



CITY OF TWIN FALLS, IDAHO

SPECIAL MEETING NOTICE

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The Monday, October 5, 2015, Twin Falls City Council meeting will start at 3:00 P.M., in the Twin Falls Council Chambers located at 305 Third Avenue East, Twin Falls, Idaho, for the purpose of touring Auger Falls.

The regular meeting will start at 5:00 p.m. in the Council Chambers.

Leila A. Sanchez
Deputy City Clerk/Recording Secretary

COUNCIL MEMBERS:Suzanne
HawkinsJim
MunnShawn
BarigarChris
TalkingtonGregory
LantingDon
HallRebecca
Mills Sojka

Vice Mayor

Mayor

**AGENDA**

Meeting of the Twin Falls City Council - Monday, October 5, 2015 - City Council Chambers
3:00 P.M. - 305 3rd Avenue East - Twin Falls, Idaho

3:00 P.M. - Tour of Auger Falls

PLEDGE OF ALLEGIANCE TO THE FLAG
CONFIRMATION OF QUORUM
CONSIDERATION OF THE AMENDMENTS TO THE AGENDA
PROCLAMATIONS: Harold Gerber Day

GENERAL PUBLIC INPUT

5:00 - AGENDA ITEMS**I. CONSENT CALENDAR:**

1. Request to approve the Accounts Payable for September 22 through October 5, 2015.
2. Request to accept the Improvement Agreement for the purpose of developing Westpark Commercial Subdivision No. 9.
3. Request to approve the Sidewalk Improvement Deferral Agreement for 153 Wiseman Avenue for Linda Cameron.
4. Request to approve the Findings of Fact, Conclusions of Law for the Final Plat for Westpark Commercial Subdivision #9.

Purpose:
Action**By:**
Sharon Bryan

Action

Troy Vitek

Action

Troy Vitek

Action

Jonathan Spendlove

II. ITEMS FOR CONSIDERATION:

1. Award presentation for outgoing Airport Board Member Dan Olmstead.
2. Request to confirm the appointment of Abbie Mashaal to the Airport Advisory Board.
3. Request to approve the renewal of the City & County Intergovernmental Cooperation Agreement for the Operation of Joslin Field, Magic Valley Regional Airport.
4. Request to approve the construction timing on infrastructure for Interstate Amusement Subdivision, a Conveyance Plat.
5. Review of the City's leaf collection program and possible action regarding the future of the program.
6. Request to provide input on the Greater Area Twin Falls Transportation Committee's (GTFATC) project priority list.
7. Request to approve a contract between the City of Twin Falls and Starr Corporation to act as the City's Construction Manager/General Contractor on the City Hall/Public Safety Complex project.
8. Second Reading: Request to adopt Ordinance 3106, amending Twin Falls City Code, Title 1.
9. Public input and/or items from the City Manager and City Council.

Purpose:
Presentation
Action**By:**
Bill Carberry
Bill Carberry

Action

Bill Carberry

Action

Jonathan Spendlove

Review/
Action

Jon Caton

Action

Jacqueline Fields

Action

Travis Rothweiler

Action

Travis Rothweiler

III. ADVISORY BOARD REPORTS/ANNOUNCEMENTS:**IV. PUBLIC HEARINGS:**

6:00 P.M.

1. Request for Vacation of a 15' utility easement along westerly boundary of Lots 1, 2, 3, 4, 5 & 6 Block 1 and a 15' utility easement along easterly boundary of Lots 1, 2, 3, 4 and Tract A Block 2 of the Eldridge Commercial Subdivision located north of the intersection of Eldridge Avenue & Madrin Street c/o The Edmunds Group, LLC & Larry Fairbanks (app. 2747)

PH/Action

Ken Edmunds
Jonathon Spendlove**ADJOURNMENT:**

Any person(s) needing special accommodations to participate in the above noticed meeting could contact Leila Sanchez at (208) 735-7287 at least two working days before the meeting. Si desea esta información en español, llame Leila Sanchez (208)735-7287.

Twin Falls City Council-Public Hearing Procedures for Zoning Requests

1. Prior to opening the first Public Hearing of the session, the Mayor shall review the public hearing procedures.
 2. Individuals wishing to testify or speak before the City Council shall wait to be recognized by the Mayor, approach the microphone/podium, state their name and address, then proceed with their comments. Following their statements, they shall write their name and address on the record sheet(s) provided by the City Clerk. The City Clerk shall make an audio recording of the Public Hearing.
 3. The Applicant, or the spokesperson for the Applicant, will make a presentation on the application/request (request). No changes to the request may be made by the applicant after the publication of the Notice of Public Hearing. The presentation should include the following:
 - A complete explanation and description of the request.
 - Why the request is being made.
 - Location of the Property.
 - Impacts on the surrounding properties and efforts to mitigate those impacts.Applicant is limited to 15 minutes, unless a written request for additional time is received, at least 72 hours prior to the hearing, and granted by the Mayor.
 4. A City Staff Report shall summarize the application and history of the request.
 - The City Council may ask questions of staff or the applicant pertaining to the request.
 5. The general public will then be given the opportunity to provide their testimony regarding the request. The Mayor may limit public testimony to no less than two minutes per person.
 - Five or more individuals, having received personal public notice of the application under consideration, may select by written petition, a spokesperson. The written petition must be received at least 72 hours prior to the hearing and must be granted by the mayor. The spokesperson shall be limited to 15 minutes.
 - Written comments, including e-mail, shall be either read into the record or displayed to the public on the overhead projector.
 - Following the Public Testimony, the applicant is permitted five (5) minutes to respond to Public Testimony.
 6. Following the Public Testimony and Applicant's response, the hearing shall continue. The City Council, as recognized by the Mayor, shall be allowed to question the Applicant, Staff or anyone who has testified. The Mayor may again establish time limits.
 7. The Mayor shall close the Public Hearing. The City Council shall deliberate on the request. Deliberations and decisions shall be based upon the information and testimony provided during the Public Hearing. Once the Public Hearing is closed, additional testimony from the staff, applicant or public is not allowed. Legal or procedural questions may be directed to the City Attorney.
- * Any person not conforming to the above rules may be prohibited from speaking. Persons refusing to comply with such prohibitions may be asked to leave the hearing and, thereafter removed from the room by order of the Mayor.



Date: Monday, October 5, 2015
To: Honorable Mayor and City Council
From: Lee Glaesemann, Staff Engineer

Tour:

Walking Tour of the Auger Falls Recycled Water Wetlands. Please wear clothing and shoes appropriate for walking through rugged landscape and areas of heavy vegetation!

Time Estimate:

30 to 45 minutes on site plus travel time to and from the site.

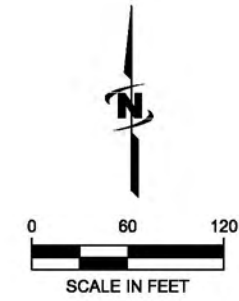
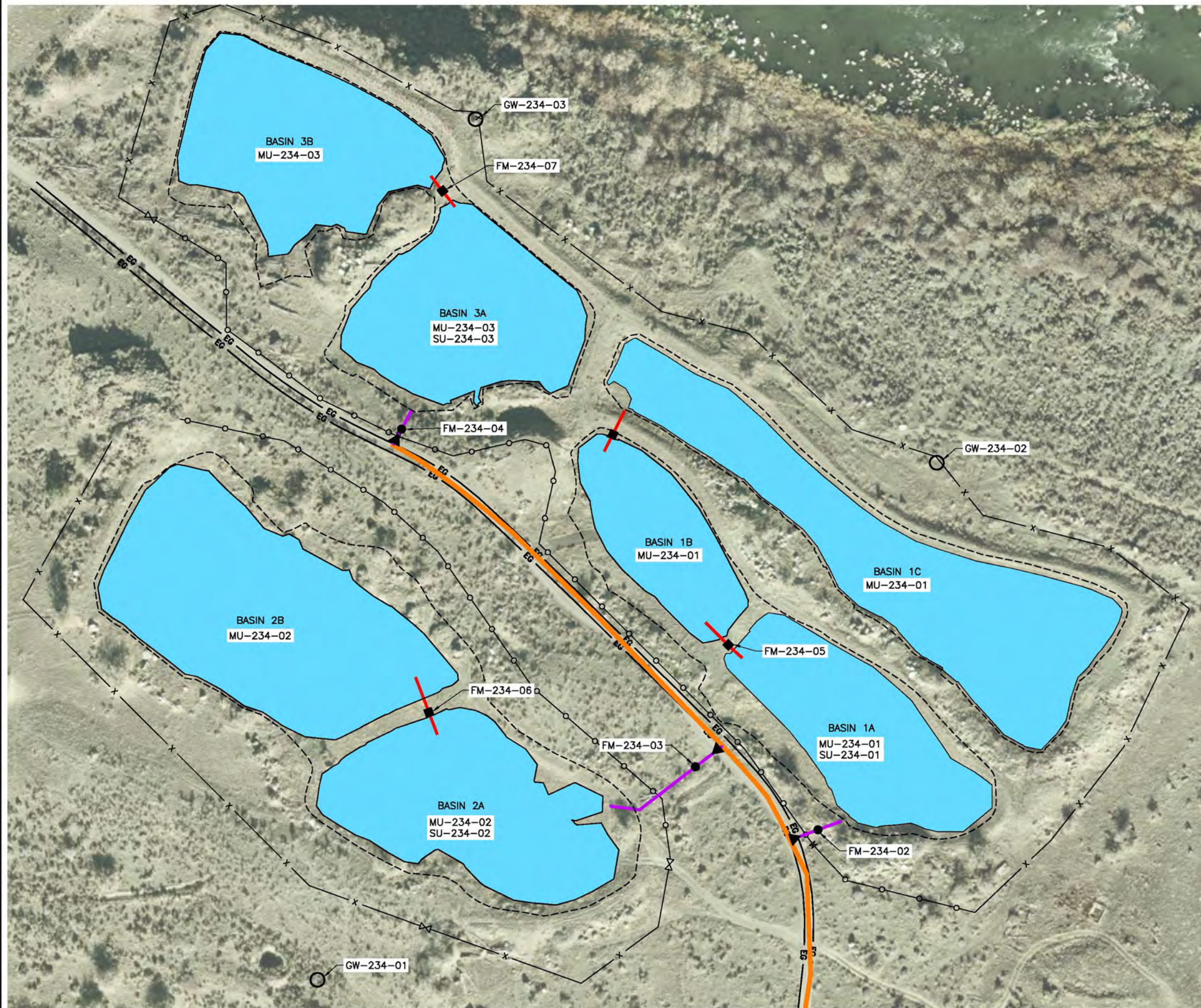
Background:

The City of Twin Falls has constructed about 6 acres of ponds for the reuse of treated wastewater within the Auger Falls Heritage Park. This effort included the installation of pump station and approximately 2 miles of 18" pipeline and road improvements to deliver treated wastewater to the Auger Falls site, where it is being used to create wetlands for wildlife habitat.

The tour is intended to show the Council what improvements have been made and provide general information about the work that has been done.

Attachement:

Site map.



LEGEND

- BASIN HIGH WATER
- TOP OF BANK
- x FENCE (BARB WIRE)
- o FENCE (FABRIC)
- X GATE
- 18" PRESSURE MAIN
- 12" BASIN INLET PIPING
- 12" TRANSFER PIPING
- ISOLATION VALVE
- FLOW METER
- TRANSFER STRUCTURE
- GROUNDWATER MONITOR WELL

*Office of the Mayor
City of Twin Falls*

Proclamation

- Whereas:* Architect Harold Gerber, a long standing and prominent businessman, is being honored for the many contributions he has made to the City of Twin Falls.
- Whereas:* He has been instrumental in designing and remodeling many businesses and City of Twin Falls Facilities.
- Whereas:* His accomplishments include, but are not limited to, the designing and remodeling of the former Shelby's Grocery; Twin Falls High School's Cafeteria; banks located on Blue Lakes Boulevard, including First Federal Savings Bank, D. L. Evans Bank, Farmers National Bank, and U.S. Bank; the former S&H Green Stamp Building; Herrett Center for Arts & Science; the former Twin Falls Area Chamber of Commerce; as well as many prominent local homes.
- Whereas:* For the City of Twin Falls he designed and remodeled the Twin Falls Public Library Addition, Joslin Field Magic Valley Regional Airport, City Park Band Shell Addition, and the existing Council Chambers.
- Whereas:* He has been an active member of our community, and was a member of Twin Falls Toastmaster/Club 149 for 65 years.

NOW, THEREFORE, I, Don Hall, Mayor of the City of Twin Falls, proclaim October 5, 2015, to be

Harold Gerber Day

and encourage all to join in this observance.

IN WITNESS WHEREOF, I set my hand
and cause our seal to be affixed.

Mayor Don Hall

Attest: _____
Leila A. Sanchez, Deputy City Clerk



Date: Monday, October 5, 2015
To: Honorable Mayor and City Council
From: Troy Vitek, Assistant City Engineer

Request:

Consideration of a request to accept the Improvement Agreement for the purpose of developing Westpark Commercial Subdivision No. 9.

Time Estimate:

The staff presentation will take approximately 2 minutes.

Background:

The final plat was approved on September 14, 2015. Prior to development, an Improvement Agreement is required. The developer is meeting that requirement with this document.

Approval Process:

Accepting the Improvement Agreement allows the developer to develop the lots. After acceptance of utilities or a financial guarantee provided to the City, the lots can be removed from trust and sold.

Budget Impact:

There is no significant budget impact associated with the Council's approval of this request.

Regulatory Impact:

Approval of this request will allow the applicant to proceed to develop the property.

Conclusion:

Staff recommends that the Council approve the request and authorize the Mayor to sign the Improvement Agreement.

Attachments:

1. Improvement Agreement.

IMPROVEMENT AGREEMENT

for

DEVELOPMENTS

This Agreement made and entered into this 31st day of AUG, 20 15, by and between the CITY OF TWIN FALLS, State of Idaho, a municipal corporation, hereinafter called "City" and WESTPARK PARTNERS hereinafter called "Developer" for the purpose of constructing certain improvements on property sought to be developed for the following Development WESTPARK COMMERCIAL SUBD No. 7.

WHEREAS, there is attached hereto and incorporated herein as if the same were set out in full, a certified copy of the deed to the real property showing ownership of said real property to be in the Developer's name, or, as the case may be, there is attached hereto and incorporated herein as if the same were set out in full, a copy of the deed to the above described real property showing ownership in fee simple in someone other than Developer together with a notarized authorization, signed by the real property owner, authorizing Developer to act on behalf of said real property owner, and;

WHEREAS, Developer desires to develop said real property for the following purposes:

COMMERCIAL

WHEREAS, the Developer is obligated to construct certain improvements pursuant to City Code Section 10-12-4.2, and;

WHEREAS, the Developer has committed to construct special features as part of the development, and;

WHEREAS, the City has certain policies, ordinances, rules and regulations governing the construction of improvements, and;

WHEREAS, it is in the best interest of the City and Developer to clearly establish in one concise document the policies, ordinances, rules and regulations which apply to developments of the type contemplated herein.

WITNESSETH

That for and in consideration of the mutual promises, conditions, and covenants contained herein the parties agree as follows:

I.

City agrees: (1) to operate and maintain all approved streets, alleys, service and roads, excluding state highways, constructed under the terms of this Agreement in any public rights-of-way

or easements and which are presently within or subsequently annexed into the City limits. Those streets, excluding state highways, lying outside the City limits and within the City Area of Impact shall be constructed to City standards but shall become the responsibility of the Twin Falls Highway District until such time as they are annexed or a maintenance agreement is signed by the City and the Twin Falls Highway District. (2) To operate and maintain all approved water lines, drainage lines, and sewer lines constructed under the terms of this Agreement in any public rights-of-way or easements and to provide water and sewer service to the Developer's real property, subject to all ordinances, rules and regulations governing sewer and water service. (3) To maintain non-pressure irrigation lines only where they cross City streets. All other maintenance of non-pressurized irrigation lines is the responsibility of the Twin Falls Canal Company or the irrigation users.

II.

In lieu of the actual installation of required public improvements before recording of the final plat, the Council may permit the subdivider to provide a financial guarantee of performance in one (1) or a combination of the following arrangements for those requirements which are over and beyond the requirements of any other agency responsible for the administration, operation and maintenance of the applicable public improvement.

a. Surety Bond

1. Accrual - The Bond shall accrue to the City covering construction, operation and maintenance of the specific public improvement.
2. Amount - the bond shall be in an amount equal to one hundred percent (100%) of the total estimated cost for completing construction of the specific public improvements, as estimated by the Developer's Engineer and approved by the City Engineer.
3. Term Length - The term length in which the bond is in force, for the duration of that phase of the project, shall be until completed and accepted by the City Engineer.
4. Bonding for Surety Company - The bond shall be with a surety company authorized to do business in the State of Idaho, acceptable to the Council.
5. The escrow agreement shall be drawn and furnished by the subdivider to the satisfaction of the Council.

b. Cash Deposit, Certified Check, Negotiable Bond, or Irrevocable Bank Letter of Credit.

1. Treasurer, Escrow Agent or Trust Company - A cash deposit, certified check, negotiable bond or an irrevocable bank letter of credit such surety acceptable by the Council, shall be deposited with an escrow agent or trust company.
2. Dollar Value - The dollar value of the cash deposit, certified check, negotiable bond or irrevocable bank letter of credit shall be equal to one hundred percent (100%) of the estimated cost of construction for the specific public improvements, as estimated by Developer's Engineer and approved by the City Engineer.
3. Escrow Time - The escrow time for the cash deposit, certified check, negotiable bond or irrevocable bank letter of credit shall be until all required improvements are completed and accepted by the City Engineer.
4. Progressive Payment - In the case of cash deposits or certified checks, an agreement between the City and the subdivider may provide for progressive payment out of the cash deposit or reduction of the certified check, negotiable bond or irrevocable bank letter of credit, to the extent of the cost of the completed portion of the public improvement, in accordance with a previously entered into agreement.

III.

Developer agrees to retain a Professional Engineer, hereinafter called the Developer's Engineer, registered by the State of Idaho to perform the following minimum Engineering Services in accordance with Title 10 Chapter 12 Section 4-1 of the City Code:

- a. Prepare a master utility plan showing the location of all existing and proposed utility lines to include but not be limited to sewer, water, gas, electricity, telephone, irrigation, pressure irrigation and storm sewer.
- b. Prepare detailed plans and specifications for construction of all improvements required by this Agreement and shall include but not be limited to a complete set of construction plans, including profiles, cross-sections, specifications and other supporting data, for all required public streets, utilities and other facilities. Such construction plans shall be based on preliminary plans which have been approved with the preliminary plat, and shall be prepared in conjunction with the final plat. Construction plans are subject to approval by the responsible public agencies. All

- construction plans shall be prepared in accordance with the public agencies' standards and specifications.
- c. Perform construction surveying, staking, testing, inspection and administer the construction of all facilities required by this contract.
 - d. Submit all test reports, inspection reports, change orders and construction diaries to the City Engineer every week during the construction of the development or subdivision.
 - e. Prepare and submit an updated copy of the enclosed development and subdivision checklist to the City Engineer every week during the construction of the development or subdivision, and also upon completion of the project.
 - f. Submit to the City Engineer the final plans, and master utility plan for the City records showing any approved changes to the original plans and specifications. A permanent drawing in ink on approved transparent polyester drafting film and an electronic media copy of the plans in ACAD 2000 using City standard format shall be provided within thirty (30) days after completion of the project.
 - g. Submit a letter upon completion of construction stating that the work has been constructed in conformance to the plans and specifications, with the certification by the Developer's Engineer that improvements were constructed to the lines and grades shown.

The above work shall be subject to the approval of the City Engineer.

The City agrees to provide asphalt pavement testing for conformance with City standards, but it shall be the responsibility of Developer's Engineer to provide all necessary quality control during construction. All tests shall be taken at a frequency based upon City of Twin Falls Standard Specifications.

The Developer agrees to: (1) allow the City full and complete access to the work (2) provide all materials necessary to conduct all tests (3) supply all water necessary to test pipe joints and (4) provide the equipment and perform or have performed any testing of manufactured materials required by the City Engineer.

The Developer shall submit a letter to the City Engineer upon completion of the project, requesting that the City assume the responsibility for maintenance and operation of all public improvements as stated herein.

IV.

The Developer agrees to obtain a permit or letter of approval from the Twin Falls Highway District or the State of Idaho Department of Highways prior to constructing improvements on their respective right-of-ways. The original or a certified copy of said permit or letter shall be submitted to the City Engineer prior to beginning of construction thereon.

V.

The Developer agrees to dedicate rights-of-way to the public for the development of all streets and alleys in accordance with the City Master Street Plan and to dedicate easements for the maintenance and operation of all public utilities. The size and location of said rights-of-way and easements shall be determined by the City Engineer.

VI.

The Developer hereby agrees and petitions the City to annex into the corporate limits of said City, the above described real property that is contiguous with the same or becomes contiguous to said City limits. Developer agrees to annexation of said real property by the City upon the terms and conditions as shall be set forth by said City.

VII.

The Developer and the City agree that the improvements listed herein are required unless specifically waived by action of the City Council and that said improvements will be constructed on any public rights-of-way or easements approved and accepted by the City Council all as designed by the Developer's Engineer and approved by the City Engineer and in accordance with standards established by the City Engineer and that all required improvements will be completed in a timely manner. If improvements are not completed in a timely manner, the Developer shall provide an updated, current version of the developer's agreement and financial guarantee for City Council consideration.

VIII.

The Developer agrees to pay the total actual costs of all materials, labor and equipment necessary to completely construct all of the improvements required herein, except those costs specifically shown to be paid by the City and to construct or contract for the construction of such improvements.

IX.

Developer agrees to pay the total extra cost of all additional materials, labor and equipment necessary to construct any streets the City requires to be wider or deeper than a standard street or any water or sewer lines the City requires to be larger than the size required to properly serve the

development. The requirement for wider and deeper streets shall be based on the City Master Street Plan. Requirements for larger water and sewer lines shall be based on the citywide sewer and water system sizing guidelines.

X.

The City shall provide no compensation for the cost of an oversize water or sewer line. In the case of water or sewer lines extended adjacent to or outside the limits of development, the Developer shall be eligible for payback from adjacent property owners pursuant to Resolution No. 1182. The Developer shall also be eligible for compensation when a private developer extends or connects to any water or sewer system previously installed by private developer, pursuant to Resolution 1651.

XI

Developer agrees to request in writing that the Developer's Engineers make the inspections required herein and the Developer or his Contractors shall not proceed with the next construction phase until the required inspection is complete and the work has been approved by the Developer's Engineer, the City Engineer or the Engineer's authorized inspector. All such inspections shall be scheduled in accordance with the City of Twin Falls Standard Specifications. Developer agrees to pay all costs resulting from: 1) his failure to properly schedule and request a required test or inspection or 2) proceeding with work before receiving approval to proceed. Developer agrees to remove or correct any rejected, unapproved or defective work or materials as required by the Developer's Engineer or the City Engineer. Any such defective work whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause, shall be removed within ten (10) days after written notice is given by the Developer's Engineer or the City Engineer, and the work shall be re-executed by the Contractor at his expense. The fact that either Engineer may have previously overlooked such defective work or materials shall not be a basis for acceptance of any part of it.

The issuance or approval of plans, specifications and computations shall not be construed as an approval of any violation of any provisions of City code, specifications, standards, policy, or any other ordinance of the City. Approvals of plans that may violate City code, specifications or departmental policies will not be valid.

The approval of construction plans, specifications, and other data shall not prevent the City from thereafter requiring the correction of errors or omissions in said plans or specifications prior to or during actual construction or final acceptance by the City.

The Developer shall remove from all public property all temporary structures, rubbish, and waste materials resulting from their operation or caused by his employees.

The Developer shall guarantee all materials, workmanship and equipment furnished for a period of one (1) year from the date of written acceptance of the work by the City Engineer or authorized representative.

The Developer shall be responsible for any damage to any existing public improvements and shall repair or replace any such damage as required by the City Engineer, during or after completion of this project.

XII.

The City and the Developer agree to the following minimum for Required Improvements, City Costs, Required Inspections and to any other improvements, approved or required by the City Council and shown on the approved construction plans.

PUBLIC WAYS

(a) Required Improvements

- (1) Curb, gutter and sidewalk on all public street rights-of-way.
- (2) A standard residential street thirty six feet (36') wide with an eight inch (8") gravel course and two inch (2") asphaltic concrete surface course on all public street rights-of-way serving residential use property.
- (3) Minor residential and private streets as specified in the City of Twin Falls Standard Drawings.
- (4) A standard commercial or collector street forty eight feet (48') wide with an eleven inch (11") gravel course and three inch (3") asphaltic concrete surface course on all public street rights-of-way serving commercial use property or as a collector street. Whenever a street serves an industrial use property the City Engineer will determine the appropriate structural section.
- (5) A service-road twenty four feet (24') wide with an eight inch (8") gravel course and two inch (2") asphaltic concrete surface course and with concrete curb-gutter or curb and valley-gutter on all public service road rights-of-way.
- (6) A sidewalk five feet (5') wide minimum on all public pedestrian rights-of-way. Four foot (4') sidewalks by special permission of the City Council are allowed by City of Twin Falls Standard Drawings for minor residential streets under certain conditions.

- (7) Landscaping and sidewalk placement required adjacent to arterial and collector streets: A tract of land eleven feet (11') in depth behind the curb line will be dedicated as part of any residential development adjacent to arterial and collector streets. Within that tract the developer shall install landscaping six feet (6') in depth with a sprinkler system and with grass and trees behind the curb line and shall also install a five foot (5') sidewalk. The landscaping will be maintained by the city and funded through a fee added to the water bill of each account within the development. Irrevocable restrictive covenants for this development and maintenance shall provide for this funding. TFCC §10-12-4.2(O).
 - (8) Street signs and traffic control devices on all public streets.
 - (9) Street lights as determined by City policy for street light installation.
- (b) City Costs
- (1) The cost of any street signs or traffic control devices installed by the City on new or existing streets.
 - (2) The cost of any required street lights (standard luminaires mounted on a wood pole). The Developer shall pay the extra cost of any decorative luminaires or poles. Prior approval will be required, and the cost of maintenance, replacement and power usage will be considered.
- (c) Required Inspections and Testing
- (1) All inspections and testing shall be as required by City of Twin Falls Standard Specifications.

WATER SYSTEM

- (a) Required Improvements
- (1) Pursuant to City Code Section 7-8-3, 7-8-10 and 10-12-4.2 water line and fittings six inch (6") minimum diameter that will transport a flow of water, which will satisfy fire, domestic, other water demands of the development, based upon the City water pipe sizing plan and computer water model. Water line extension shall include connection from the existing City Water System to each building site and fire hydrants and then loop back to the City System in a manner that will provide a properly functioning system approved by the City Engineer, Water Superintendent and Fire

Chief. If the development is to be constructed in phases, the water system shall be looped back to the City system during the first phase. No dead-end lines will be allowed during any phase of the project.

- (2) Water lines and fittings adjacent to and internal to the development shall be sized to continue the orderly expansion of the City water distribution network in accordance with existing sizing guidelines.
- (3) Water valves that will allow temporary suspension of water flow for maintenance and repair of portions of water system without causing undue inconvenience to a large number of users or creating a critical situation in the suppression of fires.
- (4) Fire hydrant connections and fire hydrants spacing to substantially comply with the minimum standards suggested by the Fire Rating Bureau and American Water Works Association. Fire hydrants are required in all developments.
- (5) One water service line shall be constructed to each building site at the time the water lines are installed. Each service line shall not exceed fifty feet (50') in length and shall terminate at the right-of-way.

During construction of the curb the letter W shall be stamped into the top or face of the curb directly in front of the water meter box. The impression shall be not less than one and one half inches (1½") high. Meters shall be grouped at adjacent side lot lines when possible or at another location if requested by the Developer and approved by the City Engineer and Water Superintendent. Water meter boxes will not be allowed in driveway approaches. Any cost associated in relocating meters from driveway approaches will be the responsibility of the Developer or Lot Owner. Temporary address or lot number signs shall be staked at the location where the water meter box is to be installed. The City may install multiple water meters in a single water meter box.

The City will make the water line tap only after all appropriate tap fees for a Water Connection General Permit have been received and permits issued. All new water service line and connections made from existing water service mains to service any new development will be the responsibility of the

Developer. The City will make the necessary service line tap after payment of the required water connection general permit fees.

- (6) One water service line tap, meter box, and service line shall be constructed for each building connected to the City water system. It is understood and agreed that the City will make all service line taps and install all meter boxes and that the fee paid by the developer for a Water Connection General Permit will reimburse the City for such work.
- (7) It is further understood and agreed that the City will make all connections to the existing water system. The City will disinfect the new water system at the developer's expense.

(b) City Costs

- (1) None.

(c) Required Inspections

- (1) All inspections and testing shall be as required by the City of Twin Falls Standard Specifications.

WASTE WATER COLLECTION SYSTEM

(a) Required Improvements

- (1) Pursuant to City Code Section 7-7-4, 7-7-11 and 10-12-4.2 a waste water collection system (eight-inch (8") minimum diameter) that will transport a flow of waste water, under conditions of maximum and minimum discharge from the development, to the existing City waste water system.
- (2) Waste water sewer lines adjacent to or internal to the development will be sized to continue the orderly expansion of the City Waste Water Collection System in accordance with existing sizing guidelines and computer sewer model.
- (3) Manholes to provide access for maintenance and cleaning of the sewer lines located at any change of grade or alignment of the sewer, at the end of each sewer and spaced not more than four hundred feet (400') apart.
- (4) During construction of the curb the letter S shall be stamped into the top or face of the curb directly in front of the sewer service line location. The impression shall be not less than one and one half inches (1½") high.

(b) City Costs

(1) None.

(c) Required Inspections and Testing

(1) All inspections and testing shall be as required by City of Twin Falls Standard Specifications.

DRAINAGE SYSTEM

(a) Required Improvements

(1) Any valley-gutters, ditching, grading or other surface drainage facilities necessary to convey any storm run-off originating from or traversing across the proposed development over the land surface to a point of retention, detention or discharge approved by the City Engineer.

(2) Any catch basin, storm sewer and other sub-surface drainage facilities necessary to convey any storm run-off, originating from or traversing across the proposed development, to a point of retention, detention or discharge approved by the City Engineer, that cannot, in the City Engineer's opinion, be conveyed over the land surface without causing damage to public or private property or without being an unreasonable inconvenience or hazard to a private individual, a group of individuals or the general public.

(b) City Costs

(1) None.

(c) Required Inspections and Testing

(1) All inspections and testing shall be as required by the City of Twin Falls Standard Specifications.

GRAVITY IRRIGATION SYSTEM

(a) Required Improvements

(1) Any pipe, boxes or other appurtenances necessary to convey all irrigation water in underground pipe across the development and any adjacent public property. Irrigation facilities outside an established City irrigation district shall be constructed in an irrigation easement on private property except where it is necessary for irrigation water to cross the public right-of-way and all such crossings shall be perpendicular to the center line of said right-of-way unless otherwise approved by the City Engineer due to some unusual condition.

(b) City Costs

- (1) None.

(c) Required Inspections and Testing

- (1) All inspections and testing shall be as required by the City of Twin Falls Standard Specifications.

PRESSURE IRRIGATION SYSTEM

(a) Required Improvements

- (1) Pursuant to Section 7-8-3 of the City Code, the use of the City's potable water supply as the primary source of irrigation water in all new developments shall be prohibited. For purposes of this subsection, the term "new development" means any new subdivision or PUD, or any development of any parcel of land of two (2) acres or larger that is not part of a subdivision or PUD. One (1) share of Twin Falls Canal Company Water for each acre of property within the subdivision shall be deeded to the City of Twin Falls before the filing of the final plat for use in the City's pressurized irrigation system.
- (2) Pressure irrigations water line and fittings shall be four inch (4") minimum diameter or larger that will transport a flow of water, which will satisfy all irrigation water demands of the development, based upon the computer irrigation water model that the developer's engineer has prepared.
- (3) Water lines and fittings adjacent to and internal to the development shall be sized to continue the orderly expansion of the City Pressure Irrigation water distribution network in accordance with existing sizing guidelines.
- (4) Water valves that will allow temporary suspension of water flow for maintenance and repair of portions of water system without causing undue inconvenience to a large number of users. One pressure irrigation water service line shall be constructed to each subdivision

lot site at the time the pressure irrigation water lines are installed. Each service line shall not exceed fifty feet (50') in length and shall terminate at the right-of-way. One Pressure irrigation water service line tap, irrigation box, and service line shall be constructed for each subdivision lot connected to the City pressure irrigation water system.

- (5) The Developer shall be responsible for all costs incurred in designing and installing the pressure irrigation station. This includes the land, pumps, motors, filters, buildings, delivery system to the station from the TFCC head gate, storage pond, Supervisory Control and Data Acquisition (SCADA) system, and power to the station.
- (6) All pressure irrigation system plans must be prepared by the Developer's engineer shall be according to the City's standard specifications and drawings. Plans submitted to the City shall be signed by a Professional Engineer for review and final approval, before the City Engineer will sign the plat or approve construction plans.
- (7) The Pressure Irrigation System shall be located within easements, right of ways and/or property deeded to the City of Twin Falls.
- (b) City Cost.
 - (1) None
- (c) Required Inspections and Testing
 - (1) All inspections and testing shall be as required by the City of Twin Falls Standard Specifications.

SPECIAL FEATURES

Pursuant to commitments made by the Developer as conditions of approval of the development, the following special features shall be constructed:

a) Required Improvements

b) City Costs

(1) None.

XIII.

The City and the Developer agree that the sequence of construction shall be as follows unless special approval in writing is obtained from the City Engineer:

1. Erosion and sedimentation controls.
2. Stormwater retention and detention facilities.
3. Waste water sewers and service connections.
4. Waste water manholes.
5. Storm sewers and catch basins.
6. Gravity irrigation pipes and boxes.
7. Pressure irrigation lines, service connections, etc.
8. Water lines and service connections.
9. Gas lines, power lines, telephone lines and cablevision lines.
10. Any other underground improvements that are required.
11. Sub-base preparation for public ways.
12. Gravel base course for public ways.
13. Curb-gutter, valley-gutter and sidewalk.
14. Gravel leveling course.
15. Asphalt paving.
16. Special Features.

XIV.

The Development may be phased as indicated on the attached development plan submitted by the Developer and approved by the City Engineer.

The terms of the basic agreement shall apply individually to each phase shown on the attached plan as though each phase were a separate and independent development providing each phase is begun in the sequence indicated on the development plan.

The two (2) year time limit, (indicated in Section VII of the Agreement) for completing the required improvements shall begin for each phase when the Developer sells a lot or an application or a building permit to construct a building within the phase has been received by the City.

The Developer may cease further development after completing any phase and before beginning the next phase and the basic agreement shall terminate in accordance with Section XVI, of the basic agreement for any undeveloped phases of the development originally proposed in the basic agreement.

XV.

This agreement shall bind the parties hereto, their heirs, successors in interest, and lawful assigns.

In the event of a breach of Agreement, or should legal action of any kind be taken to enforce the provisions, hereof, the prevailing party shall be entitled to reasonable attorney fees and costs awarded by the Court.

CITY OF TWIN FALLS, IDAHO

Mayor

Developer
Walter P. Parker
Paul M. T. T.

On this ____ day of _____, 20____, before me, the undersigned, a Notary Public for Idaho, personally appeared _____, known to me to be the persons whose names are subscribed to the within instrument on behalf of said Owner and acknowledged to me that said Owner executed the same.

Notary Public for Idaho
Residing at Twin Falls, Idaho

STATE OF IDAHO)
)ss.
County of Twin Falls)

On this ____ day of _____, 20____, before me, the undersigned, a Notary Public for Idaho, personally appeared _____, known or identified to me (or proved to me on the oath of _____) to be the president, or vice-president, or secretary or assistant secretary, of the corporation that executed the instrument or the person who executed the instrument on behalf of said corporation, and acknowledged to me that such corporation executed the same.

Notary Public for Idaho
Residing at Twin Falls, Idaho

STATE OF IDAHO)
)ss.
County of Twin Falls)

IN WITNESS WHEREOF, I have hereunto set my hand and seal the day and year first
above written.



Margo Williams
Notary Public for Idaho
Residing at Twin Falls, Idaho
Expires: 9-1-2018

NOTICE IS HEREBY GIVEN, that a document entitled "Improvement Agreement for Developers" (hereafter "Agreement") has been executed and filed with the City of Twin Falls, Idaho, for the following named subdivision:

CITY OF TWIN FALLS, IDAHO

Mayor

Developer
Westpark Partners
Shel Martin

On this ____ day of _____, 20____, before me, the undersigned, a Notary Public for Idaho, personally appeared _____, known to me to be the persons whose names are subscribed to the within instrument on behalf of said Owner and acknowledged to me that said Owner executed the same.

Notary Public for Idaho
Residing at Twin Falls, Idaho



Date: Monday, October 5, 2015
To: Honorable Mayor and City Council
From: Troy Vitek, Assistant City Engineer

Request:

Sidewalk Improvement Deferral Agreement – 153 Wiseman Avenue for Linda Cameron.

Time Estimate:

The presentation will take approximately 5 minutes.

Background:

The homeowner wishes to add on to the existing house as well as build a covered porch. A building permit would require frontage improvements, such as sidewalk installation. This home is located in an older neighborhood that only has curb & gutter. There are no sidewalks in this neighborhood. Due to the nature of this neighborhood and the fact that there are no adjoining sidewalks to tie into, the homeowner is requesting a deferral on the sidewalk requirement.

Approval Process:

City Code 10-11-5 (B) states the City Engineer may defer construction if the improvement would create a traffic hazard or unusual drainage problem. Staff believes construction of sidewalk at this location is not warranted at this time.

Budget Impact:

There is no significant budget impact associated with the Council's approval of this request.

Regulatory Impact:

Approval of this request will allow the owner to defer construction until the City Engineer requires construction.

Conclusion:

Staff recommends that the Council approve the request as presented.

Attachments:

1. Location maps
2. Site Photos
3. Sidewalk Deferral Agreement

SIDEWALK IMPROVEMENT DEFERRAL AGREEMENT

This Agreement made and entered into this 17th day of September, 20 , by and between the CITY OF TWIN FALLS, State of Idaho, a municipal corporation, hereinafter called "City", and Linda Cameron, hereinafter called "Developer", for the purpose of constructing certain improvements on property sought to be developed at 153 Wiseman Ave..

WHEREAS, Developer certifies that he is the owner in fee simple or the authorized agent of the owner in fee simple of the real property described on the attached Exhibit "A"; and,

WHEREAS, there is attached hereto and incorporated herein as if the same were set out in full, a certified copy of the deed to the above described real property, marked Exhibit "A", showing ownership of said real property to be in Developer, or, as the case may be, there is attached hereto and incorporated herein as if the same were set out in full, a copy of the deed to the above described real property showing ownership in fee simple in someone other than Developer together with a notarized authorization, signed by the real property owner, authorizing Developer to act on behalf of said real property owner; and,

WHEREAS, Developer desires to develop said real property in the following manner: Add onto house to build a covered porch; and,

WHEREAS, the Developer is obligated to construct certain improvements, namely sidewalk, pursuant to Title 10, Chapter 11 of the Twin Falls City Code; and,

WHEREAS, the City is authorized, pursuant to Twin Falls City Code Section 10-11-5(B)(2) to defer said improvements; and,

WHEREAS, the City Council on _____ agreed to defer construction of the aforementioned improvements,

WITNESSETH, that for and in consideration of the mutual promises, conditions and covenants contained herein, the parties agree as follows:

I.

City agrees: 1) to defer construction of the required sidewalk until _____ or until such time as the obligation of sidewalk construction on adjacent property or properties allows the City Engineer to require construction under the conditions specified in City Code Section 10-11-5(B)(2).

II.

Developer agrees to: 1) complete construction of sidewalk on the real property described above when required by the City Council.

III.

Developer further agrees that in the event the Developer fails to complete the aforementioned construction, the City may complete the construction at the City's expense and may file a lien against the aforementioned property for expenses incurred by the City in said construction.

IV.

Developer agrees to pay the total actual cost of all materials, labor and equipment necessary to completely construct all of the improvements required herein and to construct or contract for the construction of all such improvements.

V.

Developer agrees to request in writing that the City Engineer and any other required department of the City make the following inspections and to not proceed with construction until the required inspection is complete and the work has been approved in writing by the City Engineer or his authorized inspector. All such

inspections shall be scheduled fifteen (15) days prior to beginning work and the request for an inspection shall be made one working day before the required inspection. Developer agrees to apply all costs resulting from his failure to properly schedule and request a required inspection or from proceeding with work before receiving approval to proceed. Developer agrees to remove or correct any rejected, unapproved or defective work or materials all as required by the City Engineer.

Required inspections shall include: 1) approval of all materials before inspection; 2) approval of forms and gravel base before pouring any concrete sidewalk; and 3) approval of finished sidewalk.

VI.

The Developer agrees to: 1) allow the City full and complete access to the construction; 2) provide all materials necessary to conduct all tests; and 3) provide the equipment and perform or have performed any testing of manufactured materials required by the City Engineer.

VII.

Developer agrees to obtain any necessary permits from the Twin Falls Highway District or the State of Idaho Department of Highways prior to construction improvements on their respective rights-of-way if said permits are required by the aforementioned agencies. A certified copy of said permit or the original of said permit shall be submitted to the City prior to beginning construction thereon.

This Agreement shall be recorded and shall bind the parties hereto, their heirs, successors in interest, and lawful assigns.

In the event of a breach of this Agreement, or should legal action of any kind be taken to enforce the provisions hereof, the prevailing party shall be entitled to reasonable attorney fees and cost awarded by the Court.

CITY OF TWIN FALLS, IDAHO

BY _____
Mayor

DEVELOPER

Linda Cameron

STATE OF IDAHO

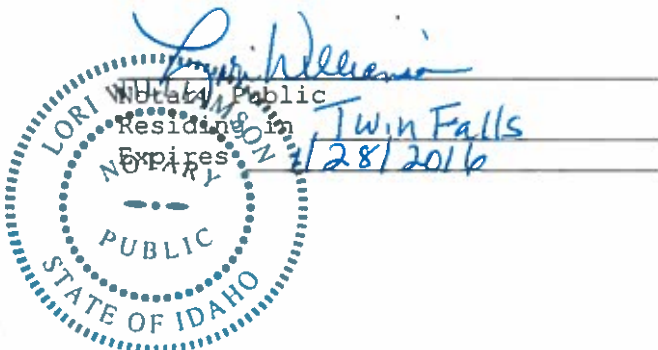
On this 17 day of September, 2015, before me a notary public in and for said State, personally appeared Linda Cameron

known to me to be the person who name subscribed to the within instrument, and acknowledged to me that _____ executed the same.

STATE OF IDAHO

On this ____ day of _____, 20____, before me a notary public in and for said State, personally appeared _____

known to me to be the person who name subscribed to the within instrument, and acknowledged to me that _____ executed the same.



Notary Public
Residing in _____
Expires _____

**CORPORATION
WARRANTY DEED**

F 2 VALUE RECEIVED.

FIRST SOUTHERN BAPTIST CHURCH OF TWIN FALLS,

a corporation duly organized and existing under the laws of the State of Idaho, grantor, does hereby Grant, Bargain, Sell and Convey unto

STEVEN GALE CAMERON AND LINDA M. CAMERON, husband and wife

whose address is: 153 Wiseman Twin Falls, Idaho 83301

grantee, the following described real estate, situated in Twin Falls County, Idaho, to-wit

Lot 7 and the East 2 feet of Lot 8, KIMES NO. 2 SUBDIVISION, Twin Falls County, Idaho, according to the official plat thereof, recorded in Book 7 of Plats, page 11, records of Twin Falls County, Idaho.

SUBJECT to Restrictive Covenants affecting Kimes No. 2 Subdivision, dated May 18, 1955, recorded May 19, 1955, as Instrument No. 445368, in Book 25 of Miscellaneous, page 372, records of Twin Falls County, Idaho.

TO HAVE AND TO HOLD, the said premises, with their appurtenances unto the said Grantee and to the Grantee's heirs and assigns forever. And the Grantor does hereby covenant to and with the said Grantee, that the Grantor is the owner in fee simple of said premises, that they are free from all incumbrances except as above described and that Grantor will warrant and defend the same from all lawful claims whatsoever.

IN WITNESS WHEREOF, The Grantor, pursuant to a resolution of its Board of Directors has caused its corporate name to be hereinto subscribed by its Trustees.

Dated: May 12, 1975

By David W. Cox
David W. Cox
William D. Graves
William D. Graves
Kenneth E. Pierce
Kenneth E. Pierce

STATE OF IDAHO.

County of Twin Falls

On this 12th day of May, 1975, before me, a Notary Public in and for said State, personally appeared David W. Cox, William D. Graves and Kenneth E. Pierce

known to me to be the Trustees of the corporation that executed this instrument or the persons who executed the instrument on behalf of said corporation, 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.

Lillian M. Hoffman
Notary Public for the State of Idaho,
Residing at Twin Falls, Idaho

STATE OF IDAHO.

County of

I hereby certify that this instrument was filed for record at the request of TitleFact, Inc.
at 54 minutes past 4 o'clock P.M.
this MAY 29 1975 day of
in my office and duly recorded in Book
of Deeds at Page

H.A. LANCASTER

Ex Officio Recorder

Fees \$ 1.00

Mail to Steven G. Cameron

153-Wiseman
Twin Falls, Idaho 83301

INSTRUMENT NO.

686527



© 2015 Google

© 2015 Google

Google™ earth

7 ft





Wiseman Ave

153 Wiseman Ave

© 2015 Google

Google earth

165 ft

1992

Imagery Date: 9/8/2013 42°34'04.01" N 114°28'52.11" W elev 3709 ft eye alt 4440 ft



BEFORE THE CITY COUNCIL OF THE CITY OF TWIN FALLS

In Re:	)	
	)	
<u>Final Plat</u> Application,	)	FINDINGS OF FACT,
	)	
<u>Westpark Commercial Subdivision #9</u>	)	CONCLUSIONS OF LAW,
<u>c/o EHM Engineers, Inc.-Martens</u>	)	
Applicant(s).	)	AND DECISION
	)	

This matter having come before the City Council of the City of Twin Falls, Idaho on **September 14, 2015** for consideration of the final plat of the **Westpark Commercial Subdivision #9-A PUD**, approximately **3.86** (+/-) acres, consisting of **3 lots** and **1 tract** located **north of Pole Line Road & west of Canyon Crest Drive**, and the City Council having heard testimony from interested parties, having received written Findings from the Planning and Zoning Commission and being fully advised in the matter, now makes the following

FINDINGS OF FACT

1. Applicant has requested approval of the final plat of the **Westpark Commercial Subdivision #9-A PUD**, approximately **3.86** (+/-) acres, consisting of **3 lots** and **1 tract** located **north of Pole Line Road & west of Canyon Crest Drive**.

2. The property in question is zoned **C-1 PUD** pursuant to the Zoning Ordinance of the City of Twin Falls. The property is designated as **Commercial Retail** in the duly adopted Comprehensive Plan of the City of Twin Falls.

3. The existing neighboring land uses in the immediate area of this property are: to the north, **Undeveloped**; to the south, **Pole Line Road**; to the east, **Denny's Restaurant**; to the west, **Undeveloped**.

4. The City Engineering Office has reviewed the final plat and has approved the proposed street accesses and public utility extensions, subject to availability of such services at the time of development. The

developer will pay all costs of public improvements, including but not limited to streets, curb gutter and sidewalks, sewer, water and pressurized irrigation systems. The proposed development includes dedication of additional right-of-way in compliance with the Master Street Plan.

Based on the foregoing Findings of Fact and the regulations and standards set forth below, the City Council hereby makes the following

CONCLUSIONS OF LAW

1. The final plat of the **Westpark Commercial Subdivision #9-A PUD**, approximately **3.86** (+/-) acres, consisting of **3 lots** and **1 tract** located **north of Pole Line Road & west of Canyon Crest Drive** is in conformance with the objectives of the zoning ordinance and the policy for developments in Twin Falls City Code §10-1-4. Specifically, the land can be used safely for building purposes without danger to health or peril from fire, flood or other menace, proper provision has been made for drainage, water sewerage and capital improvements including schools, parks, recreation facilities, transportation facilities and improvements, all existing and proposed public improvements conform to the Comprehensive Plan.

2. The final plat is in conformance with the Comprehensive Plan as required by Twin Falls City Code §10-12-2.3(H)(2)(a).

3. Public services are currently available to accommodate the proposed development, as required by Twin Falls City Code §10-12-2.3(H) (2) (b). Public services may not be available at the time of development, depending upon the speed of development of this and other subdivisions and the ability of the City to obtain additional water and/or sewer capacity.

4. The development of streets, sewer, water, irrigation, dedication of park land and other public improvements at the cost of the developer will not adversely affect any capital improvement plan and will integrate with existing public facilities, as required by Twin Falls City Code §10-12-2.3(H)(2)(c).

5. There is sufficient public financial capability of supporting services for the proposed development, as required by Twin Falls City Code §10-12-2.3(H)(2)(d).

6. There are no other health, safety or environmental problems associated with the proposed development that were brought to the City Council's attention, per Twin Falls City Code §10-12- 2.3(H)(2)(e).

7. The final plat is in conformance with the Preliminary Plat. Based on the foregoing Conclusions of Law, the Twin Falls City Council hereby enters the following

DECISION

The request for approval of the final plat of the **Westpark Commercial Subdivision #9-A PUD**, approximately **3.86 (+/-)** acres, consisting of **3 lots** and **1 tract** located **north of Pole Line Road & west of Canyon Crest Drive** is hereby granted, subject to final technical review by the City Engineer's Office and subject to the conditions which are attached as "Exhibit No. A", and incorporated by reference as though fully set forth herein. The applicant shall comply with all applicable requirements of the Adopted Standard Drawings, the Zoning Ordinance, and the City Code of the City of Twin Falls.

MAYOR - TWIN FALLS CITY COUNCIL

DATE

"EXHIBIT NO. A"

1. **Subject to final technical review and amendments as required by Building, Engineering, Fire and Zoning Officials to ensure compliance with all applicable City Code requirements and standards.**
2. **Subject to compliance with Northbridge PUD**
3. **Subject to the deed being revised in Westpark Commercial Subdivision #3, Lot 4 to exclude this subdivision, if approved.**



October 5, 2015 City Council Meeting

To: Honorable Mayor and City Council

From: Bill Carberry, Airport Manager

Request: An Award Presentation for Outgoing Airport Board Member Dan Olmstead

Time Estimate: Approximately 3 minutes

Background:

Dan Olmstead has served one partial term and two full terms on the Airport Board including the position of Chairman. Mr. Olmstead regularly attended meetings and served on subcommittees when additional time was required.

Fully understanding what an economic engine the airport is, Dan was instrumental in helping navigate through the Small Community Air Service Grant the City received, ultimately leading to the transition from 30-seat turboprops to 50-seat regional jets we enjoy today. Over the years, Dan has helped by joining with other economic development officials to visit with SkyWest at their corporate office in St. George, UT.

Dan is an active private pilot, member of Twin Falls Fliers flight club, and a sought after back country instructor pilot.

Dan's effort, support, and commitment to the airport and our community has been outstanding and we honor him today.

Conclusion: On behalf of the Airport Advisory Board, staff recommends City Council honor Dan Olmstead for his service to the Airport Advisory Board.



October 5, 2015, City Council Meeting

To: City Council

From: Mayor Don Hall

Request: Consideration of a request to confirm the appointment of Abbie Mashaal to the Airport Advisory Board.

Time Estimate: The presentation will take approximately 3 minutes. Following the presentation, additional time may be necessary for questions.

Background: The City advertised for applicants interested in becoming a City representative on the Airport Board due to the departure of Dan Olmstead, who served his maximum 2 terms. Staff worked with the City PIO in issuing two separate press releases and listing the opening on the City Web page.

An interview committee composed of Mayor Don Hall, Airport Liaison Chris Talkington, pending Airport Board Chairman elect Mark Cutler, and Airport Manager Bill Carberry interviewed 4 candidates earlier this month. The committee was impressed with Mr. Mashaal and unanimously agreed to recommend him. Mr. Mashaal revealed a good understanding of current airport operations and development goals. He formerly operated his skydiving business at the airport and currently maintains an airplane at Joslin Field. He lives in the city limits and continues to operate his skydiving business at a few airports in our region.

Approval Process: City Code 8-7-3 says that Airport Board members are appointed by the Mayor and confirmed by the City Council.

Budget Impact: None

Regulatory Impact: Approval of this request will maintain full membership on the Airport Advisory Board.

Conclusion: I request that the Council confirm my appointment of Abbie Mashaal to the Airport Advisory Board.



Date: Monday, October 5, 2015
To: Honorable Mayor and City Council
From: Bill Carberry, Airport Manager

Request:

Consideration of a Renewal of the City & County Intergovernmental Cooperation Agreement for the Operation of Joslin Field, Magic Valley Regional Airport

Time Estimate: Approximately 5 minutes with additional time for questions

Background:

Both City and County officials felt it was time to update and renew the original 1968 agreement. A renewal of this agreement continues the partnership and commitment to operate and develop Joslin Field. **The new agreement was approved and signed by the County at their Commissioner's meeting September 23rd.**

In large part, the new agreement continues with the same underling terms as the existing 1968 agreement:

- *The Airport Advisory Board's representation and operating principles remain unchanged;
- *The partnership relating to the equal funding of the airport remains unchanged;
- *The section relating to the operation of the airport has been revised to clarify that the day to day routine responsibility for the management of the airport is the City's;
- * Both parties remain as co-sponsors in the eyes of the Federal Aviation Administration (FAA) and both will approve and sign-off on FAA applications, grants, and related contracts and agreements;
- *A new section has been added seeking to maintain a cooperative approach between the City and County relating to land use planning and zoning surrounding the airport.

Budget Impact: The City and County remain as equal contributors to the airport budget.

Regulatory Impact: The Federal Aviation Administration has reviewed the agreement and is satisfied that both entities will remain as co-sponsors of the airport and will mutually maintain responsibilities as such.

Conclusion: After having reviewed the agreement with the Airport Board, and gaining approval from the County, Staff recommends the Council also approve renewal of the revised agreement and authorize the Mayor to sign.

Attachments: Copy of the new 2015 agreement.

INTERGOVERNMENTAL COOPERATION AGREEMENT
FOR THE OPERATION OF
JOSLIN FIELD, MAGIC VALLEY REGIONAL AIRPORT

INTERGOVERNMENTAL AGREEMENT, hereafter “Agreement”, made and entered into the ____ day of ____, ____ by and between the City of Twin Falls, an Idaho municipal corporation, hereafter “City”, and Twin Falls County, a political subdivision of the State of Idaho, hereafter “County” for the joint operation of Joslin Field, Magic Valley Regional Airport, hereafter “Airport”.

WHEREAS, the City and County have jointly constructed and developed the Airport which is located within the territorial boundaries of the County, pursuant to the statutory authority granted by Chapter 4 of Title 21 of the Idaho Code; and,

WHEREAS, pursuant to the authority granted in Idaho Code Sections 67-2326 and 67-2328, the City and County desire to enter into an Intergovernmental Agreement for the continued operation of the Airport.

NOW THEREFORE, the parties agree as follows:

1) – DURATION: The duration of this Agreement is twenty (20) years), beginning October 1, 2015, and ending September 30, 2035, unless terminated earlier as provided for in this Agreement. The 1968 Agreement shall terminate upon the effective date of this Agreement.

2) – AIRPORT ADVISORY COMMISSION: The parties have agreed to the creation of an Airport Advisory Commission of six (6) members. The members are selected three (3) by the City and three (3) by the County from the general populace residing within the respective jurisdictions. No member of said Airport Advisory Commission may hold an elective public office. The term of each member shall be three (3) years. Any vacancy which occurs on this Commission shall be filled by the jurisdiction losing a position on the Airport Advisory

Commission and for the remaining portion of the vacated term. No compensation shall be provided for members of the Airport Advisory Commission. Each jurisdiction may appoint a nonvoting, ex officio member of the Commission from the respective governing body. The Commission shall elect a chairman for the conduct of business, and the Airport Manager shall serve as secretary and a nonvoting ex officio member of the Commission.

The Airport Advisory Commission shall plan the operation, construction, improvement and development of said Airport; shall recommend the annual budget for operation, improvement, construction and development of said Airport; shall recommend employment of Airport personnel; consider and recommend contract and lease provisions for all operations conducted at the Airport and shall recommend and advise generally the respective governing bodies as to all matters concerning the Airport.

All meetings of the Airport Advisory Commission shall be called by the Airport Manager or the chairman of the Airport Advisory Commission and shall be conducted at the Airport. A quorum shall consist of four (4) representatives. The passage of any action shall require a minimum of four (4) votes.

3) – OPERATION: The City and County shall be co-sponsors responsible for administrative execution of all FAA grant applications and awards, and to fulfill all assurances required in such applications and awards. This co-sponsorship relationship will require both the City and County to authorize and execute FAA grant applications, awards and contracts. All future land acquisitions will be recorded in both the name of the City and County. The City shall be solely responsible for the management, control, and supervision of all routine business and affairs of the Airport. The City Manager and the Airport Manager shall be responsible to ensure that Airport maintenance and operation is performed pursuant to this agreement and to the

Airport budget approved by the City Council and County Commissioners, and to the City and County's federal grant obligations.

4) – FINANCES: The Airport Advisory Commission shall approve a preliminary annual budget for each fiscal year, showing the anticipated revenues and expenditures for the next budget year.

The Twin Falls County Commissioners, City Manager, City Financial Officer, and Airport Manager shall meet at least once per year during the month of June to discuss the affairs of the Airport, to include the current and pending annual budget; administration of the Agreement; and any extra ordinary expenditures, other than those for the day to day operation of the Airport, prior to the commitment of such expenditure. The Airport Manager will be available as requested throughout the year to discuss the airport budget.

The City shall levy and contribute 50% of the property tax supported revenue required for maintenance and operation of the Airport, as approved during the annual airport budget meeting. The City's contribution shall be the amount shown on the line item for "Airport" on the City's annual L-2 form under "Balance to be levied." The County shall contribute an amount equal to the City's contribution. Any costs not provided for in the current Airport budget shall be approved by the City Council and County Commissioners prior to incurring said costs.

Use may be made of the City administrative and other department personnel, equipment, and facilities to effect an economical operation of said airport and the City shall receive credit for the use of same upon the annual obligation of the City hereunder. Any reduction the City may receive shall not affect the County's contribution. It is further provided that the accounting procedure for the paying of the expenses of the airport operation which are presently being used

by the City will be continued. All FAA audit requirements will be the responsibility of the City finance department.

The parties hereto acknowledge the constitutional limitations on indebtedness imposed by Article VIII Section 3 of the Idaho Constitution. Budget approval shall be only for “ordinary and necessary expenses” in the operation of the airport during the next budget year, except as provided for in Article VIII Section 3E, permitting revenue and special facility bond financing for airports.

5) - COOPERATIVE LAND USE PLANNING AND ZONING: The City and County will work cooperatively, per Idaho Code 21-502 and 67-6508, to establish compatible land use planning and zoning in the surrounding airport environs. Such planning and zoning will be conducted in order to help provide for the safety of airport operations and to help prevent the creation or establishment of aviation hazards.

6) - AMENDMENT TO THE AGREEMENT: No amendment to this Agreement shall be valid and enforceable unless reduced to writing and authorized and signed by the parties.

7) – TERMINATION: This Agreement may be terminated by either party by providing written notice of termination at least six (6) months prior to the beginning of the next fiscal year (October 1). This Agreement does not establish a separate legal entity to conduct a joint or cooperative undertaking, as provided for in Idaho Code 67-2328(d). Any real property acquired or improved while this Agreement is in effect must remain available for the use of this publicly funded airport facility, pursuant to the requirements of FAA funding grants, and shall not be disposed of, but shall remain available for use of the airport operations. In the event the airport permanently ceases operation, the real property will revert back to the owner of record.

Dated this _____ day of _____, 2015.

IN WITNESS WHEREOF, the parties have cause this Agreement to be executed by their
duly authorized representatives.

CITY OF TWIN FALLS, IDAHO

Don Hall, Mayor

ATTEST: _____
Deputy City Clerk

COUNTY OF TWIN FALLS, IDAHO

Chairman, Board of County Commissioners

ATTEST: _____
Deputy County Clerk



Date: Monday October 5, 2015

To: Honorable Mayor and City Council

From: Jonathan Spendlove, Community Development Department

Request: Consideration of timing on infrastructure construction for Interstate Amusement Subdivision, a Conveyance Plat.

Time Estimate: Approximately 5 Minutes, with additional time for questions.

Background: In June 2015, the City passed Ordinance 3098 which modified City Code Section 10-12-2-5: Conveyance Plats. This modification allowed for the City Council to review the construction timing of street and utility improvements for parcels within a conveyance plat.

We have received an inquiry to develop Lot 2 of the Interstate Amusement Subdivision Conveyance Plat (see attachment #2 for detail). With that inquiry, the proposed Developer has requested to construct the street and utility infrastructure for Lot 2 exclusively from Lot 1. With the newly passed Ordinance, the Developer has the ability to petition the Council to separate the development of these lots.

Approval Process:

City Code 10-12-2-5 states the City Council may require construction of street and utility improvements on both parcels.

Budget Impact: There is no significant budget impact associated with this request.

Regulatory Impact: Approval of this request will allow the applicant to pursue development and construction of the improvements for Lot 2 (see attachment #2 for detail).

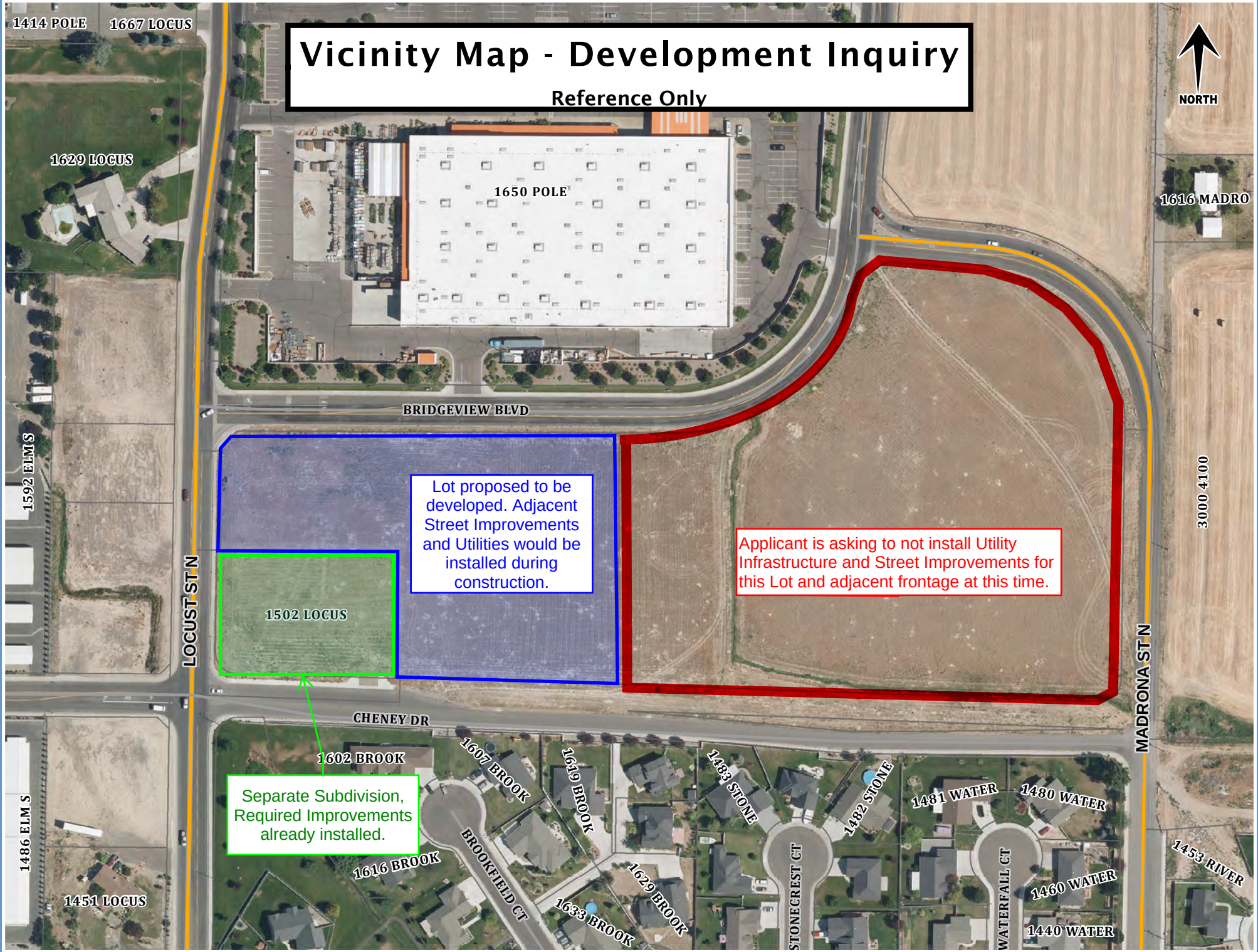
Conclusion: Staff believes the adjacent parcel (Lot 1) is large enough to warrant those infrastructure improvements being installed when it is developed in its time.

Attachments:

1. Vicinity Map
2. Interstate Amusement Subdivision Conveyance Plat
3. Ordinance 3098

Vicinity Map - Development Inquiry

Reference Only



Lot proposed to be developed. Adjacent Street Improvements and Utilities would be installed during construction.

Applicant is asking to not install Utility Infrastructure and Street Improvements for this Lot and adjacent frontage at this time.

Separate Subdivision, Required Improvements already installed.

INTERSTATE AMUSEMENT SUBDIVISION

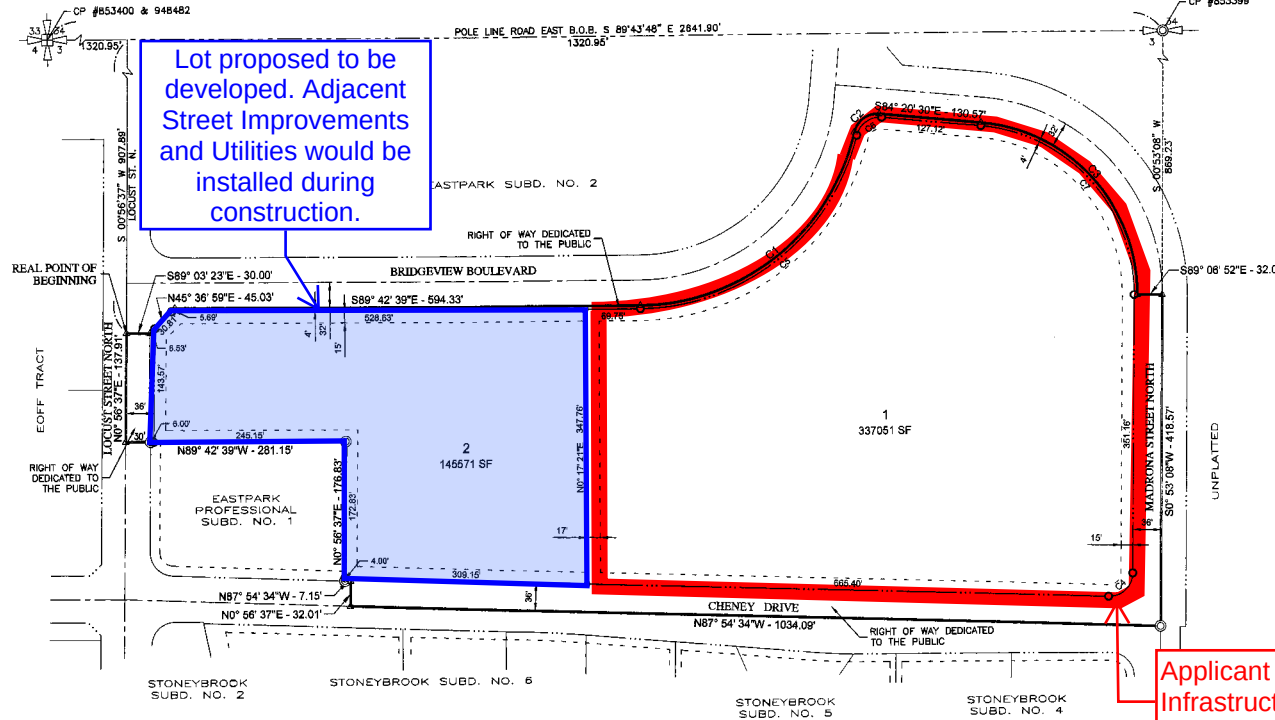
A PORTION OF
GOV'T. LOT 3, SECTION 3
T. 10 S., R. 17 E., B.M.
TWIN FALLS COUNTY, IDAHO
2007
12.505 ACRES

100 50 0 100 200
SCALE IN FEET

LEGEND

	BOUNDARY LINE
	LOT LINE
	SECTION LINE
	CENTERLINE
	RIGHT OF WAY
	UTILITY EASEMENT
	ALUMINUM CAP FOUND
	FOUND 5/8" REBAR
	FOUND 1/2" REBAR
	SET 1/2"x 24" REBAR & CAP
	SET 5/8"x 30" REBAR & CAP
	COMPUTED POINT NOT SET
	LOT NUMBER
	BASIS OF BEARINGS
	CORNER PERPETUATION NUMBER
	ACRE
	SQUARE FEET

Applicant is asking to not install Utility Infrastructure and Street Improvements for this Lot and adjacent frontage at this time.



CURVE DATA TABLE

CURVE	DELTA	RADIUS	ARC	CHORD	TANGENT	CHORD BEARING
C1	76°36'50"	282.00'	377.08'	349.61'	222.77'	N 51°58'56" E
C2	81°58'58"	30.00'	42.93'	39.36'	26.07'	N 54°40'00" E
C3	85°13'42"	218.00'	324.28'	295.20'	200.56'	S 41°43'39" E
C4	91°12'18"	30.00'	47.75'	42.87'	30.54'	S 46°29'17" W
C5	75°59'01"	288.00'	379.28'	352.09'	223.38'	N 52°17'51" E
C6	81°21'10"	30.00'	42.60'	39.11'	25.78'	N 54°58'55" E
C7	85°13'42"	214.00'	318.33'	289.78'	196.88'	S 41°43'39" E

NOTES:

A CONVEYANCE PLAT IS A RECORD OF PROPERTY BY THE CITY OF TWIN FALLS, IDAHO, FOR THE PURPOSE OF SALE OR CONVEYANCE IN ITS ENTIRETY OR INTERESTS THEREON DEFINED. NO BUILDING PERMIT SHALL BE ISSUED UNTIL A FINAL PLAT IS APPROVED. FILED OF RECORD AND PUBLIC IMPROVEMENTS ACCEPTED IN ACCORDANCE WITH THE PROVISIONS OF TITLE 10 OF THE CITY OF TWIN FALLS CITY CODE. SELLING A PORTION OF THIS PROPERTY BY METES AND BOUNDS, EXCEPT AS SHOWN ON AN APPROVED, FILED AND ACCEPTED CONVEYANCE PLAT IS A VIOLATION OF CITY CODE.

EACH LOT IS SUBJECT TO A RETENTION AREA TO RETAIN STORM WATER RUNOFF IN ACCORDANCE TO THE CITY OF TWIN FALLS REGULATIONS.

REF:

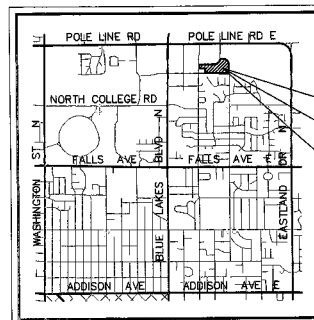
QUITCLAIM DEED #2006-018109, WARRANTY DEED #2006-018108.

HEALTH CERTIFICATE

SANITARY RESTRICTIONS AS REQUIRED BY IDAHO CODE TITLE 50, CHAPTER 13, ARE IN FORCE. NO OWNER SHALL CONSTRUCT ANY BUILDING, DWELLING, OR SHELTER WHICH NECESSITATES THE SUPPLYING OF WATER OR SEWAGE FACILITIES FOR PERSONS' USING SUCH PREMISES UNTIL SANITARY RESTRICTION REQUIREMENTS ARE SATISFIED.

11/1/07
DATE

REHS, SOUTH CENTRAL DISTRICT HEALTH



VICINITY MAP
NOT TO SCALE



TWIN FALLS COUNTY
RECORDED FOR:
RIEDEL ENGINEERING
11-19-52 pm 11-26-2007
2007-028231
NO. PAGES: 3 FEE: \$22.00
REGISTERED CLERK
JUDITH CHICE

RIEDEL ENGINEERING, INC.
202 FALLS AVENUE
TWIN FALLS, IDAHO 83301
INTERSTATE AMUSEMENT SUBDIVISION
SHEET 1 OF 2

ORDINANCE NO. 3098

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF TWIN FALLS, IDAHO, AMENDING TWIN FALLS CITY CODE §10-12-2.5(B) BY PERMITTING THE CITY COUNCIL TO REQUIRE CONSTRUCTION OF STREETS AND UTILITIES BEFORE DEVELOPMENT OF CONVEYANCE PLATS.

BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF TWIN FALLS, IDAHO:

That Twin Falls City Code §10-12-2.5(B) is amended as follows:

“10-12-2-5: CONVEYANCE PLATS:

...

(B) Conveyance Plats: The applicant may request that the subdivision application be processed as conveyance plat if the following exist:

1. The proposed subdivision does not exceed two (2) lots.
2. ~~No part of the land will be used for land development.~~
2. 3. To record the remainder of a tract created by the final platting of a portion of the property provided that the remainder is not intended for immediate development.
3. 4. To record the subdivision of property into parcels that is not intended for immediate development. All public rights of way and easements shall be dedicated. The Council may require all ~~All~~ abutting streets and utilities to shall be installed and accepted by the city at the time of the building permitting and/or development stage, whichever comes first.
4. 5. If either parcel develops or is built on, the City Council may require construction of street and utility improvements ~~will be required~~ on both parcels.”

PASSED BY THE CITY COUNCIL

June 22 , 2015.

SIGNED BY THE MAYOR

June 22, 2015.


MAYOR

ATTEST:


DEPUTY CITY CLERK

PUBLISH: THURSDAY, JULY 2, 2015



Date: Monday, October 5, 2015
To: Honorable Mayor and City Council
From: Jon Caton, P.E., Public Works Director

Request:

A review of the City's leaf collection program to determine whether the costs associated with this free to the public leaf collection service is worth the benefit provided to the limited number of citizens that utilize it.

Time Estimate:

The staff presentation will take approximately 15 minutes.

Following the presentations, staff anticipates some time for questions and answers...

Background:

This review is necessitated by the construction of an equipment storage building by the City Parks/Recreation Department on the site previously used for leaf collection. A new site could be constructed adjacent to the old site using Street Dept. crews and equipment. But, before we go to the time and expense to construct a new site, I feel that it would be prudent to discuss what we've done in the past and what we may need to consider for the future.

This program was initially started to stem the amount of leaves being illegally deposited into the street and curb lines by homeowners by providing a free disposal site. The intent was that we would "compost" the leaves and the compost would be applied to City Parks/properties. But, as far as us using the leaves we take in for compost in City Parks, that's got to be one of those "urban legends" like we sold all our snow equipment. The Parks Dept. has never really been interested in using any of the leaves we collect. They are concerned about disease issues and the amount of trash in the leaves.

Realistically, nobody wants them and because of that we currently have about six years' worth of leaves stockpiled over by the dog pound that we don't know what to do with. Without a real composting program and the associated cost and equipment needed to run one, the leaves we've accumulated so far are of no use to anybody.

Street Dept. personnel have always been responsible for taking care of the "heavy lifting" involving the leaf disposal site. We are constantly cleaning up the illegal dumping, the moving and stockpiling of leaves from the collection site to the dog pound and pushing up of the leaves deposited in or outside of the leaf collection area. These activities involving the leaf collection site occurs during one of our most busy times of the year and often times takes away from some other maintenance activity (patching, crack sealing, sweeping).

We have also had continual incidental expenses incurred by illegal dumping at the leaf collection site. A few examples of some of the illegally dumped items are household waste, couches, kitchen sinks, toilets, tires and just about anything else you can imagine. Garbage has to be separated from the leaf pile and loaded on trucks to be properly disposed at the transfer station at an additional cost to the City. Without constant monitoring this illegal dumping will surely continue.

It has also been the experience of Street Department personnel that local lawn care businesses are probably one of the major users of this free leaf collection program. These companies are charging a fee to their customers for lawn and tree maintenance and then let them dispose of their leaves and tree trimmings for free at our leaf collection site. I've even heard of these businesses hauling leaves collected from adjacent communities to our site to avoid disposal fees.

Lastly, the city is not currently running a composting program that would meet the requirements of the Department of Environmental Quality in accordance with IDAPA 58.01.06, "Solid Waste Management Rules".

Approval Process:

Requires Council Approval

Budget Impact:

See conclusion.

Regulatory Impact:

Conclusion:

Staff recommends the following:

1. Take a phased approach to discontinue these services.
 - a. First—Allow one final year of leaf collection to occur on Maxwell Ave.
 - b. Inform and educate the Public on alternatives to these free services and remind them of current City Code dealing with depositing leaves/debris in the street/curb line. Alternatives include: regular garbage pickup, local waste transfer station, Hub Butte landfill and personal recycling.
 - c. Discontinue the Christmas Tree collection this year and provide public education on alternatives to this service.

Attachments:

None



Date: Monday, October 5, 2015
To: Honorable Mayor and City Council
From: Jacqueline D Fields, City Engineer

Request:

Consideration of a request to provide input on the Greater Area Twin Falls Transportation Committee's (GTFATC) project priority list.

Time Estimate:

The staff presentation will take approximately 30 minutes. Gary Young, Chair of the GTFATC, will be available to talk about the Committee's open meeting law compliance and address questions associated with the Southeast Twin Falls Corridor Study.

Background:

The City is a member of the Greater Twin Falls Area Transportation Committee (GTFATC). This committee discusses regional transportation related issues and provides input to legislators related to transportation needs. It develops a priority list which the Idaho Transportation Department (ITD) uses as a tool when developing and recommending projects for inclusion in the State Transportation Improvement Program. When ITD secured funding to update the Southeast Twin Falls Corridor Study, one of the products was a proposal for localized safety and capacity improvements. These were presented to the GTFAC for concurrence and are summarized in the first 2 attachments.

There are 3 projects in or near the City that are/should be considered for safety or other highway funds:

- I-2 Advanced Warning Beacon on the south leg of the Washington St. South (SH-74) and Orchard intersection,
- I-7 Addition/replacement of signal heads on Kimberly Rd (US-30) & Locust to allow protected movements,
- I-3 Install left turn bays on Kimberly Rd (US-30) at 3300 E.

These are all worthy and potentially equal projects. Staff priority is I-3, I-7 then I-2. I-3 is directly related to strategic plan goal "Objective PC2.1B: Review transportation infrastructure, including truck routes, that supports industrial land uses to determine how the City can work with the region to improve the systems." even though 3300 E is not a truck route.

There are numerous capacity projects (9 of the 10) that affect the City directly. Many of these projects included State Highway roads. The funding for these could be state funding or a combination of funds. Shoshone St., Blue Lakes and Washington St. South projects fall into this category.

The strategic plans goals that address capacity in the form of emergency response time vs. congestions and in the form of maintaining our roadways through appropriate maintenance. In addition, there is "Objective PC1.2A: Address the impact of U.S. Highway 30 on downtown and determine how we can work with partners such as ITD to improve the system. " Projects that support this goal, at least somewhat indirectly, include I-8, I-9, I-11, I-13.

S-4 and S-2 are significant capacity projects. S-4 on Washington St S is a widening of SH-74 and S-2 is a communal jurisdiction project. Sections of that project are under ITD or TF Highway District jurisdiction. Eastland from US-30 to Orchard, specifically the railroad underpass is also a worthy improvement.

Staff suggests prioritizing the downtown related improvement (I-8, 9, 11 & 13) first and placing the north south arterial capacity projects on the list with Washington ST S first, then Blue Lakes and finally Eastland.

Placing a 4-way stop condition at the intersection of Orchard and Blue Lakes has been discussed between the TF Highway District and the City as an effective near term solution.

Conclusion:

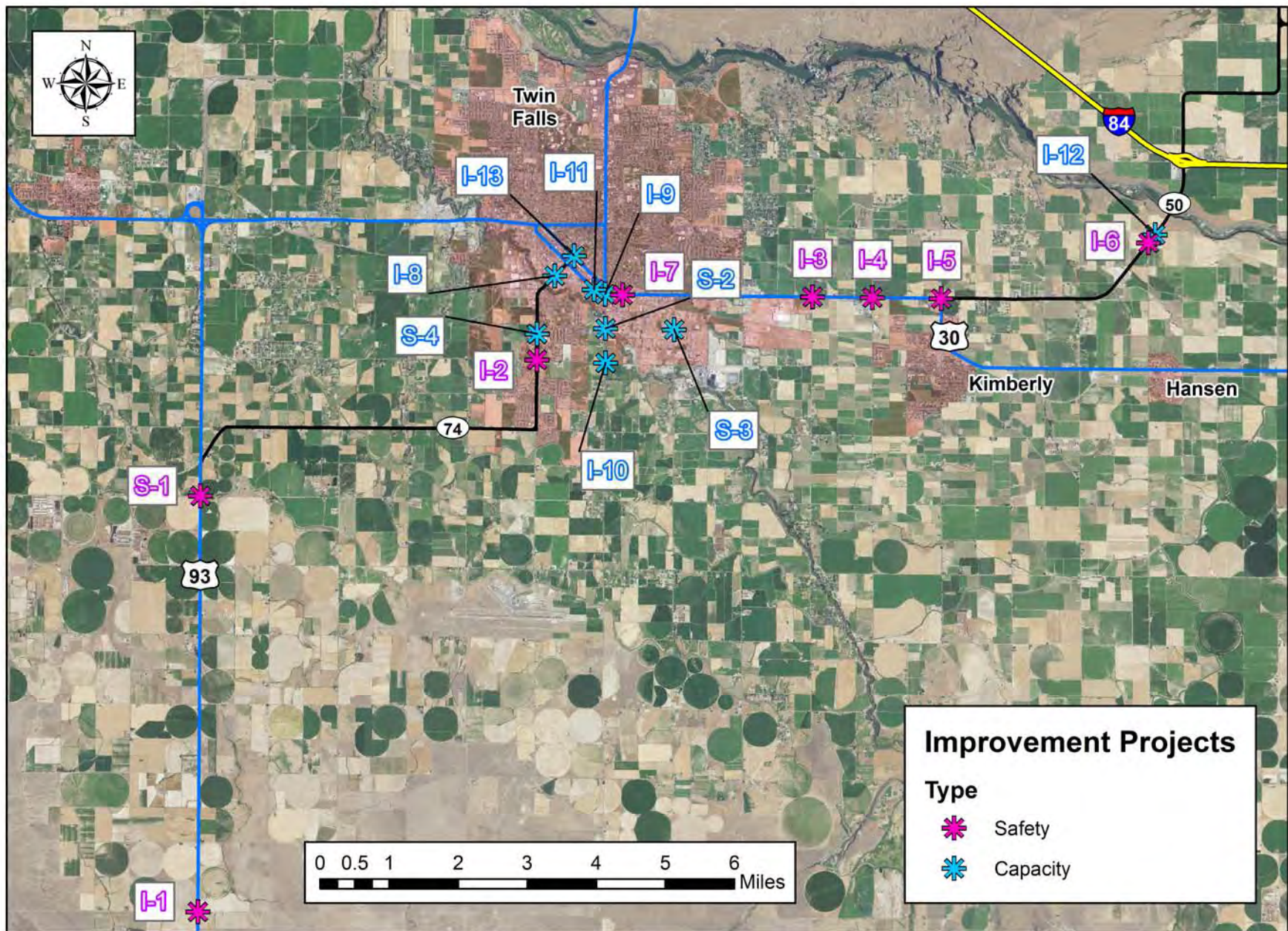
Staff recommends prioritizing safety project first, then capacity projects related to the downtown core and then capacity project on north-south arterials, starting at Washington St South and progressing east.

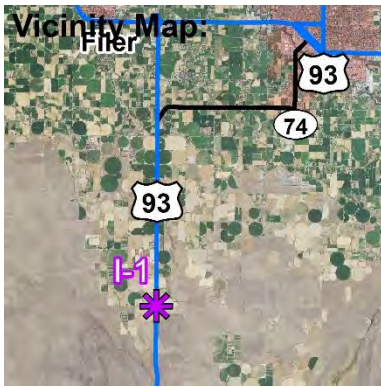
Attachments:

1. Safety
2. Capacity
3. SE TF Alt Route discussion
4. Cleaver email dated 7/31/15

Safety Project List

Key Number	Location	Project Description	Estimated Cost
I-1	US 93 & 2900 N. (North of Hollister)	Adds northbound and southbound left turn lanes. Increases US 93 shoulder width from 3' to 6'. Installs advanced intersection warning sign with flashing amber beacon on northbound approach.	\$281,000
I-2	SH 74 (Washington) & 3700 N (Orchard)	First traffic signal when approaching Twin Falls from the southwest. Installs a signal coordinated advanced warning beacon on the south leg of the intersection to warn drivers of the signal.	\$26,000
I-7	US 30 (Kimberly Rd) & Locust St	Installs left turn signal heads on all approaches to allow protected left turn phasing.	\$69,000
I-3	US 30 (Kimberly Rd) & 3300 E	Installs eastbound and westbound left turn lanes. Relocates "Stop Ahead" signs and installs flashing amber beacons on northbound and southbound 3300 E.	\$177,000
I-4	US 30 (Kimberly Rd) & 3400 E	Relocates "Stop Ahead" signs and installs flashing amber beacons on northbound and southbound 3400 E.	\$16,000
I-5	US 30 (Kimberly Rd) & 3500 E	Installs signal coordinated advanced warning beacons and signs on the eastbound, westbound, and northbound approaches.	\$36,000
I-6	SH 50 & 3800 E	Closes 3800 E between SH 50 and Addison Ave. Realignment south leg of 3800 E to connect to SH 50 at a 90 degree angle. Installs flashing amber beacons on eastbound and westbound approaches.	\$99,000
S-1	US 93 (MP 0.0 to MP 38.05)	Installs rumble strips on centerline and foglines. Increases shoulder width from 3' to 6'. Improvements should prevent "failure to maintain lane" crashes.	\$11,481,000





Safety Project:

US 93 & 2900 N (North of Hollister)

Key No.

I - 1

Route:	County	City (nearest)	District
US 93	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost		Length (miles)
31.485			0.1
Location Notes:			
Intersection of US 93 and 2900 N. north of Hollister			

Project Map:



Safety Issues:

- Total of two crashes related to intersection.
- One fatal head-on crash caused by failure to yield by driver on southbound US 93 turning left.
- One Injury B angle crash caused by northbound motorist going straight. No contributing circumstances mentioned.
- No intersection warning signs exist in either direction.
- High heavy vehicle volume.
- 60 mph speed limit.
- Narrow 3' shoulders.

Conclusion:

No warning of intersection may have contributed to northbound motorist not expecting on-coming traffic to turn. High commercial vehicle volume and lack of left turn lane may have pressured southbound motorist to fail to yield.

Recommended Improvements:

1. 14' wide left turn lanes should be added to both northbound and southbound US 93.
2. Shoulder should be increased for the entire corridor from 3' to 6'.
3. Other improvements include installing an advanced intersection warning sign with solar powered flashing amber beacons.

Traffic Data:

5-year Crash Summary

Total:	2
Fatal & "A":	1
US 30 ADT:	3900
2900 N. Rd. ADT	low

Cost Estimate:

Preliminary Engineering	\$40,000
Right-of-Way	\$23,000
Construction	\$218,000
Total Estimated Cost	\$281,000
Benefit/Cost Ratio:	43.63 (combined)

I-1 US 93 and 2900 N

Project No.

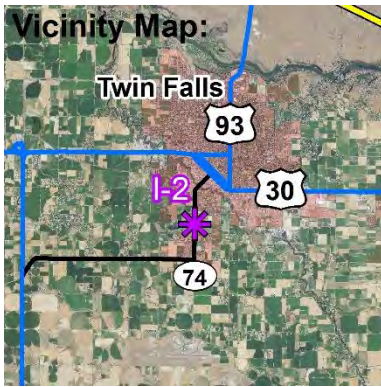
Key No. I-1

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rem of Obstructions	LS	1	\$ 2,000.00	\$2,000
Excavation	CY	750	\$ 8.00	\$6,000
Granular Borrow	CY	2,000	\$ 12.00	\$24,000
Granular Subbase	TON	2,100	\$ 10.00	\$21,000
3/4" Aggr. For Crushed Base	TON	1,100	\$ 20.00	\$22,000
CSS-1 Dil Emul Asph for Tack	Gal.	145	\$ 2.10	\$305
Superpave Plant Mix Pavement	TON	480	\$ 85.00	\$40,800
Sign Ty B	SF	64	\$ 12.00	\$768
Brkawy Wood Sign Post Ty D	MFBM	0.06	\$ 8,000.00	\$475
Flashing Beacons (solar powered)	Each	2.00	\$ 3,500.00	\$7,000
Rent Const Sign Cl B	SF	363	\$ 4.00	\$1,450
Rent Drum Cl B	Each	30	\$ 12.00	\$360
Traffic Control Maintenance	MNHR	50	\$ 48.00	\$2,400
Flagging	MNHR	120	\$ 32.00	\$3,840
Survey	LS	1	\$ 4,000.00	\$4,000
Pavement Markings	FT	5,000	\$ 0.12	\$600
Fiber Wattles	FT	200	\$ 2.50	\$500
Special Pav Marking (Thermo)	SF	116	\$ 9.00	\$1,044
Seal Coat	SY	8,300	\$ 2.00	\$16,600
SUBTOTAL (Rounded up to the nearest \$1,000)				\$156,000
Mobilization	%	10%	\$ 15,600	\$15,600
Contingency	%	10%	\$ 17,160	\$17,160
Construction Engineering & Inspection	%	15%	\$ 28,314	\$28,314
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$218,000
Design	%	18%	\$ 39,240	\$39,240
Right-of-Way	LS	1	\$ 23,000	\$23,000
TOTAL (Rounded up to the nearest \$1,000)				\$281,000



Safety Project:			Key No.
SH 74 (Washington) & 3700 North (Orchard)			I – 2
Route:	County	City (nearest)	District
SH 74	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
6.116		0.1	
Location Notes:			
Newly signalized intersection of Washington St. and Orchard Dr.			



Safety Issues:

- Total of eight crashes related to intersection.
- All crashes since the signal installation have been in northbound or southbound direction with exception of a westbound alcohol impaired crash.
- Two of eight crashes occurred before traffic signal installation.
- Four angle crashes caused by failure to yield, inattention, or failure to obey signal.
- Rear-end crash in southbound direction on SH 74 involving vehicle following too close and/or inattention.
- Same direction turning crash caused by southbound motorist turning right.
- No intersection warning signs exist in either direction on SH 74 that was the major leg of the previous two-way stop controlled intersection.

Conclusion:

New signal installation may surprise motorists that are used to free flow traffic on SH 74 at this location. New traffic signal is the first signal on SH 74 as motorists enter Twin Falls.

Recommended Improvements:

1. A signal coordinated advanced warning beacon and sign will give approaching motorists early indication that they will be required to stop as the signal is about to change to red.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$5,000
Total:	8	Right-of-Way	\$00
Fatal & "A":	3	Construction	\$21,000
SH 74 ADT:	10000	Total Estimated Cost	\$26,000
Orchard Dr. ADT	low	Benefit/Cost Ratio:	1.63

I-2 SH 74 and Orchard Dr

Project No.

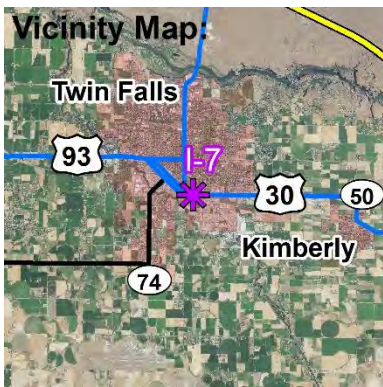
Key No. I-2

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Sign Ty B	SF	70	\$ 12.00	\$840
Brkawy Wood Sign Post Ty D	MFBM	0.12	\$ 8,000.00	\$950
Signal Coordinated Flashing Beacons	Each	2.00	\$ 5,000.00	\$10,000
Rent Const Sign Cl B	SF	150	\$ 4.00	\$600
Rent Drum Cl B	Each	10	\$ 12.00	\$120
Traffic Control Maintenance	MNHR	20	\$ 48.00	\$960
Flagging	MNHR	20	\$ 32.00	\$640
SUBTOTAL (Rounded up to the nearest \$1,000)				\$15,000
Mobilization	%	10%	\$ 1,500	\$1,500
Contingency	%	10%	\$ 1,650	\$1,650
Construction Engineering & Inspection	%	15%	\$ 2,723	\$2,723
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$21,000
Design	%	20%	\$ 4,200	\$4,200
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$26,000



Safety Project:

US 30 (Kimberly Rd) & Locust Street

Key No.

I - 7

Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
218.889		0.1	

Location Notes:

Intersection of US 30 and Locust Street east of Five-points South



Safety Issues:

- Total of nine crashes related to intersection.
- Three angle crashes caused by failure to obey signal by motorists on eastbound or westbound US 30.
- Two westbound head-on turning crashes by motorists that failed to yield turning left.

Conclusion:

The traffic signal is two-phase without protected left turn phases. Adding a protected left turn phase for eastbound and westbound traffic may reduce head-on crashes. If adding a signal phase is undesirable due to increased congestion, the added signal head with a flashing yellow arrow for the permissive left may give additional information to motorists and reduce crashes.

Recommended Improvements:

1. Install additional traffic signal heads for left turn lanes on all approaches. Signal heads can be used to add protected left turn phases or flashing yellow arrow to remind motorists of permissive movement.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$9,000
Total:	9	Right-of-Way	\$00
Fatal & "A":	0	Construction	\$60,000
US 30 ADT:	20000	Total Estimated Cost	\$69,000
Locust St. ADT	low	Benefit/Cost Ratio:	2.03

I-7 US 30 and Locust St.

Project No.

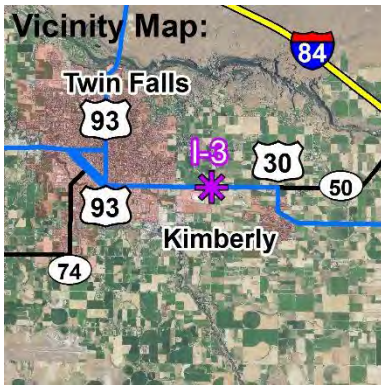
Key No. I-7

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Traffic Signal Modification	LS	1	\$ 40,000.00	\$40,000
Rent Const Sign CI B	SF	150	\$ 4.00	\$600
Rent Drum CI B	Each	20	\$ 12.00	\$240
Traffic Control Maintenance	MNHR	20	\$ 48.00	\$960
Flagging	MNHR	20	\$ 32.00	\$640
<i>SUBTOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$43,000</i>
Mobilization	%	10%	\$ 4,300	\$4,300
Contingency	%	10%	\$ 4,730	\$4,730
Construction Engineering & Inspection	%	15%	\$ 7,805	\$7,805
<i>CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$60,000</i>
Design	%	15%	\$ 9,000	\$9,000
Right-of-Way	LS	0		\$0
<i>TOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$69,000</i>



Safety Project:			Key No.
US 30 (Kimberly Rd) & 3300 East			I – 3
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
221.636		0.1	
Location Notes:			
Just east of Chobani, intersection of US 30 and Champlin Road			



Safety Issues:

- Total of seven crashes related to intersection.
- Four angle crashes caused by failure to yield by motorists on southbound or northbound 3300 E. Rd.
- Two rear-end crashes in westbound or eastbound direction of US 30 caused by following too close and slowing to turn.
- No intersection warning signs exist in either direction on US 30.
- A four foot wide painted median exists between two through lanes in each direction.
- No turn lanes providing refuge for left turning traffic.
- Slightly elevated high volume four lane highway could be deceiving for traffic judging distances especially when stopped for long periods waiting for a gap.
- "Stop Ahead" signs on 3300 E Road may be too far away from intersection.

Conclusion:

It is unknown if angle crash motorists were aware of the need to stop or entered the intersection without stopping. Nevertheless, increased awareness could reduce crashes of motorists approaching the stop condition. Rear-end crashes could be significantly reduced by providing a refuge out of the flow of traffic for turning motorists.

Recommended Improvements:

1. Construct left turn lanes for both eastbound and westbound traffic on US 30. This intersection is located between a center turn lane section in front of Chobani and a new left turn lane constructed for 3400 E. Road. Consideration should be given to extending the center turn lane through to 3400 E. that would also provide a refuge for traffic turning onto US 30 as well.
2. Relocate "Stop Ahead" advanced warning signs and install solar powered flashing amber beacons on 3300 E.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$30,000
Total:	7	Right-of-Way	\$00
Fatal & "A":	2	Construction	\$147,000
US 30 ADT:	10500	Total Estimated Cost	\$177,000
3300 E Road	low	Benefit/Cost Ratio:	6.75 (combined)

I-3 US 30 and 3300 E

Project No.

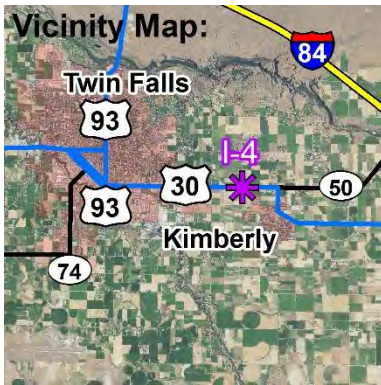
Key No. I-3

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rem of Obstructions	LS	1	\$ 2,000.00	\$2,000
Excavation	CY	2000	\$ 8.00	\$16,000
Granular Borrow	CY	200	\$ 12.00	\$2,400
Granular Subbase	TON	850	\$ 10.00	\$8,500
3/4" Aggr. For Crushed Base	TON	450	\$ 20.00	\$9,000
CSS-1 Dil Emul Asph for Tack	Gal.	60	\$ 2.10	\$126
Superpave Plant Mix Pavement	TON	200	\$ 85.00	\$17,000
Guardrail	FT	50	\$ 20.00	\$1,000
Guardrail Terminal Type 1	Each	1	\$ 900.00	\$900
Guardrail Terminal Type 7	Each	1	\$ 1,800.00	\$1,800
Sign Ty B	SF	64	\$ 12.00	\$768
Brkawy Wood Sign Post Ty D	MFBM	0.06	\$ 8,000.00	\$475
Flashing Beacons (solar powered)	Each	2.00	\$ 3,500.00	\$7,000
Rent Const Sign Cl B	SF	363	\$ 4.00	\$1,450
Rent Drum Cl B	Each	50	\$ 12.00	\$600
Traffic Control Maintenance	MNHR	120	\$ 48.00	\$5,760
Flagging	MNHR	50	\$ 32.00	\$1,600
Survey	LS	1	\$ 4,000.00	\$4,000
Pavement Markings	FT	11,000	\$ 0.12	\$1,320
Fiber Wattles	FT	200	\$ 2.50	\$500
Special Pav Marking (Thermo)	SF	116	\$ 9.00	\$1,044
Seal Coat	SY	10,500	\$ 2.00	\$21,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$105,000
Mobilization	%	10%	\$ 10,500	\$10,500
Contingency	%	10%	\$ 11,550	\$11,550
Construction Engineering & Inspection	%	15%	\$ 19,058	\$19,058
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$147,000
Design	%	20%	\$ 29,400	\$29,400
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$177,000



Safety Project:			Key No.
US 30 (Kimberly Rd) & 3400 East			I – 4
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
222.505		0.1	
Location Notes:			
Intersection of US 30 and 3400 E. near Layne Pump			



Safety Issues:

- Total of twelve crashes related to intersection.
- All crashes but one occurred prior to new left turn lanes on US 30.
- Six angle crashes caused by failure to yield by motorists on southbound or northbound 3400 E. Rd.
- One rear-end crash in eastbound direction of US 30 involving vehicle following too close.
- Slightly elevated, high volume, high speed four lane highway could be deceiving for traffic judging distances especially when stopped for long periods waiting for a gap.
- “Stop Ahead” signs on 3400 E Road may be too far away from intersection.

Conclusion:

It is unknown if angle crash motorists were aware of the need to stop or entered the intersection without stopping. Nevertheless, increased awareness could reduce crashes of motorists approaching the stop condition.

Recommended Improvements:

1. Relocate “Stop Ahead” advanced warning signs and install solar powered flashing amber beacons on 3400 E. in both northbound and southbound directions.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$3,000
Total:	12	Right-of-Way	\$00
Fatal & "A":	3	Construction	\$13,000
US 30 ADT:	10000	Total Estimated Cost	\$16,000
3400 Rd. ADT	low	Benefit/Cost Ratio:	24.99

I-4 US 30 and 3400 E

Project No.

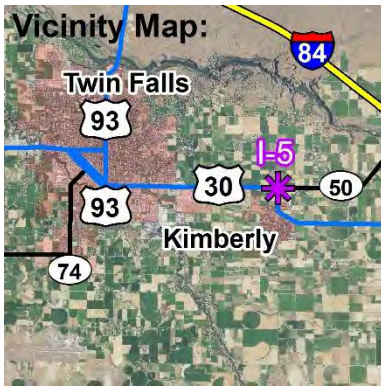
Key No. I-4

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Sign Ty B	SF	64	\$ 12.00	\$768
Brkavy Wood Sign Post Ty D	MFBM	0.06	\$ 8,000.00	\$475
Flashing Beacons (solar powered)	Each	2.00	\$ 3,500.00	\$7,000
Rent Const Sign Cl B	SF	32	\$ 4.00	\$128
SUBTOTAL (Rounded up to the nearest \$1,000)				\$9,000
Mobilization	%	10%	\$ 900	\$900
Contingency	%	10%	\$ 990	\$990
Construction Engineering & Inspection	%	15%	\$ 1,634	\$1,634
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$13,000
Design	%	20%	\$ 2,600	\$2,600
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$16,000



Safety Project:			Key No.
US 30 (Kimberly Rd) & 3500 East			I – 5
Route:	County	City (nearest)	District
US 30	Twin Falls	Kimberly	4
Beginning Milepost	Ending Milepost	Length (miles)	
223.505		0.1	
Location Notes:			
Red Cap Corner intersection of 3800 N and 3500 E			



Safety Issues: • Total of twenty-nine crashes related to intersection. • Twenty-six of twenty-nine (26 of 29) crashes occurred prior to traffic signal installation. • One C-injury angle crash since signal installed caused by failure to obey signal by motorist on westbound US 30. • One C-injury rear-end crash since signal installed in westbound direction of US 30 involving vehicle stopped in traffic. • One A-injury head-on crash since signal installed in northbound direction on 3500 E. Rd caused by failure to yield by motorist turning left. • No Intersection warning sign exists in eastbound direction on US 30. Westbound intersection warning sign does not have cross street name placard.	Conclusion: New signal installation may surprise motorists that are used to free flow traffic on 3800 N at this location. Also, motorists may not be expecting a traffic signal so far away from Twin Falls in a rural area. New traffic signal is the first signal on SH 50 for motorists heading to Twin Falls.
	Recommended Improvements: 1. A signal coordinated advanced warning beacon and sign will give approaching motorists early indication that they will be required to stop as the signal is about to change to red. Three beacons and three signs total; one each placed on eastbound, westbound, and northbound legs.

Traffic Data:		Cost Estimate:	
Crash Summary (after signal installation)		Preliminary Engineering	\$6,000
Total:	3	Right-of-Way	\$00
Fatal & "A":	1	Construction	\$30,000
US 30 ADT:	10000	Total Estimated Cost	\$36,000
3500 E Rd. ADT	moderate	Benefit/Cost Ratio:	0.79

I-5 US 30 and 3500 E

Project No.

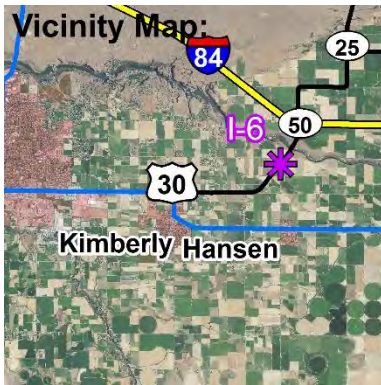
Key No. I-5

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Sign Ty B	SF	105	\$ 12.00	\$1,260
Brkavy Wood Sign Post Ty D	MFBM	0.18	\$ 8,000.00	\$1,440
Signal Coordinated Flashing Beacons	Each	3.00	\$ 5,000.00	\$15,000
Rent Const Sign Cl B	SF	150	\$ 4.00	\$600
Rent Drum Cl B	Each	10	\$ 12.00	\$120
Traffic Control Maintenance	MNHR	30	\$ 48.00	\$1,440
Flagging	MNHR	30	\$ 32.00	\$960
SUBTOTAL (Rounded up to the nearest \$1,000)				\$21,000
Mobilization	%	10%	\$ 2,100	\$2,100
Contingency	%	10%	\$ 2,310	\$2,310
Construction Engineering & Inspection	%	15%	\$ 3,812	\$3,812
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$30,000
Design	%	20%	\$ 6,000	\$6,000
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$36,000



Safety Project:			Key No.
SH 50 & 3800 East			I – 6
Route:	County	City (nearest)	District
US 30	Twin Falls	Kimberly	4
Beginning Milepost	Ending Milepost	Length (miles)	
3.382		0.1	
Location Notes:			
South of Hansen Bridge, intersection of SH 50 and 3800 E			



Safety Issues:

- Total of thirteen crashes related to intersection.
- Seven angle crashes caused by failure to yield by motorists on northbound 3800 E. Rd.
- Four angle crashes by eastbound SH 50 motorists.
- One rear-end crash in northbound direction of 3800 E. Rd involving vehicle stopped in traffic.
- One head-on crash by westbound SH 50 motorist turning left cause by failure to yield.
- No intersection warning signs exist in either direction on SH 50.
- Intersection is skewed 50 degrees; AASHTO recommends skew should not exceed 30 degrees.
- A center turn lane exists and an eastbound acceleration lane was recently installed.
- Speed limit is 65 mph.

Conclusion:

Many crashes are associated with northbound through movements. The skewed intersection and high speed on SH 50 may contribute to the safety issues at this location.

Recommended Improvements:

1. The portion of 3800 E. Rd north of SH 50 and south of Addison Ave. should be closed and the connection to SH 50 removed. Right-of-way could be vacated to adjacent property owners for a private access off Addison Ave. Northbound traffic would turn right and then left onto Addison Ave in 1000 ft. The south approach of 3800 E should be curved to tie in at 90 degrees to SH 50.
2. Other improvements include installing advanced intersection warning signs with flashing amber beacons in both eastbound and westbound directions on SH 50.

Traffic Data:

5-year Crash Summary

Total:	13
Fatal & "A":	4
US 30 ADT:	5800
3800 E. Rd. ADT	low

Cost Estimate:

Preliminary Engineering	\$15,000
Right-of-Way	\$10,000
Construction	\$74,000
Total Estimated Cost	\$99,000
Benefit/Cost Ratio:	26.49 (combined)

I-6 SH 50 and 3800 E

Project No.

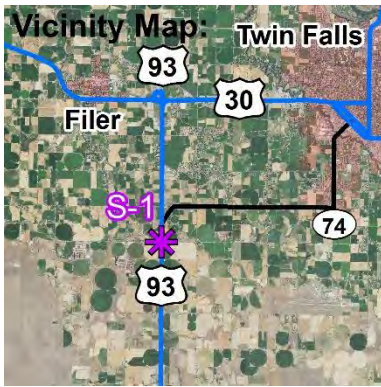
Key No. I-6

September 18, 2014

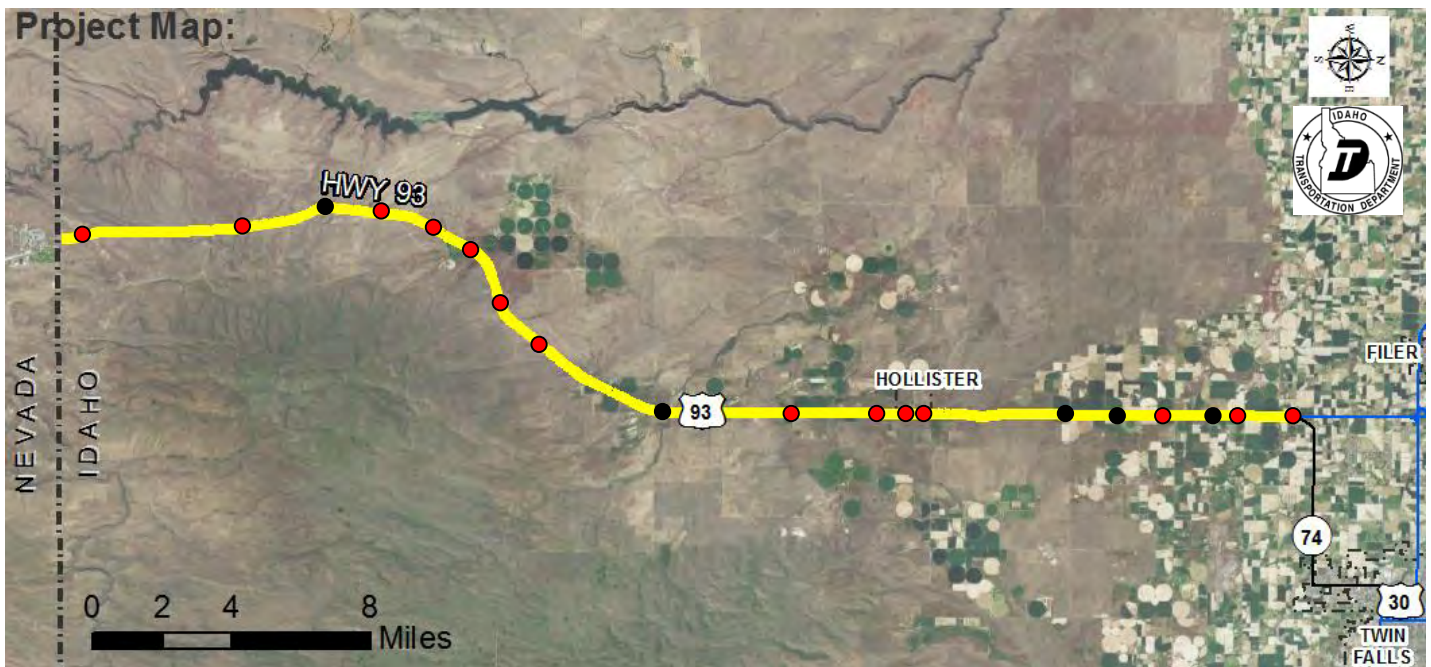
PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rem of Obstructions	LS	1	\$ 2,000.00	\$2,000
Obliteration of Old Road	FT	300	\$ 5.00	\$1,500
Water for Dust Abatement	MG	50	\$ 20.00	\$1,000
Granular Subbase	TON	650	\$ 10.00	\$6,500
3/4" Aggr. For Crushed Base	TON	350	\$ 20.00	\$7,000
CSS-1 Dil Emul Asph for Tack	Gal.	45	\$ 2.10	\$95
Superpave Plant Mix Pavement	TON	150	\$ 85.00	\$12,750
Sign Ty B	SF	32	\$ 12.00	\$384
Brkawy Wood Sign Post Ty D	MFBM	0.06	\$ 8,000.00	\$475
Flashing Beacons (solar powered)	Each	2.00	\$ 3,500.00	\$7,000
Seed Bed Preparation	Acre	0.50	\$ 300.00	\$150
Seeding	Acre	0.50	\$ 350.00	\$175
Rent Const Sign Cl B	SF	363	\$ 4.00	\$1,450
Rent Drum Cl B	Each	30	\$ 12.00	\$360
Traffic Control Maintenance	MNHR	50	\$ 48.00	\$2,400
Flagging	MNHR	100	\$ 32.00	\$3,200
Survey	LS	1	\$ 4,000.00	\$4,000
Composted Ungulate Manure	Acre	0.5	\$ 2,000.00	\$1,000
Pavement Markings	FT	1,000	\$ 0.12	\$120
Fiber Wattles	FT	200	\$ 2.50	\$500
Special Pav Marking (Thermo)	SF	60	\$ 9.00	\$540
SUBTOTAL (Rounded up to the nearest \$1,000)				\$53,000
Mobilization	%	10%	\$ 5,300	\$5,300
Contingency	%	10%	\$ 5,830	\$5,830
Construction Engineering & Inspection	%	15%	\$ 9,620	\$9,620
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$74,000
Design	%	20%	\$ 14,800	\$14,800
Right-of-Way	LS	1	\$ 10,000	\$10,000
TOTAL (Rounded up to the nearest \$1,000)				\$99,000



Safety Project:			Key No.
US 93 (MP 0.0 to MP 38.05)			S – 1
Route:	County	City (nearest)	District
US 93	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
0.00	38.05	38.05	
Location Notes:			
Segment of US 93 from MP 0.0 to MP 38.05			



Safety Issues:

- Total of 179 crashes related to this segment.
- Four fatal crashes involving run-off-the-road or crossed left of centerline head-on.
- Twelve injury A crashes, 26 injury B crashes, 22 injury C crashes, and 76 property damage only crashes of similar type as above.
- 60/65 mph speed limit.
- Narrow 3' shoulders.
- No rumble strips
- Many impaired driver related crashes.

Conclusion:

There are a large number of "Failure to maintain lane" type crashes. Many caused by or contributed by impaired drivers going to or coming from Jackpot, NV. The roadway has a fairly narrow shoulder and is characterized by long straight sections between gentle curves. Drivers become inattentive and depart from their lane often resulting in head-on collisions.

Recommended Improvements:

1. Install rumble strips on centerline and on foglines.
2. Increase shoulder width from 3' to 6'.

Traffic Data:

5-year Crash Summary

Total:	179
Fatal & "A":	20
US 30 ADT:	4300

Cost Estimate:

Preliminary Engineering	\$961,000
Right-of-Way	\$915,000
Construction	\$9,605,000
Total Estimated Cost	\$11,481,000
Benefit/Cost Ratio:	1.91

S-1 US 93, MP 0 to MP 38.05

Project No.

Key No. S-1

September 22, 2014

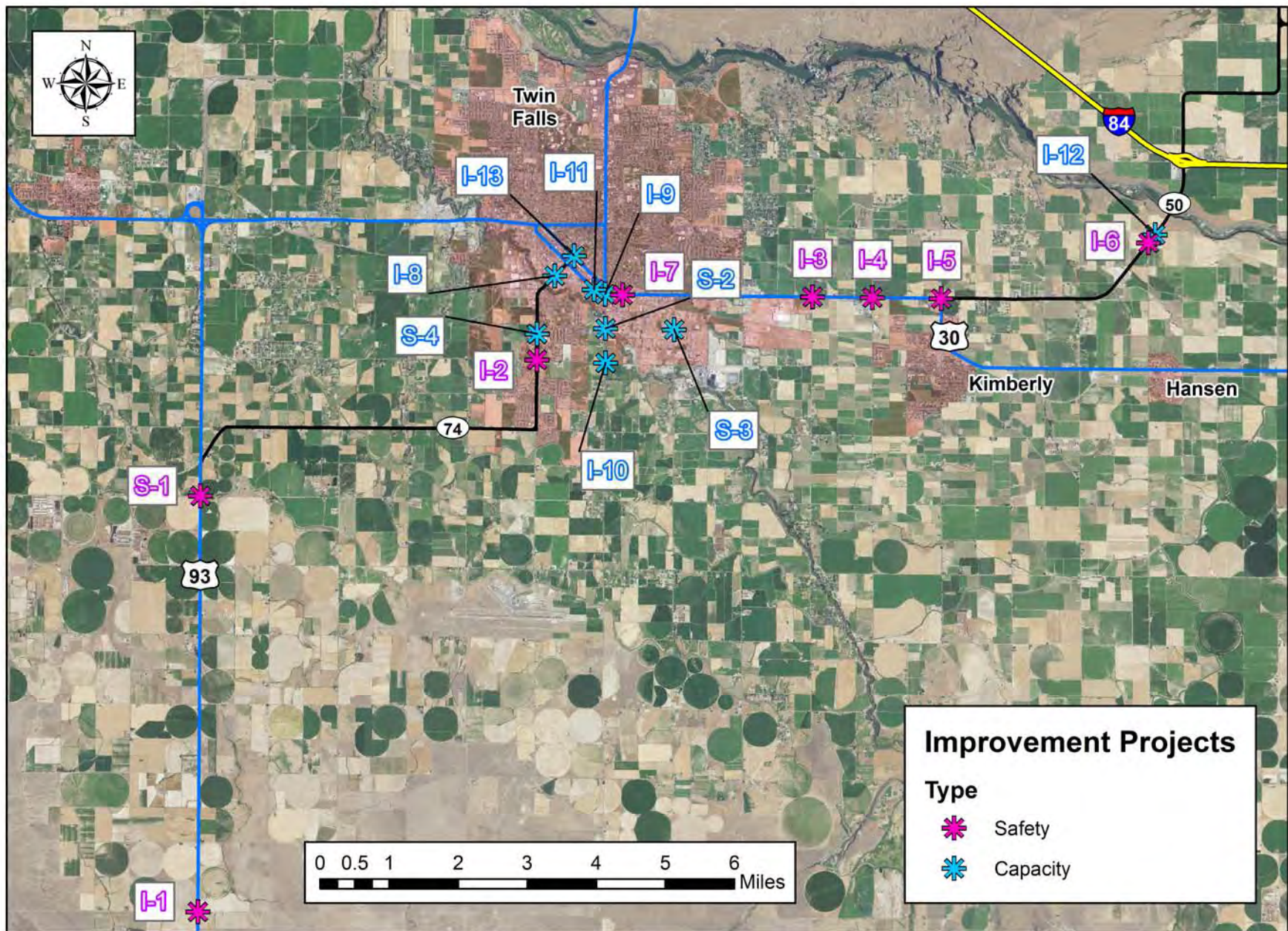
PRE-DESIGN

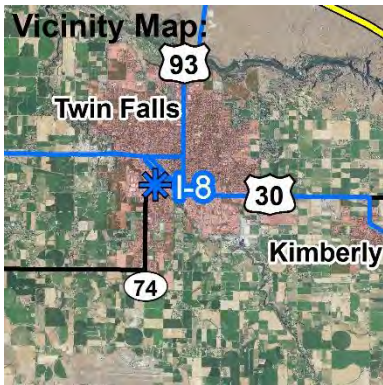
Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rem of Obstructions	LS	1	\$ 20,000.00	\$20,000
Rem of Fence	FT	300,000	\$ 1.30	\$390,000
Excavation	CY	80,000	\$ 8.00	\$640,000
Granular Borrow	CY	2,000	\$ 12.00	\$24,000
Granular Subbase	TON	98,000	\$ 10.00	\$980,000
3/4" Aggr. For Crushed Base	TON	51,000	\$ 18.00	\$918,000
CSS-1 Dil Emul Asph for Tack	Gal.	6,700	\$ 2.10	\$14,070
Superpave Plant Mix Pavement	TON	22,500	\$ 75.00	\$1,687,500
Guardrail	FT	1,000	\$ 20.00	\$20,000
Guardrail Terminal Type 5	Each	4	\$ 2,000.00	\$8,000
Guardrail Terminal Type 10	Each	4	\$ 2,600.00	\$10,400
24" Culvert	FT	1,520	\$ 50.00	\$76,000
42" Culvert	FT	760	\$ 95.00	\$72,200
24" Tapered End	Each	76	\$ 500.00	\$38,000
42" Tapered End	Each	38	\$ 1,500.00	\$57,000
Sign Ty B	SF	125	\$ 12.00	\$1,500
Brkawy Wood Sign Post Ty D	MFBM	1.29	\$ 8,000.00	\$10,296
Rent Const Sign Cl B	SF	363	\$ 4.00	\$1,450
Rent Drum Cl B	Each	50	\$ 12.00	\$600
Tubular Markers	Each	200	\$ 6.00	\$1,200
Traffic Control Maintenance	MNHR	800	\$ 48.00	\$38,400
Flagging	MNHR	240	\$ 32.00	\$7,680
Survey	LS	1	\$ 80,000.00	\$80,000
Pavement Markings	FT	630,000	\$ 0.12	\$75,600
Special Pav Marking (Thermo)	SF	1,160	\$ 9.00	\$10,440
Delineators	Each	800	\$ 30.00	\$24,000
Fiber Wattles	FT	4,000	\$ 2.50	\$10,000
Fence	FT	400,000	\$ 4.00	\$1,600,000
Rumble Strips on Centerline and Foglines	Mile	114	\$ 750.00	\$85,500
SUBTOTAL (Rounded up to the nearest \$1,000)				\$6,902,000
Mobilization	%	10%	\$ 690,200	\$690,200
Contingency	%	10%	\$ 759,220	\$759,220
Construction Engineering & Inspection	%	15%	\$ 1,252,713	\$1,252,713
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$9,605,000
Design	%	10%	\$ 960,500	\$960,500
Right-of-Way	LS	1	\$ 915,000	\$915,000
TOTAL (Rounded up to the nearest \$1,000)				\$11,481,000

Capacity Project List

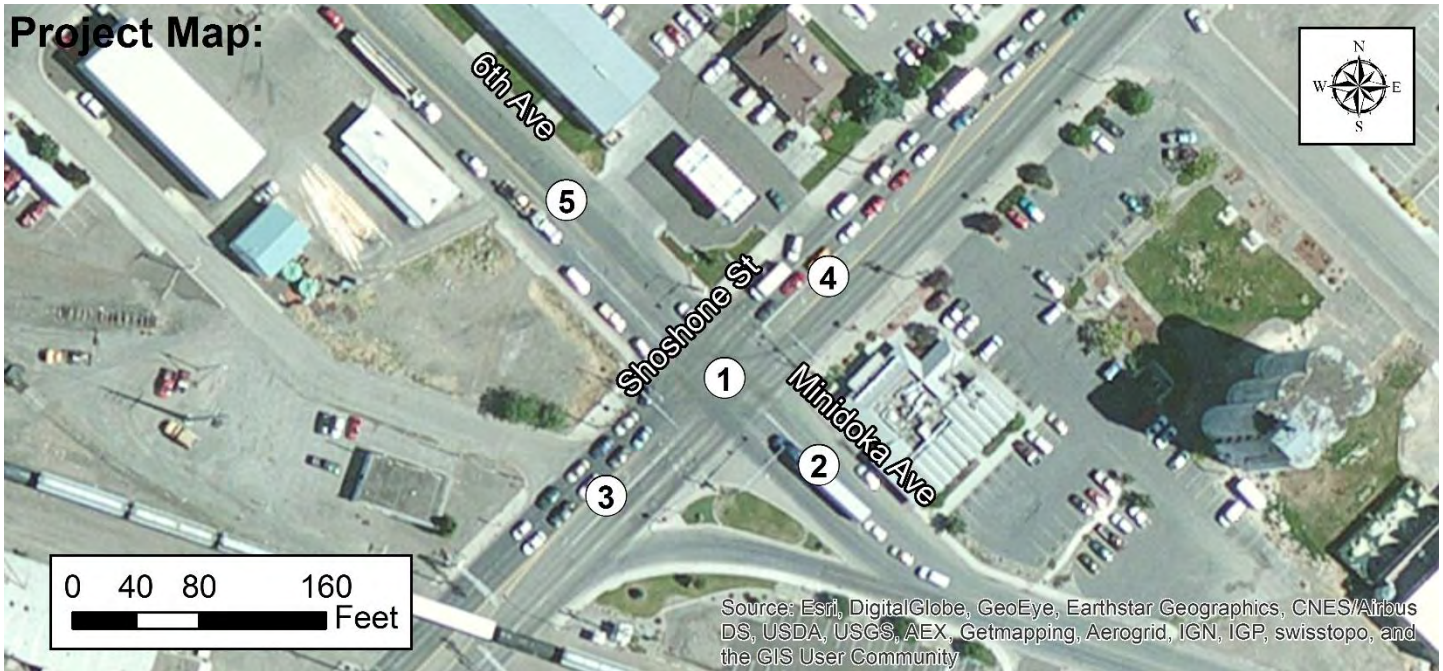
Key Number	Location	Project Description	Estimated Cost
I-8	Shoshone St & 6 th Ave W	Widens Shoshone St at intersection to add a second northbound Shoshone St left turn lane. Widens 6 th Ave northwest of the intersection to accommodate dual left turn lanes. Restripes westbound Minidoka approach to add designated right turn lane.	\$860,000
I-9a	Blue Lakes Blvd & US 30 (Kimberly Rd)	<i>Short-Term:</i> Prohibits northbound left turns and optimizes signal timing.	\$13,000
I-9b	Blue Lakes Blvd & US 30 (Kimberly Rd)	<i>Long-Term:</i> In addition to short-term improvements, adds second westbound left turn lane. Widens Blue Lakes Blvd south of the intersection to accommodate dual left turns. Converts westbound through lane to a shared through/right lane.	\$702,000
I-10	Blue Lakes Blvd & Orchard Dr	Installs traffic signal to reduce delay for eastbound and westbound traffic.	\$656,000
I-11	Murtaugh St & 2 nd Ave S	Recommends traffic analysis of the intersection. Traffic signal recommended if warranted.	\$439,000
I-12	SH 50 & Addison Ave	Installs traffic signal to reduce delay for Addison Ave traffic.	\$595,000
I-13	Shoshone St & 2 nd Ave N	Moves northbound Shoshone St left turn stop bar 8 feet back from the intersection to increase westbound left turning radius for trucks.	\$14,000
S-2	Blue Lakes Blvd (US 30 to Orchard Dr)	Widens segment to 5 lanes (two lanes each direction with two-way left turn lane) from US 30 to Highland Ave, 4 lanes (two lanes each direction) from Highland Ave to Park Ave, and 3 lanes (one lane each direction with two-way left turn lane) from Park Ave to Orchard Dr.	\$3,086,000
S-3	Eastland Dr (US 30 to Orchard Dr)	Reconstructs railroad underpass to provide 17' vertical clearance. Installs 8' paved shoulders along segment where absent.	\$2,766,000
S-4	Washington St (Highland Ave to Orchard Dr)	Widens segment to 5 lanes (two lanes each direction with two-way left turn lanes).	\$3,197,000





Capacity Project:			Key No.
Shoshone St & 6th Ave W			I – 8
Route:	County	City (nearest)	District
SH 74	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
7.5	7.5	n/a	
Location Notes:			
Intersection of Shoshone St and 6th Ave, in south Twin Falls			

Project Map:



Existing Conditions:

- Intersection is currently signalized
- Coordinated/pre-timed
- Two-phase operation, permitted left turn phasing
- Adequate operation in 2014, with all movements at LOS C or better

Projected Future Conditions:

- Undesirable level of service in 2040
- LOS F on northbound left turn
- LOS E on eastbound left turn

Conclusion:

Lane configurations and permitted left turn phasing do not adequately serve PM peak demands in the future.

Recommended Improvements:

1. Protected/permitted left turn phasing during PM peak hour; permitted phasing only otherwise.
2. Restripe westbound Minidoka Ave approach to add a designated right turn lane.
3. Widen south Shoshone St leg by 6 feet on both sides; add second left turn lane.
4. Widen north Shoshone St leg by 3 feet on both sides; add median island.
5. Widen 6th Ave from Shoshone St to 5th St W to add second northwest-bound lane so that dual northbound left turns may be accommodated.
6. Improvements should be implemented after 2020

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	C	F	C	Preliminary Engineering	\$76,000
Avg. Intersection LOS	B	E	C	Right-of-Way	\$280,000
ADT	17,300	30,100		Construction	\$504,000
				Total Estimated Cost	\$860,000
				Benefit/Cost Ratio:	3.61

I-8 Shoshone St and 6th Ave

Project No.

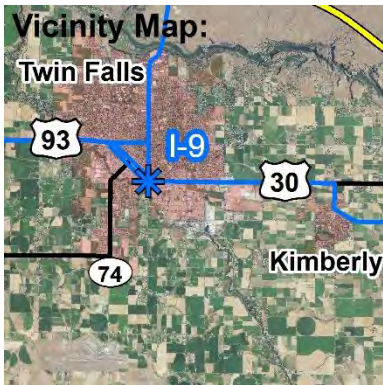
Key No. I-8

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	0.07	\$ 15,000.00	\$1,002
Removal of Obstructions	LS	1	\$ 2,000.00	\$2,000
Removal of Curb and Gutter	FT	610	\$ 4.00	\$2,440
Removal of Concrete Sidewalk	SY	300	\$ 10.00	\$3,000
Removal of Pavement	SY	270	\$ 5.00	\$1,350
Excavation	CY	3,000	\$ 10.00	\$30,000
Granular Subbase	TON	2,100	\$ 10.00	\$21,000
3/4" Aggregate Type B for Base	TON	1,400	\$ 20.00	\$28,000
Concrete Sidewalk	SY	300	\$ 40.00	\$12,000
Pedestrian Ramps	EACH	7	\$ 1,500.00	\$10,500
Combination Curb & Gutter Type A	FT	2,500	\$ 22.00	\$55,000
Pavement (HMA)	TON	600	\$ 85.00	\$51,000
Pavement Markings - Striping	FT	7,100	\$ 0.20	\$1,420
Pavement Markings - Special	SF	200	\$ 10.00	\$2,000
Seal Coat	SY	5,500	\$ 2.00	\$11,000
Railroad Crossing Improvements	LS	1	\$ 60,000.00	\$60,000
Traffic Signal Modifications	LS	1	\$ 35,000.00	\$35,000
Traffic Control Items	LS	1	\$ 20,000.00	\$20,000
Survey	LS	1	\$ 15,000.00	\$15,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$362,000
Mobilization	%	10%	\$ 36,200	\$36,200
Contingency	%	10%	\$ 39,820	\$39,820
Construction Engineering & Inspection	%	15%	\$ 65,703	\$65,703
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$504,000
Design	%	15%	\$ 75,600	\$75,600
Right-of-Way	LS	1	\$ 280,000	\$280,000
TOTAL (Rounded up to the nearest \$1,000)				\$860,000



Capacity Project:			Key No.
Blue Lakes Blvd & US 30 (Kimberly Rd)			I – 9a
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
218.6	218.6	n/a	
Location Notes:			
Intersection of Blue Lakes Blvd and Kimberly Rd (South 5-Points), in south Twin Falls			



Existing Conditions:

- Intersection is currently signalized
- Split phasing northbound and southbound
- Adequate operation in 2014, with one movement (westbound left) at LOS D and the others at LOS C or better.

Projected Future Conditions:

- Undesirable LOS by 2018 (LOS D on at least two movements)
- Heavily congested peak hour conditions in 2040
- LOS F on southbound through and northbound left lanes in 2040
- Westbound left turn bay spillover

Conclusion:

Not enough lanes to serve future demand. Split phasing is inefficient and causes more congestion.

Option A: Recommended Short-term Improvements

- Prohibit northbound left turns onto Main St
- Optimize signal timing
- Improvements can be implemented immediately and maintain acceptable LOS (D on only one movement or better) until 2026

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:		
Movement w/Lowest LOS	D	F	F	Preliminary Engineering	\$3,000	
Avg. Intersection LOS	C	E	D	Right-of-Way	\$00	
ADT	23,400	40,600		Construction	\$10,000	
				Total Estimated Cost		\$13,000
				Benefit/Cost Ratio:		74.62

I-9a Blue Lakes Blvd and US 30 (Kimberly Rd)

Project No.

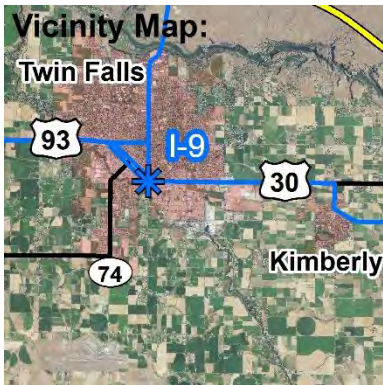
Key No. I-9a

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Sign - No Left Turn	EACH	1	\$ 200.00	\$200
Traffic Sign and Post	EACH	1	\$ 400.00	\$400
Pavement Markings - Special	SF	56	\$ 10.00	\$560
Traffic Signal Modifications	LS	1	\$ 5,000.00	\$5,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$7,000
Mobilization	%	10%	\$ 700	\$700
Contingency	%	10%	\$ 770	\$770
Construction Engineering & Inspection	%	15%	\$ 1,271	\$1,271
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$10,000
Design	%	30%	\$ 3,000	\$3,000
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$13,000



Capacity Project:			Key No.
Blue Lakes Blvd & US 30 (Kimberly Rd)			I – 9b
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
218.6	218.6	n/a	
Location Notes:			
Intersection of Blue Lakes Blvd and Kimberly Rd (South 5-Points), in south Twin Falls			



Existing Conditions:

- Intersection is currently signalized
- Split phasing northbound and southbound
- Adequate operation in 2014, with one movement (westbound left) at LOS D and the others at LOS C or better.

Projected Future Conditions:

- Undesirable LOS by 2018 (LOS D on at least two movements)
- Heavily congested peak hour conditions in 2040
- LOS F on southbound through and northbound left lanes in 2040
- Westbound left turn bay spillover

Conclusion:

Not enough lanes to serve future demand. Split phasing is inefficient and causes more congestion.

Option B: Recommended Long-term Improvements

- Prohibit northbound left turns onto Main St
- Reconfigure US 30 westbound approach to add a second left turn lane and convert the through lane into a shared through/right lane.
- Widen south leg of Blue Lakes Blvd for two receiving lanes. Dual receiving lanes should extend 1000 feet south of the intersection.
- Improvements should be completed before 2026 and considered as a companion to project S-2.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	D	F	C	Preliminary Engineering	\$79,000
Avg. Intersection LOS	C	E	C	Right-of-Way	\$97,000
ADT	23,400	40,600		Construction	\$526,000
				Total Estimated Cost	\$702,000
				Benefit/Cost Ratio:	11.54

I-9b Blue Lakes Blvd and US 30 (Kimberly Rd)

Project No.

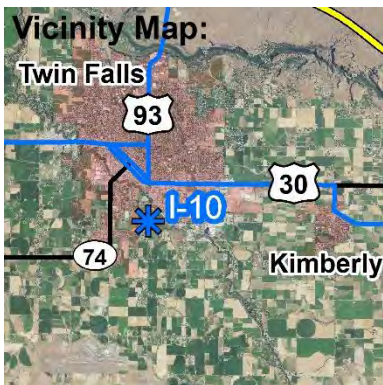
Key No. I-9b

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	0.10	\$ 15,000.00	\$1,500
Removal of Obstructions	LS	1	\$ 12,000.00	\$12,000
Remove and Reset Fence	FT	320	\$ 10.00	\$3,200
Removal of Curb and Gutter	FT	1,500	\$ 4.00	\$6,000
Removal of Concrete Sidewalk	SY	550	\$ 7.00	\$3,850
Removal of Concrete Pavement	SY	200	\$ 8.00	\$1,600
Removal of Pavement	SY	340	\$ 5.00	\$1,700
Excavation	CY	150	\$ 10.00	\$1,500
Granular Subbase	TON	560	\$ 10.00	\$5,600
3/4" Aggregate Type B for Base	TON	460	\$ 20.00	\$9,200
Concrete Sidewalk	SY	420	\$ 40.00	\$16,800
Pedestrian Ramps	EACH	6	\$ 1,500.00	\$9,000
Urban Approach	EACH	11	\$ 2,000.00	\$22,000
Combination Curb & Gutter Type A	FT	950	\$ 22.00	\$20,900
Pavement (HMA)	TON	200	\$ 85.00	\$17,000
Pavement Markings - Striping	FT	5,000	\$ 0.20	\$1,000
Pavement Markings - Special	SF	500	\$ 10.00	\$5,000
Seal Coat	SY	7,200	\$ 2.00	\$14,400
Railroad Crossing Improvements	LS	1	\$ 60,000.00	\$60,000
Sign Bridge Foundations	LS	1	\$ 10,700.00	\$10,700
Sign Bridge Steel Structure	LS	1	\$ 83,700.00	\$83,700
Relocate Bridge Signs	LS	1	\$ 7,500.00	\$7,500
Sign Bridge Luminaires	LS	1	\$ 28,000.00	\$28,000
Sign - No Left Turn	EACH	1	\$ 200.00	\$200
Sign - No Turn On Red	EACH	1	\$ 200.00	\$200
Traffic Sign and Post	EACH	1	\$ 400.00	\$400
Traffic Signal Modifications	LS	1	\$ 5,000.00	\$5,000
Traffic Control Items	LS	1	\$ 10,000.00	\$10,000
Survey	LS	1	\$ 20,000.00	\$20,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$378,000
Mobilization	%	10%	\$ 37,800	\$37,800
Contingency	%	10%	\$ 41,580	\$41,580
Construction Engineering & Inspection	%	15%	\$ 68,607	\$68,607
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$526,000
Design	%	15%	\$ 78,900	\$78,900
Right-of-Way	LS	1	\$ 97,000	\$97,000
TOTAL (Rounded up to the nearest \$1,000)				\$702,000



Capacity Project:

Key No.

Blue Lakes Blvd & Orchard Dr

I – 10

Route:	County	City (nearest)	District
STC 2730	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
18.4	18.4	n/a	

Location Notes:

Intersection of Blue Lakes Blvd and Orchard Dr, south of Twin Falls

Project Map:



Existing Conditions:

- The intersection is currently free-flowing northbound and southbound and stop controlled eastbound and westbound.
- Eastbound left turning volume is relatively high.
- Adequate operation in 2014.

Projected Future Conditions:

- LOS F expected on eastbound left turn during PM peak hour in 2040.
- LOS D expected on eastbound through movement and all westbound movements.

Conclusion:

As north and southbound volumes increase in the future, fewer gaps are available for eastbound left turn and other minor approach vehicles, leading to long delays.

Recommended Improvements:

- Install a traffic signal at the intersection with permitted left turn phasing.
- Install signal when warrant is met; projected to meet in approximately 2035.
- Signal reduces delay for east/westbound traffic at the expense of north/southbound traffic.
- Improvement should be planned with consideration to project S-2.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:		
Movement w/Lowest LOS	C	F	C	Preliminary Engineering	\$85,000	
Avg. Intersection LOS	A	C	B	Right-of-Way	\$10,000	
ADT	7,400	12,900		Construction	\$561,000	
				Total Estimated Cost		\$656,000
				Benefit/Cost Ratio:		n/a

I-10 Blue Lakes Blvd and Orchard Dr

Project No.

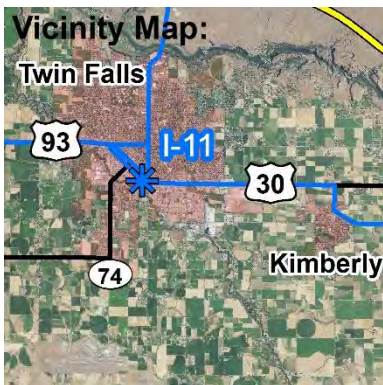
Key No. I-10

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Removal of Existing Signs	EA	3	\$ 50.00	\$150
3/4" Aggregate Type B for Base	TN	390	\$ 20.00	\$7,800
Concrete Sidewalk	SY	130	\$ 40.00	\$5,200
Pedestrian Ramps	EA	8	\$ 1,500.00	\$12,000
Combination Curb & Gutter Type A	FT	250	\$ 22.00	\$5,500
Pavement (HMA)	TON	50	\$ 110.00	\$5,500
Traffic Signal Installation	LS	1	\$ 350,000.00	\$350,000
Pavement Markings - Striping	FT	7,200	\$ 0.20	\$1,440
Pavement Markings - Special	SF	119	\$ 10.00	\$1,194
Reconstruct Irrigation Box	EA	1	\$ 4,000.00	\$4,000
Traffic Items	LS	1	\$ 1,000.00	\$1,000
Traffic Control Items	LS	1	\$ 5,000.00	\$5,000
Survey	LS	1	\$ 4,000.00	\$4,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$403,000
Mobilization	%	10%	\$ 40,300	\$40,300
Contingency	%	10%	\$ 44,330	\$44,330
Construction Engineering & Inspection	%	15%	\$ 73,145	\$73,145
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$561,000
Design	%	15%	\$ 84,150	\$84,150
Right-of-Way	LS	1	\$ 10,000	\$10,000
TOTAL (Rounded up to the nearest \$1,000)				\$656,000



Capacity Project:			Key No.
Murtaugh St & 2nd Ave S			I – 11
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
218.4	218.4	n/a	
Location Notes:			
Intersection of Murtaugh St and 2 nd Ave S, in south Twin Falls			



Existing Conditions:

- The intersection is currently free-flowing and one-way eastbound on 2nd Ave S and stop-controlled on Murtaugh St.
- Traffic counts were not collected at the intersection, but trucks are known to travel southwest across 2nd Ave S and must wait for a gap in traffic before proceeding to Minidoka.

Projected Future Conditions:

- Trucks will have a more difficult time crossing 2nd Ave S as volumes increase.

Conclusion:

Truck route crosses southwest across 2nd Ave S. Trucks accelerate slowly, making it difficult to find usable gaps across 2nd Ave S traffic.

Recommended Improvements:

- Collect traffic counts at the intersection.
- If a signal is warranted and does not significantly delay 2nd Ave S traffic, install a two-phase traffic signal. Southwest leg should be narrowed to one-way westbound. The signal should rest in green on 2nd Ave S, and the Murtaugh St phase set to call on time delay.
- Improvement serves Murtaugh St truck route at the expense of 2nd Ave S traffic.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	n/a	n/a	n/a	Preliminary Engineering	\$57,000
Avg. Intersection LOS	n/a	n/a	n/a	Right-of-Way	\$6,000
ADT	n/a	n/a		Construction	\$376,000
				Total Estimated Cost	\$439,000
				Benefit/Cost Ratio:	n/a

I-11 Murtaugh St and 2nd Ave S

Project No.

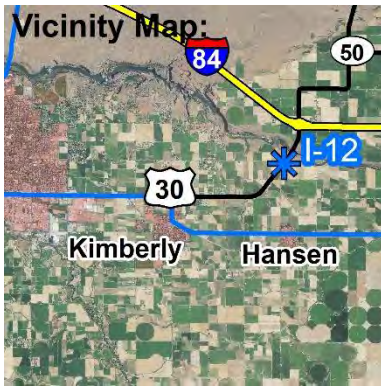
Key No. I-11

January 23, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Removal of Existing Signs	EA	2	\$ 50.00	\$100
Removal of Curb and Gutter	FT	80	\$ 6.00	\$480
Removal of Pavement	SY	200	\$ 5.00	\$1,000
Removal of Concrete Sidewalk	SY	41	\$ 10.00	\$410
3/4" Aggregate Type A for Base	TON	100	\$ 25.00	\$2,500
Concrete Sidewalk	SY	40	\$ 40.00	\$1,600
Pedestrian Ramp	EA	3	\$ 1,500.00	\$4,500
Combination Curb & Gutter Type A	FT	135	\$ 20.00	\$2,700
Pavement Markings - Striping	FT	610	\$ 2.00	\$1,220
Traffic Sign and Post	EA	1	\$ 400.00	\$400
Traffic Signal Installation	LS	1	\$ 250,000.00	\$250,000
Survey	LS	1	\$ 2,000.00	\$2,000
Traffic Control Items	LS	1	\$ 3,000.00	\$3,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$270,000
Mobilization	%	10%	\$ 27,000	\$27,000
Contingency	%	10%	\$ 29,700	\$29,700
Construction Engineering & Inspection	%	15%	\$ 49,005	\$49,005
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$376,000
Design	%	15%	\$ 56,400	\$56,400
Right-of-Way	LS	1	\$ 6,000	\$6,000
TOTAL (Rounded up to the nearest \$1,000)				\$439,000



Capacity Project:			Key No.
SH 50 & Addison Ave			I – 12
Route:	County	City (nearest)	District
SH 50	Twin Falls	Hansen	4
Beginning Milepost	Ending Milepost	Length (miles)	
3.5	3.5	n/a	
Location Notes:			
Intersection of SH 50 and Addison Ave, east of Twin Falls			

Project Map:



Existing Conditions:

- The intersection is currently free flowing on SH 50 and stop-controlled on the Addison Ave approach.
- Adequate operation in 2014, with all movements at LOS B or above.

Projected Future Conditions:

- LOS D in 2040 on the left turn from Addison Ave to SH 50, which is acceptable.
- However, the safety project at SH 50 and N 3800 E will lead to LOS F on the Addison Ave left turn.

Conclusion:

The safety project at SH 50 and N 3800 E redirects traffic through the SH 50 and Addison Ave intersection. This leaves fewer gaps for Addison Ave traffic and increases delay.

Recommended Improvements:

- Install a two-phase traffic signal at the intersection and coordinated flashing beacons at each approach. The signal should rest in green on SH 50 to minimize delay.
- Install after the SH 50 and N 3800 E safety project and when signal warrants are met.
- Signal reduces delay for Addison Ave traffic and increases delay for SH 50 traffic

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	B	F	C	Preliminary Engineering	\$78,000
Avg. Intersection LOS	A	B	B	Right-of-Way	\$00
ADT	8,300	14,400		Construction	\$517,000
					Total Estimated Cost
				Benefit/Cost Ratio:	n/a

I-12 SH 50 and Addison Ave

Project No.

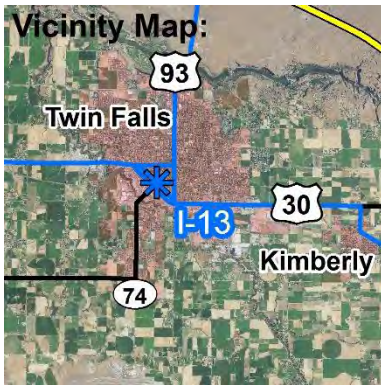
Key No. I-12

January 23, 2015

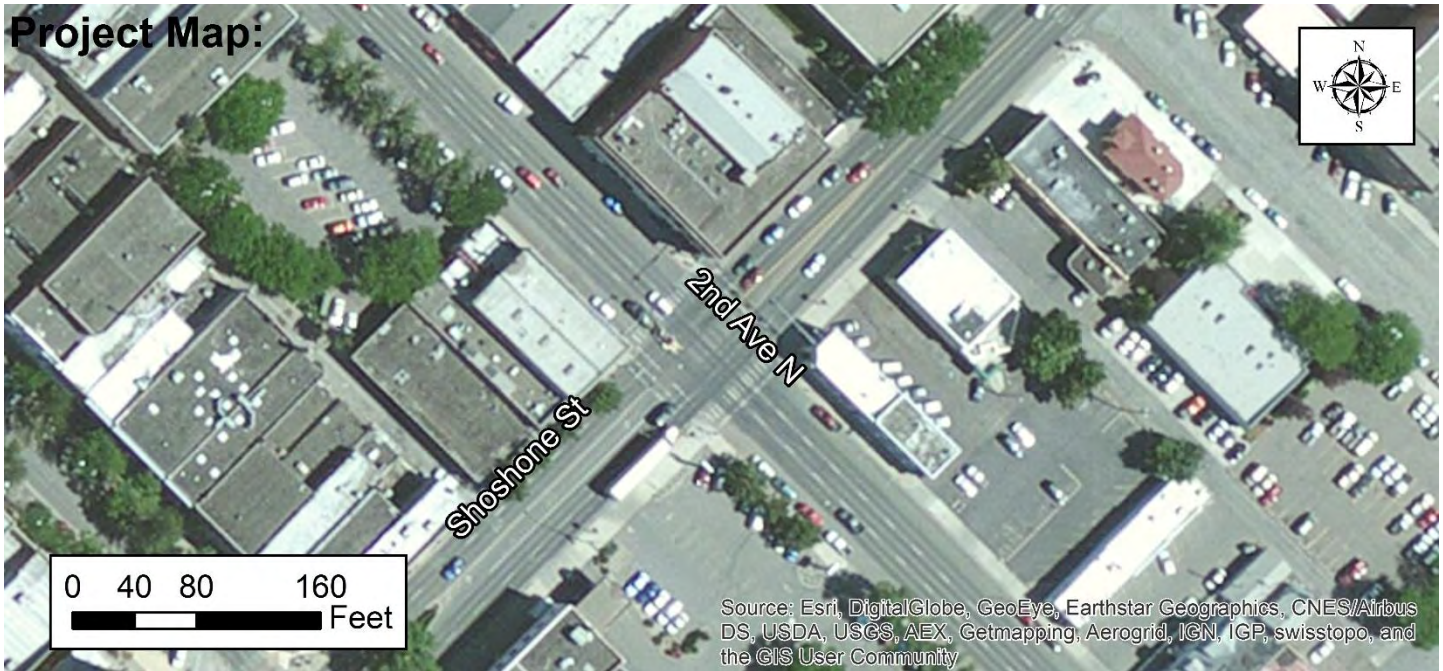
PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Removal of Existing Signs	EACH	1	\$ 50.00	\$50
Traffic Sign and Post	EACH	3	\$ 400.00	\$1,200
Pavement Markings - Striping	FT	5,100	\$ 0.20	\$1,020
Pavement Markings - Special	SF	176	\$ 10.00	\$1,760
Traffic Signal Installation	LS	1	\$ 350,000.00	\$350,000
Traffic Control Items	LS	1	\$ 4,000.00	\$4,000
Coordinated Flashing Beacons	EACH	3	\$ 4,000.00	\$12,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$371,000
Mobilization	%	10%	\$ 37,100	\$37,100
Contingency	%	10%	\$ 40,810	\$40,810
Construction Engineering & Inspection	%	15%	\$ 67,337	\$67,337
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$517,000
Design	%	15%	\$ 77,550	\$77,550
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$595,000



Capacity Project:			Key No.
Shoshone St & 2nd Ave N			I – 13
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
217.9	217.9	n/a	
Location Notes:			
Intersection of Shoshone St and 2nd Ave N, in south Twin Falls			



Existing Conditions:

- Intersection is currently signalized
- Coordinated/pre-timed
- One-way westbound on 2nd Ave N
- Two-way on Shoshone St
- Adequate operation in 2014
- Northbound left turn stop bar is too close to the intersection and impedes left turning traffic from 2nd Ave N

Projected Future Conditions:

- Adequate capacity in 2040, with LOS C or better on all movements

Conclusion:

The intersection adequately serves demand, but the position of the northbound left turn stop bar crowds left turning truck and vehicle traffic from 2nd Ave N.

Recommended Improvements:

- Move northbound Shoshone St left turn stop bar at least 8 feet southwest of its current position.
- Modify signal detection.
- Improvement increases the available turning radius of trucks and vehicles from 2nd Ave N.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:		
Movement w/Lowest LOS	C	C	C	Preliminary Engineering	\$4,000	
Avg. Intersection LOS	B	C	C	Right-of-Way	\$00	
ADT	18,500	32,200		Construction	\$10,000	
				Total Estimated Cost		\$14,000
				Benefit/Cost Ratio:		n/a

I-13 Shoshone St and 2nd Ave N

Project No.

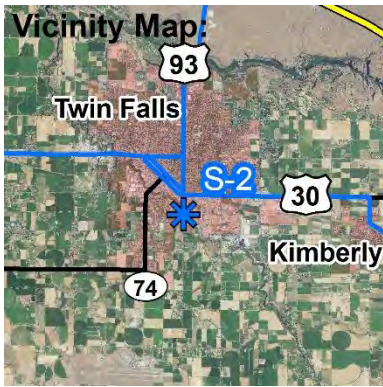
Key No. I-13

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Obliteration of Pavement Markings	SF	30	\$ 15.00	\$450
Modify Signal Detection	LS	1	\$ 4,000.00	\$4,000
Pavement Markings - Special	SF	24	\$ 10.00	\$240
Adjust Signal Timing	LS	1	\$ 200.00	\$200
Traffic Control Items	LS	1	\$ 2,000.00	\$2,000
<i>SUBTOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$7,000</i>
Mobilization	%	10%	\$ 700	\$700
Contingency	%	10%	\$ 770	\$770
Construction Engineering & Inspection	%	15%	\$ 1,271	\$1,271
<i>CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$10,000</i>
Design	%	35%	\$ 3,500	\$3,500
Right-of-Way	LS	0		\$0
<i>TOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$14,000</i>



Capacity Project:			Key No.
Blue Lakes Blvd (US 30 to Orchard Dr)			S – 2
Route:	County	City (nearest)	District
STC 7232	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
18.4	19.4	1.0	
Location Notes:			
Segment of Blue Lakes Blvd from US 30 to Orchard Dr, in south Twin Falls			



Existing Conditions:

- Two-lane highway with 13-foot lanes and 6 foot shoulders
- Access density = 42/mile or 1 per every 125 feet (includes both sides of the road)
- No-passing zones on 66% of segment length
- Adequate operation, with LOS C northbound and LOS D southbound during the PM peak hour
- Volumes on the northern end of the segment are 75% higher than volumes on the southern end

Projected Future Conditions:

- Undesirable LOS in 2040
- LOS projected to drop from D to E during the 2040 PM peak hour in the southbound direction

Conclusion:

A combination of high volumes, access density, and no-passing zone percentage contribute to low LOS in the future. Shoulder and lane widths are adequate.

Recommended Improvements:

- Widen to 5 lanes from US 30 to Highland Ave: two lanes each direction with a two-way left turn lane, curb and gutter, and sidewalks.
- Widen to 4 lanes from Highland Ave to Park Ave: two lanes each direction with 6' paved shoulders.
- Widen to 3 lanes from Park Ave to Orchard Dr: one lane in each direction with a two-way left turn lane and curb and gutter.
- Should be completed before 2040 and considered as a companion to project I-9b.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Northbound LOS	C	D	C	Preliminary Engineering	\$306,000
Southbound LOS	D	E	D	Right-of-Way	\$740,000
ADT	9,400	16,300		Construction	\$2,040,000
				Total Estimated Cost	\$3,086,000
				Benefit/Cost Ratio:	0.78

S-2 Blue Lakes Blvd (US 30 to Orchard)

Project No.

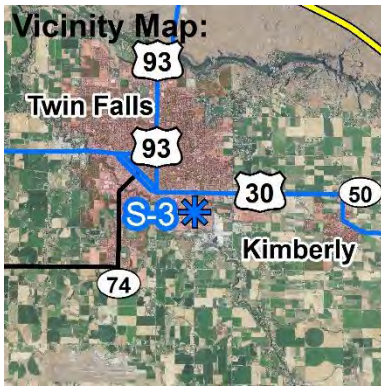
Key No. S-2

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	4.50	\$ 6,000.00	\$27,019
Removal of Obstructions	LS	1	\$ 15,000.00	\$15,000
Remove and Reset Fence	FT	440	\$ 10.00	\$4,400
Removal of Curb and Gutter	FT	7,300	\$ 3.00	\$21,900
Removal of Concrete Sidewalk	SY	1,200	\$ 8.00	\$9,600
Removal of Pavement	SY	5,600	\$ 3.00	\$16,800
Excavation	CY	4,200	\$ 10.00	\$42,000
Borrow	CY	110,000	\$ 5.00	\$550,000
Granular Subbase	TON	9,000	\$ 10.00	\$90,000
3/4" Aggregate Type B for Base	TON	5,100	\$ 20.00	\$102,000
Concrete Sidewalk	SY	1,200	\$ 40.00	\$48,000
Combination Curb & Gutter Type A	FT	7,300	\$ 22.00	\$160,600
Pavement (HMA)	TON	2,300	\$ 80.00	\$184,000
Pavement Markings - Striping	FT	23,000	\$ 0.20	\$4,600
Pavement Markings - Special	SF	420	\$ 10.00	\$4,200
Urban Approach	EACH	50	\$ 1,500.00	\$75,000
Traffic Control Items	LS	1	\$ 20,000.00	\$20,000
Survey	LS	1	\$ 30,000.00	\$30,000
Railroad Crossing Improvements	LS	1	\$ 60,000.00	\$60,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$1,466,000
Mobilization	%	10%	\$ 146,600	\$146,600
Contingency	%	10%	\$ 161,260	\$161,260
Construction Engineering & Inspection	%	15%	\$ 266,079	\$266,079
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$2,040,000
Design	%	15%	\$ 306,000	\$306,000
Right-of-Way	LS	1	\$ 740,000	\$740,000
TOTAL (Rounded up to the nearest \$1,000)				\$3,086,000



Capacity Project:			Key No.
Eastland Dr (US 30 to Orchard Dr)			S – 3
Route:	County	City (nearest)	District
SMA 7272	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
5.7	6.7	1.0	
Location Notes:			
Segment of Eastland Dr from US 30 to Orchard Dr, in southeast Twin Falls			



Existing Conditions:

- Two-lane highway with 12-foot lanes and 1-foot shoulders at the narrowest point
- Narrowest point is the railroad underpass 0.2 miles south of US 30; has low 13'9" clearance and floods occasionally
- Access density = 42/mile or 1 per every 125 feet (includes both sides of the road)
- No-passing zones on 20% of segment length
- Adequate operation, with LOS D northbound and LOS C southbound during the PM peak hour

Projected Future Conditions:

- Projected LOS drops from D to E in both directions in 2040

Conclusion:

High volumes, access density, and narrow shoulders at the railroad underpass and other locations contribute to low LOS in the future. The low underpass clearance prevents some trucks and heavy vehicles from using the segment.

Recommended Improvements:

- Reconstruct railroad underpass to provide 17' clearance. Underpass should be wide enough for 2 lanes in each direction with bike lanes, sidewalks, and a center support pier to accommodate future growth.
- Construct 8 foot paved shoulders south of underpass where lacking.
- Improvements should be implemented in approximately 2040.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Northbound LOS	D	E	D	Preliminary Engineering	\$333,000
Southbound LOS	C	E	D	Right-of-Way	\$216,000
ADT	9,200	16,000		Construction	\$2,217,000
				Total Estimated Cost	\$2,766,000
				Benefit/Cost Ratio:	0.33

S-3 Eastland Dr (US 30 to Orchard)

Project No.

Key No. S-3

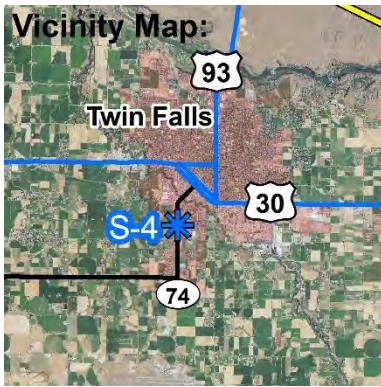
January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	0.40	\$ 12,000.00	\$4,800
Removal of Curb and Gutter	FT	2,350	\$ 3.00	\$7,050
Removal of Concrete Sidewalk	SY	1,100	\$ 8.00	\$8,800
Removal of Pavement	SY	9,200	\$ 3.00	\$27,600
Excavation	CY	13,000	\$ 8.00	\$104,000
Utility Relocate*	LS	1	\$ 100,000.00	\$100,000
Retaining Wall	SF	2,000	\$ 60.00	\$120,000
Bridge Structure	SF	1,700	\$ 500.00	\$850,000
Granular Subbase	TON	6,400	\$ 10.00	\$64,000
3/4" Aggregate Type B for Base	TON	3,200	\$ 20.00	\$64,000
Concrete Sidewalk	SY	560	\$ 40.00	\$22,400
Pedestrian Ramps	EACH	2	\$ 1,500.00	\$3,000
Combination Curb & Gutter Type A	FT	2,350	\$ 22.00	\$51,700
Pavement (HMA)	TON	1,500	\$ 80.00	\$120,000
Pavement Markings - Striping	FT	14,200	\$ 0.20	\$2,840
Pavement Markings - Special	SF	30	\$ 10.00	\$300
Urban Approach	EACH	3	\$ 2,500.00	\$7,500
Traffic Control Items	LS	1	\$ 20,000.00	\$20,000
Survey	LS	1	\$ 15,000.00	\$15,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$1,593,000
Mobilization	%	10%	\$ 159,300	\$159,300
Contingency	%	10%	\$ 175,230	\$175,230
Construction Engineering & Inspection	%	15%	\$ 289,130	\$289,130
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$2,217,000
Design	%	15%	\$ 332,550	\$332,550
Right-of-Way	LS	1	\$ 216,000	\$216,000
TOTAL (Rounded up to the nearest \$1,000)				\$2,766,000

* Utility relocation is uncertain at this time. Further field investigation is required.



Capacity Project:			Key No.
Washington St (Highland Ave to Orchard Dr)			S – 4
Route:	County	City (nearest)	District
SH 74	Twin Falls	Twin Falls	4
Beginning Milepost		Ending Milepost	Length (miles)
6.1		6.9	0.8
Location Notes:			
Segment of Washington St from Highland Ave to Orchard Dr, in southeast Twin Falls			



Existing Conditions:

- Two-lane highway with 12-foot lanes and 6-foot shoulders
- Access density = 61/mile or 1 per every 87 feet (includes both sides of the road)
- No passing zones on 67% of segment length
- Adequate operation, with LOS C in both directions

Projected Future Conditions:

- Northbound LOS drops from D to E in 2026
- Southbound LOS drops from D to E in 2030

Conclusion:

A combination of high volumes, access density, and no-passing zone percentage contribute to low LOS in the future. Lane and shoulder widths are adequate.

Recommended Improvements:

- Widen segment to 5 lanes: two lanes, a bike lane, curb and gutter, and a sidewalk in each direction with a center two-way left turn lane.
- Improvements should be implemented after 2030.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Northbound LOS	C	E	B	Preliminary Engineering	\$319,000
Southbound LOS	C	E	A	Right-of-Way	\$754,000
ADT	11,600	20,100		Construction	\$2,124,000
				Total Estimated Cost	\$3,197,000
				Benefit/Cost Ratio:	3.04

S-4 Washington (Highland to Orchard)

Project No.

Key No. S-4

January 22, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Removal of Obstructions	LS	1	\$ 50,000.00	\$50,000
Clearing and Grubbing	ACRE	1.75	\$ 6,000.00	\$10,474
Excavation	CY	8,800	\$ 10.00	\$88,000
Granular Subbase	TON	10,000	\$ 10.00	\$100,000
3/4" Aggregate Type B for Base	TON	7,000	\$ 20.00	\$140,000
Pavement (HMA)	TON	2,800	\$ 80.00	\$224,000
Tack Coat	GAL	900	\$ 2.10	\$1,890
Pavement Markings - Striping	FT	23,000	\$ 0.20	\$4,600
Pavement Markings - Arrows	SF	300	\$ 10.00	\$3,000
Concrete Sidewalk	SY	5,100	\$ 40.00	\$204,000
Urban Approach	EA	51	\$ 2,500.00	\$127,500
Combination Curb & Gutter Type A	FT	7,600	\$ 22.00	\$167,200
Pedestrian Ramps	EA	32	\$ 1,500.00	\$48,000
Remove and Reset Fence	LF	3,160	\$ 10.00	\$31,600
Traffic Items	LS	1	\$ 5,000.00	\$5,000
Storm Drain System	LS	1	\$ 250,000.00	\$250,000
Traffic Control Items	LS	1	\$ 30,000.00	\$30,000
Survey	LS	1	\$ 30,000.00	\$30,000
Sediment and Erosion Control	LS	1	\$ 10,000.00	\$10,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$1,526,000
Mobilization	%	10%	\$ 152,600	\$152,600
Contingency	%	10%	\$ 167,860	\$167,860
Construction Engineering & Inspection	%	15%	\$ 276,969	\$276,969
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$2,124,000
Design	%	15%	\$ 318,600	\$318,600
Right-of-Way	LS	1	\$ 754,000	\$754,000
TOTAL (Rounded up to the nearest \$1,000)				\$3,197,000

September 8, 2015



Twin Falls

Kimberly



FOR ADOPTION



Greater Twin Falls Area
Transportation Committee

2014 Update
**Southeast Twin Falls
Regional Corridor Study**

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1 Preface

This report is an update to the 2004 Southeast Twin Falls Regional Corridor Study (also referred to as the “2004 Study” in this report). The organization and content of this report differs from the 2004 Study due to differences in scope. Therefore, references to the 2004 Study are included where appropriate for comparison.

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2 Introduction

The purpose of this study is to update the 2004 Southeast Twin Falls Regional Corridor Study to current conditions and needs. The original 2004 Study recommended a prioritized list of intersection and roadway projects in southeast Twin Falls and a belt route south of Twin Falls. This 2014 update recommends seventeen intersection and roadway projects, re-investigates the need for a high-speed alternate route south of Twin Falls, and proposes three alignment alternatives for the SE Alternate Route.

2.1 2004 Study and Background

The original 2004 Study was requested by ITD and the Greater Twin Falls Area Transportation Committee (GTFATC) to investigate the need for a bypass route southeast of Twin Falls and to recommend smaller-scale transportation improvements in the region. The route was thought to be needed due to:

- Substantial residential and industrial growth in south Twin Falls since 1990 and,
- Lack of a clear and direct route for bypass traffic¹ from I-84, SH 50 and US 30 (east of Twin Falls) to reach SH 74 and US 93 (southwest of Twin Falls).

¹ Traffic with neither an origin nor destination in Twin Falls.

The 2004 Study produced a prioritized list of safety and capacity improvement projects, some of which have already been implemented. Table 1 (Table 12-1 in the 2004 Study) shows the completion status of the 2004 Study projects.

Table 1: 2004 Study Projects – Details and Completion Status

Priority	Location	Project Description	Cost Estimate	Completed?
1	US 30 - from Eastland to SH 50	Reduce Speed Limit	\$5,000	Partially
2	US 30 & Locust	Install left turn signals on US 30	\$25,000	No
3*	Blue Lakes Blvd & Addison Ave	Additional Signing and Striping & a Signal Pole on Median	Sign & Stripe \$5,000 Signal Pole \$25,000	No
4	US 93 - between SH 74 and Hollister	No Passing Zone at 3300 N and 3400 N	\$10,000	Yes
5	US 93 - between SH 74 and Hollister	Construct additional passing lanes at the locations listed below: NB mile 26.77 to 28.66 NB mile 30.06 to 31.14 NB mile 32.71 to 35.34 SB mile 27.16 to 27.92 SB mile 29.57 to 31.53 SB mile 33.06 to 35.90 SB mile 36.38 to 37.55	\$4,000,000 total \$610,000 \$400,000 \$810,000 \$280,000 \$630,000 \$850,000 \$420,000	No
6	US 30 & 3200 E (Hankins Rd)	Install a traffic signal in the future	\$200,000	Yes
7	SH 50	Turn lanes at 3600 E and 3700 E	\$750,000	Partially
8	Orchard Dr & Washington St	Install a traffic signal in the future	\$200,000	Yes
9	US 93 - between SH 74 and Hollister	Correct vertical sight deficiencies south of 3400 N and 3300 N	\$180,000 each	No
10	SH 50 & 3800 E (Rock Creek Rd)	Widen intersection to improve turning	\$30,000	Partially
11	US 93 & 3700 N Orchard Dr	Widen intersection to improve turning	\$30,000	No
12	US 30 & SH 50 (Red Cap Corner)	Install a traffic signal in the future	\$200,000	Yes
13	US 93 through Hollister	Investigate adding center turn lanes	To be determined	No
14*	US 30 & 3800 E (Rock Creek Rd)	Widen intersection to improve turning	\$30,000	Yes
15	SH 74 & Washington St	Widen intersection to improve turning	\$15,000	Yes
16*	Addison Ave & Washington St	Add an additional turn lane	\$500,000	No
17*	Blue Lakes Blvd & Addison Ave	Add one additional lane in each direction	\$1,500,000	No

* Outside 2014 Study Area

The 2004 Study did not find a significant need for a bypass route; an origin/destination survey determined that most travel in south Twin Falls is “to” or “from” the City, not through traffic. Instead the study recommended a clear and direct truck route through south Twin Falls to support industrial development. The recommended locations of the “Most Feasible Truck Route” and an “Interim Most Feasible Truck Route” are shown below in Figure 1. As of 2015, neither of these routes have been constructed nor have they been scheduled for construction.

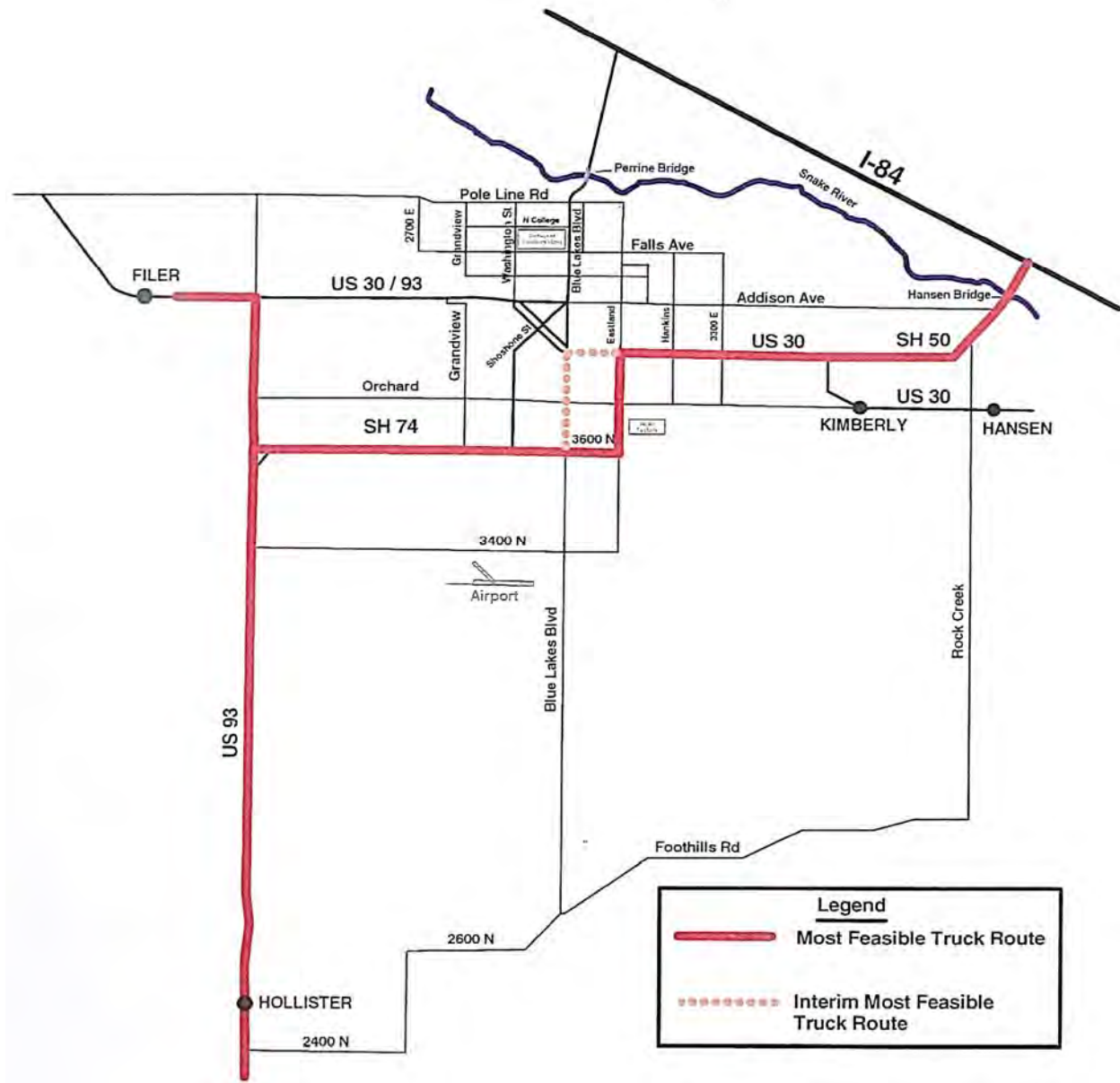


Figure 1: 2004 Most Feasible Truck Route

2.2 2014 Update Study

Industrial and residential developments have continued to grow in southeast Twin Falls and the surrounding region. Naturally, this growth results in more vehicles and trucks on the roadways, and therefore more safety and congestion concerns.

Since many of the 2004 Study projects are either completed or obsolete due to changing conditions, ITD and GTFATC requested this update to the 2004 Study with the goals to:

- Recommend up to ten new safety improvement projects,
- Recommend up to ten new traffic capacity improvement projects,
- Re-assess the need for an alternate route and,
- Recommend up to three alternate route alignments.

2.3 2014 Study Area

The study area (outlined in Figure 2) is bound by SH 50, US 30 and SH 74 to the north, the intersection of SH 50 and Addison Ave. in the east, the Idaho-Nevada border to the south, and US 93 to the west. The study area lies completely within Twin Falls County and encompasses the cities of Twin Falls, Kimberly, Hansen, and Hollister. Although the study area extends all the way to the Idaho-Nevada border, investigations were focused near the city of Twin Falls where the majority of traffic is located.

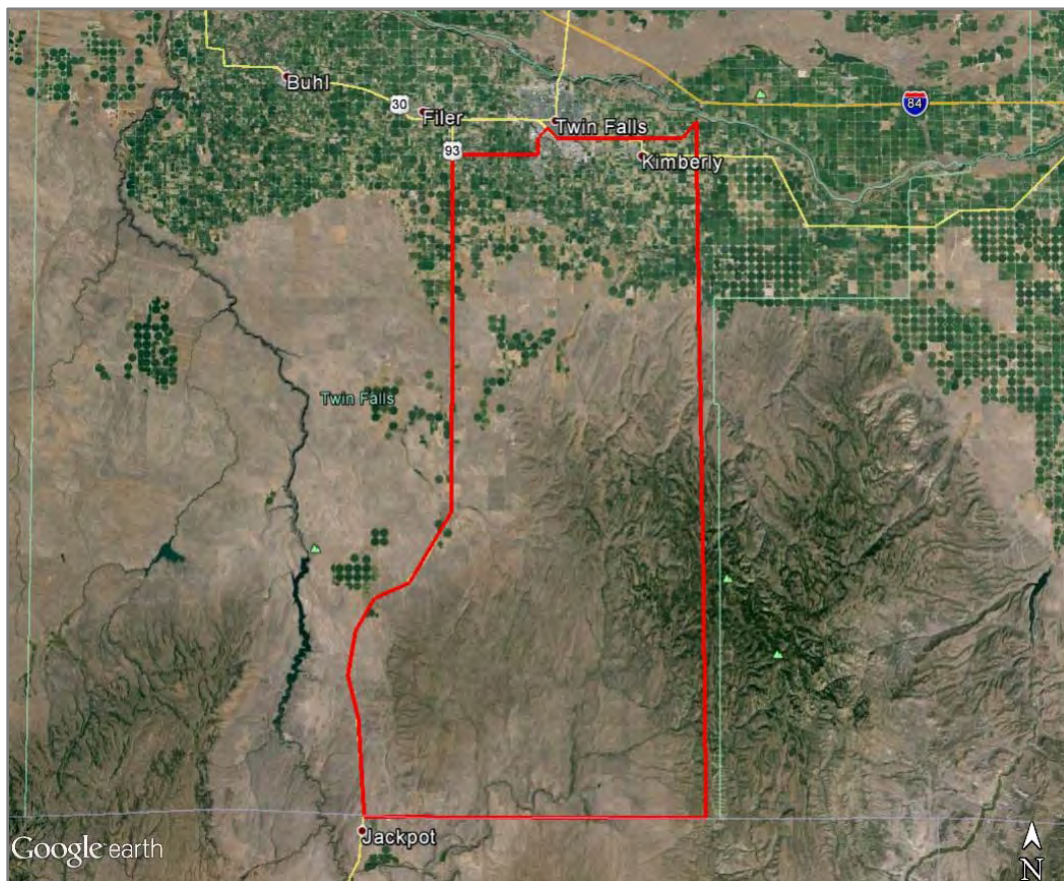


Figure 2: Study Area Map

3 Study Oversight and Administration

This section of the report summarizes coordination with stakeholders and the project task schedule.

3.1 Steering Committee

A project steering committee was formed at the outset of the project to provide local perspective to the Keller Associates team. Keller Associates met with the steering committee near the conclusion of each major project task to approve the direction of the work. The steering committee consists of three individuals:

- Gary Young, Chairman of the Greater Twin Falls Area Transportation Committee
- Jackie Fields, City Engineer for the City of Twin Falls
- Dave Burgess, Twin Falls Highway District Commissioner

3.2 Greater Twin Falls Area Transportation Committee (GTFATC)

Keller Associates presented the findings and results of each major project task to the Greater Twin Falls Area Transportation Committee (GTFATC). The GTFATC is a committee of the Twin Falls Chamber of Commerce, and consists of the following regional transportation stakeholders:

- Chairman of the Committee
- Retired Chairman of the Committee
- City of Twin Falls designated agent
- Filer City Council member or designated agent
- Kimberly City Council member or designated agent
- Twin Falls County Sheriff's Department or designated agent
- Twin Falls Highway District Commissioner or designated agent
- Filer Highway District Commissioner or designated agent
- Buhl Highway District Commissioner or designated agent
- Twin Falls County Commissioner or designated agent
- Trucking industry delegate
- Twin Falls Chamber of Commerce delegate
- Legislative delegate
- Interested county resident
- Interested city resident
- Buhl City Council member or designee
- Twin Falls County Commissioner or designated agent

3.3 Task Schedule

The schedule of tasks for this project is shown in Table 2. Meeting dates with the steering committee and GTFATC are bolded.

Table 2: Project Task Schedule

Task	Date
Existing Conditions and Data Collection	Aug. 2014 - Dec. 2014
Study Kick-off Meeting w/ Steering Committee	Sep. 9, 2014
Safety Projects	Sep. 2014 - Dec. 2014
Travel Time Studies	Sep. 2014
Future Conditions	Nov. 2014
Existing Conditions GTFATC Meeting	Dec. 9, 2014
Capacity Projects	Dec. 2014 - Feb. 2015
Safety and Capacity Projects GTFATC Meeting	Feb. 10, 2015
Belt Route Alternatives	Feb. 2015 - Apr. 2015
Belt Route Alternatives GTFATC Meeting	May 12, 2015
Chamber of Commerce Meeting	June 9, 2015
Final Report	May 2015 - Aug. 2015
Final Recommendations Meeting w/ Steering Committee	Jul. 16, 2015
Final Report Presentation to GTFATC	Aug. 11, 2015

4 Existing Conditions

Keller Associates first evaluated the existing conditions of the study area to direct the focus of more detailed safety improvement, capacity improvement, and alternate route analyses (contained in Chapters 5, 6, and 7, respectively). Existing conditions evaluations included population and employment research, a regional travel time study, and interviews with local stakeholders (public officials, commercial traffic generators, and truck drivers).

4.1 Population and Employment Characteristics

Twin Falls County is currently the sixth largest Idaho county by population and has exceeded previous growth projections in recent years. The estimated 2013 county population was 79,957, which already exceeds the 2025 population projection of 79,070 cited in the 2004 Study. Table 3 shows population trends from 2000 to 2010 within the study area. The county experienced a 20 percent population increase between 2000 and 2010, with most of the growth occurring in urban areas. The City of Twin Falls contains over half of the county's population and is the county seat.

Table 3: Population Trends

Locality	2000	2010	Increase	Percent Change from 2000-2010	1990-2000 Compounded Average Annual Growth Rate	2000-2010 Compounded Average Annual Growth Rate	1990-2010 Compounded Average Annual Growth Rate
Hansen	970	1,144	174	18%	1.4%	1.7%	1.5%
Hollister	237	272	35	15%	5.1%	1.4%	3.2%
Kimberly	2,614	3,264	650	25%	1.0%	2.2%	1.6%
Twin Falls	34,469	44,125	9,656	28%	2.3%	2.5%	2.4%
Other Areas of Twin Falls County	25,994	28,425	2,431	9%	1.4%	0.9%	1.1%
Twin Falls County	64,284	77,230	12,946	20%	1.8%	1.9%	1.8%
State of Idaho	1,293,953	1,567,582	273,629	21%	2.5%	1.9%	2.2%

Source: U.S. Census Bureau

Table 4 shows 2010 US Census age distributions for the State of Idaho, Twin Falls County, and cities in the study area. Twin Falls County has a slightly higher elderly population percentage compared to the State of Idaho. Kimberly and Hansen appear to have younger populations with higher percentages of children. Hollister follows the population distribution expected of a more rural area with a large percentage of elderly population and smaller percentage of adult population.

Table 4: Age Distribution

Locality	School Age Population (5-19 Years of Age)		Elderly Population (65 Years or older)		Median Age
	Total	% of Population	Total	% of Population	
State of Idaho	475,281	30%	194,668	12%	34.6
Twin Falls County	23,445	30%	10,706	14%	34.4
Twin Falls	13,406	30%	5,909	13%	31.9
Kimberly	1,136	35%	363	11%	31.9
Hansen	409	36%	133	12%	32.0
Hollister	89	33%	41	15%	39.0

Source: U.S. Census Bureau

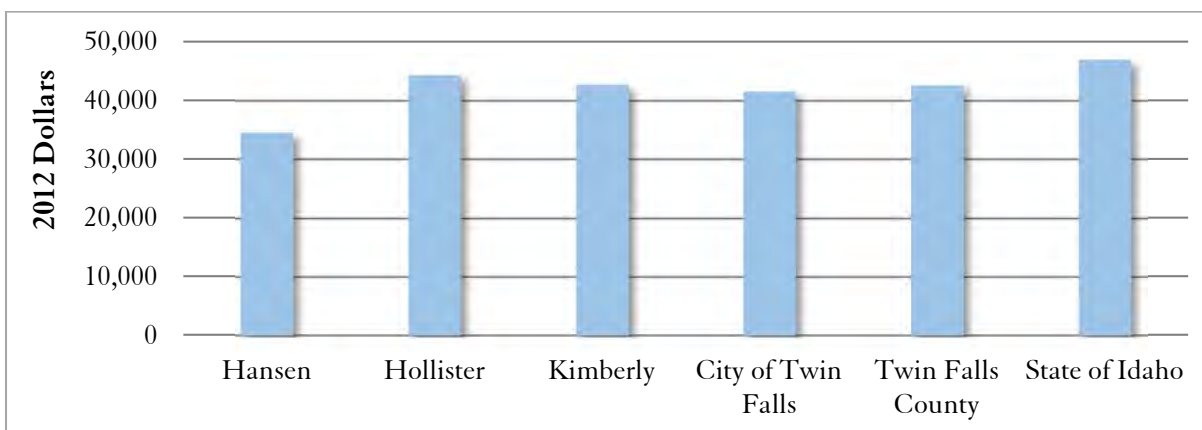
Table 5 shows per capita personal income for the State of Idaho and Twin Falls County. Twin Falls County per capita personal income is historically and currently slightly lower than the State of Idaho as a whole. County income decreased relative to State income between 1995 and 2000 but has steadily increased since then.

Table 5: Income Trends

Locality	Per Capita Personal Income					Average Annual Growth (2000-2010)
	1990	1995	2000	2005	2010	
State of Idaho	15,951	19,989	25,258	29,989	32,100	2.4%
Twin Falls County	15,373	19,095	22,926	28,332	30,280	2.8%

Source: U.S. Bureau of Economic Analysis

Figure 3 shows median household income in the study area in 2012 dollars. Hansen has the lowest median household income (\$34,565), while Hollister has the highest (\$44,375). Hollister has seen the largest change in recent years; in 1999 (cited in the 2004 Study), it had the lowest median household income in the study area. The other three cities have stayed consistent relative to Twin Falls County.



Source: 2008-2012 American Community Survey

Figure 3: 2012 Median Household Income

4.2 Travel Time Studies

A tour of the study area included travel time studies that analyzed the six route options identified in the 2004 Study (see Figure 4).

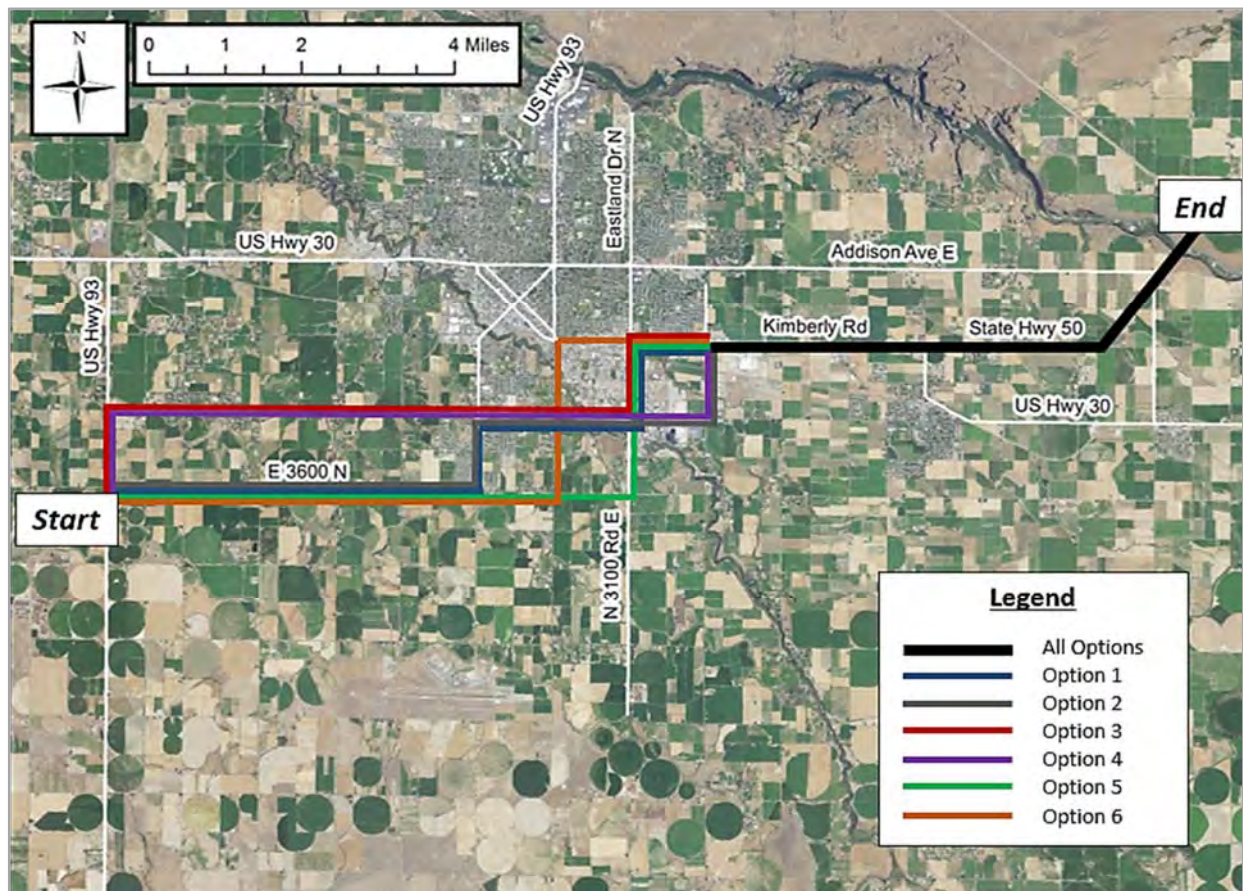


Figure 4: 2004 Truck Route Options

4.2.1 Methodology

Travel times were gathered in two sessions: one during an off-peak period and one during the PM Peak. The time of day for the peak period was determined by referencing data from Automatic Traffic Recorders on US-30 and US 93.

Off-peak travel times were measured between 9:00 pm and 11:00 pm on Monday, September 8, 2014. Travel times were recorded based on nearly continuous exercises for each of the six option routes. Some segments that were common to all or many of the options were performed independently to reduce the amount of time required to complete the study.

PM Peak travel times were measured between 4:00 pm and 6:00 pm on Tuesday, September 9, 2014 as individual segments (usually one mile sections from intersection to intersection). In this way the various options could be calculated by adding up the appropriate segments. This greatly reduced the amount of redundant trips and shortened data collection time.

Timings were recorded from the center of each intersection to account for time spent at traffic controls such as stop signs and signals. Travel times were collected with an application on an Android smartphone utilizing the GPS feature.

4.2.2 Results

Figure 5 shows off-peak and PM Peak route travel times for all six route options, including the black segment common to all options.

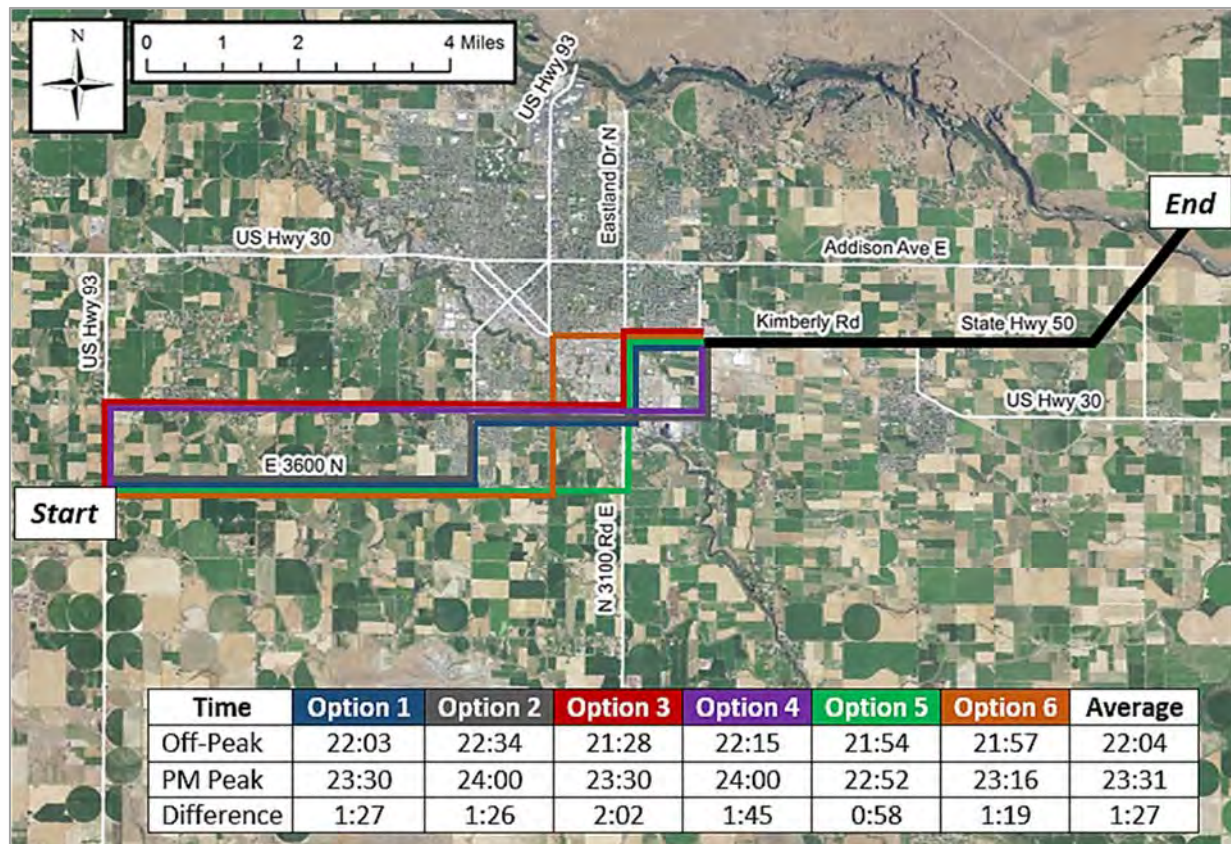


Figure 5: Truck Route Option Travel Times

The shortest travel time during off-peak was Option 3 at 21:28 minutes. The longest travel time during off-peak was Option 2 at 22:34 minutes. The average time of the six routes is 22:04 minutes. Less than a minute separates the fastest and slowest route, which indicates that all six options are more or less equal when traffic volumes are low.

The shortest travel time during the PM Peak was Option 5 at 22:52 minutes, which was the “Most Feasible Truck Route” identified in the 2004 Study. The longest travel times during the PM Peak were Options 2 and 4 at 24:00 minutes. The average PM Peak time of the six routes is 23:31 minutes. The fastest and slowest routes differ by just over one minute, indicating again that the routes are similar even at higher traffic volumes. With the exception of US 30 (Kimberly Rd.), PM Peak traffic volumes were well below capacity and vehicles could travel at free-flow speeds. Short queues and delays were experienced at some stop controlled intersections, which generally account for the difference between PM Peak and off-peak travel times. US 30 experienced the highest traffic volumes during the PM Peak but was below capacity conditions. Delays at signals were limited to one signal cycle, and congestion at the time of the study seemed minimal.

An additional exercise was conducted to test the effects of traffic signal coordination along US 30. The travel time developed for the eastbound direction of US 30 used the same process of adding segment times and was used in determining the average of the six options. However, a continuous travel time

exercise in the westbound direction resulted in a travel time of 25:11 minutes compared to 23:16 for eastbound. The difference of nearly two minutes can be attributed to catching a red light at Eastland Dr. and turning left at Blue Lakes Blvd., neither of which occurred during the eastbound exercise.

4.2.3 Summary

The travel time studies showed very little difference in travel times regardless of the route option for both the PM Peak and the off-peak exercises. The PM Peak travel times were approximately one and a half minutes longer on average than the off-peak travel times. PM Peak delays were generally associated with delays at intersections. Intersections on US 30 from Blue Lakes Blvd. to Eastland Dr. caused approximately two minutes of delay and accounted for the majority of delays.

4.3 Stakeholder Interviews

Keller Associates conducted interviews with regional transportation stakeholders in September and October 2014. Three audiences were interviewed, each with unique perspectives on the transportation system: public officials, commercial traffic generators, and truck drivers.

4.3.1 Public Official Interviews

Four telephone interviews were held with the following public officials representing transportation in the Twin Falls area.

- Jackie Fields – City Engineer for City of Twin Falls
- Scott Allen – Administrator for the Twin Falls Highway District
- Gary Young – Chairman of the Greater Twin Falls Area Transportation Committee
- Dave Burgess – Twin Falls Highway District Commissioner

Each official was asked five basic questions that helped guide and focus the corridor study. The questions and a summary of responses to each question are shown below.

Questions and Responses

Question 1: What are the significant Commercial Traffic Generators?

Responses:

- Suggestions were added to the list of potential Commercial Traffic Generator companies to be contacted and interviewed. See Section 4.3.2 for the list of companies that contributed to this study.

Question 2: What percentage of trucks traveling in southeast Twin Falls are bypass versus destination in your opinion?

Responses:

- Less than 50 percent
- 25 percent
- 25 percent
- 17 percent (referenced from a Twin Falls origin/destination study)

Question 3: What are congested intersections in the region?

Responses:

- Blue Lakes Blvd. and US 30 (Kimberly Rd.)
- Blue Lakes Blvd. and Orchard Dr.
- Eastland Dr. and US 30 (Kimberly Rd.)
- Eastland Dr. and Orchard Dr.
- Hankins Rd. and Orchard Dr.

Question 4: What intersections have safety issues?

Responses:

- Blue Lakes Blvd. and Orchard Dr. were mentioned by all four officials. One official mentioned "Many near misses..." at the intersection.

Question 5: Are you aware of any problem areas for trucks?

Responses:

- 2nd Ave. N and Shoshone St.
- Westbound on US 30 turning left onto Blue Lakes Blvd. or bearing right onto Main Ave.
- Southbound on Shoshone St. turning right at 6th Ave.
- Eastbound on US 30 turning right onto Hankins Rd.
- Narrow lanes at Blue Lakes Blvd. and Orchard Dr. intersection

4.3.2 Commercial Traffic Generators Interviews

A list of commercial traffic generators (trucking companies) in the Twin Falls area was provided by the Twin Falls Chamber of Commerce. This list was expanded by suggestions from local transportation officials during recent interviews as part of this study. A total of twelve commercial trucking companies were sent an email with five questions about their trucking operations. Two companies replied to the email and an additional six companies agreed to answer questions by phone. The following eight commercial traffic generators provided input for this study.

- Southern Idaho Solid Waste
- ConAgra Foods
- Transystems, LLC
- Hamilton Manufacturing, Inc.
- Gary Blick Trucking, Inc.
- K&T Steel Corp.
- Rush Truck Center
- Longview Fibre

Questions and Responses

The five questions included in the email and summaries of responses are shown below.

Question 1: What are your primary trucking destinations? (Include import origins as well as export destinations even if other companies than your own are used for transportation.)

Responses:

- Commercial destinations widely varied, ranging from local destinations in all directions to the west coast, Texas, Canada, and New York.
- Goods identified include sugar beets, milk, beans, yogurt, solid waste, steel, and food.

Question 2: What routes within the Southeast Twin Falls Region do your drivers use most frequently?

Responses:

- Primary route identified was US 93 Alternate Route (Pole Line Rd. from Blue Lakes Blvd. to US 93) and the US 93 connection to I-84.
- Also identified was US 30 from Buhl to Kimberly.
- Very few of the interviewed companies said they use 3600 N.

Question 3: What issues or concerns do your drivers have regarding the routes used? (i.e. safety, congestion, maneuverability, etc.) (Please indicate the location of the issue or concern.)

Responses:

- Most common concern - Too many traffic signals near base of operations.
- Railroad underpass on Eastland Dr. is too low for some trucks.
- New development and congestion on Washington St. north of Rock Creek.
- Tight left turn radius from 2nd Ave. E and Main Ave. onto Shoshone St.

Question 4: A previous study in 2004 identified “The Most Feasible Truck Route” from US 93 through the Southeast Twin Falls Region. The route is 3600 N to Eastland Drive to US 30 to SH 50 to I-84 over the Hansen Bridge. Do you think it would be appropriate to spend money to develop this route as a designated truck route southeast of Twin Falls? If not, why?

Responses:

- One of the eight responding companies said it would be a good investment of funds to improve the “Most Feasible Truck Route”.
- Two were unsure and said it would depend on time saved and number of users affected.
- Five thought there was no need to spend tax payers’ money on developing the corridor. One individual who lived on 3600 N did not want the development, noise, and congestion that would come with improvements.

Question 5: If “The Most Feasible Truck Route” or similar alternative were developed, how many trucks per day of your operations would use the improved route?

Responses:

- 170 trucks per day
- 20 to 40 trucks per day
- 7 to 8 trucks per day
- Less than one truck per day on average
- Others said they would not use the truck route because it was too far south.

4.3.3 Truck Driver Interviews

On September 18, 2014 Keller Associates employees were stationed on SH 50 (at the Garden of Eden truck stop) and US 93 (at the Hollister Port-of-Entry south of Twin Falls) to conduct interviews with commercial truck operators. Fifty-four (54) complete interviews were conducted at the Garden of Eden location and 51 were conducted at the Hollister Port-of-Entry. The five questions asked and a summary of responses are shown below.

Questions and Responses

Question 1: Do you intend to or did you bypass Twin Falls?

- ☐ Yes, if yes go to Question #3
- ☐ No

Question 2: What is your destination?

- ☐ Industrial location to the south of Twin Falls
- ☐ Commercial location within Twin Falls
- ☐ Some other location regional to Twin Falls

Responses:

Table 6: Truck Driver Destination Summary

Question 1	Question 2	On SH 50 (Garden of Eden)		On US 93 (Hollister Port-of-Entry)	
		# of responses	percentage of total	# of responses	percentage of total
Bypass		24	43%	42	82%
Non-bypass	South of TF (Industrial)	10	19%	0	0%
	Within TF (Commercial)	10	19%	9	18%
	Regional to TF (Other)	10	19%	0	0%
Total		54	100%	51	100%

Question 3: What was or will be your route to or around Twin Falls?

Responses:

- SH 50 location:
 - Routes widely varied
 - Most used was I-84 to US 93 to Blue Lakes Blvd. to US 30 to SH 50 to I-84.
- US 93 location:
 - By far the most used route was US 93 to Pole Line Rd. to Blue Lakes Blvd. over the Perrine Bridge to I-84.

Question 4: Are you aware of any maneuvering problems for trucks in the area south of Twin Falls?

Responses:

- SH 50 location:
 - Eastland Dr. railroad underpass has low clearance and floods occasionally
 - Tight left turn from westbound 2nd Ave. E onto Shoshone St. Most used was I-84 to US 93 to Blue Lakes Blvd. to US 30 to SH 50 to I-84.
- US 93 location:
 - Blue Lakes Blvd. and US 30 (Kimberly Rd.) intersection

Question 5: Is a dedicated truck route needed southeast of Twin Falls that would connect US 93 to SH 50/I-84?

- ☐ Yes
- ☐ No

Responses:

- SH 50 location:
 - 33 “Yes” responses (72 percent)
 - 13 “No” responses (28 percent)
- US 93 location:
 - 36 “Yes” responses (75 percent)
 - 12 “No” responses (25 percent)

4.4 Existing Conditions Summary

The existing conditions investigations revealed the following information.

Population and Employment Characteristics

Twin Falls and the surrounding region has seen accelerated growth since 2000.

Travel Time Studies

Travel times through southeast Twin Falls do not vary significantly by route. This shows that there is no clear and direct route through the region, which could show a need for a more direct route. The most congested area was on US 30 from the Eastland Dr. intersection to the Blue Lakes Blvd. intersection.

Stakeholder Interviews

The majority of trucks on US 93 bypass Twin Falls; US 93 Alt (Pole Line Rd.) is by far their favored route. There are relatively fewer bypass trucks on SH 50; instead, more trucks travel to or from Twin Falls and the surrounding region.

Seventy-three (73) percent of interviewed truck drivers said they would use a southeast alternate route if it were constructed. However, only one of eight interviewed trucking company officials thought a southeast alternate route would be worth the cost. These results suggest there is a need for a southeast alternate route, but the need may not be strong enough to justify the cost.

Stakeholders identified the following potential safety or capacity improvement locations:

- Blue Lakes Blvd. and US 30 (Kimberly Rd.)
- Blue Lakes Blvd. and Orchard Dr.
- Eastland Dr. and US 30 (Kimberly Rd.)
- Eastland Dr. and Orchard Dr.
- Hankins Rd. and Orchard Dr.
- 2nd Ave. N and Shoshone St.
- Eastland Dr. railroad underpass
- 6th Ave. and Shoshone St.

5 Safety Improvements

This section of the report details the development of transportation safety improvement projects as requested by ITD and the GTFATC. Projects were primarily chosen via an analysis of recent crash trends discussed in this chapter.

5.1 Crash Data

Regional 5-year crash histories were collected from the Local Highway Technical Assistance Council (LHTAC) to identify roadways and intersections in need of safety improvements. Figure 6 shows a map of Fatal and A-Injury (serious injury) crashes from 2009 to 2013 in Twin Falls and the surrounding region.

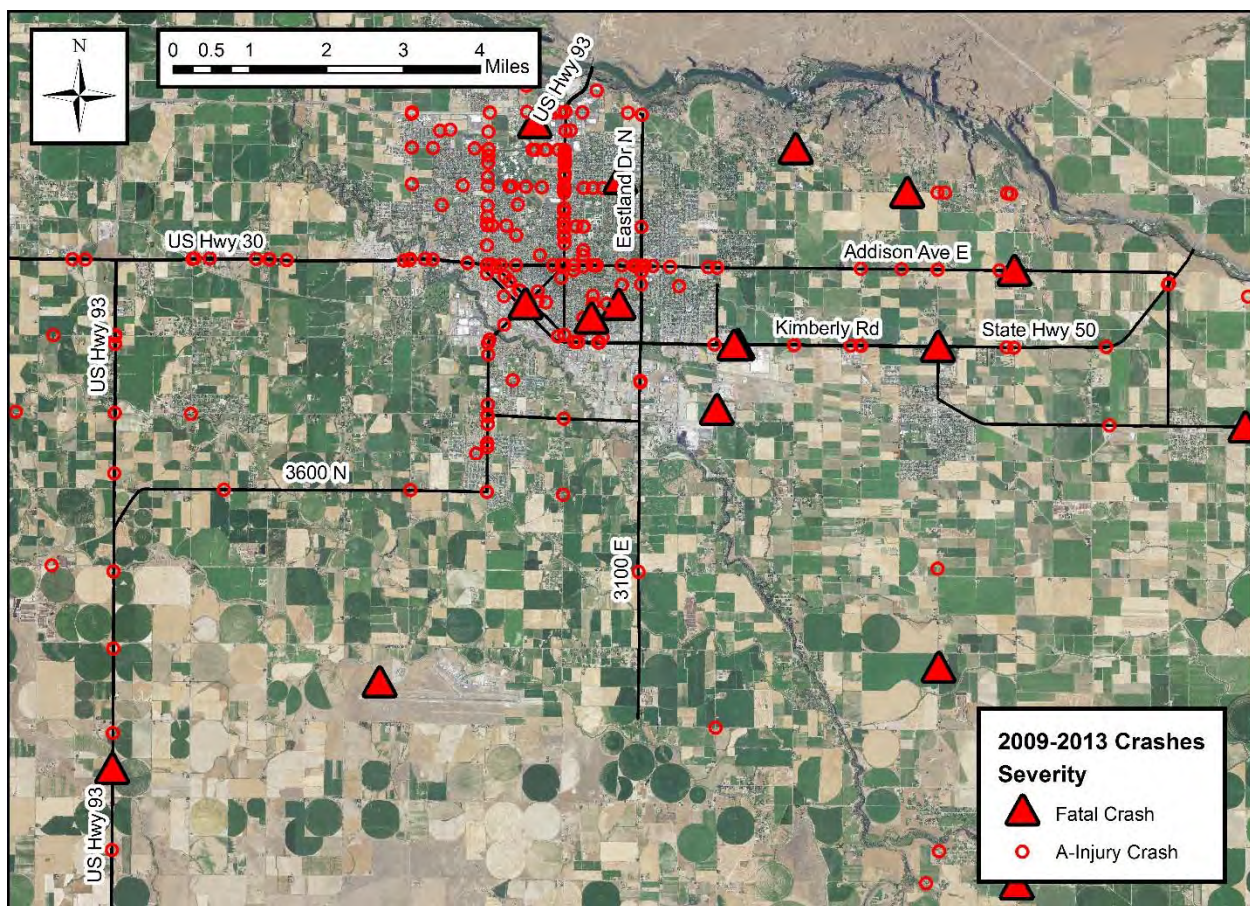


Figure 6: 2009 – 2013 Fatal and A-Injury Crashes

5.2 Crash Hot Spots

Examination of the crash data revealed six intersections and one highway segment with either crash clusters or severe crashes within the study area. Table 7 shows the locations and their crash totals.

Table 7: Summary of Crash Hot Spots

Location	Type	2009-2013 Crash History		
		Fatal	A-injury	All Severities
US 93 (Nevada border to SH 74)	Segment	5	15	179
US 93 and 2900 N (North of Hollister)	Intersection	1		2
US 30 and 3400 E	Intersection		3	12
US 30 and 3300 E	Intersection		1	7
SH 50 and 3800 E	Intersection		4	13
US 30 and Locust St	Intersection			9
SH 74 (Washington St) and Orchard Dr	Intersection		3	8

5.3 Prioritized Safety Projects

Safety projects shown in Table 8 were developed for each of the crash hot spot locations. Table 8 updates Table 12-1 from the 2004 Study. See Section 5.3.3 for project summary sheets and Appendix A for cost estimate sheets. Costs and benefits were estimated and a benefit/cost ratio was calculated for each project. Projects are prioritized by highest to lowest benefit/cost ratio.

Table 8: Prioritized Safety Projects

Priority	Key Number	Location	Project Description	Benefit/Cost Ratio	Estimated Cost
1	S-1a	US 93 (MP 0.0 to MP 38.05)	<i>Short-Term:</i> Restripes and installs rumble strips on centerline. Improvements should reduce the frequency of “failure to maintain lane” crashes.	44.5	\$101,000
2	I-1	US 93 and 2900 N (North of Hollister)	Adds northbound and southbound left turn lanes. Increases US 93 shoulder width from 3’ to 6’. Installs advanced intersection warning signs with flashing amber beacons on northbound and southbound approaches.	43.6	\$281,000
3	I-4	US 30 (Kimberly Rd) and 3400 E	Relocates “Stop Ahead” signs and installs flashing amber beacons on northbound and southbound 3400 E.	25.0	\$16,000
4	I-3	US 30 (Kimberly Rd) and 3300 E	Installs eastbound and westbound left turn lanes. Relocates “Stop Ahead” signs and installs flashing amber beacons on northbound and southbound 3300 E.	5.1	\$234,000

Priority	Key Number	Location	Project Description	Benefit/Cost Ratio	Estimated Cost
5	I-6	SH 50 and 3800 E	Realigns 3800 E to intersect SH 50 at a right angle. Shifts 3800 E (between SH 50 and Addison Ave) west 300 feet. Converts Addison Ave (between SH 50 and 3800 E) to a one-way westbound road. Installs traffic signal at the realigned SH 50 and 3800 E intersection.	2.8	\$955,000
6	I-5	US 30 (Kimberly Rd) and Locust St	Installs left turn signal heads on all approaches to allow protected left turn phasing.	2.0	\$69,000
7	S-1b	US 93 (MP 0.0 to MP 38.05)	<i>Long-Term:</i> Restripes and installs rumble strips on foglines. Increases shoulder width from 3' to 6'. Improvements should reduce the frequency of "failure to maintain lane" crashes.	1.9	\$11,395,000
8	I-2	SH 74 (Washington St) and 3700 N (Orchard Dr)	First traffic signal when approaching Twin Falls from the southwest. Installs an advanced warning signal on the south leg of the intersection.	1.6	\$26,000

5.3.1 Cost Estimation Methodology

Quantifying costs of projects is fairly straightforward and involves summing construction, engineering, and right-of-way acquisition estimates. The total cost was divided by the useful life of the project to calculate cost per year for use in benefit-cost ratios. See Appendix A for cost estimation spreadsheets for each project.

5.3.2 Benefit Estimation Methodology

Quantifying benefits is more complicated. Keller Associates used the following method for quantifying benefits (in units of cost per year) of each safety project:

Step 1 - Determine the number and types of crashes prevented by the project per year

The number of crashes per year prevented by an improvement was calculated by multiplying the average number of crashes per year at the location by an appropriate Crash Modification Factor (CMF) from the Highway Safety Manual (HSM). For example, a CMF of 0.82 implies an improvement reduces crash frequency by 18 percent.

Step 2 - Assign a value to each crash prevented

Standardized values are available for each crash severity type (Fatal, A-Injury, B-Injury, C-Injury, and Property Damage). These values were multiplied by the number of prevented crashes calculated in Step 1 above.

Step 3 - Sum the values of all prevented crashes

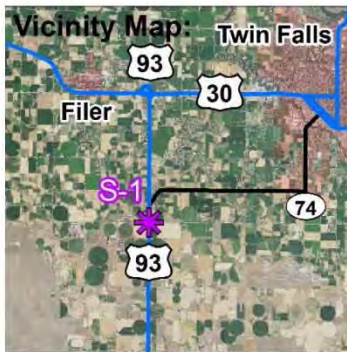
Sum the values for each severity type and improvement calculated in Step 2 for a total cost savings attributed to the project.

5.3.3 Project Summary Sheets

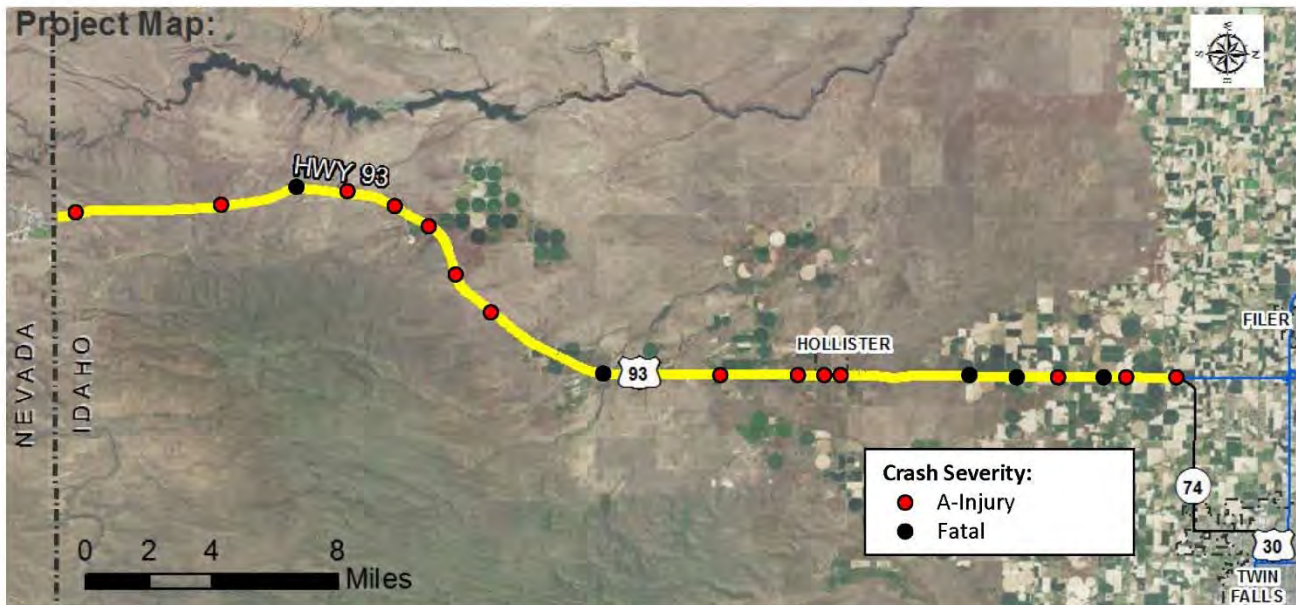
The summary sheets (beginning on the next page) detail the following information for each safety project:

- Location
- Safety Issues
- Conclusion (why improvements are needed)
- Recommended Improvements
- Traffic Data
- Cost Estimate Summary

SAFETY PRIORITY #1



Safety Project:			Key No.
US 93 (MP 0.0 to MP 38.05)			S – 1a
Route:	County	City (nearest)	District
US 93	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
0.00	38.05	38.05	
Location Notes:			
Segment of US 93 from MP 0.0 to MP 38.05			



Safety Issues:

- Total of 179 crashes related to this segment.
- Four fatal crashes involving run-off-the-road or crossed left of centerline head-on.
- Twelve injury A crashes, 26 injury B crashes, 22 injury C crashes, and 76 property damage only crashes of similar type as above.
- 60/65 mph speed limit.
- Narrow 3' shoulders.
- No rumble strips
- Many impaired driver related crashes.

Conclusion:

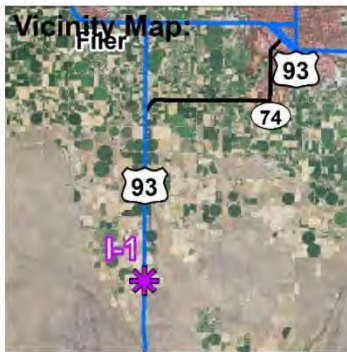
There are a large number of "Failure to maintain lane" type crashes. Many caused by or contributed by impaired drivers going to or coming from Jackpot, NV. The roadway has a fairly narrow shoulder and is characterized by long straight sections between gentle curves. Drivers become inattentive and depart from their lane often resulting in head-on collisions.

Option A: Recommended Short-Term Improvements

1. Install rumble strips on centerline.
2. Restripe centerline.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$14,000
Total:	179	Right-of-Way	\$00
Fatal & "A":	20	Construction	\$87,000
US 30 ADT:	4300	Total Estimated Cost	\$101,000
		Benefit/Cost Ratio:	44.50

SAFETY PRIORITY #2



Safety Project:			Key No.
US 93 & 2900 N (North of Hollister)			I – 1
Route:	County	City (nearest)	District
US 93	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
31.485		0.1	
Location Notes:			
Intersection of US 93 and 2900 N. north of Hollister			



Safety Issues:

- Total of two crashes related to intersection.
- One fatal head-on crash caused by failure to yield by driver on southbound US 93 turning left.
- One Injury B angle crash caused by northbound motorist going straight. No contributing circumstances mentioned.
- No intersection warning signs exist in either direction.
- Large heavy vehicle volume.
- 60 mph speed limit.
- Narrow 3' shoulders.

Conclusion:

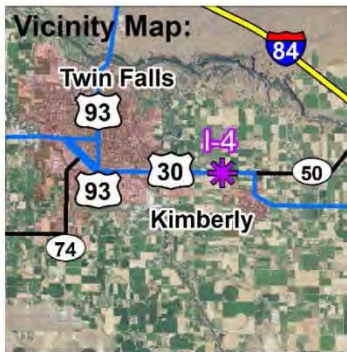
No warning of intersection may have contributed to northbound motorist not expecting on-coming traffic to turn. High commercial vehicle volume and lack of left turn lane may have pressured southbound motorist to fail to yield.

Recommended Improvements:

1. 14' wide left turn lanes should be added to both northbound and southbound US 93.
2. Shoulder width should be increased from 3' to 6' within project limits.
3. Other improvements include installing an advanced intersection warning sign with solar powered flashing amber beacons.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$40,000
Total:	2	Right-of-Way	\$23,000
Fatal & "A":	1	Construction	\$218,000
US 30 ADT:	3900	Total Estimated Cost	\$281,000
2900 N. Rd. ADT	low	Benefit/Cost Ratio:	43.63 (combined)

SAFETY PRIORITY #3



Safety Project:			Key No.
US 30 (Kimberly Rd) & 3400 East			I – 4
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
222.505		0.1	
Location Notes:			
Intersection of US 30 and 3400 E. near Layne Pump			



Safety Issues:

- Total of twelve crashes related to intersection.
- All crashes but one occurred prior to new left turn lanes on US 30.
- Six angle crashes caused by failure to yield by motorists on southbound or northbound 3400 E. Rd.
- One rear-end crash in eastbound direction of US 30 involving vehicle following too close.
- Slightly elevated, high volume, high speed four lane highway could be deceiving for traffic judging distances especially when stopped for long periods waiting for a gap.
- "Stop Ahead" signs on 3400 E Road may be too far away from intersection.

Conclusion:

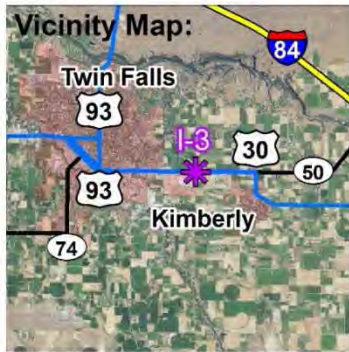
It is unknown if angle crash motorists were aware of the need to stop or entered the intersection without stopping. Nevertheless, increased awareness could reduce crashes of motorists approaching the stop condition.

Recommended Improvements:

1. Relocate "Stop Ahead" advanced warning signs and install solar powered flashing amber beacons on 3400 E. in both northbound and southbound directions.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$3,000
Total:	12	Right-of-Way	\$00
Fatal & "A":	3	Construction	\$13,000
US 30 ADT:	10000	Total Estimated Cost	\$16,000
3400 Rd. ADT	low	Benefit/Cost Ratio:	24.99

SAFETY PRIORITY #4



Safety Project:			Key No.
US 30 (Kimberly Rd) & 3300 East			I – 3
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
221.636		0.1	
Location Notes:			
Just east of Chobani, intersection of US 30 and Champlin Road			



Safety Issues:

- Total of seven crashes related to intersection.
- Four angle crashes caused by failure to yield by motorists on southbound or northbound 3300 E. Rd.
- Two rear-end crashes in westbound or eastbound direction of US 30 caused by following too close and slowing to turn.
- No intersection warning signs exist in either direction on US 30.
- A four foot wide painted median exists between two through lanes in each direction.
- No turn lanes providing refuge for left turning traffic.
- Slightly elevated high volume four lane highway could be deceiving for traffic judging distances especially when stopped for long periods waiting for a gap.
- "Stop Ahead" signs on 3300 E Road may be too far away from intersection.

Conclusion:

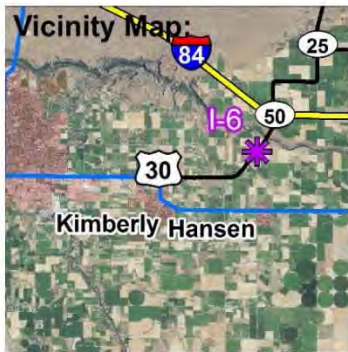
It is unknown if angle crash motorists were aware of the need to stop or entered the intersection without stopping. Nevertheless, increased awareness could reduce crashes of motorists approaching the stop condition. Rear-end crashes could be significantly reduced by providing a refuge out of the flow of traffic for turning motorists.

Recommended Improvements:

1. Construct left turn lanes for both eastbound and westbound traffic on US 30. This intersection is located between a center turn lane section in front of Chobani and a new left turn lane constructed for 3400 E. Road. Consideration should be given to extending the center turn lane through to 3400 E. This would provide a refuge for turning traffic onto US 30.
2. Relocate "Stop Ahead" advanced warning signs and install solar powered flashing amber beacons on 3300 E.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$30,000
Total:	7	Right-of-Way	\$57,000
Fatal & "A":	2	Construction	\$147,000
US 30 ADT:	10500	Total Estimated Cost	\$234,000
3300 E Road	low	Benefit/Cost Ratio:	5.11 (combined)

SAFETY PRIORITY #5



Safety Project:			Key No.
SH 50 & 3800 East			I – 6
Route:	County	City (nearest)	District
US 30	Twin Falls	Kimberly	4
Beginning Milepost	Ending Milepost	Length (miles)	
3.382		0.1	
Location Notes:			
South of Hansen Bridge, intersection of SH 50 and 3800 E			



Safety Issues:

- Total of thirteen crashes related to intersection.
- Seven angle crashes caused by failure to yield by motorists on northbound 3800 E. Rd.
- Four angle crashes by eastbound SH 50 motorists.
- One rear-end crash in northbound direction of 3800 E. Rd involving vehicle stopped in traffic.
- One head-on crash by westbound SH 50 motorist turning left cause by failure to yield.
- No intersection warning signs exist in either direction on SH 50.
- Intersection is skewed 50 degrees; AASHTO recommends skew should not exceed 30 degrees.
- A center turn lane exists and an eastbound acceleration lane was recently installed.
- Speed limit is 65 mph.

Conclusion:

Many crashes are associated with northbound through movements. The skewed intersection and high speed on SH 50 may contribute to the safety issues at this location.

Recommended Improvements:

1. Close the north leg of existing SH 50 and 3800 E intersection. Realign 3800 E to intersect SH 50 at a right angle. Reconstruct 3800 E to the west of its current location to connect with Addison Ave as shown above. Convert Addison Ave to a one-way road between SH 50 and the existing 3800 E as shown above.
2. Install traffic signal at SH 50 and 3800 E intersection.
3. Install advanced intersection warning signs with solar powered flashing amber beacons in both eastbound and westbound directions on SH 50.

Traffic Data:

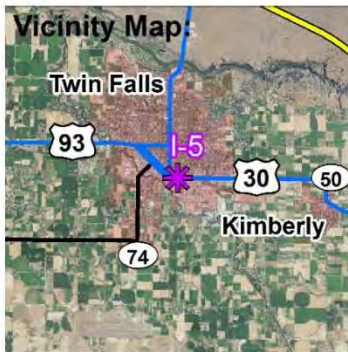
5-year Crash Summary

Total:	13
Fatal & "A":	4
US 30 ADT:	5800
3800 E. Rd. ADT	low

Cost Estimate:

Preliminary Engineering	\$110,000
Right-of-Way	\$113,000
Construction	\$732,000
Total Estimated Cost	\$955,000
Benefit/Cost Ratio:	2.75 (combined)

SAFETY PRIORITY #6



Safety Project:

Key No.

US 30 (Kimberly Rd) & Locust Street

I – 5

Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost		Length (miles)
218.889			0.1
Location Notes:			
Intersection of US 30 and Locust Street east of Five-points South			



Safety Issues:

- Total of nine crashes related to intersection.
- Three angle crashes caused by failure to obey signal by motorists on eastbound or westbound US 30.
- Two westbound head-on turning crashes by motorists that failed to yield turning left.

Conclusion:

The traffic signal is two-phase without protected left turn phases. Adding a protected left turn phase for eastbound and westbound traffic may reduce head-on crashes. If adding a signal phase is undesirable due to increased congestion, the added signal head with a flashing yellow arrow for the permissive left may give additional information to motorists and reduce crashes.

Recommended Improvements:

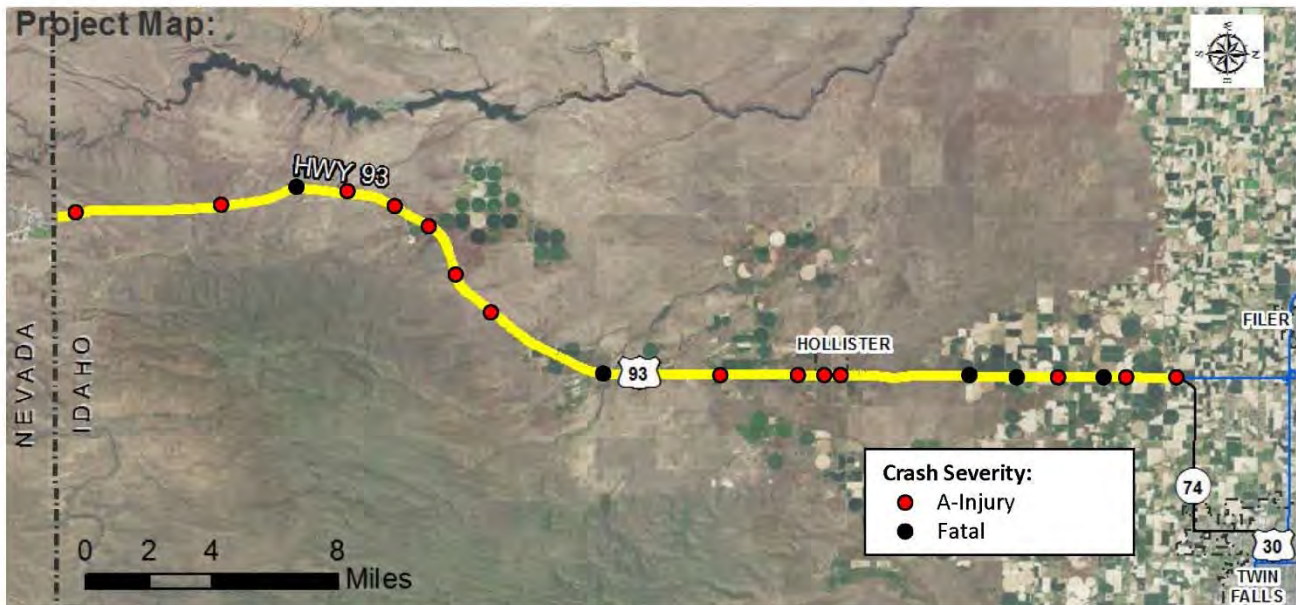
1. Install additional traffic signal heads for left turn lanes on all approaches. Signal heads can be used to add protected left turn phases or flashing yellow arrow to remind motorists of permissive movement.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$9,000
Total:	9	Right-of-Way	\$00
Fatal & "A":	0	Construction	\$60,000
US 30 ADT:	20000	Total Estimated Cost	\$69,000
Locust St. ADT	low	Benefit/Cost Ratio:	2.03

SAFETY PRIORITY #7



Safety Project:			Key No.
US 93 (MP 0.0 to MP 38.05)			S – 1b
Route:	County	City (nearest)	District
US 93	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
0.00	38.05	38.05	
Location Notes:			
Segment of US 93 from MP 0.0 to MP 38.05			



Safety Issues:

- Total of 179 crashes related to this segment.
- Four fatal crashes involving run-off-the-road or crossed left of centerline head-on.
- Twelve injury A crashes, 26 injury B crashes, 22 injury C crashes, and 76 property damage only crashes of similar type as above.
- 60/65 mph speed limit.
- Narrow 3' shoulders.
- No rumble strips
- Many impaired driver related crashes.

Conclusion:

There are a large number of "Failure to maintain lane" type crashes. Many caused by or contributed by impaired drivers going to or coming from Jackpot, NV. The roadway has a fairly narrow shoulder and is characterized by long straight sections between gentle curves. Drivers become inattentive and depart from their lane often resulting in head-on collisions.

Option B: Recommended Long-Term Improvements

1. Install rumble strips on foglines.
2. Restripe foglines.
3. Increase shoulder width from 3' to 6'.

Traffic Data:

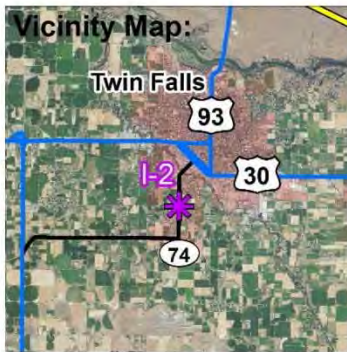
5-year Crash Summary

Total:	179
Fatal & "A":	20
US 30 ADT:	4300

Cost Estimate:

Preliminary Engineering	\$953,000
Right-of-Way	\$915,000
Construction	\$9,527,000
Total Estimated Cost	\$11,395,000
Benefit/Cost Ratio:	1.92

SAFETY PRIORITY #8



Safety Project:			Key No.
SH 74 (Washington) & 3700 North (Orchard)			I – 2
Route:	County	City (nearest)	District
SH 74	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
6.116		0.1	
Location Notes:			
Newly signalized intersection of Washington St. and Orchard Dr.			



Safety Issues:

- Total of eight crashes related to intersection.
- All crashes since the signal installation have been in northbound or southbound direction with exception of a westbound alcohol impaired crash.
- Two of eight crashes occurred before traffic signal installation.
- Four angle crashes caused by failure to yield, inattention, or failure to obey signal.
- Rear-end crash in southbound direction on SH 74 involving vehicle following too close and/or inattention.
- Same direction turning crash caused by southbound motorist turning right.
- No intersection warning signs exist in either direction on SH 74 that was the major leg of the previous two-way stop controlled intersection.

Conclusion:

New signal installation may surprise motorists that are used to free flow traffic on SH 74 at this location. New traffic signal is the first signal on SH 74 as motorists enter Twin Falls.

Recommended Improvements:

1. A signal coordinated solar powered advanced warning beacon and sign will give approaching motorists early indication that they will be required to stop as the signal is about to change to red.

Traffic Data:		Cost Estimate:	
5-year Crash Summary		Preliminary Engineering	\$5,000
Total:	8	Right-of-Way	\$00
Fatal & "A":	3	Construction	\$21,000
SH 74 ADT:	10000	Total Estimated Cost	\$26,000
Orchard Dr. ADT	low	Benefit/Cost Ratio:	1.63

6 Capacity Improvements

This section of the report details the development of traffic capacity improvement projects. Capacity issues were identified via level of service (LOS) analyses (discussed in this chapter) and stakeholder interviews (discussed in Section 4.3) and subsequently developed into projects.

6.1 Data Collection

Level of service analyses required collection of turning movement counts, existing signal timing parameters, and roadway geometry and design information.

6.1.1 Turning Movement Counts

Turning movement counts were obtained for sixteen key intersections located along the truck route options identified in the 2004 Study. The six route options are shown in Figure 4 on page 13.

Table 9 shows a list of counted intersections, the source of the count, and intersection control. The counts were provided by the Idaho Transportation Department (ITD), Twin Falls County, and the City of Twin Falls. All counts were collected in 15-minute increments and included heavy vehicles. The City and County collected data during suspected truck peak periods via tally sheet; ITD collected data over a 24-hour period using Miovision video counters. The 24-hour counts were used to identify daily traffic trends and peak hours in the region (see Section 6.1.3).

Table 9: Turning Movement Count Intersections

Intersection	Data Source	Control	Time Period
Blue Lakes and US 30 (S. 5-points)	ITD	Signal	24 hour
Eastland Dr and US 30	ITD	Signal	24 hour
Hankins Rd and US 30	ITD	Signal	24 hour
3000 E and 3600 N	County	TWSC	4:00-6:00 PM
3100 E and 3600 N	County	TWSC	4:00-6:00 PM
Orchard Dr and Blue Lakes Blvd	City	TWSC	12:00-2:00 PM
Orchard Dr and Eastland Dr	City	AWSC	12:00-2:00 PM
Orchard Dr and Washington St	City	Signal	12:00-2:00 PM
SH 50 and Addison Ave	County	TWSC	4:00-6:00 PM
SH 50 and 3800 E	County	TWSC	4:00-6:00 PM
Washington St and 3600 N	ITD	TWSC	24 hour
Shoshone St and 2nd Ave N	ITD	Signal	24 hour
Shoshone St and 2nd Ave S	ITD	Signal	24 hour
Shoshone St and 6th Ave W	City	Signal	9:00-11:00 AM
US 30 and SH 50	ITD	Signal	24 hour
US 93 and 3700 N	County	TWSC	11:00 AM-1:00 PM

TWSC = Two-Way Stop Control; AWSC = All-Way Stop Control

6.1.2 Existing ADT

Average daily traffic (ADT) was determined using the supplied counts. Figure 7 shows ADT through the SE Twin Falls corridor and gives a sense of the traffic distribution. As observed in the travel time studies (Section 4.2), the highest volume segment in the corridor is on US 30 between Eastland Dr. and Blue Lakes Blvd. Conversely, the lowest volumes are seen along 3600 N (SH 74) and 3700 N (Orchard Dr.) south of Twin Falls.

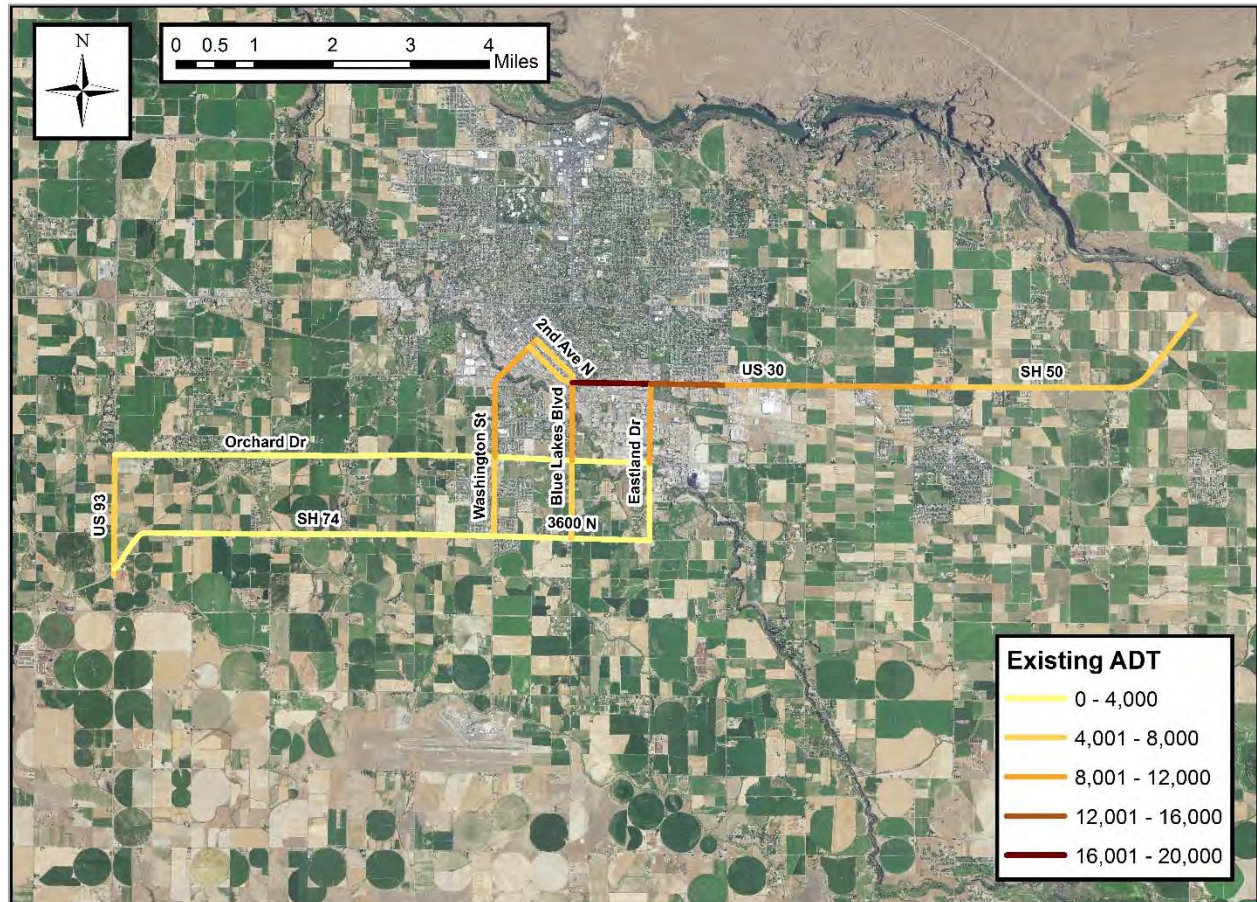


Figure 7: ADT through SE Twin Falls Corridor

6.1.3 Peak Hour Determination

The 24 hour traffic counts were examined to determine daily traffic trends and peak hours to be analyzed. Figure 8 shows the hourly volumes for each ITD-counted intersection. The dashed black line is the sum of all seven intersection volumes per hour and is displayed on a second y-axis on the right side of the figure. Four peak hour periods are visible: an AM peak hour around 8:00 AM, a lunch hour peak around noon, an afterschool peak around 3:30 PM, and a PM peak hour around 5:00 PM.

Intersections with 24 hour counts were analyzed during the PM peak hour, which experiences the highest traffic volumes and most congestion².

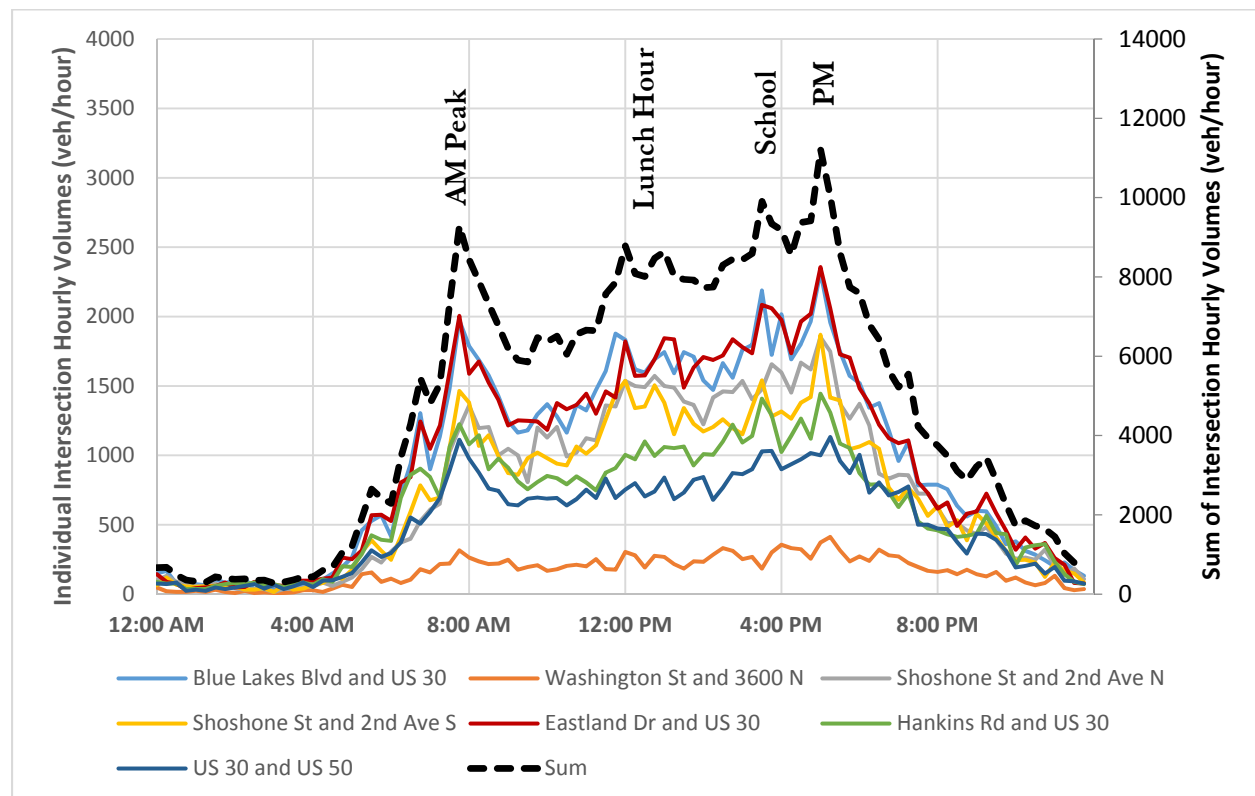


Figure 8: ITD Intersection Hourly Volumes

6.1.4 Signal Timing Parameters

Current signal timings were provided by ITD and the City of Twin Falls for the signalized intersections shown in Table 9.

6.1.5 Roadway Geometry and Design Information

Keller Associates determined lane configurations, speed limits, lane widths, shoulder widths, turn bay lengths, no passing zones lengths, and access densities used in LOS analyses via Google Earth.

² The AM and PM peak hours are the most distinct and were initially the focus of LOS analyses. However, AM peak hour LOS analyses were removed from the scope. PM peak hour conditions were found to control design, as PM peak LOS ratings were equal to or worse than AM peak in all cases.

6.2 LOS Analyses

Level of service analyses were conducted on the sixteen counted intersections listed in Table 9 and the eighteen arterials connecting them. The Highway Capacity Manual methodology and the HCS 2010 software were used for all analyses.

Both existing (2014) and projected future (2040) conditions were analyzed. The existing condition features existing geometries and existing traffic volumes from collected counts discussed in Section 6.1.1. The projected future condition features existing geometries but with projected traffic volumes in 2040.

For an overview of the LOS analysis results, Figure 9 and Figure 10 show 2014 and projected 2040 (respectively) LOS ratings of all analyzed intersections and arterials. Detailed HCS output sheets are included in the Appendix B.

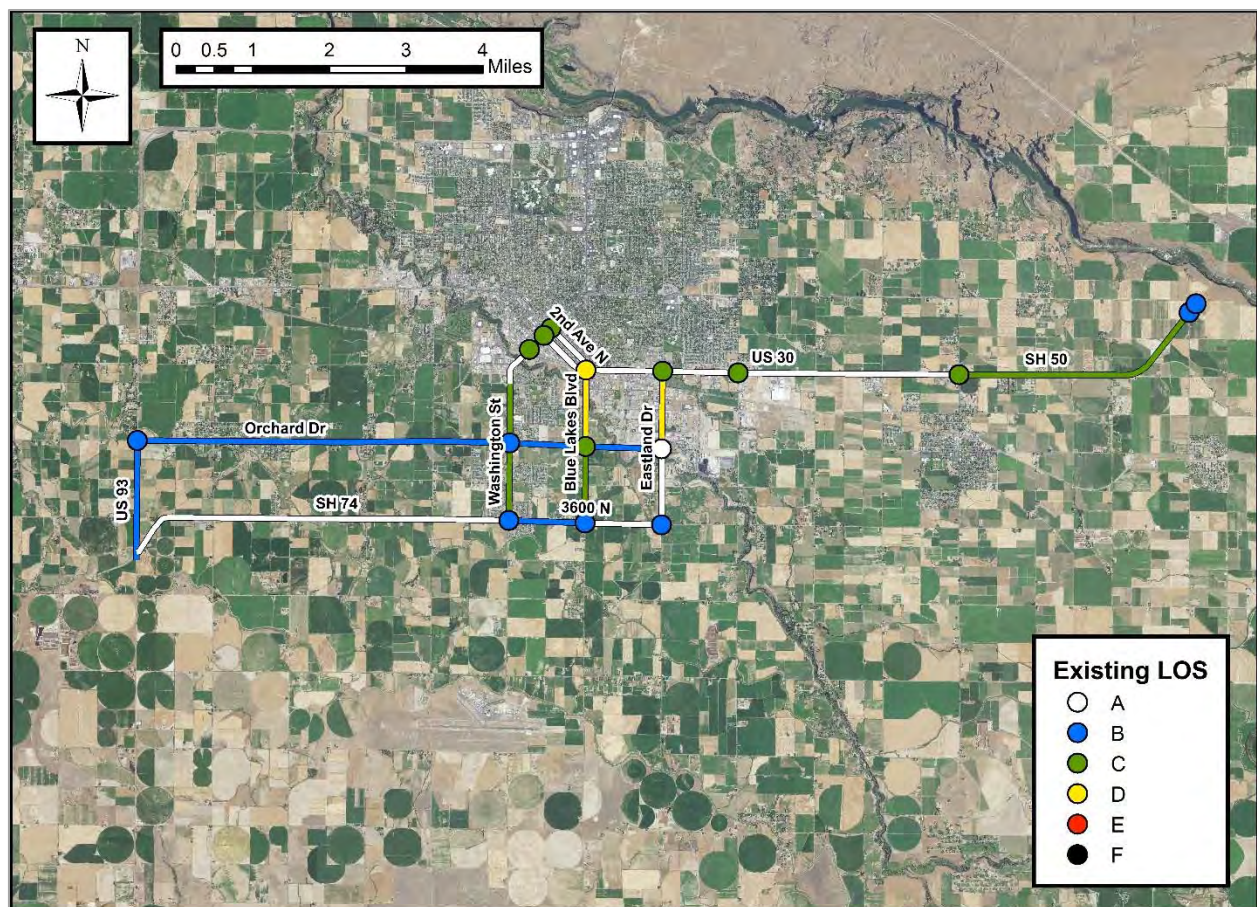


Figure 9: Existing (2014) LOS

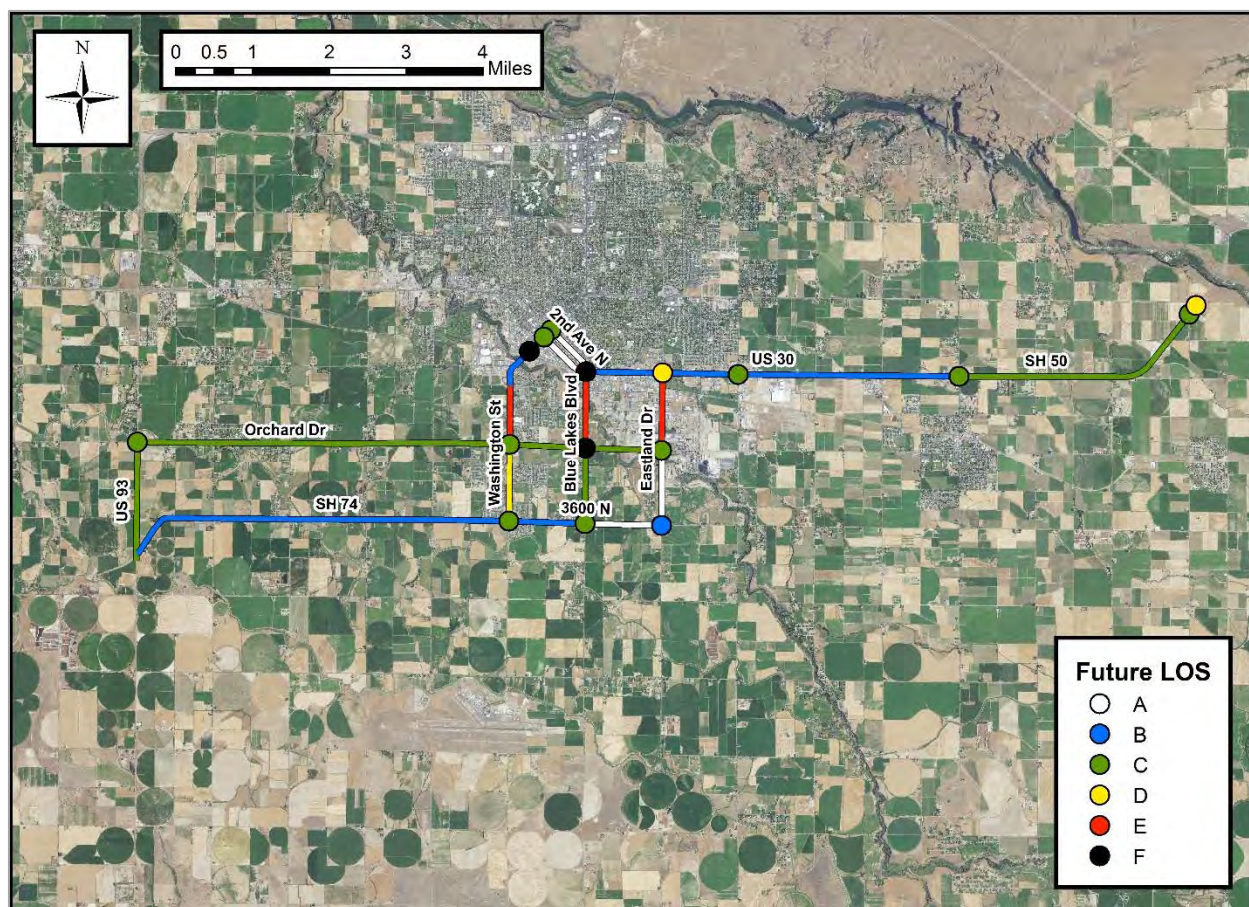


Figure 10: Future (2040) LOS

6.2.1 Projected Growth Factors

The 2040 traffic volumes were projected using a uniform growth factor of 1.74, applied to all 2014 segment and intersection movement volumes. The growth factor was calculated assuming an average annual growth rate of 2.15 percent per year between 2014 and 2040. The 2.15 percent rate was the average annual population growth rate of Twin Falls from 1990 to 2013. There was assumed to be a 1:1 increase in traffic volume for increases in population.

In the projected future (2040) analyses, PM peak hour flow rates were estimated at locations without a 2014 PM count. A unique growth factor (in addition to the 2014 to 2040 growth factor) was applied uniformly to all movements/directions at each location. The growth factors (ranging from 1.22 to 1.59) were referenced from daily traffic trends at nearby 24 hour count intersections. The resulting LOS ratings are marked with an asterisk (*) in Table 11 and Table 12.

6.2.2 Level of Service Categories

Table 10 shows the criteria and a description for each LOS category.

Table 10: Intersection and Highway Level of Service Criteria

LOS	Description	Intersection Criteria		Highway Criteria		
		Signalized	TWSC & AWSC	Multi-lane	Two-lane Class II ³	Two-lane Class III ⁴
		Delay (sec)	Delay (sec)	Density ⁵ (pc/mi/ln)	PTSF ⁶ (percent)	PFFS ⁷ (percent)
A	Free flow	≤ 10	≤ 10	> 0-11	≤ 40	> 91.7
B	Reasonably free flowing	> 10-20	> 10-15	> 11-18	> 40-55	> 83.3-91.7
C	Stable flow	> 20-35	> 15-25	> 18-26	> 55-70	> 75.0-83.3
D	Approaching unstable flow	> 35-55	> 25-35	> 26-35	> 70-85	> 66.7-75.0
E	Unstable flow (at capacity)	> 55-80	> 35-50	> 35-45	> 85	≤ 66.7
F	Forced or breakdown flow	> 80	> 50	> 45 or $v/c^8 > 1$	$v/c^8 > 1$	

LOS A through C represent acceptable traffic flow. LOS D represents traffic flow approaching capacity, with longer delays and queues; LOS D is usually considered an acceptable minimum in urban environments. LOS E and LOS F represent roadways at or over capacity, respectively, and indicate a need for improvement.

In this study, the following LOS ratings (highlighted in orange in Table 11 and Table 12) were considered to indicate a need for improvement:

Intersections - Multiple movements at LOS D, or one movement at LOS E or F

Segments - LOS E or F in either direction

³ Two-lane highways serving rugged rural areas

⁴ Two-lane highways serving moderately developed areas

⁵ Passenger car equivalents, per mile, per lane.

⁶ Percent Time Spent Following

⁷ Percent Free-Flow Speed

⁸ Volume-to-capacity ratio

6.2.3 Intersections

Table 11 shows “worst movement” LOS (turning movement with lowest LOS) and design hour for all sixteen evaluated intersections under both 2014 and projected 2040 traffic volumes.

Table 11: Intersection LOS

Intersection	Existing (2014)			Future (2040)		
	Hour	LOS	Worst Movement	Hour	LOS	Worst Movement
Blue Lakes Blvd and US 30	PM	D	WB left	PM	F	WB left
Eastland Dr and US 30	PM	C	NB through	PM	D	NB through
Hankins Rd and US 30	PM	C	NB through	PM	C	NB through
3000 E and 3600 N	PM	B	EB through	PM	C	EB through
3100 E and 3600 N	PM	B	EB through	PM	B	EB through
Orchard Dr and Blue Lakes	Mid-day	C	EB left	PM*	F	EB left
Orchard Dr and Eastland Dr	Mid-day	A	EB through	PM*	C	EB through
Orchard Dr and Washington	Mid-day	B	WB through	PM*	C	WB through
SH 50 and Addison Ave	PM	B	EB left	PM	D	EB left
SH 50 and 3800 E	PM	B	SB through	PM	C	SB through
Washington St and 3600 N	PM	B	EB through	PM	C	EB through
Shoshone St and 2nd Ave N	PM	C	WB left	PM	C	WB left
Shoshone St and 2nd Ave S	PM	C	EB left	PM	C	EB left
Shoshone St and 6th Ave W	Mid-day	C	NB left	PM*	F	NB left
US 30 and SH 50	PM	C	SB through	PM	C	SB through
US 93 and 3700 N	Mid-day	B	EB through	PM*	B	EB through

* Estimate of PM peak hour volumes from Mid-day counts

All intersections are currently operating with relatively little congestion⁹ (Blue Lakes Blvd. and US 30 has only one LOS D movement during the PM peak hour). However, by 2040, three intersections are expected to see serious congestion problems if improvements are not implemented. These are:

- Blue Lakes Blvd. and US 30 (LOS F)
- Blue Lakes Blvd. and Orchard Dr. (LOS F)
- Shoshone St. and 6th Ave. W (LOS F)

Another notable location is SH 50 and Addison Ave., which is expected to see LOS D conditions on the Addison Ave. approach in 2040. Reconfiguration of the nearby intersection of SH 50 and 3800 E could redirect more traffic through the Addison Ave. approach and cause LOS F conditions.

⁹ Note that the public perception of congestion levels may be more critical than these LOS measures. For example, the Blue Lakes Blvd. and US 30 intersection receives a number of congestion complaints. This is partly due to the fact that it is one of the most congested intersections in the region, and therefore may appear “very congested” to the local population. However, a person from a larger city that experiences higher average congestion levels may be less critical. The level of service measure is meant to offer a standardized, unbiased congestion rating for comparison across regions.

6.2.4 Arterials

Table 12 shows LOS and design hour for all eighteen evaluated arterials under both 2014 and projected 2040 traffic volumes.

Table 12: Arterial Level of Service

Eastbound/Westbound								
Arterial	From	HCM Class	Existing (2014)			Future (2040)		
			Hour	EB LOS	WB LOS	Hour	EB LOS	WB LOS
SH 50	Addison to US 30	Two-lane II	PM	C	C	PM	C	C
US 30	SH 50 to Eastland	Multi-lane	PM	A	A	PM	B	B
US 30	Eastland to Blue Lakes	Multi-lane	PM	A	A	PM	B	B
2nd Ave N & S	Blue Lakes to Shoshone	Multi-lane	PM	A	A	PM	A	A
Orchard Dr	Eastland to Blue Lakes	Two-lane II	Mid-day	B	B	PM*	C	C
Orchard Dr	Blue Lakes to Washington	Two-lane II	Mid-day	A	B	PM*	B	C
Orchard Dr	Washington to US 93	Two-lane II	Mid-day	B	B	PM*	C	C
3600 N	Eastland to Blue Lakes	Two-lane II	PM	A	A	PM	A	A
3600 N	Blue Lakes to Washington	Two-lane II	PM	A	B	PM	A	B
SH 74	Washington to US 93	Two-lane II	PM	A	A	PM	A	B
Northbound/Southbound								
Arterial	From	HCM Class	Existing (2014)			Future (2040)		
			Hour	NB LOS	SB LOS	Hour	NB LOS	SB LOS
Shoshone St	2nd Ave N to Highland	Multi-lane	PM	A	A	PM	B	A
Eastland Dr	US 30 to Orchard	Two-lane III	PM	D	C	PM	E	E
Eastland Dr	Orchard to 3600 N	Two-lane II	PM	A	A	PM	A	A
Blue Lakes Blvd	US 30 to Orchard	Two-lane III	PM	C	D	PM	D	E
Blue Lakes Blvd	Orchard to 3600 N	Two-lane II	PM	A	C	PM	B	C
Washington St	Highland to Orchard	Two-lane III	Mid-day	C	C	PM*	E*	E*
Washington St	Orchard to 3600 N	Two-lane III	Mid-day	C	C	PM*	D*	D*
US 93	Orchard to SH 74	Two-lane II	Mid-day	B	A	4:30-5:30 PM*	C*	B*

* Estimate of PM peak hour volumes from Mid-day counts

Currently, traffic flow is acceptable on all arterials. Eastland Dr. and Blue Lakes Blvd. between US 30 and Orchard Dr. are approaching capacity, with LOS D in one direction on both segments. Also notable is Washington St. (SH 74) from Highland Ave. to Orchard Dr. Although the analyses show LOS C in both directions, the analysis volumes are from 10:00 to 11:00 AM. LOS may be worse during the PM peak hour when volumes are higher.

By 2040, the three segments mentioned above are expected to reach capacity and need improvement:

- Eastland Dr. from US 30 to Orchard Dr.
- Blue Lakes Blvd. from US 30 to Orchard Dr.
- Washington St. from Highland Ave. to Orchard Dr.

Washington St. (SH 74) from Orchard Dr. to 3600 N is expected to be approaching capacity in 2040; improvements should not be needed until after 2040.

6.3 Prioritized Capacity Projects

Prioritized capacity projects are listed and summarized in Table 13. Table 13 updates Table 12-1 from the 2004 Study. The table specifies the source of each project; most were found to be needed through LOS analysis, but a few were identified through stakeholder interviews or discussions with the steering committee. See the following Section 6.3.1 for detailed project information sheets and Appendix A for cost estimate sheets.

Table 13: Prioritized Capacity Projects

Priority	Key Number	Location	Project Description	Source of Project	When is it needed?	Estimated Cost
1	I-7	Shoshone St & 2 nd Ave N	Moves northbound Shoshone St left turn stop bar 8 feet back from the intersection to increase westbound left turning radius for trucks.	Stakeholder Interviews	2015	\$14,000
2	I-9a	Blue Lakes Blvd & US 30 (Kimberly Rd)	<i>Short-Term:</i> Prohibits northbound left turns and optimizes signal timing.	Unacceptable LOS	2018	\$13,000
3	I-9b	Blue Lakes Blvd & US 30 (Kimberly Rd)	<i>Long-Term:</i> In addition to short-term improvements, adds second westbound left turn lane. Widens Blue Lakes Blvd south of the intersection to accommodate dual left turns. Converts westbound through lane to a shared through/right lane.	Unacceptable LOS	2026	\$702,000
4	I-8	Shoshone St & 6 th Ave W	Widens Shoshone St at intersection to add a second northbound Shoshone St left turn lane. Widens 6 th Ave northwest of the intersection to accommodate dual left turn lanes. Restripes westbound Minidoka approach to add designated right turn lane.	Unacceptable LOS	2030	\$935,000
5	S-4	Washington St (Highland Ave to Orchard Dr)	Widens segment to 5 lanes (two lanes each direction with two-way left turn lanes).	Unacceptable LOS	2030	\$3,027,000
6	I-10	Blue Lakes Blvd & Orchard Dr	Installs traffic signal to reduce delay for eastbound and westbound traffic.	Unacceptable LOS	2035	\$678,000

Priority	Key Number	Location	Project Description	Source of Project	When is it needed?	Estimated Cost
7	S-2	Blue Lakes Blvd (US 30 to Orchard)	Widens segment to 5 lanes (two lanes each direction with two-way left turn lane) from US 30 to Highland Ave, 4 lanes (two lanes each direction) from Highland Ave to Park Ave, and 3 lanes (one lane each direction with two-way left turn lane) from Park Ave to Orchard Dr.	Unacceptable LOS	2040	\$4,319,000
8	S-3	Eastland Dr (US 30 to Orchard Dr)	Reconstructs railroad underpass to provide 17' vertical clearance. Installs 8' paved shoulders along segment where absent.	Unacceptable LOS/ Stakeholder Interviews	2040	\$2,766,000
9	I-11	Murtaugh St & 2 nd Ave S	Recommends traffic analysis of the intersection. Traffic signal recommended if warranted.	Discussions with steering committee	n/a	\$439,000

Projects are prioritized by the year improvements are needed. For LOS Analysis projects, this was determined as the year LOS dropped to the levels defined in Section 6.2.2. The improvements proposed in Project I-7 are not measurable via LOS analysis; however the project was determined to be an immediate need and was prioritized first. Traffic volumes were not available for Project I-11 to determine LOS and need for a traffic signal, so the project was prioritized last.

6.3.1 Project Summary Sheets

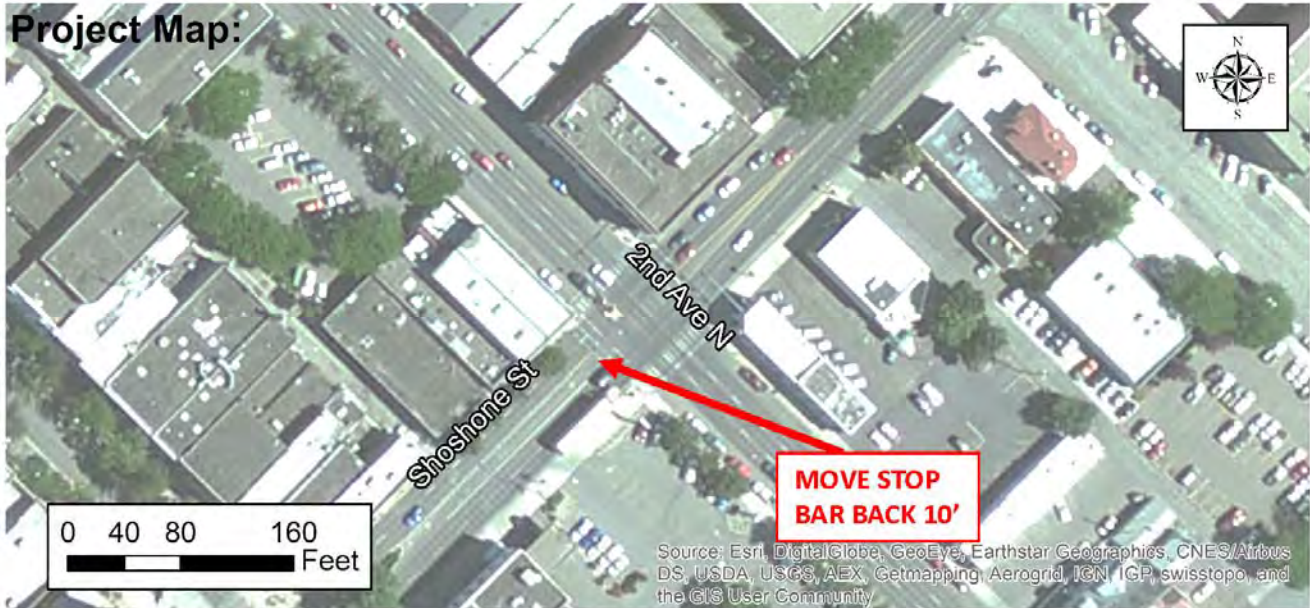
The summary sheets (beginning on the next page) detail the following information for each capacity project:

- Location
- Existing Conditions
- Projected Future Conditions
- Conclusion (why improvements are needed)
- Recommended Improvements
- Traffic Data
- Cost Estimate Summary

CAPACITY PRIORITY #1



Capacity Project:			Key No.
Shoshone St & 2nd Ave N			1 – 7
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost		Ending Milepost	Length (miles)
217.9		217.9	n/a
Location Notes:			
Intersection of Shoshone St and 2nd Ave N, in south Twin Falls			



Existing Conditions:

- Intersection is currently signalized
- Coordinated/pre-timed
- One-way westbound on 2nd Ave N
- Two-way on Shoshone St
- Adequate operation in 2014
- Northbound left turn stop bar is too close to the intersection and impedes left turning traffic from 2nd Ave N

Projected Future Conditions:

- Adequate capacity in 2040, with LOS C or better on all movements

Conclusion:

The intersection adequately serves demand, but the position of the northbound left turn stop bar crowds left turning truck and vehicle traffic from 2nd Ave N.

Recommended Improvements:

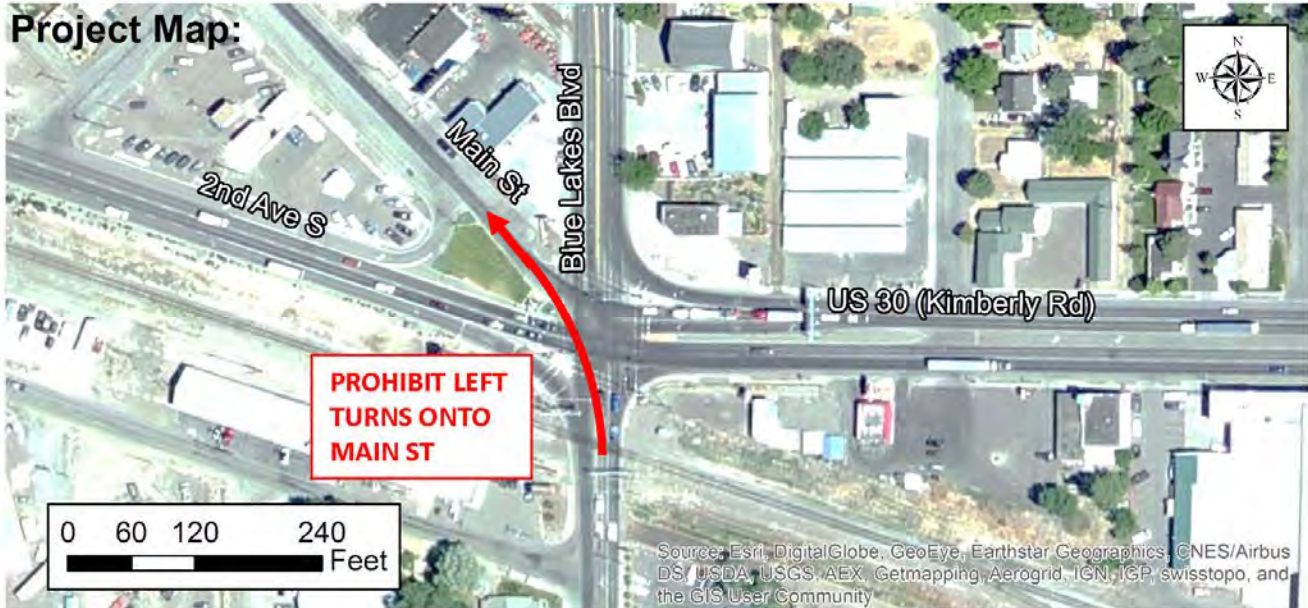
1. Move northbound Shoshone St left turn stop bar approximately 10 feet southwest of its current position. Increases available turning radius of trucks and vehicles from 2nd Ave N.
2. Modify signal detection.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	C	C	C	Preliminary Engineering	\$4,000
Avg. Intersection LOS	B	C	C	Right-of-Way	\$00
ADT	18,500	32,200		Construction	\$10,000
				Total Estimated Cost	\$14,000
				Benefit/Cost Ratio:	n/a

CAPACITY PRIORITY #2



Capacity Project:			Key No.
Blue Lakes Blvd & US 30 (Kimberly Rd)			I – 9a
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost		Ending Milepost	Length (miles)
218.6		218.6	n/a
Location Notes:			
Intersection of Blue Lakes Blvd and Kimberly Rd (South 5-Points), in south Twin Falls			



Existing Conditions:

- Intersection is currently signalized
- Split phasing northbound and southbound
- Adequate operation in 2014, with one movement (westbound left) at LOS D and the others at LOS C or better.

Projected Future Conditions:

- Undesirable LOS by 2018 (LOS D on at least two movements)
- Heavily congested peak hour conditions in 2040
- LOS F on southbound through and northbound left lanes in 2040
- Westbound left turn bay spillover

Conclusion:

Not enough lanes to serve future demand. Split phasing is inefficient and causes more congestion.

Option A: Recommended Short-term Improvements

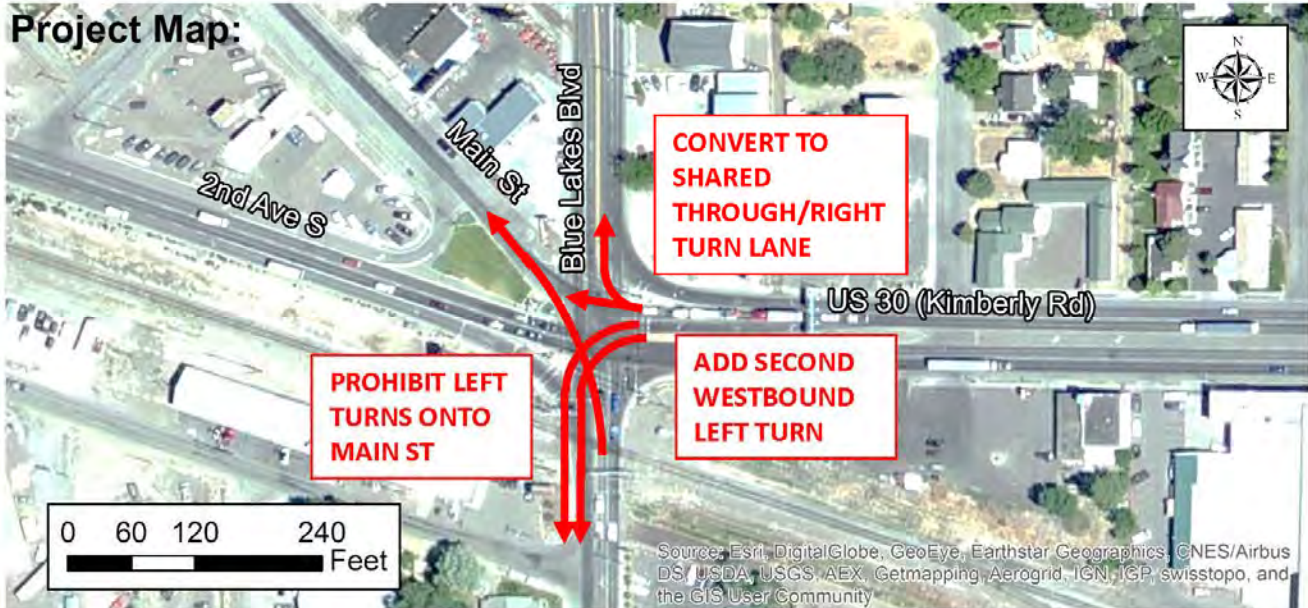
1. Prohibit northbound left turns onto Main St
2. Optimize signal timing
3. Improvements can be implemented immediately and maintain acceptable LOS (D on only one movement or better) until 2026

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	D	F	F	Preliminary Engineering	\$3,000
Avg. Intersection LOS	C	E	D	Right-of-Way	\$00
ADT	23,400	40,600		Construction	\$10,000
				Total Estimated Cost	\$13,000
				Benefit/Cost Ratio:	74.62

CAPACITY PRIORITY #3



Capacity Project:			Key No.
Blue Lakes Blvd & US 30 (Kimberly Rd)			I – 9b
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
218.6	218.6	n/a	
Location Notes:			
Intersection of Blue Lakes Blvd and Kimberly Rd (South 5-Points), in south Twin Falls			



Existing Conditions:

- Intersection is currently signalized
- Split phasing northbound and southbound
- Adequate operation in 2014, with one movement (westbound left) at LOS D and the others at LOS C or better.

Projected Future Conditions:

- Undesirable LOS by 2018 (LOS D on at least two movements)
- Heavily congested peak hour conditions in 2040
- LOS F on southbound through and northbound left lanes in 2040
- Westbound left turn bay spillover

Conclusion:

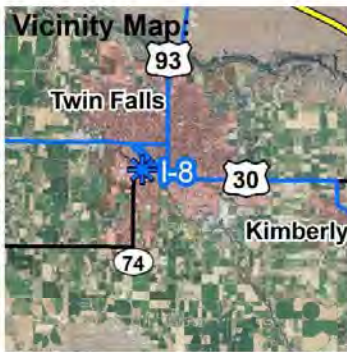
Not enough lanes to serve future demand. Split phasing is inefficient and causes more congestion.

Option B: Recommended Long-term Improvements

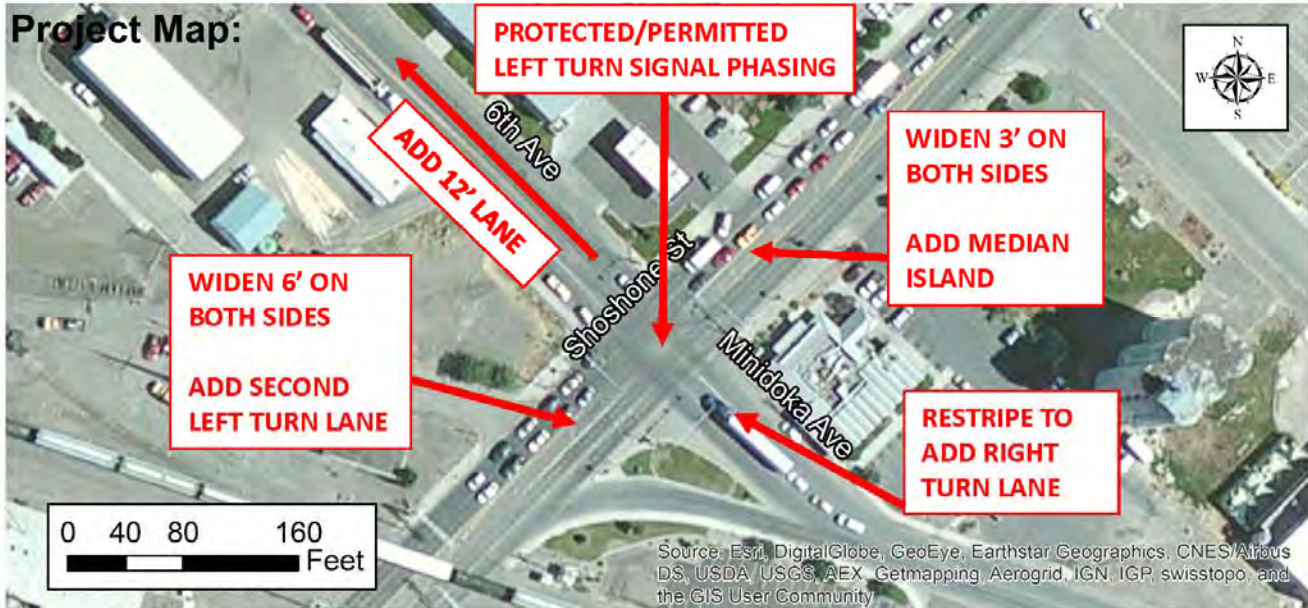
1. Prohibit northbound left turns onto Main St
2. Reconfigure US 30 westbound approach to add a second left turn lane and convert the through lane into a shared through/right lane.
3. Widen south leg of Blue Lakes Blvd for two receiving lanes. Dual receiving lanes should extend 1000 feet south of the intersection.
4. Improvements should be completed before 2026 and considered as a companion to project S-2.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	D	F	C	Preliminary Engineering	\$79,000
Avg. Intersection LOS	C	E	C	Right-of-Way	\$97,000
ADT	23,400	40,600		Construction	\$526,000
				Total Estimated Cost	\$702,000
				Benefit/Cost Ratio:	11.54

CAPACITY PRIORITY #4



Capacity Project:			Key No.
Shoshone St & 6th Ave W			I – 8
Route:	County	City (nearest)	District
SH 74	Twin Falls	Twin Falls	4
Beginning Milepost		Ending Milepost	Length (miles)
7.5		7.5	n/a
Location Notes:			
Intersection of Shoshone St and 6th Ave, in south Twin Falls			



Existing Conditions:

- Intersection is currently signalized
- Coordinated/pre-timed
- Two-phase operation, permitted left turn phasing
- Adequate operation in 2014, with all movements at LOS C or better

Projected Future Conditions:

- Undesirable level of service in 2040
- LOS F on northbound left turn
- LOS E on eastbound left turn

Conclusion:

Lane configurations and permitted left turn phasing do not adequately serve PM peak demands in the future.

Recommended Improvements:

1. Protected/permitted left turn phasing during PM peak hour; permitted phasing only otherwise.
2. Restripe westbound Minidoka Ave approach to add a designated right turn lane.
3. Widen south Shoshone St leg by 6 feet on both sides; add second left turn lane.
4. Widen north Shoshone St leg by 3 feet on both sides; add median island.
5. Widen 6th Ave from Shoshone St to 5th St W to add second northwest-bound lane so that dual northbound left turns may be accommodated.
6. Improvements should be implemented after 2020

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	C	F	C	Preliminary Engineering	\$79,000
Avg. Intersection LOS	B	E	C	Right-of-Way	\$330,000
ADT	17,300	30,100		Construction	\$526,000
				Total Estimated Cost	\$935,000
				Benefit/Cost Ratio:	2.90

CAPACITY PRIORITY #5



Capacity Project:			Key No.
Washington St (Highland Ave to Orchard Dr)			S – 4
Route:	County	City (nearest)	District
SH 74	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
6.1	6.9	0.8	
Location Notes:			
Segment of Washington St from Highland Ave to Orchard Dr, in southeast Twin Falls			



Existing Conditions:

- Two-lane highway with 12-foot lanes and 6-foot shoulders
- Access density = 61/mile or 1 per every 87 feet (includes both sides of the road)
- No passing zones on 67% of segment length
- Adequate operation, with LOS C in both directions

Projected Future Conditions:

- Northbound LOS drops from D to E in 2026
- Southbound LOS drops from D to E in 2030

Conclusion:

A combination of high volumes, access density, and no-passing zone percentage contribute to low LOS in the future. Lane and shoulder widths are adequate.

Recommended Improvements:

1. Widen segment to 5 lanes: two lanes, curb and gutter, and a sidewalk in each direction with a center two-way left turn lane.
2. Improvements should be implemented after 2030.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Northbound LOS	C	E	B	Preliminary Engineering	\$297,000
Southbound LOS	C	E	A	Right-of-Way	\$754,000
ADT	11,600	20,100		Construction	\$1,976,000
				Total Estimated Cost	\$3,027,000
				Benefit/Cost Ratio:	3.21

CAPACITY PRIORITY #6



Capacity Project:			Key No.
Blue Lakes Blvd & Orchard Dr			I – 10
Route:	County	City (nearest)	District
STC 2730	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
18.4	18.4	n/a	
Location Notes:			
Intersection of Blue Lakes Blvd and Orchard Dr, south of Twin Falls			

Project Map:



Existing Conditions:

- The intersection is currently free-flowing northbound and southbound and stop controlled eastbound and westbound.
- Eastbound left turning volume is relatively high.
- Adequate operation in 2014.

Projected Future Conditions:

- LOS F expected on eastbound left turn during PM peak hour in 2040.
- LOS D expected on eastbound through movement and all westbound movements.

Conclusion:

As north and southbound volumes increase in the future, fewer gaps are available for eastbound left turn and other minor approach vehicles, leading to long delays.

Recommended Improvements:

1. Install a traffic signal at the intersection with permitted left turn phasing when warrant is met; projected to meet in approximately 2035.
2. Signal reduces delay for east/westbound traffic at the expense of north/southbound traffic.
3. Improvement should be planned with consideration to project S-2.

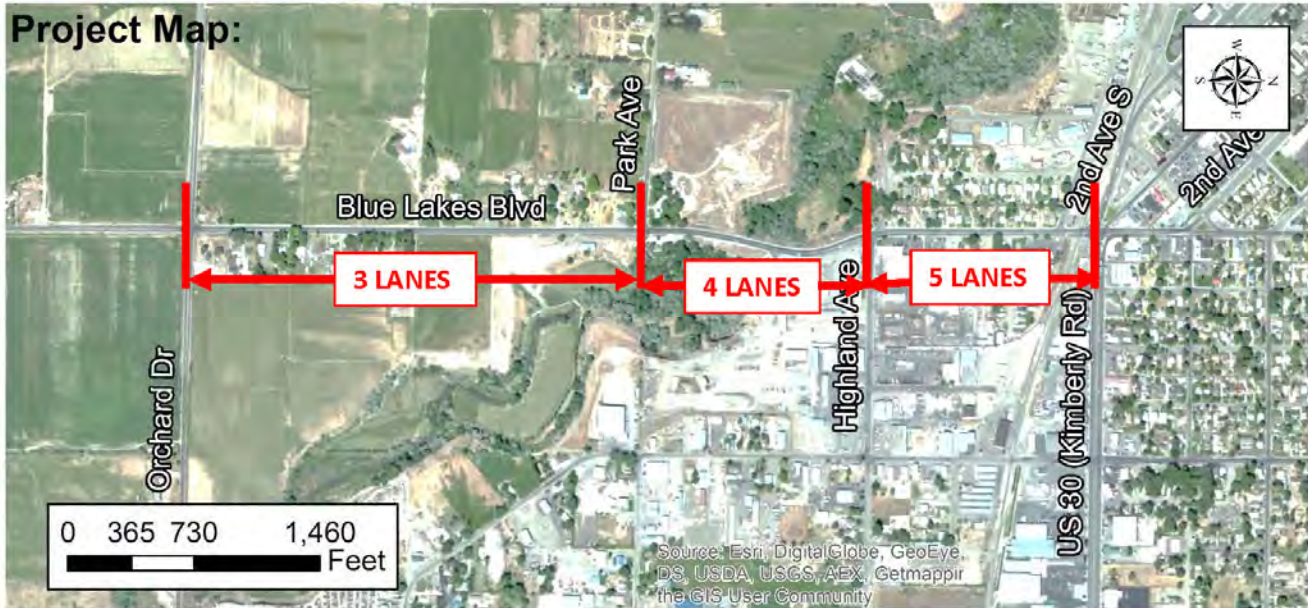
Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	C	F	C	Preliminary Engineering	\$85,000
Avg. Intersection LOS	A	C	B	Right-of-Way	\$32,000
ADT	7,400	12,900		Construction	\$561,000
				Total Estimated Cost	\$678,000
				Benefit/Cost Ratio:	n/a

CAPACITY PRIORITY #7



Capacity Project:			Key No.
Blue Lakes Blvd (US 30 to Orchard Dr)			S – 2
Route:	County	City (nearest)	District
STC 7232	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
18.4	19.4	1.0	
Location Notes:			
Segment of Blue Lakes Blvd from US 30 to Orchard Dr, in south Twin Falls			

Project Map:



Existing Conditions:

- Two-lane highway with 13-foot lanes and 6 foot shoulders
- Access density = 42/mile or 1 per every 125 feet (includes both sides of the road)
- No-passing zones on 66% of segment length
- Adequate operation, with LOS C northbound and LOS D southbound during the PM peak hour
- Volumes on the northern end of the segment are 75% higher than volumes on the southern end

Projected Future Conditions:

- Undesirable LOS in 2040
- LOS projected to drop from D to E during the 2040 PM peak hour in the southbound direction

Conclusion:

A combination of high volumes, access density, and no-passing zone percentage contribute to low LOS in the future. Shoulder and lane widths are adequate.

Recommended Improvements:

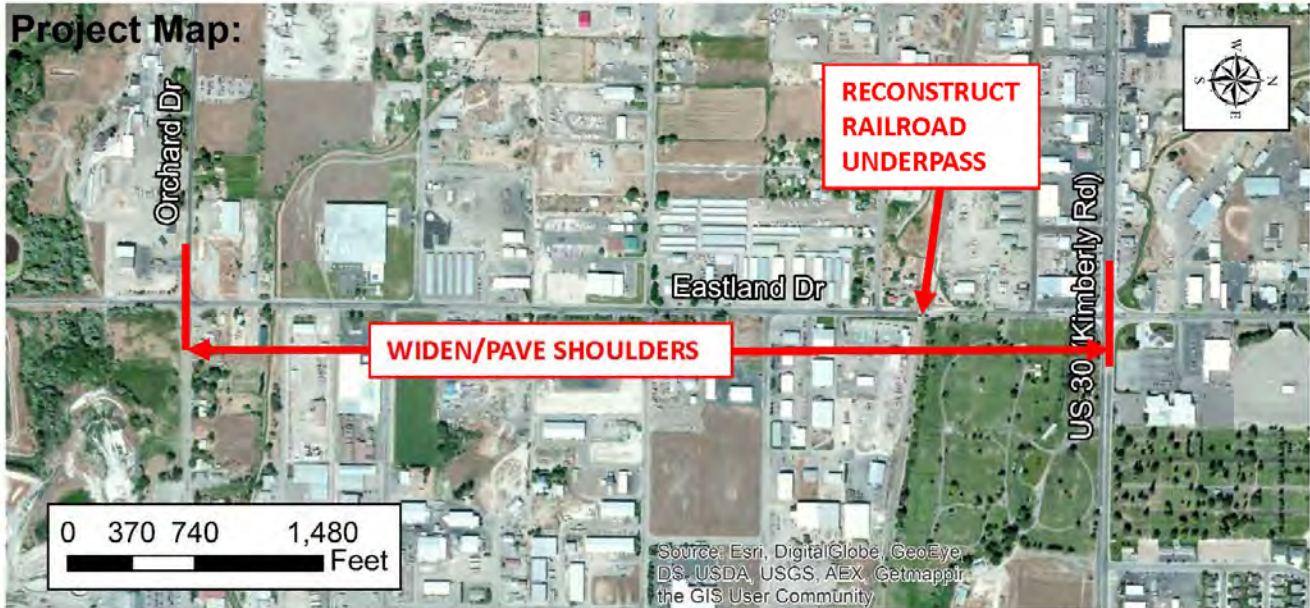
1. Widen to 5 lanes from US 30 to Highland Ave: two lanes each direction with a two-way left turn lane, curb and gutter, and sidewalks.
2. Widen to 4 lanes from Highland Ave to Park Ave: two lanes each direction with 6' paved shoulders.
3. Widen to 3 lanes from Park Ave to Orchard Dr: one lane in each direction with a two-way left turn lane and curb and gutter.
4. Should be completed before 2040 and considered as a companion to project I-9b.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Northbound LOS	C	D	C	Preliminary Engineering	\$467,000
Southbound LOS	D	E	D	Right-of-Way	\$740,000
ADT	9,400	16,300		Construction	\$3,112,000
				Total Estimated Cost	\$4,319,000
				Benefit/Cost Ratio:	0.56

CAPACITY PRIORITY #8



Capacity Project:			Key No.
Eastland Dr (US 30 to Orchard Dr)			S – 3
Route:	County	City (nearest)	District
SMA 7272	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
5.7	6.7	1.0	
Location Notes:			
Segment of Eastland Dr from US 30 to Orchard Dr, in southeast Twin Falls			



Existing Conditions:

- Two-lane highway with 12-foot lanes and 1-foot shoulders at the narrowest point
- Narrowest point is the railroad underpass 0.2 miles south of US 30; has low 13'9" clearance and floods occasionally
- Access density = 42/mile or 1 per every 125 feet (includes both sides of the road)
- No-passing zones on 20% of segment length
- Adequate operation, with LOS D northbound and LOS C southbound during the PM peak hour

Projected Future Conditions:

- Projected LOS drops from D to E in both directions in 2040

Conclusion:

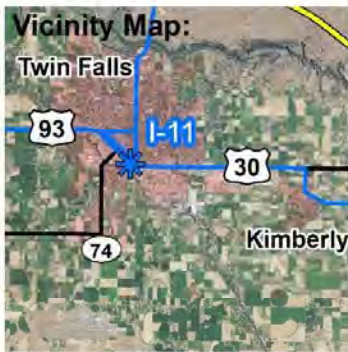
High volumes, access density, and narrow shoulders at the railroad underpass and other locations contribute to low LOS in the future. The low underpass clearance prevents some trucks and heavy vehicles from using the segment.

Recommended Improvements:

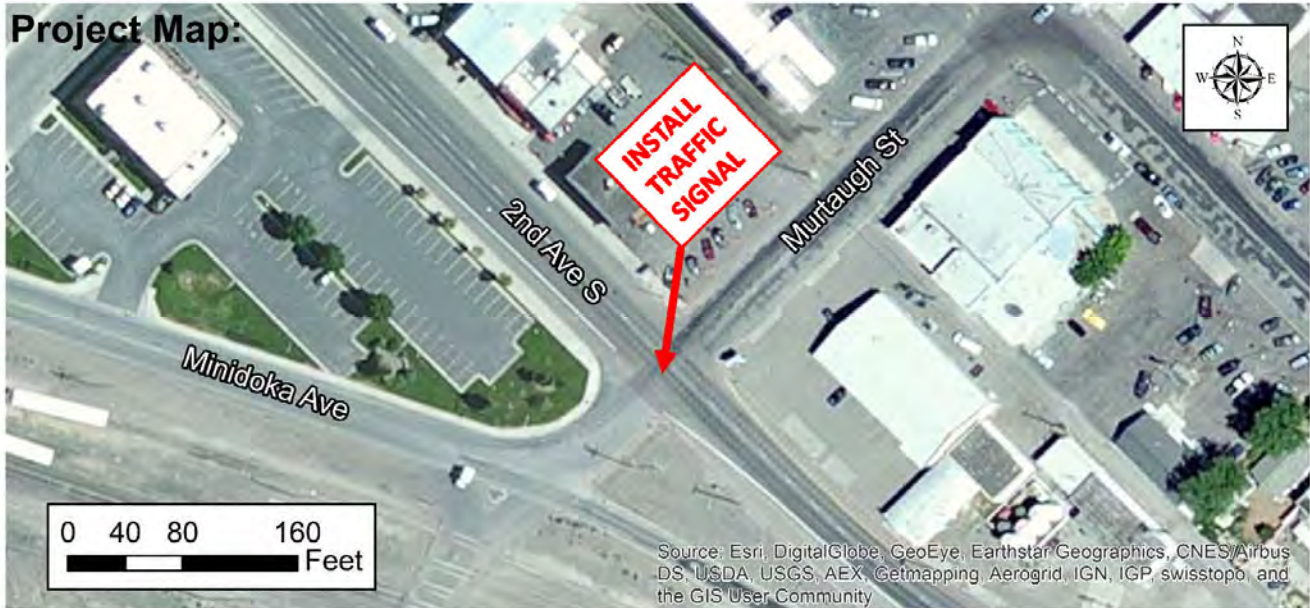
- Reconstruct railroad underpass to provide 17' clearance. Underpass should be wide enough for 2 lanes in each direction with bike lanes, sidewalks, and a center support pier to accommodate future growth.
- Construct 8 foot paved shoulders south of underpass where lacking.
- Improvements should be implemented in approximately 2040.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Northbound LOS	D	E	D	Preliminary Engineering	\$333,000
Southbound LOS	C	E	D	Right-of-Way	\$216,000
ADT	9,200	16,000		Construction	\$2,217,000
				Total Estimated Cost	\$2,766,000
				Benefit/Cost Ratio:	0.33

CAPACITY PRIORITY #9



Capacity Project:			Key No.
Murtaugh St & 2nd Ave S			I – 11
Route:	County	City (nearest)	District
US 30	Twin Falls	Twin Falls	4
Beginning Milepost		Ending Milepost	Length (miles)
218.4		218.4	n/a
Location Notes:			
Intersection of Murtaugh St and 2 nd Ave S, in south Twin Falls			



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Existing Conditions:

- The intersection is currently free-flowing and one-way eastbound on 2nd Ave S and stop-controlled on Murtaugh.
- Traffic counts were not collected at the intersection, but trucks are known to travel southwest across 2nd Ave S and must wait for a gap in traffic before proceeding to Minidoka.

Projected Future Conditions:

- Trucks will have a more difficult time crossing 2nd Ave S as volumes increase.

Conclusion:

Truck route crosses southwest across 2nd Ave S. Trucks accelerate slowly, making it difficult to find usable gaps across 2nd Ave S traffic.

Recommended Improvements:

- Collect traffic counts at the intersection.
- If a signal is warranted and does not significantly delay 2nd Ave S traffic, install a two-phase traffic signal. Southwest leg should be narrowed to one-way westbound. The signal should rest in green on 2nd Ave S, and the Murtaugh St phase set to call on time delay.
- Improvement serves Murtaugh St truck route at the expense of 2nd Ave S traffic.

Traffic Data:	2014	2040 w/o improvements	2040 with improvements	Cost Estimate:	
Movement w/Lowest LOS	n/a	n/a	n/a	Preliminary Engineering	\$57,000
Avg. Intersection LOS	n/a	n/a	n/a	Right-of-Way	\$6,000
ADT	n/a	n/a		Construction	\$376,000
				Total Estimated Cost	\$439,000
				Benefit/Cost Ratio:	n/a

7 Southeast Alternate Route

7.1 Investigation of Need

The 2004 Study, 2014 stakeholder interviews (discussed in Section 4.3 of this report), 2009 Twin Falls Comprehensive Plan, and 2009 Wastewater Systems Collection Report were referenced to assess existing and future need for the route.

7.1.1 2004 Study “Most Feasible Truck Route”

The 2004 Study found no need for an alternate route for bypass purposes. Instead, a “Most Feasible Truck Route” and interim alternative were proposed to provide a fast and clear route for truck traffic through south Twin Falls. These are shown in Figure 1 on page 7. The routes were never constructed and are not scheduled for construction. Keller Associates re-investigated the 2004 routes and also evaluated where the route (if needed) should originate and terminate.

7.1.2 2014 Stakeholder Interview Findings

Responses from 2014 interviews with truck drivers and trucking company management were reviewed to assess industrial and commercial demand for the SE Alternate Route.

Truck Driver Interviews

Table 14 on page 6 shows a summary of US 93 and SH 50 truck driver destinations. Nineteen (19) percent of SH 50 trucks had destinations in south Twin Falls, while no US 93 trucks had destinations in south Twin Falls. This indicates that truck traffic in south Twin Falls originates from SH 50, not US 93 as proposed in the 2004 Study, and may show need for a route on the southeast side of Twin Falls.

Truck driver surveys also revealed that eighty-five (85) percent of trucks bypassing Twin Falls from US 93 used US 93 Alternate Route to reach I-84. Only 15 percent traveled south of or through Twin Falls to SH 50. The popularity of US 93 Alternate Route is likely due to its high speed, access control, few stops, and more direct route to I-84. Users of the US Alternate Route that turn east at I-84 may prefer a more direct route from US 93 (southwest of Twin Falls) to SH 50 and I-84 (northeast of Twin Falls). When asked, truck drivers seemed to agree with this hypothesis (see Question 5 on page 21). Seventy-three (73) percent of interviewed truck drivers thought a SE Alternate Route was needed.

Commercial Traffic Generator Interviews

Interviewed trucking company managers/owners responded that the “Most Feasible Truck Route” from the 2004 Study would not be worth the cost (see Question 4 on page 19).

Conclusions

There may be an existing demand for an alternate, but it is not likely that the demand is strong enough to justify construction costs at the present time. The interviews also suggest that alignments should connect industrial areas in south Twin Falls with US 30 or SH 50 to the east, rather than connecting the new route to US 93 as originally recommended in the 2004 Study.

7.1.3 Twin Falls Comprehensive Plan Findings

Keller Associates reviewed the 2009 Twin Falls Comprehensive Plan to determine areas of expected growth around Twin Falls. The plan's horizon year is 2030.

Figure 11 shows the plan's existing land use map. The region near Twin Falls south of US 30 is mostly agriculture, with some residential and industrial developments west of Blue Lakes Blvd. and a large industrial area east of Blue Lakes Blvd.

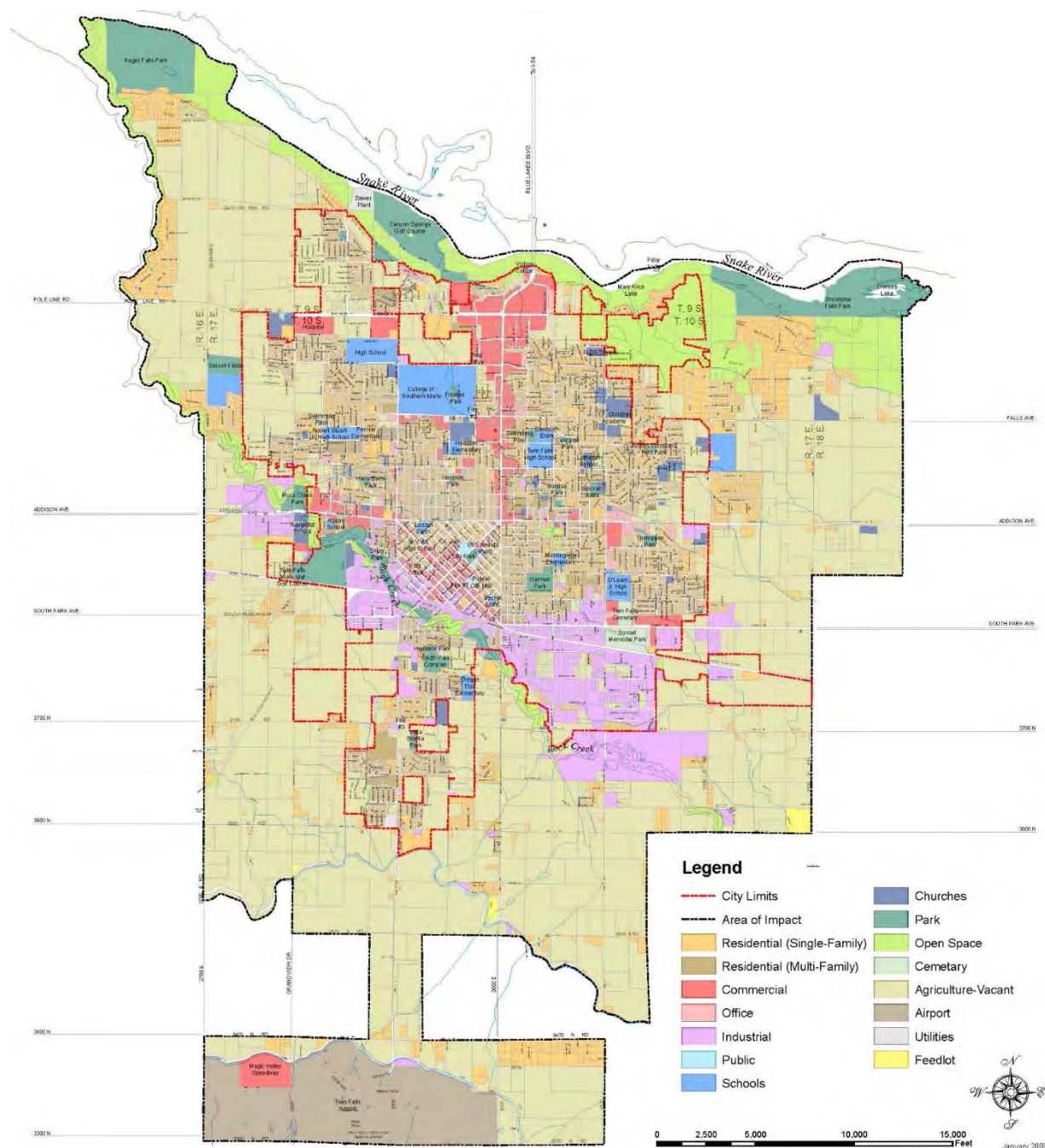


Figure 11: Existing (2009) Land Use Map

Figure 12 shows the plan's future land use map. The city plans to expand the residential and industrial areas mentioned above into existing agricultural land. The only remaining agricultural areas are south and east of the 3600 N / Eastland Dr. intersection and west of Grandview Dr. The city also plans for more commercial use on both sides of US 30 from Blue Lakes Blvd. east to the city limit.

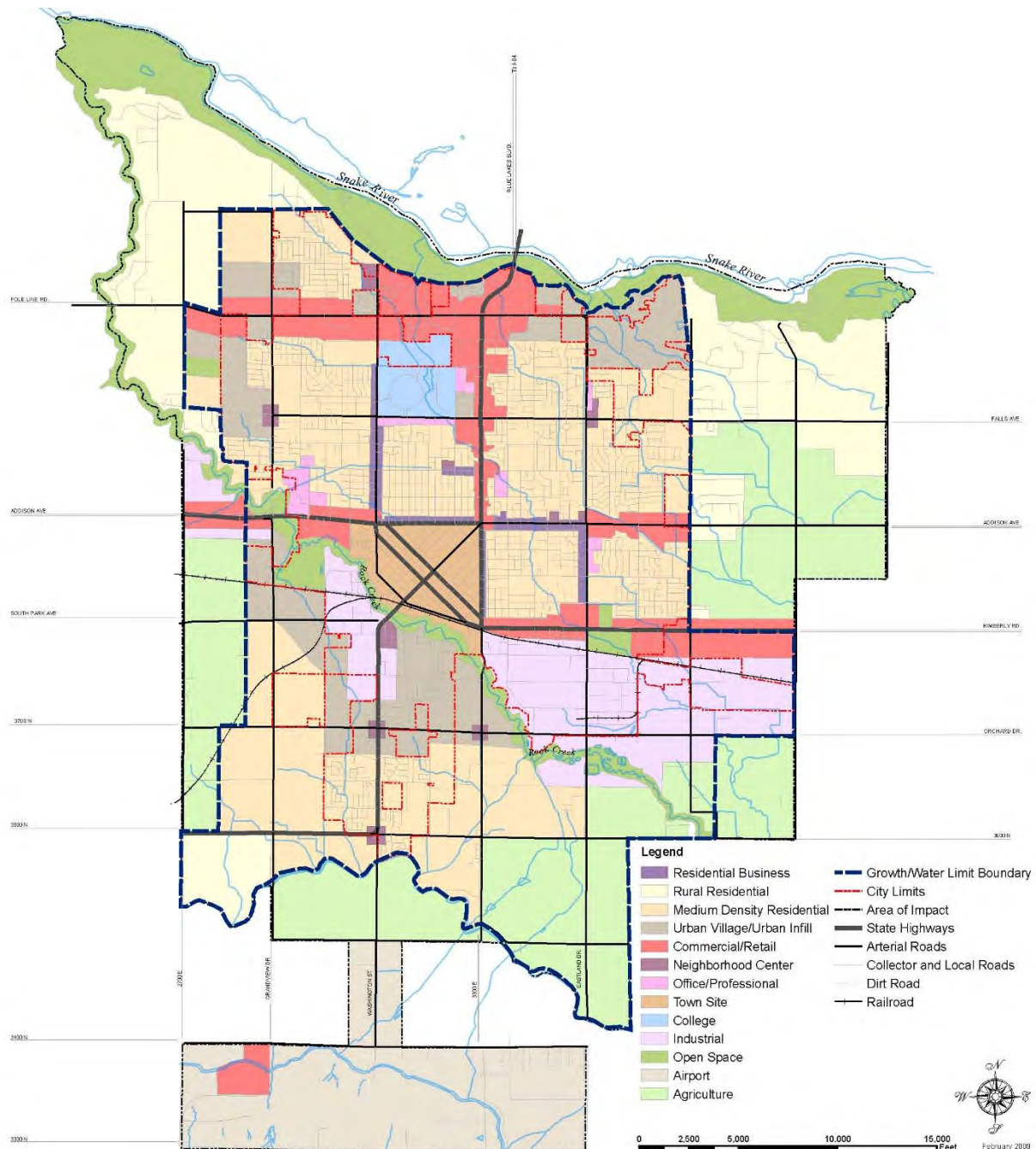


Figure 12: Future (2030) Land Use Map

The conclusions drawn from these land use plans is that there will likely be higher demand for a route southeast of Twin Falls in the future, connecting the existing industrial area (south of downtown) to SH 50. When the future land use plan is fully realized, the route could serve three purposes:

- Alternate route to shift industrial traffic away from commercial US 30.
- Arterial for local residential and agricultural traffic.
- Belt route connecting SH 74 with US 30 and SH 50 east of Twin Falls.

7.1.4 Sewer Master Plan Findings

Lastly, the 2009 Wastewater Collection Systems Report was referenced to determine the location of planned sewer lines. Development is less expensive near sewer lines, and therefore planned sewer lines can be used to predict future growth areas. Like the Comprehensive Plan, the sewer plan's horizon year is 2030.

Figure 13 shows a map of existing and planned sewer lines in Twin Falls. The proposed sewer lines (shown in green) extend south of Twin Falls. This is consistent with the future land use plan, which planned for residential and industrial expansion south-to-southeast of Twin Falls.

Therefore, the sewer plan reinforces the expectation of substantial growth south of Twin Falls, and reinforces the conclusions drawn from the Comprehensive Plan and the trucking industry interviews.

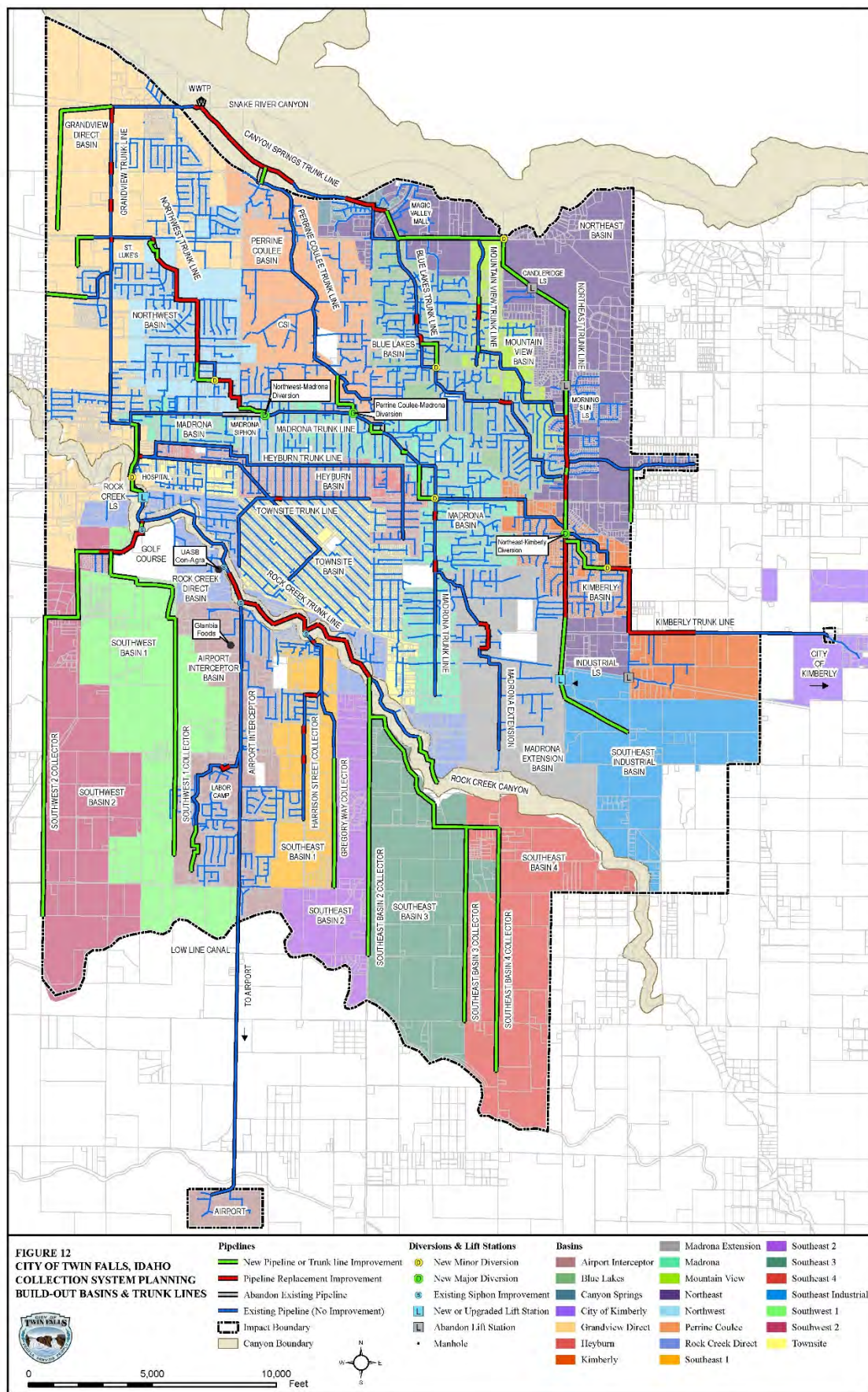


Figure 13: Sewer Master Plan

7.1.5 Projected Urban Growth Map

Keller Associates created a projected urban growth map of the Twin Falls region (shown in Figure 14). The map was created by projecting the 40-year and 60-year population growth factors for Twin Falls and Kimberly, and assuming city limit expansion equal to the growth factors with constant population density. The directions of growth were concluded from previously discussed findings from the Comprehensive Plan and Sewer Master Plan. The map helps visualize where future growth may occur.

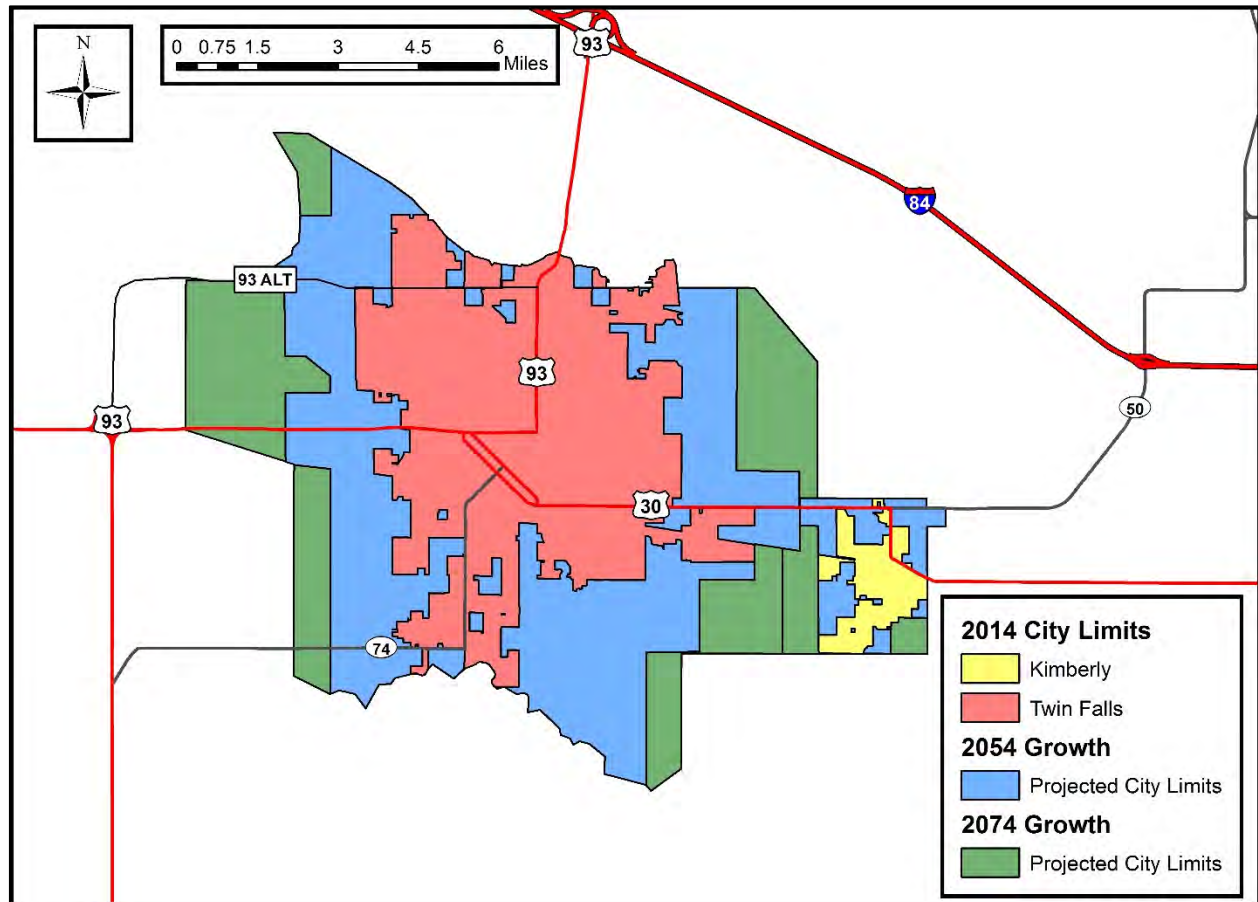


Figure 14: Projected Urban Growth Map

There are three highways that extend west out of Twin Falls (US 93, US 93 Alternate Route, and SH 74) and only one extending east (US 30). This suggests need for a future highway or arterial on the east side of Twin Falls, a conclusion that is in agreement with findings from truck driver interviews, land use plans, and the sewer master plan.

This map also suggests a need for a route or ring-road on the northeast side of Twin Falls. This has been proposed in the past but saw political resistance because it would cut through residential developments. The area is outside the study area of this 2014 Study, but an analysis of a northeast alternate route should be conducted in a future corridor study.

7.2 Investigation Conclusions and Recommendations

The sources referenced and analyzed in the previous section point to three purposes or uses for the SE Alternate Route, in order of importance:

1. Truck route
 - Provide alternate truck route to connect industrial areas to US-30/SH 50
 - Move industrial traffic away from US 30 and downtown streets
2. Future local arterial
 - Provide arterial for expected growth south of Twin Falls
 - Relieve forecasted future congestion on US-30 within Twin Falls
3. Bypass route
 - Provide efficient bypass route between US-30/SH 50 and US 93
 - Move bypass vehicles and trucks away from US 30 and downtown streets

The SE Alternate Route is *not currently needed* for several reasons:

- Analysis of the existing traffic system shows adequate operation on all intersections and arterials in south Twin Falls.
- Safety and capacity improvements have already been recommended to address expected transportation concerns out to 2040.
- The SE Alternate Route is not currently needed for bypass traffic.
- The SE Alternate Route is not currently needed as an arterial street; the area south of Twin Falls is mostly agricultural land with low traffic volumes.
- Demand may exist from truck drivers for a SE Alternate Route; however this demand does not currently appear strong enough to outweigh construction costs for the SE Alternate Route.

However, planning should begin for the SE Alternate Route, with construction expected approximately 40 years from now (2054). The route may be needed to support expected growth in the area, and therefore could be constructed as early as 20 years from now (2034).

The existing agricultural land between Twin Falls and Kimberly is developing rapidly to industrial and commercial uses. This development may outpace the land use plan and limit available routes to tie SH 50 to south Twin Falls. Therefore, a route alignment should be chosen and right-of-way preserved as soon as possible. Recommendations for alignments, right-of-way width, and an access policy for the SE Alternate Route are included in the following Sections 7.3, 7.4 and 7.5.

7.3 Alignment Alternatives

Keller Associates developed three alignment alternatives for the SE Alternate Route to be used as starting points for future planning efforts. These are shown in Figure 15. Each was designed to traverse land with little existing development to allow right-of-way preservation.

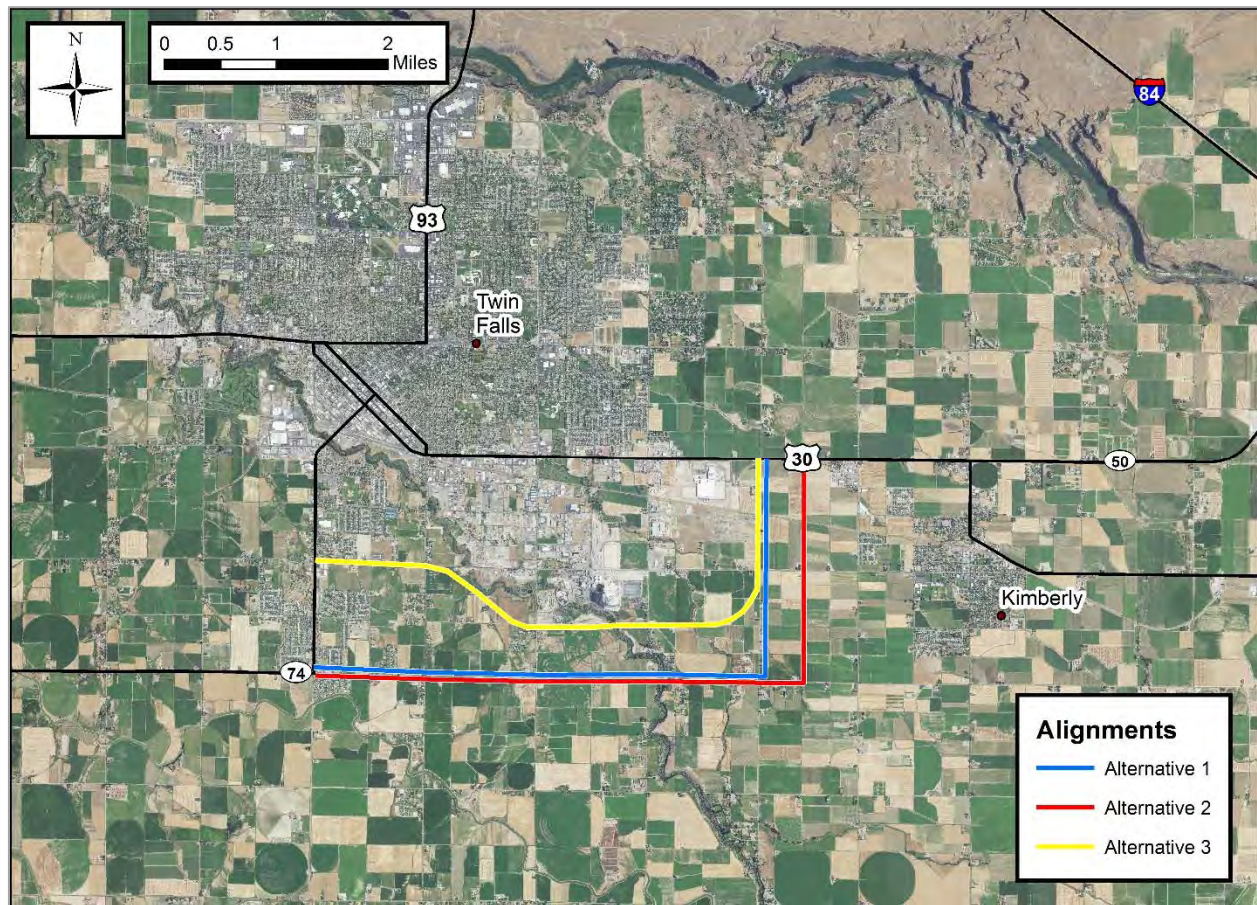


Figure 15: Alignment Alternatives - SE Alternate Route

All three alignments share the following characteristics:

- 60 mph design speed
- Five-lane section (see Section 7.4)
- 133 to 142-foot right-of-way width (see Section 7.4)
- Bridge over Rock Creek, wide enough for five lanes
- Overpass over Eastern Idaho Railroad, wide enough for five lanes
- Access management policy (see Section 7.5)

7.3.1 Route Alternative Summary Sheets

The summary sheets (beginning on the next page) detail the following information for each route alternative:

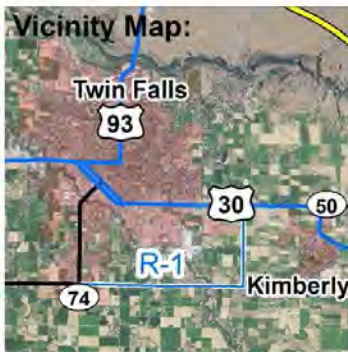
- Location
- Proposed Route Improvements
- Advantages
- Disadvantages
- Critical Route Characteristics
- Cost Estimate

7.3.2 Evaluation Matrix

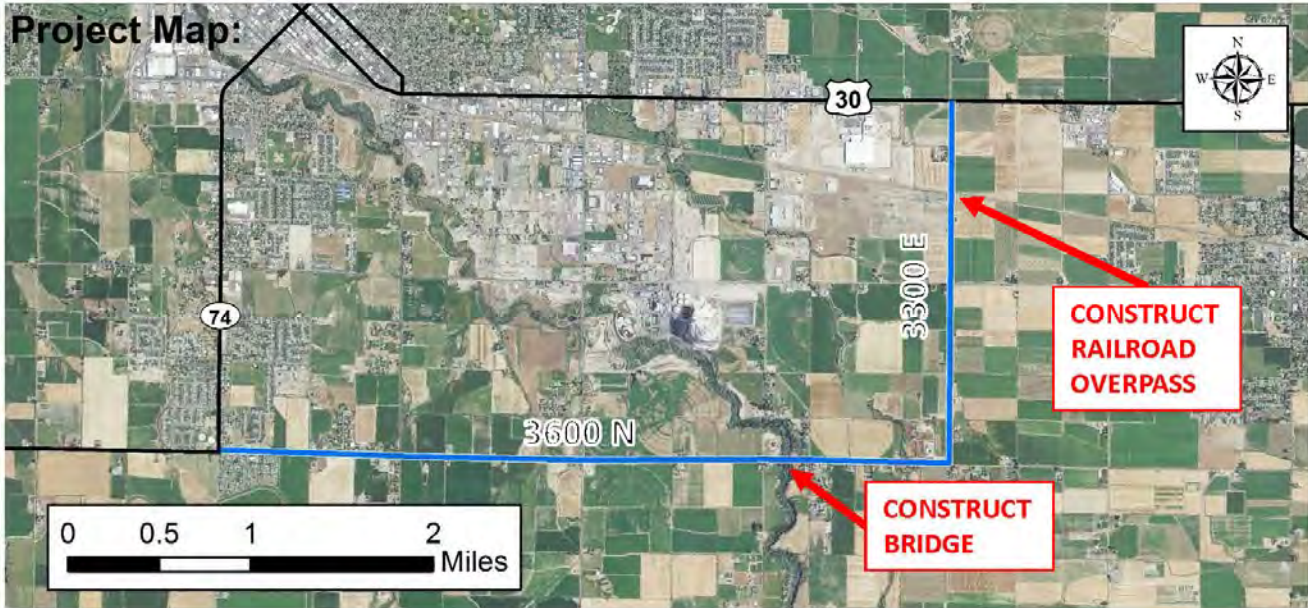
See Appendix C for an evaluation matrix that rates each alternative on eight factors listed below. Alignment options were not prioritized from overall best to worst; the evaluation matrix was created to evaluate the advantages and disadvantages of each option to assist future planning efforts.

- Connectivity
- Safety
- Long Range Planning
- Public Support
- Agricultural Development
- Residential Development
- Industrial Development
- Natural Resource Implications

ALTERNATIVE #1



Capacity Project:			Key No.
3600 N to 3300 E			R - 1
Route:	County	City (nearest)	District
n/a	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
n/a	n/a	6.0	
Location Notes:			
3600 N road and 3300 E road, southeast of Twin Falls			



Route Improvements:

- Reconstruct existing roadways 3600 N and 3300 E for an alternate route connecting SH 74 with US 30.
- Construct railroad overpass ½ mile south of US 30 on 3300 E.
- Construct bridge across Rock Creek on 3600 N just east of 3200 E.
- Considered the “baseline” of the three alternatives

Advantages:

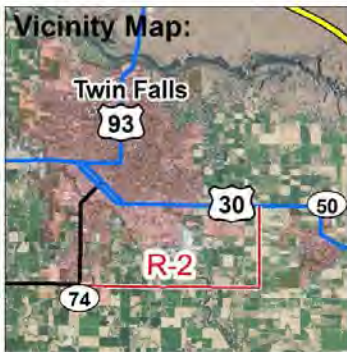
- + Alignment follows existing roadways; least disruptive to transportation grid
- + Good connectivity with SH 74 for bypass traffic

Disadvantages:

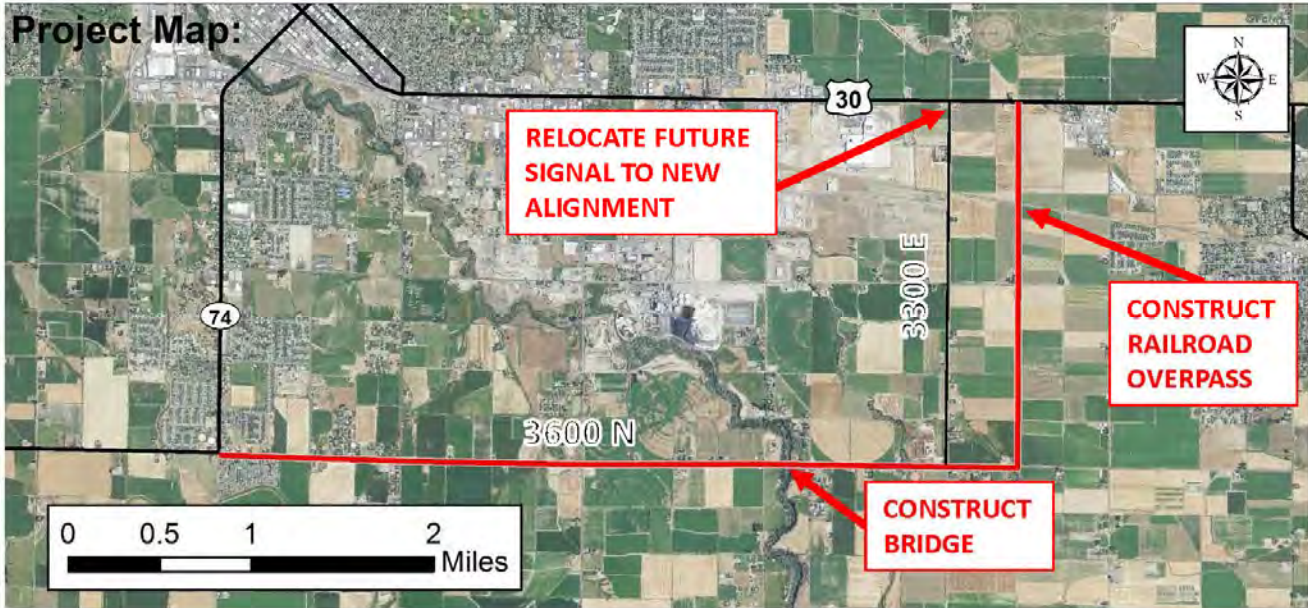
- High number of displacements caused by widening 3600 N
- Difficulty closing or consolidating existing accesses on 3600 N and 3300 E

Critical Route Characteristics:	Route #1	Route #2	Route #3	Cost Estimate:	
# of Stop Signs and Signals	7	7	6	Preliminary Engineering	\$2,162,300
# of Displacements:	18	17	6	Right-of-Way	\$14,846,880
Acres of ROW needed:	60	69	67	Construction	\$21,623,000
				Total Estimated Cost	\$38,633,000
				Benefit/Cost Ratio:	n/a

ALTERNATIVE #2



Capacity Project:			Key No.
3600 N to 3350 E			R - 2
Route:	County	City (nearest)	District
n/a	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
n/a	n/a	6.2	
Location Notes:			
3600 N road and 3350 E (2000 ft east of 3300 E road), southeast of Twin Falls			



Route Improvements:

- Portion of route on 3600 N will be reconstructed. North-south portion of new alignment will be constructed 2000 ft east of and parallel with 3300 E.
- Relocate the expected future signal at intersection of 3300 E and US 30 to new alignment.
- Construct railroad overpass ½ mile south of US 30 on 3350 E.
- Construct bridge across Rock Creek on 3600 N just east of 3200 E.

Advantages:

- + Shifting alignment to 3350 E avoids conflicts with industrial development on 3300 E
- + Good connectivity with SH 74 for bypass traffic

Disadvantages:

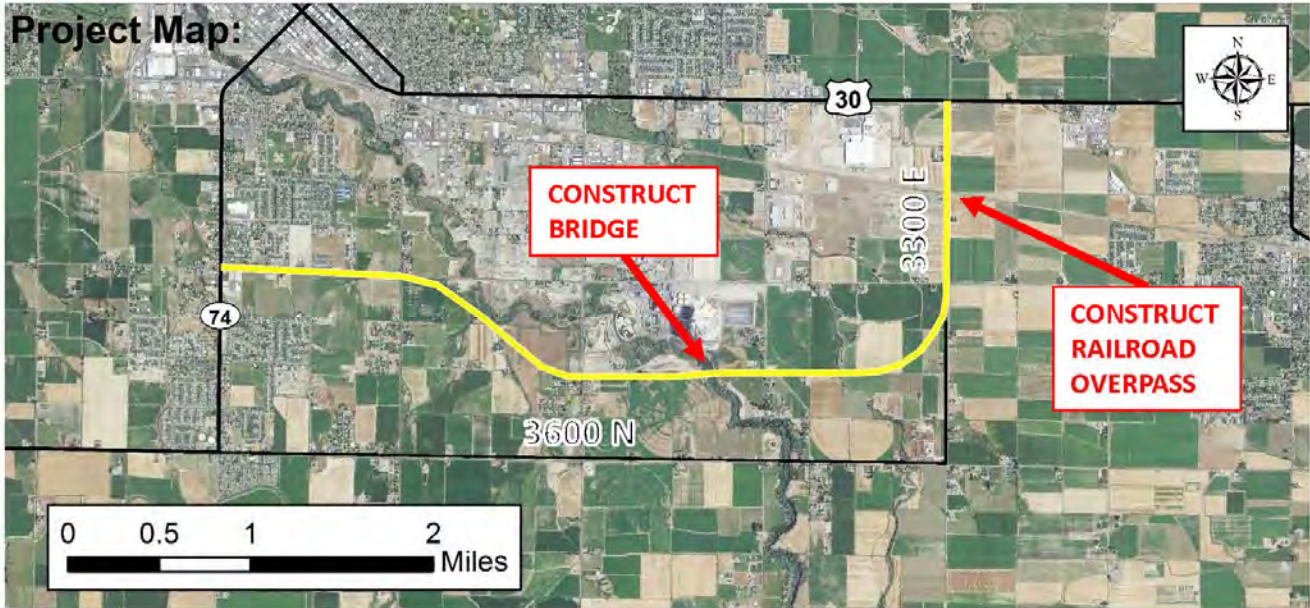
- High number of displacements caused by widening 3600 N
- Splitting of parcels needed to construct roadway at 3350 E
- Relocation of traffic signal

Critical Route Characteristics:	Route #1	Route #2	Route #3	Cost Estimate:	
# of Stop Signs and Signals	7	7	6	Preliminary Engineering	\$2,216,400
# of Displacements:	18	17	6	Right-of-Way	\$15,176,640
Acres of ROW needed:	60	69	67	Construction	\$22,164,000
				Total Estimated Cost	\$39,558,000
				Benefit/Cost Ratio:	n/a

ALTERNATIVE #3



Capacity Project:			Key No.
Orchard Dr (3700 N) to 3300 E			R - 3
Route:	County	City (nearest)	District
n/a	Twin Falls	Twin Falls	4
Beginning Milepost	Ending Milepost	Length (miles)	
n/a	n/a	5.5	
Location Notes:			
Orchard Dr (3700 N) road and 3300 E road, southeast of Twin Falls			



Route Improvements:

- Reconstruct portion of route on Orchard Dr. Construct new alignment between Blue Lakes Blvd and 3300 E. Reconstruct north-south portion on 3300 E.
- Construct railroad overpass ½ mile south of US 30 on 3300 E.
- Construct bridge across Rock Creek for new alignment.

Advantages:

- + Closest to industrial areas; best alternative for truck route use
- + Least number of displacements
- + Least number of stops

Disadvantages:

- Poorest connectivity with SH-74 for bypass use
- Splits the most parcels
- Possible resistance from residents near the alignment who do not want noise, development, or diminished property value

Critical Route Characteristics:	Route #1	Route #2	Route #3	Cost Estimate:	
# of Signals	7	7	6	Preliminary Engineering	\$2,125,100
# of Displacements:	18	17	6	Right-of-Way	\$13,169,400
Acres of ROW needed:	60	69	67	Construction	\$21,251,000
				Total Estimated Cost	\$36,546,000
				Benefit/Cost Ratio:	n/a

7.4 Right-of-Way

The recommended right-of-way width for the SE Alternate Route is 133 feet, with 142 feet required within 500 feet of intersections.

A 133-foot right-of-way would accommodate two 12-foot wide travel lanes in each direction, a center 15-foot wide depressed or raised median, 8-foot wide shoulders, 30 feet of clear zone on each side of the traveled way, and 5 feet each side for power poles and utility devices outside the clear zone. Within 500 feet of intersections, 142 feet is required to accommodate a right-turn lane and dual left-turn lanes¹⁰. See Figure 16 below for an illustration of this configuration.

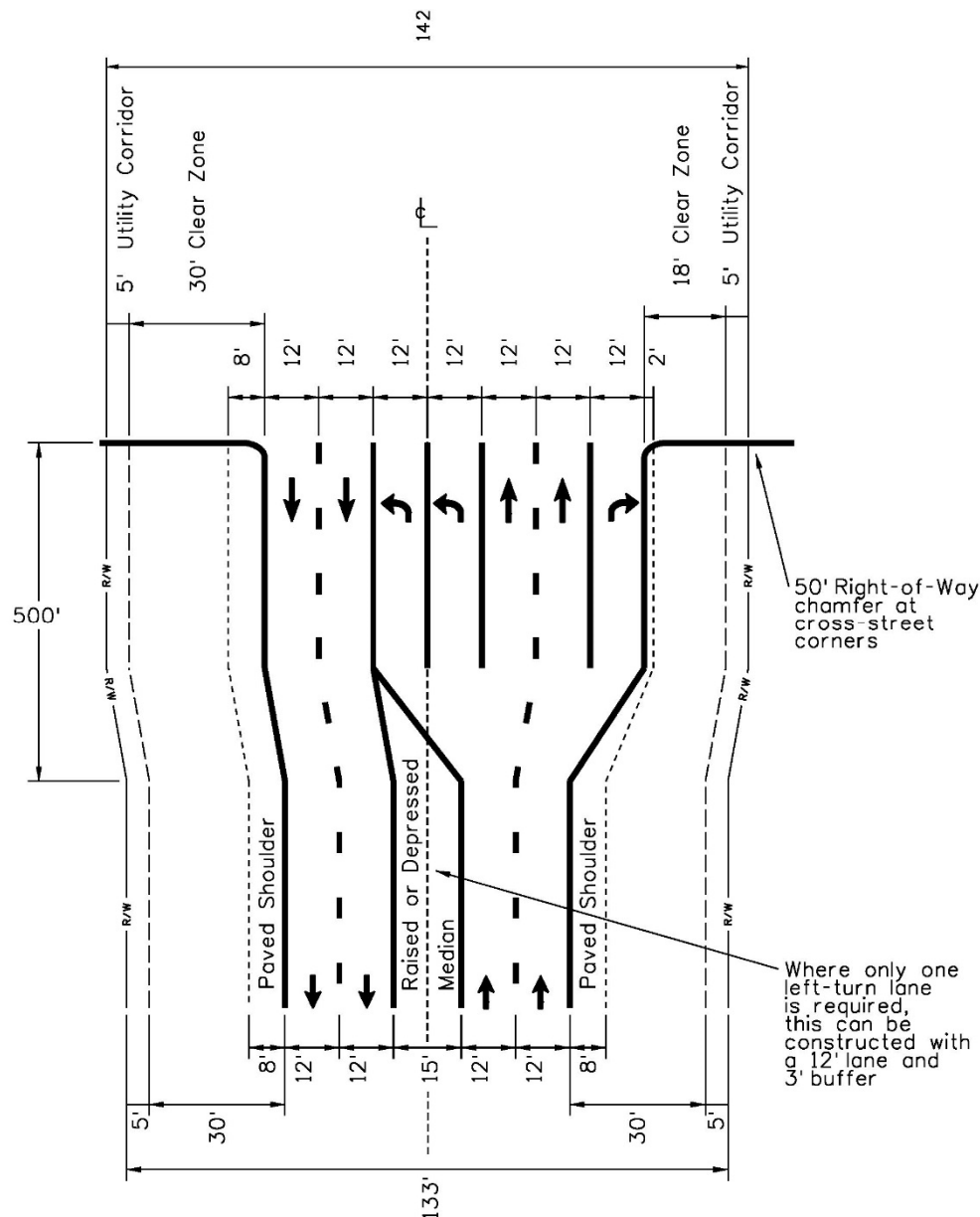


Figure 16: SE Alternate Route Lane Configuration

¹⁰ Eighteen (18) feet of clear zone is acceptable adjacent to the right-turn lane because turning vehicles must slow down or stop, and the reduced speeds allow smaller clear zone distances. Thirty (30) feet of clear zone is still provided to through traffic.

7.4.1 Median Width

The 2011 Policy on Geometric Design of Highways and Streets (Green Book) does not explicitly recommend a 15-foot wide median for divided highways. However, it implies a width greater than 12 feet:

“While medians as narrow as 1.2 to 1.8 m [4 to 6 ft] may be used under very restricted conditions, medians 3.6 to 9 m [12 to 30 ft] wide provide a protected storage area for left-turning vehicles at intersections.” Page 7.14 of 2011 Green Book

“If at all practical, the right-of-way should be wide enough to permit the use of median and borders of not less than 4.5 m [15 ft]. A 4.5 m [15 ft] median is near the minimum median width within which a median lane can be provided at intersections.” Page 7.22 of 2011 Green Book

The 15-foot median allows a 12-foot left turn lane and 3-foot buffer at intersections without having to widen the road.

7.5 Access Management Policy

This section details the recommended access management policy for the SE Alternate Route. This recommended policy limits the number of driveways, intersections, and traffic signals along the route. Limiting access is essential for safe, high-speed travel and for preserving the function of the route. The policy should be enacted as soon as an alignment is selected and used in the on-going planning process to allow enough time to locate new access points and close or reroute non-compliant accesses.

7.5.1 Access Spacing Recommendations

Access spacing for the route should follow that of a Rural Statewide Route from Idaho Administrative Procedures Act (IDAPA) 39.03.42, outlined in red in Table 14 and illustrated in Figure 17. This provides more access than the existing access control on the rural section of the US 93 Alternate Route.

Table 14: Access Spacing from IDAPA 39.03.42

HIGHWAY TYPE	AREA TYPE	Signalized Road Spacing	Public Road Spacing (A)	Driveway Distance Upstream From Public Road Intersection (B)	Driveway Distance Downstream From Unsignalized Public Road Intersection (C)	Distance Between Unsignalized Accesses Other Than Public Roads (D)
Interstate	All	Accessible only by interchanges (ramps) and requires approval by the Board and Federal Highway Administration.				
Freeway	All	Accessible only by interchanges (ramps).				
Expressway	All	Accessible only at locations specified by the Department.				
Statewide Route	Rural	5,280 ft	5,280 ft	1,000 ft	650 ft	650 ft
	Transitional	5,280 ft	2,640 ft	760 ft	500 ft	500 ft
	Urban >35 mph	2,640 ft	1,320 ft	790 ft	500 ft	500 ft
	Urban ≤35 mph	2,640 ft	1,320 ft	790 ft	250 ft**	250 ft**
Regional Route	Rural	5,280 ft	2,640 ft	1,000 ft	650 ft	650 ft
	Transitional	2,640 ft	1,320 ft	690 ft	360 ft**	360 ft**
	Urban >35 mph	2,640 ft	660 ft	660 ft	360 ft**	360 ft**
	Urban ≤35 mph	2,640 ft	660 ft	660 ft	250 ft**	250 ft**
District Route	Rural	2,640 ft	1,320 ft	760 ft	500 ft	500 ft
	Transitional	2,640 ft	660 ft	660 ft	360 ft**	360 ft**
	Urban >35 mph	1,320 ft	660 ft	660 ft	360 ft**	360 ft**
	Urban ≤35 mph	1,320 ft	660 ft	660 ft	250 ft**	250 ft**

*Distances in table are minimums based on optimal operational and safety conditions such as adequate sight distance and level grade. Definitions of spacing designated by (A), (B), (C), and (D) are represented on Figure 1.

** Where the public road intersection or private access intersection is signalized, the distances in the table are for driveways restricted to right-in/right-out movements only. For unrestricted driveways the minimum distance shall be 500 feet from a signalized intersection.

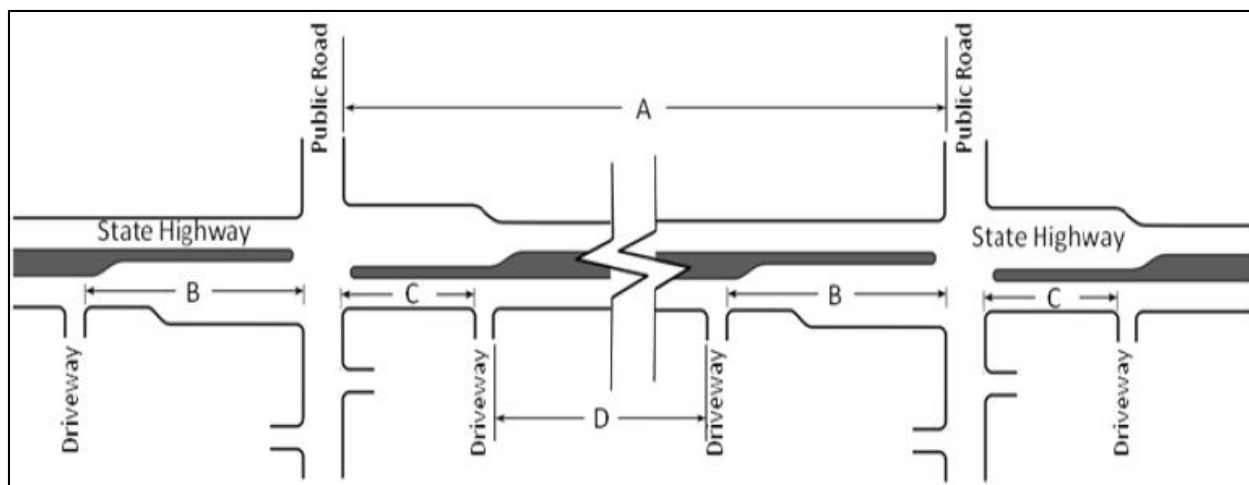


Figure 17: Access Spacing from IDAPA 39.03.42

This recommended access policy allows full-access signalized intersections every mile along the route, or on each section-line road crossed by the route. This allows up to seven signals for route Alternatives 1 and 2, and six signals for Alternative 3. These signals should be coordinated to maintain progression and low travel times through the corridor.

Full-access unsignalized intersections should be allowed at half-mile minimum spacing. The cross-street approaches would be stop-controlled. If any of these unsignalized intersections meet warrants for a traffic signal, the cross-street approaches should instead be limited to right-in/right-out access by extending the center raised or depressed median through the intersection¹¹.

The only other access to the route should be limited to right-in/right-out, private, low-volume driveways. The recommended raised or depressed median will provide right-in/right-out access control. Minimum spacings outlined in Table 14 above allow up to eight driveways per mile (four driveways per mile per side of the road).

7.5.2 Non-compliant Existing Accesses

Some of the existing accesses fronting the SE Alternate Route do not meet the access spacings suggested above. This is especially true for the numerous accesses on 3600 N road, which Alternatives 1 and 2 follow. Accesses which do not conform to the recommended access spacings should be temporarily permitted, but required to be rerouted or closed when the property is redeveloped. Preserving the route now (for construction 40 years in the future) should allow enough time to remove non-compliant accesses.

7.5.3 New Accesses

New accesses should only be permitted if compliant with the recommended access spacings. Future parcel splits and platted property should also adhere to the recommended access restrictions to the SE Alternate Route.

¹¹ Left turns (both into and out of stop-controlled approaches) are the most dangerous movement at two-way stop-controlled intersections. Restricting these movements with a center median improves safety, especially at high volume intersections where drivers face longer delays and are more likely to risk crossing the main route through unsuitable gaps.

7.6 Next Steps

The decision whether to create a SE Alternate Route is a major undertaking that is beyond the scope of this Study. This limited analysis of an alternative route indicated that the existing roadway system will not be adequate to serve the anticipated traffic in SE Twin Falls within the next 40 years. However, this Study had limited public involvement and outreach. The public outreach that occurred consisted of interviews with commercial drivers and business, and a brief presentation at a chamber of commerce luncheon, with limited elected official involvement. In addition, a comprehensive origin and destination study was not conducted for this analysis. Based on the limited public outreach and the lack of an origin and destination study, it is recommended that the following next steps should be taken to determine if a SE Alternate Route is needed and desired.

- Public Involvement – An extensive public involvement effort should be conducted that engages both the general population and elected officials. The outreach should focus on three areas:
 1. Provide information to the general public, stakeholders, and elected officials regarding this study, current traffic issues, proposed improvement projects to the current roadway system, and projected traffic and population growth areas. Present information on possible alternative routes and impacts, along with roadway lane configurations, right-of-way widths, speed limits, and access management policies.
 2. Solicit public input to determine willingness to preserve right-of-way for a SE Alternate Route.
 3. Communicate decisions regarding a SE Alternate Route to the public.
- Origin and Destination Study – Complete a comprehensive origin and destination study. The study area should include all of Twin Falls County south of I-84, and encompasses the cities of Twin Falls, Kimberly, Hansen, and Hollister.
- Twin Falls Highway District Transportation Plan Update – Further analyze the need for a SE Alternate Route in an update to the Twin Falls Highway District Transportation Plan. The analysis should be based on information and input obtained from the public involvement process and origin and destination study. If the analysis and public involvement indicate the need for a SE Alternate Route, select an alignment for the route and establish right-of-way widths, and access management policies for the route. Update the Highway Designation Map to include the selected route and formally adopt the Transportation Plan Update.
- Twin Falls County, Adoption of the Highway Designation Map – If the Twin Falls Highway District formally adopts a SE Alternative Route then Twin Falls County will need to update the Highway Designation Map in accordance with County Code 8-5-2.
- Right-of-Way and Access Preservation – If a SE Alternate Route is adopted, coordinate efforts to preserve right-of-way widths and assess access for proposed land development applications.

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8 Study Conclusions and Recommendations

The 2014 update to the 2004 Southeast Twin Falls Regional Corridor Study investigated the existing transportation conditions in the region, identified forecast shortfalls in the transportation system, and recommends improvements to address the future shortfalls. Conclusions and recommendations from this study are summarized below.

Existing Conditions

- Twin Falls and the surrounding region has seen accelerated population and traffic growth since 2000.
- All major routes through south Twin Falls have similar travel times; there is no clear and direct route through the region.
- Current demand for a SE Alternate Route likely do not justify construction costs of the route.
- Smaller scale safety and capacity issues require more immediate attention.

Prioritized Safety Improvements

1. US 93 – Install centerline rumble strips
2. US 93 & 2900 N – Construct left turn lanes, widen shoulders, install intersection warning signs
3. US 30 & 3400 E – Relocate Stop Ahead signs and install flashing amber beacons
4. US 30 & 3300 E – Construct left turn lanes, relocate Stop Ahead signs and install flashing amber beacons
5. SH 50 & 3800 E – Realign 3800 E to intersect SH 50 at a right angle, install traffic signal, install flashing amber beacons
6. SH 30 & Locust St. – Add signal heads for protected left turns and flashing yellow arrow
7. US 93 – Install fogline rumble strips, restripe foglines, widen shoulders
8. SH 74 & Orchard Dr. – Install advanced intersection warning beacon

Prioritized Capacity Improvements

1. Shoshone St. & 2nd Ave. N – Relocate stop bar
2. Blue Lakes Blvd. & US 30 – Prohibit NB left turns, optimize signal timing
3. Blue Lakes Blvd. & US 30 – Widen, add and reconfigure lanes
4. Shoshone St. & 6th Ave. W – Widen, add and reconfigure lanes
5. Washington St. (Highland Ave. to Orchard Dr.) – Widen to 5 lanes
6. Blue Lakes Blvd. & Orchard Dr. – Install traffic signal
7. Blue Lakes Blvd. (US 30 to Orchard Dr.) – Widen to 3 to 5 lanes
8. Eastland Dr. (US 30 to Orchard Dr.) – Widen/pave shoulders, reconstruct railroad underpass
9. Murtaugh St. & 2nd Ave. S – Conduct traffic study, install signal if warranted

SE Alternate Route

- Conduct an extensive public outreach and involvement effort to determine if a SE Alternate route is desired.
- Conduct an origin and destination study of Twin Falls County south of I-84 that encompasses the cities of Twin Falls, Kimberly, Hansen, and Hollister.
- Further analyze the need for a SE Alternate Route in an Update to the Twin Falls Highway District Transportation Plan.
- If a SE Alternate Route is needed, formally adopt the Transportation Plan Update and Highway Designation Map and preserve right-of-way and access to adjacent properties.

Appendix A

Planning-Level Cost Estimates

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S-1a US 93, MP 0 to MP 38.05

Project No.

Key No. S-1a

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rumble Strips on Centerline	Mile	38	\$ 750.00	\$28,500
Pavement Markings	FT	230,000	\$ 0.12	\$27,600
Rent Const Sign CI B	SF	160	\$ 4.00	\$640
Traffic Control Maintenance	MNHR	40	\$ 48.00	\$1,920
Flagging	MNHR	80	\$ 32.00	\$2,560
<i>SUBTOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$62,000</i>
Mobilization	%	10%	\$ 6,200	\$6,200
Contingency	%	10%	\$ 6,820	\$6,820
Construction Engineering & Inspection	%	15%	\$ 11,253	\$11,253
<i>CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$87,000</i>
Design	%	15%	\$ 13,050	\$13,050
Right-of-Way	LS	0		\$0
<i>TOTAL (Rounded up to the nearest \$1,000)</i>				<i>\$101,000</i>

I-1 US 93 and 2900 N

Project No.

Key No. I-1

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rem of Obstructions	LS	1	\$ 2,000.00	\$2,000
Excavation	CY	750	\$ 8.00	\$6,000
Granular Borrow	CY	2,000	\$ 12.00	\$24,000
Granular Subbase	TON	2,100	\$ 10.00	\$21,000
3/4" Aggr. For Crushed Base	TON	1,100	\$ 20.00	\$22,000
CSS-1 Dil Emul Asph for Tack	Gal.	145	\$ 2.10	\$305
Superpave Plant Mix Pavement	TON	480	\$ 85.00	\$40,800
Sign Ty B	SF	64	\$ 12.00	\$768
Brkawy Wood Sign Post Ty D	MFBM	0.06	\$ 8,000.00	\$475
Flashing Beacons (solar powered)	Each	2.00	\$ 3,500.00	\$7,000
Rent Const Sign Cl B	SF	363	\$ 4.00	\$1,450
Rent Drum Cl B	Each	30	\$ 12.00	\$360
Traffic Control Maintenance	MNHR	50	\$ 48.00	\$2,400
Flagging	MNHR	120	\$ 32.00	\$3,840
Survey	LS	1	\$ 4,000.00	\$4,000
Pavement Markings	FT	5,000	\$ 0.12	\$600
Fiber Wattles	FT	200	\$ 2.50	\$500
Special Pav Marking (Thermo)	SF	116	\$ 9.00	\$1,044
Seal Coat	SY	8,300	\$ 2.00	\$16,600
SUBTOTAL (Rounded up to the nearest \$1,000)				\$156,000
Mobilization	%	10%	\$ 15,600	\$15,600
Contingency	%	10%	\$ 17,160	\$17,160
Construction Engineering & Inspection	%	15%	\$ 28,314	\$28,314
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$218,000
Design	%	18%	\$ 39,240	\$39,240
Right-of-Way	LS	1	\$ 23,000	\$23,000
TOTAL (Rounded up to the nearest \$1,000)				\$281,000

I-4 US 30 and 3400 E

Project No.

Key No. I-4

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Sign Ty B	SF	64	\$ 12.00	\$768
Brkavy Wood Sign Post Ty D	MFBM	0.06	\$ 8,000.00	\$475
Flashing Beacons (solar powered)	Each	2.00	\$ 3,500.00	\$7,000
Rent Const Sign Cl B	SF	32	\$ 4.00	\$128
SUBTOTAL (Rounded up to the nearest \$1,000)				\$9,000
Mobilization	%	10%	\$ 900	\$900
Contingency	%	10%	\$ 990	\$990
Construction Engineering & Inspection	%	15%	\$ 1,634	\$1,634
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$13,000
Design	%	20%	\$ 2,600	\$2,600
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$16,000

I-3 US 30 and 3300 E

Project No.

Key No. I-3

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rem of Obstructions	LS	1	\$ 2,000.00	\$2,000
Excavation	CY	2000	\$ 8.00	\$16,000
Granular Borrow	CY	200	\$ 12.00	\$2,400
Granular Subbase	TON	850	\$ 10.00	\$8,500
3/4" Aggr. For Crushed Base	TON	450	\$ 20.00	\$9,000
CSS-1 Dil Emul Asph for Tack	Gal.	60	\$ 2.10	\$126
Superpave Plant Mix Pavement	TON	200	\$ 85.00	\$17,000
Guardrail	FT	50	\$ 20.00	\$1,000
Guardrail Terminal Type 1	Each	1	\$ 900.00	\$900
Guardrail Terminal Type 7	Each	1	\$ 1,800.00	\$1,800
Sign Ty B	SF	64	\$ 12.00	\$768
Brkawy Wood Sign Post Ty D	MFBM	0.06	\$ 8,000.00	\$475
Flashing Beacons (solar powered)	Each	2.00	\$ 3,500.00	\$7,000
Rent Const Sign Cl B	SF	363	\$ 4.00	\$1,450
Rent Drum Cl B	Each	50	\$ 12.00	\$600
Traffic Control Maintenance	MNHR	120	\$ 48.00	\$5,760
Flagging	MNHR	50	\$ 32.00	\$1,600
Survey	LS	1	\$ 4,000.00	\$4,000
Pavement Markings	FT	11,000	\$ 0.12	\$1,320
Fiber Wattles	FT	200	\$ 2.50	\$500
Special Pav Marking (Thermo)	SF	116	\$ 9.00	\$1,044
Seal Coat	SY	10,500	\$ 2.00	\$21,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$105,000
Mobilization	%	10%	\$ 10,500	\$10,500
Contingency	%	10%	\$ 11,550	\$11,550
Construction Engineering & Inspection	%	15%	\$ 19,058	\$19,058
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$147,000
Design	%	20%	\$ 29,400	\$29,400
Right-of-Way	LS	1	\$ 57,000	\$57,000
TOTAL (Rounded up to the nearest \$1,000)				\$234,000

I-6 SH 50 and 3800 E

Project No.

Key No. I-6

September 18, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rem of Obstructions	LS	1	\$ 2,000.00	\$2,000
Obliteration of Old Road	FT	600	\$ 5.00	\$3,000
Water for Dust Abatement	MG	50	\$ 20.00	\$1,000
Granular Subbase	TON	3,300	\$ 10.00	\$33,000
3/4" Aggr. For Crushed Base	TON	1,500	\$ 20.00	\$30,000
CSS-1 Dil Emul Asph for Tack	Gal.	370	\$ 2.10	\$777
Superpave Plant Mix Pavement	TON	690	\$ 85.00	\$58,650
Sign Ty B	SF	41	\$ 12.00	\$492
Brkawy Wood Sign Post Ty D	MFBM	0.09	\$ 8,000.00	\$713
Flashing Beacons (solar powered)	Each	2.00	\$ 3,500.00	\$7,000
Seed Bed Preparation	Acre	1.00	\$ 300.00	\$300
Seeding	Acre	1.00	\$ 350.00	\$350
Traffic Signal Installation	LS	1.00	\$ 350,000.00	\$350,000
Rent Const Sign Cl B	SF	363	\$ 4.00	\$1,450
Rent Drum Cl B	Each	30	\$ 12.00	\$360
Traffic Control Maintenance	MNHR	200	\$ 48.00	\$9,600
Flagging	MNHR	400	\$ 32.00	\$12,800
Survey	LS	1	\$ 10,000.00	\$10,000
Composted Ungulate Manure	Acre	1.0	\$ 2,000.00	\$2,000
Pavement Markings	FT	7,000	\$ 0.12	\$840
Fiber Wattles	FT	200	\$ 2.50	\$500
Special Pav Marking (Thermo)	SF	90	\$ 9.00	\$810
SUBTOTAL (Rounded up to the nearest \$1,000)				\$526,000
Mobilization	%	10%	\$ 52,600	\$52,600
Contingency	%	10%	\$ 57,860	\$57,860
Construction Engineering & Inspection	%	15%	\$ 95,469	\$95,469
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$732,000
Design	%	15%	\$ 109,800	\$109,800
Right-of-Way	LS	1	\$ 113,000	\$113,000
TOTAL (Rounded up to the nearest \$1,000)				\$955,000

I-5 US 30 and Locust St.

Project No.

Key No. I-5

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Traffic Signal Modification	LS	1	\$ 40,000.00	\$40,000
Rent Const Sign Cl B	SF	150	\$ 4.00	\$600
Rent Drum Cl B	Each	20	\$ 12.00	\$240
Traffic Control Maintenance	MNHR	20	\$ 48.00	\$960
Flagging	MNHR	20	\$ 32.00	\$640
SUBTOTAL (Rounded up to the nearest \$1,000)				\$43,000
Mobilization	%	10%	\$ 4,300	\$4,300
Contingency	%	10%	\$ 4,730	\$4,730
Construction Engineering & Inspection	%	15%	\$ 7,805	\$7,805
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$60,000
Design	%	15%	\$ 9,000	\$9,000
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$69,000

S-1b US 93, MP 0 to MP 38.05

Project No.

Key No. S-1b

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Rem of Obstructions	LS	1	\$ 20,000.00	\$20,000
Rem of Fence	FT	300,000	\$ 1.30	\$390,000
Excavation	CY	80,000	\$ 8.00	\$640,000
Granular Borrow	CY	2,000	\$ 12.00	\$24,000
Granular Subbase	TON	98,000	\$ 10.00	\$980,000
3/4" Aggr. For Crushed Base	TON	51,000	\$ 18.00	\$918,000
CSS-1 Dil Emul Asph for Tack	Gal.	6,700	\$ 2.10	\$14,070
Superpave Plant Mix Pavement	TON	22,500	\$ 75.00	\$1,687,500
Guardrail	FT	1,000	\$ 20.00	\$20,000
Guardrail Terminal Type 5	Each	4	\$ 2,000.00	\$8,000
Guardrail Terminal Type 10	Each	4	\$ 2,600.00	\$10,400
24" Culvert	FT	1,520	\$ 50.00	\$76,000
42" Culvert	FT	760	\$ 95.00	\$72,200
24" Tapered End	Each	76	\$ 500.00	\$38,000
42" Tapered End	Each	38	\$ 1,500.00	\$57,000
Sign Ty B	SF	125	\$ 12.00	\$1,500
Brkawy Wood Sign Post Ty D	MFBM	1.29	\$ 8,000.00	\$10,296
Rent Const Sign Cl B	SF	363	\$ 4.00	\$1,450
Rent Drum Cl B	Each	50	\$ 12.00	\$600
Tubular Markers	Each	200	\$ 6.00	\$1,200
Traffic Control Maintenance	MNHR	800	\$ 48.00	\$38,400
Flagging	MNHR	240	\$ 32.00	\$7,680
Survey	LS	1	\$ 80,000.00	\$80,000
Pavement Markings	FT	400,000	\$ 0.12	\$48,000
Special Pav Marking (Thermo)	SF	1,160	\$ 9.00	\$10,440
Delineators	Each	800	\$ 30.00	\$24,000
Fiber Wattles	FT	4,000	\$ 2.50	\$10,000
Fence	FT	400,000	\$ 4.00	\$1,600,000
Rumble Strips on Foglines	Mile	76	\$ 750.00	\$57,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$6,846,000
Mobilization	%	10%	\$ 684,600	\$684,600
Contingency	%	10%	\$ 753,060	\$753,060
Construction Engineering & Inspection	%	15%	\$ 1,242,549	\$1,242,549
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$9,527,000
Design	%	10%	\$ 952,700	\$952,700
Right-of-Way	LS	1	\$ 915,000	\$915,000
TOTAL (Rounded up to the nearest \$1,000)				\$11,395,000

I-2 SH 74 and Orchard Dr

Project No.

Key No. I-2

September 22, 2014

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Sign Ty B	SF	70	\$ 12.00	\$840
Brkavy Wood Sign Post Ty D	MFBM	0.12	\$ 8,000.00	\$950
Signal Coordinated Flashing Beacons	Each	2.00	\$ 5,000.00	\$10,000
Rent Const Sign Cl B	SF	150	\$ 4.00	\$600
Rent Drum Cl B	Each	10	\$ 12.00	\$120
Traffic Control Maintenance	MNHR	20	\$ 48.00	\$960
Flagging	MNHR	20	\$ 32.00	\$640
SUBTOTAL (Rounded up to the nearest \$1,000)				\$15,000
Mobilization	%	10%	\$ 1,500	\$1,500
Contingency	%	10%	\$ 1,650	\$1,650
Construction Engineering & Inspection	%	15%	\$ 2,723	\$2,723
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$21,000
Design	%	20%	\$ 4,200	\$4,200
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$26,000

I-7 Shoshone St and 2nd Ave N

Project No.

Key No. I-7

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Obliteration of Pavement Markings	SF	30	\$ 15.00	\$450
Modify Signal Detection	LS	1	\$ 4,000.00	\$4,000
Pavement Markings - Special	SF	24	\$ 10.00	\$240
Adjust Signal Timing	LS	1	\$ 200.00	\$200
Traffic Control Items	LS	1	\$ 2,000.00	\$2,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$7,000
Mobilization	%	10%	\$ 700	\$700
Contingency	%	10%	\$ 770	\$770
Construction Engineering & Inspection	%	15%	\$ 1,271	\$1,271
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$10,000
Design	%	35%	\$ 3,500	\$3,500
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$14,000

I-9a Blue Lakes Blvd and US 30 (Kimberly Rd)

Project No.

Key No. I-9a

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Sign - No Left Turn	EACH	1	\$ 200.00	\$200
Traffic Sign and Post	EACH	1	\$ 400.00	\$400
Pavement Markings - Special	SF	56	\$ 10.00	\$560
Traffic Signal Modifications	LS	1	\$ 5,000.00	\$5,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$7,000
Mobilization	%	10%	\$ 700	\$700
Contingency	%	10%	\$ 770	\$770
Construction Engineering & Inspection	%	15%	\$ 1,271	\$1,271
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$10,000
Design	%	30%	\$ 3,000	\$3,000
Right-of-Way	LS	0		\$0
TOTAL (Rounded up to the nearest \$1,000)				\$13,000

I-9b Blue Lakes Blvd and US 30 (Kimberly Rd)

Project No.

Key No. I-9b

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	0.10	\$ 15,000.00	\$1,500
Removal of Obstructions	LS	1	\$ 12,000.00	\$12,000
Remove and Reset Fence	FT	320	\$ 10.00	\$3,200
Removal of Curb and Gutter	FT	1,500	\$ 4.00	\$6,000
Removal of Concrete Sidewalk	SY	550	\$ 7.00	\$3,850
Removal of Concrete Pavement	SY	200	\$ 8.00	\$1,600
Removal of Pavement	SY	340	\$ 5.00	\$1,700
Excavation	CY	150	\$ 10.00	\$1,500
Granular Subbase	TON	560	\$ 10.00	\$5,600
3/4" Aggregate Type B for Base	TON	460	\$ 20.00	\$9,200
Concrete Sidewalk	SY	420	\$ 40.00	\$16,800
Pedestrian Ramps	EACH	6	\$ 1,500.00	\$9,000
Urban Approach	EACH	11	\$ 2,000.00	\$22,000
Combination Curb & Gutter Type A	FT	950	\$ 22.00	\$20,900
Pavement (HMA)	TON	200	\$ 85.00	\$17,000
Pavement Markings - Striping	FT	5,000	\$ 0.20	\$1,000
Pavement Markings - Special	SF	500	\$ 10.00	\$5,000
Seal Coat	SY	7,200	\$ 2.00	\$14,400
Railroad Crossing Improvements	LS	1	\$ 60,000.00	\$60,000
Sign Bridge Foundations	LS	1	\$ 10,700.00	\$10,700
Sign Bridge Steel Structure	LS	1	\$ 83,700.00	\$83,700
Relocate Bridge Signs	LS	1	\$ 7,500.00	\$7,500
Sign Bridge Luminaires	LS	1	\$ 28,000.00	\$28,000
Sign - No Left Turn	EACH	1	\$ 200.00	\$200
Sign - No Turn On Red	EACH	1	\$ 200.00	\$200
Traffic Sign and Post	EACH	1	\$ 400.00	\$400
Traffic Signal Modifications	LS	1	\$ 5,000.00	\$5,000
Traffic Control Items	LS	1	\$ 10,000.00	\$10,000
Survey	LS	1	\$ 20,000.00	\$20,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$378,000
Mobilization	%	10%	\$ 37,800	\$37,800
Contingency	%	10%	\$ 41,580	\$41,580
Construction Engineering & Inspection	%	15%	\$ 68,607	\$68,607
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$526,000
Design	%	15%	\$ 78,900	\$78,900
Right-of-Way	LS	1	\$ 97,000	\$97,000
TOTAL (Rounded up to the nearest \$1,000)				\$702,000

I-8 Shoshone St and 6th Ave

Project No.

Key No. I-8

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	0.10	\$ 15,000.00	\$1,500
Removal of Obstructions	LS	1	\$ 2,000.00	\$2,000
Removal of Curb and Gutter	FT	610	\$ 4.00	\$2,440
Removal of Concrete Sidewalk	SY	300	\$ 10.00	\$3,000
Removal of Pavement	SY	270	\$ 5.00	\$1,350
Relocate Irrigation Lines	LS	1	\$ 15,000.00	\$15,000
Excavation	CY	3,000	\$ 10.00	\$30,000
Granular Subbase	TON	2,100	\$ 10.00	\$21,000
3/4" Aggregate Type B for Base	TON	1,400	\$ 20.00	\$28,000
Concrete Sidewalk	SY	300	\$ 40.00	\$12,000
Pedestrian Ramps	EACH	7	\$ 1,500.00	\$10,500
Combination Curb & Gutter Type A	FT	2,500	\$ 22.00	\$55,000
Pavement (HMA)	TON	600	\$ 85.00	\$51,000
Pavement Markings - Striping	FT	7,100	\$ 0.20	\$1,420
Pavement Markings - Special	SF	200	\$ 10.00	\$2,000
Seal Coat	SY	5,500	\$ 2.00	\$11,000
Railroad Crossing Improvements	LS	1	\$ 60,000.00	\$60,000
Traffic Signal Modifications	LS	1	\$ 35,000.00	\$35,000
Traffic Control Items	LS	1	\$ 20,000.00	\$20,000
Survey	LS	1	\$ 15,000.00	\$15,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$378,000
Mobilization	%	10%	\$ 37,800	\$37,800
Contingency	%	10%	\$ 41,580	\$41,580
Construction Engineering & Inspection	%	15%	\$ 68,607	\$68,607
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$526,000
Design	%	15%	\$ 78,900	\$78,900
Right-of-Way	LS	1	\$ 330,000	\$330,000
TOTAL (Rounded up to the nearest \$1,000)				\$935,000

S-4 Washington (Highland to Orchard)

Project No.

Key No. S-4

January 22, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Removal of Obstructions	LS	1	\$ 50,000.00	\$50,000
Clearing and Grubbing	ACRE	1.75	\$ 6,000.00	\$10,474
Excavation	CY	7,200	\$ 10.00	\$72,000
Granular Subbase	TON	8,000	\$ 10.00	\$80,000
3/4" Aggregate Type B for Base	TON	6,000	\$ 20.00	\$120,000
Pavement (HMA)	TON	2,200	\$ 80.00	\$176,000
Tack Coat	GAL	900	\$ 2.10	\$1,890
Pavement Markings - Striping	FT	15,000	\$ 0.20	\$3,000
Pavement Markings - Arrows	SF	300	\$ 10.00	\$3,000
Concrete Sidewalk	SY	5,100	\$ 40.00	\$204,000
Urban Approach	EA	51	\$ 2,500.00	\$127,500
Combination Curb & Gutter Type A	FT	7,600	\$ 22.00	\$167,200
Pedestrian Ramps	EA	32	\$ 1,500.00	\$48,000
Remove and Reset Fence	LF	3,160	\$ 10.00	\$31,600
Traffic Items	LS	1	\$ 5,000.00	\$5,000
Storm Drain System	LS	1	\$ 250,000.00	\$250,000
Traffic Control Items	LS	1	\$ 30,000.00	\$30,000
Survey	LS	1	\$ 30,000.00	\$30,000
Sediment and Erosion Control	LS	1	\$ 10,000.00	\$10,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$1,420,000
Mobilization	%	10%	\$ 142,000	\$142,000
Contingency	%	10%	\$ 156,200	\$156,200
Construction Engineering & Inspection	%	15%	\$ 257,730	\$257,730
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$1,976,000
Design	%	15%	\$ 296,400	\$296,400
Right-of-Way	LS	1	\$ 754,000	\$754,000
TOTAL (Rounded up to the nearest \$1,000)				\$3,027,000

I-10 Blue Lakes Blvd and Orchard Dr

Project No.

Key No. I-10

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Removal of Existing Signs	EA	3	\$ 50.00	\$150
3/4" Aggregate Type B for Base	TN	390	\$ 20.00	\$7,800
Concrete Sidewalk	SY	130	\$ 40.00	\$5,200
Pedestrian Ramps	EA	8	\$ 1,500.00	\$12,000
Combination Curb & Gutter Type A	FT	250	\$ 22.00	\$5,500
Pavement (HMA)	TON	50	\$ 110.00	\$5,500
Traffic Signal Installation	LS	1	\$ 350,000.00	\$350,000
Pavement Markings - Striping	FT	7,200	\$ 0.20	\$1,440
Pavement Markings - Special	SF	119	\$ 10.00	\$1,194
Reconstruct Irrigation Box	EA	1	\$ 4,000.00	\$4,000
Traffic Items	LS	1	\$ 1,000.00	\$1,000
Traffic Control Items	LS	1	\$ 5,000.00	\$5,000
Survey	LS	1	\$ 4,000.00	\$4,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$403,000
Mobilization	%	10%	\$ 40,300	\$40,300
Contingency	%	10%	\$ 44,330	\$44,330
Construction Engineering & Inspection	%	15%	\$ 73,145	\$73,145
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$561,000
Design	%	15%	\$ 84,150	\$84,150
Right-of-Way	LS	1	\$ 32,000	\$32,000
TOTAL (Rounded up to the nearest \$1,000)				\$678,000

S-2 Blue Lakes Blvd (US 30 to Orchard)

Project No.

Key No. S-2

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	4.50	\$ 6,000.00	\$27,019
Removal of Obstructions	LS	1	\$ 15,000.00	\$15,000
Remove and Reset Fence	FT	440	\$ 10.00	\$4,400
Removal of Curb and Gutter	FT	7,300	\$ 3.00	\$21,900
Removal of Concrete Sidewalk	SY	1,200	\$ 8.00	\$9,600
Removal of Pavement	SY	5,600	\$ 3.00	\$16,800
Excavation	CY	4,200	\$ 10.00	\$42,000
Borrow	CY	110,000	\$ 12.00	\$1,320,000
Granular Subbase	TON	9,000	\$ 10.00	\$90,000
3/4" Aggregate Type B for Base	TON	5,100	\$ 20.00	\$102,000
Concrete Sidewalk	SY	1,200	\$ 40.00	\$48,000
Combination Curb & Gutter Type A	FT	7,300	\$ 22.00	\$160,600
Pavement (HMA)	TON	2,300	\$ 80.00	\$184,000
Pavement Markings - Striping	FT	23,000	\$ 0.20	\$4,600
Pavement Markings - Special	SF	420	\$ 10.00	\$4,200
Urban Approach	EACH	50	\$ 1,500.00	\$75,000
Traffic Control Items	LS	1	\$ 20,000.00	\$20,000
Survey	LS	1	\$ 30,000.00	\$30,000
Railroad Crossing Improvements	LS	1	\$ 60,000.00	\$60,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$2,236,000
Mobilization	%	10%	\$ 223,600	\$223,600
Contingency	%	10%	\$ 245,960	\$245,960
Construction Engineering & Inspection	%	15%	\$ 405,834	\$405,834
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$3,112,000
Design	%	15%	\$ 466,800	\$466,800
Right-of-Way	LS	1	\$ 740,000	\$740,000
TOTAL (Rounded up to the nearest \$1,000)				\$4,319,000

S-3 Eastland Dr (US 30 to Orchard)

Project No.

Key No. S-3

January 21, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	0.40	\$ 12,000.00	\$4,800
Removal of Curb and Gutter	FT	2,350	\$ 3.00	\$7,050
Removal of Concrete Sidewalk	SY	1,100	\$ 8.00	\$8,800
Removal of Pavement	SY	9,200	\$ 3.00	\$27,600
Excavation	CY	13,000	\$ 8.00	\$104,000
Canal Siphon	LS	1	\$ 100,000.00	\$100,000
Retaining Wall	SF	2,000	\$ 60.00	\$120,000
Bridge Structure	SF	1,700	\$ 500.00	\$850,000
Granular Subbase	TON	6,400	\$ 10.00	\$64,000
3/4" Aggregate Type B for Base	TON	3,200	\$ 20.00	\$64,000
Concrete Sidewalk	SY	560	\$ 40.00	\$22,400
Pedestrian Ramps	EACH	2	\$ 1,500.00	\$3,000
Combination Curb & Gutter Type A	FT	2,350	\$ 22.00	\$51,700
Pavement (HMA)	TON	1,500	\$ 80.00	\$120,000
Pavement Markings - Striping	FT	14,200	\$ 0.20	\$2,840
Pavement Markings - Special	SF	30	\$ 10.00	\$300
Urban Approach	EACH	3	\$ 2,500.00	\$7,500
Traffic Control Items	LS	1	\$ 20,000.00	\$20,000
Survey	LS	1	\$ 15,000.00	\$15,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$1,593,000
Mobilization	%	10%	\$ 159,300	\$159,300
Contingency	%	10%	\$ 175,230	\$175,230
Construction Engineering & Inspection	%	15%	\$ 289,130	\$289,130
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$2,217,000
Design	%	15%	\$ 332,550	\$332,550
Right-of-Way	LS	1	\$ 216,000	\$216,000
TOTAL (Rounded up to the nearest \$1,000)				\$2,766,000

I-11 Murtaugh St and 2nd Ave S

Project No.

Key No. I-11

January 23, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Removal of Existing Signs	EA	2	\$ 50.00	\$100
Removal of Curb and Gutter	FT	80	\$ 6.00	\$480
Removal of Pavement	SY	200	\$ 5.00	\$1,000
Removal of Concrete Sidewalk	SY	41	\$ 10.00	\$410
3/4" Aggregate Type A for Base	TON	100	\$ 25.00	\$2,500
Concrete Sidewalk	SY	40	\$ 40.00	\$1,600
Pedestrian Ramp	EA	3	\$ 1,500.00	\$4,500
Combination Curb & Gutter Type A	FT	135	\$ 20.00	\$2,700
Pavement Markings - Striping	FT	610	\$ 2.00	\$1,220
Traffic Sign and Post	EA	1	\$ 400.00	\$400
Traffic Signal Installation	LS	1	\$ 250,000.00	\$250,000
Survey	LS	1	\$ 2,000.00	\$2,000
Traffic Control Items	LS	1	\$ 3,000.00	\$3,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$270,000
Mobilization	%	10%	\$ 27,000	\$27,000
Contingency	%	10%	\$ 29,700	\$29,700
Construction Engineering & Inspection	%	15%	\$ 49,005	\$49,005
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$376,000
Design	%	15%	\$ 56,400	\$56,400
Right-of-Way	LS	1	\$ 6,000	\$6,000
TOTAL (Rounded up to the nearest \$1,000)				\$439,000

R-1 3600 N to 3300E

Project No.

Key No. R-1

July 15, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	78	\$ 1,500.00	\$117,000
Excavation	CY	196,000	\$ 5.00	\$980,000
Retaining Wall	SF	6,720	\$ 60.00	\$403,200
Railroad Overpass Structure	SF	3,200	\$ 320.00	\$1,024,000
Guardrail	FT	300	\$ 35.00	\$10,500
Rock Creek Bridge Structure	SF	16,000	\$ 200.00	\$3,200,000
Box Culvert	SF	1,850	\$ 100.00	\$185,000
RABS	SY	88,000	\$ 1.50	\$132,000
Granular Subbase	TON	226,000	\$ 8.00	\$1,808,000
3/4" Aggr. For Crushed Base	TON	132,000	\$ 18.00	\$2,376,000
Superpave Plant Mix Pavement	TON	66,000	\$ 70.00	\$4,620,000
Drainage System	LS	1	\$ 50,000.00	\$50,000
Pavement Markings - Striping	FT	230,000	\$ 0.20	\$46,000
Pavement Markings - Special	SF	2,150	\$ 10.00	\$21,500
Traffic Signs	EA	25	\$ 200.00	\$5,000
Traffic Signal Installation	EA	1	\$ 350,000.00	\$350,000
Traffic Control	LS	1	\$ 160,000.00	\$160,000
Survey	LS	1	\$ 40,000.00	\$40,000
Field Lab	LS	1	\$ 10,000.00	\$10,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$15,539,000
Mobilization	%	10%	\$ 1,553,900	\$1,553,900
Contingency	%	10%	\$ 1,709,290	\$1,709,290
Construction Engineering & Inspection	%	15%	\$ 2,820,329	\$2,820,329
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$21,623,000
Design	%	10%	\$ 2,162,300	\$2,162,300
Right-of-Way	LS	1	\$14,846,880	\$14,846,880
TOTAL (Rounded up to the nearest \$1,000)				\$38,633,000

R-2 3600 N to 3350 E

Project No.

Key No. R-2

July 15, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	88	\$ 1,500.00	\$132,000
Excavation	CY	203,000	\$ 5.00	\$1,015,000
Retaining Wall	SF	6,720	\$ 60.00	\$403,200
Railroad Overpass Structure	SF	3,200	\$ 320.00	\$1,024,000
Guardrail	FT	300	\$ 35.00	\$10,500
Rock Creek Bridge Structure	SF	16,000	\$ 200.00	\$3,200,000
Box Culvert	SF	1,850	\$ 100.00	\$185,000
RABS	SY	58,667	\$ 1.50	\$88,000
Granular Subbase	TON	250,000	\$ 8.00	\$2,000,000
3/4" Aggr. For Crushed Base	TON	136,000	\$ 18.00	\$2,448,000
Superpave Plant Mix Pavement	TON	68,000	\$ 70.00	\$4,760,000
Drainage System	LS	1	\$ 50,000.00	\$50,000
Pavement Markings - Striping	FT	230,000	\$ 0.20	\$46,000
Pavement Markings - Special	SF	2,150	\$ 10.00	\$21,500
Traffic Signs	EA	23	\$ 200.00	\$4,600
Relocate Traffic Signal	EA	1	\$ 350,000.00	\$350,000
Traffic Control	LS	1	\$ 140,000.00	\$140,000
Survey	LS	1	\$ 40,000.00	\$40,000
Field Lab	LS	1	\$ 10,000.00	\$10,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$15,928,000
Mobilization	%	10%	\$ 1,592,800	\$1,592,800
Contingency	%	10%	\$ 1,752,080	\$1,752,080
Construction Engineering & Inspection	%	15%	\$ 2,890,932	\$2,890,932
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$22,164,000
Design	%	10%	\$ 2,216,400	\$2,216,400
Right-of-Way	LS	1	\$15,176,640	\$15,176,640
TOTAL (Rounded up to the nearest \$1,000)				\$39,558,000

R-3 Orchard Dr to 3300 E

Project No.

Key No. R-3

July 15, 2015

PRE-DESIGN

Opinion of Probable Cost (Major Items)

Item Description	Unit	Approx. Quantity	Unit Price	Bid Price
Clearing and Grubbing	ACRE	83	\$ 1,500.00	\$124,500
Excavation	CY	186,000	\$ 5.00	\$930,000
Retaining Wall	SF	6,720	\$ 60.00	\$403,200
Railroad Overpass Structure	SF	3,200	\$ 320.00	\$1,024,000
Guardrail	FT	300	\$ 35.00	\$10,500
Rock Creek Bridge Structure	SF	16,000	\$ 200.00	\$3,200,000
Box Culvert	SF	1,850	\$ 100.00	\$185,000
RABS	SY	33,600	\$ 1.50	\$50,400
Granular Subbase	TON	236,000	\$ 8.00	\$1,888,000
3/4" Aggr. For Crushed Base	TON	122,000	\$ 18.00	\$2,196,000
Superpave Plant Mix Pavement	TON	61,000	\$ 70.00	\$4,270,000
Drainage System	LS	1	\$ 70,000.00	\$70,000
Pavement Markings - Striping	FT	210,000	\$ 0.20	\$42,000
Pavement Markings - Special	SF	2,150	\$ 10.00	\$21,500
Traffic Signs	EA	30	\$ 200.00	\$6,000
Traffic Signal Installation	EA	2	\$ 350,000.00	\$700,000
Traffic Control	LS	1	\$ 100,000.00	\$100,000
Survey	LS	1	\$ 40,000.00	\$40,000
Field Lab	LS	1	\$ 10,000.00	\$10,000
SUBTOTAL (Rounded up to the nearest \$1,000)				\$15,272,000
Mobilization	%	10%	\$ 1,527,200	\$1,527,200
Contingency	%	10%	\$ 1,679,920	\$1,679,920
Construction Engineering & Inspection	%	15%	\$ 2,771,868	\$2,771,868
CONSTRUCTION SUBTOTAL (Rounded up to the nearest \$1,000)				\$21,251,000
Design	%	10%	\$ 2,125,100	\$2,125,100
Right-of-Way	LS	1	\$13,169,400	\$13,169,400
TOTAL (Rounded up to the nearest \$1,000)				\$36,546,000

Appendix B

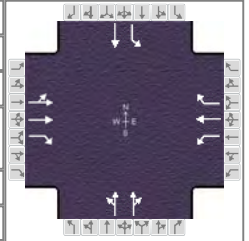
HCS Output Sheets

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HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/19/2014	Area Type	Other
Jurisdiction		Time Period	7:45 AM - 8:45 AM	PHF	0.89
Intersection	Blue Lakes Blvd and US 30	Analysis Year	2014	Analysis Period	1 > 7:45
File Name	Blue Lakes Blvd and US 30 (AM).xus				
Project Description	Note: NB and SB split phasing				





Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	2	389	120	106	141	395	27	307	112	81	76	

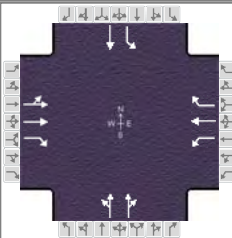
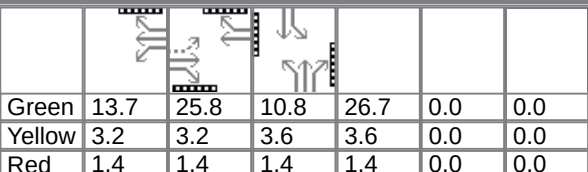
Signal Information													
Cycle, s	63.4	Reference Phase	2		6.6	15.3	5.8	16.5	0.0	0.0			
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On										
Force Mode	Fixed	Simult. Gap N/S	On										
				Green	6.6	15.3	5.8	16.5	0.0	0.0			
				Yellow	3.2	3.2	3.6	3.6	0.0	0.0			
				Red	1.4	1.4	1.4	1.4	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	2.0	3.0		12.0		10.0
Phase Duration, s		19.9	11.2	31.1		21.5		10.8
Change Period, (Y+R _c), s		4.6	4.6	4.6		5.0		5.0
Max Allow Headway (MAH), s		4.3	3.3	4.3		7.2		4.2
Queue Clearance Time (g _s), s		9.3	6.4	17.5		10.3		5.2
Green Extension Time (g _e), s		5.5	0.2	5.2		6.2		0.6
Phase Call Probability		1.00	1.00	1.00		1.00		1.00
Max Out Probability		0.02	0.00	0.07		0.04		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	230	209	135	119	158	444	271		230	91	85	
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1601	1519	1660	1810	1501	1799		1647	1740	1776	
Queue Service Time (g_s), s	0.0	7.2	4.7	4.4	3.5	15.5	8.3		7.6	3.2	2.9	
Cycle Queue Clearance Time (g_c), s	7.3	7.2	4.7	4.4	3.5	15.5	8.3		7.6	3.2	2.9	
Green Ratio (g/C)	0.24	0.24	0.24	0.10	0.42	0.42	0.26		0.26	0.09	0.09	
Capacity (c), veh/h	480	386	366	173	756	627	469		430	160	163	
Volume-to-Capacity Ratio (X)	0.479	0.543	0.369	0.687	0.210	0.708	0.577		0.536	0.570	0.524	
Available Capacity (c_a), veh/h	1161	1008	957	680	1140	945	1133		1038	1096	1119	
Back of Queue (Q), veh/ln (50th percentile)	2.8	2.5	1.5	1.8	1.3	4.6	3.3		2.8	1.3	1.2	
Queue Storage Ratio (RQ) (50th percentile)	0.00	0.00	0.00	0.39	0.00	0.00	0.00		0.00	0.19	0.00	
Uniform Delay (d_1), s/veh	21.1	21.1	20.1	27.4	11.8	15.3	20.4		20.2	27.6	27.5	
Incremental Delay (d_2), s/veh	0.3	0.4	0.2	3.6	0.1	0.6	1.4		1.3	1.2	1.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	
Control Delay (d), s/veh	21.3	21.5	20.3	31.0	11.9	15.8	21.8		21.4	28.8	28.5	
Level of Service (LOS)	C	C	C	C	B	B	C		C	C	C	
Approach Delay, s/veh / LOS	21.2	C		17.5	B		21.6	C		28.7	C	
Intersection Delay, s/veh / LOS	20.6						C					

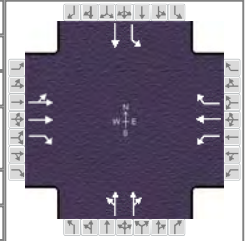
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.7	B	2.9	C	2.4	B
Bicycle LOS Score / LOS	1.0	A	1.7	A	0.9	A	0.8	A

HCS 2010 Signalized Intersection Results Summary

General Information						Intersection Information															
Agency		Keller Associates				Duration, h		0.25													
Analyst		Alex Grover		Analysis Date		11/19/2014		Area Type		Other											
Jurisdiction				Time Period		7:45 AM - 8:45 AM		PHF		0.92											
Intersection		Blue Lakes Blvd and US 30		Analysis Year		2040		Analysis Period		1> 7:45											
File Name		Blue Lakes Blvd and US 30 (AM Optimized).xus																			
Project Description		Note: NB and SB split phasing																			
Demand Information						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h						4	676	208	185	245	687	47	534	194	141	132					
Signal Information																					
Cycle, s	96.2	Reference Phase	2																		
Offset, s	0	Reference Point	End																		
Uncoordinated	Yes	Simult. Gap E/W	On																		
Force Mode	Fixed	Simult. Gap N/S	On																		
				Green	13.7	25.8	10.8	26.7	0.0	0.0											
				Yellow	3.2	3.2	3.6	3.6	0.0	0.0											
				Red	1.4	1.4	1.4	1.4	0.0	0.0											
Timer Results						EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase								2		1		6				8				4	
Case Number								7.3		2.0		3.0				12.0				10.0	
Phase Duration, s								30.4		18.3		48.7				31.7				15.8	
Change Period, (Y+Rc), s								4.6		4.6		4.6				5.0				5.0	
Max Allow Headway (MAH), s								4.5		3.3		4.5				7.2				4.2	
Queue Clearance Time (gs), s								21.9		13.4		33.0				25.8				10.2	
Green Extension Time (ge), s								3.9		0.3		0.0				0.8				0.6	
Phase Call Probability								1.00		1.00		1.00				1.00				1.00	
Max Out Probability								0.54		0.00		1.00				1.00				0.24	
Movement Group Results						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement						5	2	12	1	6	16	3	8	18	7	4					
Adjusted Flow Rate (v), veh/h						387	352	226	201	266	560	459		383	153	143					
Adjusted Saturation Flow Rate (s), veh/h/ln						1756	1601	1519	1660	1810	1501	1800		1646	1740	1776					
Queue Service Time (gs), s						0.5	19.9	12.3	11.4	9.0	31.0	23.8		21.1	8.2	7.5					
Cycle Queue Clearance Time (gc), s						19.8	19.9	12.3	11.4	9.0	31.0	23.8		21.1	8.2	7.5					
Green Ratio (g/C)						0.27	0.27	0.27	0.58	0.46	0.46	0.28		0.28	0.11	0.11					
Capacity (c), veh/h						509	429	408	236	829	688	499		456	196	200					
Volume-to-Capacity Ratio (X)						0.760	0.820	0.555	0.852	0.321	0.814	0.921		0.839	0.782	0.717					
Available Capacity (ca), veh/h						694	599	568	414	829	688	505		462	307	314					
Back of Queue (Q), veh/ln (50th percentile)						8.5	8.0	4.4	5.0	3.6	11.5	13.1		9.7	3.6	3.3					
Queue Storage Ratio (RQ) (50th percentile)						0.00	0.00	0.00	1.06	0.00	0.00	0.00		0.00	0.52	0.00					
Uniform Delay (d1), s/veh						33.0	33.0	30.3	40.3	16.6	22.5	33.7		32.7	41.5	41.2					
Incremental Delay (d2), s/veh						2.0	4.4	0.4	6.4	0.1	6.9	22.3		13.0	2.6	1.8					
Initial Queue Delay (d3), s/veh						0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0					
Control Delay (d), s/veh						35.1	37.4	30.7	46.7	16.6	29.5	56.1		45.8	44.1	43.0					
Level of Service (LOS)						D	D	C	D	B	C	E		D	D	D					
Approach Delay, s/veh / LOS						34.9		C		29.5		C		51.4		D		43.6		D	
Intersection Delay, s/veh / LOS						38.4						D									
Multimodal Results						EB			WB			NB			SB						
Pedestrian LOS Score / LOS						2.3		B		2.7		B		3.1		C		2.4		B	
Bicycle LOS Score / LOS						1.3		A		2.2		B		1.2		A		1.0		A	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/19/2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.87
Intersection	Blue Lakes Blvd and US 30	Analysis Year	2014	Analysis Period	1> 4:30
File Name	Blue Lakes Blvd and US 30 (PM).xus				
Project Description	Note: NB and SB split phasing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	3	475	134	166	121	483	22	222	99	113	173	

Signal Information													
Cycle, s	76.9	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	10.9	19.9	11.6	15.2	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.6	3.6	0.0	0.0			
				Red	1.4	1.4	1.4	1.4	0.0	0.0			

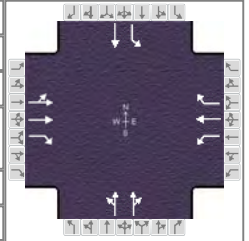
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	2.0	3.0		12.0		10.0
Phase Duration, s		24.5	15.5	40.1		20.2		16.6
Change Period, (Y+R _c), s		4.6	4.6	4.6		5.0		5.0
Max Allow Headway (MAH), s		4.3	3.3	4.3		7.2		4.5
Queue Clearance Time (g _s), s		12.6	10.5	25.0		10.1		10.1
Green Extension Time (g _e), s		6.9	0.4	6.5		5.0		1.5
Phase Call Probability		1.00	1.00	1.00		1.00		1.00
Max Out Probability		0.02	0.00	0.10		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	288	262	154	191	139	555	213		181	130	199	
Adjusted Saturation Flow Rate (s), veh/h/ln	1842	1679	1579	1675	1743	1559	1834		1657	1774	1810	
Queue Service Time (g_s), s	0.0	10.6	6.2	8.5	3.6	23.0	8.1		7.6	5.2	8.1	
Cycle Queue Clearance Time (g_c), s	10.6	10.6	6.2	8.5	3.6	23.0	8.1		7.6	5.2	8.1	
Green Ratio (g/C)	0.26	0.26	0.26	0.14	0.46	0.46	0.20		0.20	0.15	0.15	
Capacity (c), veh/h	525	435	409	239	804	719	363		328	268	274	
Volume-to-Capacity Ratio (X)	0.548	0.602	0.376	0.799	0.173	0.772	0.586		0.552	0.484	0.727	
Available Capacity (c_a), veh/h	1238	1088	1023	760	1130	1011	1189		1074	1150	1173	
Back of Queue (Q), veh/ln (50th percentile)	4.4	4.0	2.2	3.6	1.3	7.6	3.6		3.0	2.1	3.5	
Queue Storage Ratio (RQ) (50th percentile)	0.00	0.00	0.00	0.76	0.00	0.00	0.00		0.00	0.30	0.00	
Uniform Delay (d_1), s/veh	25.1	25.1	23.5	32.0	12.2	17.4	28.1		27.8	30.0	31.2	
Incremental Delay (d_2), s/veh	0.3	0.5	0.2	4.6	0.0	1.4	1.8		1.7	0.5	1.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	
Control Delay (d), s/veh	25.4	25.6	23.7	36.6	12.2	18.8	29.9		29.6	30.5	32.6	
Level of Service (LOS)	C	C	C	D	B	B	C		C	C	C	
Approach Delay, s/veh / LOS	25.1	C		21.6	C		29.7	C		31.8	C	
Intersection Delay, s/veh / LOS	25.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.7	B	2.9	C	2.4	B
Bicycle LOS Score / LOS	1.1	A	1.9	A	0.8	A	1.0	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/19/2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.87
Intersection	Blue Lakes Blvd and US 30	Analysis Year	2018	Analysis Period	1> 4:30
File Name	Blue Lakes Blvd and US 30 (PM 2018).xus				
Project Description	Note: NB and SB split phasing				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	3	517	146	181	132	526	24	242	108	123	188	

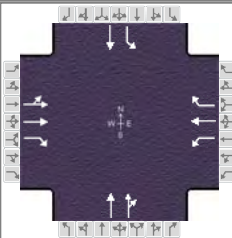
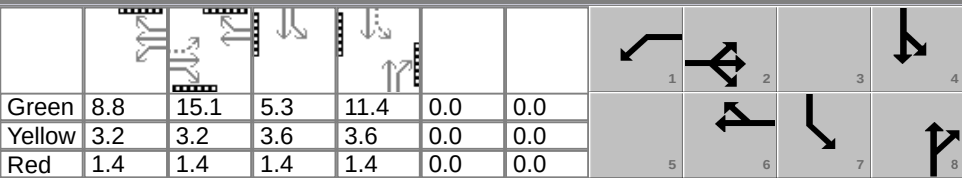
Signal Information													
Cycle, s	86.3	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	12.9	23.0	13.6	17.6	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.6	3.6	0.0	0.0			
				Red	1.4	1.4	1.4	1.4	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		7.3	2.0	3.0		12.0		10.0
Phase Duration, s		27.6	17.5	45.2		22.6		18.6
Change Period, (Y+R _c), s		4.6	4.6	4.6		5.0		5.0
Max Allow Headway (MAH), s		4.3	3.3	4.3		7.2		4.5
Queue Clearance Time (g _s), s		15.0	12.4	31.1		12.0		11.9
Green Extension Time (g _e), s		7.8	0.4	6.6		5.5		1.6
Phase Call Probability		1.00	1.00	1.00		1.00		1.00
Max Out Probability		0.05	0.00	0.24		0.01		0.00

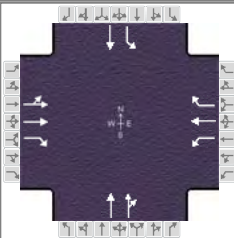
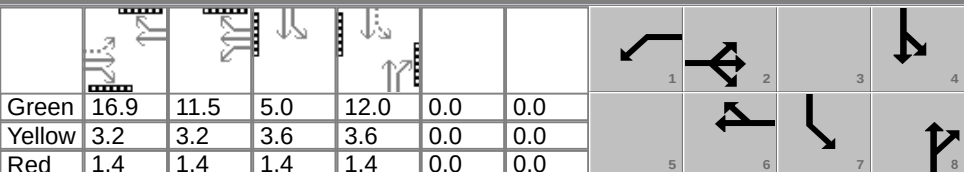
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	
Adjusted Flow Rate (v), veh/h	313	285	168	208	152	605	233		197	141	216	
Adjusted Saturation Flow Rate (s), veh/h/ln	1842	1679	1579	1675	1743	1559	1834		1657	1774	1810	
Queue Service Time (g_s), s	0.0	13.0	7.6	10.4	4.4	29.1	10.0		9.3	6.3	9.9	
Cycle Queue Clearance Time (g_c), s	13.0	13.0	7.6	10.4	4.4	29.1	10.0		9.3	6.3	9.9	
Green Ratio (g/C)	0.27	0.27	0.27	0.15	0.47	0.47	0.20		0.20	0.16	0.16	
Capacity (c), veh/h	534	448	421	251	819	733	374		338	279	285	
Volume-to-Capacity Ratio (X)	0.586	0.636	0.398	0.828	0.185	0.825	0.622		0.583	0.506	0.759	
Available Capacity (c_a), veh/h	1103	969	911	677	1006	900	1059		956	1024	1045	
Back of Queue (Q), veh/ln (50th percentile)	5.5	5.0	2.8	4.5	1.6	10.4	4.5		3.8	2.7	4.3	
Queue Storage Ratio (RQ) (50th percentile)	0.00	0.00	0.00	0.95	0.00	0.00	0.00		0.00	0.38	0.00	
Uniform Delay (d_1), s/veh	28.0	28.0	26.0	35.7	13.3	19.9	31.4		31.1	33.4	34.9	
Incremental Delay (d_2), s/veh	0.4	0.6	0.2	5.2	0.0	4.3	2.0		1.9	0.5	1.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	
Control Delay (d), s/veh	28.4	28.6	26.3	40.9	13.4	24.2	33.5		33.1	33.9	36.5	
Level of Service (LOS)	C	C	C	D	B	C	C		C	C	D	
Approach Delay, s/veh / LOS	28.0		C	26.1		C	33.3		C	35.5		D
Intersection Delay, s/veh / LOS	29.2						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.7	B	2.9	C	2.4	B
Bicycle LOS Score / LOS	1.1	A	2.1	B	0.8	A	1.1	A

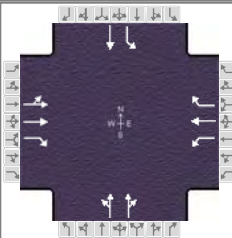
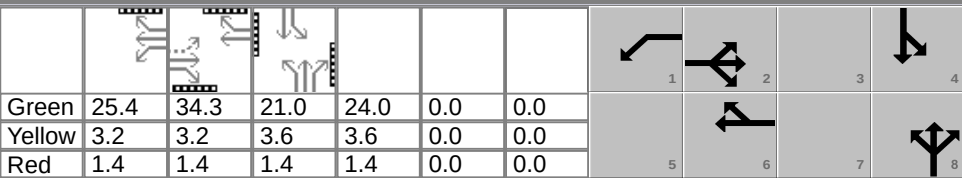
HCS 2010 Signalized Intersection Results Summary

General Information						Intersection Information															
Agency		Keller Associates				Duration, h		0.25													
Analyst		Alex Grover		Analysis Date		11/19/2014		Area Type		Other											
Jurisdiction				Time Period		4:30 PM - 5:30 PM		PHF		0.87											
Intersection		Blue Lakes Blvd and US 30		Analysis Year		2014		Analysis Period		1> 4:30											
File Name		Blue Lakes Blvd and US 30 (PM Optimized no NBL).xus																			
Project Description																					
Demand Information						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h						3	475	134	166	121	483		244	99	113	173					
Signal Information																					
Cycle, s	59.8	Reference Phase	2																		
Offset, s	0	Reference Point	End																		
Uncoordinated	Yes	Simult. Gap E/W	On																		
Force Mode	Fixed	Simult. Gap N/S	On																		
Green	8.8	15.1	5.3	11.4	0.0	0.0															
Yellow	3.2	3.2	3.6	3.6	0.0	0.0															
Red	1.4	1.4	1.4	1.4	0.0	0.0															
Timer Results						EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase								2		1		6				8		7		4	
Case Number								7.3		2.0		3.0				8.3		1.0		4.0	
Phase Duration, s								19.7		13.4		33.0				16.4		10.3		26.7	
Change Period, (Y+R _c), s								4.6		4.6		4.6				5.0		5.0		5.0	
Max Allow Headway (MAH), s								4.3		3.3		4.3				6.7		2.8		6.7	
Queue Clearance Time (g _s), s								10.3		8.6		19.3				10.0		5.2		6.7	
Green Extension Time (g _e), s								4.3		0.2		6.2				1.4		0.1		1.5	
Phase Call Probability								1.00		1.00		1.00				1.00		1.00		1.00	
Max Out Probability								0.54		0.05		0.16				1.00		0.07		1.00	
Movement Group Results						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement						5	2	12	1	6	16		8	18	7	4					
Adjusted Flow Rate (v), veh/h						288	262	154	191	139	555		204	191	130	199					
Adjusted Saturation Flow Rate (s), veh/h/ln						1842	1679	1579	1675	1743	1559		1845	1666	1774	1810					
Queue Service Time (g _s), s						0.0	8.3	4.8	6.6	2.7	17.3		8.0	6.2	3.2	4.7					
Cycle Queue Clearance Time (g _c), s						8.3	8.3	4.8	6.6	2.7	17.3		8.0	6.2	3.2	4.7					
Green Ratio (g/C)						0.25	0.25	0.25	0.15	0.48	0.48		0.19	0.19	0.31	0.36					
Capacity (c), veh/h						526	424	398	246	830	742		352	318	335	658					
Volume-to-Capacity Ratio (X)						0.547	0.618	0.387	0.777	0.168	0.748		0.578	0.599	0.388	0.302					
Available Capacity (c _a), veh/h						676	562	528	420	1166	1043		463	418	474	658					
Back of Queue (Q), veh/ln (50th percentile)						3.2	2.9	1.6	2.7	0.9	5.0		2.5	2.4	1.2	1.7					
Queue Storage Ratio (RQ) (50th percentile)						0.00	0.00	0.00	0.56	0.00	0.00		0.00	0.00	0.17	0.00					
Uniform Delay (d ₁), s/veh						19.8	19.8	18.5	24.6	8.9	12.7		22.0	22.1	16.2	13.6					
Incremental Delay (d ₂), s/veh						0.3	0.5	0.2	3.9	0.0	1.0		1.8	2.2	0.3	0.1					
Initial Queue Delay (d ₃), s/veh						0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0					
Control Delay (d), s/veh						20.1	20.3	18.7	28.5	9.0	13.7		23.8	24.3	16.4	13.7					
Level of Service (LOS)						C	C	B	C	A	B		C	C	B	B					
Approach Delay, s/veh / LOS						19.9		B		16.2		B		24.0		C		14.8		B	
Intersection Delay, s/veh / LOS						18.5						B									
Multimodal Results						EB			WB			NB			SB						
Pedestrian LOS Score / LOS						2.3		B		2.7		B		2.8		C		2.4		B	
Bicycle LOS Score / LOS						1.1		A		1.9		A		0.8		A		1.0		A	

HCS 2010 Signalized Intersection Results Summary

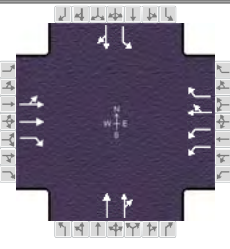
General Information						Intersection Information																																	
Agency		Keller Associates				Duration, h		0.25																															
Analyst		Alex Grover		Analysis Date		11/19/2014		Area Type						Other																									
Jurisdiction				Time Period		4:30 PM - 5:30 PM		PHF						0.92																									
Intersection		Blue Lakes Blvd and US 30		Analysis Year		2026		Analysis Period						1> 4:30																									
File Name		Blue Lakes Blvd and US 30 (PM 2026 Optimized no NBL).xus																																					
Project Description																																							
Demand Information																																							
Approach Movement				L			T			R			L			T			R																				
Demand (v), veh/h				4			613			173			214			157			624						316			128			146			223					
Signal Information																																							
Cycle, s		64.7												Reference Phase		2																							
Offset, s		0												Reference Point		End																							
Uncoordinated		Yes												Simult. Gap E/W		On																							
Force Mode		Fixed		Simult. Gap N/S		On		Green		16.9		11.5		5.0		12.0		0.0		0.0		1		2		3		4											
								Yellow		3.2		3.2		3.6		3.6		0.0		0.0		5		6		7		8											
								Red		1.4		1.4		1.4		1.4		0.0		0.0																			
Timer Results				EBL			EBT			WBL			WBT			NBL			NBT			SBL			SBT														
Assigned Phase							2			1			6						8			7			4														
Case Number							7.3			2.0			3.0						8.3			1.0			4.0														
Phase Duration, s							21.5			16.1			37.7						17.0			10.0			27.0														
Change Period, (Y+R _c), s							4.6			4.6			4.6						5.0			5.0			5.0														
Max Allow Headway (MAH), s							5.1			3.5			3.5						6.7			2.8			6.7														
Queue Clearance Time (g _s), s							13.2			10.6			26.3						13.9			6.5			8.6														
Green Extension Time (g _e), s							3.3			1.0			3.1						0.0			0.0			0.0														
Phase Call Probability							1.00			1.00			1.00						1.00			1.00			1.00														
Max Out Probability							0.57			1.00			0.00						1.00			1.00			1.00														
Movement Group Results				EB			WB			NB			SB																										
Approach Movement				L			T			R			L			T			R			L			T			R											
Assigned Movement				5			2			12			1			6			16						8			18			7			4					
Adjusted Flow Rate (v), veh/h				351			320			188			233			171			678						251			232			159			242					
Adjusted Saturation Flow Rate (s), veh/h/ln				1842			1679			1579			1675			1743			1560						1845			1665			1774			1810					
Queue Service Time (g _s), s				0.0			11.2			6.5			8.6			3.4			24.3						11.9			8.5			4.5			6.6					
Cycle Queue Clearance Time (g _c), s				11.2			11.2			6.5			8.6			3.4			24.3						11.9			8.5			4.5			6.6					
Green Ratio (g/C)				0.26			0.26			0.26			2.75			0.51			0.51						0.19			0.19			0.29			0.34					
Capacity (c), veh/h				539			440			414			299			891			798						342			309			250			616					
Volume-to-Capacity Ratio (X)				0.652			0.727			0.455			0.779			0.191			0.850						0.732			0.751			0.636			0.394					
Available Capacity (c _a), veh/h				682			571			537			337			1536			1375						342			309			250			616					
Back of Queue (Q), veh/ln (50th percentile)				4.5			4.3			2.2			3.9			1.1			7.0						4.1			4.0			1.9			2.5					
Queue Storage Ratio (RQ) (50th percentile)				0.00			0.00			0.00			0.83			0.00			0.00						0.00			0.00			0.27			0.00					
Uniform Delay (d ₁), s/veh				21.8			21.8			20.0			25.4			8.6			13.7						24.8			24.9			19.2			16.3					
Incremental Delay (d ₂), s/veh				0.7			2.0			0.3			9.3			0.0			1.0						8.1			10.2			4.0			0.2					
Initial Queue Delay (d ₃), s/veh				0.0			0.0			0.0			0.0			0.0			0.0						0.0			0.0			0.0			0.0					
Control Delay (d), s/veh				22.4			23.8			20.3			34.7			8.6			14.7						33.0			35.1			23.3			16.4					
Level of Service (LOS)				C			C			C			C			A			B						C			D			C			B					
Approach Delay, s/veh / LOS				22.5			C			18.0			B			34.0			C						19.1			B											
Intersection Delay, s/veh / LOS				22.3										C																									
Multimodal Results				EB			WB			NB			SB																										
Pedestrian LOS Score / LOS				2.3			B			2.7			B			2.8			C						2.4			B											
Bicycle LOS Score / LOS				1.2			A			2.3			B			0.9			A						1.1			A											

HCS 2010 Signalized Intersection Results Summary

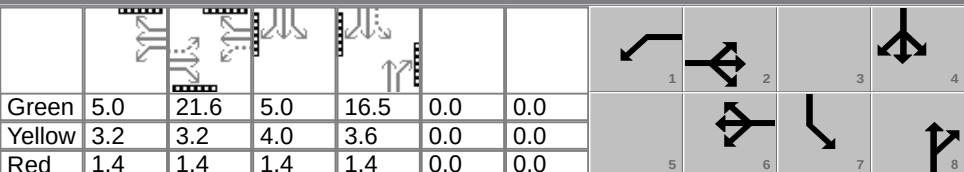
General Information					Intersection Information															
Agency		Keller Associates			Duration, h		0.25													
Analyst		Alex Grover		Analysis Date	11/19/2014		Area Type		Other											
Jurisdiction				Time Period	4:30 PM - 5:30 PM		PHF		0.92											
Intersection		Blue Lakes Blvd and US 30		Analysis Year	2040		Analysis Period		1> 4:30											
File Name		Blue Lakes Blvd and US 30 (PM Optimized).xus																		
Project Description		Note: NB and SB split phasing																		
Demand Information					EB			WB			NB			SB						
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h					5	826	233	289	210	840	38	386	172	196	301					
Signal Information																				
Cycle, s	123.9	Reference Phase	2																	
Offset, s	0	Reference Point	End																	
Uncoordinated	Yes	Simult. Gap E/W	On																	
Force Mode	Fixed	Simult. Gap N/S	On	Green	25.4	34.3	21.0	24.0	0.0	0.0										
				Yellow	3.2	3.2	3.6	3.6	0.0	0.0										
				Red	1.4	1.4	1.4	1.4	0.0	0.0										
Timer Results					EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase							2		1		6				8				4	
Case Number							7.3		2.0		3.0				12.0				10.0	
Phase Duration, s							38.9		30.0		68.9				29.0				26.0	
Change Period, (Y+R _c), s							4.6		4.6		4.6				5.0				5.0	
Max Allow Headway (MAH), s							4.4		3.3		4.4				7.2				4.5	
Queue Clearance Time (g _s), s							32.9		24.7		48.7				25.9				23.0	
Green Extension Time (g _e), s							1.3		0.7		0.0				0.0				0.0	
Phase Call Probability							1.00		1.00		1.00				1.00				1.00	
Max Out Probability							1.00		0.00		1.00				1.00				1.00	
Movement Group Results					EB			WB			NB			SB						
Approach Movement					L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement					5	2	12	1	6	16	3	8	18	7	4					
Adjusted Flow Rate (v), veh/h					473	431	253	314	228	685	354		294	213	327					
Adjusted Saturation Flow Rate (s), veh/h/ln					1841	1679	1579	1675	1743	1560	1834		1655	1774	1810					
Queue Service Time (g _s), s					6.6	30.9	17.1	22.7	9.0	46.7	23.9		21.6	14.0	21.0					
Cycle Queue Clearance Time (g _c), s					30.9	30.9	17.1	22.7	9.0	46.7	23.9		21.6	14.0	21.0					
Green Ratio (g/C)					0.28	0.28	0.28	1.71	0.52	0.52	0.19		0.19	0.17	0.17					
Capacity (c), veh/h					539	465	437	343	904	809	355		321	301	307					
Volume-to-Capacity Ratio (X)					0.877	0.927	0.580	0.915	0.252	0.846	0.996		0.916	0.708	1.066					
Available Capacity (c _a), veh/h					564	488	459	636	904	809	355		321	301	307					
Back of Queue (Q), veh/ln (50th percentile)					15.9	15.6	6.7	10.1	3.6	18.2	15.4		11.5	6.7	15.4					
Queue Storage Ratio (RQ) (50th percentile)					0.00	0.00	0.00	2.15	0.00	0.00	0.00		0.00	0.95	0.00					
Uniform Delay (d ₁), s/veh					43.6	43.6	38.6	48.2	16.5	25.6	49.9		48.9	48.5	51.4					
Incremental Delay (d ₂), s/veh					13.5	22.8	1.0	7.5	0.1	7.9	46.6		30.0	6.4	70.1					
Initial Queue Delay (d ₃), s/veh					0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0					
Control Delay (d), s/veh					57.0	66.4	39.6	55.7	16.6	33.5	96.5		78.9	55.0	121.5					
Level of Service (LOS)					E	E	D	E	B	C	F		E	D	F					
Approach Delay, s/veh / LOS					56.7		E	36.0		D	88.5		F	95.3		F				
Intersection Delay, s/veh / LOS					61.2						E									
Multimodal Results					EB			WB			NB			SB						
Pedestrian LOS Score / LOS					2.3		B	2.7		B	3.2		C	2.5		B				
Bicycle LOS Score / LOS					1.4		A	2.5		B	1.0		A	1.4		A				

HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information					
Agency	Keller Associates					Duration, h		0.25		
Analyst	Alex Grover		Analysis Date	11/19/2014		Area Type		Other		
Jurisdiction			Time Period	4:30 PM - 5:30 PM		PHF		0.92		
Intersection	Blue Lakes Blvd and US 30		Analysis Year	2040		Analysis Period		1> 4:30		
File Name	Blue Lakes Blvd and US 30 (PM Optimized add WBL, WBT-R).xus									
Project Description										



Demand Information				EB			WB			NB			SB		
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				5	826	233	289	210	840		424	172	196	301	1

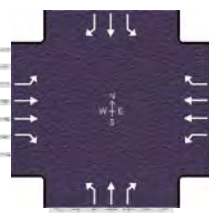
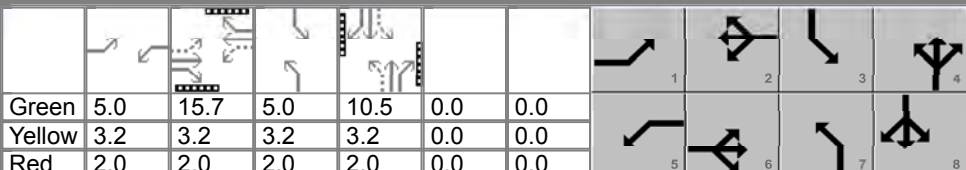
Signal Information															
Cycle, s	67.7	Reference Phase	2	Green	5.0	21.6	5.0	16.5	0.0	0.0					
Offset, s	0	Reference Point	End	Yellow	3.2	3.2	4.0	3.6	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Red	1.4	1.4	1.4	1.4	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On												

Timer Results		EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase			2	1	6		8	7	4
Case Number			7.3	1.0	3.0		8.3	1.0	4.0
Phase Duration, s			26.2	9.6	35.8		21.5	10.4	31.9
Change Period, (Y+R _c), s			4.6	4.6	4.6		5.0	5.4	5.0
Max Allow Headway (MAH), s			4.7	3.3	4.7		6.7	2.8	6.7
Queue Clearance Time (g _s), s			17.9	6.2	19.9		14.5	7.0	11.0
Green Extension Time (g _e), s			3.6	0.0	0.0		2.0	0.0	0.0
Phase Call Probability			1.00	1.00	1.00		1.00	1.00	1.00
Max Out Probability			0.84	1.00	1.00		1.00	1.00	1.00

Movement Group Results		EB			WB			NB			SB						
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement		5	2	12	1	6	16		8	18	7	4	14				
Adjusted Flow Rate (v), veh/h		473	431	253	314	399	514		339	309	213	328					
Adjusted Saturation Flow Rate (s), veh/h/ln		1841	1679	1579	1627	1664	1559		1845	1663	1774	1808					
Queue Service Time (g _s), s		0.0	15.9	8.8	4.2	11.5	17.9		12.5	11.7	5.0	9.0					
Cycle Queue Clearance Time (g _c), s		15.9	15.9	8.8	4.2	11.5	17.9		12.5	11.7	5.0	9.0					
Green Ratio (g/C)		0.32	0.32	0.32	0.42	0.46	0.46		0.24	0.24	0.35	0.40					
Capacity (c), veh/h		641	535	503	551	767	718		449	405	284	718					
Volume-to-Capacity Ratio (X)		0.738	0.804	0.503	0.570	0.521	0.715		0.754	0.763	0.751	0.457					
Available Capacity (c _a), veh/h		788	670	630	551	767	718		518	467	284	718					
Back of Queue (Q), veh/ln (50th percentile)		6.5	6.3	3.0	1.4	3.7	6.0		5.3	5.0	3.0	3.3					
Queue Storage Ratio (RQ) (50th percentile)		0.00	0.00	0.00	0.30	0.00	0.00		0.00	0.00	0.42	0.00					
Uniform Delay (d ₁), s/veh		21.1	21.1	18.7	15.7	12.9	14.7		23.7	23.8	20.5	15.0					
Incremental Delay (d ₂), s/veh		2.1	4.5	0.3	1.2	0.3	2.9		5.7	6.7	9.6	0.2					
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0					
Control Delay (d), s/veh		23.1	25.6	19.0	16.9	13.2	17.6		29.4	30.5	30.1	15.2					
Level of Service (LOS)		C	C	B	B	B	B		C	C	C	B					
Approach Delay, s/veh / LOS		23.2		C		16.0		B		29.9		C		21.0		C	
Intersection Delay, s/veh / LOS		21.6							C								

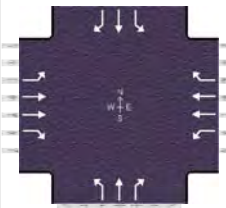
Multimodal Results		EB		WB		NB		SB	
Pedestrian LOS Score / LOS		2.7	B	2.7	B	3.2	C	2.4	B
Bicycle LOS Score / LOS		1.4	A	2.5	B	1.0	A	1.4	A

HCS 2010 Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		Keller Associates				Duration, h		0.25											
Analyst		Alex Grover		Analysis Date		11/19/2014		Area Type		Other									
Jurisdiction				Time Period		7:30 AM - 8:30 AM		PHF		0.86									
Intersection		Eastland Dr and US 30		Analysis Year		2014		Analysis Period		1> 7:30									
File Name		Eastland Dr and US 30 (AM).xus																	
Project Description																			
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				95	314	103	96	419	69	71	176	66	63	151	95				
Signal Information																			
Cycle, s	56.9	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On		Green	5.0	15.7	5.0	10.5	0.0	0.0								
Force Mode	Fixed	Simult. Gap N/S	On		Yellow	3.2	3.2	3.2	3.2	0.0	0.0								
				Red	2.0	2.0	2.0	2.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase				1		6		5		2		7		4		3		8	
Case Number				1.1		3.0		1.1		3.0		1.1		3.0		1.1		3.0	
Phase Duration, s				10.2		20.9		10.2		20.9		10.2		15.7		10.2		15.7	
Change Period, (Y+R _c), s				5.2		5.2		5.2		5.2		5.2		5.2		5.2		5.2	
Max Allow Headway (MAH), s				2.3		4.6		2.3		4.6		2.3		4.3		2.3		4.3	
Queue Clearance Time (g _s), s				4.5		7.3		4.8		9.2		4.3		8.2		4.0		7.0	
Green Extension Time (g _e), s				0.1		6.5		0.1		6.5		0.1		2.3		0.0		2.3	
Phase Call Probability				1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Max Out Probability				0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				1	6	16	5	2	12	7	4	14	3	8	18				
Adjusted Flow Rate (v), veh/h				110	365	120	112	487	80	83	205	77	73	176	110				
Adjusted Saturation Flow Rate (s), veh/h/ln				1691	1615	1519	1573	1644	1563	1547	1743	1268	1587	1792	1579				
Queue Service Time (g _s), s				2.5	5.3	3.5	2.8	7.2	2.2	2.3	6.2	3.0	2.0	5.0	3.5				
Cycle Queue Clearance Time (g _c), s				2.5	5.3	3.5	2.8	7.2	2.2	2.3	6.2	3.0	2.0	5.0	3.5				
Green Ratio (g/C)				0.36	0.28	0.28	0.36	0.28	0.28	0.27	0.18	0.18	0.27	0.18	0.18				
Capacity (c), veh/h				374	889	418	430	905	430	363	321	233	309	330	291				
Volume-to-Capacity Ratio (X)				0.295	0.411	0.286	0.260	0.538	0.186	0.227	0.638	0.329	0.237	0.532	0.380				
Available Capacity (c _a), veh/h				968	2834	1333	982	2886	1372	906	1377	1001	866	1416	1247				
Back of Queue (Q), veh/ln (50th percentile)				0.8	1.7	1.1	0.8	2.4	0.7	0.7	2.3	0.8	0.7	2.0	1.2				
Queue Storage Ratio (RQ) (50th percentile)				0.06	0.00	0.29	0.11	0.00	0.18	0.09	0.00	0.25	0.15	0.00	0.30				
Uniform Delay (d ₁), s/veh				13.2	16.9	16.2	12.7	17.6	15.8	16.2	21.5	20.2	16.5	21.0	20.4				
Incremental Delay (d ₂), s/veh				0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.8	0.3	0.1	0.5	0.3				
Initial Queue Delay (d ₃), 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				
Control Delay (d), s/veh				13.4	17.0	16.4	12.8	17.7	15.8	16.3	22.3	20.5	16.6	21.5	20.7				
Level of Service (LOS)				B	B	B	B	B	B	B	C	C	B	C	C				
Approach Delay, s/veh / LOS				16.2		B		16.7		B		20.5		C		20.3		C	
Intersection Delay, s/veh / LOS				17.9						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				2.4		B		2.4		B		2.9		C		2.9		C	
Bicycle LOS Score / LOS				1.0		A		1.0		A		1.1		A		1.1		A	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/19/2014	Area Type	Other
Jurisdiction		Time Period	7:30 AM - 8:30 AM	PHF	0.92
Intersection	Eastland Dr and US 30	Analysis Year	2040	Analysis Period	1> 7:30
File Name	Eastland Dr and US 30 (AM Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	166	546	179	167	729	120	123	306	115	109	262	166

Signal Information											
Cycle, s	68.0	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	Yes	Simult. Gap E/W	On	Green	5.0	7.4	8.1	5.0	16.5	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.2	3.2	3.2	0.0	
				Red	2.0	2.0	2.0	2.0	2.0	0.0	

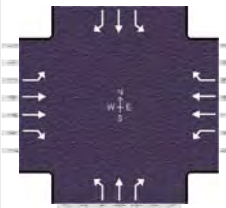
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.2	3.0	1.3	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	10.2	22.8	13.3	26.0	10.2	21.7	10.2	21.7
Change Period, (Y+R _c), s	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Max Allow Headway (MAH), s	2.3	4.5	4.4	4.4	2.3	4.3	2.3	4.3
Queue Clearance Time (g _s), s	7.0	13.3	2.0	17.0	6.4	14.2	5.8	11.7
Green Extension Time (g _e), s	0.0	4.3	1.6	3.7	0.0	2.3	0.0	2.9
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.00	1.00	0.29	1.00	0.60	1.00	0.30

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (v), veh/h	180	593	195	182	792	130	134	333	125	118	285	180
Adjusted Saturation Flow Rate (s), veh/h/ln	1691	1615	1519	1573	1644	1563	1547	1743	1268	1587	1792	1579
Queue Service Time (g_s), s	5.0	11.3	7.4	0.0	15.0	4.3	4.4	12.2	5.6	3.8	9.7	6.7
Cycle Queue Clearance Time (g_c), s	5.0	11.3	7.4	0.0	15.0	4.3	4.4	12.2	5.6	3.8	9.7	6.7
Green Ratio (g/C)	0.38	0.26	0.26	0.38	0.31	0.31	0.32	0.24	0.24	0.32	0.24	0.24
Capacity (c), veh/h	285	837	394	361	1004	477	286	422	307	254	434	382
Volume-to-Capacity Ratio (X)	0.632	0.709	0.494	0.502	0.789	0.273	0.468	0.789	0.407	0.466	0.657	0.472
Available Capacity (c_a), veh/h	285	2184	1027	361	1402	667	286	538	391	254	580	511
Back of Queue (Q), veh/ln (50th percentile)	2.0	4.0	2.2	2.5	5.4	1.4	1.5	5.1	1.5	1.3	3.9	2.3
Queue Storage Ratio (RQ) (50th percentile)	0.13	0.00	0.56	0.32	0.00	0.37	0.18	0.00	0.46	0.29	0.00	0.59
Uniform Delay (d_1), s/veh	17.1	22.9	0.9	25.2	21.6	17.9	18.6	24.2	10.8	18.9	23.2	22.1
Incremental Delay (d_2), s/veh	3.4	0.4	0.4	0.4	1.3	0.1	0.4	4.5	0.3	0.5	0.6	0.3
Initial Queue Delay (d_3), 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
Control Delay (d), s/veh	20.5	23.3	1.2	25.6	23.0	18.0	19.1	28.7	11.1	19.4	23.9	22.4
Level of Service (LOS)	C	C	A	C	C	B	B	C	B	B	C	C
Approach Delay, s/veh / LOS	18.3	B		22.8	C		22.8	C		22.5	C	
Intersection Delay, s/veh / LOS	21.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.3	A	1.4	A	1.5	A	1.5	A

HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information	
Agency	Keller Associates				Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/19/2014		Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM		PHF	0.89
Intersection	Eastland Dr and US 30		Analysis Year	2014	Analysis Period	1 > 4:30
File Name	Eastland Dr and US 30 (PM).xus					
Project Description						



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	160	430	97	82	389	121	120	258	99	84	144	116

Signal Information														
Cycle, s	62.8	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On											
Force Mode	Fixed	Simult. Gap N/S	On	Green	5.0	1.6	16.4	5.0	0.7	13.3				
				Yellow	3.2	0.0	3.2	3.2	0.0	3.2				
				Red	2.0	0.0	2.0	2.0	0.0	2.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.1	3.0	1.1	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	11.8	23.2	10.2	21.6	10.9	19.2	10.2	18.5
Change Period, (Y+R _c), s	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Max Allow Headway (MAH), s	2.3	4.6	2.3	4.6	2.3	4.2	2.3	4.2
Queue Clearance Time (g _s), s	6.5	9.4	4.7	9.0	5.6	11.2	4.5	6.9
Green Extension Time (g _e), s	0.1	7.2	0.1	7.2	0.1	2.8	0.1	2.8
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00

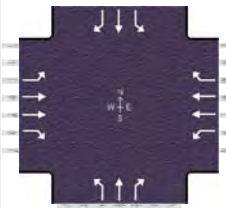
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (v), veh/h	180	483	109	92	437	136	135	290	111	94	162	130
Adjusted Saturation Flow Rate (s), veh/h/ln	1774	1706	1561	1533	1675	1451	1792	1827	1477	1774	1792	1594
Queue Service Time (g_s), s	4.5	7.4	3.4	2.7	7.0	4.8	3.6	9.2	4.0	2.5	4.9	4.4
Cycle Queue Clearance Time (g_c), s	4.5	7.4	3.4	2.7	7.0	4.8	3.6	9.2	4.0	2.5	4.9	4.4
Green Ratio (g/C)	0.37	0.29	0.29	0.34	0.26	0.26	0.30	0.22	0.22	0.29	0.21	0.21
Capacity (c), veh/h	445	979	448	345	873	378	443	408	330	305	381	339
Volume-to-Capacity Ratio (X)	0.404	0.494	0.244	0.267	0.501	0.360	0.305	0.710	0.337	0.309	0.425	0.385
Available Capacity (c_a), veh/h	962	2713	1241	833	2663	1153	993	1307	1057	869	1283	1141
Back of Queue (Q), veh/ln (50th percentile)	1.6	2.6	1.1	0.8	2.5	1.5	1.3	3.7	1.3	0.9	1.9	1.5
Queue Storage Ratio (RQ) (50th percentile)	0.10	0.00	0.28	0.11	0.00	0.41	0.15	0.00	0.34	0.19	0.00	0.39
Uniform Delay (d_1), s/veh	14.5	18.6	17.2	15.1	19.8	19.0	16.7	22.5	20.5	17.6	21.4	21.2
Incremental Delay (d_2), s/veh	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.9	0.2	0.2	0.3	0.3
Initial Queue Delay (d_3), 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
Control Delay (d), s/veh	14.7	18.8	17.3	15.3	19.9	19.2	16.9	23.4	20.7	17.8	21.7	21.5
Level of Service (LOS)	B	B	B	B	B	B	B	C	C	B	C	C
Approach Delay, s/veh / LOS	17.6		B	19.1		B	21.2		C	20.7		C
Intersection Delay, s/veh / LOS	19.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.1	A	1.0	A	1.4	A	1.1	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/19/2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.92
Intersection	Eastland Dr and US 30	Analysis Year	2040	Analysis Period	1 > 4:30
File Name	Eastland Dr and US 30 (PM Optimized).xus				
Project Description					





Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	278	748	169	142	676	210	208	448	172	138	251	202

Signal Information														
Cycle, s	88.3	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On											
Force Mode	Fixed	Simult. Gap N/S	On	Green	5.0	15.2	10.1	5.0	1.0	26.0				
				Yellow	3.2	3.2	3.2	3.2	0.0	3.2				
				Red	2.0	2.0	2.0	2.0	0.0	2.0				

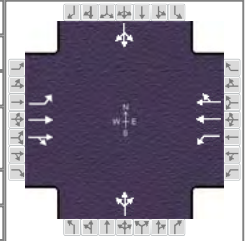
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.3	3.0	1.2	3.0	1.1	3.0	1.1	3.0
Phase Duration, s	15.3	35.6	10.2	30.6	11.2	32.2	10.2	31.2
Change Period, (Y+R _c), s	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Max Allow Headway (MAH), s	4.1	4.1	2.3	4.5	2.3	4.3	2.3	4.3
Queue Clearance Time (g _s), s	9.2	20.0	7.0	19.6	8.0	24.2	7.0	13.1
Green Extension Time (g _e), s	1.0	1.2	0.0	5.8	0.0	2.9	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.37	1.00	1.00	0.00	1.00	0.06	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (v), veh/h	302	813	184	154	735	228	226	487	187	150	273	220
Adjusted Saturation Flow Rate (s), veh/h/ln	1774	1706	1561	1533	1675	1451	1792	1827	1477	1774	1792	1594
Queue Service Time (g_s), s	7.2	18.0	7.7	5.0	17.6	11.7	6.0	22.2	8.8	5.0	11.1	9.9
Cycle Queue Clearance Time (g_c), s	7.2	18.0	7.7	5.0	17.6	11.7	6.0	22.2	8.8	5.0	11.1	9.9
Green Ratio (g/C)	0.40	0.35	0.35	0.40	0.29	0.29	0.36	0.31	0.31	0.35	0.29	0.29
Capacity (c), veh/h	347	1172	536	246	965	418	392	559	452	213	528	470
Volume-to-Capacity Ratio (X)	0.872	0.694	0.343	0.628	0.762	0.546	0.576	0.871	0.414	0.703	0.517	0.468
Available Capacity (c_a), veh/h	551	1172	536	246	9986	4324	392	977	790	213	528	470
Back of Queue (Q), veh/ln (50th percentile)	6.6	7.1	2.7	2.2	6.8	3.4	1.3	9.4	3.0	2.6	4.6	3.4
Queue Storage Ratio (RQ) (50th percentile)	0.42	0.00	0.69	0.29	0.00	0.93	0.14	0.00	0.80	0.53	0.00	0.85
Uniform Delay (d_1), s/veh	35.2	24.9	21.5	22.6	28.5	2.8	23.7	28.9	24.2	24.5	25.8	8.3
Incremental Delay (d_2), s/veh	5.4	1.5	0.1	3.8	0.5	0.4	1.4	1.7	0.2	8.5	0.4	0.3
Initial Queue Delay (d_3), 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
Control Delay (d), s/veh	40.6	26.4	21.6	26.4	29.0	3.2	25.1	30.5	24.5	33.1	26.2	8.5
Level of Service (LOS)	D	C	C	C	C	A	C	C	C	C	C	A
Approach Delay, s/veh / LOS	29.0		C	23.4		C	27.9		C	21.8		C
Intersection Delay, s/veh / LOS	26.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.5	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.6	A	1.4	A	2.0	A	1.5	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/17/2014	Area Type	Other
Jurisdiction		Time Period	7:30 AM - 8:30 AM	PHF	0.92
Intersection	Hankins Rd and US 30	Analysis Year	2014	Analysis Period	1 > 7:30
File Name	Hankins Rd and US 30 (AM).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	18	311	28	30	405	39	53	45	24	88	43	43

Signal Information													
Cycle, s	57.9	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	11.1	5.0	0.1	24.8	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	3.2	0.0	5.0	0.0	0.0			
				Red	1.0	2.0	0.0	1.6	0.0	0.0			

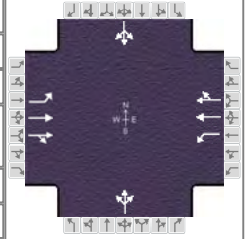
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	3	8	7	4		6		2
Case Number	1.1	4.0	1.1	4.0		8.0		8.0
Phase Duration, s	10.2	31.4	10.3	31.5		16.1		16.1
Change Period, (Y+R _c), s	5.2	6.6	5.3	6.6		5.0		5.0
Max Allow Headway (MAH), s	2.7	8.9	2.7	8.9		8.0		8.0
Queue Clearance Time (g _s), s	2.3	6.3	2.8	7.6		6.2		8.3
Green Extension Time (g _e), s	0.0	17.6	0.0	17.3		3.7		2.8
Phase Call Probability	1.00	1.00	1.00	1.00		1.00		1.00
Max Out Probability	0.00	0.31	0.00	0.32		0.15		0.52

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	20	186	183	33	244	238		133			189	
Adjusted Saturation Flow Rate (s), veh/h/ln	1707	1624	1577	1110	1681	1629		1496			1542	
Queue Service Time (g_s), s	0.3	4.3	4.3	0.8	5.6	5.6		0.0			2.1	
Cycle Queue Clearance Time (g_c), s	0.3	4.3	4.3	0.8	5.6	5.6		4.2			6.3	
Green Ratio (g/C)	0.52	0.43	0.43	0.52	0.43	0.43		0.19			0.19	
Capacity (c), veh/h	533	697	677	444	724	702		377			391	
Volume-to-Capacity Ratio (X)	0.037	0.267	0.270	0.073	0.337	0.340		0.351			0.484	
Available Capacity (c_a), veh/h	976	1262	1225	732	1307	1266		718			618	
Back of Queue (Q), veh/ln (50th percentile)	0.1	1.2	1.2	0.1	1.7	1.6		1.4			2.1	
Queue Storage Ratio (RQ) (50th percentile)	0.00	0.00	0.00	0.01	0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	7.4	10.7	10.7	7.2	11.0	11.0		20.5			21.3	
Incremental Delay (d_2), s/veh	0.0	0.2	0.2	0.0	0.3	0.3		0.2			0.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	7.4	10.9	10.9	7.2	11.2	11.3		20.7			21.7	
Level of Service (LOS)	A	B	B	A	B	B		C			C	
Approach Delay, s/veh / LOS	10.7	B		11.0	B		20.7	C		21.7	C	
Intersection Delay, s/veh / LOS	13.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	0.8	A	0.9	A	0.7	A	0.8	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/17/2014	Area Type	Other
Jurisdiction		Time Period	7:30 AM - 8:30 AM	PHF	0.92
Intersection	Hankins Rd and US 30	Analysis Year	2040	Analysis Period	1 > 7:30
File Name	Hankins Rd and US 30 (AM Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	31	541	49	52	704	68	92	79	41	153	74	74

Signal Information													
Cycle, s	68.2	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	18.0	5.0	0.1	28.3	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	3.2	0.0	5.0	0.0	0.0			
				Red	1.0	2.0	0.0	1.6	0.0	0.0			

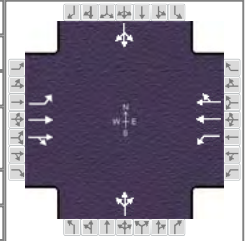
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	3	8	7	4		6		2
Case Number	1.1	4.0	1.1	4.0		8.0		8.0
Phase Duration, s	10.2	34.9	10.3	35.0		23.0		23.0
Change Period, (Y+R _c), s	5.2	6.6	5.3	6.6		5.0		5.0
Max Allow Headway (MAH), s	2.7	8.9	2.7	8.9		8.1		8.1
Queue Clearance Time (g _s), s	2.7	12.0	3.9	15.5		11.9		17.1
Green Extension Time (g _e), s	0.0	15.7	0.0	12.9		1.7		0.9
Phase Call Probability	1.00	1.00	1.00	1.00		1.00		1.00
Max Out Probability	0.00	0.92	0.00	0.95		1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	34	325	316	57	426	413		230			327	
Adjusted Saturation Flow Rate (s), veh/h/ln	1707	1624	1576	1110	1681	1629		1364			1420	
Queue Service Time (g_s), s	0.7	10.0	10.0	1.9	13.5	13.5		0.0			5.2	
Cycle Queue Clearance Time (g_c), s	0.7	10.0	10.0	1.9	13.5	13.5		9.9			15.1	
Green Ratio (g/C)	0.49	0.41	0.41	0.49	0.42	0.42		0.26			0.26	
Capacity (c), veh/h	349	674	654	318	700	678		436			455	
Volume-to-Capacity Ratio (X)	0.097	0.482	0.484	0.178	0.609	0.609		0.528			0.719	
Available Capacity (c_a), veh/h	474	714	693	400	739	716		436			497	
Back of Queue (Q), veh/ln (50th percentile)	0.2	3.2	3.1	0.4	4.5	4.4		2.9			4.9	
Queue Storage Ratio (RQ) (50th percentile)	0.01	0.00	0.00	0.03	0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	11.0	14.6	14.6	10.3	15.6	15.6		21.9			24.0	
Incremental Delay (d_2), s/veh	0.0	0.5	0.6	0.1	1.3	1.4		0.6			3.7	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	11.0	15.1	15.2	10.4	16.9	17.0		22.5			27.6	
Level of Service (LOS)	B	B	B	B	B	B		C			C	
Approach Delay, s/veh / LOS	15.0		B	16.5		B	22.5		C	27.6		C
Intersection Delay, s/veh / LOS	18.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.0	A	1.2	A	0.9	A	1.0	A

HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information	
Agency	Keller Associates				Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/17/2014		Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM		PHF	0.89
Intersection	Hankins Rd and US 30		Analysis Year	2014	Analysis Period	1 > 4:30
File Name	Hankins Rd and US 30 (PM).xus					
Project Description						



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	40	475	24	29	384	64	62	57	29	45	36	39

Signal Information													
Cycle, s	62.9	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	11.0	5.0	0.1	30.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	3.2	0.0	5.0	0.0	0.0			
				Red	1.0	2.0	0.0	1.6	0.0	0.0			

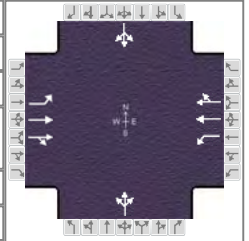
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	3	8	7	4		6		2
Case Number	1.1	4.0	1.1	4.0		8.0		8.0
Phase Duration, s	10.2	36.6	10.3	36.7		16.0		16.0
Change Period, (Y+R _c), s	5.2	6.6	5.3	6.6		5.0		5.0
Max Allow Headway (MAH), s	2.7	8.9	2.7	8.9		8.0		8.0
Queue Clearance Time (g _s), s	2.7	8.2	2.8	7.9		7.7		6.4
Green Extension Time (g _e), s	0.0	21.7	0.0	21.9		3.3		2.9
Phase Call Probability	1.00	1.00	1.00	1.00		1.00		1.00
Max Out Probability	0.00	0.51	0.00	0.50		0.17		0.35

Movement Group Results	EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12				
Adjusted Flow Rate (v), veh/h	45	282	278	33	257	247		166			135					
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1776	1745	1223	1696	1612		1629			1637					
Queue Service Time (g_s), s	0.7	6.2	6.2	0.8	5.8	5.9		1.3			0.0					
Cycle Queue Clearance Time (g_c), s	0.7	6.2	6.2	0.8	5.8	5.9		5.7			4.4					
Green Ratio (g/C)	0.56	0.48	0.48	0.56	0.48	0.48		0.17			0.17					
Capacity (c), veh/h	565	847	832	432	812	771		366			365					
Volume-to-Capacity Ratio (X)	0.079	0.333	0.334	0.075	0.316	0.320		0.454			0.369					
Available Capacity (c_a), veh/h	984	1270	1249	723	1214	1153		715			587					
Back of Queue (Q), veh/ln (50th percentile)	0.2	1.9	1.9	0.1	1.7	1.7		2.0			1.6					
Queue Storage Ratio (RQ) (50th percentile)	0.01	0.00	0.00	0.01	0.00	0.00		0.00			0.00					
Uniform Delay (d_1), s/veh	6.9	10.2	10.2	6.7	10.1	10.1		23.7			23.2					
Incremental Delay (d_2), s/veh	0.0	0.2	0.2	0.0	0.2	0.2		0.3			0.2					
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0					
Control Delay (d), s/veh	6.9	10.5	10.5	6.7	10.3	10.3		24.0			23.4					
Level of Service (LOS)	A	B	B	A	B	B		C			C					
Approach Delay, s/veh / LOS	10.2		B		10.1		B		24.0		C		23.4		C	
Intersection Delay, s/veh / LOS	13.0									B						

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.0	A	0.9	A	0.8	A	0.7	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/17/2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.92
Intersection	Hankins Rd and US 30	Analysis Year	2040	Analysis Period	1> 4:30
File Name	Hankins Rd and US 30 (PM Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	69	826	41	50	668	112	107	99	50	79	63	68

Signal Information													
Cycle, s	63.2	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	Yes	Simult. Gap E/W	On	Green	14.2	5.0	0.1	27.2	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	3.2	0.0	5.0	0.0	0.0			
				Red	1.0	2.0	0.0	1.6	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	3	8	7	4		6		2
Case Number	1.1	4.0	1.1	4.0		8.0		8.0
Phase Duration, s	10.2	33.8	10.3	33.9		19.2		19.2
Change Period, (Y+R _c), s	5.2	6.6	5.3	6.6		5.0		5.0
Max Allow Headway (MAH), s	2.7	8.9	2.7	8.9		8.1		8.1
Queue Clearance Time (g _s), s	3.4	15.2	3.4	14.4		12.3		10.0
Green Extension Time (g _e), s	0.1	12.0	0.0	5.4		1.4		4.1
Phase Call Probability	1.00	1.00	1.00	1.00		1.00		1.00
Max Out Probability	0.00	0.95	0.00	1.00		1.00		0.82

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	75	475	467	54	435	413		278			228	
Adjusted Saturation Flow Rate (s), veh/h/ln	1757	1776	1746	1223	1696	1611		1582			1576	
Queue Service Time (g_s), s	1.4	13.2	13.2	1.4	12.4	12.4		2.3			0.0	
Cycle Queue Clearance Time (g_c), s	1.4	13.2	13.2	1.4	12.4	12.4		10.3			8.0	
Green Ratio (g/C)	0.51	0.43	0.43	0.51	0.43	0.43		0.22			0.22	
Capacity (c), veh/h	383	763	750	301	732	695		435			431	
Volume-to-Capacity Ratio (X)	0.196	0.623	0.623	0.181	0.594	0.595		0.640			0.529	
Available Capacity (c_a), veh/h	661	983	966	494	732	695		455			571	
Back of Queue (Q), veh/ln (50th percentile)	0.4	4.4	4.3	0.3	4.0	3.8		3.6			2.7	
Queue Storage Ratio (RQ) (50th percentile)	0.02	0.00	0.00	0.02	0.00	0.00		0.00			0.00	
Uniform Delay (d_1), s/veh	9.8	14.0	14.0	9.6	13.8	13.8		22.9			22.0	
Incremental Delay (d_2), s/veh	0.1	0.8	0.9	0.1	1.3	1.4		2.1			0.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Control Delay (d), s/veh	9.9	14.9	14.9	9.7	15.1	15.1		25.0			22.4	
Level of Service (LOS)	A	B	B	A	B	B		C			C	
Approach Delay, s/veh / LOS	14.5	B		14.8	B		25.0	C		22.4	C	
Intersection Delay, s/veh / LOS	16.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.1	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.3	A	1.2	A	0.9	A	0.9	A

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	Alex Grover				Intersection	N 3000 E and E 3600 N		
Agency/Co.	Keller Associates				Jurisdiction			
Date Performed	11/5/2014				Analysis Year	2014		
Analysis Time Period	5:00 PM - 6:00 PM							
Project Description 214088								
East/West Street: E 3600 N					North/South Street: Blue Lakes Blvd (N 3000 E)			
Intersection Orientation: North-South					Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	6	79	2	4	129	101		
Peak-Hour Factor, PHF	0.50	0.79	0.25	0.33	0.85	0.81		
Hourly Flow Rate, HFR (veh/h)	12	99	8	12	151	124		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	53	31	5	3	46	4		
Peak-Hour Factor, PHF	0.60	0.78	0.42	0.38	0.77	0.50		
Hourly Flow Rate, HFR (veh/h)	88	39	11	7	59	8		
Percent Heavy Vehicles	15	3	20	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	LTR			LTR		
v (veh/h)	12	12	74			138		
C (m) (veh/h)	1442	1497	620			521		
v/c	0.01	0.01	0.12			0.26		
95% queue length	0.03	0.02	0.40			1.06		
Control Delay (s/veh)	7.5	7.4	11.6			14.4		
LOS	A	A	B			B		
Approach Delay (s/veh)	--	--	11.6			14.4		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	N 3000 E and E 3600 N			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2040			
Analysis Time Period	5:00 PM - 6:00 PM							
Project Description 214088								
East/West Street: E 3600 N				North/South Street: Blue Lakes Blvd (N 3000 E)				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	11	137	3	7	224	175		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	12	152	3	7	248	194		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	92	54	8	5	80	7		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	102	60	8	5	88	7		
Percent Heavy Vehicles	15	3	20	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	LTR			LTR		
v (veh/h)	12	7	100			170		
C (m) (veh/h)	1330	1438	513			382		
v/c	0.01	0.00	0.19			0.45		
95% queue length	0.03	0.01	0.72			2.22		
Control Delay (s/veh)	7.7	7.5	13.7			21.8		
LOS	A	A	B			C		
Approach Delay (s/veh)	--	--	13.7			21.8		
Approach LOS	--	--	B			C		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	N 3100 E and E 3600 N			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2014			
Analysis Time Period	5:00 PM - 6:00 PM							
Project Description 214088								
East/West Street: E 3600 N				North/South Street: N 3100 E				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	6	41	2	22	46	45		
Peak-Hour Factor, PHF	0.75	0.85	0.50	0.69	0.82	0.59		
Hourly Flow Rate, HFR (veh/h)	8	48	4	31	56	76		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	22	9	2	2	3	9		
Peak-Hour Factor, PHF	0.69	0.75	0.50	0.25	0.38	0.38		
Hourly Flow Rate, HFR (veh/h)	31	12	4	8	7	23		
Percent Heavy Vehicles	5	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	8	31		38			47	
C (m) (veh/h)	1562	1567		865			689	
v/c	0.01	0.02		0.04			0.07	
95% queue length	0.02	0.06		0.14			0.22	
Control Delay (s/veh)	7.3	7.3		9.4			10.6	
LOS	A	A		A			B	
Approach Delay (s/veh)	--	--	9.4			10.6		
Approach LOS	--	--	A			B		

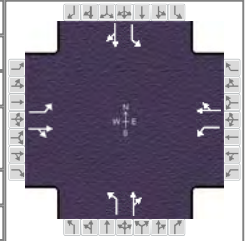
TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	N 3100 E and E 3600 N			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2040			
Analysis Time Period	5:00 PM - 6:00 PM							
Project Description 214088								
East/West Street: E 3600 N				North/South Street: N 3100 E				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	11	71	3	38	80	79		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	12	78	3	42	88	87		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	38	16	3	3	5	16		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	42	17	3	3	5	17		
Percent Heavy Vehicles	5	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	LTR			LTR		
v (veh/h)	12	42	25			62		
C (m) (veh/h)	1520	1529	820			594		
v/c	0.01	0.03	0.03			0.10		
95% queue length	0.02	0.08	0.09			0.35		
Control Delay (s/veh)	7.4	7.4	9.5			11.8		
LOS	A	A	A			B		
Approach Delay (s/veh)	--	--	9.5			11.8		
Approach LOS	--	--	A			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	Orchard Dr and Blue Lakes Blvd			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2014			
Analysis Time Period	12:00 PM - 1:00 PM							
Project Description 214088								
East/West Street: Orchard Dr (E 3700 N)				North/South Street: Blue Lakes Blvd (N 3000 E)				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	8	81	9	37	92	65		
Peak-Hour Factor, PHF	0.67	0.70	0.56	0.66	0.82	0.81		
Hourly Flow Rate, HFR (veh/h)	11	115	16	56	112	80		
Percent Heavy Vehicles	0	--	--	22	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	44	77	6	8	78	37		
Peak-Hour Factor, PHF	0.79	0.88	0.50	0.67	0.93	0.66		
Hourly Flow Rate, HFR (veh/h)	55	87	12	11	83	56		
Percent Heavy Vehicles	2	13	0	13	13	14		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	L		TR	L		TR
v (veh/h)	11	56	11		139	55		99
C (m) (veh/h)	1490	1340	407		620	392		511
v/c	0.01	0.04	0.03		0.22	0.14		0.19
95% queue length	0.02	0.13	0.08		0.85	0.48		0.71
Control Delay (s/veh)	7.4	7.8	14.1		12.5	15.7		13.7
LOS	A	A	B		B	C		B
Approach Delay (s/veh)	--	--	12.6			14.4		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	Orchard Dr and Blue Lakes Blvd			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2040			
Analysis Time Period	4:30 PM - 5:30 PM							
Project Description 214088								
East/West Street: Orchard Dr (E 3700 N)				North/South Street: Blue Lakes Blvd (N 3000 E)				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	17	173	20	80	197	139		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	18	192	22	88	218	154		
Percent Heavy Vehicles	0	--	--	22	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	93	165	14	17	167	80		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	103	183	15	18	185	88		
Percent Heavy Vehicles	2	13	0	13	13	14		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	L		TR	L		TR
v (veh/h)	18	88	18		273	103		198
C (m) (veh/h)	1364	1246	138		421	134		319
v/c	0.01	0.07	0.13		0.65	0.77		0.62
95% queue length	0.04	0.23	0.44		4.46	4.57		3.90
Control Delay (s/veh)	7.7	8.1	35.0		28.0	89.4		33.1
LOS	A	A	D		D	F		D
Approach Delay (s/veh)	--	--	28.4			52.4		
Approach LOS	--	--	D			F		

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	12/16/2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.90
Intersection	Orchard Dr and Blue Lakes	Analysis Year	2040	Analysis Period	1> 4:30
File Name	Orchard Dr and Blue Lakes Blvd (Signal Improved).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	93	165	14	17	167	80	17	173	20	80	197	139

Signal Information											
Cycle, s	60.0	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	Yes	Simult. Gap E/W	On	Green	27.0	21.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0	
				Red	2.0	2.0	0.0	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8		4		6		2
Case Number		6.0		6.0		6.0		6.0
Phase Duration, s		27.0		27.0		33.0		33.0
Change Period, (Y+R _c), s		6.0		6.0		6.0		6.0
Max Allow Headway (MAH), s		6.8		6.8		7.3		7.3
Queue Clearance Time (g _s), s		15.0		10.1		12.5		11.7
Green Extension Time (g _e), s		2.6		4.0		6.2		6.4
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		1.00		0.59		0.52		0.49

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	103	199		19	274		19	214		89	373	
Adjusted Saturation Flow Rate (s), veh/h/ln	1100	1658		1064	1589		1025	1636		1185	1637	
Queue Service Time (g _s), s	4.9	5.3		0.8	8.1		0.8	5.0		3.1	9.7	
Cycle Queue Clearance Time (g _c), s	13.0	5.3		6.1	8.1		10.5	5.0		8.1	9.7	
Green Ratio (g/C)	0.35	0.35		0.35	0.35		0.45	0.45		0.45	0.45	
Capacity (c), veh/h	356	580		398	556		415	736		555	737	
Volume-to-Capacity Ratio (X)	0.290	0.343		0.047	0.494		0.046	0.291		0.160	0.507	
Available Capacity (c _a), veh/h	356	580		398	556		415	736		555	737	
Back of Queue (Q), veh/ln (50th percentile)	1.3	1.8		0.2	2.8		0.2	1.6		0.8	3.2	
Queue Storage Ratio (RQ) (50th percentile)	0.26	0.00		0.04	0.00		0.04	0.00		0.15	0.00	
Uniform Delay (d ₁), s/veh	20.4	14.4		16.7	15.3		15.5	10.4		13.0	11.8	
Incremental Delay (d ₂), s/veh	2.1	1.6		0.2	3.1		0.2	1.0		0.6	2.5	
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	22.5	16.0		16.9	18.4		15.7	11.4		13.6	14.2	
Level of Service (LOS)	C	B		B	B		B	B		B	B	
Approach Delay, s/veh / LOS	18.2	B		18.3	B		11.8	B		14.1	B	
Intersection Delay, s/veh / LOS	15.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.2	B	2.2	B
Bicycle LOS Score / LOS	1.0	A	1.0	A	0.9	A	1.3	A

ALL-WAY STOP CONTROL ANALYSIS

General Information				Site Information	
Analyst	Alex Grover			Intersection	Orchard Dr and Eastland Dr
Agency/Co.	Keller Associates			Jurisdiction	
Date Performed	11/7/2014			Analysis Year	2014
Analysis Time Period	12:00 PM - 1:00 PM				

Project ID 214088

East/West Street: Orchard Dr (E 3700 N)

North/South Street: Eastland Dr (N 3000 E)

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	65	48	5	13	54	48
%Thrus Left Lane						
Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	7	38	12	29	46	63
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LT	R	LTR		LT	R
PHF	0.84		0.70	0.71	0.68		0.89	0.88
Flow Rate (veh/h)	139		95	67	82		83	71
% Heavy Vehicles	13		7	6	5		4	8
No. Lanes	1		2		1		2	
Geometry Group	4b		5		4b		5	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.6		0.2	0.0	0.1		0.4	0.0
Prop. Right-Turns	0.0		0.0	1.0	0.2		0.0	1.0
Prop. Heavy Vehicle	0.1		0.1	0.1	0.0		0.0	0.1
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.5	0.5
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.3		0.2	-0.6	-0.0		0.3	-0.6

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	3.20
x, initial	0.12		0.08	0.06	0.07		0.07	0.06
hd, final value (s)	5.65		5.52	4.70	5.51		5.67	4.85
x, final value	0.22		0.15	0.09	0.13		0.13	0.10
Move-up time, m (s)	2.3		2.3		2.3		2.3	
Service Time, t _s (s)	3.4		3.2	2.4	3.2		3.4	2.5

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	389		345	317	332		333	321
Delay (s/veh)	9.93		9.15	7.85	9.00		9.23	8.06
LOS	A		A	A	A		A	A
Approach: Delay (s/veh)	9.93		8.62		9.00		8.69	
LOS	A		A		A		A	
Intersection Delay (s/veh)	9.03							
Intersection LOS	A							

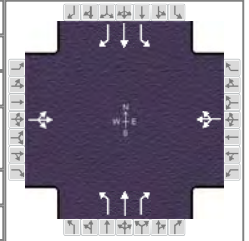
ALL-WAY STOP CONTROL ANALYSIS								
General Information					Site Information			
Analyst	Alex Grover				Intersection		Orchard Dr and Eastland Dr	
Agency/Co.	Keller Associates				Jurisdiction			
Date Performed	11/7/2014				Analysis Year		2040	
Analysis Time Period	4:30 PM - 5:30 PM							
Project ID 214088								
East/West Street: Orchard Dr (E 3700 N)					North/South Street: Eastland Dr (N 3000 E)			
Volume Adjustments and Site Characteristics								
Approach	Eastbound			Westbound				
Movement	L	T	R	L	T	R		
Volume (veh/h)	139	103	10	27	115	103		
%Thrus Left Lane								
Approach	Northbound			Southbound				
Movement	L	T	R	L	T	R		
Volume (veh/h)	15	81	26	62	99	83		
%Thrus Left Lane								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LT R		LTR		LT R	
PHF	0.90		0.90 0.90		0.90		0.90 0.90	
Flow Rate (veh/h)	279		157 114		134		178 92	
% Heavy Vehicles	13		7 6		5		4 8	
No. Lanes	1		2		1		2	
Geometry Group	4b		5		4b		5	
Duration, T	0.25							
Saturation Headway Adjustment Worksheet								
Prop. Left-Turns	0.6		0.2	0.0	0.1		0.4	0.0
Prop. Right-Turns	0.0		0.0	1.0	0.2		0.0	1.0
Prop. Heavy Vehicle	0.1		0.1	0.1	0.0		0.0	0.1
hLT-adj	0.2	0.2	0.5	0.5	0.2	0.2	0.5	0.5
hRT-adj	-0.6	-0.6	-0.7	-0.7	-0.6	-0.6	-0.7	-0.7
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.3		0.2	-0.6	-0.0		0.3	-0.6
Departure Headway and Service Time								
hd, initial value (s)	3.20		3.20	3.20	3.20		3.20	3.20
x, initial	0.25		0.14	0.10	0.12		0.16	0.08
hd, final value (s)	6.53		6.50	5.68	6.70		6.71	5.87
x, final value	0.51		0.28	0.18	0.25		0.33	0.15
Move-up time, m (s)	2.3		2.3		2.3		2.3	
Service Time, t _s (s)	4.2		4.2	3.4	4.4		4.4	3.6
Capacity and Level of Service								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	529		407	364	384		428	342
Delay (s/veh)	15.74		11.75	9.62	11.61		12.70	9.61
LOS	C		B	A	B		B	A
Approach: Delay (s/veh)	15.74		10.85		11.61		11.64	
LOS	C		B		B		B	
Intersection Delay (s/veh)	12.61							
Intersection LOS	B							

HCS 2010 Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		Keller Associates				Duration, h		0.25											
Analyst		Alex Grover		Analysis Date		Nov 7, 2014		Area Type		Other									
Jurisdiction				Time Period		4:30 PM - 5:30 PM		PHF		0.89									
Intersection		Orchard Dr and Washingto		Analysis Year		2014		Analysis Period		1> 4:30									
File Name		Orchard Dr and Washington St.xus																	
Project Description																			
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				37	52	17	27	52	32	29	199	26	26	215	33				
Signal Information																			
Cycle, s	45.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	5.0	13.8	8.4	0.0	0.0	0.0									
				Yellow	3.5	4.0	4.0	0.0	0.0	0.0									
				Red	2.3	1.6	2.3	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						8				4		1		6		5		2	
Case Number						8.0				8.0		1.1		3.0		1.1		3.0	
Phase Duration, s						14.7				14.7		10.8		19.4		10.8		19.4	
Change Period, (Y+R _c), s						6.5				6.5		5.8		5.7		5.8		5.7	
Max Allow Headway (MAH), s						7.8				7.8		2.7		7.3		2.7		7.3	
Queue Clearance Time (g _s), s						4.8				5.2		2.5		6.3		2.5		6.7	
Green Extension Time (g _e), s						3.4				2.2		0.0		7.0		0.0		7.0	
Phase Call Probability						1.00				1.00		1.00		1.00		1.00		1.00	
Max Out Probability						0.00				0.19		0.00		0.02		0.00		0.02	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				3	8	18	7	4	14	1	6	16	5	2	12				
Adjusted Flow Rate (v), veh/h					119			125		33	224	29	29	242	37				
Adjusted Saturation Flow Rate (s), veh/h/ln					1534			1473		1810	1845	1610	1616	1845	1610				
Queue Service Time (g _s), s					0.0			0.0		0.5	4.3	0.6	0.5	4.7	0.7				
Cycle Queue Clearance Time (g _c), s					2.8			3.2		0.5	4.3	0.6	0.5	4.7	0.7				
Green Ratio (g/C)					0.18			0.18		0.42	0.31	0.31	0.42	0.31	0.31				
Capacity (c), veh/h					389			369		543	564	492	514	564	492				
Volume-to-Capacity Ratio (X)					0.306			0.338		0.060	0.396	0.059	0.057	0.428	0.075				
Available Capacity (c _a), veh/h					1584			741		1146	1845	1611	1053	1845	1611				
Back of Queue (Q), veh/ln (50th percentile)					1.0			1.0		0.1	1.3	0.2	0.1	1.5	0.2				
Queue Storage Ratio (RQ) (50th percentile)					0.00			0.00		0.03	0.00	0.02	0.03	0.00	0.05				
Uniform Delay (d ₁), s/veh					16.2			16.3		8.3	12.3	11.0	8.2	12.5	11.1				
Incremental Delay (d ₂), s/veh					0.6			0.8		0.0	0.2	0.0	0.0	0.2	0.0				
Initial Queue Delay (d ₃), s/veh					0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh					16.8			17.1		8.3	12.5	11.1	8.3	12.7	11.1				
Level of Service (LOS)					B			B		A	B	B	A	B	B				
Approach Delay, s/veh / LOS				16.8		B		17.1		B		11.9		B		12.1		B	
Intersection Delay, s/veh / LOS				13.4						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				2.4		B		2.4		B		2.1		B		2.1		B	
Bicycle LOS Score / LOS				0.7		A		0.7		A		1.0		A		1.0		A	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	Nov 7, 2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.92
Intersection	Orchard Dr and Washingto	Analysis Year	2040	Analysis Period	1> 4:30
File Name	Orchard Dr and Washington St (PM Peak Estimate Optimized).xus				
Project Description	Note: Volumes are PM peak hour estimates				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	81	112	37	58	112	68	62	429	57	57	464	71

Signal Information														
Cycle, s	60.1	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On	Green	5.0	13.2	2.6	15.8	0.0	0.0				
				Yellow	3.5	4.0	3.5	4.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.3	1.6	2.3	2.3	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8		4	1	6	5	2
Case Number		8.0		8.0	1.3	3.0	1.2	3.0
Phase Duration, s		22.1		22.1	8.4	27.1	10.8	29.6
Change Period, (Y+R _c), s		6.5		6.5	5.8	5.8	5.8	5.6
Max Allow Headway (MAH), s		7.8		7.8	6.8	6.8	2.7	7.3
Queue Clearance Time (g _s), s		10.7		11.3	2.0	15.1	3.3	15.6
Green Extension Time (g _e), s		2.0		4.3	0.3	0.0	0.0	8.4
Phase Call Probability		1.00		1.00	1.00	1.00	1.00	1.00
Max Out Probability		1.00		0.51	1.00	1.00	1.00	0.05

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h		250			259		67	466	62	62	504	77
Adjusted Saturation Flow Rate (s), veh/h/ln		1472			1453		1810	1845	1610	1616	1845	1610
Queue Service Time (g_s), s		0.0			0.6		0.0	13.1	1.5	1.3	13.6	1.8
Cycle Queue Clearance Time (g_c), s		8.7			9.3		0.0	13.1	1.5	1.3	13.6	1.8
Green Ratio (g/C)		0.26			0.26		0.44	0.36	0.36	0.44	0.40	0.40
Capacity (c), veh/h		464			453		355	656	572	370	736	642
Volume-to-Capacity Ratio (X)		0.539			0.572		0.190	0.711	0.108	0.168	0.686	0.120
Available Capacity (c_a), veh/h		464			669		518	656	572	370	1566	1367
Back of Queue (Q), veh/ln (50th percentile)		3.0			3.1		0.7	5.1	0.5	0.4	4.6	0.5
Queue Storage Ratio (RQ) (50th percentile)		0.00			0.00		0.16	0.00	0.07	0.10	0.00	0.13
Uniform Delay (d_1), s/veh		19.5			19.8		19.9	16.7	13.0	11.4	14.9	11.4
Incremental Delay (d_2), s/veh		1.6			1.6		0.1	3.1	0.0	0.1	0.4	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh		21.2			21.4		20.0	19.8	13.0	11.5	15.4	11.4
Level of Service (LOS)		C			C		C	B	B	B	B	B
Approach Delay, s/veh / LOS	21.2	C		21.4	C		19.1	B		14.5	B	
Intersection Delay, s/veh / LOS	18.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.9	A	0.9	A	1.5	A	1.5	A

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	SH 50 and Addison Ave			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2014			
Analysis Time Period	4:00-5:00PM							
Project Description 214088								
East/West Street: Addison Avenue (E 3900 N)				North/South Street: SH 50				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	1	207			220	119		
Peak-Hour Factor, PHF	0.25	0.89	1.00	1.00	0.83	0.88		
Hourly Flow Rate, HFR (veh/h)	4	232	0	0	265	135		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	117		0					
Peak-Hour Factor, PHF	0.81	1.00	1.00	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	144	0	0	0	0	0		
Percent Heavy Vehicles	1	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	0	1	0	0	0		
Configuration	L		R					
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	4					144		0
C (m) (veh/h)	1311					527		779
v/c	0.00					0.27		0.00
95% queue length	0.01					1.10		0.00
Control Delay (s/veh)	7.8					14.4		9.6
LOS	A					B		A
Approach Delay (s/veh)	--	--				14.4		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	Alex Grover				Intersection	SH 50 and Addison Ave		
Agency/Co.	Keller Associates				Jurisdiction			
Date Performed	11/5/2014				Analysis Year	2040		
Analysis Time Period	4:00-5:00PM							
Project Description 214088								
East/West Street: Addison Avenue (E 3900 N)					North/South Street: SH 50			
Intersection Orientation: North-South					Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	2	360			382	207		
Peak-Hour Factor, PHF	0.90	0.90	1.00	1.00	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	2	400	0	0	424	230		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	204	0	0					
Peak-Hour Factor, PHF	0.90	0.90	0.90	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	226	0	0	0	0	0		
Percent Heavy Vehicles	1	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	0	0		
Configuration		LTR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LTR	
v (veh/h)	2						226	
C (m) (veh/h)	1146						341	
v/c	0.00						0.66	
95% queue length	0.01						4.49	
Control Delay (s/veh)	8.1						34.1	
LOS	A						D	
Approach Delay (s/veh)	--	--				34.1		
Approach LOS	--	--				D		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	SH 50 and N 3800 E			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2014			
Analysis Time Period	4:30-5:30 PM							
Project Description 214088								
East/West Street: SH 50				North/South Street: N 3800 E (Rock Creek Rd)				
Intersection Orientation: East-West				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	1	179	2	46	171	0		
Peak-Hour Factor, PHF	0.25	0.91	0.50	0.82	0.75	1.00		
Hourly Flow Rate, HFR (veh/h)	4	196	4	56	228	0		
Percent Heavy Vehicles	0	--	--	28	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	3	28	32	1	36	2		
Peak-Hour Factor, PHF	0.38	0.70	0.89	0.25	0.82	0.50		
Hourly Flow Rate, HFR (veh/h)	7	40	35	4	43	4		
Percent Heavy Vehicles	0	0	22	100	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			1		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	4	56	82			51		
C (m) (veh/h)	1352	1231	546			444		
v/c	0.00	0.05	0.15			0.11		
95% queue length	0.01	0.14	0.53			0.39		
Control Delay (s/veh)	7.7	8.1	12.8			14.2		
LOS	A	A	B			B		
Approach Delay (s/veh)	--	--	12.8			14.2		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	Alex Grover				Intersection	SH 50 and N 3800 E		
Agency/Co.	Keller Associates				Jurisdiction			
Date Performed	11/5/2014				Analysis Year	2040		
Analysis Time Period	4:30-5:30 PM							
Project Description 214088								
East/West Street: SH 50					North/South Street: N 3800 E (Rock Creek Rd)			
Intersection Orientation: East-West					Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments								
Major Street	Eastbound			Westbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	2	311	3	80	297	0		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	2	345	3	88	330	0		
Percent Heavy Vehicles	0	--	--	28	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	5	49	55	2	0	3		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	5	54	61	2	0	3		
Percent Heavy Vehicles	0	0	22	100	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			1		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	2	88	120			5		
C (m) (veh/h)	1241	1080	398			454		
v/c	0.00	0.08	0.30			0.01		
95% queue length	0.00	0.27	1.25			0.03		
Control Delay (s/veh)	7.9	8.6	17.9			13.0		
LOS	A	A	C			B		
Approach Delay (s/veh)	--	--	17.9			13.0		
Approach LOS	--	--	C			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	SH 74 and E 3600 N			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2014			
Analysis Time Period	7:30 AM - 8:30 AM							
Project Description 214088								
East/West Street: E 3600 N				North/South Street: SH 74				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	2	37	5	14	34	28		
Peak-Hour Factor, PHF	0.50	0.77	0.42	0.44	0.85	0.64		
Hourly Flow Rate, HFR (veh/h)	4	48	11	31	39	43		
Percent Heavy Vehicles	50	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	37	41	4	4	21	32		
Peak-Hour Factor, PHF	0.62	0.85	0.50	0.33	0.58	0.73		
Hourly Flow Rate, HFR (veh/h)	59	48	8	12	36	43		
Percent Heavy Vehicles	5	10	0	0	10	3		
Percent Grade (%)	0			0				
Flared Approach		Y			N			
Storage		1			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	4	31	91			115		
C (m) (veh/h)	1311	1572	818			742		
v/c	0.00	0.02	0.11			0.15		
95% queue length	0.01	0.06	0.37			0.55		
Control Delay (s/veh)	7.8	7.3	10.0			11.0		
LOS	A	A	A			B		
Approach Delay (s/veh)	--	--	10.0			11.0		
Approach LOS	--	--	A			B		

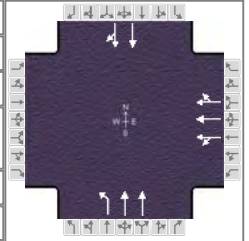
TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	SH 74 and E 3600 N			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2040			
Analysis Time Period	7:30 AM - 8:30 AM							
Project Description 214088								
East/West Street: E 3600 N				North/South Street: SH 74				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	3	65	8	24	59	49		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	3	72	8	26	65	54		
Percent Heavy Vehicles	50	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	65	71	7	7	36	55		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	72	78	7	7	40	61		
Percent Heavy Vehicles	5	10	0	0	10	3		
Percent Grade (%)	0			0				
Flared Approach		Y			N			
Storage		1			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	3	26	108			157		
C (m) (veh/h)	1280	1541	811			674		
v/c	0.00	0.02	0.13			0.23		
95% queue length	0.01	0.05	0.46			0.90		
Control Delay (s/veh)	7.8	7.4	10.1			12.1		
LOS	A	A	B			B		
Approach Delay (s/veh)	--	--	10.1			12.1		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information					Site Information			
Analyst	Alex Grover				Intersection	SH 74 and E 3600 N		
Agency/Co.	Keller Associates				Jurisdiction			
Date Performed	11/5/2014				Analysis Year	2014		
Analysis Time Period	4:30 PM - 5:30 PM							
Project Description 214088								
East/West Street: E 3600 N					North/South Street: SH 74			
Intersection Orientation: North-South					Study Period (hrs): 0.25			
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	3	39	6	42	57	55		
Peak-Hour Factor, PHF	0.25	0.75	0.50	0.75	0.75	0.76		
Hourly Flow Rate, HFR (veh/h)	12	52	12	56	76	72		
Percent Heavy Vehicles	33	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	33	38	5	0	42	21		
Peak-Hour Factor, PHF	0.63	0.79	0.42	1.00	0.70	0.75		
Hourly Flow Rate, HFR (veh/h)	52	48	11	0	60	28		
Percent Heavy Vehicles	3	16	0	0	31	0		
Percent Grade (%)	0			0				
Flared Approach		Y			N			
Storage		1			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	12	56	88			111		
C (m) (veh/h)	1348	1554	657			632		
v/c	0.01	0.04	0.13			0.18		
95% queue length	0.03	0.11	0.46			0.63		
Control Delay (s/veh)	7.7	7.4	11.3			12.3		
LOS	A	A	B			B		
Approach Delay (s/veh)	--	--	11.3			12.3		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	SH 74 and E 3600 N			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2040			
Analysis Time Period	4:30 PM - 5:30 PM							
Project Description 214088								
East/West Street: E 3600 N				North/South Street: SH 74				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	5	68	10	73	99	96		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	5	75	11	81	110	106		
Percent Heavy Vehicles	33	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			1			1		
Lanes	1	1	0	1	1	1		
Configuration	L		TR	L	T	R		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	57	66	8	0	73	36		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	63	73	8	0	81	40		
Percent Heavy Vehicles	3	16	0	0	31	0		
Percent Grade (%)	0			0				
Flared Approach		Y			N			
Storage		1			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	5	81	121			144		
C (m) (veh/h)	1308	1524	590			502		
v/c	0.00	0.05	0.21			0.29		
95% queue length	0.01	0.17	0.76			1.18		
Control Delay (s/veh)	7.8	7.5	12.7			15.2		
LOS	A	A	B			C		
Approach Delay (s/veh)	--	--	12.7			15.2		
Approach LOS	--	--	B			C		

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	Nov 18, 2014	Area Type	Other
Jurisdiction		Time Period	7:45 AM - 8:45 AM	PHF	0.91
Intersection	Shoshone St and 2nd Ave	Analysis Year	2014	Analysis Period	1 > 7:45
File Name	Shoshone St and 2nd Ave N (AM).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				44	374	45	102	313			307	54

Signal Information													
Cycle, s	85.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.0	39.0	26.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.2	0.0	0.0	0.0			
				Red	1.8	1.8	1.8	0.0	0.0	0.0			

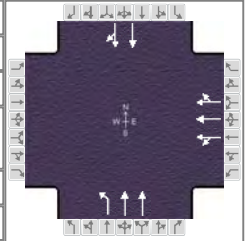
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				4	1	6		2
Case Number				12.0	1.0	4.0		8.3
Phase Duration, s				31.0	10.0	54.0		44.0
Change Period, (Y+R _c), s				5.0	5.0	5.0		5.0
Max Allow Headway (MAH), s				3.7	0.9	0.0		0.0
Queue Clearance Time (g _s), s				9.0	4.6			
Green Extension Time (g _e), s				1.3	0.0	0.0		0.0
Phase Call Probability				1.00	1.00			
Max Out Probability				0.00	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	1	6			2	12
Adjusted Flow Rate (v), veh/h				181	166	161	112	344			202	195
Adjusted Saturation Flow Rate (s), veh/h/ln				1705	1727	1633	1792	1723			1845	1748
Queue Service Time (g_s), s				7.0	6.3	6.5	2.6	4.0			5.7	5.8
Cycle Queue Clearance Time (g_c), s				7.0	6.3	6.5	2.6	4.0			5.7	5.8
Green Ratio (g/C)				0.31	0.31	0.31	0.54	0.58			0.46	0.46
Capacity (c), veh/h				521	528	499	578	1986			846	802
Volume-to-Capacity Ratio (X)				0.348	0.315	0.322	0.194	0.173			0.238	0.243
Available Capacity (c_a), veh/h				521	528	499	578	1986			846	802
Back of Queue (Q), veh/ln (50th percentile)				3.0	2.7	2.6	1.1	1.5			2.4	2.4
Queue Storage Ratio (RQ) (50th percentile)				0.00	0.00	0.00	0.00	0.00			0.00	0.00
Uniform Delay (d_1), s/veh				22.9	22.7	22.7	9.9	8.5			14.0	14.0
Incremental Delay (d_2), s/veh				1.8	1.6	1.7	0.7	0.2			0.7	0.7
Initial Queue Delay (d_3), s/veh				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Control Delay (d), s/veh				24.7	24.2	24.4	10.7	8.7			14.6	14.7
Level of Service (LOS)				C	C	C	B	A			B	B
Approach Delay, s/veh / LOS	0.0			24.5		C	9.2		A	14.7		B
Intersection Delay, s/veh / LOS	16.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.7	B	1.9	A	2.8	C
Bicycle LOS Score / LOS			0.8	A	0.9	A	0.8	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	Nov 18, 2014	Area Type	Other
Jurisdiction		Time Period	7:45 AM - 8:45 AM	PHF	0.92
Intersection	Shoshone St and 2nd Ave	Analysis Year	2040	Analysis Period	1 > 7:45
File Name	Shoshone St and 2nd Ave N (AM Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				76	650	79	177	544			534	93

Signal Information													
Cycle, s	60.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.0	21.0	19.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.2	0.0	0.0	0.0			
				Red	1.8	1.8	1.8	0.0	0.0	0.0			

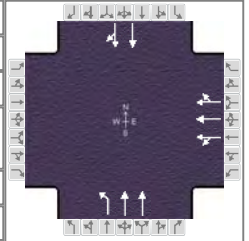
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				4	1	6		2
Case Number				12.0	1.0	4.0		8.3
Phase Duration, s				24.0	10.0	36.0		26.0
Change Period, (Y+R _c), s				5.0	5.0	5.0		5.0
Max Allow Headway (MAH), s				3.7	0.9	0.0		0.0
Queue Clearance Time (g _s), s				11.2	5.8			
Green Extension Time (g _e), s				1.8	0.0	0.0		0.0
Phase Call Probability				1.00	1.00			
Max Out Probability				0.30	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	1	6			2	12
Adjusted Flow Rate (v), veh/h				313	288	274	192	591			349	332
Adjusted Saturation Flow Rate (s), veh/h/ln				1705	1727	1631	1792	1723			1845	1748
Queue Service Time (g_s), s				9.2	8.2	8.3	3.8	6.0			9.1	9.2
Cycle Queue Clearance Time (g_c), s				9.2	8.2	8.3	3.8	6.0			9.1	9.2
Green Ratio (g/C)				0.32	0.32	0.32	0.47	0.52			0.35	0.35
Capacity (c), veh/h				540	547	517	420	1780			646	612
Volume-to-Capacity Ratio (X)				0.580	0.526	0.531	0.458	0.332			0.541	0.543
Available Capacity (c_a), veh/h				540	547	517	420	1780			646	612
Back of Queue (Q), veh/ln (50th percentile)				3.8	3.4	3.3	1.7	2.0			4.1	3.9
Queue Storage Ratio (RQ) (50th percentile)				0.00	0.00	0.00	0.00	0.00			0.00	0.00
Uniform Delay (d_1), s/veh				17.2	16.8	16.8	10.9	8.5			15.6	15.7
Incremental Delay (d_2), s/veh				4.5	3.6	3.9	3.6	0.5			3.2	3.4
Initial Queue Delay (d_3), s/veh				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Control Delay (d), s/veh				21.6	20.4	20.7	14.5	9.0			18.9	19.1
Level of Service (LOS)				C	C	C	B	A			B	B
Approach Delay, s/veh / LOS	0.0			20.9		C	10.3		B	19.0		B
Intersection Delay, s/veh / LOS	16.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.7	B	1.9	A	2.8	C
Bicycle LOS Score / LOS			1.0	A	1.1	A	1.0	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/10/2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.93
Intersection	Shoshone St and 2nd Ave	Analysis Year	2014	Analysis Period	1> 4:30
File Name	Shoshone St and 2nd Ave N (PM).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				52	528	75	103	458			435	71

Signal Information													
Cycle, s	85.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.0	39.0	26.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.2	0.0	0.0	0.0			
				Red	1.8	1.8	1.8	0.0	0.0	0.0			

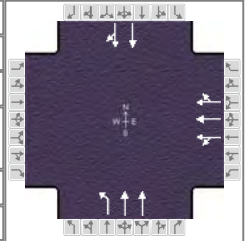
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				4	1	6		2
Case Number				12.0	1.0	4.0		8.3
Phase Duration, s				31.0	10.0	54.0		44.0
Change Period, (Y+R _c), s				5.0	5.0	5.0		5.0
Max Allow Headway (MAH), s				3.7	0.9	0.0		0.0
Queue Clearance Time (g _s), s				11.5	4.6			
Green Extension Time (g _e), s				1.8	0.0	0.0		0.0
Phase Call Probability				1.00	1.00			
Max Out Probability				0.02	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	1	6			2	12
Adjusted Flow Rate (v), veh/h				252	231	221	111	492			278	266
Adjusted Saturation Flow Rate (s), veh/h/ln				1824	1845	1729	1792	1773			1881	1788
Queue Service Time (g_s), s				9.5	8.5	8.6	2.6	5.8			8.0	8.1
Cycle Queue Clearance Time (g_c), s				9.5	8.5	8.6	2.6	5.8			8.0	8.1
Green Ratio (g/C)				0.31	0.31	0.31	0.54	0.58			0.46	0.46
Capacity (c), veh/h				558	564	529	506	2045			863	820
Volume-to-Capacity Ratio (X)				0.452	0.410	0.417	0.219	0.241			0.322	0.325
Available Capacity (c_a), veh/h				558	564	529	506	2045			863	820
Back of Queue (Q), veh/ln (50th percentile)				4.3	3.9	3.7	1.1	2.2			3.5	3.4
Queue Storage Ratio (RQ) (50th percentile)				0.00	0.00	0.00	0.00	0.00			0.00	0.00
Uniform Delay (d_1), s/veh				23.8	23.4	23.5	10.2	8.9			14.6	14.6
Incremental Delay (d_2), s/veh				2.6	2.2	2.4	1.0	0.3			1.0	1.1
Initial Queue Delay (d_3), s/veh				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Control Delay (d), s/veh				26.4	25.6	25.9	11.2	9.1			15.6	15.7
Level of Service (LOS)				C	C	C	B	A			B	B
Approach Delay, s/veh / LOS	0.0			26.0		C	9.5		A	15.6		B
Intersection Delay, s/veh / LOS	17.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.7	B	1.9	A	2.8	C
Bicycle LOS Score / LOS			0.9	A	1.0	A	0.9	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/10/2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.93
Intersection	Shoshone St and 2nd Ave	Analysis Year	2040	Analysis Period	1> 4:30
File Name	Shoshone St and 2nd Ave N (PM Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h				90	918	131	179	797			756	123

Signal Information													
Cycle, s	60.0	Reference Phase	2										
Offset, s	0	Reference Point	End										
Uncoordinated	No	Simult. Gap E/W	On	Green	5.0	21.0	19.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.2	0.0	0.0	0.0			
				Red	1.8	1.8	1.8	0.0	0.0	0.0			

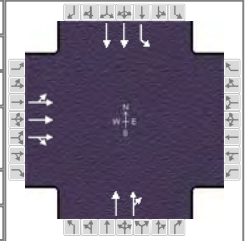
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				4	1	6		2
Case Number				12.0	1.0	4.0		8.3
Phase Duration, s				24.0	10.0	36.0		26.0
Change Period, (Y+R _c), s				5.0	5.0	5.0		5.0
Max Allow Headway (MAH), s				3.7	0.9	0.0		0.0
Queue Clearance Time (g _s), s				15.0	5.9			
Green Extension Time (g _e), s				1.7	0.0	0.0		0.0
Phase Call Probability				1.00	1.00			
Max Out Probability				0.94	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				7	4	14	1	6			2	12
Adjusted Flow Rate (v), veh/h				440	405	380	192	857			485	461
Adjusted Saturation Flow Rate (s), veh/h/ln				1825	1845	1727	1792	1773			1881	1788
Queue Service Time (g_s), s				13.0	11.5	11.6	3.9	9.2			13.4	13.5
Cycle Queue Clearance Time (g_c), s				13.0	11.5	11.6	3.9	9.2			13.4	13.5
Green Ratio (g/C)				0.32	0.32	0.32	0.47	0.52			0.35	0.35
Capacity (c), veh/h				578	584	547	344	1832			658	626
Volume-to-Capacity Ratio (X)				0.762	0.693	0.694	0.560	0.468			0.736	0.736
Available Capacity (c_a), veh/h				578	584	547	344	1832			658	626
Back of Queue (Q), veh/ln (50th percentile)				6.3	5.4	5.1	1.9	3.3			6.6	6.4
Queue Storage Ratio (RQ) (50th percentile)				0.00	0.00	0.00	0.00	0.00			0.00	0.00
Uniform Delay (d_1), s/veh				18.5	17.9	18.0	12.5	9.2			17.1	17.1
Incremental Delay (d_2), s/veh				9.2	6.6	7.1	6.5	0.9			7.2	7.5
Initial Queue Delay (d_3), s/veh				0.0	0.0	0.0	0.0	0.0			0.0	0.0
Control Delay (d), s/veh				27.6	24.6	25.1	19.0	10.1			24.3	24.6
Level of Service (LOS)				C	C	C	B	B			C	C
Approach Delay, s/veh / LOS	0.0			25.8		C	11.7		B	24.4		C
Intersection Delay, s/veh / LOS	20.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.8	C	2.7	B	1.9	A	2.8	C
Bicycle LOS Score / LOS			1.2	A	1.4	A	1.3	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/10/2014	Area Type	Other
Jurisdiction		Time Period	7:45 AM - 8:45 AM	PHF	0.86
Intersection	Shoshone St and 2nd Ave	Analysis Year	2014	Analysis Period	1 > 7:45
File Name	Shoshone St and 2nd Ave S (AM).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	62	430	55					373	30	41	270	

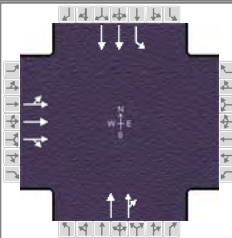
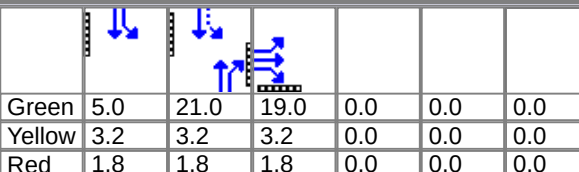
Signal Information											
Cycle, s	85.0	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	No	Simult. Gap E/W	On	Green	5.0	39.0	26.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.2	0.0	0.0	0.0	
				Red	1.8	1.8	1.8	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8				6	5	2
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		31.0				44.0	10.0	54.0
Change Period, (Y+R _c), s		5.0				5.0	5.0	5.0
Max Allow Headway (MAH), s		3.7				0.0	0.9	0.0
Queue Clearance Time (g _s), s		10.6					3.1	
Green Extension Time (g _e), s		1.6				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.01					0.02	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18				6	16		5	2	
Adjusted Flow Rate (v), veh/h	227	209	201				237	232		48	314	
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1810	1711				1827	1779		1810	1756	
Queue Service Time (g _s), s	8.6	7.7	7.8				6.9	6.9		1.1	3.5	
Cycle Queue Clearance Time (g _c), s	8.6	7.7	7.8				6.9	6.9		1.1	3.5	
Green Ratio (g/C)	0.31	0.31	0.31				0.46	0.46		0.54	0.58	
Capacity (c), veh/h	545	554	523				838	816		546	2025	
Volume-to-Capacity Ratio (X)	0.416	0.377	0.383				0.282	0.284		0.087	0.155	
Available Capacity (c _a), veh/h	545	554	523				838	816		546	2025	
Back of Queue (Q), veh/ln (50th percentile)	3.8	3.4	3.3				2.9	2.9		0.4	1.3	
Queue Storage Ratio (RQ) (50th percentile)	0.00	0.00	0.00				0.00	0.00		0.00	0.00	
Uniform Delay (d ₁), s/veh	23.5	23.1	23.2				14.3	14.3		9.7	8.4	
Incremental Delay (d ₂), s/veh	2.3	2.0	2.1				0.8	0.9		0.3	0.2	
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0				0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	25.8	25.1	25.3				15.1	15.2		10.0	8.5	
Level of Service (LOS)	C	C	C				B	B		A	A	
Approach Delay, s/veh / LOS	25.4	C		0.0			15.2	B		8.7	A	
Intersection Delay, s/veh / LOS	18.0						B					

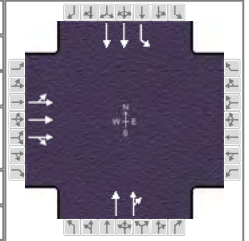
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.7	B	2.9	C	2.8	C	1.9	A
Bicycle LOS Score / LOS	0.8	A			0.9	A	0.8	A

HCS 2010 Signalized Intersection Results Summary

General Information					Intersection Information														
Agency		Keller Associates			Duration, h		0.25												
Analyst		Alex Grover		Analysis Date	11/10/2014		Area Type		Other										
Jurisdiction				Time Period	7:45 AM - 8:45 AM		PHF		0.92										
Intersection		Shoshone St and 2nd Ave		Analysis Year	2040		Analysis Period		1> 7:45										
File Name		Shoshone St and 2nd Ave S (AM Optimized).xus																	
Project Description																			
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				107	748	96					649	52	71	469					
Signal Information																			
Cycle, s	60.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	5.0	21.0	19.0	0.0	0.0	0.0									
				Yellow	3.2	3.2	3.2	0.0	0.0	0.0									
				Red	1.8	1.8	1.8	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						8								6		5		2	
Case Number						12.0								8.3		1.0		4.0	
Phase Duration, s						24.0								26.0		10.0		36.0	
Change Period, (Y+Rc), s						5.0								5.0		5.0		5.0	
Max Allow Headway (MAH), s						3.7								0.0		0.9		0.0	
Queue Clearance Time (gs), s						12.7										3.4			
Green Extension Time (ge), s						1.9								0.0		0.0		0.0	
Phase Call Probability						1.00										1.00			
Max Out Probability						0.53										0.09			
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				3	8	18					6	16	5	2					
Adjusted Flow Rate (v), veh/h				369	341	324					386	376	77	510					
Adjusted Saturation Flow Rate (s), veh/h/ln				1781	1810	1710					1827	1779	1810	1756					
Queue Service Time (gs), s				10.7	9.5	9.6					10.4	10.5	1.4	4.9					
Cycle Queue Clearance Time (gc), s				10.7	9.5	9.6					10.4	10.5	1.4	4.9					
Green Ratio (g/C)				0.32	0.32	0.32					0.35	0.35	0.47	0.52					
Capacity (c), veh/h				564	573	542					639	623	396	1815					
Volume-to-Capacity Ratio (X)				0.654	0.595	0.598					0.603	0.604	0.195	0.281					
Available Capacity (ca), veh/h				564	573	542					639	623	396	1815					
Back of Queue (Q), veh/ln (50th percentile)				4.8	4.2	4.0					4.7	4.6	0.6	1.7					
Queue Storage Ratio (RQ) (50th percentile)				0.00	0.00	0.00					0.00	0.00	0.00	0.00					
Uniform Delay (d1), s/veh				17.7	17.3	17.3					16.1	16.1	10.4	8.2					
Incremental Delay (d2), s/veh				5.8	4.5	4.8					4.2	4.3	1.1	0.4					
Initial Queue Delay (d3), s/veh				0.0	0.0	0.0					0.0	0.0	0.0	0.0					
Control Delay (d), s/veh				23.5	21.8	22.1					20.3	20.4	11.5	8.6					
Level of Service (LOS)				C	C	C					C	C	B	A					
Approach Delay, s/veh / LOS				22.5		C		0.0				20.3		C		9.0		A	
Intersection Delay, s/veh / LOS				18.5						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				2.7		B		2.8		C		2.8		C		1.9		A	
Bicycle LOS Score / LOS				1.1		A						1.1		A		1.0		A	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/10/2014	Area Type	Other
Jurisdiction		Time Period	4:45 PM - 5:45 PM	PHF	0.82
Intersection	Shoshone St and 2nd Ave	Analysis Year	2014	Analysis Period	1 > 4:45
File Name	Shoshone St and 2nd Ave S (PM).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	105	393	53					414	38	80	442	

Signal Information											
Cycle, s	85.0	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	No	Simult. Gap E/W	On	Green	5.0	39.0	26.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.2	0.0	0.0	0.0	
				Red	1.8	1.8	1.8	0.0	0.0	0.0	

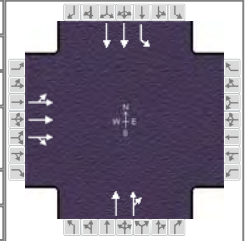
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8				6	5	2
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		31.0				44.0	10.0	54.0
Change Period, (Y+R _c), s		5.0				5.0	5.0	5.0
Max Allow Headway (MAH), s		3.7				0.0	0.9	0.0
Queue Clearance Time (g _s), s		11.3					4.2	
Green Extension Time (g _e), s		1.7				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.02					1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18				6	16		5	2	
Adjusted Flow Rate (v), veh/h	238	221	213				279	272		98	539	
Adjusted Saturation Flow Rate (s), veh/h/ln	1746	1792	1699				1863	1807		1810	1756	
Queue Service Time (g _s), s	9.3	8.3	8.4				8.1	8.2		2.2	6.5	
Cycle Queue Clearance Time (g _c), s	9.3	8.3	8.4				8.1	8.2		2.2	6.5	
Green Ratio (g/C)	0.31	0.31	0.31				0.46	0.46		0.54	0.58	
Capacity (c), veh/h	534	548	520				855	829		507	2025	
Volume-to-Capacity Ratio (X)	0.446	0.403	0.409				0.326	0.328		0.192	0.266	
Available Capacity (c _a), veh/h	534	548	520				855	829		507	2025	
Back of Queue (Q), veh/ln (50th percentile)	4.1	3.7	3.6				3.6	3.5		1.0	2.4	
Queue Storage Ratio (RQ) (50th percentile)	0.00	0.00	0.00				0.00	0.00		0.00	0.00	
Uniform Delay (d ₁), s/veh	23.7	23.4	23.4				14.6	14.7		10.1	9.0	
Incremental Delay (d ₂), s/veh	2.7	2.2	2.4				1.0	1.1		0.8	0.3	
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0				0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	26.4	25.6	25.8				15.7	15.7		11.0	9.3	
Level of Service (LOS)	C	C	C				B	B		B	A	
Approach Delay, s/veh / LOS	25.9	C		0.0			15.7	B		9.6	A	
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	2.7	B		2.9	C		2.8	C		1.9	A	
Bicycle LOS Score / LOS	0.9	A					0.9	A		1.0	A	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/10/2014	Area Type	Other
Jurisdiction		Time Period	4:45 PM - 5:45 PM	PHF	0.92
Intersection	Shoshone St and 2nd Ave	Analysis Year	2040	Analysis Period	1> 4:45
File Name	Shoshone St and 2nd Ave S (PM Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	183	683	92					720	66	139	769	

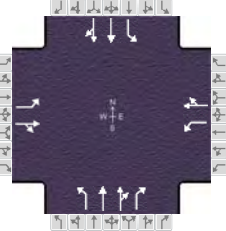
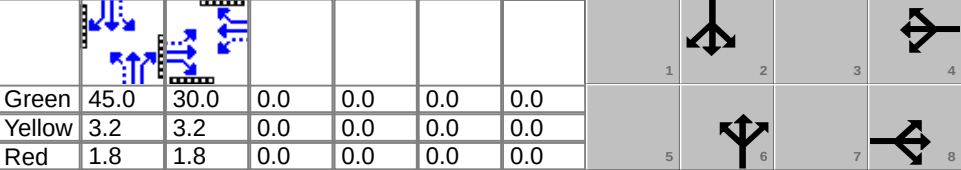
Signal Information											
Cycle, s	60.0	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	No	Simult. Gap E/W	On	Green	5.0	22.0	18.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	3.2	0.0	0.0	0.0	
				Red	1.8	1.8	1.8	0.0	0.0	0.0	

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8				6	5	2
Case Number		12.0				8.3	1.0	4.0
Phase Duration, s		23.0				27.0	10.0	37.0
Change Period, (Y+R _c), s		5.0				5.0	5.0	5.0
Max Allow Headway (MAH), s		3.7				0.0	0.9	0.0
Queue Clearance Time (g _s), s		13.3					4.8	
Green Extension Time (g _e), s		1.6				0.0	0.0	0.0
Phase Call Probability		1.00					1.00	
Max Out Probability		0.78					1.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18				6	16		5	2	
Adjusted Flow Rate (v), veh/h	369	344	328				434	421		151	836	
Adjusted Saturation Flow Rate (s), veh/h/ln	1745	1792	1699				1863	1807		1810	1756	
Queue Service Time (g _s), s	11.3	10.0	10.0				11.5	11.5		2.8	8.7	
Cycle Queue Clearance Time (g _c), s	11.3	10.0	10.0				11.5	11.5		2.8	8.7	
Green Ratio (g/C)	0.30	0.30	0.30				0.37	0.37		0.48	0.53	
Capacity (c), veh/h	524	538	510				683	663		385	1873	
Volume-to-Capacity Ratio (X)	0.705	0.640	0.643				0.635	0.635		0.392	0.446	
Available Capacity (c _a), veh/h	524	538	510				683	663		385	1873	
Back of Queue (Q), veh/ln (50th percentile)	5.1	4.5	4.3				5.3	5.2		1.3	3.0	
Queue Storage Ratio (RQ) (50th percentile)	0.00	0.00	0.00				0.00	0.00		0.00	0.00	
Uniform Delay (d ₁), s/veh	18.6	18.2	18.2				15.7	15.7		10.7	8.6	
Incremental Delay (d ₂), s/veh	7.8	5.8	6.1				4.5	4.6		3.0	0.8	
Initial Queue Delay (d ₃), s/veh	0.0	0.0	0.0				0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	26.4	24.0	24.3				20.1	20.3		13.7	9.3	
Level of Service (LOS)	C	C	C				C	C		B	A	
Approach Delay, s/veh / LOS	24.9	C		0.0			20.2	C		10.0	B	
Intersection Delay, s/veh / LOS	18.4						B					

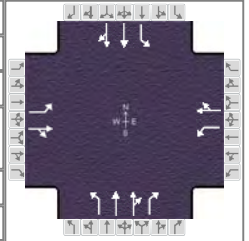
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.7	B	2.8	C	2.8	C	1.9	A
Bicycle LOS Score / LOS	1.1	A			1.2	A	1.3	A

HCS 2010 Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		Keller Associates				Duration, h		0.25											
Analyst		Alex Grover		Analysis Date		Nov 7, 2014		Area Type		Other									
Jurisdiction				Time Period		10:00 AM - 11:00 AM		PHF		0.92									
Intersection		Shoshone St and 6th Ave W		Analysis Year		2014		Analysis Period		1> 10:00									
File Name		Shoshone St and 6th Ave W.xus																	
Project Description																			
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				44	52	6	30	61	132	119	259	46	7	187	27				
Signal Information																			
Cycle, s	85.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	No	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On	Green	45.0	30.0	0.0	0.0	0.0	0.0									
				Yellow	3.2	3.2	0.0	0.0	0.0	0.0									
				Red	1.8	1.8	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						8				4				6				2	
Case Number						6.0				6.0				5.0				6.0	
Phase Duration, s						35.0				35.0				50.0				50.0	
Change Period, (Y+R _c), s						5.0				5.0				5.0				5.0	
Max Allow Headway (MAH), s						2.3				2.3				0.0				0.0	
Queue Clearance Time (g _s), s						14.0				11.2									
Green Extension Time (g _e), s						0.3				0.3				0.0				0.0	
Phase Call Probability						1.00				1.00									
Max Out Probability						0.00				0.00									
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				3	8	18	7	4	14	1	6	16	5	2	12				
Adjusted Flow Rate (v), veh/h				48	63		33	210		129	284	48	8	117	115				
Adjusted Saturation Flow Rate (s), veh/h/ln				1167	1696		1360	1458		1132	1860	1548	1115	1827	1747				
Queue Service Time (g _s), s				2.7	2.1		1.4	9.2		5.5	3.3	1.3	0.3	2.7	2.8				
Cycle Queue Clearance Time (g _c), s				12.0	2.1		3.5	9.2		8.3	3.3	1.3	3.6	2.7	2.8				
Green Ratio (g/C)				0.35	0.35		0.35	0.35		0.53	0.53	0.53	0.53	0.53	0.53				
Capacity (c), veh/h				370	598		531	515		646	1969	820	632	967	925				
Volume-to-Capacity Ratio (X)				0.129	0.105		0.061	0.408		0.200	0.144	0.058	0.012	0.121	0.125				
Available Capacity (c _a), veh/h				370	598		531	515		646	1969	820	632	967	925				
Back of Queue (Q), veh/ln (50th percentile)				0.8	0.9		0.5	3.4		1.4	1.3	0.4	0.1	1.1	1.1				
Queue Storage Ratio (RQ) (50th percentile)				0.19	0.00		0.12	0.00		0.45	0.00	0.08	0.02	0.00	0.00				
Uniform Delay (d ₁), s/veh				25.3	18.5		19.7	20.8		12.2	10.2	9.7	11.1	10.1	10.1				
Incremental Delay (d ₂), s/veh				0.7	0.4		0.2	2.4		0.7	0.2	0.1	0.0	0.3	0.3				
Initial Queue Delay (d ₃), s/veh				0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh				26.0	18.8		19.9	23.2		12.9	10.3	9.8	11.1	10.3	10.4				
Level of Service (LOS)				C	B		B	C		B	B	A	B	B	B				
Approach Delay, s/veh / LOS				21.9		C	22.7		C	11.0		B	10.4		B				
Intersection Delay, s/veh / LOS				14.7									B						
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				2.9		C	2.8		C	2.2		B	2.2		B				
Bicycle LOS Score / LOS				0.7		A	0.9		A	0.9		A	0.7		A				

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	Nov 7, 2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.92
Intersection	Shoshone St and 6th Ave W	Analysis Year	2040	Analysis Period	1> 4:30
File Name	Shoshone St and 6th Ave W (PM Peak Estimate Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	120	144	17	83	169	364	398	716	127	19	517	75

Signal Information											
Cycle, s	60.0	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	No	Simult. Gap E/W	On	Green	25.0	25.0	0.0	0.0	0.0	0.0	
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.2	3.2	0.0	0.0	0.0	0.0	
				Red	1.8	1.8	0.0	0.0	0.0	0.0	

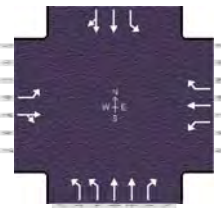
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		8		4		6		2
Case Number		6.0		6.0		5.0		6.0
Phase Duration, s		30.0		30.0		30.0		30.0
Change Period, (Y+R _c), s		5.0		5.0		5.0		5.0
Max Allow Headway (MAH), s		2.5		2.5		0.0		0.0
Queue Clearance Time (g _s), s		27.0		25.1				
Green Extension Time (g _e), s		0.0		0.0		0.0		0.0
Phase Call Probability		1.00		1.00				
Max Out Probability		1.00		1.00				

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	130	175		90	579		433	785	131	21	328	315
Adjusted Saturation Flow Rate (s), veh/h/ln	831	1695		1229	1459		776	1860	1548	705	1827	1746
Queue Service Time (g _s), s	1.9	4.0		3.1	23.1		17.3	9.4	3.2	1.3	7.7	7.7
Cycle Queue Clearance Time (g _c), s	25.0	4.0		7.1	23.1		25.0	9.4	3.2	10.7	7.7	7.7
Green Ratio (g/C)	0.42	0.42		0.42	0.42		0.42	0.42	0.42	0.42	0.42	0.42
Capacity (c), veh/h	147	706		549	608		343	1550	645	304	761	727
Volume-to-Capacity Ratio (X)	0.888	0.248		0.164	0.953		1.260	0.507	0.203	0.068	0.431	0.433
Available Capacity (c _a), veh/h	147	706		549	608		343	1550	645	304	761	727
Back of Queue (Q), veh/ln (50th percentile)	3.8	1.5		0.9	11.3		17.8	3.5	1.1	0.2	3.0	2.9
Queue Storage Ratio (RQ) (50th percentile)	0.88	0.00		0.22	0.00		5.71	0.00	0.21	0.06	0.00	0.00
Uniform Delay (d ₁), s/veh	29.8	11.4		13.7	16.9		24.4	12.9	11.2	16.9	12.4	12.5
Incremental Delay (d ₂), s/veh	49.2	0.8		0.6	26.6		138.3	1.2	0.7	0.4	1.8	1.9
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	79.0	12.2		14.3	43.6		162.7	14.1	11.9	17.3	14.2	14.3
Level of Service (LOS)	E	B		B	D		F	B	B	B	B	B
Approach Delay, s/veh / LOS	40.7	D		39.6	D		61.5	E		14.4	B	
Intersection Delay, s/veh / LOS	44.0						D					

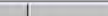
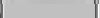
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.9	C	2.8	C	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.6	A	1.6	A	1.0	A

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	Nov 7, 2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.92
Intersection	Shoshone St and 6th Ave W	Analysis Year	2040	Analysis Period	1 > 4:30
File Name	Shoshone St and 6th Ave W (Improved PM Peak Estimate Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	120	144	17	83	169	364	398	716	127	19	517	75

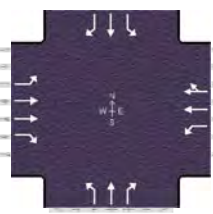
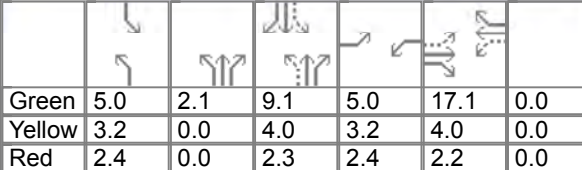
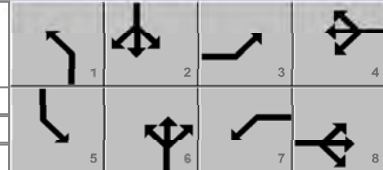
Signal Information														
Cycle, s	80.0	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	No	Simult. Gap E/W	On	Green	16.0	10.0	7.0	5.0	1.0	16.0				
				Yellow	3.2	3.2	3.2	3.2	0.0	3.2				
				Red	1.8	1.8	1.8	1.8	0.0	1.8				
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														
														

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	3	8	7	4	1	6	5	2
Case Number	1.1	4.0	1.1	3.0	2.0	3.0	2.0	4.0
Phase Duration, s	10.0	21.0	11.0	22.0	21.0	36.0	12.0	27.0
Change Period, (Y+R _c), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Allow Headway (MAH), s	0.9	1.9	0.9	1.9	0.8	0.0	0.8	0.0
Queue Clearance Time (g _s), s	6.7	9.4	5.0	16.3	11.3		2.8	
Green Extension Time (g _e), s	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0
Phase Call Probability	1.00	1.00	1.00	1.00	1.00		1.00	
Max Out Probability	1.00	0.01	0.79	1.00	0.00		0.00	

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	130	175		90	184	298	433	778	138	21	328	315
Adjusted Saturation Flow Rate (s), veh/h/ln	1774	1695		1810	1638	1610	1706	1773	1548	1810	1827	1746
Queue Service Time (g _s), s	4.7	7.4		3.0	8.0	14.3	9.3	13.8	4.8	0.8	12.7	12.8
Cycle Queue Clearance Time (g _c), s	4.7	7.4		3.0	8.0	14.3	9.3	13.8	4.8	0.8	12.7	12.8
Green Ratio (g/C)	0.26	0.20		0.28	0.21	0.21	0.20	0.39	0.39	0.09	0.28	0.28
Capacity (c), veh/h	306	339		358	348	342	682	1374	600	158	502	480
Volume-to-Capacity Ratio (X)	0.426	0.516		0.252	0.528	0.870	0.634	0.566	0.230	0.130	0.653	0.657
Available Capacity (c _a), veh/h	306	339		358	348	342	682	1374	600	158	502	480
Back of Queue (Q), veh/ln (50th percentile)	2.3	3.5		1.4	3.6	4.8	4.1	5.6	1.6	0.4	6.1	5.9
Queue Storage Ratio (RQ) (50th percentile)	0.53	0.00		0.36	0.00	1.21	1.30	0.00	0.32	0.11	0.00	0.00
Uniform Delay (d ₁), s/veh	24.0	28.5		22.5	27.9	8.9	29.3	19.2	0.8	33.7	25.6	25.7
Incremental Delay (d ₂), s/veh	4.3	5.5		1.7	5.6	24.8	4.4	1.7	0.9	1.7	6.5	6.9
Initial Queue Delay (d ₃), s/veh	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	28.3	34.1		24.2	33.6	33.7	33.8	20.9	1.7	35.4	32.1	32.5
Level of Service (LOS)	C	C		C	C	C	C	C	A	D	C	C
Approach Delay, s/veh / LOS	31.6	C		32.1	C		23.1	C		32.4	C	
Intersection Delay, s/veh / LOS	27.9						C					

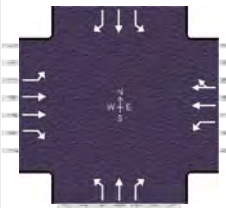
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	3.1	C	2.8	C	2.6	B	2.7	B
Bicycle LOS Score / LOS	1.0	A	1.4	A	1.6	A	1.0	A

HCS 2010 Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		Keller Associates				Duration, h		0.25											
Analyst		Alex Grover		Analysis Date		11/17/2014		Area Type		Other									
Jurisdiction				Time Period		7:30 AM - 8:30 AM		PHF		0.87									
Intersection		US 30 and SH 50		Analysis Year		2014		Analysis Period		1> 7:30									
File Name		US 30 and SH 50 (AM).xus																	
Project Description																			
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				2	155	90	45	210	4	138	141	50	2	104	23				
Signal Information																			
Cycle, s	62.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	5.0	2.1	9.1	5.0	17.1	0.0									
				Yellow	3.2	0.0	4.0	3.2	4.0	0.0									
				Red	2.4	0.0	2.3	2.4	2.2	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase				3		8		7		4		1		6		5		2	
Case Number				1.1		3.0		1.1		4.0		1.1		3.0		1.1		3.0	
Phase Duration, s				10.6		23.2		10.7		23.3		12.7		17.5		10.6		15.4	
Change Period, (Y+R _c), s				5.6		6.2		5.7		6.2		5.6		6.3		5.6		6.3	
Max Allow Headway (MAH), s				2.6		5.3		2.6		5.3		2.7		6.4		2.7		6.4	
Queue Clearance Time (g _s), s				2.1		5.5		3.3		5.8		7.0		6.8		2.1		5.6	
Green Extension Time (g _e), s				0.0		3.6		0.0		3.6		0.1		3.5		0.0		3.5	
Phase Call Probability				1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Max Out Probability				0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				3	8	18	7	4	14	1	6	16	5	2	12				
Adjusted Flow Rate (v), veh/h				2	178	103	52	123	123	159	162	57	2	120	26				
Adjusted Saturation Flow Rate (s), veh/h/ln				1810	1320	1425	1601	1570	1560	1616	1881	1464	1810	1881	1548				
Queue Service Time (g _s), s				0.1	3.3	3.5	1.3	3.8	3.8	5.0	4.8	2.1	0.1	3.6	0.9				
Cycle Queue Clearance Time (g _c), s				0.1	3.3	3.5	1.3	3.8	3.8	5.0	4.8	2.1	0.1	3.6	0.9				
Green Ratio (g/C)				0.36	0.27	0.27	0.36	0.28	0.28	0.26	0.18	0.18	0.23	0.15	0.15				
Capacity (c), veh/h				472	724	391	486	433	430	404	339	264	351	275	227				
Volume-to-Capacity Ratio (X)				0.005	0.246	0.265	0.106	0.284	0.285	0.393	0.477	0.218	0.007	0.434	0.117				
Available Capacity (c _a), veh/h				764	3408	1839	744	2026	2013	610	1214	945	643	1214	999				
Back of Queue (Q), veh/ln (50th percentile)				0.0	0.8	0.9	0.4	1.1	1.1	1.6	1.9	0.6	0.0	1.5	0.3				
Queue Storage Ratio (RQ) (50th percentile)				0.00	0.00	0.11	0.05	0.00	0.00	0.22	0.00	0.09	0.01	0.00	0.08				
Uniform Delay (d ₁), s/veh				13.2	17.5	17.6	13.4	17.6	17.6	18.9	22.8	21.7	18.7	24.1	23.0				
Incremental Delay (d ₂), s/veh				0.0	0.1	0.1	0.0	0.1	0.1	0.2	0.4	0.2	0.0	0.4	0.1				
Initial Queue Delay (d ₃), 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				
Control Delay (d), s/veh				13.2	17.6	17.7	13.5	17.8	17.8	19.1	23.2	21.8	18.7	24.5	23.1				
Level of Service (LOS)				B	B	B	B	B	B	B	C	C	B	C	C				
Approach Delay, s/veh / LOS				17.6		B		17.0		B		21.3		C		24.2		C	
Intersection Delay, s/veh / LOS				19.6						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				2.4		B		2.4		B		2.8		C		2.9		C	
Bicycle LOS Score / LOS				0.7		A		0.7		A		1.1		A		0.7		A	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/17/2014	Area Type	Other
Jurisdiction		Time Period	7:30 AM - 8:30 AM	PHF	0.92
Intersection	US 30 and SH 50	Analysis Year	2040	Analysis Period	1 > 7:30
File Name	US 30 and SH 50 (AM Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	3	270	157	79	365	7	240	245	87	3	181	40

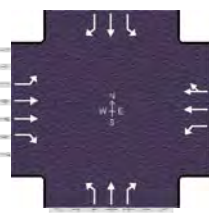
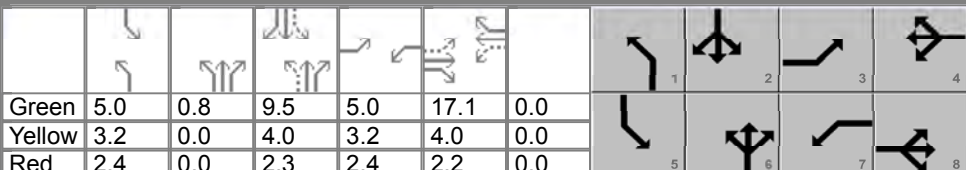
Signal Information											
Cycle, s	65.3	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	Yes	Simult. Gap E/W	On								
Force Mode	Fixed	Simult. Gap N/S	On								

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	3	8	7	4	1	6	5	2
Case Number	1.1	3.0	1.1	4.0	1.2	3.0	1.3	3.0
Phase Duration, s	10.6	23.2	10.7	23.3	10.6	20.0	11.3	20.7
Change Period, (Y+R _c), s	5.6	6.2	5.7	6.2	5.6	6.1	6.3	6.3
Max Allow Headway (MAH), s	2.6	5.3	2.6	5.3	2.7	6.1	6.9	6.9
Queue Clearance Time (g _s), s	2.1	8.6	4.5	9.2	7.0	10.5	2.0	7.9
Green Extension Time (g _e), s	0.0	6.5	0.0	6.5	0.0	3.3	2.9	2.9
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	3	293	171	86	203	202	261	266	95	3	197	43
Adjusted Saturation Flow Rate (s), veh/h/ln	1810	1320	1425	1601	1570	1560	1616	1881	1464	1810	1881	1548
Queue Service Time (g_s), s	0.1	6.0	6.6	2.5	7.2	7.2	5.0	8.5	3.6	0.0	5.9	1.5
Cycle Queue Clearance Time (g_c), s	0.1	6.0	6.6	2.5	7.2	7.2	5.0	8.5	3.6	0.0	5.9	1.5
Green Ratio (g/C)	0.34	0.26	0.26	0.34	0.26	0.26	0.30	0.21	0.21	0.29	0.22	0.22
Capacity (c), veh/h	377	689	372	396	412	410	381	403	314	350	418	344
Volume-to-Capacity Ratio (X)	0.009	0.426	0.459	0.217	0.491	0.493	0.685	0.660	0.301	0.009	0.471	0.126
Available Capacity (c_a), veh/h	8228	11820	6379	396	6909	6863	381	4139	3220	7372	3363	2767
Back of Queue (Q), veh/ln (50th percentile)	0.0	1.5	1.8	0.7	2.2	2.2	1.7	3.4	1.0	0.0	2.4	0.5
Queue Storage Ratio (RQ) (50th percentile)	0.00	0.00	0.22	0.09	0.00	0.00	0.23	0.00	0.14	0.01	0.00	0.12
Uniform Delay (d_1), s/veh	15.0	20.1	20.3	15.5	20.4	20.4	22.2	23.5	0.9	22.8	22.1	20.4
Incremental Delay (d_2), s/veh	0.0	0.2	0.3	0.1	0.3	0.3	4.2	0.7	0.2	0.0	0.3	0.1
Initial Queue Delay (d_3), 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
Control Delay (d), s/veh	15.0	20.3	20.6	15.6	20.8	20.8	26.4	24.2	1.1	22.8	22.4	20.4
Level of Service (LOS)	B	C	C	B	C	C	C	C	A	C	C	C
Approach Delay, s/veh / LOS	20.4	C		19.9	B		21.6	C		22.1	C	
Intersection Delay, s/veh / LOS	20.9						C					

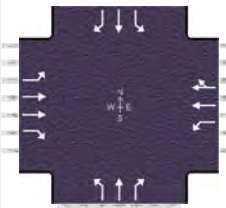
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.8	C	2.9	C
Bicycle LOS Score / LOS	0.9	A	0.9	A	1.5	A	0.9	A

HCS 2010 Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		Keller Associates				Duration, h		0.25											
Analyst		Alex Grover		Analysis Date		11/17/2014		Area Type		Other									
Jurisdiction				Time Period		4:30 PM - 5:30 PM		PHF		0.91									
Intersection		US 30 and SH 50		Analysis Year		2014		Analysis Period		1> 4:30									
File Name		US 30 and SH 50 (PM).xus																	
Project Description																			
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				14	208	181	42	194	8	115	93	28	3	132	12				
Signal Information																			
Cycle, s	61.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	5.0	0.8	9.5	5.0	17.1	0.0									
				Yellow	3.2	0.0	4.0	3.2	4.0	0.0									
				Red	2.4	0.0	2.3	2.4	2.2	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase				3		8		7		4		1		6		5		2	
Case Number				1.1		3.0		1.1		4.0		1.1		3.0		1.1		3.0	
Phase Duration, s				10.6		23.2		10.7		23.3		11.4		16.5		10.6		15.8	
Change Period, (Y+R _c), s				5.6		6.2		5.7		6.2		5.6		6.3		5.6		6.3	
Max Allow Headway (MAH), s				2.6		4.8		2.6		4.8		2.7		6.9		2.7		6.9	
Queue Clearance Time (g _s), s				2.4		8.9		3.1		5.4		5.7		4.9		2.1		6.4	
Green Extension Time (g _e), s				0.0		3.7		0.0		3.7		0.1		3.1		0.0		3.1	
Phase Call Probability				1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Max Out Probability				0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				3	8	18	7	4	14	1	6	16	5	2	12				
Adjusted Flow Rate (v), veh/h				15	229	199	46	111	111	126	102	31	3	145	13				
Adjusted Saturation Flow Rate (s), veh/h/ln				1691	1546	1477	1691	1545	1523	1707	1863	1365	1810	1863	1288				
Queue Service Time (g _s), s				0.4	3.5	6.9	1.1	3.4	3.4	3.7	2.9	1.2	0.1	4.4	0.5				
Cycle Queue Clearance Time (g _c), s				0.4	3.5	6.9	1.1	3.4	3.4	3.7	2.9	1.2	0.1	4.4	0.5				
Green Ratio (g/C)				0.36	0.28	0.28	0.36	0.28	0.28	0.25	0.17	0.17	0.24	0.16	0.16				
Capacity (c), veh/h				467	861	412	499	433	427	379	312	229	381	289	200				
Volume-to-Capacity Ratio (X)				0.033	0.265	0.483	0.093	0.257	0.259	0.333	0.327	0.135	0.009	0.502	0.066				
Available Capacity (c _a), veh/h				744	4053	1936	776	2025	1996	638	1221	894	677	1221	844				
Back of Queue (Q), veh/ln (50th percentile)				0.1	1.0	1.9	0.3	1.0	1.0	1.3	1.2	0.3	0.0	1.7	0.1				
Queue Storage Ratio (RQ) (50th percentile)				0.02	0.00	0.22	0.04	0.00	0.00	0.17	0.00	0.05	0.01	0.00	0.04				
Uniform Delay (d ₁), s/veh				12.8	17.2	18.4	12.9	17.0	17.0	18.7	22.4	21.6	17.9	23.6	22.0				
Incremental Delay (d ₂), s/veh				0.0	0.1	0.3	0.0	0.1	0.1	0.2	0.2	0.1	0.0	0.5	0.1				
Initial Queue Delay (d ₃), 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				
Control Delay (d), s/veh				12.8	17.2	18.7	13.0	17.2	17.2	18.9	22.6	21.7	17.9	24.1	22.1				
Level of Service (LOS)				B	B	B	B	B	B	B	C	C	B	C	C				
Approach Delay, s/veh / LOS				17.7		B		16.4		B		20.7		C		23.8		C	
Intersection Delay, s/veh / LOS				19.0						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				2.4		B		2.4		B		2.8		C		2.9		C	
Bicycle LOS Score / LOS				0.9		A		0.7		A		0.9		A		0.8		A	

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Keller Associates			Duration, h	0.25
Analyst	Alex Grover	Analysis Date	11/17/2014	Area Type	Other
Jurisdiction		Time Period	4:30 PM - 5:30 PM	PHF	0.92
Intersection	US 30 and SH 50	Analysis Year	2040	Analysis Period	1 > 4:30
File Name	US 30 and SH 50 (PM Optimized).xus				
Project Description					



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	24	361	314	73	338	14	200	161	49	5	229	21

Signal Information														
Cycle, s	64.8	Reference Phase	2											
Offset, s	0	Reference Point	End											
Uncoordinated	Yes	Simult. Gap E/W	On											
Force Mode	Fixed	Simult. Gap N/S	On	Green	5.0	3.9	8.4	5.0	19.5	0.0				
				Yellow	3.2	0.0	3.2	3.2	4.0	0.0				
				Red	2.4	0.0	2.4	2.4	2.2	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	3	8	7	4	1	6	5	2
Case Number	1.1	3.0	1.1	4.0	1.2	3.0	1.3	3.0
Phase Duration, s	10.6	25.6	10.7	25.7	10.6	14.5	14.0	17.9
Change Period, (Y+R _c), s	5.6	6.2	5.7	6.2	5.6	6.1	6.3	6.3
Max Allow Headway (MAH), s	2.6	4.8	2.6	4.8	2.7	6.2	7.4	7.4
Queue Clearance Time (g _s), s	2.6	15.6	4.0	8.5	7.0	7.8	2.0	10.2
Green Extension Time (g _e), s	0.0	3.7	0.0	3.8	0.0	0.6	0.7	1.4
Phase Call Probability	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max Out Probability	1.00	0.33	1.00	0.62	1.00	1.00	1.00	1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow Rate (v), veh/h	26	392	341	79	192	190	217	175	53	5	249	23
Adjusted Saturation Flow Rate (s), veh/h/ln	1691	1546	1477	1691	1545	1523	1707	1863	1365	1810	1863	1288
Queue Service Time (g_s), s	0.6	6.6	13.6	2.0	6.4	6.5	5.0	5.8	2.3	0.0	8.2	1.0
Cycle Queue Clearance Time (g_c), s	0.6	6.6	13.6	2.0	6.4	6.5	5.0	5.8	2.3	0.0	8.2	1.0
Green Ratio (g/C)	0.38	0.30	0.30	0.38	0.30	0.30	0.26	0.13	0.13	0.25	0.18	0.18
Capacity (c), veh/h	403	925	442	427	465	458	300	242	177	375	334	231
Volume-to-Capacity Ratio (X)	0.065	0.424	0.772	0.186	0.414	0.416	0.725	0.723	0.300	0.015	0.746	0.099
Available Capacity (c_a), veh/h	403	1384	661	427	465	458	300	345	253	375	489	338
Back of Queue (Q), veh/ln (50th percentile)	0.2	1.9	3.9	0.6	1.9	1.8	1.3	2.5	0.7	0.1	3.4	0.3
Queue Storage Ratio (RQ) (50th percentile)	0.03	0.00	0.46	0.07	0.00	0.00	0.17	0.00	0.09	0.02	0.00	0.08
Uniform Delay (d_1), s/veh	13.4	18.2	20.7	13.6	18.1	18.1	23.4	27.1	0.9	23.0	25.2	22.2
Incremental Delay (d_2), s/veh	0.0	0.1	1.5	0.1	0.2	0.2	7.4	1.8	0.3	0.0	1.5	0.1
Initial Queue Delay (d_3), 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
Control Delay (d), s/veh	13.4	18.3	22.2	13.7	18.3	18.3	30.8	28.9	1.3	23.1	26.7	22.3
Level of Service (LOS)	B	B	C	B	B	B	C	C	A	C	C	C
Approach Delay, s/veh / LOS	19.9		B	17.5		B	26.5		C	26.3		C
Intersection Delay, s/veh / LOS	21.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.4	B	2.4	B	2.8	C	2.9	C
Bicycle LOS Score / LOS	1.1	A	0.9	A	1.2	A	0.9	A

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	US 93 and E 3700 N			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2014			
Analysis Time Period	11:00 AM - 12:00 PM							
Project Description 214088								
East/West Street: E 3700 N				North/South Street: US 93 (N 2400 E)				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	6	127	4	6	113	17		
Peak-Hour Factor, PHF	0.50	0.74	0.50	0.50	0.83	0.53		
Hourly Flow Rate, HFR (veh/h)	12	171	8	12	136	32		
Percent Heavy Vehicles	33	--	--	33	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	23	30	7	1	15	6		
Peak-Hour Factor, PHF	0.58	0.75	0.58	0.25	0.75	0.38		
Hourly Flow Rate, HFR (veh/h)	39	40	12	4	20	15		
Percent Heavy Vehicles	9	7	14	100	7	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	12	12	39			91		
C (m) (veh/h)	1278	1230	611			558		
v/c	0.01	0.01	0.06			0.16		
95% queue length	0.03	0.03	0.20			0.58		
Control Delay (s/veh)	7.8	8.0	11.3			12.7		
LOS	A	A	B			B		
Approach Delay (s/veh)	--	--	11.3			12.7		
Approach LOS	--	--	B			B		

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Alex Grover			Intersection	US 93 and E 3700 N			
Agency/Co.	Keller Associates			Jurisdiction				
Date Performed	11/5/2014			Analysis Year	2040			
Analysis Time Period	4:30 PM - 5:30 PM							
Project Description 214088								
East/West Street: E 3700 N				North/South Street: US 93 (N 2400 E)				
Intersection Orientation: North-South				Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	16	314	10	16	0	0		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	17	348	11	17	0	0		
Percent Heavy Vehicles	33	--	--	33	--	--		
Median Type	Undivided							
RT Channelized			0			1		
Lanes	1	1	0	1	1	0		
Configuration	L		TR	L		TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	57	74	17	3	38	16		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	63	82	18	3	42	17		
Percent Heavy Vehicles	9	7	14	100	7	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			1			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	LTR			LTR		
v (veh/h)	17	17	62			163		
C (m) (veh/h)	1442	1047	527			508		
v/c	0.01	0.02	0.12			0.32		
95% queue length	0.04	0.05	0.40			1.37		
Control Delay (s/veh)	7.5	8.5	12.7			15.4		
LOS	A	A	B			C		
Approach Delay (s/veh)	--	--	12.7			15.4		
Approach LOS	--	--	B			C		

MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	2nd Ave N and S
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Shoshone St
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	542	Peak-Hour Factor, PHF	0.89
AADT(veh/h)		%Trucks and Buses, P _T	5
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	3
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.976
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	208	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	4.6	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	203.0
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.87
Bicycle level of service (Exhibit 15-4)	C

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MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	2nd Ave N and S
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Shoshone St
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	942	Peak-Hour Factor, PHF	0.90
AADT(veh/h)		%Trucks and Buses, P _T	5
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	3
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.976
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	357	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	7.9	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	348.9
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.14
Bicycle level of service (Exhibit 15-4)	C

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	2nd Ave N and S
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Shoshone St
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	655	Peak-Hour Factor, PHF	0.93
AADT(veh/h)		%Trucks and Buses, P _T	3
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	3
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.985
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	238	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	5.3	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	234.8
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.38
Bicycle level of service (Exhibit 15-4)	B

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	2nd Ave N and S
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Shoshone St
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	1138	Peak-Hour Factor, PHF	0.93
AADT(veh/h)		%Trucks and Buses, P _T	3
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	3
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.985
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	414	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	9.2	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	407.9
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.66
Bicycle level of service (Exhibit 15-4)	C

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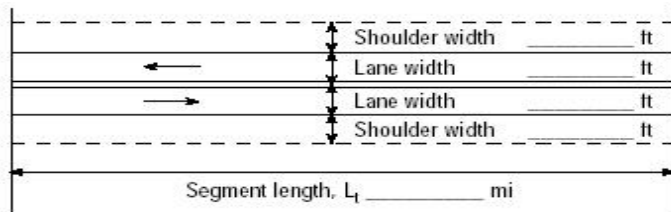
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.85 No-passing zone 50% % Trucks and Buses, P_T 7 % % Recreational vehicles, P_R 0% Access points mi 7/mi	
Analysis direction vol., V_d 136veh/h Opposing direction vol., V_o 234veh/h Shoulder width ft 2.0 Lane Width ft 13.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.7	1.4	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.953	0.973	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	168	283	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.9 mi/h		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 40.7 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 35.3 mi/h	
		Percent free flow speed, PFFS 86.7 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.993	0.993	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	161	277	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	19.5		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	46.7		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	36.7		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.09		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1654
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1688
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	86.7
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	160.0
Effective width, W_v (Eq. 15-29) ft	19.80
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.31
Bicycle level of service (Exhibit 15-4)	D
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 50% % Trucks and Buses, P_T 7 % % Recreational vehicles, P_R 0% Access points mi 7/mi	
Analysis direction vol., V_d	237veh/h		
Opposing direction vol., V_o	407veh/h		
Shoulder width ft	2.0		
Lane Width ft	13.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.4	1.2	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.973	0.986	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	271	459	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.1 mi/h		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 40.7 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 33.9 mi/h	
		Percent free flow speed, PFFS 83.3 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.993	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	265	452	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$		32.9	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)		38.9	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$		47.3	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.16		

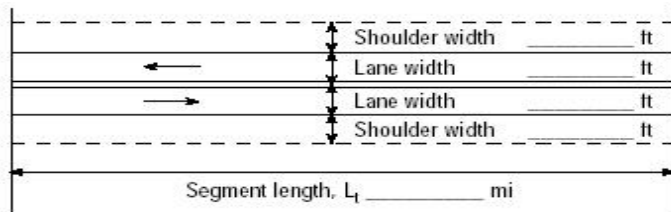
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1676
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	83.3
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	263.3
Effective width, W_v (Eq. 15-29) ft	15.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.40
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2014
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.85 No-passing zone 50% % Trucks and Buses, P_T 3 % % Recreational vehicles, P_R 0% Access points mi 10/mi	
Analysis direction vol., V _d	234veh/h		
Opposing direction vol., V _o	136veh/h		
Shoulder width ft	2.0		
Lane Width ft	13.0		
Segment Length mi	1.0		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.4	1.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.988	0.979
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		279	163
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Mean speed of sample ³ , S _{FM}		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 2.6 mi/h	
Total demand flow rate, both directions, v		Adj. for access points ⁴ , f _A (Exhibit 15-8) 2.5 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 39.9 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.9 mi/h		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 34.6 mi/h	
		Percent free flow speed, PFFS 86.7 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.1	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.997	0.997
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		276	160
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})		28.3	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		46.7	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		57.9	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		C	
Volume to capacity ratio, v/c		0.16	

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1695
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	86.7
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	275.3
Effective width, W_v (Eq. 15-29) ft	15.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.21
Bicycle level of service (Exhibit 15-4)	D
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Peak-hour factor, PHF _____ No-passing zone _____ % Trucks and Buses, P_T _____ % Recreational vehicles, P_R _____ Access points _____ mi ☒ Class II highway Up/down _____ 0.90 50% 3 % 0% 10/mi Show North Arrow	
Analysis direction vol., V_d 407veh/h Opposing direction vol., V_o 237veh/h Shoulder width ft 2.0 Lane Width ft 13.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.2	1.4	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.994	0.988	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	455	267	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 2.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.0 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 39.9 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 32.3 mi/h	
		Percent free flow speed, PFFS 81.0 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.997	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	452	264	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	44.6		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	39.0		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	69.2		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.27		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1695
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	81.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	452.2
Effective width, W_v (Eq. 15-29) ft	15.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.46
Bicycle level of service (Exhibit 15-4)	D
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.95 No-passing zone 66% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 20/mi	
Analysis direction vol., V _d	343veh/h		
Opposing direction vol., V _o	473veh/h		
Shoulder width ft	6.0		
Lane Width ft	13.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.3	1.2	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.985	0.990	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	367	503	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 5.0 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.8 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 40.0 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 31.5 mi/h	
		Percent free flow speed, PFFS 78.7 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.0	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.995	1.000	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	363	498	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})	41.4		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	38.6		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	57.7		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.22		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1683
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	78.7
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	361.1
Effective width, W_v (Eq. 15-29) ft	25.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.91
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☒ Class III highway ☐ Rolling ☒ Level Terrain Grade Length _____ mi Up/down Peak-hour factor, PHF 0.95 No-passing zone 66% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 20/mi	
Analysis direction vol., V_d 596veh/h Opposing direction vol., V_o 822veh/h Shoulder width ft 6.0 Lane Width ft 13.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.1	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.995	1.000	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	631	865	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 5.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.8 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 40.0 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 27.6 mi/h	
		Percent free flow speed, PFFS 68.9 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	627	865	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	62.4		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	24.4		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	72.7		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.37		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	68.9
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	627.4
Effective width, W_v (Eq. 15-29) ft	25.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.19
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	US 30 to Park Ave
Date Performed	12/16/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: SB Direction 2: NB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	596	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	5
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.976
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	16	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	332	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	7.4	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	323.9
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.10
Bicycle level of service (Exhibit 15-4)	C

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	Park Ave to Orchard Dr
Date Performed	1/22/2015	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 100% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 24/mi	
Analysis direction vol., V_d	338veh/h		
Opposing direction vol., V_o	466veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	0.5		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.3	1.2	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.985	0.990	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	381	523	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 6.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.1 mi/h		Free-flow speed, FFS ($FFS=BFFS-f_{LS}-f_A$) 39.0 mi/h	
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$ 29.8 mi/h	
		Percent free flow speed, PFFS 76.5 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.995	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	377	518	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$	42.7		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	40.0		
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	59.5		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.22		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1683
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	76.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	375.6
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.18
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☒ Class III highway ☐ Rolling ☒ Level Terrain Grade Length _____ mi Up/down Peak-hour factor, PHF 0.79 No-passing zone 66% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 22/mi	
Analysis direction vol., V_d 473veh/h Opposing direction vol., V_o 343veh/h Shoulder width ft 6.0 Lane Width ft 13.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.1	1.3	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.995	0.985	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	602	441	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 5.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.0 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 39.5 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 29.4 mi/h	
		Percent free flow speed, PFFS 74.4 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	599	434	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	56.4		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	34.6		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	76.5		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.35		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1675
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	598.7
Effective width, W_v (Eq. 15-29) ft	25.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.17
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_t _____ mi		☐ Class I highway ☒ Class II highway ☒ Class III highway ☐ Rolling ☒ Level Terrain Grade Length _____ mi Up/down Peak-hour factor, PHF 0.92 No-passing zone 66% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 22/mi	
Analysis direction vol., V_d 822veh/h Opposing direction vol., V_o 596veh/h Shoulder width ft 6.0 Lane Width ft 13.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.0	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.995	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	893	651	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 5.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.3 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 39.5 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 26.2 mi/h	
		Percent free flow speed, PFFS 66.4 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	893	648	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	71.4		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	23.7		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	85.1		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.53		

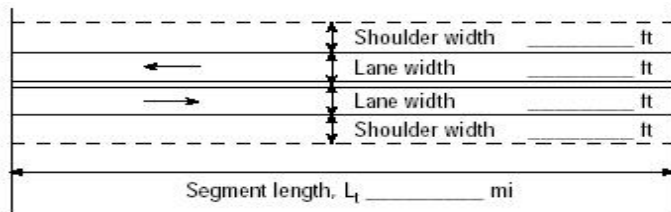
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1692
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	66.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	893.5
Effective width, W_v (Eq. 15-29) ft	25.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.37
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	US 30 to Park Ave
Date Performed	12/16/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: SB Direction 2: NB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	822	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	5
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.976
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	28	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	457	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	10.2	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

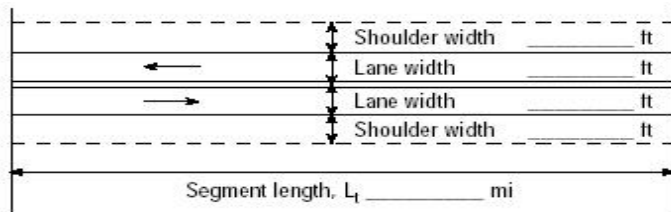
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	446.7
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.27
Bicycle level of service (Exhibit 15-4)	C

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Blue Lakes Blvd
Agency or Company	Keller Associates	From/To	Park Ave to Orchard Dr
Date Performed	1/22/2015	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway Terrain ☒ Level Grade Length _____ mi Peak-hour factor, PHF 0.90 No-passing zone 100% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 14/mi ☐ Rolling Up/down 100%	
Analysis direction vol., V_d 466veh/h Opposing direction vol., V_o 338veh/h Shoulder width ft 6.0 Lane Width ft 12.0 Segment Length mi 0.5			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.2	1.3	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.990	0.985	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	523	381	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 3.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.8 mi/h		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 41.5 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 31.7 mi/h	
		Percent free flow speed, PFFS 76.3 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.995	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	518	377	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	50.2		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	40.0		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	73.4		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.30		

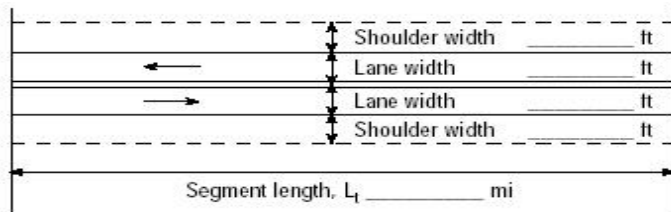
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1692
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	76.3
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	517.8
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.34
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	E 3600 N EB
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Washington
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2014
Project Description:			
Input Data			
 Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway  Show North Arrow Terrain ☒ Level ☐ Rolling Grade Length _____ mi Peak-hour factor, PHF 0.64 No-passing zone 31% % Trucks and Buses, P_T 11 % % Recreational vehicles, P_R 0% Access points mi 14/mi	
Analysis direction vol., V_d 89veh/h			
Opposing direction vol., V_o 153veh/h			
Shoulder width ft 0.0			
Lane Width ft 12.0			
Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.7	1.5	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.929	0.948	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	150	252	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$ Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.1 mi/h		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 4.2 mi/h	
		Adj. for access points ⁴ , f_A (Exhibit 15-8) 3.5 mi/h	
		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 37.3 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 33.1 mi/h	
		Percent free flow speed, PFFS 88.6 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.989	0.989	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	141	242	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	17.0		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	38.6		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	31.2		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.08		

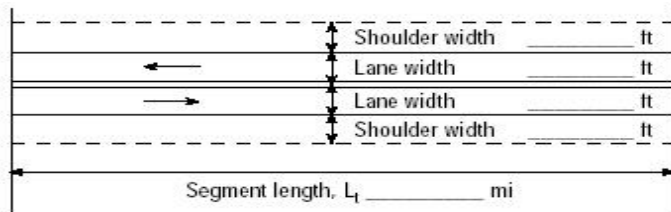
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1612
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1682
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	88.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	139.1
Effective width, W_v (Eq. 15-29) ft	18.66
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.00
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	E 3600 N EB
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Washington
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2040
Project Description:			
Input Data			
		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 31% % Trucks and Buses, P_T 11 % % Recreational vehicles, P_R 0% Access points mi 14/mi	
Analysis direction vol., V _d 155veh/h Opposing direction vol., V _o 266veh/h Shoulder width ft 0.0 Lane Width ft 12.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.6	1.4	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.938	0.958	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	184	309	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, v Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.0 mi/h		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 4.2 mi/h	
		Adj. for access points ⁴ , f _A (Exhibit 15-8) 3.5 mi/h	
		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 37.3 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 32.5 mi/h	
		Percent free flow speed, PFFS 87.2 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.989	0.989	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	174	299	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	21.3		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	38.9		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	35.6		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.10		

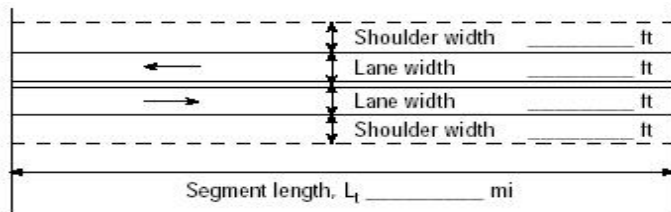
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1629
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1682
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	87.2
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	172.2
Effective width, W_v (Eq. 15-29) ft	14.70
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.77
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	E 3600 N WB
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Washington
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2014
Project Description:			
Input Data			
		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.80 No-passing zone 31% % Trucks and Buses, P _T 5 % % Recreational vehicles, P _R 0% Access points mi 23/mi	
Analysis direction vol., V _d	153veh/h	 Show North Arrow	
Opposing direction vol., V _o	89veh/h		
Shoulder width ft	0.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.5	1.9	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.976	0.957	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	196	116	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM} Total demand flow rate, both directions, v Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS}) Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.4 mi/h		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 4.2 mi/h	
		Adj. for access points ⁴ , f _A (Exhibit 15-8) 5.8 mi/h	
		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 35.0 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 32.2 mi/h	
		Percent free flow speed, PFFS 91.9 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.995	0.995	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	192	112	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	20.8		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	37.3		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	44.4		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.11		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1692
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	91.9
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	191.3
Effective width, W_v (Eq. 15-29) ft	14.82
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.62
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	E 3600 N WB
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Washington
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 31% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 23/mi	
Analysis direction vol., V _d	266veh/h		
Opposing direction vol., V _o	155veh/h		
Shoulder width ft	0.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.4	1.6
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.980	0.971
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		302	177
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 4.2 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 5.8 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.1 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 35.0 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 30.3 mi/h	
		Percent free flow speed, PFFS 86.4 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.1	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.995	0.995
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		297	173
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})		30.0	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		38.9	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		54.6	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		B	
Volume to capacity ratio, v/c		0.17	

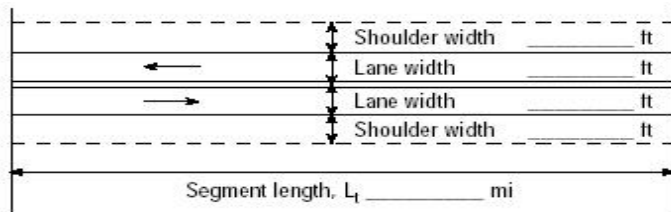
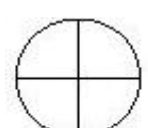
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1692
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	86.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	295.6
Effective width, W_v (Eq. 15-29) ft	12.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.22
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB E 3600 N
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2014
Project Description:			
Input Data			
		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.62 No-passing zone 0% % Trucks and Buses, P _T 3 % % Recreational vehicles, P _R 0% Access points mi 6/mi	
Analysis direction vol., V _d	37veh/h	 Show North Arrow	
Opposing direction vol., V _o	53veh/h		
Shoulder width ft	0.0		
Lane Width ft	11.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.9	1.9	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.974	0.974	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	61	88	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f _{LS} (Exhibit 15-7) 4.7 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 1.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.1 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 38.8 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 37.5 mi/h	
		Percent free flow speed, PFFS 96.8 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.997	0.997	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	60	86	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	7.2		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	10.8		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	11.6		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.04		

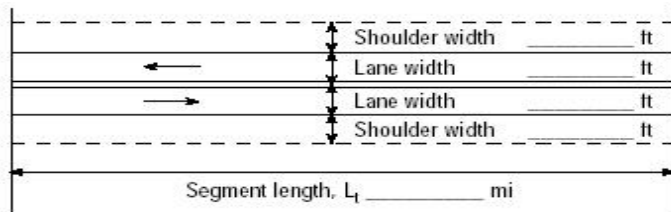
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1656
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1695
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	96.8
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	59.7
Effective width, W_v (Eq. 15-29) ft	19.97
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.57
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB E 3600 N
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway ☐ Level ☒ Rolling Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 0% % Trucks and Buses, P_T 3% % Recreational vehicles, P_R 0% Access points mi 6/mi	
Analysis direction vol., V_d	65veh/h		
Opposing direction vol., V_o	92veh/h		
Shoulder width ft	0.0		
Lane Width ft	11.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.9	1.9	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.974	0.974	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	76	107	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 4.7 mi/h	
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.2 mi/h		Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$) 38.8 mi/h	
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$ 37.2 mi/h	
		Percent free flow speed, PFFS 95.9 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.997	0.997	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	74	105	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$	8.8		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	10.7		
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	13.2		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.04		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1656
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1695
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	95.9
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	73.9
Effective width, W_v (Eq. 15-29) ft	18.42
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.97
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB E 3600 N
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2014
Project Description:			
Input Data			
		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.78 No-passing zone 0% % Trucks and Buses, P_T 2 % % Recreational vehicles, P_R 0% Access points mi 3/mi  Show North Arrow	
Analysis direction vol., V _d	53veh/h		
Opposing direction vol., V _o	37veh/h		
Shoulder width ft	0.0		
Lane Width ft	11.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.9	1.9	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.982	0.982	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	69	48	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Mean speed of sample ³ , S _{FM}		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 4.7 mi/h	
Total demand flow rate, both directions, v		Adj. for access points ⁴ , f _A (Exhibit 15-8) 0.8 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 39.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.1 mi/h		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 38.5 mi/h	
		Percent free flow speed, PFFS 97.5 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.998	0.998	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	68	48	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	8.1		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	10.8		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	14.4		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.04		

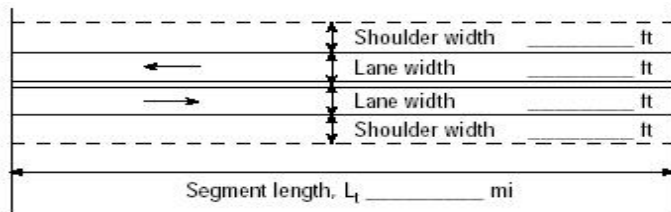
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1697
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	97.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	67.9
Effective width, W_v (Eq. 15-29) ft	19.09
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.56
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB E 3600 N
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2040
Project Description:			
Input Data			
		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 0% % Trucks and Buses, P _T 2 % % Recreational vehicles, P _R 0% Access points mi 3/mi	
Analysis direction vol., V _d	92veh/h	 Show North Arrow	
Opposing direction vol., V _o	97veh/h		
Shoulder width ft	0.0		
Lane Width ft	11.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.9	1.9	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.982	0.982	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	106	112	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 4.7 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 0.8 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.2 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 39.5 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 37.7 mi/h	
		Percent free flow speed, PFFS 95.2 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.998	0.998	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	105	110	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	12.2		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	9.8		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	17.0		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.06		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1669
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1697
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	95.2
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	104.5
Effective width, W_v (Eq. 15-29) ft	16.94
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.16
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Eastland Dr
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.78 No-passing zone 0% % Trucks and Buses, P_T 6 % % Recreational vehicles, P_R 0% Access points mi 6/mi	
Analysis direction vol., V_d	72veh/h		
Opposing direction vol., V_o	113veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.9	1.7	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.949	0.960	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	97	151	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.5 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 40.9 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 38.5 mi/h	
		Percent free flow speed, PFFS 94.1 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.994	0.994	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	93	146	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$		10.9	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)		11.5	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$		15.4	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.05		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1632
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1690
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	94.1
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	92.3
Effective width, W_v (Eq. 15-29) ft	22.96
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.02
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Eastland Dr
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 0% % Trucks and Buses, P_T 6 % % Recreational vehicles, P_R 0% Access points mi 6/mi	
Analysis direction vol., V _d	125veh/h		
Opposing direction vol., V _o	196veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.7	1.5
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.960	0.971
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		145	224
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 1.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.9 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 40.9 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 37.1 mi/h	
		Percent free flow speed, PFFS 90.8 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.1	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.994	0.994
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		140	219
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})		16.4	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		13.5	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		21.7	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		A	
Volume to capacity ratio, v/c		0.08	

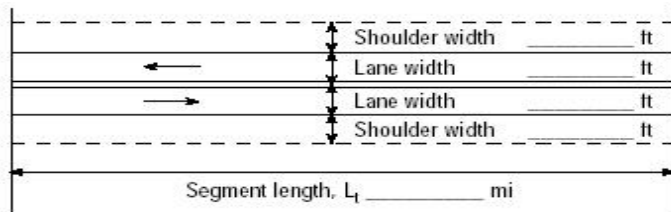
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1651
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1690
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	90.8
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	138.9
Effective width, W_v (Eq. 15-29) ft	19.25
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.01
Bicycle level of service (Exhibit 15-4)	D
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Eastland Dr
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☐ Class III highway ☐ Level ☒ Rolling Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.69 No-passing zone 0% % Trucks and Buses, P_T 2% % Recreational vehicles, P_R 0% Access points mi 7/mi	
Analysis direction vol., V_d 113veh/h Opposing direction vol., V_o 72veh/h Shoulder width ft 2.0 Lane Width ft 12.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.6	1.9	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.988	0.982	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	166	106	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.1 mi/h		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 40.7 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 38.4 mi/h	
		Percent free flow speed, PFFS 94.4 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.998	0.998	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	164	105	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	18.1		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	12.0		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	25.4		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.10		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1697
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	94.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	163.8
Effective width, W_v (Eq. 15-29) ft	20.09
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.81
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Eastland Dr
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	5:00 PM - 6:00 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Peak-hour factor, PHF _____ No-passing zone _____ % Trucks and Buses, P_T _____ % Recreational vehicles, P_R _____ Access points _____ mi ☒ Class II highway Up/down _____ 0.90 0% 2 % 0% 7/mi Show North Arrow	
Analysis direction vol., V_d 196veh/h Opposing direction vol., V_o 125veh/h Shoulder width ft 2.0 Lane Width ft 12.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.5	1.7	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.990	0.986	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	220	141	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.4 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 40.7 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 37.4 mi/h	
		Percent free flow speed, PFFS 92.1 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.998	0.998	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	218	139	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	23.2		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	13.5		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	31.4		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.13		

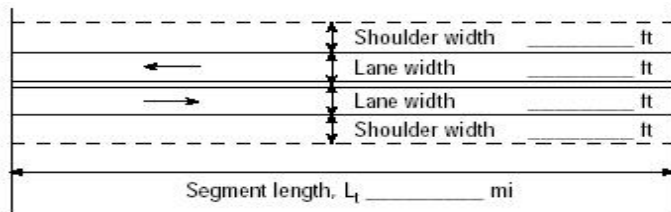
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1697
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	92.1
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	217.8
Effective width, W_v (Eq. 15-29) ft	14.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.99
Bicycle level of service (Exhibit 15-4)	D
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Eastland Dr
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description:			
Input Data			
 Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling  Grade Length _____ mi Up/down Peak-hour factor, PHF _____ No-passing zone _____ % Trucks and Buses, P_T _____ % Recreational vehicles, P_R _____ Access points _____ mi	
Analysis direction vol., V_d		477veh/h	
Opposing direction vol., V_o		323veh/h	
Shoulder width ft		1.0	
Lane Width ft		12.0	
Segment Length mi		1.0	
Average Travel Speed			
	Analysis Direction (d)		Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.1		1.3
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0		1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.996		0.988
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00		1.00
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	639		436
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$ Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.8 mi/h		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 4.2 mi/h	
		Adj. for access points ⁴ , f_A (Exhibit 15-8) 5.0 mi/h	
		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 35.8 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 26.6 mi/h	
		Percent free flow speed, PFFS 74.4 %	
Percent Time-Spent-Following			
	Analysis Direction (d)		Opposing Direction (o)
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0		1.0
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0		1.0
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000		1.000
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00		1.00
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	636		431
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	58.6		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	24.2		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	73.0		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.38		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1680
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	74.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	636.0
Effective width, W_v (Eq. 15-29) ft	13.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.19
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Eastland Dr
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class III highway ☐ Class II highway ☒ Level ☐ Rolling Terrain Grade Length _____ mi Up/down Peak-hour factor, PHF 0.92 No-passing zone 20% % Trucks and Buses, P_T 4 % % Recreational vehicles, P_R 0% Access points mi 20/mi Show North Arrow	
Analysis direction vol., V_d 829veh/h Opposing direction vol., V_o 562veh/h Shoulder width ft 1.0 Lane Width ft 12.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.0	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	0.996	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	901	613	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 4.2 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 5.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.4 mi/h		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 35.8 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 23.7 mi/h	
		Percent free flow speed, PFFS 66.1 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	901	611	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	71.3		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	17.9		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	82.0		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.53		

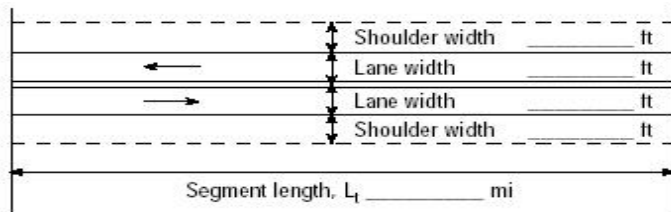
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1693
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	66.1
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	901.1
Effective width, W_v (Eq. 15-29) ft	13.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.36
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Eastland Dr
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.92 No-passing zone 20% % Trucks and Buses, P_T 4 % % Recreational vehicles, P_R 0% Access points mi 20/mi	
Analysis direction vol., V _d	829veh/h		
Opposing direction vol., V _o	562veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.0	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		1.000	0.996
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		901	613
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 5.0 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.4 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 40.0 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 27.9 mi/h	
		Percent free flow speed, PFFS 69.6 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.0	1.0
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		1.000	1.000
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		901	611
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})		71.3	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		17.9	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		82.0	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		D	
Volume to capacity ratio, v/c		0.53	

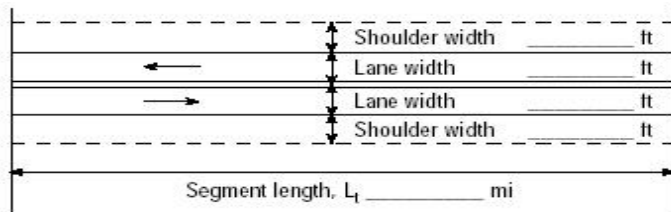
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1693
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	69.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	901.1
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.33
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Eastland Dr
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class III highway ☐ Class II highway ☒ Level ☐ Rolling Terrain Grade Length _____ mi Up/down Peak-hour factor, PHF 0.89 No-passing zone 20% % Trucks and Buses, P_T 8 % % Recreational vehicles, P_R 0% Access points mi 22/mi Show North Arrow	
Analysis direction vol., V_d 323veh/h Opposing direction vol., V_o 477veh/h Shoulder width ft 1.0 Lane Width ft 12.0 Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.3	1.2	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.977	0.984	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	371	545	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 4.2 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 5.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.5 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 35.3 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 27.7 mi/h	
		Percent free flow speed, PFFS 78.3 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.992	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	366	536	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	42.0		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	26.8		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	52.9		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.22		

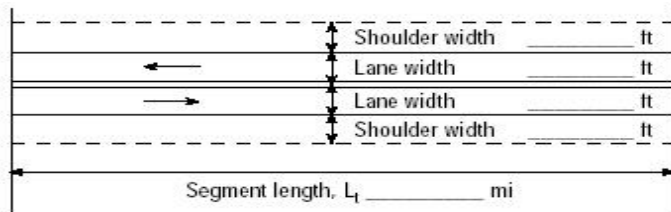
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1673
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	78.3
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	362.9
Effective width, W_v (Eq. 15-29) ft	13.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.19
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Eastland Dr
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.92 No-passing zone 20% % Trucks and Buses, P_T 8 % % Recreational vehicles, P_R 0% Access points mi 22/mi	
Analysis direction vol., V _d	562veh/h		
Opposing direction vol., V _o	829veh/h		
Shoulder width ft	1.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.1	1.0
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.992	1.000
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		616	901
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 4.2 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 5.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.3 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 35.3 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 23.2 mi/h	
		Percent free flow speed, PFFS 65.8 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.0	1.0
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		1.000	1.000
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		611	901
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})		62.1	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		17.9	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		69.3	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		E	
Volume to capacity ratio, v/c		0.36	

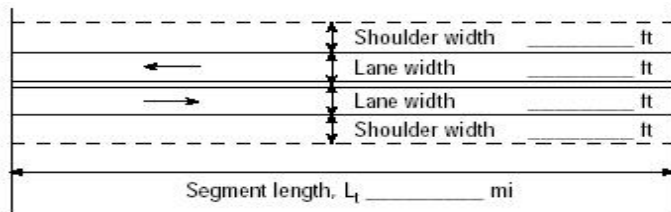
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	65.8
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	610.9
Effective width, W_v (Eq. 15-29) ft	13.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.46
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Eastland Dr
Agency or Company	Keller Associates	From/To	US 30 to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.92 No-passing zone 20% % Trucks and Buses, P_T 8 % % Recreational vehicles, P_R 0% Access points mi 22/mi	
Analysis direction vol., V _d	562veh/h		
Opposing direction vol., V _o	829veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.1	1.0	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.992	1.000	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	616	901	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 5.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.3 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 39.5 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 27.4 mi/h	
		Percent free flow speed, PFFS 69.4 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	1.000	1.000	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	611	901	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})	62.1		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	17.9		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	69.3		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.36		

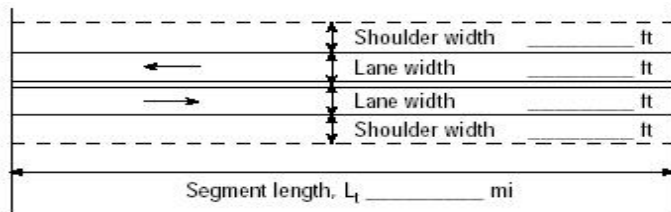
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	69.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	610.9
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.42
Bicycle level of service (Exhibit 15-4)	D
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB Orchard Dr
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Washington
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	12:00 PM - 1:00 PM	Analysis Year	2014
Project Description:			
Input Data			
 Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway  Show North Arrow Terrain ☒ Level ☐ Rolling Grade Length _____ mi Peak-hour factor, PHF 0.86 No-passing zone 44% Up/down % Trucks and Buses, P_T 9 % % Recreational vehicles, P_R 0% Access points mi 7/mi	
Analysis direction vol., V_d 127veh/h			
Opposing direction vol., V_o 151veh/h			
Shoulder width ft 2.0			
Lane Width ft 12.0			
Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.7	1.6	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.941	0.949	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	157	185	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$ Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.7 mi/h		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 2.6 mi/h	
		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.8 mi/h	
		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 40.7 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 36.3 mi/h	
		Percent free flow speed, PFFS 89.3 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.991	0.991	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	149	177	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	16.7		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	48.8		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	39.0		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.09		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1613
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1685
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	89.3
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	147.7
Effective width, W_v (Eq. 15-29) ft	19.11
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.13
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB Orchard Dr
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Washington
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
 Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway  Show North Arrow Terrain ☒ Level ☐ Rolling Grade Length _____ mi Peak-hour factor, PHF 0.90 No-passing zone 44% % Trucks and Buses, P_T 9 % % Recreational vehicles, P_R 0% Access points mi 7/mi	
Analysis direction vol., V_d 272veh/h			
Opposing direction vol., V_o 323veh/h			
Shoulder width ft 2.0			
Lane Width ft 12.0			
Segment Length mi 1.0			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.4	1.3	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.965	0.974	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	313	368	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$ Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.0 mi/h		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 2.6 mi/h	
		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.8 mi/h	
		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 40.7 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 34.4 mi/h	
		Percent free flow speed, PFFS 84.6 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.991	0.991	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	305	362	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	34.0		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	44.3		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	54.3		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.18		

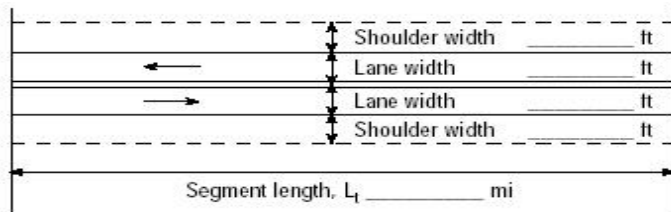
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1656
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1685
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	84.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	302.2
Effective width, W_v (Eq. 15-29) ft	14.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.34
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB Orchard Dr
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Washington
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	12:00 PM - 1:00 PM	Analysis Year	2014
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.94 No-passing zone 50% % Trucks and Buses, P_T 8 % % Recreational vehicles, P_R 0% Access points mi 14/mi	
Analysis direction vol., V _d	151veh/h		
Opposing direction vol., V _o	127veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.7	1.8	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.947	0.940	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	170	144	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 3.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.6 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 38.9 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 34.8 mi/h	
		Percent free flow speed, PFFS 89.6 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.992	0.992	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	162	136	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	17.9		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	50.1		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	45.1		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.10		

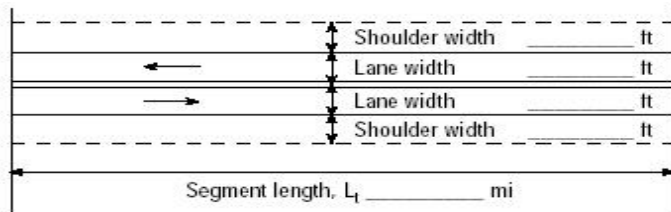
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1687
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	89.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	160.6
Effective width, W_v (Eq. 15-29) ft	17.43
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.11
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB Orchard Dr
Agency or Company	Keller Associates	From/To	Blue Lakes Blvd to Washington
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.94 No-passing zone 50% % Trucks and Buses, P_T 8 % % Recreational vehicles, P_R 0% Access points mi 14/mi	
Analysis direction vol., V_d	323veh/h		
Opposing direction vol., V_o	272veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.4	1.4	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.969	0.969	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	355	299	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 3.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.8 mi/h		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 38.9 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 32.0 mi/h	
		Percent free flow speed, PFFS 82.3 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.992	0.992	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	346	292	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$		37.2	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)		47.4	
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$		62.9	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.20		

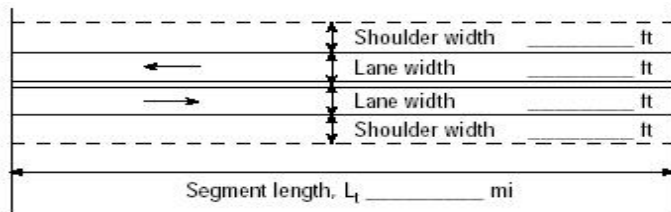
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1687
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	82.3
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	343.6
Effective width, W_v (Eq. 15-29) ft	14.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.03
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB Orchard Dr
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	12:00 PM - 1:00 PM	Analysis Year	2014
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.81 No-passing zone 100% % Trucks and Buses, P_T 15 % % Recreational vehicles, P_R 0% Access points mi 9/mi	
Analysis direction vol., V _d	123veh/h		
Opposing direction vol., V _o	123veh/h		
Shoulder width ft	4.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.7	1.7	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.905	0.905	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	168	168	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 1.3 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 2.3 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.5 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 41.5 mi/h	
		Average travel speed, ATS _d = FFS * 0.00776(v _{d,ATS} + v _{o,ATS}) * f _{np,ATS} 35.4 mi/h	
		Percent free flow speed, PFFS 85.3 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.985	0.985	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	154	154	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})	17.2		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	59.7		
Percent time-spent-following, PTSF _d (%) = BPTSF _d * f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	47.1		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.09		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1539
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1675
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	85.3
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	151.9
Effective width, W_v (Eq. 15-29) ft	22.16
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.20
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB Orchard Dr
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 100% % Trucks and Buses, P_T 15 % % Recreational vehicles, P_R 0% Access points mi 9/mi	
Analysis direction vol., V _d	262veh/h		
Opposing direction vol., V _o	262veh/h		
Shoulder width ft	4.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.4	1.4
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.943	0.943
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		309	309
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 1.3 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 2.3 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.3 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 41.5 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 33.4 mi/h	
		Percent free flow speed, PFFS 80.5 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.1	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.985	0.985
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		295	295
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})		32.8	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		57.3	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		61.4	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		C	
Volume to capacity ratio, v/c		0.17	

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1603
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1675
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	80.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	291.1
Effective width, W_v (Eq. 15-29) ft	16.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	8.70
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB Orchard Dr
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	12:00 PM - 1:00 PM	Analysis Year	2014
Project Description:			
Input Data			
		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.81 No-passing zone 100% % Trucks and Buses, P_T 13 % % Recreational vehicles, P_R 0% Access points <i>mi</i> 9/mi	
Analysis direction vol., V_d	123veh/h		
Opposing direction vol., V_o	123veh/h		
Shoulder width ft	4.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.7	1.7	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.917	0.917	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	166	166	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 1.3 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 2.3 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 3.5 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 41.5 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 35.4 mi/h	
		Percent free flow speed, PFFS 85.4 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.987	0.987	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	154	154	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	17.2		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	59.7		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	47.1		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.09		

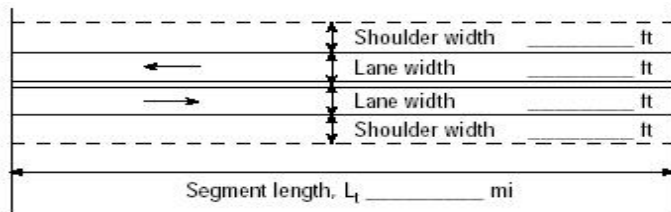
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1559
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1678
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	85.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	151.9
Effective width, W_v (Eq. 15-29) ft	22.16
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.22
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB Orchard Dr
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 100% % Trucks and Buses, P_T 13 % % Recreational vehicles, P_R 0% Access points mi 9/mi	
Analysis direction vol., V_d	262veh/h		
Opposing direction vol., V_o	262veh/h		
Shoulder width ft	4.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.4	1.4	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.951	0.951	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	306	306	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 1.3 mi/h	
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 2.3 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 3.3 mi/h		Free-flow speed, FFS ($FFS=BFFS-f_{LS}-f_A$) 41.5 mi/h	
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$ 33.4 mi/h	
		Percent free flow speed, PFFS 80.6 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.987	0.987	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	295	295	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$		32.8	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)		57.3	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$		61.4	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.17		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1617
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1678
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	80.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	291.1
Effective width, W_v (Eq. 15-29) ft	16.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.73
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB Orchard Dr
Agency or Company	Keller Associates	From/To	Washington St to US 93
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	12:15 PM - 1:15 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_t _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.78 No-passing zone 71% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 18/mi	
Analysis direction vol., V_d	106veh/h		
Opposing direction vol., V_o	114veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	4.8		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.8	1.7	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.962	0.966	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	141	151	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 50.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 4.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.7 mi/h		Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$) 42.9 mi/h	
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$ 37.9 mi/h	
		Percent free flow speed, PFFS 88.3 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.995	0.995	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	137	147	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$		15.5	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)		55.1	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$		42.1	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.08		

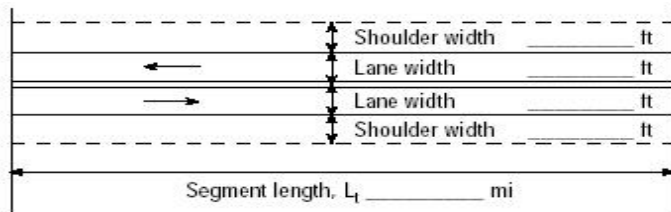
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1642
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1692
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	88.3
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	135.9
Effective width, W_v (Eq. 15-29) ft	20.58
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.43
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB Orchard Dr
Agency or Company	Keller Associates	From/To	Washington St to US 93
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 71% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 18/mi	
Analysis direction vol., V _d	248veh/h		
Opposing direction vol., V _o	267veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	4.8		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.4	1.4	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.980	0.980	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	281	303	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 50.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 4.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 2.9 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 42.9 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 35.5 mi/h	
		Percent free flow speed, PFFS 82.8 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.995	0.995	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	277	298	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	31.1		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	54.8		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	57.5		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.16		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1666
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1692
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	82.8
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	275.6
Effective width, W_v (Eq. 15-29) ft	14.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.92
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB Orchard Dr
Agency or Company	Keller Associates	From/To	Washington St to US 93
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	12:15 PM - 1:15 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Peak-hour factor, PHF 0.81 No-passing zone 67% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 6/mi ☒ Class II highway Up/down Show North Arrow	
Analysis direction vol., V_d 114veh/h Opposing direction vol., V_o 106veh/h Shoulder width ft 2.0 Lane Width ft 12.0 Segment Length mi 4.8			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.7	1.8	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.966	0.962	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	146	136	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 50.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.4 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 45.9 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 41.3 mi/h	
		Percent free flow speed, PFFS 89.9 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.995	0.995	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	141	132	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	15.9		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	54.1		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	43.8		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.08		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1692
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	89.9
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	140.7
Effective width, W_v (Eq. 15-29) ft	20.02
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.56
Bicycle level of service (Exhibit 15-4)	D
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB Orchard Dr
Agency or Company	Keller Associates	From/To	Washington St to US 93
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 67% % Trucks and Buses, P_T 5 % % Recreational vehicles, P_R 0% Access points mi 6/mi	
Analysis direction vol., V _d	267veh/h		
Opposing direction vol., V _o	248veh/h		
Shoulder width ft	2.0		
Lane Width ft	12.0		
Segment Length mi	4.8		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.4	1.4
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.980	0.980
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		303	281
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 50.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 2.6 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 1.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 2.9 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 45.9 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 38.5 mi/h	
		Percent free flow speed, PFFS 83.8 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.1	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.995	0.995
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		298	277
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})		32.3	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		54.4	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		60.5	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		C	
Volume to capacity ratio, v/c		0.18	

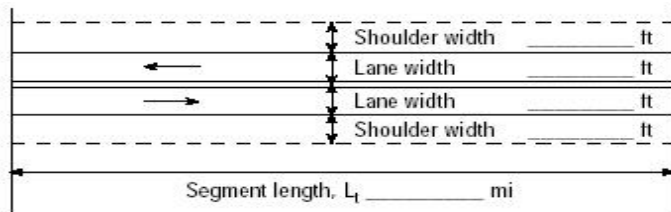
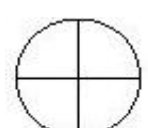
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1692
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	83.8
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	296.7
Effective width, W_v (Eq. 15-29) ft	14.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.96
Bicycle level of service (Exhibit 15-4)	E
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB SH 50
Agency or Company	Keller Associates	From/To	Addison Ave to US 30
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.84 No-passing zone 38% % Trucks and Buses, P_T 17 % % Recreational vehicles, P_R 0% Access points mi 5/mi ☒ Class II highway 	
Analysis direction vol., V_d	239veh/h		
Opposing direction vol., V_o	244veh/h		
Shoulder width ft	7.0		
Lane Width ft	12.0		
Segment Length mi	3.5		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.4	1.4	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.936	0.936	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{g,ATS}*f_{HV,ATS})$	304	310	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 65.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.3 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.6 mi/h		Free-flow speed, FFS ($FSS=BFFS-f_{LS}-f_A$) 63.8 mi/h	
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS}+v_{o,ATS})-f_{np,ATS}$ 56.4 mi/h	
		Percent free flow speed, PFFS 88.5 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.983	0.983	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i=V_i/(PHF*f_{HV,PTSF}*f_{g,PTSF})$	289	295	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$	32.3		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	47.1		
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d+f_{np,PTSF}*(v_{d,PTSF}/v_{d,PTSF}+v_{o,PTSF})$	55.6		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.17		

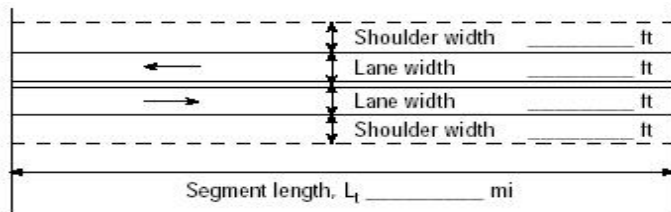
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1591
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1672
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	88.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	284.5
Effective width, W_v (Eq. 15-29) ft	26.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.65
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB SH 50
Agency or Company	Keller Associates	From/To	Addison Ave to US 30
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Peak-hour factor, PHF _____ No-passing zone _____ % Trucks and Buses, P_T _____ % Recreational vehicles, P_R _____ Access points _____ mi ☒ Class II highway Up/down _____ 0.90 38% 17 % 0% 5/mi Show North Arrow	
Analysis direction vol., V_d 415veh/h Opposing direction vol., V_o 424veh/h Shoulder width ft 7.0 Lane Width ft 12.0 Segment Length mi 3.5			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.2	1.2	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.967	0.967	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	477	487	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 65.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.3 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.8 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 63.8 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 54.4 mi/h	
		Percent free flow speed, PFFS 85.4 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	461	471	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	48.6		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	35.8		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	66.3		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.27		

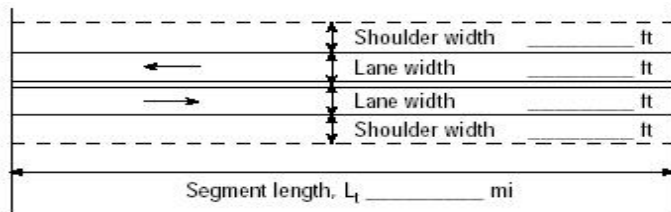
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1644
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	85.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	461.1
Effective width, W_v (Eq. 15-29) ft	26.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.89
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB SH 50
Agency or Company	Keller Associates	From/To	Addison Ave to US 30
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.92 No-passing zone 45% % Trucks and Buses, P_T 19 % % Recreational vehicles, P_R 0% Access points mi 3/mi	
Analysis direction vol., V _d	244veh/h		
Opposing direction vol., V _o	239veh/h		
Shoulder width ft	7.0		
Lane Width ft	12.0		
Segment Length mi	3.5		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.4	1.4	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.929	0.929	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	285	280	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 65.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 0.8 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.0 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 64.3 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 56.9 mi/h	
		Percent free flow speed, PFFS 88.5 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.981	0.981	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	270	265	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})	30.3		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	51.1		
Percent time-spent-following, PTSF _d (%) = BPTSF _d * f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	56.1		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.16		

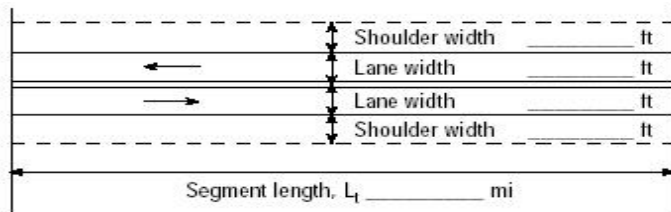
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1579
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1668
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	88.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	265.2
Effective width, W_v (Eq. 15-29) ft	26.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	8.75
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB SH 50
Agency or Company	Keller Associates	From/To	Addison Ave to US 30
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.92 No-passing zone 45% % Trucks and Buses, P_T 19 % % Recreational vehicles, P_R 0% Access points mi 3/mi	
Analysis direction vol., V _d	424veh/h		
Opposing direction vol., V _o	415veh/h		
Shoulder width ft	7.0		
Lane Width ft	12.0		
Segment Length mi	3.5		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.2	1.2	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.963	0.963	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	479	468	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 65.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 0.8 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 2.1 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 64.3 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 54.8 mi/h	
		Percent free flow speed, PFFS 85.3 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	1.000	1.000	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	461	451	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})	48.3		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	37.8		
Percent time-spent-following, PTSF _d (%) = BPTSF _d * f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	67.4		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.27		

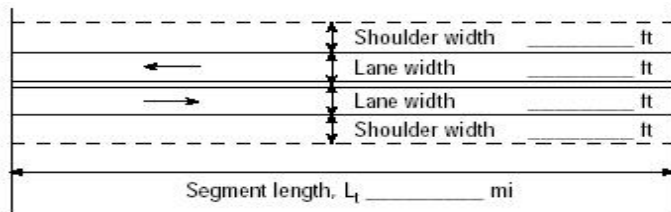
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	85.3
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	460.9
Effective width, W_v (Eq. 15-29) ft	26.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	9.03
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB SH 74
Agency or Company	Keller Associates	From/To	Washington St to US 93
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description:			
Input Data			
		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.79 No-passing zone 25% % Trucks and Buses, P_T 9 % % Recreational vehicles, P_R 0% Access points mi 7/mi 	
Analysis direction vol., V _d	76veh/h		
Opposing direction vol., V _o	100veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	5.1		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.9	1.8	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.925	0.933	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	104	136	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed ⁴ , BFFS 55.0 mi/h	
		Adj. for lane and shoulder width, ⁴ f _{LS} (Exhibit 15-7) 0.0 mi/h	
		Adj. for access points ⁴ , f _A (Exhibit 15-8) 1.8 mi/h	
Mean speed of sample ³ , S _{FM}		Free-flow speed, FFS (FSS=BFFS-f _{LS} -f _A) 53.3 mi/h	
Total demand flow rate, both directions, v		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 50.5 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Percent free flow speed, PFFS 94.7 %	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 0.9 mi/h			
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.991	0.991	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	97	128	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})		11.3	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		33.9	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		25.9	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		A	
Volume to capacity ratio, v/c		0.06	

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1586
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1685
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	94.7
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	96.2
Effective width, W_v (Eq. 15-29) ft	35.16
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	0.56
Bicycle level of service (Exhibit 15-4)	A
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	EB SH 74
Agency or Company	Keller Associates	From/To	Washington St to US 93
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 25% % Trucks and Buses, P_T 9 % % Recreational vehicles, P_R 0% Access points mi 7/mi	
Analysis direction vol., V _d	132veh/h		
Opposing direction vol., V _o	174veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	5.1		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.7	1.5	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.941	0.957	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	156	202	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 55.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 1.8 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.6 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 53.3 mi/h	
		Average travel speed, ATS _d = FFS * 0.00776(v _{d,ATS} + v _{o,ATS}) * f _{np,ATS} 48.9 mi/h	
		Percent free flow speed, PFFS 91.8 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.991	0.991	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	148	195	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	16.6		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	38.1		
Percent time-spent-following, PTSF _d (%) = BPTSF _d * f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	33.0		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.09		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1627
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1685
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	91.8
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	146.7
Effective width, W_v (Eq. 15-29) ft	30.12
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.42
Bicycle level of service (Exhibit 15-4)	B
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB SH 74
Agency or Company	Keller Associates	From/To	Washington St to US 93
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description:			
Input Data			
 Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway  Show North Arrow Terrain ☒ Level ☐ Rolling Grade Length _____ mi Peak-hour factor, PHF 0.86 No-passing zone 25% % Trucks and Buses, P_T 20 % % Recreational vehicles, P_R 0% Access points mi 5/mi	
Analysis direction vol., V_d 100veh/h			
Opposing direction vol., V_o 76veh/h			
Shoulder width ft 6.0			
Lane Width ft 12.0			
Segment Length mi 5.1			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.8	1.9	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.862	0.847	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	135	104	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$ Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.6 mi/h		Base free-flow speed ⁴ , BFFS 55.0 mi/h	
		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 0.0 mi/h	
		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.3 mi/h	
		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 53.8 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 51.3 mi/h	
		Percent free flow speed, PFFS 95.4 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.980	0.980	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	119	90	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	13.6		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	33.4		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	32.6		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	A		
Volume to capacity ratio, v/c	0.07		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1667
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	95.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	116.3
Effective width, W_v (Eq. 15-29) ft	33.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.87
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	WB SH 74
Agency or Company	Keller Associates	From/To	Washington St to US 93
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 25% % Trucks and Buses, P_T 20 % % Recreational vehicles, P_R 0% Access points mi 5/mi ☒ Class II highway 	
Analysis direction vol., V_d 174veh/h Opposing direction vol., V_o 132veh/h Shoulder width ft 6.0 Lane Width ft 12.0 Segment Length mi 5.1			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.5	1.7	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.909	0.877	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	213	167	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 55.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.3 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.3 mi/h		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 53.8 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 49.5 mi/h	
		Percent free flow speed, PFFS 92.1 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.980	0.980	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	197	150	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	21.3		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	38.3		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	43.0		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.12		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1667
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	92.1
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	193.3
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	9.69
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	Shoshone St
Agency or Company	Keller Associates	From/To	2nd Ave N to Highland Ave
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description Direction 1: SB Direction 2: NB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	561	Peak-Hour Factor, PHF	0.97
AADT(veh/h)		%Trucks and Buses, P _T	1
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.995
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	290	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	6.4	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	289.2
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.00
Bicycle level of service (Exhibit 15-4)	B

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MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	Shoshone St
Agency or Company	Keller Associates	From/To	2nd Ave N to Highland Ave
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: SB Direction 2: NB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	975	Peak-Hour Factor, PHF	0.97
AADT(veh/h)		%Trucks and Buses, P _T	1
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.995
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	505	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	11.2	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	502.6
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.28
Bicycle level of service (Exhibit 15-4)	B

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	Shoshone St
Agency or Company	Keller Associates	From/To	2nd Ave N to Highland Ave
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description Direction 1: SB Direction 2: NB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	487	Peak-Hour Factor, PHF	0.89
AADT(veh/h)		%Trucks and Buses, P _T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.990
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	276	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	6.1	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	273.6
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.20
Bicycle level of service (Exhibit 15-4)	B

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	Shoshone St
Agency or Company	Keller Associates	From/To	2nd Ave N to Highland Ave
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: SB Direction 2: NB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	846	Peak-Hour Factor, PHF	0.90
AADT(veh/h)		%Trucks and Buses, P _T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.990
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	474	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	10.5	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	470.0
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.48
Bicycle level of service (Exhibit 15-4)	B

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MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	687	Peak-Hour Factor, PHF	0.90
AADT(veh/h)		%Trucks and Buses, P _T	4
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.980
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	389	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	8.6	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	381.7
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.89
Bicycle level of service (Exhibit 15-4)	C

MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	1195	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	4
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.980
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		<u>Design (N)</u>	
Flow Rate, v _p (pc/h/ln)	662	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	14.7	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	649.5
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.16
Bicycle level of service (Exhibit 15-4)	C

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	770	Peak-Hour Factor, PHF	0.81
AADT(veh/h)		%Trucks and Buses, P _T	5
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.976
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	487	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	10.8	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	475.3
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.30
Bicycle level of service (Exhibit 15-4)	C

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	Eastland Dr to Blue Lakes Blvd
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	1338	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	5
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.976
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	745	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	16.6	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	727.2
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.51
Bicycle level of service (Exhibit 15-4)	D

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MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	Hankins Dr to Eastland Dr
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	613	Peak-Hour Factor, PHF	0.82
AADT(veh/h)		%Trucks and Buses, P _T	6
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.971
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	384	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	8.5	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	373.8
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.49
Bicycle level of service (Exhibit 15-4)	C

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MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	Hankins Dr to Eastland Dr
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	1071	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	6
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.971
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	599	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	13.3	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	582.1
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.71
Bicycle level of service (Exhibit 15-4)	D

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	Hankins Dr to Eastland Dr
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	592	Peak-Hour Factor, PHF	0.90
AADT(veh/h)		%Trucks and Buses, P _T	10
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.952
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	345	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	7.7	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	328.9
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.88
Bicycle level of service (Exhibit 15-4)	E

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	Hankins Dr to Eastland Dr
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	1029	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	10
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.952
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	587	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	13.0	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	559.2
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	5.15
Bicycle level of service (Exhibit 15-4)	E

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MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	SH 50 to Hankins Dr
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description			
☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	549	Peak-Hour Factor, PHF	0.85
AADT(veh/h)		%Trucks and Buses, P _T	9
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.957
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	337	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	7.5	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	322.9
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.48
Bicycle level of service (Exhibit 15-4)	D

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MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	SH 50 to Hankins Dr
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	955	Peak-Hour Factor, PHF	0.90
AADT(veh/h)		%Trucks and Buses, P _T	9
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.957
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	554	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	12.3	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	530.6
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	4.73
Bicycle level of service (Exhibit 15-4)	E

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	SH 50 to Hankins Dr
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2014
Project Description			
☐ Oper.(LOS) ☐ Des. (N) ☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	477	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	13
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.939
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	276	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	6.1	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	259.2
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.07
Bicycle level of service (Exhibit 15-4)	F

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MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	US 30
Agency or Company	Keller Associates	From/To	SH 50 to Hankins Dr
Date Performed	11/21/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: WB Direction 2: EB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	829	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	13
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.939
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	0	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	479	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	10.6	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	450.5
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	6.35
Bicycle level of service (Exhibit 15-4)	F

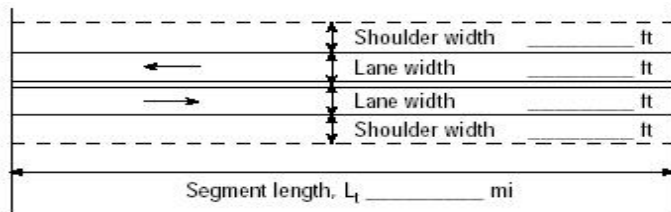
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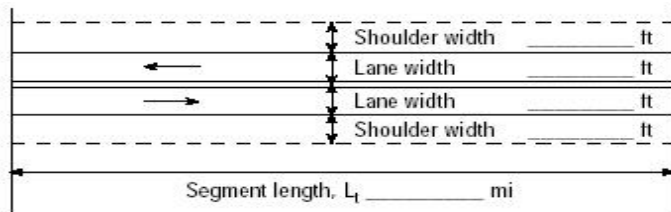
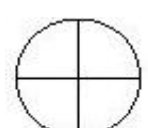
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB US 93
Agency or Company	Keller Associates	From/To	Orchard Dr to SH 74
Date Performed	11/22/2014	Jurisdiction	
Analysis Time Period	11:00 AM - 12:00 PM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length _____ mi Up/down Peak-hour factor, PHF 0.74 No-passing zone 29% % Trucks and Buses, P_T 15 % % Recreational vehicles, P_R 0% Access points mi 2/mi	
Analysis direction vol., V_d	137veh/h		
Opposing direction vol., V_o	121veh/h		
Shoulder width ft	4.0		
Lane Width ft	12.0		
Segment Length mi	1.5		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.6	1.6	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.917	0.917	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i=V_i/(PHF \cdot f_{g,ATS} \cdot f_{HV,ATS})$	202	178	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 60.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 1.3 mi/h	
Free-flow speed, $FFS=S_{FM}+0.00776(v/f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 0.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.9 mi/h		Free-flow speed, FFS ($FSS=BFFS \cdot f_{LS} \cdot f_A$) 58.2 mi/h	
		Average travel speed, $ATS_d=FFS-0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 53.3 mi/h	
		Percent free flow speed, PFFS 91.6 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.985	0.985	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i=V_i/(PHF \cdot f_{HV,PTSF} \cdot f_{g,PTSF})$	188	166	
Base percent time-spent-following ⁴ , $BPTSF_d(\%)=100(1-e^{av_d^b})$		20.4	
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)		42.7	
Percent time-spent-following, $PTSF_d(\%)=BPTSF_d + f_{np,PTSF} \cdot (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$		43.1	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.11		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1675
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	91.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	185.1
Effective width, W_v (Eq. 15-29) ft	21.04
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.54
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB US 93
Agency or Company	Keller Associates	From/To	Orchard Dr to SH 74
Date Performed	11/22/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 29% % Trucks and Buses, P_T 15 % % Recreational vehicles, P_R 0% Access points mi 2/mi	
Analysis direction vol., V _d	339veh/h		
Opposing direction vol., V _o	299veh/h		
Shoulder width ft	4.0		
Lane Width ft	12.0		
Segment Length mi	1.5		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.3	1.4	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.957	0.943	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	394	352	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 60.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 1.3 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 0.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.8 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 58.2 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 50.6 mi/h	
		Percent free flow speed, PFFS 87.0 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.985	0.985	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	382	337	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})	39.7		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	37.6		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	59.7		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.22		

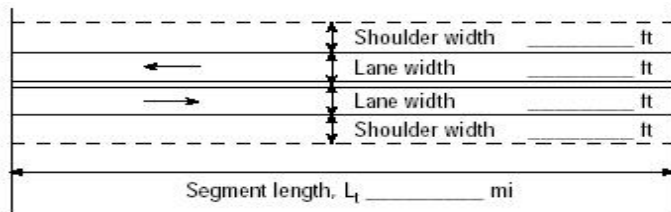
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	0
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1675
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	87.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	376.7
Effective width, W_v (Eq. 15-29) ft	16.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	8.83
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB US 93
Agency or Company	Keller Associates	From/To	Orchard Dr to SH 74
Date Performed	11/22/2014	Jurisdiction	
Analysis Time Period	11:00 AM - 12:00 PM	Analysis Year	2014
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☒ Class II highway ☐ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.86 No-passing zone 17% % Trucks and Buses, P_T 19 % % Recreational vehicles, P_R 0% Access points mi 4/mi	
Analysis direction vol., V _d	121veh/h		
Opposing direction vol., V _o	137veh/h		
Shoulder width ft	4.0		
Lane Width ft	12.0		
Segment Length mi	1.5		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.7	1.7
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.883	0.883
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		159	180
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 60.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 1.3 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 1.0 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.5 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 57.7 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) * f _{np,ATS} 53.6 mi/h	
		Percent free flow speed, PFFS 92.9 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.1	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.981	0.981
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		143	162
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})		16.1	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		31.5	
Percent time-spent-following, PTSF _d (%) = BPTSF _d * f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		30.9	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		A	
Volume to capacity ratio, v/c		0.08	

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1501
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1668
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	92.9
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	140.7
Effective width, W_v (Eq. 15-29) ft	22.32
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	9.32
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB US 93
Agency or Company	Keller Associates	From/To	Orchard Dr to SH 74
Date Performed	11/22/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☐ Class III highway ☒ Class II highway Terrain ☒ Level Grade Length _____ mi Peak-hour factor, PHF _____ No-passing zone _____ % Trucks and Buses, P_T _____ % Recreational vehicles, P_R _____ Access points _____ mi Up/down _____ 0.90 17% 19 % 0% 4/mi	
Analysis direction vol., V_d 299veh/h Opposing direction vol., V_o 339veh/h Shoulder width ft 4.0 Lane Width ft 12.0 Segment Length mi 1.5			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.4	1.3	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.929	0.946	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	358	398	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 60.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f_{LS} (Exhibit 15-7) 1.3 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 1.0 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.4 mi/h		Free-flow speed, FFS ($FSS = BFFS * f_{LS} * f_A$) 57.7 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 50.5 mi/h	
		Percent free flow speed, PFFS 87.5 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.981	0.981	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	339	384	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	37.2		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	31.4		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	51.9		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	B		
Volume to capacity ratio, v/c	0.20		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1608
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1668
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	87.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	332.2
Effective width, W_v (Eq. 15-29) ft	16.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	10.97
Bicycle level of service (Exhibit 15-4)	F
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Washington St
Agency or Company	Keller Associates	From/To	Highland Ave to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	10:00 AM - 11:00 AM	Analysis Year	2014
Project Description:			
Input Data			
		☐ Class I highway ☒ Class III highway ☐ Class II highway Terrain ☒ Level Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 69% ☐ Rolling  Show North Arrow % Trucks and Buses, P_T 3 % % Recreational vehicles, P_R 0% Access points mi 30/mi	
Analysis direction vol., V _d	424veh/h		
Opposing direction vol., V _o	223veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	0.8		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)		1.2	1.5
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		0.994	0.985
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)		1.00	1.00
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})		474	252
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 7.5 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 3.1 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 37.5 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 28.8 mi/h	
		Percent free flow speed, PFFS 76.7 %	
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)		1.0	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)		1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))		1.000	0.997
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)		1.00	1.00
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})		471	249
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})		44.7	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		40.9	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		71.5	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		C	
Volume to capacity ratio, v/c		0.28	

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1675
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1695
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	76.7
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	471.1
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.73
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Washington St
Agency or Company	Keller Associates	From/To	Highland Ave to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_1 _____ mi		☐ Class I highway ☒ Class III highway ☐ Class II highway ☒ Level ☐ Rolling Terrain Grade Length _____ mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 69% % Trucks and Buses, P_T 3 % % Recreational vehicles, P_R 0% Access points mi 30/mi	
Analysis direction vol., V_d 896veh/h Opposing direction vol., V_o 896veh/h Shoulder width ft 6.0 Lane Width ft 12.0 Segment Length mi 0.8			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	996	996	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 7.5 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.7 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 37.5 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 21.3 mi/h	
		Percent free flow speed, PFFS 56.9 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	996	996	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	77.7		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	17.9		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	86.6		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.59		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	56.9
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	995.6
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.11
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

MULTILANE HIGHWAYS WORKSHEET(Direction 2)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	Washington St
Agency or Company	Keller Associates	From/To	Highland Ave to Orchard Dr
Date Performed	12/16/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: SB Direction 2: NB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	896	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	3
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.985
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	30	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	494	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	11.0-	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	487.0
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.75
Bicycle level of service (Exhibit 15-4)	C

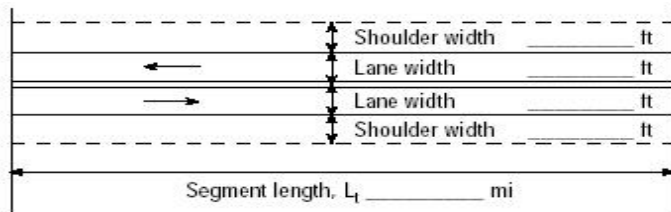
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Washington St
Agency or Company	Keller Associates	From/To	Highland Ave to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	10:00 AM - 11:00 AM	Analysis Year	2014
Project Description:			
Input Data			
Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_t _____ mi		☐ Class I highway ☒ Class III highway ☐ Class II highway ☒ Level ☐ Rolling Terrain Grade Length _____ mi Up/down Peak-hour factor, PHF 0.98 No-passing zone 65% % Trucks and Buses, P_T 3 % % Recreational vehicles, P_R 0% Access points mi 31/mi Show North Arrow	
Analysis direction vol., V_d 223veh/h Opposing direction vol., V_o 424veh/h Shoulder width ft 6.0 Lane Width ft 12.0 Segment Length mi 0.8			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.5	1.3	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.985	0.991	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	231	437	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$		Adj. for access points ⁴ , f_A (Exhibit 15-8) 7.8 mi/h	
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 2.0 mi/h		Free-flow speed, FFS ($FFS = BFFS - f_{LS} - f_A$) 37.3 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 30.1 mi/h	
		Percent free flow speed, PFFS 80.7 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.1	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.997	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	228	433	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-av_d^b})$	29.0		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	44.0		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	44.2		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.14		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1685
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	80.7
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	227.6
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.36
Bicycle level of service (Exhibit 15-4)	B
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Washington St
Agency or Company	Keller Associates	From/To	Highland Ave to Orchard Dr
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
 Shoulder width _____ ft Lane width _____ ft Lane width _____ ft Shoulder width _____ ft Segment length, L_t _____ mi		☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling  Grade Length _____ mi Up/down Peak-hour factor, PHF 0.98 No-passing zone 65% % Trucks and Buses, P_T 3 % % Recreational vehicles, P_R 0% Access points mi 31/mi Show North Arrow	
Analysis direction vol., V_d 896veh/h			
Opposing direction vol., V_o 896veh/h			
Shoulder width ft 6.0			
Lane Width ft 12.0			
Segment Length mi 0.8			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-11 or 15-12)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,ATS}$ (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{g,ATS} * f_{HV,ATS})$	914	914	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S_{FM} Total demand flow rate, both directions, v Free-flow speed, $FFS = S_{FM} + 0.00776(v / f_{HV,ATS})$ Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 0.7 mi/h		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
		Adj. for lane and shoulder width ⁴ , f_{LS} (Exhibit 15-7) 0.0 mi/h	
		Adj. for access points ⁴ , f_A (Exhibit 15-8) 7.8 mi/h	
		Free-flow speed, FFS ($FSS = BFFS - f_{LS} - f_A$) 37.3 mi/h	
		Average travel speed, $ATS_d = FFS - 0.00776(v_{d,ATS} + v_{o,ATS}) - f_{np,ATS}$ 22.3 mi/h	
		Percent free flow speed, PFFS 59.9 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E_T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E_R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, $f_{HV} = 1 / (1 + P_T(E_T - 1) + P_R(E_R - 1))$	1.000	1.000	
Grade adjustment factor ¹ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v_i (pc/h) $v_i = V_i / (PHF * f_{HV,PTSF} * f_{g,PTSF})$	914	914	
Base percent time-spent-following ⁴ , $BPTSF_d(\%) = 100(1 - e^{-a v_d^b})$	74.3		
Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)	20.2		
Percent time-spent-following, $PTSF_d(\%) = BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + v_{o,PTSF})$	84.4		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	E		
Volume to capacity ratio, v/c	0.54		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1700
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	59.9
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	914.3
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	3.07
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

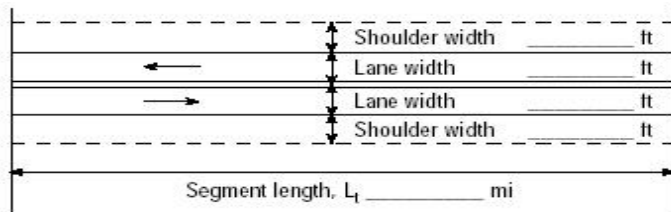
MULTILANE HIGHWAYS WORKSHEET(Direction 1)			
			
General Information		Site Information	
Analyst	Alex Grover	Highway/Direction to Travel	Washington St
Agency or Company	Keller Associates	From/To	Highland Ave to Orchard Dr
Date Performed	12/16/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description Direction 1: SB Direction 2: NB			
☐ Oper.(LOS)		☐ Des. (N)	
☐ Plan. (vp)			
Flow Inputs			
Volume, V (veh/h)	896	Peak-Hour Factor, PHF	0.92
AADT(veh/h)		%Trucks and Buses, P _T	3
Peak-Hour Prop of AADT (veh/d)		%RVs, P _R	0
Peak-Hour Direction Prop, D		General Terrain:	Level
DDHV (veh/h)		Grade Length (mi)	0.00
Driver Type Adjustment	1.00	Up/Down %	0.00
		Number of Lanes	2
Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV}	0.985
Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	
Access Points, A (A/mi)	31	f _A (mi/h)	
Median Type, M		f _M (mi/h)	
FFS (measured)	45.0	FFS (mi/h)	45.0
Base Free-Flow Speed, BFFS			
Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	494	Required Number of Lanes, N	
Speed, S (mi/h)	45.0	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	11.0-	Max Service Flow Rate (pc/h/ln)	
LOS	A	Design LOS	
Bicycle Level of Service			

Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	487.0
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.75
Bicycle level of service (Exhibit 15-4)	C

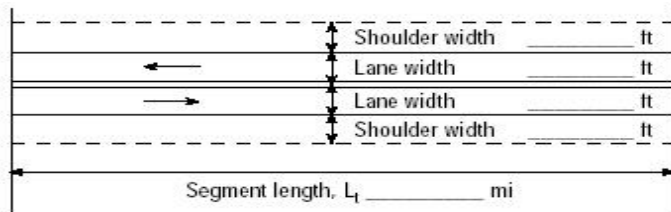
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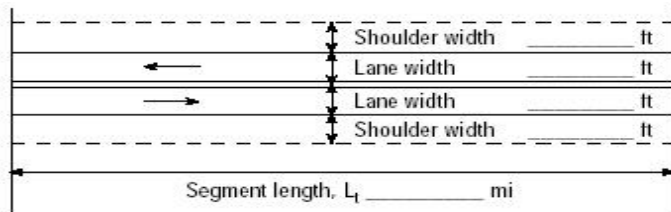
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Washington St
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	12:15 PM - 1:15 PM	Analysis Year	2014
Project Description:			
Input Data			
		 Show North Arrow ☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.87 No-passing zone 63% % Trucks and Buses, P_T 2 % % Recreational vehicles, P_R 0% Access points mi 17/mi	
Analysis direction vol., V _d	254veh/h		
Opposing direction vol., V _o	259veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.4	1.4	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.992	0.992	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	294	300	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width, ⁴ f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 4.3 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 2.6 mi/h		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 40.8 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 33.5 mi/h	
		Percent free flow speed, PFFS 82.2 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.998	0.998	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	293	298	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})		32.5	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		53.8	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		59.2	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.17		

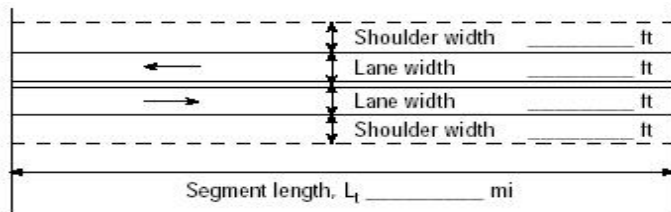
Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1686
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1697
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	82.2
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	292.0
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_f (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.24
Bicycle level of service (Exhibit 15-4)	B
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	NB Washington St
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		☐ Class I highway ☐ Class II highway ☒ Class III highway ☐ Terrain ☒ Level ☐ Rolling  Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 63% % Trucks and Buses, P_T 2 % % Recreational vehicles, P_R 0% Access points mi 17/mi	
Analysis direction vol., V _d	593veh/h		
Opposing direction vol., V _o	604veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.998	0.998	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	660	672	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 4.3 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.2 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 40.8 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 29.2 mi/h	
		Percent free flow speed, PFFS 71.8 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	1.000	1.000	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	659	671	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d})	61.9		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	28.4		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	76.0		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	D		
Volume to capacity ratio, v/c	0.39		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1697
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	71.8
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	658.9
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.65
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Washington St
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	12:15 PM - 1:15 PM	Analysis Year	2014
Project Description:			
Input Data			
		☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling  Grade Length mi Up/down Peak-hour factor, PHF 0.89 No-passing zone 63% % Trucks and Buses, P_T 3 % % Recreational vehicles, P_R 0% Access points mi 15/mi	
Analysis direction vol., V _d	259veh/h		
Opposing direction vol., V _o	254veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.4	1.4	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.988	0.988	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	295	289	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Mean speed of sample ³ , S _{FM}		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
Total demand flow rate, both directions, v		Adj. for lane and shoulder width ⁴ , f _{LS} (Exhibit 15-7) 0.0 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Adj. for access points ⁴ , f _A (Exhibit 15-8) 3.8 mi/h	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 2.7 mi/h		Free-flow speed, FFS (FFS = BFFS * f _{LS} * f _A) 41.3 mi/h	
		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 34.0 mi/h	
		Percent free flow speed, PFFS 82.5 %	
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.997	0.997	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	292	286	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})	31.3		
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)	54.3		
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})	58.7		
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)	C		
Volume to capacity ratio, v/c	0.17		

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1680
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1695
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	82.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	291.0
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.49
Bicycle level of service (Exhibit 15-4)	B
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst	Alex Grover	Highway / Direction of Travel	SB Washington St
Agency or Company	Keller Associates	From/To	Orchard Dr to E 3600 N
Date Performed	11/20/2014	Jurisdiction	
Analysis Time Period	4:30 PM - 5:30 PM	Analysis Year	2040
Project Description:			
Input Data			
		☐ Class I highway ☐ Class II highway ☒ Class III highway Terrain ☒ Level ☐ Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.90 No-passing zone 63% % Trucks and Buses, P_T 3 % % Recreational vehicles, P_R 0% Access points mi 15/mi 	
Analysis direction vol., V _d	604veh/h		
Opposing direction vol., V _o	593veh/h		
Shoulder width ft	6.0		
Lane Width ft	12.0		
Segment Length mi	1.0		
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-11 or 15-12)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 15-11 or 15-13)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV,ATS} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.997	0.997	
Grade adjustment factor ¹ , f _{g,ATS} (Exhibit 15-9)	1.00	1.00	
Demand flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{g,ATS} * f _{HV,ATS})	673	661	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
		Base free-flow speed ⁴ , BFFS 45.0 mi/h	
		Adj. for lane and shoulder width, ⁴ f _{LS} (Exhibit 15-7) 0.0 mi/h	
		Adj. for access points ⁴ , f _A (Exhibit 15-8) 3.8 mi/h	
Mean speed of sample ³ , S _{FM}		Free-flow speed, FFS (FFS = BFFS - f _{LS} - f _A) 41.3 mi/h	
Total demand flow rate, both directions, v		Average travel speed, ATS _d = FFS - 0.00776(v _{d,ATS} + v _{o,ATS}) - f _{np,ATS} 29.7 mi/h	
Free-flow speed, FFS = S _{FM} + 0.00776(v / f _{HV,ATS})		Percent free flow speed, PFFS 72.0 %	
Adj. for no-passing zones, f _{np,ATS} (Exhibit 15-15) 1.2 mi/h			
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 15-18 or 15-19)	1.0	1.0	
Passenger-car equivalents for RVs, E _R (Exhibit 15-18 or 15-19)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	1.000	1.000	
Grade adjustment factor ¹ , f _{g,PTSF} (Exhibit 15-16 or Ex 15-17)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i = V _i / (PHF * f _{HV,PTSF} * f _{g,PTSF})	671	659	
Base percent time-spent-following ⁴ , BPTSF _d (%) = 100(1 - e ^{-av_d^b})		62.9	
Adj. for no-passing zone, f _{np,PTSF} (Exhibit 15-21)		28.4	
Percent time-spent-following, PTSF _d (%) = BPTSF _d + f _{np,PTSF} * (v _{d,PTSF} / v _{d,PTSF} + v _{o,PTSF})		77.2	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 15-3)		D	
Volume to capacity ratio, v/c		0.40	

Capacity, $C_{d,ATS}$ (Equation 15-12) veh/h	1695
Capacity, $C_{d,PTSF}$ (Equation 15-13) veh/h	1700
Percent Free-Flow Speed $PFFS_d$ (Equation 15-11 - Class III only)	72.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, v_{OL} (Eq. 15-24) veh/h	671.1
Effective width, W_v (Eq. 15-29) ft	24.00
Effective speed factor, S_t (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	2.91
Bicycle level of service (Exhibit 15-4)	C
Notes	
1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain. 2. If $v_i(v_d \text{ or } v_o) \geq 1,700$ pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only and for $v > 200$ veh/h. 4. For the analysis direction only 5. Exhibit 15-20 provides coefficients a and b for Equation 15-10. 6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.	

Appendix C

Evaluation Matrix for SE Alt. Route

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Route Evaluation Matrix							
Factors	Attributes	Quantitative			Qualitative		
		Alternative 1 (baseline)	Alternative 2	Alternative 3	Alternative 1 (baseline)	Alternative 2	Alternative 3
Connectivity	Route Length (miles)	6.00	6.20	5.50		-	++
	# of Stops (stop signs and signals)	7	7	6			+
	# of Turns	1	1	3			-
	Proximity to truck generators	1.5 miles	1.5 miles	0.75 mile			++
Safety	# of Residences that front route	74	61	16		+	+++
	# of Properties that front route	116	89	70		+	++
Long Range Planning	Compatibility with future land use and predicted growth	Good	Good	Fair			--
Public Support	Anticipated public acceptance	Good	Fair	Poor		-	--
	# of parcels split	0	3	5		-	--
Agricultural Development	# of acres of Agricultural land taken	39	50	35		---	+
	# of displacements in Agricultural land	22	18	8		+	+++
Residential Development	# of acres of Residential land taken	15	15	19			-
	# of displacements in Residential land	24	24	9			+++
Industrial Development	# of acres of Industrial land taken	6	4	13		+	---
Natural Resources	# of creeks/streams crossed or adjacent	2	2	3			-

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Monday October 5, 2015
To: City Council
From: Travis Rothweiler, City Manager

Request:

Consideration of a contract between the City of Twin Falls and Starr Corporation.

Time Estimate:

The staff presentation will take approximately 10 minutes, plus time to answer questions and answers.

Background:

The City solicited requests for qualifications (RFQ) from qualified contractors to provide construction manager/general contractor (CMGC) services for the City's City Hall/Public Safety Complex project. Statements of qualification were due on June 25th. Staff received six submittals in response to the RFQ.

Don Hall, Suzanne Hawkins, Brian Pike, Mitch Humble and I interviewed all six responding firms on July 16th. Clint Sievers and Scott Straubhar, two architects with Hummel Architects, were also present in the interviews, but did not participate in the ranking. Each firm was given an hour to present their qualifications to and answer questions from the interview panel.

After the presentations, the members of the selection committee ranked Starr Corporation as the preferred firm. After presenting the list of firms, the City Council authorized the City Manager to begin negotiating a fee to serve as the City of Twin Falls CM/GC for the City Hall and Public Safety complex projects.

The Agreement contains two parts: preconstruction services and construction services. Both are outlined in the standard AIA document. Preconstruction services include estimating, scheduling, constructability review, attending design meetings, assembling bid packages, and bidding. For these services, we have negotiated a flat fee of \$16,000, or \$9,500 for the City Hall project and \$6,500 for the public safety complex respectively.

The negotiated fee for the construction services will be 3.75% of the cost of the work for the project up to \$9 million. Although unlikely, should the project exceed \$9 million the City will pay a fee equal to 3.5% of the actual cost of the work. For example, should the cost of the work be \$8 million, the CM/GC fee would be \$300,000.

In addition, the City will pay for "general condition items" such as project supervision, construction trailers, dumpsters and P&P bonds. The total cost is based the estimated total of 28-man months and will cost of for this is \$490,061: \$291,374 for the City Hall project for an estimated 15 man months and \$198,687 for the public safety complex with an estimated 13-man months. It is important to note that the City will pay for General Conditions as actual cost of the work, there is no profit built into these costs for Starr Corporation.

Starr Corporation is also a local firm, based here in Twin Falls. They made comments about having a pride in the community and in their projects. They will live here and pass by our project with their families for many years to come and they want to be able to look on this project with Pride throughout the years. Another benefit of being locally based is that they have a good working relationship with many of the subcontractors in the area. Starr Corporation came to the interview already having an understanding of the project and the City's needs. They had already thought through details like staging locations, public safety during construction, phasing, and how to work with neighboring businesses.

grading, etc is also included around the building. Exact extents of site work will be determined during the design process. The New City Hall is slated to house the following departments: Information Services, Human Resources, Utility Billing, Finance, Economic Development, Planning & Zoning, Building Inspections, Engineering, and Administration. A program will be established to determine detailed spaces to fit within the new structure. The project target is to be LEED Certified or Net-Zero Energy to align with current sustainable commitments and goals of the City. Final sustainable criteria will be determined during the programming and design phases of the project.

Other phases involve the master plan and remodel of the Twin Falls Public Safety Campus located near downtown. The current campus consists of the existing City Hall, Police Station, Fire Station #1, and surrounding parking area. The three buildings on the public safety campus will be master planned for both short term use and long term growth. The exact extent and timing of the remodel work on the public safety campus will be determined during the programming and design phases of the project.

The Architect:

(Name, legal status and address)

Hummel Architects PLLC
2785 N Bogus Basin Rd.
Boise, Idaho 83702

The Owner's Designated Representative:

(Name, address and other information)

The City of Twin Falls
Travis Rothweiler, City Manager
321 2nd Avenue East
Twin Falls, Idaho
83301

The Construction Manager's Designated Representative:

(Name, address and other information)

Starr Corporation
Michael Arrington
PO Box 46
Twin Falls, Idaho 83303

The Architect's Designated Representative:

(Name, address and other information)

Hummel Architects PLLC
Clint Sievers, Associate
2785 N Bogus Basin Rd.
Boise, Idaho 83702

The Owner and Construction Manager agree as follows.

Init.



Document A133™ – 2009

Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price

AGREEMENT made as of the Fifth (5) day of October in the year Two Thousand and Fifteen (2015)

(In words, indicate day, month and year.)

BETWEEN the Owner:

(Name, legal status and address)

City of Twin Falls
321 2nd Avenue East
PO Box 1907
Twin Falls, Idaho
83301

and the Construction Manager:

(Name, legal status and address)

Starr Corporation
PO Box 46
Twin Falls, Idaho 83303

for the following Project:

(Name and address or location)

Twin Falls City Hall and Public Safety Campus
Twin Falls City Hall (Former Banner Furniture Building)
201 Main Avenue East

Public Safety Campus
321 Second Avenue East
345 Second Avenue East
356 Third Avenue East

The project provides for the construction of a modern City Hall facility with site and the renovation of three existing City owned and occupied buildings into a Public Safety Campus.

The project will be executed in phases as determined during the program and design process.

One phase includes design and construction of a New City Hall facility and surrounding area located at the corner of Hansen Street and Main Avenue in Twin Falls. Currently an existing building occupies the project site, which used to serve as the Banner Furniture building. The existing facility will be demolished, except for the structural system and any other salvageable components. Site work including sidewalks, roadwork, landscape,

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

1	GENERAL PROVISIONS
2	CONSTRUCTION MANAGER'S RESPONSIBILITIES
3	OWNER'S RESPONSIBILITIES
4	COMPENSATION AND PAYMENTS FOR PRECONSTRUCTION PHASE SERVICES
5	COMPENSATION FOR CONSTRUCTION PHASE SERVICES
6	COST OF THE WORK FOR CONSTRUCTION PHASE
7	PAYMENTS FOR CONSTRUCTION PHASE SERVICES
8	INSURANCE AND BONDS
9	DISPUTE RESOLUTION
10	TERMINATION OR SUSPENSION
11	MISCELLANEOUS PROVISIONS
12	SCOPE OF THE AGREEMENT

EXHIBIT A GUARANTEED MAXIMUM PRICE AMENDMENT

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 The Contract Documents

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract and are as fully a part of the Contract as if attached to this Agreement or repeated herein. Upon the Owner's acceptance of the Construction Manager's Guaranteed Maximum Price proposal, the Contract Documents will also include the documents described in Section 2.2.3 and identified in the Guaranteed Maximum Price Amendment and revisions prepared by the Architect and furnished by the Owner as described in Section 2.2.8. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. If anything in the other Contract Documents, other than a Modification, is inconsistent with this Agreement, this Agreement shall govern.

§ 1.2 Relationship of the Parties

The Construction Manager accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Construction Manager's skill and judgment in furthering the interests of the Owner; to furnish efficient construction administration, management services and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish or approve, in a timely manner, information required by the Construction Manager and to make payments to the Construction Manager in accordance with the requirements of the Contract Documents.

§ 1.3 General Conditions

For the Preconstruction Phase, AIA Document A201™-2007, General Conditions of the Contract for Construction, shall apply only as specifically provided in this Agreement. For the Construction Phase, the general conditions of the contract shall be as set forth in A201-2007, which document is incorporated herein by reference. The term "Contractor" as used in A201-2007 shall mean the Construction Manager.

ARTICLE 2 CONSTRUCTION MANAGER'S RESPONSIBILITIES

The Construction Manager's Preconstruction Phase responsibilities are set forth in Sections 2.1 and 2.2. The Construction Manager's Construction Phase responsibilities are set forth in Section 2.3. The Owner and Construction Manager may agree, in consultation with the Architect, for the Construction Phase to commence prior to completion of the Preconstruction Phase, in which case, both phases will proceed concurrently. The Construction Manager shall identify a representative authorized to act on behalf of the Construction Manager with respect to the Project.

§ 2.1 Preconstruction Phase

§ 2.1.1 The Construction Manager shall provide a preliminary evaluation of the Owner's program, schedule and construction budget requirements, each in terms of the other.

§ 2.1.2 Consultation

The Construction Manager shall schedule and conduct meetings with the Architect and Owner to discuss such matters as procedures, progress, coordination, and scheduling of the Work. The Construction Manager shall advise the Owner and the Architect on proposed site use and improvements, selection of materials, and building systems and equipment. The Construction Manager shall also provide recommendations consistent with the Project requirements to the Owner and Architect on constructability; availability of materials and labor; time requirements for procurement, installation and construction; and factors related to construction cost including, but not limited to, costs of alternative designs or materials, preliminary budgets, life-cycle data, and possible cost reductions.

§ 2.1.3 When Project requirements in Section 3.1.1 have been sufficiently identified, the Construction Manager shall prepare and periodically update a Project schedule for the Architect's review and the Owner's acceptance. The Construction Manager shall obtain the Architect's approval for the portion of the Project schedule relating to the performance of the Architect's services. The Project schedule shall coordinate and integrate the Construction Manager's services, the Architect's services, other Owner consultants' services, and the Owner's responsibilities and identify items that could affect the Project's timely completion. The updated Project schedule shall include the following: submission of the Guaranteed Maximum Price proposal; components of the Work; times of commencement and completion required of each Subcontractor; ordering and delivery of products, including those that must be ordered well in advance of construction; and the occupancy requirements of the Owner.

§ 2.1.4 Phased Construction

The Construction Manager shall provide recommendations with regard to accelerated or fast-track scheduling, procurement, or phased construction. The Construction Manager shall take into consideration cost reductions, cost information, constructability, provisions for temporary facilities and procurement and construction scheduling issues.

§ 2.1.5 Preliminary Cost Estimates

§ 2.1.5.1 Based on the preliminary design and other design criteria prepared by the Architect, the Construction Manager shall prepare preliminary estimates of the Cost of the Work or the cost of program requirements using area, volume or similar conceptual estimating techniques for the Architect's review and Owner's approval. If the Architect or Construction Manager suggests alternative materials and systems, the Construction Manager shall provide cost evaluations of those alternative materials and systems.

§ 2.1.5.2 As the Architect progresses with the preparation of the Schematic Design, Design Development and Construction Documents, the Construction Manager shall prepare and update, at appropriate intervals agreed to by the Owner, Construction Manager and Architect, estimates of the Cost of the Work of increasing detail and refinement and allowing for the further development of the design until such time as the Owner and Construction Manager agree on a Guaranteed Maximum Price for the Work. Such estimates shall be provided for the Architect's review and the Owner's approval. The Construction Manager shall inform the Owner and Architect when estimates of the Cost of the Work exceed the latest approved Project budget and make recommendations for corrective action.

§ 2.1.6 Subcontractors and Suppliers

The Construction Manager shall develop bidders' interest in the Project.

§ 2.1.7 The Construction Manager shall prepare, for the Architect's review and the Owner's acceptance, a procurement schedule for items that must be ordered well in advance of construction. The Construction Manager

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shall expedite and coordinate the ordering and delivery of materials that must be ordered well in advance of construction. If the Owner agrees to procure any items prior to the establishment of the Guaranteed Maximum Price, the Owner shall procure the items on terms and conditions acceptable to the Construction Manager. Upon the establishment of the Guaranteed Maximum Price, the Owner shall assign all contracts for these items to the Construction Manager and the Construction Manager shall thereafter accept responsibility for them.

§ 2.1.8 Extent of Responsibility

The Construction Manager shall exercise reasonable care in preparing schedules and estimates. The Construction Manager, however, does not warrant or guarantee estimates and schedules except as may be included as part of the Guaranteed Maximum Price. The Construction Manager is not required to ascertain that the Drawings and Specifications are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Construction Manager shall promptly report to the Architect and Owner any nonconformity discovered by or made known to the Construction Manager as a request for information in such form as the Architect may require.

§ 2.1.9 Notices and Compliance with Laws

The Construction Manager shall comply with applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to its performance under this Contract, and with equal employment opportunity programs, and other programs as may be required by governmental and quasi governmental authorities for inclusion in the Contract Documents.

§ 2.2 Guaranteed Maximum Price Proposal and Contract Time

§ 2.2.1 At a time to be mutually agreed upon by the Owner and the Construction Manager and in consultation with the Architect, the Construction Manager shall prepare a Guaranteed Maximum Price proposal for the Owner's review and acceptance. The Guaranteed Maximum Price in the proposal shall be the sum of the Construction Manager's estimate of the Cost of the Work, including contingencies described in Section 2.2.4, and the Construction Manager's Fee.

§ 2.2.2 To the extent that the Drawings and Specifications are anticipated to require further development by the Architect, the Construction Manager shall provide in the Guaranteed Maximum Price for such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include such things as changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required, shall be incorporated by Change Order.

§ 2.2.3 The Construction Manager shall include with the Guaranteed Maximum Price proposal a written statement of its basis, which shall include the following:

- .1 A list of the Drawings and Specifications, including all Addenda thereto, and the Conditions of the Contract;
- .2 A list of the clarifications and assumptions made by the Construction Manager in the preparation of the Guaranteed Maximum Price proposal, including assumptions under Section 2.2.2, to supplement the information provided by the Owner and contained in the Drawings and Specifications;
- .3 A statement of the proposed Guaranteed Maximum Price, including a statement of the estimated Cost of the Work organized by trade categories or systems, allowances, contingency, and the Construction Manager's Fee;
- .4 The anticipated date of Substantial Completion upon which the proposed Guaranteed Maximum Price is based; and
- .5 A date by which the Owner must accept the Guaranteed Maximum Price.

§ 2.2.4 In preparing the Construction Manager's Guaranteed Maximum Price proposal, the Construction Manager shall include its contingency for the Construction Manager's exclusive use to cover those costs considered reimbursable as the Cost of the Work but not included in a Change Order.

§ 2.2.5 The Construction Manager shall meet with the Owner and Architect to review the Guaranteed Maximum Price proposal. In the event that the Owner and Architect discover any inconsistencies or inaccuracies in the information presented, they shall promptly notify the Construction Manager, who shall make appropriate adjustments to the Guaranteed Maximum Price proposal, its basis, or both.

§ 2.2.6 If the Owner notifies the Construction Manager that the Owner has accepted the Guaranteed Maximum Price proposal in writing before the date specified in the Guaranteed Maximum Price proposal, the Guaranteed Maximum Price proposal shall be deemed effective without further acceptance from the Construction Manager. Following acceptance of a Guaranteed Maximum Price, the Owner and Construction Manager shall execute the Guaranteed Maximum Price Amendment amending this Agreement, a copy of which the Owner shall provide to the Architect. The Guaranteed Maximum Price Amendment shall set forth the agreed upon Guaranteed Maximum Price with the information and assumptions upon which it is based.

§ 2.2.7 The Construction Manager shall not incur any cost to be reimbursed as part of the Cost of the Work prior to the commencement of the Construction Phase, unless the Owner provides prior written authorization for such costs.

§ 2.2.8 The Owner shall authorize the Architect to provide the revisions to the Drawings and Specifications to incorporate the agreed upon assumptions and clarifications contained in the Guaranteed Maximum Price Amendment. The Owner shall promptly furnish those revised Drawings and Specifications to the Construction Manager as they are revised. The Construction Manager shall notify the Owner and Architect of any inconsistencies between the Guaranteed Maximum Price Amendment and the revised Drawings and Specifications.

§ 2.2.9 The Construction Manager shall include in the Guaranteed Maximum Price all sales, consumer, use and similar taxes for the Work provided by the Construction Manager that are legally enacted, whether or not yet effective, at the time the Guaranteed Maximum Price Amendment is executed.

§ 2.3 Construction Phase

§ 2.3.1 General

§ 2.3.1.1 For purposes of Section 8.1.2 of A201-2007, the date of commencement of the Work shall mean the date of commencement of the Construction Phase.

§ 2.3.1.2 The Construction Phase shall commence upon the Owner's acceptance of the Construction Manager's Guaranteed Maximum Price proposal or the Owner's issuance of a Notice to Proceed, whichever occurs earlier.

§ 2.3.2 Administration

§ 2.3.2.1 Those portions of the Work that the Construction Manager does not customarily perform with the Construction Manager's own personnel shall be performed under subcontracts or by other appropriate agreements with the Construction Manager. The Owner may designate specific persons from whom, or entities from which, the Construction Manager shall obtain bids. The Construction Manager shall obtain bids from Subcontractors and from suppliers of materials or equipment fabricated especially for the Work and shall deliver such bids to the Architect. The Owner shall then determine, with the advice of the Construction Manager and the Architect, which bids will be accepted. The Construction Manager shall not be required to contract with anyone to whom the Construction Manager has reasonable objection.

§ 2.3.2.2 If the Guaranteed Maximum Price has been established and when a specific bidder (1) is recommended to the Owner by the Construction Manager, (2) is qualified to perform that portion of the Work, and (3) has submitted a bid that conforms to the requirements of the Contract Documents without reservations or exceptions, but the Owner requires that another bid be accepted, then the Construction Manager may require that a Change Order be issued to adjust the Contract Time and the Guaranteed Maximum Price by the difference between the bid of the person or entity recommended to the Owner by the Construction Manager and the amount and time requirement of the subcontract or other agreement actually signed with the person or entity designated by the Owner.

§ 2.3.2.3 Subcontracts or other agreements shall conform to the applicable payment provisions of this Agreement, and shall not be awarded on the basis of cost plus a fee without the prior consent of the Owner. If the Subcontract is awarded on a cost plus a fee basis, the Construction Manager shall provide in the Subcontract for the Owner to receive the same audit rights with regard to the Subcontractor as the Owner receives with regard to the Construction Manager in Section 6.11 below.

§ 2.3.2.4 If the Construction Manager recommends a specific bidder that may be considered a "related party" according to Section 6.10, then the Construction Manager shall promptly notify the Owner in writing of such relationship and notify the Owner of the specific nature of the contemplated transaction, according to Section 6.10.2.

§ 2.3.2.5 The Construction Manager shall schedule and conduct meetings to discuss such matters as procedures, progress, coordination, scheduling, and status of the Work. The Construction Manager shall prepare and promptly distribute minutes to the Owner and Architect.

§ 2.3.2.6 Upon the execution of the Guaranteed Maximum Price Amendment, the Construction Manager shall prepare and submit to the Owner and Architect a construction schedule for the Work and submittal schedule in accordance with Section 3.10 of A201-2007.

§ 2.3.2.7 The Construction Manager shall record the progress of the Project. On a monthly basis, or otherwise as agreed to by the Owner, the Construction Manager shall submit written progress reports to the Owner and Architect, showing percentages of completion and other information required by the Owner. The Construction Manager shall also keep, and make available to the Owner and Architect, a daily log containing a record for each day of weather, portions of the Work in progress, number of workers on site, identification of equipment on site, problems that might affect progress of the work, accidents, injuries, and other information required by the Owner.

§ 2.3.2.8 The Construction Manager shall develop a system of cost control for the Work, including regular monitoring of actual costs for activities in progress and estimates for uncompleted tasks and proposed changes. The Construction Manager shall identify variances between actual and estimated costs and report the variances to the Owner and Architect and shall provide this information in its monthly reports to the Owner and Architect, in accordance with Section 2.3.2.7 above.

§ 2.4 Professional Services

Section 3.12.10 of A201-2007 shall apply to both the Preconstruction and Construction Phases.

§ 2.5 Hazardous Materials

Section 10.3 of A201-2007 shall apply to both the Preconstruction and Construction Phases.

ARTICLE 3 OWNER'S RESPONSIBILITIES

§ 3.1 Information and Services Required of the Owner

§ 3.1.1 The Owner shall provide information with reasonable promptness, regarding requirements for and limitations on the Project, including a written program which shall set forth the Owner's objectives, constraints, and criteria, including schedule, space requirements and relationships, flexibility and expandability, special equipment, systems, sustainability and site requirements.

§ 3.1.2 Prior to the execution of the Guaranteed Maximum Price Amendment, the Construction Manager may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Construction Manager may only request such evidence if (1) the Owner fails to make payments to the Construction Manager as the Contract Documents require, (2) a change in the Work materially changes the Contract Sum, or (3) the Construction Manager identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Construction Manager and Architect.

§ 3.1.3 The Owner shall establish and periodically update the Owner's budget for the Project, including (1) the budget for the Cost of the Work as defined in Section 6.1.1, (2) the Owner's other costs, and (3) reasonable contingencies related to all of these costs. If the Owner significantly increases or decreases the Owner's budget for the Cost of the Work, the Owner shall notify the Construction Manager and Architect. The Owner and the Architect, in consultation with the Construction Manager, shall thereafter agree to a corresponding change in the Project's scope and quality.

§ 3.1.4 Structural and Environmental Tests, Surveys and Reports. During the Preconstruction Phase, the Owner shall furnish the following information or services with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Construction Manager's performance of the Work with reasonable promptness after receiving the Construction Manager's written request for such information or services. The Construction Manager shall be entitled to rely on the accuracy of information and services furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 3.1.4.1 The Owner shall furnish tests, inspections and reports required by law and as otherwise agreed to by the parties, such as structural, mechanical, and chemical tests, tests for air and water pollution, and tests for hazardous materials.

§ 3.1.4.2 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The surveys and legal information shall include, as applicable, grades and lines of streets, alleys, pavements and adjoining property and structures; designated wetlands; adjacent drainage; rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, boundaries and contours of the site; locations, dimensions and necessary data with respect to existing buildings, other improvements and trees; and information concerning available utility services and lines, both public and private, above and below grade, including inverts and depths. All the information on the survey shall be referenced to a Project benchmark.

§ 3.1.4.3 The Owner, when such services are requested, shall furnish services of geotechnical engineers, which may include but are not limited to test borings, test pits, determinations of soil bearing values, percolation tests, evaluations of hazardous materials, seismic evaluation, ground corrosion tests and resistivity tests, including necessary operations for anticipating subsoil conditions, with written reports and appropriate recommendations.

§ 3.1.4.4 During the Construction Phase, the Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Construction Manager's performance of the Work with reasonable promptness after receiving the Construction Manager's written request for such information or services.

§ 3.2 Owner's Designated Representative

The Owner shall identify a representative authorized to act on behalf of the Owner with respect to the Project. The Owner's representative shall render decisions promptly and furnish information expeditiously, so as to avoid unreasonable delay in the services or Work of the Construction Manager. Except as otherwise provided in Section 4.2.1 of A201-2007, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 3.2.1 Legal Requirements. The Owner shall furnish all legal, insurance and accounting services, including auditing services, that may be reasonably necessary at any time for the Project to meet the Owner's needs and interests.

§ 3.3 Architect

The Owner shall retain an Architect to provide services, duties and responsibilities as described in AIA Document B103™-2007, Standard Form of Agreement Between Owner and Architect, including any additional services requested by the Construction Manager that are necessary for the Preconstruction and Construction Phase services under this Agreement. The Owner shall provide the Construction Manager a copy of the executed agreement between the Owner and the Architect, and any further modifications to the agreement.

ARTICLE 4 COMPENSATION AND PAYMENTS FOR PRECONSTRUCTION PHASE SERVICES

§ 4.1 Compensation

§ 4.1.1 For the Construction Manager's Preconstruction Phase services, the Owner shall compensate the Construction Manager as follows:

§ 4.1.2 For the Construction Manager's Preconstruction Phase services described in Sections 2.1 and 2.2:
(Insert amount of, or basis for, compensation and include a list of reimbursable cost items, as applicable.)

New City Hall Phase - \$9,500
Public Safety Campus Phase - \$6,500

§ 4.1.3 If the Preconstruction Phase services covered by this Agreement have not been completed within twelve (12) months of the date of this Agreement, through no fault of the Construction Manager, the Construction Manager's compensation for Preconstruction Phase services shall be equitably adjusted.

§ 4.1.4 Compensation based on Direct Personnel Expense includes the direct salaries of the Construction Manager's personnel providing Preconstruction Phase services on the Project and the Construction Manager's costs for the

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mandatory and customary contributions and benefits related thereto, such as employment taxes and other statutory employee benefits, insurance, sick leave, holidays, vacations, employee retirement plans and similar contributions.

§ 4.2 Payments

§ 4.2.1 Unless otherwise agreed, payments for services shall be made monthly in proportion to services performed.

§ 4.2.2 Payments are due and payable upon presentation of the Construction Manager's invoice. Amounts unpaid forty-five (45) days after the invoice date shall bear interest at the rate entered below, or in the absence thereof at the legal rate prevailing from time to time at the principal place of business of the Construction Manager.
(Insert rate of monthly or annual interest agreed upon.)

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ARTICLE 5 COMPENSATION FOR CONSTRUCTION PHASE SERVICES

§ 5.1 For the Construction Manager's performance of the Work as described in Section 2.3, the Owner shall pay the Construction Manager the Contract Sum in current funds. The Contract Sum is the Cost of the Work as defined in Section 6.1.1 plus the Construction Manager's Fee.

§ 5.1.1 The Construction Manager's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Construction Manager's Fee.)

Fixed fee established upon the execution of Exhibit A in an amount of three and three quarter percent of the Owner approved estimated Cost of the Work up to \$9,000,000. (3.75%). For an approved estimated Cost of the Work over \$9,000,000, a fixed fee established upon the execution of Exhibit A in an amount of three and one half percent. (3.5%)

§ 5.1.2 The method of adjustment of the Construction Manager's Fee for changes in the Work:

Three and three quarter (3.75%) or three and one half percent (3.5%) of the Owner approved estimated Cost of the Work, based on Article 5.1.1.

§ 5.1.3 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

Ten percent (10%) for any increase up to \$10,000. Five percent (5%) for any increase over \$10,000.

§ 5.1.4 Rental rates for Construction Manager-owned equipment shall not exceed eighty percent (80 %) of the standard rate paid at the place of the Project.

§ 5.1.5 Unit prices, if any:

(Identify and state the unit price; state the quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
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§ 5.2 Guaranteed Maximum Price

§ 5.2.1 The Construction Manager guarantees that the Contract Sum shall not exceed the Guaranteed Maximum Price set forth in the Guaranteed Maximum Price Amendment, as it is amended from time to time. To the extent the Cost of the Work exceeds the Guaranteed Maximum Price, the Construction Manager shall bear such costs in excess of the Guaranteed Maximum Price without reimbursement or additional compensation from the Owner.

(Insert specific provisions if the Construction Manager is to participate in any savings.)

§ 5.2.2 The Guaranteed Maximum Price is subject to additions and deductions by Change Order as provided in the Contract Documents and the Date of Substantial Completion shall be subject to adjustment as provided in the Contract Documents.

§ 5.3 Changes in the Work

§ 5.3.1 The Owner may, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions. The Owner shall issue such changes in writing. The Architect may make minor changes in the Work as provided in Section 7.4 of AIA Document A201–2007, General Conditions of the Contract for Construction. The Construction Manager shall be entitled to an equitable adjustment in the Contract Time as a result of changes in the Work.

§ 5.3.2 Adjustments to the Guaranteed Maximum Price on account of changes in the Work subsequent to the execution of the Guaranteed Maximum Price Amendment may be determined by any of the methods listed in Section 7.3.3 of AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 5.3.3 In calculating adjustments to subcontracts (except those awarded with the Owner's prior consent on the basis of cost plus a fee), the terms "cost" and "fee" as used in Section 7.3.3.3 of AIA Document A201–2007 and the term "costs" as used in Section 7.3.7 of AIA Document A201–2007 shall have the meanings assigned to them in AIA Document A201–2007 and shall not be modified by Sections 5.1 and 5.2, Sections 6.1 through 6.7, and Section 6.8 of this Agreement. Adjustments to subcontracts awarded with the Owner's prior consent on the basis of cost plus a fee shall be calculated in accordance with the terms of those subcontracts.

§ 5.3.4 In calculating adjustments to the Guaranteed Maximum Price, the terms "cost" and "costs" as used in the above-referenced provisions of AIA Document A201–2007 shall mean the Cost of the Work as defined in Sections 6.1 to 6.7 of this Agreement and the term "fee" shall mean the Construction Manager's Fee as defined in Section 5.1 of this Agreement.

§ 5.3.5 If no specific provision is made in Section 5.1.2 for adjustment of the Construction Manager's Fee in the case of changes in the Work, or if the extent of such changes is such, in the aggregate, that application of the adjustment provisions of Section 5.1.2 will cause substantial inequity to the Owner or Construction Manager, the Construction Manager's Fee shall be equitably adjusted on the same basis that was used to establish the Fee for the original Work, and the Guaranteed Maximum Price shall be adjusted accordingly.

ARTICLE 6 COST OF THE WORK FOR CONSTRUCTION PHASE

§ 6.1 Costs to Be Reimbursed

§ 6.1.1 The term Cost of the Work shall mean costs necessarily incurred by the Construction Manager in the proper performance of the Work. Such costs shall be at rates not higher than the standard paid at the place of the Project except with prior consent of the Owner. The Cost of the Work shall include only the items set forth in Sections 6.1 through 6.7.

§ 6.1.2 Where any cost is subject to the Owner's prior approval, the Construction Manager shall obtain this approval prior to incurring the cost. The parties shall endeavor to identify any such costs prior to executing Guaranteed Maximum Price Amendment.

§ 6.2 Labor Costs

§ 6.2.1 Wages of construction workers directly employed by the Construction Manager to perform the construction of the Work at the site or, with the Owner's prior approval, at off-site workshops.

§ 6.2.2 Wages or salaries of the Construction Manager's supervisory and administrative personnel when stationed at the site with the Owner's prior approval.

(If it is intended that the wages or salaries of certain personnel stationed at the Construction Manager's principal or other offices shall be included in the Cost of the Work, identify in Section 11.5, the personnel to be included, whether for all or only part of their time, and the rates at which their time will be charged to the Work.)

§ 6.2.3 Wages and salaries of the Construction Manager's supervisory or administrative personnel engaged at factories, workshops or on the road, in expediting the production or transportation of materials or equipment required for the Work, but only for that portion of their time required for the Work.

§ 6.2.4 Costs paid or incurred by the Construction Manager for taxes, insurance, contributions, assessments and benefits required by law or collective bargaining agreements and, for personnel not covered by such agreements, customary benefits such as sick leave, medical and health benefits, holidays, vacations and pensions, provided such costs are based on wages and salaries included in the Cost of the Work under Sections 6.2.1 through 6.2.3.

§ 6.2.5 Bonuses, profit sharing, incentive compensation and any other discretionary payments paid to anyone hired by the Construction Manager or paid to any Subcontractor or vendor, with the Owner's prior approval.

§ 6.3 Subcontract Costs

Payments made by the Construction Manager to Subcontractors in accordance with the requirements of the subcontracts.

§ 6.4 Costs of Materials and Equipment Incorporated in the Completed Construction

§ 6.4.1 Costs, including transportation and storage, of materials and equipment incorporated or to be incorporated in the completed construction.

§ 6.4.2 Costs of materials described in the preceding Section 6.4.1 in excess of those actually installed to allow for reasonable waste and spoilage. Unused excess materials, if any, shall become the Owner's property at the completion of the Work or, at the Owner's option, shall be sold by the Construction Manager. Any amounts realized from such sales shall be credited to the Owner as a deduction from the Cost of the Work.

§ 6.5 Costs of Other Materials and Equipment, Temporary Facilities and Related Items

§ 6.5.1 Costs of transportation, storage, installation, maintenance, dismantling and removal of materials, supplies, temporary facilities, machinery, equipment and hand tools not customarily owned by construction workers that are provided by the Construction Manager at the site and fully consumed in the performance of the Work. Costs of materials, supplies, temporary facilities, machinery, equipment and tools that are not fully consumed shall be based on the cost or value of the item at the time it is first used on the Project site less the value of the item when it is no longer used at the Project site. Costs for items not fully consumed by the Construction Manager shall mean fair market value.

§ 6.5.2 Rental charges for temporary facilities, machinery, equipment and hand tools not customarily owned by construction workers that are provided by the Construction Manager at the site and costs of transportation, installation, minor repairs, dismantling and removal. The total rental cost of any Construction Manager-owned item may not exceed the purchase price of any comparable item. Rates of Construction Manager-owned equipment and quantities of equipment shall be subject to the Owner's prior approval.

§ 6.5.3 Costs of removal of debris from the site of the Work and its proper and legal disposal.

§ 6.5.4 Costs of document reproductions, facsimile transmissions and long-distance telephone calls, postage and parcel delivery charges, telephone service at the site and reasonable petty cash expenses of the site office.

§ 6.5.5 That portion of the reasonable expenses of the Construction Manager's supervisory or administrative personnel incurred while traveling in discharge of duties connected with the Work.

§ 6.5.6 Costs of materials and equipment suitably stored off the site at a mutually acceptable location, subject to the Owner's prior approval.

§ 6.6 Miscellaneous Costs

§ 6.6.1 Premiums for that portion of insurance and bonds required by the Contract Documents that can be directly attributed to this Contract. Self-insurance for either full or partial amounts of the coverages required by the Contract Documents, with the Owner's prior approval.

§ 6.6.2 Sales, use or similar taxes imposed by a governmental authority that are related to the Work and for which the Construction Manager is liable.

§ 6.6.3 Fees and assessments for the building permit and for other permits, licenses and inspections for which the Construction Manager is required by the Contract Documents to pay.

§ 6.6.4 Fees of laboratories for tests required by the Contract Documents, except those related to defective or nonconforming Work for which reimbursement is excluded by Section 13.5.3 of AIA Document A201–2007 or by other provisions of the Contract Documents, and which do not fall within the scope of Section 6.7.3.

§ 6.6.5 Royalties and license fees paid for the use of a particular design, process or product required by the Contract Documents; the cost of defending suits or claims for infringement of patent rights arising from such requirement of the Contract Documents; and payments made in accordance with legal judgments against the Construction Manager resulting from such suits or claims and payments of settlements made with the Owner's consent. However, such costs of legal defenses, judgments and settlements shall not be included in the calculation of the Construction Manager's Fee or subject to the Guaranteed Maximum Price. If such royalties, fees and costs are excluded by the last sentence of Section 3.17 of AIA Document A201–2007 or other provisions of the Contract Documents, then they shall not be included in the Cost of the Work.

§ 6.6.6 Costs for electronic equipment and software, directly related to the Work with the Owner's prior approval.

§ 6.6.7 Deposits lost for causes other than the Construction Manager's negligence or failure to fulfill a specific responsibility in the Contract Documents.

§ 6.6.8 Legal, mediation and arbitration costs, including attorneys' fees, other than those arising from disputes between the Owner and Construction Manager, reasonably incurred by the Construction Manager after the execution of this Agreement in the performance of the Work and with the Owner's prior approval, which shall not be unreasonably withheld.

§ 6.6.9 Subject to the Owner's prior approval, expenses incurred in accordance with the Construction Manager's standard written personnel policy for relocation and temporary living allowances of the Construction Manager's personnel required for the Work.

§ 6.7 Other Costs and Emergencies

§ 6.7.1 Other costs incurred in the performance of the Work if, and to the extent, approved in advance in writing by the Owner.

§ 6.7.2 Costs incurred in taking action to prevent threatened damage, injury or loss in case of an emergency affecting the safety of persons and property, as provided in Section 10.4 of AIA Document A201–2007.

§ 6.7.3 Costs of repairing or correcting damaged or nonconforming Work executed by the Construction Manager, Subcontractors or suppliers, provided that such damaged or nonconforming Work was not caused by negligence or failure to fulfill a specific responsibility of the Construction Manager and only to the extent that the cost of repair or correction is not recovered by the Construction Manager from insurance, sureties, Subcontractors, suppliers, or others.

§ 6.7.4 The costs described in Sections 6.1 through 6.7 shall be included in the Cost of the Work, notwithstanding any provision of AIA Document A201–2007 or other Conditions of the Contract which may require the Construction Manager to pay such costs, unless such costs are excluded by the provisions of Section 6.8.

§ 6.8 Costs Not To Be Reimbursed

§ 6.8.1 The Cost of the Work shall not include the items listed below:

- .1 Salaries and other compensation of the Construction Manager's personnel stationed at the Construction Manager's principal office or offices other than the site office, except as specifically provided in Section 6.2, or as may be provided in Article 11;
- .2 Expenses of the Construction Manager's principal office and offices other than the site office;
- .3 Overhead and general expenses, except as may be expressly included in Sections 6.1 to 6.7;
- .4 The Construction Manager's capital expenses, including interest on the Construction Manager's capital employed for the Work;

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- .5 Except as provided in Section 6.7.3 of this Agreement, costs due to the negligence or failure of the Construction Manager, Subcontractors and suppliers or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable to fulfill a specific responsibility of the Contract;
- .6 Any cost not specifically and expressly described in Sections 6.1 to 6.7;
- .7 Costs, other than costs included in Change Orders approved by the Owner, that would cause the Guaranteed Maximum Price to be exceeded; and
- .8 Costs for services incurred during the Preconstruction Phase.

§ 6.9 Discounts, Rebates and Refunds

§ 6.9.1 Cash discounts obtained on payments made by the Construction Manager shall accrue to the Owner if (1) before making the payment, the Construction Manager included them in an Application for Payment and received payment from the Owner, or (2) the Owner has deposited funds with the Construction Manager with which to make payments; otherwise, cash discounts shall accrue to the Construction Manager. Trade discounts, rebates, refunds and amounts received from sales of surplus materials and equipment shall accrue to the Owner, and the Construction Manager shall make provisions so that they can be obtained.

§ 6.9.2 Amounts that accrue to the Owner in accordance with the provisions of Section 6.9.1 shall be credited to the Owner as a deduction from the Cost of the Work.

§ 6.10 Related Party Transactions

§ 6.10.1 For purposes of Section 6.10, the term "related party" shall mean a parent, subsidiary, affiliate or other entity having common ownership or management with the Construction Manager; any entity in which any stockholder in, or management employee of, the Construction Manager owns any interest in excess of ten percent in the aggregate; or any person or entity which has the right to control the business or affairs of the Construction Manager. The term "related party" includes any member of the immediate family of any person identified above.

§ 6.10.2 If any of the costs to be reimbursed arise from a transaction between the Construction Manager and a related party, the Construction Manager shall notify the Owner of the specific nature of the contemplated transaction, including the identity of the related party and the anticipated cost to be incurred, before any such transaction is consummated or cost incurred. If the Owner, after such notification, authorizes the proposed transaction, then the cost incurred shall be included as a cost to be reimbursed, and the Construction Manager shall procure the Work, equipment, goods or service from the related party, as a Subcontractor, according to the terms of Sections 2.3.2.1, 2.3.2.2 and 2.3.2.3. If the Owner fails to authorize the transaction, the Construction Manager shall procure the Work, equipment, goods or service from some person or entity other than a related party according to the terms of Sections 2.3.2.1, 2.3.2.2 and 2.3.2.3.

§ 6.11 Accounting Records

The Construction Manager shall keep full and detailed records and accounts related to the cost of the Work and exercise such controls as may be necessary for proper financial management under this Contract and to substantiate all costs incurred. The accounting and control systems shall be satisfactory to the Owner. The Owner and the Owner's auditors shall, during regular business hours and upon reasonable notice, be afforded access to, and shall be permitted to audit and copy, the Construction Manager's records and accounts, including complete documentation supporting accounting entries, books, correspondence, instructions, drawings, receipts, subcontracts, Subcontractor's proposals, purchase orders, vouchers, memoranda and other data relating to this Contract. The Construction Manager shall preserve these records for a period of three years after final payment, or for such longer period as may be required by law.

ARTICLE 7 PAYMENTS FOR CONSTRUCTION PHASE SERVICES

§ 7.1 Progress Payments

§ 7.1.1 Based upon Applications for Payment submitted to the Architect by the Construction Manager and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Construction Manager as provided below and elsewhere in the Contract Documents.

§ 7.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 7.1.3 Provided that an Application for Payment is received by the Architect not later than the first day of a month, the Owner shall make payment of the certified amount to the Construction Manager not later than the first day of the following month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than thirty (30) days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 7.1.4 With each Application for Payment, the Construction Manager shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner or Architect to demonstrate that cash disbursements already made by the Construction Manager on account of the Cost of the Work equal or exceed progress payments already received by the Construction Manager, less that portion of those payments attributable to the Construction Manager's Fee, plus payrolls for the period covered by the present Application for Payment.

§ 7.1.5 Each Application for Payment shall be based on the most recent schedule of values submitted by the Construction Manager in accordance with the Contract Documents. The schedule of values shall allocate the entire Guaranteed Maximum Price among the various portions of the Work, except that the Construction Manager's Fee shall be shown as a single separate item. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Construction Manager's Applications for Payment.

§ 7.1.6 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed, or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Construction Manager on account of that portion of the Work for which the Construction Manager has made or intends to make actual payment prior to the next Application for Payment by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.

§ 7.1.7 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values. Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201-2007;
- .2 Add that portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work, or if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing;
- .3 Add the Construction Manager's Fee, less retainage of five percent (5 %). The Construction Manager's Fee shall be computed upon the Cost of the Work at the rate stated in Section 5.1 or, if the Construction Manager's Fee is stated as a fixed sum in that Section, shall be an amount that bears the same ratio to that fixed-sum fee as the Cost of the Work bears to a reasonable estimate of the probable Cost of the Work upon its completion;
- .4 Subtract retainage of five percent (5 %) from that portion of the Work that the Construction Manager self-performs;
- .5 Subtract the aggregate of previous payments made by the Owner;
- .6 Subtract the shortfall, if any, indicated by the Construction Manager in the documentation required by Section 7.1.4 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and
- .7 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201-2007.

§ 7.1.8 The Owner and Construction Manager shall agree upon (1) a mutually acceptable procedure for review and approval of payments to Subcontractors and (2) the percentage of retainage held on Subcontracts, and the Construction Manager shall execute subcontracts in accordance with those agreements.

§ 7.1.9 Except with the Owner's prior approval, the Construction Manager shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 7.1.10 In taking action on the Construction Manager's Applications for Payment, the Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Construction Manager and shall not be deemed to represent that the Architect has made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Section 7.1.4 or other supporting data; that the Architect has made exhaustive or continuous on-site inspections; or that the Architect has made examinations to ascertain how or for what purposes the Construction Manager has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

§ 7.2 Final Payment

§ 7.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Construction Manager when

- .1 the Construction Manager has fully performed the Contract except for the Construction Manager's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201-2007, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Construction Manager has submitted a final accounting for the Cost of the Work and a final Application for Payment; and
- .3 a final Certificate for Payment has been issued by the Architect.

The Owner's final payment to the Construction Manager shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

§ 7.2.2 The Owner's auditors will review and report in writing on the Construction Manager's final accounting within 30 days after delivery of the final accounting to the Architect by the Construction Manager. Based upon such Cost of the Work as the Owner's auditors report to be substantiated by the Construction Manager's final accounting, and provided the other conditions of Section 7.2.1 have been met, the Architect will, within seven days after receipt of the written report of the Owner's auditors, either issue to the Owner a final Certificate for Payment with a copy to the Construction Manager, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding a certificate as provided in Section 9.5.1 of the AIA Document A201-2007. The time periods stated in this Section supersede those stated in Section 9.4.1 of the AIA Document A201-2007. The Architect is not responsible for verifying the accuracy of the Construction Manager's final accounting.

§ 7.2.3 If the Owner's auditors report the Cost of the Work as substantiated by the Construction Manager's final accounting to be less than claimed by the Construction Manager, the Construction Manager shall be entitled to request mediation of the disputed amount without seeking an initial decision pursuant to Section 15.2 of A201-2007. A request for mediation shall be made by the Construction Manager within 30 days after the Construction Manager's receipt of a copy of the Architect's final Certificate for Payment. Failure to request mediation within this 30-day period shall result in the substantiated amount reported by the Owner's auditors becoming binding on the Construction Manager. Pending a final resolution of the disputed amount, the Owner shall pay the Construction Manager the amount certified in the Architect's final Certificate for Payment.

§ 7.2.4 If, subsequent to final payment and at the Owner's request, the Construction Manager incurs costs described in Section 6.1.1 and not excluded by Section 6.8 to correct defective or nonconforming Work, the Owner shall reimburse the Construction Manager such costs and the Construction Manager's Fee applicable thereto on the same basis as if such costs had been incurred prior to final payment, but not in excess of the Guaranteed Maximum Price. If the Construction Manager has participated in savings as provided in Section 5.2.1, the amount of such savings shall be recalculated and appropriate credit given to the Owner in determining the net amount to be paid by the Owner to the Construction Manager.

ARTICLE 8 INSURANCE AND BONDS

For all phases of the Project, the Construction Manager and the Owner shall purchase and maintain insurance, and the Construction Manager shall provide bonds as set forth in Article 11 of AIA Document A201-2007.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201-2007.)

Type of Insurance or Bond	Limit of Liability or Bond Amount (\$0.00)
Performance and Payment Bonds	100% of GMP
Builder's Risk Insurance	
General Liability – general aggregate	\$2,000,000 general aggregate
General Liability – each occurrence	\$1,000,000 each occurrence
Automobile Liability	\$1,000,000 combined single limit
Umbrella Liability	\$6,000,000 general aggregate and each occurrence
Worker's Compensation	\$500,000 each accident

ARTICLE 9 DISPUTE RESOLUTION

§ 9.1 Any Claim between the Owner and Construction Manager shall be resolved in accordance with the provisions set forth in this Article 9 and Article 15 of A201-2007. However, for Claims arising from or relating to the Construction Manager's Preconstruction Phase services, no decision by the Initial Decision Maker shall be required as a condition precedent to mediation or binding dispute resolution, and Section 9.3 of this Agreement shall not apply.

§ 9.2 For any Claim subject to, but not resolved by mediation pursuant to Section 15.3 of AIA Document A201-2007, the method of binding dispute resolution shall be as follows:

(Check the appropriate box. If the Owner and Construction Manager do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

- ☐ Arbitration pursuant to Section 15.4 of AIA Document A201-2007
- ☒ Litigation in a court of competent jurisdiction
- ☐ Other: *(Specify)*

§ 9.3 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Section 15.2 of AIA Document A201-2007 for Claims arising from or relating to the Construction Manager's Construction Phase services, unless the parties appoint below another individual, not a party to the Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

ARTICLE 10 TERMINATION OR SUSPENSION

§ 10.1 Termination Prior to Establishment of the Guaranteed Maximum Price

§ 10.1.1 Prior to the execution of the Guaranteed Maximum Price Amendment, the Owner may terminate this Agreement upon not less than seven days' written notice to the Construction Manager for the Owner's convenience and without cause, and the Construction Manager may terminate this Agreement, upon not less than seven days' written notice to the Owner, for the reasons set forth in Section 14.1.1 of A201-2007.

§ 10.1.2 In the event of termination of this Agreement pursuant to Section 10.1.1, the Construction Manager shall be equitably compensated for Preconstruction Phase services performed prior to receipt of a notice of termination. In no

event shall the Construction Manager's compensation under this Section exceed the compensation set forth in Section 4.1.

§ 10.1.3 If the Owner terminates the Contract pursuant to Section 10.1.1 after the commencement of the Construction Phase but prior to the execution of the Guaranteed Maximum Price Amendment, the Owner shall pay to the Construction Manager an amount calculated as follows, which amount shall be in addition to any compensation paid to the Construction Manager under Section 10.1.2:

- .1 Take the Cost of the Work incurred by the Construction Manager to the date of termination;
- .2 Add the Construction Manager's Fee computed upon the Cost of the Work to the date of termination at the rate stated in Section 5.1 or, if the Construction Manager's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed-sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion; and
- .3 Subtract the aggregate of previous payments made by the Owner for Construction Phase services.

The Owner shall also pay the Construction Manager fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Construction Manager which the Owner elects to retain and which is not otherwise included in the Cost of the Work under Section 10.1.3.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Construction Manager shall, as a condition of receiving the payments referred to in this Article 10, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Construction Manager, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Construction Manager under such subcontracts or purchase orders. All Subcontracts, purchase orders and rental agreements entered into by the Construction Manager will contain provisions allowing for assignment to the Owner as described above.

If the Owner accepts assignment of subcontracts, purchase orders or rental agreements as described above, the Owner will reimburse or indemnify the Construction Manager for all costs arising under the subcontract, purchase order or rental agreement, if those costs would have been reimbursable as Cost of the Work if the contract had not been terminated. If the Owner chooses not to accept assignment of any subcontract, purchase order or rental agreement that would have constituted a Cost of the Work had this agreement not been terminated, the Construction Manager will terminate the subcontract, purchase order or rental agreement and the Owner will pay the Construction Manager the costs necessarily incurred by the Construction Manager because of such termination.

§ 10.2 Termination Subsequent to Establishing Guaranteed Maximum Price

Following execution of the Guaranteed Maximum Price Amendment and subject to the provisions of Section 10.2.1 and 10.2.2 below, the Contract may be terminated as provided in Article 14 of AIA Document A201-2007.

§ 10.2.1 If the Owner terminates the Contract after execution of the Guaranteed Maximum Price Amendment, the amount payable to the Construction Manager pursuant to Sections 14.2 and 14.4 of A201-2007 shall not exceed the amount the Construction Manager would otherwise have received pursuant to Sections 10.1.2 and 10.1.3 of this Agreement.

§ 10.2.2 If the Construction Manager terminates the Contract after execution of the Guaranteed Maximum Price Amendment, the amount payable to the Construction Manager under Section 14.1.3 of A201-2007 shall not exceed the amount the Construction Manager would otherwise have received under Sections 10.1.2 and 10.1.3 above, except that the Construction Manager's Fee shall be calculated as if the Work had been fully completed by the Construction Manager, utilizing as necessary a reasonable estimate of the Cost of the Work for Work not actually completed.

§ 10.3 Suspension

The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201-2007. In such case, the Guaranteed Maximum Price and Contract Time shall be increased as provided in Section 14.3.2 of AIA Document A201-2007, except that the term "profit" shall be understood to mean the Construction Manager's Fee as described in Sections 5.1 and 5.3.5 of this Agreement.

ARTICLE 11 MISCELLANEOUS PROVISIONS

§ 11.1 Terms in this Agreement shall have the same meaning as those in A201-2007.

§ 11.2 Ownership and Use of Documents

Section 1.5 of A201-2007 shall apply to both the Preconstruction and Construction Phases.

§ 11.3 Governing Law

Section 13.1 of A201-2007 shall apply to both the Preconstruction and Construction Phases.

§ 11.4 Assignment

The Owner and Construction Manager, respectively, bind themselves, their agents, successors, assigns and legal representatives to this Agreement. Neither the Owner nor the Construction Manager shall assign this Agreement without the written consent of the other, except that the Owner may assign this Agreement to a lender providing financing for the Project if the lender agrees to assume the Owner's rights and obligations under this Agreement. Except as provided in Section 13.2.2 of A201-2007, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 11.5 Other provisions:

ARTICLE 12 SCOPE OF THE AGREEMENT

§ 12.1 This Agreement represents the entire and integrated agreement between the Owner and the Construction Manager and supersedes all prior negotiations, representations or agreements, either written or oral. This Agreement may be amended only by written instrument signed by both Owner and Construction Manager.

§ 12.2 The following documents comprise the Agreement:

- .1 AIA Document A133-2009, Standard Form of Agreement Between Owner and Construction Manager as Constructor where the basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price
- .2 AIA Document A201-2007, General Conditions of the Contract for Construction
- .3 AIA Document E201™-2007, Digital Data Protocol Exhibit, if completed, or the following:
 - .4 AIA Document E202™-2008, Building Information Modeling Protocol Exhibit, if completed, or the following:
 - .5 Other documents:
(List other documents, if any, forming part of the Agreement.)

This Agreement is entered into as of the day and year first written above.

OWNER (Signature)

CONSTRUCTION MANAGER (Signature)

Travis Rothweiler City Manager
(Printed name and title)

Michael Arrington Starr Corporation
(Printed name and title)

Init.

Budget Impact:

The total estimated cost of the Agreement between the City of Twin Falls and Starr Corporation is \$416,000 and includes:

- \$16,000 for Preconstruction Services
- \$300,000 in Construction Services – to be determined at execution of AIA exhibit A for Guaranteed Maximum Price.

The estimated General Conditions for the project are:

- \$490,061 for an estimated 28-man months

The funding for the CMGC contract is planned to come from unrestricted cash reserves in the Capital and General Funds. As of the August Dashboard, the City had a total slightly more than \$15 million available.

Regulatory Impact:

There is no regulatory impact associated with approval of the Agreement.

Conclusion:

Staff recommends that the City Council approved the negotiated contract with Starr Corporation to act as the City's Construction Manager/General Contractor on the City Hall/Public Safety Complex project.

This contract has been reviewed by Twin Falls City Attorney Fritz Wonderlich.

Attachments:

1. Agreement with City Starr Corporation to act as the City's Construction Manager/General Contractor on the City Hall/Public Safety Complex project



Date: Monday, September 21, 2015
To: Mayor and City Council
From: Travis Rothweiler, City Manager

Request

Second Reading:

Consideration of an Ordinance of the City Council of the City of Twin Falls, Idaho modifying Title 1 of the Twin Falls City Municipal Code.

Time Estimate

The estimated amount of time this item will take is 10 minutes plus time to answer questions.

Background

The primary purpose of the proposed Ordinance is to update Title 1 of the Twin Falls Municipal Code. Many of the recommended changes are contained in several sections of the Idaho Code, specifically 50-902, 50-903, 18-101, 50-811, 50-808, and 34-1801. In addition, the proposed Ordinance removes several outdated sections.

Additionally, the Ordinance defines the term "Department Heads." Historically, the term has been used to reflect those who are a part of the City's executive team. As a result of the City's reorganization, the members of the City's executive team include the Deputy City Managers, Chief Financial Officer, Police Chief, Fire Chief, City Engineer, Public Works Director, and Human Resource Director. The Ordinance proposes to codify the historical interpretation.

Approval Process:

Approving the Ordinance amending Title 1 of the Twin Falls Municipal Code requires a simple majority (50%+1) of the members in attendance at this meeting.

Budget Impact:

This is no budget impact with the Ordinance.

Regulatory Impact:

The primary purpose of the proposed Ordinance is to update Title 1 of the Twin Falls Municipal Code. Many of the recommended changes are contained in several sections of the Idaho Code, specifically 50-902, 50-903, 18-101, 50-811, 50-808, and 34-1801.

Conclusion:

The City Attorney and the City Manager recommend the adoption of the proposed Ordinance.

Attachments:

1. Ordinance modifying Title 1 of the Twin Falls Municipal Code
2. Redline version of the Ordinance modifying Title 1 of the Twin Falls Municipal Code.

ORDINANCE NO. _____

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF TWIN FALLS, IDAHO, REPEALING TITLE 1 OF THE TWIN FALLS CITY CODE, AND REPLACING IT WITH A NEW TITLE 1, PROVIDING FOR A CITY CODE, ADMINISTRATION INCLUDING A MAYOR, VICE MAYOR AND CITY MANAGER, AND GENERAL PENALTIES FOR VIOLATION OF THE CITY CODE.

WHEREAS, The Twin Falls City Code was originally codified in 1958, and Title 1 of this Code has become outdated over the last 57 years; and,

WHEREAS, The provisions of the Idaho Code already cover large portions of the pre-existing Title 1 of the City Code; and,

WHEREAS, The 2015 Idaho Legislature enacted a new statutory procedure for Initiative and Referendum, which replaces the procedure set forth in the existing City Code.

NOW, THEREFORE, BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF TWIN FALLS, IDAHO:

Section 1: That Title 1 of the Twin Falls City code is hereby repealed, effective upon passage and publication of this ordinance, and upon the effective date of the New Title 1 provided for herein.

Section 2: That the Twin Falls City code is hereby amended by the adoption of a New Title 1 entitled “Administrative”, as follows:

“Title 1: ADMINISTRATIVE

Chapter 1: CITY CODE

1-1-1: TWIN FALLS CITY CODE:

This City Code is hereby declared to be and shall constitute the official City Code of the City of Twin Falls. Any reference made to the number of any section contained herein shall be understood to refer to the position of the same under its appropriate chapter and title heading, and to the general penalty clause relating thereto as well as to the section itself, when reference is made to this City Code by title in any legal document.

1-1-2: SEVERABILITY CLAUSE:

If any section, subsection, subdivision, paragraph, sentence, clause or phrase of this City Code or any part thereof is for any reason held to be unconstitutional or invalid or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this Code, or any part thereof. The City Council hereby declares that it would have passed each section, subsection,

TITLE 1 ORDINANCE - 1

subdivision, paragraph, sentence, clause or phrase thereof irrespective of the fact that any one or more sections, subsections, subdivisions, paragraphs, sentences, clauses or phrases be declared unconstitutional, invalid or ineffective.

Chapter 2: ADMINISTRATION

1-2-1: MAYOR:

At the time of installing and swearing in the councilmen following each general city election, or special election called for the purpose of electing officials, the council shall elect one (1) of their members to be designated the mayor. He/She shall serve for a period of two (2) years unless sooner removed by the council or becomes disqualified.

The mayor shall preside at the meetings of the council and perform such other duties consistent with his office as may be imposed by the council. He/She shall be entitled to a vote on all matters coming before the council, but shall possess no veto power. He/She shall be recognized as the official head of the city for all ceremonial purposes, by the courts of the purposes of serving civil processes, and by the governor for military purpose. He/She may use the title of mayor in any case in which the execution of contracts or other legal instruments in writing, or other necessity arising from the general laws of this state may so require, but this shall not be construed as conferring upon him/her administrative powers or functions of a mayor under the general laws of the state.

1-2-2: VICE MAYOR:

Upon taking office, the mayor shall appoint with the consent of the council any other councilman to act in the absence or disability of the mayor. Said appointed councilman shall be titled vice mayor and shall during the temporary absence or disability of the mayor, have all duties, powers and rights of the mayor. The designated vice mayor's term of appointment shall continue until another councilman is appointed vice mayor.

1-2-3: CITY MANAGER:

The City Council and its members shall deal with the administrative services of the City only through the City Manager, except for the purpose of inquiry, and neither the City Council nor any member thereof shall give orders to any subordinates of the City Manager. It shall be the responsibility of the City Council and its members to aid and assist in an advisory capacity any department head, individually or collectively, on any phase of policy and/or public relations, such association not to conflict with the administrative duties of the City Manager.

1-2-4 Department Heads:

Department Heads shall include Deputy City Managers, Chief Financial Officer, Police Chief, Fire Chief, City Engineer, Public Works Director, and Human Resource Director.

Chapter 3: (RESERVED)

Chapter 4: GENERAL PENALTY

1-4-1: GENERAL PENALTY:

Any person violating any section of this code for which special penalty be not provided, shall be guilty of the offense defined and upon conviction thereof shall be fined in a sum not exceeding one thousand dollars (\$1,000.00) or imprisoned in the county jail for not more than six (6) months or by both such fine and imprisonment.

The city manager shall designate a code enforcement officer who shall have the right of ingress or egress to any premises for the purpose of inspecting for violations of this code, and shall be authorized to enforce this code by issuance of Idaho uniform citations.

1-4-2 LICENSE:

When a person is convicted of a violation of any section of this code, any license previously issued to him by the city may be revoked by the council or by the court having proper jurisdiction.

1-4-3 APPLICATION:

The penalty provided in this chapter shall be applicable to every section of this code the same as though it were a part of each and every separate section. Any person convicted of a violation of any section of this code where any duty is prescribed or obligation imposed, or where any act which is of a continuing nature or declared to be unlawful shall be deemed guilty of a misdemeanor.

In all cases where the same offense is made punishable or is created by different clauses or sections of this code, the prosecuting officer may elect under which to proceed; but not more than one recovery shall be had against the same person for the same offense; provided, that the revocation of a license or permit shall not be considered a recovery or penalty so as to bar any other penalty being enforced.

Whenever the doing of any act or the omission to do any act constitutes a breach of any section or provision of this code and there shall be no fine or penalty specifically declared for such breach, the provisions of this chapter shall apply and a separate offense shall be deemed committed upon each day during or on which a breach or violation occurs or continues.”

PASSED BY THE CITY COUNCIL,
SIGNED BY THE MAYOR

, 2015.
, 2015.

MAYOR

ATTEST:

DEPUTY CITY CLERK

TITLE 1 ORDINANCE - 3

Chapter 1: OFFICIAL CITY CODE

1-1-1 TITLE:

~~Upon adoption by the Council, this~~ This City Code is hereby declared to be and shall hereafter constitute the official City Code of the City of Twin Falls. Any reference made to the number of any section contained herein shall be understood to refer to the position of the same under its appropriate chapter and title heading, and to the general penalty clause relating thereto as well as to the section itself, when reference is made to this City Code by title in any legal document.

50-903. GRANT OF POWER. Any city is hereby empowered to revise, codify, and compile from time to time and to publish in book or pamphlet form all ordinances of such city of a general and permanent nature and to make such changes, alterations, modifications, additions and substitutions therein as it may deem best to the end that a complete simplified code of such ordinances then in force shall be presented, but with errors, inconsistencies, repetitions and ambiguities therein eliminated.

50-904. ARRANGEMENT OF ORDINANCES. The ordinances in such revision, codification and compilation shall be arranged in appropriate chapters, articles and sections, excluding the titles, enacting clauses, signatures of the mayor, attestations and other formal parts.

1-1-2 :ACCEPTANCE:

~~This City Code, as hereby presented in printed form, shall hereafter be received without further proof in all courts and in all administrative tribunals of this State as the ordinances of the City of general and permanent effect.~~

50-902. PASSAGE OF ORDINANCES...

All ordinances may be proved by a certificate of the clerk under the seal of the city and when printed or published individually in book or pamphlet form by authority of the city, shall be read and received in evidence in all courts and places without further proof.

1-1-3 :AMENDMENTS:

~~Any ordinance amending this City Code shall set forth the title, chapter and section number of the section or sections to be amended, and this shall constitute a sufficient compliance with any statutory requirement pertaining to the amendment or revision by ordinance of any part of this City Code. All such amendments or revisions by ordinance shall be immediately forwarded to the codifiers and the said ordinance material shall be prepared for insertion in its proper place in each copy of this City Code. Each such replacement page shall be properly identified and shall be inserted in each individual copy of the City Code within thirty (30) days from the date said ordinance becomes effective.~~

See Idaho Code 50-903 above. “and to make such changes, alterations, modifications, additions and substitutions therein as it may deem best to the end that a complete simplified code of such ordinances then in force shall be presented ...”

1-1-4 :INTERPRETATIONS:

~~In the determination of the provisions of each section of this Code, the following rules shall be observed:~~

(A) Intent to Defraud: Whenever an intent to defraud is required in order to constitute an offense, it shall be sufficient if an intent appears to defraud any person.

(B) Liability of Employers and Agents: When the provisions of any section of this City Code prohibits the commission of an act, not only the person actually doing the prohibited act or omitting the directed act, but also the employer and all other persons concerned with or in aiding or abetting the said person shall be guilty of the offense described and liable to the penalty set forth.

1-1-5 : CODE ALTERATION:

It shall be deemed unlawful for any person to alter, change, replace or deface in any way any section or any page of this City Code in such a manner that the meaning of any phrase or order may be changed or omitted. Replacement pages may be inserted according to the official instructions when so authorized by the City Council. The Clerk shall see that the replacement pages are properly inserted in the official copies maintained in the office of the Clerk.

Any person having in his custody an official copy of this City Code shall make every effort to maintain said Code in an up to date and efficient manner. He shall see to the immediate insertion of new or replacement pages when such are delivered to him or made available to him through the office of the City Clerk. Said Code books, while in actual possession of officials and other interested persons, shall be and remain the property of the City and shall be returned to the office of the Clerk when directed so to do by order of the City Council.

This really seems outdated, especially now that almost everyone accesses the City Code online.

Chapter 2: SAVING CLAUSE

1-2-1: REPEAL OF GENERAL ORDINANCES:

All general ordinances of the City passed prior to the adoption of this City Code are hereby repealed, except such as are referred to herein as being still in force or are by necessary implication herein reserved from repeal (subject to the saving clauses contained in the following Section), from which are excluded the following ordinances which are not hereby repealed: Tax levy ordinances; appropriation ordinances; ordinances relating to boundaries and annexations; franchise ordinances and other ordinances granting special rights to persons or corporations; contract ordinances and ordinances authorizing the execution of a contract or the issuance of warrants; salary ordinances; ordinances establishing, naming or vacating streets, alleys or other public places; improvement ordinances; bond ordinances; ordinances relating to elections; ordinances relating to the transfer or acceptance of real estate by or from the City; and all special ordinances.

1-2-2 : PUBLIC UTILITY ORDINANCES:

No ordinance relating to railroads or railroad crossings with streets and other public ways, or relating to the conduct, duties, service or rates of public utilities shall be repealed by virtue of the adoption of this City Code or by virtue of the preceding Section, excepting as this City Code may contain provisions for such matters, in which case this City Code shall be considered as amending such ordinance or ordinances in respect of such provisions only.

1-2-3 : COURT PROCEEDINGS:

No new ordinance shall be construed or held to repeal a former ordinance, whether such former ordinance is expressly repealed or not, as to any offense committed against such former ordinance or as to any act done, any penalty, forfeiture or punishment so incurred, or any right accrued or claim arising under the former ordinance, or in any way whatever to affect any such offense or act so committed or so done, or any penalty, forfeiture or punishment so incurred or any right accrued or claim arising before the new ordinance takes effect, save only that the proceedings thereafter shall conform to the ordinance in force at the time of such proceeding, so far as practicable. If any penalty,

~~forfeiture or punishment be mitigated by any provision of a new ordinance, such provision may be, by the consent of the party affected, applied to any judgment announced after the new ordinance takes effect.~~

~~This Section shall extend to all repeals, either by express words or implication, whether the repeal is in the ordinance making any new provisions upon the same subject or in any other ordinance.~~

~~Nothing contained in this Chapter shall be construed as abating any action now pending under or by virtue of any general ordinance of the City herein repealed and the provisions of all general ordinances contained in this Code shall be deemed to be continuing provisions and not a new enactment of the same provision; nor shall this Chapter be deemed as discontinuing, abating, modifying or altering any penalty accrued or to accrue, or as affecting the liability of any person, firm or corporation, or as waiving any right of the City under any ordinance or provision thereof in force at the time of the adoption of this Code.~~

1-2-4 SEVERABILITY CLAUSE:

If any section, subsection, subdivision, paragraph, sentence, clause or phrase of this City Code or any part thereof is for any reason held to be unconstitutional or invalid or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this Code, or any part thereof. The City Council hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase thereof irrespective of the fact that any one or more sections, subsections, subdivisions, paragraphs, sentences, clauses or phrases be declared unconstitutional, invalid or ineffective.

Most of the sections in this Chapter had relevance when the City ordinances were first codified in 1958, but really have no relevance now. But, keeping the severability clause would still be helpful.

Chapter 3: DEFINITIONS

~~**1-3-1 : CONSTRUCTION OF WORDS:** Whenever any word in any section of this City Code importing the plural number is used in describing or referring to any matters, parties or persons, any single matter, party or person shall be deemed to be included although distributive words may not have been used.~~

~~When any subject matter, party or person is referred to in this City Code by words importing the singular number only, or the masculine gender, several matters, parties or persons and females as well as males and bodies corporate shall be deemed to be included; provided, that these rules of construction shall not be applied to any section of this City Code which contains any express provision excluding such construction or where the subject matter or content may be repugnant thereto.~~

1-3-2 : DEFINITIONS, GENERAL:

Whenever the following words or terms are used in this Code, they shall have the meanings herein ascribed to them unless the context makes such meaning repugnant thereto:

AGENT: The word "agent" as used in this Code shall mean a person acting on behalf of another.

CITY: The word "City" shall mean the City of Twin Falls, County of Twin Falls, State of Idaho.

CODE: The word "Code", unless otherwise specifically stated, shall mean this City Code.

COMPUTATION OF TIME: The time in which any act provided by these compiled and codified ordinances is to be done is computed by excluding the first day (unless otherwise specifically stated); and including the last day, unless the last day is a holiday, then it is also excluded.

The hours of the day shall be computed on the basis of Mountain Standard Time or Mountain Daylight Savings Time, as the case may be.

COUNCIL: The word "Council" shall be construed to mean the City Council of the City of Twin Falls.

EMPLOYEES: Whenever reference is made in this Code to a City employee by title only, this shall be construed as though followed by the words "of the City of Twin Falls."

FEE: The word "fee" as used in this Code, shall mean a sum of money charged by the City for the carrying on of a business, profession or occupation.

KNOWINGLY: The word "knowingly" imports only a knowledge that the facts exist which bring the act or omission within the provisions of this Code. It does not require any knowledge of the unlawfulness of such act or omission.

LICENSE: The word "license" as used in this Code shall mean the permission granted for the carrying on of a business, profession or occupation.

MISDEMEANOR: The word "misdemeanor" shall mean any offense deemed a violation of the provisions of this Code which is a lesser offense than a felony as defined by State law.

NEGLIGENT: The word "negligent," as well as "neglect," "negligence" and "negligently" imports a want of such attention to the nature of probable consequences of the act or omission as a prudent man ordinarily bestows in acting in his own concern.

NUISANCE: The word "nuisance" shall mean anything offensive or obnoxious to the health and welfare of the inhabitants of the City or any act or thing repugnant to, or creating a hazard to, or having a detrimental effect on the property of another person or to the community.

OCCUPANT: The word "occupant" applied to a building or land shall include any person who occupies the whole or any part of such building or land whether alone or with others.

OFFENSE: The word "offense" shall mean any act forbidden by any provision of this Code or the omission of any act required by the provisions of this Code.

OFFICERS: Whenever reference is made in this Code to a City officer by title only, this shall be construed as though followed by the words "of the City of Twin Falls."

OPERATOR: The word "operator" as used in this Code shall mean the person who is in charge of any operation, business or profession.

OWNER: The word "owner" applied to a building or land shall include any part owner, joint owner, tenant in common, joint tenant or lessee of the whole or of a part of such building or land.

PERSON: The word "person" shall mean any individual, partnership, corporation, joint stock association or the State of Idaho or any subdivision thereof, and including any trustee, receiver, assignee or personal representative thereof.

PERSONAL PROPERTY: Shall include every description of money, goods, chattels, effects, evidence of rights in action and all written instruments by which any pecuniary obligation, right or title to property is created, acknowledged, transferred, increased, defeated, discharged or diminished and every right or interest therein.

RETAILER: As used in this code, unless otherwise specifically defined, shall be understood to relate to the sale of goods, merchandise, articles or things in small quantities direct to the consumer.

STREET: Shall include alleys, lanes, courts, boulevards, public squares, public places and sidewalks.

TENANT: Applied to a building or land shall include any person who occupies the whole or any part of such building or land whether alone or with others.

WHOLESALE: The words "wholesaler" and "wholesale dealer" as used in this code, unless otherwise specifically defined, shall be understood to relate to the sale of goods, merchandise, articles or things in quantity to persons who purchase for the purpose of resale.

~~WILFULLY: When applied to the intent with which an act is done or omitted, implies simply a purpose or willingness to commit the act or make the omission referred to. It does not require any intent to violate law, or to injure another, or to acquire an advantage.~~

~~WRITTEN OR IN WRITING: May include printing and any other mode of representing words and letters, but when the written signature of any person is required by law to any official or public writing or bond required by law, it shall be in the proper handwriting of such person, or in case he is unable to write, by his proper mark.~~

18-101. DEFINITION OF TERMS. The following words have in this code the signification attached to them in this section, unless otherwise apparent from the context:

1. The word "wilfully," when applied to the intent with which an act is done or omitted, implies simply a purpose or willingness to commit the act or make the omission referred to. It does not require any intent to violate law, or to injure another, or to acquire any advantage.
2. The words "neglect," "negligence," "negligent," and "negligently," import a want of such attention to the nature of probable consequences of the act or omission as a prudent man ordinarily bestows in acting in his own concerns.
3. The word "corruptly," imports a wrongful design to acquire or cause some pecuniary or other advantage to the person guilty of the act or omission referred to, or to some other person.
4. The words "malice," and "maliciously," import a wish to vex, annoy, or injure another person, or an intent to do a wrongful act, established either by proof or presumption of law.
5. The word "knowingly," imports only a knowledge that the facts exist which bring the act or omission within the provisions of this code. It does not require any knowledge of the unlawfulness of such act or omission.
6. The word "bribe," signifies anything of value or advantage, present or prospective, or any promise or undertaking to give any, asked, given, or accepted, with a corrupt intent to influence, unlawfully, the person to whom it is given, in his action, vote or opinion, in any public or official capacity.
7. Where the word "person" is used in this code to designate the party whose property may be the subject of any offense, it includes this state, any other state, any territory, government, or country, which may lawfully own property within this state, and all public and private corporations or joint associations, as well as individuals.

49-120. Definitions – S: ...

(27) "Street." (See "Highways," section 49-109, Idaho Code)

49-109 Definitions – H: ...

(5) "Highway" means the entire width between the boundary lines of every way publicly maintained when any part is open to the use of the public for vehicular travel, with jurisdiction extending to the adjacent property line, including

sidewalks, shoulders, berms and rights-of-way not intended for motorized traffic.
The term "street" is interchangeable with highway.

~~1-3-3 : CATCHLINES:~~

~~The catchlines of the several sections of this code are intended as mere catchwords to indicate the content of the section and shall not be deemed or taken to be titles of such sections, nor as any part of the section nor unless expressly so provided shall they be so deemed when any of such sections, including the catchlines, are amended or reenacted.~~

Chapter 4: GENERAL PENALTY

1-4-1: GENERAL PENALTY:

Any person violating any section of this code for which special penalty be not provided, shall be guilty of the offense defined and upon conviction thereof shall be fined in a sum not exceeding one thousand dollars (\$1,000.00) or imprisoned in the county jail for not more than six (6) months or by both such fine and imprisonment.

The city manager shall designate a code enforcement officer who shall have the right of ingress or egress to any premises for the purpose of inspecting for violations of this code, and shall be authorized to enforce this code by issuance of Idaho uniform citations.

1-4-2 LICENSE:

When a person is convicted of a violation of any section of this code, any license previously issued to him by the city may be revoked by the council or by the court having proper jurisdiction.

1-4-3 APPLICATION:

The penalty provided in this chapter shall be applicable to every section of this code the same as though it were a part of each and every separate section. Any person convicted of a violation of any section of this code where any duty is prescribed or obligation imposed, or where any act which is of a continuing nature or declared to be unlawful shall be deemed guilty of a misdemeanor.

In all cases where the same offense is made punishable or is created by different clauses or sections of this code, the prosecuting officer may elect under which to proceed; but not more than one recovery shall be had against the same person for the same offense; provided, that the revocation of a license or permit shall not be considered a recovery or penalty so as to bar any other penalty being enforced.

Whenever the doing of any act or the omission to do any act constitutes a breach of any section or provision of this code and there shall be no fine or penalty specifically declared for such breach, the provisions of this chapter shall apply and a separate offense shall be deemed committed upon each day during or on which a breach or violation occurs or continues.

1-4-4 : LIABILITY OF OFFICERS:

~~No provision of this code designating the duties of any officer or employee shall be so construed as to make such officer or employee liable for any fine or penalty provided for a failure to perform such duty, unless the intention of the council to impose such fine or penalty on such officer or employee is specifically and clearly expressed in the section creating the duty.~~

Chapter 5: CITY COUNCIL

1-5-1: COUNCIL MEETINGS:

~~Regular meetings of the city council shall be held on the dates and at the times set forth on the annual meeting schedule posted at city council chambers. Special meetings may be scheduled in compliance with the Idaho open meeting law.~~

1-5-2: VICE MAYOR:

Upon taking office, the mayor shall appoint with the consent of the council any other councilman to act in the absence or disability of the mayor.

Said appointed councilman shall be titled vice mayor and shall during the temporary absence or disability of the mayor, have all duties, powers and rights of the mayor. The designated vice mayor's term of appointment shall continue until another councilman is appointed vice mayor.

Chapter 6: OFFICERS AND EMPLOYEES

1-6-1: OATH OF OFFICE:

~~Each officer of the city shall take and subscribe before some person authorized to administer oaths, an oath substantially in the following form:~~

~~*I do solemnly swear that I will support the Constitution of the United States, and the Constitution and laws of this State; that I will faithfully and impartially discharge the duties of the office of of the City of Twin Falls, Idaho, according to the best of my ability. So help me God.*~~

~~Said oath shall be filed with the city clerk. No officer shall enter upon the performance of his duties until he shall have so subscribed to and filed such oath, together with the bond, if any, required by law or by ordinance.~~

1-6-2 : BOND OF OFFICERS:

~~Before entering upon the performance of his duties, any employee of the city may be required to enter into, execute and file with the city clerk a good and sufficient bond signed also by surety or sureties approved by the city council and conditioned for the faithful and honest performance of the duties of the office, and the delivery to the city of such money or property thereof as shall come into his keeping, which bond shall be in such sum as may be fixed by the city council and shall be made payable to the city of Twin Falls; provided, however, that an increase of any such bond may be required at any time by the city council.~~

1-6-3 : SUBORDINATE OFFICES:

~~(Rep. by Ord. 2132, 12-17-1984)~~

1-6-4 : SALARIES:

~~The salary of each subordinate officer, assistant or employee shall be fixed by ordinance, but shall be subject to change at any time by ordinance.~~

Chapter 7: CITY MANAGER

1-7-1: OFFICE OF CITY MANAGER CREATED:

~~The office of City Manager of the City is hereby established and created.~~

~~The City Manager shall be appointed by the City Council solely on the basis of his executive and administrative qualifications with special reference to his actual experience in, or his knowledge of, accepted practice in respect to the duties of his office as hereinafter set forth; and he shall hold office during the pleasure of the City Council.~~

1-7-2 : ELIGIBILITY:

~~Residence in the City at the time of appointment as City Manager shall not be required as a condition of appointment.~~

~~No person elected to membership on the City Council shall, subsequent to such election, be eligible for appointment as City Manager until one year has elapsed after he has ceased to be a member of the City Council.~~

1-7-3 : BOND:

the City Manager shall secure a corporate surety bond to be approved by the City Council in such sum as may be determined by said Council, and shall be conditioned on the faithful performance of the duties imposed on the City Manager as herein prescribed. The bond fee shall be paid by the City.

1-7-4 : ABSENCE:

To perform the duties of City Manager during the temporary absence or disability of the permanent City Manager, said permanent City Manager may designate by letter, filed with the City Clerk, a qualified administrative officer of the City. In the event of failure of said permanent City Manager to make such designation, the City Council may, by resolution, appoint an officer of the City to perform the duties of the City Manager until said permanent City Manager shall have returned or his disability shall have ceased, and the appointee shall qualify as provided under Sections 1-7-2 and 1-7-3 hereof.

1-7-5 : REMOVAL:

In case of his removal by the City Council, the City Manager shall be furnished with a written notice stating the City Council's intention to remove him and the reasons therefor at least thirty (30) days before the effective date of such removal. Within seven (7) days after the delivery to him of such notice, the City Manager may, by written notification to the City Clerk, request a public hearing before the City Council. Thereafter the City Council shall fix a time for the public hearing, which shall be held at its usual place of meeting before the expiration of said thirty (30) day period, and at which time the City Manager shall appear and be heard. After furnishing the City Manager with written notice of intention to remove, the City Council may suspend him from duty but his salary shall continue until his removal by resolution of the City Council is passed subsequent to the public hearing. The City Council, in removing the City Manager, shall use its uncontrolled discretion and its action shall be final and shall not depend upon any particular showing or degree of proof at the hearing, the purpose of which is to allow the City Manager publicly to present to the City Council his grounds of opposition to removal prior to its action.

1-7-6 : RESIGNATION:

The City Manager shall give in writing a thirty (30) day notice of his intention to resign before leaving, resigning or quitting the office of City Manager.

1-7-7 : COMPENSATION:

The City Manager shall receive such compensation as the City Council shall from time to time determine and fix by ordinance, resolution or motion, and said compensation shall be a proper charge against such funds of the City that the Council shall designate.

Said City Manager shall be reimbursed for all sums necessarily incurred or paid by him in the performance of his duties, or incurred when traveling on business pertaining to said City under direction of the City Council; reimbursement shall only be made, however, when a verified itemized claim, setting forth the sums expended for which reimbursement is requested, has been presented to the City Council and by said Council duly approved and allowed.

1-7-8 : POWERS AND DUTIES:

The City Manager shall be the chief executive officer and the head of the administrative branch of the City government. He shall be responsible to the City Council for the proper administration of all affairs of the City under the specific direction and control of the City Council.

In addition to his general powers as the chief executive officer and the head of the administrative branch of the City government, and not as a limitation thereof, it shall be his responsibility and duty and he shall have the power:

- (A) ~~To see that all laws and ordinances of the City are duly enforced, and that all franchises and privileges granted by the City are faithfully observed.~~
- (B) ~~To control, order and give directions to all heads of departments, subordinate officers and employees of the City, except elected officers and their respective staffs, and to transfer employees from one department to another; and to consolidate or combine offices, positions, departments or units under his direction.~~
- (C) ~~To appoint and remove any officers and employees of the City except the elected officers and their respective staffs, subject to ratification by the City Council in the case of department heads.~~
- (D) ~~To exercise control over all departments of the City government and over all appointive officers and employees thereof, except elective officers and their respective staffs.~~
- (E) ~~To attend all meetings of the City Council unless excused therefrom by said Council, except when his removal is under consideration by the Council.~~
- (F) ~~To recommend to the City Council for adoption such measures and ordinances as he deems necessary or expedient.~~
- (G) ~~To keep the City Council at all times fully advised as to the financial conditions and needs of the City.~~
- (H) ~~To prepare and submit to the City Council the annual tentative budget.~~
- (I) ~~To purchase or cause to be purchased all supplies and equipment and to make arrangements for contractual services, for all of the departments or divisions of the City.~~
- (J) ~~To make investigation into the affairs of the City, and any department or division thereof, and any contract, or the proper performance of any obligations of the City.~~
- (K) ~~To investigate all complaints in relation to matters concerning the administration of the City government and in regard to the service maintained by public utilities in the City.~~
- (L) ~~To exercise general supervision over all public buildings, public parks and other public property which are under the control and jurisdiction of the City Council.~~
- (M) ~~To devote his entire time to the duties of his office and the interest of the City.~~
- (N) ~~To perform such other duties and exercise such other powers as may be delegated to him from time to time by ordinance or resolution of the City Council.~~
- (O) ~~In addition to the elective officers and their respective staffs, the position of City Attorney shall be excluded from the scope of the Manager's surveillance; however, the services and facilities of said City Attorney shall be made available to the City Manager.~~

50-811. CITY MANAGER -- DUTIES. The council shall appoint a city manager to be the administrative head of the city government under the direction and supervision of such council and who shall hold office at the pleasure of the majority of the members thereof. Before entering upon the duties of his office, such city manager shall take the official oath for the support of the government and the faithful performance of his duties, and shall execute a bond in favor of the city in such sum as may be fixed by the council. He shall:

1. Have general supervision over the business of the city.
2. See that the ordinances and policies of the city are complied with and faithfully executed.
3. Attend all meetings of the council at which his attendance is required by that body.

4. Recommend for adoption to the council such measures as he may deem necessary or expedient.
5. Make the appointment of all department heads, subject to such civil service regulations as may relate thereto.
6. Prepare and submit to the council such reports as may be required by that body, or as he may deem advisable.
7. Keep the council fully advised of the financial condition of the city and its future needs.
8. Prepare and submit to the council a tentative budget for the next fiscal year.
9. Perform such other duties as the council may establish by ordinance or resolution.
10. Possess such powers as are vested in the mayor as provided in section 50-606.

~~1-7-9 ORDERS AND DIRECTIONS:~~

The City Council and its members shall deal with the administrative services of the City only through the City Manager, except for the purpose of inquiry, and neither the City Council nor any member thereof shall give orders to any subordinates of the City Manager.

It shall be the responsibility of the City Council and its members to aid and assist in an advisory capacity any department head, individually or collectively, on any phase of policy and/or public relations, such association not to conflict with the administrative duties of the City Manager.

50-808. POWERS -- DUTIES OF THE COUNCIL. The council shall have all powers delegated under general law, appoint a chief administrative officer to be known as the city manager, and confirm all appointments of department heads made by the city manager.

~~Chapter 8: CORPORATE SEAL~~

~~1-8-1: DESCRIPTION OF SEAL:~~

~~The Corporate Seal of the City of Twin Falls, Idaho, shall be circular in form, with inner and outer circles. The outer circle to be one and seven eighths inches ($1\frac{7}{8}$ ") in diameter and the inner circle one and three sixteenths inches ($1\frac{3}{16}$ ") in diameter. It shall bear in the space between the circles "City of Twin Falls, Twin Falls County, Idaho," and upon the space within the inner circle "Seal."~~

~~1-8-2: ADOPTION OF SEAL:~~

~~The Seal, the impression of which is described in Section 1-8-1 above, is adopted and declared to be the Seal of the City.~~

~~Chapter 9: INITIATIVE AND REFERENDUM~~

~~1-9-1: CREATION OF RIGHT:~~

~~The people of the City shall have the right to enact ordinances through initiative process, and to repeal ordinances through the referendum process, according to the procedures set forth in this Chapter.~~

~~1-9-2 : NUMBER OF PETITIONERS REQUIRED:~~

~~A petition to enact an ordinance by the initiative process or to repeal an ordinance by the referendum process shall be instituted by filing with the City Clerk a verified written petition requesting the~~

initiative or referendum, and there shall be attached or appended to the petition the signatures of registered electors of the City equal in number to twenty percent (20%) of the total number of registered electors registered to vote at the last general election in the City.

~~1-9-3 : TIME FOR FILING PETITIONS:~~

~~Referendum petitions with the requisite number of signatures attached shall be filed with the City Clerk not less than sixty (60) days following the final adoption of the ordinance to be subject to referendum.~~

~~1-9-4 : PETITION REQUIREMENTS, TIME LIMITS:~~

~~Referendum and initiative petitions shall conform with the requirements for signature, verification of valid petitions, printing of petitions, and time limits, except as expressly modified to meet the purposes of initiative and referendum to be as nearly as practicable as provided in sections 34-1701 through 34-1705 of the Idaho Code.~~

~~1-9-5 : ELECTION:~~

~~A special election for initiative or referendum shall be provided not more than ninety (90) days following the certification of the petition, provided that in the event a municipal election will occur within ninety (90) days, the initiative and referendum shall be submitted at the time of the Municipal election.~~

~~50-501. INITIATIVE AND REFERENDUM. The city council of each city shall provide by ordinance for direct legislation by the people through the initiative and referendum. Minimum requirements of the ordinance adopted shall be as follows:~~

- ~~(1) Petitioners for initiative or referendum shall be equal to twenty percent (20%) of the total number of electors who cast votes at the last general election in the city;~~
- ~~(2) Petitions for referendum shall be filed not less than sixty (60) days following the final adoption of the ordinance to be subject to referendum;~~
- ~~(3) A special election for initiative or referendum shall be provided as prescribed in section 34-106, Idaho Code;~~
- ~~(4) Requirements for signature, verification of valid petitions, printing of petition, and time limits, except as expressly modified herein, shall be as nearly as practicable as provided in chapter 18, title 34, Idaho Code. This section does not apply to bond elections.~~

~~This section was repealed by the 2015 legislature and Initiative and Referendum is now controlled by a new State Statute. See Idaho Code 34-1801, et seq.~~



Public Hearing: Monday, October 5, 2015

To: Honorable Mayor Hall and City Council Members

From: Jonathan Spendlove, Community Development Department

AGENDA ITEM IV-

Request: Request for **Vacation** of a 15' utility easement along westerly boundary of Lots 1, 2, 3, 4, 5 & 6 Block 1 and a 15' utility easement along easterly boundary of Lots 1, 2, 3, 4 and Tract A Block 2 of the Eldridge Commercial Subdivision located north of the intersection of Eldridge Avenue & Madrin Street c/o The Edmunds Group, LLC & Larry Fairbanks (app. 2747)

Time Estimate:

The applicant's presentation may take up to ten (10) minutes. Staff's presentation may be up to five (5) minutes.

Background:

Applicant:	Status: Owner	Size: Two 15' x 612'(+/-) easements
Edmunds Group LLC & Larry Fairbanks 961 Wildwood Way Twin Falls, ID 83301 208-539-1692 edmunds@cableone.net	Current Zoning: M-2	Requested Zoning: vacation of Utility easements within Eldridge Commercial Subdivision
	Comprehensive Plan: Commercial/Retail	Lot Count: 10 Lot
	Existing Land Use: Commercial Development under construction	Proposed Land Use: Industrial/Commercial/Retail
Representative:	Zoning Designations & Surrounding Land Use(s)	
Ken Edmunds 961 Wildwood Way Twin Falls, ID 83301 208-539-1692 edmunds@cableone.net	North: M-2, Residential/Madrin St	East: M-2, Commercial Storage
	South: M-2, Eldridge Ave/Commercial	West: M-2, Undeveloped
	Applicable Regulations: 10-1-4, 10-1-5, 10-12-1 through 4, 10-16-1 & 2	

Approval Process:

All procedures will follow the process as described in TF City Code: 10-16-1

Vacations & Dedications require a public hearing before the Planning Commission where the public and the applicant will have the opportunity to make a presentation, ask questions, or voice their concerns. The Planning Commission will make a recommendation to the City Council that the vacation be granted or it may recommend a modification to the vacation, or it may recommend that the vacation be denied.

The Council will conduct a public hearing and approve, modify or deny the vacation. Whenever public rights of way or lands are vacated, the Council shall provide adjacent property owners with a Quit Claim Deed for the vacated rights or way.

Budget Impact:

Approval of this request will have negligible impact the City budget.

Regulatory Impact:

Approval of this request will allow the applicant to proceed to the City Council with their request. Approval of this request will allow Edmunds Group, LLC and Larry Fairbanks to vacate specific utility easements within the Eldridge Commercial Subdivision.

History:

In 2008, the owner of the above stated property went through the public hearing process with the Planning and Zoning Commission, and the City Council to create the Eldridge Commercial Subdivision consisting of 10 lots and 1 tract. The plat was recorded in November 2008.

On September 9, 2015 the Planning and Zoning Commission conducted a Public Hearing. During the meeting, no public comment was heard for or against this request. The commission recommended approval of this request by unanimous vote of those in attendance.

Analysis:

This is a request to vacate portions of a utility easement within the Eldridge Commercial Subdivision. During the platting process in 2008, a utility easement was placed on the plat along the exterior boundary of the subdivision. At the time of platting this was a common practice.

Since the recordation of this plat, the common practice has been changed, no longer requiring utility easements along the exterior boundary. As no structure may be built over a recorded easement, it limits the buildable space within a lot. Current platting practices have shifted to requiring easements along street frontages to minimize intrusions to private property owners.

Staff received authorization to vacate the identified easement from each of the required utility companies. The described platted easement is potentially redundant and no longer needed.

The owners of said property are requesting the recorded easement to be vacated in order to pursue building permits that will take place.

The Engineering Department has reviewed this request and is supportive of the vacation. We have also received letters from all applicable utility companies in support of this vacation.

Staff awaits the Council decision prior to preparing a Vacation Ordinance for this request.

CONCLUSION:

Should the City Council motion to approve this request, as presented, staff recommends approval be subject to the following condition(s):

1. Subject to any and all requirements placed by applicable utility companies being met prior to publication of the Vacation Ordinance.

Attachments:

1. Vacation request – Applicant Submittal
2. Vacation Exhibit – Applicant Submittal
3. Zoning Vicinity Map
4. Utility Company Approval Letters
5. Site Pictures

Eldridge Commercial Subdivision – Easement Vacation Request

B. 1. – Street Address and Legal Description

Block 1, Lot 1 – 484 Madrin or 2053 Eldridge
Block 1, Lot 2 – 470 Madrin
Block 1, Lot 3 – 456 Madrin
Block 1, Lot 4 – 442 Madrin
Block 1, Lot 5 – 420 Madrin
Block 1, Lot 6 – 414 Madrin
Block 2, Lot 1 – 477 Madrin or 2085 Eldridge
Block 2, Lot 2 – 449 Madrin
Block 2, Lot 3 – 437 Madrin
Block 2, Lot 4 – 421 Madrin

B. 2. - Present use of all adjoining property:

North – residential
East - rental storage units
South - commercial businesses
West - vacant farm land

B. 3. - Area of proposed property to be vacated:

See attached drawing.

B. 4. - Proposed use of property to be vacated:

All permitted uses within current M-2 zoning classification.

C. 4. - Statement of reason for request and effects on adjoining properties:

- a. Reason for request – At the time of platting the subdivision, we were not aware of the easement requirements of the utility companies and provided easements on all sides of each block. The utilities are now installed and the utility companies have placed all the utilities next to the roadways. By vacation of the easement, the building setbacks can comply with the minimum requirements for fire separation. In addition, an existing building encroaches in the easement and we are not able to renovate this building because a building permit cannot be issued where a conflict exists with an easement.
- b. Effect on adjoining properties - The properties adjoining the area where the easements are being vacated are on the east and west. On the east, the land is fully developed as rental storage units and the easement has no effect on their current use. On the west, when the land is developed or subdivided, it will function the same as the Eldridge Commercial Subdivision and any easements for utilities or other uses will be in roadways. The roadway will not be adjoining Eldridge and therefore no easement will be necessary.



④ 15.00' UTILITY EASEMENT

Notes: _____

TRACT A SHALL BE OWNED AND MAINTAINED BY ALL LOT OWNERS WITHIN THIS SUBDIVISION FOR THE PURPOSE OF RETAINING STORMWATER RUNOFF.

"Sanitary restrictions as required by Idaho Code, Title 50, Chapter 13 have been reaffirmed based on the State of Idaho, Department of Environmental Quality (DEQ) approval of the design plans and specifications and the conditions imposed on the developer for continued reclamation of the sanitary restrictions. There is continued work at the time of this approval, no drinking water or sewer/septic facilities were constructed. Building construction can proceed with appropriate building permits for drinking water or sewer/septic facilities. The developer is responsible for the proper construction and operation of these facilities. The developer is responsible for obtaining and meeting the other conditions of DEQ, then 100,000 gallons may be taken or removed, in accordance with Section 50-1212, Idaho Code, by the issuance of a certificate of disapproval, and no construction of any building or shelter requiring drinking water or sewer/septic facilities shall be allowed.

Gratfield Health Department 18712

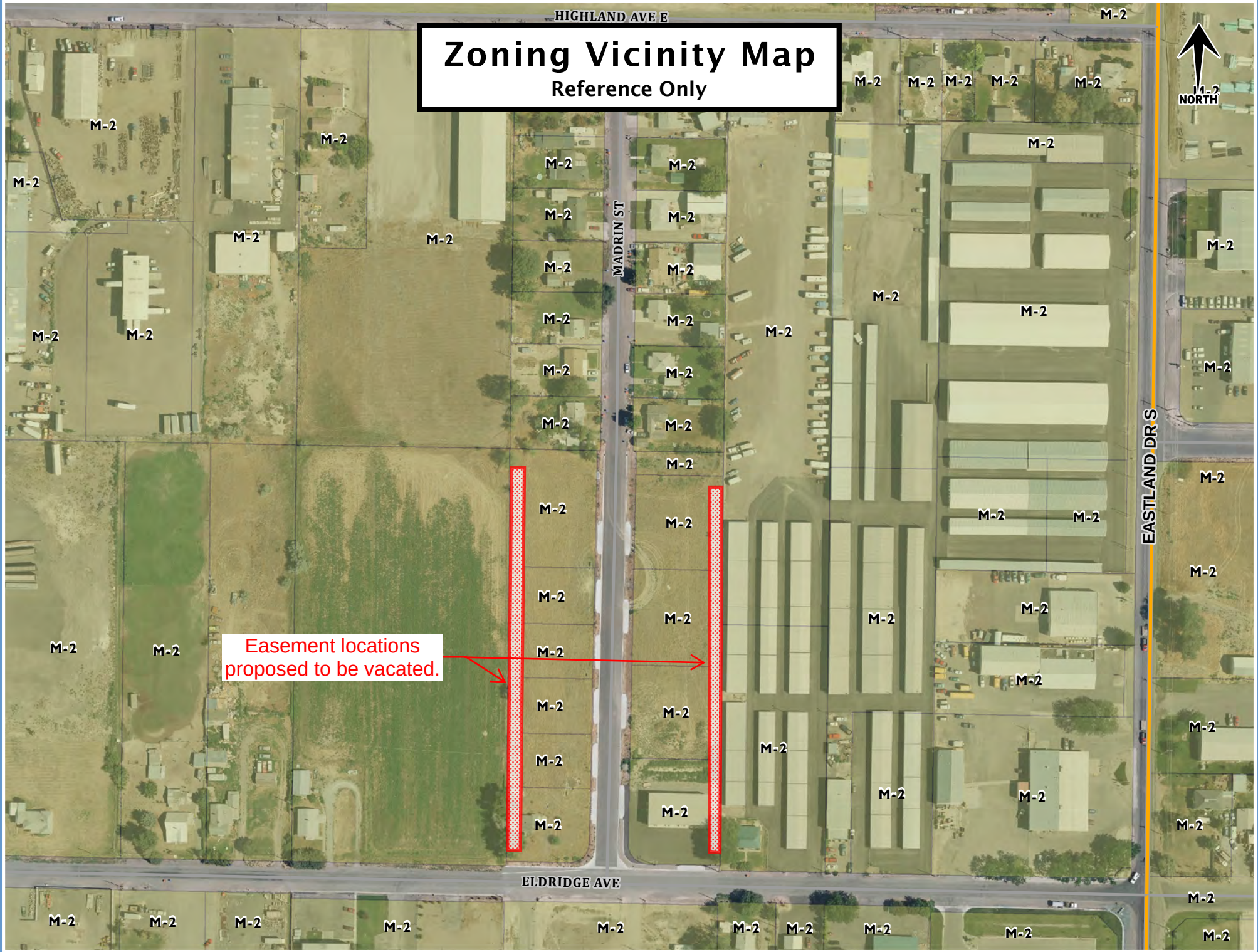
Index

Engineers, Inc.
ENGINEERS/SURVEYORS/PLANNERS

03-06 77
E 30 1 13-5
S-10 1 03

Zoning Vicinity Map

Reference Only





June 4, 2015

The Edmunds Group, LLC
961 Wildwood Way
Twin Falls, ID 83301

Re: Relinquishment of the 15' public utility easement along the rear lot lines of Eldridge Commercial Subdivision

Situated in the Northeast Quarter of Section 22, Township 10 South, Range 17 East,
Boise Meridian, Twin Falls County, Idaho.

Dear Mr. Edmunds:

This is in response to the Relinquishment Application submitted to Idaho Power Company on May 28, 2015, regarding the possible relinquishment of the 15' public utility easement along the rear lot lines of Eldridge Commercial Subdivision, as shown in Exhibit A (the "Utility Easement Area").

Idaho Power's review of the relinquishment request indicated that there are no facilities with the Utility Easement Area. As such, Idaho Power agrees to relinquish what easement rights are found within the Utility Easement Area.

Thank you once again for providing Idaho Power Company the opportunity to review and comment upon the subject petition for relinquishment.

Sincerely,

Rachael Butterworth
Associate Real Estate Specialist
Land Management and Permitting Department
(208) 388-2699
rbutterworth@idahopower.com



Watch us make you smile.

261 EASTLAND DR.
P.O. Box 1946
TWIN FALLS, ID 83301
PH: 208-733-6230
FX: 208-733-6296

August 3, 2015

RE: Eldridge Commercial Subdivision Easement Vacation Request

The Edmunds Group, L.L.C.

Mr. Ken Edmunds

961 Wildwood Way

Twin Falls, Idaho 83301

Dear Mr. Edmunds

We agree to abandon the 15' Utility Easement on the West Side of Lots 1,2,3,4,5 and 6 of Block 1 and the East side of Lots 1,2,3, and 4 of Block 2 of The Eldridge Commercial Subdivision, Excluding the South and north 15' of each easement where the easements overlap with the corresponding east/west easements, as indicated in the attached drawing.

Thank you,


Ron Burns

Cable One Construction

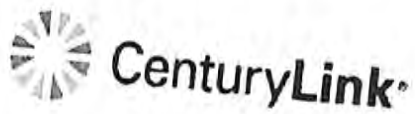
261 Eastland Dr.

P.O. Box 1946

Twin Falls, Idaho 83301

208-733-6877 Ext. 7150

208-539-9886



CenturyLink

Brad McNew
216 South Park Ave
Twin Falls, Id. 83301

Office (208) 736-8760

April 09, 2015

The Edmunds Group, LLC
961 Wildwood Way
Twin Falls, Id. 83301

RE: Vacation of 15' utility easement on the west side of Lots 1,2,3,4,5 and 6
Block 1 and the East side of Lots 1,2,3, and 4 of Block 2.
The SE4NE4, Section 22
T10S, R17E
Twin Falls County
Eldridge Commercial Subdivision

To whom it may concern, Reference is made to your request for CenturyLink to vacate the existing 15' utility easements. CenturyLink has no need to use the described access, drainage and utility easement at this time and have no plans to utilize them in the future. Based upon this we have no objections to the requested vacation of easement.

Please call me if you have any questions.

Sincerely,

Brad McNew



451 Alan Dr., Jerome, ID 83338-5505
Phone: (208) 737-6300 • (800) 548-3679
Fax: (208) 737-6342
www.intgas.com

IGC# 42-00706
Eldridge Commercial Sub

EASEMENT VACATION

Intermountain Gas Company relinquishes all rights to the following described public utility easement.

The 15' utility easement on the west side of Lots 1, 2, 3, 4, 5 and 6 of Block 1 and the 15' utility easement on the east side of Lots 1, 2, 3 and 4 of Block 2; Eldridge Commercial Subdivision located in the SE ¼ of the NE ¼ Section 22 Township 10 South, Range 17 East Boise Meridian, Twin Falls County, Idaho.

Excluding the north and south 15' of each easement where the easements overlap with corresponding east/west easements.

INTERMOUNTAIN GAS COMPANY

By: 

Name: James McMurtrey

Title: District Operations Manager

Date: 4-10-15



TWIN FALLS CANAL COMPANY

357 6TH AVE WEST
POST OFFICE BOX 326
TWIN FALLS, IDAHO 83303-0326



August 4, 2015

Ken Edmunds
The Edmunds Group, L.L.C.
961 Wildwood Way
Twin Falls, ID 83301

RE: Eldridge Commercial Subdivision easement vacation

Ken,

I have reviewed the plans for the Eldridge Commercial Subdivision. The Twin Falls Canal Company has been asked to comment on a request for the vacation of a 15 foot utility easement on the west side of lots 1,2,3,4,5, and 6, of Block 1 and the east side of lots 1,2,3, and 4 of block 2 Eldridge Commercial Subdivision. This Letter is to inform you that the Twin Falls Canal Company has no facilities in the area and therefore has no issues with the proposed vacation of the easement.

If you have any questions, please contact me at 733-6731.

Sincerely,

Jay Barlogi
Twin Falls Canal Company



Subdivision where proposed utility vacation is to take place. Looking South along Madrin Road.



Looking North along Madrin Road