Application
19838-2024 Roadway Modernization
20253 - Bloomington W 98th Street at I-35W
Regional Solicitation - Roadways Including Multimodal Elements

Status:
Submitted Date:

Submitted
12/15/2023 10:14 AM

## Primary Contact

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## Organization Information

| Name: | BLOOMINGTON, CITY OF |  |  |
| :---: | :---: | :---: | :---: |
| Jurisdictional Agency (if different): |  |  |  |
| Organization Type: | City |  |  |
| Organization Website: |  |  |  |
| Address: | 1700 W 98TH STREET |  |  |
| * | BLOOMINGTON | Minnesota | 55431 |
|  | city | State/Province | Postal Code/Zip |
| County: | Hennepin |  |  |
| Phone:* | 952-563-8700 |  |  |
|  |  |  | Ext. |
| Fax: |  |  |  |
| PeopleSoft Vendor Number | 0000026809A5 |  |  |

## Project Information

Project Name
Primary County where the Project is Located
Cities or Townships where the Project is Located:
Jurisdictional Agency (If Different than the Applicant):

Bloomington W 98th Street at I-35W Modernization Project
Hennepin
City of Bloomington
Hennepin County

Brief Project Description (Include location, road name/functional class, The Bloomington W 98th Street at l-35W Modernization project will reconstruct
type of improvement, etc.)
and modernize W 98th St. from west of the southbound l-35W ramp/Dupont Ave. intersection to east of the northbound $\mathrm{l}-35 \mathrm{~W}$ ramp/E Bloomington Fwy intersection to address safety issues through geometric improvements and to include important pedestrian and transit amenities and enhancements. W 98th St. is classified as an A Minor Arterial Expander and the l-35W ramps are part of the Principal Arterial network.

The project will improve roadway geometrics and safety through the elimination of the third westbound thru lane and removal of the southbound free right turn and island at the W 98th St./southbound $\mathrm{I}-35 \mathrm{~W}$ ramp/Dupont Ave. intersection. The outside westbound lane at the l-35W northbound ramp will be restriped as a right turn lane. A curb bumpout will be installed on the northwest corner of the W 98th St./l-35W northbound ramp/E Bloomington Fwy intersection to enforce this change and better funnel thru traffic. The project will increase boulevard space for bus pullouts, greenery, and pedestrian buffer along the north and south sides of W 98th St.

The project area has high pedestrian usage due to the regional transit center proximity, adjacent retail and medical facility uses, and multifamily housing near the project area. The purpose of this project is to reimagine the project area for the safety of all users. Ten-foot trails will be constructed on both sides of 98th Street, replacing narrow sidewalks and connecting to existing pedestrian infrastructure on both ends of the project. The project will upgrade elements to ADA compliance as feasible with expanded accessibility for disabled users along W 98th St, the I-35W SB ramp, Dupont Ave, and Aldrich Ave intersections, which all have insufficient curbs and ramps. The most significant change will be reclaiming existing pavement area for pedestrian infrastructure and landscaping by reducing westbound travel lanes from 3 to 2 . This will reduce the pedestrian crossing distance at all intersections. Pedestrian crossing safety will be improved at both signals through reduced conflict points and reduced crossing distance.

The project will improve access to and reliability of bus transit routes. The proposed project will add a southbound left bus bypass shoulder along the W 98th St./l-35W ramp terminal/Dupont Ave. intersection. These improvements will be beneficial to the METRO Orange Line and Express Route 465 that use this ramp. The efficiency of these routes will be improved with the implementation of a bus only phase at the W 98th St./Dupont Ave. signal. This signalization change will allow buses to turn left while all other traffic is stopped, prioritizing transit mobility.
(Limit 2,800 characters; approximately 400 words)
TRANSPORTATIONIMPROVEMENT PROGRAM (TIP) DESCRIPTION - will be used in TIP Reconstruct W 98th Street from approximately 300 feet west of Dupont Ave/lif the project is selected for funding. See MnDOT's TIP description guidance. $\quad 35 \mathrm{~W}$ Southbound exit terminal ramp 0.3 miles to Aldrich Avenue including intersection and ramp reconfiguration, concrete median, signal replacement, and trail and curb ramps
Include both the CSAHMSAS/TH references and their corresponding street names in the TIP Description (see Resources link on Regional Solicitation webpage for examples).
Project Length (Miles)
0.3
to the nearest one-tenth of a mile

## Project Funding

| Are you applying for competitive funds from another source(s) to implement this <br> project? | No |
| :--- | :--- |
| If yes, please identify the source(s) | $\$ 3,455,040.00$ |
| Federal Amount $\$ 863,760.00$ <br> Match Amount  | $\$ 4,318,800.00$ |
| Minimumof $20 \%$ of project total <br> Project Total <br> For transit projects, the total cost for the application is total cost minus fare revenues. <br> Match Percentage | $20.0 \%$ |

A minimumof $20 \%$ of the total project cost must come fromnon-federal sources; additional match funds over the 20\% minimumcan come fromother federal sources
Preferred Program Year
Select one: 2028, 2029

Select 2026 or 2027 for TDM and Unique projects only. For all other applications, select 2028 or 2029.
Additional Program Years:
2026, 2027
Select all years that are feasible if funding in an earlier year becomes available.

## Project Information-Roadways

NOTE: If your project has already been assigned a State Aid Project \# (SAP or SP), please Indicate SAP\# here
SAP\#:

County, City, or Lead Agency
Functional Class of Road
Road System
TH, CSAH, MSAS, CO. RD., TMP. RD., ATY STREET
Road/Route No.
i.e., 53 for CSAH 53

Name of Road
Example; 1st ST., MAINAVE
TERMIN:(Termini listed must be within 0.3 miles of any work)
From:
Road System
Road/Route No.
i.e., 53 for CSAH 53

Name of Road

Example; 1st ST., MAINAVE
To:
Road System
DO NOT INCLUDE LEGAL DESCRIPTION
Road/Route No.
i.e., 53 for CSAH 53

Name of Road
Example; 1st ST., MAINAVE
In the City/Cities of:
(List all cities within project linits)
OR:
At:
Road System
(TH, CSAH, MSAS, CO. RD., TMP. RD., City Street)
Road/Route No.
i.e., 53 for CSAH 53

Name of Road
Example; 1st ST., MAINAVE
In the City/Cities of:
(List all cities within project linits)
PROJECT LENGTH
Miles
(nearest 0.1 miles)
Primary Types of Work (check all the apply)
New Construction
Reconstruction Yes
Resurfacing Yes
Bituminous Pavement Yes
Concrete Pavement
Roundabout
New Bridge
Bridge Replacement

City of Bloomington
A Minor Arterial Expander, Principal Arterial
CSAH, TH

135

W 98th Street, I-35W

Local

300 feet west of W 98th St./I-35W southbound ramp terminal/Dupont Ave. intersection

Local

Aldrich Ave S

Bloomington

## Bridge Rehab

## New Signal

Signal Replacement/Revision ..... Yes
Bike TrailOther (do not include incidental items)YesGRADE, AGG BASE, BIT BASE, BIT SURF, REPLACE SIGNALS, LIGHTING,TRAIL, SIDEWALK, PED RAMPS, CONCRETE MEDIAN, CURB, LANDSCAPING
BRIDGE/CULVERT PROJECTS (IF APPLICABLE)
Old Bridge/Culvert No.:
New Bridge/Culvert No.:
Structure is Over/Under(Bridge or culvert name):
OTHERINFORMATION:
Zip Code where Majority of Work is Being Performed ..... 55431
Approximate Begin Construction Date ..... 05/01/2026
Approximate End Construction Date ..... 10/01/2026
Miles of Trail (nearest 0.1 miles) ..... 0.7
Miles of Sidewalk (nearest 0.1 miles) ..... 0.1
Miles of trail on the Regional Bicycle Transportation Network (nearest 0.1 miles): ..... 0.7
Is this a new trail? ..... Yes

## Requirements - All Projects

## All Projects

1. The project must be consistent with the goals and policies in these adopted regional plans: Thrive MSP 2040 (2014), the 2040 Transportation Policy Plan (2018), the 2040 Regional Parks Policy Plan (2018), and the 2040 Water Resources Policy Plan (2015).

Check the box to indicate that the project meets this requirement. Yes
2. The project must be consistent with the 2040 Transportation Policy Plan. Reference the 2040 Transportation Plan goals, objectives, and strategies that relate to the project.

Briefly list the goals, objectives, strategies, and associated pages: B. Safety and Security - Objective A (page 2.5), B1 (page 2.5), B3 (page 2.6), B6 (page 2.8)
C. Access to Destinations - Objective A (page 2.10), Objective B, Objective D, Objective E, C1 (Page 2.10), C2 (Page 2.11), C4 (page 2.14), C6 (page 2.15), C9 (page 2.17), C10 (page 2.18), C11 (page 2.20), C12 (page 2.21), C15 (page 2.22), C16 (page 2.23), C17 (2.24)

Competitive Economy
Objective A (page 2.26), Objective B, D1 (page 2.26), D3 (page 2.27), D4 (page 2.28)

Health Environment
Objective A (page 2.30), Objective C, Objective D, E2 (page 2.31), E3 (page 2.31), E5 (page 2.33), E6 (page 2.34)

Leveraging Transportation Investment to Guide Land Use
Objective A (page 2.35), Objective C, F2 (page 2.36), F3 (page 2.36), F4. (Page 2.37)

## Limit 2,800 characters, approximately 400 words

3. The project or the transportation problem/need that the project addresses must be in a local planning or programming document. Reference the name of the appropriate comprehensive plan, regional/statewide plan, capital improvement program, corridor study document [studies on trunk highway must be approved by the Minnesota Department of Transportation and the Metropolitan Council], or other official plan or program of the applicant agency [includes Safe Routes to School Plans] that the project is included in and/or a transportation problem/need that the project addresses.

City of Bloomington - Forward 2040 Comprehensive Plan (2018) - Identifies W 98th St as a future bikeway. The plan identifies that the W98th and I-35W area needs mobility and safety improvements for people who drive, bike and roll. (p. 45, 4-7)

City of Bloomington - 98th Street Station Area Plan (2019) - The plan identifies public infrastructure projects to enhance access and mobility at the 98th Street Transit Station and establishes a land use vision to foster transit-supportive redevelopment. Proposed infrastructure enhancements include improving the sidewalk
and bikeway network, streetscape enhancements, and roadway modifications to improve
pedestrian/cyclist safety. (p. 52)

City of Bloomington - Lyndale Retrofit Strategy (2021) - This plan identifies plans to enhance Lyndale Ave S and Aldrich Ave S to support multimodal options and pedestrian-friendly spaces. The W 98th St corridor is identified as an access point. Project improvements will connect to these planned improvements (p. 14, 26)

City of Bloomington - W 98th Street at l-35W Traffic Study (2023) - Building off needs identified in previous efforts, this traffic study was conducted to identify the preferred alternative for the project corridor.

Limit 2,800 characters, approximately 400 words
4. The project must exclude costs for studies, preliminary engineering, design, or construction engineering. Right-of-way costs are only eligible as part of transit stations/stops, transit terminals, park-and-ride facilities, or pool-and-ride lots. Noise barriers, drainage projects, fences, landscaping, etc., are not eligible for funding as a standalone project, but can be included as part of the larger submitted project, which is otherwise eligible. Unique project costs are limited to those that are federally eligible.

Check the box to indicate that the project meets this requirement.

## Yes

5. Applicant is a public agency (e.g., county, city, tribal government, transit provider, etc.) or non-profit organization (TDM and Unique Projects applicants only). Applicants that are not State Aid cities or counties in the seven-county metro area with populations over 5,000 must contact the MnDOT Metro State Aid Office prior to submitting their application to determine if a public agency sponsor is required.
Check the box to indicate that the project meets this requirement. Yes
6. Applicants must not submit an application for the same project elements in more than one funding application category

Check the box to indicate that the project meets this requirement. Yes
7. The requested funding amount must be more than or equal to the minimum award and less than or equal to the maximum award. The cost of preparing a project for funding authorization can be substantial. For that reason, minimum federal amounts apply. Other federal funds may be combined with the requested funds for projects exceeding the maximum award, but the source(s) must be identified in the application. Funding amounts by application category are listed belowin Table 1. For unique projects, the minimum award is $\$ 500,000$ and the maximum award is the total amount available each funding cycle (approximately $\$ 4,000,000$ for the 2024 funding cycle).

Strategic Capacity (Roadway Expansion): \$1,000,000 to \$10,000,000
Roadway Reconstruction/M odernization: \$1,000,000 to \$7,000,000
Traffic Management Technologies (Roadway System M anagement): \$500,000 to $\$ 3,500,000$
Spot M obility and Safety: \$1,000,000 to \$3,500,000
Bridges Rehabilitation/Replacement: \$1,000,000 to \$7,000,000
Check the box to indicate that the project meets this requirement.
Yes
8. The project must comply with the Americans with Disabilities Act (ADA).

Check the box to indicate that the project meets this requirement.
Yes
9. In order for a selected project to be included in the Transportation Improvement Program (TIP) and approved by USDOT, the public agency sponsor must either have a current Americans with Disabilities Act (ADA) self-evaluation or transition plan that covers the public right of way/transportation, as required under Title II of the ADA. The plan must be completed by the local agency before the Regional Solicitation application deadline. For future Regional Solicitation funding cycles, this requirement may include that the plan has undergone a recent update, e.g., within five years prior to application.
The applicant is a public agency that employs 50 or more people and has a
Yes completed ADA transition plan that covers the public right of way/transportation.
(TDM and Unique Project Applicants Only) The applicant is not a public agency subject to the self-evaluation requirements in Title II of the ADA.

Date plan completed:
Link to plan:

02/28/2022
https://www.bloomingtonmn.gov/sites/default/files/2022-03/ADA\ Transition\ Plan\ for\ Public\ Rights-of-Way.pdf

The applicant is a public agency that employs fewer than 50 people and has a completed ADA self-evaluation that covers the public right of way/transportation.
Date self-evaluation completed:
Link to plan:
Upload plan or self-evaluation if there is no link
Upload as PDF
10. The project must be accessible and open to the general public.

Check the box to indicate that the project meets this requirement. Yes
11. The owner/operator of the facility must operate and maintain the project year-round for the useful life of the improvement. This includes assurance of year-round use of bicycle, pedestrian, and transit facilities, per FHWA direction established 8/27/2008 and updated 4/15/2019. Unique projects are exempt from this qualifying requirement.
Check the box to indicate that the project meets this requirement.
Yes
12. The project must represent a permanent improvement with independent utility. The term ?independent utility? means the project provides benefits described in the application by itself and does not depend on any construction elements of the project being funded from other sources outside the regional solicitation, excluding the required non-federal match. Projects that include traffic management or transit operating funds as part of a construction project are exempt from this policy.
Check the box to indicate that the project meets this requirement.
Yes
13. The project must not be a temporary construction project. A temporary construction project is defined as work that must be replaced vithin five years and is ineligible for funding. The project must also not be staged construction where the project will be replaced as part of future stages. Staged construction is eligible for funding as long as future stages build on, rather than replace, previous work.

Check the box to indicate that the project meets this requirement. Yes
14. The project applicant must send written notification regarding the proposed project to all affected state and local units of government prior to submitting the application. Check the box to indicate that the project meets this requirement. Yes

## Roadways Including Multimodal Elements

1. All roadway projects must be identified as a principal arterial (non-freeway facilities only) or A-minor arterial as shown on the latest TAB approved roadway functional classification map. Bridge Rehabilitation/Replacement projects must be located on a minor collector and above functionally classified roadway in the urban areas or a major collector and above in the rural areas.

Check the box to indicate that the project meets this requirement.
Yes
Roadway Strategic Capacity and Reconstruction/Modernization and Spot Mobility projects only:
2. The project must be designed to meet 10 -ton load limit standards.

Check the box to indicate that the project meets this requirement.
Yes
Bridge Rehabilitation/Replacement and Strategic Capacity projects only:
3. Projects requiring a grade-separated crossing of a principal arterial freeway must be limited to the federal share of those project costs identified as local (non-MnDOT) cost responsibility using MnDOT?s ?Cost Participation for Cooperative Construction Projects and Maintenance Responsibilities? manual. In the case of a federally funded trunk highway project, the policy guidelines should be read as if the funded trunk highway route is under local jurisdiction.
Check the box to indicate that the project meets this requirement.
4. The bridge must carry vehicular traffic. Bridges can carry traffic from multiple modes. However, bridges that are exclusively for bicycle or pedestrian traffic must apply under one of the Bicycle and Pedestrian Facilities application categories. Rail-only bridges are ineligible for funding.

Check the box to indicate that the project meets this requirement.
Bridge Rehabilitation/Replacement projects only:
5. The length of the in-place structure is 20 feet or longer.

Check the box to indicate that the project meets this requirement.
6. The bridge must have a Local Planning Index (LPI) of less than 60 OR a National Bridge Inventory (NBI) Rating of 3 or less for either Deck Geometry, Approach Roadway, or Waterway Adequacy as reported on the most recent Minnesota Structure Inventory Report.
Check the box to indicate that the project meets this requirement.
Roadway Expansion, Reconstruction/Modernization, and Bridge Rehabilitation/Replacement projects only:
7. All roadway projects that involve the construction of a newexpanded interchange or newinterchange ramps must have approval by the Metropolitan Council/MnDOT Interchange Planning Review Committee prior to application submittal. Please contact David Evin at MnDOT (David.Evin@state.mn.us or 651-234-7795) to determine whether your project needs to go through this process as described in Appendix F of the 2040 Transportation Policy Plan.
Check the box to indicate that the project meets this requirement.

## Requirements - Roadways Including Multimodal Elements

| Specific Roadway Elements |  |
| :--- | ---: |
| CONSTRUCTION PROJECT EEMENTS/COST ESTIMATES | Cost |
| Mobilization (approx $5 \%$ of total cost) | $\$ 143,900.00$ |
| Removals (approx. $5 \%$ of total cost) | $\$ 138,900.00$ |


| Roadway (grading, borrow, etc.) | \$256,600.00 |
| :---: | :---: |
| Roadway (aggregates and paving) | \$969,300.00 |
| Subgrade Correction (muck) | \$0.00 |
| Storm Sewer | \$320,000.00 |
| Ponds | \$0.00 |
| Concrete Items (curb \& gutter, sidewalks, median barriers) | \$233,700.00 |
| Traffic Control | \$143,900.00 |
| Striping | \$43,200.00 |
| Signing | \$43,200.00 |
| Lighting | \$100,000.00 |
| Turf-Erosion \& Landscaping | \$143,900.00 |
| Bridge | \$0.00 |
| Retaining Walls | \$0.00 |
| Noise Wall (not calculated in cost effectiveness measure) | \$0.00 |
| Traffic Signals | \$1,100,000.00 |
| Wetland Mtigation | \$0.00 |
| Other Natural and Cultural Resource Protection | \$0.00 |
| RR Crossing | \$0.00 |
| Roadway Contingencies | \$554,300.00 |
| Other Roadway Elements | \$0.00 |
| Totals | \$4,190,900.00 |
| Specific Bicycle and Pedestrian Elements |  |
| CONSTRUCTION PROJECT EPEMENTS/COST ESTIMATES | Cost |
| Path/Trail Construction | \$46,600.00 |
| Sidewalk Construction | \$10,000.00 |
| On-Street Bicycle Facility Construction | \$0.00 |
| Right-of-Way | \$0.00 |
| Pedestrian Curb Ramps (ADA) | \$10,000.00 |
| Crossing Aids (e.g., Audible Pedestrian Signals, HAWK) | \$40,000.00 |
| Pedestrian-scale Lighting | \$0.00 |
| Streetscaping | \$0.00 |
| Wayfinding | \$0.00 |
| Bicycle and Pedestrian Contingencies | \$21,300.00 |
| Other Bicycle and Pedestrian Elements | \$0.00 |
| Totals | \$127,900.00 |
| Specific Transit and TDM Elements |  |
| CONSTRUCTION PROJECT E-PMENTS/COST ESTIMATES | Cost |
| Fixed Guideway Elements | \$0.00 |
| Stations, Stops, and Terminals | \$0.00 |
| Support Facilities | \$0.00 |
| Transit Systems (e.g. communications, signals, controls, fare collection, etc.) | \$0.00 |
| Vehicles | \$0.00 |
| Contingencies | \$0.00 |
| Right-of-Way | \$0.00 |
| Other Transit and TDMElements | \$0.00 |
| Totals | \$0.00 |

## Transit Operating Costs

Number of Platform hours 0
Cost Per Platform hour (full loaded Cost) \$0.00
Subtotal $\$ 0.00$

Other Costs - Administration, Overhead,etc. \$0.00

## PROTECT Funds Eligibility

One of the newfederal funding sources is Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT). Please describe which specific elements of your project and associated costs out of the Total TAB-Eligible Costs are eligible to receive PROTECT funds. Examples of potential eligible items may include: storm sener, ponding, erosion control/landscaping, retaining walls, newbridges over floodplains, and road realignments out of floodplains.

## Totals

| Total Cost | $\$ 4,318,800.00$ |
| :--- | :--- |
| Construction Cost Total | $\$ 4,318,800.00$ |
| Transit Operating Cost Total | $\$ 0.00$ |


| Measure B: Project Location Relative to Jobs, Manufacturing, and Education |  |
| :--- | :--- |
| Existing Employment within 1 Mile: | 14095 |
| Existing Manufacturing/Distribution-Related Employment within 1 Mile: | 3357 |
| Existing Post-Secondary Students within 1 Mile: | 129 |
| Upload Map | 1702586776904_Regional Economy.pdf |
| Please upload attachrent in PDF form |  |

## Measure C: Current Heavy Commercial Traffic

RESPONSE: Select one for your project, based on the updated 2021 Regional Truck Corridor Study:
Along Tier 1: Yes

Miles: 3.0
(to the nearest 0.1 miles)
Along Tier 2:
Miles: 0
(to the nearest 0.1 miles)
Along Tier 3:
Miles: 0
(to the nearest 0.1 miles)
The project provides a direct and immediate connection (i.e., intersects) with either a Tier 1, Tier 2, or Tier 3 corridor:
None of the tiers:

## Measure A: Current Daily Person Throughput

Location
Current AADT Volume
Existing Transit Routes on the Project
For New Roadways only, list transit routes that will likely be diverted to the new proposed roadway (if applicable).
Upload Transit Connections Map 1702586955080_Transit Connections.pdf
Please upload attachment in PDF form
W 98th St (CSAH 1) at Dupont Ave S
26809
18, 460, 465, 467, 534, 539, 546, METRO Orange Line, Other

Response: Current Daily Person Throughput
Average Annual Daily Transit Ridership 0
Current Daily Person Throughput
34852.0

## Measure B: 2040 Forecast ADT

Use Metropolitan Council model to determine forecast (2040) ADT volume
If checked, METC Staff will provide Forecast (2040) ADT volume
OR
Identify the approved county or city travel demand model to determine forecast (2040) ADT volume
Forecast (2040) ADT volume
City of Bloomington Forward 2040 Comprehensive Plan 33000

## Measure A: Engagement

ii. Describe howBlack, Indigenous, and People of Color populations, low-income populations, persons with disabilities, youth, older adults, and residents in affordable housing were engaged, whether through community planning efforts, project needs identification, or during the project development process.
iii. Describe the progression of engagement activities in this project. A full response should answer these questions:

1. What engagement methods and tools were used?
2. How did you engage specific communities and populations likely to be directly impacted by the project?
3. What techniques did you use to reach populations traditionally not involved in community engagement related to transportation projects?
4. How were the project?s purpose and need identified?
5. How was the community engaged as the project was developed and designed?
6. How did you provide multiple opportunities for of Black, Indigenous, and People of Color populations, low-income populations, persons with disabilities, youth, older adults, and residents in affordable housing to engage at different points of project development?
7. How did engagement influence the project plans or recommendations? How did you share back findings with community and re-engage to assess responsiveness of these changes?
8. If applicable, how will NEPA or Title VI regulations will guide engagement activities?

## Response:

According to the EPA's EJScreen Tool, there are approx. 3,530 residents within a $1 / 2$ mile of the project area. Incomes are significantly lower for residents within $1 / 2$ mile of the project area than the region: falling $29 \%$ below the 7 -county metro income per capita. Communities within the project area are very diverse featuring multiple vulnerable groups. $41 \%$ of residents are people of color, compared to $26 \%$ metro wide. A considerable population (18\%) is disabled, compared to $10 \%$ across the Metro area. The area is linguistically diverse with $18 \%$ of residents speaking a language other than English at home, predominantly Spanish and Vietnamese.

The project team worked to capture a representative sample of the diverse community through engagement. Engagement began in fall 22 with pop-up events intended to reach people while they were near the corridor. Pop-up events were held at the Farmers Market and South Bloomington Transit Station. These locations were chosen for proximity to the corridor and easy access for pedestrians and transit users. Nearly 100 conversations were had with residents and identified the public's needs. Common input included: Difficulties crossing W 98th Street on foot; Desire for more direct access to transit station; W 98th St-just very busy; Desire for more lighting.

Engagement continued throughout Sept and Oct 22. Three focused conversation events were held with the goal of reaching typically underserved communities. Events were held at the Creekside Community Center, Kennedy High School, and Summerhouse Independent Living. These meetings engaged about 100 residents, mainly seniors and highschoolers. Students voiced difficulty crossing streets in the time provided and seniors expressed concerns over mobility issues caused by poor sidewalk conditions.

Online engagement included surveys and interactive maps to solicit comments. QR code stickers placed near bus stops to connect with residents that often aren't notified of meetings but affected by the project. The survey received 193 submissions. The purpose of the first open house in Dec 22 was to understand needs and share improvement options. The second open house shared a recommended concept. The first open house was online and open for a month. Respondents expressed the desire to use transportation alternatives more often. The 90 contributors were asked to rate how well they like the improvement options. The second open house in May 23 was similarly held online for a month. 75 people engaged in this process and were supportive of the recommended concept.

The project was influenced by engagement by emphasizing pedestrian safety specifically in reducing crossing distances at all intersection legs and upgrading narrow sidewalks to 10 ft trail on both sides of W 98th St. relate to:
? pedestrian and bicycle safety improvements;
? public health benefits;
? direct access improvements for residents or improved access to destinations such as jobs, school, health care, or other;
? travel time improvements;
? gap closures,
? newtransportation services or modal options;
? leveraging of other beneficial projects and investments;
? and/or community connection and cohesion improvements.
This is not an exhaustive list. A full response will support the benefits claimed, identify benefits specific to Disadvantaged communities residing or engaged in activities near the project area, identify benefits addressing a transportation issue affecting Disadvantaged communities specifically identified through engagement, and substantiate benefits with data.

Acknowledge and describe any negative project impacts to Black, Indigenous, and People of Color populations, low-income populations, children, people with disabilities, youth, and older adults. Describe measures to mitigate these impacts. Unidentified or unmitigated negative impacts may result in a reduction in points.

Belowis a list of potential negative impacts. This is not an exhaustive list.
? Decreased pedestrian access through sidewalk removal / narrowing, placement of barriers along the walking path, increase in auto-oriented curb cuts, etc.
? Increased speed and/or ?cut-through? traffic.
? Removed or diminished safe bicycle access.
? Inclusion of some other barrier to access to jobs and other destinations.

Response:
The proposed project includes a package of improvements that are intended to better meet the transportation needs of disadvantaged groups including transit advantages, 10 ft trails on both sides of W 98 th St , and decreased pedestrian crossing distances on all intersection legs.

Community engagement was used to identify the unique transportation issues that disadvantaged populations near the project area experience. Engagement efforts included events focused on engaging specific disadvantaged populations, including youth at a nearby high school and residents at a senior center. Disabled and Senior populations ( $18 \%$ of nearby residents) are a particularly important group to consider in the project area. In engagement these groups identified short crossing times at signals and poor sidewalk conditions as barriers to mobility and access. These issues will be solved with adjusted signal patterns, sidewalk reconstructions, and lane changes that shorten crossing distances at Dupont Ave S and E Bloomington Fwy.

Project public engagement efforts were held at the transit station to identify specific issues for these users. Transit users identified the following transportation issues when navigating the project area: Buses frequently stack up and get delayed; More direct access to Lyndale from the transit station; Crosswalk lights force long delays that require extra planning and crossing can be difficult in the time allotted. The project will prioritize mobility for transit users through this corridor with bus bypass shoulder, signal timing adjustments, and improved pedestrian crossings and refuge islands.

With Kennedy high school $1 / 2$ mile east of the project, transportation issues faced by the youth are relevant. In engagement, highschoolers identified 'blind spots' as an issue along the corridor. They wanted to see additional pedestrian countermeasures to increase pedestrian visibility. Pedestrian visibility countermeasures have been integrated into the project and are expanded on in the Safety Section.

This project is centered around providing benefits to underrepresented communities especially in the area of increased safety for all users and improved level of service for multimodal transportation system vulnerable users. It is important to recognize, however, that per traffic analysis, this project is likely to increase vehicle delay and emissions within the project area due to prioritizing multimodal users over vehicle capacity including reduction of a westbound thru lane. However, the goals of the project especially related to vulnerable populations are being met through an increased level of service specifically for transit riders and pedestrians in a significant effort to improve navigating an interchange area centered around vehicle mobility.

## Measure C: Affordable Housing Access

Describe any affordable housing developments?existing, under construction, or planned?within $1 / 2$ mile of the proposed project. The applicant should note the number of existing subsidized units, which will be provided on the Socio-Economic Conditions map. Applicants can also describe other types of affordable housing (e.g., naturally-occurring affordable housing, manufactured housing) and under construction or planned affordable housing that is within a half mile of the project. If applicable, the applicant can provide self-generated PDF maps to support these additions. Applicants are encouraged to provide a self-generated PDF map describing how a project connects affordable housing residents to destinations (e.g., childcare, grocery stores, schools, places of worship).

Describe the project?s benefits to current and future affordable housing residents within $1 ⁄ 2$ mile of the project. Benefits must relate to affordable housing residents. Examples may include:
? specific direct access improvements for residents
? improved access to destinations such as jobs, school, health care or other;
? newtransportation services or modal options;
? and/or community connection and cohesion improvements.
This is not an exhaustive list. Since residents of affordable housing are more likely not to own a private vehicle, higher points will be provided to roadway projects that include other multimodal access improvements. A full response will support the benefits claimed, identify benefits specific to residents of affordable housing, identify benefits addressing a transportation issue affecting residents of affordable housing specifically identified through engagement, and substantiate benefits with data.

Response:

There are 1,251 subsidized rental housing units within a $1 / 2$ mile of the project area, per city data. See the attached affordable housing map for locations of all units. These are the most significant affordable housing developments with $1 / 2$ a mile of the project:

- The Bloomington Glen Townhomes are located south of the project area on Lyndale Ave S. This development is supported by Minnesota Housing's Low and Moderate Income Rental (LMIR) program. It has 50 units at or below 30\% AMI.
- The National Handicap Housing Initiative operates Bloomington Supportive Housing north of the project area on Garfield Ave S. This development provides 21 units below $30 \%$ AMI with a focus on meeting the unique needs of disabled residents.
- The Meadows of Oxboro are state subsidized Section 202 housing located north of the project area on Garfield. It provides 49 units below 50\% AMI.
- Bloomington Barrier Free Housing is additional Section 202 housing on Lyndale Ave S. It contains an additional 24 units below 30\% AMI.

Presbyterian Homes \& Services operates SummerHouse adjacent to the project area, which is a senior living community with 88 total 1 and 2 bedroom units. Hennepin County is currently leasing a 160 -room hotel that is located within $1 / 2$ mile of the project and using it to shelter unhoused individuals and families.

The project will provide a multimodal corridor that better reflects the needs of these residents. Project improvements will provide nearby residents with greater mobility through the corridor with alternate modes of transportation. By providing enhanced pedestrian access to the South Bloomington Transit Station, the project will provide safer last-mile connections for station users. Project improvements will provide transit users with safe connections to grocery stores, retail stores, services within a short walk from the South Bloomington Transit Station. The project will provide greater multimodal access to a manufacturing center just northwest of the project area.

The project includes the following elements for multimodal safety and access:

- Implementation of 10 ft trails on both sides of W 98th St
- Reconstruct pedestrian ramps as feasible to meet ADA compliance
- Adjust signal phasing to improve multimodal safety
- Reduced pedestrian crossing distance at all intersection legs
- Add Bus Bypass Shoulder on l-35W southbound ramp

Featuring nine transit routes, the project area is a critical transit hub. The city expects that this area will grow into a busy multimodal transit hub in the future. The project will ensure that the needs of vulnerable populations are met, while still allowing W 98th St to serve regional and freight trips. Region-wide transit users will also benefit from travel time reductions resulting from the addition of bus bypass shoulder.

## Measure D: BONUS POINTS

Project is located in an Area of Concentrated Poverty:
Project?s census tracts are above the regional average for population in poverty Yes or population of color (Regional Environmental Justice Area):
Project located in a census tract that is below the regional average for population
in poverty or populations of color (Regional Environmental Justice Area):
Upload the ?Socio-Economic Conditions? map used for this measure.
1702587356282_Socio-Economic Conditions.pdf

| Year of Original Roadway | Segment Length | ulation | $\begin{aligned} & \text { Salculation } \\ & 2 \end{aligned}$ |
| :---: | :---: | :---: | :---: |
| Construction or |  |  |  |
| Most Recent |  |  |  |
| Reconstruction |  |  |  |
| 1958 | 0.2 | 391.6 | 1305.333 |
| 1962 | 0.1 | 196.2 | 654.0 |
|  | 0 | 588 | 1959 |

Total Project Length
Total Project Length (as entered in "Project Information" form) 0.3

## Average Construction Year

| Weighted Year | 1959 |
| :--- | :--- |

## Total Segment Length (Miles)

Total Segment Length

## 0.3

## Measure B: Geometric, Structural, or Infrastructure Improvements

Improved roadway to better accommodate freight movements:
Response:
(Limit 700 characters; approximately 100 words)
Improved clear zones or sight lines:
Response:
(Linit 700 characters; approximately 100 words)
Improved roadway geometrics:
Response:
(Limit 700 characters; approximately 100 words)
Access management enhancements:
Response:

Yes
Smart channels or truck aprons will be implemented where appropriate at intersections where modifications or removals of right turn lanes are being implemented. This will be evaluated for intersections including W 98th St./southbound I-35W ramp/Dupont Ave and at W 98th St./northbound I-35W ramp/E Bloomington Fwy. All intersections and turning movements were reviewed to not hinder accommodating freight through the project area.

## Yes

The project will increase blvd space for bus pullouts, greenery, and pedestrian buffer along the south side of W 98th St . Buffer greenery area will be expanded between the trail and the travel lanes east of the W 98th St./I-35W NB ramp/E Bloomington Fwy intersection along the south side of the project where there is no buffer today east of Aldrich Ave. On the west side of the project, the buffer area will be significantly expanded at and around the 98th St./SB I-35W ramp/Dupont Ave intersection where the free right turn is being removed combined with elimination of a WB thru lane. This will result in an enhanced buffer area of 25 ft on the north side of W 98th St. west of this intersection.

## Yes

The project will remove the southbound free right turn and island at the W 98th St./southbound I-35W ramp/Dupont Ave. intersection. The project will reduce the angle of the free right turn from westbound W 98th St. to l-35W southbound ramp and reduce the angle of the free right turn from eastbound W 98th St. to I-35W southbound ramp. The third westbound thru lane will be eliminated. The outside westbound lane at the $\mathrm{l}-35 \mathrm{~W}$ northbound ramp will be restriped as a right turn lane. A curb bumpout will be installed on the northwest corner of the W 98th St./I35 W northbound ramp/E Bloomington Fwy intersection to enforce this change and better funnel thru traffic out of the now-turn-lane.

Yes
Existing access management through the corridor will be carried forward and enhanced. The corridor is median divided between the two signalized intersections and approx. 300 ft on either side of the intersections. No new access is proposed. The main improvement is definition of the left turn movement from westbound W 98th St. into the Clover Center from the existing $3 / 4$ access. Today this access is confusing because it is a continuation of the left turn lane serving the Lyndale Ave. intersection to the east. The project will add median barrier to separate these two turn lanes. Median width will be expanded throughout the corridor to enhance pedestrian refuge areas and define travel lanes.

The southbound $\mathrm{I}-35 \mathrm{~W}$ entrance ramps, on the north and south side of W 98th St., will be reconstructed with improved vertical and horizontal alignments. Specifically, the angle on the ramp entrance will be reduced and reconfigured.
(Linit 700 characters; approximately 100 words) Improved stormwater mitigation:
Response:
(Linit 700 characters; approximately 100 words)
Signals/lighting upgrades:
Response:
(Limit 700 characters; approximately 100 words)
Other Improvements
Response:

Yes
Storm sewer will be designed to local standards and catch basins designed based on State Aid standards. Much of the corridor, especially at low points and intersections, is equipped with storm sewer and the project will utilize this where applicable. The project may utilize the existing storm sewer and connect Green Stormwater Infrastructure areas to it pending capacity issues. The gutter spread will be considered and catch basin inlets added as needed for a more sustainable solution. The project will integrate streetscaping with water quality/volume control improvements. Narrower pavement widths and wider, vegetated boulevards will translate to stormwater mitigation improvements.

## Yes

New traffic signal poles will be installed at both signalized intersections for a total of 7 new poles and associated infrastructure. The signal phasing and timing will be revised to improve safety for all movements including pedestrians at the 98th St./southbound $1-35 \mathrm{~W}$ ramp/Dupont Ave intersection. All street lighting will be upgraded with the project.

Yes
Reconstruct pedestrian ramps to meet ADA compliance at the 98th St./southbound l-35W ramp/Dupont Ave intersection and the W 98th St./Aldrich Ave. Intersection as feasibility allows. The project includes expanded pedestrian refuge median areas at signalized intersections. A southbound left transit priority bypass/left shoulder along the southbound I-35W exist ramp is proposed.
(Limit 700 characters; approximately 100 words)


## Vehicle Delay Reduced

| Total | Total | Delay |
| :---: | :---: | :---: |
| Peak | Peak | Reduced |
| Hour | Hour | Total |
| Delay | Delay |  |
| Reduced | Reduced |  |

## Measure B: Roadway projects that do not include new roadway segments or railroad grade-separation elements

| Total (CO, | Total (CO, | Total (CO, |
| :---: | :---: | :---: |
| NOX, and | NOX, and <br> NOX, and |  |
| VOC) Peak | VOC) Peak | VOC) Peak |
| Hour | Hour | Hour |
| Emissions | Emissions | Emissions |
| without the | with the | Reduced by <br> Project |
| Project | the Project |  |
| (Kilograms): | (Kilograms): | (Kilograms): |
| 13.36 | 16.04 | -2.68 |
| 13 | 16 | -3 |

## Total

| Total Emissions Reduced: | -2.68 |
| :--- | :--- |
| Upload Synchro Report | 1702610417083 _Synchro Existing and Build_98th St RS - |
|  | Reports_combined.pdf |

Please upload attachment in PDF form (Save Form then click 'Edit' in top right to upload file.)

## Measure B: Roadway projects that are constructing new roadway segments, but do not include railroad gradeseparation elements (for Roadway Expansion applications only):

| Total (CO, | Total (CO, | Total (CO, |
| :---: | :---: | :---: |
| NOX, and | NOX, and | NOX, and |
| VOC) Peak | VOC) Peak | VOC) Peak |
| Hour | Hour | Hour |
| Emissions | Emissions | Emissions |
| without the | with the | Reduced by |
| Project | Project | the Project |
| (Kilograms): | (Kilograms): | (Kilograms): |
| 0 | 0 | 0 |

## Total Parallel Roadway

Emissions Reduced on Parallel Roadways
0
Upload Synchro Report
Please upload attachment in PDF form (Save Form then click 'Edit' in top right to upload file.)

## New Roadway Portion:

Cruise speed in miles per hour with the project: 0
Vehicle miles traveled with the project: 0
Total delay in hours with the project: 0
Total stops in vehicles per hour with the project: 0
Fuel consumption in gallons: 0
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced or Produced on New 0
Roadway (Klograms):
EXPLANATION of methodology and assumptions used:(Limit 1,400
characters; approximately 200 words)
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project 0.0 (Kilograms):

## Measure B: Roadway projects that include railroad grade-separation elements

Cruise speed in miles per hour without the project: 0
Vehicle miles traveled without the project: 0
Total delay in hours without the project: 0
Total stops in vehicles per hour without the project: 0
Cruise speed in miles per hour with the project: 0
Vehicle miles traveled with the project: 0
Total delay in hours with the project: 0
Total stops in vehicles per hour with the project: 0
Fuel consumption in gallons (F1) 0
Fuel consumption in gallons (F2) 0
Fuel consumption in gallons (F3) 0
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project 0 (Klograms):
EXPLANATION of methodology and assumptions used:(Limit 1,400
characters; approximately 200 words)

Measure A: Roadway Projects that do not Include Railroad Grade-Separation Elements

CMF ID 342 - Changed permitted to permitted/protected on minor approach

- Applies to angle crashes of all severity

CMF ID 4124 - Install high visibility crosswalk

- Applies to angle, head on, left turn, rear end, rear to rear, right turn, and sideswipe crashes of all severity

CMF ID 4123 - Install high visibility crosswalk

- Applies to vehicle-pedestrian crashes of all severity

CMF ID 3071 - Presence of right turn lane on arterial with signal coordination

- Applies to rear end crashes of all severity
(Limit 700 Characters; approximately 100 words)
Rationale for Crash Modification Selected CMF ID 3071 - This CMF was selected as a westbound right turn lane is
recommended at the intersection of $W$ 98th St and the NB I-35W Ramps.
CMF was applied to the rear end crash along the westbound approach. CMF ID 3071 - This CMF was selected as a westbound right turn lane is
recommended at the intersection of W 98th St and the NB I-35W Ramps. This
CMF was applied to the rear end crash along the westbound approach. CMF ID 3071 - This CMF was selected as a westbound right turn lane is
recommended at the intersection of W 98th St and the NB I-35W Ramp
CMF was applied to the rear end crash along the westbound approach.
CMF ID 4123 - This CMF was selected as there was a pedestrian crash at the intersection of W 98th St and the SB I-35W Ramps/Dupont Ave and high visibility crosswalks are recommended at this intersection. recommended at the intersections of W 98th St at the SB I-35W Ramps/Dupont Ave and the NB I-35W Ramps. It was applied to the crash types listed previously at the two signalized intersections.
CMF ID 342 - This CMF was selected as the signal phasing is recommended to be changed from permitted to protected/permitted for the northbound/southbound approaches at W 98th St and the SB I-35W Ramps/Dupont Ave intersection. This CMF was applied all angle crashes at the intersection.
CMF ID 8499 - This CMF was selected as it applies to locations that reduce the radius for a right turn lane. The southbound right turn at the intersection of W 98th St at the SB I-35W Ramps/Dupont Ave is proposed to have the free right removed and radius reduced. This CMF was applied to vehicle crashes that involved southbound right turning vehicles.

CMF ID 4124 - This CMF was selected as high visibility crosswalks are and1
Total Crashes: ..... 30
Total Fatal (K) Crashes Reduced by Project: ..... 0
Total Serious Injury (A) Crashes Reduced by Project: ..... 1
Total Non-Motorized Fatal and Serious Injury Crashes Reduced by Project: ..... 1
Total Crashes Reduced by Project: ..... 9
Worksheet Attachment 1702610813720_Bloomington W98th St Safety-CostBenefitWorksheet-Crashes- CMFs_combined.pdf
Please upload attachment in PDF form
Roadway projects that include railroad grade-separation elements:
Current AADT volume: ..... 0
Average daily trains: ..... 0
Crash Risk Exposure eliminated: ..... 0

## Measure B: Pedestrian Safety

Determine if these measures do not apply to your project. Does the project match either of the following descriptions?
If either of the items are checked yes, then score for entire pedestrian safety measure is zero. Applicant does not need to respond to the sub-measures and can proceed to the next section.

Project is primarily a freeway (or transitioning to a freeway) and does not provide No safe and comfortable pedestrian facilities and crossings.
Existing location lacks any pedestrian facilities (e.g., sidewalks, marked
crossings, wide shoulders in rural contexts) and project does not add pedestrian
elements (e.g., reconstruction of a roadway without sidewalks, that doesn?t also No
add pedestrian crossings and sidewalk or sidepath on one or both sides).
SUB-M EASURE 1: Project-Based Pedestrian Safety Enhancements and Risk Elements
To receive maximum points in this category, pedestrian safety countermeasures selected for implementation in projects should be, to the greatest extent feasible, consistent with the countermeasure recommendations in the Regional Pedestrian Safety Action Plan and state and national best practices. Links to resources are provided on the Regional Solicitation Resources web page.

Please answer the following two questions with as much detail as possible based on the known attributes of the proposed design. If any aspect referenced in this section is not yet determined, describe the range of options being considered, to the greatest extent available. If there are project elements that may increase pedestrian risk, describe howthese risks are being mitigated.

1. Describe how this project will address the safety needs of people crossing the street at signalized intersections, unsignalized intersections, midblock locations, and roundabouts.
Treatments and countermeasures should be well-matched to the roadway?s context (e.g., appropriate for the speed, volume, crossing distance, and other location attributes). Refer to the Regional Solicitation Resources web page for guidance links.

The project area has high pedestrian usage due to the regional transit center proximity, adjacent retail and medical facility uses, and multifamily housing adjacent and nearby the project area, which regularly serves pedestrians even with existing conditions that are not conducive to pedestrian safety. This is highlighted by the 1,251 units of affordable housing within a half mile of project and combined with Hennepin County leasing of a 160-room hotel that is located within $1 / 2$ mile of the project that is being used to shelter unhoused individuals and families. These adjacent and nearby uses add to the pedestrian activity in the project area and the need for increased pedestrian safety. The purpose of this project is to reimagine the project area for the safety of all users. Ten foot trails will be constructed on both sides of W 98th Street, replacing narrow sidewalks and connecting to existing pedestrian infrastructure on both ends of the project. The project will upgrade elements to ADA compliance as feasible and expand accessibility for disabled users specifically along W 98th St, the I-35W southbound ramp, Dupont Ave, and Aldrich Ave intersections, which all have curbs and ramps identified as insufficient.

The most significant change will be reclaiming existing pavement area for pedestrian infrastructure and landscaping by reducing westbound travel lanes from 3 to 2 . This will reduce the pedestrian crossing distance at all intersections. Most notably, at the signalized intersection of W 98th St./Dupont Ave., the pedestrian crossing on the west leg across W 98th St. will be reduced from 120 ft . total to 48 ft . to pedestrian median refuge plus 26 ft . for a total of approximately 95 ft . including the refuge area. On the east leg, a pedestrian crossing will be created where pedestrians are not allowed to cross today. This crossing will be approximately 80 ft . including the pedestrian refuge area, where today if attempted it would be approximately 125 ft . In addition, the southbound $\mathrm{I}-35 \mathrm{~W}$ ramp free right onto W 98th St. at Dupont Ave. will be removed, reducing the pedestrian crossing distance from 68 ft . to 49 ft . and creating an environment where vehicles will be expected to stop for pedestrians at this intersection. Pedestrian infrastructure and crossing distances will also be improved at the signalized W 98th St./I-35W northbound ramp/E Bloomington Fwy intersection where a bumpout will be installed on the northwest corner to better funnel through traffic and create a more prominent pedestrian environment. Pedestrian crossings will be retrofitted to be cross the $\mathrm{l}-35 \mathrm{~W}$ ramp lanes at perpendicular angles to improve sight lines for vehicles and pedestrians.

If yes, describe what measures are being used to fill the gap between protected crossing opportunities for pedestrians (e.g., adding High-Intensity Activated Crosswalk beacons to help motorists yield and help pedestrians find a suitable gap for crossing, turning signal into a roundabout to slowmotorist speed, etc.).
Response:
(Limit 1,400 characters; approximately 200 words)
Will your design increase the crossing distance or crossing time across any leg of an intersection? (e.g., by adding turn or through lanes, widening lanes, using a multi-phase crossing, prohibiting crossing on any leg of an intersection, pedestrian bridge requiring length detour, etc.). This does not include any increases to crossing distances solely due to the addition of bike lanes (i.e., no other through or turn lanes being added or widened).

Select one:
No
If yes,
? How many intersections will likely be affected?
Response:
? Describe what measures are being used to reduce exposure and delay for pedestrians (e.g., median crossing islands, curb bulb-outs, etc.)
Response:
(Limit 1,400 characters; approximately 200 words)
? If grade separated pedestrian crossings are being added and increasing crossing time, describe any features that are included that will reduce the detour required of pedestrians and make the separated crossing a more appealing option (e.g., shallowtunnel that doesn?t require much elevation change instead of pedestrian bridge with numerous switchbacks).

## Response:

(Limit 1,400 characters; approximately 200 words)
If mid-block crossings are restricted or blocked, explain why this is necessary and howpedestrian crossing needs and safety are supported in other ways (e.g., nearest protected or enhanced crossing opportunity).
Response:
A pedestrian crossing is not provided mid-block between the two signalized intersections of W 98th St./Dupont Ave./I-35W southbound ramp and W 98th St./E Bloomington Fwy/I-35W northbound ramp due to the majority of this distance being filled by the bridge over $\mathrm{l}-35 \mathrm{~W}$ with no destinations to provide access to for that distance. The total distance between the signals is approx. 700 ft or $1 / 8$ mile with the closest destinations connecting via pedestrian infrastructure from the traffic signals and not between the signals.
(Limit 1,400 characters; approximately 200 words)
2. Describe how motorist speed will be managed in the project design, both for through traffic and turning movements. Describe any project-related factors that may affect speed directly or indirectly, even if speed is not the intended outcome (e.g., wider lanes and turning radii to facilitate freight movements, adding turn lanes to alleviate peak hour congestion, etc.). Note any strategies or treatments being considered that are intended to help motorists drive slower (e.g., visual narrowing, narrowlanes, truck aprons to mitigate wide turning radii, etc.) or protect pedestrians if increasing motorist speed (e.g., buffers or other separation from moving vehicles, crossing treatments appropriate for higher speed roadways, etc.).

Response: Speed will be managed by multiple, purposeful changes to the corridor. Reducing westbound travel lanes from three to two lanes will reduce the amount of wideopen pavement experienced by motorists. The southbound $\mathrm{l}-35 \mathrm{~W}$ ramp free right onto W 98th St. at Dupont Ave. will be removed, creating a new expectation and experience at the intersection with where vehicles will stop on when the signal is a red light. At the signalized W 98th St./I-35W northbound ramp/E Bloomington Fwy intersection a bumpout will be installed on the northwest corner to better funnel through traffic and create more defined travel lane to encourage slower speeds. Both signalized intersections will include reconstructed and enhanced pedestrian refuges, which will enhance visual lane narrowing through the corridor. Truck aprons on $1-35 \mathrm{~W}$ ramps are preliminarily shown to accommodate freight vehicle turning movements on and off of the interstate system; however, the project specifically reduces the angle of the right turning movement from eastbound W 98th St. to the southbound l-35W ramp, which will slow speeds.
(Limit 2,800 characters; approximately 400 words)
If known, what are the existing and proposed design, operation, and posted speeds? Is this an increase or decrease from existing conditions?
Response: The existing posted speed limit is 35 mph. This is not expected to change with the project.
(Limit 1,400 characters; approximately 200 words)
SUB-M EASURE 2: Existing Location-Based Pedestrian Safety Risk Factors
These factors are based on based on trends and patterns observed in pedestrian crash analysis done for the Regional Pedestrian Safety Action Plan. Check off howmany of the following factors are present. Applicants receive more points if more risk factors are present.

Existing road configuration is a One-way, 3+ through lanes
or
Existing road configuration is a Two-way, 4+ through lanes Yes
Existing road has a design speed, posted speed limit, or speed study/data Yes
showing 85th percentile travel speeds in excess of 30 MPH or more showing 85th percentile travel speeds in excess of 30 MPH or more
Existing road has AADT of greater than 15,000 vehicles per day Yes
List the AADT
26809

## SUB-M EASURE 3: Existing Location-Based Pedestrian Safety Exposure Factors

These factors are based on based on trends and patterns observed in pedestrian crash analysis done for the Regional Pedestrian Safety Action Plan. Check off how many of the following existing location exposure factors are present. Applicants receive more points if more risk factors are present.

Existing road has transit running on or across it with $1+$ transit stops in the project area (lf flag-stop route with no fixed stops, then $1+$ locations in the project area where roadside stops are allowed. Do not count portions of transit routes Yes with no stops, such as non-stop freeway sections of express or limited-stop routes.)
Existing road has high-frequency transit running on or across it and 1+ high-
frequency stops in the project area (high-frequency defined as service at least Yes every 15 minutes from 6am to 7pm weekdays and 9am to 6pm Saturdays.)
Existing road is within 500? of $1+$ shopping, dining, or entertainment destinations Yes (e.g., grocery store, restaurant)

If checked, please describe:
(Limit 1,400 characters; approximately 200 words)
Existing road is within 500 ? of other known pedestrian generators (e.g., school, civic/community center, senior housing, multifamily housing, regulatorily- Yes designated affordable housing)
If checked, please describe:
M Health Fairview is within 500 ft of the project area and includes Urgent Care services. Senior housing apartment building called SummerHouse of Bloomington operated by Presbyterian Homes is adjacent to the project area. Hennepin County is currently leasing a 160 -room hotel that is located within $1 / 2$ mile of the project and using it to shelter unhoused individuals and families.

## Measure A: Multimodal Elements and Existing Connections

Response:

The city has a long-term vision to redevelop the W 98th St area into a transit oriented multimodal corridor that provides safe multimodal connections. The proposed project will prioritize multimodal mobility and safety throughout the corridor and improve on the existing conditions for multimodal users.

10 ft trails will be constructed on both sides of W 98th St, replacing narrow sidewalks and connecting to existing pedestrian infrastructure on both ends of the project. The most significant change will be reclaiming existing pavement area for pedestrian infrastructure by reducing WB travel lanes from 3 to 2 . This will reduce the pedestrian crossing distance at all intersections.

The entire project area is within the RBTN Tier 2 Corridor, and the project meets the intent of the Tier 1 RBTN Corridor just south of the project area. l-35W acts as a barrier and limits bicycle access to Lyndale Ave. The I-35W and W 98th St Interchange is a tier I Regional Bicycle Barrier. The proposed project will mitigate this barrier by shortening crossing distances, adjusting signal patterns, and widening bvld. spaces and trails.

Project improvements will prioritize transit mobility. Nine different routes rely on the project area. Local bus Routes 18 and 534 utilize Lyndale Ave and directly access the South Bloomington Transit Station. Bus Routes 546 and 539 navigate the project corridor along W 98th Street connecting to Normandale Community College. Express Route 465 connects the project area to Burnsville, downtown Minneapolis, and the $U$ of MN campus. The project area serves as regional transfer point for METRO Transit's Orange Line BRT, that provides express BRT service between Burnsville and Downtown Minneapolis.

The project will improve access to and reliability of bus transit routes to one of the most critical transit locations in the south metro. The proposed project will add a SB left bus bypass shoulder along the l-35W SB ramp terminal/Dupont Ave. intersection. These improvements will be specifically beneficial to the Orange Line and Express Route 465 that heavily use this ramp. The efficiency of these routes will be further improved with the implementation of a bus only phase at the Dupont Ave and W 98th St signal. This signalization change will allow buses to turn left while all other traffic is stopped, prioritizing transit mobility in the corridor.

The city of Bloomington ADA transition plan was updated in 2022, and identified locations within the project area where infrastructure is not in compliance with ADA guidelines. W 98th St, the l-35W south ramp, Dupont Ave, and Aldrich Ave intersections all have curbs and ramps identified as insufficient. The project will upgrade these elements to ADA compliance as the existing bridge structure permits.

## Transit Projects Not Requiring Construction

If the applicant is completing a transit application that is operations only, check the box and do not complete the remainder of the form. These projects will receive full points for the Risk Assessment.

Park-and-Ride and other transit construction projects require completion of the Risk Assessment below.
Check Here if Your Transit Project Does Not Require Construction

## Measure A: Risk Assessment - Construction Projects

## 1. Public Involvement ( 20 Percent of Points)

Projects that have been through a public process with residents and other interested public entities are more likely than others to be successful. The project applicant must indicate that events and/or targeted outreach (e.g., surveys and other web-based input) were held to help identify the transportation problem, howthe potential solution was selected instead of other options, and the public involvement completed to date on the project. The focus of this section is on the opportunity for public input as opposed to the quality of input. NOTE: A witten response is required and failure to respond will result in zero points.

Multiple types of targeted outreach efforts (such as meetings or online/mail outreach) specific to this project with the general public and partner agencies have been used to help identify the project need.

100\%
At least one meeting specific to this project with the general public has been used to help identify the project need.
50\%
At least online/mail outreach effort specific to this project with the general public has been used to help identify the project need.
50\%
No meeting or outreach specific to this project was conducted, but the project was identified through meetings and/or outreach related to a larger planning effort.

25\%
No outreach has led to the selection of this project.
0\%
Describe the type(s) of outreach selected for this project (i.e., online or in-person meetings, surveys, demonstration projects), the method(s) used to announce outreach opportunities, and how many people participated. Include any public website links to outreach opportunities.

## Response:

Public engagement efforts focused on engaging hard-to-reach groups that do not usually take part in the planning process. This process took place from August 2022 to May 2023. It included pop-up information tables, focus group conversations, online surveys, and two virtual open houses. This process identified transportation issues residents face and was successful at engaging hundreds of citizens.

Locations for engagement events were chosen with equitable participation in mind. The team selected locations that were close to transit stops and easily accessible for pedestrians and bicyclists. A project website that facilitated the online elements of this process: https://letstalk.bloomingtonmn.gov/west98th.

The first steps in the engagement process involved pop-up information tables. The goal of these sessions was to identify transportation issues as people interacted with the corridor. The first took place just west of the project corridor at the Bloomington Civic Center during the "Midweek Music and Market", a community event (8/21/22). The project team had conversations with $30+$ people and shared info with many more. A second information table was set up at the South Bloomington Transit Station on (9/27/22). This event focused on soliciting feedback from transit users. The team spoke with 50-60 people and shared information with many more.

The engagement effort included three focus group conversations. The first such conversation was held at Creekside Community Center on $9 / 15 / 22$. This venue is a common gather place for seniors. This conversation involved about 45 people. The second (10/5/22) was held at the Kennedy High School, with the student "Voices of Unity Club" (https://www.bloomington.k12.mn.us/news/kennedys-student-voices-unity-club-partners-city-bloomington). This event involved about 25 students of all grade levels. The final conversation event was held at Summerhouse Independent Living on 10/6/22. This is another space popular for senior events. About 35 attendees were engaged at this event.

The remainder of the engagement was held online and were open over time. These engagement events were advertised through social media and mailings. Pre-open house activities included an online survey and interactive map where residents could provide input on project improvements. The online survey was successful in receiving 193 responses.

The first open house was open 12/09/22-1/6/23. This event saw 90 direct participants and another 750 visitors to the webpage. This event focused on identifying issues. The second open house was held online from 5/9/23 to 6/6/23. 75 people were involved and another 200 visited the webpage. The objective of this open house was to share the recommended alternative with the public, which was well received.

## (Limit 2,800 characters; approximately 400 words)

## 2. Layout ( $\mathbf{2 5}$ Percent of Points)

Layout includes proposed geometrics and existing and proposed right-of-way boundaries. A basic layout should include a base map (north arrow, scale; legend;* city and/or county limits; existing ROW, labeled; existing signals;* and bridge numbers*) and design data (proposed alignments; bike and/or roadway lane widths; shoulder width;* proposed signals;* and proposed ROW). An aerial photograph with a line showing the project?s termini does not suffice and will be awarded zero points. */f applicable
Layout approved by the applicant and all impacted jurisdictions (i.e.,
cities/counties/MnDOT. If a MnDOT trunk highway is impacted, approval by MnDOT must have occurred to receive full points. A PDF of the layout must be attached along with letters from each jurisdiction to receive points.

## 100\%

A layout does not apply (signal replacement/signal timing, stand-alone
streetscaping, minor intersection improvements). Applicants that are not certain whether a layout is required should contact Colleen Brown at MnDOT Metro State Aid? colleen.brown@state.mn.us.
100\%

For projects where MnDOT trunk highways are impacted and a MnDOT Staff Approved layout is required. Layout approved by the applicant and all impacted local jurisdictions (i.e., cities/counties), and layout review and approval by MnDOT is pending. A PDF of the layout must be attached along with letters from each jurisdiction to receive points.

75\%
Layout completed but not approved by all jurisdictions. A PDF of the layout must be attached to receive points.

50\%
Layout has been started but is not complete. A PDF of the layout must be attached to receive points.
25\%
Layout has not been started
0\%
Attach Layout
Please upload attachrent in PDF form
Additional Attachments
Please upload attachment in PDF form
3. Review of Section 106 Historic Resources (15 Percent of Points)

No known historic properties eligible for or listed in the National Register of Historic Places are located in the project area, and project is not located on an identified historic bridge
100\%
There are historical/archeological properties present but determination of ?no historic properties affected? is anticipated.

100\%
Historic/archeological property impacted; determination of ?no adverse effect? anticipated

80\%
Historic/archeological property impacted; determination of ?adverse effect? anticipated

40\%
Unsure if there are any historic/archaeological properties in the project area.
0\%
Project is located on an identified historic bridge
4. Right-of-Way ( 25 Percent of Points)

Right-of-way, permanent or temporary easements, and MnDOT agreement/limited-use permit either not required or all have been acquired 100\%

Right-of-way, permanent or temporary easements, and/or MnDOT agreement/limited-use permit required - plat, legal descriptions, or official map complete
50\%
Right-of-way, permanent or temporary easements, and/or MnDOT agreement/limited-use permit required - parcels identified 25\%

Right-of-way, permanent or temporary easements, and/or MnDOT agreement/limited-use permit required - parcels not all identified $0 \%$
5. Railroad Involvement (15 Percent of Points)

No railroad involvement on project or railroad Right-of-Way agreement is executed (include signature page, if applicable)
100\%
Signature Page
Please upload attachrent in PDF form
Railroad Right-of-Way Agreement required; negotiations have begun
50\%
Railroad Right-of-Way Agreement required; negotiations have not begun.
0\%

## Measure A: Cost Effectiveness

Total Project Cost (entered in Project Cost Form):
Enter Amount of the Noise Walls:
Total Project Cost subtract the amount of the noise walls:
Enter amount of any outside, competitive funding:

## Other Attachments

| File Name | Description | File Size |
| :--- | :--- | :--- |
| Bloomington W98th St One Page Summary.pdf | One Page Description | 387 KB |
| Bloomington W98th St_Affordable Housing Map-attachments.pdf | Affordable Housing Map and Attachments | 4.0 MB |
| Bloomington W98th St_cd0172_Mid Term Reg Sol Layout.pdf | Layout | 8.1 MB |
| Existing Conditions Photos.pdf | Existing Conditions Photos | 9.4 MB |
| Hennepin County - LOS - Bloomington - CSAH 001 I-35W.pdf | Hennepin County Letter of Support | 95 KB |
| Item_3.8_-_Resol._2023-216_-_2024_98thSTModernization.docx.pdf | Resolution | 292 KB |
| Level of Congestion.pdf | Level of Congestion Map | 4.7 MB |
| METRO_Transit_Bloomington 98th St Project_letter of support.pdf | Metro Transit Letter of Support | 571 KB |
| MnDOT_2024 Regional Solicitation_BI_35W98th.pdf | MnDOT Letter of Support | 210 KB |




## Socio-Economic Conditions

Roadway Reconstruction/Modernization Project: 98th St W at I-35W | Map ID: 1701299110129

Results

Total of publicly subsidized rental housing units in census
tracts within $1 / 2$ mile: 760
Project located in census tract(s) that are ABOVE the regional average for population in poverty or population of color.



Area of Concentrated Poverty
$0 \quad 0.15$
For complete disclaimer of accuracy, please visit For complete disclaimer of accuracy, please visit
http://giswebsite.metc.state.mn.us/gissite/notice.aspx

| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Configurations |  | 个个中 | 「 | ${ }^{7}$ | 个种 |  | ${ }^{7}$ |  | F | \％ | $\uparrow$ | F |
| Traffic Volume（vph） | 0 | 1639 | 84 | 140 | 937 | 0 | 51 | 0 | 208 | 238 | 116 | 383 |
| Future Volume（vph） | 0 | 1639 | 84 | 140 | 937 | 0 | 51 | 0 | 208 | 238 | 116 | 383 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 0 |  | 270 | 170 |  | 0 | 0 |  | 0 | 270 |  | 310 |
| Storage Lanes | 0 |  | 1 | 1 |  | 0 | 1 |  | 1 | 1 |  | 1 |
| Taper Length（ t ） | 25 |  |  | 50 |  |  | 25 |  |  | 180 |  |  |
| Lane Util．Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  |  |  |  |  | 0.850 |  |  | 0.850 |
| Flt Protected |  |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（prot） | 0 | 5085 | 1583 | 1770 | 5085 | 0 | 1770 | 0 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted |  |  |  | 0.950 |  |  | 0.582 |  |  | 0.950 |  |  |
| Satd．Flow（perm） | 0 | 5085 | 1583 | 1770 | 5085 | 0 | 1084 | 0 | 1583 | 1770 | 1863 | 1583 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  | 127 |  |  |  |  |  | 293 |  |  | 395 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 555 |  |  | 375 |  |  | 626 |  |  | 1097 |  |
| Travel Time（s） |  | 10.8 |  |  | 7.3 |  |  | 14.2 |  |  | 24.9 |  |
| Peak Hour Factor | 1.00 | 0.96 | 0.66 | 0.73 | 0.89 | 1.00 | 0.75 | 1.00 | 0.71 | 0.86 | 0.72 | 0.97 |
| Heavy Vehicles（\％） | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ |
| Adj．Flow（vph） | 0 | 1707 | 127 | 192 | 1053 | 0 | 68 | 0 | 293 | 277 | 161 | 395 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 0 | 1707 | 127 | 192 | 1053 | 0 | 68 | 0 | 293 | 277 | 161 | 395 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（t） |  | 18 |  |  | 18 |  |  | 18 |  |  | 12 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 16 |  | 12 | 16 |  | 12 | 16 |  | 12 | 16 |  | 18 |
| Number of Detectors |  | 2 | 1 | 1 | 2 |  | 1 |  | 1 | 1 | 1 | 1 |

Detector Template

| Leading Detector（ft） | 186 | 11 | 35 | 171 | 35 | 35 | 50 | 50 | 0 |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Trailing Detector $(\mathrm{ft})$ | 180 | 5 | 0 | 165 | 0 | 0 | 5 | 5 | 0 |
| Detector 1 Position（ft） | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 5 | 0 |
| Detector 1 Size（ft） | 20 | 6 | 35 | 20 | 35 | 35 | 45 | 45 | 0 |
| Detector 1 Type | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |

Detector 1 Channel

| Detector 1 Extend（s） | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Detector 1 Queue（s） | 15.0 | 0.0 | 0.0 | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay（s） | 0.0 | 25.5 | 0.0 | 0.0 | 0.0 | 8.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position（ft） | 180 |  |  | 165 |  |  |  |  |  |
| Detector 2 Size（ft） | 6 |  |  | 6 |  |  |  |  |  |
| Detector 2 Type | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |  |  |
| Detector 2 Channel |  |  |  |  |  |  |  |  |  |
| Detector 2 Extend（s） | 0.0 |  |  | 0.0 |  |  |  |  |  |
| Turn Type | NA | Perm | Prot | NA | Perm | Perm | Perm | NA | Free |
| Protected Phases | 6 |  | 5 | 2 |  |  |  | 4 |  |


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Permitted Phases |  |  | 6 |  |  |  | 8 |  | 8 | 4 |  | Free |
| Detector Phase |  | 6 | 6 | 5 | 2 |  | 8 |  | 8 | 4 | 4 |  |
| Switch Phase |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum Initial (s) |  | 10.0 | 10.0 | 7.0 | 10.0 |  | 7.0 |  | 7.0 | 7.0 | 7.0 |  |
| Minimum Split (s) |  | 27.0 | 27.0 | 15.0 | 19.1 |  | 15.0 |  | 15.0 | 42.0 | 42.0 |  |
| Total Split (s) |  | 28.0 | 28.0 | 15.0 | 43.0 |  | 42.0 |  | 42.0 | 42.0 | 42.0 |  |
| Total Split (\%) |  | 32.9\% | 32.9\% | 17.6\% | 50.6\% |  | 49.4\% |  | 49.4\% | 49.4\% | 49.4\% |  |
| Maximum Green (s) |  | 22.9 | 22.9 | 10.3 | 37.9 |  | 37.1 |  | 37.1 | 36.6 | 36.6 |  |
| Yellow Time (s) |  | 3.6 | 3.6 | 3.2 | 3.6 |  | 3.2 |  | 3.2 | 3.9 | 3.9 |  |
| All-Red Time (s) |  | 1.5 | 1.5 | 1.5 | 1.5 |  | 1.7 |  | 1.7 | 1.5 | 1.5 |  |
| Lost Time Adjust (s) |  | -1.1 | -1.1 | -0.7 | -1.1 |  | -0.9 |  | -0.9 | -1.4 | -1.4 |  |
| Total Lost Time (s) |  | 4.0 | 4.0 | 4.0 | 4.0 |  | 4.0 |  | 4.0 | 4.0 | 4.0 |  |
| Lead/Lag |  | Lead | Lead | Lag |  |  |  |  |  |  |  |  |
| Lead-Lag Optimize? |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |
| Vehicle Extension (s) |  | 4.0 | 4.0 | 3.0 | 4.0 |  | 3.5 |  | 3.5 | 3.5 | 3.5 |  |
| Recall Mode |  | C-Max | C-Max | None | C-Max |  | None |  | None | None | None |  |
| Walk Time (s) |  | 7.0 | 7.0 |  | 7.0 |  |  |  |  | 7.0 | 7.0 |  |
| Flash Dont Walk (s) |  | 14.0 | 14.0 |  | 7.0 |  |  |  |  | 29.0 | 29.0 |  |
| Pedestrian Calls (\#/hr) |  | 0 | 0 |  | 0 |  |  |  |  | 0 | 0 |  |
| Act Effct Green (s) |  | 41.2 | 41.2 | 11.0 | 56.2 |  | 20.8 |  | 20.8 | 20.8 | 20.8 | 85.0 |
| Actuated g/C Ratio |  | 0.48 | 0.48 | 0.13 | 0.66 |  | 0.24 |  | 0.24 | 0.24 | 0.24 | 1.00 |
| v/c Ratio |  | 0.69 | 0.15 | 0.84 | 0.31 |  | 0.26 |  | 0.48 | 0.64 | 0.35 | 0.25 |
| Control Delay |  | 19.9 | 3.6 | 67.5 | 7.1 |  | 26.4 |  | 5.7 | 35.0 | 27.4 | 0.4 |
| Queue Delay |  | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay |  | 19.9 | 3.6 | 67.5 | 7.1 |  | 26.4 |  | 5.7 | 35.0 | 27.4 | 0.4 |
| LOS |  | B | A | E | A |  | C |  | A | C | C | A |
| Approach Delay |  | 18.8 |  |  | 16.4 |  |  | 9.6 |  |  | 17.1 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | B |  |
| 90th \%ile Green (s) |  | 32.7 | 32.7 | 10.3 | 47.7 |  | 27.3 |  | 27.3 | 26.8 | 26.8 |  |
| 90th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| 70th \%ile Green (s) |  | 37.4 | 37.4 | 10.3 | 52.4 |  | 22.6 |  | 22.6 | 22.1 | 22.1 |  |
| 70th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| 50th \%ile Green (s) |  | 40.3 | 40.3 | 10.3 | 55.3 |  | 19.7 |  | 19.7 | 19.2 | 19.2 |  |
| 50th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| 30th \%ile Green (s) |  | 43.1 | 43.1 | 10.3 | 58.1 |  | 16.9 |  | 16.9 | 16.4 | 16.4 |  |
| 30th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| 10th \%ile Green (s) |  | 47.1 | 47.1 | 10.3 | 62.1 |  | 12.9 |  | 12.9 | 12.4 | 12.4 |  |
| 10th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| Stops (vph) |  | 1225 | 11 | 121 | 377 |  | 38 |  | 23 | 203 | 90 | 0 |
| Fuel Used(gal) |  | 22 | 0 | 3 | 7 |  | 1 |  | 1 | 5 | 2 | 3 |
| CO Emissions (g/hr) |  | 1568 | 34 | 225 | 470 |  | 51 |  | 97 | 339 | 149 | 231 |
| NOx Emissions (g/hr) |  | 305 | 7 | 44 | 91 |  | 10 |  | 19 | 66 | 29 | 45 |
| VOC Emissions (g/hr) |  | 363 | 8 | 52 | 109 |  | 12 |  | 22 | 79 | 35 | 54 |
| Dilemma Vehicles (\#) |  | 96 | 0 | 0 | 55 |  | 0 |  | 0 | 0 | 0 | 0 |
| Queue Length 50th (ft) |  | 246 | 0 | 102 | 76 |  | 29 |  | 0 | 133 | 71 | 0 |
| Queue Length 95th (ft) |  | 358 | 12 | \#150 | 127 |  | 46 |  | 16 | 177 | 85 | 0 |
| Internal Link Dist (ft) |  | 475 |  |  | 295 |  |  | 546 |  |  | 1017 |  |
| Turn Bay Length (ft) |  |  | 270 | 170 |  |  |  |  |  | 270 |  | 310 |
| Base Capacity (vph) |  | 2466 | 833 | 229 | 3363 |  | 484 |  | 869 | 791 | 832 | 1583 |


|  | $\rangle$ | $\rightarrow$ |  | 1 | $\leftrightarrow$ | 4 | , | $\dagger$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Starvation Cap Reductn |  | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn |  | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 | 0 | 0 |
| Storage Cap Reductn |  | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio |  | 0.69 | 0.15 | 0.84 | 0.31 |  | 0.14 |  | 0.34 | 0.35 | 0.19 | 0.25 |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| Area Type: |  |  |  |  |  |  |  |  |  |  |  |  |

Cycle Length: 85
Actuated Cycle Length: 85
Offset: $0(0 \%)$, Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
$\begin{array}{ll}\text { Intersection Signal Delay: } 17.0 & \text { Intersection LOS: B } \\ \text { Intersection Capacity Utilization 67.7\% } & \text { ICU Level of Service C }\end{array}$
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
Splits and Phases: 2: 98th St \& 35W West Ramps


|  | 4 |  |  | 7 |  |  |  | 4 | 7 |  | $\frac{1}{1}$ | 4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 44 |  |  | 性个 |  | ${ }^{7}$ | $\uparrow$ | 「 |  |  |  |
| Traffic Volume（vph） | 459 | 1136 | 0 | 0 | 1130 | 274 | 380 | 78 | 314 | 0 | 0 | 0 |
| Future Volume（vph） | 459 | 1136 | 0 | 0 | 1130 | 274 | 380 | 78 | 314 | 0 | 0 | 0 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 0 |  | 0 | 0 |  | 0 | 375 |  | 150 | 0 |  | 0 |
| Storage Lanes | 0 |  | 0 | 0 |  | 0 | 1 |  | 1 | 0 |  | 0 |
| Taper Length（ft） | 25 |  |  | 25 |  |  | 100 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | 0.91 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  |  |  | 0.973 |  |  |  | 0.850 |  |  |  |
| Flt Protected | 0.950 |  |  |  |  |  | 0.950 | 0.988 |  |  |  |  |
| Satd．Flow（prot） | 1770 | 3539 | 0 | 0 | 4948 | 0 | 1681 | 1748 | 1583 | 0 | 0 | 0 |
| Flt Permitted | 0.950 |  |  |  |  |  | 0.950 | 0.988 |  |  |  |  |
| Satd．Flow（perm） | 1770 | 3539 | 0 | 0 | 4948 | 0 | 1681 | 1748 | 1583 | 0 | 0 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  |  |  | 44 |  |  |  | 85 |  |  |  |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 350 |  |  | 267 |  |  | 992 |  |  | 960 |  |
| Travel Time（s） |  | 6.8 |  |  | 5.2 |  |  | 22.5 |  |  | 21.8 |  |
| Peak Hour Factor | 0.88 | 0.91 | 0.25 | 1.00 | 0.78 | 0.85 | 0.82 | 0.53 | 0.91 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles（\％） | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ |
| Adj．Flow（vph） | 522 | 1248 | 0 | 0 | 1449 | 322 | 463 | 147 | 345 | 0 | 0 | 0 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  | 10\％ |  |  |  |  |  |
| Lane Group Flow（vph） | 522 | 1248 | 0 | 0 | 1771 | 0 | 417 | 193 | 345 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | R NA | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 24 |  |  | 12 |  |  | 12 |  |  | 12 |  |
| Link Offset（ft） |  | 6 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 16 |  | 12 | 16 |  | 15 | 16 |  | 15 | 16 |  | 12 |
| Number of Detectors | 1 | 2 |  |  | 2 |  | 1 | 1 | 1 |  |  |  |
| Detector Template |  |  |  |  |  |  |  |  |  |  |  |  |
| Leading Detector（ft） | 50 | 176 |  |  | 216 |  | 40 | 30 | 0 |  |  |  |
| Trailing Detector（ft） | 0 | 170 |  |  | 210 |  | 5 | 0 | 0 |  |  |  |
| Detector 1 Position（ft） | 0 | 0 |  |  | 0 |  | 5 | 0 | 0 |  |  |  |
| Detector 1 Size（ft） | 50 | 20 |  |  | 20 |  | 35 | 30 | 0 |  |  |  |
| Detector 1 Type | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | $\mathrm{Cl}+\mathrm{Ex}$ |  | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |
| Detector 1 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 1 Extend（s） | 0.0 | 0.0 |  |  | 0.0 |  | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 1 Queue（s） | 0.0 | 15.0 |  |  | 15.0 |  | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 1 Delay（s） | 0.0 | 0.0 |  |  | 0.0 |  | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 2 Position（ft） |  | 170 |  |  | 210 |  |  |  |  |  |  |  |
| Detector 2 Size（ft） |  | 6 |  |  | 6 |  |  |  |  |  |  |  |
| Detector 2 Type |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |  |  |  |  |
| Detector 2 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 2 Extend（s） |  | 0.0 |  |  | 0.0 |  |  |  |  |  |  |  |
| Turn Type | Prot | NA |  |  | NA |  | Perm | NA | Perm |  |  |  |
| Protected Phases | 1 | 6 |  |  | 2 |  |  | 8 |  |  |  |  |


|  | 4 | $\rightarrow$ |  | 1 | $4$ |  | $4$ | $\dagger$ | \% |  | $\dagger$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Permitted Phases |  |  |  |  |  |  | 8 |  | 8 |  |  |  |
| Detector Phase | 1 | 6 |  |  | 2 |  | 8 | 8 | 8 |  |  |  |
| Switch Phase |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum Initial (s) | 7.0 | 10.0 |  |  | 10.0 |  | 7.0 | 7.0 | 7.0 |  |  |  |
| Minimum Split (s) | 15.0 | 19.1 |  |  | 27.0 |  | 38.0 | 38.0 | 38.0 |  |  |  |
| Total Split (s) | 38.0 | 82.0 |  |  | 44.0 |  | 38.0 | 38.0 | 38.0 |  |  |  |
| Total Split (\%) | 31.7\% | 68.3\% |  |  | 36.7\% |  | 31.7\% | 31.7\% | 31.7\% |  |  |  |
| Maximum Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| Yellow Time (s) | 3.2 | 3.6 |  |  | 3.6 |  | 3.9 | 3.9 | 3.9 |  |  |  |
| All-Red Time (s) | 1.5 | 1.5 |  |  | 1.5 |  | 1.5 | 1.5 | 1.5 |  |  |  |
| Lost Time Adjust (s) | -0.7 | -1.1 |  |  | -1.1 |  | -1.4 | -1.4 | 0.0 |  |  |  |
| Total Lost Time (s) | 4.0 | 4.0 |  |  | 4.0 |  | 4.0 | 4.0 | 5.4 |  |  |  |
| Lead/Lag | Lag |  |  |  | Lead |  |  |  |  |  |  |  |
| Lead-Lag Optimize? | Yes |  |  |  | Yes |  |  |  |  |  |  |  |
| Vehicle Extension (s) | 3.0 | 4.0 |  |  | 4.0 |  | 3.5 | 3.5 | 3.5 |  |  |  |
| Recall Mode | None | C-Max |  |  | C-Max |  | None | None | None |  |  |  |
| Walk Time (s) |  | 7.0 |  |  | 7.0 |  | 7.0 | 7.0 | 7.0 |  |  |  |
| Flash Dont Walk (s) |  | 7.0 |  |  | 14.0 |  | 25.0 | 25.0 | 25.0 |  |  |  |
| Pedestrian Calls (\#/hr) |  | 0 |  |  | 0 |  | 0 | 0 | 0 |  |  |  |
| Act Effct Green (s) | 34.0 | 78.9 |  |  | 40.9 |  | 33.1 | 33.1 | 31.7 |  |  |  |
| Actuated g/C Ratio | 0.28 | 0.66 |  |  | 0.34 |  | 0.28 | 0.28 | 0.26 |  |  |  |
| v/c Ratio | 1.04 | 0.54 |  |  | 1.03 |  | 0.90 | 0.40 | 0.72 |  |  |  |
| Control Delay | 93.8 | 12.1 |  |  | 68.6 |  | 65.6 | 38.1 | 39.2 |  |  |  |
| Queue Delay | 0.0 | 0.4 |  |  | 0.0 |  | 0.0 | 0.0 | 0.0 |  |  |  |
| Total Delay | 93.8 | 12.4 |  |  | 68.6 |  | 65.6 | 38.1 | 39.2 |  |  |  |
| LOS | F | B |  |  | E |  | E | D | D |  |  |  |
| Approach Delay |  | 36.4 |  |  | 68.6 |  |  | 50.5 |  |  |  |  |
| Approach LOS |  | D |  |  | E |  |  | D |  |  |  |  |
| 90th \%ile Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| 90th \%ile Term Code | Max | Coord |  |  | Coord |  | Max | Max | Max |  |  |  |
| 70th \%ile Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| 70th \%ile Term Code | Max | Coord |  |  | Coord |  | Max | Max | Max |  |  |  |
| 50th \%ile Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| 50th \%ile Term Code | Max | Coord |  |  | Coord |  | Max | Max | Max |  |  |  |
| 30th \%ile Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| 30th \%ile Term Code | Max | Coord |  |  | Coord |  | Max | Max | Max |  |  |  |
| 10th \%ile Green (s) | 33.3 | 81.6 |  |  | 43.6 |  | 27.9 | 27.9 | 27.9 |  |  |  |
| 10th \%ile Term Code | Max | Coord |  |  | Coord |  | Gap | Gap | Gap |  |  |  |
| Stops (vph) | 395 | 571 |  |  | 1211 |  | 308 | 92 | 218 |  |  |  |
| Fuel Used(gal) | 13 | 10 |  |  | 31 |  | 9 | 2 | 6 |  |  |  |
| CO Emissions (g/hr) | 901 | 696 |  |  | 2196 |  | 623 | 161 | 429 |  |  |  |
| NOx Emissions (g/hr) | 175 | 135 |  |  | 427 |  | 121 | 31 | 83 |  |  |  |
| VOC Emissions (g/hr) | 209 | 161 |  |  | 509 |  | 144 | 37 | 99 |  |  |  |
| Dilemma Vehicles (\#) | 0 | 47 |  |  | 54 |  | 0 | 0 | 0 |  |  |  |
| Queue Length 50th (ft) | $\sim 437$ | 253 |  |  | $\sim 542$ |  | 324 | 127 | 184 |  |  |  |
| Queue Length 95th (ft) | \#629 | 308 |  |  | 464 |  | \#432 | 109 | 295 |  |  |  |
| Internal Link Dist (ft) |  | 270 |  |  | 187 |  |  | 912 |  |  | 880 |  |
| Turn Bay Length (ft) |  |  |  |  |  |  | 375 |  | 150 |  |  |  |
| Base Capacity (vph) | 501 | 2328 |  |  | 1716 |  | 476 | 495 | 491 |  |  |  |

PM Peak W 98th Street 4:30 pm 04/19/2022 Existing Condition - PM


Splits and Phases: $\quad 3: 35 \mathrm{~W}$ East Ramps \& 98th St


|  | $\stackrel{ }{*}$ |  |  |  |  |  |  | $\uparrow$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \％ | 快 |  |  | 恌t |  |  |  | 「 |  |  | F |
| Traffic Volume（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Future Volume（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 90 |  | 0 | 0 |  | 0 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 0 | 0 |  | 0 | 0 |  | 1 | 0 |  | 1 |
| Taper Length（ft） | 75 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.91 | 0.91 | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  | 0.996 |  |  | 0.997 |  |  |  | 0.865 |  |  | 0.865 |
| Flt Protected | 0.950 |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（prot） | 1736 | 4968 | 0 | 0 | 4973 | 0 | 0 | 0 | 1580 | 0 | 0 | 1580 |
| Flt Permitted | 0.950 |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（perm） | 1736 | 4968 | 0 | 0 | 4973 | 0 | 0 | 0 | 1580 | 0 | 0 | 1580 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 267 |  |  | 314 |  |  | 617 |  |  | 373 |  |
| Travel Time（s） |  | 5.2 |  |  | 6.1 |  |  | 14.0 |  |  | 8.5 |  |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj．Flow（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Shared Lane Trafic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 42 | 1408 | 0 | 0 | 1379 | 0 | 0 | 0 | 18 | 0 | 0 | 50 |
| Enter Blocked Intersection | Yes | Yes | No | No | No | No | No | No | No | No | No | Yes |
| Lane Alignment | Left | RNA | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 20 |  |  | 6 |  |  | 0 |  |  | 0 |  |
| Link Offset（ft） |  | 0 |  |  | 6 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 15 |  | 9 | 15 |  | 9 | 15 |  | ， | 15 |  | 9 |
| Sign Control |  | Free |  |  | Free |  |  | Stop |  |  | Stop |  |

## Intersection Summary

```
Area Type: Other
```

Control Type: Unsignalized
Intersection Capacity Utilization 37.3\% ICU Level of Service A
Analysis Period (min) 15

HCM 6th TWSC
4: Aldrich Ave S \& 98th St



|  | $y$ | $\rightarrow$ | 7 | 7 |  | 4 | 4 | $\dagger$ | $>$ | ＊ | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | 快4 | 「 |  | 檪 |  |  |  |  |  |  |  |
| Traffic Volume（vph） | 0 | 1595 | 490 | 0 | 1077 | 433 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume（vph） | 0 | 1595 | 490 | 0 | 1077 | 433 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 10 |  | 0 | 0 |  | 0 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 1 | 0 |  | 0 | 0 |  | 0 | 0 |  | 0 |
| Taper Length（ft） | 50 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  | 0.957 |  |  |  |  |  |  |  |


| Flt Protected |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Satd．Flow（prot） | 0 | 5085 | 1583 | 0 | 4867 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Flt Permitted |  |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（perm） | 0 | 5085 | 1583 | 0 | 4867 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 375 |  |  | 350 |  |  | 749 |  |  | 698 |  |
| Travel Time（s） |  | 7.3 |  |  | 6.8 |  |  | 17.0 |  |  | 15.9 |  |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles（\％） | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ |
| Adj．Flow（vph） | 0 | 1595 | 490 | 0 | 1077 | 433 | 0 | 0 | 0 | 0 | 0 | 0 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 0 | 1595 | 490 | 0 | 1510 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | Yes | No | No | Yes | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 6 |  |  | 6 |  |  | 0 |  |  | 0 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | －15 |  |  | －15 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 16 |  | 30 | 16 |  | 30 | 16 |  | 12 | 16 |  | 12 |
| Sign Control |  | Free |  |  | Free |  |  | Free |  |  | Free |  |

## Intersection Summary

```
Area Type: Other
```

Control Type：Unsignalized
Intersection Capacity Utilization $34.2 \%$ ICU Level of Service A

Analysis Period（min） 15

Network Totals

| Number of Intersections | 4 |
| :--- | ---: |
| Control Delay / Veh (s/v) | 18 |
| Queue Delay / Veh (s/v) | 0 |
| Total Delay / Veh (s/v) | 18 |
| Total Delay (hr) | 71 |
| Stops / Veh | 0.36 |
| Stops ( (\#) | 5062 |
| Average Speed (mph) | 11 |
| Total Travel Time (hr) | 106 |
| Distance Traveled (mi) | 1172 |
| Fuel Consumed (gal) | 134 |
| Fuel Economy (mpg) | 8.7 |
| CO Emissions (kg) | 9.37 |
| NOx Emissions (kg) | 1.82 |
| VOC Emissions (kg) | 2.17 |
| Unserved Vehicles (\#) | 60 |
| Vehicles in dilemma zone (\#) | 252 |
| Performance Index | 85.5 |


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Configurations |  | 4种 | 「 | ${ }^{*}$ | 44 | 「＇ | ${ }^{1}$ |  | 「 | ${ }^{*}$ | 4 | 「 |
| Traffic Volume（vph） | 0 | 1639 | 84 | 140 | 937 | 433 | 51 | 0 | 208 | 238 | 116 | 383 |
| Future Volume（vph） | 0 | 1639 | 84 | 140 | 937 | 433 | 51 | 0 | 208 | 238 | 116 | 383 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 0 |  | 250 | 170 |  | 0 | 0 |  | 0 | 270 |  | 310 |
| Storage Lanes | 0 |  | 2 | 1 |  | 1 | 1 |  | 1 | 1 |  | 1 |
| Taper Length（ft） | 25 |  |  | 50 |  |  | 25 |  |  | 180 |  |  |
| Lane Util．Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  |  | 0.850 |  |  | 0.850 |  |  | 0.850 |
| Flt Protected |  |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（prot） | 0 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 0 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted |  |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（perm） | 0 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 0 | 1583 | 1770 | 1863 | 1583 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  | 189 |  |  | 433 |  |  | 140 |  |  | 157 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 555 |  |  | 375 |  |  | 626 |  |  | 1097 |  |
| Travel Time（s） |  | 10.8 |  |  | 7.3 |  |  | 14.2 |  |  | 24.9 |  |
| Peak Hour Factor | 1.00 | 0.96 | 0.66 | 0.73 | 0.89 | 1.00 | 0.75 | 1.00 | 0.71 | 0.86 | 0.72 | 0.97 |
| Heavy Vehicles（\％） | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ |
| Adj．Flow（vph） | 0 | 1707 | 127 | 192 | 1053 | 433 | 68 | 0 | 293 | 277 | 161 | 395 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 0 | 1707 | 127 | 192 | 1053 | 433 | 68 | 0 | 293 | 277 | 161 | 395 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | L NA | Left | Right | Left | Left | L NA |
| Median Width（ft） |  | 18 |  |  | 18 |  |  | 18 |  |  | 24 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 16 |  | 12 | 16 |  | 12 | 16 |  | 12 | 16 |  | 18 |
| Number of Detectors |  | 2 | 1 | 1 | 2 | 1 | 1 |  | 1 | 1 | 1 | 1 |
| Detector Template |  |  |  |  |  | Right |  |  |  |  |  |  |
| Leading Detector（ft） |  | 186 | 11 | 35 | 171 | 20 | 35 |  | 35 | 50 | 50 | 0 |
| Trailing Detector（ft） |  | 180 | 5 | 0 | 165 | 0 | 0 |  | 0 | 5 | 5 | 0 |
| Detector 1 Position（ft） |  | 0 | 5 | 0 | 0 | 0 | 0 |  | 0 | 5 | 5 | 0 |
| Detector 1 Size（ft） |  | 20 | 6 | 35 | 20 | 20 | 35 |  | 35 | 45 | 45 | 0 |
| Detector 1 Type |  | Cl＋Ex | Cl＋Ex | Cl＋Ex | Cl＋Ex | Cl＋Ex | Cl＋Ex |  | Cl＋Ex | Cl＋Ex | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |
| Detector 1 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 1 Extend（s） |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue（s） |  | 15.0 | 0.0 | 0.0 | 15.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay（s） |  | 0.0 | 25.5 | 0.0 | 0.0 | 0.0 | 0.0 |  | 8.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position（ft） |  | 180 |  |  | 165 |  |  |  |  |  |  |  |
| Detector 2 Size（ft） |  | 6 |  |  | 6 |  |  |  |  |  |  |  |
| Detector 2 Type |  | Cl＋Ex |  |  | Cl＋Ex |  |  |  |  |  |  |  |
| Detector 2 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 2 Extend（s） |  | 0.0 |  |  | 0.0 |  |  |  |  |  |  |  |
| Turn Type |  | NA | Perm | Prot | NA | Perm | Prot |  | pm＋ov | Prot | NA | Perm |
| Protected Phases |  | 6 |  | 5 | 2 |  | 3 |  | 5 | 7 | 4 |  |

Build PM Peak W 98th Street 4：30 pm 04／19／2022 Build Condition－PM
Synchro 11 Report
Bolton \＆Menk，Inc．


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Permitted Phases |  |  | 6 |  |  | 2 |  |  | 8 |  |  | 4 |
| Detector Phase |  | 6 | 6 | 5 | 2 | 2 | 3 |  | 8 | 7 | 4 | 4 |
| Switch Phase |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum Initial (s) |  | 10.0 | 10.0 | 7.0 | 10.0 | 10.0 | 7.0 |  | 7.0 | 4.0 | 7.0 | 7.0 |
| Minimum Split (s) |  | 26.1 | 26.1 | 11.7 | 19.1 | 19.1 | 11.7 |  | 11.7 | 8.0 | 41.4 | 41.4 |
| Total Split (s) |  | 44.2 | 44.2 | 17.2 | 61.4 | 61.4 | 11.7 |  | 17.2 | 27.0 | 41.4 | 41.4 |
| Total Split (\%) |  | 35.4\% | 35.4\% | 13.8\% | 49.1\% | 49.1\% | 9.4\% |  | 13.8\% | 21.6\% | 33.1\% | 33.1\% |
| Maximum Green (s) |  | 39.1 | 39.1 | 12.5 | 56.3 | 56.3 | 7.0 |  | 12.5 | 23.0 | 36.0 | 36.0 |
| Yellow Time (s) |  | 3.6 | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 |  | 3.2 | 3.5 | 3.9 | 3.9 |
| All-Red Time (s) |  | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |  | 1.5 | 0.5 | 1.5 | 1.5 |
| Lost Time Adjust (s) |  | -1.1 | -1.1 | -0.7 | -1.1 | 0.0 | -0.9 |  | -0.9 | -1.4 | -1.4 | 0.0 |
| Total Lost Time (s) |  | 4.0 | 4.0 | 4.0 | 4.0 | 5.1 | 3.8 |  | 3.8 | 2.6 | 4.0 | 5.4 |
| Lead/Lag |  | Lead | Lead | Lag |  |  | Lag |  | Lag | Lead | Lead | Lead |
| Lead-Lag Optimize? |  | Yes | Yes | Yes |  |  | Yes |  | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) |  | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 |  | 3.0 | 3.0 | 3.5 | 3.5 |
| Recall Mode |  | C-Max | C-Max | None | C-Max | C-Max | None |  | None | None | None | None |
| Walk Time (s) |  | 7.0 | 7.0 |  | 7.0 | 7.0 |  |  |  |  | 7.0 | 7.0 |
| Flash Dont Walk (s) |  | 14.0 | 14.0 |  | 7.0 | 7.0 |  |  |  |  | 29.0 | 29.0 |
| Pedestrian Calls (\#/hr) |  | 0 | 0 |  | 0 | 0 |  |  |  |  | 0 | 0 |
| Act Effct Green (s) |  | 47.5 | 47.5 | 13.2 | 64.7 | 63.6 | 9.7 |  | 29.4 | 23.1 | 30.3 | 28.9 |
| Actuated g/C Ratio |  | 0.38 | 0.38 | 0.11 | 0.52 | 0.51 | 0.08 |  | 0.24 | 0.18 | 0.24 | 0.23 |
| v/c Ratio |  | 0.88 | 0.18 | 1.03 | 0.58 | 0.43 | 0.50 |  | 0.61 | 0.85 | 0.36 | 0.81 |
| Control Delay |  | 43.8 | 1.3 | 129.0 | 23.6 | 3.3 | 67.9 |  | 17.4 | 72.4 | 40.8 | 40.5 |
| Queue Delay |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay |  | 43.8 | 1.3 | 129.0 | 23.6 | 3.3 | 67.9 |  | 17.4 | 72.4 | 40.8 | 40.5 |
| LOS |  | D | A | F | C | A | E |  | B | E | D | D |
| Approach Delay |  | 40.9 |  |  | 30.4 |  |  | 26.9 |  |  | 51.2 |  |
| Approach LOS |  | D |  |  | C |  |  | C |  |  | D |  |
| 90th \%ile Green (s) |  | 39.1 | 39.1 | 12.5 | 56.3 | 56.3 | 7.0 |  | 12.5 | 23.0 | 36.0 | 36.0 |
| 90th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Max |  | Max | Max | Max | Max |
| 70th \%ile Green (s) |  | 39.1 | 39.1 | 12.5 | 56.3 | 56.3 | 11.0 |  | 12.5 | 23.0 | 32.0 | 32.0 |
| 70th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Max |  | Max | Max | Gap | Gap |
| 50th \%ile Green (s) |  | 43.9 | 43.9 | 12.5 | 61.1 | 61.1 | 10.4 |  | 12.5 | 23.0 | 27.3 | 27.3 |
| 50th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Gap |  | Max | Max | Gap | Gap |
| 30th \%ile Green (s) |  | 51.1 | 51.1 | 12.5 | 68.3 | 68.3 | 8.8 |  | 12.5 | 22.1 | 21.7 | 21.7 |
| 30th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Gap |  | Max | Gap | Gap | Gap |
| 10th \%ile Green (s) |  | 58.6 | 58.6 | 12.5 | 75.8 | 75.8 | 0.0 |  | 12.5 | 17.4 | 27.7 | 27.7 |
| 10th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Skip |  | Max | Gap | Hold | Hold |
| Stops (vph) |  | 1353 | 1 | 117 | 637 | 28 | 47 |  | 93 | 217 | 92 | 230 |
| Fuel Used(gal) |  | 31 | 0 | 5 | 12 | 2 | 1 |  | 2 | 7 | 2 | 8 |
| CO Emissions (g/hr) |  | 2192 | 26 | 345 | 827 | 117 | 85 |  | 158 | 471 | 172 | 538 |
| NOx Emissions (g/hr) |  | 427 | 5 | 67 | 161 | 23 | 17 |  | 31 | 92 | 34 | 105 |
| VOC Emissions (g/hr) |  | 508 | 6 | 80 | 192 | 27 | 20 |  | 37 | 109 | 40 | 125 |
| Dilemma Vehicles (\#) |  | 61 | 0 | 0 | 37 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Queue Length 50th (ft) |  | 483 | 0 | $\sim 166$ | 311 | 0 | 53 |  | 68 | 216 | 111 | 193 |
| Queue Length 95th (ft) |  | \#645 | 0 | \#228 | 404 | 58 | 87 |  | 72 | \#323 | 125 | 294 |
| Internal Link Dist (ft) |  | 475 |  |  | 295 |  |  | 546 |  |  | 1017 |  |
| Turn Bay Length (ft) |  |  | 250 | 170 |  |  |  |  |  | 270 |  | 310 |
| Base Capacity (vph) |  | 1930 | 718 | 186 | 1830 | 1017 | 137 |  | 552 | 345 | 557 | 567 |

Build PM Peak W 98th Street 4:30 pm 04/19/2022 Build Condition - PM
Bolton \& Menk, Inc.

| Lane Group | $\varnothing 8$ | $\varnothing 9$ |
| :---: | :---: | :---: |
| Permitted Phases |  |  |
| Detector Phase |  |  |
| Switch Phase |  |  |
| Minimum Initial (s) | 7.0 | 5.0 |
| Minimum Split (s) | 11.7 | 10.5 |
| Total Split (s) | 26.1 | 10.5 |
| Total Split (\%) | 21\% | 8\% |
| Maximum Green (s) | 21.4 | 5.0 |
| Yellow Time (s) | 3.2 | 3.5 |
| All-Red Time (s) | 1.5 | 2.0 |
| Lost Time Adjust (s) |  |  |
| Total Lost Time (s) |  |  |
| Lead/Lag | Lag |  |
| Lead-Lag Optimize? | Yes |  |
| Vehicle Extension (s) | 3.0 | 3.0 |
| Recall Mode | None | Min |
| Walk Time (s) |  |  |
| Flash Dont Walk (s) |  |  |
| Pedestrian Calls (\#/hr) |  |  |
| Act Effct Green (s) |  |  |
| Actuated g/C Ratio |  |  |
| v/c Ratio |  |  |
| Control Delay |  |  |
| Queue Delay |  |  |
| Total Delay |  |  |
| LOS |  |  |
| Approach Delay |  |  |
| Approach LOS |  |  |
| 90th \%ile Green (s) | 21.4 | 5.0 |
| 90th \%ile Term Code | Hold | Max |
| 70th \%ile Green (s) | 21.4 | 5.0 |
| 70th \%ile Term Code | Hold | Max |
| 50th \%ile Green (s) | 16.1 | 5.5 |
| 50th \%ile Term Code | Hold | Gap |
| 30th \%ile Green (s) | 9.8 | 5.5 |
| 30th \%ile Term Code | Hold | Gap |
| 10th \%ile Green (s) | 7.0 | 5.5 |
| 10th \%ile Term Code | Min | Gap |
| Stops (vph) |  |  |
| Fuel Used(gal) |  |  |
| CO Emissions (g/hr) |  |  |
| NOx Emissions (g/hr) |  |  |
| VOC Emissions (g/hr) |  |  |
| Dilemma Vehicles (\#) |  |  |
| Queue Length 50th (ft) |  |  |
| Queue Length 95th (ft) |  |  |
| Internal Link Dist (ft) |  |  |
| Turn Bay Length (ft) |  |  |
| Base Capacity (vph) |  |  |


|  | 4 | $\rightarrow$ | $\geqslant$ | 7 | $\leftrightarrow$ | 4 | 4 | $\uparrow$ | $p$ | $\checkmark$ | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Starvation Cap Reductn |  | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn |  | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Storage Cap Reductn |  | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio |  | 0.88 | 0.18 | 1.03 | 0.58 | 0.43 | 0.50 |  | 0.53 | 0.80 | 0.29 | 0.70 |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| Area Type: |  |  |  |  |  |  |  |  |  |  |  |  |

Cycle Length: 125
Actuated Cycle Length: 125
Offset: $0(0 \%)$, Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle: 125
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03

| Intersection Signal Delay: 37.9 | Intersection LOS: D |
| :--- | :--- |
| Intersection Capacity Utilization $67.7 \%$ | ICU Level of Service C |

Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
Splits and Phases: 2: 98th St \& 35W West Ramps


| Lane Group $\quad \varnothing 8 \quad \emptyset 9$ |
| :--- | :--- |
| Starvation Cap Reductn |
| Spillback Cap Reductn |
| Storage Cap Reductn |
| Reduced v/c Ratio |
| Intersection Summary |


|  | 4 |  |  | $\dagger$ |  | 4 | $4$ | 4 | $p$ |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 44 |  |  | 44 | 「 | ${ }^{7}$ | 4 | 「' |  |  |  |
| Traffic Volume (vph) | 459 | 1136 | 0 | 0 | 1130 | 274 | 380 | 78 | 314 | 0 | 0 | 0 |
| Future Volume (vph) | 459 | 1136 | 0 | 0 | 1130 | 274 | 380 | 78 | 314 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 |  | 0 | 0 |  | 0 | 375 |  | 150 | 0 |  | 0 |
| Storage Lanes | 0 |  | 0 | 0 |  | 1 | 1 |  | 1 | 0 |  | 0 |
| Taper Length (ft) | 25 |  |  | 25 |  |  | 100 |  |  | 25 |  |  |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  |  |  |  | 0.850 |  |  | 0.850 |  |  |  |
| Flt Protected | 0.950 |  |  |  |  |  | 0.950 | 0.988 |  |  |  |  |
| Satd. Flow (prot) | 1770 | 3539 | 0 | 0 | 3539 | 1583 | 1681 | 1748 | 1583 | 0 | 0 | 0 |
| Flt Permitted | 0.950 |  |  |  |  |  | 0.950 | 0.988 |  |  |  |  |
| Satd. Flow (perm) | 1770 | 3539 | 0 | 0 | 3539 | 1583 | 1681 | 1748 | 1583 | 0 | 0 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd. Flow (RTOR) |  |  |  |  |  | 194 |  |  | 103 |  |  |  |
| Link Speed (mph) |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance (ft) |  | 350 |  |  | 267 |  |  | 992 |  |  | 960 |  |
| Travel Time (s) |  | 6.8 |  |  | 5.2 |  |  | 22.5 |  |  | 21.8 |  |
| Peak Hour Factor | 0.88 | 0.91 | 0.25 | 1.00 | 0.78 | 0.85 | 0.82 | 0.53 | 0.91 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (\%) | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% |
| Adj. Flow (vph) | 522 | 1248 | 0 | 0 | 1449 | 322 | 463 | 147 | 345 | 0 | 0 | 0 |
| Shared Lane Traffic (\%) |  |  |  |  |  |  | 10\% |  |  |  |  |  |
| Lane Group Flow (vph) | 522 | 1248 | 0 | 0 | 1449 | 322 | 417 | 193 | 345 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | R NA | Right | Left | L NA | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) |  | 18 |  |  | 12 |  |  | 12 |  |  | 12 |  |
| Link Offset(ft) |  | 6 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width(ft) |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 16 |  | 12 | 16 |  | 15 | 16 |  | 15 | 16 |  | 12 |
| Number of Detectors | 1 | 2 |  |  | 2 | 1 | 1 | 1 | 1 |  |  |  |
| Detector Template |  |  |  |  |  | Right |  |  |  |  |  |  |
| Leading Detector (ft) | 50 | 176 |  |  | 216 | 20 | 40 | 30 | 0 |  |  |  |
| Trailing Detector (ft) | 0 | 170 |  |  | 210 | 0 | 5 | 0 | 0 |  |  |  |
| Detector 1 Position(ft) | 0 | 0 |  |  | 0 | 0 | 5 | 0 | 0 |  |  |  |
| Detector 1 Size(ft) | 50 | 20 |  |  | 20 | 20 | 35 | 30 | 0 |  |  |  |
| Detector 1 Type | Cl+Ex | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | Cl+Ex | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |
| Detector 1 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 1 Extend (s) | 0.0 | 0.0 |  |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 1 Queue (s) | 0.0 | 15.0 |  |  | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 1 Delay (s) | 0.0 | 0.0 |  |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 2 Position(ft) |  | 170 |  |  | 210 |  |  |  |  |  |  |  |
| Detector 2 Size(ft) |  | 6 |  |  | 6 |  |  |  |  |  |  |  |
| Detector 2 Type |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |  |  |  |  |
| Detector 2 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 2 Extend (s) |  | 0.0 |  |  | 0.0 |  |  |  |  |  |  |  |
| Turn Type | Prot | NA |  |  | NA | Perm | Perm | NA | Perm |  |  |  |
| Protected Phases | 1 | 6 |  |  | 2 |  |  | 8 |  |  |  |  |


|  | 4 | $\rightarrow$ |  | 7 |  | 4 | $4$ | $\dagger$ | $p$ |  | $\dagger$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Permitted Phases |  |  |  |  |  | 2 | 8 |  | 8 |  |  |  |
| Detector Phase | 1 | 6 |  |  | 2 | 2 | 8 | 8 | 8 |  |  |  |
| Switch Phase |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum Initial (s) | 7.0 | 10.0 |  |  | 10.0 | 10.0 | 7.0 | 7.0 | 7.0 |  |  |  |
| Minimum Split (s) | 15.0 | 19.1 |  |  | 27.0 | 27.0 | 38.0 | 38.0 | 38.0 |  |  |  |
| Total Split (s) | 43.0 | 102.0 |  |  | 59.0 | 59.0 | 38.0 | 38.0 | 38.0 |  |  |  |
| Total Split (\%) | 30.7\% | 72.9\% |  |  | 42.1\% | 42.1\% | 27.1\% | 27.1\% | 27.1\% |  |  |  |
| Maximum Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| Yellow Time (s) | 3.2 | 3.6 |  |  | 3.6 | 3.6 | 3.9 | 3.9 | 3.9 |  |  |  |
| All-Red Time (s) | 1.5 | 1.5 |  |  | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |  |  |  |
| Lost Time Adjust (s) | -0.7 | -1.1 |  |  | -1.1 | 0.0 | -1.4 | -1.4 | 0.0 |  |  |  |
| Total Lost Time (s) | 4.0 | 4.0 |  |  | 4.0 | 5.1 | 4.0 | 4.0 | 5.4 |  |  |  |
| Lead/Lag | Lag |  |  |  | Lead | Lead |  |  |  |  |  |  |
| Lead-Lag Optimize? | Yes |  |  |  | Yes | Yes |  |  |  |  |  |  |
| Vehicle Extension (s) | 3.0 | 4.0 |  |  | 4.0 | 4.0 | 3.5 | 3.5 | 3.5 |  |  |  |
| Recall Mode | None | C-Max |  |  | C-Max | C-Max | None | None | None |  |  |  |
| Walk Time (s) |  | 7.0 |  |  | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |  |  |  |
| Flash Dont Walk (s) |  | 7.0 |  |  | 14.0 | 14.0 | 25.0 | 25.0 | 25.0 |  |  |  |
| Pedestrian Calls (\#/hr) |  | 0 |  |  | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Act Effct Green (s) | 39.0 | 98.0 |  |  | 55.0 | 53.9 | 34.0 | 34.0 | 32.6 |  |  |  |
| Actuated g/C Ratio | 0.28 | 0.70 |  |  | 0.39 | 0.38 | 0.24 | 0.24 | 0.23 |  |  |  |
| v/c Ratio | 1.06 | 0.50 |  |  | 1.04 | 0.44 | 1.02 | 0.46 | 0.77 |  |  |  |
| Control Delay | 104.9 | 10.6 |  |  | 77.3 | 14.0 | 101.9 | 49.2 | 47.5 |  |  |  |
| Queue Delay | 0.0 | 0.6 |  |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |  |  |
| Total Delay | 104.9 | 11.2 |  |  | 77.3 | 14.0 | 101.9 | 49.2 | 47.5 |  |  |  |
| LOS | F | B |  |  | E | B | F | D | D |  |  |  |
| Approach Delay |  | 38.8 |  |  | 65.8 |  |  | 71.6 |  |  |  |  |
| Approach LOS |  | D |  |  | E |  |  | E |  |  |  |  |
| 90th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 90th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| 70th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 70th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| 50th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 50th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| 30th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 30th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| 10th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 10th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| Stops (vph) | 397 | 498 |  |  | 1007 | 81 | 298 | 97 | 210 |  |  |  |
| Fuel Used(gal) | 14 | 9 |  |  | 28 | 2 | 11 | 3 | 7 |  |  |  |
| CO Emissions (g/hr) | 975 | 634 |  |  | 1924 | 134 | 796 | 181 | 463 |  |  |  |
| NOx Emissions (g/hr) | 190 | 123 |  |  | 374 | 26 | 155 | 35 | 90 |  |  |  |
| VOC Emissions (g/hr) | 226 | 147 |  |  | 446 | 31 | 184 | 42 | 107 |  |  |  |
| Dilemma Vehicles (\#) | 0 | 41 |  |  | 38 | 0 | 0 | 0 | 0 |  |  |  |
| Queue Length 50th (ft) | $\sim 521$ | 253 |  |  | $\sim 749$ | 79 | $\sim 423$ | 158 | 212 |  |  |  |
| Queue Length 95th (ft) | \#719 | 301 |  |  | 652 | 143 | \#550 | 132 | \#339 |  |  |  |
| Internal Link Dist (ft) |  | 270 |  |  | 187 |  |  | 912 |  |  | 880 |  |
| Turn Bay Length (ft) |  |  |  |  |  |  | 375 |  | 150 |  |  |  |
| Base Capacity (vph) | 493 | 2477 |  |  | 1390 | 728 | 408 | 424 | 447 |  |  |  |

Build PM Peak W 98th Street 4:30 pm 04/19/2022 Build Condition - PM


Splits and Phases: $\quad 3: 35 \mathrm{~W}$ East Ramps \& 98th St


|  | $\rangle$ |  |  | 7 |  |  |  | $\uparrow$ |  |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \％ | 个 ${ }_{\text {¢ }}$ |  |  | 惺 |  |  |  | 「 |  |  | 7 |
| Traffic Volume（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Future Volume（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 90 |  | 0 | 0 |  | 200 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 0 | 0 |  | 1 | 0 |  | 1 | 0 |  | 1 |
| Taper Length（ft） | 75 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  | 0.996 |  |  | 0.997 |  |  |  | 0.865 |  |  | 0.865 |
| Flt Protected | 0.950 |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（prot） | 1736 | 3457 | 0 | 0 | 4973 | 0 | 0 | 0 | 1580 | 0 | 0 | 1580 |
| Flt Permitted | 0.950 |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（perm） | 1736 | 3457 | 0 | 0 | 4973 | 0 | 0 | 0 | 1580 | 0 | 0 | 1580 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 267 |  |  | 314 |  |  | 617 |  |  | 373 |  |
| Travel Time（s） |  | 5.2 |  |  | 6.1 |  |  | 14.0 |  |  | 8.5 |  |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj．Flow（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 42 | 1408 | 0 | 0 | 1379 | 0 | 0 | 0 | 18 | 0 | 0 | 50 |
| Enter Blocked Intersection | No | Yes | No | No | No | No | No | No | No | No | No | Yes |
| Lane Alignment | Left | R NA | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 20 |  |  | 18 |  |  | 0 |  |  | 0 |  |
| Link Offset（ft） |  | 0 |  |  | 6 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Sign Control |  | Free |  |  | Free |  |  | Stop |  |  | Stop |  |

## Intersection Summary

Area Type：Other

Control Type：Unsignalized
Intersection Capacity Utilization 49．1\％ICU Level of Service A
Analysis Period（min） 15

| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay，s／veh 0．7 |  |  |  |  | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Movement | EBL | EBT | EBR | WBL |  |  |  |  |  |  |  |  |
| Lane Configurations | ${ }^{1}$ | 虾 |  |  | 虾 $\%$ |  |  |  | 「 |  |  | 「 |
| Traffic Vol，veh／h | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Future Vol，veh／h | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Conflicting Peds，\＃／hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | － | － | None | － | － | None | － | － | None | － | － | None |
| Storage Length | 90 | － | － | － | － | 200 | － | － | 0 | － | － | 0 |
| Veh in Median Storage，\＃ | \＃ | 0 | － | － | 0 | － | － | 0 | － | － | 0 | － |
| Grade，\％ | － | 0 | － | － | 0 | － | － | 0 | － | － | 0 | － |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles，\％ | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Mvmt Flow | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |




## Intersection Summary

```
Area Type: Other
```

Control Type: Unsignalized
Intersection Capacity Utilization 79.2\% ICU Level of Service D
Analysis Period (min) 15

Network Totals

| Number of Intersections | 4 |
| :--- | ---: |
| Control Delay / Veh (s/v) | 25 |
| Queue Delay / Veh (s/v) | 0 |
| Total Delay / Veh (s/v) | 25 |
| Total Delay (hr) | 102 |
| Stops / Veh | 0.39 |
| Stops (\#) | 5582 |
| Average Speed (mph) | 9 |
| Total Travel Time (hr) | 138 |
| Distance Traveled (mi) | 1203 |
| Fuel Consumed (gal) | 161 |
| Fuel Economy (mpg) | 7.5 |
| Co Emissions (kg) | 11.24 |
| NOx Emissions (kg) | 2.19 |
| VOC Emissions (kg) | 2.61 |
| Unserved Venicles (\#) | 83 |
| Vehicles in dilemma zone (\#) | 1177 |
| Performance Index | 117.4 |


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Configurations |  | 个个中 | 「 | ${ }^{7}$ | 个种 |  | ${ }^{7}$ |  | F | \％ | $\uparrow$ | F |
| Traffic Volume（vph） | 0 | 1639 | 84 | 140 | 937 | 0 | 51 | 0 | 208 | 238 | 116 | 383 |
| Future Volume（vph） | 0 | 1639 | 84 | 140 | 937 | 0 | 51 | 0 | 208 | 238 | 116 | 383 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 0 |  | 270 | 170 |  | 0 | 0 |  | 0 | 270 |  | 310 |
| Storage Lanes | 0 |  | 1 | 1 |  | 0 | 1 |  | 1 | 1 |  | 1 |
| Taper Length（ t ） | 25 |  |  | 50 |  |  | 25 |  |  | 180 |  |  |
| Lane Util．Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  |  |  |  |  | 0.850 |  |  | 0.850 |
| Flt Protected |  |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（prot） | 0 | 5085 | 1583 | 1770 | 5085 | 0 | 1770 | 0 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted |  |  |  | 0.950 |  |  | 0.582 |  |  | 0.950 |  |  |
| Satd．Flow（perm） | 0 | 5085 | 1583 | 1770 | 5085 | 0 | 1084 | 0 | 1583 | 1770 | 1863 | 1583 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  | 127 |  |  |  |  |  | 293 |  |  | 395 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 555 |  |  | 375 |  |  | 626 |  |  | 1097 |  |
| Travel Time（s） |  | 10.8 |  |  | 7.3 |  |  | 14.2 |  |  | 24.9 |  |
| Peak Hour Factor | 1.00 | 0.96 | 0.66 | 0.73 | 0.89 | 1.00 | 0.75 | 1.00 | 0.71 | 0.86 | 0.72 | 0.97 |
| Heavy Vehicles（\％） | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ |
| Adj．Flow（vph） | 0 | 1707 | 127 | 192 | 1053 | 0 | 68 | 0 | 293 | 277 | 161 | 395 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 0 | 1707 | 127 | 192 | 1053 | 0 | 68 | 0 | 293 | 277 | 161 | 395 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（t） |  | 18 |  |  | 18 |  |  | 18 |  |  | 12 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 16 |  | 12 | 16 |  | 12 | 16 |  | 12 | 16 |  | 18 |
| Number of Detectors |  | 2 | 1 | 1 | 2 |  | 1 |  | 1 | 1 | 1 | 1 |

Detector Template

| Leading Detector（ft） | 186 | 11 | 35 | 171 | 35 | 35 | 50 | 50 | 0 |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: | ---: |
| Trailing Detector $(\mathrm{ft})$ | 180 | 5 | 0 | 165 | 0 | 0 | 5 | 5 | 0 |
| Detector 1 Position（ft） | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 5 | 0 |
| Detector 1 Size（ft） | 20 | 6 | 35 | 20 | 35 | 35 | 45 | 45 | 0 |
| Detector 1 Type | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |

Detector 1 Channel

| Detector 1 Extend（s） | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Detector 1 Queue（s） | 15.0 | 0.0 | 0.0 | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay（s） | 0.0 | 25.5 | 0.0 | 0.0 | 0.0 | 8.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position（ft） | 180 |  |  | 165 |  |  |  |  |  |
| Detector 2 Size（ft） | 6 |  |  | 6 |  |  |  |  |  |
| Detector 2 Type | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |  |  |
| Detector 2 Channel |  |  |  |  |  |  |  |  |  |
| Detector 2 Extend（s） | 0.0 |  |  | 0.0 |  |  |  |  |  |
| Turn Type | NA | Perm | Prot | NA | Perm | Perm | Perm | NA | Free |
| Protected Phases | 6 |  | 5 | 2 |  |  |  | 4 |  |


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Permitted Phases |  |  | 6 |  |  |  | 8 |  | 8 | 4 |  | Free |
| Detector Phase |  | 6 | 6 | 5 | 2 |  | 8 |  | 8 | 4 | 4 |  |
| Switch Phase |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum Initial (s) |  | 10.0 | 10.0 | 7.0 | 10.0 |  | 7.0 |  | 7.0 | 7.0 | 7.0 |  |
| Minimum Split (s) |  | 27.0 | 27.0 | 15.0 | 19.1 |  | 15.0 |  | 15.0 | 42.0 | 42.0 |  |
| Total Split (s) |  | 28.0 | 28.0 | 15.0 | 43.0 |  | 42.0 |  | 42.0 | 42.0 | 42.0 |  |
| Total Split (\%) |  | 32.9\% | 32.9\% | 17.6\% | 50.6\% |  | 49.4\% |  | 49.4\% | 49.4\% | 49.4\% |  |
| Maximum Green (s) |  | 22.9 | 22.9 | 10.3 | 37.9 |  | 37.1 |  | 37.1 | 36.6 | 36.6 |  |
| Yellow Time (s) |  | 3.6 | 3.6 | 3.2 | 3.6 |  | 3.2 |  | 3.2 | 3.9 | 3.9 |  |
| All-Red Time (s) |  | 1.5 | 1.5 | 1.5 | 1.5 |  | 1.7 |  | 1.7 | 1.5 | 1.5 |  |
| Lost Time Adjust (s) |  | -1.1 | -1.1 | -0.7 | -1.1 |  | -0.9 |  | -0.9 | -1.4 | -1.4 |  |
| Total Lost Time (s) |  | 4.0 | 4.0 | 4.0 | 4.0 |  | 4.0 |  | 4.0 | 4.0 | 4.0 |  |
| Lead/Lag |  | Lead | Lead | Lag |  |  |  |  |  |  |  |  |
| Lead-Lag Optimize? |  | Yes | Yes | Yes |  |  |  |  |  |  |  |  |
| Vehicle Extension (s) |  | 4.0 | 4.0 | 3.0 | 4.0 |  | 3.5 |  | 3.5 | 3.5 | 3.5 |  |
| Recall Mode |  | C-Max | C-Max | None | C-Max |  | None |  | None | None | None |  |
| Walk Time (s) |  | 7.0 | 7.0 |  | 7.0 |  |  |  |  | 7.0 | 7.0 |  |
| Flash Dont Walk (s) |  | 14.0 | 14.0 |  | 7.0 |  |  |  |  | 29.0 | 29.0 |  |
| Pedestrian Calls (\#/hr) |  | 0 | 0 |  | 0 |  |  |  |  | 0 | 0 |  |
| Act Effct Green (s) |  | 41.2 | 41.2 | 11.0 | 56.2 |  | 20.8 |  | 20.8 | 20.8 | 20.8 | 85.0 |
| Actuated g/C Ratio |  | 0.48 | 0.48 | 0.13 | 0.66 |  | 0.24 |  | 0.24 | 0.24 | 0.24 | 1.00 |
| v/c Ratio |  | 0.69 | 0.15 | 0.84 | 0.31 |  | 0.26 |  | 0.48 | 0.64 | 0.35 | 0.25 |
| Control Delay |  | 19.9 | 3.6 | 67.5 | 7.1 |  | 26.4 |  | 5.7 | 35.0 | 27.4 | 0.4 |
| Queue Delay |  | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 |  | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay |  | 19.9 | 3.6 | 67.5 | 7.1 |  | 26.4 |  | 5.7 | 35.0 | 27.4 | 0.4 |
| LOS |  | B | A | E | A |  | C |  | A | C | C | A |
| Approach Delay |  | 18.8 |  |  | 16.4 |  |  | 9.6 |  |  | 17.1 |  |
| Approach LOS |  | B |  |  | B |  |  | A |  |  | B |  |
| 90th \%ile Green (s) |  | 32.7 | 32.7 | 10.3 | 47.7 |  | 27.3 |  | 27.3 | 26.8 | 26.8 |  |
| 90th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| 70th \%ile Green (s) |  | 37.4 | 37.4 | 10.3 | 52.4 |  | 22.6 |  | 22.6 | 22.1 | 22.1 |  |
| 70th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| 50th \%ile Green (s) |  | 40.3 | 40.3 | 10.3 | 55.3 |  | 19.7 |  | 19.7 | 19.2 | 19.2 |  |
| 50th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| 30th \%ile Green (s) |  | 43.1 | 43.1 | 10.3 | 58.1 |  | 16.9 |  | 16.9 | 16.4 | 16.4 |  |
| 30th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| 10th \%ile Green (s) |  | 47.1 | 47.1 | 10.3 | 62.1 |  | 12.9 |  | 12.9 | 12.4 | 12.4 |  |
| 10th \%ile Term Code |  | Coord | Coord | Max | Coord |  | Hold |  | Hold | Gap | Gap |  |
| Stops (vph) |  | 1225 | 11 | 121 | 377 |  | 38 |  | 23 | 203 | 90 | 0 |
| Fuel Used(gal) |  | 22 | 0 | 3 | 7 |  | 1 |  | 1 | 5 | 2 | 3 |
| CO Emissions (g/hr) |  | 1568 | 34 | 225 | 470 |  | 51 |  | 97 | 339 | 149 | 231 |
| NOx Emissions (g/hr) |  | 305 | 7 | 44 | 91 |  | 10 |  | 19 | 66 | 29 | 45 |
| VOC Emissions (g/hr) |  | 363 | 8 | 52 | 109 |  | 12 |  | 22 | 79 | 35 | 54 |
| Dilemma Vehicles (\#) |  | 96 | 0 | 0 | 55 |  | 0 |  | 0 | 0 | 0 | 0 |
| Queue Length 50th (ft) |  | 246 | 0 | 102 | 76 |  | 29 |  | 0 | 133 | 71 | 0 |
| Queue Length 95th (ft) |  | 358 | 12 | \#150 | 127 |  | 46 |  | 16 | 177 | 85 | 0 |
| Internal Link Dist (ft) |  | 475 |  |  | 295 |  |  | 546 |  |  | 1017 |  |
| Turn Bay Length (ft) |  |  | 270 | 170 |  |  |  |  |  | 270 |  | 310 |
| Base Capacity (vph) |  | 2466 | 833 | 229 | 3363 |  | 484 |  | 869 | 791 | 832 | 1583 |


|  | $\rangle$ | $\rightarrow$ |  | 1 | $\leftrightarrow$ | 4 | , | $\dagger$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Starvation Cap Reductn |  | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn |  | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 | 0 | 0 |
| Storage Cap Reductn |  | 0 | 0 | 0 | 0 |  | 0 |  | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio |  | 0.69 | 0.15 | 0.84 | 0.31 |  | 0.14 |  | 0.34 | 0.35 | 0.19 | 0.25 |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| Area Type: |  |  |  |  |  |  |  |  |  |  |  |  |

Cycle Length: 85
Actuated Cycle Length: 85
Offset: $0(0 \%)$, Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
$\begin{array}{ll}\text { Intersection Signal Delay: } 17.0 & \text { Intersection LOS: B } \\ \text { Intersection Capacity Utilization 67.7\% } & \text { ICU Level of Service C }\end{array}$
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
Splits and Phases: 2: 98th St \& 35W West Ramps


|  | 4 |  |  | 7 |  |  |  | 4 | 7 |  | $\frac{1}{1}$ | 4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 44 |  |  | 性个 |  | ${ }^{7}$ | $\uparrow$ | 「 |  |  |  |
| Traffic Volume（vph） | 459 | 1136 | 0 | 0 | 1130 | 274 | 380 | 78 | 314 | 0 | 0 | 0 |
| Future Volume（vph） | 459 | 1136 | 0 | 0 | 1130 | 274 | 380 | 78 | 314 | 0 | 0 | 0 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 0 |  | 0 | 0 |  | 0 | 375 |  | 150 | 0 |  | 0 |
| Storage Lanes | 0 |  | 0 | 0 |  | 0 | 1 |  | 1 | 0 |  | 0 |
| Taper Length（ft） | 25 |  |  | 25 |  |  | 100 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | 0.91 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  |  |  | 0.973 |  |  |  | 0.850 |  |  |  |
| Flt Protected | 0.950 |  |  |  |  |  | 0.950 | 0.988 |  |  |  |  |
| Satd．Flow（prot） | 1770 | 3539 | 0 | 0 | 4948 | 0 | 1681 | 1748 | 1583 | 0 | 0 | 0 |
| Flt Permitted | 0.950 |  |  |  |  |  | 0.950 | 0.988 |  |  |  |  |
| Satd．Flow（perm） | 1770 | 3539 | 0 | 0 | 4948 | 0 | 1681 | 1748 | 1583 | 0 | 0 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  |  |  | 44 |  |  |  | 85 |  |  |  |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 350 |  |  | 267 |  |  | 992 |  |  | 960 |  |
| Travel Time（s） |  | 6.8 |  |  | 5.2 |  |  | 22.5 |  |  | 21.8 |  |
| Peak Hour Factor | 0.88 | 0.91 | 0.25 | 1.00 | 0.78 | 0.85 | 0.82 | 0.53 | 0.91 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles（\％） | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ |
| Adj．Flow（vph） | 522 | 1248 | 0 | 0 | 1449 | 322 | 463 | 147 | 345 | 0 | 0 | 0 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  | 10\％ |  |  |  |  |  |
| Lane Group Flow（vph） | 522 | 1248 | 0 | 0 | 1771 | 0 | 417 | 193 | 345 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | R NA | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 24 |  |  | 12 |  |  | 12 |  |  | 12 |  |
| Link Offset（ft） |  | 6 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 16 |  | 12 | 16 |  | 15 | 16 |  | 15 | 16 |  | 12 |
| Number of Detectors | 1 | 2 |  |  | 2 |  | 1 | 1 | 1 |  |  |  |
| Detector Template |  |  |  |  |  |  |  |  |  |  |  |  |
| Leading Detector（ft） | 50 | 176 |  |  | 216 |  | 40 | 30 | 0 |  |  |  |
| Trailing Detector（ft） | 0 | 170 |  |  | 210 |  | 5 | 0 | 0 |  |  |  |
| Detector 1 Position（ft） | 0 | 0 |  |  | 0 |  | 5 | 0 | 0 |  |  |  |
| Detector 1 Size（ft） | 50 | 20 |  |  | 20 |  | 35 | 30 | 0 |  |  |  |
| Detector 1 Type | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | $\mathrm{Cl}+\mathrm{Ex}$ |  | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |
| Detector 1 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 1 Extend（s） | 0.0 | 0.0 |  |  | 0.0 |  | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 1 Queue（s） | 0.0 | 15.0 |  |  | 15.0 |  | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 1 Delay（s） | 0.0 | 0.0 |  |  | 0.0 |  | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 2 Position（ft） |  | 170 |  |  | 210 |  |  |  |  |  |  |  |
| Detector 2 Size（ft） |  | 6 |  |  | 6 |  |  |  |  |  |  |  |
| Detector 2 Type |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |  |  |  |  |
| Detector 2 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 2 Extend（s） |  | 0.0 |  |  | 0.0 |  |  |  |  |  |  |  |
| Turn Type | Prot | NA |  |  | NA |  | Perm | NA | Perm |  |  |  |
| Protected Phases | 1 | 6 |  |  | 2 |  |  | 8 |  |  |  |  |


|  | 4 | $\rightarrow$ |  | 1 | $4$ |  | $4$ | $\dagger$ | \% |  | $\dagger$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Permitted Phases |  |  |  |  |  |  | 8 |  | 8 |  |  |  |
| Detector Phase | 1 | 6 |  |  | 2 |  | 8 | 8 | 8 |  |  |  |
| Switch Phase |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum Initial (s) | 7.0 | 10.0 |  |  | 10.0 |  | 7.0 | 7.0 | 7.0 |  |  |  |
| Minimum Split (s) | 15.0 | 19.1 |  |  | 27.0 |  | 38.0 | 38.0 | 38.0 |  |  |  |
| Total Split (s) | 38.0 | 82.0 |  |  | 44.0 |  | 38.0 | 38.0 | 38.0 |  |  |  |
| Total Split (\%) | 31.7\% | 68.3\% |  |  | 36.7\% |  | 31.7\% | 31.7\% | 31.7\% |  |  |  |
| Maximum Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| Yellow Time (s) | 3.2 | 3.6 |  |  | 3.6 |  | 3.9 | 3.9 | 3.9 |  |  |  |
| All-Red Time (s) | 1.5 | 1.5 |  |  | 1.5 |  | 1.5 | 1.5 | 1.5 |  |  |  |
| Lost Time Adjust (s) | -0.7 | -1.1 |  |  | -1.1 |  | -1.4 | -1.4 | 0.0 |  |  |  |
| Total Lost Time (s) | 4.0 | 4.0 |  |  | 4.0 |  | 4.0 | 4.0 | 5.4 |  |  |  |
| Lead/Lag | Lag |  |  |  | Lead |  |  |  |  |  |  |  |
| Lead-Lag Optimize? | Yes |  |  |  | Yes |  |  |  |  |  |  |  |
| Vehicle Extension (s) | 3.0 | 4.0 |  |  | 4.0 |  | 3.5 | 3.5 | 3.5 |  |  |  |
| Recall Mode | None | C-Max |  |  | C-Max |  | None | None | None |  |  |  |
| Walk Time (s) |  | 7.0 |  |  | 7.0 |  | 7.0 | 7.0 | 7.0 |  |  |  |
| Flash Dont Walk (s) |  | 7.0 |  |  | 14.0 |  | 25.0 | 25.0 | 25.0 |  |  |  |
| Pedestrian Calls (\#/hr) |  | 0 |  |  | 0 |  | 0 | 0 | 0 |  |  |  |
| Act Effct Green (s) | 34.0 | 78.9 |  |  | 40.9 |  | 33.1 | 33.1 | 31.7 |  |  |  |
| Actuated g/C Ratio | 0.28 | 0.66 |  |  | 0.34 |  | 0.28 | 0.28 | 0.26 |  |  |  |
| v/c Ratio | 1.04 | 0.54 |  |  | 1.03 |  | 0.90 | 0.40 | 0.72 |  |  |  |
| Control Delay | 93.8 | 12.1 |  |  | 68.6 |  | 65.6 | 38.1 | 39.2 |  |  |  |
| Queue Delay | 0.0 | 0.4 |  |  | 0.0 |  | 0.0 | 0.0 | 0.0 |  |  |  |
| Total Delay | 93.8 | 12.4 |  |  | 68.6 |  | 65.6 | 38.1 | 39.2 |  |  |  |
| LOS | F | B |  |  | E |  | E | D | D |  |  |  |
| Approach Delay |  | 36.4 |  |  | 68.6 |  |  | 50.5 |  |  |  |  |
| Approach LOS |  | D |  |  | E |  |  | D |  |  |  |  |
| 90th \%ile Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| 90th \%ile Term Code | Max | Coord |  |  | Coord |  | Max | Max | Max |  |  |  |
| 70th \%ile Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| 70th \%ile Term Code | Max | Coord |  |  | Coord |  | Max | Max | Max |  |  |  |
| 50th \%ile Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| 50th \%ile Term Code | Max | Coord |  |  | Coord |  | Max | Max | Max |  |  |  |
| 30th \%ile Green (s) | 33.3 | 76.9 |  |  | 38.9 |  | 32.6 | 32.6 | 32.6 |  |  |  |
| 30th \%ile Term Code | Max | Coord |  |  | Coord |  | Max | Max | Max |  |  |  |
| 10th \%ile Green (s) | 33.3 | 81.6 |  |  | 43.6 |  | 27.9 | 27.9 | 27.9 |  |  |  |
| 10th \%ile Term Code | Max | Coord |  |  | Coord |  | Gap | Gap | Gap |  |  |  |
| Stops (vph) | 395 | 571 |  |  | 1211 |  | 308 | 92 | 218 |  |  |  |
| Fuel Used(gal) | 13 | 10 |  |  | 31 |  | 9 | 2 | 6 |  |  |  |
| CO Emissions (g/hr) | 901 | 696 |  |  | 2196 |  | 623 | 161 | 429 |  |  |  |
| NOx Emissions (g/hr) | 175 | 135 |  |  | 427 |  | 121 | 31 | 83 |  |  |  |
| VOC Emissions (g/hr) | 209 | 161 |  |  | 509 |  | 144 | 37 | 99 |  |  |  |
| Dilemma Vehicles (\#) | 0 | 47 |  |  | 54 |  | 0 | 0 | 0 |  |  |  |
| Queue Length 50th (ft) | $\sim 437$ | 253 |  |  | $\sim 542$ |  | 324 | 127 | 184 |  |  |  |
| Queue Length 95th (ft) | \#629 | 308 |  |  | 464 |  | \#432 | 109 | 295 |  |  |  |
| Internal Link Dist (ft) |  | 270 |  |  | 187 |  |  | 912 |  |  | 880 |  |
| Turn Bay Length (ft) |  |  |  |  |  |  | 375 |  | 150 |  |  |  |
| Base Capacity (vph) | 501 | 2328 |  |  | 1716 |  | 476 | 495 | 491 |  |  |  |

PM Peak W 98th Street 4:30 pm 04/19/2022 Existing Condition - PM


Splits and Phases: $\quad 3: 35 \mathrm{~W}$ East Ramps \& 98th St


|  | $\stackrel{ }{*}$ |  |  |  |  |  |  | $\uparrow$ | $p$ |  | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \％ | 快 |  |  | 恌t |  |  |  | 「 |  |  | F |
| Traffic Volume（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Future Volume（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 90 |  | 0 | 0 |  | 0 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 0 | 0 |  | 0 | 0 |  | 1 | 0 |  | 1 |
| Taper Length（ft） | 75 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.91 | 0.91 | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  | 0.996 |  |  | 0.997 |  |  |  | 0.865 |  |  | 0.865 |
| Flt Protected | 0.950 |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（prot） | 1736 | 4968 | 0 | 0 | 4973 | 0 | 0 | 0 | 1580 | 0 | 0 | 1580 |
| Flt Permitted | 0.950 |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（perm） | 1736 | 4968 | 0 | 0 | 4973 | 0 | 0 | 0 | 1580 | 0 | 0 | 1580 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 267 |  |  | 314 |  |  | 617 |  |  | 373 |  |
| Travel Time（s） |  | 5.2 |  |  | 6.1 |  |  | 14.0 |  |  | 8.5 |  |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj．Flow（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Shared Lane Trafic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 42 | 1408 | 0 | 0 | 1379 | 0 | 0 | 0 | 18 | 0 | 0 | 50 |
| Enter Blocked Intersection | Yes | Yes | No | No | No | No | No | No | No | No | No | Yes |
| Lane Alignment | Left | RNA | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 20 |  |  | 6 |  |  | 0 |  |  | 0 |  |
| Link Offset（ft） |  | 0 |  |  | 6 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 15 |  | 9 | 15 |  | 9 | 15 |  | ， | 15 |  | 9 |
| Sign Control |  | Free |  |  | Free |  |  | Stop |  |  | Stop |  |

## Intersection Summary

```
Area Type: Other
```

Control Type: Unsignalized
Intersection Capacity Utilization 37.3\% ICU Level of Service A
Analysis Period (min) 15

HCM 6th TWSC
4: Aldrich Ave S \& 98th St



|  | $y$ | $\rightarrow$ | 7 | 7 |  | 4 | 4 | $\dagger$ | $>$ | ＊ | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations |  | 快4 | 「 |  | 檪 |  |  |  |  |  |  |  |
| Traffic Volume（vph） | 0 | 1595 | 490 | 0 | 1077 | 433 | 0 | 0 | 0 | 0 | 0 | 0 |
| Future Volume（vph） | 0 | 1595 | 490 | 0 | 1077 | 433 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 10 |  | 0 | 0 |  | 0 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 1 | 0 |  | 0 | 0 |  | 0 | 0 |  | 0 |
| Taper Length（ft） | 50 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  | 0.957 |  |  |  |  |  |  |  |


| Flt Protected |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Satd．Flow（prot） | 0 | 5085 | 1583 | 0 | 4867 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Flt Permitted |  |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（perm） | 0 | 5085 | 1583 | 0 | 4867 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 375 |  |  | 350 |  |  | 749 |  |  | 698 |  |
| Travel Time（s） |  | 7.3 |  |  | 6.8 |  |  | 17.0 |  |  | 15.9 |  |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles（\％） | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ |
| Adj．Flow（vph） | 0 | 1595 | 490 | 0 | 1077 | 433 | 0 | 0 | 0 | 0 | 0 | 0 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 0 | 1595 | 490 | 0 | 1510 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | Yes | No | No | Yes | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 6 |  |  | 6 |  |  | 0 |  |  | 0 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | －15 |  |  | －15 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 16 |  | 30 | 16 |  | 30 | 16 |  | 12 | 16 |  | 12 |
| Sign Control |  | Free |  |  | Free |  |  | Free |  |  | Free |  |

## Intersection Summary

```
Area Type: Other
```

Control Type：Unsignalized
Intersection Capacity Utilization $34.2 \%$ ICU Level of Service A

Analysis Period（min） 15

Network Totals

| Number of Intersections | 4 |
| :--- | ---: |
| Control Delay / Veh (s/v) | 18 |
| Queue Delay / Veh (s/v) | 0 |
| Total Delay / Veh (s/v) | 18 |
| Total Delay (hr) | 71 |
| Stops / Veh | 0.36 |
| Stops ( (\#) | 5062 |
| Average Speed (mph) | 11 |
| Total Travel Time (hr) | 106 |
| Distance Traveled (mi) | 1172 |
| Fuel Consumed (gal) | 134 |
| Fuel Economy (mpg) | 8.7 |
| CO Emissions (kg) | 9.37 |
| NOx Emissions (kg) | 1.82 |
| VOC Emissions (kg) | 2.17 |
| Unserved Vehicles (\#) | 60 |
| Vehicles in dilemma zone (\#) | 252 |
| Performance Index | 85.5 |


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Configurations |  | 4种 | 「 | ${ }^{*}$ | 44 | 「＇ | ${ }^{1}$ |  | 「 | ${ }^{*}$ | 4 | 「 |
| Traffic Volume（vph） | 0 | 1639 | 84 | 140 | 937 | 433 | 51 | 0 | 208 | 238 | 116 | 383 |
| Future Volume（vph） | 0 | 1639 | 84 | 140 | 937 | 433 | 51 | 0 | 208 | 238 | 116 | 383 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 0 |  | 250 | 170 |  | 0 | 0 |  | 0 | 270 |  | 310 |
| Storage Lanes | 0 |  | 2 | 1 |  | 1 | 1 |  | 1 | 1 |  | 1 |
| Taper Length（ft） | 25 |  |  | 50 |  |  | 25 |  |  | 180 |  |  |
| Lane Util．Factor | 1.00 | 0.91 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  | 0.850 |  |  | 0.850 |  |  | 0.850 |  |  | 0.850 |
| Flt Protected |  |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（prot） | 0 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 0 | 1583 | 1770 | 1863 | 1583 |
| Flt Permitted |  |  |  | 0.950 |  |  | 0.950 |  |  | 0.950 |  |  |
| Satd．Flow（perm） | 0 | 5085 | 1583 | 1770 | 3539 | 1583 | 1770 | 0 | 1583 | 1770 | 1863 | 1583 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd．Flow（RTOR） |  |  | 189 |  |  | 433 |  |  | 140 |  |  | 157 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 555 |  |  | 375 |  |  | 626 |  |  | 1097 |  |
| Travel Time（s） |  | 10.8 |  |  | 7.3 |  |  | 14.2 |  |  | 24.9 |  |
| Peak Hour Factor | 1.00 | 0.96 | 0.66 | 0.73 | 0.89 | 1.00 | 0.75 | 1.00 | 0.71 | 0.86 | 0.72 | 0.97 |
| Heavy Vehicles（\％） | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ | 2\％ |
| Adj．Flow（vph） | 0 | 1707 | 127 | 192 | 1053 | 433 | 68 | 0 | 293 | 277 | 161 | 395 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 0 | 1707 | 127 | 192 | 1053 | 433 | 68 | 0 | 293 | 277 | 161 | 395 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | Left | Right | Left | Left | Right | L NA | Left | Right | Left | Left | L NA |
| Median Width（ft） |  | 18 |  |  | 18 |  |  | 18 |  |  | 24 |  |
| Link Offset（ft） |  | 0 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 16 |  | 12 | 16 |  | 12 | 16 |  | 12 | 16 |  | 18 |
| Number of Detectors |  | 2 | 1 | 1 | 2 | 1 | 1 |  | 1 | 1 | 1 | 1 |
| Detector Template |  |  |  |  |  | Right |  |  |  |  |  |  |
| Leading Detector（ft） |  | 186 | 11 | 35 | 171 | 20 | 35 |  | 35 | 50 | 50 | 0 |
| Trailing Detector（ft） |  | 180 | 5 | 0 | 165 | 0 | 0 |  | 0 | 5 | 5 | 0 |
| Detector 1 Position（ft） |  | 0 | 5 | 0 | 0 | 0 | 0 |  | 0 | 5 | 5 | 0 |
| Detector 1 Size（ft） |  | 20 | 6 | 35 | 20 | 20 | 35 |  | 35 | 45 | 45 | 0 |
| Detector 1 Type |  | Cl＋Ex | Cl＋Ex | Cl＋Ex | Cl＋Ex | Cl＋Ex | Cl＋Ex |  | Cl＋Ex | Cl＋Ex | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |
| Detector 1 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 1 Extend（s） |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Queue（s） |  | 15.0 | 0.0 | 0.0 | 15.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 | 0.0 |
| Detector 1 Delay（s） |  | 0.0 | 25.5 | 0.0 | 0.0 | 0.0 | 0.0 |  | 8.0 | 0.0 | 0.0 | 0.0 |
| Detector 2 Position（ft） |  | 180 |  |  | 165 |  |  |  |  |  |  |  |
| Detector 2 Size（ft） |  | 6 |  |  | 6 |  |  |  |  |  |  |  |
| Detector 2 Type |  | Cl＋Ex |  |  | Cl＋Ex |  |  |  |  |  |  |  |
| Detector 2 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 2 Extend（s） |  | 0.0 |  |  | 0.0 |  |  |  |  |  |  |  |
| Turn Type |  | NA | Perm | Prot | NA | Perm | Prot |  | pm＋ov | Prot | NA | Perm |
| Protected Phases |  | 6 |  | 5 | 2 |  | 3 |  | 5 | 7 | 4 |  |

Build PM Peak W 98th Street 4：30 pm 04／19／2022 Build Condition－PM
Synchro 11 Report
Bolton \＆Menk，Inc．


| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Permitted Phases |  |  | 6 |  |  | 2 |  |  | 8 |  |  | 4 |
| Detector Phase |  | 6 | 6 | 5 | 2 | 2 | 3 |  | 8 | 7 | 4 | 4 |
| Switch Phase |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum Initial (s) |  | 10.0 | 10.0 | 7.0 | 10.0 | 10.0 | 7.0 |  | 7.0 | 4.0 | 7.0 | 7.0 |
| Minimum Split (s) |  | 26.1 | 26.1 | 11.7 | 19.1 | 19.1 | 11.7 |  | 11.7 | 8.0 | 41.4 | 41.4 |
| Total Split (s) |  | 44.2 | 44.2 | 17.2 | 61.4 | 61.4 | 11.7 |  | 17.2 | 27.0 | 41.4 | 41.4 |
| Total Split (\%) |  | 35.4\% | 35.4\% | 13.8\% | 49.1\% | 49.1\% | 9.4\% |  | 13.8\% | 21.6\% | 33.1\% | 33.1\% |
| Maximum Green (s) |  | 39.1 | 39.1 | 12.5 | 56.3 | 56.3 | 7.0 |  | 12.5 | 23.0 | 36.0 | 36.0 |
| Yellow Time (s) |  | 3.6 | 3.6 | 3.2 | 3.6 | 3.6 | 3.2 |  | 3.2 | 3.5 | 3.9 | 3.9 |
| All-Red Time (s) |  | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |  | 1.5 | 0.5 | 1.5 | 1.5 |
| Lost Time Adjust (s) |  | -1.1 | -1.1 | -0.7 | -1.1 | 0.0 | -0.9 |  | -0.9 | -1.4 | -1.4 | 0.0 |
| Total Lost Time (s) |  | 4.0 | 4.0 | 4.0 | 4.0 | 5.1 | 3.8 |  | 3.8 | 2.6 | 4.0 | 5.4 |
| Lead/Lag |  | Lead | Lead | Lag |  |  | Lag |  | Lag | Lead | Lead | Lead |
| Lead-Lag Optimize? |  | Yes | Yes | Yes |  |  | Yes |  | Yes | Yes | Yes | Yes |
| Vehicle Extension (s) |  | 4.0 | 4.0 | 3.0 | 4.0 | 4.0 | 3.0 |  | 3.0 | 3.0 | 3.5 | 3.5 |
| Recall Mode |  | C-Max | C-Max | None | C-Max | C-Max | None |  | None | None | None | None |
| Walk Time (s) |  | 7.0 | 7.0 |  | 7.0 | 7.0 |  |  |  |  | 7.0 | 7.0 |
| Flash Dont Walk (s) |  | 14.0 | 14.0 |  | 7.0 | 7.0 |  |  |  |  | 29.0 | 29.0 |
| Pedestrian Calls (\#/hr) |  | 0 | 0 |  | 0 | 0 |  |  |  |  | 0 | 0 |
| Act Effct Green (s) |  | 47.5 | 47.5 | 13.2 | 64.7 | 63.6 | 9.7 |  | 29.4 | 23.1 | 30.3 | 28.9 |
| Actuated g/C Ratio |  | 0.38 | 0.38 | 0.11 | 0.52 | 0.51 | 0.08 |  | 0.24 | 0.18 | 0.24 | 0.23 |
| v/c Ratio |  | 0.88 | 0.18 | 1.03 | 0.58 | 0.43 | 0.50 |  | 0.61 | 0.85 | 0.36 | 0.81 |
| Control Delay |  | 43.8 | 1.3 | 129.0 | 23.6 | 3.3 | 67.9 |  | 17.4 | 72.4 | 40.8 | 40.5 |
| Queue Delay |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Delay |  | 43.8 | 1.3 | 129.0 | 23.6 | 3.3 | 67.9 |  | 17.4 | 72.4 | 40.8 | 40.5 |
| LOS |  | D | A | F | C | A | E |  | B | E | D | D |
| Approach Delay |  | 40.9 |  |  | 30.4 |  |  | 26.9 |  |  | 51.2 |  |
| Approach LOS |  | D |  |  | C |  |  | C |  |  | D |  |
| 90th \%ile Green (s) |  | 39.1 | 39.1 | 12.5 | 56.3 | 56.3 | 7.0 |  | 12.5 | 23.0 | 36.0 | 36.0 |
| 90th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Max |  | Max | Max | Max | Max |
| 70th \%ile Green (s) |  | 39.1 | 39.1 | 12.5 | 56.3 | 56.3 | 11.0 |  | 12.5 | 23.0 | 32.0 | 32.0 |
| 70th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Max |  | Max | Max | Gap | Gap |
| 50th \%ile Green (s) |  | 43.9 | 43.9 | 12.5 | 61.1 | 61.1 | 10.4 |  | 12.5 | 23.0 | 27.3 | 27.3 |
| 50th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Gap |  | Max | Max | Gap | Gap |
| 30th \%ile Green (s) |  | 51.1 | 51.1 | 12.5 | 68.3 | 68.3 | 8.8 |  | 12.5 | 22.1 | 21.7 | 21.7 |
| 30th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Gap |  | Max | Gap | Gap | Gap |
| 10th \%ile Green (s) |  | 58.6 | 58.6 | 12.5 | 75.8 | 75.8 | 0.0 |  | 12.5 | 17.4 | 27.7 | 27.7 |
| 10th \%ile Term Code |  | Coord | Coord | Max | Coord | Coord | Skip |  | Max | Gap | Hold | Hold |
| Stops (vph) |  | 1353 | 1 | 117 | 637 | 28 | 47 |  | 93 | 217 | 92 | 230 |
| Fuel Used(gal) |  | 31 | 0 | 5 | 12 | 2 | 1 |  | 2 | 7 | 2 | 8 |
| CO Emissions (g/hr) |  | 2192 | 26 | 345 | 827 | 117 | 85 |  | 158 | 471 | 172 | 538 |
| NOx Emissions (g/hr) |  | 427 | 5 | 67 | 161 | 23 | 17 |  | 31 | 92 | 34 | 105 |
| VOC Emissions (g/hr) |  | 508 | 6 | 80 | 192 | 27 | 20 |  | 37 | 109 | 40 | 125 |
| Dilemma Vehicles (\#) |  | 61 | 0 | 0 | 37 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Queue Length 50th (ft) |  | 483 | 0 | $\sim 166$ | 311 | 0 | 53 |  | 68 | 216 | 111 | 193 |
| Queue Length 95th (ft) |  | \#645 | 0 | \#228 | 404 | 58 | 87 |  | 72 | \#323 | 125 | 294 |
| Internal Link Dist (ft) |  | 475 |  |  | 295 |  |  | 546 |  |  | 1017 |  |
| Turn Bay Length (ft) |  |  | 250 | 170 |  |  |  |  |  | 270 |  | 310 |
| Base Capacity (vph) |  | 1930 | 718 | 186 | 1830 | 1017 | 137 |  | 552 | 345 | 557 | 567 |

Build PM Peak W 98th Street 4:30 pm 04/19/2022 Build Condition - PM
Bolton \& Menk, Inc.

| Lane Group | $\varnothing 8$ | $\varnothing 9$ |
| :---: | :---: | :---: |
| Permitted Phases |  |  |
| Detector Phase |  |  |
| Switch Phase |  |  |
| Minimum Initial (s) | 7.0 | 5.0 |
| Minimum Split (s) | 11.7 | 10.5 |
| Total Split (s) | 26.1 | 10.5 |
| Total Split (\%) | 21\% | 8\% |
| Maximum Green (s) | 21.4 | 5.0 |
| Yellow Time (s) | 3.2 | 3.5 |
| All-Red Time (s) | 1.5 | 2.0 |
| Lost Time Adjust (s) |  |  |
| Total Lost Time (s) |  |  |
| Lead/Lag | Lag |  |
| Lead-Lag Optimize? | Yes |  |
| Vehicle Extension (s) | 3.0 | 3.0 |
| Recall Mode | None | Min |
| Walk Time (s) |  |  |
| Flash Dont Walk (s) |  |  |
| Pedestrian Calls (\#/hr) |  |  |
| Act Effct Green (s) |  |  |
| Actuated g/C Ratio |  |  |
| v/c Ratio |  |  |
| Control Delay |  |  |
| Queue Delay |  |  |
| Total Delay |  |  |
| LOS |  |  |
| Approach Delay |  |  |
| Approach LOS |  |  |
| 90th \%ile Green (s) | 21.4 | 5.0 |
| 90th \%ile Term Code | Hold | Max |
| 70th \%ile Green (s) | 21.4 | 5.0 |
| 70th \%ile Term Code | Hold | Max |
| 50th \%ile Green (s) | 16.1 | 5.5 |
| 50th \%ile Term Code | Hold | Gap |
| 30th \%ile Green (s) | 9.8 | 5.5 |
| 30th \%ile Term Code | Hold | Gap |
| 10th \%ile Green (s) | 7.0 | 5.5 |
| 10th \%ile Term Code | Min | Gap |
| Stops (vph) |  |  |
| Fuel Used(gal) |  |  |
| CO Emissions (g/hr) |  |  |
| NOx Emissions (g/hr) |  |  |
| VOC Emissions (g/hr) |  |  |
| Dilemma Vehicles (\#) |  |  |
| Queue Length 50th (ft) |  |  |
| Queue Length 95th (ft) |  |  |
| Internal Link Dist (ft) |  |  |
| Turn Bay Length (ft) |  |  |
| Base Capacity (vph) |  |  |


|  | 4 | $\rightarrow$ | $\geqslant$ | 7 | $\leftrightarrow$ | 4 | 4 | $\uparrow$ | $p$ | $\checkmark$ | $\downarrow$ | $\checkmark$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Starvation Cap Reductn |  | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Spillback Cap Reductn |  | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Storage Cap Reductn |  | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Reduced v/c Ratio |  | 0.88 | 0.18 | 1.03 | 0.58 | 0.43 | 0.50 |  | 0.53 | 0.80 | 0.29 | 0.70 |
| Intersection Summary |  |  |  |  |  |  |  |  |  |  |  |  |
| Area Type: |  |  |  |  |  |  |  |  |  |  |  |  |

Cycle Length: 125
Actuated Cycle Length: 125
Offset: $0(0 \%)$, Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
Natural Cycle: 125
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.03

| Intersection Signal Delay: 37.9 | Intersection LOS: D |
| :--- | :--- |
| Intersection Capacity Utilization $67.7 \%$ | ICU Level of Service C |

Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
Splits and Phases: 2: 98th St \& 35W West Ramps


| Lane Group $\quad \varnothing 8 \quad \emptyset 9$ |
| :--- | :--- |
| Starvation Cap Reductn |
| Spillback Cap Reductn |
| Storage Cap Reductn |
| Reduced v/c Ratio |
| Intersection Summary |


|  | 4 |  |  | $\dagger$ |  | 4 | $4$ | 4 | $p$ |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | ${ }^{7}$ | 44 |  |  | 44 | 「 | ${ }^{7}$ | 4 | 「' |  |  |  |
| Traffic Volume (vph) | 459 | 1136 | 0 | 0 | 1130 | 274 | 380 | 78 | 314 | 0 | 0 | 0 |
| Future Volume (vph) | 459 | 1136 | 0 | 0 | 1130 | 274 | 380 | 78 | 314 | 0 | 0 | 0 |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length (ft) | 0 |  | 0 | 0 |  | 0 | 375 |  | 150 | 0 |  | 0 |
| Storage Lanes | 0 |  | 0 | 0 |  | 1 | 1 |  | 1 | 0 |  | 0 |
| Taper Length (ft) | 25 |  |  | 25 |  |  | 100 |  |  | 25 |  |  |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.95 | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  |  |  |  |  | 0.850 |  |  | 0.850 |  |  |  |
| Flt Protected | 0.950 |  |  |  |  |  | 0.950 | 0.988 |  |  |  |  |
| Satd. Flow (prot) | 1770 | 3539 | 0 | 0 | 3539 | 1583 | 1681 | 1748 | 1583 | 0 | 0 | 0 |
| Flt Permitted | 0.950 |  |  |  |  |  | 0.950 | 0.988 |  |  |  |  |
| Satd. Flow (perm) | 1770 | 3539 | 0 | 0 | 3539 | 1583 | 1681 | 1748 | 1583 | 0 | 0 | 0 |
| Right Turn on Red |  |  | Yes |  |  | Yes |  |  | Yes |  |  | Yes |
| Satd. Flow (RTOR) |  |  |  |  |  | 194 |  |  | 103 |  |  |  |
| Link Speed (mph) |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance (ft) |  | 350 |  |  | 267 |  |  | 992 |  |  | 960 |  |
| Travel Time (s) |  | 6.8 |  |  | 5.2 |  |  | 22.5 |  |  | 21.8 |  |
| Peak Hour Factor | 0.88 | 0.91 | 0.25 | 1.00 | 0.78 | 0.85 | 0.82 | 0.53 | 0.91 | 1.00 | 1.00 | 1.00 |
| Heavy Vehicles (\%) | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% | 2\% |
| Adj. Flow (vph) | 522 | 1248 | 0 | 0 | 1449 | 322 | 463 | 147 | 345 | 0 | 0 | 0 |
| Shared Lane Traffic (\%) |  |  |  |  |  |  | 10\% |  |  |  |  |  |
| Lane Group Flow (vph) | 522 | 1248 | 0 | 0 | 1449 | 322 | 417 | 193 | 345 | 0 | 0 | 0 |
| Enter Blocked Intersection | No | No | No | No | No | No | No | No | No | No | No | No |
| Lane Alignment | Left | R NA | Right | Left | L NA | Right | Left | Left | Right | Left | Left | Right |
| Median Width(ft) |  | 18 |  |  | 12 |  |  | 12 |  |  | 12 |  |
| Link Offset(ft) |  | 6 |  |  | 0 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width(ft) |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed (mph) | 16 |  | 12 | 16 |  | 15 | 16 |  | 15 | 16 |  | 12 |
| Number of Detectors | 1 | 2 |  |  | 2 | 1 | 1 | 1 | 1 |  |  |  |
| Detector Template |  |  |  |  |  | Right |  |  |  |  |  |  |
| Leading Detector (ft) | 50 | 176 |  |  | 216 | 20 | 40 | 30 | 0 |  |  |  |
| Trailing Detector (ft) | 0 | 170 |  |  | 210 | 0 | 5 | 0 | 0 |  |  |  |
| Detector 1 Position(ft) | 0 | 0 |  |  | 0 | 0 | 5 | 0 | 0 |  |  |  |
| Detector 1 Size(ft) | 50 | 20 |  |  | 20 | 20 | 35 | 30 | 0 |  |  |  |
| Detector 1 Type | Cl+Ex | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | Cl+Ex | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |
| Detector 1 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 1 Extend (s) | 0.0 | 0.0 |  |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 1 Queue (s) | 0.0 | 15.0 |  |  | 15.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 1 Delay (s) | 0.0 | 0.0 |  |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |  |  |
| Detector 2 Position(ft) |  | 170 |  |  | 210 |  |  |  |  |  |  |  |
| Detector 2 Size(ft) |  | 6 |  |  | 6 |  |  |  |  |  |  |  |
| Detector 2 Type |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  | $\mathrm{Cl}+\mathrm{Ex}$ |  |  |  |  |  |  |  |
| Detector 2 Channel |  |  |  |  |  |  |  |  |  |  |  |  |
| Detector 2 Extend (s) |  | 0.0 |  |  | 0.0 |  |  |  |  |  |  |  |
| Turn Type | Prot | NA |  |  | NA | Perm | Perm | NA | Perm |  |  |  |
| Protected Phases | 1 | 6 |  |  | 2 |  |  | 8 |  |  |  |  |


|  | 4 | $\rightarrow$ |  | 7 |  | 4 | $4$ | $\dagger$ | $p$ |  | $\dagger$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Permitted Phases |  |  |  |  |  | 2 | 8 |  | 8 |  |  |  |
| Detector Phase | 1 | 6 |  |  | 2 | 2 | 8 | 8 | 8 |  |  |  |
| Switch Phase |  |  |  |  |  |  |  |  |  |  |  |  |
| Minimum Initial (s) | 7.0 | 10.0 |  |  | 10.0 | 10.0 | 7.0 | 7.0 | 7.0 |  |  |  |
| Minimum Split (s) | 15.0 | 19.1 |  |  | 27.0 | 27.0 | 38.0 | 38.0 | 38.0 |  |  |  |
| Total Split (s) | 43.0 | 102.0 |  |  | 59.0 | 59.0 | 38.0 | 38.0 | 38.0 |  |  |  |
| Total Split (\%) | 30.7\% | 72.9\% |  |  | 42.1\% | 42.1\% | 27.1\% | 27.1\% | 27.1\% |  |  |  |
| Maximum Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| Yellow Time (s) | 3.2 | 3.6 |  |  | 3.6 | 3.6 | 3.9 | 3.9 | 3.9 |  |  |  |
| All-Red Time (s) | 1.5 | 1.5 |  |  | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |  |  |  |
| Lost Time Adjust (s) | -0.7 | -1.1 |  |  | -1.1 | 0.0 | -1.4 | -1.4 | 0.0 |  |  |  |
| Total Lost Time (s) | 4.0 | 4.0 |  |  | 4.0 | 5.1 | 4.0 | 4.0 | 5.4 |  |  |  |
| Lead/Lag | Lag |  |  |  | Lead | Lead |  |  |  |  |  |  |
| Lead-Lag Optimize? | Yes |  |  |  | Yes | Yes |  |  |  |  |  |  |
| Vehicle Extension (s) | 3.0 | 4.0 |  |  | 4.0 | 4.0 | 3.5 | 3.5 | 3.5 |  |  |  |
| Recall Mode | None | C-Max |  |  | C-Max | C-Max | None | None | None |  |  |  |
| Walk Time (s) |  | 7.0 |  |  | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |  |  |  |
| Flash Dont Walk (s) |  | 7.0 |  |  | 14.0 | 14.0 | 25.0 | 25.0 | 25.0 |  |  |  |
| Pedestrian Calls (\#/hr) |  | 0 |  |  | 0 | 0 | 0 | 0 | 0 |  |  |  |
| Act Effct Green (s) | 39.0 | 98.0 |  |  | 55.0 | 53.9 | 34.0 | 34.0 | 32.6 |  |  |  |
| Actuated g/C Ratio | 0.28 | 0.70 |  |  | 0.39 | 0.38 | 0.24 | 0.24 | 0.23 |  |  |  |
| v/c Ratio | 1.06 | 0.50 |  |  | 1.04 | 0.44 | 1.02 | 0.46 | 0.77 |  |  |  |
| Control Delay | 104.9 | 10.6 |  |  | 77.3 | 14.0 | 101.9 | 49.2 | 47.5 |  |  |  |
| Queue Delay | 0.0 | 0.6 |  |  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |  |  |
| Total Delay | 104.9 | 11.2 |  |  | 77.3 | 14.0 | 101.9 | 49.2 | 47.5 |  |  |  |
| LOS | F | B |  |  | E | B | F | D | D |  |  |  |
| Approach Delay |  | 38.8 |  |  | 65.8 |  |  | 71.6 |  |  |  |  |
| Approach LOS |  | D |  |  | E |  |  | E |  |  |  |  |
| 90th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 90th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| 70th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 70th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| 50th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 50th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| 30th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 30th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| 10th \%ile Green (s) | 38.3 | 96.9 |  |  | 53.9 | 53.9 | 32.6 | 32.6 | 32.6 |  |  |  |
| 10th \%ile Term Code | Max | Coord |  |  | Coord | Coord | Max | Max | Max |  |  |  |
| Stops (vph) | 397 | 498 |  |  | 1007 | 81 | 298 | 97 | 210 |  |  |  |
| Fuel Used(gal) | 14 | 9 |  |  | 28 | 2 | 11 | 3 | 7 |  |  |  |
| CO Emissions (g/hr) | 975 | 634 |  |  | 1924 | 134 | 796 | 181 | 463 |  |  |  |
| NOx Emissions (g/hr) | 190 | 123 |  |  | 374 | 26 | 155 | 35 | 90 |  |  |  |
| VOC Emissions (g/hr) | 226 | 147 |  |  | 446 | 31 | 184 | 42 | 107 |  |  |  |
| Dilemma Vehicles (\#) | 0 | 41 |  |  | 38 | 0 | 0 | 0 | 0 |  |  |  |
| Queue Length 50th (ft) | $\sim 521$ | 253 |  |  | $\sim 749$ | 79 | $\sim 423$ | 158 | 212 |  |  |  |
| Queue Length 95th (ft) | \#719 | 301 |  |  | 652 | 143 | \#550 | 132 | \#339 |  |  |  |
| Internal Link Dist (ft) |  | 270 |  |  | 187 |  |  | 912 |  |  | 880 |  |
| Turn Bay Length (ft) |  |  |  |  |  |  | 375 |  | 150 |  |  |  |
| Base Capacity (vph) | 493 | 2477 |  |  | 1390 | 728 | 408 | 424 | 447 |  |  |  |

Build PM Peak W 98th Street 4:30 pm 04/19/2022 Build Condition - PM


Splits and Phases: $\quad 3: 35 \mathrm{~W}$ East Ramps \& 98th St


|  | $\rangle$ |  |  | 7 |  |  |  | $\uparrow$ |  |  | $\downarrow$ | $\downarrow$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Lane Group | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | \％ | 个 ${ }_{\text {¢ }}$ |  |  | 惺 |  |  |  | 「 |  |  | 7 |
| Traffic Volume（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Future Volume（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Ideal Flow（vphpl） | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Storage Length（ft） | 90 |  | 0 | 0 |  | 200 | 0 |  | 0 | 0 |  | 0 |
| Storage Lanes | 1 |  | 0 | 0 |  | 1 | 0 |  | 1 | 0 |  | 1 |
| Taper Length（ft） | 75 |  |  | 25 |  |  | 25 |  |  | 25 |  |  |
| Lane Util．Factor | 1.00 | 0.95 | 0.95 | 1.00 | 0.91 | 0.91 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Frt |  | 0.996 |  |  | 0.997 |  |  |  | 0.865 |  |  | 0.865 |
| Flt Protected | 0.950 |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（prot） | 1736 | 3457 | 0 | 0 | 4973 | 0 | 0 | 0 | 1580 | 0 | 0 | 1580 |
| Flt Permitted | 0.950 |  |  |  |  |  |  |  |  |  |  |  |
| Satd．Flow（perm） | 1736 | 3457 | 0 | 0 | 4973 | 0 | 0 | 0 | 1580 | 0 | 0 | 1580 |
| Link Speed（mph） |  | 35 |  |  | 35 |  |  | 30 |  |  | 30 |  |
| Link Distance（ft） |  | 267 |  |  | 314 |  |  | 617 |  |  | 373 |  |
| Travel Time（s） |  | 5.2 |  |  | 6.1 |  |  | 14.0 |  |  | 8.5 |  |
| Peak Hour Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Adj．Flow（vph） | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Shared Lane Traffic（\％） |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane Group Flow（vph） | 42 | 1408 | 0 | 0 | 1379 | 0 | 0 | 0 | 18 | 0 | 0 | 50 |
| Enter Blocked Intersection | No | Yes | No | No | No | No | No | No | No | No | No | Yes |
| Lane Alignment | Left | R NA | Right | Left | Left | Right | Left | Left | Right | Left | Left | Right |
| Median Width（ft） |  | 20 |  |  | 18 |  |  | 0 |  |  | 0 |  |
| Link Offset（ft） |  | 0 |  |  | 6 |  |  | 0 |  |  | 0 |  |
| Crosswalk Width（ft） |  | 16 |  |  | 16 |  |  | 16 |  |  | 16 |  |
| Two way Left Turn Lane |  |  |  |  |  |  |  |  |  |  |  |  |
| Headway Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Turning Speed（mph） | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 | 15 |  | 9 |
| Sign Control |  | Free |  |  | Free |  |  | Stop |  |  | Stop |  |

## Intersection Summary

Area Type：Other

Control Type：Unsignalized
Intersection Capacity Utilization 49．1\％ICU Level of Service A
Analysis Period（min） 15

| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay，s／veh 0．7 |  |  |  |  | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Movement | EBL | EBT | EBR | WBL |  |  |  |  |  |  |  |  |
| Lane Configurations | ${ }^{1}$ | 虾 |  |  | 虾 $\%$ |  |  |  | 「 |  |  | 「 |
| Traffic Vol，veh／h | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Future Vol，veh／h | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |
| Conflicting Peds，\＃／hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized | － | － | None | － | － | None | － | － | None | － | － | None |
| Storage Length | 90 | － | － | － | － | 200 | － | － | 0 | － | － | 0 |
| Veh in Median Storage，\＃ | \＃ | 0 | － | － | 0 | － | － | 0 | － | － | 0 | － |
| Grade，\％ | － | 0 | － | － | 0 | － | － | 0 | － | － | 0 | － |
| Peak Hour Factor | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Heavy Vehicles，\％ | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Mvmt Flow | 42 | 1370 | 38 | 0 | 1355 | 24 | 0 | 0 | 18 | 0 | 0 | 50 |




## Intersection Summary

```
Area Type: Other
```

Control Type: Unsignalized
Intersection Capacity Utilization 79.2\% ICU Level of Service D
Analysis Period (min) 15

Network Totals

| Number of Intersections | 4 |
| :--- | ---: |
| Control Delay / Veh (s/v) | 25 |
| Queue Delay / Veh (s/v) | 0 |
| Total Delay / Veh (s/v) | 25 |
| Total Delay (hr) | 102 |
| Stops / Veh | 0.39 |
| Stops (\#) | 5582 |
| Average Speed (mph) | 9 |
| Total Travel Time (hr) | 138 |
| Distance Traveled (mi) | 1203 |
| Fuel Consumed (gal) | 161 |
| Fuel Economy (mpg) | 7.5 |
| Co Emissions (kg) | 11.24 |
| NOx Emissions (kg) | 2.19 |
| VOC Emissions (kg) | 2.61 |
| Unserved Venicles (\#) | 83 |
| Vehicles in dilemma zone (\#) | 1177 |
| Performance Index | 117.4 |

Traffic Safety Benefit-Cost Calculation
Highway Safety Improvement Program (HSIP) Reactive Project
mํ
DEPARTMENT OF TRANSPORTATION

## A. Roadway Description

| Route | W 98th St (CSAH 1) | District | Metro | County | Hennepin |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Begin RP |  | End RP |  | Miles |  |
| Location | W 98th St at Dupont Ave/SB I-35W Ramps |  |  |  |  |

## B. Project Description

| Proposed Work Project Cost* | Install high visibility crossings |  |  |
| :---: | :---: | :---: | :---: |
|  |  | Installation Year | 2028 |
| Project Service Life | 20 years | Traffic Growth Factor | 1.12\% |
| * exclude Right of Way from Project Cost |  |  |  |


| C. Crash Modification Factor |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 0.60 | Fatal (K) Crashes | Reference CMF ID 4123 |  |  |
| 0.60 | Serious Injury (A) Crashes |  |  |  |
| 0.60 | Moderate Injury (B) Crashes | Crash Type | Pedestrian |  |
| 0.60 | Possible Injury (C) Crashes |  |  |  |
| 0.60 | Property Damage Only Crashes |  |  | www.CMFclearinghouse.org |


| D. Crash Modification Factor (optional second CMF) |  |  |
| :---: | :---: | :---: |
| Fatal (K) Crashes | Reference |  |
| Serious Injury (A) Crashes |  |  |
| Moderate Injury (B) Crashes | Crash Type |  |
| Possible Injury (C) Crashes |  |  |
| Property Damage Only Crashes |  | www.CMFclearinghouse.org |


F. Benefit-Cost Calculation

| $\$ 2,198,915$ | Benefit (present value) | Cost |
| ---: | :--- | :--- |
| $\$ 0$ | Proposed project expected to reduce 1 crashes annually, 1 of which involving fatality or serious injury. |  |

F. Analysis Assumptions

| Crash Severity | Crash Cost |
| :--- | ---: |
| K crashes | $\$ 1,600,000$ |
| A crashes | $\$ 800,000$ |
| B crashes | $\$ 250,000$ |
| C crashes | $\$ 130,000$ |
| PDO crashes | $\$ 15,000$ |

Link: mndot.gov/planning/program/appendix_a.html

| Real Discount Rate: | $0.8 \%$ | Default |
| :--- | :--- | :--- |
| Traffic Growth Rate: | $1.1 \%$ | Revised |
| Project Service Life: | 20 years | Revised |

G. Annual Benefit

| Crash Severity | Crash Reduction | Annual Reduction | Annual Benefit |
| :--- | :---: | :---: | :---: |
| K crashes | 0.00 | 0.00 | $\$ 0$ |
| A crashes | 0.40 | 0.13 | $\$ 106,667$ |
| B crashes | 0.00 | 0.00 | $\$ 0$ |
| C crashes | 0.00 | 0.00 | $\$ 0$ |
| PDO crashes | 0.00 | 0.00 | $\$ 0$ |

$\$ 106,667$
H. Amortized Benefit

| Year | Crash Benefits | Present Value |  |
| :---: | :---: | :---: | :---: |
| 2028 | \$106,667 | \$106,667 | Total = \$2,198,915 |
| 2029 | \$107,861 | \$107,005 |  |
| 2030 | \$109,069 | \$107,345 |  |
| 2031 | \$110,291 | \$107,686 |  |
| 2032 | \$111,526 | \$108,028 |  |
| 2033 | \$112,775 | \$108,371 |  |
| 2034 | \$114,038 | \$108,715 |  |
| 2035 | \$115,316 | \$109,060 |  |
| 2036 | \$116,607 | \$109,406 |  |
| 2037 | \$117,913 | \$109,753 |  |
| 2038 | \$119,234 | \$110,102 |  |
| 2039 | \$120,569 | \$110,451 |  |
| 2040 | \$121,920 | \$110,802 |  |
| 2041 | \$123,285 | \$111,154 |  |
| 2042 | \$124,666 | \$111,506 |  |
| 2043 | \$126,062 | \$111,860 |  |
| 2044 | \$127,474 | \$112,216 |  |
| 2045 | \$128,902 | \$112,572 |  |
| 2046 | \$130,345 | \$112,929 |  |
| 2047 | \$131,805 | \$113,288 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 | NOTE: |
| 0 | \$0 | \$0 | This calculation relies on the real discount rate, which accounts |
| 0 | \$0 | \$0 | for inflation. No further discounting is necessary. |
| 0 | \$0 | \$0 |  |

Traffic Safety Benefit-Cost Calculation
Highway Safety Improvement Program (HSIP) Reactive Project

## A. Roadway Description

| Route | W 98th St (CSAH 1) | District | Metro | County | Hennepin |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Begin RP |  | End RP |  | Miles |  |
| Location | W 98th St at Dupont Ave/SB I-35W Ramps |  |  |  |  |

## B. Project Description

| Proposed Work Change right tur | Change right turn lane geometry to increase line of sight and install high visibility crossings |  |
| :---: | :---: | :---: |
| Project Cost* | Installation Year | 2028 |
| Project Service Life 20 years | Traffic Growth Factor | 1.12\% |
| * exclude Right of Way from Project Cost |  |  |


| C. Crash Modification Factor |  |  |  |
| :--- | :--- | :--- | :--- |
| 0.33 | Fatal (K) Crashes | Reference CMF ID 8499 (RT Geometry) and CMF ID 4124 (Crossing) |  |
| 0.33 | Serious Injury (A) Crashes |  |  |
| 0.33 | Moderate Injury (B) Crashes | Crash Type All |  |
| 0.33 | Possible Injury (C) Crashes |  |  |
| 0.33 | Property Damage Only Crashes |  | www.CMFclearinghouse.org |

D. Crash Modification Factor (optional second CMF)

|  | Fatal (K) Crashes | Reference |  |
| :--- | :--- | :--- | :--- |
|  | Serious Injury (A) Crashes |  |  |
|  | Moderate Injury (B) Crashes | Crash Type |  |
|  |  |  | www.CMFclearinghouse.org |


| E. Crash Data |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Begin Date <br> Data Source | 1/1/2020 | End Date | 12/31/2022 | 3 years |
|  | MnCMAT2 |  |  |  |
|  | Crash Severity | All | < optional 2nd CMF > |  |
|  | K crashes |  |  |  |
|  | A crashes |  |  |  |
|  | B crashes | 2 |  |  |
|  | C crashes |  |  |  |
|  | PDO crashes | 2 |  |  |

F. Benefit-Cost Calculation
\$2,450,160

Benefit (present value)
Cost

## $B / C$ Ratio $=N / A$

Proposed project expected to reduce 1 crashes annually, o of which involving fatality or serious injury.
F. Analysis Assumptions

| Crash Severity |  |
| :--- | ---: |
| K crashes | $\$ 1,600,000$ |
| A crashes | $\$ 800,000$ |
| B crashes | $\$ 250,000$ |
| C crashes | $\$ 130,000$ |
| PDO crashes | $\$ 15,000$ |

Link: mndot.gov/planning/program/appendix_a.html

| Real Discount Rate: | $0.8 \%$ | Default |
| :--- | :--- | :--- |
| Traffic Growth Rate: | $1.1 \%$ | Revised |
| Project Service Life: | 20 years | Revised |

G. Annual Benefit

| Crash Severity | Crash Reduction | Annual Reduction | Annual Benefit |
| :--- | :---: | :---: | :---: |
| K crashes | 0.00 | 0.00 | $\$ 0$ |
| A crashes | 0.00 | 0.00 | $\$ 0$ |
| B crashes | 1.35 | 0.45 | $\$ 112,127$ |
| C crashes | 0.00 | 0.00 | $\$ 0$ |
| PDO crashes | 1.35 | 0.45 | $\$ 6,728$ |

H. Amortized Benefit

| Year | Crash Benefits | Present Value |  |
| :---: | :---: | :---: | :---: |
| 2028 | \$118,854 | \$118,854 | Total = \$2,450,160 |
| 2029 | \$120,185 | \$119,232 |  |
| 2030 | \$121,532 | \$119,610 |  |
| 2031 | \$122,893 | \$119,990 |  |
| 2032 | \$124,269 | \$120,371 |  |
| 2033 | \$125,661 | \$120,753 |  |
| 2034 | \$127,068 | \$121,136 |  |
| 2035 | \$128,491 | \$121,521 |  |
| 2036 | \$129,931 | \$121,907 |  |
| 2037 | \$131,386 | \$122,294 |  |
| 2038 | \$132,857 | \$122,682 |  |
| 2039 | \$134,345 | \$123,071 |  |
| 2040 | \$135,850 | \$123,462 |  |
| 2041 | \$137,371 | \$123,854 |  |
| 2042 | \$138,910 | \$124,247 |  |
| 2043 | \$140,466 | \$124,642 |  |
| 2044 | \$142,039 | \$125,037 |  |
| 2045 | \$143,630 | \$125,434 |  |
| 2046 | \$145,239 | \$125,832 |  |
| 2047 | \$146,865 | \$126,232 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 | NOTE: |
| 0 | \$0 | \$0 | This calculation relies on the real discount rate, which accounts |
| 0 | \$0 | \$0 | for inflation. No further discounting is necessary. |
| 0 | \$0 | \$0 |  |

Traffic Safety Benefit-Cost Calculation
Highway Safety Improvement Program (HSIP) Reactive Project

## A. Roadway Description

| Route | W 98th St (CSAH 1) | District | Metro | County | Hennepin |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Begin RP |  | End RP |  | Miles |  |
| Location | W 98th St at Dupont Ave/SB I-35W Ramps |  |  |  |  |

## B. Project Description

Proposed Work
New signal that changes permitted phasing on minor apporah to protected/permissive FYA and install high visibility crossings

| Project Cost* |  | Installation Year | 2028 |
| :---: | :---: | :---: | :---: |
| Project Service Life | 20 years | Traffic Growth Factor | 1.12\% |
| * exclude Right of Wa | from Project Cost |  |  |


| 0.59 | Fatal (K) Crashes | Reference | CMF ID 342 (Signal Phasing) and CMF ID 4124 (Crossing) |  |
| :---: | :---: | :---: | :---: | :---: |
| 0.59 | Serious Injury (A) Crashes |  |  |  |
| 0.59 | Moderate Injury (B) Crashes | Crash Type | Angle |  |
| 0.59 | Possible Injury (C) Crashes |  |  |  |
| 0.59 | Property Damage Only Crashes |  |  | www.CMFclearinghouse.org |

D. Crash Modification Factor (optional second CMF)

| 0.81 | Fatal (K) Crashes | Reference CMF ID 4124 (Crossing) |  |
| :--- | :--- | :--- | :--- |
| 0.81 | Serious Injury (A) Crashes |  |  |
| 0.81 | Moderate Injury (B) Crashes | Crash Type All |  |
| 0.81 | Possible Injury (C) Crashes |  |  |
| 0.81 | Property Damage Only Crashes |  | www.CMFclearinghouse.org |

E. Crash Data

| Begin Date | 1/1/ | End Date | 12/31/2022 | 3 years |
| :---: | :---: | :---: | :---: | :---: |
| Data Source | MnCMAT2 |  |  |  |
|  | Crash Severity | Angle | All |  |
|  | K crashes |  |  |  |
|  | A crashes |  |  |  |
|  | B crashes |  | 1 |  |
|  | C crashes | 2 | 2 |  |
|  | PDO crashes | 3 | 1 |  |

F. Benefit-Cost Calculation
$\frac{\$ 1,542,013}{\$ 0}$ Benefit (present value) Cost

## $B / C$ Ratio $=N / A$

Proposed project expected to reduce 1 crashes annually, o of which involving fatality or serious injury.
F. Analysis Assumptions

| Crash Severity |  |
| :--- | ---: |
| K crashes | $\$ 1,600,000$ |
| A crashes | $\$ 800,000$ |
| B crashes | $\$ 250,000$ |
| C crashes | $\$ 130,000$ |
| PDO crashes | $\$ 15,000$ |

Link: mndot.gov/planning/program/appendix_a.html

| Real Discount Rate: | $0.8 \%$ | Default |
| :--- | :--- | :--- |
| Traffic Growth Rate: | $1.1 \%$ | Revised |
| Project Service Life: | 20 years | Revised |

G. Annual Benefit

| Crash Severity | Crash Reduction | Annual Reduction | Annual Benefit |
| :--- | :---: | :---: | :---: |
| K crashes | 0.00 | 0.00 | $\$ 0$ |
| A crashes | 0.00 | 0.00 | $\$ 0$ |
| B crashes | 0.19 | 0.06 | $\$ 15,833$ |
| C crashes | 1.20 | 0.40 | $\$ 51,887$ |
| PDO crashes | 1.42 | 0.47 | $\$ 7,081$ |

$\$ 74,801$
H. Amortized Benefit

| Year | Crash Benefits | Present Value |  |
| :---: | :---: | :---: | :---: |
| 2028 | \$74,801 | \$74,801 | Total $=$ \$1,542,013 |
| 2029 | \$75,639 | \$75,039 |  |
| 2030 | \$76,486 | \$75,277 |  |
| 2031 | \$77,343 | \$75,516 |  |
| 2032 | \$78,209 | \$75,756 |  |
| 2033 | \$79,085 | \$75,996 |  |
| 2034 | \$79,971 | \$76,237 |  |
| 2035 | \$80,866 | \$76,479 |  |
| 2036 | \$81,772 | \$76,722 |  |
| 2037 | \$82,688 | \$76,966 |  |
| 2038 | \$83,614 | \$77,210 |  |
| 2039 | \$84,550 | \$77,455 |  |
| 2040 | \$85,497 | \$77,701 |  |
| 2041 | \$86,455 | \$77,948 |  |
| 2042 | \$87,423 | \$78,195 |  |
| 2043 | \$88,402 | \$78,443 |  |
| 2044 | \$89,393 | \$78,692 |  |
| 2045 | \$90,394 | \$78,942 |  |
| 2046 | \$91,406 | \$79,193 |  |
| 2047 | \$92,430 | \$79,444 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 | NOTE: |
| 0 | \$0 | \$0 | This calculation relies on the real discount rate, which accounts |
| 0 | \$0 | \$0 | for inflation. No further discounting is necessary. |
| 0 | \$0 | \$0 |  |

Traffic Safety Benefit-Cost Calculation
Highway Safety Improvement Program (HSIP) Reactive Project

DEPARTMENT OF TRANSPORTATION

## A. Roadway Description

| Route | W 98th St (CSAH 1) | District | Metro | County <br> Miles |
| :---: | :---: | :---: | :---: | :---: |
| Begin RP |  | End RP |  |  |
| Location | W 98th St at NB I-35W Ramps |  |  |  |

## B. Project Description



| C. Crash Modification Factor |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 0.05 | Fatal (K) Crashes | Reference | CMF ID 3071 (Right Turn Lane) \& CMF ID 4124 (Crossing) |  |
| 0.05 | Serious Injury (A) Crashes |  |  |  |
| 0.05 | Moderate Injury (B) Crashes | Crash Type | Rear End |  |
| 0.05 | Possible Injury (C) Crashes |  |  |  |
| 0.05 | Property Damage Only Crashes |  |  | www.CMFclearinghouse.org |

D. Crash Modification Factor (optional second CMF)

| 0.81 | Fatal (K) Crashes | Reference CMF ID 4124 (Crossing) |  |
| :--- | :--- | :--- | :--- |
| 0.81 | Serious Injury (A) Crashes |  |  |
| 0.81 | Moderate Injury (B) Crashes | Crash Type All |  |
| 0.81 | Possible Injury (C) Crashes |  |  |
| 0.81 | Property Damage Only Crashes |  | www.CMFclearinghouse.org |


F. Benefit-Cost Calculation

| $\$ 1,946,603$ | Benefit (present value) | Cost |
| ---: | :--- | :--- |$\quad \mathbf{B} / \mathbf{C}$ Ratio $=\mathbf{N} / \mathbf{A}$

F. Analysis Assumptions

| Crash Severity |  |
| :--- | ---: |
| K crashes | $\$ 1,600,000$ |
| A crashes | $\$ 800,000$ |
| B crashes | $\$ 250,000$ |
| C crashes | $\$ 130,000$ |
| PDO crashes | $\$ 15,000$ |

Link: mndot.gov/planning/program/appendix_a.html

| Real Discount Rate: | $0.8 \%$ | Default |
| :--- | :--- | :--- |
| Traffic Growth Rate: | $1.1 \%$ | Revised |
| Project Service Life: | 20 years | Revised |

G. Annual Benefit

| Crash Severity | Crash Reduction | Annual Reduction | Annual Benefit |
| :--- | :---: | :---: | :---: |
| K crashes | 0.00 | 0.00 | $\$ 0$ |
| A crashes | 0.00 | 0.00 | $\$ 0$ |
| B crashes | 0.57 | 0.19 | $\$ 47,500$ |
| C crashes | 0.95 | 0.32 | $\$ 41,227$ |
| PDO crashes | 1.14 | 0.38 | $\$ 5,700$ |

$\$ 94,427$
H. Amortized Benefit

| Year | Crash Benefits | Present Value |  |
| :---: | :---: | :---: | :---: |
| 2028 | \$94,427 | \$94,427 | Total = \$1,946,603 |
| 2029 | \$95,485 | \$94,727 |  |
| 2030 | \$96,554 | \$95,028 |  |
| 2031 | \$97,636 | \$95,329 |  |
| 2032 | \$98,729 | \$95,632 |  |
| 2033 | \$99,835 | \$95,936 |  |
| 2034 | \$100,953 | \$96,240 |  |
| 2035 | \$102,084 | \$96,546 |  |
| 2036 | \$103,227 | \$96,852 |  |
| 2037 | \$104,383 | \$97,160 |  |
| 2038 | \$105,552 | \$97,468 |  |
| 2039 | \$106,735 | \$97,778 |  |
| 2040 | \$107,930 | \$98,088 |  |
| 2041 | \$109,139 | \$98,399 |  |
| 2042 | \$110,361 | \$98,712 |  |
| 2043 | \$111,597 | \$99,025 |  |
| 2044 | \$112,847 | \$99,340 |  |
| 2045 | \$114,111 | \$99,655 |  |
| 2046 | \$115,389 | \$99,971 |  |
| 2047 | \$116,681 | \$100,289 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 |  |
| 0 | \$0 | \$0 | NOTE: |
| 0 | \$0 | \$0 | This calculation relies on the real discount rate, which accounts |
| 0 | \$0 | \$0 | for inflation. No further discounting is necessary. |
| 0 | \$0 | \$0 |  |

## Dupont-SB 35 Exit at W 98th St

| CMF(s) Applied | InCIDENTID | CRASH_MONTH | CRASH_DAY | CRASH_YEAR | CRASHSEVERITY | IBEROFVEH | BASIC_TYPE | DIRECTIONU1 | DIRECTIONU2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Signal Phasing (342) <br> High Visibility Crossing (4124) | 974966 | 11-Nov | 19 | 2021 | Property Damage Only | 2 | Angle | Eastbound | Southbound |
|  | 944865 | 10-Oct | 4 | 2021 | Possible Injury | 2 | Angle | Eastbound | Southbound |
|  | 812088 | 5-May | 22 | 2020 | Property Damage Only | 2 | Angle | Southbound | Eastbound |
|  | 1053565 | 10-Oct | 24 | 2022 | Possible Injury | 2 | Angle | Eastbound | Southbound |
|  | 1045848 | 9-Sep | 15 | 2022 | Property Damage Only | 2 | Angle | Eastbound | Southbound |
| High Visibility Crossing (4124) | 1049186 | 10-Oct | 2 | 2022 | Minor Injury | 2 | Left Turn | Eastbound | Westbound |
| High Visibility Crossing (4124) | 1013588 | 3-Mar | 21 | 2022 | Possible Injury | 2 | Left Turn | Eastbound | Westbound |
| High Visibility Crossing (4123) | 1048685 | $9-\mathrm{Sep}$ | 29 | 2022 | Serious Injury | 1 | Pedestrian | Eastbound |  |
| High Visibility Crossing (4124) | 1052189 | 10-Oct | 17 | 2022 | Property Damage Only | 2 | Rear End | Eastbound | Eastbound |
|  | 821775 | 7-Jul | 25 | 2020 | Minor Injury | 2 | Rear End - SBR | Southbound | Southbound |
| Change RT Geometry (8499) | 781758 | 1-Jan | 20 | 2020 | Property Damage Only | 2 | Rear End - SBR | Southbound | Southbound |
| High Visibility Crossing (4124) | 908380 | 5-May | 28 | 2021 | Minor Injury | 2 | Rear End - SBR | Southbound | Southbound |
|  | 1050879 | 10-Oct | 11 | 2022 | Property Damage Only | 2 | Right Turn | Southbound | Westbound |
| High Visibility Crossing (4124) | 801960 | 3-Mar | 3 | 2020 | Possible Injury | 6 | Sideswipe Opposing | Eastbound | Westbound |
| N/A | 986096 | 12-Dec | 31 | 2021 | Serious Injury | 1 | Single Vehicle Run Off Road | Southbound |  |
| N/A | 898036 | 3-Mar | 28 | 2021 | Property Damage Only | 1 | Single Vehicle Run Off Road | Southbound |  |
| N/A | 1060046 | 11-Nov | 21 | 2022 | Property Damage Only | 1 | Single Vehicle Run Off Road | Southbound |  |
| N/A | 945272 | 10-Oct | 6 | 2021 | Property Damage Only | 1 | Single Vehicle Run Off Road | Southbound |  |

## EB 98th at SB Entrance Ramp

| CMF(s) Applied | INCIDENTID | CRASH_MONTH | CRASH_DAY | CRASH_YEAR |
| :---: | :---: | :---: | :---: | :---: |
| N/A | 866542 | 12-Dec | 4 | 2020 |
| N/A | 844192 | 9-Sep | 24 | 2020 |


| CRASHSEVERITY | IBEROFVEH | BASIC_TYPE | DIRECTIONU1 | DIRECTIONU2 |
| :---: | :---: | :---: | :---: | :---: |
| Possible Injury | 2 | Rear End | Eastbound | Eastbound |
| Property Damage Only | 2 | Sideswipe Same Direction | Eastbound | Eastbound |

NB 35W Ramps at W 98th St

| CMF(s) Applied | INCIDENTID | CRASH_MONTH | CRASH_DAY | CRASH_YEAR | CRASHSEVERITY | IBEROFVEH | BASIC_TYPE | DIRECTIONU1 | DIRECTIONU2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| High Visibility Crossing (4124) | 1070833 | 12-Dec | 24 | 2022 | Property Damage Only | 2 | Angle | Northbound | Northbound |
| High Visibility Crossing (4124) | 887834 | 2-Feb | 3 | 2021 | Property Damage Only | 2 | Angle | Southbound | Westbound |
| High Visibility Crossing (4124) | 914700 | 6-Jun | 27 | 2021 | Minor Injury | 2 | Angle | Eastbound | Northbound |
| High Visibility Crossing (4124) | 889392 | 2-Feb | 4 | 2021 | Property Damage Only | 2 | Left Turn | Westbound | Eastbound |
| High Visibility Crossing (4124) | 973665 | 11-Nov | 13 | 2021 | Property Damage Only | 2 | Sideswipe Same Direction | Eastbound | Eastbound |
| High Visibility Crossing (4124) | 1014435 | 3-Mar | 27 | 2022 | Minor Injury | 3 | Rear End | Eastbound | Eastbound |
| Add Right Turn Lane (3071) <br> High Visibility Crossing (4124) | 912322 | 6-Jun | 15 | 2021 | Possible Injury | 2 | Rear End | Westbound | Westbound |
| High Visibility Crossing (4124) | 942385 | 9-Sep | 22 | 2021 | Property Damage Only | 2 | Rear End | Northbound | Northbound |
| High Visibility Crossing (4124) | 806883 | 4-Apr | 13 | 2020 | Minor Injury | 2 | Sideswipe Same Direction | Northbound | Westbound |
| High Visibility Crossing (4124) | 1061263 | 11-Nov | 25 | 2022 | Property Damage Only | 3 | Rear End | Eastbound | Eastbound |

CRASH MODIFICATION FACTORS CLEARINGHOUSE

## CMF / CRF Details

CMF ID: 342
CMF Name: Changed permitted to permitted/protected on minor approach

## Description:

## Prior Condition: No Prior Condition(s)

## Category: Intersection traffic control

Study ID: Safety Effects of Left-Turn Phasing Schemes at High-Speed Intersections, Davis and Aul 2007

|  |  |
| :--- | :--- |
|  | Star Quality Rating |
| Star Quality Rating: | 4 Stars |
|  |  |
|  | Crash Modification Factor (CMF) |
| Value: | 0.73 |
| Adjusted Standard Error: | 0.98 |
| Unadjusted Standard Error: | 0.55 |


|  |  | Crash Reduction Factor |
| ---: | :--- | :--- |
| Value: | 27 |  |
| Adjusted Standard Error: | 98 |  |
| Unadjusted Standard Error: | 55 |  |

## Applicability

| Crash Type: | Angle |
| :---: | :---: |
| Crash Severity: | Not specified |
| Roadway Types: | Not specified |
| Minimum Number of Lanes: |  |
| Maximum Number of Lanes: |  |
| Number of Lanes Direction: |  |
| Number of Lanes Comment: |  |
| Road Division Type: |  |
| Minimum Speed Limit: |  |
| Maximum Speed Limit: |  |
| Speed Unit: |  |
| Speed Limit Comment: |  |
| Area Type: | Urban |
| Traffic Volume: |  |
| Average Traffic Volume: |  |
| Time of Day: |  |
|  | If countermeasure is intersection-based. |
| Intersection Type: | Roadway/roadway (not interchange related) |
| Intersection Geometry: | Not specified |
| Traffic Control: | Signalized |
| Major Road Traffic Volume: |  |
| Minor Road Traffic Volume: |  |

Average Major Road Volume:

Average Minor Road Volume:

## Development Details

| Date Range of Data Used: |  |
| ---: | :--- | :--- |
| Municipality: |  |
| State: |  |
| Country: |  |
| Type of Methodology Used: | Before/after using empirical Bayes or full Bayes |

## Other Details

| Included in HSM: | No |
| ---: | :--- | :--- |
| Date Added to Clearinghouse: | Dec 01, 2009 |
| Comments: | The number of crashes in the after period were not reported in this study, <br> however, they have been recorded as 300 to give 10 points as a beneift of <br> doubt for one or more of the following: (1) number of miles/sites in the <br> reference/treatment group, (2) number of crashes in the references/treatment <br> group, (3) reporting AADTs for the aggregate dataset but not for the <br> disaggragate dataset used for CMF development. |

[^0]The information contained in the Crash Modification Factors (CMF) Clearinghouse is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The U.S.
Government assumes no liability for the use of the information contained in the CMF Clearinghouse. The information contained in the CMF Clearinghouse does not constitute a standard, specification, or regulation, nor is it a substitute for sound engineering judgment.

CRASH MODIFICATION FACTORS CLEARINGHOUSE

## CMF / CRF Details

CMF ID: 3071
CMF Name: Presence of right turning lane on arterial with signal coordination

## Description:

## Prior Condition: No Prior Condition(s)

Category: Intersection geometry
Study ID: Safety Effect of Arterial Signal Coordination, Wei and Tarko 2011

|  |  | Star Quality Rating |
| ---: | :--- | :--- |
| Star Quality Rating: | 4 Stars |  |
|  | Crash Modification Factor (CMF) |  |
| Value: | 0.06 |  |
| Adjusted Standard Error: |  |  |
| Unadjusted Standard Error: | 0.02 |  |
| Value: | 93.6 |  |
| Crash Reduction Factor |  |  |
| Adjusted Standard Error: |  |  |
| Unadjusted Standard Error: | 2.1 |  |

## Applicability

| Crash Type: | Rear end |
| :---: | :---: |
| Crash Severity: | All |
| Roadway Types: | All |
| Minimum Number of Lanes: | 1 |
| Maximum Number of Lanes: | 3 |
| Number of Lanes Direction: |  |
| Number of Lanes Comment: |  |
| Road Division Type: |  |
| Minimum Speed Limit: | 30 |
| Maximum Speed Limit: | 50 |
| Speed Unit: | mph |
| Speed Limit Comment: |  |
| Area Type: | Urban and suburban |
| Traffic Volume: |  |
| Average Traffic Volume: |  |
| Time of Day: | All |
|  | If countermeasure is intersection-based. |
| Intersection Type: | Roadway/roadway (not interchange related) |
| Intersection Geometry: |  |
| Traffic Control: | Signalized |
| Major Road Traffic Volume: | Maximum of 1840 Vehicles Per Hour |
| Minor Road Traffic Volume: |  |

Average Major Road Volume:

Average Minor Road Volume:

## Development Details

| Date Range of Data Used: | 2003 to 2006 |
| ---: | :--- | :--- |
| Municipality: |  |
| State: | IN |
| Country: | USA |
| Type of Methodology Used: | Regression cross-section |
| Sample Size (crashes): | 324 crashes |

## Other Details

| Included in HSM: | No |
| ---: | :--- |
| Date Added to Clearinghouse: | Jul 15, 2011 |
| Comments: | The volume is entered as vehicles per hour per lane |
|  |  |

[^1]
## CMF / CRF Details

CMF ID: 4123
CMF Name: Install high-visibility crosswalk
Description: High-visibility crosswalks aim to increase awareness of pedestriar
Prior Condition: High visibility crosswalks aim to increase awareness of pedest

## Category: Pedestrians

Study ID: The Relative Effectiveness of Pedestrian Safety Countermeasures at Urban Intersections - Lessons from a New York City Experience, Li Chen, Cynthia Chen, and Reid Ewing 2012

|  |  |
| :--- | :--- |
|  | Star Quality Rating |
| Star Quality Rating: | 2 Stars |
|  |  |
|  | Crash Modification Factor (CMF) |
| Value: | 0.6 |
| Adjusted Standard Error: |  |
| Unadjusted Standard Error: |  |


|  | Crash Reduction Factor |
| ---: | :--- |
| Value: | 40 |
| Adjusted Standard Error: |  |
| Unadjusted Standard Error: |  |

## Applicability

| Crash Type: | Vehicle/pedestrian |
| :---: | :---: |
| Crash Severity: | All |
| Roadway Types: | Not Specified |
| Minimum Number of Lanes: |  |
| Maximum Number of Lanes: |  |
| Number of Lanes Direction: |  |
| Number of Lanes Comment: |  |
| Road Division Type: |  |
| Minimum Speed Limit: |  |
| Maximum Speed Limit: |  |
| Speed Unit: |  |
| Speed Limit Comment: |  |
| Area Type: | Urban |
| Traffic Volume: |  |
| Average Traffic Volume: |  |
| Time of Day: | All |
|  | If countermeasure is intersection-based. |
| Intersection Type: | Roadway/roadway (not interchange related) |
| Intersection Geometry: | 3-leg, $4-\mathrm{leg}$ |
| Traffic Control: | Not specified |
| Major Road Traffic Volume: |  |
| Minor Road Traffic Volume: |  |

Average Major Road Volume:

Average Minor Road Volume:

## Development Details

| Date Range of Data Used: | 1998 to 2008 |
| ---: | :--- |
| Municipality: | New York City |
| Country: | USA |
| Type of Methodology Used: | Simple before/after |
| Sample Size (crashes): | 63 crashes before, 15 crashes after |

## Other Details

| Included in HSM: |
| ---: |
| Date Added to Clearinghouse: |
| Comments: |

The treatment group included both signalized and unsignalized intersections. The corresponding change in crashes in the comparison group was an 18 percent reduction in pedestrian-vehicle crashes. This could be used to adjust the treatment effect to account for other factors not related to the treatment.

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the
University of North Carolina Highway Safety Research Center

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Government assumes no liability for the use of the information contained in the CMF Clearinghouse. The
information contained in the CMF Clearinghouse does not constitute a standard, specification, or regulation, nor is it a substitute for sound engineering judgment.

## CMF / CRF Details

CMF ID: 4124
CMF Name: Install high-visibility crosswalk
Description: High-visibility crosswalks aim to increase awareness of pedestriar
Prior Condition: High visibility crosswalks aim to increase awareness of pedest

## Category: Pedestrians

Study ID: The Relative Effectiveness of Pedestrian Safety Countermeasures at Urban Intersections - Lessons from a New York City Experience, Li Chen, Cynthia Chen, and Reid Ewing 2012

|  |  |
| :--- | :--- |
|  | Star Quality Rating |
| Star Quality Rating: | 2 Stars |
|  |  |
|  | Crash Modification Factor (CMF) |
| Value: | 0.81 |
| Adjusted Standard Error: |  |
| Unadjusted Standard Error: |  |


|  | Crash Reduction Factor |
| ---: | :--- |
| Value: | 19 |
| Adjusted Standard Error: |  |
| Unadjusted Standard Error: |  |

## Applicability

| Crash Type: | Angle,Head on,Left turn,Rear end,Rear to rear,Right turn,Sideswipe |
| :---: | :---: |
| Crash Severity: | All |
| Roadway Types: | Not Specified |
| Minimum Number of Lanes: |  |
| Maximum Number of Lanes: |  |
| Number of Lanes Direction: |  |
| Number of Lanes Comment: |  |
| Road Division Type: |  |
| Minimum Speed Limit: |  |
| Maximum Speed Limit: |  |
| Speed Unit: |  |
| Speed Limit Comment: |  |
| Area Type: | Urban |
| Traffic Volume: |  |
| Average Traffic Volume: |  |
| Time of Day: | All |
|  | If countermeasure is intersection-based. |
| Intersection Type: | Roadway/roadway (not interchange related) |
| Intersection Geometry: | 3-leg, $4-\mathrm{leg}$ |
| Traffic Control: | Not specified |
| Major Road Traffic Volume: |  |
| Minor Road Traffic Volume: |  |

Average Major Road Volume:

Average Minor Road Volume:

## Development Details

| Date Range of Data Used: | 1998 to 2008 |
| ---: | :--- |
| Municipality: | New York City |
| State: | NY |
| Country: | USA |
| Type of Methodology Used: | Simple before/after |
| Sample Size (crashes): | 262 crashes before, 85 crashes after |

## Other Details

| Included in HSM: |
| ---: |
| Date Added to Clearinghouse: |
| Comments: |

The treatment intersections included both signalized and unsignalized intersections. The corresponding change in crashes in the comparison group was a 39 percent reduction in pedestrian-vehicle crashes. This could be used to adjust the treatment effect to account for other factors not related to the treatment.

[^2]
## CMF / CRF Details

CMF ID: 8499
CMF Name: Change right-turn lane geometry to increase line of sight (approach
Description: Changes made to study approaches include: sharpening the flat a
Prior Condition: Traditional right-turn lane design
Category: Intersection geometry
Study ID: Effectiveness Evaluation of a Modified Right-Turn Lane Design at Intersections, Schattler et al. 2016

|  | Star Quality Rating |
| ---: | :--- |
| Star Quality Rating: | 4 Stars |
|  |  |
|  | Crash Modification Factor (CMF) |
| Value: | 0.404 |
| Adjusted Standard Error: |  |
| Unadjusted Standard Error: | 0.113 |


|  | Crash Reduction Factor |
| ---: | :--- |
| Value: | 59.6 |
| Adjusted Standard Error: |  |
| Unadjusted Standard Error: | 11.27 |

## Applicability

| Crash Type: | Right turn |
| :---: | :---: |
| Crash Severity: | All |
| Roadway Types: | All |
| Minimum Number of Lanes: |  |
| Maximum Number of Lanes: |  |
| Number of Lanes Direction: |  |
| Number of Lanes Comment: |  |
| Road Division Type: |  |
| Minimum Speed Limit: | 25 |
| Maximum Speed Limit: | 45 |
| Speed Unit: | mph |
| Speed Limit Comment: |  |
| Area Type: |  |
| Traffic Volume: |  |
| Average Traffic Volume: |  |
| Time of Day: |  |
|  | If countermeasure is intersection-based. |
| Intersection Type: | Other |
| Intersection Geometry: | No values chosen. |
| Traffic Control: | Other |
| Major Road Traffic Volume: |  |
| Minor Road Traffic Volume: |  |

Average Major Road Volume:

Average Minor Road Volume:

## Development Details

| Date Range of Data Used: | 2003 to 2014 |
| ---: | :--- | :--- |
| Sunicipality: |  |
| Country: | IL |
| Type of Methodology Used: | Before/after using empirical Bayes or full Bayes |
| Sample Size (crashes): | 161 crashes before, 45 crashes after |
| Sample Size (sites): | 7 sites before, 7 sites after |
| Sample Size (site-years): | site-years before, 21 site-years after |

## Other Details

| Included in HSM: | No |
| ---: | :--- | :--- |
| Date Added to Clearinghouse: | Mar 13, 2017 |
| Comments: | CMF applies only to treated approaches. Intersection AADT ranges from <br> 15,558 to 29,992. CMF applies to both stop-controlled and signalized <br> intersections. Roadway/roadway both interchange and not-interchange <br> related. |

[^3]

# West $98^{\text {th }}$ Steet at I-35W Project City of Bloomington 

Project Name: West $98^{\text {th }}$ St at I-35W Project
Applicant: City of Bloomington
Route: W $98^{\text {th }}$ Street (CSAH 1)
Location: Bloomington, MN
Application Category: Roadway Reconstruction/Modernization

## Funding Information:

Requested Award Amount: \$3,455,040
Local Match: \$863,760
Project Total: \$4,318,800

## Additional Funding Sources:

- City of Bloomington local and State Aid funding


## Primary Contact:

Amy Marohn
Assistant Traffic Engineer
amarohn@BloomingtonMN.gov
952-563-8700

## Project Description

The Bloomington W 98th St at I-35W modernization project will reconstruct and modernize W 98th St. from west of the southbound I-35W ramp/Dupont Ave. intersection to east of the northbound I-35W ramp/E Bloomington Fwy intersection to significantly address safety issues through geometric improvements and to include important pedestrian and transit amenities and enhancements. W 98th St. is classified as an A Minor Arterial Expander and the I-35W ramps are part of the Principal Arterial network. The proposed project will construct a package of improvements that are more consistent with the surrounding community's needs. Key corridor improvements will include:

- Elimination of dangerous free right turning movements that threaten pedestrian and bicyclist safety.
- Addition of 10 ft . trails on both sides of $\mathrm{W} 98^{\text {th }} \mathrm{St}$
- Decrease pedestrian crossing distance on all intersection legs
- Readjusted signal patterns that better serve the needs of multimodal users
- Adjust intersection geometry to calm vehicle traffic
- Eliminate ADA accessibility barriers
- Safe last-mile connections to daily services
- Consideration of bus bypass shoulder on I-35 W off ramps to increase transit efficiency


## Project Benefits

The W 98 ${ }^{\text {th }}$ St at I-35W project will deliver benefits that support nearby community multimodal needs, while also servicing regional traffic effectively. The project will uniquely meet the needs of nearby vulnerable population. There are 1,251 units of affordable housing within a $1 / 2$ mile of the project, many with a focus on lowering barriers to housing for disabled individuals. These residents will experience greater multimodal access and safety throughout the corridor.


Regional Significance/Context
W $98^{\text {th }}$ St (CSAH 1) is regionally significant route, serving both commuter and transit regional trips. Nine different transit routes utilize the project corridor and will benefit from transit priority improvements that will facilitate more efficient and reliable transit service. The area is expected to grow into a multimodal transit hub in the future. The corridor is also part of the regional truck tier freight network as well as the Regional Bicycle Transportation Network.


Project Development and Status
Extensive community engagement was conducted in the development of this project with a focus on hard-to-reach populations. The project is currently in the preliminary design phase. With a Regional Solicitation award, the project will be on track to be constructed in 2026.


Project Website: https://letstalk.bloomingtonmn.gov/west98th


## HousingLink

## Property Detail

Blooming Glen Townhomes
Multiple addresses Ilsted at Bottom of
page

Funding Categories
Project-Based Subsidy
Subsidized-Other
Tax Credit (LIHTC 4\%)
Tax Credit (LIHTC 9\%)
Property Information
Year Built: 1981
Building Type: Townhome
Groups Served: Family
Total Units: 50
Affordable Units: 50
Âffordable Unilts by Beãroom
2 BR: 28
3 BR: 18
4 BR: 4
Units by Ârea Međlian Income
30\%: 50

About Streams


Housing+Transit Cost
Walk Score ${ }^{\circledR}$ : 61
Report a problem

Known Property Addresses

| 1 | 735 Northglen Dr | Bloomington |
| ---: | :--- | :--- |
| 2 | 702 Southglen Dr | Bloomington |
| 3 | 704 Southglen Dr | Bloomington |
| 4 | 717 Northglen Dr | Bloomington |
| 5 | 749 Northglen Dr | Bloomington |
| 6 | 717 Southglen Dr | Bloomington |
| 7 | 731 Southglen Dr | Bloomington |
| 8 | 701 Southglen Dr | Bloomington |
| 9 | 715 Southglen Dr | Bloomington |
| 10 | 747 Southglen Dr | Bloomington |
| 11 | 751 Northglen Dr | Bloomington |
| 12 | 765 Northglen Dr | Bloomington |
| 13 | 731 Northglen Dr | Bloomington |
| 14 | 733 Southglen Dr | Bloomington |

Funding Dates \& Programs
First known closing: 1/1/2007
Most recent closing: 12/21/2011

Earliest expiration: 9/18/2007
Last Activity: Preservation

## County: County

MHFA: LHIA
Close Date: 9/18/2007
Expiration: 9/18/2007
HUD: Section 8 (PBA)
Close Date: 12/21/2011
Expiration: 12/20/2031
MHFA: Housing Tax Credits 9\% Close Date: 1/1/2007
Estimated Expiration: 1/1/2037
MHFA: EDHC
Close Date: 9/18/2007
Expiration: 9/18/2037
MHFA: ELHIF
Close Date: 9/18/2007
Expiration: 9/18/2037
MHFA: Housing Tax Credits 4\%
Close Date: 1/1/2008
Expiration: 1/1/2038
MHFA: LMIR
Close Date: 9/18/2007
Expiration: 10/1/2038
Known Froperty Identifiers
HousingLink: 4097
HUD: 800010782
MHFA: D0198
HUDLIHTC4: MNA20089003

## HousingLink

## Streams

## Property Detail

The Meadows Of Oxboro
9501 Garfield Ave S Bloomington, MN 55420

Funding Categories
Project-Based Subsidy
Property Information
Year Built: 2007
Building Type: Apartment
Groups Served: Elderly
Total Units: 50
Affordable Units: 49
Âffordable Unlts by Beđroom
1 BR: 49
Ưilits by Area Veadian Income 50\%: 49

## About Streams


$\underline{\text { Housing+Transit Cost }} \underline{\text { Walk Score }}{ }^{\circledR}: 73 \quad$ Report a problem
Listing Summary

| BR Size | 1st Listing | Last Listing | Low Rent | High Rent | Last Rent |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | $08 / 02 / 2017$ | 08/02/2017 <br> $*$ | Subsidized | Subsidized | Subsidized |

* A listing is currently open for this property in hList

Known Property Addresses

| 1 | 9501 Garfield Ave S | Bloomington |
| ---: | :--- | :--- |

Funding Dates \& Programs
First known closing: 5/29/2020
Most recent closing: 5/29/2020
Earliest expiration: 5/28/2047
Last Activity: Preservation

HUD: Section 202
Close Date: 5/29/2020
Expiration: 5/28/2047
Known Property Identifiers
HousingLink: 3607
HUD: 800221538

## HousingLink

## Property Detail



Housing+Transit Cost Walk Score ${ }^{\circledR}: 69$ Report a problem

| Listing Summary |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| BR Size | 1st Listing | Last Listing | Low Rent | High Rent | Last Rent |  |
| 1 | $11 / 20 / 2008$ | $01 / 22 / 2016$ <br> $*$ | Subsidized | Subsidized | Subsidized |  |

* A listing is currently open for this property in hList

Known Property Addresses

| 1 | 9450 Garfield Ave S | Bloomington |
| ---: | :--- | :--- |

Funding Dates \& Programs
First known closing: 6/26/2001
Most recent closing: 6/26/2001
Earliest expiration: 6/26/2021
Last Activity: New Construction

MHFA: HTF
Close Date: 6/26/2001
Expiration: 6/26/2021
MHFA: Section 8
Close Date: 6/26/2001
Estimated Expiration: 6/26/2022

MHFA: HOME
Close Date: 6/26/2001
Estimated Expiration: 6/26/2022
Known Property Identifiers
HousingLink: 4714
MHFA: D2899

## HousingLink

## Property Detail



Known Property Addresses

| 1 | 10100 Lyndale Ave S | Bloomington |
| ---: | :--- | :--- |

Funding Dates \& Programs
First known closing: 10/1/2016
Most recent closing: 10/1/2016
Earliest expiration: 9/30/2036
Last Activity: Preservation

HUD: Section 202
Close Date: 10/1/2016
Expiration: 9/30/2036
Knownn Property Identifiers
HousingLink: 3179
HUD: 800010783


## W 98 ${ }^{\text {th }}$ Street at I-35W Project

Existing Conditions Photos


Aerial view of intersection where W 98th Street (CSAH 1) meets Dupont Ave S and I-35W.


View facing north on Dupont Ave S where it intersects W 98 ${ }^{\text {th }}$ St (CSAH 1).


View facing east on $\mathrm{W} 98^{\text {th }}$ St on the I-35W overpass.


Aerial view of where W $98^{\text {th }}$ St (CSAH 1) and meets the I-35W northbound ramp and the south Bloomington Transit Center parking.


View facing west on $\mathrm{W} 98^{\text {th }}$ St where it meets the I-35W northbound ramp.


BLOOMINGTON

# HENNEPIN COUNTY <br> MINNESOTA 

December 12, 2023

Elaine Koutsoukos - TAB Coordinator
Metropolitan Council
390 North Robert Street
St. Paul, MN 55101

Re: Support for 2024 Regional Solicitation Application CSAH 1 (98th Street) at I-35W Interchange Project

Dear Ms. Koutsoukos,
Hennepin County has been notified that the City of Bloomington is submitting a funding application as part of the 2024 Regional Solicitation through the Metropolitan Council. The proposed project on CSAH 1 (98th Street) at the I-35W Interchange is anticipated to improve transportation safety, mobility and accessibility for all users by modernizing the CSAH 1 (98th Street) corridor from Dupont Avenue to Aldrich Avenue. Hennepin County supports this funding application and agrees to operate and maintain the roadway facilities along West 98th Street (CSAH 1) for the useful life of improvements.

At this time, Hennepin County has no funding programmed for this project in its 2023-2027 Transportation Capital Improvement Program (CIP). Therefore, county staff is currently unable to commit county cost participation in this project. Additionally, we kindly request that the City of Bloomington includes county staff in the project development process to ensure project success. We look forward to working together to improve the accessibility, safety, and mobility of all users along West 98th Street (CSAH 1).

Sincerely,

## Cour sturve

Carla Stueve, P.E.<br>Transportation Project Delivery Director and County Engineer<br>cc: Jason Pieper, P.E. - Capital Program Manager

# RESOLUTION OF SUPPORT OF A ROADWAY MODERNIZATION PROJECT, WEST $98^{\text {th }}$ STREET AT INTERSTATE 35W BETWEEN DUPONT AND EAST BLOOMINGTON FREEWAY FY 2028-29 METROPOLITAN COUNCIL REGIONAL SOLICITATION APPLICATION BLOOMINGTON, MINNESOTA 

WHEREAS, the City Council of the City of Bloomington is the official governing body of the City of Bloomington, Minnesota ("City"); and

WHEREAS, the City of Bloomington places a high value on providing a safe and convenient multimodal transportation network for its residents; and

WHEREAS, the Regional Solicitation Program provides federal transportation funding for projects as part of the Metropolitan Council's federally-required continuing, comprehensive, and cooperative transportation planning process for the 7-County Twin Cities metropolitan area; and

WHEREAS, the Metropolitan Council is accepting candidate projects for the Fiscal Years (FY) 20282029 and providing up to 80 percent of the project construction cost for transportation projects; and

WHEREAS, West 98th Street is a critical corridor for the City of Bloomington serving as both a local and regional connecting roadway. It is part of the only roadway, County State Aid Highway (CSAH) 1, between Interstate 494 (I-494) and the Minnesota River that continuously connects the major highways of 169, I-35W, 77/Cedar Avenue, and I-494; and,

WHEREAS, the interchange of West 98th Street at I-35W serves as a key transportation hub for the city that is expected to grow as a multi-modal hub into the future with a regional transit hub connecting multiple transit routes that travel along West 98th Street, Lyndale Avenue, and I-35W, including the Orange Line Bus Rapid Transit; and,

WHEREAS, today the corridor serves motor vehicle traffic, it does not serve other non-motorized traffic modes well since there are no shoulders and the sidewalks are narrow; and,

WHEREAS, the City led the W $98^{\text {th }}$ Street Traffic Study in 2022/2023 which worked in coordination with Hennepin County and MnDOT to determine preferred layouts for the section of W $98^{\text {th }}$ Street between the Old Shakopee Road $/ 98^{\text {th }}$ Street intersection and Lyndale Avenue, and this project would construct a significant segment of the recommended study layout; and,

WHEREAS, once funded and constructed, the West 98th Street at Interstate 35W Project (Project) will modernize the corridor between Dupont Avenue S and East Bloomington Freeway Frontage Road with the improvements focused on reducing vehicle speeds by revising the angles of free right turns, reducing the number of traffic lanes and traffic lane extents for shorter pedestrian crossings, safer movements, and enhanced area for pedestrian facilities and a wider boulevard, all while maintaining acceptable vehicle operations; and,

WHEREAS, Hennepin County, the local road authority, has shown support for the proposed multimodal modernization Project; and

WHEREAS, the City, in conjunction with Hennepin County and the Minnesota Department of Transportation, documents its acceptance of the responsibility for the operation and maintenance of the Project throughout its useful life, including snow removal to allow for year-round use of the pedestrian and bicycle facility;

WHEREAS, the City of Bloomington has identified this corridor for bike and pedestrian facilities in its Alternative Transportation Plan dated November 21, 2016 and this corridor remains a critical system element and priority in the 2023 Draft Active Transportation Action Plan; and

WHEREAS, Hennepin County has identified this corridor as a Planned Bikeway in the Hennepin County 2040 Bikeway System Plan; and

WHEREAS, the City of Bloomington accepts responsibility for an amount equal to or greater than 20\% of the eligible Project construction costs, in addition to the design, administration, rights-of-way, and peripheral Project costs.

NOW THEREFORE, BE IT RESOLVED by the City Council of the City of Bloomington in regular meeting assembled to adopt this Resolution in support of the request for federal funds under the Modernization category of the 2024 Regional Solicitation for Transportation Funding for 2028 or 2029 Fiscal Year funds.

BE IT FURTHER RESOLVED, based on the foregoing and as required by State Law and City Charter, that the Mayor, City Manager, Chief Financial Officer, and City Attorney are hereby authorized and directed to take any and all actions required to accept the grant funds for and on behalf of the City and to make any and all necessary related budget adjustments to the approved budget of the City.

BE IT FINALLY RESOLVED, that a copy of this Resolution be provided to Metropolitan Council Transportation Advisory Board with the Bloomington Project submittal.

Passed and adopted this 4th day of December 2023.


ATIdESTITred by:
MattBollt
Secretary to the Council


# (1) MetroTransit 

December 8, 2023

Julie Long, P.E.
City Engineer
City of Bloomington
1800 W Old Shakopee Road
Bloomington, MN 55431

Dear Ms. Long:

On behalf of Metro Transit, I want to express strong support for the City of Bloomington's 2024 Regional Solicitation application to fund the West $98^{\text {th }}$ Street at I-35W Project. The proposed project will dramatically improve multimodal safety and travel time reliability in a critical location for regional transit mobility.

The project area includes many bus routes, including routes $18,465,534,539,546$ and METRO Orange Line Bus Rapid Transit (BRT). Project improvements are expected to enhance access to the I-35W \& 98 ${ }^{\text {th }}$ Street Station, a major transfer point which abuts the project area. The transit station is also adjacent to many community services, businesses, stores, and health care facilities. For such reasons, safe, efficient, and affordable access, prioritizing pedestrians, bicyclists, and transit users, was a top priority in developing the proposed improvements with the community.

Metro Transit has been involved in each step of 98th Street transportation improvements with the City of Bloomington and other agency partners. This project includes the consideration of adding a transitpriority bypass/left shoulder lane along the southbound I-35W exit ramp, which would further reduce travel time and traffic signal delay for the Orange Line.

Overall, the West $98^{\text {th }}$ Street at I-35W project will create safer last-mile connections, improve Orange Line BRT and bus route reliability, and support the city's transit-oriented redevelopment plans for this area. Metro Transit is committed to supporting the City of Bloomington in developing a project that is fully supported by the community. I appreciate the opportunity to advocate for this important project.

Sincerely,


## A service of the Metropolitan Council

11/29/2023
Julie Long, P.E.
City Engineer
City of Bloomington
1800 W Old Shakopee Road
Bloomington, MN 55431

## Re: MnDOT Letter for City of Bloomington

Metropolitan Council/Transportation Advisory Board 2024 Regional Solicitation Funding
Request for the West 98th Street at Interstate 35W Project

Dear Julie Long,

This letter documents MnDOT Metro District's recognition for City of Bloomington to pursue funding for the Metropolitan Council/Transportation Advisory Board's (TAB) 2024 Regional Solicitation for the West 98th Street at Interstate 35W Project in Bloomington.

Once funded and constructed, the West 98th Street at Interstate 35W Project will modernize the corridor between Dupont Avenue S and East Bloomington Freeway Frontage Road with the improvements focused on reducing vehicle speeds by revising the angles of free right turns, reducing the number of traffic lanes and traffic lane extents for shorter pedestrian crossings, safer movements, an enhanced area for pedestrian facilities and a wider boulevard.

As the agency with jurisdiction over I-35W, MnDOT will allow the City of Bloomington to seek improvements proposed in the application. If funded, details of how the project is delivered and any future maintenance agreement with the City will need to be determined during the project's development to define how the improvements will be maintained for the project's useful life.

MnDOT does not anticipate partnering on local projects beyond current agreements. If your project receives funding, continue to work with MnDOT Area staff to coordinate and review needs and opportunities for cooperation.

MnDOT Metro District looks forward to continued cooperation with City of Bloomington as this project moves forward and as we work together to improve safety and travel options within the Metro Area.

If you have questions or require additional information at this time, please reach out to your Area Manager at Ryan.Wilson@state.mn.us or 651-775-4216.

Sincerely,

Sheila Kauppi, PE
Metro District Engineer

CC:
Ryan Wilson, West Area Manager Aaron Tag, Metro Program Director Dan Erickson, Metro State Aid Engineer


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