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Micron

Traffic Impact Study

Lehi, Utah

<u>REVISED</u> – August 2011

UT10-263

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EXECUTIVE SUMMARY

This study addresses the traffic impacts associated with the proposed Micron Development located in Lehi, Utah. The proposed project is located north of SR-92 from approximately 500 West to Highland Blvd.

Included within the analyses for this study are the traffic operations and recommended mitigation measures for future conditions and plus project conditions (conditions after development of the proposed project) at key intersections and roadways in the vicinity of the site. Future 2020 and 2030 conditions were analyzed. Because of current construction on SR-92, and because it could take several years for a project of this size to be completed, no existing conditions were analyzed.

TRAFFIC ANALYSIS

The following is an outline of the traffic analysis performed by Hales Engineering for the traffic conditions of this project.

Future (2020) Background Conditions Analysis

Hales Engineering estimated future (2020) background p.m. peak hour turning movement volumes for the following study intersections:

- 1200 West / SR-92
- Traverse “D” Access (Approximately 900 West) / SR-92
- Center Street / SR-92
- EB Commuter Lane Off-Ramp / Center Street
- 1200 East / SR-92
- Highland Blvd / SR-92

The counts were estimated using data form the SR-92 Environmental Assessment (EA) and the MAG draft 2040 travel demand model (2020 and 2030 model runs).

As shown in Table ES-1, all of the study intersections have acceptable levels of delay during the weekday p.m. peak hour. Queuing is discussed in the body of the report.

Project Conditions Analysis

Land use for the project is as follows:

- Technical/Manufacturing: 742,000 sq ft
- Office: 4,955,000 sq ft

- Social Heart:
  - Retail: 298,000 sq ft
  - Office: 481,000 sq ft
  - Apartments: 115 units
- Condos/Townhouses: 470 units
- Single Family Residential: 195 units
- Schools: 2 schools

Phasing estimates are discussed in the body of the report.

The projected gross trip generation for the partial build development (not including pass-by, transit, and internal capture reductions as discussed in the body of the report) is as follows:

- Daily Trips: 82,973 vehicles per day (vpd)
- a.m. Trips: 9,705 vehicles per hour (vph)
- p.m. Trips: 9,432 vph
- Saturday Trips: 34,098 vpd
- Saturday Peak Hour Trips: 3,315 vph

The net p.m. peak hour trip generation was estimated to be 7,963 trip ends (16 percent reduction).

Future (2020) Plus Project Conditions Analysis

As shown in Table ES-1, all study intersections experience acceptable levels of delay. Queuing is discussed in the body of the report.

Future (2030) Background Conditions Analysis

As shown in Table ES-1, all study intersections experience acceptable levels of delay. Queuing is discussed in the body of the report.

Future (2030) Plus Project Conditions Analysis

As shown in Table ES-1, several study intersections have unacceptable levels of delay during the weekday p.m. peak hour.

TABLE ES-1 P.M. Peak Hour Lehi - Micron TIS				
Intersection	Future 2020 Background	Future 2020 Plus Project	Future 2030 Background	Future 2030 Plus Project
Description	LOS (Sec/Veh[1])	LOS (Sec/Veh[1])	LOS (Sec/Veh[1])	LOS (Sec/Veh[1])
1200 West / SR-92	**C (22.6)**	**C (24.6)**	**C (32.0)**	**D (54.6)**
Traverse Mountain Access "D" / SR-92	**A (6.6)**	**A (6.9)**	**A (8.3)**	**A (7.0)**
500 West / SR-92[2]	**-**	**C (29.3)**	**WBL (2.9)**	**D (41.8)**
Center Street / SR-92	**A (8.4)**	**C (25.3)**	**B (13.1)**	**E (68.6)**
EB Commuter Lane Off-Ramp / Center Street	**EB / A (1.6)**	**EB / A (2.8)**	**EB / A (2.1)**	**NB / F (>50.0)**
400 East / SR-92[2]	**-**	**B (20.0)**	**-**	**D (49.5)**
1200 East / SR-92	**C (20.4)**	**C (28.8)**	**C (29.9)**	**E (63.8)**
Highland Blvd. / SR-92	**C (32.1)**	**C (21.6)**	**C (24.3)**	**D (42.8)**

1. Intersection LOS and delay (seconds/vehicle) values represent the overall intersection average for signalized and all-way stop-controlled intersections and the worst approach for all other unsignalized intersections.
2. This access is a project access and was only analyzed in "plus project" scenarios.

Source: Hales Engineering, August 2011

RECOMMENDATIONS

Hales Engineering has estimated the approximate time frame (and associated percentage of build-out) for when the various background and plus project improvements may be required. However, there are numerous variables that will affect the exact timing of the improvements such as changes in land use and the actual growth in background traffic. Detailed assumptions for phasing of the development are found in Appendix E. As some of these improvements could be very expensive, it is recommended that additional analysis be completed closer to the actual time of construction.

The improvements are recommended as follows (based on p.m. peak hour conditions):

- Westbound Commuter Lane On-Ramp at 500 West:
  - The on-ramp should be constructed between 2016 and 2020 (25 percent of overall project completion)
- Provide two receiving lanes at 500 West for the westbound commuter lane. This would allow dual left-turn lanes and dual southbound lanes thereby significantly increasing the capacity of the intersection

  - This improvement should be constructed between 2021 and 2025 (at approximately 50 percent of overall project completion)
- Eastbound Commuter Lane Off-Ramp – Loop Ramp to Northbound Center Street:
  - This loop ramp should be constructed between 2021 and 2025 (at approximately 50 percent of overall project completion). This recommendation is based on a high eastbound to northbound left-turn volume during the a.m. peak period as commuters enter the Micron development from the west. The dual left-turn lanes on the arterial will become oversaturated thereby requiring the capacity of the commuter lanes and the new loop ramp. Hales Engineering is currently conducting a traffic study to refine the analysis for this Center Street / SR-92 area because a.m. conditions were not analyzed for this study.
- Cross Access from Micron to IMFT (East and West Sides)
  - Cross access would have an immediate benefit once retail, restaurant, and other service land uses begin operation in the Micron development.
  - Based on traffic operations, the cross access should be constructed by at least year 2015 as this is when the social heart portion of the project is anticipated to begin.
  - Significant use of cross access from the east portion of the Micron development through IMFT will be required at approximately year 2025.
- Right- and left-turn deceleration lanes are required for each new access (at 500 West, Center Street, and 400 East).
  - These auxiliary lanes should be constructed simultaneously with the new accesses.
- Appendix D shows the recommended cross section widths for roads internal to the Micron development. All internal streets identified as larger than a local cross section should be constructed to their full width when originally constructed. The difference between the local cross section width and the full width will be reimbursed by Lehi City.
- Potential future signal locations internal to the site are also shown in Appendix D. These signals should be installed once warrants are met, or in anticipation of warrants being met. However, based on the estimated phasing of the project, the following is an estimated timeframe for when the signals may be warranted:
  - 2016 to 2020 (25% Build):
    - First signal north of SR-92 on Center Street
    - First signal north of SR-92 on 400 East
  - 2021 to 2025 (50% Build):
    - First signal north of SR-92 on 500 West
    - Second signal north of SR-92 on Center Street
  - 2026 to 2030 (75% Build):
    - Signal at east IMFT border

Summary of Key Findings/Recommendations

The following is a summary of key findings and recommendations:

- The roadway network as currently being constructed should be adequate for 2020 traffic volumes as well as a portion of the project traffic (Phase I). In this TIS, Phase I was assumed to be roughly 55 percent of full build-out traffic.
- With 2030 background traffic and full build-out of the project, the external roadway network will experience significant deficiencies that could require additional improvements by UDOT.
- Although the p.m. peak hour traffic will be the worst-case scenario for the SR-92 corridor and was analyzed for this study to remain consistent with the SR-92 EA evaluation at UDOT's request, the a.m. peak hour in-loading conditions should be monitored by UDOT to ensure that left-turn movements do not get oversaturated and create spillover issues on SR-92.
- Access management recommendations for this development are given in the body of the report.

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I. INTRODUCTION

A. Purpose

This study addresses the traffic impacts associated with the proposed Micron Development located in Lehi, Utah. The proposed project is located north of SR-92 from approximately 500 West to Highland Blvd. Figure 1 shows a vicinity map of the proposed development.

Included within the analyses for this study are the traffic operations and recommended mitigation measures for future conditions and plus project conditions (conditions after development of the proposed project) at key intersections and roadways in the vicinity of the site. Future 2020 and 2030 conditions were analyzed. Because of current construction on SR-92, and because it could take several years for a project of this size to be completed, no existing conditions were analyzed.

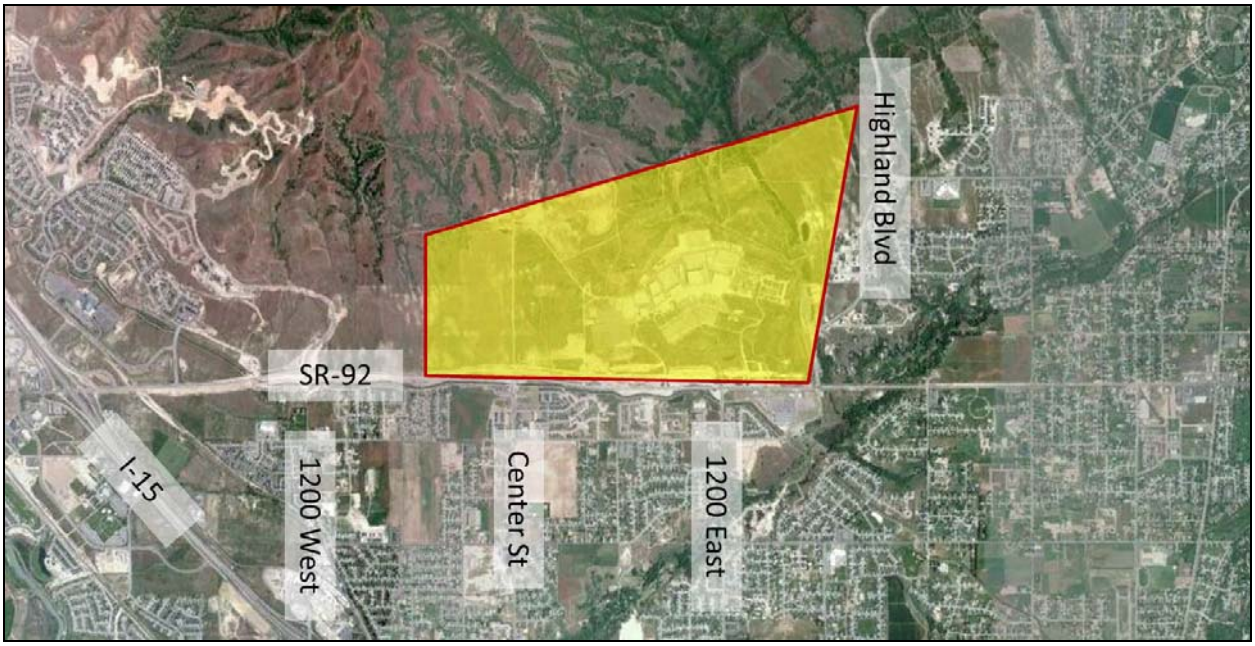

Figure 1 **Vicinity map showing project location in Lehi, Utah.**

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B. Scope

The study area and the period of evaluation (weekday p.m. peak hour) were defined based on conversations with the development team and Lehi staff. This study was scoped to evaluate the traffic operational performance impacts of the project on the following intersections:

- 1200 West / SR-92
- Traverse "D" Access (Approximately 900 West) / SR-92
- 500 West / SR-92
- Center Street / SR-92
- EB Commuter Lane Off-Ramp / Center Street
- 400 East / SR-92
- 1200 East / SR-92
- Highland Blvd / SR-92

C. Analysis Methodology

Level of service (LOS) is a term that describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst. Table 1 provides a brief description of each LOS letter designation and an accompanying average delay per vehicle for both signalized and unsignalized intersections.

The Highway Capacity Manual 2000 (HCM 2000) methodology was used in this study to remain consistent with "state-of-the-practice" professional standards. This methodology has different quantitative evaluations for signalized and unsignalized intersections. For signalized and all-way stop intersections, the LOS is provided for the overall intersection (weighted average of all approach delays). For all other unsignalized intersections LOS is reported based on the worst approach. Hales Engineering has also calculated overall delay values for unsignalized intersections, which provides additional information and represents the overall intersection conditions rather than just the worst approach.

D. Level of Service Standards

For the purposes of this study, a minimum overall intersection performance for each of the study intersections was set at LOS D. However, if LOS E or F conditions exist, an explanation and/or mitigation measures will be presented. An LOS D threshold is consistent with "state-of-the-practice" traffic engineering principles for urbanized areas.

Table 1 Level of Service Descriptions

Level of Service	Description of Traffic Conditions	Average Delay (seconds/vehicle)
Signalized Intersections		**Overall Intersection**
A	Extremely favorable progression and a very low level of control delay. Individual users are virtually unaffected by others in the traffic stream.	0 ≤ 10.0
B	Good progression and a low level of control delay. The presence of other users in the traffic stream becomes noticeable.	> 10.0 and ≤ 20.0
C	Fair progression and a moderate level of control delay. The operation of individual users becomes somewhat affected by interactions with others in the traffic stream.	>20.0 and ≤ 35.0
D	Marginal progression with relatively high levels of control delay. Operating conditions are noticeably more constrained.	> 35.0 and ≤ 55.0
E	Poor progression with unacceptably high levels of control delay. Operating conditions are at or near capacity.	> 55.0 and ≤ 80.0
F	Unacceptable progression with forced or breakdown operating conditions.	> 80.0
Unsignalized Intersections		**Worst Approach**
A	Free Flow / Insignificant Delay	0 ≤ 10.0
B	Stable Operations / Minimum Delays	>10.0 and ≤ 15.0
C	Stable Operations / Acceptable Delays	>15.0 and ≤ 25.0
D	Approaching Unstable Flows / Tolerable Delays	>25.0 and ≤ 35.0
E	Unstable Operations / Significant Delays Can Occur	>35.0 and ≤ 50.0
F	Forced Flows / Unpredictable Flows / Excessive Delays Occur	> 50.0

Source: Hales Engineering Descriptions, based on Highway Capacity Manual, 2000 Methodology (Transportation Research Board, 2000)

II. FUTURE (2020) BACKGROUND CONDITIONS

A. Purpose

The purpose of the future (2020) background analysis is to study the intersections and roadways during the peak travel periods of the day for future background traffic and geometric conditions. Through this analysis, future background traffic operational deficiencies can be identified and potential mitigation measures recommended.

B. Roadway System

The primary roadways that will provide access to the project site are described below:

Timpanogos Highway (SR-92) – is a state-operated roadway connecting I-15 to the mouth of American Fork Canyon. SR-92 is currently a two-lane road, but is being reconstructed as a five-lane arterial with adjacent grade-separated commuter lanes. The commuter lanes portion of SR-92 will have one travel lane in each direction. A corridor agreement between UDOT, Lehi, and Highland is currently in place outlining the existing and future access to SR-92 (see Appendix F). Other than these planned access locations, it is not anticipated that any additional access to SR-92 will be provided. Many of the assumptions used for this analysis are based on assumptions contained in the SR-92 Environmental Assessment (EA) completed by UDOT in 2008.

Some key assumptions include the following:

- Speed limit on SR-92 (Arterial): 45 mph
- Speed limit on SR-92 (Commuter Lanes): 50 mph
- Year 2020 at-grade intersections:
  - 1200 West (signalized)
  - Traverse “D” Access (signalized)
  - 500 West (added with project) (signalized)
  - Center Street (south leg only, north leg added with project) (signalized)
  - 400 East (added with project) (signalized)
  - 1200 East (signalized)
  - Highland Blvd (SunCrest Drive) (signalized)
- Year 2020 commuter lane configuration:
  - EB begins between Frontage Road and Triumph Blvd and ends just west of 1200 East with an off-ramp at Center Street (directional to southbound Center Street only).

  - WB begins east of east of Highland Blvd and ends west of 1200 West with an on-ramp west of 1200 East, an on-ramp from southbound Highland Blvd. just north of SR-92, and an on-ramp at 500 West.
- Year 2030 commuter lane configuration:
  - EB begins between Frontage Road and Triumph Blvd and ends east of 1200 East with an off-ramp at Center Street (directional to southbound Center Street only) and an off-ramp just west of 1200 East onto the eastbound SR-92 arterial. An additional off-ramp is proposed with the project at Center Street (loop ramp directional to northbound Center Street only).
  - WB begins east of Highland Blvd and ends with a ramp directly onto northbound I-15 with an on-ramp west of 1200 East, an on-ramp from southbound Highland Blvd. just north of SR-92, an on-ramp at 500 West, and an off-ramp west of 1200 West.

Geometric layouts used for the analysis were obtained from the UDOT Access Utah County Team for the current construction project on SR-92 and are shown in Appendix E. Other future improvements will be completed with future funding and the geometric layout of these improvements was based on conversations with the Access Utah County Team and from the SR-92 EA documentation.

C. Traffic Volumes

Hales Engineering estimated future 2020 and 2030 traffic volumes for the study intersections based on data from the SR-92 Environmental Assessment (EA) and from the Mountainland Association of Governments (MAG) draft 2040 travel demand model (2020 and 2030 model runs). Hales Engineering used NCHRP 255 methodologies to forecast future intersection turning volumes. Because the SR-92 corridor is currently under construction, Hales Engineering used the turning movement volumes from the SR-92 EA as the base volumes. The future ADT link volumes were obtained from the 2020 and 2030 MAG model runs. Hales Engineering estimated the model trip generation from the traffic analysis zones (TAZs) in the area occupies by the Micron project, and subtracted these trips from the modeled link volumes. This created more realistic “background” scenarios.

Figure 2 shows the future (2020) weekday p.m. peak hour volumes as well as assumed intersection geometry at each of the study intersections.

D. Level of Service Analysis

Using VISSIM, the weekday p.m. peak hour LOS was computed for each study intersection. The results of this analysis are reported in Table 2 (see Appendix B for the detailed LOS reports). Multiple runs of VISSIM were used to provide a statistical evaluation of the interaction between the intersections. These results serve as a baseline condition for the impact analysis of the proposed development during future (2020) conditions. As shown in Table 2, all intersections have acceptable levels of service.

Table 2 Future (2020) Background p.m. Peak Hour Level of Service

Intersection		Worst Approach			Overall Intersection	
Description	Control	Approach[1,3]	Aver. Delay (Sec/Veh)[1]	LOS[1]	Aver. Delay (Sec/Veh)[2]	LOS[2]
1200 West / SR-92	Signal	-	-	-	22.6	C
Traverse Access "D" / SR-92	Signal	-	-	-	6.6	A
Center Street / SR-92	Signal	-	-	-	8.4	A
EB Commuter Lane Off-Ramp / Center Street	EB Yield	EB	1.6	A	-	-
1200 East / SR-92	Signal	-	-	-	20.4	C
Highland Blvd / SR-92	Signal	-	-	-	32.1	C

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for non-all-way-stop unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds / vehicle).
3. SB = Southbound approach, etc.

Source: Hales Engineering, April 2011

E. Queuing Analysis

Hales Engineering calculated the maximum and average queue lengths for each of the study intersections. The queue reports can be found in Appendix D. No significant queuing issues exist at any of the study intersections.

F. Mitigation Measures

No mitigation measures are recommended.


1200 W
SR-92
SR-92
Trav D
100
80
60
60
690
220
160
560
350
160
40
140
60
40
60
700
20
910


860
120
SR-92
610
130
70
80
Center Street


1200 E
High Blvd
SR-92
120
180
360
50
660
60
80
1180
210
180
80
260
210
50
180
70
460
90
430
1180
50
100
60
250

III. PROJECT CONDITIONS

A. Purpose

The project conditions analysis explains the type and intensity of development. This provides the basis for trip generation, distribution, and assignment of project trips to the surrounding study intersections defined in the Introduction.

B. Project Description

This study addresses the traffic impacts associated with the proposed Micron Development located in Lehi, Utah. The proposed project is located north of SR-92 from approximately 500 West to Highland Blvd.

A concept plan for the proposed development has been included in Appendix C.

Because of the size of the development, Hales Engineering split the project into two phases based on conversations with the development team. The intent is to provide more realistic operational analyses of the roadway network based on background growth and phased project development.

Phase I includes a significant portion of the office and the technical/manufacturing component as well as a smaller portion of the "social heart" and residential areas. The land use for phase I is as follows:

- Technical/Manufacturing: 600,000 sq ft
- Office: 3,000,000 sq ft
- Social Heart:
  - Retail: 60,000 sq ft
  - Office: 96,000 sq ft
- Condos/Townhouses: 140 units

As currently shown on the concept plan, the Phase I land uses would be located primarily west of IMFT and access 500 West, Center Street, and 400 East.

Phase II includes the remainder of the office and technical/manufacturing components as well as the social heart (mixed use retail/office/residential) and the residential components of the development. The land use for Phase II is as follows:

- Technical/Manufacturing: 142,000 sq ft
- Office: 1,955,000 sq ft
- Social Heart:

  - Retail: 238,000 sq ft
  - Office: 385,000 sq ft
  - Apartments: 115 units
- Condos/Townhouses: 330 units
- Single Family Residential: 195 units
- Schools: 2 schools

Phase II land uses are located on the northern edge of the project and east of IMFT.

Detailed assumptions for phasing of the development are found in Appendix E.

C. Trip Generation

Trip generation for the development was calculated using trip generation rates published in the Institute of Transportation Engineers (ITE) *Trip Generation (8th Edition, 2008)*. Trip Generation for the proposed project is included in Table 3 for Phase I and Table 4 for Phase I and II combined.

ITE trip generation rates are based on gross trips to and from a site. They do not account for the internal interaction between different land uses within a mixed-use development. Because the Micron project will contain employment, retail, and residential land uses, a significant portion of the trips to and from each land use will never exit the development onto SR-92 or the surrounding roadway network. Using ITE mixed-use internal capture methodologies discussed in ITE *Trip Generation Handbook* (2nd Edition, 2004), Hales Engineering estimated the internal capture reduction for the overall site. These reductions are shown in Table 4 and equate to approximately 4 percent of all p.m. peak hour trips. The internal capture percentage is lower for this development than many other mixed-use developments because the proportion of work trips is much higher than retail and residential trips.

Pass-by trips for the retail component of the development were also estimated using data available from the ITE Trip Generation Handbook (2nd Edition, 2004). ITE reports a 34 percent pass-by reduction for shopping centers. This rate can vary greatly depending on the specific land uses. To remain conservative, Hales Engineering assumed a 30 percent pass-by reduction for the analysis. This reduction is shown in Table 4.

Hales Engineering also assumed that some form of mass transit will connect this development with other major transit options (such as light rail and commuter rail). However, since specific details are not yet known at this time, to remain conservative, Hales Engineering took only a 10 percent transit reduction for the employment portions of the site. This reduction is shown in Table 4.

Table 3
Lehi - Micron TIS
Trip Generation - Phase I (2020)

Daily		Number of	Unit	Trip	%	%	Trips	Trips	Mixed-Use	Transit	Pass-by	Net Trips	Net Trips	Total Daily
	Land Use[1]	Units	Type	Generation	Entering	Exiting	Entering	Exiting	Internal Capture	Reduction	Reduction	Entering	Exiting	Trips
Employment	Industrial Park (130)	600	1,000 Sq. Ft. GFA	3,724	50%	50%	1,862	1,862	0%	0%	0%	1,862	1,862	**3,724**
Employment	Office Park (750)	3000	1,000 Sq. Ft. GFA	31,669	50%	50%	15,835	15,835	0%	0%	0%	15,835	15,835	**31,669**
Social Heart	Shopping Center (820)	60	1,000 Sq. Ft. GLA	4,872	50%	50%	2,436	2,436	0%	0%	0%	2,436	2,436	**4,872**
Social Heart	General Office Building (710)	96	1,000 Sq. Ft. GFA	1,293	50%	50%	646	646	0%	0%	0%	646	646	**1,293**
Residential	Residential Condominium/Townhouse (230)	140	Dwelling Units	862	50%	50%	431	431	0%	0%	0%	431	431	**862**
	Project Total Daily Trips						**21,210**	**21,210**				**21,210**	**21,210**	**42,420**
a.m. Peak Hour		Number of	Unit	Trip	%	%	Trips	Trips	Mixed-Use	Transit	Pass-by	Net Trips	Net Trips	Total a.m.
	Land Use[1]	Units	Type	Generation	Entering	Exiting	Entering	Exiting	Internal Capture	Reduction	Reduction	Entering	Exiting	Trips
Employment	Industrial Park (130)	600	1,000 Sq. Ft. GFA	410	82%	18%	336	74	0%	0%	0%	336	74	**410**
Employment	Office Park (750)	3000	1,000 Sq. Ft. GFA	4,234	89%	11%	3,769	466	0%	0%	0%	3,769	466	**4,234**
Social Heart	Shopping Center (820)	60	1,000 Sq. Ft. GLA	114	61%	39%	70	44	0%	0%	0%	70	44	**114**
Social Heart	General Office Building (710)	96	1,000 Sq. Ft. GFA	182	88%	12%	160	22	0%	0%	0%	160	22	**182**
Residential	Residential Condominium/Townhouse (230)	140	Dwelling Units	68	17%	83%	11	56	0%	0%	0%	11	56	**68**
	Project Total a.m. Peak Hour Trips						**4,345**	**662**				**4,345**	**662**	**5,007**
p.m. Peak Hour		Number of	Unit	Trip	%	%	Trips	Trips	Mixed-Use	Transit	Pass-by	Net Trips	Net Trips	Total p.m.
	Land Use[1]	Units	Type	Generation	Entering	Exiting	Entering	Exiting	Internal Capture	Reduction	Reduction	Entering	Exiting	Trips
Employment	Industrial Park (130)	600	1,000 Sq. Ft. GFA	504	21%	79%	106	398	1%	10%	0%	94	355	**449**
Employment	Office Park (750)	3000	1,000 Sq. Ft. GFA	3,756	14%	86%	526	3,230	1%	10%	0%	469	2,878	**3,346**
Social Heart	Shopping Center (820)	60	1,000 Sq. Ft. GLA	452	49%	51%	221	230	9%	0%	30%	141	147	**288**
Social Heart	General Office Building (710)	96	1,000 Sq. Ft. GFA	186	17%	83%	32	155	1%	10%	0%	28	138	**166**
Residential	Residential Condominium/Townhouse (230)	140	Dwelling Units	79	67%	33%	53	26	40%	0%	0%	32	16	**48**
	Project Total p.m. Peak Hour Trips						**938**	**4,039**				**764**	**3,533**	**4,297**
Saturday Daily		Number of	Unit	Trip	%	%	Trips	Trips	Mixed-Use	Transit	Pass-by	Net Trips	Net Trips	Total Sat. Daily
	Land Use[1]	Units	Type	Generation	Entering	Exiting	Entering	Exiting	Internal Capture	Reduction	Reduction	Entering	Exiting	Trips
Employment	Industrial Park (130)	600	1,000 Sq. Ft. GFA	1,449	50%	50%	725	725	0%	0%	0%	725	725	**1,449**
Employment	Office Park (750)	3000	1,000 Sq. Ft. GFA	4,920	50%	50%	2,460	2,460	0%	0%	0%	2,460	2,460	**4,920**
Social Heart	Shopping Center (820)	60	1,000 Sq. Ft. GLA	6,697	50%	50%	3,349	3,349	0%	0%	0%	3,349	3,349	**6,697**
Social Heart	General Office Building (710)	96	1,000 Sq. Ft. GFA	224	50%	50%	112	112	0%	0%	0%	112	112	**224**
Residential	Residential Condominium/Townhouse (230)	140	Dwelling Units	935	50%	50%	467	467	0%	0%	0%	467	467	**935**
	Project Total Saturday Trips						**7,113**	**7,113**				**7,113**	**7,113**	**14,225**
Saturday Peak Hour		Number of	Unit	Trip	%	%	Trips	Trips	Mixed-Use	Transit	Pass-by	Net Trips	Net Trips	Total Sat Pk Hr
	Land Use[1]	Units	Type	Generation	Entering	Exiting	Entering	Exiting	Internal Capture	Reduction	Reduction	Entering	Exiting	Trips
Employment	Industrial Park (130)	600	1,000 Sq. Ft. GFA	210	32%	68%	67	143	0%	0%	0%	67	143	**210**
Employment	Office Park (750)	3000	1,000 Sq. Ft. GFA	420	74%	26%	311	109	0%	0%	0%	311	109	**420**
Social Heart	Shopping Center (820)	60	1,000 Sq. Ft. GLA	615	52%	48%	320	295	0%	0%	0%	320	295	**615**
Social Heart	General Office Building (710)	96	1,000 Sq. Ft. GFA	39	54%	46%	21	18	0%	0%	0%	21	18	**39**
Residential	Residential Condominium/Townhouse (230)	140	Dwelling Units	83	54%	46%	45	38	0%	0%	0%	45	38	**83**
	Project Total Saturday Peak Hour Trips						**764**	**604**				**764**	**604**	**1,367**

1. Land Use Code from the Institute of Transportation Engineers - 8th Edition Trip Generation Manual (ITE Manual)

SOURCE: Hales Engineering, May 2011

Table 4
Lehi - Micron TIS
Trip Generation - Phase I&II

Daily														
Land Use[1]		Number of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	Mixed-Use Internal Capture	Transit Reduction	Pass-by Reduction	Net Trips Entering	Net Trips Exiting	Total Daily Trips
Employment	Industrial Park (130)	742	1,000 Sq. Ft. GFA	4,428	50%	50%	2,214	2,214	0%	0%	0%	2,214	2,214	**4,428**
Employment	Office Park (750)	4955	1,000 Sq. Ft. GFA	52,040	50%	50%	26,020	26,020	0%	0%	0%	26,020	26,020	**52,040**
Social Heart	Shopping Center (820)	298	1,000 Sq. Ft. GLA	13,809	50%	50%	6,905	6,905	0%	0%	0%	6,905	6,905	**13,809**
Social Heart	General Office Building (710)	481	1,000 Sq. Ft. GFA	4,471	50%	50%	2,236	2,236	0%	0%	0%	2,236	2,236	**4,471**
Social Heart	Apartment (220)	115	Dwelling Units	820	50%	50%	410	410	0%	0%	0%	410	410	**820**
Residential	Residential Condominium/Townhouse (230)	470	Dwelling Units	2,472	50%	50%	1,236	1,236	0%	0%	0%	1,236	1,236	**2,472**
Residential	Single-Family Detached Housing (210)	195	Dwelling Units	1,922	50%	50%	961	961	0%	0%	0%	961	961	**1,922**
School	Elementary School (520)	70	1,000 Sq. Ft. GFA	1,080	50%	50%	540	540	0%	0%	0%	540	540	**1,080**
School	Middle School (522)	140	1,000 Sq. Ft. GFA	1,929	50%	50%	965	965	0%	0%	0%	965	965	**1,929**
	Project Total Daily Trips						**41,486**	**41,486**				**41,486**	**41,486**	**82,973**
a.m. Peak Hour														
Land Use[1]		Number of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	Mixed-Use Internal Capture	Transit Reduction	Pass-by Reduction	Net Trips Entering	Net Trips Exiting	Total a.m. Trips
Employment	Industrial Park (130)	742	1,000 Sq. Ft. GFA	483	82%	18%	396	87	0%	0%	0%	396	87	**483**
Employment	Office Park (750)	4955	1,000 Sq. Ft. GFA	6,913	89%	11%	6,152	760	0%	0%	0%	6,152	760	**6,913**
Social Heart	Shopping Center (820)	298	1,000 Sq. Ft. GLA	293	61%	39%	179	114	0%	0%	0%	179	114	**293**
Social Heart	General Office Building (710)	481	1,000 Sq. Ft. GFA	659	88%	12%	580	79	0%	0%	0%	580	79	**659**
Social Heart	Apartment (220)	115	Dwelling Units	60	20%	80%	12	48	0%	0%	0%	12	48	**60**
Residential	Residential Condominium/Townhouse (230)	470	Dwelling Units	178	17%	83%	30	148	0%	0%	0%	30	148	**178**
Residential	Single-Family Detached Housing (210)	195	Dwelling Units	146	25%	75%	36	109	0%	0%	0%	36	109	**146**
School	Elementary School (520)	70	1,000 Sq. Ft. GFA	364	56%	44%	204	160	0%	0%	0%	204	160	**364**
School	Middle School (522)	140	1,000 Sq. Ft. GFA	609	55%	45%	335	274	0%	0%	0%	335	274	**609**
	Project Total a.m. Peak Hour Trips						**7,924**	**1,780**				**7,924**	**1,780**	**9,705**
p.m. Peak Hour														
Land Use[1]		Number of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	Mixed-Use Internal Capture	Transit Reduction	Pass-by Reduction	Net Trips Entering	Net Trips Exiting	Total p.m. Trips
Employment	Industrial Park (130)	742	1,000 Sq. Ft. GFA	613	21%	79%	129	485	1%	10%	0%	115	432	**547**
Employment	Office Park (750)	4955	1,000 Sq. Ft. GFA	6,141	14%	86%	860	5,281	1%	10%	0%	766	4,706	**5,472**
Social Heart	Shopping Center (820)	298	1,000 Sq. Ft. GLA	1,322	49%	51%	648	674	13%	0%	30%	395	411	**805**
Social Heart	General Office Building (710)	481	1,000 Sq. Ft. GFA	618	17%	83%	105	513	1%	10%	0%	94	457	**550**
Social Heart	Apartment (220)	115	Dwelling Units	81	65%	35%	53	28	30%	0%	0%	37	20	**57**
Residential	Residential Condominium/Townhouse (230)	470	Dwelling Units	214	67%	33%	143	71	30%	0%	0%	100	49	**150**
Residential	Single-Family Detached Housing (210)	195	Dwelling Units	192	63%	37%	121	71	30%	0%	0%	85	50	**134**
School	Elementary School (520)	70	1,000 Sq. Ft. GFA	85	45%	55%	38	47	1%	0%	0%	38	46	**84**
School	Middle School (522)	140	1,000 Sq. Ft. GFA	167	52%	48%	87	80	1%	0%	0%	86	79	**165**
	Project Total p.m. Peak Hour Trips						**2,183**	**7,249**				**1,714**	**6,249**	**7,963**
Saturday Daily														
Land Use[1]		Number of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	Mixed-Use Internal Capture	Transit Reduction	Pass-by Reduction	Net Trips Entering	Net Trips Exiting	Total Sat. Daily Trips
Employment	Industrial Park (130)	742	1,000 Sq. Ft. GFA	1,769	50%	50%	884	884	0%	0%	0%	884	884	**1,769**
Employment	Office Park (750)	4955	1,000 Sq. Ft. GFA	8,126	50%	50%	4,063	4,063	0%	0%	0%	4,063	4,063	**8,126**
Social Heart	Shopping Center (820)	298	1,000 Sq. Ft. GLA	18,383	50%	50%	9,191	9,191	0%	0%	0%	9,191	9,191	**18,383**
Social Heart	General Office Building (710)	481	1,000 Sq. Ft. GFA	1,048	50%	50%	524	524	0%	0%	0%	524	524	**1,048**
Social Heart	Apartment (220)	115	Dwelling Units	647	50%	50%	323	323	0%	0%	0%	323	323	**647**
Residential	Residential Condominium/Townhouse (230)	470	Dwelling Units	2,129	50%	50%	1,065	1,065	0%	0%	0%	1,065	1,065	**2,129**
Residential	Single-Family Detached Housing (210)	195	Dwelling Units	1,997	50%	50%	998	998	0%	0%	0%	998	998	**1,997**
School	Elementary School (520)	70	1,000 Sq. Ft. GFA	0			0	0	0%	0%	0%	0	0	**0**
School	Middle School (522)	140	1,000 Sq. Ft. GFA	0			0	0	0%	0%	0%	0	0	**0**
	Project Total Saturday Trips						**17,049**	**17,049**				**17,049**	**17,049**	**34,098**
Saturday Peak Hour														
Land Use[1]		Number of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	Mixed-Use Internal Capture	Transit Reduction	Pass-by Reduction	Net Trips Entering	Net Trips Exiting	Total Sat Pk Hr Trips
Employment	Industrial Park (130)	742	1,000 Sq. Ft. GFA	260	32%	68%	83	177	0%	0%	0%	83	177	**260**
Employment	Office Park (750)	4955	1,000 Sq. Ft. GFA	694	74%	26%	513	180	0%	0%	0%	513	180	**694**
Social Heart	Shopping Center (820)	298	1,000 Sq. Ft. GLA	1,743	52%	48%	906	836	0%	0%	0%	906	836	**1,743**
Social Heart	General Office Building (710)	481	1,000 Sq. Ft. GFA	197	54%	46%	106	91	0%	0%	0%	106	91	**197**
Social Heart	Apartment (220)	115	Dwelling Units	60	54%	46%	32	28	0%	0%	0%	32	28	**60**
Residential	Residential Condominium/Townhouse (230)	470	Dwelling Units	179	54%	46%	97	82	0%	0%	0%	97	82	**179**
Residential	Single-Family Detached Housing (210)	195	Dwelling Units	183	54%	46%	99	84	0%	0%	0%	99	84	**183**
School	Elementary School (520)	70	1,000 Sq. Ft. GFA	0			0	0	0%	0%	0%	0	0	**0**
School	Middle School (522)	140	1,000 Sq. Ft. GFA	0			0	0	0%	0%	0%	0	0	**0**
	Project Total Saturday Peak Hour Trips						**1,837**	**1,478**				**1,837**	**1,478**	**3,315**

1. Land Use Code from the Institute of Transportation Engineers - 8th Edition Trip Generation Manual (ITE Manual)

SOURCE: Hales Engineering, August 2011

D. Trip Distribution and Assignment

Project traffic is assigned to the roadway network based on the type of trip and the proximity of project access points to major streets, high population densities, and regional trip attractions. Existing travel patterns observed during data collection also provide helpful guidance to establishing these distribution percentages, especially in close proximity to the site. Hales

Engineering also made use of the MAG 2040 travel demand model to assist in estimating future distribution of traffic. The resulting overall distribution of project generated trips is as follows:

To/From the Development:

- 40% West on SR-92
- 5% Northwest to/from Traverse Mountain area
- 5% North on Highland Blvd. (SunCrest Dr.)
- 20% East on SR-92
- 15% South on 1200 East
- 10% South on Center Street
- 5% South on 1200 West

These trip distribution assumptions were used to assign the p.m. peak hour generated traffic at the study intersections to create trip assignment for the proposed development. Figure 3 shows the Phase I trip assignment and Figure 4 shows the Phase I and II combined trip assignment.

Appendix D shows the recommended cross section widths for the roads internal to the Micron development based on distribution and assignment assumptions above. While the streetscape and side treatments may be altered, the primary purpose of the map is to show recommended lane counts.

In addition to the internal roads and SR-92, several other roads in Lehi are critical to the success of this project in dispersing traffic away from the site such as 2300 West, 1200 West, Center Street, 1200 East, Highland Blvd., and 3200 North.

E. Access

As previously discussed, a corridor agreement is in place between UDOT, Lehi, and Highland that defines the access onto SR-92 (see Appendix F). Access to the Micron development includes the following:

- 500 West: Full, signalized access at 500 West to the arterial portion of SR-92. This intersection would also have an on-ramp onto the westbound commuter lanes.
- Center Street: Full signalized access at Center Street to the arterial portion of SR-92. There is also a planned eastbound commuter lane off-ramp to southbound Center Street and an off-ramp form eastbound commuter lane to northbound Center Street which would allow access into the development.
- 400 East: Full, signalized access at 400 East to the arterial portion of SR-92. Because it will be a T-intersection, Hales Engineering assumed it will be constructed as a “high functioning T-intersection” (High-T). This provides an acceleration lane for the southbound to eastbound left-turn movement and does not require the eastbound movement to stop.

In addition to this direct access to SR-92, the project would also have access to Highland Blvd at multiple locations as well as east/west connectivity parallel to SR-92 on the west side of the development (See concept plan in Appendix C). Additionally, it was assumed that cross access will eventually exist between the Micron project and IMFT, although those details have not yet been worked out. Advantages to this cross access include utilizing unused capacity at the 1200 East intersection, as well as reducing trips on SR-92 because trips between IMFT and the retail areas in the Micron project won't need to use SR-92.

F. Auxiliary Lane Requirements

Based on UDOT Administrative Rule R930-6, the following auxiliary lanes are required for access onto an Access Category 3 roadway:

Right-Turn Deceleration Lane:

- Required when the projected peak hour right-turn ingress volume is greater than 10 vph.

Left-Turn Deceleration Lane:

- Required when the projected peak hour left turn ingress volume is greater than 5 vph.

Right-Turn Acceleration Lane:

- Required when the projected peak hour right turn egress volume is greater than 10 vph.

Left-Turn Acceleration Lane:

- Generally not required when the speed limit is less than 50 mph or the access is signalized.

Based on these requirements, a right-turn deceleration lane and left-turn deceleration lane recommended at the following proposed access locations:

- 500 West
- Center Street
- 400 East

Right- and left-turn acceleration lanes are not recommended at any of the access locations because it is assumed they will all be signalized on opening day of the access and because the speed limit is only 45 mph. A left-turn acceleration lane is recommended at 400 East as part of a High-T intersection.


1200 W
0
0
20
40
620
180
0
370
0
0
0
40
SR-92
Trav D
0
10
40
840
0
430

Lehi Micron TIS
Future (2020) Trip Assignment

PM Peak Hour
Figure 3b

Hales Engineering
Lehi, Utah

801-766-4343
8/30/2011

Lehi Micron TIS
Future (2020) Trip Assignment

PM Peak Hour
Figure 3c

Hales Engineering
Lehi, Utah

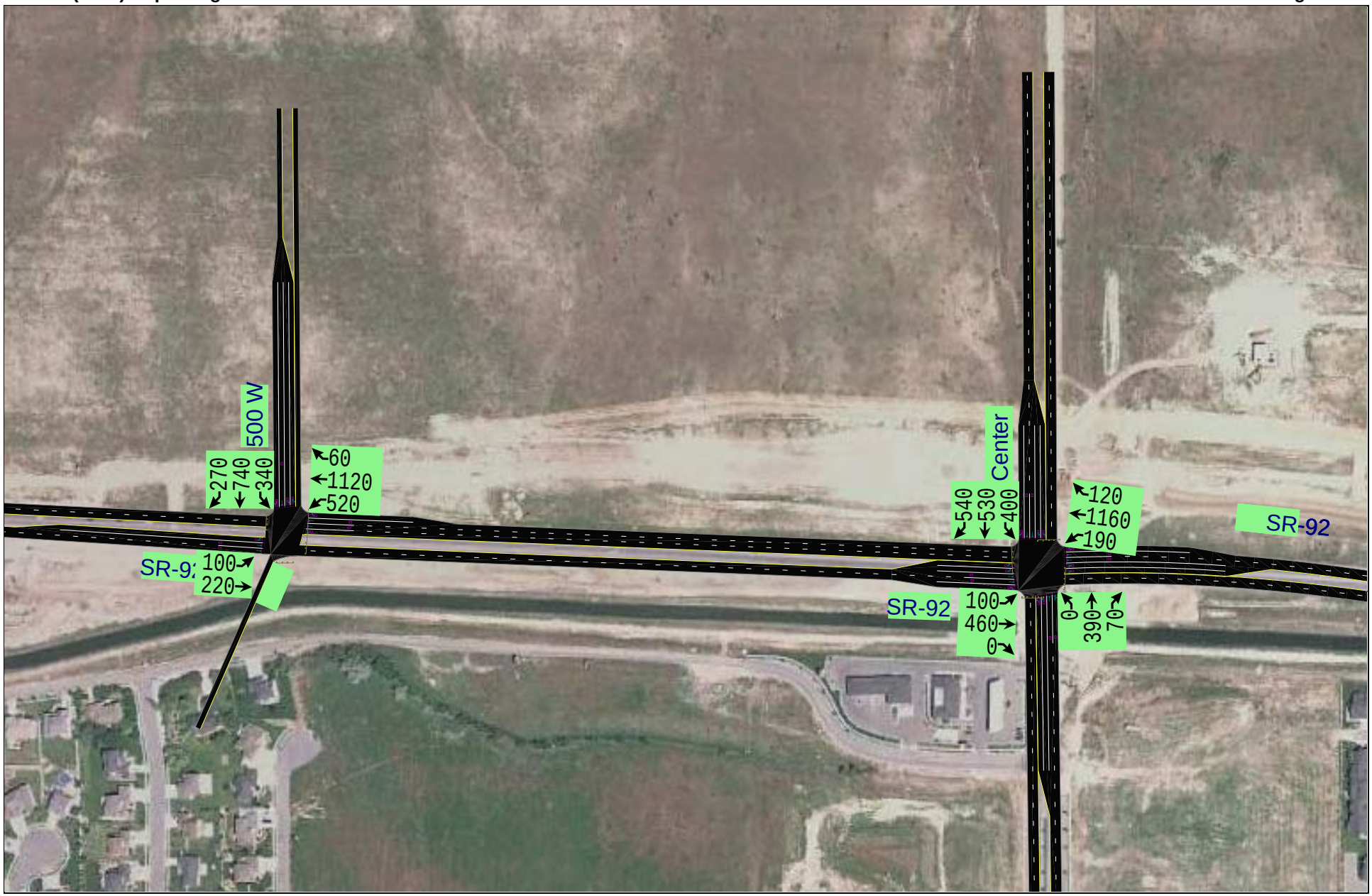
801-766-4343
8/30/2011


1200 E
High Blvd
SR-92
SR
0
110
0
0
190
0
0
890
410
100
20
0
40
0
0
0
150
0
180
710
0
0
0
0


1200 W
SR-92
SR-92
Trav D
0
0
50
150
520
620
0
70
0
0
0
170
0
30
100
1290
0
290

Lehi Micron TIS
Future (2030) Trip Assignment

PM Peak Hour
Figure 4b



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Lehi, Utah

801-766-4343
8/30/2011

Lehi Micron TIS
Future (2030) Trip Assignment

PM Peak Hour
Figure 4c

Hales Engineering
Lehi, Utah

801-766-4343
8/30/2011

Lehi Micron TIS
Future (2030) Trip Assignment

PM Peak Hour
Figure 4d

Hales Engineering
Lehi, Utah

801-766-4343
8/30/2011

IV. FUTURE (2020) PLUS PROJECT CONDITIONS

A. Purpose

This section of the report examines the traffic impacts of the proposed project at each of the study intersections during future 2020 conditions. The trips generated by the proposed development were combined with the future 2020 background traffic volumes to create the future plus project conditions. The future plus project scenario evaluates the impacts of the project traffic on the surrounding roadway network assuming Phase I development as discussed in Chapter III of this report. This scenario provides valuable insight into the potential impacts of the proposed project on future background traffic conditions.

B. Traffic Volumes

Trips were assigned to the study intersections based on the trip distribution percentages discussed in Chapter III and permitted intersection turning movements.

The future (2020) plus project weekday p.m. peak hour volumes were generated for the study intersections and are shown in Figure 5.

C. Level of Service Analysis

Using VISSIM, the future 2020 plus project weekday p.m. peak hour LOS were computed for each study intersection. The results of this analysis are reported in Table 5 (see Appendix B for the detailed LOS reports). Multiple runs of VISSIM were used for the analysis to provide a statistical evaluation of the interaction between the intersections. As shown in Table 5, all intersections have acceptable levels of service.

Table 5 Future (2020) Plus Project p.m. Peak Hour Level of Service

Intersection		Worst Approach			Overall Intersection	
Description	Control	Approach[1,3]	Aver. Delay (Sec/Veh)[1]	LOS[1]	Aver. Delay (Sec/Veh)[2]	LOS[2]
1200 West / SR-92	Signal	-	-	-	24.6	C
Traverse Access "D" / SR-92	Signal	-	-	-	6.9	A
500 West / SR-92	Signal	-	-	-	29.3	C
Center Street / SR-92	Signal	-	-	-	25.3	C
EB Commuter Lane Off-Ramp / Center Street	EB Yield	EB	2.8	A	-	-
400 East / SR-92	Signal	-	-	-	20.0	B
1200 East / SR-92	Signal	-	-	-	28.8	C
Highland Blvd / SR-92	Signal	-	-	-	21.6	C

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for non-all-way-stop unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds / vehicle).
3. SB = Southbound approach, etc.

Source: Hales Engineering, August 2011

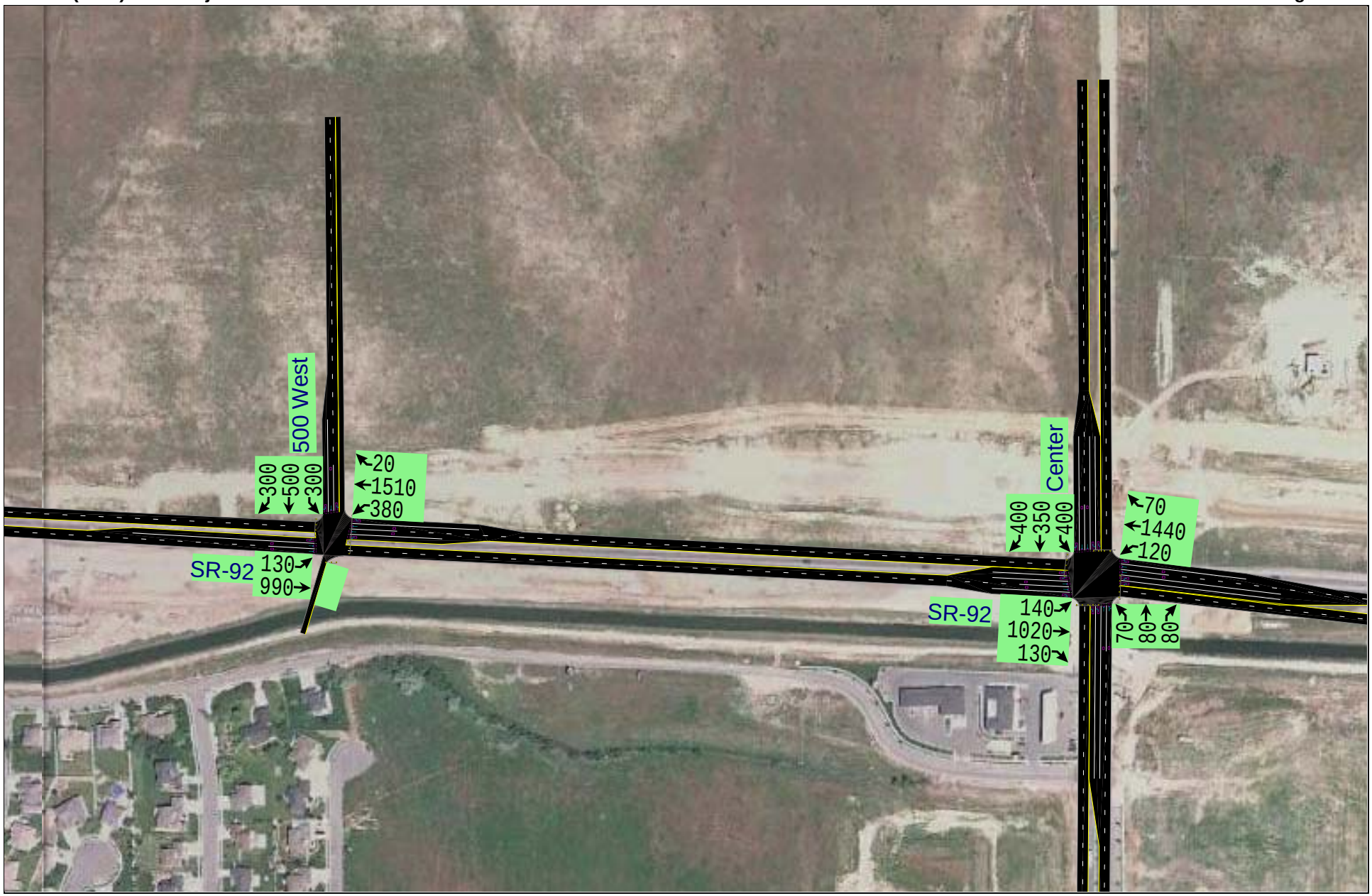
D. Queuing Analysis

Hales Engineering calculated the maximum and average queue lengths for each of the study intersections. The queue reports can be found in Appendix B. No significant queuing issues exist at the study intersections.

E. Mitigation Measures

No mitigation measures are required.


1200 W
100
80
80
120
1270
400
Traverse D
60
50
80
1730
SR-92
160
870
350
160
40
180
SR-92
60
1070


500 West
300
500
300
20
1510
380
SR-92
130
990
Center
400
350
400
70
1440
120
SR-92
140
1020
130
70
80
80


1000 E
560
600
200
1070
SR-92
110
1390


1200 E
High Blvd
SR-92
92
120
290
360
50
850
60
80
2070
620
280
100
260
250
50
180
70
610
90
610
1890
50
100
60
250

V. FUTURE (2030) BACKGROUND CONDITIONS

A. Purpose

The purpose of the future (2030) background analysis is to study the intersections and roadways during the peak travel periods of the day for future background traffic and geometric conditions. Through this analysis, future background traffic operational deficiencies can be identified and potential mitigation measures recommended.

B. Traffic Volumes

Traffic volumes for the future year 2030 were calculated as discussed in Chapter II. The resulting future 2030 weekday p.m. peak hour traffic volumes are shown in Figure 6.

C. Planned Roadway Improvements

As previously discussed in Chapter II, the following additional improvements to the roadway network were assumed to have occurred by year 2030:

- Year 2030 commuter lane configuration:
    - EB begins between Frontage Road and Triumph Blvd and ends east of 1200 East with an off-ramp at Center Street (directional to southbound Center Street only) and an off-ramp just west of 1200 East onto the eastbound SR-92 arterial. An additional off-ramp is proposed with the project at Center Street (loop ramp directional to northbound Center Street only).
    - WB begins east of Highland Blvd and ends with a ramp directly onto northbound I-15 with an on-ramp west of 1200 East, an on-ramp from southbound Highland Blvd. just north of SR-92, an on-ramp at 500 West, and an off-ramp west of 1200 West.

D. Level of Service Analysis

Using VISSIM, the weekday p.m. peak hour LOS was computed for each study intersection. The results of this analysis are reported in Table 6 (see Appendix B for the detailed LOS reports). Multiple runs of VISSIM were used to provide a statistical evaluation of the interaction between the intersections. These results serve as a baseline condition for the impact analysis of the proposed development during future (2030) conditions. As shown in Table 6, all intersections have acceptable levels of service.

Table 6 Future (2030) Background p.m. Peak Hour Level of Service

Intersection		Worst Approach			Overall Intersection	
Description	Control	Approach[1,3]	Aver. Delay (Sec/Veh)[1]	LOS[1]	Aver. Delay (Sec/Veh)[2]	LOS[2]
1200 West / SR-92	Signal	-	-	-	32.0	C
Traverse Access "D" / SR-92	Signal	-	-	-	8.3	A
WB CL On-Ramp / 500 West	WB Yield	WB	2.9	A	-	-
Center Street / SR-92	Signal	-	-	-	13.1	B
EB Commuter Lane Off-Ramp / Center Street	EB Yield	EB	2.1	A	-	-
1200 East / SR-92	Signal	-	-	-	29.9	C
Highland Blvd / SR-92	Signal	-	-	-	24.3	C

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for non-all-way-stop unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds / vehicle).
3. SB = Southbound approach, etc.

Source: Hales Engineering, April 2011

E. Queuing Analysis

Hales Engineering calculated the maximum and average queue lengths for each of the study intersections. The queue reports can be found in Appendix B. No significant queuing issues exist.

F. Mitigation Measures

No mitigation measures are recommended.


1200 W
100
130
80
80
560
330
160
630
690
370
70
220
Trav D
60
40
20
910
SR-92
60
870


930
240
SR-92
SR-92
850
60
40
160
Center Street


1200 E
Highland Blvd
SR-92
R-92
260
260
300
140
760
140
100
710
300
260
70
380
200
60
50
40
640
60
450
1430
170
200
70
110

VI. FUTURE (2030) PLUS PROJECT CONDITIONS

A. Purpose

This section of the report examines the traffic impacts of the proposed project at each of the study intersections during future 2030 conditions. The trips generated by the proposed development were combined with the future 2030 background traffic volumes to create the future plus project conditions. The future plus project scenario evaluates the impacts of the project traffic on the surrounding roadway network assuming full build-out as discussed in Chapter III of this report. This scenario provides valuable insight into the potential impacts of the proposed project on future background traffic conditions.

B. Traffic Volumes

Trips were assigned to the study intersections based on the trip distribution percentages discussed in Chapter III and permitted intersection turning movements.

The future (2030) plus project weekday p.m. peak hour volumes were generated for the study intersections and are shown in Figure 7.

C. Level of Service Analysis

Using VISSIM, the future 2030 plus project weekday p.m. peak hour LOS were computed for each study intersection. The results of this analysis are reported in Table 7 (see Appendix B for the detailed LOS reports). Multiple runs of VISSIM were used for the analysis to provide a statistical evaluation of the interaction between the intersections. As shown in Table 7 several study intersections have unacceptable levels of service. Significant queuing also exists, primarily in the westbound direction.

Table 7 Future (2030) Plus Project p.m. Peak Hour Level of Service

Intersection		Worst Approach			Overall Intersection	
Description	Control	Approach[1,3]	Aver. Delay (Sec/Veh)[1]	LOS[1]	Aver. Delay (Sec/Veh)[2]	LOS[2]
1200 West / SR-92	Signal	-	-	-	54.6	D
Traverse Access "D" / SR-92	Signal	-	-	-	7.0	A
500 West / SR-92	Signal	-	-	-	41.8	D
Center Street / SR-92	Signal	-	-	-	68.6	E
EB Commuter Lane Off-Ramp / Center Street	EB Yield	NB	>50.0	F	-	-
400 East / SR-92	Signal	-	-	-	49.5	D
1200 East / SR-92	Signal	-	-	-	63.8	E
Highland Blvd / SR-92	Signal	-	-	-	42.8	D

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for non-all-way-stop unsignalized intersections.
2. This represents the overall intersection LOS and delay (seconds / vehicle).
3. SB = Southbound approach, etc.

Source: Hales Engineering, August 2011

D. Queuing Analysis

Hales Engineering calculated the maximum and average queue lengths for each of the study intersections. The queue reports can be found in Appendix B. Significant queuing exists in the westbound direction from Highland Blvd to Center Street due to insufficient green time for the westbound flow of traffic.

E. Mitigation Measures

One mitigation measure included in the analysis above was to provide two receiving lanes at 500 West for the westbound commuter lane. This would allow dual left-turn lanes and dual southbound lanes thereby significantly increasing the capacity of the intersection.

Even with this improvement in place, there is insufficient capacity for the westbound flow of traffic on SR-92. Additional improvements may be required such as widening SR-92 from the planned five-lane arterial to a seven-lane arterial.

F. Timeline of Improvements

Hales Engineering has estimated the approximate trigger points that would require the background and plus project improvements based on percentage of overall development. However, there are numerous variables that will affect the exact timing of the improvements such as changes in land use and the actual growth in background traffic. Detailed assumptions for phasing of the development are found in Appendix E. As some of these improvements could be very expensive, it is recommended that additional analysis be completed closer to the actual time that the improvements are to be constructed.

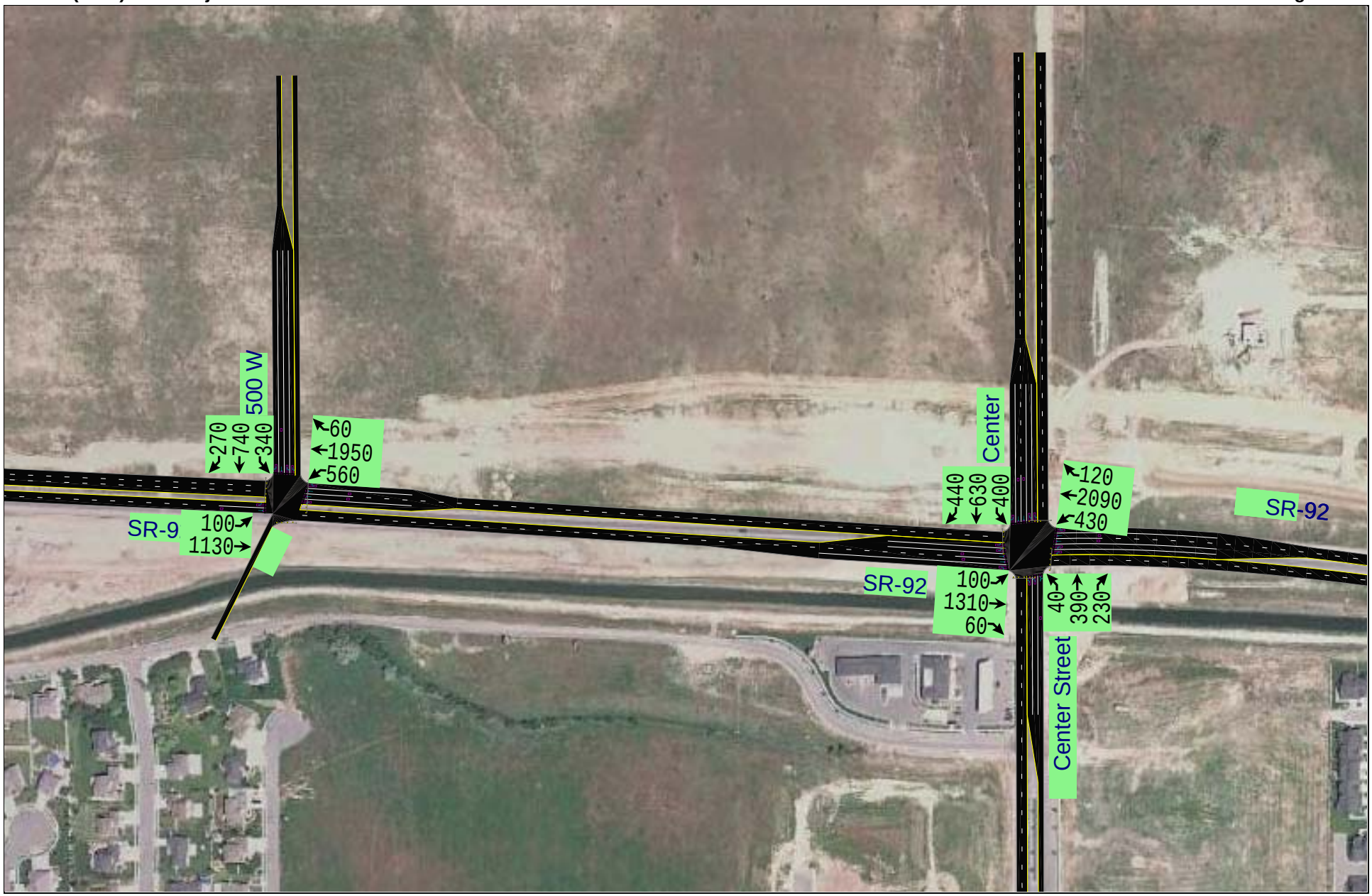
The improvements are recommended as follows (based on p.m. peak hour conditions):

- Westbound Commuter Lane On-Ramp at 500 West:
  - The on-ramp should be constructed between 2016 and 2020 (25 percent of overall project completion)
- Provide two receiving lanes at 500 West for the westbound commuter lane. This would allow dual left-turn lanes and dual southbound lanes thereby significantly increasing the capacity of the intersection
  - This improvement should be constructed between 2021 and 2025 (at approximately 50 percent of overall project completion)
- Eastbound Commuter Lane Off-Ramp – Loop Ramp to Northbound Center Street:
  - This loop ramp should be constructed between 2021 and 2025 (at approximately 50 percent of overall project completion). This recommendation is based on a high eastbound to northbound left-turn volume during the a.m. peak period as commuters enter the Micron development from the west. The dual left-turn lanes on the arterial will become oversaturated thereby requiring the capacity of the commuter lanes and the new loop ramp. Hales Engineering is currently conducting a traffic study to refine the analysis for this Center Street / SR-92 area because a.m. conditions were not analyzed for this TIS.
- Cross Access from Micron to IMFT (East and West Sides)
  - Cross access would have an immediate benefit once retail, restaurant, and other service land uses begin operation in the Micron development.
  - Based on traffic operations, the cross access should be constructed by at least year 2015 as this is when the social heart portion of the project is anticipated to begin.
  - Significant use of cross access from the east portion of the Micron development through IMFT will be required at approximately year 2025.

- Right- and left-turn deceleration lanes are required for each new access (at 500 West, Center Street, and 400 East).
    - These auxiliary lanes should be constructed simultaneously with the new accesses.
- Appendix D shows the recommended cross section widths for roads internal to the Micron development. All internal streets identified as larger than a local cross section should be constructed to their full width when originally constructed. The difference between the local cross section width and the full width will be reimbursed by Lehi City.
- Potential future signal locations internal to the site are also shown in Appendix D. These signals should be installed once warrants are met, or in anticipation of warrants being met. However, based on the estimated phasing of the project, the following is an estimated timeframe for when the signals may be warranted:
    - 2016 to 2020 (25% Build):
        - First signal north of SR-92 on Center Street
        - First signal north of SR-92 on 400 East
    - 2021 to 2025 (50% Build):
        - First signal north of SR-92 on 500 West
        - Second signal north of SR-92 on Center Street
    - 2026 to 2030 (75% Build):
        - Signal at east IMFT border

The percentages of overall development are based on trips of each land use as outlined in Table 3 and 4 (see Chapter III).


1200 W
100
130
130
230
1080
850
160
700
690
370
70
390
Trav D
60
70
120
2100
SR-92
60
1160


500 W
270
740
340
60
1950
560
SR-9
100
1130
Center
440
630
400
120
2090
430
SR-92
SR-92
100
1310
60
40
390
230
Center Street


400 E
630
600
250
2010
50
1890


1200 E
High Blvd
SR-92
430
680
630
140
1370
140
590
60
430
110
860
60
490
1530
710
410
160
380
700
2310
170
200
90
110

VII. ACCESS MANAGEMENT

A. Purpose

This section of the report provides general guidelines and principals regarding access management for this development. It is recommended that as smaller parcels of the project are designed and constructed that individual traffic impact studies be completed to analyze safety and operational issues relating to access at the individual parcel level.

B. Shared Access

Individual parcels should be master planned to provide cross access between developments, specifically in areas of mixed use and along busy streets. This has the following benefits:

- Trips between individual parcels can be accomplished without affecting the adjacent roadway. This can reduce delay and improve safety along the major corridors.
- Secondary access can be provided which increases opportunities for public safety vehicles to have access in emergency situations.
- Multiple ingress/egress opportunities minimize delay as optimal routes can be chosen for vehicle travel. Having cross access allows vehicles to enter/exit multiple sites at the best location.
- Cross access prevents “cul-de-sacs” from occurring which concentrates all traffic at one location.

Cross access should also include pedestrian connectivity between parcels which reduces vehicle trips and prevents damage to landscaping.

C. Access Spacing

Direct access to commercial developments should be minimized on major arterials, specifically in close proximity to major intersections (such as SR-92 and other arterial intersections). Single family residential access should be limited to local streets (and minor collectors if possible). Multi-family residential access should be provided on collector streets (and local streets for secondary access).

Street spacing on the arterial streets and major collectors should be 660 feet. On minor collectors, street spacing can be as short as 330 feet. Street intersections on local streets should line up; however, if they are offset it should be by at least 150 feet.

Commercial access to minor arterial and major collectors should be limited to 330 feet. Commercial access to major arterials should be limited to right-in/right-out access, if possible.

D. Signalized Intersection Spacing

Intersections should only be signalized after meeting warrants as outlined in the latest version of the Manual on Uniform Traffic Control Devices (MUTCD). However, it is wise to plan future locations so that appropriate spacing will exist once the intersections become signalized. UDOT typically considers one-half mile the appropriate spacing for signalized intersections, and longer spacing for higher functioning roads. A corridor agreement is currently in place outlining all future signalized intersections locations on SR-92 (see Appendix F). However, in an urbanized core area where access is more important than movement of through traffic, such as in the "social heart" area of the Micron development, shorter signalized intersection spacing is appropriate (one-quarter mile). While more signals increases delay and reduces travel speeds, they provide better side-street access and provide a more pedestrian-friendly area as long out-of-direction travel is not required for pedestrians to cross busy streets. Therefore, Hales Engineering recommends signalized intersections spacing as warranted at or near one-quarter mile.

Appendix D shows potential signalized intersections locations based on anticipated future ADT values.

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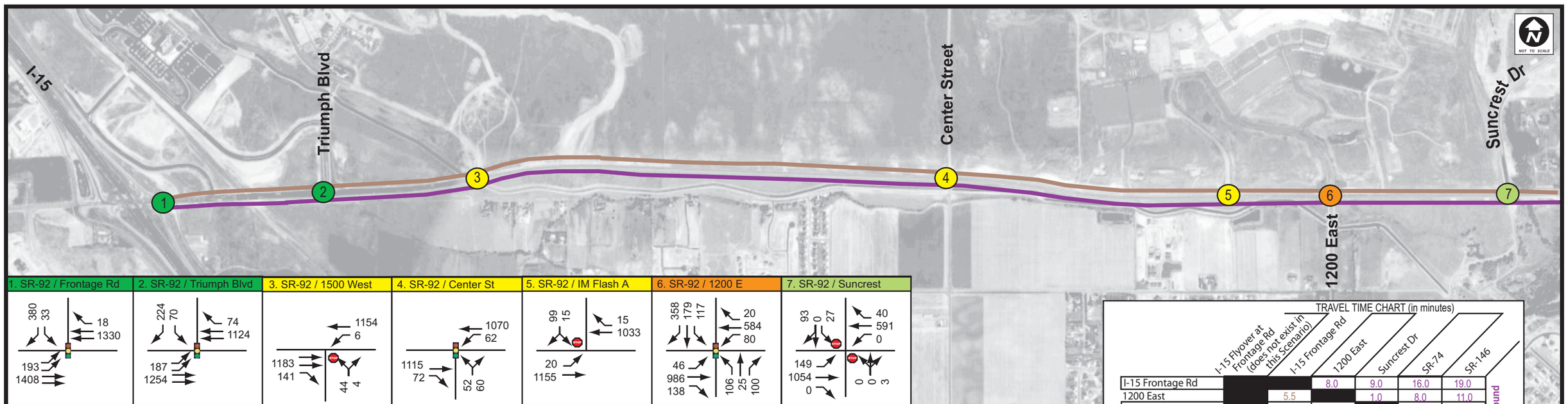
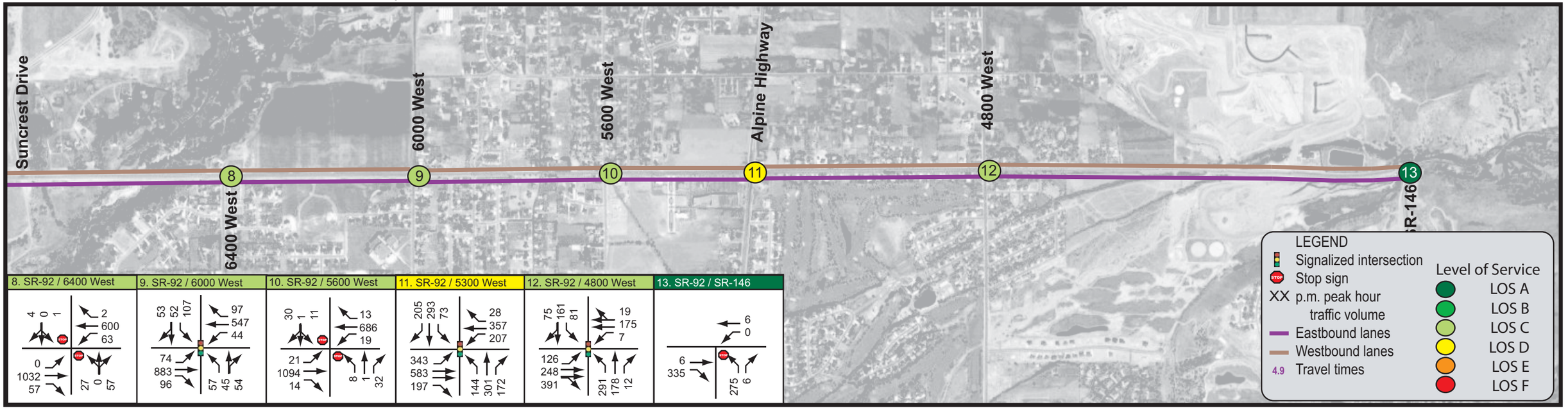
APPENDIX A

Turning Movement Counts

SR-92: I-15 to Suncrest Drive



SR-92: Suncrest Drive to Canyon Drive



FEHR & PEERS
TRANSPORTATION CONSULTANTS

SR-92 Environmental Assessment
Existing PM Peak Hour Conditions
FIGURE 3

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APPENDIX B

LOS & Queue Length Reports

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VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2020-Background**
Time Period: **PM** **Project #:** ***UT-263***

Intersection: **1200 West**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	162	125	31	52.8	3.0	*D*
	T	39	82	11	54.2	4.9	*D*
	R	136	81	4	8.9	0.9	*A*
	Subtotal	337			35.2		*D*
SB	L	61	115	18	56.4	4.6	*E*
	T	76	132	23	56.7	5.8	*E*
	R	101	73	5	11.9	1.9	*B*
	Subtotal	238			37.6		*D*
EB	L	155	132	28	52.7	3.6	*D*
	T	555	258	26	17.3	1.7	*B*
	R	350	310	15	10.4	1.3	*B*
	Subtotal	1,060			20.2		*C*
WB	L	222	139	25	31.6	1.9	*C*
	T	693	191	26	13.7	1.6	*B*
	R	64	56	1	5.2	0.9	*A*
	Subtotal	979			17.2		*B*
Total		2,614			22.6	0.6	*C*

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VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2020-Background**
Time Period: **PM** **Project #:** ***UT-263***

Intersection: **Traverse D**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
SB	L	39	79	9	45.8	4.9	*D*
	R	59	51	2	10.3	1.2	*B*
	Subtotal	98			24.4		*C*
EB	L	58	66	1	10.8	1.6	*B*
	T	692	131	5	3.5	0.6	*A*
	Subtotal	750			4.0		*A*
WB	T	919	292	15	6.9	0.8	*A*
	R	20	23	0	2.1	0.3	*A*
	Subtotal	939			6.8		*A*
Total		1,788			6.6	0.6	*A*

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VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2020-Background**
Time Period: **PM** **Project #:** ***UT-263***

Intersection: **Center St**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	68	72	16	52.1	3.9	*D*
	R	80	69	3	9.0	1.6	*A*
	Subtotal	148			28.8		*C*
EB	T	606	127	9	5.7	0.8	*A*
	R	125	51	1	2.7	0.4	*A*
	Subtotal	731			5.2		*A*
WB	L	115	99	22	49.0	1.4	*D*
	T	871	104	4	2.2	0.3	*A*
	Subtotal	986			7.7		*A*
Total		1,865			8.4	0.5	*A*

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VISSIM Level of Service Report

Project: Lehi-Micron TIS
Analysis Period: 2020-Background
Time Period: PM
Project #: *UT-263*

Intersection: 1200 East
Type: Signalized

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	175	143	37	53.1	4.3	*D*
	T	85	81	14	45.9	4.6	*D*
	R	260	221	35	25.8	3.0	*C*
	Subtotal	519			38.3		*D*
SB	L	119	110	26	54.2	5.5	*D*
	T	178	133	29	48.6	2.1	*D*
	Subtotal	297			50.8		*D*
EB	L	83	88	19	58.8	6.9	*E*
	T	1,173	355	52	16.0	1.1	*B*
	R	213	90	3	5.6	0.4	*A*
	Subtotal	1,469			16.9		*B*
WB	L	63	80	20	76.7	6.8	*E*
	T	665	179	13	7.3	0.7	*A*
	R	51	30	0	2.3	0.6	*A*
	Subtotal	779			12.5		*B*
SWB	R	363	8	0	0.5	0.0	*A*
	Subtotal	363			0.5		*A*
Total		3,426			20.4	0.6	*C*

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VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2020-Background**
Time Period: **PM** **Project #: *UT-263***

Intersection: **Highland Blvd**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	101	137	24	46.1	2.6	*D*
	T	57	102	14	50.1	3.8	*D*
	R	251	196	18	16.8	1.4	*B*
	Subtotal	408			28.7		*C*
SB	L	176	221	39	40.8	2.3	*D*
	T	51	107	11	41.1	5.7	*D*
	Subtotal	227			40.8		*D*
EB	L	404	232	73	57.7	1.4	*E*
	T	1,100	300	69	31.1	1.5	*C*
	R	46	318	76	9.0	2.3	*A*
	Subtotal	1,550			37.3		*D*
WB	L	88	148	26	55.0	4.7	*D*
	T	463	203	37	27.7	1.2	*C*
	R	68	54	2	5.7	0.9	*A*
	Subtotal	620			29.2		*C*
SWB	R	214	0	0	0.5	0.1	*A*
	Subtotal	214			0.5		*A*
Total		3,019			32.1	0.7	*C*

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VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2020-Background**
Time Period: **PM** **Project #:** ***UT-263***

Intersection: **EB CL Off-Ramp Center**
Type: **Unsignalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	T	68	0	0	0.3	0.1	*A*
	T2	80	0	0	0.4	0.1	*A*
	Subtotal	148			0.3		*A*
SB	T	240	0	0	0.1	0.0	*A*
	Subtotal	240			0.1		*A*
SEB	R	99	38	0	1.6	0.2	*A*
	Subtotal	***99***			***1.6***		***A***
Total		487			0.4	0.1	*A*

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VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2020 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **1200 West**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	160	130	32	54.6	2.5	*D*
	T	39	91	11	57.1	5.2	*E*
	R	179	125	11	14.1	1.5	*B*
	Subtotal	378			35.6		*D*
SB	L	79	145	25	59.0	4.3	*E*
	T	76	140	23	57.8	1.8	*E*
	R	102	112	11	22.9	4.0	*C*
	Subtotal	257			44.4		*D*
EB	L	154	151	29	56.9	3.6	*E*
	T	860	498	63	25.5	2.0	*C*
	R	346	242	19	13.6	1.5	*B*
	Subtotal	1,361			26.0		*C*
WB	L	388	327	59	51.1	0.9	*D*
	T	1,264	479	24	9.4	1.2	*A*
	R	116	49	0	5.3	1.2	*A*
	Subtotal	1,768			18.3		*B*
Total		3,764			24.6	0.7	*C*

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VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2020 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **Traverse D**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
SB	L	49	100	13	51.2	3.4	*D*
	R	58	76	6	21.6	4.9	*C*
	Subtotal	107			35.1		*C*
EB	L	59	84	3	19.1	3.0	*B*
	T	1,057	151	6	2.8	0.2	*A*
	Subtotal	1,116			3.6		*A*
WB	T	1,709	529	29	7.4	1.0	*A*
	R	81	45	0	4.0	0.6	*A*
	Subtotal	1,790			7.2		*A*
Total		3,013			6.9	0.6	*A*

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VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2020 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **500 West**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
SB	L	300	180	37	40.0	2.6	*D*
	R	298	292	44	29.7	3.1	*C*
	R2	500	898	159	50.6	3.1	*D*
	Subtotal	1,098			42.0		*D*
EB	L	132	240	64	90.7	36.6	*F*
	T	968	516	55	19.8	1.3	*B*
	Subtotal	1,100			28.3		*C*
WB	L	375	590	73	34.5	3.7	*C*
	T	1,492	542	85	19.4	1.2	*B*
	R	18	37	1	12.1	3.0	*B*
	Subtotal	1,885			22.3		*C*
Total		4,083			29.3	1.9	*C*

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VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2020 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **Center St**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	68	82	19	66.9	13.6	*E*
	T	80	107	20	52.6	2.2	*D*
	R	81	105	17	15.8	2.2	*B*
	Subtotal	228			43.8		*D*
SB	L	403	272	74	57.6	2.9	*E*
	T	353	199	49	44.9	1.3	*D*
	R	393	384	72	40.3	3.5	*D*
	Subtotal	1,148			47.8		*D*
EB	L	132	120	23	47.6	7.3	*D*
	T	1,003	369	50	17.3	1.9	*B*
	R	128	92	2	5.7	1.0	*A*
	Subtotal	1,263			19.3		*B*
WB	L	118	101	36	88.2	2.2	*F*
	T	1,428	189	17	5.3	1.0	*A*
	R	67	17	0	2.3	0.6	*A*
	Subtotal	1,612			11.2		*B*
Total		4,250			25.3	0.8	*C*

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VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2020 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **400 East**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
SB	L	591	855	285	54.5	6.2	*D*
	R	551	0	0	15.8	4.0	*B*
	Subtotal	1,143			35.8		*D*
EB	L	109	180	41	68.1	10.9	*E*
	T	1,381	0	0	0.4	0.1	*A*
	Subtotal	1,490			5.4		*A*
WB	T	1,062	520	82	24.0	1.0	*C*
	R	202	58	0	16.1	1.7	*B*
	Subtotal	1,264			22.8		*C*
Total		3,897			20.0	1.6	*B*

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VISSIM Level of Service Report

Project: Lehi - Micron TIS
Analysis Period: 2020 - Plus Project
Time Period: P.M. Peak Hour
Project #: *UT11-263*

Intersection: 1200 East
Type: Signalized

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	283	181	53	55.1	1.9	*E*
	T	102	90	16	43.9	4.9	*D*
	R	255	184	19	23.2	1.6	*C*
	Subtotal	640			40.6		*D*
SB	L	121	111	30	65.6	5.2	*E*
	T	282	176	47	51.3	2.9	*D*
	Subtotal	402			55.6		*E*
EB	L	81	89	17	69.5	7.4	*E*
	T	2,062	781	169	31.9	2.9	*C*
	R	613	448	27	19.1	2.9	*B*
	Subtotal	2,756			30.2		*C*
WB	L	60	78	16	64.5	4.1	*E*
	T	824	222	31	13.5	1.1	*B*
	R	47	45	0	4.1	0.8	*A*
	Subtotal	931			16.3		*B*
SWB	R	368	11	0	0.5	0.1	*A*
	Subtotal	368			0.5		*A*
Total		5,097			28.8	1.5	*C*

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VISSIM Level of Service Report

Project: Lehi - Micron TIS
Analysis Period: 2020 - Plus Project
Time Period: P.M. Peak Hour
Project #: *UT11-263*

Intersection: Highland Blvd
Type: Signalized

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	100	164	26	51.3	3.6	*D*
	T	57	133	16	55.0	5.3	*D*
	R	250	259	31	24.8	3.1	*C*
	Subtotal	407			35.6		*D*
SB	L	172	215	44	46.5	3.0	*D*
	T	50	102	11	44.5	5.3	*D*
	Subtotal	222			46.0		*D*
EB	L	615	239	47	26.6	0.9	*C*
	T	1,717	238	43	12.7	0.7	*B*
	R	107	256	45	4.1	0.9	*A*
	Subtotal	2,438			15.8		*B*
WB	L	81	146	27	61.6	4.7	*E*
	T	574	259	54	31.9	1.0	*C*
	R	64	57	2	8.7	1.6	*A*
	Subtotal	719			33.2		*C*
SWB	R	259	0	0	0.6	0.1	*A*
	Subtotal	259			0.6		*A*
Total		4,045			21.6	0.5	*C*

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2020 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **EB CL Off-Ramp Center**
Type: **Unsignalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	T	67	0	0	0.5	0.1	*A*
	T2	161	0	0	0.5	0.1	*A*
	Subtotal	228			0.5		*A*
SB	T	598	0	0	0.0	0.0	*A*
	Subtotal	598			0.0		*A*
SEB	R	99	53	1	2.8	0.5	*A*
	Subtotal	***99***			***2.8***		***A***
Total		925			0.4	0.1	*A*

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2030-Background**
Time Period: **PM** **Project #: *UT-263***

Intersection: **1200 West**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	372	240	63	52.4	2.5	*D*
	T	71	131	17	47.3	3.9	*D*
	R	215	144	12	13.3	1.1	*B*
	Subtotal	657			39.1		*D*
SB	L	81	157	25	58.0	5.6	*E*
	T	124	174	37	54.2	3.1	*D*
	R	103	80	5	11.5	1.2	*B*
	Subtotal	308			40.9		*D*
EB	L	155	134	30	62.2	4.6	*E*
	T	631	324	41	26.6	1.2	*C*
	R	677	800	93	26.3	2.3	*C*
	Subtotal	1,463			30.2		*C*
WB	L	328	269	61	58.4	7.3	*E*
	T	556	209	16	11.6	1.0	*B*
	R	85	61	1	4.4	0.8	*A*
	Subtotal	968			26.8		*C*
Total		3,396			32.0	1.2	*C*

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2030-Background**
Time Period: **PM** **Project #:** ***UT-263***

Intersection: **Traverse D**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
SB	L	39	79	9	43.0	4.7	*D*
	R	60	51	2	9.8	1.8	*A*
	Subtotal	98			22.9		*C*
EB	L	61	53	1	8.6	2.2	*A*
	T	865	132	7	3.5	0.4	*A*
	Subtotal	926			3.9		*A*
WB	T	909	371	30	11.3	1.6	*B*
	R	20	25	0	2.8	0.8	*A*
	Subtotal	929			11.1		*B*
Total		1,953			8.3	0.9	*A*

HALES ENGINEERING
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VISSIM Level of Service Report

Project: Lehi-Micron TIS
Analysis Period: 2030-Background
Time Period: PM
Project #: *UT-263*

Intersection: 500 West
Type: Signalized

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
EB	T	904	53	0	0.3	0.2	*A*
	Subtotal	904			0.3		*A*
WB	L	38	45	0	2.9	0.8	*A*
	T	932	0	0	0.2	0.0	*A*
	Subtotal	969			0.3		*A*
Total		1,873			0.3	0.1	*A*

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2030-Background**
Time Period: **PM** **Project #:** ***UT-263***

Intersection: **Center St**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	38	66	10	53.6	7.0	*D*
	R	160	107	9	12.0	1.2	*B*
	Subtotal	198			19.9		*B*
EB	T	847	233	21	9.0	1.2	*A*
	R	52	46	1	3.4	0.7	*A*
	Subtotal	899			8.7		*A*
WB	L	228	166	36	46.3	2.9	*D*
	T	931	301	17	7.8	0.9	*A*
	Subtotal	1,159			15.4		*B*
Total		2,257			13.1	0.7	*B*

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: Lehi-Micron TIS
Analysis Period: 2030-Background
Time Period: PM
Project #: *UT-263*

Intersection: 1200 East
Type: Signalized

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	252	173	49	54.2	2.7	*D*
	T	74	71	13	48.3	5.2	*D*
	R	385	324	52	25.3	2.1	*C*
	Subtotal	710			37.9		*D*
SB	L	255	182	48	54.2	4.3	*D*
	T	258	170	39	46.9	2.4	*D*
	Subtotal	513			50.5		*D*
EB	L	103	103	22	54.9	4.3	*D*
	T	700	345	48	24.0	1.0	*C*
	R	299	203	12	10.2	1.2	*B*
	Subtotal	1,102			23.1		*C*
WB	L	140	120	33	64.7	1.7	*E*
	T	745	335	60	27.4	1.8	*C*
	R	142	109	5	9.5	1.8	*A*
	Subtotal	1,026			30.0		*C*
SWB	R	308	4	0	0.5	0.0	*A*
	Subtotal	308			0.5		*A*
Total		3,658			29.9	0.6	*C*

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi-Micron TIS**
Analysis Period: **2030-Background**
Time Period: **PM** **Project #: *UT-263***

Intersection: **Highland Blvd**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	199	322	53	48.6	3.5	*D*
	T	69	112	13	41.2	4.4	*D*
	R	112	100	8	17.9	1.3	*B*
	Subtotal	379			38.2		*D*
SB	L	50	94	13	50.4	5.5	*D*
	T	59	116	17	53.5	4.5	*D*
	Subtotal	110			52.1		*D*
EB	L	456	246	58	40.3	2.4	*D*
	T	1,409	263	46	15.9	0.7	*B*
	R	172	280	51	5.6	0.7	*A*
	Subtotal	2,036			20.5		*C*
WB	L	57	117	18	61.4	5.3	*E*
	T	634	270	53	28.5	1.8	*C*
	R	42	46	1	6.4	1.4	*A*
	Subtotal	732			29.8		*C*
SWB	R	196	0	0	0.5	0.1	*A*
	Subtotal	196			0.5		*A*
Total		3,453			24.3	0.5	*C*

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: Lehi-Micron TIS
Analysis Period: 2030-Background
Time Period: PM
Project #: *UT-263*

Intersection: EB CL Off-Ramp Center
Type: Unsignalized

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	T	38	0	0	0.4	0.1	*A*
	T2	161	0	0	0.8	0.1	*A*
	Subtotal	199			0.7		*A*
SB	T	280	0	0	0.0	0.0	*A*
	Subtotal	280			0.0		*A*
SEB	R	151	46	0	2.1	0.2	*A*
	Subtotal	***151***			***2.1***		***A***
Total		630			0.7	0.1	*A*

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2030 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **1200 West**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	375	362	90	75.6	5.3	*E*
	T	65	125	21	64.3	4.9	*E*
	R	386	512	70	31.4	6.8	*C*
	Subtotal	825			54.1		*D*
SB	L	129	252	57	77.2	7.5	*E*
	T	130	216	49	68.3	3.9	*E*
	R	100	106	10	21.8	2.4	*C*
	Subtotal	358			58.5		*E*
EB	L	155	150	36	79.9	1.6	*E*
	T	704	392	47	31.0	5.2	*C*
	R	672	1,070	156	39.3	7.4	*D*
	Subtotal	1,531			39.6		*D*
WB	L	746	1,380	395	95.8	10.1	*F*
	T	1,003	1,357	370	49.8	11.1	*D*
	R	197	147	8	33.0	7.5	*C*
	Subtotal	1,946			65.7		*E*
Total		4,661			54.6	4.5	*D*

4,900 95%

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2030 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **Traverse D**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
SB	L	67	142	28	75.1	10.4	*E*
	R	59	88	10	35.1	8.9	*D*
	Subtotal	126			56.5		*E*
EB	L	57	87	5	34.8	6.7	*C*
	T	1,162	346	9	4.8	0.2	*A*
	Subtotal	1,219			6.2		*A*
WB	T	1,904	372	16	4.5	3.3	*A*
	R	109	7	0	2.0	0.6	*A*
	Subtotal	2,012			4.4		*A*
Total		3,357			7.0	2.1	*A*

3,570 94%

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2030 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **500 West**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
SB	L	335	222	57	53.7	1.6	*D*
	R	275	316	56	36.6	2.6	*D*
	R2	737	472	142	62.4	1.9	*E*
	Subtotal	1,347			55.0		*D*
EB	L	105	292	114	173.9	50.4	*F*
	T	1,121	259	39	12.7	0.7	*B*
	Subtotal	1,226			26.5		*C*
WB	L	497	311	78	57.5	2.5	*E*
	T	1,745	925	275	38.6	1.2	*D*
	R	52	40	1	16.8	1.9	*B*
	Subtotal	2,294			42.2		*D*
Total		4,867			41.8	1.4	*D*

5,150 95%

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2030 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **Center St**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	32	58	10	73.3	11.6	*E*
	T	354	269	200	73.8	2.7	*E*
	R	169	267	198	71.8	10.1	*E*
	Subtotal	554			73.2		*E*
SB	L	391	804	228	134.5	32.5	*F*
	T	634	640	102	54.9	13.5	*D*
	R	430	778	117	54.1	12.2	*D*
	Subtotal	1,455			76.1		*E*
EB	L	90	131	32	115.7	33.2	*F*
	T	1,297	847	187	36.8	2.9	*D*
	R	65	82	2	10.3	1.5	*B*
	Subtotal	1,451			40.5		*D*
WB	L	388	827	129	129.0	6.1	*F*
	T	1,829	1,674	1,057	71.7	8.7	*E*
	R	102	68	1	48.7	6.8	*D*
	Subtotal	2,319			80.2		*F*
Total		5,780			68.6	5.5	*E*

6,240 93%

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2030 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **400 East**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
SB	L	490	858	495	104.0	4.2	*F*
	R	515	376	14	47.9	5.5	*D*
	Subtotal	1,006			75.3		*E*
EB	L	47	106	19	76.3	15.6	*E*
	T	1,807	0	0	0.4	0.2	*A*
	Subtotal	1,854			2.3		*A*
WB	T	1,842	1,674	894	81.2	17.0	*F*
	R	235	59	0	63.4	17.3	*E*
	Subtotal	2,078			79.1		*E*
Total		4,937			49.5	7.2	*D*

5,430 91%

HALES ENGINEERING
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VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2030 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **1200 East**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	406	354	102	75.6	5.3	*E*
	T	159	128	29	53.7	4.9	*D*
	R	379	380	66	35.5	5.8	*D*
	Subtotal	944			55.8		*E*
SB	L	419	1,241	318	107.1	20.6	*F*
	T	668	1,275	388	91.8	22.9	*F*
	Subtotal	1,087			97.7		*F*
EB	L	474	1,170	260	100.8	14.0	*F*
	T	1,377	1,207	180	37.7	9.7	*D*
	R	667	1,088	90	26.4	6.5	*C*
	Subtotal	2,518			46.6		*D*
WB	L	97	111	36	141.2	27.3	*F*
	T	1,309	1,493	588	88.6	38.4	*F*
	R	78	57	1	67.5	36.5	*E*
	Subtotal	1,483			90.9		*F*
SWB	R	630	186	4	24.6	17.7	*C*
	Subtotal	630			24.6		*C*
Total		6,662			63.8	4.9	*E*

7,070 94%

HALES ENGINEERING
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VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2030 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **Highland Blvd**
Type: **Signalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	L	196	333	67	59.9	3.8	*E*
	T	87	206	33	71.4	7.0	*E*
	R	110	143	12	26.0	2.7	*C*
	Subtotal	393			53.0		*D*
SB	L	413	1,660	311	74.9	6.5	*E*
	T	59	114	16	63.0	6.6	*E*
	Subtotal	473			73.4		*E*
EB	L	676	369	116	55.9	1.6	*E*
	T	2,175	519	148	30.6	1.0	*C*
	R	159	537	158	18.6	3.8	*B*
	Subtotal	3,010			35.6		*D*
WB	L	57	447	140	304.6	142.2	*F*
	T	845	578	164	54.3	13.3	*D*
	R	162	144	10	19.1	7.6	*B*
	Subtotal	1,064			62.2		*E*
SWB	R	573	468	29	10.9	8.1	*B*
	Subtotal	573			10.9		*B*
Total		5,512			42.8	3.3	*D*

5,740 96%

HALES ENGINEERING
innovative transportation solutions

VISSIM Level of Service Report

Project: **Lehi - Micron TIS**
Analysis Period: **2030 - Plus Project**
Time Period: **P.M. Peak Hour** **Project #: *UT11-263***

Intersection: **EB CL Off-Ramp Center**
Type: **Unsignalized**

Approach	Movement	Volume	Queue		Delay/Veh (sec)		
			Max	Avg	Avg	St Dev	LOS
NB	T	32	0	0	141.0	104.0	*F*
	T2	549	1,180	521	163.6	69.5	*F*
	Subtotal	***581***			***162.4***		***F***
SB	T	1,087	0	0	0.0	0.0	*A*
	Subtotal	1,087			0.0		*A*
SEB	R	145	94	4	6.7	0.9	*A*
	Subtotal	145			6.7		*A*
Total		1,812			52.4	22.3	*F*

1,930 94%

HALES ENGINEERING
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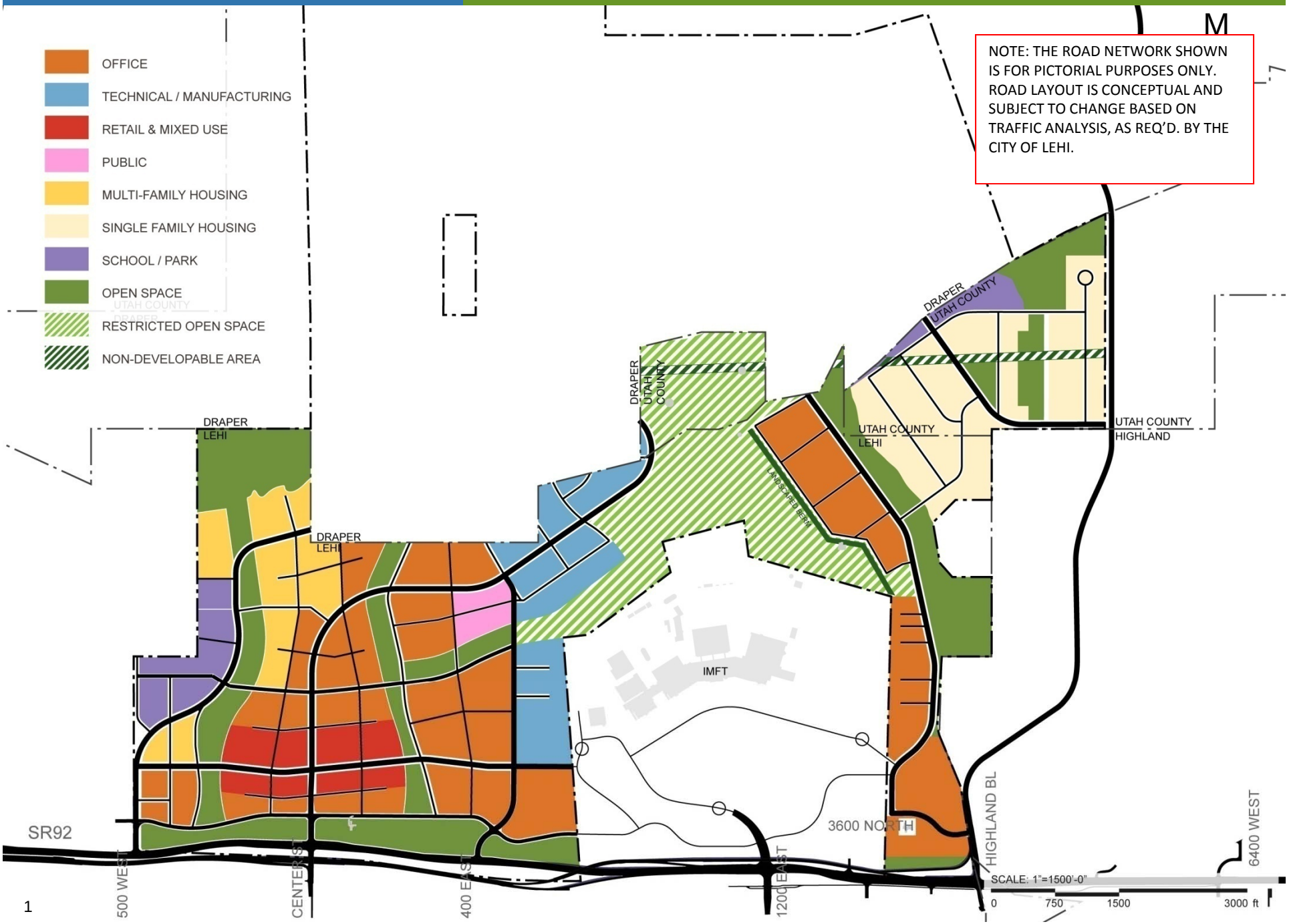
APPENDIX C

Site Plan


OFFICE
TECHNICAL / MANUFACTURING
RETAIL & MIXED USE
PUBLIC
MULTI-FAMILY HOUSING
SINGLE FAMILY HOUSING
SCHOOL / PARK
OPEN SPACE
RESTRICTED OPEN SPACE
NON-DEVELOPABLE AREA
NOTE: THE ROAD NETWORK SHOWN IS FOR PICTORIAL PURPOSES ONLY. ROAD LAYOUT IS CONCEPTUAL AND SUBJECT TO CHANGE BASED ON TRAFFIC ANALYSIS, AS REQ'D. BY THE CITY OF LEHI.
DRAPER
LEHI
DRAPER
UTAH COUNTY
UTAH COUNTY
LEHI
UTAH COUNTY
HIGHLAND
IMFT
SR92
500 WEST
CENTER ST
400 EAST
3600 NORTH
HIGHLAND BL
6400 WEST
SCALE: 1"=1500'-0"
0
750
1500
3000 ft

HALES ENGINEERING
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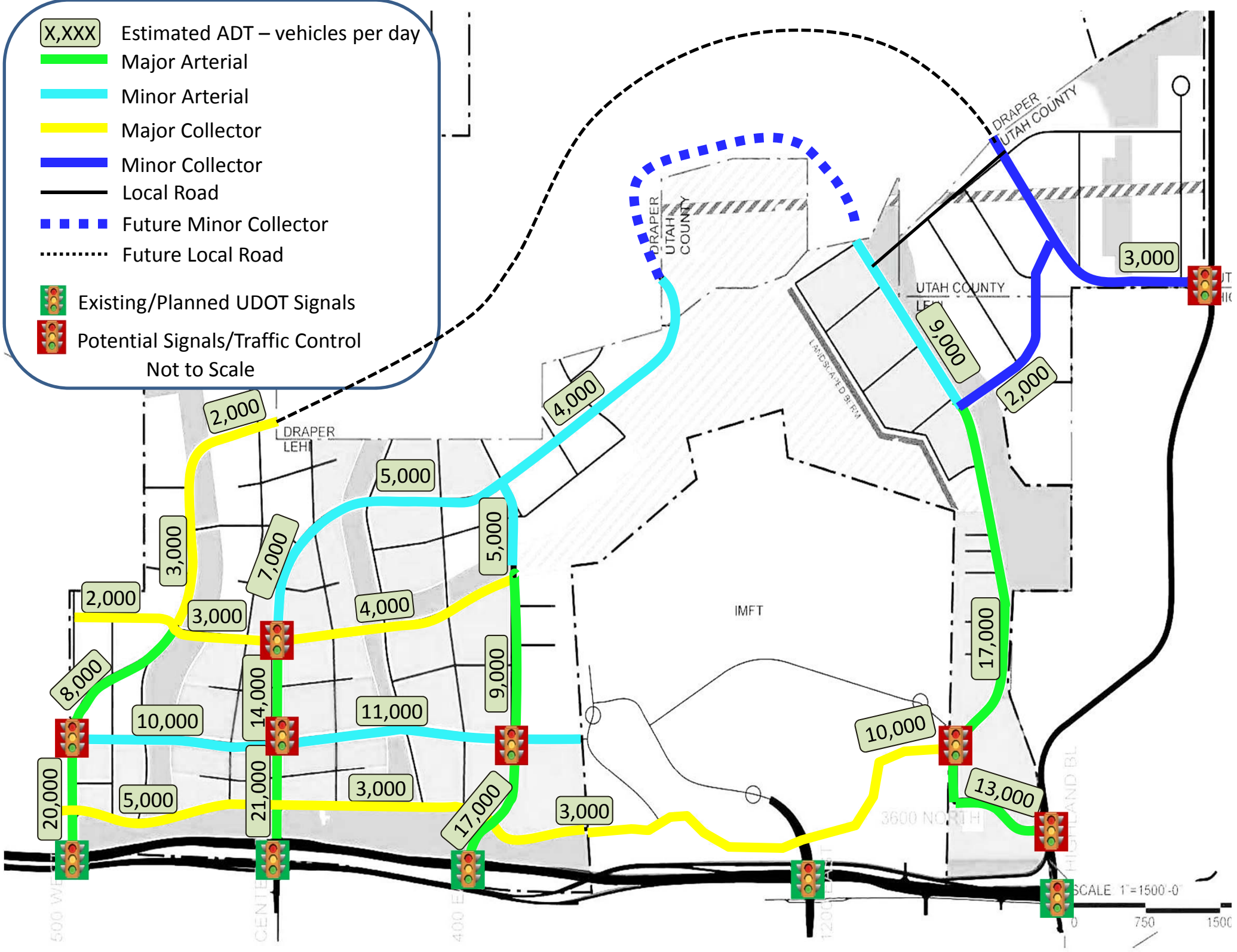
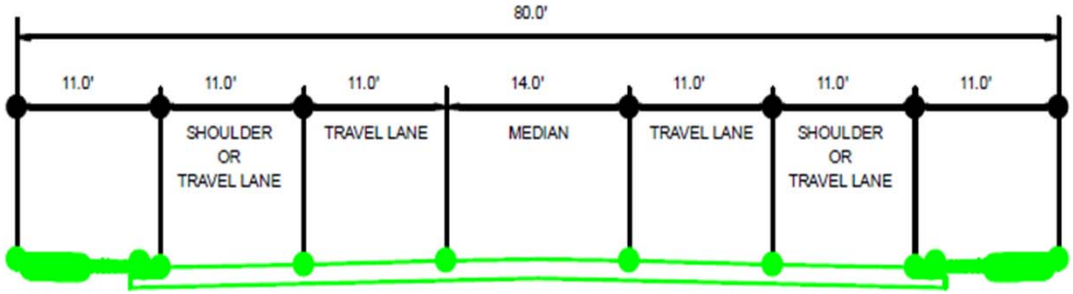
APPENDIX D

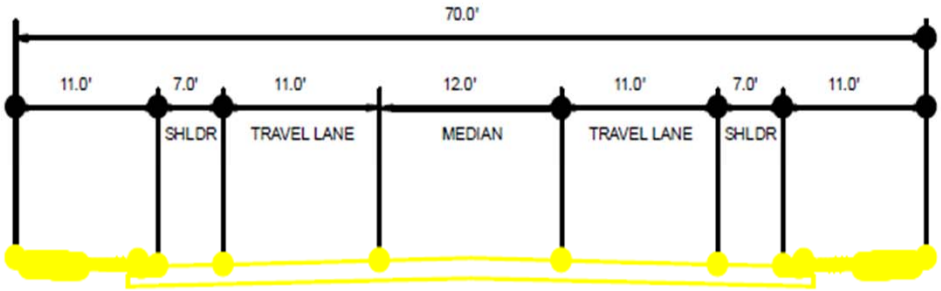
Recommended Cross Sections


X,XXX Estimated ADT – vehicles per day
Major Arterial
Minor Arterial
Major Collector
Minor Collector
Local Road
Future Minor Collector
Future Local Road
Existing/Planned UDOT Signals
Potential Signals/Traffic Control
Not to Scale
DRAPER
UTAH COUNTY
LEHI
IMFT
3600 NORTH
SCALE 1"=1500'-0"
0
750
1500
2,000
4,000
5,000
3,000
7,000
5,000
2,000
3,000
4,000
8,000
14,000
9,000
10,000
11,000
20,000
5,000
21,000
3,000
17,000
3,000
9,000
2,000
17,000
10,000
13,000
3,000

74 FOOT MINOR ARTERIAL (2600 NORTH)

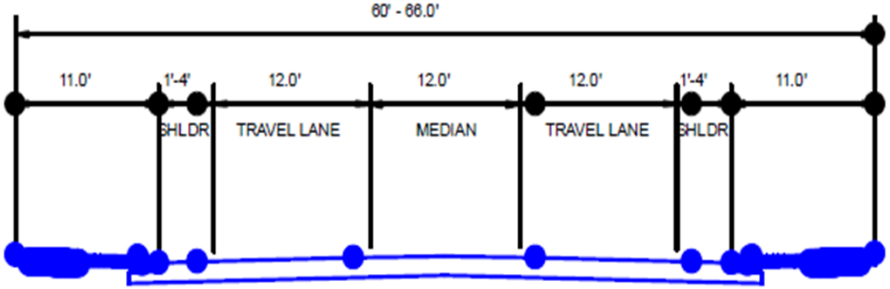


80 FOOT MAJOR ARTERIAL

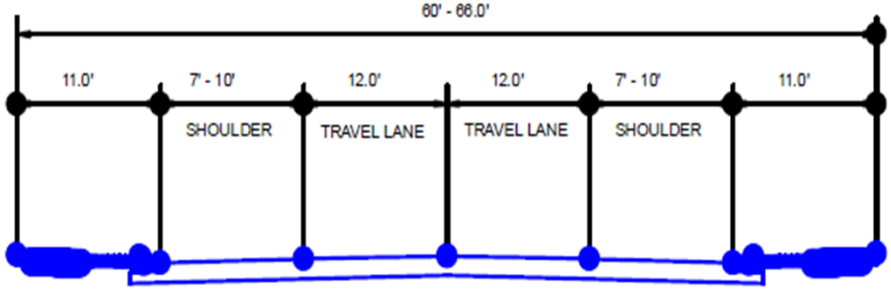


70 FOOT MAJOR COLLECTOR

80 FOOT MINOR ARTERIAL (700 SOUTH)



66 FOOT MINOR COLLECTOR



66 FOOT MINOR COLLECTOR

HALES ENGINEERING
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APPENDIX E

Phasing Assumptions

Phasing Estimate for Micron Project 8/26/2011

	Employment		Social Heart			Residential	
Time Period	Tech/Manufacturing	Office Park	Retail	Office	Apartment	MF	SFDU
2012-2015	300,000	1,500,000	0	0	0	0	0
2016-2020	300,000	1,500,000	60,000	96,000	0	140	0
2021-2025	142,000	1,500,000	119,000	192,000	115	165	100
2026-2030	0	455,000	119,000	193,000	0	165	95
	742,000	4,955,000	298,000	481,000	115	470	195

First priority is office in the southwest area primarily using Center Street for access.
Office will spread form there to the north.
Office east of IMFT will occur later.

Anlaysis years will be 2020 and 2030 as with original TIS.
Additional timing detail for improvements will be given to Lehi in five-year increments as shown above.

HALES ENGINEERING
innovative transportation solutions

APPENDIX F

SR-92 Corridor Agreement

118607

13773

Corridor Preservation Along SR-92 from Thanksgiving Way to 1800 East in Lehi
LEHI CITY CORPORATION
Federal ID No. 876000240

COOPERATIVE AGREEMENT

THIS COOPERATIVE AGREEMENT, made and entered into this 10th day of January, 2011, by and between the **UTAH DEPARTMENT OF TRANSPORTATION (UDOT)** and **LEHI CITY CORPORATION (CITY)**, a Municipal Corporation of the State of Utah,

WITNESSETH:

WHEREAS, the Utah Department of Transportation has completed an environmental document for SR-92 from Interstate 15 to SR-146 which includes an analysis of all accesses along the corridor. This project is known as "SR-92 Lehi to Highland - Environmental," project number HPP-TI-0092(8)0.

WHEREAS, UDOT has determined by formal finding that regulation of intersection point for future highway improvements is not a violation of the laws of the State of Utah or any legal contract with the Cities.

WHEREAS, the parties hereto desire to establish and preserve a corridor along SR-92 from Thanksgiving Way to 1800 East in Lehi City, Utah County, Utah to facilitate traffic flow and in accordance with Lehi City's Master Transportation Plan approved 9-28-10, including:

1. Future extension of 2300 West to SR-92 at the Triumph Blvd. intersection.
2. Extension of 1200 West from the current terminus at Bull River Rd. to SR-92.
3. Access from the north side of SR-92 at:

    a. Future Traverse Mountain Road B
    b. Future Traverse Mountain Road F
    c. 500 West
    d. Center St.
    e. 400 East (IM Flash Road A)
    f. IM Flash Road C (relocated from SR-92 to 1800 East)

This agreement complements an existing cooperative agreement (#058602) between **UDOT**, the **CITY**, and Traverse Mountain Commercial Investments, LLC.

NOW THEREFORE, it is agreed by and between the parties hereto as follows:

1. The following locations are identified as locations for existing, warranted, or proposed traffic signal installations along SR-92 as indicated on the attached maps:

A. Thanksgiving Way (to be relocated to Ashton Blvd)	(Existing)
B. I-15 SB On/Off Ramps	(Existing)
C. I-15 NB On/Off Ramps	(Existing)
D. East Frontage Road/Cabela's Way	(North Leg Existing) (South Leg Proposed)
E. Triumph Blvd./2300 West	(North Leg Existing) (South Leg Proposed)
F. Traverse Mountain Road B*	(North Leg Proposed)
G. Morning Glory Rd./1200 West	(Warranted)
H. Traverse Mountain Road F*	(North Leg Proposed)
I. 500 West*	(North Leg Proposed)
J. Center Street	(South Leg Existing) (North Leg Proposed)
K. 400 East/IM Flash Road A*	(North Leg Proposed)
L. 1200 East/IM Flash Road B	(Existing)
M. 1800 East	(Existing)

*These proposed future intersections (consisting of a north leg only) may be considered for traffic signals per the environmental document for the expansion of SR-92. If any of these intersections are warranted for traffic signals, the construction of traffic signals is at the sole discretion of **UDOT**.

2. No other intersections or accesses will be allowed by **UDOT** except for the two existing accesses on the south side of SR-92 between 1200 East and 1800 East. The first driveway located at approx. MP 3.45 and the second driveway at approx. MP 3.92.

3. It is understood that it may be necessary to restrict traffic movements at any of the intersections or accesses listed above in order to maximize traffic flow and improve safety through the corridor as agreed upon by the parties hereto. Specifically, when 1200 West extends north and connects to SR-92, the intersection of SR-92 at Bull River Road (1500 West) shall be eliminated by Bull River Road being made into a cul-de-sac (or equivalent) at SR-92.

4. The parties hereto shall develop any master plans in this area around the concepts contained herein and work towards the common goal of this Cooperative Agreement.

5. In the event there are changes in the concepts or provisions covered by this Cooperative Agreement, a modification to this agreement approved in writing by all parties hereto is required to place them in effect.

Corridor Preservation Along SR-92 from
Thanksgiving Way to 1800 East in Lehi
LEHI CITY CORPORATION
Federal ID No. 876000240

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

ATTEST:

Title City Recorder
Date: 1-3-2011

(IMPRESS SEAL)

LEHI CITY CORPORATION, a
Municipal Corporation of the State of Utah

By
Title Mayor
Date: 1-3-2011

AF

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RECOMMENDED FOR APPROVAL: UTAH DEPARTMENT OF TRANSPORTATION

Utilities/Railroad Coordinator
Date: 1/10/11

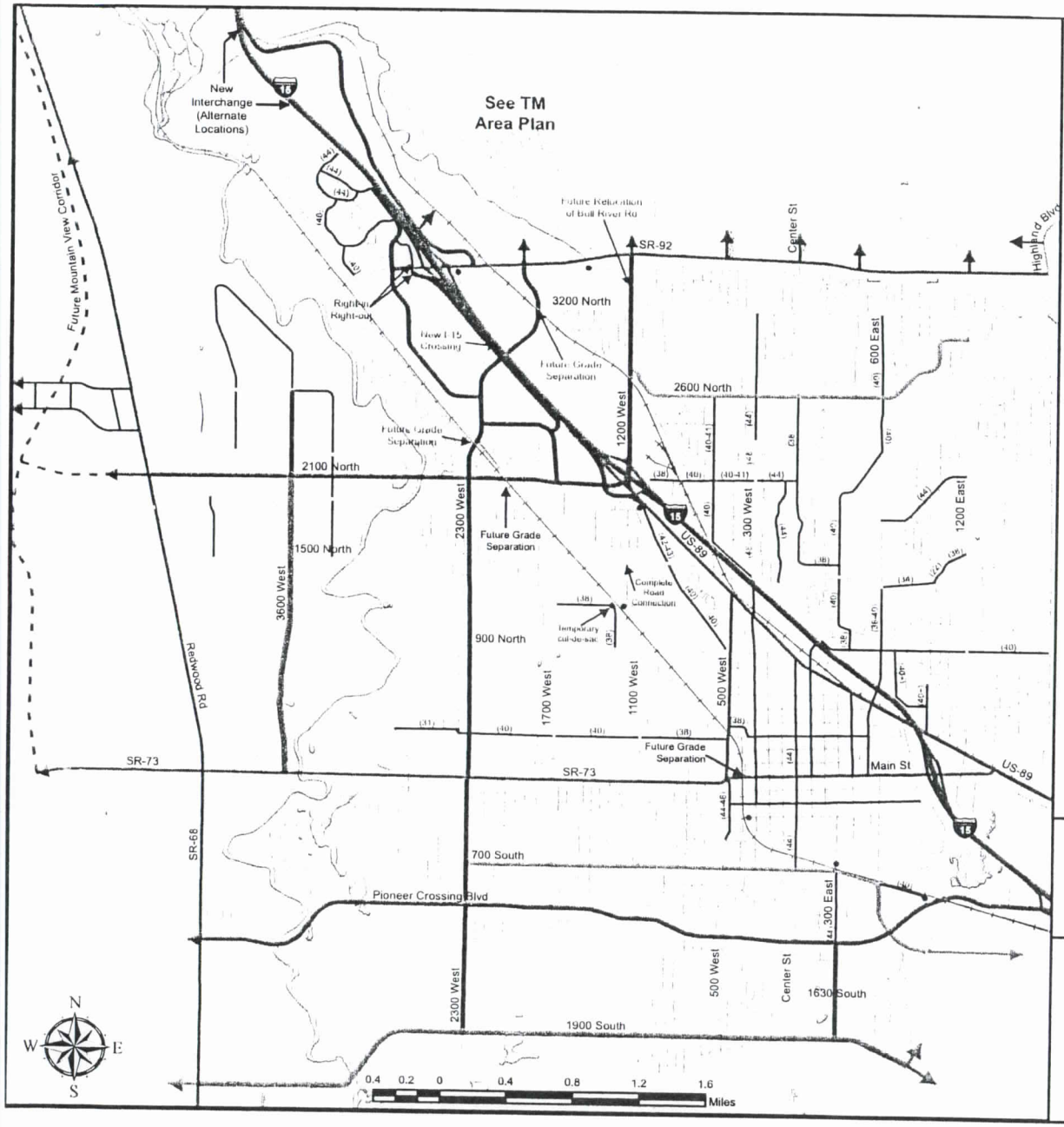
By
Region Director
Date: 1/10/11

APPROVED AS TO FORM:

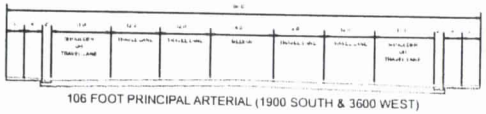
The Utah State Attorney General's Office has previously approved all paragraphs in this Agreement as to form.

COMPTROLLER OFFICE

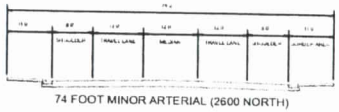
By
Contract Administrator
Date: 1-20-11



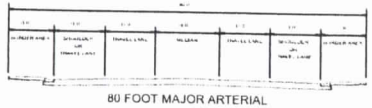
PROPOSED TYPICAL STREET SECTIONS



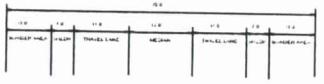
106 FOOT PRINCIPAL ARTERIAL (1900 SOUTH & 3600 WEST)



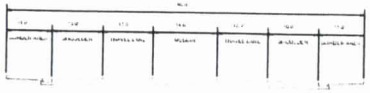
74 FOOT MINOR ARTERIAL (2600 NORTH)



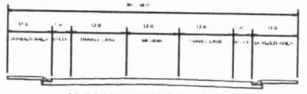
80 FOOT MAJOR ARTERIAL



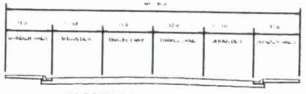
70 FOOT MAJOR COLLECTOR



80 FOOT MINOR ARTERIAL (700 SOUTH)



66 FOOT MINOR COLLECTOR



66 FOOT MINOR COLLECTOR

11.0' MINIMUM BORDER AREA

*ACTUAL DIMENSIONS TO BE DETERMINED ON A CASE-BY-CASE BASIS BASED UPON EXISTING CONDITIONS

INCORPORATED BY REFERENCE (AS HEREBY AMENDED)

- CURRENT PLANNING / ENVIRONMENTAL DOCUMENTS FOR REDWOOD ROAD, 1000 SOUTH, 2100 NORTH, SR 92 & I-15.
- CITY OF LEHI MASTER TRANSPORTATION PLAN, SEPTEMBER 1996
- NORTH VALLEY CONNECTOR STUDY, SEPTEMBER 2001

Lehi City

Master Transportation Plan

(APPROVED BY THE LEHI CITY COUNCIL ON SEPT. 28, 2010)

Legend

- Road Closed (cul-de-sac)
- Major Arterial
- Major Collector
- Minor Arterial
- Minor Collector
- Principal Arterial
- State Road
- (XX) Asphalt Width

LEHI

Pioneers Past and Present