

ADAMS ROAD PLANNING AND ENVIRONMENTAL LINKAGE (PEL) STUDY

ADAMS ROAD FROM HAMLIN ROAD TO WALTON BOULEVARD
ROCHESTER HILLS, MICHIGAN

PREPARED FOR:



QUALITY LIFE THROUGH GOOD ROADS - WE CARE



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Acronyms

AASHTO – American Association of State Highway and Transportation Officials
ACHP – Advisory Council on Historic Preservation
ADA – Americans with Disabilities Act
ADT – Average Daily Traffic
APE – Area of Potential Effects
BLM GLO – Bureau of Land Management General Land Office
BMP – Best Management Practices
BUILD – Better Utilizing Investments to Leverage Development
CARL – Conservation and Recreation Land
CIP – Capital Improvement Plan
DEGR – MDOT Dynamic Environmental GIS Resource
EGLE – Michigan Department of Environment, Great Lakes, and Energy
EMS – Emergency Medical Services
FAST Act – Fixing America’s Surface Transportation Act
FEMA – Federal Emergency Management Agency
FFS – Free Flow Speed
FHWA – Federal Highway Administration
GIS – Geographic Information Systems
HAWK Beacon – High-Intensity Activated Crosswalk Beacon
HCM – Highway Capacity Manual
HRC – Hubbell, Roth and Clark, Inc.
IPaC – Information for Planning and Consultation
LOS – Level of Service
MDOT – Michigan Department of Transportation
MDOT LAP – Michigan Department of Transportation Local Agency Program
MDOT SP – Michigan Department of Transportation Special Provisions
MS4 – Municipal Separate Storm Sewer Systems
MVM – Million Vehicle Miles

NATA – National Air Toxics Assessment
NBI – National Bridge Inventory
NEPA – National Environmental Policy Act
NHL – National Historic Landmark
NHLD – National Historic Landmark District
NPDES – National Pollutant Discharge Elimination System Permit
NPS – National Park Service
OU – Oakland University
P&N – Purpose and Need
PASER – Pavement Surface Evaluation and Rating
PC/H/LN – Passenger Cars per Hour per Lane
PDO – Property Damage Only
PEL – Planning and Environmental Linkage Study
PEP – Public Engagement Plan
PMP – Programmatic Mitigation Plan
RCOC – Road Commission for Oakland County
RCP – Reinforced Concrete Pipe
RHFD – Rochester Hills Fire Department
ROW – Right-of-Way
RTP – Regional Transportation Plan
SEMCOG – Southeast Michigan Council of Governments
SHPO – Michigan State Historic Preservation Office
TAMP – Transportation Asset Management Plan
TAZ – Traffic Analysis Zones
TCAT – Traffic Crash Analysis Tool
TDFM – Travel Demand Forecasting Model
TDMS – Transportation Data Management System
TIP – Transportation Improvement Program
U.S.DOT – United States Department of Transportation
USACE – United States Army Corps of Engineers
USFW – United States Fish and Wildlife Service
USGS – U.S. Geological Survey
V/C – Volume-to-Capacity

1. Introduction

This Planning and Environmental Linkage (PEL) study covers a 2.2-mile segment of Adams Road from Hamlin Road to Walton Boulevard located in the City of Rochester Hills, Oakland County, Michigan. Adams Road is a two lane, north-south corridor in a primarily residential area of the city and is classified on the federal National Functional Classification System as a Principal Arterial. Adams Road is under the jurisdiction of the Road Commission for Oakland County (RCOC) and is Act 51 certified as a county primary road. The study corridor has an average daily traffic of almost 23,000 vehicles and serves as a major connection to state highway M-59 to the south and provides access to Oakland University at the north end of the study area.

Despite rapid growth occurring all around, Adams Road from Hamlin Road to Walton Boulevard has remained the same two-lane road and no longer provides the level of service in terms of capacity and safety for the growing population. Past efforts to make improvements or changes to the road have not been successful due to various complexities along the corridor and the significance of historic and cultural assets in the area.

RCOC in partnership with the City of Rochester Hills and Oakland University submitted a grant application to the United States Department of Transportation (U.S.DOT) to help fund a comprehensive evaluation of the existing conditions and to develop appropriate improvements for the future. This PEL study is the product of a grant that was awarded through the Fiscal Year 2020 Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grant program.

The Adams Road PEL Study is a partnership effort between RCOC, the City of Rochester Hills and Oakland University to work with the public to develop future improvements and enhance the corridor.

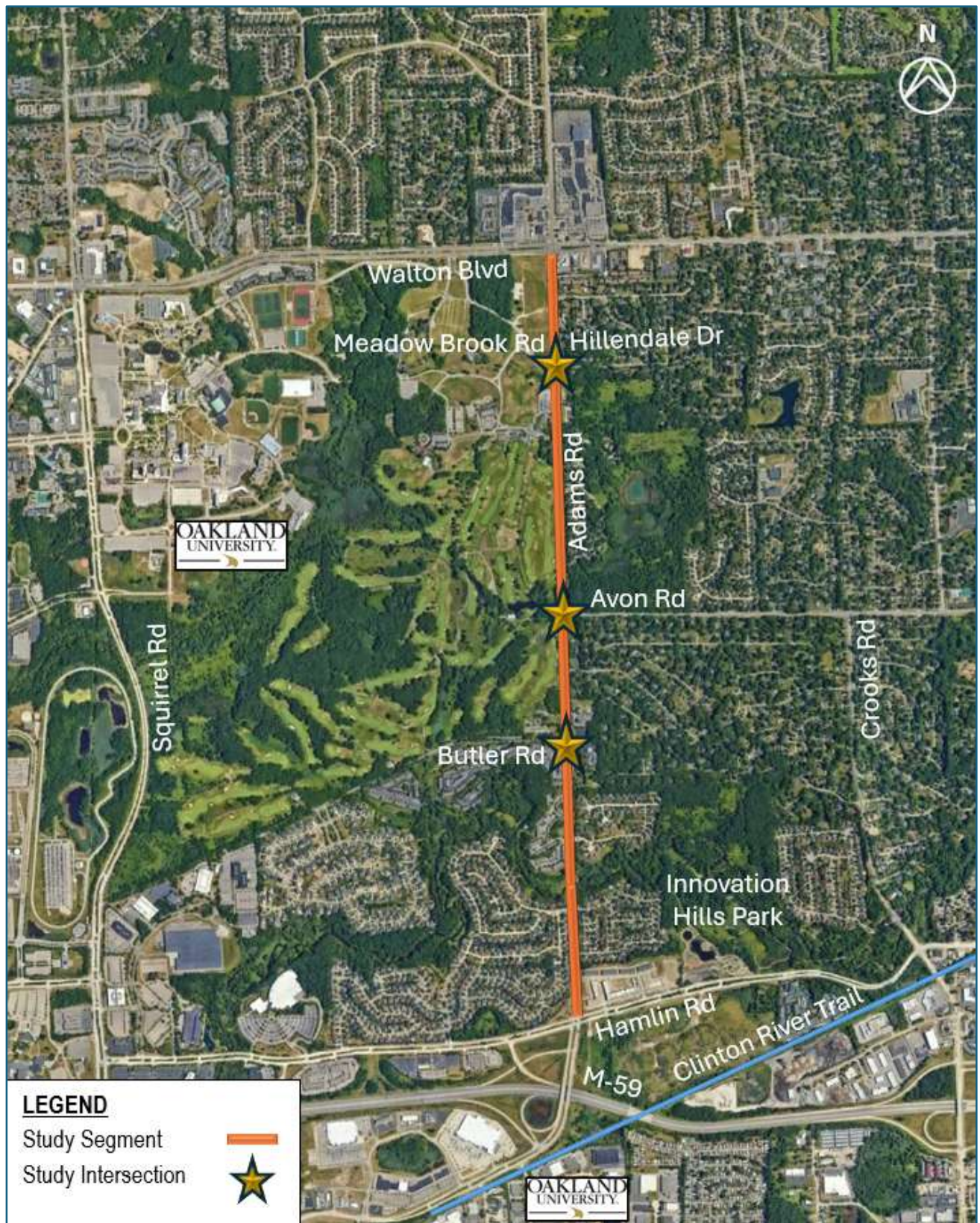


Figure 1.1: Map of Adams Road Corridor Study Segment and Intersections

2. Background

RCOC has been serving as the county-level road agency in Oakland County, Michigan for over one hundred years. With more than 2,700 miles of county roads under its jurisdiction, it is the largest county road network in Michigan and is the second largest road agency, next to the Michigan Department of Transportation (MDOT). RCOC also maintains over 230 miles of MDOT highways and approximately 1,700 county, city, village, state and private traffic signals in Oakland County.

Rochester Hills is the 15th largest city in Michigan, based on the 2020 Census from the U.S. Census Bureau, and had an estimated population of 76,300 in 2020. The population has grown 7.5% since 2010.

Oakland University is a major regional institution with a growing medical school in addition to 132 traditional undergraduate and 138 graduate programs. Oakland University has more than 15,500 students, with 85% of these students commuting to campus. The University is expanding its programs and as a result is experiencing a growth in its student population.

The Adams Road Corridor has been a priority of study for RCOC, the City of Rochester Hills and Oakland University. As the area has grown in population, attracts more visitors and grows in popularity, there has been an ever-increasing strain on the capacity of the road network and safety concerns. Adams Road between Hamlin and Avon was first paved in 1959, while Adams Road between Avon and Walton was first paved in 1964. At the time, land adjacent to the road was primarily farms and residences. Safety standards have changed since the road was first constructed. The road has many hills that block the line of sight and can be difficult to navigate in inclement weather. Many sections of the road are narrow and are immediately adjacent to historic and geographically constricting features, thus hindering emergency service vehicles from navigating through traffic and reducing response time. Intersections along the corridor are antiquated and in need of safety improvements. Any improvements implemented or constructed now are required to be built following modern engineering design standards related to vertical and horizontal curves, sight distance and road width. To provide a safe and efficient roadway, impacts to the corridor are unavoidable.

This PEL study includes an assessment of existing conditions and a refined alternative for future implementation with the identification of its impacts and mitigation strategies. The PEL study process included coordination between the agencies, stakeholders, and the public to develop the Purpose and Need and the refined alternative.

Relevant Studies and Policies

Over the last 35 years, public concerns, and studies about Adams Road from Hamlin Road to Walton Boulevard have been expressed consistently as needing improvement. The findings supported the need for a comprehensive PEL study. Subsequently, the PEL study has been conducted in good faith, and the findings are in alignment with the Purpose and Need, corroborating the methodology used. The recommendations made in this PEL report align with SEMCOG's Vision 2050 long range transportation plan's goals to reduce serious crashes, expand accessible transportation options, and modernize key regional corridors to accommodate forecasted growth in travel demand in the region through 2050.

Vision 2050: Regional Transportation Plan for Southeast Michigan (2024)



The Southeast Michigan Council of Governments (SEMCOG) developed this Regional Transportation Plan (RTP) for Southeast Michigan in June 2024. This document serves as the policy document for regional transportation investments for the next 25 years. The plan intends to provide a coordinated and strategic approach to transportation planning with the goal of improving mobility, increasing safety, reducing congestion, and supporting economic growth and development throughout the region. This document prioritizes road safety and targets zero serious injuries and fatalities on

Michigan roadways by 2050. Similarly to the PEL, one of the key actions of the RTP is to promote safer speeds in all roadway environments through a combination of thoughtful, context-appropriate roadway design, targeted education and outreach campaigns, and enforcement.

SEMCOG's Southeast Michigan Transportation Safety Plan



December 2015, update in June 2023 lists the following safety priorities along the corridor:

- ≡ Adams Road/Walton Boulevard intersection – medium priority
- ≡ Adams Road segment, Avon Road to Walton Boulevard – marginally above average in crash reduction potential especially for senior drivers and motorcycles
- ≡

SEMCOG High Priority Safety Locations, 2016–2020, shows the following safety priorities along the corridor.

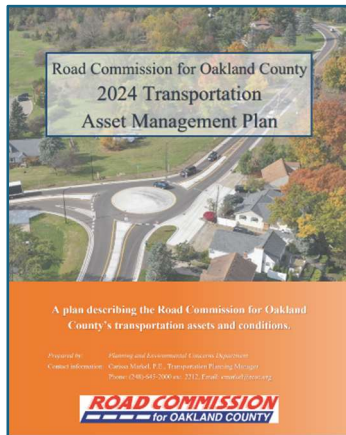
- ≡ Adams Road segment, Avon Road to Walton Boulevard (198th out of 4,351, top 5%)
- ≡ Adams Road/Avon Road intersection (35th out of 870, top 4%)

Safe Streets and Roads for All - Safety Action Plan (2025)



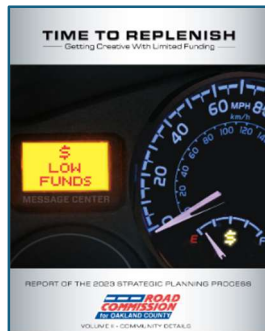
The Road Commission for Oakland County completed a Safety Action Plan in 2025 through the Safe Streets for All program. A Safety Action Plan provides a structured approach for transportation agencies and local governments to enhance system-wide safety, aligning with the Vision Zero initiative. This effort aims to eliminate traffic fatalities and serious injuries. Plans are developed through data driven analysis, establishing measurable safety targets, timelines and improvements. The City of Rochester Hills is currently developing a Comprehensive Transportation Safety Action Plan, also through the Safe Streets for All program.

Transportation Asset Management Plan (TAMP) (2024)



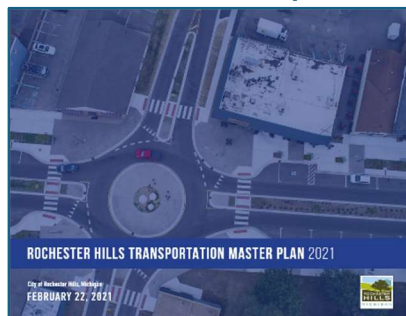
The ROCOC developed its first TAMP in 2021 and adopted an update in 2024. Per Public Act 325 of 2018, any local road agency in Michigan with over one hundred certified miles, must develop and adopt a TAMP. The plan identifies the inventory of road, bridge, culvert and signal assets and their condition. It lays out a strategy regarding how and when transportation funds are utilized to improve transportation assets within the agency's jurisdiction. The strategy determines the type of fix appropriate for assets depending on their condition. A key component to prioritization of future projects involves a risk of failure analysis which identifies critical assets in the transportation network. Critical assets including roads and bridges with high traffic volumes provide regional connectivity and if they were to fail or be closed to traffic, it would create long detours and negatively impact commerce and quality of life. Adams Road and the bridge over the Clinton River on Adams Road are identified as critical assets in the ROCOC TAMP.

ROCO Strategic Plan (2023)



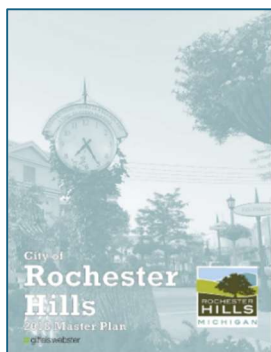
Officials from the ROCOC meet biennially with all communities in Oakland County to provide updates on ROCOC activities, transportation funding, policy and to discuss local transportation needs. These meetings provide an opportunity for local communities to list and discuss locations where there are concerns over safety, operations, maintenance, and traffic. Rochester Hills participates in the strategic planning process conducted by the ROCOC and has formally identified capacity improvements along Adams Road as a long-range strategic transportation priority since 2017.

Rochester Hills Transportation Master Plan (2021)



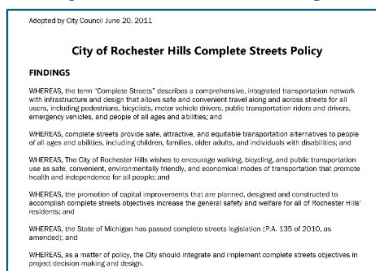
The intersections of Adams Road at Avon Road and at Walton Boulevard are highlighted as having the highest potential for crash reduction. From the 2019 public opinion survey, one third of respondents indicated Adams Road is in the most need of widening. The percentage of responses was up 12% from the last public opinion survey conducted in 2007 as part of the City of Rochester Hills Master Thoroughfare Plan Update.

City of Rochester Hills Master Plan (2018)



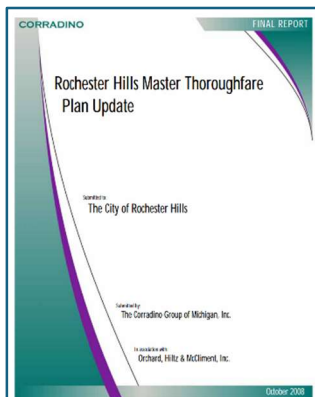
The 2019 public opinion survey was also used for the development of the Master Plan. Traffic congestion is noted as one of the most serious problems that the city faces within the Adams Road Corridor, with widening listed as a way to alleviate this congestion. The public also identified that non-motorized pathways on both sides of the road that connect to adjacent sidewalks, roadways and sites, is either very important or somewhat important.

Complete Streets Policy, June 2011



The Complete Streets Policy was adopted by the City of Rochester Hills as a way to ensure a comprehensive, integrated transportation network with infrastructure and design that allows safe and convenient travel along all streets for all users, including bicyclists, pedestrians, transit users and people of all ages and abilities.

City of Rochester Hills Master Thoroughfare Plan Update (2008)



During the development of this plan the public was asked to provide feedback on transportation related concerns within the city. The public identified one of their highest-placed concerns at northbound Adams Road during evening peak travel times. The public's highest-placed proposed improvement was to widen the Adams Road corridor from Hamlin Road to Tienken Road and fix sight-distance problems at hills along Adams Road. According to the public opinion survey, Adams Road ranked number one for the major road in need of widening.

The plan listed the following as proposed improvements:

- ≡ Adams Road at Walton Boulevard: Add one northbound through-lane. Add dual northbound right turn lanes. Add one southbound through-lane.
- ≡ Meadow Brook Road/Hillendale Drive at Adams Road: Add one Northbound through-lane and increase left turn storage to 150 feet. Add a southbound left turn lane with 150-foot storage.
- ≡ Avon Road at Adams Road: Add a second westbound right turn lane. Add one northbound through-lane. Add one Southbound through-lane.

The City of Rochester Hills Adams Road Corridor Study, July 1991, stressed the need for capacity improvements to reduce safety concerns along the corridor. The study primarily focused on a four-lane residential boulevard following the geometric outline in the Major Thoroughfare Plan.

The City of Rochester Hills Major Thoroughfare Plan, 1989, did not initially identify improvements to Adams Road from Hamlin Road to the northern city limits. Later, after receiving concerns from

residents regarding neighborhood traffic circulation problems, the City Council requested an update to the 1989 Major Thoroughfare Plan and requested that it include the following objectives:

- ≡ Improve traffic capacity and safety on Adams Road through the provision of left and right turn lanes, modern traffic signals, and other operational improvements.
- ≡ Conduct a Corridor Study of Adams Road between Hamlin Road and Tienken Road before considering possible widening-type improvements.

PEL Process

Fixing America’s Surface Transportation Act (“FAST” Act) was signed into federal law in 2015. A key component to the act was the efforts to accelerate the environmental review process around surface transportation projects. Before FAST Act, this process would occur beyond the early planning stages of a project and would often require re-evaluation of decisions that have been made. By establishing the PEL process, the environmental review and public engagement processes are prioritized and occur at the beginning of a large surface transportation project. The PEL process represents a collaborative and integrated approach to transportation decision-making that:

- ≡ Considers environmental, community and economic goals early in the transportation planning process, and
- ≡ Uses the information, analysis and products developed during planning to inform the environmental review process.

The goal of PEL is to develop a more seamless decision-making process that minimizes duplication of effort, promotes environmental stewardship, and reduces delays in project implementation. In addition, the PEL study serves as a reference document used during the National Environmental Policy Act (NEPA) analysis stage of project planning. It is used to inform the public, government and decision-makers on the proposed project, its benefits and mitigation strategies to reduce impacts. The PEL process was followed by the partnering agencies and established a transparent and productive relationship between decision-makers and the public. Figure 2.1 below highlights the timeline used to complete the PEL.

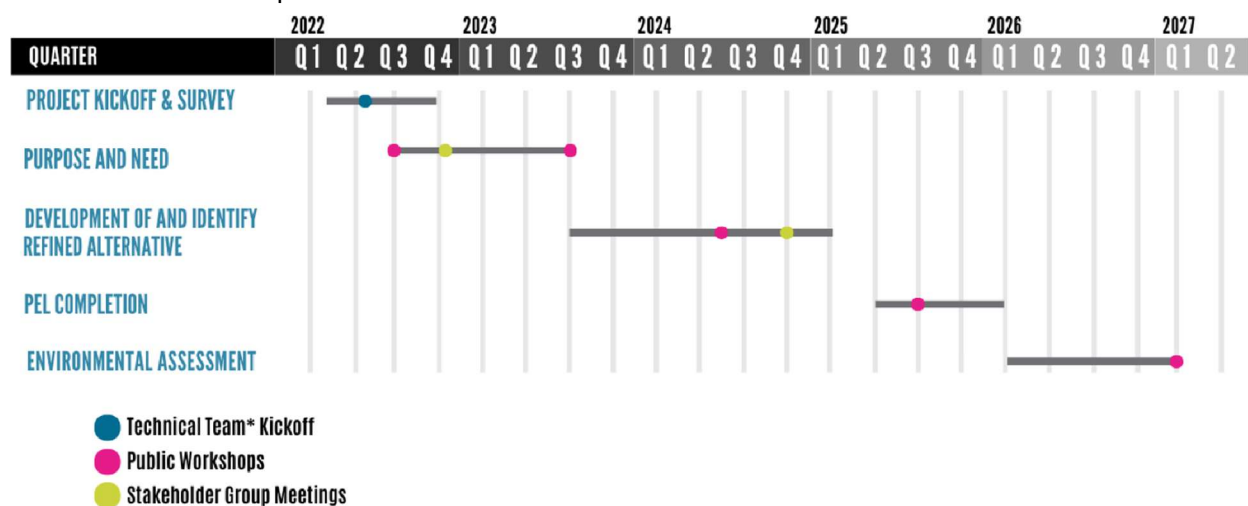


Figure 2.1: Adams Road PEL Timeline

The Study began by looking at existing conditions and engaging the public and stakeholders. Information collected was utilized to develop the Purpose & Need for the project. After the Purpose & Needs were established, there were 5 alternatives developed for review by the stakeholders and public. From the feedback provided a Refined Alternative was developed and presented. This report will provide more information on the development and findings throughout the process of conducting the study.

3. Engagement and Coordination

Agency

During the development of the BUILD Grant application, coordination efforts between RCOC, City of Rochester Hills and Oakland University were underway. The partnership led the development of the project scope and grant application. All three agencies provided support and submitted the application with intention to comprehensively study the Adams Road Corridor. Post grant award, the three agencies began the process of conducting a Planning and Environmental Linkage study. At the PEL Study kick-off meeting, the agency group, in coordination with the consultant team, developed a Public Engagement Plan (PEP) identifying the approach that would provide a framework for informing the public and soliciting feedback throughout the process. The PEP outlined the tentative schedule, strategy and assorted opportunities for stakeholders and the public to be involved. The document also outlined the groups that would be involved throughout the process. These groups included the Technical Team, Stakeholder Groups (Agency Committee and Special Interest Group) and the Public.

Technical Team

Through the process of the Adams Road Corridor PEL Study, the Technical Team met frequently and included staff from RCOC, City of Rochester Hills, Oakland University, Michigan Department of Transportation (MDOT), Federal Highway Administration (FHWA) and project consultants Hubbell, Roth and Clark, Inc. (HRC), MKSK and Chronicle Heritage. These meetings provided oversight, recommendations and discussions involving data collection, public engagement activities, and development and evaluation of alternatives.

The technical team met 19 times throughout the multi-year study. Meetings were held at city hall, with a virtual attendance option on Microsoft TEAMS. For documentation of each meeting see Appendix A.

Stakeholder Groups

Stakeholder Groups (Table 3.1) were developed early in the process of the PEL Study. A Special Interest Stakeholder Group was developed to include business owners, Oakland University, Rochester Hills City Council, various City of Rochester Hills' Committees, and additional review agencies identified by the technical team that would be involved throughout the study and function as intermediaries between the study team and residents. Table 3.1, left column, identifies members of the Special Interest Stakeholder Group.

An Agency Stakeholder Group was developed to include individuals from Homeowners' Associations, churches, and schools, along or near the corridor that could provide additional insight and feedback during the study. Table 3.1, right column, identifies members of the Agency Group. The stakeholder groups (Table 3.2) met seventeen times over the course of the study to provide feedback, discuss concerns, and share ideas. More information on each meeting with the stakeholder groups can be found in Appendix B.

Table 3.1: Identified Stakeholder Groups

Special Interest Group	Agency Group
AT&T	Churches
Citizens & Pathway Review Committee	Homeowners' Associations
Clinton River Watershed Council	Schools
Fire Department	
Friends of Historic Adams Road	
Green Spaces Committee	
Historic District Commission	
Oakland University	
Rochester Hills Advisory Traffic & Safety Board	
School District	
Additional Review Agencies identified by RCOC	

Table 3.2: Stakeholder Group Meeting Information

Date	Time	Stakeholder Group	Phase of Study
November 1, 2022	9:00 A.M.	Residential Stakeholders	1
	10:00 A.M.	Traffic/Pathways Stakeholders	
	11:00 A.M.	Historic Stakeholders	
	1:00 P.M.	Institutional Stakeholders	
	2:00 P.M.	Public Safety Stakeholders	
November 4, 2022	11:00 A.M.	Oakland University Stakeholders	
	1:00 P.M.	Environmental Stakeholders	
November 17, 2022	10:00 A.M.	Public Safety Stakeholders	
	11:00 A.M.	Environmental Stakeholders	
	1:00 P.M.	Residential Stakeholders	
	2:00 P.M.	Historic Stakeholders	
November 18, 2022	11:00 A.M.	Institutional Stakeholders	
	1:00 P.M.	Traffic/Pathways Stakeholders	
September 18, 2024	11:00 A.M.	Agency Group Stakeholders	3
September 18, 2024	9:00 A.M.	Special Interest Stakeholders	
	2:00 P.M.	Special Interest Stakeholders	
May 23, 2025	2:00 P.M.	Emergency Services Stakeholders	4

Public Engagement

Meaningful public engagement during the environmental and transportation planning process is vital, as it helps the study team consider feasibility and any existing or future concerns early on. Regular opportunities for public feedback were provided throughout the PEL study and feedback received was necessary in developing the Purpose and Need as well as the refined alternative. Throughout the study, there were four community update workshops (Table 3.3). Opportunities for additional comments were also provided on the study website.

Table 3.3: Community Update Workshop Information

Date/Time	Location	Number of Attendees	Summary of Topic	Outcome
September 20, 2022, 4:00 P.M.	University Presbyterian Church – 1385 S Adams Road, Rochester Hills, MI 48309	165	This workshop introduced the study and gave the project team the chance to listen and obtain comments from the community and stakeholders impacted by the corridor. Workshop materials were created to foster an open and positive dialogue with the workshop participants to collect priorities on issues to inform the draft Purpose and Need.	<i>Phase 1 provided the public with a project overview for better understanding and also collected priorities on issues to inform the Purpose & Need.</i>
May 9, 2023, 6:00 P.M.	West Middle School – 500 Old Perch Road, Rochester Hills, MI 48309	164	The workshop provided an overview presentation of the project and summarized feedback from stakeholders and the community. The project team also explained existing conditions along the corridor as well as the draft Purpose and Need of the project. Flyers were handed out with information to access a Purpose and Need survey.	<i>Phase 2 of the project utilized public input to finalize the Purpose & Need.</i>
June 17, 2024, 6:00 P.M.	West Middle School – 500 Old Perch Road, Rochester Hills, MI 48309	166	The workshop began with an in-depth overview of the project, review of prior public engagement efforts and an outline highlighting how the presented alternatives were created. During the presentation, it was emphasized that the project team was seeking feedback on what participants liked about each alternative and what they would change. Following the presentation, community members were encouraged to visit the five evaluation stations for the respective alternatives. The input received would help to shape a refined alternative for further study and to develop mitigation strategies for potential impacts.	<i>Phase 3 gathered public input to gauge what was liked and disliked about the 5 alternatives presented, as a way to inform the refined alternative. This public input was gathered via comment form at the third community update workshop or via an online comment forum added to the project website.</i>

Date/Time	Location	Number of Attendees	Summary of Topic	Outcome
October 1, 2025, 6:00 P.M.	West Middle School – 500 Old Perch Road, Rochester Hills, MI 48309	133	The workshop began with a presentation outlining the PEL process, past public input received and introduced refined alternative. The presentation included emphasis on how the project team utilized feedback from the public to develop an alternative that met the purpose of the study while also taking care to minimize impacts to cultural assets along the corridor. Following the presentation, community members were encouraged to visit six stations that provided more information on how the refined alternative met the purpose of the PEL. One station included a conceptual video rendering of the corridor. Input received helped determine if the refined alternative met the purpose statements of the study and identified any factors not assessed during the study.	<i>Phase 4 was an opportunity to present the Refined Alternative and collect input on potential items missing from consideration.</i>

Study Website

The Adams Road Corridor PEL Study website launched in September 2022 and has since served as a central hub for the public to access project information and provide input. The website featured detailed information about the project’s Purpose and Need, along with various documents, plans, presentations and schedules. A dedicated page highlighted past engagement effort and materials from previous meetings and input opportunities.

Two interactive tools were available on the study website homepage throughout the duration of the study: an interactive map and an ideas wall. These tools were used to gather public input and helped shape the recommendation of the study. Details on these tools can be found below.

Interactive Map

The interactive map (Figure 3.1) was a popular tool used by many residents throughout the study process. The map allowed users to publicly identify locations and note issues or potential enhancements along the Adams Road corridor. The option to attach photos to location specific concerns was available. Everyone could see all comments on the map, which gave users an opportunity to agree or disagree with other comments posted.

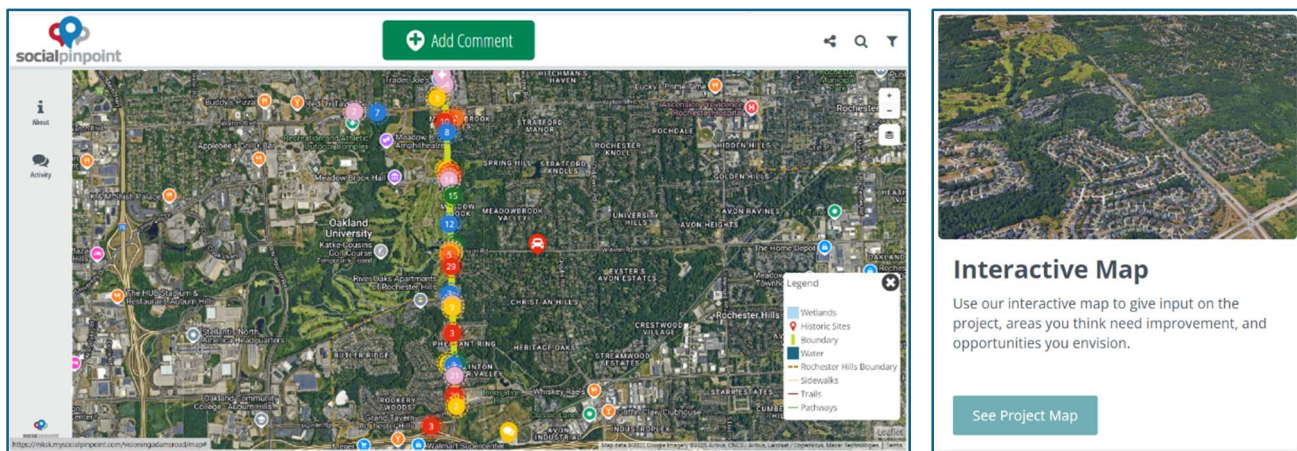


Figure 3.1: Adams Road Interactive map found on the study website

Ideas Wall

The Visioning Adams Road Study Ideas Wall was an online engagement platform that allowed users to provide input, insight, and information which in turn is posted on the wall. This idea wall was provided as an option for comments to be placed publicly that may not have an associated location

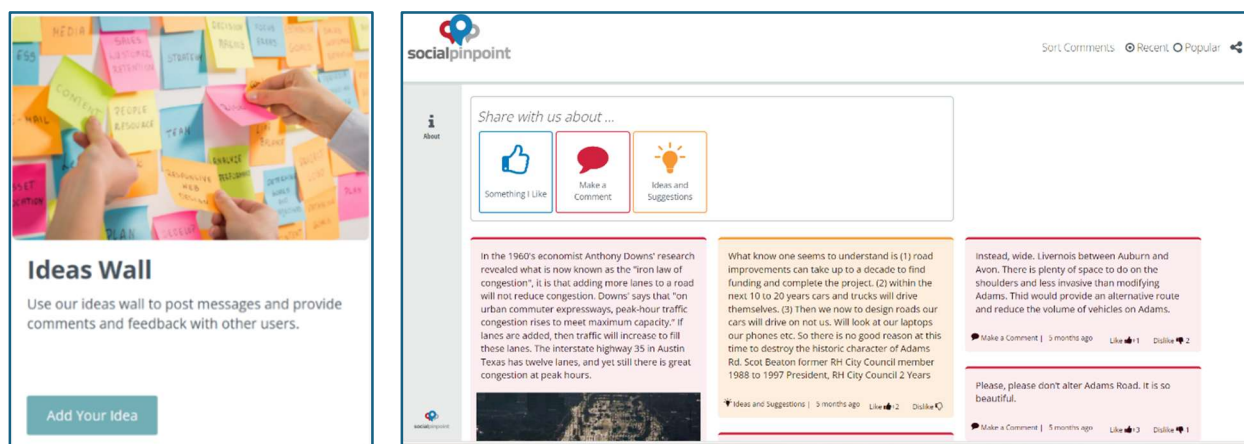


Figure 3.2: Adams Road idea wall found on study website

(as the interactive map does). In this format the public could write their comments/questions on a virtual sticky note and others could agree or disagree. The idea wall (Figure 3.2) was open for comment during the duration of the PEL study.

Emails

Throughout the duration of the PEL Study, the project team received emails from the public regarding the future of the Adams Road Corridor. The Adams Road alternatives presented at the third community update workshop prompted an influx of emails from residents. Comments provided in emails were included in all public feedback documentation.

Additional information at each meeting and feedback received can be found in Appendix C, the Engagement Summaries. Public comments and concerns were documented, incorporated into the study, and helped guide the development of the refined alternative.

Engagement Summaries

Each Community Update Workshop offered an opportunity for the public to provide feedback in person, then additional opportunities on the website to review materials from the workshop and provide feedback online. Appendix C includes Engagement Summaries for each phase of the study. Each summary provides information on the topics covered, materials presented and the feedback received.

4. Purpose and Need

Background

Defining the Purpose and Need (P&N) for this project is a critical step in the NEPA process. It identifies the underlying problems the project must address and guides the determination of the appropriate level of environmental review. The following P&N statements were developed through public and stakeholder engagement; more information can be found in Appendix C, Phase Two Engagement Summary, Page 7.

Purpose and Need Evaluation Criteria in Table 4.1 were developed to link public concerns to the established P&N statements and identified technical team objectives for the necessary analysis to evaluate potential improvements. These included crash data review, traffic operations modeling, multi-modal connectivity assessments, environmental and historic resource inventories, and infrastructure condition evaluations to support development of alternatives that address identified needs while maintaining corridor character.

Purpose

The purpose of this study and project is to consider the needs, understand the value of each element, and create a corridor that will maximize the benefits and improvements to the public while maintaining the character for future generations. The study will develop and evaluate alternatives to achieve the following objectives:

- ≡ Improve safety along the corridor and at intersections by mitigating crash patterns and implementing proven safety countermeasures.
- ≡ Improve capacity by reducing congestion and improving traffic operations to provide a reliable north-south arterial connection while accommodating existing and future traffic volumes.
- ≡ Promote safe and efficient multi-modal movement including walking and biking.
- ≡ Complement the natural beauty and views along the corridor.
- ≡ Respect the historical character and cultural significance.
- ≡ Improve the condition of aging infrastructure on the corridor.

Need

The project will address the following needs:

- ≡ Address correctable crash patterns to reduce vehicle crashes and minimize the potential for serious injuries and fatalities.
- ≡ Address vehicular traffic that exceeds the capacity of the existing roadway configuration which may cause delays and results in diversion of traffic to alternate routes.
- ≡ Provide safe access to accommodate active traffic modes including pedestrians and cyclists.
- ≡ Improve access for emergency response.
- ≡ Improve stormwater best management practices.

Table 4.1: Purpose and Need Evaluation Criteria

Purpose Statement	Need Statement	Public Concerns	Technical Team Objectives
Improve safety along the corridor and at intersections by mitigating crash patterns and implementing proven safety countermeasures.	Address correctable crash patterns to reduce vehicle crashes and minimize the potential for serious injuries and fatalities.	Intersection at Avon and left turning movements can be difficult and unsafe. Limited sight line due to hills. Speeding. Currently no signal at Butler.	Review crash data to identify locations of concern. Implement road features that improve safety for motorists at locations with identified safety concerns. Determine level of effectiveness based on crash reduction factors.
Improve capacity by reducing congestion and improving traffic operations to provide a reliable north-south arterial connection while accommodating existing and future traffic volumes.	Address vehicular traffic that exceeds the capacity of the existing roadway configuration which may cause delays and results in diversion of traffic to alternate routes. Improve access for emergency response.	Evening northbound travel is heavy. Long wait at intersections. Emergency vehicles cannot get through due to lack of space. Long wait at intersections. Emergency vehicles cannot get through.	Collect traffic counts and develop forecasts. Transportation modelling can show the improvement of traffic flow from the implementation of capacity improvements.
Promote safe and efficient multi-modal movement including walking and biking.	Provide safe access to accommodate active traffic modes including pedestrians and cyclists.	Existing sidewalk is not continuous. A lack of pedestrian crossings.	Provide a continuous pathway with safe crossings where needed.
Complement the natural beauty and views along the corridor.		Public input reflects a strong appreciation for the natural and scenic character of the corridor. Old trees, naturally growing flora, and hills provide pleasing views the public do not want disturbed.	Inventory the condition and number of trees. Identify the impact to existing tree canopy and develop an opportunity to implement a landscaping plan with native plants and aesthetically pleasing features.
Respect the historical character and cultural significance.		The gate house, stone retaining wall and workers stairs are significant and contribute to the corridors' beauty and cultural character. Limit impacts to private property.	Research and identify features that will be impacted and develop mitigation measures with the alternative.
Improve the condition of aging infrastructure on the corridor.	Improve stormwater best management practices.	The corridor does not include updated infrastructure.	The alternative will provide an opportunity for public utility infrastructure improvements.

5. Analytic Methods

The purpose and needs statements in this study identified quantitative and qualitative factors to consider when evaluating the corridor. With the purpose of improving safety and capacity along the corridor a detailed traffic analysis was done to evaluate crash patterns and the existing level of service. The forecast year (2045) used in future modeling efforts was consistent with SEMCOG's 2045 Regional Transportation Plan. Safety and capacity were analyzed using quantitative data and analysis. Qualitative factors such as complementing natural beauty and views along the corridor, respecting historic and cultural significance required an approach that incorporated some data analysis, but also detailed consideration of context and importance of specific features. Mitigation and protection of valuable assets would be necessary, but understanding the importance and value associated with assets along the corridor is important.

Traffic Analysis

A detailed traffic study was conducted along the Adams Road corridor. The Traffic Analysis Report, found in Appendix D, includes the results of technical analysis conducted on crashes, traffic volumes, traffic speeds, future traffic data and level of service. The report details findings and further explains the methods used to conduct these analyses below.

Crash Data Methodology

A crash analysis was performed on Adams Road from Hamlin Road to Walton Boulevard for three signalized intersections and the segments between them were analyzed as listed below.

Segments

- ≡ Adams Road – Hamlin Road to Avon Road
- ≡ Adams Road – Avon Road to Meadow Brook Road/Hillendale Drive
- ≡ Adams Road – Meadow Brook Road/Hillendale Drive to Walton Boulevard

Intersections

- ≡ Adams Road at Walton Boulevard
- ≡ Adams Road at Meadow Brook Road/Hillendale Drive
- ≡ Adams Road at Avon Road

Seven years of traffic crash data for 2016–2022 was obtained from the National Transportation Safety Organization's (NTSO) Traffic Crash Analysis Tool (TCAT). TCAT is an online search tool for traffic crashes in Michigan.

Traffic crashes were analyzed for crash type and severity. Severity classifications of crashes include fatal (K), injury type A, injury type B, injury type C, or property damage only (PDO) (Table 5.1). The severity of a crash is determined by the most severe injury present in the crash.

Table 5.1: Severity Classifications of Crashes

Injury Type	Definition
Fatal (K)	Refers to any injury that results in death due to a motor vehicle traffic crash.
A	Refers to an incapacitating injury that prevents a person from walking, driving, or continuing normal activities that they were capable of performing before the crash.
B	Refers to any injury that is evident at the scene of the crash, but the injury is not fatal or incapacitating.
C	Refers to an injury reported by an occupant but not visible to the officer completing the crash report.
Property Damage Only (PDO)	Refers to a crash that does not result in any injuries.

Safety Impacts - Crash Reduction Rates

The Crash Reduction Rate was calculated for each alternative by identifying what design features included in that alternative were proven to reduce crashes and what the percent reduction was. The Crash Modification Factor Clearinghouse was a source of information utilized to inform the public on how modifications to the road can reduce the likelihood of crashes. The results of this analysis can be found in Section 7 - Alternatives.

Capacity Analysis and Level of Service

The highway capacity manual defines the level of service (LOS) for signalized intersections in terms of control delay. Control delay is defined as the extra time a driver encounters due to the traffic control devices at an intersection, such as a signalized intersection, compared to how long it would take if there were no devices. Table 5.2 shows the control delay that corresponds with each LOS. More LOS analysis can be found in the Traffic Report (Appendix D).

Table 5.2: Level of Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (Seconds)	Definition	Acceptable LOS
A	<10	Progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	Yes
B	>10 to ≤ 20	This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average delay.	Yes
C	>20 to ≤ 35	These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	Yes
D	>35 to ≤ 55	The influence of congestion becomes more noticeable. Longer delays may result from unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	No
E	>55 to ≤ 80	This is considered to be above the limit of acceptable delay for an urban roadway in the study area. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	No
F	>80	This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high V/C ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	No

Intersection Capacity Analysis – Synchro Simulation

A capacity analysis of the four signalized intersections listed below was conducted using Synchro 11 and following the procedures outlined in the Highway Capacity Manual (HCM) to evaluate the performance of each intersection. Traffic volumes collected in 2020 were used to develop the existing-conditions Synchro models and were projected forward at an annual growth rate of 0.5% for the future-conditions models. The capacity analysis for the four signalized intersections with one unsignalized intersection was conducted for the AM, Off, and PM peak hours for existing conditions (2022) and future conditions (2045). The signal timing plans were not altered or optimized in the existing capacity analysis. The existing signal timings were applied in the Synchro models by the signal timing permits provided by RCOC. For each alternative, the corridor signal timing was updated and optimized.

- ≡ Adams Road at Walton Boulevard
- ≡ Adams Road at Meadow Brook Road/Hillendale Drive
- ≡ Adams Road at Avon Road
- ≡ Adams Road at Butler Road (unsignalized)
- ≡ Adams Road at Hamlin Road

More LOS analysis can be found in the Traffic Report in Appendix D. In Section 7 – Alternatives of the PEL, final results are summarized for each alternative.

Roundabout Analysis – ARCADY Analysis

Kimley-Horn analyzed the following intersections as roundabouts:

- ≡ Adams Road at Meadow Brook Road/Hillendale Drive
- ≡ Adams Road at Avon Road
- ≡ Adams Road at Butler Road

The full Roundabout report can be found in Appendix D.

Capacity Analysis – TransCAD Modeling

The Adams Road corridor, between Hamlin Road and Walton Boulevard, underwent a Volume-to-Capacity (V/C) analysis utilizing the TransCAD 9 software and based on the SEMCOG Travel Demand Forecasting Model (TDFM) E7. The V/C ratio measures the congestion level on a given roadway and can determine which parts of the network operate at acceptable levels and which have capacity constraints. The V/C ratio is a function of demand and capacity. Traffic volumes represent demand. Whereas capacity represents the maximum traffic flow a transportation facility can accommodate at a given time and under various road conditions. Capacity is typically expressed in passenger cars per hour per lane (pc/h/ln) and is a function of factors such as the number of lanes and free flow speed (FFS). The V/C ratio ranges on a scale of 0 to 1 or greater and can generally be defined as follows:

- ≡ 0 → no demand
- ≡ 0.8 to 1 → demand reaching capacity
- ≡ 1 → demand equals capacity
- ≡ Greater than 1 → demand exceeds capacity

Additional factors considered in the capacity analysis and reflected in the V/C ratio include transportation mode (i.e., walking, biking, or public transportation), trip characteristics, and temporal traffic volume variations. The V/C TransCAD modeling analysis can be found in Appendix D.

Additional Analysis

Public input conducted prior to this study during the development of other City and RCOC led plans identified an increasing concern related to safety along the corridor. Driver delay was also a commonly expressed concern for residents. Throughout the PEL study, the study team gathered feedback from the public to identify specific locations where there were safety concerns, as well as specific dates, times, and directions they would experience delay. Existing safety and capacity data was cross referenced with public input which provided clarity and assurance on where, when, and how the corridor operates.

Public input received also highlighted community sentiment for the corridor's natural aesthetic and historical significance. The primary concern expressed was the impact of road reconfiguration on the

existing environment, cultural and historic assets. Assets identified included trees, rolling hills, historic structures and private property. The identification of these assets lead to additional analysis.

Cultural Impacts - Right-of-Way

Corridor improvements may impact properties along the corridor. A detailed assessment was conducted to identify impacts associated with each presented alternative and more information can be found in Section 7. The assessment included looking at existing public right-of-way, the limits of construction and the type of impact to each property along Adams Road. The limits of construction were identified by utilizing the slope-stake line required for each alternative. The number of fee acquisitions, permanent easements, or temporary easements required were counted for each alternative.

Environmental Impacts - Tree Survey

A Tree Inventory and Condition Assessment was conducted, and full results can be found in Appendix E. By utilizing a combination of LiDAR scanning and traditional survey methods, an inventory and condition assessment was conducted on trees and shrubs within the existing right-of-way along the corridor. To understand the environmental impacts of road improvements within the corridor, 439 deciduous and conifer trees were evaluated.

The condition was established by reviewing many factors including, but not limited to structural integrity, plant health, form, crown development, insect, and/or disease, lean or trunk habit, structural strength, vigor, and species. The result of the application of the evaluation criteria results in a general statement concerning the plant's condition.

Historic and Cultural Impacts – Cultural Resources Assessment

Chronicle Heritage Group (previously called Commonwealth Heritage) completed a preliminary cultural resources assessment for the Adams Road corridor in April 2023 (Appendix F - Preliminary Cultural Resources Review). As part of their process, they reviewed a variety of historic maps, soils data, and conducted a desktop review of above-ground historic and archeological resources, to track the development and land use in the Project Area over time. The Michigan State Historic Preservation Office (SHPO) records were also reviewed to identify any significant archaeological sites in the area. In April 2025, Chronicle Heritage completed an Above Ground Survey (Appendix G), to identify and evaluate previously unrecorded resources along with previously recorded resources in the area of potential effects (APE). They surveyed 23 previously unrecorded resources, 5 previously recorded resources, and 17.05 acres (6.9 hectares). A pedestrian and vehicular field survey was also conducted as part of the Above Ground Survey. Historians at Chronicle Heritage identified resources 50 years of age or older by reviewing newspapers, property deed records, aerial photos, and historical maps. Chronicle identified 76 resources with the APE. 72 of the resources have always served as residences.

6. Existing Conditions

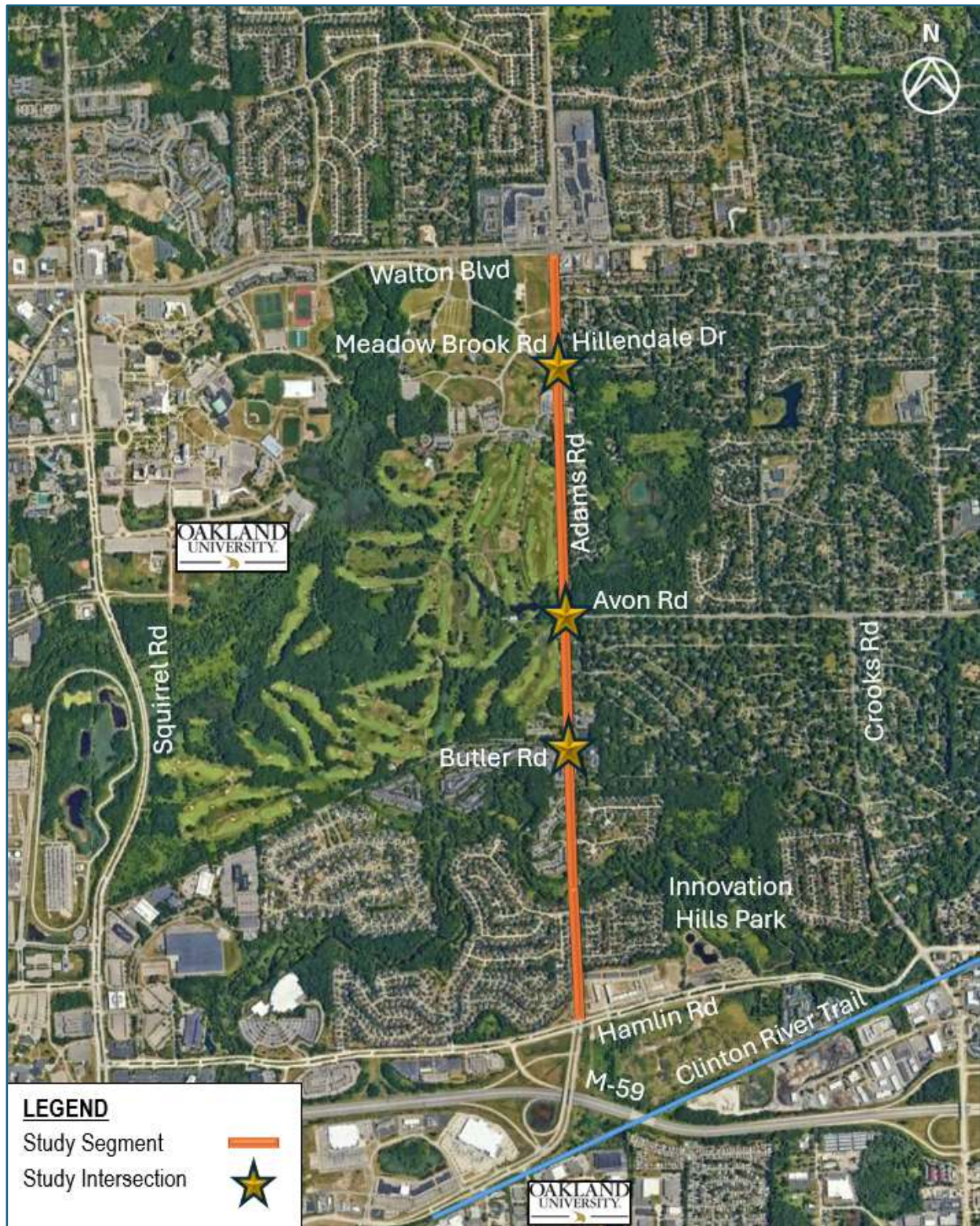


Figure 6.1: Map of Adams Road Corridor Study Segment and Intersections

Roadway Characteristics

Table 6.1: Roadway Characteristics

Road Jurisdictional Owner	Road Commission for Oakland County
National Functional Classification	3 - Other Principal Arterial
Michigan Road Classification	County Primary
Lanes	2 (intermittent passing/turn lanes)
Traffic Volumes	23,055 in 2021
Speed	45 MPH
Intersections	Meadowbrook/Hillendale (Signalized), Butler Rd (no signal), Avon Rd (Signalized)
Existing ROW	Varies from 63 feet to 123 feet
Planned ROW	120 feet (Master ROW Plan)

Surrounding Land Use

The City of Rochester Hills is a suburban community with approximately 97% land developed. The southern and eastern areas of the corridor are characterized by single-family residential and multifamily developments, vacant public land in the east, and some commercial development in the northeast. To the west, the corridor borders Oakland University, which includes the Katke-Cousins and R&S Sharf golf courses. Approximately 2/3 of the land to the west of the corridor is public/institutional and recreational. The remaining 1/3 in the southwest are multifamily and single-family residential developments, with some conservation land use and the Clinton River intertwined.

Connectivity and Regional Access

Adams Road plays a key role in connecting adjacent residential neighborhoods, Oakland University, and a nearby commercial district. The corridor lies near two major highways: M-59, located just south of Hamlin Road, and I-75, located approximately 2.4 miles west from the M-59 and Adams Road interchange. These highways provide vital regional access and contribute to commuter traffic in the area.

The corridor also provides key access to popular commercial and retail centers located immediately north and south of the study corridor. Large stores including Walmart, Meijer to the south and Whole Foods, Trader Joes, Busch's to the north are anchor tenants that attract residents in and outside of the immediate Adams Road corridor.

Rochester Hills and northerly neighboring communities of Oakland, Orion, Oxford and Addison Townships have significantly grown in population and have experienced rapid development. Between 1980 and 2024, the population of Rochester Hills grew by 89.2%. Oakland Township, Orion Township, Oxford Township, and Addison Township grew by 167%, 82%, 144%, and 37%, respectively. The Adams Road corridor lies in the middle of the rapid development and is the most convenient and direct route for many travelers. In the current two-lane configuration, Adams Road no longer supports the traffic volumes it is experiencing.

Nearby Arterials

Squirrel Road, located west of Adams Road, functions as the next major north-south principal arterial and provides additional capacity and redundancy for traffic in the region. Crooks Road to the east ends at Avon Road and does not provide access to the northerly neighboring communities.

Safety

Adams Road is a two-lane road with steep vertical curves, a pavement width of 22 feet and does not meet current design safety standards. When engaging with the public and stakeholders throughout the study, it has been indicated safety is a priority. A frequently expressed concern is the sightline at the signalized intersections at Avon Road, Meadow Brook Road/Hillendale Drive. The public has also indicated the need for intersection control at Butler Road. Other significant safety concerns include sightline obstructions due to vertical curves (hills and valleys) which are also difficult to navigate in inclement weather events. The narrow width of the pavement prevents emergency vehicles from effectively navigating through peak traffic volumes. The most referenced safety concern was the posted speed limit and excessive vehicle speeds.

Speed

A common way to measure speed is by using the 85th percentile speed—the speed at or below which 85% of drivers are traveling under normal, free-flowing conditions. For this study, the 85th percentile speeds were recorded separately for northbound and southbound traffic, then combined for three key segments of the corridor: from Hamlin Road to Butler Road, from Butler Road to Avon Road, and from Avon Road to Meadow Brook Road/Hillendale Drive. The table below (Table 6.2) summarizes the 85th percentile speeds for each of these locations collected on November 15, 2022. The data indicates that many drivers are driving over the posted speed limit of 45 mph. More information can be found in the Traffic Report in Appendix D.

Table 6.2: Adams Road Speed Data

Location	Combined (mph)			
	Min	Max	50 th %ile	85 th %ile
Hamlin Road to Butler Road	7.5	86.4	46	50.3
Butler Road to Avon Road	6.8	86.4	42.3	47.8
Avon Road to Meadow Brook Road/Hillendale Drive	6.8	78.9	40.4	45.4

Crash Analysis

Crash Severity

Severity classifications of crashes are also calculated using crash type with the Property Damage Only (PDO) classification. Of the 733 total crashes, most were classified as PDO:

The results of the Crash Analysis show between 2016-2022 there were 766 total crashes, of which 113 resulted in injuries, and one resulted in fatality. Of the 133 crashes reported with injuries, the majority were classified as Injury type C (Figure 6.2).

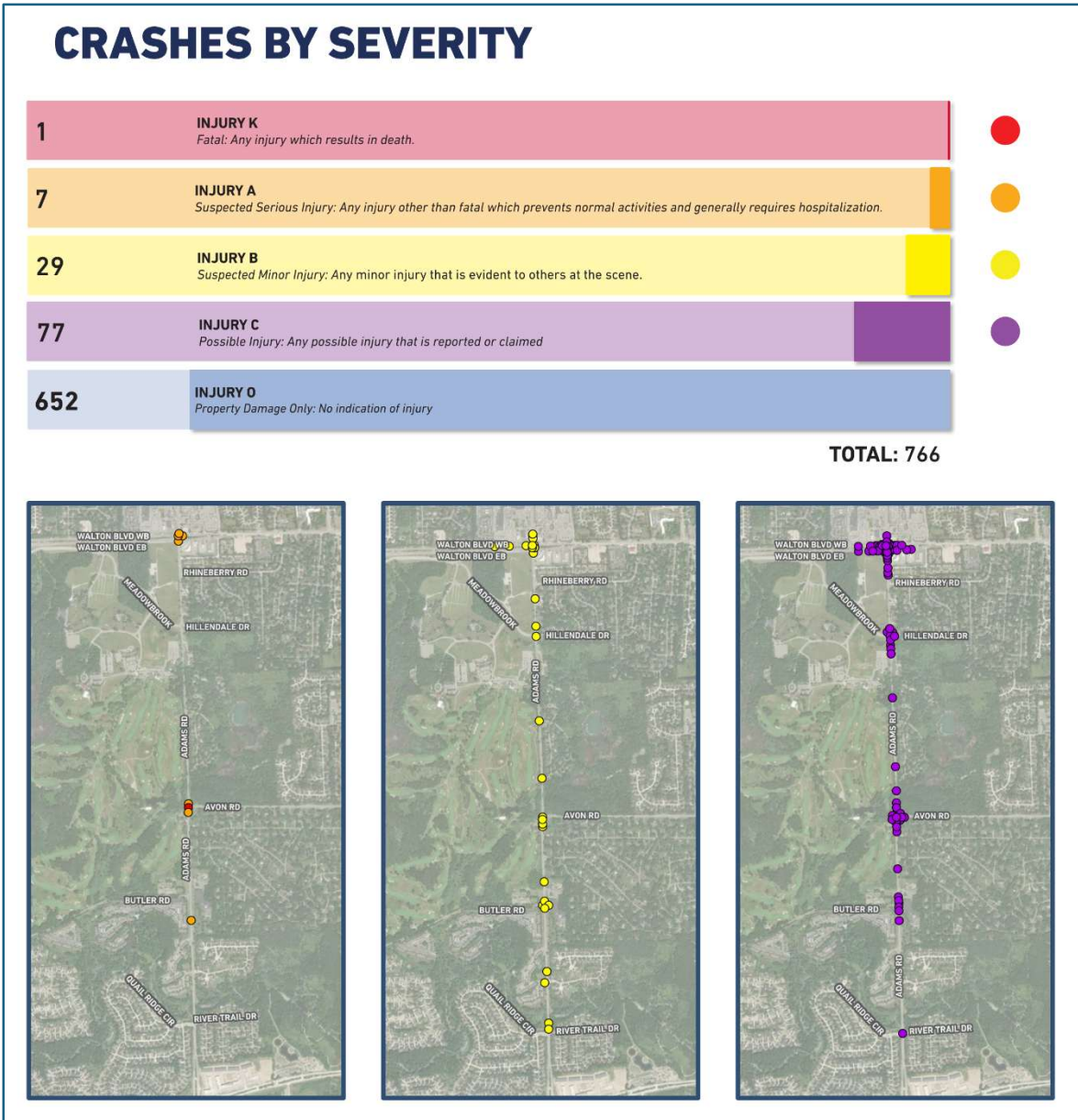


Figure 6.2: Injury Type Corridor Totals 2016-2022

Crash Type

Of the 766 total crashes, rear end crashes at intersections were the most frequent along the corridor. Angle crashes occurring when vehicles turn, and sideswipe crashes in the same direction were the next highest occurring crash types. (Figure 6.3).

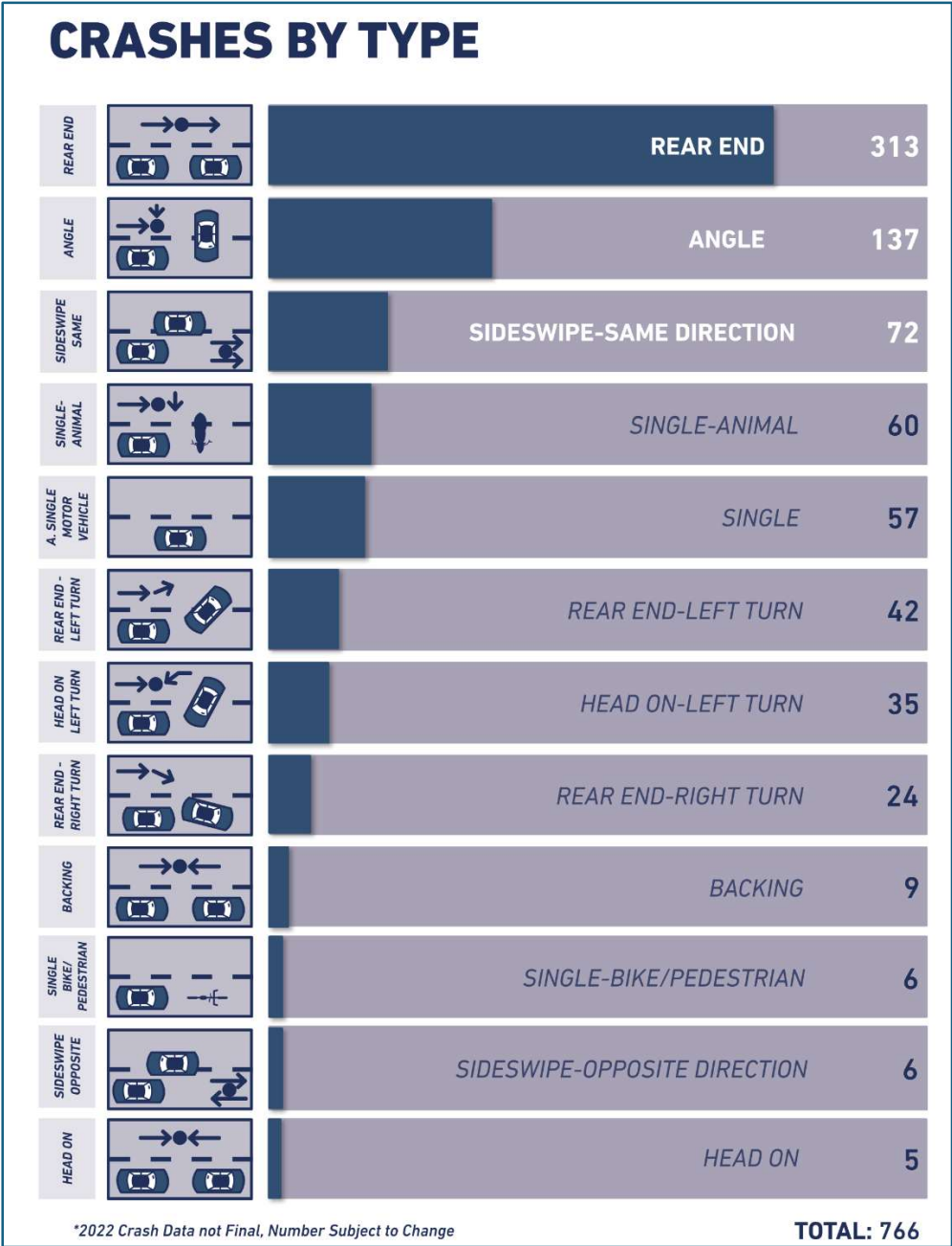


Figure 6.3: Crash Type Corridor Totals 2016-2022

Crash

Location

Figure 6.4 and Figure 6.5 provide intersection and segment crash heat maps. Crashes within the corridor are most dense on Adams Road at the Walton Boulevard and Avon Road intersections. The crash data analysis aligned with public input received regarding specific safety concerns at the Avon Road intersection.

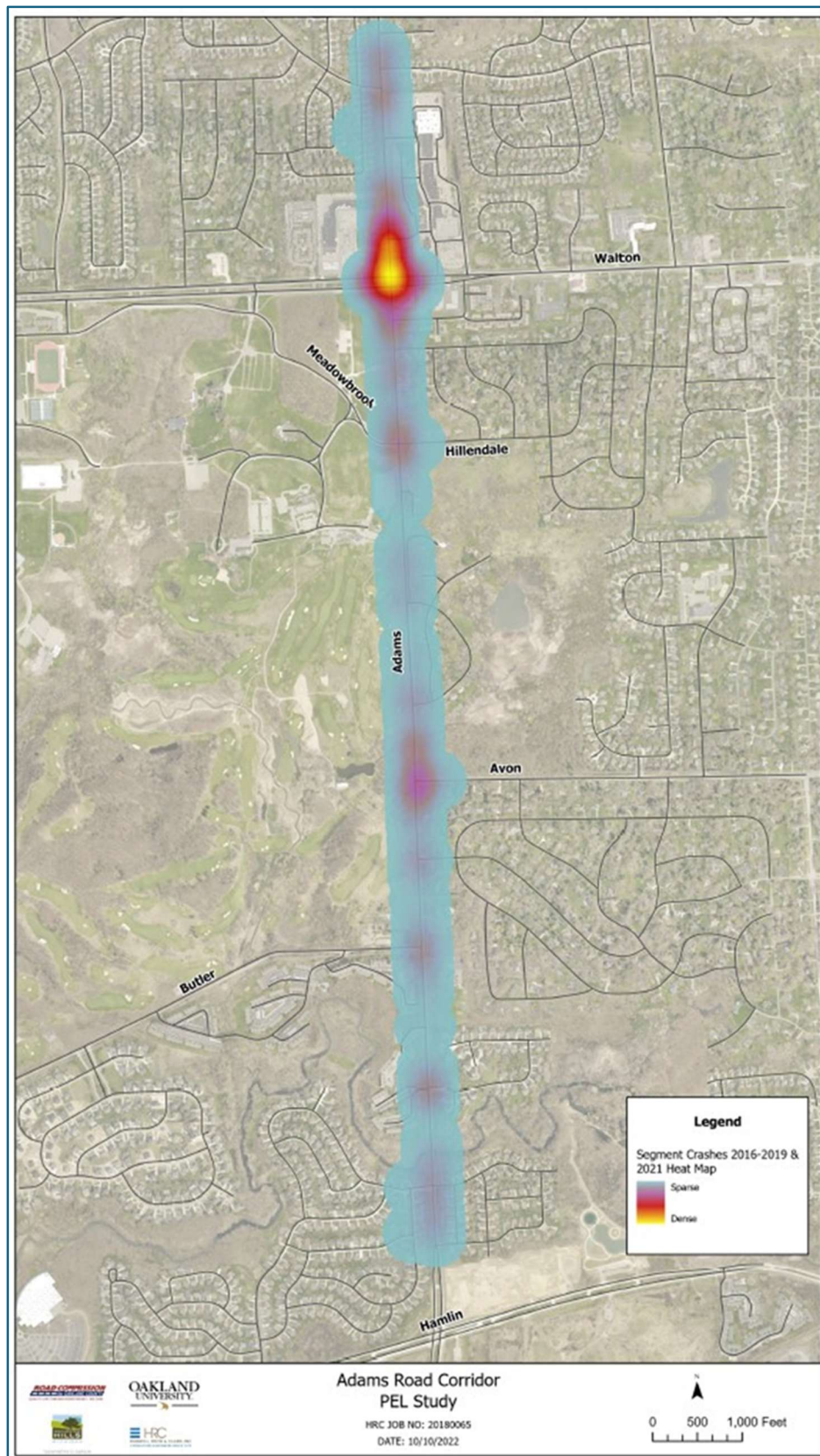


Figure 6.4: Segment Crashes Heat Map 2016-2019, 2021

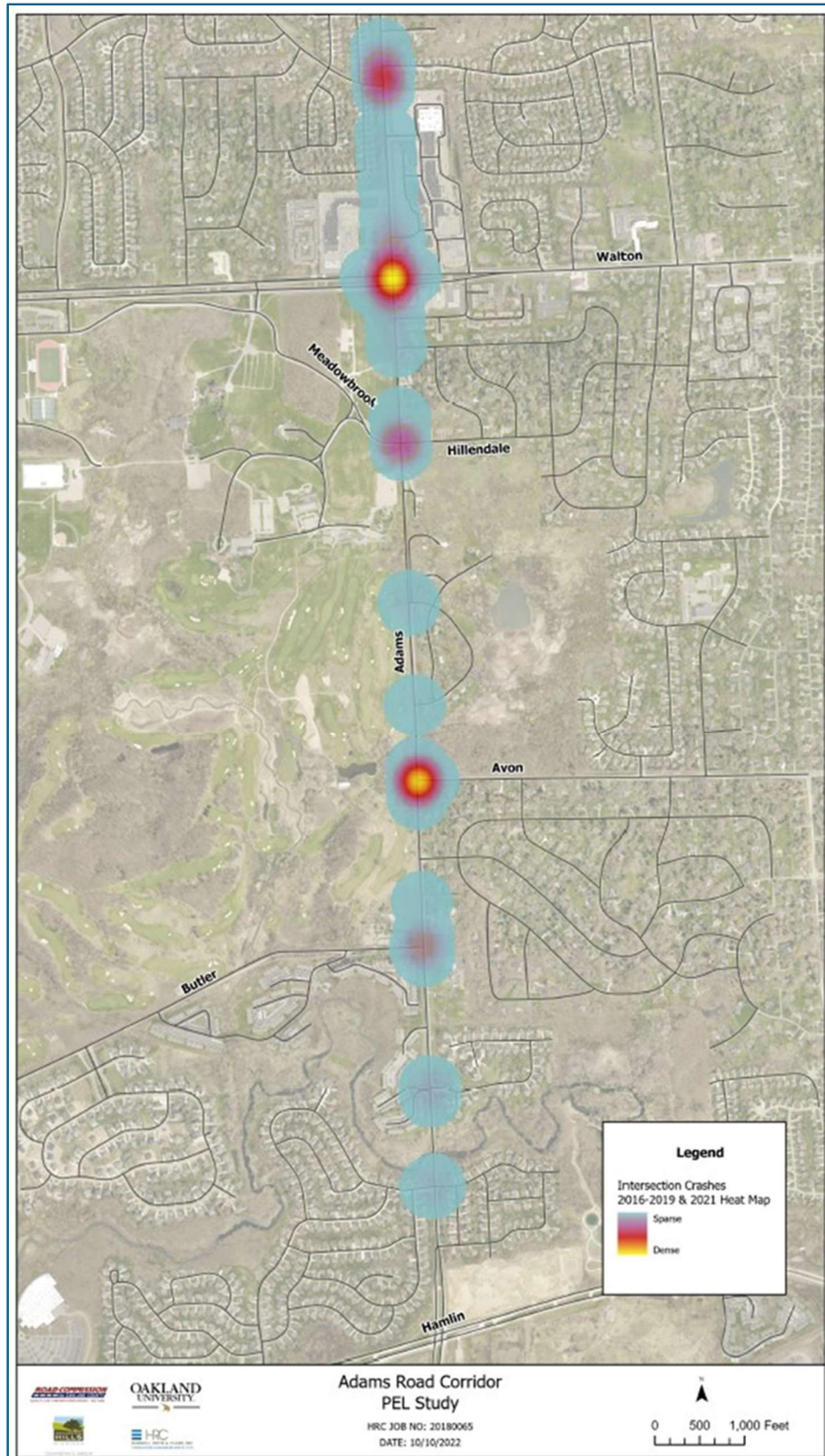


Figure 6.5: Intersection Crashes Heat Map 2016-2019, 2021

Intersection and Segment Crash Evaluation

Crash Frequency Evaluation

Crash rate frequency was evaluated for segments and intersections and then compared to regional averages provided by SEMCOG (Table 6.3). From Hamlin Road to Avon Road the crash frequency of 18.43 crashes per year is 134% higher than similar segments in the SEMCOG region. The intersection of Adams Road and Walton Boulevard exhibited a higher crash frequency with 50.14 crashes per year which is 102% higher than the regional average. The intersection at Avon Road had a lower crash frequency of 16.14, however this 128% higher than crash frequencies at similar intersections regionally. For more detailed crash analysis, see the Traffic Analysis Report (Appendix D).

Crash Rate Evaluation

The crash rate was also calculated to compare Adams Road with similar corridors in the Southeast Michigan region (Table 6.3). The analysis indicates that the segment crash rate for Adams Road varies from 2.25 to 3.8 crashes per million vehicle miles (mvm) traveled. The segment of Adams Road, Meadow Brook Road/Hillendale Drive, to Walton Boulevard exhibits the highest crash rate of 3.8 crashes per mvm travelled which is a 32% higher rate than comparable segments in the SEMCOG region. The intersection at Avon has a crash rate of 1.54 which is 97% higher than the regional average. The Walton Boulevard intersection crash rate of 1.54 is 104% higher than comparable intersections in the SEMCOG Region.

Table 6.3: Adams Road Crash Rates and Frequency Comparison with Regional Averages

Location	Average Daily Traffic Volumes	Regional Average Crash Frequency (crashes/yr)	Adams Road Crash Frequency (crashes/yr)	Regional Average Crash Rate (mvm)	Adams Road Crash Rate (mvm/mev)
Segments					
Hamlin Road to Avon Road	20,001 to 30,000	7.86	18.43	2.87	2.25
Avon Road to Meadow Brook Road/Hillendale Drive	20,001 to 30,000	7.86	10.43	2.87	2.00
Meadow Brook Road/Hillendale Drive to Walton Boulevard	20,001 to 30,000	7.86	7.71	2.87	3.80
Intersections					
Adams Road/Meadow Brook Road/Hillendale Drive	20,001 to 30,000	7.06	6.57	.78	.78
Adams Road/Avon Road	20,001 to 30,000	7.06	16.14	.78	1.54
Adams Road/Walton Boulevard	50,001 to 60,000	24.78	50.14	1.25	2.56

Table 6.3 Regional rates from SEMCOG, the Southeast Michigan Council of Governments, Crash Analysis Process, January 2016.

Traffic Volumes

Historic Average Daily Traffic (ADT) was pulled from RCOC's Transportation Data Management System. This included two-way ADTs from 2003 to 2021 for the southern segment from Hamlin Road to Avon Road and the northern segment from Avon Road to Walton Boulevard. Detailed information and data can be found in The Traffic Report, which also includes counts on articulated trucks and non-motorized traffic. The data indicated that two-way 24-hour volumes range from 19,000 to 23,000 vehicles per day. Volumes are higher at the north end of the corridor between Avon Road and Walton Boulevard. In general, southbound Adams carries more traffic than northbound in the AM and northbound Adams carries more traffic than southbound in the PM.

Capacity Analysis

When engaging with the public and stakeholders during the development of past studies and as part of this study, a common concern expressed was related to congestion throughout the corridor. Specifically, most concerns indicated delay during evening peak travel times in the northbound direction. Northbound traffic in the evening is attributed to the population growth in north neighboring communities. Adams Road was built prior to the rapid development of these communities and no longer provides the level of service required for traffic volumes.

Intersection Capacity Analysis

A primary factor influencing congestion is intersection operations. The level of service (LOS) analysis studied the five intersections along the project corridor: Walton Boulevard, Meadow Brook Road/Hillendale Drive, Avon Road, Butler Road, and Hamlin Road. Three out of the five intersections are not operating at an acceptable LOS and are indicated in red. (Table 6.4).

Table 6.4: Existing Total LOS by Intersection

Intersection	Existing AM Peak Total LOS	Existing Off Peak Total LOS	Existing PM Peak Total LOS
Adams Road and Walton Boulevard	C	B	C
Adams Road and Meadow Brook Road/Hillendale Drive	A	A	A
Adams Road and Avon Road	D	C	C
Adams Road and Butler Road	A	A	A
Adams Road and Hamlin Road	C	C	C

To further understand how each intersection and approach operate at peak travel times, the LOS is indicated below (Figure 6.6). The heaviest delay is experienced at Avon during morning peak hours, and the stop controlled eastbound approach from Butler during morning and evening peak hours.

Existing

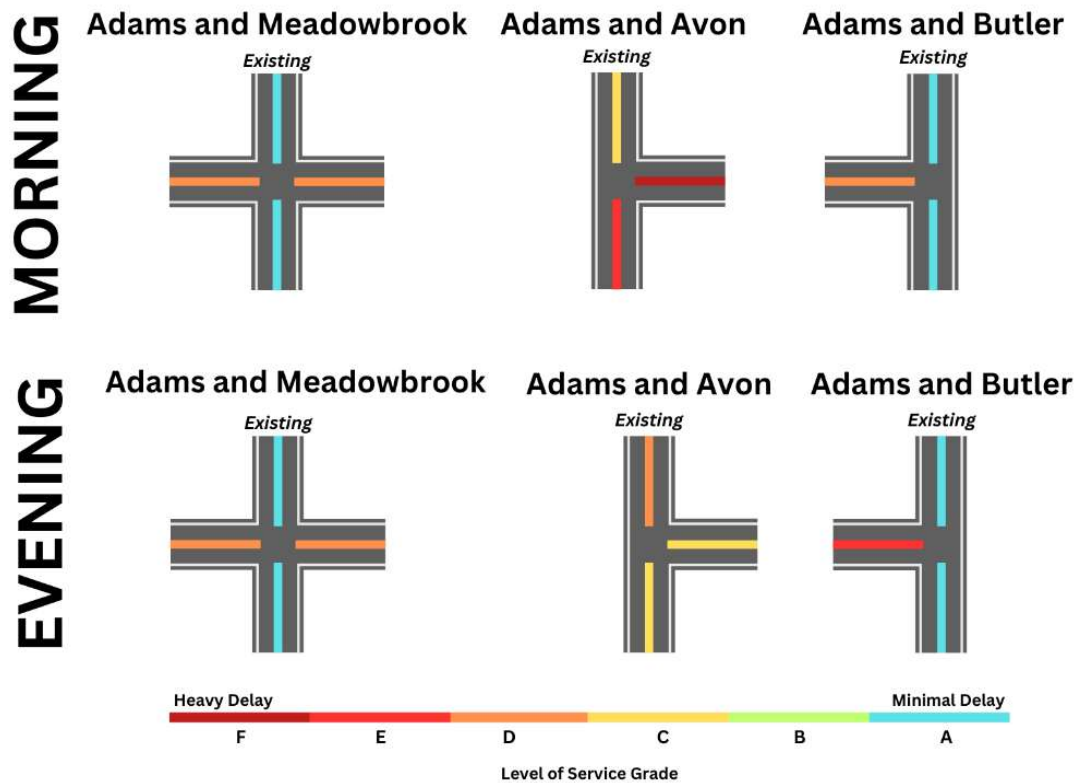


Figure 6.6: Existing Intersection Capacity Analysis

Non-Motorized Connectivity

Adams Road has an eight-foot pathway on the east side of the corridor. The pathway is not continuous; it begins at Hamlin Road and continues to Avon Road. From Avon Road, the pathway ends about 500 feet south of Hillendale Drive, picks back up again north of Hillendale Drive, and continues to the end of the corridor at Walton Boulevard. Non-motorized facilities at the intersections of Hamlin Road, Meadow Brook Road/Hillendale Drive and Walton Boulevard include push buttons for pedestrian signals and ADA accessible ramps but lack striped crosswalks. There is a marked crossing with a pedestrian refuge island just south of Portage Trail Drive at the southern end of the study area. The intersection of Adams Road and Avon Road currently does not have any non-motorized facilities.



Figure 6.7: Pathway Terminus at Greek Cottages on Adams Road

Infrastructure

Infrastructure assets along this corridor include road pavement, a vehicular bridge on Adams Road over the Clinton River, a non-motorized pedestrian bridge over the Clinton River, overhead electrical lines, underground water, stormwater, sanitary, and natural gas lines, and fiber optic and co-axial cable lines.



Figure 6.8: Wooden Pedestrian Bridge on Adams Road north of River Trail Drive

Transportation Infrastructure

The pavement on Adams Road has been in the same state of repair since 2019 after RCOC performed a preventative maintenance overlay. This overlay includes minimal milling of the road surface (grinding off sections of bad pavement) and the overlay of 2 inches of new asphalt and newly painted pavement markings. A preventative maintenance overlay is expected to extend the life of the road by 5-10 years, with crack sealing applied after two years. Although the pavement condition rating in 2025 was a 7 (good category), Adams Road is predicted to drop to a fair rating of 6 by 2028, to a 5 in 2030 and so on until 2038 when a poor rating of 3 is predicted. The RCOC Transportation Asset Management Plan (TAMP) identifies Adams Road as a critical link in the Risk of Failure Analysis.

The vehicular bridge on Adams Road is located between Quail Ridge Circle/River Trail Drive and Stoney Brook Drive/Pheasant Creek and intersects the Clinton River. It is a prestressed concrete box beam bridge identified on the National Bridge Inventory (NBI) and is listed as structure number 8151 in Michigan. The bridge is set up for inspection every 12 months and in its current state and has two lanes. The existing condition of the bridge is poor, with deck condition rated 6, fair; superstructure condition rated 5, Fair; and substructure condition all rated 4 poor. The RCOC TAMP identifies this bridge as part of the critical bridge network and it is listed as a Scour Critical Bridge with a rating of 3. This indicates there is a depletion of sediment from around the bridge's foundation, commonly caused by fast-moving water.

Adjacent to the vehicular bridge is a separate non-motorized bridge originally built on a farm in Southfield, Michigan. In 1989, the bridge was repurposed and transported to the Adams Road location and the span was shortened to fit within the banks of the Clinton River.

It is recommended that this bridge be inspected every 5 years. In its current condition, the bridge superstructure is in fair/good condition, the substructure is in good condition, the approaches are in fair condition, and the bridge hydraulics are in good condition. The bridge is 90 feet in length and eight-feet wide. The bridge has evidence of general weather/deterioration as well as longitudinal and lateral cracking in both bituminous approaches. Neither bridge has been hot pour sealed.

Utilities

Utilities along the Adams Road corridor include both overhead lines and underground conduit and pipes. The City of Rochester Hills maintains ownership of water supply lines, storm water drainage, and sanitary sewers. Other owners and their respective utilities include Consumers Energy with natural gas distribution, WOW internet connection, DTE overhead and underground electricity supply, and Comcast and AT&T's overhead and underground cable network. Overhead lines, in some places, are along the road and other locations run behind adjacent properties. Underground utilities are mostly adjacent to or below the roadway.

Stormwater

Storm water drainage infrastructure along the Adams Road corridor is primarily open ditches. The longest stretch of built storm water drainage was constructed north of Hamlin Road and south of Portage Trail Drive where Adams Road has a boulevard with a 36" Reinforced Concrete Pipe (RCP) that is located in the greenspace on the west side of the road. The existing drainage along Adams Road from the Clinton River to Butler Road is contained in roadside ditches with culverts at driveways and road intersection that drains into the Clinton River from the north. The drainage north of Butler Road is also contained in roadside ditches with culverts at driveways and road intersections that

traverses into storm sewer in the intersection of Adams Road and Avon Road. Some stormwater outlets into the Ramiro Drain, a 72" diameter and 90' long culvert built in 1971 is located is underneath Adams Road to allow the drain to flow under the roadway. The Meadow Brook Neighborhood and the Oakland University Golf Course have storm sewers.

Overhead Utilities

Overhead lines run along the west side of Adams Road from Hamlin Road to Butler Road approximately 60' off the centerline of Adams Road. The overhead lines then, just south of the Butler Road intersection, cross to the east side of Adams Road. In general, residences that have frontage on Adams Road have overhead lines along the backside of properties, whereas properties adjacent (but not fronting Adams Road), commercial properties, and vacant lots have overhead lines roughly 60' off the Adams Road centerline. Utility companies that own utilities in the overhead network are DTE, AT&T, Comcast, and WOW.

Underground Utilities

Watermain

Watermain pipes follow or intersect with the Adams Road corridor; some were constructed as late as 1970 .

Sanitary

Sanitary infrastructure along Adams Road is limited south of Meadow Brook Road but becomes more prevalent north of Meadow Brook Road to Walton Boulevard. In the subdivisions and neighborhoods from Hamlin Road to the Avon Road sanitary sewer only exists as connections from houses and flows away from Adams Road. Sanitary sewer also picks up just north of Hillendale Road on the east side of the road and follows Adams Road until Walton Boulevard.

Natural Gas (Consumers Energy)

Natural gas infrastructure runs the full length of the study area from Hamlin Road to Walton Boulevard and crosses under the road at a few locations. Natural gas service lines range in size from half inch to four-inch split from the main at each crossroad within their respective intersections and into each property with frontage on Adams Road.

Fiber Optic and Co-Axial

Comcast underground services are present in isolated areas around the south end of the Adams Road corridor south of Butler Road and at the north end, north of Meadow Brook Road. In both areas, the service that runs parallel to Adams Road is in overhead lines.

Limited WOW infrastructure is present in the Adams Road corridor. All co-axial cables are underground and connect subdivisions.

AT&T conduit lines run along much of the study area with many lines splitting off to service properties and subdivisions along the corridor.

Emergency Services

The Rochester Hills Fire Department (RHFD) is a full-time, all-hazards fire, rescue, and emergency medical services (EMS) department. There are five fire stations staffed 24 hours a day that are strategically located throughout the city to provide outstanding service to all residents and visitors.

In 2023, the RHFD responded to 8,530 calls, an increase of 6.75% over 2022. Of those calls, 7,090 were EMS calls, representing 83% of the total calls. The Adams Road corridor is covered by Station 4, located on Walton Boulevard east of Adams Road, and is backed up by Station 3 on Auburn Road east of Adams Road, and Station 1 on Livernois Road north of Hamlin Road. The area with the highest number of EMS calls in the city is Adams Road between Auburn Road and South Boulevard, approximately 1.5 miles south of the southern terminus of this study area. As such, Adams Road is one of the busiest travel routes for the RHFD. Fire engines measure between 25 and 35 feet in length and weigh 30,000 lbs. on average. Therefore, they require larger turning radii and a minimum access road width of 20 feet. With the existing conditions during morning and evening peak traffic flow, all fire and EMS vehicles have a challenging time traversing Adams Road, especially between Walton Boulevard and Avon Road, as traffic cannot move to the side far enough to allow the Fire/EMS apparatus safe and quick passage through the area. With call volumes projected to increase each year, road design will need to include elements allowing for safer passage with increased capacity for Emergency Services.

Natural Environment

The City of Rochester Hills is home to various natural environments such as open spaces, rural areas with diverse topography, rivers, and lakes. The Clinton River, which traverses directly through Rochester Hills, is called out in the City's current master plan as one of the favorite natural amenities in the city. The Clinton River is directly affected by the Adams Road corridor as it flows under Adams Road just south of Butler Road and north of Hamlin Road. The Clinton River Watershed is a 760 square mile area comprised of thousands of lakes, ponds, wetlands, marshes, coldwater tributaries, etc. Waters rise from within Independence, Brandon, and Springfield Townships and flow for 81.5 miles in an easterly direction through 71 communities and five counties, including Oakland, Macomb, Lapeer, Wayne, and St. Clair, before reaching Lake St. Clair in Harrison Township.



Figure 6.9: Clinton River under Adams Road, north of River Trail Drive

Tree Survey Condition Report, (found in Appendix E), identified 21 species of trees. Close to 75% of the trees were either Maple, Black Walnut, Oak, Spruce, Black Locust, Hemlock, or Elm. The

remaining 25% was comprised of trees of unknown species (14.6%), and small numbers of Cherry, Mulberry, Pine, Hickory, Apple, Basswood, Zelkova, Hazel, Juniper, Willow, Serviceberry, Hackberry, Fir, and Poplar trees. “Unknown” is defined as trees located in larger wooded areas where a substantial understory exists, and observations of the condition attributes could not be confirmed. The following evaluation ratings shown in the table below (Table 6.5) apply to the 439 surveyed trees within the Right-of-Way corridor, with over half receiving an evaluation of “Good”, “Very Good”, or “Excellent”:

Table 6.5: Evaluation Rating of Surveyed Trees

Rating	Percent of Total
Excellent	4.3%
Very Good	15.9%
Good	31.2%
Fair	29.8%
Very Poor	1.1%
Unknown condition	13.6%

As part of the required evaluation of each presented alternative, additional tree counts were added based on the limits of construction (slope stake line) for each alternative design. Totals can be found in the Alternatives section of this study.

History and Culture

Housing

The area is primarily residential with 73 total properties located directly adjacent to the study corridor. This includes the Meadow Brook subdivision that is owned by Oakland University and is commonly referred to as the “Oakland University Faculty Subdivision,” as it was originally built to house staff and faculty of the university. The homes in the subdivision are owned by the occupants, but the land where they are built is still owned by the university. The residential subdivision to the east of the intersection of Adams Road and Meadow Brook Road/Hillendale Drive is called Spring Hill. Construction of Spring Hill began in the 1950’s. In addition to historic assets near Meadow Brook Hall, the Christian Hills Subdivision is located east of Adams Road, south of Avon Road and was built in the 1950’s. South of Christian Hills lies the Pheasant Ring Subdivision which began development in the late 1980’s. West of Adams and south of Avon Road includes the Oakwood Park Condominiums that began construction in the mid-1970’s. To the south of Oakwood Park lies the Quail Ridge Subdivision that was built in the late 1970’s. On the south side of Butler Road, west of Adams Road, the River Oaks Apartment complex was built in 1987. To the west of the apartment complex, the Butler Ridge Subdivision started construction in the mid 2000’s.

Schools

Meadow Brook Elementary School

Meadow Brook Elementary School is located east of Adams Road in the Spring Hill subdivision. It was built in 1957 as a way for the district to accommodate its expanding population and student enrollment from the post-World War II baby boom. The elementary replaced traditional one-room schoolhouses that could no longer accommodate growth and modernized education.

West Middle School

West Middle School, formerly West Junior High School, is located east of Adams in the Stratford Knoll subdivision on Old Perch Road. It was built in 1962 to accommodate expanding student enrollment from residential development in the area.

Brookfield Academy

Brookfield Academy is a Montessori school located on the east side of Adams Road, south of Avon Road and was built in 1985. It is a private school that houses 125 students from Pre-K through 5th grade.

Meadow Brook Farms & Meadow Brook Hall

In 1908, John and Matilda Dodge purchased the 320-acre farm in Rochester, Michigan as a weekend vacation home. After acquiring adjacent land, the property expanded to over 2,000 acres and was named Meadow Brook Farms. It became known for its premium produce and livestock. It was also used by the Dodge brothers as a secret testing ground for Dodge Motors' automobile prototypes. Meadow Brook and the structures around the property have been identified as valuable assets to the community. In 2012 it received National Historic Landmark Status from the National Park Service. Oakland University owns, maintains and operates the property today.

Stone Retaining Wall

The stone retaining wall was designed by the Dodge Motors engineering department and built by RCOC circa 1919 (Figure 6.10). The wall served to keep the higher elevated soil from eroding into Dodge Road, now known as Adams Road.



Figure 6.10: Northbound Dodge Road highlighting stone retaining wall, ca. 1920

(Photo Credit: Board of County Road Commissioners of the County of Oakland 1919-1920 Annual Report)

Construction

Designed by Detroit architect William Kapp, construction of Meadow Brook Hall began in 1926. Using almost entirely Michigan materials, the 88,000 square foot mansion contained 110 rooms and was completed in 1929 (Figure 6.11).



Figure 6.11: Meadow Brook Hall

(Photo Credit: Tanya Moutzalias, MLive Detroit, 2015.)

Architecture

Inspired by lavish estates in England, Meadow Brook Hall is an example of Tudor-revival architecture with stone masonry, timber framing and A-frame gables. The interior includes elaborately carved stone and woodwork, 39 spiral chimneys, Tiffany-stained glass, 4 kitchens, a hidden staircase, and decorative plaster ceilings. It is the fourth largest historic house museum in the United States.

Gate Lodge

Constructed in 1928, the Meadow Brook Hall Gate Lodge (Figure 6.12) is located near the intersection of Adams Road and Avon Road and is approximately 1,100 square feet. It contained two bedrooms, one bathroom, a kitchen, and a living area. It had an attached 150' x 100' garden and a chicken coop. The Gate Lodge served as the estate entrance, located via a driveway one mile away. The lodge housed the gatekeeper who managed access to the estate for family and visitors. Over the years, the lodge was vacant and began to deteriorate. The University started restoration activities in 2010 but quickly realized they needed assistance. In 2020, the Gatehouse Society was formed and with the help of volunteers, the Lodge was restored to its original condition.



Figure 6.12: Meadow Brook Hall Gate Lodge, ca. 1947

(Photo courtesy of Meadow Brook Hall)

Historic Recognition

In 1971, Meadow Brook Hall was open to the public and became the fourth largest historic house museum in the United States. In 1979, Meadow Brook Hall was added to the National Register of Historic Places. In 2012, it was designated a National Historic Landmark for its Tudor-revival architecture and for its contributions to agriculture, landscape design, and the arts. It receives over 90,000 visitors annually.

Oakland University

In 1956, Matilda Dodge Wilson and her husband Alfred signed an agreement in Meadow Brook Hall's library in partnership with Michigan State University, creating one of the largest private donations to public education in history. This historic agreement affirmed the 1,400 acres of donated land would become a university campus, known as Oakland University, and came with a \$2 million endowment.

As a predominantly commuter-based institution, many of its students travel to campus daily by private vehicle, which significantly increases traffic volumes especially during peak hours. In 2000, Oakland University had an enrollment of 15,875 students. By 2015, enrollment increased by over 30% to a record of 20,711 students. In 2020, Oakland University's enrollment dropped slightly to 19,013 students. In the fall of 2024, total enrollment was down to 16,108, which is the five-year average. In addition to student traffic volumes, the entrance at Adams Road and Meadow Brook Road/Hillendale Drive experiences elevated traffic volumes, particularly during events held at Meadow Brook Music Amphitheatre. The Amphitheatre provides concerts of all musical genres. It is open from May through September each year and has a capacity of 7,700 people.

Additional university-related facilities along Adams Road include an organic farm at the Butler Road intersection and a Research Park located south of M-59.

Oakland University Golf Course

Golf has been a part of the Meadow Brook estate since the early 1900's. It began when John Dodge created a personal nine-hole golf course at Meadow Brook Farms. It was not until 1976 when an additional nine holes were constructed to make a complete 18-hole course, now called Katke-Cousins Golf Course, named for two major Oakland University donors, Mr. and Mrs. Marvin Katke and Mrs. Harold Cousins. A root cellar from Meadow Brook Estate was converted into a two-story clubhouse and pro shop. Originally, the course was only open to the university community but has since expanded to the public. In 2000, the 18th hole R&S Golf Course opened. Golf Digest ranked the Sharf Course 21st among Michigan's 855 golf courses. The R&S Golf Course was designed by famed golf course architect and teacher Rick Smith.

Existing Need for Improvements

Adams Road has long been identified as a corridor in need of safety and capacity improvements. With increased population and development to the north and as a primary route for traffic to access M-59 and key commercial areas, Adams Road has remained the same as the world around it has developed and evolved.

A lack of consistent non-motorized facilities along the corridor does not reflect the needs of the residents and the city, as walkability was identified as one of the things residents like most about the community during the development of the Master Transportation Plan.

The corridor is rich with history and cultural significance, any improvement to the infrastructure must be developed with sensitivity to the various historic and cultural assets. In addition to this, the corridor with rolling hills and large old trees provides pleasing aesthetics for residents and travelers. Any safety, capacity and infrastructure improvements must also be designed with sensitivity to the landscape. It is important when strategically planning for corridor improvements that historic, cultural, and environmental assets are acknowledged, deeply considered and impacts are identified and minimized. Planning for the corridor must also include consideration of the needs of the future population and addressing existing safety concerns while reducing traveler delays thus contributing to increased emissions. The compromise between improving safety and operations while impacting aesthetics and valuable historic assets must be done thoroughly and respectfully. This PEL study and the participation of three partnering agencies is proof of the acknowledgement of this sensitive corridor and the intent to adequately address the needs associated with improving transportation safety and operations.

7. Alternatives

Five alternatives for evaluation were identified throughout the PEL process. Public input and project team expertise helped to develop the Purpose and Need statements, which guided the development of the five alternatives.

Designing to Meet Purpose and Need

When considering potential alternatives, design features or opportunities that met the Purpose and Needs of the study were included (Table 7.1).

Table 7.1: Designing to Meet Purpose and Need

P & N Category	Design Approach
Safety	To address safety concerns, design features in newly designed alternatives may include roundabouts, vertical alignments, turn lanes, crosswalks, boulevards with dedicated left turn lanes, and sight-distance improvements.
Capacity	To address congestion flow of vehicular traffic, design features in newly designed alternatives may include signals and signal timing improvements, roundabouts, additional through lanes, boulevards with dedicated left turns and turn lanes.
Multi-Modal	To address the need for non-motorized amenities, pathways and safe crossings at intersections are included in each newly designed alternative.
Emergency Response	The existing road width along Adams Road makes it extremely difficult for emergency vehicles to navigate the corridor. Newly designed alternatives address and improve access issues for emergency vehicles with capacity improvements.
Environment	Stormwater infrastructure improvements are included in each newly designed alternative. Each newly designed alternative has a different impact to the environmental features along the corridor, mitigation and preservation efforts are anticipated.
History & Culture	Each newly proposed alternative impacts existing historic & cultural assets. Mitigation and preservation efforts are anticipated.
Infrastructure	Each newly designed alternative provides the opportunity for improvements or replacement of structural elements including pavement, bridge, stormwater, utilities, and telecommunications.

Design Guidelines/Standards

The following design guidelines and standards (Table 7.2) were used to develop the five Adams Road design alternatives, including:

- ≡ AASHTO A Policy on Geometric Design of Highways and Streets (2018)
- ≡ Road Commission for Oakland County Geometric Design Guidelines
- ≡ City of Rochester Hills Master Plan

Table 7.2: Design Guidelines and Design Standards Chart

Design Feature	AASHTO	RCOC Design Guidelines	City of Rochester Master Plan
Speed	4R Guidelines (2.3.6): 50 mph	N/A	N/A
Vertical Alignment	Sight Distance Guidelines (3.4.6.2): Minimum K Values- Sag 96, Crest 84	N/A	N/A
Horizontal Alignment	4R Guidelines (3.3.3.3.1): Cross Slope- 2%, 4R Guidelines (3.3.3.2): Minimum Radius (3.3.5.1): 1190 feet-max 7% superelevation rate	N/A	N/A
Lane Width	4R Guidelines (7.2.11.2): Lane Width- 12-foot lanes	N/A	N/A
Pathways	N/A	N/A	8 foot wide
Deceleration Tapers at Side Street Approaches	N/A	Geometric Design Guidelines	N/A

Alternatives

Five alternative concepts were developed and evaluated during the study. Each of the five alternatives include full corridor concept plans that show potential road alignment, area of construction, sidewalk, and intersection configurations. The concept plans can be found in Appendix H.

The No Build alternative (Figure 7.1) does not include any changes and maintains existing conditions. Throughout the corridor, Adams Road has two 12-foot through lanes in each direction and four-foot shoulders. Additionally, there are eight-foot pathways on each side of the road, but the location varies along the corridor.

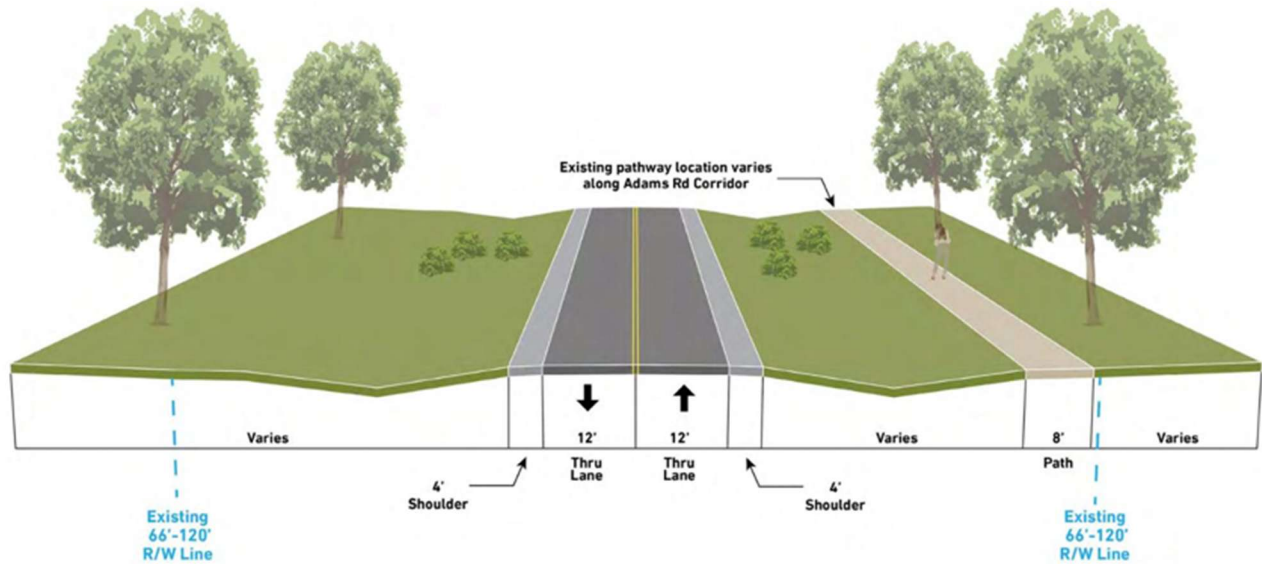


Figure 7.1: Typical Cross Section for the No Build Alternative

The 3 Lane concept (Figure 7.2) includes two 12-foot through lanes in each direction with a 12-foot center left turn lane to accommodate left turn movements. Various taper/deceleration lanes are located at side street intersections along the corridor. Traffic signals are located at Butler Road, Avon Road, and Meadow Brook Road/Hillendale Drive with dedicated turn lanes. The alternative includes continuous eight-foot pathways on each side of Adams Road. The anticipated ROW for this concept is 120 feet.

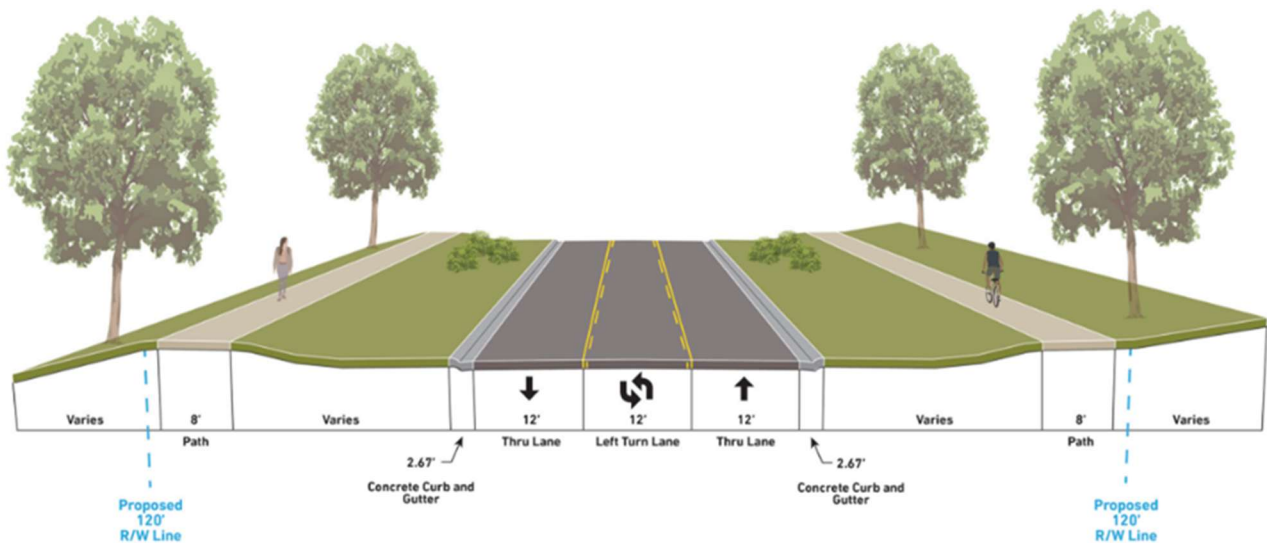


Figure 7.2: Typical Cross Section for the 3 Lane Alternative

The 3 Lane with Roundabouts concept (Figure 7.3) includes two 12-foot through lanes in each direction with a 12-foot center left turn lane to accommodate left turn movements. Various taper/deceleration lanes are located at side street intersections. Roundabouts are located at Butler

Road, Avon Road, and Meadow Brook Road/Hillendale Drive. The alternative includes continuous eight-foot pathways on each side of Adams Road. The anticipated ROW for this concept is 120 feet.

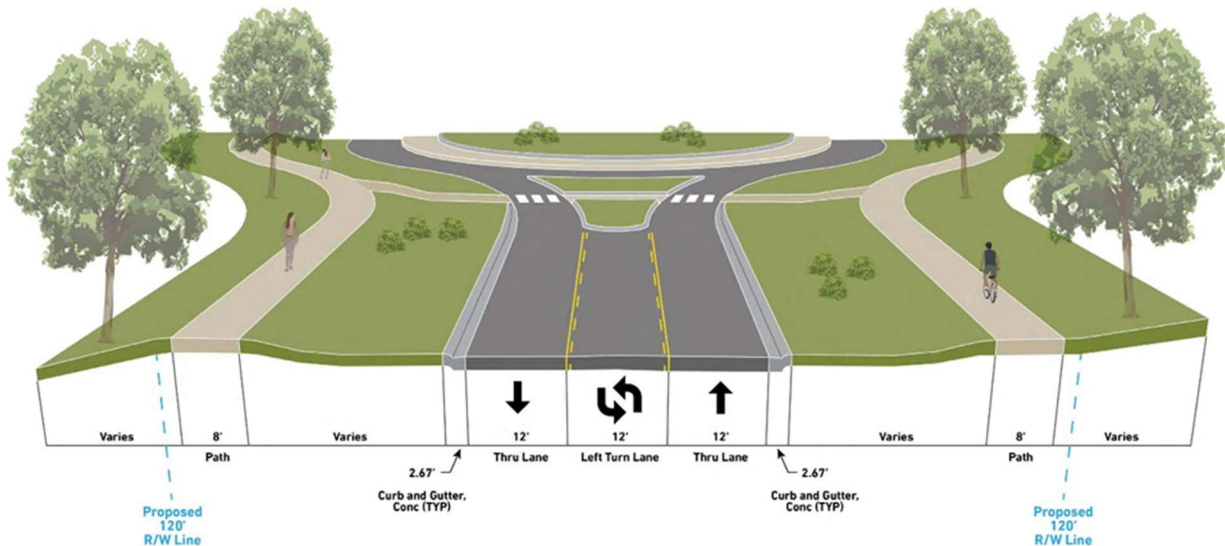


Figure 7.3: Typical Cross Section for the 3 Lane with Roundabouts Alternative

The 5 Lane concept (Figure 7.4) includes four 12-foot through lanes in each direction with a 12-foot center left turn lane to accommodate left turn movements. Traffic signals are located at Butler Road, Avon Road, and Meadow Brook Road/Hillendale Drive with dedicated turn lanes. The alternative includes continuous eight-foot pathways on each side of Adams Road. The anticipated ROW for this concept is 120 feet.

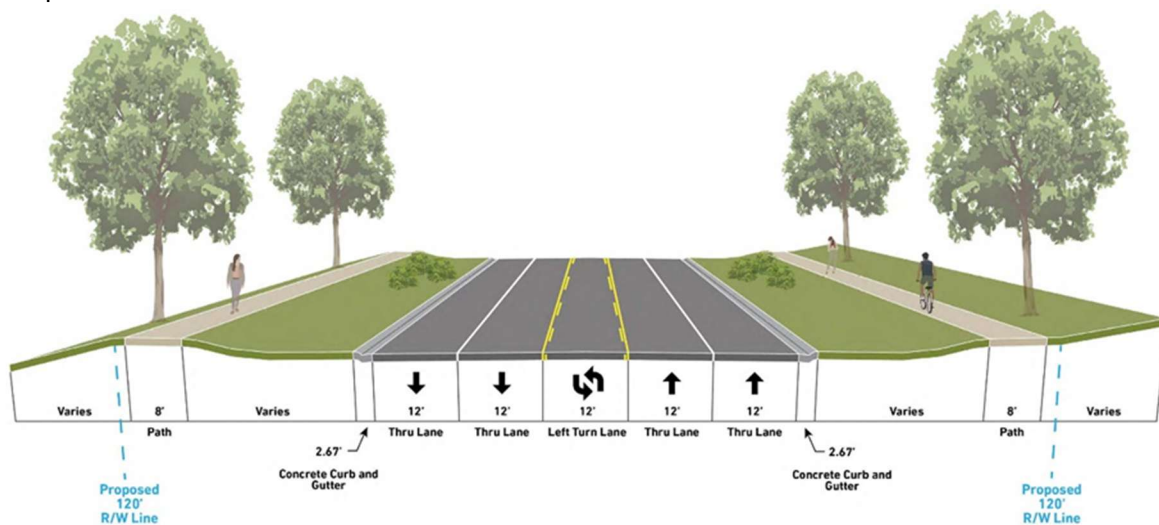


Figure 7.4: Typical Cross Section for the 5 Lane Alternative

The 4 Lane Boulevard concept (Figure 7.5) includes two 12-foot through lanes in each direction, with a boulevard median to accommodate truck turning movements. Various left turn lanes will be located at crossovers, traffic signals at Butler Road, Avon Road, and Meadow Brook Road/Hillendale Drive, along with the two corresponding crossovers north and south of the Avon intersection. This alternative includes continuous eight-foot pathways on each side of Adams Road. The anticipated ROW for this concept is 180 feet.

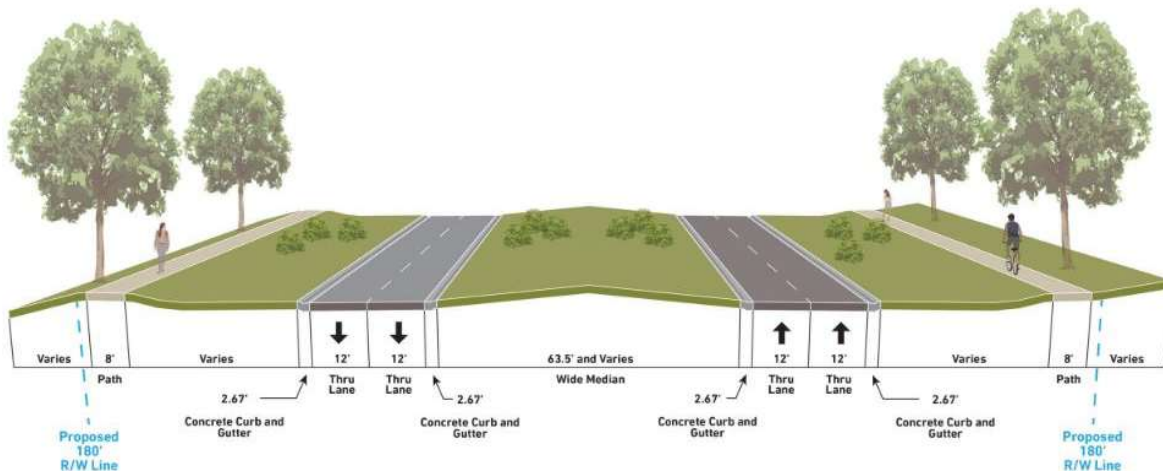


Figure 7.5: Typical Cross Section for the 4 Lane Boulevard Alternative

Evaluating Alternatives

The project team performed various analyses (as outlined in Section 5. Analytic Methods) to determine the level of outcome each alternative would have to address Purpose and Need. After evaluating the impacts of each alternative on the Purpose and Needs, an evaluation score was given to each alternative. Each alternative was assigned an evaluation score using an alphabetic scale (A–F) to indicate how well it addressed the corresponding Purpose and Need statement. A score of ‘A’ signifies that the alternative fully addressed the stated need, whereas a score of ‘F’ indicates it did not address the need at all. The assigned scores were informed by quantitative performance metrics and anticipated impacts, and reflect the qualitative judgements of the technical team. Metrics considered included Level of Service results for capacity, crash-reduction factors for safety, the number of tree removals for environmental impact, and the extent of property acquisitions required and how those acquisitions would affect cultural and historic resources. Qualitative judgments also incorporated past public input, which showed a wide range of viewpoints; some residents preferred leaving the corridor unchanged, while others identified specific safety and delay concerns that needed to be addressed. Because community perspectives were often conflicting, the evaluation of alternatives could not rely on quantitative data alone. Instead, the technical team considered both the analytical results and the context of public values to ensure that recommended improvements were responsive to community priorities and sensitive to corridor character.

Safety Analysis

To analyze safety for all five alternatives, various design elements were examined in accordance with how they affect the crash reduction rate of the corridor or intersection. Table 7.3 below has a crash reduction percentage for each alternative based on road type, design element and crash type. A percent reduction in crashes was calculated at each intersection for each alternative.

The No Build Alternative received an evaluation score of F because it provides no safety improvements and does not reduce the potential for crashes. The 5 Lane and 3 Lane Alternatives received scores of D and C, respectively, as both improved operations but fail to reduce crash potential at the Butler Road intersection; additionally, the 5 Lane Alternative’s wider footprint increases exposure time for left-turning vehicles. In contrast, both the 3 Lane with Roundabouts and

the 4 Lane Boulevard Alternatives were assigned scores of A as they provide meaningful crash reductions at each intersection and incorporate design features such as roundabouts or a boulevard median. Both are proven to reduce the likelihood of fatal and serious-injury crashes.

Table 7.3: Alternative Crash Reduction Percentages

			No Build	3 Lane	3 Lane with Roundabouts	5 Lane	4 Lane Boulevard
Crash Reduction Factors Associated with Design Elements in Each Alternative	Design Element	CRASH TYPE	% REDUCTION				
	Vertical Curve Modification	All Applicable Crash Types		20%	20%	20%	20%
	Fixed Objects from Clear zone (Trees, Culverts, Etc.) - <i>Removal</i>	Fixed-Object Applicable Crashes		75%	75%	75%	75%
	Center Left-Turn Lane	Rear-End Left-Turn		80%	80%	80%	
		Head-On Left-Turn		50%	50%	50%	
		Head-On, Angle, Sideswipe		20%	20%	20%	
		Non-Left-Turn Rear-End, Other		15%	15%	15%	
	Install Reflectorized Backplates	All Applicable Crash Types		15%		15%	15%
	Box Span Signal - <i>Upgrade from Diagonal Span</i>			10%		10%	10%
	Signal Optimization & Timing Updates			10%		10%	10%
	Center Left-Turn Lane	Rear-End Left-Turn		80%	80%	80%	
		Head-On Left-Turn		50%	50%	50%	
		Head-On, Angle, Sideswipe		20%	20%	20%	
		Non-Left-Turn Rear-End, Other		15%	15%	15%	
	Intersection Improvements (Realignment, Sight-Distance Improvements, Radii Improvements, Etc.)	Angle		30%		30%	30%
		Rear-End		15%		15%	15%
		Head-On, Sideswipe, Pedestrian, Bicycle, Left-Turn Related		10%		10%	10%
	Right-Turn Lane - <i>Construct</i>	Right-End Right-Turn			65%		
		Applicable Rear-End Crashes, Sideswipe Same Direction			20%		
	Roundabout	Fatal and A-Injury Reduction			78%		
		Minor Crash Reduction			57%		
	Pedestrian Countdown Signals - <i>Install new</i>	Pedestrian Crashes		30%		30%	30%
	Pedestrian Hybrid Beacons (HAWK) - <i>Install</i>	Pedestrian Crashes			55%		
Predicted % Crash Reduction at Intersections			% REDUCTION				
			No Build	3 Lane	3 Lane with Roundabouts	5 Lane	4 Lane Boulevard
	Meadow Brook Road		+14.6%	-42.3%	-75.1%	-35.8%	-63.3%
	Avon Road		+13.6%	-56.1%	-82.9%	-52.1%	-80.9%
	Butler Road		+22.6%	+36.9%	-80.0%	+52.3%	-29.2%
EVALUATION SCORE			F	C	A	D	A

Capacity Analysis

To evaluate capacity needs and improvements, the study included detailed analysis on the V/C ratio as well as the Level of Service (LOS). Table 7.4 provides the total Capacity Evaluation & Score, based on the projected V/C ratio and the reduction of delay (LOS) of each subsequent alternative.

Table 7.4: Capacity Evaluation & Score

	No Build	3 Lane	3 Lane with Roundabouts	5 Lane	4 Lane Boulevard
Capacity	This alternative will not reduce delays or improve traffic flow throughout the corridor.	This alternative will reduce delays and improve traffic flow throughout the corridor.	This alternative will reduce delays and improve traffic flow throughout the corridor.	This alternative will reduce delays and improve traffic flow throughout the corridor.	This alternative will reduce delays and improve traffic flow throughout the corridor.
EVALUATION SCORE	F	D	A	B	A

V/C Ratio

The volume to capacity analysis for the Adams Road corridor was performed for Existing (2022) and Future (2045) PM peak hour conditions. The PM peak hour was identified as the most appropriate time interval for the analysis as it represents the worst performing hour of the day.

Alternatives with intersection modifications, like the addition of roundabouts, were not evaluated due to TransCAD's inability to provide a micro level of analysis. Results for Existing (2022) and Future (2045) PM peak hour scenarios are provided in Table 7.5.

Table 7.5: Adams Road Estimated V/C Ratios for PM Peak

Segment	No Build		3 Lane		5 Lane		4 Lane Boulevard	
	2022	2045	2022	2045	2022	2045	2022	2045
Hamlin Road to Avon Road	0.92	0.98	0.90	0.96	0.71	0.79	0.77	0.84
Avon Road to Meadow Brook Road/Hillendale Drive	0.71	0.80	0.70	0.78	0.59	0.66	0.64	0.69
Meadow Brook Road/Hillendale Drive to Walton Boulevard	0.83	0.86	0.81	0.84	0.64	0.71	0.64	0.75
TOTAL	0.83	0.90	0.81	0.88	0.66	0.73	0.71	0.78

The analysis in the Traffic Report (Appendix D) indicates that the demand along the Adams Road corridor is reaching (V/C of 0.8 to 1) existing road capacities. Demand is anticipated to grow in future years, further exacerbating capacity constraints. The V/C ratio for the No Build and 3 Lane alternative is higher than other alternatives and thus effected the evaluation score.

Level of Service

To calculate the LOS for the No Build alternative, the analysis provides existing LOS compared with future LOS based on population and traffic growth projections as discussed in Section 5. Analytic

Methods. The LOS Grade utilized during analysis is on a scale of A-F. LOS grade ‘A’ represents minimal delay (shown in blue on Figures 7.6-7.10) A LOS grade ‘F’ represents heaviest delay (shown in dark red on Figures 7.6-7.10). The Existing and Future Peak Hour Intersection LOS diagrams (Figures 7.6 – 7.10) show the existing delay (LOS) and the future projected delay (LOS). For the purposes of evaluating each alternative, the team assessed if there were reductions in delay at each intersection from existing conditions to future projections.

No Build Alternative

An Evaluation Score of F (Table 7.4) was assigned to the No Build Alternative due to each intersection showing unacceptable levels of delay by 2045 (Figure 7.6). This alternative does not include any design elements that improve the capacity along the corridor or at intersections.

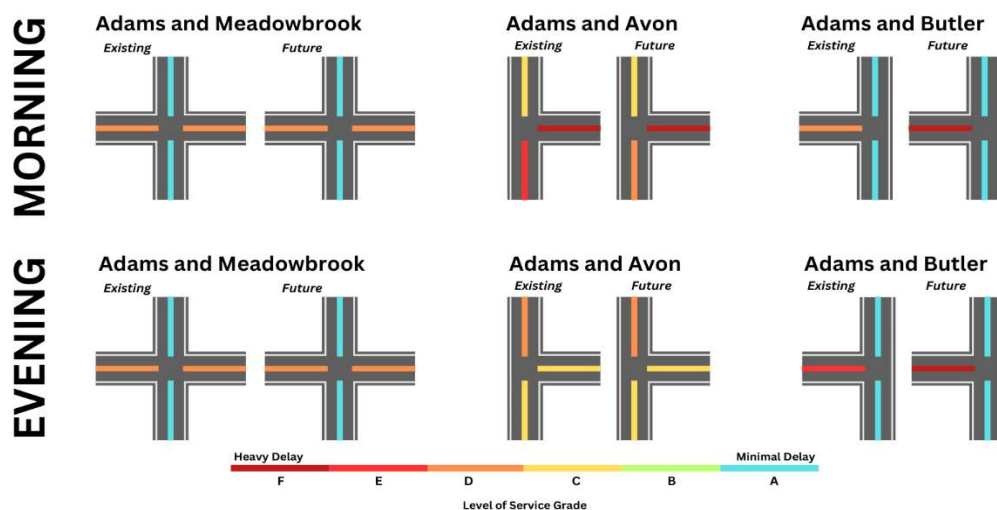


Figure 7.6: Existing and Future Peak Hour Intersection LOS for No Build Alternative

3 Lane Alternative

An evaluation score of D (Table 7.4) was given to the 3 Lane Alternative. This alternative provides a continuous center left-turn lane, and traffic analysis shows a Level of Service improvement at most intersections (Figure 7.7). A reduction in delay is observed at the Adams Road and Avon Road intersection. However, the addition of a new traffic signal at Butler Road may introduce minor delays that do not currently occur on southbound Adams Road. The intersection of Meadow Brook/Hillendale also experiences increased delay in both the northbound and southbound directions.

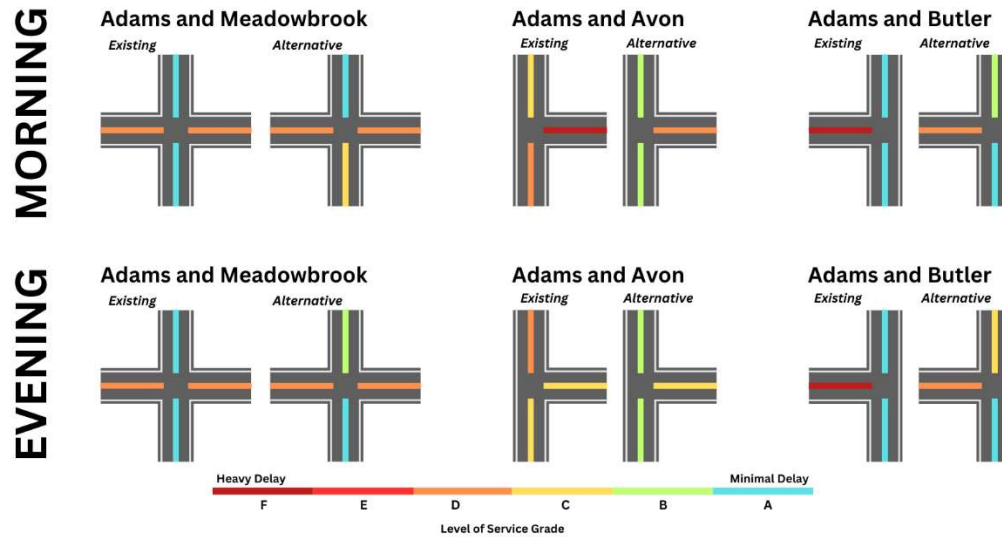


Figure 7.7: Existing and Future Peak Hour Intersection LOS for 3 Lane Alternative

3 Lane with Roundabouts

The 3 Lane with Roundabouts alternative received an Evaluation Score of A (Table 7.4). The alternative provides a continuous center left-turn lane throughout the corridor and roundabouts at each intersection. Traffic analysis shows an improvement in LOS from existing conditions during the morning and evenings at every intersection (Figure 7.8).

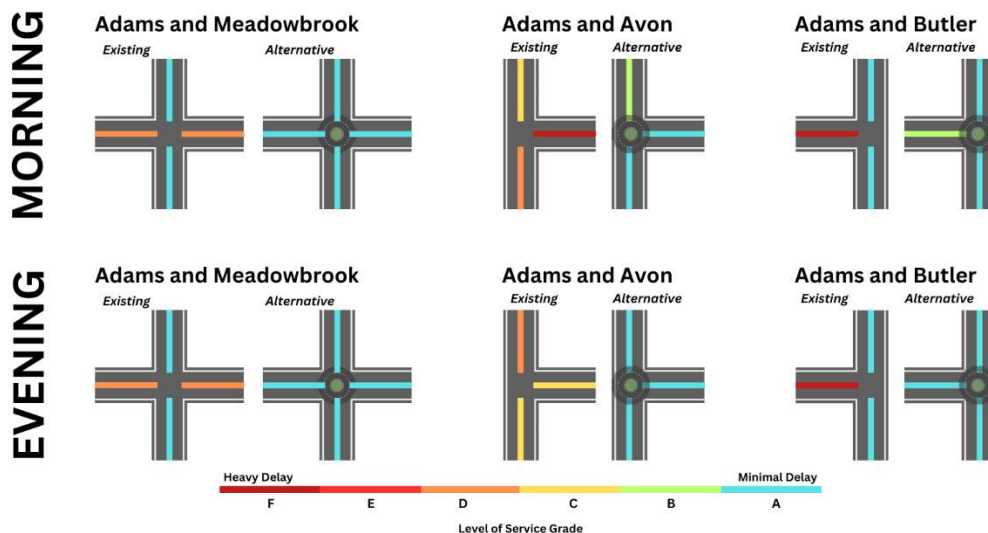


Figure 7.8: Existing & Future Peak Hour Intersection LOS for 3 Lane - Roundabouts Alternative

5 Lane Alternative

The 5 Lane Alternative provides a continuous center left-turn lane, and traffic analysis shows a Level of Service improvement at every intersection (Figure 7.9). Where no improvement occurs, that leg continues to operate at the highest level of service. This alternative received an evaluation score of B

(Table 7.4) because it generally reduces delay; however, the addition of a new traffic signal at Butler Road may introduce minor delays that do not currently exist. Southbound AM delay at Avon would also not be reduced as much as with other alternatives, although overall performance still improves compared to existing conditions.

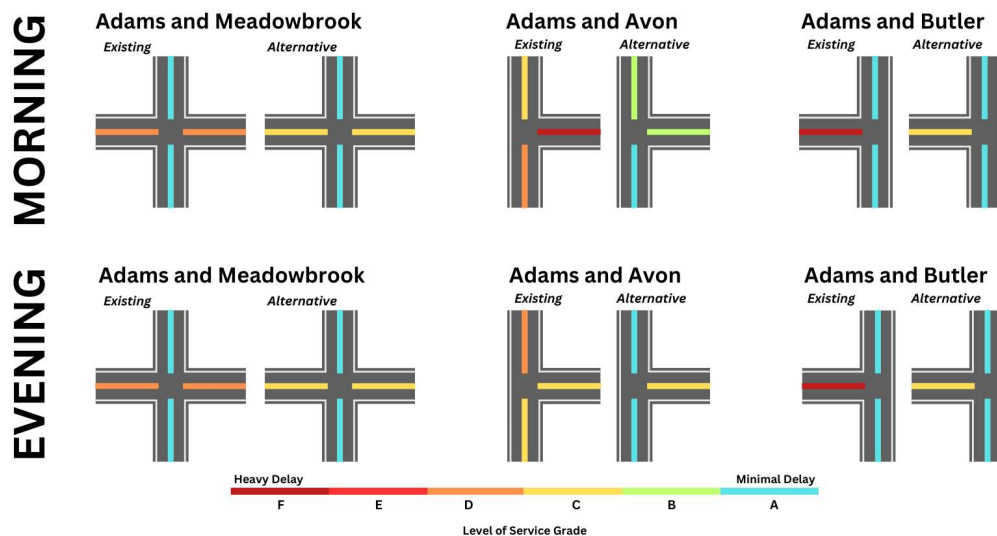


Figure 7.9: Existing and Future Peak Hour Intersection LOS for 5 Lane Alternative

4 Lane Boulevard Alternative

The 4 Lane Boulevard Alternative provides a median, eliminating direct left turns. This alternative was given an Evaluation Score of A (Table 7.4), as traffic analysis shows a LOS improvement at every intersection (Figure 7.10). The addition of a new traffic signal at Butler Road may cause minor delays, however, there is still improvement from the existing level of service.

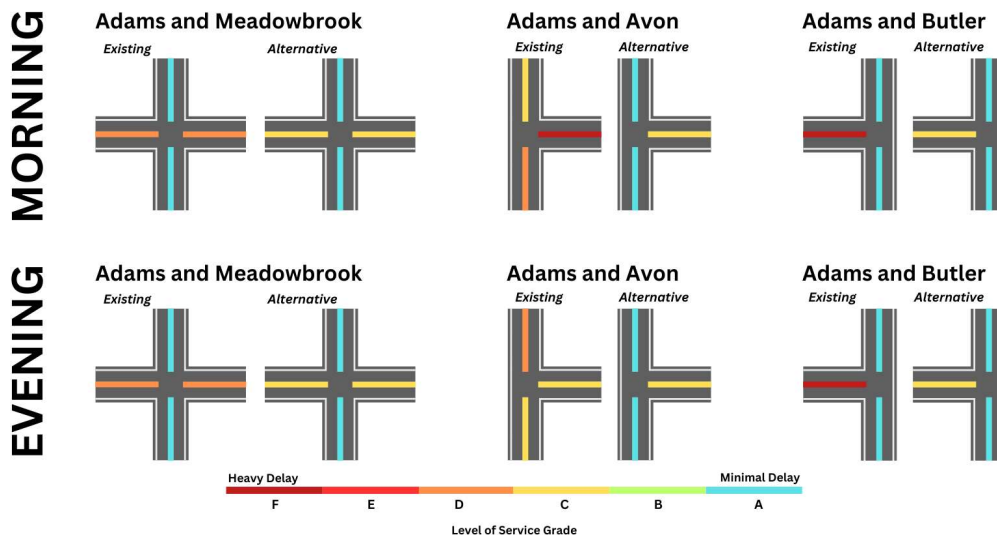


Figure 7.10: Existing and Future Peak Hour Intersection LOS for 4 Lane Boulevard Alternative

Multi-Modal

Each alternative, except for the No Build, promotes multi-modal activity by providing safe and accessible facilities (Table 7.6). The No Build alternative does not include any new non-motorized facilities, therefore, no improvements to safety or connectivity for pedestrians, bicyclists or other vulnerable road users will be implemented. An evaluation score of F was given to the No Build Alternative, as it does not provide any new non-motorized facilities. The 3 Lane and 3 Lane with Roundabouts alternatives received scores of A due to the inclusion of continuous pathways, safe crossings, and ADA-compliant crosswalks. The 4 Lane Boulevard alternative was assigned a score of B because the required crossing distance is longer, though the median provides a refuge island for pedestrians. The 5 Lane alternative received a score of C; while it does include new facilities, crossing five lanes of traffic is not ideal for vulnerable road users.

Table 7.4: Multi-Modal Evaluation & Score

	No Build	3 Lane	3 Lane with Roundabouts	5 Lane	4 Lane Boulevard
Multi-Modal	None	4.1 miles of multi-use pathway. Signalized, ADA compliant crosswalks.	4.1 miles of multi-use pathway. HAWK signals and ADA compliant crosswalks at roundabouts.	4.1 miles of multi-use pathway, signalized, ADA compliant crosswalks.	4.1 miles of multi-use pathway, signalized, ADA compliant crosswalks. Median/Boulevard serves as a refuge island.
EVALUATION SCORE	F	A	A	C	B

Environment

The tree canopy along Adams Road has been a topic of discussion by the public throughout the PEL study. To measure the impact each alternative would have on the existing tree inventory, a tree survey was conducted to assess the condition and type of trees within the existing right-of-way (ROW). Based on the tree inventory survey, approximately 1,233 trees are located within the study area. Table 7.7 below outlines the number of trees to be removed, the percentage of total tree loss, and whether each alternative includes opportunities for additional landscaping.

The 5 Lane and 4 Lane Boulevard alternatives were assigned an evaluation score of E. Although both alternatives would include new landscaping and tree plantings, the number of trees that would need to be removed was considered detrimental to the corridor and resulted in a low score. The No Build alternative received a score of C because it would preserve existing conditions; however, many of the older trees along the corridor are nearing the end of their lifespan and may require removal over time. The 3 Lane and 3 Lane with Roundabouts alternatives were scored a B because they would have a substantially reduced impact on the existing tree canopy compared to the wider-footprint alternatives, though some tree loss would still occur, preventing an A rating.

Table 7.5: Environmental Evaluation & Score

	No Build	3 Lane	3 Lane with Roundabouts	5 Lane	4 Lane Boulevard
Total Trees to be removed	0	578	574	831	1233
% Removal	5% *due to poor condition	47%	47%	67%	100%
Landscaping Opportunities	No	Yes	Yes	Yes	Yes
EVALUATION SCORE	C	B	B	E	E

History & Culture

Each alternative, except for the No Build, will impact and require mitigation of two historically significant assets, the boundary wall, and the workers stairway. Impacts on properties along the corridor due to construction and associated right-of-way required were evaluated as part of evaluating cultural impacts. Temporary easements include space needed for construction and expire upon completion of the project. Permanent Easements are needed to construct and maintain infrastructure (roadway, pathways, utilities, etc.). Fee acquisition includes full purchase of property and relocating tenants. Table 7.8 highlights potential impacts to the history & culture of the corridor by alternative.

The No Build Alternative was assigned an evaluation score of A because it would not affect any historically or culturally significant properties or features along the corridor. The 4 Lane Boulevard Alternative received an evaluation score of F due to its extensive impacts throughout the corridor and 55 fee acquisitions required. The 5 Lane Alternative was given a score of C, as it would require 4 fee acquisitions but, due to its wider footprint, would still significantly affect historic and cultural resources. The 3 Lane and 3 Lane with Roundabouts alternatives received scores of B because they require 1 and 2 fee acquisitions respectively and result in considerably less impact to historic features compared to the wider-footprint options.

Table 7.6: Historic & Cultural Evaluation & Score

	No Build	3 Lane	3 Lane with Roundabouts	5 Lane	4 Lane Boulevard
History	This alternative will not impact and/or require mitigation of the boundary wall and workers stairway.	This alternative will impact and require mitigation of the boundary wall and workers stairway.	This alternative will impact and require mitigation of the boundary wall and workers stairway.	This alternative will impact and require mitigation of the boundary wall and workers stairway.	This alternative will impact and require mitigation of the boundary wall and workers stairway.

Cultural	There are no easements or acquisitions required.	This alternative may require 37 temporary easements, 16 temporary and permanent easements and 1 fee acquisition.	This alternative may require 36 temporary easements, 16 temporary and permanent easements and 2 fee acquisitions.	This alternative may require 29 temporary easements, 38 temporary and permanent easements and 4 fee acquisitions required.	This alternative may require 16 temporary and permanent easements and 55 fee acquisitions.
EVALUATION SCORE	A	B	B	C	F

Infrastructure

Each alternative, except for the No Build, would provide an opportunity to improve aging infrastructure along the corridor and allow for the implementation of stormwater best management practices (Table 7.9). Because these alternatives include upgrades to all public infrastructure within the right-of-way, they were assigned an evaluation score of A. The No-Build Alternative does not include any new infrastructure or upgrades and therefore received an evaluation score of F. Under the No-Build scenario, existing infrastructure assets along the corridor would continue to deteriorate over time.

Table 7.7: Infrastructure Evaluation & Score

	No Build	3 Lane	3 Lane with Roundabouts	5 Lane	4 Lane Boulevard
Infrastructure Upgrades	None	Yes	Yes	Yes	Yes
EVALUATION SCORE	F	A	A	A	A

Alternatives Evaluation Matrix by Purpose and Need

The alternative evaluation matrix (Table 7.10) was developed to summarize each alternative and how it scored based on each Purpose and Need statement. Every alternative was assigned an evaluation score based on the level at which the alternative met each purpose statement as discussed above.

Table 7.8: Alternatives Evaluation Matrix

Purpose	No Build	3 Lane	3 Lane with Roundabouts	5 Lane	4 Lane Boulevard
Safety	F	C	A	D	A
	Does NOT include any design elements that improve safety along the corridor and crash frequency is expected to increase as population growth increases	Provides a dedicated left turn lane creating safer intersections and reducing crash frequency	Provides roundabouts at intersections and a dedicated left turn lane, creating safer intersections and reducing crash frequency	Provides a dedicated left turn lane, creating safer intersections and reducing crash frequency	Provides a median eliminating direct left turns, creating safer intersections and reducing crash frequency
Capacity	F	D	A	B	A
	Will NOT reduce delays or improve traffic flow throughout the corridor	Will reduce delays and improve traffic flow throughout the corridor	Will reduce delays and improve traffic flow throughout the corridor	Will reduce delays and improve traffic flow throughout the corridor	Will reduce delays and improve traffic flow throughout the corridor
Multi-Modal	F	A	A	C	B
	Does NOT include any new non-motorized facilities	4.1 miles of multi-use pathways and signalized ADA compliant crosswalks at intersections	4.1 miles of multi-use pathways with the addition of HAWK signals at major intersections	4.1 miles of multi-use pathways and signalized ADA compliant crosswalks at intersections. This alternative requires longer crossing distances for non-motorized travelers	4.1 miles of multi-use pathways, signalized ADA compliant crosswalks at intersections and center of road refuge islands. This alternative requires longer crossing distances for non-motorized travelers
Environment	C	B	B	E	E
	Little to no impact on existing trees along Adams Road with no opportunity to improve landscaping	Opportunity to save a significant number of trees, replant new trees, and add landscaping along the corridor	Opportunity to save a significant number of trees, replant new trees, and add landscaping along the corridor.	Impacts a significant number of existing trees, but there is an opportunity to replant new trees and add landscaping along the corridor	Largest impact on existing trees, but there is an opportunity to replant new trees and add landscaping along the corridor

History & Culture	A	B	B	C	F
	Will NOT impact and require mitigation of the boundary wall and workers stairway and there are no easements or acquisitions required	Will impact and require mitigation of the boundary wall and workers stairway; 37 temporary easements, 16 temporary and permanent easements and 1 fee acquisition required	Will impact and require mitigation of the boundary wall and workers stairway; 36 temporary easements, 16 temporary and permanent easements and 2 fee acquisitions required	Will impact and require mitigation of the boundary wall and workers stairway; 29 temporary easements, 38 temporary and permanent easements and 4 fee acquisitions required	Will impact and require mitigation of the boundary wall and workers stairway; no temporary easements, 16 temporary and permanent easements and 55 fee acquisitions required
Infrastructure	F	A	A	A	A
	Will NOT improve the aging infrastructure alongside the corridor and will allow for stormwater best management practices	Will improve the aging infrastructure alongside the corridor and will allow for stormwater best management practices	Will improve the aging infrastructure alongside the corridor and will allow for stormwater best management practices	Will improve the aging infrastructure alongside the corridor and will allow for stormwater best management practices	Will improve the aging infrastructure alongside the corridor and will allow for stormwater best management practices
EVALUATION SCORE	E	B	A	C	C

Public and Stakeholder Alternative Evaluation

The public was presented with the results of analysis conducted as well as the study team's evaluation score. The team solicited the public to provide constructive feedback on design components in each alternative (Table 7.11). The public was asked what about each alternative met the Purpose and Needs of the study corridor.

Table 7.9: Public and Stakeholder Alternative Evaluation

	Public Comment
No Build	Proponents indicated their dissatisfaction with all alternatives and would like to keep the road as is. Opponents indicated a No Build was not an option because something needs to be done to the road. Others indicated the alternatives presented did not cover a viable middle of the road option.
3 Lane	Proponents were in favor of this as being the least impactful alternative. Others stated they were in favor of a signal at Butler Road and the opportunity to utilize a center left turn lane for safety. Many were also appreciative of the addition of a non-motorized pathway. Opponents indicated their dissatisfaction and want to keep the road as is.
3 Lane with Roundabouts	Proponents were in favor of the alternative and found it to be a viable option with the least impacts to the corridor while also improving safety and traffic flow. Others stated they were in favor of adding a roundabout at Butler Road and the opportunity to utilize a center left turn lane. Many were also appreciative of the addition of a non-motorized pathway. Opponents indicated their dissatisfaction and want to keep the road as is. Others were not supportive of roundabouts.
5 Lane	Proponents suggested this alternative is the best way to move traffic. Opponents indicated their dissatisfaction and want to keep the road as is. Others also indicated the width of this option would be too impactful to residents and environmental/historic features along the corridor. Many indicated this alternative would increase speeds and more lanes will encourage more traffic.
4 Lane Boulevard	Proponents suggested this alternative as the best way to improve safety and move traffic. Some indicated there would be an opportunity for landscaping in the median and appreciated safety features like a signal at Butler Road. Opponents indicated their dissatisfaction and want to keep the road as is. Others also indicated the width of this option would be too impactful to residents and environmental/historic features along the corridor. Many indicated this alternative would increase speeds and more lanes will encourage more traffic.

Alternative Evaluation Conclusion

The evaluation of the alternatives was successful in determining which of the proposed alternatives were unreasonable and why. The final evaluation scores are presented in Table 7.12.

Table 7.10: Alternative Evaluation Scores by Purpose and Need Objective

		Purpose and Need Objectives						
		Safety	Capacity	Multi-Modal	Environmental	Historical & Culture	Infrastructure	TOTAL SCORE
Alternatives	No Build	F	F	F	C	A	F	E
	3 Lane	C	D	A	B	B	A	B
	3 Lane with Roundabouts	A	A	A	B	B	A	A
	5 Lane	D	B	C	E	C	A	C
	4 Lane Boulevard	A	A	B	E	F	A	C

The 5 Lane and 4 Lane Boulevard alternatives were eliminated from further consideration and are unreasonable alternatives because they did not meet the purpose statements for the environment, history & culture. Consensus among the public, agencies, and project team was that the two alternatives would require too much property acquisition and would change the corridor dramatically. These alternatives were deemed too costly and determined unreasonable.

The No Build was eliminated for being an unreasonable alternative, as it did not address safety, capacity, multi-modal or infrastructure needs of the corridor. Although many public comments received were in favor of the No Build as an alternative, it does not satisfy the original purpose of this study as documented during the grant application and during prior City and RCOC led plans and public engagement efforts. Adams Road has long been identified in multiple plans and by multiple constituents as a corridor with safety concerns. RCOC holds the responsibility of addressing safety concerns and providing a safe and efficient transportation network for the public. With this responsibility, a road owning agency must address safety concerns that can be addressed with roadway design improvements. RCOC is not responsible for driver behavior but can enhance safety through roadway design. The No Build alternative insufficiently addresses safety, capacity, infrastructure and non-motorized needs and is determined as an unreasonable alternative.

The 3 Lane and 3 Lane with Roundabout alternatives scored the highest and had minimal impacts while also providing the opportunity to enhance the corridor not only in terms of safety and capacity, but with modernized infrastructure and by providing non-motorized facilities. The addition of one center left-turn lane and roundabouts was well received. The 3 Lane with Roundabout alternative was determined to have positive impacts on safety and capacity. It would have less impact in terms of altering the character of the corridor. Whereas the 5 Lane and 4 Lane Boulevard alternatives would have a significant negative impact to the character of the Adams Road corridor. The evaluation of these alternatives and the comments received from stakeholders and the public led to the development of the refined alternative, and the identification of potential impacts and related mitigation efforts.

8. Refined Alternative

Identification of a Refined Alternative

The process of identifying a refined alternative in the PEL Study is similar to the process used during the NEPA phase of a project. A refined alternative must satisfy the purpose and needs, consider direct and indirect impacts and is identified as reasonable as well as feasible.

Alternatives found to be unreasonable during the evaluation process did not meet the purpose and needs established and were eliminated due to impacts and/or infeasibility. Components of the alternatives that had minimal negative impacts and highest positive impacts were incorporated in the development of the refined alternative.

Description of Refined Alternative

ADAMS ROAD STREET SECTION

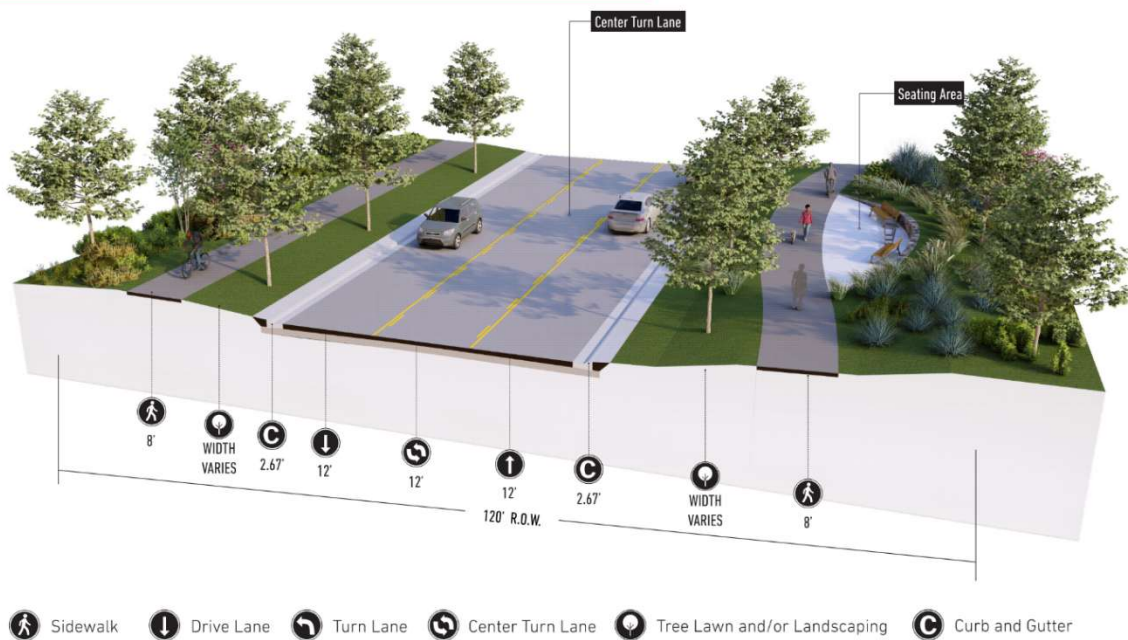


Figure 8.1: Adams Road Street Section

ADAMS ROAD STREET SECTION | AREAS WITH MEDIAN

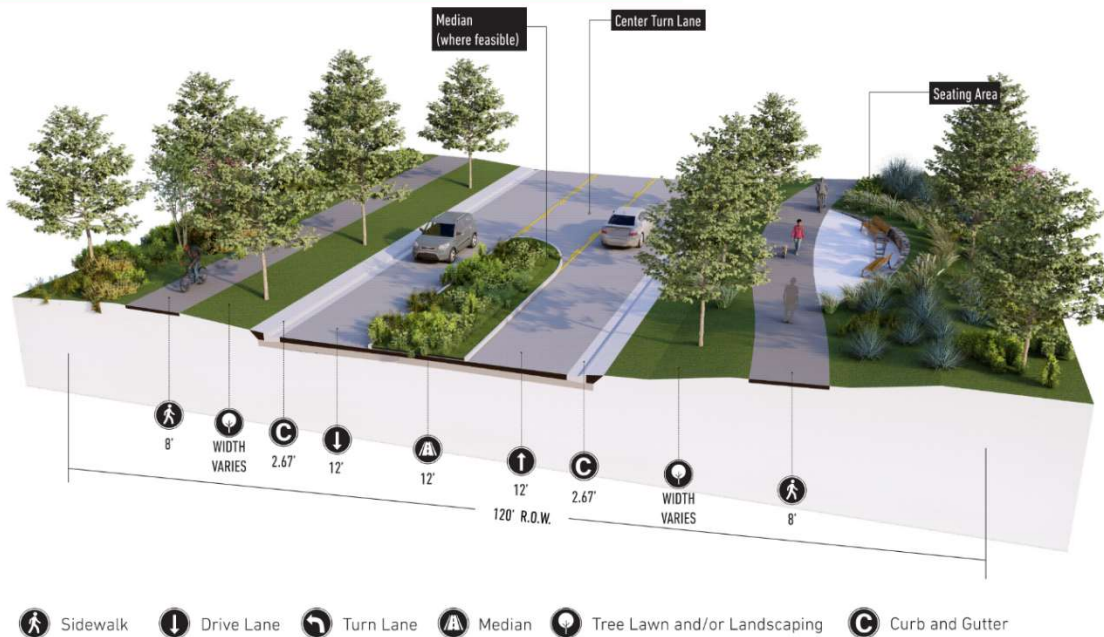


Figure 8.2: Adams Road Street Section - Areas with Median

ADAMS ROAD | TYPICAL ROUNDABOUT



Figure 8.3: Typical Cross Section for the Refined Alternative

The refined alternative is an enhanced version of the 3 Lane with Roundabouts alternative (Figure 7.3). The full corridor concept drawing scrolls can be found in Appendix I. A virtual drive through rendering of the refined alternative was developed as part of the public engagement process and can be viewed on YouTube here: [Adams Road – Hamlin Road to Walton Blvd | 3D Concept Rendering of Refined Alternative Corridor](#)

The refined alternative includes 2 through lanes of traffic with a center left turn lane from Hamlin Road to Meadowbrook/Hillendale. North of Meadowbrook/Hillendale, the refined alternative includes two lanes in each direction with a center left turn lane. Right turn lanes are included at the intersection of Walton for both northbound and southbound directions. Roundabouts are located at the intersections of Butler Road, Avon Road and Hillendale/Meadow Brook Road. A median is located throughout the corridor where left turning movements are not needed. Sightline improvements include hill cuts to lower the road and raising the road in low areas to smooth vertical curves. Retaining walls will be placed where grading for vertical improvements is required. The corridor will include a consistent pathway on the east side of the road, and the pathway on the west side starts at Hamlin, ends at Avon Road, then picks back up north of Meadow Brook Road. Enhanced signalized crossings at intersections allow for safe non-motorized crossings and on mid-block crossing located north of Portage Trail Drive.

The refined alternative improves capacity, safety, multi-modal facilities, infrastructure and provides the opportunity to enhance the corridor with new landscaping and recreation. Impacts to existing natural, historic and cultural features exist and mitigation efforts will be identified during NEPA.

Development and Analysis of Refined Alternative

Safety Analysis

Predicted crash reduction at intersections where a roundabout will be installed shows a 75.1% reduction at Meadow Brook Road 82.9% at Avon Road and 80% at Butler Road. Crash modification factors (Table 8.1) indicate the addition of a center left turn lane reduces the likelihood of rear-end left-turn crashes by 80%, head-on left-turn crashes by 50%, head-on/angle sideswipe crashes by 20% and non-left-turn rear-end crashes by 15%. Vertical curve modifications will reduce the likelihood of crashes by 20% and will vastly improve sightlines southbound at Avon Road. Smoothing vertical curves will reduce the likelihood of vehicles sliding down hills in inclement weather. The installation of a median at strategic locations acts as a traffic calming measure and may help to slow speeds and prevent lane departure crashes.

Table 8.1: Crash Reduction By Design Element

Type	Design Element	Crash Type	% Reduction
Road Segment	Center Left-Turn Lane	Rear-End Left-Turn	80%
		Head-On Left-Turn	50%
		Head-On, Angle, Sideswipe	20%
		Rear-End	15%
	Vertical Curve Modification	All Vertical Curve Related	20%
Intersection	Roundabout	Fatal and Serious Injuries	78%
		Minor Injuries	57%
Non-Motorized	Pathways	Bicycle	33%
		Pedestrian	85%
	HAWK Signals	Pedestrian	55%
	Pedestrian Refuge Island	Pedestrian	50%
Crash reduction percentages are provided through the Crash Modification Factors (CMF) Clearinghouse. Website: https://cmfclearinghouse.fhwa.dot.gov/			

Capacity Analysis

The addition of a center left turn lane and roundabouts at intersections was determined as the least impactful design profile to the corridor while addressing existing capacity concerns. Figure 8.2 shows existing delays at every intersection will be reduced during peak hours and non-peak travel times. The addition of a center left turn lane improves traffic flow by providing a space for vehicles making left-turns to wait and yield to oncoming traffic.

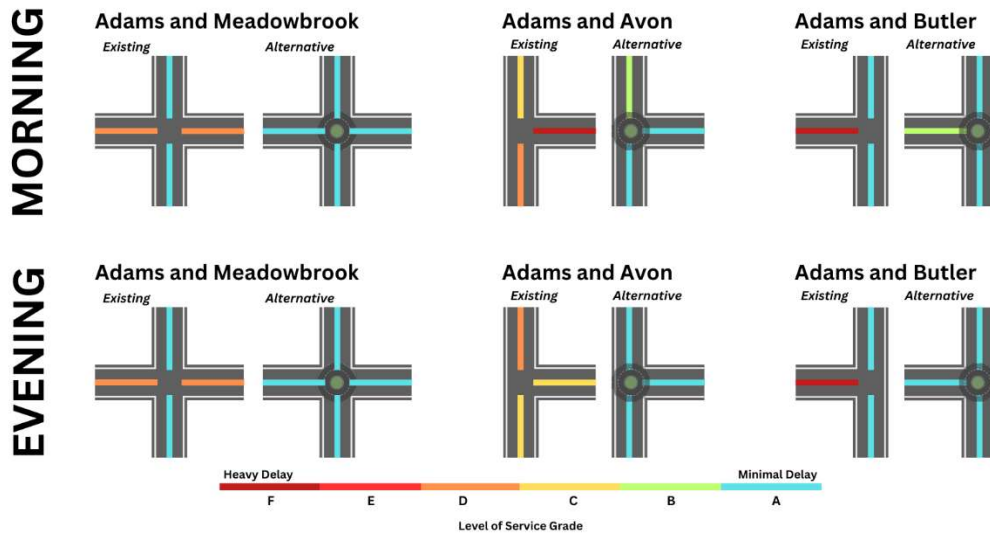


Figure 8.4: Existing and Future Peak Hour Intersection LOS for the Refined Alternative

Multi-Modal

The refined alternative includes an 8' pathway and the addition of enhanced signalized crossings at intersections. A pathway will extend both sides of Adams Road from Hamlin Road to Avon Road. The west side pathway will end with a crossing to the east near the Gate House. From Avon Road to Walton Boulevard a consistent pathway will be located on the east side only to limit impacts to historic features located primarily on the west side of the segment. Five seating areas will be located along the pathways providing benches, landscaping, waste bins and potentially bike racks. A crossing with High-Intensity Activated Crosswalk Beacon (HAWK) will be located at the midblock crossing north of Portage Trail Drive.

ADAMS ROAD | SEATING AREA WITH RETAINING WALL

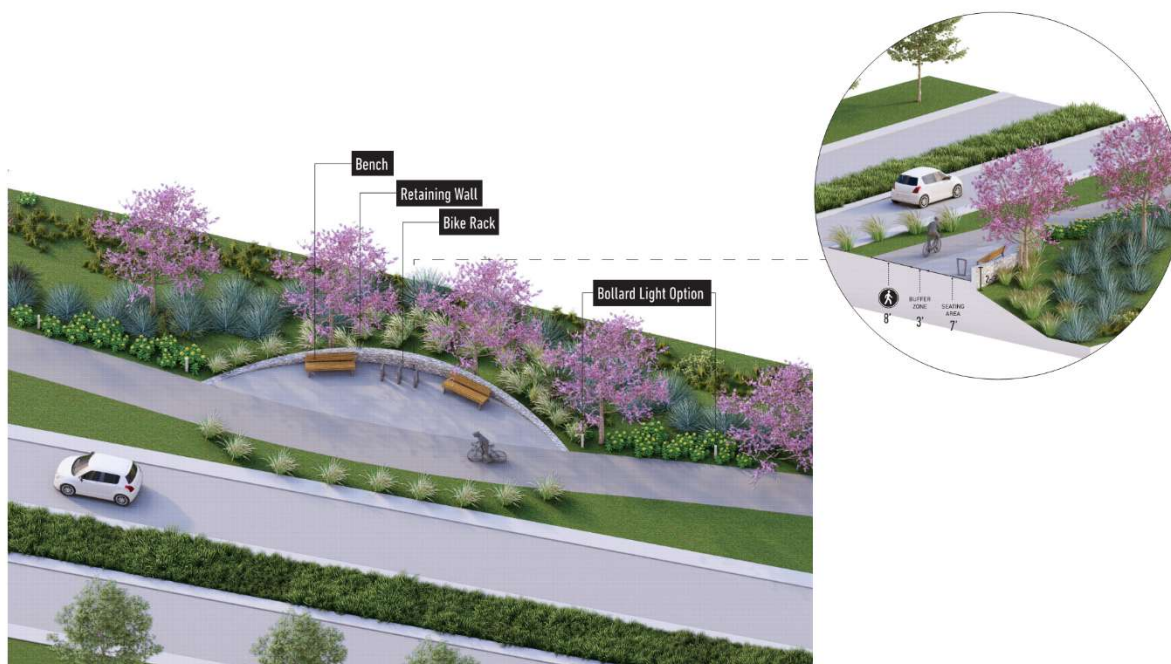


Figure 8.5: Typical Seating Area with Retaining Wall for the Refined Alternative

Environment

The refined alternative maintains the existing hilly landscape and retains approximately 53% of existing trees located immediately along the corridor. A landscaping plan was developed for the refined alternative and it provides an opportunity to incorporate new landscaping with native species and the addition of over 400 new tree plantings. The Landscaping Plan can be found in Appendix J. Landscaping will be incorporated along the corridor within the right of way or easements from Oakland University. Additional enhanced landscaping will be placed at non-motorized seating areas, in the median, and in roundabout islands.

The refined alternative provides an opportunity to improve stormwater infrastructure throughout the corridor with the addition of storm sewers and other stormwater best management practices.

History & Culture

The refined alternative was developed to reduce the level of impacts to historically significant assets near Meadow Brook by shifting the center line of construction to the east. A west-side pathway in this area was not included to further reduce the impact to the National Historic Landmark site. The worker's stairway on the east side of the road and the stone wall on the west side of the road will be removed as part of this refined alternative. It is proposed that these items along the corridor be relocated/repurposed. Input received from the public and stakeholders indicated support for enhancing historic features like the stairs and wall through creative means. To enhance and promote the historical significance of the corridor, interpretive signage could be placed along the corridor and adaptive reuse of the stairs and wall could be considered. The existing decorative fencing along OU's property could be extended along the corridor as well. Some input suggested instead of removing the stone wall, that the new retaining wall could be constructed under the existing wall. Determining the architectural and design feasibility of this was not assessed at this time. Mitigation strategies will be considered during NEPA and through engagement with the State Historic Preservation Office (SHPO).

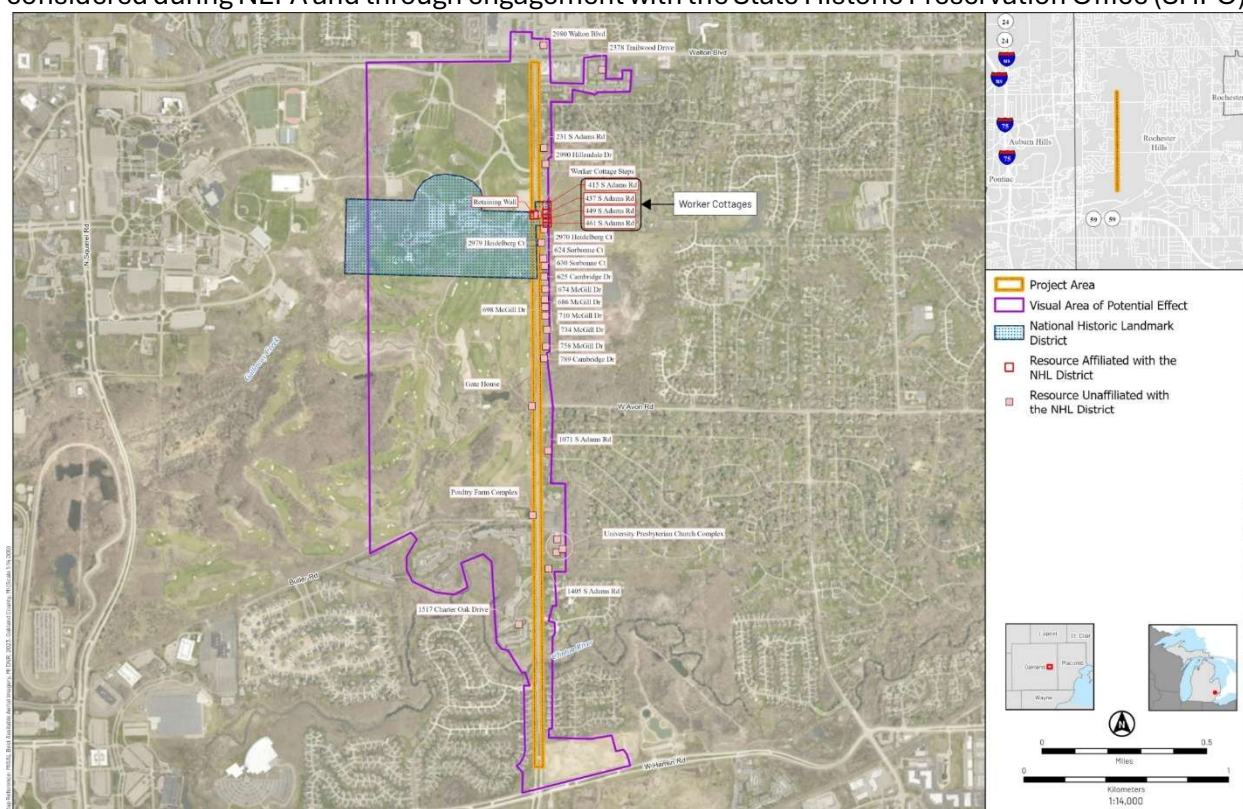


Figure 8.6: Map of Historic Landmarks Located in/near the Adams Road Corridor

Easements

Temporary easements are space needed for construction that expire upon completion of the project. Permanent easements are needed to construct and maintain infrastructure (roadway, pathways, utilities, etc.). Fee acquisition includes full purchase of a property and relocating the tenant.

The refined alternative was designed with sensitivity to eliminate fee acquisitions, but easements will be required. The refined alternative will require 57 Temporary Easements, 12 Permanent Easements.

Among the historically significant properties reviewed, 19 have been identified as having structures older than 50 years, reflecting general historical significance, and 5 are located within the National Historic Landmark District, indicating a higher level of historic designation. Of those historically significant properties, 3 older-than-50 structures will require both temporary and permanent easements, 13 will require only temporary easements, and 0 will require only permanent easements, while 2 of these properties, 415 S. Adams Road and 1385 S. Adams Road, hold both age-based significance and National Historic Landmark District status. The type of easements required for each address along the project corridor can be found on the Adams PEL Easement & Historic Designation Matrix in Appendix I.

Infrastructure

Improvements to utility infrastructure will be possible and can be coordinated in the event of construction. Infrastructure asset management includes early coordination and planning of future projects. By identifying the existing utility infrastructure along the corridor, RCOC, the City and Oakland University will be prepared to coordinate with utility companies in the future.

ADAMS ROAD STREET SECTION | TYPICAL UTILITIES



Figure 8.7: Typical Cross Section with Utilities for the Refined Alternative

Bridge and Pavement

In the event of construction, Adams Road will be reconstructed with new aggregate base and hot-mix-asphalt. A fully reconstructed road has a life span of 20 years and with routine maintenance like crack sealing and preservation overlays the life span can be extended for another 5-10 years. Preventative maintenance techniques extend the service life of the pavement significantly and are cost-effective ways to maintain safety and reliability for travelers.

73'-8"

14'-10" 4'-0" (SHY-AWAY) 3 LANES @ 12'-0" = 36'-0" 4'-0" (SHY-AWAY) 14'-10"

GUTTER LINE 1'-0" GUTTER LINE CROWN 18'-0" 1'-8" 12'-0" (SIDEWALK) 1'-2"

PG -0.493 PG -0.533 PG -0.280 PG -0.360 9" THK PG -0.000 2% 2% 2% 2% 2% 2% 2% 2% 2% 2% 2% 2% 2% 2%

"BRIDGE RAILING, 4 TUBE" "PEDESTRIAN RAILING"

1 (S-2)

13 @ 5'-4" = 69'-4" (14) - PRESRESSED CONC TYPE II BEAMS

2" 2'-0" 2'-0" 2"

DECK SECTION 1 S-1

SCALE: 1/8" = 1'-0"

Adams Road PEL Study

9. Informing NEPA

Environmental Review

This PEL study was developed to support and inform the NEPA process. In addition to the information provided in earlier sections of this study, a preliminary environmental review was conducted to identify processes, forms and review that would be required during NEPA.

Table 9.1 has been included to provide a summary of the key data and metrics referenced throughout this section. It serves as a quick reference point for readers to understand the foundational information that supports the subsequent analysis and discussion.

Table 9.1: Environmental Impacts Overview

Resource	PEL Method of Review	Present in Study Area	Post PEL Study - NEPA
Soil Disturbance	Google Maps	Yes	NPDES Permit
Section 4F; Section 6F	DEGR map from MDOT	Yes	MDOT LAP Section 106 Application. A memorandum of Agreement will be required to resolve Adverse Effects. Individual Section 4(f) Evaluation may be required and needs to include a detailed alternatives analysis for FHWA. Archaeological Survey, Inadvertent Discovery Plan, Inadvertent Discovery Training. Public involvement for 4f impacts. Consult the Michigan Department of Natural Resources for 6(f) protected lands in Michigan records.
Contamination Sites	RIDE mapper from EGLE	Yes	MDOT Special Provision for Non-Hazardous Contaminated Material Handling and Disposal
Air Quality	EGLE's Attainment Status for the National Ambient Air Quality Standards mapper	Yes	EGLE's Attainment Status for the National Ambient Air Quality Standards
Noise	MDOT Noise Abatement Handbook	Yes	Noise Analysis
Public Involvement	MKSK Website and 4 public meetings	Yes	Public Hearing
Traffic Impacts	Traffic Analysis Report: Adams Road	Yes	Public Hearing

Historic Properties and Archaeological Resources	DEGR map from EGLE; Above Ground Survey	Yes	Section 106 form; Tribal Consultation/Coordination, Archeological Survey, (Inadvertent Discovery Plan and Training);
Wetland	Wetland mapper provided by EGLE	Yes	EGLE/USACE Joint Permit
100-Year Floodplain	Floodplain maps provided by FEMA	Yes	EGLE/USACE Joint Permit Part 31: Floodplain regulation; Voluntary Transportation Preliminary Request/Hydraulic Report from EGLE.
Threatened and Endangered Species	IPaC from USFW	Yes	MDOT Special Provision for Eastern Massasauga Rattlesnake; mussel survey
Water Quality	Mapper provided by EGLE	Yes	None
Inland Lakes and Streams	DEGR Map from EGLE	Yes	Part 301, NREPA permit
Commercially Navigable River or Stream	DEGR map from EGLE	No	None
National Wilde and Scenic Rivers	DEGR map from EGLE	No	None
Coastal Zones	DEGR map from EGLE	No	None
Agricultural Properties	USDA Web Soil Survey	No	None

Soil Disturbance

The study area for the proposed project is approximately 2.2 miles long, which equates to about 1,408 acres according to google maps. If more than 5 acres of soil will be disturbed, a Notice of Coverage (NOC) and NPEDS permit will be required through EGLE for soil erosion and sedimentation control.

Section 4(f)/6(f) Public Park, Recreation, Refuge, Historic Sites

Section 4(f) protects public parks, recreation areas, wildlife refuges and historic sites from transportation use unless no feasible alternatives exist. Section 6(f) safeguards recreational lands acquired with Land and Water Conservation Fund (LWCF) grants from conversion without replacement approval.

As displayed in Figure 9.1 there are local and private conservation and recreation lands (CARL) near the proposed project scope under the Recreation (4f-6f) section highlighted in blue and yellow. The land highlighted as private CARL along the west of the project corridor is partly Oakland University's campus and partly the Katke-Cousins golf course.

The land highlighted as local CARL to the east of the project corridor is a public park known as Innovation Hills. Within Innovation Hills Green Space is Kayak Launch Point, a public launch off of

Innovation Hills boardwalk adjacent to the Clinton River. This landing allows kayakers to make a stop at innovation hills to explore, use the restroom or charge their phone at the solar charging stations. Information used to identify these lands came from google maps.

More information on the historic sites can be found in the Above Ground Survey in Appendix G. Since Adams Road traverses through Meadow Brook Hall and Farms Historic Landmark District, it is anticipated that engaging with SHPO, National Park Service (NPS) and the Advisory Council on Historic Preservation (ACHP) will be required as part of Section 106 consultation carried out under NEPA and will influence findings under Section 4(f). An individual Section 4(f) Evaluation may be required.

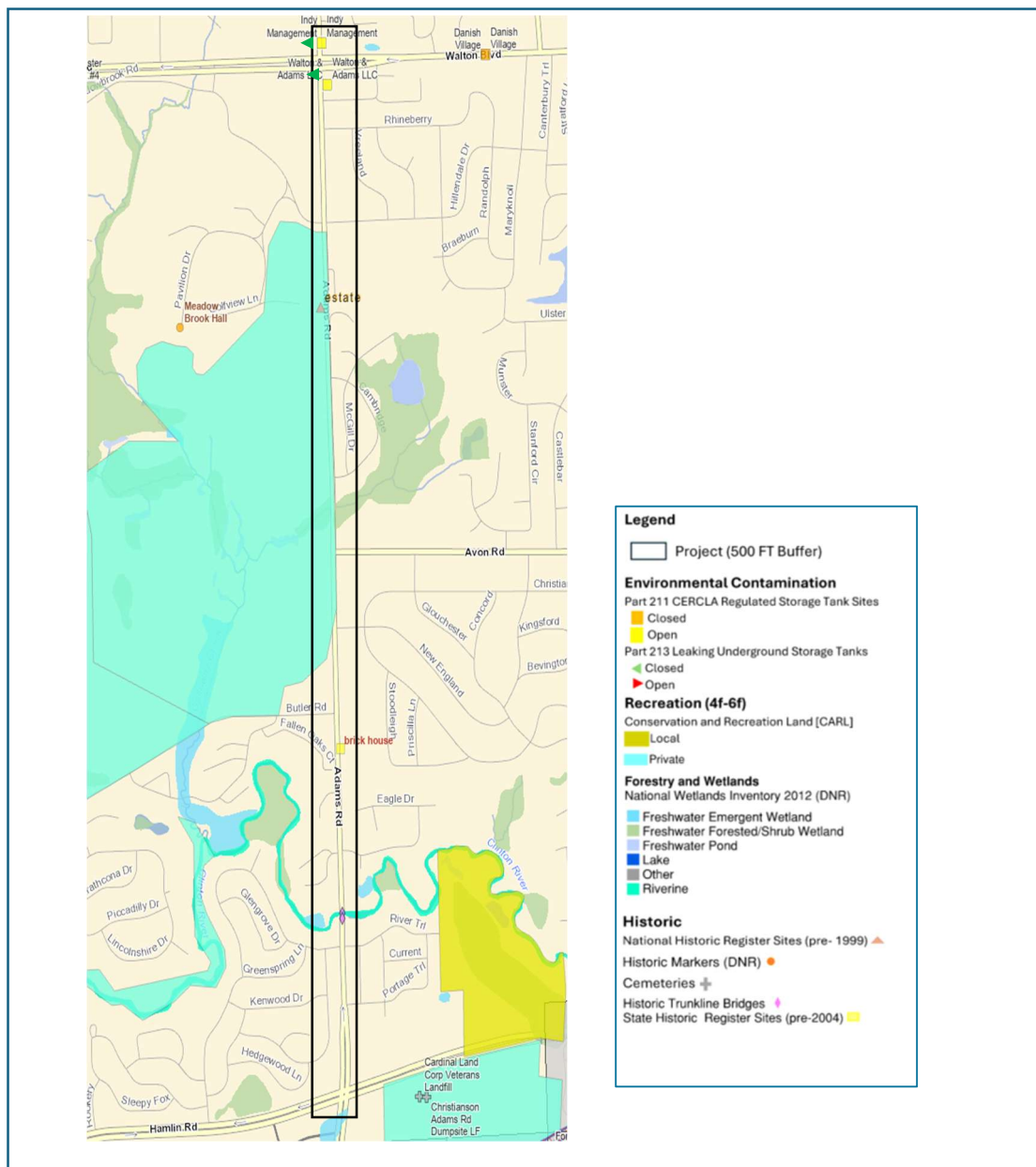


Figure 9.1: A map showing 4(f)/6(f) sites with proposed scope of work outlined

Contamination Sites

Displayed in Figure 9.2 are two contaminated sites within 500 ft of the Walton Boulevard at Adams Road intersection. Both sites are Part 211 and Part 213 sites. Part 211 and Part 213 sites are Underground Storage Tanks and Leaking Underground Storage Tanks. The facility in the southeast corner of Walton Boulevard at Adams Road, 2995 Walton Boulevard (Facility ID:00010468) is active for Part 211 and closed for Part 213. The facility reported a leak of gasoline twice. [This property also holds a land restriction dated October 2003](#). The facility was and still is a gas station. The facility on the northeast corner of Walton Boulevard at Adams Road 2980 Walton Boulevard (Facility ID: 00016666) is also active for Part 211 and closed for Part 213. The facility reported a gas leak three times. The facility was and still is a gas station.

The impact of these contaminated sites on the proposed project will depend on how much soil or right of way (ROW) may be acquired from these sites, should the proposed Refined Alternative go into effect, ROW acquisition and ground disturbance may be needed from the northwest corner of Walton Boulevard at Adams Road which may have an impact on the proposed project.

Should the Refined Alternative encounter any contaminated soils during ground disturbing activities in proximity to the open sites, the proposed future projects shall use the MDOT Special Provision for Non-Hazardous Contaminated Material Handling and Disposal whenever applicable.

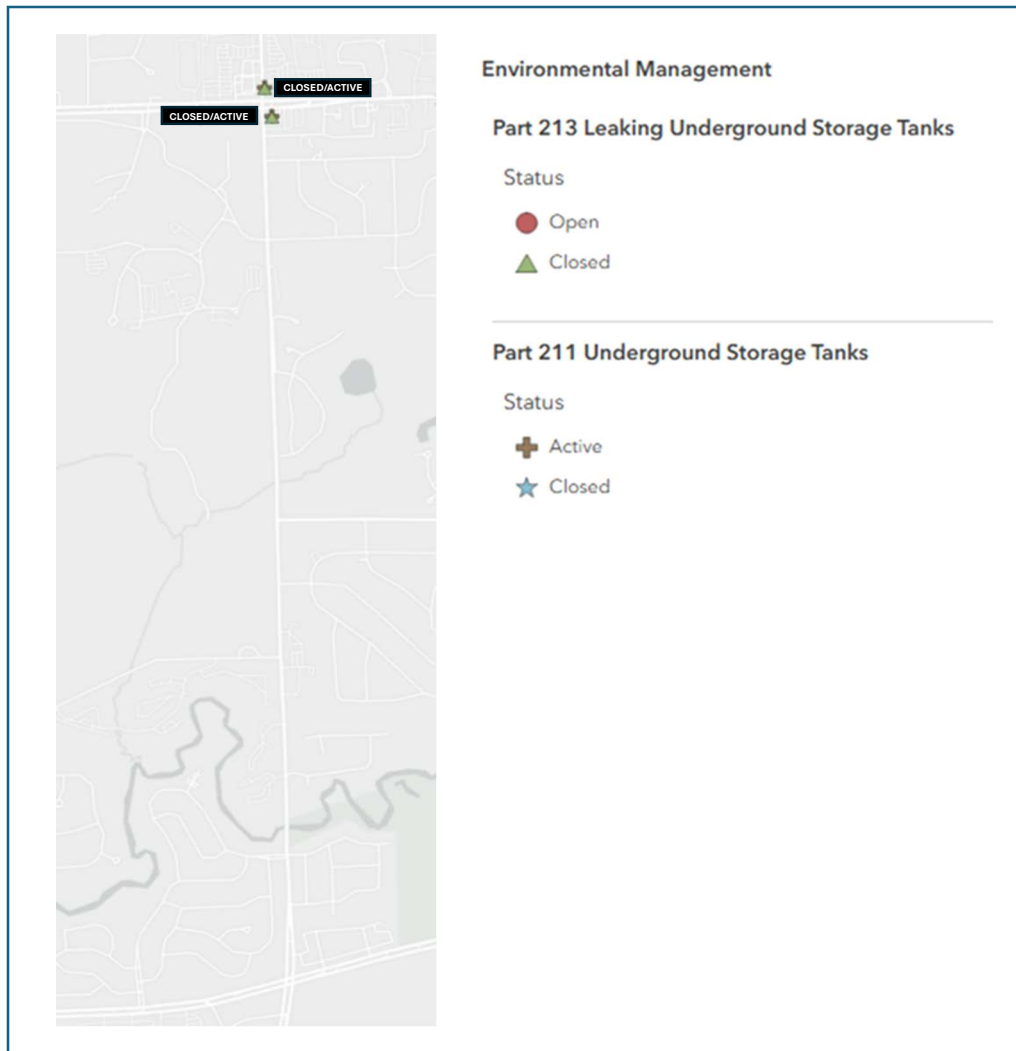


Figure 9.2: A map showing Contamination sites within Project Location Limits

Photo Credit: Michigan Department of Environment, Great Lakes, and Energy's (EGLE) Remediation Information Data Exchange [RIDE Mapper](#)

Air Quality

According to Figure 9.3, the scope of work is in an ozone attainment/maintenance zone.

Using the Michigan Department of Transportation's Dynamic Environmental GIS Resource, we can also see three transport related air quality statuses within the proposed project scope of work area:

- 1997 8-Hour Ozone (Maintenance)
- 2006 24-Hour PM2.5 (Maintenance)
- 2015 8-Hour Ozone (Non-Attainment)

Based on the Refined Alternative, air quality impacts are unlikely.

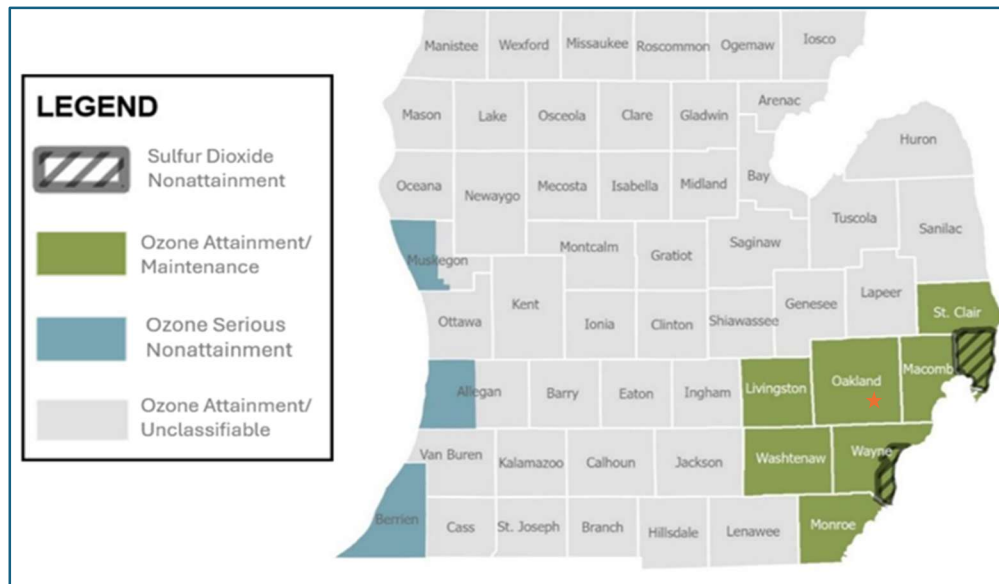


Figure 9.3: EGLE's Attainment Status for the National Ambient Air Quality
 Photo Credit: [EGLE's Attainment Status for the National Ambient Air Quality Standards](#)

Noise

There are noise sensitive land uses along the corridor (residences, places of worship, parks) within the area of potential effect.

The project is considered Type I and will require a noise analysis that will be included in the Environmental Assessment Report.

Public Involvement

As mentioned in Section 3, multiple meetings were held to understand the needs and concerns of those who reside in the proposed project's scope of work area. There was also a website created with a board and an interactive map where citizens could map out and write their opinions on the proposed project and alternatives: [Adams Road PEL | Social Pinpoint](#). The public was provided opportunities throughout the study to learn about the study and provide comments. All comments were reviewed and recorded and helped to shape the refined alternative. A public hearing will be held during NEPA to present the environmental assessment.

See Section 3 for more information about public involvement.

Traffic Impacts

A traffic analysis was conducted on the study area of the 2-mile stretch of Adams Road from Hamlin Road to Walton Boulevard.

Refer to the Traffic Report in Appendix D to find information about traffic impacts.

Section 106

Section 106 of the National Historic Preservation Act requires federally funded or permitted projects to assess potential effects on properties listed in or eligible for the National Register of Historic

Places. Compliance includes coordination with the State Historic Preservation Office to ensure historic resources are properly considered.

A Memorandum of Agreement (MOA) may be required to resolve Adverse Effects on historic properties if they are reasonably expected. The process for consultation on an MOA and resolution of Adverse Effects will likely take up to 2 years to complete.

Formal coordination with SHPO through the MDOT LAP office will be required due to the presence of cultural and historical resources within the project area. Coordination with the National Park Service is required because Adams Road runs through the Meadow Brook Hall and Farms Historic Landmark District.

Tribal coordination will be essential to ensure that areas of potential significance to Tribal Nations are appropriately considered. Initial coordination began on October 27, 2025, with Tribal Nations that have an interest in Oakland County. In response, one Tribal Nation requested that an Inadvertent Discovery Plan be developed and implemented to address any unforeseen discoveries that may occur during project execution.

Refer to Appendix G - Above Ground Survey to learn more information regarding cultural and historical impacts.

Wetlands

Federal Executive Order 11990 requires all impacts to wetlands to be mitigated regardless of their size and regulatory status. There is a freshwater forested/shrub wetland associated with Galloway Creek approximately 450 feet north of the intersection of Adams Road and Avon Road within the project limits. Wetlands are also present adjacent to Adams Road along the Clinton River which is located south of Stoney Brook Drive/Pheasant Ring Drive and north of Quail Ridge Circle/River Trail Drive. If work is required in any wetland Michigan Department of Environment, Great Lakes, and Energy (EGLE) Part 303 (NREPA) permit will be required. Wetland mitigation would also be required for any impacts. A U.S. Environmental Protection Agency (EPA) Section 404 permit may also be required depending on the level of wetland impacts.

Based on the Refined Alternative there is the potential for wetland impacts at the intersection of Adams Road and Avon Road due to the proposed roundabout, a culvert replacement 450 feet north of the intersection of Adams Road and Avon Road, and the proposed pathway along the east side of Adams Road at the culvert crossing. Wetlands are located at the Galloway Creek roadway crossing and will require a delineation to determine the extents of impacts.

Figure 9.4 shows the substantial number of wetland areas within project limits.

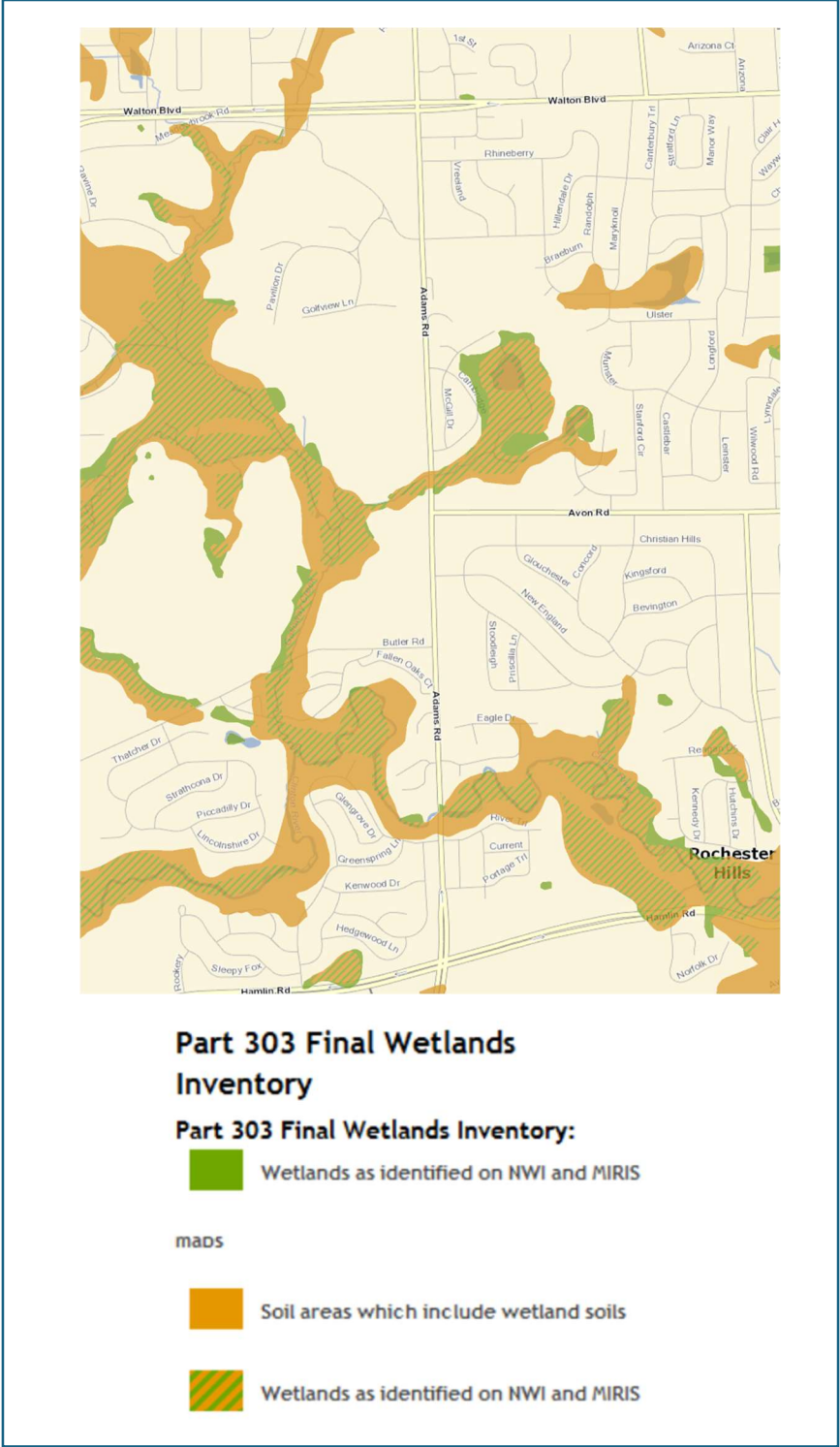


Figure 9.4: Wetlands mapper from EGLE within Project Limits

Photo Credit: [Wetlands Map Viewer](#)

Floodplains

There is a floodplain area associated with the Clinton River which crosses under Adams Road. If cut or fill is required at any floodplain area an EGLE/USACE Joint Part 31 Floodplain Regulation Permit will be required.

Based on the Refined Alternative construction activities that will occur at the bridge over the Clinton River on Adams Road and new outfall locations along the Clinton River for storm sewer drainage, an EGLE/USACE Joint Part 31 Floodplain Regulation Permit will be required for the bridge, culvert and outfall replacement in the floodplain. Contact the Transportation Review Unit (TRU) of the Water Resources Division at EGLE to conduct a Voluntary Transportation Preliminary Request to provide feedback early in the design process. This would determine if a hydraulic Report will be necessary for any proposed work in the floodway/floodplain.

In Figure 9.5 about 5-10% of the study area does overlap with a floodplain.

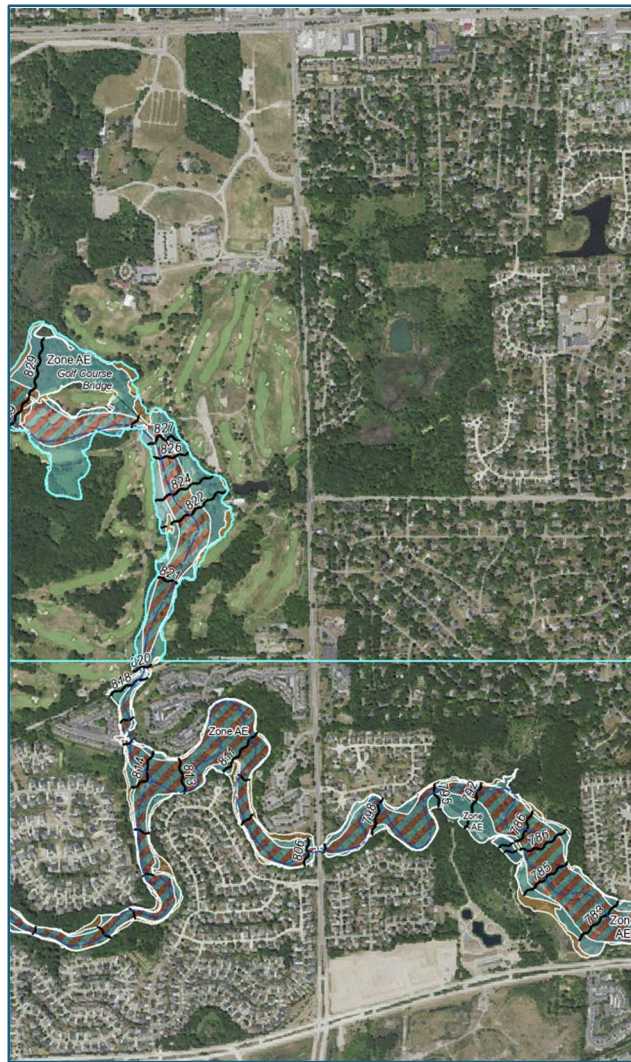


Figure 9.5: Floodplain Map within Project Limits

Photo Credit: [FEMA Flood Map Service Center](#)

Threatened and Endangered Species

According to the report generated from U.S. Fish and Wildlife Services Information for Planning and Consultation (IPaC) website using the study area's location, there is a list of threatened and endangered species (Table 9.2) that may or may not be affected should the refined alternative be constructed.

Table 9.2: List of Threatened and Endangered Species

Species	Determination
Eastern Massasauga Rattlesnake (EMR)	Not likely to adverse effect
Indiana Bat	May have an adverse effect
Monarch Butterfly	No effect
Northern Long-Eared Bat	Not likely to adverse effect
Snuffbox Mussel	No effect
Tricolored Bat	Not likely to adverse effect

However, the Michigan Determination Key from iPaC determined that the proposed project would have no likely adverse effect or no effect on any of these species, with the exception of the Indiana Bat. Tree removal or cutting is restricted between April 15th and September 30th each year to protect Indiana Bat populations during their mating season. Tree removal will be staged to avoid impacts to the species.

A structure assessment will be required on the bridge and consultation with USFWS may be required due to the number of tree removals. Since this is a linear project, individual tree removals do not constitute a congruent habitat so the consultation would be informal if needed at all.

Since Eastern Massasauga is a part of this list due to possible earthwork that could disturb the EMR habitats, the MDOT SP for EMR will need to be implemented should a future project implement the refined alternative.

In coordination with the Michigan DNR, a freshwater mussel survey will be required to detect the presence of rare populations, if a presence is recorded, relocation will be required prior to construction.

Water Quality

The city of Rochester Hills is in a Regulated Areas for the Municipal Separate Storm Sewer System (MS4) Program area according to this [EGLE Mapper](#).

The purpose of the Municipal Separate Storm Sewer System (MS4) program is to minimize the release of pollutants into the surface waters of the state.

An MS4 refers to a drainage system, such as roads, storm drains, pipes, and ditches, which operate independently from combined sewers or wastewater treatment facilities. During rainfall or other wet weather events, these systems can carry pollutants directly into nearby water bodies. Non-plastic erosion control will be required throughout the project.

The Refined Alternative will be designed to meet MS4 requirements.

Resources Not Applicable

Commercially Navigable Rivers or Streams

Not being considered in this study as the proposed project area does not interfere with any commercially navigable river or stream.

National Wild, Scenic, and State Designated Natural Rivers

Not being considered in this study as the proposed project area does not interfere with any National Wild, Scenic, and State Designated Natural Rivers.

Coastal Zones

Not being considered in this study as the proposed project area does not interfere with any Coastal Zones.

Agricultural Properties

Not being considered as the proposed project area is in a built-out urban environment of Rochester Hills

From Planning to NEPA

The activities outlined below were completed as part of the Planning and Environmental Linkage (PEL) study to follow the transportation planning process which in turn informs and streamlines the subsequent NEPA process. By engaging stakeholders early, defining the corridor's purpose and need, evaluating alternatives, and assessing environmental, cultural, and infrastructure impacts, the PEL study established a strong foundation for the NEPA review process.

Purpose and Need

Defined early in the process. The study included a look at existing conditions along the corridor like traffic volumes, safety, land use, growth and operations. The information was presented to the public and stakeholders. Through these efforts the purpose and need statements were developed.

Preliminary Screening of Five Alternatives

With consideration to the purpose and needs as defined, five alternatives for evaluation were developed. Corridor-wide needs and system level needs were addressed at varying levels, sensitivity to the potential effects of each were determined through technical analysis and public input. Each alternative provided improvements to safety, congestion and added opportunities for infrastructure and multimodal improvements. The level of impact to the environment, cultural and historical assets were considered. The public and stakeholders evaluated each alternative and provided their input to what design features they supported and helped to define the level of impact the community would consent to.

Eliminating Unreasonable Alternatives

Alternatives that would create the highest level of impact to the environment, cultural and historic assets were determined to be unreasonable. The evaluation of a no-build alternative was favorable by many vocal residents, however, other residents, stakeholders and the project team determined this was also unreasonable as it did not address safety, capacity, infrastructure, and multi-modal improvements.

Refined Alternative

The refined alternative was evaluated to sufficient detail. The results of the refined alternative show improvements to the corridor and the potential negative impacts to the corridor were defined. Consultation with federal and state resource agencies and Indian Tribes will be required during NEPA.

Future Public Engagement

Public participation was strong and input received was varying between members of the public. A public hearing will be required during NEPA. The public hearing will follow all open meetings act requirements and will be advertised as required to provide additional opportunities for the public to participate and provide input. Public involvement will also be required as part of the Section 4(f) de minimis determination process.

Coordination with Regional Planning Agency

Adams Road improvements from Hamlin to Walton Boulevard have been programmed in SEMCOG's long-range transportation plan (SEMCOG Vision 2050.) The right of way phase and construction phase are scheduled in the 2031-2040 timeframe.

Resources for Review During NEPA

A list of items to be further investigated during NEPA are included in Table 9.1: Environmental Impacts Overview.