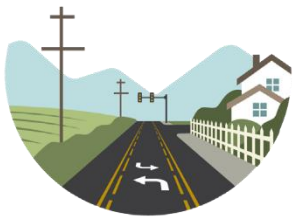
APPENDIX 2:

EXISTING AND PROJECTED CONDITIONS



WEST RESERVE DRIVE

CORRIDOR PLANNING STUDY

WEST RESERVE DRIVE

CORRIDOR PLANNING STUDY

Kalispell, MT

February 2021

EXISTING & PROJECTED CONDITIONS

Prepared for:

VISION ZERO
zero deaths · zero serious injuries

MONTANA DEPARTMENT OF TRANSPORTATION

Prepared by:

DOWL

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Attachment 3: 2040 Operational Analysis Reports

ACRONYMS

AADT	Annual Average Daily Traffic
CFR	Code of Federal Regulations
DNRC	Montana Department of Natural Resources and Conservation
DOC	Department of Commerce
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
FWP	Montana Fish, Wildlife, and Parks
GIS	Geographic Information System
GWIC	Groundwater Information Center
HUC	Hydrologic Unit Code
LOS	Level of Service
LUST	Leaking Underground Storage Tank
LWCF	Land and Water Conservation Fund
MAAQS	Montana Ambient Air Quality Standards
MBMG	Montana Bureau of Mines and Geology
MDEQ	Montana Department of Environmental Quality
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MPDES	Montana Pollutant Discharge Elimination System
MS4	Municipal Separate Storm Sewer System
MSATs	Mobile Source Air Toxics
MTNHP	Montana Natural Heritage Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PM	Particulate Matter
RCRA	Resource Conservation and Recovery Act
RP	Reference Post
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SOC	Species of Concern
TMDL	Total Maximum Daily Load
US 2	United States Highway 2
US 93	United States Highway 93
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank

1.0 INTRODUCTION

The Montana Department of Transportation (MDT) has initiated a corridor study of W. Reserve Drive (Dr.), between the intersection with United States Highway 93 (US 93) and United States Highway 2 (US 2). A portion of Whitefish Stage Road (Rd.), within the Kalispell urban limits, 0.5 miles north of W. Reserve Dr. and 300 feet south of W. Reserve Dr., is also included as part of this study. The goal of the W. Reserve Dr. corridor study is to develop a comprehensive long-range plan for managing the corridor and determining what, if anything, can be done to improve the corridor based on needs, public and agency input, and financial feasibility. This is a collaborative process with local jurisdictions, resource agencies, MDT, Federal Highway Administration (FHWA), and the public to identify transportation needs and potential solutions given environmental and funding constraints.

The Existing and Projected Conditions report provides a planning-level overview of environmental and transportation system conditions along portions of W. Reserve Dr. and Whitefish Stage Rd. as part of the W. Reserve Dr. corridor planning study. Information in this report was obtained from publicly available reports, websites, documentation, and from an on-site field review conducted in October 2020. Additional environmental information is contained in the Environmental Scan Report.

The intent of the W. Reserve Dr. corridor study is to examine needs and opportunities for improvements along the highway corridor. If specific improvement options are advanced from this study, a feasibility study and an analysis for compliance with the National and Montana Environmental Policy Acts (NEPA and MEPA) and other applicable regulations will be completed as part of the MDT project development process. Information provided in this report may be forwarded into the NEPA and/or MEPA process.

1.1 Study Corridor Area

The study area for the W. Reserve Dr. corridor planning study is located in the northeast part of Kalispell, within Flathead County, Montana. The study corridor includes W. Reserve Dr. (S-292) beginning at the intersection with US 93 (Reference Post [RP] 4.0) and continues east to the intersection with US 2 (RP 6.5). The study corridor also includes 0.5 miles of Whitefish Stage Rd. north of W. Reserve Dr. (U-6736) and 300 feet of Whitefish Stage Rd. south of W. Reserve Dr. (U-6728). For the purposes of this planning study, the study limits include a 250-foot buffer from the centerline of each roadway. Figure 1 shows the study area and the system designation for the roads within the study area.

Traffic at Whitefish Stage Rd.

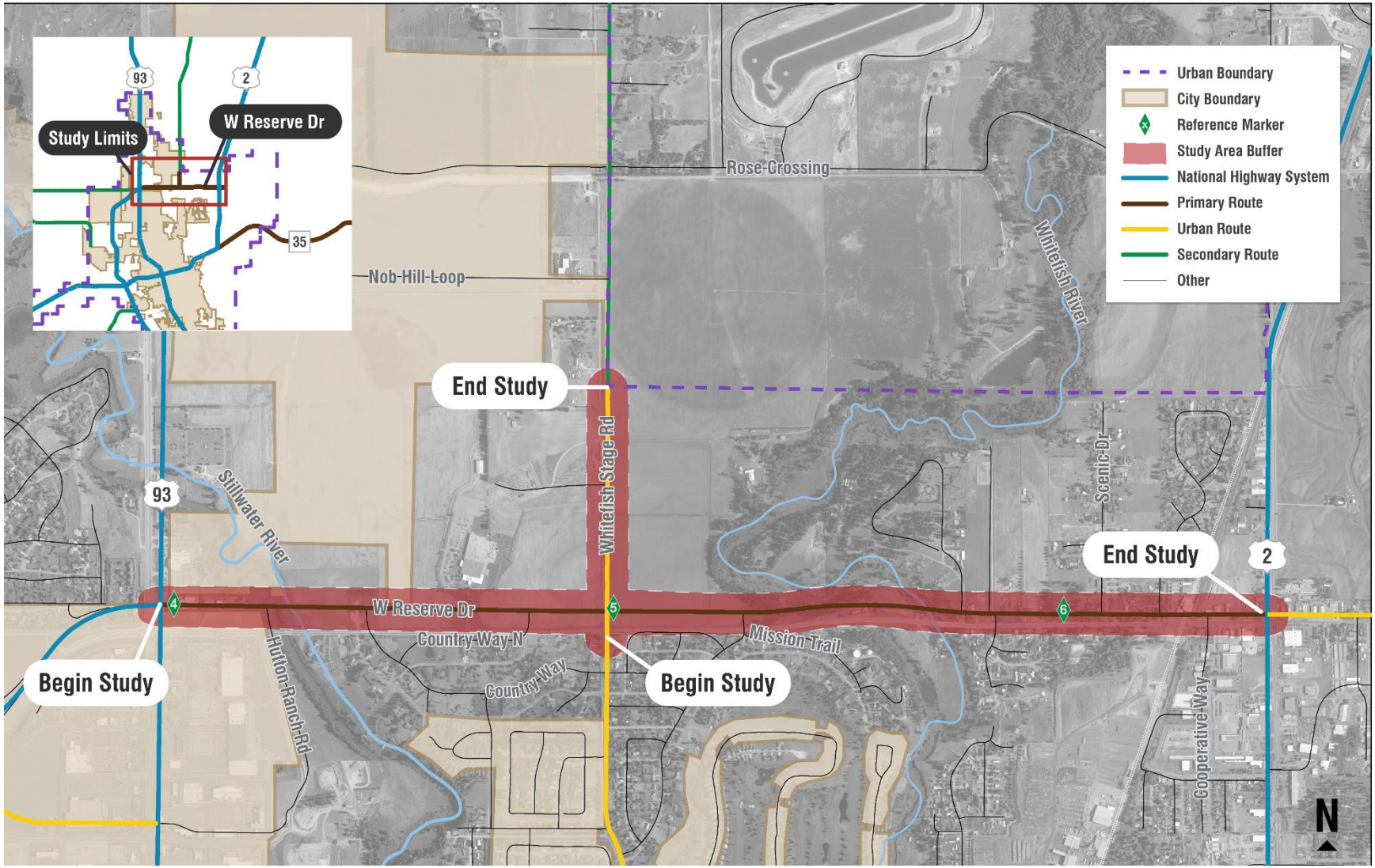

Figure 1: Study Area

Highway system designation is established based on the functional classification of the route; the system designation is important as it affects the roadway's ability to receive different types of funding. W. Reserve Dr. is designated as a primary system route. Whitefish Stage Rd. is designated as an urban system route within the study limits, while US 93 and US 2 are designated as national highway system (NHS) non-interstate routes.

1.2 Study Background

The city of Kalispell and the area surrounding the W. Reserve Dr. study corridor, specifically in the area north of the study corridor, have experienced substantial growth in recent years. This has resulted in increased commuter, homeowner, and commercial/construction traffic volumes on W. Reserve Dr., which has become a major east-west thoroughfare, connecting US 2 and US 93. The Flathead Valley has realized a 12 percent increase in population since 2010 resulting in a strain on the existing infrastructure including traffic volumes along the route. In April 2020, the Transportation Commission approved a system change for W. Reserve Dr., removing it from the urban system and adding it to the primary system. The primary route designation more closely aligns with the roadway's current functionality, as a high-volume roadway that provides an important east-west connection between two state highways.

In addition to providing an east-west connection from US 2 and US 93, the W. Reserve Dr. corridor also serves several subdivisions and individual residences, farms, a large timber mill, and the commercial areas around US 93 and US 2.

1.3 Related Plans and Projects

Several local plans related to transportation and land use exist that pertain to the corridor study area. The following is a summary of local plans and regulations that include land use policy and transportation guidance.

The **Flathead County Growth Policy**[1] provides growth and land development guidelines for the county. It was most recently updated in 2012. Its intended use includes guidance for land use and development through definition of goals, policies, and regulations based on the public's vision. Objectives are stated in the document that correspond to the values and vision of the public and how that pertains to land use and development in the county. The growth policy is supplemented by individual Neighborhood Plans including the Evergreen Enterprise Area plan.

The **Flathead County Transportation Plan – Phase II**[2] serves to provide transportation guidance throughout the county. It was created in 2009 and has not been updated since that time. The document identifies intersection and corridor level of service, areas of concern, and recommended improvements. The plan recommends the following re-classification of roadways within the study area:

- Whitefish Stage Rd. (from W. Reserve Dr. to Rose Crossing): reconstruct to an urban minor arterial standard (currently classified as a major collector).
- W. Reserve Dr. (from US 93 to Whitefish Stage Rd.): reconstruct to a five-lane principal arterial standard (currently classified as a minor arterial).
- W. Reserve Dr. (from Whitefish Stage Rd. to US 2): reconstruct to a three-lane principal arterial standard (currently classified as a minor arterial).

The **Kalispell Area Transportation Plan** is currently being updated and is planned for completion in mid-2021. The updated transportation plan, MOVE 2040, will establish existing and projected conditions for the Kalispell area and will evaluate improvements needed to meet

projected traffic demand. The draft plan identifies two major projects that may impact traffic on the W. Reserve Dr. corridor[3]:

- Evergreen/Grandview Connection (east-west corridor located one mile south of W. Reserve Dr.): this project provides a new roadway connection between Grandview Drive and W. Evergreen Drive and upgrades the corridor to a minor arterial from Farm to Market Road to Whitefish Stage Rd. (one lane in each direction with left-turn lanes at major intersections).
- Rose Crossing (east-west corridor located one mile north of W. Reserve Dr.): this project upgrades Rose Crossing to a minor arterial from US 93 to Helena Flats Road (one lane in each direction with left-turn lanes at major intersections).

These improvements to parallel east-west routes are expected to reduce traffic on W. Reserve Dr., Whitefish Stage Rd., and US 93.

The **Kalispell Pedestrian and Bicycle Plan** is currently being developed, with an expected completion date in mid-2021. The draft plan recommends the following improvements:

- A separated shared-use path on W. Reserve Dr. from Hutton Ranch Rd. to Mountain View Drive, located just east of US 2 (ranked as high priority).
- A separated shared-use path on Whitefish Stage Rd. from W. Reserve Dr. to Mannington Street, located two miles north of W. Reserve Dr. (ranked as low priority).

Planned construction projects affecting the corridor study area include the following:

- **US 93 North Signals-Kalispell**: Construction of this project is anticipated in calendar year 2021. The US 93 North Signals-Kalispell project will upgrade traffic signals, so they are more visible and are timed to allow more efficient movement of traffic. The project will also make improvements to pedestrian accessibility with ramps and crosswalk signals that meet ADA standards. The US 93 and W. Reserve Dr. intersection is included in this project.
- **Center Line Rumble Strips-Kalispell Area:** Construction of this project is anticipated in calendar year 2021. The project will install center line rumble strips in the Kalispell area including Whitefish Stage Rd., north of W. Reserve Dr.
- **City of Kalispell Projects**: The city of Kalispell's 2018 Water Facility Plan Update and 2019 Wastewater Facility Plan Update identify future water and wastewater capital improvement projects between US 93 and Whitefish Stage Rd. The future wastewater improvements include an 8-inch gravity wastewater collection system and sewer lift station east of the Stillwater River within Whitefish Stage Rd. and W. Reserve Dr. The future water improvements consist of a transmission main between US 93 and Whitefish Stage Rd. along W. Reserve Dr. and Whitefish Stage Rd. The water and wastewater capital improvement projects are on a 5- to 15-year timeline and are driven by growth and development in the surrounding area.

Planned regulatory updates affecting the corridor study area include the following:

- **City of Kalispell Small Municipal Separate Storm Sewer Systems (MS4) permit**: The city of Kalispell has identified a proposed future annexation boundary in the area of W. Reserve Dr. The annexation boundary would incorporate lands west of the Whitefish River into the city at some point in the future. Once annexed, the City's MS4 permit would be updated, with this area falling within the new MS4 boundary. Future stormwater development would occur in this area to comply with MS4 permit requirements.

1.4 Planned Developments

The Kalispell North Town Center is a planned development located on Rose Crossing between US 93 and Whitefish Stage Rd. The project will add significant traffic with the development of 13 commercial lots (hotel, supermarket, bank, car sales, fast-food restaurant, and offices), residential apartments, an elementary school, and a shopping center[4]. When fully complete, this development is expected to attract additional traffic to the study area. The development plans to add one additional access point on W. Reserve Dr., located near the Country Way intersection.

2.0 PHYSICAL FEATURES AND CHARACTERISTICS

This section documents existing physical features on the corridor, including roadway characteristics, utilities, railroad crossings, geotechnical and drainage conditions, bridges, and alternative transportation modes.

2.1 Functional Classification

Functional classification is a hierarchical system used to classify each road based on its relative emphasis on mobility versus land access. Freeways and interstates provide the greatest mobility but are intended to have limited access (i.e., higher travel speeds primarily serving long-distance travel). Local roads focus on land access and have limited mobility (i.e., lower travel speeds primarily serving adjacent land uses). Arterial and collector roads are intermediate classifications that provide transitions between other roads. Arterial roads focus more on mobility and provide connections between the freeway system and collector roads, while collector roads focus more on land access and provide connections between arterial and local roads. Figure 2 further details the functional classification hierarchy.

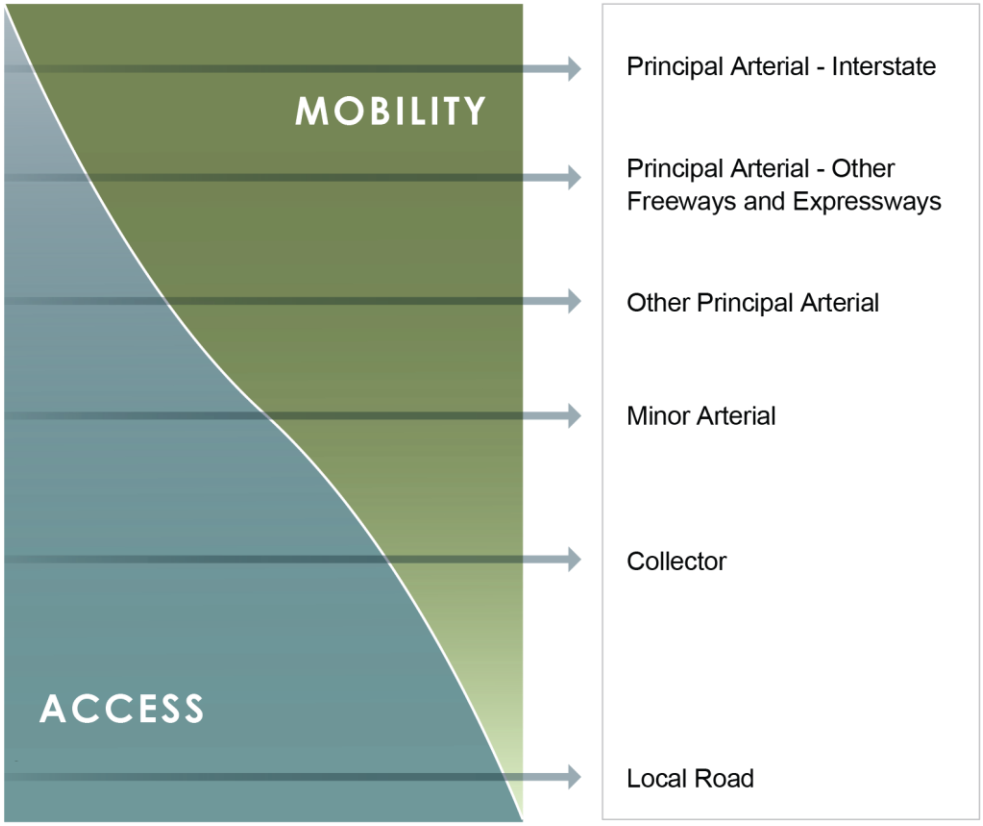

Figure 2: Functional Classification Hierarchy

Figure 3 shows the functional classification for roads within the study area. W. Reserve Dr. is classified as a minor arterial, while US 93 and US 2 are classified as principal arterials. Whitefish Stage Rd. is classified as a major collector north of W. Reserve Dr. and a minor arterial south of W. Reserve Dr.

Figure 3: Functional Classification

2.2 Posted Speed Limits

Figure 4 shows the posted speed limits in the study area. The speed limit is 45 miles per hour (mph) along most of the W. Reserve Dr. corridor but decreases to 40 mph about 0.6 miles west of US 2. The reduced speed limit occurs as the corridor transitions into a more residential area, where homes and business have direct access to W. Reserve Dr. The speed limit on Whitefish Stage Rd. is 45 mph south of W. Reserve Dr. and 50 mph north of the intersection.

Figure 4: Posted Speed Limits

2.3 Access Density

Figure 5 shows the access density along the study corridor. The corridor was divided into quarter-mile segments and the number of approaches and intersections were counted on each segment. As shown below, access density is relatively low from US 93 to the Whitefish River bridge. However, the nature of the corridor changes just east of the Whitefish River bridge, where there are numerous residential and commercial properties with direct access to W. Reserve Dr. The speed limit also decreases to 40 mph just east of the bridge. No access control plan currently exists for the corridor.

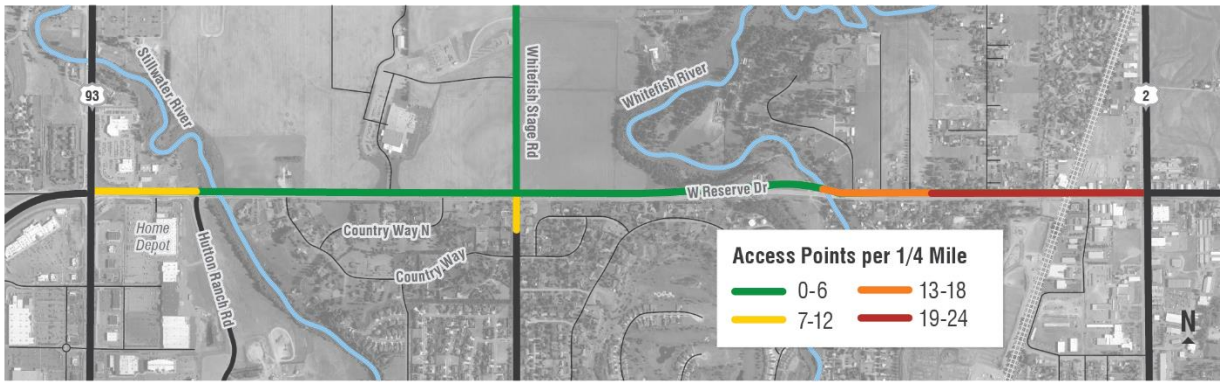

Figure 5: Access Density

2.4 Roadway Surfacing

The MDT Road Log contains data on roadway surfacing including widths and thicknesses along state routes. The W. Reserve Dr. corridor consists of a three-lane cross section with one travel lane in each direction, a center two-way left turn lane (TWLTL), four-foot shoulders, and curb and gutter. The corridor widens to a five-lane cross section west of Hutton Ranch Rd., with two lanes in each direction and a center turn lane. The intersection of W. Reserve Dr. and US 93 also includes a westbound right turn only lane.

The Whitefish Stage Rd. corridor consists of a two-lane cross section with one travel lane in each direction, one-foot shoulders, and roadside ditches.

Pavement monitoring is conducted on an annual basis by MDT. There are a wide variety of conditional assessments conducted by the department consisting primarily of Ride, Rut, and Cracking. Specifically, these attributes are tracked as follows:

- **Ride Index (IRI)**: roughness index measurement in inches per mile and converted to a 0 to 100 scale
- **Rut Index (RI)**: rut depth measurement taken every foot and converted to a 0 to 100 scale
- **Alligator Cracking Index (ACI)**: fatigue cracking measurement for all load-related cracks converted to a 0 to 100 scale
- **Miscellaneous Cracking Index (MCI)**: fatigue cracking measurement for non-load-rated cracks converted to a 0 to 100 scale
- **Overall Performance Index (OPI)**: factored overall performance score derived empirically from the previously noted indices and converted to a 0 to 100 scale

The Overall Performance Index (OPI) is a summary of the pavement's general condition. OPI scores of 80-100 is good, 60-80 fair, and less than 60 is considered poor. The W. Reserve Dr. corridor pavement was milled and overlaid in 2007. From RP 4.44 to 5.11, W. Reserve Dr. is rated on the low end of fair and the remaining section to RP 6.48 is rated as poor. Whitefish Stage Rd. from RP 0.14 to 2.57 is rated as fair.

Table 1: Pavement Condition

Corridor Route		Begin RP	End RP	IRI	RI	ACI	MCI	OPI
C000548	W. Reserve Dr.	4.44	5.11	73.12	58.63	99.90	97.55	62.26
C000548	W. Reserve Dr.	5.11	6.48	64.57	34.97	85.48	95.93	44.51
C006728A	Whitefish Stage Rd.	0.14	2.57	72.20	79.80	99.70	99.50	72.70

2.5 Utilities

According to Flathead County records, most of the parcels along W. Reserve Dr. have individual septic systems and drain fields. The primary concentration of the septic systems is on the south side of W. Reserve Dr. between the Stillwater and Whitefish Rivers. In addition to the individual septic systems, existing sanitary sewer infrastructure is located within the W. Reserve Dr. right-of-way at the following locations:

- At the intersection of US 93, the city of Kalispell has two (2) 8-inch diameter sewer force mains crossing W. Reserve Dr.
- East of the Whitefish River, the Evergreen Water & Sewer District (EWSD) has a small diameter (6-inch) sewer collection gravity main located on the south side of W. Reserve Dr. between the Whitefish River (flowing east) and the railroad crossing (flowing west). The small diameter gravity sewer main flows east/west converging in a manhole at the intersection of Scenic Dr. where flow is diverted to the north, crossing W. Reserve Dr. The small diameter gravity sewer mains collect septic tank effluent from EWSD users.
- East of the railroad tracks to the intersection of US 2, EWSD has an 8-inch diameter sewer gravity main located on the north side of W. Reserve Dr. The 8-inch gravity main collects raw wastewater from EWSD system users.

Potable water mains are present along the corridor owned by the city of Kalispell and the EWSD. The city of Kalispell water mains are within the city limits with a 12-inch transmission main crossing at the US 93 intersection, a 12-inch main on the south side of W. Reserve Dr. between the Home Depot entrance and Hutton Ranch Rd. and a 8-inch water main on the north side of W. Reserve Dr. between US 93 and the east side of Town Pump. The EWSD District spans from the Stillwater River to the US 2 intersection. The EWSD potable water mains impacting the corridor area right-of-way are described below:

- Approximately 1,300 feet west of Whitefish Stage Rd., there is an 8-inch diameter water main crossing.
- Approximately 1,200 feet east of Whitefish Stage Rd., a 12-inch diameter water main parallels W. Reserve Dr. on the north side for approximately 800 feet where it crosses to the south at Mission Trail.
- Approximately 600 feet east of the Whitefish River, a 14-inch diameter water main runs within W. Reserve Dr. to the intersection with US 2. The water main is a primary supply line for the EWSD feeding the distribution system and water storage tanks. In addition to the 14-inch diameter water main, there are system valves, fire hydrants, and distribution pipe crossings at the cross streets.

Bonneville Power Administration (BPA) has a transmission easement with a major transmission line crossing W. Reserve Dr. approximately 700 feet east of the US 93 intersection. Overhead utility lines run along the entire length of W. Reserve Dr. as described below:

- US 93 to Hutton Ranch Rd.: Overhead utility on north and south sides of W. Reserve Dr.
- Hutton Ranch Rd.: South side overhead utility crosses to north side of W. Reserve Dr.
- Hutton Ranch Rd. to Mission Trail: Overhead utility on north side of W. Reserve Dr.
- Mission Trail: Overhead utility crosses to south side of W. Reserve Dr.
- Mission Trail to Whitefish River: Overhead utility on south side of W. Reserve Dr.
- Whitefish River: Overhead utility crosses to the north side of W. Reserve Dr.
- Whitefish River to US 2: Overhead utility on north side of W. Reserve Dr. Additionally, in this section, a minor overhead utility line runs along the south side of West Reserve Dr.

There are no records of existing water or sewer utilities within Whitefish Stage Rd. outside of the immediate intersection with W. Reserve Dr.

There are overhead utility lines at the intersection of W. Reserve Dr. and Whitefish Stage Rd. and along the east and west sides of Whitefish Stage Rd. and at the Flathead Electrical Cooperative-Stillwater Substation located approximately 1,900 feet north of the W. Reserve Dr. intersection.

Throughout the W. Reserve Dr. and Whitefish Stage Rd. corridors, there are buried natural gas and communication utilities running parallel and transverse. There is a 2-inch diameter natural gas main within the roadway from the Whitefish River bridge east to the US 2 intersection. Additional parallel and transverse natural gas and communication utility crossings may be present but require location by a qualified utility location service. Subsurface natural gas and communication typically have a bury depth ranging from one (1) to four (4) feet below the surface.

2.6 Railroad

A BNSF railroad spur crosses W. Reserve Dr. near RP 6.3. The track averages 2 trains daily and serves local warehousing and commercial facilities. A recent upgrade to the railroad crossing at W. Reserve Dr. included new concrete sidewalk and detectable warning devices. The crossing has a 60-degree skew angle with crossing gates and warning lights.

Railroad Crossing on W. Reserve Dr.

2.7 Maintenance and Operations

MDT is responsible for maintenance of both W. Reserve Dr. and Whitefish Stage Rd. throughout the entire study area. The maintenance of Whitefish Stage Rd. was transferred to MDT in 2000. These responsibilities include repairs and preventative maintenance of the roadway, structures, and signs within the highway right-of-way. The MDT Kalispell Maintenance Section has jurisdiction over these facilities.

2.7.1 Winter Operations

MDT maintenance personnel are responsible for winter snowplowing and sanding of both W. Reserve Dr. and Whitefish Stage Rd. north of W. Reserve Dr. Whitefish Stage Rd. is locally maintained south of W. Reserve Dr. The MDT Maintenance Operations and Procedures Manual provides classification of winter maintenance areas. Areas within the corridor study are considered Level I and I-A winter maintenance areas. The W. Reserve Dr. corridor qualifies as a Level I facility. Level I facilities include roadways within or adjacent to a 3-mile radius to towns or cities with an average daily traffic (ADT) greater than 5,000 vehicles per day (vpd). These routes may receive continuous snowplowing and anti-icing/de-icing operations throughout a storm event. Whitefish Stage Rd. north of W. Reserve Dr. qualifies as a Level I-A facility. Level I-A facilities include interstate and other MDT-maintained roadways with an ADT greater than 3,000 vpd but less than 5,000 vpd. These routes may receive coverage up to 19 hours per day during a storm event, typically between the hours of 5:00 AM and 12:00 AM. Coverage of these facilities is at the discretion of the Area Maintenance Chief. The primary objective is to keep the roadway open to traffic and provide an intermittent bare pavement surface in the main driving lane as soon as possible.

2.7.2 Emergency Services

Coordination of public safety agencies is the responsibility of Flathead County Office of Emergency Services (OES). These services include law enforcement, fire, ambulances, public works, volunteers, and other groups that may be associated with an emergency response.

The Evergreen Fire Department is the fire district responsible for the W. Reserve Dr. corridor and Whitefish Stage Rd. south of W. Reserve Dr. The Evergreen Fire Rescue station is located on US 2, approximately 0.8 miles south of its intersection with W. Reserve Dr. The segment of Whitefish Stage Rd. north of W. Reserve Dr. lies within the West Valley Fire Department's management area. The West Valley Fire Department includes a station on Whitefish Stage Rd. approximately 0.7 miles north of the Kalispell urban limits.

Law enforcement is provided by the city of Kalispell Police Department and Flathead County Sheriff Department within the corridor study limits. As state routes, both W. Reserve Dr. and Whitefish Stage Rd. are patrolled by local law enforcement and Montana Highway Patrol.

Emergency response is provided by both the local fire departments and medical services are provided by Logan Health, formerly known as Kalispell Regional Healthcare, in Kalispell. The facilities are over a mile from the W. Reserve Dr. corridor. Logan Health capabilities include air ambulance and certification as a Level III Trauma Center by the American College of Surgeons.

2.8 Geotechnical Conditions

The terrain within the corridor limits is relatively flat with elevation gradually decreasing as the road moves toward the east. The land to the south of W. Reserve Dr. is mostly developed with housing and commercial structures. The northern part of the road is less developed and contains agricultural fields. A review of the corridor indicates there are no rock slope assets or hazardous slopes.

Based on local geologic maps of the area[5], much of the project is mapped on "glaciolacustrine deposits." This soil was deposited during the Pleistocene epoch in a glacial lake. The sediment consists of relatively soft silt, sand, and clay. Quaternary Alluvium is present along the Stillwater and Whitefish Rivers.

The Natural Resource Conservation Service (NRCS) provides soil survey mapping[6]. Most of the project site is mapped as Kalispell loam, Kalispell-Tuffit silt loam, and Kiwanis fine sandy loam. Along the Stillwater and Whitefish Rivers the soil is mapped as Alluvial land. Foundation soil at the Stillwater River Bridge consists of clay and silty clay while at the Whitefish River bridge foundation soil consists predominantly of gravel. Most of the soil within the study limits is mapped as fine grained.

The fine-grained silty/sandy soil along the project alignment are likely frost susceptible when moisture is present. These soil types often require additional subgrade preparation. Compaction may be more difficult with the fine grain soil if the subgrade soil is moist, especially in the spring.

2.9 Drainage Conditions

The entire study corridor is an urban section with limited stormwater and drainage facilities. Stormwater systems are located at the ends of the W. Reserve Dr. corridor including a section between US 93 and Hutton Ranch Rd. and another section from Cooperative Way to US 2. These storm systems range from 18-inch to 36-inch pipe. Other stormwater features are located at sags, where inlets collect runoff and discharge into the natural drainages either south of the roadway or into either the Stillwater or Whitefish Rivers. The stormwater utility is further described as:

- Inlets/catch basins and conveyance piping between US 93 and Hutton Ranch Rd. On the northside of W. Reserve Dr. at the Hutton Ranch Rd. intersection there is a stormwater detention pond with a controlled outlet structure discharging to the Stillwater River.
- Inlets/catch basins at the Stillwater and Whitefish Rivers bridges collecting stormwater prior to the bridges. The stormwater discharges into vegetated areas prior to flowing into the rivers.
- Along W. Reserve Dr. there are numerous inlet/catch basins collecting and conveying stormwater from the roadway to roadside drainages.

The natural topography generally slopes from the north to the south. Runoff from the mostly undeveloped lands to the north are collected along the north side of W. Reserve Dr. because the roadway is elevated. This runoff generally flows east or west along the toe of the road slope and spills into nearby drainages. There are six minor drainage culverts, 42-inch and smaller, identified throughout the corridor. Three of these culverts are 18-inch approach culverts and the other three include one 18-inch and two 24-inch crossing culverts. Many of these drainage culverts have buried ends and are ineffective.

Stormwater along Whitefish Stage Rd. is captured in roadside borrow ditches that flow south. Only one stormwater utility is located along this roadway within the study corridor area. This is an 18-inch approach culvert located at the Flathead Electric substation approach (approximately 1,975 feet north of the W. Reserve Dr. centerline).

Small MS4s for incorporated cities in Montana with a population of at least 10,000 people are regulated under the Montana Pollutant Discharge Elimination System (MPDES) General Permit MTR040000. The city of Kalispell is a designated MS4; however, W. Reserve Dr. and Whitefish Stage Rd., within the study corridor area, primarily fall outside the currently designated MS4 boundary[7]. Future proposed annexation would incorporate lands west of the Whitefish River into

the city and within a revised MS4 boundary. Future stormwater development would be anticipated in this area to comply with MS4 permit requirements. Stormwater and MS4 will be important hydraulic considerations during design of any future improvement options.

There are two major drainages along the corridor and include bridges over the Stillwater River and Whitefish River. Both crossings are located within FEMA delineated floodplains. The Stillwater River crossing is located within an approximate zone A floodplain (FIRM Panel 30029C1805J). The Whitefish River crossing is located within a detailed zone AE floodplain (FIRM Panel 30029C1810J).

2.10 Bridges

MDT's Bridge Management Section is a section of the Bridge Bureau and operates under the standards of the FHWA to manage the inspection and maintenance of thousands of structures across the state. The responsibilities of this Section include providing and maintaining Bridge Inspection Records, Bridge Rating, and management of maintenance for structural and functionality concerns for bridges within the system. The objectives and measures are intended to identify the right treatments for Montana's bridge assets, as well as promoting cost-effective bridge preservation, appropriate safety-related work, and economic growth.

MDT uses a Structure Condition Performance Measure and a Deck Performance Condition Measure to classify the elements of a bridge. These measures categorize bridge conditions as good, fair, or poor, based on the condition rating given to the bridge deck, superstructure (including beams, bearings and diaphragms supporting the bridge deck), and substructure (the foundational elements that transfer load from the structure to the soil and provide stability). Additionally, the structures are classified as Structurally Deficient or Functionally Obsolete if certain serviceability inadequacies exist.

A bridge is considered structurally deficient if any of the load carrying members are known to have structural issues resulting in a condition assessment of "poor" or if the structure has insufficient waterway capacity. When a bridge is classified as structurally deficient, it does not mean that it is unsafe, but it typically requires increased maintenance and repair to remain in service and eventual rehabilitation or replacement to address overall deficiencies. A bridge is considered functionally obsolete if the structure is inadequate for current traffic requirements or waterway adequacy.

Stillwater River Bridge

The deck condition performance measure uses the National Bridge Inventory (NBI) deck rating to give an assessment of the deck condition and a planning level suggestion of future maintenance or rehabilitation. The deck condition ranking is a general indicator of the condition of any individual deck. The rankings are useful for planning purposes on a system wide basis.

W. Reserve Dr. crosses the Stillwater and Whitefish Rivers with bridges in each location that were constructed in 1983. The Stillwater River bridge is a skewed three-span concrete bridge with a center span of 76.5 feet and two outer spans of 65.75 feet for a total length of 209 feet. The Whitefish River bridge is also a skewed three-span concrete bridge with a west and center span of roughly 51 feet and an east span of 30.5 feet for a total length of 133 feet. Both bridges are supported on 12-inch timber piles at the abutments and 14-inch steel pipe piles at the bents. The planned pile lengths were 65 feet for the Stillwater River bridge and 35 feet at the Whitefish River bridge. Both bridges have a Good structure condition rating and a Fair deck condition rating. Inspection records indicate that both structures have undergone bridge rehabilitation in the past. It is apparent that both structures still have observable issues with the bridge decks that require regular maintenance. Structure No. 06913 over the Stillwater River also has the classification of Structurally Deficient/Functionally Obsolete and therefore may be a candidate for replacement in the future if bridge widening is considered. Structure No. 06914 over the Whitefish River is not classified as Structurally Deficient/Functionally Obsolete.

Table 2 lists the overall width, length, and age of each bridge within the study area. According to the MDT Bridge Design Standards, both bridges have adequate width for structures to remain in place but due to the pedestrian access on both structures and approaching roadway alignment there is only one travel lane in each direction. At Structure No. 06913 (Stillwater River) it is documented from recent inspection reports that there has been observed rutting in the bridge deck due to high traffic volume. Both structures are candidates for structure rehabilitation and widening, if an overall corridor widening improvement option is forwarded through this study. However, structure No. 06913 would warrant an evaluation of replacement rather than widening due to its classification of Structurally Deficient/Functionally Obsolete.

Table 2: Bridge Condition

Structure No.	Feature Crossed	Year Built	Width (ft)	Length (ft)	Structure Condition	Deck Condition
06913	Stillwater River (RP 4.28)	1983	59	209.1	Good	Fair-1
06914	Whitefish River (RP 5.74)	1983	59	133.0	Good	Fair-1

2.11 Other Transportation Modes

2.11.1 Transit

Figure 6 shows existing transit routes within the study area. Eagle Transit / Mountain Climber operates the green line bus route, which passes through the west end of the study area. The green line provides a north-south connection between the Gateway Center and US 93 and W. Reserve Dr. The route primarily runs along Meridian Road and US 93 and loops back using Hutton Ranch Rd. The route currently is not in service due to COVID-related concerns. It typically operates with a 30-minute headway from 9am-4pm and a 60-minute headway from 8-9am and 4-6pm.

Figure 6: Transit Routes

2.11.2 Bicycles and Pedestrians

Figure 7 shows the existing bicycle and pedestrian facilities within the study area. Sidewalk coverage is incomplete. Sidewalk exists on the both sides of the corridor from US 93 to the Stillwater Bridge. However, sidewalk only exists on the south side of W. Reserve Dr. from the Stillwater Bridge to the Whitefish River Bridge. Just east of the Whitefish River Bridge, the sidewalk moves from the south side to the north side of W. Reserve Dr. without a dedicated crosswalk and continues to the US 2 intersection. A paved trail exists on the west side of Whitefish Stage Rd., starting at W. Reserve Dr. and extending 1.6 miles south.

Figure 7: Bicycle and Pedestrian Facilities

3.0 GEOMETRIC CONDITIONS

Existing roadway geometrics were evaluated and compared to current MDT standards. The analysis was completed based on a review of public information, MDT as-built drawings, GIS data, and field observations.

3.1 Design Criteria

The MDT Road Design Manual establishes the design controls and general design criteria that influence the overall roadway design approach. A balanced design incorporates the general design criteria while meeting the desired outcome of the project mindful of impacts related to the project. MDT considers W. Reserve Dr. an urban minor arterial which accommodates shorter trip lengths, lower traffic volumes, and more access to property than a principal arterial. The geometric criteria for the study corridor are based on current MDT standards for urban minor

arterials on non-NHS routes, consistent with the corridor's classification. The corridor is generally considered level terrain. Table 3 provides the current standards for the various design elements for an urban minor arterial.

Table 3: Design Standards

Urban Minor Arterial			
Design Element			**Criteria for Curbed Cross-Section**
Design Control	Design Speed (1)		35 mph
Roadway Elements	Travel Lane Width (1)		11 ft
	Minimum Roadway Width		26 ft
	Shoulder Width (1)	Outside	Varies
		Inside	N/A
	Cross Slope (1)	Travel Lane	2% Typical
		Shoulder	2% Typical
	Minimum Median Width		Raised: 4 ft
	TWLTL Width		11 ft
	Bicycle Lane Width		4 ft
	Parking Lane Width		10 ft
Cut Section	Ditch Slope		4:1
Alignment Elements	Design Speed		35 mph
	Stopping Sight Distance (1)		250 ft
	Intersection Sight Distance		165 ft
	Minimum Radius (1)		371 ft
	Superelevation Rate (1)		e_{max} = 4.0%
	Vertical Curve Length (1)	Crest	(2)
		Sag	(2)
	Maximum Grade (1)	Level	6%
		Rolling	7%
		Mountainous	9%
	Minimum Vertical Clearance		17.0 ft

(1) Controlling design criteria.
(2) Refer to MDT Road Design Manual Chapter 4, Section 4.4
Source: MDT Geometric Design Standards[8]

3.2 Roadway Typical Section

For most of the corridor extents, the roadway has a three-lane typical section, with one travel lane in each direction and a center TWLTL. The existing three-lane typical section has a roadway surfacing width of 41 feet with curb and gutter on both sides of the roadway for a total of 45 feet from back-of-curb to back-of-curb. Sidewalk is present throughout the corridor, on one side of the roadway or the other. The existing sidewalk does not provide continuous accessible routes on either side of the roadway. Lane widths, shoulders, and sidewalk widths are generally compliant with existing standards.

3.3 Roadway Alignment

A roadway alignment consists of both a horizontal alignment and a vertical alignment. A horizontal alignment consists of a series of straight lines, known as tangents, and curves to change direction. Consideration is also given to the degree of curvature, the rate of superelevation, and curve type. A vertical alignment consists of a series of straight grades and vertical curves. Consideration is given to the elevation change, the vertical curve type (either a crest or sag), and the rate of curvature (K-value). The K-value is the horizontal distance needed to produce a one percent change in gradient. The functional classification of the roadway and design speed dictate the specific geometric design criteria.

Available as-built information provided by MDT included the following projects:

- Reserve Dr. South-Kalispell (Completion Date: 8/2013)
- Jct. US 93 – Jct. US 2 (Completion Date 11/2007)
- W. Reserve Dr. – North of Kalispell (Completion Date 11/1985)
- W. Reserve Dr. – North of Kalispell (Completion Date 12/1984)

The horizontal alignment is relatively straight with three curves. The existing horizontal alignment complies with current geometric design standards. The vertical alignment is generally flat and in compliance with current geometric standards with one exception. The grade from the existing bench to the bridge crossing the Whitefish River just exceeds the maximum grade for level terrain. Vertical curves generally meet or exceed current geometric design standards. Improvement options forwarded from this study need to ensure that current alignment standards are met and consider design speed and terrain type.

4.0 TRAFFIC CONDITIONS

Traffic conditions on the study corridor have been documented, including a review of existing and historic traffic volumes, anticipated future growth, and intersection operations with existing and future 2040 traffic volumes.

4.1 Existing AADT

Figure 8 shows the existing annual average daily traffic (AADT) on the corridor and on major crossroads. Estimated AADT was obtained from MDT's short-term count sites within the study area; the figure shows 2019 AADT, the most recent data available. The corridor volumes are highest west of Whitefish Stage Rd., with an AADT exceeding 18,300 vehicles per day. This AADT indicates the roadway is operating near or at capacity in the existing condition, considering the planning level capacity of a two-lane urban arterial is 18,300 vehicles per day[9].

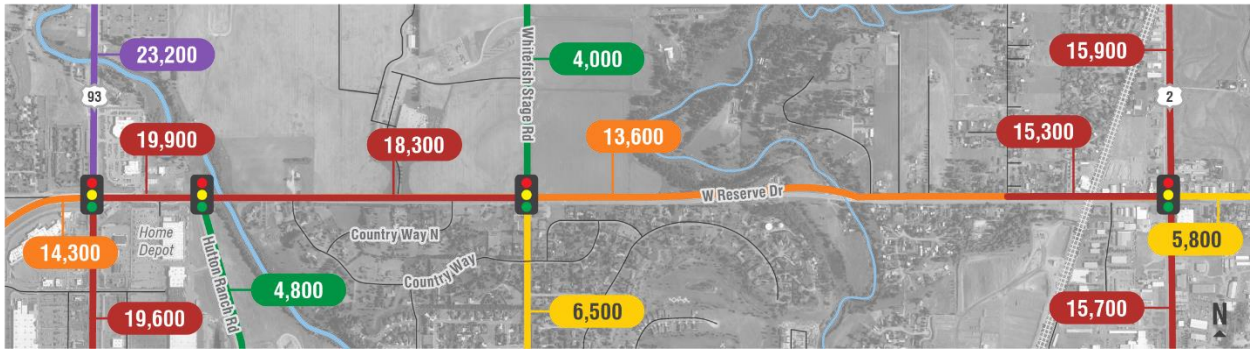

Figure 8: Existing AADT

As shown in the figure, the corridor provides an east-west connection between US 93 and US 2, two north-south state highway corridors. Whitefish Stage Rd. is a local north-south route on the corridor which provides access to residential areas located north and south of W. Reserve Dr.

4.2 Historic AADT and Expected Growth

The historic growth rate was analyzed over the last 20 years (2000 to 2019) to estimate future traffic volumes. Historic AADT was obtained for the short-term count sites on W. Reserve Dr. and Whitefish Stage Rd. Of note, the AADT reported at short-term counts sites is based on a seasonally adjusted 48-hour traffic count. Therefore, the AADT reported is only an estimate and can vary widely from year to year, based on the conditions during the traffic count.

Table 4 lists the locations of the short-term count sites and the compound annual growth rate (CAGR) at each site. Figure 9 shows the data graphically.

Traffic growth on W. Reserve Dr. was highest from 2000 to 2009 (3.4% average growth); however, growth decreased from 2010 to 2019 (1.7% average growth). Little to no growth has occurred in the last five years; this is likely attributed to the fact that the corridor is operating near capacity and vehicles are taking alternate routes, like Rose Crossing, to avoid congestion. From a high-level view, the average growth rate over the last twenty years is equal to 2.4%. The twenty-year growth rate is less impacted by randomness in the data, which can occur when analyzing shorter periods. The recommended 2.4% growth rate is also consistent with growth rates used for other planning-level studies in the area. The Kalispell Move 2040 Transportation plan projects 2.4% annual growth in households in the Kalispell area and 1.9% annual growth in employment over the next 20 years.

Table 4: Historic AADT and Growth Rate

Count Site	2000 AADT	2019 AADT	Growth Rate		
			2000-2009	2010-2019	2000-2019
W. Reserve Dr., west of Country Way	10,700	19,853	5.2%	1.5%	3.1%
W. Reserve Dr., west of Whitefish Stage Rd.	13,230	18,323	2.3%	1.4%	1.6%
W. Reserve Dr., east of Whitefish Stage Rd.	8,730	13,574	3.8%	1.0%	2.2%
W. Reserve Dr., west of US 2	9,340	15,281	2.6%	2.7%	2.5%
Average Growth Rate for W. Reserve Count Sites			**3.4%**	**1.7%**	**2.4%**

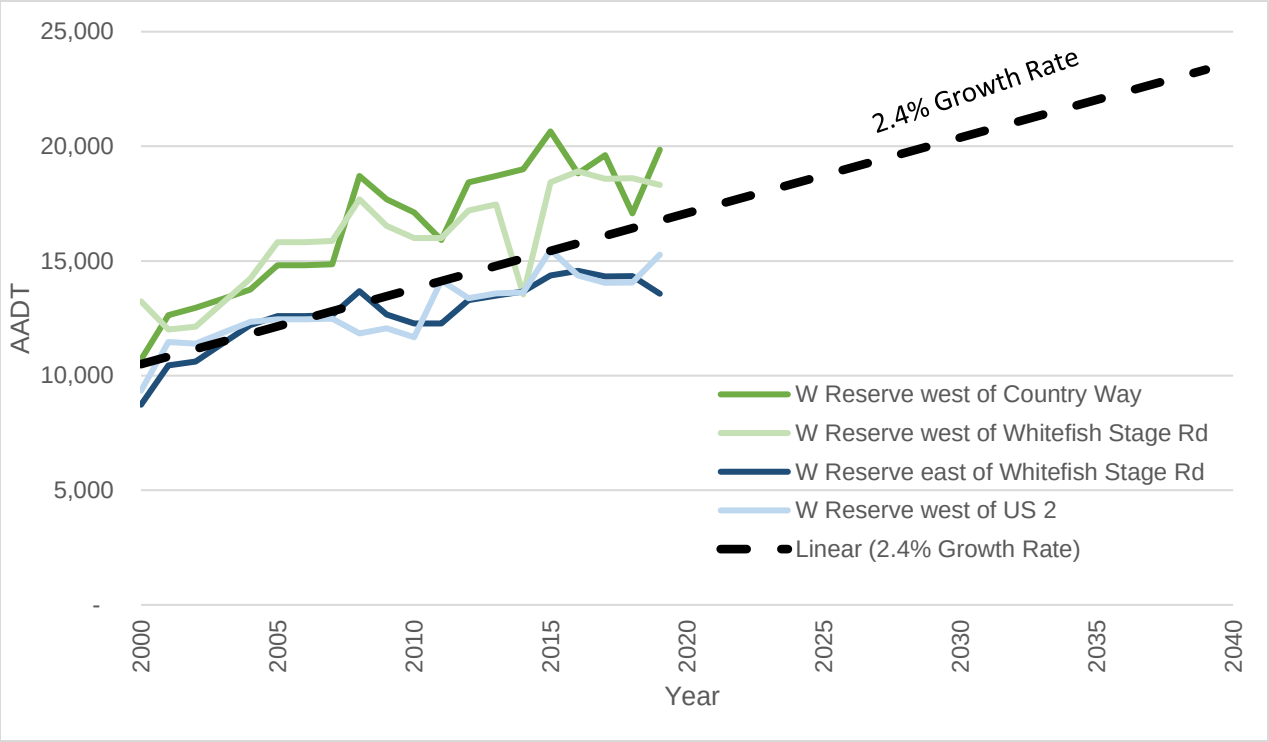

Figure 9: Historic and Projected AADT

Table 5 shows the projected AADT at the short-term count sites in year 2040, assuming a CAGR of 2.4%. The corridor is expected to have 30,000 to 33,000 daily vehicles on the west end and 22,000 to 25,000 daily vehicles on the east end in 2040.

Table 5: Forecasted 2040 AADT

Count Site	2019 AADT	2040 AADT
W. Reserve Dr., west of Country Way	19,853	32,668
W. Reserve Dr., west of Whitefish Stage Rd.	18,323	30,151
W. Reserve Dr., east of Whitefish Stage Rd.	13,574	22,336
W. Reserve Dr., west of US 2	15,281	25,145

Of note, this projected AADT assumes that corridor laneage will be expanded. If the corridor cross-section remains as-is, growth in AADT will be capped at around 20,000 vehicles per day (based on the capacity of a two-lane urban arterial) and traffic will divert to other routes.

4.3 Heavy Vehicle Traffic

Table 6 shows the percent heavy vehicles at the three major intersections on the corridor. Heavy vehicles generally include buses, delivery trucks, and semi-trailer trucks. The percent heavy vehicles were calculated using recent 48-hour traffic counts collected by MDT. In order to obtain information specific to W. Reserve Dr., the percent heavy vehicles were calculated based on vehicles on or entering/leaving the corridor (e.g., does not include north-south through traffic on US 93, Whitefish Stage Rd., and US 2). On average, heavy vehicles make up about 4.1 percent of all vehicles on the corridor over a 24-hour period.

Table 6: Percent Heavy Vehicles

Intersection	Count Date	% Heavy Vehicles
W. Reserve Dr. / US 93	Wednesday, Sept 5th, 2018	4.9%
W. Reserve Dr. / Whitefish Stage Rd.	Tuesday, May 7th, 2019	3.1%
W. Reserve Dr. / US 2	Tuesday, May 14th, 2019	4.4%
	Average	**4.1%**

4.4 COVID Traffic Impacts

A 12-hour traffic count was collected at each study intersection during October 13th-15th, 2020. This count data was compared to recent historic counts (count dates shown in Table 6), to understand how the COVID-19 pandemic has impacted existing traffic volumes. The historic counts were collected by MDT over a 48-hour period and represent typical traffic conditions (i.e., typical weekday traffic while school was in session). **Attachment 1** provides a summary of historic and October 2020 count data.

Figure 10 compares the traffic volume profile for historic traffic counts versus October 2020 traffic counts at the three intersections. The historic 48-hour traffic count data was averaged across the two weekdays and is shown as a dashed line in the figure.

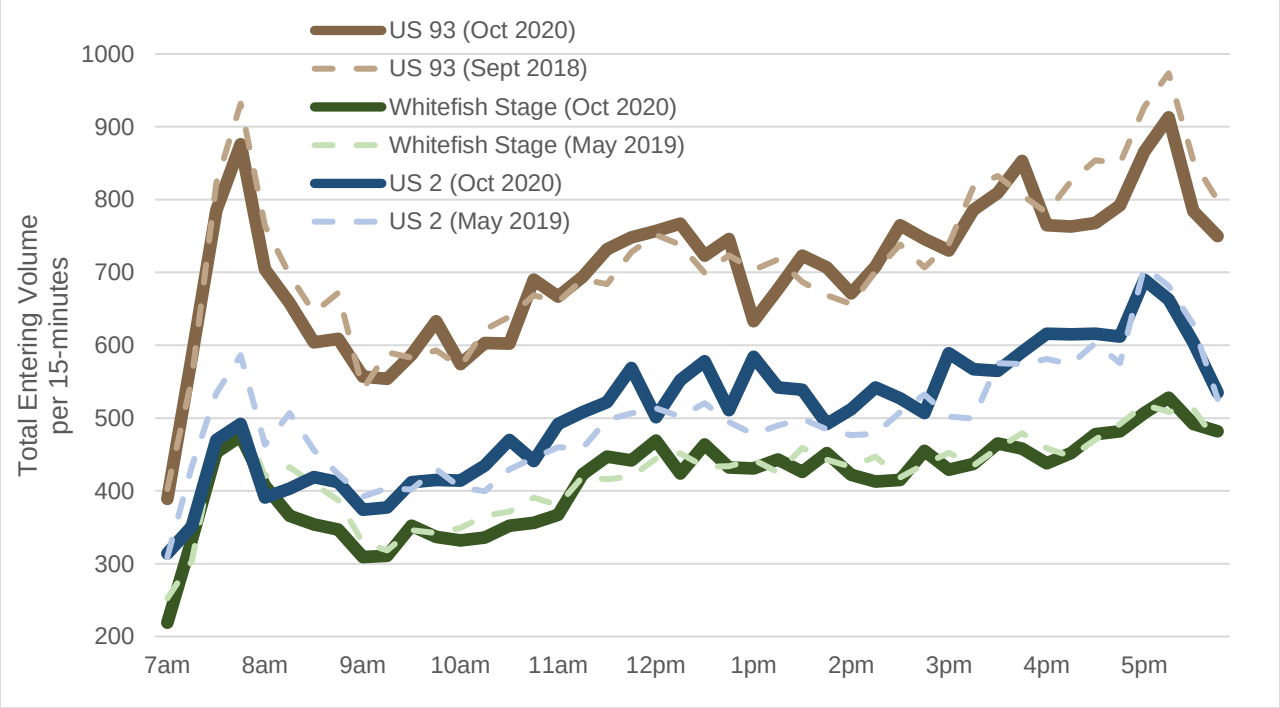

Figure 10: Comparison of Historic vs October 2020 Traffic Counts

From 8:00-9:00 am, October 2020 traffic volumes are lower at all three intersections. From 5-6pm, existing and historic volumes are about the same at Whitefish Stage Rd. and US 2 while US 93 has lower volumes compared to historic data.

The highest hourly volumes generally occurred from 7:30-8:30 am for the AM peak hour and 4:45-5:45 pm for the PM peak hour. Table 7 takes a closer look at total entering volume (TEV) during the AM and PM peak hours and the percent change observed.

Table 7: Comparison of Historic vs October 2020 Peak Hour Total Entering Volume

Intersection	AM Peak Hour TEV			PM Peak Hour TEV		
	2018 / 2019	Oct 2020	% Change	2018 / 2019	Oct 2020	% Change
W. Reserve Dr. / US 93	3,216	3,023	-6%	3,605	3,355	-6%
W. Reserve Dr. / Whitefish Stage Rd.	1,826	1,701	-7%	2,031	2,009	-1%
W. Reserve Dr. / US 2	2,091	1,756	-16%	2,593	2,569	-1%
AM Average			**-10%**	**PM Average**		**-3%**

On average, the AM peak hour is about 10% lower and the PM peak hour is about 3% lower due to COVID traffic impacts. The October 2020 turning movement proportions were also compared to historic data. The proportion of traffic making each turning movement was very similar to historic data (within 2%); this indicates that travel patterns have not changed substantially on the corridor due to COVID-19.

The following bullets summarize the data used for peak hour intersection analysis:

- Historic traffic count data was used at US 93, Whitefish Stage Rd., and US 2.
- October 2020 traffic count data was used at all other intersections.
    - October 2020 data was increased by 10% in AM peak and 3% in PM peak
    - Through volumes on W. Reserve Dr. were balanced using historic count data as the basis for east-west corridor through volumes.

4.5 Existing Traffic Control and Intersection Configuration

Figure 11 shows the existing traffic control and intersection configuration at the seven study intersections. All traffic signals operate actuated-uncoordinated. The following bullets summarize the left-turn phasing at the signalized intersections with W. Reserve Dr.

- US 93: northbound and southbound protected-permitted left turn phasing; eastbound and westbound split phasing
- Hutton Ranch Rd.: westbound protected-permitted left turn phasing.
- Whitefish Stage Rd.: eastbound and westbound protected-permitted left turn phasing.
- US 2: northbound and eastbound protected-permitted left-turn phasing.

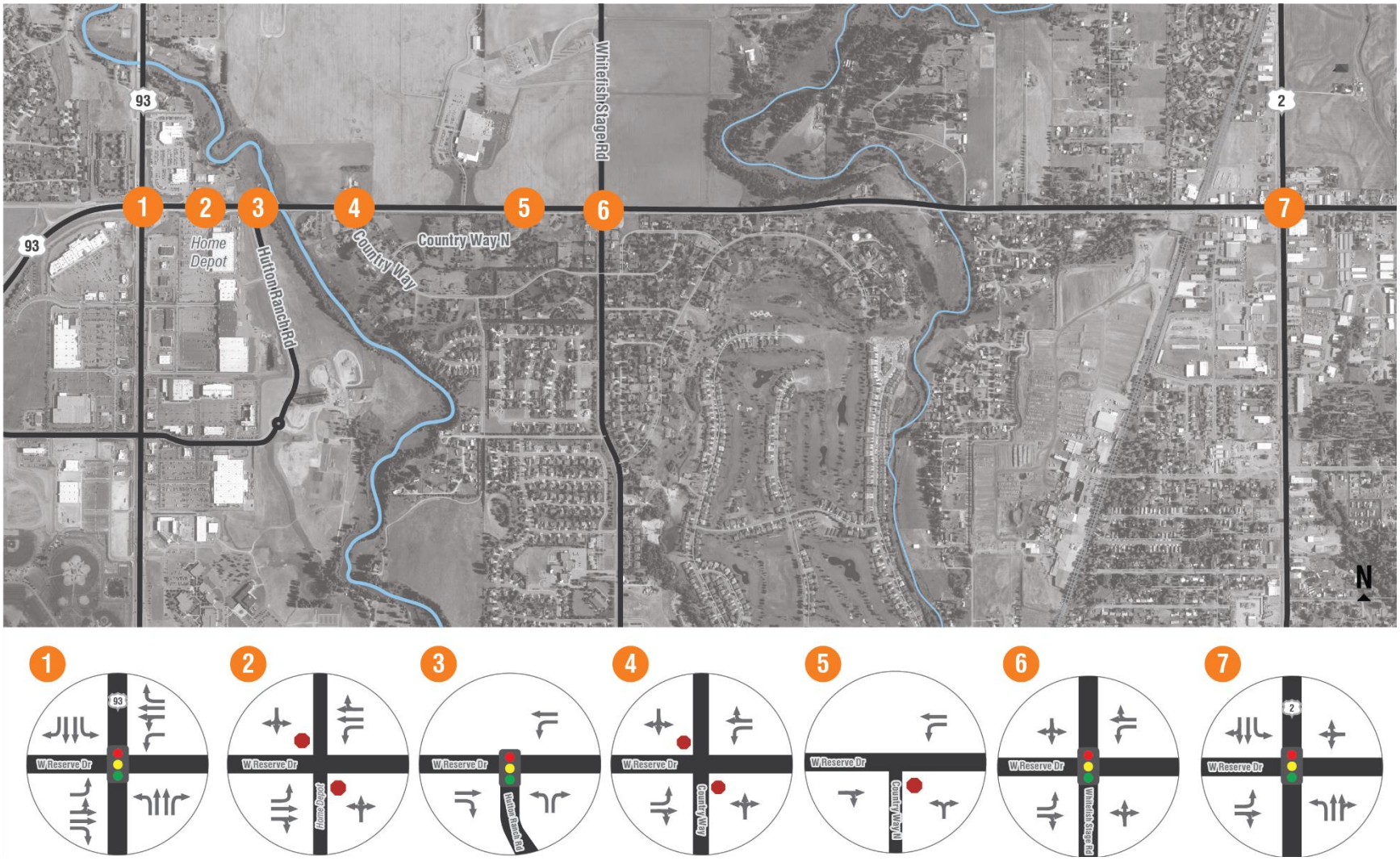

Figure 11: Traffic Control and Intersection Configuration

4.6 Existing Operations

4.6.1 Pedestrian Volumes

Table 8 shows the number of pedestrian crossings at study intersections over a 12-hour period (6am-6pm) during the week of October 13th-15th, 2020. Pedestrian volumes are relatively low throughout the corridor, with the US 93 and US 2 intersections having the highest pedestrian volumes. Of note, pedestrian volumes are likely higher during the warmer summer months.

Table 8: Pedestrian Crossing Data

Intersection	Pedestrian Crossings (6am-6pm)
W. Reserve Dr. / US 93	18
W. Reserve Dr. / Home Depot	4
W. Reserve Dr. / Hutton Ranch Rd.	5
W. Reserve Dr. / Country Way	2
W. Reserve Dr. / Country Way N	1
W. Reserve Dr. / Whitefish Stage Rd.	1
W. Reserve Dr. / US 2	19

4.6.2 Traffic Patterns

Figure 12 shows the directional distribution of traffic at the W. Reserve Dr./Country Way intersection. This intersection represents the typical directional distribution on the west end of the corridor. Westbound traffic is heaviest during the AM peak hour, with about 57% of traffic heading westbound. However, volumes are more balanced during the PM peak hour, with about 51% of traffic heading westbound.

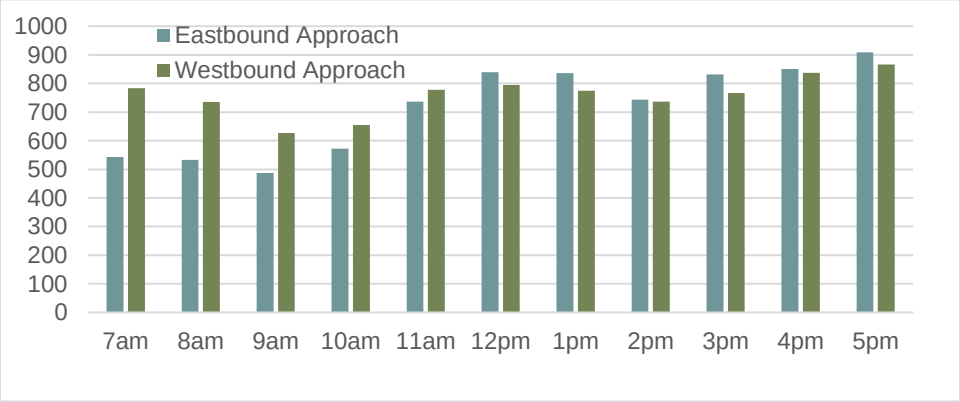

Figure 12: Directional Distribution of Traffic at West Reserve/Country Way

Figure 13 shows the heavy traffic movements at the three critical intersections on the corridor. The figure only shows movements greater than 100 vehicles per hour. At US 93, all four approaches have heavy traffic volumes during the peak hours. The total entering volume at this intersection is significantly higher than other intersections on the corridor. Whitefish Stage Rd. is a key intersection where vehicles enter and exit the corridor. Heavy northbound lefts and southbound rights increase the amount of westbound traffic on the corridor. At US 2, the west leg has significantly higher volumes than the east leg.

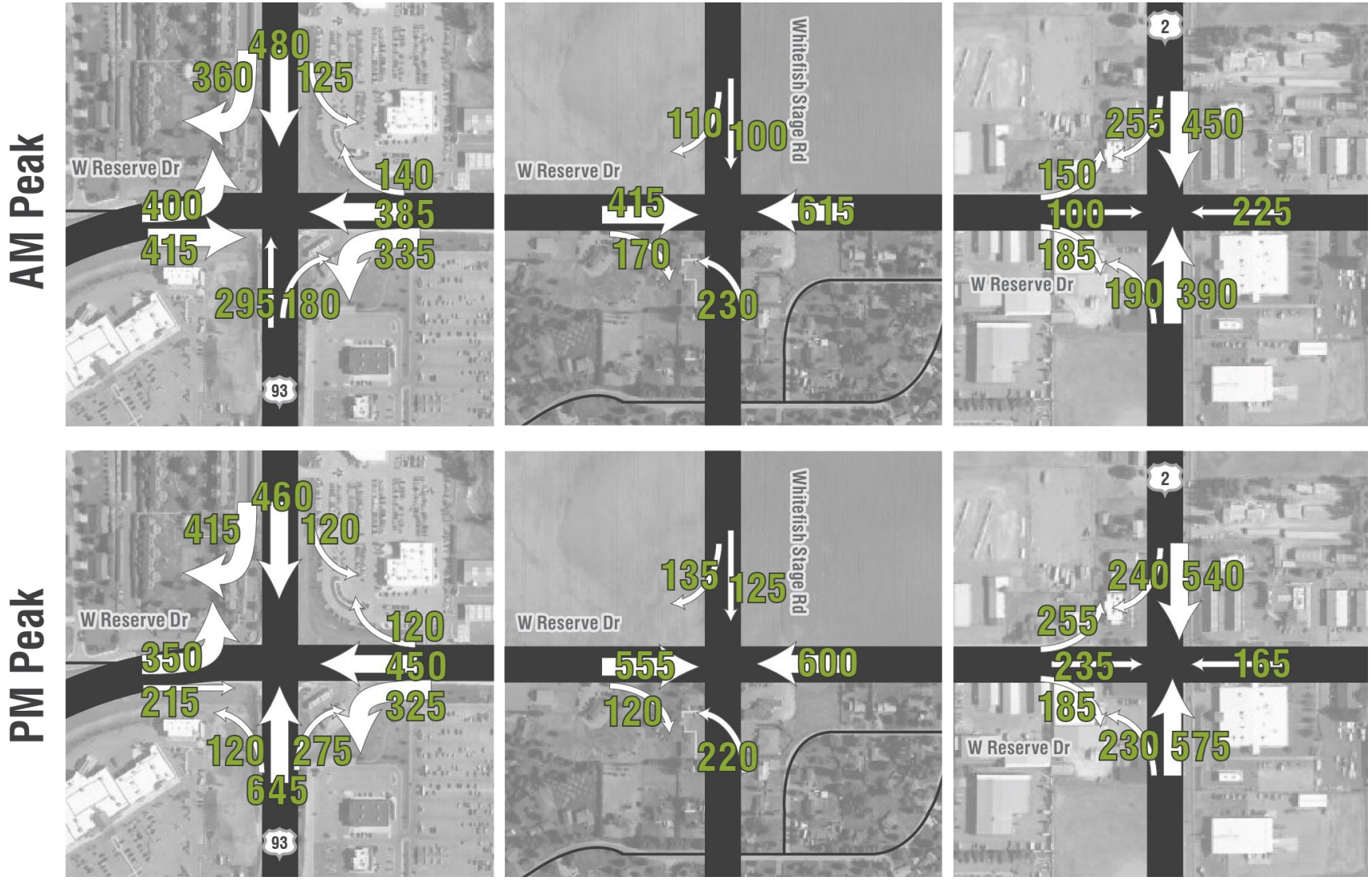

Figure 13: Heavy Traffic Movements

4.6.3 Field Observations and Calibration

Existing traffic conditions were modeled in Synchro/SimTraffic version 10. SimTraffic is a microsimulation tool within Synchro that creates a two-dimensional animation of corridor traffic; SimTraffic was used for this analysis because Synchro is limited in its ability to analyze congested traffic conditions. The SimTraffic model was calibrated using PM Peak hour queue lengths. Existing queue lengths were observed in the field from 4:45-5:45 pm on two typical weekdays during December 2020. Particular attention was given to the intersection of W. Reserve Dr. and Whitefish Stage Rd., as this intersection operates near capacity during the PM peak hour.

On the eastbound approach, the max stationary queue observed at the beginning of green was equal to 800 feet (extending to Country Way North); in this case, all vehicles were at a complete stop within the queue. The eastbound queue continued to lengthen after the signal turned green, as vehicles joined the back of queue. During green, a slow-moving rolling queue developed, where vehicles at the front of queue were largely unimpeded, but vehicles at the back of queue were moving slowly. The eastbound rolling queue typically extended back to the Applied Materials approach (about 1,500 feet west of Whitefish Stage Rd.). During the peak ten minutes (5:20-5:30pm) the rolling queue extended about 0.5 miles west (to the Country Way intersection).

Field observed max queues were compared to SimTraffic queues, to ensure the traffic model aligns with field conditions. Of note, SimTraffic does not report rolling queues; in SimTraffic, a vehicle is only considered queued when it is traveling less than 6.8 mph. Regarding calibration settings, the traffic model assumes a saturation flow rate of 1,750 vehicles per hour per lane on all approaches. A vehicle length of 20 feet was used for SUVs and pickups, while a vehicle length of 16 feet was used for passenger cars. SimTraffic queues were within 25% of field observed max stationary queues at Whitefish Stage Rd., except on the northbound approach, where the model overestimates queueing. Overall, the traffic model is reasonably aligned with field conditions, given the natural variability in traffic volumes and queuing which occurs from day to day.

Of note, the Whitefish Stage Rd. intersection is located near two major schools, Edgerton Elementary School and Glacier High School, and experiences severe delay and queuing during school release times (3:30-4:30 pm). The school release was not modeled in Synchro/SimTraffic because the volumes are lower than that experienced during the PM peak hour.

4.6.4 Level of Service and Delay

Intersection level of service (LOS) was analyzed using Synchro/SimTraffic version 10 software. LOS describes the quality of traffic operations and is a letter grade based on average control delay. It is graded from A to F, with LOS A representing free-flow conditions and LOS F representing severe congestion with stop-and-go flow conditions. Table 9 shows the LOS criteria for signalized and two-way stop controlled (TWSC) Intersections.

Table 9: LOS Criteria for Signalized and TWSC Intersections

LOS	Average Control Delay (Seconds / Vehicle)	
	Signalized Intersections	TWSC Intersections
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

*Delay reported for overall intersection at signalized intersections; Delay reported for critical movement at Two-Way Stop Controlled (TWSC) Intersections (side street lane with the highest delay).

Figure 14 and Figure 15 show the existing turning movement volumes and LOS at the study intersections. Traffic volumes less than seven vehicles per hour were not rounded at stop-controlled intersections, because a small increase in side street volumes can have a major impact on delay results. Table 10 shows the delay in seconds/vehicle at each intersection. Results are reported based on the average of ten simulation runs in SimTraffic. **Attachment 2** provides the operational analysis reports from SimTraffic.

Table 10: Existing Peak Hour LOS and Delay (sec/veh)

Intersection	Control	AM Peak	PM Peak
W. Reserve Dr. / US 93	Signal	D/42	D/41
W. Reserve Dr. / Home Depot	TWSC	C/20	D/29
W. Reserve Dr. / Hutton Ranch Rd.	Signal	A/6	B/14
W. Reserve Dr. / Country Way	TWSC	D/34	**E/43**
W. Reserve Dr. / Country Way N	TWSC	B/11	A/4
W. Reserve Dr. / Whitefish Stage Rd.	Signal	D/46	**E/71**
W. Reserve Dr. / US 2	Signal	C/29	D/45

*Delay reported for overall intersection at signalized intersections; Delay reported for critical movement at Two-Way Stop Controlled (TWSC) Intersections (side street lane with the highest delay).

All signalized intersections operate at LOS C or D, except for Whitefish Stage Rd., which operates at LOS E in the PM peak hour. The stop-controlled intersection at Country Way is operating at LOS E in the PM peak hour. Country Way North operates at LOS A during the PM peak hour, as very little traffic was observed on the northbound approach during the October 2020 traffic count. Of note, side street traffic at Country Way and Country Way North can make a left-turn using two-stage gap acceptance (i.e., the vehicle uses the center TWLTL to make the turning movement in two stages). However, no TWLTL exists at the Home Depot approach, making a left-turn maneuver more difficult on the side-street approaches at that location.

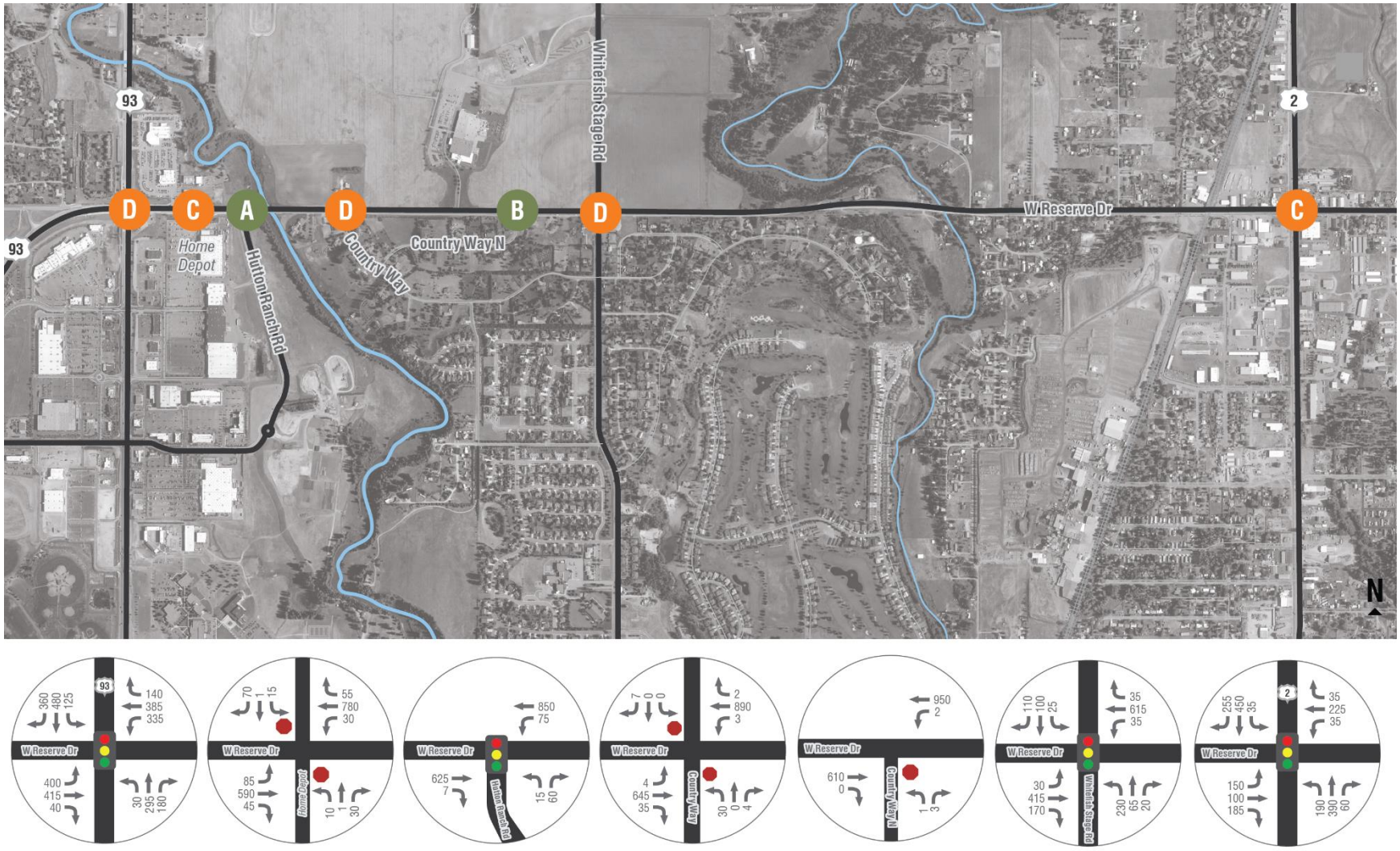

Figure 14: Existing AM Peak Hour Traffic Operations

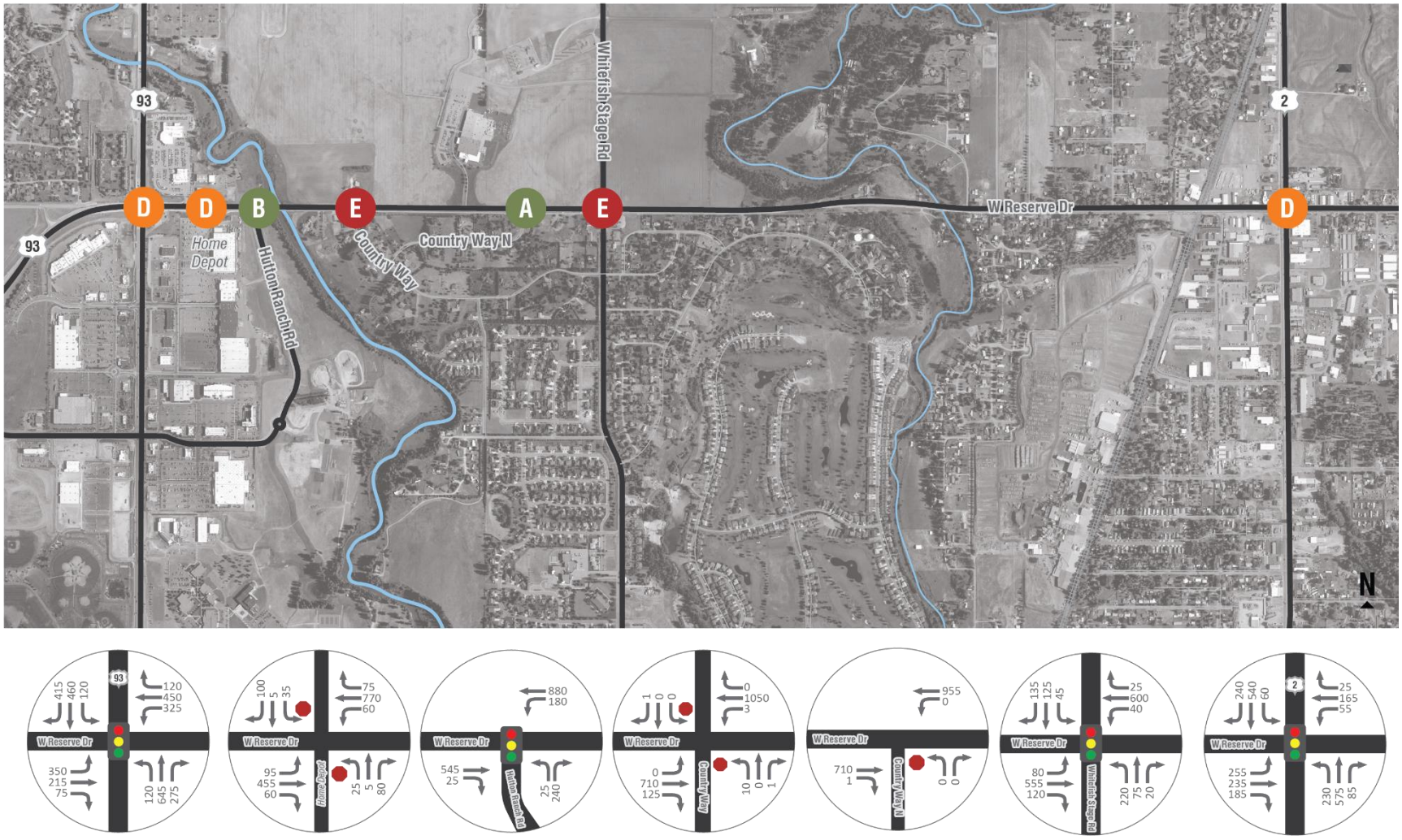

Figure 15: Existing PM Peak Hour Traffic Operations

4.7 2040 Projected Operations

Year 2040 traffic volumes were developed assuming a projected growth rate of 2.4% per year. As noted previously, this level of traffic growth could only be sustained if the corridor capacity is increased. Figure 16 and Figure 17 show the projected turning movements and LOS at study intersections in year 2040.

Table 11 shows the LOS and delay at each intersection, with the existing signal phasing and intersection laneage. Similar to the existing conditions, all results are reported based on the average of ten simulation runs. **Attachment 3** provides year 2040 operational analysis reports from SimTraffic.

Table 11: 2040 Peak Hour LOS and Delay (sec/veh)

Intersection	Control	AM Peak	PM Peak
W. Reserve Dr. / US 93	Signal	**F/>100**	**F/>100**
W. Reserve Dr. / Home Depot	TWSC	**F/>100**	**F/>100**
W. Reserve Dr. / Hutton Ranch Rd.	Signal	C/23	**F/>100**
W. Reserve Dr. / Country Way	TWSC	**F/>100**	**F/>100**
W. Reserve Dr. / Country Way N	TWSC	**F/>100**	**F/>100**
W. Reserve Dr. / Whitefish Stage Rd.	Signal	**F/>100**	**F/>100**
W. Reserve Dr. / US 2	Signal	**F/>100**	**F/>100**

*Delay reported for overall intersection at signalized intersections; Delay reported for critical movement at Two-Way Stop Controlled (TWSC) Intersections (side street lane with the highest delay).

With no capacity improvements, all intersections are expected to fail during the peak hours in 2040, except for Hutton Ranch Rd. in the AM peak hour. The delay reported assumes that signal timings have been optimized to accommodate forecasted traffic volumes.

4.8 Summary of Traffic Conditions

The corridor is currently operating near capacity with an AADT of over 18,300 vehicles per day on the west end. Two of the study intersections on the corridor are currently failing (LOS E) during the PM peak hour. The Whitefish Stage Rd. intersection experiences particularly high delay, developing long rolling eastbound queues during the PM peak hour. Over the last 20 years, traffic has grown at a rate of 2.4% per year on the corridor; this growth rate is consistent with other planning level studies and was used to forecast 2040 traffic volumes. In 2040, all seven study intersections are expected to fail during the PM peak hour.

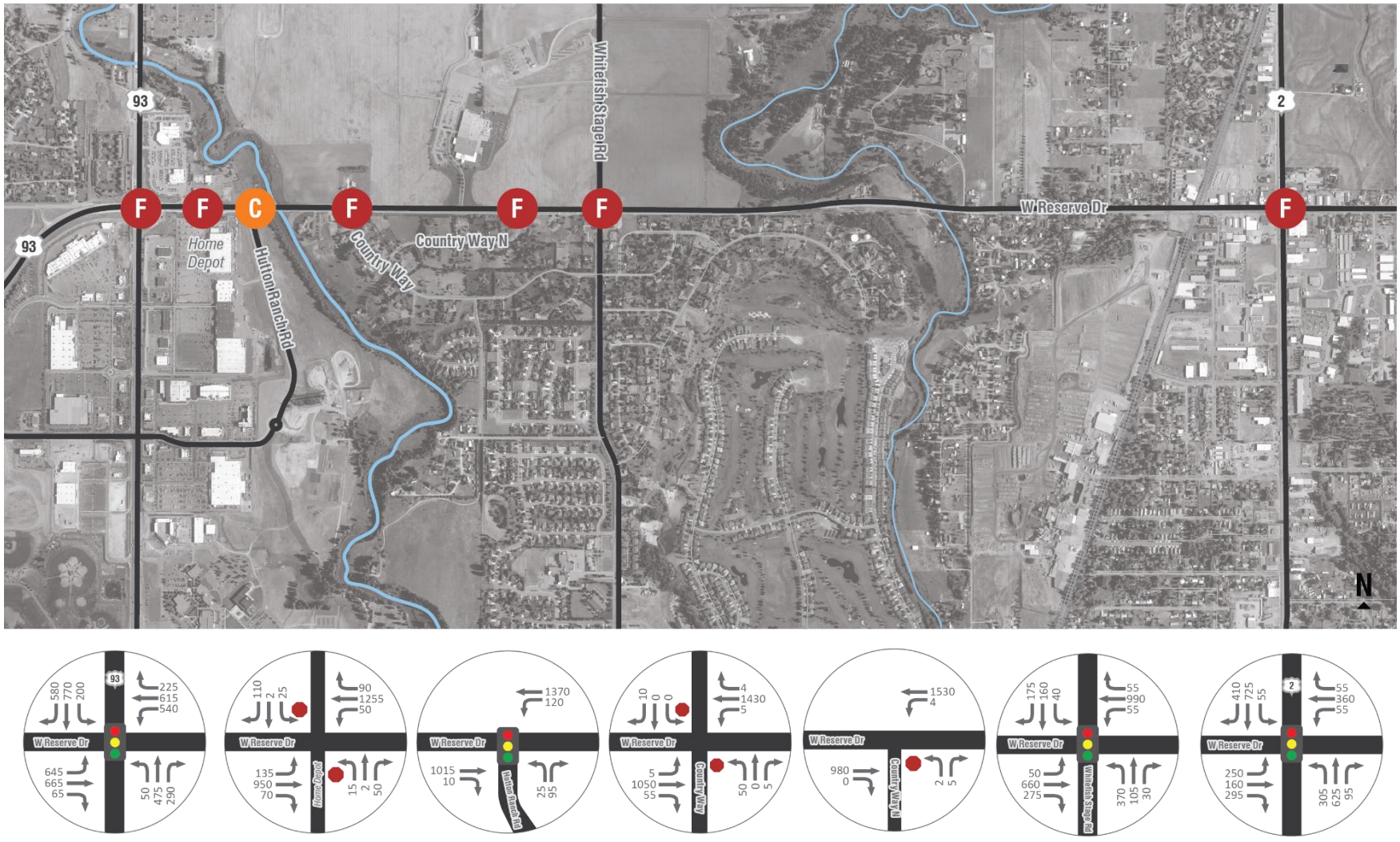

Figure 16: 2040 AM Peak Hour Traffic Operations

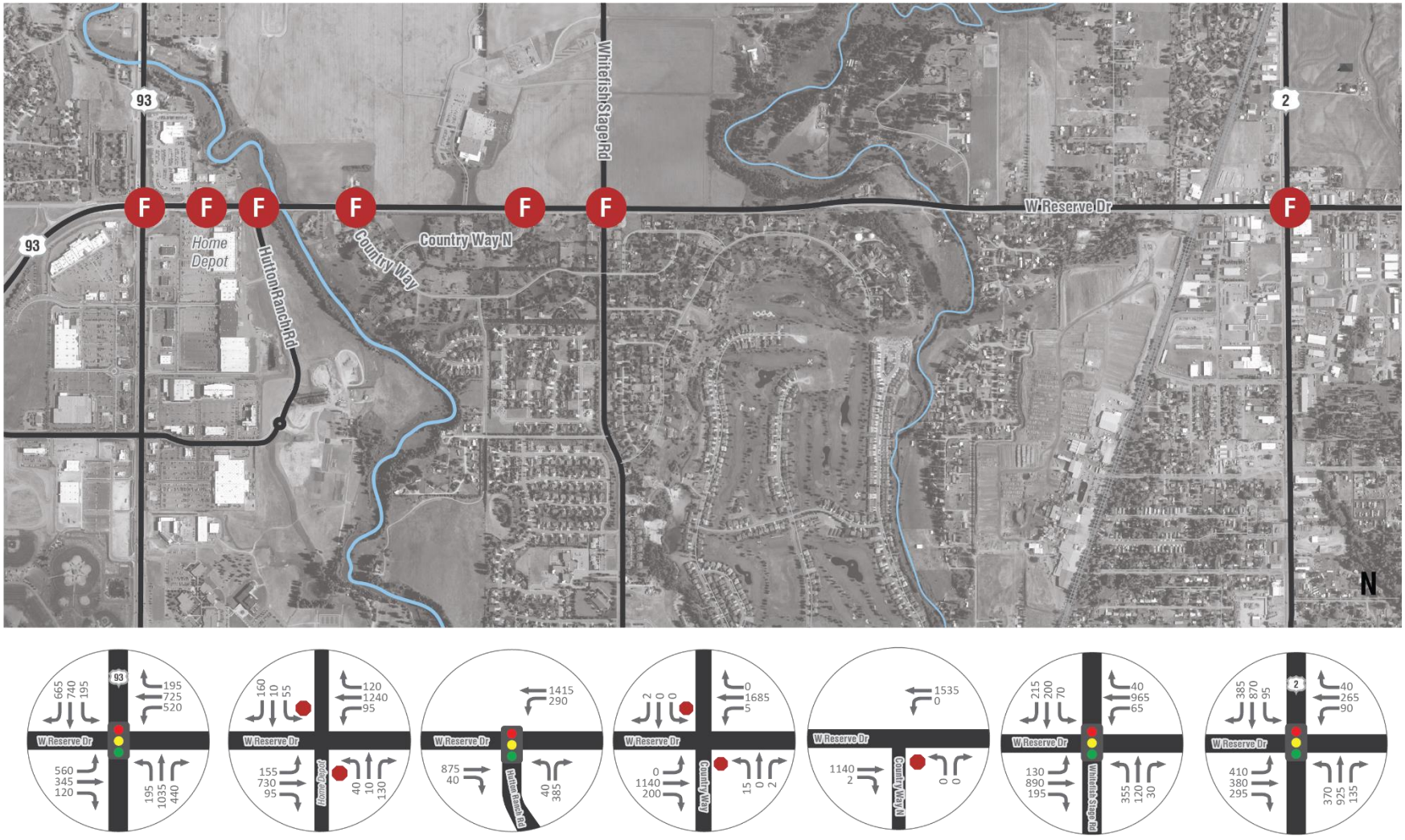

Figure 17: 2040 PM Peak Hour Traffic Operations

5.0 SAFETY

Ten years of crash data were analyzed along the study corridor (January 1st, 2010 to December 31st, 2019). A total of 725 crashes were reported over the ten years. It's important to note that that crash data is obtained from crash reports completed by police officers at the time of the crash. The data can be incomplete or inaccurate, as many crashes go unreported and the reporting of crash information can vary, depending on the reporting officer.

5.1 Corridor Crash Trends

Figure 18 shows the number of crashes per year on the corridor and the AADT on W. Reserve Dr. (based on the count site located west of Country Way). Crashes have nearly doubled on the corridor over the last ten years, while AADT has increased by about 16% over ten years. The increase in crashes can be attributed to recent development and increases in traffic congestion. The west end of the corridor has changed significantly over the last ten years, with the construction of the Hutton Ranch Rd. intersection completed in 2012 and the construction of the Kalispell Bypass completed in 2017, which increased traffic on the west leg of W. Reserve Dr. and US 93. These changes increased the number of turning movements on the corridor, thereby increasing the number of potential vehicle conflicts.

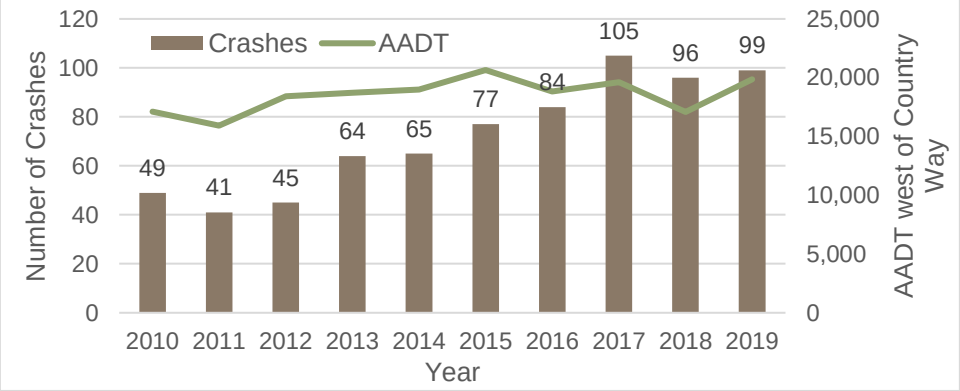

Figure 18: Crashes by Year

Figure 19 shows the crashes by time of day. Crashes occur most often during school release and the PM peak hour, with 38% of all crashes occurring from 3:00-6:00 pm. This period coincides with when the corridor experiences the heaviest traffic volumes and longest intersection delays.

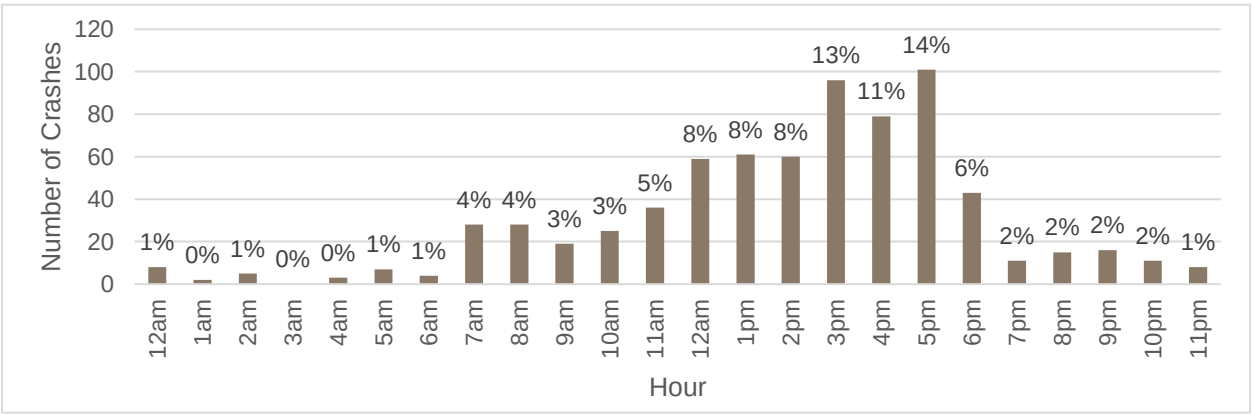

Figure 19: Crashes by Time of Day

When analyzed by day of week, crashes occurred more frequently Monday through Friday, with Friday having the highest number of crashes. This trend is attributed to the fact that traffic is higher on weekdays than weekends. No distinct trends were observed when crashes were analyzed by month; crashes were about evenly spread throughout the year.

5.2 Corridor Crash Locations

Figure 20 shows the density of crashes along the corridor and the location of serious injury crashes. The west end of the corridor has a much higher crash density than the east end. The suspected serious injury crashes generally occurred at the four signalized intersections. About 62% of crashes were intersection-related or occurred at intersections and approaches.

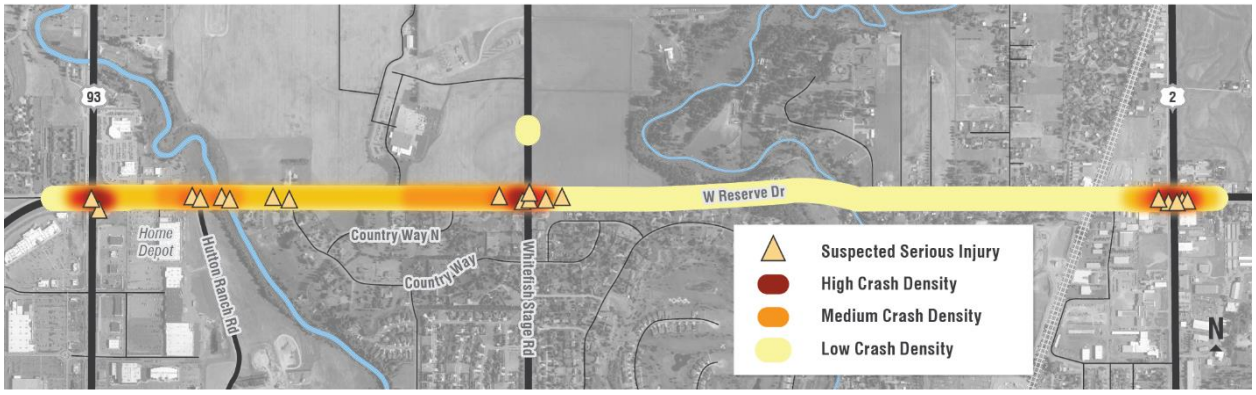

Figure 20: Crash Density

5.3 Corridor Crash Severity

Figure 21 shows the crash severity for all crashes on the corridor. About 68% of crashes were property damage only (PDO) and 31% of crashes resulted in injury. No fatal crashes occurred on the corridor over the ten-year period. Among the crashes that resulted in injury, 103 were categorized as possible injury crashes, 100 were categorized as minor injury crashes, and 23 categorized as serious injury crashes.

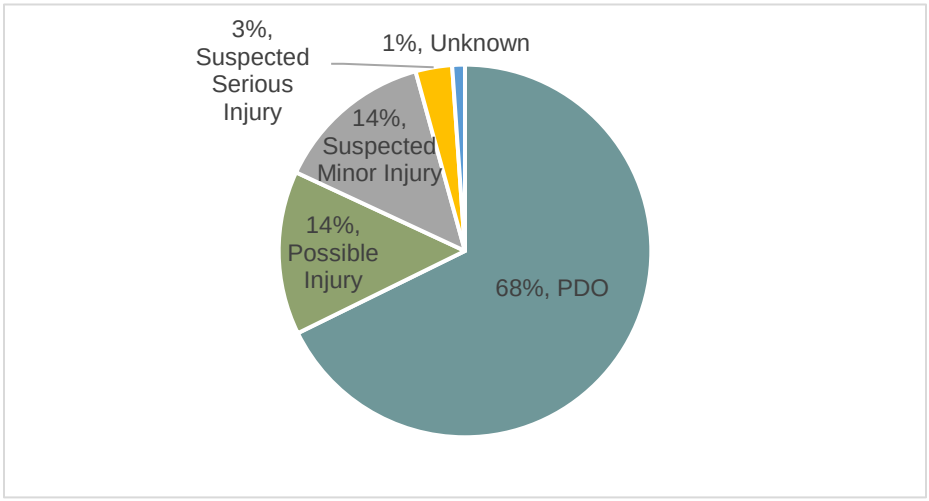

Figure 21: Crash Severity

5.4 Corridor Crash Types

Figure 22 summarizes the types of crashes occurring on the corridor. Rear end collisions made up about 58% of crashes. Right angle crashes were the second most common crash type, typically occurring at intersections. Of note, there were relatively few wildlife-vehicle collisions on the corridor (19 collisions over ten years). Two pedestrian crashes and two bicycle crashes occurred on the corridor over ten years. All bicycle and pedestrian crashes occurred on the east end of the corridor. The bicycle crashes occurred at Cooperative Way and Scenic Dr. intersections, while the pedestrian crashes occurred at the US 2 intersection and the approach just east of the US 2 intersection.

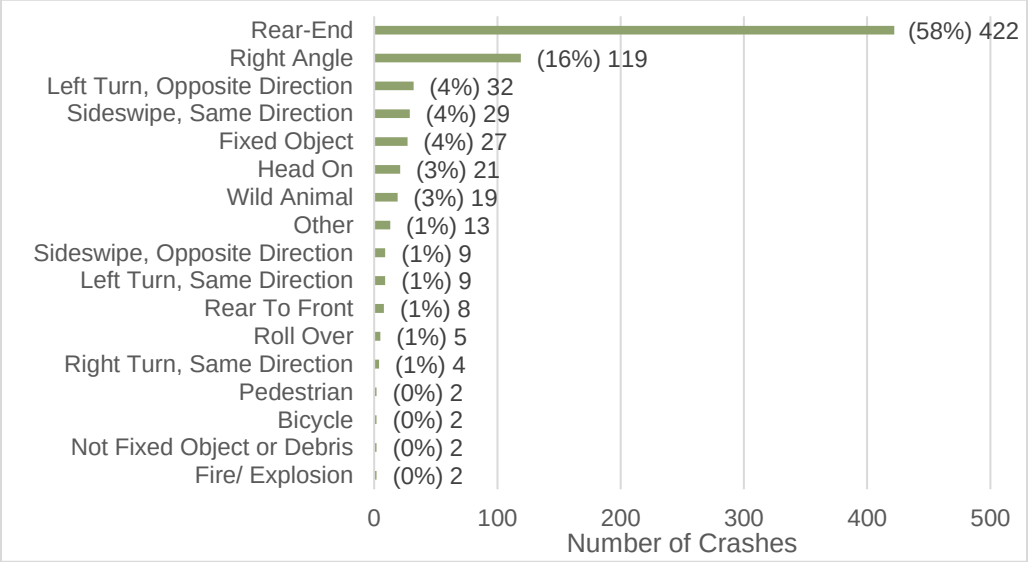

Figure 22: Crash Types

5.5 Corridor Road & Lighting Condition

Figure 23 shows the road condition and lighting condition during the crashes. About 30% of crashes occurred during wet, snowy, or icy road conditions. About 18% of crashes occurred during dawn, dusk, or dark conditions.

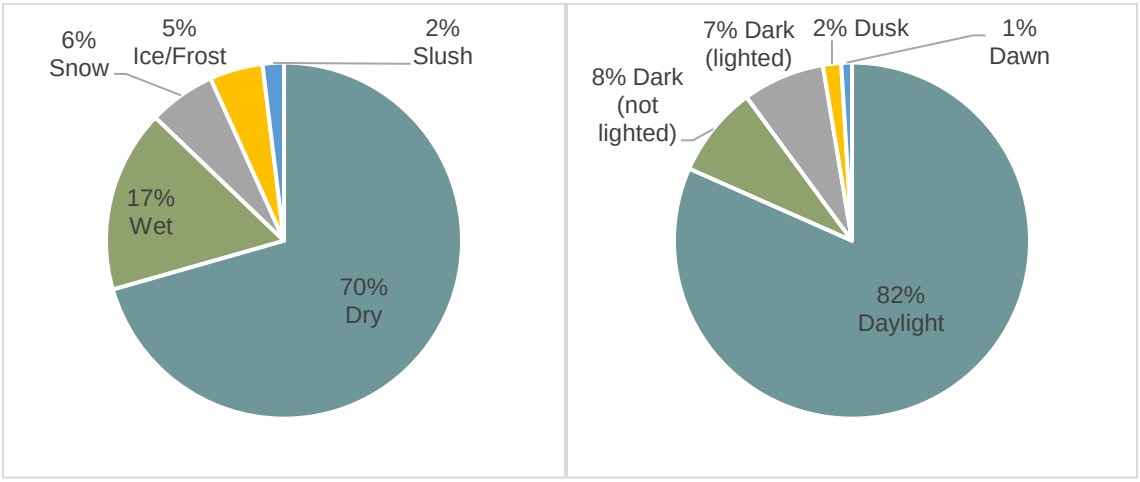

Figure 23: Road & Lighting Condition

5.6 Intersection Crash Severity

Table 12 shows the total number of crashes and the crash severity at each of the study intersections. Of note, the Home Depot intersection is not included because it is an approach and did not have crashes directly assigned to it. The Whitefish Stage Rd. intersection experienced the highest number of crashes, followed by US 93 and US 2.

Table 12: Crash Severity at Study Intersections

Intersection	PDO	Injury	Unknown	Fatal	Total
W. Reserve Dr. / US 93	63	30	0	0	93
W. Reserve Dr. / Hutton Ranch Rd.	40	14	1	0	55
W. Reserve Dr. / Country Way	8	5	0	0	13
W. Reserve Dr. / Country Way N	8	6	0	0	14
W. Reserve Dr. / Whitefish Stage Rd.	73	39	2	0	114
W. Reserve Dr. / US 2	52	35	0	0	87

5.7 Intersection Crash Rates

Table 13 shows the crash rate at each study intersection, along with a weighted crash rate which accounts for crash severity. The crash rate provides more information than crash frequency alone, as it factors in the number of vehicles entering an intersection. This makes the crash rate an effective tool for comparing the relative safety of one intersection or segment to another. The crash rate equation is provided below. Intersection crash rate is the number of crashes occurring per million entering vehicles.

$$\textit{Intersection Crash Rate} = \frac{Total\ Number\ of\ Crashes * 1{,}000{,}000\ Vehicles}{Vehicles\ per\ Day * Number\ of\ Years * 365\ Days\ per\ Year}$$

To calculate the weighted crash rate, PDO crashes were weighted by a value of one, while injury crashes were weighted by a value of three.

Table 13: Crash Rates at Study Intersections

Intersection	Total Crashes	Vehicles per Day	Crash Rate	Weighted Crash Rate (by Crash Severity)
W. Reserve Dr. / US 93	93	38,467	0.66	1.09
W. Reserve Dr. / Hutton Ranch Rd.	55	22,247	0.68	1.02
W. Reserve Dr. / Country Way	13	19,778	0.18	0.32
W. Reserve Dr. / Country Way N	14	18,353	0.21	0.39
W. Reserve Dr. / Whitefish Stage Rd.	114	21,204	1.47	2.48
W. Reserve Dr. / US 2	87	26,286	0.91	1.64

*Vehicles per day estimated at Country Way and Country Way North, assuming the peak hour volume is equal to approximately 10% of the daily traffic volume.

The raw crash rate and weighted crash rates are significantly higher at the Whitefish Stage Rd. intersection, compared to all other study intersections. The US 2 has the second highest crash rate, followed by US 93 and Hutton Ranch Rd.

5.8 Intersection Crash Types

Table 14 shows the breakdown of crash types at each of the study intersections. Rear end crashes are the most common crash type, followed by right angle crashes. Of note, most of the right-angle crashes at signalized intersections were attributed to red light running or failure to yield right of way.

Table 14: Crash Types at Study Intersections

Intersection	Rear End	Right Angle	Left Turn		Side Swipe		Head On	Other	Total
			Same Dir	Opp Dir	Same Dir	Opp Dir			
W. Reserve Dr. / US 93	46	26	2	5	3	4	1	6	93
W. Reserve Dr. / Hutton Ranch Rd.	48	2	0	0	3	0	0	2	55
W. Reserve Dr. / Country Way	9	3	0	0	0	0	1	0	13
W. Reserve Dr. / Country Way N	13	0	0	0	1	0	0	0	14
W. Reserve Dr. / Whitefish Stage Rd.	88	17	1	2	2	1	3	0	114
W. Reserve Dr. / US 2	42	17	2	7	7	1	5	6	87

5.9 Summary of Safety Analysis

Crashes on the corridor have nearly doubled over the last ten years. This increase is partially attributed to recent development on the west end of the corridor study area (construction of the Hutton Ranch Rd. intersection in 2012 and construction of the Kalispell Bypass in 2017). These changes increased the number of turning movements and number of potential vehicle conflicts on the corridor. Increased congestion has also influenced corridor crashes. The Whitefish Stage Rd. intersection experiences both the highest delay/congestion and the highest crash rate. Most crashes at this intersection are rear-end collisions attributed to congested traffic conditions.

6.0 PHYSICAL ENVIRONMENT

The following sections provide an overview of the physical environment within the study corridor area.

6.1 Land Ownership and Land Use

W. Reserve Dr. and Whitefish Stage Rd. are within MDT and Flathead County right-of-way. A large Montana State Trust Land parcel is located at the southwest quadrant of the W. Reserve Dr. and US 93 intersection. The remainder of the study corridor area is owned by private landowners. Lands within and adjacent to the study corridor area are primarily used for residential and commercial uses and crop production. The privately-owned Village Greens Golf Course and the Plum Creek Timber Mill are also located south of W. Reserve Dr.

Flathead County[10] zoning encompasses all, but the very western end, of the study corridor area. From US 93 to Whitefish Stage Rd., lands adjacent to W. Reserve Dr. are zoned as residential apartment, suburban residential, light industrial, two-family residential, and suburban agricultural. From Whitefish Stage Rd. to US 2, lands adjacent to W. Reserve Dr. are zoned as two-family residential, agricultural, one-family residential, suburban residential, suburban agricultural, light industrial, general business, and heavy industrial. Lands adjacent to Whitefish Stage Rd. are zoned as two-family residential, agricultural, one-family residential, suburban residential, and suburban agricultural. City of Kalispell Zoning[11] encompasses portions of the study corridor area near US 93. City zoning near US 93 include general business, general business with planned urban development, and industrial business with planned urban development.

Improvement options carried forward from this study will need to consider potential impacts to adjacent private landowners, as well as potential impacts to adjacent land use, should new right-of-way or easements on adjacent lands, new access points, or changes in access be required.

6.2 Soil Resources and Prime Farmland

The Farmland Protection Policy Act (FPPA) (7 U.S.C. 4201 et. seq.) is intended "to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that federal programs are administered in a manner that, to the extent practicable, are compatible with State, unit of local government, and private programs and policies to protect farmland." The term "farmland" refers to prime farmland; some prime if irrigated farmland; unique farmland; and farmland, other than prime or unique farmland, that is of statewide importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land. However, projects that occur on farmland already in urban development or committed to urban development or are used for water storage are not subject to FPPA.

Soil surveys, which provide data on land classifications, including farmland, are available from the Natural Resources Conservation Service[12] (NRCS). Within the study corridor area limits, approximately 78 acres (41.2 percent) of land are classified as prime farmland if irrigated, and 0.2 acre (0.1 percent) of land within the study corridor area limits is classified as farmland of statewide importance. The remainder of soils within the study corridor area are not classified as prime or unique farmland. Of the 78.02 acres classified as either prime farmland or farmland of statewide importance, only 8.8 acres are committed (zoned) to agricultural or suburban agriculture. The remaining acreage has already been developed or is zoned for future non-agricultural use. Improvement options carried forward from this study, that become federally funded projects, must consider impacts to farmland and farmland infrastructure, and potential effects if farmland is permanently removed from production or converted to non-agricultural uses. Coordination with the NRCS is required to determine the necessary NRCS processing requirements. Projects planned and completed without the assistance of a federal agency are not subject to the FPPA.

6.3 Geological Resources and Hazards

The study corridor area is located within the Upper Flathead Valley to the north of Flathead Lake. Bedrock in the area is Precambrian bedrock (>1 billion-year old Belt Supergroup rock), with depth to bedrock ranging from just a few feet to over 500 feet. The valley is filled with thick sequences of geologically young, unconsolidated glacial or glacial-lake deposits, and post-glacial alluvial sediments. The study corridor area is primarily mapped as Quaternary Glacial Deposits that consist of glacial drift (Qg) and glacial lake deposits (Qgl). The eastern portion of the study corridor area is mapped as Quaternary Alluvium (Qal), which includes alluvium- gravel, sand, silt, and clay deposits likely associated with the Flathead River[13].

The study corridor area is located within the Intermountain Seismic Belt. While there are no active faults mapped within the study corridor area, a 1.7 magnitude earthquake was documented south of W. Reserve Dr., near the Stillwater River, in 2018. In addition, the study corridor area is located within a Seismic Hazard Zone that is more likely to experience significant ground shaking[14]. A review of the MDT Rock Slope Asset Management Program database did not identify any sites within the study area that were identified as potential hazards.

Improvement options carried forward from this study that involve new construction, reconstruction or other substantial improvements will require geotechnical investigations to determine potential stability, erosion, and settlement concerns posed by surface geology and soil conditions.

6.4 Hazardous Substances

The most current database information on existing hazardous sites within Flathead County was provided by Montana Department of Environmental Quality (MDEQ), United States Environmental Protection Agency[15] (USEPA), the Montana Bureau of Mines and Geology (MBMG) database, and the National Pipeline Mapping System[16]. The following summarizes potential hazardous sites within the study area corridor. Additional investigation regarding locations of hazardous sites and potential contaminated soils may be warranted if improvement options are forwarded from this study.

National Priority List (Superfund) Sites

No National Priority List Superfund sites exist in or near the study area.

Remediation Response Sites

There is one remediation response/hazardous waste release site within the study corridor area. The Semitool, Inc site is a MDEQ listed site where unpermitted releases of hazardous materials occurred. The site is maintained by the state superfund unit; however, the MDEQ site report does not indicate whether the site is active or inactive, and it has no information other than to state that a notice letter, regarding a compliant-class V injection well, was issued on June 25, 1993. MDEQ shows the site south of W. Reserve Dr. on Whitefish State Rd.; however, the address for the facility is 655 W. Reserve Dr., which places it north of W. Reserve Dr. at the same location as the current Applied Materials facility. USEPA also lists the Semitool, Inc site as a Resource Conservation and Recovery Act (RCRA) site but shows it as an inactive site located at 655 W. Reserve Dr.

Hazardous Waste Generators

There are three hazardous waste generators within or near the study corridor area. Applied Materials is a MDEQ listed large quantity generator located north of the study corridor area, with its entrance at 655 W. Reserve Dr. Hazardous wastes generated at this site include lead, silver, methyl ethyl ketone, tetrachloroethylene, arsenic, barium, chromium, and a number of spent halogenated and nonhalogenated solvents. Home Depot is a MDEQ listed small quantity generator located south of W. Reserve Dr. at 2455 US 93 N. Hazardous wastes generated at this site include lead, methyl ethyl ketone, tetrachloroethylene, benzene, barium, and chromium. Steel Reality Manufacturing is a plastic fabrication company located north of the study corridor area on Scenic Drive. The site is listed on the USEPA RCRA Facilities database; however, no information on the site is provided.

Underground Storage Tanks

There are 15 active regulated underground storage tanks (USTs) and 5 closed USTs within the study corridor area. The active tanks are located at Zip Trip 41 (RP 4.0), Town Pump Kalispell #7 (RP 4.1), and Town Pump Kalispell #3 (US 2 Intersection). The closed USTs are documented at the former Village Mart Kalispell, located at the intersection of W. Reserve Dr. and Whitefish Stage Rd. (RP 5.0); Robert M Rechtsteiner property, located at 105 W. Reserve Dr. (RP 6.0); Tri City Lumber, Inc., located at 41 W. Reserve Dr. (RP 6.3); Lilienthal and Schuman Insulation, located at 22 W. Reserve Dr. (RP 6.4); and Tri City Quick Stop.

Petroleum-Tank Releases

Several petroleum-tank releases have occurred within or adjacent to the study corridor area. All of the releases had claims for assistance from the Petroleum Tank Release Compensation Board and Cleanup Fund, except for one identified leaking underground storage tank (LUST). All petroleum tank releases have been resolved. The LUST sites are documented at Village Mart Kalispell (Facility ID #15-02334), located at the intersection of W. Reserve Dr. and Whitefish Stage Rd. (RP 5.0);

Robert M Rechtsteiner (Facility ID #15-11654), located at 105 W. Reserve Dr. (RP 6.0); and Tri City Quick Stop (Facility ID #15-07490), located at the northwest corner of the W. Reserve Dr. and US 2 intersection.

Landfills

There are no active landfills within the study corridor area.

Pipelines

Two natural gas pipelines cross the study corridor area. A primary natural gas pipeline, owned by Northwestern Energy, crosses W. Reserve Dr. at RP 5.8. A smaller natural gas pipeline spurs off the primary pipeline and parallels W. Reserve Dr. to the north. This tap line, called the Kalispell City Gate 2 tap line, crosses under the Whitefish River and then crosses under W. Reserve Dr. at RP 5.7, where it extends 0.2 mile along the south side of W. Reserve Dr. before connecting into a large residential development.

Abandoned and Inactive Mine Sites

No mining prospects or abandoned/inactive mines are located within or near the study corridor area.

Open Cut Permits

No permitted open cut mine sites are located within or near the study corridor area. Schellinger Construction Company does operate an open cut mine north of the study limits on Whitefish Stage Rd.

6.5 Air Quality

The Kalispell area has been designated a nonattainment area for PM_{10}[17]. The eastern portion of the study corridor area from Whitefish Stage Rd. to US 2 is within the designated limits of the PM_{10} nonattainment area. In addition, an area of concern for carbon monoxide has been designated within the Kalispell area. An area of concern is an area that has not been legally designated as a nonattainment area. The Kalispell area of concern for carbon monoxide includes a delineated core area centered around downtown Kalispell and a broader study area limit in which the pollutant is being recorded and reviewed. The W. Reserve Dr. corridor area is found within the designated study limits for the carbon monoxide area of concern.

Transportation conformity is required by the Clean Air Act to ensure that federal funding and approval are given to transportation projects that are consistent with the air quality goals established by a State Implementation Plan (SIP). Conformity to the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of NAAQS. Improvement options carried forward from this study will need to examine the current air quality status and determine if a project is subject to conformity requirements. In addition, depending on the scope of improvements being considered within the study corridor area, an evaluation of mobile source air toxics (MSATs) may be required.

6.6 Surface Waters

The study corridor area is found almost entirely within the delineated Stillwater River (Flathead River) Watershed (hydrologic unit code [HUC] 17010210), which is divided into two sub watersheds. The western half of the study corridor area lies within the Lower Stillwater River Sub Watershed (HUC 1701021004). The eastern half of the study corridor area lies within the Whitefish River Sub Watershed (HUC 1701021005). The last 200 feet of the study corridor area on W. Reserve Dr. are

found within the Flathead River – Columbia Fall Sub Watershed of the greater Flathead Lake Watershed (HUC 1701021005). Within the study corridor area, W. Reserve Dr. crosses two primary waterways via bridges: the Stillwater River at RP 4.28 and the Whitefish River at RP 5.74. Three, small unnamed intermittent drainages are also shown on topographic maps as crossing W. Reserve Dr. at RP 4.02, RP 4.92, and RP 6.04. These intermittent drainages are not very apparent and have likely been graded or realigned due to development in the area.

Bridge reconstruction or replacement, placement of fill, or bank stabilization may impact surface waters. Coordination with federal, state, and local agencies, including United States Army Corps of Engineers (USACE) and Montana Fish, Wildlife & Parks (FWP), will be necessary to determine appropriate permits based on the improvement options forwarded from this study. Impacts must be avoided and minimized to the maximum extent practicable.

6.6.1 Water Quality

The Stillwater River and the Whitefish River, within the study corridor area, are listed as impaired waterways, with both listed as not fully supporting aquatic life beneficial uses[18, 19]. Total Maximum Daily Loads (TMDLs) are required to address these waterway impairments. The study corridor area is located within the Flathead-Stillwater TMDL Planning Area. Stillwater River is listed as Category 4(A), meaning all TMDLs are approved and implemented. Whitefish River is listed as Category 5, which indicates at least one designated use is not being supported or is threatened, and a TMDL is needed. The published TMDL for any listed cause of impairment within the Stillwater and Whitefish Rivers, and potential impacts to water quality, must be considered for any projects brought forward from this corridor study.

On non-tribal lands in Montana, stormwater management is regulated by MDEQ through MPDES and provides coverage for storm water discharges through the MPDES Stormwater Construction General Permit. The applicability of the MPDES permit would need to be reviewed for any projects brought forward from the corridor study.

Small MS4s for incorporated cities in Montana with a population of at least 10,000 people are regulated under MPDES General Permit MTR040000. MS4s are required to apply for, and obtain, authorization for the discharge of storm water into state waters per requirements of the General Permit. The city of Kalispell is a designated MS4; however, W. Reserve Dr. and Whitefish Stage Rd., within the study corridor area, primarily fall outside the currently designated MS4 boundary[20]. Future proposed annexation would incorporate lands west of the Whitefish River into the city and within a revised MS4 boundary. The applicability of Permanent Erosion and Sediment Control measures will need to be reviewed for any projects carried forward from the corridor study.

6.6.2 Wild and Scenic Rivers

In Montana, portions of the North, South, and Middle Forks of the Flathead River and portions of the Missouri River downstream of Fort Benton were designated by Congress in 1976 as wild, scenic, or recreational components of the National Wild and Scenic River System. In 2018, East Rosebud Creek was added to the System. None of these rivers are within or near the study corridor area.

6.7 Irrigation Features

Within the study corridor area several agricultural fields are located north of W. Reserve Dr. and along Whitefish Stage Rd. Maps from the Flathead County Montana Water Resources Survey (1965)[21], show no irrigation ditches, laterals, or canals within or adjacent to the study corridor area that can supply irrigation water to these fields. The survey does show individual pumps at the

Stillwater River and Whitefish River. MBMG Ground Water Information Center (GWIC) data also indicates several groundwater wells in the area are used primarily for irrigation. One central pivot and a large lateral move sprinkler irrigation system were identified in agricultural fields east of Whitefish Stage Rd. and north of W. Reserve Dr. An irrigation hydrant and vents are also located west of Whitefish Stage Rd. (approximately 1,365 feet north of W. Reserve Dr.). To help avoid or minimize impacts to agricultural operations, coordination with affected landowners is required if irrigation facilities, such as pumps, pivots or sprinkler systems, are affected by improvement options carried forward from this planning study.

6.8 Groundwater

The study corridor area lies above the Evergreen aquifer, which is a shallow, unconfined aquifer that sits atop low-permeability silt and clay. Well depths are generally around 25 feet and groundwater within the Evergreen aquifer flows south toward the confluence of the Whitefish and Flathead Rivers[22]. According to the GWIC, there are over 84 wells located within 0.25 miles of the study corridor area[23]. Approximately 70 percent of these wells were drilled to depths of less than 100 feet. Only 15 wells are located within the study corridor area. Well depths vary by individual location, but the drill depths in the study corridor area primarily range from 6 to 31 feet. Of the 15 wells, 10 are used for domestic use, 2 are used for industrial use, 2 are used for irrigation, and 1 is an unknown use. The two closest public water supply wells are 500 feet south and 700 feet north of W. Reserve Dr. These wells are located at a local business or within a neighborhood off of Country Way.

Evergreen Water and Sewer District is the only water and sewer district within the study corridor area. The district's water system provides 3,283 customers (3,130 domestic and 153 irrigation) with water. The Sewer District has 2,004 sewer customers[24]. Individual septic systems, however, appear to be prevalent within the study corridor area, with all parcels south of W. Reserve Dr., from the Stillwater River to the Whitefish River, and some parcels north of the roadway showing septic permits[25].

Impacts to groundwater, existing groundwater wells, and septic tanks must be considered for any improvement option carried forward from this study. Engineering and constructability constraints due to shallow groundwater must also be reviewed. Roadways can impact groundwater quality through contaminated stormwater that is conveyed off roadway surfaces or through contaminated particles from hydrocarbon combustion or weathering pavement that collects on soils and infiltrates to groundwater. Roadways can also impact groundwater recharge due to increases in impervious surfaces, which prevents infiltration or directs stormwater elsewhere. The study corridor area also includes several groundwater wells and septic tanks. Impacting one of these wells or tanks may be costly if replacement is required. In addition, shallow groundwater may require more expensive engineering practices and longer construction durations.

6.9 Floodplains and Floodways

Flood zones are geographic areas that Federal Emergency Management Agency (FEMA) has defined according to varying levels of flood risk. FEMA-issued flood insurance rate maps for Flathead County, Montana, indicate three flood zones within the study corridor area[26]. Flood Zone A (100-year floodplain with no depths or base flood elevations have been determined) is designated along the Stillwater River. Along W. Reserve Dr., the study corridor area crosses Flood Zone A from RP 4.26 to RP 4.3. Flood Zone AE (100-year floodplain with depths and base flood elevation provided) is designated along the Whitefish River. Along W. Reserve Dr., the study corridor area crosses Flood Zone AE from RP 5.6 to RP 5.8. All other areas within the study corridor area are designated at Flood Zone X (area of minimal flood hazard/ areas outside the 500-year flood).

In Flathead County, development activities in flood hazard areas are regulated under the Flathead County Floodplain and Floodway Management Regulations[27]. Improvement options that cross or encroach on delineated flood hazard areas must be evaluated, and coordination with the Flathead County floodplain administrator is required on design and potential permits.

6.10 Wetlands

United States Fish and Wildlife Service (USFWS) National Wetlands Inventory and Montana Natural Heritage Program (MTNHP) mapping for the study corridor area shows freshwater emergent wetlands and freshwater forested/shrub wetlands only along or near the Whitefish River. Field-based wetland delineations are required if improvement options are forwarded from the study that could potentially impact wetlands. Future improvements will need to incorporate project design features to avoid and minimize adverse impacts to wetlands to the maximum extent practicable. Unavoidable impacts to wetlands may require compensatory mitigation in accordance with USACE regulatory requirements and requirements of Executive Order 11990. State and federal permits may also be required to construct improvements within wetlands, including Clean Water Act (CWA) Section 404 authorization and CWA Section 401 certification.

7.0 BIOLOGICAL RESOURCES

The following provides information on the baseline biological environment within the study area corridor.

7.1 Vegetation

The study corridor area is located within the Flathead Valley ecoregion of the Northern Rockies. This ecoregion is comprised of a primarily treeless, intermontane landscape, underlain with Quaternary glacial outwash, till, lake sediments, and alluvium. Natural vegetation is primarily foothills prairie, with local land use dominated by agricultural, rural residential, suburban, commercial activity, and orchards. Within the study corridor area itself, the landscape has been heavily manipulated through agricultural practices and urban and residential development. Vegetation within the corridor is dominated by cultivated crops or landscape vegetation found on developed lands. Small pockets of native vegetation cross the study corridor area at the Stillwater River and Whitefish River, this primarily includes native riparian vegetation consisting of species such as black cottonwood, aspen, chokecherry, bur oak, green ash, dogwood, and willow.

7.1.1 Noxious Weeds

Both the state of Montana and Flathead County have established lists which designate specific weeds as priority noxious weeds. The Flathead County Noxious Weed List includes 10 priority weeds. These include baby's breath (*Gypsophila paniculata*), Russian thistle (*Salsosa trangus*), tumble mustard (*Sisymbrium altissimum*), white campion (*Silene latifolia*), musk thistle (*Carduus nutans*), creeping bellflower (*Campanula rapunculoides*), scentless chamomile (*Matricaria perforate*), absinth wormwood (*Artemisia absinthium*), noble yarrow (*Achillea nobilis*), and kochia (*Kochia scoparia*)[28]. A 2015 distribution and abundance inventory for Flathead County noted 34 noxious weeds present, with Canada thistle (*Cirsium arvense*), spotted knapweed (*Centaurea stoebe*), oxeye daisy (*Leucanthemum vulgare*), orange hawkweed (*Hieracium aurantiacum*), and cheatgrass (*Bromus tectorum*) comprising the most acreage. MTNHP indicates approximately 16 of these noxious weed species have been observed in the study corridor area and vicinity. If improvements are forwarded from the study, field reviews for noxious weeds will commence prior to any ground disturbance, and coordination with the Flathead County Weed District will occur. Proposed projects

will implement applicable best management practices, as outlined in the MDT Standard Specifications and the Flathead County Weed Management Plan.

7.2 General Wildlife Species

A majority of the study corridor area has been heavily disturbed by various agricultural practices and commercial and residential development. These changes to the landscape have negatively impacted the amount and quality of suitable wildlife habitat. Riparian areas along Stillwater River and Whitefish River bisect the study corridor area. These wooded corridors still possess specimens of native vegetation that was likely present in this area prior to its conversion to agriculture and urban/residential development. These are important corridors for wildlife moving from higher elevations down to the Flathead River valley.

7.2.1 Mammals

The MTNHP database indicates over 36 species of mammals have been recorded within the study corridor area and a 3-mile radius around the study corridor area. Most of these species tend to be generalist and can adapt to a wide range of environments and are more tolerant of human activities and land use changes. Some of these species include white-tailed deer, striped skunk, racoon, coyote, fox, deer mouse, and northern river otter. Montana Fish, Wildlife, and Parks (FWP) general and wintering distribution mapping for larger mammals shows the entire study corridor area and surrounding area provides general range for mule deer, moose, black bear, and mountain lion. The study corridor area and surrounding area provides general and winter range for white-tail deer.

MDT Maintenance Animal Incident Database includes recorded animal carcass collection data for the last 10 years. The data shows 13 animal carcasses were collected and documented along the study corridor area by MDT maintenance personnel. White-tail deer accounted for all but one of the carcasses collected along the study corridor area. Carcasses were distributed throughout the corridor but tended to be more concentrated near the Stillwater and Whitefish River crossings.

If improvement options are forwarded from the study, impacts to habitat and other wildlife mitigation strategies will be considered during the project development process. Carcass data must continue to be reviewed to identify possible wildlife accommodation opportunities near both river crossing. Additional coordination with FWP area wildlife biologists will be undertaken for local expertise in the study corridor area.

7.2.2 Birds

The MTNHP database indicates there are more than 272 species of birds documented with the potential to occur and nest in or near the study corridor area. These species include representative songbirds, birds of prey, waterfowl, owls, and shorebirds, including several listed as species of concern (SOC) or special status species. Many of these bird species are protected under the Migratory Bird Treaty Act (MBTA) and direct disturbance of a nest occupied with birds or eggs is prohibited under the law. Any improvements carried forward from this study will consider possible project constraints that may result from seasonal nesting of migratory birds.

7.2.3 Amphibians, Reptiles, and Invertebrates

According to the MTNHP database, amphibian and reptile species documented as occurring within the study corridor area and 3-mile vicinity include, but are not limited to, Columbia spotted frog, northern leopard frog, western toad, painted turtle, and terrestrial garter snake. Nearly 88 invertebrate species have also been observed in the area.

7.2.4 Fisheries

The Stillwater River and the Whitefish River are the two primary waterbodies that cross the study corridor area. FWP's FishMT database[29] shows both the Stillwater and the Whitefish Rivers as supporting a variety of Montana native and game fish species. These include brook trout, bull trout, lake trout, lake whitefish, largescale sucker, longnose sucker, mountain whitefish, northern pike, northern pike minnow, peamouth, rainbow trout, redside shiner, slimy sculpin, westslope cutthroat trout, and yellow perch. In-water work that may affect fish during construction and potential fish passage opportunities will be considered if a project is forwarded from this study. Permit conditions from regulatory and resource agencies may require incorporation of design measures to facilitate aquatic species passage.

7.3 Threatened and Endangered Species

The federal list of threatened and endangered species is maintained by the USFWS. Species on this list receive protection under the Endangered Species Act. Seven species have been listed within Flathead County. Of these listed species, grizzly bear, bull trout, and yellow-billed cuckoo have the potential to occur within the study corridor area. Both the Whitefish River and the Stillwater River connect to the Flathead River. There are no known fish barriers between the study corridor area and the Flathead River, allowing bull trout to migrate upstream, crossing the study corridor area. FWP fisheries data indicates bull trout occurrences in both rivers. Wooded riparian vegetation found along both the Stillwater and Whitefish Rivers may provide some stopover or foraging habitat for yellow-billed cuckoo. MTNHP lists yellow-billed cuckoo as a species with potential occurrence in the general area. The study corridor area is located within the known range for grizzly bear, and it is near the designated Northern Continental Divide Ecosystem for grizzly bear. MTNHP has recorded occurrences of grizzly bear within 3 miles of the study corridor area.

Any improvements forwarded from the corridor study must undergo review for compliance with the provisions of the ESA. Because the listing status of species and critical habitat can change over time, an up-to-date list of potentially affected federally listed species and designated critical habitat must be reviewed for any project carried forward from this study.

7.4 State Species of Concern and Special Status Species

Montana species of concern are native plants or native animals breeding in the state that are considered "at risk" due to declining population trends, threats to their habitats, and/or restricted distribution. Montana special status species are species that have some legal protections in place but are otherwise not Montana Species of Concern. According to MTNHP, 11 species of concern have documented occurrences within the study corridor area or within a 3-mile radius around the study corridor area. According to bald eagle nesting data provided by MTNHP, 16 bald eagle nests have been identified and surveyed within a 3-mile radius of the study corridor area since 1993. Fifteen of these nests are located along the Flathead River, over 3-miles to the east/southeast. One nest is located within 1-mile northwest of the study corridor area along the Stillwater River. Bald eagles are protected under the MBTA and the Bald and Golden Eagle Protection Act of 1940.

A review of the Montana Sage Grouse Habitat Conservation Map[30] shows the study corridor area is not within core, general, or connectivity habitat for sage grouse.

Should projects be carried forward from this corridor study, additional review of databases documenting SOC and special status species occurrences must be conducted, and an evaluation of habitats near proposed projects must be completed to determine suitability for SOC and special

status species. Measures to avoid or minimize impacts to these species and their habitat will be incorporated into project designs and implementation.

8.0 SOCIAL AND CULTURAL RESOURCES

The following presents an overview of the social and cultural environment within the study corridor.

8.1 Population Demographics and Economic Conditions

Under NEPA/MEPA, federal, state, and local agencies are directed to assess potential social and economic impacts anticipated from proposed actions. Improvement options carried forward from this study must consider impacts to neighborhoods and community cohesion, local and/or regional economies, as well as growth and development that may be induced by transportation improvements.

Kalispell is the largest urban area in Flathead County and one of the fastest growing areas in Montana. The Kalispell area has experienced significant growth and supports a relatively large portion of the county's consumption-based economic activity. Since the corridor is fully contained within Flathead County, demographic and economic conditions discussed in this section cover all of Flathead County.

The three primary industries in Flathead County are: 1) educational, healthcare, and social services; 2) arts, entertainment, recreation, accommodation/hospitality, and food services; and 3) retail trade. Figure 24 displays Flathead County's employment distribution by industry as compared to Montana and the United States. Flathead County has relatively more employment in the arts, entertainment, recreation, accommodation, and food services, and retail trade categories than Montana and the United States.

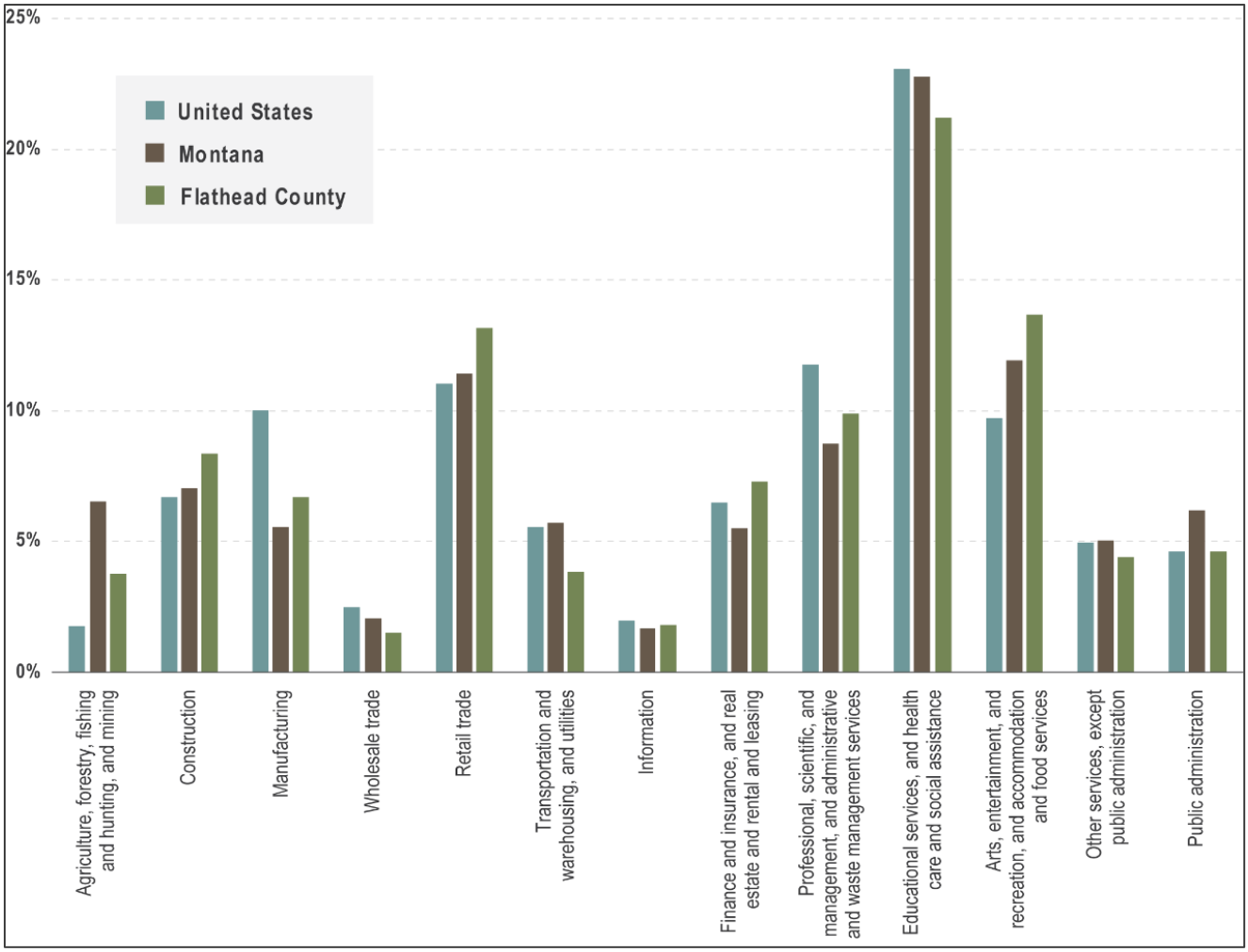

Figure 24. Employment Distribution by Industry

The number of employed civilians over the age of 16 in Flathead County is approximately 50,938. The unemployment rate in Flathead County is 1.7 percent as compared to 2.2 percent in Montana and 3.1 percent in the United States. The median household income in Flathead County is slightly lower than the median household income in Montana at $53,193 and $55,328, respectively. The median household income in the United States is $61,937. Figure 25 shows the income distribution of Flathead County as compared to Montana and the United States. Flathead County has a larger concentration of higher income households than the state, but relatively less than the United States at large. Flathead County is primarily different from both Montana and the United States in that it has higher concentrations of low to middle and very high-income households. Flathead County has relatively fewer households in the $75,000-$150,000 income categories relative to the United States and Montana. This suggests there is significant income stratification in the area, which is usually the case within areas that rely heavily on recreation-resort economies.

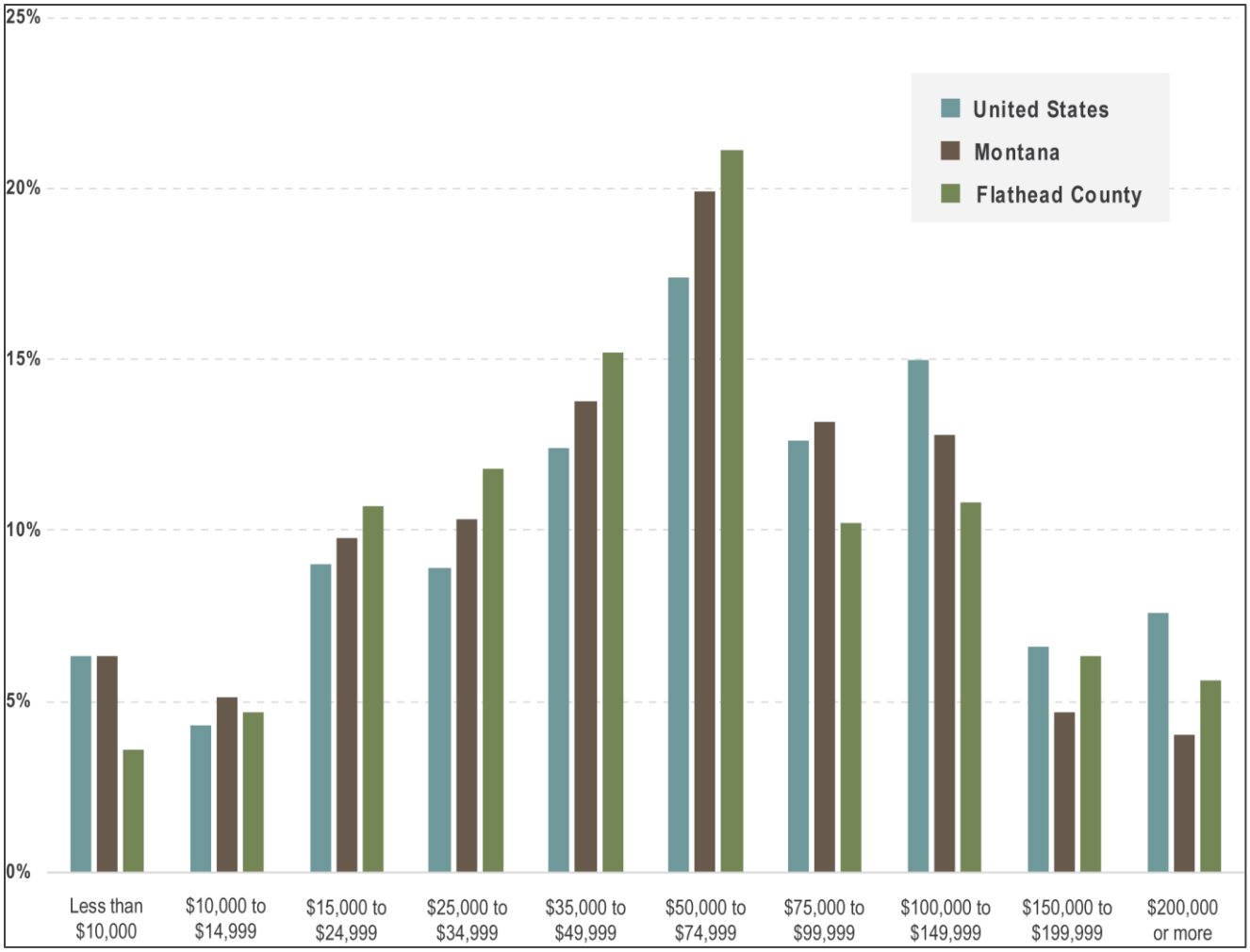

Figure 25. Income Distribution

Flathead County has a population of 102,106 which is about 10 percent of the 973,739 of individuals residing in Montana. Flathead County has a larger proportion of individuals who identify as white relative to the rest of the state and the United States as a whole. Flathead County has a smaller percentage of individuals who identify as Native Americans than Montana, but a larger percentage of its population is made up of Native Americans than the United States as a whole. Flathead County and Montana have very low numbers of individuals identifying as African American, relative to the United States. Flathead County has a larger proportion of individuals who identify as Asian than Montana, but less than the United States. Flathead County has a similar proportion of Hispanic people in its populations relative to Montana as a whole. Both Flathead County and Montana have a much lower proportion of Hispanic people than the United States.

Table 15. Population and Racial Makeup for Flathead County

	Flathead County	Montana	United States
2018 Population	102,106	973,739	303,965,272
Race			
White	94.4%	88.6%	72.2%
Black or African American	0.4%	0.5%	12.7%
American Indian or Alaskan Native	2.0%	6.4%	0.9%
Asian	1.3%	0.8%	5.6%
Native Hawaiian and other Pacific Islander	0.0%	0.1%	0.2%
Some Other Race	0.4%	0.5%	5.0%
Two or More Races	1.5%	3.1%	3.4%
Hispanic Population			
Hispanic or Latino	2.8%	3.9%	18.3%
Not Hispanic or Latino	97.2%	96.1%	81.7%

From 2010 to 2018, Flathead County grew at an average annual rate of 1 percent compared to 0.75 percent for Montana and 0.67 percent for the United States over the same period. The population is projected to grow over the next 20 years at a rate greater than Montana as a whole. The rate of growth is expected to increase in Montana and Flathead County in the future, but the increase is anticipated to be more significant in Flathead County. This is supported by both American Community Survey data and Kalispell's 2019 transportation plan update.

8.1.1 Environmental Justice

Title VI of the United States Civil Rights Act of 1964 prohibits recipients of federal financial assistance from discriminating based on race, color, or national origin in any program or activity. Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations – was issued in 1994 and directs that federal programs, policies, and activities do not have disproportionately high and adverse human health and environmental effects on minority and low-income populations.

The study corridor area is located in three Flathead County Census Tracts: Census Tract 6.01, Census Tract 7, and Census Tract 8. To determine potential low-income or minority populations within or near the study corridor area, American Community Survey data (2015-2019 5-Year Estimates)[31] at the Census Tract level was compared with the percentages of corresponding county and state occurrences. For people living below the poverty line, both Census Tracts 6.01 and 8 had percentages below Flathead County and state of Montana. Census Tract 7 had a slightly higher percentage than Flathead County and was lower than the state of Montana percentage. Based on the data evaluated, no relative concentrations of residents living below the poverty level were identified. Populations of Black or African America, Native American, Asian, Native Hawaiian or Pacific Islander, and Other Race for all three Census Tracts were consistent or lower than percentages for Flathead County and state of Montana. The only notable difference was Hispanic or Latino and Other Race populations for Census Tract 7. These percentage were higher compared to Flathead County and state of Montana percentages. However, this percentage is likely not meaningfully higher than the percentages for the comparison populations and is likely not great enough to indicate a relative population concentration.

The USEPA EJSCREEN report prepared for this study, indicates that minority and/or low-income populations are unlikely to be adversely affected by projects that may be forwarded from this study. The report indicates that most EJSCREEN environmental and demographic indicator values for the

study corridor area are below comparable values for the State of Montana, USEPA Region, and the Nation.

8.2 Recreational Resources

Land ownership within the study corridor area is primarily private, with land use dominated by agricultural, residential, and commercial/industrial development. Very few recreational resources are located within the study corridor area. W. Reserve Dr. does provide a direct connection to US 93 and US 2, which provide direct routes to Glacier National Park, Whitefish Lake, and Flathead Lake. Within the study corridor area, paved paths are maintained by MDT or Flathead County. These include a paved, 8-foot wide, shared use path that begins on the west side of the US 93 and W. Reserve Dr. intersection and a maintained asphalt path that starts at the southeast corner of the US 93 and W. Reserve Dr. intersection and extends souths along US 93. In addition, several sidewalks within the study corridor area, or that begin in the study corridor area, have been designated as city trails. All these paths and sidewalks are designated as part of the local transportation system. The privately-owned Village Greens Golf Course is located directly south of the study limits, with access to the golf course provided from Whitefish Stage Rd. The golf course is privately owned, but open to the public through payment of a daily greens fee.

8.3 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effects that a subject undertaking may have on eligible historic properties, determine methods to avoid and minimize or mitigate any adverse effects, and to consult with the State Historic Preservation Office (SHPO) or Tribal Historic Preservation Office regarding those effect determinations. In addition to the NHPA, federal directives, such as Section 4(f) of the US Department of Transportation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, and Montana directives, including the Montana Antiquities Act and the Montana Human Skeletal Remains and Burial Site Protection Act, outline requirements regarding effects of proposed undertakings on historic and archaeological resources and paleontological sites.

The Montana SHPO identified one site within the study corridor area. This site is the historic Great Northern Railroad (Site 24FH0350), which is eligible for listing on the National Register of Historic Places (NRHP) and crosses the study corridor area at RP 6.3. If improvement options are forwarded from this study, a cultural resources survey of the area of potential affect will be completed for unrecorded historic and archaeological properties. Potential direct and indirect effects to NRHP eligible properties within the area of potential effect will be considered under Section 106 of the NHPA.

8.4 Section 4(f) Resources

Section 4(f) of the U.S. Department of Transportation Act of 1966, was enacted to protect publicly-owned parks, recreation areas, wildlife and waterfowl refuges, and public and private historic sites of local, state, and national significance. Before approving a federally-funded project that uses a Section 4(f) property, FHWA must determine that there is no feasible and prudent alternative that avoids the Section 4(f) resource and that the project includes all possible planning to minimize harm; or, FHWA makes a finding that the project has a *de minimis* (minor) impact on the Section 4(f) property. Acquisition of new right-of-way is one type of use of a Section 4(f) property that will trigger a Section 4(f) review if publicly-owned resources or historic properties are present.

There are no publicly-owned parks, recreation areas, or wildlife and waterfowl refuges within the study corridor area. The recreational paths and trails identified within the study corridor area appear to all be associated with the local transportation system, and any impacts to these paths as part of an improvement option would not be considered a Section 4(f) use. The Great Northern Railroad grade, which crosses the study corridor area, is an historic site eligible for listing on the NRHP. If improvement options are forwarded from this study, potential direct and indirect effects to this site will be made under Section 106 of the NHPA. A Section 106 determination of "no adverse effect" or "no historic properties affected" would result in a *de minimis* impact. An "adverse effect" determination is a Section 4(f) use that triggers additional FHWA evaluation.

8.5 Section 6(f) Resources

The National Land and Water Conservation Fund (LWCF) Act, or Section 6(f), was enacted to preserve, develop, and assure the quality and quantity of outdoor recreation resources. Section 6(f) protection applies to all projects that impact recreational lands purchased or improved with LWCF funds. The Secretary of the Interior must approve any conversion of a LWCF property to a use other than public, outdoor recreation. No Section 6(f) resources were identified within the study corridor area.

8.6 Noise

Sensitive noise receptors within the study corridor area primarily include adjacent residential properties. These receptors are found from approximately RP 4.3 to RP 6.2 on the south side of W. Reserve Dr. and RP 5.8 to RP 6.2 on the north side of W. Reserve Dr. Improvement options carried forward from this study may require a noise analysis, consistent with MDT noise policies. Noise abatement measures will be considered if noise levels approach or substantially exceed noise abatement criteria.

8.7 Visual Resources

The study corridor area is characterized as primarily agricultural to the north, with mid- and high-density residential areas to the south, commercial and industrial areas primarily to the east and west, and the bisecting riparian corridors for Stillwater River and Whitefish River. Distant views of the Swan range are visible far to the east with the Salish Range far to the west. Potential projects carried forward from this study must consider effects on visual resources, particularly projects that may be located on a new alignment, involve expansion, or involve other changes that would alter the character of the existing landscape.

9.0 AREAS OF CONCERN AND CONSIDERATION

This section summarizes key areas of concern and consideration for the corridor, which were identified based on a comprehensive review of existing corridor conditions. The transportation system stands out as a key area of concern due to existing traffic congestion and delay issues at study intersections.

9.1 Demographics

9.1.1 Population and Economic Conditions

- The population of Kalispell has grown by more than 12 percent since 2010. The population is projected to incur increasing growth trends over the next 20 years.
- Flathead County is primarily different from both Montana and the United States in that it has higher concentrations of low to middle and very high-income households. This indicates the area is a recreation-resort community.
- The EJSCREEN report prepared for this study indicates that minority and/or low-income populations are unlikely to be adversely affected by projects that may be forwarded from this study.

9.2 Transportation System

9.2.1 Physical Features and Characteristics

- Access density is highest on the east end of the corridor, where there are numerous residential and commercial properties with direct access to W. Reserve Dr. The corridor speed limit also decreases from 45 to 40 mph on the east end.
- Sidewalk coverage is incomplete. Sidewalk exists on the both sides of the corridor from US 93 to the Stillwater Bridge. However, sidewalk only exists on the south side of West Reserve, from the Stillwater Bridge to the Whitefish River Bridge. Just east of the Whitefish River Bridge, the sidewalk moves from the south side to the north side of West Reserve, continuing there until the US 2 intersection.
- The pavement condition on the west end of the corridor (RP 4.44 to 5.11) is rated on the low end of fair, while the pavement condition on the east end (RP 5.11 to 6.48) is rated as poor. The pavement condition on Whitefish Stage Road (RP 0.14 to 2.57) is rated as fair.

9.2.2 Geometric Conditions

- For most of the corridor extents, the roadway has a three-lane cross section, with one travel lane in each direction and a center TWLTL. The existing three-lane cross section has a roadway width of 41 feet with curb and gutter on both sides of the roadway.
- The horizontal alignment is relatively straight with three curves. The existing horizontal alignment complies with current geometric design standards. The vertical alignment is generally flat and in compliance with current geometric standards with one exception. The grade from the existing bench to the bridge crossing the Whitefish River just exceeds the maximum grade for level terrain.

9.2.3 Traffic Conditions

- The corridor is currently operating near capacity with an AADT of over 18,300 vehicles per day on the west end. Two of the study intersections on the corridor are currently failing (LOS E) during the PM peak hour. The Whitefish Stage Rd. intersection experiences particularly high delay, developing long rolling eastbound queues during the PM peak hour.
- Over the last 20 years, traffic has grown at a rate of 2.4% per year on the corridor; this growth rate is consistent with other planning level studies and was used to forecast 2040 traffic volumes. In 2040, all seven study intersections are expected to fail during the PM peak hour.

9.2.4 Safety

- Crashes on the corridor have nearly doubled over the last ten years. This increase is partially attributed to recent development on the west end (construction of the Hutton Ranch Rd. intersection in 2012 and construction of the Kalispell Bypass in 2017). These changes increased the number of turning movements and number of potential vehicle conflicts on the corridor.
- Increased congestion has also influenced corridor crashes. The Whitefish Stage Rd. intersection experiences both the highest delay/congestion and the highest crash rate. Most crashes at this intersection are rear-end collisions attributed to congested traffic conditions.

9.3 Physical Environment

9.3.1 Farmland

- Approximately 78 acres (41.2 percent) of land are classified as prime farmland if irrigated, and 0.2 acre (0.1 percent) of land within the study corridor area limits is classified as farmland of statewide importance. Of the 78.02 acres classified as either prime farmland or farmland of statewide importance, only 8.8 acres are committed (zoned) to agricultural or suburban agriculture. The remaining acreage has already been developed or is zoned for future non-agricultural use. Improvement options carried forward from this study, that become federally funded projects, must consider impacts to farmland and farmland infrastructure, and potential effects if farmland is permanently removed from production or converted to non-agricultural uses.

9.3.2 Surface Waters

- Within the study corridor area, W. Reserve Dr. crosses two primary waterways via bridges: the Stillwater River at RP 4.28 and the Whitefish River at RP 5.74. Bridge reconstruction or replacement, placement of fill, or bank stabilization may impact surface waters and requiring permitting under CWA Section 404 and Stream Protection Act 124.
- The published TMDL for any listed cause of impairment must also be considered within the Stillwater and Whitefish Rivers and potential impacts to water quality.
- Future city annexation will modify the MS4 boundary, with the study corridor area west of the Whitefish River falling under MS4 permit requirements.

9.3.3 Floodplains

- Flood Zone A and Flood Zone AE are designated along the Stillwater River and Whitefish River. Improvement options that cross or encroach on delineated flood hazard areas must be evaluated, and coordination with the Flathead County floodplain administrator is required on design and potential permits.

9.3.4 Wetlands

- Freshwater emergent wetlands and freshwater forested/shrub wetlands were preliminary mapped along or near the Whitefish River. Field-based wetland delineations are required if improvement options are forwarded from the study that could potentially impact wetlands. Future improvements will need to incorporate project design features to avoid and minimize adverse impacts to wetlands to the maximum extent practicable.

9.3.5 Threatened and Endangered Species

- Bull trout have been documented within both the Stillwater River and the Whitefish River. Improvement options carried from this study will need to consider impacts to this species, particularly if bridge improvements are considered.

9.3.6 Cultural Resources

- The historic Great Northern Railroad (Site 24FH0350), which is eligible for listing on the NRHP crosses the study corridor area at RP 6.3. If improvement options are forwarded from this study, a cultural resources survey of the area of potential affect will need to be completed for unrecorded historic and archaeological properties and potential direct and indirect effects to NRHP eligible properties considered as required under Section 106 of the NHPA.

9.3.7 Noise

- Several sensitive noise receptors are found in the study corridor area from approximately RP 4.3 to RP 6.2 on the south side of W. Reserve Dr. and RP 5.8 to RP 6.2 on the north side of W. Reserve Dr. Improvement options carried forward from this study may require a noise analysis, consistent with MDT noise policies. Noise abatement measures will be considered if noise levels approach or substantially exceed noise abatement criteria.

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ATTACHMENT 1: TRAFFIC COUNT DATA

Turning Movement Count

W Reserve Dr & US 93

Total Vehicles (15-Minute Periods)

AM Peak Hour

Thursday, September 6, 2018

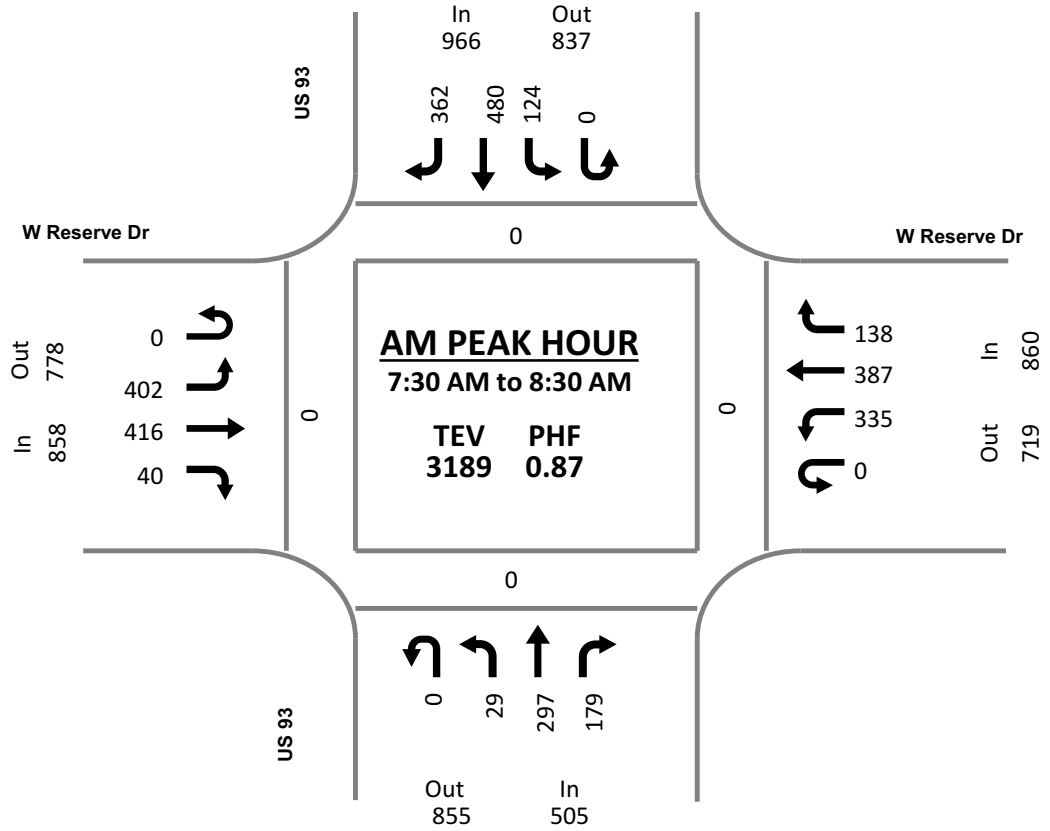
7:00 AM to 9:00 AM

Start Time	US 93 (Northbound)					US 93 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	9	45	20	0	0	16	65	51	0	0	55	43	9	0	0	49	46	30	0	438
7:15 AM	0	4	48	26	0	0	20	81	69	0	1	79	73	8	0	0	66	74	17	0	566
7:30 AM	0	8	88	42	0	0	34	101	106	0	0	107	101	12	0	0	98	94	26	0	817
7:45 AM	0	7	75	44	0	0	27	146	108	0	0	110	131	14	0	0	82	139	34	0	917
8:00 AM	0	6	65	51	0	0	33	121	84	0	0	90	108	10	0	0	79	96	31	0	774
8:15 AM	0	8	69	42	0	0	30	112	64	0	0	95	76	4	0	0	76	58	47	0	681
8:30 AM	0	13	65	49	0	0	35	127	56	0	0	75	44	12	0	0	97	68	38	0	679
8:45 AM	0	16	84	45	0	0	31	138	65	0	0	64	51	10	0	0	80	57	32	0	673
Total	0	71	539	319	0	0	226	891	603	0	1	675	627	79	0	0	627	632	255	0	5,545

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
7:30 AM to 8:30 AM

Data Type	US 93 (Northbound)					US 93 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	29	297	179	0	0	124	480	362	0	0	402	416	40	0	0	335	387	138	0	3189
%HV	0.0%	3.4%	3.4%	2.2%		0.0%	11.3%	0.8%	4.4%		0.0%	4.0%	3.8%	0.0%		0.0%	2.4%	8.0%	18.1%		4.5%
PHF	0.00	0.91	0.84	0.88	0.00	0.00	0.91	0.82	0.84	0.00	0.00	0.91	0.79	0.71	0.00	0.00	0.85	0.70	0.73	0.00	0.87
Volume			505					966					858					860			3189
%HV			3.0%					3.5%					3.7%					7.4%			4.5%
PHF			0.91					0.86					0.84					0.84			0.87



Turning Movement Count

W Reserve Dr & US 93

Total Vehicles (15-Minute Periods)

PM Peak Hour

Thursday, September 6, 2018

4:00 PM to 6:00 PM

Start Time	US 93 (Northbound)					US 93 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	23	161	86	0	0	24	89	81	0	0	77	56	16	0	0	74	70	25	0	782
4:15 PM	0	30	163	63	0	0	25	97	104	0	0	68	70	12	0	0	61	84	30	0	807
4:30 PM	0	31	159	84	0	0	31	114	70	0	0	76	64	18	0	0	74	86	38	0	845
4:45 PM	0	29	138	63	0	0	21	104	89	0	0	86	67	18	0	0	72	91	29	0	807
5:00 PM	0	36	176	62	0	0	31	113	103	0	0	112	67	14	0	0	67	113	33	0	927
5:15 PM	0	29	186	82	0	0	32	144	129	0	0	89	38	22	0	0	85	117	34	0	987
5:30 PM	0	24	147	67	0	0	34	98	92	0	0	64	45	19	0	0	99	131	25	0	845
5:45 PM	0	41	142	52	0	0	27	85	74	0	0	92	63	12	0	0	97	92	31	0	808
Total	0	243	1,272	559	0	0	225	844	742	0	0	664	470	131	0	0	629	784	245	0	6,808

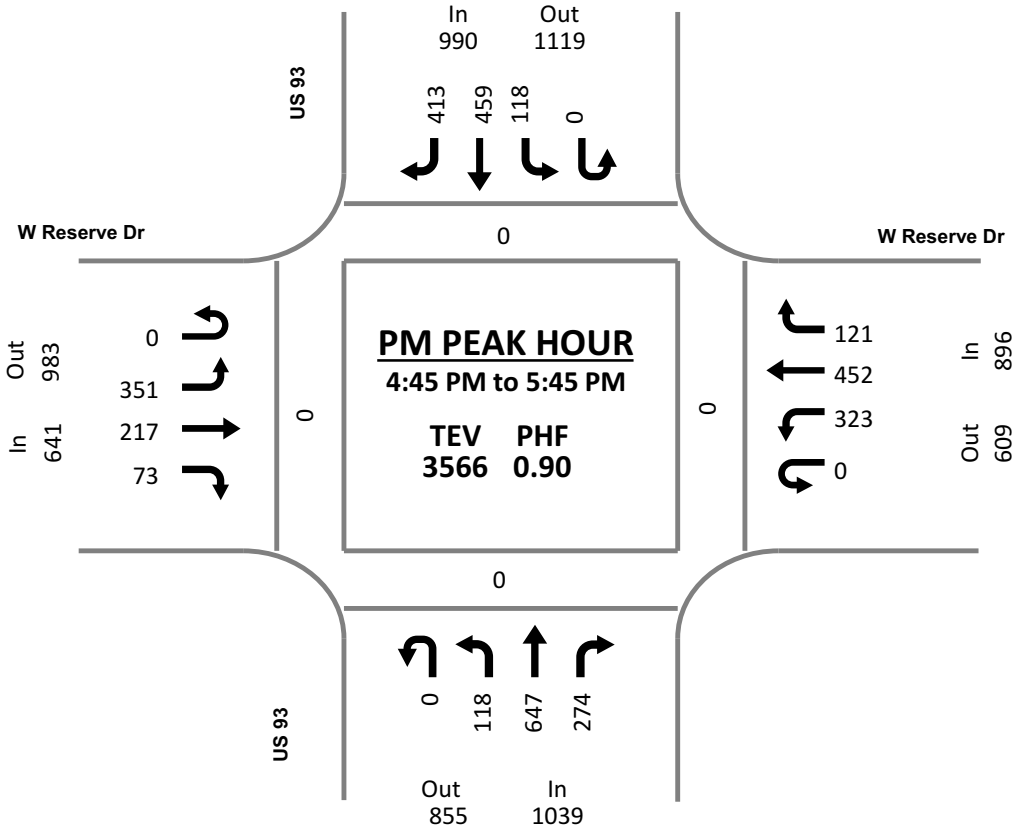
*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary (System Peak*)

4:45 PM to 5:45 PM

Data Type	US 93 (Northbound)					US 93 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	118	647	274	0	0	118	459	413	0	0	351	217	73	0	0	323	452	121	0	3566
%HV	0.0%	0.0%	0.9%	1.1%		0.0%	5.9%	1.5%	3.4%		0.0%	4.0%	3.2%	5.5%		0.0%	0.9%	2.4%	1.7%		2.2%
PHF	0.00	0.82	0.87	0.84	0.00	0.00	0.87	0.80	0.80	0.00	0.00	0.78	0.81	0.83	0.00	0.00	0.82	0.86	0.89	0.00	0.90
Volume			1039					990					641					896			3566
%HV			0.9%					2.8%					3.9%					1.8%			2.2%
PHF			0.87					0.81					0.83					0.88			0.90

*System Peak is based on comparison of other study area counts rather than highest total entering volume at this intersection.



Turning Movement Count

W Reserve Dr & Whitefish Stage Rd

Total Vehicles (15-Minute Periods)

AM Peak Hour

Tuesday, May 7, 2019

7:00 AM to 9:00 AM

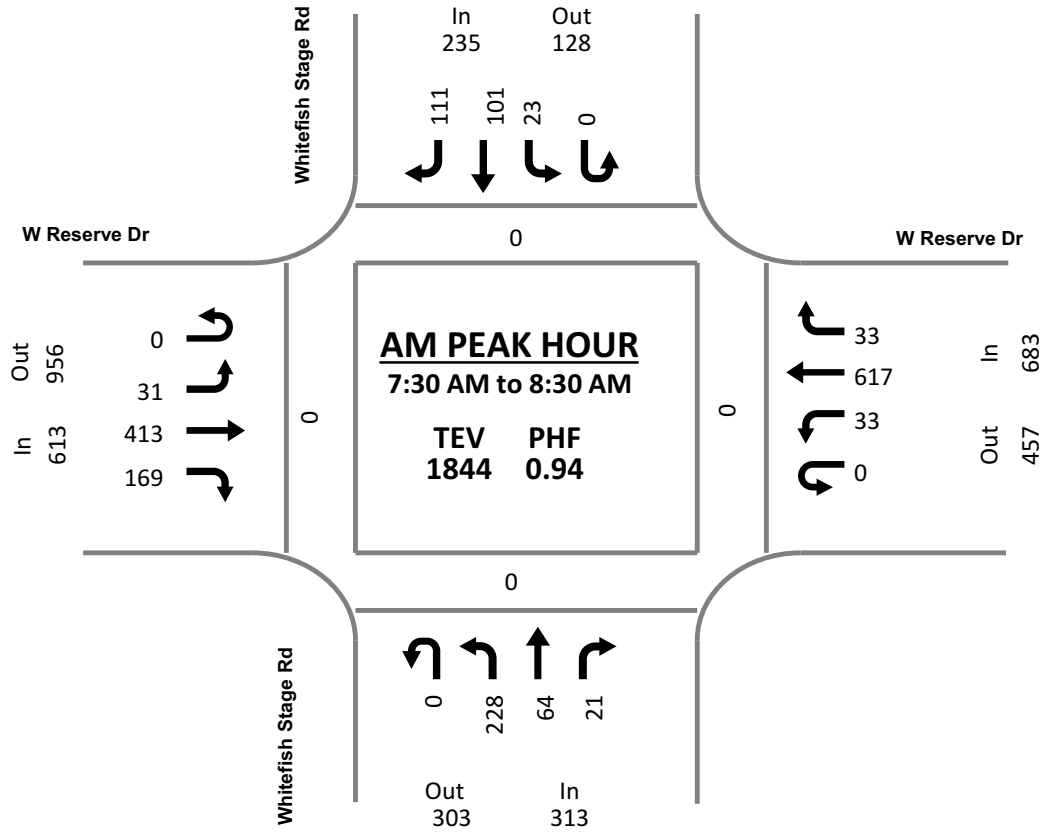
Start Time	Whitefish Stage Rd (Northbound)					Whitefish Stage Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	36	6	6	0	0	2	8	8	0	0	4	87	14	0	0	7	90	3	0	271
7:15 AM	0	27	10	4	0	0	1	16	17	0	0	8	78	16	0	0	6	121	5	0	309
7:30 AM	0	56	17	4	0	0	6	13	38	0	0	6	114	33	0	0	9	169	11	0	476
7:45 AM	0	67	12	4	0	0	5	26	38	0	0	8	117	43	0	0	7	160	3	0	490
8:00 AM	0	54	18	5	0	0	7	32	18	0	0	2	90	50	0	0	5	151	8	0	440
8:15 AM	0	51	17	8	0	0	5	30	17	0	0	15	92	43	0	0	12	137	11	0	438
8:30 AM	0	49	18	9	0	0	2	17	34	0	0	10	79	37	0	0	14	151	9	0	429
8:45 AM	0	56	14	10	0	0	7	13	17	0	0	10	92	22	0	0	10	149	4	0	404
Total	0	396	112	50	0	0	35	155	187	0	0	63	749	258	0	0	70	1,128	54	0	3,257

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary

7:30 AM to 8:30 AM

Data Type	Whitefish Stage Rd (Northbound)					Whitefish Stage Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	228	64	21	0	0	23	101	111	0	0	31	413	169	0	0	33	617	33	0	1844
%HV	0.0%	2.2%	10.9%	0.0%		0.0%	21.7%	3.0%	1.8%		0.0%	9.7%	5.3%	3.6%		0.0%	0.0%	5.2%	6.1%		4.7%
PHF	0.00	0.85	0.89	0.66	0.00	0.00	0.82	0.79	0.73	0.00	0.00	0.52	0.88	0.85	0.00	0.00	0.69	0.91	0.75	0.00	0.94
Volume			313					235					613					683			1844
%HV			3.8%					4.3%					5.1%					5.0%			4.7%
PHF			0.94					0.85					0.91					0.90			0.94



Turning Movement Count

W Reserve Dr & Whitefish Stage Rd

Total Vehicles (15-Minute Periods)

PM Peak Hour

Tuesday, May 7, 2019

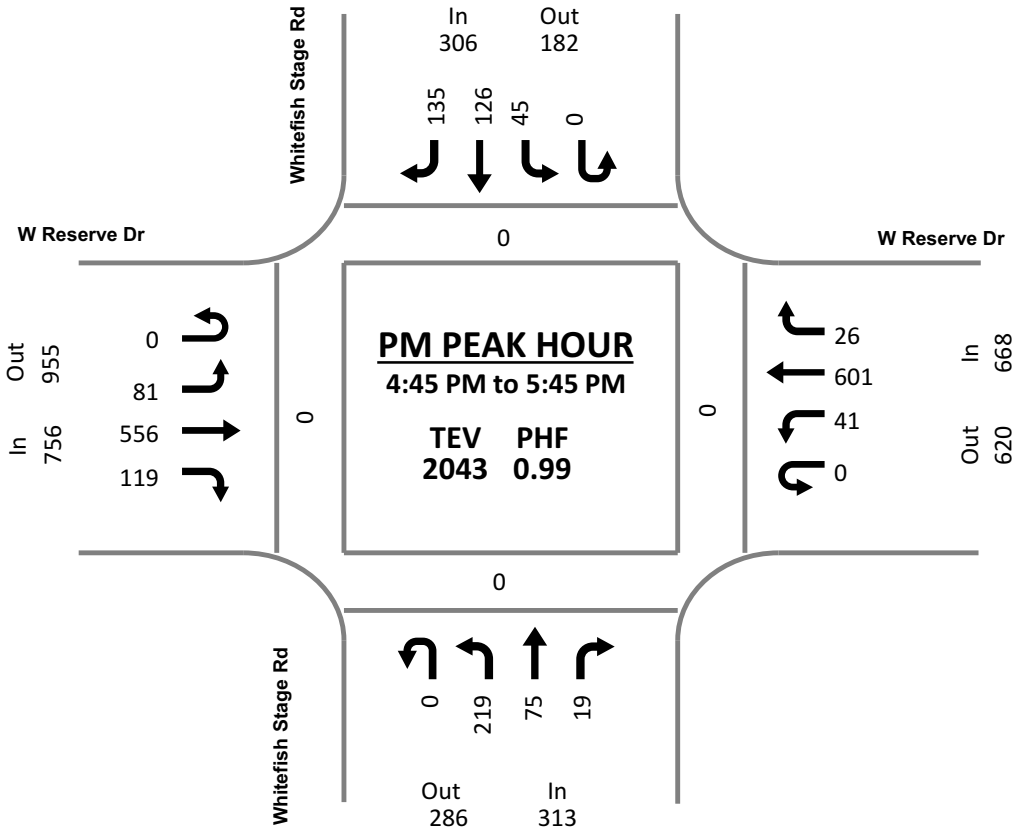
4:00 PM to 6:00 PM

Start Time	Whitefish Stage Rd (Northbound)					Whitefish Stage Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	52	16	10	0	0	7	21	19	0	0	9	147	38	0	0	11	132	7	0	469
4:15 PM	0	41	17	9	0	0	10	18	19	0	0	27	128	40	0	0	11	120	2	0	442
4:30 PM	0	53	17	8	0	0	20	30	27	0	0	16	129	30	0	0	6	126	3	0	465
4:45 PM	0	45	21	7	0	0	6	38	33	0	0	20	153	29	0	0	9	145	7	0	513
5:00 PM	0	65	19	5	0	0	20	28	28	0	0	18	130	28	0	0	16	150	6	0	513
5:15 PM	0	50	15	3	0	0	12	31	43	0	0	23	132	26	0	0	10	152	6	0	503
5:30 PM	0	59	20	4	0	0	7	29	31	0	0	20	141	36	0	0	6	154	7	0	514
5:45 PM	0	66	20	9	0	0	6	18	30	0	0	19	125	38	0	0	5	126	6	0	468
Total	0	431	145	55	0	0	88	213	230	0	0	152	1,085	265	0	0	74	1,105	44	0	3,887

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
4:45 PM to 5:45 PM

Data Type	Whitefish Stage Rd (Northbound)					Whitefish Stage Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	219	75	19	0	0	45	126	135	0	0	81	556	119	0	0	41	601	26	0	2043
%HV	0.0%	1.4%	1.3%	0.0%		0.0%	4.4%	3.2%	0.7%		0.0%	1.2%	1.4%	0.0%		0.0%	0.0%	1.2%	0.0%		1.3%
PHF	0.00	0.84	0.89	0.68	0.00	0.00	0.56	0.83	0.78	0.00	0.00	0.88	0.91	0.83	0.00	0.00	0.64	0.98	0.93	0.00	0.99
Volume			313					306					756					668			2043
%HV			1.3%					2.3%					1.2%					1.0%			1.3%
PHF			0.88					0.89					0.94					0.97			0.99



Turning Movement Count

W Reserve Dr & US 2

Total Vehicles (15-Minute Periods)

AM Peak Hour

Tuesday, May 14, 2019

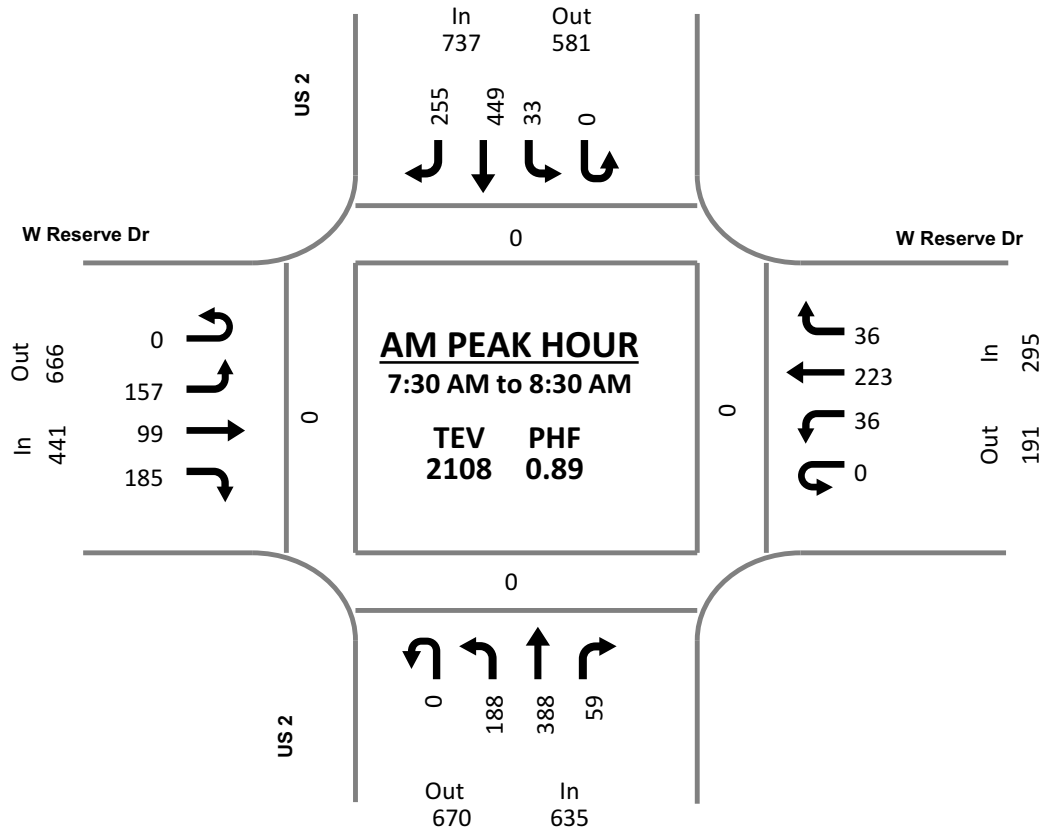
7:00 AM to 9:00 AM

Start Time	US 2 (Northbound)					US 2 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	23	48	3	0	0	4	54	52	0	0	34	14	20	0	0	17	36	7	0	312
7:15 AM	0	24	104	11	0	0	8	75	49	0	0	46	23	21	0	0	7	49	7	0	424
7:30 AM	0	51	112	14	0	0	10	129	45	0	0	29	17	48	0	0	11	60	11	0	537
7:45 AM	0	57	106	11	0	0	10	110	75	0	0	43	32	59	0	0	9	74	7	0	593
8:00 AM	0	37	70	17	0	0	4	95	76	0	0	49	24	40	0	0	5	47	13	0	477
8:15 AM	0	43	100	17	0	0	9	115	59	0	0	36	26	38	0	0	11	42	5	0	501
8:30 AM	0	50	70	9	0	0	5	85	59	0	0	39	14	36	0	0	18	32	11	0	428
8:45 AM	0	41	71	7	0	0	7	62	59	0	0	49	21	34	0	0	10	50	8	0	419
Total	0	326	681	89	0	0	57	725	474	0	0	325	171	296	0	0	88	390	69	0	3,691

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
7:30 AM to 8:30 AM

Data Type	US 2 (Northbound)					US 2 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	188	388	59	0	0	33	449	255	0	0	157	99	185	0	0	36	223	36	0	2108
%HV	0.0%	8.0%	8.0%	1.7%		0.0%	0.0%	6.2%	6.3%		0.0%	12.1%	6.1%	7.0%		0.0%	5.6%	3.1%	5.6%		6.6%
PHF	0.00	0.82	0.87	0.87	0.00	0.00	0.83	0.87	0.84	0.00	0.00	0.80	0.77	0.78	0.00	0.00	0.82	0.75	0.69	0.00	0.89
Volume			635					737					441					295			2108
%HV			7.4%					6.0%					8.6%					3.7%			6.6%
PHF			0.90					0.94					0.82					0.82			0.89



Turning Movement Count

W Reserve Dr & US 2

Total Vehicles (15-Minute Periods)

PM Peak Hour

Tuesday, May 14, 2019

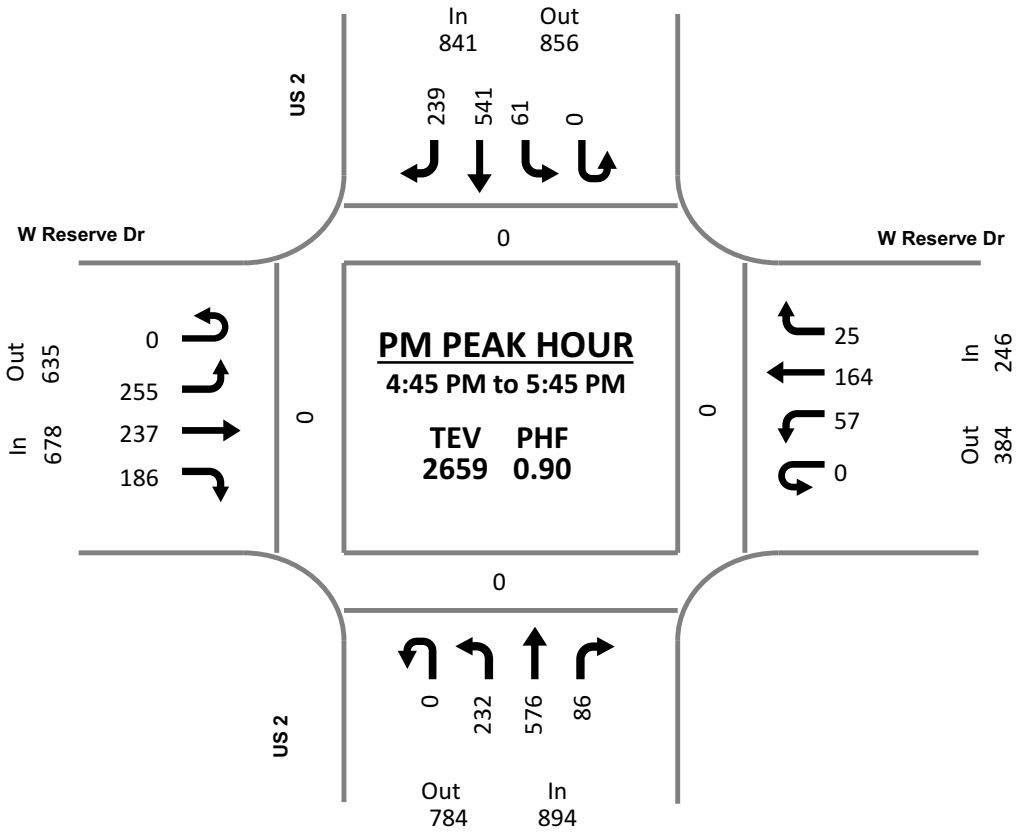
4:00 PM to 6:00 PM

Start Time	US 2 (Northbound)					US 2 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	61	114	19	0	0	17	122	53	0	0	54	45	44	0	0	18	27	5	0	579
4:15 PM	0	58	103	16	0	0	10	116	62	0	0	54	33	43	0	0	15	46	7	0	563
4:30 PM	0	60	121	22	0	0	12	116	58	0	0	60	37	56	0	0	19	46	6	0	613
4:45 PM	0	46	112	15	0	0	13	126	57	0	0	48	64	55	0	0	13	35	8	0	592
5:00 PM	0	77	185	25	0	0	10	140	56	0	0	70	65	41	0	0	17	46	6	0	738
5:15 PM	0	61	152	34	0	0	18	141	66	0	0	72	56	40	0	0	19	41	4	0	704
5:30 PM	0	48	127	12	0	0	20	134	60	0	0	65	52	50	0	0	8	42	7	0	625
5:45 PM	0	56	121	22	0	0	7	81	57	0	0	50	34	37	0	0	13	37	5	0	520
Total	0	467	1,035	165	0	0	107	976	469	0	0	473	386	366	0	0	122	320	48	0	4,934

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
4:45 PM to 5:45 PM

Data Type	US 2 (Northbound)					US 2 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	232	576	86	0	0	61	541	239	0	0	255	237	186	0	0	57	164	25	0	2659
%HV	0.0%	2.6%	2.8%	0.0%		0.0%	1.6%	3.1%	4.6%		0.0%	3.1%	1.3%	4.3%		0.0%	0.0%	0.6%	0.0%		2.7%
PHF	0.00	0.75	0.78	0.63	0.00	0.00	0.76	0.96	0.91	0.00	0.00	0.89	0.91	0.85	0.00	0.00	0.75	0.89	0.78	0.00	0.90
Volume			894					841					678					246			2659
%HV			2.5%					3.4%					2.8%					0.4%			2.7%
PHF			0.78					0.93					0.96					0.89			0.90



Turning Movement Count

W Reserve Dr & US 93

Total Vehicles (15-Minute Periods)

AM Peak Hour

Tuesday, October 13, 2020

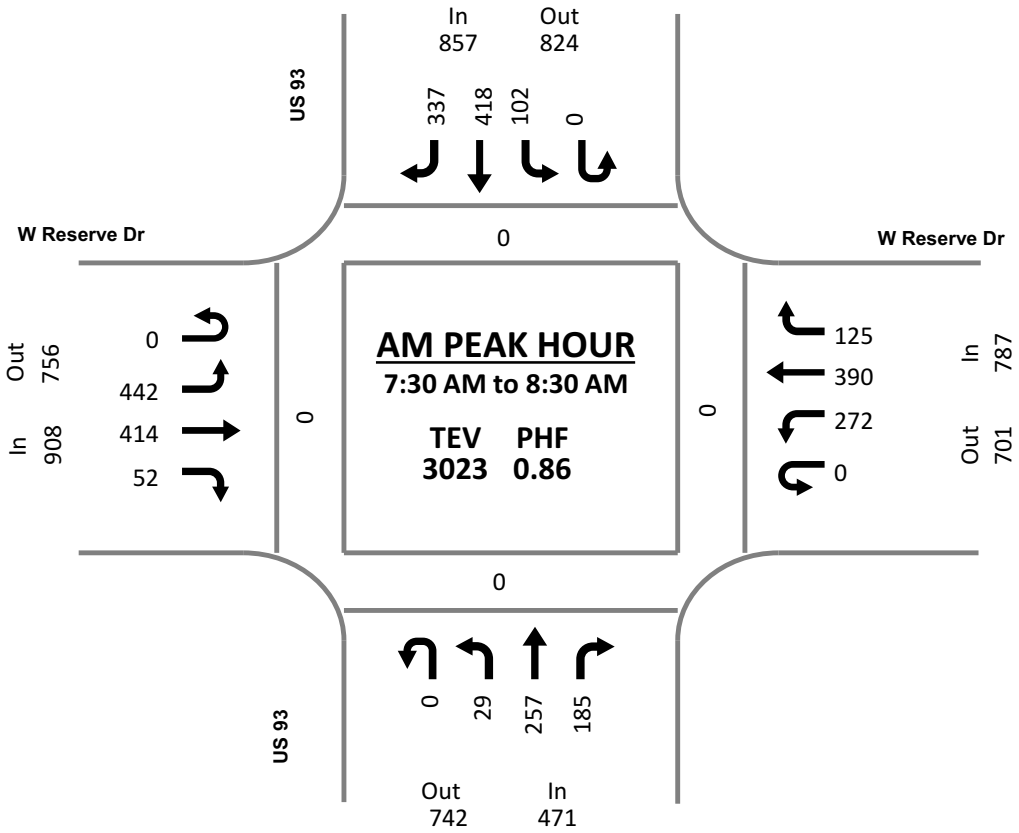
7:00 AM to 9:00 AM

Start Time	US 93 (Northbound)					US 93 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	4	41	30	0	0	14	62	31	0	0	73	56	6	0	0	25	28	19	0	389
7:15 AM	0	3	39	29	0	0	14	74	69	0	0	97	77	13	0	0	71	71	26	0	583
7:30 AM	0	4	61	46	0	0	26	102	110	0	0	123	104	10	0	0	66	100	33	0	785
7:45 AM	0	6	56	47	0	0	28	131	96	0	0	125	125	11	0	0	74	156	21	0	876
8:00 AM	0	13	65	41	0	0	26	89	76	0	0	98	107	13	0	0	59	82	35	0	704
8:15 AM	0	6	75	51	0	0	22	96	55	0	0	96	78	18	0	0	73	52	36	0	658
8:30 AM	0	9	65	39	0	0	24	95	54	0	0	104	47	12	0	0	75	48	32	0	604
8:45 AM	0	14	75	38	1	0	29	100	50	0	0	83	70	14	0	0	68	38	30	0	609
Total	0	59	477	321	1	0	183	749	541	0	0	799	664	97	0	0	511	575	232	0	5,208

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
7:30 AM to 8:30 AM

Data Type	US 93 (Northbound)					US 93 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	29	257	185	0	0	102	418	337	0	0	442	414	52	0	0	272	390	125	0	3023
%HV	0.0%	0.0%	1.2%	3.8%		0.0%	6.9%	0.5%	2.4%		0.0%	3.8%	3.1%	0.0%		0.0%	1.1%	4.6%	5.6%		2.8%
PHF	0.00	0.56	0.86	0.91	0.00	0.00	0.91	0.80	0.77	0.00	0.00	0.88	0.83	0.72	0.00	0.00	0.92	0.63	0.87	0.00	0.86
Volume			471					857					908					787			3023
%HV			2.1%					2.0%					3.3%					3.6%			2.8%
PHF			0.89					0.84					0.87					0.78			0.86



Turning Movement Count

W Reserve Dr & US 93

Total Vehicles (15-Minute Periods)

PM Peak Hour

Tuesday, October 13, 2020

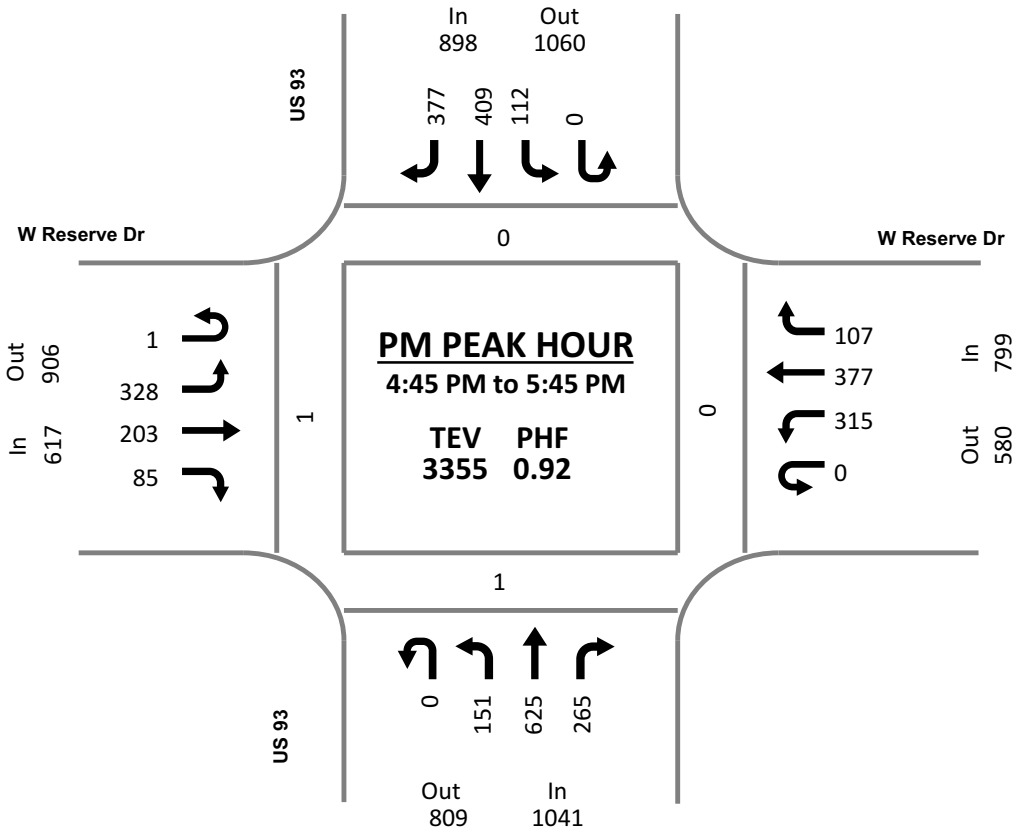
4:00 PM to 6:00 PM

Start Time	US 93 (Northbound)					US 93 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	45	161	49	0	0	16	100	57	0	0	86	59	23	0	0	65	75	29	0	765
4:15 PM	0	32	130	67	0	0	20	101	81	0	0	64	53	16	0	0	85	83	31	0	763
4:30 PM	1	29	128	71	0	0	27	90	86	0	0	78	54	16	0	0	82	80	26	0	768
4:45 PM	0	39	146	71	0	0	21	91	75	0	0	74	44	24	0	0	85	105	17	0	792
5:00 PM	0	42	171	57	0	0	33	97	102	0	1	92	55	19	0	0	74	84	39	0	866
5:15 PM	0	36	164	71	0	0	26	128	123	0	0	82	41	26	0	0	77	112	27	0	913
5:30 PM	0	34	144	66	1	0	32	93	77	0	0	80	63	16	1	0	79	76	24	0	784
5:45 PM	0	43	128	73	0	0	28	65	81	0	0	75	59	15	0	0	71	87	25	0	750
Total	1	300	1,172	525	1	0	203	765	682	0	1	631	428	155	1	0	618	702	218	0	6,401

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
4:45 PM to 5:45 PM

Data Type	US 93 (Northbound)					US 93 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	151	625	265	1	0	112	409	377	0	1	328	203	85	1	0	315	377	107	0	3355
%HV	0.0%	0.7%	0.2%	0.8%		0.0%	0.9%	0.5%	2.4%		0.0%	0.9%	2.0%	1.2%		0.0%	0.3%	0.0%	0.0%		0.7%
PHF	0.00	0.90	0.91	0.93	0.25	0.00	0.85	0.80	0.77	0.00	0.25	0.89	0.81	0.82	0.25	0.00	0.93	0.84	0.69	0.00	0.92
Volume			1041					898					617					799			3355
%HV			0.4%					1.3%					1.3%					0.1%			0.7%
PHF			0.96					0.81					0.92					0.92			0.92



Turning Movement Count

W Reserve Dr & Home Depot

Total Vehicles (15-Minute Periods)

AM Peak Hour

Tuesday, October 13, 2020

7:00 AM to 9:00 AM

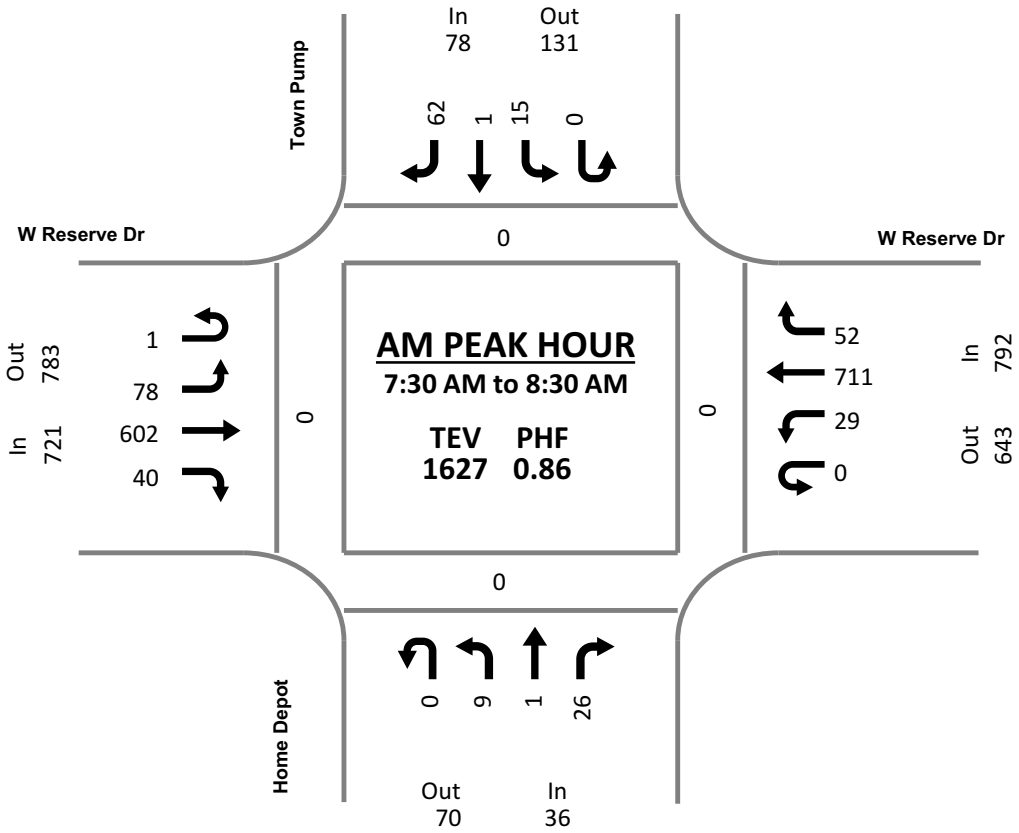
Start Time	Home Depot (Northbound)					Town Pump (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	0	0	2	0	0	0	1	6	0	0	6	74	4	0	0	1	76	9	0	179
7:15 AM	0	0	1	3	0	0	3	0	10	0	0	15	107	6	0	0	2	154	10	0	311
7:30 AM	0	2	0	3	0	0	3	0	10	0	1	19	144	9	0	0	2	195	21	0	409
7:45 AM	0	2	0	5	0	0	2	0	17	0	0	23	170	10	0	0	8	220	14	0	471
8:00 AM	0	2	1	10	0	0	4	0	23	0	0	17	160	12	0	0	8	146	9	0	392
8:15 AM	0	3	0	8	0	0	6	1	12	0	0	19	128	9	0	0	11	150	8	0	355
8:30 AM	0	3	3	8	0	0	6	1	19	0	0	14	85	12	0	0	9	129	10	0	299
8:45 AM	0	2	3	17	0	0	8	0	21	0	0	16	112	18	0	0	11	112	9	0	329
Total	0	14	8	56	0	0	32	3	118	0	1	129	980	80	0	0	52	1,182	90	0	2,745

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary

7:30 AM to 8:30 AM

Data Type	Home Depot (Northbound)					Town Pump (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	9	1	26	0	0	15	1	62	0	1	78	602	40	0	0	29	711	52	0	1627
%HV	0.0%	0.0%	100.0%	0.0%		0.0%	0.0%	0.0%	6.5%		0.0%	2.6%	3.7%	2.5%		0.0%	0.0%	3.7%	7.7%		3.7%
PHF	0.00	0.75	0.25	0.65	0.00	0.00	0.63	0.25	0.67	0.00	0.25	0.85	0.89	0.83	0.00	0.00	0.66	0.81	0.62	0.00	0.86
Volume			36					78					721					792			1627
%HV			2.8%					5.1%					3.5%					3.8%			3.7%
PHF			0.69					0.72					0.89					0.82			0.86



Turning Movement Count

W Reserve Dr & Home Depot

Total Vehicles (15-Minute Periods)

PM Peak Hour

Tuesday, October 13, 2020

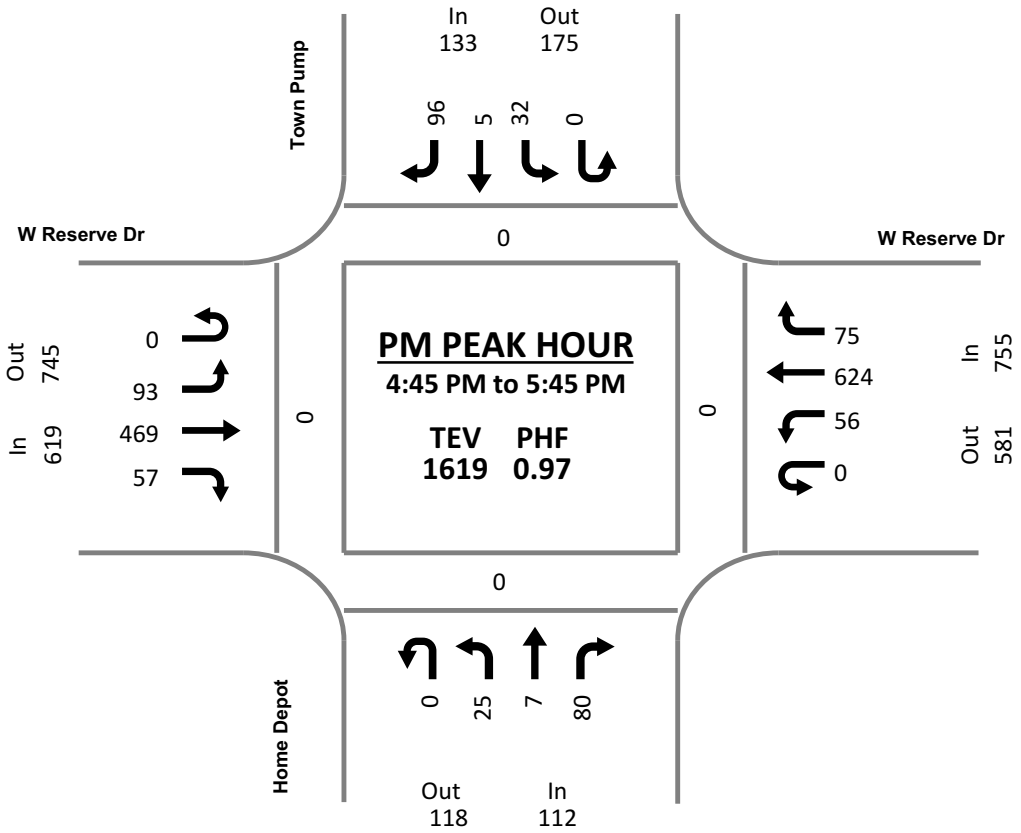
4:00 PM to 6:00 PM

Start Time	Home Depot (Northbound)					Town Pump (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	3	2	21	0	0	8	3	21	0	0	16	108	14	0	0	14	140	11	0	361
4:15 PM	0	6	5	10	0	0	6	3	15	0	0	12	130	9	0	0	12	154	11	0	373
4:30 PM	0	10	1	18	0	0	6	2	18	0	0	19	109	21	0	0	18	145	13	0	380
4:45 PM	0	4	3	26	0	0	6	1	26	0	0	23	122	9	0	0	18	161	19	0	418
5:00 PM	0	6	2	21	0	0	11	3	21	0	0	14	124	17	0	0	14	164	20	0	417
5:15 PM	0	11	2	19	0	0	5	0	23	0	0	26	110	13	0	0	13	151	18	0	391
5:30 PM	0	4	0	14	0	0	10	1	26	0	0	30	113	18	0	0	11	148	18	0	393
5:45 PM	0	4	5	20	0	0	6	0	8	0	0	18	141	10	0	0	12	140	16	0	380
Total	0	48	20	149	0	0	58	13	158	0	0	158	957	111	0	0	112	1,203	126	0	3,113

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
4:45 PM to 5:45 PM

Data Type	Home Depot (Northbound)					Town Pump (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	25	7	80	0	0	32	5	96	0	0	93	469	57	0	0	56	624	75	0	1619
%HV	0.0%	0.0%	0.0%	1.3%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	1.3%	0.0%		0.0%	0.0%	0.2%	0.0%		0.5%
PHF	0.00	0.57	0.58	0.77	0.00	0.00	0.73	0.42	0.92	0.00	0.00	0.78	0.95	0.79	0.00	0.00	0.78	0.95	0.94	0.00	0.97
Volume			112					133					619					755			1619
%HV			0.9%					0.0%					1.0%					0.1%			0.5%
PHF			0.85					0.90					0.96					0.95			0.97



Turning Movement Count

W Reserve Dr & Hutton Ranch Rd

Total Vehicles (15-Minute Periods)

AM Peak Hour

Tuesday, October 13, 2020

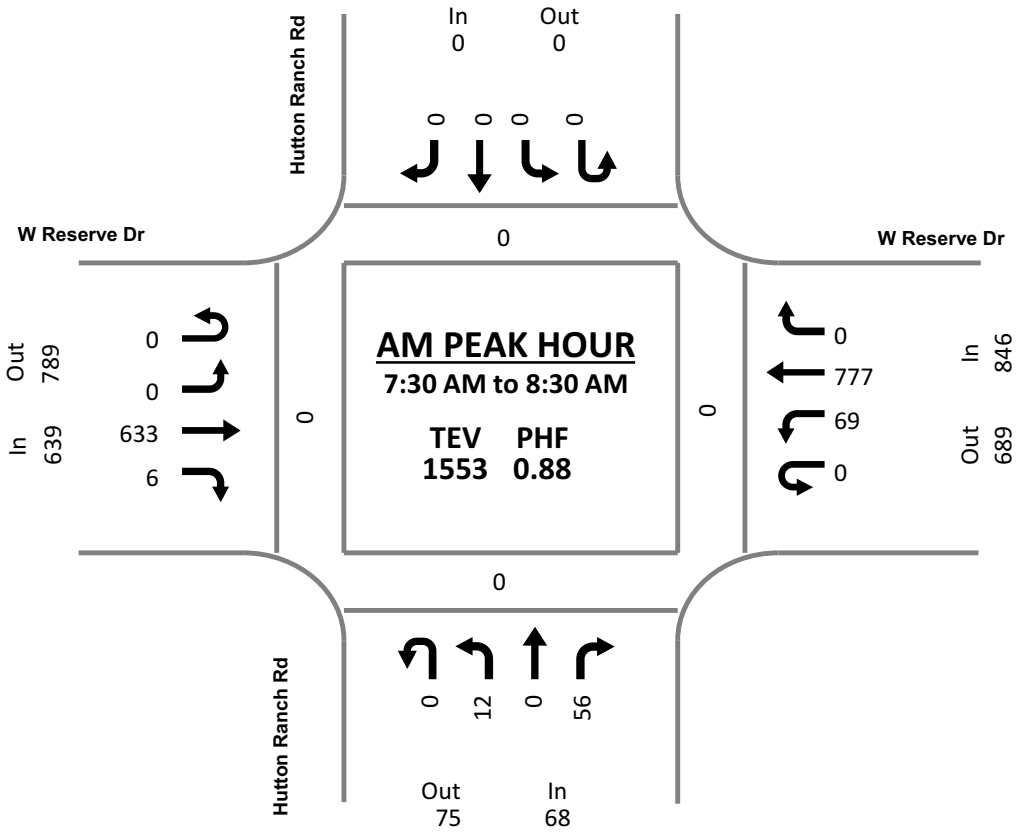
7:00 AM to 9:00 AM

Start Time	Hutton Ranch Rd (Northbound)					Hutton Ranch Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	0	0	8	0	0	0	0	0	0	0	0	75	1	0	0	7	87	0	0	178
7:15 AM	0	1	0	5	0	0	0	0	0	0	0	0	112	1	0	0	6	166	0	0	291
7:30 AM	0	2	0	11	0	0	0	0	0	0	0	0	147	2	0	0	17	221	0	0	400
7:45 AM	0	4	0	8	0	0	0	0	0	0	0	0	175	2	0	0	17	235	0	0	441
8:00 AM	0	2	0	19	0	0	0	0	0	0	0	0	173	1	0	0	13	156	0	0	364
8:15 AM	0	4	0	18	0	0	0	0	0	0	0	0	138	1	0	0	22	165	0	0	348
8:30 AM	0	1	0	13	0	0	0	0	0	0	0	0	98	2	0	0	27	148	0	0	289
8:45 AM	0	2	0	12	0	0	0	0	0	0	0	0	131	4	0	0	28	131	0	0	308
Total	0	16	0	94	0	0	0	0	0	0	0	0	1,049	14	0	0	137	1,309	0	0	2,619

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
7:30 AM to 8:30 AM

Data Type	Hutton Ranch Rd (Northbound)					Hutton Ranch Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	12	0	56	0	0	0	0	0	0	0	0	633	6	0	0	69	777	0	0	1553
%HV	0.0%	8.3%	0.0%	1.8%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	3.8%	0.0%		0.0%	2.9%	3.9%	0.0%		3.7%
PHF	0.00	0.75	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.75	0.00	0.00	0.78	0.83	0.00	0.00	0.88
Volume			68					0					639					846			1553
%HV			2.9%					0.0%					3.8%					3.8%			3.7%
PHF			0.77					0.00					0.90					0.84			0.88



DOWL

Turning Movement Count

W Reserve Dr & Hutton Ranch Rd

Total Vehicles (15-Minute Periods)

PM Peak Hour

Tuesday, October 13, 2020

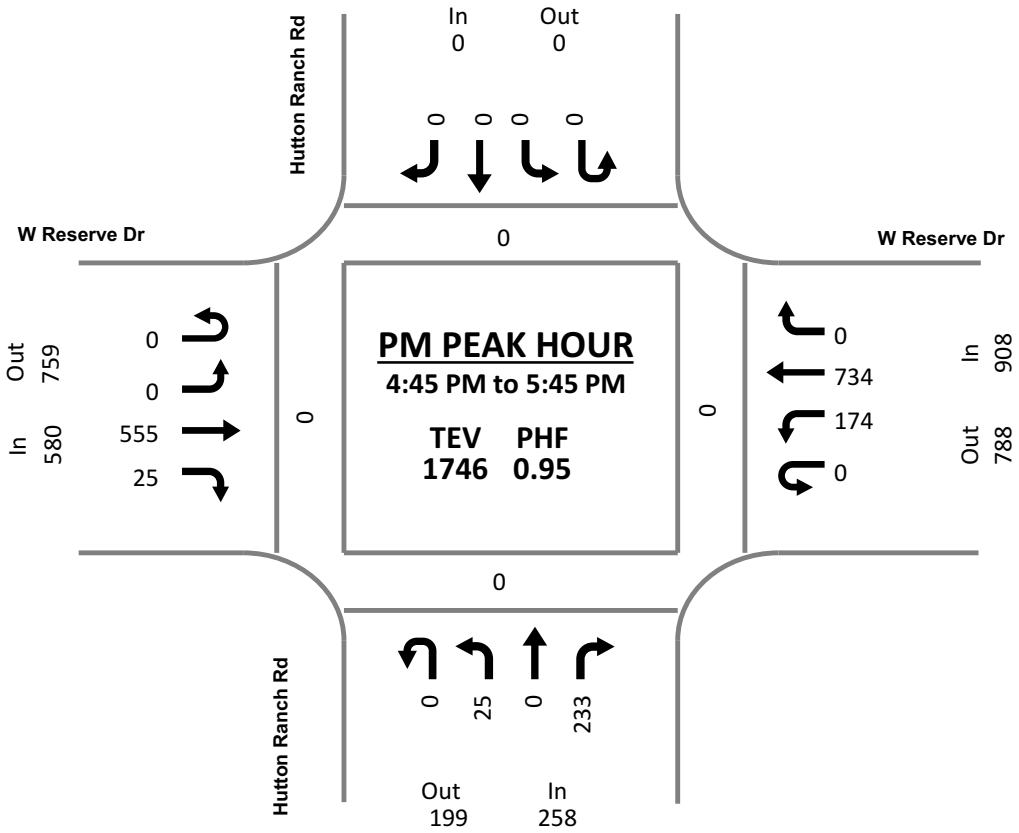
4:00 PM to 6:00 PM

Start Time	Hutton Ranch Rd (Northbound)					Hutton Ranch Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	7	0	66	0	0	0	0	0	0	0	0	137	5	0	0	36	156	0	0	407
4:15 PM	0	9	0	66	0	0	0	0	0	0	0	0	143	3	0	0	38	167	0	0	426
4:30 PM	0	3	0	55	0	0	0	0	0	0	0	0	130	2	0	0	45	169	0	0	404
4:45 PM	0	7	0	51	0	0	0	0	0	0	0	0	141	9	0	0	34	193	0	0	435
5:00 PM	0	8	0	60	0	0	0	0	0	0	0	0	151	7	0	0	44	191	0	0	461
5:15 PM	0	4	0	61	0	0	0	0	0	0	0	0	128	5	0	0	39	178	0	0	415
5:30 PM	0	6	0	61	0	0	0	0	0	0	0	0	135	4	0	0	57	172	0	0	435
5:45 PM	0	10	0	58	0	0	0	0	0	0	0	0	159	7	0	0	21	158	0	0	413
Total	0	54	0	478	0	0	0	0	0	0	0	0	1,124	42	0	0	314	1,384	0	0	3,396

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
4:45 PM to 5:45 PM

Data Type	Hutton Ranch Rd (Northbound)					Hutton Ranch Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	25	0	233	0	0	0	0	0	0	0	0	555	25	0	0	174	734	0	0	1746
%HV	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	1.1%	4.0%		0.0%	0.0%	0.1%	0.0%		0.5%
PHF	0.00	0.78	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.69	0.00	0.00	0.76	0.95	0.00	0.00	0.95
Volume			258					0					580					908			1746
%HV			0.0%					0.0%					1.2%					0.1%			0.5%
PHF			0.95					0.00					0.92					0.97			0.95



Turning Movement Count

W Reserve Dr & Country Way

Total Vehicles (15-Minute Periods)

AM Peak Hour

Wednesday, October 14, 2020

7:00 AM to 9:00 AM

Start Time	Country Way (Northbound)					Country Way (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	4	0	0	0	0	0	0	0	0	0	0	70	1	0	0	1	118	0	0	194
7:15 AM	0	3	0	0	0	0	0	0	0	0	0	1	127	6	0	0	1	163	0	0	301
7:30 AM	0	9	0	2	0	0	0	0	1	0	0	2	134	6	0	0	1	256	0	0	411
7:45 AM	0	14	0	1	0	0	0	0	4	0	0	0	186	10	0	0	0	243	1	0	459
8:00 AM	0	2	0	0	0	0	0	0	1	0	0	2	179	8	0	0	0	175	0	0	367
8:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	113	6	0	0	2	166	1	0	289
8:30 AM	0	7	0	0	0	0	1	0	1	0	0	1	106	2	0	0	2	201	1	0	322
8:45 AM	0	1	0	1	0	0	0	0	0	0	0	1	111	4	0	0	0	187	0	0	305
Total	0	40	0	5	0	0	1	0	7	0	0	7	1,026	43	0	0	7	1,509	3	0	2,648

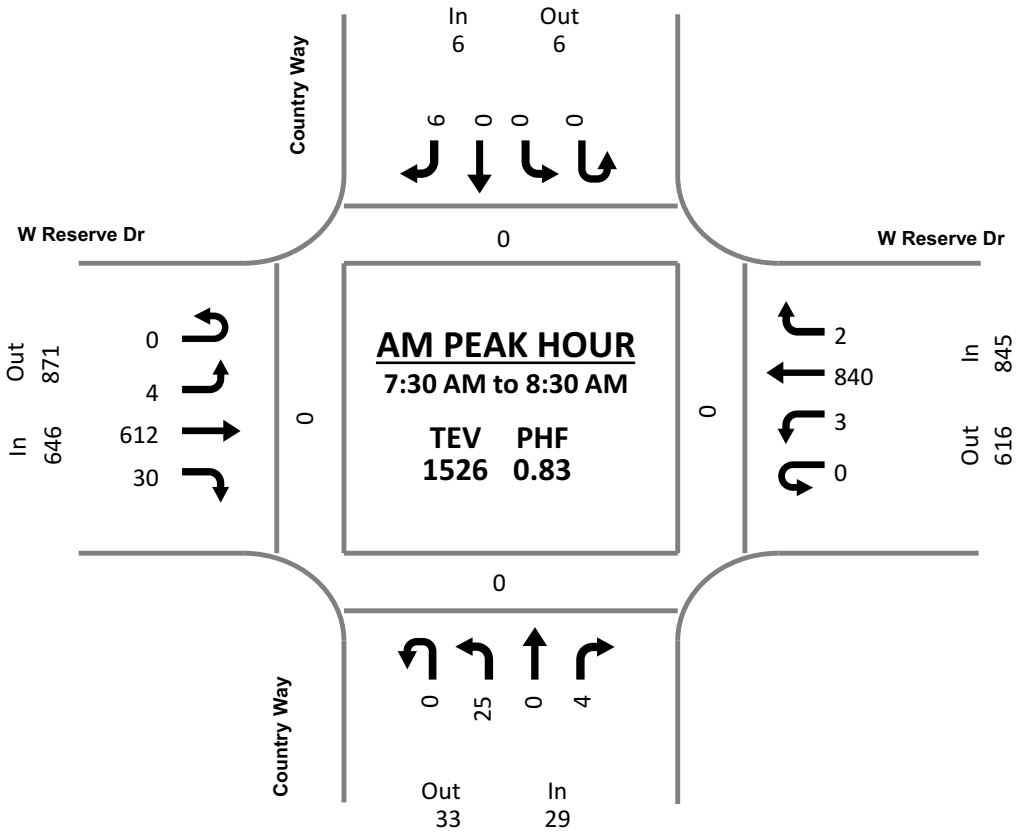
*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary (System Peak*)

7:30 AM to 8:30 AM

Data Type	Country Way (Northbound)					Country Way (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	25	0	4	0	0	0	0	6	0	0	4	612	30	0	0	3	840	2	0	1526
%HV	0.0%	0.0%	0.0%	25.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	3.9%	0.0%		0.0%	0.0%	2.9%	0.0%		3.2%
PHF	0.00	0.45	0.00	0.50	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.50	0.82	0.75	0.00	0.00	0.38	0.82	0.50	0.00	0.83
Volume			29					6					646					845			1526
%HV			3.4%					0.0%					3.7%					2.8%			3.2%
PHF			0.48					0.38					0.82					0.82			0.83

*System Peak is based on comparison of other study area counts rather than highest total entering volume at this intersection.



DOWL

Turning Movement Count

W Reserve Dr & Country Way

Total Vehicles (15-Minute Periods)

PM Peak Hour

Wednesday, October 14, 2020

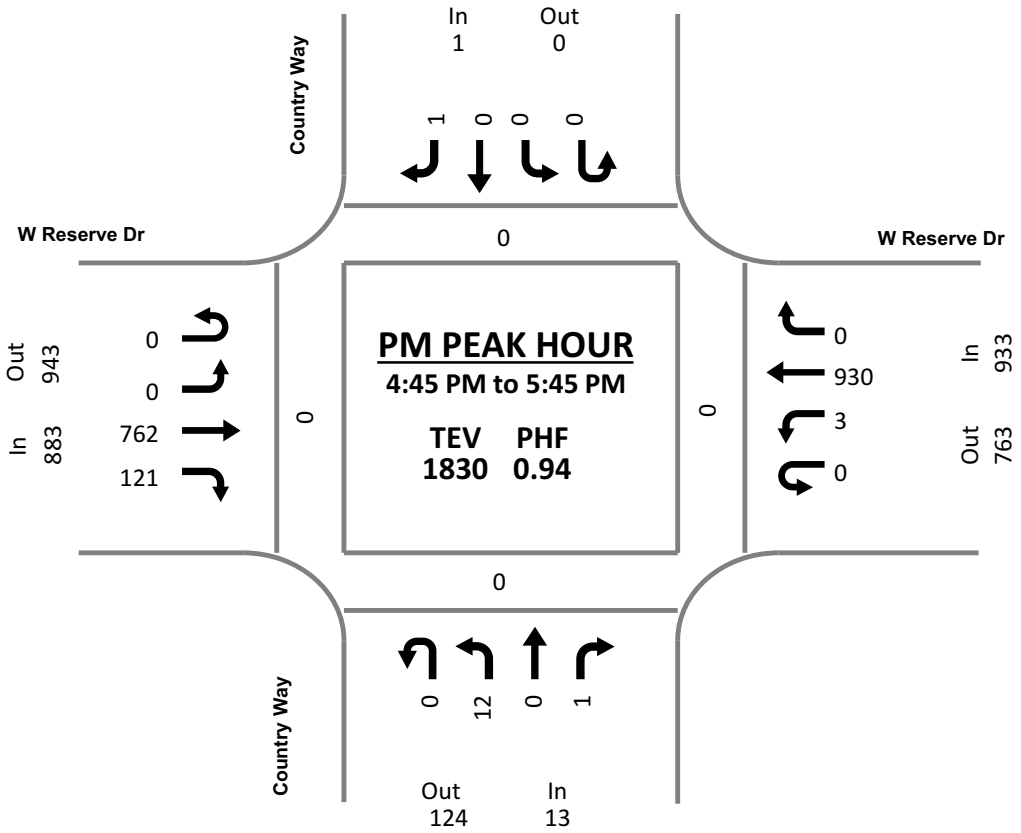
4:00 PM to 6:00 PM

Start Time	Country Way (Northbound)					Country Way (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	3	0	0	0	0	0	0	0	0	0	1	198	33	0	0	0	197	1	0	433
4:15 PM	0	3	0	1	0	0	0	1	2	0	0	0	196	20	0	0	1	179	0	0	403
4:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	192	12	0	1	1	223	0	0	430
4:45 PM	0	3	0	0	0	0	0	0	1	0	0	0	172	26	0	0	0	235	0	0	437
5:00 PM	0	4	0	1	0	0	0	0	0	0	0	0	197	23	0	0	1	225	0	0	451
5:15 PM	0	2	0	0	0	0	0	0	0	0	0	0	199	26	0	0	1	259	0	0	487
5:30 PM	0	3	0	0	0	0	0	0	0	0	0	0	194	46	0	0	1	211	0	0	455
5:45 PM	0	4	0	0	0	0	0	0	0	0	0	0	204	20	0	0	1	167	0	0	396
Total	0	23	0	2	1	0	0	1	3	0	0	1	1,552	206	0	1	6	1,696	1	0	3,492

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
4:45 PM to 5:45 PM

Data Type	Country Way (Northbound)					Country Way (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	12	0	1	0	0	0	0	1	0	0	0	762	121	0	0	3	930	0	0	1830
%HV	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.4%	0.0%		0.0%	0.0%	0.6%	0.0%		0.5%
PHF	0.00	0.75	0.00	0.25	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.96	0.66	0.00	0.00	0.75	0.90	0.00	0.00	0.94
Volume			13					1					883					933			1830
%HV			0.0%					0.0%					0.3%					0.6%			0.5%
PHF			0.65					0.25					0.92					0.90			0.94



Turning Movement Count

W Reserve Dr & Country Way North

Total Vehicles (15-Minute Periods)

AM Peak Hour

Wednesday, October 14, 2020

7:00 AM to 9:00 AM

Start Time	Country Way North (Northbound)					Country Way North (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	69	0	0	0	0	122	0	0	192
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	123	0	0	0	0	167	0	0	290
7:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	131	0	0	0	0	252	0	0	385
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	176	0	0	0	1	239	0	0	416
8:00 AM	0	0	0	2	0	0	0	0	0	0	0	0	171	0	0	0	1	181	0	0	355
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	112	0	0	0	0	168	0	0	280
8:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	195	0	0	296
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	114	0	0	0	0	177	0	0	291
Total	0	2	0	4	0	0	0	0	0	0	0	0	996	0	0	0	2	1,501	0	0	2,505

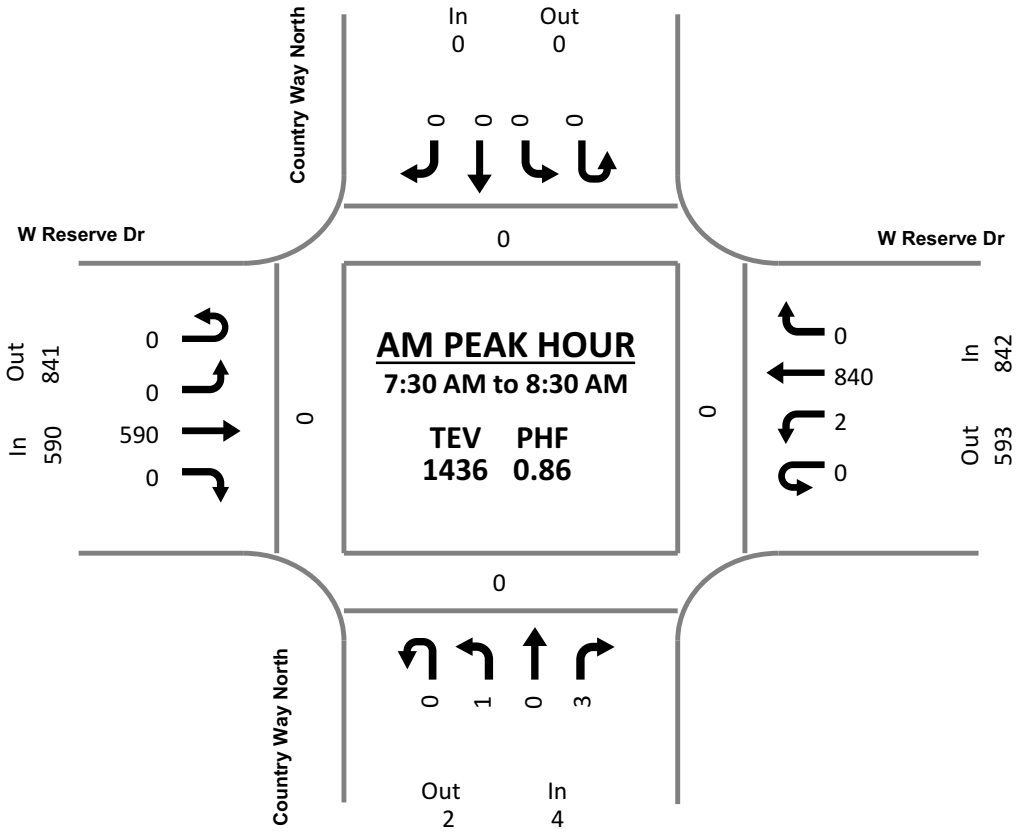
*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary (System Peak*)

7:30 AM to 8:30 AM

Data Type	Country Way North (Northbound)					Country Way North (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	1	0	3	0	0	0	0	0	0	0	0	590	0	0	0	2	840	0	0	1436
%HV	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	4.2%	0.0%		0.0%	0.0%	2.7%	0.0%		3.3%
PHF	0.00	0.25	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.00	0.00	0.50	0.83	0.00	0.00	0.86
Volume			4					0					590					842			1436
%HV			0.0%					0.0%					4.2%					2.7%			3.3%
PHF			0.50					0.00					0.84					0.84			0.86

*System Peak is based on comparison of other study area counts rather than highest total entering volume at this intersection.



Turning Movement Count

W Reserve Dr & Country Way North

Total Vehicles (15-Minute Periods)

PM Peak Hour

Wednesday, October 14, 2020

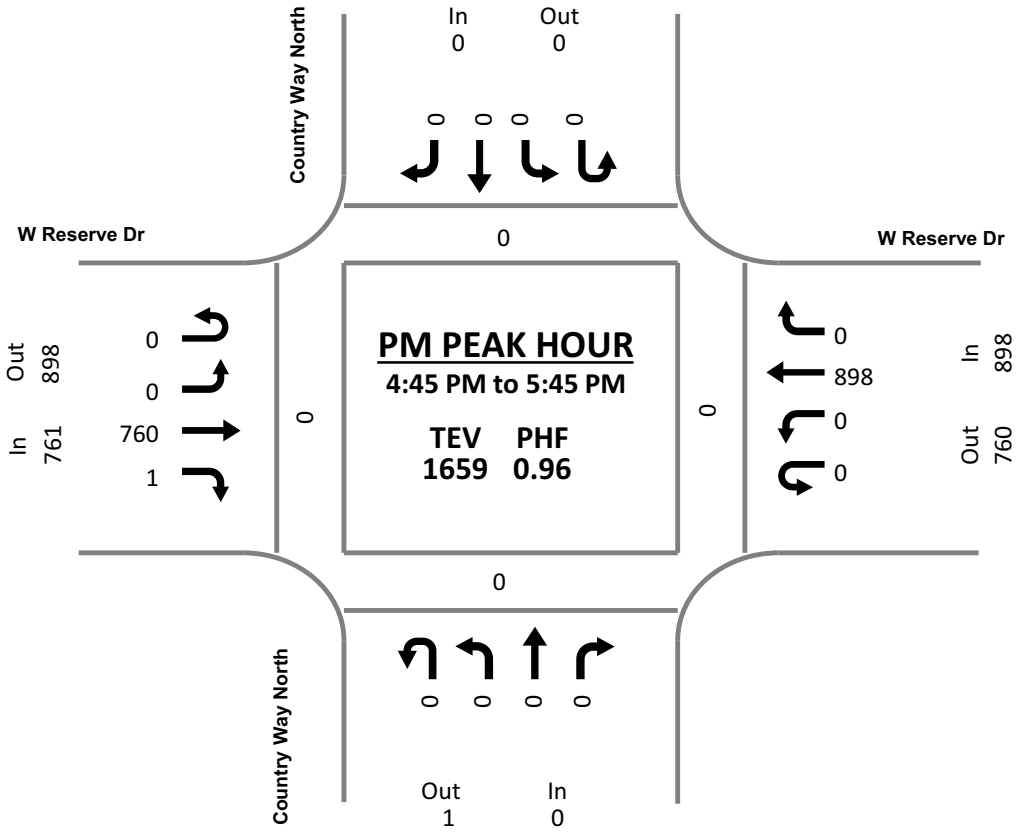
4:00 PM to 6:00 PM

Start Time	Country Way North (Northbound)					Country Way North (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	184	0	0	0	0	194	0	0	378
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	199	1	0	0	0	180	0	0	380
4:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	173	1	0	0	0	212	0	0	387
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	178	0	0	0	0	217	0	0	395
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	192	1	0	0	0	223	0	0	416
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	183	0	0	0	0	251	0	0	434
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	207	0	0	0	0	207	0	0	414
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	218	0	0	0	1	163	0	0	382
Total	0	0	0	1	0	0	0	0	0	0	0	0	1,534	3	0	0	1	1,647	0	0	3,186

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
4:45 PM to 5:45 PM

Data Type	Country Way North (Northbound)					Country Way North (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	0	0	0	0	0	0	0	0	0	0	0	760	1	0	0	0	898	0	0	1659
%HV	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	1.3%	0.0%		0.0%	0.0%	0.8%	0.0%		1.0%
PHF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.25	0.00	0.00	0.00	0.89	0.00	0.00	0.96
Volume			0					0					761					898			1659
%HV			0.0%					0.0%					1.3%					0.8%			1.0%
PHF			0.00					0.00					0.92					0.89			0.96



Turning Movement Count

W Reserve Dr & Whitefish Stage Rd

Total Vehicles (15-Minute Periods)

AM Peak Hour

Wednesday, October 14, 2020

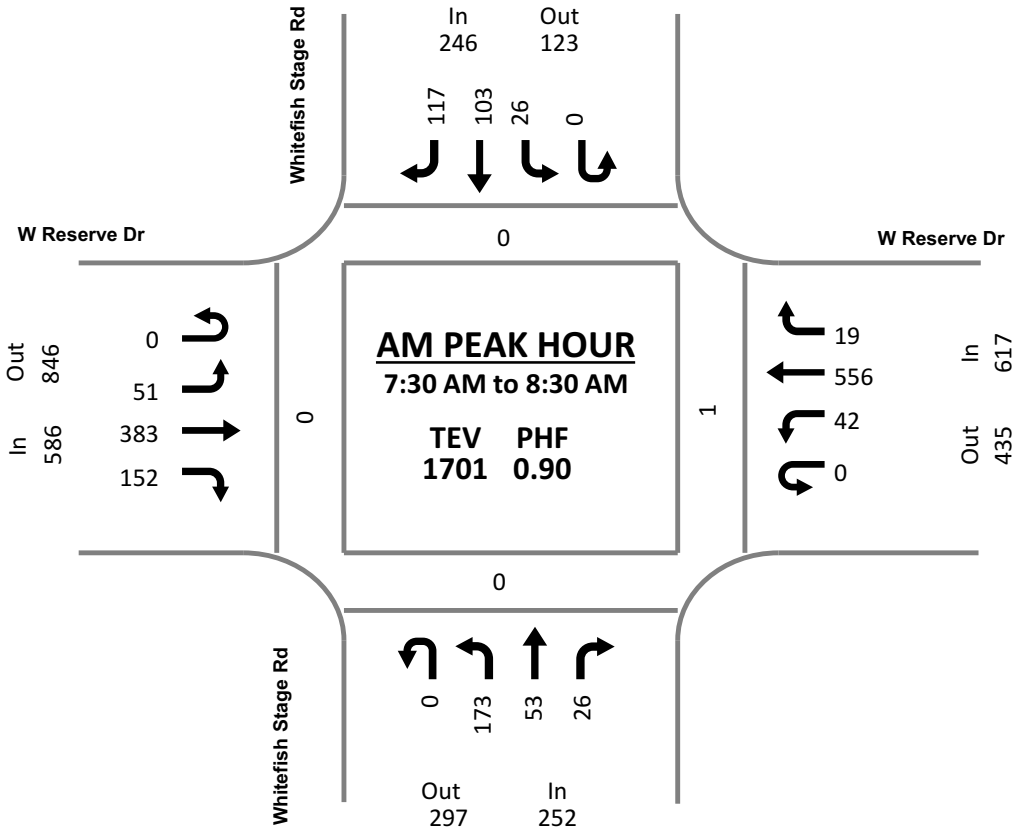
7:00 AM to 9:00 AM

Start Time	Whitefish Stage Rd (Northbound)					Whitefish Stage Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	20	4	0	0	0	3	4	9	0	0	4	60	12	0	0	4	93	6	0	219
7:15 AM	0	36	13	7	0	0	4	8	19	0	0	6	87	24	0	0	6	114	8	0	332
7:30 AM	0	58	7	4	0	0	9	18	43	0	0	9	97	25	0	0	11	167	5	0	453
7:45 AM	0	49	16	8	0	0	4	34	37	0	0	19	108	41	0	0	9	147	3	0	475
8:00 AM	0	25	16	5	0	0	5	16	17	0	0	11	103	59	0	0	11	131	8	0	407
8:15 AM	0	41	14	9	0	0	8	35	20	0	0	12	75	27	0	0	11	111	3	1	366
8:30 AM	0	39	13	9	0	0	6	17	30	0	0	7	75	16	0	0	16	123	3	0	354
8:45 AM	0	41	11	9	0	0	3	17	19	0	0	7	84	23	0	0	7	121	5	0	347
Total	0	309	94	51	0	0	42	149	194	0	0	75	689	227	0	0	75	1,007	41	1	2,953

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
7:30 AM to 8:30 AM

Data Type	Whitefish Stage Rd (Northbound)					Whitefish Stage Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	173	53	26	0	0	26	103	117	0	0	51	383	152	0	0	42	556	19	1	1701
%HV	0.0%	0.6%	0.0%	3.8%		0.0%	0.0%	2.9%	0.0%		0.0%	3.9%	4.2%	3.9%		0.0%	4.8%	4.0%	5.3%		3.2%
PHF	0.00	0.75	0.83	0.72	0.00	0.00	0.72	0.74	0.68	0.00	0.00	0.67	0.89	0.64	0.00	0.00	0.95	0.83	0.59	0.25	0.90
Volume			252					246					586					617			1701
%HV			0.8%					1.2%					4.1%					4.1%			3.2%
PHF			0.86					0.82					0.85					0.84			0.90



DOWL

Turning Movement Count

W Reserve Dr & Whitefish Stage Rd

Total Vehicles (15-Minute Periods)

PM Peak Hour

Wednesday, October 14, 2020

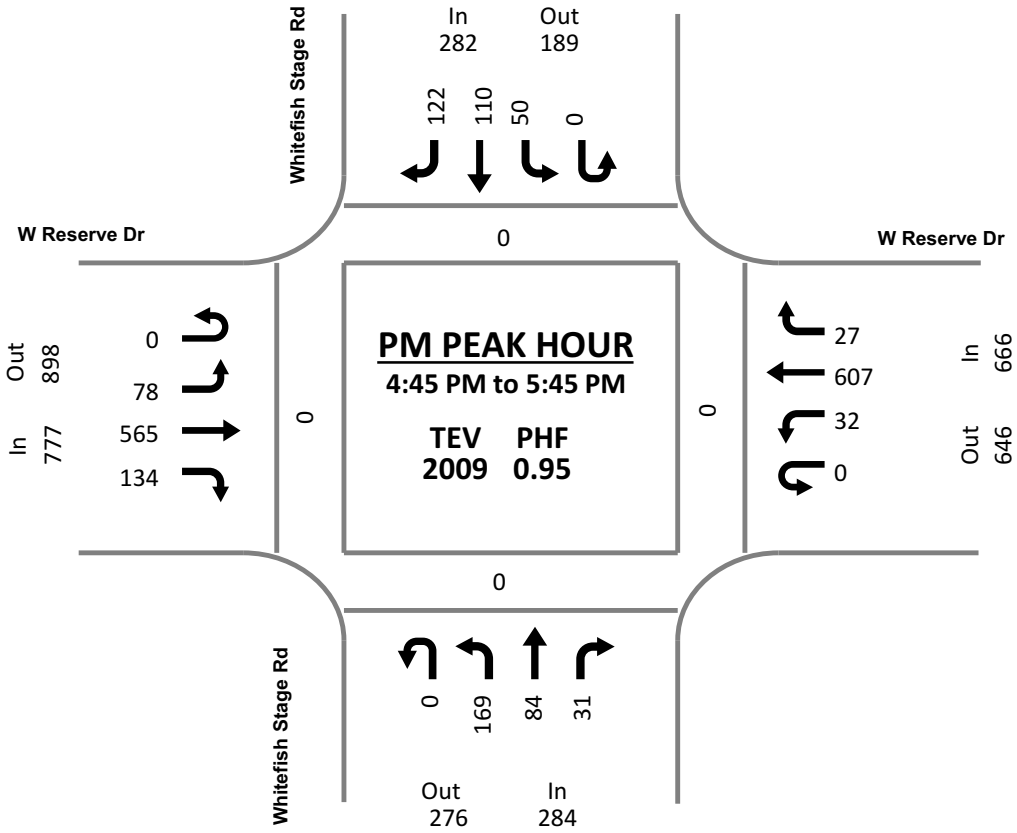
4:00 PM to 6:00 PM

Start Time	Whitefish Stage Rd (Northbound)					Whitefish Stage Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	50	12	10	0	0	13	24	24	0	0	8	137	37	0	0	5	114	4	0	438
4:15 PM	0	39	16	12	0	0	12	29	16	0	0	15	141	35	0	0	5	126	6	0	452
4:30 PM	0	48	23	2	0	0	8	30	30	0	0	15	131	36	0	0	11	135	9	0	478
4:45 PM	0	43	25	7	0	0	12	27	30	0	0	17	121	39	0	0	11	143	7	0	482
5:00 PM	0	41	21	7	0	0	22	28	32	0	0	18	143	31	0	0	8	152	4	0	507
5:15 PM	0	55	24	13	0	0	9	27	35	0	0	18	136	31	0	0	7	163	10	0	528
5:30 PM	0	30	14	4	0	0	7	28	25	0	0	25	165	33	0	0	6	149	6	0	492
5:45 PM	0	39	28	3	0	0	8	22	21	0	0	36	142	48	0	0	6	107	22	0	482
Total	0	345	163	58	0	0	91	215	213	0	0	152	1,116	290	0	0	59	1,089	68	0	3,859

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary
4:45 PM to 5:45 PM

Data Type	Whitefish Stage Rd (Northbound)					Whitefish Stage Rd (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	169	84	31	0	0	50	110	122	0	0	78	565	134	0	0	32	607	27	0	2009
%HV	0.0%	0.6%	1.2%	0.0%		0.0%	0.0%	0.9%	1.6%		0.0%	2.6%	1.1%	0.0%		0.0%	0.0%	0.7%	3.7%		0.9%
PHF	0.00	0.77	0.84	0.60	0.00	0.00	0.57	0.98	0.87	0.00	0.00	0.78	0.86	0.86	0.00	0.00	0.73	0.93	0.68	0.00	0.95
Volume			284					282					777					666			2009
%HV			0.7%					1.1%					1.0%					0.8%			0.9%
PHF			0.77					0.86					0.87					0.93			0.95



Turning Movement Count

W Reserve Dr & US 2

Total Vehicles (15-Minute Periods)

AM Peak Hour

Thursday, October 15, 2020

7:00 AM to 9:00 AM

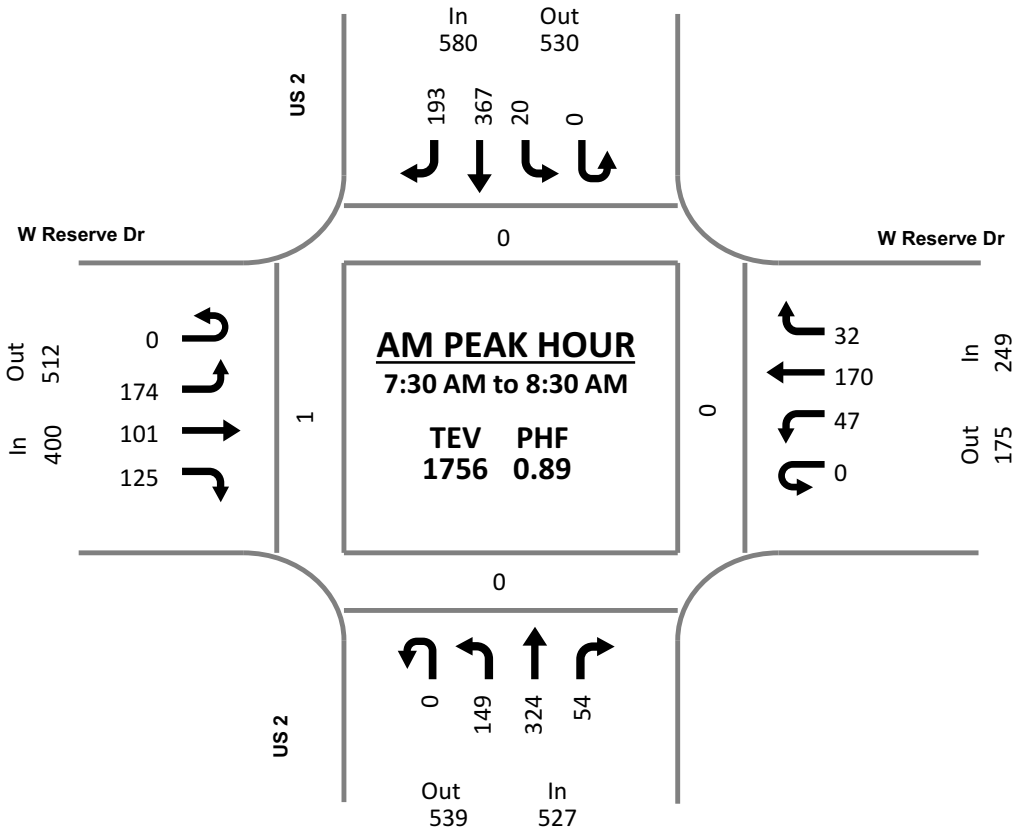
Start Time	US 2 (Northbound)					US 2 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
7:00 AM	0	26	63	15	0	0	5	48	48	0	0	35	15	24	0	0	12	18	5	0	314
7:15 AM	0	29	58	10	0	0	5	72	53	0	0	36	11	22	0	0	7	36	12	0	351
7:30 AM	0	35	87	17	0	0	6	107	52	0	0	46	31	32	0	0	9	40	8	0	470
7:45 AM	0	42	86	14	0	0	7	107	47	0	0	52	22	45	0	0	14	49	7	0	492
8:00 AM	0	41	74	11	0	0	4	82	48	0	0	29	21	23	1	0	11	38	9	0	391
8:15 AM	0	31	77	12	0	0	3	71	46	0	0	47	27	25	0	0	13	43	8	0	403
8:30 AM	0	34	95	11	0	0	7	108	52	0	0	29	14	17	0	0	4	37	11	0	419
8:45 AM	0	37	89	9	2	0	7	62	37	0	0	38	27	36	0	0	15	45	10	0	412
Total	0	275	629	99	2	0	44	657	383	0	0	312	168	224	1	0	85	306	70	0	3,252

*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary

7:30 AM to 8:30 AM

Data Type	US 2 (Northbound)					US 2 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	149	324	54	0	0	20	367	193	0	0	174	101	125	1	0	47	170	32	0	1756
%HV	0.0%	7.4%	7.7%	5.6%		0.0%	0.0%	6.8%	6.7%		0.0%	4.6%	2.0%	8.0%		0.0%	2.1%	1.2%	9.4%		5.9%
PHF	0.00	0.89	0.93	0.79	0.00	0.00	0.71	0.86	0.93	0.00	0.00	0.84	0.81	0.69	0.25	0.00	0.84	0.87	0.89	0.00	0.89
Volume			527					580					400					249			1756
%HV			7.4%					6.6%					5.0%					2.4%			5.9%
PHF			0.93					0.88					0.84					0.89			0.89



Turning Movement Count

W Reserve Dr & US 2

Total Vehicles (15-Minute Periods)

PM Peak Hour

Thursday, October 15, 2020

4:00 PM to 6:00 PM

Start Time	US 2 (Northbound)					US 2 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Period Total (Veh)
	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	U	L	T	R	Peds*	
4:00 PM	0	72	136	27	0	0	10	100	40	0	0	56	48	68	0	0	11	39	9	0	616
4:15 PM	0	53	122	20	0	0	9	123	65	0	0	77	42	54	0	0	23	21	6	0	615
4:30 PM	0	48	118	18	0	0	12	141	66	2	0	50	57	48	0	0	15	38	5	0	616
4:45 PM	0	55	106	16	0	0	14	126	61	0	0	63	49	44	0	0	19	54	5	0	612
5:00 PM	0	51	131	25	0	0	15	144	79	3	0	81	54	59	0	0	15	29	7	0	690
5:15 PM	0	55	148	33	0	0	10	143	61	0	0	64	49	46	0	0	11	33	10	0	663
5:30 PM	0	62	116	19	0	0	17	95	72	0	0	71	57	29	0	0	24	37	5	0	604
5:45 PM	0	57	108	20	0	0	13	84	47	0	0	53	54	34	0	0	19	37	9	0	535
Total	0	453	985	178	0	0	100	956	491	5	0	515	410	382	0	0	137	288	56	0	4,951

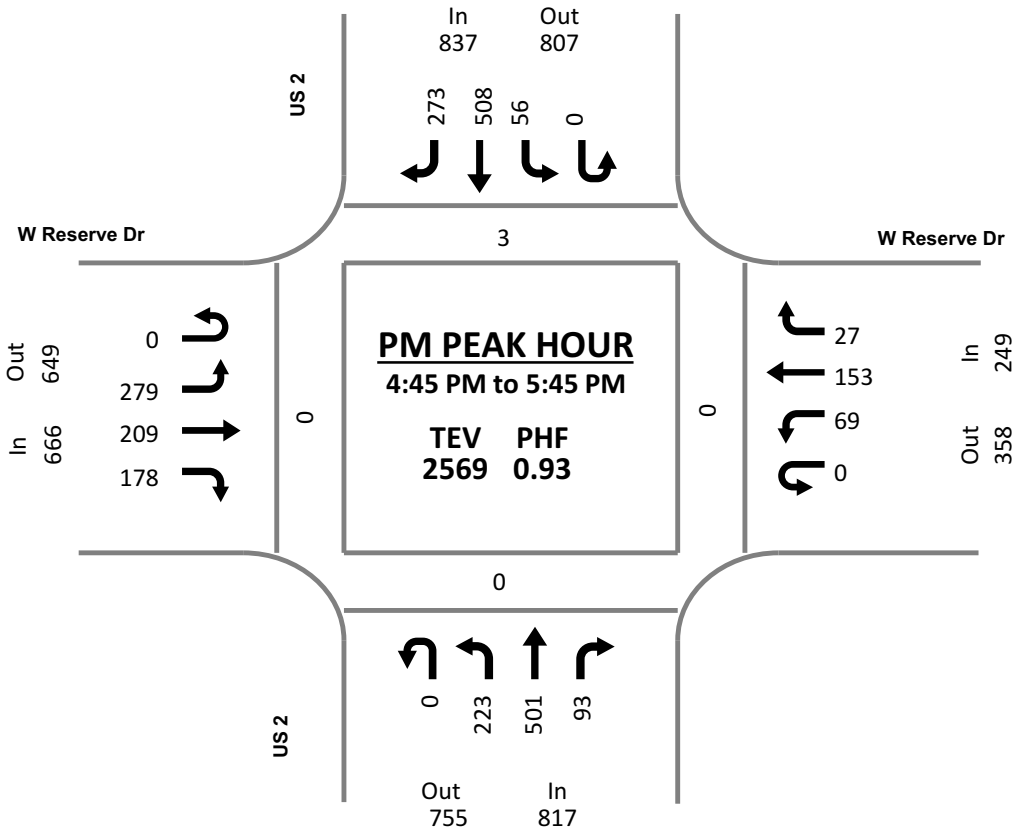
*Peds = Pedestrian and bicycle crossing counts using crosswalk on corresponding approach (volumes not included in "Period Total")

Peak Hour Summary (System Peak*)

4:45 PM to 5:45 PM

Data Type	US 2 (Northbound)					US 2 (Southbound)					W Reserve Dr (Eastbound)					W Reserve Dr (Westbound)					Peak Hour Total
	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	U	L	T	R	Peds	
Volume	0	223	501	93	0	0	56	508	273	3	0	279	209	178	0	0	69	153	27	0	2569
%HV	0.0%	2.7%	3.0%	0.0%		0.0%	0.0%	3.9%	4.8%		0.0%	3.2%	1.4%	2.2%		0.0%	0.0%	0.7%	0.0%		2.8%
PHF	0.00	0.90	0.85	0.70	0.00	0.00	0.82	0.88	0.86	0.25	0.00	0.86	0.92	0.75	0.00	0.00	0.72	0.71	0.68	0.00	0.93
Volume			817					837					666					249			2569
%HV			2.6%					3.9%					2.4%					0.4%			2.8%
PHF			0.87					0.88					0.86					0.80			0.93

*System Peak is based on comparison of other study area counts rather than highest total entering volume at this intersection.



ATTACHMENT 2: EXISTING OPERATIONAL ANALYSIS REPORTS

1: US 93 & US 93 ALT/W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.5	0.4	2.6	0.0	0.0	0.0	3.5	0.2	3.4	2.7	0.5	2.9
Total Del/Veh (s)	61.1	65.2	35.6	46.6	44.7	17.3	37.4	45.3	19.2	39.9	37.8	14.9

1: US 93 & US 93 ALT/W Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.9
Total Del/Veh (s)	42.3

2: Home Depot/Town Pump & W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.7	4.5	0.2
Total Del/Veh (s)	13.0	5.9	2.6	7.4	1.6	0.8	41.4	40.7	12.2	45.1	48.4	14.7

2: Home Depot/Town Pump & W Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	5.1

3: Hutton Ranch Rd & W Reserve Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	4.1	0.2	0.1
Total Del/Veh (s)	5.4	0.6	10.9	5.4	23.2	7.9	5.9

4: Country Way & Reserve Dr/W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0
Total Del/Veh (s)	7.4	3.9	2.9	10.1	2.8	1.2	37.6	17.9	11.3	4.0

5: Country Way N & Reserve Dr/W Reserve Dr Performance by movement

Movement	EBT	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.4	0.0		0.1	0.0
Total Del/Veh (s)	2.5	6.6	4.1		7.1	3.5

6: Whitefish Stage Rd & Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.1	0.1	0.3	0.0	0.0	0.6	0.5	0.7	0.3	0.3	0.3
Total Del/Veh (s)	31.7	33.0	27.4	34.1	42.8	34.6	95.0	102.0	99.1	25.9	30.0	21.8

6: Whitefish Stage Rd & Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	45.6

7: LaSalle US 2 & Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.0	0.0	0.3	0.4	0.4	3.1	0.2	0.3	3.0	0.2	0.3
Total Del/Veh (s)	36.2	27.4	21.0	52.3	51.7	38.1	29.3	16.3	8.8	30.9	32.7	22.8

7: LaSalle US 2 & Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	28.9

Total Network Performance

Denied Del/Veh (s)	0.9
Total Del/Veh (s)	65.5

Intersection: 1: US 93 & US 93 ALT/W Reserve Dr

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	LT	T	R	L	LT	T	R	L	T	T	R
Maximum Queue (ft)	404	605	546	85	276	306	302	160	77	248	210	194
Average Queue (ft)	279	341	259	24	155	208	198	67	25	141	100	81
95th Queue (ft)	411	509	456	64	236	282	279	128	61	215	192	162
Link Distance (ft)		1676	1676			719	719			1082	1082	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	380			380	380			380	400			495
Storage Blk Time (%)	1	5	0			0	0					
Queuing Penalty (veh)	2	11	0			0	0					

Intersection: 1: US 93 & US 93 ALT/W Reserve Dr

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	222	302	318	271
Average Queue (ft)	96	176	150	127
95th Queue (ft)	182	264	253	237
Link Distance (ft)		1155	1155	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	260			260
Storage Blk Time (%)	0	1	0	1
Queuing Penalty (veh)	0	1	1	2

Intersection: 2: Home Depot/Town Pump & W Reserve Dr

Movement	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	99	3	49	2	27	88	155
Average Queue (ft)	38	0	13	0	1	32	54
95th Queue (ft)	74	3	42	2	12	71	109
Link Distance (ft)		719		426	426	251	214
Upstream Blk Time (%)							0
Queuing Penalty (veh)							0
Storage Bay Dist (ft)	150		130				
Storage Blk Time (%)	0						
Queuing Penalty (veh)	0						

Intersection: 3: Hutton Ranch Rd & W Reserve Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	274	17	89	198	47	64
Average Queue (ft)	78	1	34	57	13	27
95th Queue (ft)	183	8	72	154	40	53
Link Distance (ft)	426	426		1116		1009
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)			70		200	
Storage Blk Time (%)			0	3		
Queuing Penalty (veh)			4	2		

Intersection: 4: Country Way & Reserve Dr/W Reserve Dr

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	30	30	94	42
Average Queue (ft)	2	2	32	8
95th Queue (ft)	15	17	74	34
Link Distance (ft)			312	230
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	100	100		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Country Way N & Reserve Dr/W Reserve Dr

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	21	36
Average Queue (ft)	1	5
95th Queue (ft)	10	23
Link Distance (ft)		338
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	100	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Whitefish Stage Rd & Reserve Dr

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	339	610	266	658	628	246
Average Queue (ft)	44	298	36	356	344	117
95th Queue (ft)	169	534	158	630	726	203
Link Distance (ft)		872		4497	1180	1222
Upstream Blk Time (%)					1	
Queuing Penalty (veh)					0	
Storage Bay Dist (ft)	325		490			
Storage Blk Time (%)		9		6		
Queuing Penalty (veh)		3		2		

Intersection: 7: LaSalle US 2 & Reserve Dr

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	229	320	434	220	214	224	96	338	378
Average Queue (ft)	113	139	224	108	100	86	25	187	199
95th Queue (ft)	196	270	385	193	179	175	68	306	334
Link Distance (ft)		3233	992		1188	1188		1230	1230
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	365			330			305		
Storage Blk Time (%)		0						1	
Queuing Penalty (veh)		0						0	

Network Summary

Network wide Queuing Penalty: 28

1: US 93 & US 93 ALT/W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.4	0.3	2.8	0.0	0.0	0.0	2.7	0.4	2.8	2.8	0.5	2.9
Total Del/Veh (s)	51.5	54.3	30.7	50.1	49.7	19.3	42.3	49.0	19.5	43.3	43.5	18.3

1: US 93 & US 93 ALT/W Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	41.4

2: Home Depot/Town Pump & W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.3	1.5	0.3	0.8
Total Del/Veh (s)	9.5	3.3	1.5	5.5	2.6	1.5	32.0	57.4	15.6	48.7	55.0	21.4

2: Home Depot/Town Pump & W Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	6.3

3: Hutton Ranch Rd & W Reserve Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	3.8	0.4	0.1
Total Del/Veh (s)	9.8	1.6	22.2	15.4	22.2	13.0	14.0

4: Country Way & Reserve Dr/W Reserve Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.1
Total Del/Veh (s)	5.8	3.8	9.8	3.2	47.3	10.3	11.3	4.4

5: Country Way N & Reserve Dr/W Reserve Dr Performance by movement

Movement	EBT	EBR	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.3	3.0	4.1	3.8

6: Whitefish Stage Rd & Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.4	1.0	1.1	0.1	0.1	0.0	7.2	5.8	4.3	0.4	0.4	0.4
Total Del/Veh (s)	38.2	45.3	37.9	34.7	46.9	41.2	225.6	237.2	206.8	33.5	38.3	28.1

6: Whitefish Stage Rd & Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	1.5
Total Del/Veh (s)	70.8

7: LaSalle US 2 & Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.4	0.1	0.2	0.3	0.3	0.3	2.9	0.3	0.4	2.8	0.2	0.4
Total Del/Veh (s)	39.6	41.8	33.0	104.2	106.5	96.0	40.9	23.2	16.7	49.4	53.9	46.5

7: LaSalle US 2 & Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	45.2

Total Network Performance

Denied Del/Veh (s)	1.4
Total Del/Veh (s)	77.1

Intersection: 1: US 93 & US 93 ALT/W Reserve Dr

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	LT	T	R	L	LT	T	R	L	T	T	R
Maximum Queue (ft)	306	342	287	132	288	328	324	112	312	429	387	259
Average Queue (ft)	188	233	120	45	163	223	222	50	96	256	225	117
95th Queue (ft)	281	321	252	106	246	301	305	99	203	379	343	217
Link Distance (ft)		1676	1676			719	719			1082	1082	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	380			380	380			380	400			495
Storage Blk Time (%)	0	0				0	0			1		
Queuing Penalty (veh)	0	0				0	0			1		

Intersection: 1: US 93 & US 93 ALT/W Reserve Dr

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	239	317	377	283
Average Queue (ft)	96	184	167	153
95th Queue (ft)	186	272	292	261
Link Distance (ft)		1155	1155	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	260			260
Storage Blk Time (%)	0	1	0	1
Queuing Penalty (veh)	0	2	1	3

Intersection: 2: Home Depot/Town Pump & W Reserve Dr

Movement	EB	EB	EB	WB	WB	NB	SB
Directions Served	L	T	TR	L	TR	LTR	LTR
Maximum Queue (ft)	85	6	16	58	25	170	189
Average Queue (ft)	35	0	1	20	2	60	74
95th Queue (ft)	69	6	8	50	13	120	156
Link Distance (ft)		719	719		426	251	214
Upstream Blk Time (%)						0	2
Queuing Penalty (veh)						0	0
Storage Bay Dist (ft)	150			130			
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Hutton Ranch Rd & W Reserve Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	271	45	95	436	60	170
Average Queue (ft)	114	8	67	179	20	77
95th Queue (ft)	223	31	107	389	50	136
Link Distance (ft)	426	426		1116		1009
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)			70		200	
Storage Blk Time (%)			6	13		0
Queuing Penalty (veh)			53	23		0

Intersection: 4: Country Way & Reserve Dr/W Reserve Dr

Movement	WB	NB	SB
Directions Served	L	LTR	LTR
Maximum Queue (ft)	29	52	20
Average Queue (ft)	2	11	1
95th Queue (ft)	15	39	11
Link Distance (ft)		312	230
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Country Way N & Reserve Dr/W Reserve Dr

Movement	EB
Directions Served	TR
Maximum Queue (ft)	12
Average Queue (ft)	1
95th Queue (ft)	9
Link Distance (ft)	1859
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Whitefish Stage Rd & Reserve Dr

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	371	796	326	657	1064	346
Average Queue (ft)	107	400	43	374	632	172
95th Queue (ft)	319	691	186	621	1196	293
Link Distance (ft)		872		4497	1180	1222
Upstream Blk Time (%)		0			8	
Queuing Penalty (veh)		0			0	
Storage Bay Dist (ft)	325		490			
Storage Blk Time (%)		19		5		
Queuing Penalty (veh)		15		2		

Intersection: 7: LaSalle US 2 & Reserve Dr

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	345	485	560	295	310	308	277	556	567
Average Queue (ft)	163	247	297	156	165	157	61	302	316
95th Queue (ft)	281	429	547	263	262	256	180	492	519
Link Distance (ft)		3233	992		1188	1188		1230	1230
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	365			330			305		
Storage Blk Time (%)		3		0	0			11	
Queuing Penalty (veh)		7		1	0			7	

Network Summary

Network wide Queuing Penalty: 115

ATTACHMENT 3: 2040 OPERATIONAL ANALYSIS REPORTS

1: US 93 & US 93 ALT/W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	502.2	497.1	520.4	0.0	0.0	0.0	2.9	0.4	3.0	386.5	378.3	387.0
Total Del/Veh (s)	310.9	270.5	172.2	50.3	48.7	27.7	49.6	48.4	28.6	695.6	138.8	91.8

1: US 93 & US 93 ALT/W Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	271.1
Total Del/Veh (s)	153.0

2: Home Depot/Town Pump & W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.8	0.6	0.9	0.0	0.0	0.0	115.9	130.4	120.3	527.5	528.9	530.7
Total Del/Veh (s)	50.6	46.2	8.1	11.5	2.1	1.1	257.5	583.3	306.6	371.3	591.0	240.0

2: Home Depot/Town Pump & W Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	38.9
Total Del/Veh (s)	41.2

3: Hutton Ranch Rd & W Reserve Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	3.9	0.0	0.1	0.1	4.0	0.3	1.7
Total Del/Veh (s)	37.4	0.9	21.0	9.3	52.6	38.8	22.7

4: Country Way & Reserve Dr/W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	SBR	All
Denied Del/Veh (s)	0.0	27.0	25.0	0.0	0.0	0.0	25.9	16.3	0.1	12.5
Total Del/Veh (s)	98.8	93.5	87.2	8.5	3.2	2.0	267.8	274.0	20.2	50.8

5: Country Way N & Reserve Dr/W Reserve Dr Performance by movement

Movement	EBT	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	1.0	0.1	0.1	0.1	0.1
Total Del/Veh (s)	220.2	15.5	4.7	52.2	173.9	97.8

6: Whitefish Stage Rd & Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	77.2	35.6	38.9	19.0	22.2	20.0	903.4	921.7	1003.6	0.4	0.4	0.4
Total Del/Veh (s)	119.6	126.0	123.1	381.4	397.0	405.0	466.6	464.9	448.8	37.5	42.7	35.4

6: Whitefish Stage Rd & Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	212.6
Total Del/Veh (s)	262.5

7: LaSalle US 2 & Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.0	0.1	484.5	482.3	508.7	890.1	889.5	867.8	2.6	0.3	0.5
Total Del/Veh (s)	140.8	45.5	39.7	305.4	308.9	297.3	769.8	30.0	22.5	35.0	41.6	46.6

7: LaSalle US 2 & Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	360.1
Total Del/Veh (s)	139.7

Total Network Performance

Denied Del/Veh (s)	387.2
Total Del/Veh (s)	306.1

Intersection: 1: US 93 & US 93 ALT/W Reserve Dr

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	LT	T	R	L	LT	T	R	L	T	T	R
Maximum Queue (ft)	405	1727	1726	372	345	413	379	253	146	359	345	348
Average Queue (ft)	399	1702	1699	82	199	248	236	94	46	211	179	150
95th Queue (ft)	452	1720	1714	291	309	367	354	201	104	320	321	303
Link Distance (ft)		1676	1676			719	719			1082	1082	
Upstream Blk Time (%)		91	58									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (ft)	380			380	380			380	400			495
Storage Blk Time (%)	6	57	17	0	0	1	1	0			0	1
Queuing Penalty (veh)	41	185	11	0	0	2	1	0			0	3

Intersection: 1: US 93 & US 93 ALT/W Reserve Dr

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	285	1213	1208	285
Average Queue (ft)	284	1152	1119	241
95th Queue (ft)	289	1310	1458	375
Link Distance (ft)		1155	1155	
Upstream Blk Time (%)		64	50	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	260			260
Storage Blk Time (%)	97	7	15	9
Queuing Penalty (veh)	374	14	88	35

Intersection: 2: Home Depot/Town Pump & W Reserve Dr

Movement	EB	EB	EB	WB	WB	NB	SB
Directions Served	L	T	TR	L	TR	LTR	LTR
Maximum Queue (ft)	175	765	772	68	22	273	255
Average Queue (ft)	100	363	265	20	2	159	200
95th Queue (ft)	209	919	819	52	12	316	291
Link Distance (ft)		719	719		426	251	214
Upstream Blk Time (%)		8	5			34	70
Queuing Penalty (veh)		47	27			0	0
Storage Bay Dist (ft)	150			130			
Storage Blk Time (%)	0	36					
Queuing Penalty (veh)	1	47					

Intersection: 3: Hutton Ranch Rd & W Reserve Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	448	67	94	421	83	168
Average Queue (ft)	306	3	45	135	24	65
95th Queue (ft)	566	47	87	319	62	135
Link Distance (ft)	426	426		1116		1009
Upstream Blk Time (%)	13	0				
Queuing Penalty (veh)	64	0				
Storage Bay Dist (ft)			70		200	
Storage Blk Time (%)			2	7		0
Queuing Penalty (veh)			32	8		0

Intersection: 4: Country Way & Reserve Dr/W Reserve Dr

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	L	LTR	LTR
Maximum Queue (ft)	84	1124	22	272	47
Average Queue (ft)	9	775	2	151	10
95th Queue (ft)	56	1578	13	314	38
Link Distance (ft)		1116		312	230
Upstream Blk Time (%)		4		11	
Queuing Penalty (veh)		42		0	
Storage Bay Dist (ft)	100		100		
Storage Blk Time (%)	0	49			
Queuing Penalty (veh)	0	3			

Intersection: 5: Country Way N & Reserve Dr/W Reserve Dr

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	1873	25	69
Average Queue (ft)	1690	2	16
95th Queue (ft)	2302	13	57
Link Distance (ft)	1859		338
Upstream Blk Time (%)	10		
Queuing Penalty (veh)	111		
Storage Bay Dist (ft)		100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Whitefish Stage Rd & Reserve Dr

Movement	EB	EB	WB	WB	B13	NB	SB
Directions Served	L	TR	L	TR	T	LTR	LTR
Maximum Queue (ft)	400	888	565	4528	974	1236	452
Average Queue (ft)	93	877	166	3274	174	1206	234
95th Queue (ft)	325	886	547	5065	816	1224	382
Link Distance (ft)		872		4497	3233	1180	1222
Upstream Blk Time (%)		36		23		99	
Queuing Penalty (veh)		360		234		0	
Storage Bay Dist (ft)	325		490				
Storage Blk Time (%)		57		56			
Queuing Penalty (veh)		29		31			

Intersection: 7: LaSalle US 2 & Reserve Dr

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	428	836	1045	480	1245	1230	362	646	724
Average Queue (ft)	253	318	1016	480	1213	1011	55	327	381
95th Queue (ft)	473	920	1045	481	1244	1691	208	568	641
Link Distance (ft)		3233	992		1188	1188		1230	1230
Upstream Blk Time (%)			96		96	22			
Queuing Penalty (veh)			0		0	0			
Storage Bay Dist (ft)	365			330			305		
Storage Blk Time (%)	17	1		100				12	
Queuing Penalty (veh)	75	2		312				7	

Network Summary

Network wide Queuing Penalty: 2184

1: US 93 & US 93 ALT/W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	33.0	31.4	33.0	0.0	0.0	0.0	297.0	288.7	293.8	395.9	407.2	406.9
Total Del/Veh (s)	268.2	207.6	106.5	51.6	52.8	22.6	163.4	193.4	104.6	539.7	152.6	121.1

1: US 93 & US 93 ALT/W Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	225.8
Total Del/Veh (s)	163.8

2: Home Depot/Town Pump & W Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.3	1.4	2.1	0.0	0.0	0.0	823.2	921.3	812.8	1078.4	1102.8	1093.1
Total Del/Veh (s)	36.0	31.5	4.4	12.4	2.8	1.7	386.4	414.3	380.0	473.8	425.7	331.5

2: Home Depot/Town Pump & W Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	178.4
Total Del/Veh (s)	46.5

3: Hutton Ranch Rd & W Reserve Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	7.0	21.3	6.0	7.5	319.1	311.8	64.3
Total Del/Veh (s)	55.0	2.0	86.2	66.2	316.6	343.6	105.0

4: Country Way & Reserve Dr/W Reserve Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	SBR	All
Denied Del/Veh (s)	109.0	117.3	102.5	42.0	61.9	7.0	0.1	73.2
Total Del/Veh (s)	109.5	102.9	49.9	55.0	1130.1	608.0	300.6	87.0

5: Country Way N & Reserve Dr/W Reserve Dr Performance by movement

Movement	EBT	EBR	WBT	NBR	All
Denied Del/Veh (s)	26.3	0.0	0.0	0.1	11.3
Total Del/Veh (s)	253.5	360.4	5.5	1506.9	117.9

6: Whitefish Stage Rd & Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	159.1	139.0	134.6	21.5	23.4	18.1	1098.8	1114.9	1117.1	0.5	0.5	0.5
Total Del/Veh (s)	158.9	128.1	121.8	244.0	272.4	274.1	625.5	642.0	617.5	65.7	69.5	61.3

6: Whitefish Stage Rd & Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	267.0
Total Del/Veh (s)	221.4

7: LaSalle US 2 & Reserve Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.6	0.4	0.4	38.2	41.1	40.0	920.9	901.3	906.9	370.1	366.2	367.0
Total Del/Veh (s)	62.4	38.0	29.3	186.4	188.5	178.1	677.1	51.8	45.6	219.0	228.2	244.0

7: LaSalle US 2 & Reserve Dr Performance by movement

Movement	All
Denied Del/Veh (s)	466.9
Total Del/Veh (s)	181.4

Total Network Performance

Denied Del/Veh (s)	444.0
Total Del/Veh (s)	317.2

Intersection: 1: US 93 & US 93 ALT/W Reserve Dr

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	LT	T	R	L	LT	T	R	L	T	T	R
Maximum Queue (ft)	405	1720	1715	404	318	366	358	192	425	1116	1124	520
Average Queue (ft)	400	1444	1372	111	177	236	233	61	340	1097	1101	495
95th Queue (ft)	422	2039	2065	305	280	331	337	143	559	1136	1140	659
Link Distance (ft)		1676	1676			719	719			1082	1082	
Upstream Blk Time (%)		36	21							40	56	
Queuing Penalty (veh)		0	0							0	0	
Storage Bay Dist (ft)	380			380	380			380	400			495
Storage Blk Time (%)	15	58	7	0	0	0	0	0	0	61	55	2
Queuing Penalty (veh)	67	161	8	0	0	1	0	0	0	120	243	8

Intersection: 1: US 93 & US 93 ALT/W Reserve Dr

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	285	1205	1207	285
Average Queue (ft)	281	1166	1173	277
95th Queue (ft)	307	1270	1261	325
Link Distance (ft)		1155	1155	
Upstream Blk Time (%)		49	70	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	260			260
Storage Blk Time (%)	88	9	15	22
Queuing Penalty (veh)	324	18	98	83

Intersection: 2: Home Depot/Town Pump & W Reserve Dr

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (ft)	175	678	603	87	3	23	279	234
Average Queue (ft)	98	246	105	30	0	2	254	224
95th Queue (ft)	201	656	463	67	3	15	312	241
Link Distance (ft)		719	719		426	426	251	214
Upstream Blk Time (%)		2	1				91	98
Queuing Penalty (veh)		10	5				0	0
Storage Bay Dist (ft)	150			130				
Storage Blk Time (%)	1	27		0				
Queuing Penalty (veh)	2	42		1				

Intersection: 3: Hutton Ranch Rd & W Reserve Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	457	165	95	1117	225	1028
Average Queue (ft)	380	15	81	926	109	862
95th Queue (ft)	533	101	114	1393	279	1330
Link Distance (ft)	426	426		1116		1009
Upstream Blk Time (%)	18	0		2		67
Queuing Penalty (veh)	82	1		42		0
Storage Bay Dist (ft)			70		200	
Storage Blk Time (%)			27	18	0	86
Queuing Penalty (veh)			386	52	0	34

Intersection: 4: Country Way & Reserve Dr/W Reserve Dr

Movement	EB	WB	WB	NB	SB
Directions Served	TR	L	TR	LTR	LTR
Maximum Queue (ft)	1125	75	1192	240	34
Average Queue (ft)	967	4	573	130	5
95th Queue (ft)	1537	36	1510	295	22
Link Distance (ft)	1116		1859	312	230
Upstream Blk Time (%)	4		0	8	
Queuing Penalty (veh)	44		0	0	
Storage Bay Dist (ft)		100			
Storage Blk Time (%)	56		21		
Queuing Penalty (veh)	0		1		

Intersection: 5: Country Way N & Reserve Dr/W Reserve Dr

Movement	EB	WB	NB
Directions Served	TR	T	LR
Maximum Queue (ft)	1874	52	114
Average Queue (ft)	1820	8	53
95th Queue (ft)	2099	84	165
Link Distance (ft)	1859	872	338
Upstream Blk Time (%)	12		
Queuing Penalty (veh)	140		
Storage Bay Dist (ft)			
Storage Blk Time (%)		1	
Queuing Penalty (veh)		0	

Intersection: 6: Whitefish Stage Rd & Reserve Dr

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	400	886	565	3427	1221	734
Average Queue (ft)	195	877	162	2114	1200	408
95th Queue (ft)	458	886	533	3663	1223	681
Link Distance (ft)		872		4497	1180	1222
Upstream Blk Time (%)		36			99	
Queuing Penalty (veh)		408			0	
Storage Bay Dist (ft)	325		490			
Storage Blk Time (%)		56		56		
Queuing Penalty (veh)		73		37		

Intersection: 7: LaSalle US 2 & Reserve Dr

Movement	EB	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	441	570	964	480	1238	1220	430	1281	1283
Average Queue (ft)	228	267	723	480	1210	1147	242	1251	1254
95th Queue (ft)	417	497	1205	482	1243	1502	536	1276	1275
Link Distance (ft)		3233	992		1188	1188		1230	1230
Upstream Blk Time (%)			30		96	21		61	78
Queuing Penalty (veh)			0		0	0		0	0
Storage Bay Dist (ft)	365			330			305		
Storage Blk Time (%)	3	4		97	1		2	67	
Queuing Penalty (veh)	22	15		448	2		7	63	

Network Summary

Network wide Queuing Penalty: 3050