

# **Appendix A**

## **Summary of Previous Studies**

**Spokane International Airport  
Airport Drive Couplet at Spotted Road Intersection Study  
Summary of Previous Studies**

Several studies have been performed that have included the Airport Drive Couplet/Spotted Road intersections. These studies have been performed either in anticipation of potential impacts of development, as a result of accident history, or were simply considered as part of a larger study or planning effort. It is appropriate to consider the findings, thought processes and recommendations of these studies, and as such, a brief summary of pertinent aspects of these studies will be discussed below.

**Spokane International Airport Technology Park Transportation Impact Analysis**

In 2004 the Transpo Group completed a Transportation Impact Analysis (TIA) to evaluate the three intersections of Spotted Road at Inbound Airport Drive, Outbound Airport Drive and US 2 upon build-out of Phase II of the 53 acre Technology Park situated between US 2 and Airport Drive east of Spotted Road. (Phase I, west of Spotted Road, was approved for development in 1997.) The study identified that the 2003 Level of Service at the two intersections of Spotted Road at Airport Drive were LOS “B” for both the AM and the PM peak hours while the intersection of Spotted Road at US 2 functioned at LOS “D” and “F” during the AM and PM peak hours.

The study year for Stage 1 of Phase II, including a 30,000 sq. ft. Entrepreneurial Center was 2005. Included in the traffic forecasts was a 1% per year background growth rate as well as seven pipeline projects:

- Airway Business Center Expansion
- Cross Pointe Rezone
- Pacific Northwest Technology Park
- Russell Heights Residential Development
- SIA Technology Park - Phase I Development
- Yokes Supermarket
- Jolt Industrial Park

These pipeline projects combined were anticipated to add 1,309 westbound trips on US 2 during the AM peak hour and 1,436 PM peak hour at the Spotted Road intersection. At Airport Drive Inbound/Spotted Road the increase in traffic was 458 trips during the AM and 156 during the PM peak hour while at the Outbound Airport Drive traffic would increase 146 in the AM and 441 in the PM peak. The Technology Park was to add 35 AM trips and 34 PM trips. The resulting 2005 LOS was projected to be “F” during AM and PM peak hours at US2/Spotted Road, “C” at Inbound Airport Drive and “B” and “E” during the AM and PM peak hours respectively at Outbound Airport Drive.

Build-out of Phase II was studied for 2018. The study recognized that the build-out scenario timeframe for the pipeline projects would more closely approximate anticipated conditions in 2018, but that the forecasts still presented a growth scenario that exceeds historical trends. The 1% percent per year

background growth rate in addition to the pipeline projects and the 746 AM trips and 704 PM peak hour trips of the full Phase II Technology Park in place was anticipated to result in 2018 LOS of “F” during AM and PM peak hours at US2/Spotted Road, “F” at Inbound Airport Drive during both peak hours and “D” and “F” during the AM and PM peak hours respectively at Outbound Airport Drive. In order to achieve acceptable LOS at the three study intersections a traffic signal warrant analysis was performed and it was determined that Warrants 1 – 3 (8-hour, 4-hour and peak hour) of the Manual of Uniform Traffic Control Devices (MUTCD) would be met by year 2018, based on the assumptions of the TIA.

Due to perceived high accident rates, this study also evaluated available collision histories from 1998 – 2002. During those 5 years there had been 12 collisions at the intersection of US/Spotted Road, with 3 of those being fatalities. The Inbound Airport Drive/Spotted Road intersection had 10 collisions and the Outbound Airport Drive/Spotted Road intersection had 25 collisions. Accident Severity Rate calculations were performed that considers fatalities and injury collisions along with the traffic volumes and rates for the 3 intersections were 0.59 at US 2, 1.91 at Inbound Airport Drive and 4.4 at Outbound Airport Drive. The Outbound Airport Drive intersection was identified as a “High Accident Location” because the rate was above the Washington Department of Transportation upper critical limit for intersections in the same category.

### **SIA Spotted Road and Airport Drive Safety Improvements Project**

This study was completed in 2006 by WH Pacific and was prompted by the collision rate and identification of Outbound Airport Drive/Spotted Road intersection as a High Accident Location in the 2004 Technology Park Study. This study relied heavily on the traffic analysis and collision summary of the previous study and focused on Short and Long-range improvements to address safety issues. A geotechnical report was also prepared to assist in evaluation of alternatives and preparation of cost estimates. An initial list and figures of 26 alternatives was developed that were combined into 5 categories for a pre-screening analysis.

- Do Nothing/Limited Changes Alternatives
- U-turn Route Alternatives
- Roundabout Alternatives
- Signalization Alternatives
- Grade Separation Alternatives

Design issue considerations were also discussed in the report and are briefly described below.

- ✓ **Couplet Considerations:** combining the inbound and outbound Airport Drive couplet in the vicinity of Spotted Road allows for a more efficient and standardized application of improvement options and would provide value to the airport by providing additional land for development.
- ✓ **Airport Access Road Considerations:** The Federal Aviation Administration’s Ground Access Planning Guide was consulted for geometric design alternatives, which states that “...burgeoning traffic demands through a critical at-grade intersection may warrant consideration of a grade-separated interchange”. The Guide also states that “Access highways to large airports should

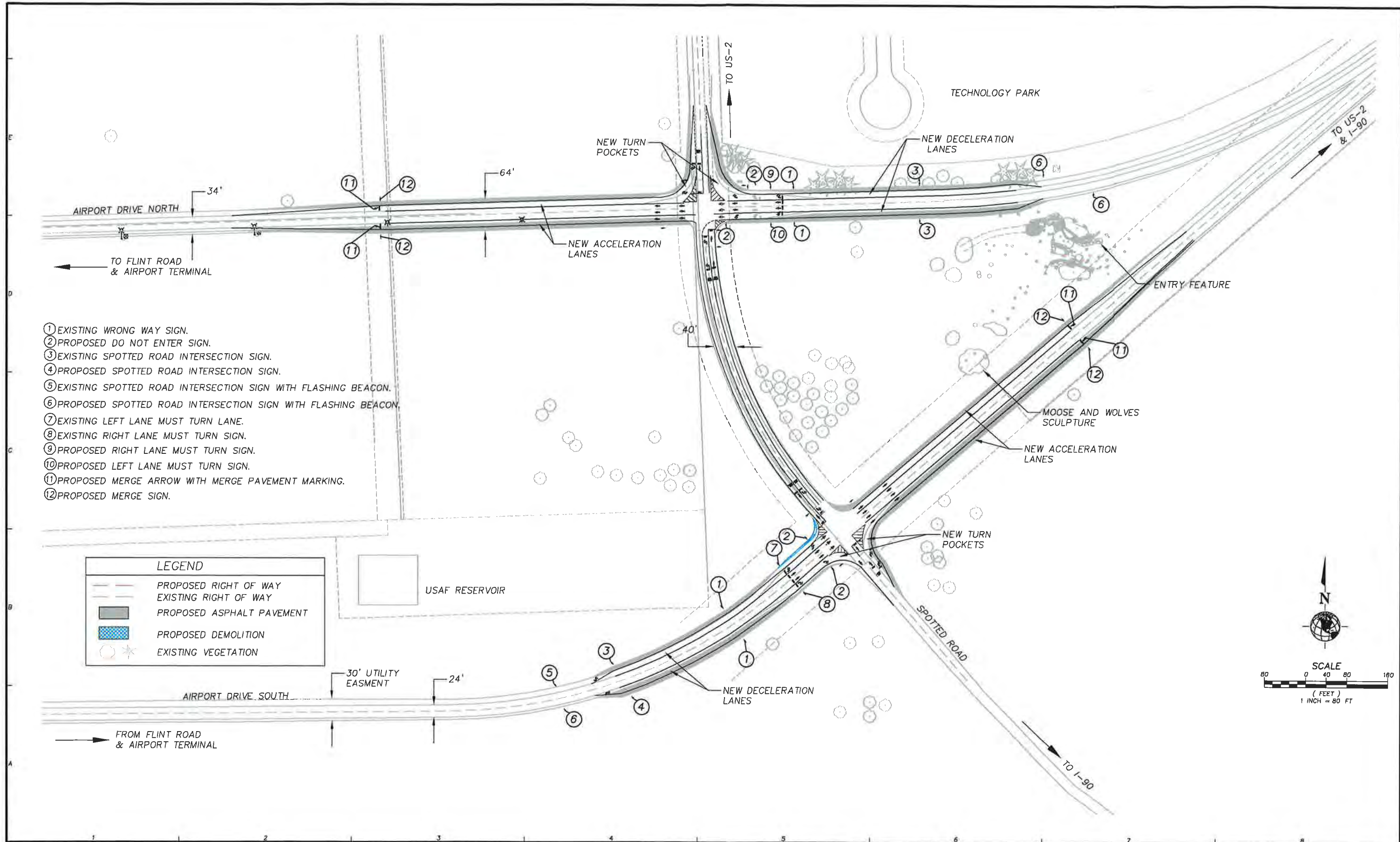
have full control of access with no crossings at grade”, and that “most airports that serve more than 2.5 million annual originating passengers are served by fully controlled access facilities.” According to the then most recent SIA Master Plan Update, it was projected that there would be more than 2.5 million enplanements in the year 2010, increasing to 3.3 million by 2020. Therefore it was indicated that the Spotted Road and Airport Drive at-grade intersections should be mitigated and a highway grade separation should be constructed.”

- ✓ **Intersection Safety Considerations:** A brief discussion of the conflicting crossing and turning movement that occur within a limited area of at-grade intersections, and that by separating the grades of intersecting roadways crashes caused by these conflicting movement can be reduced.
- ✓ **Right-of-Way Considerations:** Spotted Road currently has 80' ROW except at the intersections with Airport Drive where it becomes 100'
- ✓ **Posted Speed Limit Considerations:** A reduction in the current speed limit on Airport Drive was considered, but it was felt that because of roadway geometrics drivers would often exceed the speed limit and the desired safety level would not be achieved.
- ✓ **A Sight Distance Analysis:** This analysis was performed for the minimum WSDOT setback and for the stop bar locations for cars and trucks. It was determined that multiple evergreen trees obstructing views at the stop bar locations at Inbound Airport Drive and northbound and southbound Spotted Road. Other minor sight triangle obstructions exist for trucks at all intersection locations.

A selection matrix was prepared that ranked the alternatives for safety, mobility, development benefits, and cost. The alternatives are summarized in the table on the following page. Figures of the Short-term and Long-term recommendations are included as well.

**Summary of Short Listed Alternatives Identified in 2006 Spotted Road and Airport Drive Safety Improvements Project**

<b>Alternative</b>	<b>Description</b>	<b>Summary of Analysis</b>
Do Nothing/Limited Changes Alternative	Adds channelization, signage, painted traffic islands, turn lanes, acceleration and deceleration lanes to the current intersection.	This alternative was the recommendation for the short-term solution.
U-turn Route Alternative	Proposes the removal of Spotted Road between the Airport Drive Couplet and adds a u-turn located between the entry feature and the beginning of the couplet and a u-turn route located just west of the Geiger Reservoir.	Provides limited improvement to the safety while decreasing the function of Spotted Road at or near Airport Drive. This decrease in function is a concern given that Spotted Road is a freight mobility corridor along with the planned development along Spotted Road. Given these considerations as well as a cost greater than the Limited Changes Alternative, it was recommended that the U-Turn Alternative be dismissed as a preferred alternative.
Roundabout Alternative	Combines the Couplet and proposes a modern roundabout at a new combined Airport Drive intersection with Spotted Road.	The Roundabout Alternative would provide an increase in safety but would impede the traffic flow on Airport Drive, which is contrary to the roadway's intended function and FAA guidance. It was recommended that this alternative be dismissed as a preferred alternative.
Signalization Alternative	Combines the couplet and proposes a traffic signal at the new combined Airport Drive intersection with Spotted Road. This alternative also adds signage, raised traffic islands, turn lanes, acceleration and deceleration lanes.	The Traffic Signal Alternative would provide an increase in safety but would impede the traffic flow on Airport Drive, which is contrary to the roadway's intended function and FAA guidance. It was recommended that this alternative be dismissed as a preferred alternative.
Grade Separation Alternatives	Combines the couplet and proposes the following structures at the new combined intersection of Airport Drive and Spotted Rd: <ul style="list-style-type: none"> <li>o Single Point Urban Interchange</li> <li>o Urban Diamond Interchange</li> <li>o Partial Clover Diamond Interchange</li> </ul>	Grade separation alternatives provide the greatest efficiency, safety an dlong term solution. Based upon overall costs and impact upon surrounding properties, the Partial Clover Diamond Interchange was chosen over the Single Point Urban Interchange and the Urban Diamond Interchange.



- ① EXISTING WRONG WAY SIGN.
- ② PROPOSED DO NOT ENTER SIGN.
- ③ EXISTING SPOTTED ROAD INTERSECTION SIGN.
- ④ PROPOSED SPOTTED ROAD INTERSECTION SIGN.
- ⑤ EXISTING SPOTTED ROAD INTERSECTION SIGN WITH FLASHING BEACON.
- ⑥ PROPOSED SPOTTED ROAD INTERSECTION SIGN WITH FLASHING BEACON.
- ⑦ EXISTING LEFT LANE MUST TURN LANE.
- ⑧ EXISTING RIGHT LANE MUST TURN SIGN.
- ⑨ PROPOSED RIGHT LANE MUST TURN SIGN.
- ⑩ PROPOSED LEFT LANE MUST TURN SIGN.
- ⑪ PROPOSED MERGE ARROW WITH MERGE PAVEMENT MARKING.
- ⑫ PROPOSED MERGE SIGN.

**LEGEND**

	PROPOSED RIGHT OF WAY
	EXISTING RIGHT OF WAY
	PROPOSED ASPHALT PAVEMENT
	PROPOSED DEMOLITION
○	EXISTING VEGETATION

**SCALE**

( FEET )

1 INCH = 80 FT

DESIGNED BY: PM		CHECKED BY: NAP	
DRAWN BY: PM		APPROVED BY: MIN	
LAST EDIT: 3/2/2006		PLOT DATE: 03/24/06	
DATE	BY	REV	REVISION

**W&H  
PACIFIC**

12409 East Mirabeau Parkway  
Suite 300  
Spokane, Washington 99216  
(509) 252-0088  
(509) 252-5088 Fax  
whpacific.com

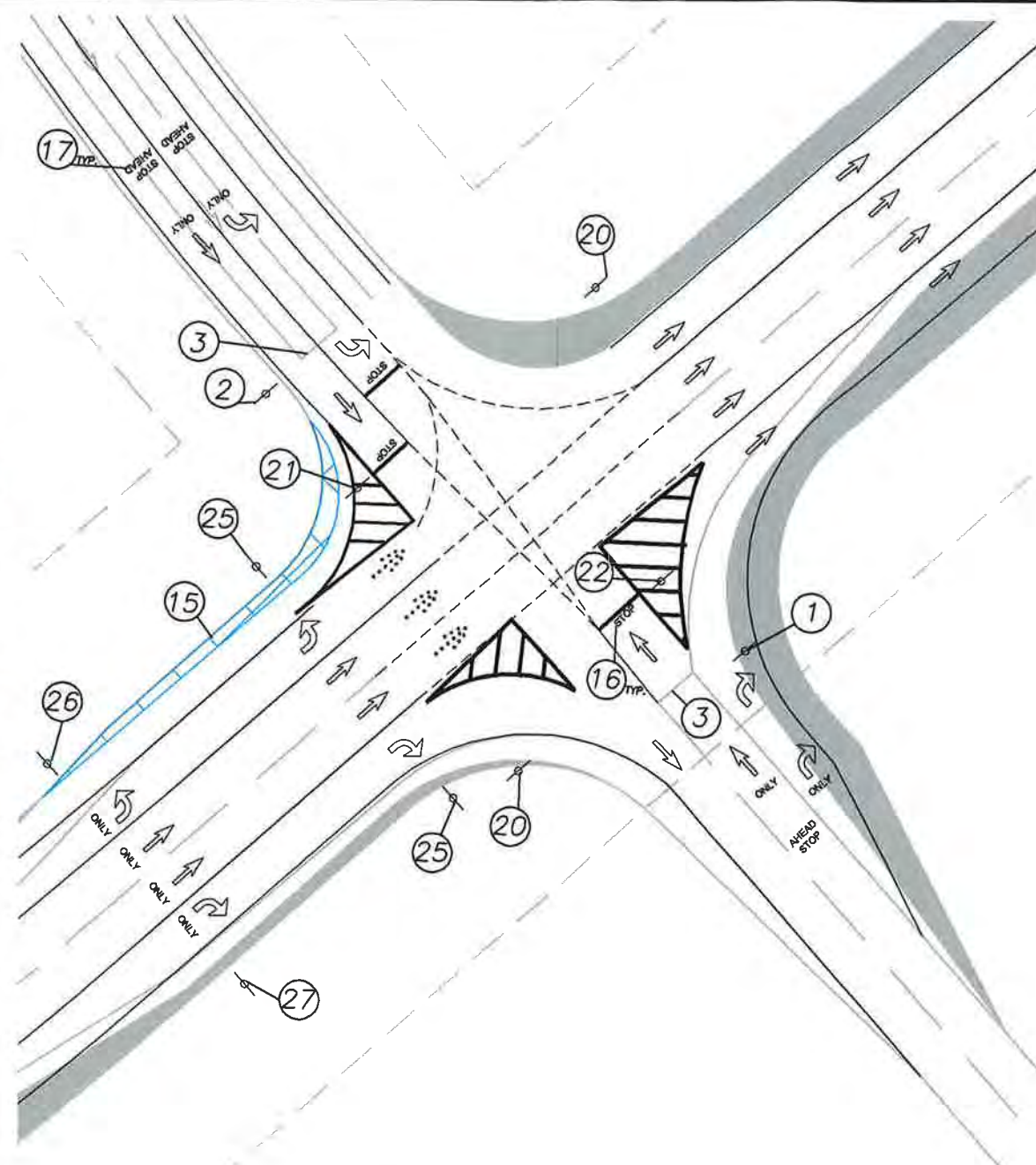
Planners • Engineers • Surveyors • Landscape Architects

PRELIMINARY

**SPOKANE INTERNATIONAL AIRPORT  
SPOTTED ROAD SAFETY IMPROVEMENT PROJECT  
LIMITED CHANGES  
FIGURE SL-1, ALTERNATIVE L-2**

<p>SPOKANE SCALE: 1"=80'</p>	<p>PROJECT NO. 33102</p>	<p>DRAWING FILE NAME: 33102-SL-1 1 OF 2 LIM.</p>
<p>WASHINGTON</p>		<p>1 SHEET 1/2</p>





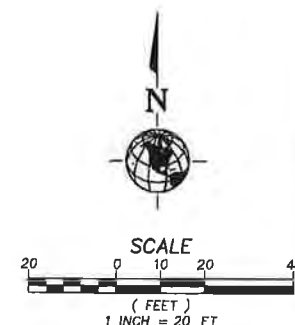
SOUTH AIRPORT DRIVE AND SPOTTED ROAD INTERSECTION

PROPOSED RIGHT OF WAY  
EXISTING RIGHT OF WAY  
PROPOSED ASPHALT PAVEMENT  
PROPOSED DEMOLITION  
EXISTING VEGETATION

<ul style="list-style-type: none"> <li>① EXISTING STOP SIGN WITH FLASHING BEACONS, ONE WAY SIGN AND PROHIBITED LEFT TURN SIGN TO BE RELOCATED.</li> <li>② EXISTING STOP SIGN WITH FLASHING BEACON, ONE WAY SIGN AND PROHIBITED RIGHT TURN SIGN TO BE RELOCATED.</li> <li>③ EXISTING STOP BAR TO BE REMOVED.</li> <li>④ PROPOSED 12" WIDE SOLID WHITE STOP BAR.</li> <li>⑤ PROPOSED PAINTED ISLAND.</li> <li>⑥ LEFT TURN—USE ARROW.</li> <li>⑦ THROUGH LANE—USE ARROW.</li> <li>⑧ RIGHT TURN—USE ARROW.</li> <li>⑨ NOT USED.</li> <li>⑩ THROUGH LANE—USE ARROW WITH ONLY PAVEMENT MARKING.</li> <li>⑪ RIGHT TURN—USE ARROW WITH ONLY PAVEMENT MARKING.</li> <li>⑫ LEFT TURN—USE ARROW WITH ONLY PAVEMENT MARKING.</li> </ul>	<ul style="list-style-type: none"> <li>⑬ PROPOSED RED RAISED REFLECTOR PAVEMENT MARKERS.</li> <li>⑭ NOT USED.</li> <li>⑮ REMOVE EXISTING SHOULDER PAVEMENT.</li> <li>⑯ PROPOSED STOP PAVEMENT MARKING.</li> <li>⑰ PROPOSED STOP AHEAD PAVEMENT MARKING.</li> <li>⑱ EXISTING DO NOT ENTER SIGN.</li> <li>⑲ EXISTING WRONG WAY SIGN.</li> <li>⑳ PROPOSED ONE WAY SIGN.</li> <li>㉑ PROPOSED STOP SIGN WITH FLASHING BEACONS ONE WAY SIGN AND PROHIBITED RIGHT TURN SIGN.</li> <li>㉒ PROPOSED STOP SIGN WITH FLASHING BEACONS ONE WAY SIGN AND PROHIBITED LEFT TURN SIGN.</li> </ul>
---	--

- ②3 PROPOSED LEFT LANE MUST TURN LEFT SIGN
- ②4 PROPOSED RIGHT LANE MUST TURN RIGHT SIGN
- ②5 PROPOSED DO NOT ENTER SIGN.
- ②6 EXISTING LEFT LANE MUST TURN LEFT SIGN.
- ②7 EXISTING RIGHT LANE MUST TURN RIGHT SIGN.

1. ALL EXISTING PAVEMENT MARKINGS AND LANE STRIPING IN CONFLICT WITH PROPOSED PAVEMENT MARKINGS AND LANE STRIPING NEEDS TO BE REMOVED.
2. THIS LIMITED ALTERNATIVE ALSO INCLUDES CHANGES IN THE SIGHT DISTANCE TRIANGLE BY PROPOSING REMOVAL OF SIGHT TRIANGLE OBSTRUCTIONS.

[illegible]

PRELIMINARY

**SPOKANE INTERNATIONAL AIRPORT  
SPOTTED ROAD SAFETY IMPROVEMENT PROJECT  
LIMITED CHANGES INTERSECTION DETAILS  
FIGURE SL-1, ALTERNATIVE L-2**

SPOKANE

SCALE: 1"=20'

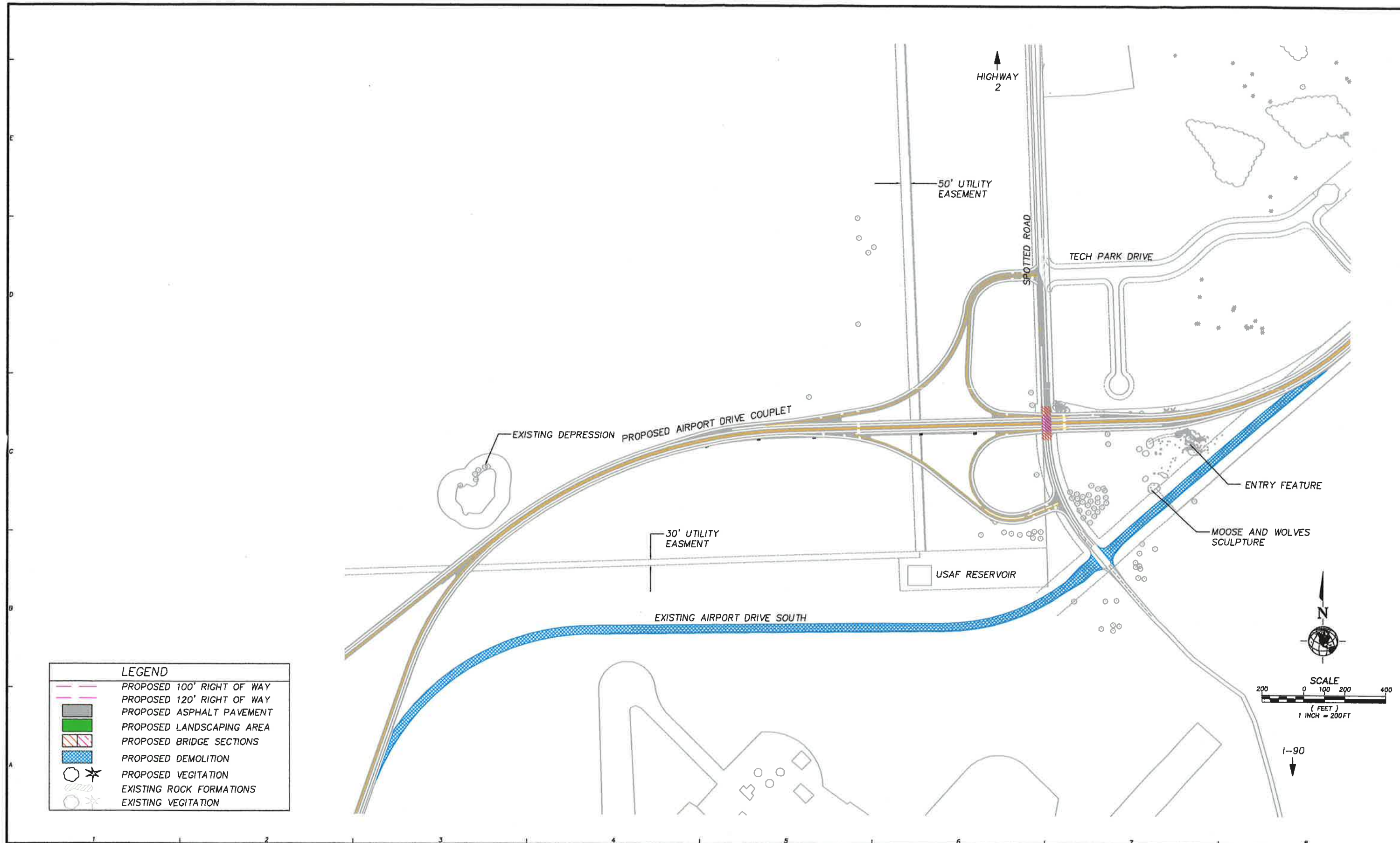
PROJECT NO.	33102
-------------	-------

DRAWING FILE NAME:  
33102-SL-1 2 OF 2 LIM.

WASHINGTON

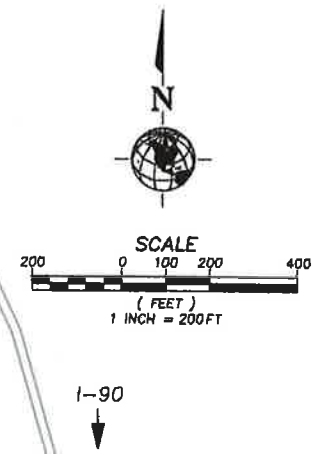
2 SHEET 2/2





**LEGEND**

	PROPOSED 100' RIGHT OF WAY
	PROPOSED 120' RIGHT OF WAY
	PROPOSED ASPHALT PAVEMENT
	PROPOSED LANDSCAPING AREA
	PROPOSED BRIDGE SECTIONS
	PROPOSED DEMOLITION
	PROPOSED VEGETATION
	EXISTING ROCK FORMATIONS
	EXISTING VEGETATION



DESIGNED BY:	<u>PM</u>	CHECKED BY:	<u>NAP</u>		
DRAWN BY:	<u>PM</u>	APPROVED BY:	<u>MIN</u>		
LAST EDIT:	<u>4/20/2006</u>	PLOT DATE:	<u>04/20/06</u>		
DATE	BY	REV#	REVISION	CK'D	APPR

**W&H**  
PACIFIC

12408 East Mirabeau Parkway  
Suite 300  
Spokane, Washington 99216  
(509) 338-5088  
(509) 338-5098 Fax  
whpacific.com

Planners • Engineers • Surveyors • Landscape Architects

**PRELIMINARY**

**SPOKANE INTERNATIONAL AIRPORT  
SPOTTED ROAD SAFETY IMPROVEMENT PROJECT  
PARTIAL CLOVER DIAMOND INTERCHANGE  
INTERCHANGE, FIGURE SL-7, ALTERNATIVE C-I-6**

SPOKANE SCALE: 1"=200'	PROJECT NO. 33102	DRAWING FILE NAME: 33102-SL-7 CLOVER	1 SHEET 1/1
---------------------------	----------------------	---	-------------



## **West Plains – Spokane International Airport Transportation Study**

In 2011 The Spokane Regional Transportation Council (SRTC) completed a 2-year process of preparing a multi-modal transportation study of the area north and west of I-90 westward to include SIA, Airway Heights and Fairchild Airforce Base and developing areas. The study was performed to address long-term transportation needs of the West Plains area and to facilitate coordination and cooperation at the local, regional and statewide levels. Several agencies participated in the study, including: SRTC, WSDOT, SIA, City of Spokane, City of Airway Heights, Spokane County, Spokane Transit Authority.

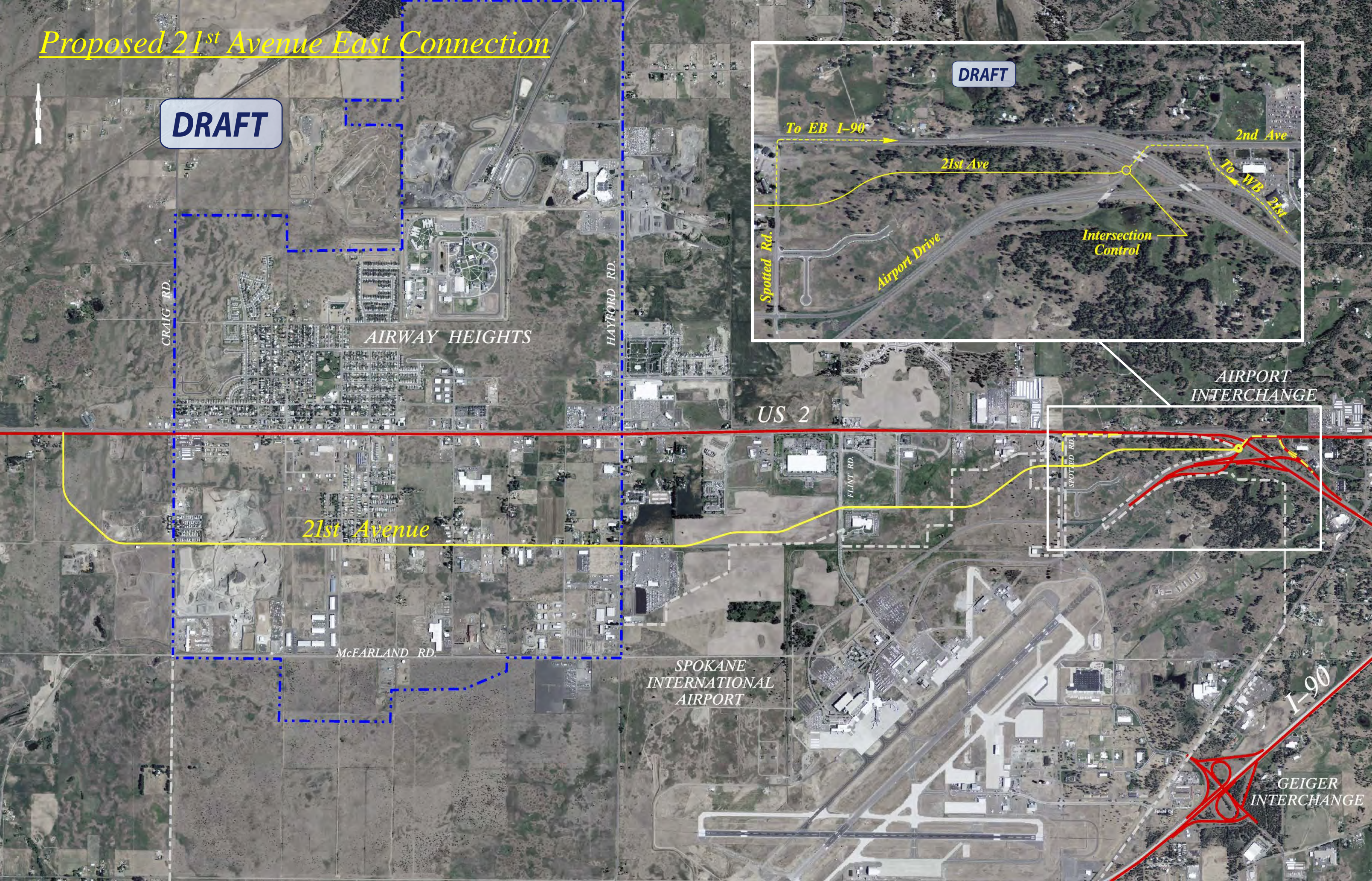
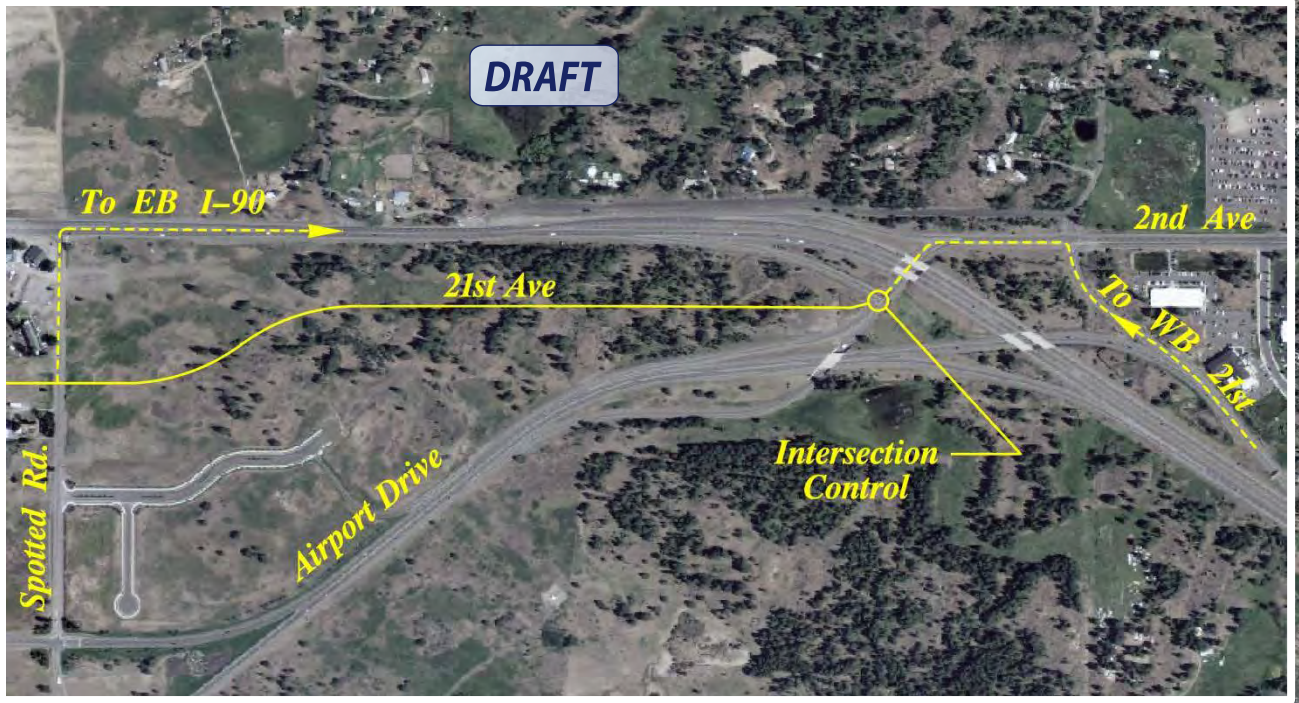
Forecasted development in the study area was significant and a considerable amount of effort was performed to review proposed development which combined would far exceed historic rates. A primary factor of the review was likelihood of development which considered official actions taken such as platting, permitting, TIA's, EIS's, property purchases and groundbreaking which increase the likelihood of actual development. This review was used to update the SRTC regional model demographics and test the benefits of several alternatives that were developed.

The study acknowledged that safety improvements would be needed as well as transit and non-motorized improvements. The public noted the lack of north-south and east-west arterial roadways in the study area. Nine alternatives were developed to address long-range solutions to congestion in the study area. Some of the 9 alternatives, although they would not provide benefits to the entire study area, were recognized to provide benefits to a specific area, such as Geiger Interchange Improvements or the Medical Lake Interchange Improvements. Other alternatives proposed widening of existing facilities or new facilities. The most effective alternative to reducing congestion was a new minor arterial connecting to and paralleling US 2 along the 21<sup>st</sup> Avenue alignment from west of the City of Airway Heights to the vicinity of the Airport Drive/US 2 interchange. The alignment of this roadway would cross Spotted Road between Inbound Airport Drive and US 2. Both a 3-lane roadway and a 5-lane roadway were evaluated. The study indicated that although the capacity provided by a 5-lane roadway was more than what is needed for the next twenty years, reserving right-of way for a 5 lane facility should be discussed amongst local transportation decision-makers. A graphic prepared by WSDOT is included on the following page.



Proposed 21<sup>st</sup> Avenue East Connection

**DRAFT**





## **Spokane International Airport Master Plan**

The Spokane International Airport recently completed a Master Plan for the Airport. The Master Plan identifies that in 2010 passenger Enplanements were nearly 1.6 million and by 2025 would rise to more than 2.6 million. The forecasted growth rate for enplanements was a 3.42% compounded annual growth rate.

The SIA Master Plan recognizes the safety issues at the Spotted Road intersections at Inbound and Outbound Airport Drive as well as at US 2. It mentions that one safety improvement being considered was the prohibition of northbound left turns from Spotted Road to westbound US 2. This would affect traffic patterns and volumes at the Spotted Road intersections at Airport Drive. The Master Plan also states that one safety improvement being considered is an overpass of Spotted Road at Airport Drive to eliminate the intersections. It was recommended that both directions of Airport Drive be co-located so that an interchange could be built with a single bridge structure instead of two.

The SIA Master Plan discusses Land Use Compatibility and the Runway Protection Zones (RPZ) and their importance for both aircraft and people and development on the ground. Areas within the Runway Protection Zones (RPZ), are to be kept as clear as possible.

## **Horizon 2040 Transportation Plan**

The Spokane Metropolitan Transportation Plan (MTP), Horizon2040, prepared by the Spokane Regional Transportation Council was adopted in 2013. A Long-Range Regional Transportation Plan is required to be prepared by each Metropolitan Transportation Planning Organization in the United States and updated every 5 years. A process is undertaken to identify both needs based transportation improvements as well as fiscally constrained improvements or those improvements that can be reasonably expected to be afforded within the available financial resources of the planning area.

The proposed 21<sup>st</sup> Avenue Minor Arterial identified in the West Plains Spokane International Airport Study is identified as a needed transportation improvement, however this project is not included in the fiscally constrained MTP.

## **Appendix B**

### **Runway Protection Zone Technical Memorandum**



## Technical Memorandum



To: SIA Traffic Study  
Technical Advisory Committee

From: Mitchell Hooper, AICP  
Mead & Hunt, Inc.  
mitchell.hooper@meadhunt.com  
(360) 771-1764

Date: August 15, 2014

Subject: *Spokane International Airport (GEG)*  
*Spokane, Washington*  
*Runway Protection Zone (RPZ) Technical Memorandum Phase I*

### Introduction

---

This memorandum is written to document and summarize existing Federal Aviation Administration (FAA) regulations pertaining to land uses within Runway Protection Zones (RPZ) and how roadway alternatives can be developed to avoid triggering an RPZ memorandum at the Spokane International Airport (GEG). Phase II, if necessary, includes the technical memorandum if the proposed road alignment requires an RPZ memorandum. It is organized into two main sections.

- *Section 1 – FAA Guidance:* Summarizes the Interim Guidance on Land Uses Within a Runway Protection Zone.
- *Section 2 – Triggering Events:* Reviews events that trigger a technical memorandum.

## Section 1 – FAA Guidance

---

The following text is from the September 27, 2012 FAA Memorandum *Interim Guidance on Land Uses within a Runway Protection Zone*:

*The Federal Aviation Administration (FAA) Office of Airports (ARP) has identified the need to clarify our policy on land uses within the Runway Protection Zone (RPZ). This memorandum presents interim policy guidance on compatible land uses within RPZs to address recurrent questions about what constitutes a compatible land use and how to evaluate proposed land uses that would reside in an RPZ. While Advisory Circular (AC) 150/5300-13 Change 17(Airport Design) notes that "it is desirable to clear all objects from the RPZ," it also acknowledges that "some uses are permitted" with conditions and other "land uses are prohibited."*

*RPZ land use compatibility also is often complicated by ownership considerations. Airport owner control over the RPZ land is emphasized to achieve the desired protection of people and property on the ground. Although the FAA recognizes that in certain situations the airport sponsor may not fully control land within the RPZ, the FAA expects airport sponsors to take all possible measures to protect against and remove or mitigate incompatible land uses.*

*ARP is developing a new guidance document for the Regional Office (RO) and Airport District Office (ADO) staff that clarifies our policy regarding land uses in the RPZ. This new guidance document will outline a comprehensive review process for existing and proposed land uses within an RPZ and is slated for publication in 2013. We also intend to incorporate RPZ land use considerations into the ongoing update to the Land Use Compatibility Advisory Circular (AC) which is slated for publication in 2014.*

There are four instances when a review of land uses within the RPZ must happen:

- An airfield project such as a runway extension or runway shift
- A change in the critical design aircraft that increases the RPZ dimensions
- New or revised instrument approach procedures that increase the RPZ dimensions
- A local development proposal, either new or reconfigured, within the RPZ

Each of these four cases require a review of the following land uses within the RPZ or those included in the new RPZ boundary:

- Buildings and structures
  - Examples include, but are not limited to: residences, schools, churches, hospitals or other medical care facilities, commercial/industrial buildings, etc.
- Recreational land use
  - Examples include, but are not limited to: golf courses, sports fields, amusement parks, other places of public assembly, etc.
- Transportation facilities; including:
  - Rail facilities: light or heavy, passenger, or freight
  - Public roads or highways
  - Vehicular parking facilities
- Fuel storage facilities, above and below ground
- Hazardous material storage, above and below ground
- Wastewater treatment facilities
- Above-ground utility infrastructure (i.e. electrical substations), including any type of solar panel installations.

## Section 2 – Triggering Events

---

The first three triggering events (runway extension or shift, new critical design aircraft, and revised instrument procedure) are not anticipated in relation to this study however they will be covered briefly in this memorandum. The first event is an airport project which changes the physical location of the RPZ; a runway extension or shift are examples as both of these project types change the RPZ location in relation to existing features beyond the runway ends. Trigger number two, a change in the critical design aircraft (the type of aircraft that the dimensions of airport safety surfaces like the RPZ are based on) also changes the RPZ size. Per FAA AC 5300-13A Change 1, *Airport Design*, Section 310, *Runway Protection Zone*, larger aircraft and aircraft capable of operating under lower visibility minimums can increase the size of the RPZ which requires a review of the land uses within the expanded RPZ. The third trigger is a change to the instrument approach procedures. Similar to a change in critical aircraft, instrument procedures with lower visibility minimums will increase the size of the RPZ.

The fourth trigger point, a local development proposal in the RPZ (either new or reconfigured), is expected to be the potential trigger at Spokane International Airport for this project. This is based on the fact that all of the land within the RPZs is owned by the airport, with the exception of transportation right-of ways in three of the four RPZs. The RPZs at GEG are shown in **Exhibit 1**.

There are roadways and right-of-ways within three of the four RPZs at GEG, the only one being completely clear is the Runway 7 RPZ. The Runway 3 RPZ includes a right-of-way for W Electric Avenue which transects the RPZ from southeast to southwest, cutting across the approach lighting system as it traverses the RPZ. This path also crosses through the “central” portion of the RPZ (that area of the RPZ created when the Runway Object Free Area is extended horizontally to the limits of the RPZ).

The Runway 21 RPZ is transected by S. Spotted Road and W. Airport Drive. S. Spotted Road cuts through the middle of the RPZ, including the central portion of the RPZ, and travels north/south across the approach lighting system. W. Airport Drive, one of two primary airport terminal access roads, enters the northern corner of the Runway 21 RPZ.

Geiger Road travels north-northeast/south-southwest through the southeast corner of the Runway 25 RPZ. Only a very small portion of the right-of-way enters the central portion of the RPZ. Interstate 90 is just to the east of the Runway 25 RPZ running parallel to Geiger Road. Interstate 90 does not enter the Runway 25 RPZ.

Modification of these roads and right-of-ways which causes the new alignment to enter the RPZ or changes the realigns the road within the RPZ will trigger a review of the land uses in the RPZ. During the alternatives analysis for any potential action, consideration should be given to options that could avoid requiring a land use review. This can be accomplished through the following actions.

The first strategy is to avoid introducing new incompatible land uses into the RPZ. By not introducing incompatible land uses into the RPZ, there is no requirement to review the land uses. Introduction of incompatible land use is unlikely within the RPZs at GEG because the Airport owns RPZ property outside of the road right-of-ways.

The second strategy is to minimize the impact of the incompatible land use in the RPZ. This can be accomplished by moving the roadway or incompatible land use to the controlled activity area of the RPZ rather than the central portion of the RPZ, moving the roadway or incompatible land use further from the runway end, or re-routing and re-siting the roadway or incompatible land use. If a roadway or incompatible land use must be introduced, there are numerous methods to minimize the impact of the roadway or incompatible land use and its effect on the RPZ and airport operations.

Finally, mitigate the risk to people and property; using alternative design options that might include tunneling, depressing the road level, or protecting the road through the RPZ. Additional alternatives might include operational actions including automated traffic controlling features such as stoplights at the limits of the RPZ. In the event an incompatible land use is required, mitigation of the risk must be considered.

While it is easy to identify instances when physical change within the RPZ will require a review of land uses, there are secondary effects by nearby changes that may not be as easily identifiable that might drive a review. For instance, near Runway 21, at the intersection of S Spotted Avenue and W Airport Drive, it could be possible to realign those roads and the intersections that are outside of the RPZ without affecting any of the roadway within the RPZ. However, if these changes were to increase the amount of traffic through the RPZ, or increase the dwell time of vehicles (the time vehicles are physically within the RPZ) within the RPZ, this increased risk may require a review of the land uses within the RPZ. This type of scenario can only be followed once the design and road alignments are complete.



Exhibit 1: Airport Vicinity Map and RPZs



## **Appendix C**

### **Traffic Counts**

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: **AIRPORT ROAD WEST**  
Station ID: **WEST OF SPOTTED**

Latitude: 0' 0.0000 South

**WESTBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	17	7	0	4	0	0	0	1	0	0	0	0	0	29
01:00	0	3	2	0	2	0	0	0	0	0	0	0	0	0	7
02:00	0	5	2	0	1	0	0	0	0	0	0	0	0	0	8
03:00	4	101	28	0	4	0	0	2	0	0	0	0	0	0	139
04:00	1	269	72	2	18	0	0	6	0	0	0	0	1	4	373
05:00	1	270	80	0	32	0	0	5	0	0	0	0	0	3	391
06:00	1	183	45	1	33	0	0	4	2	0	0	0	0	4	273
07:00	2	226	60	2	21	2	0	2	2	0	0	0	0	0	317
08:00	0	207	59	2	18	0	0	5	3	0	0	0	0	4	298
09:00	1	215	69	2	21	1	0	2	0	0	0	0	0	5	316
10:00	1	272	51	4	25	0	0	5	3	0	0	0	0	4	365
11:00	0	288	71	4	22	1	0	3	0	0	0	0	0	0	389
12 PM	1	405	98	1	24	0	0	3	1	0	0	0	0	4	537
13:00	2	296	74	2	25	0	0	3	0	0	1	0	0	2	405
14:00	1	337	85	2	23	0	0	5	0	0	0	0	0	3	456
15:00	1	259	56	1	19	0	0	8	1	0	0	0	0	1	346
16:00	0	222	59	2	19	0	0	4	0	0	0	0	0	1	307
17:00	0	189	55	3	26	0	0	1	0	0	0	0	0	3	277
18:00	0	145	31	1	15	1	0	1	1	0	0	0	0	1	196
19:00	1	70	31	1	9	1	0	0	2	0	0	0	0	0	115
20:00	0	54	9	1	1	0	0	1	0	0	0	0	0	0	66
21:00	0	104	12	1	11	0	0	0	0	0	0	0	0	1	129
22:00	0	167	46	1	14	0	0	1	0	0	0	0	0	2	231
23:00	0	137	26	0	8	1	0	0	0	0	0	0	0	1	173
Total	17	4441	1128	33	395	7	0	61	16	0	1	0	1	43	6143
Percent	0.3%	72.3%	18.4%	0.5%	6.4%	0.1%	0.0%	1.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.7%	
AM Peak Vol.	03:00	11:00	05:00	10:00	06:00	07:00		04:00	08:00				04:00	09:00	05:00
PM Peak Vol.	13:00	12:00	12:00	17:00	17:00	18:00		15:00	19:00		13:00			12:00	12:00
	4	288	80	4	33	2		6	3				1	5	391
	2	405	98	3	26	1		8	2		1			4	537

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: AIRPORT ROAD WEST  
Station ID: **EAST OF SPOTTED**

Latitude: 0' 0.0000 South

**WESTBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	13	6	0	2	0	0	0	1	0	0	0	0	1	23
01:00	0	3	1	0	2	0	0	0	0	0	0	0	0	0	6
02:00	0	4	0	0	2	0	0	0	0	0	0	0	0	1	7
03:00	3	88	28	0	11	0	0	3	0	0	0	0	0	1	134
04:00	1	233	96	2	28	0	0	2	1	0	0	0	0	1	364
05:00	1	242	87	0	39	0	0	3	0	1	0	0	0	1	374
06:00	1	167	51	2	36	1	0	2	2	0	0	0	0	1	263
07:00	3	198	66	3	31	0	0	2	3	1	0	0	0	3	310
08:00	0	182	65	3	21	0	0	3	2	0	0	0	1	5	282
09:00	1	192	64	3	22	1	0	3	0	0	0	0	0	5	291
10:00	0	230	51	4	23	0	0	3	2	1	0	0	0	1	315
11:00	0	243	85	3	22	0	0	3	0	0	0	0	0	4	360
12 PM	1	333	92	3	32	1	0	7	2	0	0	0	0	6	477
13:00	0	238	83	3	26	1	0	3	0	0	0	0	0	2	356
14:00	0	283	78	2	31	0	0	11	0	0	0	0	0	4	409
15:00	0	231	67	2	24	0	0	3	1	1	0	0	0	0	329
16:00	0	194	77	1	19	0	0	2	0	0	0	0	0	1	294
17:00	0	179	57	2	24	1	0	2	0	0	0	0	0	0	265
18:00	0	123	42	1	19	1	0	0	2	0	0	0	0	0	188
19:00	0	69	31	1	10	0	0	0	3	0	0	0	0	0	114
20:00	0	52	13	1	2	0	0	0	0	0	0	0	0	0	68
21:00	0	89	19	1	7	0	0	0	0	0	0	0	0	0	116
22:00	0	153	43	1	19	0	0	0	0	0	0	0	0	0	216
23:00	1	111	37	0	10	0	0	0	0	0	0	0	0	2	161
Total	12	3850	1239	38	462	6	0	52	19	4	0	0	1	39	5722
Percent	0.2%	67.3%	21.7%	0.7%	8.1%	0.1%	0.0%	0.9%	0.3%	0.1%	0.0%	0.0%	0.0%	0.7%	
AM Peak	03:00	11:00	04:00	10:00	05:00	06:00		03:00	07:00	05:00			08:00	08:00	05:00
Vol.	3	243	96	4	39	1		3	3	1			1	5	374
PM Peak	12:00	12:00	12:00	12:00	12:00	12:00		14:00	19:00	15:00				12:00	12:00
Vol.	1	333	92	3	32	1		11	3	1				6	477



**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: AIRPORT ROAD EAST  
Station ID: **WEST OF SPOTTED**

Latitude: 0' 0.0000 South

**EASTBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	1	118	25	0	10	0	0	0	0	0	0	0	0	0	154
01:00	0	21	3	0	1	0	0	0	0	0	0	0	0	0	25
02:00	0	3	1	0	0	0	0	0	0	0	0	0	0	0	4
03:00	0	8	0	1	1	0	0	1	0	0	0	0	0	0	11
04:00	0	71	19	1	15	2	0	1	0	0	0	0	0	0	109
05:00	0	130	31	1	24	0	0	4	2	0	0	0	0	0	192
06:00	0	70	18	0	22	0	0	3	2	0	0	0	0	0	115
07:00	0	136	34	0	21	0	0	3	3	0	0	0	1	1	199
08:00	0	165	35	0	19	0	0	1	1	0	0	0	0	0	221
09:00	1	197	39	3	19	0	0	4	1	0	0	0	0	7	271
10:00	0	244	35	2	19	1	0	3	0	0	0	0	0	0	304
11:00	1	297	46	3	26	2	0	2	1	0	0	0	0	4	382
12 PM	2	370	51	2	20	1	0	5	2	0	0	0	0	1	454
13:00	3	451	89	1	26	0	0	3	0	0	0	1	0	4	578
14:00	2	279	64	1	25	0	0	1	0	0	0	0	0	1	373
15:00	2	315	61	1	25	1	0	1	2	0	0	0	0	3	411
16:00	2	305	79	1	30	1	0	3	0	0	0	0	0	3	424
17:00	0	229	36	4	27	0	0	3	0	0	0	0	0	2	301
18:00	0	285	59	1	20	1	0	2	1	0	1	0	0	5	375
19:00	0	198	40	1	17	0	0	1	1	0	0	0	0	3	261
20:00	0	116	20	0	7	0	0	1	1	0	0	0	0	3	148
21:00	0	104	24	1	10	0	0	0	0	0	0	0	0	5	144
22:00	0	246	44	0	17	0	0	2	0	0	0	0	0	5	314
23:00	0	223	39	0	11	0	0	2	0	0	0	0	0	4	279
Total	14	4581	892	24	412	9	0	46	17	0	1	1	1	51	6049
Percent	0.2%	75.7%	14.7%	0.4%	6.8%	0.1%	0.0%	0.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.8%	
AM Peak	00:00	11:00	11:00	09:00	11:00	04:00		05:00	07:00				07:00	09:00	11:00
Vol.	1	297	46	3	26	2		4	3				1	7	382
PM Peak	13:00	13:00	13:00	17:00	16:00	12:00		12:00	12:00		18:00	13:00		18:00	13:00
Vol.	3	451	89	4	30	1		5	2		1	1		5	578

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: AIRPORT ROAD EAST  
Station ID: **EAST OF SPOTTED**

Latitude: 0' 0.0000 South

**EASTBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	86	28	0	9	0	0	1	0	0	0	0	0	0	124
01:00	0	18	6	0	1	0	0	0	0	0	0	0	0	0	25
02:00	0	4	2	0	0	0	0	0	0	0	0	0	0	0	6
03:00	0	8	1	1	1	0	0	1	0	0	0	0	0	0	12
04:00	0	56	38	1	12	1	0	1	0	0	0	0	0	0	109
05:00	0	108	38	1	20	0	0	3	2	0	0	0	0	0	172
06:00	0	61	29	1	17	0	0	1	2	0	0	0	0	0	111
07:00	0	120	42	3	19	0	0	5	2	0	0	0	0	0	191
08:00	0	129	49	2	17	0	0	2	0	1	0	0	1	1	202
09:00	3	156	68	3	13	0	0	1	1	0	0	0	0	5	250
10:00	1	175	56	1	26	1	0	2	0	0	0	0	0	5	267
11:00	0	237	87	4	27	2	0	3	2	1	0	0	1	1	365
12 PM	0	310	93	3	27	0	0	2	1	0	0	0	0	5	441
13:00	1	344	115	4	36	0	0	4	0	0	0	1	0	7	512
14:00	4	234	76	3	25	0	0	2	0	0	0	0	0	5	349
15:00	0	252	80	2	38	1	1	1	2	0	0	0	0	3	380
16:00	1	274	97	3	45	2	0	5	0	0	0	0	0	6	433
17:00	0	197	57	5	30	0	0	3	0	0	0	0	0	4	296
18:00	1	247	72	2	32	0	0	3	2	0	0	0	0	3	362
19:00	0	159	54	1	21	1	0	2	1	0	0	0	0	1	240
20:00	0	103	29	1	7	0	0	2	1	0	0	0	0	0	143
21:00	0	96	29	0	13	0	0	1	0	0	0	0	0	0	139
22:00	0	195	69	1	20	0	0	3	0	0	0	0	0	3	291
23:00	0	199	56	0	14	0	0	0	0	0	0	0	0	1	270
Total	11	3768	1271	42	470	8	1	48	16	2	0	1	2	50	5690
Percent	0.2%	66.2%	22.3%	0.7%	8.3%	0.1%	0.0%	0.8%	0.3%	0.0%	0.0%	0.0%	0.0%	0.9%	
AM Peak	09:00	11:00	11:00	11:00	11:00	11:00		07:00	05:00	08:00			08:00	09:00	11:00
Vol.	3	237	87	4	27	2		5	2	1			1	5	365
PM Peak	14:00	13:00	13:00	17:00	16:00	16:00	15:00	16:00	15:00			13:00		13:00	13:00
Vol.	4	344	115	5	45	2	1	5	2			1		7	512

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: **SPOTTED RD**  
Station ID: **NORTH OF AIRPORT RD**

Latitude: 0' 0.0000 South

**SOUTHBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	5	1	0	2	1	0	0	0	0	0	0	0	0	9
01:00	0	2	2	0	0	0	0	0	0	0	0	0	0	0	4
02:00	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
03:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
04:00	0	6	3	0	3	0	0	0	0	0	0	0	0	0	12
05:00	0	11	9	0	4	0	0	0	0	0	0	0	0	0	24
06:00	0	14	6	0	3	0	0	0	0	0	0	0	0	0	23
07:00	1	29	9	2	3	1	0	1	1	0	0	0	2	0	49
08:00	1	27	12	1	9	0	1	1	1	0	0	0	0	0	53
09:00	0	25	9	0	9	0	0	0	0	0	0	0	1	3	47
10:00	1	34	6	1	5	1	1	2	0	0	0	0	0	0	51
11:00	0	38	20	0	9	0	0	1	0	0	0	0	2	2	72
12 PM	0	54	19	0	5	1	0	1	0	0	0	0	2	0	82
13:00	1	63	16	2	13	0	0	1	1	0	0	0	2	0	99
14:00	1	59	18	0	10	1	0	1	2	0	0	0	2	2	96
15:00	0	48	16	1	7	1	0	0	0	0	0	0	1	3	77
16:00	2	47	22	1	5	0	0	1	0	0	0	0	0	1	79
17:00	0	39	14	1	2	0	0	0	0	0	0	0	0	2	58
18:00	0	32	6	2	2	0	0	0	0	0	0	0	0	0	42
19:00	0	38	6	0	1	0	0	0	0	0	0	0	0	0	45
20:00	0	30	5	0	0	1	0	0	0	0	0	0	0	0	36
21:00	0	17	6	0	3	0	0	0	0	0	0	0	0	0	26
22:00	0	17	3	0	1	0	0	0	0	0	0	0	0	0	21
23:00	0	10	2	0	3	1	0	0	0	0	0	0	0	0	16
Total	7	653	210	11	99	8	2	9	5	0	0	0	12	13	1029
Percent	0.7%	63.5%	20.4%	1.1%	9.6%	0.8%	0.2%	0.9%	0.5%	0.0%	0.0%	0.0%	1.2%	1.3%	
AM Peak	07:00	11:00	11:00	07:00	08:00	00:00	08:00	10:00	07:00				07:00	09:00	11:00
Vol.	1	38	20	2	9	1	1	2	1				2	3	72
PM Peak	16:00	13:00	16:00	13:00	13:00	12:00		12:00	14:00				12:00	15:00	13:00
Vol.	2	63	22	2	13	1		1	2				2	3	99

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: SPOTTED RD  
Station ID: NORTH OF AIRPORT RD

Latitude: 0' 0.0000 South

**NORTHBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	5	1	0	2	0	0	0	0	0	0	0	0	0	8
01:00	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
04:00	0	13	2	3	4	0	0	0	1	0	0	0	0	0	23
05:00	0	14	6	0	5	0	0	0	0	0	0	0	0	0	25
06:00	0	15	9	0	4	1	0	0	0	0	0	0	0	0	29
07:00	0	18	13	1	6	0	0	0	1	0	0	0	0	1	40
08:00	0	32	7	1	2	0	0	0	0	2	0	0	0	0	44
09:00	0	29	12	1	9	0	0	0	1	2	0	0	0	5	59
10:00	0	41	17	1	4	2	0	1	0	1	0	0	0	1	68
11:00	2	35	14	0	6	1	1	0	0	1	0	0	0	3	63
12 PM	0	62	21	0	10	0	0	1	1	2	0	0	0	1	98
13:00	0	54	20	1	10	0	0	1	0	3	0	0	0	0	89
14:00	0	41	16	0	9	0	0	0	0	0	0	0	0	1	67
15:00	0	42	16	1	6	2	0	1	0	0	0	0	0	1	69
16:00	1	38	25	0	9	0	0	0	0	0	0	0	0	1	74
17:00	0	37	14	1	5	0	0	1	0	2	0	0	0	2	62
18:00	0	33	9	0	3	0	0	0	0	0	0	0	0	0	45
19:00	0	35	12	0	4	1	0	0	0	0	0	0	0	0	52
20:00	0	18	2	0	0	2	0	0	0	0	0	0	0	0	22
21:00	0	16	4	0	0	0	0	0	0	0	0	0	0	0	20
22:00	0	18	3	0	1	0	0	0	0	0	0	0	0	0	22
23:00	0	12	0	0	3	0	0	0	0	0	0	0	0	0	15
Total	3	610	223	10	102	9	1	5	5	13	0	0	0	16	997
Percent	0.3%	61.2%	22.4%	1.0%	10.2%	0.9%	0.1%	0.5%	0.5%	1.3%	0.0%	0.0%	0.0%	1.6%	
AM Peak	11:00	10:00	10:00	04:00	09:00	10:00	11:00	10:00	03:00	08:00				09:00	10:00
Vol.	2	41	17	3	9	2	1	1	1	2				5	68
PM Peak	16:00	12:00	16:00	13:00	12:00	15:00		12:00	12:00	13:00				17:00	12:00
Vol.	1	62	25	1	10	2		1	1	3				2	98



**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: **SPOTTED RD**  
Station ID: **AIRPORT-AIRPORT**

Latitude: 0' 0.0000 South

**SOUTHBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	1	5	1	0	1	1	0	0	0	0	0	0	0	0	9
01:00	0	2	2	0	0	0	0	0	0	0	0	0	0	0	4
02:00	0	5	0	0	0	0	0	0	0	0	0	0	0	0	5
03:00	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
04:00	2	7	3	0	0	0	0	0	0	0	0	0	0	1	13
05:00	0	19	12	0	2	0	0	0	0	0	0	0	0	1	34
06:00	0	24	6	0	3	0	0	1	0	0	0	0	0	2	36
07:00	3	34	15	2	6	0	1	1	2	1	0	0	1	4	70
08:00	1	33	14	1	7	0	1	1	0	0	0	0	0	3	61
09:00	2	30	8	0	8	0	1	0	0	0	0	0	0	1	50
10:00	1	23	7	1	3	1	1	1	0	1	0	0	0	1	40
11:00	2	40	24	0	8	0	1	1	0	0	0	0	2	1	79
12 PM	1	44	17	0	7	1	2	1	0	0	0	0	1	0	74
13:00	1	53	20	2	13	0	0	3	1	0	0	0	2	9	104
14:00	3	52	25	0	9	1	1	1	2	0	0	0	1	5	100
15:00	2	48	20	1	8	0	0	1	0	1	0	0	1	4	86
16:00	2	51	23	2	9	1	0	1	0	0	0	0	0	0	89
17:00	1	53	14	1	2	1	0	0	0	0	0	0	0	1	73
18:00	0	31	9	2	4	1	0	0	0	0	0	0	0	2	49
19:00	0	41	11	0	1	0	0	0	1	0	0	0	0	0	54
20:00	1	28	9	0	0	1	0	0	0	0	0	0	0	3	42
21:00	0	21	7	0	2	0	0	0	0	0	0	0	0	0	30
22:00	0	16	2	0	1	0	0	0	0	0	0	0	0	0	19
23:00	1	10	1	0	2	1	0	0	0	0	0	0	0	2	17
Total	24	673	250	12	96	9	8	12	6	3	0	0	8	40	1141
Percent	2.1%	59.0%	21.9%	1.1%	8.4%	0.8%	0.7%	1.1%	0.5%	0.3%	0.0%	0.0%	0.7%	3.5%	
AM Peak Vol.	07:00	11:00	11:00	07:00	09:00	00:00	07:00	06:00	07:00	07:00			11:00	07:00	11:00
PM Peak Vol.	14:00	13:00	14:00	13:00	13:00	12:00	12:00	13:00	14:00	15:00			13:00	13:00	13:00
	3	40	24	2	8	1	1	1	2	1			2	4	79
	3	53	25	2	13	1	2	3	2	1			2	9	104

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: SPOTTED RD  
Station ID: **AIRPORT-AIRPORT**

Latitude: 0' 0.0000 South

**NORTHBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	9	0	0	3	0	0	0	0	0	0	0	0	0	12
01:00	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2
03:00	1	6	2	0	0	0	0	0	1	0	0	0	0	1	11
04:00	0	29	3	3	6	0	0	0	1	0	0	0	0	1	43
05:00	0	31	10	0	7	0	0	0	0	0	0	0	0	0	48
06:00	0	33	10	0	7	1	0	0	1	0	0	0	0	0	52
07:00	0	33	14	1	8	0	0	0	1	0	0	0	0	2	59
08:00	0	47	12	1	4	0	0	1	0	2	0	0	0	0	67
09:00	0	51	16	1	13	0	0	0	1	2	0	0	0	3	87
10:00	0	75	20	1	9	2	0	1	0	1	0	0	0	2	111
11:00	2	69	10	2	7	2	0	1	0	1	0	0	1	2	97
12 PM	1	102	22	0	10	0	0	1	1	3	0	0	0	3	143
13:00	0	99	20	1	15	0	0	2	0	1	0	0	0	5	143
14:00	3	81	16	1	9	0	0	0	1	0	0	0	0	3	114
15:00	1	63	17	2	9	3	0	1	0	0	0	0	0	3	99
16:00	1	54	26	2	11	0	0	1	0	0	0	0	0	2	97
17:00	0	54	17	2	12	0	0	1	0	2	0	0	0	1	89
18:00	1	45	9	1	2	0	0	0	0	0	0	0	0	1	59
19:00	0	43	12	1	3	1	0	0	1	0	0	0	0	2	63
20:00	0	21	3	0	0	2	0	0	0	0	0	0	0	0	26
21:00	0	28	5	0	3	0	0	0	0	0	0	0	0	1	37
22:00	0	25	5	0	4	0	0	0	0	0	0	0	0	0	34
23:00	0	18	4	0	4	0	0	0	0	0	0	0	0	0	26
Total Percent	10 0.7%	1018 66.9%	254 16.7%	19 1.2%	147 9.7%	11 0.7%	0 0.0%	9 0.6%	8 0.5%	12 0.8%	0 0.0%	0 0.0%	1 0.1%	33 2.2%	1522
AM Peak	11:00	10:00	10:00	04:00	09:00	10:00		08:00	03:00	08:00			11:00	09:00	10:00
Vol.	2	75	20	3	13	2		1	1	2			1	3	111
PM Peak	14:00	12:00	16:00	15:00	13:00	15:00		13:00	12:00	12:00				13:00	12:00
Vol.	3	102	26	2	15	3		2	1	3				5	143

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: **SPOTTED RD**  
Station ID: **SOUTH OF AIRPORT RD**

Latitude: 0' 0.0000 South

**SOUTHBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	1	10	6	0	2	1	0	0	0	0	0	0	0	0	20
01:00	0	3	2	0	0	0	0	0	0	0	0	0	0	0	5
02:00	0	6	0	0	0	0	0	0	0	0	0	0	0	0	6
03:00	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
04:00	0	11	7	0	2	0	0	0	0	0	0	0	0	0	20
05:00	0	27	19	0	6	0	0	0	0	0	0	0	0	1	53
06:00	0	29	13	0	6	0	0	0	0	0	0	0	0	0	48
07:00	1	35	16	2	7	0	1	1	1	1	0	0	0	8	73
08:00	1	42	17	1	6	1	0	2	0	0	0	0	1	0	71
09:00	0	38	17	0	13	0	0	0	0	0	0	0	0	6	74
10:00	1	44	9	3	6	1	0	1	0	0	0	0	1	5	71
11:00	1	45	18	1	13	0	0	1	0	0	0	0	3	3	85
12 PM	2	53	23	0	5	2	1	2	0	0	0	0	1	3	92
13:00	1	69	31	2	12	0	1	3	0	0	0	0	0	9	128
14:00	2	72	32	0	13	1	1	1	2	0	0	0	1	1	126
15:00	1	63	25	1	9	0	0	1	0	1	0	0	1	0	102
16:00	2	50	30	2	7	1	0	3	0	0	0	0	0	3	98
17:00	1	60	16	1	0	0	1	0	0	0	0	0	0	0	79
18:00	0	48	12	3	3	0	0	0	0	0	0	0	0	0	66
19:00	0	52	10	0	1	0	0	0	0	0	0	0	1	0	64
20:00	0	44	9	0	0	1	0	0	0	0	0	0	0	2	56
21:00	0	21	8	1	3	0	0	0	0	0	0	0	0	0	33
22:00	0	26	7	0	4	0	0	0	0	0	0	0	0	0	37
23:00	0	12	2	0	1	1	0	0	0	0	0	0	0	1	17
Total	14	864	329	17	119	9	5	15	3	2	0	0	9	42	1428
Percent	1.0%	60.5%	23.0%	1.2%	8.3%	0.6%	0.4%	1.1%	0.2%	0.1%	0.0%	0.0%	0.6%	2.9%	
AM Peak	00:00	11:00	05:00	10:00	09:00	00:00	07:00	08:00	07:00	07:00			11:00	07:00	11:00
Vol.	1	45	19	3	13	1	1	2	1	1			3	8	85
PM Peak	12:00	14:00	14:00	18:00	14:00	12:00	12:00	13:00	14:00	15:00			12:00	13:00	13:00
Vol.	2	72	32	3	13	2	1	3	2	1			1	9	128

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: **SPOTTED RD**  
Station ID: **SOUTH OF AIRPORT RD**

Latitude: 0' 0.0000 South

**NORTHBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	8	0	0	2	0	0	0	0	0	0	0	0	0	10
01:00	0	2	2	0	0	0	0	0	0	0	0	0	0	0	4
02:00	0	2	1	0	1	0	0	0	0	0	0	0	0	0	4
03:00	2	8	2	0	0	1	0	0	0	0	0	0	0	0	13
04:00	1	35	3	3	3	1	0	0	0	0	0	0	0	1	47
05:00	0	36	8	0	4	0	0	0	0	0	0	0	0	1	49
06:00	0	33	12	0	5	1	0	0	1	0	0	0	0	1	53
07:00	0	30	14	1	9	0	0	0	0	0	0	0	0	2	56
08:00	3	42	15	1	2	1	0	0	1	2	0	0	0	1	68
09:00	1	44	20	0	9	1	0	0	1	2	0	0	0	3	81
10:00	2	64	25	1	9	4	1	0	0	0	0	0	0	2	108
11:00	2	48	11	1	8	2	0	1	3	1	0	0	0	6	83
12 PM	1	88	28	0	7	0	0	0	0	3	0	0	0	3	130
13:00	2	73	18	1	10	1	0	3	0	1	0	0	0	13	122
14:00	4	82	23	1	6	1	0	0	0	0	0	0	0	1	118
15:00	0	62	19	2	10	2	1	1	0	0	0	0	0	5	102
16:00	2	58	28	2	10	1	0	1	0	0	1	0	0	2	105
17:00	0	57	22	1	9	0	0	1	0	2	0	0	0	1	93
18:00	0	49	11	1	5	0	0	0	0	0	0	0	0	2	68
19:00	1	37	13	1	2	3	0	0	0	0	0	0	0	0	57
20:00	0	23	5	0	0	2	0	0	0	0	0	0	0	0	30
21:00	0	26	5	0	3	0	0	0	0	0	0	0	0	0	34
22:00	0	20	7	0	3	0	0	0	0	0	0	0	0	0	30
23:00	0	10	4	0	2	0	0	0	0	0	0	0	0	0	16
Total	21	937	296	16	119	21	2	7	6	11	1	0	0	44	1481
Percent	1.4%	63.3%	20.0%	1.1%	8.0%	1.4%	0.1%	0.5%	0.4%	0.7%	0.1%	0.0%	0.0%	3.0%	
AM Peak	08:00	10:00	10:00	04:00	07:00	10:00	10:00	11:00	11:00	08:00				11:00	10:00
Vol.	3	64	25	3	9	4	1	1	3	2				6	108
PM Peak	14:00	12:00	12:00	15:00	13:00	19:00	15:00	13:00		12:00	16:00			13:00	12:00
Vol.	4	88	28	2	10	3	1	3		3	1			13	130

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: **US-2 EASTBOUND**  
Station ID: RUSSELL-SPOTTED

Latitude: 0' 0.0000 South

**EASTBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	72	57	0	15	0	0	3	2	0	0	0	0	10	159
01:00	1	63	31	1	11	0	0	0	1	0	0	0	0	3	111
02:00	0	36	32	1	4	0	0	3	0	0	0	0	0	2	78
03:00	1	43	31	1	6	0	0	2	0	0	0	0	0	3	87
04:00	1	59	34	1	14	0	0	2	6	0	0	0	0	3	120
05:00	0	97	62	4	33	0	0	10	5	0	0	0	1	11	223
06:00	3	213	127	7	82	5	1	20	7	3	0	0	4	19	491
07:00	5	327	215	16	108	2	3	44	4	6	0	0	3	65	798
08:00	2	236	243	13	93	8	2	36	13	3	0	1	6	67	723
09:00	2	223	202	14	105	0	1	31	6	3	1	0	3	62	653
10:00	3	190	226	22	115	2	4	39	4	4	0	0	4	99	712
11:00	2	187	242	24	103	2	2	25	7	0	1	0	3	162	760
12 PM	6	218	252	23	149	3	2	30	4	8	0	0	3	193	891
13:00	5	210	282	21	124	6	2	49	4	3	1	0	3	179	889
14:00	5	273	408	24	157	3	1	63	7	4	0	2	1	245	1193
15:00	11	251	315	30	186	4	0	67	8	7	1	0	1	334	1215
16:00	8	369	464	25	210	2	0	78	5	2	6	3	0	315	1487
17:00	8	320	429	17	164	1	0	47	4	2	0	0	0	165	1157
18:00	4	218	311	6	112	2	0	30	4	1	1	0	0	96	785
19:00	0	188	246	5	70	2	0	23	2	0	0	1	0	72	609
20:00	0	201	210	1	69	0	0	11	2	0	0	0	0	24	518
21:00	1	146	168	1	42	0	0	12	3	0	0	0	0	26	399
22:00	2	128	159	5	28	0	0	2	0	0	0	0	0	16	340
23:00	3	132	129	4	30	0	0	8	2	0	0	1	0	9	318
Total	73	4400	4875	266	2030	42	18	635	100	46	11	8	32	2180	14716
Percent	0.5%	29.9%	33.1%	1.8%	13.8%	0.3%	0.1%	4.3%	0.7%	0.3%	0.1%	0.1%	0.2%	14.8%	
AM Peak Vol.	07:00	07:00	08:00	11:00	10:00	08:00	10:00	07:00	08:00	07:00	09:00	08:00	08:00	11:00	07:00
PM Peak Vol.	15:00	16:00	16:00	15:00	16:00	13:00	12:00	16:00	15:00	12:00	16:00	16:00	12:00	15:00	16:00
	11	369	464	30	210	6	2	78	8	8	6	3	3	334	1487



**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: **US-2 WESTBOUND**  
Station ID: RUSSELL-SPOTTED

Latitude: 0' 0.0000 South

**WESTBOUND**

Start Time	Bikes	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Not Classe	Total
05/08/14	0	90	15	0	5	0	0	2	2	1	0	0	0	3	118
01:00	1	55	8	0	1	0	0	2	2	0	0	0	0	3	72
02:00	0	36	7	1	0	0	0	0	1	0	0	0	0	1	46
03:00	1	44	8	0	2	1	0	0	2	0	0	1	0	2	61
04:00	1	104	38	1	9	0	0	5	1	0	0	0	0	5	164
05:00	8	425	125	7	48	1	1	12	0	0	0	0	0	34	661
06:00	7	553	181	10	72	5	0	29	4	0	1	2	2	47	913
07:00	5	720	188	10	95	7	0	32	7	1	0	1	3	65	1134
08:00	5	576	199	11	77	9	1	28	6	1	2	1	3	60	979
09:00	4	390	157	13	78	10	0	30	5	1	2	0	4	59	753
10:00	3	476	158	14	57	11	1	16	6	3	1	0	2	66	814
11:00	2	490	175	11	59	10	1	23	5	2	0	1	3	75	857
12 PM	2	566	164	16	61	3	0	24	6	2	1	1	5	80	931
13:00	5	509	132	16	57	8	0	28	6	4	1	1	1	124	892
14:00	3	571	182	11	45	2	1	22	4	4	1	0	1	119	966
15:00	3	597	145	9	53	3	1	25	3	1	3	0	2	116	961
16:00	3	671	202	16	52	3	0	19	4	1	1	1	2	149	1124
17:00	5	794	196	7	46	6	0	15	0	4	1	0	2	151	1227
18:00	4	527	118	5	26	0	0	15	1	1	2	0	1	83	783
19:00	0	385	93	4	30	1	0	12	2	0	0	0	1	59	587
20:00	0	353	93	0	29	0	0	7	1	1	0	0	1	24	509
21:00	1	327	77	1	17	3	0	4	2	1	1	0	0	13	447
22:00	0	200	48	1	9	1	0	1	3	0	0	0	0	7	270
23:00	2	155	32	0	5	1	0	2	2	0	0	0	0	2	201
Total	65	9614	2741	164	933	85	6	353	75	28	17	9	33	1347	15470
Percent	0.4%	62.1%	17.7%	1.1%	6.0%	0.5%	0.0%	2.3%	0.5%	0.2%	0.1%	0.1%	0.2%	8.7%	
AM Peak	05:00	07:00	08:00	10:00	07:00	10:00	05:00	07:00	07:00	10:00	08:00	06:00	09:00	11:00	07:00
Vol.	8	720	199	14	95	11	1	32	7	3	2	2	4	75	1134
PM Peak	13:00	17:00	16:00	12:00	12:00	13:00	14:00	13:00	12:00	13:00	15:00	12:00	12:00	17:00	17:00
Vol.	5	794	202	16	61	8	1	28	6	4	3	1	5	151	1227



**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: AIRPORT ROAD WEST  
Station ID: EAST OF SPOTTED

Latitude: 0' 0.0000 South

**WESTBOUND**

Start	1	36	41	46	51	56	61	66	71	76	81	86	91	96		Pace	Number
Time	35	40	45	50	55	60	65	70	75	80	85	90	95	999	Total	Speed	in Pace
05/08/14	3	1	3	9	7	0	0	0	0	0	0	0	0	0	23	46-55	10
01:00	0	0	2	2	2	0	0	0	0	0	0	0	0	0	6	44-53	4
02:00	1	0	1	0	3	2	0	0	0	0	0	0	0	0	7	51-60	3
03:00	1	0	5	18	76	26	8	0	0	0	0	0	0	0	134	49-58	97
04:00	2	6	40	131	137	42	5	1	0	0	0	0	0	0	364	46-55	236
05:00	1	1	19	100	<b>180</b>	<b>58</b>	<b>12</b>	1	<b>2</b>	0	0	0	0	0	<b>374</b>	48-57	260
06:00	0	2	14	84	105	45	10	1	2	0	0	0	0	0	263	47-56	174
07:00	2	4	22	109	139	31	2	1	0	0	0	0	0	0	310	47-56	216
08:00	5	6	13	102	135	20	1	0	0	0	0	0	0	0	282	47-56	196
09:00	<b>7</b>	2	39	110	113	16	4	0	0	0	0	0	0	0	291	46-55	188
10:00	0	<b>7</b>	49	113	123	22	1	0	0	0	0	0	0	0	315	46-55	209
11:00	5	7	<b>60</b>	<b>152</b>	115	19	1	1	0	0	0	0	0	0	360	45-54	233
12 PM	<b>8</b>	8	<b>64</b>	<b>217</b>	<b>147</b>	<b>27</b>	5	<b>1</b>	0	0	0	0	0	0	<b>477</b>	45-54	314
13:00	1	6	56	150	123	17	2	1	0	0	0	0	0	0	356	45-54	244
14:00	3	1	46	186	143	23	<b>6</b>	0	<b>1</b>	0	0	0	0	0	409	45-54	292
15:00	1	9	48	131	115	23	2	0	0	0	0	0	0	0	329	45-54	215
16:00	1	4	37	124	98	26	4	0	0	0	0	0	0	0	294	45-54	198
17:00	1	4	32	96	99	27	6	0	0	0	0	0	0	0	265	46-55	173
18:00	0	3	26	72	72	11	4	0	0	0	0	0	0	0	188	46-55	128
19:00	2	4	18	51	28	8	3	0	0	0	0	0	0	0	114	44-53	68
20:00	1	3	12	27	23	2	0	0	0	0	0	0	0	0	68	45-54	42
21:00	1	9	29	38	35	3	1	0	0	0	0	0	0	0	116	44-53	62
22:00	2	<b>14</b>	49	76	66	7	2	0	0	0	0	0	0	0	216	45-54	120
23:00	4	14	31	54	46	12	0	0	0	0	0	0	0	0	161	45-54	79
Total	52	115	715	2152	2130	467	79	7	5	0	0	0	0	0	5722		
Percent	0.9%	2.0%	12.5%	37.6%	37.2%	8.2%	1.4%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	09:00	10:00	11:00	11:00	05:00	05:00	05:00	04:00	05:00						05:00		
Vol.	7	7	60	152	180	58	12	1	2						374		
PM Peak	12:00	22:00	12:00	12:00	12:00	12:00	14:00	12:00	14:00						12:00		
Vol.	8	14	64	217	147	27	6	1	1						477		

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: AIRPORT ROAD EAST  
Station ID: WEST OF SPOTTED

Latitude: 0' 0.0000 South

**EASTBOUND**

Start	1	36	41	46	51	56	61	66	71	76	81	86	91	96		Pace	Number
Time	35	40	45	50	55	60	65	70	75	80	85	90	95	999	Total	Speed	in Pace
05/08/14	0	5	34	83	29	1	2	0	0	0	0	0	0	0	154	43-52	110
01:00	0	0	5	8	10	2	0	0	0	0	0	0	0	0	25	45-54	17
02:00	0	1	3	0	0	0	0	0	0	0	0	0	0	0	4	36-45	3
03:00	0	1	4	4	1	1	0	0	0	0	0	0	0	0	11	42-51	6
04:00	0	4	23	56	23	2	1	0	0	0	0	0	0	0	109	43-52	75
05:00	1	10	38	114	28	1	0	0	0	0	0	0	0	0	192	43-52	135
06:00	1	6	30	54	20	4	0	0	0	0	0	0	0	0	115	43-52	73
07:00	2	3	43	97	47	6	1	0	0	0	0	0	0	0	199	44-53	136
08:00	1	11	58	121	26	4	0	0	0	0	0	0	0	0	221	42-51	154
09:00	8	9	68	143	38	5	0	0	0	0	0	0	0	0	271	43-52	176
10:00	2	10	93	151	42	6	0	0	0	0	0	0	0	0	304	42-51	212
11:00	5	13	87	199	68	9	1	0	0	0	0	0	0	0	382	43-52	256
12 PM	1	9	99	248	85	11	1	0	0	0	0	0	0	0	454	43-52	330
13:00	6	15	140	304	99	12	2	0	0	0	0	0	0	0	578	43-52	400
14:00	3	6	54	222	80	6	2	0	0	0	0	0	0	0	373	44-53	279
15:00	4	8	66	224	102	6	1	0	0	0	0	0	0	0	411	44-53	295
16:00	3	14	94	212	95	6	0	0	0	0	0	0	0	0	424	43-52	287
17:00	3	7	61	150	67	11	1	0	1	0	0	0	0	0	301	44-53	202
18:00	4	4	55	197	101	13	1	0	0	0	0	0	0	0	375	45-54	267
19:00	4	4	56	127	59	9	2	0	0	0	0	0	0	0	261	44-53	173
20:00	5	2	23	72	40	5	1	0	0	0	0	0	0	0	148	45-54	94
21:00	5	2	23	70	41	1	2	0	0	0	0	0	0	0	144	44-53	93
22:00	5	8	75	160	59	7	0	0	0	0	0	0	0	0	314	43-52	211
23:00	13	15	66	137	45	3	0	0	0	0	0	0	0	0	279	43-52	161
Total	76	167	1298	3153	1205	131	18	0	1	0	0	0	0	0	6049		
Percent	1.3%	2.8%	21.5%	52.1%	19.9%	2.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	09:00	11:00	10:00	11:00	11:00	11:00	00:00								11:00		
Vol.	8	13	93	199	68	9	2								382		
PM Peak	23:00	13:00	13:00	13:00	15:00	18:00	13:00		17:00						13:00		
Vol.	13	15	140	304	102	13	2		1						578		

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: AIRPORT ROAD EAST  
Station ID: EAST OF SPOTTED

Latitude: 0' 0.0000 South

**EASTBOUND**

Start	1	36	41	46	51	56	61	66	71	76	81	86	91	96		Pace	Number
Time	35	40	45	50	55	60	65	70	75	80	85	90	95	999	Total	Speed	in Pace
05/08/14	1	5	7	45	50	12	4	0	0	0	0	0	0	0	124	46-55	79
01:00	0	1	1	5	12	4	1	1	0	0	0	0	0	0	25	48-57	16
02:00	0	0	2	4	0	0	0	0	0	0	0	0	0	0	6	43-52	5
03:00	0	1	3	6	0	2	0	0	0	0	0	0	0	0	12	42-51	7
04:00	1	2	10	37	41	16	2	0	0	0	0	0	0	0	109	47-56	68
05:00	1	5	14	56	79	15	2	0	0	0	0	0	0	0	172	47-56	116
06:00	3	4	10	32	48	9	3	<b>2</b>	0	0	0	0	0	0	111	47-56	65
07:00	0	2	13	56	78	36	<b>5</b>	1	0	0	0	0	0	0	191	47-56	125
08:00	3	5	20	72	82	16	3	1	0	0	0	0	0	0	202	46-55	130
09:00	<b>8</b>	4	<b>30</b>	78	102	25	2	1	0	0	0	0	0	0	250	46-55	148
10:00	6	2	23	84	122	28	2	0	0	0	0	0	0	0	267	47-56	176
11:00	3	<b>11</b>	29	<b>115</b>	<b>157</b>	<b>45</b>	5	0	0	0	0	0	0	0	<b>365</b>	47-56	234
12 PM	5	5	37	126	201	<b>58</b>	8	<b>1</b>	0	0	0	0	0	0	441	47-56	290
13:00	<b>13</b>	9	<b>74</b>	<b>196</b>	159	52	7	1	0	<b>1</b>	0	0	0	0	<b>512</b>	45-54	300
14:00	5	6	32	121	141	37	7	0	0	0	0	0	0	0	349	46-55	224
15:00	7	2	27	110	177	53	4	0	0	0	0	0	0	0	380	47-56	252
16:00	11	<b>14</b>	35	123	<b>202</b>	42	5	1	0	0	0	0	0	0	433	47-56	267
17:00	6	9	30	82	123	41	4	1	0	0	0	0	0	0	296	47-56	174
18:00	4	6	27	93	164	53	<b>14</b>	1	0	0	0	0	0	0	362	47-56	229
19:00	1	1	20	77	101	35	4	1	0	0	0	0	0	0	240	47-56	162
20:00	0	4	13	47	60	17	2	0	0	0	0	0	0	0	143	46-55	94
21:00	1	2	14	35	63	18	5	1	0	0	0	0	0	0	139	47-56	88
22:00	3	7	25	116	107	30	3	0	0	0	0	0	0	0	291	46-55	190
23:00	1	9	40	107	88	24	1	0	0	0	0	0	0	0	270	45-54	170
Total	83	116	536	1823	2357	668	93	13	0	1	0	0	0	0	5690		
Percent	1.5%	2.0%	9.4%	32.0%	41.4%	11.7%	1.6%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	09:00	11:00	09:00	11:00	11:00	11:00	07:00	06:00							11:00		
Vol.	8	11	30	115	157	45	5	2							365		
PM Peak	13:00	16:00	13:00	13:00	16:00	12:00	18:00	12:00		13:00					13:00		
Vol.	13	14	74	196	202	58	14	1		1					512		

Latitude: 0' 0.0000 South

[illegible]



Latitude: 0' 0.0000 South

[illegible]

Latitude: 0' 0.0000 South

[illegible]

Latitude: 0' 0.0000 South

[illegible]

Latitude: 0' 0.0000 South

[illegible]

Latitude: 0' 0.0000 South

[illegible]

**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: US-2 EASTBOUND  
Station ID: RUSSELL-SPOTTED

Latitude: 0' 0.0000 South

**EASTBOUND**

Start	1	36	41	46	51	56	61	66	71	76	81	86	91	96		Pace	Number
Time	35	40	45	50	55	60	65	70	75	80	85	90	95	999	Total	Speed	in Pace
05/08/14	9	0	0	5	22	61	49	10	2	1	0	0	0	0	159	55-64	88
01:00	3	1	2	5	19	38	31	8	4	0	0	0	0	0	111	55-64	60
02:00	2	1	0	5	21	23	24	1	1	0	0	0	0	0	78	54-63	42
03:00	2	0	1	3	12	34	26	6	2	0	1	0	0	0	87	55-64	52
04:00	2	0	0	3	14	46	34	19	2	0	0	0	0	0	120	56-65	71
05:00	9	0	3	5	17	63	87	31	6	1	0	1	0	0	223	57-66	125
06:00	16	0	0	6	32	156	209	64	7	1	0	0	0	0	491	57-66	308
07:00	55	1	3	9	52	231	333	95	17	2	0	0	0	0	798	57-66	435
08:00	66	1	1	14	58	212	275	90	5	1	0	0	0	0	723	57-66	357
09:00	58	0	4	13	110	219	186	58	5	0	0	0	0	0	653	55-64	305
10:00	96	0	3	32	98	227	201	50	5	0	0	0	0	0	712	55-64	288
11:00	158	0	3	13	109	190	223	54	9	1	0	0	0	0	760	56-65	242
12 PM	188	0	5	19	110	249	210	93	16	1	0	0	0	0	891	55-64	270
13:00	175	2	1	41	149	233	205	67	14	1	0	0	1	0	889	55-64	269
14:00	238	1	6	43	166	329	305	95	8	2	0	0	0	0	1193	55-64	379
15:00	329	1	5	34	158	286	276	110	14	1	1	0	0	0	1215	14-23	325
16:00	306	0	4	19	127	371	444	181	33	2	0	0	0	0	1487	57-66	480
17:00	162	0	0	9	59	289	347	223	61	7	0	0	0	0	1157	58-67	438
18:00	94	2	3	9	54	198	278	123	22	2	0	0	0	0	785	57-66	335
19:00	70	0	4	8	70	180	165	92	18	2	0	0	0	0	609	56-65	244
20:00	23	1	3	7	70	134	186	78	15	1	0	0	0	0	518	57-66	268
21:00	26	1	3	22	45	119	129	45	9	0	0	0	0	0	399	56-65	193
22:00	16	0	3	8	34	101	121	48	7	2	0	0	0	0	340	57-66	182
23:00	9	0	3	10	49	103	95	45	3	1	0	0	0	0	318	56-65	172
Total	2112	12	60	342	1655	4092	4439	1686	285	29	2	1	1	0	14716		
Percent	14.4%	0.1%	0.4%	2.3%	11.2%	27.8%	30.2%	11.5%	1.9%	0.2%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	01:00	09:00	10:00	09:00	07:00	07:00	07:00	07:00	07:00	03:00	05:00			07:00		
Vol.	158	1	4	32	110	231	333	95	17	2	1	1			798		
PM Peak	15:00	13:00	14:00	14:00	14:00	16:00	16:00	17:00	17:00	17:00	15:00		13:00		16:00		
Vol.	329	2	6	43	166	371	444	223	61	7	1		1		1487		



**JUB Engineers, Inc.**  
**422 W Riverside Suite 304**  
**Spokane WA 99201**  
**(509)458-3727**

Site Code: US-2 WESTBOUND  
Station ID: RUSSELL-SPOTTED

Latitude: 0' 0.0000 South

WESTBOUND

Start	1	36	41	46	51	56	61	66	71	76	81	86	91	96		Pace	Number
Time	35	40	45	50	55	60	65	70	75	80	85	90	95	999	Total	Speed	in Pace
05/08/14	5	0	6	22	44	31	8	2	0	0	0	0	0	0	118	49-58	64
01:00	4	0	4	11	34	14	5	0	0	0	0	0	0	0	72	49-58	40
02:00	1	1	3	8	22	11	0	0	0	0	0	0	0	0	46	49-58	29
03:00	2	1	2	11	23	17	4	1	0	0	0	0	0	0	61	49-58	34
04:00	3	0	1	13	61	63	21	2	0	0	0	0	0	0	164	51-60	108
05:00	33	1	2	7	186	314	101	14	3	0	0	0	0	0	661	52-61	409
06:00	41	3	3	18	240	443	144	18	3	0	0	0	0	0	913	53-62	570
07:00	58	2	2	52	355	515	143	7	0	0	0	0	0	0	1134	52-61	699
08:00	53	2	12	79	405	344	78	6	0	0	0	0	0	0	979	51-60	587
09:00	54	0	10	92	296	236	61	4	0	0	0	0	0	0	753	50-59	406
10:00	60	1	3	103	343	245	55	4	0	0	0	0	0	0	814	50-59	449
11:00	71	0	9	123	336	264	48	6	0	0	0	0	0	0	857	50-59	450
12 PM	75	1	12	117	397	276	48	5	0	0	0	0	0	0	931	50-59	506
13:00	124	0	15	89	336	274	49	5	0	0	0	0	0	0	892	50-59	399
14:00	115	1	16	97	381	291	59	5	0	1	0	0	0	0	966	50-59	459
15:00	116	5	10	80	368	330	51	1	0	0	0	0	0	0	961	51-60	468
16:00	146	1	16	115	389	353	95	8	1	0	0	0	0	0	1124	51-60	497
17:00	146	0	15	104	381	477	97	6	0	1	0	0	0	0	1227	51-60	584
18:00	81	3	4	102	299	238	53	3	0	0	0	0	0	0	783	50-59	382
19:00	58	2	7	51	236	202	27	4	0	0	0	0	0	0	587	51-60	308
20:00	25	1	14	61	217	168	22	1	0	0	0	0	0	0	509	50-59	308
21:00	13	3	13	58	188	157	13	2	0	0	0	0	0	0	447	50-59	288
22:00	7	0	8	40	128	74	13	0	0	0	0	0	0	0	270	50-59	176
23:00	2	0	2	17	98	68	14	0	0	0	0	0	0	0	201	50-59	146
Total	1293	28	189	1470	5763	5405	1209	104	7	2	0	0	0	0	15470		
Percent	8.4%	0.2%	1.2%	9.5%	37.3%	34.9%	7.8%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	06:00	08:00	11:00	08:00	07:00	06:00	06:00	05:00						07:00		
Vol.	71	3	12	123	405	515	144	18	3						1134		
PM Peak	16:00	15:00	14:00	12:00	12:00	17:00	17:00	16:00	16:00	14:00					17:00		
Vol.	146	5	16	117	397	477	97	8	1	1					1227		

422 W Riverside Suite 304  
Spokane WA 99201  
(509)458-3727

File Name : Airport Road Westbound and Spotted  
Site Code : 00000000  
Start Date : 5/15/2014  
Page No : 1

**Groups Printed- Unshifted - Bank 1**

[illegible]

# JUB ENGINEERS INC.

422 W Riverside Suite 304

Spokane WA 99201

**(509)458-3727**

File Name : Airport Road Westbound and Spotted

Site Code : 00000000

Start Date : 5/15/2014

Page No : 1

**Groups Printed- Unshifted - Bank 1**

[illegible]

422 W Riverside Suite 304  
Spokane WA 99201  
(509)458-3727

File Name : Airport Road Eastbound and Spotted  
Site Code : 00000000  
Start Date : 5/15/2014  
Page No : 1

**Groups Printed- Unshifted - Bank 1**

[illegible]

# JUB ENGINEERS INC.

422 W Riverside Suite 304

Spokane WA 99201

**(509)458-3727**

File Name : Airport Road Eastbound and Spotted

Site Code : 00000000

Start Date : 5/15/2014

Page No : 1

**Groups Printed- Unshifted - Bank 1**

[illegible]

422 W Riverside Suite 304  
Spokane WA 99201  
(509)458-3727

File Name : Spotted and US-2  
Site Code : 00000000  
Start Date : 5/13/2014  
Page No : 1

Groups Printed- Unshifted - Bank 1

[illegible]

422 W Riverside Suite 304  
Spokane WA 99201  
(509)458-3727

File Name : Spotted and US-2  
Site Code : 00000000  
Start Date : 5/13/2014  
Page No : 1

**Groups Printed- Unshifted - Bank 1**

[illegible]



# JUB ENGINEERS INC.

422 W Riverside Suite 304

Spokane WA 99201

**(509)458-3727**

File Name : Airport Road Westbound and Flint

Site Code : 00000000

Start Date : 5/13/2014

Page No : 1

**Groups Printed- Unshifted - Bank 1**

[illegible]

# JUB ENGINEERS INC.

422 W Riverside Suite 304

Spokane WA 99201

**(509)458-3727**

File Name : Airport Road Westbound and Flint

Site Code : 00000000

Start Date : 5/13/2014

Page No : 1

**Groups Printed- Unshifted - Bank 1**

[illegible]

## **Appendix D**

### **Level of Service Worksheets**

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery		Intersection	US 2/Spotted				
Agency/Co.	JUB ENGINEERS		Jurisdiction	WSDOT				
Date Performed	8/27/2014		Analysis Year	2014				
Analysis Time Period	Mid-day Peak							
Project Description Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: US 2			North/South Street: Spotted Road					
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)		795	105	25	890			
Peak-Hour Factor, PHF	1.00	0.92	0.92	0.88	0.88	1.00		
Hourly Flow Rate, HFR (veh/h)	0	864	114	28	1011	0		
Percent Heavy Vehicles	0	--	--	4	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	2	1	1	2	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	80		20					
Peak-Hour Factor, PHF	0.82	1.00	0.82	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	97	0	24	0	0	0		
Percent Heavy Vehicles	2	0	0	0	0	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		28		121				
C (m) (veh/h)		689		284				
v/c		0.04		0.43				
95% queue length		0.13		2.03				
Control Delay (s/veh)		10.4		26.8				
LOS		B		D				
Approach Delay (s/veh)	--	--	26.8					
Approach LOS	--	--	D					

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 8/27/2014 6:24 PM

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Montgomery			Intersection	US 2/Spotted			
Agency/Co.	JUB ENGINEERS			Jurisdiction	WSDOT			
Date Performed	8/27/2014			Analysis Year	2014			
Analysis Time Period	PM Peak							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: US 2				North/South Street: Spotted Road				
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)		1400	85	15	1110			
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.94	0.94	1.00		
Hourly Flow Rate, HFR (veh/h)	0	1473	89	15	1180	0		
Percent Heavy Vehicles	0	—	—	4	—	—		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	2	1	1	2	0		
Configuration		T	R	L	T			
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	55		15					
Peak-Hour Factor, PHF	0.74	1.00	0.74	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	74	0	20	0	0	0		
Percent Heavy Vehicles	2	0	0	0	0	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		15		94				
C (m) (veh/h)		410		156				
v/c		0.04		0.60				
95% queue length		0.11		3.21				
Control Delay (s/veh)		14.1		58.0				
LOS		B		F				
Approach Delay (s/veh)	—	—	58.0					
Approach LOS	—	—	F					

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 8/27/2014 6:28 PM



TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery		Intersection	Inbound/Spotted				
Agency/Co.	JUB ENGINEERS		Jurisdiction	SIA				
Date Performed	8/27/2014		Analysis Year	2014				
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Inbound Airport Drive			North/South Street: Spotted Road					
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)				5	490	5		
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.88	0.88	0.88		
Hourly Flow Rate, HFR (veh/h)	0	0	0	5	556	5		
Percent Heavy Vehicles	0	--	--	4	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	0	0	1	2	1		
Configuration				L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	35	85			90	35		
Peak-Hour Factor, PHF	0.82	0.82	0.74	1.00	0.96			
Hourly Flow Rate, HFR (veh/h)	42	103	0	0	93	35		
Percent Heavy Vehicles	2	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	1	0		
Configuration	LT					TR		
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	LT					TR
v (veh/h)		5	145					128
C (m) (veh/h)		1610	449					493
v/c		0.00	0.32					0.26
95% queue length		0.01	1.38					1.03
Control Delay (s/veh)		7.2	16.8					14.8
LOS		A	C					B
Approach Delay (s/veh)	--	--	16.8			14.8		
Approach LOS	--	--	C			B		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 8/28/2014 8:47 AM

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Montgomery			Intersection	Inbound/Spotted			
Agency/Co.	JUB ENGINEERS			Jurisdiction	SIA			
Date Performed	8/27/2014			Analysis Year	2014			
Analysis Time Period	PM Peak							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Inbound Airport Drive				North/South Street: Spotted Road				
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)				25	270	5		
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.86	0.86	0.86		
Hourly Flow Rate, HFR (veh/h)	0	0	0	29	313	5		
Percent Heavy Vehicles	0	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	0	0	1	2	1		
Configuration				L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	40	85			75	15		
Peak-Hour Factor, PHF	0.85	0.85	0.74	1.00	0.97	0.97		
Hourly Flow Rate, HFR (veh/h)	47	99	0	0	77	15		
Percent Heavy Vehicles	2	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	1	0		
Configuration	LT					TR		
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	LT					TR
v (veh/h)		29	146					92
C (m) (veh/h)		1610	566					589
v/c		0.02	0.26					0.16
95% queue length		0.06	1.02					0.55
Control Delay (s/veh)		7.3	13.6					12.2
LOS		A	B					B
Approach Delay (s/veh)	—	—	13.6			12.2		
Approach LOS	—	—	B			B		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 8/28/2014 8:49 AM

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery	Intersection	Outbound/Spotted					
Agency/Co.	JUB ENGINEERS	Jurisdiction	SIA					
Date Performed	8/27/2014	Analysis Year	2014					
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Outbound Airport Drive			North/South Street: Spotted Road					
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)	30	495	40					
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.94	0.94	1.00		
Hourly Flow Rate, HFR (veh/h)	33	556	44	0	0	0		
Percent Heavy Vehicles	2	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	1	0	0	0		
Configuration	L	T	R					
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)		90	10	5	90			
Peak-Hour Factor, PHF	0.74	0.96	0.96	0.69	0.69	1.00		
Hourly Flow Rate, HFR (veh/h)	0	93	10	7	130	0		
Percent Heavy Vehicles	2	2	2	2	2	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound		Southbound			
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L				TR	LT		
v (veh/h)	33				103	137		
C (m) (veh/h)	1623				414	375		
w/c	0.02				0.25	0.37		
95% queue length	0.06				0.97	1.64		
Control Delay (s/veh)	7.3				16.6	20.0		
LOS	A				C	C		
Approach Delay (s/veh)	—	—	16.6		20.0			
Approach LOS	—	—	C		C			

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 8/27/2014 6:47 PM

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery		Intersection	Outbound/Spotted				
Agency/Co.	JUB ENGINEERS		Jurisdiction	SIA				
Date Performed	8/27/2014		Analysis Year	2014				
Analysis Time Period	PM Peak							
Project Description Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Outbound Airport Drive			North/South Street: Spotted Road					
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)	30	500	25					
Peak-Hour Factor, PHF	0.83	0.83	0.83	0.94	0.94	1.00		
Hourly Flow Rate, HFR (veh/h)	36	602	30	0	0	0		
Percent Heavy Vehicles	2	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	1	0	0	0		
Configuration	L	T	R					
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)		95	25	20	80			
Peak-Hour Factor, PHF	0.74	0.92	0.92	0.89	0.89	1.00		
Hourly Flow Rate, HFR (veh/h)	0	103	27	22	89	0		
Percent Heavy Vehicles	2	2	2	2	2	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L				TR	LT		
v (veh/h)	36				130	111		
C (m) (veh/h)	1623				411	362		
w/c	0.02				0.32	0.31		
95% queue length	0.07				1.34	1.27		
Control Delay (s/veh)	7.3				17.8	19.3		
LOS	A				C	C		
Approach Delay (s/veh)	—	—	17.8			19.3		
Approach LOS	—	—	C			C		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 8/27/2014 6:46 PM



TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery	Intersection	Inbound/Flint					
Agency/Co.	JUB ENGINEERS	Jurisdiction	SIA					
Date Performed	8/27/2014	Analysis Year	2014					
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Inbound Airport Drive			North/South Street: Flint Road					
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)				105	450	5		
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	0	0	0	116	500	5		
Percent Heavy Vehicles	0	--	--	4	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	0	0	1	2	1		
Configuration				L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	35	30			20	30		
Peak-Hour Factor, PHF	0.66	0.66	0.74	1.00	0.82	0.82		
Hourly Flow Rate, HFR (veh/h)	53	45	0	0	24	36		
Percent Heavy Vehicles	2	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	1	0		
Configuration	LT					TR		
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	LT					TR
v (veh/h)		116	98					60
C (m) (veh/h)		1610	367					504
v/c		0.07	0.27					0.12
95% queue length		0.23	1.06					0.40
Control Delay (s/veh)		7.4	18.3					13.1
LOS		A	C					B
Approach Delay (s/veh)	--	--	18.3			13.1		
Approach LOS	--	--	C			B		

TWO-WAY STOP CONTROL SUMMARY							
General Information			Site Information				
Analyst	Montgomery	Intersection	Inbound/Flint				
Agency/Co.	JUB ENGINEERS	Jurisdiction	SIA				
Date Performed	8/27/2014	Analysis Year	2014				
Analysis Time Period	PM Peak						
Project Description: Airport Drive Couplet at Spotted Road Intersection Study							
East/West Street: Inbound Airport Drive		North/South Street: Flint Road					
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)				10	220	10	
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.96	0.96	0.96	
Hourly Flow Rate, HFR (veh/h)	0	0	0	10	229	10	
Percent Heavy Vehicles	0	—	—	4	—	—	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	0	0	1	2	1	
Configuration				L	T	R	
Upstream Signal		0			0		
Minor Street	Northbound			Southbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	30	30		30	15		
Peak-Hour Factor, PHF	0.74	0.74	0.74	1.00	0.72	0.72	
Hourly Flow Rate, HFR (veh/h)	40	40	0	0	41	20	
Percent Heavy Vehicles	2	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	1	0	
Configuration	LT			TR			
Delay, Queue Length, and Level of Service							
Approach	Eastbound	Westbound	Northbound			Southbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		L	LT				TR
v (veh/h)		10	80				61
C (m) (veh/h)		1610	695				726
v/c		0.01	0.12				0.08
95% queue length		0.02	0.39				0.27
Control Delay (s/veh)		7.2	10.9				10.4
LOS		A	B				B
Approach Delay (s/veh)	—	—	10.9			10.4	
Approach LOS	—	—	B			B	

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery		Intersection		Inbound/Spotted			
Agency/Co.	JUB ENGINEERS		Jurisdiction		SIA			
Date Performed	9/22/2014		Analysis Year		2019			
Analysis Time Period	Mid-day Peak							
Project Description Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Inbound Airport Drive			North/South Street: Spotted Road					
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)				5	545	5		
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.88	0.88	0.88		
Hourly Flow Rate, HFR (veh/h)	0	0	0	5	619	5		
Percent Heavy Vehicles	0	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	0	0	1	2	1		
Configuration				L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	40	95		105	40			
Peak-Hour Factor, PHF	0.82	0.82	0.74	1.00	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	48	115	0	0	109	41		
Percent Heavy Vehicles	2	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	1	0		
Configuration	LT					TR		
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	LT					TR
v (veh/h)		5	163					150
C (m) (veh/h)		1610	408					458
v/c		0.00	0.40					0.33
95% queue length		0.01	1.88					1.41
Control Delay (s/veh)		7.2	19.6					16.6
LOS		A	C					C
Approach Delay (s/veh)	—	—	19.6			16.6		
Approach LOS	—	—	C			C		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 9/22/2014 10:29 AM

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery		Intersection	Outbound/Spotted				
Agency/Co.	JUB ENGINEERS		Jurisdiction	SIA				
Date Performed	9/22/2014		Analysis Year	2019				
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Outbound Airport Drive			North/South Street: Spotted Road					
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)	35	550	45					
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.94	0.94	1.00		
Hourly Flow Rate, HFR (veh/h)	39	617	50	0	0	0		
Percent Heavy Vehicles	2	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	1	0	0	0		
Configuration	L	T	R					
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)		100	10	5	105			
Peak-Hour Factor, PHF	0.74	0.96	0.96	0.69	0.69	1.00		
Hourly Flow Rate, HFR (veh/h)	0	104	10	7	152	0		
Percent Heavy Vehicles	2	2	2	2	2	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L				TR	LT		
v (veh/h)	39				114	159		
C (m) (veh/h)	1623				374	336		
v/c	0.02				0.30	0.47		
95% queue length	0.07				1.27	2.43		
Control Delay (s/veh)	7.3				18.8	25.0		
LOS	A				C	C		
Approach Delay (s/veh)	—	—	18.8			25.0		
Approach LOS	—	—	C			C		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 9/22/2014 10:13 AM



TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery		Intersection	Inbound/Spotted				
Agency/Co.	JUB ENGINEERS		Jurisdiction	SIA				
Date Performed	9/22/2014		Analysis Year	2024				
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road			Intersection Study					
East/West Street: Inbound Airport Drive			North/South Street: Spotted Road					
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)				5	610	5		
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.88	0.88	0.88		
Hourly Flow Rate, HFR (veh/h)	0	0	0	5	693	5		
Percent Heavy Vehicles	0	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	0	0	1	2	1		
Configuration				L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	45	105			125	50		
Peak-Hour Factor, PHF	0.82	0.82	0.74	1.00	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	54	128	0	0	130	52		
Percent Heavy Vehicles	2	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	1	0		
Configuration		LT				TR		
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound		Southbound			
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	LT					TR
v (veh/h)		5	182					182
C (m) (veh/h)		1610	361					421
v/c		0.00	0.50					0.43
95% queue length		0.01	2.72					2.13
Control Delay (s/veh)		7.2	24.7					19.9
LOS		A	C					C
Approach Delay (s/veh)	—	—	24.7		19.9			
Approach LOS	—	—	C		C			

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 9/22/2014 10:30 AM

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Montgomery			Intersection	Outbound/Spotted			
Agency/Co.	JUB ENGINEERS			Jurisdiction	SIA			
Date Performed	9/22/2014			Analysis Year	2024			
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Outbound Airport Drive				North/South Street: Spotted Road				
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)	35	615	50					
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.94	0.94	1.00		
Hourly Flow Rate, HFR (veh/h)	39	691	56	0	0	0		
Percent Heavy Vehicles	2	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	1	0	0	0		
Configuration	L	T	R					
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)		110	10	5	125			
Peak-Hour Factor, PHF	0.74	0.96	0.96	0.69	0.69	1.00		
Hourly Flow Rate, HFR (veh/h)	0	114	10	7	181	0		
Percent Heavy Vehicles	2	2	2	2	2	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L				TR	LT		
v (veh/h)	39				124	188		
C (m) (veh/h)	1623				339	303		
v/c	0.02				0.37	0.62		
95% queue length	0.07				1.63	3.87		
Control Delay (s/veh)	7.3				21.6	34.5		
LOS	A				C	D		
Approach Delay (s/veh)	—	—	21.6			34.5		
Approach LOS	—	—	C			D		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 9/22/2014 10:14 AM

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery		Intersection	Inbound/Spotted				
Agency/Co.	JUB ENGINEERS		Jurisdiction	SIA				
Date Performed	9/22/2014		Analysis Year	2034				
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road			Intersection Study					
East/West Street: Inbound Airport Drive			North/South Street: Spotted Road					
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)				10	760	10		
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.88	0.88	0.88		
Hourly Flow Rate, HFR (veh/h)	0	0	0	11	863	11		
Percent Heavy Vehicles	0	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	0	0	1	2	1		
Configuration				L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	50	125		170	65			
Peak-Hour Factor, PHF	0.82	0.82	0.74	1.00	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	60	152	0	0	177	67		
Percent Heavy Vehicles	2	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	1	0		
Configuration	LT					TR		
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	LT					TR
v (veh/h)		11	212					244
C (m) (veh/h)		1610	252					334
v/c		0.01	0.84					0.73
95% queue length		0.02	6.76					5.47
Control Delay (s/veh)		7.3	65.3					40.1
LOS		A	F					E
Approach Delay (s/veh)	—	—	65.3			40.1		
Approach LOS	—	—	F			E		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 9/22/2014 10:32 AM

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Montgomery			Intersection	Inbound/Spotted			
Agency/Co.	JUB ENGINEERS			Jurisdiction	SIA			
Date Performed	9/22/2014			Analysis Year	2034 mitigated			
Analysis Time Period	Mid-day Peak							
Project Description Airport Drive Couplet at Spotted Road				Intersection Study				
East/West Street: Inbound Airport Drive				North/South Street: Spotted Road				
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)				10	760	10		
Peak-Hour Factor, PHF	1.00	0.95	0.95	0.88	0.88	0.88		
Hourly Flow Rate, HFR (veh/h)	0	0	0	11	863	11		
Percent Heavy Vehicles	0	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	0	0	1	2	1		
Configuration				L	T	R		
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	50	125			170	65		
Peak-Hour Factor, PHF	0.82	0.82	0.74	1.00	0.96	0.96		
Hourly Flow Rate, HFR (veh/h)	60	152	0	0	177	67		
Percent Heavy Vehicles	2	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	1	1	0	0	1	1		
Configuration	L	T			T	R		
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	T			T	R
v (veh/h)		11	60	152			177	67
C (m) (veh/h)		1610	201	280			284	628
v/c		0.01	0.30	0.54			0.62	0.11
95% queue length		0.02	1.20	3.00			3.85	0.36
Control Delay (s/veh)		7.3	30.4	32.1			36.5	11.4
LOS		A	D	D			E	B
Approach Delay (s/veh)	—	—	31.6			29.6		
Approach LOS	—	—	D			D		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 9/22/2014 10:31 AM



TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery		Intersection	Outbound/Spotted				
Agency/Co.	JUB ENGINEERS		Jurisdiction	SIA				
Date Performed	9/22/2014		Analysis Year	2034				
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road			Intersection Study					
East/West Street: Outbound Airport Drive			North/South Street: Spotted Road					
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)	45	765	60					
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.94	0.94	1.00		
Hourly Flow Rate, HFR (veh/h)	50	859	67	0	0	0		
Percent Heavy Vehicles	2	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	1	0	0	0		
Configuration	L	T	R					
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)		130	15	10	170			
Peak-Hour Factor, PHF	0.74	0.96	0.96	0.69	0.69	1.00		
Hourly Flow Rate, HFR (veh/h)	0	135	15	14	246	0		
Percent Heavy Vehicles	2	2	2	2	2	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage	0			0				
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration				TR	LT			
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound		Southbound			
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L				TR	LT		
v (veh/h)	50				150	260		
C (m) (veh/h)	1623				265	228		
v/c	0.03				0.57	1.14		
95% queue length	0.10				3.20	12.07		
Control Delay (s/veh)	7.3				34.9	147.8		
LOS	A				D	F		
Approach Delay (s/veh)	—	—	34.9			147.8		
Approach LOS	—	—	D			F		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 9/22/2014 10:16 AM

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Montgomery			Intersection	Outbound/Spotted			
Agency/Co.	JUB ENGINEERS			Jurisdiction	SIA			
Date Performed	9/22/2014			Analysis Year	2034 mitigated			
Analysis Time Period	Mid-day Peak							
Project Description: Airport Drive Couplet at Spotted Road				Intersection Study				
East/West Street: Outbound Airport Drive				North/South Street: Spotted Road				
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)	45	765	60					
Peak-Hour Factor, PHF	0.89	0.89	0.89	0.94	0.94	1.00		
Hourly Flow Rate, HFR (veh/h)	50	859	67	0	0	0		
Percent Heavy Vehicles	2	—	—	4	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	1	2	1	0	0	0		
Configuration	L	T	R					
Upstream Signal		0			0			
Minor Street	Northbound			Southbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)		130	15	10	170			
Peak-Hour Factor, PHF	0.74	0.96	0.96	0.69	0.69	1.00		
Hourly Flow Rate, HFR (veh/h)	0	135	15	14	246	0		
Percent Heavy Vehicles	2	2	2	2	2	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	1	1	1	0		
Configuration		T	R	L	T			
Delay, Queue Length, and Level of Service								
Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L			T	R	L	T	
v (veh/h)	50			135	15	14	246	
C (m) (veh/h)	1623			249	625	227	228	
v/c	0.03			0.54	0.02	0.06	1.08	
95% queue length	0.10			2.94	0.07	0.20	10.80	
Control Delay (s/veh)	7.3			35.4	10.9	21.9	127.9	
LOS	A			E	B	C	F	
Approach Delay (s/veh)	—	—		32.9			122.2	
Approach LOS	—	—		D			F	

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 9/22/2014 10:19 AM

## **Appendix E**

### **Summary of Public Involvement**

# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | bk@langdongroupinc.com



## KEY STAKEHOLDERS INTERVIEWS COMPREHENSIVE SUMMARY

Bryant Kuechle conducted in-person key stakeholder interviews, Aug. 19-20. The following summarizes their specific comments and concerns:

### Eric Jones, Service Center Manager

#### UPS

- Traffic driving inbound to airport is going Interstate speed
- Vehicles waiting at Spotted misjudge speed of Airport traffic
- Primary UPS entry is off of Spotted
- Recommends grade separation
- Tractor trailer trucks need six seconds lead time before proceeding through intersection. Sight distance and speed of Airport traffic does not allow for this.
- Spotted is also used for local delivery traffic as short-cut between I-90 and US 2. This is used by residential/local traffic as well

---

### Kelly Williquette, Public Works Director

### Jerry Richards, Streets Lead

#### Airway Heights

- 21<sup>st</sup> Ave. Extension
  - o Airway Heights jurisdiction east to Hazelwood, then become city of Spokane
  - o One version had the extension extending past Flint then turning north to US 2 before Spotted
  - o Goal is to push Airway Heights traffic off of highway
- Favor the "Avoid RPZ" alternative and eliminate current Spotted intersection (dangerous)
- Consider signal at Airport/Spotted
- New signal at Flint/US 2 will move most west US 2 traffic to/from Airport to Flint, take some pressure off Spotted
- WSDOT will likely recommend a roundabout
- Hayford/US 2 intersection is LOS F (37k per day)

# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | bk@langdongroupinc.com



Steve Turcott, Lieutenant

Washington State Patrol

- Determined through meeting with WSP and phone calls w/ County and City that Airport police is primary law enforcement in the study area
- WSP use to patrol prior to annexation and will help on collisions
- Most recent Spotted/Airport upgrades have helped
- Most accident history is from driver behavior. Fatality was an elderly person that pulled off Spotted and didn't look
- Consider "Avoid RPZ" alternative regardless of what is done with 21<sup>st</sup>, it still makes sense for the Spotted intersection
- Likes the idea of looking at intersection in the context of larger plans

---

Peter Troyer, Chief

SIA Police

- Speed monitors, speed awareness devices and ticketing all working to keep speeds down
- 50 mph at intersection with Spotted a concern
- Consider grade separation, traffic signal not likely
- Not in favor of roundabouts, difficult to determine in accidents who should have yielded and travelers unfamiliar in rental cars will get confused – not likely in a roundabout where you drive it every day and are used to it.

---

Miles Vierck, General Manger

Best Western Plus Peppertree Airport Inn

- Shuttle drivers use Spotted to drive guests to airport, casino, Wal-Mart, etc.
- They have often seen vehicles driving the wrong way on Airport. They are advised to look both ways at inbound and outbound intersections.
- They have witnessed near misses with people walking on Spotted to/from bus stops on Airport. There are no pedestrian facilities and difficult to see at night.
- Spotted/US 2 intersection is also dangerous, hard to turn left
- Flint/US 2 signal will help. They will divert all US-2 traffic to that intersection after signal is up.
- There is inadequate signage for Spotted on Airport. Guests often miss it when looking for hotel.

# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | bk@langdongroupinc.com



---

#### Danette Taylor, Manager

USPS, Flightline Blvd.

- Caution all drivers at this intersection. Speeds are unpredictable.
- Consider lower speed limit on Airport and stoplight
- Spotted/US 2 is more dangerous. They are changing their delivery route in that area.

---

#### Nick Scharff, Fire Chief

#### Robert Ladd, Deputy Chief

Fire District 10

- Main station in Airway Heights is only staffed station. They have an island of coverage on the other side of the airport (see image below). They have a volunteer station there but often trucks come from Airway Heights station and use Spotted to access incidents.
- Area around airport use to be in their district until it was annexed by City. The new City station on Spotted Road is rarely staffed, lowest use in the system. The truck station there is often downtown or south hill because the need is not there. Therefore District 10 still responds to calls in the area and often the Airport Fire is the first on the scene.
- Airport fire must keep a presence at the runway but can respond to calls in the surrounding area.
- Most accidents are on Outbound – T-Bones at Spotted that send cars into the center area.
- Have responded to calls where Spotted traffic blew through the Stop sign.
- Curves on airport make it difficult to for Spotted traffic to judge the speed of inbound and outbound traffic.
- For trucks, the sight distance does not allow them to get up to speed safely
- There has been a number wrong-way inbound and outbound accidents when Spotted traffic didn't yield to the wrong direction
- A number of accidents at US 2/Sunset where Airport peels off – limited sight distance
- Many accidents are by people coming to the airport on US 2 that miss the exit, take their first left (Spotted) and in the confusion get T-Boned at either US 2 or Airport
- Flint and Inbound Airport also has a number of accidents
- Consider roundabout at Spotted Road – it would slow everyone down.
- Signal is not a good solution, it would slow Airport traffic too much

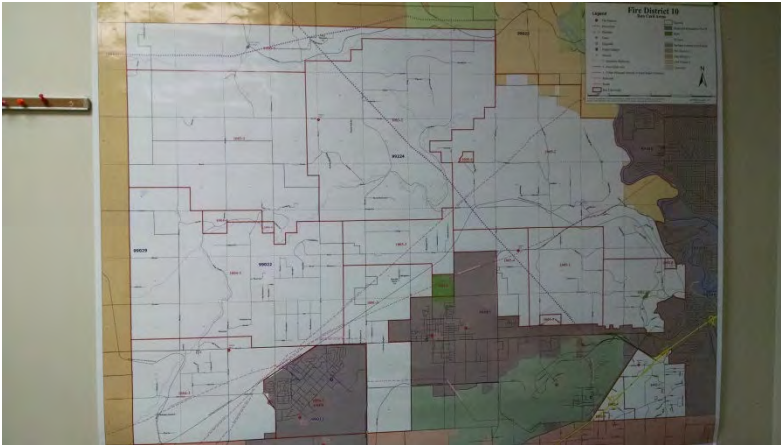


# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | bk@langdongroupinc.com



---

Steve Hopkins, Operations Scheduling Analyst

Mike Hynes, Transit Planner

Spokane Transit Authority

- Non-improved stops west of Spotted/Inbound Airport and east of Spotted/Outbound airport.
- Bus route goes inbound, stops at terminal (end of the line) then returns on outbound.
- They have been approach recently by airport about shelters at these stops, which would be a strange set-up because there are no pedestrian facilities leading to these stops.
- Stops are for shift works south that walk south on Spotted, and residents/workers that walk north on Spotted to US 2. People who use these stops work all hours. There are stops at 10:45 pm and 6:20 am. It is difficult to see them at the stops and walking to/from the stops on Spotted.
- There is a stop at US 2/Spotted that will move to US 2/Flint after the signal is installed. This may increase the use of the Spotted/Inbound stop for people that walk to the low income housing unit at US 2/Spotted
- People that are walking south on Spotted will get off at Inbound stop because it is quicker to walk through the intersection than wait on the bus through the terminal. Dangerous for these pedestrians that are crossing inbound and outbound spotted
- Greatest need is pedestrian facilities, crossings and lighting at the stop and paths for these riders (joint project)
- Also need turn-outs on Airport for buses. Currently buses stop on the road. Speed of traffic makes a rear-end accident likely.
- 2-lane Roundabout would make pedestrian crossing difficult, it would offset crossings further away down Airport
- Consider closing spotted north of Airport, and traffic use Flint instead. Make the center section of Spotted a "return to airport" U-turn.



**Spokane International Airport Traffic Study, Project #13-07**  
**Airport Drive Couplet at Spotted Road Intersection Study**  
**Public Involvement Summary**

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | bk@langdongroupinc.com



Teresa Toriana, Ship Center Manager

FedEx

- More concerns with Flint Road than Spotted Road. Tractor Trailer drivers when approaching the terminal, when you turn left on Flint. Right now cars are allowed to come too far forward. They should be back 10 more feet because it makes it a narrow turn for a tractor trailer to get in there. Sometimes people go past the white line. Her drivers will stop and motion them. Where it drops down to 35 mph. Left turn from flint to terminal, allows driver at intersection to come way to far forward for a tractor trailer to execute a turn.
  - People still get confused car rental area from Flint to Terminal. They don't realize it is one-way coming from the terminal. It has gotten better, use to be an accident every other week.
  - Nature of people when they come to an airport people get overwhelmed and make poor decisions. They are thinking of too much, trying to read every sign. From her standpoint everything works well at Aviation/Spotted.
-

# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | bk@langdongroupinc.com



#### PUBLIC INFORMATION MEETING COMPREHENSIVE SUMMARY



15 People attended the meeting:

- Joe Torelli, Spokane Good Roads
- Mike Frucci, WSDOT
- Rochard Rush, City of Spokane Legislative Assistant
- Len Urgeleit, Park n Jet
- Steve Hopkins, STA
- Al Stover, Cheney Free Press
- Don and Sharon Blums
- Carlie Archer, Aircraft Solutions
- Barbara Olson, Cheney School District
- Juan Contreras, Parking Express
- Max Kuney, SIA Board
- Larry Krauter, SIA CEO
- Melode Hall
- Ric Hall

8 people submitted comment forms (transcription below). Of those that specified a preferred alternative, three favored Alternative D (roundabout), one favored D or C and one expressed dissention for Alternative A. There were numerous concerns about pedestrian access and safe crossings with regard to a potential roundabout, access to transit facilities, ADA compliance, grade separation from roads/bridges and connectivity to the “West Plains Trail” connecting the airport to the Centennial Trail, Airway Heights and Fairchild AFB. The representative from STA also requested consideration for bus acceleration and deceleration areas to serve stops.

On the reverse of the comment form, respondents were asked to rank the alternative evaluation criteria, 1-10, one being the most important.

# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | [bk@langdongroupinc.com](mailto:bk@langdongroupinc.com)



---

#### *Transcribed Notes*

**Richard Rush**, City of Spokane

808 W Spokane Falls Blvd

Spokane, WA 99201

509-625-6718

[rrush@spokanecity.org](mailto:rrush@spokanecity.org)

1. Prefer the alternative that facilitates pedestrian and bicycle traffic connectivity. Discussions are ongoing between regional jurisdictions and the airport regarding establishment of a “West Plains Trail” connecting the airport to the Centennial Trail, the City of Airway Heights and Fairchild AFB.

The portion of the trail connecting to the airport is expected to follow the existing gravel path between the incoming and outgoing lanes of Airport Drive. It is imperative that pedestrian and bicycle access via a 12’ wide trail, consistent with regional trail design that will be eligible for federal and state grant funding, be preserved during this project to permit future establishment of this trail.

To be the best trail facility that will attract the maximum number of users/travelers/recreationalists, the trail should be grade-separated from existing and proposed roadways and bridges. This grade-separation will promote a sense of safety and dedication to the area’s regional trail system which will maximize its attractiveness and use. Current bike/pedestrian projects on the Spokane Regional Transportation Council priority funding list demonstrate the value of planning for trail facilities as projects are built rather than attempting to retrofit trail projects subsequent to construction of vehicular facilities.

The alternative chosen for traffic improvements should reflect this multi-model vision for the airport and region.

2. No ranking

---

#### **Melode Hall**

1807 S Geiger Blvd

Spokane, WA 99224

509-328-3942

[MelodeHall@comcast.net](mailto:MelodeHall@comcast.net)

1. I like option C or D. Less turns, easy flow of traffic. Seems easy to understand.

# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | [bk@langdongroupinc.com](mailto:bk@langdongroupinc.com)



#### 2. Ranking

- a. 1 – cost
- b. 2 – consistent and familiar traffic control devices for most drivers
- c. 3 – connectivity for Spotted Road

---

#### Ric Hall

1807 S Geiger Blvd  
Spokane, WA 99224  
509-328-3942

1. Figure D = roundabout; they work – slow down and control

#### 2. Ranking

- a. 1 – cost
- b. 2 – connectivity for 21<sup>st</sup> Avenue
- c. 3 – connectivity for Spotted Road
- d. 4 – ability to construct improvements in phases
- e. 5 – consistent and familiar traffic control devices for most drivers

---

#### Steven Hopkins, Spokane Transit Authority

1229 W Boone Ave  
Spokane, WA 99201  
509-325-6077

[shopkins@spokanetransit.com](mailto:shopkins@spokanetransit.com)

1. Alternative A is not preferred due to the challenges for transit to serve a limited-access environment.

If an alternative using a roundabout is selected, please consider pedestrian access and crossing movements in the design.

Transit buses need sufficient acceleration/deceleration areas to serve stops – this should be considered.

ADA – accessible stops/sidewalks would need to be incorporated in the design of any improvements.

#### 2. Ranking

- a. 1 – safety
- b. 2 – criteria: pedestrian access to transit facilities
- c. 3 – connectivity for Spotted Road

# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | [bk@langdongroupinc.com](mailto:bk@langdongroupinc.com)



- d. 4 – airport drive outbound mobility
- e. 5 – airport drive inbound mobility
- f. 6 – consistent and familiar traffic control devices for most drivers
- g. 7 – cost
- h. 8 – public and agency support
- i. 9 – reduced congestion
- j. 10 – ability to construct improvements in phases
- k. 11 – connectivity for 21<sup>st</sup> Avenue

---

**Len Urgeleit**, Diamond Park N Jet

5062 W Sunset Hwy

Spokane, WA 99224

[len.urgeleit@diamondparking.com](mailto:len.urgeleit@diamondparking.com)

1. Roundabout seems best since it slows traffic without stopping it. Raised bridges seem like overkill since Spotted Rd. is not a high volume road. Avoiding stoplights on the one ways would be best since it slows and stops traffic when it is not always necessary. The speed limit currently at 50 mph is excessive with Spotted Rd. being a dangerous intersection. Maybe decrease speed limit to 35 mph.
2. Ranking
  - a. 1 – safety
  - b. 2- reduced congestion
  - c. 3 – consistent and familiar traffic control devices for most drivers
  - d. 4 – airport drive inbound mobility
  - e. 5 – airport drive outbound mobility
  - f. 5 (two 5s) - cost
  - g. 6 – ability to construct improvements in phases
  - h. 7 – connectivity for Spotted Road
  - i. 8 – connectivity for 21<sup>st</sup> Avenue
  - j. 8 (two 8s, no 9)– public and agency support

# Spokane International Airport Traffic Study, Project #13-07

## Airport Drive Couplet at Spotted Road Intersection Study

### Public Involvement Summary

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | [bk@langdongroupinc.com](mailto:bk@langdongroupinc.com)



#### Mike Frucci

2714 N Mayfair  
Spokane, WA 99207  
509-324-6020

[frucciM@wsdot.wa.gov](mailto:frucciM@wsdot.wa.gov)

1. Figure D looks like a very practical design.

The volumes on airport drive are easily handled by a roundabout.

Roundabouts are proven to have a significant impact on crash frequency and severity.

Figure D basically eliminates two intersections and provides for movement in all directions at the roundabout.

I encourage you to contact and work with WSDOT on the roundabout design both because it interfaces with a state route and because we have very good experience in roundabout design.

2. No ranking

---

#### Joe Tortorelli

No other contact information provided

1. Alternative D solves the immediate problem and would be sufficient for many years. It also slows traffic coming off Hwy 2 earlier. Depending on additional development in the area with more employees and freight traffic congestion is not a problem. Do a building fill rate study and project growth.
2. Ranking
  - k. 1 – ability to construct improvements in phases
  - l. 2 – cost
  - m. 3 – public and agency support
  - n. 4 – airport drive inbound mobility
  - o. 5 – airport drive outbound mobility
  - p. 6 – connectivity for Spotted Road
  - q. 7 – connectivity for 21<sup>st</sup> Avenue
  - r. 8 – consistent and familiar traffic control devices for most drivers
  - s. 9 – safety
  - t. 10 – reduced congestion
  - u. Criteria – the intersection is not failing, based on projected traffic when will it fail or become a critical safety issues
  - v. Criteria – Spotted Road relocation is very critical due to FAA and HAS concerns



**Spokane International Airport Traffic Study, Project #13-07**  
**Airport Drive Couplet at Spotted Road Intersection Study**  
**Public Involvement Summary**

Bryant Kuechle | Senior Project Manager | The Langdon Group  
208-739-3048 | bk@langdongroupinc.com



---

**Barbara Olson**

717 S Russell Rd  
Spokane, WA 99224  
509-624-0095

1. I live on Russell Road and am concerned about the intersection of said road and highways. Over twenty years or so, the hill east of Russell Road was straightened (the road was altered) so cars come over the hill faster even than before. Also, the turn lane at Russell Rd was narrowed.

In the intervening years, more development west of us means more traffic every year. We are only a mile-long road not much in comparison to longer more-heavily roads, but Russell Road is important to its residents and many people north, west and east of it. The traffic on Highway has proved too much for many residents, so they use backwoods and side roads an inconvenience and a nuisance.

Please acknowledge Russell Road's Highway 2 intersection as worthy of a close look.

2. No ranking



# SIA TRAFFIC STUDY SIGN-IN SHEET

SIA TRAFFIC STUDY PUBLIC INFORMATION MEETING

Oct. 22, 2014 / 4:30-7 pm / Irv Reed Event Center / 9211 W MacFarlane Road, Spokane, WA 99224

The Spokane International Airport monitors attendance to ensure equal opportunity. We appreciate your providing this information. This information will only be used to monitor attendance at public meetings and for affirmative action purposes, as specified by law (CFR 42.21.9).

Name (Please print or write clearly)	Title/Representing	Employer (if you work at, in or near the airport)	Address (City, State, and ZIP)	Phone	Email
JOE TORTORELLI	GOOD ROADS	SPOKANE	PO BOX 14009 SPOKANE VALLEY	509 926 9356	
MIKE FRUCCI	WSDOT		2714 N MACFARLANE	509-324-6020	fruccim@wsdot
RICHARD RUST	CEC/TOTYPOLAND	LEGISLATIVE ASSISTANT	808 W SIO PAULS RD/PO	625-6718	R.RUST@SPokaneCC
Len Urgeleit	Park N Jet		5602 W. Sunset	747-1905	len.urgeleit@edmundparka
Steven Haghans	STA	Spokane Transit Authority	1229 W Boone Ave	325-6077	Shopkins@spokanebus.com
Al Stener	report-Cheney Free Press	Cheney Free Press	579 4th St Apt 9	506-650-2130	al@cheneyfreepress.com
Davis Shinnon Blum			8403 W. Greenwood Rd	747-5714	darblum@outlook.com
Christine Acosta	AK SOLUTIONS		6125 W PICO DR	879-0369	acosta@ak-solutions.com
Barbara Olson	Russell Rd	Cheney S.D.	717 S. Russell Rd.	624-0095	
Tuan Centromas	Parking Express	same	1610 S. Spotted Rd	509 747-6855	
Max Kunev	SIA BOD	Max J. Kunev Co.	PO Box 4008 Spokane	535-0651	max@maxkunev.com
Larry Kramer	SIA CEO	SIA	9000 W. Airport Dr. 99224	509/455-4419	lkr@spokaneairport.net
Melinda Havel			1807 S Geiger Blvd 99224	328-3942	
Re. Ham					
LISA CORCORAN	SIA PM	SIA	9000 W. AIRPORT Dr 99224	509-455-6406	LCORCORAN@SPokaneAIRPORTS.NET

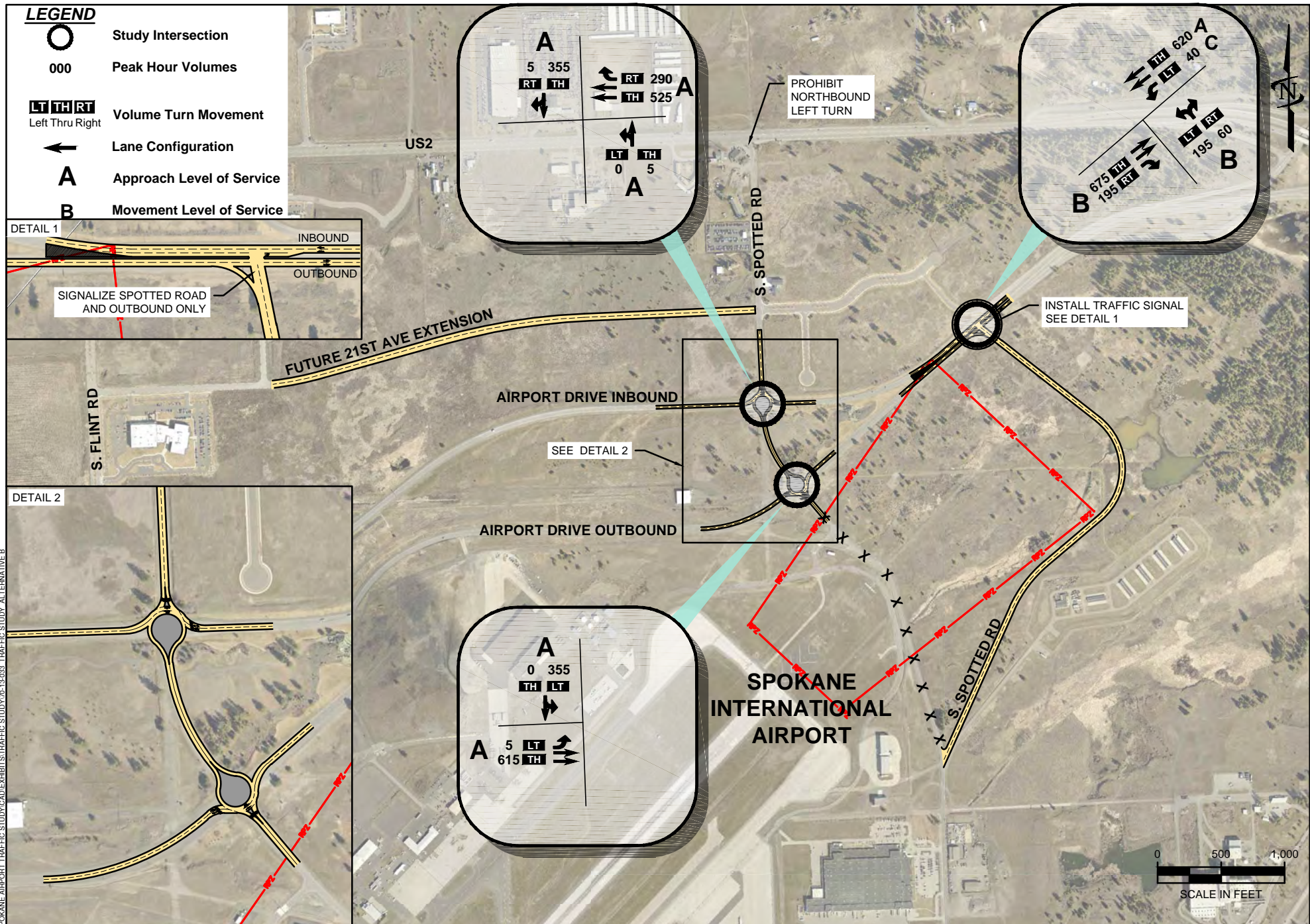
## **Appendix F**

### **Traffic Volumes for Each Alternative**









ALT B: TWO ROUNDABOUTS WITH  
CONTINUOUS GREEN-T INTERSECTION  
2034 PM PEAK VOLUMES

FIGURE  
F-2

AIRPORT DRIVE COUPLET AT  
SPOTTED ROAD INTERSECTION STUDY



Engineers • Surveyors • Planners

LAST UPDATE: 2/5/2015  
PLOT DATE: 2/5/2015  
FILE

F:\PROJECT\JUB\7413-033 SPOKANE AIRPORT TRAFFIC STUDY\CAD\EXHIBITS\TRAFFIC STUDY\7413-033 TRAFFIC STUDY - ALTERNATIVE B



# LEGEND



Study Intersection

000

Peak Hour Volumes



Volume Turn Movement



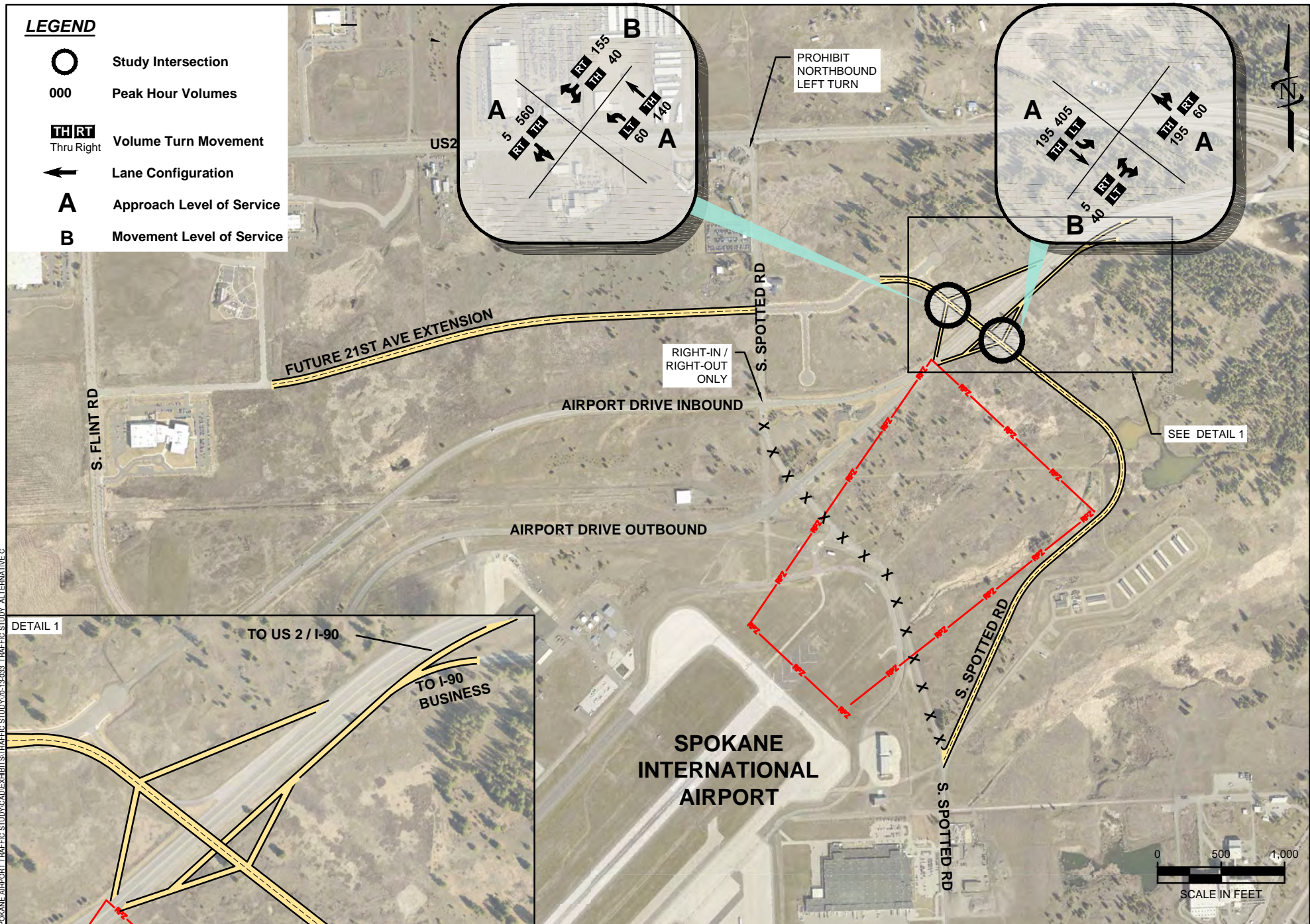
Lane Configuration

A

Approach Level of Service

B

Movement Level of Service



DETAIL 1



Engineers • Surveyors • Planners

ALT C: INTERCHANGE AT AIRPORT DRIVE/ 21ST AVE EXTENSION/ SPOTTED ROAD  
2034 PM PEAK VOLUMES

FIGURE  
F-3





AIRPORT DRIVE COUPLET AT  
SPOTTED ROAD INTERSECTION STUDY

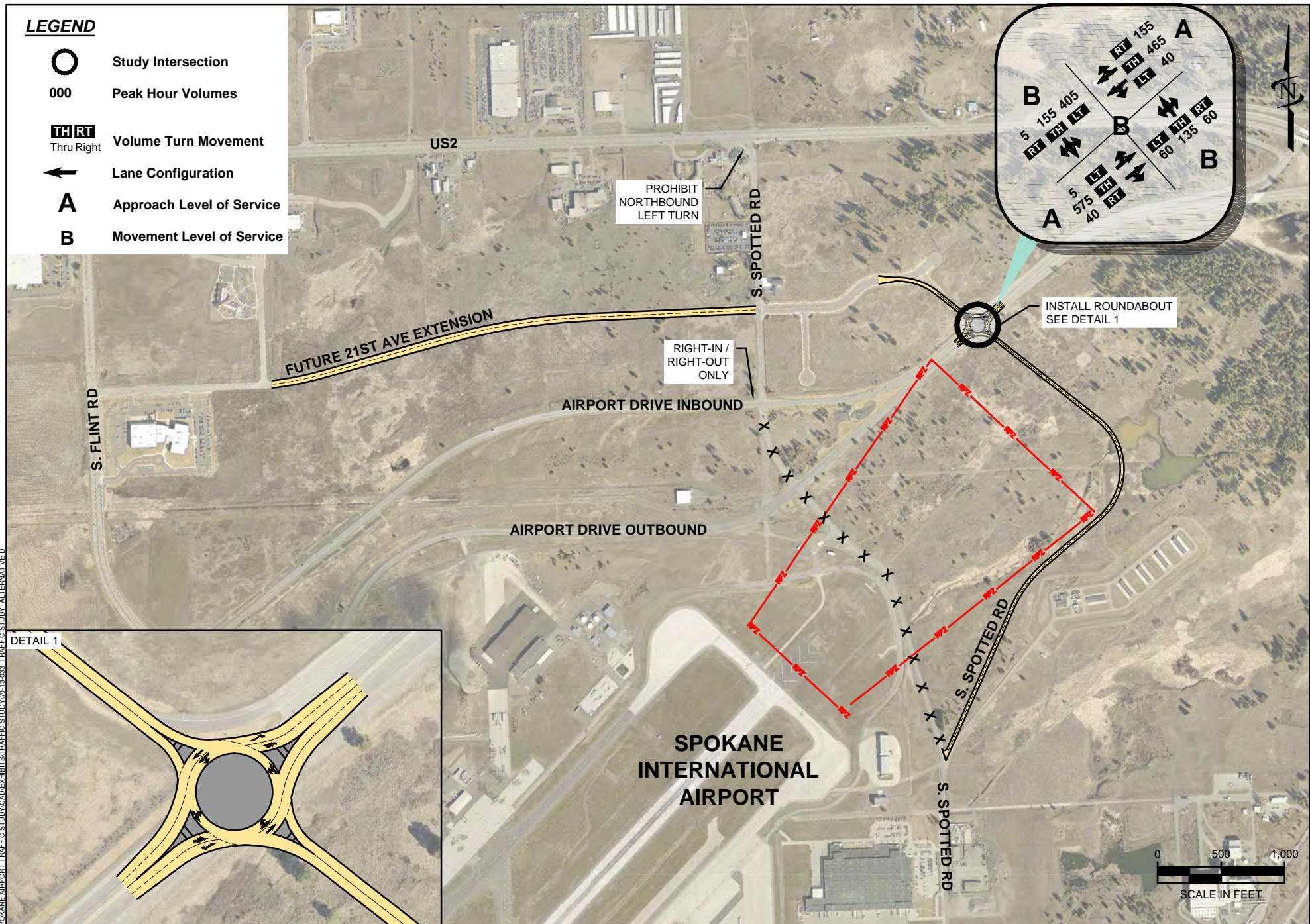
LAST UPDATE: 2/5/2015  
PLOT DATE: 2/5/2015  
FILE

F:\PROJECT\JUB\74134033 SPOKANE AIRPORT TRAFFIC STUDY\CAD\EXHIBIT\TRAFFIC STUDY\74134033 TRAFFIC STUDY ALTERNATIVE C



# LEGEND

-  Study Intersection
-  Peak Hour Volumes
-  Volume Turn Movement
-  Lane Configuration
- A** Approach Level of Service
- B** Movement Level of Service



ALT D: ROUNDABOUT AT AIRPORT DRIVE/  
21ST AVE EXTENSION/ SPOTTED ROAD  
2034 PM PEAK VOLUMES

FIGURE  
**F-4**



AIRPORT DRIVE COUPLET AT  
SPOTTED ROAD INTERSECTION STUDY

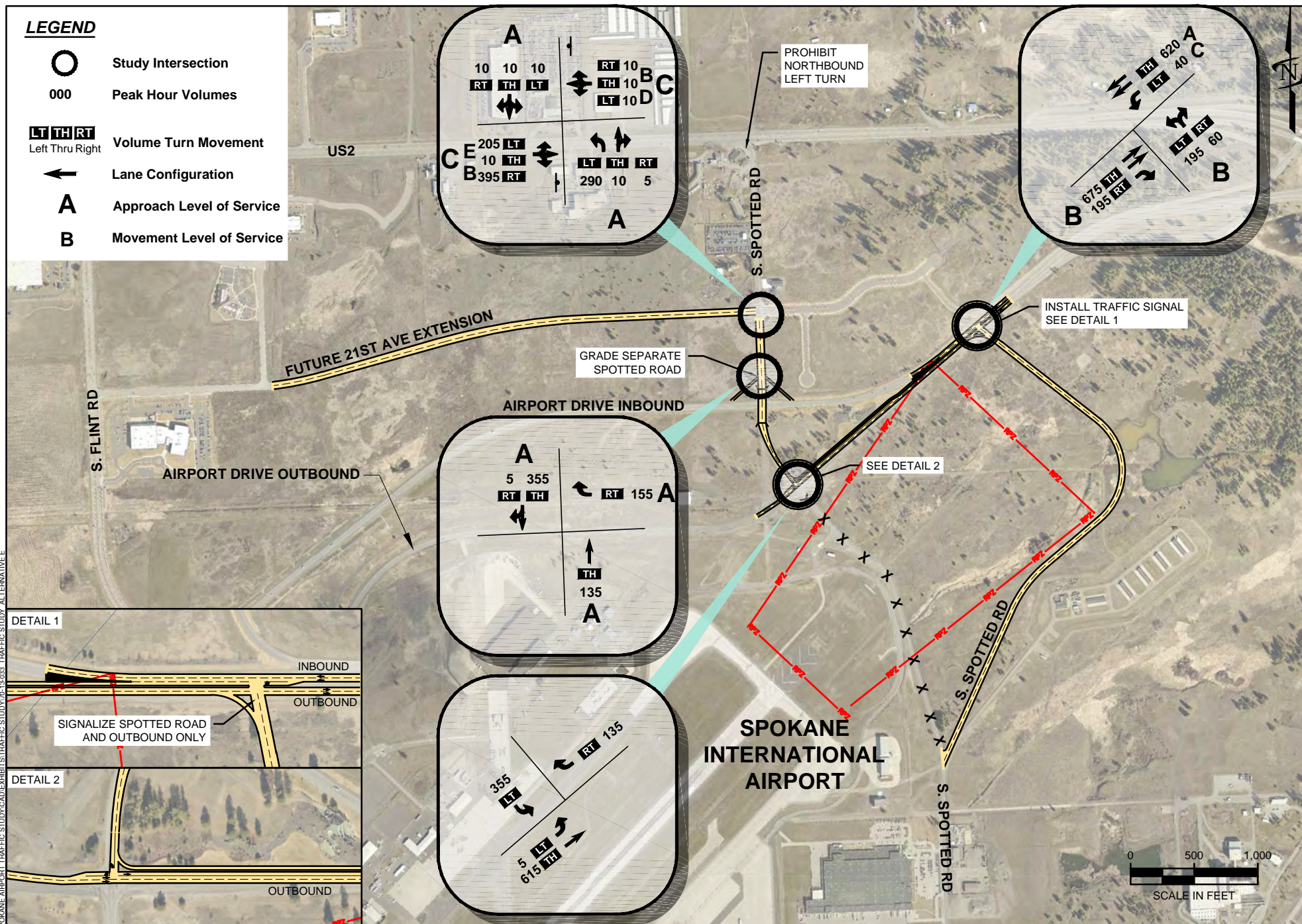
LAST UPDATE: 2/5/2015  
PLOT DATE: 2/5/2015  
FILE

F:\PROJECT\JUB\74134033 SPOKANE AIRPORT TRAFFIC STUDY\CAD\EXHIBIT\TRAFFIC STUDY\74134033 TRAFFIC STUDY ALTERNATIVE D



# LEGEND

-  Study Intersection
- 000** Peak Hour Volumes
- LT TH RT** Volume Turn Movement  
Left Thru Right
-  Lane Configuration
- A** Approach Level of Service
- B** Movement Level of Service



ALT E: CONTINUOUS GREEN-T INTERSECTION  
AND OVERPASS FOR SPOTTED ROAD AT  
INBOUND AIRPORT DRIVE  
2034 PM PEAK VOLUMES

FIGURE  
F-5

AIRPORT DRIVE COUPLET AT  
SPOTTED ROAD INTERSECTION STUDY



Engineers • Surveyors • Planners

LAST UPDATE: 2/5/2015  
PLOT DATE: 2/5/2015  
FILE

E:\PROJECTS\JUB\7413-033 SPOKANE AIRPORT TRAFFIC STUDY\CAD\EXHIBITS\TRAFFIC STUDY\7413-033 TRAFFIC STUDY ALTERNATIVE E

## **Appendix G**

### **Detailed Safety Evaluation for Each Alternative**



## Crash Severity Factor

### Unsignalized Intersection

Conflict	Number of Conflicts	Factor		
		50 MPH	35 MPH	20 MPH
"T" Crossing (Perpendicular) one high speed	4	10	8	--
Left turn crossing, one high speed	8	8	5	--
Both left turns	4	5	4	--
Merge	12	4	3	--

### Traffic Signal

Conflict	Number of Conflicts	Factor		
		50 MPH	35 MPH	20 MPH
"T" Crossing (Perpendicular) one high speed	4	7	5	--
Left turn crossing, one high speed	8	5	4	--
Both left turns	4	4	3	--
Merge	12	3	2	--

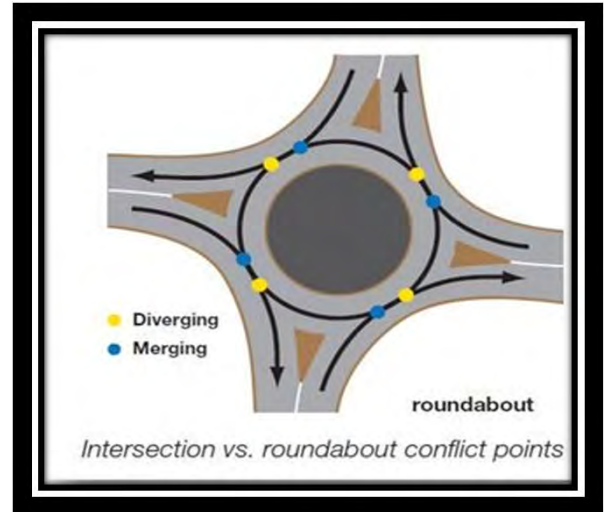
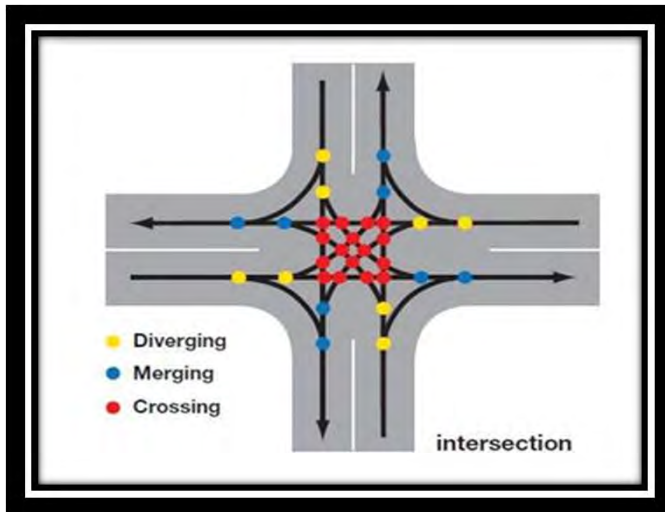
### Roundabout

Conflict	Number of Conflicts	Factor		
		50 MPH	35 MPH	20 MPH
"T" Crossing (Perpendicular) one high speed	4	--	--	--
Left turn crossing, one high speed	8	--	--	--
Both left turns	4	--	--	--
Merge	12	--	--	1

### Possible Movements

Conflict Type	Movements	Conflict Type	Movements
left turn/cross	NBL/EBT	left turn/cross	EBL/SBT
left turn/cross	NBL/EBL	left turn/cross	EBL/SBL
left turn/merge	NBL/SBR	left turn/merge	EBL/WBR
left turn/cross	NBL/SBT	left turn/cross	EBL/WBT
left turn/merge	NBL/WBT	left turn/merge	EBL/NBT
left turn/cross	NBL/WBL	left turn/cross	EBL/NBL
cross	NBT/EBT	cross	EBT/SBT
left turn/merge	NBT/EBL	left turn/merge	EBT/SBL
left turn/cross	NBT/SBL	left turn/cross	EBT/WBL
right turn/merge	NBT/WBR	right turn/merge	EBT/NBR
cross	NBT/WBT	cross	EBT/NBT
left turn/cross	NBT/WBL	left turn/cross	EBT/NBL
right turn/merge	NBR/EBT	right turn/merge	EBR/SBT
right turn/merge	NBR/SBL	right turn/merge	EBR/WBL
left turn/cross	SBL/WBT	left turn/cross	WBL/NBT
left turn/cross	SBL/WBL	left turn/cross	WBL/NBL
left turn/merge	SBL/NBR	left turn/merge	WBL/EBR
cross	SBL/NBT	left turn/cross	WBL/EBT
left turn/merge	SBL/EBT	left turn/merge	WBL/SBT
left turn/cross	SBL/EBL	left turn/cross	WBL/SBL
cross	SBT/WBT	cross	WBT/NBT
left turn/merge	SBT/WBL	left turn/merge	WBT/NBL
cross	SBT/NBT	cross	WBT/EBL
right turn/merge	SBT/EBR	right turn/merge	WBT/SBR
cross	SBT/EBT	cross	WBT/SBT
left turn/cross	SBT/EBL	left turn/cross	WBT/SBL
right turn/merge	SBR/WBT	right turn/merge	WBR/NBT
right turn/merge	SBR/NBL	right turn/merge	WBR/EBL

### Repeated Combinations



# Airport Drive Couplet at Spotted Road Intersection Study Safety Analysis

## No-Build Alternative

Movement 1	Movement 2	Type of Conflict	Traffic Volume 1	Traffic Volume 2	Volume Product	Crash Severity Factor	Final Product
<b>Intersection: Airport Drive Inbound/Spotted Road</b>					<b>50 MPH, Stop Controlled</b>		
NBL	EBT	left turn/cross	50		0	8	-
NBL	EBL	left turn/cross	50		0	5	-
NBL	SBR	left turn/merge	50	65	3250	4	13,000
NBL	SBT	left turn/cross	50	170	8500	8	68,000
NBL	WBT	left turn/merge	50	760	38000	4	152,000
NBL	WBL	left turn/cross	50	10	500	5	2,500
NBT	EBT	cross	125		0	10	-
NBT	EBL	left turn/merge	125		0	4	-
NBT	SBL	left turn/cross	125		0	8	-
NBT	WBR	right turn/merge	125	10	1250	4	5,000
NBT	WBT	cross	125	760	95000	10	950,000
NBT	WBL	left turn/cross	125	10	1250	8	10,000
NBR	EBT	right turn/merge			0	4	-
NBR	SBL	right turn/merge			0	4	-
SBL	WBT	left turn/cross		760	0	8	-
SBL	WBL	left turn/cross		10	0	5	-
SBL	EBT	left turn/merge			0	4	-
SBL	EBL	left turn/cross			0	5	-
SBT	WBT	cross	170	760	129200	10	1,292,000
SBT	WBL	left turn/merge	170	10	1700	4	6,800
SBT	EBR	right turn/merge	170		0	4	-
SBT	EBT	cross	170		0	10	-
SBT	EBL	left turn/cross	170		0	8	-
SBR	WBT	right turn/merge	65	760	49400	4	197,600
EBL	WBR	left turn/merge		10	0	4	-
EBL	WBT	left turn/cross		760	0	8	-
EBT	WBL	left turn/cross		10	0	8	-
EBR	WBL	right turn/merge		10	0	4	-
EBR/WBL		right turn/merge		10	0	1	-
Total							2,696,900

<b>Intersection: Airport Drive Outbound/Spotted Road</b>					<b>50 MPH, Stop Controlled</b>		
NBL/EBT		left turn/cross		765	0	8	-
NBL/EBL		left turn/cross		45	0	5	-
NBL/SBR		left turn/merge			0	4	-
NBL/SBT		left turn/cross		170	0	8	-
NBL/WBT		left turn/merge			0	4	-
NBL/WBL		left turn/cross			0	5	-
NBT/EBT		cross	130	765	99450	10	994,500
NBT/EBL		left turn/merge	130	45	5850	4	23,400
NBT/SBL		left turn/cross	130	10	1300	8	10,400
NBT/WBR		right turn/merge	130		0	4	-
NBT/WBT		cross	130		0	10	-
NBT/WBL		left turn/cross	130		0	8	-
NBR/EBT		right turn/merge	15	765	11475	4	45,900
NBR/SBL		right turn/merge	15	10	150	4	600
SBL/WBT		left turn/cross	10		0	8	-
SBL/WBL		left turn/cross	10		0	5	-
SBL/EBT		left turn/merge	10	765	7650	4	30,600
SBL/EBL		left turn/cross	10	45	450	5	2,250
SBT/WBT		cross	170		0	10	-
SBT/WBL		left turn/merge	170		0	4	-
SBT/EBR		right turn/merge	170	60	10200	4	40,800
SBT/EBT		cross	170	765	130050	10	1,300,500
SBT/EBL		left turn/cross	170	45	7650	8	61,200
SBR/WBT		right turn/merge			0	4	-
EBL/WBR		left turn/merge	45		0	4	-
EBL/WBT		left turn/cross	45		0	8	-
EBT/WBL		left turn/cross	765		0	8	-
EBR/WBL		right turn/merge	60		0	4	-
Total							2,510,150
<b>TOTAL CONFLICT VALUE</b>							<b>5,207,050</b>

### Alternative A

#### Partial Clover Interchange on Spotted

					Crash		
Movement 1	Movement 2	Type of Conflict	Traffic Volume 1	Traffic Volume 2	Volume Product	Severity Factor	Final Product
Intersection: Outbound Ramps/Spotted Rd					35 MPH, Stop Controlled		
NBL	EBT	left turn/cross			0	5	-
NBL	EBL	left turn/cross	60	5	300	4	1,200
NBL	SBR	left turn/merge	60	200	12000	3	36,000
NBL	SBT	left turn/cross	60	195	11700	5	58,500
NBL	WBT	left turn/merge			0	3	-
NBL	WBL	left turn/cross			0	4	-
NBT	EBT	cross			0	8	-
NBT	EBL	left turn/merge	195	5	975	3	2,925
NBT	SBL	left turn/cross			0	5	-
NBT	WBR	right turn/merge			0	3	-
NBT	WBT	cross			0	8	-
NBT	WBL	left turn/cross			0	5	-
NBR	EBT	right turn/merge			0	3	-
NBR	SBL	right turn/merge			0	3	-
SBL	WBT	left turn/cross			0	5	-
SBL	WBL	left turn/cross			0	4	-
SBL	EBT	left turn/merge			0	3	-
SBL	EBL	left turn/cross			0	4	-
SBT	WBT	cross			0	8	-
SBT	WBL	left turn/merge			0	3	-
SBT	EBR	right turn/merge	195	40	7800	3	23,400
SBT	EBT	cross			0	8	-
SBT	EBL	left turn/cross	195	5	975	5	4,875
SBR	WBT	right turn/merge			0	3	-
EBL	WBR	left turn/merge			0	3	-
EBL	WBT	left turn/cross			0	5	-
EBT	WBL	left turn/cross			0	5	-
EBR	WBL	right turn/merge			0	3	-
						TOTAL	126,900
Intersection: Spotted Rd/21st Ave					35 MPH, Stop Controlled		
NBL	EBT	left turn/cross	200	10	2000	5	10,000
NBL	EBL	left turn/cross	200	205	41000	4	164,000
NBL	SBR	left turn/merge	200	10	2000	3	6,000
NBL	SBT	left turn/cross	200	10	2000	5	10,000
NBL	WBT	left turn/merge	200	10	2000	2	4,000
NBL	WBL	left turn/cross	200	10	2000	4	8,000
NBT	EBT	cross	10	10	100	8	800
NBT	EBL	left turn/merge	10	205	2050	3	6,150
NBT	SBL	left turn/cross	10	10	100	5	500
NBT	WBR	right turn/merge	10	10	100	3	300
NBT	WBT	cross	10	10	100	8	800
NBT	WBL	left turn/cross	10	10	100	5	500
NBR	EBT	right turn/merge	5	10	50	3	150
NBR	SBL	right turn/merge	5	10	50	3	150
SBL	WBT	left turn/cross	10	10	100	5	500
SBL	WBL	left turn/cross	10	10	100	4	400
SBL	EBT	left turn/merge	10	10	100	3	300
SBL	EBL	left turn/cross	10	205	2050	4	8,200
SBT	WBT	cross	10	10	100	8	800
SBT	WBL	left turn/merge	10	10	100	3	300
SBT	EBR	right turn/merge	10	200	2000	3	6,000
SBT	EBT	cross	10	10	100	8	800
SBT	EBL	left turn/cross	10	205	2050	5	10,250
SBR	WBT	right turn/merge	10	10	100	3	300
EBL	WBR	left turn/merge	205	10	2050	3	6,150
EBL	WBT	left turn/cross	205	10	2050	5	10,250
EBT	WBL	left turn/cross	10	10	100	5	500
EBR	WBL	right turn/merge	200	10	2000	3	6,000
						TOTAL	262,100



# **Airport Drive Couplet at Spotted Road Intersection Study** **Safety Analysis**

## **Alternative A** **Partial Clover Interchange on Spotted**

Intersection: Inbound Ramps/21st Ave					35 MPH, Stop Controlled			
NBL	EBT	left turn/cross	155	560	86800	5	434,000	
NBL	EBL	left turn/cross	155		0	4	-	
NBL	SBR	left turn/merge	155		0	3	-	
NBL	SBT	left turn/cross	155		0	5	-	
NBL	WBT	left turn/merge	155	140	21700	3	65,100	
NBL	WBL	left turn/cross	155	60	9300	4	37,200	
NBT	EBT	cross		560	0	8	-	
NBT	EBL	left turn/merge			0	3	-	
NBT	SBL	left turn/cross			0	5	-	
NBT	WBR	right turn/merge			0	3	-	
NBT	WBT	cross		140	0	8	-	
NBT	WBL	left turn/cross		60	0	5	-	
NBR	EBT	right turn/merge	40	560	22400	3	67,200	
NBR	SBL	right turn/merge	40		0	3	-	
SBL	WBT	left turn/cross		140	0	5	-	
SBL	WBL	left turn/cross		60	0	4	-	
SBL	EBT	left turn/merge		560	0	3	-	
SBL	EBL	left turn/cross			0	4	-	
SBT	WBT	cross		140	0	8	-	
SBT	WBL	left turn/merge		60	0	3	-	
SBT	EBR	right turn/merge		5	0	3	-	
SBT	EBT	cross		560	0	8	-	
SBT	EBL	left turn/cross			0	5	-	
SBR	WBT	right turn/merge		140	0	3	-	
EBL	WBR	left turn/merge			0	3	-	
EBL	WBT	left turn/cross		140	0	5	-	
EBT	WBL	left turn/cross	560	60	33600	5	168,000	
EBR	WBL	right turn/merge	5	60	300	3	900	
						TOTAL	772,400	
						TOTAL CONFLICT VALUE		1,161,400

### Alternative B

#### Two Roundabouts Existing Locations








						Crash	
			Traffic	Traffic	Volume	Severity	Final
Movement 1	Movement 2	Type of Conflict	Volume 1	Volume 2	Product	Factor	Product
Intersection: Inbound/Spotted Rd					20 MPH, Roundabout		
NBL	EBT	right turn/merge			0	1	-
NBL	EBL	right turn/merge			0	1	-
NBL	SBR	right turn/merge		5	0	1	-
NBL	SBT+SBL	right turn/merge		355	0	1	-
NBL	WBT+WBR	right turn/merge		815	0	1	-
NBL	WBL	right turn/merge			0	1	-
NBT	EBT	right turn/merge	5		0	1	-
NBT	EBL	right turn/merge	5		0	1	-
NBT	SBL	right turn/merge	5		0	1	-
NBT	WBR	right turn/merge	5	290	1450	1	1,450
NBT	WBT	right turn/merge	5	525	2625	1	2,625
NBT	WBL	right turn/merge	5		0	1	-
NBR	EBT+EBL	right turn/merge			0	1	-
NBR	SBL	right turn/merge			0	1	-
SBL	WBT	right turn/merge		525	0	1	-
SBL	WBL	right turn/merge			0	1	-
SBL	EBT+EBR	right turn/merge			0	1	-
SBL	EBL	right turn/merge			0	1	-
SBT	WBT	right turn/merge	355	525	186375	1	186,375
SBT	WBL	right turn/merge	355		0	1	-
SBT	EBR	right turn/merge	355		0	1	-
SBT	EBT	right turn/merge	355		0	1	-
SBT	EBL	right turn/merge	355		0	1	-
SBR	WBT+WBL	right turn/merge	5	525	2625	1	2,625
EBL	WBR	right turn/merge		290	0	1	-
EBL	WBT+WBL	right turn/merge		525	0	1	-
EBT	WBL	right turn/merge			0	1	-
EBR	WBL	right turn/merge			0	1	-
						TOTAL	193,075
Intersection: Outbound/Spotted Rd					20 MPH, Roundabout		
NBL	EBT	right turn/merge		615	0	1	-
NBL	EBL	right turn/merge		5	0	1	-
NBL	SBR	right turn/merge			0	1	-
NBL	SBT+SBL	right turn/merge		355	0	1	-
NBL	WBT+WBR	right turn/merge			0	1	-
NBL	WBL	right turn/merge			0	1	-
NBT	EBT	right turn/merge		615	0	1	-
NBT	EBL	right turn/merge		5	0	1	-
NBT	SBL	right turn/merge		355	0	1	-
NBT	WBR	right turn/merge			0	1	-
NBT	WBT	right turn/merge			0	1	-
NBT	WBL	right turn/merge			0	1	-
NBR	EBT+EBL	right turn/merge		620	0	1	-
NBR	SBL	right turn/merge		355	0	1	-
SBL	WBT	right turn/merge	355		0	1	-
SBL	WBL	right turn/merge	355		0	1	-
SBL	EBT+EBR	right turn/merge	355	615	218325	1	218,325
SBL	EBL	right turn/merge	355	5	1775	1	1,775
SBT	WBT	right turn/merge			0	1	-
SBT	WBL	right turn/merge			0	1	-
SBT	EBR	right turn/merge			0	1	-
SBT	EBT	right turn/merge		615	0	1	-
SBT	EBL	right turn/merge		5	0	1	-
SBR	WBT+WBL	right turn/merge			0	1	-
EBL	WBR	right turn/merge	5		0	1	-
EBL	WBT+WBL	right turn/merge	5		0	1	-
EBT	WBL	right turn/merge	615		0	1	-
EBR	WBL	right turn/merge			0	1	-
						TOTAL	220,100

### Alternative B

#### Two Roundabouts Existing Locations

Intersection: Airport Drive/New Spotted Road					50 MPH, Traffic Signal		
NBL	EBT	left turn/cross	195	675	131625	5	658,125
NBL	EBL	left turn/cross	195		0	4	-
NBL	SBR	left turn/merge	195		0	3	-
NBL	SBT	left turn/cross	195		0	5	-
NBL-NBL to Spotted	WBT	left turn/merge	60	620	37200	3	111,600
NBL	WBL	left turn/cross	195	40	7800	4	31,200
NBT	EBT	cross		675	0	7	-
NBT	EBL	left turn/merge			0	3	-
NBT	SBL	left turn/cross			0	5	-
NBT	WBR	right turn/merge			0	3	-
NBT	WBT	cross		620	0	7	-
NBT	WBL	left turn/cross		40	0	5	-
NBR	EBT	right turn/merge	60	675	40500	3	121,500
NBR	SBL	right turn/merge	60		0	3	-
SBL	WBT	left turn/cross		620	0	5	-
SBL	WBL	left turn/cross		40	0	4	-
SBL	EBT	left turn/merge		675	0	3	-
SBL	EBL	left turn/cross			0	4	-
SBT	WBT	cross		620	0	7	-
SBT	WBL	left turn/merge		40	0	3	-
SBT	EBR	right turn/merge		195	0	3	-
SBT	EBT	cross		620	0	7	-
SBT	EBL	left turn/cross			0	5	-
SBR	WBT	right turn/merge		620	0	3	-
EBL	WBR	left turn/merge			0	3	-
EBL	WBT	left turn/cross		620	0	5	-
EBT	WBL	left turn/cross	675	40	27000	5	135,000
EBR	WBL	right turn/merge	195	40	7800	3	23,400
TOTAL							1,080,825
TOTAL CONFLICT VALUE							1,494,000

### Diamond Interchange Connecting Spotted/21st

Intersection: Airport Drive eastbound ramps /Spotted Rd					35 MPH Stop Controlled	
NBL	EBT	left turn/cross		0		5
NBL	EBL	left turn/cross	5	0		4
NBL	SBR	left turn/merge		0		3
NBL	SBT	left turn/cross	195	0		5
NBL	WBT	left turn/merge		0		2
NBL	WBL	left turn/cross		0		4
NBT	EBT	cross	195	0		8
NBT	EBL	left turn/merge	195	5	975	3
NBT	SBL	left turn/cross	195	405	78975	5
NBT	WBR	right turn/merge	195		0	3
NBT	WBT	cross	195		0	8
NBT	WBL	left turn/cross	195		0	5
NBR	EBT	right turn/merge	60		0	3
NBR	SBL	right turn/merge	60	405	24300	3
SBL	WBT	left turn/cross	405		0	5
SBL	WBL	left turn/cross	405		0	4
SBL	EBT	left turn/merge	405		0	3
SBL	EBL	left turn/cross	405	5	2025	4
SBT	WBT	cross	195		0	8
SBT	WBL	left turn/merge	195		0	3
SBT	EBR	right turn/merge	195	40	7800	3
SBT	EBT	cross	195		0	8
SBT	EBL	left turn/cross	195	5	975	5
SBR	WBT	right turn/merge			0	3
EBL	WBR	left turn/merge	5		0	3
EBL	WBT	left turn/cross	5		0	5
EBT	WBL	left turn/cross			0	5
EBR	WBL	right turn/merge	40		0	3
					TOTAL	507,075

<b>TOTAL CONFLICT VALUE</b>	<b>1,106,275</b>
-----------------------------	------------------

# **Airport Drive Couplet at Spotted Road Intersection Study** **Safety Analysis**

## **Alternative D** **One Roundabout Connecting Spotted/21st**

						Crash	
Movement 1	Movement 2	Type of Conflict	Traffic Volume 1	Traffic Volume 2	Volume Product	Severity Factor	Final Product
Intersection: Airport Drive/21st Ave/Spotted Rd						20 MPH, Roundabout	
NBL	EBT	right turn/merge	60	575	34500	1	34,500
NBL	EBL	right turn/merge	60	5	300	1	300
NBL	SBR	right turn/merge	60	5	300	1	300
NBL	SBT+SBL	right turn/merge	60	610	36600	1	36,600
NBL	WBT+WBR	right turn/merge	60	620	37200	1	37,200
NBL	WBL	right turn/merge	60	40	2400	1	2,400
NBT	EBT	right turn/merge	135	575	77625	1	77,625
NBT	EBL	right turn/merge	135	5	675	1	675
NBT	SBL	right turn/merge	135	405	54675	1	54,675
NBT	WBR	right turn/merge	135	155	20925	1	20,925
NBT	WBT	right turn/merge	135	465	62775	1	62,775
NBT	WBL	right turn/merge	135	40	5400	1	5,400
NBR	EBT+EBL	right turn/merge	60	580	34800	1	34,800
NBR	SBL	right turn/merge	60	405	24300	1	24,300
SBL	WBT	right turn/merge	405	465	188325	1	188,325
SBL	WBL	right turn/merge	405	40	16200	1	16,200
SBL	EBT+EBR	right turn/merge	405	615	249075	1	249,075
SBL	EBL	right turn/merge	405	5	2025	1	2,025
SBT	WBT	right turn/merge	155	465	72075	1	72,075
SBT	WBL	right turn/merge	155	40	6200	1	6,200
SBT	EBR	right turn/merge	155	40	6200	1	6,200
SBT	EBT	right turn/merge	155	575	89125	1	89,125
SBT	EBL	right turn/merge	155	5	775	1	775
SBR	WBT+WBL	right turn/merge	5	505	2525	1	2,525
EBL	WBR	right turn/merge	5	155	775	1	775
EBL	WBT+WBL	right turn/merge	5	505	2525	1	2,525
EBT	WBL	right turn/merge	575	40	23000	1	23,000
EBR	WBL	right turn/merge	40	40	1600	1	1,600
						TOTAL	1,052,900

<b>TOTAL CONFLICT VALUE</b>	<b>1,052,900</b>
-----------------------------	------------------



## Airport Drive Couplet at Spotted Road Intersection Study -- Safety Analysis

### Alternative E -- Continuous Green-T Intersection Inbound

						Crash	
			Traffic	Traffic	Volume	Severity	
Movement 1	Movement 2	Type of Conflict	Volume 1	Volume 2	Product	Factor	Final Product
Intersection: 21st Ave/Spotted Rd					35 MPH, Stop Controlled		
NBL	EBT	left turn/cross	290	10	2900	5	14,500
NBL	EBL	left turn/cross	290	205	59450	4	237,800
NBL	SBR	left turn/merge	290	10	2900	3	8,700
NBL	SBT	left turn/cross	290	10	2900	5	14,500
NBL	WBT	left turn/merge	290	10	2900	3	8,700
NBL	WBL	left turn/cross	290	10	2900	4	11,600
NBT	EBT	cross	10	10	100	8	800
NBT	EBL	left turn/merge	10	10	100	3	300
NBT	SBL	left turn/cross	10	10	100	5	500
NBT	WBR	right turn/merge	10	10	100	3	300
NBT	WBT	cross	10	10	100	8	800
NBT	WBL	left turn/cross	10	10	100	5	500
NBR	EBT	right turn/merge	5	10	50	3	150
NBR	SBL	right turn/merge	5	10	50	3	150
SBL	WBT	left turn/cross	10	10	100	5	500
SBL	WBL	left turn/cross	10	10	100	4	400
SBL	EBT	left turn/merge	10	10	100	3	300
SBL	EBL	left turn/cross	10	205	2050	4	8,200
SBT	WBT	cross	10	10	100	8	800
SBT	WBL	left turn/merge	10	10	100	3	300
SBT	EBR	right turn/merge	10	360	3600	3	10,800
SBT	EBT	cross	10	10	100	8	800
SBT	EBL	left turn/cross	10	205	2050	5	10,250
SBR	WBT	right turn/merge	10	10	100	3	300
EBL	WBR	left turn/merge	205	10	2050	3	6,150
EBL	WBT	left turn/cross	205	10	2050	5	10,250
EBT	WBL	left turn/cross	10	10	100	5	500
EBR	WBL	right turn/merge	360	10	3600	3	10,800
						Total	359,650

					Crash		
Movement 1	Movement 2	Type of Conflict	Traffic Volume 1	Traffic Volume 2	Volume Product	Severity Factor	Final Product
Intersection: Inbound Ramps/Spotted Rd					35 MPH, Stop Controlled		
NBL	EBT	left turn/cross			0	5	-
NBL	EBL	left turn/cross			0	4	-
NBL	SBR	left turn/merge	0	5	0	3	-
NBL	SBT	left turn/cross		355	0	5	-
NBL	WBT	left turn/merge			0	3	-
NBL	WBL	left turn/cross			0	4	-
NBT	EBT	cross	135		0	8	-
NBT	EBL	left turn/merge	135		0	3	-
NBT	SBL	left turn/cross	135		0	5	-
NBT	WBR	right turn/merge	135	155	20925	3	62,775
NBT	WBT	cross	135		0	8	-
NBT	WBL	left turn/cross	135		0	5	-
NBR	EBT	right turn/merge			0	3	-
NBR	SBL	right turn/merge			0	3	-
SBL	WBT	left turn/cross			0	5	-
SBL	WBL	left turn/cross			0	4	-
SBL	EBT	left turn/merge			0	3	-
SBL	EBL	left turn/cross			0	4	-
SBT	WBT	cross	355		0	8	-
SBT	WBL	left turn/merge	355		0	3	-
SBT	EBR	right turn/merge	355		0	3	-
SBT	EBT	cross	355		0	8	-
SBT	EBL	left turn/cross	355		0	5	-
SBR	WBT	right turn/merge	5		0	3	-
EBL	WBR	left turn/merge		155	0	3	-
EBL	WBT	left turn/cross			0	5	-
EBT	WBL	left turn/cross			0	5	-
EBR	WBL	right turn/merge			0	3	-
						Total	62,775

### Airport Drive Couplet at Spotted Road Intersection Study -- Safety Analysis

						Crash	
			Traffic	Traffic	Volume	Severity	
Movement 1	Movement 2	Type of Conflict	Volume 1	Volume 2	Product	Factor	Final Product
Intersection: Outbound/Spotted Rd					35 MPH, Stop Controlled		
NBL	EBT	left turn/cross		615	0	5	-
NBL	EBL	left turn/cross		5	0	4	-
NBL	SBR	left turn/merge			0	3	-
NBL	SBT	left turn/cross			0	5	-
NBL	WBT	left turn/merge			0	3	-
NBL	WBL	left turn/cross			0	4	-
NBT	EBT	cross		615	0	8	-
NBT	EBL	left turn/merge		5	0	3	-
NBT	SBL	left turn/cross		355	0	5	-
NBT	WBR	right turn/merge		135	0	3	-
NBT	WBT	cross			0	8	-
NBT	WBL	left turn/cross			0	5	-
NBR	EBT	right turn/merge		615	0	3	-
NBR	SBL	right turn/merge		355	0	3	-
SBL	WBT	left turn/cross	355		0	5	-
SBL	WBL	left turn/cross	355		0	4	-
SBL	EBT	left turn/merge	355	615	218325	3	654,975
SBL	EBL	left turn/cross	355	5	1775	4	7,100
SBT	WBT	cross			0	8	-
SBT	WBL	left turn/merge			0	3	-
SBT	EBR	right turn/merge			0	3	-
SBT	EBT	cross		615	0	8	-
SBT	EBL	left turn/cross		5	0	5	-
SBR	WBT	right turn/merge			0	3	-
EBL	WBR	left turn/merge	5	135	675	3	2,025
EBL	WBT	left turn/cross	5		0	5	-
EBT	WBL	left turn/cross	615		0	5	-
EBR	WBL	right turn/merge			0	3	-
						Total	664,100
					0		-

					Crash		
			Traffic	Traffic	Volume	Severity	
Movement 1	Movement 2	Type of Conflict	Volume 1	Volume 2	Product	Factor	Final Product
Intersection: Airport Drive/New Spotted Road					35 MPH, Stop Controlled		
NBL	EBT	left turn/cross	195	675	131625	5	658,125
NBL	EBL	left turn/cross	195		0	4	-
NBL	SBR	left turn/merge	195		0	3	-
NBL	SBT	left turn/cross	195		0	5	-
NBL-NBL to Spot	WBT	left turn/merge	60	620	37200	3	111,600
NBL	WBL	left turn/cross	195	40	7800	4	31,200
NBT	EBT	cross		675	0	7	-
NBT	EBL	left turn/merge			0	3	-
NBT	SBL	left turn/cross			0	5	-
NBT	WBR	right turn/merge			0	3	-
NBT	WBT	cross		620	0	7	-
NBT	WBL	left turn/cross		40	0	5	-
NBR	EBT	right turn/merge	60	675	40500	3	121,500
NBR	SBL	right turn/merge	60		0	3	-
SBL	WBT	left turn/cross		620	0	5	-
SBL	WBL	left turn/cross		40	0	4	-
SBL	EBT	left turn/merge		675	0	3	-
SBL	EBL	left turn/cross			0	4	-
SBT	WBT	cross		620	0	7	-
SBT	WBL	left turn/merge		40	0	3	-
SBT	EBR	right turn/merge		195	0	3	-
SBT	EBT	cross		620	0	7	-
SBT	EBL	left turn/cross			0	5	-
SBR	WBT	right turn/merge		620	0	3	-
EBL	WBR	left turn/merge			0	3	-
EBL	WBT	left turn/cross		620	0	5	-
EBT	WBL	left turn/cross	675	40	27000	5	135,000
EBR	WBL	right turn/merge	195	40	7800	3	23,400
						Total	1,080,825
			TOTAL CONFLICT VALUE				2,167,350

## **Appendix H**

### **Alternatives Analysis Level of Service Worksheets**

TWO-WAY STOP CONTROL SUMMARY							
General Information			Site Information				
Analyst	Montgomery		Intersection	Alt A Inbound ramps/21st			
Agency/Co.	JUB Engineers		Jurisdiction				
Date Performed	11/19/2014		Analysis Year	2035			
Analysis Time Period	PM Peak Hour						
Project Description: Airport Drive Couplet at Spotted Road Intersection Study							
East/West Street: 21st Avenue			North/South Street: Inbound Ramps				
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)		560	5	60	140		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	1.00	
Hourly Flow Rate, HFR (veh/h)	0	622	5	66	155	0	
Percent Heavy Vehicles	2	--	--	0	--	--	
Median Type	Two Way Left Turn Lane						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration			TR		LT		
Upstream Signal		0			0		
Minor Street	Northbound			Southbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	155		40				
Peak-Hour Factor, PHF	0.90	0.90	0.90	1.00	0.90	0.90	
Hourly Flow Rate, HFR (veh/h)	172	0	44	0	0	0	
Percent Heavy Vehicles	2	0	0	0	0	0	
Percent Grade (%)		0			0		
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	0	0	0	0	0	
Configuration		LR					
Delay, Queue Length, and Level of Service							
Approach	Eastbound	Westbound	Northbound			Southbound	
Movement	1	4	7	8	9	10	11
Lane Configuration		LT		LR			
v (veh/h)		66		216			
C (m) (veh/h)		965		417			
v/c		0.07		0.52			
95% queue length		0.22		2.89			
Control Delay (s/veh)		9.0		22.5			
LOS		A		C			
Approach Delay (s/veh)	--	--	22.5				
Approach LOS	--	--	C				

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 11/19/2014 4:12 PM

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Montgomery			Intersection	Alt A Outbound ramps/Spotted			
Agency/Co.	JUB Engineers			Jurisdiction				
Date Performed	11/19/2014			Analysis Year	2035			
Analysis Time Period	PM Peak Hour							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Airport Drive				North/South Street: Spotted Road				
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)	60	195			195	200		
Peak-Hour Factor, PHF	0.90	0.90	1.00	1.00	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	66	216	0	0	216	222		
Percent Heavy Vehicles	2	—	—	0	—	—		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					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)	5		40					
Peak-Hour Factor, PHF	0.90	1.00	0.90	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	5	0	44	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)		0			0			
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	66						49	
C (m) (veh/h)	1122						684	
v/c	0.06						0.07	
95% queue length	0.19						0.23	
Control Delay (s/veh)	8.4						10.7	
LOS	A				B		B	
Approach Delay (s/veh)	—	—				10.7		
Approach LOS	—	—				B		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 11/19/2014 4:13 PM



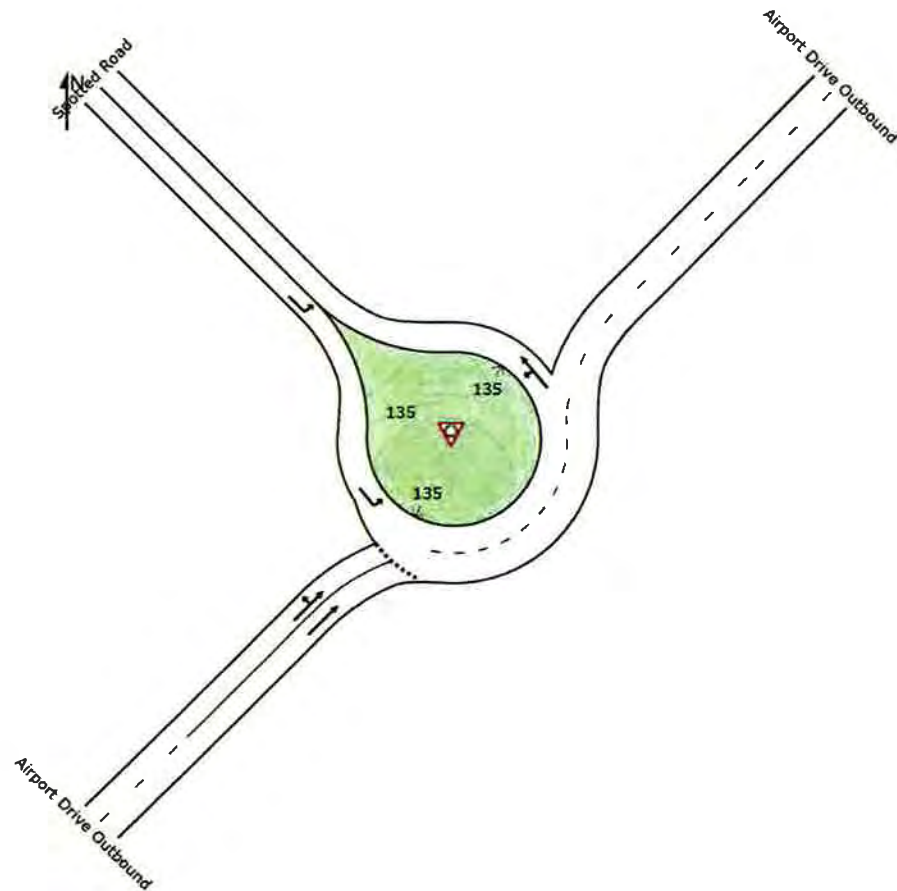
TWO-WAY STOP CONTROL SUMMARY									
<b>General Information</b>					<b>Site Information</b>				
Analyst	Montgomery				Intersection	Alt A Spotted/21st			
Agency/Co.	JUB Engineers				Jurisdiction				
Date Performed	11/19/2014				Analysis Year	2035			
Analysis Time Period	PM Peak Hour								
Project Description: Airport Drive Couplet at Spotted Road Intersection Study									
East/West Street: 21st Avenue					North/South Street: Spotted Rd				
Intersection Orientation: North-South					Study Period (hrs): 0.25				
<b>Vehicle Volumes and Adjustments</b>									
<b>Major Street</b>	Northbound			Southbound					
Movement	1	2	3	4	5	6			
	L	T	R	L	T	R			
Volume (veh/h)	200	10	5	10	10	10			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90			
Hourly Flow Rate, HFR (veh/h)	222	11	5	11	11	11			
Percent Heavy Vehicles	2	—	—	0	—	—			
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				
<b>Minor Street</b>	Eastbound			Westbound					
Movement	7	8	9	10	11	12			
	L	T	R	L	T	R			
Volume (veh/h)	205	10	395	10	10	10			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90			
Hourly Flow Rate, HFR (veh/h)	227	11	438	11	11	11			
Percent Heavy Vehicles	2	0	2	0	0	0			
Percent Grade (%)	0			0					
Flared Approach		N			N				
Storage		0			0				
RT Channelized			0			0			
Lanes	1	1	0	1	1	0			
Configuration	L		TR	L		TR			
<b>Delay, Queue Length, and Level of Service</b>									
Approach	Northbound	Southbound	Westbound			Eastbound			
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	L	L	L		TR	L		TR	
v (veh/h)	222	11	11		22	227		449	
C (m) (veh/h)	1593	1615	188		588	422		1023	
v/c	0.14	0.01	0.06		0.04	0.54		0.44	
95% queue length	0.48	0.02	0.18		0.12	3.10		2.27	
Control Delay (s/veh)	7.6	7.2	25.3		11.4	23.0		11.2	
LOS	A	A	D		B	C		B	
Approach Delay (s/veh)	—	—	16.0			15.2			
Approach LOS	—	—	C			C			

## SITE LAYOUT

Site: 2035 Outbound/Spotted Rd Mid-Day - Dual

Airport Drive Outbound and Spotted Road  
2035 Mid-Day  
Roundabout

ALT B



## MOVEMENT SUMMARY

Site: 2035 Outbound/Spotted Rd Mid-Day - Dual

Airport Drive Outbound and Spotted Road  
2035 Mid-Day  
Roundabout

Movement Performance - Vehicles										
Mov	OD	Demand Flows		Deg	Average	Level of	95% Back of Queue	Prop.	Effective	Average
IC	Mov	Total	HV	Satn	Delay	Service	Vehicles	Queued	Stop Rate	Speed
		veh/h	%	v/c	sec		veh	ft	per veh	mph
NorthWest: Spotted Road										
SBL	L2	514	7.0	0.402	7.1	LOS A	0.0	0.0	0.00	31.1
Approach		514	7.0	0.402	7.1	LOS A	0.0	0.0	0.00	31.1
SouthWest: Airport Drive Outbound										
WBL	L2	6	1.0	0.341	12.5	LOS B	2.1	53.3	0.67	33.1
WBT	T1	691	1.0	0.341	5.0	LOS A	2.2	56.3	0.66	33.4
Approach		697	1.0	0.341	5.0	LOS A	2.2	56.3	0.66	33.4
All Vehicles		1211	3.5	0.402	5.9	LOS A	2.2	56.3	0.38	32.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Processed: Friday, November 7, 2014 10:43:49 AM

SIDRA INTERSECTION 6.0.24.4877

Project: \\slcfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\SIA Spotted Road Study.sip6

8000863, 6016535, J U B ENGINEERS, INC., PLUS / 1PC

Copyright © 2000-2014 Akcelik and Associates Pty Ltd

www.sidrasolutions.com

Project: \\slcfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\SIA Spotted Road Study.sip6

PLUS / 1PC

**SIDRA  
INTERSECTION 6**

Created: Friday, November 7, 2014 11:21:00 AM

SIDRA INTERSECTION 6.0.24.4877

Project: \\slcfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\SIA Spotted Road Study.sip6

8000863, 6016535, J U B ENGINEERS, INC., PLUS / 1PC

Copyright © 2000-2014 Akcelik and Associates Pty Ltd

www.sidrasolutions.com

Project: \\slcfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\SIA Spotted Road Study.sip6

PLUS / 1PC

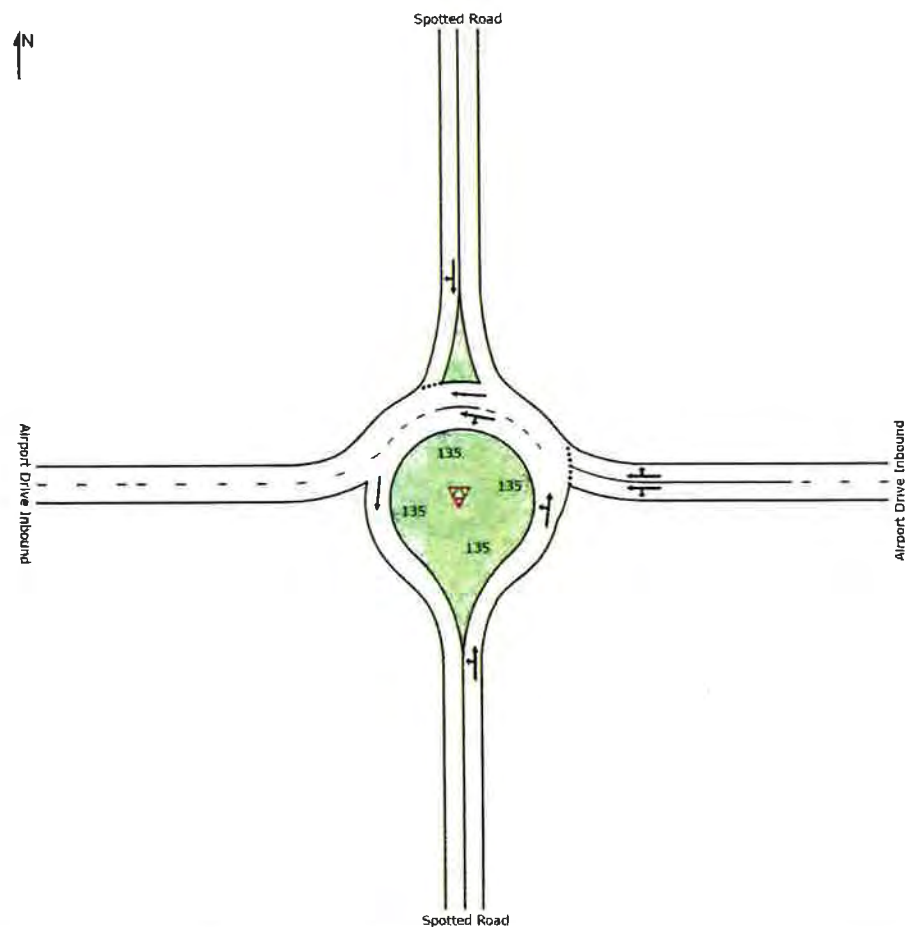
**SIDRA  
INTERSECTION 6**

## SITE LAYOUT

Site: 2035 Inbound/Spotted Rd Mid-Day - Dual

Airport Drive Inbound and Spotted Road  
2035 Mid-Day  
Roundabout

ALT B



## MOVEMENT SUMMARY

Site: 2035 Inbound/Spotted Rd Mid-Day - Dual

Airport Drive Inbound and Spotted Road  
2035 Mid-Day  
Roundabout

Movement Performance - Vehicles											
Mov ID	QD Mov	Demand Total veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Spotted Road											
NBL	L2	1	3.0	0.004	7.1	LOS A	0.0	0.0	0.00	0.19	34.9
NBT	T1	5	3.0	0.004	0.3	LOS A	0.0	0.0	0.00	0.19	34.0
Approach		6	3.0	0.004	1.7	LOS A	0.0	0.0	0.00	0.19	34.2
East: Airport Drive Inbound											
WBL	L2	1	2.0	0.281	8.8	LOS A	1.8	44.6	0.06	0.22	35.9
WBT	T1	597	2.0	0.281	2.0	LOS A	1.8	44.6	0.06	0.25	35.3
WBR	R2	330	2.0	0.281	2.7	LOS A	1.7	44.2	0.05	0.31	33.8
Approach		927	2.0	0.281	2.3	LOS A	1.8	44.6	0.06	0.27	34.8
North: Spotted Road											
SBT	T1	370	7.0	0.503	7.0	LOS A	3.0	79.6	0.68	0.81	31.5
SBR	R2	5	7.0	0.503	7.6	LOS A	3.0	79.6	0.68	0.81	31.9
Approach		375	7.0	0.503	7.1	LOS A	3.0	79.6	0.68	0.81	31.6
All Vehicles		1308	3.4	0.503	3.6	LOS A	3.0	79.6	0.23	0.42	34.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Processed: Friday, November 7, 2014 10:43:44 AM

SIDRA INTERSECTION 6 0 24 4877

Project: \\elcfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\ISA Spotted

Road Study.sip6

8000863, 6016535, J U B ENGINEERS, INC., PLUS / 1PC

Copyright © 2000-2014 Akcelik and Associates Pty Ltd

www.sidrasolutions.com

Project: \\elcfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\ISA Spotted

Road Study.sip6

1PC

**SIDRA  
INTERSECTION 6**

Created: Friday, November 7, 2014 11:19:39 AM

SIDRA INTERSECTION 6 0 24 4877

Project: \\elcfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\ISA Spotted

Road Study.sip6

8000863, 6016535, J U B ENGINEERS, INC., PLUS / 1PC

Copyright © 2000-2014 Akcelik and Associates Pty Ltd

www.sidrasolutions.com

Project: \\elcfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\ISA Spotted

Road Study.sip6

1PC

**SIDRA  
INTERSECTION 6**








## Queues

2035 High Tee.syn

8: Airport Drive Outbound/Airport Drive &amp; Spotted Road &amp; Airport Drive Inbound

11/24/2014



Lane Group	NWL	NET	NEP	SWL	SWR
Lane Group Flow (vph)	277	734	212	43	674
v/c Ratio	0.44	0.45	0.25	0.30	0.24
Control Delay	10.7	11.5	3.1	27.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	11.5	3.1	27.7	0.2
Queue Length 50th (ft)	36	61	0	12	0
Queue Length 95th (ft)	86	133	33	36	0
Internal Link Dist (ft)	527	1390			
Turn Bay Length (ft)			100		
Base Capacity (vph)	629	1614	836	141	2787
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.44	0.45	0.25	0.30	0.24

Intersection Summary

TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery	Intersection	Alt C Airport Dr In/21st					
Agency/Co.	JUB Engineers	Jurisdiction						
Date Performed	11/19/2014	Analysis Year	2035					
Analysis Time Period	PM Peak Hour							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Airport Drive		North/South Street: 21st Avenue						
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)	60	140			560	5		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	66	155	0	0	622	5		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	1	1	0	0	1	0		
Configuration	L	T				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)				40		155		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	0	0	0	44	0	172		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L			LR				
v (veh/h)	66			216				
C (m) (veh/h)	955			701				
v/c	0.07			0.31				
95% queue length	0.22			1.31				
Control Delay (s/veh)	9.0			12.4				
LOS	A			B				
Approach Delay (s/veh)	--	--	12.4					
Approach LOS	--	--	B					

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 11/19/2014 4:27 PM

file:///C:/Temp/4/h2kA9F6.tmn

11/19/2014

TWO-WAY STOP CONTROL SUMMARY								
General Information				Site Information				
Analyst	Montgomery			Intersection	Alt C Airport Dr Out/Spotted			
Agency/Co.	JUB Engineers			Jurisdiction				
Date Performed	11/19/2014			Analysis Year	2035			
Analysis Time Period	PM Peak Hour							
Project Description: Airport Drive Couplet at Spotted Road				Intersection Study				
East/West Street: Airport Drive				North/South Street: Spotted Road				
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)		195	60	405	195			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	0	216	66	450	216	0		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Two Way Left Turn Lane							
RT Channelized			0			0		
Lanes	0	1	0	1	1	0		
Configuration			TR	L	T			
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	5		40					
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	5	0	44	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L					LR	
v (veh/h)		450					49	
C (m) (veh/h)		1292					579	
v/c		0.35					0.08	
95% queue length		1.58					0.28	
Control Delay (s/veh)		9.3					11.8	
LOS		A					B	
Approach Delay (s/veh)	--	--				11.8		
Approach LOS	--	--				B		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 11/19/2014 4:24 PM

file:///C:/Temp/4/u2kA9F6.tmn

11/19/2014

## MOVEMENT SUMMARY

Site: 2035 Airport Dr./Spotted Rd Mid-Day

Airport Dr. and Spotted Road  
2035 Mid-Day  
Roundabout

ALT D

Movement Performance - Vehicles											
Mov ID	OP Mov	Demand Flows veh/h	Flows MV	Req Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Cautioid	Effective Stop Rate per veh	Average Speed mph
SouthEast: Spotted Road											
NBL	L2	63	4.0	0.507	16.5	LOS B	3.1	80.4	0.83	0.97	34.2
NBT	T1	141	4.0	0.507	9.3	LOS A	3.1	80.4	0.83	0.97	31.3
NBR	R2	63	4.0	0.507	10.1	LOS B	3.1	80.4	0.83	0.97	33.1
Approach		266	4.0	0.507	11.2	LOS B	3.1	80.4	0.83	0.97	32.4
NorthEast: Airport Drive Outbound											
WBL	L2	45	2.0	0.299	13.8	LOS B	2.1	52.6	0.50	0.55	38.6
WBT	T1	528	2.0	0.299	6.0	LOS A	2.2	54.9	0.50	0.54	42.6
WBR	R2	176	2.0	0.299	6.0	LOS A	2.2	54.9	0.49	0.52	36.6
Approach		750	2.0	0.299	6.5	LOS A	2.2	54.9	0.49	0.53	40.8
NorthWest: 21st Avenue											
SBL	L2	422	7.0	0.832	20.7	LOS C	9.5	251.3	0.93	1.22	30.6
SBT	T1	161	7.0	0.832	13.5	LOS B	9.5	251.3	0.93	1.22	28.6
SBR	R2	5	7.0	0.832	14.3	LOS B	9.5	251.3	0.93	1.22	29.8
Approach		589	7.0	0.832	18.7	LOS B	9.5	251.3	0.93	1.22	30.0
SouthWest: Airport Drive Outbound											
WBL	L2	6	1.0	0.441	17.9	LOS B	3.5	89.4	0.89	0.87	37.3
WBT	T1	646	1.0	0.441	9.4	LOS A	3.8	95.9	0.90	0.80	40.9
WBR	R2	45	1.0	0.441	8.8	LOS A	3.8	95.9	0.90	0.75	35.0
Approach		697	1.0	0.441	9.5	LOS A	3.8	95.9	0.90	0.80	40.4
All Vehicles		2301	3.2	0.832	11.1	LOS B	9.5	251.3	0.77	0.84	36.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

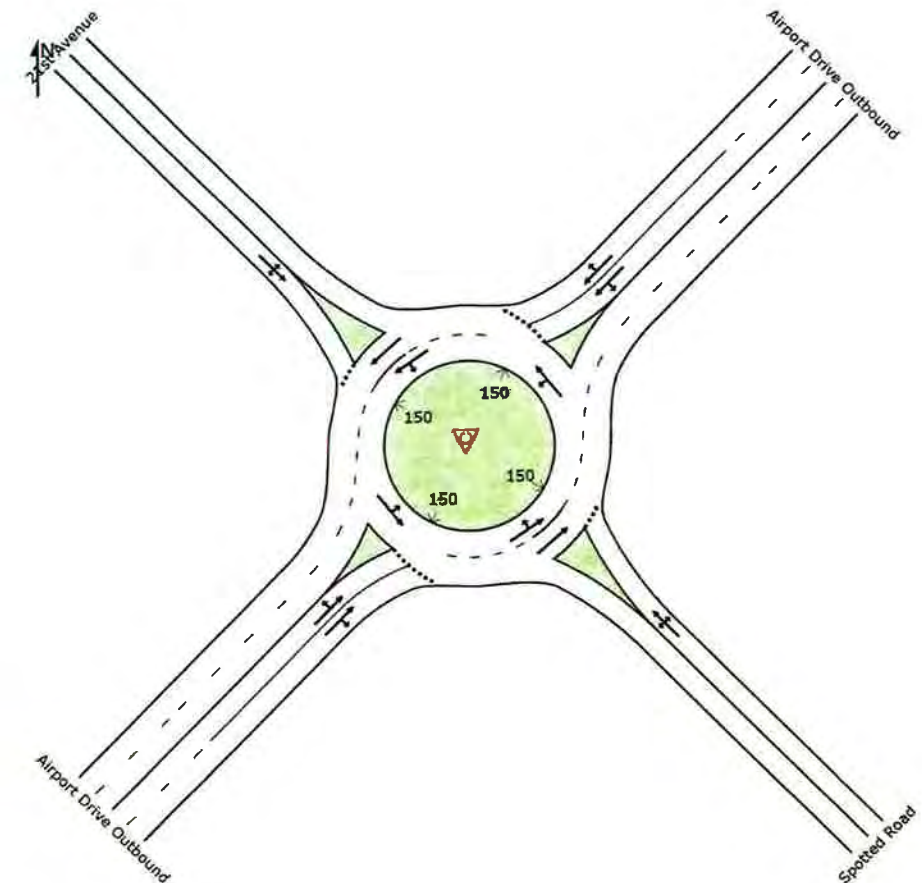
Processed: Friday, November 7, 2014 12:53:36 PM  
SIDRA INTERSECTION 6.0.24.4877  
Project: \\valdfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\ISA Spotted Road Study.sip6  
8000863, 6016535, J U B ENGINEERS, INC., PLUS / 1PC

SIDRA  
INTERSECTION 6

## SITE LAYOUT

Site: 2035 Airport Dr./Spotted Rd Mid-Day

Airport Dr. and Spotted Road  
2035 Mid-Day  
Roundabout



Created: Friday, November 7, 2014 12:17:26 PM  
SIDRA INTERSECTION 6.0.24.4877  
Project: \\valdfiles\public\projects\jub\Kennewick Office\70-13-033 SIA Spotted Road Study\SIDRA\ISA Spotted Road Study.sip6  
8000863, 6016535, J U B ENGINEERS, INC., PLUS / 1PC

SIDRA  
INTERSECTION 6



TWO-WAY STOP CONTROL SUMMARY								
General Information			Site Information					
Analyst	Montgomery	Intersection	Alt 2 Airport Dr In/Spotted					
Agency/Co.	JUB Engineers	Jurisdiction						
Date Performed	11/19/2014	Analysis Year	2035					
Analysis Time Period	PM Peak Hour							
Project Description: Airport Drive Couplet at Spotted Road Intersection Study								
East/West Street: Airport Drive Inbound Ramps			North/South Street: Spotted Rd					
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)	0	140			355	5		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	0	155	0	0	394	5		
Percent Heavy Vehicles	2	—	—	0	—	—		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					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)				0		155		
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly Flow Rate, HFR (veh/h)	0	0	0	0	0	172		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration					LR			
Delay, Queue Length, and Level of Service								
Approach	Northbound		Southbound		Westbound		Eastbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT			LR				
v (veh/h)	0			172				
C (m) (veh/h)	1160			896				
w/c	0.00			0.19				
95% queue length	0.00			0.71				
Control Delay (s/veh)	8.1			10.0				
LOS	A			A				
Approach Delay (s/veh)	—	—		10.0				
Approach LOS	—	—		A				

Copyright © 2010 University of Florida, All Rights Reserved

HCS™ Version 5.6

Generated: 11/19/2014 4:35 PM

TWO-WAY STOP CONTROL SUMMARY									
General Information					Site Information				
Analyst	Montgomery				Intersection	Alt 2 Spotted/21st			
Agency/Co.	JUB Engineers				Jurisdiction				
Date Performed	11/19/2014				Analysis Year	2035			
Analysis Time Period	PM Peak Hour								
Project Description: Airport Drive Couplet at Spotted Road Intersection Study									
East/West Street: 21st Avenue					North/South Street: Spotted 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)	205	10	360	10	10	10			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90			
Hourly Flow Rate, HFR (veh/h)	227	11	400	11	11	11			
Percent Heavy Vehicles	2	—	—	0	—	—			
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)	290	10	5	10	10	10			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90			
Hourly Flow Rate, HFR (veh/h)	322	11	5	11	11	11			
Percent Heavy Vehicles	2	0	0	0	0	0			
Percent Grade (%)	0			0					
Flared Approach		N			N				
Storage		0			0				
RT Channelized			0			0			
Lanes	1	1	0	1	1	0			
Configuration	L		TR	L		TR			
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	L		TR	L		TR	
v (veh/h)	227	11	322		16	11		22	
C (m) (veh/h)	1593	1159	336		383	324		388	
w/c	0.14	0.01	0.96		0.04	0.03		0.06	
95% queue length	0.50	0.03	10.15		0.13	0.11		0.18	
Control Delay (s/veh)	7.6	8.1	75.0		14.8	16.5		14.8	
LOS	A	A	F		B	C		B	
Approach Delay (s/veh)	—	—	72.1			15.4			
Approach LOS	—	—	F			C			

Copyright © 2010 University of Florida, All Rights Reserved

HCS™ Version 5.6

Generated: 11/19/2014 4:44 PM



TWO-WAY STOP CONTROL SUMMARY									
<b>General Information</b>					<b>Site Information</b>				
Analyst	Montgomery				Intersection	Alt 6 Spotted/21st			
Agency/Co.	JUB Engineers				Jurisdiction				
Date Performed	11/19/2014				Analysis Year	2035			
Analysis Time Period	PM Peak Hour								
Project Description: Airport Drive Couplet at Spotted Road Intersection Study									
East/West Street: 21st Avenue					North/South Street: Spotted Rd				
Intersection Orientation: North-South					Study Period (hrs): 0.25				
<b>Vehicle Volumes and Adjustments</b>									
Major Street	Northbound			Southbound					
Movement	1	2	3	4	5	6			
	L	T	R	L	T	R			
Volume (veh/h)	290	10	5	10	10	10			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90			
Hourly Flow Rate, HFR (veh/h)	322	11	5	11	11	11			
Percent Heavy Vehicles	2	—	—	0	—	—			
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	Eastbound			Westbound					
Movement	7	8	9	10	11	12			
	L	T	R	L	T	R			
Volume (veh/h)	205	10	360	10	10	10			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90			
Hourly Flow Rate, HFR (veh/h)	227	11	400	11	11	11			
Percent Heavy Vehicles	2	0	2	0	0	0			
Percent Grade (%)	0			0					
Flared Approach		N			N				
Storage		0			0				
RT Channelized			0			0			
Lanes	1	1	0	1	1	0			
Configuration	L		TR	L		TR			
<b>Delay, Queue Length, and Level of Service</b>									
Approach	Northbound	Southbound	Westbound			Eastbound			
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	L	L	L		TR	L		TR	
v (veh/h)	322	11	11		22	227		411	
C (m) (veh/h)	1593	1615	132		455	300		993	
w/c	0.20	0.01	0.08		0.05	0.76		0.41	
95% queue length	0.76	0.02	0.27		0.15	5.73		2.06	
Control Delay (s/veh)	7.8	7.2	34.7		13.3	46.4		11.2	
LOS	A	A	D		B	E		B	
Approach Delay (s/veh)	—	—	20.5			23.7			
Approach LOS	—	—	C			C			

# ALT B + E

Lanes, Volumes, Timings  
8: Airport Drive Outbound/Airport Drive & Spotted Road & Airport Drive Inbound 11/24/2014

	EBL	EBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Group	EBL	EBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	0	0	195	60	0	675	195	40	0	620
Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	0	0	0	0	0	100	0	0	0	0
Storage Length (ft)	0	0	1	0	0	1	1	2		
Storage Lanes	25	25	25	25	25	25	25	25		
Taper Length (ft)	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	1.00	0.88
Lane Util. Factor			0.968			0.850			0.850	
Flt Protected			0.963				0.950			
Satd. Flow (prot)	0	0	1736	0	0	3539	1583	1770	0	2787
Flt Permitted			0.963				0.950			
Satd. Flow (perm)	0	0	1736	0	0	3539	1583	1770	0	2787
Right Turn on Red				Yes	Yes	Yes	Yes	Yes	Yes	Yes
Satd. Flow (RTOR)			109			212				674
Link Speed (mph)	30	35				50			50	
Link Distance (ft)	643	607				1470			663	
Travel Time (s)	14.6	11.8				20.0			9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	212	65	0	734	212	43	0	674
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	277	0	0	734	212	43	0	674
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0	12				12			12	
Link Offset(ft)	0	0				0			0	
Crosswalk Width(ft)	16	16				16			16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15	9	15		9	15		9
Number of Detectors			1			2	1	1		1
Detector Template			Left			Thru	Right	Left		Right
Leading Detector (ft)			20			100	20	20		20
Trailing Detector (ft)			0			0	0	0		0
Detector 1 Position(ft)			0			0	0	0		0
Detector 1 Size(ft)			20			6	20	20		20
Detector 1 Type			Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel										
Detector 1 Extend (s)			0.0			0.0	0.0	0.0		0.0
Detector 1 Queue (s)			0.0			0.0	0.0	0.0		0.0
Detector 1 Delay (s)			0.0			0.0	0.0	0.0		0.0
Detector 2 Position(ft)						94				
Detector 2 Size(ft)						6				
Detector 2 Type						Cl+Ex				
Detector 2 Channel										
Detector 2 Extend (s)						0.0				
Turn Type			Prot			NA	Perm	Prot		Free
Protected Phases			2			4		3		
Permitted Phases							4			Free
Detector Phase			2			4	4	3		

Spotted Road 7/8/2014 2035 High Tee  
J-U-B

Synchro 8 Report  
Page 1

Lanes, Volumes, Timings  
8: Airport Drive Outbound/Airport Drive & Spotted Road & Airport Drive Inbound 11/24/2014

	EBL	EBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Group	EBL	EBR	NWL	NWR	NEL	NET	NER	SWL	SWT	SWR
Switch Phase										
Minimum Initial (s)			4.0			4.0	4.0	4.0		
Minimum Split (s)			20.0			20.0	20.0	8.0		
Total Split (s)			20.0			22.0	22.0	8.0		
Total Split (%)			40.0%			44.0%	44.0%	16.0%		
Maximum Green (s)			16.0			18.0	18.0	4.0		
Yellow Time (s)			3.5			3.5	3.5	3.5		
All-Red Time (s)			0.5			0.5	0.5	0.5		
Lost Time Adjust (s)			0.0			0.0	0.0	0.0		
Total Lost Time (s)			4.0			4.0	4.0	4.0		
Lead/Lag						Lag	Lag	Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		
Vehicle Extension (s)			3.0			3.0	3.0	3.0		
Recall Mode			Max			C-Max	C-Max	None		
Walk Time (s)			5.0			5.0	5.0			
Flash Dont Walk (s)			11.0			11.0	11.0			
Pedestrian Calls (#/hr)			0			0	0			
Act Effect Green (s)			16.0			22.8	22.8	4.0		50.0
Actuated g/C Ratio			0.32			0.46	0.46	0.08		1.00
v/c Ratio			0.44			0.45	0.25	0.30		0.24
Control Delay			10.7			11.5	3.1	27.7		0.2
Queue Delay			0.0			0.0	0.0	0.0		0.0
Total Delay			10.7			11.5	3.1	27.7		0.2
LOS			B			B	A	C		A
Approach Delay			10.7			9.6				
Approach LOS			B			A				

Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 28 (56%), Referenced to phase 4:NET, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 46.5%	ICU Level of Service A
Analysis Period (min): 15	

Splits and Phases: 8: Airport Drive Outbound/Airport Drive & Spotted Road & Airport Drive Inbound

e2	e3	e4 (R)
20 s	18 s	12 s

Spotted Road 7/8/2014 2035 High Tee  
J-U-B


Synchro 8 Report  
Page 2

## Queues

2035 High Tee.syn

8: Airport Drive Outbound/Airport Drive &amp; Spotted Road &amp; Airport Drive Inbound

11/24/2014



Lane Group	NWL	NET	NER	SWL	SWR
Lane Group Flow (vph)	277	734	212	43	674
v/c Ratio	0.44	0.45	0.25	0.30	0.24
Control Delay	10.7	11.5	3.1	27.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.7	11.5	3.1	27.7	0.2
Queue Length 50th (ft)	35	61	0	12	0
Queue Length 95th (ft)	86	133	33	36	0
Internal Link Dist (ft)	527	1390			
Turn Bay Length (ft)			100		
Base Capacity (vph)	629	1614	836	141	2787
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.44	0.45	0.25	0.30	0.24

Intersection Summary

## **Appendix I**

### **Travel Time Calculations for Each Alternative**



TRAVEL TIME CALCULATIONS

No-Build			
Inbound from US 2 exit to McFarlane		Speed	Travel
Segment	Distance	(MPH)	Time (sec)
US 2 to east of Flint	10807	50	147
east of Flint to McFarlane	3798	35	74
Length in Miles	2.77		
Total Seconds			221
Travel Time in Minutes			3:41
Outbound from Flint to US 2			
Flint to east of Flint	1203	35	23
east of Flint to US 2	10131	50	138
Length in Miles	2.15		
Total Seconds			161
Travel Time in Minutes			2:41
Spotted Road Northbound from south of RPZ to Flint			
Spotted Rd s/o RPZ to Outbound	2800	35	55
Spotted Outbound to Inbound	608	30	14
Inbound from Spotted to e/o Flint	3295	50	45
Inbound e/o Flint to Flint	1970	35	38
Flint from Inbound to 21st	2600	35	51
delay NBT at Spotted/Outbound			33
delay NBL at Spotted/Inbound			32
Length in Miles	2.14		
Total Seconds			268
Travel Time			4:28
21st Avenue Eastbound from Flint to US 2			
Flint from 21st to Inbound	2600	35	51
Flint from Inbound to Outbound	1200	50	16
Flint to east of Flint	1203	35	23
east of Flint to US 2	10356	50	141
delay SBT at Flint/Inbound			21
delay SBL at Flint/Outbound			39
Length in Miles	2.91		
Total Seconds			291
Travel Time			4:51

Alt A - Partial Cloverleaf Interchange			
Inbound from US 2 exit to McFarlane		Speed	Travel
Segment	Distance	(MPH)	Time (sec)
US 2 to east of Flint	10807	50	147
east of Flint to McFarlane	3798	35	74
Length in Miles	2.77		
Total Seconds			221
Travel Time in Minutes			3:41
Outbound from Flint to US 2			
Flint to east of Flint	1203	35	23
east of Flint to US 2	10356	50	141
Length in Miles	2.19		
Total Seconds			164
Travel Time in Minutes			2:44
Spotted Road Northbound from south of RPZ to Flint			
Spotted Rd s/o RPZ to 21st Ave	6488	35	126
21st Ave from Spotted to Flint	5189	35	101
delay NBT at Spotted/Outbound ramps			8
delay NBL at Spotted/21st			8
Length in Miles	2.21		
Total Seconds			243
Travel Time			4:03
21st Avenue Eastbound from Flint to US 2			
21st Avenue from Flint to Outbound	7249	35	141
Outbound from Spotted to US 2	6188	50	84
delay EBR at 21st/Spotted			11
Length in Miles	2.54		
Total Seconds			236
Travel Time			3:56

Alt B - Two Roundabouts and Continuous Green -T			
Inbound from US 2 exit to McFarlane		Speed	Travel
Segment	Distance	(MPH)	Time (sec)
US 2 to east of Spotted	7312	50	100
200 ' east and west of Spotted	400	20	14
200' west of Spotted to e/o Flint	3095	50	42
east of Flint to McFarlane	3798	35	74
delay WBT at roundabout			2
Length in Miles	2.77		
Total Seconds			232
Travel Time in Minutes			3:52
Outbound from Flint to US 2			
Flint to east of Flint	1203	35	23
east of Flint to 200' w/o Spotted	3875	50	53
200 ' west and east of Spotted	400	20	14
200 east of Spotted to US 2	5856	50	80
delay EBT at roundabout			5
delay at new intersection			11
Length in Miles	2.15		
Total Seconds			186
Travel Time in Minutes			3:06
Spotted Road Northbound from south of RPZ to Flint			
Spotted Rd s/o RPZ to Outbound	4360	35	85
Inbound from new Int to 200' e/o Spotted	1787	50	24
200' east and north of Spotted	400	20	14
Spotted north to 21st Ave	485	35	9
21st Ave from Spotted to Flint	5189	35	101
delay NBL at new intersection			11
delay at roundabout			3
delay at Spotted/21st			0
Length in Miles	2.31		
Total Seconds			247
Travel Time			4:07
21st Avenue Eastbound from Flint to US 2			
21st Avenue from Flint to Spotted	5189	35	101
Spotted from 21st to Outbound (less rdbts)	693	35	14
200' north and east of Spotted	400	20	14
Outbound from Spotted to US 2	5856	50	80
delay EBR at 21st/Spotted			7
delay at Inbound roundabout			7
delay at Outbound roundabout			7
delay at new intersection			11
Length in Miles	2.30		
Total Seconds			241
Travel Time			4:01

TRAVEL TIME CALCULATIONS

Alt C - Interchange at Airport Dr/21st/Spotted			
Inbound from US 2 exit to McFarlane			
Segment	Distance	Speed (MPH)	Travel Time (sec)
US 2 to east of Flint	10807	50	147
east of Flint to McFarlane	3798	35	74
Length in Miles	2.77		
Total Seconds			221
Travel Time in Minutes			3:41
Outbound from Flint to US 2			
Flint to east of Flint	1203	35	23
east of Flint to US 2	10131	50	138
Length in Miles	2.15		
Total Seconds			161
Travel Time in Minutes			2:41
Spotted Road Northbound from south of RPZ to Flint			
Spotted Rd s/o RPZ to New Intersection	4360	35	85
New Intersection to existing Spotted	1808	50	25
21st Ave from Spotted to Flint	5189	35	101
Length in Miles	2.15		
Total Seconds			211
Travel Time			3:31
21st Avenue Eastbound from Flint to US 2			
21st Avenue from Flint to Spotted	5189	35	101
21st Avenue from Spotted to Airport Dr	1808	35	35
Airport Drive from 21st/Spotted to US 2	4201	50	57
delay SBL at On ramp (from 21st)			9
Length in Miles	2.12		
Total Seconds			202
Travel Time			3:22

Alt D - Roundabout at Airport Dr/21st/Spotted			
Inbound from US 2 exit to McFarlane			
Segment	Distance	Speed (MPH)	Travel Time (sec)
US 2 to new intersection	5325	50	73
200' east and West of new intersection	400	20	14
new intersection to e/o Flint	5082	50	69
e/o Flint to McFarlane	3798	35	74
delay at new roundabout			6
Length in Miles	2.77		
Total Seconds			236
Travel Time in Minutes			3:56
Outbound from Flint to US 2			
Flint to east of Flint	1203	35	23
east of Flint to new intersection	5930	50	81
new intersection to US 2	4201	50	57
delay at new roundabout			9
Length in Miles	2.15		
Total Seconds			170
Travel Time in Minutes			2:50
Spotted Road Northbound from south of RPZ to Flint			
Spotted Rd s/o RPZ to New Intersection	4360	35	85
New Intersection to existing Spotted	1808	50	25
21st Ave from Spotted to Flint	5189	35	101
delay NBT at roundabout			9
Length in Miles	2.15		
Total Seconds			220
Travel Time			3:40
21st Avenue Eastbound from Flint to US 2			
21st Avenue from Flint to Spotted	5189	35	101
21st Avenue from Spotted to Airport Dr	1808	35	35
Airport Drive from 21st/Spotted to US 2	4201	50	57
delay SBL at roundabout			14
Length in Miles	2.12		
Total Seconds			207
Travel Time			3:27

Alt E - Continuous Green -T and Overpass for Spotted			
Inbound from US 2 exit to McFarlane			
Segment	Distance	Speed (MPH)	Travel Time (sec)
US 2 to east of Flint	10807	50	147
east of Flint to McFarlane	3798	35	74
Length in Miles	2.77		
Total Seconds			221
Travel Time in Minutes			3:41
Outbound from Flint to US 2			
Flint to east of Flint	1203	35	23
east of Flint to new intersection	5930	50	81
new intersection to US 2	4201	50	57
delay at new intersection			12
Length in Miles	2.15		
Total Seconds			173
Travel Time in Minutes			2:53
Spotted Road Northbound from south of RPZ to Flint			
Spotted Rd s/o RPZ to Outbound	4360	35	85
West from new Int to Spotted	1855	35	36
Spotted from Outbound to 21st	1293	35	25
21st Ave from Spotted to Flint	5189	35	101
delay NBL at new intersection			11
delay NBL at Spotted/21st			8
Length in Miles	2.40		
Total Seconds			266
Travel Time			4:26
21st Avenue Eastbound from Flint to US 2			
21st Avenue from Flint to Spotted	5189	35	101
Spotted from 21st to Outbound	1293	35	25
Outbound from Spotted to US 2	6056	50	83
delay EBR at 21st/Spotted			11
delay SBL at Outbound			2
delay at new intersection			11
Length in Miles	2.37		
Total Seconds			233
Travel Time			3:53

## **Appendix J**

### **Planning Level Cost Estimates for Each Alternative**

### ALT A - PARTIAL CLOVERLEAF INTERCHANGE

Component	Length of Road/Improvement (ft)	# Lanes	Lane Width (ft)	Lane HMA depth (ft)	Lane CSBC depth (ft)	# Shlds	Shld Width (ft)	Shld HMA Depth (ft)	Shld CSBC depth (ft)	Approx. earthwork depth (ft)	Sideslopes (X:1)
21st Ave Extension	3800	3	12	0.25	0.75	2	4	0.17	0.83	2	4
Spotted Rd Relocation	4300	3	12	0.25	0.75	2	4	0.17	0.83	2	4
2 Lane Bridge (over 6 lanes + 2 gores)	212	2	12			2	8				
Spotted Rd connection to bridge	1050	3	12	0.25	0.75	2	4	0.17	0.83	16	2
Relocate Outbound Lanes	5000	2	12	0.50	1.00	2	6	0.17	1.33	2	4
NW Ramp	1500	1	15	0.33	0.92	2	6	0.17	1.08	2	4
NE Ramp	1300	1	15	0.33	0.92	2	6	0.17	1.08	2	4
SW Ramp	1700	1	15	0.33	0.92	2	6	0.17	1.08	10	4
SE Ramp (Loop)	1100	1	15	0.33	0.92	2	6	0.17	1.08	10	4
<b>Totals</b>											

Component	Area (Acre)	HMA (TON)	CSBC (TON)	Pavement Removal (SY)	Earthwork (CY)	Curb/Gutter (LF)	Guardrail (LF)	Drainage (LF)	Illumination System (LF)	Permanent Signing (LF)	Bridge (SF)	LS Items (\$)	Construction Major Items
21st Ave Extension	5.3	3070	9000		14700	7600	0	3800	3800	3800			\$ 846,300
Spotted Rd Relocation	6.0	3470	10180		16600	8600	0	4300	4300	4300			\$ 956,940
2 Lane Bridge (over 6 lanes + 2 gores)											8480		\$ 1,526,400
Spotted Rd connection to bridge	2.7	850	2490		47300	0	2100		1050	1050			\$ 669,820
Relocate Outbound Lanes	6.0	5460	14060		16300	0	0		5000	5000			\$ 1,004,880
NW Ramp	1.5	820	2830		3900	0	0		1500	1500			\$ 199,040
NE Ramp	1.3	710	2450		3400	0	0		1300	1300			\$ 172,600
SW Ramp	4.2	930	3210		42200	0	300		1700	1700			\$ 626,980
SE Ramp (Loop)	2.8	600	2080		27300	0	300		1100	1100			\$ 408,240
<b>Totals</b>	<b>29.80</b>	<b>15910</b>	<b>46300</b>	<b>0</b>	<b>171700</b>	<b>16200</b>	<b>2700</b>	<b>8100</b>	<b>19750</b>	<b>19750</b>	<b>8480</b>	<b>0</b>	<b>\$ 6,411,200</b>
Unit Cost	\$ 7,000	\$ 80	\$ 18		\$ 10	\$ 10	\$ 20	\$ 25	\$ 20	\$ 2	\$ 180	\$ 1	
Total Costs	\$ 208,600	\$ 1,272,800	\$ 833,400	\$ -	\$ 1,717,000	\$ 162,000	\$ 54,000	\$ 202,500	\$ 395,000	\$ 39,500	\$ 1,526,400	\$ -	

Component	Construction Major Items	Mobilization @6%	Traffic Control @ 5%	Surveying @1%	Construction Subtotal	Contingency @30%	Construction Total	Preliminary Engineering @10%	Construction Engineering @15%	TOTAL
21st Ave Extension	\$ 846,300	\$ 50,778	\$ 42,315	\$ 8,463	\$ 947,856	\$ 284,357	\$ 1,232,213	\$ 123,221	\$ 184,832	\$ 1,540,266
Spotted Rd Relocation	\$ 956,940	\$ 57,416	\$ 47,847	\$ 9,569	\$ 1,071,773	\$ 321,532	\$ 1,393,305	\$ 139,330	\$ 208,996	\$ 1,741,631
2 Lane Bridge (over 6 lanes + 2 gores)	\$ 1,526,400	\$ 91,584	\$ 76,320	\$ 15,264	\$ 1,709,568	\$ 512,870	\$ 2,222,438	\$ 222,244	\$ 333,366	\$ 2,778,048
Spotted Rd connection to bridge	\$ 669,820	\$ 40,189	\$ 33,491	\$ 6,698	\$ 750,198	\$ 225,060	\$ 975,258	\$ 97,526	\$ 146,289	\$ 1,219,072
Relocate Outbound Lanes	\$ 1,004,880	\$ 60,293	\$ 50,244	\$ 10,049	\$ 1,125,466	\$ 337,640	\$ 1,463,105	\$ 146,311	\$ 219,466	\$ 1,828,882
NW Ramp	\$ 199,040	\$ 11,942	\$ 9,952	\$ 1,990	\$ 222,925	\$ 66,877	\$ 289,802	\$ 28,980	\$ 43,470	\$ 362,253
NE Ramp	\$ 172,600	\$ 10,356	\$ 8,630	\$ 1,726	\$ 193,312	\$ 57,994	\$ 251,306	\$ 25,131	\$ 37,696	\$ 314,132
SW Ramp	\$ 626,980	\$ 37,619	\$ 31,349	\$ 6,270	\$ 702,218	\$ 210,665	\$ 912,883	\$ 91,288	\$ 136,932	\$ 1,141,104
SE Ramp (Loop)	\$ 408,240	\$ 24,494	\$ 20,412	\$ 4,082	\$ 457,229	\$ 137,169	\$ 594,397	\$ 59,440	\$ 89,160	\$ 742,997
<b>Totals</b>	<b>\$ 6,411,200</b>	<b>\$ 384,672</b>	<b>\$ 320,560</b>	<b>\$ 64,112</b>	<b>\$ 7,180,544</b>	<b>\$ 2,154,163</b>	<b>\$ 9,334,707</b>	<b>\$ 933,471</b>	<b>\$ 1,400,206</b>	<b>\$ 11,668,384</b>



### ALT B - TWO ROUNDABOUTS WITH CONTINUOUS FLOW GREEN-T

Component	Length of Road/ Improvement (ft)	# Lanes	Lane Width (ft)	Lane HMA depth (ft)	Lane CSBC depth (ft)	# Shlds	Shld Width (ft)	Shld HMA Depth (ft)	Shld CSBC depth (ft)	Approx. earthwork depth (ft)	Sideslopes (X:1)
21st Ave Extension	3800	3	12	0.25	0.75	2	4	0.17	0.83	2	4
Spotted Rd Relocation	4300	3	12	0.25	0.75	2	4	0.17	0.83	2	4
Signal and Lane Modifications											
North Roundabout											
South Roundabout											
North and South Connections to Rndbts	2000	2	12	0.50	1.00	2	6	0.17	1.33	2	4
<b>Totals</b>											

Component	Area (Acre)	HMA (TON)	CSBC (TON)	Pavement Removal (SY)	Earthwork (CY)	Curb/Gutter (LF)	Guardrail (LF)	Drainage (LF)	Illumination System (LF)	Permanent Signing (LF)	Bridge (SF)	LS Items (\$)	Construction Major Items
21st Ave Extension	5.3	3070	9000		14700	7600	0	3800	3800	3800			\$ 846,300
Spotted Rd Relocation	6.0	3470	10180		16600	8600	0	4300	4300	4300			\$ 956,940
Signal and Lane Modifications												500000	\$ 500,000
North Roundabout												350000	\$ 350,000
South Roundabout												350000	\$ 350,000
North and South Connections to Rndbts	2.4	2190	5630		6600	4000	0	2000	2000	2000			\$ 493,340
<b>Totals</b>	<b>13.70</b>	<b>8730</b>	<b>24810</b>	<b>0</b>	<b>37900</b>	<b>20200</b>	<b>0</b>	<b>10100</b>	<b>10100</b>	<b>10100</b>	<b>0</b>	<b>1200000</b>	\$ 3,496,580
Unit Cost	\$ 7,000	\$ 80	\$ 18		\$ 10	\$ 10	\$ 20	\$ 25	\$ 20	\$ 2	\$ 180	\$ 1	
Total Costs	\$ 95,900	\$ 698,400	\$ 446,580	\$ -	\$ 379,000	\$ 202,000	\$ -	\$ 252,500	\$ 202,000	\$ 20,200	\$ -	\$ 1,200,000	

Component	Construction Major Items	Mobilization @6%	Traffic Control @ 5%	Surveying @1%	Construction Subtotal	Contingency @30%	Construction Total	Preliminary Engineering @10%	Construction Engineering @15%	TOTAL
21st Ave Extension	\$ 846,300	\$ 50,778	\$ 42,315	\$ 8,463	\$ 947,856	\$ 284,357	\$ 1,232,213	\$ 123,221	\$ 184,832	\$ 1,540,266
Spotted Rd Relocation	\$ 956,940	\$ 57,416	\$ 47,847	\$ 9,569	\$ 1,071,773	\$ 321,532	\$ 1,393,305	\$ 139,330	\$ 208,996	\$ 1,741,631
Signal and Lane Modifications	\$ 500,000	\$ 30,000	\$ 25,000	\$ 5,000	\$ 560,000	\$ 168,000	\$ 728,000	\$ 72,800	\$ 109,200	\$ 910,000
North Roundabout	\$ 350,000	\$ 21,000	\$ 17,500	\$ 3,500	\$ 392,000	\$ 117,600	\$ 509,600	\$ 50,960	\$ 76,440	\$ 637,000
South Roundabout	\$ 350,000	\$ 21,000	\$ 17,500	\$ 3,500	\$ 392,000	\$ 117,600	\$ 509,600	\$ 50,960	\$ 76,440	\$ 637,000
North and South Connections to Rndbts	\$ 493,340	\$ 29,600	\$ 24,667	\$ 4,933	\$ 552,541	\$ 165,762	\$ 718,303	\$ 71,830	\$ 107,745	\$ 897,879
<b>Totals</b>	\$ 3,496,580	\$ 209,795	\$ 174,829	\$ 34,966	\$ 3,916,170	\$ 1,174,851	\$ 5,091,020	\$ 509,102	\$ 763,653	<b>\$ 6,363,776</b>

### ALT C - INTERCHANGE AT AIRPORT DR/21st AVE/SPOTTED RD

Component	Length of Road/Improvement (ft)	# Lanes	Lane Width (ft)	Lane HMA depth (ft)	Lane CSBC depth (ft)	# Shlds	Shld Width (ft)	Shld HMA Depth (ft)	Shld CSBC depth (ft)	Approx. earthwork depth (ft)	Sideslopes (X:1)
21st Ave Extension	3800	3	12	0.25	0.75	2	4	0.17	0.83	2	4
Spotted Rd Relocation	4300	3	12	0.25	0.75	2	4	0.17	0.83	2	4
2 Lane Bridge (over 5 lanes)	185	2	12			2	8				
Spotted Rd connection to bridge	1050	3	12	0.25	0.75	2	4	0.17	0.83	16	2
Collector Distributor/match ramps	3000	1	15	0.33	0.92	2	6	0.17	1.08	4	4
NW Ramp	1200	1	15	0.33	0.92	2	6	0.17	1.08	10	4
NE Ramp	1000	1	15	0.33	0.92	2	6	0.17	1.08	10	4
SW Ramp	600	1	15	0.33	0.92	2	6	0.17	1.08	10	4
SE Ramp	600	1	15	0.33	0.92	2	6	0.17	1.08	10	4
<b>Totals</b>											

Component	Area (Acre)	HMA (TON)	CSBC (TON)	Pavement Removal (SY)	Earthwork (CY)	Curb/Gutter (LF)	Guardrail (LF)	Drainage (LF)	Illumination System (LF)	Permanent Signing (LF)	Bridge (SF)	LS Items (\$)	Construction Major Items
21st Ave Extension	5.3	3070	9000		14700	7600	0	3800	3800	3800			\$ 846,300
Spotted Rd Relocation	6.0	3470	10180		16600	8600	0	4300	4300	4300			\$ 956,940
2 Lane Bridge (over 5 lanes)						0	0				7400		\$ 1,332,000
Spotted Rd connection to bridge	2.7	850	2490		47300	0	2100		1050	1050			\$ 669,820
Collector Distributor/match ramps	4.1	1640	5650		19200	0	0		3000	3000			\$ 519,600
NW Ramp	3.0	660	2260		29800	0	0		1200	1200			\$ 438,880
NE Ramp	2.5	550	1890		24900	0	0		1000	1000			\$ 366,520
SW Ramp	1.5	330	1130		14900	0	300		600	600			\$ 225,440
SE Ramp	1.5	330	1130		14900	0	300		600	600			\$ 225,440
<b>Totals</b>	<b>26.60</b>	<b>10900</b>	<b>33730</b>	<b>0</b>	<b>182300</b>	<b>16200</b>	<b>2700</b>	<b>8100</b>	<b>15550</b>	<b>15550</b>	<b>7400</b>	<b>0</b>	<b>\$ 5,580,940</b>
Unit Cost	\$ 7,000	\$ 80	\$ 18		\$ 10	\$ 10	\$ 20	\$ 25	\$ 20	\$ 2	\$ 180	\$ 1	
Total Costs	\$ 186,200	\$ 872,000	\$ 607,140	\$ -	\$ 1,823,000	\$ 162,000	\$ 54,000	\$ 202,500	\$ 311,000	\$ 31,100	\$ 1,332,000	\$ -	

Component	Construction Major Items	Mobilization @6%	Traffic Control @ 5%	Surveying @1%	Construction Subtotal	Contingency @30%	Construction Total	Preliminary Engineering @10%	Construction Engineering @15%	TOTAL
21st Ave Extension	\$ 846,300	\$ 50,778	\$ 42,315	\$ 8,463	\$ 947,856	\$ 284,357	\$ 1,232,213	\$ 123,221	\$ 184,832	\$ 1,540,266
Spotted Rd Relocation	\$ 956,940	\$ 57,416	\$ 47,847	\$ 9,569	\$ 1,071,773	\$ 321,532	\$ 1,393,305	\$ 139,330	\$ 208,996	\$ 1,741,631
2 Lane Bridge (over 5 lanes)	\$ 1,332,000	\$ 79,920	\$ 66,600	\$ 13,320	\$ 1,491,840	\$ 447,552	\$ 1,939,392	\$ 193,939	\$ 290,909	\$ 2,424,240
Spotted Rd connection to bridge	\$ 669,820	\$ 40,189	\$ 33,491	\$ 6,698	\$ 750,198	\$ 225,060	\$ 975,258	\$ 97,526	\$ 146,289	\$ 1,219,072
Collector Distributor/match ramps	\$ 519,600	\$ 31,176	\$ 25,980	\$ 5,196	\$ 581,952	\$ 174,586	\$ 756,538	\$ 75,654	\$ 113,481	\$ 945,672
NW Ramp	\$ 438,880	\$ 26,333	\$ 21,944	\$ 4,389	\$ 491,546	\$ 147,464	\$ 639,009	\$ 63,901	\$ 95,851	\$ 798,762
NE Ramp	\$ 366,520	\$ 21,991	\$ 18,326	\$ 3,665	\$ 410,502	\$ 123,151	\$ 533,653	\$ 53,365	\$ 80,048	\$ 667,066
SW Ramp	\$ 225,440	\$ 13,526	\$ 11,272	\$ 2,254	\$ 252,493	\$ 75,748	\$ 328,241	\$ 32,824	\$ 49,236	\$ 410,301
SE Ramp	\$ 225,440	\$ 13,526	\$ 11,272	\$ 2,254	\$ 252,493	\$ 75,748	\$ 328,241	\$ 32,824	\$ 49,236	\$ 410,301
<b>Totals</b>	<b>\$ 5,580,940</b>	<b>\$ 334,856</b>	<b>\$ 279,047</b>	<b>\$ 55,809</b>	<b>\$ 6,250,653</b>	<b>\$ 1,875,196</b>	<b>\$ 8,125,849</b>	<b>\$ 812,585</b>	<b>\$ 1,218,877</b>	<b>\$ 10,157,311</b>

### ALT D - ROUNDABOUT AT AIRPORT DR/21st/SPOTTED RD

Component	Length of Road/Improvement (ft)	# Lanes	Lane Width (ft)	Lane HMA depth (ft)	Lane CSBC depth (ft)	# Shlds	Shld Width (ft)	Shld HMA Depth (ft)	Shld CSBC depth (ft)	Approx. earthwork depth (ft)	Sideslopes (X:1)
21st Ave Extension	3800	3	12	0.25	0.75	2	4	0.17	0.83	2	4
Spotted Rd Relocation	4300	3	12	0.25	0.75	2	4	0.17	0.83	2	4
2-Lane Roundabout											
North Connection to Roundabout	1200	2	12	0.33	0.92	2	6	0.17	1.08	3	4
<b>Totals</b>											

Unit Cost  
Total Costs

Component	Area (Acre)	HMA (TON)	CSBC (TON)	Pavement Removal (SY)	Earthwork (CY)	Curb/Gutter (LF)	Guardrail (LF)	Drainage (LF)	Illumination System (LF)	Permanent Signing (LF)	Bridge (SF)	LS Items (\$)	Construction Major Items
21st Ave Extension	5.3	3070	9000		14700	7600		0	3800	3800			\$ 846,300
Spotted Rd Relocation	6.0	3470	10180		16600	8600		0	4300	4300			\$ 956,940
2-Lane Roundabout												500000	\$ 500,000
North Connection to Roundabout	1.7	930	2960		6400	2400	0	1200	1200	1200			\$ 283,980
<b>Totals</b>	<b>13.00</b>	<b>7470</b>	<b>22140</b>	<b>0</b>	<b>37700</b>	<b>18600</b>	<b>0</b>	<b>9300</b>	<b>9300</b>	<b>9300</b>	<b>0</b>	<b>500000</b>	<b>\$ 2,587,220</b>
	\$ 7,000	\$ 80	\$ 18		\$ 10	\$ 10	\$ 20	\$ 25	\$ 20	\$ 2	\$ 180	\$ 1	
	\$ 91,000	\$ 597,600	\$ 398,520	\$ -	\$ 377,000	\$ 186,000	\$ -	\$ 232,500	\$ 186,000	\$ 18,600	\$ -	\$ 500,000	

Component	Construction Major Items	Mobilization @6%	Traffic Control @ 5%	Surveying @1%	Construction Subtotal	Contingency @30%	Construction Total	Preliminary Engineering @10%	Construction Engineering @15%	TOTAL
21st Ave Extension	\$ 846,300	\$ 50,778	\$ 42,315	\$ 8,463	\$ 947,856	\$ 284,357	\$ 1,232,213	\$ 123,221	\$ 184,832	\$ 1,540,266
Spotted Rd Relocation	\$ 956,940	\$ 57,416	\$ 47,847	\$ 9,569	\$ 1,071,773	\$ 321,532	\$ 1,393,305	\$ 139,330	\$ 208,996	\$ 1,741,631
2-Lane Roundabout	\$ 500,000	\$ 30,000	\$ 25,000	\$ 5,000	\$ 560,000	\$ 168,000	\$ 728,000	\$ 72,800	\$ 109,200	\$ 910,000
North Connection to Roundabout	\$ 283,980	\$ 17,039	\$ 14,199	\$ 2,840	\$ 318,058	\$ 95,417	\$ 413,475	\$ 41,347	\$ 62,021	\$ 516,844
<b>Totals</b>	<b>\$ 2,587,220</b>	<b>\$ 155,233</b>	<b>\$ 129,361</b>	<b>\$ 25,872</b>	<b>\$ 2,897,686</b>	<b>\$ 869,306</b>	<b>\$ 3,766,992</b>	<b>\$ 376,699</b>	<b>\$ 565,049</b>	<b>\$ 4,708,740</b>

### ALT E - CONTINUOUS GREEN T INTERSECTION AND SPOTTED RD OVERPASS

Component	Length of Road/Improve ment (ft)	# Lanes	Lane Width (ft)	Lane HMA depth (ft)	Lane CSBC depth (ft)	# Shlds	Shld Width (ft)	Shld HMA Depth (ft)	Shld CSBC depth (ft)	Approx. earthwork depth (ft)	Sideslopes (X:1)
21st Ave Extension	3800	3	12	0.25	0.75	2	4	0.17	0.83	2	4
Spotted Rd Relocation	4300	3	12	0.25	0.75	2	4	0.17	0.83	2	4
2 Lane Bridge (over 4 lanes)	158	2	12			2	8				
Spotted Rd connection to bridge	1050	3	12	0.25	0.75	2	4	0.17	0.83	16	2
NW Ramp	1500	1	15	0.33	0.92	2	6	0.17	1.08	10	4
NE Ramp	1300	1	15	0.33	0.92	2	6	0.17	1.08	10	4
Signal and Lane Modifications											
Additional inbound lane from Spotted Rd North	2000	1	12	0.33	0.92	2	4	0.17	1.08	2	4
Spotted/Outbound west I/S improvements											
<b>Totals</b>											

Component	Area (Acre)	HMA (TON)	CSBC (TON)	Pavement Removal (SY)	Earthwork (CY)	Curb/Gutter (LF)	Guardrail (LF)	Drainage (LF)	Illumination System (LF)	Permanent Signing (LF)	Bridge (SF)	LS Items (\$)	Construction Major Items
21st Ave Extension	5.3	3070	9000		14700	7600	0	3800	3800	3800			\$ 846,300
Spotted Rd Relocation	6.0	3470	10180		16600	8600	0	4300	4300	4300			\$ 956,940
2 Lane Bridge (over 4 lanes)											6320		\$ 1,137,600
Spotted Rd connection to bridge	2.7	850	2490		47300	0	2100		1050	1050			\$ 669,820
NW Ramp	3.7	820	2830		37300	0	0		1500	1500			\$ 548,440
NE Ramp	3.2	710	2450		32300	0	0		1300	1300			\$ 474,900
Signal and Lane Modifications												500000	\$ 500,000
Additional inbound lane from Spotted Rd North	1.7	830	2770		4200	0	0		2000	2000			\$ 214,160
Spotted/Outbound west I/S improvements												100000	\$ 100,000
<b>Totals</b>	<b>22.60</b>	<b>9750</b>	<b>29720</b>	<b>0</b>	<b>152400</b>	<b>16200</b>	<b>2100</b>	<b>8100</b>	<b>13950</b>	<b>13950</b>	<b>6320</b>	<b>600000</b>	\$ 5,448,160

Unit Cost	\$ 7,000	\$ 80	\$ 18		\$ 10	\$ 10	\$ 20	\$ 25	\$ 20	\$ 2	\$ 180	\$ 1
Total Costs	\$ 158,200	\$ 780,000	\$ 534,960	\$ -	\$ 1,524,000	\$ 162,000	\$ 42,000	\$ 202,500	\$ 279,000	\$ 27,900	\$ 1,137,600	\$ 600,000

Component	Construction Major Items	Mobilization @6%	Traffic Control @ 5%	Surveying @1%	Construction Subtotal	Contingency @30%	Construction Total	Preliminary Engineering @10%	Construction Engineering @15%	TOTAL
21st Ave Extension	\$ 846,300	\$ 50,778	\$ 42,315	\$ 8,463	\$ 947,856	\$ 284,357	\$ 1,232,213	\$ 123,221	\$ 184,832	\$ 1,540,266
Spotted Rd Relocation	\$ 956,940	\$ 57,416	\$ 47,847	\$ 9,569	\$ 1,071,773	\$ 321,532	\$ 1,393,305	\$ 139,330	\$ 208,996	\$ 1,741,631
2 Lane Bridge (over 4 lanes)	\$ 1,137,600	\$ 68,256	\$ 56,880	\$ 11,376	\$ 1,274,112	\$ 382,234	\$ 1,656,346	\$ 165,635	\$ 248,452	\$ 2,070,432
Spotted Rd connection to bridge	\$ 669,820	\$ 40,189	\$ 33,491	\$ 6,698	\$ 750,198	\$ 225,060	\$ 975,258	\$ 97,526	\$ 146,289	\$ 1,219,072
NW Ramp	\$ 548,440	\$ 32,906	\$ 27,422	\$ 5,484	\$ 614,253	\$ 184,276	\$ 798,529	\$ 79,853	\$ 119,779	\$ 998,161
NE Ramp	\$ 474,900	\$ 28,494	\$ 23,745	\$ 4,749	\$ 531,888	\$ 159,566	\$ 691,454	\$ 69,145	\$ 103,718	\$ 864,318
Signal and Lane Modifications	\$ 500,000	\$ 30,000	\$ 25,000	\$ 5,000	\$ 560,000	\$ 168,000	\$ 728,000	\$ 72,800	\$ 109,200	\$ 910,000
Additional inbound lane from Spotted Rd North	\$ 214,160	\$ 12,850	\$ 10,708	\$ 2,142	\$ 239,859	\$ 71,958	\$ 311,817	\$ 31,182	\$ 46,773	\$ 389,771
Spotted/Outbound west I/S improvements	\$ 100,000	\$ 6,000	\$ 5,000	\$ 1,000	\$ 112,000	\$ 33,600	\$ 145,600	\$ 14,560	\$ 21,840	\$ 182,000
<b>Totals</b>	<b>\$ 5,448,160</b>	<b>\$ 326,890</b>	<b>\$ 272,408</b>	<b>\$ 54,482</b>	<b>\$ 6,101,939</b>	<b>\$ 1,830,582</b>	<b>\$ 7,932,521</b>	<b>\$ 793,252</b>	<b>\$ 1,189,878</b>	<b>\$ 9,915,651</b>



