Cedar Hills Wal-Mart Development
Traffic Impact Study

Cedar Hills, Utah

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PacLand

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EXECUTIVE SUMMARY

The purpose of this study is to address the potential traffic impacts of the proposed Cedar Hills Wal-Mart development located on the northeast corner of 4800 West/Cedar Hills Drive in Cedar Hills, Utah. Potential impacts of the project were analyzed at key intersections and roadways in the vicinity of the project under existing and future (2030) conditions.

TRAFFIC ANALYSIS

Following is an outline of the traffic analysis performed by Fehr & Peers for the respective traffic conditions of this project.

Existing (2007) Conditions Analysis

- Traffic counts were performed and background conditions evaluated at the following intersections:
    - 4800 West/Southeast School Access
    - 4800 West/Cedar Hills Drive
    - Redwood Drive/Cedar Hills Drive
- Each of the study intersections is expected to operate at LOS C or better. See Table 4 for details.

Proposed Cedar Hills Wal-Mart Development

- The proposed Cedar Hills Wal-Mart development contains the following land use profile:
    - **123,500** Square-foot Retail Discount Store
    - **18,500** Square-foot Shopping Center
    - **15,600** Square-foot Office Space
- The proposed development, including all out-parcels, is projected to have an external trip generation of:
    - Daily Trips: **3,380 Enter/3,380 Exit**
    - AM Peak Hour Trips: **149 Enter/107 Exit**
    - PM Peak Hour Trips: **257 Enter/325 Exit**
    - Saturday Daily Trips: **3,991 Enter/3,991 Exit**
    - Saturday Peak Hour Trips: **324 Enter/308 Exit**

Existing (2007) Plus Project Conditions Analysis

- The project-generated trips were combined with background traffic volumes to create an existing plus project scenario.

- The background plus project conditions were evaluated at the following intersections:

    - 4800 West/Southeast School Access
    - 4800 West/Cedar Hills Drive
    - Redwood Drive/Cedar Hills Drive
    - 6 Access Driveways to the Wal-Mart Development Site

- All of the study intersections are expected to operate at an acceptable overall LOS C or better. However, the eastbound approach (High School traffic) of the intersection 4800 West/Northwest Access is expected to operate at an LOS D during the PM peak period. See Table 5 for details.

Future (2030) Background Conditions Analysis

- A historical linear growth rate of 3.0% was applied to the existing PM peak volumes of all study intersections to produce projected 2030 volumes.

- All of the study intersections are expected to operate at an acceptable overall LOS C or better. However, the eastbound approach at the intersection of 4800 West/Southeast School Access is expected to operate at LOS D during the PM peak period See Table 6 for details.

Future (2030) Plus Project Conditions

- The projected (2030) background traffic volumes were combined with those of the proposed Cedar Hills Wal-Mart development to create a future (2030) plus project scenario.

- All of the study intersections are expected to operate at an acceptable overall LOS C or better. However, the eastbound and westbound approaches at the intersection of 4800 West/Northwest Access are expected to operate at LOS F and LOS D during the PM peak period, respectively. The westbound approach at the intersection of 4800 West/West Access is expected to operate at LOS E during the PM peak period. See Table 7 for details.

RECOMMENDATIONS

Fehr & Peers recommends the following:

Existing (2007) Background Conditions

- No mitigation measures are necessary to maintain all studied intersections at LOS C or better.

Project Access

- Align the northwest access to the project (Intersection #1) with the opposing High School driveway. Also, align the south access to the project (Intersection #5) with the opposing access or move the opposing access.

- Provide the minimum required and turn pocket lengths as discussed in Chapter IV. This includes modifications to the raised islands along Cedar Hills Drive to provide adequate turn pocket storage.

- Restrict the southwest and southeast accesses to the project (Intersections #4 and #6) to right-in/right-out movements only.

Existing (2007) Plus Project Conditions

- No additional mitigation measures were determined necessary beyond those recommended for the background conditions and project access.

Future (2030) Background Conditions

- The arterial roadway of 4800 West needs to be expanded to a five (5) lane cross-section with two travel lanes in each direction.

Future (2030) Plus Project Conditions

- To maintain acceptable LOS, appropriate left-turn storage lanes should be constructed at future intersections. No additional mitigation measures were determined necessary beyond those presented above.

CONCLUSIONS

With the development of the proposed land uses included in the Cedar Hills Wal-Mart development, minimal traffic mitigation measures are necessary to maintain an acceptable traffic operating condition adjacent to the project site.

LOS SUMMARY

The following table provides overall intersection operation. See Tables 4-7 for detailed approach results.

TABLE ES-1
PM Peak Hour Conditions
Cedar Hills Wal-Mart, Cedar Hills, Utah

Intersection		Existing (2007) Background	Existing (2007) Plus Project	Future (2030) Background	Future (2030) Plus Project
ID	**Description**	**LOS** & Sec/Veh[1]	**LOS** & Sec/Veh[1]	**LOS** & Sec/Veh[1]	**LOS** & Sec/Veh[1]
1	4800 West/ Northwest Access	**A** 0.6	**A** 1.3	**A** 0.6	**A** 1.9
2	4800 West/ West Access	N/A[2]	**A** 2.0	N/A[2]	**A** 3.0
3	4800 West/ Cedar Hills Drive	**B** 13.1	**B** 14.0	**B** 15.4	**B** 18.2
4	Cedar Hills Drive/ Southwest Access	N/A[2]	**A** 0.3	N/A[2]	**A** 0.1[4]
5	Cedar Hills Drive/ South Access	N/A[2]	**A** 2.8	N/A[2]	**A** 2.7[4]
6	Cedar Hills Drive/ Southeast Access	N/A[2]	**A** 0.7	N/A[2]	**A** 0.5[4]
7	Cedar Hills Drive/ Redwood Drive	**A** v/c 0.2[3]	**A** v/c 0.2[3]	**B** v/c 0.3[3]	**B** v/c 0.4[3]
8	Redwood Drive/ East Access	N/A[2]	**A** 1.5	N/A[2]	**A** 1.0[4]

1. Intersection LOS and delay (seconds/vehicle) values represent the overall intersection average. LOS and Delay details for the worst movement of unsignalized intersections are reported in the main body of the report. Future LOS reflect improvements discussed in the report.
2. This intersection is a project access and was only analyzed in "plus project" scenarios.
3. V/C ratio is reported instead of delay as the measure of effectiveness (MOE) for roundabouts. Roundabout analysis was based on HCM 2000 Methodolgies. A designation of LOS C for the roundabout represents LOS C or better.
4. The delay reported here is the weighted average of the overall intersection delay. Because the project adds traffic to the through movements which experience no delay, the overall intersection delay decreases, even though the delay per vehicle for the minor streets increases.

Source: Fehr & Peers January 2007

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I. INTRODUCTION

A. Purpose

This study addresses the traffic impacts associated with the proposed Cedar Hills Wal-Mart Development, to be located north of Cedar Hills Drive between 4800 West and Redwood Drive, in Cedar Hills, Utah. The study analyzes the traffic impacts of the project for existing and future (2030) traffic conditions at key intersections in the vicinity of the site.

See Figure 1 for a project location map.

B. Scope

Potential impacts of the project were evaluated at the following intersections:

- Northwest Project Access/4800 West
- West Project Access/4800 West
- 4800 West/Cedar Hills Drive
- Southwest Project Access/Cedar Hills Drive
- South Project Access/Cedar Hills Drive
- Southeast Project Access/Cedar Hills Drive
- Cedar Hills Drive/Redwood Road
- East Project access/Redwood Road

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. Table 2 provides LOS descriptions and an accompanying average volume / capacity (v/c) ratio for roundabouts.

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 intersections, the LOS is provided for the overall intersection (weighted average of all approach delays). For unsignalized intersections LOS is reported based on the worst movement, in which case the threshold and corresponding delay values are provided. Fehr & Peers has also calculated overall delay values for unsignalized intersections. The overall delay provides additional information and represents the overall intersection conditions rather than the worst approach. The HCM 2000 methodology was also used to analyze roundabouts. This methodology provides volume to capacity (v/c) ratios instead of delay as a measure of effectiveness (MOE). Fehr & Peers reported the v/c ratio for the worst approach and the overall intersection for the roundabout at Cedar Hills Drive/4800 West.

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Cedar Hills Big Box T.I.S.
Project Location

Figure 1

Table 1
Level of Service Descriptions

Level of Service	Description of Traffic Conditions	Signalized Intersections	Unsignalized Intersections
		Average Delay[1] (sec / veh)	Delay[2] (sec / veh)
A	*Free Flow / Insignificant Delay* Extremely favorable progression. Individual users are virtually unaffected by others in the traffic stream.	0 to 10	0 to 10
B	*Stable Operations / Minimum Delays* Good progression. The presence of other users in the traffic stream becomes noticeable.	> 10 to 20	> 10 to 15
C	*Stable Operations / Acceptable Delays* Fair progression. The operation of individual users is affected by interactions with others in the traffic stream.	> 20 to 35	> 15 to 25
D	*Approaching Unstable Flows / Tolerable Delays* Marginal progression. Operating conditions are noticeably more constrained.	> 35 to 55	> 25 to 35
E	*Unstable Operations / Significant Delays Can Occur* Poor progression. Operating conditions are at or near capacity.	> 55 to 80	> 35 to 50
F	*Forced, Unpredictable Flows / Excessive Delays* Unacceptable progression with forced or breakdown of operating conditions.	> 80	> 50

1. Overall intersection LOS and average delay (seconds/vehicle) for all approaches.
2. Worst approach LOS and delay (seconds/vehicle) only.

Source: Fehr & Peers Descriptions, based on *Highway Capacity Manual,* 2000 Methodology (Transportation Research Board).

Table 2
Roadway Level of Service

Level of Service	Description of Traffic Conditions	Roadway Corridors		
		v/c ratio[1]	Travel Speed [2]	Vehicle Density [3]
A	*Free Flow / Insignificant Delay* Extremely favorable progression. Individual users are virtually unaffected by others in the traffic stream.	< 0.30	> 85%	0 to 10
B	*Stable Operations / Minimum Delays* Good progression. The presence of other users in the traffic stream becomes noticeable.	> 0.30 to 0.50	> 73% to 85%	< 10 to 18
C	*Stable Operations / Acceptable Delays* Fair progression. The operation of individual users is affected by interactions with others in the traffic stream.	> 0.50 to 0.70	> 60% to 75%	< 18 to 26
D	*Approaching Unstable Flows / Tolerable Delays* Marginal progression. Operating conditions are noticeably more constrained.	> 0.70 to 0.90	> 45% to 60%	< 26 to 35
E	*Unstable Operations / Significant Delays Can Occur* Poor progression. Operating conditions are at or near capacity.	> 0.90 to 1.00	> 30% to 74%	< 35 to 45
F	*Forced, Unpredictable Flows / Excessive Delays* Unacceptable progression with forced or breakdown of operating conditions.	> 1.00	< 30%	< 45

1. Volume / Capacity (v/c) ratio, average values
2. As percentage of Free Flow Speed (FFS)
3. Passenger Cars /mile / lane (pc/mi/ln)

Source: Fehr & Peers Descriptions, based on Highway Capacity Manual, 2000 Methodology (Transportation Research Board).

D. Level of Service Standards

For the purposes of this analysis, a minimum intersection performance for each of the signalized intersections was set at LOS C. An overall LOS C threshold was also applied to unsignalized intersections. However, if a worst movement LOS E or F, for an individual movement at an unsignalized intersection exists, explanation and/or mitigation measures will be presented.

An overall intersection LOS C threshold is consistent with "state-of-the-practice" traffic engineering principals for suburban and non-CBD urbanized intersections, which typically considers LOS D as an acceptable threshold.

II. EXISTING (2007) BACKGROUND CONDITIONS

A. Purpose

The purpose of the existing (2007) background conditions analysis is to study the intersections and roadways during the peak travel periods of the day and under existing geometric conditions. Through this analysis, existing traffic operational deficiencies can be identified and potential mitigation measures recommended.

B. Land Use

The project property is currently zoned general commercial. The general commercial zoning currently permits the proposed land uses for this development.

C. Roadway System

The primary roadways that will provide access to the project site are described below and illustrated in Figure 2:

- 4800 West – is a north/south arterial that traverses Utah County from Pleasant Grove to Alpine. Adjacent to the proposed project, this road currently has one travel lane in each direction. According to City staff (May 14, 2003), the right-of-way for 4800 West is 96-feet wide and is planned to accommodate a five-lane cross-section. 4800 West will serve as a main access to the development.

- Cedar Hills Drive – is an east/west interior collector that extends from 4800 West to Canyon Road. This road has a 2-lane cross-section with one travel lane in each direction. Cedar Hills Drive will also serve as a main access to the development.

- Redwood Drive – is classified as a local street and primarily functions as an access to residential areas. It is a north/south access that extends from Harvey Boulevard to the subdivision just north of the proposed development. Redwood Drive will provide minor access to the east side of the site.

D. Traffic Volumes

Fehr & Peers performed traffic counts on Tuesday, December 19, 2006 at each of the study intersections during the PM peak period (4:00 – 6:00). Fehr & Peers used the traffic count data collected for this project in 2003 as a comparison and as supplemental data for the Southeast Access of the High School on 4800 West. Count data sheets are included in Appendix A. The PM peak period counts were adjusted to represent PM peak volumes for an average day. The traffic volume adjustments were based on daily and monthly adjustment factors published by UDOT.

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Cedar Hills Big Box T.I.S.
Existing (2007) Background P.M. Peak Hour Traffic Volumes

Figure 2

Comparative review of these count periods and of previous counts (2003), as well as the trip generation of the proposed project, show that the PM peak period has the most traffic and was therefore selected as the design analysis period for this study. The PM peak hour occurs from 5:00 to 6:00 PM. Figure 2 displays the existing PM peak hour traffic volumes (5:00 – 6:00 PM), lane configurations, and traffic control devices.

E. Level of Service Analysis

The PM peak hour LOS was computed at each study intersection using the traffic modeling software Synchro and the HCM 2000 methodology (see Appendix B for technical calculations). Table 3 shows the results for the existing (2007) background analysis. The signal timing for 4800 West/Cedar Hills Drive was adjusted to accommodate the traffic volumes and geometric characteristics of the existing (2007) background conditions.

F. Mitigation Measures

As shown in Table 3, each of the study intersections operates at an overall LOS C or better. No mitigation measures are expected to be necessary to accommodate the existing (2007) background conditions.

Table 3

Existing (2007) Background PM Peak Hour Level of Service

Intersection			Worst Approach			Overall Intersection	
ID	**Description**	**Control**	**LOS[1]**	**Approach[1]**	**Aver. Delay (Sec / Veh)[2]**	**LOS[1]**	**Aver. Delay (Sec / Veh)[2]**
1	4800 West/ SE School Access	EB Stop	C	Eastbound	15.4	A	0.6
3	4800 West/ Cedar Hills Drive	Signalized	N/A	N/A	N/A	B	13.1
7	Cedar Hills Drive/ Redwood Drive	Roundabout	B	Eastbound	v/c 0.3[3]	A	v/c 0.2[3]

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for unsignalized intersections.

2. This represents the overall intersection LOS and delay (seconds / vehicle).

3. V/C ratio is reported instead of delay as the measure of effectiveness (MOE) for roundabouts. Roundabout analysis was based on HCM 2000 methodology. A designation of LOS C for the roundabout represents LOS C or better.

Source: Fehr & Peers, January 2007.

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-generated trips to the surrounding intersections defined in the introduction.

B. Project Description

The proposed Cedar Hills Wal-Mart development is a commercial node with the following land use profile (see Figure 3 for the project site plan):

- **123,500** Square-foot Retail Discount Store
- **18,500** Square-foot Shopping Center
- **15,600** Square-foot Office Space

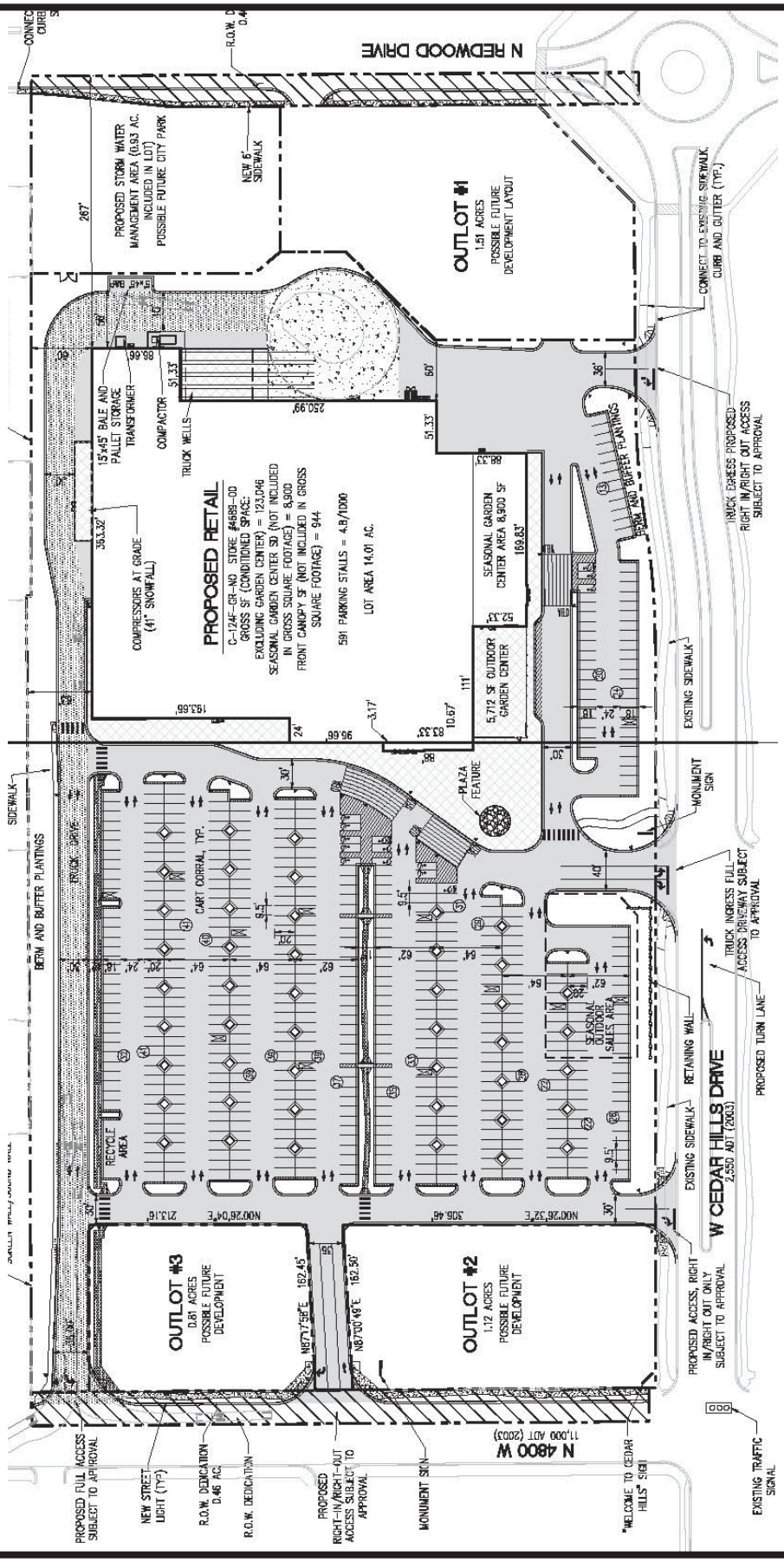
C. Trip Generation

Trip generation for the project was computed using trip generation rates published in the Institute of Transportation Engineers (ITE) *Trip Generation, 7th Edition*, 2007. Trips were generated using the land use intensities previously described and are summarized in Table 4. The trip generation values shown in Table 4 represent conditions at 100% build-out and full occupancy. The ITE trip generation rates identify gross trips to and from a facility as if it were a stand-alone activity. Fehr & Peers reduced the gross trip generation to account for internal and pass-by trips.

Pass-by Trips:
Pass-by trips are the portion of the project-generated trips that come from vehicles already passing by on adjacent roadways. They represent new trips to the development but *not* to the adjacent roadway network. Pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination without a route diversion, i.e. stopping by to shop on the way home from work.

Pass-by trips were applied to the Cedar Hills Wal-Mart development based on rates published by the *Trip Generation Handbook, 2004*. These pass-by adjustment rates are reported to be 15% for free-standing discount stores (123,500 square feet) during the evening peak period, respectively. As a conservative measure and to remain consistent with the previous study (2003), Fehr & Peers applied a pass-by adjustment factor of 15% for the shopping center (18,500 square feet). The resulting pass-by trips for the project are as follows:

- Weekday Daily Trips: **349 Enter / 349 Exit**
- Weekday AM Peak Hour Trips: **12 Enter / 12 Exit**
- Weekday PM Peak Hour Trips: **42 Enter / 42 Exit**



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Cedar Hills Big Box T.I.S
Site Plan

Figure 3

TABLE 4
Cedar Hills Wal-Mart Development
Trip Generation

Land Use[1]	Number of Units	Unit Type	Daily Trip Generation[2]	Trips Per 1,000 SF	% Internal Capture[3]	% Passby[6]	% Entering[5]	% Exiting[5]	Trips Entering	Trips Exiting	**New Daily Trips**
Free-Standing Disc. Store (813)	123,500	Square Feet	6,077	49.2	14%	10%	50%	50%	2,352	2,352	**4,704**
Shopping Center (820)	18,500	Square Feet	2,303	124.5	14%	10%	50%	50%	891	891	**1,782**
Office (710)	15,600	Square Feet	319	20.5	14%	0%	50%	50%	137	137	**274**
									3,380	**3,380**	**6,760**
Land Use[1]	Number of Units	Unit Type	AM Peak Hour Trip Generation[2]	Trips Per 1,000 SF	% Internal Capture[3]	% Passby[6]	% Entering[5]	% Exiting[5]	Trips Entering	Trips Exiting	**New AM Peak Hour Trips**
Free-Standing Disc. Store (813)	123,500	Square Feet	227	1.8	14%	10%	51%	49%	90	86	**176**
Shopping Center (820)	18,500	Square Feet	57	3.1	14%	10%	61%	39%	27	17	**44**
Office (710)	15,600	Square Feet	42	2.7	14%	0%	88%	12%	32	4	**36**
									149	**107**	**256**
Land Use[1]	Number of Units	Unit Type	PM Peak Hour Trip Generation[2]	Trips Per 1,000 SF	% Internal Capture[3]	% Passby[6]	% Entering[5]	% Exiting[5]	Trips Entering	Trips Exiting	**New PM Peak Hour Trips**
Free-Standing Disc. Store (813)	123,500	Square Feet	478	3.9	14%	15%	49%	51%	171	178	**349**
Shopping Center (820)	18,500	Square Feet	206	11.1	14%	15%	48%	52%	72	78	**150**
Office (710)	15,600	Square Feet	96	6.2	14%	0%	17%	83%	14	69	**83**
									257	**325**	**582**
Land Use[1]	Number of Units	Unit Type	Saturday Daily Trip Generation[2]	Trips Per 1,000 SF	% Internal Capture[3]	% Passby[6]	% Entering[5]	% Exiting[5]	Trips Entering	Trips Exiting	**New Saturday Daily Trips**
Free-Standing Disc. Store (813)	123,500	Square Feet	7,101	57.5	14%	10%	50%	50%	2,748	2,748	**5,496**
Shopping Center (820)	18,500	Square Feet	3,170	171.3	14%	10%	50%	50%	1,227	1,227	**2,454**
Office (710)	15,600	Square Feet	37	2.4	14%	0%	50%	50%	16	16	**32**
									3,991	**3,991**	**7,982**
Land Use[1]	Number of Units	Unit Type	Saturday Peak Trip Generation[2]	Trips Per 1,000 SF	% Internal Capture[3]	% Passby[6]	% Entering[5]	% Exiting[5]	Trips Entering	Trips Exiting	**New Sat. Peak Hour Trips**
Free-Standing Disc. Store (813)	123,500	Square Feet	619	5.0	14%	20%	51%	49%	217	209	**426**
Shopping Center (820)	18,500	Square Feet	291	15.7	14%	20%	52%	48%	104	96	**200**
Office (710)	15,600	Square Feet	6	0.4	14%	0%	54%	46%	3	3	**6**
									324	**308**	**632**

1. Land Use Code from the *Institute of Transportation Engineers - 7th Edition Trip Generation Manual (ITE Manual)*
2. Traffic Generated by the development according to trip generation rates provided in the ITE Manual
3. Percentage of the development traffic that is "captured" from one trip visiting several pads within the development. Percentage based on Trip Generation Handbook, 2004. Technical calculations can be found in appendix.
4. Saturday trip generation data for the Gasoline/Service station was not available in the Trip Generation Handbook, 2004. Therefore, a conservative estimate was made.
5. Percentage of trips Entering and Exiting the development according to the ITE Manual.
6. The Trip Generation Handbook, 2004 was used to estimate these values. Conservative estimates were used where values were not available in the Trip Generation Handbook.

SOURCE: Fehr & Peers Associates, Inc. January 2007

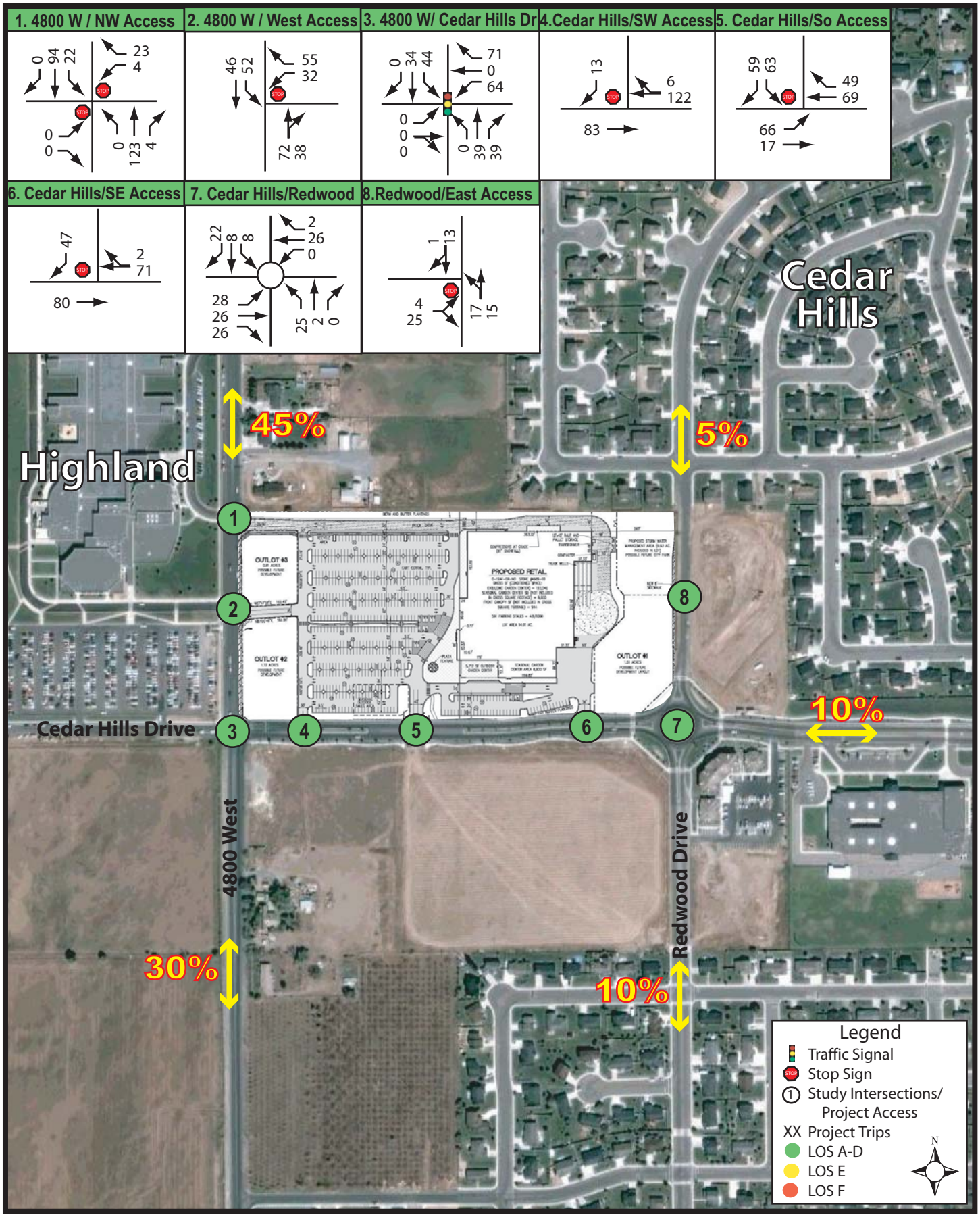
Internal Capture:
Internal capture accounts for trips that are made between the various land uses within a multi-use development without using off-site road systems and, therefore, do not represent new trips external to the site.
An internal capture spreadsheet can be found in Appendix C. This spreadsheet follows the methodologies given in the *Trip Generation Handbook*, which resulted in an internal capture rate of 14%.

D. Trip Distribution and Assignment

Project traffic was assigned to the roadway network based on the proximity to existing and future access points to the project, major streets, population densities, and proximity to other retail attractions. The resulting overall distribution of trips is as follows:

- 45% North on 4800 West
- 30% South on 4800 West
- 5% North on Redwood
- 10% South on Redwood
- 10% East on Cedar Hills Drive

These distributions reflect recommendations made by Cedar Hills City staff (May 14, 2003) and account for the future completion of Harvey Street. When completed, this road will provide an additional east/west connection from 4800 West to Canyon Road. Based on discussions with Cedar Hills staff, it was determined that the distribution percentages were appropriate for this study. The resulting PM peak hour project generated trips are shown in Figure 4.



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Cedar Hills Big Box T.I.S.
P.M. Peak Hour Project Generated Traffic Conditions

Figure 4

IV. PROJECT ACCESS REVIEW

A. Purpose

The purpose of this chapter is to analyze the proposed project access points to determine if any potential design flaws are proposed.

B. Project Access

Access to the project will be provided at the following points, as illustrated in Figure 4:

- Northwest Project Access/4800 West: Unsignalized, full access.
- West Project Access/4800 West: Unsignalized, full access.
- Southwest Project Access/Cedar Hills Drive: Unsignalized, right-in/right-out.
- South Project Access/Cedar Hills Drive: Unsignalized, full access.
- Southeast Project Access/Cedar Hills Drive: Unsignalized, right-in/right-out.
- East Project Access/Cedar Hills Drive: Unsignalized, full access.

The northwest access to the project (Intersection #1) should align with the opposing High School driveway to minimize the number of conflicts at this intersection. As recommended by Cedar Hills staff (December 2006), truck deliveries should be directed from 4800 West to the Northwest Access. Cedar Hills staff also recommended scheduling the truck deliveries outside of the High School peak hours to eliminate heavy truck conflicts with school traffic.

The southwest and southeast accesses to the development (Intersections #4 and #6) should be restricted to right-in/right-out movements only. This access restriction may be enforced by retaining a raised island along Cedar Hills Drive through the intersection of these accesses.

Cedar Hills staff has expressed interest that the south access to the project be a roundabout intersection. Although a roundabout at this location may be a traffic calming option it will not improve and may even deteriorate the operations of this intersection. The throat depths on the project site would be minimized due to the roundabout, thus not allowing adequate storage queuing lengths for exiting vehicles. This lack of queue area or throat depth can cause the roundabout to fail. Fehr & Peers does not recommend constructing a roundabout at this location.

C. Access Spacing, Auxiliary Lanes, & Internal Circulation

This section evaluates the accesses proposed for the Cedar Hills Wal-Mart development.

Access Spacing

4800 West and Cedar Hills Drive are owned and controlled by the city of Cedar Hills. Cedar Hills does not currently have access management guidelines in place. Therefore, UDOT's access guidelines were used to evaluate the access spacing. UDOT requires 150 feet

minimum access spacing for these type of roadways, it appears the access spacing for this development on 4800 West and Cedar Hills Drive meet this standard.

Auxiliary Lanes

Based on a Community-Urban classification for 4800 West and Cedar Hills Drive, a left turn deceleration lane is recommended if the peak hour left turn ingress volume is greater than 25 vehicles per hour (vph), a right turn deceleration lane is recommended if the peak hour right turn ingress volume is greater than 50 vph.

The left and right turn pockets must meet UDOT and Cedar Hills City design guidelines and meet requirements outlined in the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (*Green Book*). Fehr & Peers recommends constructing an eastbound left-turn pocket (as shown on the site plan) and a westbound right-turn pocket at the South Project Access/Cedar Hills Drive intersection. Based on a design speed of 25 mph, the left and right-turn lanes should be 100 feet (including a minimum storage length of 50 feet) in length including the taper.

A northbound right-turn pocket should be provided on 4800 West for the Northwest Project Access to accommodate the delivery truck traffic using that access. Based on a design speed of 35 mph, the right turn deceleration lane should be at least 150 feet long including the taper.

However, it should be noted that the above recommended auxiliary lanes are not needed to accommodate the operational needs of 4800 West and Cedar Hills Drive.

Internal Circulation

The parking rows are aligned and will provide good circulation around the parking lot. The exit lanes (throat depths) at the accesses are of a sufficient length to accommodate exiting vehicle storage.

V. EXISTING (2007) PLUS PROJECT CONDITIONS

A. Purpose

This section of the report examines the traffic impact of the proposed project at each of the study intersections. The trips generated by the proposed development were combined with the background traffic volumes. The end result creates an existing (2007) plus project condition.

B. Traffic Volumes

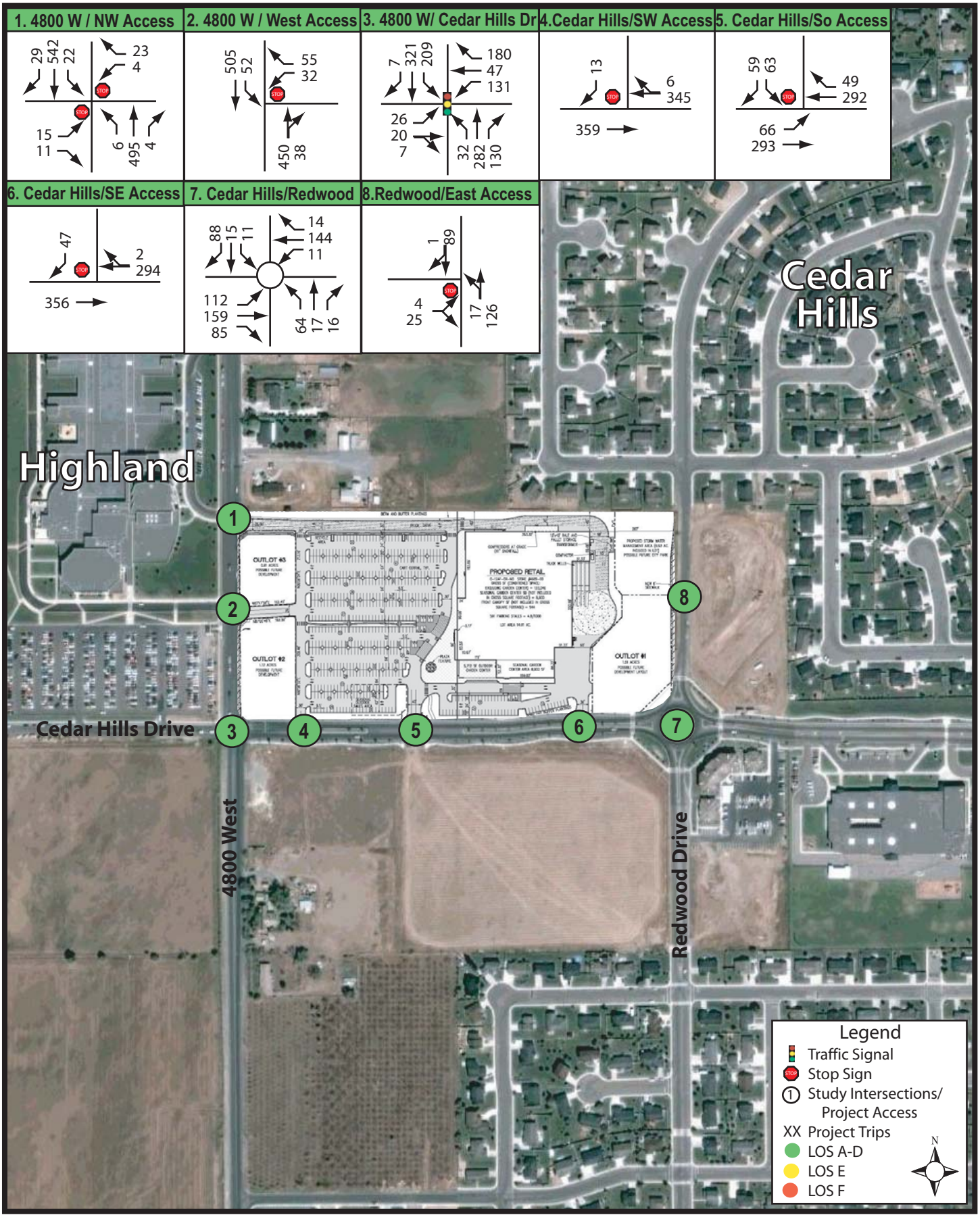
Project trips were assigned to the study intersections and driveways based on the trip distribution percentages discussed in Chapter III and permitted intersection turning movements. Project-generated traffic was then added to the existing volumes to yield "existing plus project" PM peak hour volumes at the study intersections. These volumes are displayed in Figure 5.

C. Level of Service Analysis

The PM peak hour LOS was computed at each study intersection using the traffic modeling software Synchro and the HCM 2000 methodology (see Appendix B for technical calculations). Table 5 shows the results for the existing (2007) plus project analysis. The signal timing for 4800 West/Cedar Hills Drive was adjusted to accommodate the traffic volumes and geometric characteristics of the existing (2007) background conditions.

D. Mitigation Measures

As shown in Table 5, the eastbound approach (High School traffic) at the intersection of 4800 West/Northwest Access is expected to operate at LOS D during the PM peak period. Specific mitigation measures are not recommended for this movement because the intersection is expected to operate at an overall LOS A. Eastbound left turning motorists will likely experience long delays and may choose an alternative route. Additionally, these delays will be experienced on the High School site, only for a short duration (when students are exiting) in the day. No further mitigation measures are expected to be necessary to accommodate the traffic volumes of the existing (2007) plus project conditions.



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Cedar Hills Big Box T.I.S.
Existing (2007) Plus Project P.M. Peak Hour Traffic Volumes

Figure 5

Table 5

Existing (2007) Plus Project PM Peak Hour Level of Service

Intersection			Worst Approach			Overall Intersection	
ID	**Description**	**Control**	**LOS[1]**	**Approach[1]**	**Aver. Delay (Sec / Veh)[2]**	**LOS[1]**	**Aver. Delay (Sec / Veh)[2]**
1	4800 West/ Northwest Access	EB/WB Stop	D	Eastbound	25.4	A	1.3
2	4800 West/ West Access	WB Stop	C	Westbound	18.3	A	2.0
3	4800 West/ Cedar Hills Drive	Signalized	N/A	N/A	N/A	B	14.0
4	Cedar Hills/ Southwest Access	SB Stop	B	Southbound	10.3	A	0.3
5	Cedar Hills Drive/ South Access	NB Stop	B	Southbound	13.8	A	2.8
6	Cedar Hills Drive/ Southeast Access	SB Stop	B	Southbound	10.3	A	0.7
7	Cedar Hills Drive/ Redwood Drive	Roundabout	B	Eastbound	v/c 0.4[3]	A	v/c 0.2[3]
8	Redwood Drive/ East Access	EB Stop	A	Eastbound	9.0	A	1.5

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for unsignalized intersections.

2. This represents the overall intersection LOS and delay (seconds / vehicle).

3. V/C ratio is reported instead of delay as the measure of effectiveness (MOE) for roundabouts. Roundabout analysis was based on HCM 2000 methodology. A designation of LOS C for the roundabout represents LOS C or better.

Source: Fehr & Peers, January 2007.

VI. FUTURE (2030) BACKGROUND CONDITIONS

A. Purpose

The purpose of the Future (2030) Conditions analysis is to evaluate the intersections and roadways under projected 2030 peak hour traffic volumes and roadway conditions. This reveals any potential problems that may be created by general background traffic growth.

B. Traffic Volumes

Several methods of projection were used to estimate future (2030) traffic volumes. The historical growth for the past five years and past three years was evaluated for 4800 West in the vicinity of the proposed project. This evaluation produced historical linear growth rates of 6.9% for the past five years and 0% for the past three years for 4800 West. As a conservative measure, a linear growth rate of 3% was applied to the existing PM peak volumes of all study intersections to produce projected 2030 volumes. The projected traffic volumes for the future (2030) background condition are shown in Figure 6.

C. Level of Service Analysis

The PM peak hour LOS was computed at each study intersection using the traffic modeling software Synchro and the HCM 2000 methodology (see Appendix B for technical calculations). Table 6 shows the results for the existing (2007) plus project analysis. The signal timing was adjusted to accommodate the traffic volumes and geometric characteristics of the future (2030) background condition.

Table 6

Future (2030) Background PM Peak Hour Level of Service

Intersection			Worst Approach			Overall Intersection	
ID	**Description**	**Control**	**LOS[1]**	**Approach[1]**	**Aver. Delay (Sec / Veh)[2]**	**LOS[1]**	**Aver. Delay (Sec / Veh)[2]**
1	4800 West/ SE School Access	EB Stop	D	Eastbound	30.8	A	0.6
3	4800 West/ Cedar Hills Drive	Signalized	N/A	N/A	N/A	B	15.4
7	Cedar Hills Drive/ Redwood Drive	Roundabout	C	Eastbound	v/c 0.5[3]	B	v/c 0.3[3]

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for unsignalized intersections.

2. This represents the overall intersection LOS and delay (seconds / vehicle).

3. V/C ratio is reported instead of delay as the measure of effectiveness (MOE) for roundabouts. Roundabout analysis was based on HCM 2000 methodology. A designation of LOS C for the roundabout represents LOS C or better.

Source: Fehr & Peers, January 2007.

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Cedar Hills Big Box T.I.S.
Future (2030) Background P.M. Peak Hour Traffic Volumes

Figure 6

D. Mitigation Measures

As shown in Table 6, the eastbound approach at the intersection of 4800 West/Southeast School Access is expected to operate at LOS D during the PM peak period. Specific mitigation measures are not recommended for this movement because the intersection is expected to operate at an overall LOS A. Eastbound left turning motorists will likely experience long delays and may choose an alternative route. No further mitigation measures are expected to be necessary to accommodate the traffic volumes of the future (2030) background conditions.

The Average Daily Traffic (ADT) for 4800 West is projected to be approximately 14,000 in the year 2030. Roadway traffic capacity estimates 14,000 ADT for a three (3) lane arterial road to operate at an LOS E. As discussed in the previous traffic study (2003), Fehr & Peers recommends expanding 4800 West to a five (5) lane cross-section with two travel lanes in each direction to better accommodate the future background traffic conditions.

VII. FUTURE (2030) PLUS PROJECT CONDITIONS

A. Purpose

The purpose of the Future (2030) Plus Project Conditions analysis is to evaluate the impact of the project traffic on the surrounding roadway network in the year 2030. In order to analyze this, the projected 2030 background traffic volumes were combined with those generated by the proposed project. Intersection LOS analyses were then performed and compared to the results of the projected 2030 background traffic volumes. This comparison shows the impact of the proposed project in the future.

B. Traffic Volumes

Project-generated traffic (Figure 4) was added to future (2030) background volumes to yield "future plus project" PM peak hour volumes at the study intersections. These combined PM peak hour traffic volumes are displayed in Figure 7.

C. Level of Service Analysis

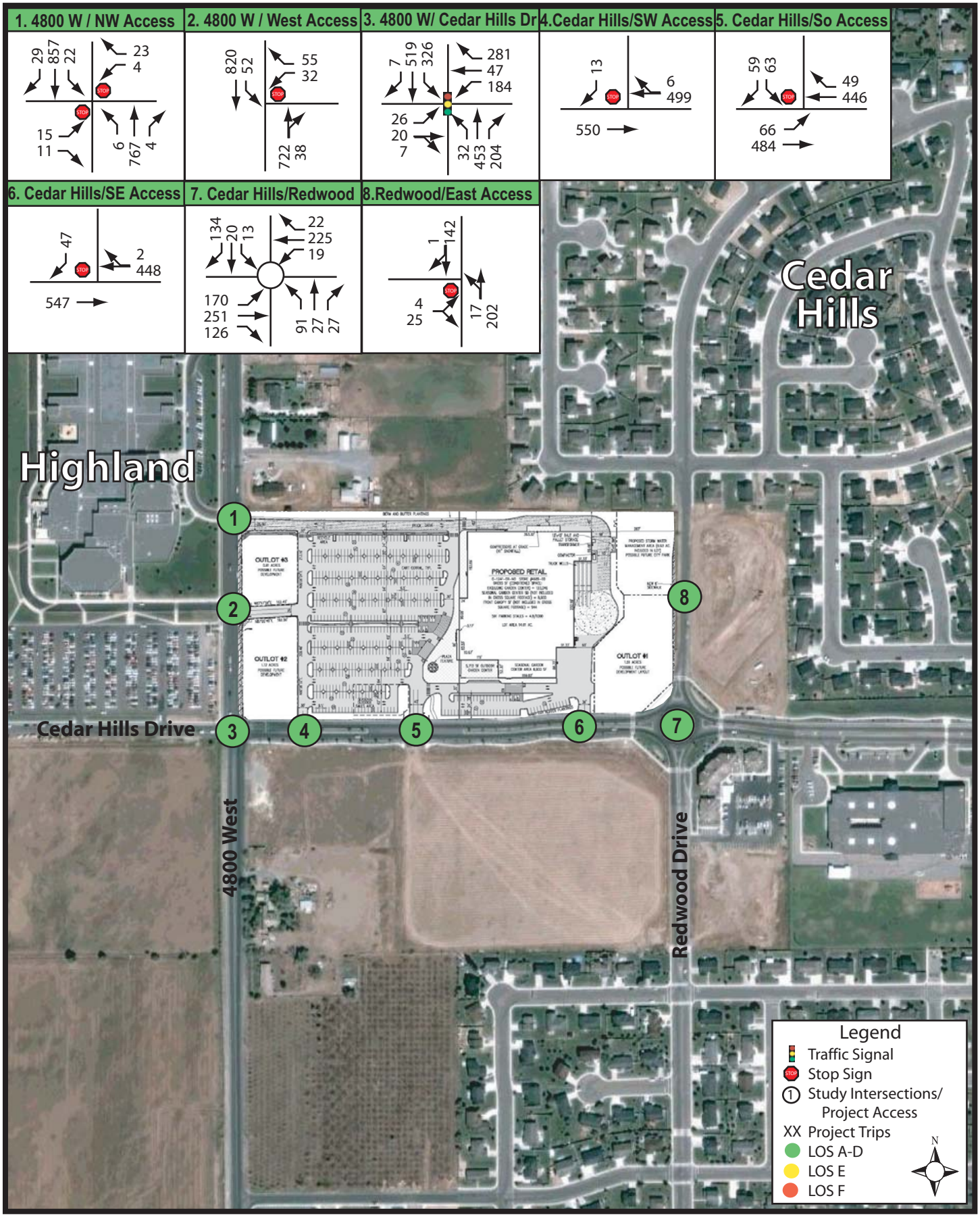
The PM peak hour LOS was computed for each study intersection using Synchro and the HCM 2000 methodology. Table 7 shows the results for the future (2030) plus project analysis (see Appendix B for a detailed LOS report).

D. Mitigation Measures

In addition to recommendations made previously, no further mitigation measures are needed to accommodate the projected traffic volumes of the future (2030) plus project conditions.

As shown in Table 7, the eastbound and westbound approaches at the intersection of 4800 West/Northwest Access are expected to operate at LOS F and LOS D during the PM peak period, respectively. The westbound approach at the intersection of 4800 West/West Access is expected to operate at LOS E during the PM peak period. Specific mitigation measures are not recommended for these movements because both intersections are expected to operate at an overall LOS A. The left turning motorists will likely experience long delays and may choose an alternative route.

The ADT for Cedar Hills Drive is projected to be approximately 10,000 in the year 2030 plus project. Roadway traffic capacity estimates 10,000 ADT for a three (3) lane collector road operating at an LOS C. To maintain this LOS, appropriate left-turn storage lanes should be constructed at future intersections.



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Cedar Hills Big Box T.I.S.
Future (2030) Plus Project P.M. Peak Hour Traffic Volumes

Figure 7

Table 7

Future (2030) Plus Project PM Peak Hour Level of Service

Intersection			Worst Approach			Overall Intersection	
ID	Description	Control	LOS[1]	Approach[1]	Aver. Delay (Sec / Veh)[2]	LOS[1]	Aver. Delay (Sec / Veh)[2]
1	4800 West/ Northwest Access	EB/WB Stop	F	Eastbound	>50.0	A	1.9
2	4800 West/ West Access	WB Stop	E	Westbound	47.2	A	3.0
3	4800 West/ Cedar Hills Drive	Signalized	N/A	N/A	N/A	B	18.2
4	Cedar Hills/ Southwest Access	SB Stop	B	Southbound	11.6	A	0.1
5	Cedar Hills Drive/ South Access	NB Stop	C	Southbound	20.1	A	2.7
6	Cedar Hills Drive/ Southeast Access	SB Stop	B	Southbound	11.6	A	0.5
7	Cedar Hills Drive/ Redwood Drive	Roundabout	C	Eastbound	v/c 0.6[3]	B	v/c 0.4[3]
8	Redwood Drive/ East Access	EB Stop	A	Eastbound	9.4	A	1.0

1. This represents the worst approach LOS and delay (seconds / vehicle) and is only reported for unsignalized intersections.

2. This represents the overall intersection LOS and delay (seconds / vehicle).

3. V/C ratio is reported instead of delay as the measure of effectiveness (MOE) for roundabouts. Roundabout analysis was based on HCM 2000 methodology. A designation of LOS C for the roundabout represents LOS C or better.

Source: Fehr & Peers, January 2007.

VIII. CONCLUSIONS/RECOMMENDATIONS

Conclusions

With the development of the proposed land uses included in the Cedar Hills Wal-Mart development, minimal traffic mitigation measures are necessary to maintain an acceptable traffic operating condition adjacent to the project site.

Recommendations

Fehr & Peers recommends the following:

Existing (2007) Background Conditions

- No mitigation measures are necessary to maintain all studied intersections at LOS C or better.

Project Access

- Align the northwest access to the project (Intersection #1) with the opposing High School driveway. Also, align the south access to the project (Intersection #5) with the opposing access or move the opposing access.
- Provide the minimum required and turn pocket lengths as discussed in Chapter IV. This includes modifications to the raised islands along Cedar Hills Drive to provide adequate turn pocket storage.
- Restrict the southwest and southeast accesses to the project (Intersections #4 and #6) to right-in/right-out movements only.

Existing (2007) Plus Project Conditions

- No additional mitigation measures were determined necessary beyond those recommended for the background conditions and project access.

Future (2030) Background Conditions

- The arterial roadway of 4800 West needs to be expanded to a five (5) lane cross-section with two travel lanes in each direction.

Future (2030) Plus Project Conditions

- To maintain acceptable LOS, appropriate left-turn storage lanes should be constructed at future intersections. No additional mitigation measures were determined necessary beyond those presented above.

Appendix A
TRAFFIC COUNTS

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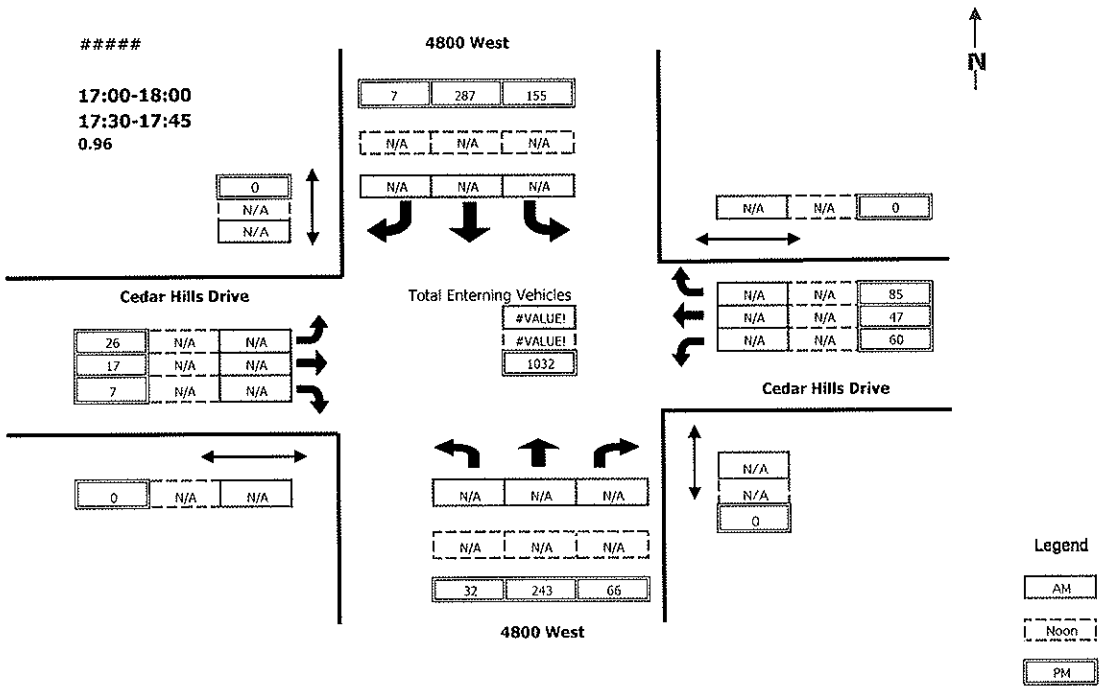
Intersection Turning Movement Summary

Intersection:	**4800 West / Cedar Hills Drive**	**Date:**	**12-19-06, Tue**
	North/South: 4800 West	**Day of Week Adjustment:**	**103.7%**
	East/West: Cedar Hills Drive	**Month of Year Adjustment:**	**90.1%**
Jurisdiction:	**Cedar Hills, UT**	**Adjustment Station #:**	**350**
Project Title:		**Growth Rate:**	**0.0%**
Project No:	**06-734**	**Number of Years:**	**0**
Weather:			

AM PEAK HOUR PERIOD:
AM PEAK 15 MINUTE PERIOD:
AM PHF: #####

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: #####

PM PEAK HOUR PERIOD: **17:00-18:00**
PM PEAK 15 MINUTE PERIOD: **17:30-17:45**
PM PHF: **0.96**



RAW COUNT SUMMARIES	4800 West Northbound				4800 West Southbound				Cedar Hills Drive Eastbound				Cedar Hills Drive Westbound				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
AM PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
7:00-7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15-7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30-7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45-8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00-8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15-8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30-8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45-9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOON PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
11:00-11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15-11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30-11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45-12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00-12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15-12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30-12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45-13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
16:00-16:15	1	61	24	0	20	67	0	0	5	1	1	0	17	4	27	0	228
16:15-16:30	1	73	19	0	14	73	1	0	2	2	3	0	13	0	20	0	221
16:30-16:45	3	73	18	0	35	60	1	0	7	0	0	0	15	1	27	0	240
16:45-17:00	2	67	15	0	28	71	0	0	3	1	6	0	19	0	17	0	229
17:00-17:15	2	72	18	0	35	81	0	0	7	2	1	0	12	1	29	0	260
17:15-17:30	4	93	20	0	36	58	3	0	7	2	1	0	13	2	12	0	251
17:30-17:45	14	18	25	0	47	76	3	0	10	7	2	0	13	30	24	0	269
17:45-18:00	12	60	3	0	37	72	1	0	2	6	3	0	22	14	20	0	252

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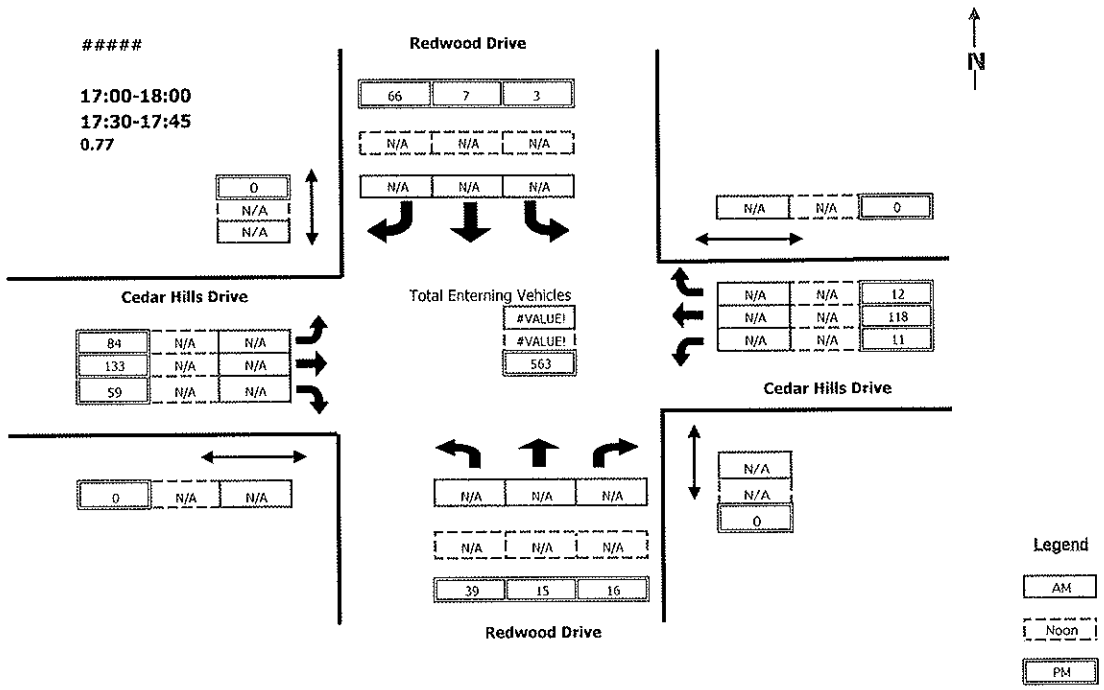
Intersection Turning Movement Summary

Intersection:	**Ceder Hills Dr. / Redwood Dr.**	**Date:**	**12-19-06, Tue**
	North/South: Redwood Drive	**Day of Week Adjustment:**	**103.7%**
	East/West: Cedar Hills Drive	**Month of Year Adjustment:**	**90.1%**
Jurisdiction:	**Cedar Hills, UT**	**Adjustment Station #:**	**350**
Project Title:		**Growth Rate:**	**0.0%**
Project No:	**06-734**	**Number of Years:**	**0**
Weather:			

AM PEAK HOUR PERIOD:
AM PEAK 15 MINUTE PERIOD:
AM PHF: #####

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: #####

PM PEAK HOUR PERIOD: **17:00-18:00**
PM PEAK 15 MINUTE PERIOD: **17:30-17:45**
PM PHF: **0.77**



RAW COUNT SUMMARIES	Redwood Drive Northbound				Redwood Drive Southbound				Cedar Hills Drive Eastbound				Cedar Hills Drive Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15-7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30-7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45-8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00-8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15-8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30-8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45-9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
11:00-11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15-11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30-11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45-12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00-12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15-12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30-12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45-13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	7	3	3	0	5	2	17	0	17	21	7	0	3	22	3	0	110
16:15-16:30	6	1	1	0	2	4	10	0	15	19	5	0	9	17	2	0	91
16:30-16:45	12	1	3	0	2	3	16	0	13	26	11	0	7	21	2	0	117
16:45-17:00	5	5	2	0	0	2	13	0	21	21	7	0	2	21	2	0	101
17:00-17:15	7	0	4	0	0	2	12	0	14	33	13	0	1	28	3	0	117
17:15-17:30	4	2	0	0	2	2	14	0	20	39	11	0	3	18	1	0	116
17:30-17:45	17	9	9	0	0	0	21	0	28	31	20	0	4	39	5	0	183
17:45-18:00	11	4	3	0	1	3	19	0	22	30	15	0	3	33	3	0	147

Traffic Counts!

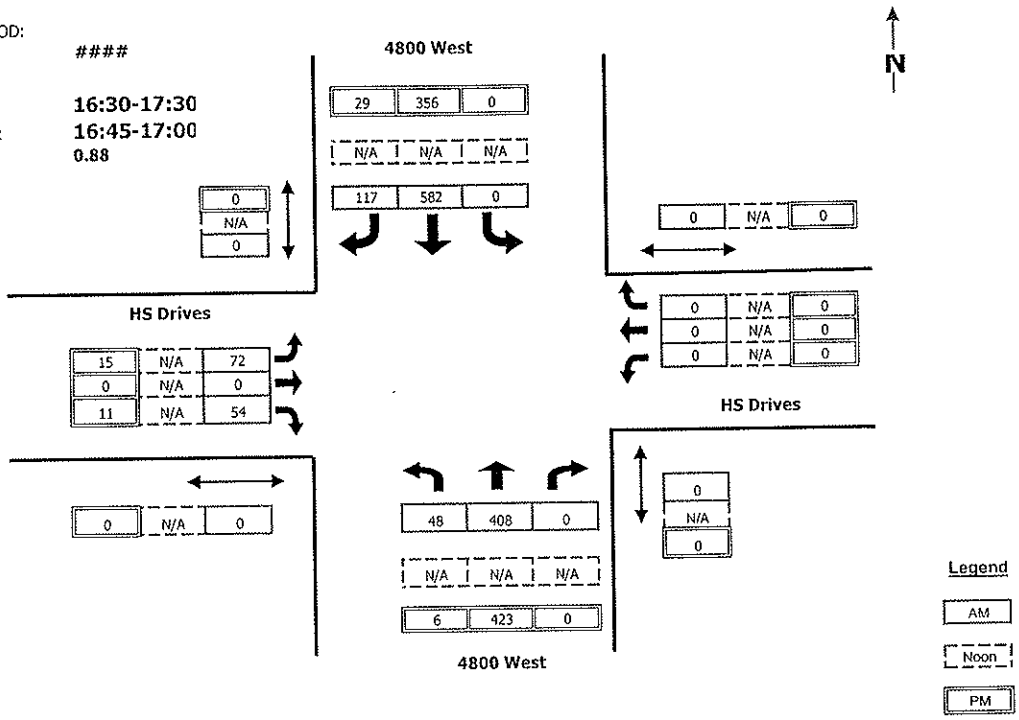
Intersection Turning Movement Summary

Intersection:	**4800 West/HS Drives**	**Date:**	**4-29-03, Tue**
	North/South: 4800 West	**Day of Week Adjustment:**	**109.0%**
	East/West: HS Drives	**Month of Year Adjustment:**	**98.6%**
Jurisdiction:	**Cedar Hills, Utah**	**Adjustment Station #:**	**49-350**
Project Title:		**Growth Rate:**	**0.0%**
Project No:	**P50**	**Number of Years:**	**0**
Weather:	**Clear**		

AM PEAK HOUR PERIOD: **7:00-8:00**
AM PEAK 15 MINUTE PERIOD: **7:30-7:45**
AM PHF: **0.62**

NOON PEAK HOUR PERIOD:
NOON PEAK 15 MINUTE PERIOD:
NOON PHF: **####**

PM PEAK HOUR PERIOD: **16:30-17:30**
PM PEAK 15 MINUTE PERIOD: **16:45-17:00**
PM PHF: **0.88**



RAW COUNT SUMMARIES	4800 West Northbound				4800 West Southbound				HS Drives Eastbound				HS Drives Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	3	83	0	0	0	82	19	0	12	0	11	0	0	0	0	0	210
7:15-7:30	12	106	0	0	0	184	36	0	16	0	15	0	0	0	0	0	369
7:30-7:45	29	139	0	0	0	254	52	0	28	0	18	0	0	0	0	0	520
7:45-8:00	8	110	0	0	0	106	19	0	21	0	14	0	0	0	0	0	278
8:00-8:15	3	73	0	0	0	93	4	0	4	0	3	0	0	0	0	0	180
8:15-8:30	3	65	0	0	0	89	3	0	5	0	3	0	0	0	0	0	168
8:30-8:45	5	71	0	0	0	65	4	0	4	0	6	0	0	0	0	0	155
8:45-9:00	6	79	0	0	0	81	4	0	5	0	4	0	0	0	0	0	179

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
11:00-11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15-11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30-11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45-12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00-12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15-12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30-12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45-13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	1	93	0	0	0	90	1	0	1	0	2	0	0	0	0	0	188
16:15-16:30	1	92	0	0	0	95	4	0	3	0	2	0	0	0	0	0	197
16:30-16:45	0	95	0	0	0	91	7	0	2	0	3	0	0	0	0	0	198
16:45-17:00	1	124	0	0	0	91	10	0	8	0	5	0	0	0	0	0	239
17:00-17:15	1	119	0	0	0	101	11	0	2	0	0	0	0	0	0	0	234
17:15-17:30	4	117	0	0	0	100	3	0	4	0	4	0	0	0	0	0	232
17:30-17:45	2	91	0	0	0	97	1	0	1	0	2	0	0	0	0	0	194
17:45-18:00	3	137	0	0	0	87	4	0	1	0	4	0	0	0	0	0	236

Traffic Counts!

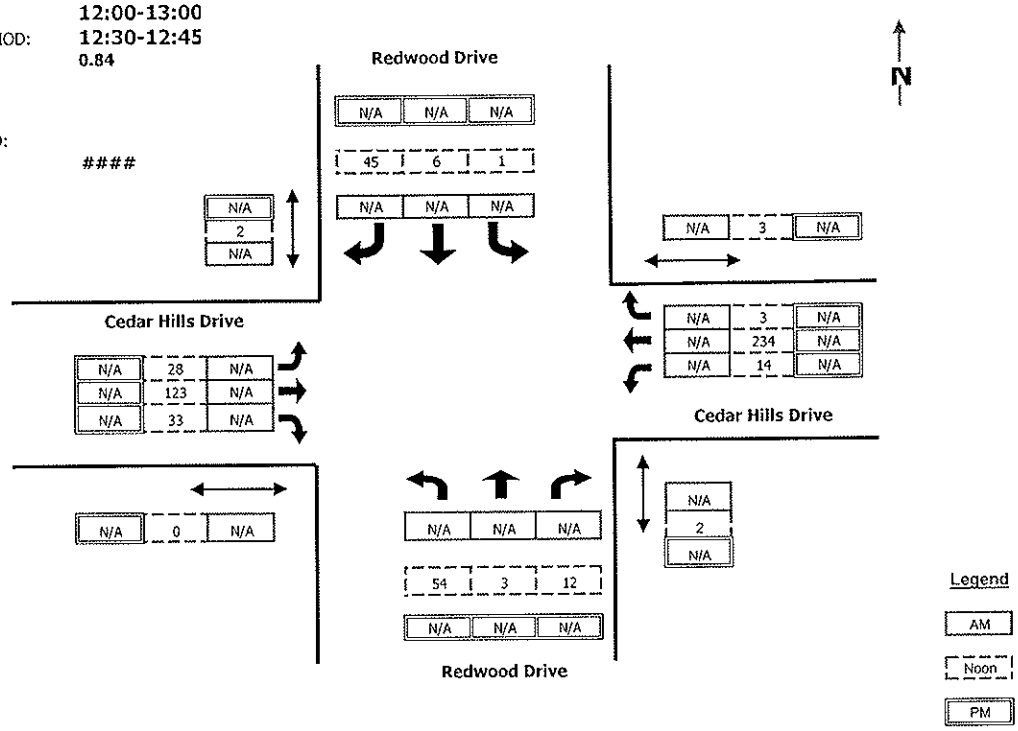
Intersection Turning Movement Summary

Intersection:	**Redwood Drive/Cedar Hills Drive**	**Date:**	**4-26-03, Sat**
	North/South: Redwood Drive	**Day of Week Adjustment:**	**90.0%**
	East/West: Cedar Hills Drive	**Month of Year Adjustment:**	**98.6%**
Jurisdiction:	**Cedar Hills, Utah**	**Adjustment Station #:**	**49-350**
Project Title:		**Growth Rate:**	**0.0%**
Project No:	**P50**	**Number of Years:**	**0**
Weather:	**Clear**		

AM PEAK HOUR PERIOD:
AM PEAK 15 MINUTE PERIOD:
AM PHF: ####

NOON PEAK HOUR PERIOD: 12:00-13:00
NOON PEAK 15 MINUTE PERIOD: 12:30-12:45
NOON PHF: 0.84

PM PEAK HOUR PERIOD:
PM PEAK 15 MINUTE PERIOD:
PM PHF: ####



RAW COUNT SUMMARIES	Redwood Drive Northbound				Redwood Drive Southbound				Cedar Hills Drive Eastbound				Cedar Hills Drive Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15-7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30-7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45-8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00-8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15-8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30-8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45-9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
11:00-11:15	7	2	5	0	0	1	8	0	5	34	14	0	5	33	0	0	114
11:15-11:30	13	0	5	1	1	0	10	0	9	30	13	2	2	20	1	0	104
11:30-11:45	14	0	1	0	0	0	8	0	12	20	12	0	8	32	0	1	107
11:45-12:00	8	2	4	0	3	0	4	1	4	27	14	0	6	36	0	1	108
12:00-12:15	18	0	3	2	1	2	7	0	8	22	6	0	4	45	2	0	118
12:15-12:30	9	2	0	0	0	2	9	1	6	20	3	0	3	18	0	0	72
12:30-12:45	10	1	4	0	0	0	14	1	3	33	13	0	5	81	1	1	165
12:45-13:00	11	0	4	0	0	1	10	0	8	34	7	0	0	64	0	2	139

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15-16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30-17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45-18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Traffic Counts!

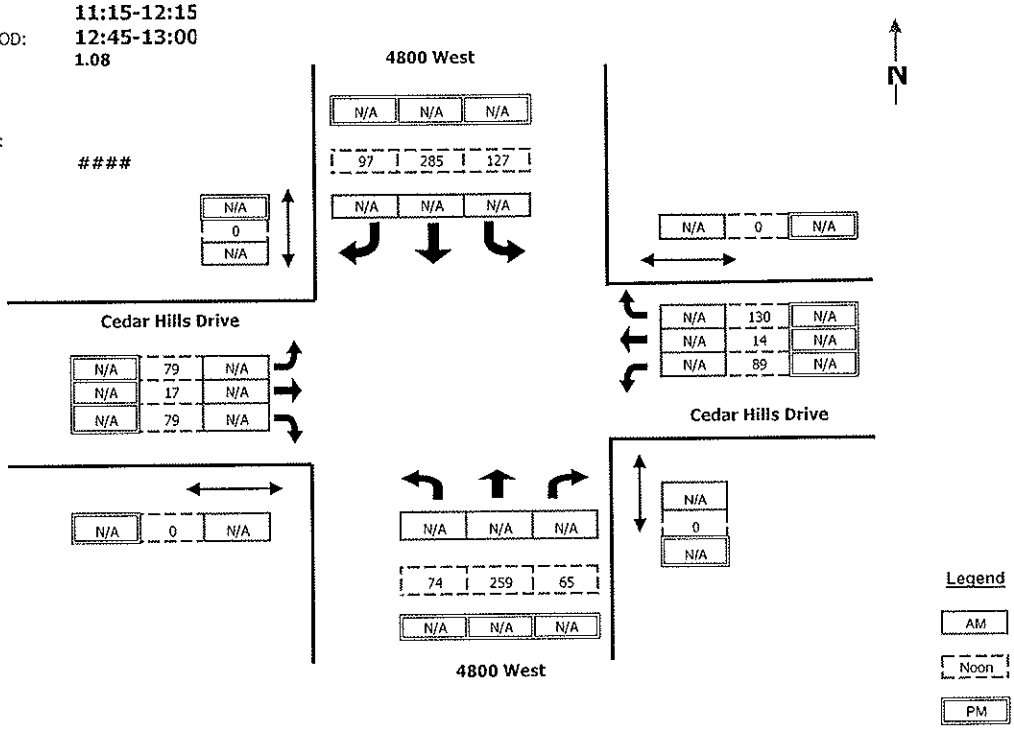
Intersection Turning Movement Summary

Intersection:	**4800 West/Cedar Hills Drive**	**Date:**	**4-26-03, Sat**
	North/South: 4800 West	**Day of Week Adjustment:**	**90.0%**
	East/West: Cedar Hills Drive	**Month of Year Adjustment:**	**98.6%**
Jurisdiction:	**Cedar Hills, Utah**	**Adjustment Station #:**	**49-350**
Project Title:		**Growth Rate:**	**0.0%**
Project No:	**P50**	**Number of Years:**	**0**
Weather:	**Clear**		

AM PEAK HOUR PERIOD:
AM PEAK 15 MINUTE PERIOD:
AM PHF: ####

NOON PEAK HOUR PERIOD: **11:15-12:15**
NOON PEAK 15 MINUTE PERIOD: **12:45-13:00**
NOON PHF: **1.08**

PM PEAK HOUR PERIOD:
PM PEAK 15 MINUTE PERIOD:
PM PHF: ####



RAW COUNT SUMMARIES	4800 West Northbound				4800 West Southbound				Cedar Hills Drive Eastbound				Cedar Hills Drive Westbound				
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
AM PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
7:00-7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15-7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30-7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45-8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00-8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15-8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30-8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45-9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NOON PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
11:00-11:15	12	67	19	0	31	43	11	0	24	3	22	0	25	4	18	0	279
11:15-11:30	26	57	16	0	34	63	25	0	16	4	15	0	16	2	25	0	299
11:30-11:45	21	61	18	0	26	63	16	0	20	3	19	0	21	3	25	0	296
11:45-12:00	13	50	10	0	29	66	20	0	19	7	19	0	13	3	24	0	273
12:00-12:15	6	62	14	0	24	61	25	0	15	1	17	0	29	4	41	0	299
12:15-12:30	8	62	8	0	15	48	17	0	13	0	17	0	19	2	25	0	234
12:30-12:45	6	61	20	0	28	47	27	0	13	0	6	0	25	0	66	0	299
12:45-13:00	19	55	17	1	32	45	31	0	6	0	12	0	21	1	65	0	304
PM PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
16:00-16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15-16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30-17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45-18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Traffic Counts!

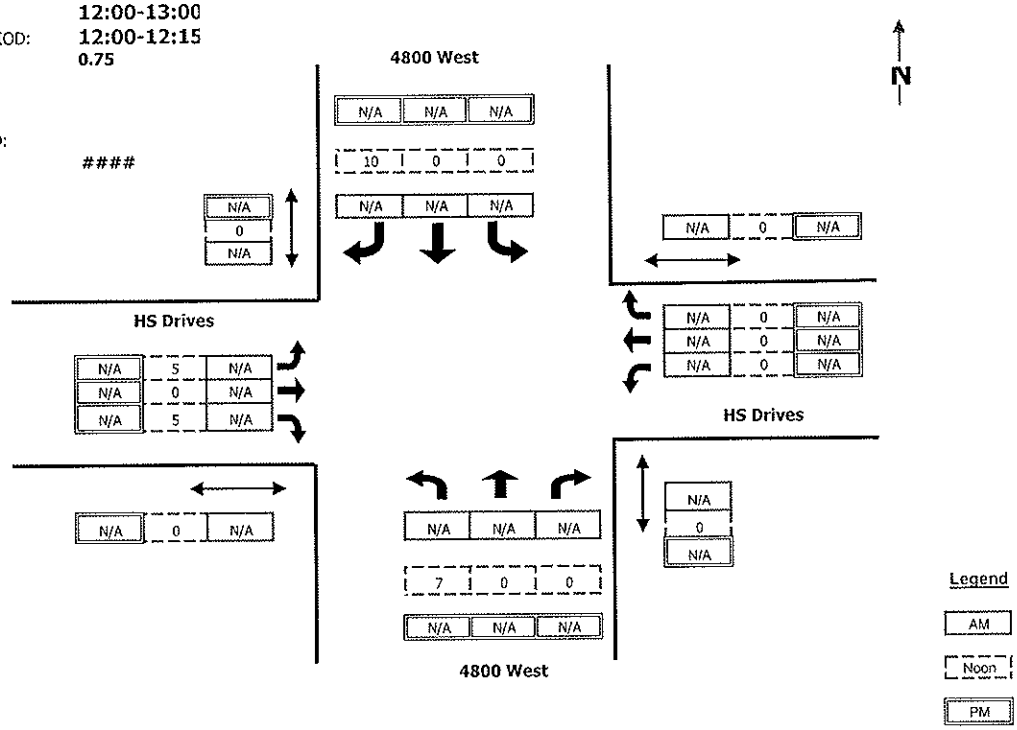
Intersection Turning Movement Summary

Intersection:	**4800 West/HS Drives**	**Date:**	**4-26-03, Sat**
	North/South: 4800 West	**Day of Week Adjustment:**	**90.0%**
	East/West: HS Drives	**Month of Year Adjustment:**	**98.6%**
Jurisdiction:	**Cedar Hills, Utah**	**Adjustment Station #:**	**49-350**
Project Title:		**Growth Rate:**	**0.0%**
Project No:	**P50**	**Number of Years:**	**0**
Weather:	**Clear**		

AM PEAK HOUR PERIOD:
AM PEAK 15 MINUTE PERIOD:
AM PHF: ####

NOON PEAK HOUR PERIOD: 12:00-13:00
NOON PEAK 15 MINUTE PERIOD: 12:00-12:15
NOON PHF: 0.75

PM PEAK HOUR PERIOD:
PM PEAK 15 MINUTE PERIOD:
PM PHF: ####



RAW COUNT SUMMARIES	4800 West Northbound				4800 West Southbound				HS Drives Eastbound				HS Drives Westbound			
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00-7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15-7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30-7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45-8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00-8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15-8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30-8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45-9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NOON PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
11:00-11:15	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	3
11:15-11:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
11:30-11:45	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	3
11:45-12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00-12:15	2	0	0	0	0	0	3	0	2	0	2	0	0	0	0	0	9
12:15-12:30	1	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	4
12:30-12:45	3	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	7
12:45-13:00	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	3

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00-16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15-16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30-16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00-17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30-17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45-18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B
LEVEL OF SERVICE
DETAILED REPORTS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1793		1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.77	1.00		0.53	1.00	1.00	0.58	1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)	1433	1793		993	1863	1583	1076	1863	1583	937	1863	1583
Volume (vph)	26	20	7	67	47	109	32	243	91	165	287	7
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	21	7	70	49	114	33	253	95	172	299	7
RTOR Reduction (vph)	0	6	0	0	0	101	0	0	51	0	0	3
Lane Group Flow (vph)	27	22	0	70	49	13	33	253	44	172	299	4
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	6.7	4.2		11.3	6.5	6.5	31.8	29.4	29.4	40.2	33.6	33.6
Effective Green, g (s)	8.7	5.2		13.3	7.5	7.5	33.8	30.4	30.4	42.0	34.6	34.6
Actuated g/C Ratio	0.13	0.08		0.20	0.12	0.12	0.52	0.47	0.47	0.65	0.53	0.53
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	210	143		273	215	183	596	871	740	703	992	843
v/s Ratio Prot	0.01	0.01		c0.02	0.03		0.00	0.14		c0.03	c0.16	
v/s Ratio Perm	0.01			c0.03		0.01	0.03		0.03	0.13		0.00
v/c Ratio	0.13	0.15		0.26	0.23	0.07	0.06	0.29	0.06	0.24	0.30	0.00
Uniform Delay, d1	24.8	27.8		21.5	26.1	25.6	7.6	10.7	9.5	4.8	8.5	7.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.5		0.5	0.5	0.2	0.0	0.8	0.2	0.2	0.8	0.0
Delay (s)	25.0	28.3		21.9	26.7	25.8	7.7	11.5	9.6	5.0	9.2	7.1
Level of Service	C	C		C	C	C	A	B	A	A	A	A
Approach Delay (s)		26.7			24.8			10.7			7.7	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	28	70	49	114	33	253	95	172	299	7
v/c Ratio	0.10	0.12	0.22	0.18	0.35	0.07	0.27	0.11	0.25	0.26	0.01
Control Delay	16.7	21.2	17.2	22.8	7.4	7.7	14.7	4.8	7.0	11.6	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	21.2	17.2	22.8	7.4	7.7	14.7	4.8	7.0	11.6	8.9
Queue Length 50th (ft)	7	5	17	12	0	2	45	0	13	25	0
Queue Length 95th (ft)	22	28	42	44	39	17	140	28	63	158	7
Internal Link Dist (ft)		920		150			920			580	
Turn Bay Length (ft)	100		100		100	300		120	300		200
Base Capacity (vph)	336	399	368	431	453	544	921	830	684	1133	966
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.19	0.11	0.25	0.06	0.27	0.11	0.25	0.26	0.01

Intersection Summary

ROUNDABOUTS - UNSIGNALIZED INTERSECTIONS WORKSHEET

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2007*
Time Period	*Existing Conditions*		

Project Description *Cedar Hills Big Box*

Volume Adjustments

		EB	WB	NB	SB
LT Traffic	Volume, veh/h	*84*	*11*	*39*	*3*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*104*	*13*	*48*	*3*
TH Traffic	Volume, veh/h	*133*	*118*	*15*	*7*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*166*	*147*	*18*	*8*
RT Traffic	Volume, veh/h	*59*	*12*	*16*	*66*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*73*	*14*	*19*	*82*

Approach Flow Computation

Approach Flow (veh/h)	Va (veh/h)
V_{ae}	*343*
V_{aw}	*174*
V_{an}	*85*
V_{as}	*93*

Circulating Flow Computation

Approach Flow (veh/h)	Vc (veh/h)
V_{ce}	*24*
V_{cw}	*170*
V_{cn}	*273*
V_{cs}	*208*

Capacity Computation

		EB	WB	NB	SB
Capacity	Upper bound	*1358*	*1212*	*1117*	*1176*
	Lower bound	*1137*	*1004*	*919*	*972*
v/c Ratio	Upper bound	*0.25*	*0.14*	*0.08*	*0.08*
	Lower bound	*0.30*	*0.17*	*0.09*	*0.10*

 HCS+™ Version 5.2 Generated: 1/2/2007 1:11 PM

LOS B

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	PS
Agency/Co.	F&P
Date Performed	1/2/2007
Analysis Time Period	Existing Conditions

Site Information

Intersection	
Jurisdiction	
Analysis Year	2007

Project Description: Cedar Hills Big Box

East/West Street: 4800 West | North/South Street: High School

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	6	372			448	29
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	17	0	12	0	0	0
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	1	0	0	1	1
Configuration	L	T			T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	15		11			
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	0	509	32	6	422	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L					L		R
v (veh/h)	6					17		12
C (m) (veh/h)	1028					292		568
v/c	0.01					0.06		0.02
95% queue length	0.02					0.18		0.06
Control Delay (s/veh)	8.5					18.1		11.5
LOS	A					C		B
Approach Delay	--	--				15.4		

(s/veh)				
Approach LOS	--	--		C

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DELAY 0.6
LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1793		1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	1.00	1.00		0.51	1.00	1.00	0.56	1.00	1.00	0.46	1.00	1.00
Satd. Flow (perm)	1863	1793		943	1863	1583	1042	1863	1583	851	1863	1583
Volume (vph)	26	20	7	131	47	180	32	282	130	209	321	7
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	21	7	136	49	188	33	294	135	218	334	7
RTOR Reduction (vph)	0	7	0	0	0	164	0	0	75	0	0	3
Lane Group Flow (vph)	27	21	0	136	49	24	33	294	60	218	334	4
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	5.3	2.9		13.9	7.2	7.2	29.5	27.2	27.2	37.7	31.3	31.3
Effective Green, g (s)	7.3	3.9		15.6	8.2	8.2	31.5	28.2	28.2	39.6	32.3	32.3
Actuated g/C Ratio	0.12	0.06		0.25	0.13	0.13	0.50	0.45	0.45	0.63	0.51	0.51
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	210	111		334	242	205	557	831	706	641	952	809
v/s Ratio Prot	0.01	0.01		c0.05	0.03		0.00	0.16		c0.04	c0.18	
v/s Ratio Perm	0.01			c0.05		0.02	0.03		0.04	0.17		0.00
v/c Ratio	0.13	0.19		0.41	0.20	0.12	0.06	0.35	0.09	0.34	0.35	0.00
Uniform Delay, d1	25.1	28.2		19.6	24.6	24.3	8.1	11.5	10.1	5.5	9.2	7.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.9		0.8	0.4	0.3	0.0	1.2	0.2	0.3	1.0	0.0
Delay (s)	25.4	29.0		20.4	25.0	24.6	8.1	12.7	10.3	5.8	10.2	7.6
Level of Service	C	C		C	C	C	A	B	B	A	B	A
Approach Delay (s)		27.2			23.1			11.7			8.5	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	28	136	49	188	33	294	135	218	334	7
v/c Ratio	0.10	0.12	0.36	0.16	0.45	0.08	0.33	0.16	0.36	0.30	0.01
Control Delay	16.8	20.9	18.3	22.3	6.6	8.2	16.3	4.5	8.4	12.7	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	20.9	18.3	22.3	6.6	8.2	16.3	4.5	8.4	12.7	9.3
Queue Length 50th (ft)	7	6	36	12	0	3	60	0	21	34	0
Queue Length 95th (ft)	21	28	72	44	48	18	169	35	83	185	8
Internal Link Dist (ft)		920		150			920			320	
Turn Bay Length (ft)	100		100		100	300		120	300		100
Base Capacity (vph)	348	404	401	458	531	488	901	835	610	1115	950
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.34	0.11	0.35	0.07	0.33	0.16	0.36	0.30	0.01

Intersection Summary

ROUNDABOUTS - UNSIGNALIZED INTERSECTIONS WORKSHEET

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2007*
Time Period	*Existing+Project*		

Project Description *Cedar Hills Big Box*

Volume Adjustments

		EB	WB	NB	SB
LT Traffic	Volume, veh/h	*112*	*11*	*64*	*11*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*139*	*13*	*79*	*13*
TH Traffic	Volume, veh/h	*159*	*144*	*17*	*15*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*198*	*179*	*21*	*18*
RT Traffic	Volume, veh/h	*85*	*14*	*16*	*88*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*106*	*17*	*19*	*109*

Approach Flow Computation

Approach Flow (veh/h)	Va (veh/h)
V_{ae}	*443*
V_{aw}	*209*
V_{an}	*119*
V_{as}	*140*

Circulating Flow Computation

Approach Flow (veh/h)	Vc (veh/h)
V_{ce}	*44*
V_{cw}	*239*
V_{cn}	*350*
V_{cs}	*271*

Capacity Computation

		EB	WB	NB	SB
Capacity	Upper bound	*1337*	*1148*	*1051*	*1119*
	Lower bound	*1118*	*946*	*860*	*920*
v/c Ratio	Upper bound	*0.33*	*0.18*	*0.11*	*0.13*
	Lower bound	*0.40*	*0.22*	*0.14*	*0.15*

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LOS B

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PS	Intersection	
Agency/Co.	F&P	Jurisdiction	
Date Performed	1/2/2007	Analysis Year	2007
Analysis Time Period	Existing+Project		

Project Description: Cedar Hills Big Box

East/West Street: West Access | North/South Street: 4800 West

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)		450	38	52	505	
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	0	0	0	36	0	62
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
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)				32		55
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	59	573	0	0	511	43
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	1	0	1
Configuration				L		R

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L	L		R			
v (veh/h)		59	36		62			
C (m) (veh/h)		1026	188		551			
v/c		0.06	0.19		0.11			
95% queue length		0.18	0.69		0.38			
Control Delay (s/veh)		8.7	28.6		12.4			
LOS		A	D		B			
Approach Delay	--	--	18.3					

(s/veh)				
Approach LOS	--	--	C	

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DELAY 2.0
LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PS	Intersection	
Agency/Co.	F&P	Jurisdiction	
Date Performed	1/2/2007	Analysis Year	2007
Analysis Time Period	Existing+Project		

Project Description: Cedar Hills Big Box

East/West Street: North West Access | North/South Street: 4800 West

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	6	495	4	22	542	29
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	17	0	12	4	0	26
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	1	1	1	1	1
Configuration	L	T	R	L	T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	15		11	4		23
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	25	615	32	6	562	4
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	1	0	1
Configuration	L		R	L		R

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		R	L		R
v (veh/h)	6	25	4		26	17		12
C (m) (veh/h)	948	1006	140		526	139		495
v/c	0.01	0.02	0.03		0.05	0.12		0.02
95% queue length	0.02	0.08	0.09		0.16	0.41		0.07
Control Delay (s/veh)	8.8	8.7	31.5		12.2	34.5		12.5
LOS	A	A	D		B	D		B
Approach Delay	--	--	14.8			25.4		

(s/veh)				
Approach LOS	--	--	B	D

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DELAY 1.3
LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*PS*
Agency/Co.	*F&P*
Date Performed	*1/2/2007*
Analysis Time Period	*Existing+Project*

Site Information

Intersection	
Jurisdiction	
Analysis Year	*2007*

Project Description *Cedar Hills Big Box*

East/West Street: *Cedar Hills Drive* | North/South Street: *South East Access*

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)		*356*			*294*	*2*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*370*	*0*	*0*	*306*	*2*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*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)						*47*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*48*
Percent Heavy Vehicles	*2*	*0*	*0*	*0*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*48*
C (m) (veh/h)								*733*
v/c								*0.07*
95% queue length								*0.21*
Control Delay (s/veh)								*10.3*
LOS								*B*
Approach Delay	--	--				*10.3*		

(s/veh)				
Approach LOS	--	--		B

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DELAY 0.7
LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2007*
Analysis Time Period	*Existing+Project*		

Project Description *Cedar Hills Big Box*

East/West Street: *Cedar Hills Drive* | North/South Street: *South West Access*

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)		*359*			*345*	*6*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*373*	*0*	*0*	*359*	*6*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*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)						*13*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*13*
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*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*13*
C (m) (veh/h)								*687*
v/c								*0.02*
95% queue length								*0.06*
Control Delay (s/veh)								*10.3*
LOS								*B*
Approach Delay	--	--				*10.3*		

(s/veh)				
Approach LOS	--	--		B

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DELAY .3
LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	PS	Intersection	
Agency/Co.	F&P	Jurisdiction	
Date Performed	1/2/2007	Analysis Year	2007
Analysis Time Period	Existing+Project		

Project Description: Cedar Hills Big Box

East/West Street: East Access | North/South Street: Redwood Drive

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	17	126			89	1
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Hourly Flow Rate, HFR (veh/h)	4	0	26	0	0	0
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)	4		25			
Peak-Hour Factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Hourly Flow Rate, HFR (veh/h)	0	92	1	17	131	0
Percent Heavy Vehicles	0	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	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	17						30	
C (m) (veh/h)	1501						930	
v/c	0.01						0.03	
95% queue length	0.03						0.10	
Control Delay (s/veh)	7.4						9.0	
LOS	A						A	
Approach Delay	--	--				9.0		

(s/veh)				
Approach LOS	--	--		A

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DELAY 1.5

LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2007*
Analysis Time Period	*Existing+Project*		

Project Description *Cedar Hills Big Box*

East/West Street: *Cedar Hills Drive*	North/South Street: *South Access*
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)	*66*	*293*			*292*	*49*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*68*	*305*	*0*	*0*	*304*	*51*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*1*
Configuration	*L*	*T*			*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)				*63*		*59*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*65*	*0*	*61*
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*	*1*	*0*	*1*
Configuration				*L*		*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*		*R*
v (veh/h)	*68*					*65*		*61*
C (m) (veh/h)	*1215*					*363*		*740*
v/c	*0.06*					*0.18*		*0.08*
95% queue length	*0.18*					*0.64*		*0.27*
Control Delay (s/veh)	*8.1*					*17.1*		*10.3*
LOS	*A*					*C*		*B*
Approach Delay	--	--				*13.8*		

(s/veh)				
Approach LOS	--	--		B

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DELAY 2.8
LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1793		1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	1.00	1.00		0.51	1.00	1.00	0.45	1.00	1.00	0.31	1.00	1.00
Satd. Flow (perm)	1863	1793		943	1863	1583	836	1863	1583	578	1863	1583
Volume (vph)	26	20	7	120	47	210	32	414	165	282	485	7
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	21	7	125	49	219	33	431	172	294	505	7
RTOR Reduction (vph)	0	7	0	0	0	191	0	0	96	0	0	3
Lane Group Flow (vph)	27	21	0	125	49	28	33	431	76	294	505	4
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	5.2	2.9		13.6	7.1	7.1	27.0	24.7	24.7	38.4	31.1	31.1
Effective Green, g (s)	7.2	3.9		15.4	8.1	8.1	29.0	25.7	25.7	39.4	32.1	32.1
Actuated g/C Ratio	0.11	0.06		0.25	0.13	0.13	0.46	0.41	0.41	0.63	0.51	0.51
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	111		330	240	204	435	762	648	547	952	809
v/s Ratio Prot	0.01	0.01		c0.05	0.03		0.00	0.23		c0.08	0.27	
v/s Ratio Perm	0.01			c0.05		0.02	0.03		0.05	c0.25		0.00
v/c Ratio	0.13	0.19		0.38	0.20	0.14	0.08	0.57	0.12	0.54	0.53	0.00
Uniform Delay, d1	25.0	28.0		19.4	24.5	24.3	9.3	14.3	11.5	6.8	10.3	7.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.9		0.7	0.4	0.3	0.1	3.0	0.4	1.0	2.1	0.0
Delay (s)	25.3	28.8		20.1	24.9	24.6	9.4	17.3	11.9	7.8	12.4	7.5
Level of Service	C	C		C	C	C	A	B	B	A	B	A
Approach Delay (s)		27.1			23.2			15.4			10.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	62.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	28	125	49	219	33	431	172	294	505	7
v/c Ratio	0.09	0.12	0.34	0.16	0.49	0.10	0.57	0.23	0.59	0.45	0.01
Control Delay	16.8	20.7	18.2	22.4	6.6	8.5	21.2	5.0	14.6	15.8	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	20.7	18.2	22.4	6.6	8.5	21.2	5.0	14.6	15.8	9.4
Queue Length 50th (ft)	7	6	34	13	0	3	100	2	28	56	0
Queue Length 95th (ft)	21	28	67	43	51	19	#297	42	#167	#350	8
Internal Link Dist (ft)		920		150			920			580	
Turn Bay Length (ft)	100		100		100	300		120	300		200
Base Capacity (vph)	353	398	404	449	548	408	754	738	503	1122	956
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.31	0.11	0.40	0.08	0.57	0.23	0.58	0.45	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

ROUNDABOUTS - UNSIGNALIZED INTERSECTIONS WORKSHEET

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2030*
Time Period	*Future Background*		

Project Description *Cedar Hills Big Box*

Volume Adjustments

		EB	WB	NB	SB
LT Traffic	Volume, veh/h	*142*	*19*	*66*	*5*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*177*	*23*	*82*	*6*
TH Traffic	Volume, veh/h	*225*	*199*	*25*	*12*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*281*	*248*	*31*	*14*
RT Traffic	Volume, veh/h	*100*	*20*	*27*	*112*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*124*	*24*	*33*	*139*

Approach Flow Computation

Approach Flow (veh/h)	Va (veh/h)
V_{ae}	*582*
V_{aw}	*295*
V_{an}	*146*
V_{as}	*159*

Circulating Flow Computation

Approach Flow (veh/h)	Vc (veh/h)
V_{ce}	*43*
V_{cw}	*290*
V_{cn}	*464*
V_{cs}	*353*

Capacity Computation

		EB	WB	NB	SB
Capacity	Upper bound	*1339*	*1103*	*960*	*1049*
	Lower bound	*1119*	*905*	*778*	*857*
v/c Ratio	Upper bound	*0.43*	*0.27*	*0.15*	*0.15*
	Lower bound	*0.52*	*0.33*	*0.19*	*0.19*

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LOS C

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*PS*
Agency/Co.	*F&P*
Date Performed	*1/2/2007*
Analysis Time Period	*Future Background*

Site Information

Intersection	
Jurisdiction	
Analysis Year	*2030*

Project Description *Cedar Hills Big Box*

East/West Street: *4800 West* | North/South Street: *High School*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*6*	*644*			*763*	*29*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*17*	*0*	*12*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*1*
Configuration	*L*	*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*15*		*11*			
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*867*	*32*	*6*	*731*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*6*					*17*		*12*
C (m) (veh/h)	*756*					*115*		*355*
v/c	*0.01*					*0.15*		*0.03*
95% queue length	*0.02*					*0.50*		*0.10*
Control Delay (s/veh)	*9.8*					*41.7*		*15.5*
LOS	*A*					*E*		*C*
Approach Delay	--	--				*30.8*		

(s/veh)				
Approach LOS	--	--		D

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DELAY 0.6

LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1793		1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.73	1.00		0.43	1.00	1.00	0.40	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1351	1793		809	1863	1583	742	1863	1583	448	1863	1583
Volume (vph)	26	20	7	184	47	281	32	453	204	326	519	7
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	27	21	7	192	49	293	33	472	212	340	541	7
RTOR Reduction (vph)	0	6	0	0	0	246	0	0	114	0	0	3
Lane Group Flow (vph)	27	22	0	192	49	47	33	472	98	340	541	4
Turn Type	pm+pt			pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	7.1	4.7		16.3	9.3	9.3	25.0	22.7	22.7	36.9	29.6	29.6
Effective Green, g (s)	9.1	5.7		17.7	10.3	10.3	27.0	23.7	23.7	37.9	30.6	30.6
Actuated g/C Ratio	0.14	0.09		0.28	0.16	0.16	0.42	0.37	0.37	0.60	0.48	0.48
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	216	161		346	302	256	368	694	590	479	896	762
v/s Ratio Prot	0.01	0.01		c0.07	0.03		0.00	0.25		c0.11	0.29	
v/s Ratio Perm	0.01			c0.08		0.03	0.03		0.06	c0.31		0.00
v/c Ratio	0.12	0.13		0.55	0.16	0.19	0.09	0.68	0.17	0.71	0.60	0.01
Uniform Delay, d1	23.7	26.7		18.7	22.9	23.0	10.8	16.8	13.3	8.9	12.1	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.4		1.9	0.3	0.4	0.1	5.3	0.6	4.8	3.0	0.0
Delay (s)	24.0	27.1		20.7	23.2	23.4	10.9	22.1	13.9	13.7	15.1	8.6
Level of Service	C	C		C	C	C	B	C	B	B	B	A
Approach Delay (s)		25.5			22.4			19.2			14.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	28	192	49	293	33	472	212	340	541	7
v/c Ratio	0.09	0.11	0.49	0.15	0.56	0.10	0.71	0.31	0.70	0.54	0.01
Control Delay	16.7	20.3	21.2	21.9	6.4	9.0	26.6	6.1	20.3	18.0	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	20.3	21.2	21.9	6.4	9.0	26.6	6.1	20.3	18.0	11.0
Queue Length 50th (ft)	7	6	54	13	0	3	114	6	35	64	0
Queue Length 95th (ft)	21	27	98	43	57	20	#357	56	#230	#407	9
Internal Link Dist (ft)		920		150			920			320	
Turn Bay Length (ft)	100		100		100	300		120	300		100
Base Capacity (vph)	352	413	404	467	617	388	664	681	483	997	850
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.48	0.10	0.47	0.09	0.71	0.31	0.70	0.54	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

ROUNDABOUTS - UNSIGNALIZED INTERSECTIONS WORKSHEET

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2030*
Time Period	*Future+Project*		

Project Description *Cedar Hills Big Box*

Volume Adjustments

		EB	WB	NB	SB
LT Traffic	Volume, veh/h	*170*	*19*	*91*	*13*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*212*	*23*	*113*	*16*
TH Traffic	Volume, veh/h	*251*	*225*	*27*	*20*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*313*	*281*	*33*	*24*
RT Traffic	Volume, veh/h	*126*	*22*	*27*	*134*
	PHF	*0.80*	*0.80*	*0.80*	*0.80*
	Flow rate, veh/h	*157*	*27*	*33*	*167*

Approach Flow Computation

Approach Flow (veh/h)	Va (veh/h)
V_{ae}	*682*
V_{aw}	*331*
V_{an}	*179*
V_{as}	*207*

Circulating Flow Computation

Approach Flow (veh/h)	Vc (veh/h)
V_{ce}	*63*
V_{cw}	*358*
V_{cn}	*541*
V_{cs}	*417*

Capacity Computation

		EB	WB	NB	SB
Capacity	Upper bound	*1318*	*1045*	*903*	*997*
	Lower bound	*1100*	*854*	*727*	*811*
v/c Ratio	Upper bound	*0.52*	*0.32*	*0.20*	*0.21*
	Lower bound	*0.62*	*0.39*	*0.25*	*0.26*

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LOS C

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	PS
Agency/Co.	F&P
Date Performed	1/2/2007
Analysis Time Period	Future+Project

Site Information

Intersection	
Jurisdiction	
Analysis Year	2030

Project Description: Cedar Hills Big Box

East/West Street: North West Access

North/South Street: 4800 West

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	6	767	4	22	857	29
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	17	0	12	4	0	26
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	1	1	1	1	1
Configuration	L	T	R	L	T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	15		11	4		23
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR (veh/h)	25	973	32	6	871	4
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	1	0	1	1	0	1
Configuration	L		R	L		R

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L	L		R	L		R
v (veh/h)	6	25	4		26	17		12
C (m) (veh/h)	697	771	47		350	46		309
v/c	0.01	0.03	0.09		0.07	0.37		0.04
95% queue length	0.03	0.10	0.27		0.24	1.30		0.12
Control Delay (s/veh)	10.2	9.8	88.6		16.1	123.4		17.1
LOS	B	A	F		C	F		C
Approach Delay	--	--	25.8			79.4		

(s/veh)				
Approach LOS	--	--	D	F

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DELAY 1.9

LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2030*
Analysis Time Period	*Future+Project*		

Project Description *Cedar Hills Big Box*

East/West Street: *West Access* | North/South Street: *4800 West*

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)		*722*	*38*	*52*	*820*	
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*36*	*0*	*62*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
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)				*32*		*55*
Peak-Hour Factor, PHF	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*	*0.88*
Hourly Flow Rate, HFR (veh/h)	*59*	*931*	*0*	*0*	*820*	*43*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*L*	*L*		*R*			
v (veh/h)		*59*	*36*		*62*			
C (m) (veh/h)		*779*	*71*		*364*			
v/c		*0.08*	*0.51*		*0.17*			
95% queue length		*0.25*	*2.09*		*0.61*			
Control Delay (s/veh)		*10.0*	*99.3*		*16.9*			
LOS		*A*	*F*		*C*			
Approach Delay	--	--	*47.2*					

(s/veh)				
Approach LOS	--	--	E	

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DELAY 3.0
LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*PS*
Agency/Co.	*F&P*
Date Performed	*1/2/2007*
Analysis Time Period	*Future+Project*

Site Information

Intersection	
Jurisdiction	
Analysis Year	*2030*

Project Description *Cedar Hills Big Box*

East/West Street: *Cedar Hills Drive* | North/South Street: *South East Access*

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)		*547*			*448*	*2*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*569*	*0*	*0*	*466*	*2*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*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)						*47*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*48*
Percent Heavy Vehicles	*2*	*0*	*0*	*0*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*48*
C (m) (veh/h)								*596*
v/c								*0.08*
95% queue length								*0.26*
Control Delay (s/veh)								*11.6*
LOS								*B*
Approach Delay	--	--				*11.6*		

(s/veh)				
Approach LOS	--	--		B

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DELAY .5
LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*PS*
Agency/Co.	*F&P*
Date Performed	*1/2/2007*
Analysis Time Period	*Future+Project*

Site Information

Intersection	
Jurisdiction	
Analysis Year	*2030*

Project Description *Cedar Hills Big Box*

East/West Street: *Cedar Hills Drive* | North/South Street: *South West Access*

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)		*550*			*499*	*6*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*572*	*0*	*0*	*519*	*6*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration		*T*				*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)						*13*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*13*
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*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*13*
C (m) (veh/h)								*559*
v/c								*0.02*
95% queue length								*0.07*
Control Delay (s/veh)								*11.6*
LOS								*B*
Approach Delay	--	--				*11.6*		

(s/veh)				
Approach LOS	--	--		B

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DELAY 0.1
LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2030*
Analysis Time Period	*Future+Project*		

Project Description *Cedar Hills Big Box*

East/West Street: *Cedar Hills Drive* | North/South Street: *South Access*

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)	*66*	*484*			*446*	*49*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*68*	*504*	*0*	*0*	*464*	*51*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*1*
Configuration	*L*	*T*			*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)				*63*		*59*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*65*	*0*	*61*
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*	*1*	*0*	*1*
Configuration				*L*		*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*		*R*
v (veh/h)	*68*					*65*		*61*
C (m) (veh/h)	*1061*					*221*		*602*
v/c	*0.06*					*0.29*		*0.10*
95% queue length	*0.21*					*1.18*		*0.34*
Control Delay (s/veh)	*8.6*					*27.9*		*11.7*
LOS	*A*					*D*		*B*
Approach Delay	--	--				*20.1*		

(s/veh)				
Approach LOS	--	--		C

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DELAY 2.7

LOS A

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*PS*	Intersection	
Agency/Co.	*F&P*	Jurisdiction	
Date Performed	*1/2/2007*	Analysis Year	*2030*
Analysis Time Period	*Future+Project*		

Project Description *Cedar Hills Big Box*

East/West Street: *East Access* | North/South Street: *Redwood Drive*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*17*	*202*			*142*	*1*
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*4*	*0*	*26*	*0*	*0*	*0*
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)	*4*		*25*			
Peak-Hour Factor, PHF	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*	*0.96*
Hourly Flow Rate, HFR (veh/h)	*0*	*147*	*1*	*17*	*210*	*0*
Percent Heavy Vehicles	*0*	*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	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
v (veh/h)	*17*						*30*	
C (m) (veh/h)	*1434*						*849*	
v/c	*0.01*						*0.04*	
95% queue length	*0.04*						*0.11*	
Control Delay (s/veh)	*7.5*						*9.4*	
LOS	*A*						*A*	
Approach Delay	--	--				*9.4*		

(s/veh)				
Approach LOS	--	--		A

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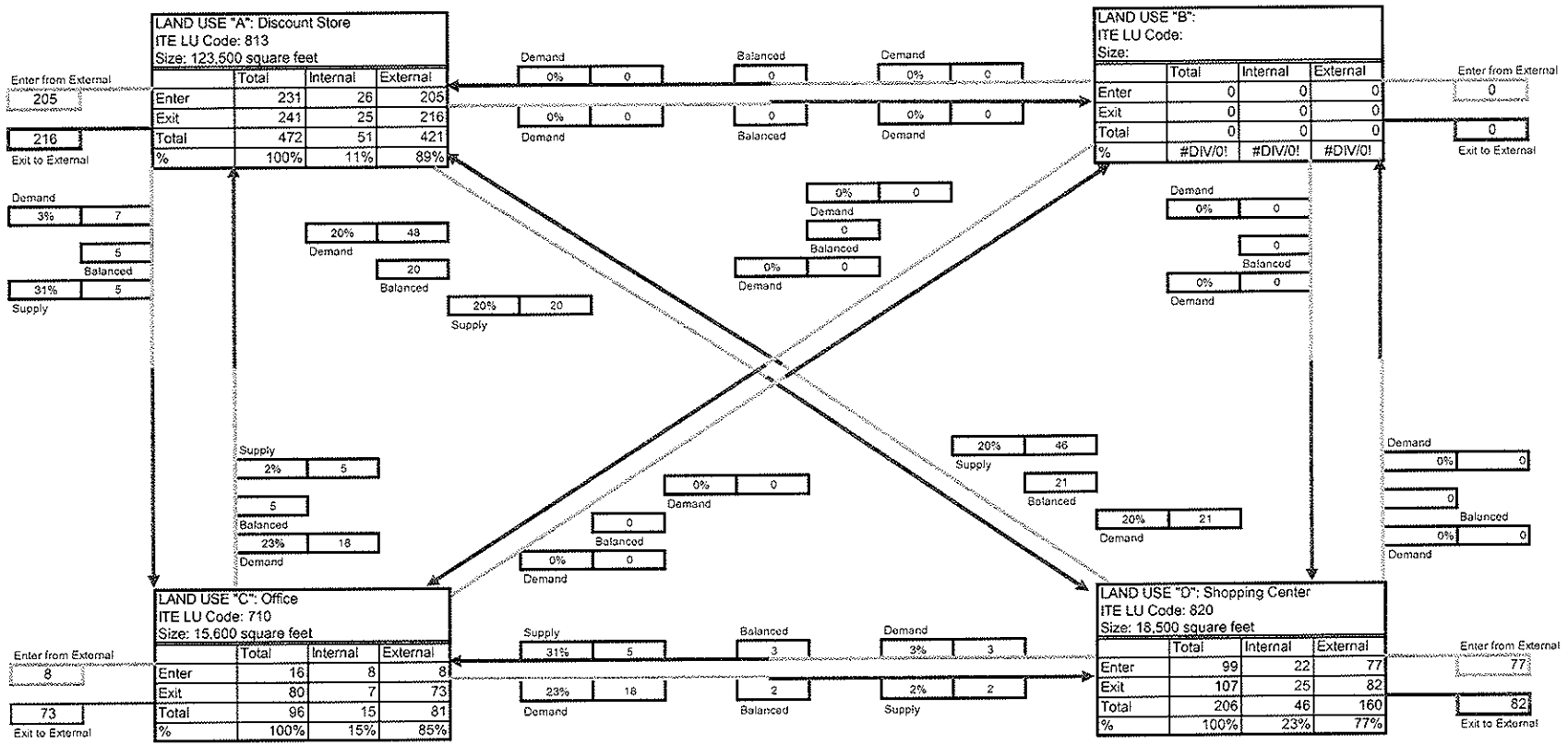
DELAY 1.0
LOS A

Appendix C
INTERNAL CAPTURE

Analyst: **PS**
Date: **12/28/2006**
Project #: **UT06-734**

ALTERNATIVE MULTI-USE DEVELOPMENT TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Name of Development: **Cedar Hills Big Box**
Time Period: **PM Peak Hour**



Net External Trips for Multi-Use Development

	LU "A"	LU "B"	LU "C"	LU "D"	Total	
Enter	205	0	8	77	290	
Exit	216	0	73	82	372	
Total	421	0	81	160	662	*INTERNAL CAPTURE*
Single-Use Trip Gen. Est.	472	0	96	206	774	**14%**