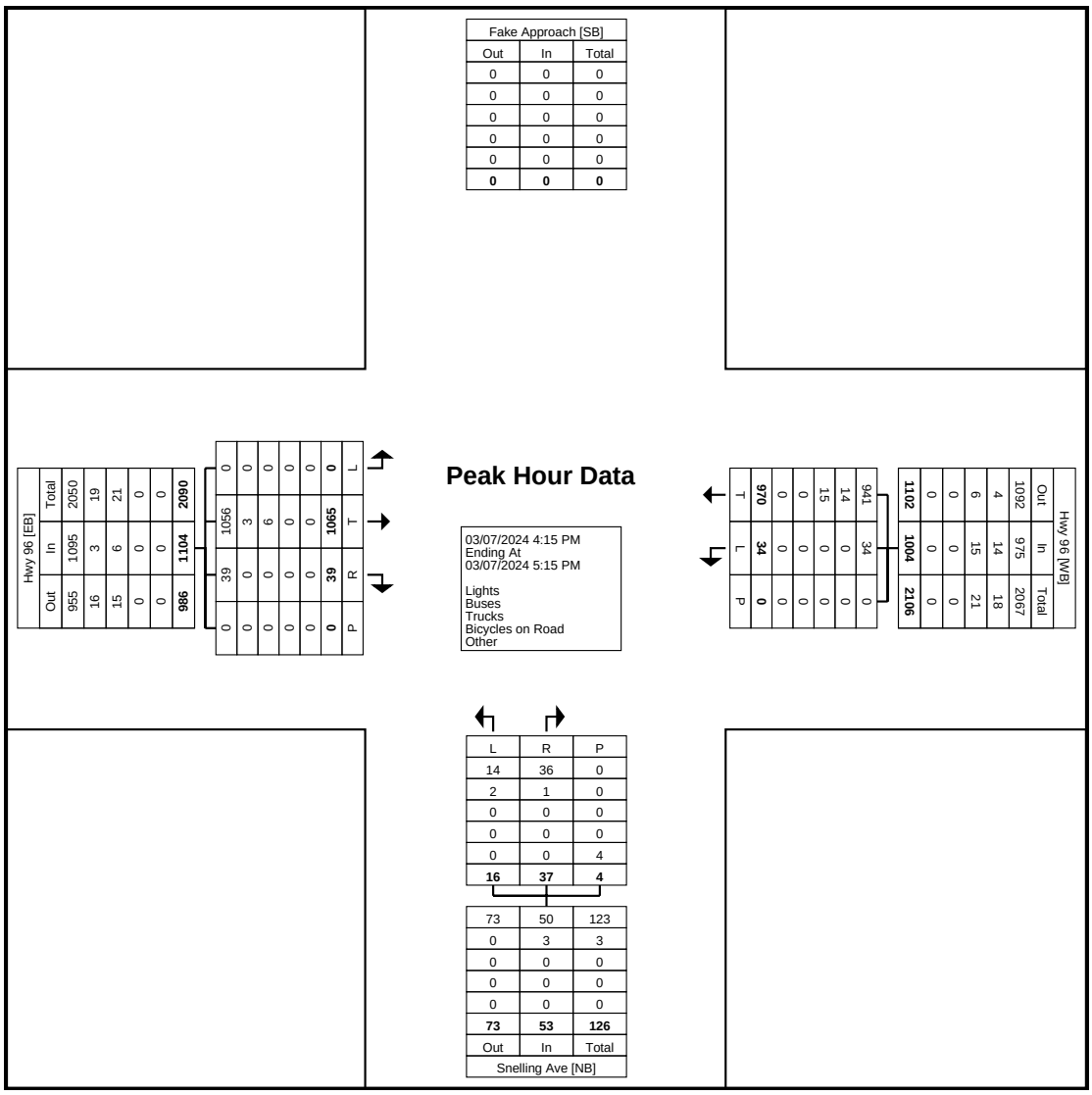
Count Name: County Hwy 96 & Snelling Ave N
Site Code:
Start Date: 03/07/2024



Turning Movement Peak Hour Data Plot (4:15 PM)

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Rd H & Mounds View Blvd
Site Code:
Start Date: 03/05/2024

Turning Movement Data

Start Time	County Rd H Westbound					County Rd H Eastbound					Hwy 10 Southbound					Hwy 10 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
7:00 AM	18	37	8	0	63	11	24	26	0	61	10	166	28	0	204	43	125	5	0	173	501
7:15 AM	15	54	12	0	81	26	17	62	0	105	16	284	39	0	339	56	177	4	0	237	762
7:30 AM	17	44	14	0	75	22	28	65	0	115	14	382	46	0	442	45	192	5	0	242	874
7:45 AM	15	49	13	0	77	10	18	54	0	82	9	331	37	0	377	63	246	2	0	311	847
Hourly Total	65	184	47	0	296	69	87	207	0	363	49	1163	150	0	1362	207	740	16	0	963	2984
8:00 AM	17	51	15	0	83	20	21	42	0	83	8	230	23	0	261	43	180	3	0	226	653
8:15 AM	13	49	11	0	73	27	25	62	0	114	11	236	24	0	271	52	177	1	0	230	688
8:30 AM	17	31	18	0	66	19	24	47	0	90	11	197	12	0	220	25	151	0	0	176	552
8:45 AM	13	32	9	0	54	12	16	40	0	68	6	148	19	1	173	25	168	1	1	194	489
Hourly Total	60	163	53	0	276	78	86	191	0	355	36	811	78	1	925	145	676	5	1	826	2382
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	32	34	14	1	80	42	41	59	2	142	13	228	17	0	258	30	290	2	3	322	802
4:15 PM	15	36	23	0	74	50	44	68	0	162	17	202	22	2	241	48	336	3	0	387	864
4:30 PM	23	30	16	0	69	53	59	56	0	168	18	216	18	1	252	42	302	3	0	347	836
4:45 PM	12	32	25	0	69	37	38	42	0	117	16	234	10	0	260	41	377	1	1	419	865
Hourly Total	82	132	78	1	292	182	182	225	2	589	64	880	67	3	1011	161	1305	9	4	1475	3367
5:00 PM	32	28	14	2	74	61	47	56	1	164	13	238	15	1	266	60	279	2	4	341	845
5:15 PM	17	35	16	0	68	28	25	41	2	94	15	210	18	3	243	38	275	2	1	315	720
5:30 PM	22	27	13	0	62	34	20	41	0	95	17	182	21	0	220	39	274	2	1	315	692
5:45 PM	11	30	17	0	58	31	20	33	0	84	19	144	12	0	175	48	206	3	0	257	574
Hourly Total	82	120	60	2	262	154	112	171	3	437	64	774	66	4	904	185	1034	9	6	1228	2831
Grand Total	289	599	238	3	1126	483	467	794	5	1744	213	3628	361	8	4202	698	3755	39	11	4492	11564
Approach %	25.7	53.2	21.1	-	-	27.7	26.8	45.5	-	-	5.1	86.3	8.6	-	-	15.5	83.6	0.9	-	-	-
Total %	2.5	5.2	2.1	-	9.7	4.2	4.0	6.9	-	15.1	1.8	31.4	3.1	-	36.3	6.0	32.5	0.3	-	38.8	-
Lights	267	572	232	-	1071	465	440	751	-	1656	208	3510	337	-	4055	677	3634	34	-	4345	11127
% Lights	92.4	95.5	97.5	-	95.1	96.3	94.2	94.6	-	95.0	97.7	96.7	93.4	-	96.5	97.0	96.8	87.2	-	96.7	96.2
Buses	4	12	2	-	18	14	14	27	-	55	1	27	13	-	41	8	35	4	-	47	161
% Buses	1.4	2.0	0.8	-	1.6	2.9	3.0	3.4	-	3.2	0.5	0.7	3.6	-	1.0	1.1	0.9	10.3	-	1.0	1.4
Trucks	18	15	4	-	37	4	13	16	-	33	4	91	11	-	106	13	86	1	-	100	276
% Trucks	6.2	2.5	1.7	-	3.3	0.8	2.8	2.0	-	1.9	1.9	2.5	3.0	-	2.5	1.9	2.3	2.6	-	2.2	2.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	1	-	-	-	-	1	-	-	-	-	8	-	-
% Bicycles on Crosswalk	-	-	-	66.7	-	-	-	-	20.0	-	-	-	-	12.5	-	-	-	-	72.7	-	-
Pedestrians	-	-	-	1	-	-	-	-	4	-	-	-	-	7	-	-	-	-	3	-	-
% Pedestrians	-	-	-	33.3	-	-	-	-	80.0	-	-	-	-	87.5	-	-	-	-	27.3	-	-

Kimley-Horn and Associates, Inc.
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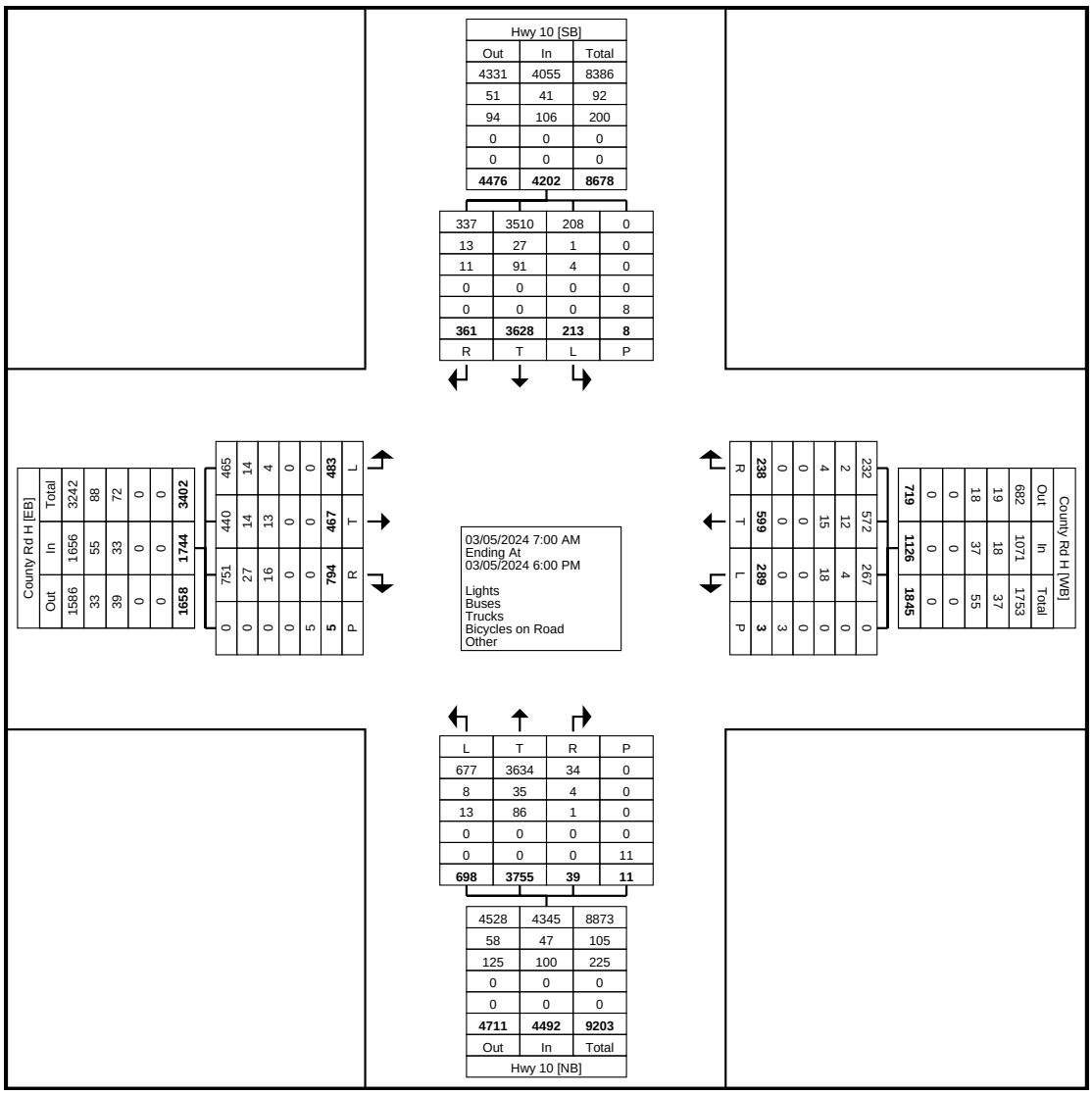
Count Name: County Rd H & Mounds View Blvd
Site Code:
Start Date: 03/05/2024



Turning Movement Data Plot

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Rd H & Mounds View Blvd
Site Code:
Start Date: 03/05/2024

Turning Movement Peak Hour Data (7:15 AM)

Start Time	County Rd H Westbound					County Rd H Eastbound					Hwy 10 Southbound					Hwy 10 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
7:15 AM	15	54	12	0	81	26	17	62	0	105	16	284	39	0	339	56	177	4	0	237	762
7:30 AM	17	44	14	0	75	22	28	65	0	115	14	382	46	0	442	45	192	5	0	242	874
7:45 AM	15	49	13	0	77	10	18	54	0	82	9	331	37	0	377	63	246	2	0	311	847
8:00 AM	17	51	15	0	83	20	21	42	0	83	8	230	23	0	261	43	180	3	0	226	653
Total	64	198	54	0	316	78	84	223	0	385	47	1227	145	0	1419	207	795	14	0	1016	3136
Approach %	20.3	62.7	17.1	-	-	20.3	21.8	57.9	-	-	3.3	86.5	10.2	-	-	20.4	78.2	1.4	-	-	-
Total %	2.0	6.3	1.7	-	10.1	2.5	2.7	7.1	-	12.3	1.5	39.1	4.6	-	45.2	6.6	25.4	0.4	-	32.4	-
PHF	0.941	0.917	0.900	-	0.952	0.750	0.750	0.858	-	0.837	0.734	0.803	0.788	-	0.803	0.821	0.808	0.700	-	0.817	0.897
Lights	52	185	53	-	290	68	72	209	-	349	44	1180	131	-	1355	198	762	14	-	974	2968
% Lights	81.3	93.4	98.1	-	91.8	87.2	85.7	93.7	-	90.6	93.6	96.2	90.3	-	95.5	95.7	95.8	100.0	-	95.9	94.6
Buses	2	8	1	-	11	9	6	12	-	27	1	16	8	-	25	7	5	0	-	12	75
% Buses	3.1	4.0	1.9	-	3.5	11.5	7.1	5.4	-	7.0	2.1	1.3	5.5	-	1.8	3.4	0.6	0.0	-	1.2	2.4
Trucks	10	5	0	-	15	1	6	2	-	9	2	31	6	-	39	2	28	0	-	30	93
% Trucks	15.6	2.5	0.0	-	4.7	1.3	7.1	0.9	-	2.3	4.3	2.5	4.1	-	2.7	1.0	3.5	0.0	-	3.0	3.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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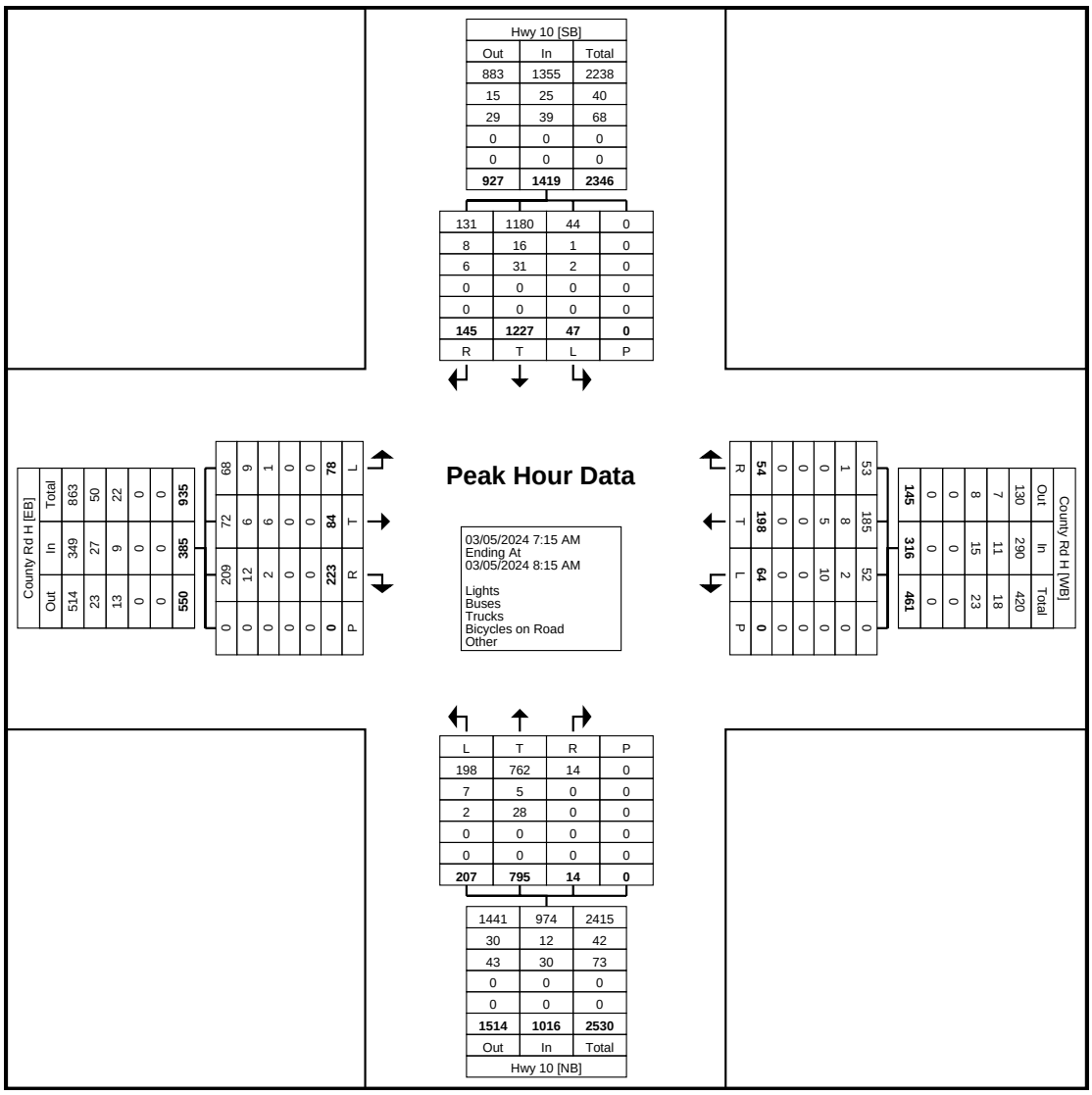
Count Name: County Rd H & Mounds View Blvd
Site Code:
Start Date: 03/05/2024



Turning Movement Peak Hour Data Plot (7:15 AM)

Kimley-Horn and Associates, Inc.
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Count Name: County Rd H & Mounds View Blvd
Site Code:
Start Date: 03/05/2024

Turning Movement Peak Hour Data (4:15 PM)

Start Time	County Rd H Westbound					County Rd H Eastbound					Hwy 10 Southbound					Hwy 10 Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
4:15 PM	15	36	23	0	74	50	44	68	0	162	17	202	22	2	241	48	336	3	0	387	864
4:30 PM	23	30	16	0	69	53	59	56	0	168	18	216	18	1	252	42	302	3	0	347	836
4:45 PM	12	32	25	0	69	37	38	42	0	117	16	234	10	0	260	41	377	1	1	419	865
5:00 PM	32	28	14	2	74	61	47	56	1	164	13	238	15	1	266	60	279	2	4	341	845
Total	82	126	78	2	286	201	188	222	1	611	64	890	65	4	1019	191	1294	9	5	1494	3410
Approach %	28.7	44.1	27.3	-	-	32.9	30.8	36.3	-	-	6.3	87.3	6.4	-	-	12.8	86.6	0.6	-	-	-
Total %	2.4	3.7	2.3	-	8.4	5.9	5.5	6.5	-	17.9	1.9	26.1	1.9	-	29.9	5.6	37.9	0.3	-	43.8	-
PHF	0.641	0.875	0.780	-	0.966	0.824	0.797	0.816	-	0.909	0.889	0.935	0.739	-	0.958	0.796	0.858	0.750	-	0.891	0.986
Lights	80	124	76	-	280	197	185	218	-	600	63	876	63	-	1002	186	1262	5	-	1453	3335
% Lights	97.6	98.4	97.4	-	97.9	98.0	98.4	98.2	-	98.2	98.4	98.4	96.9	-	98.3	97.4	97.5	55.6	-	97.3	97.8
Buses	0	1	1	-	2	3	1	3	-	7	0	3	1	-	4	1	18	4	-	23	36
% Buses	0.0	0.8	1.3	-	0.7	1.5	0.5	1.4	-	1.1	0.0	0.3	1.5	-	0.4	0.5	1.4	44.4	-	1.5	1.1
Trucks	2	1	1	-	4	1	2	1	-	4	1	11	1	-	13	4	14	0	-	18	39
% Trucks	2.4	0.8	1.3	-	1.4	0.5	1.1	0.5	-	0.7	1.6	1.2	1.5	-	1.3	2.1	1.1	0.0	-	1.2	1.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	1	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	100.0	-	-	-	-	0.0	-	-	-	-	25.0	-	-	-	-	80.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	3	-	-	-	-	1	-	-
% Pedestrians	-	-	-	0.0	-	-	-	-	100.0	-	-	-	-	75.0	-	-	-	-	20.0	-	-

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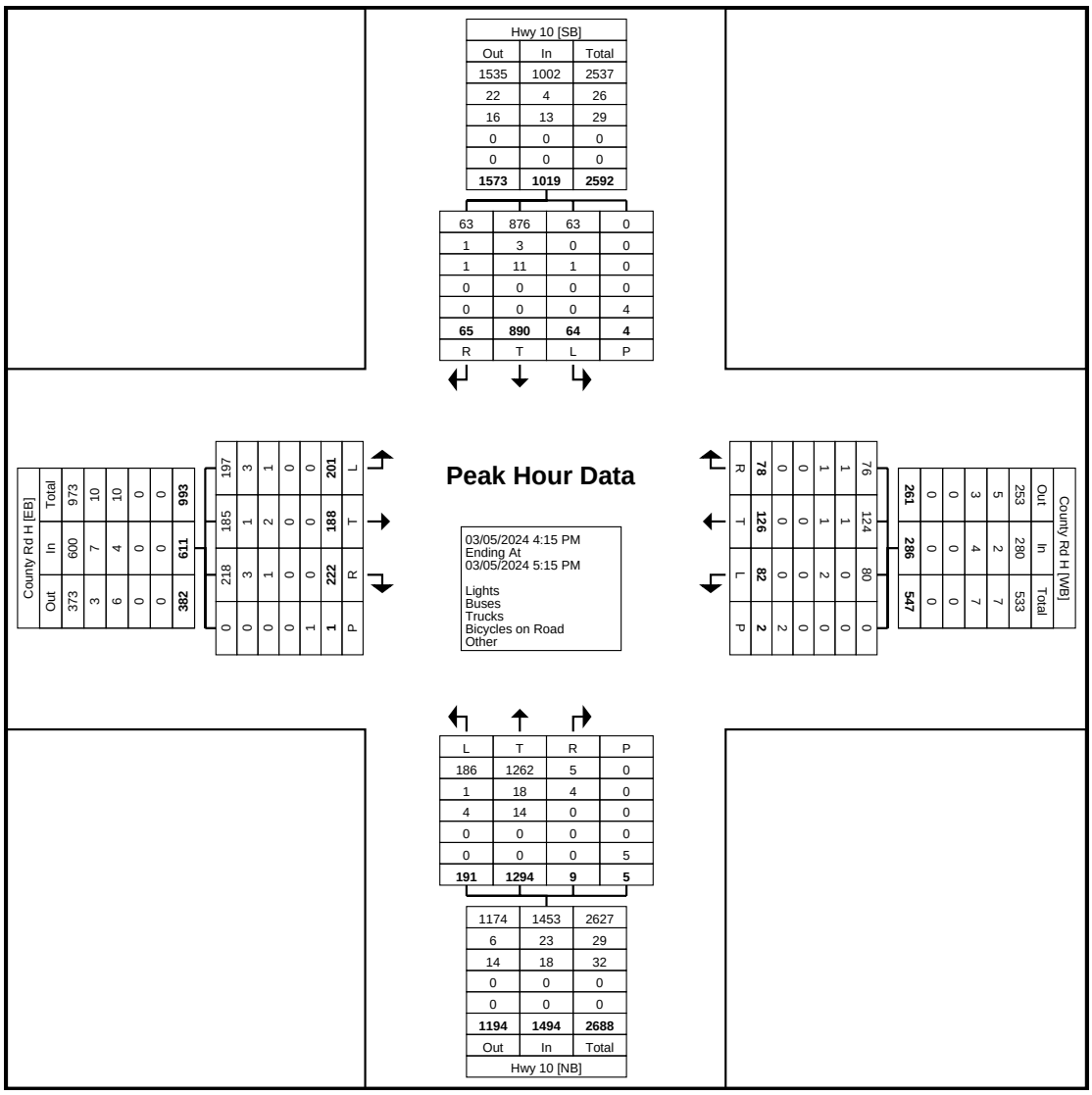
Site Code:
Start Date: 03/05/2024



Turning Movement Peak Hour Data Plot (4:15 PM)

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Road H & I-35W Ramp
Site Code:
Start Date: 03/12/2024

Turning Movement Data

Start Time	County H Westbound					County H Eastbound					I-35W Ramp Southbound					Park N Ride Driveway Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
7:00 AM	1	3	0	0	4	1	22	0	0	23	7	2	51	0	60	3	0	0	0	3	90
7:15 AM	0	7	0	0	7	2	19	0	0	21	11	2	54	0	67	4	0	1	0	5	100
7:30 AM	2	19	0	0	21	2	30	2	0	34	12	1	45	0	58	0	0	0	0	0	113
7:45 AM	3	10	0	0	13	1	19	1	0	21	8	3	61	0	72	2	0	3	0	5	111
Hourly Total	6	39	0	0	45	6	90	3	0	99	38	8	211	0	257	9	0	4	0	13	414
8:00 AM	0	8	0	0	8	3	18	0	0	21	11	6	46	0	63	0	0	1	0	1	93
8:15 AM	1	7	0	0	8	4	26	0	0	30	11	2	41	0	54	2	0	0	0	2	94
8:30 AM	2	12	0	0	14	5	18	0	0	23	6	0	37	0	43	0	0	0	0	0	80
8:45 AM	0	9	0	0	9	2	27	0	0	29	4	0	59	0	63	0	0	0	0	0	101
Hourly Total	3	36	0	0	39	14	89	0	0	103	32	8	183	0	223	2	0	1	0	3	368
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	3	8	0	0	11	0	46	0	0	46	22	0	46	0	68	2	0	3	3	5	130
4:15 PM	0	24	0	0	24	0	47	0	0	47	16	1	53	0	70	4	0	3	1	7	148
4:30 PM	0	23	0	0	23	3	52	0	0	55	12	1	48	0	61	9	0	8	2	17	156
4:45 PM	1	14	0	0	15	2	40	0	0	42	15	1	43	0	59	5	0	3	1	8	124
Hourly Total	4	69	0	0	73	5	185	0	0	190	65	3	190	0	258	20	0	17	7	37	558
5:00 PM	1	13	0	0	14	4	41	0	0	45	12	1	61	0	74	6	0	1	0	7	140
5:15 PM	1	10	0	0	11	1	31	0	0	32	14	0	44	0	58	4	0	1	2	5	106
5:30 PM	1	5	0	0	6	0	39	0	0	39	15	0	59	0	74	0	0	0	2	0	119
5:45 PM	1	8	0	0	9	4	38	0	0	42	5	0	46	0	51	4	0	4	4	8	110
Hourly Total	4	36	0	0	40	9	149	0	0	158	46	1	210	0	257	14	0	6	8	20	475
Grand Total	17	180	0	0	197	34	513	3	0	550	181	20	794	0	995	45	0	28	15	73	1815
Approach %	8.6	91.4	0.0	-	-	6.2	93.3	0.5	-	-	18.2	2.0	79.8	-	-	61.6	0.0	38.4	-	-	-
Total %	0.9	9.9	0.0	-	10.9	1.9	28.3	0.2	-	30.3	10.0	1.1	43.7	-	54.8	2.5	0.0	1.5	-	4.0	-
Lights	17	172	0	-	189	32	490	3	-	525	177	17	758	-	952	40	0	24	-	64	1730
% Lights	100.0	95.6	-	-	95.9	94.1	95.5	100.0	-	95.5	97.8	85.0	95.5	-	95.7	88.9	-	85.7	-	87.7	95.3
Buses	0	2	0	-	2	0	2	0	-	2	0	3	2	-	5	5	0	4	-	9	18
% Buses	0.0	1.1	-	-	1.0	0.0	0.4	0.0	-	0.4	0.0	15.0	0.3	-	0.5	11.1	-	14.3	-	12.3	1.0
Trucks	0	6	0	-	6	2	21	0	-	23	4	0	34	-	38	0	0	0	-	0	67
% Trucks	0.0	3.3	-	-	3.0	5.9	4.1	0.0	-	4.2	2.2	0.0	4.3	-	3.8	0.0	-	0.0	-	0.0	3.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	13	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86.7	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.3	-	-

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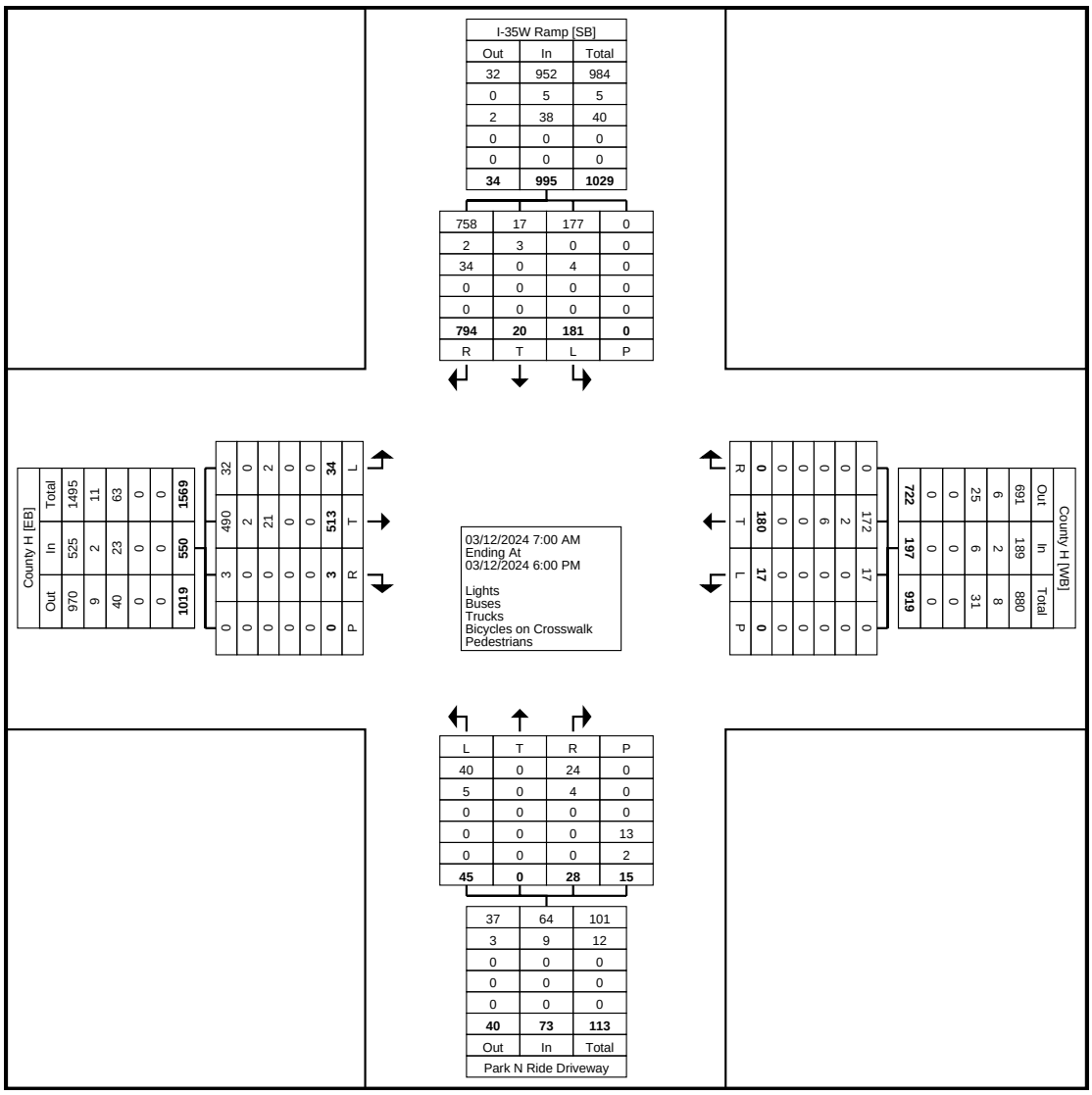
Count Name: County Road H & I-35W Ramp
Site Code:
Start Date: 03/12/2024



Turning Movement Data Plot

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Count Name: County Road H & I-35W Ramp
Site Code:
Start Date: 03/12/2024

Approach Data

Start Time	Wb Street Westbound						Eb Street Eastbound						Sb Street Southbound						Nb Street Northbound					
	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next
7:00 AM	0	0	4	29	4	3	0	0	9	57	23	0	0	0	7	0	59	2	0	0	30	3	3	0
7:15 AM	0	0	6	31	7	7	0	0	13	68	22	0	0	0	14	0	67	2	0	0	33	2	5	1
7:30 AM	0	0	2	42	21	19	0	0	15	65	33	0	0	0	23	0	58	1	0	0	43	5	0	0
7:45 AM	0	0	4	30	12	10	0	0	14	75	22	0	0	0	15	0	72	3	0	0	29	7	5	3
Hourly Total	0	0	16	132	44	39	0	0	51	265	100	0	0	0	59	0	256	8	0	0	135	17	13	4
8:00 AM	0	0	4	29	9	8	0	0	19	57	22	0	0	0	11	0	64	6	0	0	33	6	1	1
8:15 AM	0	0	6	37	8	7	0	0	14	54	30	0	0	0	14	0	54	2	0	0	41	3	2	0
8:30 AM	0	0	6	26	14	12	0	0	8	54	24	0	0	0	20	0	43	0	0	0	32	0	0	0
8:45 AM	0	0	2	30	10	9	0	0	4	71	30	0	0	0	12	0	63	0	0	0	34	0	0	0
Hourly Total	0	0	18	122	41	36	0	0	45	236	106	0	0	0	57	0	224	8	0	0	140	9	3	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	0	2	73	10	8	0	0	23	56	46	0	0	0	12	0	67	0	2	1	70	1	5	3
4:15 PM	0	0	5	66	24	24	0	0	17	81	47	0	0	0	28	0	70	1	1	0	63	1	8	3
4:30 PM	0	0	12	72	23	23	0	0	13	83	55	0	0	0	35	0	61	1	1	1	68	1	17	8
4:45 PM	0	0	8	58	15	14	0	0	16	64	42	0	0	0	23	0	59	1	1	0	57	2	8	3
Hourly Total	0	0	27	269	72	69	0	0	69	284	190	0	0	0	98	0	257	3	5	2	258	5	38	17
5:00 PM	0	0	10	54	14	13	0	0	15	84	46	0	0	0	24	0	75	1	0	0	59	2	7	1
5:15 PM	0	0	5	46	11	10	0	0	15	59	32	0	0	0	16	0	58	0	0	2	46	1	5	1
5:30 PM	0	0	0	55	6	5	0	0	16	64	39	0	0	0	6	0	74	0	2	0	54	1	0	0
5:45 PM	0	0	8	48	10	8	0	0	5	61	40	0	0	0	19	0	51	0	2	2	44	1	7	4
Hourly Total	0	0	23	203	41	36	0	0	51	268	157	0	0	0	65	0	258	1	4	4	203	5	19	6
Grand Total	0	0	84	726	198	180	0	0	216	1053	553	0	0	0	279	0	995	20	9	6	736	36	73	28
Approach %	-	-	7.1	61.1	16.7	15.2	-	-	11.9	57.8	30.4	0.0	-	-	21.6	0.0	76.9	1.5	-	-	84.3	4.1	8.4	3.2
Total %	-	-	1.6	14.0	3.8	3.5	-	-	4.2	20.3	10.7	0.0	-	-	5.4	0.0	19.2	0.4	-	-	14.2	0.7	1.4	0.5
Lights	-	-	77	695	189	172	-	-	209	1001	527	0	-	-	263	0	952	17	-	-	706	33	64	24
% Lights	-	-	91.7	95.7	95.5	95.6	-	-	96.8	95.1	95.3	-	-	-	94.3	-	95.7	85.0	-	-	95.9	91.7	87.7	85.7
Buses	-	-	5	6	3	2	-	-	3	9	2	0	-	-	8	0	5	3	-	-	2	3	9	4
% Buses	-	-	6.0	0.8	1.5	1.1	-	-	1.4	0.9	0.4	-	-	-	2.9	-	0.5	15.0	-	-	0.3	8.3	12.3	14.3
Trucks	-	-	2	25	6	6	-	-	4	43	24	0	-	-	8	0	38	0	-	-	28	0	0	0
% Trucks	-	-	2.4	3.4	3.0	3.3	-	-	1.9	4.1	4.3	-	-	-	2.9	-	3.8	0.0	-	-	3.8	0.0	0.0	0.0
Bicycles on Crosswalk	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	7	6	-	-	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	77.8	100.0	-	-	-	-
Pedestrians	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	2	0	-	-	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.2	0.0	-	-	-	-

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Road H & I-35W Ramp
Site Code:
Start Date: 03/12/2024

Turning Movement Peak Hour Data (7:15 AM)

Start Time	County H Westbound					County H Eastbound					I-35W Ramp Southbound					Park N Ride Driveway Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
7:15 AM	0	7	0	0	7	2	19	0	0	21	11	2	54	0	67	4	0	1	0	5	100
7:30 AM	2	19	0	0	21	2	30	2	0	34	12	1	45	0	58	0	0	0	0	0	113
7:45 AM	3	10	0	0	13	1	19	1	0	21	8	3	61	0	72	2	0	3	0	5	111
8:00 AM	0	8	0	0	8	3	18	0	0	21	11	6	46	0	63	0	0	1	0	1	93
Total	5	44	0	0	49	8	86	3	0	97	42	12	206	0	260	6	0	5	0	11	417
Approach %	10.2	89.8	0.0	-	-	8.2	88.7	3.1	-	-	16.2	4.6	79.2	-	-	54.5	0.0	45.5	-	-	-
Total %	1.2	10.6	0.0	-	11.8	1.9	20.6	0.7	-	23.3	10.1	2.9	49.4	-	62.4	1.4	0.0	1.2	-	2.6	-
PHF	0.417	0.579	0.000	-	0.583	0.667	0.717	0.375	-	0.713	0.875	0.500	0.844	-	0.903	0.375	0.000	0.417	-	0.550	0.923
Lights	5	41	0	-	46	7	74	3	-	84	39	10	195	-	244	3	0	5	-	8	382
% Lights	100.0	93.2	-	-	93.9	87.5	86.0	100.0	-	86.6	92.9	83.3	94.7	-	93.8	50.0	-	100.0	-	72.7	91.6
Buses	0	0	0	-	0	0	0	0	-	0	0	2	0	-	2	3	0	0	-	3	5
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	16.7	0.0	-	0.8	50.0	-	0.0	-	27.3	1.2
Trucks	0	3	0	-	3	1	12	0	-	13	3	0	11	-	14	0	0	0	-	0	30
% Trucks	0.0	6.8	-	-	6.1	12.5	14.0	0.0	-	13.4	7.1	0.0	5.3	-	5.4	0.0	-	0.0	-	0.0	7.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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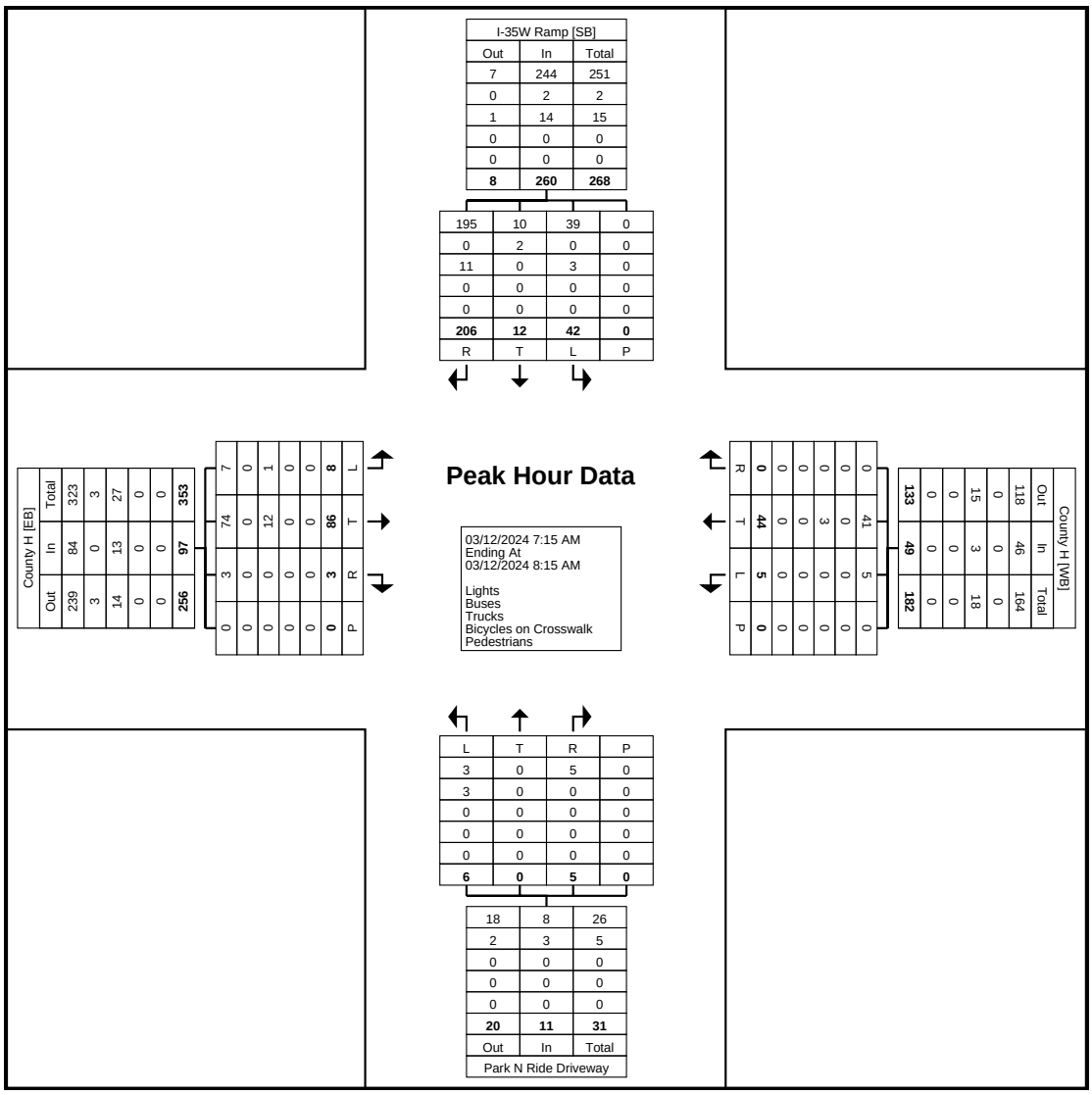
Count Name: County Road H & I-35W Ramp
Site Code:
Start Date: 03/12/2024



Turning Movement Peak Hour Data Plot (7:15 AM)

Kimley-Horn and Associates, Inc.
4201 Winfield Road Suite 600

Warrenville, Illinois, United States 60555
(630) 487-5550 ethan.scowcroft@kimley-horn.com

Count Name: County Road H & I-35W Ramp
Site Code:
Start Date: 03/12/2024

Turning Movement Peak Hour Data (4:15 PM)

Start Time	County H Westbound					County H Eastbound					I-35W Ramp Southbound					Park N Ride Driveway Northbound					
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
4:15 PM	0	24	0	0	24	0	47	0	0	47	16	1	53	0	70	4	0	3	1	7	148
4:30 PM	0	23	0	0	23	3	52	0	0	55	12	1	48	0	61	9	0	8	2	17	156
4:45 PM	1	14	0	0	15	2	40	0	0	42	15	1	43	0	59	5	0	3	1	8	124
5:00 PM	1	13	0	0	14	4	41	0	0	45	12	1	61	0	74	6	0	1	0	7	140
Total	2	74	0	0	76	9	180	0	0	189	55	4	205	0	264	24	0	15	4	39	568
Approach %	2.6	97.4	0.0	-	-	4.8	95.2	0.0	-	-	20.8	1.5	77.7	-	-	61.5	0.0	38.5	-	-	-
Total %	0.4	13.0	0.0	-	13.4	1.6	31.7	0.0	-	33.3	9.7	0.7	36.1	-	46.5	4.2	0.0	2.6	-	6.9	-
PHF	0.500	0.771	0.000	-	0.792	0.563	0.865	0.000	-	0.859	0.859	1.000	0.840	-	0.892	0.667	0.000	0.469	-	0.574	0.910
Lights	2	73	0	-	75	9	178	0	-	187	55	4	199	-	258	24	0	12	-	36	556
% Lights	100.0	98.6	-	-	98.7	100.0	98.9	-	-	98.9	100.0	100.0	97.1	-	97.7	100.0	-	80.0	-	92.3	97.9
Buses	0	0	0	-	0	0	0	0	-	0	0	0	1	-	1	0	0	3	-	3	4
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.5	-	0.4	0.0	-	20.0	-	7.7	0.7
Trucks	0	1	0	-	1	0	2	0	-	2	0	0	5	-	5	0	0	0	-	0	8
% Trucks	0.0	1.4	-	-	1.3	0.0	1.1	-	-	1.1	0.0	0.0	2.4	-	1.9	0.0	-	0.0	-	0.0	1.4
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-

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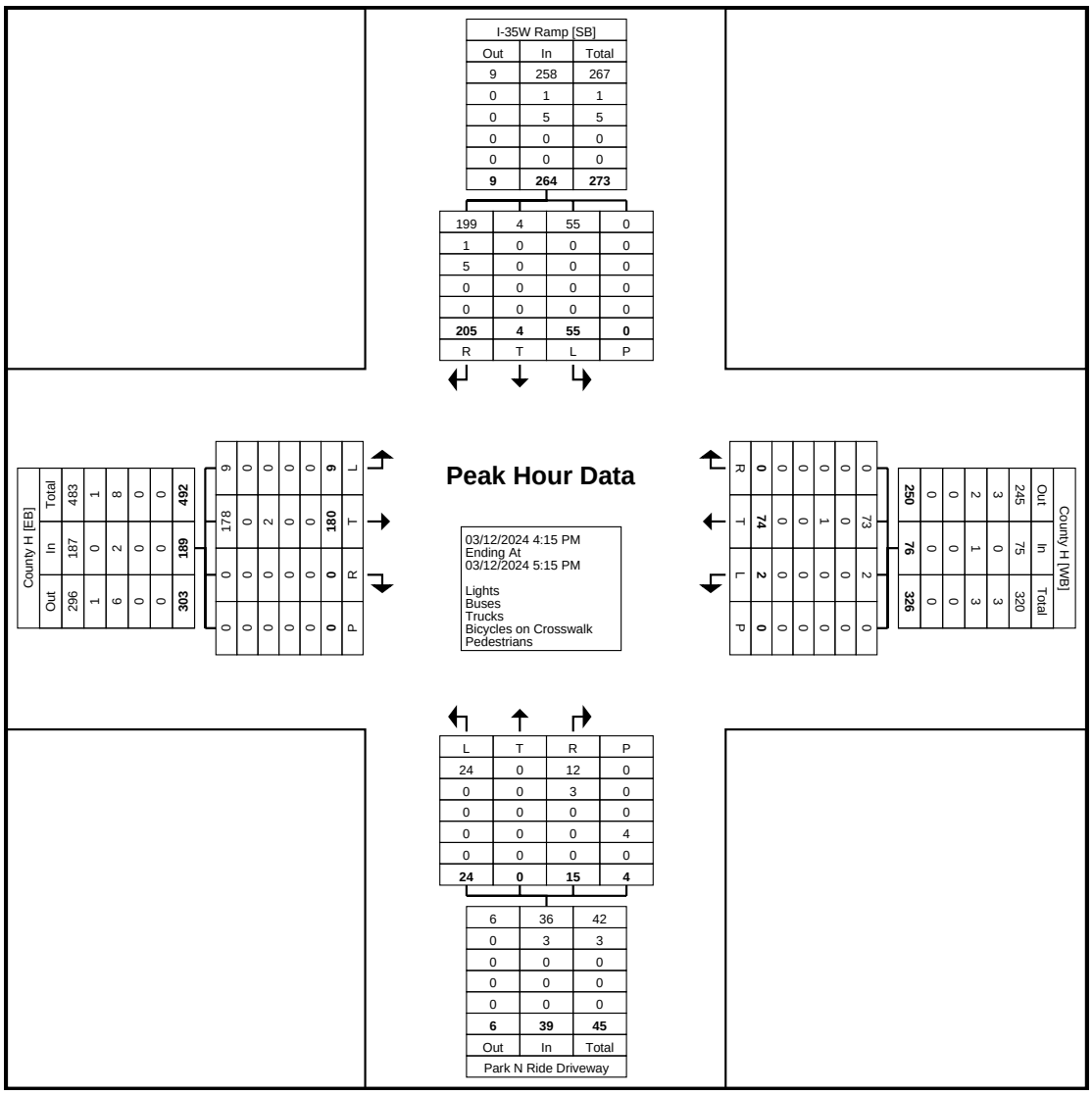

Turning Movement Peak Hour Data Plot (4:15 PM)

Appendix C: Traffic Reports

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	1.0	3.5	0.9	0.0	0.0	2.7	0.3	2.6	2.2	0.3	2.4
Total Del/Veh (s)	56.5	61.9	20.0	62.2	54.3	7.4	69.6	16.4	3.7	58.4	24.8	5.2

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	0.9
Total Del/Veh (s)	29.0

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	3.5	0.0	0.0	0.4	4.0	3.5	1.4	3.6	1.0
Total Del/Veh (s)	28.4	5.2	44.4	9.5	50.8	9.3	43.5	33.1	7.4	24.6

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	1.2	0.3		0.1	0.2
Total Del/Veh (s)	3.2	2.5	13.4	0.8		4.8	1.8

Total Zone Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	458.1

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	104	148	146	163	184	93	112	160	147	61	317	336
Average Queue (ft)	9	66	72	16	85	14	47	76	82	22	173	164
95th Queue (ft)	54	126	134	88	162	53	96	136	135	51	288	292
Link Distance (ft)			491					684	684	684		649
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200	200		200	200	300	300				300	
Storage Blk Time (%)				0	0						1	0
Queuing Penalty (veh)				0	0						6	1

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	T	R
Maximum Queue (ft)	250	104	33	80	454	376	142
Average Queue (ft)	127	8	2	25	264	214	17
95th Queue (ft)	242	50	19	68	402	351	85
Link Distance (ft)	649				709	709	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		100	500	500			400
Storage Blk Time (%)	10				0	0	
Queuing Penalty (veh)	1				0	0	

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	234	187	7	283	167	159	103	92	288	340	236	85
Average Queue (ft)	119	60	1	161	70	64	27	44	163	221	40	29
95th Queue (ft)	190	151	5	269	137	132	72	79	294	325	128	69
Link Distance (ft)	598	598			1415	1415	560				417	
Upstream Blk Time (%)											0	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)							0		0	6	9	1
Queuing Penalty (veh)							0		0	6	48	5

Intersection: 5: Northern Heights & CSAH 96

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	10	10	20
Average Queue (ft)	0	0	3
95th Queue (ft)	4	6	13
Link Distance (ft)			276
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300	100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 67

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.5	1.4	3.4	0.2	0.0	0.0	2.4	0.4	2.2	2.7	0.2	2.6
Total Del/Veh (s)	61.7	61.8	15.1	75.2	66.5	20.8	73.1	22.9	10.5	71.2	25.6	4.2

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	0.9
Total Del/Veh (s)	33.5

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.2	2.6	0.0	0.0	0.5	3.9	3.6	0.9	3.6	0.9
Total Del/Veh (s)	20.0	2.7	49.8	6.2	49.8	12.3	38.7	34.7	3.9	18.2

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	2.6	0.2	4.2	0.1	0.1
Total Del/Veh (s)	3.5	3.9	7.2	0.5	36.9	7.7	2.3

Total Zone Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	301.4

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	195	230	226	193	171	108	122	124	136	98	349	507
Average Queue (ft)	71	134	130	67	60	30	56	47	65	34	203	290
95th Queue (ft)	182	212	198	172	124	84	104	101	119	78	348	458
Link Distance (ft)			491					684	684	684		649
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200	200		200	200	300	300				300	
Storage Blk Time (%)	0	2	0	0	0						1	6
Queuing Penalty (veh)	0	7	2	0	0						4	12

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	T	R
Maximum Queue (ft)	454	105	93	116	378	361	28
Average Queue (ft)	254	8	8	47	229	183	3
95th Queue (ft)	409	58	44	103	341	303	15
Link Distance (ft)	649				709	709	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		100	500	500			400
Storage Blk Time (%)	24					0	
Queuing Penalty (veh)	2					0	

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	291	234	19	105	121	111	79	91	219	270	69	62
Average Queue (ft)	155	94	2	31	40	37	31	41	105	173	21	18
95th Queue (ft)	251	204	10	76	92	88	67	76	223	246	55	47
Link Distance (ft)	598	598			1415	1415	560				417	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)									0	0	5	0
Queuing Penalty (veh)									0	0	20	1

Intersection: 5: Northern Heights & CSAH 96

Movement	WB	WB	NB	NB
Directions Served	L	L	L	R
Maximum Queue (ft)	3	17	28	26
Average Queue (ft)	0	4	3	7
95th Queue (ft)	2	14	15	23
Link Distance (ft)				276
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300	300	100	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 49

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	1.1	3.6	1.0	0.0	1.1	2.7	0.3	2.8	2.1	0.4	2.3
Total Del/Veh (s)	60.2	57.2	26.9	58.8	57.4	11.1	85.3	19.7	5.2	53.9	28.7	5.4

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	33.3

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	3.3	0.0	0.0	0.3	4.0	3.5	1.2	3.4	1.0
Total Del/Veh (s)	31.3	5.5	42.7	9.3	50.7	8.9	46.1	29.2	7.5	25.4

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	2.9	0.3	3.4	0.1	0.2
Total Del/Veh (s)	3.3	3.5	2.6	0.8	55.9	3.9	1.9

Total Zone Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	502.6

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	118	186	273	221	215	88	118	159	181	76	331	454
Average Queue (ft)	14	77	87	30	101	16	48	88	94	27	212	228
95th Queue (ft)	70	145	202	134	186	58	99	153	154	60	350	448
Link Distance (ft)			491					690	690			649
Upstream Blk Time (%)			0									0
Queuing Penalty (veh)			0									0
Storage Bay Dist (ft)	200	200		200	200	300	300			200	300	
Storage Blk Time (%)			0	0	2				0		8	0
Queuing Penalty (veh)			0	0	2				0		36	1

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	T	R
Maximum Queue (ft)	385	103	20	178	530	477	56
Average Queue (ft)	185	7	2	30	308	259	14
95th Queue (ft)	381	49	11	112	450	400	43
Link Distance (ft)	649				709	709	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		100	500	500			400
Storage Blk Time (%)	16				0	0	
Queuing Penalty (veh)	2				0	1	

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	251	222	7	354	154	141	102	88	277	337	168	93
Average Queue (ft)	139	74	1	170	68	67	29	40	177	232	39	28
95th Queue (ft)	221	179	5	287	128	132	75	72	277	328	126	67
Link Distance (ft)	598	598			1415	1415	560				417	
Upstream Blk Time (%)											0	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)				0			0		0	6	8	2
Queuing Penalty (veh)				1			0		0	7	45	8

Intersection: 5: Northern Heights & CSAH 96

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	6	14	21
Average Queue (ft)	0	1	4
95th Queue (ft)	3	8	17
Link Distance (ft)			276
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300	100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 103

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.4	1.5	3.4	0.5	0.0	0.5	2.4	0.5	2.6	2.5	0.3	2.4
Total Del/Veh (s)	59.0	58.5	20.3	70.7	65.6	29.5	76.9	26.7	14.2	74.7	29.6	4.6

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	36.6

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.2	2.7	0.0	0.0	0.5	3.9	3.5	1.2	3.6	0.9
Total Del/Veh (s)	23.0	2.9	52.0	6.3	49.1	12.7	38.7	32.9	4.3	19.3

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	2.6	0.2	4.6	0.1	0.1
Total Del/Veh (s)	3.9	2.8	9.9	0.5	31.5	6.9	2.4

Total Zone Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	346.9

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	204	228	222	200	181	122	137	113	133	104	350	606
Average Queue (ft)	80	142	131	68	85	33	65	53	67	44	226	338
95th Queue (ft)	186	209	203	175	162	89	119	101	120	87	368	537
Link Distance (ft)			491					690	690			649
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	200	200		200	200	300	300			200	300	
Storage Blk Time (%)	0	1	1	0	1						0	11
Queuing Penalty (veh)	0	5	3	0	2						3	23

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	T	R
Maximum Queue (ft)	533	102	92	162	396	361	34
Average Queue (ft)	290	7	8	52	256	207	4
95th Queue (ft)	487	50	42	119	383	336	18
Link Distance (ft)	649				709	709	
Upstream Blk Time (%)	0						
Queuing Penalty (veh)	0						
Storage Bay Dist (ft)		100	500	500			400
Storage Blk Time (%)	26						
Queuing Penalty (veh)	3						

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	308	269	14	113	118	118	92	94	226	280	80	73
Average Queue (ft)	175	123	2	41	48	41	31	43	124	179	23	17
95th Queue (ft)	272	243	9	90	99	98	73	78	233	259	61	48
Link Distance (ft)	598	598			1415	1415	560				417	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)									0	1	6	0
Queuing Penalty (veh)									0	1	22	1

Intersection: 5: Northern Heights & CSAH 96

Movement	WB	NB	NB
Directions Served	L	L	R
Maximum Queue (ft)	19	14	29
Average Queue (ft)	4	2	6
95th Queue (ft)	15	13	22
Link Distance (ft)			276
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	300	100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 65

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.3	0.2	3.2	3.0	0.3	3.0	2.5	0.4	2.5	2.9	1.6	2.8
Total Del/Veh (s)	65.3	65.0	50.4	69.2	54.9	15.5	60.7	26.2	7.3	63.1	36.4	10.3

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	1.6
Total Del/Veh (s)	41.2

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.3	2.9	0.0	0.0	0.3	4.0	5.7	3.7	6.6	1.7
Total Del/Veh (s)	53.8	7.2	46.7	15.1	53.1	19.2	51.1	39.4	14.6	35.2

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.8	0.8	2.4		0.1	0.3	0.3	0.6
Total Del/Veh (s)	50.6	13.2	7.0	57.6	31.0	17.7		10.0	46.3	23.7	27.7

Total Zone Performance

Denied Del/Veh (s)	1.8
Total Del/Veh (s)	732.3

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L
Maximum Queue (ft)	116	143	290	323	302	255	325	220	201	201	190
Average Queue (ft)	18	64	123	117	138	150	196	129	108	68	90
95th Queue (ft)	70	125	196	336	311	228	281	202	184	139	196
Link Distance (ft)			1198	1198							
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	200	200			200	300	300			200	300
Storage Blk Time (%)				0	4	0	0		1	0	
Queuing Penalty (veh)				0	5	0	1		1	0	

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	408	339	135	214	364	587	553	311
Average Queue (ft)	237	201	40	115	182	364	327	46
95th Queue (ft)	350	307	96	213	340	557	529	213
Link Distance (ft)	650	650				709	709	
Upstream Blk Time (%)						2	2	
Queuing Penalty (veh)						0	0	
Storage Bay Dist (ft)			300	500	500			400
Storage Blk Time (%)	2	0				3	4	0
Queuing Penalty (veh)	4	0				8	7	0

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	455	412	10	345	223	200	103	130	300	350	457	89
Average Queue (ft)	282	225	1	200	79	92	32	50	235	273	152	30
95th Queue (ft)	404	367	6	311	166	169	75	97	343	393	449	73
Link Distance (ft)	598	598			1407	1407	553				412	
Upstream Blk Time (%)											6	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)		0		0				0	6	18	15	4
Queuing Penalty (veh)		0		1				0	7	21	122	30

Intersection: 5: Northern Heights & CSAH 96

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	L	T	T	R	L	T	T	R	L	R	L
Maximum Queue (ft)	269	277	279	284	17	15	605	600	300	9	21	198
Average Queue (ft)	155	161	115	114	1	1	333	284	173	0	2	83
95th Queue (ft)	250	250	215	221	8	7	517	494	327	5	13	189
Link Distance (ft)			1407	1407			966	966			535	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350	350			250	300			250	100		200
Storage Blk Time (%)	0	0	0	1			11	7	2			0
Queuing Penalty (veh)	0	1	0	0			0	34	11			0

Intersection: 5: Northern Heights & CSAH 96

Movement	SB	SB	SB
Directions Served	L	R	R
Maximum Queue (ft)	234	210	173
Average Queue (ft)	136	92	29
95th Queue (ft)	211	168	104
Link Distance (ft)	674	674	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			200
Storage Blk Time (%)	1	0	0
Queuing Penalty (veh)	1	0	0

Zone Summary

Zone wide Queuing Penalty: 255

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.0	0.4	2.9	0.1	0.0	0.1	2.2	0.6	2.0	2.4	0.4	2.2
Total Del/Veh (s)	54.2	99.5	46.2	83.9	58.2	41.0	164.9	73.9	38.3	112.1	34.4	6.2

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	67.3

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.3	2.6	0.0	0.0	0.4	3.9	3.5	1.4	3.4	0.9
Total Del/Veh (s)	27.7	3.3	50.6	9.2	51.4	21.3	42.2	28.2	8.2	21.7

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	2.5	0.5	2.4	4.5	0.1	0.6	0.5	0.5
Total Del/Veh (s)	37.7	9.6	5.1	70.4	29.0	11.6	71.8	19.8	41.4	18.4	23.2

Total Zone Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	507.8

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L
Maximum Queue (ft)	189	254	309	318	330	337	374	484	446	225	219
Average Queue (ft)	72	119	178	158	138	261	283	151	159	178	113
95th Queue (ft)	160	199	267	256	257	372	394	401	320	249	203
Link Distance (ft)			1198	1198				688	688		
Upstream Blk Time (%)								0	0		
Queuing Penalty (veh)								2	0		
Storage Bay Dist (ft)	200	200			200	300	300			200	300
Storage Blk Time (%)					0	5	11	0	0	8	
Queuing Penalty (veh)					0	7	16	0	1	12	

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	1222	1192	350	258	324	414	402	44
Average Queue (ft)	744	704	113	154	188	288	281	6
95th Queue (ft)	1208	1156	345	244	293	389	385	25
Link Distance (ft)	1317	1317				1678	1678	
Upstream Blk Time (%)	1	0						
Queuing Penalty (veh)	0	0						
Storage Bay Dist (ft)			300	500	500			400
Storage Blk Time (%)	38	35	0				0	
Queuing Penalty (veh)	78	37	0				0	

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	426	371	12	93	127	140	79	110	289	321	190	52
Average Queue (ft)	249	180	2	28	49	64	30	47	165	214	26	17
95th Queue (ft)	374	325	10	73	101	123	69	91	263	304	101	43
Link Distance (ft)	598	598			1407	1407	553				412	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)		0						0	0	4	3	1
Queuing Penalty (veh)		0						0	0	3	21	4

Intersection: 5: Northern Heights & CSAH 96

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	R
Maximum Queue (ft)	192	207	162	151	21	9	52	375	357	272	27	34
Average Queue (ft)	104	113	58	55	1	1	14	247	216	91	3	9
95th Queue (ft)	168	173	122	119	9	6	40	350	326	198	16	27
Link Distance (ft)			1407	1407				966	966			535
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350	350			250	300	300			250	100	
Storage Blk Time (%)								2	2	0		
Queuing Penalty (veh)								0	9	0		

Intersection: 5: Northern Heights & CSAH 96

Movement	SB	SB	SB	SB
Directions Served	L	L	R	R
Maximum Queue (ft)	250	409	346	249
Average Queue (ft)	198	254	177	111
95th Queue (ft)	284	373	284	242
Link Distance (ft)		674	674	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	200			200
Storage Blk Time (%)	1	20	5	0
Queuing Penalty (veh)	4	60	14	0

Zone Summary

Zone wide Queuing Penalty: 270

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	3.8	0.8	2.1	2.5	0.1	0.3	0.3	0.6
Total Del/Veh (s)	35.0	2.7	1.8	83.3	43.3	32.1	50.1	16.6	54.9	2.5	28.4

Intersection: 5: Northern Heights & CSAH 96

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	T	T	L	T	T	R	L	R	L	L
Maximum Queue (ft)	303	330	148	142	24	895	929	300	14	25	201	238
Average Queue (ft)	193	206	11	9	1	402	398	225	1	2	95	143
95th Queue (ft)	286	310	93	89	9	742	769	372	7	14	191	214
Link Distance (ft)			913	913		1742	1742			276		814
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350	350			300			250	100		200	
Storage Blk Time (%)	0	1				15	15	4			0	1
Queuing Penalty (veh)	0	3				0	81	28			0	1

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	1.9	0.5	2.1	4.6	0.1	0.6	0.6	0.5
Total Del/Veh (s)	40.6	10.5	3.4	40.3	39.3	17.1	31.6	10.4	52.0	5.8	25.9

Intersection: 5: Northern Heights & CSAH 96

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	L	T	T	R	L	T	T	R	L	R	L
Maximum Queue (ft)	246	261	240	256	29	110	457	458	300	23	21	250
Average Queue (ft)	136	146	104	99	4	10	273	262	145	3	6	203
95th Queue (ft)	210	221	195	191	21	62	403	409	305	15	21	288
Link Distance (ft)			913	913			1742	1742			276	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350	350			250	300			250	100		200
Storage Blk Time (%)				0			6	9	0			5
Queuing Penalty (veh)				0			1	36	1			18

Intersection: 5: Northern Heights & CSAH 96

Movement	SB	SB
Directions Served	L	R
Maximum Queue (ft)	502	24
Average Queue (ft)	276	1
95th Queue (ft)	437	18
Link Distance (ft)	814	814
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	23	
Queuing Penalty (veh)	76	

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.1	0.3	3.0	2.3	0.4	2.2	2.0	0.6	1.9
Total Del/Veh (s)	60.1	95.4	55.5	74.2	56.7	16.6	94.2	25.5	11.8	80.4	38.0	11.5

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	46.8

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.3	2.7	0.0	0.0	0.3	3.9	5.2	3.2	5.0	1.5
Total Del/Veh (s)	68.8	14.9	59.5	12.4	65.0	28.0	60.8	44.6	26.9	42.2

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	1.7	0.7	2.0	2.5	0.1	0.3	0.3	0.5
Total Del/Veh (s)	39.9	6.5	4.1	61.3	34.2	25.2	40.2	13.1	55.7	31.6	28.4

Total Network Performance

Denied Del/Veh (s)	1.4
Total Del/Veh (s)	56.8

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	B10	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	R	T	L	L	T	T	R	L
Maximum Queue (ft)	98	113	431	250	225	257	248	269	198	173	167	336
Average Queue (ft)	24	58	208	155	149	30	118	158	116	93	51	221
95th Queue (ft)	72	107	394	265	245	177	214	239	181	163	116	351
Link Distance (ft)		340	340			618			1012	1012		
Upstream Blk Time (%)			7									
Queuing Penalty (veh)			0									
Storage Bay Dist (ft)	200			200	200		300	300			200	300
Storage Blk Time (%)			8	3	12		0	0		0	0	10
Queuing Penalty (veh)			28	3	14		0	0		0	0	48

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	490	416	150	240	426	626	643	369
Average Queue (ft)	247	234	80	138	186	339	338	48
95th Queue (ft)	439	409	178	225	359	543	549	232
Link Distance (ft)	1858	1858				1878	1878	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			100	500	500			400
Storage Blk Time (%)	0	24	0			2	6	
Queuing Penalty (veh)	1	35	1			6	8	

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	682	644	100	360	241	268	135	182	300	350	773	100
Average Queue (ft)	388	324	7	196	58	59	38	59	257	284	243	37
95th Queue (ft)	651	592	97	349	240	193	91	123	345	391	698	83
Link Distance (ft)	926	926			1420	1420	893				813	
Upstream Blk Time (%)	0										3	
Queuing Penalty (veh)	0										0	
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)		6		2			0	1	11	18	12	8
Queuing Penalty (veh)		1		11			0	0	13	20	102	68

Intersection: 5: Northern Heights & CSAH 96

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	L	T	T	R	L	T	T	R	L	R	L
Maximum Queue (ft)	288	308	61	33	5	20	592	579	300	9	20	208
Average Queue (ft)	199	215	12	5	0	1	340	333	217	1	2	103
95th Queue (ft)	274	296	44	23	3	11	529	537	359	6	13	201
Link Distance (ft)			1420	1420			1742	1742			276	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350	350			250	300			250	100		200
Storage Blk Time (%)		0					10	10	3			0
Queuing Penalty (veh)		0					0	56	19			0

Intersection: 5: Northern Heights & CSAH 96

Movement	SB	SB
Directions Served	L	R
Maximum Queue (ft)	236	309
Average Queue (ft)	149	157
95th Queue (ft)	217	274
Link Distance (ft)	814	814
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	1	
Queuing Penalty (veh)	2	

Network Summary

Network wide Queuing Penalty: 437

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	4.3	2.1	4.2	2.0	0.5	1.9	2.2	0.4	2.0
Total Del/Veh (s)	104.7	133.6	31.9	107.8	55.7	46.5	105.4	67.2	50.4	146.2	41.3	7.5

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	1.4
Total Del/Veh (s)	72.4

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.4	2.6	0.0	0.0	0.4	3.9	3.4	1.4	3.5	0.8
Total Del/Veh (s)	39.1	4.7	59.9	11.1	49.9	21.2	38.6	25.9	9.2	24.9

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	2.1	0.5	2.1	4.5	0.1	4.0	3.8	1.5
Total Del/Veh (s)	32.6	13.9	8.3	58.3	54.7	24.7	30.5	10.8	56.5	47.6	38.2

Total Network Performance

Denied Del/Veh (s)	1.8
Total Del/Veh (s)	68.1

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	B10	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	R	T	L	L	T	T	R	L
Maximum Queue (ft)	196	255	401	250	225	266	337	375	731	683	225	350
Average Queue (ft)	119	147	246	192	134	46	275	311	284	273	193	270
95th Queue (ft)	206	236	399	288	246	279	379	413	743	681	255	432
Link Distance (ft)		340	340			618			1012	1012		
Upstream Blk Time (%)			8			1			4	0		
Queuing Penalty (veh)			0			0			0	0		
Storage Bay Dist (ft)	200			200	200		300	300			200	300
Storage Blk Time (%)	2	5	26	13	1		7	22	0	0	18	1
Queuing Penalty (veh)	2	5	101	20	1		11	33	0	1	27	11

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	L	T	T	R
Maximum Queue (ft)	1023	995	150	335	375	446	468	116
Average Queue (ft)	643	624	62	178	205	293	282	11
95th Queue (ft)	1006	966	165	319	346	416	416	74
Link Distance (ft)	1858	1858				1878	1878	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			100	500	500			400
Storage Blk Time (%)	35	46	0				1	
Queuing Penalty (veh)	73	50	2				1	

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	565	498	28	104	142	147	100	121	299	338	333	57
Average Queue (ft)	331	266	3	36	64	81	38	51	154	201	27	18
95th Queue (ft)	508	453	13	87	121	137	83	95	270	309	138	46
Link Distance (ft)	598	598			1408	1408	553				412	
Upstream Blk Time (%)	0										0	
Queuing Penalty (veh)	0										0	
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)		1					0	0	0	4	4	1
Queuing Penalty (veh)		0					0	0	0	3	23	7

Intersection: 5: Northern Heights & CSAH 96

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	R
Maximum Queue (ft)	196	201	212	213	33	4	220	566	574	300	23	29
Average Queue (ft)	106	110	104	94	4	0	20	356	346	199	2	6
95th Queue (ft)	166	169	183	168	21	5	115	532	542	365	12	22
Link Distance (ft)			1408	1408				1741	1741			276
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350	350			250	300	300			250	100	
Storage Blk Time (%)				0				18	20	0		
Queuing Penalty (veh)				0				2	80	2		

Intersection: 5: Northern Heights & CSAH 96

Movement	SB	SB	SB
Directions Served	L	L	R
Maximum Queue (ft)	250	706	782
Average Queue (ft)	209	381	456
95th Queue (ft)	284	757	831
Link Distance (ft)		814	814
Upstream Blk Time (%)		6	8
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)	200		
Storage Blk Time (%)	6	26	
Queuing Penalty (veh)	20	86	

Network Summary

Network wide Queuing Penalty: 561

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.4	1.1	3.5	0.5	0.0	0.5	2.5	0.4	2.3	2.2	0.5	2.0
Total Del/Veh (s)	63.8	73.7	45.1	59.1	57.3	16.0	81.7	24.2	10.3	64.0	34.4	8.3

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	40.0

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.3	3.4	0.0	0.0	0.3	4.0	3.5	1.7	3.4	1.0
Total Del/Veh (s)	46.4	8.4	53.4	12.0	59.6	23.6	50.0	37.8	17.2	33.0

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	2.7	0.7	2.3	3.4	0.1	0.2	0.2	0.6
Total Del/Veh (s)	41.8	6.5	3.3	58.3	35.1	17.5	19.1	9.1	51.3	23.2	26.5

Total Zone Performance

Denied Del/Veh (s)	1.3
Total Del/Veh (s)	711.5

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	79	162	386	245	224	165	199	218	191	174	331	402
Average Queue (ft)	13	60	152	107	142	81	114	116	108	58	197	220
95th Queue (ft)	46	122	286	234	228	158	190	193	178	128	310	339
Link Distance (ft)			1008					690	690			1216
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200	200		200	200	300	300			200	300	
Storage Blk Time (%)			1	1	5				0	0	3	1
Queuing Penalty (veh)			6	2	11				0	0	13	2

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	T	R
Maximum Queue (ft)	361	150	197	424	583	548	446
Average Queue (ft)	193	66	88	143	328	303	31
95th Queue (ft)	299	164	177	264	501	466	166
Link Distance (ft)	1216				1114	1114	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		100	500	500			400
Storage Blk Time (%)	21	0			1	2	
Queuing Penalty (veh)	24	1			3	4	

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	488	415	9	365	195	191	105	170	300	349	515	88
Average Queue (ft)	290	226	1	175	34	44	30	60	222	247	81	28
95th Queue (ft)	425	363	5	339	144	129	79	121	319	351	314	69
Link Distance (ft)	598	598			1413	1413	826				792	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)		0		1				0	3	10	13	4
Queuing Penalty (veh)		0		6				0	4	11	97	29

Intersection: 5: Northern Heights & CSAH 96

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB
Directions Served	L	L	T	T	R	L	T	T	R	L	R	L
Maximum Queue (ft)	290	303	58	72	4	90	707	662	300	10	18	264
Average Queue (ft)	169	178	7	13	0	4	399	349	175	0	2	129
95th Queue (ft)	260	265	37	49	3	54	592	563	349	5	10	223
Link Distance (ft)			1413	1413			973	973			276	680
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	350	350			250	300			250	100		
Storage Blk Time (%)		0					17	10	0			
Queuing Penalty (veh)		0					0	43	3			

Intersection: 5: Northern Heights & CSAH 96

Movement	SB
Directions Served	R
Maximum Queue (ft)	205
Average Queue (ft)	88
95th Queue (ft)	171
Link Distance (ft)	680
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 260

1: Mounds View Boulevard & County Road H Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.2	2.0	4.1	0.2	0.0	0.2	2.1	0.5	2.1	2.4	0.4	2.4
Total Del/Veh (s)	98.4	124.9	55.0	87.4	62.5	65.0	117.9	49.5	32.1	92.5	38.4	6.6

1: Mounds View Boulevard & County Road H Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	63.1

4: US Hwy 10 SB Ramps & CSAH 96 Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.3	2.7	0.0	0.0	0.4	3.9	3.4	1.4	3.6	0.8
Total Del/Veh (s)	31.8	3.7	63.8	10.5	45.1	16.4	40.4	31.9	12.2	22.9

5: Northern Heights & CSAH 96 Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	2.4	0.4	2.4	4.8	0.1	2.3	2.0	0.9
Total Del/Veh (s)	46.4	21.8	9.0	54.5	50.2	16.8	33.8	9.3	43.2	40.2	36.6

Total Zone Performance

Denied Del/Veh (s)	1.4
Total Del/Veh (s)	597.1

Intersection: 1: Mounds View Boulevard & County Road H

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	217	249	868	250	225	335	366	484	550	225	350	850
Average Queue (ft)	106	167	324	187	140	232	256	172	272	207	260	505
95th Queue (ft)	201	256	717	289	247	339	368	381	500	263	408	799
Link Distance (ft)			1008					690	690			1216
Upstream Blk Time (%)			2									
Queuing Penalty (veh)			0									
Storage Bay Dist (ft)	200	200		200	200	300	300			200	300	
Storage Blk Time (%)	0	2	20	8	6	1	7	0	1	32	5	28
Queuing Penalty (veh)	0	9	118	28	20	2	9	1	2	42	38	58

Intersection: 1: Mounds View Boulevard & County Road H

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	R	L	L	T	T	R
Maximum Queue (ft)	834	150	213	261	479	455	283
Average Queue (ft)	476	48	110	149	305	279	12
95th Queue (ft)	766	148	197	228	450	431	99
Link Distance (ft)	1216				1114	1114	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		100	500	500			400
Storage Blk Time (%)	40	0			0	1	
Queuing Penalty (veh)	34	0			0	1	

Intersection: 4: US Hwy 10 SB Ramps & CSAH 96

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	L	R	L	L	T	R
Maximum Queue (ft)	475	404	14	124	100	116	96	121	282	323	72	61
Average Queue (ft)	264	199	2	42	44	57	31	51	143	181	21	21
95th Queue (ft)	410	359	8	95	93	108	66	97	234	274	57	48
Link Distance (ft)	598	598			1413	1413	826				792	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			360	350				150	250	250		50
Storage Blk Time (%)		0					0	0	0	1	5	1
Queuing Penalty (veh)		0					0	0	0	1	30	8

Intersection: 5: Northern Heights & CSAH 96

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	R
Maximum Queue (ft)	196	210	310	311	30	10	103	628	608	299	27	30
Average Queue (ft)	108	121	178	198	5	0	17	364	326	122	2	5
95th Queue (ft)	170	181	264	280	23	5	101	603	576	295	12	18
Link Distance (ft)			1413	1413				973	973			276
Upstream Blk Time (%)								0	0			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (ft)	350	350			250	300	300			250	100	
Storage Blk Time (%)			0	2				18	13			
Queuing Penalty (veh)			0	0				2	41			

Intersection: 5: Northern Heights & CSAH 96

Movement	SB	SB
Directions Served	L	R
Maximum Queue (ft)	594	608
Average Queue (ft)	316	323
95th Queue (ft)	551	620
Link Distance (ft)	680	680
Upstream Blk Time (%)	2	5
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 446

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
2	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
3	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
4	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
2	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
3	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
4	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2024 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Thumb Road	None	75		110		66	1109		0.0676	
2	I-35W NB Entrance Ramp	None	0		0		151	0		0.0000	
3	County Road H West Leg	None	138		0		34	2269		0.0608	
4	I-35 W NB Exit Ramp	None	38		138		0	1358		0.0280	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Thumb Road	None	3.25		3.25	0.24		A		A
2	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
3	County Road H West Leg	None	2.18		2.18	0.29		A		A
4	I-35 W NB Exit Ramp	None	4.35		4.35	0.16		A		A

Global Results

Performance and Accidents

2024 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	251		251
Capacity	veh/hr	4736		4736
Average Delay	sec/veh	2.83		2.83
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.20		0.20

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
2	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
3	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
4	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
2	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
3	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
4	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2024 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Thumb Road	None	75		110		66	921		0.0814	
2	I-35W NB Entrance Ramp	None	0		0		151	0		0.0000	
3	County Road H West Leg	None	138		0		34	2081		0.0663	
4	I-35 W NB Exit Ramp	None	38		138		0	1170		0.0325	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Thumb Road	None	3.97		3.97	0.29		A		A
2	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
3	County Road H West Leg	None	2.39		2.39	0.32		A		A
4	I-35 W NB Exit Ramp	None	5.07		5.07	0.19		A		A

Global Results

Performance and Accidents

2024 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	251		251
Capacity	veh/hr	4173		4173
Average Delay	sec/veh	3.26		3.26
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.23		0.23

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
2	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
3	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
4	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
2	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
3	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
4	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2024 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Thumb Road	None	71		221		239	1072		0.0662	
2	I-35W NB Entrance Ramp	None	0		0		227	0		0.0000	
3	County Road H West Leg	None	253		0		65	2269		0.1115	
4	I-35 W NB Exit Ramp	None	207		253		0	1278		0.1620	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Thumb Road	None	3.36		3.36	0.22		A		A
2	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
3	County Road H West Leg	None	2.98		2.98	0.70		A		A
4	I-35 W NB Exit Ramp	None	5.34		5.34	1.06		A		A

Global Results

Performance and Accidents

2024 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	531		531
Capacity	veh/hr	4619		4619
Average Delay	sec/veh	3.95		3.95
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.58		0.58

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
2	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
3	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
4	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
2	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
3	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
4	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2024 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Thumb Road	None	71		221		239	884		0.0803	
2	I-35W NB Entrance Ramp	None	0		0		227	0		0.0000	
3	County Road H West Leg	None	253		0		65	2081		0.1216	
4	I-35 W NB Exit Ramp	None	207		253		0	1090		0.1898	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Thumb Road	None	4.14		4.14	0.28		A		A
2	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
3	County Road H West Leg	None	3.28		3.28	0.77		A		A
4	I-35 W NB Exit Ramp	None	6.46		6.46	1.30		A		A

Global Results

Performance and Accidents

2024 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	531		531
Capacity	veh/hr	4056		4056
Average Delay	sec/veh	4.64		4.64
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.68		0.68

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2024 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		145		21	787		0.0102	
2	County Road H East Leg	None	50		14		139	2225		0.0225	
3	I-35W SB Exit Ramp	None	157		64		0	1426		0.1101	
4	Program Avenue Connection	None	90		221		0	989		0.0910	
5	County Road H West Approach	None	106		60		251	1836		0.0577	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	1.63		1.63	0.04		A		A
2	County Road H East Leg	None	1.69		1.69	0.11		A		A
3	I-35W SB Exit Ramp	None	4.94		4.94	0.65		A		A
4	Program Avenue Connection	None	3.72		3.72	0.28		A		A
5	County Road H West Approach	None	1.98		1.98	0.23		A		A

Global Results

Performance and Accidents

2024 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	411		411
Capacity	veh/hr	7263		7263
Average Delay	sec/veh	3.45		3.45
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.39		0.39

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2024 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	39		244		6	1059		0.0368	
2	County Road H East Leg	None	76		33		250	2385		0.0319	
3	I-35W SB Exit Ramp	None	146		109		0	1517		0.0963	
4	Program Avenue Connection	None	118		255		0	1060		0.1114	
5	County Road H West Approach	None	189		61		312	2255		0.0838	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	3.39		3.39	0.17		A		A
2	County Road H East Leg	None	1.54		1.54	0.11		A		A
3	I-35W SB Exit Ramp	None	4.77		4.77	0.59		A		A
4	Program Avenue Connection	None	3.70		3.70	0.37		A		A
5	County Road H West Approach	None	1.77		1.77	0.29		A		A

Global Results

Performance and Accidents

2024 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	568		568
Capacity	veh/hr	8275		8275
Average Delay	sec/veh	3.02		3.02
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.48		0.48

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2024 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		145		21	643		0.0124	
2	County Road H East Leg	None	50		14		139	2041		0.0245	
3	I-35W SB Exit Ramp	None	157		64		0	1241		0.1265	
4	Program Avenue Connection	None	90		221		0	805		0.1118	
5	County Road H West Approach	None	106		60		251	1674		0.0633	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	2.00		2.00	0.05		A		A
2	County Road H East Leg	None	1.85		1.85	0.12		A		A
3	I-35W SB Exit Ramp	None	5.77		5.77	0.76		A		A
4	Program Avenue Connection	None	4.67		4.67	0.36		A		A
5	County Road H West Approach	None	2.18		2.18	0.25		A		A

Global Results

Performance and Accidents

2024 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	411		411
Capacity	veh/hr	6404		6404
Average Delay	sec/veh	4.05		4.05
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.46		0.46

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2024 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	39		244		6	860		0.0454	
2	County Road H East Leg	None	76		33		250	2186		0.0348	
3	I-35W SB Exit Ramp	None	146		109		0	1318		0.1108	
4	Program Avenue Connection	None	118		255		0	861		0.1371	
5	County Road H West Approach	None	189		61		312	2056		0.0919	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	4.22		4.22	0.21		A		A
2	County Road H East Leg	None	1.69		1.69	0.12		A		A
3	I-35W SB Exit Ramp	None	5.58		5.58	0.69		A		A
4	Program Avenue Connection	None	4.68		4.68	0.48		A		A
5	County Road H West Approach	None	1.96		1.96	0.33		A		A

Global Results

Performance and Accidents

2024 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	568		568
Capacity	veh/hr	7280		7280
Average Delay	sec/veh	3.58		3.58
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.56		0.56

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
2	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
3	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
4	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
2	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
3	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
4	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Thumb Road	None	87		119		77	1106		0.0787	
2	I-35W NB Entrance Ramp	None	0		0		163	0		0.0000	
3	County Road H West Leg	None	149		6		37	2265		0.0658	
4	I-35 W NB Exit Ramp	None	41		155		0	1346		0.0305	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Thumb Road	None	3.30		3.30	0.28		A		A
2	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
3	County Road H West Leg	None	2.18		2.18	0.32		A		A
4	I-35 W NB Exit Ramp	None	4.40		4.40	0.18		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	277		277
Capacity	veh/hr	4717		4717
Average Delay	sec/veh	2.86		2.86
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.22		0.22

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
2	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
3	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
4	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
2	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
3	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
4	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Thumb Road	None	87		119		77	918		0.0947	
2	I-35W NB Entrance Ramp	None	0		0		163	0		0.0000	
3	County Road H West Leg	None	149		6		37	2077		0.0717	
4	I-35 W NB Exit Ramp	None	41		155		0	1158		0.0354	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Thumb Road	None	4.04		4.04	0.35		A		A
2	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
3	County Road H West Leg	None	2.39		2.39	0.35		A		A
4	I-35 W NB Exit Ramp	None	5.13		5.13	0.21		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	277		277
Capacity	veh/hr	4154		4154
Average Delay	sec/veh	3.31		3.31
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.26		0.26

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
2	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
3	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
4	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
2	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
3	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
4	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Thumb Road	None	77		239		259	1066		0.0722	
2	I-35W NB Entrance Ramp	None	0		0		246	0		0.0000	
3	County Road H West Leg	None	274		0		70	2269		0.1208	
4	I-35 W NB Exit Ramp	None	224		274		0	1264		0.1773	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Thumb Road	None	3.40		3.40	0.25		A		A
2	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
3	County Road H West Leg	None	3.01		3.01	0.76		A		A
4	I-35 W NB Exit Ramp	None	5.50		5.50	1.19		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	575		575
Capacity	veh/hr	4598		4598
Average Delay	sec/veh	4.03		4.03
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.64		0.64

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
2	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
3	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
4	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
2	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
3	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
4	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Thumb Road	None	77		239		259	878		0.0877	
2	I-35W NB Entrance Ramp	None	0		0		246	0		0.0000	
3	County Road H West Leg	None	274		0		70	2081		0.1317	
4	I-35 W NB Exit Ramp	None	224		274		0	1076		0.2082	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Thumb Road	None	4.20		4.20	0.30		A		A
2	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
3	County Road H West Leg	None	3.32		3.32	0.84		A		A
4	I-35 W NB Exit Ramp	None	6.70		6.70	1.48		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	575		575
Capacity	veh/hr	4035		4035
Average Delay	sec/veh	4.76		4.76
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.76		0.76

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		158		22	783		0.0102	
2	County Road H East Leg	None	54		15		151	2224		0.0243	
3	I-35W SB Exit Ramp	None	170		69		0	1423		0.1195	
4	Program Avenue Connection	None	98		239		0	983		0.0997	
5	County Road H West Approach	None	115		65		272	1832		0.0628	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	1.64		1.64	0.04		A		A
2	County Road H East Leg	None	1.68		1.68	0.12		A		A
3	I-35W SB Exit Ramp	None	5.00		5.00	0.72		A		A
4	Program Avenue Connection	None	3.78		3.78	0.31		A		A
5	County Road H West Approach	None	2.01		2.01	0.25		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	445		445
Capacity	veh/hr	7245		7245
Average Delay	sec/veh	3.49		3.49
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.43		0.43

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		158		22	639		0.0125	
2	County Road H East Leg	None	54		15		151	2040		0.0265	
3	I-35W SB Exit Ramp	None	170		69		0	1239		0.1372	
4	Program Avenue Connection	None	98		239		0	799		0.1227	
5	County Road H West Approach	None	115		65		272	1670		0.0689	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	2.02		2.02	0.05		A		A
2	County Road H East Leg	None	1.88		1.88	0.13		A		A
3	I-35W SB Exit Ramp	None	5.85		5.85	0.84		A		A
4	Program Avenue Connection	None	4.76		4.76	0.40		A		A
5	County Road H West Approach	None	2.22		2.22	0.28		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	445		445
Capacity	veh/hr	6386		6386
Average Delay	sec/veh	4.12		4.12
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.51		0.51

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	42		265		6	1051		0.0400	
2	County Road H East Leg	None	82		36		271	2382		0.0344	
3	I-35W SB Exit Ramp	None	158		118		0	1512		0.1045	
4	Program Avenue Connection	None	128		276		0	1052		0.1216	
5	County Road H West Approach	None	205		66		338	2250		0.0911	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	3.43		3.43	0.19		A		A
2	County Road H East Leg	None	1.55		1.55	0.12		A		A
3	I-35W SB Exit Ramp	None	4.83		4.83	0.65		A		A
4	Program Avenue Connection	None	3.77		3.77	0.42		A		A
5	County Road H West Approach	None	1.79		1.79	0.32		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	615		615
Capacity	veh/hr	8247		8247
Average Delay	sec/veh	3.06		3.06
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.52		0.52

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	42		265		6	852		0.0493	
2	County Road H East Leg	None	82		36		271	2183		0.0376	
3	I-35W SB Exit Ramp	None	158		118		0	1313		0.1204	
4	Program Avenue Connection	None	128		276		0	853		0.1500	
5	County Road H West Approach	None	205		66		338	2051		0.1000	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	4.28		4.28	0.23		A		A
2	County Road H East Leg	None	1.69		1.69	0.13		A		A
3	I-35W SB Exit Ramp	None	5.66		5.66	0.76		A		A
4	Program Avenue Connection	None	4.79		4.79	0.53		A		A
5	County Road H West Approach	None	1.99		1.99	0.36		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	615		615
Capacity	veh/hr	7252		7252
Average Delay	sec/veh	3.63		3.63
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	0.62		0.62

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	470		190		1344	2079		0.2261	
2	Thumb Road	None	293		546		114	963		0.3041	
3	I-35W NB Entrance Ramp	None	0		0		334	0		0.0000	
4	County Road H West Leg	None	1075		212		293	2124		0.5062	
5	I-35 W NB Exit Ramp	Merge	41	206	1287	1138	0	561	925	0.0731	0.2227

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	3.82		3.82	1.51		A		A
2	Thumb Road	None	4.95		4.95	1.27		A		A
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	3.59		3.59	3.43		A		A
5	I-35 W NB Exit Ramp	Merge	11.19	4.96	5.99	0.46	0.90	B	A	A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1879	206	2085
Capacity	veh/hr	5726	925	6651
Average Delay	sec/veh	4.03	4.96	4.12
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	2.10	0.28	2.38

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	470		190		1344	1891		0.2486	
2	Thumb Road	None	293		546		114	776		0.3778	
3	I-35W NB Entrance Ramp	None	0		0		334	0		0.0000	
4	County Road H West Leg	None	1075		212		293	1936		0.5553	
5	I-35 W NB Exit Ramp	Merge	41	206	1287	1138	0	373	728	0.1100	0.2831

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	4.31		4.31	1.71		A		A
2	Thumb Road	None	6.82		6.82	1.78		A		A
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	4.33		4.33	4.20		A		A
5	I-35 W NB Exit Ramp	Merge	17.84	6.83	8.66	0.82	1.28	C	A	A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1879	206	2085
Capacity	veh/hr	4975	728	5703
Average Delay	sec/veh	5.01	6.83	5.19
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	2.61	0.39	3.01

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	1397		498		975	1873		0.7459	
2	Thumb Road	None	227		1508		386	642		0.3538	
3	I-35W NB Entrance Ramp	None	0		0		754	0		0.0000	
4	County Road H West Leg	None	949		150		832	2166		0.4381	
5	I-35 W NB Exit Ramp	Merge	224	150	1099	825	0	691	1018	0.3242	0.1473

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	11.61		11.61	15.59		B		B
2	Thumb Road	None	8.02		8.02	1.76		A		A
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	3.78		3.78	3.11		A		A
5	I-35 W NB Exit Ramp	Merge	12.22	4.10	8.97	2.73	0.53	B	A	A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2797	150	2947
Capacity	veh/hr	5372	1018	6390
Average Delay	sec/veh	8.71	4.10	8.48
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	6.77	0.17	6.94

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	1397		497		975	1685		0.8289	
2	Thumb Road	None	227		1506		385	455		0.4993	
3	I-35W NB Entrance Ramp	None	0		0		753	0		0.0000	
4	County Road H West Leg	None	949		150		830	1979		0.4796	
5	I-35 W NB Exit Ramp	Merge	224	150	1099	825	0	503	821	0.4449	0.1827

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	17.88		17.88	25.72		C		C
2	Thumb Road	None	14.48		14.48	3.54		B		B
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	4.44		4.44	3.68		A		A
5	I-35 W NB Exit Ramp	Merge	20.54	5.31	14.43	5.13	0.69	C	A	B

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2797	150	2947
Capacity	veh/hr	4622	821	5443
Average Delay	sec/veh	13.26	5.31	12.85
L.O.S. (Signal)	A – F	B	A	B
L.O.S. (Unsig)	A – F	B	A	B
Total Delay	veh.hrs	10.30	0.22	10.52

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		982		22	559		0.0143	
2	County Road H East Leg	None	310		15		975	2224		0.1394	
3	I-35W SB Exit Ramp	None	582		325		0	1285		0.4528	
4	Program Avenue Connection	None	98		907		0	757		0.1295	
5	County Road H West Approach	None	527		477		528	1471		0.3583	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	2.60		2.60	0.06		A		A
2	County Road H East Leg	None	1.79		1.79	0.75		A		A
3	I-35W SB Exit Ramp	None	8.71		8.71	4.98		A		A
4	Program Avenue Connection	None	5.11		5.11	0.48		A		A
5	County Road H West Approach	None	3.35		3.35	2.24		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1525		1525
Capacity	veh/hr	6296		6296
Average Delay	sec/veh	5.19		5.19
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	2.20		2.20

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		981		22	416		0.0192	
2	County Road H East Leg	None	310		15		974	2040		0.1520	
3	I-35W SB Exit Ramp	None	582		325		0	1101		0.5285	
4	Program Avenue Connection	None	98		906		0	573		0.1711	
5	County Road H West Approach	None	527		476		528	1309		0.4026	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	7.39		7.39	0.09		A		A
2	County Road H East Leg	None	1.99		1.99	0.84		A		A
3	I-35W SB Exit Ramp	None	11.76		11.76	7.10		B		B
4	Program Avenue Connection	None	7.12		7.12	0.71		A		A
5	County Road H West Approach	None	4.05		4.05	2.81		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1525		1525
Capacity	veh/hr	5438		5438
Average Delay	sec/veh	6.79		6.79
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	2.88		2.88

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	42		865		6	841		0.0499	
2	County Road H East Leg	None	844		36		871	2382		0.3544	
3	I-35W SB Exit Ramp	None	458		880		0	1086		0.4217	
4	Program Avenue Connection	None	128		1338		0	679		0.1887	
5	County Road H West Approach	None	505		366		1100	1939		0.2604	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	4.38		4.38	0.25		A		A
2	County Road H East Leg	None	2.28		2.28	2.05		A		A
3	I-35W SB Exit Ramp	None	10.59		10.59	5.12		B		B
4	Program Avenue Connection	None	6.42		6.42	0.85		A		A
5	County Road H West Approach	None	2.47		2.47	1.16		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1977		1977
Capacity	veh/hr	6927		6927
Average Delay	sec/veh	4.57		4.57
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	2.51		2.51

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	42		864		6	642		0.0654	
2	County Road H East Leg	None	844		36		870	2183		0.3867	
3	I-35W SB Exit Ramp	None	458		880		0	887		0.5162	
4	Program Avenue Connection	None	128		1336		0	480		0.2667	
5	County Road H West Approach	None	505		365		1099	1741		0.2900	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	5.87		5.87	0.34		A		A
2	County Road H East Leg	None	2.62		2.62	2.41		A		A
3	I-35W SB Exit Ramp	None	15.92		15.92	8.50		C		C
4	Program Avenue Connection	None	10.29		10.29	1.52		B		B
5	County Road H West Approach	None	2.87		2.87	1.36		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1977		1977
Capacity	veh/hr	5934		5934
Average Delay	sec/veh	6.33		6.33
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	3.48		3.48

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	653		190		1603	2079		0.3142	
2	Thumb Road	None	333		713		130	908		0.3669	
3	I-35W NB Entrance Ramp	None	0		0		401	0		0.0000	
4	County Road H West Leg	None	1254		252		393	2096		0.5982	
5	I-35 W NB Exit Ramp	Merge	41	246	1506	1357	0	409	860	0.1003	0.2861

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	4.26		4.26	2.35		A		A
2	Thumb Road	None	5.74		5.74	1.71		A		A
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	4.29		4.29	4.94		A		A
5	I-35 W NB Exit Ramp	Merge	16.22	5.81	7.30	0.76	1.30	C	A	A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2281	246	2527
Capacity	veh/hr	5491	860	6351
Average Delay	sec/veh	4.71	5.81	4.82
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	2.98	0.40	3.38

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	653		190		1602	1891		0.3453	
2	Thumb Road	None	333		713		130	720		0.4626	
3	I-35W NB Entrance Ramp	None	0		0		401	0		0.0000	
4	County Road H West Leg	None	1254		252		393	1909		0.6570	
5	I-35 W NB Exit Ramp	Merge	41	246	1505	1356	0	221	663	0.1853	0.3712

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	4.89		4.89	2.71		A		A
2	Thumb Road	None	8.42		8.42	2.59		A		A
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	5.43		5.43	6.41		A		A
5	I-35 W NB Exit Ramp	Merge	38.99	8.58	12.92	2.61	2.01	E	A	B

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2281	246	2527
Capacity	veh/hr	4741	663	5404
Average Delay	sec/veh	6.32	8.58	6.54
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	4.00	0.59	4.59

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	1677		498		1234	1873		0.8953	
2	Thumb Road	None	267		1759		410	558		0.4787	
3	I-35W NB Entrance Ramp	None	0		0		854	0		0.0000	
4	County Road H West Leg	None	1129		190		982	2139		0.5278	
5	I-35 W NB Exit Ramp	Merge	224	190	1318	1045	0	539	953	0.4159	0.1994

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	23.22		23.22	44.21		C		C
2	Thumb Road	None	11.32		11.32	3.12		B		B
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	4.22		4.22	4.22		A		A
5	I-35 W NB Exit Ramp	Merge	18.50	4.67	12.15	4.73	0.78	C	A	B

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	3297	190	3487
Capacity	veh/hr	5108	953	6061
Average Delay	sec/veh	15.43	4.67	14.84
L.O.S. (Signal)	A – F	B	A	B
L.O.S. (Unsig)	A – F	C	A	B
Total Delay	veh.hrs	14.13	0.25	14.38

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	1677		497		1234	1686		0.9948	
2	Thumb Road	None	267		1728		407	380		0.7018	
3	I-35W NB Entrance Ramp	None	0		0		841	0		0.0000	
4	County Road H West Leg	None	1129		189		963	1952		0.5785	
5	I-35 W NB Exit Ramp	Merge	224	190	1318	1044	0	351	756	0.6376	0.2514

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	54.21		54.21	100.89		F		F
2	Thumb Road	None	26.59		26.59	7.06		D		D
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	5.12		5.12	5.20		A		A
5	I-35 W NB Exit Ramp	Merge	50.74	6.29	30.34	17.83	1.07	F	A	D

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	3297	190	3487
Capacity	veh/hr	4369	756	5125
Average Delay	sec/veh	34.93	6.29	33.37
L.O.S. (Signal)	A – F	C	A	C
L.O.S. (Unsig)	A – F	D	A	D
Total Delay	veh.hrs	31.99	0.33	32.32

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		1139		22	517		0.0155	
2	County Road H East Leg	None	410		15		1132	2224		0.1844	
3	I-35W SB Exit Ramp	None	661		425		0	1232		0.5367	
4	Program Avenue Connection	None	98		1085		0	696		0.1407	
5	County Road H West Approach	None	606		555		628	1402		0.4322	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	2.92		2.92	0.07		A		A
2	County Road H East Leg	None	1.90		1.90	1.08		A		A
3	I-35W SB Exit Ramp	None	10.85		10.85	7.75		B		B
4	Program Avenue Connection	None	5.67		5.67	0.56		A		A
5	County Road H West Approach	None	3.99		3.99	3.27		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1783		1783
Capacity	veh/hr	6071		6071
Average Delay	sec/veh	6.14		6.14
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	3.04		3.04

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		1140		22	373		0.0215	
2	County Road H East Leg	None	410		15		1133	2040		0.2010	
3	I-35W SB Exit Ramp	None	661		425		0	1047		0.6311	
4	Program Avenue Connection	None	98		1086		0	512		0.1914	
5	County Road H West Approach	None	606		556		628	1239		0.4889	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	8.44		8.44	0.10		A		A
2	County Road H East Leg	None	2.13		2.13	1.23		A		A
3	I-35W SB Exit Ramp	None	16.31		16.31	12.94		C		C
4	Program Avenue Connection	None	8.32		8.32	0.91		A		A
5	County Road H West Approach	None	5.07		5.07	4.39		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1783		1783
Capacity	veh/hr	5211		5211
Average Delay	sec/veh	8.75		8.75
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	4.34		4.34

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	42		1024		6	785		0.0535	
2	County Road H East Leg	None	997		36		1030	2382		0.4186	
3	I-35W SB Exit Ramp	None	538		1033		0	1001		0.5376	
4	Program Avenue Connection	None	128		1569		0	597		0.2144	
5	County Road H West Approach	None	585		445		1252	1858		0.3149	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	4.73		4.73	0.27		A		A
2	County Road H East Leg	None	2.55		2.55	2.80		A		A
3	I-35W SB Exit Ramp	None	15.00		15.00	9.68		C		C
4	Program Avenue Connection	None	7.65		7.65	1.09		A		A
5	County Road H West Approach	None	2.78		2.78	1.55		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2290		2290
Capacity	veh/hr	6623		6623
Average Delay	sec/veh	5.86		5.86
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	3.73		3.73

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	42		1024		6	586		0.0716	
2	County Road H East Leg	None	997		36		1030	2183		0.4568	
3	I-35W SB Exit Ramp	None	538		1033		0	802		0.6711	
4	Program Avenue Connection	None	128		1570		0	398		0.3218	
5	County Road H West Approach	None	585		445		1253	1658		0.3528	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	6.50		6.50	0.38		A		A
2	County Road H East Leg	None	2.99		2.99	3.37		A		A
3	I-35W SB Exit Ramp	None	29.71		29.71	23.62		D		D
4	Program Avenue Connection	None	14.12		14.12	2.42		B		B
5	County Road H West Approach	None	3.29		3.29	1.84		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2290		2290
Capacity	veh/hr	5627		5627
Average Delay	sec/veh	10.03		10.03
L.O.S. (Signal)	A – F	B		B
L.O.S. (Unsig)	A – F	B		B
Total Delay	veh.hrs	6.38		6.38

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	699		190		1721	2079		0.3363	
2	Thumb Road	None	351		754		135	894		0.3927	
3	I-35W NB Entrance Ramp	None	0		0		417	0		0.0000	
4	County Road H West Leg	None	1337		270		418	2084		0.6415	
5	I-35 W NB Exit Ramp	Merge	41	264	1606	1457	0	339	830	0.1210	0.3181

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	4.39		4.39	2.60		A		A
2	Thumb Road	None	6.06		6.06	1.92		A		A
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	4.75		4.75	5.94		A		A
5	I-35 W NB Exit Ramp	Merge	20.69	6.31	8.24	1.07	1.54	C	A	A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2428	264	2692
Capacity	veh/hr	5395	830	6225
Average Delay	sec/veh	5.11	6.31	5.22
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	3.44	0.46	3.91

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	699		190		1721	1891		0.3696	
2	Thumb Road	None	351		754		135	706		0.4971	
3	I-35W NB Entrance Ramp	None	0		0		417	0		0.0000	
4	County Road H West Leg	None	1337		270		418	1896		0.7051	
5	I-35 W NB Exit Ramp	Merge	41	264	1606	1458	0	151	633	0.2717	0.4173

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	5.06		5.06	2.98		A		A
2	Thumb Road	None	9.13		9.13	3.00		A		A
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	6.21		6.21	8.04		A		A
5	I-35 W NB Exit Ramp	Merge	120.54	9.73	24.63	12.77	2.52	F	A	C

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2428	264	2692
Capacity	veh/hr	4644	633	5277
Average Delay	sec/veh	8.23	9.73	8.38
L.O.S. (Signal)	A – F	A	A	A
L.O.S. (Unsig)	A – F	A	A	A
Total Delay	veh.hrs	5.55	0.71	6.27

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	1766		497		1292	1873		0.9428	
2	Thumb Road	None	276		1832		419	533		0.5174	
3	I-35W NB Entrance Ramp	None	0		0		883	0		0.0000	
4	County Road H West Leg	None	1169		199		1026	2133		0.5481	
5	I-35 W NB Exit Ramp	Merge	224	199	1367	1094	0	505	938	0.4439	0.2121

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	32.30		32.30	69.44		D		D
2	Thumb Road	None	12.65		12.65	3.44		B		B
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	4.36		4.36	4.54		A		A
5	I-35 W NB Exit Ramp	Merge	21.00	4.82	13.39	5.64	0.84	C	A	B

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	3435	199	3634
Capacity	veh/hr	5044	938	5982
Average Delay	sec/veh	20.48	4.82	19.62
L.O.S. (Signal)	A – F	C	A	B
L.O.S. (Unsig)	A – F	C	A	C
Total Delay	veh.hrs	19.54	0.27	19.81

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	TCAAP Access	85	0	26.00	2	26.00	2	0.00	90.00	30.00
2	Thumb Road	170	0	12.00	1	18.00	1	131.00	95.00	25.00
3	I-35W NB Entrance Ramp	240	0	18.00	1	18.00	1	0.00	66.00	30.00
4	County Road H West Leg	270	0	21.00	2	27.00	2	131.00	95.00	25.00
5	I-35 W NB Exit Ramp	340	0	12.00	1	18.00	1	90.00	75.00	25.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	TCAAP Access	190.00	28.00	2	26.00	2	24.00	2
2	Thumb Road	200.00	28.00	2	18.00	1	12.00	1
3	I-35W NB Entrance Ramp	200.00	16.00	1	15.00	1	13.00	1
4	County Road H West Leg	190.00	28.00	2	26.00	2	21.00	2
5	I-35 W NB Exit Ramp	200.00	17.00	1	14.00	1	14.00	1

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	TCAAP Access	None	1766		496		1292	1686		1.0474	
2	Thumb Road	None	276		1757		410	371		0.7447	
3	I-35W NB Entrance Ramp	None	0		0		853	0		0.0000	
4	County Road H West Leg	None	1169		198		981	1946		0.6008	
5	I-35 W NB Exit Ramp	Merge	224	199	1366	1093	0	317	741	0.7055	0.2685

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	TCAAP Access	None	91.00		91.00	149.70		F		F
2	Thumb Road	None	29.96		29.96	8.03		D		D
3	I-35W NB Entrance Ramp	None	0.00		0.00	0.00		A		A
4	County Road H West Leg	None	5.34		5.34	5.66		A		A
5	I-35 W NB Exit Ramp	Merge	71.86	6.57	41.14	27.47	1.18	F	A	E

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	3435	199	3634
Capacity	veh/hr	4320	741	5061
Average Delay	sec/veh	55.69	6.57	53.00
L.O.S. (Signal)	A – F	E	A	D
L.O.S. (Unsig)	A – F	F	A	F
Total Delay	veh.hrs	53.14	0.36	53.50

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		1276		22	479		0.0167	
2	County Road H East Leg	None	435		15		1269	2224		0.1956	
3	I-35W SB Exit Ramp	None	698		450		0	1218		0.5729	
4	Program Avenue Connection	None	98		1147		0	676		0.1451	
5	County Road H West Approach	None	707		592		652	1370		0.5161	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	6.48		6.48	0.08		A		A
2	County Road H East Leg	None	1.94		1.94	1.18		A		A
3	I-35W SB Exit Ramp	None	11.98		11.98	9.39		B		B
4	Program Avenue Connection	None	5.89		5.89	0.60		A		A
5	County Road H West Approach	None	4.90		4.90	5.07		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1946		1946
Capacity	veh/hr	5966		5966
Average Delay	sec/veh	6.83		6.83
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	3.69		3.69

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	8		1277		22	335		0.0239	
2	County Road H East Leg	None	435		15		1270	2040		0.2133	
3	I-35W SB Exit Ramp	None	698		450		0	1034		0.6751	
4	Program Avenue Connection	None	98		1147		0	491		0.1996	
5	County Road H West Approach	None	707		592		653	1207		0.5856	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	9.71		9.71	0.13		A		A
2	County Road H East Leg	None	2.17		2.17	1.34		A		A
3	I-35W SB Exit Ramp	None	19.18		19.18	17.15		C		C
4	Program Avenue Connection	None	8.82		8.82	0.99		A		A
5	County Road H West Approach	None	6.72		6.72	7.53		A		A

Global Results

Performance and Accidents

2040 AM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	1946		1946
Capacity	veh/hr	5107		5107
Average Delay	sec/veh	10.29		10.29
L.O.S. (Signal)	A – F	B		B
L.O.S. (Unsig)	A – F	B		B
Total Delay	veh.hrs	5.56		5.56

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	42		1061		6	772		0.0544	
2	County Road H East Leg	None	1045		36		1067	2382		0.4388	
3	I-35W SB Exit Ramp	None	556		1081		0	974		0.5709	
4	Program Avenue Connection	None	128		1637		0	573		0.2233	
5	County Road H West Approach	None	603		464		1301	1838		0.3281	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	4.82		4.82	0.28		A		A
2	County Road H East Leg	None	2.65		2.65	3.09		A		A
3	I-35W SB Exit Ramp	None	17.05		17.05	11.96		C		C
4	Program Avenue Connection	None	8.11		8.11	1.18		A		A
5	County Road H West Approach	None	2.86		2.86	1.65		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2374		2374
Capacity	veh/hr	6539		6539
Average Delay	sec/veh	6.41		6.41
L.O.S. (Signal)	A – F	A		A
L.O.S. (Unsig)	A – F	A		A
Total Delay	veh.hrs	4.22		4.22

Operational Data

Main Geometry (ft)

Approach and Entry Geometry

Leg	Leg Names	Approach Bearing (deg)	Grade Separation G	Half Width V	Approach Lanes n	Entry Width E	Entry Lanes n	Flare Length L'	Entry Radius R	Entry Angle Phi
1	Park and Ride Access	0	0	15.00	1	19.00	1	40.00	55.00	40.00
2	County Road H East Leg	90	0	21.00	2	28.00	2	110.00	100.00	30.00
3	I-35W SB Exit Ramp	165	0	13.00	1	19.00	1	90.00	55.00	30.00
4	Program Avenue Connection	190	0	17.00	1	19.00	1	40.00	45.00	35.00
5	County Road H West Approach	300	0	21.00	2	26.00	2	110.00	110.00	27.00

Circulating and Exit Geometry

Leg	Leg Names	Inscribed Diameter D	Circulating Width C	Circulating Lanes nc	Exit Width Ex	Exit Lanes nex	Exit Half Width Vx	Exit Half Width Lanes nvx
1	Park and Ride Access	170.00	28.00	2	15.00	1	15.00	1
2	County Road H East Leg	160.00	17.00	1	24.00	2	21.00	2
3	I-35W SB Exit Ramp	170.00	28.00	2	15.00	1	13.00	1
4	Program Avenue Connection	170.00	28.00	2	15.00	1	17.00	1
5	County Road H West Approach	160.00	17.00	1	24.00	2	21.00	2

Operational Results

2040 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Park and Ride Access	None	42		1059		6	574		0.0732	
2	County Road H East Leg	None	1045		36		1065	2183		0.4787	
3	I-35W SB Exit Ramp	None	556		1081		0	775		0.7174	
4	Program Avenue Connection	None	128		1635		0	375		0.3413	
5	County Road H West Approach	None	603		462		1300	1640		0.3676	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Park and Ride Access	None	6.64		6.64	0.39		A		A
2	County Road H East Leg	None	3.13		3.13	3.76		A		A
3	I-35W SB Exit Ramp	None	38.24		38.24	34.40		E		E
4	Program Avenue Connection	None	15.69		15.69	2.79		C		C
5	County Road H West Approach	None	3.39		3.39	1.94		A		A

Global Results

Performance and Accidents

2040 PM Peak Global Performance

Parameter	Units	Entries	Bypasses	Total
Arrive Flows	veh/hr	2374		2374
Capacity	veh/hr	5547		5547
Average Delay	sec/veh	12.16		12.16
L.O.S. (Signal)	A – F	B		B
L.O.S. (Unsig)	A – F	B		B
Total Delay	veh.hrs	8.02		8.02

Attachment C

Comments Received

May 29, 2024

Jessica Jagoe, Community Development Director
City of Arden Hills
1245 Highway 96 W
Arden Hills, MN 55112

RE: City of Arden Hills – Alternative Urban Areawide Review (AUAR) Update – TCAAP
Metropolitan Council Review File No. 21237-4
Metropolitan Council District No. 10

Dear Jessica Jagoe:

Metropolitan Council received the TCAAP AUAR Update on May 14, 2024. The AUAR represents the 5-year update required under environmental rules for a study area of approximately 429 acres. The site is bounded by County State Aid Highway (CSAH) on the south, US Highway 10 and Interstate 35W on the west, and State of Minnesota property on the north, and by the National Guard's Arden Hills Army Training Site (AHATS) property on the east. Metropolitan Council staff completed its review of the TCAAP AUAR Update to determine its accuracy and completeness in addressing regional concerns. Staff concludes that the AUAR Update is complete and accurate with respect to regional concerns and does not raise major issues of consistency with Council policies. However, staff offers the following comments for your consideration:

Forecasts *(Todd Graham, 651-602-1322)*
The AUAR site includes all of Transportation Analysis Zone #1708, the western end of TAZ #1709, and a small part of TAZ #1700 (north of County Rd H at I-35). The Council's TAZs database lists these zones adding a combined +1328 households, +3064 population and +674 jobs during 2010 – 2040.

The development timeline is uncertain; analyses for the AUAR used horizon year 2040 for full build out. Should development of the AUAR site be pursued, with full development in 2040 planning period, the TAZ allocations for households, population and employment will need to be revised higher. For example, in the case of scenario 1, we would add +1000 jobs in 2040, as needed, to the TAZs with commercial development; and add +200 household and +400 population to TAZ #1708 or 1709 in 2040. The employment adjustments will be debited from other parts of Arden Hills; resulting community totals will be unchanged. The households and population adjustment would merit a community total forecast increase. City staff are welcome to contact Council Research if they wish to discuss this.

Transit *(Stephen Baisden, 612-349-7361)*
Limited bus stops are located within walking distance of the TCAPP site along Old Hwy 8 in New Brighton for access to Routes 25 and 250. Limited public trails currently exist providing access to/from the TCAPP site. Right-of-way should be set aside for the addition of sidewalks/trails to ensure connectivity with the rest of the pedestrian network and facilitate safe pedestrian access to/from the site if they are not planned to be constructed.

Given the current transit investments in the area, the low residential density that exists in this area now, the moderately low-density (depending on the City's proposed zoning district) residential development that is proposed with this AUAR Update, and the longer timeframe of overall development, this master planned development will likely have some ridership impact on nearby existing regular route transit network. This AUAR should not expect additional expansion of the existing fixed-route transit network.

Climate and GHG Calculations *(Mackenzie Young-Walters, 651-602-1373)*
The original AUAR predates the current climate requirement and as such does not discuss potential climate hazards and impacts. Metropolitan Council staff encourages the project proposer to consider how the changing climate could impact the site and mitigation measures that could offset these impacts. For example, the update notes that the site is in Flood Management Zone. Given that most models predict an increase in large rain events, it may be appropriate to consider additional stormwater BMPs to offset the impact of the impervious surface associated with the maximum development scenario.

The original AUAR predates the current greenhouse gas emissions analysis requirements and as such does not discuss GHG emissions or mitigation strategies. Metropolitan Council staff encourages the project proposer to consider how the different scenarios could impact the site's GHG emissions and to adopt mitigation measures such as solar and EV ready design.

The Council will not take formal action on the AUAR Update. If you have any questions or need further information, please contact Eric Wojchik, Principal Reviewer, at 651-602-1832 or via email at eric.wojchik@metc.state.mn.us.

Sincerely,

Angela R. Torres, AICP, Senior Manager
Local Planning Assistance

CC: Tod Sherman, Development Reviews Coordinator, MnDOT - Metro Division
Peter Lindstrom, Metropolitan Council District No. 10
Judy Sventek, Water Resources Manager
Eric Wojchik, Sector Representative/ Principal Reviewer
Reviews Coordinator

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DEPARTMENT OF NATURAL RESOURCES

Division of Ecological and Water Resources
Region 3 Headquarters
1200 Warner Road
Saint Paul, MN 55106

Transmitted by Email

May 29, 2024

Dave Perrault
City of Arden Hills
1245 W Highway 96
Arden Hills, MN 55112

Dear Dave Perrault,

Thank you for the opportunity to review the Twin Cities Army Ammunitions Plant (TCAAP) Alternative Urban Areawide Review (AUAR) Update for the project area located in Ramsey County. The DNR respectfully submits the following comments for your consideration:

1. Page 8, Section 4.2.4. Contamination/Hazardous Materials/Solid Wastes. This section mentions Round Lake, a DNR public water, and the Proposed Plan by the U.S. Army to clean up this superfund site, but this section does not discuss the proposed staging area located within the AUAR study area that would be needed to complete this cleanup effort.

   It has taken decades of study and negotiation to reach a consensus between stakeholders on the Proposed Plan for the cleanup of Round Lake. Now that design plans for the cleanup activity are moving forward, it is important that this project be allowed to proceed for the benefit of the National Wildlife Refuge and the local wildlife that are currently impacted by unsafe levels of contamination, as well as the recreational opportunities this lake could provide to the residents of Arden Hills.

   The AUAR Update should discuss the proposed staging area for the Round Lake cleanup activities, and indicate if the proposed development timeline for this site would conflict with this effort. If so, how would this be resolved to still enable the cleanup of Round Lake?

2. Page 10, Section 4.2.5. Fish, Plant Communities, and Sensitive Ecological Resources. This section states that given the highly disturbed nature of the site, there is minimal likelihood of finding suitable habitat for the identified species. That is not an accurate statement. The disturbed sandy nature of the site provides the ideal habitat for many species. This site contains the last remaining Ghost tiger beetle population in the entire state. The site also contains nesting habitat for the state-threatened, Blanding's turtle, and ideal habitat for the state-threatened, Seaside three-awn, which thrives in sandy sparse conditions.

   Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of

endangered or threatened plants or animals, including their parts or seeds, without a permit. Please see the attached May 16, 2024 Natural Heritage letter that contains **requirements** to avoid impacts to state-listed species. **Further coordination with DNR is necessary prior to the start of any work:**

- A Blanding's turtle avoidance plan is required prior to any development activities within the project area.
- A rare plant survey is required for the project area.
- A Ghost tiger beetle avoidance plan is required prior to any development activities within the project area.
- Confirmation is required regarding the avoidance measures provided for the state-endangered, Henslow's sparrow.

3. Page 10, Section 4.2.5. Fish, Plant Communities, and Sensitive Ecological Resources. There is no discussion of federally-listed species, and no evidence of coordination with U.S. Fish and Wildlife Service. Please be aware that the project area is located within a High Potential Zone for the federally-endangered, rusty patched bumble bee. Please see the attached Natural Heritage letter for more information.
4. Page 11, Section 4.2.6. Visual. We appreciate that the development will be mindful of potential wildlife impacts from lighting given the close proximity to Rice Creek Regional Park. Animals depend on the daily cycle of light and dark for behaviors such as hunting, migrating, sleeping, and protection from predators. Light pollution can affect their sensitivity to the night environment and alter their activities. In addition to the undesirable effects of upward facing lighting, the hue of lights can also affect wildlife. LED lighting has become increasingly popular due to its efficiency and long lifespan. However, these bright lights tend to emit blue light, which can be harmful to birds, insects, and fish. The DNR recommends that any projects using LED luminaries follow the MnDOT Approved Products for luminaries, which limits the Uplight rating to 0. A nominal color temperature below 2700K is preferable for wildlife, and so we recommend choosing products that have the lowest number for backlight and glare (all approved products should already be 0 for Uplight).

   We also recommend that all non-essential lighting be turned off during bird migration and follow the Audubon Society's Lights Out program. This program advocates for darkening all buildings and structures during the bird migration from midnight until dawn March 15 - May 31 and August 15 - Oct 31. Information on this program can be found at: http://mn.audubon.org/conservation/lights-out-faq.
5. Page 14, Table 6: Permits and Approvals Required. Please update Table 6 to include the Blanding's turtle avoidance plan, the Ghost tiger beetle avoidance plan, and a potential Takings Permit.
6. Page 16, Table 7: Water Resources. We recommend using weed-free, native seed mixes and plantings to the greatest degree possible in development landscaping and stormwater features in order to provide pollinator habitat for the federally-endangered rusty patched bumble bee, and to reduce the spread of invasive species. Native species also require less irrigation and soil inputs.

7. Page 16, Table 7: Water Resources. The project area is located within the New Brighton and Saint Anthony Village Wellhead Protection Area and Drinking Water Supply Management Area. Development of this site will significantly increase the amount of impervious surfaces within the project area, and consequently the amount of road salt used for winter maintenance. Chloride released into local lakes, streams, and groundwater does not break down, and instead accumulates in the environment, potentially reaching levels that are toxic to aquatic wildlife and plants. Consider promoting local business and city participation in the Smart Salting Training offered through the Minnesota Pollution Control Agency. There are a variety of classes available for road applicators, sidewalk applicators, and property managers. More information and resources can be found at this website. Many winter maintenance staff who have attended the Smart Salting training — both from cities and counties and from private companies — have used their knowledge to reduce salt use and save money for their organizations.

   We encourage the City of Arden Hills to consider requiring that developments with a significant area of impervious surfaces develop a chloride management plan that outlines what BMP's and strategies will be used to reduce chloride use within the project area and include this plan within Operations and Maintenance Agreements that are tied to the property. We also encourage cities and counties to consider how they may participate in the Statewide Chloride Management Plan and provide public outreach to reduce the overuse of chloride. Here are some educational resources for residents as well as a sample ordinance regarding chloride use.

8. Page 16, Table 7: Water Resources. The AUAR should discuss the capacity of the municipal water supply to support the planned water use at this new development, and how the contaminated groundwater plumes in the area will impact groundwater use at the site.

9. Page 16, Table 7: Water Resources. A DNR Water Appropriation Permit is required if the water pumped exceeds 10,000 gallons in a day, and/or one million gallons in one year. The DNR General Permit for Temporary Appropriation, with its lower permit application fee and reduced time for review, may be used for the dewatering if the dewatering volume is less than 50 million gallons and the time of the appropriation is less than one year. A DNR Water Appropriations Permit can also be applied for through the Minnesota DNR Permitting and Reporting System.

Thank you again for the opportunity to review this document. Please let me know if you have any questions.

Sincerely,

Melissa Collins

Regional Environmental Assessment Ecologist | Ecological and Water Resources
Minnesota Department of Natural Resources
Phone: 651-259-5755
Email: melissa.collins@state.mn.us

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

May 16, 2024

Twin Cities - Environmental (Kimley-Horn)
Kimley-Horn and Associates, Inc.

RE: Natural Heritage Review of the proposed **TCAAP AUAR Update,**
T30N R23W Sections 9 and 16; Ramsey County

Dear Twin Cities - Environmental (Kimley-Horn),

For all correspondence regarding the Natural Heritage Review of this project please include the project ID **MCE-2024-00315** in the email subject line.

As requested, the Minnesota Natural Heritage Information System has been reviewed to determine if the proposed project has the potential to impact any rare species or other significant natural features. Based on the project details provided with the request, the following rare features may be impacted by the proposed project:

State-listed Species

- Henslow's sparrow (*Centronyx henslowii*), a state-listed endangered bird species, has been documented in the vicinity of the proposed project. Suitable nesting habitat for this species includes uncultivated and unmowed grasslands, and old fields with standing, dead vegetation, and a substantial litter layer. As such, disturbance in these areas should not occur during their breeding season, between May 15th and July 15th. **If avoidance during breeding season is not feasible, areas that will be disturbed that contain suitable nesting habitat will need to be surveyed for active nests prior to any project disturbance.**

  Please contact Review.NHIS@state.mn.us to confirm that the above avoidance measure will be implemented or to inform us that avoidance is not feasible. If avoidance is not feasible, the project area will need to be surveyed for active nests prior to any disturbance. Requirements for surveys and lists of DNR certified lists of surveyors can be found at the Natural Heritage Review website.

- Blanding's turtles (*Emydoidea blandingii*), a state-listed threatened species, have been documented in the direct vicinity of the proposed project. Blanding's turtles use upland areas up to and over a mile distant from wetlands, waterbodies, and watercourses. Uplands are used for nesting, basking, periods of dormancy, and traveling between wetlands. Factors believed to contribute to the decline of this species include collisions with vehicles, wetland drainage and degradation, and the development of upland habitat. Any added mortality can be detrimental to populations of Blanding's turtles, as these turtles have a low reproduction rate that depends upon a high survival rate to maintain population levels.

  This project has the potential to impact this rare turtle through direct fatalities and habitat disturbance/destruction due to excavation, fill, and other construction activities associated with the project. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of threatened or endangered species without a permit. **Given the project details and the potential for a take of a Blanding's turtle, an avoidance plan is required.**

  We do not currently have a template for avoidance plans. The plan needs to:
  - Provide a description of the project activities and construction methods,
  - Identify measures that will be taken to avoid take and minimize disturbance to the species, and
  - Include a map of disturbance areas. This can include a map of potential Blanding's turtle summer, winter, and nesting habitat overlayed with timing of project impacts.

  Measures to avoid or minimize disturbance include, but are not limited to, the following:
  - Avoidance of suitable habitat.
  - Timing the impacts to avoid incidental take.
  - Implementation of recommendations listed in the Blanding's turtle fact sheet.
  - Implementation of best practices for Species Protection (Chapter 1) listed in the Best Practices for Meeting DNR General Public Waters Work Permit manual.
  - Installation of wildlife friendly curbs, gutters, and stormwater inlets to prevent turtles from entering the storm sewer and to allow turtles to leave the road.
    - For an example, reference "Curb Design and Small Animals" (Chapter 1, Page 24) in Best Practices for Meeting DNR General Public Waters Work Permit manual.
  - Limiting erosion and sediment control to wildlife friendly erosion control.
  - Creation and implementation of a turtle monitoring plan for construction areas.
  - Training for construction crew.
  - Distribution of the Blanding's turtle flyer to all contractors working in the area.

  Please submit the completed avoidance plan to Reports.NHIS@state.mn.us.

- Seaside three-awn (*Aristida tuberculosa*), a state-listed threatened plant species, has been recently documented in the vicinity of the proposed project. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, including their parts or seeds, without a permit. **To demonstrate avoidance, a qualified surveyor will need to determine if suitable habitat exists within the activity impact area and, if so, conduct a survey prior to any project activities.** Surveys must be conducted by a qualified surveyor and follow the standards contained in the Rare Species Survey Process and Rare Plant Guidance. Visit the Natural Heritage Review page for a list of certified surveyors and more information on this process. Project planning should take into account that any botanical survey needs to be conducted during the appropriate time of the year, which may be limited. Please contact Review.NHIS@state.mn.us if you have any questions regarding this process.

- Ghost tiger beetle (*Cicindela lepida*), a state-listed threatened species, has been recently documented in the vicinity of the proposed project. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, including their parts or seeds, without a permit. The Twin Cities Army Ammunition Plant (TCAAP) is the last known population of ghost tiger beetle in Minnesota. **Given the rarity of this species, coordination with the MN DNR Central Region Nongame Specialist Erica Hoaglund (erica.hoaglund@state.mn.us) and an avoidance plan are required.**

  We do not currently have a template for avoidance plans. The plan needs to:
  - Provide a description of the project activities and construction methods,
  - Identify measures that will be taken to avoid take and minimize disturbance to the species, and
  - Include a map of disturbance areas.

  Measures to avoid or minimize disturbance include, but are not limited to, the following:
  - Avoidance of suitable habitat.
  - Timing the impacts to avoid incidental take.
  - Conducting surveys in areas to be impacted.

  Please submit the completed avoidance plan to Reports.NHIS@state.mn.us.

- Lark sparrow (*Chondestes grammacus*), a state-listed bird species of special concern, has been documented frequently in the vicinity of the proposed project. This bird species is found in open, dry grassland areas with scattered trees and shrubs. They build their nest on the ground, in a shrub or a small tree. Given the presence of this rare species, **the DNR recommends avoiding disturbance to grassland areas and tree/shrub removal from May 15th through August 15th to avoid disturbance of nesting birds.**

- Little brown myotis (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus*), both state-listed as special concern, have been documented frequently in the vicinity of the proposed project. During the active season (approximately April-November) bats roost underneath bark, in cavities, or in crevices of both live and dead trees. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, **the DNR recommends that tree removal be avoided from June 1 through August 15.** If greater protection for bats is desired, you may avoid tree removal during the entire bat active season (April-November).

- Trumpeter swans (*Cygnus buccinator*), a state-listed species of special concern, have been documented nesting in the vicinity of the proposed project. During the breeding season, trumpeter swans select small ponds and lakes with extensive beds of cattails, bulrush, sedges, and/or horsetail. Ideal habitat includes about 100 m of open water for take-off, stable levels of unpolluted water, emergent vegetation, low levels of human disturbance, and the presence of muskrat (*Ondatra zibethicus*) houses and American beaver (*Castor canadensis*) lodges for use as nesting platforms. If any of the wetlands on site provide suitable habitat, swans may choose to nest in these wetlands. **The DNR recommends avoiding construction activities during the nesting season, late April through early June, near suitable nesting habitat.**

- Plains pocket mouse (*Perognathus flavescens*), a state-listed species of special concern, has been documented in the vicinity of the proposed project and may be encountered on site if the site contains suitable habitat. **Given the presence of this rare species, the DNR recommends that the use of erosion control mesh, if any, be limited to wildlife-friendly materials.**

- Please visit the DNR Rare Species Guide for more information on the habitat use of these species and recommended measures to avoid or minimize impacts.

Federally Protected Species

- The area of interest overlaps with a U.S Fish and Wildlife Service (USFWS) Rusty Patched Bumble Bee High Potential Zone. The rusty patched bumble bee *(Bombus affinis)* is federally listed as endangered and is likely to be present in suitable habitat within High Potential Zones. From April through October this species uses underground nests in upland grasslands, shrublands, and forest edges, and forages where nectar and pollen are available. From October through April the species overwinters under tree litter in upland forests and woodlands. The rusty patched bumble bee may be impacted by a variety of land management activities including, but not limited to, prescribed fire, tree-removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. If applicable, **the DNR recommends reseeding disturbed soils with native species of grasses and forbs using** BWSR Seed Mixes **or** MnDOT Seed Mixes**.**

To ensure compliance with federal law, please conduct a federal regulatory review using the U.S. Fish and Wildlife Service's online Information for Planning and Consultation (IPaC) tool. Please note that all projects, regardless of whether there is a federal nexus, are subject to federal take prohibitions. The IPaC review will determine if prohibited take is likely to occur and, if not, will generate an automated letter. The USFWS RPBB guidance provides guidance on avoiding impacts to rusty patched bumble bee and a key for determining if actions are likely to affect the species; the determination key can be found in the appendix.

Environmental Review and Permitting

- Please include a copy of this letter and the MCE-generated Final Project Report in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

- Given the potential presence of state protected species, we encourage submission of Natural Heritage Review requests to ensure avoidance of take for these species and to determine survey needs as individual projects are planned.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and project description provided with the request. **If project details change or the project has not occurred within one year, please resubmit the project for review within one year of initiating project activities.**

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential impacts to these rare features. Visit the Natural Heritage Review website for additional information regarding this process, survey guidance, and other related information. For information on the environmental review process or other natural resource concerns, you may contact your DNR Regional Environmental Assessment Ecologist.

Thank you for consulting us on this matter and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

Molly Barrett
Natural Heritage Review Specialist
Molly.Barrett@state.mn.us

Cc: Melissa Collins, Regional Environmental Assessment Ecologist, Central (Region 3)
Cc: Catherine Plank, Assistant Regional Environmental Assessment Ecologist, Central (Region 3)
Cc: Erica Hoaglund, Nongame Specialist, Central (Region 3)

Attachment D

Response to Comments

TCAAP AUAR Update
July 2024

Introduction

The AUAR Update was revised based on comments received during the comment period. This section includes a response to each comment received during the comment period and indicates in what way the comment has been addressed. The 10-business day comment period began May 14, 2024, and comments were accepted through May 29, 2024. Two comment letters were received from government agencies.

Metropolitan Council

Comment	Response
Forecasts The AUAR site includes all of Transportation Analysis Zone #1708, the western end of TAZ #1709, and a small part of TAZ #1700 (north of County Rd H at I-35). The Council's TAZs database lists these zones adding a combined +1328 households, +3064 population and +674 jobs during 2010 – 2040. The development timeline is uncertain; analyses for the AUAR used horizon year 2040 for full build out. Should development of the AUAR site be pursued, with full development in 2040 planning period, the TAZ allocations for households, population and employment will need to be revised higher. For example, in the case of scenario 1, we would add +1000 jobs in 2040, as needed, to the TAZs with commercial development; and add +200 household and +400 population to TAZ #1708 or 1709 in 2040. The employment adjustments will be debited from other parts of Arden Hills; resulting community totals will be unchanged. The households and population adjustment would merit a community total forecast increase. City staff are welcome to contact Council Research if they wish to discuss this.	The City will coordinate with the Metropolitan Council to adjust TAZ allocations and the community total forecast, as needed.
Transit Limited bus stops are located within walking distance of the TCAPP site along Old Hwy 8 in New Brighton for access to Routes 25 and 250. Limited public trails currently exist providing access to/from the TCAPP site. Right-of-way should be set aside for the addition of sidewalks/trails to ensure connectivity with the rest of the	Comment noted. The AUAR study area is intended to be a pedestrian- and bike-friendly development, and the street design standards in the TCAAP Redevelopment Code were developed

Comment	Response
pedestrian network and facilitate safe pedestrian access to/from the site if they are not planned to be constructed. Given the current transit investments in the area, the low residential density that exists in this area now, the moderately low-density (depending on the City's proposed zoning district) residential development that is proposed with this AUAR Update, and the longer timeframe of overall development, this master planned development will likely have some ridership impact on nearby existing regular route transit network. This AUAR should not expect additional expansion of the existing fixed-route transit network.	to service multiple modes of transportation.
Climate and GHG Calculations The original AUAR predates the current climate requirement and as such does not discuss potential climate hazards and impacts. Metropolitan Council staff encourages the project proposer to consider how the changing climate could impact the site and mitigation measures that could offset these impacts. For example, the update notes that the site is in Flood Management Zone. Given that most models predict an increase in large rain events, it may be appropriate to consider additional stormwater BMPs to offset the impact of the impervious surface associated with the maximum development scenario. The original AUAR predates the current greenhouse gas emissions analysis requirements and as such does not discuss GHG emissions or mitigation strategies. Metropolitan Council staff encourages the project proposer to consider how the different scenarios could impact the site's GHG emissions and to adopt mitigation measures such as solar and EV ready design.	The City of Arden Hills and Ramsey County developed an Energy Integration and Resiliency Framework for the TCAAP development previously. A new Energy Advisory Committee has been established and is working with a consultant to update the vision and incorporate current sustainable best practices into the project.

Minnesota Department of Natural Resources

Comment	Response
1. Page 8, Section 4.2.4. Contamination/Hazardous Materials/Solid Wastes. This section mentions Round Lake, a DNR public water, and the Proposed Plan by the U.S. Army to clean up this superfund site, but this section does not discuss the proposed staging area located within the AUAR study area that would be needed to complete this cleanup effort. It has taken decades of study and negotiation to reach a consensus between stakeholders on the Proposed Plan for the cleanup of Round Lake. Now that design plans for the cleanup activity are moving forward, it is important that this project be allowed to proceed for the benefit of the National Wildlife Refuge and the local wildlife that are currently impacted by unsafe levels of contamination, as well as the recreational opportunities this lake could provide to the residents of Arden Hills. The AUAR Update should discuss the proposed staging area for the Round Lake cleanup activities, and indicate if the proposed development timeline for this site would conflict with this effort. If so, how would this be resolved to still enable the cleanup of Round Lake?	The proposed staging area for the Round Lake cleanup activities is located in the southwest corner of the AUAR study area, east of US Highway 10 and north of CSAH 96. All necessary sitework Is currently planned to be complete by the end of 2026. This work is not anticipated to conflict with any proposed development, and the City and County will continue to coordinate with the US Army on ongoing cleanup efforts. A statement about the staging area has been added to the AUAR Update in Section 4.2.4.
2. Page 10, Section 4.2.5. Fish, Plant Communities, and Sensitive Ecological Resources. This section states that given the highly disturbed nature of the site, there is minimal likelihood of finding suitable habitat for the identified species. That is not an accurate statement. The disturbed sandy nature of the site provides the ideal habitat for many species. This site contains the last remaining Ghost tiger beetle population in the entire state. The site also contains nesting habitat for the state-threatened, Blanding's turtle, and ideal habitat for the state-threatened, Seaside three-awn, which thrives in sandy sparse conditions. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, including their parts or seeds, without a permit. Please	Section 4.2.5 of the AUAR Update has been revised to reflect the presence of suitable habitat within the AUAR study area as described in the Natural Heritage Review letter. Recommendations and requirements from the DNR to avoid impacts to state-listed species have also been added to the table of mitigation measures in Section 5 (now Table 8).

Comment	Response
see the attached May 16, 2024 Natural Heritage letter that contains requirements to avoid impacts to state-listed species. Further coordination with DNR is necessary prior to the start of any work: • A Blanding's turtle avoidance plan is required prior to any development activities within the project area. • A rare plant survey is required for the project area. • A Ghost tiger beetle avoidance plan is required prior to any development activities within the project area. • Confirmation is required regarding the avoidance measures provided for the state-endangered, Henslow's sparrow.	
3. Page 10, Section 4.2.5. Fish, Plant Communities, and Sensitive Ecological Resources. There is no discussion of federally-listed species, and no evidence of coordination with U.S. Fish and Wildlife Service. Please be aware that the project area is located within a High Potential Zone for the federally-endangered, rusty patched bumble bee. Please see the attached Natural Heritage letter for more information.	Information regarding federally-listed species in the vicinity of the AUAR study area has been added to the AUAR Update. Ramsey County, as the landowner, or developers who propose projects within the AUAR study area will be responsible for compliance with the Endangered Species Act.
4. Page 11, Section 4.2.6. Visual. We appreciate that the development will be mindful of potential wildlife impacts from lighting given the close proximity to Rice Creek Regional Park. Animals depend on the daily cycle of light and dark for behaviors such as hunting, migrating, sleeping, and protection from predators. Light pollution can affect their sensitivity to the night environment and alter their activities. In addition to the undesirable effects of upward facing lighting, the hue of lights can also affect wildlife. LED lighting has become increasingly popular due to its efficiency and long lifespan. However, these bright lights tend to emit blue light, which can be harmful to birds, insects, and fish. The DNR recommends that any projects using LED luminaries follow the MnDOT Approved Products for luminaries, which limits the Uplight rating to 0. A nominal color temperature below 2700K is preferable for wildlife, and so we recommend	Development within the AUAR study area will comply with standards for street lighting and exterior lighting in the TCAAP Redevelopment Code. MnDOT Approved Products and Audubon Society's Lights Out Program will be considered to the extent practicable to prevent avoidable impacts to wildlife.

Comment	Response
choosing products that have the lowest number for backlight and glare (all approved products should already be 0 for Uplight). We also recommend that all non-essential lighting be turned off during bird migration and follow the Audubon Society's Lights Out program. This program advocates for darkening all buildings and structures during the bird migration from midnight until dawn March 15 – May 31 and August 15 – Oct 31. Information on this program can be found at: http://mn.audubon.org/conservation/lights-out-faq.	
5. Page 14, Table 6: Permits and Approvals Required. Please update Table 6 to include the Blanding's turtle avoidance plan, the Ghost tiger beetle avoidance plan, and a potential Takings Permit.	These plans and permits have been added to the table of permits and approvals required (now Table 7).
6. Page 16, Table 7: Water Resources. We recommend using weed-free, native seed mixes and plantings to the greatest degree possible in development landscaping and stormwater features in order to provide pollinator habitat for the federally-endangered rusty patched bumble bee, and to reduce the spread of invasive species. Native species also require less irrigation and soil inputs.	The table of mitigation measures in Section 5 (now Table 8) has been updated to include reseeding disturbed soils with native species or grasses and forbs using BWSR Seed Mixes or MnDOT Seed Mixes where practicable, as recommended in the DNR's Natural Heritage Review letter.
7. Page 16, Table 7: Water Resources. The project area is located within the New Brighton and Saint Anthony Village Wellhead Protection Area and Drinking Water Supply Management Area. Development of this site will significantly increase the amount of impervious surfaces within the project area, and consequently the amount of road salt used for winter maintenance. Chloride released into local lakes, streams, and groundwater does not break down, and instead accumulates in the environment, potentially reaching levels that are toxic to aquatic wildlife and plants. Consider promoting local business and city participation in the Smart Salting Training offered through the Minnesota Pollution Control Agency. There are a variety of classes available for road applicators, sidewalk applicators, and property managers. More information and	Comment noted. The City and County will consider ways to manage chloride, such as through the Smart Salting Training or chloride management plans.

Comment	Response
resources can be found at this website. Many winter maintenance staff who have attended the Smart Salting training — both from cities and counties and from private companies — have used their knowledge to reduce salt use and save money for their organizations. We encourage the City of Arden Hills to consider requiring that developments with a significant area of impervious surfaces develop a chloride management plan that outlines what BMP's and strategies will be used to reduce chloride use within the project area and include this plan within Operations and Maintenance Agreements that are tied to the property. We also encourage cities and counties to consider how they may participate in the Statewide Chloride Management Plan and provide public outreach to reduce the overuse of chloride. Here are some educational resources for residents as well as a sample ordinance regarding chloride use.	
8. Page 16, Table 7: Water Resources. The AUAR should discuss the capacity of the municipal water supply to support the planned water use at this new development, and how the contaminated groundwater plumes in the area will impact groundwater use at the site.	The 2014 AUAR documented that the regional wastewater collection and treatment facilities and municipal wastewater pipes serving the study area have sufficient long-term capacity to handle the additional wastewater flow generated by both the Zoning and Maximum Development Scenarios. Future capacity will be confirmed as part of the final design process. The 2014 AUAR also discussed groundwater use. All water pumped during construction dewatering activities will be discharged in compliance with City, Watershed, and DNR requirements and the National Pollutant Discharge Elimination System (NPDES) permit, and consistent with approved Response Action Plans, as necessary. No discharge water will be directed to surface waters

Comment	Response
	without prior retention in a temporary settling basin and a determination that no contamination exists. The developer will determine if groundwater is contaminated as a basis for determining discharge to storm sewer, sanitary sewer, or through a treatment process such as the existing groundwater treatment facilities.
9. Page 16, Table 7: Water Resources. A DNR Water Appropriation Permit is required if the water pumped exceeds 10,000 gallons in a day, and/or one million gallons in one year. The DNR General Permit for Temporary Appropriation, with its lower permit application fee and reduced time for review, may be used for the dewatering if the dewatering volume is less than 50 million gallons and the time of the appropriation is less than one year. A DNR Water Appropriations Permit can also be applied for through the Minnesota DNR Permitting and Reporting System.	The table of required permits and approvals in Section 5 (now Table 7) has been updated to include both DNR water appropriation permits.