CITY OF BILLINGS

CITY OF BILLINGS VISION STATEMENT:

"THE MAGIC CITY: A DIVERSE, WELCOMING COMMUNITY WHERE PEOPLE PROSPER AND BUSINESS SUCCEEDS."

AGENDA

COUNCIL CHAMBERS June 27, 2016 6:30 P.M.

CALL TO ORDER: Mayor Hanel

PLEDGE OF ALLEGIANCE: Mayor Hanel

INVOCATION: Councilmember Brewster

ROLL CALL: Councilmembers present on roll call were:

MINUTES: June 13, 2016

COURTESIES:

PROCLAMATIONS:

ADMINISTRATOR REPORTS - TINA VOLEK

PUBLIC COMMENT on "NON-PUBLIC HEARING" Agenda Items: #1 ONLY. Speaker sign-in required. (Comments offered here are limited to one (1) minute for one item, or three (3) minutes for multiple items. Please sign in at the cart located at the back of the council chambers or at the podium. Comment on items listed as public hearing items will be heard ONLY during the designated public hearing time for each respective item. For Items not on this agenda, public comment will be taken at the end of the agenda.)

1. **CONSENT AGENDA** -- Separations:

   A. **Bid Awards:**

1. **W.O. 11-12 HHW Facility Parking Lot.** (Opened 06/14/16) Recommend CMG Construction, $139,760.

2. **W.O. 16-17; 2016 Miscellaneous Locations Valley Gutter Construction.** (Opened 5/24/16) Recommend J&J Concrete, Inc., $98,695.

B. **Landfill Agreement** with Yellowstone County; $171,667 annual revenue for the Solid Waste Fund, and $8,583 in franchise fees for the General Fund in FY 2017.

C. **Evidence Facility CCTV Security System Agreement** with TelNet Systems, $101,425.

D. **Amendment #3, W.O. 09-15 Grand Avenue Zimmerman Trail to Shiloh Road,** Professional Services Contract, HDR Engineering, Inc., $58,590.

E. **Consultant Agreement** with Kadrmas, Lee & Jackson, Inc. to complete the 5th Avenue North Corridor Feasibility Study, not to exceed $80,000.

F. **Approval** of new Automobile Rental Concession and Lease Agreements with: Overland West, Inc., DBA Hertz, Corpat, Inc. DBA Alamo/National, Enterprise, Avis/Budget, DTG Operations, DBA Thrifty/Dollar; 7/1/2016-6/30/2021; guaranteed revenue of $5,757,510 over the five-year period.

G. **Acceptance of Donation** to the Billings Fire Department from Yellowstone County Tavern Association for new patient lift devices; $1,500.

H. **Resolution** relating to $4,935,00 pooled tax increment bonds, Series 2016 (Phase 2 Sanitary Sewer and Orchard Lane projects in the South Billings Urban Renewal District (SBURD)); fixing the form and details and providing for the execution, delivery, and security.

I. **Resolution** amending Resolution #16-10544 correcting the legal description of the property annexed in Annexation #16-03.

J. **Resolution** for Proposed Fee Increase for Mountview Cemetery.

K. **Second/Final Reading Ordinance** amending City Code Article 26-200, Water and Wastewater Service Area.

L. **Preliminary Major Plat** of Emma Jean Heights Subdivision, generally located on the west side of Bitterroot Drive, south of Wicks Lane, in the northeast Billings Heights; Felton Associates, Inc., owner; Northern Engineering and Consulting Inc., agent; conditional approval and adoption of the findings of fact.

M. **W.O. 15-05, Poly Drive Bike & Pedestrian,** Final Payment; $383, 599.82.

N. **Recommendation of approval** to the Policy Coordinating Committee for the West End Multi-Modal Traffic Modeling Study.

O. **Cancellation of Checks and Warrants.**

P. **Bills and Payroll:**

1. May 31, 2016

2. June 6, 2016

REGULAR AGENDA:

2. **PUBLIC HEARING AND RESOLUTION** approving and adopting Budget Amendments for FY16. Staff recommends approval. (Action: approval or disapproval of staff recommendation.)

3. **CONTINUANCE OF PUBLIC HEARING AND RESOLUTION** vacating a portion of Montgomery Street near Hansen Lane and accepting a utility easement, Popelka Enterprises, petitioner. Staff recommends approval. (Action: approval or disapproval of staff recommendation.)

4. **PUBLIC HEARING AND SPECIAL REVIEW #943:** a special review to locate a Jiffy Lube service station, in an Neighborhood Commercial (NC) zoning district on a 13,068 square foot parcel of land described as: Lot 9A, Block 2, Justiss Subdivision, 1st Amended. Jason Smith and Matt Johnson, agents. Zoning Commission recommends conditional approval and adoption of the findings of the 3 criteria. (Action: approval or disapproval of Zoning Commission recommendation.)

PUBLIC COMMENT on Non-Agenda Items -- Speaker Sign-in required. (*Restricted to ONLY items not on this printed agenda. Comments here are limited to 3 minutes. Please sign in at the cart located at the back of the council chambers or at the podium.)*

COUNCIL INITIATIVES

ADJOURN

Additional information on any of these items is available in the City Clerk's Office.

Reasonable accommodations will be made to enable individuals with disabilities to attend this meeting. Please notify Billie Guenther, City Clerk, at 657-8210.

Consent **1. A. 1.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Bid Award: W.O. 11-12 HHW Facility Parking Lot

PRESENTED BY: David Mumford, Public Works Director

Department: Public Works

PROBLEM/ISSUE STATEMENT

This project is part of the City Solid Waste providing an area for residents of Billings to safely dispose of household hazardous waste (HHW) products. Solid Waste has already purchased two HHW material storage buildings and this project will provide a small parking lot area to set the buildings and provide parking for drop off. Staff opened bids on June 14, 2016, for Work Order 11-12, HHW Facility Parking Lot. The contract was advertised on May 26th and June 2nd and 9th in the Billings Times and on the City's website. CMG Construction submitted the lowest responsible bid.

ALTERNATIVES ANALYZED

The Council may:

- Award W.O. 11-12, HHW Facility Parking Lot to CMG Construction in the amount of $139,760.00; or
- Do not award a contract and reject all bids. If this project is not awarded, the HHW buildings will be set on a dirt parking area.

FINANCIAL IMPACT

The following bids were received and evaluated:

Contractor	Bid Amount
LGI Construction	$141,196.00
CMG Construction	$139,760.00
Knife River	$151,217.00
Hardrives Construction	$193,496.30
Asphalt Plus	$170,925.00
Whorton Asphalt	$184,461.50
Matriarch Construction	$166,064.10

The funding for the project was budgeted in FY16 and the source is the Solid Waste Fund. The previously encumbered funds represent the purchase of the HHW buildings.

Project Budget	$400,000
Previously Encumbered	$45,680
This Contract	$139,760
Budget Remaining	$214,560

RECOMMENDATION

Staff recommends the City Council award a contract for W.O. 11-12, HHW Facility Parking Lot to CMG Construction in the amount of $139,760.00.

APPROVED BY CITY ADMINISTRATOR

Consent **1. A. 2.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Bid Award: W.O. 16-17; 2016 Miscellaneous Locations Valley Gutter Construction

PRESENTED BY: David Mumford, Public Works Director

Department: Public Works

PROBLEM/ISSUE STATEMENT

W.O. 16-17; 2016 Miscellaneous Locations Valley Gutter Construction project is to install and reconstruct valley gutters at existing stormwater trouble spots. The project was advertised on May 12th and 19th in the Billings Times and on the City's Website. Bids were opened on May 24, 2016 and the City received three bids. Action on this contract award was delayed at the June 13, 2016 Council meeting.

A public agency in Montana must award a public contract for construction, repair, and public works to the lowest responsible bidder without regard for residency. However, a Montana resident bidder must be allowed a preference on a contract against the bid of a nonresident bidder from any state or country that enforces a preference for resident bidders. The preference given to Montana resident bidders must be equal to the preference given in the other state or country.

Wyoming's bid preference statute provides that Wyoming resident bidders will receive preference over nonresident bidders if the nonresident bid is not more than 5% lower than the lowest resident bid. Therefore, although Wyoming's nonresident bidder (EHC, LLC) submitted the lowest construction bid and would otherwise be awarded the project, its nonresident bid is not more than 5% lower than the lowest Montana resident bidder (J&J Concrete, Inc). In this case, EHC, LLC was only 4.4% ($4,335.50) lower than J&J Concrete, Inc. Therefore, the City must award this construction to the Montana resident low bidder, J&J Concrete, Inc.

ALTERNATIVES ANALYZED

City Council may:

- Approve the construction contract with J&J Concrete, Inc. in the amount of $98,695; or,
- Do not approve the construction contract and reject all bids. If the project is not approved, the City will continue to experience ongoing maintenance problems. Future repair costs can be minimized by completing this project.

FINANCIAL IMPACT

The following bids were received and evaluated:

Contractor	Bid Amount
J&J Concrete, Inc.	$98,695.00
CMG Construction, Inc.	$102,705.00
EHC, LLC	$94,359.50

Funding for this project will be from Storm Drain Funds budgeted in FY16.

Budget	$150,000
Previously Encumbered	$0
This Project	$98,695
Remaining budget	$51,305

RECOMMENDATION

Staff recommends that Council approve a contract with J&J Concrete, Inc. for W.O. 16-17, 2016 Misc. Locations Valley Gutter Construction in the amount of $98,695.

APPROVED BY CITY ADMINISTRATOR

Consent **1. B.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Landfill Use Agreement with Yellowstone County

PRESENTED BY: David Mumford, Public Works Director

Department: Public Works

PROBLEM/ISSUE STATEMENT

The Billings Regional Landfill currently accepts waste from Yellowstone County. Disposal of waste picked up and hauled by private haulers is charged directly to those haulers. Yellowstone County is only charged for the estimated tonnage of self-haul residential waste. The agreement with Yellowstone County is for fiscal year 2017 and the dollar amount is based on the landfill fees approved by Council on June 13, 2016.

ALTERNATIVES ANALYZED

City Council may:

- Approve the landfill agreement with Yellowstone County, or;
- Disapprove the agreement. If Council does not approve the agreement, there would be a loss of revenue for the Solid Waste Fund.

FINANCIAL IMPACT

The landfill agreement will generate $171,667 in revenue for the Solid Waste Fund, as well as $8,583 in franchise fees for the General Fund in FY 2017.

RECOMMENDATION

Staff recommends the City Council approve the one-year landfill agreement with Yellowstone County.

APPROVED BY CITY ADMINISTRATOR

Attachments

Landfill Agreement

LANDFILL USE AGREEMENT

THIS AGREEMENT made and entered into this 27th day of June 2016, by and between the CITY OF BILLINGS, MONTANA, a municipal corporation, hereinafter referred to as "CITY" and the YELLOWSTONE COUNTY SOLID WASTE DISPOSAL DISTRICT, hereinafter referred to as "DISTRICT."

WITNESSETH:

WHEREAS, the DISTRICT and its residents are desirous of using the landfill facilities of the CITY for the disposal of solid waste; and

WHEREAS, the CITY is willing to allow the DISTRICT and its residents use of its landfill facilities during normal published operating times.

NOW THEREFORE, in consideration of the mutual covenants and agreements between the parties hereto, it is mutually agreed as follows:

1. **DEFINITIONS**
   a. Landfill – The term "Landfill" shall mean the Billings Regional Landfill situated in Yellowstone County, owned and operated by the City of Billings.
   b. Other Waste – The term "other waste" shall mean construction and demolition refuse, dead animals, non-processed tires, asbestos, and special waste such as contaminated soil, sludges, and treated timbers.
   c. Refuse – The term "refuse" shall mean all approved and permitted wastes that lawfully may be disposed of in the Landfill.
   d. Residential Municipal Solid Waste – The term "residential municipal solid waste" shall mean any refuse not falling under the definition of "Other Waste" and generated from or at a property used as a residential dwelling.

2. **TERM**. The term of this AGREEMENT shall be from July 1, 2016 through June 30, 2017. Either party may terminate this AGREEMENT at any time with or without cause, upon six months written notice to the other party. In the event of such termination, a pro rata payment shall be paid or refunded, depending on the termination date.

3. **USE OF FACILITIES**. The CITY will permit the DISTRICT and its residents to use its landfill facility for disposal of refuse generated within the area of the DISTRICT at such times as said landfill shall be open for disposal of refuse. The DISTRICT agrees to use facilities in accordance with all applicable federal and state legislation, all applicable local ordinances including, but not limited to Billings Municipal Code, Chapter 21, and all applicable federal, state, and local administrative rules in order to promote the health, safety, and welfare of the citizens of Billings, Montana.

4. **PAYMENT FOR RESIDENTIAL MUNICIPAL SOLID WASTE**. For the period from July 1, 2016 through June 30, 2017, the DISTRICT agrees to pay the CITY the sum of one hundred eighty thousand two hundred fifty dollars ($180,250.00) for residential municipal solid waste hauled by District residents from their primary residence. One half of this amount shall be paid semi-annually on or before July 1, 2016 and January 1, 2017.

   DISTRICT residents will not be charged at the Landfill for residential municipal solid waste hauled by residential users for loads less than 1.5 yards or 700 pounds, but will be charged for other waste of any volume or weight.

5. **INDEMNITY**. Each of the parties hereto shall indemnify, hold harmless, and defend the other party, its agents, employees or officials, against any and all claims, demands, causes of action, damages, costs, expenses, liability, or judgments against the other party for personal injury, death, or property damage caused by the negligence of the other party, its agents, employees or contractors arising from, growing out of, or in any way connected with or incidental to performance of this agreement.

Indemnity under this agreement shall commence on the date of execution hereof and shall continue for the entire term this agreement is in effect and for any applicable period of limitations thereafter. Either party shall notify the other party, in writing, within ten (10) days of any claim made on the obligations indemnified against hereunder.

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

CITY OF BILLINGS, MONTANA

By _____
THOMAS HANEL, MAYOR

APPROVED AS TO FORM:

By _____
BRENT BROOKS, CITY Attorney

_____
BOARD OF COUNTY COMMISSIONERS
YELLOWSTONE COUNTY, MONTANA

_____
BILL KENEDY, Chairman

_____
JOHN OSTLUND, Member

_____
JAMES E. RENO, Member

Consent **1. C.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Evidence Facility CCTV Security System

PRESENTED BY: Rich St. John, Police Chief

Department: Police

PROBLEM/ISSUE STATEMENT

The Purchasing Agent and Police Department recently prepared a Request for Proposals (RFP) for a new CCTV Security System at the Police Evidence Facility (PD-2). The RFP was advertised May 5 and 12, 2016, and a mandatory pre-proposal walk-through was held on-site on May 17, 2016. Seven company representatives attended the walk-through and submitted the Intent to Respond form. Five companies submitted proposals: Collins Communications, Honcoop Technology Services, Kenco Security and Technology, Security Management Systems and TelNet Systems.

A City staff committee evaluated the proposals for comprehensiveness of products and services provided, related experience and prior City experience. The committee voted unanimously to recommend the proposal from TelNet Systems.

ALTERNATIVES ANALYZED

City Council may:

- Approve a contract with TelNet Systems in the amount of $101,425.00, or;
- Disapprove the contract with TelNet Systems and provide additional guidance to staff.

FINANCIAL IMPACT

The cost of this project has been budgeted in the Police Department/Public Safety Fund .

RECOMMENDATION

Staff recommends that the City Council approve the contract for a PD-2 CCTV Security System with TelNet Systems for $101,425.00.

APPROVED BY CITY ADMINISTRATOR

Consent **1. D.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: W.O. 09-15 Grand Avenue Zimmerman Trail to Shiloh Road - Professional Services Contract Amendment #3

PRESENTED BY: David Mumford, Public Works Director

Department: Public Works

PROBLEM/ISSUE STATEMENT

The professional services contract with HDR Engineering, Inc. for design of Work Order 09-15 Grand Avenue, Zimmerman Trail to Shiloh Road, was approved at the November 9, 2009, City Council Meeting. Design was delayed to allow discussion of access issues with the adjacent property owners and due to the fact that construction will not be until 2016. The original contract with HDR Engineering, Inc. did not include the design of roundabouts, development of the specifications, or construction administration. Contract Amendment #1 was approved in 2014 for the design of the roundabouts. With the design of the contract, it was decided that the construction contract would last for 120 days, and Contract Amendment #2 was approved in 2015 for construction administration for a 120 day construction project. During the bidding process and after discussions with the potential contractors, it was decided to expand the construction contract to 150 days. Contract Amendment #3 includes contract administration for the extra 30 days of construction. The construction administration includes full time inspection and testing during construction.

ALTERNATIVES ANALYZED

The Council may:

• Approve Professional Services Contract Amendment #3 in the amount of $58,590.00; or

• Do not approve Professional Services Contract Amendment #3. If not approved, construction administration will have to re-evaluated for the last 30 days of construction. This would make construction difficult for the last 30 days and there would be little to no oversite of the contractor.

FINANCIAL IMPACT

This Contract Amendment #3 is for $58,590.00 and brings the total professional services contract with HDR Engineering, Inc. to $624,758.00. Funding for this project is from arterial and gas tax funds. There is sufficient funding in the budget for this amendment.

RECOMMENDATION

Staff recommends that Council approve Professional Services Contract Amendment #3 with HDR Engineering, Inc. in the amount of $58,590.00 for W.O. 09-15, Grand Avenue, Zimmerman Trail to Shiloh Road.

APPROVED BY CITY ADMINISTRATOR

Attachments

Contract Amendment #3

AMENDMENT NO. 3

TO

CONTRACT FOR PROFESSIONAL ENGINEERING SERVICES

W.O. 09-15

GRAND AVENUE – ZIMMERMAN TRAIL TO SHILOH ROAD

THIS AGREEMENT, made and entered into on November 9, 2009, by and between the following:

CITY OF BILLINGS, a Municipal Corporation,
Billings, Montana 59103,
Hereinafter designated the City

and

HDR Engineering, Inc.
970 S. 29th Street W
Billings, Montana 59102
Hereinafter designated the Contractor

WITNESSETH:

WHEREAS, the City and Contractor have entered into a contract dated November 9, 2009, for Contractor to provide engineering services to the City for Work Order 09-15 Grand Avenue – Zimmerman Trail to Shiloh Road, and;

WHEREAS, the City has need for additional engineering services, and;

WHEREAS, the City has authority to contract for consulting engineering services, and;

WHEREAS, the Contractor represents that he is qualified to perform such services, is in compliance with Montana Statutes relating to the registration of professional engineers and is willing to furnish such services to the City;

NOW, THEREFORE, in consideration of the terms, conditions, covenants and performance contained herein, or attached and incorporated herein, the Parties hereto agree as follows:

Part I, Section 4. is amended as follows:

Increase the amount of compensation by Fifty Eight Thousand Five Hundred Ninety and no/100 DOLLLARS ($58,590.00) to Six Hundred Twenty Four Thousand Seven Hundred Fifty Eight and no/100 DOLLARS ($624,758.00).

Appendix A, Section 3. Modify the following to the Scope of Work:

- Modify Task 602 – Office Assistance and Administration to include:
  - Increase duration of office assistance and administration during construction from 120 calendar days to 150 calendar days.
- Modify Task 603 – Field Services to include:
  - Increase duration of full-time on-site construction administration from 120 calendar days to 150 calendar days.
  - Provide additional construction staking services to include luminaire poles, signal poles, controller cabinets and full pavement marking layout.
  - Provide additional material testing services for increased construction duration from 120 days to 150 days and existing field conditions.

All other terms and conditions of the contract to which this amendment applies shall remain in full effect.

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

CITY OF BILLINGS, MONTANA

By _____
THOMAS W. HANEL,
Mayor

ATTEST

_____
BILLIE GUENTHER, City Clerk

APPROVED AS TO FORM:

By_____
BRENT BROOKS, City Attorney

HDR Engineering, Inc.
CONTRACTOR

By_____

Title _____

Consent **1. E.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Consulting Agreement for the 5th Avenue North Corridor Feasibility Study

PRESENTED BY: Candi Millar, Planning & Community Services Department Director

Department: Planning & Community Services

PROBLEM/ISSUE STATEMENT

The 5th Avenue North Corridor Feasibility Study contract with KLJ is submitted to City Council for approval after being delayed for 30 days by the Council at its May 23 meeting. At the May 23 meeting, concerns were raised by Council and members of the Billings Industrial Revitalization District (BIRD) regarding input and knowledge of this project. There were additional comments that property owners adjacent to the corridor were concerned about the impact of this study on their properties. Staff cannot address the potential impacts of the study on adjacent property until the study is underway and property owner discussions and study analysis work begins. However, written into the contract with KLJ is an Initial Feasibility Evaluation of the corridor to determine which elements of the study, if any, should proceed for further analysis.

Council directed Planning staff to meet with the BIRD to discuss the study including the planning process and the type of public participation that will be included. Transportation Planning Coordinator Scott Walker attended the monthly BIRD Board meeting on June 14th.
He provided history on why the 5th Avenue North Corridor Feasibility Study was brought forward based on the 1997 Downtown Framework Plan, 2008 North Park Neighborhood Plan, and the 2009 East Billings Urban Renewal District Master Plan. He also explained that staff was directed to move forward with the plan when it was approved as part of the 2016 Unified Planning Work Program by the City Council, Board of County Commissioners and Yellowstone County Board of Planning acting as the Policy Coordinating Committee in September 2015. The BIRD Board discussed the project and was unable to come to a consensus either to formally support or not support the plan. The Board may provide additional comments at the June 27 Council meeting.

The 5th Avenue North Corridor Feasibility Study was programmed by the Billings Metropolitan Planning Organization to review potential connections, including non-traditional motorized and non-motorized facilities, along the 5th Avenue North Corridor between North 32nd Street and Main Street (approximately 2 miles) and includes the railroad spur at North 23rd extending to Montana Avenue. This project is programmed in the adopted 2016 Billings Urban Area Unified Planning Work Program (UPWP). The UPWP is developed each year and identifies tasks to be completed through the use of Federal Planning dollars allocated to the Billings Metropolitan Planning Organization.

The Study will include an examination of existing right-of-way and corridor information including width, ownership, and existing uses. An analysis of the existing corridor conditions, including opportunities and constraints within and along the corridor will be provided, along with a description of the types of non-traditional motorized and non-motorized transportation elements that might function in the corridor in the future. As part of this study, initial cost estimates for various improvement alternatives and possible funding sources will be included.

This study will involve extensive public involvement of the adjacent property owners, MRL and BNSF Railroad Companies, downtown organizations, and other interested and vested individuals. A project steering committee will be established as well as a project website. This Planning Study will require completion of the scope of work and a final document package within approximately 10 months of contract signing. The negotiated contract cost will not exceed $80,000.

ALTERNATIVES ANALYZED

City Council may:

- Approve the Consultant Agreement with KLJ for a total contract amount not to exceed $80,000, or;
- Not approve the Consultant Agreement with KLJ and direct staff to develop an acceptable alternative. Since the project was programmed in the 2016 UPWP, altering it may be difficult.

FINANCIAL IMPACT

The 5th Avenue North Corridor Study was programmed into the 2016 UPWP. The UPWP is the document that outlines activities for the Planning Division staff as well as budgeting the Federal Planning funds received by the Billings MPO. The UPWP was recommended for approval by the City Council on September 14, 2015 and approved by the Policy Coordinating Committee on September 15, 2015. The Montana Department of Transportation and the Federal Highway Administration supported the local approval for the 2016 UPWP for the 2016 Federal Fiscal year. The 5 th Avenue North Corridor Study is 100% reimbursed through the Federal Planning funds received by the Billings MPO.

RECOMMENDATION

Staff recommends that the Council approve the contract not to exceed $80,000 with KLJ to complete the 5th Avenue North Corridor Study and authorize the Mayor to sign the consultant agreement.

APPROVED BY CITY ADMINISTRATOR

Attachments

KLJ Consultant Agreement

CONSULTANT AGREEMENT

THIS AGREEMENT is made and entered into this _____ day of _____, 2016, by and between the **CITY OF BILLINGS, MONTANA,** a municipal corporation organized and existing under the laws of the State of Montana, P.O. Box 1178, Billings, Montana 59103, hereinafter referred to as "**CITY**," and KLJ Engineering located at 2969 Airport Road, Suite 1B, PO Box 1567, Helena, Montana, 59601, hereinafter referred to as "**CONSULTANT**."

WITNESSETH:

WHEREAS, the **CITY** proposes to obtain information regarding the feasibility of developing potential connections, non-traditional motorized and non-motorized system along the 5th Avenue North Corridor between North 32nd Street and Main Street in downtown Billings and desires to hire **CONSULTANT** as an independent contractor to perform the services as described in the Scope of Work attached hereto as Exhibit "A" and by this reference made a part hereof.

WHEREAS, the **CITY** has authority to contract for such services, and;

WHEREAS, the **CONSULTANT** represents that he/she is fully qualified to perform such services personally and is in compliance with the Montana Statutes relating to the provisions of such services.

NOW THEREFORE, in consideration of the mutual covenants and agreements herein contained, the receipt and sufficiency whereof being hereby acknowledged, the parties hereto agree as follows:

1. **PURPOSE: CITY** agrees to hire **CONSULTANT** as an independent contractor to perform the services as described in the Scope of Work attached hereto as Exhibit "A" and by this reference made a part hereof. In performing these services, the **CONSULTANT** shall at all times comply with all federal, state and local statutes, rules and ordinances applicable. These services and all duties incidental or necessary therefore, shall be performed diligently and completely and in accordance with professional standards of conduct and performance.

2. **TERM:** This **AGREEMENT** shall be for a period of ten-months, from the execution of this **AGREEMENT**. This **AGREEMENT** may be extended for 1-three month option by mutual agreement of both parties, in writing, thirty (30) days prior to termination.

3. **PAYMENT**: In consideration of the services provided by the **CONSULTANT** under this **AGREEMENT**, the **CITY** agrees to pay **CONSULTANT** a price not to exceed $79,800.00 as described in the Project Cost attached hereto as Exhibit "B".

In the event scope of work issues arise, the **CONSULTANT** shall immediately discuss them with the Project Manager for the **CITY**. It is understood that the Consultant will not perform any work that the **CITY** deems outside the scope prior to receiving written approval from the **CITY**, and at a rate agreed upon by both parties. Any payment for work not agreed upon by the **CITY** shall be denied.

CONSULTANT, shall invoice City monthly for the percentage of the work completed by the **CONSULTANT. CITY** shall pay undisputed invoices within thirty (30) days of the invoice date and may deduct five percent (5%) from each pay estimate to be held until the completion of the final scope of work. The final payment shall be made only after acceptance of final invoice by the **CITY**, and determination has been made by the **CITY** that the scope of work has been satisfactorily completed.

4. **INDEPENDENT CONTRACTOR STATUS:** The parties agree that **CONSULTANT** is an independent Contractor for purposes of this **AGREEMENT** and is not to be considered an employee of the **CITY** for any purpose. **CONSULTANT** is not subject to the terms and provisions of the **CITY's** personnel policies handbook and may not be considered a **CITY** employee for workers' compensation or any other purpose. **CONSULTANT** is not authorized to represent the **CITY** or otherwise bind the **CITY** in any dealings between **CONSULTANT** and any third parties.

5. **INDEMNITY AND INSURANCE:**

A. The Consultant shall not indemnify, defend, save and hold Billings harmless from claims, causes of action, lawsuits, damages, judgments, liabilities, and litigation costs and expenses or attorneys' fees and costs arising from wrongful or negligent acts, error or omission solely of Billings occurring during the course of or as a result of the performance of the **AGREEMENT**.
B. The Consultant agrees to indemnify the City, its officers, agents and employees from any and all losses, damage and liability resulting from any negligent act, error, or omission on the part of Consultant or its agents or employees.
C. Where lawsuits or liability, including attorneys' fees and costs are caused by the wrongful or negligent act of both Billings and the Consultant, the Consultant shall indemnify Billings harmless from only that portion of causes of action, lawsuits, damages, judgments, liabilities, and litigation costs and expenses including attorneys' fees and costs, which result from the Consultant's or any subcontractor's negligent acts, errors, or omissions occurring as a result from the Consultant's performance pursuant to this **AGREEMENT**.
D. The **CONSULTANT** shall maintain in good standing the insurance described in this Section. Before rendering any services under this **AGREEMENT**, the **CONSULTANT** shall furnish the **CITY** with proof of insurance in accordance with this Section.

The **CONSULTANT** shall provide the following insurance:

1. Workers' compensation and employer's liability coverage as required by Montana law.
2. Commercial general liability, including contractual and personal injury coverage's -- $750,000 per claim and $1,500,000 per occurrence.
3. Commercial automobile liability -- $1,000,000 per accident, using KLJ's umbrella insurance for up to an additional $500,000 per accident if needed.
4. Professional liability in the amount of $1,500,000 per claim.

Each policy of insurance required by this Section shall provide for no less than 30 days' advance written notice to the **CITY** prior to cancellation, except for cancellation due to non-payment and Worker's Compensation. CONSULTANT may use an Excess Limits policy that drops down and follows form to meet the required insurance limits.

The **CITY** shall be listed as an additional insured on all policies except Professional Liability and Worker's Compensation Policies.

In addition, all policies except Professional Liability and Worker's Compensation shall contain a waiver of subrogation against Billings.

CONSULTANT shall comply with the applicable requirements of the Workers' Compensation Act, Title 39, Chapter 71, MCA, and the Occupational Disease Act of Montana, Title 39, Chapter 71, MCA. **CONSULTANT** shall maintain workers' compensation insurance coverage for all members and employees of **CONSULTANT's** business, except for those members who are exempted as independent **CONSULTANTs** under the provisions of §39-71-401, MCA.

CONSULTANT shall furnish **CITY** with copies showing one of the following: **(1)** proof of registration as a registered Contractor under Title 39, Chapter 9, MCA; **(2)** a binder for workers' compensation coverage by an insurer licensed and authorized to provide workers' compensation insurance in the State of Montana; or **(3)** proof of exemption from workers' compensation granted by law for independent Contractors.

6. **AGREEMENTS OF CONSULTANT**: As an inducement to the execution of this **AGREEMENT** by the **CITY** and in consideration of the agreements to be performed by the **CITY**, the **CONSULTANT** agrees that:

A. Qualifications

The **CONSULTANT** is qualified to perform the services to be furnished under this **AGREEMENT** and is permitted by law to perform such services, and all personnel engaged in the work shall be qualified and so permitted to do the work they perform.

B. Solicitation of Agreement

The **CONSULTANT** has not employed any person to solicit this **AGREEMENT** and has not made, and will not make, any payment or any agreement for the payment of any commission, percentage, brokerage, contingent fee, or other compensation in connection with the procurement of this **AGREEMENT**.

C. Facilities and Personnel

The **CONSULTANT** has and will continue to have proper facilities and personnel to perform the services and work agreed to be performed.

D. Subcontracting

None of the work or services covered by this **AGREEMENT** shall be subcontracted without the prior approval of the **CITY**.

E. Affidavits of Compliance

The **CONSULTANT** will, if requested by the **CITY**, furnish the **CITY** affidavits certifying compliance with the provisions of this Section.

7. **AGREEMENTS OF CITY:**

A. To furnish all labor, materials, equipment, supplies, and incidentals necessary to conduct and complete the City of Billings' portion of the project as designated in the scope of work.

B. Name a Project Manager who shall be the liaison between the Consultant and the City of Billings. For this project, the Project Manager for **CONSULTANT** designated is Steve Grabill and the Project Manager for **CITY** designated is Scott Walker.

8. **NONDISCRIMINATION:**

A. The **CONSULTANT** will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, ancestry, age, sex, or marital status or who is a "qualified individual with a disability" (as that phrase is defined in the Americans With Disabilities Act of 1990). The **CONSULTANT** will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, or mental or physical impairment/disability. Such action shall include, without limitation, employment, upgrading, demotion or transfer, recruitment or recruiting advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The

CONSULTANT agrees to post, in conspicuous places available to employees and applicants for employment, notices setting forth the provisions of this non-discrimination clause.

B. The **CONSULTANT** shall state, in all solicitations or advertisements for employees to work on jobs, that all qualified applicants will receive equal consideration for employment without regard to race, color, religion, national origin, ancestry, age, sex or marital status, or mental or physical impairment/disability.

C. The **CONSULTANT** shall comply with any and all reporting requirements that may apply to it that the **CITY** may establish by regulation.

D. The **CONSULTANT** shall include the provisions of Subsections A through C of this Section in every subcontract or purchase order under this **AGREEMENT**, so as to be binding upon every such sub-consultant or vendor of the **CONSULTANT** under this **AGREEMENT**.

E. The **CONSULTANT** shall comply with all applicable federal, state, and city laws concerning the prohibition of discrimination (Exhibit "C").

9. **PERMITS, LAWS, AND TAXES:** The **CONSULTANT** shall acquire and maintain in good standing all permits, licenses and other entitlements necessary to its performance under this **AGREEMENT**. All actions taken by the **CONSULTANT** under this **AGREEMENT** shall comply with all applicable statutes, ordinances, rules and regulations. The **CONSULTANT** shall pay all taxes pertaining to its performance under this **AGREEMENT**.

10. **NONWAIVER:** The failure of either party at any time to enforce a provision of this **AGREEMENT** shall in no way constitute a waiver of the provision, nor in any way affect the validity of this **AGREEMENT** or any part hereof, or the right of such party thereafter to enforce each and every provision hereof.

11. **DECLARATION OF NO FINANCIAL INTEREST:** The **CONSULTANT** hereby declares that he does not have any interest (including that of real estate agent or broker), direct or indirect, present or prospective, in any property described in Section 1 or in its sale, or any other interest, whether or not in connection with the property, which would conflict in any manner or degree with the performance of the services and the submission of impartial reports, and has not employed and will not employ, in connection with the services to be furnished under this **AGREEMENT**, any person having any such interest. Until the property is acquired by the **CITY** or excluded from its project by resolution of its governing body, the **CONSULTANT** and any employees of the **CONSULTANT**, so long as they are employed by the **CONSULTANT**, will not acquire any such interests and will not, for their own account or for other than the **CITY**, negotiate for any of the property, perform services in connection with the

property, or testify voluntarily as a witness in a condemnation or other proceeding with respect to the property.

12. **SUCCESSORS AND ASSIGNS:** This **AGREEMENT** and all of the covenants hereof shall inure to the benefit of and be binding upon the **CITY** and the **CONSULTANT** respectively and his partners, successors, assigns, and legal representatives. Neither the **CITY** nor the **CONSULTANT** shall have the right to assign, transfer, or sublet his interest or obligations hereunder without written consent of the other party.

13. **CHANGES IN WORK:** Any change in the scope of **CONSULTANT'S** services as stated in this **AGREEMENT** for whatever reason, will be negotiated between the **CITY** and the **CONSULTANT** and an amendment to this **AGREEMENT** will be issued with the appropriate change of services and **AGREEMENT** fee noted.

14. **LEGAL RELATIONS:** The **CONSULTANT** shall comply with all Federal, State, and local laws and ordinances applicable to the work to be done.

15. **TERMINATION OF AGREEMENT:** The right is reserved by the **CITY** to terminate this **AGREEMENT** at any time upon not less than thirty (30) days written notice to the **CONSULTANT**. If one of the parties fails to comply with the terms and conditions of the Agreement, written notice may be provided describing the default. If the defaulting party fails to cure and correct the claimed default within a reasonable period specified in the notice, the non-defaulting party may terminate its services under the Agreement.

    In the event the **CITY** terminates this **AGREEMENT**, the **CONSULTANT** shall be paid for the amount of work performed or services rendered to date of termination per the **AGREEMENT** fee.

16. **ENDORSEMENTS:** The **CONSULTANT** shall furnish signatures, statements, or other suitable means to signify responsible endorsement of work on all reports furnished by him.

17. **OWNERSHIP OF DOCUMENTS:** All information relating to the project and prepared under the terms of this **AGREEMENT**, including reports, data, recommendations, exhibits, analyses, and plans shall be deemed the property of the **CITY**. Reproducibles of all notes, reports, and plans shall be made available at the **CITY'S** request. CONSULTANT shall not be liable for modifications to documents prepared by CONSULTANT which are made without CONSULTANT's advice after delivery to CITY, nor shall CONSULTANT be liable for their use in projects other than the Project outlined within this Agreement.

18. **PUBLIC INFORMATION:** The **CONSULTANT** shall not issue any statements, releases, or information for public dissemination without prior written approval of the **CITY**.

19. **PROPRIETARY RIGHTS:** If patentable discoveries or inventions should result from work required herein, all rights accruing from such discoveries or inventions shall be the property of the **CITY**. Pre-existing works created by CONSULTANT outside of the services for CITY but utilized in connection with such services shall continue to be owned by CONSULTANT.

20. **RECORDS:** The **CONSULTANT** shall maintain accounting records and other evidence pertaining to the cost incurred and to make the records available at all times during the **AGREEMENT** term and for three (3) years from the date of final payment. Such accounting records and other evidence pertaining to the cost incurred will be made available for inspections authorized by the **CITY** and copies thereof shall be furnished if requested.

21. **ATTORNEY'S FEES AND COSTS:** That in the event it becomes necessary for either Party to this **AGREEMENT** to retain an attorney to enforce any of the terms or conditions of the **AGREEMENT** or to give any notice required herein, then each Party shall be responsible for its own reasonable attorney's fees and costs.

22. **LITIGATION LOCATION:** The parties agree that this **AGREEMENT** shall be governed in all respects by the laws of the state of Montana, and the parties expressly agree that venue shall be in the Montana Thirteenth Judicial District County for Yellowstone County and there shall be no other venue for resolution of disputes arising from the **AGREEMENT** or the performance of its terms.

23. **MODIFICATION AND AMENDMENTS:** That any amendment or modification of this **AGREEMENT** or any provisions herein shall be made in writing and executed in the same manner as this original document and shall after execution become a part of this **AGREEMENT**.

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

CITY OF BILLINGS, MONTANA

By_____
THOMAS W. HANEL,
MAYOR

KLJ Engineering
CONSULTANT (Print Name Above)

By Mark Anderson

Print Name Mark Anderson

Print Title Dir, Surface Transportation

APPROVED AS TO FORM:

By_____
BRENT BROOKS, CITY Attorney

EXHIBIT A
SCOPE OF SERVICES

5th AVENUE NORTH CORRIDOR FEASIBILITY STUDY

Project Tasks

Project Management
KLJ will actively manage project activities to enable successful project coordination, as well as management to keep the project on schedule and within budget.

1. Project Management

A. Project Management
KLJ will provide project management efforts to include weekly project management reports to the City-County Planning Division, monthly invoicing and project coordination.

2. Corridor Conditions Analysis

The purpose of this task is to determine the availability of the corridor for locating and implementing some form of transportation facility improvements.
This task will include gathering existing corridor conditions, including ROW widths, land ownership and contact information and corridor use information. While some of the corridor is currently used for rail spur activity, the level and locations of rail use are unknown, and other uses along the corridor may be present as well.

A. Corridor Constraints Evaluation
KLJ will evaluate the location and availability of land owned by MRL and BNSF railroads to determine their existing or planned corridor use and opportunities for City use.

We have learned that a number of businesses are still being served by the railroad. This issue has the potential to impact feasibility for portions of the corridor, or for the corridor as a whole. We will map businesses along the corridor and meet or converse with them to determine what their future plans are for rail service.

Physical features of the corridor will also be identified and documented. These include utilities and other identified conditions. West of 25th Street, there is no remaining rail corridor and no obvious space for a facility bisecting the properties. Opportunities to connect to the 32nd Street corridor will consider potential use of parking lots and other parallel corridors. The positions and desires of landowners in and adjacent to the corridor will be assessed once other constraints and

opportunities have been identified.

B. Corridor Opportunities Evaluation

Once the corridor constraints have been defined, the question that remains is, what is left? What opportunities can reasonably be pursued given the current uses and constraints of the corridor? If some constraints appear to be roadblocks in the development of a corridor improvement solution, can efforts be made to remove them as roadblocks? Corridor opportunities will be mapped and described for review by the Steering Committee.

C. Initial Feasibility Evaluation

A Corridor Conditions Analysis Summary document will be prepared that shows corridor constraints and opportunities and provides an overall evaluation of the corridor. At this stage in the study, an initial determination will be made on the level of feasibility of the corridor. It will be further decided on which elements of the study, if any, should proceed for further analysis, corridor planning and recommendations.

3. Corridor Planning

Once constraints and opportunities along the corridor have been identified, both non-traditional motorized and non-motorized improvement alternatives for the corridor will be prepared. Corridor planning will consider not only the use of the corridor as a transportation facility, but also corridor beautification, screening and provision of other amenities that would benefit corridor users. The Billings Trail Master Plan will serve as a resource for beneficial trail site amenities.

Past planning documents say much about the context of the Billings Downtown and the Billings Exposition Gateway, and it is important to understand how the 5th Avenue corridor can enrich the central core of the community. Planning will consider potential major redevelopment east of 10th Street North, as proposed by the Billings Exposition Gateway Concept Plan.

Connectivity is a significant opportunity provided by developing transportation facilities along this corridor. Connections between MetraPark, Exposition Gateway and downtown area establishments, such as the YMCA, Art Museum and the Library, could benefit residents, tourists and businesses alike.

A. Non-traditional Motorized Facilities Planning

Corridor conditions will be assessed to determine the feasibility of corridor use by non-traditional motorized vehicles. A list and description of potential non-traditional motorized candidates (such as a trolley) will be prepared and reviewed with the Steering Committee. A typical section will be prepared relative to chosen candidates. Alternative horizontal alignments will be developed for consideration by the Steering Committee.

B. Non-motorized Facilities Planning

Corridor conditions will be assessed to determine the feasibility of corridor use by non-motorized users. Linkages to existing and proposed pedestrian and bicycle facilities and with transit, as well as to anticipated high use origins and destinations, will be identified and documented. A typical section will be prepared relative to chosen candidates. Alternative horizontal alignments will be developed for consideration by the Steering Committee.

C. Cost Estimates and Innovative Funding

Planning and programming level costs for basic corridor improvements will be estimated. Early in development of the 5th Avenue North Corridor Study, KLJ will determine existing local options to move potential project concepts out of the planning phase and into the project development phase. Most importantly will be a discussion and evaluation of the potential to include project elements into either the Billings Capital Improvement Program (CIP) or Billings Transportation Improvement Program (TIP).

As a potential signature project growing out of the Downtown Billings Framework Plan, there is excitement regarding the potential to develop an investment strategy for improvements along the 5th Avenue North corridor. While investments in the 5th Avenue North corridor are not currently included in either the Billings CIP or TIP, as the project moves into the middle phases and project concepts are more clearly understood, consensus will be achieved regarding the potential priority for investments in the corridor through future CIP or TIP development efforts.

Following development of the corridor constraints evaluation, KLJ will determine if the 5th Street Corridor may be a potential candidate to seek funding through the Environmental Protection Agency (EPA) Brownfields Program. As part of the corridor constraints evaluation, KLJ will develop a dialogue with the Montana Department of Environmental Quality (DEQ) and discuss the potential for some or all of the corridor to seek EPA Brownfields funding. Two potential Brownfields grant opportunities would be an EPA Assessment Grant to develop more specific site assessments or an Area-Wide Planning Program grant, which is tailored more towards multiple sites connected by infrastructure.

At the end of the 5th Avenue North Corridor Study, KLJ will finalize the funding strategy refined through the planning process. KLJ will develop an achievable implementation plan that will facilitate continuity of the prioritized project concepts to move further into project development.

D. Draft and Final Reports

KLJ will complete a draft report that incorporates analysis and input received from the stakeholders involved with the project. The report will include a project priority summary, outlining long-term and short-term projects and phasing for improvements, including cost estimates. A quality review will be performed on the contents of the draft report. Once

completed, the draft report will be distributed to the Steering Committee and MPO for review. Once review is complete, KLJ shall update and make any requested changes. Once a final draft is completed, an electronic copy will be distributed to the MPO for the local government review and adoption.

Upon receipt of all comments on the draft report and adoption by the Billings City Council, City/County Planning Board, Board of County Commissioners and the Policy Coordinating Committee, KLJ will incorporate any of these comments into a final report. Final deliverable to the MPO shall include five printed copies, 10 flash drives, 1 electronic writable format copy and a Digital Adobe Flipbook (or similar software tool) version of the report.

4. Public Involvement

Beyond our online outreach, KLJ will conduct interviews with property owners, key businesses and stakeholders. Individual meetings will be targeted around ROW analysis and designed to get in-depth information that will shape the plan and future of the 5th Avenue corridor. KLJ will work with the project team to identify groups and individuals that we need to meet with to get their important insight.

Visualization will be used in meetings and provided on the website and YouTube to show stakeholders and the public how the corridor could look after improvements are made. Minutes from all meetings will be attached as an appendix to the final report.

A. Steering Committee Interaction

The Steering Committee will include local staff, key stakeholders and concerned citizens from along the corridor. They will meet bi-monthly and continuing until the end of the study. Their role will be to provide input and direction on study activities, and feedback on study findings. KLJ will prepare an agenda and minutes for each Steering Committee meeting.

B. Key Stakeholder Interaction

KLJ will attend meetings with the MPO Technical Advisory Committee (TAC) and Policy Coordinating Committee (PCC), and governing bodies as required. Key landowners and businesses served by the rail spurs or adjacent to the corridor will be contacted for one-on-one meetings or conversations. This will allow assessment of interest in being involved throughout the study and will give us a better sense of their willingness to support a future project.

At these one-on-one meetings we will discuss how corridor improvements can benefit both them and the community. We will listen to any concerns they may have, and seek to maintain an open dialog so that any concerns they raise may be addressed in later conversations.

A number of methods will be used to provide opportunities for key stakeholders to participate in

study activities. These include individual meetings, focus group meetings and involvement on the Steering Committee or general public interaction.

C. General Public Interaction

General public interaction will include development and maintenance of a project website and conducting two public input meetings. We will provide public announcements and community meeting sign-in sheets, meeting graphics and presentations, and a link to the public using email, two newsletters and social media, and meeting minutes.

Prior to each public meeting, notification to all landowners within 500 feet of the corridor will be completed through the following means: a one-time direct mailing (first public meeting) with information regarding the public meeting and access to the project website. The cost of this mailing will be covered by the MPO. Future public meetings will be noticed through email collected through correspondence with property owners and interested parties, notice on the project website, social media announcements, media announcements and announced over the City of Billings Notify Me website software.

The first public meeting will be held early in the study. At this meeting, we intend to limit formal presentation in order to facilitate discussion and ideas from the public on corridor-related issues and solutions. This meeting will include corridor maps and some of the early ROW research that we will complete. After a brief introduction and orientation, we will potentially break into small groups that will work with a member of KLJ staff to talk through corridor issues and discuss possible ideas. We want this plan to resonate with the public and convey their values; that is why we plan on listening more than presenting at this first meeting.

The second public meeting will be an open house style meeting near the end of the study. At this meeting, we will give a presentation covering what we learned throughout the study and the analysis, which will lead into the detailed plan. We anticipate having maps of alternatives, as well as a handout with final recommendations and next steps. The presentation will be combined with key pad polling to engage and get feedback from the public. After the presentation, we will invite the public to comment on the recommended action items on the maps, complete comment forms and respond to the information provided. We will consider all the comments received before completing the final report.

D. Website and Online Survey

Our team will create an interactive website to inform and engage the community. We will use a domain similar to *www.5thaveBillings.com*. The website will be updated periodically and include all relevant information, surveys, maps, documentation, draft reports and presentation materials. The website will include web analytic tools to track visitors, top content, page views and sources of web traffic. Project websites have been effective tools for us to inform the community and reach individuals who may not attend a meeting.

5. Project Schedule

Based on a May 23rd Notice to Proceed, the following schedule is proposed for project activities and deliverables:

Project Task	Topic/Deliverable	Completion/Submittal Date
Business and Stakeholder Interviews	Meeting Summaries	Ongoing
Steering Committee Meeting 1	Kickoff Meeting	6/21/2016
Public Meeting 1	Corridor Issues and Solutions	7/28/2016
Task 1.0 Corridor Conditions Analysis	Initial Feasibility Evaluation Report	8/18/2016
Steering Committee Meeting 2	Initial Feasibility Results	8/23/2016
Steering Committee Meeting 3	Corridor Planning Status	10/25/2016
Task 2.0 Corridor Planning	Alternatives and Funding	12/6/2016
Draft Report	Draft Report	12/6/2016
Steering Committee Meeting 4	Draft Report Presentation	12/13/2016
Public Meeting 2	Draft Report Presentation	1/17/2017
Final Report	Final Report	2/10/2017
Steering Committee Meeting 5	Final Report Presentation	2/21/2017

EXHIBIT B
SCHEDULE OF FEES AND CHARGES

SCHEDULE OF FEES AND CHARGES
Billings 5th Avenue Corridor Feasibility Study
Billings, MT

KLJ Project No. 4116100

	STAFF TYPE	Engineer V Steve	Engineer IV Carl	Engineer III Mike/Matt	Planner IV Wade	Planner III Thomas	Visual Designer	Gov. Relations Specialist II	Engineer I	Total Hours	Total Labor Cost
	Hourly Rate	$ 56.50	$ 48.58	$ 34.23	$ 42.00	$ 42.75	$ 28.00	$ 33.00	$ 28.00		
	TASK										
TASK #	TASK NAME										
1.0	Project Management	24								24	$1,356.00
	Subtotal	24								24	$1,356.00
2.0	Corridor Conditions Analysis									0	$0.00
2.1	Constraints Evaluation	12	8			2		33	11	66	$2,548.50
2.2	Opportunities Evaluation	8	2			6		4	8	28	$1,161.50
2.3	Initial Feasibility Evaluation	8		2		2		12	4	28	$1,114.00
	Subtotal	28	10	2	0	10	0	49	23	122	$4,824.00
3.0	Corridor Planning									0	$0.00
3.1	Non-traditional Motorized Facilities Planning	4		8		16	16			44	$1,632.00
3.2	Non-motorized Facilities Planning	4		8		24	24			60	$2,109.00
3.3	Cost Estimates and Innovative Funding	4		4	8					16	$859.00
3.4	Draft and Final Reports	32		6	4	16			60	118	$4,828.50
	Subtotal	44	0	26	12	56	40	0	60	238	$9,314.50
4.0	Public Involvement									0	$0.00
4.1	Steering Committee Interaction	50	4			4		50	8	116	$5,054.00
4.2	Key Stakeholder Interaction	4	4					24		32	$1,212.00
4.3	General Public Interaction	16						16		32	$1,432.00
4.4	Website and Online Survey	4				16		8		28	$1,174.00
	Subtotal	74	8	0	0	20	0	98	8	208	$8,892.00
	Total Hours	170	18	28	12	86	40	147	91	568	
	Direct Labor Costs	$ 9,605.00	$ 873.00	$ 959.00	$ 744.00	$ 3,676.50	$ 1,120.00	$ 4,851.00	$ 2,548.00		$ 24,376.50

Indirect Costs (1.8772)	$ 45,759.57
Subtotal Labor + Indirect	$ 70,136.07
Profit (12%)	$ 8,416.33
Direct Cost Totals	$ 1,247.61
Total Fee	$ 79,800.00

EXHIBIT C
DBE AND NON-DISCRIMINATION NOTICE

DBE Goals

There are no DBE/WBE goals for this work, but firms are strongly encouraged to utilize DBE firms if applicable. A Montana certified DBE consultant list is available and can be found on the MDT web page, http://www.mdt.mt.gov/business/contracting/civil/dbe.shtml

Nondiscrimination Compliance

Consultants will be subject to Federal and Montana nondiscrimination laws and regulations (see attached notice).

NON-DISCRIMINATION NOTICE

During the performance of this Agreement, the Consultant (hereafter in this Section "the Party"), for itself, its assignees and successors in interest, agrees as follows:

A) COMPLIANCE WITH TITLE VI OF THE CIVIL RIGHTS ACT OF 1964 FOR FEDERAL-AID CONTRACTS

(1) Compliance with Regulations: The Party shall comply with all Regulations relative to nondiscrimination in Federally-assisted programs of the Department of Transportation, 49 Code of Federal Regulations (CFR), Part 21, as they may be amended (hereafter referred to as the Regulations), which are incorporated by reference and made a part of this Agreement, even if only state funding is here involved.

(2) Nondiscrimination: The Party, with regard to the work performed by it during the Agreement, shall not discriminate on the grounds of sex, race, color, or national origin in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The Party shall not participate either directly or indirectly in the discrimination prohibited by 49 CFR 21.5.

(3) Solicitations for Subcontracts, Including Procurement of Materials and Equipment: In all solicitations, whether by competitive bidding or negotiation by the Party for work to be performed under a subcontract, including procurement of materials or leases of equipment, any potential subcontractor or supplier shall be notified by the Party of the Party's obligations under this Agreement and the Regulations relative to nondiscrimination.

(4) Information and Reports: The Party will provide all reports and information required by the Regulations, or directives issued pursuant thereto, and permit access to its books, records, accounts, other sources of information and its facilities as may be determined by State or

the Federal Highway Administration (FHWA) to be pertinent to ascertain compliance with Regulations or directives. Where any information required of the Party is in the exclusive possession of another who fails or refuses to furnish this information, the Party shall so certify to the Department or the FHWA as requested, setting forth what efforts it has made to obtain the information.

(5) Sanctions for Noncompliance: In the event of the Party's noncompliance with the nondiscrimination provisions of this Agreement, State may impose sanctions as it or the FHWA determines appropriate, including, but not limited to,

(a) Withholding payments to the Party under the Agreement until the Party complies, and/or

(b) Cancellation, termination or suspension of the Agreement, in whole or in part.

(6) Incorporation of Provisions: The Party will include the provisions of paragraphs (1) through (6) in every subcontract, including procurement of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The Party will take such action with respect to any subcontract or procurement as the State or the FHWA may direct to enforce such provisions including sanctions for noncompliance: Provided, however, that in the event the Party is sued or is threatened with litigation by a subcontractor or supplier as a result of such direction, the Party may request the State to enter into the litigation to protect the interests of the State, and, in addition, the Party or the State may request the United States to enter into such litigation to protect the interests of the United States.

B) COMPLIANCE WITH THE MONTANA GOVERNMENTAL CODE OF FAIR PRACTICES, §49-3-207, MCA

In accordance with Section 49-3-207, MCA, the Party agrees that for this Agreement all hiring will be made on the basis of merit and qualifications and that there will be no discrimination on the basis of race, color, religion, creed, political ideas, sex, age, marital status, physical or mental disability, or national origin by the persons performing the Agreement.

C) COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT (ADA)

(1) The Party will comply with all regulations relative to implementation of the AMERICANS WITH DISABILITIES ACT.

(2) The Party will incorporate or communicate the intent of the following statement in all publications, announcements, video recordings, course offerings or other program outputs: "The Party will provide reasonable accommodations for any known disability that may interfere with a person in participating in any service, program or activity offered by the Party. In the case of documents, recordings or verbal presentations, alternative accessible formats will be provided.

For further information call the Party."

All video recordings produced and created under contract and/or agreement will be closed captioned.

D) COMPLIANCE WITH PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES IN DEPARTMENT OF TRANSPORTATION FINANCIAL ASSISTANCE PROGRAMS, 49 CFR §26

Each Agreement the Department signs with a Party (and each subcontract the prime contractor signs with a subcontractor) must include the following assurance:

The Party, sub-recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Party shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the Party to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

EXHIBIT D
CERTIFICATE OF LIABILITY INSURANCE

Client#: 1108320 KADRMLEE

ACORD. CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 4/29/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Martin Fisher	
USI Ins Svcs CL Fargo 1020 36th St. S, Suite C Fargo, ND 58103 701 526-2800	PHONE (A/C, No, Ext): 701.526.2801	FAX (A/C, No): 701.526.2818
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A: Travelers Indemnity Company	25658
INSURED Kadrmas, Lee and Jackson Inc. PO Box 4130 Bismarck, ND 58502	INSURER B: Lexington Insurance Company	19437
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY			6801G791656	09/13/2015	09/13/2016	EACH OCCURRENCE	$1,000,000
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$1,000,000
	CLAIMS-MADE X OCCUR						MED EXP (Any one person)	$5,000
							PERSONAL & ADV INJURY	$1,000,000
							GENERAL AGGREGATE	$2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$2,000,000
	POLICY X PRO-JECT LOC							$
A	AUTOMOBILE LIABILITY			8101G857035	09/13/2015	09/13/2016	COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	X HIRED AUTOS / X NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
A	X UMBRELLA LIAB X OCCUR			CUP3G289637	09/13/2015	09/13/2016	EACH OCCURRENCE	$10,000,000
	EXCESS LIAB / CLAIMS-MADE						AGGREGATE	$10,000,000
	DED X RETENTION $ 10000							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY						WC STATU-TORY LIMITS / OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N (Mandatory in NH)	N/A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
B	Professional Liab & Pollution			026154203	09/13/2015	09/13/2016	$10,000,000 Per Claim $10,000,000 Aggregate $250,000 Deductible	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

City of Billings Montana is listed as an additional insured under the general liability and automobile liability only when required by written contract. Waiver of subrogation in favor of City of Billings Montana in respects to the general liability and automobile liability policies. Cancellation notice has been revised to 30 days.

CERTIFICATE HOLDER	CANCELLATION
City of Billings Montana PO Box 1178 Billings, MT 59103-0000	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE

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EXHIBIT D - Continued
CERTIFICATE OF LIABILITY INSURANCE

CERTIFICATE OF LIABILITY INSURANCE — DATE (MM/DD/YYYY): 4/29/2016

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER TRJ Professional Group, Inc. P.O. Box 9067 Rapid City, SD, 57709	CONTACT NAME: Tom Johnson PHONE (A/C, No, Ext): (605)-716-6547 FAX (A/C, No): (605)-716-6534 E-MAIL ADDRESS: tom@trjprofessional.com
INSURED KADRMAS LEE & JACKSON INC. P.O. Box 4130 Bismarck, ND 58502-4130 (701)355-84	INSURER(S) AFFORDING COVERAGE — NAIC# INSURER A: Travelers INSURER B: INSURER C: INSURER D: INSURER E: INSURER F:

COVERAGES — CERTIFICATE NUMBER: — REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	COMMERCIAL GENERAL LIABILITY CLAIMS-MADE / OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY / PRO-JECT / LOC / OTHER						EACH OCCURRENCE $ DAMAGE TO RENTED PREMISES (Ea occurrence) $ MED EXP (Any one person) $ PERSONAL & ADV INJURY $ GENERAL AGGREGATE $ PRODUCTS - COMP/OP AGG $
	AUTOMOBILE LIABILITY ANY AUTO / ALL OWNED AUTOS / SCHEDULED AUTOS / HIRED AUTOS / NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident) $ BODILY INJURY (Per person) $ BODILY INJURY (Per accident) $ PROPERTY DAMAGE (Per accident) $
	UMBRELLA LIAB / EXCESS LIAB / OCCUR / CLAIMS-MADE DED / RETENTION $						EACH OCCURRENCE $ AGGREGATE $
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N: N/A If yes, describe under DESCRIPTION OF OPERATIONS below		Y	VHPAUB-3185742-6-15	6/2/2015	6/2/2016	X STATUTE / OTH-ER E.L. EACH ACCIDENT $ 1,000,000 E.L. DISEASE - EA EMPLOYEE $ 1,000,000 E.L. DISEASE - POLICY LIMIT $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Stop Gap liability endorsed for ND and Wyo. 1,000,000 limit

CERTIFICATE HOLDER	CANCELLATION
City of Billings Montana P.O. Box 1178 Billings, MT, 59103	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE

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Consent **1. F.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Approval of New Automobile Rental Concession Leases with Five Car Rental Companies

PRESENTED BY: Kevin Ploehn, Director of Aviation and Transit

Department: Airport

PROBLEM/ISSUE STATEMENT

The current Automobile Rental Concession Leases to operate car rental concessions at the Billings Logan International Airport expired March 31, 2016. These Leases were extended on a month-by-month basis until June 30, 2016, while the terms of the new Leases were finalized. The Airport has five car rental concession spots available, currently leased by (1) Overland West, Inc., DBA Hertz Rent-A-Car, (2) Corpat, Inc., DBA Alamo/National Car Rental, (3) Enterprise RAC Company of Montana/Wyoming, LLC, DBA Enterprise Rent-A-Car, (4) Larson Enterprises, Inc., DBA Avis Rent A Car, and Blackfoot Rentals, Inc., DBA Budget Rent A Car, and (5) DTG Operations, Inc., DBA as Thrifty/Dollar Rent A Car. All five existing Concessionaires have requested to enter into new Leases. The new Leases begin July 1, 2016 and end on June 30, 2021. Copies of the new Leases for each of the five Concessionaires are on file in the City Clerk's Office.

ALTERNATIVES ANALYZED

City Council may:

- Approve the new Leases with the five current car rental concessionaires for terms beginning July 1, 2016 and ending June 30, 2021; or
- Disapprove the new Leases with the five current car rental concessionaires for terms beginning July 1, 2016 and ending June 30, 2021.

FINANCIAL IMPACT

With the acceptance and approval of the five Automobile Rental Concession Leases, the City will be guaranteed a revenue stream of $5,757,510 over the next five-year period. The five-year minimum annual guarantees (MAGs) are as follows:

CONCESSIONAIRE	MAG
Overland West, Inc., DBA Hertz	$1,925,000
Corpat, Inc. DBA Alamo/National	$1,675,000
Enterprise	$797,510
Avis/Budget	$750,000
DTG Operations, DBA Thrifty/Dollar	$610,000

RECOMMENDATION

Staff recommends the City Council approve the five Automobile Rental Concession Leases with the five current concessionaires for terms that begin July 1, 2016 and end on June 30, 2021.

APPROVED BY CITY ADMINISTRATOR

Consent **1. G.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Donation: $1500 from the Yellowstone County Tavern Association

PRESENTED BY: Paul Dextras, Fire Chief

Department: Fire

PROBLEM/ISSUE STATEMENT

The Yellowstone County Tavern Association has made a donation to the Billings Fire Department in the amount of $1,500 to purchase patient lifting equipment. These lifting devices provide multiple handles for moving or lifting patients. The Yellowstone County Tavern Association approved the Department's request to fund the purchase of patient lifting equipment that will minimize injuring the patient as well as reduce firefighter lifting injuries. City policy is that any donations over $500 must be approved by the City Council.

ALTERNATIVES ANALYZED

City Council may approve or disapprove accepting the $1,500 donation from the Yellowstone County Tavern Association.

FINANCIAL IMPACT

Accepting this donation allows City of Billings Fire staff to purchase two of these patient lifting devices which retail for $749.00 each.

RECOMMENDATION

Staff recommends that the City Council accept the $1,500 donation from the Yellowstone County Tavern Association to purchase new patient lift devices.

APPROVED BY CITY ADMINISTRATOR

Consent **1. H.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Bond Resolution for Series 2016 Tax Increment Bonds

PRESENTED BY: Patrick M. Weber, Finance Director

Department: City Hall Administration

PROBLEM/ISSUE STATEMENT

The City staff has been working with DA Davidson on the sale of bonds to finance the Phase 2 Sanitary Sewer and Orchard Lane projects in the South Billings Urban Renewal District (SBURD). On May 23, 2016, Council approved a resolution which included authorization for the City Administrator and the City Finance Director to approve, execute and deliver to the purchaser a bond purchase agreement. The agreement was executed on June 13, 2016. Council must adopt a resolution that outlines the terms and details of the bonds.

ALTERNATIVES ANALYZED

Upon approval of the resolution, the Finance staff will proceed with the bond closing on June 29, 2016. If the Council does not approve the resolution, there would be a delay in the closing and receiving the bond proceeds, which could lead to the inability to timely pay the contractor and stopping or slowing the project.

FINANCIAL IMPACT

The term of the bonds is 24 years at an interest rate of 3.586%.

The debt service payment will be made from the tax increment revenue collected in the District.

RECOMMENDATION

Staff recommends that City Council approve the bond resolution for Series 2016 SBURD tax increment bonds

APPROVED BY CITY ADMINISTRATOR

Attachments

bond resolution

CERTIFICATE AS TO RESOLUTION AND ADOPTING VOTE

I, the undersigned, being the duly qualified and acting recording officer of the City of Billings, Montana (the "City"), hereby certify that the attached resolution is a true copy of Resolution No. _____, entitled: "RESOLUTION RELATING TO $4,935,000 TAX INCREMENT URBAN RENEWAL REVENUE BONDS (SOUTH BILLINGS BOULEVARD URBAN RENEWAL DISTRICT), SERIES 2016; AUTHORIZING THE SALE AND PRESCRIBING THE FORMS AND TERMS THEREOF AND THE SECURITY THEREFOR" (the "Resolution"), on file in the original records of the City in my legal custody; that the Resolution was duly adopted by the City Council of the City at a regular meeting on June 27, 2016, and that the meeting was duly held by the City Council and was attended throughout by a quorum, pursuant to call and notice of such meeting given as required by law; and that the Resolution has not as of the date hereof been amended or repealed.

I further certify that, upon vote being taken on the Resolution at said meeting, the following Council Members voted in favor thereof: _____ _____; voted against the same: _____; abstained from voting thereon: _____; or were absent: _____.

WITNESS my hand officially this 27th day of June, 2016.

(SEAL)

_____
City Clerk

RESOLUTION NO. _____

RESOLUTION RELATING TO $4,935,000 TAX INCREMENT URBAN RENEWAL REVENUE BONDS (SOUTH BILLINGS BOULEVARD URBAN RENEWAL DISTRICT), SERIES 2016; AUTHORIZING THE SALE AND PRESCRIBING THE FORMS AND TERMS THEREOF AND THE SECURITY THEREFOR

BE IT RESOLVED by the City Council (the "Council") of the City of Billings, Montana (the "City"), as follows:

Section 1. Authorizations and Findings.

1.01. Recitals; Prior City Actions. Under Montana Code Annotated, Title 7, Chapter 15, Parts 42 and 43, as amended (the "Act"), the City is authorized to create urban renewal areas, prepare and adopt an urban renewal plan therefor and amendments thereto, undertake urban renewal projects therein, provide for the segregation and collection of tax increment with respect to property taxes collected in such areas, issue its bonds to pay the costs of such projects and to refund bonds previously issued under the Act and pledge to the repayment of the bonds the tax increment and other revenues derived from projects undertaken within the urban renewal area.

Pursuant to the Act and Ordinance No. 07-5441 adopted on December 10, 2007, as amended by Ordinance Nos. 08-5462 and 08-5484 adopted on May 12, 2008 and December 8, 2008, respectively (as so amended, the "Ordinance"), the Council created the South Billings Boulevard Urban Renewal District (the "District") and approved the South Billings Boulevard Urban Renewal Plan (the "Plan") containing a tax increment financing provision.

Pursuant to the Act and Resolution No. 15-10452 adopted by the Council on May 11, 2015 (the "Original Resolution"), the City issued its Tax Increment Urban Renewal Revenue Refunding Bonds (South Billings Boulevard Urban Renewal District), Series 2015, in the aggregate principal amount of $5,170,000 (the "Series 2015 Bonds"). The Series 2015 Bonds are payable from Tax Increment. Capitalized terms used herein but not otherwise defined shall have the meanings set forth in the Original Resolution. The Original Resolution, as amended and supplemented by this Resolution, are together referred to herein as the "Resolution."

The City proposes to undertake (i) the design, engineering, construction and installation of sewer system improvements in the area bounded north-south by Morgan and Francis Avenue and bounded east-west by Jackson Street and Hallowell Lane and (ii) the design, engineering and reconstruction of Orchard Lane between King Avenue East and State Avenue, including widening of the street and installation of a two way left turn lane, sidewalks, new corner radiuses and street lights (collectively, the "2016 Project"). The 2016 Project has been authorized as urban renewal projects pursuant to the Act and the Plan, and as set forth in the Plan the City declared its intention to use Tax Increment received in the District to finance such improvements.

1.02. Authorization and Sale of Series 2016 Bonds. Pursuant to Resolution No. 16-10546 adopted May 23, 2016 (the "Parameters Resolution"), this Council determined that it is in the best interests of the City to issue its Tax Increment Urban Renewal Revenue Bonds (South

Billings Boulevard Urban Renewal District), Series 2016 (the "Series 2016 Bonds"), as authorized by Section 7-15-4301(1)(a) of the Act and the Resolution, for the purpose of financing a portion of the costs of the Series 2016 Project, funding a deposit to the Reserve Account and paying costs of issuance of the Series 2016 Bonds. The City has reserved the right under Sections 4.01 and 4.02 of the Original Resolution to issue Additional Bonds for the purpose of providing funds to pay the costs of one or more Projects, which Additional Bonds shall be payable and secured ratably and equally and on a parity with Outstanding Bonds, upon compliance with the provisions of Section 4.01 and 4.02 of the Original Resolution.

Pursuant to the Parameters Resolution, this Council authorized the negotiated sale of the Series 2016 Bonds to D.A. Davidson & Co., Great Falls, Montana (the "Original Purchaser") and authorized the Mayor, City Administrator, Deputy City Administrator and City Finance Director to enter into the Bond Purchase Agreement, dated as of June 13, 2016 with the Original Purchaser (the "Bond Purchase Agreement"), pursuant to which the Original Purchaser agreed to purchase the Series 2016 Bonds at the aggregate purchase price of $4,880,678.35 (representing the par amount of the Series 2016 Bonds, less underwriter's compensation of $54,285.00 and less a net original issue discount of $36.65), in each case, subject to the terms and conditions of the Bond Purchase Agreement and the Resolution. The true interest cost of the Series 2016 Bonds is 3.586219%. The sale of the Series 2016 Bonds to the Original Purchaser is hereby ratified and confirmed.

1.03. Application of Series 2016 Bond Proceeds. Proceeds of the Series 2016 Bonds will be applied as follows:

Deposit to Construction Account	$4,571,928.33
Underwriter's Discount	54,285.00
Deposit to Reserve Account	308,750.02
Total Financed*	$4,934,963.35

* Totals reflect the net original issue discount of $36.65 on the Series 2016 Bonds.

1.04. Estimate of Tax Increment. The City estimates that Tax Increment will be at least $1,526,445 per year (based on Tax Increment of $1,526,445 received by the City in 2015). The maximum Principal and Interest Requirements on the Series 2015 Bonds and the Series 2016 Bonds is $653,187. There are no other bonds or other obligations of the City payable from Tax Increment. Accordingly, the Tax Increment estimated to be received each year by the City will be sufficient to pay the maximum Principal and Interest Requirements on the Series 2015 Bonds and the Series 2016 Bonds.

In addition, the Tax Increment received by the City in fiscal year 2015 ($1,526,445) was equal to at least 130% of the maximum Principal and Interest Requirements for any future calendar year ($849,143) with respect to the Series 2015 Bonds and the Series 2016 Bonds. The Tax Increment received by the City in fiscal year 2015 ($1,526,445) and the Tax Increment estimated to be received in the next succeeding three Fiscal Years ($1,526,445) (adjusted as provided in Section 4.02 of the Original Resolution) is estimated to be equal to at least 140% of the maximum Principal and Interest Requirements for any future calendar year ($914,462) with respect to the Series 2015 Bonds and the Series 2016 Bonds.

1.05. Findings and Determinations. It is hereby found, determined and declared by this Council as follows:

(a) no persons will be displaced from their housing by the 2016 Project;

(b) the Plan and the 2016 Project conform to the comprehensive plan or parts thereof of the City as a whole;

(c) the Plan and the 2016 Project will afford maximum opportunity, consistent with the needs of the City as a whole, for the rehabilitation or redevelopment in the District by private enterprise;

(d) a sound and adequate financial program exists for the financing of the 2016 Project, which program includes the City's use of the proceeds of the Series 2016 Bonds;

(e) the 2016 Project is in the best interests of the City;

(f) the 2016 Project is authorized under the Plan and constitutes and urban renewal project within the meaning of the Act;

(g) the estimated Tax Increment to be received by the City, as set forth in Section 1.04, and pledged to the payment of the Series 2016 Bonds will be sufficient to pay the Principal and Interest Requirements thereon when due;

(h) it is in the best interests of the City to issue and sell the Series 2016 Bonds to finance the costs of the 2016 Project as provided in the Resolution; and

(i) the findings and determinations made by this Council in the Ordinance are hereby ratified and confirmed.

All acts, conditions and things required by the Constitution and laws of the State, including the Act, in order to pledge the Tax Increment to the payment of the Series 2016 Bonds, to make the Series 2016 Bonds valid and binding special, limited obligations of the City in accordance with their terms and in accordance with the terms of the Resolution have been done, do exist, have happened and have been performed in regular and due form, time and manner as so required.

Section 2. Bond Terms, Execution and Delivery.

2.01. Term of Series 2016 Bonds. The Series 2016 Bonds shall be designated "Tax Increment Urban Renewal Revenue Bonds (South Billings Boulevard Urban Renewal District), Series 2016." The Series 2016 Bonds shall be in denominations of $5,000 or any integral multiple thereof of single maturities. The Series 2016 Bonds shall mature, subject to redemption as hereinafter provided, on July 1 in the years and amounts listed below, and the Series 2016 Bonds maturing in such years and amounts shall bear interest from date of original issue until paid or duly called for redemption at the rates shown opposite such years and amounts, as follows:

Year	Amount	Interest

		Rate
2017	$ 150,000	2.000%
2018	150,000	2.000
2019	155,000	2.000
2020	160,000	2.000
2021	160,000	2.000
2022	165,000	2.000
2023	165,000	2.500
2024	170,000	2.750
2025	175,000	3.000
2026	180,000	3.000
2031*	1,000,000	3.375
2036*	1,185,000	3.750
2040*	1,120,000	3.750

*Term Bonds subject to mandatory sinking fund redemption as set forth in Section 2.07 below.

Interest shall be calculated on the basis of a 360-day year composed of twelve 30-day months.

2.02. Registered Form, Interest Payment Dates. The Series 2016 Bonds shall be issuable only in fully registered form, and the ownership of the Series 2016 Bonds shall be transferred only upon the Bond Register. The interest on the Series 2016 Bonds shall be payable on January 1 and July 1 in each year, commencing January 1, 2017. Interest on the Series 2016 Bonds shall be payable to the Owners thereof as of the close of business on the 15th day of the month immediately preceding each Interest Payment Date, whether or not such day is a Business Day. Interest on and, upon presentation and surrender thereof, principal of each Series 2016 Bond shall be payable by check or draft issued by the Registrar described herein.

2.03. Dated Date. Each Series 2016 Bond shall be dated, as originally issued, as of June 29, 2016, and upon authentication of any Series 2016 Bond the Registrar shall indicate thereon the date of such authentication.

2.04. Registration. The City shall appoint, and shall maintain, a bond registrar, transfer agent and paying agent (the "Registrar"). This Section 2.04 shall establish a system of registration for the Series 2016 Bonds. The effect of registration and the rights and duties of the City and the Registrar with respect thereto shall be as follows:

(a) Bond Register. The Registrar shall keep at its principal office a Bond Register in which the Registrar shall provide for the registration of ownership of Series 2016 Bonds and the registration of transfers and exchanges of Series 2016 Bonds entitled to be registered, transferred or exchanged.

(b) Transfer of Series 2016 Bonds. Upon surrender to the Registrar for transfer of any Series 2016 Bond duly endorsed by the Owner thereof or accompanied by a written instrument of transfer, in form satisfactory to the Registrar, duly executed by the Owner thereof or by an attorney duly authorized by the Owner in writing, the Registrar

shall authenticate and deliver, in the name of the designated transferee or transferees, one or more new Series 2016 Bonds of the same series and a like aggregate principal amount, interest rate and maturity, as requested by the transferor. The Registrar may, however, close the books for registration of transfer of any Series 2016 Bond or portion thereof selected or called for redemption.

(c) Exchange of Series 2016 Bonds. Whenever any Series 2016 Bond is surrendered by the Owner for exchange, the Registrar shall authenticate and deliver one or more new Series 2016 Bonds of the same series and a like aggregate principal amount, interest rate and maturity, as requested by the Owner or the Owner's attorney in writing.

(d) Cancellation. All Series 2016 Bonds surrendered upon any transfer or exchange shall be promptly cancelled by the Registrar and thereafter disposed of as directed by the City.

(e) Improper or Unauthorized Transfer. When any Series 2016 Bond is presented to the Registrar for transfer, the Registrar may refuse to transfer the same until it is satisfied that the endorsement on such Series 2016 Bond or separate instrument of transfer is valid and genuine and that the requested transfer is legally authorized. The Registrar shall incur no liability for the refusal, in good faith, to make transfers which it, in its judgment, deems improper or unauthorized.

(f) Persons Deemed Owners. The City and the Registrar may treat the Person in whose name any Series 2016 Bond is at any time registered in the Bond Register as the absolute owner of such Series 2016 Bond, whether such Series 2016 Bond shall be overdue or not, for the purpose of receiving payment of, or on account of, the principal of, premium, if any, and interest on such Series 2016 Bond and for all other purposes, and all such payments so made to any such registered owner or upon the owner's order shall be valid and effectual to satisfy and discharge the liability of the City upon such Series 2016 Bond to the extent of the sum or sums so paid.

(g) Taxes, Fees and Charges. For every transfer or exchange of Series 2016 Bonds (except for an exchange upon a partial redemption of a Series 2016 Bond), the Registrar may impose a charge upon the Owner thereof sufficient to reimburse the Registrar for any tax, fee or other governmental charge required to be paid with respect to such transfer or exchange.

(h) Mutilated, Lost, Stolen or Destroyed Series 2016 Bonds. In case any Series 2016 Bond shall become mutilated or be lost, stolen or destroyed, the Registrar shall deliver a new Series 2016 Bond of the same series and a like aggregate principal amount, interest rate and maturity in exchange and substitution for and upon cancellation of any such mutilated Series 2016 Bond or in lieu of and in substitution for any such Series 2016 Bond lost, stolen or destroyed, upon the payment of the reasonable expenses and charges of the Registrar in connection therewith; and, in the case of a Series 2016 Bond lost, stolen or destroyed, upon filing with the Registrar of evidence satisfactory to it that such Series 2016 Bond was lost, stolen or destroyed, and of the ownership thereof, and upon furnishing to the Registrar of an appropriate bond or indemnity in form, substance and amount satisfactory to it, in which both the City and the Registrar shall be

named as obligees. All Series 2016 Bonds so surrendered to the Registrar shall be cancelled by it and evidence of such cancellation shall be given to the City. If the mutilated, lost, stolen or destroyed Series 2016 Bond has already matured or such Series 2016 Bond has been called for redemption in accordance with its terms, it shall not be necessary to issue a new Series 2016 Bond prior to payment.

2.05. Appointment of Initial Registrar. The City hereby appoints U.S. Bank National Association, of Salt Lake City, Utah, to act as the Registrar. The City reserves the right to appoint a successor Registrar, but the City agrees to pay the reasonable and customary charges of the Registrar for the services performed. Upon merger or consolidation of a bank or trust company that is acting as the Registrar, if the resulting corporation is a bank or trust company authorized by law to conduct such business, such corporation shall be authorized to act as successor Registrar. The City reserves the right to remove any Registrar upon 30 days' notice and upon the appointment of a successor Registrar, in which event the predecessor Registrar shall deliver all cash and Series 2016 Bonds in its possession as Registrar to the successor Registrar and shall deliver the Bond Register to the successor Registrar.

2.06. Optional Redemption. The Series 2016 Bonds with Stated Maturities in the years 2017 through 2026 are not subject to redemption prior to their Stated Maturities. The Series 2016 Bonds with Stated Maturities on or after July 1, 2031 are subject to redemption on July 1, 2026 and any date thereafter, at the option of the City, in whole or in part, and if in part from such Stated Maturities and in such principal amounts as the City may designate in writing to the Registrar (or, if no designation is made, in inverse order of maturities and within a maturity in $5,000 principal amounts selected by the Registrar by lot or other manner it deems fair), at a Redemption Price equal to the principal amount thereof and interest accrued to the Redemption Date, without premium.

The Redemption Date and the principal amount of the Series 2016 Bonds to be redeemed shall be fixed by the City Finance Director who shall give notice thereof to the Registrar at least 35 days prior to the Redemption Date or such lesser period as the Registrar accepts. The Registrar, at least 30 days prior to the designated Redemption Date, shall cause notice of redemption to be mailed, by first class mail, or by other means required by the securities depository, to the Owners of each Series 2016 Bond to be redeemed at their addresses as they appear on the Bond Register, but no defect in or failure to give such mailed notice shall affect the validity of proceedings for the redemption of any Series 2016 Bond not affected by such defect or failure. The notice of redemption shall specify the Redemption Date, Redemption Price, the numbers, interest rates and CUSIP numbers of the Series 2016 Bonds to be redeemed and the place at which the Series 2016 Bonds are to be surrendered for payment, which is the principal office of the Registrar. Official notice of redemption having been given as aforesaid, the Series 2016 Bonds or portions thereof so to be redeemed shall, on the Redemption Date, become due and payable at the Redemption Price therein specified and from and after such date (unless the City shall default in the payment of the Redemption Price) such Series 2016 Bonds or portions thereof shall cease to bear interest.

2.07. Mandatory Sinking Fund Redemption. The Series 2016 Bonds having Stated Maturities in 2031, 2036 and 2040 are subject to mandatory sinking fund redemption on July 1 in the respective years and the respective principal amounts set forth below in $5,000 principal amounts selected by the Registrar, by lot or other manner it deems fair, at a Redemption Price

equal to the principal amount thereof to be redeemed plus interest accrued to the Redemption Date:

2031 Term Bond		2036 Term Bond		2040 Term Bond	
July 1	Sinking Fund Payment Amount	July 1	Sinking Fund Payment Amount	July 1	Sinking Fund Payment Amount
2027	$185,000	2032	$220,000	2037	$265,000
2028	195,000	2033	230,000	2038	275,000
2029	200,000	2034	235,000	2039	285,000
2030	205,000	2035	245,000	2040*	295,000
2031*	215,000	2036*	255,000		

*Stated Maturity.

If the Term Bonds having Stated Maturities in 2031, 2036 and 2040 are not previously purchased by the City in the open market or prepaid, $215,000, $255,000 and $295,000, respectively, in principal amount of such Term Bonds would remain to mature in 2031, 2036 and 2040, respectively. The principal amount of such Term Bonds required to be redeemed on the above Sinking Fund Payment Dates shall be reduced by the principal amount of such Term Bonds theretofore redeemed at the option of the City and as to which the City has not previously applied amounts to reduce the principal amount of such Term Bonds on a Sinking Fund Payment Date.

2.08. Execution and Delivery. The Series 2016 Bonds shall be forthwith prepared for execution under the direction of the City Clerk and shall be executed on behalf of the City by the signatures of the Mayor, the City Finance Director and the City Clerk, provided that said signatures may be printed, engraved or lithographed facsimiles thereof. The seal of the City need not be imprinted on or affixed to any Series 2016 Bond. In case any officer whose signature or a facsimile of whose signature shall appear on the Series 2016 Bonds shall cease to be such officer before the delivery thereof, such signature or facsimile shall nevertheless be valid and sufficient for all purposes, the same as if such officer had remained in office until delivery. When the Series 2016 Bonds have been so executed by said City officers, they shall be registered by the City Finance Director in accordance with Montana Code Annotated, Section 7-15-4322, as amended. Notwithstanding such execution, no Series 2016 Bond shall be valid or obligatory for any purpose or be entitled to any security or benefit under the Resolution unless and until a certificate of authentication on such Series 2016 Bond has been duly executed by the manual signature of an authorized representative of the Registrar. Certificates of authentication on different Series 2016 Bonds need not be signed by the same representative. The executed certificate of authentication on each Series 2016 Bond shall be conclusive evidence that it has been authenticated and delivered under the Resolution. When the Series 2016 Bonds have been fully executed and authenticated, they shall be delivered by the Registrar to the Original Purchaser upon payment of the purchase price in accordance with the contract of sale heretofore made and executed, and the Original Purchaser shall not be obligated to see to the application of the purchase price.

2.09. Securities Depository for the Series 2016 Bonds.

(a) For purposes of this Section 2.09, the following terms shall have the following meanings:

"Beneficial Owner" shall mean, whenever used with respect to a Series 2016 Bond of which DTC (as hereinafter defined) or its nominee is the Owner, the Person (or subrogee of the Person) recorded as the beneficial owner of such Series 2016 Bond on the records of the Participant (as hereinafter defined) in whose name DTC holds such Series 2016 Bond.

"Cede & Co." shall mean Cede & Co., the nominee of DTC, and any successor nominee of DTC with respect to the Series 2016 Bonds.

"DTC" shall mean The Depository Trust Company of New York, New York.

"Participant" shall mean any broker-dealer, bank or other financial institution for which DTC holds Series 2016 Bonds as securities depository.

"Representation Letter" shall mean the Blanket Issuer Letter of Representations pursuant to which the City agrees to comply with DTC's Operational Arrangements.

(b) The Series 2016 Bonds shall be initially issued as separately authenticated fully registered Series 2016 Bonds, and one Series 2016 Bond shall be issued in the principal amount of each Stated Maturity of the Series 2016 Bonds. Upon initial issuance, the ownership of all Series 2016 Bonds shall be registered in the Bond Register in the name of Cede & Co., as nominee of DTC. The Registrar and the City may treat DTC (or its nominee) as the sole and exclusive Owner of the Series 2016 Bonds registered in its name for the purposes of payment of the principal of or interest on the Series 2016 Bonds, selecting the Series 2016 Bonds or portions thereof to be redeemed, if any, giving any notice permitted or required to be given to Owners of Series 2016 Bonds under the Resolution, registering the transfer of Series 2016 Bonds, and for all other purposes whatsoever; and neither the Registrar nor the City shall be affected by any notice to the contrary. Neither the Registrar nor the City shall have any responsibility or obligation to any Participant, any Person claiming a beneficial ownership interest in the Series 2016 Bonds under or through DTC or any Participant, or any other Person which is not shown on the Bond Register as being an Owner, with respect to the accuracy of any records maintained by DTC or any Participant, with respect to the payment by DTC or any Participant of any amount with respect to the principal of or interest on the Series 2016 Bonds, with respect to any notice which is permitted or required to be given to Owners under the Resolution, with respect to the selection by DTC or any Participant of any Person to receive payment in the event of a partial redemption of the Series 2016 Bonds, or with respect to any consent given or other action taken by DTC as Owner of the Series 2016 Bonds. So long as any Series 2016 Bond is registered in the name of Cede & Co., as nominee of DTC, the Registrar shall pay all principal of and interest on such Series 2016 Bond, and shall give all notices with respect to such Series 2016 Bond, only to Cede & Co. in accordance with the Representation Letter, and all such payments shall be valid and effective to fully satisfy and discharge the City's obligations with respect to the principal of and interest on the Series 2016 Bonds to the extent of the sum or sums so paid. Unless the services of DTC as securities depository with respect to the Series 2016 Bonds are terminated as provided in subsection (c) hereof, no Person other than DTC shall receive an authenticated Series 2016 Bond for each separate stated maturity evidencing the obligation of the City to make

payments of principal and interest. Upon delivery by DTC to the Registrar of written notice to the effect that DTC has determined to substitute a new nominee in place of Cede & Co., the Series 2016 Bonds will be transferable to such new nominee in accordance with subsection (e) hereof.

(c) In the event the City determines to discontinue the book-entry-only system for the Series 2016 Bonds, the City may notify DTC and the Registrar, whereupon DTC shall notify the Participants of the availability through DTC of Series 2016 Bonds in the form of certificates. In such event, the Series 2016 Bonds will be transferable in accordance with subsection (e) hereof. DTC may determine to discontinue providing its services with respect to the Series 2016 Bonds at any time by giving notice to the City and the Registrar and discharging its responsibilities with respect thereto under applicable law. In such event the Series 2016 Bonds will be transferable in accordance with subsection (e) hereof.

(d) The Representation Letter sets forth certain matters with respect to, among other things, notices, consents and approvals by Owners and Beneficial Owners and payments on the Series 2016 Bonds. The Registrar shall have the same rights with respect to its actions thereunder as it has with respect to its actions under the Resolution.

(e) In the event that any transfer or exchange of Series 2016 Bonds is permitted under subsection (b) or (c) hereof, such transfer or exchange shall be accomplished upon receipt by the Registrar of the Series 2016 Bonds to be transferred or exchanged and appropriate instruments of transfer to the permitted transferee in accordance with the provisions of the Resolution. In the event Series 2016 Bonds in the form of certificates are issued to Owners other than Cede & Co., its successor as nominee for DTC as Owner of all the Series 2016 Bonds, or another securities depository as Owner of all the Series 2016 Bonds, the provisions of the Resolution shall also apply to all matters relating thereto, including, without limitation, the preparation of such Series 2016 Bonds in the form of Series 2016 Bond certificates and the method of payment of principal of and interest on such Series 2016 Bonds in the form of Series 2016 Bond certificates.

2.10. Form of Series 2016 Bonds. The Series 2016 Bonds shall be prepared in substantially the form set forth in Exhibit A hereto and by this reference is made a part hereof.

2.11. Application of Proceeds of Series 2016 Bonds. Simultaneously with the delivery of the Series 2016 Bonds, the City Finance Director shall cause the proceeds of the Series 2016 Bonds to be deposited as follows:

(i) Deposit $308,750.02 in the Reserve Account in order to cause the balance therein to equal the Reserve Requirement giving effect to the issuance of the Series 2016 Bonds; and

(ii) Deposit $4,571,928.33 in the Construction Account to be used to pay costs of the 2016 Project and costs of issuance of the Series 2016 Bonds.

Section 3. Continuing Disclosure.

(a) Purpose and Beneficiaries. To provide for the public availability of certain information relating to the Series 2016 Bonds and the security therefor and to permit the Original

Purchasers and other participating underwriters in the primary offering of the Series 2016 Bonds to comply with paragraph (b)(5) of Rule 15c2-12 promulgated by the Securities and Exchange Commission under the Securities Exchange Act of 1934, as amended (the "Rule"), the City hereby makes the following covenants and agrees, for the benefit of the Owners (as hereinafter defined) from time to time of the outstanding Series 2016 Bonds, to provide annual reports of specified information and notice of the occurrence of certain events to the Municipal Securities Rulemaking Board ("MSRB") through its Electronic Municipal Market Access system website ("EMMA"), as hereinafter described (the "Disclosure Covenants"). The City is the only "obligated person" in respect of the Series 2016 Bonds within the meaning of the Rule for purposes of identifying the entities in respect of which continuing disclosure must be made.

If the City fails to comply with the Disclosure Covenants, any Person aggrieved thereby, including the Owners of the outstanding Series 2016 Bonds, may take whatever action at law or in equity may appear necessary or appropriate to enforce performance and observance of the Disclosure Covenants, including an action for a writ of mandamus or specific performance. Direct, indirect, consequential and punitive damages shall not be recoverable for any default hereunder. Notwithstanding anything to the contrary contained in the Disclosure Covenants, in no event shall a default under this Section 3 constitute a default under the Series 2016 Bonds or under any other provision of the Resolution.

As used in this Section 3, "Owner" means, in respect of a Series 2016 Bond, the registered owner or owners thereof appearing in the Bond Register or any Beneficial Owner (as hereinafter defined) thereof, if such Beneficial Owner provides to the Registrar evidence of such beneficial ownership in form and substance reasonably satisfactory to the Registrar. As used in this Section 3, "Beneficial Owner" means, in respect of a Series 2016 Bond, any Person that (i) has the power, directly or indirectly, to vote or consent with respect to, or to dispose of ownership of, such Series 2016 Bond (including Persons holding Series 2016 Bonds through nominees, depositories or other intermediaries), or (ii) is treated as the owner of the Series 2016 Bond for federal income tax purposes.

(b) Information To Be Disclosed. The City will provide, in the manner set forth in paragraph (c) hereof, either directly or indirectly through an agent designated by the City, the following information at the following times:

(i) on or before 365 days after the end of each fiscal year of the City, commencing with the fiscal year ending June 30, 2016, the following financial information and operating data in respect of the City (the "Disclosure Information"):

(A) the audited financial statements of the City for such fiscal year, accompanied by the audit report and opinion of the Accountant or government auditor relating thereto, as permitted or required by the laws of the State, containing a balance sheet as of the end of such fiscal year, a statement of operations, changes in fund balances and cash flows for the fiscal year then ended, and information similar to that presented in the table in the Official Statement under "THE DISTRICT—District Financial Statements" for the fiscal year then ended, prepared in accordance with generally accepted accounting principles promulgated by the Financial Accounting Standards Board as modified in accordance with the governmental accounting standards promulgated by the

Governmental Accounting Standards Board or as otherwise provided under Montana law, as in effect from time to time or, if and to the extent such financial statements have not been prepared in accordance with such generally accepted accounting principles for reasons beyond the reasonable control of the City, noting the discrepancies therefrom and the effect thereof, and certified as to accuracy and completeness in all material respects by the City Finance Director; and

(B) To the extent not included in the financial statements referred to in paragraph (b)(i)(A) above, the information for such fiscal year of the type set forth below, which information may be unaudited:

(1) the value of property in the District in a format similar to the table in the Official Statement under "THE DISTRICT—Value of Property and Tax Increment of the District;"

(2) Tax Increment available for debt service and debt service coverage in a format similar to that shown in the Official Statement under "THE DISTRICT—District Financial Statements" and under "ESTIMATED REVENUE AVAILABLE TO PAY DEBT SERVICE AND COVERAGE—Revenue Available and Debt Service Coverage;"

(3) a description of any additional borrowing or future financing of the City payable from Tax Increment;

(4) mill levy rates for the then current fiscal year in format similar to that shown in the Official Statement under "THE DISTRICT—Mill Levies in the District;" and

(5) a list of the major taxpayers in the District for the then current fiscal year in a format similar to the table in the Official Statement under "THE DISTRICT—Top Ten Taxpayers in the District."

Notwithstanding anything in this Section 3 to the contrary, if the audited financial statements are not available by the date specified, the City shall provide on or before such date unaudited financial statements in the format required for the audited financial statements as part of the Disclosure Information and, within ten (10) days after the receipt thereof, the City shall provide the audited financial statements.

Any or all of the Disclosure Information may be incorporated by reference, if it is updated as required hereby, by reference from other documents, including official statements, which have been submitted to the MSRB in the manner set forth in paragraph (c) hereof. The City shall clearly identify in the Disclosure Information in each document so incorporated by reference.

If any part of the Disclosure Information can no longer be generated because the operations of the City have materially changed or been discontinued, such Disclosure Information need no longer be provided if the City includes in the Disclosure Information a

statement to such effect; provided, however, if such operations have been replaced by other City operations in respect of which data is not included in the Disclosure Information and the City determines that certain specified data regarding such replacement operations would be material (as hereinafter defined), then, from and after such determination, the Disclosure Information shall include such additional specified data regarding the replacement operations.

If the Disclosure Information is changed or the Disclosure Covenants are amended as permitted by paragraph (d) hereof, then the City shall include in the next Disclosure Information to be delivered pursuant to this Section 3, to the extent necessary, an explanation of the reasons for the amendment and the effect of any change in the type of financial information or operating data provided.

(ii) In a timely manner not in excess of ten (10) business days, the City will provide notice of the occurrence of any of the following events:

(A) principal and interest payment delinquencies;
(B) non-payment related defaults, if material;
(C) unscheduled draws on debt service reserves reflecting financial difficulties;
(D) unscheduled draws on credit enhancements reflecting financial difficulties;
(E) substitution of credit or liquidity providers, or their failure to perform;
(F) adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701-TEB), or other material notices or determinations with respect to the tax status of the Series 2016 Bonds or other material events affecting the tax status of the Series 2016 Bonds;
(G) modifications to rights of holders of the Series 2016 Bonds, if material;
(H) bond calls, if material, and tender offers;
(I) defeasances;
(J) release, substitution or sale of property securing repayment of the Series 2016 Bonds, if material;
(K) rating changes;
(L) bankruptcy, insolvency, receivership, or similar event of the City;
(M) the consummation of a merger, consolidation, or acquisition involving the City or the sale of all or substantially all of the assets of the City, other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material; and
(N) appointment of a successor or additional trustee or the change of name of a trustee, if material.

An event is "material" if it is an event as to which a substantial likelihood exists that a reasonably prudent investor would attach importance thereto in deciding to buy, hold or sell a Series 2016 Bond or, if not disclosed, would materially alter the total mix of information otherwise available to an investor from the Official Statement or information generally available to the public. Notwithstanding the foregoing sentence, an event is also "material" if it is an event

that would be deemed material for purposes of the purchase, holding or sale of a Series 2016 Bond within the meaning of applicable federal securities laws, as interpreted at the time of discovery of the occurrence of the event.

(iii) In a timely manner, the City will provide notice of the occurrence of any of the following events or conditions:

(A) the failure of the City to provide the Disclosure Information described under paragraph (b)(i) hereof at the time specified thereunder;

(B) the amendment or supplementing of the Disclosure Covenants pursuant to paragraph (d) hereof, together with a copy of such amendment or supplement and any explanation provided by the City;

(C) the termination of the obligations of the City under the Disclosure Covenants; and

(D) any change in the fiscal year of the City.

(c) Manner of Disclosure. The City agrees to make available the information described in paragraph (b) hereof to the MSRB through EMMA or in a manner as may be otherwise proscribed by the MSRB consistent with the Rule. All documents provided to the MSRB shall be accompanied by identifying information as prescribed by the MSRB.

(d) Term; Amendments; Interpretation.

(i) The Disclosure Covenants shall remain in effect so long as any Series 2016 Bonds are outstanding.

(ii) Notwithstanding paragraph (d)(i) hereof, the Disclosure Covenants (and the form and requirements of the Disclosure Information) may be amended or supplemented by the City from time to time, without notice to (except as provided under paragraph (b)(iii) hereof), or the consent of the Owners of any Series 2016 Bonds, by a resolution of this Council filed in the office of the recording officer of the City accompanied by an opinion of Bond Counsel, who may rely on certificates of the City and others and the opinion may be subject to customary qualifications, to the effect that the Disclosure Covenants (and the form and requirements of the Disclosure Information), as so amended or supplemented, will comply with paragraph (b)(5) of the Rule. If the Disclosure Covenants (and the form and requirements of the Disclosure Information) are so amended, the City agrees to provide, contemporaneously with the effectiveness of such amendment, an explanation of the reasons for the amendment and the effect, if any, of the change in the type of financial information or operating data being provided hereunder.

(iii) The Disclosure Covenants are entered into to comply with the continuing disclosure provisions of the Rule and should be construed so the undertaking would satisfy the requirements of paragraph (b)(5) of the Rule.

Section 4. Tax Covenants and Certifications.

4.01. Use of 2016 Project. The 2016 Project is and will be owned and operated by the City. No user of the 2016 Project is granted any concession, license or special arrangement with respect to the 2016 Project. The City shall not enter into any lease, use or other agreement or arrangement with any non-governmental Person relating to the use of the 2016 Project or security for the payment of the Series 2016 Bonds which might cause the Series 2016 Bonds to be considered "private activity bonds" or "private loan bonds" within the meaning of Section 141 the Code. No "impermissible agreement" as defined in Section 1.141-4(e)(4)(ii) of the Regulations, has been or will be entered into by the Commission in respect of the Tax Increment or otherwise to secure the Series 2016 Bonds.

4.02. General Covenant. The City covenants and agrees with the Owners from time to time of the Series 2016 Bonds that it will not take or permit to be taken by any of its officers, employees or agents any action which would cause the interest on the Series 2016 Bonds to become includable in gross income for federal income tax purposes under the Code and applicable Regulations, and covenants to take any and all actions within its powers to ensure that the interest on the Series 2016 Bonds will not become includable in gross income for federal income tax purposes under the Code and the Regulations.

4.03. Arbitrage Certification. The Mayor, the City Finance Director and the City Clerk being the officers of the City charged with the responsibility for issuing the Series 2016 Bonds pursuant to the Resolution, are authorized and directed to execute and deliver to the Original Purchaser a certificate in accordance with the provisions of Section 148 of the Code, and Section 1.148-2(b) of the Regulations, stating that on the basis of facts, estimates and circumstances in existence on the date of issue and delivery of the Series 2016 Bonds, it is reasonably expected that the proceeds of the Series 2016 Bonds will not be used in a manner that would cause the Series 2016 Bonds to be "arbitrage bonds" within the meaning of Section 148 of the Code and the Regulations.

4.04. Arbitrage Rebate. The City acknowledges that the Series 2016 Bonds are subject to the rebate requirements of Section 148(f) of the Code. The City covenants and agrees to retain such records, make such determinations, file such reports and documents and pay such amounts at such times as are required under said Section 148(f) and applicable Regulations to preserve the exclusion of interest on the Series 2016 Bonds from gross income for federal income tax purposes, unless the Series 2016 Bonds qualify for the exception from the rebate requirement under Section 148(f)(4)(B) of the Code and no "gross proceeds" of the Series 2016 Bonds (other than amounts constituting a "bona fide debt service fund") arise during or after the expenditure of the original proceeds thereof. In furtherance of the foregoing, the Mayor, the City Finance Director and the City Clerk are hereby authorized and directed to execute a Rebate Certificate, substantially in the form to be prepared by Bond Counsel, and the City hereby covenants and agrees to observe and perform the covenants and agreements contained therein, unless amended or terminated in accordance with the provisions thereof.

4.05. Information Reporting. The City shall file with the Secretary of the Treasury, not later than November 15, 2016, a statement concerning the Series 2016 Bonds containing the information required by Section 149(e) of the Code.

Section 5. Repeals and Effective Date.

5.01. Repeal. All provisions of other resolutions and other actions and proceedings of the City and this Council that are in any way inconsistent with the terms and provisions of the Resolution are repealed, amended and rescinded to the full extent necessary to give full force and effect to the provisions of the Resolution.

5.02. Effective Date. This Resolution shall take effect immediately upon its passage and adoption by this Council.

PASSED AND ADOPTED by the City Council of the City of Billings, Montana, this 27th day of June, 2016.

_____
Mayor

Attest: _____
City Clerk

(SEAL)

EXHIBIT A

UNITED STATES OF AMERICA
STATE OF MONTANA
COUNTY OF YELLOWSTONE

CITY OF BILLINGS, MONTANA

**TAX INCREMENT URBAN RENEWAL REVENUE BONDS
(SOUTH BILLINGS BOULEVARD URBAN RENEWAL DISTRICT), SERIES 2016**

No. _____ $_____

Rate	Maturity Date	Date of Original Issue	CUSIP
	July 1,	June 29, 2016	090141 [___]

REGISTERED OWNER: CEDE & CO.

PRINCIPAL AMOUNT: DOLLARS AND NO/100

FOR VALUE RECEIVED, THE CITY OF BILLINGS, YELLOWSTONE COUNTY, STATE OF MONTANA (the "City"), acknowledges itself to be specially indebted and hereby promises to pay to the registered owner named above or registered assigns the principal amount specified above on the maturity date specified above or, if this Bond is prepayable as stated below, on an earlier date on which this Bond shall have been duly called for redemption, with interest hereon from the date of original issue hereof, or such later date to which interest hereon has been paid or duly provided for, until the principal amount is paid or until this Bond, if redeemable, has been duly called for redemption, at the annual rate specified above. Principal of this Bond is payable upon presentation and surrender hereof to U.S. Bank National Association, Seattle, Washington, as registrar, transfer agent and paying agent, or its successor designated under the Resolution described herein (the "Registrar") at its operations center in St. Paul, Minnesota. The interest on this Bond shall be payable on January 1 and July 1 in each year, commencing January 1, 2017. Interest on the Series 2016 Bonds shall be payable to the owners of record thereof as such appear on the Bond Register as of the close of business on the 15th day of the month immediately preceding each interest payment date, whether or not such day is a Business Day. Interest on, and upon presentation and surrender thereof, the principal of each Bond shall be payable by check or draft issued by the Registrar described herein.

The principal of and interest on this Bond are payable in lawful money of the United States of America. Interest shall be calculated on the basis of a 360-day year composed of twelve 30-day months.

Notwithstanding any other provisions of this Bond, so long as this Bond is registered in the name of Cede & Co., as nominee of The Depository Trust Company, or in the name of any other nominee of The Depository Trust Company or other securities depository, the Registrar shall pay all principal of and interest on this Bond, and shall give all notices with respect to this Bond, only to Cede & Co. or other nominee in accordance with the operational arrangements of The Depository Trust Company or other securities depository as agreed to by the City.

This Bond is one of a duly authorized issue of Bonds of the City designated as "Tax Increment Urban Renewal Revenue Bonds (South Billings Boulevard Urban Renewal District), Series 2016" (collectively, the "Bonds"), issued and to be issued in one or more series under, and all equally and ratably secured by Resolution No. 15-10452, adopted by the City Council on May 11, 2015 (the "Original Resolution"), as amended by Resolution No. [___], adopted by the City Council on June 27, 2016 (as amended or supplemented in accordance with the provisions thereof, the "Resolution"), to which Resolution, copies of which are on file with the City, reference is hereby made for a description of the nature and extent of the security, the respective rights thereunder of the Owners of the Bonds and the City and the terms upon which the Bonds are to be issued and delivered. This Bond is one of the series specified in its title, issued in the aggregate principal amount of $4,935,000 (the "Series 2016 Bonds"), all of like date of original issue and tenor except as to serial number, denomination, date, interest rate, maturity date and redemption privilege. The Series 2016 Bonds are issued by the City for the purpose of financing a portion of the costs of an urban renewal project (as defined in the Act) within the City's South Billings Boulevard Urban Renewal District (the "District"). The Series 2016 Bonds are payable and secured ratably and equally and on a parity with the City's Tax Increment Urban Renewal Revenue Refunding Bonds (South Billings Boulevard Urban Renewal District), Series 2015 (the "Series 2015 Bonds") and any additional parity Bonds hereafter issued pursuant to the Resolution. Capitalized terms used herein but not otherwise defined shall have the respective meanings given such terms in the Resolution.

The Series 2016 Bonds are issued pursuant to and in full compliance with the Constitution and laws of the State of Montana, particularly Montana Code Annotated, Title 7, Chapter 15, Parts 42 and 43, as amended (the "Act"), and pursuant to the Resolution. The Bonds are payable solely and ratably from Tax Increment received by the City and resulting from the extension of ad valorem taxes levied by certain Taxing Bodies against the incremental taxable value of taxable property within the District pursuant to the Act, except that under certain conditions as described in the Resolution, the Bonds may be payable from replacement revenues, if any, provided in the event of the abolition or substantial elimination of property taxation in Montana.

The Bonds are not general obligations of the City and the City's general credit and taxing powers are not pledged to the payment of the Bonds or the interest thereon. The Bonds shall not constitute an indebtedness of the City within the meaning of any constitutional or statutory limitations.

The Series 2016 Bonds with Stated Maturities in the years 2017 through 2026 are not subject to redemption prior to their Stated Maturities. The Series 2016 Bonds with Stated Maturities on or after July 1, 2031 are subject to redemption on July 1, 2026 and any date thereafter, at the option of the City, in whole or in part, and if in part from such Stated Maturities

and in such principal amounts as the City may designate in writing to the Registrar (or, if no designation is made, in inverse order of maturities and within a maturity in $5,000 principal amounts selected by the Registrar by lot or other manner it deems fair), at a Redemption Price equal to the principal amount thereof and interest accrued to the Redemption Date, without premium.

The Series 2016 Bonds having Stated Maturities in 2031, 2036 and 2040 are subject to mandatory sinking fund redemption on July 1 in the respective years and the respective principal amounts set forth below in $5,000 principal amounts selected by the Registrar, by lot or other manner it deems fair, at a Redemption Price equal to the principal amount thereof to be redeemed plus interest accrued to the Redemption Date:

2031 Term Bond		2036 Term Bond		2040 Term Bond	
July 1	Sinking Fund Payment Amount	July 1	Sinking Fund Payment Amount	July 1	Sinking Fund Payment Amount
2027	$185,000	2032	$220,000	2037	$265,000
2028	195,000	2033	230,000	2038	275,000
2029	200,000	2034	235,000	2039	285,000
2030	205,000	2035	245,000	2040*	295,000
2031*	215,000	2036*	255,000		

*Stated Maturity.

If the Term Bonds having Stated Maturities in 2031, 2036 and 2040 are not previously purchased by the City in the open market or prepaid, $215,000, $255,000 and $295,000, respectively, in principal amount of such Term Bonds would remain to mature in 2031, 2036 and 2040, respectively. The principal amount of such Term Bonds required to be redeemed on the above Sinking Fund Payment Dates shall be reduced by the principal amount of such Term Bonds theretofore redeemed at the option of the City and as to which the City has not previously applied amounts to reduce the principal amount of such Term Bonds on a Sinking Fund Payment Date.

As provided in the Resolution and subject to certain limitations set forth therein, this Series 2016 Bond is transferable upon the books of the City at the principal office of the Registrar, by the registered owner hereof in person or by his attorney duly authorized in writing, upon surrender hereof together with a written instrument of transfer satisfactory to the Registrar duly executed by the registered owner or his attorney; and may also be surrendered in exchange for Series 2016 Bonds of other authorized denominations. Upon any such transfer or exchange, the City will cause a new Series 2016 Bond or Bonds to be issued in the name of the transferee or registered owner, of the same aggregate principal amount, bearing interest at the same rate and maturing on the same date, subject to reimbursement for any tax, fee or governmental charge required to be paid with respect to such transfer or exchange.

The City and the Registrar may deem and treat the Person in whose name this Bond is registered as the absolute owner hereof, whether this Bond is overdue or not, for the purpose of

receiving payment and for all other purposes, and neither the City nor the Registrar shall be affected by any notice to the contrary.

IT IS HEREBY CERTIFIED AND RECITED that all acts, conditions and things required by the Constitution and laws of the State of Montana and ordinances and resolutions of the City to be done, to exist, to happen and to be performed in order to make this Series 2016 Bond a valid and binding special, limited obligation of the City in accordance with its terms have been done, do exist, have happened and have been performed as so required; that this Series 2016 Bond has been issued by the City in connection with an urban renewal project (as defined in the Act); that the City, in and by the Resolution, has validly made and entered into covenants and agreements with and for the benefit of the Owners from time to time of all Bonds issued thereunder, including covenants that it will pledge, appropriate and credit the Tax Increment to the Tax Increment Debt Service Account of the City; that Additional Bonds may be issued and made payable from the Tax Increment Debt Service Account on a parity with the Series 2015 Bonds and the Series 2016 Bonds upon certain conditions set forth in the Resolution, but no obligation will be otherwise incurred and made payable from the Tax Increment, unless the lien thereof shall be expressly made subordinate to the lien of the Series 2015 Bonds and the Series 2016 Bonds on the Tax Increment; that all provisions for the security of the Owners of the Bonds as set forth in the Resolution will be punctually and faithfully performed as therein stipulated; and that the issuance of the Series 2016 Bonds does not cause the obligations of the City to exceed any constitutional or statutory limitation of indebtedness.

This Bond shall not be valid or become obligatory for any purpose or be entitled to any security or benefit under the Resolution until the Certificate of Authentication hereon shall have been executed by the Registrar by the manual signature of one of its authorized representatives.

IN WITNESS WHEREOF, the City of Billings, Montana, by its City Council, has caused this Bond to be executed by the facsimile signatures of the Mayor, the City Finance Director and the City Clerk, and by a printed facsimile of the official seal of the City.

CITY OF BILLINGS, MONTANA

(Facsimile Signature)
MAYOR

(Facsimile Signature)
(Facsimile Seal) CITY FINANCE DIRECTOR

(Facsimile Signature)
CITY CLERK

Dated:

CERTIFICATE OF AUTHENTICATION

This is one of the Bonds delivered pursuant to the Resolution mentioned herein.

U.S. BANK NATIONAL ASSOCIATION,
as Registrar, Transfer Agent, and
Paying Agent

By_____
Authorized Signature

The following abbreviations, when used in the inscription on the face of this Bond, shall be construed as though they were written out in full according to applicable laws or regulations:

TEN COM --	as tenants in common	UTMA.....Custodian..... (Cust) (Minor)	
TEN ENT --	as tenants by the entireties		
		under Uniform Gifts to	
JT TEN --	as joint tenants with right of survivorship and not as tenants in common	Minor Act..... (State)	

_____
abbreviations may also be used.

ASSIGNMENT

FOR VALUE RECEIVED the undersigned hereby sells, assigns and transfers unto _____ _____ the within Bond and all rights thereunder, and hereby irrevocably constitutes and appoints _____ attorney to transfer the within Bond on the books kept for registration thereof, with full power of substitution in the premises.

Dated: _____

PLEASE INSERT SOCIAL SECURITY OR OTHER IDENTIFYING NUMBER OF ASSIGNEE:

_____

_____

_____

NOTICE: The signature to this assignment must correspond with the name as it appears upon the face of the within Bond in every particular, without alteration, enlargement or any change whatsoever.

SIGNATURE GUARANTEED

_____

Signature(s) must be guaranteed by an "eligible guarantor institution" meeting the requirements of the Registrar, which requirements include membership or participation in STAMP or such other "signature guaranty program" as may be determined by the Registrar in addition to or in substitution for STAMP, all in accordance with the Securities Exchange Act of 1934, as amended.

Consent **1. I.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Resolution Amending Resolution #16-10544 for Annexation 16-03

PRESENTED BY: Candi Millar, Planning & Community Services Department Director

Department: Planning & Community Services

PROBLEM/ISSUE STATEMENT

The City Council approved the annexation of property owned by Yellowstone Meadows Partners, LLC (Annexation #16-03) on May 9, 2016. The property is located at the southwest corner of the intersection of 54th Street West and Trail Creek Drive. After this action, it was determined that there was an error in the legal description. Therefore, it becomes necessary to approve an amended resolution that corrects the legal description of Annexation #16-03. This correction has no other impact on the property's annexation.

ALTERNATIVES ANALYZED

The Council may:

- Approve the amended resolution correcting the legal description for Annexation #16-03; or
- Not approve the resolution. Not approving the resolution will leave an error in the legal description of the annexed property and cause problems in the future if other platting or annexation takes place around the subject property.

FINANCIAL IMPACT

There is no financial impact to the City with this action.

RECOMMENDATION

Staff recommends that the City Council approve the amended resolution correcting the legal description for Annexation #16-03.

APPROVED BY CITY ADMINISTRATOR

Attachments

Resolution

RESOLUTION NO. 16 -

A RESOLUTION AMENDING BILLINGS RESOLUTION 16-10544, A RESOLUTION APPROVING ANNEXATION OF TERRITORY TO THE CITY, AND CORRECTING THE LEGAL DESCRIPTION OF THE PROPERTY ANNEXED

WHEREAS, the Billings City Council adopted Resolution 16-10544 on May 9, 2016, annexing property to the City of Billings; and

WHEREAS, the legal description contained in Resolution 16-10544 was incorrect and should be corrected to ensure the legal description of the property annexed is accurate; and

WHEREAS, the City Engineering Division has prepared a corrected legal description for the annexed property.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BILLINGS, MONTANA, AS FOLLOWS:

That Resolution 16-10544 is hereby amended to correct the legal description pf property annexed by the City of Billings as follows:

A tract of unplatted land situated in the NE1/4, NE1/4 of Section 31, T.1N., R.25E., P.M.M., Yellowstone County, Montana, more particularly described as:

Beginning at the southeast corner of Trail Creek Drive of Yellowstone Meadows-Phase One, Recorded December 15, 1970, under Document No. 873104, on file and of record in the Records of Yellowstone County, said Point of Beginning being the southwest corner Right-Of-Way line of Trail Creek Drive and 54th Street West; thence in a southwesterly direction and along the west Right-Of-Way line of said 54th Street West for a distance of 426.00 feet; thence leaving said 54th Street West Right-Of-Way line and in a southwesterly direction and parallel to said Trail Creek Drive for a distance of 576.68 feet to a point; thence in a northeasterly direction and parallel to 54th Street West for a distance of 426.00 feet to a point on the south Right-Of-Way line of Trail Creek Drive; thence in a northeasterly direction and along said Right-Of-Way line of Trail Creek Drive for a distance of 576.68 feet to the Point of Beginning. Including all adjacent right-of-way of Trail Creek Drive.

Containing 6.434 gross acres and 5.639 net acres more or less.

(#16-02) See Exhibit "A" Attached

Thomas W. Hanel, MAYOR

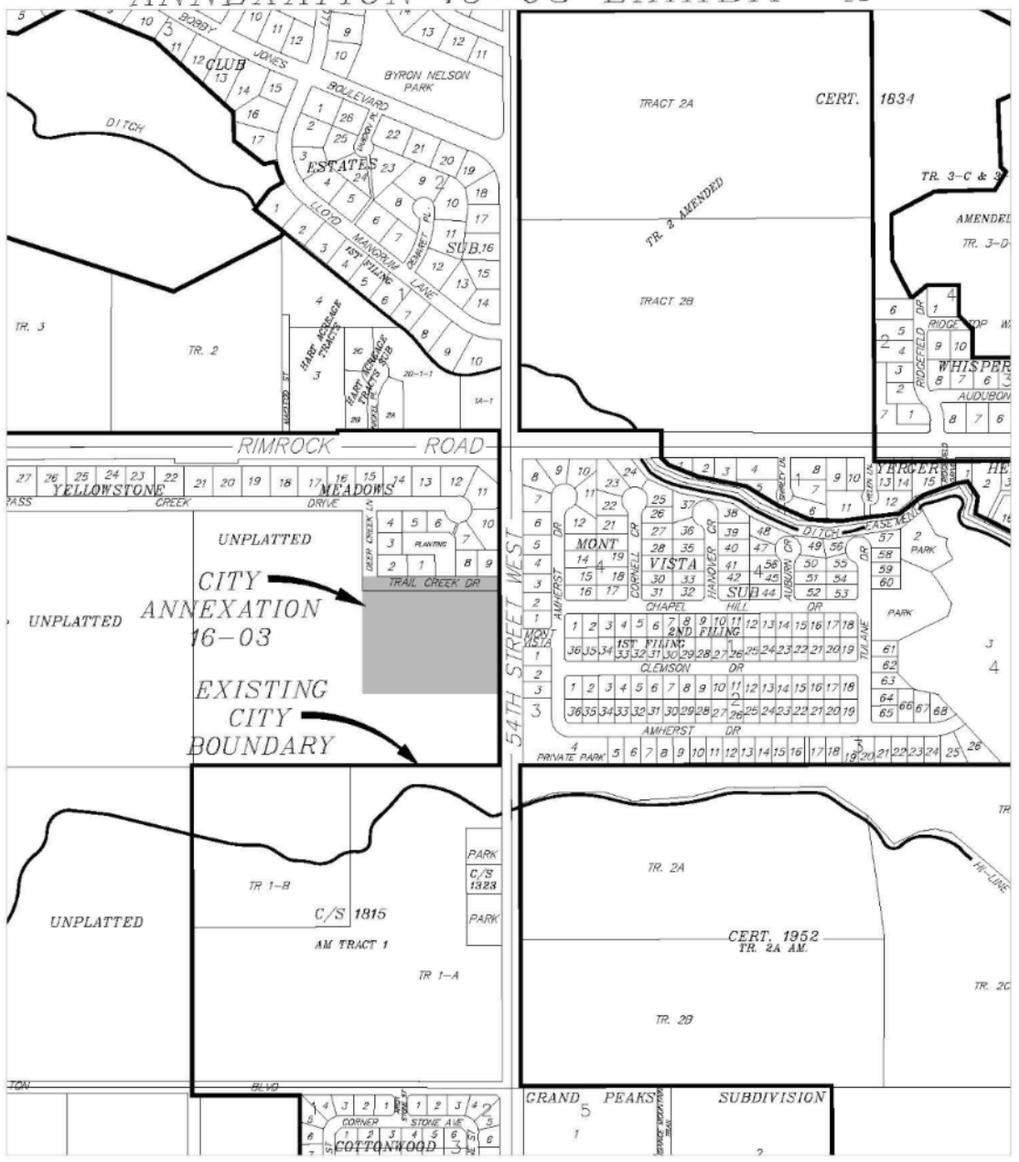
ATTEST:

BY: _____

Billie Guenther, CITY CLERK

(AN# 16-03)

ANNEXATION 16-03 EXHIBIT "A"



Consent **1. J.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Resolution for Mountview Cemetery Fee Adjustment

PRESENTED BY: Mike Whitaker

Department: Parks/Rec/Public Lands

PROBLEM/ISSUE STATEMENT

A fee increase of approximately 3% (see attached resolution) in the City of Billings Mountview Cemetery will raise approximately $3,000 in additional funds per year. These additional funds will be used to offset the Cemetery's impact on the General Fund. Cemetery fees were last increased on May 12, 2014. The Parks, Recreation and Cemetery Board reviewed the proposed 2016 Cemetery fee adjustment at their March 9, 2016 board meeting and recommends approval. The proposed fee increase is intended to start with the new fiscal year on July 1, 2016.

ALTERNATIVES ANALYZED

The City Council may approve or disapprove the fee increase. Approving the increase lessens the Cemetery's impact on the General Fund for its operations.

FINANCIAL IMPACT

This proposal will raise General Fund revenue approximately $3,000.

BACKGROUND

It has been the practice of the City to increase fees in Mountview Cemetery every few years to try to offset the impact of its operation on the General Fund. Those increases have been 3%, 5% or more depending on the time interval between each of the increases.

RECOMMENDATION

Staff and the Parks, Recreation and Cemetery Board recommends that the City Council approve the Resolution revising fees for purchasing grave sites and niches, for setup and for other services in the City of Billings Mountview Cemetery.

APPROVED BY CITY ADMINISTRATOR

Attachments

2016 Cemetery Fee Resolution

RESOLUTION NO. 16 -

A RESOLUTION REVISING FEES FOR PURCHASE OF GRAVESITES AND NICHES, AND FEES FOR SETUP AND OTHER SERVICES IN THE CITY OF BILLINGS MOUNTVIEW CEMETERY; REPEALING RESOLUTION NO. 14-10355.

WHEREAS, the City of Billings provides for the purchase of gravesites, niches, setup, and other services in the City of Billings Mountview Cemetery.

WHEREAS, all cemetery fees and prices are established by City Council resolution as required by Section 8-334(f), BMCC.

WHEREAS, fees were last set in May of 2014. The cost of providing services continually increases necessitating fee adjustments.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Billings, Montana, as follows:

1. The prices for graves and niches in the Mountview Cemetery which include a thirty-five per cent (35%) perpetual care cost, are:

a. Full size traditional grave	$765.00
b. Cremation section grave	$430.00
c. Baby section grave	$280.00
d. Landmark Columbarium	
(1) Row D single niche	$1,105.00
(2) Row C single niche	$1,050.00
(3) Row B single niche	$990.00
(4) Row A single niche	$935.00
e. Urn Columbaria North and South	
(1) Rows A & N single niche	$560.00
(2) Rows B & M single niche	$575.00
(3) Rows C & L single niche	$605.00
(4) Rows D & K single niche	$630.00
(5) Rows E thru J single niche	$665.00
(6) Rows B & M companion	$880.00
(7) Rows C & L companion	$960.00
(8) Rows D & K companion	$995.00
(9) Rows E thru J companion	$1,050.00
f. Simplicity Columbarium	
(1) Row A single niche	$1,050.00
(2) Row A companion niche	$1,275.00

(3) Row B single niche	$1,025.00
(4) Row B companion niche	$1,150.00
(5) Row C single niche	$1,025.00
(6) Row D single niche	$970.00
(7) Row E single niche	$940.00
g. Section 12 traditional grave	$1,320.00

2. Opening, closing and setup for a full size traditional grave shall include a lowering device and tent. A discount shall be issued, except in the mausoleum, when a tent is impractical to set up for all ground burials. The opening, closing and setup for cremations and infant burials do not include a lowering device, but do include artificial turf, tent and a stand for either the baby casket or urn. The fees for opening, closing and setups during normal business hours are:

a. Full size traditional setup	$495.00
b. Cremation burial setup	$360.00
c. Infant burial setup	$295.00
d. Columbarium setup	$190.00

3. The normal cemetery business hours for burial services are from 9:00 AM to 4:00 PM, Monday through Friday. For burial services that start after 4:00 PM on Monday through Friday or after 2:00 PM on Saturday, a late overtime fee of $300 will be charged. The minimum late overtime charge is $300.

A normal Saturday overtime fee will be charged for burials scheduled between 9:00 AM and 2:00 PM and they are:

a. Saturday traditional setup	$1,030.00
b. Saturday cremation burial setup	$715.00
c. Saturday infant burial setup	$560.00
d. Saturday columbarium setup	$290.00

4. The Veteran Sections of the cemetery are special purpose areas. For that reason the city does not make a charge for the grave or niche space, but other charges are issued to compensate for opening, closing, setup, tent, curbing, engraving of the columbarium and flower container. A veteran's cremains may ~~not~~ be buried in a traditional full size veteran grave. The fees for burial or inurnment in the veteran section are:

a. Traditional veteran burial setup	$715.00
b. Saturday traditional veteran burial	$1,250.00
c. Cremation veteran burial setup	$580.00
d. Saturday cremation veteran burial	$935.00
e. Veteran Columbarium setup	$485.00
f. Saturday Veteran Columbarium setup	$535.00

5. Other charges made for services provided by the cemetery are:

a. Requested tent setup	$120.00
b. Discount of tent for traditional setup	$45.00
c. Flower Container	$35.00
d. Disinterment of casket and vault	$1,165.00
e. Disinterment from mausoleum	$580.00
f. Disinterment of buried urn	$495.00
g. Disinterment of infant grave	$495.00
h. Veteran Curbing	$185.00

6. Resolution 14-10355 is hereby repealed.

APPROVED this 27th day of June, 2016.

THE CITY OF BILLINGS

BY: _____
Thomas W. Hanel, Mayor

ATTEST:

BY: _____
Billie Guenther, City Clerk

Consent **1. K.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Second and Final Reading of an Ordinance Amending Billings Montana City Code (BMCC) Article 26-200, Water and Wastewater Service Area

PRESENTED BY: David Mumford, Public Works Director

Department: Public Works

PROBLEM/ISSUE STATEMENT

The Billings Montana City Code (BMCC) Article 26-200, Water and Wastewater Service Area states that the water and/or wastewater service area may be expanded either by a property annexing to the City or if certain conditions are met allowing properties outside of the City limits to be added to the respective service areas. The proposed changes in this ordinance allow the Council to waive requirements of BMCC Article 26-203 and 26-204 regarding petitions for service and annexation, if in their discretion there exists unique or exceptional factual circumstances that convince them that such requirements within these two sections of City code are unnecessary or impractical. An example of this situation might be property that cannot meet the Section 26-203 standards of proximity to the current city limits and service area, but to protect public health and safety, the City wants to provide it with utility services. At the June 27, 2016 meeting Council will be asked to consider approving a sanitary sewer service agreement with Meadowlark Capital for its manufactured home park (formerly Blaine's). The waiver provision within this ordinance is necessary for Meadowlark to connect to the City's sewer because its property cannot meet the BMCC Section 26-203 annexation or proximity standards. Providing sanitary sewer service to this property will protect public health, which will be further described when the agreement is presented to Council. Other parts of Section 26-200 need to be updated and within one (1) year, staff will propose a more comprehensive re-write for the Council's consideration.

Two readings are required for this action. The first reading of the ordinance was conducted on June 13, 2016 along with a public hearing.

ALTERNATIVES ANALYZED

City Council may:

- Approve the ordinance amending BMCC Article 26-200, Water and Wastewater Service Area on second reading, or
- Not approve the ordinance. If not approved, properties desiring water or sewer service that are not eligible to annex or are not adjacent to the current service area could not obtain City water or sewer service even if it would benefit the City of Billings and would protect public health and safety.

FINANCIAL IMPACT

There is no financial impact to adopting the ordinance. The waiver provision may have financial implications if the Council waives the current proximity and annexation standards and provides service to properties outside of the city limits and not adjacent to other served property. Those impacts will be explained when applications are presented to the Council.

RECOMMENDATION

Staff recommends that the City Council approve this ordinance on second reading, amending City Code Article 26-200, Water and Wastewater Service Area.

APPROVED BY CITY ADMINISTRATOR

Attachments

Proposed Ordinance

ORDINANCE NO. 16 -_____

AN ORDINANCE OF THE CITY OF BILLINGS PROVIDING THAT THE BILLINGS, MONTANA CITY CODE BE AMENDED BY REVISING SECTIONS 26-203, 26-204, 26-205, 26-206 and 26-207 PROVIDING UPDATES AND WAIVER PROVISIONS FOR THE CITY'S WATER AND WASTEWATER SERVICE AREAS FOR PROPERTY OWNERS OUTSIDE OF THE CORPORATE LIMITS OF THE CITY

Section 1. That Section 26-203 of the Billings, Montana City Code be amended so that such section shall read as follows:

Sec. 26-203. - Prerequisite to application.

Unless this Section is waived by the Mayor and City Council as provided in Section 26-207, ~~T~~the following conditions shall be met prior to making application for enlargement of the service area:

(1) The property at the time the application is filed shall be:

a. Contiguous to the boundary of the service area as same exists;

b. Entirely within the city's Red Area on the Limits of Annexation Map;

c. Entirely within the city's facilities planning area.

(2) Applicant shall complete annexation requirements.

(3) Provided, that should a state or federal governmental entity, as a condition of providing funds or grants, require that service be extended to other areas outside the scope of this section (section 26-203), the city council may, upon receipt of application for waiver and upon a proper showing, waive the requirements of this section.

Section 2. That Section 26-204 of the Billings, Montana City Code be amended so that such section shall read as follows:

Sec. 26-204. - Annexation requirements.

(a) Unless this Section is waived by the Mayor and City Council as provided in Section 26-207, ~~A~~all properties to be included within the service area shall be annexed or an attempt at annexation shall be made first and before any service area enlargement applications may be considered. Further, that whenever possible the property being considered for inclusion in the service areas shall be annexed to the city rather than accepting waivers of the property owner's right to protest annexation of said property to the city. Waivers may be accepted by the city in its sole discretion only in those particular cases where good and sufficient cause is shown and a hardship would result if waivers were not accepted.

(b) A prospective applicant shall first petition the city to annex the property involved prior to submission of a service area enlargement application. The city council shall then consider such petition. Any waivers must be in legal form as approved by the city attorney; be recorded with the County Clerk and Recorder, Yellowstone County, Montana; run with the land; and shall be signed by owners of the majority of the land area and by a majority of the land owners of the area to be considered for inclusion in the water service area.

(c) The city administrator shall notify in writing the prospective applicant of denial of annexation or right to file waivers or both, and approval or denial of enlargement of the service area. If approved the applicant shall be notified as to when the requirements set forth in this section have been satisfactorily completed and authorize said applicant to proceed with the service area enlargement application.

Section 3. That Section 26-205 of the Billings, Montana City Code be amended so that such section shall read as follows:

Sec. 26-205. - Enlargement application.

Applications and required documentation for water and/or wastewater service area enlargements ~~and for wastewater service area enlargements~~ shall be submitted in writing using ~~made on~~ forms provided ~~prescribed by the city administrator and shall be accompanied by all documentation requested~~ by the city.

Section 4. That Section 26-206 of the Billings, Montana City Code be amended so that such section shall read as follows:

Sec. 26-206. - Public hearing.

At the time of completion of annexation, the annexed territory shall automatically be included in the service area; however, before officially acting upon any application for enlargement of the service area into an unannexed area the city council shall hold a public hearing thereon and shall give public notice of hearing upon each such application. ~~published once each week for two (2) consecutive weeks in a newspaper of general circulation in the county. Said notice shall set forth the time, place and site of the public hearing and shall be published not less than fifteen (15) nor more than thirty (30) days prior to the date of the hearing. Prior to the public hearing the public utilities board shall make its recommendation to the city council regarding said application.~~

Section 5. That Section 26-207 of the Billings, Montana City Code be amended so that such section shall read as follows:

Sec. 26-207.- City council action.

After the conclusion of a public hearing as provided in Section 26-206, by a simple majority vote of those members present and voting, the Mayor and City Council may waive the requirements of Sections 26-203 and 26-204 if in their discretion there exists unique or exceptional factual circumstances that convince them that such requirements within these two sections are unnecessary or impractical.

If the requirements of 26-203 and 26-204 are not waived, ~~T~~the city council shall approve, conditionally approve or deny an application for enlargement of a service area that has met the requirements of Section 26-203 and 26-204 within thirty (30) days after the date of the public hearing. The approval or conditional approval shall be in force for the period of time set forth in the approval. A denial of an application shall be in force for one (1) year after date of such denial.

In all circumstances where an enlargement of a service area has been approved or conditionally approved but annexation has been denied, prior to the provision of services by the City the applicant shall enter into a service agreement with the City and shall submit a written waiver of right to protest annexation.

Section 6. EFFECTIVE DATE. This ordinance shall be effective thirty (30) days after second reading and final adoption as provided by law.

Section 7. REPEALER. All resolutions, ordinances, and sections of the City Code inconsistent herewith are hereby repealed.

Section 8. SEVERABILITY. If any provision of this ordinance or the application thereof to any person or circumstances is held invalid, such invalidity shall not affect the other provisions of this ordinance which may be given effect without the invalid provisions or application, and, to this end, the provisions of this ordinance are declared to be severable.

PASSED by the City Council on first reading this 13th day of June 2016.

PASSED, ADOPTED and APPROVED on second reading this 27th day of June 2016.

CITY OF BILLINGS

By _____
Thomas Hanel, Mayor

ATTEST:

By _____
Billie Guenther, City Clerk

Consent **1. L.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Emma Jean Heights Subdivision, 3rd Filing - Preliminary Major Plat

PRESENTED BY: Candi Millar, Planning & Community Services Department Director

Department: Planning & Community Services

PROBLEM/ISSUE STATEMENT

On April 1, 2016, Northern Engineering and Consulting Inc., agent for Felton Associates, Inc., applied for preliminary major plat approval for Emma Jean Heights Subdivision, 3rd Filing. The proposed subdivision creates 37 new lots for single family residential development to be completed in two phases. This proposal is the third filing of a master planned subdivision that was originally reviewed in 2006. The subject property is generally located on the west side of Bitterroot Drive, south of Wicks Lane, in the northeast Billings Heights. The property is zoned Residential-7000 (R-70) which allows a single family home on a minimum lot size of 7,000 square feet. It also allows two dwelling units on a lot with a minimum square footage of 9,600.

ALTERNATIVES ANALYZED

In accordance with state law, the City Council has 60 working days to act upon this major preliminary plat. The 60 working day review period for the proposed plat ends on June 28, 2016. State and City subdivision regulations also require that preliminary plats be reviewed using specific criteria, as stated within this report. The City may not unreasonably restrict an owner's ability to develop land if the subdivider provides evidence that any identified adverse effects can be mitigated. Within the 60 working day review period, the City Council is required to:

1. Approve;
2. Conditionally Approve; or
3. Deny the Preliminary Plat

-

FINANCIAL IMPACT

If the City Council approves the preliminary plat, the subject property may further develop under private ownership, resulting in additional tax revenues.

BACKGROUND

General location:	Near the south west corner of Wicks Lane and Bitterroot Drive
Legal Description:	Lot 1, Block 19, Emma Jean, 2nd Filing
Owner/Subdivider:	Felton Associates, Inc.
Engineer and Surveyor:	Northern Engineering and Consulting, Inc.

Existing Zoning:	Residential 7000 (R-70)
Existing land use:	Vacant land
Proposed land use:	Single-family residential
Gross and Net area:	32.33 acres; 6.79 acres with this filing
Proposed number of lots:	37 (19 in Phase 1, 18 in Phase 2)
Lot size:	Max: 22.52 acres Min.: 7,500 square feet
Parkland requirements:	In accordance with 76-3-621(6)(a), MCA the applicant will be providing 11% of the net land being developed with this filing as park land. This filing requires a .75 acre dedication. The requirements for the entire subdivision is 4.37 acres.

STAKEHOLDERS

The Planning Board conducted a public hearing on this subdivision at its meeting on May 24. A brief presentation was given by staff to the Planning Board about the proposed subdivision. Board members asked staff several questions. One question was about the storm water detention pond currently in the subdivision and whether it might go away in the future when there is a storm drain system in Bitterroot Drive. Staff responded that in the future when there is a storm drain system in Bitterroot Drive, the development would be able to connect to the system and the lots currently in use as detention basins may be able to be filled and sold for home construction. Staff cautioned that there is still a need to have storm detention in a subdivision, so it will have to be determined what will be done with the existing system with approval by City Engineering. The Board also asked about contributions to street improvements and whether the developer would be required to contribute to street construction in the County subdivision to the south. Staff responded that the developer will not be required to contribute to street construction in the County subdivision to the south and that the roads in the County subdivision are gravel at this time.

The Board then opened the public hearing for questions or comments, but no one spoke. A motion to forward a recommendation of conditional approval was made and seconded. The board voted unanimously to forward a conditional approval recommendation to the City Council.

CONSISTENCY WITH ADOPTED POLICIES OR PLANS

Consistency with the 2008 Growth Policy, the Transportation Plan 2014 Update, and Billings Area Bikeways and Trail Master Plan are discussed within the Findings of Fact.

RECOMMENDATION

The Planning Board recommends conditional approval of the preliminary plat of Emma Jean Heights Subdivision, 3rd Filing to the City Council, and adoption of the Findings of Fact as presented in the staff report.

PROPOSED CONDITIONS OF APPROVAL

The Planning Board recommends the following conditions of approval:

1. To minimize effects on the BBWA ditch company access to perform maintenance, prior to final plat approval the applicant will coordinate easement locations with the BBWA, show them on the final plat, and provide the applicable easement documents.
2. To minimize effects on the BBWA ditch company and to ensure legal use of water, prior to final plat approval the applicant will add to the paragraph in the SIA under **Conditions That Run With The Land, E.** 'Residents of Emma Jean Height Subdivision are not allowed to pump water from the BBWA ditch without a permit from the BBWA'.
3. To minimize effects on local services and to ensure proper water distribution and pressure equalization within the subdivision, prior to final plat approval the applicant will provide construction drawings to the County Water District of Billings Heights (CWDBH) showing the connection of new water lines in Tania Circle to the new water lines in Jean Avenue to provide a looped water system going through Tania Circle and Jean Avenue.
4. To minimize the effects on local services and to ensure proper water line installation and the ability to perform repairs or make connections in the future, prior to final plat approval the applicant will provide to the CWDBH 'As Built' drawings of the existing water lines installed in Emma Jean Heights Subdivision, 2nd Filing, both phases 1 and 2.
5. To minimize the effects on local services and ensure proper sewer line installation and the ability to perform repairs or make connections in the future, prior to final plat approval the applicant will provide to the City of Billings Engineering Division 'As Built' drawings of the existing sewer lines installed in Emma Jean Heights Subdivision, 2 nd Filing, both phases 1 and 2.
6. To minimize the effects on public health and safety and meet the City of Billings Subdivision Regulations and City of Billings Fire Department Regulations that require two ways into and out of a major subdivision, prior to final plat approval the applicant with remove the gate and fencing that is across Columbine Drive between Emma Jean Heights Subdivision and the subdivision to the south, Shamrock Acreage Tracts, to allow full access between the two developments.
7. To mitigate the effects on local services and ensure park land is dedicated for public use per the Emma Jean Heights Master Plan updated with the 3rd Filing, prior to final plat approval language shall be added to **Section VI of the SIA** stating that: "Park land shown on the subdivision master plan for the 3rd Filing will be dedicated either in whole or in part as further filings of Emma Jean Heights Subdivision are platted until the total park land dedication of 4.5 acres that is shown on the master planned has been provided."
8. Minor changes may be made in the SIA and final documents, as requested by the Planning, Legal or Public Works Departments to clarify the documents and bring them into the standard acceptable format.
9. The final plat shall comply with all requirements of the City of Billings Subdivision Regulations, rules, regulations, policies, and resolutions of the City of Billings, and the laws and Administrative Rules of the State of Montana.

APPROVED BY CITY ADMINISTRATOR

Attachments

Findings of Fact

Proposed Plat
Master Plan of Emma Jean Heighs Subdivison
Mayors Letter

FINDINGS OF FACT

The Planning staff has prepared the Findings of Fact for the Planning Board for the preliminary plat of Emma Jean Heights Subdivision, 3rd Filing and has provided them for review by the City Council, as follows:

A. What are the effects on agriculture, local services, the natural environment, wildlife, wildlife habitat, and public health, safety and welfare? [MCA 76-3-608 (3) (a) and BMCC 23-302.H.2.]

1. Effect on agriculture and agricultural water user facilities

The subject property was historically used for irrigated pasture and was the site of a gravel mine. It was annexed and master planned for development in 2006. It is adjacent to similar residential uses on all sides, and will provide community housing in an area that is not particularly productive for agriculture. It should not have a negative effect on the agriculture.

This 3rd Filing of the subdivision has some lots near the Billings Bench Water Association (BBWA) irrigation canal. No water rights are being transferred to new lot owners, and therefore the subdivision should not have an effect on agricultural water user facilities. The BBWA has asked for a 20 foot maintenance easement for a trackhoe to clean Lateral #1 every 5 years or as needed. There is an existing easement on the main ditch of 25 feet from centerline of ditch. The applicant needs to coordinate with the BBWA Ditch Company to make certain the easements are shown on the plat as required by the BBWA **(Condition #1).** Another concern expressed by the BBWA was people pumping water from the ditch without permits. In the SIA under **Conditions That Run With The Land, E.** the applicant will add to the paragraph language to inform future property owners they are not allowed to install a pump and take water out of the BBWA canal without a permit **(Condition #2).**

2. Effect on local services

a. **Utilities** – Water services to the subject property are provided by the County Water District of Billings Heights (CWDBH). The existing water mains in Tania Circle and Jean Avenue will be extended to serve the new lots. CWDBH has indicated that they are requiring the water lines to be installed to complete the loop. The subdivider needs to connect the water lines in Tania Circle to the water lines in Jean Avenue. The developer needs to connect new water lines in Tania Circle to the new water lines in Jean Avenue to complete a looped water line system at the intersection of Tania Circle and Jean Avenue **(Condition #3).** The improvements are subject to the review and approval by CWDBH prior to construction. As proposed with the completion of the looped water line in Tania Circle to Jean Avenue, the CWDBH finds that the water main extensions are acceptable.

   CWDBH has indicated that although what it is requiring and what is proposed for the new water lines is acceptable it is still waiting for the 'as built' drawings from Emma Jean Heights, 2nd Filing both Phases 1 and 2. As a condition of final

approval for this filing, the applicant will need to provide 'as built' drawings for the entire second filing **(Condition #4).**

Sanitary sewer service will be provided by the City of Billings by connecting to existing sewer mains in Tania Circle and Jean Avenue. As proposed, the City of Billings Public Works Department finds the sewer main extensions to be acceptable.

City of Billings Public Works has indicated that although what is proposed is acceptable it is still waiting for the 'as built' drawings from Emma Jean Heights, 2nd Filing both Phases 1 and 2. As a condition of final approval for this filing, the applicant will need to provide 'as built' drawings for the entire second filing **(Condition #5).**

MDU will provide gas services, and North Western Energy will provide electric services to the subdivision. Easements shall be shown on the face of the final plat as requested by these utility providers.

b. **Storm water** – A storm water master plan was reviewed in 2007 for the overall master planned area of Emma Jean Heights Subdivision. At this time, there are no nearby City storm sewer lines to which this development can connect. However, it is in the City's Capital Improvement Plan to install storm sewer in Wicks Lane west to Bitterroot Drive and then south on Bitterroot Drive to Anchor Avenue in the near future. This subdivision will be able to connect once the lines are installed. Until then, the subdivider has proposed to construct internal storm sewer lines draining to temporary retention ponds.

   At this time, storm water drainage for the public streets is proposed to be provided by curb and gutters that discharge into storm water pipes and eventually to retention areas on Lots 12 and 13, Block 2 of Emma Jean Heights Subdivision, 1st Filing and Lots 10 and 11, Block 10, of Emma Jean Heights Subdivision, 2nd Filing.

   In addition to the proposed storm water management facilities, a Storm Water Pollution Prevention Plan (SWPPP) will be required of the developer and construction contractors prior to site disturbance to ensure that storm drain facilities are not compromised during site and home construction.

   These and all other drainage improvements shall satisfy the criteria set forth by the *City of Billings Stormwater Management Manual* and will be subject to review and approval by the City Engineering Department.

c. **Solid waste** – The City of Billings will provide solid waste collection and disposal. The City's landfill has adequate capacity for this waste.

d. **Streets** – The proposed subdivision will be accessed by the extension of the existing streets from Anchor Avenue, Tania Circle and Jean Avenue. These streets will be built to the current design standards of 34-foot wide streets with curb, gutter and boulevard-style sidewalk within 56-foot rights-of-way. During the First Filing construction, a temporary gated emergency access road was constructed from the terminus of Anchor Avenue to the existing County gravel road, Columbine Drive, to the south. With this filing, this second access will need to be constructed to meet City street standards so that it functions as a full second access **(Condition #6).** Columbine Drive will still remain gravel as it exists off site within the County to the south.

   A Traffic Impact Study (TIS) was completed with the original Master Plan in order to evaluate the subdivision's impact on the street network in the surrounding area. Cash contributions have not been made up to this point of the development of Emma Jean Heights for future intersection improvements. Two intersections have been identified to have a noticeable traffic increase. These are Hawthorne Lane and Yellowstone River Road, and Wicks Lane and Hawthorne Lane. A proportionate contribution will be made with this third filing of $4,291.24 as described in the SIA for the two above mentioned intersections. The Bench Boulevard, Hilltop Road and Yellowstone River Road intersection was reviewed but that intersection has been upgraded with a roundabout by MDT. The Wicks Lane and Bitterroot Drive intersection was also reviewed but the impact was below the 2% threshold for contributions for improvements.

e. **Emergency services** – The Billings Police and Fire Departments will respond to emergencies within the proposed subdivision. The Police Department has no concerns with the proposal. The nearest fire station is located at 1601 St. Andrews Drive (Station #6).

   The main fire department concerns are access to the site, water supply, and hydrant availability. With this filing of Emma Jean Heights the applicant is required to make the connection to Columbine Drive to the south. This includes paving to the southern edge of this subdivision and removing the gate and fence that currently blocks the street from this subdivision to the development to the south **(Condition #6).** Current subdivision regulations require 2 ways in and out of a major subdivision. If the second full access through Columbine Drive is constructed, the Fire Marshal indicated that the street layout will be acceptable.

   In the SIA under **III Emergency Service,** the applicant indicates he will be installing 'An operational fire hydrant within 600 feet of the furthest portion of a residence under construction and 400 feet for commercial development. The fire hydrants will be installed with infrastructure construction and streets.

   The subdivision is located within the ambulance service area of American Medical Response (AMR).

f. **Schools** – School District #2 provides educational services to elementary through high school students. Beartooth Elementary School, Castle Rock Middle School, and Skyview High School will serve the children in this subdivision. Previous responses from the district's facilities director regarding these schools indicated that both Beartooth and Castle Rock are currently overcrowded. School District #2 is currently constructing a new Middle School that will be open in the fall of 2016 and the District will be switching to K-5 elementary schools, moving 6th graders to middle schools. These changes should help eliminate overcrowding of schools in the Billings Heights, according to School District #2.

g. **Parks and Recreation** – The parkland dedication requirement for this subdivision amounts to 0.75 acres (11% of the net single family lot area). The subdivider had master planned the subdivision park land areas for the entire subdivision during the First Filing. Based on the Planning Board's recommendation to City Council at that time, the park master plan includes a 2.8 acre centralized neighborhood park just west of this filing, and an additional 1.7 acres of linear parkland along the BBWA canal, for a total of 4.5 acres of parkland. At this time, the subdivider is proposing to provide 0.75 acres of land dedication for parkland at the northeast corner of Tania Circle and what will be Emma Avenue to meet the park land dedication required for the 3rd Filing.

   City of Billings Parks, Recreation and Public Lands (PRPL) is concerned the parkland dedication of one small piece at a time as each filing is platted may result in challenges to tracking dedications and ensuring the total park land dedication originally proposed is provided when all filings of the subdivision are complete. Therefore, to ensure the parkland as shown on the masterplan as updated with this 3rd Filing is provided, staff is proposing a condition that language be added to Section VI of the SIA stating that: "Park land shown on the subdivision master plan for the 3rd Filing will be dedicated either in whole or in part as further filings of Emma Jean Subdivision are platted until the total park land dedication of 4.5 acres that is master planned has been provided (**Condition #7**).

h. **Mail Delivery -** The United States Postal Service will provide postal service to the subdivision. With the previous filing the developer provided centralized delivery facilities and the same is proposed for this filing. The developer will consult with the USPS prior to placement of the centralized mail boxes.

3. Effect on the natural environment

The subject property is relatively flat with a slight slope to the east. A preliminary geotechnical evaluation was done for the subject area in December of 2006 to investigate soil, rock, and groundwater conditions and provide recommendations to support design and construction of foundation and drainage elements. The major findings indicated that the area is characterized by lean clay alluvium over poorly graded gravel with silt and sand, and shale bedrock. Construction on these substrates is fairly unrestricted, however, relatively high ground water will limit foundation depths to 7 feet maximum below grade.

The City Building Official has reviewed this geotechnical report and made notes on its recommendations that will be enforced at the time of building permit issuance and subsequent inspections as has been taking place with both the 1st and 2nd Filings.

4. Effect on wildlife and wildlife habitat

There are no known endangered or threatened species on the property. There is a note in the SIA that warns future lot owners of the presence of deer in the area, which may cause damage to their landscaping. This subdivision should have a minimal effect on wildlife and wildlife habitat.

5. Effect on the public health, safety and welfare

The subdivision is located in an area with no known natural hazards. Fire hydrants will be constructed to meet fire department requirements. The effects on public health and safety should be minimal.

B. Was an Environmental Assessment required? [(MCA 76-3-616 and BMCC 23-302.H.1.]

The proposed subdivision is exempt from the requirement for an Environmental Assessment pursuant to Section 76-3-616, MCA.

C. Does the subdivision conform to the Yellowstone County-City of Billings 2008 Growth Policy, the Urban Area Transportation Plan, 2009 Update, and the Billings Area Bikeway and Trail Master Plan? [BMCC 23-302.H.4.]

1. Yellowstone County-City of Billings 2008 Growth Policy

The proposed subdivision is consistent with the following goals of the Growth Policy:

a. Goal: Predictable land use decision that are consistent with neighborhood character and preferred land use patterns identified in neighborhood plans. (p. 6)

b. Goal: Contiguous development focused in and around existing population centers separated by open space. (p.6)

c. Goal: Affordable housing for all income levels dispersed throughout the City. (p. 6)

d. Goal: More housing and business choices within each neighborhood. (p. 6)

2. Billings Heights Neighborhood Plan

The Billings Heights Neighborhood Plan identifies this area for medium density residential development on its Future Land Use Map, as this area was not yet annexed or developed when the Plan was adopted. The subdivision meets the following goals of the Heights Neighborhood Plan:

a) **Increase extent and quality of non-motorized transportation facilities (Transportation Goal, Page 17).** The provision of a trail corridor along the BBWA Canal through the subdivision from Bitterroot Drive and Hawthorne Lane is a significant amenity for the neighborhood and the Heights overall.

b) Provide safe, good quality and affordable housing in the Heights. Develop housing patterns that are compatible with existing neighborhoods. Encourage high density multi-family development along arterial routes. Maintain similar housing in established neighborhoods (Land Use Goal, Page 19). This subdivision provides medium density residential single-family development in a neighborhood with existing single family and some two-family development.

c) Encourage infill housing (Housing Goal, Page 23). This property is surrounded by existing City and County development on the north, south, east and west and municipal services are already provided to much of the neighborhood making development of this property logical to provide municipal services efficiently.

3. Urban Area Transportation Plan 2009 Update

The proposed subdivision adheres to the goals and objectives of the 2014 Transportation Plan Update and preserves the street network and street hierarchy specified in the plan.

4. Billings Area Bikeways and Trail Master Plan

The proposed subdivision lies within the jurisdiction of the BABTMP. The Plan identifies a potential multi-use trail along the south side of the BBWA canal. The developer started construction of a trail along the BBWA with the first filing, and will continue its development with subsequent filings. This third filing has some lots that will have BBWA along the rear property line. The applicant will be continuing the multi-use trail along the south side of the BBWA canal.

D. Does the subdivision conform to the Montana Subdivision and Platting Act and to local subdivision regulations? [MCA 76-3-608 (3) (b) and BMCC 23-302.H.3.a.]

The proposed subdivision satisfies the requirements of the Montana Subdivision and Platting Act and conforms to the design standards specified in the local subdivision regulations. The subdivider and the local government have complied with the subdivision review and approval procedures set forth in the local and state subdivision regulations.

E. Does the proposed subdivision conform to all requirements of the zoning in effect? [BMCC 23-302.H.3.e.]

The subject property is located within the R-70 zoning district. All development shall comply with the standards set forth in Section 27-308, BMCC. Final zoning compliance will be determined at the time of the building permit.

F. Does the proposed plat provide easements for the location and installation of any utilities? [MCA 76-3-608 (3) (c) and BMCC 23-302.H.3.b.]

The subdivider shall provide utility easements as requested by the City, MDU and NWE on the face of the final plat.

G. Does the proposed plat provide legal and physical access to each parcel within the subdivision and notation of that access on the plat? [MCA 76-3-608 (3) (d) and BMCC 23-302.H.3.c.]

Legal and physical access is provided to the proposed lots from Emma Avenue, Jean Avenue, Anchor Avenue and Columbine Drive. These streets connect to existing street network from the first and second filings, and out to Bitterroot Drive.

CONCLUSIONS OF FINDINGS OF FACT

- The preliminary plat of Emma Jean Heights Subdivision, 3rd Filing does not create any adverse impacts that warrant denial of the subdivision.

- The proposed subdivision conforms to several goals and policies of the 2008 Growth Policy and does not conflict with the Transportation or Bikeway and Trail Plans.

- The proposed subdivision complies with state and local subdivision regulations, local zoning, and provides legal and physical access to each lot.

- Any potential negative or adverse impacts will be mitigated with the proposed conditions of approval.

RECOMMENDATION

Staff recommends that the Planning Board recommend conditional approval of the preliminary plat of Emma Jean Heights Subdivision, 3rd Filing, to the City Council, and adopt the Findings of Fact as presented in the staff report.

ATTACHMENT

A: Preliminary Plat and Associated Documents

Approved by the Billings City Council, June 27, 2016

_____

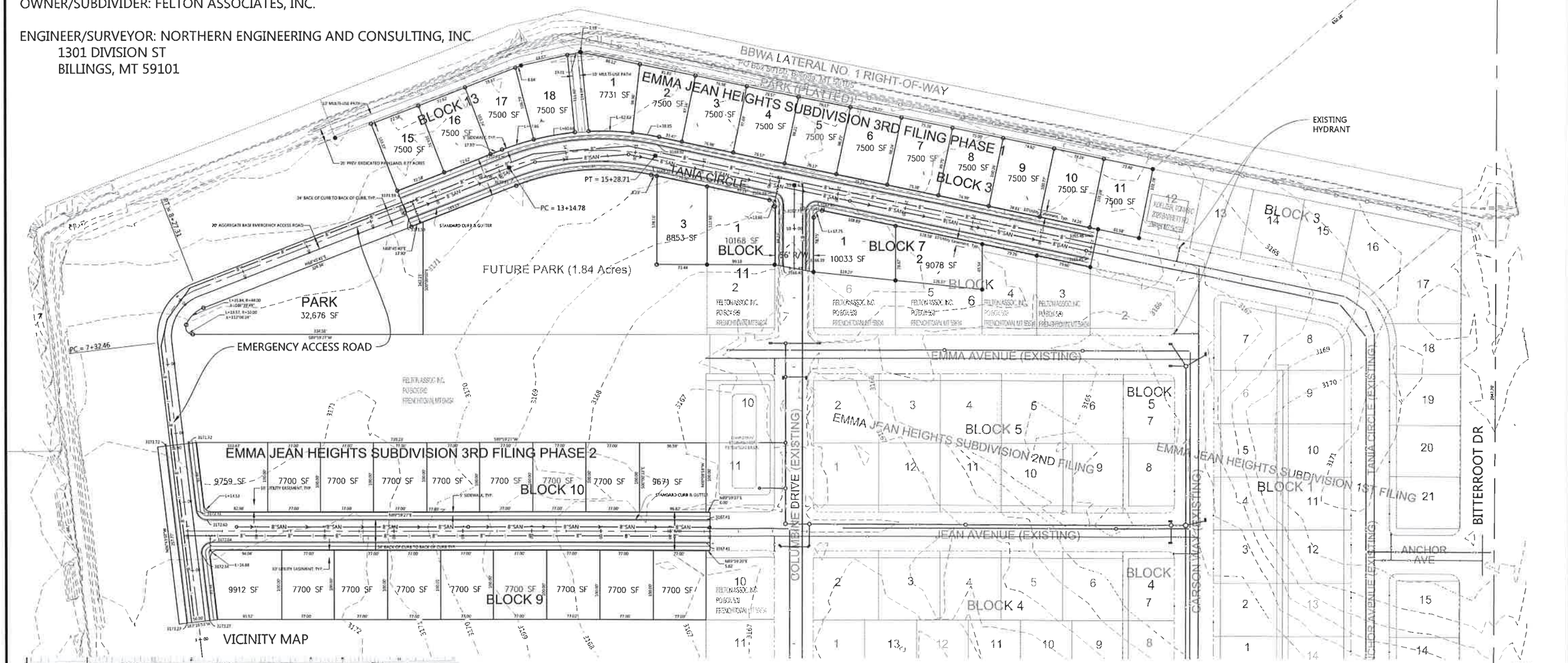
Thomas W. Hanel, Mayor

EMMA JEAN HEIGHTS SUBDIVISION 3RD FILING, PHASES 1 & 2, PRELIMINARY PLAT

BEING LOTS 1-11 OF BLOCK 3, LOTS 1-2 OF BLOCK 7,
LOTS 1 AND 3 OF BLOCK 11, AND LOTS 15-18 OF BLOCK 13
SITUATED IN THE NE ¼ OF SECTION 23
T1N, R26E, P.M.M.
CITY OF BILLINGS, YELLOWSTONE COUNTY, MONTANA

OWNER/SUBDIVIDER: FELTON ASSOCIATES, INC.

ENGINEER/SURVEYOR: NORTHERN ENGINEERING AND CONSULTING, INC.
1301 DIVISION ST
BILLINGS, MT 59101



0 70 140

LEGEND
- FIRE HYDRANT
- WATER VALVE
- WATER TEE
- MANHOLE
- PROPOSED SANITARY SEWER
- PROPOSED WATER LINE
- EXISTING UTILITY LINE

ALL ELEVATIONS ARE TO FLOWLINE OF CURB UNLESS OTHERWISE NOTED

CONSIDERING THE BASIS OF BEARING TO BE THE EAST LINE OF THE NE ¼ OF SECTION 23, T1N R26E, SAID LINE HAVING A BEARING OF S00°15'32"W

NUMBER OF LOTS: 37 (19 PHASE 1, 18 PHASE 2)
MAX LOT AREA: 10,168 SF
MIN LOT AREA: 7,500 SF
AREA OF PARKLAND: 3.36 ACRES
LINEAR FEET OF STREETS: 2161 LF
NET AREA: 6.79 ACRES
GROSS AREA: 9.81 ACRES
ZONING EXISTING: R-7000
PROPOSED: R-7000
LAND USE EXISTING: VACANT
PROPOSED: SINGLE FAMILY RESIDENTIAL

-WATER TO BE PROVIDED BY HEIGHTS WATER DISTRICT (CONNECTION TO LINES INSTALLED IN 2ND FILING).
-STORM WATER TO DRAIN TO EXISTING TEMPORARY RETENTION BASINS IN 2ND FILING AS DISCUSSED IN PREVIOUSLY APPROVED SIA AND MASTER PLAN.
-SANITARY SEWER SERVICE TO BE PROVIDED BY CITY OF BILLINGS AND TO BE CONNECTED TO 2ND FILING LINES.

EMMA JEAN HEIGHTS 3RD FILING PHASE 1 SUBDIVISION PLAT YELLOWSTONE COUNTY, MONTANA	JOB NO : 15-128
	DATE: 2016-02-18
NORTHERN ENGINEERING & CONSULTING, INC. 1301 Division Street, Billings, MT 59101 - 6050 Phone: 406-839-2217, 406-839-2218. Fax: 406-281-8258 email: info@neclmt.com, web: www.neclusa.com	SHEET : 1 OF 1

MASTER PLAN

EMMA JEAN HEIGHTS SUBDIVISION - 1ST FILING

BEING AN UNPLATTED SITE AND ALL OF CERTIFICATE OF SURVEY 999
SAID TRACT OF LAND IS SITUATED IN THE NE 1/4 OF SECTION 23, T. 1 N., R. 26 E., P.M.M.,
CITY OF BILLINGS, YELLOWSTONE COUNTY, MONTANA

FOR: FELCO INDUSTRIES

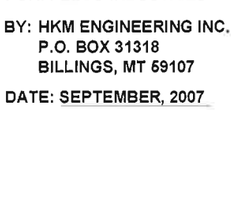
BY: HKM ENGINEERING INC.
P.O. BOX 31318
BILLINGS, MT 69107

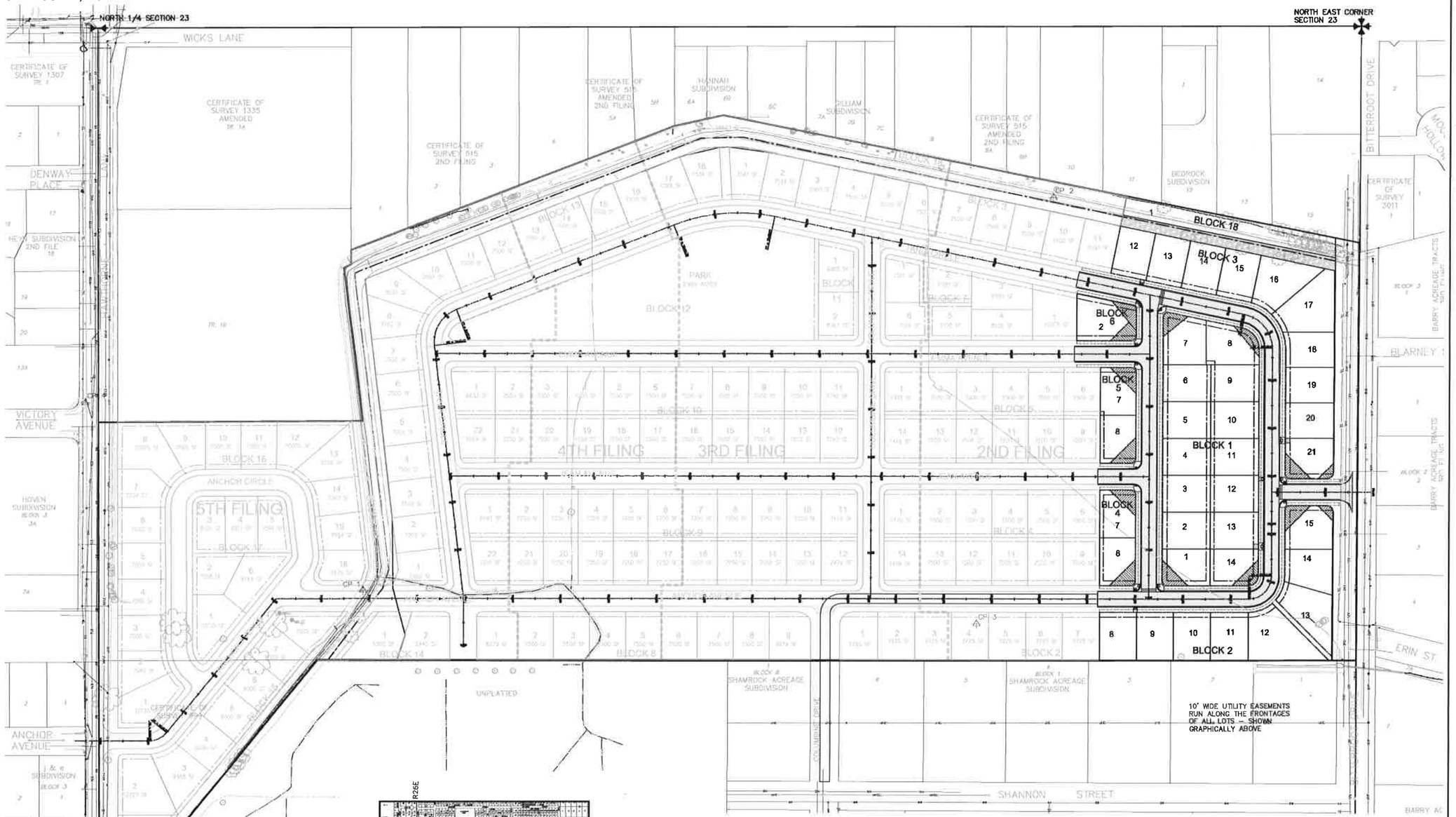
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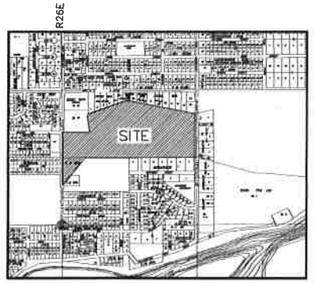
SITE DATA (TOTAL)

NUMBER OF LOTS:		197
MAXIMUM LOT AREA: * (BUILDABLE)		14,452 sq. ft.
MINIMUM LOT AREA:		7,100 sq. ft.
AREA OF PARKLAND:		2.87 acres
LINEAR FEET OF STREETS	ASPHALT W/ C&G GRAVEL	10,934 ln. ft. 938 ln. ft.
GROSS ACREAGE:		57.78 acres
NET ACREAGE:		39.71 acres
ZONING	EXISTING: PROPOSED:	R-7000 R-7000
LAND USE	EXISTING: PROPOSED:	VACANT SINGLE FAMILY RESIDENTIAL

* LOTS 1-5, BLOCK 18 & LOT 9, BLOCK 15 ARE UNBUILDABLE. (BBWA CANAL LATERAL)







VICINITY MAP

LOT/TR	OWNER	ADDRESS
COS 1335 AMENDED		
TR 1A	FIRST FREE WLL. BAPTIST CHURCH	1545 HAWTHORNE LN
TR 1B	RONALD E & ALVIN B CARLSON	"
COS 515 AMENDED 2ND FILING		
1	ROBERT J CARRITSON	1246 WICKS LN
2	ODELTA A THOMSEN	1302 WICKS LN
3	CLAYTON J BONDOOFSKY	1314 WICKS LN
4	DEBRA J NORTHROP	1322 WICKS LN
5A	CARY GREENFIELD	1334 WICKS LN
5B	LESLIE N. ROHR	1340 WICKS LN
8	PAUL A WALLER	1430 WICKS LN
9A & 9B	MICHAEL K RIST	1444 WICKS LN
10	JON J WILSON	1506 WICKS LN
11	CAE SAUNDERS TRUST	1516 WICKS LN
13	JOHN A BREWER	1536 WICKS LN
14	JOHN A BREWER	"
15	JOHN A BREWER	1530 BITTERROOT DR
HANNAH SUBDIVISION		
6A	ROBERT H WENS - TRUSTEE	1344 WICKS LN
6B	WILLIS C & EUNICE E EICHSTADT	1346 WICKS LN
6C	DALE L & THERESA A CHAMON	1410 WICKS LN

LOT/TR	OWNER	ADDRESS
GILLIAM SUBDIVISION		
7A	BIRDELL C LIEN	1418 WICKS LN
7B	TIMOTHY E PETERSON	1422 WICKS LN
7C	BROOKE LUND	1426 WICKS LN
BEDROCK SUBDIVISION		
1	CATHLEEN A PENCE & JAMES L PICKENS	TOWNHOUSES 1522, 1524, 1526, 1528 WICKS LN
COS 3011		
1	RICHARD E JUSTICE JR	1503 BITTERROOT DR
BARRY ACREAGE TRACTS		
BLOCK 3		
1 (W 1/2)	MARVIN L & MARJORIE E BROWN	1805 BLARNEY ST
1 (E 1/2)	NAN S LUCE	1615 BLARNEY ST
BLOCK 2		
1	LARRY & LINDA TRETTENBACH	1608 BLARNEY ST
2	STANLEY H & JUANITA H McINTIRE	1425 BITTERROOT DR
3	YOUTH DYNAMICS INC	1415 BITTERROOT DR

LOT/TR	OWNER	ADDRESS
BLOCK 2		
4	CAROL J STEVENSON & FRED W WALLIS	-
7 & 7A	ROY E CLAUSE	-
SHAMROCK ACREAGE SUBDIVISION		
BLOCK 1		
1	HERBERT E & MARY C GUNSCH	1539 SHANNON ST
2	BARBARA D NELSON	1525 SHANNON ST
3	DARLA J AGUILER TRUSTEE & ET AL	1511 SHANNON ST
4	DOUGLAS MORAN	1447 SHANNON ST
5	BARRY L & COLLEEN WRIGHT	1433 SHANNON ST
6	NEWELL & LAURIE B SCHUAB	1423 SHANNON ST
BLOCK 8		
1	GARY A & CONNIE M BECKER	1405 SHANNON ST
UNPLATTED		
	GARY A & CONNIE M BECKER	1405 SHANNON ST
COS 3189		
1	RANDY SHELTON	1305 HAWTHORNE LN

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C:\02548\101\DWG\PRELIMINARY PLAT.dwg 9/21/2007 10:24:06 AM MDT

June 27, 2016

Felton Associates, Inc.
P.O. Box 598
Frenchtown, MT 59834

Dear Property Owners:

On June 27, 2016, the Billings City Council conditionally approved the preliminary plat of Emma Jean Subdivision, 3rd Filing, subject to the following conditions of approval:

1. To minimize effects on the BBWA ditch company access to perform maintenance, prior to final plat approval the applicant will coordinate easement locations with the BBWA, show them on the final plat, and provide the applicable easement documents.
2. To minimize effects on the BBWA ditch company and to ensure legal use of water, prior to final plat approval the applicant will add to the paragraph in the SIA under **Conditions That Run With The Land, E.** 'Residents of Emma Jean Height Subdivision are not allowed to pump water from the BBWA ditch without a permit from the BBWA'.
3. To minimize effects on local services and to ensure proper water distribution and pressure equalization within the subdivision, prior to final plat approval the applicant will provide construction drawings to the County Water District of Billings Heights (CWDBH) showing the connection of new water lines in Tania Circle to the new water lines in Jean Avenue to provide a looped water system going through Tania Circle and Jean Avenue.
4. To minimize the effects on local services and to ensure proper water line installation and the ability to perform repairs or make connections in the future, prior to final plat approval the applicant will provide to the CWDBH 'As Built' drawings of the existing water lines installed in Emma Jean Heights Subdivision, 2nd Filing, both phases 1 and 2.
5. To minimize the effects on local services and ensure proper sewer line installation and the ability to perform repairs or make connections in the future, prior to final plat approval the applicant will provide to the City of Billings Engineering Division 'As Built' drawings of the existing sewer lines installed in Emma Jean Heights Subdivision, 2nd Filing, both phases 1 and 2.
6. To minimize the effects on public health and safety and meet the City of Billings Subdivision Regulations and City of Billings Fire Department Regulations that require two ways into and out of a major subdivision, prior to final plat approval the applicant with remove the gate and fencing that is across Columbine Drive between Emma Jean Heights Subdivision and the subdivision to the south, Shamrock Acreage Tracts, to allow full access between the two developments.
7. To mitigate the effects on local services and ensure park land is dedicated for public use per the Emma Jean Heights Master Plan updated with the 3rd Filing, prior to final

plat approval language shall be added to **Section VI of the SIA** stating that: “Park land shown on the subdivision master plan for the 3rd Filing will be dedicated either in whole or in part as further filings of Emma Jean Heights Subdivision are platted until the total park land dedication of 4.5 acres that is shown on the master planned has been provided."

8. Minor changes may be made in the SIA and final documents, as requested by the Planning, Legal or Public Works Departments to clarify the documents and bring them into the standard acceptable format.
9. The final plat shall comply with all requirements of the City of Billings Subdivision Regulations, rules, regulations, policies, and resolutions of the City of Billings, and the laws and Administrative Rules of the State of Montana.

If you have questions please contact Dave Green at (406) 247-8666 or by email at greend@ci.billings.mt.us.

Sincerely,

_____

Thomas W. Hanel, Mayor

Pc: Northern Engineering and Consulting, Inc.

Consent **1. M.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: WO 15-05: Poly Drive Bike & Ped, Final Payment

PRESENTED BY: David Mumford, Public Works Director

Department: Public Works

PROBLEM/ISSUE STATEMENT

Montana Lines, Inc. was hired to reconstruct the traffic signal at Poly Drive and Virginia Lane. In addition to the signal reconstruction, the contractor was required to install ADA improvements (ramps, sidewalk, striping, signal pushbuttons, etc.). The City used the federally-funded Community Transportation Enhancement Program (CTEP) to offset some of the costs. The contract was awarded in June 2015 with the contract completion date in July 2015. Change order #1 was approved shortly after executing the contract because it was determined that additional sidewalk needed to be replaced immediately west of the intersection along the Shadow Lawn Estates subdivision due to condition. By including the work in the contract with Montana Lines, this allowed the City to maximize the use of the CTEP funding. However, the amount of additional work caused the cost of the project to go above the City Administrator's 10% change order authority. As such, the Council must act on this reconciling change order. Reconciling change orders are done at the end of every project and it "reconciles" the actual quantity of work with the estimated quantity of work. All contracts have reconciling change orders because quantities always change during construction, even if only slightly. Reconciling change orders are unique in that the work has already been performed instead of typical change orders where approval is required before work is done.

ALTERNATIVES ANALYZED

City Council may approve the reconciling change order to Montana Lines, Inc. for the work that has been completed. There are no viable alternatives due to the unique nature of reconciling change orders.

FINANCIAL IMPACT

The original contract plus previous change orders for this project was for $371,554.26. The reconciling change order is in the amount of $12,045.56 which brings the total contract to $383,599.82. Adequate funding is available in the project budget for this change order.

RECOMMENDATION

Staff recommends approval of the reconciling change order to Montana Lines, Inc. in the amount of $12,045.56.

APPROVED BY CITY ADMINISTRATOR

Attachments

Change Order

Reconciled Bid Items

CHANGE ORDER

(Instructions on reverse side) **No.** 2

PROJECT: **Poly Drive Bike/Ped (W.O. 15-05)**

DATE OF ISSUANCE: 07/27/2016

OWNER: (Name & Address) City of Billings, 2224 Montana Ave., Billings, MT 59101

OWNER'S PROJECT NO. W.O. 15-05

CONTRACTOR: Montana Lines, Inc., 2800 Upper River Rd, Great Falls, MT 59405

ENGINEER: Office of the City Engineer

ENGINEER'S PROJECT NO. W.O. 15-05

CONTRACT FOR: Work Order 15-05: Poly Drive Bike/Ped

You are directed to make the following changes in the Contract Documents.

Description: Reconcile bid items between approved construction and actual construction quantities.

Purpose of Change Order: Reconcile contract amount.

Attachments: (**List documents supporting change):** Itemized table with reconciled items.

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIME:**
Original Contract Price	Original Contract Time
$ 340,915.26	60 days (days or date)
Previous Change Orders No.	Net Change from previous Change Orders
$ 30,639.00	N/A
Contract Price prior to this Change Order	Contract Time prior to this Change Order
$ 371,554.26	60 days (days or date)
Net Increase (decrease) of this Change	Net Increase (decrease) of this Change
$ 12,045.56	0 days
Contract Price with approved Change Order	Contract Time with approved Change Order
$ 383,599.82	60 days (days or date)

RECOMMENDED:

By _____ Engineer

APPROVED:

By _____ Owner

APPROVED:

By _____ Contractor

Z:\Engineering Data\Work Orders\2015 Work Orders\WO 15-05 - Poly & Virginia Bike & Ped\Contracts\Construction Contract\Change Orders\20160727 CO2 - Reconciling.docx

CHANGE ORDER

INSTRUCTIONS

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Time. Changes that have been initiated by a Work Directive Change must be incorporated into a subsequent Change Order if they affect price or time.

Changes that affect Contract Price or Contract Time should be promptly covered by a Change Order. The practice of accumulating Change Order items to reduce the administrative burden may lead to unnecessary disputes.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Time, a Field Order may be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Contractor for approval. After approval by Contractor, all copies should be sent to Owner for approval. Engineer should make distribution of executed copies after approval by Owner.

If a change only applies to price or to time, cross out the part of the tabulation that does not apply.

Work Order 15-05
Poly Drive Bike/Ped - Billings
CONTRACTOR: Montana Lines, Inc.

RECONCILED BID ITEMS			ORIGINAL CONTRACT AMOUNT			CONSTRUCTION AMOUNT		Amount OverRun/ (UnderRun)
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT	QUANTITY	AMOUNT	
103	Construction Traffic Control	LS	1	$ 12,980.00	$ 12,980.00	1.085	$ 14,083.30	$ 1,103.30
105	Unclassified Excavation	CY	15	$ 175.00	$ 2,625.00	7.32	$ 1,281.00	$ (1,344.00)
106	Remove & Dispose Concrete Curb & Gutter	LF	200	$ 20.00	$ 4,000.00	196	$ 3,920.00	$ (80.00)
107	Remove & Dispose Concrete Sidewalk	SY	105	$ 90.00	$ 9,450.00	104.3	$ 9,387.00	$ (63.00)
1d	Remove Sidewalk	SY	270	$ 43.80	$ 11,826.00	314	$ 13,753.20	$ 1,927.20
108	Remove & Dispose Existing Pavement	SY	90	$ 40.00	$ 3,600.00	178	$ 7,120.00	$ 3,520.00
202	New Island Curb	LF	118	$ 28.00	$ 3,304.00	126	$ 3,528.00	$ 224.00
203	New 4" Concrete Sidewalk	SF	1035	$ 9.00	$ 9,315.00	442.9	$ 3,986.10	$ (5,328.90)
1e	4" Concrete Sidewalk	SF	2430	$ 6.60	$ 16,038.00	2835	$ 18,711.00	$ 2,673.00
204	New 6" Concrete Sidewalk with ADA Ramps	SF	360	$ 12.00	$ 4,320.00	678.5	$ 8,142.00	$ 3,822.00
206	New ADA Concrete Collar w/ ADA Panels	SF	45	$ 20.00	$ 900.00	77	$ 1,540.00	$ 640.00
207	1.5" Minus Crushed Base Course	CY	11	$ 480.00	$ 5,280.00	7.67	$ 3,681.60	$ (1,598.40)
208	Bituminous Plant Mix Surfacing (4" Thick)	SY	40	$ 365.00	$ 14,600.00	65	$ 23,725.00	$ 9,125.00
301	Structural Concrete Pole Foundations	CY	7.3	$ 1,810.00	$ 13,213.00	7.331	$ 13,269.11	$ 56.11
302	Conduit, 1.5" PVC, Trench	LF	55	$ 14.50	$ 797.50	41	$ 594.50	$ (203.00)
303	Conduit, 2.0" PVC, Trench	LF	235	$ 17.30	$ 4,065.50	50	$ 865.00	$ (3,200.50)
304	Conduit, 3.0" PVC, Trench	LF	30	$ 27.35	$ 820.50	270	$ 7,384.50	$ 6,564.00
305	Conduit, 3.0" PVC, Push	LF	200	$ 34.15	$ 6,830.00	0	$ -	$ (6,830.00)
307	Pull Box, Concrete Type 2	EA	4	$ 370.00	$ 1,480.00	3	$ 1,110.00	$ (370.00)
308	Pull Box, Concrete Type 3	EA	1	$ 555.00	$ 555.00	2	$ 1,110.00	$ 555.00
309	Cable, Copper, 12c No. 14AWG (Signals)	LF	230	$ 3.85	$ 885.50	244	$ 939.40	$ 53.90
310	Cable, Copper, 9c No. 14AWG (Signals)	LF	805	$ 2.75	$ 2,213.75	972	$ 2,673.00	$ 459.25
311	Cable, Copper, 5c No. 14AWG (Signals)	LF	1670	$ 2.00	$ 3,340.00	1516	$ 3,032.00	$ (308.00)
312	Cable, Copper, 3c No. 14AWG (Opticom)	LF	370	$ 1.90	$ 703.00	427	$ 811.30	$ 108.30
313	Cable, Copper, 3c No. 14AWG (PPB.)	LF	1410	$ 1.75	$ 2,467.50	1645	$ 2,878.75	$ 411.25
314	Cable, Copper, 2c No. 14AWG (Loop Lead)	LF	850	$ 1.55	$ 1,317.50	595	$ 922.25	$ (395.25)
315	Cable, Radar Detector	LF	580	$ 3.70	$ 2,146.00	631	$ 2,334.70	$ 188.70
316	Conductor, Copper, #10 AWG, Lighting & Ground	LF	925	$ 0.80	$ 740.00	907	$ 725.60	$ (14.40)
317	Conductor, Copper, #8 AWG	LF	500	$ 1.00	$ 500.00	56	$ 56.00	$ (444.00)
318	Conductor, Copper, #6 AWG	LF	620	$ 1.50	$ 930.00	567	$ 850.50	$ (79.50)
326	Remove & Reset Existing Emergency Pre-Empt and Radar	LS	1	$ 86.00	$ 86.00	2	$ 172.00	$ 86.00
401	4" Epoxy, Yellow	LF	3922	$ 0.35	$ 1,372.70	6039	$ 2,113.65	$ 740.95
402	4" Epoxy, White	LF	8384	$ 0.35	$ 2,934.40	7760	$ 2,716.00	$ (218.40)
403	6" Epoxy, White	LF	9432	$ 0.58	$ 5,470.56	9897	$ 5,740.26	$ 269.70
404	8" Epoxy, White	LF	615	$ 1.05	$ 645.75	40	$ 42.00	$ (603.75)
405	12" Epoxy, White	LF	297	$ 5.50	$ 1,633.50	299	$ 1,644.50	$ 11.00
406	24" Epoxy, Yellow	LF	25	$ 11.00	$ 275.00	23	$ 253.00	$ (22.00)
407	24" Epoxy, White	LF	300	$ 11.00	$ 3,300.00	210	$ 2,310.00	$ (990.00)
408	Epoxy White Turn Lane - Arrows	EA	16	$ 220.00	$ 3,520.00	20	$ 4,400.00	$ 880.00
413	Remove Existing Sign Panel	EA	8	$ 30.00	$ 240.00	22	$ 660.00	$ 420.00
414	Install New Sign Panel	EA	16	$ 150.00	$ 2,400.00	18	$ 2,700.00	$ 300.00
TOTAL PROJECT								$ 12,045.56

Consent **1. N.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: West End Multi-Modal Traffic Modeling Study

PRESENTED BY: Candi Millar, Planning & Community Services Department Director

Department: Planning & Community Services

PROBLEM/ISSUE STATEMENT

The Planning Division is presenting to the City Council the West End Multi-Modal Traffic Modeling Study with the intent to have the Council make a recommendation to the Policy Coordinating Committee (PCC). The City Council received information regarding this study at its June 20 Work Session. At the June 27 Council meeting, the Council is expected to take action on the study to forward a recommendation to PCC. The PCC is scheduled to meet on July 19.

In recent years, land development in the area of Billings that lies west of Shiloh Road has brought about an increase in traffic volumes that directly impacts safety, traffic operations and access. As more and more rooftops are constructed in this area, demand for pedestrian and bicycle facilities to support multi-modal transportation options is also rapidly increasing. The intent of this study is to provide the City of Billings and Yellowstone County with a tool for planning improvement projects to meet the demands of a vibrant and growing region in our community.

The study was managed by a project steering committee comprised of representatives from City/County Planning, City Engineering Division, County Public Works Department and the Montana Department of Transportation. The planning process included a public participation element that hosted two public open houses on the context and goals of the study. Participants were able to review the transportation history of the study area, the estimated land use and future traffic impacts and comment on proposed improvements.

The Executive Summary and the Appendices can be found in the attachments and at the following links. Hard copies are available by request.

- Executive Summary: http://ci.billings.mt.us/DocumentCenter/View/29949
- Appendix A Traffic Count Data: http://ci.billings.mt.us/DocumentCenter/View/29989
- Appendix B Existing Conditions Worksheet: http://ci.billings.mt.us/DocumentCenter/View/29990
- Appendix C Horizon Year Unimproved Intersection Capacity Worksheets: http://ci.billings.mt.us/DocumentCenter/View/29991
- Appendix D Horizon Year Improved Intersection Capacity Worksheets: http://ci.billings.mt.us/DocumentCenter/View/29992

ALTERNATIVES ANALYZED

City Council may:

- Approve the West End Multi-Modal Traffic Modeling Study and forward the recommendation to the Policy Coordinating Committee through the City's PCC representative; or
- Approve the West End Multi-Modal Traffic Modeling Study with modifications and forward the recommendation to the Policy Coordinating Committee's through the City's PCC representative; or
- Disapprove the West End Multi-Modal Traffic Modeling Study and forward the recommendation to the Policy Coordinating Committee through the City's PCC representative.

FINANCIAL IMPACT

There should be no direct financial impact from the adoption of this study. However, if adopted, it will assist with future transportation improvements for the west end and provides recommendations for incorporating corridor and intersection treatments and bike/pedestrian facilities.

RECOMMENDATION

Staff recommends that the Council approve the West End Multi-Modal Traffic Modeling Study and forward this recommendation to the Policy Coordinating Committee for its meeting on July 19.

APPROVED BY CITY ADMINISTRATOR

Attachments

Study Document
Appendix A
Appendix B
Appendix C
Appendix D

WEST END MULTI-MODAL PLANNING STUDY







DRAFT REPORT

APRIL 2016

SANDERSON STEWART

ACKNOWLEDGEMENTS

The West End Multi-Modal Planning Study was conducted under the direction of the Project Oversight Committee, which included the members listed below. Along with the input of numerous community members, the guidance of the Project Oversight Committee has been essential to the success of this process and is very much appreciated.

Project Oversight Committee

Candi Millar, City-County Planning Division

Wyeth Friday, City-County Planning Division

Scott Walker, City-County Planning Division

Lora Mattox, City-County Planning Division

Terry Smith, City Engineering

Mike Black, County Public Works

Stan Jonutis, MDT Billings District

Katie Potts, MDT Helena

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EXECUTIVE SUMMARY

The West End Multi-Model Planning Study is the result of a collaborative effort between the Billings-Yellowstone County Metropolitan Planning Organization (MPO), the City of Billings, Yellowstone County and the consultant Project Team (Sanderson Stewart and Fehr & Peers). The purpose statement for the study is as follows:

To evaluate the cumulative effect of ongoing and projected future land development and population growth on the multi-modal transportation system for the area of Billings west of Shiloh Road

This document provides guidance in terms of cost and prioritization for multi-modal transportation system projects in the study area based on a pair of land development projection scenarios for the 20-year period leading up to the study Horizon Year of 2035.

Study Area

The study area for the West End Multi-Modal Planning Study is depicted at right in **Figure ES1**. The areas shown in light blue are in the City of Billings, while all other areas have not yet been annexed. The areas shaded in red have been identified for potential annexation by 2018, while the areas in yellow-orange have been identified for potential longer-term annexation. The orange dotted line represents the MPO planning jurisdictional boundary.

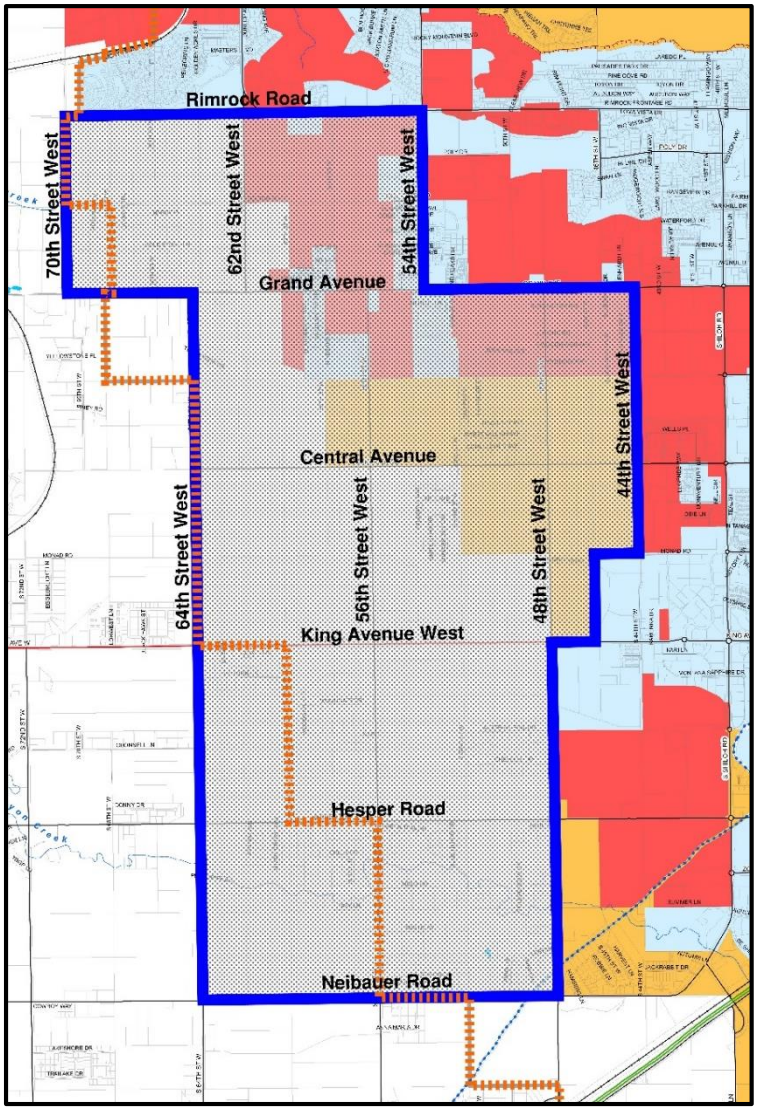


FIGURE ES1. STUDY AREA

Methodology

The Project Team inventoried existing multi-modal transportation system features within the study area, collected traffic counts and crash history data and performed a comprehensive analysis of existing conditions to utilize as a baseline for the study. In addition to evaluating operations and safety for vehicular travel, the team evaluated conditions for the bicycle and pedestrian environment using latent demand and level of traffic stress (LTS) metrics.

Two (2) Horizon Year (2035) land development projection scenarios were calculated; one that approximated a continuation of recent historical development in the area, including a mixture of City and County subdivisions; and a second scenario that projected more aggressive annexation of study area property, thereby resulting in denser development and growth.

The parameters for the two growth scenarios were provided to the Montana Department of Transportation (MDT) for analysis in the Transcad transportation model for Yellowstone County. MDT returned link-specific average daily traffic (ADT) volume projections for both scenarios to be utilized for the Horizon Year (2035) analyses.

The Project Team analyzed future multi-modal operations for both of the growth scenarios. Based on the results of those efforts and the crash history analysis for the study area, the team developed a series of prioritized short-term and long-term project recommendations with high-level approximate construction cost ranges estimates.

Analysis Results

Existing Conditions

For the Existing Conditions (2015) scenario, all of the study area intersections and street corridor segments were found to operate at acceptable levels of service (LOS) during all periods of a typical day. However, an evaluation of crash history for study area intersections for the 5-year period from 2010-2014 revealed that there are seven (7) intersections with crash rates higher than 1.0 crashes/million vehicles entering (MVE), which is a threshold number that MDT uses to determine when an intersection may be of concern. The following three (3) of those intersections exhibited crash rates greater than 1.50 crashes/MVE:

- Rimrock Road & 62nd Street West
- Neibauer Road & 48th Street West
- Neibauer Road & 56th Street West

There were no fatalities reported as a result of any of the crashes during the 5-year analysis period. However, crash severity, which takes into account how many injuries and/or fatalities have occurred as a result of a sample of crashes, was found to be elevated for six (6) intersections. The two Neibauer Road intersections listed above had the highest crash severity rates.

From an active transportation (bicycle/pedestrian) standpoint, the availability of sidewalks, side paths, trails, or bike lanes in the study area is very limited with the exception of sidewalks internal to masterplanned communities. In general, the study area lacks connectivity to low stress bike/pedestrian facilities. A level of traffic stress (LTS) analysis showed that all of the major streets in the study area exhibit the highest LTS scores, thereby making them uninviting to typical bicyclists and pedestrians. This is generally due to the high speeds and narrow or non-existent shoulders in the study area.

Future Conditions (2035)

Under land use growth Scenario 1 (typical growth), most roadways in the study area continue to experience a LOS D or better. However, three of the primary east-west arterials (Rimrock Road, Grand Avenue, King Avenue West) are not projected to meet that standard. Of the north-south arterials, only 62nd Street West, north of Rimrock Road, is projected to operate below LOS D. **Figure ES2** on the following page provides a graphical illustration of the corridor LOS conditions for Scenario 1. Figure ES2 also shows the intersections that are projected to operate below an acceptable LOS C during one or both peak hour periods for Scenario 1.

Under the higher-growth Scenario 2 (aggressive growth), Central Avenue joins Rimrock Road, Grand Avenue and King Avenue West in having one or more segments exhibiting LOS E or worse conditions. For the north-south corridors, 62nd Street West, north of Rimrock Road degrades to LOS F, while 54th Street West is projected at LOS D north of Rimrock Road and LOS E south of Rimrock Road. **Figure ES3**, also on the following page, illustrates the corridor LOS analysis results for Scenario 2 and also shows graphically which intersections are projected to fail under that scenario.

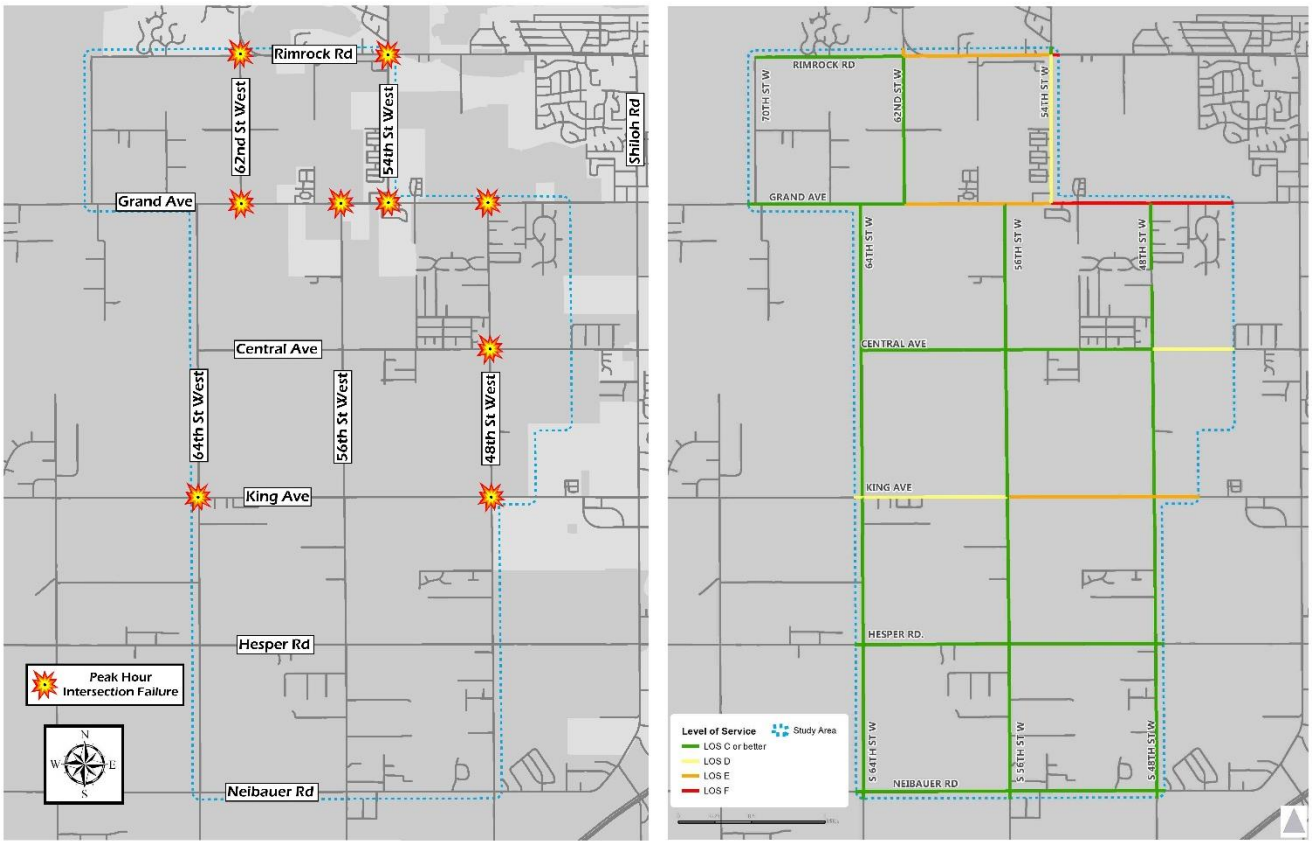


FIGURE ES2. SCENARIO 1 (2035) INTERSECTION AND CORRIDOR LOS ANALYSIS RESULTS

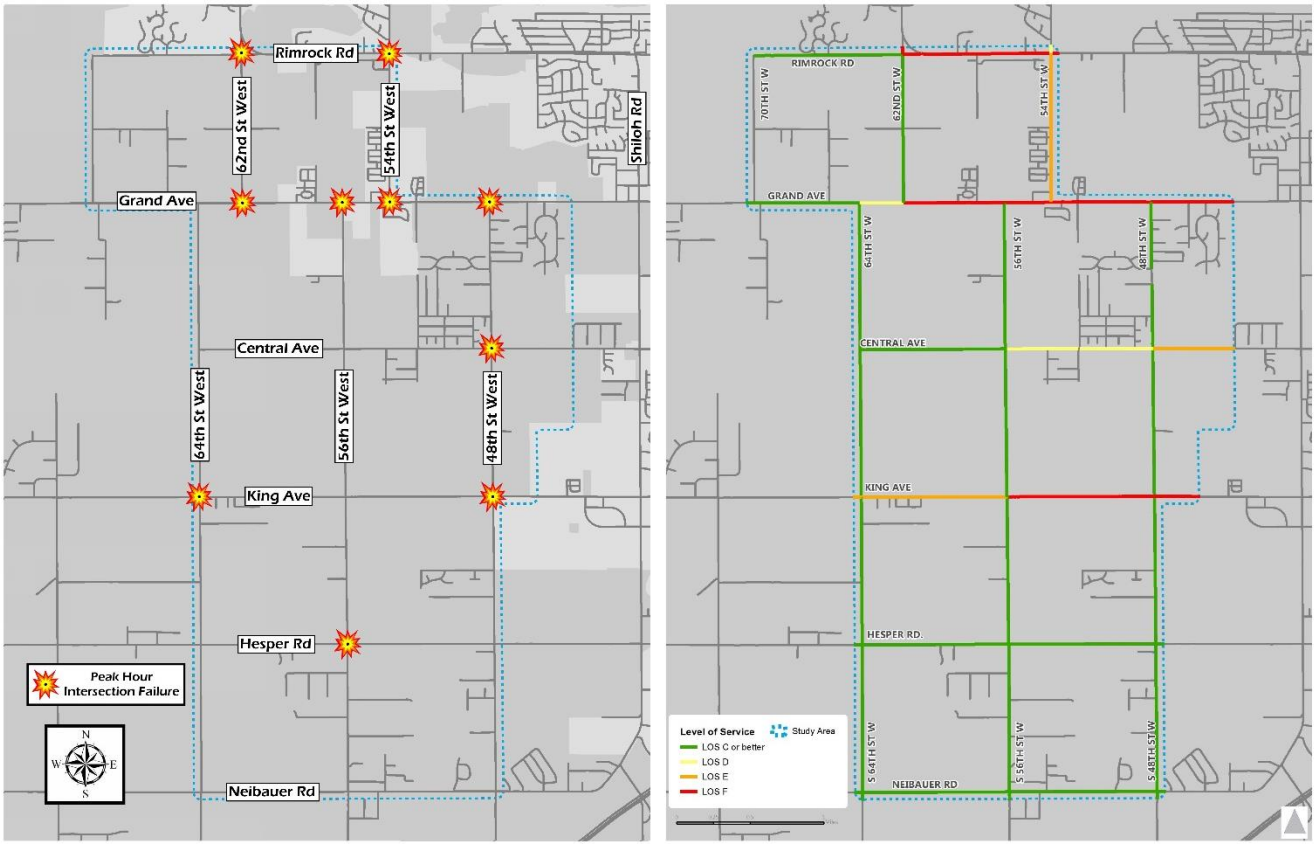


FIGURE ES3. SCENARIO 2 (2035) INTERSECTION AND CORRIDOR LOS ANALYSIS RESULTS

A Latent Demand Model was used to provide a logical analysis framework to prioritize attention and investment for active transportation. Based on the growth projections, demand for active transportation is expected to increase significantly. Most of the study area north of King Avenue and east of 56th Street will generate demand, with the highest concentrations along 54th Street and Grand Avenue. **Figure ES4** below illustrates the projected change in active transportation demand from Existing Conditions (2015) to Scenario 2 (2035)

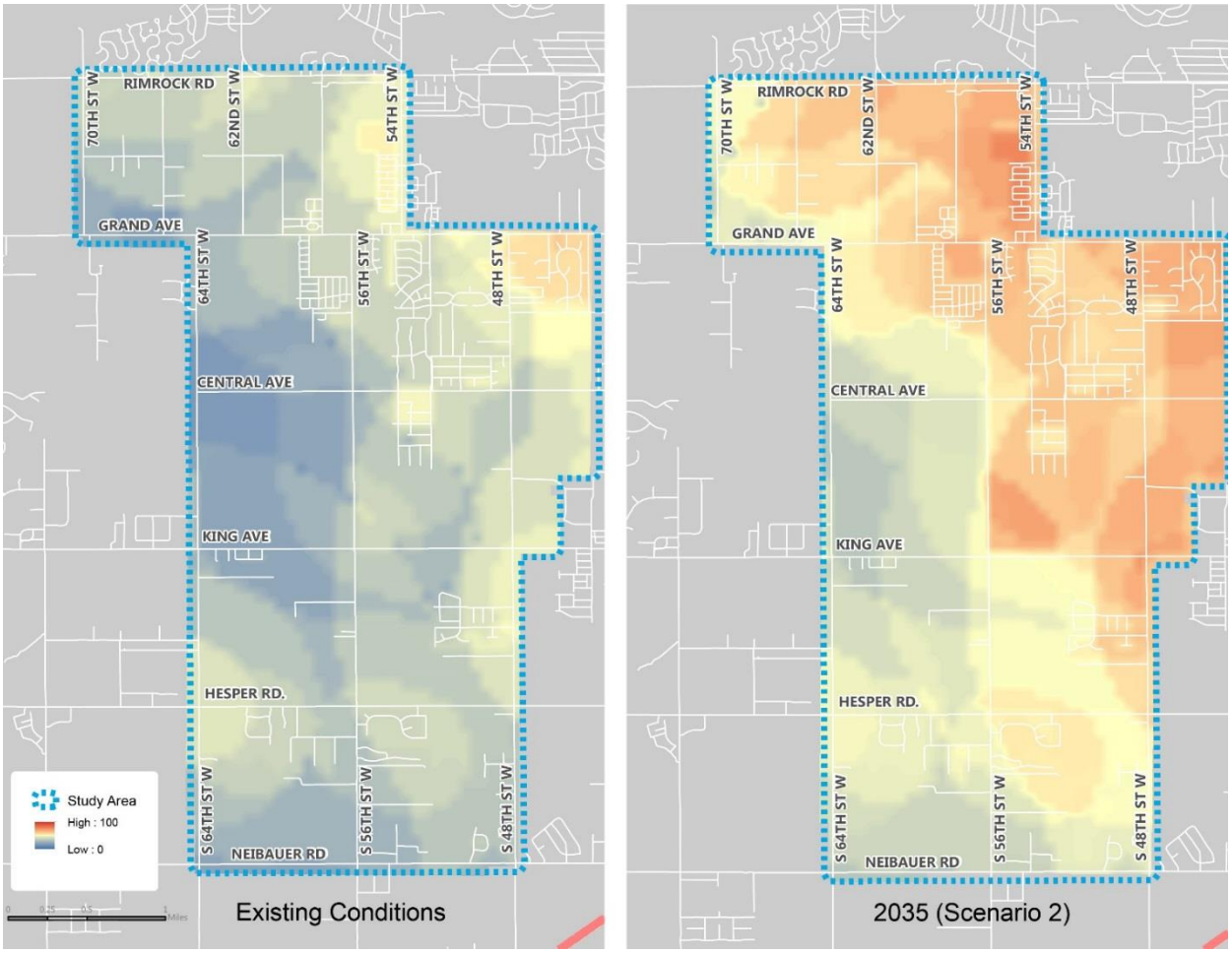


FIGURE ES4. LATENT DEMAND MODEL ANALYSIS RESULTS

Study Recommendations

Streets & Intersections

The priority project recommendations for this study were broken down into short-term and long-term categories. Short-term priority projects are those that could be necessary in order to maintain safe and efficient operations during the first half of the 20-year study period. Long-term priority projects are more likely to be needed during the second half of that period. However, it should be noted that there are many factors related to land development that could change the priority, location and cost considerations that are summarized in these recommendations. As such, the recommendations are to be utilized as a guideline for planning and not as a hard and fast committed projects list.

Tables ES1-ES4 and **Figure ES5-ES6** on the following pages list and illustrate the short term and long-term priority project recommendations for street and intersection improvements. In addition to details about each recommended project, the tables provide estimated construction cost ranges. The estimated costs do not consider right-of-way, irrigation systems modifications or street lighting other than as associated directly with traffic signals or roundabouts.

TABLE ES1. SHORT-TERM INTERSECTION PROJECT RECOMMENDATIONS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Neibauer Rd. & 56th St. West	All-Way Stop Control/OH Flashing Beacons/Transverse Rumble Strips	$120,000-$200,000
2	Neibauer Rd. & 48th St. West	OH Flashing Beacons/Transverse Rumble Strips	$120,000-$200,000
3	Rimrock Rd. & 54th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
4	King Ave. West & 64th St. West	Auxiliary Turn Lanes	$400,000-$600,000
5	Grand Ave. & 48th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
6	Molt Rd./Rimrock Rd./62nd St. West	Design Study	$20,000-$30,000
7	Grand Ave. & 56th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000

TABLE ES2. SHORT-TERM CORRIDOR PROJECT RECOMMENDATIONS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Grand Ave. - Shiloh Rd. to 52nd St. West	Widening/Reconstruction (3-lane section)	$2,800,000-$4,500,000
2	Rimrock Rd. - 50th St. West to 54th St. West	Widening/Reconstruction (3-lane section)	$1,000,000-$1,600,000
3	King Ave. West - MT Sapphire Dr. to 48th St. West	Widening/Reconstruction (3-lane section)	$1,300,000-$2,000,000
4	Grand Ave. - Wilderness Dr. to 62nd St. West	Widening/Reconstruction (3-lane section)	$900,000-$1,400,000

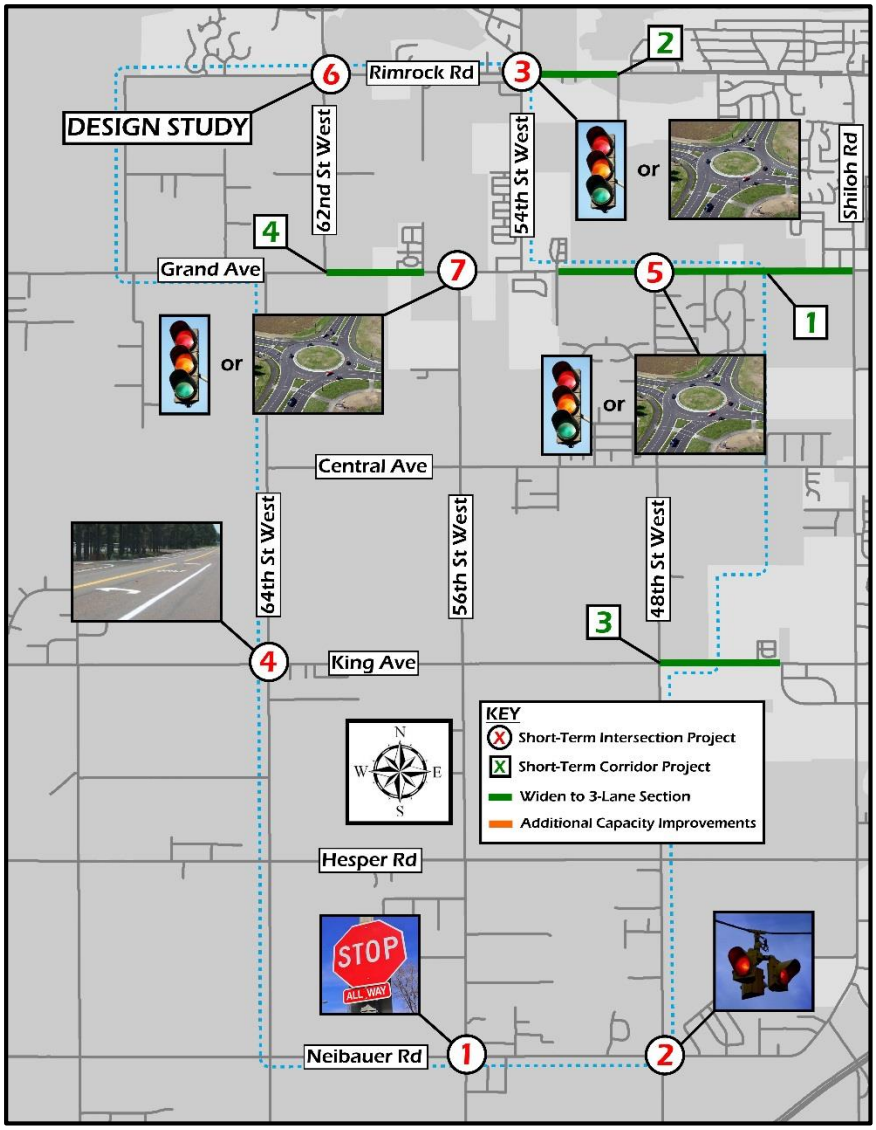


FIGURE ES5. SHORT-TERM INTERSECTION & CORRIDOR PROJECT RECOMMENDATIONS

TABLE ES3. LONG-TERM INTERSECTION PROJECT RECOMMENDATIONS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Molt Rd./Rimrock Rd./62nd St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
2	King Ave. West & 48th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
3	Central Ave. & 48th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
4	King Ave. West & 64th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
5	Grand Ave. & 62nd St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
6	Hesper Rd. & 56th St. West	All-Way Stop	$4,000-$200,000

TABLE ES4. LONG-TERM CORRIDOR PROJECT RECOMMENDATIONS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Grand Ave. - Shiloh Rd. to 62nd St. West	Widening/Reconstruction (5-lane section)	$7,500,000-$11,000,000
2	Rimrock Rd. - Shiloh Rd. to 62nd St. West	Widening/Reconstruction (5-lane section/3-lane section)	$6,900,000-$10,300,000
3	King Ave. West - MT Sapphire Dr. to 64th St. West	Widening/Reconstruction (5-lane section/3-lane section)	$6,100,000-$9,300,000
4	54th St. West - Grand Ave. to Rimrock Rd.	Widening/Reconstruction (3-lane section)	$2,100,000-$3,300,000
5	Central Ave. - Shiloh Rd. to 48th St. West	Widening/Reconstruction (3-lane section)	$2,000,000-$3,100,000
6	62nd St. West - Rimrock Rd. to Western Bluffs Dr.	Widening/Reconstruction (3-lane section)	$700,000-$1,100,000

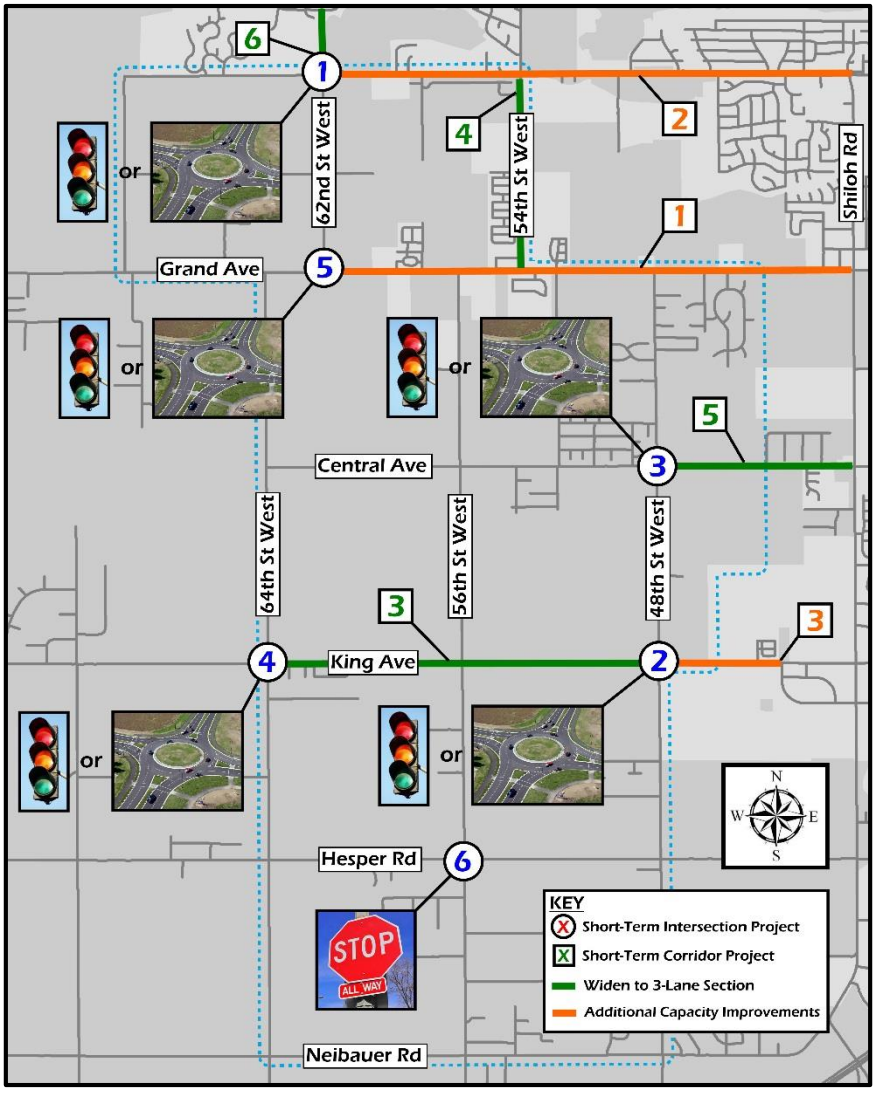


FIGURE ES6. LONG-TERM INTERSECTION & CORRIDOR PROJECT RECOMMENDATIONS

The City and County should also strongly consider the implementation of access control as a tool for extending the life (in terms of capacity) for roadway corridors in this area. Closely spaced driveways with no restrictions on turning movements can greatly degrade the throughput capacity for an arterial. A well-conceived access control plan can improve arterial capacity and also provide safety benefits by reducing conflict points in high-mobility corridors.

Active Transportation Systems

The Project Team recommends the implantation of short-term bicycle facility improvements in the following locations:

- 54th Street from Rimrock Road to Grand Avenue
- 48th Street from Central Avenue to Grand Avenue
- Grand Avenue from 58th Street to Shiloh Road
- Central Avenue from 56th Street to Shiloh Road

Specific improvements could include shoulder widening to provide ridable space (5-8 ft of pavement outside of the shoulder stripe), protected bike lanes ("cycletrack"), and sidewalks or sidepaths. The provision of parallel multi-use pathways designed to serve both pedestrians and bicycles should also be a focus to better accommodate the needs of multiple user groups.

Near-term improvements for pedestrian facilities should focus on improving sidewalk connectivity with neighborhoods and providing crosswalks and related signage to make drivers aware of crossing locations. The following locations should be considered in the short-term for crossing improvements:

- Grand Ave/54th St: crosswalk enhancements, possibly a traffic signal, to improve pedestrian safety near school zone
- Grand Avenue midway between 56th Street West and 58th Street West: pedestrian actuated mid-block beacon, possibly a pedestrian hybrid beacon ("HAWK signal") or rectangular rapid flashing beacon (RRFB)
- 54th Street West at terminus of multi-use path (north end of Cottonwood Park): pedestrian actuated mid-block beacon, possibly a pedestrian hybrid beacon ("HAWK signal") or rectangular rapid flashing beacon (RRFB)
- Rimrock Road/54th St: crosswalk enhancements, possibly a traffic signal, to connect multi-use paths

The following corridors should be considered in the short-term for sidewalk or multi-use path improvements:

- Multi-use path on Grand Ave from 52nd Street West to west boundary of Trails West Subdivision
- Sidewalk on Grand Ave from west boundary of Foxtail Subdivision to HAWK signal
- Multi-use path from Grand Avenue to north boundary of Cottonwood Park along west side of 54th Street West
- Sidewalk along east side of 54th Street West from Grand Avenue to north boundary of Grand Peaks Subdivision

Figure ES7 on the following page illustrates the recommended locations for short-term active transportation system improvements.

Longer-term, it is recommended that a "layered network" principle be implemented as a way as to provide comfortable and efficient bike and pedestrian connectivity via lower-stress streets instead of force-fitting all modes onto the arterial corridors. Since many of these future collector corridors are platted but not built, it is an ideal time to establish the roadway standards that incorporate bike lanes, sidewalks and modest speed limits. A key consideration regarding this concept is cooperation between the City of Billings and Yellowstone County in terms of developing and implanting development requirements that will require construction of well-planned and consistent facilities as property develops in the study area. In the event that some of the major arterials become more urbanized over time, with speed limit reductions and bike facilities they could also become useful low-stress bikeways.

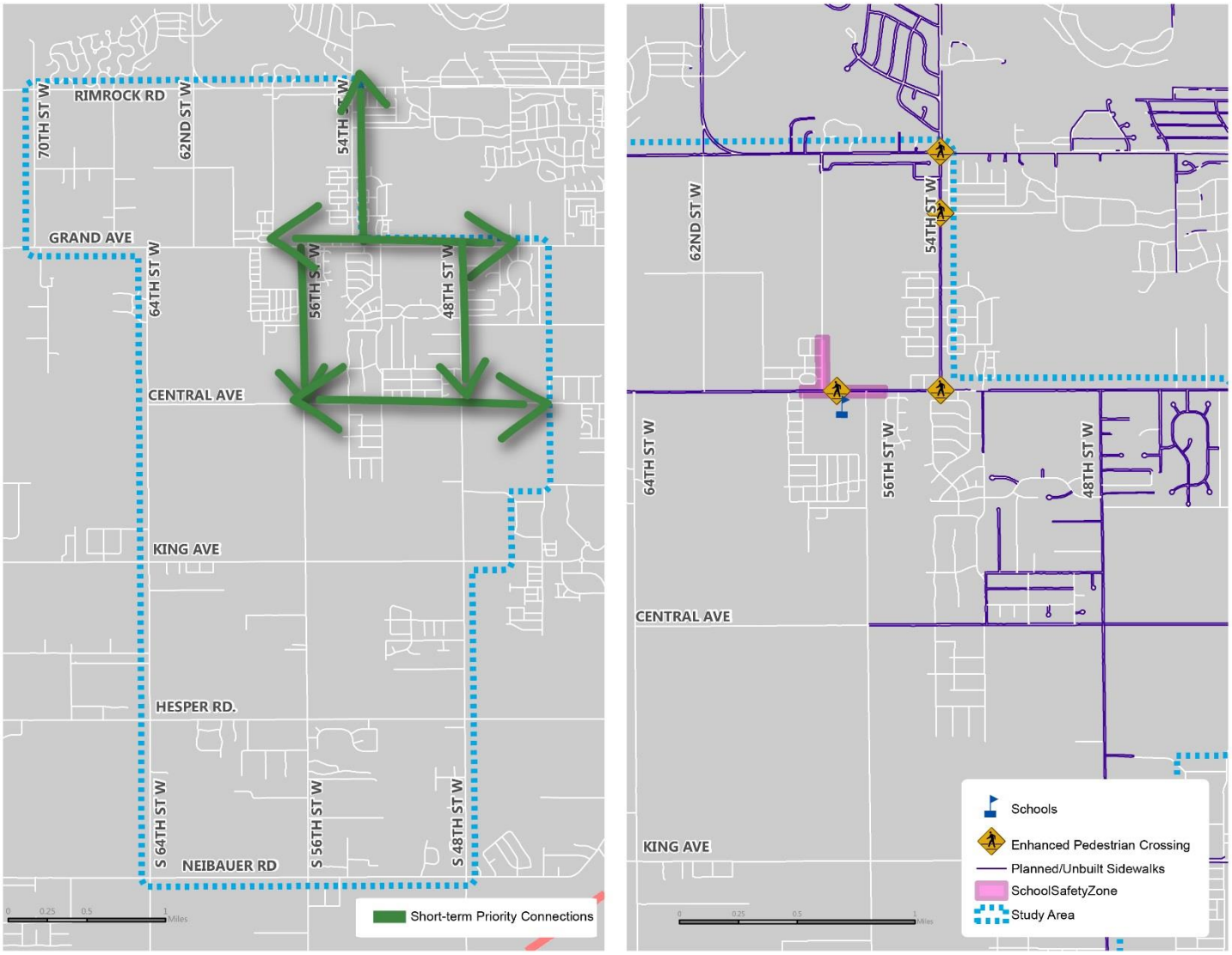


FIGURE ES7. SHORT-TERM IMPROVEMENTS FOR ON-STREET BICYCLE AND PEDESTRIAN FACILITIES

Recommended long-term low-stress corridors include:

- 58th Street West - Rimrock Road to Grand Avenue
- 66th Street West - Rimrock Road to Grand Avenue
- 60th Street West
- 52nd Street West
- Monad Road
- Broadwater Avenue
- Colton Boulevard

Future pathway segments should be prioritized based on the proximity to high demand areas and the ability of the segment to provide connectivity through barriers and gaps in the street system. **Figure ES8** on the following page illustrates the locations for recommended long-term active transportation projects. For more detail on all of the project conclusions and recommendations, please see the report body.

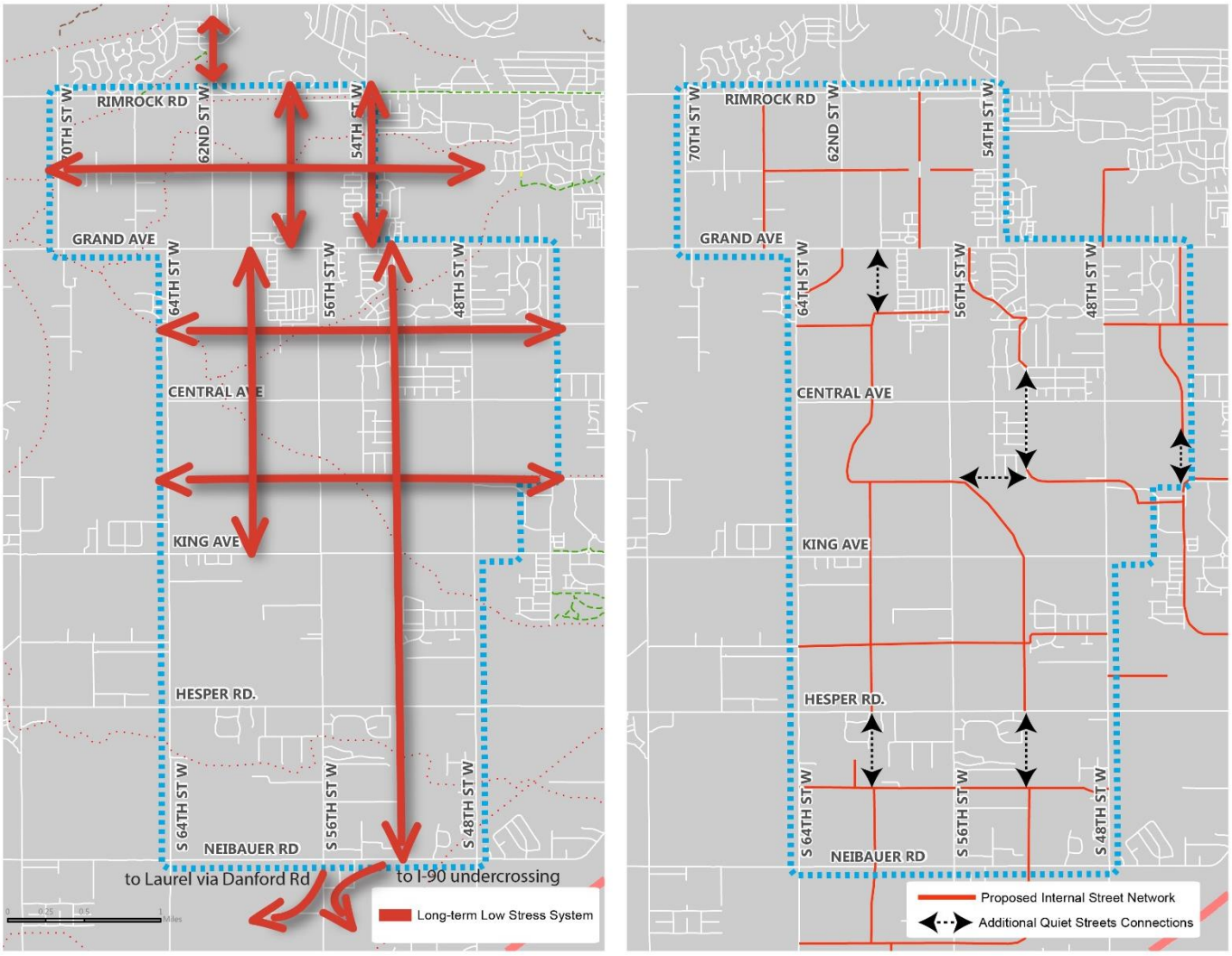


FIGURE ES8. LONG-TERM ACTIVE TRANSPORTATION STRATEGIES

INTRODUCTION

1



Billings is the largest municipality in the state of Montana with a population that was estimated at 108,869 by the US Census Bureau in 2014. Billings and Yellowstone County are governed by the City Council, County Commissioners and the Yellowstone County Board of Planning. The Metropolitan Planning Organization (MPO) administers the transportation planning program for the City and the County in the great Billings urban area.

In recent years, land development in the suburban/rural area west of Shiloh Road has brought about an increase in traffic volumes that directly impacts safety, operations and access. In addition to increased vehicular traffic, there is a growing demand for pedestrian and bicycle facilities in this area to provide connectivity amongst subdivisions and back to the more densely developed "West End" portion of Billings proper.

Study Objectives

The West End Multi-Modal Planning Study came about partially in response to complaints registered by residents west of Billings regarding increased traffic levels and the resulting impacts on traffic operations and safety. Through discussions between the MPO and the Technical Advisory Committee (TAC), it was determined that a study should be commissioned to look at the cumulative effect of subdivision development on the transportation system to help identify future gaps in infrastructure relative to all modes of transportation. To that end, the objectives of the West End Multi-Modal Planning Study are as follows:

1. Obtain Existing Conditions model data from the Montana Department of Transportation (MDT) and calibrate the study area based on recently collected traffic data and land usage information
2. Develop two (2) land development projection scenarios to be utilized as the basis for the future model runs; the "baseline" scenario represents a continuation of status quo growth and the "aggressive" scenario presumes more substantial annexation of the study area into the City
3. Develop preliminary improvement project recommendations based on model run results
4. Hold public meetings to present preliminary study results and solicit input from public
5. Revise model inputs as necessary based on public meeting and steering committee input; re-run models and revise improvement project recommendations accordingly

6. Summarize final results in a guiding document that provides recommendations on priority and approximate cost for improvement projects to mitigate projected impacts.

The Project Team also developed a purpose statement for the study that reads as follows:

To evaluate the cumulative effect of ongoing and projected future land development and population growth on the multi-modal transportation system for the area of Billings west of Shiloh Road.

Study Area Description

The study area for this project is depicted in **Figure 1** on the following page. The study area boundary was determined by the Planning Board and Planning Division. The intent was to include the areas generally outside of the City limits (though there are some annexed subdivisions that fall within the study area) that are most likely to develop with the 20-year horizon period for the study. It should be noted that there are some properties that were not included in the study area although they are currently still in the County. In general, those areas are already developed and/or are projected for annexation in the next few years.

Public Participation Process

A thorough public participation process was conducted for the West End Multi-Modal Planning Study in conformance with the 2009 Yellowstone County Board of Planning Participation Plan.

The following meetings were conducted as part of the plan development:

- **Project Steering Committee** meetings were held during most months to discuss the direction of the planning study.
- **Public Meeting No. 1** was held on February 2, 2016 to introduce the study to the public and request input on the type and prioritization of infrastructure improvement projects. Attendance was excellent (approximately 100 people). The primary themes of the question and comments received revolved around the anticipated Grand Avenue improvement project (City of Billings W.O. 16-09), roundabouts, and the high speeds within the study area. There was some discussion about active transportation (bike and pedestrian) modes and facilities.
- **Public Meeting No. 2** was held on April 14, 2016 in order to present preliminary recommendations and gather additional public input. Attendance was lower for this meeting, but we did receive some good input from the public.

The following dates were scheduled for review and approval of the West End Multi-Modal Planning Study:

- **Technical Advisory Committee** – Presentation and action on May 5, 2016
- **Yellowstone County Planning Board** – Presentation on May 10, 2016 and public hearing/action on May 24, 2016
- **Billings City Council** – Presentation on June 20, 2016 and action on June 27, 2016 (consent agenda, no public hearing)
- **Yellowstone County Commission** – Discussion on June 20, 2016 and presentation/action on June 28, 2016
- **Policy Coordinating Committee** – Final action on July 19, 2016

A project website was developed as a location to post draft documents for review and as a tool to request additional public input. The web address is www.sandersonstewart.com/projects/westend. The final document will be posted on the City of Billings website at http://ci.billings.mt.us/DocumentCenter/View/26772.

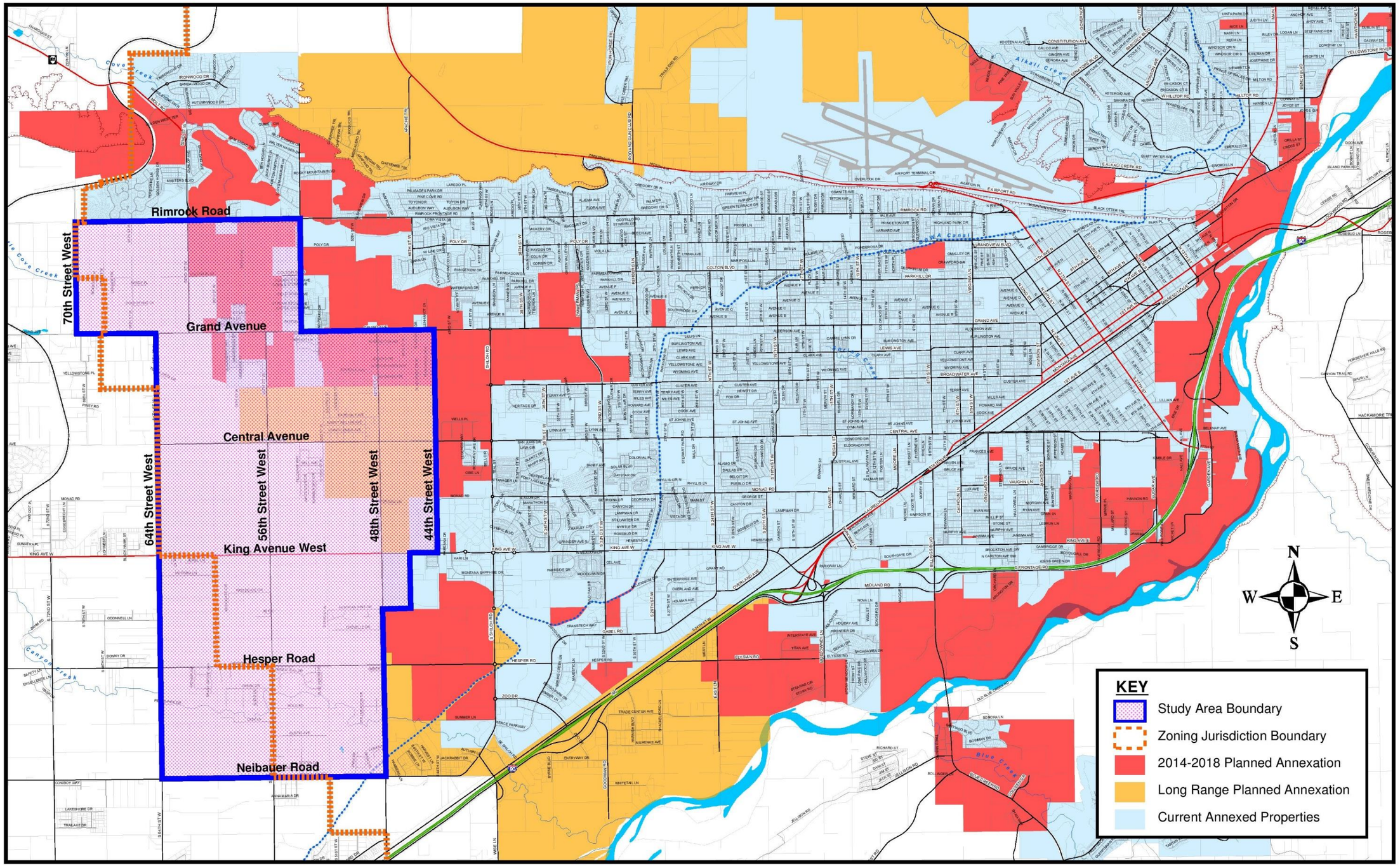


FIGURE 1 – STUDY AREA

EXISTING CONDITIONS

2



Although the primary intent of this study is to evaluate and prioritize potential project needs for a horizon year that is 20 years in the future, it was also important to evaluate existing conditions in order to provide a reasonable basis for comparison and expectations in terms of growth and demand. The following sections of this report summarize the Project Team's analysis of existing operational and safety conditions for all modes of travel.

Streets & Intersections

The following paragraphs provide background information about major streets and intersections that fall within the study area boundary for this project. The descriptions include physical measurements, speed limits, traffic control configurations and classification designations that help to determine the traffic demand and traffic stream makeup for the streets and intersections.

Streets

This region of Billings and Yellowstone County is transected by a series of streets that are generally laid out on a standard north-south-east-west grid. Those streets have a variety of roles, generally defined by Functional Classification, in the transportation of people and goods throughout the area. Functional Classification is the process by which streets and highways are grouped into classes according to the character of the traffic service that they are intended to provide. The basic system generally includes three categories: 1.) Arterials; 2.) Collectors; and 3.) Local Streets. Arterials are intended to provide a high level of mobility with limited local access. At the other end of the spectrum, Local Streets are designed to focus on providing access with limited function in terms of regional mobility. Collectors typically fall in between with an intended balance between mobility and access. Most jurisdictions further expand upon this system by adding Major (Principal) and Minor designations to the Arterial and sometimes Collector categories. Interstate is also often a separate classification category. The MPO utilizes the designations of Interstate, Principal Arterial, Minor Arterial, Collector and Local Street to define the streets and highways in Yellowstone County. MDT utilizes the categories of Interstate Principal Arterial, Other Principal Arterial, Minor Arterial, Major Collector, Minor Collector, Local and Alley to classify roadways. **Table 1** on the following page provides a listing of all non-Local streets within the study area, with functional classifications provided based on both systems where applicable.

TABLE 1. STUDY AREA STREET CHARACTERISTICS

Street	Functional Classification		Truck Traffic Restriction	Typical Street Widths (ft)		Speed Limit (mph)
	MPO	MDT		Travel Lanes	Shoulders	
Rimrock Road	Principal Arterial	Minor Arterial/Local Street[1]	No Restriction	11.0	0.5	55/(n/a)[5]
Grand Avenue	Principal Arterial	Major Collector/Minor Collector[2]	No Restriction	11.0	0.5-1.5	45/50/55[6]
Central Avenue	Principal Arterial	Major Collector/Minor Collector[3]	RESTRICTED	10.0	0.5-1.5	45/55/60[7]
King Avenue West	Principal Arterial	Major Collector	No Restriction	12.0	1.0	60
Hesper Road	Principal Arterial	Local Street	RESTRICTED	10.0-11.0	0.5-1.0	60
Neibauer Road	Principal Arterial	Minor Collector	RESTRICTED	11.5	1.0	60
64th Street West	Principal Arterial	Minor Collector/Local Street[4]	RESTRICTED	10.5-11.0	0.5-1.5	35/45/50/60[8]
62nd Street West	Principal Arterial	Minor Collector	RESTRICTED	11.0	1.0	(n/a)[9]
56th Street West	Principal Arterial	Minor Collector	No Restriction	11.0	0.5-1.0	45/50[10]
54th Street West	Minor Arterial	Local Street	No Restriction	12.0	0.5	45
48th Street West	Principal Arterial	Local Street	RESTRICTED	11.0	0.5-1.5	45/50[11]

[1] Minor Arterial - 54th Street West to Molt Road/Local Street - Molt Road to 70th Street West

[2] Major Collector - 48th Street West to 52nd Street West/Minor Collector - 52nd Street West to 64th Street West

[3] Major Collector - 48th Street West to 52nd Street West/Minor Collector - 52nd Street West to 64th Street West

[4] Minor Collector - Grand Avenue to King Avenue West/Local Street - King Avenue West to Neibauer Road

[5] 55 mph - 54th Street West to Molt Road/No speed limit posted - Molt Road to 70th Street West

[6] 45 mph - 44th Street West to 48th Street West/50 mph - 48th Street West to Molt Road/No speed limit posted - Molt Road to 70th Street West

[7] 45 mph - 44th Street West to 48th Street West/55 mph - 48th Street West to 56th Street West/60 mph - 56th Street West to 64th Street West

[8] 60 mph - Neibauer Road to School Zone area just south of Hesper Road/45 mph and 35 mph - School Zone area /55 mph - School Zone area to Grand Avenue

[9] No posted speed limit

[10] 50 mph - Neibauer Road to Central Avenue/45 mph - Central Avenue to Grand Avenue

[11] 50 mph - Neibauer Road to Central Avenue/45 mph - Central Avenue to Grand Avenue

Yellowstone County has an ordinance (07-107) in place that defines restrictions for the allowance of truck traffic on County roads. The ordinance states that "no truck traffic except for local deliveries" will be allowed on County roads designated as "restricted." For the purposes of the ordinance, a truck is defined as a vehicle with a combined gross vehicle weight of 16,000 pounds of more. Entities (businesses) located on roads that are designated as restricted are required to direct trucks via the shortest route possible to an unrestricted route. Within the study area for the West End Multi-Modal Planning Study, the majority of arterial streets are designated as restricted with the exception of Rimrock Road, Grand Avenue, King Avenue West and 56th Street West. **Table 1** includes a column that notes the restrictions accordingly.

In terms of the physical environment, the two biggest factors that impact multi-modal mobility in the study are roadway widths (lane and shoulder widths) and speeds. The Project Team performed an inventory of all of the above and the resulting data is included in **Table 1**. As indicated, all of the street segments within the study area boundaries have posted speed limits of 45 mph or higher. Combined with narrow travel lanes and shoulder widths, the travel speed conditions make for an uninviting setting for pedestrian and bicycle travel.

Intersections

Nineteen (19) existing intersections were identified as being prominent within the study area in terms of existing or future anticipated traffic demand. Those intersections are depicted in **Figure 2** on page 7. All 19 intersections are currently two-way stop-controlled. However, single-lane roundabouts are planned for the intersections of Central Avenue/56th Street West and King Avenue West/56th Street West and a traffic signal or roundabout is planned for construction at the Grand Avenue/54th Street West intersection as well. More detail is provided on these projects in a later section of the report. Several study area intersections also have overhead flashing beacons in place to warn high-speed drivers of approaching stop signs (red beacons) or stop-controlled side street approaches (amber beacons). It should also be noted that intersection sight distance is limited at various study area intersections during certain periods of the year as a result of agricultural crop production.

Traffic & Safety

A thorough evaluation of existing conditions relative to traffic and safety was conducted to establish a baseline future scenario operations analyses. That effort included a review of available historic traffic data from MDT, collection of new peak hour turning movement counts at major intersections, and review and analysis of historical crash data provided by MDT.

Traffic Volumes

The Project Team conducted AM and PM peak hour turning movement counts at eighteen (18) major intersections in May of 2105 and/or January of 2016 to utilize as the basis for existing conditions traffic analyses and model calibration. The AM and PM peak hours were generally found to occur from 7:15 to 8:15 AM and 4:45 to 5:45 PM. Raw count data was adjusted for seasonal variation utilizing MDT's published Seasonal Day of the Week For Axle Counts adjustment factors. **Figure 2** on the following page summarizes the Existing Conditions peak hour turning movement volume data. Detailed traffic count data is included in **Appendix A.**

Average Daily Traffic (ADT) volume count data for various key locations in the study area was provided by the MPO. The Project Team utilized that data and a K-factor approach (relating peak hour turning movement volumes to 24-hour ADT volumes) to estimate annual average daily traffic (AADT) volumes for study area corridor segments. **Figure 2** also illustrates the AADT estimates for the Existing Conditions scenario. The raw data counts from the MPO are included in Appendix A.

Crash History

Historical crash data was obtained from MDT for the 5-year period from January 1, 2010 through December 31, 2014 for the eighteen (18) study area intersections referenced previously. The data was analyzed for the purpose of calculating intersection crash and severity rates and evaluating collision type trends. **Table 2** on the page 8 illustrates the results of that analysis organized by intersection.

Intersection crash rates were calculated on the standard basis of crashes per million vehicle entering (MVE) each intersection. The MVE metric was estimated from the 2015 traffic counts. As a general rule, MDT considers that intersections with a crash rate greater than 1.0 crashes per million vehicles entering (MVE) should be examined further to determine if an inherent safety concern exists. The following seven (7) study area intersections exhibited intersection crash rates greater than 1.0 crashes/MVE per this analysis.

- Rimrock Road & 62nd Street West (crashes on Molt Road curve not included in this analysis)
- Central Avenue & 48th Street West
- Central Avenue & 56th Street West
- King Avenue & 56th Street West
- Hesper Road & 56th Street West
- Neibauer Road & 48th Street West
- Neibauer Road & 56th Street West

Of those seven (7) intersection, Rimrock Road & 62nd Street West, Neibauer Road & 48th Street West and Neibauer Road & 56th Street West exhibited crash rates higher than 1.50 with Neibauer Road having the highest rate at 2.87 crashes/MVE. The average intersection crash rate for the study area was 1.03 crashes/MVE.

Severity indexes and rates were also calculated for each of the study area intersections. The severity index is defined as the weighted average by crash severity, including fatal, injury, and property damage only crashes. Severity rate is defined as the crash rate multiplied by the severity index. There were no fatal crashes reported at any of the study area intersections, but

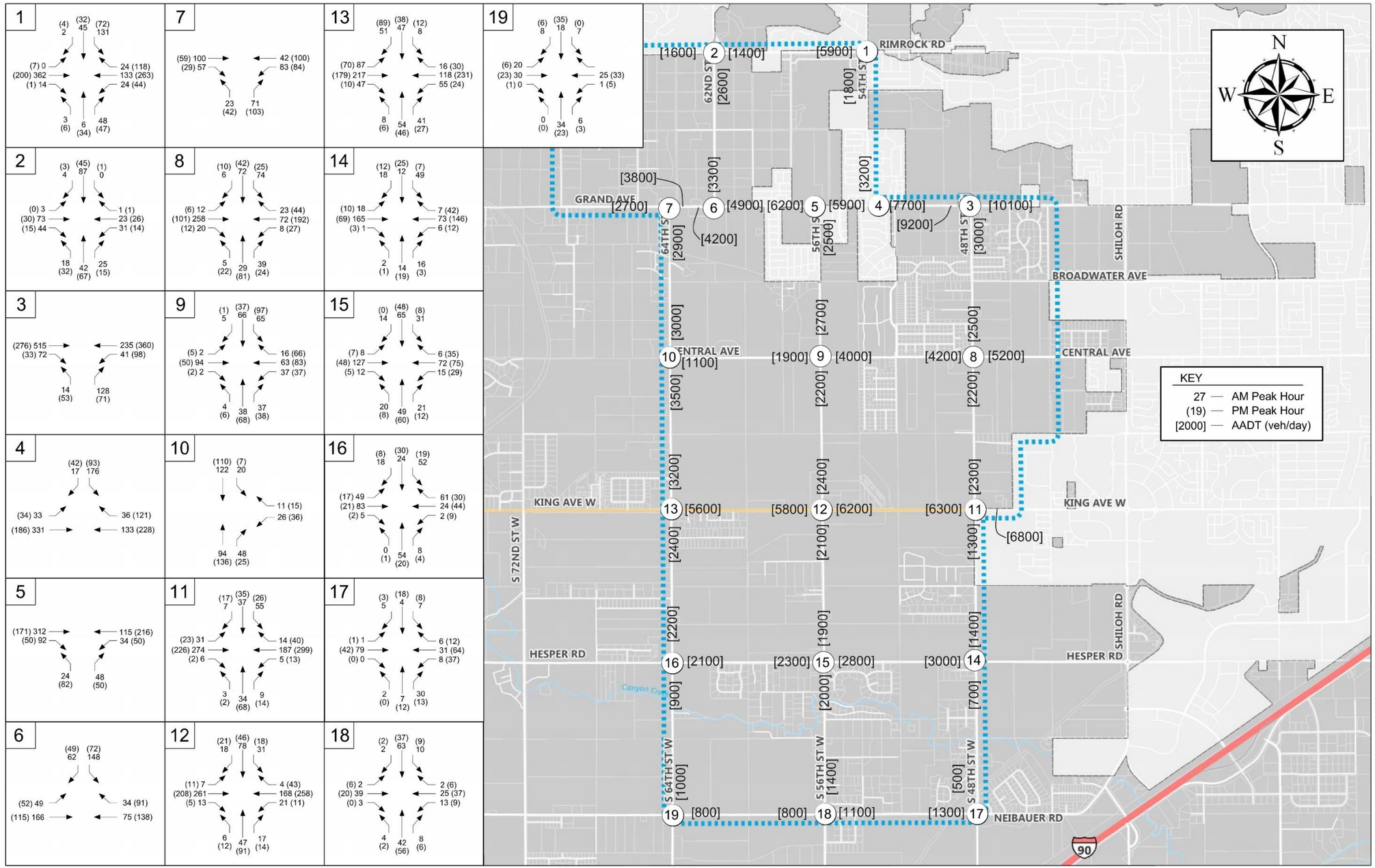


FIGURE 2 – EXISTING CONDITIONS (2015) TRAFFIC VOLUMES

TABLE 2. STUDY AREA INTERSECTION CRASH HISTORY

Intersection	2015 DEV[1]	Reported Crashes[2]	Crash Type			Rates (per MVE[3])		Collision Type						
			PDO	Injury	Fatality	Crash	Severity	Rear End	Right Angle	Fixed Object	Right Turn SD	Left Turn OD	Head On	Other[4]
Rimrock Road & 54th Street West	9526	13	9	4	0	0.75	1.21	3	8	2	0	0	0	0
Rimrock Road & 62nd Street West	3528	11	8	3	0	1.71	2.64	1	6	2	0	1	0	1
Grand Avenue & 48th Street West	11148	9	7	2	0	0.44	0.64	6	2	1	0	0	0	0
Grand Avenue & 54th Street West	8408	13	9	4	0	0.85	1.37	3	3	6	0	0	0	1
Grand Avenue & 56th Street West	7315	3	1	2	0	0.22	0.51	0	1	1	0	0	0	1
Grand Avenue & 62nd Street West	6180	7	5	2	0	0.62	0.97	2	2	1	0	1	0	1
Central Avenue & 48th Street West	3822	9	3	6	0	1.29	3.01	1	6	1	1	0	0	0
Central Avenue & 56th Street West	6292	13	5	8	0	1.13	2.52	2	8	2	0	0	0	1
Central Avenue & 64th Street West	7080	No Reported Crashes												
King Avenue & 48th Street West	8391	7	2	5	0	0.46	1.12	2	2	1	0	2	0	0
King Avenue & 56th Street West	8285	20	12	8	0	1.32	2.38	3	12	2	0	0	0	3
King Avenue & 64th Street West	8885	15	9	6	0	0.93	1.67	3	5	4	0	1	0	2
Hesper Road & 48th Street West	4292	7	4	3	0	0.89	1.65	1	3	1	0	0	0	2
Hesper Road & 56th Street West	4557	12	7	5	0	1.44	2.64	0	6	3	0	0	1	2
Hesper Road & 64th Street West	3440	1	1	0	0	0.16	0.16	0	0	0	0	0	0	1
Neibauer Road & 48th Street West	2293	12	5	7	0	2.87	6.22	2	9	1	0	0	0	0
Neibauer Road & 56th Street West	2370	8	4	4	0	1.85	3.70	0	4	4	0	0	0	0
Neibauer Road & 64th Street West	1723	No Reported Crashes												
TOTALS/AVERAGES	**6171**	**160**	**91**	**69**	**0**	**1.06**	**2.03**	**29**	**77**	**32**	**1**	**5**	**1**	**15**

[1] Daily Entering Volume (DEV) estimated from 2015 hourly counts

[2] Crashes reported from January 1, 2010 to December 31, 2014

[3] Crash and severity rates expressed as crashes per million vehicles entering (MVE) based on MDT severity factors

[4] "Other" crash types include sideswipes, backing vehicles, rollovers, animal-vehicle collisons and other

there were a substantial number of injury crashes reported (approximately 43.1 percent of crashes). There is not a rule-of-thumb threshold for severity rate that MDT utilizes to gauge concern for intersections. However, six (6) of the study area intersections exhibited severity rates above 2.50. Again it was the intersection of Neibauer Road & 56th Street West that had the highest severity rate at 6.22. The average severity rate for the study area was 2.03.

In terms of collision type, right-angle collisions were easily the most common, comprising almost 42 percent of the overall sample for the 5-year analysis period. This trend is not surprising given that the majority of the study area intersections are stop-controlled, right-angle intersections of high-speed rural facilities. Fixed-object (18.1 percent) and rear-end (15.6 percent) collisions were the next most prevalent. A couple of specific intersections contributed the majority of the fixed-object collision crashes. The fixed objects were most often utility poles or pedestals or in the case of the Grand Avenue & 54th Street West intersection, the masonry wall for Vintage Estates Subdivision. Again here, higher speeds are likely a contributing factor, as they are for the rear-end collisions which were generally clustered at higher-demand intersections that do not have auxiliary turn bays.

Intersection Traffic Operations

The Project Team performed Existing Conditions (2015) AM and PM peak hour intersection capacity calculations for all of the major study area intersections using Synchro, Version 8.0, the analysis methods for which are based on the HCM2010. The HCM2010 defines level of service (LOS) as "a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience." LOS is a qualitative measure of the performance of an intersection with values ranging from LOS A, indicating good operation and low vehicle delays, to LOS F, which indicates congestion and longer vehicle delays. The purpose of this exercise was to establish a baseline for intersection operations and to identify any intersections that are currently at or approaching failure during peak traffic periods. **Table 3** on the following page illustrates the results of the Existing Conditions (2015) intersection capacity analysis.

The City of Billings and the Montana Department of Transportation generally consider Level of Service (LOS) C to be the minimum threshold for acceptable intersection operations. For the Existing Conditions (2015) scenario, all of the study area intersections were calculated to operate at LOS C or better (for the intersection as a whole) during both peaks. Overall, there were four individual intersection approaches that exhibited sub-standard LOS conditions (LOS D or E), all during the AM peak hour. Projected maximum queue lengths were generally manageable for all study area intersection approaches, even those with substandard LOS results. **Appendix B** contains Existing Conditions (2015) intersection capacity calculation worksheets.

Corridor Traffic Operations

In addition to peak hour intersections analysis, the Project Team performed an evaluation of daily corridor LOS to evaluate corridor capacity concerns and the potential need for road widening or other measures to improve capacity. The analysis was based on the Existing Conditions (2015) AADT volumes that are illustrated in **Figure 2**.

Planning-level corridor LOS values were estimated by comparing Existing Conditions (2015) AADT volumes to assumed capacity levels to calculate a volume-to-capacity (V/C) ratio. **Table 4** (page 11) displays the LOS categories and a description of the associated traffic conditions. It was determined collectively with the City that Level of Service D would be the desired minimum threshold for corridor traffic operations for this study. **Table 5** (page 11) contains typical LOS thresholds based on V/C ratio and categorized by the functional classifications of the streets. **Figure 3** (page 12) illustrates the results of this analysis for the Existing Conditions (2015) scenario. All corridors in the study area were projected to operate at LOS C or better. Note that the color-coding scheme in **Figure 3** matches those in **Tables 4 and 5**.

TABLE 3. EXISTING CONDITIONS (2015) INTERSECTION CAPACITY CALCULATION RESULTS

Intersection	Approach	Existing (2015) AM Peak Avg Delay (s/veh)	AM Peak LOS	AM Peak 95th % Queue (veh)	PM Peak Avg Delay (s/veh)	PM Peak LOS	PM Peak 95th % Queue (veh)
Intersection Control		*Stop Controlled (EB & WB)*					
62nd Street West & Rimrock Road	EB	11.5	B	1	10.2	B	1
	WB	12.9	B	1	10.9	B	1
	NB	1.6	A	1	2.1	A	1
	SB	0.0	A	0	0.2	A	0
	Intersection	6.3	A	--	4.9	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
54th Street West & Rimrock Road	EB	0.0	A	0	0.3	A	0
	WB	1.2	A	1	0.8	A	1
	NB	14.4	B	1	14.0	B	1
	SB	*42.6*	*E*	*5*	23.7	C	2
	Intersection	9.1	A	--	5.1	A	--
Intersection Control		*Stop Controlled (SB)*					
62nd Street West & Grand Avenue	EB	1.7	A	1	2.5	A	1
	WB	0.0	A	0	0.0	A	0
	SB	14.5	B	2	12.8	B	1
	Intersection	6.5	A	--	4.1	A	--
Intersection Control		*Stop Controlled (NB)*					
64th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	5.2	A	1	3.5	A	1
	NB	10.5	B	1	11.0	B	1
	Intersection	4.6	A	--	5.5	A	--
Intersection Control		*Stop Controlled (SB)*					
56th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	1.9	A	1	1.5	A	1
	NB	13.8	B	1	15.7	C	2
	SB	15.1	C	1	0.0	A	0
	Intersection	2.4	A	--	4.4	A	--
Intersection Control		*Stop Controlled (SB)*					
54th Street West & Grand Avenue	EB	0.7	A	1	1.3	A	1
	WB	0.0	A	0	0.0	A	0
	SB	19.1	C	3	15.4	C	2
	Intersection	5.2	A	--	3.3	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	1.4	A	1	1.7	A	1
	NB	19.0	C	2	19.6	C	2
	SB	0.0	A	0	21.9	C	1
	Intersection	3.1	A	--	3.9	A	--
Intersection Control		*Stop Controlled (WB)*					
64th Street West & Central Avenue	WB	10.9	B	1	10.7	B	1
	NB	0.0	A	0	0.0	A	0
	SB	1.1	A	1	0.5	A	0
	Intersection	2.0	A	--	2.0	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
56th Street West & Central Avenue	EB	0.2	A	0	0.7	A	0
	WB	2.4	A	1	1.5	A	1
	NB	11.7	B	1	11.8	B	1
	SB	15.2	C	2	14.6	B	2
	Intersection	7.3	A	--	7.4	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Central Avenue	EB	0.3	A	0	0.4	A	0
	WB	0.6	A	0	0.8	A	1
	NB	12.7	B	1	14.5	B	2
	SB	20.4	C	3	14.4	B	1
	Intersection	7.4	A	--	5.5	A	--

Intersection	Approach	Existing (2015) AM Peak Avg Delay (s/veh)	AM Peak LOS	AM Peak 96th % Queue (veh)	PM Peak Avg Delay (s/veh)	PM Peak LOS	PM Peak 96th % Queue (veh)
Intersection Control		*Stop Controlled (NB & SB)*					
64th Street West & King Avenue West	EB	1.9	A	1	2.2	A	1
	WB	2.3	A	1	0.7	A	1
	NB	*32.3*	*D*	*4*	19.8	C	2
	SB	*25.7*	*D*	*3*	18.7	C	3
	Intersection	11.0	B	--	6.8	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
56th Street West & King Avenue West	EB	0.2	A	0	0.4	A	0
	WB	0.9	A	1	0.3	A	0
	NB	16.4	C	1	21.8	C	3
	SB	21.2	C	3	19.2	C	2
	Intersection	6.5	A	--	6.8	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & King Avenue West	EB	0.8	A	1	0.7	A	1
	WB	0.2	A	0	0.3	A	0
	NB	15.8	C	1	18.8	C	2
	SB	21.4	C	2	19.8	C	2
	Intersection	5.1	A	--	4.7	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
64th Street West & Hesper Road	EB	17.8	C	3	10.4	B	1
	WB	11.0	B	1	10.1	B	1
	NB	0.0	A	0	0.3	A	0
	SB	4.2	A	1	2.4	A	1
	Intersection	9.6	A	--	6.5	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
56th Street West & Hesper Road	EB	15.5	C	2	11.1	B	1
	WB	14.8	B	2	11.7	B	1
	NB	1.7	A	1	0.7	A	0
	SB	2.1	A	1	1.1	A	0
	Intersection	9.3	A	--	6.9	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Hesper Road	EB	0.7	A	0	0.9	A	0
	WB	0.5	A	0	0.4	A	0
	NB	10.7	B	1	11.7	B	1
	SB	12.5	B	1	11.4	B	1
	Intersection	4.8	A	--	2.8	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
64th Street West & Neibauer Road	EB	10.5	B	1	9.7	A	1
	WB	9.9	A	1	9.7	A	1
	NB	0.0	A	0	0.0	A	0
	SB	1.6	A	0	0.0	A	0
	Intersection	6.4	A	--	4.6	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
56th Street West & Neibauer Road	EB	10.6	B	1	10.3	B	1
	WB	10.8	B	1	10.3	B	1
	NB	0.5	A	0	0.2	A	0
	SB	1.0	A	0	1.4	A	0
	Intersection	4.5	A	--	4.7	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Neibauer Road	EB	0.1	A	0	0.2	A	0
	WB	1.3	A	0	2.4	A	1
	NB	9.3	A	1	10.1	B	1
	SB	9.8	A	1	11.1	B	1
	Intersection	3.4	A	--	4.3	A	--

TABLE 4. LEVEL OF SERVICE (LOS) CAPACITY ANALYSIS DESCRIPTIONS

	Level of Service	Traffic Flow	Description
Uncongested	A		• Light traffic • Free flow speeds
	B		• Slightly increased traffic levels • Still free flow speeds
	C		• Approaching moderate congestion levels • Speeds near free flow
Congesting	D		• Speeds reduced • Lane changes restricted due to traffic
Congested	E		• Congestion • Irregular traffic flow
	F		• Road at capacity • Gridlock with frequent stops

TABLE 5. LEVEL OF SERVICE (LOS) THRESHOLDS BY FUNCTIONAL CLASSIFICATION

LOS Threshold	A-C	D	E	F
Arterials/Collectors	*Upper Limit V/C Cutpoints*			
	0.58	0.75	0.92	>0.92
Principal Arterial	*(Daily Capacity Per Lane - 9000)*			
2 Lane	10,440	13,500	16,560	≥18,000
3 Lane	11,480	14,850	18,220	≥19,800
4 Lane	20,880	27,000	33,120	≥36,000
Minor Arterial	*(Daily Capacity Per Lane - 7000)*			
2 Lane	8120	10,500	12,880	≥14,000
3 Lane	8930	11,550	14,170	≥15,400
4 Lane	16,240	21,000	25,760	≥28,000
Collector	*(Daily Capacity Per Lane - 6000)*			
2 Lane	6960	9000	11,040	≥12,000
3 Lane	7660	9,900	12,140	≥13,200
4 Lane	13,920	18,000	22,080	≥24,000

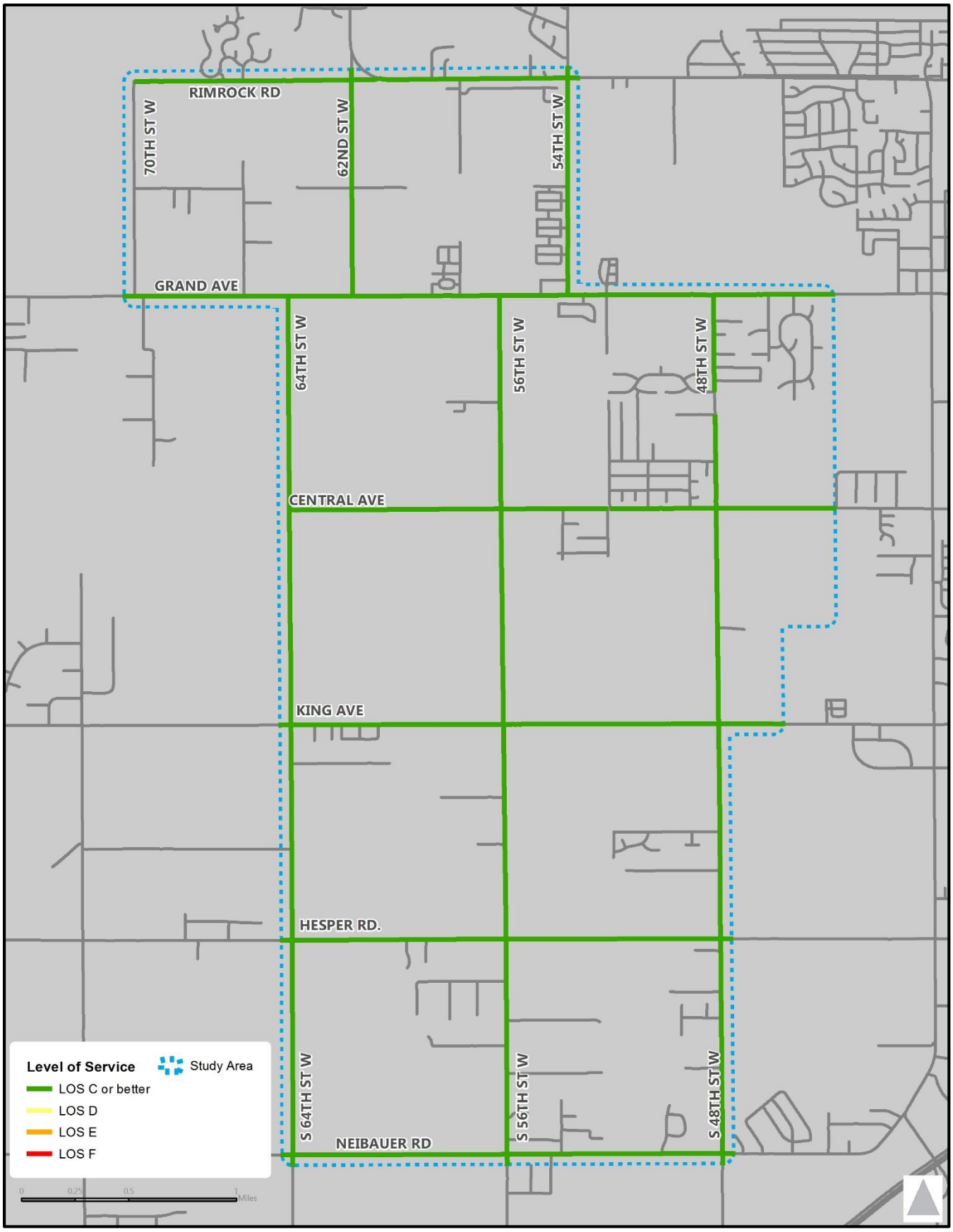


FIGURE 3. EXISTING CONDITIONS (2015) CORRIDOR LEVEL OF SERVICE (LOS)

Active Transportation Facilities

The term "active transportation" usually refers to walking and bicycle trips, but can include many forms of transportation powered by human energy, such as skateboards, kick scooters, or rollerblades. Active transportation trips offer an affordable and healthy way to access employment, schools, retail centers, or simply a way to recreate. Similar to the roadway networks that connect destinations for automobiles, active transportation networks get people from point A to point B on trails, quiet neighborhood streets, side paths, and bike lanes.

Figure 4 on the following page illustrates the existing network of active transportation facilities in the study area. Except for sidewalks internal to master-planned communities, the availability of sidewalks, side paths, trails, or bike lanes in the study area is very limited. This is primarily due to the undeveloped and agricultural nature of the study area, which is typical of rural areas. Towards the east side of the study area, development becomes denser approaching the urban core of the City of Billings. In these established urban areas (many of which are just outside the study area boundary), active transportation facilities are more prevalent. High quality paths on the eastern edge of the study area include the Rimrock Road Trail, Big Ditch Trail, Shiloh Road Trail, King Avenue West Trail, Zimmerman Trail, Gabel Road Trail, and the Olympic & Heritage Sub Trails. Additionally, there are striped bike lanes on Monad Road, and sidewalks are typical.

While there are nearby low-stress facilities, the study area generally lacks connectivity to these facilities. The existing roads that connect are arterials with very narrow shoulders and speeds limits between 45 to 60 MPH. The sidewalk and trail facilities that exist in and around subdivisions are isolated from connection to the Billings network.

What Type of Bike Rider Are You?

To be effective, Active Transportation systems should be designed to provide a network of facilities that accommodate a diversity of equipment and skill levels. For instance, it is not unusual to have side paths in a corridor with bike lanes; experienced adult riders may choose to ride at higher speeds adjacent to vehicle travel lanes, whereas a child riding to school may feel more comfortable on a path or sidewalk separated from traffic.

A commonly-cited study from the Portland Bureau of Transportation[1] developed four basic categories of cyclists: The Strong and the Fearless, The Enthused and Confident, The Interested but Concerned, and No Way No How. **Figure 5** on page 15 depicts the typical population split for these four categories and gives a description for reach. The categories are particularly useful when characterizing how different types of bikeways influence a rider's level of comfort. The percent of population breakdown for the four typologies indicates that the majority of cyclists (67 percent) fall into the Enthused and Confident and Interested but Concerned, suggesting that there is potential to increase cycling by investing in a low-stress bikeway system that is more comfortable to a wide range of people. While the percentage breakdown of four types of cyclists in Billings may not be exactly the same, the concept is a useful one for understanding aspects of a bike network that would increase cycling.

Level of Traffic Stress

Level of Traffic Stress (LTS) is a modern methodology developed by Mekuria, Furth and Nixon (2012) that examines the characteristics of city streets and how various aspects can cause stress on bicyclists and affect where they are likely to ride. LTS methodology classifies roadway segments into one of four levels of traffic stress, which are termed as LTS1 through LTS4. Groups of cyclists are categorized by how much stress they will tolerate in different environments:

[1] Geller, R. "Four Types of Cyclists," Portland Bureau of Transportation, Portland, OR, 2006. http://www.portlandoregon.gov/transportation/article/264746, Accessed March 2016.

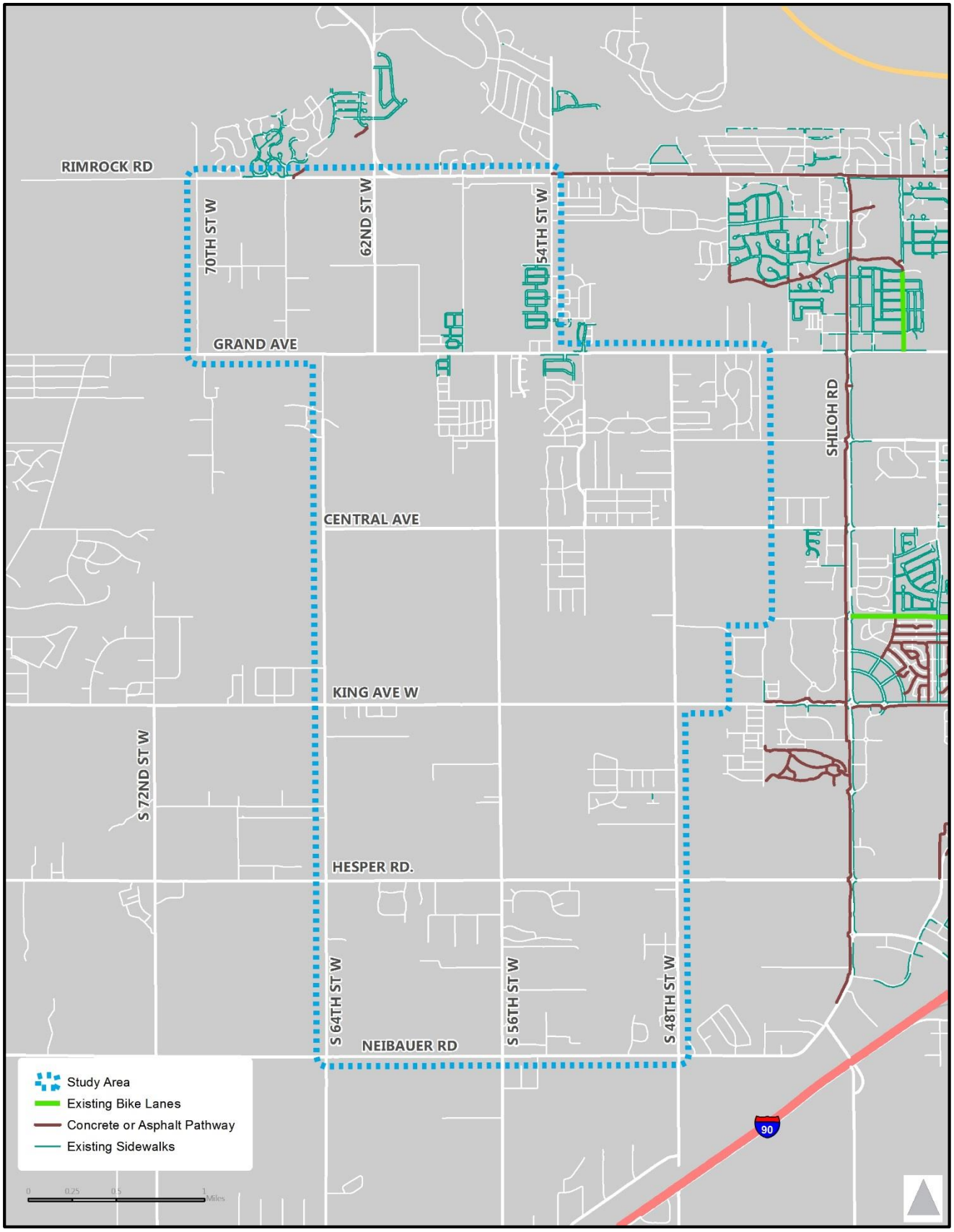


FIGURE 4. EXISTING STUDY AREA ACTIVE TRANSPORTATION FACILITIES

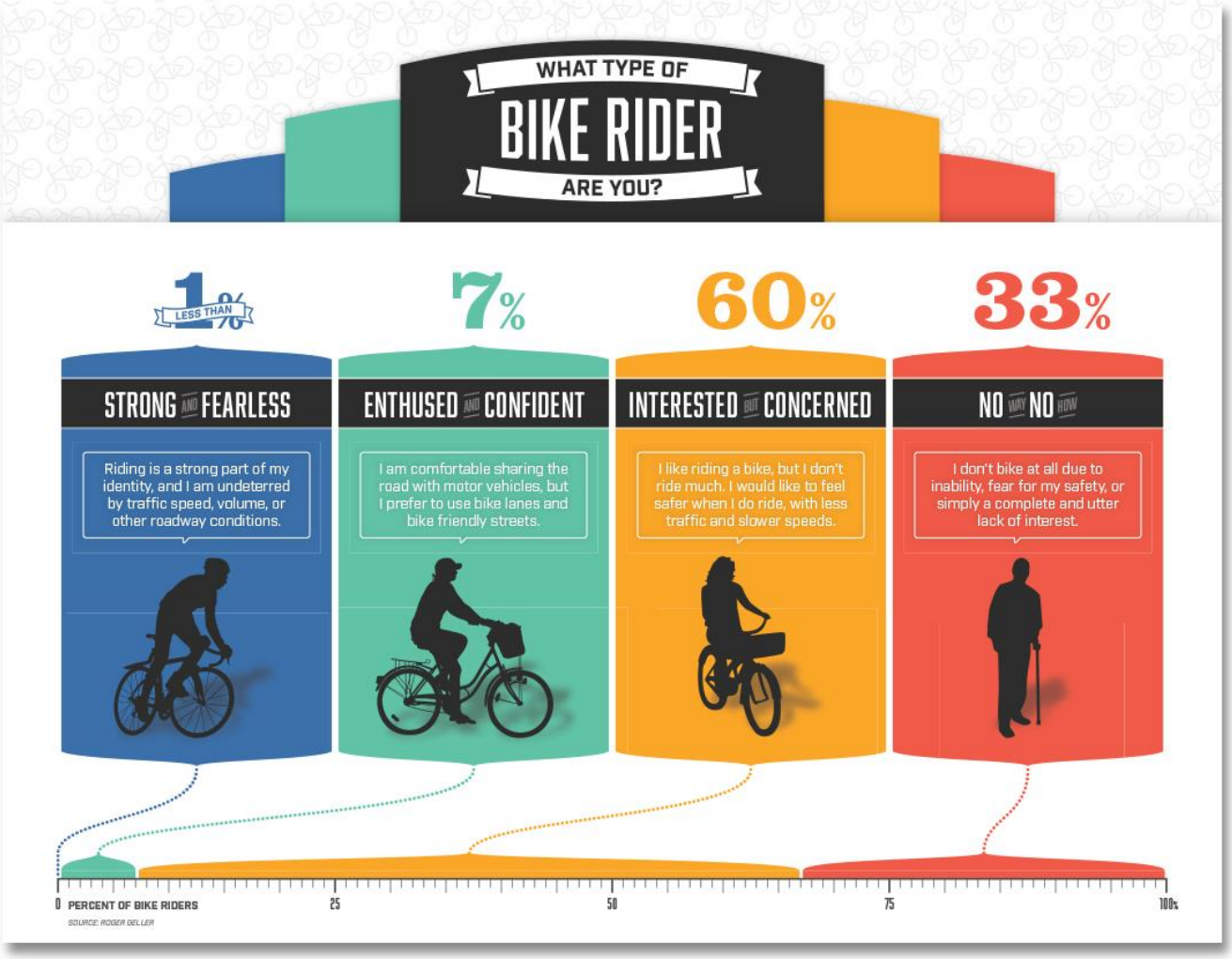


FIGURE 5 – TYPES OF BICYCLE RIDERS

- LTS1: most children can tolerate and feel safe while bicycling.
- LTS2: the mainstream adult population will tolerate and feel safe while bicycling
- LTS3: cyclists who are considered "enthused and confident," but still prefer having their own dedicated space for riding, will tolerate and feel safe while bicycling.
- LTS4: a level tolerated only by those characterized as "strong and fearless", which comprises just 0.5 percent of the population. The high-stress streets that LTS4 groups will ride are those with high speed limits, multiple travel lanes, limited or non-existent bike lanes and signage, and large distances to cross at intersections.

Table 6 on the following page presents the variables used to develop LTS scores for the roadway network in the study area. LTS works on the "weakest link" principle, where the traffic stress for a given corridor, intersection approach or crossing is dictated by the most stressful portion. This means a full segment receives the score of its lowest-scored portion. For example, a cross-town ride could have large portions of LTS1 and LTS2, but just one section of LTS3 would present a barrier. Only cyclists that could tolerate LTS3 would ride the entire route. So, LTS3 becomes the score for that route. LTS analysis was conducted only for minor arterials and arterials in the study area because there is limited connectivity for local/collector streets, requiring most trips to use the arterial system. **Figure 6** on page 17 illustrates the LTS rank for roads in the study area.

TABLE 6. LEVEL OF TRAFFIC STRESS (LTS) VARIABLES

Level of Traffic Stress (LTS) Variable	Data Source
Direction	Derived
Mode separation (mixed flow or bicycle lane)	Bike trails, field review
Is this a residential street?	Calculate based on land use
Adjacent parking	Field review
Lanes in analysis direction	Have from centerline file
Is there a median?	Field review
Is there a center line?	Field review
What is the prevailing speed? (Use speed limit if prevailing speed not available)	Speed limit from centerline file
Bike Lane + Parking Width (if bike lane present)	Field review
How often do bike lane blockages occur?	Estimate

This analysis suggests that virtually all the arterials in the study area are categorized as LTS4. The most significant elements of the physical roadway cross section contributing to the stressful cycling environment are vehicle speeds above 35 MPH and a lack of bike lanes or rideable shoulders.

Committed/Planned Projects

A variety of projects that are intended to improve multi-modal operations and/or safety are committed via the capital improvement plans for the City, County or MDT or are being tentatively planned for the near future. The following paragraphs provide descriptions of committed or planned projects as they are known at this time.

Street & Intersection Projects

Two projects are currently being designed under MDT administration that are specifically intended to improve safety conditions for the intersections of Central Avenue & 56th Street West and King Avenue West & 56th Street West. Both of those intersections will be reconstructed as single-lane roundabouts, and in both cases the projects were programmed in response to concerns about safety and the crash histories at those intersections. The current schedules for those projects would have the King Avenue-56th Street West roundabout starting construction in 2016 and the Central Avenue-56th Street West roundabout starting construction in 2017. Although both projects were initiated for safety reasons, the proposed improvements will also greatly increase traffic volume capacities for those intersections. The design years for the projects are 2035 (King) and 2036 (Central). It should be noted that crosswalks and sidewalk connections are not currently planned for construction at either the King Avenue West/56th Street West or Central Avenue/56th Street West roundabouts due to right-of-way constraints at the intersections. The roundabouts will be constructed with a removable sections of raised median so as to facilitate a retrofitting of crosswalks without complete reconstruction of the medians.

The City of Billings is in contract negotiations with Sanderson Stewart for design and construction services on the W.O. 16-09 Grand Avenue – 48th to 58th project, which is programmed for construction in 2017. That project will widen Grand Avenue to a 3-lane section from approximately 52nd Street West to 58th Street West. It will also construct eastbound and westbound auxiliary left-turn bays at the Grand Avenue-48th Street West intersection and a traffic signal or roundabout at the Grand Avenue-54th Street West intersection.

In addition to the committed street and intersection projects referenced above, it is tentatively planned that a traffic signal will be installed at the intersection of Rimrock Road and 54th Street West within the next couple years (per the City of Billings).

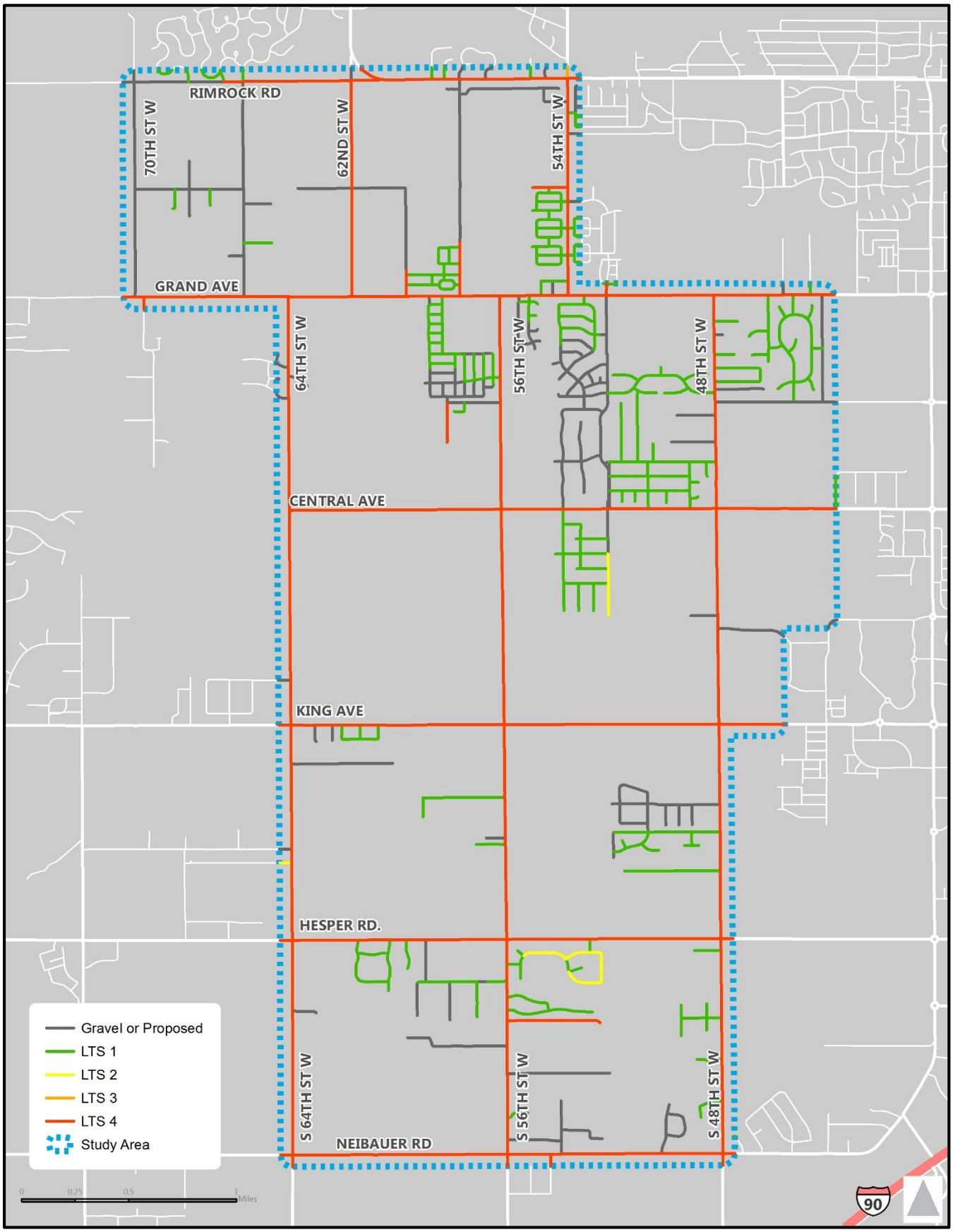


FIGURE 6. EXISTING CONDITIONS (2015) LEVEL OF TRAFFIC STRESS (LTS)

The Project Team is not aware of any other additional street or intersection improvement projects within or directly adjacent to the study area that are currently committed or even planned at this point in time.

Bicycle & Pedestrian Facility Projects

The above-referenced City of Billings W.O. 16-09 project is planned to construct a network of sidewalks and multi-use paths that will, at a minimum, provide pedestrian and bicycle connectivity along Grand Avenue from 52nd Street West to the west boundary of Trails West Subdivision and along 54th Street West from Grand Avenue to Rimrock Road. The ultimate configuration (and mixture of narrower sidewalk versus wider multi-use path) is yet to be finally determined and will depend somewhat on the availability of right-of-way or easement across a few key privately-held properties. The general intent of this network of bicycle and pedestrian facilities is to provide active transportation interconnectivity amongst area residential developments, Ben Steele Middle School and other neighborhood facilities.

Depending upon the final configuration of the system along 54th Street West, a mid-block pedestrian crossing with rectangular rapid flashing beacons (RRFBs) may be constructed at the boundary between Cottonwood Grove Subdivision and Cottonwood Park. Also, the City of Billings W.O. 16-09 project will install a High-Intensity Activated Crosswalk (HAWK) signal on Grand Avenue mid-block between 56th Street West and 58th Street West expressly for the purpose of getting pedestrians across Grand Avenue at the main entrance to Ben Steele Middle School. At this time, the Project Team is not aware of any other active transportation improvement projects that are committed or planned within the boundaries of the study area.

LAND DEVELOPMENT FORECASTING

3



The planned approach for analyzing the horizon year scenarios for this study was to work cooperatively with the MDT Statewide and Urban Planning Department to develop horizon year (2035) Transcad transportation model runs to projected future land development scenarios within the study area. MDT owns and maintains the transportation model for the Billings area, so its personnel were charged with creating the model runs for our study and it was the consultant team's responsibility to determine the input parameters that would most accurately represent the land development scenarios that were agreed upon by the Project Oversight Committee for analysis. The following paragraphs describe how those scenarios were planned and how the model input parameters were calculated.

Land Development Scenarios

Through discussions at the initial meetings of the project Steering Committee it was determined that two (2) land develop scenarios would be modeled and analyzed for the purposes of this study. Scenario 1 would represent an assumed progression of land development in the study area that was more conservatively consistent with recent historical trends in this area. Annexation (and thereby land development at densities consistent with City of Billings lot size requirements) would be presumed to occur only in the areas shown as "in the red" on the current version of the City's annexation planning map (see **Figure 1**). The areas not in the red (approximately 900 acres) would be presumed to develop with densities consistent with Montana Department of Environmental Quality (DEQ) requirements for lot size based on private water well and septic systems. Scenario 2 was more aggressively planned to represent an expansion of annexation that included the areas identified in yellow-orange on the City's annexation planning map (See **Figure 1**) in addition to the areas that are shown "in the red." That distinction increased the raw land area projected for City-based development densities by approximately 950 acres (total area of approximately 1850 acres).

In addition to the distinctions between the two scenarios that are based on presumed annexations, it was agreed that Scenario 1 would be based on a more conservative assumption of overall raw land development density, and that the assumptions for Scenario 2 would be more aggressive in terms of density of development. Since the undeveloped properties in the study area are owned by a multitude of different individuals, families and corporations, the Project Team relied heavily on the expertise of Mr. Bob Sanderson to project the raw land development densities for both scenarios. Mr. Sanderson is one of the founders of Sanderson Stewart and has more than 40 years of experience with land development in Billings area, but he has also resided

at a rural residence located just outside the study area boundary for a similar timeframe. Mr. Sanderson knows this area very well and he also has relationships with several of the property owners. The Project Team worked with Mr. Sanderson to evaluate each and every parcel of land in the study area to project land development probabilities (percentages) for both scenarios. Those projections were then converted to residential dwelling units, retail employees and non-retail employees so that the projections could be utilized as inputs for the Transcad models for each scenario. The determination of where residential vs. commercial development would occur was based on the current adopted zoning scheme and discussions between the Project Team and the Steering Committee about where commercial nodes might be most likely to develop in the future.

The residential dwelling unit conversions were made using absorption rates for housing derived from data for recent (past 10 years) residential subdivisions developed in and around the study area. Separate rates were derived for subdivisions developed in the County vs. within City Limits, since lot sizes and subdivision covenants are generally very different for County and City subdivisions. The commercial employee projections were calculated using Institute of Transportation Engineers (ITE) *Trip Generation* rates for retail and industrial employees and actual employee projection numbers for Ben Steele Middle School and future potential elementary and high schools based on discussions with School District #2.

To differentiate between Scenarios 1 and 2 from a land development sprawl standpoint, the projected percentage of developable area for Scenario 1 (as calculated by Mr. Sanderson) was doubled for Scenario 2. If the Scenario 1 percentage was 50 percent or greater, the Scenario 2 percentage was capped at 100 percent. As an additional differentiation, it was presumed through discussions with School District #2 that the only likely school opening within the study area for Scenario 1 would be Ben Steele Middle School. For Scenario 2, it as additionally assumed that new elementary and high schools would also be in operation.

Growth Projections

Based on the detailed forecasting of land development densities, types and locations, the Project Team performed some simple exponential growth projections and presented that data to the Steering Committee for the purpose of building consensus on the anticipated levels of growth for the land development scenarios. **Table 7** (below) and **Table 8** (next page) present the results of the residential and commercial growth projections along with census-based projections for population growth.

TABLE 7. SUMMARY OF RESIDENTIAL GROWTH PROJECTIONS

Scenario	2014		2035		Delta (Horizon Year)		Population Growth
	Homes[1]	Population[2]	Homes	Population	Homes	Population	
Existing Conditions	1,093	2,459	-	-	-	-	-
Scenario 1	-	-	9,269	20,855	8,176	18,396	10.7%
Scenario 2	-	-	19,334	43,502	18,241	41,043	14.7%
Delta (Scenario)	**-**	**-**	***10,065***	***22,647***	***10,065***	***22,647***	***3.9%***

[1] Calculated using 4.5% total growth from 2010 to 2014 (from US census data)

[2] Calculated using rate of 2.25 persons/household (from 2010 US census data)

TABLE 8. SUMMARY OF COMMERCIAL GROWTH PROJECTIONS

Scenario	Employees						Annualized Growth	
	2010		2035		Delta (Horizon Year)			
	Retail[1]	Non-Retail[1]	Retail	Non-Retail	Retail	Non-Retail	Retail	Non-Retail
Existing Conditions	66	469	-	-	-	-	-	-
Scenario 1	-	-	187	757	121	288	4.09%	1.86%
Scenario 2	-	-	248	1,146	182	677	5.22%	3.50%
Delta (Scenario)	**-**	**-**	***61***	***389***	***61***	***389***	***1.14%***	***1.64%***

[1] From 2010 MDT Transcad model for Billings

The Project Team presented the preliminary growth projections to the Steering Committee at a meeting in November of 2015. The group reviewed the information, particularly as it related to ongoing efforts by the MPO to update the Billings/Yellowstone County Growth Policy (separate project). The MPO reported a Growth Policy target range for City-wide population growth of 40,000-70,000 people with a mid-range estimate of 55,000 new residents by 2035. The expectation is that the overall growth will be spread out into a handful of areas around Billings, but that the West End region that is largely included in our study area is likely to account for a significant percentage of the total growth. After reviewing the initial projections, the Steering Committee agreed that the targeted growth for the West End Multi-Modal Planning Study was consistent with the range of overall growth (in terms of population and employees) from the Growth Policy project. The Project Team was given the go-ahead to provide model inputs to MDT based on the growth projections and proceed with the travel demand modeling effort on that basis.

TRAVEL DEMAND MODELING

4



Travel Demand Model Background

At the inception of this planning study, the original intent was to utilize the Yellowstone County travel demand model to develop future year traffic volume forecasts. The regional model is maintained by the Montana Department of Transportation (MDT), and includes traffic analysis zones (TAZs) and roadways in the study area. MDT does not allow consultants to run the model directly, and model documentation was not available; as such, the Project Team has limited knowledge of the assumptions, equations, and overall validation of the model. This chapter summarizes efforts made to use the travel model and describes assumptions ultimately used for the calculation of the traffic projections for this study.

Model Scenarios & Process

Initial Reasonability Checks - Base Year Validation

Model validation is the term used to describe model performance in terms of how closely the model's output matches existing travel data in the base year. Traditionally, most model validation guidelines have focused on the performance of the trip assignment step in accurately assigning trips to the street network. To determine the reasonableness of the Yellowstone County travel model in the project study area, daily volume results from the 2010 base year model runs were examined. Thirty daily traffic counts from 2014-2015 were compared to the base year model estimates; key validation measures are summarized below:

- At least 75 percent of the roadway links for which counts are available should be within the maximum desirable deviation, which ranges from approximately 15 to 60 percent depending on total volume (the larger the volume, the less deviation is permitted).

  Result: Model volumes were compared to existing traffic counts at thirty individual count sites for daily validation. Of those, 25 were within allowable deviation which meets the 75 percent requirement.

- The two-way sum of the volumes on all roadway links for which counts are available should be within 10 percent of the counts. Also called model-to-count ratio.

Result: The default model estimated 72 percent of volume indicated by counts, which is outside the allowable threshold.

Roadway Network Modifications - Calibration

Model calibration is the term used to describe the process by which the coefficients and inputs of the model may be adjusted to better replicate travel behavior and traffic volumes. Since the Project Team had limited access to the model to review key parameters such as trip generation rates, modifications to the roadway network were the primary calibration mechanism after verifying the base year land use was reasonable relative to Census population data. In an attempt to improve model validation, roadway characteristics were reviewed to ensure that the link attributes reflected local operating conditions. During this review, link characteristics such as speed, functional class, and capacity were modified to better reflect conditions on the ground. TAZ connectors were also modified to produce more realistic neighborhood access locations.

Future Land Use Scenarios

Land use data is one of the primary inputs to the Yellowstone County model, and this data is instrumental in estimating trip generation. The model's primary source of land use data is household and employment information. Households are categorized in terms of total dwelling units. The employment data is aggregated into two categories: retail employment, and non-retail employment. The future land use scenarios discussed in the previous chapter were summarized in terms of model-compatible inputs at the TAZ geography.

Model Run Results

Table 9 below summarizes the final model results in terms of annualized growth rates on key roadways in the study area. The annualized growth rates in excess of 6.0 percent were considered to be too high even for the more aggressive land development projection scenario. The application of the rates at that level or higher resulted in traffic volume projections that the Project Team and ultimately the Steering Committee found to be unrealistic for this market under any reasonable growth scenario. In general however, the geographic dispersion of growth as portrayed by the model was found to be relatively consistent with expected growth patterns. As such, the decision was made to manually override the model run results in terms of magnitude of traffic volume projections, but to utilize the model results as a basis for development of traffic growth projections (summarized in the following section).

Street	2035 Scenario 1 Annualized Growth Rate	2035 Scenario 2 Annualized Growth Rate
Rimrock Road	5.33%	7.31%
Grand Avenue	5.60%	6.94%
Central Avenue	8.14%	10.49%
King Avenue West	2.62%	3.59%
Hesper Road	2.58%	4.02%
Neibauer Road	3.51%	5.35%
48th Street West	2.83%	3.89%
54th Street West	6.29%	6.91%
56th Street West	7.47%	8.77%
62nd Street West	4.24%	4.35%
64th Street West	4.42%	6.80%

TABLE 9. TRAVEL DEMAND MODEL RESULTS – AVERAGE ANNUALIZED CORRIDOR GROWTH

Horizon Year (2035) Traffic Projections

In order to temper the overall magnitude of the Horizon Year (2035) traffic projections relative to the output volumes from the travel demand model, the Project Team evaluated a series of annualized growth rates for each scenario that were blended across the study area so as to project a higher intensity of growth in the northeast portion of the study area and lesser growth as you move south and west. The blended approach was found to generally be consistent with how the travel demand model was distributing traffic for the Horizon Year (2035) model runs. An iterative process was utilized to test different growth rate schemes using design year projections from the MDT Central Avenue & 56th Street West and King Avenue & 56th Street West intersection reconstruction projects to calibrate the projections.

Ultimately, the Project Team settled on a pair of blended schemes whereby the annualized growth rate percentages for Scenario 1 ranged from 2.7 percent to 4.5 percent (average of 3.5 percent) and the growth percentages for Scenario 2 ranged from 3.5 percent to 5.9 percent (average of 4.6 percent). This approach and the resulting peak hour turning movement and annual average daily traffic (AADT) volume projections were presented to the Steering Committee for review and approval in March of 2016. After a thorough discussion of the pros and cons, the approach was approved and the Project Team moved forward with final adjustments to the projections. Since the simplified application of growth rates directly to existing turning movement volumes does not take into account individual movement capacity thresholds or other factors that could limit growth for specific movements, manual adjustments were made in certain cases based on the professional judgement of the Project Team. **Figure 7** and **Figure 8** on (pages 25 to 26) illustrate the projected AM and PM peak hour turning movement and AADT volumes for Scenarios 1 and 2, respectively.

The resulting increases in traffic volumes were substantial across the board. The average corridor AADTs for Scenario 1 (2035) increased when compared to Existing Conditions (2015) by approximately 122.9 percent. The average AADTs for Scenario two represented an increase over existing of approximately 177.2 percent. The projected magnitude of increase for peak hour turning movement volumes was similar.

Active Transportation Modeling

Although there is a growing interest in modeling active transportation, most travel demand models are sensitive only to automobile and transit trips. Forecasting tools have traditionally excluded pedestrian and bicycle activity. One key complication to modeling non-auto modes is the scale at which bicycle and pedestrian trip are made. Since most walk trips are less than three miles, most travel model networks and traffic analysis zone (TAZ) structures simply lack adequate resolution to develop reasonable trip distribution and assignment estimates.

Rather than try to forecast the magnitude of bicycle and pedestrian activity, the Project Team implemented a methodology that determines the relative level of demand for walking and biking in the study area. The Latent Demand Model uses economic, demographic, land use, and built environment factors to identify "hot spots" for active transportation, and provides a logical analysis framework to prioritize attention and investment.

Latent Demand Variables

Active transportation – bicycling and walking – are dependent on a variety of factors. This analysis uses a combination of existing and newly developed GIS data correlated with active transportation. The weighting of these variables is, in part, based on results of previous research, but is also tailored to this project based on planning and engineering judgment. The variables, as well as the corresponding scoring criteria are provided in **Table 10** and **Table 11** on page 27.

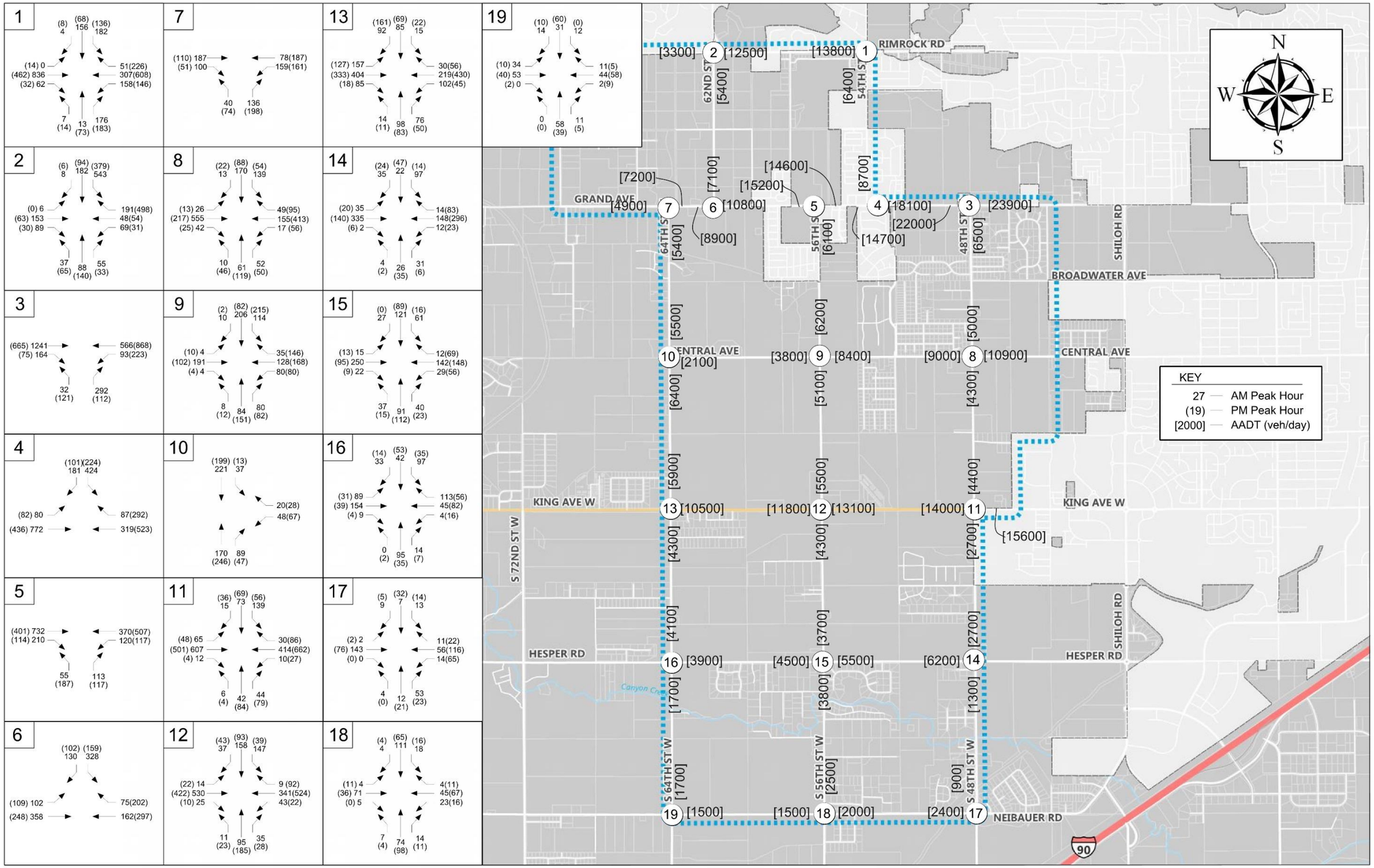


FIGURE 7 – SCENARIO 1 (2035) TRAFFIC VOLUME PROJECTIONS

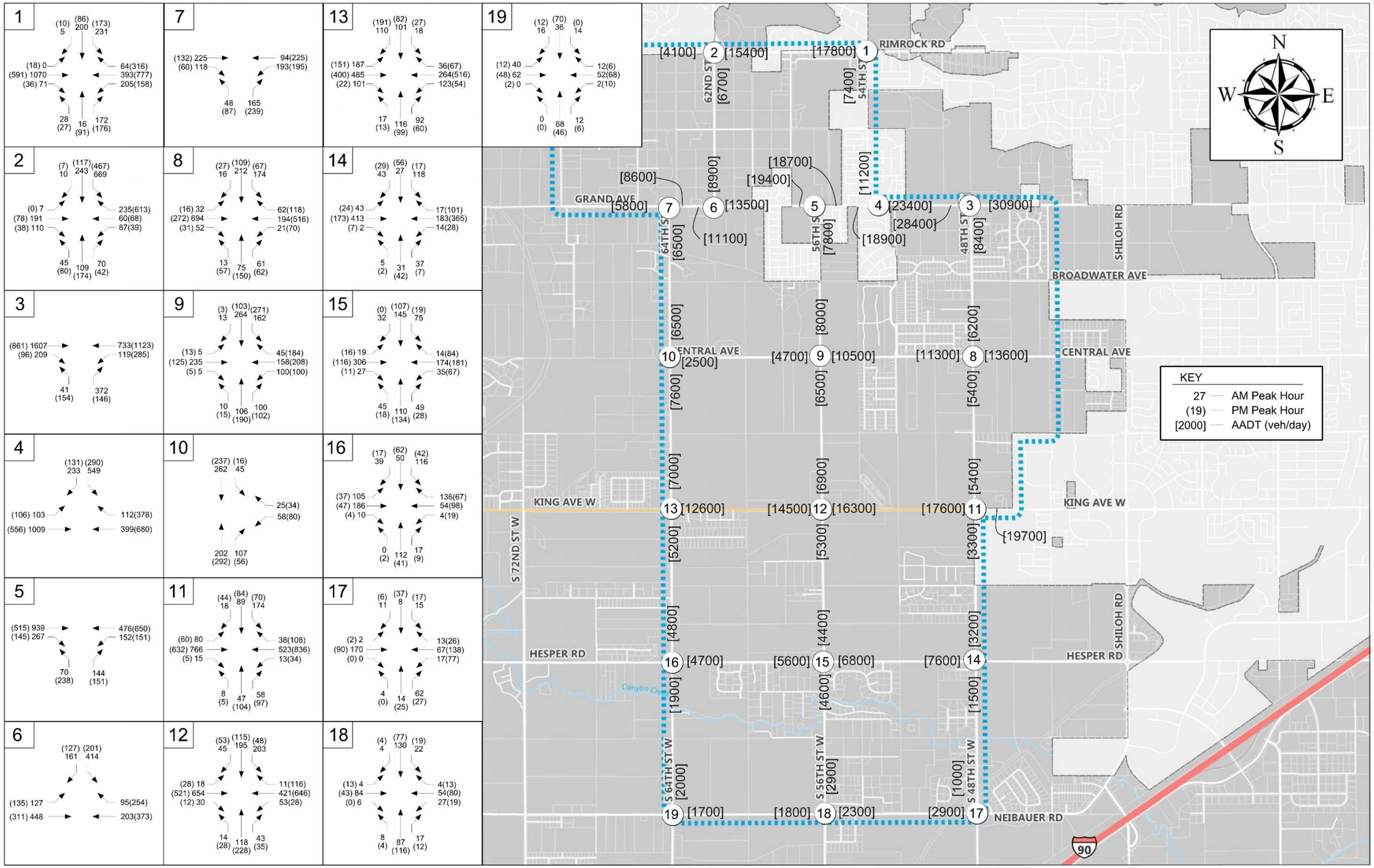


FIGURE 8 – SCENARIO 2 (2035) TRAFFIC VOLUME PROJECTIONS

TABLES 10 & 11. LATENT ACTIVE TRANSPORTATION DEMAND VARIABLES & SCORING

Built Environment Factors	
Dwelling Unity Density (Dwelling Units/Acre)	*Score (12 Maximum)*
0.0 - 0.4	0.0
0.5 - 1.3	2.4
1.4 - 2.3	4.8
2.4 - 4.1	7.2
4.2 - 6.7	9.6
> 6.7	12.0
Employment Density (Jobs/Acre)	*Score (12 Maximum)*
0.0 - 0.1	0.0
0.2 - 0.3	2.4
0.4 - 0.6	4.8
0.7 - 1.0	7.2
1.1 - 1.9	9.6
> 1.9	12.0
Land Use Mix (Jobs/Dwelling Units)	*Score (12 Maximum)*
0.0 - 0.2	0.0
0.3 - 0.6	1.5
0.7 - 1.5	3.0
1.6 - 2.5	4.5
> 2.5	6.0

Proximity Factors	
Schools (Proximity in Feet)	*Score (25 Maximum)*
0 - 660	25
661 - 1320	23.75
1231 - 2640	21.25
2641 - 3960	12.5
3961 - 5280	2.5
> 5280	0
Parks (Proximity in Feet)	*Score (20 Maximum)*
0 - 660	20
661 - 1320	15
1231 - 2640	10
2641 - 3960	5
> 3960	0
Retail (Proximity in Feet)	*Score (10 Maximum)*
0	10
1 - 2640	5
> 2640	0
Trails (Proximity in Feet)	*Score (15 Maximum)*
0 - 1320	15
1321 - 2640	7.5
> 2640	0

HORIZON YEAR (2035) OPERATIONS ANALYSIS

5



Once the Horizon Year (2035) traffic projections were approved by the Steering Committee for both scenarios, the Project Team was able to proceed with analyses to determine where in the study area that deficiencies would be most likely to occur in terms of both operations and safety. The following paragraphs describe how those considerations were evaluated for the vehicular environment, as well as for the existing system of bicycle and pedestrian facilities.

Intersection Traffic Operations

The Project Team performed Horizon Year (2035) AM and PM peak hour intersection capacity calculations for all of the major study area intersection using Synchro, Version 8.0, for stop-controlled and signalized intersections and Rodel, Version 1.88, for roundabouts. Capacity calculations were performed for Scenarios 1 and 2. Each volume scenario was first analyzed for a "no-build" scenario using existing intersection traffic control and lane configurations, except in the cases of the Central Avenue and King Avenue intersections with 56th Street West, where single-lane roundabouts are being designed and planned for construction in the near future (committed projects). The purpose of this exercise was to establish future intersection operation conditions without improvements in order to identify deficiencies. **Table 12** and **Table 13** (pages 29 to 30) illustrate the results of the Scenario 1 and Scenario 2 Horizon Year (2035) intersection capacity analyses for the "no-build" condition. Detailed intersection capacity calculation worksheets for the Horizon Year (2035) scenarios can be found in **Appendix C**.

For the purposes of this study, a LOS C metric for an intersection (not individual approaches) was considered to be the minimum acceptable threshold for requiring improvements. For the Scenario 1 (2035) no build condition, nine (9) intersections were projected to fall below LOS C during the AM peak hour and eight (8) intersections were projected to fall below LOS C during the PM peak hour. Of the intersections that sustained acceptable metrics, there were two (64th Street West/Hesper Road and 56th Street West/Hesper Road) that exhibited LOS D conditions on one or more individual approaches during the AM peak only. However, projected maximum queue lengths for these approaches were projected to be relative minor. The following intersections were projected to fall below LOS C during one or both peak hours as noted:

- 62nd Street West & Rimrock Road (AM Peak and PM Peak)
- 54th Street West & Rimrock Road (AM Peak and PM Peak)
- 62nd Street West & Grand Avenue (AM Peak)

TABLE 12. SCENARIO 1 (2035) NO BUILD CAPACITY CALCULATION RESULTS

Intersection	Approach	Scenario 1 (2035) - No Build					
		AM Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Stop Controlled (EB & WB)*					
62nd Street West & Rimrock Road	EB	--	*F*	--	*71.1*	*F*	*4*
	WB	--	*F*	--	*459.7*	*F*	*45*
	NB	1.6	A	1	2.1	A	1
	SB	6.9	A	3	6.9	A	2
	Intersection	--	*F*	--	*199.9*	*F*	--
Intersection Control		*Stop Controlled (NB & SB)*					
54th Street West & Rimrock Road	EB	0.0	A	0	0.3	A	1
	WB	3.9	A	2	1.4	A	1
	NB	--	*F*	--	--	*F*	--
	SB	*7661.1*	*F*	*48*	--	*F*	--
	Intersection	--	*F*	--	--	*F*	--
Intersection Control		*Stop Controlled (SB)*					
62nd Street West & Grand Avenue	EB	1.8	A	1	2.8	A	1
	WB	0.0	A	0	0.0	A	0
	SB	*228.9*	*F*	*26*	*66.8*	*F*	*9*
	Intersection	*91.5*	*F*	--	16.5	C	--
Intersection Control		*Stop Controlled (NB)*					
64th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	5.6	A	1	3.7	A	1
	NB	13.9	B	2	16.1	C	3
	Intersection	5.4	A	--	7.3	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
56th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	3.0	A	1	1.8	A	1
	NB	*263.7*	*F*	*12*	*555.0*	*F*	*27*
	Intersection	*28.6*	*D*	--	*117.7*	*F*	--
Intersection Control		*Stop Controlled (SB)*					
54th Street West & Grand Avenue	EB	0.9	A	1	1.7	A	1
	WB	0.0	A	0	0.0	A	0
	SB	*1497.1*	*F*	*68*	*624.5*	*F*	*30*
	Intersection	*486.6*	*F*	--	*122.9*	*F*	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	2.3	A	1	2.3	A	2
	NB	*1467.5*	*F*	*38*	*4322.7*	*F*	*33*
	Intersection	*199.7*	*F*	--	*489.2*	*F*	--
Intersection Control		*Stop Controlled (WB)*					
64th Street West & Central Avenue	WB	12.8	B	1	13.1	B	1
	NB	0.0	A	0	0.0	A	0
	SB	1.1	A	1	0.5	A	0
	Intersection	2.0	A	--	2.3	A	--
Intersection Control		*Roundabout*					
56th Street West & Central Avenue	EB	4.7	A	1	4.1	A	1
	WB	4.1	A	1	4.9	A	2
	NB	4.7	A	1	4.8	A	2
	SB	4.9	A	2	4.6	A	2
	Intersection	4.6	A	--	4.7	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Central Avenue	EB	0.3	A	1	0.4	A	0
	WB	0.7	A	1	0.8	A	1
	NB	*37.9*	*E*	*4*	*102.3*	*F*	*10*
	SB	*440.4*	*F*	*26*	*127.2*	*F*	*9*
	Intersection	*113.9*	*F*	--	*36.2*	*E*	--

Intersection	Approach	Scenario 1 (2035) - No Build					
		AM Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Stop Controlled (NB & SB)*					
64th Street West & King Avenue West	EB	2.0	A	1	2.4	A	1
	WB	2.6	A	1	0.7	A	1
	NB	*678.9*	*F*	*19*	*182.3*	*F*	*10*
	SB	--	*F*	--	*266.4*	*F*	*18*
	Intersection	--	*F*	--	*73.5*	*F*	--
Intersection Control		*Roundabout*					
56th Street West & King Avenue West	EB	8.9	A	5	7.4	A	3
	WB	5.1	A	2	20.1	C	15
	NB	5.5	A	1	5.5	A	2
	SB	5.9	A	2	6.5	A	1
	Intersection	6.8	A	--	13.5	B	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & King Avenue West	EB	0.8	A	1	0.8	A	1
	WB	0.2	A	0	0.3	A	1
	NB	*52.7*	*F*	*4*	*231.7*	*F*	*12*
	SB	*885.2*	*F*	*24*	*3381.6*	*F*	*23*
	Intersection	*141.7*	*F*	--	*352.5*	*F*	--
Intersection Control		*Stop Controlled (EB & WB)*					
64th Street West & Hesper Road	EB	*25.4*	*D*	*5*	11.5	B	1
	WB	11.7	B	1	10.9	B	1
	NB	0.0	A	0	0.3	A	0
	SB	4.3	A	1	2.5	A	1
	Intersection	13.0	B	--	7.5	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
56th Street West & Hesper Road	EB	*33.6*	*D*	*6*	13.2	B	1
	WB	*29.7*	*D*	*4*	16.0	C	3
	NB	1.7	A	1	0.7	A	0
	SB	2.2	A	1	1.1	A	0
	Intersection	18.7	C	--	9.5	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Hesper Road	EB	0.7	A	1	1.0	A	1
	WB	0.6	A	0	0.4	A	1
	NB	13.9	B	1	15.5	C	1
	SB	22.1	C	3	16.0	C	1
	Intersection	6.1	A	--	3.4	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
64th Street West & Neibauer Road	EB	10.7	B	1	10.1	B	1
	WB	10.2	B	1	10.2	B	1
	NB	0.0	A	0	0.0	A	0
	SB	1.6	A	0	0.0	A	0
	Intersection	5.9	A	--	5.3	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
56th Street West & Neibauer Road	EB	11.7	B	1	11.2	B	1
	WB	11.9	B	1	11.3	B	1
	NB	0.5	A	0	0.3	A	0
	SB	1.0	A	0	1.4	A	0
	Intersection	5.2	A	--	5.1	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Neibauer Road	EB	0.1	A	0	0.2	A	0
	WB	1.3	A	0	2.4	A	1
	NB	9.9	A	1	10.6	B	1
	SB	10.7	B	1	12.6	B	1
	Intersection	3.4	A	--	4.3	A	--

TABLE 13. SCENARIO 2 (2035) NO BUILD INTERSECTION CAPACITY CALCULATION RESULTS

Intersection	Approach	Scenario 1 (2035) - No Build					
		AM Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Stop Controlled (EB & WB)*					
62nd Street West & Rimrock Road	EB	--	F	--	--	F	--
	WB	--	F	--	--	F	--
	NB	1.6	A	1	2.1	A	1
	SB	7.8	A	4	7.4	A	2
	Intersection	--	F	--	--	F	--
Intersection Control		*Stop Controlled (NB & SB)*					
54th Street West & Rimrock Road	EB	0.0	A	0	0.3	A	1
	WB	2.6	A	3	1.3	A	1
	NB	--	F	--	--	F	--
	SB	12806.0	F	62	--	F	--
	Intersection	--	F	--	--	F	--
Intersection Control		*Stop Controlled (SB)*					
62nd Street West & Grand Avenue	EB	1.9	A	1	3.0	A	1
	WB	0.0	A	0	0.0	A	0
	SB	684.3	F	52	353.5	F	24
	Intersection	272.5	F	--	83.7	F	--
Intersection Control		*Stop Controlled (NB)*					
64th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	5.9	A	1	3.8	A	1
	NB	17.7	C	3	23.9	C	5
	Intersection	6.5	A	--	10.0	B	--
Intersection Control		*Stop Controlled (NB & SB)*					
56th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	4.0	A	2	2.0	A	1
	NB	1506.4	F	26	2116.9	F	48
	Intersection	158.6	F	--	446.0	F	--
Intersection Control		*Stop Controlled (SB)*					
54th Street West & Grand Avenue	EB	0.9	A	1	2.0	A	1
	WB	0.0	A	0	0.0	A	0
	SB	5167.4	F	103	2284.2	F	52
	Intersection	1680.6	F	--	449.8	F	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0
	WB	4.0	A	3	3.1	A	3
	NB	12129.7	F	59	7835.0	F	43
	Intersection	1627.1	F	--	883.6	F	--
Intersection Control		*Stop Controlled (WB)*					
64th Street West & Central Avenue	WB	14.6	B	1	15.1	C	1
	NB	0.0	A	0	0.0	A	0
	SB	1.2	A	1	0.5	A	0
	Intersection	2.3	A	--	2.6	A	--
Intersection Control		*Roundabout*					
56th Street West & Central Avenue	EB	8.3	A	2	4.5	A	1
	WB	4.5	A	2	5.9	A	3
	NB	6.5	A	2	5.6	A	2
	SB	18.3	C	17	5.4	A	2
	Intersection	12.6	B	--	5.5	B	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Central Avenue	EB	0.3	A	1	0.5	A	1
	WB	0.7	A	1	0.8	A	1
	NB	--	F	--	638.5	F	26
	SB	1492.1	F	46	--	F	--
	Intersection	--	F	--	--	F	--

Intersection	Approach	Scenario 1 (2035) - No Build					
		AM Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Stop Controlled (NB & SB)*					
64th Street West & King Avenue West	EB	2.1	A	1	2.5	A	1
	WB	2.7	A	1	0.7	A	1
	NB	--	F	--	--	F	--
	SB	--	F	--	--	F	--
	Intersection	--	F	--	--	F	--
Intersection Control		*Roundabout*					
56th Street West & King Avenue West	EB	17.1	C	14	7.2	A	4
	WB	6.0	A	3	16.8	C	15
	NB	7.0	A	2	6.5	A	2
	SB	7.9	A	4	6.3	A	2
	Intersection	10.9	B	--	11.1	B	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & King Avenue West	EB	0.8	A	1	0.9	A	1
	WB	0.2	A	1	0.3	A	1
	NB	--	F	--	--	F	--
	SB	4487.2	F	39	--	F	--
	Intersection	--	F	--	--	F	--
Intersection Control		*Stop Controlled (EB & WB)*					
64th Street West & Hesper Road	EB	53.5	F	9	12.4	B	1
	WB	13.0	B	2	11.7	B	2
	NB	0.0	A	0	0.3	A	0
	SB	4.4	A	1	2.6	A	1
	Intersection	23.6	C	--	8.0	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
56th Street West & Hesper Road	EB	109.2	F	15	15.3	C	2
	WB	313.8	F	17	22.3	C	5
	NB	1.7	A	1	0.7	A	0
	SB	2.3	A	1	1.1	A	0
	Intersection	106.1	F	--	12.6	B	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Hesper Road	EB	0.7	A	1	1.0	A	1
	WB	0.5	A	0	0.4	A	1
	NB	16.6	C	1	19.0	C	1
	SB	43.8	E	6	20.7	C	2
	Intersection	10.6	B	--	4.1	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
64th Street West & Neibauer Road	EB	11.1	B	1	10.4	B	1
	WB	10.4	B	1	10.4	B	1
	NB	0.0	A	0	0.0	A	0
	SB	1.6	A	0	0.0	A	0
	Intersection	6.1	A	--	5.4	A	--
Intersection Control		*Stop Controlled (EB & WB)*					
56th Street West & Neibauer Road	EB	12.5	B	1	11.8	B	1
	WB	12.9	B	1	12.1	B	1
	NB	0.5	A	0	0.2	A	0
	SB	1.1	A	1	1.5	A	0
	Intersection	5.6	A	--	5.5	A	--
Intersection Control		*Stop Controlled (NB & SB)*					
48th Street West & Neibauer Road	EB	0.1	A	0	0.2	A	0
	WB	1.3	A	0	2.4	A	1
	NB	10.2	B	1	11.5	B	1
	SB	11.2	B	1	13.8	B	1
	Intersection	3.5	A	--	4.5	A	--

- 56th Street West & Grand Avenue (AM Peak and PM Peak)
- 54th Street West & Grand Avenue (AM Peak and PM Peak)
- 48th Street West & Grand Avenue (AM Peak and PM Peak)
- 48th Street West & Central Avenue (AM Peak and PM Peak)
- 64th Street West & King Avenue West (AM Peak and PM Peak)
- 48th Street West & King Avenue West (AM Peak and PM Peak)

For the Scenario 2 (2035) "no build" condition, ten (10) intersections were projected to fall below LOS C during the AM peak hour and nine (9) intersections were projected to fall below LOS C during the PM peak hour. The intersections of Hesper Road with 64th Street West and 48th Street West were projected to have individual approaches operate at LOS F and E during the AM peak hour. Projected maximum queue lengths for these approaches were still projected to be relatively manageable regardless of the poor LOS projections. Mitigation strategies for the substandard intersections are discussed in the next chapter of the report. The following intersections were projected to fall below LOS during one or both peak hours as noted:

- 62nd Street West & Rimrock Road (AM Peak and PM Peak)
- 54th Street West & Rimrock Road (AM Peak and PM Peak)
- 62nd Street West & Grand Avenue (AM Peak and PM Peak)
- 56th Street West & Grand Avenue (AM Peak and PM Peak)
- 54th Street West & Grand Avenue (AM Peak and PM Peak)
- 48th Street West & Grand Avenue (AM Peak and PM Peak)
- 48th Street West & Central Avenue (AM Peak and PM Peak)
- 64th Street West & King Avenue West (AM Peak and PM Peak)
- 48th Street West & King Avenue West (AM Peak and PM Peak)
- 56th Street West & Hesper Road (AM Peak)

Corridor Traffic Operations

The Project Team re-evaluated corridor LOS for all arterial streets within the study area boundary. As was previously discussed, the minimum required corridor LOS is D for the purposes of this planning study. The following paragraphs discuss the results of the analysis for the two Horizon Year (2035) land development scenarios.

Scenario 1 (2035)

As shown in **Figure 9** (next page), most roadways in the study area continue to experience a LOS D or better. However, three of the primary east-west arterials (Rimrock Road, Grand Avenue, King Avenue West) are not projected to meet that standard. In the worse instance, Grand Avenue and Rimrock Road are projected to operate at LOS F to the east of 54th Street West. Segments of Rimrock Road, Grand Avenue and King Avenue West are also projected to operate at LOS E. In general, the predominant traffic patterns show higher traffic volumes to the east, closer to existing urban development; these volumes decline substantially in the western portion of the study area, except in certain cases (King Avenue West, Grand Avenue). Of the north-south arterials, only 62nd Street West, north of Rimrock Road, is projected to operate below LOS D for Scenario 1, while 54th Street West is the only other north-south corridor that is projected to operate below LOS C.

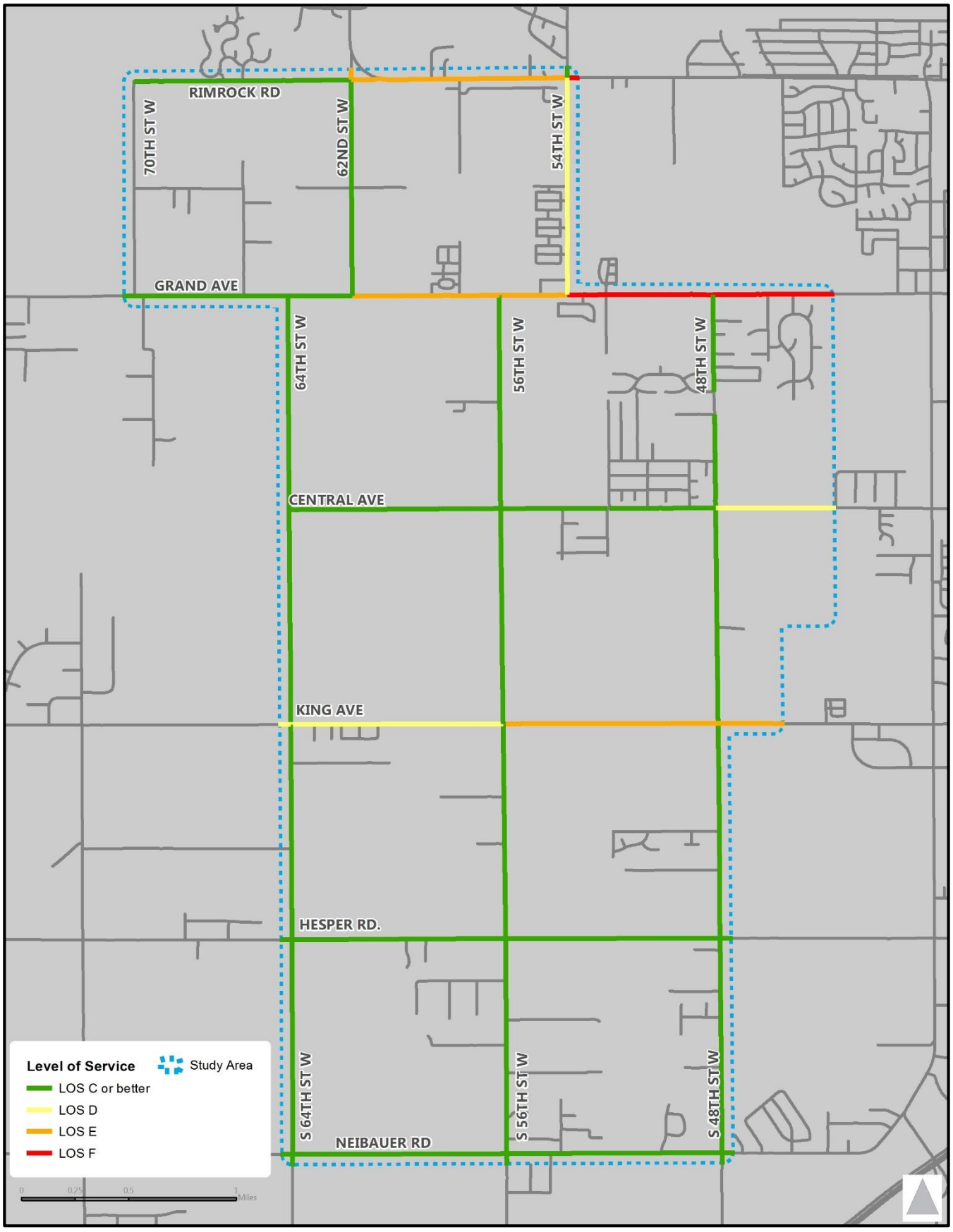


FIGURE 9. SCENARIO 1 (2035) CORRIDOR LEVEL OF SERVICE (LOS)

Scenario 2 (2035)

Under the higher-growth Scenario 2 (**Figure 10**, next page), conditions on these roadways become predictably more congested. Central Avenue joins Rimrock Road, Grand Avenue and King Avenue West in having one or more segments exhibit LOS E or worse conditions and the extent of the LOS F operation projection grows considerably, particularly along Grand Avenue. For the north-south corridors, 62nd Street West, north of Rimrock Road degrades to LOS F, while 54th Street West is projected at LOS D north of Rimrock Road and LOS E south of Rimrock Road. Chapter 6 of this report provides a discussion of mitigation alternatives for addressing the corridor LOS deficiencies identified for Scenarios 1 and 2.

Active Transportation Demand Analysis

The Latent Demand Model indicates areas where there is latent demand for active transportation (not necessarily usage); essentially places where walking or bicycling would be likely to occur if the conditions were favorable. Typically, favorable conditions mean the presence of bicycling facilities, sidewalks, and paths.

Two demand analyses were conducted; base year (2010) and future year (2035). The baseline analysis used current conditions based on GIS layers provided by the City of Billings and 2010 socio-economic data from the regional travel demand model provided by MDT. The second analysis was completed for the Horizon Year (2035). For this analysis, socio-economic data from the high-growth scenario - Scenario 2 - was used. Future retail and school locations were assumed based on local land use plans, zoning, and feedback from City staff.

Figure 11 (page 35) illustrates the analysis results, using blue color tones to indicate areas of lower demand and red/orange color tones to indicate the higher demand areas. For the 2010 baseline condition, higher active transportation demand is primarily limited to the northeast portion of the study area from 48th to 54th Street near Grand Avenue. This is rather intuitive since this district has established neighborhoods. Elsewhere there is very little demand, due to low density residential, few employment or commercial destinations, and predominantly agricultural land uses.

Based on the growth projections described in Chapter 3, demand for active transportation is expected to increase significantly in terms of relative magnitude and geographic area. Most of the study area north of King Avenue and east of 56th Street will generate demand, with the highest concentrations along 54th Street and Grand Avenue. This analysis suggests that investment in active transportation infrastructure should be prioritized in the northern and eastern portion of the study area.

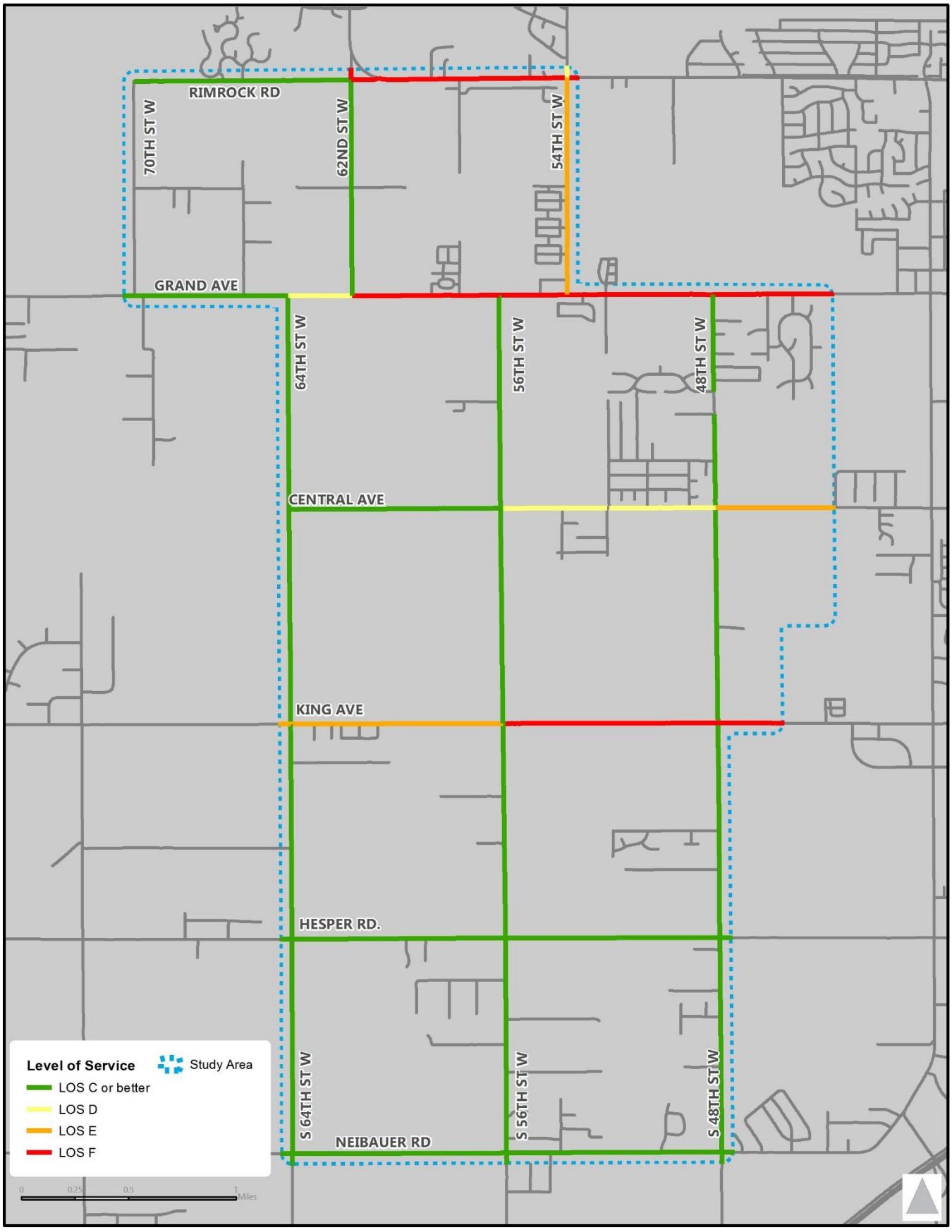


FIGURE 10. SCENARIO 2 (2035) CORRIDOR LEVEL OF SERVICE (LOS)

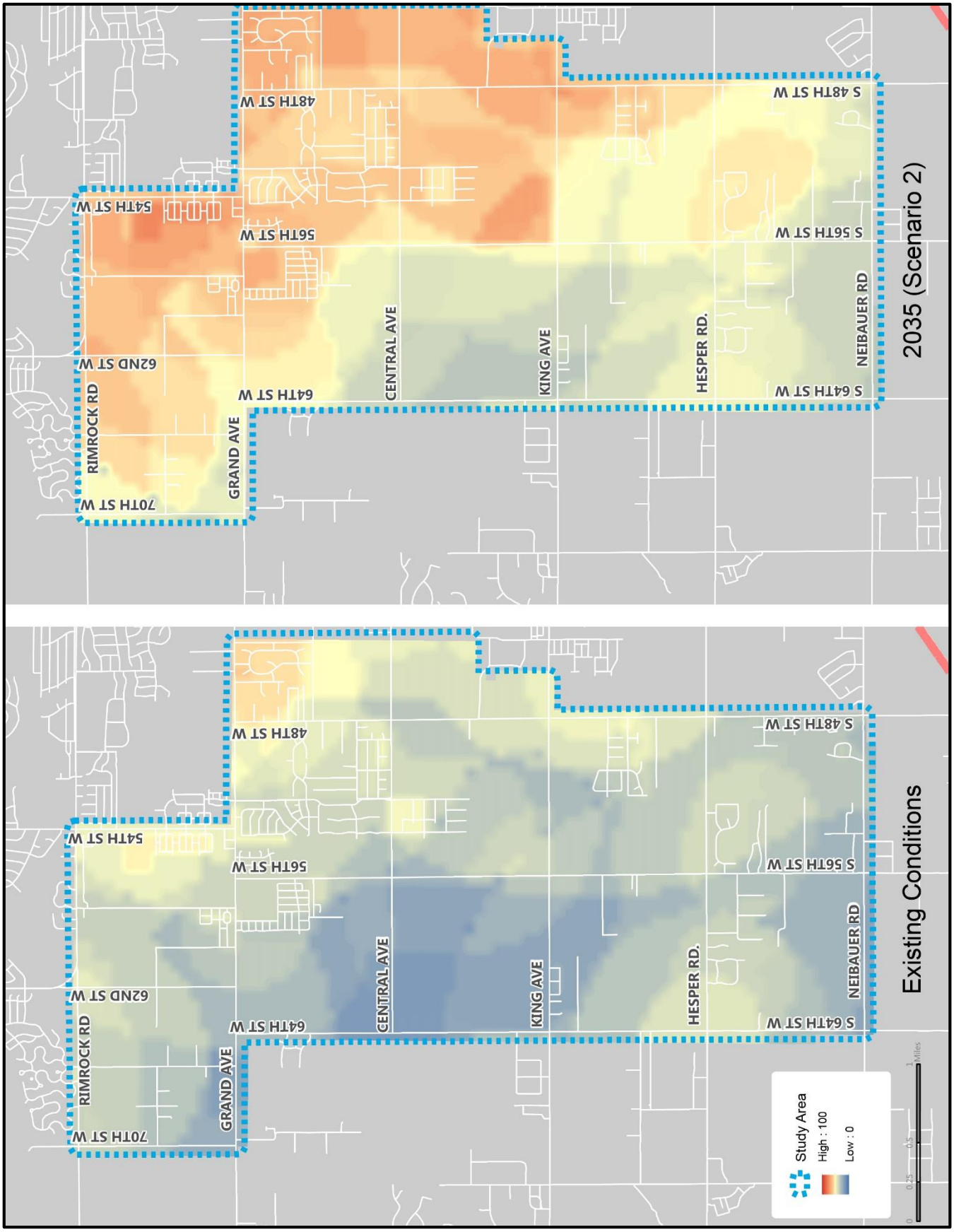
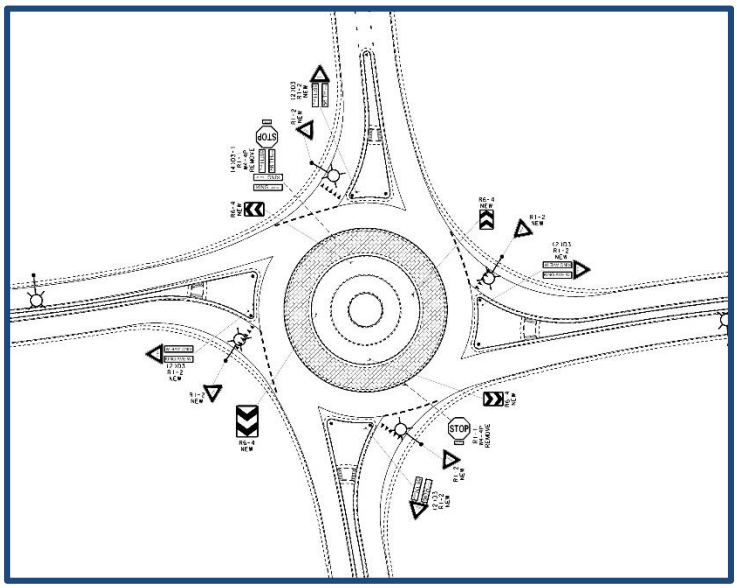


FIGURE 11. EXISTING CONDITIONS (2015) AND SCENARIO 2 (2035) LATENT DEMAND CONDITIONS MAPS

MITIGATION ALTERNATIVES

6



The previous section of this report identified the major study area intersections, street corridors and active transportation facilities that are expected to require improvement or expansion in order to accommodate projected traffic demands for Horizon Year (2035) growth scenarios 1 and 2. This chapter will discuss mitigation alternatives for addressing the deficiencies that were identified in the previous chapter, as well as provide a summary of analysis results for those alternatives to illustrate the relative effectiveness of each measure.

Intersections

Based on the intersection LOS deficiencies that were identified for Scenarios 1 and 2 (2035) for the no-build condition, the Project Team evaluated potential mitigation alternatives to address those deficiencies. The purpose of this exercise was to establish a minimum level of improvements needed to bring each intersection up to an acceptable LOS C. The Project Team did not evaluate Manual on Uniform Traffic Control Devices (MUTCD) Traffic Signal Warrants for any of the intersections. The analysis was purely operation. Both volume scenarios were analyzed for an "improved" scenario implementing changes in intersection traffic control and lane configurations as necessary to achieve the minimum LOS C for each intersection. The sensitivity analyses were conducted using Synchro, Version 8.0, for stop-controlled and signalized intersections and Rodel, Version 1.88, for roundabouts. **Table 14** and **Table 15** on pages 37 and 38 illustrate the results of the Horizon Year (2035) peak hour intersection capacity analyses for the "improved" condition for Scenarios 1 and 2, respectively. In any case where signalization was required in order to achieve the desired intersection capacity results, a roundabout was also evaluated as an alternative to a traffic signal and those results are concurrently displayed in the tables. Detailed intersection capacity calculation worksheets for the improved alternatives for both Horizon Year (2035) scenarios are included in **Appendix D**.

Scenario 1 (2035)

This section of the report discusses mitigation alternatives for each of the study area intersections that were found to be deficient in terms of Scenario 1 (2035) peak hour traffic operations. The evaluations were originally made independent of any consideration of corridor widening (from two lanes to four lanes, for example) though references to the potential need for such widening are made in several cases. Specific discussion about the marriage of intersection and corridor improvements will occur in a later section of the report.

TABLE 14. SCENARIO 1 (2035) IMPROVED INTERSECTION CAPACITY CALCULATION RESULTS

Intersection	Approach	Scenario 1 (2035) - Improved											
		AM Peak			PM Peak			AM Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Traffic Signal*						*Roundabout*					
62nd Street West & Rimrock Road	EB	15.0	B	6	10.7	B	3	8.2	A	2	4.5	A	1
	WB	9.0	A	3	9.4	A	2	4.5	A	2	6.9	A	4
	NB	18.4	B	4	18.8	B	5	5.9	A	1	4.9	A	1
	SB	11.0	B	12	12.3	B	7	10.1	B	8	5.6	A	3
	Intersection	12.2	B	--	12.1	B	--	8.1	A	--	5.9	A	--
Intersection Control		*Traffic Signal*						*Roundabout*					
54th Street West & Rimrock Road	EB	32.9	C	39	16.6	B	13	5.2	A	5	2.7	A	2
	WB	15.1	B	10	14.7	B	20	4.9	A	2	7.8	A	7
	NB	31.3	C	4	18.6	B	3	6.1	A	1	5.0	A	2
	SB	32.6	C	9	16.6	B	4	6.2	A	2	6.2	A	2
	Intersection	28.0	C	--	15.9	B	--	5.4	A	--	6.0	A	--
Intersection Control		*Traffic Signal*						*Roundabout*					
62nd Street West & Grand Avenue	EB	7.2	A	7	4.2	A	4	7.0	A	3	5.0	A	1
	WB	5.3	A	3	3.8	A	4	4.1	A	1	6.0	A	1
	SB	12.3	B	6	14.4	B	4	5.9	A	2	4.9	A	1
	Intersection	8.8	A	--	6.4	A	--	6.0	A	--	5.4	A	--
Intersection Control		*Stop Controlled (NB)*						*No Alternative Analysis Required*					
64th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0						
	WB	5.6	A	1	3.7	A	1						
	NB	13.9	B	2	16.1	C	3						
	Intersection	5.4	A	--	7.3	A	--						
Intersection Control		*Traffic Signal*						*Roundabout*					
56th Street West & Grand Avenue	EB	5.0	A	9	4.4	A	6	9.1	A	8	4.9	A	2
	WB	5.1	A	3	5.8	A	7	5.7	A	3	8.5	A	5
	NB	26.7	C	2	15.5	B	4	6.1	A	1	5.7	A	2
	Intersection	7.3	A	--	7.4	A	--	7.7	A	--	6.7	A	--
Intersection Control		*Traffic Signal*						*Roundabout*					
54th Street West & Grand Avenue	EB	17.4	B	24	6.2	A	8	4.9	A	4	3.1	A	2
	WB	7.8	A	6	6.0	A	10	2.5	A	1	4.1	A	3
	SB	27.4	C	15	15.2	B	5	8.4	A	5	5.6	A	2
	Intersection	18.6	B	--	7.9	A	--	5.5	A	--	4.1	A	--
Intersection Control		*Traffic Signal*						*Roundabout*					
48th Street West & Grand Avenue	EB	9.7	A	10	3.2	A	3	5.4	A	8	3.1	A	2
	WB	6.8	A	5	4.0	A	5	2.9	A	2	5.0	A	5
	NB	*44.7*	*D*	*10*	23.7	C	4	10.4	B	4	5.4	A	2
	Intersection	13.6	B	--	5.9	A	--	5.4	A	--	4.4	A	--
Intersection Control		*Stop Controlled (WB)*						*No Alternative Analysis Required*					
64th Street West & Central Avenue	WB	12.8	B	1	13.1	B	1						
	NB	0.0	A	0	0.0	A	0						
	SB	1.1	A	1	0.5	A	0						
	Intersection	2.0	A	--	2.3	A	--						
Intersection Control		*Roundabout (committed)*						*No Alternative Analysis Required*					
56th Street West & Central Avenue	EB	4.7	A	1	4.1	A	1						
	WB	4.1	A	1	4.9	A	2						
	NB	4.7	A	1	4.8	A	2						
	SB	4.9	A	2	4.6	A	2						
	Intersection	4.6	A	--	4.7	A	--						
Intersection Control		*Traffic Signal*						*Roundabout*					
48th Street West & Central Avenue	EB	8.8	B	12	5.3	A	3	12.2	A	3	4.5	A	1
	WB	5.5	A	3	8.2	A	7	4.0	A	1	6.5	A	3
	NB	14.4	B	3	11.0	B	3	5.7	A	1	4.2	A	1
	SB	16.2	B	5	10.8	B	2	4.7	A	1	4.7	A	1
	Intersection	10.6	B	--	8.5	A	--	8.3	A	--	5.4	A	--

Intersection	Approach	Scenario 1 (2035) - Improved											
		AM Peak			PM Peak			AM Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Traffic Signal*						*Roundabout*					
64th Street West & King Avenue West	EB	14.3	B	11	7.2	A	5	10.7	B	3	5.9	A	2
	WB	11.5	A	4	7.5	A	7	5.3	A	1	6.4	A	3
	NB	9.1	B	3	12.3	B	3	5.5	A	1	4.5	A	1
	SB	9.2	B	2	14.1	B	3	4.5	A	1	5.2	A	1
	Intersection	12.1	B	--	9.1	A	--	7.7	A	--	5.8	A	--
Intersection Control		*Roundabout (committed)*						*No Alternative Analysis Required*					
56th Street West & King Avenue West	EB	8.9	A	5	7.4	A	3						
	WB	5.1	A	2	20.1	C	15						
	NB	5.5	A	1	5.5	A	2						
	SB	5.9	A	2	6.5	A	1						
	Intersection	6.8	A	--	13.5	B	--						
Intersection Control		*Traffic Signal*						*Roundabout*					
48th Street West & King Avenue West	EB	8.1	A	16	6.3	A	8	12.5	B	4	6.8	A	3
	WB	5.8	A	8	9.0	A	14	5.4	A	1	9.9	A	7
	NB	18.6	B	3	21.2	C	4	5.9	A	1	5.0	A	1
	SB	21.4	C	8	21.0	C	3	5.0	A	1	5.4	A	1
	Intersection	10.1	B	--	10.5	B	--	8.7	A	--	7.9	A	--
Intersection Control		*Stop Controlled (EB & WB)*						*No Alternative Analysis Required*					
64th Street West & Hesper Road	EB	*25.4*	*D*	*5*	11.5	B	1						
	WB	11.7	B	1	10.9	B	1						
	NB	0.0	A	0	0.3	A	0						
	SB	4.3	A	1	2.5	A	1						
	Intersection	13.0	B	--	7.5	A	--						
Intersection Control		*Stop Controlled (EB & WB)*						*No Alternative Analysis Required*					
56th Street West & Hesper Road	EB	*33.6*	*D*	*6*	13.2	B	1						
	WB	*29.7*	*D*	*4*	16.0	C	3						
	NB	1.7	A	1	0.7	A	0						
	SB	2.2	A	1	1.1	A	0						
	Intersection	18.7	C	--	9.5	A	--						
Intersection Control		*Stop Controlled (NB & SB)*						*No Alternative Analysis Required*					
48th Street West & Hesper Road	EB	0.7	A	1	1.0	A	1						
	WB	0.6	A	0	0.4	A	1						
	NB	13.9	B	1	15.5	C	1						
	SB	22.1	C	3	16.0	C	1						
	Intersection	6.1	A	--	3.4	A	--						
Intersection Control		*Stop Controlled (EB & WB)*						*No Alternative Analysis Required*					
64th Street West & Neibauer Road	EB	10.7	B	1	10.1	B	1						
	WB	10.2	B	1	10.2	B	1						
	NB	0.0	A	0	0.0	A	0						
	SB	1.6	A	0	0.0	A	0						
	Intersection	5.9	A	--	5.3	A	--						
Intersection Control		*Stop Controlled (EB & WB)*						*No Alternative Analysis Required*					
56th Street West & Neibauer Road	EB	11.7	B	1	11.2	B	1						
	WB	11.9	B	1	11.3	B	1						
	NB	0.5	A	0	0.3	A	0						
	SB	1.0	A	0	1.4	A	0						
	Intersection	5.2	A	--	5.1	A	--						
Intersection Control		*Stop Controlled (NB & SB)*						*No Alternative Analysis Required*					
48th Street West & Neibauer Road	EB	0.1	A	0	0.2	A	0						
	WB	1.3	A	0	2.4	A	1						
	NB	9.9	A	1	10.6	B	1						
	SB	10.7	B	1	12.6	B	1						
	Intersection	3.4	A	--	4.3	A	--						

TABLE 15. SCENARIO 2 (2035) IMPROVED INTERSECTION CAPACITY CALCULATION RESULTS

Intersection	Approach	Scenario 2 (2035) - Improved											
		AM Peak			PM Peak			AM Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Traffic Signal*						*Roundabout*					
62nd Street West & Rimrock Road	EB	22.6	C	12	16.0	B	7	5.1	A	2	3.2	A	1
	WB	11.8	B	6	13.2	B	5	4.4	A	1	9.0	A	1
	NB	25.4	C	6	20.3	C	7	5.7	A	2	4.9	A	2
	SB	18.3	B	19	13.5	B	8	4.2	A	4	2.9	A	2
	Intersection	18.5	B	--	14.8	B	--	4.6	A	--	5.8	A	--
Intersection Control		*Traffic Signal*						*Roundabout*					
54th Street West & Rimrock Road	EB	33.7	C	23	17.8	B	9	8.8	A	11	3.1	A	2
	WB	13.0	B	9	29.7	C	18	3.2	A	2	3.3	A	3
	NB	33.0	C	4	24.7	C	6	7.9	A	2	5.7	A	2
	SB	*39.6*	*D*	*12*	17.1	B	6	7.0	A	3	6.1	A	2
	Intersection	29.1	C	--	24.6	C	--	6.8	A	--	3.9	A	--
Intersection Control		*Traffic Signal*						*Roundabout*					
62nd Street West & Grand Avenue	EB	9.9	A	9	6.1	A	5	10.6	B	6	6.0	A	3
	WB	6.6	A	4	5.4	A	6	4.5	A	2	8.0	A	5
	SB	14.9	B	9	12.1	B	4	7.8	A	5	5.8	A	2
	Intersection	11.2	B	--	7.2	A	--	8.2	A	--	6.9	A	--
Intersection Control		*Stop Controlled (NB)*						*No Alternative Analysis Required*					
64th Street West & Grand Avenue	EB	0.0	A	0	0.0	A	0						
	WB	5.9	A	1	3.8	A	1						
	NB	17.7	C	3	23.9	C	5						
	Intersection	6.5	A	--	10.0	B	--						
Intersection Control		*Traffic Signal*						*Roundabout*					
56th Street West & Grand Avenue	EB	13.3	B	21	5.9	A	7	4.9	A	6	3.1	A	2
	WB	5.3	A	3	8.8	A	10	3.0	A	2	3.6	A	3
	NB	*51.2*	*D*	*4*	16.9	B	6	6.1	A	2	6.3	A	3
	Intersection	14.8	B	--	9.5	A	--	4.4	A	--	4.0	A	--
Intersection Control		*Traffic Signal*						*Roundabout*					
54th Street West & Grand Avenue	EB	12.0	B	11	5.2	A	4	5.4	A	6	3.0	A	1
	WB	11.4	B	3	11.6	B	8	2.7	A	2	4.9	A	1
	SB	20.3	C	9	17.0	B	8	4.3	A	3	3.8	A	1
	Intersection	14.6	B	--	10.7	B	--	4.5	A	--	4.1	A	--
Intersection Control		*Traffic Signal*						*Roundabout*					
48th Street West & Grand Avenue	EB	14.4	B	19	3.2	A	4	15.7	A	16	4.0	A	4
	WB	13.0	B	5	6.7	A	12	3.4	A	1	8.5	A	12
	NB	*39.2*	*D*	*13*	*38.0*	*D*	*8*	*29.3*	*D*	*7*	6.7	A	2
	Intersection	17.4	B	--	9.0	A	--	14.2	B	--	6.7	A	--
Intersection Control		*Stop Controlled (WB)*						*No Alternative Analysis Required*					
64th Street West & Central Avenue	WB	14.6	B	1	15.1	C	1						
	NB	0.0	A	0	0.0	A	0						
	SB	1.2	A	1	0.5	A	0						
	Intersection	2.3	A	--	2.6	A	--						
Intersection Control		*Roundabout (committed)*						*No Alternative Analysis Required*					
56th Street West & Central Avenue	EB	8.3	A	2	4.5	A	1						
	WB	4.5	A	2	5.9	A	3						
	NB	6.5	A	2	5.6	A	2						
	SB	18.3	C	17	5.4	A	2						
	Intersection	12.6	B	--	5.5	A	--						
Intersection Control		*Traffic Signal*						*Roundabout*					
48th Street West & Central Avenue	EB	13.3	B	19	6.1	A	5	4.0	A	2	2.3	A	1
	WB	7.2	A	4	9.8	A	12	4.3	A	1	9.3	A	7
	NB	17.5	B	3	15.8	B	5	5.3	A	1	4.4	A	1
	SB	20.4	C	7	15.7	B	4	5.5	A	1	5.5	A	1
	Intersection	14.4	B	--	10.9	B	--	4.6	A	--	6.4	A	--

Intersection	Approach	Scenario 2 (2035) - Improved											
		AM Peak			PM Peak			AM Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Traffic Signal*						*Roundabout*					
64th Street West & King Avenue West	EB	11.5	B	11	8.6	A	7	4.2	A	2	3.1	A	2
	WB	10.7	B	6	8.4	A	11	6.3	A	1	8.4	A	5
	NB	15.1	B	4	17.5	B	4	5.3	A	1	4.3	A	1
	SB	15.2	B	4	22.1	C	4	4.9	A	1	6.1	A	2
	Intersection	12.3	B	--	11.9	B	--	5.0	A	--	5.8	A	--
Intersection Control		*Roundabout (committed)*						*No Alternative Analysis Required*					
56th Street West & King Avenue West	EB	17.1	C	14	7.2	A	4						
	WB	6.0	A	3	16.8	C	15						
	NB	7.0	A	2	6.5	A	2						
	SB	7.9	A	4	6.3	A	2						
	Intersection	10.9	B	--	11.1	B	--						
Intersection Control		*Traffic Signal*						*Roundabout*					
48th Street West & King Avenue West	EB	12.8	B	21	9.8	A	12	3.9	A	3	2.8	A	2
	WB	9.1	A	11	17.9	B	31	2.4	A	2	3.3	A	3
	NB	17.9	B	3	23.6	C	6	5.4	A	1	4.9	A	1
	SB	21.1	C	6	23.6	C	4	5.1	A	2	5.2	A	1
	Intersection	13.2	B	--	16.3	B	--	3.7	A	--	3.5	A	--
Intersection Control		*Stop Controlled (EB & WB)*						*No Alternative Analysis Required*					
64th Street West & Hesper Road	EB	*53.5*	*F*	*9*	12.4	B	1						
	WB	13.0	B	2	11.7	B	2						
	NB	0.0	A	0	0.3	A	0						
	SB	4.4	A	1	2.6	A	1						
	Intersection	23.6	C	--	8.0	A	--						
Intersection Control		*Stop Controlled (All-way)*						*Roundabout*					
56th Street West & Hesper Road	EB	20.8	C	5	10.1	B	1	5.5	A	2	3.9	A	1
	WB	16.2	C	3	13.2	B	3	4.2	A	1	4.5	A	1
	NB	14.3	B	2	10.9	B	2	4.9	A	1	3.7	A	1
	SB	16.2	C	3	10.3	B	1	4.0	A	1	3.8	A	1
	Intersection	17.4	C	--	11.6	B	--	4.8	A	--	4.1	A	--
Intersection Control		*Stop Controlled (NB & SB)*						*No Alternative Analysis Required*					
48th Street West & Hesper Road	EB	0.7	A	1	1.0	A	1						
	WB	0.5	A	0	0.4	A	1						
	NB	16.6	C	1	19.0	C	1						
	SB	*43.8*	*E*	*6*	20.7	C	2						
	Intersection	10.6	B	--	4.1	A	--						
Intersection Control		*Stop Controlled (EB & WB)*						*No Alternative Analysis Required*					
64th Street West & Neibauer Road	EB	11.1	B	1	10.4	B	1						
	WB	10.4	B	1	10.4	B	1						
	NB	0.0	A	0	0.0	A	0						
	SB	1.6	A	0	0.0	A	0						
	Intersection	6.1	A	--	5.4	A	--						
Intersection Control		*Stop Controlled (EB & WB)*						*No Alternative Analysis Required*					
56th Street West & Neibauer Road	EB	12.5	B	1	11.8	B	1						
	WB	12.9	B	1	12.1	B	1						
	NB	0.5	A	0	0.2	A	0						
	SB	1.1	A	1	1.5	A	0						
	Intersection	5.6	A	--	5.5	A	--						
Intersection Control		*Stop Controlled (NB & SB)*						*No Alternative Analysis Required*					
48th Street West & Neibauer Road	EB	0.1	A	0	0.2	A	0						
	WB	1.3	A	0	2.4	A	1						
	NB	10.2	B	1	11.5	B	1						
	SB	11.2	B	1	13.8	B	1						
	Intersection	3.5	A	--	4.5	A	--						

62nd Street West/Rimrock Road

For Scenario 1, a traffic signal with auxiliary left-turn bays on all four approaches and an auxiliary right-turn bay on the east (WB) approach would serve to provide excellent operational conditions. Thru movements could be served by single lanes (in the cases of the north, south and west approaches, shared with right turns). The east approach right-turn bay should be channelized given the high demand for that movement in both peak hours. Depending upon the relative demands of other movements and other approaches, the north approach may benefit from implementation of a southbound dual-left turn lane. However, two receiving lanes would then be required on the east approach.

A single-lane roundabout is also projected to operate fairly well for this intersection overall. That said, given the magnitude of the projected east approach (WB) right-turn volume, a westbound to northbound bypass (yielding to the north approach exit leg) would likely be implemented. Also, because the southbound left-turn demand is very high, the north approach would be susceptible to short periods of lengthy queuing, particularly during the peak hours. A flared approach to separate the southbound left-turn movement would help with to relieve some of the pressure.

54th Street West/Rimrock Road

A traffic signal at the intersection of 54th Street West and Rimrock Road would require auxiliary left-turn bays on all approaches, as well as auxiliary right-turn bays on all but the north (SB) approach, in combination with dedicated thru lanes on all but the north approach where a shared thru/right-turn lane would suffice. Although this configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, east and west approach queues would be very lengthy at times. In order to reduce those queues, widening to provide additional thru lanes would be necessary, at the very least to the east of the intersection.

A roundabout at this intersection would require dual entering and exit lanes for eastbound traffic and an east approach westbound to northbound right-turn bypass. This configuration would provide excellent operations with quite a bit of reserve capacity. Dual thru lanes for westbound traffic would extend that reserve capacity of the intersection considerably as well.

62nd Street West/Grand Avenue

For the intersection of 62nd Street West and Grand Avenue, a traffic signal with auxiliary left-turn bays on the north and west approaches and an auxiliary right-turn bay on the east approach projects to operate very well for Scenario 1 during both peaks. Max (95 percent) queues are projected to be limited to single digits for both the AM and PM peak hours.

A single-lane roundabout would also serve this intersection very well with no requirements for flared approaches or bypass lanes. Queuing projects to be minimal even during the busier surges of the AM and PM peak hours.

56th Street West/Grand Avenue

A traffic signal at the intersection of 56th Street West and Grand Avenue would require auxiliary left-turn bays on the east (WB) and south (NB) approaches, as well as auxiliary right-turn bays on the south (NB) and west (EB), in combination with dedicated thru lanes on the west (EB) and east (WB) approaches. This configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, and approach queues would be limited to the single digits for both the AM and PM peak hours.

A single-lane roundabout with an eastbound to southbound bypass would serve this intersection reasonably well during the standard peaks. However, the west approach (AM Peak) and east approach (PM Peak) would experience some extended queuing during surges within those peak periods.

54th Street West/Grand Avenue

A traffic signal at the intersection of 54th Street West and Grand Avenue would require auxiliary left-turn bays on the west (EB) and north (SB) approaches, as well as auxiliary right-turn bays on the north (SB) and east (WB), in combination with dedicated thru lanes on the west (EB) and east (WB) approaches. Although this configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, all approach queues would be very lengthy at times. In order to reduce those queues, widening to provide additional thru lanes would be necessary, at the very least to the west of the intersection. Depending upon the relative demands of other movements and other approaches, the north approach may benefit from implementation of a southbound dual-left turn lane. However, two receiving lanes would then be required on the east approach.

A roundabout for the intersection of 54th Street West and Grand Avenue would require dual entering, circulation and exit lanes for the east and west approaches. With that configuration in place, the intersection would operate very well with substantial reserve capacity on all but the north approach, where some queuing would be likely during the AM peak. A flared approach to split southbound left-turns and right-turns would help to address that issue.

48th Street West/Grand Avenue

A traffic signal at the intersection of 48th Street West and Grand Avenue would require auxiliary left-turn bays on the east (WB) and south (NB) approaches, as well as an auxiliary right-turn bay on the south (NB) approach. The east (WB) approach would require dual thru lanes in combination with a dedicated thru lane on and shared thru/right-turn lane on the west (EB) approach. Although this configuration would provide LOS C or better conditions during both peak hours for the intersections as a whole, the south (NB) approach would experience substandard delay in the AM peak hour as well as lengthy south and west approach queues at times. In order to reduce those queues and approach delay, widening to provide additional thru lanes would be necessary, at the very least to the east of the intersection.

A roundabout for the intersection of 48th Street West and Grand Avenue would also require dual entering, circulation and exit lanes for the east and west approaches. With that configuration in place, the intersection would operate very well with substantial reserve capacity on all approaches.

48th Street West/Central Avenue

A traffic signal at the intersection of 48th Street West and Central Avenue would require auxiliary left-turn bays on all approaches, in combination with shared thru/right-turn lanes on all approaches. This configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, and east and west approach queues would be lengthy but manageable. In order to reduce those queues, widening to provide additional thru lanes would be necessary.

For the intersection of 48th Street West and Central Avenue, a single-lane roundabout with no bypass lanes or flared approaches would provide excellent operations throughout the majority of the day. During the AM peak, however, there may be times when the relatively heavy eastbound thru volume would overwhelm that approach and cause substantial queues (greater than 20 vehicles) to occur for short periods. A flared approach would not provide much relief. An additional eastbound thru lane would be necessary to alleviate this condition.

64th Street West/King Avenue West

A traffic signal at the intersection of 64th Street West and King Avenue West would require auxiliary left-turn bays on all approaches, in combination with shared thru/right-turn lanes on all approaches. This configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, and east and west approach queues would be manageable.

For the intersection of 64th Street West and King Avenue West, a single-lane roundabout with no bypass lanes or flared approaches would provide excellent operations throughout the majority of the day. During the AM peak, however, there may be times when the eastbound thru demand would cause some lengthy queues to occur. In this case, a flared approach to separate eastbound left turns would help greatly with mitigating that risk.

48th Street West/King Avenue West

A traffic signal at the intersection of 48th Street West and King Avenue West would require auxiliary left-turn bays on all approaches, in combination with shared thru/right-turn lanes on all approaches. Although this configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, the east and west approach queues would be lengthy at times. In order to reduce those queues, widening to provide additional thru lanes would be necessary.

The intersection of 48th Street West and King Avenue West would operate much the same as the 48th Street West/Central Avenue intersection with a single-lane roundabout in place for Scenario 1. During the AM peak, there would be times when the heavy eastbound thru volume would overwhelm that approach and cause substantial queues (greater than 25 vehicles) to occur. A flared approach would not provide much relief. An additional eastbound thru lane would likely be necessary to alleviate this condition.

Scenario 2 (2035)

This section of the report discusses mitigation alternatives for each of the study area intersections that were found to be deficient in terms of Scenario 1 (2035) peak hour traffic operations. Once again, the evaluations were made independent of any consideration of corridor widening (from two lanes to four lanes, for example) though references to the potential need for such widening are made in several cases.

62nd Street West/Rimrock Road

For Scenario 2, a traffic signal with auxiliary left-turn bays on all four approaches and an auxiliary right-turn bay on the east (WB) approach would serve to provide excellent operational conditions. Thru movements could be served by single lanes (in the cases of the north, south and west approaches, shared with right turns). The east approach right-turn bay should be channelized given the high demand for that movement in both peak hours. Depending upon the relative demands of other movements and other approaches, the north approach may benefit from implementation of a southbound dual-left turn lane. However, two receiving lanes would then be required on the east approach.

For Scenario 2, a roundabout at this intersection would require the westbound to northbound bypass, as well as a southbound to eastbound dual left-turn configuration in order to function well. With this configuration in place, the intersection would operate very well with reserve capacity on all approaches.

54th Street West/Rimrock Road

A traffic signal at the intersection of 54th Street West and Rimrock Road would require auxiliary left-turn bays on all approaches, as well as a shared thru/right-turn lane on the north (SB) and south (NB) approach. The east (WB) and west (EB) approaches would require a combination with a dedicated thru lanes and shared thru/right-turn lanes. Although this configuration would provide LOS C conditions during both peak hours for the intersections as a whole, the north (SB) approach would experience substandard delay in the AM peak hour as well as lengthy north, east, and west approach queues at times. In order to reduce those queues and approach delay, the north approach may benefit from implementation of a southbound dual-left turn lane.

Scenario 2 peak hour traffic demands would require that a roundabout at the intersection of 54th Street West and Rimrock Road provide two lanes eastbound and westbound through the intersection. In addition, the west (EB) approach would need

a drop/bypass lane for right-turns. Even then, the V/C ratio would be very high for the west approach during the AM peak, but it does appear that there would be some reserve capacity there before the approach would break down.

62nd Street West/Grand Avenue

For the intersection of 62nd Street West and Grand Avenue, a traffic signal with auxiliary left-turn bays on the north and west approaches and an auxiliary right-turn bay on the east approach projects to operate very well for Scenario 2 during both peaks. Max (95 percent) queues are projected to be limited to single digits for both the AM and PM peak hours.

At the intersection of 62nd Street West and Grand Avenue, a single-lane roundabout would continue to provide very good operations even during peak periods for Scenario 2. A flared approach on the west leg would help with surge period queuing for that approach, but would not be necessary to provide adequate LOS conditions.

56th Street West/Grand Avenue

A traffic signal at the intersection of 56th Street West and Grand Avenue would require auxiliary left-turn bays on the east (WB) and south (NB) approaches, as well as auxiliary right-turn bays on the south (NB) and west (EB), in combination with dedicated thru lanes on the west (EB) and east (WB) approaches. This configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, except the south (NB) approach in the AM peak hour. The west (EB) approach experiences high queues in the AM peak hour. In order to reduce those queues, the north approach may benefit from widening to provide additional thru lanes.

For Scenario 2, a roundabout at the intersection of 56th Street West and Grand Avenue would require dual entering and exit lanes on the east and west approaches and a single approach to the south. This configuration would operate very well with a lot of reserve capacity relative to the traffic projections.

54th Street West/Grand Avenue

A traffic signal at the intersection of 54th Street West and Grand Avenue would require auxiliary left-turn bays on the north (SB) and west (EB), as well as dedicated right-turn lanes on the north (SB) and east (WB) approach. The east (WB) and west (EB) approaches would require dual dedicated thru lanes. This configuration would provide LOS C conditions during both peak hours for the intersections as a whole, with manageable queues.

A roundabout for the intersection of 54th Street West and Grand Avenue would require dual entering, circulation and exit lanes for the east and west approaches, as well as a dual left-turn configuration for the north (SB) approach. With that roundabout configuration in place, the intersection would operate very well with substantial reserve capacity on all approaches for Scenario 2.

48th Street West/Grand Avenue

A traffic signal at the intersection of 48th Street West and Grand Avenue would require auxiliary left-turn bays on the east (WB) and south (NB) approaches, as well as auxiliary right-turn bays on the west (EB) and south (NB) approaches. The east (WB) and west (EB) approaches would require dual thru lanes. Although this configuration would provide LOS C or better conditions during both peak hours for the intersections as a whole, the south (NB) approach would experience substandard delay in both the AM and PM peak hours as well as lengthy queues at times. In order to reduce those queues and approach delay, the south approach may benefit from implementation of a northbound dual-right turn lane.

Scenario 2 peak hour traffic demands for the intersection of 48th Street West and Grand Avenue are projected to be high enough that dual approach and receiving lanes on Grand Avenue would still not provide enough capacity through a roundabout during peak period surges. If Scenario 2 traffic demands are realized at some point in the future a roundabout is selected for this intersection, a third eastbound approach and receiving lane would be required along with a northbound dual-

left turn configuration in order to provide acceptable LOS conditions during the AM peak hour. However, dual lanes eastbound and westbound with a northbound dual-left turn would likely provide adequate capacity for a long period of time at this intersection regardless of growth.

48th Street West/Central Avenue

A traffic signal at the intersection of 48th Street West and Central Avenue would require auxiliary left-turn bays on all approaches, in combination with shared thru/right-turn lanes on all approaches. This configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, and east and west approach queues would be lengthy at times. In order to reduce those queues, widening to provide additional thru lanes would be necessary.

For the intersection of 48th Street West and Central Avenue, a roundabout configured with dual lanes for eastbound thru traffic and single lanes for all other movements would provide good operations with substantial reserve capacity. A westbound to northbound right-turn bypass would help alleviate potential for congestion on the east approach during the PM peak.

64th Street West/King Avenue West

A traffic signal at the intersection of 64th Street West and King Avenue West would require auxiliary left-turn bays on all approaches, in combination with shared thru/right-turn lanes on all approaches. This configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, and east and west approach queues would be manageable.

The intersection of 64th Street West and King Avenue West would function well as a roundabout configured with dual lanes for eastbound thru traffic and single lanes for all other movements, with substantial reserve capacity. Additional growth beyond what is projected for Scenario 2 would likely require dual entering and exit lanes for the westbound thru movement as well, though such growth is unlikely to occur during the 20-year horizon period for this study.

48th Street West/King Avenue West

A traffic signal at the intersection of 48th Street West and King Avenue West would require auxiliary left-turn bays on all approaches, in combination with shared thru/right-turn lanes on all approaches. Although this configuration would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, and east and west approach queues would be lengthy at times. In order to reduce those queues, widening to provide additional thru lanes would be necessary.

For the intersection of 48th Street West and King Avenue West, a roundabout configured with dual lanes for eastbound and westbound thru traffic would function very well even for the peak period projections of Scenario 2. No flared approaches or bypass lanes would be required and the intersection would have a substantial amount of reserve capacity.

56th Street West/Hesper Road

The implementation of an all-way stop control at the intersection of 56th Street West and Hesper Road with a shared left-turn, thru, and right-turn lane on all approaches would provide LOS C or better conditions during both peak hours for all approaches, as well as the intersections as a whole, east and minimal queues.

The intersection of 56th Street West and Hesper Road would function very well as a single-lane roundabout. No flared approaches or bypass lines would be required. Reserve capacity would be substantial.

Corridors

Various major streets within the study area were projected to operate below an acceptable LOS D for the Horizon Year (2035) analysis scenarios. This section of the report will stratify those streets into specific segments and provide alternatives for mitigation of the corridor LOS deficiencies for both scenarios. To quantify the value of two-way left-turn lane (or a series of auxiliary left-turn lanes) in terms of added capacity, the project team assumed 3,600 vehicles per day increase, which is 20 percent of the daily capacity for a two lane facility. For a 5-lane cross section, the assumed capacity increase was also 3,600 vehicles per day, utilized a factor of 0.2 lanes for a turn lane that would create a 3-lane section from a 2-lane section or a 5-lane section from a 4-lane section. The thought here was that the added capacity for the lane itself would not change whether it was part of a 3-lane or 5-lane section.

Scenario 1 (2035)

Figure 9 on page 32 provided a graphical representation of the corridor LOS projections for Scenario 1 (2035). **Table 16** below illustrates how the addition of center turn lanes and/or additional thru lanes for impacted corridors would improve V/C ratio and in some cases, LOS. Note that since a center turn lane only provides a 5 percent increase in total volume capacity over and above a 4-lane section (4.2 lanes vs. 4.0 lanes), the 4-lane and 5-lane typical sections were grouped together for the purposes of this planning level analysis.

TABLE 16. SCENARIO 1 (2035) CORRIDOR LOS MITIGATION ANALYSIS RESULTS

Segment	Scenario 1 - No Build		Scenario 1 - Mitigation			
	2 Lanes		3 Lanes		4/5 Lanes	
	V/C Ratio	LOS	V/C Ratio	LOS	V/C Ratio	LOS
King Avenue West - East of 48th Street West	0.87	E	0.72	D	0.39	C or better
King Avenue West - 48th Street West to 56th Street West	0.77	E	0.65	D	0.35	C or better
Grand Avenue - East of 48th Street West	1.11	F	0.92	E	0.5	C or better
Grand Avenue - 48th Street West to 54th Street West	1.02	F	0.85	E	0.46	C or better
Grand Avenue - 54th Street West to 56th Street West	0.82	E	0.68	D	0.37	C or better
Grand Avenue - 56th Street West to 62nd Street West	0.84	E	0.70	D	0.38	C or better
Rimrock Road - East of 54th Street West	1.13	F	0.94	E	0.52	C or better
Rimrock Road - 54th Street West to 62nd Street West	0.77	E	0.64	D	0.35	C or better
62nd Street West - North of Rimrock Road	0.77	E	0.64	D	0.35	C or better

The analysis results show six of the impacted corridor segments could be improved to the required LOS D standard through the addition of a center turn lane or turn bays. However, Grand Avenue from east of 48th Street West to 54th Street West would need to be expanded to a 4-lane or 5-lane typical section in order to achieve LOS D or better corridor capacity results. The same is projected to be true for Rimrock Road east of 54th Street West.

Scenario 2 (2035)

Figure 10 on page 34 provided a graphical representation of the corridor LOS projections for Scenario 2 (2035). **Table 17** on the following page illustrates how the addition of lanes for impacted corridors would improve V/C ratio and in some cases, LOS.

As would be expected the number of corridors segments that would require additional thru lanes in order to meet the LOS D minimum planning standard would increase substantially. Nine (9) of the impacted Scenario 2 (2035) corridor segments would require 4 or 5-lane typical sections in order to achieve LOS D or better corridor metrics. Even with a 4-lane or 5-lane section in place, Grand Avenue would still only project to operate at LOS from east of 48th Street West to 54th Street West and the same is projected to be true for Rimrock Road east of 54th Street West.

TABLE 17. SCENARIO 2 (2035) CORRIDOR LOS MITIGATION ANALYSIS RESULTS

Segment	Scenario 2 - No Build		Scenario 2 - Mitigation			
	2 Lanes		3 Lanes		4/5 Lanes	
	V/C Ratio	LOS	V/C Ratio	LOS	V/C Ratio	LOS
King Avenue West - East of 48th Street West	1.09	F	0.91	E	0.50	C or better
King Avenue West - 48th Street West to 56th Street West	0.98	F	0.81	E	0.44	C or better
King Avenue West - West of 56th Street West	0.81	E	0.67	D	0.37	C or better
Central Avenue - East of 48th Street West	0.76	E	0.63	D	0.34	C or better
Grand Avenue - East of 48th Street West	1.43	F	1.19	F	0.65	D
Grand Avenue - 48th Street West to 54th Street West	1.31	F	1.1	F	0.6	D
Grand Avenue - 54th Street West to 56th Street West	1.05	F	0.88	E	0.48	C or better
Grand Avenue - 56th Street West to 62nd Street West	1.08	F	0.9	E	0.49	C or better
Rimrock Road - East of 54th Street West	1.41	F	1.18	F	0.64	D
Rimrock Road - 54th Street West to 62nd Street West	0.99	F	0.82	E	0.45	C or better
54th Street West - Grand Avenue to Rimrock Road	0.80	E	0.67	D	0.36	C or better
62nd Street West - North of Rimrock Road	0.98	F	0.82	E	0.45	C or better

Another important consideration for the preservation of overall corridor capacity is access management. Access management is a process of regulating public access to and from properties adjacent to a roadway corridor. Common access management tools include curbed medians, driveway consolidation and turn restrictions (e.g. right-in/right-out driveways). Where access is managed, driveways and sidestreets are designed to enable vehicles to enter and leave the roadway with minimal disruption to vehicle flow. Where there is no access management, turning vehicles can increase crash potential, reduce capacity, and erode the mobility of a corridor. The reduction in frequency and severity of crashes is important from a public safety perspective, but crash reduction also improves travel reliability since crash incidents can create substantial traffic congestion. In the context of West Billings, good access management practices may help forestall roadway widening by preserving vehicle capacity. It is noted that the benefits of access management depend on the context of the corridor, and some corridors will benefit from access management more than others.

From a transportation system perspective, the roadway network ideally offers a range of functional types to balance regional mobility and local access. In West Billings, there is relatively poor road network connectivity at the collector level, which forces drivers to rely primarily on the arterial road system. As the region develops, it will be important to create a connected network of collector and local streets to help distribute traffic and minimize the number of accesses on the arterial roads.

RECOMMENDATIONS

7



Intersections and Corridors

Short-Term Priority Projects

Based on the results of the Existing Conditions (2015) and Horizon Year (2035) analyses performed for this study, the following list of street and intersection projects (listed in order of anticipated priority) should be given strong consideration for construction within the next two to ten years. Note that some references to street corridor segments which fall outside of the study are made where it would make sense to include those segments in an actual improvement project. Approximate costs for the projects listed on the following pages are presented in **Tables 18 and 19** on Page 51. The estimated costs do not consider right-of-way, irrigation systems modifications or street lighting other than as associated directly with traffic signals or roundabouts.

Intersections

1. Neibauer Road/56th Street West – it will likely be a surprise to many that this intersection tops the list of recommended short-term priority projects, because traffic volume demands are pretty low in this area. However, the crash and severity rates for this intersection were the second highest of the 19 intersections within the study area. This is likely because intersection sight distance is very poor at this intersection while speeds on the major street (56th Street West) are very high. There are large, mature trees and utility poles that fall within the clear vision triangle on three corners of the intersection and a corn field occupied the fourth intersection corner as of Fall 2015. The intersection is equipped with an overhead flashing beacon for all four approaches, but the crash history implies that more improvements are needed.

   The sight obstructions could be removed, but that might be difficult and/or controversial given that the mature trees are in all three cases in landowner's yards. The other solution would be to implement all-way stop control at this intersection. The traffic volumes are reasonably balanced here. All-way stop control would function well. It would introduce additional delay for northbound/southbound traffic on 56th Street West, which is an unrestricted truck route, but given the crash history and the potential risk for a fatal crash, the Project Team recommends that all-way stop be implemented. The overhead flasher should be converted to red lights on the north and south faces.

Appropriate warning signage should be installed on those approaches as well. The County should also consider installing transverse rumble strips on the north and south intersection approaches to warn drivers of the conversion to all-way stop control. If the conversion is to be installed, a media campaign would also be helpful in notifying drivers of the change.

2. Neibauer Road/48th Street West – similarly, although this intersection had the 2nd lowest average daily entering traffic volume out of the 19 study area intersections, it experienced the 6th highest number of crashes and the third highest number of injury crashes. The crash and severity rates for the intersection were quite easily the highest in the study area. Over half of the total reported crashes resulted in injuries. Unlike the Neibauer Road/56th Street West intersection, it is not immediately apparent why this intersection is experiencing such a negative crash history. There are utility poles on the northwest and northeast (minor approach) corners and also some trees on the northeast corner, but those trees are set back a reasonable distance from both streets. There appears to be an irrigation ditch along north shoulder of the road, west of 48th Street West, the banks for which are higher than the street centerlines. It's certainly possible that when grass grows tall on those banks, vision could be obstructed to the west. Nine of the 12 crashes occurred between late April and late October (seven between early June and late August), but that may not necessarily be indicative of a correlation to vegetation growth. This is an area that experiences farm and ranch-related traffic, but only one of the crashes obviously involved a slow-moving piece of equipment. An examination of the crash reports showed that for eight of the 12 reported crashes, a violation was issued for failure to stop or failure to yield right-of-way.

   Regardless of the lack of a clear cause, the effect has been alarming. Potential mitigation options include installation of an overhead flashing beacon, installation of transverse rumble strips on the minor street approaches and conversion to all-way stop control. The traffic volumes are not very well balanced for this intersection, so a conversion to all-way stop control would introduce delay for what is clearly the more heavily used street (Neibauer Road). Given the history of citations for failure to stop/yield, the Project Team recommends that an overhead flashing beacon be installed at this intersection to provide additional warning of the required stop condition on 48th Street West. This treatment would be consistent with several other rural, high-speed intersections in the area. The County should also consider installing transverse rumble strips on the north and south intersection approaches to provide additional warning to drivers.

3. Rimrock Road/54th Street West Intersection – a traffic signal or roundabout should be installed at this intersection to reduce delay for the minor approaches and improve safety for vehicles and pedestrians. Based on the Horizon Year (2035) scenario traffic projections, a roundabout would be advantageous in that dual eastbound and westbound thru lanes could be provided with short lane drops to the east and west such that a full 4/5-lane section would not be required for a long distance upstream or downstream. Conversely though, a roundabout could require acquisition of right-of-way and would likely be substantially more expensive given that signal may be able to be retrofitted to the existing intersection. If a traffic signal is constructed, consideration should be given to locating signal poles and other infrastructure to accommodate additional future corridor widening for both intersecting streets.

4. King Avenue West/64th Street West Intersection – although this intersection operates at LOS B and LOS A during the AM and PM peaks for existing conditions, both minor approaches operate at LOS D during the AM peak. The crash rate for the intersection was found to be 0.93 crashes/MVE, which falls just below the 1.0 crashes/MVE threshold for concern. It is not likely that traffic signal warrants will be met for this intersection any time soon. However, the MDT auxiliary lane warrant criteria are met for eastbound left turn and right-turn lanes. The addition of these auxiliary turn lanes (as well as a westbound left-turn lane to mirror the eastbound lane) would improve intersection capacity and would likely improve safety conditions as well and therefore should be strongly considered in

the near-term. Prior to construction of these improvements, consideration should also be given to whether a traffic signal or roundabout is to be constructed for future traffic control at the intersection.

5. Grand Avenue/48th Street West Intersection – the traffic impact study for Ben Steele Middle School (*West End Middle School TIS, Sanderson Stewart, September 2015)* stated that all three traffic volume-based MUTCD traffic signal warrants are projected to be met for this intersection once the new school is open and generating traffic demand. Although the intersection may operate at LOS C or better without traffic control improvements, the south (minor) approach will continue to degrade in terms of peak hour delays and queuing. As such, a traffic signal or roundabout should be planned for implementation at this intersection within the next two to four years. By the time Scenario 1-level traffic demands are realized, both intersection types would require dual thru lanes in both directions on Grand Avenue, but it's highly likely that Grand Avenue would have a 5-lane typical section upstream and downstream of this intersection at that point anyway. In this case, the two intersection types seem to be very similar in terms of performance. It's also worth noting that the MPO Functional Classification map shows a future Collector connection from this intersection north and east to tie into 46th Street West, south of Rimrock Road. That connection could change traffic patterns substantially in this area. Therefore, the recommendation is that either a roundabout or traffic signal be constructed with careful consideration given to the future expansion of Grand Avenue and the timing of that future connection to the north.

6. Molt Road/Rimrock Road/62nd Street West Intersection – this "intersection" is currently made up of three intersections, two of which have approach alignment characteristics that do not meet current AASHTO standards relative to intersection skew. Also, the offsets between the actual Rimrock Road/62nd Street intersection and the intersections on Molt Road are such that there is not much space for queuing. The actual intersection of Rimrock Road and 62nd Street West also exhibited a high crash and severity rate during the 5-year crash analysis period for this study with the majority of the collisions being of a right-angle nature. The collisions most likely result from minor approach (EB/WB) cars misjudging the speed or intentions of southbound vehicles exiting Molt Road onto 62nd Street West.

   This intersection area has been studied in the past to try to determine how best to improve the configuration for both safety and operation's sake. For the purposes of the Horizon Year (2035) analysis for this study, it was assumed that all traffic on all three of the associated streets would be routed through one intersection. Since additional development may be forthcoming soon in this area, it is recommended that a new project is planned to finalize at least a design for improvements at this location. From an operational standpoint, construction could potentially be delayed for several years depending upon the pace of development in this area.

7. Grand Avenue/56th Street West – this intersection is could realize a degradation in AM peak hour operations within a relatively short time frame after Ben Steele Middle School opens if land development continues to occur in that area as expected. The TIS for this school projects a very palatable AM peak hour LOS even for the stop-controlled minor (south) approach. However, schools often have a unique impact on traffic operations by virtue of the surges in traffic that they generate. As such, operations will need to be monitored for this intersection to determine how well it is handling traffic demands after the school is operational. A single-lane roundabout (with bypasses) or a relatively simple lane configuration with a traffic signal would provide excellent operations for this intersections up to and beyond a traffic demand level consistent with the Scenario 1 projections. Pedestrian traffic control will be a key consideration for the intersection given its proximity to the school. In addition, this intersection will need to operate in cooperation with either a traffic signal or roundabout at the Grand Avenue/54th Street West intersection. The decision on whether a traffic signal or roundabout is to be implemented at the 56th Street West intersection should be based on those factors, as well as cost and right-of-way considerations.

There are two other intersections in the study area that should be monitored in the short-term relative to their respective crash histories. The intersection of Central Avenue and 48th Street West has a slightly elevated crash rate (1.29 crashes/MVE), but of more concern is the relative severity of the crashes. Six of the nine reported crashes during the analysis period resulted in injuries, which pushes the severity rate up to 3.01 (compared to a study area average of 2.03). Four of those crashes resulted in citations for failure to yield right-of-way. A physical observation of the intersection showed that there is a stand of trees on the northeast corner of the intersection that in combination with a trio of utility poles, could obstruct vision for north approach vehicles to the east. The intersection is already fitted with overhead flashers and oversized stop signs with supplementary signs that say "CROSS TRAFFIC DOES NOT STOP." Regardless, the intersection should be monitored to determine if the high frequency and severity of crashes continues, in which case additional measures may be necessary.

The intersection of Hesper Road and 56th Street West also exhibited crash (1.44 crashes/MVE) and severity (2.64) rates that were substantially above average for the study area. Half of the crashes were right-angle collisions, but only two citations were written for failure-to-yield. Sight distance at the intersection appears to be relatively good, though there could be periods of time where crops serve as a sight obstruction on the northwest corner of the intersection. Again, the recommendation is that the intersection be monitored going forward to determine if additional action is needed.

Corridors

1. Grand Avenue – Shiloh Road to 52nd Street West – this segment of Grand Avenue should be widened to three lanes at a minimum in the near future to improve capacity and safety. However, if funding allows, strong consideration should be given to additional capacity-building improvements, since the analysis from this study shows that a 3-lane section will most likely not be adequate for maintaining LOS D or better operations for the Horizon Year (2035) even if only Scenario 1 growth is realized.

2. Rimrock Road – 50th Street West to 54th Street West – Rimrock Road currently carries three lanes from 50th Street West to the east. That three-lane section may need to be extended to 54th Street West, although depending on the timing of the project, the analysis in this study projects that Rimrock Road will need a 4 or 5-lane section in order to provide acceptable LOS operations for the Horizon Year (2035), much like for Grand Avenue above. However, the segment of Rimrock Road to the east of 50th Street West was recently reconstructed, so it's not likely that it will be reconstructed again as a 4/5-lane facility in the short-term. Therefore, it may make sense to extend the 3-lane section on Rimrock Road in conjunction with a roundabout or traffic signal project at the intersection of Rimrock Road and 54th Street West.

3. King Avenue West – Montana Sapphire Drive to 48th Street West – this segment of King Avenue West may need to be widened to three lanes within the short-term project timeframe. This will depend largely upon the progression of development west of 44th Street West. For the purposes of planning for future funding needs, it is recommended that this improvement be considered.

4. Grand Avenue – Wilderness Drive to 62nd Street West – this segment of Grand Avenue may need to be widened to three lanes as depending upon the progression of land development along its frontage and in the area of the Rimrock Road/62nd Street West intersection. As such, it should be considered strongly in the short-term improvements plans in the coming years.

Figure 12 on the following page provides a graphical depiction of the locations, priority and features associated with the short-term priority project recommendations from this study.

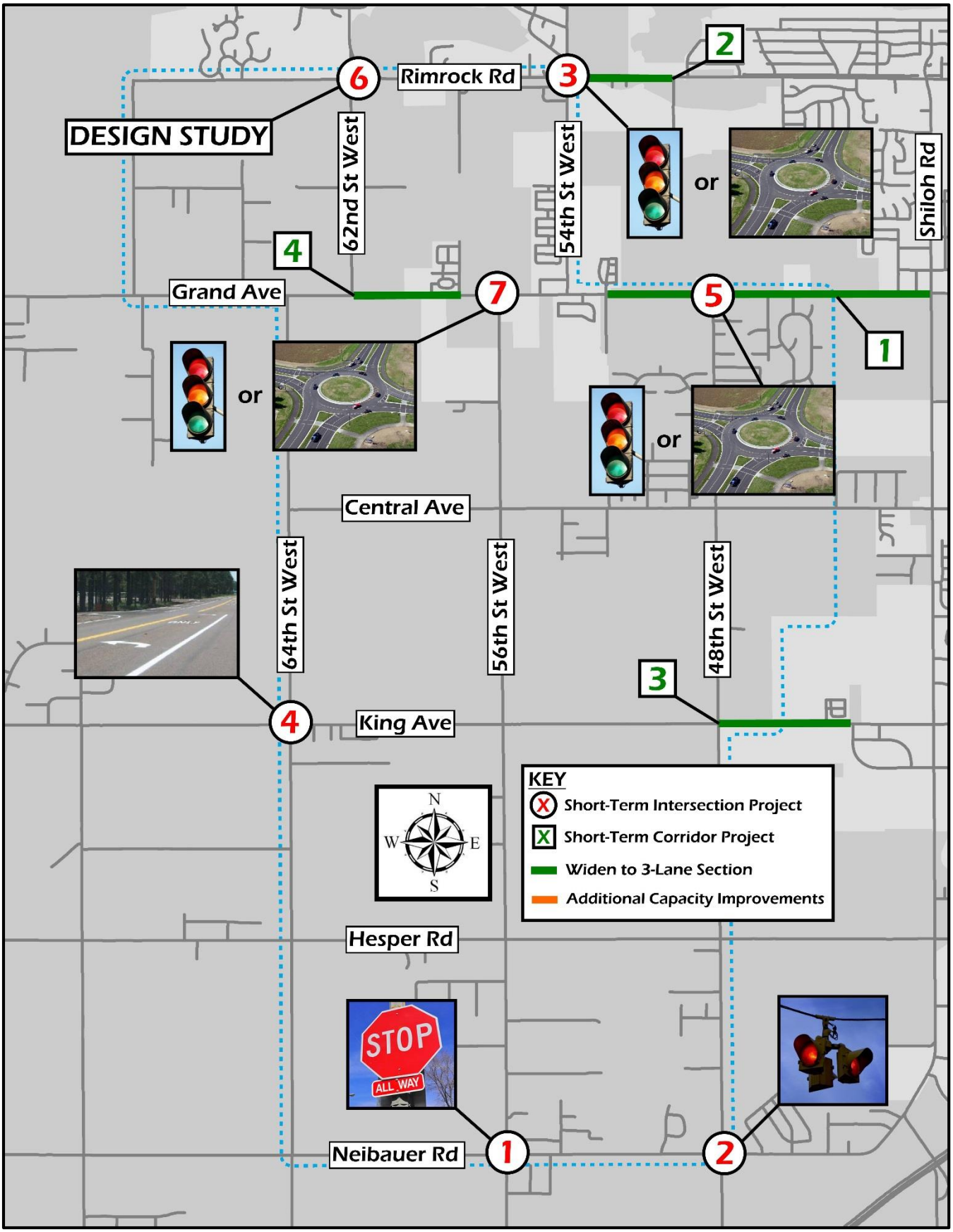


FIGURE 12 – SHORT-TERM PRIORITY STREET & INTERSECTION PROJECTS

TABLE 18. SHORT-TERM INTERSECTION PROJECT ESTIMATED CONSTRUCTION COSTS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Neibauer Rd. & 56th St. West	All-Way Stop Control/OH Flashing Beacons/Transverse Rumble Strips	$120,000-$200,000
2	Neibauer Rd. & 48th St. West	OH Flashing Beacons/Transverse Rumble Strips	$120,000-$200,000
3	Rimrock Rd. & 54th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
4	King Ave. West & 64th St. West	Auxiliary Turn Lanes	$400,000-$600,000
5	Grand Ave. & 48th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
6	Molt Rd./Rimrock Rd./62nd St. West	Design Study	$20,000-$30,000
7	Grand Ave. & 56th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000

TABLE 19. SHORT-TERM CORRIDOR PROJECT ESTIMATED CONSTRUCTION COSTS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Grand Ave. - Shiloh Rd. to 52nd St. West	Widening/Reconstruction (3-lane section)	$2,800,000-$4,500,000
2	Rimrock Rd. - 50th St. West to 54th St. West	Widening/Reconstruction (3-lane section)	$1,000,000-$1,600,000
3	King Ave. West - MT Sapphire Dr. to 48th St. West	Widening/Reconstruction (3-lane section)	$1,300,000-$2,000,000
4	Grand Ave. - Wilderness Dr. to 62nd St. West	Widening/Reconstruction (3-lane section)	$900,000-$1,400,000

Long-Term Priority Projects

The following list of projects will be needed in order to maintain safe and efficient traffic operations conditions with the study area. These projections are anticipated to be needed in addition to those identified as Short-Term Priority projects. Approximate costs for the projects listed on the following pages are presented in **Tables 20 and 21** on Page 55. The estimated costs do not consider right-of-way, irrigation systems modifications or street lighting other than as associated directly with traffic signals or roundabouts.

Intersections

1. Molt Road/Rimrock Road/62nd Street West Intersection – this intersection was referenced in the short-term priority project section, but the minimum recommendation was simply to commission a design study and program a project for planning purposes. Since this project may or may not be constructed as a short-term improvement, we are including it here with a formal recommendation for reconstruction of the intersection as a traffic signal or roundabout depending upon results of the design study.

2. King Avenue West/48th Street West Intersection – for this intersection, single thru lanes on King Avenue West would provide reasonably good operations for even Scenario 2 traffic demand projections, albeit with some pretty lengthy queues once you reach those demand levels. This is because there are a relatively small number of eastbound and westbound left-turn movements projected such that a protected left-turn phase would not necessarily be required even for Scenario 2. Conversely, a roundabout would be susceptible to extended queuing and potential short-term breakdowns on the east and west approaches during peak period surges even for Scenario 1. Those concerns could be addressed through the implementation of dual eastbound and westbound thru lanes. However, unless the major street left-turn demand grows to a point where protected left-turn phasing is required on the King Avenue West approaches, a traffic signal would seem to be a more cost-effective solution for this intersection.

3. Central Avenue/48th Street West Intersection – this intersection shares very similar operational characteristics to the King Avenue West/48th Street West intersection. A traffic signal with single eastbound and westbound thru lanes would handle projected traffic demands up to and beyond Scenario 2, whereas a roundabout would require dual entry

and receiving lanes east and west. As such, a traffic signal is recommended as the planned improvement for the intersection once traffic signal warrants are met and/or peak hour operations degrade substantially.

4. King Avenue West/64th Street West Intersection - it was previously recommended as a short-term project that auxiliary turn lanes be constructed on King Avenue West at 64th Street West to improve capacity (slightly) and safety for the intersection. However, it is also likely that improvements to traffic control will be required well before the advent of the Horizon Year of 2035. While either a traffic signal or roundabout would function well here for both Scenarios 1 and 2, a roundabout for Scenario 2 would need dual eastbound thru lanes. For that reason and given that the previously recommended auxiliary turn lanes would be sacrificial if a roundabout was constructed, a traffic signal would make more sense at this location in terms of a planning level recommendation now.

5. Grand Avenue/62nd Street West Intersection – this intersection would be served well for both Horizon Year (2035) traffic projection scenarios by either a traffic signal with auxiliary turn lanes or a single-lane roundabout. That being the case, right-of-way impacts and a comparison of cost should be considered prior to making a final decision on what type of intersection traffic control is to be programmed. It's also worth noting here that the MPO Functional Classification map shows a future Principal Arterial connection from this intersection to the north end of 64th Street West (which currently dead-ends north of Central Avenue). Such a connection would likely change traffic patterns for this intersection, possibly quite significantly.

6. Hesper Road/56th Street West Intersection – the intersection of Hesper Road and 56th Street West projects to fail during the AM peak hour for Scenario 2, though it would meet the minimum LOS criteria for Scenario 1. The Project Team's analysis showed that the deficiencies at this intersection could be addressed by implementing all-way stop control. That's not surprising given that the traffic demand is relatively balanced across the four approaches (at least during the peak hours). Traffic signal warrants would not be met for this intersection unless growth occurs much more rapidly than has been projected through Scenario 2 from this study, which is unlikely. A roundabout would also certainly address the AM peak LOS problems, but would be a very costly improvement for a problem that is projected to be isolated to the AM peak hour. All that taken into account, it shouldn't be necessary to plan or commit improvements for this project any time soon. If the intersection starts to break down at some point, all-way stop control.

The study area intersections not specifically referenced in the preceding sections are projected to operate acceptably from a peak hour LOS standpoint through both scenarios of the Horizon Year (2035) and they don't have recent crash history characteristics that raise specific concerns at this time. However, it is certainly possible that as traffic demand increase over time, safety concerns could arise for any of those intersections. As such, crash histories should be re-revaluated periodically to determine if improvements may be necessary to maintain safe operations. Likewise, as growth occurs, variations in traffic patterns could cause the projected impacts in the study area to very relative to the results of this study. As such, periodic re-evaluation of study area intersection and corridor operations is also recommended.

Corridors

1. Grand Avenue – Shiloh Road to 62nd Street West – if the segment of Grand Avenue from Shiloh Road to 54th Street West is not widened to a 4/5-lane section via an initial reconstruction project (as recommended in the Short-Term Priority Project section), that segment as a 3-lane street could very well remain as the highest priority project relative to V/C ratio. In addition, the segment of Grand Avenue from 54th Street West to 62nd Street West is projected to require 4 or 5 lanes based on Scenario 2 growth for the year 2035. At a minimum, it is recommended that plans be laid for Grand Avenue to be widened to 4/5 lanes from Shiloh Road to 54th Street West and three lanes from 54th Street West to 62nd Street West.

2. Rimrock Road – Shiloh Road to 62nd Street West – similarly, Rimrock Road projects to need 4/5 lanes from Shiloh Road to 62nd Street West for Scenario 2. At a minimum, it should be planned that Rimrock Road will be a 5-lane facility to 54th Street West and a 3-lane facility from 54th Street West to 62nd Street West.

3. King Avenue West – Montana Sapphire Drive to 64th Street West – the short-term priority project list included an expansion of King Avenue West to three lanes from Montana Sapphire Drive to 48th Street West. Longer-term, that 3-lane facility would likely need to extend to 56th Street West and possibly beyond. If the more aggressive growth progression is realized, four or five lanes may be necessary to 48th Street West or even to 56th Street West with the three-lane section needed as far west as 72nd Street West. The recommendation here is that the MPO plans long-term for 4/5 lanes from Montana Sapphire Drive to 48th Street West and three lanes from 48th Street West to 64th Street West.

4. 54th Street West – Grand Avenue to Rimrock Road – 54th Street West is projected to require a 3-lane section at some point in the future. That lane configuration is projected to be adequate for either growth scenario. This is one street segment that could benefit from the construction of future planned collectors or arterials as identified on the MPO functional classification map. The completion of 58th Street West between Grand Avenue and Rimrock Road would relieve some traffic demand on 54th Street West, as may the connection between 48th Street West (at Grand Avenue) to 46th Street West, south of Rimrock Road. Even so, it is recommended that the widening of 54th Street West to a 3-lane section be included in future CIP documents.

5. Central Avenue – Shiloh Road to 48th Street West – this segment of Central Avenue is projected to need three lanes if growth surpasses the Scenario 1 projection level and approaches the Scenario 2 level. The timing for that need will likely depend upon whether or not the rural agricultural properties along this segment are developed within the next 20 years. Our expectation is that development will progress in this corridor since water and sewer facilities are stubbed into Central Avenue part way into this stretch. As such, it is recommended that this widening improvement be programmed for long-term plans.

6. 62nd Street West – Rimrock Road to Western Bluffs Drive – the urgency of any improvement to this stretch of road depends largely upon what happens with the trio of intersections that were previously discussed in this chapter. If an intersection reconstruction occurs that results in Molt Road traffic being funneled through the Rimrock Road/62nd Street West intersection, widening to three lanes or even 4/5 lanes will be required. For the purposes of this study, it is recommended that 3-lane section is planned for this stretch of roadway.

Figure 13 in the following page provides a graphical representation of the location, priority and features associated with the long-term priority street and intersection project recommendations from this study.

As with the intersections, any study area street corridor segments not specifically referenced in the preceding pages is not projected to experience substandard corridor LOS conditions for either of the Horizon Year (2035) traffic projection scenarios. However, as development patterns change, those corridors may need to be monitored accordingly.

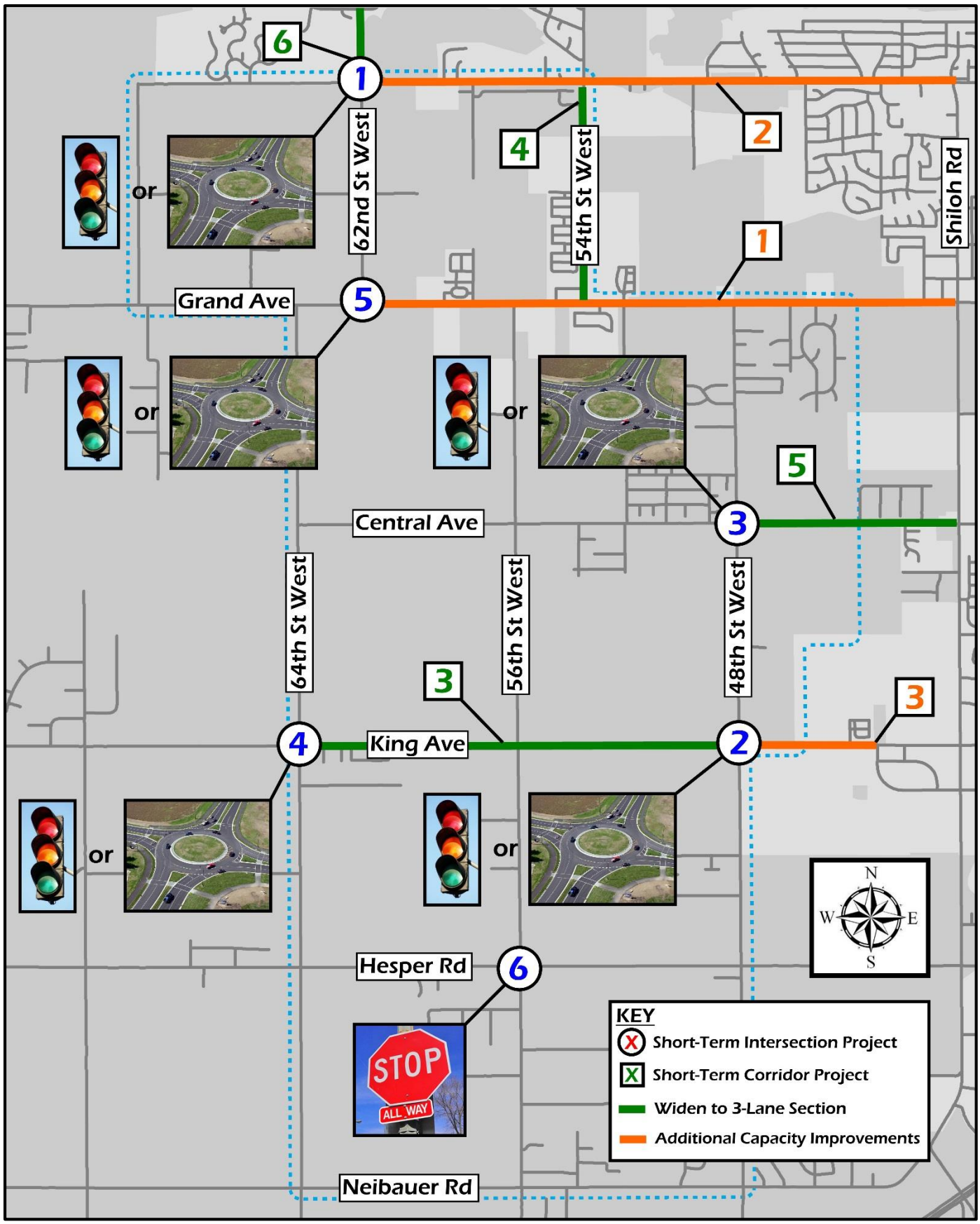


FIGURE 13 – LONG-TERM PRIORITY STREET & INTERSECTION PROJECTS

TABLE 20. LONG-TERM INTERSECTION PROJECT ESTIMATED CONSTRUCTION COSTS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Molt Rd./Rimrock Rd./62nd St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
2	King Ave. West & 48th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
3	Central Ave. & 48th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
4	King Ave. West & 64th St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
5	Grand Ave. & 62nd St. West	Traffic Signal or Roundabout	$400,000-$1,500,000
6	Hesper Rd. & 56th St. West	All-Way Stop	$4,000-$200,000

TABLE 21. LONG-TERM CORRIDOR PROJECT ESTIMATED CONSTRUCTION COSTS

Priority Ranking	Project Location	Project Type	Estimated Cost
1	Grand Ave. - Shiloh Rd. to 62nd St. West	Widening/Reconstruction (5-lane section)	$7,500,000-$11,000,000
2	Rimrock Rd. - Shiloh Rd. to 62nd St. West	Widening/Reconstruction (5-lane section/3-lane section)	$6,900,000-$10,300,000
3	King Ave. West - MT Sapphire Dr. to 64th St. West	Widening/Reconstruction (5-lane section/3-lane section)	$6,100,000-$9,300,000
4	54th St. West - Grand Ave. to Rimrock Rd.	Widening/Reconstruction (3-lane section)	$2,100,000-$3,300,000
5	Central Ave. - Shiloh Rd. to 48th St. West	Widening/Reconstruction (3-lane section)	$2,000,000-$3,100,000
6	62nd St. West - Rimrock Rd. to Western Bluffs Dr.	Widening/Reconstruction (3-lane section)	$700,000-$1,100,000

Active Transportation Recommendations

Combining the Latent Demand Model and Level of Traffic Stress, it is clear which geographic areas are most likely to generate walk/bike trips (based on land use) and that the existing arterial roadway network does not provide facilities the majority of people would feel comfortable using. Given the rural context of the area now, and understanding that over the next 20 years only a portion of the study area will begin to urbanize, this plan recommends a combination of short-term to meet immediate needs and long-term strategies that can leverage development-driven infrastructure.

Short-term Strategies

On-street Bicycle Facilities

There are few strategies for high-speed rural roads beyond shoulder widening; based on guidance for rural roadways from Minnesota Department of Transportation Bikeway Facility Design Manual and the AASHTO Guide for Development of Bicycle Facilities, a paved shoulder of six to eight feet is recommended to provide enough lateral separation to minimize wind blasts and other effects. However, the current arterial roadway system in the study area is likely to continue to exhibit high levels of traffic stress (LTS4) for bicyclists even if the roads are widened to provide better shoulders or on-street bike facilities, as long as speeds are higher than 35 mph and there is no physical separation from traffic. Speed limit modifications should be carefully considered, since arbitrarily lowering the speed limit below the design speed and/or the 85th-percentile speed can have negative unintended consequences for infractions and safety.

This means that widened arterials are not likely to attract or accommodate cyclists, except for the most confident user group. Furthermore, there is a significant amount of roadway centerline miles in the southern and western study area that are not likely to see even modest levels of demand in the near future. As such, the recommended strategies for short-term improvements focus on key corridors where there are gaps between existing land uses and existing trail/path systems (**Figure 14**, page 55):

- 54th Street from Rimrock Road to Grand Avenue
- 48th Street from Central Avenue to Grand Avenue

- Grand Avenue from 58th Street to Shiloh Road
- Central Avenue from 56th Street to Shiloh Road

Improvements could include shoulder widening to provide ridable space (five to eight feet of pavement left of the white line), protected bike lane ("cycletrack"), and sidewalks or sidepaths. Providing parallel multi-use pathways designed to serve both pedestrians and bicycles should be a focus to better accommodate the needs of multiple user groups. In many instances this road expansion could have major impacts to utilities and private property.

Pedestrian Facilities

Near-term improvements for pedestrian facilities should focus on improving sidewalk connectivity with neighborhoods and providing crosswalks in the on the corridors shown in green in Figure 12. In many instances the pedestrian facilities can be complementary with the bikeways, by providing wider (eight to ten feet) sidewalks that function as sidepaths. In general, as intersection modifications are made to accommodate vehicle traffic, consideration should be given to accommodate safe pedestrian crossings.

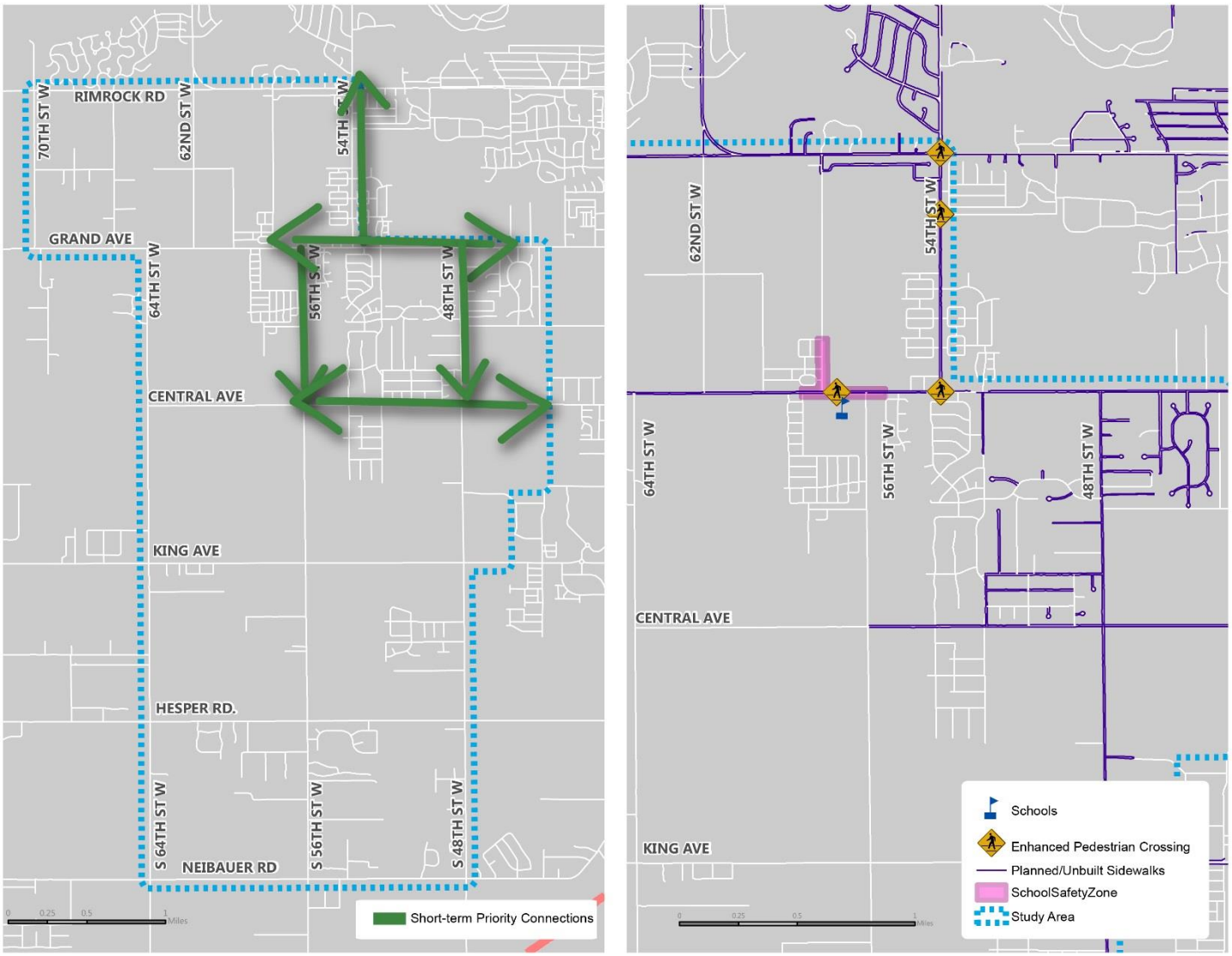


FIGURE 14 – SHORT-TERM IMPROVEMENTS FOR ON-STREET BICYCLE AND PEDESTRIAN FACILITIES

Crosswalks (note the following recommendations are planning-level, and the final determination of traffic control and safety measures should be based on an engineering study of prevailing vehicle patterns and pedestrian demand):

- Grand Ave/54th Street: crosswalk enhancements, possibly a traffic signal, to improve pedestrian safety near school zone
- Grand Avenue midway between 56th Street West and 58th Street West: pedestrian actuated mid-block beacon, possibly a pedestrian hybrid beacon ("HAWK signal") or rectangular rapid flashing beacon (RRFB)
- 54th Street West at terminus of multi-use path (north end of Cottonwood Park): pedestrian actuated mid-block beacon, possibly a pedestrian hybrid beacon ("HAWK signal") or rectangular rapid flashing beacon (RRFB)
- Rimrock Road/54th Street: crosswalk enhancements, possibly a traffic signal, to connect multi-use paths

Sidewalks:

- Multi-use path on Grand Ave from 52nd Street West to west boundary of Trails West Subdivision
- Sidewalk on Grand Ave from west boundary of Foxtail Subdivision to HAWK signal
- Multi-use path from Grand Avenue to north boundary of Cottonwood Park along west side of 54th Street West
- Sidewalk along east side of 54th Street West from Grand Avenue to north boundary of Grand Peaks Subdivision

Long-term Strategies

Except for local roads developed for master planned neighborhoods, there are few existing roadways internal to the arterial system. There is, however, a master plan (Functional Classification Map) for local and collector street system. The construction of those streets over time, if developed with multi-modal considerations directly in mind, could create a network of low-stress streets with organic active transportation facilities. This "layered network" principle is a way as to provide comfortable bike and pedestrian connectivity instead of force-fitting all modes onto the arterial corridors. Furthermore, a more developed collector street system can help disperse vehicle traffic and avoid over-reliance on arterial roadways. Since many of these future collector corridors are platted but not built, it is an ideal time to establish the roadway standards that incorporate bike lanes, sidewalks, and modest speed limits. In the event that some of the major arterials become more urbanized over time, with speed limit reductions and bike facilities they could also become useful low-stress bikeways. Recommended long-term low-stress corridors are (**Figure 15,** Page 58):

- 58th Street from Rimrock Road to Grand Avenue
- 66th Street from Rimrock Road to Grand Avenue
- 60th Street corridor
- 52nd Street corridor
- Monad Road
- Broadwater Avenue
- Colton Blvd

As shown by the black dashed lines in **Figure 15** (next page), this system of collector streets can also be linked by trail connectors similar to the way the Big Ditch Trail connects with local neighborhood streets. There are several planned multi-use pathways in the Long Range Transportation Plan that would complement a system of low-stress streets. Future pathway segments should be prioritized based on the proximity to high demand areas and the ability of the segment to provide connectivity through barriers and gaps in the street system.

Physical improvements and locations aside, the most important recommendation from a multi-modal transportation system perspective is that the City of Billings and Yellowstone County coordinate to implement a consistent and stringent set of

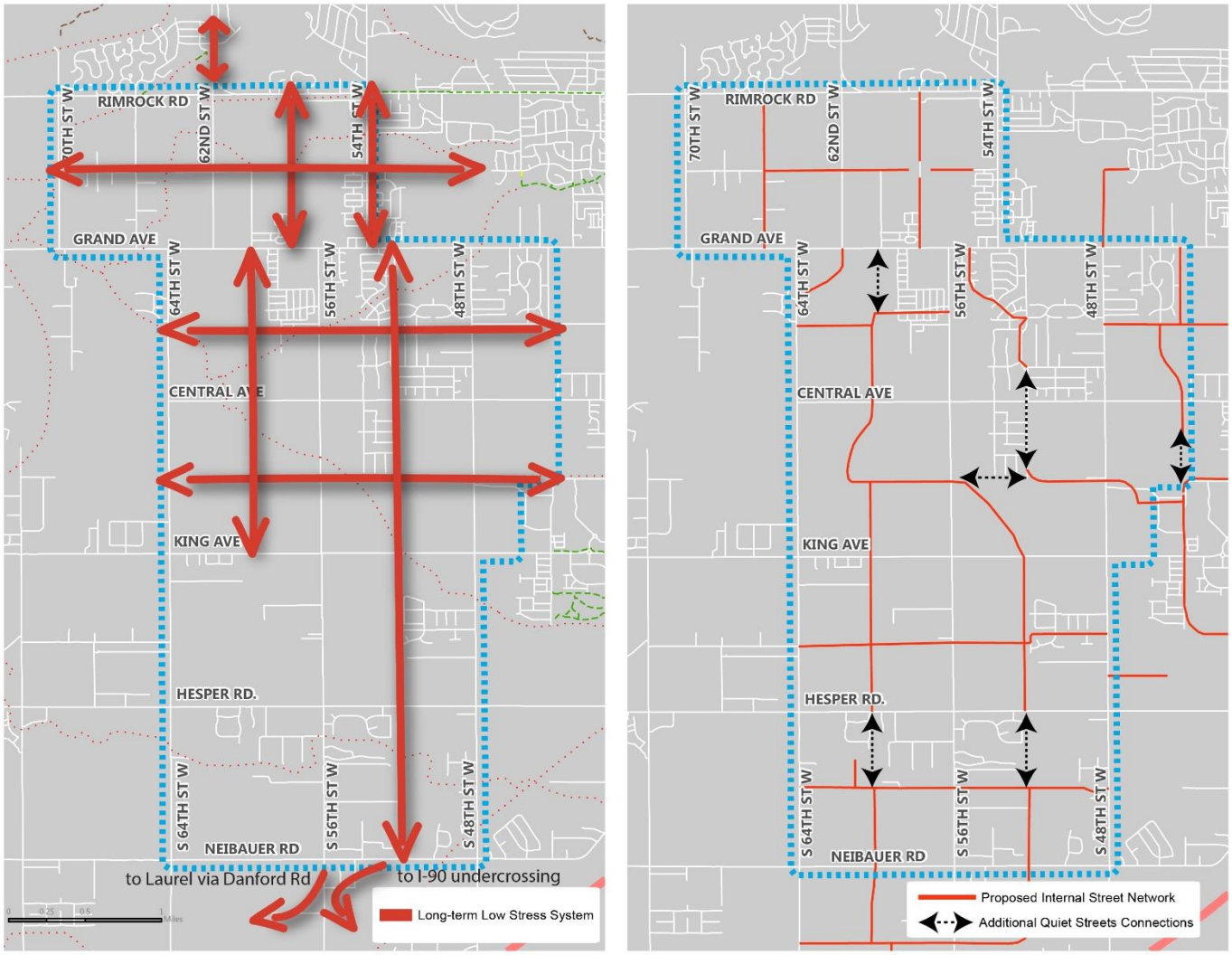


FIGURE 15 – LONG-TERM ACTIVE TRANSPORTATION STRATEGIES

requirements for the subdivision of land that requires dedication of right-of-way and construction of facilities to further the mission of expanding and improving safety for the multi-modal travel environment. If the development of multi-modal facilities becomes an integral part of the land development process, the system will inherently improve and expand in the general locations where demand for those facilities is also most likely to grow and the potential costs associated with independent multi-modal facility projects can be partially if not wholly defrayed.

APPENDIX A
TRAFFIC COUNT DATA

SANDERSON STEWART

FEHR & PEERS

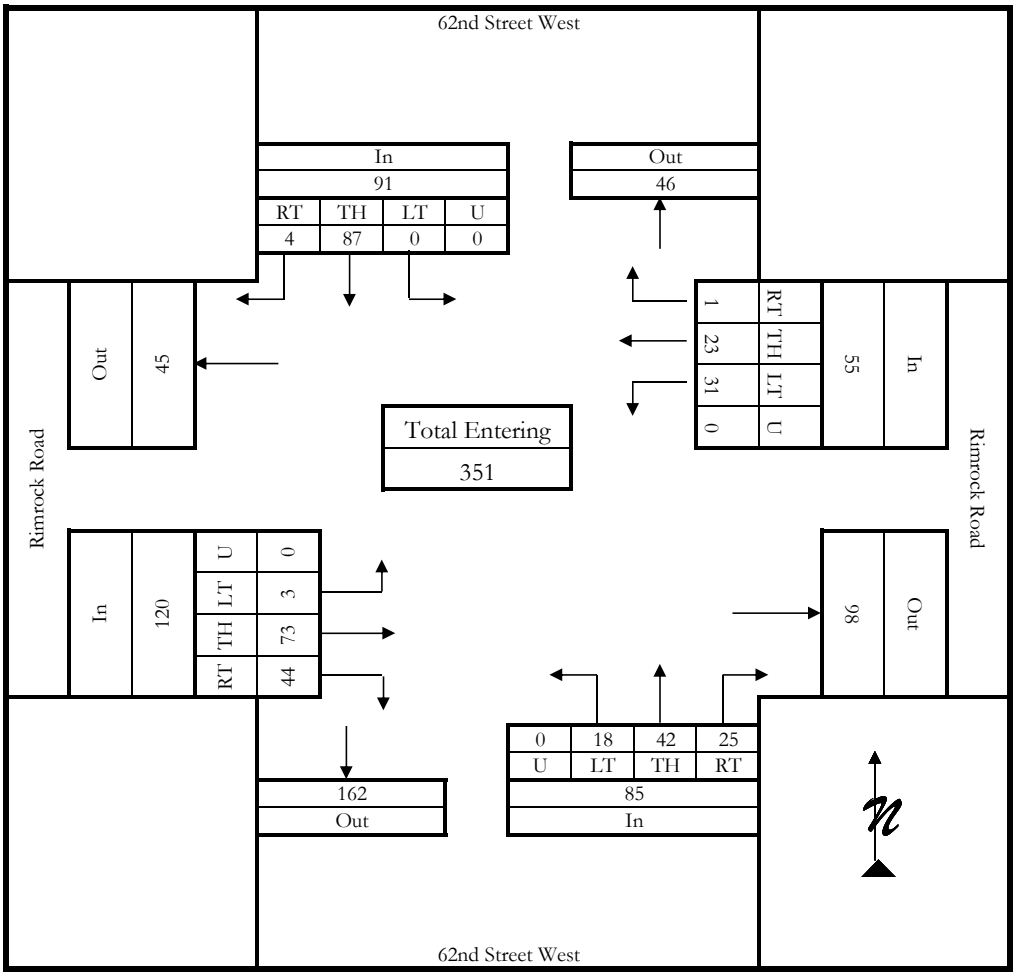
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Rimrock Road & 62nd Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Friday, May 29, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:30 - 8:30 AM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	62nd Street West	East/West Street:	Rimrock Road

Vehicle Volumes and Adjustments

	62nd Street West Southbound					62nd Street West Northbound					Rimrock Road Eastbound					Rimrock Road Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	0.93	0.93	0.93	0.93		0.93	0.93	0.93	0.93		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
7:30 AM	0	29	0	0	29	9	7	0	0	16	13	26	0	0	39	0	4	8	0	12	96
7:45 AM	0	30	0	0	30	5	7	6	0	18	14	22	1	0	37	1	8	12	0	21	106
8:00 AM	2	11	0	0	13	5	10	3	0	18	8	14	1	0	23	0	3	6	0	9	63
8:15 AM	2	17	0	0	19	6	18	9	0	33	9	11	1	0	21	0	8	5	0	13	86
Grand Total	4	87	0	0	91	25	42	18	0	85	44	73	3	0	120	1	23	31	0	55	351
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.4	3.2	0.0	14.5	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.4	3.2	0.0	14.5	
Total %	1.1	24.8	0.0	0.0	25.9	7.1	12.0	5.1	0.0	24.2	12.5	20.8	0.9	0.0	34.2	0.3	6.6	8.8	0.0	15.7	100.0
PHF	0.76	0.76	0.76			0.64	0.64	0.64			0.77	0.77	0.77			0.65	0.65	0.65			0.83



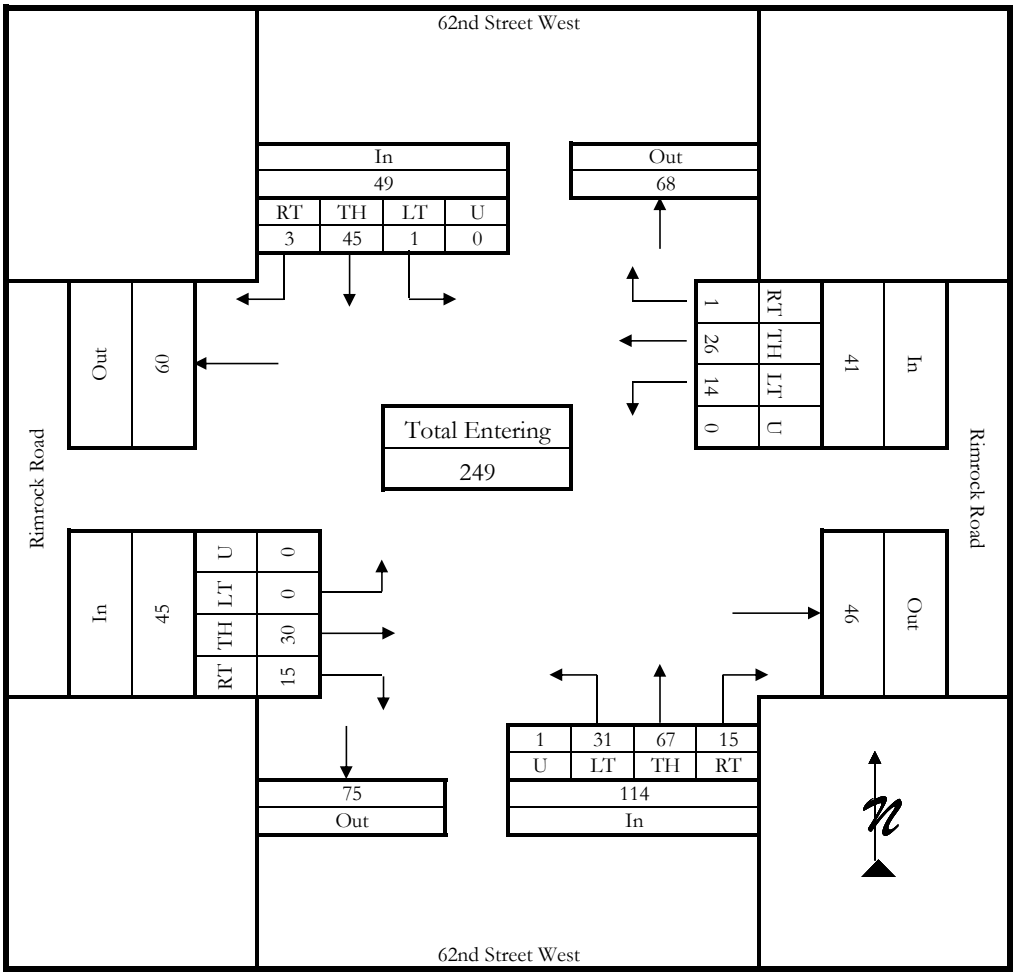
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Rimrock Road & 62nd Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, May 28, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (3:30 - 4:30 PM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	62nd Street West	East/West Street:	Rimrock Road

Vehicle Volumes and Adjustments

	62nd Street West Southbound					62nd Street West Northbound					Rimrock Road Eastbound					Rimrock Road Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
3:30 PM	0	13	0	0	13	3	21	7	0	31	3	6	0	0	9	1	10	3	0	14	67
3:45 PM	1	8	1	0	10	4	12	8	0	24	2	6	0	0	8	0	4	4	0	8	50
4:00 PM	1	15	0	0	16	6	15	7	1	29	4	9	0	0	13	0	9	2	0	11	69
4:15 PM	1	9	0	0	10	2	19	9	0	30	6	9	0	0	15	0	3	5	0	8	63
Grand Total	3	45	1	0	49	15	67	31	1	114	15	30	0	0	45	1	26	14	0	41	249
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	33.3	2.2	0.0	0.0	4.1	6.7	1.5	3.2	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	33.3	2.2	0.0	0.0	4.1	6.7	1.5	3.2	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total %	1.2	18.1	0.4	0.0	19.7	6.0	26.9	12.4	0.4	45.8	6.0	12.0	0.0	0.0	18.1	0.4	10.4	5.6	0.0	16.5	100.0
PHF	0.77	0.77	0.77			0.92	0.92	0.92			0.75	0.75	0.75			0.73	0.73	0.73			0.90



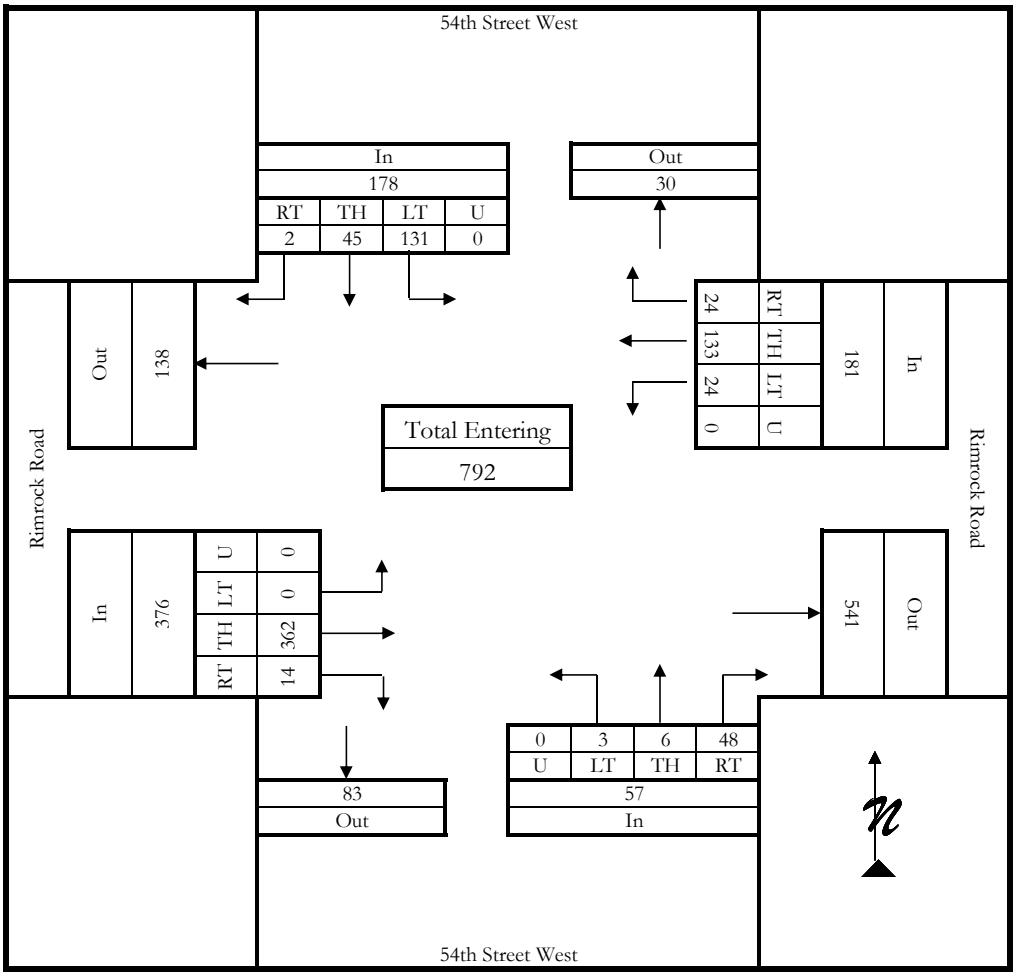
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Rimrock Road & 54th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, May 14, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	54th Street West	East/West Street:	Rimrock Road

Vehicle Volumes and Adjustments

	54th Street West Southbound					54th Street West Northbound					Rimrock Road Eastbound					Rimrock Road Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
7:15 AM	1	11	34	0	46	6	1	1	0	8	3	80	0	0	83	4	30	3	0	37	174
7:30 AM	0	12	34	0	46	13	1	0	0	14	4	130	0	0	134	6	24	7	0	37	231
7:45 AM	1	15	25	0	41	10	2	1	0	13	4	83	0	0	87	5	39	7	0	51	192
8:00 AM	0	7	38	0	45	19	2	1	0	22	3	69	0	0	72	9	40	7	0	56	195
Grand Total	2	45	131	0	178	48	6	3	0	57	14	362	0	0	376	24	133	24	0	181	792
Medium Truck %	50.0	2.2	0.8	0.0	1.7	8.3	0.0	33.3	0.0	8.8	7.1	3.0	0.0	0.0	3.2	12.5	10.5	12.5	0.0	11.0	
Heavy Truck %	50.0	0.0	0.0	0.0	0.6	4.2	0.0	0.0	0.0	3.5	0.0	0.3	0.0	0.0	0.3	0.0	0.0	4.2	0.0	0.6	
Total Truck %	100.0	2.2	0.8	0.0	2.2	12.5	0.0	33.3	0.0	12.3	7.1	3.3	0.0	0.0	3.5	12.5	10.5	16.7	0.0	11.6	
Total %	0.3	5.7	16.5	0.0	22.5	6.1	0.8	0.4	0.0	7.2	1.8	45.7	0.0	0.0	47.5	3.0	16.8	3.0	0.0	22.9	100.0
PHF	0.97	0.97	0.97			0.65	0.65	0.65			0.70	0.70	0.70			0.81	0.81	0.81			0.86



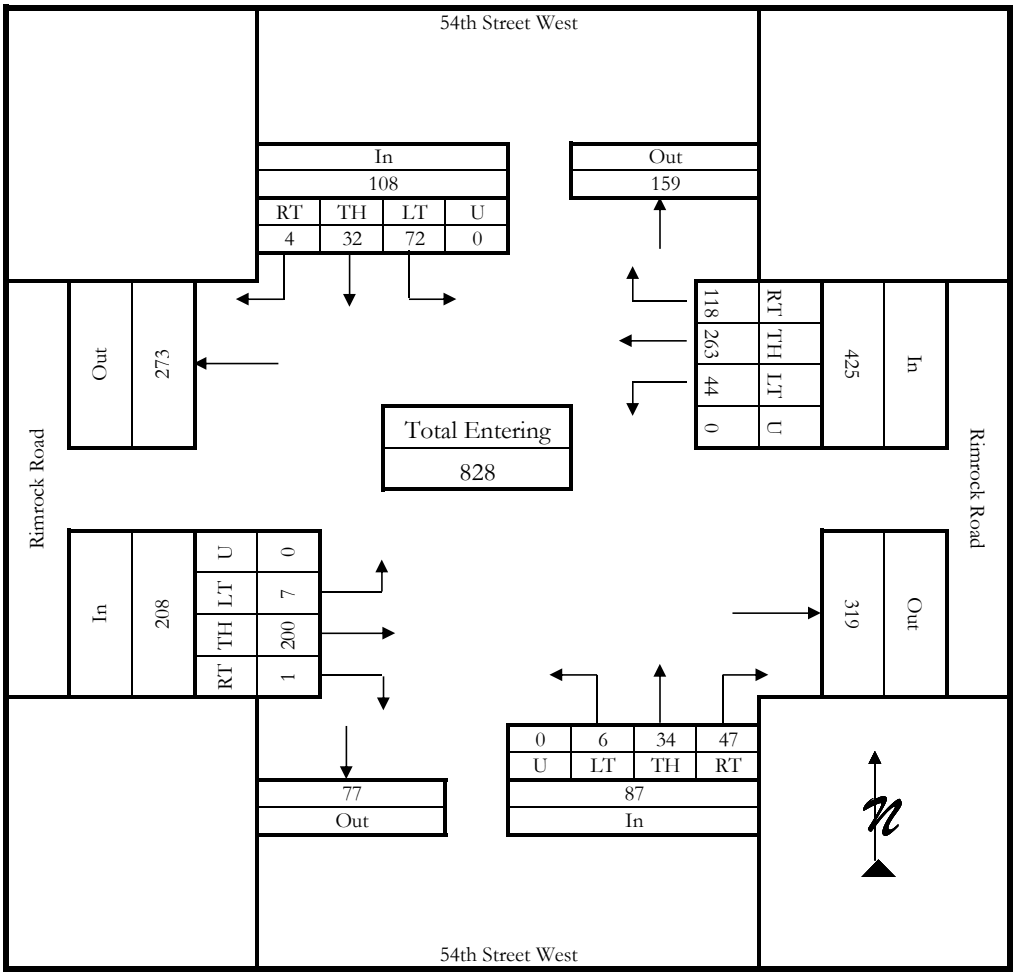
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Rimrock Road & 54th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, May 14, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	54th Street West	East/West Street:	Rimrock Road

Vehicle Volumes and Adjustments

	54th Street West Southbound					54th Street West Northbound					Rimrock Road Eastbound					Rimrock Road Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
4:45 PM	2	9	14	0	25	15	11	3	0	29	0	45	3	0	48	27	72	6	0	105	207
5:00 PM	0	6	21	0	27	12	6	2	0	20	0	53	1	0	54	32	42	14	0	88	189
5:15 PM	1	7	18	0	26	10	5	1	0	16	0	57	3	0	60	31	76	15	0	122	224
5:30 PM	1	10	19	0	30	10	12	0	0	22	1	45	0	0	46	28	73	9	0	110	208
Grand Total	4	32	72	0	108	47	34	6	0	87	1	200	7	0	208	118	263	44	0	425	828
Medium Truck %	0.0	0.0	1.4	0.0	0.9	4.3	0.0	0.0	0.0	2.3	0.0	2.0	14.3	0.0	2.4	0.0	0.0	4.5	0.0	0.5	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	0.0	0.0	1.4	0.0	0.9	4.3	0.0	0.0	0.0	2.3	0.0	2.0	14.3	0.0	2.4	0.0	0.0	4.5	0.0	0.5	
Total %	0.5	3.9	8.7	0.0	13.0	5.7	4.1	0.7	0.0	10.5	0.1	24.2	0.8	0.0	25.1	14.3	31.8	5.3	0.0	51.3	100.0
PHF	0.90	0.90	0.90			0.75	0.75	0.75			0.87	0.87	0.87			0.87	0.87	0.87			0.92



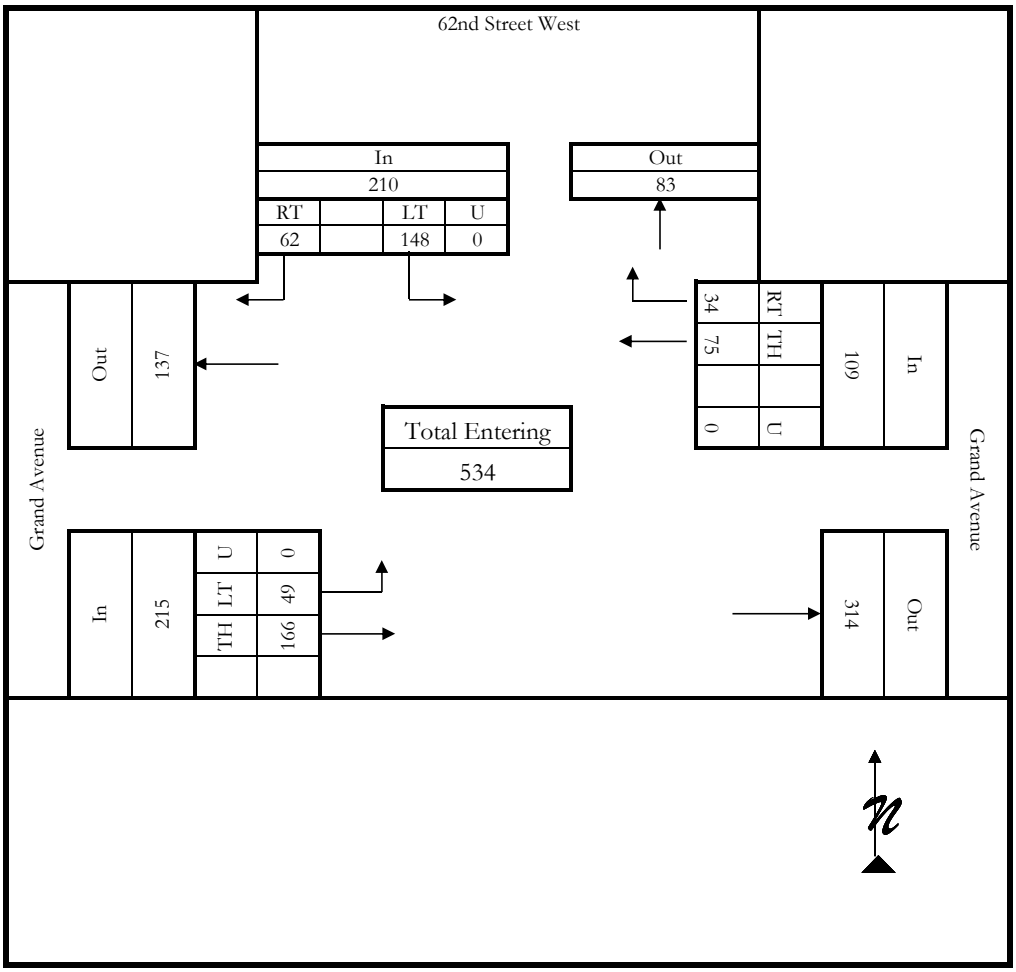
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Grand Avenue & 62nd Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, May 19, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	62nd Street West	East/West Street:	Grand Avenue

Vehicle Volumes and Adjustments

	62nd Street West Southbound					Northbound					Grand Avenue Eastbound					Grand Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	0.96	0.96	0.96	0.96		0.00	0.00	0.00	0.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
7:15 AM	18	0	29	0	47	0	0	0	0	0	0	38	11	0	49	5	19	0	0	24	120
7:30 AM	9	0	43	0	52	0	0	0	0	0	0	46	16	0	62	8	16	0	0	24	138
7:45 AM	19	0	47	0	66	0	0	0	0	0	0	43	11	0	54	7	20	0	0	27	147
8:00 AM	16	0	29	0	45	0	0	0	0	0	0	39	11	0	50	14	20	0	0	34	129
Grand Total	62	0	148	0	210	0	0	0	0	0	0	166	49	0	215	34	75	0	0	109	534
Medium Truck %	4.8	0.0	1.4	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	4.8	6.1	0.0	5.1	5.9	2.7	0.0	0.0	3.7	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.3	0.0	0.0	1.8	
Total Truck %	4.8	0.0	1.4	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	4.8	6.1	0.0	5.1	8.8	4.0	0.0	0.0	5.5	
Total %	11.6	0.0	27.7	0.0	39.3	0.0	0.0	0.0	0.0	0.0	0.0	31.1	9.2	0.0	40.3	6.4	14.0	0.0	0.0	20.4	100.0
PHF	0.80	0.80	0.80			0.00	0.00	0.00			0.87	0.87	0.87			0.80	0.80	0.80			0.91



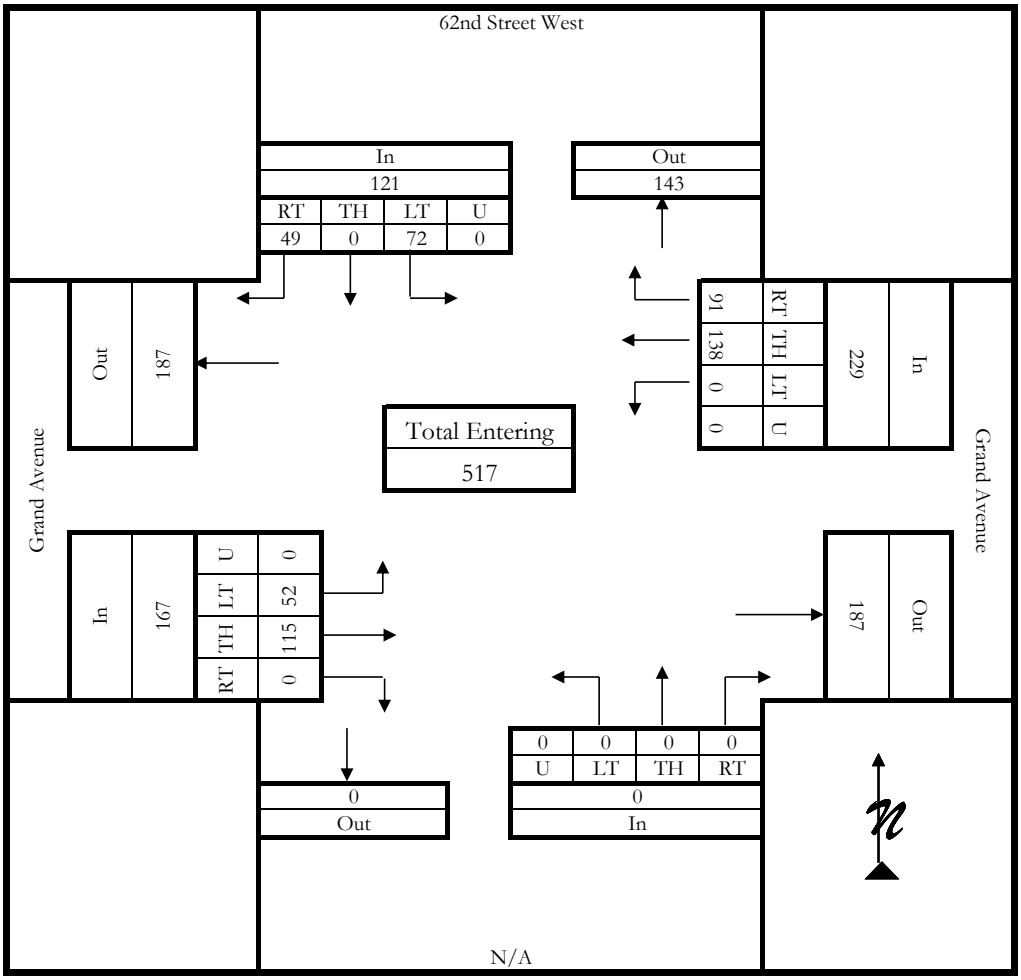
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Grand Avenue & 48th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, May 19, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	62nd Street West	East/West Street:	Grand Avenue

Vehicle Volumes and Adjustments

	62nd Street West Southbound					N/A Northbound					Grand Avenue Eastbound					Grand Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
4:45 PM	11	0	16	0	27	0	0	0	0	0	0	29	15	0	44	22	29	0	0	51	122
5:00 PM	14	0	16	0	30	0	0	0	0	0	0	31	14	0	45	19	33	0	0	52	127
5:15 PM	14	0	27	0	41	0	0	0	0	0	0	27	13	0	40	28	40	0	0	68	149
5:30 PM	10	0	13	0	23	0	0	0	0	0	0	28	10	0	38	22	36	0	0	58	119
Grand Total	49	0	72	0	121	0	0	0	0	0	0	115	52	0	167	91	138	0	0	229	517
Medium Truck %	2.0	0.0	2.8	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.9	0.0	1.8	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.4	
Total Truck %	2.0	0.0	2.8	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.9	0.0	1.8	0.0	0.7	0.0	0.0	0.4	
Total %	9.5	0.0	13.9	0.0	23.4	0.0	0.0	0.0	0.0	0.0	0.0	22.2	10.1	0.0	32.3	17.6	26.7	0.0	0.0	44.3	100.0
PHF	0.74	0.74	0.74			0.00	0.00	0.00			0.93	0.93	0.93			0.84	0.84	0.84			0.87



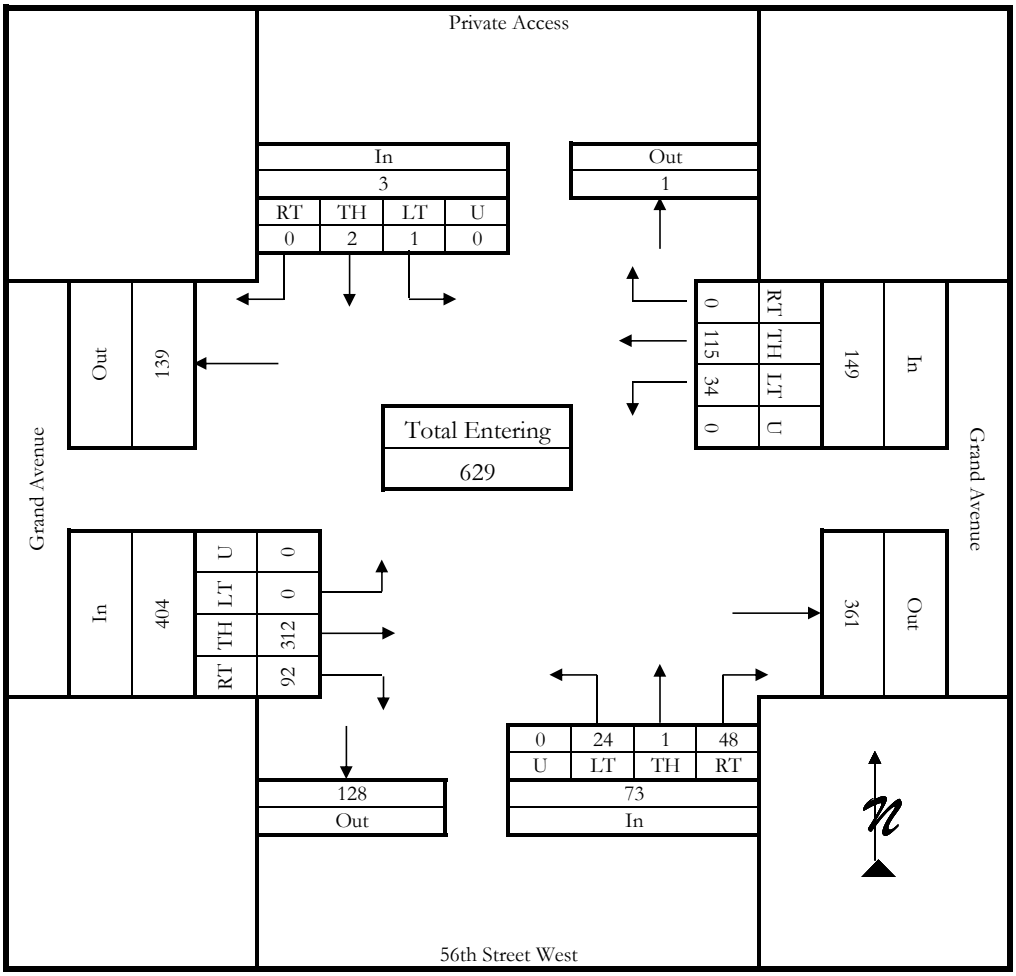
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Grand Avenue & 56th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, May 19, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	56th Street West	East/West Street:	Grand Avenue

Vehicle Volumes and Adjustments

	Private Access Southbound					56th Street West Northbound					Grand Avenue Eastbound					Grand Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
7:15 AM	0	0	1	0	1	9	0	4	0	13	18	72	0	0	90	0	28	9	0	37	141
7:30 AM	0	0	0	0	0	10	1	4	0	15	28	86	0	0	114	0	27	7	0	34	163
7:45 AM	0	2	0	0	2	17	0	7	0	24	30	83	0	0	113	0	24	14	0	38	177
8:00 AM	0	0	0	0	0	12	0	9	0	21	16	71	0	0	87	0	36	4	0	40	148
Grand Total	0	2	1	0	3	48	1	24	0	73	92	312	0	0	404	0	115	34	0	149	629
Medium Truck %	0.0	0.0	0.0	0.0	0.0	18.8	100.0	4.2	0.0	15.1	2.2	1.9	0.0	0.0	2.0	0.0	7.8	2.9	0.0	6.7	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.9	8.8	0.0	2.7	
Total Truck %	0.0	0.0	0.0	0.0	0.0	25.0	100.0	4.2	0.0	19.2	2.2	1.9	0.0	0.0	2.0	0.0	8.7	11.8	0.0	9.4	
Total %	0.0	0.3	0.2	0.0	0.5	7.6	0.2	3.8	0.0	11.6	14.6	49.6	0.0	0.0	64.2	0.0	18.3	5.4	0.0	23.7	100.0
PHF	0.38	0.38	0.38			0.76	0.76	0.76			0.89	0.89	0.89			0.93	0.93	0.93			0.89



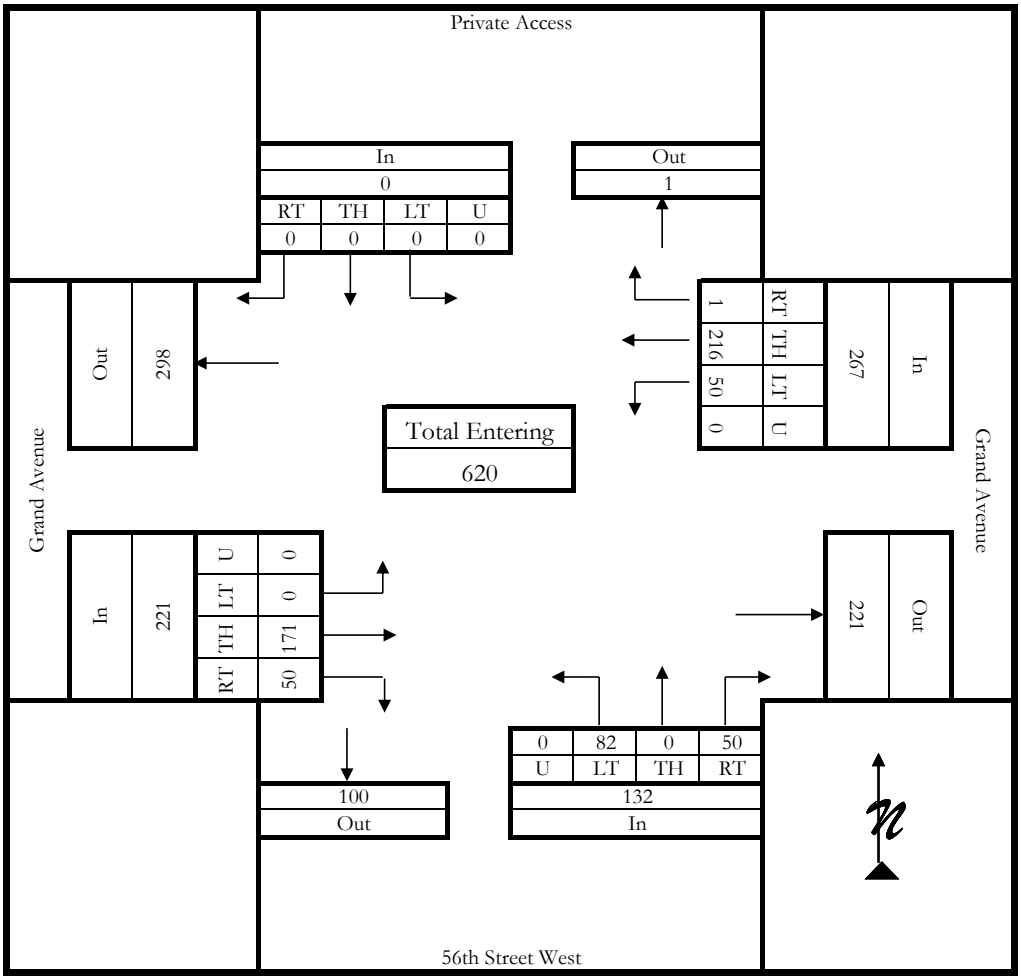
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Grand Avenue & 56th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, May 19, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	56th Street West	East/West Street:	Grand Avenue

Vehicle Volumes and Adjustments

	Private Access Southbound					56th Street West Northbound					Grand Avenue Eastbound					Grand Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
4:45 PM	0	0	0	0	0	8	0	16	0	24	11	43	0	0	54	0	50	9	0	59	137
5:00 PM	0	0	0	0	0	18	0	16	0	34	17	47	0	0	64	1	52	16	0	69	167
5:15 PM	0	0	0	0	0	14	0	30	0	44	14	41	0	0	55	0	58	14	0	72	171
5:30 PM	0	0	0	0	0	10	0	20	0	30	8	40	0	0	48	0	56	11	0	67	145
Grand Total	0	0	0	0	0	50	0	82	0	132	50	171	0	0	221	1	216	50	0	267	620
Medium Truck %	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	2.3	2.0	2.3	0.0	0.0	2.3	0.0	0.0	16.0	0.0	3.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0	0.0	0.7	
Total Truck %	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	3.0	2.0	2.3	0.0	0.0	2.3	0.0	0.5	18.0	0.0	3.7	
Total %	0.0	0.0	0.0	0.0	0.0	8.1	0.0	13.2	0.0	21.3	8.1	27.6	0.0	0.0	35.6	0.2	34.8	8.1	0.0	43.1	100.0
PHF	0.00	0.00	0.00			0.75	0.75	0.75			0.86	0.86	0.86			0.93	0.93	0.93			0.91



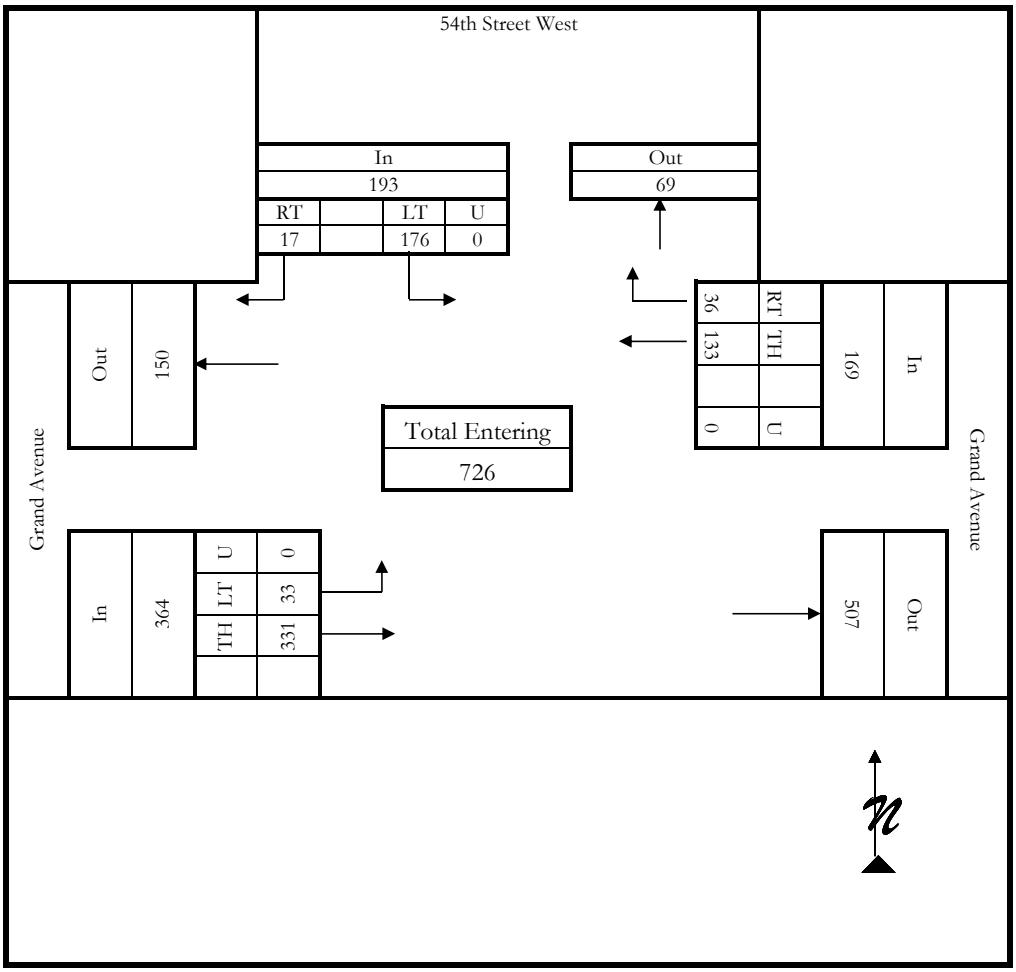
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Grand Avenue & 54th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, May 19, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	54th Street West	East/West Street:	Grand Avenue

Vehicle Volumes and Adjustments

	54th Street West Southbound					Northbound					Grand Avenue Eastbound					Grand Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		0.00	0.00	0.00	0.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
7:15 AM	2	0	44	0	46	0	0	0	0	0	0	75	7	0	82	7	36	0	0	43	171
7:30 AM	5	0	45	0	50	0	0	0	0	0	0	86	10	0	96	7	31	0	0	38	184
7:45 AM	9	0	42	0	51	0	0	0	0	0	0	93	5	0	98	8	27	0	0	35	184
8:00 AM	1	0	45	0	46	0	0	0	0	0	0	77	11	0	88	14	39	0	0	53	187
Grand Total	17	0	176	0	193	0	0	0	0	0	0	331	33	0	364	36	133	0	0	169	726
Medium Truck %	0.0	0.0	2.8	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.4	24.2	0.0	4.4	22.2	8.3	0.0	0.0	11.2	
Heavy Truck %	5.9	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.0	0.5	0.0	1.5	0.0	0.0	1.2	
Total Truck %	5.9	0.0	2.8	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	2.4	30.3	0.0	4.9	22.2	9.8	0.0	0.0	12.4	
Total %	2.3	0.0	24.2	0.0	26.6	0.0	0.0	0.0	0.0	0.0	0.0	45.6	4.5	0.0	50.1	5.0	18.3	0.0	0.0	23.3	100.0
PHF	0.95	0.95	0.95			0.00	0.00	0.00			0.93	0.93	0.93			0.80	0.80	0.80			0.97



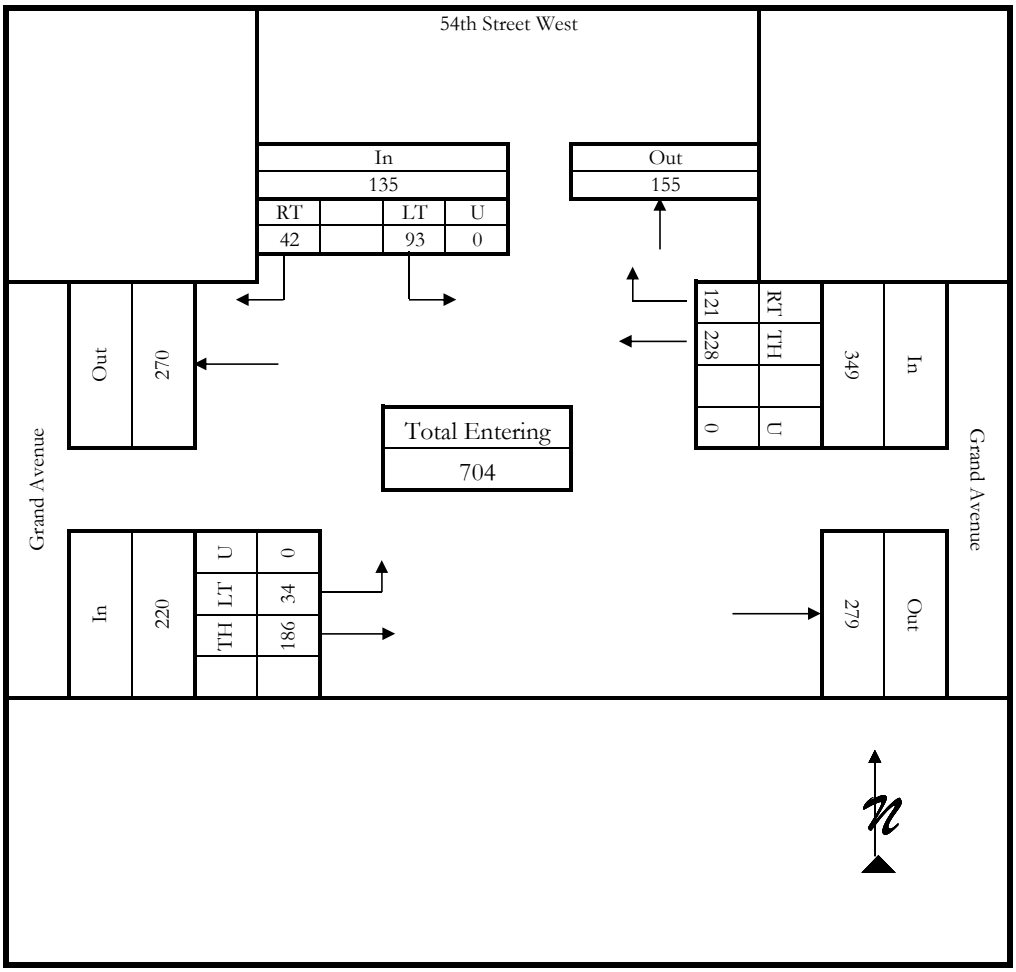
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Grand Avenue & 54th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, May 19, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	54th Street West	East/West Street:	Grand Avenue

Vehicle Volumes and Adjustments

	54th Street West Southbound					Northbound					Grand Avenue Eastbound					Grand Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		0.00	0.00	0.00	0.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
4:45 PM	9	0	27	0	36	0	0	0	0	0	0	49	4	0	53	30	51	0	0	81	170
5:00 PM	9	0	23	0	32	0	0	0	0	0	0	53	13	0	66	24	62	0	0	86	184
5:15 PM	12	0	18	0	30	0	0	0	0	0	0	42	11	0	53	33	61	0	0	94	177
5:30 PM	12	0	25	0	37	0	0	0	0	0	0	42	6	0	48	34	54	0	0	88	173
Grand Total	42	0	93	0	135	0	0	0	0	0	0	186	34	0	220	121	228	0	0	349	704
Medium Truck %	16.7	0.0	1.1	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.9	0.0	2.7	0.8	0.0	0.0	0.0	0.3	
Heavy Truck %	2.4	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.9	0.0	0.0	0.6	
Total Truck %	19.0	0.0	1.1	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	3.2	2.9	0.0	3.2	0.8	0.9	0.0	0.0	0.9	
Total %	6.0	0.0	13.2	0.0	19.2	0.0	0.0	0.0	0.0	0.0	0.0	26.4	4.8	0.0	31.3	17.2	32.4	0.0	0.0	49.6	100.0
PHF	0.91	0.91	0.91			0.00	0.00	0.00			0.83	0.83	0.83			0.93	0.93	0.93			0.96



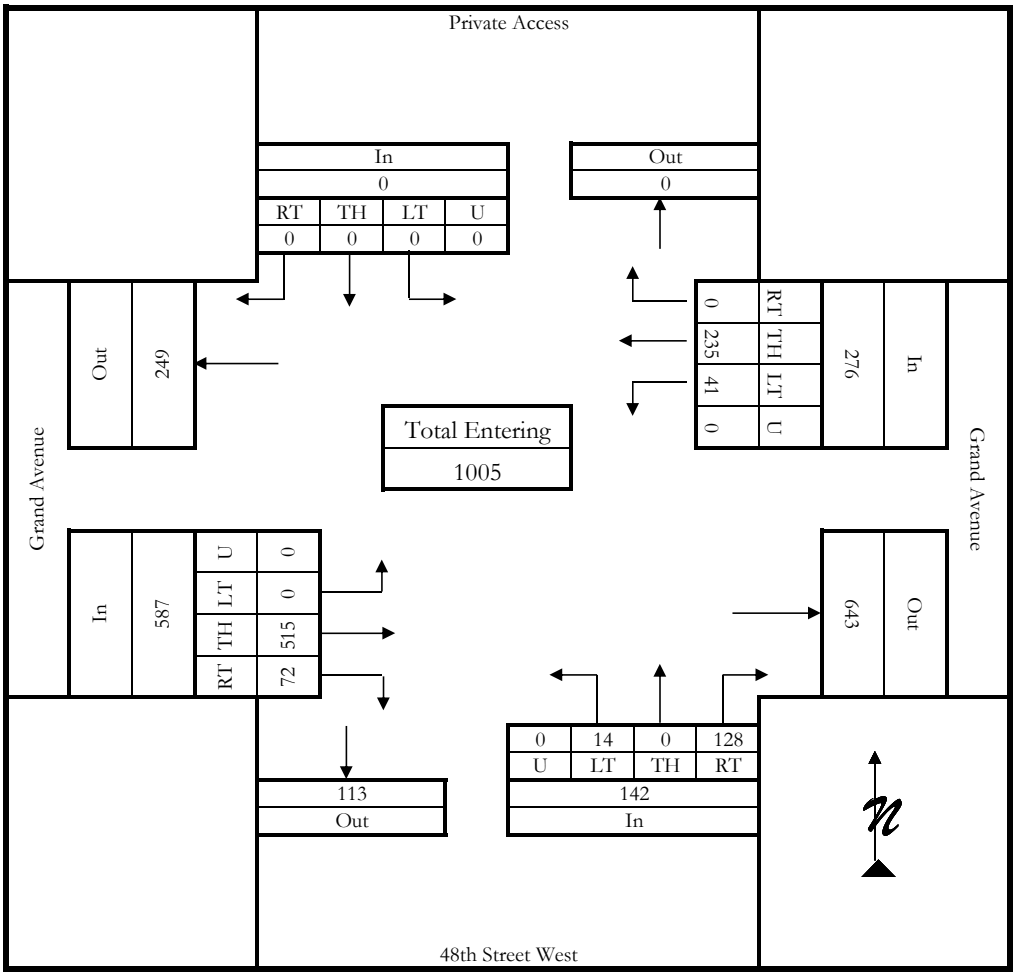
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Grand Avenue & 48th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, May 19, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	48th Street West	East/West Street:	Grand Avenue

Vehicle Volumes and Adjustments

	Private Access Southbound					48th Street West Northbound					Grand Avenue Eastbound					Grand Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
7:15 AM	0	0	0	0	0	26	0	2	0	28	19	110	0	0	129	0	51	5	0	56	213
7:30 AM	0	0	0	0	0	29	0	6	0	35	10	131	0	0	141	0	39	3	0	42	218
7:45 AM	0	0	0	0	0	36	0	6	0	42	19	135	0	0	154	0	61	15	0	76	272
8:00 AM	0	0	0	0	0	37	0	0	0	37	24	139	0	0	163	0	84	18	0	102	302
Grand Total	0	0	0	0	0	128	0	14	0	142	72	515	0	0	587	0	235	41	0	276	1005
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.8	0.0	7.1	0.0	1.4	1.4	2.1	0.0	0.0	2.0	0.0	5.5	2.4	0.0	5.1	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.7	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.8	0.0	7.1	0.0	1.4	1.4	2.1	0.0	0.0	2.0	0.0	6.4	2.4	0.0	5.8	
Total %	0.0	0.0	0.0	0.0	0.0	12.7	0.0	1.4	0.0	14.1	7.2	51.2	0.0	0.0	58.4	0.0	23.4	4.1	0.0	27.5	100.0
PHF	0.00	0.00	0.00			0.85	0.85	0.85			0.90	0.90	0.90			0.68	0.68	0.68			0.83



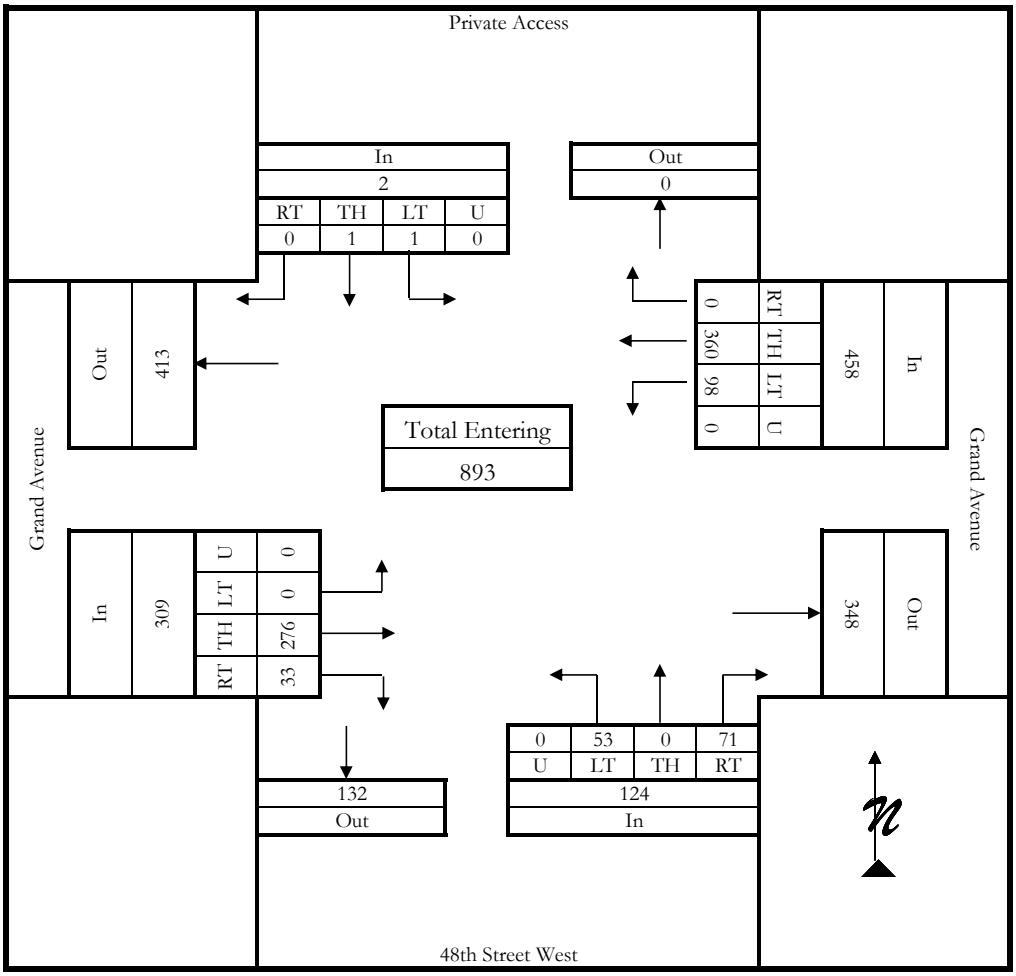
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Grand Avenue & 48th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, May 19, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	48th Street West	East/West Street:	Grand Avenue

Vehicle Volumes and Adjustments

	Private Access Southbound					48th Street West Northbound					Grand Avenue Eastbound					Grand Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.96	0.96	0.96	0.96		0.96	0.96	0.96	0.96		
4:45 PM	0	0	0	0	0	15	0	13	0	28	10	73	0	0	83	0	80	21	0	101	212
5:00 PM	0	0	0	0	0	22	0	13	0	35	7	76	0	0	83	0	93	26	0	119	237
5:15 PM	0	1	1	0	2	17	0	16	0	33	8	60	0	0	68	0	95	25	0	120	223
5:30 PM	0	0	0	0	0	17	0	11	0	28	8	67	0	0	75	0	92	26	0	118	221
Grand Total	0	1	1	0	2	71	0	53	0	124	33	276	0	0	309	0	360	98	0	458	893
Medium Truck %	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	1.6	3.0	1.8	0.0	0.0	1.9	0.0	0.3	0.0	0.0	0.2	
Heavy Truck %	0.0	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	0.3	0.0	0.6	0.0	0.0	0.4	
Total Truck %	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	1.6	3.0	2.2	0.0	0.0	2.3	0.0	0.8	0.0	0.0	0.7	
Total %	0.0	0.1	0.1	0.0	0.2	8.0	0.0	5.9	0.0	13.9	3.7	30.9	0.0	0.0	34.6	0.0	40.3	11.0	0.0	51.3	100.0
PHF	0.25	0.25	0.25			0.89	0.89	0.89			0.93	0.93	0.93			0.95	0.95	0.95			0.94



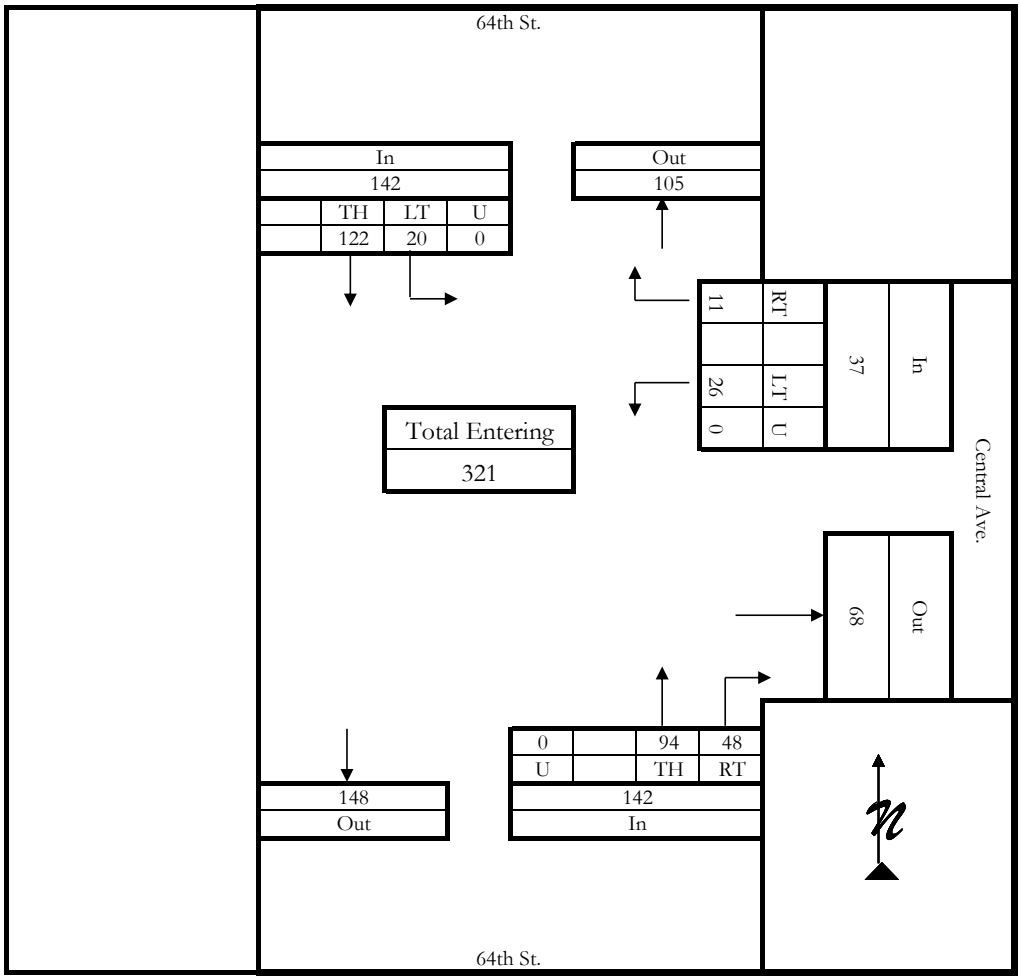
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Central Ave. & 64th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	64th St.	East/West Street:	Central Ave.

Vehicle Volumes and Adjustments

	64th St. Southbound					64th St. Northbound					N/A Eastbound					Central Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		0.00	0.00	0.00	0.00		1.12	1.12	1.12	1.12		
7:15 AM	0	26	8	0	34	9	16	0	0	25	0	0	0	0	0	1	0	3	0	4	63
7:30 AM	0	31	3	0	34	8	17	0	0	25	0	0	0	0	0	4	0	7	0	11	70
7:45 AM	0	41	9	0	50	15	30	0	0	45	0	0	0	0	0	6	0	10	0	16	111
8:00 AM	0	24	0	0	24	16	31	0	0	47	0	0	0	0	0	0	0	6	0	6	77
Grand Total	0	122	20	0	142	48	94	0	0	142	0	0	0	0	0	11	0	26	0	37	321
Medium Truck %	0.0	0.8	0.0	0.0	0.7	0.0	1.1	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	0.0	0.8	0.0	0.0	0.7	0.0	3.2	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total %	0.0	38.0	6.2	0.0	44.2	15.0	29.3	0.0	0.0	44.2	0.0	0.0	0.0	0.0	0.0	3.4	0.0	8.1	0.0	11.5	100.0
PHF	0.71	0.71	0.71			0.76	0.76	0.76			0.00	0.00	0.00			0.58	0.58	0.58			0.72



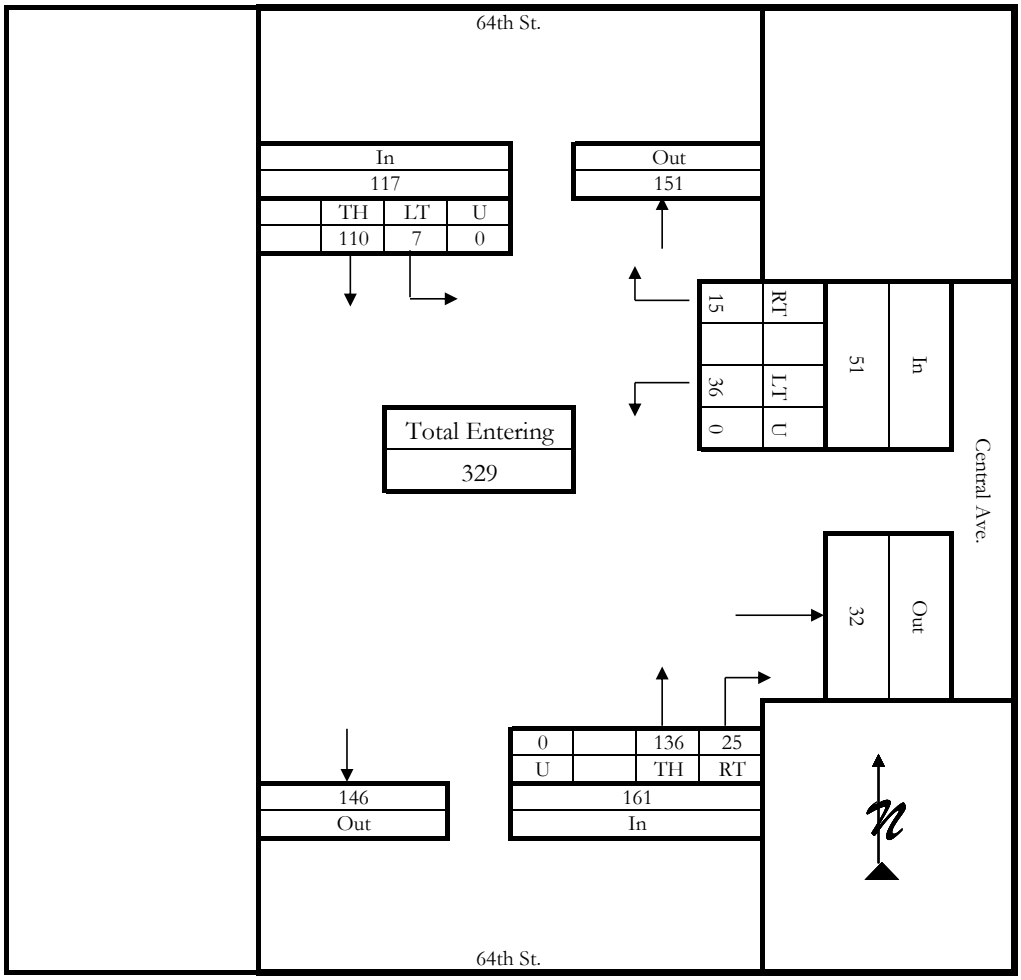
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Central Ave. & 64th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	64th St.	East/West Street:	Central Ave.

Vehicle Volumes and Adjustments

	64th St. Southbound					64th St. Northbound					N/A Eastbound					Central Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		0.00	0.00	0.00	0.00		1.12	1.12	1.12	1.12		
4:45 PM	0	29	2	0	31	2	32	0	0	34	0	0	0	0	0	4	0	8	0	12	77
5:00 PM	0	39	2	0	41	7	34	0	0	41	0	0	0	0	0	3	0	15	0	18	100
5:15 PM	0	21	1	0	22	7	40	0	0	47	0	0	0	0	0	4	0	7	0	11	80
5:30 PM	0	21	2	0	23	9	30	0	0	39	0	0	0	0	0	4	0	6	0	10	72
Grand Total	0	110	7	0	117	25	136	0	0	161	0	0	0	0	0	15	0	36	0	51	329
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.9	0.0	0.0	0.9	4.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	0.0	0.9	0.0	0.0	0.9	4.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total %	0.0	33.4	2.1	0.0	35.6	7.6	41.3	0.0	0.0	48.9	0.0	0.0	0.0	0.0	0.0	4.6	0.0	10.9	0.0	15.5	100.0
PHF	0.71	0.71	0.71			0.86	0.86	0.86			0.00	0.00	0.00			0.71	0.71	0.71			0.82



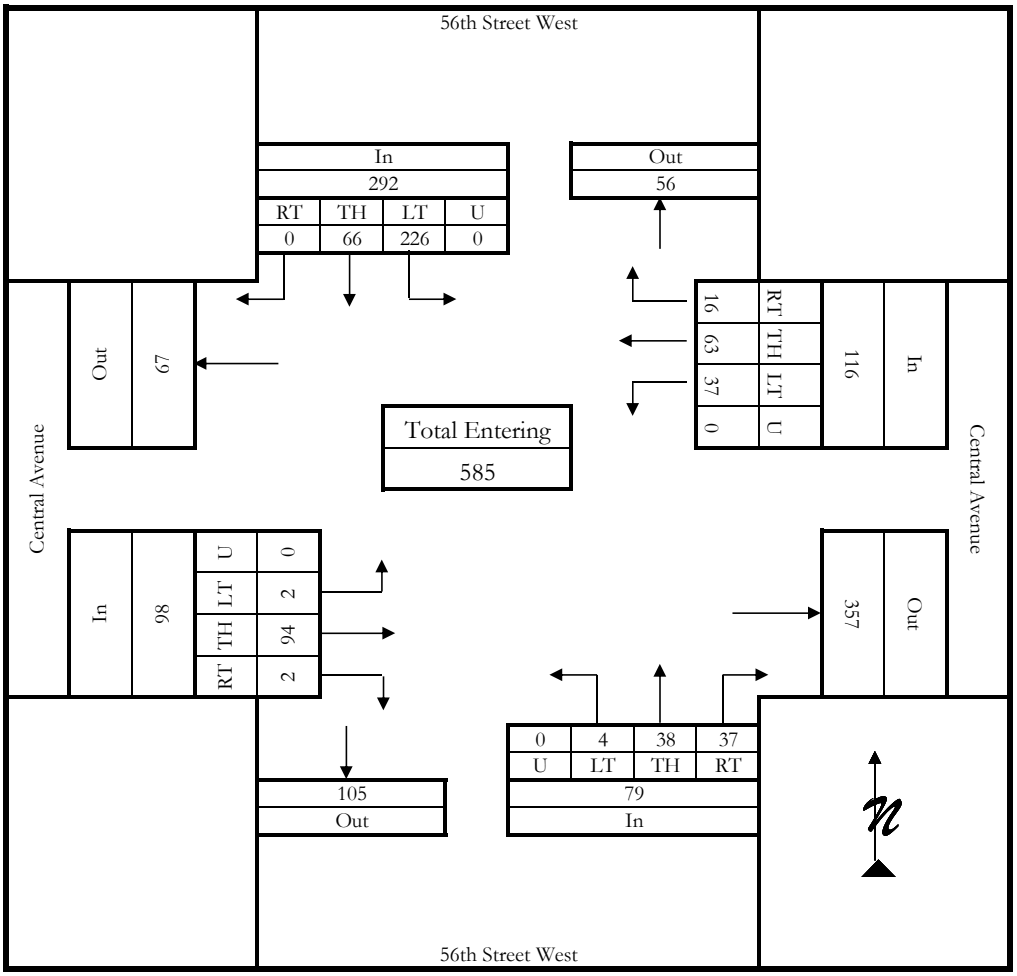
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Central Avenue & 56th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, April 14, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	14063.01	Project Description:	West End Middle School TIS
North/South Street:	56th Street West	East/West Street:	Central Avenue

Vehicle Volumes and Adjustments

	56th Street West Southbound					56th Street West Northbound					Central Avenue Eastbound					Central Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		
7:15 AM	0	18	51	0	69	7	7	2	0	16	1	16	0	0	17	4	16	7	0	27	129
7:30 AM	0	15	72	0	87	10	6	0	0	16	1	26	1	0	28	4	7	8	0	19	150
7:45 AM	0	16	53	0	69	9	9	1	0	19	0	30	1	0	31	5	24	15	0	44	163
8:00 AM	0	17	50	0	67	11	16	1	0	28	0	22	0	0	22	3	16	7	0	26	143
Grand Total	0	66	226	0	292	37	38	4	0	79	2	94	2	0	98	16	63	37	0	116	585
Medium Truck %	0.0	3.0	2.7	0.0	2.7	2.7	13.2	0.0	0.0	7.6	0.0	3.2	0.0	0.0	3.1	18.8	1.6	2.7	0.0	4.3	
Heavy Truck %	0.0	4.5	0.0	0.0	1.0	5.4	5.3	0.0	0.0	5.1	0.0	1.1	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	0.0	7.6	2.7	0.0	3.8	8.1	18.4	0.0	0.0	12.7	0.0	4.3	0.0	0.0	4.1	18.8	1.6	2.7	0.0	4.3	
Total %	0.0	11.3	38.6	0.0	49.9	6.3	6.5	0.7	0.0	13.5	0.3	16.1	0.3	0.0	16.8	2.7	10.8	6.3	0.0	19.8	100.0
PHF	0.84	0.84	0.84			0.71	0.71	0.71			0.79	0.79	0.79			0.66	0.66	0.66			0.90



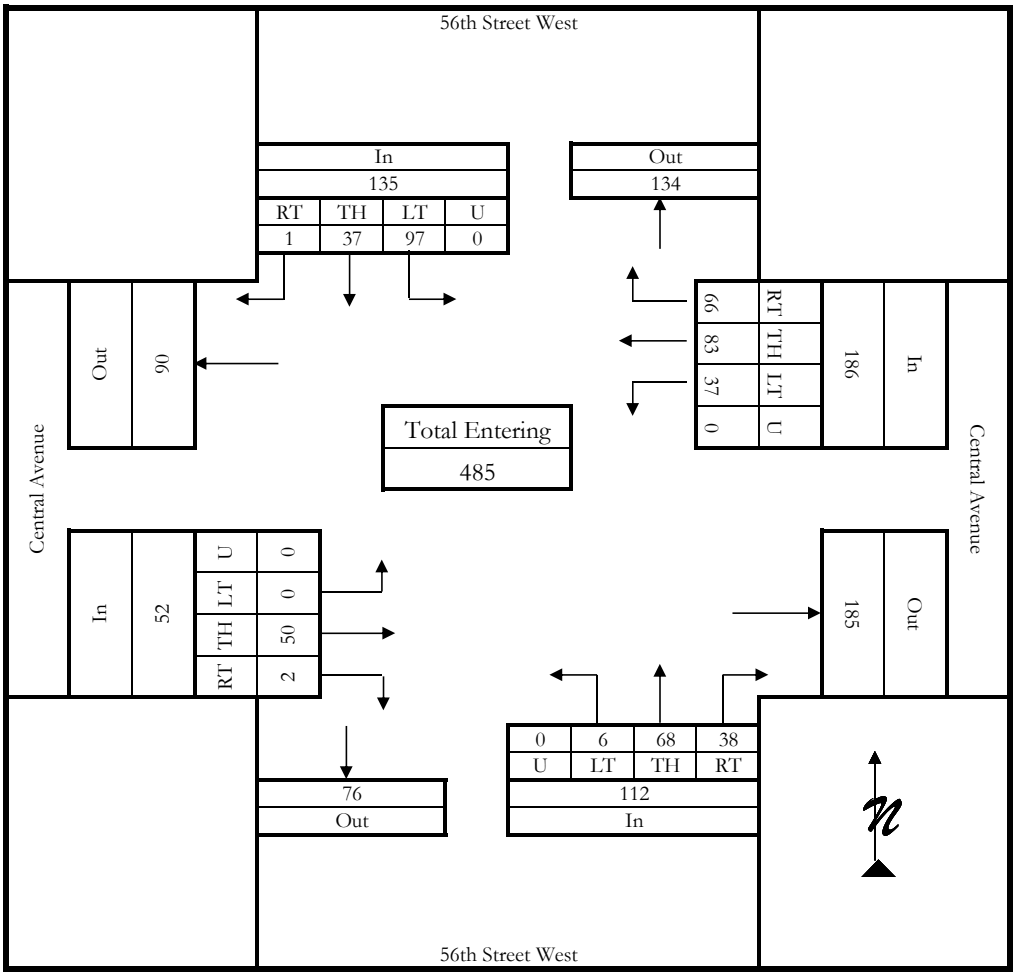
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	V. Morasko	Intersection:	Central Avenue & 56th Street West
Agency/Company:	Sanderson Stewart		
Date Performed:	Tuesday, April 14, 2015	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (5:00 - 6:00 PM)		
Project Number:	HSIP 56(82)	Project Description:	SF 139 - Rndabout Central & 56th
North/South Street:	56th Street West	East/West Street:	Central Avenue

Vehicle Volumes and Adjustments

	56th Street West Southbound					56th Street West Northbound					Central Avenue Eastbound					Central Avenue Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		0.99	0.99	0.99	0.99		
4:45 PM	0	11	27	0	38	6	12	1	0	19	0	10	0	0	10	13	25	4	0	42	109
5:00 PM	1	4	26	0	31	2	16	5	0	23	0	18	0	0	18	11	22	13	0	46	118
5:15 PM	0	11	22	0	33	15	20	0	0	35	1	11	0	0	12	21	18	10	0	49	129
5:30 PM	0	11	22	0	33	15	20	0	0	35	1	11	0	0	12	21	18	10	0	49	129
Grand Total	1	37	97	0	135	38	68	6	0	112	2	50	0	0	52	66	83	37	0	186	485
Medium Truck %	0.0	0.0	1.0	0.0	0.7	5.3	1.5	16.7	0.0	3.6	0.0	2.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	0.0	0.0	1.0	0.0	0.7	5.3	4.4	16.7	0.0	5.4	0.0	2.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0	
Total %	0.2	7.6	20.0	0.0	27.8	7.8	14.0	1.2	0.0	23.1	0.4	10.3	0.0	0.0	10.7	13.6	17.1	7.6	0.0	38.4	100.0
PHF	0.89	0.89	0.89			0.80	0.80	0.80			0.72	0.72	0.72			0.95	0.95	0.95			0.94



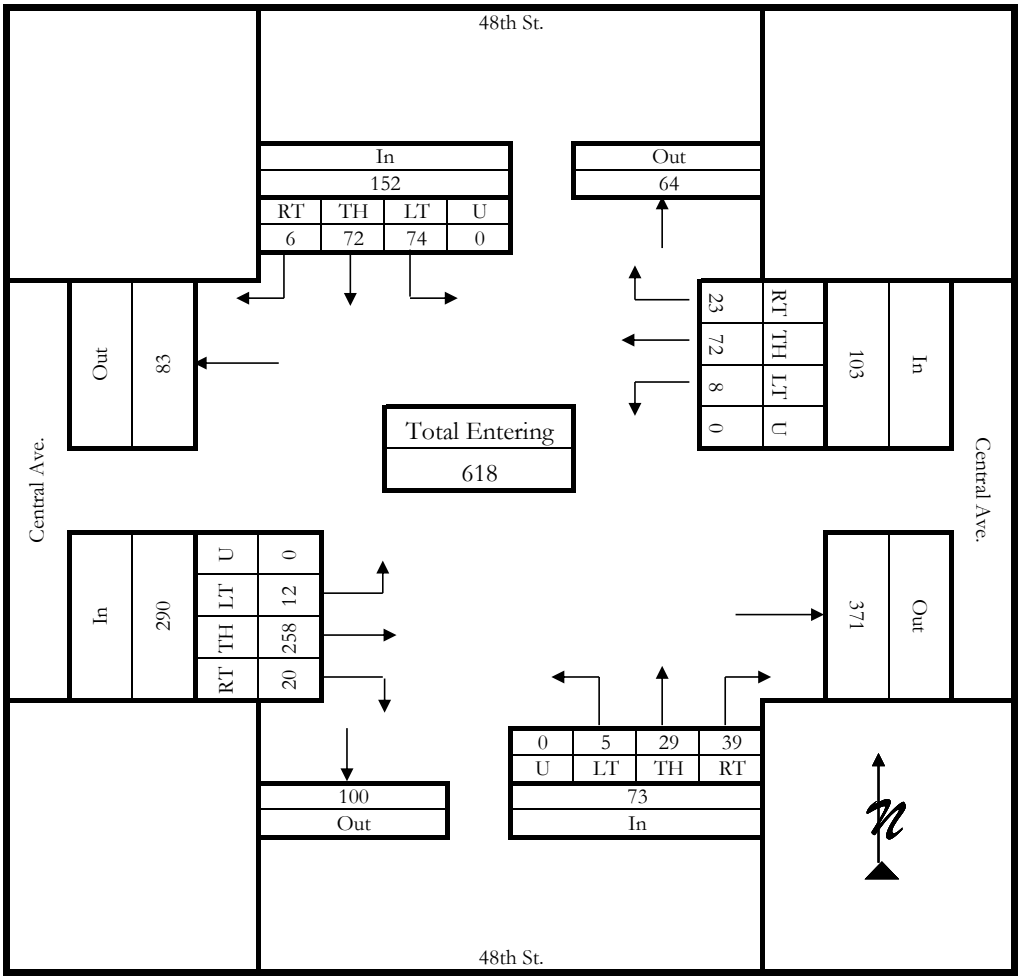
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Central Ave. & 48th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	48th St.	East/West Street:	Central Ave.

Vehicle Volumes and Adjustments

	48th St. Southbound					48th St. Northbound					Central Ave. Eastbound					Central Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
7:15 AM	1	15	7	0	23	6	4	1	0	11	3	58	2	0	63	9	15	1	0	25	122
7:30 AM	0	26	28	0	54	16	6	2	0	24	9	72	2	0	83	6	15	3	0	24	185
7:45 AM	1	13	20	0	34	9	7	0	0	16	1	80	6	0	87	4	24	2	0	30	167
8:00 AM	4	18	19	0	41	8	12	2	0	22	7	48	2	0	57	4	18	2	0	24	144
Grand Total	6	72	74	0	152	39	29	5	0	73	20	258	12	0	290	23	72	8	0	103	618
Medium Truck %	0.0	0.0	2.7	0.0	1.3	0.0	0.0	20.0	0.0	1.4	0.0	1.2	0.0	0.0	1.0	0.0	2.8	0.0	0.0	1.9	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	1.0	
Total Truck %	0.0	0.0	2.7	0.0	1.3	0.0	3.4	20.0	0.0	2.7	0.0	1.2	0.0	0.0	1.0	0.0	4.2	0.0	0.0	2.9	
Total %	1.0	11.7	12.0	0.0	24.6	6.3	4.7	0.8	0.0	11.8	3.2	41.7	1.9	0.0	46.9	3.7	11.7	1.3	0.0	16.7	100.0
PHF	0.70	0.70	0.70			0.76	0.76	0.76			0.83	0.83	0.83			0.86	0.86	0.86			0.84



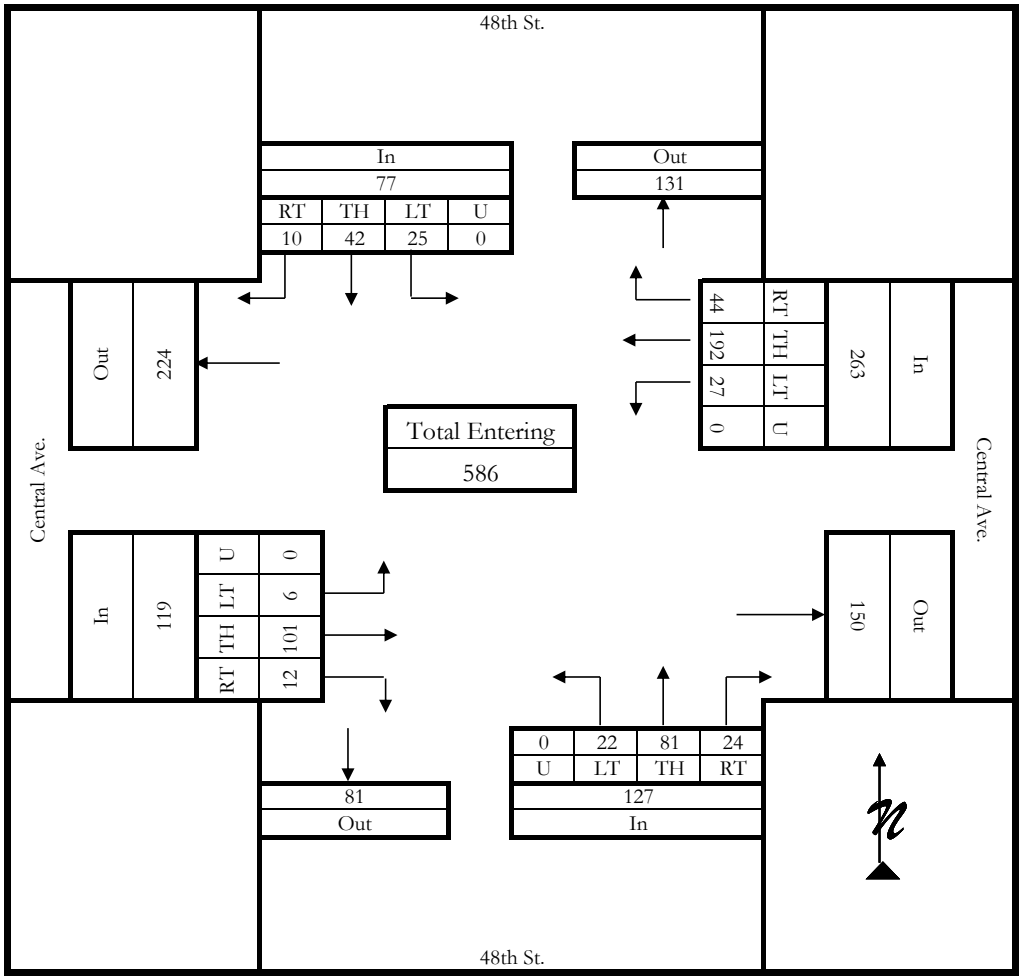
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Central Ave. & 48th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	48th St.	East/West Street:	Central Ave.

Vehicle Volumes and Adjustments

	48th St. Southbound					48th St. Northbound					Central Ave. Eastbound					Central Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
4:45 PM	1	12	10	0	23	6	20	6	0	32	4	22	1	0	27	7	35	10	0	52	134
5:00 PM	2	11	6	0	19	3	25	5	0	33	2	24	1	0	27	8	49	7	0	64	143
5:15 PM	2	10	6	0	18	9	22	5	0	36	3	25	3	0	31	17	52	6	0	75	160
5:30 PM	5	9	3	0	17	6	14	6	0	26	3	30	1	0	34	12	56	4	0	72	149
Grand Total	10	42	25	0	77	24	81	22	0	127	12	101	6	0	119	44	192	27	0	263	586
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	4.0	0.0	1.3	0.0	1.2	0.0	0.0	0.8	0.0	1.0	0.0	0.0	0.8	2.3	0.5	0.0	0.0	0.8	
Total Truck %	0.0	0.0	4.0	0.0	1.3	0.0	1.2	0.0	0.0	0.8	0.0	1.0	0.0	0.0	0.8	2.3	0.5	0.0	0.0	0.8	
Total %	1.7	7.2	4.3	0.0	13.1	4.1	13.8	3.8	0.0	21.7	2.0	17.2	1.0	0.0	20.3	7.5	32.8	4.6	0.0	44.9	100.0
PHF	0.84	0.84	0.84			0.88	0.88	0.88			0.88	0.88	0.88			0.88	0.88	0.88			0.92



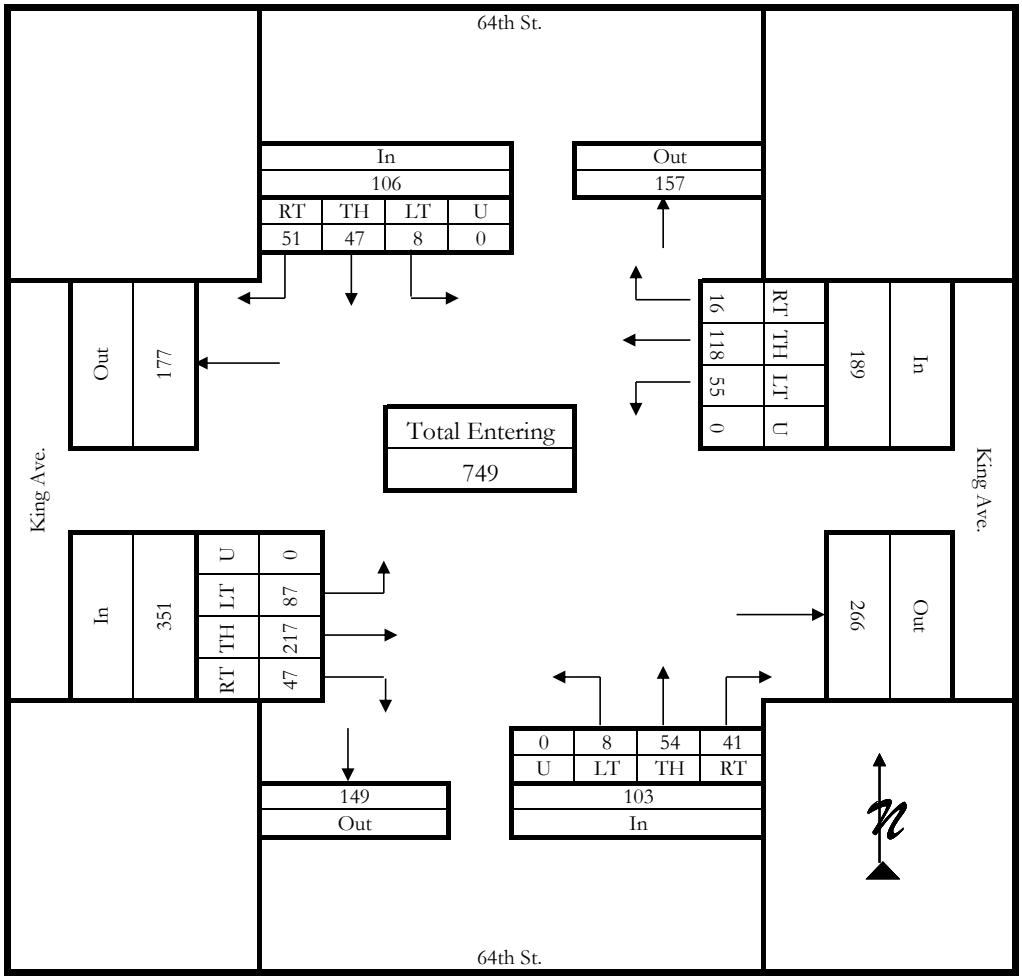
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	King Ave. & 64th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	64th St.	East/West Street:	King Ave.

Vehicle Volumes and Adjustments

	64th St. Southbound					64th St. Northbound					King Ave. Eastbound					King Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
7:15 AM	14	7	0	0	21	2	3	0	0	5	3	57	20	0	80	6	20	3	0	29	135
7:30 AM	10	8	3	0	21	0	6	1	0	7	13	66	22	0	101	4	38	18	0	60	189
7:45 AM	12	26	2	0	40	22	21	4	0	47	30	48	24	0	102	6	38	32	0	76	265
8:00 AM	15	6	3	0	24	17	24	3	0	44	1	46	21	0	68	0	22	2	0	24	160
Grand Total	51	47	8	0	106	41	54	8	0	103	47	217	87	0	351	16	118	55	0	189	749
Medium Truck %	0.0	2.1	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	4.3	0.5	0.0	0.0	0.9	6.3	1.7	0.0	0.0	1.6	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	1.0	0.0	1.4	0.0	0.0	0.9	12.5	5.9	0.0	0.0	4.8	
Total Truck %	0.0	2.1	0.0	0.0	0.9	2.4	0.0	0.0	0.0	1.0	4.3	1.8	0.0	0.0	1.7	18.8	7.6	0.0	0.0	6.3	
Total %	6.8	6.3	1.1	0.0	14.2	5.5	7.2	1.1	0.0	13.8	6.3	29.0	11.6	0.0	46.9	2.1	15.8	7.3	0.0	25.2	100.0
PHF	0.66	0.66	0.66			0.55	0.55	0.55			0.86	0.86	0.86			0.62	0.62	0.62			0.71



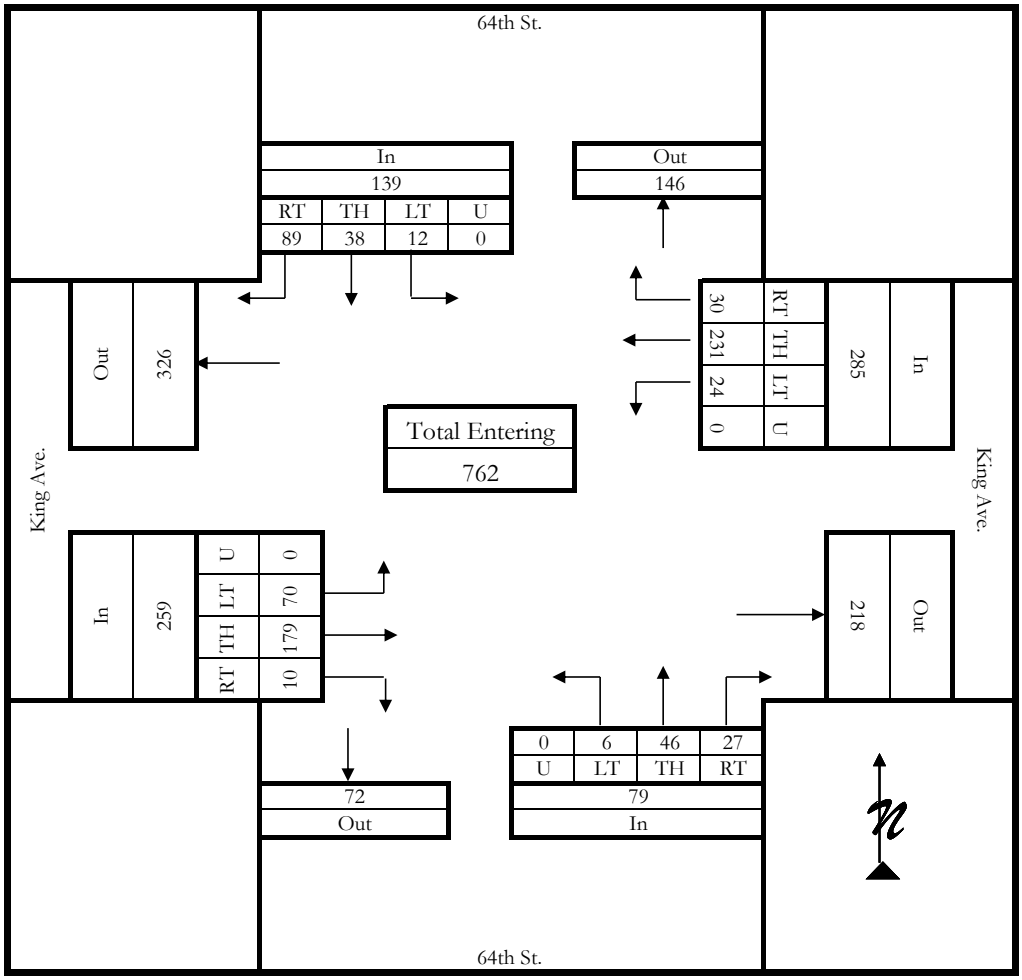
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	King Ave. & 64th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	64th St.	East/West Street:	King Ave.

Vehicle Volumes and Adjustments

	64th St. Southbound					64th St. Northbound					King Ave. Eastbound					King Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
4:45 PM	21	9	1	0	31	11	7	2	0	20	3	36	11	0	50	8	53	9	0	70	171
5:00 PM	30	12	6	0	48	6	13	1	0	20	6	59	19	0	84	8	71	8	0	87	239
5:15 PM	23	8	2	0	33	6	18	2	0	26	1	43	19	0	63	6	66	4	0	76	198
5:30 PM	15	9	3	0	27	4	8	1	0	13	0	41	21	0	62	8	41	3	0	52	154
Grand Total	89	38	12	0	139	27	46	6	0	79	10	179	70	0	259	30	231	24	0	285	762
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	1.1	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.3	0.0	0.0	1.4	
Total Truck %	1.1	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	1.3	0.0	0.0	1.4	
Total %	11.7	5.0	1.6	0.0	18.2	3.5	6.0	0.8	0.0	10.4	1.3	23.5	9.2	0.0	34.0	3.9	30.3	3.1	0.0	37.4	100.0
PHF	0.72	0.72	0.72			0.76	0.76	0.76			0.77	0.77	0.77			0.82	0.82	0.82			0.80



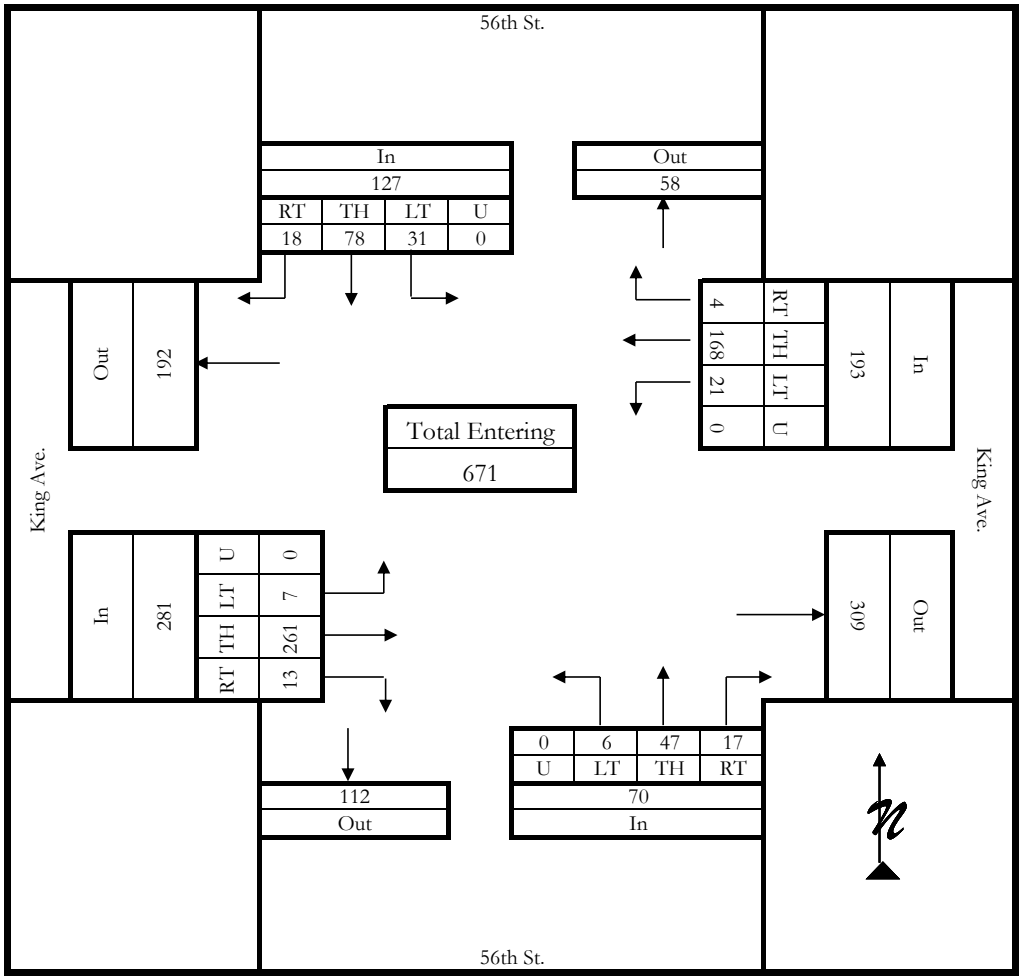
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	King Ave. West & 56th St. West
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	56th St.	East/West Street:	King Ave.

Vehicle Volumes and Adjustments

	56th St. Southbound					56th St. Northbound					King Ave. Eastbound					King Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
7:15 AM	0	12	8	0	20	7	3	3	0	13	4	53	1	0	58	1	27	6	0	34	125
7:30 AM	9	21	6	0	36	3	13	1	0	17	4	73	2	0	79	1	56	8	0	65	197
7:45 AM	8	25	10	0	43	3	21	2	0	26	3	78	1	0	82	1	56	4	0	61	212
8:00 AM	1	20	7	0	28	4	10	0	0	14	2	57	3	0	62	1	29	3	0	33	137
Grand Total	18	78	31	0	127	17	47	6	0	70	13	261	7	0	281	4	168	21	0	193	671
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0	0.4	0.0	1.8	0.0	0.0	1.6	
Heavy Truck %	0.0	3.8	0.0	0.0	2.4	0.0	2.1	16.7	0.0	2.9	7.7	1.5	14.3	0.0	2.1	0.0	6.5	9.5	0.0	6.7	
Total Truck %	0.0	3.8	0.0	0.0	2.4	0.0	2.1	16.7	0.0	2.9	15.4	1.5	14.3	0.0	2.5	0.0	8.3	9.5	0.0	8.3	
Total %	2.7	11.6	4.6	0.0	18.9	2.5	7.0	0.9	0.0	10.4	1.9	38.9	1.0	0.0	41.9	0.6	25.0	3.1	0.0	28.8	100.0
PHF	0.74	0.74	0.74			0.67	0.67	0.67			0.86	0.86	0.86			0.74	0.74	0.74			0.79



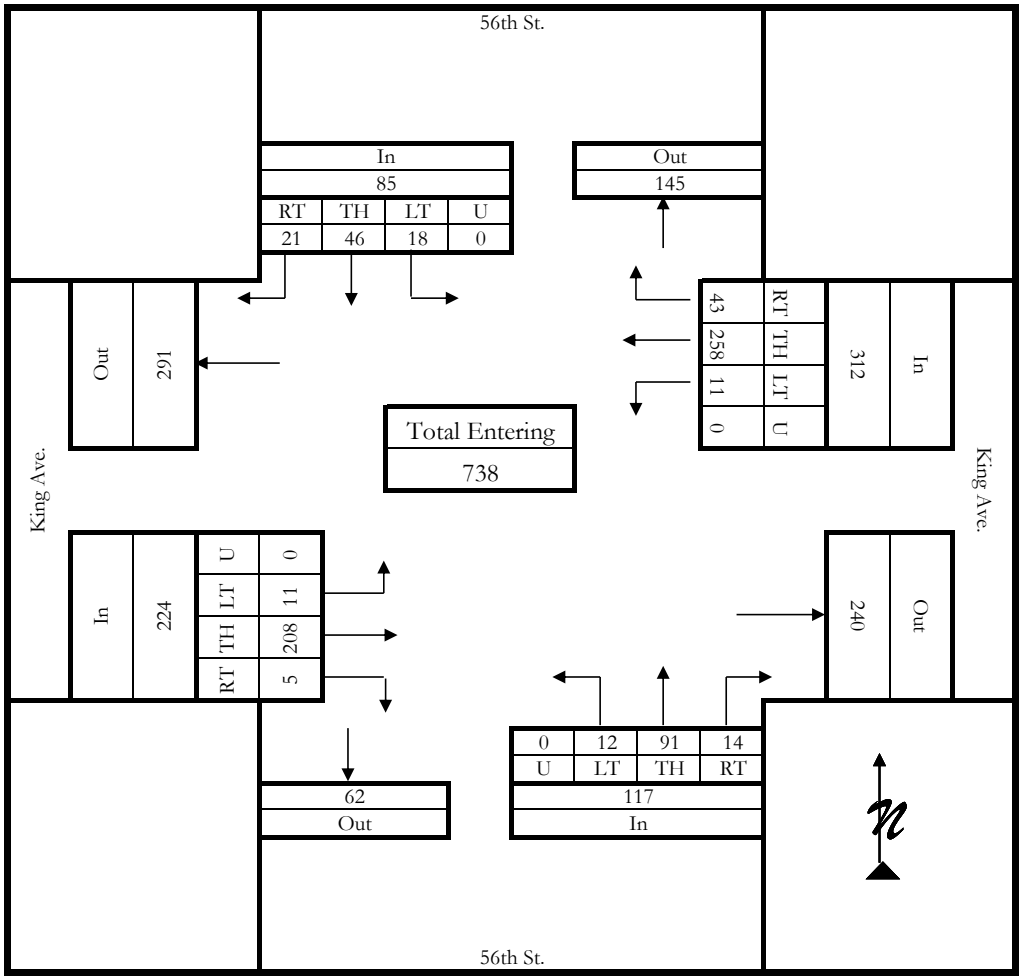
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	King Ave. West & 56th St. West
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	56th St.	East/West Street:	King Ave.

Vehicle Volumes and Adjustments

	56th St. Southbound					56th St. Northbound					King Ave. Eastbound					King Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
4:45 PM	4	7	4	0	15	1	22	2	0	25	2	44	1	0	47	10	58	2	0	70	157
5:00 PM	6	11	4	0	21	8	29	7	0	44	3	66	4	0	73	10	73	4	0	87	225
5:15 PM	4	18	8	0	30	3	25	2	0	30	0	54	2	0	56	11	74	2	0	87	203
5:30 PM	7	10	2	0	19	2	15	1	0	18	0	44	4	0	48	12	53	3	0	68	153
Grand Total	21	46	18	0	85	14	91	12	0	117	5	208	11	0	224	43	258	11	0	312	738
Medium Truck %	4.8	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	4.3	11.1	0.0	4.7	0.0	2.2	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	1.3	
Total Truck %	4.8	4.3	11.1	0.0	5.9	0.0	2.2	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	1.3	
Total %	2.8	6.2	2.4	0.0	11.5	1.9	12.3	1.6	0.0	15.9	0.7	28.2	1.5	0.0	30.4	5.8	35.0	1.5	0.0	42.3	100.0
PHF	0.71	0.71	0.71			0.66	0.66	0.66			0.77	0.77	0.77			0.90	0.90	0.90			0.82



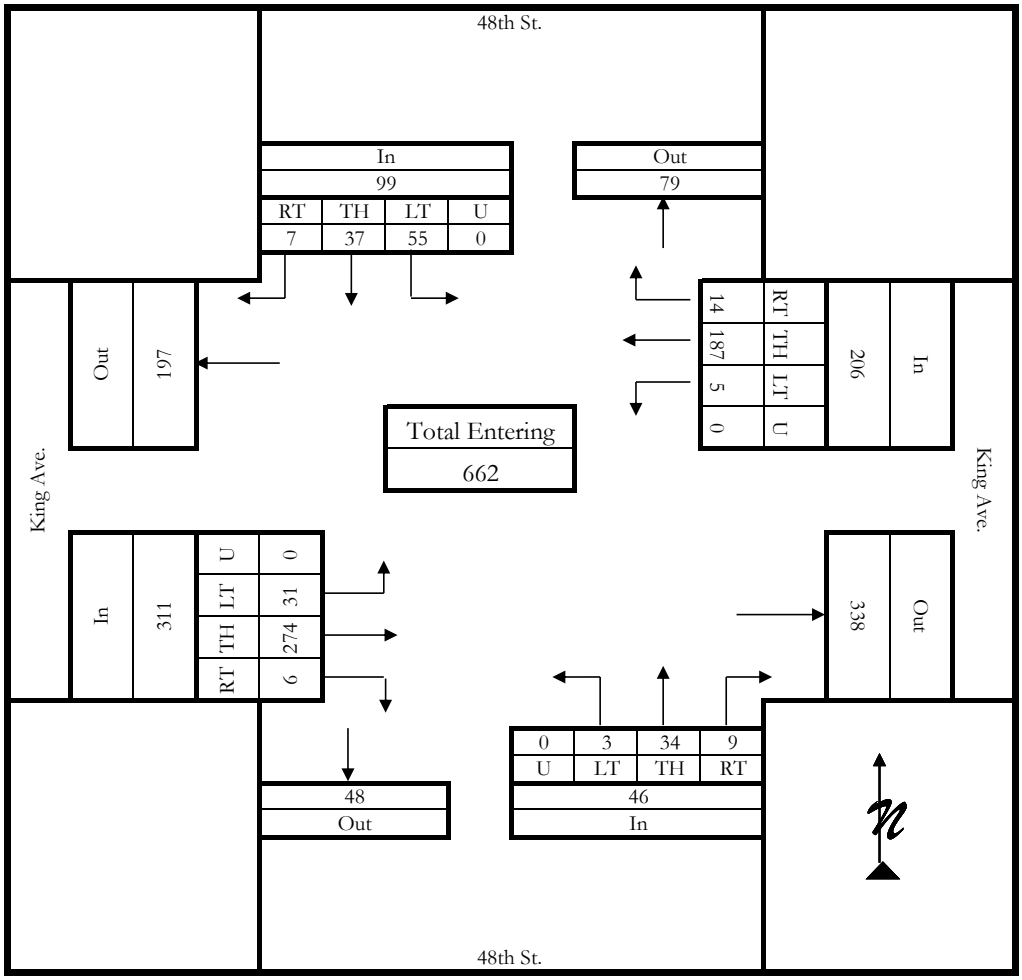
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	King Ave. & 48th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	48th St.	East/West Street:	King Ave.

Vehicle Volumes and Adjustments

	48th St. Southbound					48th St. Northbound					King Ave. Eastbound					King Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
7:15 AM	1	10	8	0	19	1	5	0	0	6	1	58	6	0	65	2	37	1	0	40	130
7:30 AM	2	12	19	0	33	4	11	1	0	16	2	82	9	0	93	3	59	1	0	63	205
7:45 AM	2	9	14	0	25	3	9	0	0	12	1	69	9	0	79	3	57	3	0	63	179
8:00 AM	2	6	14	0	22	1	9	2	0	12	2	65	7	0	74	6	34	0	0	40	148
Grand Total	7	37	55	0	99	9	34	3	0	46	6	274	31	0	311	14	187	5	0	206	662
Medium Truck %	0.0	0.0	0.0	0.0	0.0	11.1	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	7.1	1.6	0.0	0.0	1.9	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0	2.2	0.0	1.5	0.0	0.0	1.3	0.0	7.0	40.0	0.0	7.3	
Total Truck %	0.0	0.0	0.0	0.0	0.0	11.1	0.0	33.3	0.0	4.3	0.0	1.5	0.0	0.0	1.3	7.1	8.6	40.0	0.0	9.2	
Total %	1.1	5.6	8.3	0.0	15.0	1.4	5.1	0.5	0.0	6.9	0.9	41.4	4.7	0.0	47.0	2.1	28.2	0.8	0.0	31.1	100.0
PHF	0.75	0.75	0.75			0.72	0.72	0.72			0.84	0.84	0.84			0.82	0.82	0.82			0.81



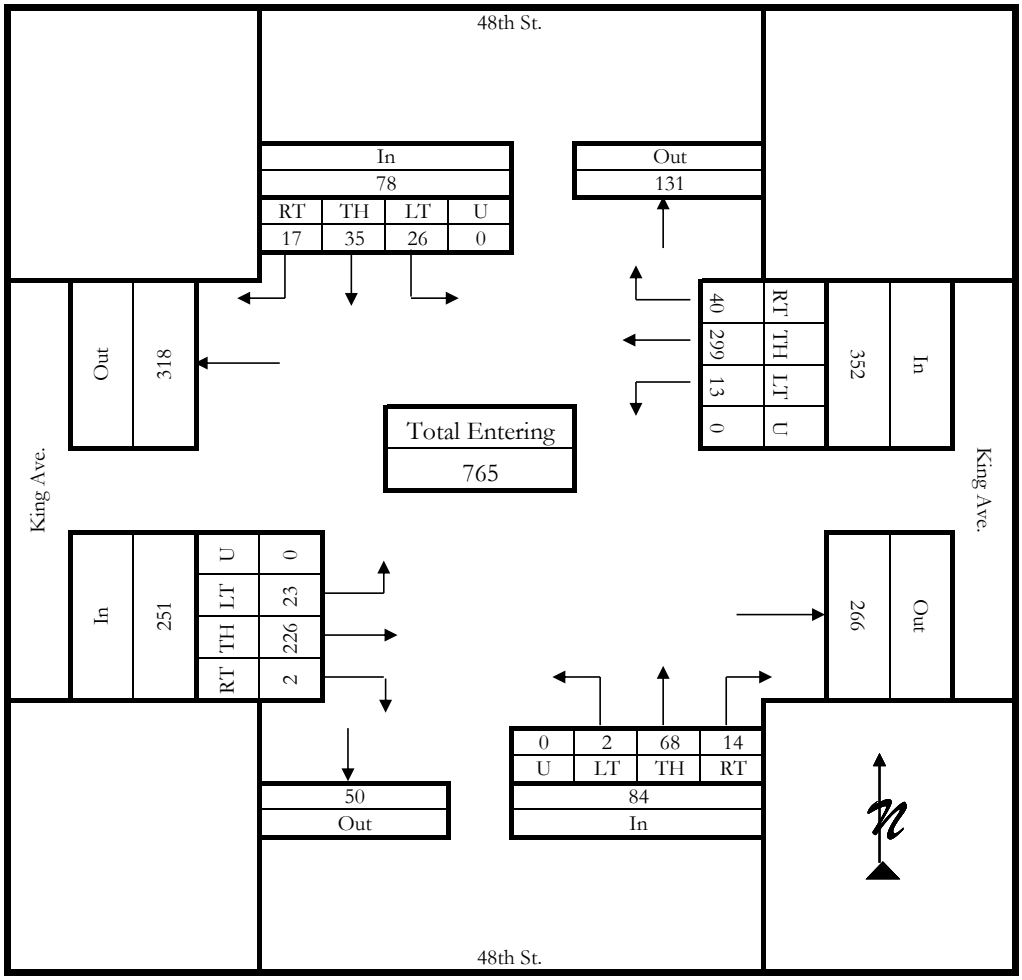
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	King Ave. & 48th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Thursday, January 21, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	48th St.	East/West Street:	King Ave.

Vehicle Volumes and Adjustments

	48th St. Southbound					48th St. Northbound					King Ave. Eastbound					King Ave. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
4:45 PM	4	12	7	0	23	5	21	1	0	27	1	47	3	0	51	9	68	3	0	80	181
5:00 PM	2	10	3	0	15	4	18	0	0	22	1	67	7	0	75	12	86	1	0	99	211
5:15 PM	6	8	8	0	22	2	21	1	0	24	0	60	6	0	66	11	83	2	0	96	208
5:30 PM	5	5	8	0	18	3	8	0	0	11	0	52	7	0	59	8	62	7	0	77	165
Grand Total	17	35	26	0	78	14	68	2	0	84	2	226	23	0	251	40	299	13	0	352	765
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	2.5	1.0	0.0	0.0	1.1	
Total Truck %	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	2.5	1.0	0.0	0.0	1.1	
Total %	2.2	4.6	3.4	0.0	10.2	1.8	8.9	0.3	0.0	11.0	0.3	29.5	3.0	0.0	32.8	5.2	39.1	1.7	0.0	46.0	100.0
PHF	0.85	0.85	0.85			0.78	0.78	0.78			0.84	0.84	0.84			0.89	0.89	0.89			0.91



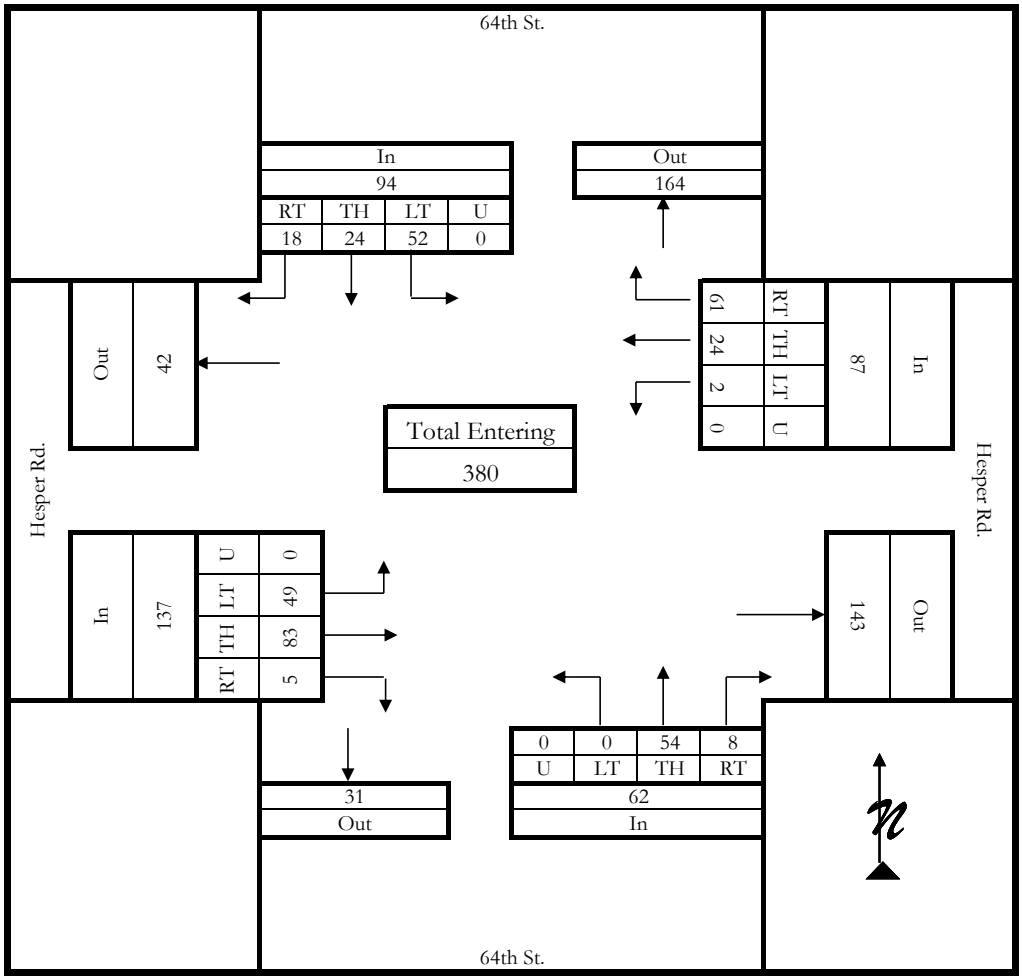
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Hesper Rd. & 64th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	64th St.	East/West Street:	Hesper Rd.

Vehicle Volumes and Adjustments

	64th St. Southbound					64th St. Northbound					Hesper Rd. Eastbound					Hesper Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
7:15 AM	1	3	6	0	10	1	5	0	0	6	1	13	7	0	21	9	4	0	0	13	50
7:30 AM	1	3	7	0	11	2	13	0	0	15	1	19	16	0	36	6	4	0	0	10	72
7:45 AM	11	11	17	0	39	5	26	0	0	31	1	32	23	0	56	33	3	1	0	37	163
8:00 AM	5	7	22	0	34	0	10	0	0	10	2	19	3	0	24	13	13	1	0	27	95
Grand Total	18	24	52	0	94	8	54	0	0	62	5	83	49	0	137	61	24	2	0	87	380
Medium Truck %	0.0	0.0	1.9	0.0	1.1	0.0	1.9	0.0	0.0	1.6	0.0	6.0	0.0	0.0	3.6	1.6	0.0	0.0	0.0	1.1	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	8.3	0.0	0.0	2.3	
Total Truck %	0.0	0.0	1.9	0.0	1.1	0.0	5.6	0.0	0.0	4.8	0.0	6.0	0.0	0.0	3.6	1.6	8.3	0.0	0.0	3.4	
Total %	4.7	6.3	13.7	0.0	24.7	2.1	14.2	0.0	0.0	16.3	1.3	21.8	12.9	0.0	36.1	16.1	6.3	0.5	0.0	22.9	100.0
PHF	0.60	0.60	0.60			0.50	0.50	0.50			0.61	0.61	0.61			0.59	0.59	0.59			0.58



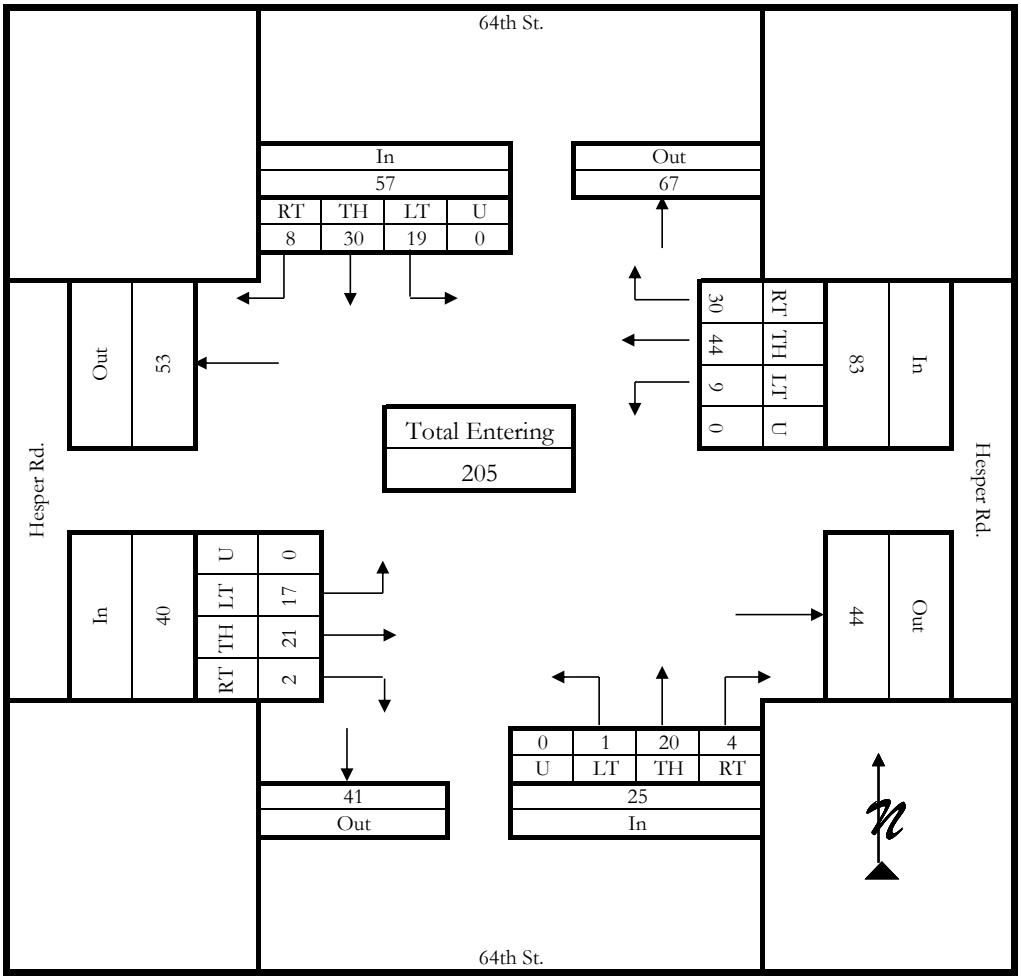
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Hesper Rd. & 64th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	64th St.	East/West Street:	Hesper Rd.

Vehicle Volumes and Adjustments

	64th St. Southbound					64th St. Northbound					Hesper Rd. Eastbound					Hesper Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
4:45 PM	1	6	4	0	11	2	5	0	0	7	0	8	3	0	11	6	11	0	0	17	46
5:00 PM	2	7	2	0	11	1	9	0	0	10	1	5	4	0	10	12	14	4	0	30	61
5:15 PM	3	10	9	0	22	1	3	1	0	5	1	2	7	0	10	9	16	3	0	28	65
5:30 PM	2	7	4	0	13	0	3	0	0	3	0	6	3	0	9	3	3	2	0	8	33
Grand Total	8	30	19	0	57	4	20	1	0	25	2	21	17	0	40	30	44	9	0	83	205
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	
Total %	3.9	14.6	9.3	0.0	27.8	2.0	9.8	0.5	0.0	12.2	1.0	10.2	8.3	0.0	19.5	14.6	21.5	4.4	0.0	40.5	100.0
PHF	0.65	0.65	0.65			0.63	0.63	0.63			0.91	0.91	0.91			0.69	0.69	0.69			0.79



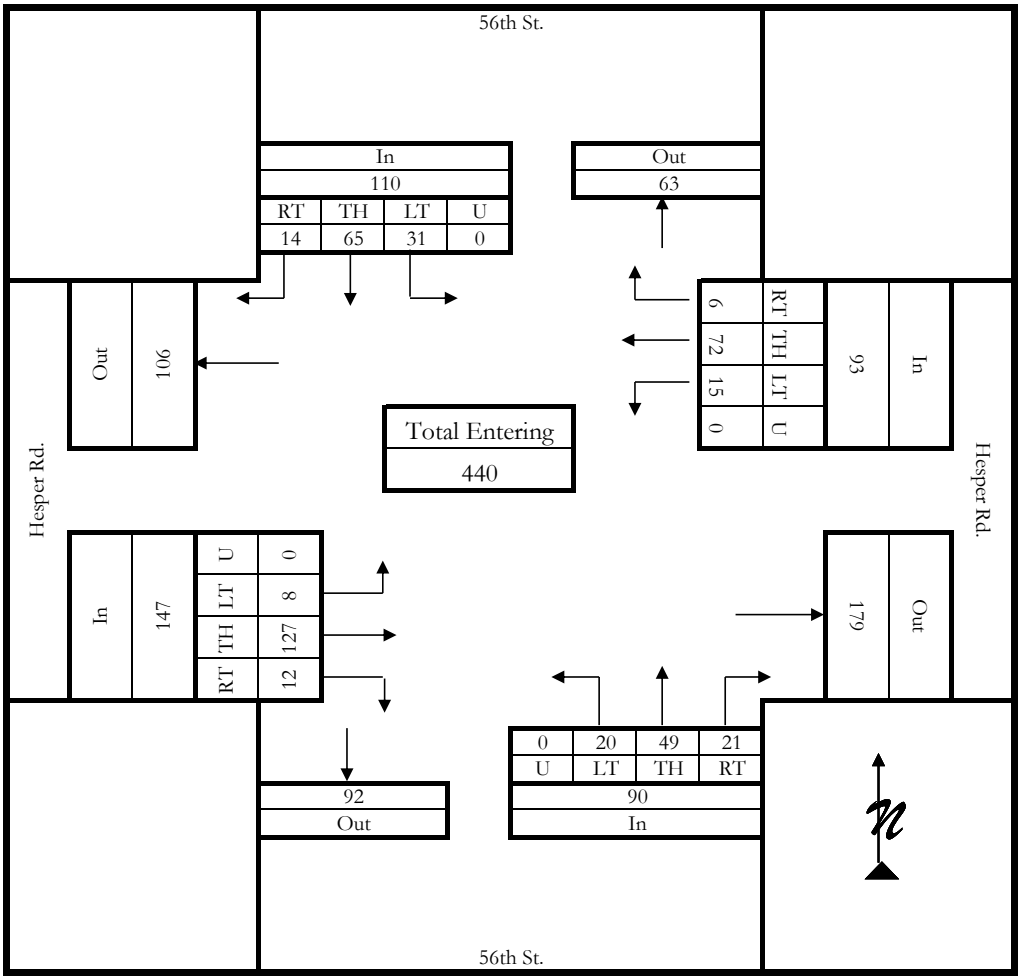
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Hesper Rd. & 56th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	56th St.	East/West Street:	Hesper Rd.

Vehicle Volumes and Adjustments

	56th St. Southbound					56th St. Northbound					Hesper Rd. Eastbound					Hesper Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
7:15 AM	1	20	6	0	27	4	8	1	0	13	0	20	1	0	21	0	13	3	0	16	77
7:30 AM	4	17	15	0	36	4	10	1	0	15	2	27	3	0	32	2	10	5	0	17	100
7:45 AM	6	13	6	0	25	6	13	17	0	36	7	44	2	0	53	2	32	2	0	36	150
8:00 AM	3	15	4	0	22	7	18	1	0	26	3	36	2	0	41	2	17	5	0	24	113
Grand Total	14	65	31	0	110	21	49	20	0	90	12	127	8	0	147	6	72	15	0	93	440
Medium Truck %	7.1	0.0	0.0	0.0	0.9	4.8	0.0	0.0	0.0	1.1	0.0	3.9	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	1.5	0.0	0.0	0.9	0.0	2.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	4.2	26.7	0.0	7.5	
Total Truck %	7.1	1.5	0.0	0.0	1.8	4.8	2.0	0.0	0.0	2.2	0.0	3.9	0.0	0.0	3.4	0.0	4.2	26.7	0.0	7.5	
Total %	3.2	14.8	7.0	0.0	25.0	4.8	11.1	4.5	0.0	20.5	2.7	28.9	1.8	0.0	33.4	1.4	16.4	3.4	0.0	21.1	100.0
PHF	0.76	0.76	0.76			0.63	0.63	0.63			0.69	0.69	0.69			0.65	0.65	0.65			0.73



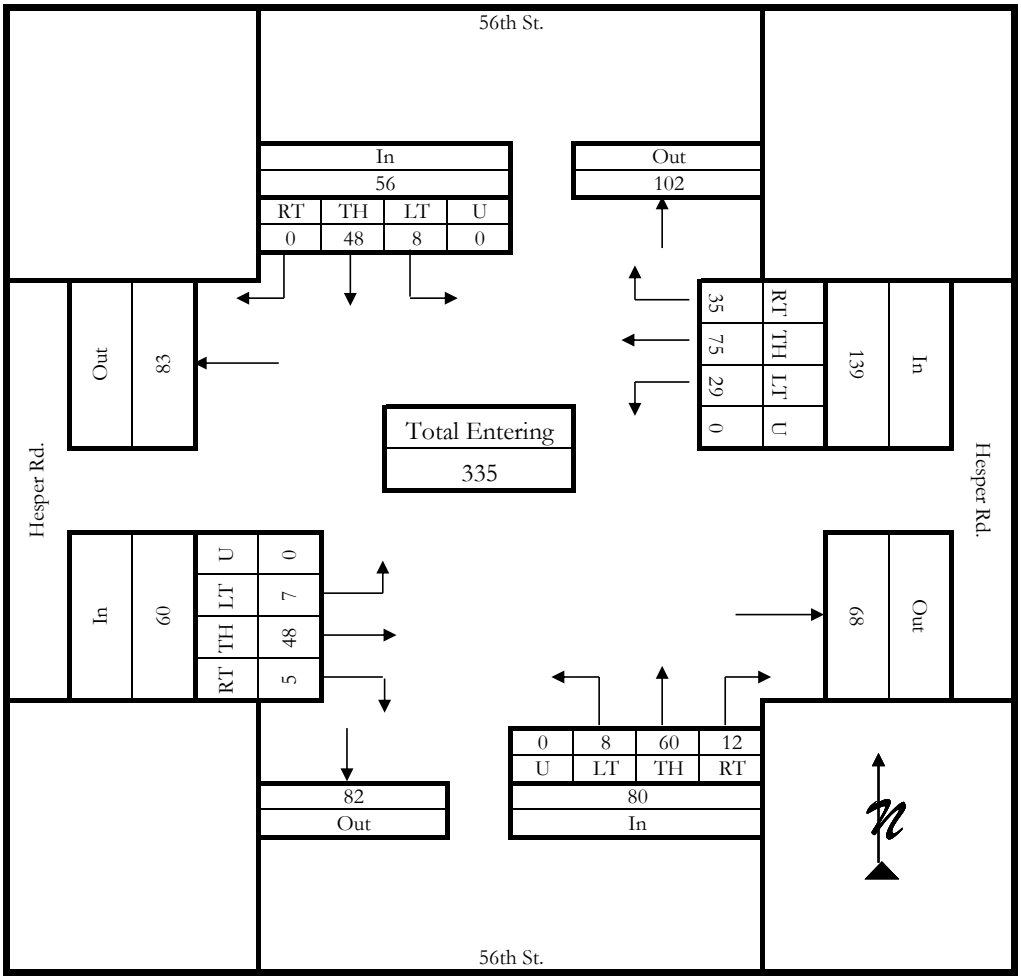
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Hesper Rd. & 56th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	56th St.	East/West Street:	Hesper Rd.

Vehicle Volumes and Adjustments

	56th St. Southbound					56th St. Northbound					Hesper Rd. Eastbound					Hesper Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
4:45 PM	0	12	3	0	15	3	13	2	0	18	1	15	4	0	20	8	20	4	0	32	85
5:00 PM	0	10	2	0	12	6	25	3	0	34	0	13	2	0	15	12	25	9	0	46	107
5:15 PM	0	15	2	0	17	1	13	0	0	14	3	10	0	0	13	9	21	8	0	38	82
5:30 PM	0	11	1	0	12	2	9	3	0	14	1	10	1	0	12	6	9	8	0	23	61
Grand Total	0	48	8	0	56	12	60	8	0	80	5	48	7	0	60	35	75	29	0	139	335
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	2.1	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	
Total Truck %	0.0	2.1	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	
Total %	0.0	14.3	2.4	0.0	16.7	3.6	17.9	2.4	0.0	23.9	1.5	14.3	2.1	0.0	17.9	10.4	22.4	8.7	0.0	41.5	100.0
PHF	0.82	0.82	0.82			0.59	0.59	0.59			0.75	0.75	0.75			0.76	0.76	0.76			0.78



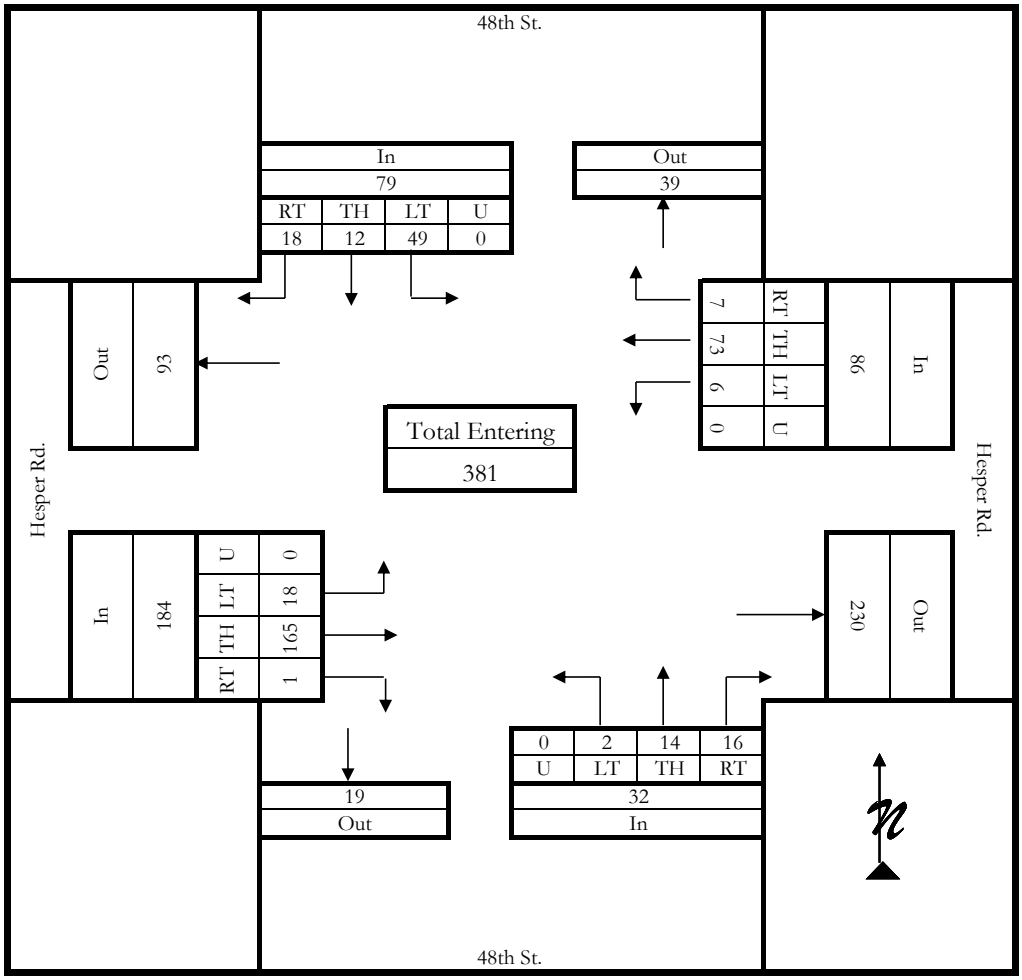
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Hesper Rd. & 48th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	48th St.	East/West Street:	Hesper Rd.

Vehicle Volumes and Adjustments

	48th St. Southbound					48th St. Northbound					Hesper Rd. Eastbound					Hesper Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
7:15 AM	1	3	8	0	12	7	0	0	0	7	0	31	3	0	34	1	17	1	0	19	72
7:30 AM	2	3	14	0	19	4	6	1	0	11	1	42	4	0	47	2	14	2	0	18	95
7:45 AM	13	2	20	0	35	2	4	0	0	6	0	47	3	0	50	0	21	1	0	22	113
8:00 AM	2	4	7	0	13	3	4	1	0	8	0	45	8	0	53	4	21	2	0	27	101
Grand Total	18	12	49	0	79	16	14	2	0	32	1	165	18	0	184	7	73	6	0	86	381
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	3.0	5.6	0.0	3.8	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0	5.8	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	3.0	5.6	0.0	3.8	0.0	6.8	0.0	0.0	5.8	
Total %	4.7	3.1	12.9	0.0	20.7	4.2	3.7	0.5	0.0	8.4	0.3	43.3	4.7	0.0	48.3	1.8	19.2	1.6	0.0	22.6	100.0
PHF	0.56	0.56	0.56			0.73	0.73	0.73			0.87	0.87	0.87			0.80	0.80	0.80			0.84



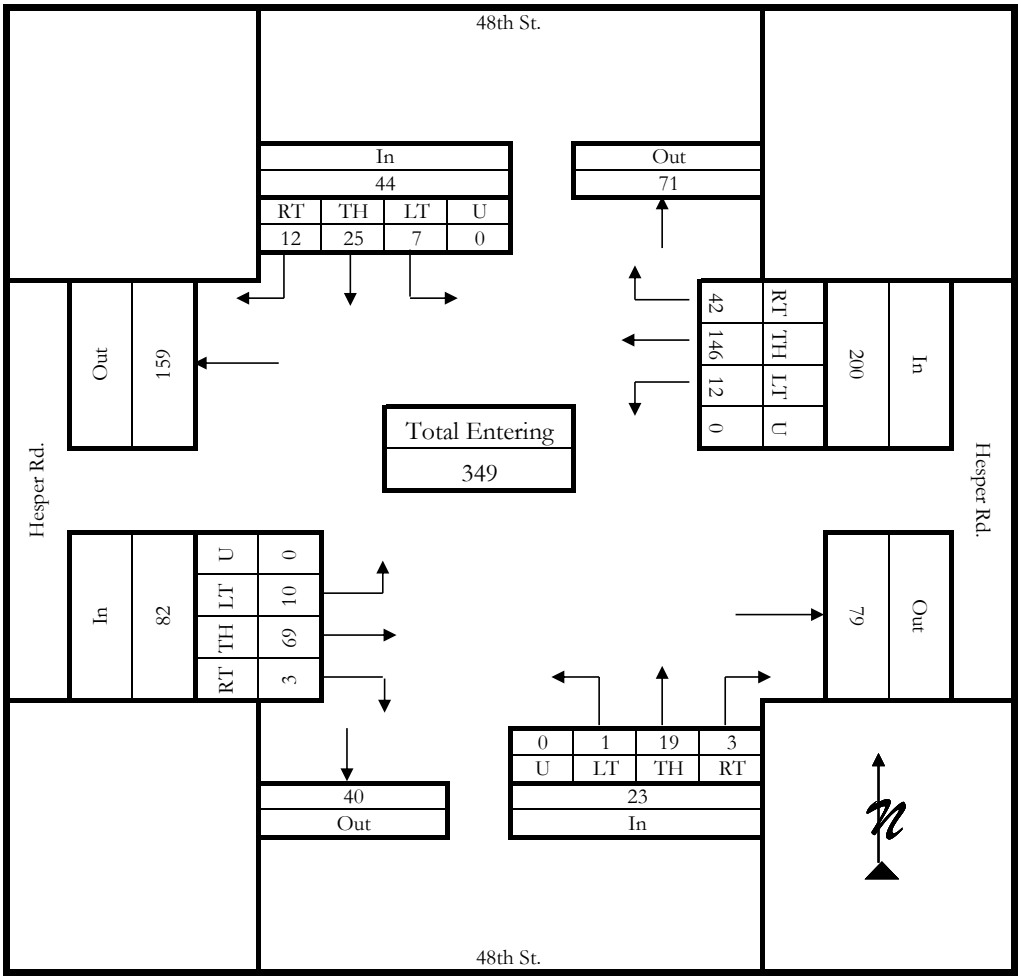
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Hesper Rd. & 48th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	48th St.	East/West Street:	Hesper Rd.

Vehicle Volumes and Adjustments

	48th St. Southbound					48th St. Northbound					Hesper Rd. Eastbound					Hesper Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
4:45 PM	2	6	1	0	9	1	5	0	0	6	2	17	2	0	21	5	34	1	0	40	76
5:00 PM	4	6	1	0	11	2	8	1	0	11	0	18	2	0	20	16	44	4	0	64	106
5:15 PM	4	5	3	0	12	0	2	0	0	2	1	17	0	0	18	8	39	4	0	51	83
5:30 PM	2	8	2	0	12	0	4	0	0	4	0	17	6	0	23	13	29	3	0	45	84
Grand Total	12	25	7	0	44	3	19	1	0	23	3	69	10	0	82	42	146	12	0	200	349
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	4.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	33.3	1.4	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	
Total Truck %	0.0	4.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	33.3	1.4	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	
Total %	3.4	7.2	2.0	0.0	12.6	0.9	5.4	0.3	0.0	6.6	0.9	19.8	2.9	0.0	23.5	12.0	41.8	3.4	0.0	57.3	100.0
PHF	0.92	0.92	0.92			0.52	0.52	0.52			0.89	0.89	0.89			0.78	0.78	0.78			0.82



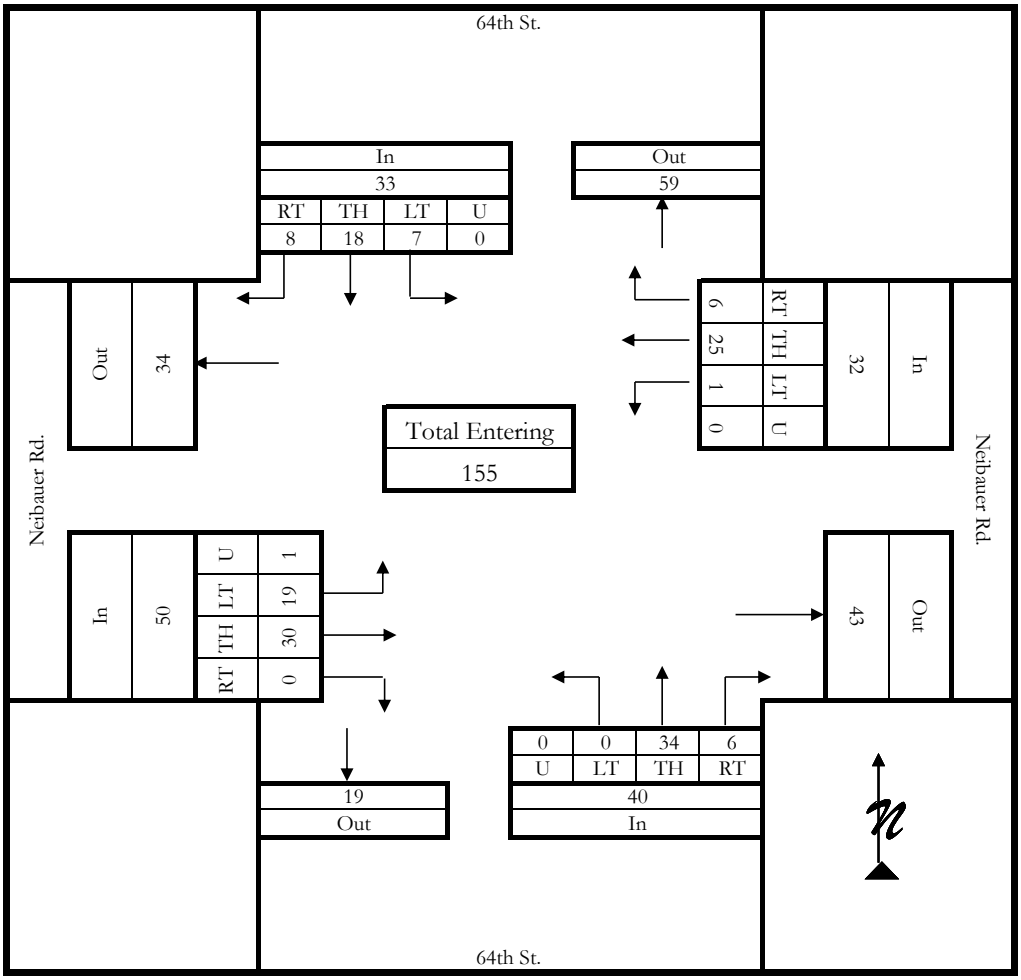
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Neibauer Rd. & 64th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	64th St.	East/West Street:	Neibauer Rd.

Vehicle Volumes and Adjustments

	64th St. Southbound					64th St. Northbound					Neibauer Rd. Eastbound					Neibauer Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
7:15 AM	1	1	1	0	3	3	4	0	0	7	0	13	0	0	13	0	6	0	0	6	29
7:30 AM	0	3	1	0	4	2	12	0	0	14	0	7	1	0	8	2	7	1	0	10	36
7:45 AM	2	9	3	0	14	0	12	0	0	12	0	8	17	1	26	4	10	0	0	14	66
8:00 AM	5	5	2	0	12	1	6	0	0	7	0	2	1	0	3	0	2	0	0	2	24
Grand Total	8	18	7	0	33	6	34	0	0	40	0	30	19	1	50	6	25	1	0	32	155
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.0	2.0	0.0	4.0	0.0	0.0	3.1	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	2.5	0.0	6.7	0.0	0.0	4.0	0.0	8.0	0.0	0.0	6.3	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	2.5	0.0	6.7	5.3	0.0	6.0	0.0	12.0	0.0	0.0	9.4	
Total %	5.2	11.6	4.5	0.0	21.3	3.9	21.9	0.0	0.0	25.8	0.0	19.4	12.3	0.6	32.3	3.9	16.1	0.6	0.0	20.6	100.0
PHF	0.59	0.59	0.59			0.71	0.71	0.71			0.48	0.48	0.48			0.57	0.57	0.57			0.59



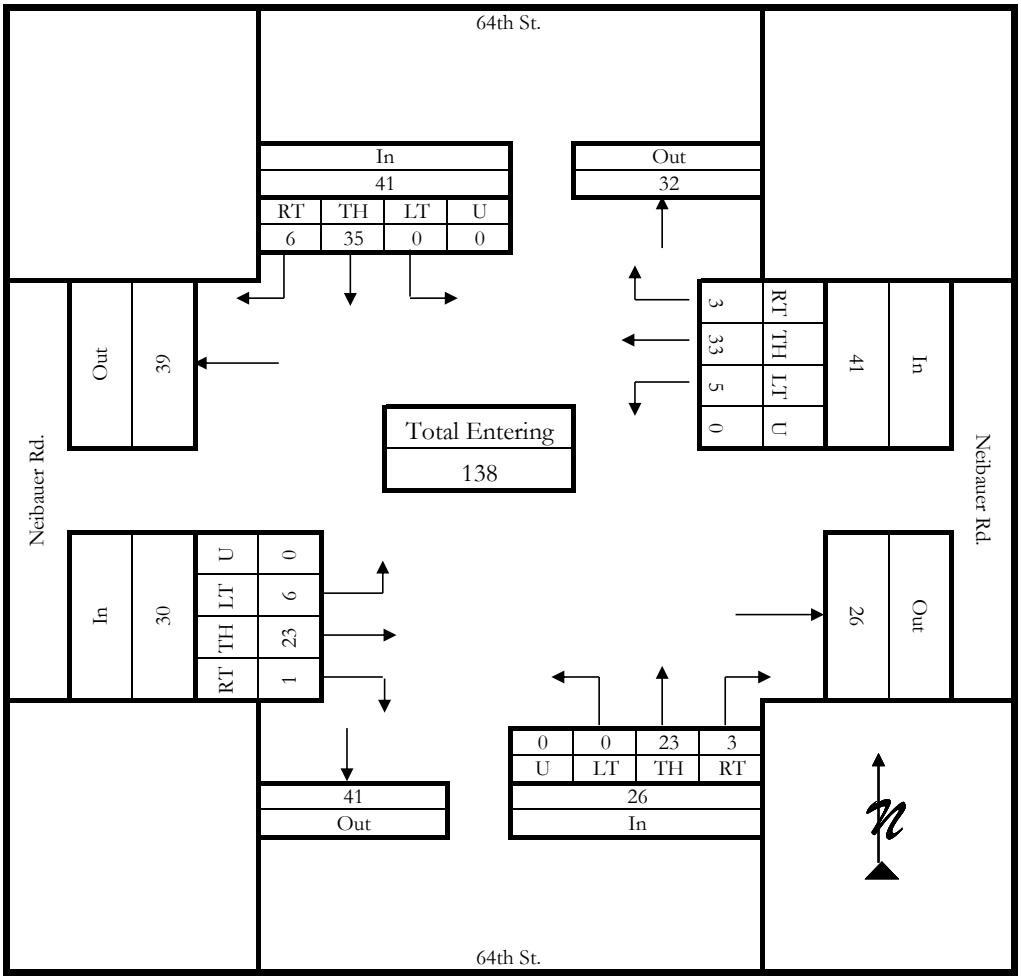
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Neibauer Rd. & 64th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	64th St.	East/West Street:	Neibauer Rd.

Vehicle Volumes and Adjustments

	64th St. Southbound					64th St. Northbound					Neibauer Rd. Eastbound					Neibauer Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
4:45 PM	2	4	0	0	6	0	4	0	0	4	0	6	2	0	8	1	7	2	0	10	28
5:00 PM	2	9	0	0	11	2	6	0	0	8	1	7	2	0	10	2	10	0	0	12	41
5:15 PM	1	13	0	0	14	0	4	0	0	4	0	6	2	0	8	0	9	2	0	11	37
5:30 PM	1	9	0	0	10	1	9	0	0	10	0	4	0	0	4	0	7	1	0	8	32
Grand Total	6	35	0	0	41	3	23	0	0	26	1	23	6	0	30	3	33	5	0	41	138
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	16.7	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	6.7	0.0	6.1	0.0	0.0	4.9	
Total Truck %	16.7	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.0	0.0	6.7	0.0	6.1	0.0	0.0	4.9	
Total %	4.3	25.4	0.0	0.0	29.7	2.2	16.7	0.0	0.0	18.8	0.7	16.7	4.3	0.0	21.7	2.2	23.9	3.6	0.0	29.7	100.0
PHF	0.73	0.73	0.73			0.65	0.65	0.65			0.75	0.75	0.75			0.85	0.85	0.85			0.84



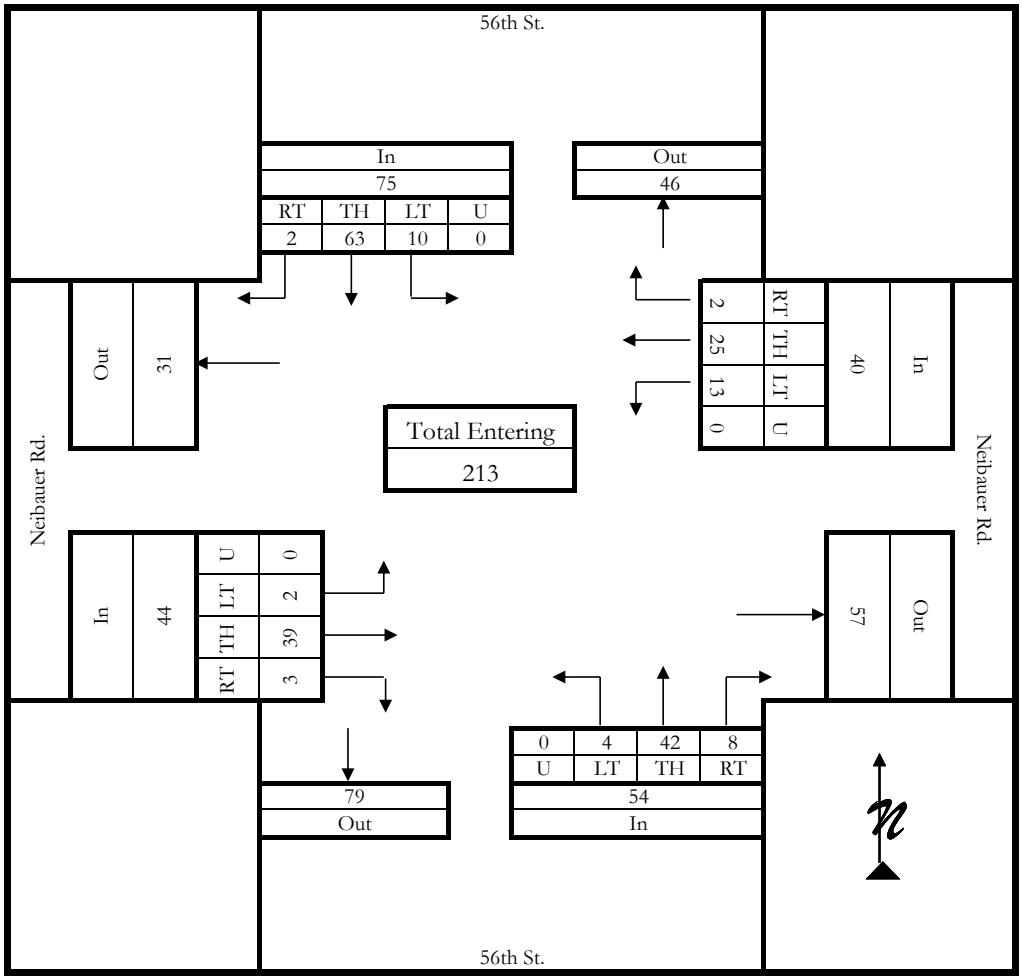
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Neibauer Rd. & 56th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	56th St.	East/West Street:	Neibauer Rd.

Vehicle Volumes and Adjustments

	56th St. Southbound					56th St. Northbound					Neibauer Rd. Eastbound					Neibauer Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
7:15 AM	0	13	2	0	15	1	3	2	0	6	0	13	0	0	13	1	2	2	0	5	39
7:30 AM	1	21	3	0	25	0	9	1	0	10	1	9	2	0	12	0	11	3	0	14	61
7:45 AM	1	17	4	0	22	3	12	1	0	16	2	11	0	0	13	0	9	6	0	15	66
8:00 AM	0	12	1	0	13	4	18	0	0	22	0	6	0	0	6	1	3	2	0	6	47
Grand Total	2	63	10	0	75	8	42	4	0	54	3	39	2	0	44	2	25	13	0	40	213
Medium Truck %	0.0	0.0	0.0	0.0	0.0	12.5	2.4	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	4.0	7.7	0.0	5.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	1.9	0.0	5.1	0.0	0.0	4.5	0.0	8.0	0.0	0.0	5.0	
Total Truck %	0.0	0.0	0.0	0.0	0.0	12.5	4.8	0.0	0.0	5.6	0.0	5.1	0.0	0.0	4.5	0.0	12.0	7.7	0.0	10.0	
Total %	0.9	29.6	4.7	0.0	35.2	3.8	19.7	1.9	0.0	25.4	1.4	18.3	0.9	0.0	20.7	0.9	11.7	6.1	0.0	18.8	100.0
PHF	0.75	0.75	0.75			0.61	0.61	0.61			0.85	0.85	0.85			0.67	0.67	0.67			0.81



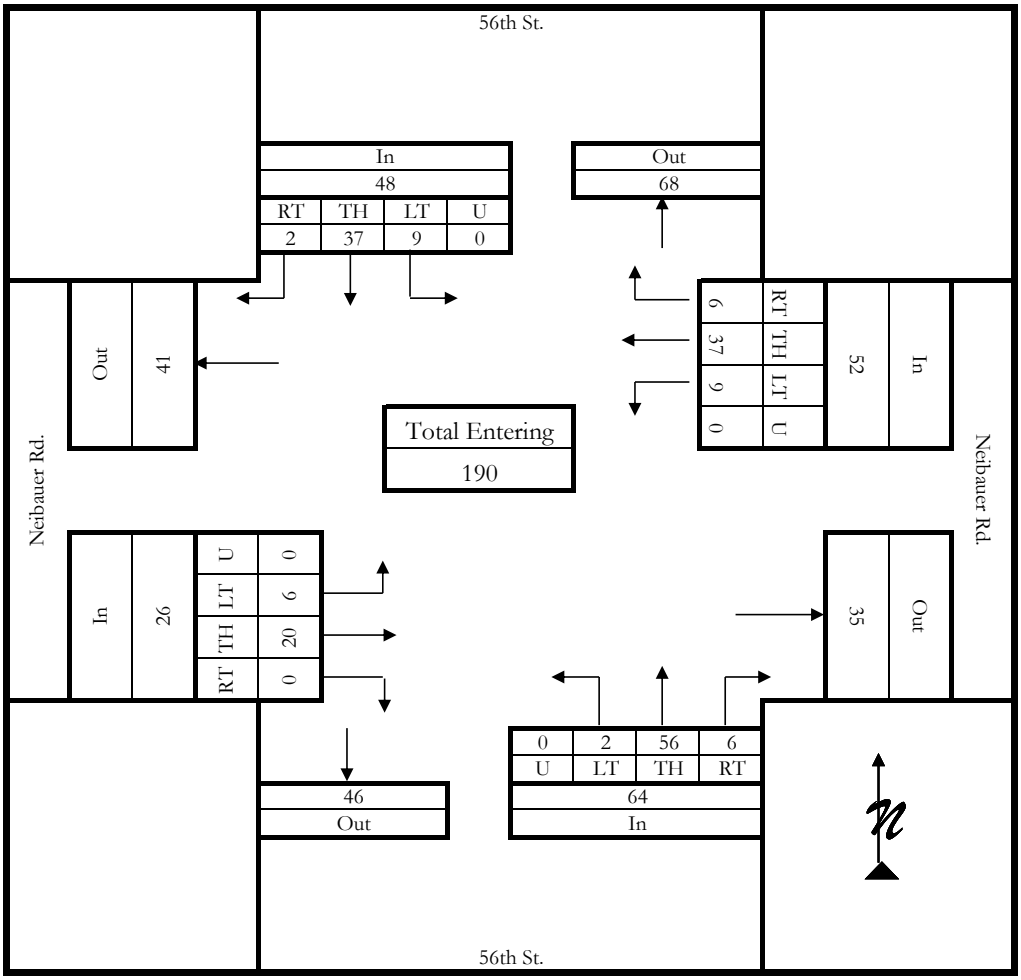
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Neibauer Rd. & 56th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	56th St.	East/West Street:	Neibauer Rd.

Vehicle Volumes and Adjustments

	56th St. Southbound					56th St. Northbound					Neibauer Rd. Eastbound					Neibauer Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
4:45 PM	0	13	4	0	17	2	17	0	0	19	0	3	0	0	3	4	11	2	0	17	56
5:00 PM	1	9	2	0	12	3	17	1	0	21	0	9	1	0	10	1	11	2	0	14	57
5:15 PM	0	7	2	0	9	1	13	1	0	15	0	6	1	0	7	1	9	4	0	14	45
5:30 PM	1	8	1	0	10	0	9	0	0	9	0	2	4	0	6	0	6	1	0	7	32
Grand Total	2	37	9	0	48	6	56	2	0	64	0	20	6	0	26	6	37	9	0	52	190
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	2.7	11.1	0.0	4.2	0.0	1.8	0.0	0.0	1.6	0.0	5.0	0.0	0.0	3.8	0.0	8.1	0.0	0.0	5.8	
Total Truck %	0.0	2.7	11.1	0.0	4.2	0.0	1.8	0.0	0.0	1.6	0.0	5.0	0.0	0.0	3.8	0.0	8.1	0.0	0.0	5.8	
Total %	1.1	19.5	4.7	0.0	25.3	3.2	29.5	1.1	0.0	33.7	0.0	10.5	3.2	0.0	13.7	3.2	19.5	4.7	0.0	27.4	100.0
PHF	0.71	0.71	0.71			0.76	0.76	0.76			0.65	0.65	0.65			0.76	0.76	0.76			0.83



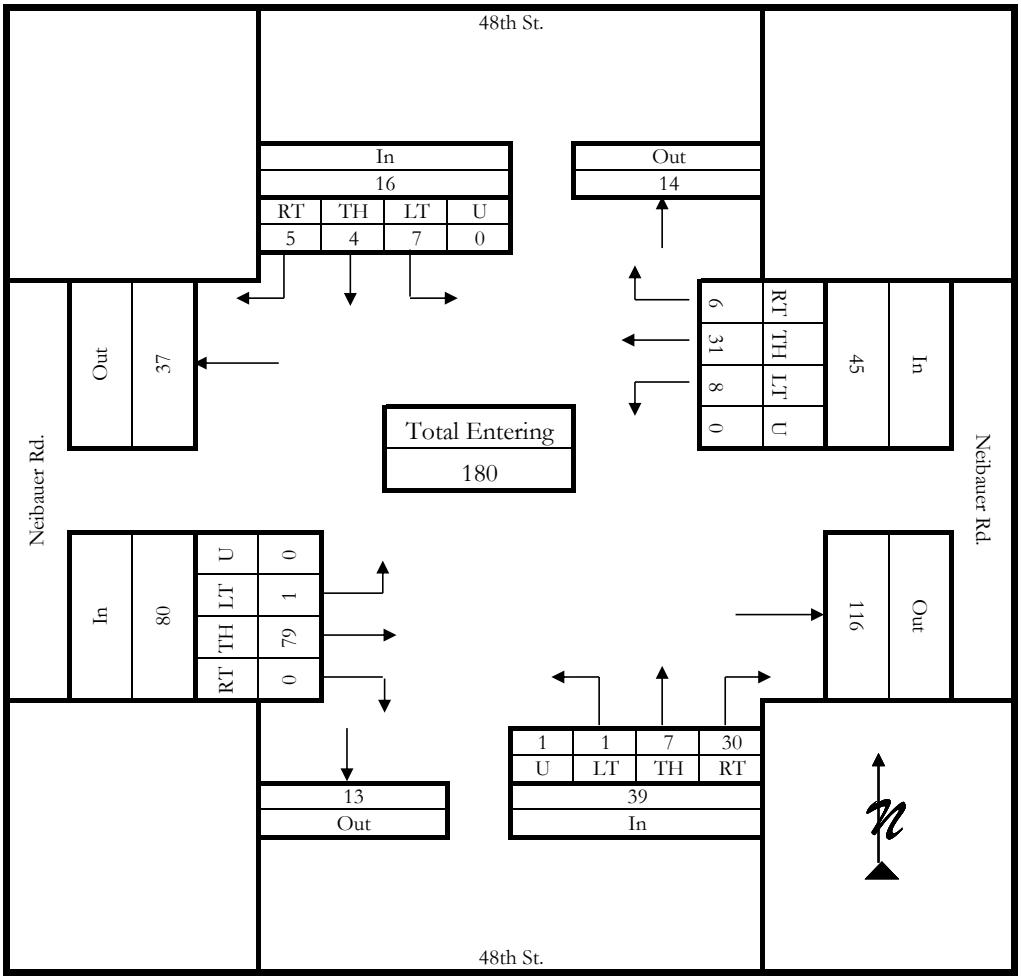
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Neibauer Rd. & 48th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	AM Peak Hour (7:15 - 8:15 AM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	48th St.	East/West Street:	Neibauer Rd.

Vehicle Volumes and Adjustments

	48th St. Southbound					48th St. Northbound					Neibauer Rd. Eastbound					Neibauer Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
7:15 AM	1	0	2	0	3	10	1	0	0	11	0	19	0	0	19	2	6	2	0	10	43
7:30 AM	3	1	2	0	6	9	4	0	0	13	0	26	0	0	26	1	9	0	0	10	55
7:45 AM	1	1	1	0	3	5	0	1	0	6	0	24	0	0	24	1	6	3	0	10	43
8:00 AM	0	2	2	0	4	6	2	0	1	9	0	10	1	0	11	2	10	3	0	15	39
Grand Total	5	4	7	0	16	30	7	1	1	39	0	79	1	0	80	6	31	8	0	45	180
Medium Truck %	0.0	25.0	0.0	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	2.2	
Heavy Truck %	0.0	0.0	14.3	0.0	6.3	3.3	0.0	0.0	0.0	2.6	0.0	2.5	0.0	0.0	2.5	0.0	9.7	0.0	0.0	6.7	
Total Truck %	0.0	25.0	14.3	0.0	12.5	3.3	0.0	0.0	0.0	2.6	0.0	2.5	0.0	0.0	2.5	0.0	12.9	0.0	0.0	8.9	
Total %	2.8	2.2	3.9	0.0	8.9	16.7	3.9	0.6	0.6	21.7	0.0	43.9	0.6	0.0	44.4	3.3	17.2	4.4	0.0	25.0	100.0
PHF	0.67	0.67	0.67			0.75	0.75	0.75			0.77	0.77	0.77			0.75	0.75	0.75			0.82



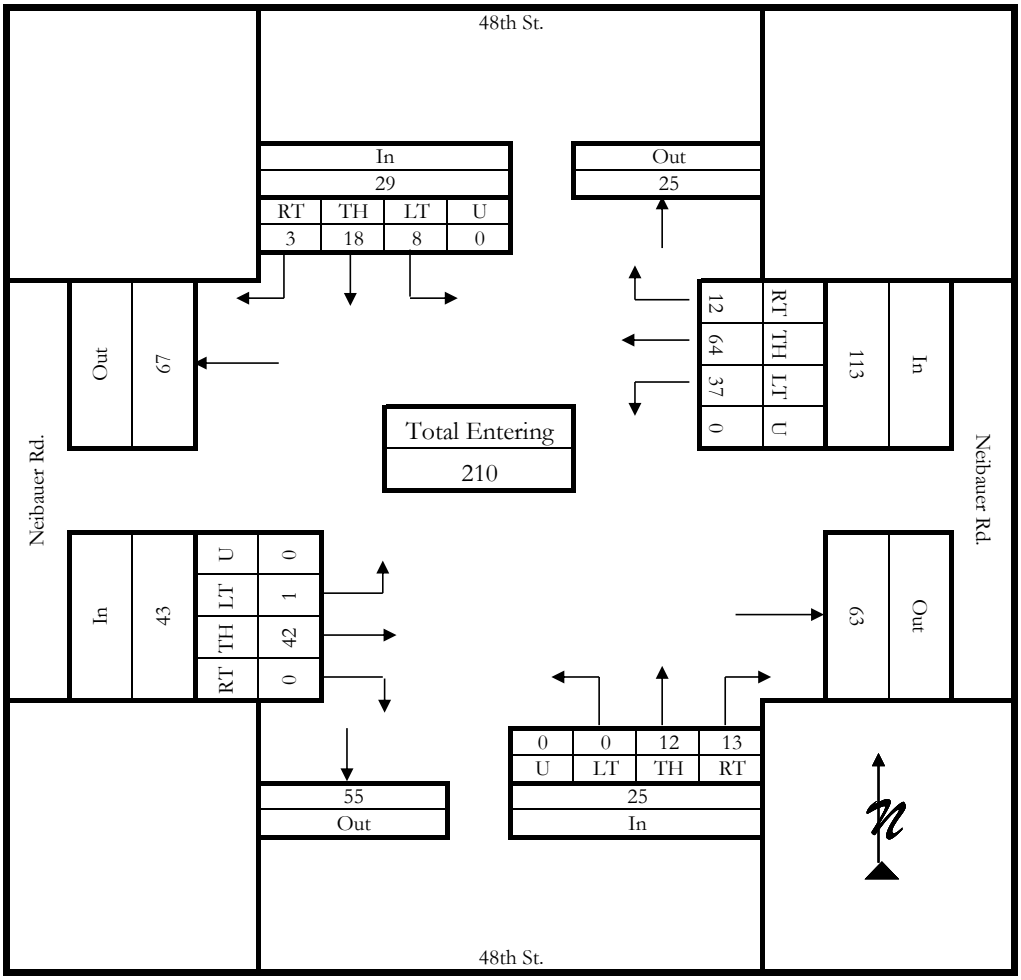
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	J. Staszcuk	Intersection:	Neibauer Rd. & 48th St.
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, January 20, 2016	Jurisdiction:	City of Billings / MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	15053	Project Description:	West End Multi-Modal Traffic Modeling
North/South Street:	48th St.	East/West Street:	Neibauer Rd.

Vehicle Volumes and Adjustments

	48th St. Southbound					48th St. Northbound					Neibauer Rd. Eastbound					Neibauer Rd. Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.12	1.12	1.12	1.12		1.12	1.12	1.12	1.12		
4:45 PM	1	5	3	0	9	1	4	0	0	5	0	7	1	0	8	0	21	15	0	36	58
5:00 PM	0	1	3	0	4	9	6	0	0	15	0	19	0	0	19	3	16	6	0	25	63
5:15 PM	1	7	1	0	9	1	0	0	0	1	0	7	0	0	7	6	17	7	0	30	47
5:30 PM	1	5	1	0	7	2	2	0	0	4	0	9	0	0	9	3	10	9	0	22	42
Grand Total	3	18	8	0	29	13	12	0	0	25	0	42	1	0	43	12	64	37	0	113	210
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	25.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0	2.7	
Total Truck %	0.0	0.0	25.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	0.0	0.0	2.7	
Total %	1.4	8.6	3.8	0.0	13.8	6.2	5.7	0.0	0.0	11.9	0.0	20.0	0.5	0.0	20.5	5.7	30.5	17.6	0.0	53.8	100.0
PHF	0.81	0.81	0.81			0.42	0.42	0.42			0.57	0.57	0.57			0.78	0.78	0.78			0.83



APPENDIX B
EXISTING CONDITIONS (2015) INTERSECTION CAPACITY WORKSHEETS

SANDERSON STEWART

FEHR PEERS

Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	3	73	44	31	23	1	18	42	25	0	87	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	65	65	65	64	64	64	76	76	76
Heavy Vehicles, %	0	0	0	3	30	0	0	0	0	0	0	0
Mvmt Flow	4	95	57	48	35	2	28	66	39	0	114	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	277	278	117	334	261	85	120	0	0	105	0	0
Stage 1	117	117	-	141	141	-	-	-	-	-	-	-
Stage 2	160	161	-	193	120	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.13	6.8	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.8	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.8	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.527	4.27	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	679	633	941	618	599	980	1480	-	-	1499	-	-
Stage 1	892	803	-	860	730	-	-	-	-	-	-	-
Stage 2	847	769	-	806	746	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	637	620	941	505	587	980	1480	-	-	1499	-	-
Mov Cap-2 Maneuver	637	620	-	505	587	-	-	-	-	-	-	-
Stage 1	874	803	-	843	715	-	-	-	-	-	-	-
Stage 2	788	754	-	668	746	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	12.9	1.6	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1480	-	-	709	541	1499	-	-
HCM Lane V/C Ratio	0.019	-	-	0.22	0.156	-	-	-
HCM Control Delay (s)	7.5	0	-	11.5	12.9	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.6	0	-	-

Intersection	
Int Delay, s/veh	9.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	362	14	24	133	24	3	6	48	131	45	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	81	81	81	65	65	65	97	97	97
Heavy Vehicles, %	0	3	7	17	11	13	33	0	13	1	2	100
Mvmt Flow	0	517	20	30	164	30	5	9	74	135	46	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	164	0	0	537	0	0	775	750	527	792	760	164
Stage 1	-	-	-	-	-	-	527	527	-	223	223	-
Stage 2	-	-	-	-	-	-	248	223	-	569	537	-
Critical Hdwy	4.1	-	-	4.27	-	-	7.43	6.5	6.33	7.11	6.52	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.5	-	6.11	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.5	-	6.11	5.52	-
Follow-up Hdwy	2.2	-	-	2.353	-	-	3.797	4	3.417	3.509	4.018	4.2
Pot Cap-1 Maneuver	1427	-	-	960	-	-	280	342	530	308	336	678
Stage 1	-	-	-	-	-	-	482	532	-	782	719	-
Stage 2	-	-	-	-	-	-	692	723	-	509	523	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1427	-	-	960	-	-	242	330	530	253	324	678
Mov Cap-2 Maneuver	-	-	-	-	-	-	242	330	-	253	324	-
Stage 1	-	-	-	-	-	-	482	532	-	782	694	-
Stage 2	-	-	-	-	-	-	621	698	-	430	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.2	14.4	42.6
HCM LOS			B	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	471	1427	-	-	960	-	-	270
HCM Lane V/C Ratio	0.186	-	-	-	0.031	-	-	0.68
HCM Control Delay (s)	14.4	0	-	-	8.9	0	-	42.6
HCM Lane LOS	B	A	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.7	0	-	-	0.1	-	-	4.5

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	100	57	83	42	23	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	87	87	76	76	78	78
Heavy Vehicles, %	5	4	1	2	9	0
Mvmt Flow	115	66	109	55	29	91

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	180	0	422	148
Stage 1	-	-	-	-	148	-
Stage 2	-	-	-	-	274	-
Critical Hdwy	-	-	4.11	-	6.49	6.2
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.209	-	3.581	3.3
Pot Cap-1 Maneuver	-	-	1402	-	575	904
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	756	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1402	-	529	904
Mov Cap-2 Maneuver	-	-	-	-	529	-
Stage 1	-	-	-	-	863	-
Stage 2	-	-	-	-	696	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.2	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	770	-	-	1402	-
HCM Lane V/C Ratio	0.157	-	-	0.078	-
HCM Control Delay (s)	10.5	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.3	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	52	115	138	91	72	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	84	84	74	74
Heavy Vehicles, %	2	2	1	0	3	2
Mvmt Flow	56	124	164	108	97	66

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	453	218
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	235	-
Critical Hdwy	4.12	-	-	-	6.43	6.22
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.218	-	-	-	3.527	3.318
Pot Cap-1 Maneuver	1290	-	-	-	563	822
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	802	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1290	-	-	-	537	822
Mov Cap-2 Maneuver	-	-	-	-	537	-
Stage 1	-	-	-	-	816	-
Stage 2	-	-	-	-	764	-

Approach	EB	WB	SB
HCM Control Delay, s	2.5	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1290	-	-	-	625
HCM Lane V/C Ratio	0.043	-	-	-	0.262
HCM Control Delay (s)	7.9	0	-	-	12.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	312	92	34	115	0	24	1	48	1	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	93	93	93	76	76	76	38	38	38
Heavy Vehicles, %	0	2	2	12	9	0	4	100	25	0	0	0
Mvmt Flow	0	351	103	37	124	0	32	1	63	3	5	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	124	0	0	454	0	0	601	599	402	631	651	124
Stage 1	-	-	-	-	-	-	402	402	-	197	197	-
Stage 2	-	-	-	-	-	-	199	197	-	434	454	-
Critical Hdwy	4.1	-	-	4.22	-	-	7.14	7.5	6.45	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	6.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	6.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.308	-	-	3.536	4.9	3.525	3.5	4	3.3
Pot Cap-1 Maneuver	1475	-	-	1056	-	-	409	308	601	396	390	932
Stage 1	-	-	-	-	-	-	621	462	-	809	742	-
Stage 2	-	-	-	-	-	-	798	587	-	604	573	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1475	-	-	1056	-	-	393	296	601	343	375	932
Mov Cap-2 Maneuver	-	-	-	-	-	-	393	296	-	343	375	-
Stage 1	-	-	-	-	-	-	621	462	-	809	714	-
Stage 2	-	-	-	-	-	-	762	565	-	539	573	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.9	13.8	15.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	506	1475	-	-	1056	-	-	364
HCM Lane V/C Ratio	0.19	-	-	-	0.035	-	-	0.022
HCM Control Delay (s)	13.8	0	-	-	8.5	0	-	15.1
HCM Lane LOS	B	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0.1	-	-	0.1

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	33	331	133	36	176	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	80	80	95	95
Heavy Vehicles, %	30	2	10	22	3	6
Mvmt Flow	35	356	166	45	185	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	211	0	-	0	616	189
Stage 1	-	-	-	-	189	-
Stage 2	-	-	-	-	427	-
Critical Hdwy	4.4	-	-	-	6.43	6.26
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.47	-	-	-	3.527	3.354
Pot Cap-1 Maneuver	1210	-	-	-	452	843
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	656	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1210	-	-	-	436	843
Mov Cap-2 Maneuver	-	-	-	-	436	-
Stage 1	-	-	-	-	841	-
Stage 2	-	-	-	-	632	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	19.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1210	-	-	-	455
HCM Lane V/C Ratio	0.029	-	-	-	0.447
HCM Control Delay (s)	8.1	0	-	-	19.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2.3

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	515	72	41	235	0	14	0	128	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	68	68	68	85	85	85	92	92	92
Heavy Vehicles, %	0	2	2	2	6	0	7	0	1	0	0	0
Mvmt Flow	0	572	80	60	346	0	16	0	151	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	346	0	0	652	0	0	1078	1078	612	1154	1118	346
Stage 1	-	-	-	-	-	-	612	612	-	466	466	-
Stage 2	-	-	-	-	-	-	466	466	-	688	652	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.17	6.5	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.563	4	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	1224	-	-	935	-	-	192	220	495	176	209	702
Stage 1	-	-	-	-	-	-	472	487	-	581	566	-
Stage 2	-	-	-	-	-	-	567	566	-	440	467	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1224	-	-	935	-	-	180	203	495	115	192	702
Mov Cap-2 Maneuver	-	-	-	-	-	-	180	203	-	115	192	-
Stage 1	-	-	-	-	-	-	472	487	-	581	521	-
Stage 2	-	-	-	-	-	-	522	521	-	306	467	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.4	19	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	422	1224	-	-	935	-	-	-
HCM Lane V/C Ratio	0.396	-	-	-	0.064	-	-	-
HCM Control Delay (s)	19	0	-	-	9.1	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	1.9	0	-	-	0.2	-	-	-

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	26	11	94	48	20	122
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	58	58	76	76	71	71
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	45	19	124	63	28	172

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	383	155	0	0	187	0
Stage 1	155	-	-	-	-	-
Stage 2	228	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	624	896	-	-	1399	-
Stage 1	878	-	-	-	-	-
Stage 2	815	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	610	896	-	-	1399	-
Mov Cap-2 Maneuver	610	-	-	-	-	-
Stage 1	878	-	-	-	-	-
Stage 2	797	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	674	1399	-
HCM Lane V/C Ratio	-	-	0.095	0.02	-
HCM Control Delay (s)	-	-	10.9	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0.1	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	94	2	37	63	16	4	38	37	65	66	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	66	66	66	71	71	71	84	84	84
Heavy Vehicles, %	0	4	0	3	2	19	0	18	8	3	8	0
Mvmt Flow	3	119	3	56	95	24	6	54	52	77	79	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	120	0	0	122	0	0	387	357	120	398	347	108
Stage 1	-	-	-	-	-	-	125	125	-	220	220	-
Stage 2	-	-	-	-	-	-	262	232	-	178	127	-
Critical Hdwy	4.1	-	-	4.13	-	-	7.1	6.68	6.28	7.13	6.58	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.68	-	6.13	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.68	-	6.13	5.58	-
Follow-up Hdwy	2.2	-	-	2.227	-	-	3.5	4.162	3.372	3.527	4.072	3.3
Pot Cap-1 Maneuver	1480	-	-	1459	-	-	575	544	916	560	567	951
Stage 1	-	-	-	-	-	-	884	763	-	780	710	-
Stage 2	-	-	-	-	-	-	747	684	-	821	780	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1480	-	-	1459	-	-	492	521	916	471	543	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	492	521	-	471	543	-
Stage 1	-	-	-	-	-	-	882	761	-	778	681	-
Stage 2	-	-	-	-	-	-	630	656	-	718	778	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.4	11.7	15.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	650	1480	-	-	1459	-	-	514
HCM Lane V/C Ratio	0.171	0.002	-	-	0.038	-	-	0.315
HCM Control Delay (s)	11.7	7.4	0	-	7.6	0	-	15.2
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0	-	-	0.1	-	-	1.3

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	12	258	20	8	72	23	5	29	39	74	72	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	86	86	86	76	76	76	70	70	70
Heavy Vehicles, %	0	1	0	0	4	0	20	3	0	3	0	0
Mvmt Flow	14	311	24	9	84	27	7	38	51	106	103	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	110	0	0	335	0	0	523	481	323	513	480	97
Stage 1	-	-	-	-	-	-	352	352	-	116	116	-
Stage 2	-	-	-	-	-	-	171	129	-	397	364	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.3	6.53	6.2	7.13	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.53	-	6.13	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.53	-	6.13	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.68	4.027	3.3	3.527	4	3.3
Pot Cap-1 Maneuver	1493	-	-	1236	-	-	437	483	723	470	488	965
Stage 1	-	-	-	-	-	-	629	630	-	886	803	-
Stage 2	-	-	-	-	-	-	790	787	-	627	627	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1493	-	-	1236	-	-	356	473	723	404	478	965
Mov Cap-2 Maneuver	-	-	-	-	-	-	356	473	-	404	478	-
Stage 1	-	-	-	-	-	-	621	622	-	875	797	-
Stage 2	-	-	-	-	-	-	676	781	-	540	619	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.6	12.7	20.4
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	565	1493	-	-	1236	-	-	447
HCM Lane V/C Ratio	0.17	0.01	-	-	0.008	-	-	0.486
HCM Control Delay (s)	12.7	7.4	0	-	7.9	0	-	20.4
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	2.6

Intersection	
Int Delay, s/veh	11

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	87	217	47	55	118	16	8	54	41	8	47	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	62	62	62	55	55	55	66	66	66
Heavy Vehicles, %	0	2	4	0	8	19	0	0	2	0	2	0
Mvmt Flow	101	252	55	89	190	26	15	98	75	12	71	77

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	216	0	0	307	0	0	937	876	280	949	890	203
Stage 1	-	-	-	-	-	-	482	482	-	381	381	-
Stage 2	-	-	-	-	-	-	455	394	-	568	509	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1366	-	-	1265	-	-	247	290	759	242	282	843
Stage 1	-	-	-	-	-	-	569	557	-	645	613	-
Stage 2	-	-	-	-	-	-	589	609	-	511	538	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1366	-	-	1265	-	-	152	243	759	132	236	843
Mov Cap-2 Maneuver	-	-	-	-	-	-	152	243	-	132	236	-
Stage 1	-	-	-	-	-	-	518	507	-	587	564	-
Stage 2	-	-	-	-	-	-	430	560	-	338	490	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.9	2.3	32.3	25.7
HCM LOS			D	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	313	1366	-	-	1265	-	-	331
HCM Lane V/C Ratio	0.598	0.074	-	-	0.07	-	-	0.485
HCM Control Delay (s)	32.3	7.8	0	-	8.1	0	-	25.7
HCM Lane LOS	D	A	A	-	A	A	-	D
HCM 95th %tile Q(veh)	3.6	0.2	-	-	0.2	-	-	2.5

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	261	13	21	168	4	6	47	17	31	78	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	74	74	74	67	67	67	74	74	74
Heavy Vehicles, %	14	2	15	10	8	0	17	2	0	0	4	0
Mvmt Flow	8	303	15	28	227	5	9	70	25	42	105	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	232	0	0	319	0	0	678	616	311	661	621	230
Stage 1	-	-	-	-	-	-	327	327	-	286	286	-
Stage 2	-	-	-	-	-	-	351	289	-	375	335	-
Critical Hdwy	4.24	-	-	4.2	-	-	7.27	6.52	6.2	7.1	6.54	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.52	-	6.1	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.52	-	6.1	5.54	-
Follow-up Hdwy	2.326	-	-	2.29	-	-	3.653	4.018	3.3	3.5	4.036	3.3
Pot Cap-1 Maneuver	1268	-	-	1197	-	-	347	406	734	379	401	814
Stage 1	-	-	-	-	-	-	655	648	-	726	671	-
Stage 2	-	-	-	-	-	-	636	673	-	650	639	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1268	-	-	1197	-	-	259	392	734	307	387	814
Mov Cap-2 Maneuver	-	-	-	-	-	-	259	392	-	307	387	-
Stage 1	-	-	-	-	-	-	650	643	-	720	653	-
Stage 2	-	-	-	-	-	-	503	655	-	555	634	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.9	16.4	21.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	421	1268	-	-	1197	-	-	391
HCM Lane V/C Ratio	0.248	0.006	-	-	0.024	-	-	0.439
HCM Control Delay (s)	16.4	7.9	0	-	8.1	0	-	21.2
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1	0	-	-	0.1	-	-	2.2

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	31	274	6	5	187	14	3	34	9	55	37	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	82	82	82	72	72	72	75	75	75
Heavy Vehicles, %	0	2	0	40	8	7	33	0	11	0	0	0
Mvmt Flow	37	326	7	6	228	17	4	47	12	73	49	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	245	0	0	333	0	0	682	661	330	682	656	237
Stage 1	-	-	-	-	-	-	404	404	-	249	249	-
Stage 2	-	-	-	-	-	-	278	257	-	433	407	-
Critical Hdwy	4.1	-	-	4.5	-	-	7.43	6.5	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.56	-	-	3.797	4	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	1333	-	-	1042	-	-	325	385	691	367	388	807
Stage 1	-	-	-	-	-	-	566	603	-	759	704	-
Stage 2	-	-	-	-	-	-	666	699	-	605	601	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1333	-	-	1042	-	-	280	369	691	315	372	807
Mov Cap-2 Maneuver	-	-	-	-	-	-	280	369	-	315	372	-
Stage 1	-	-	-	-	-	-	547	582	-	733	699	-
Stage 2	-	-	-	-	-	-	608	694	-	527	581	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.2	15.8	21.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	397	1333	-	-	1042	-	-	350
HCM Lane V/C Ratio	0.161	0.028	-	-	0.006	-	-	0.377
HCM Control Delay (s)	15.8	7.8	0	-	8.5	0	-	21.4
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0	-	-	1.7

Intersection	
Int Delay, s/veh	9.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	49	83	5	2	24	61	0	54	8	52	24	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	59	59	59	50	50	50	60	60	60
Heavy Vehicles, %	0	6	0	0	8	2	0	6	0	2	0	0
Mvmt Flow	80	136	8	3	41	103	0	108	16	87	40	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	416	352	55	416	359	116	70	0	0	124	0	0
Stage 1	228	228	-	116	116	-	-	-	-	-	-	-
Stage 2	188	124	-	300	243	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.56	6.2	7.1	6.58	6.22	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.054	3.3	3.5	4.072	3.318	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	551	566	1018	551	558	936	1544	-	-	1463	-	-
Stage 1	779	708	-	894	788	-	-	-	-	-	-	-
Stage 2	818	786	-	713	694	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	439	531	1018	419	523	936	1544	-	-	1463	-	-
Mov Cap-2 Maneuver	439	531	-	419	523	-	-	-	-	-	-	-
Stage 1	779	664	-	894	788	-	-	-	-	-	-	-
Stage 2	690	786	-	527	651	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.8	11	0	4.2
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1544	-	-	502	751	1463	-	-
HCM Lane V/C Ratio	-	-	-	0.447	0.196	0.059	-	-
HCM Control Delay (s)	0	-	-	17.8	11	7.6	0	-
HCM Lane LOS	A	-	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	2.3	0.7	0.2	-	-

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	8	127	12	15	72	6	20	49	21	31	65	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	65	65	65	63	63	63	76	76	76
Heavy Vehicles, %	0	4	0	27	4	0	0	2	5	0	2	7
Mvmt Flow	12	184	17	23	111	9	32	78	33	41	86	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	394	351	95	435	344	94	104	0	0	111	0	0
Stage 1	176	176	-	158	158	-	-	-	-	-	-	-
Stage 2	218	175	-	277	186	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.54	6.2	7.37	6.54	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.54	-	6.37	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.54	-	6.37	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.036	3.3	3.743	4.036	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	569	570	967	491	575	968	1500	-	-	1492	-	-
Stage 1	831	750	-	789	763	-	-	-	-	-	-	-
Stage 2	789	750	-	678	742	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	457	541	967	342	545	968	1500	-	-	1492	-	-
Mov Cap-2 Maneuver	457	541	-	342	545	-	-	-	-	-	-	-
Stage 1	812	728	-	771	745	-	-	-	-	-	-	-
Stage 2	650	733	-	483	720	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.5	14.8	1.7	2.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1500	-	-	555	511	1492	-	-
HCM Lane V/C Ratio	0.021	-	-	0.384	0.28	0.027	-	-
HCM Control Delay (s)	7.5	0	-	15.5	14.8	7.5	0	-
HCM Lane LOS	A	A	-	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.8	1.1	0.1	-	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	18	165	1	6	73	7	2	14	16	49	12	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	80	80	80	73	73	73	56	56	56
Heavy Vehicles, %	6	3	100	0	7	0	0	0	0	0	0	0
Mvmt Flow	21	190	1	8	91	9	3	19	22	88	21	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	100	0	0	191	0	0	369	347	190	363	343	96
Stage 1	-	-	-	-	-	-	232	232	-	111	111	-
Stage 2	-	-	-	-	-	-	137	115	-	252	232	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1468	-	-	1395	-	-	591	580	857	597	583	966
Stage 1	-	-	-	-	-	-	775	716	-	899	807	-
Stage 2	-	-	-	-	-	-	871	804	-	757	716	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1468	-	-	1395	-	-	546	567	857	557	570	966
Mov Cap-2 Maneuver	-	-	-	-	-	-	546	567	-	557	570	-
Stage 1	-	-	-	-	-	-	763	705	-	885	802	-
Stage 2	-	-	-	-	-	-	815	799	-	706	705	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.5	10.7	12.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	681	1468	-	-	1395	-	-	619
HCM Lane V/C Ratio	0.064	0.014	-	-	0.005	-	-	0.228
HCM Control Delay (s)	10.7	7.5	0	-	7.6	0	-	12.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.9

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	20	30	0	1	25	6	0	34	6	7	18	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	48	48	48	57	57	57	71	71	71	59	59	59
Heavy Vehicles, %	5	7	0	0	12	0	0	3	0	0	0	0
Mvmt Flow	42	62	0	2	44	11	0	48	8	12	31	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	140	117	37	144	120	52	44	0	0	56	0	0
Stage 1	61	61	-	52	52	-	-	-	-	-	-	-
Stage 2	79	56	-	92	68	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.57	6.2	7.1	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.063	3.3	3.5	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	823	764	1041	830	752	1021	1577	-	-	1562	-	-
Stage 1	943	834	-	966	832	-	-	-	-	-	-	-
Stage 2	922	838	-	920	819	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	773	758	1041	773	746	1021	1577	-	-	1562	-	-
Mov Cap-2 Maneuver	773	758	-	773	746	-	-	-	-	-	-	-
Stage 1	943	827	-	966	832	-	-	-	-	-	-	-
Stage 2	864	838	-	844	812	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.5	9.9	0	1.6
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1577	-	-	764	787	1562	-	-
HCM Lane V/C Ratio	-	-	-	0.136	0.071	0.008	-	-
HCM Control Delay (s)	0	-	-	10.5	9.9	7.3	0	-
HCM Lane LOS	A	-	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.2	0	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	39	3	13	25	2	4	42	8	10	63	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	67	67	67	61	61	61	75	75	75
Heavy Vehicles, %	0	5	0	7	12	0	0	5	13	0	0	0
Mvmt Flow	2	46	4	19	37	3	7	69	13	13	84	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	221	207	85	226	202	75	87	0	0	82	0	0
Stage 1	112	112	-	89	89	-	-	-	-	-	-	-
Stage 2	109	95	-	137	113	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.17	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.563	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	739	684	980	719	677	992	1522	-	-	1528	-	-
Stage 1	898	797	-	906	802	-	-	-	-	-	-	-
Stage 2	901	810	-	854	783	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	698	674	980	672	668	992	1522	-	-	1528	-	-
Mov Cap-2 Maneuver	698	674	-	672	668	-	-	-	-	-	-	-
Stage 1	894	790	-	901	798	-	-	-	-	-	-	-
Stage 2	852	806	-	794	776	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	10.8	0.5	1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1522	-	-	690	680	1528	-	-
HCM Lane V/C Ratio	0.004	-	-	0.075	0.088	0.009	-	-
HCM Control Delay (s)	7.4	0	-	10.6	10.8	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	79	0	8	31	6	2	7	30	7	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	75	75	75	75	75	75	67	67	67
Heavy Vehicles, %	0	3	0	0	13	0	0	0	3	14	25	0
Mvmt Flow	1	103	0	11	41	8	3	9	40	10	6	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	49	0	0	103	0	0	178	176	103	197	172	45
Stage 1	-	-	-	-	-	-	105	105	-	67	67	-
Stage 2	-	-	-	-	-	-	73	71	-	130	105	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.23	7.24	6.75	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327	3.626	4.225	3.3
Pot Cap-1 Maneuver	1571	-	-	1502	-	-	789	721	949	737	682	1031
Stage 1	-	-	-	-	-	-	906	812	-	914	796	-
Stage 2	-	-	-	-	-	-	942	840	-	846	766	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1571	-	-	1502	-	-	773	715	949	694	676	1031
Mov Cap-2 Maneuver	-	-	-	-	-	-	773	715	-	694	676	-
Stage 1	-	-	-	-	-	-	905	811	-	913	790	-
Stage 2	-	-	-	-	-	-	921	833	-	800	765	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	9.3	9.8
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	887	1571	-	-	1502	-	-	767
HCM Lane V/C Ratio	0.059	0.001	-	-	0.007	-	-	0.031
HCM Control Delay (s)	9.3	7.3	0	-	7.4	0	-	9.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	49	166	75	34	148	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	87	87	80	80	80	80
Heavy Vehicles, %	6	5	4	9	1	5
Mvmt Flow	56	191	94	42	185	78

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	136	0	-	0	418	115
Stage 1	-	-	-	-	115	-
Stage 2	-	-	-	-	303	-
Critical Hdwy	4.16	-	-	-	6.41	6.25
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.254	-	-	-	3.509	3.345
Pot Cap-1 Maneuver	1424	-	-	-	593	929
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	751	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1424	-	-	-	567	929
Mov Cap-2 Maneuver	-	-	-	-	567	-
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	718	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1424	-	-	-	641
HCM Lane V/C Ratio	0.04	-	-	-	0.41
HCM Control Delay (s)	7.6	0	-	-	14.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	2

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	30	15	14	26	1	32	67	15	1	45	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	73	73	73	92	92	92	77	77	77
Heavy Vehicles, %	0	0	0	0	0	0	3	2	7	0	2	33
Mvmt Flow	0	40	20	19	36	1	35	73	16	1	58	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	232	222	60	244	216	81	62	0	0	89	0	0
Stage 1	63	63	-	151	151	-	-	-	-	-	-	-
Stage 2	169	159	-	93	65	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.13	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	727	680	1011	714	685	985	1535	-	-	1519	-	-
Stage 1	953	846	-	856	776	-	-	-	-	-	-	-
Stage 2	838	770	-	919	845	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	683	663	1011	655	668	985	1535	-	-	1519	-	-
Mov Cap-2 Maneuver	683	663	-	655	668	-	-	-	-	-	-	-
Stage 1	930	845	-	835	757	-	-	-	-	-	-	-
Stage 2	778	752	-	857	844	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.2	10.9	2.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1535	-	-	749	669	1519	-	-
HCM Lane V/C Ratio	0.023	-	-	0.08	0.084	0.001	-	-
HCM Control Delay (s)	7.4	0	-	10.2	10.9	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.3	0	-	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	200	1	44	263	118	6	34	47	72	32	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	75	75	75	90	90	90
Heavy Vehicles, %	14	2	0	5	0	0	0	0	4	1	0	0
Mvmt Flow	8	230	1	51	302	136	8	45	63	80	36	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	302	0	0	231	0	0	670	650	230	704	650	302
Stage 1	-	-	-	-	-	-	247	247	-	403	403	-
Stage 2	-	-	-	-	-	-	423	403	-	301	247	-
Critical Hdwy	4.24	-	-	4.15	-	-	7.1	6.5	6.24	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Follow-up Hdwy	2.326	-	-	2.245	-	-	3.5	4	3.336	3.509	4	3.3
Pot Cap-1 Maneuver	1194	-	-	1319	-	-	373	391	804	353	391	742
Stage 1	-	-	-	-	-	-	761	706	-	626	603	-
Stage 2	-	-	-	-	-	-	613	603	-	710	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1194	-	-	1319	-	-	328	368	804	282	368	742
Mov Cap-2 Maneuver	-	-	-	-	-	-	328	368	-	282	368	-
Stage 1	-	-	-	-	-	-	755	700	-	621	572	-
Stage 2	-	-	-	-	-	-	542	572	-	607	700	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.8	14	23.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	514	1194	-	-	1319	-	-	311
HCM Lane V/C Ratio	0.226	0.007	-	-	0.038	-	-	0.386
HCM Control Delay (s)	14	8	0	-	7.8	0	-	23.7
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	1.8

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	34	186	228	121	93	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	93	93	91	91
Heavy Vehicles, %	3	3	1	1	1	19
Mvmt Flow	41	224	245	130	102	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	375	0	-	0	616	310
Stage 1	-	-	-	-	310	-
Stage 2	-	-	-	-	306	-
Critical Hdwy	4.13	-	-	-	6.41	6.39
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.227	-	-	-	3.509	3.471
Pot Cap-1 Maneuver	1178	-	-	-	456	692
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	749	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1178	-	-	-	438	692
Mov Cap-2 Maneuver	-	-	-	-	438	-
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	15.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1178	-	-	-	494
HCM Lane V/C Ratio	0.035	-	-	-	0.3
HCM Control Delay (s)	8.2	0	-	-	15.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	171	50	50	216	1	82	0	50	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	93	93	93	75	75	75	38	38	38
Heavy Vehicles, %	0	2	2	18	1	0	0	0	8	0	0	0
Mvmt Flow	0	199	58	54	232	1	109	0	67	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	233	0	0	257	0	0	568	569	228	601	597	233
Stage 1	-	-	-	-	-	-	228	228	-	340	340	-
Stage 2	-	-	-	-	-	-	340	341	-	261	257	-
Critical Hdwy	4.1	-	-	4.28	-	-	7.1	6.5	6.28	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.362	-	-	3.5	4	3.372	3.5	4	3.3
Pot Cap-1 Maneuver	1346	-	-	1220	-	-	437	435	797	415	419	811
Stage 1	-	-	-	-	-	-	779	719	-	679	643	-
Stage 2	-	-	-	-	-	-	679	642	-	748	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1346	-	-	1220	-	-	420	413	797	365	398	811
Mov Cap-2 Maneuver	-	-	-	-	-	-	420	413	-	365	398	-
Stage 1	-	-	-	-	-	-	779	719	-	679	610	-
Stage 2	-	-	-	-	-	-	644	609	-	685	699	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.5	15.7	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	512	1346	-	-	1220	-	-	-
HCM Lane V/C Ratio	0.344	-	-	-	0.044	-	-	-
HCM Control Delay (s)	15.7	0	-	-	8.1	0	-	0
HCM Lane LOS	C	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	1.5	0	-	-	0.1	-	-	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	276	33	98	360	0	53	0	71	1	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	95	95	95	89	89	89	25	25	25
Heavy Vehicles, %	0	2	3	0	1	0	0	0	3	0	0	0
Mvmt Flow	0	297	35	103	379	0	60	0	80	4	4	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	379	0	0	332	0	0	902	900	315	939	917	379
Stage 1	-	-	-	-	-	-	315	315	-	585	585	-
Stage 2	-	-	-	-	-	-	587	585	-	354	332	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1191	-	-	1239	-	-	261	280	723	246	274	672
Stage 1	-	-	-	-	-	-	700	659	-	501	501	-
Stage 2	-	-	-	-	-	-	499	501	-	667	648	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1191	-	-	1239	-	-	237	251	723	201	245	672
Mov Cap-2 Maneuver	-	-	-	-	-	-	237	251	-	201	245	-
Stage 1	-	-	-	-	-	-	700	659	-	501	448	-
Stage 2	-	-	-	-	-	-	443	448	-	593	648	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.7	19.6	21.9
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	385	1191	-	-	1239	-	-	221
HCM Lane V/C Ratio	0.362	-	-	-	0.083	-	-	0.036
HCM Control Delay (s)	19.6	0	-	-	8.2	0	-	21.9
HCM Lane LOS	C	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	1.6	0	-	-	0.3	-	-	0.1

Intersection	
Int Delay, s/veh	5.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	59	29	84	100	42	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	76	76	84	84	76	76
Heavy Vehicles, %	0	0	0	2	0	0
Mvmt Flow	78	38	100	119	55	136

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	116	0	416	97
Stage 1	-	-	-	-	97	-
Stage 2	-	-	-	-	319	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1485	-	597	965
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1485	-	554	965
Mov Cap-2 Maneuver	-	-	-	-	554	-
Stage 1	-	-	-	-	932	-
Stage 2	-	-	-	-	688	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.5	11
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	794	-	-	1485	-
HCM Lane V/C Ratio	0.24	-	-	0.067	-
HCM Control Delay (s)	11	-	-	7.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.2	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	6	101	12	27	192	44	22	81	24	25	42	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	84	84	84
Heavy Vehicles, %	0	1	0	0	1	2	0	1	0	4	0	0
Mvmt Flow	7	115	14	31	218	50	25	92	27	30	50	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	268	0	0	128	0	0	470	465	122	500	447	243
Stage 1	-	-	-	-	-	-	135	135	-	305	305	-
Stage 2	-	-	-	-	-	-	335	330	-	195	142	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.51	6.2	7.14	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.51	-	6.14	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.51	-	6.14	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.009	3.3	3.536	4	3.3
Pot Cap-1 Maneuver	1307	-	-	1470	-	-	507	496	935	478	509	801
Stage 1	-	-	-	-	-	-	873	787	-	700	666	-
Stage 2	-	-	-	-	-	-	683	648	-	802	783	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1307	-	-	1470	-	-	450	481	935	387	493	801
Mov Cap-2 Maneuver	-	-	-	-	-	-	450	481	-	387	493	-
Stage 1	-	-	-	-	-	-	868	782	-	696	649	-
Stage 2	-	-	-	-	-	-	605	632	-	683	778	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.8	14.5	14.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	523	1307	-	-	1470	-	-	474
HCM Lane V/C Ratio	0.276	0.005	-	-	0.021	-	-	0.193
HCM Control Delay (s)	14.5	7.8	0	-	7.5	0	-	14.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.1	0	-	-	0.1	-	-	0.7

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	50	2	37	83	66	6	68	38	97	37	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	95	95	95	80	80	80	89	89	89
Heavy Vehicles, %	0	2	0	0	0	0	17	4	5	1	0	0
Mvmt Flow	7	69	3	39	87	69	8	85	48	109	42	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	157	0	0	72	0	0	306	320	71	351	286	122
Stage 1	-	-	-	-	-	-	85	85	-	200	200	-
Stage 2	-	-	-	-	-	-	221	235	-	151	86	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.27	6.54	6.25	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.54	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.54	-	6.11	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.653	4.036	3.345	3.509	4	3.3
Pot Cap-1 Maneuver	1435	-	-	1541	-	-	618	594	983	606	627	935
Stage 1	-	-	-	-	-	-	887	820	-	804	739	-
Stage 2	-	-	-	-	-	-	749	707	-	854	827	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1435	-	-	1541	-	-	570	574	983	499	606	935
Mov Cap-2 Maneuver	-	-	-	-	-	-	570	574	-	499	606	-
Stage 1	-	-	-	-	-	-	883	816	-	800	718	-
Stage 2	-	-	-	-	-	-	685	687	-	724	823	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.5	11.8	14.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	668	1435	-	-	1541	-	-	526
HCM Lane V/C Ratio	0.21	0.005	-	-	0.025	-	-	0.288
HCM Control Delay (s)	11.8	7.5	0	-	7.4	0	-	14.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	1.2

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	36	15	136	25	7	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	71	71	86	86	71	71
Heavy Vehicles, %	0	0	0	4	0	1
Mvmt Flow	51	21	158	29	10	155

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	348	173	0	0	187	0
Stage 1	173	-	-	-	-	-
Stage 2	175	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	653	876	-	-	1399	-
Stage 1	862	-	-	-	-	-
Stage 2	860	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	648	876	-	-	1399	-
Mov Cap-2 Maneuver	648	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	853	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	702	1399	-
HCM Lane V/C Ratio	-	-	0.102	0.007	-
HCM Control Delay (s)	-	-	10.7	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	23	226	2	13	299	40	2	68	14	26	35	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	89	89	89	78	78	78	85	85	85
Heavy Vehicles, %	0	0	0	0	1	3	0	0	7	0	0	0
Mvmt Flow	27	269	2	15	336	45	3	87	18	31	41	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	381	0	0	271	0	0	743	735	270	766	714	358
Stage 1	-	-	-	-	-	-	325	325	-	388	388	-
Stage 2	-	-	-	-	-	-	418	410	-	378	326	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.3
Pot Cap-1 Maneuver	1189	-	-	1304	-	-	334	349	757	322	359	691
Stage 1	-	-	-	-	-	-	692	653	-	640	612	-
Stage 2	-	-	-	-	-	-	616	599	-	648	652	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1189	-	-	1304	-	-	285	334	757	243	344	691
Mov Cap-2 Maneuver	-	-	-	-	-	-	285	334	-	243	344	-
Stage 1	-	-	-	-	-	-	673	635	-	623	603	-
Stage 2	-	-	-	-	-	-	549	590	-	531	634	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.3	18.8	19.8
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	367	1189	-	-	1304	-	-	334
HCM Lane V/C Ratio	0.293	0.023	-	-	0.011	-	-	0.275
HCM Control Delay (s)	18.8	8.1	0	-	7.8	0	-	19.8
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0	-	-	1.1

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	11	208	5	11	258	43	12	91	14	18	46	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	90	90	90	66	66	66	71	71	71
Heavy Vehicles, %	0	0	0	0	2	0	0	2	0	11	4	5
Mvmt Flow	14	270	6	12	287	48	18	138	21	25	65	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	334	0	0	277	0	0	684	661	273	716	640	311
Stage 1	-	-	-	-	-	-	302	302	-	335	335	-
Stage 2	-	-	-	-	-	-	382	359	-	381	305	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.52	6.2	7.21	6.54	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.52	-	6.21	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.52	-	6.21	5.54	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.018	3.3	3.599	4.036	3.345
Pot Cap-1 Maneuver	1237	-	-	1298	-	-	365	383	771	334	391	722
Stage 1	-	-	-	-	-	-	712	664	-	660	639	-
Stage 2	-	-	-	-	-	-	645	627	-	623	659	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1237	-	-	1298	-	-	299	374	771	228	382	722
Mov Cap-2 Maneuver	-	-	-	-	-	-	299	374	-	228	382	-
Stage 1	-	-	-	-	-	-	703	655	-	651	632	-
Stage 2	-	-	-	-	-	-	549	620	-	472	650	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.3	21.8	19.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	388	1237	-	-	1298	-	-	372
HCM Lane V/C Ratio	0.457	0.012	-	-	0.009	-	-	0.322
HCM Control Delay (s)	21.8	7.9	0	-	7.8	0	-	19.2
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	2.3	0	-	-	0	-	-	1.4

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	70	179	10	24	231	30	6	46	27	12	38	89
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	82	82	82	76	76	76	72	72	72
Heavy Vehicles, %	0	0	0	0	1	3	0	0	0	0	0	1
Mvmt Flow	91	232	13	29	282	37	8	61	36	17	53	124

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	318	0	0	245	0	0	868	798	239	828	786	300
Stage 1	-	-	-	-	-	-	421	421	-	359	359	-
Stage 2	-	-	-	-	-	-	447	377	-	469	427	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.309
Pot Cap-1 Maneuver	1253	-	-	1333	-	-	275	321	805	293	326	742
Stage 1	-	-	-	-	-	-	614	592	-	663	631	-
Stage 2	-	-	-	-	-	-	595	619	-	579	589	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1253	-	-	1333	-	-	181	286	805	216	291	742
Mov Cap-2 Maneuver	-	-	-	-	-	-	181	286	-	216	291	-
Stage 1	-	-	-	-	-	-	562	542	-	607	614	-
Stage 2	-	-	-	-	-	-	441	602	-	450	540	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.2	0.7	19.8	18.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	347	1253	-	-	1333	-	-	454
HCM Lane V/C Ratio	0.3	0.073	-	-	0.022	-	-	0.425
HCM Control Delay (s)	19.8	8.1	0	-	7.8	0	-	18.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.2	0.2	-	-	0.1	-	-	2.1

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	17	21	2	9	44	30	1	20	4	19	30	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	69	69	69	63	63	63	65	65	65
Heavy Vehicles, %	0	0	50	0	0	0	0	0	0	0	0	0
Mvmt Flow	19	23	2	13	64	43	2	32	6	29	46	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	203	152	52	161	155	35	58	0	0	38	0	0
Stage 1	111	111	-	38	38	-	-	-	-	-	-	-
Stage 2	92	41	-	123	117	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.7	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.75	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	759	743	895	809	741	1044	1559	-	-	1585	-	-
Stage 1	899	807	-	982	867	-	-	-	-	-	-	-
Stage 2	920	865	-	886	803	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	668	728	895	776	726	1044	1559	-	-	1585	-	-
Mov Cap-2 Maneuver	668	728	-	776	726	-	-	-	-	-	-	-
Stage 1	898	792	-	981	866	-	-	-	-	-	-	-
Stage 2	816	864	-	842	788	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	10.1	0.3	2.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1559	-	-	708	822	1585	-	-
HCM Lane V/C Ratio	0.001	-	-	0.062	0.146	0.018	-	-
HCM Control Delay (s)	7.3	0	-	10.4	10.1	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.5	0.1	-	-

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	48	5	29	75	35	8	60	12	8	48	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	76	76	76	59	59	59	82	82	82
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	2	0
Mvmt Flow	9	64	7	38	99	46	14	102	20	10	59	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	289	227	59	252	217	112	59	0	0	122	0	0
Stage 1	78	78	-	139	139	-	-	-	-	-	-	-
Stage 2	211	149	-	113	78	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	667	672	1012	706	685	947	1558	-	-	1478	-	-
Stage 1	936	830	-	869	785	-	-	-	-	-	-	-
Stage 2	796	774	-	897	834	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	556	661	1012	641	673	947	1558	-	-	1478	-	-
Mov Cap-2 Maneuver	556	661	-	641	673	-	-	-	-	-	-	-
Stage 1	927	824	-	860	777	-	-	-	-	-	-	-
Stage 2	654	766	-	816	828	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	11.7	0.7	1.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1558	-	-	666	718	1478	-	-
HCM Lane V/C Ratio	0.009	-	-	0.12	0.255	0.007	-	-
HCM Control Delay (s)	7.3	0	-	11.1	11.7	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	1	0	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	69	3	12	146	42	1	19	3	7	25	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	78	78	78	52	52	52	92	92	92
Heavy Vehicles, %	0	1	33	0	0	0	0	0	0	0	4	0
Mvmt Flow	11	78	3	15	187	54	2	37	6	8	27	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	241	0	0	81	0	0	367	374	79	368	348	214
Stage 1	-	-	-	-	-	-	102	102	-	245	245	-
Stage 2	-	-	-	-	-	-	265	272	-	123	103	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.54	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.036	3.3
Pot Cap-1 Maneuver	1337	-	-	1529	-	-	593	560	987	592	572	831
Stage 1	-	-	-	-	-	-	909	815	-	763	700	-
Stage 2	-	-	-	-	-	-	745	688	-	886	806	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1337	-	-	1529	-	-	554	549	987	550	561	831
Mov Cap-2 Maneuver	-	-	-	-	-	-	554	549	-	550	561	-
Stage 1	-	-	-	-	-	-	901	808	-	756	692	-
Stage 2	-	-	-	-	-	-	697	680	-	833	799	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.4	11.7	11.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	583	1337	-	-	1529	-	-	613
HCM Lane V/C Ratio	0.076	0.008	-	-	0.01	-	-	0.078
HCM Control Delay (s)	11.7	7.7	0	-	7.4	0	-	11.4
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.3

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	6	23	1	5	33	3	0	23	3	0	35	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	85	85	85	65	65	65	73	73	73
Heavy Vehicles, %	0	9	0	0	6	0	0	0	0	0	0	17
Mvmt Flow	8	31	1	6	39	4	0	35	5	0	48	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	111	92	52	106	94	38	56	0	0	40	0	0
Stage 1	52	52	-	38	38	-	-	-	-	-	-	-
Stage 2	59	40	-	68	56	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.59	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.081	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	872	785	1021	878	789	1040	1562	-	-	1583	-	-
Stage 1	966	838	-	982	855	-	-	-	-	-	-	-
Stage 2	958	848	-	947	840	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	836	785	1021	851	789	1040	1562	-	-	1583	-	-
Mov Cap-2 Maneuver	836	785	-	851	789	-	-	-	-	-	-	-
Stage 1	966	838	-	982	855	-	-	-	-	-	-	-
Stage 2	911	848	-	911	840	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.7	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1562	-	-	801	811	1583	-	-
HCM Lane V/C Ratio	-	-	-	0.05	0.059	-	-	-
HCM Control Delay (s)	0	-	-	9.7	9.7	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	6	20	0	9	37	6	2	56	6	9	37	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	65	65	76	76	76	76	76	76	71	71	71
Heavy Vehicles, %	0	5	0	0	8	0	0	2	0	11	3	0
Mvmt Flow	9	31	0	12	49	8	3	74	8	13	52	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	190	166	54	177	163	78	55	0	0	82	0	0
Stage 1	79	79	-	83	83	-	-	-	-	-	-	-
Stage 2	111	87	-	94	80	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.1	6.58	6.2	4.1	-	-	4.21	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.5	4.072	3.3	2.2	-	-	2.299	-	-
Pot Cap-1 Maneuver	774	721	1019	790	719	988	1563	-	-	1460	-	-
Stage 1	935	823	-	930	814	-	-	-	-	-	-	-
Stage 2	899	817	-	918	817	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	722	713	1019	758	711	988	1563	-	-	1460	-	-
Mov Cap-2 Maneuver	722	713	-	758	711	-	-	-	-	-	-	-
Stage 1	933	816	-	928	812	-	-	-	-	-	-	-
Stage 2	837	815	-	875	810	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	10.3	0.2	1.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1563	-	-	715	743	1460	-	-
HCM Lane V/C Ratio	0.002	-	-	0.056	0.092	0.009	-	-
HCM Control Delay (s)	7.3	0	-	10.3	10.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	42	0	37	64	12	0	12	13	8	18	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	57	57	57	78	78	78	42	42	42	81	81	81
Heavy Vehicles, %	0	0	0	0	5	0	0	0	0	25	0	0
Mvmt Flow	2	74	0	47	82	15	0	29	31	10	22	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	97	0	0	74	0	0	275	269	74	292	262	90
Stage 1	-	-	-	-	-	-	77	77	-	185	185	-
Stage 2	-	-	-	-	-	-	198	192	-	107	77	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.35	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.725	4	3.3
Pot Cap-1 Maneuver	1509	-	-	1538	-	-	681	641	993	617	646	973
Stage 1	-	-	-	-	-	-	937	835	-	766	751	-
Stage 2	-	-	-	-	-	-	808	745	-	845	835	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1509	-	-	1538	-	-	643	620	993	562	625	973
Mov Cap-2 Maneuver	-	-	-	-	-	-	643	620	-	562	625	-
Stage 1	-	-	-	-	-	-	936	834	-	765	727	-
Stage 2	-	-	-	-	-	-	755	721	-	790	834	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.4	10.1	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	770	1509	-	-	1538	-	-	629
HCM Lane V/C Ratio	0.077	0.001	-	-	0.031	-	-	0.057
HCM Control Delay (s)	10.1	7.4	0	-	7.4	0	-	11.1
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0.2

APPENDIX C
HORIZON YEAR (2035) - UNIMPROVED INTERSECTION CAPACITY WORKSHEETS

SANDERSON STEWART

FEHR PEERS

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	6	153	89	69	48	191	37	88	55	543	182	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	3	30	0	0	0	0	0	0	0
Mvmt Flow	7	170	99	77	53	212	41	98	61	603	202	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1756	1654	207	1759	1629	128	211	0	0	159	0	0
Stage 1	1413	1413	-	211	211	-	-	-	-	-	-	-
Stage 2	343	241	-	1548	1418	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.13	6.8	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.8	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.8	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.527	4.27	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	67	~ 99	839	~ 66	88	927	1372	-	-	1433	-	-
Stage 1	173	206	-	789	678	-	-	-	-	-	-	-
Stage 2	676	710	-	142	177	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 50	839	-	~ 45	927	1372	-	-	1433	-	-
Mov Cap-2 Maneuver	-	~ 50	-	-	~ 45	-	-	-	-	-	-	-
Stage 1	167	~ 108	-	763	656	-	-	-	-	-	-	-
Stage 2	463	687	-	-	93	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			1.6	6.9
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1372	-	-	-	-	1433	-	-
HCM Lane V/C Ratio	0.03	-	-	-	-	0.421	-	-
HCM Control Delay (s)	7.7	0	-	-	-	9.3	0	-
HCM Lane LOS	A	A	-	-	-	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-	2.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1343.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	836	62	158	307	51	7	13	176	182	156	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	7	17	11	13	33	0	13	1	2	100
Mvmt Flow	0	929	69	176	341	57	8	14	196	202	173	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	341	0	0	998	0	0	1744	1655	963	1760	1690	341
Stage 1	-	-	-	-	-	-	963	963	-	692	692	-
Stage 2	-	-	-	-	-	-	781	692	-	1068	998	-
Critical Hdwy	4.1	-	-	4.27	-	-	7.43	6.5	6.33	7.11	6.52	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.5	-	6.11	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.5	-	6.11	5.52	-
Follow-up Hdwy	2.2	-	-	2.353	-	-	3.797	4	3.417	3.509	4.018	4.2
Pot Cap-1 Maneuver	1229	-	-	638	-	-	57	99	296	~ 66	~ 93	525
Stage 1	-	-	-	-	-	-	270	337	-	436	445	-
Stage 2	-	-	-	-	-	-	345	448	-	269	322	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1229	-	-	638	-	-	-	64	296	~ 14	~ 60	525
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	64	-	~ 14	~ 60	-
Stage 1	-	-	-	-	-	-	270	337	-	436	286	-
Stage 2	-	-	-	-	-	-	87	288	-	~ 87	322	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.9		$ 7661.1
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1229	-	-	638	-	-	22
HCM Lane V/C Ratio	-	-	-	-	0.275	-	-	17.273
HCM Control Delay (s)	-	0	-	-	12.8	0	-	$ 7661.1
HCM Lane LOS	-	A	-	-	B	A	-	F
HCM 95th %tile Q(veh)	-	0	-	-	1.1	-	-	47.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	486.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	80	772	319	87	424	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	30	2	10	22	3	6
Mvmt Flow	89	858	354	97	471	201

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	451	0	-	0	1439	403
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	1036	-
Critical Hdwy	4.4	-	-	-	6.43	6.26
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.47	-	-	-	3.527	3.354
Pot Cap-1 Maneuver	977	-	-	-	~ 146	639
Stage 1	-	-	-	-	673	-
Stage 2	-	-	-	-	~ 341	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	977	-	-	-	~ 121	639
Mov Cap-2 Maneuver	-	-	-	-	~ 121	-
Stage 1	-	-	-	-	673	-
Stage 2	-	-	-	-	~ 282	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	$ 1497.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	977	-	-	-	160
HCM Lane V/C Ratio	0.091	-	-	-	4.201
HCM Control Delay (s)	9.1	0	-		$ 1497.1
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.3	-	-	-	67.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	28.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	732	210	120	370	0	55	0	113	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	12	9	0	4	100	25	0	0	0
Mvmt Flow	0	813	233	133	411	0	61	0	126	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	411	0	0	1047	0	0	1608	1608	930	1671	1725	411
Stage 1	-	-	-	-	-	-	930	930	-	678	678	-
Stage 2	-	-	-	-	-	-	678	678	-	993	1047	-
Critical Hdwy	4.1	-	-	4.22	-	-	7.14	7.5	6.45	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	6.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	6.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.308	-	-	3.536	4.9	3.525	3.5	4	3.3
Pot Cap-1 Maneuver	1159	-	-	628	-	-	83	64	294	77	90	645
Stage 1	-	-	-	-	-	-	318	242	-	445	455	-
Stage 2	-	-	-	-	-	-	439	331	-	298	308	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1159	-	-	628	-	-	65	46	294	35	65	645
Mov Cap-2 Maneuver	-	-	-	-	-	-	65	46	-	35	65	-
Stage 1	-	-	-	-	-	-	318	242	-	445	330	-
Stage 2	-	-	-	-	-	-	319	240	-	171	308	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3	263.7	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	137	1159	-	-	628	-	-	-
HCM Lane V/C Ratio	1.363	-	-	-	0.212	-	-	-
HCM Control Delay (s)	263.7	0	-	-	12.3	0	-	0
HCM Lane LOS	F	A	-	-	B	A	-	A
HCM 95th %tile Q(veh)	12	0	-	-	0.8	-	-	-

Intersection	
Int Delay, s/veh	199.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	1241	164	93	566	0	32	0	292	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	2	6	0	7	0	1	0	0	0
Mvmt Flow	0	1379	182	103	629	0	36	0	324	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	629	0	0	1561	0	0	2306	2306	1470	2468	2397	629
Stage 1	-	-	-	-	-	-	1470	1470	-	836	836	-
Stage 2	-	-	-	-	-	-	836	836	-	1632	1561	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.17	6.5	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.563	4	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	963	-	-	423	-	-	~ 26	39	~ 157	21	34	486
Stage 1	-	-	-	-	-	-	154	193	-	364	385	-
Stage 2	-	-	-	-	-	-	354	385	-	129	175	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	963	-	-	423	-	-	~ 18	24	~ 157	-	21	486
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 18	24	-	-	21	-
Stage 1	-	-	-	-	-	-	154	193	-	364	241	-
Stage 2	-	-	-	-	-	-	222	241	-	-	175	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.3	$ 1467.5	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	89	963	-	-	423	-	-	-
HCM Lane V/C Ratio	4.045	-	-	-	0.244	-	-	-
HCM Control Delay (s)	$ 1467.5	0	-	-	16.2	0	-	0
HCM Lane LOS	F	A	-	-	C	A	-	A
HCM 95th %tile Q(veh)	37.5	0	-	-	0.9	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	187	100	159	78	40	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	4	1	2	9	0
Mvmt Flow	208	111	177	87	44	151

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	319	0	703	263
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	440	-
Critical Hdwy	-	-	4.11	-	6.49	6.2
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.209	-	3.581	3.3
Pot Cap-1 Maneuver	-	-	1247	-	393	781
Stage 1	-	-	-	-	765	-
Stage 2	-	-	-	-	635	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1247	-	334	781
Mov Cap-2 Maneuver	-	-	-	-	334	-
Stage 1	-	-	-	-	765	-
Stage 2	-	-	-	-	540	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.6	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	599	-	-	1247	-
HCM Lane V/C Ratio	0.326	-	-	0.142	-
HCM Control Delay (s)	13.9	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.4	-	-	0.5	-

Intersection	
Int Delay, s/veh	113.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	26	555	42	17	155	49	10	61	52	139	170	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	0	0	4	0	20	3	0	3	0	0
Mvmt Flow	29	617	47	19	172	54	11	68	58	154	189	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	227	0	0	663	0	0	1037	962	640	998	958	199
Stage 1	-	-	-	-	-	-	698	698	-	237	237	-
Stage 2	-	-	-	-	-	-	339	264	-	761	721	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.3	6.53	6.2	7.13	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.53	-	6.13	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.53	-	6.13	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.68	4.027	3.3	3.527	4	3.3
Pot Cap-1 Maneuver	1353	-	-	935	-	-	194	255	479	222	259	847
Stage 1	-	-	-	-	-	-	403	441	-	764	713	-
Stage 2	-	-	-	-	-	-	640	688	-	396	435	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1353	-	-	935	-	-	67	241	479	~ 147	244	847
Mov Cap-2 Maneuver	-	-	-	-	-	-	67	241	-	~ 147	244	-
Stage 1	-	-	-	-	-	-	389	426	-	738	697	-
Stage 2	-	-	-	-	-	-	448	672	-	283	420	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.7	37.9	$ 440.4
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	241	1353	-	-	935	-	-	194
HCM Lane V/C Ratio	0.567	0.021	-	-	0.02	-	-	1.844
HCM Control Delay (s)	37.9	7.7	0	-	8.9	0	-	$ 440.4
HCM Lane LOS	E	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0.1	-	-	25.7

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	327.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	191	4	80	128	35	8	84	80	311	336	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	0	3	2	19	0	18	8	3	8	0
Mvmt Flow	4	212	4	89	142	39	9	93	89	346	373	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	181	0	0	217	0	0	755	582	214	653	565	162
Stage 1	-	-	-	-	-	-	223	223	-	339	339	-
Stage 2	-	-	-	-	-	-	532	359	-	314	226	-
Critical Hdwy	4.1	-	-	4.13	-	-	7.1	6.68	6.28	7.13	6.58	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.68	-	6.13	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.68	-	6.13	5.58	-
Follow-up Hdwy	2.2	-	-	2.227	-	-	3.5	4.162	3.372	3.527	4.072	3.3
Pot Cap-1 Maneuver	1407	-	-	1347	-	-	328	404	811	379	426	888
Stage 1	-	-	-	-	-	-	784	690	-	673	629	-
Stage 2	-	-	-	-	-	-	535	600	-	695	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1407	-	-	1347	-	-	47	373	811	~ 257	393	888
Mov Cap-2 Maneuver	-	-	-	-	-	-	47	373	-	~ 257	393	-
Stage 1	-	-	-	-	-	-	782	688	-	671	582	-
Stage 2	-	-	-	-	-	-	175	556	-	533	704	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.6	27.2	$ 625.4
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	348	1407	-	-	1347	-	-	316
HCM Lane V/C Ratio	0.549	0.003	-	-	0.066	-	-	2.31
HCM Control Delay (s)	27.2	7.6	0	-	7.9	0	-	$ 625.4
HCM Lane LOS	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	3.1	0	-	-	0.2	-	-	56.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	48	20	170	89	37	221
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	53	22	189	99	41	246

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	566	238	0	0	288	0
Stage 1	238	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	489	806	-	-	1286	-
Stage 1	806	-	-	-	-	-
Stage 2	734	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	471	806	-	-	1286	-
Mov Cap-2 Maneuver	471	-	-	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	707	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	537	1286	-
HCM Lane V/C Ratio	-	-	0.141	0.032	-
HCM Control Delay (s)	-	-	12.8	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	141.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	65	607	12	10	414	30	6	42	44	139	73	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	40	8	7	33	0	11	0	0	0
Mvmt Flow	72	674	13	11	460	33	7	47	49	154	81	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	493	0	0	688	0	0	1374	1342	681	1372	1331	477
Stage 1	-	-	-	-	-	-	826	826	-	499	499	-
Stage 2	-	-	-	-	-	-	548	516	-	873	832	-
Critical Hdwy	4.1	-	-	4.5	-	-	7.43	6.5	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.56	-	-	3.797	4	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	1081	-	-	752	-	-	105	154	435	~ 124	156	592
Stage 1	-	-	-	-	-	-	325	389	-	557	547	-
Stage 2	-	-	-	-	-	-	469	538	-	348	387	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1081	-	-	752	-	-	49	135	435	~ 73	136	592
Mov Cap-2 Maneuver	-	-	-	-	-	-	49	135	-	~ 73	136	-
Stage 1	-	-	-	-	-	-	290	347	-	497	536	-
Stage 2	-	-	-	-	-	-	379	527	-	238	345	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.2	52.7	$ 885.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	172	1081	-	-	752	-	-	92
HCM Lane V/C Ratio	0.594	0.067	-	-	0.015	-	-	2.742
HCM Control Delay (s)	52.7	8.6	0	-	9.9	0	-	$ 885.2
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	3.2	0.2	-	-	0	-	-	24

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	504.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	530	25	43	341	9	11	95	35	257	158	37
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	14	2	15	10	8	0	17	2	0	0	4	0
Mvmt Flow	16	589	28	48	379	10	12	106	39	286	176	41

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	389	0	0	617	0	0	1222	1118	603	1185	1127	384
Stage 1	-	-	-	-	-	-	634	634	-	479	479	-
Stage 2	-	-	-	-	-	-	588	484	-	706	648	-
Critical Hdwy	4.24	-	-	4.2	-	-	7.27	6.52	6.2	7.1	6.54	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.52	-	6.1	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.52	-	6.1	5.54	-
Follow-up Hdwy	2.326	-	-	2.29	-	-	3.653	4.018	3.3	3.5	4.036	3.3
Pot Cap-1 Maneuver	1107	-	-	925	-	-	146	207	503	~ 167	203	668
Stage 1	-	-	-	-	-	-	443	473	-	571	552	-
Stage 2	-	-	-	-	-	-	470	552	-	430	463	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1107	-	-	925	-	-	20	189	503	~ 81	185	668
Mov Cap-2 Maneuver	-	-	-	-	-	-	20	189	-	~ 81	185	-
Stage 1	-	-	-	-	-	-	433	463	-	558	516	-
Stage 2	-	-	-	-	-	-	272	516	-	300	453	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1	226.1	$ 1664.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	126	1107	-	-	925	-	-	111
HCM Lane V/C Ratio	1.243	0.014	-	-	0.052	-	-	4.525
HCM Control Delay (s)	226.1	8.3	0	-	9.1	0	-	$ 1664.1
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	9.8	0	-	-	0.2	-	-	52.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	94.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	157	404	85	102	219	30	14	98	76	15	85	92
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	4	0	8	19	0	0	2	0	2	0
Mvmt Flow	174	449	94	113	243	33	16	109	84	17	94	102

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	277	0	0	543	0	0	1430	1348	496	1429	1379	260
Stage 1	-	-	-	-	-	-	845	845	-	487	487	-
Stage 2	-	-	-	-	-	-	585	503	-	942	892	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1298	-	-	1036	-	-	113	152	574	114	144	784
Stage 1	-	-	-	-	-	-	360	382	-	566	550	-
Stage 2	-	-	-	-	-	-	501	545	-	318	360	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1298	-	-	1036	-	-	~ 14	~ 107	574	-	101	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 14	~ 107	-	-	101	-
Stage 1	-	-	-	-	-	-	290	308	-	456	479	-
Stage 2	-	-	-	-	-	-	305	475	-	141	290	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2	2.6	$ 678.9	
HCM LOS			F	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	92	1298	-	-	1036	-	-	-
HCM Lane V/C Ratio	2.271	0.134	-	-	0.109	-	-	-
HCM Control Delay (s)	$ 678.9	8.2	0	-	8.9	0	-	-
HCM Lane LOS	F	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	18.8	0.5	-	-	0.4	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	89	154	9	4	45	113	0	95	14	97	42	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	6	0	0	8	2	0	6	0	2	0	0
Mvmt Flow	99	171	10	4	50	126	0	106	16	108	47	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	482	402	65	484	412	113	83	0	0	121	0	0
Stage 1	281	281	-	113	113	-	-	-	-	-	-	-
Stage 2	201	121	-	371	299	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.56	6.2	7.1	6.58	6.22	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.054	3.3	3.5	4.072	3.318	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	498	531	1005	496	521	940	1527	-	-	1467	-	-
Stage 1	730	671	-	897	790	-	-	-	-	-	-	-
Stage 2	805	788	-	653	656	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	374	490	1005	338	480	940	1527	-	-	1467	-	-
Mov Cap-2 Maneuver	374	490	-	338	480	-	-	-	-	-	-	-
Stage 1	730	619	-	897	790	-	-	-	-	-	-	-
Stage 2	653	788	-	431	605	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.4	11.7	0	4.3
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1527	-	-	449	717	1467	-	-
HCM Lane V/C Ratio	-	-	-	0.624	0.251	0.073	-	-
HCM Control Delay (s)	0	-	-	25.4	11.7	7.6	0	-
HCM Lane LOS	A	-	-	D	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	4.2	1	0.2	-	-

Intersection	
Int Delay, s/veh	18.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	15	250	22	29	142	12	37	91	40	61	121	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	0	27	4	0	0	2	5	0	2	7
Mvmt Flow	17	278	24	32	158	13	41	101	44	68	134	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	576	513	149	642	506	123	164	0	0	146	0	0
Stage 1	285	285	-	206	206	-	-	-	-	-	-	-
Stage 2	291	228	-	436	300	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.54	6.2	7.37	6.54	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.54	-	6.37	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.54	-	6.37	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.036	3.3	3.743	4.036	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	431	462	903	354	466	933	1427	-	-	1448	-	-
Stage 1	727	672	-	742	728	-	-	-	-	-	-	-
Stage 2	721	712	-	553	662	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	285	424	903	154	428	933	1427	-	-	1448	-	-
Mov Cap-2 Maneuver	285	424	-	154	428	-	-	-	-	-	-	-
Stage 1	704	637	-	719	705	-	-	-	-	-	-	-
Stage 2	535	690	-	288	628	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33.6	29.7	1.7	2.2
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1427	-	-	431	343	1448	-	-
HCM Lane V/C Ratio	0.029	-	-	0.74	0.593	0.047	-	-
HCM Control Delay (s)	7.6	0	-	33.6	29.7	7.6	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	6	3.6	0.1	-	-

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	35	335	2	12	148	14	4	26	31	97	22	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	6	3	100	0	7	0	0	0	0	0	0	0
Mvmt Flow	39	372	2	13	164	16	4	29	34	108	24	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	180	0	0	374	0	0	682	658	373	682	651	172
Stage 1	-	-	-	-	-	-	451	451	-	199	199	-
Stage 2	-	-	-	-	-	-	231	207	-	483	452	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1372	-	-	1196	-	-	367	387	678	367	390	877
Stage 1	-	-	-	-	-	-	592	574	-	807	740	-
Stage 2	-	-	-	-	-	-	776	734	-	569	574	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1372	-	-	1196	-	-	321	369	678	316	371	877
Mov Cap-2 Maneuver	-	-	-	-	-	-	321	369	-	316	371	-
Stage 1	-	-	-	-	-	-	571	553	-	778	731	-
Stage 2	-	-	-	-	-	-	708	725	-	493	553	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.6	13.9	22.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	474	1372	-	-	1196	-	-	379
HCM Lane V/C Ratio	0.143	0.028	-	-	0.011	-	-	0.451
HCM Control Delay (s)	13.9	7.7	0	-	8	0	-	22.1
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	2.3

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	34	53	0	2	44	11	0	58	11	12	31	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	5	7	0	0	12	0	0	3	0	0	0	0
Mvmt Flow	38	59	0	2	49	12	0	64	12	13	34	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	170	146	42	169	148	71	50	0	0	77	0	0
Stage 1	69	69	-	71	71	-	-	-	-	-	-	-
Stage 2	101	77	-	98	77	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.57	6.2	7.1	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.063	3.3	3.5	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	787	736	1034	799	725	997	1570	-	-	1535	-	-
Stage 1	934	828	-	944	817	-	-	-	-	-	-	-
Stage 2	898	821	-	913	812	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	732	729	1034	745	718	997	1570	-	-	1535	-	-
Mov Cap-2 Maneuver	732	729	-	745	718	-	-	-	-	-	-	-
Stage 1	934	821	-	944	817	-	-	-	-	-	-	-
Stage 2	834	821	-	840	805	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	10.2	0	1.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1570	-	-	730	760	1535	-	-
HCM Lane V/C Ratio	-	-	-	0.132	0.083	0.009	-	-
HCM Control Delay (s)	0	-	-	10.7	10.2	7.4	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.3	0	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	71	5	23	45	4	7	74	14	18	111	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	7	12	0	0	5	13	0	0	0
Mvmt Flow	4	79	6	26	50	4	8	82	16	20	123	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	299	279	126	314	274	90	128	0	0	98	0	0
Stage 1	166	166	-	106	106	-	-	-	-	-	-	-
Stage 2	133	113	-	208	168	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.17	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.563	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	657	624	930	629	617	973	1470	-	-	1508	-	-
Stage 1	841	755	-	888	789	-	-	-	-	-	-	-
Stage 2	875	796	-	783	741	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	603	612	930	555	605	973	1470	-	-	1508	-	-
Mov Cap-2 Maneuver	603	612	-	555	605	-	-	-	-	-	-	-
Stage 1	836	744	-	883	784	-	-	-	-	-	-	-
Stage 2	811	791	-	686	731	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	11.9	0.5	1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1470	-	-	625	600	1508	-	-
HCM Lane V/C Ratio	0.005	-	-	0.142	0.133	0.013	-	-
HCM Control Delay (s)	7.5	0	-	11.7	11.9	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.5	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	143	0	14	56	11	4	12	53	13	7	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	0	0	13	0	0	0	3	14	25	0
Mvmt Flow	2	159	0	16	62	12	4	13	59	14	8	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	74	0	0	159	0	0	271	269	159	298	262	68
Stage 1	-	-	-	-	-	-	163	163	-	99	99	-
Stage 2	-	-	-	-	-	-	108	106	-	199	163	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.23	7.24	6.75	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327	3.626	4.225	3.3
Pot Cap-1 Maneuver	1538	-	-	1433	-	-	686	641	884	631	606	1001
Stage 1	-	-	-	-	-	-	844	767	-	879	771	-
Stage 2	-	-	-	-	-	-	902	811	-	776	722	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1538	-	-	1433	-	-	666	633	884	574	598	1001
Mov Cap-2 Maneuver	-	-	-	-	-	-	666	633	-	574	598	-
Stage 1	-	-	-	-	-	-	843	766	-	878	762	-
Stage 2	-	-	-	-	-	-	873	801	-	711	721	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	9.9	10.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	813	1538	-	-	1433	-	-	669
HCM Lane V/C Ratio	0.094	0.001	-	-	0.011	-	-	0.048
HCM Control Delay (s)	9.9	7.3	0	-	7.5	0	-	10.7
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	91.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	102	358	162	75	328	130
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	6	5	4	9	1	5
Mvmt Flow	113	398	180	83	364	144

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	263	0	-	0	846	222
Stage 1	-	-	-	-	222	-
Stage 2	-	-	-	-	624	-
Critical Hdwy	4.16	-	-	-	6.41	6.25
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.254	-	-	-	3.509	3.345
Pot Cap-1 Maneuver	1278	-	-	-	~ 334	810
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	536	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1278	-	-	-	~ 296	810
Mov Cap-2 Maneuver	-	-	-	-	~ 296	-
Stage 1	-	-	-	-	817	-
Stage 2	-	-	-	-	475	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	228.9
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1278	-	-	-	361
HCM Lane V/C Ratio	0.089	-	-	-	1.41
HCM Control Delay (s)	8.1	0	-	-	228.9
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.3	-	-	-	25.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	199.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	63	30	31	54	498	65	140	33	379	94	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0	3	2	7	0	2	33
Mvmt Flow	0	70	33	34	60	553	72	156	37	421	104	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1575	1287	108	1320	1271	174	111	0	0	192	0	0
Stage 1	950	950	-	318	318	-	-	-	-	-	-	-
Stage 2	625	337	-	1002	953	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.13	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	90	166	951	135	169	875	1473	-	-	1394	-	-
Stage 1	315	341	-	698	657	-	-	-	-	-	-	-
Stage 2	476	645	-	295	340	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	14	106	951	46	108	875	1473	-	-	1394	-	-
Mov Cap-2 Maneuver	14	106	-	46	108	-	-	-	-	-	-	-
Stage 1	298	231	-	660	621	-	-	-	-	-	-	-
Stage 2	149	610	-	135	231	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	71.1	$ 459.7	2.1	6.9
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1473	-	-	149	334	1394	-	-
HCM Lane V/C Ratio	0.049	-	-	0.694	1.939	0.302	-	-
HCM Control Delay (s)	7.6	0	-	71.1	$ 459.7	8.7	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	4	44.7	1.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	462	32	146	608	226	14	73	183	136	68	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	14	2	0	5	0	0	0	0	4	1	0	0
Mvmt Flow	16	513	36	162	676	251	16	81	203	151	76	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	676	0	0	549	0	0	1604	1562	531	1704	1580	676
Stage 1	-	-	-	-	-	-	562	562	-	1000	1000	-
Stage 2	-	-	-	-	-	-	1042	1000	-	704	580	-
Critical Hdwy	4.24	-	-	4.15	-	-	7.1	6.5	6.24	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Follow-up Hdwy	2.326	-	-	2.245	-	-	3.5	4	3.336	3.509	4	3.3
Pot Cap-1 Maneuver	862	-	-	1006	-	-	86	113	544	~ 73	110	457
Stage 1	-	-	-	-	-	-	515	513	-	294	324	-
Stage 2	-	-	-	-	-	-	280	324	-	429	503	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	862	-	-	1006	-	-	-	~ 71	544	-	~ 69	457
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 71	-	-	~ 69	-
Stage 1	-	-	-	-	-	-	501	499	-	286	210	-
Stage 2	-	-	-	-	-	-	114	210	-	219	489	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.4		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	862	-	-	1006	-	-	-
HCM Lane V/C Ratio	-	0.018	-	-	0.161	-	-	-
HCM Control Delay (s)	-	9.3	0	-	9.3	0	-	-
HCM Lane LOS	-	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-	0.6	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	122.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	82	436	523	292	224	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	1	1	1	19
Mvmt Flow	91	484	581	324	249	112

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	906	0	-	0	1410	743
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	667	-
Critical Hdwy	4.13	-	-	-	6.41	6.39
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.227	-	-	-	3.509	3.471
Pot Cap-1 Maneuver	747	-	-	-	~ 153	389
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	512	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	747	-	-	-	~ 127	389
Mov Cap-2 Maneuver	-	-	-	-	~ 127	-
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	426	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	$ 624.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	747	-	-	-	161
HCM Lane V/C Ratio	0.122	-	-	-	2.243
HCM Control Delay (s)	10.5	0	-	-	$ 624.5
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	29.6

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	117.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	401	114	117	507	0	187	0	117	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	18	1	0	0	0	8	0	0	0
Mvmt Flow	0	446	127	130	563	0	208	0	130	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	563	0	0	572	0	0	1332	1332	509	1397	1395	563
Stage 1	-	-	-	-	-	-	509	509	-	823	823	-
Stage 2	-	-	-	-	-	-	823	823	-	574	572	-
Critical Hdwy	4.1	-	-	4.28	-	-	7.1	6.5	6.28	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.362	-	-	3.5	4	3.372	3.5	4	3.3
Pot Cap-1 Maneuver	1019	-	-	926	-	-	~ 133	156	552	120	143	530
Stage 1	-	-	-	-	-	-	550	541	-	371	391	-
Stage 2	-	-	-	-	-	-	371	391	-	507	508	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1019	-	-	926	-	-	~ 112	124	552	77	114	530
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 112	124	-	77	114	-
Stage 1	-	-	-	-	-	-	550	541	-	371	311	-
Stage 2	-	-	-	-	-	-	295	311	-	388	508	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.8	$ 555	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	162	1019	-	-	926	-	-	-
HCM Lane V/C Ratio	2.085	-	-	-	0.14	-	-	-
HCM Control Delay (s)	$ 555	0	-	-	9.5	0	-	0
HCM Lane LOS	F	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	26.7	0	-	-	0.5	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	489.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	665	75	223	868	0	121	0	112	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	3	0	1	0	0	0	3	0	0	0
Mvmt Flow	0	739	83	248	964	0	134	0	124	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	964	0	0	822	0	0	2241	2241	781	2303	2282	964
Stage 1	-	-	-	-	-	-	781	781	-	1460	1460	-
Stage 2	-	-	-	-	-	-	1460	1460	-	843	822	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	722	-	-	816	-	-	~ 30	43	393	27	40	312
Stage 1	-	-	-	-	-	-	391	408	-	162	196	-
Stage 2	-	-	-	-	-	-	162	196	-	361	391	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	722	-	-	816	-	-	~ 14	15	393	9	14	312
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 14	15	-	9	14	-
Stage 1	-	-	-	-	-	-	391	408	-	162	68	-
Stage 2	-	-	-	-	-	-	~ 56	68	-	247	391	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.3	$ 4322.7	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	26	722	-	-	816	-	-	-
HCM Lane V/C Ratio	9.957	-	-	-	0.304	-	-	-
HCM Control Delay (s)	$ 4322.7	0	-	-	11.3	0	-	0
HCM Lane LOS	F	A	-	-	B	A	-	A
HCM 95th %tile Q(veh)	32.1	0	-	-	1.3	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	7.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	110	51	161	187	74	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	2	0	0
Mvmt Flow	122	57	179	208	82	220

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	179	0	717	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	566	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1409	-	399	901
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1409	-	342	901
Mov Cap-2 Maneuver	-	-	-	-	342	-
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	490	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	624	-	-	1409	-
HCM Lane V/C Ratio	0.484	-	-	0.127	-
HCM Control Delay (s)	16.1	-	-	7.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.6	-	-	0.4	-

Intersection	
Int Delay, s/veh	36.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	13	217	25	56	413	95	46	119	50	54	88	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	0	0	1	2	0	1	0	4	0	0
Mvmt Flow	14	241	28	62	459	106	51	132	56	60	98	24

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	564	0	0	269	0	0	981	973	255	1014	934	512
Stage 1	-	-	-	-	-	-	284	284	-	636	636	-
Stage 2	-	-	-	-	-	-	697	689	-	378	298	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.51	6.2	7.14	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.51	-	6.14	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.51	-	6.14	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.009	3.3	3.536	4	3.3
Pot Cap-1 Maneuver	1018	-	-	1306	-	-	231	253	789	215	268	566
Stage 1	-	-	-	-	-	-	727	678	-	463	475	-
Stage 2	-	-	-	-	-	-	435	448	-	640	671	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1018	-	-	1306	-	-	143	232	789	103	245	566
Mov Cap-2 Maneuver	-	-	-	-	-	-	143	232	-	103	245	-
Stage 1	-	-	-	-	-	-	715	667	-	456	442	-
Stage 2	-	-	-	-	-	-	301	417	-	469	660	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.8	102.3	127.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	239	1018	-	-	1306	-	-	178
HCM Lane V/C Ratio	1	0.014	-	-	0.048	-	-	1.024
HCM Control Delay (s)	102.3	8.6	0	-	7.9	0	-	127.2
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	9.5	0	-	-	0.1	-	-	8.5

Intersection	
Int Delay, s/veh	94.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	102	4	80	168	146	12	151	82	215	82	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	0	0	0	17	4	5	1	0	0
Mvmt Flow	11	113	4	89	187	162	13	168	91	239	91	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	349	0	0	118	0	0	630	665	116	713	586	268
Stage 1	-	-	-	-	-	-	138	138	-	446	446	-
Stage 2	-	-	-	-	-	-	492	527	-	267	140	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.27	6.54	6.25	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.54	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.54	-	6.11	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.653	4.036	3.345	3.509	4	3.3
Pot Cap-1 Maneuver	1221	-	-	1483	-	-	374	378	928	348	425	776
Stage 1	-	-	-	-	-	-	830	779	-	593	577	-
Stage 2	-	-	-	-	-	-	531	525	-	741	785	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1221	-	-	1483	-	-	286	346	928	~ 183	389	776
Mov Cap-2 Maneuver	-	-	-	-	-	-	286	346	-	~ 183	389	-
Stage 1	-	-	-	-	-	-	822	771	-	587	533	-
Stage 2	-	-	-	-	-	-	406	485	-	518	777	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.5	26.5	$ 307.8
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	432	1221	-	-	1483	-	-	215
HCM Lane V/C Ratio	0.63	0.009	-	-	0.06	-	-	1.545
HCM Control Delay (s)	26.5	8	0	-	7.6	0	-	$ 307.8
HCM Lane LOS	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	4.2	0	-	-	0.2	-	-	20.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	67	28	246	47	13	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	4	0	1
Mvmt Flow	74	31	273	52	14	221

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	549	299	0	0	326	0
Stage 1	299	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	500	745	-	-	1245	-
Stage 1	757	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	494	745	-	-	1245	-
Mov Cap-2 Maneuver	494	-	-	-	-	-
Stage 1	757	-	-	-	-	-
Stage 2	786	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	548	1245	-
HCM Lane V/C Ratio	-	-	0.193	0.012	-
HCM Control Delay (s)	-	-	13.1	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0	-

Intersection	
Int Delay, s/veh	352.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	48	501	4	27	662	86	4	84	79	56	69	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	1	3	0	0	7	0	0	0
Mvmt Flow	53	557	4	30	736	96	4	93	88	62	77	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	831	0	0	561	0	0	1568	1557	559	1599	1511	783
Stage 1	-	-	-	-	-	-	666	666	-	843	843	-
Stage 2	-	-	-	-	-	-	902	891	-	756	668	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.3
Pot Cap-1 Maneuver	810	-	-	1020	-	-	91	114	519	87	121	397
Stage 1	-	-	-	-	-	-	452	460	-	361	382	-
Stage 2	-	-	-	-	-	-	335	363	-	403	459	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	810	-	-	1020	-	-	29	97	519	~ 9	103	397
Mov Cap-2 Maneuver	-	-	-	-	-	-	29	97	-	~ 9	103	-
Stage 1	-	-	-	-	-	-	409	416	-	327	361	-
Stage 2	-	-	-	-	-	-	224	343	-	235	415	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.3	231.7	$ 3381.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	144	810	-	-	1020	-	-	23
HCM Lane V/C Ratio	1.289	0.066	-	-	0.029	-	-	7.778
HCM Control Delay (s)	231.7	9.8	0	-	8.6	0	-	$ 3381.6
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	11.3	0.2	-	-	0.1	-	-	22.5

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	65.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	22	422	10	22	524	92	23	185	28	39	93	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	2	0	0	2	0	11	4	5
Mvmt Flow	24	469	11	24	582	102	26	206	31	43	103	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	684	0	0	480	0	0	1281	1256	474	1324	1211	633
Stage 1	-	-	-	-	-	-	523	523	-	682	682	-
Stage 2	-	-	-	-	-	-	758	733	-	642	529	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.52	6.2	7.21	6.54	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.52	-	6.21	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.52	-	6.21	5.54	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.018	3.3	3.599	4.036	3.345
Pot Cap-1 Maneuver	919	-	-	1093	-	-	144	~ 171	595	127	181	474
Stage 1	-	-	-	-	-	-	541	530	-	425	447	-
Stage 2	-	-	-	-	-	-	402	426	-	448	524	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	919	-	-	1093	-	-	63	~ 159	595	-	168	474
Mov Cap-2 Maneuver	-	-	-	-	-	-	63	~ 159	-	-	168	-
Stage 1	-	-	-	-	-	-	522	511	-	410	431	-
Stage 2	-	-	-	-	-	-	265	411	-	245	505	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0.3	$ 414.6	
HCM LOS			F	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	150	919	-	-	1093	-	-	-
HCM Lane V/C Ratio	1.748	0.027	-	-	0.022	-	-	-
HCM Control Delay (s)	$ 414.6	9	0	-	8.4	0	-	-
HCM Lane LOS	F	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	19.2	0.1	-	-	0.1	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	73.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	127	333	18	45	430	56	11	83	50	22	69	161
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	1	3	0	0	0	0	0	1
Mvmt Flow	141	370	20	50	478	62	12	92	56	24	77	179

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	540	0	0	390	0	0	1399	1302	380	1345	1281	509
Stage 1	-	-	-	-	-	-	662	662	-	609	609	-
Stage 2	-	-	-	-	-	-	737	640	-	736	672	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.309
Pot Cap-1 Maneuver	1039	-	-	1180	-	-	119	162	671	130	167	566
Stage 1	-	-	-	-	-	-	454	462	-	486	488	-
Stage 2	-	-	-	-	-	-	413	473	-	414	458	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1039	-	-	1180	-	-	37	126	671	41	130	566
Mov Cap-2 Maneuver	-	-	-	-	-	-	37	126	-	41	130	-
Stage 1	-	-	-	-	-	-	375	382	-	401	458	-
Stage 2	-	-	-	-	-	-	221	444	-	238	378	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.7	182.3	299.4
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	140	1039	-	-	1180	-	-	186
HCM Lane V/C Ratio	1.143	0.136	-	-	0.042	-	-	1.505
HCM Control Delay (s)	182.3	9	0	-	8.2	0	-	299.4
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	9.1	0.5	-	-	0.1	-	-	17.7

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	31	39	4	16	82	56	2	35	7	35	53	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	50	0	0	0	0	0	0	0	0	0
Mvmt Flow	34	43	4	18	91	62	2	39	8	39	59	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	268	195	67	215	199	43	74	0	0	47	0	0
Stage 1	144	144	-	47	47	-	-	-	-	-	-	-
Stage 2	124	51	-	168	152	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.7	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.75	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	689	704	877	746	700	1033	1538	-	-	1573	-	-
Stage 1	864	782	-	972	860	-	-	-	-	-	-	-
Stage 2	885	856	-	839	775	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	569	685	877	692	681	1033	1538	-	-	1573	-	-
Mov Cap-2 Maneuver	569	685	-	692	681	-	-	-	-	-	-	-
Stage 1	863	762	-	971	859	-	-	-	-	-	-	-
Stage 2	743	855	-	767	755	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	10.9	0.3	2.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1538	-	-	638	779	1573	-	-
HCM Lane V/C Ratio	0.001	-	-	0.129	0.22	0.025	-	-
HCM Control Delay (s)	7.3	0	-	11.5	10.9	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.8	0.1	-	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	13	95	9	56	148	69	15	112	23	16	89	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	2	0
Mvmt Flow	14	106	10	62	164	77	17	124	26	18	99	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	425	317	99	363	305	137	99	0	0	150	0	0
Stage 1	134	134	-	171	171	-	-	-	-	-	-	-
Stage 2	291	183	-	192	134	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	543	599	962	597	612	917	1507	-	-	1444	-	-
Stage 1	874	785	-	836	761	-	-	-	-	-	-	-
Stage 2	721	748	-	814	789	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	385	584	962	499	597	917	1507	-	-	1444	-	-
Mov Cap-2 Maneuver	385	584	-	499	597	-	-	-	-	-	-	-
Stage 1	864	775	-	826	752	-	-	-	-	-	-	-
Stage 2	510	739	-	687	779	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	16	0.7	1.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1507	-	-	569	627	1444	-	-
HCM Lane V/C Ratio	0.011	-	-	0.228	0.484	0.012	-	-
HCM Control Delay (s)	7.4	0	-	13.2	16	7.5	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.9	2.6	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	20	140	6	23	296	83	2	35	6	14	47	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	33	0	0	0	0	0	0	0	4	0
Mvmt Flow	22	156	7	26	329	92	2	39	7	16	52	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	421	0	0	162	0	0	669	675	159	652	633	375
Stage 1	-	-	-	-	-	-	203	203	-	426	426	-
Stage 2	-	-	-	-	-	-	466	472	-	226	207	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.54	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.036	3.3
Pot Cap-1 Maneuver	1149	-	-	1429	-	-	374	378	892	384	394	676
Stage 1	-	-	-	-	-	-	804	737	-	610	582	-
Stage 2	-	-	-	-	-	-	581	562	-	781	727	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1149	-	-	1429	-	-	310	361	892	338	376	676
Mov Cap-2 Maneuver	-	-	-	-	-	-	310	361	-	338	376	-
Stage 1	-	-	-	-	-	-	787	722	-	597	568	-
Stage 2	-	-	-	-	-	-	495	549	-	718	712	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.4	15.5	16
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	390	1149	-	-	1429	-	-	421
HCM Lane V/C Ratio	0.123	0.019	-	-	0.018	-	-	0.224
HCM Control Delay (s)	15.5	8.2	0	-	7.6	0	-	16
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	0.8

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	40	2	9	58	5	0	39	5	0	60	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	9	0	0	6	0	0	0	0	0	0	17
Mvmt Flow	11	44	2	10	64	6	0	43	6	0	67	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	153	121	72	142	124	46	78	0	0	49	0	0
Stage 1	72	72	-	46	46	-	-	-	-	-	-	-
Stage 2	81	49	-	96	78	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.59	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.081	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	819	756	996	832	759	1029	1533	-	-	1571	-	-
Stage 1	943	821	-	973	849	-	-	-	-	-	-	-
Stage 2	932	840	-	916	822	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	762	756	996	793	759	1029	1533	-	-	1571	-	-
Mov Cap-2 Maneuver	762	756	-	793	759	-	-	-	-	-	-	-
Stage 1	943	821	-	973	849	-	-	-	-	-	-	-
Stage 2	857	840	-	864	822	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	10.2	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1533	-	-	764	777	1571	-	-
HCM Lane V/C Ratio	-	-	-	0.076	0.103	-	-	-
HCM Control Delay (s)	0	-	-	10.1	10.2	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0	-	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	11	36	0	16	67	11	4	98	11	16	65	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	0	8	0	0	2	0	11	3	0
Mvmt Flow	12	40	0	18	74	12	4	109	12	18	72	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	277	240	74	254	236	115	77	0	0	121	0	0
Stage 1	110	110	-	124	124	-	-	-	-	-	-	-
Stage 2	167	130	-	130	112	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.1	6.58	6.2	4.1	-	-	4.21	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.5	4.072	3.3	2.2	-	-	2.299	-	-
Pot Cap-1 Maneuver	679	656	993	703	654	943	1535	-	-	1412	-	-
Stage 1	900	799	-	885	782	-	-	-	-	-	-	-
Stage 2	840	783	-	878	791	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	604	646	993	662	644	943	1535	-	-	1412	-	-
Mov Cap-2 Maneuver	604	646	-	662	644	-	-	-	-	-	-	-
Stage 1	897	789	-	882	780	-	-	-	-	-	-	-
Stage 2	748	781	-	823	781	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	11.3	0.3	1.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1535	-	-	636	672	1412	-	-
HCM Lane V/C Ratio	0.003	-	-	0.082	0.155	0.013	-	-
HCM Control Delay (s)	7.4	0	-	11.2	11.3	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.5	0	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	76	0	65	116	22	0	21	23	14	32	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	5	0	0	0	0	25	0	0
Mvmt Flow	2	84	0	72	129	24	0	23	26	16	36	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	153	0	0	84	0	0	395	387	84	399	375	141
Stage 1	-	-	-	-	-	-	89	89	-	286	286	-
Stage 2	-	-	-	-	-	-	306	298	-	113	89	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.35	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.725	4	3.3
Pot Cap-1 Maneuver	1440	-	-	1526	-	-	568	551	981	522	559	912
Stage 1	-	-	-	-	-	-	923	825	-	674	679	-
Stage 2	-	-	-	-	-	-	708	671	-	839	825	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1440	-	-	1526	-	-	514	522	981	471	529	912
Mov Cap-2 Maneuver	-	-	-	-	-	-	514	522	-	471	529	-
Stage 1	-	-	-	-	-	-	922	824	-	673	644	-
Stage 2	-	-	-	-	-	-	630	636	-	793	824	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.4	10.6	12.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	691	1440	-	-	1526	-	-	533
HCM Lane V/C Ratio	0.071	0.002	-	-	0.047	-	-	0.106
HCM Control Delay (s)	10.6	7.5	0	-	7.5	0	-	12.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.4

Intersection	
Int Delay, s/veh	16.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	109	248	297	202	159	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	1	0	3	2
Mvmt Flow	121	276	330	224	177	113

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	554	0	-	0	960	442
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	518	-
Critical Hdwy	4.12	-	-	-	6.43	6.22
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.218	-	-	-	3.527	3.318
Pot Cap-1 Maneuver	1016	-	-	-	284	615
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	596	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1016	-	-	-	244	615
Mov Cap-2 Maneuver	-	-	-	-	244	-
Stage 1	-	-	-	-	646	-
Stage 2	-	-	-	-	512	-

Approach	EB	WB	SB
HCM Control Delay, s	2.8	0	66.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1016	-	-	-	319
HCM Lane V/C Ratio	0.119	-	-	-	0.909
HCM Control Delay (s)	9	0	-	-	66.8
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	8.8

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	7	191	110	87	60	235	45	109	70	669	226	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	3	30	0	0	0	0	0	0	0
Mvmt Flow	8	212	122	97	67	261	50	121	78	743	251	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2167	2042	257	2171	2009	160	262	0	0	199	0	0
Stage 1	1743	1743	-	260	260	-	-	-	-	-	-	-
Stage 2	424	299	-	1911	1749	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.13	6.8	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.13	5.8	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.13	5.8	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.527	4.27	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	34	~ 57	787	~ 33	~ 50	890	1314	-	-	1385	-	-
Stage 1	111	~ 142	-	743	644	-	-	-	-	-	-	-
Stage 2	612	670	-	~ 87	119	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 20	787	-	~ 18	890	1314	-	-	1385	-	-
Mov Cap-2 Maneuver	-	~ 20	-	-	~ 18	-	-	-	-	-	-	-
Stage 1	106	~ 53	-	711	616	-	-	-	-	-	-	-
Stage 2	369	641	-	-	~ 44	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			1.6	7.8
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1314	-	-	-	-	1385	-	-
HCM Lane V/C Ratio	0.038	-	-	-	-	0.537	-	-
HCM Control Delay (s)	7.8	0	-	-	-	10.6	0	-
HCM Lane LOS	A	A	-	-	-	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	-	-	3.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	2275.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	1070	71	205	393	64	28	16	172	231	200	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	7	17	11	13	33	0	13	1	2	100
Mvmt Flow	0	1189	79	228	437	71	31	18	191	257	222	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	437	0	0	1268	0	0	2234	2120	1228	2225	2160	437
Stage 1	-	-	-	-	-	-	1228	1228	-	892	892	-
Stage 2	-	-	-	-	-	-	1006	892	-	1333	1268	-
Critical Hdwy	4.1	-	-	4.27	-	-	7.43	6.5	6.33	7.11	6.52	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.5	-	6.11	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.5	-	6.11	5.52	-
Follow-up Hdwy	2.2	-	-	2.353	-	-	3.797	4	3.417	3.509	4.018	4.2
Pot Cap-1 Maneuver	1134	-	-	500	-	-	~ 25	51	206	~ 31	~ 47	457
Stage 1	-	-	-	-	-	-	189	253	-	338	360	-
Stage 2	-	-	-	-	-	-	255	363	-	~ 191	240	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1134	-	-	500	-	-	-	18	206	0	~ 17	457
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	18	-	0	~ 17	-
Stage 1	-	-	-	-	-	-	189	253	-	338	~ 129	-
Stage 2	-	-	-	-	-	-	-	130	-	~ 13	240	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	5.6		$ 12806
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1134	-	-	500	-	-	17
HCM Lane V/C Ratio	-	-	-	-	0.456	-	-	28.497
HCM Control Delay (s)	-	0	-	-	18.1	0	-	$ 12806
HCM Lane LOS	-	A	-	-	C	A	-	F
HCM 95th %tile Q(veh)	-	0	-	-	2.3	-	-	61.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1680.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	103	1009	399	112	549	233
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	30	2	10	22	3	6
Mvmt Flow	114	1121	443	124	610	259

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	568	0	-	0	1856	506
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	1350	-
Critical Hdwy	4.4	-	-	-	6.43	6.26
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.47	-	-	-	3.527	3.354
Pot Cap-1 Maneuver	879	-	-	-	~ 80	558
Stage 1	-	-	-	-	~ 603	-
Stage 2	-	-	-	-	~ 240	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	879	-	-	-	~ 52	558
Mov Cap-2 Maneuver	-	-	-	-	~ 52	-
Stage 1	-	-	-	-	~ 603	-
Stage 2	-	-	-	-	~ 157	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	$ 5167.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	879	-	-	-	71
HCM Lane V/C Ratio	0.13	-	-	-	12.238
HCM Control Delay (s)	9.7	0	-	-	$ 5167.4
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	102.9

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	158.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	939	267	152	476	0	70	0	144	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	12	9	0	4	100	25	0	0	0
Mvmt Flow	0	1043	297	169	529	0	78	0	160	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	529	0	0	1340	0	0	2059	2059	1192	2139	2207	529
Stage 1	-	-	-	-	-	-	1192	1192	-	867	867	-
Stage 2	-	-	-	-	-	-	867	867	-	1272	1340	-
Critical Hdwy	4.1	-	-	4.22	-	-	7.14	7.5	6.45	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	6.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	6.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.308	-	-	3.536	4.9	3.525	3.5	4	3.3
Pot Cap-1 Maneuver	1048	-	-	483	-	-	~ 40	30	205	36	45	554
Stage 1	-	-	-	-	-	-	226	173	-	350	373	-
Stage 2	-	-	-	-	-	-	345	262	-	208	223	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1048	-	-	483	-	-	~ 24	15	205	5	23	554
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 24	15	-	5	23	-
Stage 1	-	-	-	-	-	-	226	173	-	350	188	-
Stage 2	-	-	-	-	-	-	174	132	-	46	223	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4	$ 1506.4	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	59	1048	-	-	483	-	-	-
HCM Lane V/C Ratio	4.03	-	-	-	0.35	-	-	-
HCM Control Delay (s)	$ 1506.4	0	-	-	16.4	0	-	0
HCM Lane LOS	F	A	-	-	C	A	-	A
HCM 95th %tile Q(veh)	25.8	0	-	-	1.6	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1627.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	1607	209	119	733	0	41	0	372	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	2	6	0	7	0	1	0	0	0
Mvmt Flow	0	1786	232	132	814	0	46	0	413	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	814	0	0	2018	0	0	2981	2981	1902	3187	3097	814
Stage 1	-	-	-	-	-	-	1902	1902	-	1079	1079	-
Stage 2	-	-	-	-	-	-	1079	1079	-	2108	2018	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.17	6.5	6.21	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.563	4	3.309	3.5	4	3.3
Pot Cap-1 Maneuver	822	-	-	282	-	-	~ 8	14	~ 87	6	12	381
Stage 1	-	-	-	-	-	-	86	118	-	267	297	-
Stage 2	-	-	-	-	-	-	259	297	-	68	103	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	822	-	-	282	-	-	~ 2	2	~ 87	-	2	381
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 2	2	-	-	2	-
Stage 1	-	-	-	-	-	-	86	118	-	267	43	-
Stage 2	-	-	-	-	-	-	~ 38	43	-	-	103	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	4	$ 12129.7	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	17	822	-	-	282	-	-	-
HCM Lane V/C Ratio	26.993	-	-	-	0.469	-	-	-
HCM Control Delay (s)	$ 12129.7	0	-	-	28.5	0	-	0
HCM Lane LOS	F	A	-	-	D	A	-	A
HCM 95th %tile Q(veh)	58.2	0	-	-	2.4	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	6.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	225	118	193	94	48	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	4	1	2	9	0
Mvmt Flow	250	131	214	104	53	183

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	381	0	849	316
Stage 1	-	-	-	-	316	-
Stage 2	-	-	-	-	533	-
Critical Hdwy	-	-	4.11	-	6.49	6.2
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.209	-	3.581	3.3
Pot Cap-1 Maneuver	-	-	1183	-	322	729
Stage 1	-	-	-	-	724	-
Stage 2	-	-	-	-	575	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1183	-	260	729
Mov Cap-2 Maneuver	-	-	-	-	260	-
Stage 1	-	-	-	-	724	-
Stage 2	-	-	-	-	465	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.9	17.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	518	-	-	1183	-
HCM Lane V/C Ratio	0.457	-	-	0.181	-
HCM Control Delay (s)	17.7	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.4	-	-	0.7	-

Intersection	
Int Delay, s/veh	373.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	32	694	52	21	194	62	13	75	61	174	212	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	0	0	4	0	20	3	0	3	0	0
Mvmt Flow	36	771	58	23	216	69	14	83	68	193	236	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	284	0	0	829	0	0	1294	1202	800	1244	1197	250
Stage 1	-	-	-	-	-	-	871	871	-	297	297	-
Stage 2	-	-	-	-	-	-	423	331	-	947	900	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.3	6.53	6.2	7.13	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.53	-	6.13	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.53	-	6.13	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.68	4.027	3.3	3.527	4	3.3
Pot Cap-1 Maneuver	1290	-	-	811	-	-	128	184	388	~ 150	~ 187	794
Stage 1	-	-	-	-	-	-	322	367	-	709	671	-
Stage 2	-	-	-	-	-	-	575	643	-	312	360	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1290	-	-	811	-	-	-	169	388	~ 71	~ 171	794
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	169	-	~ 71	~ 171	-
Stage 1	-	-	-	-	-	-	305	348	-	672	648	-
Stage 2	-	-	-	-	-	-	346	621	-	~ 186	341	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.7		$ 1492.1
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1290	-	-	811	-	-	108
HCM Lane V/C Ratio	-	0.028	-	-	0.029	-	-	4.136
HCM Control Delay (s)	-	7.9	0	-	9.6	0	-	$ 1492.1
HCM Lane LOS	-	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	-	0.1	-	-	0.1	-	-	46

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	769

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	5	235	5	100	158	45	10	106	100	393	423	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	0	3	2	19	0	18	8	3	8	0
Mvmt Flow	6	261	6	111	176	50	11	118	111	437	470	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	226	0	0	267	0	0	940	723	264	812	701	201
Stage 1	-	-	-	-	-	-	275	275	-	423	423	-
Stage 2	-	-	-	-	-	-	665	448	-	389	278	-
Critical Hdwy	4.1	-	-	4.13	-	-	7.1	6.68	6.28	7.13	6.58	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.68	-	6.13	5.58	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.68	-	6.13	5.58	-
Follow-up Hdwy	2.2	-	-	2.227	-	-	3.5	4.162	3.372	3.527	4.072	3.3
Pot Cap-1 Maneuver	1354	-	-	1291	-	-	246	334	760	~ 296	~ 356	845
Stage 1	-	-	-	-	-	-	736	654	-	607	577	-
Stage 2	-	-	-	-	-	-	453	547	-	633	670	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1354	-	-	1291	-	-	-	299	760	~ 162	~ 319	845
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	299	-	~ 162	~ 319	-
Stage 1	-	-	-	-	-	-	732	651	-	604	520	-
Stage 2	-	-	-	-	-	-	39	493	-	440	667	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.7		$ 1476.6
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1354	-	-	1291	-	-	220
HCM Lane V/C Ratio	-	0.004	-	-	0.086	-	-	4.187
HCM Control Delay (s)	-	7.7	0	-	8.1	0		$ 1476.6
HCM Lane LOS	-	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	-	0	-	-	0.3	-	-	91.4

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	58	25	202	107	45	262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	64	28	224	119	50	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	675	284	0	0	343	0
Stage 1	284	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	422	760	-	-	1227	-
Stage 1	769	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	401	760	-	-	1227	-
Mov Cap-2 Maneuver	401	-	-	-	-	-
Stage 1	769	-	-	-	-	-
Stage 2	654	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	1.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	468	1227	-
HCM Lane V/C Ratio	-	-	0.197	0.041	-
HCM Control Delay (s)	-	-	14.6	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Intersection	
Int Delay, s/veh	689.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	80	766	15	13	523	38	8	47	58	174	89	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	40	8	7	33	0	11	0	0	0
Mvmt Flow	89	851	17	14	581	42	9	52	64	193	99	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	623	0	0	868	0	0	1728	1689	859	1727	1677	602
Stage 1	-	-	-	-	-	-	1037	1037	-	631	631	-
Stage 2	-	-	-	-	-	-	691	652	-	1096	1046	-
Critical Hdwy	4.1	-	-	4.5	-	-	7.43	6.5	6.31	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.56	-	-	3.797	4	3.399	3.5	4	3.3
Pot Cap-1 Maneuver	968	-	-	637	-	-	58	94	343	~ 70	~ 96	503
Stage 1	-	-	-	-	-	-	245	311	-	472	477	-
Stage 2	-	-	-	-	-	-	389	467	-	261	308	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	968	-	-	637	-	-	-	75	343	~ 21	~ 76	503
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	75	-	~ 21	~ 76	-
Stage 1	-	-	-	-	-	-	201	256	-	388	461	-
Stage 2	-	-	-	-	-	-	283	451	-	~ 139	253	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.8	0.2		$ 4487.2
HCM LOS			-	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	968	-	-	637	-	-	30
HCM Lane V/C Ratio	-	0.092	-	-	0.023	-	-	10.407
HCM Control Delay (s)	-	9.1	0	-	10.8	0	-	$ 4487.2
HCM Lane LOS	-	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	-	0.3	-	-	0.1	-	-	38.3

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	18	654	30	53	421	11	14	118	43	322	195	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	14	2	15	10	8	0	17	2	0	0	4	0
Mvmt Flow	20	727	33	59	468	12	16	131	48	358	217	50

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	480	0	0	760	0	0	1508	1381	743	1465	1392	474
Stage 1	-	-	-	-	-	-	783	783	-	592	592	-
Stage 2	-	-	-	-	-	-	725	598	-	873	800	-
Critical Hdwy	4.24	-	-	4.2	-	-	7.27	6.52	6.2	7.1	6.54	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.52	-	6.1	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.52	-	6.1	5.54	-
Follow-up Hdwy	2.326	-	-	2.29	-	-	3.653	4.018	3.3	3.5	4.036	3.3
Pot Cap-1 Maneuver	1023	-	-	817	-	-	92	144	418	~ 107	~ 141	595
Stage 1	-	-	-	-	-	-	365	404	-	496	491	-
Stage 2	-	-	-	-	-	-	394	491	-	~ 348	394	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1023	-	-	817	-	-	-	~ 125	418	-	~ 123	595
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 125	-	-	~ 123	-
Stage 1	-	-	-	-	-	-	353	390	-	479	442	-
Stage 2	-	-	-	-	-	-	166	442	-	~ 198	381	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.1		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1023	-	-	817	-	-	-
HCM Lane V/C Ratio	-	0.02	-	-	0.072	-	-	-
HCM Control Delay (s)	-	8.6	0	-	9.7	0	-	-
HCM Lane LOS	-	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-	0.2	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	187	485	101	123	264	36	17	116	92	18	101	110
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	4	0	8	19	0	0	2	0	2	0
Mvmt Flow	208	539	112	137	293	40	19	129	102	20	112	122

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	333	0	0	651	0	0	1715	1618	595	1713	1654	313
Stage 1	-	-	-	-	-	-	1011	1011	-	587	587	-
Stage 2	-	-	-	-	-	-	704	607	-	1126	1067	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1238	-	-	945	-	-	72	~ 104	504	72	~ 98	732
Stage 1	-	-	-	-	-	-	291	320	-	499	497	-
Stage 2	-	-	-	-	-	-	431	489	-	251	299	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1238	-	-	945	-	-	-	~ 63	504	-	~ 59	732
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 63	-	-	~ 59	-
Stage 1	-	-	-	-	-	-	213	234	-	365	408	-
Stage 2	-	-	-	-	-	-	214	401	-	66	219	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	2.7		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	1238	-	-	945	-	-	-
HCM Lane V/C Ratio	-	0.168	-	-	0.145	-	-	-
HCM Control Delay (s)	-	8.5	0	-	9.5	0	-	-
HCM Lane LOS	-	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	-	0.6	-	-	0.5	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	23.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	105	186	10	4	54	136	0	112	17	116	50	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	6	0	0	8	2	0	6	0	2	0	0
Mvmt Flow	117	207	11	4	60	151	0	124	19	129	56	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	574	478	77	578	491	134	99	0	0	143	0	0
Stage 1	335	335	-	134	134	-	-	-	-	-	-	-
Stage 2	239	143	-	444	357	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.56	6.2	7.1	6.58	6.22	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.054	3.3	3.5	4.072	3.318	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	433	481	990	430	470	915	1507	-	-	1440	-	-
Stage 1	683	635	-	874	774	-	-	-	-	-	-	-
Stage 2	769	771	-	597	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	299	435	990	249	425	915	1507	-	-	1440	-	-
Mov Cap-2 Maneuver	299	435	-	249	425	-	-	-	-	-	-	-
Stage 1	683	575	-	874	774	-	-	-	-	-	-	-
Stage 2	592	771	-	342	559	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	53.5	13	0	4.4
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1507	-	-	382	665	1440	-	-
HCM Lane V/C Ratio	-	-	-	0.876	0.324	0.09	-	-
HCM Control Delay (s)	0	-	-	53.5	13	7.7	0	-
HCM Lane LOS	A	-	-	F	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	8.6	1.4	0.3	-	-

Intersection	
Int Delay, s/veh	106.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	19	306	27	35	174	14	45	110	49	75	145	32
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	0	27	4	0	0	2	5	0	2	7
Mvmt Flow	21	340	30	39	193	16	50	122	54	83	161	36

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	700	623	179	780	612	149	197	0	0	177	0	0
Stage 1	346	346	-	249	249	-	-	-	-	-	-	-
Stage 2	354	277	-	531	363	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.54	6.2	7.37	6.54	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.54	-	6.37	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.54	-	6.37	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.036	3.3	3.743	4.036	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	357	400	869	284	406	903	1388	-	-	1411	-	-
Stage 1	674	632	-	703	697	-	-	-	-	-	-	-
Stage 2	667	678	-	489	621	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	189	359	869	40	364	903	1388	-	-	1411	-	-
Mov Cap-2 Maneuver	189	359	-	40	364	-	-	-	-	-	-	-
Stage 1	647	590	-	675	669	-	-	-	-	-	-	-
Stage 2	447	651	-	187	580	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	109.2	$ 313.8	1.7	2.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1388	-	-	358	163	1411	-	-
HCM Lane V/C Ratio	0.036	-	-	1.092	1.52	0.059	-	-
HCM Control Delay (s)	7.7	0	-	109.2	$ 313.8	7.7	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	14.4	16.3	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	43	413	2	14	183	17	5	31	37	118	27	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	6	3	100	0	7	0	0	0	0	0	0	0
Mvmt Flow	48	459	2	16	203	19	6	34	41	131	30	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	222	0	0	461	0	0	839	809	460	837	801	213
Stage 1	-	-	-	-	-	-	556	556	-	244	244	-
Stage 2	-	-	-	-	-	-	283	253	-	593	557	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1324	-	-	1111	-	-	288	317	605	288	320	832
Stage 1	-	-	-	-	-	-	519	516	-	764	708	-
Stage 2	-	-	-	-	-	-	728	701	-	496	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1324	-	-	1111	-	-	239	297	605	233	299	832
Mov Cap-2 Maneuver	-	-	-	-	-	-	239	297	-	233	299	-
Stage 1	-	-	-	-	-	-	494	491	-	727	697	-
Stage 2	-	-	-	-	-	-	646	690	-	409	490	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.5	16.6	43.8
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	392	1324	-	-	1111	-	-	290
HCM Lane V/C Ratio	0.207	0.036	-	-	0.014	-	-	0.72
HCM Control Delay (s)	16.6	7.8	0	-	8.3	0	-	43.8
HCM Lane LOS	C	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.8	0.1	-	-	0	-	-	5.1

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	40	62	0	2	52	12	0	68	12	14	36	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	5	7	0	0	12	0	0	3	0	0	0	0
Mvmt Flow	44	69	0	2	58	13	0	76	13	16	40	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	198	169	49	196	171	82	58	0	0	89	0	0
Stage 1	80	80	-	82	82	-	-	-	-	-	-	-
Stage 2	118	89	-	114	89	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.57	6.2	7.1	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.063	3.3	3.5	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	754	715	1025	767	704	983	1559	-	-	1519	-	-
Stage 1	921	819	-	931	808	-	-	-	-	-	-	-
Stage 2	879	811	-	896	802	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	691	707	1025	704	696	983	1559	-	-	1519	-	-
Mov Cap-2 Maneuver	691	707	-	704	696	-	-	-	-	-	-	-
Stage 1	921	810	-	931	808	-	-	-	-	-	-	-
Stage 2	805	811	-	811	793	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	10.4	0	1.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1559	-	-	701	735	1519	-	-
HCM Lane V/C Ratio	-	-	-	0.162	0.1	0.01	-	-
HCM Control Delay (s)	0	-	-	11.1	10.4	7.4	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	0	-	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	84	6	27	54	4	8	87	17	22	130	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	7	12	0	0	5	13	0	0	0
Mvmt Flow	4	93	7	30	60	4	9	97	19	24	144	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	352	329	147	370	322	106	149	0	0	116	0	0
Stage 1	196	196	-	124	124	-	-	-	-	-	-	-
Stage 2	156	133	-	246	198	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.17	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.563	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	607	585	905	577	579	954	1445	-	-	1485	-	-
Stage 1	810	733	-	868	774	-	-	-	-	-	-	-
Stage 2	851	781	-	747	719	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	545	570	905	491	565	954	1445	-	-	1485	-	-
Mov Cap-2 Maneuver	545	570	-	491	565	-	-	-	-	-	-	-
Stage 1	804	720	-	862	769	-	-	-	-	-	-	-
Stage 2	775	776	-	634	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	12.9	0.5	1.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1445	-	-	583	549	1485	-	-
HCM Lane V/C Ratio	0.006	-	-	0.179	0.172	0.016	-	-
HCM Control Delay (s)	7.5	0	-	12.5	12.9	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.6	0.1	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	170	0	17	67	13	4	14	62	15	8	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	0	0	13	0	0	0	3	14	25	0
Mvmt Flow	2	189	0	19	74	14	4	16	69	17	9	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	89	0	0	189	0	0	323	320	189	355	312	82
Stage 1	-	-	-	-	-	-	193	193	-	119	119	-
Stage 2	-	-	-	-	-	-	130	127	-	236	193	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.23	7.24	6.75	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327	3.626	4.225	3.3
Pot Cap-1 Maneuver	1519	-	-	1397	-	-	634	600	850	578	567	983
Stage 1	-	-	-	-	-	-	813	745	-	857	755	-
Stage 2	-	-	-	-	-	-	878	795	-	741	700	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1519	-	-	1397	-	-	611	591	850	515	559	983
Mov Cap-2 Maneuver	-	-	-	-	-	-	611	591	-	515	559	-
Stage 1	-	-	-	-	-	-	812	744	-	856	744	-
Stage 2	-	-	-	-	-	-	845	784	-	666	699	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	10.2	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	775	1519	-	-	1397	-	-	622
HCM Lane V/C Ratio	0.115	0.001	-	-	0.014	-	-	0.061
HCM Control Delay (s)	10.2	7.4	0	-	7.6	0	-	11.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	272.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	127	448	203	95	414	161
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	6	5	4	9	1	5
Mvmt Flow	141	498	226	106	460	179

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	331	0	-	0	1058	278
Stage 1	-	-	-	-	278	-
Stage 2	-	-	-	-	780	-
Critical Hdwy	4.16	-	-	-	6.41	6.25
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.254	-	-	-	3.509	3.345
Pot Cap-1 Maneuver	1206	-	-	-	~ 250	754
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	~ 454	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1206	-	-	-	~ 210	754
Mov Cap-2 Maneuver	-	-	-	-	~ 210	-
Stage 1	-	-	-	-	771	-
Stage 2	-	-	-	-	~ 380	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	$ 684.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1206	-	-	-	263
HCM Lane V/C Ratio	0.117	-	-	-	2.429
HCM Control Delay (s)	8.4	0	-	-	$ 684.3
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	51.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	191	38	39	68	613	80	174	42	467	117	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0	3	2	7	0	2	33
Mvmt Flow	0	212	42	43	76	681	89	193	47	519	130	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1945	1590	134	1693	1570	217	138	0	0	240	0	0
Stage 1	1172	1172	-	394	394	-	-	-	-	-	-	-
Stage 2	773	418	-	1299	1176	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.13	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	49	~ 109	920	74	112	828	1440	-	-	1339	-	-
Stage 1	237	269	-	635	609	-	-	-	-	-	-	-
Stage 2	395	594	-	200	267	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 59	920	-	~ 60	828	1440	-	-	1339	-	-
Mov Cap-2 Maneuver	-	~ 59	-	-	~ 60	-	-	-	-	-	-	-
Stage 1	220	~ 156	-	589	565	-	-	-	-	-	-	-
Stage 2	56	551	-	-	155	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			2.1	7.4
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1440	-	-	-	-	1339	-	-
HCM Lane V/C Ratio	0.062	-	-	-	-	0.388	-	-
HCM Control Delay (s)	7.7	0	-	-	-	9.4	0	-
HCM Lane LOS	A	A	-	-	-	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-	1.9	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	18	591	36	158	777	316	27	91	176	173	86	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	250	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	14	2	0	5	0	0	0	0	4	1	0	0
Mvmt Flow	20	657	40	176	863	351	30	101	196	192	96	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	863	0	0	697	0	0	1985	1931	677	2079	1951	863
Stage 1	-	-	-	-	-	-	717	717	-	1214	1214	-
Stage 2	-	-	-	-	-	-	1268	1214	-	865	737	-
Critical Hdwy	4.24	-	-	4.15	-	-	7.1	6.5	6.24	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.11	5.5	-
Follow-up Hdwy	2.326	-	-	2.245	-	-	3.5	4	3.336	3.509	4	3.3
Pot Cap-1 Maneuver	731	-	-	885	-	-	46	~ 67	449	~ 39	~ 65	357
Stage 1	-	-	-	-	-	-	424	437	-	223	257	-
Stage 2	-	-	-	-	-	-	209	257	-	350	428	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	731	-	-	885	-	-	-	~ 20	449	-	~ 19	357
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 20	-	-	~ 19	-
Stage 1	-	-	-	-	-	-	405	417	-	213	~ 78	-
Stage 2	-	-	-	-	-	-	-	~ 78	-	~ 143	409	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.3		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	731	-	-	885	-	-	-
HCM Lane V/C Ratio	-	0.027	-	-	0.198	-	-	-
HCM Control Delay (s)	-	10.1	0	-	10.1	0	-	-
HCM Lane LOS	-	B	A	-	B	A	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-	0.7	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	449.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	106	556	680	378	290	131
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	3	3	1	1	1	19
Mvmt Flow	118	618	756	420	322	146

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1176	0	-	0	1819	966
Stage 1	-	-	-	-	966	-
Stage 2	-	-	-	-	853	-
Critical Hdwy	4.13	-	-	-	6.41	6.39
Critical Hdwy Stg 1	-	-	-	-	5.41	-
Critical Hdwy Stg 2	-	-	-	-	5.41	-
Follow-up Hdwy	2.227	-	-	-	3.509	3.471
Pot Cap-1 Maneuver	590	-	-	-	~ 86	287
Stage 1	-	-	-	-	371	-
Stage 2	-	-	-	-	419	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	590	-	-	-	~ 60	287
Mov Cap-2 Maneuver	-	-	-	-	~ 60	-
Stage 1	-	-	-	-	371	-
Stage 2	-	-	-	-	~ 291	-

Approach	EB	WB	SB
HCM Control Delay, s	2	0	$ 2284.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	590	-	-	-	80
HCM Lane V/C Ratio	0.2	-	-	-	5.847
HCM Control Delay (s)	12.6	0	-		$ 2284.2
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.7	-	-	-	51.9

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	446

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	515	145	151	650	0	238	0	151	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	2	18	1	0	0	0	8	0	0	0
Mvmt Flow	0	572	161	168	722	0	264	0	168	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	722	0	0	733	0	0	1711	1711	653	1795	1791	722
Stage 1	-	-	-	-	-	-	653	653	-	1058	1058	-
Stage 2	-	-	-	-	-	-	1058	1058	-	737	733	-
Critical Hdwy	4.1	-	-	4.28	-	-	7.1	6.5	6.28	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.362	-	-	3.5	4	3.372	3.5	4	3.3
Pot Cap-1 Maneuver	889	-	-	803	-	-	~ 72	92	457	63	82	430
Stage 1	-	-	-	-	-	-	460	467	-	274	304	-
Stage 2	-	-	-	-	-	-	274	304	-	413	429	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	889	-	-	803	-	-	~ 52	60	457	29	53	430
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 52	60	-	29	53	-
Stage 1	-	-	-	-	-	-	460	467	-	274	198	-
Stage 2	-	-	-	-	-	-	~ 178	198	-	261	429	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2	$ 2116.9	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	79	889	-	-	803	-	-	-
HCM Lane V/C Ratio	5.471	-	-	-	0.209	-	-	-
HCM Control Delay (s)	$ 2116.9	0	-	-	10.7	0	-	0
HCM Lane LOS	F	A	-	-	B	A	-	A
HCM 95th %tile Q(veh)	47.6	0	-	-	0.8	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	883.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	861	96	285	1123	0	154	0	146	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	3	0	1	0	0	0	3	0	0	0
Mvmt Flow	0	957	107	317	1248	0	171	0	162	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1248	0	0	1063	0	0	2891	2891	1010	2972	2944	1248
Stage 1	-	-	-	-	-	-	1010	1010	-	1881	1881	-
Stage 2	-	-	-	-	-	-	1881	1881	-	1091	1063	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	565	-	-	663	-	-	~ 10	16	290	9	15	213
Stage 1	-	-	-	-	-	-	292	320	-	93	121	-
Stage 2	-	-	-	-	-	-	~ 93	121	-	263	302	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	565	-	-	663	-	-	~ 10	16	290	4	15	213
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 10	16	-	4	15	-
Stage 1	-	-	-	-	-	-	292	320	-	93	121	-
Stage 2	-	-	-	-	-	-	~ 93	121	-	116	302	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	3.1	$ 7835	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	19	565	-	-	663	-	-	-
HCM Lane V/C Ratio	17.544	-	-	-	0.478	-	-	-
HCM Control Delay (s)	$ 7835	0	-	-	15.3	0	-	0
HCM Lane LOS	F	A	-	-	C	A	-	A
HCM 95th %tile Q(veh)	42.2	0	-	-	2.6	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	10

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	132	60	195	225	87	239
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	2	0	0
Mvmt Flow	147	67	217	250	97	266

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	213	0	863	180
Stage 1	-	-	-	-	180	-
Stage 2	-	-	-	-	683	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1369	-	328	868
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	505	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1369	-	268	868
Mov Cap-2 Maneuver	-	-	-	-	268	-
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	412	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.8	23.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	543	-	-	1369	-
HCM Lane V/C Ratio	0.667	-	-	0.158	-
HCM Control Delay (s)	23.9	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	4.9	-	-	0.6	-

Intersection	
Int Delay, s/veh	115.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	272	31	70	516	118	57	150	62	67	109	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	0	0	1	2	0	1	0	4	0	0
Mvmt Flow	18	302	34	78	573	131	63	167	69	74	121	30

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	704	0	0	337	0	0	1225	1215	319	1267	1166	639
Stage 1	-	-	-	-	-	-	355	355	-	794	794	-
Stage 2	-	-	-	-	-	-	870	860	-	473	372	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.51	6.2	7.14	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.51	-	6.14	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.51	-	6.14	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.009	3.3	3.536	4	3.3
Pot Cap-1 Maneuver	903	-	-	1234	-	-	157	182	726	144	196	480
Stage 1	-	-	-	-	-	-	666	631	-	378	403	-
Stage 2	-	-	-	-	-	-	349	374	-	568	622	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	903	-	-	1234	-	-	~ 57	~ 159	726	-	171	480
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 57	~ 159	-	-	171	-
Stage 1	-	-	-	-	-	-	649	615	-	369	360	-
Stage 2	-	-	-	-	-	-	194	334	-	365	606	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.8	$ 638.5	
HCM LOS			F	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	133	903	-	-	1234	-	-	-
HCM Lane V/C Ratio	2.247	0.02	-	-	0.063	-	-	-
HCM Control Delay (s)	$ 638.5	9.1	0	-	8.1	0	-	-
HCM Lane LOS	F	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	25.2	0.1	-	-	0.2	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	484.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	13	125	5	100	208	184	15	190	102	271	103	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	0	0	0	17	4	5	1	0	0
Mvmt Flow	14	139	6	111	231	204	17	211	113	301	114	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	436	0	0	144	0	0	785	829	142	889	729	333
Stage 1	-	-	-	-	-	-	171	171	-	556	556	-
Stage 2	-	-	-	-	-	-	614	658	-	333	173	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.27	6.54	6.25	7.11	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.54	-	6.11	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.54	-	6.11	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.653	4.036	3.345	3.509	4	3.3
Pot Cap-1 Maneuver	1134	-	-	1451	-	-	293	304	898	~ 265	352	713
Stage 1	-	-	-	-	-	-	797	753	-	517	516	-
Stage 2	-	-	-	-	-	-	454	458	-	683	760	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1134	-	-	1451	-	-	191	269	898	~ 75	311	713
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	269	-	~ 75	311	-
Stage 1	-	-	-	-	-	-	787	743	-	510	462	-
Stage 2	-	-	-	-	-	-	305	410	-	422	750	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	1.6	83.7	$ 1624.6
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	342	1134	-	-	1451	-	-	95
HCM Lane V/C Ratio	0.997	0.013	-	-	0.077	-	-	4.409
HCM Control Delay (s)	83.7	8.2	0	-	7.7	0	-	$ 1624.6
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	11.3	0	-	-	0.2	-	-	44.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	80	34	292	56	16	237
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	4	0	1
Mvmt Flow	89	38	324	62	18	263

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	655	356	0	0	387	0
Stage 1	356	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	434	693	-	-	1183	-
Stage 1	713	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	426	693	-	-	1183	-
Mov Cap-2 Maneuver	426	-	-	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	743	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	481	1183	-
HCM Lane V/C Ratio	-	-	0.263	0.015	-
HCM Control Delay (s)	-	-	15.1	8.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	60	632	5	34	836	108	5	104	97	70	84	44
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	1	3	0	0	7	0	0	0
Mvmt Flow	67	702	6	38	929	120	6	116	108	78	93	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1049	0	0	708	0	0	1974	1962	705	2014	1905	989
Stage 1	-	-	-	-	-	-	838	838	-	1064	1064	-
Stage 2	-	-	-	-	-	-	1136	1124	-	950	841	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.3
Pot Cap-1 Maneuver	671	-	-	900	-	-	47	~ 64	428	~ 44	~ 69	302
Stage 1	-	-	-	-	-	-	364	384	-	272	302	-
Stage 2	-	-	-	-	-	-	248	283	-	315	383	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	671	-	-	900	-	-	-	~ 48	428	-	~ 52	302
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 48	-	-	~ 52	-
Stage 1	-	-	-	-	-	-	304	321	-	227	270	-
Stage 2	-	-	-	-	-	-	122	253	-	126	320	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.9	0.3		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	671	-	-	900	-	-	-
HCM Lane V/C Ratio	-	0.099	-	-	0.042	-	-	-
HCM Control Delay (s)	-	11	0	-	9.2	0	-	-
HCM Lane LOS	-	B	A	-	A	A	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-	0.1	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	28	521	12	28	646	116	28	228	35	48	115	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	2	0	0	2	0	11	4	5
Mvmt Flow	31	579	13	31	718	129	31	253	39	53	128	59

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	847	0	0	592	0	0	1586	1557	586	1638	1498	782
Stage 1	-	-	-	-	-	-	648	648	-	844	844	-
Stage 2	-	-	-	-	-	-	938	909	-	794	654	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.52	6.2	7.21	6.54	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.52	-	6.21	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.52	-	6.21	5.54	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.018	3.3	3.599	4.036	3.345
Pot Cap-1 Maneuver	799	-	-	994	-	-	88	~ 113	514	76	~ 121	390
Stage 1	-	-	-	-	-	-	462	466	-	345	376	-
Stage 2	-	-	-	-	-	-	320	354	-	368	460	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	799	-	-	994	-	-	-	~ 100	514	-	~ 107	390
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 100	-	-	~ 107	-
Stage 1	-	-	-	-	-	-	435	439	-	325	353	-
Stage 2	-	-	-	-	-	-	163	332	-	136	433	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0.3		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	799	-	-	994	-	-	-
HCM Lane V/C Ratio	-	0.039	-	-	0.031	-	-	-
HCM Control Delay (s)	-	9.7	0	-	8.7	0	-	-
HCM Lane LOS	-	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-	0.1	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	151	400	22	54	516	67	13	99	60	27	82	191
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	1	3	0	0	0	0	0	1
Mvmt Flow	168	444	24	60	573	74	14	110	67	30	91	212

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	648	0	0	469	0	0	1674	1560	457	1612	1535	611
Stage 1	-	-	-	-	-	-	792	792	-	731	731	-
Stage 2	-	-	-	-	-	-	882	768	-	881	804	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.21
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.309
Pot Cap-1 Maneuver	947	-	-	1103	-	-	77	113	608	85	117	496
Stage 1	-	-	-	-	-	-	385	404	-	416	430	-
Stage 2	-	-	-	-	-	-	344	414	-	344	398	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	947	-	-	1103	-	-	-	~ 78	608	-	~ 81	496
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 78	-	-	~ 81	-
Stage 1	-	-	-	-	-	-	292	307	-	316	393	-
Stage 2	-	-	-	-	-	-	138	378	-	149	302	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.5	0.7		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	947	-	-	1103	-	-	-
HCM Lane V/C Ratio	-	0.177	-	-	0.054	-	-	-
HCM Control Delay (s)	-	9.6	0	-	8.5	0	-	-
HCM Lane LOS	-	A	A	-	A	A	-	-
HCM 95th %tile Q(veh)	-	0.6	-	-	0.2	-	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	37	47	4	19	98	67	2	41	9	42	62	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	50	0	0	0	0	0	0	0	0	0
Mvmt Flow	41	52	4	21	109	74	2	46	10	47	69	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	319	232	78	255	236	51	88	0	0	56	0	0
Stage 1	172	172	-	55	55	-	-	-	-	-	-	-
Stage 2	147	60	-	200	181	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.7	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.75	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	638	672	864	702	668	1023	1520	-	-	1562	-	-
Stage 1	835	760	-	962	853	-	-	-	-	-	-	-
Stage 2	860	849	-	806	754	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	502	650	864	639	646	1023	1520	-	-	1562	-	-
Mov Cap-2 Maneuver	502	650	-	639	646	-	-	-	-	-	-	-
Stage 1	834	736	-	961	852	-	-	-	-	-	-	-
Stage 2	695	848	-	721	730	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.4	11.7	0.3	2.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1520	-	-	584	745	1562	-	-
HCM Lane V/C Ratio	0.001	-	-	0.167	0.274	0.03	-	-
HCM Control Delay (s)	7.4	0	-	12.4	11.7	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	1.1	0.1	-	-

Intersection	
Int Delay, s/veh	12.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	16	116	11	67	181	84	18	134	28	19	107	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	2	0
Mvmt Flow	18	129	12	74	201	93	20	149	31	21	119	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	513	381	119	436	365	164	119	0	0	180	0	0
Stage 1	161	161	-	204	204	-	-	-	-	-	-	-
Stage 2	352	220	-	232	161	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	475	552	938	534	566	886	1482	-	-	1408	-	-
Stage 1	846	765	-	803	737	-	-	-	-	-	-	-
Stage 2	669	721	-	775	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	297	535	938	419	549	886	1482	-	-	1408	-	-
Mov Cap-2 Maneuver	297	535	-	419	549	-	-	-	-	-	-	-
Stage 1	833	753	-	791	726	-	-	-	-	-	-	-
Stage 2	426	710	-	624	757	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.3	22.3	0.7	1.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1482	-	-	506	568	1408	-	-
HCM Lane V/C Ratio	0.013	-	-	0.314	0.649	0.015	-	-
HCM Control Delay (s)	7.5	0	-	15.3	22.3	7.6	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.3	4.7	0	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	24	173	7	28	365	101	2	42	7	17	56	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	33	0	0	0	0	0	0	0	4	0
Mvmt Flow	27	192	8	31	406	112	2	47	8	19	62	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	518	0	0	200	0	0	820	829	196	801	777	462
Stage 1	-	-	-	-	-	-	249	249	-	524	524	-
Stage 2	-	-	-	-	-	-	571	580	-	277	253	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.54	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.036	3.3
Pot Cap-1 Maneuver	1058	-	-	1384	-	-	296	308	850	305	326	604
Stage 1	-	-	-	-	-	-	759	704	-	540	527	-
Stage 2	-	-	-	-	-	-	509	503	-	734	694	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1058	-	-	1384	-	-	226	289	850	253	306	604
Mov Cap-2 Maneuver	-	-	-	-	-	-	226	289	-	253	306	-
Stage 1	-	-	-	-	-	-	737	684	-	524	510	-
Stage 2	-	-	-	-	-	-	410	487	-	658	674	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.4	19	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	314	1058	-	-	1384	-	-	342
HCM Lane V/C Ratio	0.18	0.025	-	-	0.022	-	-	0.331
HCM Control Delay (s)	19	8.5	0	-	7.7	0	-	20.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	1.4

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	12	48	2	10	68	6	0	46	6	0	70	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	9	0	0	6	0	0	0	0	0	0	17
Mvmt Flow	13	53	2	11	76	7	0	51	7	0	78	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	180	142	84	166	145	54	91	0	0	58	0	0
Stage 1	84	84	-	54	54	-	-	-	-	-	-	-
Stage 2	96	58	-	112	91	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.59	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.081	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	786	736	981	803	739	1019	1517	-	-	1559	-	-
Stage 1	929	812	-	963	842	-	-	-	-	-	-	-
Stage 2	916	833	-	898	812	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	720	736	981	757	739	1019	1517	-	-	1559	-	-
Mov Cap-2 Maneuver	720	736	-	757	739	-	-	-	-	-	-	-
Stage 1	929	812	-	963	842	-	-	-	-	-	-	-
Stage 2	828	833	-	837	812	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	10.4	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1517	-	-	739	756	1559	-	-
HCM Lane V/C Ratio	-	-	-	0.093	0.123	-	-	-
HCM Control Delay (s)	0	-	-	10.4	10.4	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	13	43	0	19	80	13	4	116	12	19	77	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	0	8	0	0	2	0	11	3	0
Mvmt Flow	14	48	0	21	89	14	4	129	13	21	86	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	326	281	88	298	276	136	90	0	0	142	0	0
Stage 1	130	130	-	144	144	-	-	-	-	-	-	-
Stage 2	196	151	-	154	132	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.1	6.58	6.2	4.1	-	-	4.21	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.5	4.072	3.3	2.2	-	-	2.299	-	-
Pot Cap-1 Maneuver	631	622	976	658	621	918	1518	-	-	1387	-	-
Stage 1	878	783	-	864	766	-	-	-	-	-	-	-
Stage 2	810	767	-	853	776	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	544	610	976	610	609	918	1518	-	-	1387	-	-
Mov Cap-2 Maneuver	544	610	-	610	609	-	-	-	-	-	-	-
Stage 1	875	770	-	861	764	-	-	-	-	-	-	-
Stage 2	702	765	-	787	764	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	12.1	0.2	1.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1518	-	-	593	634	1387	-	-
HCM Lane V/C Ratio	0.003	-	-	0.105	0.196	0.015	-	-
HCM Control Delay (s)	7.4	0	-	11.8	12.1	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.7	0	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	90	0	77	138	26	0	25	27	17	37	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	5	0	0	0	0	25	0	0
Mvmt Flow	2	100	0	86	153	29	0	28	30	19	41	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	182	0	0	100	0	0	467	457	100	472	443	168
Stage 1	-	-	-	-	-	-	104	104	-	339	339	-
Stage 2	-	-	-	-	-	-	363	353	-	133	104	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.35	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.725	4	3.3
Pot Cap-1 Maneuver	1405	-	-	1505	-	-	509	503	961	466	512	881
Stage 1	-	-	-	-	-	-	907	813	-	630	643	-
Stage 2	-	-	-	-	-	-	660	634	-	818	813	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1405	-	-	1505	-	-	448	470	961	410	478	881
Mov Cap-2 Maneuver	-	-	-	-	-	-	448	470	-	410	478	-
Stage 1	-	-	-	-	-	-	905	811	-	629	602	-
Stage 2	-	-	-	-	-	-	571	593	-	764	811	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.4	11.2	13.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	640	1405	-	-	1505	-	-	477
HCM Lane V/C Ratio	0.09	0.002	-	-	0.057	-	-	0.14
HCM Control Delay (s)	11.2	7.6	0	-	7.5	0	-	13.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.5

Intersection	
Int Delay, s/veh	83.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	135	311	373	254	201	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	1	0	3	2
Mvmt Flow	150	346	414	282	223	141

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	697	0	-	0	1202	556
Stage 1	-	-	-	-	556	-
Stage 2	-	-	-	-	646	-
Critical Hdwy	4.12	-	-	-	6.43	6.22
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	2.218	-	-	-	3.527	3.318
Pot Cap-1 Maneuver	899	-	-	-	~ 203	531
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	520	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	899	-	-	-	~ 161	531
Mov Cap-2 Maneuver	-	-	-	-	~ 161	-
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	413	-

Approach	EB	WB	SB
HCM Control Delay, s	3	0	$ 353.5
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	899	-	-	-	220
HCM Lane V/C Ratio	0.167	-	-	-	1.657
HCM Control Delay (s)	9.8	0	-	-	$ 353.5
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.6	-	-	-	23.8

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

APPENDIX D
HORIZON YEAR (2035) - IMPROVED INTERSECTION CAPACITY WORKSHEETS

SANDERSON STEWART

FEHR PEERS

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	48	20	170	89	37	221
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	53	22	189	99	41	246

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	566	238	0	0	288	0
Stage 1	238	-	-	-	-	-
Stage 2	328	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	489	806	-	-	1286	-
Stage 1	806	-	-	-	-	-
Stage 2	734	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	471	806	-	-	1286	-
Mov Cap-2 Maneuver	471	-	-	-	-	-
Stage 1	806	-	-	-	-	-
Stage 2	707	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.8	0	1.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	537	1286	-
HCM Lane V/C Ratio	-	-	0.141	0.032	-
HCM Control Delay (s)	-	-	12.8	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.5	0.1	-

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	89	154	9	4	45	113	0	95	14	97	42	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	6	0	0	8	2	0	6	0	2	0	0
Mvmt Flow	99	171	10	4	50	126	0	106	16	108	47	37

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	482	402	65	484	412	113	83	0	0	121	0	0
Stage 1	281	281	-	113	113	-	-	-	-	-	-	-
Stage 2	201	121	-	371	299	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.56	6.2	7.1	6.58	6.22	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.054	3.3	3.5	4.072	3.318	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	498	531	1005	496	521	940	1527	-	-	1467	-	-
Stage 1	730	671	-	897	790	-	-	-	-	-	-	-
Stage 2	805	788	-	653	656	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	374	490	1005	338	480	940	1527	-	-	1467	-	-
Mov Cap-2 Maneuver	374	490	-	338	480	-	-	-	-	-	-	-
Stage 1	730	619	-	897	790	-	-	-	-	-	-	-
Stage 2	653	788	-	431	605	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.4	11.7	0	4.3
HCM LOS	D	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1527	-	-	449	717	1467	-	-
HCM Lane V/C Ratio	-	-	-	0.624	0.251	0.073	-	-
HCM Control Delay (s)	0	-	-	25.4	11.7	7.6	0	-
HCM Lane LOS	A	-	-	D	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	4.2	1	0.2	-	-

Intersection	
Int Delay, s/veh	18.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	15	250	22	29	142	12	37	91	40	61	121	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	4	0	27	4	0	0	2	5	0	2	7
Mvmt Flow	17	278	24	32	158	13	41	101	44	68	134	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	576	513	149	642	506	123	164	0	0	146	0	0
Stage 1	285	285	-	206	206	-	-	-	-	-	-	-
Stage 2	291	228	-	436	300	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.54	6.2	7.37	6.54	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.54	-	6.37	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.54	-	6.37	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.036	3.3	3.743	4.036	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	431	462	903	354	466	933	1427	-	-	1448	-	-
Stage 1	727	672	-	742	728	-	-	-	-	-	-	-
Stage 2	721	712	-	553	662	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	285	424	903	154	428	933	1427	-	-	1448	-	-
Mov Cap-2 Maneuver	285	424	-	154	428	-	-	-	-	-	-	-
Stage 1	704	637	-	719	705	-	-	-	-	-	-	-
Stage 2	535	690	-	288	628	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33.6	29.7	1.7	2.2
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1427	-	-	431	343	1448	-	-
HCM Lane V/C Ratio	0.029	-	-	0.74	0.593	0.047	-	-
HCM Control Delay (s)	7.6	0	-	33.6	29.7	7.6	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	6	3.6	0.1	-	-

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	35	335	2	12	148	14	4	26	31	97	22	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	6	3	100	0	7	0	0	0	0	0	0	0
Mvmt Flow	39	372	2	13	164	16	4	29	34	108	24	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	180	0	0	374	0	0	682	658	373	682	651	172
Stage 1	-	-	-	-	-	-	451	451	-	199	199	-
Stage 2	-	-	-	-	-	-	231	207	-	483	452	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1372	-	-	1196	-	-	367	387	678	367	390	877
Stage 1	-	-	-	-	-	-	592	574	-	807	740	-
Stage 2	-	-	-	-	-	-	776	734	-	569	574	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1372	-	-	1196	-	-	321	369	678	316	371	877
Mov Cap-2 Maneuver	-	-	-	-	-	-	321	369	-	316	371	-
Stage 1	-	-	-	-	-	-	571	553	-	778	731	-
Stage 2	-	-	-	-	-	-	708	725	-	493	553	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.6	13.9	22.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	474	1372	-	-	1196	-	-	379
HCM Lane V/C Ratio	0.143	0.028	-	-	0.011	-	-	0.451
HCM Control Delay (s)	13.9	7.7	0	-	8	0	-	22.1
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	2.3

Intersection	
Int Delay, s/veh	7.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	34	53	0	2	44	11	0	58	11	12	31	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	48	48	48	57	57	57	71	71	71	59	59	59
Heavy Vehicles, %	5	7	0	0	12	0	0	3	0	0	0	0
Mvmt Flow	71	110	0	4	77	19	0	82	15	20	53	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	243	202	64	249	206	89	76	0	0	97	0	0
Stage 1	105	105	-	89	89	-	-	-	-	-	-	-
Stage 2	138	97	-	160	117	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.57	6.2	7.1	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.063	3.3	3.5	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	705	685	1006	709	673	975	1536	-	-	1509	-	-
Stage 1	893	799	-	923	802	-	-	-	-	-	-	-
Stage 2	858	805	-	847	780	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	623	675	1006	614	664	975	1536	-	-	1509	-	-
Mov Cap-2 Maneuver	623	675	-	614	664	-	-	-	-	-	-	-
Stage 1	893	788	-	923	802	-	-	-	-	-	-	-
Stage 2	760	805	-	718	769	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.6	10.9	0	1.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1536	-	-	654	705	1509	-	-
HCM Lane V/C Ratio	-	-	-	0.277	0.142	0.013	-	-
HCM Control Delay (s)	0	-	-	12.6	10.9	7.4	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.1	0.5	0	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	71	5	23	45	4	7	74	14	18	111	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	7	12	0	0	5	13	0	0	0
Mvmt Flow	4	79	6	26	50	4	8	82	16	20	123	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	299	279	126	314	274	90	128	0	0	98	0	0
Stage 1	166	166	-	106	106	-	-	-	-	-	-	-
Stage 2	133	113	-	208	168	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.17	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.563	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	657	624	930	629	617	973	1470	-	-	1508	-	-
Stage 1	841	755	-	888	789	-	-	-	-	-	-	-
Stage 2	875	796	-	783	741	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	603	612	930	555	605	973	1470	-	-	1508	-	-
Mov Cap-2 Maneuver	603	612	-	555	605	-	-	-	-	-	-	-
Stage 1	836	744	-	883	784	-	-	-	-	-	-	-
Stage 2	811	791	-	686	731	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.7	11.9	0.5	1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1470	-	-	625	600	1508	-	-
HCM Lane V/C Ratio	0.005	-	-	0.142	0.133	0.013	-	-
HCM Control Delay (s)	7.5	0	-	11.7	11.9	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.5	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	143	0	14	56	11	4	12	53	13	7	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	0	0	13	0	0	0	3	14	25	0
Mvmt Flow	2	159	0	16	62	12	4	13	59	14	8	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	74	0	0	159	0	0	271	269	159	298	262	68
Stage 1	-	-	-	-	-	-	163	163	-	99	99	-
Stage 2	-	-	-	-	-	-	108	106	-	199	163	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.23	7.24	6.75	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327	3.626	4.225	3.3
Pot Cap-1 Maneuver	1538	-	-	1433	-	-	686	641	884	631	606	1001
Stage 1	-	-	-	-	-	-	844	767	-	879	771	-
Stage 2	-	-	-	-	-	-	902	811	-	776	722	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1538	-	-	1433	-	-	666	633	884	574	598	1001
Mov Cap-2 Maneuver	-	-	-	-	-	-	666	633	-	574	598	-
Stage 1	-	-	-	-	-	-	843	766	-	878	762	-
Stage 2	-	-	-	-	-	-	873	801	-	711	721	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	9.9	10.7
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	813	1538	-	-	1433	-	-	669
HCM Lane V/C Ratio	0.094	0.001	-	-	0.011	-	-	0.048
HCM Control Delay (s)	9.9	7.3	0	-	7.5	0	-	10.7
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	5.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	187	100	159	78	40	136
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	4	1	2	9	0
Mvmt Flow	208	111	177	87	44	151

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	319	0	703	263
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	440	-
Critical Hdwy	-	-	4.11	-	6.49	6.2
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.209	-	3.581	3.3
Pot Cap-1 Maneuver	-	-	1247	-	393	781
Stage 1	-	-	-	-	765	-
Stage 2	-	-	-	-	635	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1247	-	334	781
Mov Cap-2 Maneuver	-	-	-	-	334	-
Stage 1	-	-	-	-	765	-
Stage 2	-	-	-	-	540	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.6	13.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	599	-	-	1247	-
HCM Lane V/C Ratio	0.326	-	-	0.142	-
HCM Control Delay (s)	13.9	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.4	-	-	0.5	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	153	89	69	48	191	37	88	55	543	182	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1845	1462	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	7	170	99	77	53	212	41	98	61	603	202	9
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	3	30	0	0	0	0	0	0	0
Cap, veh/h	435	303	177	314	393	929	412	171	107	806	770	34
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.04	0.16	0.16	0.31	0.43	0.43
Sat Flow, veh/h	1132	1128	657	1095	1462	1615	1810	1097	683	1810	1805	80
Grp Volume(v), veh/h	7	0	269	77	53	212	41	0	159	603	0	211
Grp Sat Flow(s),veh/h/ln	1132	0	1784	1095	1462	1615	1810	0	1780	1810	0	1886
Q Serve(g_s), s	0.2	0.0	5.8	2.9	1.2	2.9	0.8	0.0	3.7	11.0	0.0	3.2
Cycle Q Clear(g_c), s	1.4	0.0	5.8	8.7	1.2	2.9	0.8	0.0	3.7	11.0	0.0	3.2
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.38	1.00		0.04
Lane Grp Cap(c), veh/h	435	0	480	314	393	929	412	0	278	806	0	804
V/C Ratio(X)	0.02	0.00	0.56	0.25	0.13	0.23	0.10	0.00	0.57	0.75	0.00	0.26
Avail Cap(c_a), veh/h	535	0	639	411	523	1073	509	0	637	901	0	1182
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.9	0.0	14.0	17.8	12.4	4.6	14.9	0.0	17.5	8.8	0.0	8.3
Incr Delay (d2), s/veh	0.0	0.0	1.0	0.4	0.2	0.1	0.1	0.0	1.8	3.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	3.0	0.9	0.5	1.3	0.4	0.0	2.0	5.9	0.0	1.7
LnGrp Delay(d),s/veh	12.9	0.0	15.1	18.2	12.5	4.8	15.0	0.0	19.3	11.9	0.0	8.4
LnGrp LOS	B		B	B	B	A	B		B	B		A
Approach Vol, veh/h		276			342			200			814	
Approach Delay, s/veh		15.0			9.0			18.4			11.0	
Approach LOS		B			A			B			B	

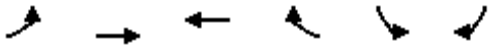
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.7	11.0		16.0	5.6	23.1		16.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	16.0	16.0		16.0	4.0	28.0		16.0
Max Q Clear Time (g_c+I1), s	13.0	5.7		7.8	2.8	5.2		10.7
Green Ext Time (p_c), s	0.7	1.3		1.8	0.0	1.8		1.3

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	836	62	158	307	51	7	13	176	182	156	4
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1845	1776	1624	1712	1681	1429	1900	1681	1881	1823	1900
Adj Flow Rate, veh/h	0	929	69	176	341	57	8	14	196	202	173	4
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	3	7	17	11	13	33	0	13	1	2	2
Cap, veh/h	627	995	826	227	1123	1004	195	297	323	346	347	8
Arrive On Green	0.00	0.54	0.54	0.07	0.66	0.66	0.01	0.16	0.16	0.05	0.20	0.20
Sat Flow, veh/h	1810	1845	1509	1547	1712	1429	1361	1900	1429	1792	1775	41
Grp Volume(v), veh/h	0	929	69	176	341	57	8	14	196	202	0	177
Grp Sat Flow(s),veh/h/ln	1810	1845	1509	1547	1712	1429	1361	1900	1429	1792	0	1816
Q Serve(g_s), s	0.0	39.9	1.8	4.0	7.3	1.1	0.4	0.5	10.5	4.0	0.0	7.4
Cycle Q Clear(g_c), s	0.0	39.9	1.8	4.0	7.3	1.1	0.4	0.5	10.5	4.0	0.0	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	627	995	826	227	1123	1004	195	297	323	346	0	355
V/C Ratio(X)	0.00	0.93	0.08	0.77	0.30	0.06	0.04	0.05	0.61	0.58	0.00	0.50
Avail Cap(c_a), veh/h	710	995	826	229	1123	1004	248	401	401	346	0	383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	18.2	9.1	19.4	6.3	3.9	30.0	30.6	29.6	30.8	0.0	30.6
Incr Delay (d2), s/veh	0.0	16.4	0.2	15.1	0.7	0.1	0.1	0.1	1.8	2.5	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	24.7	0.8	3.3	3.6	0.4	0.2	0.3	4.3	2.7	0.0	3.8
LnGrp Delay(d),s/veh	0.0	34.6	9.3	34.5	7.0	4.0	30.1	30.6	31.4	33.4	0.0	31.7
LnGrp LOS		C	A	C	A	A	C	C	C	C		C
Approach Vol, veh/h		998			574			218			379	
Approach Delay, s/veh		32.9			15.1			31.3			32.6	
Approach LOS		C			B			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	17.3	9.9	50.0	4.7	20.7	0.0	59.9
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	18.0	6.0	46.0	4.0	18.0	4.0	48.0
Max Q Clear Time (g_c+I1), s	6.0	12.5	6.0	41.9	2.4	9.4	0.0	9.3
Green Ext Time (p_c), s	0.0	0.9	0.0	2.8	0.0	1.2	0.0	10.9

Intersection Summary	
HCM 2010 Ctrl Delay	28.0
HCM 2010 LOS	C



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	80	772	319	87	424	181
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1462	1863	1727	1557	1845	1792
Adj Flow Rate, veh/h	89	858	354	97	471	201
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	30	2	10	22	3	6
Cap, veh/h	450	1037	962	737	534	463
Arrive On Green	0.56	0.56	0.56	0.56	0.30	0.30
Sat Flow, veh/h	734	1863	1727	1324	1757	1524
Grp Volume(v), veh/h	89	858	354	97	471	201
Grp Sat Flow(s),veh/h/ln	734	1863	1727	1324	1757	1524
Q Serve(g_s), s	4.4	21.8	6.6	2.0	14.7	6.1
Cycle Q Clear(g_c), s	11.0	21.8	6.6	2.0	14.7	6.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	450	1037	962	737	534	463
V/C Ratio(X)	0.20	0.83	0.37	0.13	0.88	0.43
Avail Cap(c_a), veh/h	450	1037	962	737	611	530
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.2	10.5	7.1	6.1	19.0	16.0
Incr Delay (d2), s/veh	1.0	7.6	1.1	0.4	12.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	13.1	3.3	0.8	9.0	2.6
LnGrp Delay(d),s/veh	11.2	18.1	8.2	6.5	31.9	16.7
LnGrp LOS	B	B	A	A	C	B
Approach Vol, veh/h		947	451		672	
Approach Delay, s/veh		17.4	7.8		27.4	
Approach LOS		B	A		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				36.0		21.5		36.0
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				32.0		20.0		32.0
Max Q Clear Time (g_c+I1), s				23.8		16.7		8.6
Green Ext Time (p_c), s				5.0		0.8		9.4

Intersection Summary	
HCM 2010 Ctrl Delay	18.6
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	732	210	120	370	55	113
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1696	1743	1827	1520
Adj Flow Rate, veh/h	813	233	133	411	61	126
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	12	9	4	25
Cap, veh/h	1306	1110	395	1222	220	164
Arrive On Green	0.70	0.70	0.70	0.70	0.13	0.13
Sat Flow, veh/h	1863	1583	489	1743	1740	1292
Grp Volume(v), veh/h	813	233	133	411	61	126
Grp Sat Flow(s),veh/h/ln	1863	1583	489	1743	1740	1292
Q Serve(g_s), s	10.1	2.2	8.6	4.0	1.4	4.1
Cycle Q Clear(g_c), s	10.1	2.2	18.7	4.0	1.4	4.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1306	1110	395	1222	220	164
V/C Ratio(X)	0.62	0.21	0.34	0.34	0.28	0.77
Avail Cap(c_a), veh/h	1306	1110	395	1222	280	208
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	3.5	2.3	8.4	2.5	17.2	18.4
Incr Delay (d2), s/veh	2.2	0.4	2.3	0.7	0.7	12.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	1.1	1.4	2.1	0.7	2.0
LnGrp Delay(d),s/veh	5.7	2.7	10.7	3.3	17.9	30.9
LnGrp LOS	A	A	B	A	B	C
Approach Vol, veh/h	1046			544	187	
Approach Delay, s/veh	5.0			5.1	26.7	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		9.5		34.0				34.0
Change Period (Y+Rc), s		4.0		3.5				3.5
Max Green Setting (Gmax), s		7.0		30.5				30.5
Max Q Clear Time (g_c+I1), s		6.1		12.1				20.7
Green Ext Time (p_c), s		0.0		9.7				6.3

Intersection Summary	
HCM 2010 Ctrl Delay	7.3
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1241	164	93	566	32	292
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1900	1863	1792	1776	1881
Adj Flow Rate, veh/h	1379	182	103	629	36	324
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	6	7	1
Cap, veh/h	1983	260	255	2146	372	352
Arrive On Green	0.63	0.63	0.63	0.63	0.22	0.22
Sat Flow, veh/h	3241	412	329	3495	1691	1599
Grp Volume(v), veh/h	770	791	103	629	36	324
Grp Sat Flow(s),veh/h/ln	1770	1790	329	1703	1691	1599
Q Serve(g_s), s	14.3	14.6	15.1	4.2	0.8	9.9
Cycle Q Clear(g_c), s	14.3	14.6	29.8	4.2	0.8	9.9
Prop In Lane		0.23	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1115	1128	255	2146	372	352
V/C Ratio(X)	0.69	0.70	0.40	0.29	0.10	0.92
Avail Cap(c_a), veh/h	1115	1128	255	2146	372	352
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	6.1	16.0	4.2	15.5	19.1
Incr Delay (d2), s/veh	3.5	3.6	4.7	0.3	0.1	28.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.7	8.2	1.7	2.0	0.4	7.1
LnGrp Delay(d),s/veh	9.6	9.8	20.7	4.5	15.7	47.9
LnGrp LOS	A	A	C	A	B	D
Approach Vol, veh/h	1561			732	360	
Approach Delay, s/veh	9.7			6.8	44.7	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		15.0		35.0				35.0
Change Period (Y+Rc), s		4.0		3.5				3.5
Max Green Setting (Gmax), s		11.0		31.5				31.5
Max Q Clear Time (g_c+I1), s		11.9		16.6				31.8
Green Ext Time (p_c), s		0.0		12.1				0.0

Intersection Summary	
HCM 2010 Ctrl Delay	13.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	26	555	42	17	155	49	10	61	52	139	170	13
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1883	1900	1900	1844	1900	1583	1870	1900	1845	1900	1900
Adj Flow Rate, veh/h	29	617	47	19	172	54	11	68	58	154	189	14
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	1	1	0	4	4	20	3	3	3	0	0
Cap, veh/h	765	998	76	429	778	244	313	228	195	391	428	32
Arrive On Green	0.58	0.58	0.58	0.58	0.58	0.58	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	1173	1728	132	784	1347	423	998	933	796	1247	1748	129
Grp Volume(v), veh/h	29	0	664	19	0	226	11	0	126	154	0	203
Grp Sat Flow(s),veh/h/ln	1173	0	1859	784	0	1769	998	0	1729	1247	0	1877
Q Serve(g_s), s	0.6	0.0	10.6	0.7	0.0	2.8	0.4	0.0	2.7	5.2	0.0	4.1
Cycle Q Clear(g_c), s	3.3	0.0	10.6	11.3	0.0	2.8	4.5	0.0	2.7	7.8	0.0	4.1
Prop In Lane	1.00		0.07	1.00		0.24	1.00		0.46	1.00		0.07
Lane Grp Cap(c), veh/h	765	0	1074	429	0	1022	313	0	423	391	0	459
V/C Ratio(X)	0.04	0.00	0.62	0.04	0.00	0.22	0.04	0.00	0.30	0.39	0.00	0.44
Avail Cap(c_a), veh/h	765	0	1074	429	0	1022	423	0	615	529	0	667
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.4	0.0	6.2	10.0	0.0	4.6	16.3	0.0	13.8	17.0	0.0	14.4
Incr Delay (d2), s/veh	0.1	0.0	2.7	0.2	0.0	0.5	0.0	0.0	0.4	0.6	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	6.1	0.2	0.0	1.5	0.1	0.0	1.3	1.8	0.0	2.2
LnGrp Delay(d),s/veh	5.5	0.0	8.9	10.2	0.0	5.1	16.4	0.0	14.2	17.7	0.0	15.1
LnGrp LOS	A		A	B		A	B		B	B		B
Approach Vol, veh/h		693			245			137			357	
Approach Delay, s/veh		8.8			5.5			14.4			16.2	
Approach LOS		A			A			B			B	

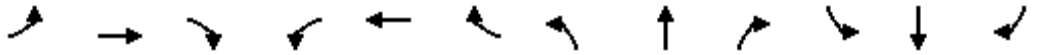
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.0		30.0		15.0		30.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		26.0		16.0		26.0
Max Q Clear Time (g_c+I1), s		6.5		12.6		9.8		13.3
Green Ext Time (p_c), s		1.6		4.5		1.2		4.4

Intersection Summary	
HCM 2010 Ctrl Delay	10.6
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	65	607	12	10	414	30	6	42	44	139	73	15
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1867	1900	1900	1749	1900	1900	1768	1900	1900	1900	1900
Adj Flow Rate, veh/h	72	674	13	11	460	33	7	47	49	154	81	17
Adj No. of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	8	8	8	0	0	0	0	0	0
Cap, veh/h	141	1049	19	75	1032	73	80	165	157	292	115	22
Arrive On Green	0.65	0.65	0.65	0.65	0.65	0.65	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	104	1615	30	11	1590	112	41	814	776	909	566	107
Grp Volume(v), veh/h	759	0	0	504	0	0	103	0	0	252	0	0
Grp Sat Flow(s),veh/h/ln	1750	0	0	1713	0	0	1632	0	0	1581	0	0
Q Serve(g_s), s	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0
Cycle Q Clear(g_c), s	13.2	0.0	0.0	7.8	0.0	0.0	2.9	0.0	0.0	7.9	0.0	0.0
Prop In Lane	0.09		0.02	0.02		0.07	0.07		0.48	0.61		0.07
Lane Grp Cap(c), veh/h	1209	0	0	1180	0	0	402	0	0	428	0	0
V/C Ratio(X)	0.63	0.00	0.00	0.43	0.00	0.00	0.26	0.00	0.00	0.59	0.00	0.00
Avail Cap(c_a), veh/h	1209	0	0	1180	0	0	581	0	0	595	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	4.7	0.0	0.0	18.3	0.0	0.0	20.1	0.0	0.0
Incr Delay (d2), s/veh	2.5	0.0	0.0	1.1	0.0	0.0	0.3	0.0	0.0	1.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.0	4.0	0.0	0.0	1.3	0.0	0.0	3.7	0.0	0.0
LnGrp Delay(d),s/veh	8.1	0.0	0.0	5.8	0.0	0.0	18.6	0.0	0.0	21.4	0.0	0.0
LnGrp LOS	A			A			B			C		
Approach Vol, veh/h		759			504			103			252	
Approach Delay, s/veh		8.1			5.8			18.6			21.4	
Approach LOS		A			A			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		14.9		39.0		14.9		39.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		17.0		35.0		17.0		35.0
Max Q Clear Time (g_c+I1), s		4.9		15.2		9.9		9.8
Green Ext Time (p_c), s		1.4		7.8		1.0		8.6

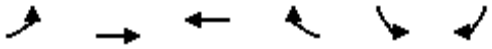
Intersection Summary	
HCM 2010 Ctrl Delay	10.1
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	157	404	85	102	219	30	14	98	76	15	85	92
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1856	1900	1900	1738	1900	1900	1884	1900	1900	1882	1900
Adj Flow Rate, veh/h	174	449	94	113	243	33	16	109	84	17	94	102
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	2	2	0	8	8	0	0	0	0	2	2
Cap, veh/h	498	596	125	304	599	81	569	395	305	574	331	359
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1121	1490	312	877	1499	204	1206	988	761	1209	827	897
Grp Volume(v), veh/h	174	0	543	113	0	276	16	0	193	17	0	196
Grp Sat Flow(s),veh/h/ln	1121	0	1801	877	0	1702	1206	0	1749	1209	0	1724
Q Serve(g_s), s	5.3	0.0	10.4	5.1	0.0	4.6	0.4	0.0	3.0	0.4	0.0	3.1
Cycle Q Clear(g_c), s	9.9	0.0	10.4	15.4	0.0	4.6	3.4	0.0	3.0	3.4	0.0	3.1
Prop In Lane	1.00		0.17	1.00		0.12	1.00		0.44	1.00		0.52
Lane Grp Cap(c), veh/h	498	0	721	304	0	681	569	0	700	574	0	689
V/C Ratio(X)	0.35	0.00	0.75	0.37	0.00	0.41	0.03	0.00	0.28	0.03	0.00	0.28
Avail Cap(c_a), veh/h	498	0	721	304	0	681	569	0	700	574	0	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	0.0	10.3	16.9	0.0	8.6	9.3	0.0	8.1	9.2	0.0	8.1
Incr Delay (d2), s/veh	0.4	0.0	4.5	0.8	0.0	0.4	0.1	0.0	1.0	0.1	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	5.9	1.3	0.0	2.2	0.1	0.0	1.6	0.1	0.0	1.6
LnGrp Delay(d),s/veh	12.6	0.0	14.8	17.7	0.0	9.0	9.4	0.0	9.1	9.3	0.0	9.2
LnGrp LOS	B		B	B		A	A		A	A		A
Approach Vol, veh/h		717			389			209			213	
Approach Delay, s/veh		14.3			11.5			9.1			9.2	
Approach LOS		B			B			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		20.0		20.0		20.0		20.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s		5.4		12.4		5.4		17.4
Green Ext Time (p_c), s		1.6		2.0		1.6		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	102	358	162	75	328	130
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1810	1827	1743	1881	1810
Adj Flow Rate, veh/h	113	398	180	83	364	144
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	6	5	4	9	1	5
Cap, veh/h	675	876	884	717	491	421
Arrive On Green	0.48	0.48	0.48	0.48	0.27	0.27
Sat Flow, veh/h	1070	1810	1827	1482	1792	1538
Grp Volume(v), veh/h	113	398	180	83	364	144
Grp Sat Flow(s),veh/h/ln	1070	1810	1827	1482	1792	1538
Q Serve(g_s), s	2.2	4.8	1.9	1.0	6.1	2.5
Cycle Q Clear(g_c), s	4.1	4.8	1.9	1.0	6.1	2.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	675	876	884	717	491	421
V/C Ratio(X)	0.17	0.45	0.20	0.12	0.74	0.34
Avail Cap(c_a), veh/h	675	876	884	717	867	745
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	5.6	4.9	4.7	10.9	9.6
Incr Delay (d2), s/veh	0.5	1.7	0.5	0.3	2.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	2.7	1.0	1.2	3.2	1.1
LnGrp Delay(d),s/veh	6.6	7.3	5.4	5.0	13.2	10.1
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		511	263		508	
Approach Delay, s/veh		7.2	5.3		12.3	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				20.0		13.1		20.0
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s				6.8		8.1		3.9
Green Ext Time (p_c), s				2.7		1.0		3.1

Intersection Summary	
HCM 2010 Ctrl Delay	8.8
HCM 2010 LOS	A



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	7	269	77	53	212	41	159	603	211
v/c Ratio	0.02	0.58	0.39	0.15	0.19	0.11	0.43	0.75	0.21
Control Delay	14.7	18.8	22.1	16.0	1.2	7.9	16.9	14.4	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	18.8	22.1	16.0	1.2	7.9	16.9	14.4	8.5
Queue Length 50th (ft)	1	53	18	12	0	4	26	83	21
Queue Length 95th (ft)	9	120	52	35	17	15	74	#222	80
Internal Link Dist (ft)		919		4037			5231		921
Turn Bay Length (ft)	250		250		250	250		250	
Base Capacity (vph)	494	677	302	526	1178	382	677	853	1195
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.40	0.25	0.10	0.18	0.11	0.23	0.71	0.18

Intersection Summary

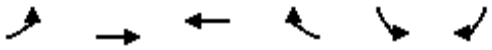
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	929	69	176	341	57	8	14	196	202	177
v/c Ratio	0.91	0.07	0.93	0.30	0.04	0.07	0.08	0.73	0.55	0.62
Control Delay	33.6	2.1	70.5	7.4	0.8	32.0	34.2	33.6	35.6	43.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	2.1	70.5	7.4	0.8	32.0	34.2	33.6	35.6	43.1
Queue Length 50th (ft)	435	0	50	69	0	4	7	48	92	89
Queue Length 95th (ft)	#776	16	#191	130	9	14	23	94	#174	154
Internal Link Dist (ft)	1084			924			5202			920
Turn Bay Length (ft)		250	250		250	250		250	250	
Base Capacity (vph)	1020	1004	189	1152	1350	122	411	267	365	394
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.07	0.93	0.30	0.04	0.07	0.03	0.73	0.55	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	89	858	354	97	471	201
v/c Ratio	0.22	0.84	0.37	0.13	0.86	0.33
Control Delay	9.2	21.8	9.4	2.3	36.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	21.8	9.4	2.3	36.2	4.3
Queue Length 50th (ft)	15	244	68	0	152	0
Queue Length 95th (ft)	39	#476	118	17	#297	37
Internal Link Dist (ft)		1579	867		5202	
Turn Bay Length (ft)	250			250	250	
Base Capacity (vph)	406	1022	947	770	600	654
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.84	0.37	0.13	0.79	0.31

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	813	233	133	411	61	126
v/c Ratio	0.57	0.18	0.35	0.31	0.26	0.45
Control Delay	5.6	0.9	6.5	3.4	20.9	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	0.9	6.5	3.4	20.9	10.1
Queue Length 50th (ft)	86	0	11	32	16	0
Queue Length 95th (ft)	163	12	37	60	39	34
Internal Link Dist (ft)	884			1579	5173	
Turn Bay Length (ft)		250	250			250
Base Capacity (vph)	1426	1266	375	1334	248	292
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.18	0.35	0.31	0.25	0.43

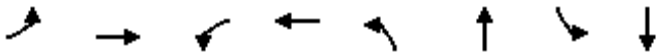
Intersection Summary



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1561	103	629	36	324
v/c Ratio	0.70	0.69	0.29	0.10	0.84
Control Delay	7.9	36.8	4.6	16.5	37.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	36.8	4.6	16.5	37.8
Queue Length 50th (ft)	123	16	35	8	74
Queue Length 95th (ft)	184	#94	54	26	#192
Internal Link Dist (ft)	2574		424	5188	
Turn Bay Length (ft)		250		250	250
Base Capacity (vph)	2231	150	2164	374	400
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.69	0.29	0.10	0.81

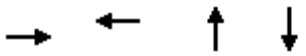
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



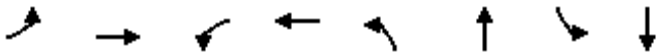
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	29	664	19	226	11	126	154	203
v/c Ratio	0.04	0.59	0.05	0.21	0.05	0.28	0.54	0.46
Control Delay	5.5	9.5	5.9	4.8	12.9	9.8	22.2	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	9.5	5.9	4.8	12.9	9.8	22.2	17.7
Queue Length 50th (ft)	3	88	2	18	2	14	34	42
Queue Length 95th (ft)	13	225	10	54	11	43	75	85
Internal Link Dist (ft)		1097		420		5201		5188
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	705	1124	355	1088	315	625	420	639
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.59	0.05	0.21	0.03	0.20	0.37	0.32

Intersection Summary



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	759	504	103	252
v/c Ratio	0.70	0.47	0.25	0.71
Control Delay	12.9	8.1	11.6	31.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	12.9	8.1	11.6	31.3
Queue Length 50th (ft)	156	80	14	76
Queue Length 95th (ft)	316	158	46	142
Internal Link Dist (ft)	5180	420	5199	5201
Turn Bay Length (ft)				
Base Capacity (vph)	1083	1081	495	432
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.70	0.47	0.21	0.58

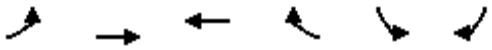
Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	174	543	113	276	16	193	17	196
v/c Ratio	0.43	0.79	0.57	0.43	0.03	0.25	0.03	0.25
Control Delay	12.7	20.6	24.3	10.5	7.6	5.8	7.7	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	20.6	24.3	10.5	7.6	5.8	7.7	5.3
Queue Length 50th (ft)	26	90	18	38	2	15	2	12
Queue Length 95th (ft)	62	#220	#72	80	9	43	10	40
Internal Link Dist (ft)		420		5100		5198		5203
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	457	775	224	727	505	786	506	786
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.70	0.50	0.38	0.03	0.25	0.03	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	113	398	180	83	364	144
v/c Ratio	0.21	0.47	0.21	0.11	0.63	0.24
Control Delay	8.6	10.3	8.0	3.0	15.8	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	10.3	8.0	3.0	15.8	3.2
Queue Length 50th (ft)	12	50	20	0	57	0
Queue Length 95th (ft)	40	123	54	16	112	21
Internal Link Dist (ft)		1482	2578		5231	
Turn Bay Length (ft)	250			250	250	
Base Capacity (vph)	539	846	853	736	753	731
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.47	0.21	0.11	0.48	0.20

Intersection Summary

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	67	28	246	47	13	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	250	-	250	250	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	4	0	1
Mvmt Flow	74	31	273	52	14	221

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	523	273	0	0	273	0
Stage 1	273	-	-	-	-	-
Stage 2	250	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	518	771	-	-	1302	-
Stage 1	778	-	-	-	-	-
Stage 2	796	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	512	771	-	-	1302	-
Mov Cap-2 Maneuver	512	-	-	-	-	-
Stage 1	778	-	-	-	-	-
Stage 2	787	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	512	771	1302	-
HCM Lane V/C Ratio	-	-	0.145	0.04	0.011	-
HCM Control Delay (s)	-	-	13.2	9.9	7.8	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0.1	0	-

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	31	39	4	16	82	56	2	35	7	35	53	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	50	0	0	0	0	0	0	0	0	0
Mvmt Flow	34	43	4	18	91	62	2	39	8	39	59	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	268	195	67	215	199	43	74	0	0	47	0	0
Stage 1	144	144	-	47	47	-	-	-	-	-	-	-
Stage 2	124	51	-	168	152	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.7	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.75	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	689	704	877	746	700	1033	1538	-	-	1573	-	-
Stage 1	864	782	-	972	860	-	-	-	-	-	-	-
Stage 2	885	856	-	839	775	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	569	685	877	692	681	1033	1538	-	-	1573	-	-
Mov Cap-2 Maneuver	569	685	-	692	681	-	-	-	-	-	-	-
Stage 1	863	762	-	971	859	-	-	-	-	-	-	-
Stage 2	743	855	-	767	755	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	10.9	0.3	2.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1538	-	-	638	779	1573	-	-
HCM Lane V/C Ratio	0.001	-	-	0.129	0.22	0.025	-	-
HCM Control Delay (s)	7.3	0	-	11.5	10.9	7.3	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.8	0.1	-	-

Intersection	
Int Delay, s/veh	9.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	13	95	9	56	148	69	15	112	23	16	89	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	0	2	0
Mvmt Flow	14	106	10	62	164	77	17	124	26	18	99	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	425	317	99	363	305	137	99	0	0	150	0	0
Stage 1	134	134	-	171	171	-	-	-	-	-	-	-
Stage 2	291	183	-	192	134	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	543	599	962	597	612	917	1507	-	-	1444	-	-
Stage 1	874	785	-	836	761	-	-	-	-	-	-	-
Stage 2	721	748	-	814	789	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	385	584	962	499	597	917	1507	-	-	1444	-	-
Mov Cap-2 Maneuver	385	584	-	499	597	-	-	-	-	-	-	-
Stage 1	864	775	-	826	752	-	-	-	-	-	-	-
Stage 2	510	739	-	687	779	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.2	16	0.7	1.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1507	-	-	569	627	1444	-	-
HCM Lane V/C Ratio	0.011	-	-	0.228	0.484	0.012	-	-
HCM Control Delay (s)	7.4	0	-	13.2	16	7.5	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.9	2.6	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	20	140	6	23	296	83	2	35	6	14	47	24
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	33	0	0	0	0	0	0	0	4	0
Mvmt Flow	22	156	7	26	329	92	2	39	7	16	52	27

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	421	0	0	162	0	0	669	675	159	652	633	375
Stage 1	-	-	-	-	-	-	203	203	-	426	426	-
Stage 2	-	-	-	-	-	-	466	472	-	226	207	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.54	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.036	3.3
Pot Cap-1 Maneuver	1149	-	-	1429	-	-	374	378	892	384	394	676
Stage 1	-	-	-	-	-	-	804	737	-	610	582	-
Stage 2	-	-	-	-	-	-	581	562	-	781	727	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1149	-	-	1429	-	-	310	361	892	338	376	676
Mov Cap-2 Maneuver	-	-	-	-	-	-	310	361	-	338	376	-
Stage 1	-	-	-	-	-	-	787	722	-	597	568	-
Stage 2	-	-	-	-	-	-	495	549	-	718	712	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.4	15.5	16
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	390	1149	-	-	1429	-	-	421
HCM Lane V/C Ratio	0.123	0.019	-	-	0.018	-	-	0.224
HCM Control Delay (s)	15.5	8.2	0	-	7.6	0	-	16
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	0.8

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	10	40	2	9	58	5	0	39	5	0	60	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	9	0	0	6	0	0	0	0	0	0	17
Mvmt Flow	11	44	2	10	64	6	0	43	6	0	67	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	153	121	72	142	124	46	78	0	0	49	0	0
Stage 1	72	72	-	46	46	-	-	-	-	-	-	-
Stage 2	81	49	-	96	78	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.59	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.081	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	819	756	996	832	759	1029	1533	-	-	1571	-	-
Stage 1	943	821	-	973	849	-	-	-	-	-	-	-
Stage 2	932	840	-	916	822	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	762	756	996	793	759	1029	1533	-	-	1571	-	-
Mov Cap-2 Maneuver	762	756	-	793	759	-	-	-	-	-	-	-
Stage 1	943	821	-	973	849	-	-	-	-	-	-	-
Stage 2	857	840	-	864	822	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	10.2	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1533	-	-	764	777	1571	-	-
HCM Lane V/C Ratio	-	-	-	0.076	0.103	-	-	-
HCM Control Delay (s)	0	-	-	10.1	10.2	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.3	0	-	-

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	11	36	0	16	67	11	4	98	11	16	65	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	0	8	0	0	2	0	11	3	0
Mvmt Flow	12	40	0	18	74	12	4	109	12	18	72	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	277	240	74	254	236	115	77	0	0	121	0	0
Stage 1	110	110	-	124	124	-	-	-	-	-	-	-
Stage 2	167	130	-	130	112	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.1	6.58	6.2	4.1	-	-	4.21	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.5	4.072	3.3	2.2	-	-	2.299	-	-
Pot Cap-1 Maneuver	679	656	993	703	654	943	1535	-	-	1412	-	-
Stage 1	900	799	-	885	782	-	-	-	-	-	-	-
Stage 2	840	783	-	878	791	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	604	646	993	662	644	943	1535	-	-	1412	-	-
Mov Cap-2 Maneuver	604	646	-	662	644	-	-	-	-	-	-	-
Stage 1	897	789	-	882	780	-	-	-	-	-	-	-
Stage 2	748	781	-	823	781	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.2	11.3	0.3	1.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1535	-	-	636	672	1412	-	-
HCM Lane V/C Ratio	0.003	-	-	0.082	0.155	0.013	-	-
HCM Control Delay (s)	7.4	0	-	11.2	11.3	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.5	0	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	76	0	65	116	22	0	21	23	14	32	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	5	0	0	0	0	25	0	0
Mvmt Flow	2	84	0	72	129	24	0	23	26	16	36	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	153	0	0	84	0	0	395	387	84	399	375	141
Stage 1	-	-	-	-	-	-	89	89	-	286	286	-
Stage 2	-	-	-	-	-	-	306	298	-	113	89	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.35	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.725	4	3.3
Pot Cap-1 Maneuver	1440	-	-	1526	-	-	568	551	981	522	559	912
Stage 1	-	-	-	-	-	-	923	825	-	674	679	-
Stage 2	-	-	-	-	-	-	708	671	-	839	825	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1440	-	-	1526	-	-	514	522	981	471	529	912
Mov Cap-2 Maneuver	-	-	-	-	-	-	514	522	-	471	529	-
Stage 1	-	-	-	-	-	-	922	824	-	673	644	-
Stage 2	-	-	-	-	-	-	630	636	-	793	824	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.4	10.6	12.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	691	1440	-	-	1526	-	-	533
HCM Lane V/C Ratio	0.071	0.002	-	-	0.047	-	-	0.106
HCM Control Delay (s)	10.6	7.5	0	-	7.5	0	-	12.6
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.4

Intersection	
Int Delay, s/veh	7.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	110	51	161	187	74	198
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	2	0	0
Mvmt Flow	122	57	179	208	82	220

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	179	0	717	151
Stage 1	-	-	-	-	151	-
Stage 2	-	-	-	-	566	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1409	-	399	901
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1409	-	342	901
Mov Cap-2 Maneuver	-	-	-	-	342	-
Stage 1	-	-	-	-	882	-
Stage 2	-	-	-	-	490	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.7	16.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	624	-	-	1409	-
HCM Lane V/C Ratio	0.484	-	-	0.127	-
HCM Control Delay (s)	16.1	-	-	7.9	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.6	-	-	0.4	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	63	30	31	54	498	65	140	33	379	94	6
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1845	1845	1900	1900	1828	1900
Adj Flow Rate, veh/h	0	70	33	34	60	553	72	156	37	421	104	7
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	3	2	2	0	2	2
Cap, veh/h	158	430	203	568	668	923	459	238	56	633	563	38
Arrive On Green	0.00	0.35	0.35	0.35	0.35	0.35	0.05	0.16	0.16	0.22	0.33	0.33
Sat Flow, veh/h	822	1222	576	1312	1900	1615	1757	1443	342	1810	1694	114
Grp Volume(v), veh/h	0	0	103	34	60	553	72	0	193	421	0	111
Grp Sat Flow(s),veh/h/ln	822	0	1798	1312	1900	1615	1757	0	1785	1810	0	1808
Q Serve(g_s), s	0.0	0.0	1.8	0.8	1.0	10.2	1.5	0.0	4.6	7.9	0.0	2.0
Cycle Q Clear(g_c), s	0.0	0.0	1.8	2.6	1.0	10.2	1.5	0.0	4.6	7.9	0.0	2.0
Prop In Lane	1.00		0.32	1.00		1.00	1.00		0.19	1.00		0.06
Lane Grp Cap(c), veh/h	158	0	632	568	668	923	459	0	294	633	0	600
V/C Ratio(X)	0.00	0.00	0.16	0.06	0.09	0.60	0.16	0.00	0.66	0.67	0.00	0.18
Avail Cap(c_a), veh/h	158	0	632	568	668	923	521	0	628	672	0	914
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	10.1	11.0	9.9	6.4	14.5	0.0	17.8	10.4	0.0	10.8
Incr Delay (d2), s/veh	0.0	0.0	0.6	0.2	0.3	2.9	0.2	0.0	2.5	2.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	1.0	0.3	0.5	5.1	0.7	0.0	2.5	4.3	0.0	1.0
LnGrp Delay(d),s/veh	0.0	0.0	10.7	11.3	10.1	9.2	14.7	0.0	20.3	12.7	0.0	11.0
LnGrp LOS			B	B	B	A	B		C	B		B
Approach Vol, veh/h		103			647			265			532	
Approach Delay, s/veh		10.7			9.4			18.8			12.3	
Approach LOS		B			A			B			B	

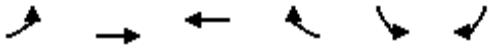
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	11.5		20.0	6.4	19.1		20.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	11.0	16.0		16.0	4.0	23.0		16.0
Max Q Clear Time (g_c+I1), s	9.9	6.6		3.8	3.5	4.0		12.2
Green Ext Time (p_c), s	0.2	1.0		2.4	0.0	1.3		1.2

Intersection Summary	
HCM 2010 Ctrl Delay	12.1
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	14	462	32	146	608	226	14	73	183	136	68	8
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1667	1863	1900	1810	1900	1900	1900	1900	1827	1881	1900	1900
Adj Flow Rate, veh/h	16	513	36	162	676	251	16	81	203	151	76	9
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	14	2	0	5	0	0	0	0	4	1	0	0
Cap, veh/h	231	696	629	390	837	833	388	320	390	414	379	45
Arrive On Green	0.02	0.37	0.37	0.08	0.44	0.44	0.02	0.17	0.17	0.08	0.23	0.23
Sat Flow, veh/h	1587	1863	1615	1723	1900	1615	1810	1900	1553	1792	1668	197
Grp Volume(v), veh/h	16	513	36	162	676	251	16	81	203	151	0	85
Grp Sat Flow(s),veh/h/ln	1587	1863	1615	1723	1900	1615	1810	1900	1553	1792	0	1865
Q Serve(g_s), s	0.3	12.7	0.7	2.8	16.5	4.8	0.4	2.0	6.0	3.6	0.0	2.0
Cycle Q Clear(g_c), s	0.3	12.7	0.7	2.8	16.5	4.8	0.4	2.0	6.0	3.6	0.0	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	231	696	629	390	837	833	388	320	390	414	0	424
V/C Ratio(X)	0.07	0.74	0.06	0.42	0.81	0.30	0.04	0.25	0.52	0.36	0.00	0.20
Avail Cap(c_a), veh/h	325	839	753	409	891	879	495	570	595	414	0	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.6	14.4	10.2	10.1	12.9	7.4	17.9	19.3	17.2	15.8	0.0	16.7
Incr Delay (d2), s/veh	0.1	2.8	0.0	0.7	5.3	0.2	0.0	0.4	1.1	0.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	6.9	0.3	1.4	9.7	2.1	0.2	1.1	2.7	1.8	0.0	1.0
LnGrp Delay(d),s/veh	11.8	17.2	10.2	10.8	18.2	7.6	17.9	19.7	18.3	16.4	0.0	16.9
LnGrp LOS	B	B	B	B	B	A	B	B	B	B		B
Approach Vol, veh/h		565			1089			300			236	
Approach Delay, s/veh		16.6			14.7			18.6			16.6	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	13.0	8.4	23.9	4.8	16.1	4.8	27.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	16.0	5.0	24.0	4.0	16.0	4.0	25.0
Max Q Clear Time (g_c+I1), s	5.6	8.0	4.8	14.7	2.4	4.0	2.3	18.5
Green Ext Time (p_c), s	0.0	1.0	0.0	5.2	0.0	1.2	0.0	4.0

Intersection Summary	
HCM 2010 Ctrl Delay	15.9
HCM 2010 LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	82	436	523	292	224	101
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1881	1881	1881	1597
Adj Flow Rate, veh/h	91	484	581	324	249	112
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	1	1	1	19
Cap, veh/h	437	1069	1090	927	358	271
Arrive On Green	0.58	0.58	0.58	0.58	0.20	0.20
Sat Flow, veh/h	608	1845	1881	1599	1792	1357
Grp Volume(v), veh/h	91	484	581	324	249	112
Grp Sat Flow(s),veh/h/ln	608	1845	1881	1599	1792	1357
Q Serve(g_s), s	3.9	5.4	6.8	3.9	4.7	2.6
Cycle Q Clear(g_c), s	10.7	5.4	6.8	3.9	4.7	2.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	437	1069	1090	927	358	271
V/C Ratio(X)	0.21	0.45	0.53	0.35	0.70	0.41
Avail Cap(c_a), veh/h	437	1069	1090	927	791	599
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.9	4.3	4.6	4.0	13.5	12.6
Incr Delay (d2), s/veh	1.1	1.4	1.9	1.0	2.4	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	3.1	4.0	1.9	2.5	1.0
LnGrp Delay(d),s/veh	9.0	5.7	6.5	5.1	15.9	13.7
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		575	905		361	
Approach Delay, s/veh		6.2	6.0		15.2	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				25.0		11.2		25.0
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				21.0		16.0		21.0
Max Q Clear Time (g_c+I1), s				12.7		6.7		8.8
Green Ext Time (p_c), s				4.9		0.8		6.3

Intersection Summary	
HCM 2010 Ctrl Delay	7.9
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	401	114	117	507	187	117
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1610	1881	1900	1759
Adj Flow Rate, veh/h	446	127	130	563	208	130
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	18	1	0	8
Cap, veh/h	1117	950	548	1128	311	257
Arrive On Green	0.60	0.60	0.60	0.60	0.17	0.17
Sat Flow, veh/h	1863	1583	723	1881	1810	1495
Grp Volume(v), veh/h	446	127	130	563	208	130
Grp Sat Flow(s),veh/h/ln	1863	1583	723	1881	1810	1495
Q Serve(g_s), s	4.4	1.2	4.0	6.0	3.8	2.8
Cycle Q Clear(g_c), s	4.4	1.2	8.5	6.0	3.8	2.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1117	950	548	1128	311	257
V/C Ratio(X)	0.40	0.13	0.24	0.50	0.67	0.51
Avail Cap(c_a), veh/h	1117	950	548	1128	569	470
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	3.7	3.0	5.9	4.0	13.6	13.2
Incr Delay (d2), s/veh	1.1	0.3	1.0	1.6	2.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.6	0.9	3.5	2.1	1.2
LnGrp Delay(d),s/veh	4.8	3.3	6.9	5.6	16.1	14.7
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h	573			693	338	
Approach Delay, s/veh	4.4			5.8	15.5	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		10.0		25.0				25.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		11.0		21.0				21.0
Max Q Clear Time (g_c+I1), s		5.8		6.4				10.5
Green Ext Time (p_c), s		0.5		6.2				5.1

Intersection Summary	
HCM 2010 Ctrl Delay	7.4
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	665	75	223	868	121	112
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1861	1900	1900	1881	1900	1845
Adj Flow Rate, veh/h	739	83	248	964	134	124
Adj No. of Lanes	2	0	1	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	0	1	0	3
Cap, veh/h	2290	257	577	2553	213	184
Arrive On Green	0.71	0.71	0.71	0.71	0.12	0.12
Sat Flow, veh/h	3298	360	676	3668	1810	1568
Grp Volume(v), veh/h	407	415	248	964	134	124
Grp Sat Flow(s),veh/h/ln	1768	1797	676	1787	1810	1568
Q Serve(g_s), s	4.1	4.1	10.2	5.0	3.4	3.6
Cycle Q Clear(g_c), s	4.1	4.1	14.3	5.0	3.4	3.6
Prop In Lane		0.20	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1263	1284	577	2553	213	184
V/C Ratio(X)	0.32	0.32	0.43	0.38	0.63	0.67
Avail Cap(c_a), veh/h	1263	1284	577	2553	304	264
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	2.5	2.5	5.2	2.7	20.0	20.1
Incr Delay (d2), s/veh	0.7	0.7	2.3	0.4	3.1	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	2.2	2.2	2.6	1.9	1.8
LnGrp Delay(d),s/veh	3.2	3.2	7.5	3.1	23.1	24.3
LnGrp LOS	A	A	A	A	C	C
Approach Vol, veh/h	822			1212	258	
Approach Delay, s/veh	3.2			4.0	23.7	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		9.6		38.0				38.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		8.0		34.0				34.0
Max Q Clear Time (g_c+I1), s		5.6		6.1				16.3
Green Ext Time (p_c), s		0.2		15.8				11.8

Intersection Summary	
HCM 2010 Ctrl Delay	5.9
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	217	25	56	413	95	46	119	50	54	88	22
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1883	1900	1900	1878	1900	1900	1887	1900	1827	1900	1900
Adj Flow Rate, veh/h	14	241	28	62	459	106	51	132	56	60	98	24
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	1	1	0	1	1	0	1	1	4	0	0
Cap, veh/h	476	843	98	709	752	174	464	298	126	401	349	85
Arrive On Green	0.51	0.51	0.51	0.51	0.51	0.51	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	859	1657	192	1128	1477	341	1289	1259	534	1168	1475	361
Grp Volume(v), veh/h	14	0	269	62	0	565	51	0	188	60	0	122
Grp Sat Flow(s),veh/h/ln	859	0	1849	1128	0	1818	1289	0	1793	1168	0	1836
Q Serve(g_s), s	0.4	0.0	2.6	1.1	0.0	7.0	1.1	0.0	2.8	1.5	0.0	1.7
Cycle Q Clear(g_c), s	7.3	0.0	2.6	3.7	0.0	7.0	2.8	0.0	2.8	4.3	0.0	1.7
Prop In Lane	1.00		0.10	1.00		0.19	1.00		0.30	1.00		0.20
Lane Grp Cap(c), veh/h	476	0	941	709	0	925	464	0	424	401	0	434
V/C Ratio(X)	0.03	0.00	0.29	0.09	0.00	0.61	0.11	0.00	0.44	0.15	0.00	0.28
Avail Cap(c_a), veh/h	476	0	941	709	0	925	815	0	912	719	0	935
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.1	0.0	4.4	5.5	0.0	5.5	10.9	0.0	10.2	12.1	0.0	9.8
Incr Delay (d2), s/veh	0.1	0.0	0.8	0.2	0.0	3.0	0.1	0.0	0.7	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.5	0.4	0.0	4.2	0.4	0.0	1.4	0.5	0.0	0.9
LnGrp Delay(d),s/veh	8.2	0.0	5.2	5.7	0.0	8.5	11.0	0.0	11.0	12.2	0.0	10.2
LnGrp LOS	A		A	A		A	B		B	B		B
Approach Vol, veh/h		283			627			239			182	
Approach Delay, s/veh		5.3			8.2			11.0			10.8	
Approach LOS		A			A			B			B	

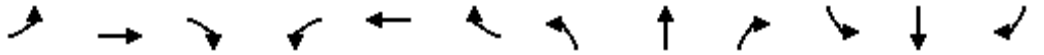
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		11.4		20.0		11.4		20.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s		4.8		9.3		6.3		9.0
Green Ext Time (p_c), s		1.5		2.8		1.4		2.9

Intersection Summary	
HCM 2010 Ctrl Delay	8.5
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	48	501	4	27	662	86	4	84	79	56	69	36
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1877	1900	1900	1837	1900	1900	1900	1900
Adj Flow Rate, veh/h	53	557	4	30	736	96	4	93	88	62	77	40
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	1	1	0	0	0	0	0	0
Cap, veh/h	383	1239	9	575	1070	140	313	171	162	254	232	120
Arrive On Green	0.66	0.66	0.66	0.66	0.66	0.66	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	670	1884	14	862	1627	212	1295	870	823	1222	1179	613
Grp Volume(v), veh/h	53	0	561	30	0	832	4	0	181	62	0	117
Grp Sat Flow(s),veh/h/ln	670	0	1898	862	0	1839	1295	0	1692	1222	0	1792
Q Serve(g_s), s	2.9	0.0	7.9	1.0	0.0	15.5	0.1	0.0	5.3	2.6	0.0	3.1
Cycle Q Clear(g_c), s	18.4	0.0	7.9	8.8	0.0	15.5	3.2	0.0	5.3	7.9	0.0	3.1
Prop In Lane	1.00		0.01	1.00		0.12	1.00		0.49	1.00		0.34
Lane Grp Cap(c), veh/h	383	0	1248	575	0	1210	313	0	332	254	0	352
V/C Ratio(X)	0.14	0.00	0.45	0.05	0.00	0.69	0.01	0.00	0.54	0.24	0.00	0.33
Avail Cap(c_a), veh/h	383	0	1248	575	0	1210	437	0	495	371	0	524
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.6	0.0	4.6	6.7	0.0	5.9	20.3	0.0	19.8	23.4	0.0	18.9
Incr Delay (d2), s/veh	0.8	0.0	1.2	0.2	0.0	3.2	0.0	0.0	1.4	0.5	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	4.5	0.3	0.0	8.7	0.1	0.0	2.6	0.9	0.0	1.6
LnGrp Delay(d),s/veh	12.4	0.0	5.7	6.9	0.0	9.1	20.3	0.0	21.2	23.8	0.0	19.5
LnGrp LOS	B		A	A		A	C		C	C		B
Approach Vol, veh/h		614			862			185			179	
Approach Delay, s/veh		6.3			9.0			21.2			21.0	
Approach LOS		A			A			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		14.7		40.0		14.7		40.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		36.0		16.0		36.0
Max Q Clear Time (g_c+I1), s		7.3		20.4		9.9		17.5
Green Ext Time (p_c), s		1.1		8.0		0.9		8.9

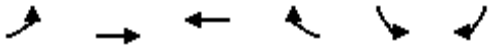
Intersection Summary	
HCM 2010 Ctrl Delay	10.5
HCM 2010 LOS	B



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	127	333	18	45	430	56	11	83	50	22	69	161
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1877	1900	1900	1900	1900	1900	1887	1900
Adj Flow Rate, veh/h	141	370	20	50	478	62	12	92	56	24	77	179
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	1	1	0	0	0	0	0	0
Cap, veh/h	505	969	52	622	884	115	314	266	162	411	121	282
Arrive On Green	0.54	0.54	0.54	0.54	0.54	0.54	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	879	1786	97	1010	1628	211	1141	1107	674	1259	505	1174
Grp Volume(v), veh/h	141	0	390	50	0	540	12	0	148	24	0	256
Grp Sat Flow(s),veh/h/ln	879	0	1883	1010	0	1840	1141	0	1781	1259	0	1680
Q Serve(g_s), s	4.6	0.0	4.4	1.1	0.0	7.0	0.4	0.0	2.5	0.6	0.0	5.0
Cycle Q Clear(g_c), s	11.6	0.0	4.4	5.5	0.0	7.0	5.4	0.0	2.5	3.1	0.0	5.0
Prop In Lane	1.00		0.05	1.00		0.11	1.00		0.38	1.00		0.70
Lane Grp Cap(c), veh/h	505	0	1022	622	0	998	314	0	428	411	0	404
V/C Ratio(X)	0.28	0.00	0.38	0.08	0.00	0.54	0.04	0.00	0.35	0.06	0.00	0.63
Avail Cap(c_a), veh/h	505	0	1022	622	0	998	566	0	821	689	0	775
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	4.9	6.5	0.0	5.5	15.0	0.0	11.6	12.9	0.0	12.5
Incr Delay (d2), s/veh	1.4	0.0	1.1	0.3	0.0	2.1	0.0	0.0	0.5	0.1	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	2.6	0.3	0.0	4.0	0.1	0.0	1.3	0.2	0.0	2.5
LnGrp Delay(d),s/veh	10.6	0.0	5.9	6.7	0.0	7.6	15.0	0.0	12.1	13.0	0.0	14.2
LnGrp LOS	B		A	A		A	B		B	B		B
Approach Vol, veh/h		531			590			160			280	
Approach Delay, s/veh		7.2			7.5			12.3			14.1	
Approach LOS		A			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		12.9		24.0		12.9		24.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		17.0		20.0		17.0		20.0
Max Q Clear Time (g_c+I1), s		7.4		13.6		7.0		9.0
Green Ext Time (p_c), s		1.6		3.2		1.6		4.6

Intersection Summary	
HCM 2010 Ctrl Delay	9.1
HCM 2010 LOS	A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	109	248	297	202	159	102
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1881	1900	1845	1863
Adj Flow Rate, veh/h	121	276	330	224	177	113
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	1	0	3	2
Cap, veh/h	654	1102	1113	955	280	252
Arrive On Green	0.59	0.59	0.59	0.59	0.16	0.16
Sat Flow, veh/h	851	1863	1881	1615	1757	1583
Grp Volume(v), veh/h	121	276	330	224	177	113
Grp Sat Flow(s),veh/h/ln	851	1863	1881	1615	1757	1583
Q Serve(g_s), s	2.6	2.3	2.8	2.1	3.0	2.1
Cycle Q Clear(g_c), s	5.4	2.3	2.8	2.1	3.0	2.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	654	1102	1113	955	280	252
V/C Ratio(X)	0.19	0.25	0.30	0.23	0.63	0.45
Avail Cap(c_a), veh/h	654	1102	1113	955	711	641
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.6	3.1	3.2	3.1	12.6	12.2
Incr Delay (d2), s/veh	0.6	0.5	0.7	0.6	2.4	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.3	1.6	3.0	1.6	1.0
LnGrp Delay(d),s/veh	5.2	3.7	3.9	3.7	15.0	13.5
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		397	554		290	
Approach Delay, s/veh		4.2	3.8		14.4	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				23.0		9.1		23.0
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				19.0		13.0		19.0
Max Q Clear Time (g_c+I1), s				7.4		5.0		4.8
Green Ext Time (p_c), s				3.7		0.5		4.0

Intersection Summary	
HCM 2010 Ctrl Delay	6.4
HCM 2010 LOS	A



Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	103	34	60	553	72	193	421	111
v/c Ratio	0.16	0.07	0.09	0.43	0.19	0.49	0.71	0.16
Control Delay	10.3	13.3	13.1	1.8	8.5	19.5	15.1	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	13.3	13.1	1.8	8.5	19.5	15.1	10.5
Queue Length 50th (ft)	14	7	12	1	9	43	69	20
Queue Length 95th (ft)	44	24	35	32	23	90	121	46
Internal Link Dist (ft)	919		4467			5231		921
Turn Bay Length (ft)		250		250	250		250	
Base Capacity (vph)	662	464	673	1280	376	649	623	928
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.07	0.09	0.43	0.19	0.30	0.68	0.12

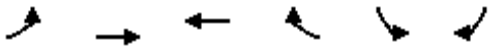
Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	16	513	36	162	676	251	16	81	203	151	85
v/c Ratio	0.06	0.76	0.04	0.47	0.70	0.22	0.05	0.29	0.32	0.44	0.20
Control Delay	6.4	22.9	0.5	11.2	16.6	1.4	14.8	23.8	4.3	20.6	20.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	22.9	0.5	11.2	16.6	1.4	14.8	23.8	4.3	20.6	20.1
Queue Length 50th (ft)	2	131	0	22	129	0	3	23	0	35	21
Queue Length 95th (ft)	9	241	3	50	#391	25	15	58	38	80	57
Internal Link Dist (ft)		654			924			5202			920
Turn Bay Length (ft)	250		250	250		250	250		250	250	
Base Capacity (vph)	261	874	877	342	1006	1161	339	594	641	343	591
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.59	0.04	0.47	0.67	0.22	0.05	0.14	0.32	0.44	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	91	484	581	324	249	112
v/c Ratio	0.22	0.43	0.50	0.29	0.53	0.26
Control Delay	8.1	8.0	8.9	1.9	16.8	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	8.0	8.9	1.9	16.8	4.6
Queue Length 50th (ft)	9	57	73	0	46	0
Queue Length 95th (ft)	37	146	186	29	92	23
Internal Link Dist (ft)		1579	2667		5202	
Turn Bay Length (ft)	250			250	250	
Base Capacity (vph)	417	1135	1157	1108	700	600
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.43	0.50	0.29	0.36	0.19

Intersection Summary



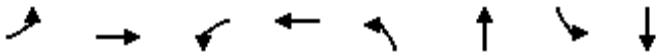
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	446	127	130	563	208	130
v/c Ratio	0.38	0.12	0.26	0.47	0.50	0.29
Control Delay	6.4	1.7	7.2	7.4	17.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	1.7	7.2	7.4	17.1	5.1
Queue Length 50th (ft)	47	0	13	65	38	0
Queue Length 95th (ft)	101	15	39	137	80	26
Internal Link Dist (ft)	884			1579	5173	
Turn Bay Length (ft)		250	250			250
Base Capacity (vph)	1187	1054	491	1198	500	508
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.12	0.26	0.47	0.42	0.26

Intersection Summary



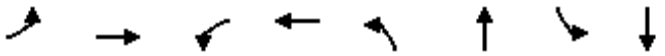
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	822	248	964	134	124
v/c Ratio	0.31	0.52	0.36	0.51	0.37
Control Delay	3.1	9.0	3.5	27.2	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	9.0	3.5	27.2	8.3
Queue Length 50th (ft)	36	28	48	36	0
Queue Length 95th (ft)	54	86	71	78	35
Internal Link Dist (ft)	774		424	5188	
Turn Bay Length (ft)		250			250
Base Capacity (vph)	2632	481	2688	278	346
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.31	0.52	0.36	0.48	0.36

Intersection Summary



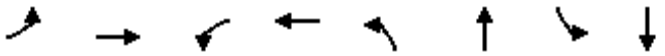
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	14	269	62	565	51	188	60	122
v/c Ratio	0.03	0.24	0.09	0.51	0.17	0.40	0.22	0.27
Control Delay	5.2	5.4	5.4	7.6	10.5	9.9	11.4	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	5.4	5.4	7.6	10.5	9.9	11.4	9.5
Queue Length 50th (ft)	1	20	4	50	7	18	8	13
Queue Length 95th (ft)	6	54	18	132	21	46	24	35
Internal Link Dist (ft)		837		420		5201		5188
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	439	1114	675	1105	623	900	564	903
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.24	0.09	0.51	0.08	0.21	0.11	0.14

Intersection Summary



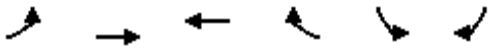
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	53	561	30	832	4	181	62	117
v/c Ratio	0.14	0.40	0.05	0.61	0.02	0.53	0.37	0.35
Control Delay	5.0	5.2	3.9	7.7	17.8	17.7	25.7	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	5.2	3.9	7.7	17.8	17.7	25.7	16.6
Queue Length 50th (ft)	4	59	2	108	1	29	17	21
Queue Length 95th (ft)	19	143	11	276	7	75	46	57
Internal Link Dist (ft)		5180		420		5199		5201
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	371	1398	583	1364	383	558	302	561
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.40	0.05	0.61	0.01	0.32	0.21	0.21

Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	141	390	50	540	12	148	24	256
v/c Ratio	0.31	0.35	0.09	0.50	0.06	0.36	0.09	0.52
Control Delay	7.6	5.9	5.0	7.3	11.3	10.3	11.5	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	5.9	5.0	7.3	11.3	10.3	11.5	8.6
Queue Length 50th (ft)	11	31	3	47	2	15	4	12
Queue Length 95th (ft)	46	89	16	135	10	44	15	51
Internal Link Dist (ft)		420		5100		5198		5188
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	449	1104	578	1085	437	826	559	849
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.35	0.09	0.50	0.03	0.18	0.04	0.30

Intersection Summary



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	121	276	330	224	177	113
v/c Ratio	0.19	0.24	0.28	0.20	0.43	0.25
Control Delay	6.3	5.8	6.0	1.7	14.9	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	5.8	6.0	1.7	14.9	4.4
Queue Length 50th (ft)	10	24	30	0	29	0
Queue Length 95th (ft)	36	65	79	22	63	22
Internal Link Dist (ft)		1482	2578		5231	
Turn Bay Length (ft)	250			250	250	
Base Capacity (vph)	653	1165	1176	1094	598	614
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.24	0.28	0.20	0.30	0.18

Intersection Summary

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Rimrock	Yield	117	191	131	131	751	1062	1000	0.1116	0.1937
2	62nd	None	733		154		285	1044		0.7208	
3	Rimrock	None	248		794		93	606		0.4209	
4	62nd	None	180		702		340	749		0.2459	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Rimrock	Yield	3.62	4.40	4.10	0.35	0.71	A	A	A
2	62nd	None	10.09		10.09	7.13		B		B
3	Rimrock	None	8.21		8.21	1.92		A		A
4	62nd	None	5.93		5.93	0.96		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Rimrock	Yield	85	498	205	205	475	1092	996	0.0788	0.5103
2	62nd	None	479		150		638	1095		0.4450	
3	Rimrock	None	93		504		125	846		0.1118	
4	62nd	None	238		442		155	973		0.2489	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Rimrock	Yield	3.51	7.15	6.62	0.25	3.21	A	A	A
2	62nd	None	5.59		5.59	2.35		A		A
3	Rimrock	None	4.46		4.46	0.36		A		A
4	62nd	None	4.85		4.85	1.01		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Rimrock	Yield	465	51	20	20	1194	1120	1058	0.4214	0.0488
2	54th	None	342		472		64	879		0.3971	
3	Rimrock	None	898		496		318	1456		0.6284	
4	54th	None	196		1018		376	745		0.2693	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Rimrock	Yield	5.09	3.54	4.94	2.05	0.15	A	A	A
2	54th	None	6.22		6.22	1.92		A		A
3	Rimrock	None	5.21		5.21	4.49		A		A
4	54th	None	6.14		6.14	1.09		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Rimrock	Yield	754	226	101	101	781	1147	1049	0.6731	0.2184
2	54th	None	212		768		313	769		0.2821	
3	Rimrock	None	508		350		630	1821		0.2823	
4	54th	None	270		612		246	987		0.2782	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Rimrock	Yield	8.89	4.32	7.84	6.34	0.83	A	A	A
2	54th	None	6.24		6.24	1.21		A		A
3	Rimrock	None	2.70		2.70	1.19		A		A
4	54th	None	4.96		4.96	1.17		A		A

Operational Results

2017 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	62nd St West	None	458		162		177	1021		0.4609	
2	Grand Avenue	None	460		328		292	936		0.5081	
3	Grand Avenue	None	237		102		686	1053		0.2304	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	62nd St West	None	5.90		5.90	2.41		A		A
2	Grand Avenue	None	7.01		7.01	2.95		A		A
3	Grand Avenue	None	4.13		4.13	0.84		A		A

Operational Results

2017 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	62nd St West	None	261		297		311	952		0.2819	
2	Grand Avenue	None	357		159		399	1023		0.3580	
3	Grand Avenue	None	499		109		407	1049		0.4889	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	62nd St West	None	4.88		4.88	1.12		A		A
2	Grand Avenue	None	5.03		5.03	1.57		A		A
3	Grand Avenue	None	6.02		6.02	2.68		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th Street West	None	168		732		330	727		0.2410	
2	Grand Avenue	None	490		55		845	1077		0.4669	
3	Grand Avenue	Yield	732	210	120	120	425	1043	994	0.7282	0.2164

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th Street West	None	6.12		6.12	0.94		A		A
2	Grand Avenue	None	5.65		5.65	2.44		A		A
3	Grand Avenue	Yield	10.42	4.58	9.12	7.29	0.82	B	A	A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th Street West	None	304		401		231	898		0.3494	
2	Grand Avenue	None	624		187		518	1009		0.6400	
3	Grand Avenue	Yield	401	114	117	117	694	1045	996	0.3937	0.1171

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th Street West	None	5.67		5.67	1.54		A		A
2	Grand Avenue	None	8.54		8.54	4.97		A		A
3	Grand Avenue	Yield	5.18	4.06	4.94	1.82	0.39	A	A	A

Operational Results

2017 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	54th St West	None	605		319		167	996		0.6287	
2	Grand Avenue	None	852		424		500	1611		0.5453	
3	Grand Avenue	None	406		80		1196	2100		0.1971	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	54th St West	None	8.42		8.42	4.76		A		A
2	Grand Avenue	None	4.89		4.89	3.92		A		A
3	Grand Avenue	None	2.54		2.54	0.88		A		A

Operational Results

2017 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	54th St West	None	325		523		374	925		0.3619	
2	Grand Avenue	None	518		224		624	1811		0.2926	
3	Grand Avenue	None	815		82		660	2098		0.3973	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	54th St West	None	5.60		5.60	1.62		A		A
2	Grand Avenue	None	3.10		3.10	1.40		A		A
3	Grand Avenue	None	4.05		4.05	2.85		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	48th Street West	None	324		1241		257	658		0.5219	
2	Grand Avenue	None	659		32		1533	2002		0.3356	
3	Grand Avenue	None	1405		93		598	2087		0.6909	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	48th Street West	None	10.42		10.42	3.39		B		B
2	Grand Avenue	None	2.91		2.91	1.65		A		A
3	Grand Avenue	None	5.44		5.44	7.17		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	48th Street West	None	233		665		298	865		0.2780	
2	Grand Avenue	None	1091		121		777	1913		0.5848	
3	Grand Avenue	None	740		223		989	1953		0.3875	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	48th Street West	None	5.35		5.35	1.11		A		A
2	Grand Avenue	None	5.04		5.04	4.98		A		A
3	Grand Avenue	None	3.08		3.08	2.01		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th	None	330		216		123	1017		0.3296	
2	Central	None	199		400		146	916		0.2208	
3	56th	None	172		309		290	822		0.2126	
4	Central	None	243		96		385	1066		0.2310	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th	None	4.90		4.90	1.40		A		A
2	Central	None	4.72		4.72	0.81		A		A
3	56th	None	4.72		4.72	0.69		A		A
4	Central	None	4.10		4.10	0.84		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th	None	299		260		307	1062		0.2859	
2	Central	None	116		377		182	975		0.1207	
3	56th	None	245		327		166	935		0.2662	
4	Central	None	394		173		399	1120		0.3574	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th	None	4.62		4.62	1.19		A		A
2	Central	None	4.06		4.06	0.40		A		A
3	56th	None	4.80		4.80	1.02		A		A
4	Central	None	4.90		4.90	1.68		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Central	None	221		97		746	1079		0.2076	
2	48th	None	322		182		136	1030		0.3175	
3	Central	None	623		326		178	814		0.7899	
4	48th	None	123		720		229	721		0.1744	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Central	None	3.96		3.96	0.74		A		A
2	48th	None	4.74		4.74	1.32		A		A
3	Central	None	12.15		12.15	7.53		B		B
4	48th	None	5.66		5.66	0.63		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Central	None	564		178		321	1106		0.5197	
2	48th	None	164		515		227	902		0.1849	
3	Central	None	255		198		481	999		0.2591	
4	48th	None	215		284		169	1057		0.2064	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Central	None	6.47		6.47	3.29		A		A
2	48th	None	4.71		4.71	0.67		A		A
3	Central	None	4.46		4.46	0.97		A		A
4	48th	None	4.23		4.23	0.78		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	King	None	351		269		495	983		0.3632	
2	64th	None	192		335		285	950		0.2052	
3	King	None	646		202		325	870		0.7640	
4	64th	None	188		576		272	797		0.2408	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	King	None	5.32		5.32	1.63		A		A
2	64th	None	4.47		4.47	0.74		A		A
3	King	None	10.68		10.68	6.63		B		B
4	64th	None	5.54		5.54	0.93		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	King	None	531		221		405	1080		0.5013	
2	64th	None	252		486		266	918		0.2797	
3	King	None	478		136		602	1029		0.4725	
4	64th	None	144		482		132	943		0.1553	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	King	None	6.40		6.40	3.06		A		A
2	64th	None	5.21		5.21	1.16		A		A
3	King	None	5.86		5.86	2.47		A		A
4	64th	None	4.46		4.46	0.56		A		A

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	58	25	202	107	45	262
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	3	0	0	1
Mvmt Flow	64	28	224	119	50	291

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	675	284	0	0	343	0
Stage 1	284	-	-	-	-	-
Stage 2	391	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	422	760	-	-	1227	-
Stage 1	769	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	401	760	-	-	1227	-
Mov Cap-2 Maneuver	401	-	-	-	-	-
Stage 1	769	-	-	-	-	-
Stage 2	654	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.6	0	1.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	468	1227	-
HCM Lane V/C Ratio	-	-	0.197	0.041	-
HCM Control Delay (s)	-	-	14.6	8.1	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-

Intersection	
Int Delay, s/veh	23.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	105	186	10	4	54	136	0	112	17	116	50	39
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	6	0	0	8	2	0	6	0	2	0	0
Mvmt Flow	117	207	11	4	60	151	0	124	19	129	56	43

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	574	478	77	578	491	134	99	0	0	143	0	0
Stage 1	335	335	-	134	134	-	-	-	-	-	-	-
Stage 2	239	143	-	444	357	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.56	6.2	7.1	6.58	6.22	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.56	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.054	3.3	3.5	4.072	3.318	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	433	481	990	430	470	915	1507	-	-	1440	-	-
Stage 1	683	635	-	874	774	-	-	-	-	-	-	-
Stage 2	769	771	-	597	618	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	299	435	990	249	425	915	1507	-	-	1440	-	-
Mov Cap-2 Maneuver	299	435	-	249	425	-	-	-	-	-	-	-
Stage 1	683	575	-	874	774	-	-	-	-	-	-	-
Stage 2	592	771	-	342	559	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	53.5	13	0	4.4
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1507	-	-	382	665	1440	-	-
HCM Lane V/C Ratio	-	-	-	0.876	0.324	0.09	-	-
HCM Control Delay (s)	0	-	-	53.5	13	7.7	0	-
HCM Lane LOS	A	-	-	F	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	8.6	1.4	0.3	-	-

Intersection	
Int Delay, s/veh	10.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	43	413	2	14	183	17	5	31	37	118	27	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	6	3	100	0	7	0	0	0	0	0	0	0
Mvmt Flow	48	459	2	16	203	19	6	34	41	131	30	48

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	222	0	0	461	0	0	839	809	460	837	801	213
Stage 1	-	-	-	-	-	-	556	556	-	244	244	-
Stage 2	-	-	-	-	-	-	283	253	-	593	557	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.254	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1324	-	-	1111	-	-	288	317	605	288	320	832
Stage 1	-	-	-	-	-	-	519	516	-	764	708	-
Stage 2	-	-	-	-	-	-	728	701	-	496	515	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1324	-	-	1111	-	-	239	297	605	233	299	832
Mov Cap-2 Maneuver	-	-	-	-	-	-	239	297	-	233	299	-
Stage 1	-	-	-	-	-	-	494	491	-	727	697	-
Stage 2	-	-	-	-	-	-	646	690	-	409	490	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.7	0.5	16.6	43.8
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	392	1324	-	-	1111	-	-	290
HCM Lane V/C Ratio	0.207	0.036	-	-	0.014	-	-	0.72
HCM Control Delay (s)	16.6	7.8	0	-	8.3	0	-	43.8
HCM Lane LOS	C	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.8	0.1	-	-	0	-	-	5.1

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	40	62	0	2	52	12	0	68	12	14	36	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	5	7	0	0	12	0	0	3	0	0	0	0
Mvmt Flow	44	69	0	2	58	13	0	76	13	16	40	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	198	169	49	196	171	82	58	0	0	89	0	0
Stage 1	80	80	-	82	82	-	-	-	-	-	-	-
Stage 2	118	89	-	114	89	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.57	6.2	7.1	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.57	-	6.1	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.063	3.3	3.5	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	754	715	1025	767	704	983	1559	-	-	1519	-	-
Stage 1	921	819	-	931	808	-	-	-	-	-	-	-
Stage 2	879	811	-	896	802	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	691	707	1025	704	696	983	1559	-	-	1519	-	-
Mov Cap-2 Maneuver	691	707	-	704	696	-	-	-	-	-	-	-
Stage 1	921	810	-	931	808	-	-	-	-	-	-	-
Stage 2	805	811	-	811	793	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	10.4	0	1.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1559	-	-	701	735	1519	-	-
HCM Lane V/C Ratio	-	-	-	0.162	0.1	0.01	-	-
HCM Control Delay (s)	0	-	-	11.1	10.4	7.4	0	-
HCM Lane LOS	A	-	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.3	0	-	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	4	84	6	27	54	4	8	87	17	22	130	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	7	12	0	0	5	13	0	0	0
Mvmt Flow	4	93	7	30	60	4	9	97	19	24	144	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	352	329	147	370	322	106	149	0	0	116	0	0
Stage 1	196	196	-	124	124	-	-	-	-	-	-	-
Stage 2	156	133	-	246	198	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.17	6.62	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.17	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.563	4.108	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	607	585	905	577	579	954	1445	-	-	1485	-	-
Stage 1	810	733	-	868	774	-	-	-	-	-	-	-
Stage 2	851	781	-	747	719	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	545	570	905	491	565	954	1445	-	-	1485	-	-
Mov Cap-2 Maneuver	545	570	-	491	565	-	-	-	-	-	-	-
Stage 1	804	720	-	862	769	-	-	-	-	-	-	-
Stage 2	775	776	-	634	706	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	12.9	0.5	1.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1445	-	-	583	549	1485	-	-
HCM Lane V/C Ratio	0.006	-	-	0.179	0.172	0.016	-	-
HCM Control Delay (s)	7.5	0	-	12.5	12.9	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.6	0.1	-	-

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	170	0	17	67	13	4	14	62	15	8	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	3	0	0	13	0	0	0	3	14	25	0
Mvmt Flow	2	189	0	19	74	14	4	16	69	17	9	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	89	0	0	189	0	0	323	320	189	355	312	82
Stage 1	-	-	-	-	-	-	193	193	-	119	119	-
Stage 2	-	-	-	-	-	-	130	127	-	236	193	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.23	7.24	6.75	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.24	5.75	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.327	3.626	4.225	3.3
Pot Cap-1 Maneuver	1519	-	-	1397	-	-	634	600	850	578	567	983
Stage 1	-	-	-	-	-	-	813	745	-	857	755	-
Stage 2	-	-	-	-	-	-	878	795	-	741	700	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1519	-	-	1397	-	-	611	591	850	515	559	983
Mov Cap-2 Maneuver	-	-	-	-	-	-	611	591	-	515	559	-
Stage 1	-	-	-	-	-	-	812	744	-	856	744	-
Stage 2	-	-	-	-	-	-	845	784	-	666	699	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.3	10.2	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	775	1519	-	-	1397	-	-	622
HCM Lane V/C Ratio	0.115	0.001	-	-	0.014	-	-	0.061
HCM Control Delay (s)	10.2	7.4	0	-	7.6	0	-	11.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	6.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	225	118	193	94	48	165
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	5	4	1	2	9	0
Mvmt Flow	250	131	214	104	53	183

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	381	0	849	316
Stage 1	-	-	-	-	316	-
Stage 2	-	-	-	-	533	-
Critical Hdwy	-	-	4.11	-	6.49	6.2
Critical Hdwy Stg 1	-	-	-	-	5.49	-
Critical Hdwy Stg 2	-	-	-	-	5.49	-
Follow-up Hdwy	-	-	2.209	-	3.581	3.3
Pot Cap-1 Maneuver	-	-	1183	-	322	729
Stage 1	-	-	-	-	724	-
Stage 2	-	-	-	-	575	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1183	-	260	729
Mov Cap-2 Maneuver	-	-	-	-	260	-
Stage 1	-	-	-	-	724	-
Stage 2	-	-	-	-	465	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5.9	17.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	518	-	-	1183	-
HCM Lane V/C Ratio	0.457	-	-	0.181	-
HCM Control Delay (s)	17.7	-	-	8.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	2.4	-	-	0.7	-

Intersection	
Intersection Delay, s/veh	17.4
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	19	306	27	0	35	174	14	0	45	110	49
Peak Hour Factor	0.92	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.92	0.90	0.90	0.90
Heavy Vehicles, %	2	0	4	0	2	27	4	0	2	0	2	5
Mvmt Flow	0	21	340	30	0	39	193	16	0	50	122	54
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	20.8	16.2	14.3
HCM LOS	C	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	22%	5%	16%	30%
Vol Thru, %	54%	87%	78%	58%
Vol Right, %	24%	8%	6%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	204	352	223	252
LT Vol	45	19	35	75
Through Vol	110	306	174	145
RT Vol	49	27	14	32
Lane Flow Rate	227	391	248	280
Geometry Grp	1	1	1	1
Degree of Util (X)	0.414	0.668	0.476	0.507
Departure Headway (Hd)	6.577	6.147	6.913	6.516
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	544	587	520	552
Service Time	4.65	4.208	4.983	4.583
HCM Lane V/C Ratio	0.417	0.666	0.477	0.507
HCM Control Delay	14.3	20.8	16.2	16.2
HCM Lane LOS	B	C	C	C
HCM 95th-tile Q	2	5	2.5	2.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	75	145	32
Peak Hour Factor	0.92	0.90	0.90	0.90
Heavy Vehicles, %	2	0	2	7
Mvmt Flow	0	83	161	36
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	16.2
HCM LOS	C

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	191	110	87	60	235	45	109	70	669	226	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1845	1462	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	8	212	122	97	67	261	50	121	78	743	251	11
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	3	30	0	0	0	0	0	0	0
Cap, veh/h	381	318	183	237	410	1032	372	176	114	837	875	38
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.04	0.16	0.16	0.36	0.48	0.48
Sat Flow, veh/h	1069	1133	652	1032	1462	1615	1810	1081	697	1810	1807	79
Grp Volume(v), veh/h	8	0	334	97	67	261	50	0	199	743	0	262
Grp Sat Flow(s),veh/h/ln	1069	0	1785	1032	1462	1615	1810	0	1777	1810	0	1886
Q Serve(g_s), s	0.3	0.0	10.0	5.6	2.1	4.2	1.4	0.0	6.4	18.8	0.0	5.0
Cycle Q Clear(g_c), s	2.4	0.0	10.0	15.6	2.1	4.2	1.4	0.0	6.4	18.8	0.0	5.0
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.39	1.00		0.04
Lane Grp Cap(c), veh/h	381	0	500	237	410	1032	372	0	290	837	0	913
V/C Ratio(X)	0.02	0.00	0.67	0.41	0.16	0.25	0.13	0.00	0.69	0.89	0.00	0.29
Avail Cap(c_a), veh/h	381	0	500	237	410	1032	423	0	498	904	0	1151
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	19.3	26.2	16.5	4.7	19.9	0.0	23.9	11.2	0.0	9.4
Incr Delay (d2), s/veh	0.0	0.0	3.4	1.1	0.2	0.1	0.2	0.0	2.9	10.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	5.4	1.7	0.9	1.9	0.7	0.0	3.4	11.5	0.0	2.7
LnGrp Delay(d),s/veh	17.4	0.0	22.7	27.4	16.6	4.8	20.1	0.0	26.8	21.4	0.0	9.5
LnGrp LOS	B		C	C	B	A	C		C	C		A
Approach Vol, veh/h		342			425			249			1005	
Approach Delay, s/veh		22.6			11.8			25.4			18.3	
Approach LOS		C			B			C			B	

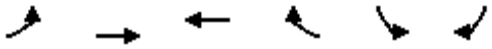
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	25.7	13.9		21.0	6.3	33.4		21.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	24.0	17.0		17.0	4.0	37.0		17.0
Max Q Clear Time (g_c+I1), s	20.8	8.4		12.0	3.4	7.0		17.6
Green Ext Time (p_c), s	0.9	1.5		1.6	0.0	2.4		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	18.5
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1070	71	205	393	64	28	16	172	231	200	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1840	1900	1624	1707	1900	1429	1698	1900	1881	1817	1900
Adj Flow Rate, veh/h	0	1189	79	228	437	71	31	18	191	257	222	6
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	3	3	17	11	11	33	0	0	1	2	2
Cap, veh/h	473	1348	89	299	1598	258	244	23	245	289	404	11
Arrive On Green	0.00	0.40	0.40	0.11	0.57	0.57	0.03	0.18	0.18	0.07	0.23	0.23
Sat Flow, veh/h	1810	3328	221	1547	2798	452	1361	126	1336	1792	1761	48
Grp Volume(v), veh/h	0	624	644	228	252	256	31	0	209	257	0	228
Grp Sat Flow(s),veh/h/ln	1810	1748	1801	1547	1622	1628	1361	0	1462	1792	0	1808
Q Serve(g_s), s	0.0	22.8	22.9	5.5	5.5	5.5	1.3	0.0	9.4	5.0	0.0	7.7
Cycle Q Clear(g_c), s	0.0	22.8	22.9	5.5	5.5	5.5	1.3	0.0	9.4	5.0	0.0	7.7
Prop In Lane	1.00		0.12	1.00		0.28	1.00		0.91	1.00		0.03
Lane Grp Cap(c), veh/h	473	708	729	299	926	929	244	0	268	289	0	415
V/C Ratio(X)	0.00	0.88	0.88	0.76	0.27	0.28	0.13	0.00	0.78	0.89	0.00	0.55
Avail Cap(c_a), veh/h	576	708	729	333	926	929	287	0	360	289	0	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	19.0	19.1	14.7	7.5	7.5	22.3	0.0	26.9	26.0	0.0	23.5
Incr Delay (d2), s/veh	0.0	14.8	14.6	8.9	0.7	0.7	0.2	0.0	7.6	26.8	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	13.8	14.2	3.0	2.6	2.7	0.5	0.0	4.3	4.5	0.0	3.9
LnGrp Delay(d),s/veh	0.0	33.8	33.6	23.6	8.3	8.3	22.5	0.0	34.5	52.8	0.0	24.6
LnGrp LOS		C	C	C	A	A	C		C	D		C
Approach Vol, veh/h		1268			736			240			485	
Approach Delay, s/veh		33.7			13.0			33.0			39.6	
Approach LOS		C			B			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	16.7	11.5	32.0	5.8	19.9	0.0	43.5
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	17.0	9.0	28.0	4.0	18.0	4.0	33.0
Max Q Clear Time (g_c+I1), s	7.0	11.4	7.5	24.9	3.3	9.7	0.0	7.5
Green Ext Time (p_c), s	0.0	1.2	0.1	2.4	0.0	1.6	0.0	11.9

Intersection Summary	
HCM 2010 Ctrl Delay	29.1
HCM 2010 LOS	C



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	103	1009	399	112	549	233
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1462	1863	1727	1557	1845	1792
Adj Flow Rate, veh/h	114	1121	443	124	610	259
Adj No. of Lanes	1	2	2	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	30	2	10	22	3	6
Cap, veh/h	395	1698	1120	971	689	705
Arrive On Green	0.07	0.48	0.34	0.34	0.39	0.39
Sat Flow, veh/h	1392	3632	3368	1324	1757	1524
Grp Volume(v), veh/h	114	1121	443	124	610	259
Grp Sat Flow(s),veh/h/ln	1392	1770	1641	1324	1757	1524
Q Serve(g_s), s	2.5	12.4	5.3	1.4	16.6	5.7
Cycle Q Clear(g_c), s	2.5	12.4	5.3	1.4	16.6	5.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	395	1698	1120	971	689	705
V/C Ratio(X)	0.29	0.66	0.40	0.13	0.89	0.37
Avail Cap(c_a), veh/h	419	1698	1120	971	809	809
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.1	10.2	12.9	2.0	14.6	9.0
Incr Delay (d2), s/veh	0.4	2.0	1.0	0.3	10.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	6.4	2.6	1.3	9.9	5.7
LnGrp Delay(d),s/veh	9.5	12.2	14.0	2.3	25.0	9.3
LnGrp LOS	A	B	B	A	C	A
Approach Vol, veh/h		1235	567		869	
Approach Delay, s/veh		12.0	11.4		20.3	
Approach LOS		B	B		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				28.0		23.5	7.1	20.9
Change Period (Y+Rc), s				* 3.3		3.3	3.5	* 3.3
Max Green Setting (Gmax), s				* 25		23.7	4.5	* 17
Max Q Clear Time (g_c+I1), s				14.4		18.6	4.5	7.3
Green Ext Time (p_c), s				6.7		1.5	0.0	6.3

Intersection Summary	
HCM 2010 Ctrl Delay	14.6
HCM 2010 LOS	B

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	939	267	152	476	70	144
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1696	1743	1827	1520
Adj Flow Rate, veh/h	1043	297	169	529	78	160
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	12	9	4	25
Cap, veh/h	1213	1031	316	1379	127	181
Arrive On Green	0.65	0.65	0.07	0.79	0.07	0.07
Sat Flow, veh/h	1863	1583	1616	1743	1740	1292
Grp Volume(v), veh/h	1043	297	169	529	78	160
Grp Sat Flow(s),veh/h/ln	1863	1583	1616	1743	1740	1292
Q Serve(g_s), s	24.4	4.4	1.6	5.0	2.4	4.0
Cycle Q Clear(g_c), s	24.4	4.4	1.6	5.0	2.4	4.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1213	1031	316	1379	127	181
V/C Ratio(X)	0.86	0.29	0.53	0.38	0.62	0.88
Avail Cap(c_a), veh/h	1213	1031	325	1379	127	181
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.6	4.1	12.3	1.7	24.8	23.2
Incr Delay (d2), s/veh	8.1	0.7	1.6	0.8	8.7	36.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.9	2.1	1.9	2.7	1.5	4.2
LnGrp Delay(d),s/veh	15.7	4.8	13.9	2.5	33.4	59.9
LnGrp LOS	B	A	B	A	C	E
Approach Vol, veh/h	1340			698	238	
Approach Delay, s/veh	13.3			5.3	51.2	
Approach LOS	B			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		8.0	7.7	39.3				47.0
Change Period (Y+Rc), s		4.0	4.0	3.5				3.5
Max Green Setting (Gmax), s		4.0	4.0	35.5				43.5
Max Q Clear Time (g_c+I1), s		6.0	3.6	26.4				7.0
Green Ext Time (p_c), s		0.0	0.0	6.6				16.3

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1607	209	119	733	41	372
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1792	1776	1881
Adj Flow Rate, veh/h	1786	232	132	814	46	413
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	6	7	1
Cap, veh/h	2017	902	172	1941	474	448
Arrive On Green	0.57	0.57	0.57	0.57	0.28	0.28
Sat Flow, veh/h	3632	1583	211	3495	1691	1599
Grp Volume(v), veh/h	1786	232	132	814	46	413
Grp Sat Flow(s),veh/h/ln	1770	1583	211	1703	1691	1599
Q Serve(g_s), s	21.9	3.7	6.6	6.8	1.0	12.5
Cycle Q Clear(g_c), s	21.9	3.7	28.5	6.8	1.0	12.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2017	902	172	1941	474	448
V/C Ratio(X)	0.89	0.26	0.77	0.42	0.10	0.92
Avail Cap(c_a), veh/h	2017	902	172	1941	474	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.3	5.4	24.3	6.1	13.3	17.5
Incr Delay (d2), s/veh	6.2	0.7	27.5	0.7	0.1	24.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	1.8	3.1	3.2	0.5	8.6
LnGrp Delay(d),s/veh	15.5	6.1	51.8	6.7	13.4	42.1
LnGrp LOS	B	A	D	A	B	D
Approach Vol, veh/h	2018			946	459	
Approach Delay, s/veh	14.4			13.0	39.2	
Approach LOS	B			B	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		18.0		32.0				32.0
Change Period (Y+Rc), s		4.0		3.5				3.5
Max Green Setting (Gmax), s		14.0		28.5				28.5
Max Q Clear Time (g_c+I1), s		14.5		23.9				30.5
Green Ext Time (p_c), s		0.0		4.4				0.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	32	694	52	21	194	62	13	75	61	174	212	16
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1882	1900	1900	1844	1900	1583	1869	1900	1845	1900	1900
Adj Flow Rate, veh/h	36	771	58	23	216	69	14	83	68	193	236	18
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	1	1	0	4	4	20	3	3	3	0	0
Cap, veh/h	693	1020	77	300	791	253	275	258	212	371	473	36
Arrive On Green	0.59	0.59	0.59	0.59	0.59	0.59	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1112	1729	130	672	1340	428	953	952	780	1219	1744	133
Grp Volume(v), veh/h	36	0	829	23	0	285	14	0	151	193	0	254
Grp Sat Flow(s),veh/h/ln	1112	0	1860	672	0	1769	953	0	1732	1219	0	1877
Q Serve(g_s), s	0.9	0.0	19.0	1.5	0.0	4.5	0.7	0.0	4.0	8.7	0.0	6.6
Cycle Q Clear(g_c), s	5.5	0.0	19.0	20.5	0.0	4.5	7.3	0.0	4.0	12.7	0.0	6.6
Prop In Lane	1.00		0.07	1.00		0.24	1.00		0.45	1.00		0.07
Lane Grp Cap(c), veh/h	693	0	1097	300	0	1043	275	0	470	371	0	509
V/C Ratio(X)	0.05	0.00	0.76	0.08	0.00	0.27	0.05	0.00	0.32	0.52	0.00	0.50
Avail Cap(c_a), veh/h	693	0	1097	300	0	1043	314	0	541	421	0	586
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.1	0.0	8.7	16.3	0.0	5.8	20.8	0.0	16.8	21.8	0.0	17.7
Incr Delay (d2), s/veh	0.1	0.0	4.9	0.5	0.0	0.6	0.1	0.0	0.4	1.1	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	10.9	0.3	0.0	2.4	0.2	0.0	1.9	3.0	0.0	3.5
LnGrp Delay(d),s/veh	7.3	0.0	13.6	16.8	0.0	6.4	20.9	0.0	17.2	23.0	0.0	18.5
LnGrp LOS	A		B	B		A	C		B	C		B
Approach Vol, veh/h		865			308			165			447	
Approach Delay, s/veh		13.3			7.2			17.5			20.4	
Approach LOS		B			A			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		19.6		38.0		19.6		38.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		18.0		34.0		18.0		34.0
Max Q Clear Time (g_c+I1), s		9.3		21.0		14.7		22.5
Green Ext Time (p_c), s		1.9		5.8		1.0		5.4

Intersection Summary	
HCM 2010 Ctrl Delay	14.4
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	766	15	13	523	38	8	47	58	174	89	18
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1357	1760	1900	1429	1791	1900	1900	1900	1900
Adj Flow Rate, veh/h	89	851	17	14	581	42	9	52	64	193	99	20
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	2	2	40	8	8	33	0	0	0	0	0
Cap, veh/h	450	1117	22	253	996	72	315	180	222	370	378	76
Arrive On Green	0.61	0.61	0.61	0.61	0.61	0.61	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	814	1821	36	463	1622	117	972	732	901	1296	1535	310
Grp Volume(v), veh/h	89	0	868	14	0	623	9	0	116	193	0	119
Grp Sat Flow(s),veh/h/ln	814	0	1857	463	0	1740	972	0	1632	1296	0	1845
Q Serve(g_s), s	4.2	0.0	19.3	1.3	0.0	12.3	0.4	0.0	3.3	8.1	0.0	3.0
Cycle Q Clear(g_c), s	16.5	0.0	19.3	20.6	0.0	12.3	3.4	0.0	3.3	11.4	0.0	3.0
Prop In Lane	1.00		0.02	1.00		0.07	1.00		0.55	1.00		0.17
Lane Grp Cap(c), veh/h	450	0	1140	253	0	1068	315	0	402	370	0	454
V/C Ratio(X)	0.20	0.00	0.76	0.06	0.00	0.58	0.03	0.00	0.29	0.52	0.00	0.26
Avail Cap(c_a), veh/h	450	0	1140	253	0	1068	365	0	487	438	0	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.6	0.0	8.0	15.5	0.0	6.6	18.7	0.0	17.5	22.1	0.0	17.3
Incr Delay (d2), s/veh	1.0	0.0	4.8	0.4	0.0	2.3	0.0	0.0	0.4	1.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	11.2	0.2	0.0	6.4	0.1	0.0	1.5	3.0	0.0	1.5
LnGrp Delay(d),s/veh	12.6	0.0	12.8	15.9	0.0	9.0	18.7	0.0	17.8	23.2	0.0	17.6
LnGrp LOS	B		B	B		A	B		B	C		B
Approach Vol, veh/h		957			637			125			312	
Approach Delay, s/veh		12.8			9.1			17.9			21.1	
Approach LOS		B			A			B			C	

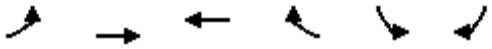
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		18.0		39.0		18.0		39.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		17.0		35.0		17.0		35.0
Max Q Clear Time (g_c+I1), s		5.4		21.3		13.4		22.6
Green Ext Time (p_c), s		1.4		8.0		0.7		7.5

Intersection Summary	
HCM 2010 Ctrl Delay	13.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	187	485	101	123	264	36	17	116	92	18	101	110
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1856	1900	1900	1738	1900	1900	1883	1900	1900	1882	1900
Adj Flow Rate, veh/h	208	539	112	137	293	40	19	129	102	20	112	122
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	2	2	0	8	8	0	0	0	0	2	2
Cap, veh/h	564	763	159	333	766	105	402	318	251	407	269	293
Arrive On Green	0.51	0.51	0.51	0.51	0.51	0.51	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	1064	1492	310	793	1497	204	1165	976	772	1168	825	899
Grp Volume(v), veh/h	208	0	651	137	0	333	19	0	231	20	0	234
Grp Sat Flow(s),veh/h/ln	1064	0	1802	793	0	1702	1165	0	1747	1168	0	1723
Q Serve(g_s), s	7.3	0.0	13.6	7.8	0.0	5.8	0.6	0.0	5.0	0.7	0.0	5.2
Cycle Q Clear(g_c), s	13.1	0.0	13.6	21.4	0.0	5.8	5.8	0.0	5.0	5.7	0.0	5.2
Prop In Lane	1.00		0.17	1.00		0.12	1.00		0.44	1.00		0.52
Lane Grp Cap(c), veh/h	564	0	922	333	0	871	402	0	569	407	0	561
V/C Ratio(X)	0.37	0.00	0.71	0.41	0.00	0.38	0.05	0.00	0.41	0.05	0.00	0.42
Avail Cap(c_a), veh/h	583	0	953	347	0	900	402	0	569	407	0	561
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.3	0.0	9.2	17.4	0.0	7.3	15.2	0.0	12.9	15.1	0.0	12.9
Incr Delay (d2), s/veh	0.4	0.0	2.3	0.8	0.0	0.3	0.2	0.0	2.1	0.2	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	7.3	1.8	0.0	2.7	0.2	0.0	2.8	0.2	0.0	2.8
LnGrp Delay(d),s/veh	11.7	0.0	11.5	18.2	0.0	7.6	15.4	0.0	15.0	15.3	0.0	15.2
LnGrp LOS	B		B	B		A	B		B	B		B
Approach Vol, veh/h		859			470			250			254	
Approach Delay, s/veh		11.5			10.7			15.1			15.2	
Approach LOS		B			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		20.0		29.1		20.0		29.1
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		26.0		16.0		26.0
Max Q Clear Time (g_c+I1), s		7.8		15.6		7.7		23.4
Green Ext Time (p_c), s		1.7		5.3		1.7		1.7

Intersection Summary	
HCM 2010 Ctrl Delay	12.3
HCM 2010 LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	127	448	203	95	414	161
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1792	1810	1827	1743	1881	1810
Adj Flow Rate, veh/h	141	498	226	106	460	179
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	6	5	4	9	1	5
Cap, veh/h	591	869	878	712	568	488
Arrive On Green	0.48	0.48	0.48	0.48	0.32	0.32
Sat Flow, veh/h	1004	1810	1827	1482	1792	1538
Grp Volume(v), veh/h	141	498	226	106	460	179
Grp Sat Flow(s),veh/h/ln	1004	1810	1827	1482	1792	1538
Q Serve(g_s), s	3.8	7.8	2.9	1.6	9.3	3.6
Cycle Q Clear(g_c), s	6.7	7.8	2.9	1.6	9.3	3.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	591	869	878	712	568	488
V/C Ratio(X)	0.24	0.57	0.26	0.15	0.81	0.37
Avail Cap(c_a), veh/h	591	869	878	712	816	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.1	7.4	6.1	5.7	12.4	10.4
Incr Delay (d2), s/veh	1.0	2.7	0.7	0.4	4.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	4.5	1.6	1.8	5.2	1.6
LnGrp Delay(d),s/veh	9.0	10.1	6.8	6.2	16.5	10.9
LnGrp LOS	A	B	A	A	B	B
Approach Vol, veh/h		639	332		639	
Approach Delay, s/veh		9.9	6.6		14.9	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				23.0		16.5		23.0
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				19.0		18.0		19.0
Max Q Clear Time (g_c+I1), s				9.8		11.3		4.9
Green Ext Time (p_c), s				3.4		1.2		4.3

Intersection Summary	
HCM 2010 Ctrl Delay	11.2
HCM 2010 LOS	B



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	8	334	97	67	261	50	199	743	262
v/c Ratio	0.02	0.71	0.69	0.19	0.22	0.15	0.55	0.88	0.26
Control Delay	19.4	28.9	51.4	21.0	1.2	10.4	24.7	22.9	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	28.9	51.4	21.0	1.2	10.4	24.7	22.9	9.3
Queue Length 50th (ft)	2	101	33	20	0	7	55	167	56
Queue Length 95th (ft)	13	#223	#112	53	21	17	112	#379	97
Internal Link Dist (ft)		919		4037			5231		921
Turn Bay Length (ft)	250		250		250	250		250	
Base Capacity (vph)	402	561	169	434	1257	331	562	906	1223
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.60	0.57	0.15	0.21	0.15	0.35	0.82	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

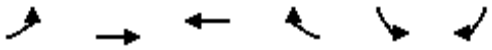


Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1268	228	508	31	209	257	228
v/c Ratio	0.88	0.77	0.26	0.15	0.59	1.02	0.54
Control Delay	28.8	32.3	7.0	19.2	14.2	88.4	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	32.3	7.0	19.2	14.2	88.4	28.8
Queue Length 50th (ft)	224	41	36	10	14	~94	77
Queue Length 95th (ft)	#446	#179	85	27	69	#223	158
Internal Link Dist (ft)	1084		924		5202		920
Turn Bay Length (ft)		250		250		250	
Base Capacity (vph)	1439	299	1934	202	496	252	482
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.76	0.26	0.15	0.42	1.02	0.47

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	114	1121	443	124	610	259
v/c Ratio	0.36	0.67	0.42	0.12	0.87	0.28
Control Delay	12.7	13.9	16.3	0.6	29.5	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	13.9	16.3	0.6	29.5	3.4
Queue Length 50th (ft)	21	145	60	0	165	13
Queue Length 95th (ft)	47	208	95	5	#332	39
Internal Link Dist (ft)		1579	867		5202	
Turn Bay Length (ft)	250			250	250	
Base Capacity (vph)	319	1668	1046	1125	792	912
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.67	0.42	0.11	0.77	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1043	297	169	529	78	160
v/c Ratio	0.82	0.25	0.67	0.36	0.63	0.46
Control Delay	15.5	1.2	21.6	2.4	51.1	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	1.2	21.6	2.4	51.1	10.9
Queue Length 50th (ft)	223	0	8	29	26	8
Queue Length 95th (ft)	#514	19	#41	51	#80	49
Internal Link Dist (ft)	884			1579	5173	
Turn Bay Length (ft)		250	250			250
Base Capacity (vph)	1265	1170	251	1451	123	346
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.25	0.67	0.36	0.63	0.46

Intersection Summary

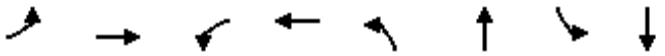
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1786	232	132	814	46	413
v/c Ratio	0.88	0.23	0.89	0.42	0.10	0.91
Control Delay	16.7	1.6	69.8	6.9	14.1	45.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	1.6	69.8	6.9	14.1	45.6
Queue Length 50th (ft)	205	0	29	60	10	111
Queue Length 95th (ft)	#380	20	#79	91	29	#255
Internal Link Dist (ft)	2574			424	5188	
Turn Bay Length (ft)		250	250			250
Base Capacity (vph)	2022	1004	148	1946	473	459
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.23	0.89	0.42	0.10	0.90

Intersection Summary

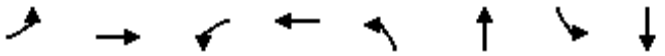
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	36	829	23	285	14	151	193	254
v/c Ratio	0.05	0.72	0.10	0.26	0.08	0.32	0.66	0.56
Control Delay	5.8	13.4	7.0	5.6	16.5	11.8	30.4	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	13.4	7.0	5.6	16.5	11.8	30.4	22.7
Queue Length 50th (ft)	4	162	3	31	4	22	57	71
Queue Length 95th (ft)	15	#365	13	73	15	59	115	129
Internal Link Dist (ft)		1097		420		5201		5188
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	685	1154	242	1114	236	603	389	605
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.72	0.10	0.26	0.06	0.25	0.50	0.42

Intersection Summary

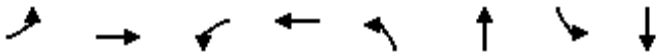
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	89	868	14	623	9	116	193	119
v/c Ratio	0.21	0.73	0.08	0.56	0.04	0.28	0.67	0.28
Control Delay	7.2	13.3	6.8	9.1	16.4	10.7	31.7	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	13.3	6.8	9.1	16.4	10.7	31.7	16.5
Queue Length 50th (ft)	11	174	2	102	2	14	58	28
Queue Length 95th (ft)	35	#406	9	214	11	47	115	63
Internal Link Dist (ft)		5180		420		5199		5201
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	421	1190	172	1119	281	520	374	547
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.73	0.08	0.56	0.03	0.22	0.52	0.22

Intersection Summary

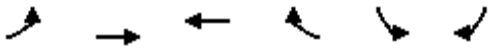
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	208	651	137	333	19	231	20	234
v/c Ratio	0.47	0.78	0.74	0.43	0.05	0.33	0.05	0.33
Control Delay	11.9	17.0	38.1	9.2	11.9	9.6	12.0	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	17.0	38.1	9.2	11.9	9.6	12.0	8.3
Queue Length 50th (ft)	33	119	26	48	3	26	3	21
Queue Length 95th (ft)	74	217	#105	91	15	75	15	67
Internal Link Dist (ft)		420		5100		5198		5203
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	584	1086	242	1021	420	696	423	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.60	0.57	0.33	0.05	0.33	0.05	0.33

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	141	498	226	106	460	179
v/c Ratio	0.28	0.60	0.27	0.14	0.74	0.27
Control Delay	10.1	13.2	9.1	2.9	19.8	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	13.2	9.1	2.9	19.8	3.2
Queue Length 50th (ft)	20	85	32	0	90	0
Queue Length 95th (ft)	53	176	72	19	168	26
Internal Link Dist (ft)		1472	2578		5231	
Turn Bay Length (ft)	250			250	250	
Base Capacity (vph)	508	832	840	738	768	763
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.60	0.27	0.14	0.60	0.23

Intersection Summary

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	80	34	292	56	16	237
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	4	0	1
Mvmt Flow	89	38	324	62	18	263

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	655	356	0	0	387	0
Stage 1	356	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	434	693	-	-	1183	-
Stage 1	713	-	-	-	-	-
Stage 2	757	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	426	693	-	-	1183	-
Mov Cap-2 Maneuver	426	-	-	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	743	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.1	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	481	1183	-
HCM Lane V/C Ratio	-	-	0.263	0.015	-
HCM Control Delay (s)	-	-	15.1	8.1	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	1	0	-

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	37	47	4	19	98	67	2	41	9	42	62	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	50	0	0	0	0	0	0	0	0	0
Mvmt Flow	41	52	4	21	109	74	2	46	10	47	69	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	319	232	78	255	236	51	88	0	0	56	0	0
Stage 1	172	172	-	55	55	-	-	-	-	-	-	-
Stage 2	147	60	-	200	181	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.7	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.75	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	638	672	864	702	668	1023	1520	-	-	1562	-	-
Stage 1	835	760	-	962	853	-	-	-	-	-	-	-
Stage 2	860	849	-	806	754	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	502	650	864	639	646	1023	1520	-	-	1562	-	-
Mov Cap-2 Maneuver	502	650	-	639	646	-	-	-	-	-	-	-
Stage 1	834	736	-	961	852	-	-	-	-	-	-	-
Stage 2	695	848	-	721	730	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.4	11.7	0.3	2.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1520	-	-	584	745	1562	-	-
HCM Lane V/C Ratio	0.001	-	-	0.167	0.274	0.03	-	-
HCM Control Delay (s)	7.4	0	-	12.4	11.7	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	1.1	0.1	-	-

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	24	173	7	28	365	101	2	42	7	17	56	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	1	33	0	0	0	0	0	0	0	4	0
Mvmt Flow	27	192	8	31	406	112	2	47	8	19	62	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	518	0	0	200	0	0	820	829	196	801	777	462
Stage 1	-	-	-	-	-	-	249	249	-	524	524	-
Stage 2	-	-	-	-	-	-	571	580	-	277	253	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.54	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.54	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4.036	3.3
Pot Cap-1 Maneuver	1058	-	-	1384	-	-	296	308	850	305	326	604
Stage 1	-	-	-	-	-	-	759	704	-	540	527	-
Stage 2	-	-	-	-	-	-	509	503	-	734	694	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1058	-	-	1384	-	-	226	289	850	253	306	604
Mov Cap-2 Maneuver	-	-	-	-	-	-	226	289	-	253	306	-
Stage 1	-	-	-	-	-	-	737	684	-	524	510	-
Stage 2	-	-	-	-	-	-	410	487	-	658	674	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	0.4	19	20.7
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	314	1058	-	-	1384	-	-	342
HCM Lane V/C Ratio	0.18	0.025	-	-	0.022	-	-	0.331
HCM Control Delay (s)	19	8.5	0	-	7.7	0	-	20.7
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.1	-	-	1.4

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	12	48	2	10	68	6	0	46	6	0	70	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	9	0	0	6	0	0	0	0	0	0	17
Mvmt Flow	13	53	2	11	76	7	0	51	7	0	78	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	180	142	84	166	145	54	91	0	0	58	0	0
Stage 1	84	84	-	54	54	-	-	-	-	-	-	-
Stage 2	96	58	-	112	91	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.59	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.59	-	6.1	5.56	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.081	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	786	736	981	803	739	1019	1517	-	-	1559	-	-
Stage 1	929	812	-	963	842	-	-	-	-	-	-	-
Stage 2	916	833	-	898	812	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	720	736	981	757	739	1019	1517	-	-	1559	-	-
Mov Cap-2 Maneuver	720	736	-	757	739	-	-	-	-	-	-	-
Stage 1	929	812	-	963	842	-	-	-	-	-	-	-
Stage 2	828	833	-	837	812	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.4	10.4	0	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1517	-	-	739	756	1559	-	-
HCM Lane V/C Ratio	-	-	-	0.093	0.123	-	-	-
HCM Control Delay (s)	0	-	-	10.4	10.4	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.4	0	-	-

Intersection	
Int Delay, s/veh	5.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	13	43	0	19	80	13	4	116	12	19	77	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	0	0	8	0	0	2	0	11	3	0
Mvmt Flow	14	48	0	21	89	14	4	129	13	21	86	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	326	281	88	298	276	136	90	0	0	142	0	0
Stage 1	130	130	-	144	144	-	-	-	-	-	-	-
Stage 2	196	151	-	154	132	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.55	6.2	7.1	6.58	6.2	4.1	-	-	4.21	-	-
Critical Hdwy Stg 1	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.55	-	6.1	5.58	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.045	3.3	3.5	4.072	3.3	2.2	-	-	2.299	-	-
Pot Cap-1 Maneuver	631	622	976	658	621	918	1518	-	-	1387	-	-
Stage 1	878	783	-	864	766	-	-	-	-	-	-	-
Stage 2	810	767	-	853	776	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	544	610	976	610	609	918	1518	-	-	1387	-	-
Mov Cap-2 Maneuver	544	610	-	610	609	-	-	-	-	-	-	-
Stage 1	875	770	-	861	764	-	-	-	-	-	-	-
Stage 2	702	765	-	787	764	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	12.1	0.2	1.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1518	-	-	593	634	1387	-	-
HCM Lane V/C Ratio	0.003	-	-	0.105	0.196	0.015	-	-
HCM Control Delay (s)	7.4	0	-	11.8	12.1	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.7	0	-	-

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	2	90	0	77	138	26	0	25	27	17	37	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	5	0	0	0	0	25	0	0
Mvmt Flow	2	100	0	86	153	29	0	28	30	19	41	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	182	0	0	100	0	0	467	457	100	472	443	168
Stage 1	-	-	-	-	-	-	104	104	-	339	339	-
Stage 2	-	-	-	-	-	-	363	353	-	133	104	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.35	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.35	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.725	4	3.3
Pot Cap-1 Maneuver	1405	-	-	1505	-	-	509	503	961	466	512	881
Stage 1	-	-	-	-	-	-	907	813	-	630	643	-
Stage 2	-	-	-	-	-	-	660	634	-	818	813	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1405	-	-	1505	-	-	448	470	961	410	478	881
Mov Cap-2 Maneuver	-	-	-	-	-	-	448	470	-	410	478	-
Stage 1	-	-	-	-	-	-	905	811	-	629	602	-
Stage 2	-	-	-	-	-	-	571	593	-	764	811	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	2.4	11.2	13.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	640	1405	-	-	1505	-	-	477
HCM Lane V/C Ratio	0.09	0.002	-	-	0.057	-	-	0.14
HCM Control Delay (s)	11.2	7.6	0	-	7.5	0	-	13.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.5

Intersection	
Int Delay, s/veh	10

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	132	60	195	225	87	239
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	2	0	0
Mvmt Flow	147	67	217	250	97	266

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	213	0	863	180
Stage 1	-	-	-	-	180	-
Stage 2	-	-	-	-	683	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1369	-	328	868
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	505	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1369	-	268	868
Mov Cap-2 Maneuver	-	-	-	-	268	-
Stage 1	-	-	-	-	856	-
Stage 2	-	-	-	-	412	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.8	23.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	543	-	-	1369	-
HCM Lane V/C Ratio	0.667	-	-	0.158	-
HCM Control Delay (s)	23.9	-	-	8.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	4.9	-	-	0.6	-

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	16	116	11	0	67	181	84	0	18	134	28
Peak Hour Factor	0.92	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.92	0.90	0.90	0.90
Heavy Vehicles, %	2	0	2	0	2	0	0	0	2	0	0	0
Mvmt Flow	0	18	129	12	0	74	201	93	0	20	149	31
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.1	13.2	10.9
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	11%	20%	15%
Vol Thru, %	74%	81%	55%	85%
Vol Right, %	16%	8%	25%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	180	143	332	126
LT Vol	18	16	67	19
Through Vol	134	116	181	107
RT Vol	28	11	84	0
Lane Flow Rate	200	159	369	140
Geometry Grp	1	1	1	1
Degree of Util (X)	0.303	0.238	0.512	0.22
Departure Headway (Hd)	5.452	5.389	5	5.66
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	658	666	719	633
Service Time	3.492	3.431	3.034	3.703
HCM Lane V/C Ratio	0.304	0.239	0.513	0.221
HCM Control Delay	10.9	10.1	13.2	10.3
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.3	0.9	2.9	0.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	19	107	0
Peak Hour Factor	0.92	0.90	0.90	0.90
Heavy Vehicles, %	2	0	2	0
Mvmt Flow	0	21	119	0
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	10.3
HCM LOS	B

Lane

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	191	38	39	68	613	80	174	42	467	117	7
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1845	1845	1900	1900	1830	1900
Adj Flow Rate, veh/h	0	212	42	43	76	681	89	193	47	519	130	8
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	3	2	2	0	2	2
Cap, veh/h	142	488	97	380	601	929	474	269	65	681	664	41
Arrive On Green	0.00	0.32	0.32	0.32	0.32	0.32	0.06	0.19	0.19	0.26	0.39	0.39
Sat Flow, veh/h	719	1541	305	1143	1900	1615	1757	1434	349	1810	1707	105
Grp Volume(v), veh/h	0	0	254	43	76	681	89	0	240	519	0	138
Grp Sat Flow(s),veh/h/ln	719	0	1846	1143	1900	1615	1757	0	1783	1810	0	1812
Q Serve(g_s), s	0.0	0.0	5.5	1.6	1.4	15.7	2.0	0.0	6.4	10.5	0.0	2.5
Cycle Q Clear(g_c), s	0.0	0.0	5.5	7.1	1.4	15.7	2.0	0.0	6.4	10.5	0.0	2.5
Prop In Lane	1.00		0.17	1.00		1.00	1.00		0.20	1.00		0.06
Lane Grp Cap(c), veh/h	142	0	584	380	601	929	474	0	334	681	0	705
V/C Ratio(X)	0.00	0.00	0.43	0.11	0.13	0.73	0.19	0.00	0.72	0.76	0.00	0.20
Avail Cap(c_a), veh/h	142	0	584	380	601	929	513	0	565	786	0	1004
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	13.7	16.5	12.3	7.9	15.2	0.0	19.3	10.5	0.0	10.2
Incr Delay (d2), s/veh	0.0	0.0	2.3	0.6	0.4	5.1	0.2	0.0	2.9	3.8	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	3.1	0.6	0.8	8.0	1.0	0.0	3.4	5.8	0.0	1.3
LnGrp Delay(d),s/veh	0.0	0.0	16.0	17.1	12.7	13.0	15.4	0.0	22.2	14.3	0.0	10.3
LnGrp LOS			B	B	B	B	B		C	B		B
Approach Vol, veh/h		254			800			329			657	
Approach Delay, s/veh		16.0			13.2			20.3			13.5	
Approach LOS		B			B			C			B	

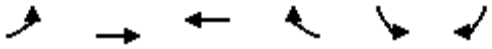
Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	17.1	13.5		20.0	6.9	23.7		20.0
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	16.0	16.0		16.0	4.0	28.0		16.0
Max Q Clear Time (g_c+I1), s	12.5	8.4		7.5	4.0	4.5		17.7
Green Ext Time (p_c), s	0.6	1.1		3.0	0.0	1.8		0.0

Intersection Summary	
HCM 2010 Ctrl Delay	14.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	591	36	158	777	316	27	91	176	173	86	10
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1667	1865	1900	1810	1900	1900	1900	1851	1900	1881	1900	1900
Adj Flow Rate, veh/h	20	657	40	176	863	351	30	101	196	192	96	11
Adj No. of Lanes	1	2	0	1	2	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	14	2	2	5	0	0	0	0	0	1	0	0
Cap, veh/h	187	1027	62	397	949	384	480	127	247	333	459	53
Arrive On Green	0.02	0.30	0.30	0.09	0.38	0.38	0.03	0.23	0.23	0.08	0.27	0.27
Sat Flow, veh/h	1587	3394	206	1723	2509	1016	1810	564	1094	1792	1674	192
Grp Volume(v), veh/h	20	343	354	176	620	594	30	0	297	192	0	107
Grp Sat Flow(s),veh/h/ln	1587	1772	1828	1723	1805	1721	1810	0	1658	1792	0	1866
Q Serve(g_s), s	0.5	8.9	8.9	3.4	17.3	17.4	0.7	0.0	9.0	4.0	0.0	2.3
Cycle Q Clear(g_c), s	0.5	8.9	8.9	3.4	17.3	17.4	0.7	0.0	9.0	4.0	0.0	2.3
Prop In Lane	1.00		0.11	1.00		0.59	1.00		0.66	1.00		0.10
Lane Grp Cap(c), veh/h	187	536	554	397	683	651	480	0	375	333	0	512
V/C Ratio(X)	0.11	0.64	0.64	0.44	0.91	0.91	0.06	0.00	0.79	0.58	0.00	0.21
Avail Cap(c_a), veh/h	276	600	620	428	683	651	567	0	500	333	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.1	16.0	16.0	10.9	15.6	15.7	15.1	0.0	19.4	15.8	0.0	14.8
Incr Delay (d2), s/veh	0.2	1.9	1.9	0.8	16.0	17.4	0.1	0.0	6.3	2.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.6	4.7	1.7	11.5	11.4	0.3	0.0	4.7	1.0	0.0	1.2
LnGrp Delay(d),s/veh	14.4	17.9	17.9	11.7	31.6	33.0	15.1	0.0	25.7	18.3	0.0	15.0
LnGrp LOS	B	B	B	B	C	C	B		C	B		B
Approach Vol, veh/h		717			1390			327			299	
Approach Delay, s/veh		17.8			29.7			24.7			17.1	
Approach LOS		B			C			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	16.0	9.0	20.1	5.4	18.6	5.0	24.1
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	4.0	16.0	6.0	18.0	4.0	16.0	4.0	20.0
Max Q Clear Time (g_c+I1), s	6.0	11.0	5.4	10.9	2.7	4.3	2.5	19.4
Green Ext Time (p_c), s	0.0	1.0	0.0	5.2	0.0	1.8	0.0	0.5

Intersection Summary	
HCM 2010 Ctrl Delay	24.6
HCM 2010 LOS	C



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	106	556	680	378	290	131
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1845	1845	1881	1881	1881	1597
Adj Flow Rate, veh/h	118	618	756	420	322	146
Adj No. of Lanes	1	2	2	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	3	1	1	1	19
Cap, veh/h	413	2058	1529	684	416	409
Arrive On Green	0.07	0.59	0.43	0.43	0.23	0.23
Sat Flow, veh/h	1757	3597	3668	1599	1792	1357
Grp Volume(v), veh/h	118	618	756	420	322	146
Grp Sat Flow(s),veh/h/ln	1757	1752	1787	1599	1792	1357
Q Serve(g_s), s	1.5	3.9	6.8	9.0	7.4	3.7
Cycle Q Clear(g_c), s	1.5	3.9	6.8	9.0	7.4	3.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	413	2058	1529	684	416	409
V/C Ratio(X)	0.29	0.30	0.49	0.61	0.77	0.36
Avail Cap(c_a), veh/h	530	2058	1529	684	647	584
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.1	4.6	9.2	9.8	15.9	12.1
Incr Delay (d2), s/veh	0.4	0.4	1.1	4.1	3.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	2.0	3.5	4.7	4.0	3.1
LnGrp Delay(d),s/veh	6.5	5.0	10.3	13.9	19.0	12.6
LnGrp LOS	A	A	B	B	B	B
Approach Vol, veh/h		736	1176		468	
Approach Delay, s/veh		5.2	11.6		17.0	
Approach LOS		A	B		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				30.0		14.3	7.1	22.9
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				26.0		16.0	6.0	16.0
Max Q Clear Time (g_c+I1), s				5.9		9.4	3.5	11.0
Green Ext Time (p_c), s				10.2		0.9	0.1	3.7

Intersection Summary	
HCM 2010 Ctrl Delay	10.7
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	515	145	151	650	238	151
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1610	1881	1900	1759
Adj Flow Rate, veh/h	572	161	168	722	264	168
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	18	1	0	8
Cap, veh/h	1094	930	444	1105	360	298
Arrive On Green	0.59	0.59	0.59	0.59	0.20	0.20
Sat Flow, veh/h	1863	1583	623	1881	1810	1495
Grp Volume(v), veh/h	572	161	168	722	264	168
Grp Sat Flow(s),veh/h/ln	1863	1583	623	1881	1810	1495
Q Serve(g_s), s	6.9	1.7	8.2	9.6	5.1	3.8
Cycle Q Clear(g_c), s	6.9	1.7	15.1	9.6	5.1	3.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1094	930	444	1105	360	298
V/C Ratio(X)	0.52	0.17	0.38	0.65	0.73	0.56
Avail Cap(c_a), veh/h	1094	930	444	1105	483	399
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.6	3.6	9.1	5.2	14.1	13.5
Incr Delay (d2), s/veh	1.8	0.4	2.4	3.0	3.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.8	1.7	5.7	2.9	1.7
LnGrp Delay(d),s/veh	6.4	4.0	11.5	8.2	17.9	15.2
LnGrp LOS	A	A	B	A	B	B
Approach Vol, veh/h	733			890	432	
Approach Delay, s/veh	5.9			8.8	16.9	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		11.5		26.0				26.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		10.0		22.0				22.0
Max Q Clear Time (g_c+I1), s		7.1		8.9				17.1
Green Ext Time (p_c), s		0.4		7.8				3.6

Intersection Summary	
HCM 2010 Ctrl Delay	9.5
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	861	96	285	1123	154	146
Number	4	14	3	8	5	12
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1845	1900	1881	1900	1845
Adj Flow Rate, veh/h	957	107	317	1248	171	162
Adj No. of Lanes	2	1	1	2	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	3	0	1	0	3
Cap, veh/h	2597	1151	462	2623	240	208
Arrive On Green	0.73	0.73	0.73	0.73	0.13	0.13
Sat Flow, veh/h	3632	1568	539	3668	1810	1568
Grp Volume(v), veh/h	957	107	317	1248	171	162
Grp Sat Flow(s),veh/h/ln	1770	1568	539	1787	1810	1568
Q Serve(g_s), s	5.9	1.2	31.3	8.6	5.4	6.0
Cycle Q Clear(g_c), s	5.9	1.2	37.2	8.6	5.4	6.0
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2597	1151	462	2623	240	208
V/C Ratio(X)	0.37	0.09	0.69	0.48	0.71	0.78
Avail Cap(c_a), veh/h	2597	1151	462	2623	241	209
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	2.9	2.3	9.7	3.3	24.9	25.1
Incr Delay (d2), s/veh	0.4	0.2	8.0	0.6	9.4	16.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.6	5.5	4.4	3.3	3.5
LnGrp Delay(d),s/veh	3.3	2.4	17.7	3.9	34.3	41.9
LnGrp LOS	A	A	B	A	C	D
Approach Vol, veh/h	1064			1565	333	
Approach Delay, s/veh	3.2			6.7	38.0	
Approach LOS	A			A	D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4				8
Phs Duration (G+Y+Rc), s		12.0		48.0				48.0
Change Period (Y+Rc), s		4.0		4.0				4.0
Max Green Setting (Gmax), s		8.0		44.0				44.0
Max Q Clear Time (g_c+I1), s		8.0		7.9				39.2
Green Ext Time (p_c), s		0.0		26.4				4.5

Intersection Summary	
HCM 2010 Ctrl Delay	9.0
HCM 2010 LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	16	272	31	70	516	118	57	150	62	67	109	27
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1883	1900	1900	1878	1900	1900	1887	1900	1827	1900	1900
Adj Flow Rate, veh/h	18	302	34	78	573	131	63	167	69	74	121	30
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	1	1	0	1	1	0	1	1	4	0	0
Cap, veh/h	390	956	108	669	851	194	386	315	130	309	365	91
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	755	1663	187	1061	1480	338	1256	1270	525	1118	1471	365
Grp Volume(v), veh/h	18	0	336	78	0	704	63	0	236	74	0	151
Grp Sat Flow(s),veh/h/ln	755	0	1850	1061	0	1818	1256	0	1794	1118	0	1836
Q Serve(g_s), s	0.8	0.0	4.3	1.9	0.0	12.2	2.0	0.0	5.1	2.8	0.0	3.0
Cycle Q Clear(g_c), s	12.9	0.0	4.3	6.1	0.0	12.2	5.0	0.0	5.1	7.9	0.0	3.0
Prop In Lane	1.00		0.10	1.00		0.19	1.00		0.29	1.00		0.20
Lane Grp Cap(c), veh/h	390	0	1063	669	0	1045	386	0	446	309	0	456
V/C Ratio(X)	0.05	0.00	0.32	0.12	0.00	0.67	0.16	0.00	0.53	0.24	0.00	0.33
Avail Cap(c_a), veh/h	390	0	1063	669	0	1045	519	0	635	427	0	649
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.2	0.0	5.0	6.6	0.0	6.7	16.0	0.0	14.7	18.1	0.0	13.9
Incr Delay (d2), s/veh	0.2	0.0	0.8	0.4	0.0	3.5	0.2	0.0	1.0	0.4	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	2.4	0.6	0.0	6.9	0.7	0.0	2.6	0.9	0.0	1.6
LnGrp Delay(d),s/veh	11.4	0.0	5.8	6.9	0.0	10.1	16.2	0.0	15.7	18.5	0.0	14.3
LnGrp LOS	B		A	A		B	B		B	B		B
Approach Vol, veh/h		354			782			299			225	
Approach Delay, s/veh		6.1			9.8			15.8			15.7	
Approach LOS		A			A			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		15.2		30.0		15.2		30.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		26.0		16.0		26.0
Max Q Clear Time (g_c+I1), s		7.1		14.9		9.9		14.2
Green Ext Time (p_c), s		1.7		5.0		1.3		5.2

Intersection Summary	
HCM 2010 Ctrl Delay	10.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	632	5	34	836	108	5	104	97	70	84	44
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1877	1900	1900	1838	1900	1900	1900	1900
Adj Flow Rate, veh/h	67	702	6	38	929	120	6	116	108	78	93	49
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	1	1	0	0	0	0	0	0
Cap, veh/h	216	1223	10	447	1060	137	312	195	182	237	261	138
Arrive On Green	0.65	0.65	0.65	0.65	0.65	0.65	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	546	1881	16	752	1629	210	1266	877	817	1175	1173	618
Grp Volume(v), veh/h	67	0	708	38	0	1049	6	0	224	78	0	142
Grp Sat Flow(s),veh/h/ln	546	0	1897	752	0	1840	1266	0	1694	1175	0	1791
Q Serve(g_s), s	7.2	0.0	13.1	1.9	0.0	29.2	0.3	0.0	7.5	4.0	0.0	4.2
Cycle Q Clear(g_c), s	36.4	0.0	13.1	15.0	0.0	29.2	4.5	0.0	7.5	11.5	0.0	4.2
Prop In Lane	1.00		0.01	1.00		0.11	1.00		0.48	1.00		0.35
Lane Grp Cap(c), veh/h	216	0	1234	447	0	1196	312	0	377	237	0	399
V/C Ratio(X)	0.31	0.00	0.57	0.09	0.00	0.88	0.02	0.00	0.59	0.33	0.00	0.36
Avail Cap(c_a), veh/h	216	0	1234	447	0	1196	351	0	430	273	0	454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.8	0.0	6.2	10.3	0.0	9.0	22.6	0.0	21.9	27.1	0.0	20.7
Incr Delay (d2), s/veh	3.7	0.0	1.9	0.4	0.0	9.2	0.0	0.0	1.7	0.8	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.0	7.4	0.4	0.0	17.6	0.1	0.0	3.7	1.4	0.0	2.2
LnGrp Delay(d),s/veh	27.5	0.0	8.1	10.7	0.0	18.2	22.6	0.0	23.7	27.9	0.0	21.2
LnGrp LOS	C		A	B		B	C		C	C		C
Approach Vol, veh/h		775			1087			230			220	
Approach Delay, s/veh		9.8			17.9			23.6			23.6	
Approach LOS		A			B			C			C	

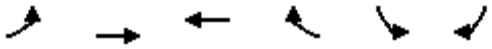
Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		18.0		45.0		18.0		45.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		41.0		16.0		41.0
Max Q Clear Time (g_c+I1), s		9.5		38.4		13.5		31.2
Green Ext Time (p_c), s		1.2		2.2		0.6		7.4

Intersection Summary	
HCM 2010 Ctrl Delay	16.3
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	151	400	22	54	516	67	13	99	60	27	82	191
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1877	1900	1900	1900	1900	1900	1887	1900
Adj Flow Rate, veh/h	168	444	24	60	573	74	14	110	67	30	91	212
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	1	1	0	0	0	0	0	0
Cap, veh/h	449	1077	58	583	983	127	221	267	163	333	122	284
Arrive On Green	0.60	0.60	0.60	0.60	0.60	0.60	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	796	1786	97	940	1629	210	1093	1107	674	1227	504	1175
Grp Volume(v), veh/h	168	0	468	60	0	647	14	0	177	30	0	303
Grp Sat Flow(s),veh/h/ln	796	0	1883	940	0	1840	1093	0	1781	1227	0	1679
Q Serve(g_s), s	8.4	0.0	6.7	1.9	0.0	11.1	0.6	0.0	4.3	1.1	0.0	8.6
Cycle Q Clear(g_c), s	19.5	0.0	6.7	8.6	0.0	11.1	9.2	0.0	4.3	5.4	0.0	8.6
Prop In Lane	1.00		0.05	1.00		0.11	1.00		0.38	1.00		0.70
Lane Grp Cap(c), veh/h	449	0	1136	583	0	1110	221	0	430	333	0	405
V/C Ratio(X)	0.37	0.00	0.41	0.10	0.00	0.58	0.06	0.00	0.41	0.09	0.00	0.75
Avail Cap(c_a), veh/h	449	0	1136	583	0	1110	298	0	554	419	0	523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.2	0.0	5.4	7.7	0.0	6.2	22.3	0.0	16.4	18.7	0.0	18.1
Incr Delay (d2), s/veh	2.4	0.0	1.1	0.4	0.0	2.2	0.1	0.0	0.6	0.1	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	3.7	0.5	0.0	6.3	0.2	0.0	2.2	0.4	0.0	4.4
LnGrp Delay(d),s/veh	14.6	0.0	6.5	8.0	0.0	8.5	22.4	0.0	17.1	18.8	0.0	22.4
LnGrp LOS	B		A	A		A	C		B	B		C
Approach Vol, veh/h		636			707			191			333	
Approach Delay, s/veh		8.6			8.4			17.5			22.1	
Approach LOS		A			A			B			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		16.4		35.0		16.4		35.0
Change Period (Y+Rc), s		4.0		4.0		4.0		4.0
Max Green Setting (Gmax), s		16.0		31.0		16.0		31.0
Max Q Clear Time (g_c+I1), s		11.2		21.5		10.6		13.1
Green Ext Time (p_c), s		1.2		5.1		1.3		7.5

Intersection Summary	
HCM 2010 Ctrl Delay	11.9
HCM 2010 LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	135	311	373	254	201	127
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1881	1900	1845	1863
Adj Flow Rate, veh/h	150	346	414	282	223	141
Adj No. of Lanes	1	1	1	1	1	1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	1	0	3	2
Cap, veh/h	533	984	994	853	364	328
Arrive On Green	0.53	0.53	0.53	0.53	0.21	0.21
Sat Flow, veh/h	746	1863	1881	1615	1757	1583
Grp Volume(v), veh/h	150	346	414	282	223	141
Grp Sat Flow(s),veh/h/ln	746	1863	1881	1615	1757	1583
Q Serve(g_s), s	4.6	3.3	4.0	3.0	3.5	2.3
Cycle Q Clear(g_c), s	8.6	3.3	4.0	3.0	3.5	2.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	533	984	994	853	364	328
V/C Ratio(X)	0.28	0.35	0.42	0.33	0.61	0.43
Avail Cap(c_a), veh/h	533	984	994	853	928	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	6.9	4.1	4.3	4.1	10.9	10.4
Incr Delay (d2), s/veh	1.3	1.0	1.3	1.0	1.7	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.9	2.4	1.6	1.8	1.1
LnGrp Delay(d),s/veh	8.2	5.1	5.6	5.1	12.6	11.3
LnGrp LOS	A	A	A	A	B	B
Approach Vol, veh/h		496	696		364	
Approach Delay, s/veh		6.1	5.4		12.1	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				20.0		10.3		20.0
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				16.0		16.0		16.0
Max Q Clear Time (g_c+I1), s				10.6		5.5		6.0
Green Ext Time (p_c), s				2.8		0.8		4.4

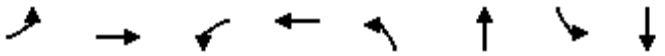
Intersection Summary	
HCM 2010 Ctrl Delay	7.2
HCM 2010 LOS	A



Lane Group	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	254	43	76	681	89	240	519	138
v/c Ratio	0.45	0.15	0.13	0.58	0.23	0.60	0.76	0.16
Control Delay	19.1	17.8	16.7	4.5	9.1	24.6	15.7	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	17.8	16.7	4.5	9.1	24.6	15.7	9.3
Queue Length 50th (ft)	65	11	19	29	12	66	91	26
Queue Length 95th (ft)	133	34	49	99	26	125	#159	53
Internal Link Dist (ft)	919		4467			5231		921
Turn Bay Length (ft)		250		250	250		250	
Base Capacity (vph)	562	287	565	1223	394	548	721	949
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.15	0.13	0.56	0.23	0.44	0.72	0.15

Intersection Summary

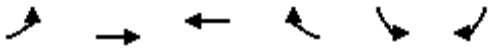
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	20	697	176	1214	30	297	192	107
v/c Ratio	0.08	0.55	0.46	0.70	0.08	0.64	0.71	0.21
Control Delay	9.1	17.2	12.8	15.5	11.9	16.3	31.3	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	17.2	12.8	15.5	11.9	16.3	31.3	15.9
Queue Length 50th (ft)	3	94	27	121	6	38	42	20
Queue Length 95th (ft)	13	164	69	#347	20	103	#110	61
Internal Link Dist (ft)		654		924		5202		920
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	243	1375	383	1723	385	666	272	649
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.51	0.46	0.70	0.08	0.45	0.71	0.16

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	118	618	756	420	322	146
v/c Ratio	0.29	0.31	0.53	0.47	0.67	0.22
Control Delay	7.8	6.6	14.5	3.8	22.9	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	6.6	14.5	3.8	22.9	5.6
Queue Length 50th (ft)	14	42	89	0	76	14
Queue Length 95th (ft)	35	76	147	48	141	36
Internal Link Dist (ft)		1579	2667		5202	
Turn Bay Length (ft)	250			250	250	
Base Capacity (vph)	406	1986	1431	892	586	667
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.31	0.53	0.47	0.55	0.22

Intersection Summary



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	572	161	168	722	264	168
v/c Ratio	0.53	0.16	0.48	0.66	0.66	0.36
Control Delay	7.8	1.5	11.4	10.1	22.8	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	1.5	11.4	10.1	22.8	5.4
Queue Length 50th (ft)	69	0	19	98	52	0
Queue Length 95th (ft)	131	15	#63	189	#109	31
Internal Link Dist (ft)	884			1579	5173	
Turn Bay Length (ft)		250	250			250
Base Capacity (vph)	1089	992	353	1099	432	485
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.16	0.48	0.66	0.61	0.35

Intersection Summary

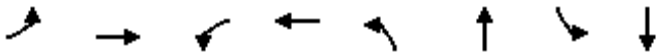
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	957	107	317	1248	171	162
v/c Ratio	0.36	0.09	0.78	0.47	0.75	0.48
Control Delay	3.3	0.8	23.5	3.9	48.5	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	0.8	23.5	3.9	48.5	10.0
Queue Length 50th (ft)	47	0	53	70	60	0
Queue Length 95th (ft)	67	8	#227	97	#143	45
Internal Link Dist (ft)	774			424	5188	
Turn Bay Length (ft)		250	250			250
Base Capacity (vph)	2640	1197	404	2666	229	341
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.09	0.78	0.47	0.75	0.48

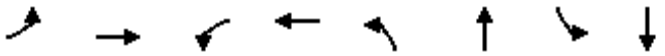
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	18	336	78	704	63	236	74	151
v/c Ratio	0.05	0.29	0.12	0.62	0.23	0.55	0.36	0.36
Control Delay	5.6	5.7	5.6	9.6	15.6	17.4	19.1	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	5.7	5.6	9.6	15.6	17.4	19.1	14.0
Queue Length 50th (ft)	2	32	7	88	13	42	16	26
Queue Length 95th (ft)	9	84	26	232	35	89	42	61
Internal Link Dist (ft)		837		420		5201		5188
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	336	1139	643	1128	429	646	325	647
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.29	0.12	0.62	0.15	0.37	0.23	0.23

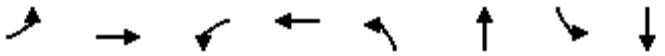
Intersection Summary



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	708	38	1049	6	224	78	142
v/c Ratio	0.37	0.54	0.09	0.81	0.03	0.63	0.54	0.41
Control Delay	12.6	7.2	4.8	15.2	19.4	23.8	36.2	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.6	7.2	4.8	15.2	19.4	23.8	36.2	19.1
Queue Length 50th (ft)	8	101	4	213	2	51	26	33
Queue Length 95th (ft)	44	228	15	#607	10	110	63	75
Internal Link Dist (ft)		5180		420		5199		5201
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	182	1320	422	1288	313	489	211	491
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.54	0.09	0.81	0.02	0.46	0.37	0.29

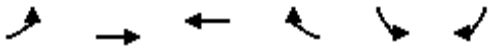
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	168	468	60	647	14	177	30	303
v/c Ratio	0.40	0.38	0.11	0.54	0.09	0.46	0.13	0.62
Control Delay	9.0	5.9	5.0	7.5	16.5	15.8	16.9	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	5.9	5.0	7.5	16.5	15.8	16.9	11.9
Queue Length 50th (ft)	17	45	5	70	3	30	7	22
Queue Length 95th (ft)	72	130	22	205	14	71	23	74
Internal Link Dist (ft)		420		5100		5198		5188
Turn Bay Length (ft)	250		250		250		250	
Base Capacity (vph)	423	1224	569	1202	262	618	381	690
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.38	0.11	0.54	0.05	0.29	0.08	0.44

Intersection Summary



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	150	346	414	282	223	141
v/c Ratio	0.35	0.39	0.46	0.31	0.46	0.26
Control Delay	9.4	7.9	8.6	2.2	13.0	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	7.9	8.6	2.2	13.0	3.6
Queue Length 50th (ft)	14	34	42	0	32	0
Queue Length 95th (ft)	50	88	109	26	67	21
Internal Link Dist (ft)		1482	2578		5231	
Turn Bay Length (ft)	250			250	250	
Base Capacity (vph)	430	894	902	921	840	833
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.39	0.46	0.31	0.27	0.17

Intersection Summary

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Rimrock	Yield	147	235	161	161	930	1046	985	0.1424	0.2423
2	62nd	None	922		192		351	2021		0.4626	
3	Rimrock	None	308		999		115	890		0.3530	
4	62nd	None	224		867		440	815		0.2805	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Rimrock	Yield	3.79	4.75	4.38	0.47	0.95	A	A	A
2	62nd	None	4.16		4.16	3.36		A		A
3	Rimrock	None	5.13		5.13	1.43		A		A
4	62nd	None	5.69		5.69	1.14		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Rimrock	Yield	107	613	254	254	587	1066	971	0.1018	0.6486
2	62nd	None	591		187		786	2122		0.2817	
3	Rimrock	None	116		623		155	1172		0.1002	
4	62nd	None	296		545		194	1017		0.2960	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Rimrock	Yield	3.69	9.98	9.04	0.33	5.84	A	A	A
2	62nd	None	2.87		2.87	1.45		A		A
3	Rimrock	None	3.18		3.18	0.31		A		A
4	62nd	None	4.94		4.94	1.28		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Rimrock	None	662		44		1473	2187		0.3061	
2	54th	None	436		626		80	908		0.4907	
3	Rimrock	None	1070		636		426	1332		0.8258	
4	54th	None	216		1301		405	640		0.3476	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Rimrock	None	3.21		3.21	1.80		A		A
2	54th	None	7.00		7.00	2.80		A		A
3	Rimrock	None	8.75		8.75	10.60		A		A
4	54th	None	7.92		7.92	1.64		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Rimrock	None	935		136		940	2227		0.4249	
2	54th	None	269		962		109	837		0.3285	
3	Rimrock	None	645		417		814	1754		0.3725	
4	54th	None	294		782		280	923		0.3248	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Rimrock	None	3.28		3.28	2.68		A		A
2	54th	None	6.11		6.11	1.49		A		A
3	Rimrock	None	3.14		3.14	1.80		A		A
4	54th	None	5.66		5.66	1.49		A		A

Operational Results

2017 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	62nd St West	None	575		203		222	1000		0.5938	
2	Grand Avenue	None	575		414		364	891		0.6732	
3	Grand Avenue	None	298		127		862	1040		0.2937	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	62nd St West	None	7.75		7.75	4.11		A		A
2	Grand Avenue	None	10.55		10.55	5.92		B		B
3	Grand Avenue	None	4.53		4.53	1.17		A		A

Operational Results

2017 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	62nd St West	None	328		373		389	912		0.3708	
2	Grand Avenue	None	446		201		500	1001		0.4583	
3	Grand Avenue	None	627		135		512	1035		0.6252	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	62nd St West	None	5.75		5.75	1.69		A		A
2	Grand Avenue	None	6.00		6.00	2.39		A		A
3	Grand Avenue	None	8.02		8.02	4.65		A		A

Operational Results

2017 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th St West	None	214		939		419	774		0.2873	
2	Grand Avenue	None	628		70		1083	2114		0.3030	
3	Grand Avenue	None	1206		152		546	2070		0.5973	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th St West	None	6.08		6.08	1.18		A		A
2	Grand Avenue	None	2.98		2.98	1.61		A		A
3	Grand Avenue	None	4.90		4.90	5.35		A		A

Operational Results

2017 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th St West	None	389		515		296	924		0.4347	
2	Grand Avenue	None	801		238		666	1951		0.4204	
3	Grand Avenue	None	660		151		888	2070		0.3254	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th St West	None	6.27		6.27	2.20		A		A
2	Grand Avenue	None	3.59		3.59	2.55		A		A
3	Grand Avenue	None	3.05		3.05	1.74		A		A

Operational Results

2017 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	54th St West	None	782		399		215	1903		0.4217	
2	Grand Avenue	None	1112		549		632	1798		0.6375	
3	Grand Avenue	None	511		103		1558	2110		0.2469	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	54th St West	None	4.26		4.26	2.95		A		A
2	Grand Avenue	None	5.38		5.38	5.74		A		A
3	Grand Avenue	None	2.70		2.70	1.18		A		A

Operational Results

2017 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	54th St West	None	421		680		484	1706		0.2539	
2	Grand Avenue	None	662		290		811	1979		0.3419	
3	Grand Avenue	None	1058		106		846	2108		0.5142	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	54th St West	None	3.82		3.82	1.42		A		A
2	Grand Avenue	None	3.04		3.04	1.76		A		A
3	Grand Avenue	None	4.90		4.90	4.55		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	48th Street West	None	413		1607		328	553		0.8344	
2	Grand Avenue	None	852		41		1978	1997		0.4356	
3	Grand Avenue	None	1816		119		774	2060		0.9260	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	48th Street West	None	29.34		29.34	14.41		D		D
2	Grand Avenue	None	3.38		3.38	2.52		A		A
3	Grand Avenue	None	15.74		15.74	31.09		C		C

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	48th Street West	None	300		861		381	809		0.3850	
2	Grand Avenue	None	1408		154		1007	1893		0.7691	
3	Grand Avenue	None	957		285		1277	1889		0.5196	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	48th Street West	None	6.65		6.65	1.83		A		A
2	Grand Avenue	None	8.47		8.47	11.51		A		A
3	Grand Avenue	None	3.98		3.98	3.48		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th	None	439		268		156	990		0.4519	
2	Central	None	245		526		181	851		0.2937	
3	56th	None	216		402		369	781		0.2817	
4	Central	None	303		121		497	1052		0.2921	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th	None	6.05		6.05	2.37		A		A
2	Central	None	5.56		5.56	1.21		A		A
3	56th	None	5.36		5.36	1.01		A		A
4	Central	None	4.48		4.48	1.16		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th	None	377		323		387	1028		0.3731	
2	Central	None	143		474		226	924		0.1573	
3	56th	None	307		409		208	895		0.3495	
4	Central	None	492		218		498	1094		0.4579	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th	None	5.41		5.41	1.80		A		A
2	Central	None	4.46		4.46	0.55		A		A
3	56th	None	5.60		5.60	1.52		A		A
4	Central	None	5.91		5.91	2.59		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Central	None	277		120		929	1067		0.2634	
2	48th	None	402		228		169	1006		0.4066	
3	Central	None	778		407		223	1534		0.5149	
4	48th	None	149		900		285	788		0.1928	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Central	None	4.29		4.29	1.01		A		A
2	48th	None	5.52		5.52	1.95		A		A
3	Central	None	4.03		4.03	2.86		A		A
4	48th	None	5.29		5.29	0.70		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Central	None	704		223		401	1082		0.6674	
2	48th	None	203		643		284	835		0.2480	
3	Central	None	319		246		600	1923		0.1676	
4	48th	None	269		355		210	1084		0.2518	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Central	None	9.28		9.28	6.26		A		A
2	48th	None	5.50		5.50	1.00		A		A
3	Central	None	2.31		2.31	0.62		A		A
4	48th	None	4.37		4.37	1.01		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th	None	443		488		147	853		0.5321	
2	King	None	702		451		480	872		0.8406	
3	56th	None	175		874		278	653		0.2752	
4	King	None	485		150		899	1028		0.4804	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th	None	7.89		7.89	3.27		A		A
2	King	None	17.10		17.10	13.30		C		C
3	56th	None	6.99		6.99	1.14		A		A
4	King	None	5.99		5.99	2.57		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	56th	None	216		702		372	742		0.2976	
2	King	None	561		191		727	1006		0.5689	
3	56th	None	291		597		155	796		0.3736	
4	King	None	790		284		604	958		0.8591	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	56th	None	6.32		6.32	1.24		A		A
2	King	None	7.18		7.18	3.66		A		A
3	56th	None	6.53		6.53	1.73		A		A
4	King	None	16.76		16.76	14.35		C		C

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	King	None	574		135		998	2085		0.2780	
2	48th	None	281		544		165	936		0.3053	
3	King	None	861		276		549	1650		0.5292	
4	48th	None	113		1020		117	744		0.1553	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	King	None	2.40		2.40	1.18		A		A
2	48th	None	5.13		5.13	1.26		A		A
3	King	None	3.94		3.94	3.06		A		A
4	48th	None	5.38		5.38	0.54		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	King	None	978		169		799	2189		0.4521	
2	48th	None	198		875		272	867		0.2327	
3	King	None	697		188		885	1980		0.3560	
4	48th	None	206		762		123	929		0.2257	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	King	None	3.27		3.27	2.83		A		A
2	48th	None	5.19		5.19	0.91		A		A
3	King	None	2.81		2.81	1.70		A		A
4	48th	None	4.92		4.92	0.89		A		A

Operational Results

2035 AM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Hesper	None	223		174		430	1039		0.2177	
2	56th	None	152		254		143	992		0.1554	
3	Hesper	None	352		155		251	890		0.4020	
4	56th	None	204		400		107	898		0.2310	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Hesper	None	4.16		4.16	0.79		A		A
2	56th	None	4.04		4.04	0.52		A		A
3	Hesper	None	5.46		5.46	1.66		A		A
4	56th	None	4.86		4.86	0.86		A		A

Operational Results

2035 PM Peak - 60 minutes

Flows and Capacity

Leg	Leg Names	Bypass Type	Flows (veh/hr)					Capacity (veh/hr)			
			Arrival Flow		Opposing Flow		Exit Flow	Capacity		Average VCR	
			Entry	Bypass	Entry	Bypass		Entry	Bypass	Entry	Bypass
1	Hesper	None	332		168		163	1111		0.3032	
2	56th	None	126		266		234	1034		0.1236	
3	Hesper	None	143		193		199	1001		0.1448	
4	56th	None	180		151		185	1132		0.1610	

Delays, Queues and Level of Service

Leg	Leg Names	Bypass Type	Average Delay (sec)			95% Queue (veh)		Level of Service		
			Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Leg
1	Hesper	None	4.52		4.52	1.29		A		A
2	56th	None	3.84		3.84	0.41		A		A
3	Hesper	None	3.90		3.90	0.47		A		A
4	56th	None	3.74		3.74	0.57		A		A

Consent **1. O.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Cancellation of Checks and Warrants

PRESENTED BY: Patrick M. Weber, Finance Director

Department: City Hall Administration

PROBLEM/ISSUE STATEMENT

The Finance Department annually reviews outstanding checks and warrants. Under state law MCA 7-6-4303, City Council has the authority to cancel municipal checks and warrants that have remained outstanding or unpaid for a period of one year. Vendors, City employees and former employees were notified that they had outstanding checks and were given the option to pay the stop payment fee of $13 to have a check reissued.

ALTERNATIVES ANALYZED

The Council may:

- Approve cancelling outstanding checks and warrants, or
- Disapprove cancelling the checks and warrants.

FINANCIAL IMPACT

The money amounts contained in the canceled checks and warrants will revert to affected funds. Employees and vendors were notified and given the opportunity to pay the stop payment fee and have their checks reissued. The final cancelations may not exactly match the attachment, because payees are still responding and checks that are reissued will not be canceled.

RECOMMENDATION

Staff recommends that Council authorize cancelling outstanding checks and warrants and receivable balances.

APPROVED BY CITY ADMINISTRATOR

Attachments

Cancelled checks

VOIDED CHECKS TO COUNCIL- JUNE 2016

ACCOUNTS PAYABLE Checks Outstanding Thru 6-30-15

Number	Date	Name	Amount
771616	12/16/2013	UMC in Billings Inc	45.00
773418	3/10/2014	KYLE, RHIANA & CHR HOELLWARTH	45.00
776990	7/21/2014	Lausch, Jared	24.99
777112	7/28/2014	Douglas Teller	12.00
777144	7/28/2014	Holly Hofer	25.00
777210	7/28/2014	Obie, Nicole	5.00
777241	7/28/2014	Russell Anderson	12.00
777657	8/18/2014	Brandon Oelkers	12.00
777690	8/18/2014	DBA Dwellings By Amos Lee	25.00
777755	8/18/2014	Jack Evankovich	12.00
777776	8/18/2014	Kyle Jones	10.00
777840	8/18/2014	Randi Adams	25.00
777884	8/18/2014	Tiffany Perman	12.00
778127	9/2/2014	Danielson, Rosanne	18.29
778130	9/2/2014	Diane Martin	10.00
778999	10/6/2014	Dan Niess	12.00
779078	10/6/2014	Mark Kahler	12.00
779148	10/6/2014	Shelly Harr	10.00
779223	10/14/2014	Cornerstone Tower	50.00
779641	10/27/2014	Mashek, Vern	20.99
779722	11/3/2014	Ace Oshefka	12.00
780005	11/10/2014	Lindsay Honnold	12.00
780164	11/17/2014	Lorri Stalkingcat	15.00
780351	11/24/2014	Lynsia Hoem	12.00
780509	12/1/2014	Jeffrey Johnson	12.00
780510	12/1/2014	Jolyn Colvin	12.00
780594	12/1/2014	Thomas Schuman	12.00
780608	12/1/2014	Walmart CO: Kyle Jones	10.00
780798	12/15/2014	Dorothy DeGroat	45.00
781089	12/22/2014	Watkins, Judy	21.31
781514	1/20/2015	Bevolden,Curtis	5.00
781561	1/20/2015	Ferrell, Erin B.	5.00
781779	1/26/2015	Steven Chesarek	28.50
782390	2/23/2015	Kyle Jones	10.00
782831	3/16/2015	Janice Medicine Horse	91.03
782899	3/16/2015	Thomas Jogun	201.64
782916	3/16/2015	Weber, Amanda	5.00
783077	3/23/2015	Permaletter Sign Co	50.00
783701	4/20/2015	Little, Nick	5.00
783781	4/20/2015	Undeland, Todd	5.00
783903	4/27/2015	Marilynn Reher	12.00
783974	4/27/2015	Tyler Connell	25.00
784573	5/26/2015	Brenda Neuharth	12.00
784592	5/26/2015	Daniel Lee Anderson	12.00
784684	5/26/2015	Nichole Bell Tall Bull	12.00
784709	5/26/2015	Shawn Harrison	12.00
784735	5/26/2015	Tony Wilson	12.00
784836	6/1/2015	Kristi Brenden	135.00
784886	6/1/2015	Trimpe, David	5.00
784893	6/8/2015	Aaron Morgenstern	20.00
784986	6/8/2015	Lee, Kathy	27.63
785319	6/22/2015	Brittney Mill	5.00
785388	6/22/2015	Jagers, Justin	9.00
785469	6/22/2015	Sign And Design	75.00
		Total	1,341.38

PAYROLL CHECKS TO BE VOIDED - JUNE 2016

Check #	Date	Name	Amount
14704	5/16/2014	Cleveland, Mariah	3.84
14726	5/16/2014	Norris, Krista	3.16
14737	5/16/2014	Kirkpatrick, Amanda	45.17
14892	5/30/2014	Kirkpatrick, Amanda	398.14
14906	5/30/2014	Whitwright, Jeremiah	9.46
16121	8/8/2014	Kirkpatrick, Amanda	89.00
16556	9/5/2014	Johnson, Conner	186.09

16603	9/5/2014	Weber, Courtney	9.01
17260	12/12/2014	Kirkpatrick, Amanda	35.94
17613	2/20/2015	Kirkpatrick, Amanda	35.94
17702	3/6/2015	Kirkpatrick, Amanda	18.47
17789	3/20/2015	Kirkpatrick, Amanda	35.94
17873	4/3/2015	Kirkpatrick, Amanda	18.47
17970	4/17/2015	Kirkpatrick, Amanda	35.94
		Total	924.57

HEALTH - FLEX CHECKS TO BE VOIDED - JUNE 2016

Check #	Date	NAME	Amount
79700	05/31/2014	Kuntz, Dellon	90.00
79833	05/31/2014	Arellano, John	173.35
80357	07/31/2014	Emmons, Abbey	90.00
80383	07/31/2014	Kuntz, Dellon	90.00
80507	08/31/2014	Kuntz, Dellon	140.12
80560	08/31/2014	Kuntz, Dellon	258.08
80636	09/30/2014	Kuntz, Dellon	35.70
80671	09/30/2014	Kuntz, Dellon	90.00
80791	10/31/2014	Emmons, Abbey	93.53
81055	12/31/2014	Emmons, Abbey	57.69
81121	12/31/2014	Emmons, Abbey	57.69
81199	12/31/2014	Emmons, Abbey	57.69
81382	01/30/2015	Kuntz, Dellon	90.00
81608	02/27/2015	Kuntz, Dellon	25.00
81826	03/30/2015	Kuntz, Dellon	90.00
82191	04/29/2015	Kuntz, Dellon	90.00
		Total	1,528.85

HEALTH - CLAIMS CHECKS TO BE VOIDED - JUNE 2016

Check #	Date	Name	Amount
273854	05/06/2014	The Arthritis & Osteoporosis Center	8,967.84
274244	05/20/2014	ST. Vincent Healthcare IP	337.76
274624	06/10/2014	Berumen, David	171.24
275027	06/24/2014	Addy, John	25.00
275653	07/15/2014	White, Scott	0.30
275846	07/22/2014	Gartner, George	25.00
275889	07/22/2014	Chiropractic Health Assoc.	23.00
275890	07/22/2014	Chiropractic Health Assoc.	32.00
276825	08/26/2014	Martin, Ronald	25.00
276826	08/26/2014	Walter, Jeannine	7.89
277045	09/02/2014	Redman, Dee Ann	30.00
277231	09/09/2014	Ihde, Brandon	25.00
277232	09/09/2014	Jefferson, Dana	25.00
277233	09/09/2014	Lindstrand, Aura	25.00
277492	09/16/2014	Castro, Marco	25.00
277499	09/16/2014	Crable, Randy	25.00
277701	09/23/2014	Noe, Steven	25.00
277705	09/23/2014	Stanton, Colin	220.00
277909	09/23/2014	Cotrell, Daniel	30.00
277958	09/30/2014	Garcia, Lawrence	0.60
277959	09/30/2014	Harris, Travis	25.00
277964	09/30/2014	Redman, David	20.00
278176	10/07/2014	Barbeau, Eric	18.38
278177	10/07/2014	Berumen, David	25.00
278183	10/07/2014	Mattox, Lora	2.36
278185	10/07/2014	Pust, Lester	5.00
278396	10/07/2014	Billings Clinic	175.05
278800	10/28/2014	Palmieri, Kim	25.00
278801	10/28/2014	Pust, Lester	5.00
278802	10/28/2014	Scott, Tracy	7.69
279048	11/04/2014	Palmieri, Kim	25.00
279085	11/04/2014	Barbara Pellant Mende LCPC	105.40

279279	11/11/2014	Lehman, Peter	25.00
279729	11/23/2014	Palmieri, Kim	25.00
279919	12/02/2014	Young, Dennis	25.00
280181	12/09/2014	Yarina, Michael	25.00
280435	12/16/2014	Davidson, Christopher	10.00
280445	12/16/2014	Robinson, Michael	25.00
280847	12/30/2014	Addy, John	25.00
280856	12/30/2014	Boehm, Alexander	50.00
280857	12/30/2014	Booth, Cari	35.00
280873	12/30/2014	Donohoe, Cheryl	49.00
280878	12/30/2014	Fox, Ronda	20.00
280883	12/30/2014	Harper, Alan	49.00
280901	12/30/2014	Maul, Randy	20.00
280917	12/30/2014	Shine, Tiffany	25.00
280919	12/30/2014	Solheim, Leslie	30.00
280926	12/30/2014	Taylor, Ashley	149.00
280930	12/30/2014	Walter, Jeannine	60.00
281424	01/13/2015	Heil, Bridgette	25.00
281659	01/20/2015	Schillinger, Jamie	26.32
281872	01/27/2015	Mills, Garrett	25.00
282493	02/24/2015	Donohoe, Cheryl	10.00
282993	03/17/2015	Hagen, Rebecca	51.16
		Total	11,268.99

Consent **1. P. 1.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Payment of Claims May 31, 2016

PRESENTED BY: Patrick M. Weber, Finance Director

Department: City Hall Administration

PROBLEM/ISSUE STATEMENT

Claims in the amount of $1,356,715.86 have been audited and are presented for City Council payment approval. A complete listing of the claims dated May 31, 2016, is available in the Finance Department.

ALTERNATIVES ANALYZED

No other alternatives were analyzed.

FINANCIAL IMPACT

Claims have a varying impact on department budgets, but are submitted by the departments and reviewed by Finance staff before being sent to the Council.

RECOMMENDATION

Staff recommends that Council approve the Payment of Claims.

APPROVED BY CITY ADMINISTRATOR

Attachments

councilmemo_5.31.2016

Check Date	Check	Name	Amount	Account	Item Desc
05/31/2016	794313	911 Security Cameras Inc	$ 4,300.00	9000-00000-229000	BD1236 - BID refund, Evidence CCTV System
05/31/2016	794322	Atlantic Coast Polymers Inc	$ 55,737.00	5020-00000-141000	WATER PARTS AND SUPPLIES PO NUM 300610
05/31/2016	794333	Blake Mitchell	$ 3,892.68	5020-00000-115731	1412 Granite - overpayment
05/31/2016	794338	Brockwhite Company Llc	$ 2,101.77	5610-71130-403650	Invoice #12656443. Crack Seal Material
05/31/2016	794338	Brockwhite Company Llc	$ 2,101.77	5610-71130-403650	Invoice #12659653. Crack Seal Material
05/31/2016	794344	Chicago Title of Montana LLC	$ 335,508.40	2250-22320-409220	2315 & 2325 9th Ave N, land purchase for 911
05/31/2016	794348	Cmg Construction, Inc.	$ 24,872.76	2120-43700-409390	CTEP Medicine Crow Middle School project
05/31/2016	794352	Crane Tech Services & Material Handling, Inc.	$ 2,625.00	5120-84000-403660	Annual Inspection Boiler room etc
05/31/2016	794357	Davey Coach Sales Inc	$ 398,308.00	4120-71560-409440	Purchase 2 31ft Medium Duty Low Floor Diesel
05/31/2016	794365	Downtown Billings BID, Inc.	$ 3,941.41	7800-15750-407680	Paid April, distributed May 2016
05/31/2016	794377	Fisher Construction, Inc	$ 16,335.00	5710-71430-402450	Install blastproof exhaust fan to better ventilate
05/31/2016	794380	Gillig Corporation	$ 5,912.72	5710-00000-141714	BUS MET PO NUM 300652
05/31/2016	794380	Gillig Corporation	$ 143.64	5710-71440-402320	AUTO &TRUCK MAINT.ITEMS
05/31/2016	794380	Gillig Corporation	$ 1,423.20	5710-00000-141714	BUS MET PO NUM 300658
05/31/2016	794383	Hample Excavation Inc	$ 24,798.26	5130-85910-409340	WO 16-97 Bench Blvd Sewer Service Extendtion
05/31/2016	794384	Hanson Chemical Inc.	$ 150.24	5020-00000-141000	WATER PARTS AND SUPPLIES
05/31/2016	794384	Hanson Chemical Inc.	$ 2,943.25	0100-51270-402450	Carpet cleaner for the PRPL office and Community
05/31/2016	794388	HDR, Inc.	$ 3,847.88	8400-31840-403590	MS4 General Permit
05/31/2016	794394	Iaff	$ 4,387.76	9000-00000-209920	Payroll Summary
05/31/2016	794397	Ingram Library Services Inc.	$ 10.61	2600-55190-403333	92923170
05/31/2016	794397	Ingram Library Services Inc.	$ 15.33	2600-55190-403226	92923171
05/31/2016	794397	Ingram Library Services Inc.	$ 10.02	2600-55190-403333	92923172
05/31/2016	794397	Ingram Library Services Inc.	$ 15.59	2600-55190-403227	92923173
05/31/2016	794397	Ingram Library Services Inc.	$ 124.99	2600-55190-403226	92923174
05/31/2016	794397	Ingram Library Services Inc.	$ 89.77	2600-55190-403226	92923175
05/31/2016	794397	Ingram Library Services Inc.	$ 17.70	2600-55190-403227	92923176
05/31/2016	794397	Ingram Library Services Inc.	$ 10.61	2600-55190-403255	92923177
05/31/2016	794397	Ingram Library Services Inc.	$ 39.54	2600-55140-402280	92923178
05/31/2016	794397	Ingram Library Services Inc.	$ 623.64	2600-55190-403227	93018116
05/31/2016	794397	Ingram Library Services Inc.	$ 1,021.58	2600-55190-403333	93018116
05/31/2016	794397	Ingram Library Services Inc.	$ 10.61	2600-55190-403333	93018117
05/31/2016	794397	Ingram Library Services Inc.	$ 32.99	2600-55190-403222	93018118
05/31/2016	794397	Ingram Library Services Inc.	$ 23.60	2600-55190-403227	93018118
05/31/2016	794397	Ingram Library Services Inc.	$ 15.34	2600-55190-403226	93018119
05/31/2016	794397	Ingram Library Services Inc.	$ 15.92	2600-55190-403227	93018119
05/31/2016	794397	Ingram Library Services Inc.	$ 28.18	2600-55190-403227	93018120
05/31/2016	794397	Ingram Library Services Inc.	$ 95.08	2600-55190-403226	93018121
05/31/2016	794397	Ingram Library Services Inc.	$ 175.74	2600-55190-403226	93018122
05/31/2016	794397	Ingram Library Services Inc.	$ 21.99	2600-55190-403222	93018123

Check Date	Check	Name	Amount	Account	Item Desc
05/31/2016	794397	Ingram Library Services Inc.	$ 35.71	2600-55190-403226	93018123
05/31/2016	794397	Ingram Library Services Inc.	$ 45.84	2600-55190-403227	93018123
05/31/2016	794397	Ingram Library Services Inc.	$ 5.39	2600-55190-403333	93018123
05/31/2016	794397	Ingram Library Services Inc.	$ 65.98	2600-55190-403227	93027092
05/31/2016	794397	Ingram Library Services Inc.	$ 23.82	2600-55190-403333	93027092
05/31/2016	794397	Ingram Library Services Inc.	$ 71.48	2600-55190-403222	93035792
05/31/2016	794397	Ingram Library Services Inc.	$ 390.09	2600-55190-403226	93035792
05/31/2016	794397	Ingram Library Services Inc.	$ 406.89	2600-55190-403227	93035792
05/31/2016	794397	Ingram Library Services Inc.	$ 93.47	2600-55190-403242	93035792
05/31/2016	794397	Ingram Library Services Inc.	$ 19.44	2600-55190-403227	93035793
05/31/2016	794397	Ingram Library Services Inc.	$ 29.09	2600-55190-403227	93044031
05/31/2016	794406	Knife River (JTL Group Inc.)	$ 405.65	2110-31320-404710	asphalt
05/31/2016	794406	Knife River (JTL Group Inc.)	$ 594.00	2110-31320-404160	concrete used on country club circle headwall
05/31/2016	794406	Knife River (JTL Group Inc.)	$ 545.34	2110-31320-404710	asphalt
05/31/2016	794406	Knife River (JTL Group Inc.)	$ 1,733.62	2110-31320-404710	asphalt
05/31/2016	794408	L N Curtis & Sons	$ 3,550.00	1500-22290-402490	BH20B 24" ELECTRIC VENTILATION/EXHAUST
05/31/2016	794408	L N Curtis & Sons	$ 1,200.00	1500-22290-402490	EB16S W/10' EXHAUST TUBE
05/31/2016	794408	L N Curtis & Sons	$ 1,800.00	1500-22290-402490	365 HD20DG .404 VENT MASTER CHAINSAW
05/31/2016	794408	L N Curtis & Sons	$ 2,900.00	1500-22290-402490	AXD1STNXT TFT BALL VALVE
05/31/2016	794408	L N Curtis & Sons	$ 1,000.00	1500-22290-402490	SALVAGE COVERS 12X18, FOLD-A-TANK-VINYL
05/31/2016	794414	Miller Trois LLC	$ 1,837.00	0100-43210-405311	I16-024849 Planning & Community Services June
05/31/2016	794414	Miller Trois LLC	$ 6,029.00	2090-44510-405311	I16-024849 Planning & Community Services June
05/31/2016	794414	Miller Trois LLC	$ 3,997.00	2400-43010-405311	I16-024849 Planning & Community Services June
05/31/2016	794414	Miller Trois LLC	$ 4,734.00	2740-67800-405310	I16-024849 Planning & Community Services June
05/31/2016	794417	Montana CSED	$ 3,941.59	9000-00000-209926	Payroll Summary
05/31/2016	794418	Montana Dakota Utilities	$ 3,176.14	6010-00000-141000	061016 PO NUM 300670
05/31/2016	794419	Montana Dakota Utilities Co	$ 19.92	2910-66980-407275	FORECLOSURE PROGRAM - 619 Custer Ave
05/31/2016	794419	Montana Dakota Utilities Co	$ 42.91	5610-71170-403440	283 116 0655 3. IP-12 Alpine Maintenance.
05/31/2016	794419	Montana Dakota Utilities Co	$ 51.14	5610-71170-403440	295 580 1000 4. Aero Interiors. May 2016
05/31/2016	794419	Montana Dakota Utilities Co	$ 94.27	5610-71170-403440	185 580 1000 7. TSA Building. May 2016
05/31/2016	794419	Montana Dakota Utilities Co	$ 329.60	5610-71190-403440	889 373 1000 6. Car Wash. May 2016
05/31/2016	794419	Montana Dakota Utilities Co	$ 229.28	5610-71190-403440	129 573 1000 1. Mud Wash. May 2016
05/31/2016	794419	Montana Dakota Utilities Co	$ 31.26	5610-71190-403440	229 573 1000 0. Detail Bay 1 Hertz. May 2016
05/31/2016	794419	Montana Dakota Utilities Co	$ 83.12	5610-71190-403440	629 573 1000 6. Detail Bay 2 National/Alamo.
05/31/2016	794419	Montana Dakota Utilities Co	$ 51.64	5610-71190-403440	329 573 1000 9. Detail Bay 3 Enterprise.
05/31/2016	794419	Montana Dakota Utilities Co	$ 37.08	5610-71190-403440	429 573 1000 8. Detail Bay 4 Avis/Budget.
05/31/2016	794419	Montana Dakota Utilities Co	$ 20.13	5610-71190-403440	529 573 1000 7. Detail Bay 5 Thrifty/Dollar
05/31/2016	794419	Montana Dakota Utilities Co	$ 52.15	5020-74000-403440	010 490 1000 0
05/31/2016	794419	Montana Dakota Utilities Co	$ 71.69	0100-51410-403440	037 890 1000 0
05/31/2016	794419	Montana Dakota Utilities Co	$ 26.68	0100-51260-403440	061 943 1000 6

Check Date	Check	Name	Amount	Account	Item Desc
05/31/2016	794419	Montana Dakota Utilities Co	$ 17.65	5020-74000-403440	110 490 1000 9
05/31/2016	794419	Montana Dakota Utilities Co	$ 70.48	6500-15660-403440	130 733 1000 8
05/31/2016	794419	Montana Dakota Utilities Co	$ 57.91	5020-74000-403440	210 490 1000 8
05/31/2016	794419	Montana Dakota Utilities Co	$ 199.70	5020-73140-403440	310 490 1000 7
05/31/2016	794419	Montana Dakota Utilities Co	$ 66.57	5120-83140-403440	310 490 1000 7
05/31/2016	794419	Montana Dakota Utilities Co	$ 131.79	5020-73140-403440	410 490 1000 6
05/31/2016	794419	Montana Dakota Utilities Co	$ 43.92	5120-83140-403440	410 490 1000 6
05/31/2016	794419	Montana Dakota Utilities Co	$ 187.05	1500-22210-403440	442 190 1000 4
05/31/2016	794419	Montana Dakota Utilities Co	$ 622.31	5020-74000-403440	500 490 1000 7
05/31/2016	794419	Montana Dakota Utilities Co	$ 22.93	5020-74000-403440	510 490 1000 5
05/31/2016	794419	Montana Dakota Utilities Co	$ 142.61	1500-22210-403440	533 653 1000 1
05/31/2016	794419	Montana Dakota Utilities Co	$ 37.30	5020-74000-403440	566 923 1000 8
05/31/2016	794419	Montana Dakota Utilities Co	$ 7.62	5020-74000-403440	600 490 1000 6
05/31/2016	794419	Montana Dakota Utilities Co	$ 7.63	5020-74000-403440	600 490 1000 6
05/31/2016	794419	Montana Dakota Utilities Co	$ 13.34	5020-74000-403440	610 490 1000 4
05/31/2016	794419	Montana Dakota Utilities Co	$ 15.25	5020-74000-403440	666 923 1000 7
05/31/2016	794419	Montana Dakota Utilities Co	$ 123.07	5020-74000-403440	700 490 1000 5
05/31/2016	794419	Montana Dakota Utilities Co	$ 27.65	5120-85000-403440	735 453 1000 2
05/31/2016	794419	Montana Dakota Utilities Co	$ 786.20	6500-15660-403440	757 633 1000 2
05/31/2016	794419	Montana Dakota Utilities Co	$ 99.43	5410-31230-403440	770 390 1000 2
05/31/2016	794419	Montana Dakota Utilities Co	$ 36.27	5020-74000-403440	800 490 1000 4
05/31/2016	794419	Montana Dakota Utilities Co	$ 27.65	5120-85000-403440	868 563 1000 7
05/31/2016	794419	Montana Dakota Utilities Co	$ 27.15	5020-74000-403440	900 490 1000 3
05/31/2016	794419	Montana Dakota Utilities Co	$ 35.32	0100-51410-403440	927 890 1000 3
05/31/2016	794419	Montana Dakota Utilities Co	$ 773.25	6500-15660-403440	989 733 1000 0
05/31/2016	794419	Montana Dakota Utilities Co	$ 245.61	6500-15660-403440	993 733 1000 4
05/31/2016	794421	Montana Peterbilt LLC	$ 1,691.39	5710-71440-402320	AUTO &TRUCK MAINT.ITEMS
05/31/2016	794421	Montana Peterbilt LLC	$ 31,997.64	6300-17530-407310	Inv. 261320073 MET Bus #1813 #2016-031
05/31/2016	794422	Montana State Fireman's Assoc	$ 3,607.86	9000-00000-209924	Payroll Summary
05/31/2016	794425	Moulton Bellingham PC	$ 5,514.50	0100-16110-403560	Inv. 115999, 4/30/16, EBURD
05/31/2016	794425	Moulton Bellingham PC	$ 9,579.25	0100-16110-403560	Inv. 116081, 4/30/16, Watters v. City
05/31/2016	794429	MT Waterworks	$ 84.00	5020-00000-141000	WATER PARTS AND SUPPLIES
05/31/2016	794429	MT Waterworks	$ 1,736.01	5020-00000-141000	SYSTEMS PO NUM 300570
05/31/2016	794429	MT Waterworks	$ 1,065.08	5020-00000-141000	SYSTEMS PO NUM 300616
05/31/2016	794432	NorMont Equipment Company	$ 1,740.38	2110-31320-402320	broom wires for sweeper brooms
05/31/2016	794432	NorMont Equipment Company	$ 1,612.88	2110-31320-402420	2.5 x 12 ft telspar post
05/31/2016	794433	NorthWestern Energy	$ 1,552.73	0100-51270-403410	Monthly electrical charges for the office.
05/31/2016	794433	NorthWestern Energy	$ 3,111.10	5020-73140-403410	2251 Belknap
05/31/2016	794433	NorthWestern Energy	$ 16,592.59	5020-74000-403410	2251 Belknap
05/31/2016	794433	NorthWestern Energy	$ 62,222.20	5020-74000-403410	2251 Belknap

Check Date	Check	Name	Amount	Account	Item Desc
05/31/2016	794433	NorthWestern Energy	$ 1,037.04	5120-83140-403410	2251 Belknap
05/31/2016	794433	NorthWestern Energy	$ 3,113.56	1500-22210-403410	FIRE1: MONTHLY ELECTRIC SERVICE
05/31/2016	794433	NorthWestern Energy	$ 62.87	5610-71130-403410	0719616-5. ARFF Facility Lights. May 2016
05/31/2016	794433	NorthWestern Energy	$ 374.69	5610-71170-403410	0712792-1. IP-7. May 2016
05/31/2016	794433	NorthWestern Energy	$ 15.99	5610-71170-403410	0712799-6. IP-8. May 2016
05/31/2016	794433	NorthWestern Energy	$ 1,550.63	5610-71170-403410	0712800-2. IP-9. May 2016
05/31/2016	794433	NorthWestern Energy	$ 304.91	5610-71170-403410	0712809-3. IP-12 Alpine Maintenance. May 2016
05/31/2016	794433	NorthWestern Energy	$ 77.37	5610-71170-403410	0712817-6. IP-House. May 2016
05/31/2016	794433	NorthWestern Energy	$ 6,945.96	6500-15670-403410	0100507-3
05/31/2016	794433	NorthWestern Energy	$ 378.20	5210-15950-403410	0720829-1
05/31/2016	794433	NorthWestern Energy	$ 2,565.70	5210-15920-403410	0720834-1
05/31/2016	794433	NorthWestern Energy	$ 225.32	6070-22350-403410	0721580-9
05/31/2016	794433	NorthWestern Energy	$ 18.04	0100-51120-403410	0722237-5
05/31/2016	794433	NorthWestern Energy	$ 7.55	0100-51120-403410	0722247-4
05/31/2016	794433	NorthWestern Energy	$ 129.55	0100-51120-403410	0722251-6
05/31/2016	794433	NorthWestern Energy	$ 55.17	0100-51120-403410	0722254-0
05/31/2016	794433	NorthWestern Energy	$ 95.60	0100-51120-403410	0722255-7
05/31/2016	794433	NorthWestern Energy	$ 443.28	0100-51120-403410	0722257-3
05/31/2016	794433	NorthWestern Energy	$ 129.55	0100-51120-403410	0722260-7
05/31/2016	794433	NorthWestern Energy	$ 54.95	0100-51120-403410	0722263-1
05/31/2016	794433	NorthWestern Energy	$ 54.95	0100-51120-403410	0722265-6
05/31/2016	794433	NorthWestern Energy	$ 99.12	0100-51120-403410	0722266-4
05/31/2016	794433	NorthWestern Energy	$ 54.95	0100-51120-403410	0722268-0
05/31/2016	794433	NorthWestern Energy	$ 13.20	0100-51120-403410	0722269-8
05/31/2016	794433	NorthWestern Energy	$ 54.95	0100-51120-403410	0722285-4
05/31/2016	794433	NorthWestern Energy	$ 12.35	0100-51120-403410	0722292-0
05/31/2016	794433	NorthWestern Energy	$ 47.00	0100-51120-403410	0722293-8
05/31/2016	794433	NorthWestern Energy	$ 18.65	0100-51120-403410	0722905-7
05/31/2016	794433	NorthWestern Energy	$ 55.50	0100-51120-403410	0722933-9
05/31/2016	794433	NorthWestern Energy	$ 108.07	0100-51120-403410	0723035-2
05/31/2016	794433	NorthWestern Energy	$ 8.87	0100-51120-403410	0723036-0
05/31/2016	794433	NorthWestern Energy	$ 200.38	0100-51120-403410	0723037-8
05/31/2016	794433	NorthWestern Energy	$ 54.95	0100-51120-403410	0723038-6
05/31/2016	794433	NorthWestern Energy	$ 54.95	0100-51120-403410	0723041-0
05/31/2016	794433	NorthWestern Energy	$ 49.72	0100-51120-403410	0723042-8
05/31/2016	794433	NorthWestern Energy	$ 192.52	0100-51120-403410	0723044-4
05/31/2016	794433	NorthWestern Energy	$ 129.55	0100-51120-403410	0723048-5
05/31/2016	794433	NorthWestern Energy	$ 129.55	0100-51120-403410	0723050-1
05/31/2016	794433	NorthWestern Energy	$ 54.95	0100-51120-403410	0723051-9
05/31/2016	794433	NorthWestern Energy	$ 54.95	0100-51120-403410	0723052-7

Check Date	Check	Name	Amount	Account	Item Desc
05/31/2016	794433	NorthWestern Energy	$ 424.98	0100-51120-403410	0723054-3
05/31/2016	794433	NorthWestern Energy	$ 19.01	0100-51120-403410	0723055-0
05/31/2016	794433	NorthWestern Energy	$ 44.16	0100-51120-403410	0723056-8
05/31/2016	794433	NorthWestern Energy	$ 31.41	0100-51120-403410	0723057-6
05/31/2016	794433	NorthWestern Energy	$ 20.56	0100-51120-403410	0723058-4
05/31/2016	794433	NorthWestern Energy	$ 7.55	0100-51120-403410	0723162-4
05/31/2016	794433	NorthWestern Energy	$ 651.24	0100-51120-403410	0723170-7
05/31/2016	794433	NorthWestern Energy	$ 7.55	0100-51120-403410	0723644-1
05/31/2016	794433	NorthWestern Energy	$ 7.55	0100-51120-403410	0723645-8
05/31/2016	794433	NorthWestern Energy	$ 28.27	0100-51120-403410	0789437-1
05/31/2016	794433	NorthWestern Energy	$ 1,406.75	5210-15910-403410	1569636-2
05/31/2016	794433	NorthWestern Energy	$ 1,148.82	5210-15920-403410	1594282-4
05/31/2016	794433	NorthWestern Energy	$ 400.55	6600-31100-403410	1741314-7
05/31/2016	794433	NorthWestern Energy	$ 600.84	6700-31410-403410	1741314-7
05/31/2016	794433	NorthWestern Energy	$ 198.88	5710-71480-403410	1784756-7
05/31/2016	794433	NorthWestern Energy	$ 283.44	1500-21150-403410	1984155-0
05/31/2016	794433	NorthWestern Energy	$ 1,779.90	5210-15940-403410	3067416-2
05/31/2016	794442	Public Utilities	$ 55.52	2910-66980-407275	FORECLOSURE Program 619 Custer
05/31/2016	794442	Public Utilities	$ 2,580.08	5120-84000-403420	111176
05/31/2016	794451	Sanderson Stewart	$ 18,803.31	5030-75910-409340	WO 16-01 2016 Water/Sewer Replc;
05/31/2016	794466	Tetra Tech, Inc.	$ 3,851.00	0100-43210-403585	I16-024567 Tetra Tech, Inc.
05/31/2016	794468	Titan Machinery Inc	$ 2,499.74	2110-31320-402320	631581
05/31/2016	794468	Titan Machinery Inc	$ 481.26	2110-31320-402320	7658681
05/31/2016	794468	Titan Machinery Inc	$ 79.50	2110-31320-402320	7658681
05/31/2016	794468	Titan Machinery Inc	$ 1,107.48	5120-85000-402320	7687007
05/31/2016	794468	Titan Machinery Inc	$ 41.80	5120-85000-402320	7687007
05/31/2016	794468	Titan Machinery Inc	$ 42.89	2110-31320-402320	7724984
05/31/2016	794468	Titan Machinery Inc	$ 55.56	2110-31320-402320	7724984
05/31/2016	794472	Town & Country Supply Association	$ 5,976.80	6010-00000-141000	221161 PO NUM 300680
05/31/2016	794472	Town & Country Supply Association	$ 17,512.42	6010-00000-141000	221190 PO NUM 300681
05/31/2016	794472	Town & Country Supply Association	$ 493.96	0100-51420-402310	Town&Country Mountview 329 gal #2dyed diesel
05/31/2016	794472	Town & Country Supply Association	$ 3,660.85	5710-00000-141000	BUS MET PO NUM 300661
05/31/2016	794472	Town & Country Supply Association	$ 671.03	1500-22260-402310	221226 FIRE 1: UNLEADED DELIVERED
05/31/2016	794472	Town & Country Supply Association	$ 298.84	1500-22260-402310	221226 FIRE 1: DYED DIESEL DELIVERED
05/31/2016	794472	Town & Country Supply Association	$ (0.03)	1500-22260-402310	221226: DECIMAL PT CORRECTION
05/31/2016	794472	Town & Country Supply Association	$ 8,983.19	5710-00000-141000	BUS MET PO NUM 300656
05/31/2016	794474	Tractor & Equipment Co.	$ 19.32	6010-15530-402650	BLCS0623926
05/31/2016	794474	Tractor & Equipment Co.	$ 90,800.09	5410-31230-402320	BLW00167363
05/31/2016	794482	Valmont Industries Inc	$ 5,060.00	2110-00000-141318	STREET LIGHTS PO NUM 300639
05/31/2016	794486	Water Research Foundation	$ 17,831.82	5020-74000-403350	June 2016 thru May 2017 Subscription

Check Date	Check	Name	Amount	Account	Item Desc
05/31/2016	794489	WW Goetsch Associates, Inc.	$ 8,732.00	5020-00000-141000	WASTEWATER PARTS & SUPPLY
05/31/2016	794493	Yellowstone County GIS	$ 7,000.00	6200-19130-403590	Yellowstone County MOU 4th Quarter

Consent **1. P. 2.**

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Payment of Claims June 6,2016

PRESENTED BY: Patrick M. Weber, Finance Director

Department: City Hall Administration

PROBLEM/ISSUE STATEMENT

Claims in the amount of $900,434.87 have been audited and are presented for City Council payment approval. A complete listing of the claims dated June 6, 2016, is available in the Finance Department.

ALTERNATIVES ANALYZED

No other alternatives were analyzed.

FINANCIAL IMPACT

Claims have a varying impact on department budgets, but are submitted by the departments and reviewed by Finance staff before being sent to the Council.

RECOMMENDATION

Staff recommends that Council approve the Payment of Claims.

APPROVED BY CITY ADMINISTRATOR

Attachments

councilmemo_6.6.2016

Check Date	Check	Name	Amount	Account	Item Desc
06/06/2016	47	U.S. Bank PCards	$ 154.85	2400-43010-403920	Topz Llc - PCard
06/06/2016	47	U.S. Bank PCards	$ 144.85	2400-43010-403920	Topz Llc - PCard
06/06/2016	47	U.S. Bank PCards	$ 233.75	0100-17500-403370	Regionalhelpwanted, Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,350.97	2110-31320-409420	21Best.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ (200.00)	1500-22240-403824	Airport Van Rental Inc In - PCard
06/06/2016	47	U.S. Bank PCards	$ 48.69	5410-31230-402290	Tacoma Screw Products B - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.49	5410-31230-402260	Tacoma Screw Products B - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.77	5020-74000-402360	Tacoma Screw Products B - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.78	5120-85000-402360	Tacoma Screw Products B - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.83	5120-84300-402360	Tacoma Screw Products B - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.21	5120-84300-402360	Tacoma Screw Products B - PCard
06/06/2016	47	U.S. Bank PCards	$ 3.45	5120-84300-402360	Tacoma Screw Products B - PCard
06/06/2016	47	U.S. Bank PCards	$ 90.00	0100-13130-403360	Dickeys Mt-619 - PCard
06/06/2016	47	U.S. Bank PCards	$ 144.00	0100-43210-402190	Billings Ink And Toner - PCard
06/06/2016	47	U.S. Bank PCards	$ 160.00	0100-51140-403650	Phillips Feed Montana - PCard
06/06/2016	47	U.S. Bank PCards	$ 398.48	0100-51120-403650	Phillips Feed Montana - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.94	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.99	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.48	2600-55190-403242	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ (11.48)	2600-55190-403242	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 122.08	2600-55190-403227	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.26	2600-55190-403333	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.64	2600-55190-403333	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.98	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.99	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.94	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.94	2600-55160-402190	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.98	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.13	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.15	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.65	2600-55190-403333	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.95	2600-55190-403243	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.00	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.99	2600-55190-403243	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 44.88	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.43	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.75	2600-55190-403382	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.98	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 77.08	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.97	2600-55190-403243	Amazon Mktplace Pmts - PCard

Check Date	Check	Name	Amount	Account	Item Desc
06/06/2016	47	U.S. Bank PCards	$ 77.76	2600-55190-403336	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.39	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.48	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.99	2600-55120-402290	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 424.63	2110-31320-402320	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.77	2110-31320-402320	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.99	2110-31320-402475	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 28.80	0100-51120-402190	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 692.00	1500-21120-402120	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.95	1500-21120-402120	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 53.10	1500-21120-402120	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.98	1500-21120-402120	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 90.59	5610-71130-403660	The Ups Store 2594 - PCard
06/06/2016	47	U.S. Bank PCards	$ 42.56	2650-67720-402290	The Ups Store 2594 - PCard
06/06/2016	47	U.S. Bank PCards	$ 125.16	2650-67720-402290	The Ups Store 2594 - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.23	1500-21700-403110	The Ups Store 2594 - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.50	2910-65010-403110	The Ups Store 2594 - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.59	5610-71150-402320	Oreilly Auto 00015511 - PCard
06/06/2016	47	U.S. Bank PCards	$ 568.71	5610-71130-402320	Oreilly Auto 00015511 - PCard
06/06/2016	47	U.S. Bank PCards	$ 120.96	2110-31320-402310	Oreilly Auto 00015511 - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.99	0100-51120-402320	Oreilly Auto 00015511 - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.99	2110-31320-402430	Oreilly Auto 00017517 - PCard
06/06/2016	47	U.S. Bank PCards	$ 152.16	1500-22310-402640	Wpsg. Inc 800-852-6088 - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.98	1500-21710-402120	Wpsg. Inc 800-852-6088 - PCard
06/06/2016	47	U.S. Bank PCards	$ 400.00	6500-15670-403690	Stanley Steemer/Bllngs - PCard
06/06/2016	47	U.S. Bank PCards	$ 560.00	6500-15660-403660	Stanley Steemer/Bllngs - PCard
06/06/2016	47	U.S. Bank PCards	$ 107.52	5610-71100-403110	Addco Business - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,177.36	5610-71120-402450	Sherwin Williams 701710 - PCard
06/06/2016	47	U.S. Bank PCards	$ 143.19	0100-51120-402290	Sherwin Williams 701710 - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.96	1500-22310-402690	Sherwin Williams 703429 - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.00	2600-55110-403822	Amerlibassoc-Brightkey - PCard
06/06/2016	47	U.S. Bank PCards	$ 125.00	1500-22240-403350	The International Soci - PCard
06/06/2016	47	U.S. Bank PCards	$ 125.00	1500-22240-403350	The International Soci - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.36	5120-84000-402223	Durable Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ (60.00)	0100-51140-403823	Lied Conference Center Lo - PCard
06/06/2016	47	U.S. Bank PCards	$ (60.00)	0100-51140-403823	Lied Conference Center Lo - PCard
06/06/2016	47	U.S. Bank PCards	$ 644.38	0100-51140-403823	Lied Conference Center Lo - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.00	0100-51140-403823	Lied Conference Center Lo - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.00	0100-51140-403823	Lied Conference Center Lo - PCard
06/06/2016	47	U.S. Bank PCards	$ 62.00	2090-44510-403821	Mike Holt Enterprise Of L - PCard

Check Date	Check	Name	Amount	Account	Item Desc
06/06/2016	47	U.S. Bank PCards	$ 16.05	2090-44510-403821	Mike Holt Enterprise Of L - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.82	5610-71120-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.63	5710-71430-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 44.80	5020-74000-402410	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 86.16	6500-15660-402350	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 38.40	5020-74000-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 100.44	5020-74000-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.78	5610-71120-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 59.44	5610-71170-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 180.24	5020-74000-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.16	2600-55120-402350	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 225.12	6500-15670-403690	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 77.18	2110-31320-402920	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 200.03	0100-51120-402410	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.80	5210-15910-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.80	5210-15920-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.80	5210-15930-402450	Ww Grainger - PCard
06/06/2016	47	U.S. Bank PCards	$ 50.00	1500-22240-403350	Mt Gov Online Trns - PCard
06/06/2016	47	U.S. Bank PCards	$ 276.00	5610-71190-403660	Mt Gov Online Trns - PCard
06/06/2016	47	U.S. Bank PCards	$ 70.00	5020-74000-403350	Mt Gov Online Trns - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.99	5210-15210-403210	Fedexoffice 00016089 - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.00	5210-15210-403824	Gaylord Opryland Retai - PCard
06/06/2016	47	U.S. Bank PCards	$ 195.39	7090-21910-403822	Disney Resort-Parad - PCard
06/06/2016	47	U.S. Bank PCards	$ 917.94	5030-74910-409480	Www.Newegg.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 305.98	5120-84300-402360	Www.Newegg.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 121.99	5120-84300-402360	Www.Newegg.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,701.00	0100-51250-403990	Lamar Media 3 - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.50	6500-15660-402450	Bridger Steel Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ (852.75)	5020-74000-402450	Emerald Automotive Divis - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.57	5710-71430-403823	Exxonmobil 45941648 - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.01	1500-22210-403760	Exxonmobil 45944386 - PCard
06/06/2016	47	U.S. Bank PCards	$ 198.19	2110-31320-403823	Pln*Priceline Rental - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.00	2110-31320-403823	Pln*Priceline.Com Air - PCard
06/06/2016	47	U.S. Bank PCards	$ 250.00	2110-31320-402430	Intermountain Traf - PCard
06/06/2016	47	U.S. Bank PCards	$ 949.46	5020-73110-403823	Expedia*1134962059633 - PCard
06/06/2016	47	U.S. Bank PCards	$ 632.98	5120-83110-403823	Expedia*1134962059633 - PCard
06/06/2016	47	U.S. Bank PCards	$ (350.00)	1500-21150-403822	Pay*Homeaway 789630 13 - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.19	5020-73110-403110	Ups*294413Jj1Q2 - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.79	5120-83110-403110	Ups*294413Jj1Q2 - PCard
06/06/2016	47	U.S. Bank PCards	$ 497.20	1500-21400-403822	Comfort Suites Of Helena - PCard

Check Date	Check	Name	Amount	Account	Item Desc
06/06/2016	47	U.S. Bank PCards	$ 497.20	1500-21400-403822	Comfort Suites Of Helena - PCard
06/06/2016	47	U.S. Bank PCards	$ 106.50	5410-31230-403420	American Water & Technolo - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.00	1500-21710-402120	American Water & Technolo - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.00	0100-51120-402290	Dollar Tree - PCard
06/06/2016	47	U.S. Bank PCards	$ 3.00	0100-51100-403360	Dollar Tree - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.00	0100-51120-402290	Dollar Tree - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.00	0100-51120-402290	Dollar Tree - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.00	5120-87000-402280	Dolrtree 2828 00028282 - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.14	1500-21400-403822	Town Pump Helena 5 - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.35	5710-71430-403823	Town Pump Billings Fo 3 - PCard
06/06/2016	47	U.S. Bank PCards	$ 199.00	2090-44510-403821	Ncs*Itl Cde Council Ex - PCard
06/06/2016	47	U.S. Bank PCards	$ 199.00	2090-44510-403821	Ncs*Itl Cde Council Ex - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,263.00	1500-21120-402260	L A Police Gear Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 96.64	7380-12640-402190	Candy Town Usa Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 198.88	5710-71430-403823	Best Wester Premier Hele - PCard
06/06/2016	47	U.S. Bank PCards	$ 298.32	5710-71410-403822	Best Wester Premier Hele - PCard
06/06/2016	47	U.S. Bank PCards	$ 310.95	2400-43010-403722	Comfort Inn University - PCard
06/06/2016	47	U.S. Bank PCards	$ 128.40	5610-71150-402220	Paypal *Aed Superst - PCard
06/06/2016	47	U.S. Bank PCards	$ 262.40	5610-71150-402220	Paypal *Aed Superst - PCard
06/06/2016	47	U.S. Bank PCards	$ 90.00	1500-21110-403824	Paypal *Fbinaamonta - PCard
06/06/2016	47	U.S. Bank PCards	$ 180.00	1500-21400-403822	Paypal *Fbinaamonta - PCard
06/06/2016	47	U.S. Bank PCards	$ 65.00	2400-43010-403350	Paypal *Map - PCard
06/06/2016	47	U.S. Bank PCards	$ 195.00	5120-87000-403824	Paypal *Region8Pret - PCard
06/06/2016	47	U.S. Bank PCards	$ 98.95	5610-71130-402260	Paypal *Wrangler - PCard
06/06/2016	47	U.S. Bank PCards	$ 433.44	1500-21720-403824	Rio Suites Front Desk - PCard
06/06/2016	47	U.S. Bank PCards	$ 360.82	1500-22260-402120	Americanflagscom - PCard
06/06/2016	47	U.S. Bank PCards	$ 1.00	0100-13130-403824	Bozeman Parking Garage - PCard
06/06/2016	47	U.S. Bank PCards	$ 3,528.51	1500-21120-402120	Crashdatagr - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.90	2600-55140-402290	Jet.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 505.56	5120-87000-403824	Doubletree Durngo - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.60	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 108.36	5610-71130-402450	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.11	5120-85000-402360	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.91	6500-15660-402450	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 3.30	6500-15660-402450	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 354.00	6500-15670-403690	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 74.85	5120-85000-402360	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 83.56	1500-21500-402271	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.17	5020-75000-402410	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.45	5120-85000-402410	Lowes #00319* - PCard

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06/06/2016	47	U.S. Bank PCards	$ 53.70	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 38.66	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.48	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 3.49	8730-51990-403670	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.97	0100-51120-402330	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 53.20	2110-31320-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 160.88	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.98	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.94	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.40	5410-31220-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.96	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 38.73	0100-51120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 179.00	2110-31320-402920	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.16	2110-31320-402475	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.50	0100-51120-402260	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 29.61	8730-51990-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.95	1500-22230-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.78	1500-22260-402240	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 186.89	1500-21120-402290	Lowes #00319* - PCard
06/06/2016	47	U.S. Bank PCards	$ 223.96	5610-71130-403650	Edge Construction Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 114.72	5610-71130-403650	Edge Construction Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 67.90	2110-31320-402920	Edge Construction Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 94.33	1500-21150-402285	Pita Pit - 14-025-Mt - PCard
06/06/2016	47	U.S. Bank PCards	$ 300.00	1500-21110-401170	Pita Pit - 14-025-Mt - PCard
06/06/2016	47	U.S. Bank PCards	$ 114.18	2650-67720-402290	Pita Pit - 14-025-Mt E - PCard
06/06/2016	47	U.S. Bank PCards	$ 266.43	2650-67720-402290	Pita Pit - 14-025-Mt E - PCard
06/06/2016	47	U.S. Bank PCards	$ 264.96	1500-21150-402285	Pita Pit - 14-025-Mt - PCard
06/06/2016	47	U.S. Bank PCards	$ 46.00	1500-21110-403824	Grantree Conoco - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.82	5020-77000-403824	Grantree Conoco - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.82	5120-87000-403824	Grantree Conoco - PCard
06/06/2016	47	U.S. Bank PCards	$ 50.00	0100-12120-402190	State Farm - PCard
06/06/2016	47	U.S. Bank PCards	$ 763.72	5120-84300-402360	Tfs*Thermoasheville - PCard
06/06/2016	47	U.S. Bank PCards	$ 278.19	1500-21400-402270	Midwayusa Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 600.00	5610-71190-402450	Paypal *Custombio - PCard
06/06/2016	47	U.S. Bank PCards	$ 47.39	2110-31320-402475	M K Rittenhouse & Sons - PCard
06/06/2016	47	U.S. Bank PCards	$ 29.96	2920-65010-402190	Nordstrom Direct #0808 - PCard
06/06/2016	47	U.S. Bank PCards	$ 869.00	2110-31320-402290	International Bronze Plaq - PCard
06/06/2016	47	U.S. Bank PCards	$ 577.00	7750-51540-407249	International Bronze Plaq - PCard
06/06/2016	47	U.S. Bank PCards	$ 877.36	5610-71130-403653	Airside Solutions, Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 535.10	5610-71130-403653	Airside Solutions, Inc - PCard

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06/06/2016	47	U.S. Bank PCards	$ 255.00	5020-74000-402220	Delta Scientific - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,422.12	1500-21120-402120	Hc Warehouse/Buckstaff - PCard
06/06/2016	47	U.S. Bank PCards	$ 193.50	5020-73140-402120	Nextwarehouse.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 64.50	5120-83140-402120	Nextwarehouse.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 322.86	0100-13130-403824	The Lark - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,311.15	5210-15940-402190	The Parking Zone - PCard
06/06/2016	47	U.S. Bank PCards	$ 66.75	2510-21270-402190	Tlo Transunion - PCard
06/06/2016	47	U.S. Bank PCards	$ 525.00	1500-21400-402270	Alias Training - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.00	2600-55110-403824	Bb *Creativity Museum - PCard
06/06/2016	47	U.S. Bank PCards	$ 210.00	1500-22240-403824	Capital Commons - PCard
06/06/2016	47	U.S. Bank PCards	$ 107.65	1500-21400-402270	Outdoor Gear Barn - PCard
06/06/2016	47	U.S. Bank PCards	$ 294.00	5020-74000-403350	Owpsacstate - PCard
06/06/2016	47	U.S. Bank PCards	$ 46.19	0100-51120-402290	Ferguson Ent #3027 - PCard
06/06/2016	47	U.S. Bank PCards	$ 371.92	5610-71120-402450	Ferguson Ent #3027 - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.34	2600-55120-402350	Ferguson Ent #3027 - PCard
06/06/2016	47	U.S. Bank PCards	$ 315.39	6010-15500-402925	Hp *Hp Home Store - PCard
06/06/2016	47	U.S. Bank PCards	$ 28.79	6010-15500-402190	Hp *Hp Home Store - PCard
06/06/2016	47	U.S. Bank PCards	$ (59.99)	6010-15500-402925	Hp *Hp Home Store - PCard
06/06/2016	47	U.S. Bank PCards	$ 274.66	0100-51120-402290	Aerosol Store - PCard
06/06/2016	47	U.S. Bank PCards	$ 322.72	5710-71430-402450	Belanger Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 70.00	2510-21270-402190	Conferencing - PCard
06/06/2016	47	U.S. Bank PCards	$ 100.00	1500-21110-403170	Magic City Wrecker And Re - PCard
06/06/2016	47	U.S. Bank PCards	$ 125.00	5020-74000-403823	Paypal *Montanasect - PCard
06/06/2016	47	U.S. Bank PCards	$ 104.50	1500-22250-403824	Antler Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 104.50	1500-22250-403824	Antler Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 104.50	1500-22250-403824	Antler Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 557.88	1500-21400-402270	Ftf Industrie Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 675.00	1500-21400-403822	Paypal *Colsnsafety - PCard
06/06/2016	47	U.S. Bank PCards	$ 134.93	5610-71130-402260	Cabelas.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 101.08	5020-74000-402220	Fedex 20369767 - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.89	5020-74000-402290	Fedex 782950348641 - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.89	5120-84300-402290	Fedex 782950348641 - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.28	5120-85000-403660	Fedex 782950367566 - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.66	2110-31320-402290	Fedex 783045244668 - PCard
06/06/2016	47	U.S. Bank PCards	$ 68.21	7380-12640-402190	Fedex 783126608521 - PCard
06/06/2016	47	U.S. Bank PCards	$ 28.58	1500-21110-403110	Fedex 99050006 - PCard
06/06/2016	47	U.S. Bank PCards	$ 68.49	1500-21110-403110	Fedex 99144723 - PCard
06/06/2016	47	U.S. Bank PCards	$ 61.19	1500-21110-403110	Fedex 99343793 - PCard
06/06/2016	47	U.S. Bank PCards	$ 61.17	5610-71130-403650	Probuild N #409 - PCard
06/06/2016	47	U.S. Bank PCards	$ 275.00	5610-71150-402290	Billings Clinic Ctc - PCard

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06/06/2016	47	U.S. Bank PCards	$ 35.00	5610-71150-402290	Billings Clinic Ctc - PCard
06/06/2016	47	U.S. Bank PCards	$ 160.00	5610-71150-402290	Billings Clinic Ctc - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.00	5610-71150-402220	Billings Clinic Homeox - PCard
06/06/2016	47	U.S. Bank PCards	$ 28.35	0100-51210-403665	Plug N Pay Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 33.50	2600-55190-403382	Alibris Books - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.12	2600-55190-403226	Alibris Books - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.88	2600-55190-403333	Alibris Books - PCard
06/06/2016	47	U.S. Bank PCards	$ 118.52	2110-31320-402920	Titan Machinery - Billin - PCard
06/06/2016	47	U.S. Bank PCards	$ 105.20	2110-31320-402310	Cenex Zip Trip07082696 - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.08	1500-21120-402120	Cenex Zip Trip07082720 - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,603.92	5610-71120-402450	Battery Systems Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 94.00	0100-12120-402190	Nna*Natl Notary Assn - PCard
06/06/2016	47	U.S. Bank PCards	$ 121.10	0100-51120-402260	Snappy Duds - PCard
06/06/2016	47	U.S. Bank PCards	$ 457.50	0100-51120-402260	Snappy Duds - PCard
06/06/2016	47	U.S. Bank PCards	$ 140.89	2090-44510-401170	Flowers From The Heart - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.75	2110-31320-402420	American Weldi - PCard
06/06/2016	47	U.S. Bank PCards	$ 57.70	0100-51120-403660	American Weldi - PCard
06/06/2016	47	U.S. Bank PCards	$ 136.35	5020-74000-402450	American Weldi - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.33	0100-51120-403370	Facebook Bjxbw92Kf2 - PCard
06/06/2016	47	U.S. Bank PCards	$ 96.61	0100-51120-403370	Facebook Xdvdh96Rv2 - PCard
06/06/2016	47	U.S. Bank PCards	$ 82.00	2090-44510-403821	National I T C Corp - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.00	5610-71130-402320	Industrial Coating Soluti - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.00	5120-85000-403660	Industrial Coating Soluti - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.00	5020-74000-403660	Industrial Coating Soluti - PCard
06/06/2016	47	U.S. Bank PCards	$ 115.00	1500-21400-402270	Glock Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.37	5610-71130-402320	Schnitzer Steel Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 55.95	5610-71100-403390	Magic City Floral Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,255.74	5610-00000-141000	Tidal Wave Car Wash - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,010.17	5610-71120-402450	Plumbmaster Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 113.69	5410-31230-402290	Respond Systems - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.42	1500-22240-403824	East Street 66 - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.00	1500-22240-402260	Marlow White Uniforms - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.95	0100-17500-403370	Planetizen Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 454.00	5610-71120-402450	Qualified Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.00	2910-65010-403822	Rtd East Dia - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.75	0100-15120-402190	Supplygeeks.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 46.98	5710-71470-402450	Vistapr*Vistaprint.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 442.73	5610-71150-402290	Wm Llc - PCard
06/06/2016	47	U.S. Bank PCards	$ 210.87	1500-21150-402975	Elite K-9 Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.50	5020-74000-402190	Aaim Solutions - PCard

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06/06/2016	47	U.S. Bank PCards	$ 117.39	5610-71130-402370	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.48	0100-51120-403660	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.31	0100-51120-403660	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 287.00	5020-73120-402410	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.88	5120-85000-402410	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 118.14	5410-31220-402290	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 414.50	5410-31220-402630	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 151.67	5410-31220-402630	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 188.67	5410-31220-402290	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 66.48	5410-31220-402630	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 87.39	5410-31220-402290	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 380.08	5610-71130-402370	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.87	2110-31320-402630	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 92.47	5410-31230-402290	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 29.74	5410-31230-402290	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.94	5410-31230-402290	Norco Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.27	5710-71410-403822	Sinclair Friendly'S - PCard
06/06/2016	47	U.S. Bank PCards	$ 115.00	0100-12200-403824	Nacm - PCard
06/06/2016	47	U.S. Bank PCards	$ 525.00	0100-12200-403824	Nacm - PCard
06/06/2016	47	U.S. Bank PCards	$ 400.38	5030-74910-409480	Monoprice Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 400.37	5130-84910-409480	Monoprice Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.50	5020-74000-402360	Monoprice Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 54.86	5120-84300-402360	Monoprice Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 33.38	5120-84300-402360	Monoprice Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,000.00	5610-71140-403990	Transportation Security - PCard
06/06/2016	47	U.S. Bank PCards	$ 62.60	7690-51820-402290	Jimmy Johns - 1646 - E - PCard
06/06/2016	47	U.S. Bank PCards	$ 116.40	7690-51820-402290	Jimmy Johns - 1646 - E - PCard
06/06/2016	47	U.S. Bank PCards	$ 124.50	0100-11000-402230	Jimmy Johns - 1646 - M - PCard
06/06/2016	47	U.S. Bank PCards	$ 58.00	0100-13130-403360	Jimmy Johns - 1646 - M - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.40	1500-21400-403822	Jimmy Johns - 1646 - M - PCard
06/06/2016	47	U.S. Bank PCards	$ 339.35	0100-13130-403824	Sheraton Hotel - PCard
06/06/2016	47	U.S. Bank PCards	$ 339.36	0100-11000-403740	Sheraton Hotel - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,089.11	5710-71420-403823	Omni Charlotte - PCard
06/06/2016	47	U.S. Bank PCards	$ 300.00	0100-51260-402290	Arc*Services/Training - PCard
06/06/2016	47	U.S. Bank PCards	$ 210.00	0100-51260-402290	Arc*Services/Training - PCard
06/06/2016	47	U.S. Bank PCards	$ 189.00	0100-51260-402290	Arc*Services/Training - PCard
06/06/2016	47	U.S. Bank PCards	$ 65.01	5410-31230-403450	At&T*Bill Payment - PCard
06/06/2016	47	U.S. Bank PCards	$ 150.00	6500-15660-402210	Scotts Lawn Service Of - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,088.35	1500-21400-403822	Hampton Inn Suites - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.98	7380-12640-402190	Albertsons #2038 - PCard

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06/06/2016	47	U.S. Bank PCards	$ 44.24	2600-55140-402290	Albertsons #2038 - PCard
06/06/2016	47	U.S. Bank PCards	$ 55.86	0100-51120-402290	Albertsons Sto00000380 - PCard
06/06/2016	47	U.S. Bank PCards	$ 109.90	5410-31210-401170	Albertsons Sto00000471 - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.77	1500-21120-402120	Albertsons Sto00000471 - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.95	7690-51820-402290	Albertsons Sto00012278 - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.40	0100-12200-402190	Albertsons Sto00012278 - PCard
06/06/2016	47	U.S. Bank PCards	$ 71.12	1500-21120-402120	Albertsons Sto00012278 - PCard
06/06/2016	47	U.S. Bank PCards	$ 61.23	5610-71150-402290	Albertsons Sto00040253 - PCard
06/06/2016	47	U.S. Bank PCards	$ 75.85	5610-71150-402290	Albertsons Sto00040253 - PCard
06/06/2016	47	U.S. Bank PCards	$ 50.21	5610-71150-402290	Albertsons Sto00040253 - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.88	0100-16110-402190	Albertsons Sto00040253 - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.16	0100-13130-403360	Albertsons Sto00040253 - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.98	1500-21150-402285	Albertsons Sto00040253 - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.92	8730-51990-403360	Albertsons Sto00040253 - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.00	8730-51990-402290	Albertsons Sto00040253 - PCard
06/06/2016	47	U.S. Bank PCards	$ 3.79	0100-51120-402290	Albertsons #2047 - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.98	1500-21110-401170	Albertsons #2047 - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.97	8730-51990-403360	Albertsons #2047 - PCard
06/06/2016	47	U.S. Bank PCards	$ 70.20	5710-71430-402260	Alsco Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 424.72	5710-71430-402450	Alsco Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 255.28	5710-71440-402260	Alsco Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 56.26	5710-71430-403660	Alsco Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 48.30	5710-71480-402450	Alsco Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 168.18	6500-15670-403690	Ecolab, Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 141.15	6500-15660-403660	Ecolab, Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.00	1500-21720-403824	00809 - Apcoa Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 128.70	5610-71130-402320	Waytek - PCard
06/06/2016	47	U.S. Bank PCards	$ 67.02	5610-71130-402320	Waytek - PCard
06/06/2016	47	U.S. Bank PCards	$ (97.14)	5120-84000-402220	Mitchell Instruments C - PCard
06/06/2016	47	U.S. Bank PCards	$ (97.14)	5020-74000-402220	Mitchell Instruments C - PCard
06/06/2016	47	U.S. Bank PCards	$ 120.63	5120-84000-402220	Mitchell Instruments C - PCard
06/06/2016	47	U.S. Bank PCards	$ 120.62	5020-74000-402220	Mitchell Instruments C - PCard
06/06/2016	47	U.S. Bank PCards	$ 634.45	5120-84000-402220	Mitchell Instruments C - PCard
06/06/2016	47	U.S. Bank PCards	$ 634.45	5020-74000-402220	Mitchell Instruments C - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,131.50	1500-21120-402290	Dash Medical Gloves - PCard
06/06/2016	47	U.S. Bank PCards	$ 392.65	1500-21120-402261	High Speed Gear - PCard
06/06/2016	47	U.S. Bank PCards	$ (62.99)	0100-13130-402110	360 Office Solutions - PCard
06/06/2016	47	U.S. Bank PCards	$ 55.96	0100-51420-402290	360 Office Solutions I - PCard
06/06/2016	47	U.S. Bank PCards	$ 459.00	1500-22250-402450	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 171.00	5410-31210-402190	360 Office Solutions Inc - PCard

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06/06/2016	47	U.S. Bank PCards	$ 275.84	6010-15500-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 53.71	6010-15500-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 734.87	5610-71100-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.54	5610-71100-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.36	5020-75000-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.90	5120-85000-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.57	0100-51120-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.18	0100-51100-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 59.44	0100-51120-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 61.24	0100-51210-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 59.44	0100-51100-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.13	0100-51270-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 349.00	5210-15920-402120	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 156.79	5020-74000-402220	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 160.49	5020-73110-403620	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 106.99	5120-83110-403620	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.90	5120-83110-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.36	5020-73110-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 219.99	5120-84000-402120	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 217.56	5120-84000-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 100.98	0100-16110-403240	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.88	0100-16110-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 94.78	2400-43010-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 369.73	2400-43010-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 444.23	6700-31410-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 113.70	6050-15160-402160	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 139.60	6050-15160-402160	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 232.29	0100-15120-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 218.40	6050-15160-402160	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 298.25	0100-15120-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 69.80	6050-15160-402160	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 69.80	6050-15160-402160	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 69.80	6050-15160-402160	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 210.94	5710-71410-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.94	5710-71410-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 54.87	6600-31100-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 42.00	5020-77000-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 42.00	5120-87000-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 367.36	1500-21500-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.07	2090-44510-402190	360 Office Solutions Inc - PCard

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06/06/2016	47	U.S. Bank PCards	$ 62.99	0100-17500-402110	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 62.99	0100-13130-402110	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 89.58	2910-65010-402190	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 474.94	2600-55160-402290	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 539.96	2600-55110-403690	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 547.90	2600-55130-402150	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 500.00	2600-55130-403210	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 225.00	2600-55130-403690	360 Office Solutions Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 56.11	5610-71190-402450	Ring O Matic Mfg Co Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 67.32	5710-71430-402450	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 41.10	0100-51120-402410	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 79.83	0100-51120-402240	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 87.50	0100-51120-402240	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 87.50	0100-51120-402240	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 178.35	0100-51120-402240	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 43.75	0100-51120-402240	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 87.50	0100-51120-402240	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 79.67	6500-15670-402240	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 78.98	6500-15670-403690	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 128.77	6500-15660-402240	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 118.58	6500-15670-403690	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 390.91	0100-51270-402450	Heartland Paper Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,798.51	1500-21150-402285	4Imprint - PCard
06/06/2016	47	U.S. Bank PCards	$ 100.00	1500-21110-403170	Jims Auto Repair - PCard
06/06/2016	47	U.S. Bank PCards	$ 225.00	6700-31410-403824	Asphalt Institute Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,205.00	2600-55180-403690	Evanced Solutions Llc - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,401.45	0100-51260-402290	In *Elifeguard, Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 300.00	2510-21270-403450	In *Gibson Advertising, M - PCard
06/06/2016	47	U.S. Bank PCards	$ 285.00	2600-55190-403380	Inf* City Directories - PCard
06/06/2016	47	U.S. Bank PCards	$ 250.00	8400-31840-403590	In *Buttenews.Net, Llc - PCard
06/06/2016	47	U.S. Bank PCards	$ 923.35	2650-67720-402290	National Service Gear - PCard
06/06/2016	47	U.S. Bank PCards	$ 782.00	2650-67720-402290	National Service Gear - PCard
06/06/2016	47	U.S. Bank PCards	$ 546.98	5610-71130-402320	Dana Safety Supply Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 807.50	0100-51210-403665	Zeecreative - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.00	0100-51210-403665	Zeecreative - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.99	0100-51120-402320	Autozone #3428 - PCard
06/06/2016	47	U.S. Bank PCards	$ 276.99	1500-21120-402440	Handtrucks2Go - PCard
06/06/2016	47	U.S. Bank PCards	$ 89.95	5610-71150-402320	Interstate Battery Of - PCard
06/06/2016	47	U.S. Bank PCards	$ 56.95	0100-51120-402320	Interstate Battery Of - PCard
06/06/2016	47	U.S. Bank PCards	$ 170.31	0100-51120-402330	Interstate Battery Of - PCard

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06/06/2016	47	U.S. Bank PCards	$ 56.95	0100-51120-402320	Interstate Battery Of - PCard
06/06/2016	47	U.S. Bank PCards	$ 520.07	1500-21400-402270	Brownells Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 140.33	1500-21400-402270	Brownells Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.95	1500-21400-402270	Brownells Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.98	1500-21400-402270	Brownells Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.92	1500-21400-402270	Brownells Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 95.00	1500-21110-403170	Budget Towing - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.99	2600-55110-402110	Laurel Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.95	0100-51120-402390	Rimrock Tire - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.94	0100-51120-402390	Rimrock Tire - PCard
06/06/2016	47	U.S. Bank PCards	$ 636.00	0100-51120-402290	Bettymillsc - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,304.00	5120-84000-402290	Lou'S Gloves Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 150.00	2110-31320-402290	Force America Distributin - PCard
06/06/2016	47	U.S. Bank PCards	$ 144.00	1500-21150-402285	Sunset Bowl - PCard
06/06/2016	47	U.S. Bank PCards	$ 193.91	2600-55190-403333	Cavendishsq - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.00	6200-19130-402120	Sq *Billings Office Syste - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.00	5020-75000-403660	Sq *Billings Office Syste - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.00	5120-85000-403660	Sq *Billings Office Syste - PCard
06/06/2016	47	U.S. Bank PCards	$ 33.25	6200-19130-402190	Sq *Billings Office Syste - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.95	5020-75000-403660	Sq *Billings Office Syste - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.30	5120-85000-403660	Sq *Billings Office Syste - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.00	5020-73110-403630	Sq *Billings Office Syste - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.00	5120-83110-403630	Sq *Billings Office Syste - PCard
06/06/2016	47	U.S. Bank PCards	$ 150.00	1500-21110-403170	Sq *Maverick Wrecker - PCard
06/06/2016	47	U.S. Bank PCards	$ 181.00	5610-71120-403660	Sq *Roger Connor - PCard
06/06/2016	47	U.S. Bank PCards	$ 323.00	5610-71190-403660	Sq *Roger Connor - PCard
06/06/2016	47	U.S. Bank PCards	$ 78.00	5610-71190-403660	Sq *Roger Connor - PCard
06/06/2016	47	U.S. Bank PCards	$ 188.00	5610-71190-403660	Sq *Roger Connor - PCard
06/06/2016	47	U.S. Bank PCards	$ 180.00	5610-71120-403660	Sq *Roger Connor - PCard
06/06/2016	47	U.S. Bank PCards	$ 155.00	5610-71190-403660	Sq *Roger Connor - PCard
06/06/2016	47	U.S. Bank PCards	$ 155.00	5610-71190-403660	Sq *Roger Connor - PCard
06/06/2016	47	U.S. Bank PCards	$ 743.50	6500-15660-403990	Sq *Rolling Right Door Se - PCard
06/06/2016	47	U.S. Bank PCards	$ 281.25	6500-15660-403990	Sq *Rolling Right Door Se - PCard
06/06/2016	47	U.S. Bank PCards	$ 645.00	6500-15670-403690	Sq *Skyline Services, Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 52.00	2400-43010-403310	Sq *Yellowstone Cou - PCard
06/06/2016	47	U.S. Bank PCards	$ 100.00	1500-21110-403170	Sq *Agave Towing - PCard
06/06/2016	47	U.S. Bank PCards	$ 200.00	1500-21110-403170	Sq *Agave Towing - PCard
06/06/2016	47	U.S. Bank PCards	$ 171.75	7380-12660-402190	Sq *Dns Enterprise Dba Am - PCard
06/06/2016	47	U.S. Bank PCards	$ 255.73	1500-21150-403822	Sq *The Rose Granite Hous - PCard
06/06/2016	47	U.S. Bank PCards	$ 352.63	2400-43010-403310	Sq *Yellowstone Cou - PCard

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06/06/2016	47	U.S. Bank PCards	$ 59.99	0100-51270-402290	Charter Comm - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.00	2600-55110-403581	In *Southeastern Security - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.00	1500-21150-402285	Volgistics Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 81.00	0100-51120-403360	Volgistics Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 195.76	1500-21150-402285	Sam & Louie'S Nyp - PCard
06/06/2016	47	U.S. Bank PCards	$ 48.65	1500-21120-402260	Mallory Safety And Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 297.29	5610-71120-402450	Ir Industrial - PCard
06/06/2016	47	U.S. Bank PCards	$ 838.44	1500-21710-402220	Mwi Veterinary Supply Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,327.63	1500-21120-402120	Gracie Academy - PCard
06/06/2016	47	U.S. Bank PCards	$ 199.99	1500-21150-402290	Lenovo Group - PCard
06/06/2016	47	U.S. Bank PCards	$ 199.99	1500-21150-402290	Lenovo Group - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,290.60	1500-21150-402290	Lenovo Group - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,290.60	1500-21150-402290	Lenovo Group - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,770.00	2520-21490-402120	Callyo - PCard
06/06/2016	47	U.S. Bank PCards	$ 180.00	1500-21110-403170	Hanson Auto Body, Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,026.63	5610-71100-403581	E & Jk Enterprises Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,046.00	5610-71100-403581	E & Jk Enterprises Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,065.39	5610-71100-403581	E & Jk Enterprises Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,053.76	5610-71100-403581	E & Jk Enterprises Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,049.88	5610-71100-403581	E & Jk Enterprises Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.69	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.09	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 53.71	2600-55190-403227	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 67.94	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.52	2600-55190-403227	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.00	2600-55190-403333	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.23	2600-55190-403241	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.95	2600-55190-403241	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.95	2600-55190-403226	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.00	2600-55190-403227	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.94	2600-55190-403241	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 42.55	2600-55190-403225	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.63	1500-21150-402285	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 281.98	5610-71120-402450	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.96	2600-55140-402290	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 57.17	2600-55140-402280	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 59.97	2600-55190-403225	Target 00013334 - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.99	2600-55190-403222	Target 00013334 - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.99	2600-55190-403225	Target 00013334 - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.99	2600-55190-403336	Target 00013334 - PCard

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06/06/2016	47	U.S. Bank PCards	$ 154.00	2400-43010-403920	Tinys Tavern Inc 2 - PCard
06/06/2016	47	U.S. Bank PCards	$ 250.00	8730-51990-403690	Total Rental Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 105.10	0100-51120-402330	Total Rental Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 332.50	8730-51990-403650	Total Rental Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 150.00	8730-51990-403660	Total Rental Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 77.95	2110-31320-402320	Tractor & Equipment - PCard
06/06/2016	47	U.S. Bank PCards	$ 68.96	2110-31320-402475	Tractor-Supply-Co #0303 - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.20	5410-31220-402320	Tnt Springs - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,346.00	2110-31320-402475	Tvetene Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 570.00	2110-31320-402475	Tvetene Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 95.63	0100-51120-402391	2M Company Warehouse - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.82	0100-51120-402391	2M Company Warehouse - PCard
06/06/2016	47	U.S. Bank PCards	$ 102.96	5610-71120-403660	Usa Communications - PCard
06/06/2016	47	U.S. Bank PCards	$ 58.50	5610-71130-403660	Usa Communications - PCard
06/06/2016	47	U.S. Bank PCards	$ 59.00	2510-21270-402190	Universal Awards - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.50	1500-21120-402120	Universal Awards - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.00	1500-21110-401170	Universal Awards - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.44	0100-51120-402290	Carquest 3103 - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.61	5610-71130-402410	Carquest 3103 - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.28	5610-71130-402310	Carquest 3103 - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.98	5610-71150-402320	Carquest 3103 - PCard
06/06/2016	47	U.S. Bank PCards	$ 90.55	5610-71130-402320	Carquest 3103 - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.92	5020-74000-402290	Carquest 3103 - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.94	0100-51120-402310	Carquest 3104 - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.94	0100-51120-402320	Carquest 3104 - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.64	0100-51120-402320	Carquest 3104 - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.76	0100-51120-402320	Carquest 3104 - PCard
06/06/2016	47	U.S. Bank PCards	$ 550.02	0100-12120-403390	Thomson West*Tcd - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.00	2110-31320-402320	Western Ranch Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.50	1500-22230-402290	Western Ranch Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 70.00	8730-51990-403650	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 140.00	8730-51990-403650	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 210.00	8730-51990-403650	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.00	8730-51990-403650	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 101.00	8730-51990-403650	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,928.00	8730-51990-403650	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 133.00	8730-51990-403650	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,475.00	5020-74000-402450	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 72.50	8730-51990-403650	Wilbur Ellis Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 68.13	8730-51990-403650	Wilbur Ellis Billings - PCard

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06/06/2016	47	U.S. Bank PCards	$ (7.38)	0100-51120-402330	Yellowstone County - PCard
06/06/2016	47	U.S. Bank PCards	$ 295.65	5610-71130-402320	Yellowstone County Implem - PCard
06/06/2016	47	U.S. Bank PCards	$ 207.40	0100-51120-402330	Yellowstone County Implem - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.28	8730-51990-402330	Yellowstone County Implem - PCard
06/06/2016	47	U.S. Bank PCards	$ 118.45	0100-51120-402330	Yellowstone County Implem - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.36	0100-51120-402310	Yellowstone County Implem - PCard
06/06/2016	47	U.S. Bank PCards	$ 218.70	0100-51120-402330	Yellowstone County Implem - PCard
06/06/2016	47	U.S. Bank PCards	$ 844.03	5410-31230-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 129.12	2110-31320-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 62.91	8720-51980-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 59.69	8720-51980-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.01	8720-51980-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.80	8720-51980-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 262.67	8720-51980-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 96.96	0100-51120-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.12	8720-51980-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,217.73	5020-74000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 197.05	5120-85000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,268.83	5120-84000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 162.49	5120-85000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.00	5120-85000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 238.14	5120-85000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.58	5020-74000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,325.64	5020-74000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 184.30	5120-85000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,221.74	5120-84000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 149.22	5120-85000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.00	5120-85000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 246.13	5120-85000-403410	Yellowstone Valley Elect - PCard
06/06/2016	47	U.S. Bank PCards	$ 761.01	1500-21710-402120	Animal Care Equip Online - PCard
06/06/2016	47	U.S. Bank PCards	$ (37.79)	1500-21710-402120	Animal Care Equipment - PCard
06/06/2016	47	U.S. Bank PCards	$ 46.62	5410-31220-402290	In *Frontier Fence Compan - PCard
06/06/2016	47	U.S. Bank PCards	$ 163.20	5410-31220-402290	In *Frontier Fence Compan - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.61	5410-31220-402290	In *Frontier Fence Compan - PCard
06/06/2016	47	U.S. Bank PCards	$ 97.23	1500-21110-403824	Best Western Grantree Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 97.23	6700-31410-403824	Holiday Inns - PCard
06/06/2016	47	U.S. Bank PCards	$ 48.62	5020-77000-403824	Holiday Inns - PCard
06/06/2016	47	U.S. Bank PCards	$ 48.61	5120-87000-403824	Holiday Inns - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.56	5410-31230-402290	Mountain Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 672.00	5610-71130-403650	Redds Prints And Signs In - PCard

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06/06/2016	47	U.S. Bank PCards	$ 1,891.35	5610-71130-403650	Redds Prints And Signs In - PCard
06/06/2016	47	U.S. Bank PCards	$ 3.99	5710-71430-402450	Zigs Bldg Materials - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.04	2110-31320-404310	Zigs Bldg Materials - PCard
06/06/2016	47	U.S. Bank PCards	$ 94.62	2110-31320-404310	Zigs Bldg Materials - PCard
06/06/2016	47	U.S. Bank PCards	$ (348.95)	0100-17500-403330	Blr/Hcpro - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.00	0100-17500-403820	Blr/Hcpro - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,016.71	5610-71130-402320	Dyna - PCard
06/06/2016	47	U.S. Bank PCards	$ 819.24	5610-71120-402240	House Of Clean, Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.98	0100-51120-402320	Harbor Freight Tools 207 - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.98	2110-31320-402290	Harbor Freight Tools 207 - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.94	0100-51120-402410	Harbor Freight Tools 207 - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.98	5410-31220-402410	Harbor Freight Tools 207 - PCard
06/06/2016	47	U.S. Bank PCards	$ 183.82	2110-31320-402410	Harbor Freight Tools 207 - PCard
06/06/2016	47	U.S. Bank PCards	$ 206.98	0100-51120-402120	Harbor Freight Catalog - PCard
06/06/2016	47	U.S. Bank PCards	$ 376.02	2110-31320-404310	Grand Lumber Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.00	2110-31320-402290	Grand Lumber Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,438.13	5610-71130-403653	Standard Signs Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 514.05	2550-21440-402290	Peavey Corp. - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,492.22	1500-21200-402631	Peavey Corp. - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,524.35	1500-21500-402271	Peavey Corp. - PCard
06/06/2016	47	U.S. Bank PCards	$ 129.99	5410-31230-402410	Scheels Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 436.00	4240-51110-409370	Protech Mechanical Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 38.44	0100-13130-402110	Franklincoveyproducts - PCard
06/06/2016	47	U.S. Bank PCards	$ 96.23	1500-22210-403760	Holiday Inn Great Falls - PCard
06/06/2016	47	U.S. Bank PCards	$ 96.23	1500-22210-403760	Holiday Inn Great Falls - PCard
06/06/2016	47	U.S. Bank PCards	$ 252.00	7690-51820-402290	Subway 00999912 - PCard
06/06/2016	47	U.S. Bank PCards	$ 126.00	7690-51820-402290	Subway 00999912 - PCard
06/06/2016	47	U.S. Bank PCards	$ 660.70	2510-21270-403822	Delta Air 0062343648065 - PCard
06/06/2016	47	U.S. Bank PCards	$ 526.70	7090-21910-403822	Delta Air 0062344256918 - PCard
06/06/2016	47	U.S. Bank PCards	$ 737.20	2840-65810-403822	Delta Air 0067770862531 - PCard
06/06/2016	47	U.S. Bank PCards	$ 712.70	0100-12200-403824	Delta Air 0067812501198 - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.00	1500-21720-403824	Delta Air Baggage Fee - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.00	1500-22240-403824	Delta Air Baggage Fee - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.00	1500-22240-403824	Delta Air Baggage Fee - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.00	1500-22240-403824	Delta Air Baggage Fee - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.00	1500-21720-403824	Delta Air Baggage Fee - PCard
06/06/2016	47	U.S. Bank PCards	$ 289.95	5020-74000-402220	Ultra Scientific - PCard
06/06/2016	47	U.S. Bank PCards	$ 301.90	5020-74000-402220	Cpi - PCard
06/06/2016	47	U.S. Bank PCards	$ 243.74	5020-74000-402360	Cdw Government - PCard
06/06/2016	47	U.S. Bank PCards	$ 243.74	5120-84300-402360	Cdw Government - PCard

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06/06/2016	47	U.S. Bank PCards	$ 191.87	5120-84300-402360	Cdw Government - PCard
06/06/2016	47	U.S. Bank PCards	$ 120.00	1500-22230-403350	Iaai - PCard
06/06/2016	47	U.S. Bank PCards	$ 755.00	5620-71200-409490	Sign Pro Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 450.00	5610-71130-402320	Sign Pro Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 116.00	5610-71130-402320	Sign Pro Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.00	1500-22230-402260	Sign Pro Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 745.63	5610-71170-402450	Wesco Distribution6668 - PCard
06/06/2016	47	U.S. Bank PCards	$ 277.50	5610-71120-402450	Wesco Distribution6668 - PCard
06/06/2016	47	U.S. Bank PCards	$ 776.00	2600-55160-402190	Vernon Library Supplies - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.46	8730-51990-403360	Pizza Hut #1714 - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.98	0100-13130-403360	Pizza Hut #1714 - PCard
06/06/2016	47	U.S. Bank PCards	$ 50.00	1500-21120-402120	Pizza Hut #1706 - PCard
06/06/2016	47	U.S. Bank PCards	$ 47.16	1500-21120-402120	Pizza Hut #1706 - PCard
06/06/2016	47	U.S. Bank PCards	$ 444.15	1500-21500-402925	Pcm Tigerdirect - PCard
06/06/2016	47	U.S. Bank PCards	$ 625.95	1500-21500-402925	Pcm Tigerdirect - PCard
06/06/2016	47	U.S. Bank PCards	$ 52.92	1500-21500-402925	Pcm Tigerdirect - PCard
06/06/2016	47	U.S. Bank PCards	$ 706.12	1500-21500-402925	Pcm Tigerdirect - PCard
06/06/2016	47	U.S. Bank PCards	$ 41.10	1500-21500-402925	Pcm Tigerdirect - PCard
06/06/2016	47	U.S. Bank PCards	$ 193.16	1500-21500-402925	Pcm Tigerdirect - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.99	0100-51120-402290	Billings Hardware & Ga - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.92	0100-51260-402290	Billings Hardware & Ga - PCard
06/06/2016	47	U.S. Bank PCards	$ 139.90	0100-51140-403650	Billings Hardware & Ga - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.55	2110-31320-402290	Billings Hardware & Se - PCard
06/06/2016	47	U.S. Bank PCards	$ 149.99	2110-31320-402920	Billings Hardware & Se - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.98	0100-51120-402290	Billings Hardware & Se - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.00	0100-51120-402290	Billings Hardware & Se - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.00	5020-73120-403823	United 0162605332545 - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.00	5020-73120-403823	United 0162605607900 - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.00	5020-73120-403823	United 0162605608062 - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.00	5210-15210-403824	United 0162606472238 - PCard
06/06/2016	47	U.S. Bank PCards	$ 749.20	2110-31320-403823	United 0167793126715 - PCard
06/06/2016	47	U.S. Bank PCards	$ 749.20	2110-31320-403823	United 0167793126717 - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.85	0100-13130-403360	Perkins Rest 04136966 - PCard
06/06/2016	47	U.S. Bank PCards	$ 51.40	0100-51420-402290	Big Sky Irrigation Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,081.21	6200-19110-402290	Idu*Insight Public Sec - PCard
06/06/2016	47	U.S. Bank PCards	$ 137.50	6200-19110-402290	Idu*Insight Public Sec - PCard
06/06/2016	47	U.S. Bank PCards	$ 230.13	1500-21150-402285	Alphagraphics #387 - PCard
06/06/2016	47	U.S. Bank PCards	$ 135.38	0100-51140-402290	Alphagraphics #387 - PCard
06/06/2016	47	U.S. Bank PCards	$ 122.76	0100-12200-402190	Alphagraphics #387 - PCard
06/06/2016	47	U.S. Bank PCards	$ 326.31	0100-12200-402190	Alphagraphics #387 - PCard

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06/06/2016	47	U.S. Bank PCards	$ 200.00	1500-21110-401170	Dee Jay Bee Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.00	7380-12640-402190	408118 Wynnsong 10 - PCard
06/06/2016	47	U.S. Bank PCards	$ 200.00	1500-22250-403350	National Academy Of Emd - PCard
06/06/2016	47	U.S. Bank PCards	$ 37.40	0100-13130-403360	Jakes Restaurant - PCard
06/06/2016	47	U.S. Bank PCards	$ 164.00	2650-67720-402290	Jakes Restaurant - PCard
06/06/2016	47	U.S. Bank PCards	$ 98.67	2400-43010-403720	Fredpryor Careertrack - PCard
06/06/2016	47	U.S. Bank PCards	$ 98.67	0100-43210-403822	Fredpryor Careertrack - PCard
06/06/2016	47	U.S. Bank PCards	$ 101.66	2090-44510-403822	Fredpryor Careertrack - PCard
06/06/2016	47	U.S. Bank PCards	$ 149.00	5020-74000-403823	Fredpryor Careertrack - PCard
06/06/2016	47	U.S. Bank PCards	$ 273.90	6700-31410-403824	Radisson Hotel - PCard
06/06/2016	47	U.S. Bank PCards	$ 96.23	0100-16110-403821	Best Western Heritage Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 118.69	2090-44510-403822	Best Western Heritage Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.04	2090-44510-403822	Best Western Heritage Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.11	2400-43010-403720	Best Western Heritage Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.08	0100-43210-403822	Best Western Heritage Inn - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.99	5610-71130-403650	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 75.98	5610-71130-403650	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 1.79	1500-22260-403670	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.79	2200-22330-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.69	1500-22260-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.89	1500-22260-402340	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.99	1500-22290-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 48.65	1500-22260-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.99	0100-51420-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 349.00	0100-51420-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.08	0100-51410-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.15	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.90	5020-74000-402360	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.97	6500-15660-402210	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.38	6500-15660-402350	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 399.00	6500-15660-402120	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.87	6500-15660-402350	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.97	6500-15660-402210	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.99	6500-15660-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 29.92	5410-31220-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.94	0100-51120-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 44.07	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.95	0100-51120-402391	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.57	0100-51120-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 44.98	5020-74000-402310	Kings Ace Hardware - PCard

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06/06/2016	47	U.S. Bank PCards	$ 15.98	5020-74000-402310	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 131.08	5020-74000-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 33.27	5020-74000-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.98	0100-51250-402250	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 128.10	0100-51120-402240	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.57	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.77	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.98	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 43.98	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.99	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.98	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.09	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.99	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 70.36	0100-51120-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.92	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.99	0100-51120-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.82	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.99	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 83.80	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 41.37	2110-31320-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.52	2110-31320-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.98	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.38	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.96	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.99	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 71.12	0100-51120-402240	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 81.93	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.99	0100-51120-402330	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 63.97	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 133.91	0100-51120-402330	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 124.96	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 57.96	0100-51120-402330	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.90	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.99	0100-51140-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.98	0100-51140-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.01	0100-51140-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.63	5120-84300-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.62	5020-74000-402410	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 33.25	2110-31320-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.99	2110-31320-402475	Kings Ace Hardware - PCard

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06/06/2016	47	U.S. Bank PCards	$ 328.41	2110-31320-402310	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.34	5410-31220-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.93	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.96	5210-15230-402310	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.70	5210-15950-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 0.50	5210-15950-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.99	5210-15950-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.88	5210-15230-402925	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.84	5210-15230-402925	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.98	5210-15230-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.99	5210-15230-402925	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.97	0100-51120-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.99	8730-51990-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.13	5410-31230-402290	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.87	5020-74000-402450	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.28	5020-77000-402190	Kings Ace Hardware - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.33	0100-51120-402290	Heights Ace Hdwe - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.77	0100-51120-402290	Heights Ace Hdwe - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.98	0100-51120-402290	Heights Ace Hdwe - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.37	0100-51120-402330	Heights Ace Hdwe - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.71	5020-74000-402360	Heights Ace Hdwe - PCard
06/06/2016	47	U.S. Bank PCards	$ 37.95	2110-31320-402340	Heights Ace Hdwe - PCard
06/06/2016	47	U.S. Bank PCards	$ 47.00	2600-55190-403227	Renaissance Safe T - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.47	8730-51990-402330	Fei Inc Nd - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.47	8730-51990-402330	Fei Inc Nd - PCard
06/06/2016	47	U.S. Bank PCards	$ 110.00	2400-43010-403350	Assoc Of Pedestrian & Bic - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.48	5020-74000-402450	Superior Water Solutions - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.00	0100-12200-402190	Apl* Itunes.Com/Bill - PCard
06/06/2016	47	U.S. Bank PCards	$ 55.00	2600-55190-403380	Cody Enterprise - PCard
06/06/2016	47	U.S. Bank PCards	$ 465.50	5610-71150-402440	Rf Communications Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 889.00	5610-71120-402240	Montana Broom Brush Comp - PCard
06/06/2016	47	U.S. Bank PCards	$ 241.92	5610-71120-402240	Montana Broom Brush Comp - PCard
06/06/2016	47	U.S. Bank PCards	$ 207.10	5610-71130-402240	Montana Broom Brush Comp - PCard
06/06/2016	47	U.S. Bank PCards	$ 146.54	5020-74000-402220	Idexx Distribution Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 168.48	0100-16110-403821	Big Sky Lodging - PCard
06/06/2016	47	U.S. Bank PCards	$ 168.48	0100-16110-403821	Big Sky Lodging - PCard
06/06/2016	47	U.S. Bank PCards	$ 80.00	2600-55120-403581	Labor Ready - PCard
06/06/2016	47	U.S. Bank PCards	$ 80.00	2600-55120-403581	Labor Ready - PCard
06/06/2016	47	U.S. Bank PCards	$ 80.00	2600-55120-403581	Labor Ready - PCard
06/06/2016	47	U.S. Bank PCards	$ 87.18	5610-71150-402220	Big Sky Fire Equipment - PCard

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06/06/2016	47	U.S. Bank PCards	$ 246.35	2600-55130-402190	Big Sky Fire Equipment - PCard
06/06/2016	47	U.S. Bank PCards	$ 656.93	0100-51120-402290	Big Sky Fire Equipment - PCard
06/06/2016	47	U.S. Bank PCards	$ 148.00	0100-11000-402925	Professional Audio & Lig - PCard
06/06/2016	47	U.S. Bank PCards	$ 575.04	1500-21200-402610	B&H Photo, 800-606-6969 - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.99	5610-71100-403390	Albertsons #2025 - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.36	2400-43010-403824	Albertsons #2025 - PCard
06/06/2016	47	U.S. Bank PCards	$ 3.00	0100-51120-402290	Albertsons #2025 - PCard
06/06/2016	47	U.S. Bank PCards	$ 639.97	0100-16110-403240	Dell Sales & Service - PCard
06/06/2016	47	U.S. Bank PCards	$ 197.98	1500-21500-402190	Dmi* Dell Bus Online - PCard
06/06/2016	47	U.S. Bank PCards	$ 704.95	1500-21500-402190	Dmi* Dell Bus Online - PCard
06/06/2016	47	U.S. Bank PCards	$ 48.58	5710-71430-402450	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 251.23	0100-51120-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.99	6500-15660-402210	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 119.20	8730-51990-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 57.88	0100-51250-402250	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.92	0100-51120-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.88	0100-51120-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 277.97	0100-51120-402120	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.46	0100-51140-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.98	0100-51250-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 78.66	0100-51120-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.25	0100-51120-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 106.91	0100-51120-402410	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.54	0100-51270-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.04	5210-15230-402925	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 139.55	8730-51990-402410	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.50	8730-51990-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 55.82	8730-51990-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 139.41	8730-51990-402290	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 103.68	8730-51990-403650	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.10	0100-51120-402410	The Home Depot 3101 - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.99	8730-51990-403360	Office Depot #2135 - PCard
06/06/2016	47	U.S. Bank PCards	$ 475.92	5210-15210-402190	Office Depot #2135 - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.48	5710-71410-402190	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 210.64	5710-71410-402190	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 129.16	5710-71470-402190	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.98	5210-15210-402190	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.00	5210-15220-402290	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.00	5210-15230-402290	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.99	5210-15920-402190	Office Depot #450 - PCard

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06/06/2016	47	U.S. Bank PCards	$ 5.99	5210-15930-402190	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 74.96	7380-12640-402190	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 760.00	5020-74000-402120	Office Depot #450 - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.97	1500-21150-402285	Albertsons #2030 - PCard
06/06/2016	47	U.S. Bank PCards	$ 185.30	0100-51120-402290	Dxp Enterprises - PCard
06/06/2016	47	U.S. Bank PCards	$ 158.30	0100-51420-402290	Dxp Enterprises - PCard
06/06/2016	47	U.S. Bank PCards	$ 101.56	5020-74000-402450	Dxp Enterprises - PCard
06/06/2016	47	U.S. Bank PCards	$ 492.15	5020-74000-402450	Dxp Enterprises - PCard
06/06/2016	47	U.S. Bank PCards	$ 85.90	0100-51120-402290	Dxp Enterprises - PCard
06/06/2016	47	U.S. Bank PCards	$ 920.30	5610-71150-402290	Dxp Enterprises - PCard
06/06/2016	47	U.S. Bank PCards	$ 395.00	0100-51120-403690	Dxp Enterprises - PCard
06/06/2016	47	U.S. Bank PCards	$ 550.00	5610-71160-403370	Metro Marketing Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 41.34	2600-55190-407930	Center Point Large Print - PCard
06/06/2016	47	U.S. Bank PCards	$ 177.36	2600-55190-403382	Center Point Large Print - PCard
06/06/2016	47	U.S. Bank PCards	$ 47.16	5710-71440-402410	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.99	0100-13140-402120	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ (7.99)	0100-13140-402120	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.97	2600-55190-403255	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.27	2600-55190-403333	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.99	2600-55190-403336	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ (38.19)	2600-55150-402280	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ (84.52)	2600-55150-402280	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 668.93	5610-71140-402290	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 87.63	0100-51140-403650	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 129.99	0100-51250-402250	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.05	2110-31320-402320	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 369.09	2110-31320-402320	Amazon.Com - PCard
06/06/2016	47	U.S. Bank PCards	$ 143.50	1500-22210-402190	Amazon.Com Amzn.Com/Bill - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.42	0100-13140-402120	Amazon.Com Amzn.Com/Bill - PCard
06/06/2016	47	U.S. Bank PCards	$ 167.10	5120-84300-402360	Amazon.Com Amzn.Com/Bill - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.73	2600-55190-403225	Amazon.Com Amzn.Com/Bill - PCard
06/06/2016	47	U.S. Bank PCards	$ 668.93	5610-71140-402290	Amazon.Com Amzn.Com/Bill - PCard
06/06/2016	47	U.S. Bank PCards	$ 129.99	0100-51250-402250	Amazon.Com Amzn.Com/Bill - PCard
06/06/2016	47	U.S. Bank PCards	$ 111.28	6700-31410-402290	Selby'S - PCard
06/06/2016	47	U.S. Bank PCards	$ 155.10	1500-21500-403210	Selby'S - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,167.63	1500-21500-402925	Selby'S - PCard
06/06/2016	47	U.S. Bank PCards	$ 429.99	5020-74000-402290	Best Buy 00005926 - PCard
06/06/2016	47	U.S. Bank PCards	$ 141.94	2510-21270-402190	Best Buy 00005926 - PCard
06/06/2016	47	U.S. Bank PCards	$ 124.96	5610-71120-402450	Best Buy 00005926 - PCard
06/06/2016	47	U.S. Bank PCards	$ 119.98	1500-21200-402610	Best Buy 00005926 - PCard

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06/06/2016	47	U.S. Bank PCards	$ 149.88	1500-21200-402610	Best Buy 00005926 - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.67	5020-73140-402450	Usps 29077401028700474 - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.78	5120-83140-402450	Usps 29077401028700474 - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.47	0100-51400-403110	Usps 29078201028700540 - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.49	0100-51120-402190	Verizon Wrls W3091-01 - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.23	2600-55110-403581	Adecco - PCard
06/06/2016	47	U.S. Bank PCards	$ 386.78	1500-21120-402260	Armament Systems Proce - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.99	5610-71150-402481	Batteries Plus #25 - PCard
06/06/2016	47	U.S. Bank PCards	$ 54.72	6500-15660-402190	Batteries Plus #25 - PCard
06/06/2016	47	U.S. Bank PCards	$ 57.54	5020-74000-402450	Batteries Plus #25 - PCard
06/06/2016	47	U.S. Bank PCards	$ 172.78	5020-74000-402450	Batteries Plus #25 - PCard
06/06/2016	47	U.S. Bank PCards	$ 55.98	5610-71140-402290	Batteries Plus #25 - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.98	1500-21200-402120	Batteries Plus #25 - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.63	5020-73120-402320	Yellowstone County Treas - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.50	0100-51120-402320	Yellowstone County Treas - PCard
06/06/2016	47	U.S. Bank PCards	$ 75.00	5020-74000-403823	Awwa.Org - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.00	2910-65010-402190	The Sign Store - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,479.50	5610-71130-403650	Helena Chemical Co 44021 - PCard
06/06/2016	47	U.S. Bank PCards	$ 51.06	0100-51120-402260	Wal-Mart #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 95.82	5610-71120-402240	Wal-Mart #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.94	0100-51120-402290	Wal-Mart #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 20.43	7690-51820-402290	Wal-Mart #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.00	0100-51120-402290	Wal-Mart #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 34.88	0100-51120-402410	Wal-Mart #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 68.90	5710-71430-402450	Wal-Mart #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 121.85	2600-55150-402280	Wal-Mart #2923 - PCard
06/06/2016	47	U.S. Bank PCards	$ 47.28	1500-21400-403822	Wal-Mart #2923 - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.92	0100-51250-402250	Wal-Mart #2923 - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.32	5710-71430-402450	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 43.98	5710-71470-402450	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.88	5710-71430-402450	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 64.15	5710-71430-402450	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 37.68	0100-51120-402260	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.10	0100-51100-403360	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.43	5210-15910-403650	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.44	5210-15920-403650	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.43	5210-15930-403650	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.85	1500-21500-402271	Wm Supercenter #1956 - PCard
06/06/2016	47	U.S. Bank PCards	$ 52.21	7690-51820-402290	Wm Supercenter #2923 - PCard
06/06/2016	47	U.S. Bank PCards	$ 34.87	0100-16110-402190	Wm Supercenter #2923 - PCard

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06/06/2016	47	U.S. Bank PCards	$ 6.37	1500-22250-402410	Wm Supercenter #2923 - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.97	1500-22250-402190	Wm Supercenter #2923 - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.76	0100-51120-402260	Wm Supercenter #4412 - PCard
06/06/2016	47	U.S. Bank PCards	$ 500.00	2520-21490-403822	Nasro - PCard
06/06/2016	47	U.S. Bank PCards	$ 500.00	7090-21910-403822	Nasro - PCard
06/06/2016	47	U.S. Bank PCards	$ 500.00	7090-21910-403822	Nasro - PCard
06/06/2016	47	U.S. Bank PCards	$ (81.10)	5610-71170-402450	Graybar Electric Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 198.84	5610-71170-402450	Graybar Electric Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 63.60	5610-71170-402450	Graybar Electric Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,424.16	0100-51250-403990	Johnson Lane Materials - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,385.52	0100-51250-403990	Johnson Lane Materials - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,437.74	0100-51250-403990	Johnson Lane Materials - PCard
06/06/2016	47	U.S. Bank PCards	$ 101.00	2650-67720-402290	Greyhound Lines Cnp - PCard
06/06/2016	47	U.S. Bank PCards	$ 96.00	2400-43010-403824	St Vincent Cafeteria - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.00	0100-51210-403450	Dri*Lg - PCard
06/06/2016	47	U.S. Bank PCards	$ 60.00	1500-21710-402220	Vet-To-Go - PCard
06/06/2016	47	U.S. Bank PCards	$ 56.00	2400-43010-403310	Billingsgazettethriftynck - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,799.80	5410-31220-402290	Impact Plastics - PCard
06/06/2016	47	U.S. Bank PCards	$ 228.50	1500-21200-407910	Lexisnexis Risk Dat - PCard
06/06/2016	47	U.S. Bank PCards	$ 102.84	6200-19110-402290	Dmi* Dell K-12/Govt - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.99	0100-12120-403390	Adobe *Acropro Subs - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.99	1500-22210-403590	Adobe *Acropro Subs - PCard
06/06/2016	47	U.S. Bank PCards	$ 799.00	1500-21400-403822	Ti *Taser Intl - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,845.00	1500-21120-402120	Salsbury Industries - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,845.73	1500-21120-402120	Salsbury Industries - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.92	1500-21120-402290	Valet Today Cleaners - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.00	5610-71120-402450	West End Lock And Secur - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.25	6070-22350-403450	West End Lock And Secur - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.50	0100-51250-402250	West End Lock And Secur - PCard
06/06/2016	47	U.S. Bank PCards	$ 28.50	0100-51120-402290	West End Lock And Secur - PCard
06/06/2016	47	U.S. Bank PCards	$ 264.75	5410-31230-402290	West End Lock And Secur - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,459.25	1500-21120-402120	West End Lock And Secur - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.00	1500-21200-402120	West End Lock And Secur - PCard
06/06/2016	47	U.S. Bank PCards	$ 396.00	1500-21120-402261	Gunarama Wholesale I - PCard
06/06/2016	47	U.S. Bank PCards	$ 378.00	1500-21120-402261	Gunarama Wholesale I - PCard
06/06/2016	47	U.S. Bank PCards	$ 933.68	1500-21500-402271	Uline *Ship Supplies - PCard
06/06/2016	47	U.S. Bank PCards	$ 995.00	1500-21200-402120	Ocean Systems - PCard
06/06/2016	47	U.S. Bank PCards	$ 51.76	5610-71130-402320	Meadow Green Sales - PCard
06/06/2016	47	U.S. Bank PCards	$ 52.88	5610-71130-402320	Meadow Green Sales - PCard
06/06/2016	47	U.S. Bank PCards	$ 475.43	0100-51420-402330	Meadow Green Sales - PCard

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06/06/2016	47	U.S. Bank PCards	$ 560.00	1500-21500-402271	Bargreen Ellingson #11 - PCard
06/06/2016	47	U.S. Bank PCards	$ 180.00	6270-17520-403516	City Of Billings Park And - PCard
06/06/2016	47	U.S. Bank PCards	$ 79.99	6270-17520-403516	Target 00001719 - PCard
06/06/2016	47	U.S. Bank PCards	$ 132.05	5020-74000-402220	Online Labels - PCard
06/06/2016	47	U.S. Bank PCards	$ 66.00	2910-65010-402190	Peterson Quality Office - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,425.21	1500-21200-402610	Peterson Quality Office - PCard
06/06/2016	47	U.S. Bank PCards	$ 649.70	5020-74000-402220	Agilenttechnologies - PCard
06/06/2016	47	U.S. Bank PCards	$ 373.40	5020-74000-402220	Agilenttechnologies - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.30	5120-85000-402360	Fastenal Company01 - PCard
06/06/2016	47	U.S. Bank PCards	$ 272.13	2110-31320-402420	Fastenal Company01 - PCard
06/06/2016	47	U.S. Bank PCards	$ 284.30	2110-31320-402290	Fastenal Company01 - PCard
06/06/2016	47	U.S. Bank PCards	$ 167.64	2110-31320-402920	Fastenal Company01 - PCard
06/06/2016	47	U.S. Bank PCards	$ 600.00	1500-21200-402631	Ron Smith And Associat - PCard
06/06/2016	47	U.S. Bank PCards	$ 94.42	0100-14110-403325	Allegra - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.00	0100-14110-403325	Allegra - PCard
06/06/2016	47	U.S. Bank PCards	$ 425.00	0100-51120-403350	Asla Member Services - PCard
06/06/2016	47	U.S. Bank PCards	$ 47.45	5020-74000-402450	Backflow Prevention Su - PCard
06/06/2016	47	U.S. Bank PCards	$ 333.63	0100-51140-402330	Vermeer Rocky Mountain - PCard
06/06/2016	47	U.S. Bank PCards	$ 86.49	0100-51140-402330	Vermeer Rocky Mountain - PCard
06/06/2016	47	U.S. Bank PCards	$ 130.00	0100-51140-403823	Vermeer Rocky Mountain - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,427.65	0100-51120-402120	Rdo Equipment Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 943.35	0100-51120-402120	Rdo Equipment Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.57	5410-31230-403824	Wheat Montana Farms - PCard
06/06/2016	47	U.S. Bank PCards	$ 344.00	0100-51210-402290	Boxwood Technology - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.00	2600-55150-402280	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.46	2600-55150-402280	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 101.30	2600-55150-402280	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 51.57	1500-22260-402120	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 86.92	1500-22210-402190	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.98	1500-22210-402190	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 197.49	1500-22210-403630	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.80	2600-55140-402280	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.28	2600-55140-402280	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 41.35	0100-13140-402120	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 623.14	2090-44510-402120	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.17	2650-67720-402290	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 144.86	2600-55140-402290	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.14	2600-55140-402290	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.67	2600-55140-402280	Amazon Mktplace Pmts - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.53	2600-55140-402290	Amazon Mktplace Pmts - PCard

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06/06/2016	47	U.S. Bank PCards	$ 678.87	2600-55150-402280	Target 00013334 - PCard
06/06/2016	47	U.S. Bank PCards	$ 175.00	2600-55140-402280	Target 00013334 - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.62	5120-87000-402190	Target 00013334 - PCard
06/06/2016	47	U.S. Bank PCards	$ 134.00	5020-74000-403330	Usgovt Print Ofc 32 - PCard
06/06/2016	47	U.S. Bank PCards	$ 197.95	1500-21710-402220	State Chemic*State Che - PCard
06/06/2016	47	U.S. Bank PCards	$ 228.98	1500-21710-402220	State Chemic*State Che - PCard
06/06/2016	47	U.S. Bank PCards	$ 507.18	5610-71130-402240	State Chemic*State Che - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,391.00	5610-71120-402450	State Chemic*State Che - PCard
06/06/2016	47	U.S. Bank PCards	$ 460.10	5610-71120-402450	State Chemic*State Che - PCard
06/06/2016	47	U.S. Bank PCards	$ 3.05	0100-51120-402330	Six Robblees No 6 - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.91	0100-51120-402320	Six Robblees No 6 - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.27	0100-51120-402320	Six Robblees No 6 - PCard
06/06/2016	47	U.S. Bank PCards	$ 118.87	1500-21710-402230	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 33.98	0100-51260-402290	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 69.98	0100-51120-402410	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.49	0100-51120-402290	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 54.00	0100-51120-403990	A-1 Rentals - PCard
06/06/2016	47	U.S. Bank PCards	$ 176.78	0100-51120-402310	A & I Distriubutors - PCard
06/06/2016	47	U.S. Bank PCards	$ 524.16	0100-51120-402290	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.69	0100-51120-402391	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 110.80	6500-15660-402210	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.50	6500-15660-402450	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.33	6500-15660-402210	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 131.13	6500-15660-402210	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.28	6500-15660-402210	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,139.07	0100-51120-402391	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 563.88	0100-51120-402391	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.22	0100-51120-402391	A & H Turf - PCard
06/06/2016	47	U.S. Bank PCards	$ 50.00	5610-71100-403210	Accent Print Shop, Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 581.36	6500-15660-402450	Ace Electric, Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 501.00	6500-15670-403690	Ace Electric, Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 213.33	6500-15660-402450	Ace Electric, Inc. - PCard
06/06/2016	47	U.S. Bank PCards	$ 85.00	6500-15670-403690	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,579.34	6500-15660-402450	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 212.50	6500-15660-402450	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 170.00	6500-15670-403690	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 503.50	6500-15660-402450	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 578.90	6500-15670-403690	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 212.50	6500-15670-403690	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 750.58	1500-21710-402450	Air Controls-Billings - PCard

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06/06/2016	47	U.S. Bank PCards	$ 85.00	1500-21710-402450	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 330.03	1500-21710-402450	Air Controls-Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,010.00	6500-15670-403990	Alpine Plumbing Heating I - PCard
06/06/2016	47	U.S. Bank PCards	$ 494.00	2400-43010-403350	American Planning Associ - PCard
06/06/2016	47	U.S. Bank PCards	$ 295.00	0100-17500-403370	American Planning Associ - PCard
06/06/2016	47	U.S. Bank PCards	$ 759.24	5610-71130-402390	Lp Anderson Tire Point S - PCard
06/06/2016	47	U.S. Bank PCards	$ 318.00	5610-71120-402450	Anderson Steel Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 288.00	2600-55110-403290	Artcraft Printer Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,821.53	0100-51420-402530	Asco Pacific Supply Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 212.28	5610-71130-402320	Applied Ind Tech 2422 - PCard
06/06/2016	47	U.S. Bank PCards	$ 199.25	5610-71120-402450	Applied Ind Tech 2422 - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,085.35	5410-31220-402260	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 546.72	5410-31230-402260	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 166.36	5610-71120-402240	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 526.10	5610-71120-402260	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 237.55	5610-71130-402260	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 944.40	2110-31320-402260	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,074.70	2110-31320-402260	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 7.15	0100-51120-403660	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 395.61	6010-15530-402260	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 831.75	6500-15670-403690	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 301.95	6500-15660-402450	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 43.00	1500-21120-402450	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.30	0100-51270-402450	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.30	0100-51270-402450	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 135.88	2600-55120-402260	Big Sky Linen & Uniform - PCard
06/06/2016	47	U.S. Bank PCards	$ 371.50	5410-31230-405333	Billings Const. Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 70.00	5610-71130-403660	Billings Const. Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 187.74	5610-71130-403650	Billings Const. Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 133.75	0100-51120-402410	Billings Const. Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 80.39	5610-71130-402320	Billings Const. Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 210.00	1500-22240-402450	Billings Const. Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 146.79	2110-31320-404310	Bloedorn Lumber Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 91.23	5120-84300-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 77.90	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 64.74	5120-84300-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.20	5120-84300-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 46.47	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 146.04	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 37.43	5020-74000-402360	Border States Electric - PCard

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06/06/2016	47	U.S. Bank PCards	$ 44.54	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 83.71	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 52.63	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.93	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.79	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.79	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 114.84	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 114.84	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 38.28	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 38.28	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.46	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.46	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 319.29	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 319.29	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 155.15	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 155.14	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.39	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.39	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 177.48	5120-85000-402290	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 177.48	5020-74000-402290	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 88.74	5120-85000-402290	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 88.74	5020-74000-402290	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.85	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.85	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.48	5120-85000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.48	5020-74000-402360	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,070.92	6060-19310-402122	Border States Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 68.90	2600-55140-402190	Brodart Supplies - PCard
06/06/2016	47	U.S. Bank PCards	$ 89.33	2600-55160-402190	Brodart Supplies - PCard
06/06/2016	47	U.S. Bank PCards	$ 157.50	5020-74000-402450	Canyon Creek Nursery - PCard
06/06/2016	47	U.S. Bank PCards	$ 600.00	7750-51540-407249	Canyon Creek Nursery - PCard
06/06/2016	47	U.S. Bank PCards	$ 100.00	1500-21110-403170	City Towing - PCard
06/06/2016	47	U.S. Bank PCards	$ 381.62	5610-71130-402320	Archie Cochrane Motors - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.00	1500-21120-402260	Creative Monograms Smb - PCard
06/06/2016	47	U.S. Bank PCards	$ 308.00	1500-21400-403822	Creative Monograms Smb - PCard
06/06/2016	47	U.S. Bank PCards	$ 600.00	1500-21720-402260	Creative Monograms Smb - PCard
06/06/2016	47	U.S. Bank PCards	$ 45.23	5710-71430-402450	Crescent Electric 054 - PCard
06/06/2016	47	U.S. Bank PCards	$ 61.34	5120-85000-402360	Crescent Electric 054 - PCard
06/06/2016	47	U.S. Bank PCards	$ 61.34	5020-74000-402360	Crescent Electric 054 - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.99	0100-51120-402310	Dons Xpress Center 6 - PCard

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06/06/2016	47	U.S. Bank PCards	$ 450.00	2600-55110-403360	Downtown Billings Assoc - PCard
06/06/2016	47	U.S. Bank PCards	$ 129.99	2600-55190-403380	Ebsco Info Service Bhm - PCard
06/06/2016	47	U.S. Bank PCards	$ 98.33	5610-71190-403660	Ecolab Pest Elimination - PCard
06/06/2016	47	U.S. Bank PCards	$ 93.15	5610-71170-403660	Ecolab Pest Elimination - PCard
06/06/2016	47	U.S. Bank PCards	$ 83.84	5610-71170-403660	Ecolab Pest Elimination - PCard
06/06/2016	47	U.S. Bank PCards	$ 148.52	5610-71120-403660	Ecolab Pest Elimination - PCard
06/06/2016	47	U.S. Bank PCards	$ 148.52	5610-71120-403660	Ecolab Pest Elimination - PCard
06/06/2016	47	U.S. Bank PCards	$ 83.84	5610-71170-403660	Ecolab Pest Elimination - PCard
06/06/2016	47	U.S. Bank PCards	$ 98.33	5610-71190-403660	Ecolab Pest Elimination - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.00	2110-31320-402320	Econo Print - PCard
06/06/2016	47	U.S. Bank PCards	$ 228.53	1500-21700-403210	Econo Print - PCard
06/06/2016	47	U.S. Bank PCards	$ 121.01	0100-14110-403325	Econo Print - PCard
06/06/2016	47	U.S. Bank PCards	$ 154.58	1500-21150-402285	Econo Print - PCard
06/06/2016	47	U.S. Bank PCards	$ 160.64	5120-84000-402223	Environmental Resource - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.33	5610-71130-402320	Fasteners Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.17	0100-51120-402290	Fasteners Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.99	2110-31320-402410	Fasteners Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.43	0100-51120-402290	Fasteners Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.29	2110-31320-402360	Fasteners Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.34	2110-31320-402290	Fasteners Billings - PCard
06/06/2016	47	U.S. Bank PCards	$ 24.00	7380-12640-402190	City Of Billings Finance - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.94	5610-71100-403390	Tlf Gainans Floral And G - PCard
06/06/2016	47	U.S. Bank PCards	$ 46.90	2600-55110-403360	Tlf Gainans Floral And G - PCard
06/06/2016	47	U.S. Bank PCards	$ 66.94	5610-71130-402260	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.90	1500-21120-402260	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 42.23	1500-21120-402261	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 776.10	1500-21120-402260	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 270.17	1500-21120-402261	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 206.73	1500-21120-402260	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 137.92	1500-21120-402260	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 949.56	1500-21120-402260	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 118.07	1500-21120-402261	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 211.64	1500-21120-402261	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 570.49	1500-21120-402260	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 218.99	1500-21120-402260	Galls - PCard
06/06/2016	47	U.S. Bank PCards	$ 41.24	5120-84300-402360	Graybar Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 41.23	5020-74000-402360	Graybar Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 280.75	5120-84300-402360	Graybar Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 239.76	5610-71120-402450	Graybar Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 79.92	6500-15660-402360	Graybar Electric - PCard

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06/06/2016	47	U.S. Bank PCards	$ 257.14	5610-71120-402450	Graybar Electric - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,201.58	5020-74000-402450	Hach Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 160.97	5020-74000-402220	Hach Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 110.79	5020-74000-402220	Hach Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 95.00	1500-21110-403170	Hansers Wrecker Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 95.00	1500-21110-403170	Hansers Wrecker Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 86.85	0100-51420-402290	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 289.50	0100-51120-402410	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.95	5020-74000-402450	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 237.62	0100-51220-402450	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 275.43	0100-51120-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 17.88	0100-51120-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.86	0100-51120-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 125.58	1500-22260-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 38.00	1500-21120-402450	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 140.68	6500-15660-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 166.59	6500-15660-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 178.84	6500-15660-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 520.05	2600-55120-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 370.72	2600-55120-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 323.85	2600-55120-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 684.60	1500-22260-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 68.88	1500-22260-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 245.15	1500-22260-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 98.85	0100-51120-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 178.38	0100-51120-402240	Hanson Chemical - PCard
06/06/2016	47	U.S. Bank PCards	$ 220.73	0100-51120-402290	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.17	5020-74000-402450	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 115.42	2110-31320-402320	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 80.29	5610-71120-402450	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.86	5020-74000-402450	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.31	5020-74000-402450	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 36.94	0100-51120-402290	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 318.18	0100-51260-402290	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 14.42	2110-31320-402290	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 64.02	2110-31320-402320	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.27	5410-31230-402320	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 29.32	5410-31230-402320	Hose & Rubber Supply - PCard
06/06/2016	47	U.S. Bank PCards	$ 266.90	0100-51120-402390	Tire Rama 101 Bc - PCard
06/06/2016	47	U.S. Bank PCards	$ 104.74	2400-43010-403240	J And H Inc - PCard

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06/06/2016	47	U.S. Bank PCards	$ 476.80	5610-71190-403660	Johnson Controls Ss - PCard
06/06/2016	47	U.S. Bank PCards	$ 103.11	1500-22250-402450	Kb Commercial Products - PCard
06/06/2016	47	U.S. Bank PCards	$ 135.22	1500-22250-402450	Kb Commercial Products - PCard
06/06/2016	47	U.S. Bank PCards	$ 205.64	5610-71120-402240	Kb Commercial Products - PCard
06/06/2016	47	U.S. Bank PCards	$ 264.24	5610-71120-402240	Kb Commercial Products - PCard
06/06/2016	47	U.S. Bank PCards	$ 373.60	5410-31230-402290	Kb Commercial Products - PCard
06/06/2016	47	U.S. Bank PCards	$ 33.50	5410-31230-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.08	5020-75000-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.05	5120-85000-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.28	5020-73140-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 2.09	5120-83140-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.50	5020-74000-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.88	5020-73140-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 1.62	5120-83140-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 67.00	6500-15660-402450	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 46.00	6500-15670-403690	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 80.00	6500-15670-403690	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,047.96	6500-15660-402450	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 750.00	6500-15660-402450	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.40	6600-31100-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 27.60	6700-31410-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 76.00	6600-31100-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 114.00	6700-31410-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.00	2510-21270-402190	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 67.00	1500-21110-403574	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 73.00	2600-55120-403660	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 99.98	5020-74000-402360	Kenco Security And Tec - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.11	0100-51120-402190	Lamination Depot Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.10	0100-51100-402190	Lamination Depot Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 13.50	0100-51210-402190	Lamination Depot Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 138.50	5120-85000-403660	Lesman Iron Works - PCard
06/06/2016	47	U.S. Bank PCards	$ 138.50	5020-74000-403660	Lesman Iron Works - PCard
06/06/2016	47	U.S. Bank PCards	$ 42.00	5120-85000-403660	Lesman Iron Works - PCard
06/06/2016	47	U.S. Bank PCards	$ 42.00	5020-74000-403660	Lesman Iron Works - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,266.50	2110-31320-402920	Macon Supply Billi - PCard
06/06/2016	47	U.S. Bank PCards	$ 90.00	2110-31320-402290	Macon Supply Billi - PCard
06/06/2016	47	U.S. Bank PCards	$ 33.98	5120-84300-402360	Mcmaster-Carr - PCard
06/06/2016	47	U.S. Bank PCards	$ 57.81	5020-74000-402360	Mcmaster-Carr - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,315.76	5020-74000-402360	Mcmaster-Carr - PCard
06/06/2016	47	U.S. Bank PCards	$ 157.39	5120-84300-402360	Mcmaster-Carr - PCard

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06/06/2016	47	U.S. Bank PCards	$ 95.64	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 67.24	0100-51420-402290	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.38	5710-71430-402450	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 88.12	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,341.92	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 8.84	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,076.00	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 32.93	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 46.41	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 167.60	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 28.14	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 2,302.50	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,562.50	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 117.50	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 35.38	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,131.00	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 741.00	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 58.91	0100-51120-402290	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 39.28	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 273.90	0100-51120-402330	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 155.29	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 166.00	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 150.43	0100-51120-402330	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 5.94	2110-31320-402475	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 534.23	0100-51120-403690	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 78.45	0100-51120-402391	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 263.16	0100-51120-402330	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 598.18	0100-51120-402330	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 30.00	5610-71130-403650	Midland Implement Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 192.50	6500-15670-403690	Midland Mechanical Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 444.19	8730-51990-403650	Knife River 5601 - PCard
06/06/2016	47	U.S. Bank PCards	$ 269.00	0100-51270-402450	Midwest Heating & Cooli - PCard
06/06/2016	47	U.S. Bank PCards	$ 156.97	1500-21710-403512	Moore Lane Veterinary Hos - PCard
06/06/2016	47	U.S. Bank PCards	$ 26.28	2110-31320-402320	Motor Power Equipment Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.76	5610-71150-402320	Napa Store 3547001 - PCard
06/06/2016	47	U.S. Bank PCards	$ 21.98	0100-51140-402320	Napa Store 3547001 - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.45	0100-51140-402410	Napa Store 3547001 - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.98	0100-51120-402320	Napa Store 3547001 - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.83	5410-31230-402410	Napa Store 3547001 - PCard
06/06/2016	47	U.S. Bank PCards	$ 330.00	0100-51120-403350	National Recreation & - PCard

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06/06/2016	47	U.S. Bank PCards	$ 330.00	0100-51100-403350	National Recreation & - PCard
06/06/2016	47	U.S. Bank PCards	$ 330.00	0100-51210-403350	National Recreation & - PCard
06/06/2016	47	U.S. Bank PCards	$ 10.00	8730-51990-403350	National Recreation & - PCard
06/06/2016	47	U.S. Bank PCards	$ 215.78	5020-75000-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 34.10	5020-75000-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 22.74	5120-85000-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 9.04	5020-75000-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.03	5120-85000-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 15.52	5020-73120-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 409.31	5020-73120-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 12.96	5120-85000-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 300.03	2110-31320-402290	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.50	5020-75000-402410	Northwest Industrial Supp - PCard
06/06/2016	47	U.S. Bank PCards	$ 50.03	0100-51120-402290	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 149.23	0100-51120-402290	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 53.65	0100-51120-402290	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 53.88	0100-51120-402290	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 195.52	0100-51120-402290	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 304.07	0100-51120-402391	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 40.52	5610-71190-402450	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 96.10	0100-51120-402391	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 320.76	0100-51120-402391	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 392.90	0100-51120-402391	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 93.36	0100-51120-402391	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 105.05	0100-51120-402391	Northwest Pipe Fitting - PCard
06/06/2016	47	U.S. Bank PCards	$ 409.39	5020-74000-402220	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 714.80	5120-84000-402223	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 992.01	5020-74000-402220	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 620.43	5120-84000-402223	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 76.02	5120-84000-402223	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 50.28	5120-84000-402223	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 152.87	5020-74000-402220	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 38.70	5020-74000-402220	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 82.12	5120-84000-402223	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 785.74	5020-74000-402220	Northwest Scientific Inc - PCard
06/06/2016	47	U.S. Bank PCards	$ 69.76	5020-74000-402450	Pacific Steel #02 - PCard
06/06/2016	47	U.S. Bank PCards	$ 90.13	2110-31320-402420	Pacific Steel #02 - PCard
06/06/2016	47	U.S. Bank PCards	$ 72.13	5120-85000-403660	Pacific Steel #02 - PCard
06/06/2016	47	U.S. Bank PCards	$ 72.12	5020-74000-403660	Pacific Steel #02 - PCard
06/06/2016	47	U.S. Bank PCards	$ 103.98	5610-71130-402450	The Paint Center - PCard

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06/06/2016	47	U.S. Bank PCards	$ 22.50	0100-51280-402290	Pepsi-Cola Bottling Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 222.00	0100-51290-402230	Pepsi-Cola Bottling Co - PCard
06/06/2016	47	U.S. Bank PCards	$ 380.00	0100-51120-402290	Permaletter Sign Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 150.00	0100-51120-402290	Permaletter Sign Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 1,080.00	5410-31230-402290	Permaletter Sign Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 318.33	1500-21120-402320	Pierce Rv Service - PCard
06/06/2016	47	U.S. Bank PCards	$ 63.92	2110-31320-402430	Radioshack Dea00030676 - PCard
06/06/2016	47	U.S. Bank PCards	$ 74.98	5020-74000-402190	Radioshack Dea00030676 - PCard
06/06/2016	47	U.S. Bank PCards	$ 19.99	1500-22240-402120	Radioshack Dea00030676 - PCard
06/06/2016	47	U.S. Bank PCards	$ 148.42	0100-51120-402320	Ratco Trailer And Hitch - PCard
06/06/2016	47	U.S. Bank PCards	$ 322.56	0100-51120-402320	Ratco Trailer And Hitch - PCard
06/06/2016	47	U.S. Bank PCards	$ 107.00	0100-51120-402330	Ratco Trailer And Hitch - PCard
06/06/2016	47	U.S. Bank PCards	$ 134.52	0100-51260-402290	Recreation Supply Company - PCard
06/06/2016	47	U.S. Bank PCards	$ 25.20	2550-21440-402290	The Rubber Stamp Shop, In - PCard
06/06/2016	47	U.S. Bank PCards	$ 67.12	0100-16110-402190	The Rubber Stamp Shop, In - PCard
06/06/2016	47	U.S. Bank PCards	$ 29.51	2090-44510-402190	The Rubber Stamp Shop, In - PCard
06/06/2016	47	U.S. Bank PCards	$ 6.30	5020-74000-402450	Sherwin Williams #3203 - PCard
06/06/2016	47	U.S. Bank PCards	$ 150.40	2110-31320-402320	Sherwin Williams #3203 - PCard
06/06/2016	47	U.S. Bank PCards	$ 342.64	5410-31220-402290	Sherwin Williams #3203 - PCard
06/06/2016	47	U.S. Bank PCards	$ 49.98	2110-31320-402320	Sherwin Williams 703203 - PCard
06/06/2016	47	U.S. Bank PCards	$ 4.61	5410-31220-402290	Sherwin Williams #9848 - PCard
06/06/2016	47	U.S. Bank PCards	$ 153.75	5610-71130-403650	Sherwin Williams 703203 - PCard
06/06/2016	47	U.S. Bank PCards	$ (141.19)	5020-74000-402450	Sherwin Williams 703203 - PCard
06/06/2016	47	U.S. Bank PCards	$ 189.57	5020-74000-402450	Sherwin Williams 703203 - PCard
06/06/2016	47	U.S. Bank PCards	$ 248.96	0100-51120-402410	Shiptons Big R Heights - PCard
06/06/2016	47	U.S. Bank PCards	$ 55.90	2110-31320-402310	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 89.99	0100-51260-402290	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 29.97	0100-51120-402290	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 53.97	0100-51120-402410	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 16.99	0100-51120-402290	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 31.19	5020-74000-402120	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 159.95	0100-51140-402410	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 55.90	2110-31320-402310	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 80.92	0100-51140-402290	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 503.82	1500-21120-402261	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 11.98	1500-22210-403760	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 71.88	1500-22310-402310	Shipton'S Big R-East - PCard
06/06/2016	47	U.S. Bank PCards	$ 137.90	0100-51120-402260	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 23.96	2110-31320-402430	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 101.96	0100-51120-402290	Shipton'S Big R-West - PCard

Check Date	Check	Name	Amount	Account	Item Desc
06/06/2016	47	U.S. Bank PCards	$ 56.99	5020-74000-402450	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 59.97	0100-51120-402290	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 18.13	0100-51120-402391	Shipton'S Big R-West - PCard
06/06/2016	47	U.S. Bank PCards	$ 65.96	0100-51120-402290	Shipton'S Big R-West - PCard
06/06/2016	794499	Acuity Brands Lighting Inc	$ 5,432.00	2110-00000-141318	STREET LIGHTS PO NUM 300723
06/06/2016	794506	Armasight Inc	$ 7,274.00	1500-21150-402120	CO-MR 3P - night vision scopes for SWAT
06/06/2016	794506	Armasight Inc	$ 210.00	1500-21150-402120	Mounting System #6
06/06/2016	794506	Armasight Inc	$ 105.00	1500-21150-402120	Mounting System #4
06/06/2016	794506	Armasight Inc	$ 20.00	1500-21150-402120	Shipping
06/06/2016	794507	Armscor Cartridge Incorporated	$ 2,475.00	1500-21400-402270	AC223-1N, .223,55 gr, FMJ, New
06/06/2016	794507	Armscor Cartridge Incorporated	$ 2,475.00	1500-21400-402270	N22355VP250, .223, 55 gr, FMJ, New
06/06/2016	794508	Bailey Garage Doors Inc	$ 4,184.00	5020-74000-402450	Garage doors
06/06/2016	794518	BLM Tree Service	$ 4,750.00	5020-74000-403660	tree removal 2251 Belknap Facility and surrounding property
06/06/2016	794518	BLM Tree Service	$ 1,000.00	5020-74000-403660	Tree Removal at 2251 Belknap
06/06/2016	794534	Community Seven	$ 17,413.75	0100-00000-229150	Peg Fees - 3rd Qtr FY2016
06/06/2016	794542	CTA Inc	$ 5,040.17	4240-51110-409370	Consult on repairs at Rose Pool-fire. Payment #1
06/06/2016	794548	Dell Computer L P	$ 2,746.86	2400-43010-402925	(3) Dell OptiPlex 3020 PlanningJX8J96K6
06/06/2016	794548	Dell Computer L P	$ 616.47	2400-43010-402925	(3) 24 Inch Monitors XJXKWW1P5
06/06/2016	794555	Ecoverse Industries Ltd	$ 2,723.46	5410-31230-402320	Teeth for grinder at the Landfill
06/06/2016	794560	Empire Garage Owner's Association	$ 7,837.42	5210-15940-403660	City of Billings June Assessment.
06/06/2016	794560	Empire Garage Owner's Association	$ 7,837.42	5210-15940-403660	City of Billings Non-Capital Assessment.
06/06/2016	794575	Hach Company	$ 2,892.47	5020-74000-402450	flow cell network kit module
06/06/2016	794576	Hardrives Construction Inc	$ 93,942.10	2050-31310-409310	WO1603 2016 Overlay/Chip Seal - Contract#3 Chip Seal
06/06/2016	794580	HDR, Inc.	$ 46,828.50	5030-74910-409390	WO 15-10 WTP Chemical Building/Disinfection Improvements
06/06/2016	794587	Hydrotech	$ 6,791.40	5030-75910-409340	Temp water for Lux Ave project
06/06/2016	794589	InfoSend Inc	$ 7,488.67	5020-73110-403110	postage and mailings
06/06/2016	794589	InfoSend Inc	$ 1,804.10	5020-73110-403111	postage and mailings
06/06/2016	794589	InfoSend Inc	$ 4,992.45	5120-83110-403110	postage and mailings
06/06/2016	794589	InfoSend Inc	$ 1,202.74	5120-83110-403111	postage and mailings
06/06/2016	794589	InfoSend Inc	$ 15,544.80	5020-73110-403110	Postage
06/06/2016	794589	InfoSend Inc	$ 10,363.20	5120-83110-403110	Postage
06/06/2016	794589	InfoSend Inc	$ 1,121.61	5020-73110-403110	Statement postage
06/06/2016	794589	InfoSend Inc	$ 747.74	5120-83110-403110	Statement postage
06/06/2016	794590	Intermountain Traffic, LLC	$ 8,120.00	2050-31310-409390	WO 15-93 Chronomax School Flasher Upgrade
06/06/2016	794592	Jack Henry & Associates Inc	$ 2,422.56	5020-73110-403553	Software Maintenance
06/06/2016	794592	Jack Henry & Associates Inc	$ 1,615.04	5120-83110-403553	Software Maintenance
06/06/2016	794596	Jay's Waterline Repair	$ 10,593.00	5050-75150-403671	Curb Valve repair list 02 26 2016
06/06/2016	794596	Jay's Waterline Repair	$ 650.00	5050-75150-403671	Repair at 601 s 31st st
06/06/2016	794601	Joshua Cornelius	$ 4,000.00	8730-51990-403990	Work on the Rose pool slide.
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 1,194.38	2110-31320-404710	asphalt

Check Date	Check	Name	Amount	Account	Item Desc
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 50.94	2110-31320-404520	1 1/2" crushed base
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 210.96	2110-31320-404520	1 1/2" crushed base
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 3,879.60	2110-31320-404710	asphalt
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 685.87	2110-31320-404520	1 1/2" crushed base
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 601.57	2110-31320-404520	1 1/2" crushed base
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 735.05	2110-31320-404710	asphalt
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 855.22	2110-31320-404520	asphalt
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 396.00	2110-31320-404190	concrete for country club circle
06/06/2016	794609	Knife River (JTL Group Inc.)	$ 2,586.40	2110-31320-404710	asphalt
06/06/2016	794611	Labor Ready Northwest, Inc.	$ 1,362.42	5410-31230-403581	Paper Pickers for the Landfill
06/06/2016	794611	Labor Ready Northwest, Inc.	$ 2,960.32	5410-31230-403581	Paper Pickers for the Landfill
06/06/2016	794614	Law Enforcement Targets	$ 349.00	1500-21400-402270	AT-206-3-0, PT Tactical Torso - 3' Stand
06/06/2016	794614	Law Enforcement Targets	$ 1,049.85	1500-21400-402270	PXL-STK KIT, Protector XL Trap/Stock-Kit
06/06/2016	794614	Law Enforcement Targets	$ 1,080.00	1500-21400-402270	IPSC-CB, IPSC-CB Cardboard Targets
06/06/2016	794614	Law Enforcement Targets	$ 435.18	1500-21400-402270	Freight
06/06/2016	794619	Mailing Technical Services	$ 138.58	5210-15210-403110	parking - special inserts only
06/06/2016	794619	Mailing Technical Services	$ 93.14	0100-15120-403110	Finance
06/06/2016	794619	Mailing Technical Services	$ 4,131.45	6050-15150-403110	Postage Fund (weekly bills)
06/06/2016	794635	Midland Manufacturing Company	$ 26,769.00	2200-22390-409460	B-243-VA-EPDM: MIDLAND EMERGENCY RESPONSE KIT
06/06/2016	794635	Midland Manufacturing Company	$ -	2200-22390-409460	ESTIMATED SHIPPING
06/06/2016	794649	NorthWestern Energy	$ 2,166.12	5020-74000-403410	3116 17th st west
06/06/2016	794649	NorthWestern Energy	$ 2,166.13	5020-74000-403410	3116 17th st west
06/06/2016	794649	NorthWestern Energy	$ 441.55	1500-22210-403410	FIRE6: MONTHLY ELECTIC SERVICE (1601 ST. ANDREWS)
06/06/2016	794649	NorthWestern Energy	$ 156.63	6070-22350-403410	1006915-1
06/06/2016	794649	NorthWestern Energy	$ 7.55	0100-51120-403410	1230066-1
06/06/2016	794649	NorthWestern Energy	$ 8.75	2110-31320-403410	2047000-1
06/06/2016	794649	NorthWestern Energy	$ 8.87	2110-31320-403410	2047011-8
06/06/2016	794649	NorthWestern Energy	$ 267.40	5020-74000-403410	805 Constitution
06/06/2016	794649	NorthWestern Energy	$ 24,133.79	5610-71120-403410	0100482-9. Main Vault. May 2016
06/06/2016	794649	NorthWestern Energy	$ 464.42	1500-22210-403410	0712537-0
06/06/2016	794649	NorthWestern Energy	$ 82.30	0100-51410-403410	0712539-6
06/06/2016	794649	NorthWestern Energy	$ 98.29	0100-51220-403410	0712683-2
06/06/2016	794649	NorthWestern Energy	$ 25.42	5710-71480-403410	0712764-0
06/06/2016	794649	NorthWestern Energy	$ 378.81	1500-22210-403410	0720840-8
06/06/2016	794649	NorthWestern Energy	$ 7.55	0100-51120-403410	0831702-6
06/06/2016	794649	NorthWestern Energy	$ 70.98	0100-51120-403410	0920801-8
06/06/2016	794649	NorthWestern Energy	$ 140.88	8720-51980-403410	1059093-3
06/06/2016	794649	NorthWestern Energy	$ 21.73	0100-51410-403410	1635289-0
06/06/2016	794649	NorthWestern Energy	$ 370.46	1500-21150-403410	1984150-1
06/06/2016	794649	NorthWestern Energy	$ 18.84	0100-51120-403410	3020837-5

Check Date	Check	Name	Amount	Account	Item Desc
06/06/2016	794649	NorthWestern Energy	$ 111.32	5210-15950-403410	3279035-4
06/06/2016	794652	Old Town Works	$ 45,000.00	2030-15130-407968	TIF grant for Price Motors Building restoration
06/06/2016	794663	Public Utilities	$ 7,164.20	8720-51980-403420	136097
06/06/2016	794663	Public Utilities	$ 139.47	8720-51980-403420	148074
06/06/2016	794663	Public Utilities	$ 5,173.87	8720-51980-403420	187900
06/06/2016	794665	Qwest	$ 33.33	5610-71120-403450	Qwest 406-245-1044 Airport Terminal Power M
06/06/2016	794665	Qwest	$ 49.31	5710-71470-403450	Qwest 406-245-1789 Transit STS
06/06/2016	794665	Qwest	$ 60.14	5410-31230-403450	Qwest 406-245-7193 Solid Waste Landfill
06/06/2016	794665	Qwest	$ 103.96	5410-31230-403450	Qwest 406-245-9820 Solid Waste Landfil
06/06/2016	794665	Qwest	$ 33.33	2110-31320-403450	Qwest 406-245-9906 PW Traffic Signal 4th 27
06/06/2016	794665	Qwest	$ 95.90	5610-71120-403450	Qwest 406-252-9412 Airport
06/06/2016	794665	Qwest	$ 49.31	5710-71410-403450	Qwest 406-254-7038 MET Transit
06/06/2016	794665	Qwest	$ 7,304.24	2250-22320-403450	Qwest 406-255-9700 E911
06/06/2016	794665	Qwest	$ 47.95	1500-22250-403450	Qwest 406-655-0728 Fire Maintenance Shop
06/06/2016	794665	Qwest	$ 33.33	0100-51120-403450	Qwest 406-657-3014 Parks 3890 Stillwater
06/06/2016	794665	Qwest	$ 2,706.11	6060-19310-403450	Qwest 406-657-8377 Main System Centrex
06/06/2016	794665	Qwest	$ 73.92	6060-19310-403450	Qwest 406-248-9124 Met Measured Lines
06/06/2016	794665	Qwest	$ 68.54	6060-19310-403450	Qwest 406-248-3329 Airport Measured Lines
06/06/2016	794665	Qwest	$ 105.18	6060-19310-403450	Qwest 406-657-3009 PUD Measured Lines
06/06/2016	794665	Qwest	$ 33.35	1500-21110-403450	Qwest 406-245-6600 Crime Prevention Alarm
06/06/2016	794665	Qwest	$ 33.37	5210-15920-403450	Qwest 406-657-3054 Park 1 Elevator Phone
06/06/2016	794665	Qwest	$ 71.85	6060-19310-403450	Qwest 406-252-3774 BOC Measured Lines
06/06/2016	794665	Qwest	$ 137.44	2600-55120-403450	Qwest 406-245-1579 Library 6 lines
06/06/2016	794665	Qwest	$ 68.60	6060-19310-403450	Qwest 406-245-1579 Library 6 lines
06/06/2016	794665	Qwest	$ 33.95	6200-19110-403450	Qwest 406-245-4437 Kenco Security Alarm IT Alarm
06/06/2016	794665	Qwest	$ 34.27	1500-22210-403450	Qwest 406-245-1743 Fire Elevator 1500-22210-403450
06/06/2016	794669	Rescue Phone Inc	$ 6,495.00	1500-21120-402120	Rescue Phone Quad Crisis Response Module (QUAD)
06/06/2016	794669	Rescue Phone Inc	$ 1,495.00	1500-21120-402120	Pescue Phone Cellular Response Console (CRC)
06/06/2016	794676	Rotational Molding Inc	$ 40,800.00	5410-31220-404270	300 gallon alley barrels
06/06/2016	794684	Securitas Security Services USA, Inc	$ 1,088.33	5210-15910-403970	Security Patrol City owned parking garages. in Park I, II, III.
06/06/2016	794684	Securitas Security Services USA, Inc	$ 1,088.34	5210-15920-403970	Security Patrol City owned parking garages. in Park I, II, III.
06/06/2016	794684	Securitas Security Services USA, Inc	$ 1,088.33	5210-15930-403970	Security Patrol City owned parking garages. in Park I, II, III.
06/06/2016	794688	Solid Waste Systems Inc	$ 313.25	6010-00000-141000	86225 PO NUM 300717
06/06/2016	794688	Solid Waste Systems Inc	$ 238.83	6010-00000-141000	86227 PO NUM 300717
06/06/2016	794688	Solid Waste Systems Inc	$ 9,512.66	5410-31220-402320	86069
06/06/2016	794688	Solid Waste Systems Inc	$ 463.44	5410-31220-402320	86069
06/06/2016	794688	Solid Waste Systems Inc	$ 19.89	5410-31220-402320	86080
06/06/2016	794688	Solid Waste Systems Inc	$ 24.72	5410-31220-402320	86080
06/06/2016	794688	Solid Waste Systems Inc	$ 450.77	5410-31220-402320	86244
06/06/2016	794688	Solid Waste Systems Inc	$ 12.14	5410-31220-402320	86244

Check Date	Check	Name	Amount	Account	Item Desc
06/06/2016	794688	Solid Waste Systems Inc	$ 697.20	5410-31220-402320	86363
06/06/2016	794688	Solid Waste Systems Inc	$ 136.32	5410-31220-402320	86363
06/06/2016	794688	Solid Waste Systems Inc	$ 310.52	5410-31220-402320	86383
06/06/2016	794688	Solid Waste Systems Inc	$ 39.48	5410-31220-402320	86383
06/06/2016	794697	Tetra Tech, Inc.	$ 1,362.36	5410-31230-403590	Landfill monitoring and consulting Year 2 of contract
06/06/2016	794697	Tetra Tech, Inc.	$ 7,535.96	5410-31230-403590	Landfill monitoring and consulting Year 2 of contract
06/06/2016	794699	Town & Country Supply Association	$ 13,420.11	6010-00000-141000	221316 PO NUM 300720
06/06/2016	794699	Town & Country Supply Association	$ 16,559.81	5610-71180-402313	Invoice #220181. QTA Car Rental Fuel
06/06/2016	794699	Town & Country Supply Association	$ 213.26	1500-22260-402310	217763 FIRE 6: DIESEL DELIVERED 5/27/2016
06/06/2016	794699	Town & Country Supply Association	$ (0.01)	1500-22260-402310	DECIMAL PT CORRECTION
06/06/2016	794699	Town & Country Supply Association	$ 266.10	1500-22260-402310	221305: FIRE 5 - UNLEADED & DIESEL DELIVERED
06/06/2016	794699	Town & Country Supply Association	$ 380.80	1500-22260-402310	221305: FIRE5 - DIESEL DELIVERED 5/27/2016
06/06/2016	794699	Town & Country Supply Association	$ 376.98	1500-22260-402310	221306 FIRE 1: UNLEADED DELIVERED 5/27/2016
06/06/2016	794699	Town & Country Supply Association	$ 258.94	1500-22260-402310	221306 FIRE 1: DIESEL DELIVERED 5/27/2016
06/06/2016	794699	Town & Country Supply Association	$ 487.42	1500-22260-402310	221307 FIRE 2: DIESEL DELIVERED 5/27/2016
06/06/2016	794699	Town & Country Supply Association	$ (0.03)	1500-22260-402310	DECIMAL PT CORRECTION
06/06/2016	794702	Tristan Sophia PSYD	$ 2,500.00	1500-21400-403822	Invoice dated 5/14/2016 - Pre-employment Evaluations (5)

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Public Hearing and Resolution for FY16 Budget Amendments

PRESENTED BY: Patrick M. Weber, Finance Director

Department: City Hall Administration

PROBLEM/ISSUE STATEMENT

Montana Code allows local governments to amend their fiscal year budgets by using the same method as used for the original budget adoption: public notice, public hearing and Council adopting a resolution. The following amendments are proposed for the fourth quarter of FY 2016:

0100-16 - General Fund - City Attorney
The amendment is for the remodel of the law library to create office space for the Legal department and a transfer to the Attorney Grants fund. Reserves will be used for this amendment.

7690 - Park Development: 0100-11 - General Fund - Council Contingency
Initiate transfer that was approved at the 06/09/14 Council meeting for the Optimist Park master plan.

2600 - Library
This amendment is follow up to the final contractor payment that was made earlier in the fiscal year. This is a transfer from the Library fund to the Library Construction fund and reserves will be used.

0100 - General Fund - Code Enforcement
This amendment is to cover over time and compensation cash out. Also, a pre-Demo asbestos inspection and plan was done at 114 S 29th Street per a court order and reserves will be used. The house will be demolished in FY17.

1500-22 - Public Safety - Fire
This amendment is to cover the roof replacement at Fire Station 2. Council approved the construction project on 10-13-15 and was informed that a budget amendment would be required and that General Fund reserves would be the funding source.

4240 - Rose Park Construction; 8730 - Park District 1
To fix damages and clean up at Rose Park for the June 8th opening. Updated cost estimates have been received by PRPL.

2030 - N 27th Tax Increment District
The council approved the purchase of property legally described as BILLINGS ORIGINAL TOWNSITE, S03, T01 S, R26 E, BLOCK 94, Lot 1 - 3 located at 102 N. 29th St. by the Downtown Billings Partnership, Inc. (DBP) at their 05/09/16 regular meeting. Reserves will be used for the purchase.

Funds 4050 - Airport - Airport Improvement Plan Capital Fund (AIP) and 4070 - Passenger Facility Charges Fund (PFC)
The Airport is requesting budget amendments to its AIP and PFC Capital Funds. The Airport Pond D Storm Water Detention and Conveyance System project was not included in the Airport's FY16 Capital Improvement Program. This project was originally approved in the FY14 Budget but was delayed due to a number of issues, including Federal Funding, private land access and the need for numerous permits to allow the storm water detained in the new Pond D to be piped to Alkali Creek. All of these items came together during FY16 to allow this project to proceed. The Airport has sufficient AIP grant funds, PFC funds, and local revenue source monies available in its capital funds to proceed with this project.

6270 - City Health Insurance Fund
There are more mid-range to high cost claimants being treated than were predicted when the FY 16 budget was approved and high cost, specialty drug prescription use continues to expand. Reserves are adequate to cover the additional costs.

ALTERNATIVES ANALYZED

The Council may: Approve the requested budget amendments; or Not approve the requested budget amendments, which would put the City in violation of Montana law.

FINANCIAL IMPACT

The requested budget amendments will be funded by reserves or current revenue, as described in the budget resolution exhibit and above.

RECOMMENDATION

Staff recommends that the City Council conduct a public hearing and approve the resolution approving and adopting the budget amendments for the Fourth Quarter of Fiscal Year 2016.

APPROVED BY CITY ADMINISTRATOR

Attachments

Resolution
Exhibit A

Attachment A

RESOLUTION 16-

A RESOLUTION TO MAKE **FISCAL YEAR 2015/2016** ADJUSTMENTS TO APPROPRIATIONS PURSUANT TO M.C.A. 7-6-4006 AS AMENDED, AND PROVIDING TRANSFERS AND REVISIONS WITHIN THE GENERAL CLASS OF SALARIES AND WAGES, MAINTENANCE AND SUPPORT AND CAPITAL OUTLAY.

WHEREAS, M.C.A. 7-6-4006 provides that the City Council, upon proper resolution, adopted by said Council at a regular meeting and entered into its Minutes, may transfer or revise appropriations within the general class of salaries and wages, maintenance and support, and capital outlay, and

WHEREAS, based upon a Budget Review **(FY 2015/2016)**, it is necessary to alter and change said appropriations.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BILLINGS, MONTANA:

That the attached transfers or revisions are hereby adopted.

(SEE EXHIBIT A)

PASSED AND APPROVED by the City Council, this 27th day of June, 2016.

THE CITY OF BILLINGS:

BY:_____
Thomas W. Hanel, MAYOR

ATTEST:

BY:_____
Billie Guenther, CITY CLERK

EXHIBIT A

	Revenue	Expenditure	
0100-16 - General Fund - City Attorney			
The amendment is for the remodel of the law library to create office space for the Legal department and a transfer to the Attorney Grants fund. Reserves will be used for this amendment.			
0100-16110-409291		50,100	Improvements City Hall
0100-16110-408225		35,000	Transfer to Attorney Grants
7690 - Park Development: 0100-11 - General Fund - Council Contingency			
Initiate transfer that was approved at the 06/09/14 Council meeting for the Optimist Park master plan.			
7690-51820-307514	10,000		Transfer In
0100-11000-408200		10,000	Transfer Out
2600 - Library			
This amendment is to cover the transfer from the Library fund to the Library Construction fund, reserves will be used.			
2600-55110-408214		357,000	Transfer to Construction Fund
0100 - General Fund - Code Enforcement			
This amendment is to cover additional salaries and benefits. Also, a pre-Demo asbestos inspection was done at 618 S 26th Street, reserves will be used.			
0100-43210-401110		1,000	Salaries & Wages
0100-43210-403585		5,000	Nuisance Abatement
1500-22 - Public Safety - Fire			
This amendment is to cover the roof replacement that occurred at Fire Station 2, reserves will be used.			
1500-22260-409250		102,000	Capital Improvements
4240 - Rose Park Construction; 8730 - Park District 1			
To start demolition and clean up at Rose Park after the concession stand and pool house was damaged by a fire. The pool house was scheduled to be renovated in FY18 so another project will be moved to FY18 to pay for the rebuild at Rose Park. Updated cost estimates have been received by PRPL.			
4240-51110-307514	70,000		Transfer In
8730-51990-408225		70,000	Transfer Out
4240-51110-409370		70,000	Public Facility Improvements
2030 - N 27th Tax Increment District			
The council approved the purchase of property legally described as BILLINGS ORIGINAL TOWNSITE, S03, T01 S, R26 E, BLOCK 94, Lot 1 - 3 located at 102 N. 29th St. by the Downtown Billings Partnership, Inc. (DBP) at their 05/09/16 regular meeting. Reserves will be used for the purchase.			
2030-15130-409120		815,000	Land Purchase

Funds 4050 - Airport - Airport Improvement Plan Capital Fund (AIP) and 4070 - Passenger Facility Charges

The Airport is requesting budget amendments to its AIP and PFC Capital Funds. The **Airport Pond D Storm Water Detention and Conveyance System** project was not included in the Airport's FY16 Capital Improvement Program. This project was originally approved in the FY14 Budget but was delayed due to a number of issues, including Federal Funding, Private land access and the need for numerous permits to allow the storm water detained in the new Pond D to be piped to Alkali Creek. All of these items came together during FY16 to allow this project to proceed. The Airport has sufficient AIP grant funds, PFC funds, and local revenue source monies available in its capital funds to proceed with this project.

Account Number	Revenue	Expenditure	Account Description
4050-71250-331984	2,038,500		AIP Grant Revenue
4050-71250-409687		2,038,500	AIP FY2016 Federal Share Capital
4050-71250-409689		226,500	AIP FY2016 Local Share Capital
4070-71280-409397		1,047,000	PFC Non Building Improvements

6270 - City Health Insurance Fund

To cover Health Insurance costs that have exceeded budget, reserves will be used.

6270-17520-401430	1,065,000	Health Insurance

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Public Hearing for vacation of a portion of Montgomery Street and accept easement

PRESENTED BY: David Mumford, Public Works Director

Department: Public Works

PROBLEM/ISSUE STATEMENT

At the June 13, 2016 meeting, City Council delayed action on the vacation of Montgomery Street to the June 27th meeting. Popelka Enterprises petitioned to vacate a portion of Montgomery Street near Hansen Lane. The petitioner is requesting that the right of way be reverted to Lot 11 of Block 2 Hansen Subdivision, which is owned by Popelka Enterprises. The property owner on the other side of Montgomery Street is in support of vacating the property and transferring it to Popelka Enterprises. Popelka is proposing to re-develop the area and the Montgomery Street right of way will be utilized in the development. Montgomery Street only extends a short distance south of Hansen Lane and appears to be a driveway into the Albertsons. Since the street cannot be extended in the future, there is no need to have this portion of street. There is a sanitary sewer main and storm drain in Montgomery, which will remain in place and the city will require an easement over the sanitary sewer and storm drain to allow future maintenance. The area of the right of way proposed to be vacated is 3,900 square feet.

ALTERNATIVES ANALYZED

The Council may:

- After holding a public hearing, approve of the vacation of the above-mentioned right-of-way and accept the easement; or
- After holding a public hearing, do not approve the vacation.

FINANCIAL IMPACT

George Warmer from Coldwell Bankers has established value of the right of way at $5.05 per square foot. The total value of the right of way is $19,695.

RECOMMENDATION

Staff recommends that the City Council conduct a public hearing and approve the vacation of a portion of Montgomery Street and accept the easement.

APPROVED BY CITY ADMINISTRATOR

Attachments

Resolution to Vacate
Valuation Letter
Exhibit
Easement
Quitclaim Deed

RESOLUTION NO. 16-_____

A RESOLUTION OF THE CITY OF BILLINGS, MONTANA, DISCONTINUING AND VACATING **a portion of Montgomery Street.**

WHEREAS, a proper petition was filed with the City Council of the City of Billings, Montana, as per Section 22-601 BMCC, requesting discontinuance and vacation of **a portion of Montgomery Street** as described hereinafter; and

WHEREAS, a public hearing was properly noticed and held as required by law.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BILLINGS, MONTANA, AS FOLLOWS:

1. DISCONTINUANCE AND VACATION. Pursuant to Sections 7-14-4114 and 7-14-4115, M.C.A., **Montgomery Street**;

A tract of land situated in the NE1/4 of Section 27, T. 1 N., R. 26 E., P.M.M., in the City of Billings, Yellowstone County, Montana, being that portion of the Montgomery Street right-of-way lying south of Hansen Lane, more particularly described as follows, to-wit:

Beginning at a point being the intersection of the south right-of-way line of Hansen Lane and the east right-of-way of Montgomery Street, said point also being the northwest corner of Lot 1A, Block 2 of Maltese Subdivision; thence, from said Point of Beginning, Southerly along the west line of said Lot 1A, also being the east right-of-way line of said Montgomery Street, a distance of 130 feet; thence, leaving said west line, Westerly along the south right-of-way line of said Montgomery Street, a distance of 30 feet to a point on the east line of Block 2 of Hansen Subdivision; thence Northerly along said east line of Block 2, also being the west right-of-way line of said Montgomery Street, a distance of 130 feet to a point on said south right-of-way line of Hansen Lane; thence Easterly along said south right-of-way line, a distance of 30 feet to said Point of Beginning;

Said described tract having an area of 3,900 square feet. As shown on Exhibit "A".

Is hereby discontinued, abandoned and vacated.

2. PUBLIC INTEREST. The discontinuance, vacation and abandonment of the above described **Montgomery Street** is in the best interest of the public and can be done without any public detriment. Ownership of the vacated area will revert to the adjacent owner of Lot 11, Block 2, Hansen Subdivision.

PASSED by the City Council and APPROVED this 13th day of June 2016.

THE CITY OF BILLINGS:

BY:_____
Thomas W. Hanel MAYOR

ATTEST:

BY:_____
Billie Guenther CITY CLERK

COLDWELL BANKER COMMERCIAL
CBS
1215 24TH STREET WEST
BILLINGS, MT 59102
BUS (406) 656-2001
FAX (866) 795-7999
www.cbcmontana.com

March 28, 2016

Chris Hertz
City of Billings

RE: Broker's Evaluation for the attached lot description:

Dear Chris,

We have evaluated the subject property. It is the intent of the purchaser to use this land for additional parking for the Albertsons store located to the south. Given the limited potential use of this land and further supported by the negotiated price of the 11 acres under contract immediately to the west of the subject property we believe a value of $5.05 per square foot is reasonable.

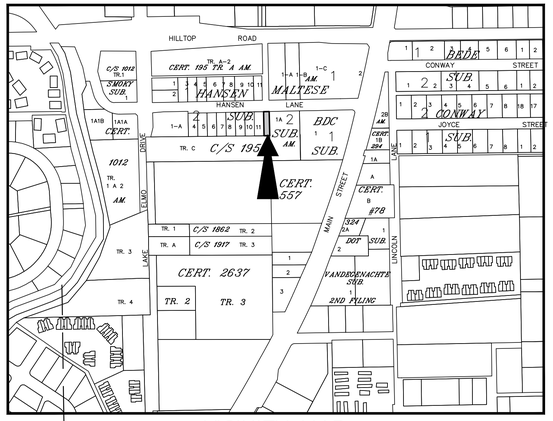
Please do not hesitate to contact us should you have additional questions.

Best regards,

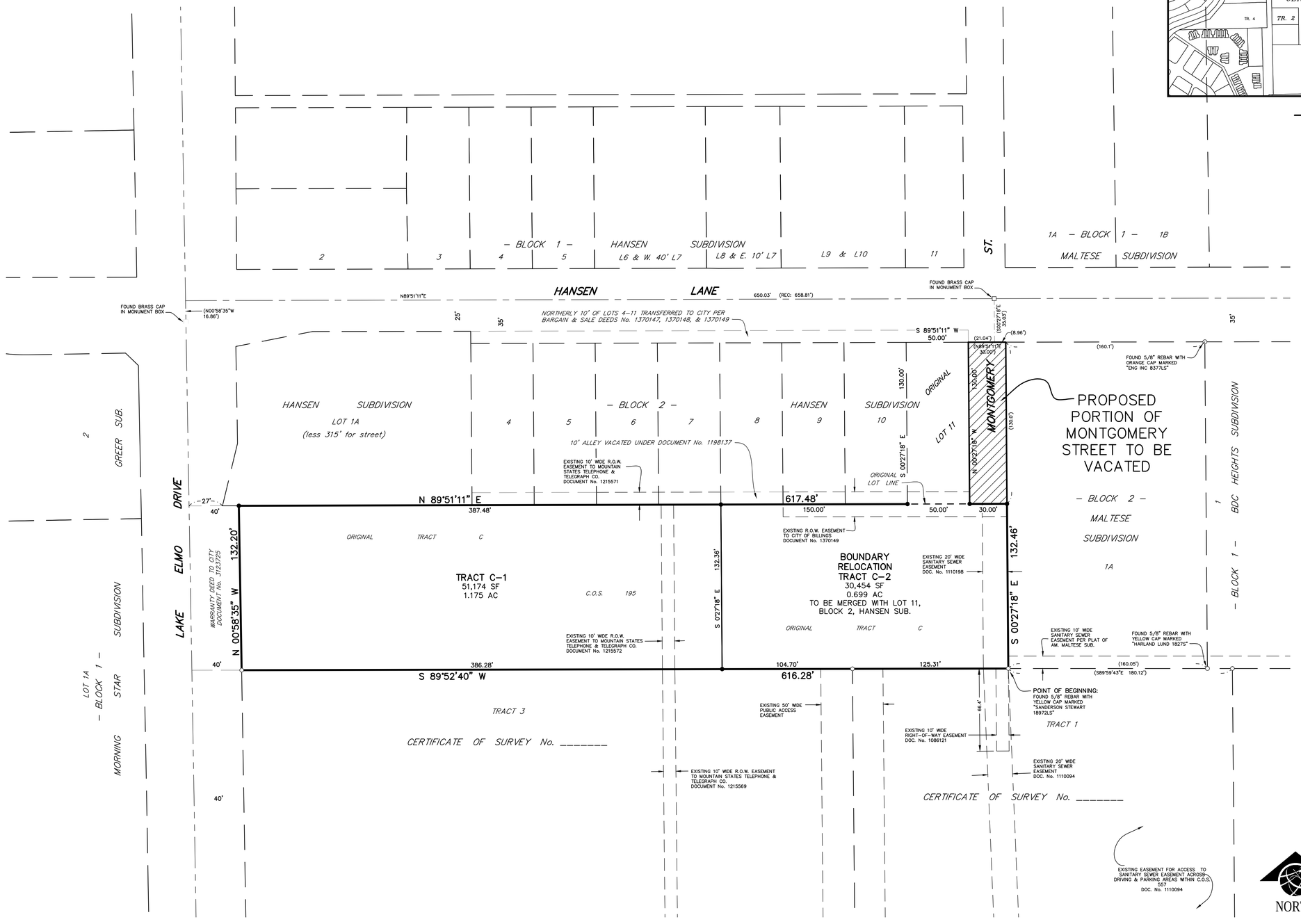
George Warmer & Blaine Poppler
Coldwell Banker Commercial CBS

EXHIBIT "A"

PROPOSED RIGHT-OF-WAY VACATION



VICINITY MAP
NOT TO SCALE



NORTH

40 20 0 40 80
SCALE: 1" = 40'

TO PLAN AND DESIGN ENDURING COMMUNITIES...

SANDERSON STEWART
www.sandersonstewart.com

DATE: 01/19/2016
FILE: 15062_RW-VAC_EXHIBIT.DWG
PROJECT NO: 15062
CAD: SRS
QUALITY ASSURANCE: -
REVISIONS
DATE DESCRIPTION
- -

MONTGOMERY STREET
LOT 11, BLOCK 2 OF HANSEN LANE SUB.
LOT 1A, BLOCK 2 OF MALTESE SUB.
BILLINGS, MONTANA
RIGHT-OF-WAY VACATION EXHIBIT

1.0

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P:\15062_Lake_Elmo_&_Hansen_Lane_Bndry_Srv_PMC\CAD_CSO\PRODUCTION_DWG\15062_RW-VAC_EXHIBIT.dwg, 24x36 SITE, 1/20/2016 9:45:02 AM, isampson, 1:1

Return to:
City of Billings
PO Box 1178
Billings, MT 59103

PERPETUAL RIGHT-OF-WAY EASEMENT
SANITARY SEWER AND/OR STORM DRAIN MANAGEMENT SYSTEM

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged on this _____ day of _____, 2016, the undersigned, POPELKA ENTERPRISES, LLC, of the address of P.O. Box 50126, Billings, Montana, hereinafter called "Grantors", hereby grant and convey unto THE CITY OF BILLINGS, a municipal corporation and political subdivision of the State of Montana, of the address of City Hall, Billings, Montana 59101, hereinafter called "Grantee", a perpetual easement and right-of-way over, across, under and through the following described tracts of real property in Yellowstone County Montana:

A tract of land situated in the NE1/4 of Section 27, T. 1 N., R. 26 E., P.M.M., in the City of Billings, Yellowstone County, Montana, being that vacated portion of the Montgomery Street right-of-way formerly lying south of Hansen Lane, more particularly described as follows, to-wit:

> Beginning at a point which is the northwest corner of Lot 1A, Block 2 of Maltese Subdivision; thence, from said Point of Beginning, southerly along the west line of said Lot 1A a distance of 130.00 feet; thence, leaving said west line, westerly a distance of 30.00 feet to a point on the east line of Block 2 of Hansen Subdivision; thence northerly along said east line of Block 2 a distance of 130.00 feet to a point on the south right-of-way line of Hansen Lane; thence easterly along said south right-of-way line, a distance of 30.00 feet to said Point of Beginning; said described tract having an area of 3,900 square feet.

This Perpetual easement to Grantee is for the purpose of constructing, reconstructing, maintaining, operating, servicing, repairing and replacing sanitary sewers and/or storm drain management systems over, across, under and through the said real property.

Grantors shall continue to have the right to use and enjoy the above-described property, except as to the rights herein granted, subject to the following restrictions:

1. Grantors and their successors agree not to construct, nor cause to be constructed, within the easement right-of-way, any type of building or structure, such as, but not limited to, houses, garages, sheds, kennels, fences, nor any other fixed objects of any kind, shape or form, except as many be licensed by Grantee.

2. Grantors agree not to plant, nor cause to be planted within the easement right-of-way any trees, bushes, shrubs, hedges nor any other plantings of a similar nature, except as may be

3. Grantors agree that authorized representatives of the City of Billings can freely travel within the easement right-of-way with their equipment in the performance of their duties at any time, day or night, regardless of outside weather conditions having given a minimum of twenty-four (24) hours prior notice of any activity to the owner(s) of the above described real property. In the unlikely event of an emergency, the twenty-four (24) hour prior notice requirement shall be waived. To ensure proper restoration, it is the responsibility of the Grantee to document conditions existing prior to any construction within the easement area.

4. Grantors agree that the responsibility of the City of Billings for any surface restoration due to any construction, replacement, repair or service work to the sanitary sewer and/or storm drain management system by the City of Billings, shall be limited to backfill and compaction to the existing ground, restore any paved areas to like conditions and to grade, seed and fertilize existing sodded areas to the satisfaction of the property owners. All areas disturbed during construction, replacement, repair or service work to the sanitary sewer and/or storm drain management system shall be returned to its original condition.

5. HOLD HARMLESS AGREEMENT:
    - Grantors agree that the owner or owners of the above described property shall at all times fully relieve and save harmless the City of Billings and its authorized representatives for any and all damages of property that may be caused within said easement right-of-way, such as, but not limited to, ruts or deep tracks in lawns, gardens, or flower beds, broken or crushed shrubs, bushes, hedges, trees or any other type of plantings; crushed, cracked split or otherwise damaged, irrigation piping and appurtenances; and, any other damage to any other type of object, material or equipment located within the easement right-of-way which cannot, with a minimum of human effort and within a few minutes time period, be removed from easement right-of-way by authorized representatives of the City of Billings in exercise of any of their rights under this easement right-of-way, except as noted in paragraph 4 above.

    - Grantors agree the owners of the above described real property shall be responsible in the event damage results from owners' failure to comply with any portion of the rights, restrictions, obligations or responsibilities contained in this agreement.

7. The restrictions, Covenants and Hold Harmless Agreements herein contained shall attach to and run with the land and shall bind the parties hereto and all persons claiming thereunder.

POPELKA ENTERPRISES, LLC

By: _____

Title: _____

STATE OF MONTANA)
) ss.
County of Yellowstone)

On this _____ day of _____, 20____, before me, the undersigned, a Notary Public for the State of Montana, personally appeared _____ known to me to be the _____ of the corporation that executed the within instrument and acknowledged to me that such corporation executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

_____
Signature of Notary

ACKNOWLEDGMENT AND ACCEPTANCE OF CONVEYANCE

The Mayor and City Council of the City of Billings acknowledges receipt of this perpetual easement and hereby accepts the property interest conveyed through this instrument.

_____
Mayor, City of Billings

ATTEST:

_____
City Clerk

STATE OF MONTANA)
) ss.
County of Yellowstone)

On this _____ day of _____, 20____, before me, the undersigned, a Notary Public for the State of Montana, personally appeared _____ and _____ known to me to be the Mayor and City Clerk of Billings, respectively, and acknowledged to me that they duly executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

Return to:
Popelka Enterprises LLC.
P.O. Box 50126
Billings, MT 59105

QUITCLAIM DEED

FOR VALUABLE CONSIDERATION, receipt of which is acknowledged this 15th day of June, 2016, the undersigned, NAVE PROPERTIES LLC., 1518 Alkali Creek Road, Billings, MT 59105, as Grantor, does hereby grant, convey, release and forever quitclaim unto POPELKA ENTERPRISES LLC., P.O. Box 50126, Billings, MT 59105, as Grantee, its interest in the following described real property situated in the City of Billings, Yellowstone County, Montana:

A tract of land situated in the NE1/4 of Section 27, T. 1 N., R. 26 E., P.M.M., in the City of Billings, Yellowstone County, Montana, being that portion of the Montgomery Street right-of-way lying south of Hansen Lane, more particularly described as follows, to-wit:

Beginning at a point being the intersection of the south right-of-way line of Hansen Lane and the east right-of-way of Montgomery Street, said point also being the northwest corner of Lot 1A, Block 2 of Maltese Subdivision; thence, from said Point of Beginning, Southerly along the west line of said Lot 1A, also being the east right-of-way line of said Montgomery Street, a distance of 130 feet; thence, leaving said west line, Westerly along the south right-of-way line of said Montgomery Street, a distance of 30 feet to a point on the east line of Block 2 of Hansen Subdivision; thence Northerly along said east line of Block 2, also being the west right-of-way line of said Montgomery Street, a distance of 130 feet to a point on said south right-of-way line of Hansen Lane; thence Easterly along said south right-of-way line, a distance of 30 feet to said Point of Beginning; said described tract having an area of 3,900 square feet.

TO HAVE AND TO HOLD unto the Grantees, and to Grantees' assigns and successors forever.

IN WITNESS WHEREOF, the Grantor has herein executed this instrument the day and year first above written.

NAVE PROPERTIES LLC.

By: Tony G. Nave

Title: President

STATE OF MONTANA)
:ss
County of Yellowstone)

On this 15th day of June, 2016, before me, the undersigned Notary Public for the State of Montana, personally appeared TONY G. NAVE, known to me to be the person who signed the forgoing instrument as President of NAVE PROPERTIES LLC., and acknowledged to me that said corporation executed the same. Witness my hand and seal the day and year herein above written.

Shelly Molen
Notary Public in and for the State of Montana

SHELLY MOLEN
NOTARY PUBLIC for the
State of Montana
Residing at Billings, Montana
My Commission Expires
April 01, 2018

SEAL

Regular City Council Meeting

Meeting Date: 06/27/2016

TITLE: Special Review 943 - Public Hearing

PRESENTED BY: Nicole Cromwell

Department: Planning & Community Services

PROBLEM/ISSUE STATEMENT

This is a special review request to locate a service station, a Jiffy Lube, in an NC zoning district. Service stations include single service locations such oil changes, alignments, tire services and minor vehicle repairs. The use is an allowed use provided the proposal meets the 3 criteria for special review approval.The property is generally located at 741 S 24th St West and owner, Jeff Essman, is represented by the agent for Jiffy Lube, Terra Form Companies of Salt Lake City, UT. The Zoning Commission conducted a public hearing on June 7, 2016, and is forwarding a recommendation of conditional approval and adoption of the findings of the 3 criteria.

Special Review applications are reviewed using City Code criteria referenced in the Alternatives Analyzed section of this memo. Special Reviews do not require an ordinance for approval, are not zone changes on property; rather, are tied to specific uses that are allowed in a given zoning district but are subject to a review by the City prior to the use being allowed. Special Reviews, unlike zone changes, may be conditioned to mitigate possible impacts from the use on the subject property or surrounding properties.

ALTERNATIVES ANALYZED

City Council may:

- Approve the request
- Conditionally approve the request
- Deny the request
- Allow the applicant to withdraw the request
- Delay action on the request for up to 30 days

The Planning Division reviewed the request and recommended conditional approval to the Zoning Commission based on the findings of the 3 review criteria. The Zoning Commission concurred. Before a recommendation of approval or conditional approval may be made, each special review request must demonstrate conformance with three primary criteria: 1) the application complies with all parts of the Unified Zoning Regulations, 2) the application is consistent with the objectives and purposes of the Unified Zoning Regulations and the 2008 Growth Policy, including any neighborhood plans, and 3) is compatible with surrounding land uses and is otherwise screened and separated from adjacent land to minimize adverse impacts.

This application conforms to the first criteria because it is in a zoning district where service stations are allowed by special review approval. The application is consistent with the objectives and purposes of the Unified Zoning Regulations and the site plan appears to meet all of the requirements of those regulations. The application is consistent with the adopted Growth Policy

and Infill Policy to encourage development or re-development of property with compatible uses in existing neighborhoods where City infrastructure already exists and can readily serve the property. The proposed use may have some adverse impact to the immediate vicinity and the Zoning Commission is recommending several conditions of approval to ensure these potential impacts are minimized.

The Zoning Commission proposes the following conditions of approval:
1. The special review approval is for the operation of a service station and no other use is intended or implied by this approval.
2. The special review is limited to Lot 9A, Block 2 of Justiss Subdivision generally located at 741 S 24th St West.
3. The applicant will retain all existing trees on the property and on the adjacent rights of way. Any tree trimming required for the demolition of the existing building or construction of the new building will be done in consultation with a certified arborist. Tree trimming on trees within the public rights of way will be done after consultation with the City's Forester.
4. The applicant will use the color scheme for the new building as shown on the submitted site plan.
5. The applicant will develop the site in substantial conformance with the submitted site plan. Minor deviations and modifications are allowed.
6. There shall be no demolition or construction activity on the site before 7 am or after 8 pm daily.
7. Any centralized solid waste storage shall be enclosed by a wall on 3 sides and a closing gate or gates. The wall and gates for the solid waste storage shall be similar or complimentary in color to the adjacent buildings and shall be sight-obscuring. The wall and gates shall be tall enough that no part of the interior dumpster(s) are visible from the outside.
8. These conditions of special review approval shall run with the land described in this authorization and shall apply to all current and subsequent owners, operators, managers, lease holders, heirs and assigns.
9. The proposed development shall comply with all other limitations of Section 27-613 of the Unified Zoning Regulations concerning special review uses, and all other City of Billings regulations and ordinances that apply.

FINANCIAL IMPACT

If the special review use is approved, a new structure and re-development of the site will occur. This will likely raise the appraised value of the property and add to the City's tax base.

BACKGROUND

This location has been the subject of 5 zone change applications and 1 special review. Three zone changes from Residential 7,000 (R-70) to Residential Professional (RP) or Community Commercial (CC) zoning were attempted but denied in the late 1970s and early 1980s. In 1996, the City approved a zone change to RP and a special review to allow the drive-through service for the Valet Today dry cleaning service. The business closed approximately 2 years ago. The owner of the property submitted a zone change in 2015 from RP to Neighborhood Commercial (NC) zoning. The City Council approved the zone change in July, 2015. At the time, the property was to be sold to a small national food retailer. This sale did not occur.

The Justiss Subdivision and the Valley View Acres Subdivision to the north have been the subject of numerous zone changes and special review requests since the early 1970s. Four of the 11 zone change requests were denied. These proposed zone changes were from residential zoning to commercial zoning. Notably, in 1993, the lot directly north of the subject property

received a Planned Development zone change from Public zoning to allow the city to sell a portion of property to Pier One for development. The underlying zoning for the Pier One property is NC. Special reviews for liquor licenses, large satellite dishes, a clothing store and for a veterinary clinic have been approved in the Valley View Acres Subdivision, located north of the subject property.

The owner of the subject property would like to redevelop the property as a Jiffy Lube. This business provides lubricating service to vehicles on a drive through basis similar to Master Lube, Wal-mart, Sears and Pep Boys. The site has been fully developed, but has 3 street frontages; Rosebud Drive, Henesta Drive and S 24th St West. This will make re-development of the 1/3-acre property a challenge. The property will only have access from the Henesta Drive street frontage. No access will be allowed from S 24th St West or from Rosebud Drive. The traffic count on this section of S 24th St West is about 26,000 vehicle trips per day and King Ave West, 1/2-block to the south, carries about 27,000 vehicle per day. South 24th Street West at this location is a 6-lane arterial street with a full traffic control signal at its intersection with Rosebud Drive. Rosebud Drive is a 2-lane local street with a dedicated left turn bay at the signalized intersection. Henesta Drive is also a 2-lane local street that provides service to the adjacent businesses as well as dwellings to the south and east. Henesta Drive is a dead end street when it meets property owned by Lithia Dodge on King Avenue West. There are no directly adjacent residential uses to the subject property.

STAKEHOLDERS

The Zoning Commission conducted a public hearing on June 7, 2016, and received the staff recommendation and testimony from the agents, Jason Smith of Terra Form Companies and Matt Johnson, franchise owner for Jiffy Lube in Billings. No other testimony was received at the public hearing.
Mr. Smith explained the sample building elevations show a 4-bay facility and this location will be a 3-bay facility. He noted the building materials and color scheme will be the same as what is shown. He stated the plan is to move vehicles through the bays from south to north. He stated the site meets the minimum number of off-street parking spaces required by City code. He stated the parking spots are generally only used by employees on shift since the customer vehicles are queued in front of the bays. He stated occasionally a customer will leave the waiting area and the completed vehicle would then be parked in 1 of the 3 spaces shown on the north side of the building. Mr. Smith stated there are other Jiffy Lube stores in Montana but only 1 other location in Billings; on Main Street. He stated the business is actively pursuing at least one other location in Billings and possibly a fourth location.

Mr. Matt Johnson testified in favor of the application. He is the franchise owner of the Billings location and will be the owner of this location if it is approved. In response to a question from the Commission, he stated he owns 18 franchise locations including stores in Utah that have very challenging traffic situations for access and egress. He stated a successful franchise provides service to about 30 to 40 vehicles per day. He stated there are busy times that may overlap on the busy times on Rosebud and S 24th St West. He understands the traffic queued in the west bound lane of Rosebud could prevent left turns out of Henesta Drive during certain periods of time. Commissioners Larson, Mariska and Ulvestad all stated this is a concern since the traffic signal on S. 24th St West is given precedence and the east bound traffic out of Walmart has a longer green (left turn arrow) than the westbound traffic on Rosebud. Mr. Johnson stated Jiffy Lube always strives to assist customers so the employees will be trained to direct customers on alternate routes into and out of the neighborhood.

Commissioner Mariska asked staff why a condition was recommended to install 1 bicycle

parking rack. Staff explained this would serve the future employees primarily. Commissioner Mariska stated he did not believe this condition was necessary.

Chairman Wagner closed the hearing. Commissioner Larson made a motion to recommend conditional approval, with the removal of the condition to require a bicycle parking rack, and adopt the findings of the 3 criteria. The motion was seconded by Commissioner Mariska and was approved on a 4-0 vote.

CONSISTENCY WITH ADOPTED POLICIES OR PLANS

Consistency with Adopted Policies and Plans is discussed in the Alternatives Analyzed section above.

RECOMMENDATION

The Zoning Commission recommends conditional approval and adoption of the findings of the 3 criteria for Special Review 943 on a 4-0 vote.

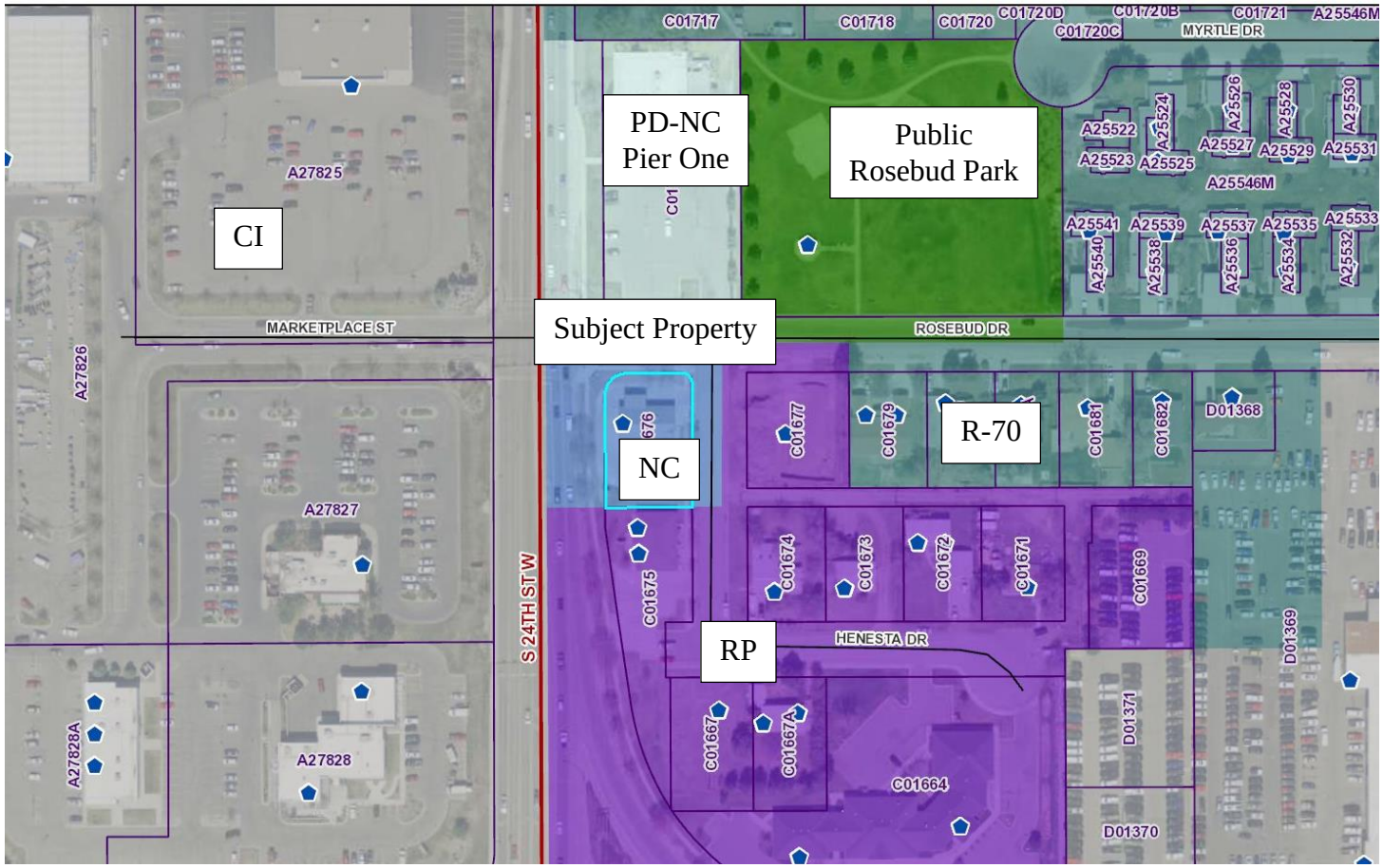
APPROVED BY CITY ADMINISTRATOR

Attachments

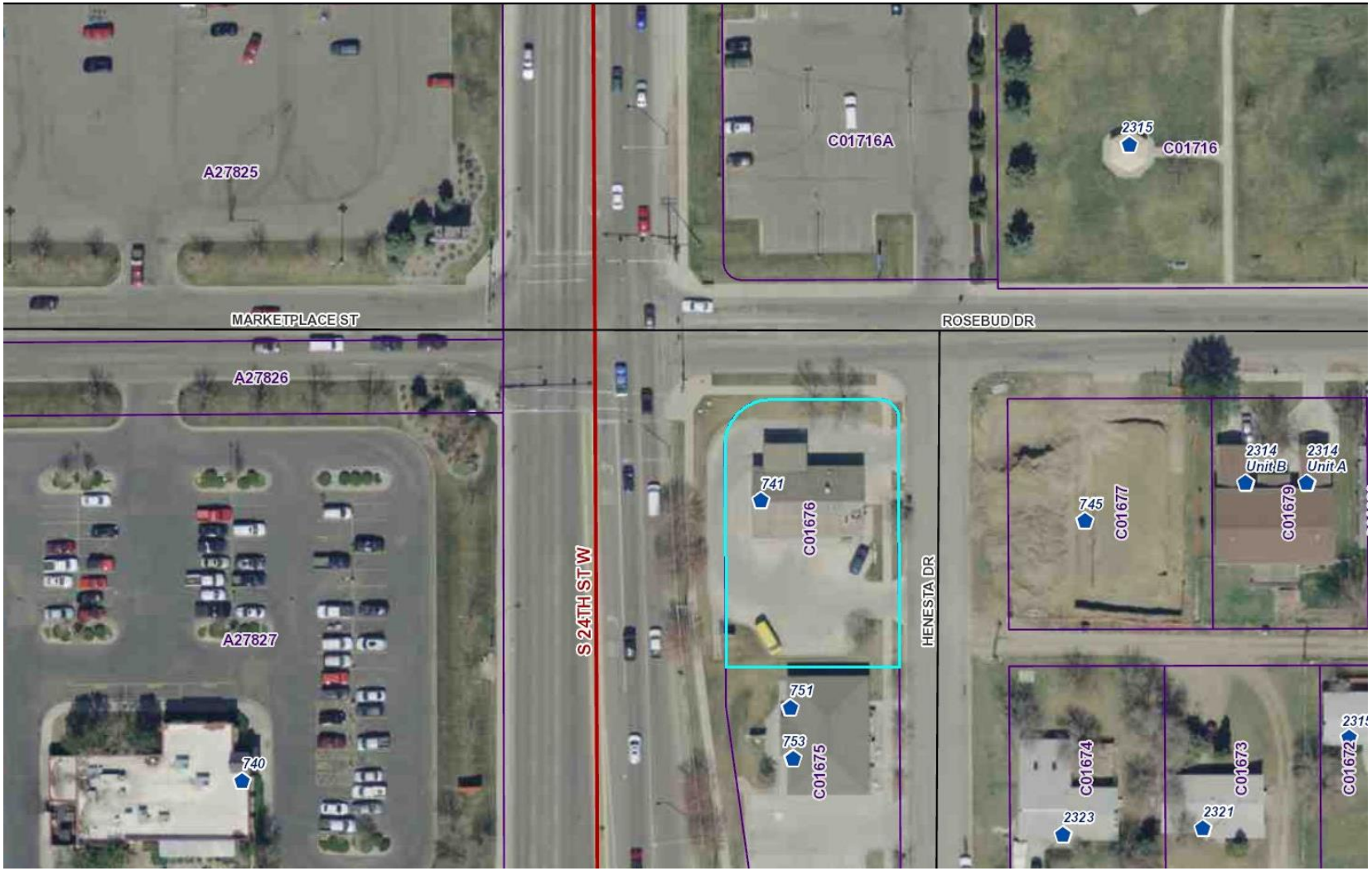
Zoning Map and Site Photos
Applicant Letter and Site Plan

Special Review 942
Zoning Map and Site Photos

741 S 24th St West - Special Review 943



741 S 24th St West - Special Review 943





Subject Property – view east from intersection of Rosebud Dr & S 24th St West



View north across intersection of Rosebud Dr & S 24th St West



View south along S 24th St West



View south west across S 24th St West



View north along Henesta Drive – 2 drive existing approaches



View south along Henesta Drive from intersection with Rosebud Drive



View east across intersection of Henesta Drive and Rosebud Drive



View north at intersection of Henesta Drive and Rosebud Drive

Special Review 943
Applicant Letter and Site Plan

May 2, 2016

City-County Planning Division
Planning & Community Services Department
Attn: Nicole M. Cromwell, Zoning Coordinator
2825 3rd Avenue North, 4th Floor
Billings, Montana 59101

RE: Special Review Application – 741 South 24th Street West, Billings, MT 59102 ("Property")

Dear Ms. Cromwell:

The purpose of this letter is to provide additional information that is required by the Special Review Application for the Property located at 741 South 24th Street West in Billings.

TerraForm Companies LLC ("TFC") is a boutique land development firm headquartered in Salt Lake City, UT. TFC specializes in commercial retail development and offers full build to suit development services for retail tenants throughout the western United States.

TFC is a preferred developer for Jiffy Lube, the tenant that is interested in operating a store at the Property. The purpose of this Special Review application is to request approval to demolish the existing dry cleaning structure on the Property and build a new Jiffy Lube. Sample architectural renderings of a prototypical Jiffy Lube are attached hereto as Exhibit 'A'.

The current zoning designation for the Property is Neighborhood Commercial. Under NIC 5531 and 5541, Jiffy Lube could be permitted as a "service station" in the NC zone with a Special Review.

Section 1 of the Special Review Application requires answers to the following questions:

1. *In what ways is your proposal consistent with the goals and policies of the adopted Growth Policy?:*
    a. *Land Use Element:* The Property is located in an infill, urban area. A quick lube use such as Jiffy Lube is not inconsistent with uses on the surrounding properties.
    b. *Economic Development Element*: A Jiffy Lube will provide more job opportunities than the existing dry cleaning use as well as generate more retail tax base for the City.
    c. *Aesthetics Element*: The new Jiffy Lube prototype is aesthetically pleasing. The new Jiffy Lube building and site landscaping will enhance and improve the Property.
    d. *Natural Resources Element:* Development of the intended use will not have a significant impact on natural resources or wildlife.
    e. *Open Space and Recreation Element*: Development of the intended use will not have a significant impact on the open space on the Property.

f. *Transportation Element*: Development of the intended use will not alter the current access points to the Property, nor will it significantly change the number of vehicle trips per day.
g. *Public Facilities and Services Element*: Development of the intended use will not require additional public facilities or services than those already servicing the Property.
h. *Cultural and Historic Resources Element*: Development of the intended use will not negatively impact any historical landmarks, structural or cultural aspects of the surrounding area.
i. *Community Health Element:* Development of the intended use will not negatively impact the health or well-being of the citizens in, or the environment of the surrounding community.

2. *Why is there a need for the intend use of the Property at this location?:*
    a. The proposed development of a new Jiffy Lube will be an aesthetic enhancement to the existing dry cleaning structure on the Property, and increase the useful life of the Property.
3. *How will the public interest be served if this application is approved:*
    a. Development of a Jiffy Lube will provide jobs for the surrounding community, increased tax base to the City and offer a convenient location for the surrounding residents to service and maintain their vehicles in a clean, safe, attractive environment.

Please do not hesitate to contact the undersigned with additional questions about the proposed project or details of this application. We appreciate your time and consideration in reviewing this application.

Sincerely,
TERRAFORM COMPANIES, LLC

Elliott B. Smith
Managing Partner

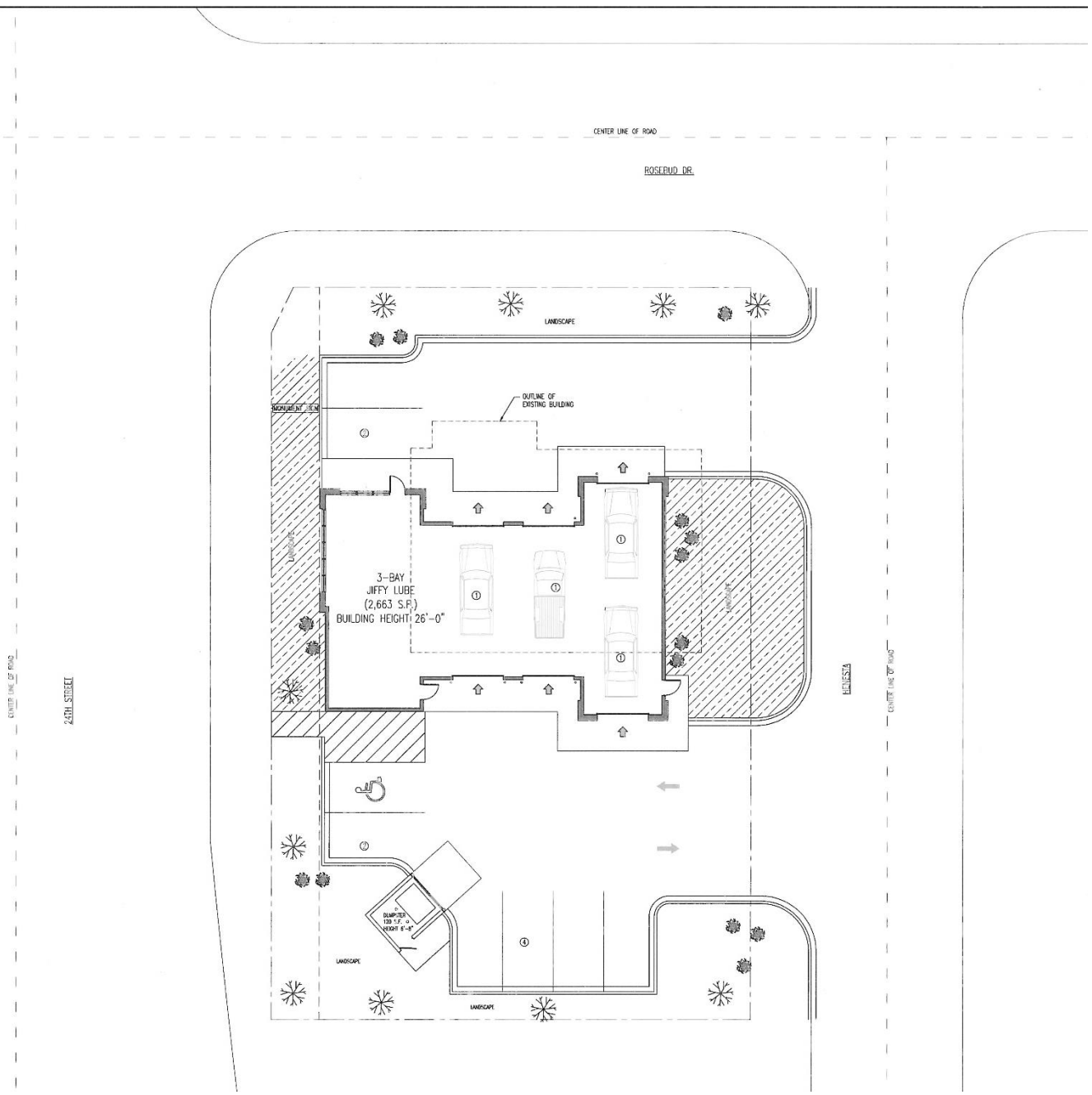
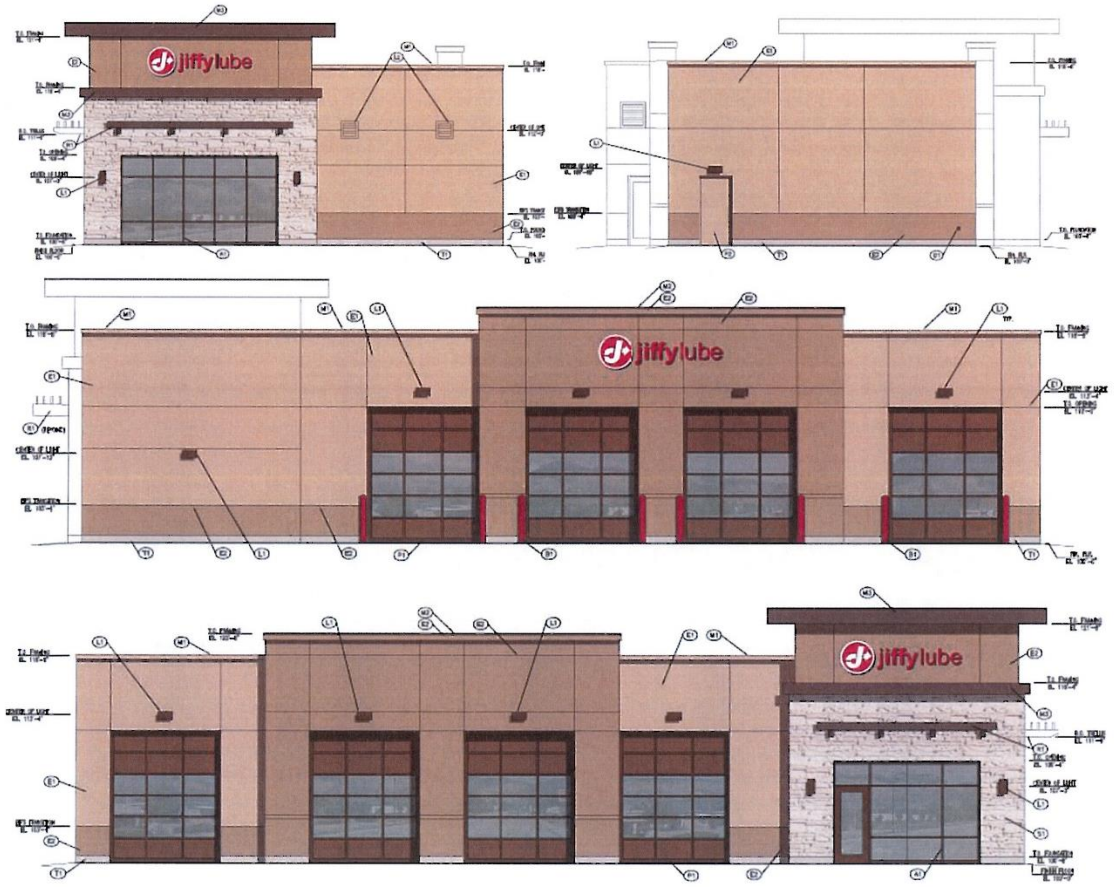

CENTER LINE OF ROAD
ROSEBUD DR.
LANDSCAPE
OUTLINE OF EXISTING BUILDING
MONUMENT SIGN
3-BAY
JIFFY LUBE
(2,663 S.F.)
BUILDING HEIGHT: 26'-0"
DUMPSTER
LANDSCAPE
LANDSCAPE
LANDSCAPE
LANDSCAPE
CENTER LINE OF ROAD
24TH STREET
CENTER LINE OF ROAD

Exhibit 'A'
(sample building elevations**)



**sample elevations of a current Jiffy Lube prototype. Colors and materials will be similar, but number of bays, building footprint and configuration subject to change.