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M E M O R A N D U M

Date: June 7, 2012

To: El Dorado County Department of Transportation

Cc: Larry Ito, Ardor Consulting
            Derek Minnema, Mark Thomas & Company

From: David B Robinson - Fehr & Peers
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Subject: Latrobe Road Connector Study – Alternatives Evaluation

RS06-2336

Fehr & Peers has completed a summary of transportation-related measures of effectiveness for the Latrobe Road Connector project Alternatives Evaluation Matrix. The measures presented in the matrix are based on previous analysis conducted for this project and are intended to help with the selection of a preferred alternative. The Latrobe Road Connector Study is required as a Condition of Approval (No. 27) of TM99-1359 for the West Valley Tentative Map, which is located in the Valley View Specific Plan.

This memorandum provides background on previous work completed for the Latrobe Road Connector Study and summarizes the model development; including refinements to the traffic analysis zones (TAZ), land use, and roadway network, and summarizes transportation-related performance measures of effectiveness.

BACKGROUND

The goal of the Latrobe Road Connector Study is to provide to El Dorado County a ranking of the four connection alternatives relative to their ability to provide acceptable level of service based on General Plan policy. As defined in Policy TC-Xd of the 2004 General Plan (Amended January 2009), LOS E or better is considered acceptable in the Community Regions, which includes the Latrobe Road/White Rock Road intersection. Therefore, LOS E will be used as an evaluation criterion for the four connection alternatives.

<u>Previous Work Efforts</u>

Under a separate work order, Fehr & Peers produced four technical memorandums between September 2006 and June 2007, covering the development of traffic volume forecast and operations analysis for the connector study.

Developed for the analysis of the General Plan, the 2004 El Dorado County General Plan Traffic Model was not used for the analysis of the Latrobe Road Connector Study, because it lacked sufficient detail in the study area and connectivity to developing areas in Sacramento County. The 2004 El Dorado General Plan model only includes roadways in El Dorado County with areas

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outside the county represented by TAZs at the gateway roadways like US 50 and White Rock Road.

At that time, there were several travel demand forecasting models available to develop forecasts for the connector study. However, the variation in inputs resulted in large variation in forecasts in the study area. The available models included the following:

- 2004 El Dorado County General Plan Model

- SACOG's SACMET Regional Travel Demand Model

- Silva Valley Parkway Interchange Model

- Highway 50 Corridor Mobility Partnership Model

Based on County direction at the time, the traffic volume forecasts were developed using a modified version of the SACMET Regional Travel Demand Model. Consistent with California Transportation Commission (CTC) guidelines, sub-area refinements were made to the model to better reflect roadway network and TAZ detail in the study area and connectivity to areas in Sacramento County like the Folsom SOI amendment area and the planned US 50/Empire Ranch interchange.

August 2011, Initial Screening Memorandum

In August 2011 Fehr & Peers collaborated with Mark Thomas & Company to prepare an initial screening memorandum for the Latrobe Road Connector Study. The purpose of the initial screening memorandum was to narrow down 10 alternatives to four alternatives before performing focused traffic analysis. The following alternatives were chosen as part of that initial screening:

- Alternative 1

- Alternative 2

- Alternative 2A

- Alternative 5

The alternatives screening included the analysis of year 2032 AM and PM peak hour intersection operations at the Latrobe Road/White Rock Road intersection using the modified version of the SACMET Regional Travel Demand Model described above. This work effort was developed under a separate work order.

New Traffic Model Since 2007

Since 2007, another modified version of the SACMET Regional Travel Demand Model was developed for the analysis of the Capital Southeast Connector. Since this model was developed for a regional connector project, it reflects input from the JPA partners including the City of Elk Grove, Folsom, and Rancho Cordova, as well as El Dorado and Sacramento County. Consequently, County staff directed that the forecasts for the focused analysis of the four recommended alternatives be developed using the Capital Southeast Connector JPA model. While there is agreement on the regional-level model inputs, additional refinement in the study area is needed to match the scale of the analysis for the Latrobe Road Connector Study.

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November 3, 2011 Meeting with El Dorado County

On November 3rd, Fehr & Peers attended a coordination meeting with El Dorado County to review the Capital Southeast Connector JPA model and receive direction on additional study area refinements. El Dorado County provided the following direction:

- Update the TAZs in the study area to match the recent traffic analysis zones developed by the county.

- Update the study area land use to match control totals from the 2004 El Dorado County General Plan. This is consistent with the intent of the condition of approval.

- Update the traffic model roadway network to be consistent with existing and planned roadways and the updated traffic analysis zone structure.

The evaluation of the four recommended alternatives was conducted using the year 2025 land use and roadway network inputs consistent with the 2004 El Dorado County General Plan.

Once the project moves into a project development and environmental documentation phase, additional analysis to demonstrate consistency with the El Dorado County General Plan will be performed as required by CEQA, using the analysis methods from the General Plan.

For clarity, the refined version of the Capital Southeast Connector JPA model is referred to as the Latrobe Road Connector Model. The following summarizes the development of the Latrobe Road Connector Model, including TAZ, land use, and roadway network refinements. The refinements outlined below are needed to provide sufficient detail in the study area to match the scale of the Latrobe Road connector project, which is a minor connection relative to the regional roadway system. However, additional TAZ and roadway network detail in the study area is necessary to develop accurate peak hour intersection turning movement forecasts.

TRAFFIC ANALYSIS ZONE REFINEMENTS

The first step in the development of the Latrobe Road Connector Model was to refine the study area TAZs. The study area, which is shown on Figure 1, is generally bounded by US 50 to the north, Wetsel-Oviatt Road to the south, Valley View Parkway/Blackstone Parkway to the east and future Empire Ranch Road to the west.

The study area was selected because it represents the land use and associated trips that will be affected by the Latrobe Road Connector.

The number of TAZs is increased from 5 to 39 in the study area compared to the 2004 General Plan Model with the refined TAZ system developed by El Dorado County. Figure 1 shows the updated TAZ system.

LEGEND

New TAZ*

Old TAZ

Study Area

N

Not to Scale
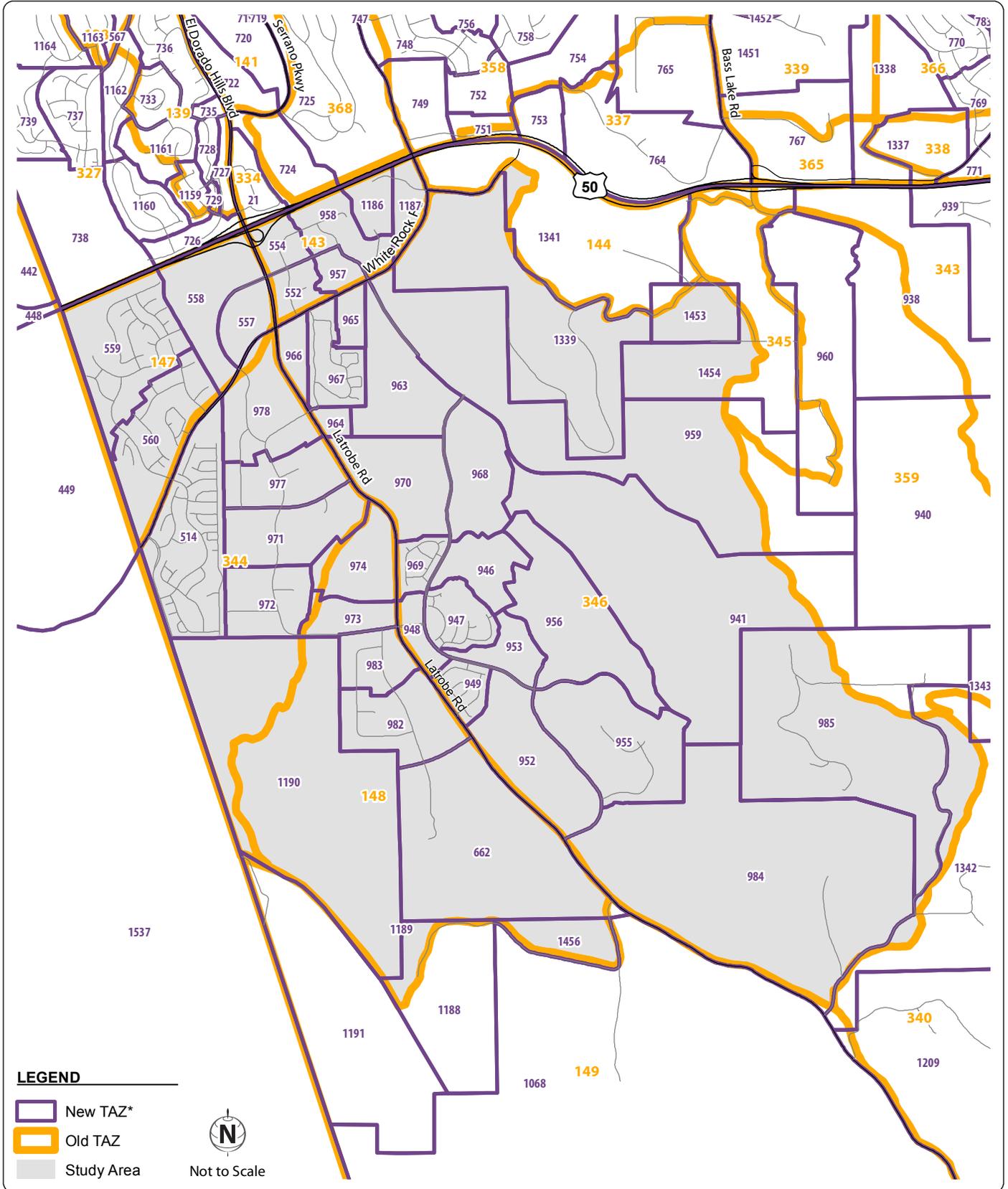
*New TAZs were created to refine input for the sub-area model. The New TAZs have not been adopted by El Dorado County.

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Path: N:\2006Projects\2336_Latrobe_Road_Connector\GIS\StudyArea.mxd

UPDATED TRAFFIC ANALYSIS ZONES

FIGURE 1

LAND USE REFINEMENTS

The second step in the development of the Latrobe Road Connector Model was to refine the study area land use. The land use in the study area was modified to match the year 2025 control totals from the 2004 El Dorado County General Plan and disaggregated to the refined TAZs. The following tables are provided to illustrate the progression of the TAZ and land use refinement process from the 2004 El Dorado County General Plan model TAZ system and land use input categories to the refined Latrobe Road Connector Model TAZ system and land use categories.

- Table 1A – Summarizes 2025 General Plan Land Use allocated to the TAZs and land use categories used by the 2004 El Dorado County General Plan model.

- Table 2A – Summarizes 2025 General Plan Land Use allocated to the land use categories used by the 2004 El Dorado County General Plan, but disaggregated based on the refined TAZ system shown in Figure 1.

  NOTE: The land uses allocated to the refined TAZ system aggregate to the control totals for each of the 2004 El Dorado County General Plan model TAZs. For example, the subtotal for TAZ 346 (i.e., the "Old TAZ" column in the table) will match the total for TAZ 346 in Table 1A.

- Table 1B - Summarizes 2025 General Plan Land Use allocated to the TAZs used by the 2004 El Dorado County General Plan model, but disaggregated into the expanded land use categories used by the Latrobe Road Connector model.

- Table 2B – Summarizes the final 2025 General Plan Land Use allocated to the TAZs and land use categories used by the Latrobe Road Connector model. This includes refinements to the allocations based on existing and approved land uses in the study area.

  NOTE: While the land uses are allocated to the refined TAZ system, the overall control total (i.e., General Plan Land Use Control Totals) for the 2004 El Dorado County General Plan model is retained for major land use categories such as total residential dwelling units, retail employment, and non-retail employment. However, the subtotal allocations to the old TAZs may not be the same due to refinements made to reflect existing and planned development. For example, the subtotal for TAZ 344 (i.e., the "Old TAZ" column in the table) does not match the total for TAZ 344 in Table 1B due to these refinements.

The Latrobe Road Connector model based on the Table 2B inputs was used to develop traffic volume forecasts for the evaluation of traffic operations at the Latrobe Road/White Rock Road intersection with Alternatives 1, 2, 2A, and 5.

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Table 1A
2025 General Plan Land Use (General Plan Model Land Use Categories)

| TAZ | Residential [Dwelling Units] | | | Employment | | | |
| | Total | Single Family | Multi-Family | Retail | Non-Retail | | |
					Total	Service	Other
143	1	1	-	554	2,086	1,293	793
147	823	490	333	40	4,033	2,005	2,028
148	798	781	17	1,184	5,780	3,900	1,880
344	866	847	19	616	2,465	1,510	955
346	3,182	3,012	170	80	321	202	119
GP LU Control Totals	5,670	5,131	539	2,474	14,685	8,910	5,775

Source: Fehr & Peers, 2012

Table 1B
Consistent With 2025 General Plan Land Use (Latrobe Road Connector Model Land Use Categories)

| TAZ | Residential [Dwelling Units] | | | | Employment | | | | | | Enrollment [Students] | |
| | Total | Single Family | Multi-Family | Multi-Family (High) | Retail | Non-Retail | | | | | College | K-12 |
						Total	Office	Medical	Education	M & O		
143	1	1	-	-	554	2,086	1,875	63	-	148	-	-
147	823	490	333	-	40	4,033	3,549	29	-	455	-	-
148	798	781	17	-	1,184	5,780	3,915	364	21	1,480	-	-
344	866	847	19	-	616	2,465	1,618	156	14	677	-	-
346	3,182	3,012	170	-	80	321	220	40	20	41	-	-
GP LU Control Totals	5,670	5,131	539	-	2,474	14,685	11,177	652	55	2,801	-	-

Source: Fehr & Peers, 2012
M&O - Manufacturing & Other
Note: For this study area, buildout of the 2004 General Plan included the following land use input assumptions:
6,084 Dwelling Units, 5,961 Retail Employees, and 29,824 Non-Retail Employees.

| | | | | Residential [Dwelling Units] | | | Employment | | | |
| | | | | | | | | Non-Retail | | |
Old TAZ	Development in the TAZ	Category	New TAZ	Total	Single Family	Multi-Family	Retail	Total	Service	Other
143	R&D/Com	R&D/Com	1186	1	1	-	-	32	20	12
			1187	-	-	-	-	42	26	16
	Town Center	Commercial	552	-	-	-	73	750	465	285
			554	-	-	-	139	563	349	214
			957	-	-	-	277	251	156	95
			958	-	-	-	65	448	278	170
		Subtotal		1	1	-	554	2,086	1,293	793
147	Town Center	R&D/Com	557	-	-	-	20	1,520	756	764
			558	-	-	-	20	2,513	1,249	1,264
	Stonebriar & MF	SF & MF	559	458	273	185	-	-	-	-
			560	365	217	148	-	-	-	-
		Subtotal		823	490	333	40	4,033	2,005	2,028
148	Carson Creek	R&D/SF	1190 (Portion)	798	781	17	-	-	-	-
	EDHBP	Indust/Comm/ R&D	662	-	-	-	414	2,172	1,465	707
			973	-	-	-	237	744	502	242
			974	-	-	-	355	786	530	256
			982	-	-	-	118	1,053	710	343
			983	-	-	-	60	1,025	692	333
	Not EDHBP	Indust	1189	-	-	-	-	-	-	-
	Not EDHBP	RA-80/HS	1456	-	-	-	-	-	-	-
		Subtotal		798	781	17	1,184	5,780	3,900	1,880
344	Four Season (Portion of 1190 Carson Creek)	SF	514	866	847	19	-	-	-	-
	EDHBP	Indust/Com/R&D	971	-	-	-	75	775	475	300
			972	-	-	-	102	162	99	63
			977	-	-	-	199	721	442	279
			978	-	-	-	240	807	494	313
		Subtotal		866	847	19	616	2,465	1,510	955

Table 2A
2025 General Plan Land Use (General Plan Model Land Use Categories_Allocation to New TAZ)

| | | | | Residential [Dwelling Units] | | | Employment | | | |
| | | | | | | | | Non-Retail | | |
Old TAZ	Development in the TAZ	Category	New TAZ	Total	Single Family	Multi-Family	Retail	Total	Service	Other

Table 2A
2025 General Plan Land Use (General Plan Model Land Use Categories_Allocation to New TAZ)

Old TAZ	Development in the TAZ	Category	New TAZ	Residential Total	Single Family	Multi-Family	Retail	Non-Retail Total	Service	Other
346	Valley View Specific Plan	Single Family	941	352	333	19	-	-	-	-
			946	64	61	3	-	-	-	-
			947	176	167	9	-	-	-	-
			949	105	99	6	-	-	-	-
			952	230	218	12	3	100	63	37
			955	345	327	18	-	-	-	-
			956	228	216	12	-	-	-	-
			959	300	284	16	-	-	-	-
			968	111	105	6	-	-	-	-
			969	107	101	6	-	-	-	-
			1453	8	8	0	-	-	-	-
			1454	66	62	4	-	-	-	-
		SF/Com	948	80	76	4	36	80	50	30
		School	953	-	-	-	-	20	13	7
		MF/MOS	963	668	632	36	-	-	-	-
	Trailor Park/Creekside Greens/U Haul	Mobile Homes	965	131	124	7	-	-	-	-
		SF	967	174	165	9	-	-	-	-
		U-Haul	964	-	-	-	-	10	6	4
	Corner Comm	Com.	966	-	-	-	41	81	51	30
	Deer Creek	SF 10/40 acre	984	-	-	-	-	-	-	-
			985	37	35	2	-	-	-	-
	EID	WW Plant	970	-	-	-	-	30	19	11
	Remainder	Does not Access WRR	1339	-	-	-	-	-	-	-
	Unknown		1342	-	-	-	-	-	-	-
		Subtotal		**3,182**	**3,012**	**170**	**80**	**321**	**202**	**119**
		GP LU Control Totals		**5,670**	**5,131**	**539**	**2,474**	**14,685**	**8,910**	**5,775**

Source: Fehr & Peers, 2012

Table 2B
Consistent With 2025 General Plan Land Use (Latrobe Road Connector Model Land Use Categories_Allocation to New TAZ)

Old TAZ	Development in the TAZ	Category	Existing & Approved Allocations	New TAZ	Residential Total	Single Family	Multi-Family	Multi-Family (High)	Retail	Non-Retail Total	Office	Medical	Education	Manufacturing Other	College	K-12
143	R&D/Com	R&D/Com	1 sf/R&D/Com	1186	1	1	-	-	-	32	29	1	-	2	-	-
	R&D/Com	R&D/Com	R&D/Com	1187	-	-	-	-	-	42	38	1	-	3	-	-
	Town Center	Commercial		552	-	-	-	-	73	750	674	23	-	53	-	-
				554	-	-	-	-	139	563	506	17	-	40	-	-
				957	-	-	-	-	277	251	226	8	-	18	-	-
				958	-	-	-	-	65	448	403	14	-	32	-	-
			Subtotal		1	1	-	-	554	2,086	1,875	63	-	148	-	-
147	Town Center	R&D/Com		557	-	-	-	-	20	1,520	1,338	11	-	171	-	-
				558	-	-	-	-	20	2,513	2,211	18	-	283	-	-
	Stonebriar & MF	SF & MF	350 sf/23 acres mf assign 365 mf units here	559	350	350	-	-	-	-	-	-	-	-	-	-
				560	365	-	365	-	-	-	-	-	-	-	-	-
			Subtotal		715	350	365	-	40	4,033	3,549	29	-	455	-	-
148	Carson Creek	R&D/SF	1249 sf/ 40,000 sq ft Community Center/ 3.3 Parks/59.7 Indust/34.4 acre R&D/30 acre park	1190	1,249	1,249	-	-	-	1,801	1,220	113	6	461	-	-
	EDHBP	Indust/Comm/R&D	Per GP policy TC-1y 10,045 full time employee cap in the EDHBp	662	-	-	-	-	414	1,375	931	87	5	352	-	-
				973	-	-	-	-	237	471	319	30	2	121	-	-
				974	-	-	-	-	355	497	337	31	2	127	-	-
				982	-	-	-	-	118	666	451	42	2	171	-	-
				983	-	-	-	-	60	649	440	41	2	166	-	-
	Not EDHBP	Indust		1189	-	-	-	-	-	-	-	-	-	-	-	-
	Not EDHBP	RA-80/HS		1456	-	-	-	-	-	321	-	-	321	-	-	3,048
			Subtotal		1,249	1,249	-	-	1,184	5,780	3,697	344	341	1,398	-	3,048
344	Four Season	SF	460 sf/4.6 acres comm/20,000 sf Community Center	514	460	450	10	-	40	40	30	10	0	-	-	-
	EDHBP	Indust/Com/R&D	Per GP policy TC-1y 10,045 full time employee cap in the EDHBp	971	-	-	-	-	75	775	509	49	4	213	-	-
				972	-	-	-	-	102	162	106	10	1	44	-	-
				977	-	-	-	-	199	721	473	46	4	198	-	-
				978	-	-	-	-	200	767	503	49	4	211	-	-
			Subtotal		460	450	10	-	616	2,465	1,622	164	14	666	-	-

Table 2B
Consistent With 2025 General Plan Land Use (Latrobe Road Connector Model Land Use Categories_Allocation to New TAZ)

Old TAZ	Development in the TAZ	Category	Existing & Approved Allocations	New TAZ	Residential				Employment						Enrollment [Students]	
					Total	Single Family	Multi-Family	Multi-Family (High)	Retail	Non-Retail					College	K-12
										Total	Office	Medical	Education	Manufacturing Other		
346	Valley View Specific Plan	Single Family	+/-352 sf	941	352	352	-	-	-	-	-	-	-	-	-	-
			64 sf	946	64	64	-	-	-	-	-	-	-	-	-	-
			176 sf/rec	947	176	176	-	-	-	-	-	-	-	-	-	-
			105 sf	949	105	105	-	-	-	-	-	-	-	-	-	-
			118 sf/112 live work	952	230	230	-	-	3	100	69	12	6	13	-	-
			345 sf	955	345	345	-	-	-	-	-	-	-	-	-	-
			228 sf	956	228	228	-	-	-	-	-	-	-	-	-	-
			+/-300 sf	959	300	300	-	-	-	-	-	-	-	-	-	-
			111 sf	968	111	111	-	-	-	-	-	-	-	-	-	-
			107 sf	969	107	107	-	-	-	-	-	-	-	-	-	-
			+/-8 sf	1453	8	8	-	-	-	-	-	-	-	-	-	-
			+/-66 sf	1454	66	66	-	-	-	-	-	-	-	-	-	-
		SF/Com	80sf/+/-12 acre comm	948	80	80	-	-	36	80	55	10	5	10	-	-
		School	school	953	-	-	-	-	-	20	-	-	20	-	-	600
		MF/MOS	668mf/mos	963	668	-	668	-	-	-	-	-	-	-	-	-
	Trailor Park/Creekside Greens/U Haul	Mobile Homes	131 units	965	131	-	131	-	-	-	-	-	-	-	-	-
		SF	174 sf	967	174	174	-	-	-	-	-	-	-	-	-	-
		U-Haul	U-haul	964	-	-	-	-	-	10	7	1	1	1	-	-
	Corner Comm	Com.	com	966	-	-	-	-	41	81	56	10	5	10	-	-
	Deer Creek	SF 10/40 acre	60 sf	984	60	60	-	-	-	-	-	-	-	-	-	-
			41 sf	985	40	40	-	-	-	-	-	-	-	-	-	-
	EID	WW Plant	WW plant	970	-	-	-	-	-	30	21	4	2	4	-	-
	Remainder	Does not Access WRR	?	1339	-	-	-	-	-	-	-	-	-	-	-	-
	Unknown		?	1342	-	-	-	-	-	-	-	-	-	-	-	-
			Subtotal		**3,245**	**2,446**	**799**	**-**	**80**	**321**	**206**	**38**	**39**	**38**	**-**	**600**
			GP LU Control Totals		**5,670**	**4,496**	**1,174**	**0**	**2,474**	**14,685**	**10,949**	**637**	**393**	**2,705**	**0**	**3,648**

Source: Fehr & Peers, 2012

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ROADWAY NETWORK REFINEMENTS

The final step in the development of the Latrobe Road Connector Model was to refine the study area roadway network.

Fehr & Peers refined the roadway network based on current mapping of the existing roadways in the study area and approved planned roadways in the study area. The roadway lane assumptions are consistent with the year 2025 circulation element of 2004 El Dorado County General Plan. The roadway network also includes the planned US 50/Empire Ranch Interchange in Sacramento County.

Another important refinement was to provide accurate loading of the TAZs to the roadway network so that the distribution of trips in the study area is accurate and reflects planned site-specific development access assumptions. For example, the trips generated by development in the Marble Valley area will not have access to Latrobe Road. Likewise, trips generated by development in the Valley View area will not have access to Bass Lake Road. These types of access issues occurred with the large TAZ size of the 2004 El Dorado County General Plan model.

To illustrate the level of detail added to the network, roadway lane miles in the study area, which are the number of directional travel lanes multiplied by the network distance (in miles), were increased from about 42 miles in the 2004 El Dorado County General Plan model to about 56 miles in the refined Latrobe Road Connector model.

Figure 2 shows the roadway network from the 2004 El Dorado County General Plan model. Figure 3 shows the updated roadway network developed for the Latrobe Road Connector model. Alternative-specific roadway networks were developed for the four alternatives screened for focused evaluation.

TRAFFIC VOLUME FORECASTS FOR ANALYSIS

Fehr & Peers refined the Latrobe Road Connector model to develop traffic volume forecast for the evaluation of the Latrobe Road Connector Alternatives. Table 3 compares daily roadway segment traffic volumes (two-way total) for the no project and project alternatives.
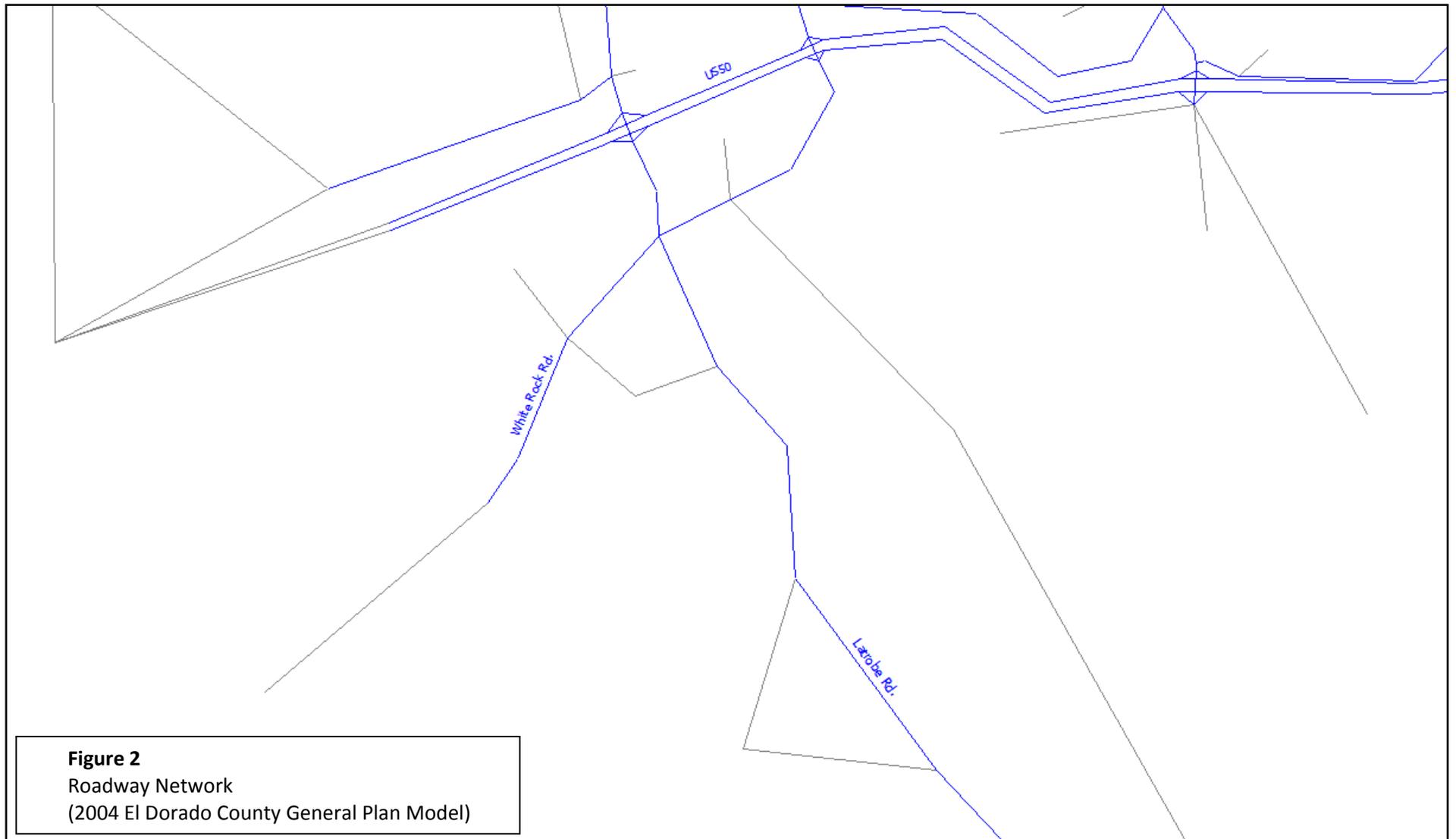
Table 3 Year 2025 Daily Traffic Volume Forecasts - Latrobe Road Connector Alternatives						
Roadway	**Segment**	**Alternative**				
		No Project	**1**	**2**	**2A**	**5**
White Rock Road	West of Latrobe Road	19,100	14,000	15,300	14,000	15,100
	East of Latrobe Road	21,400	22,200	22,700	22,300	22,000
Latrobe Road	North of White Rock Road	48,200	40,300	41,000	39,200	34,700
	South of White Rock Road	48,500	36,700	38,300	35,600	30,100
Connector	East of White Rock Road	-	22,400	19,200	23,700	30,400
Source: Fehr & Peers, 2012						

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As shown in Table 3, daily traffic volumes would decrease on most of the roadway segment in Table 3 compared to the No Project alternative. The daily traffic volume on the segment of White Rock Road east of Latrobe Road would increase with all of the alternatives. The traffic volume forecasts for the connector are shown just east of White Rock Road and are generally highest in this location. The traffic volumes vary due to the location of the connection to Latrobe Road and whether they include a connection to Golden Foothill Parkway.

All of the connector alternatives improve accessibility for development south of White Rock Road to White Rock Road (to the west) and US 50 by way of the planned Empire Ranch interchange.

The traffic volume forecasts presented in Table 3 have been adjusted using the difference method approach, which adds the growth between the base and future year model to existing counts. Attachment A includes traffic model network plots showing daily traffic volume forecasts (two-way total) on study area roadway. Please note that these plots have not been adjusted, so there will be differences when comparing the volumes in Table 3 to the plots. However, the plots are useful for comparing the change in traffic flow in the study area between the alternatives, and were not used in the analysis.
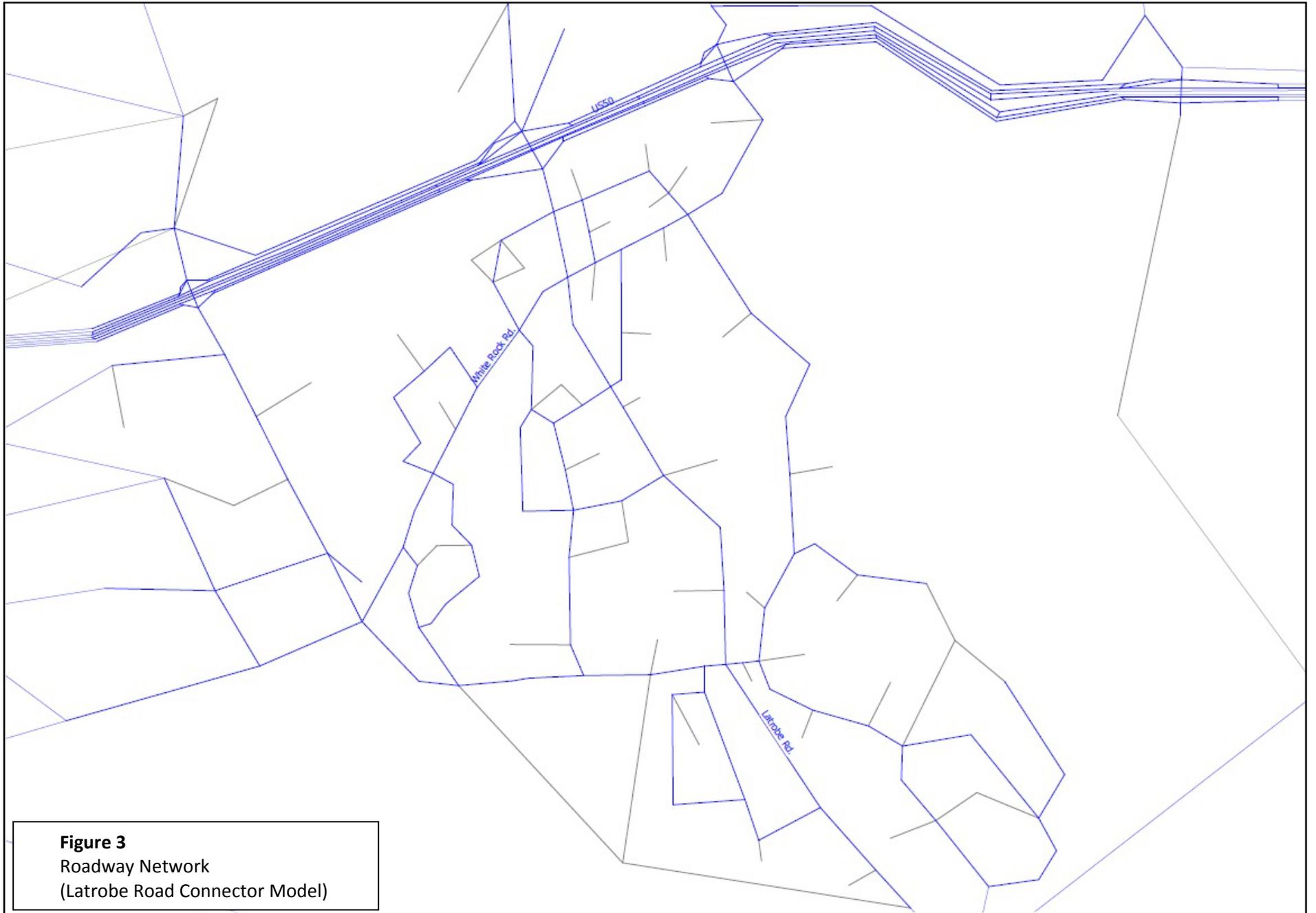
US50

White Rock Rd.

Latrobe Rd.

Figure 2
Roadway Network
(2004 El Dorado County General Plan Model)

Figure 3
Roadway Network
(Latrobe Road Connector Model)

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ALTERNATIVES EVALUATION

The alternatives were evaluated against transportation criteria related to traffic operations at the White Rock Road/Latrobe Road intersection and consistency with the Sacramento County General Plan and the Folsom Sphere of Influence (SOI). This memorandum describes these criteria and the assumptions and methodology used to complete the Alternatives Evaluation Matrix as shown in Attachment B.

White Rock Road/Latrobe Road Intersection Fix (Yes/No)

White Rock Road/Latrobe Road Intersection Fix – this criterion identifies if the subject alternative improves traffic operations at the White Rock Road/Latrobe Road intersection compared to the No Project alternative. "Yes" was assigned for improved traffic operations (i.e., during the AM and PM peak hour). If only one peak hour was improved, "No" was assigned.

Consistent with Sacramento County GP (Yes/No)

Consistent with Sacramento County GP – this criterion identifies if the subject alternative is consistent with the Sacramento County General Plan circulation map (see attachment), which includes an arterial roadway connection between the planned Empire Ranch interchange on U.S. 50 and White Rock Road. Therefore, an alternative was considered to be consistent (i.e., assigned "Yes") if it had a similar roadway connection to the Empire Ranch interchange. Alternatives with the Payen Road connection were listed as not consistent (i.e., assigned "No"), since the Sacramento County General plan does not identify improvements to Payen Road.

Consistent with Folsom SOI (Yes/No)

Consistent with Folsom SOI - this criterion identifies if the subject alternative is consistent with the Folsom SOI Cumulative Plus Project circulation map or the Cumulative Plus Project With Mitigation circulation map. The Cumulative Plus Project circulation map includes an arterial roadway connection between Latrobe Road and White Rock Road. The Cumulative Plus Project With Mitigation circulation map includes an arterial roadway connection between White Rock Road and the planned Empire Ranch Road interchange on U.S. 50. Therefore, an alternative was considered to be consistent with the Cumulative Plus Project circulation map (i.e., assigned "Yes") if it had a similar roadway connection between Latrobe Road and White Rock Road and was considered to be consistent with the Cumulative Plus Project With Mitigation circulation map if it had a similar roadway connection from White Rock Road to the Empire Ranch interchange.

White Rock Road/Latrobe Road Intersection LOS at 2025

As defined in Policy TC-Xd of the 2004 General Plan (Amended January 2009), LOS E or better is considered acceptable in the Community Regions, which includes the Latrobe Road/White Rock Road intersection. Therefore, LOS E will be used as an evaluation criterion for the four connection alternatives.

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White Rock Road/Latrobe Road Intersection LOS at 2025 – this criterion identifies the subject alternative LOS at the White Rock Road/Latrobe Road intersection under 2025 conditions. LOS is given for the ultimate lane configurations. With the No Project alternative, the White Rock Road/Latrobe Road intersection will operate at LOS E (nearly LOS F), which as described in the background is acceptable. **A three percent increase in volume through the intersection, or about two years of growth (i.e., 2027 conditions), would result in LOS F operations.** All of the alternatives would improve operations at the White Rock Road/Latrobe Road intersection compared to no project conditions.

We used a similar approach to evaluate how long the White Rock Road/Latrobe Road intersection would continue to provide acceptable operations with the Latrobe Road connector. For this evaluation, we used the Alternative 2 traffic, because it resulted in the lowest delay at the intersection. A 30 percent increase in volume through the intersection would result in LOS F operations, which would be about 20 years of growth, representing conditions through 2045, assuming annual regional growth projections.

Detailed AM and PM peak hour intersection operations analysis is included in Attachment C

We look forward to further coordination. Please contact David Robinson at (916) 773-1900 if you have any questions.

Attachment A

Traffic Model Plots
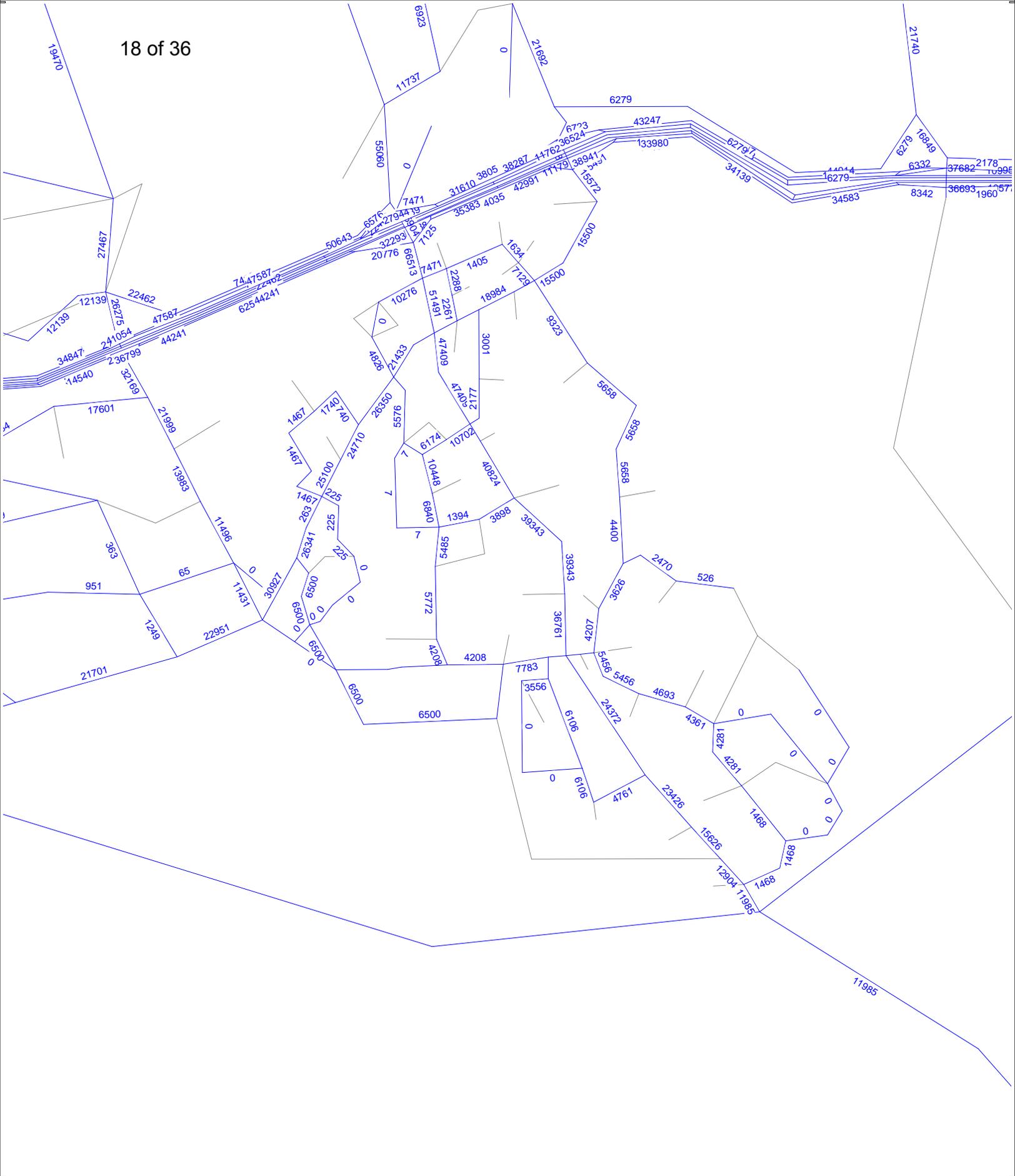
Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
12-1342 I 18 of 36 **No Project**
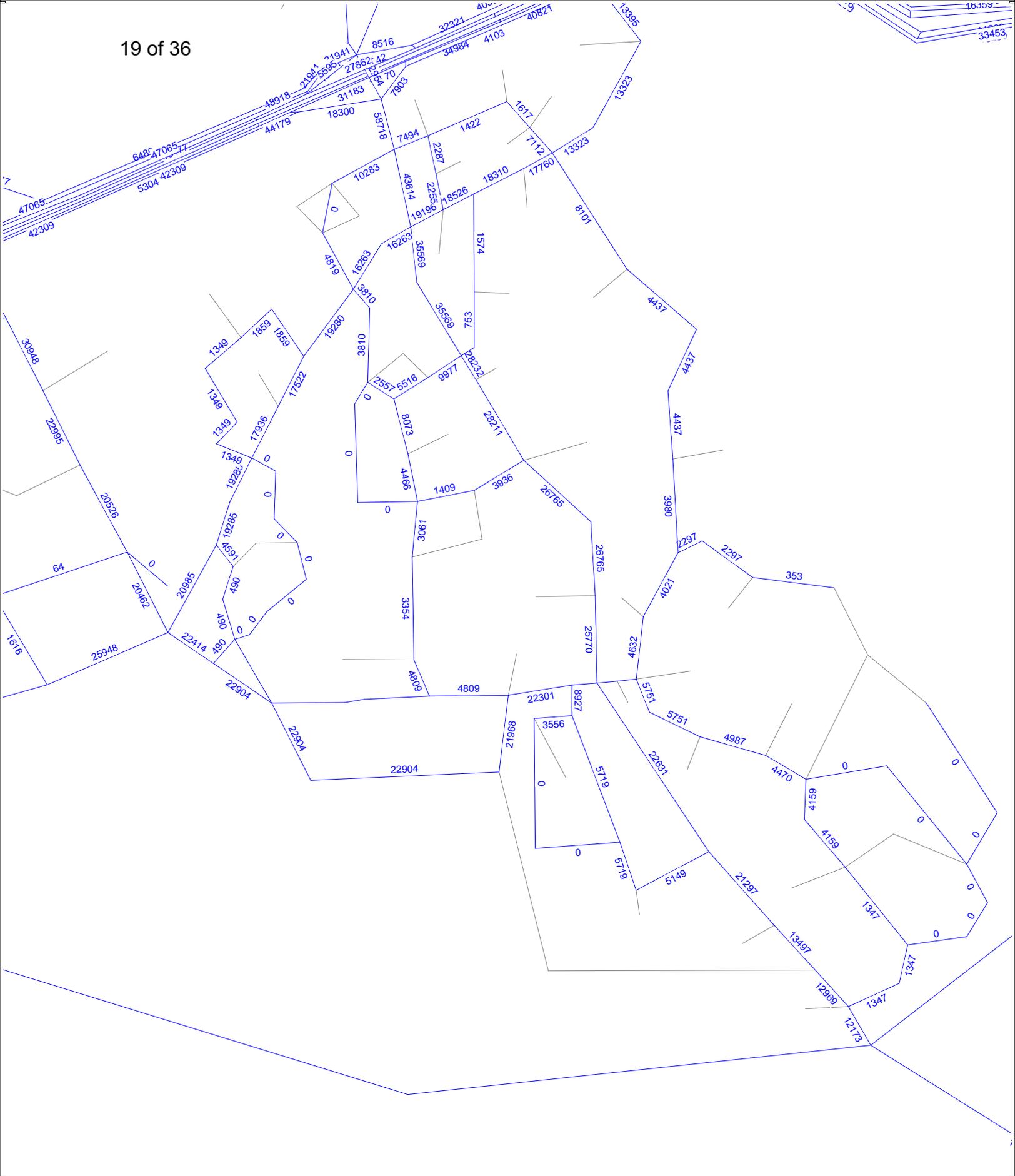
Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
12-1342 I 19.dgn **Alternative 1**

Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
Alternative 2
12-1342 I 20
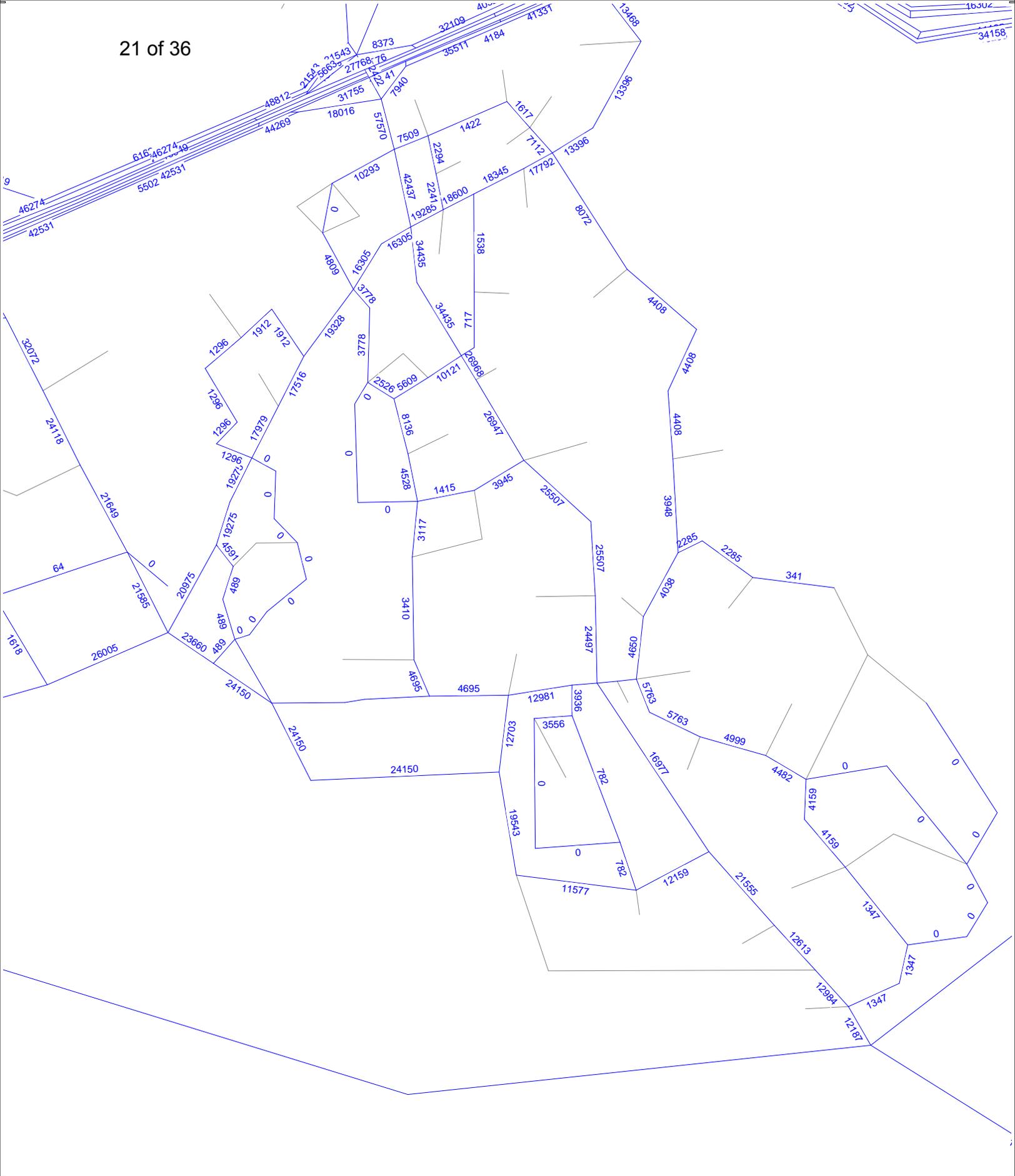
Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
12-1342 | 21 of 36
Alternative 2A
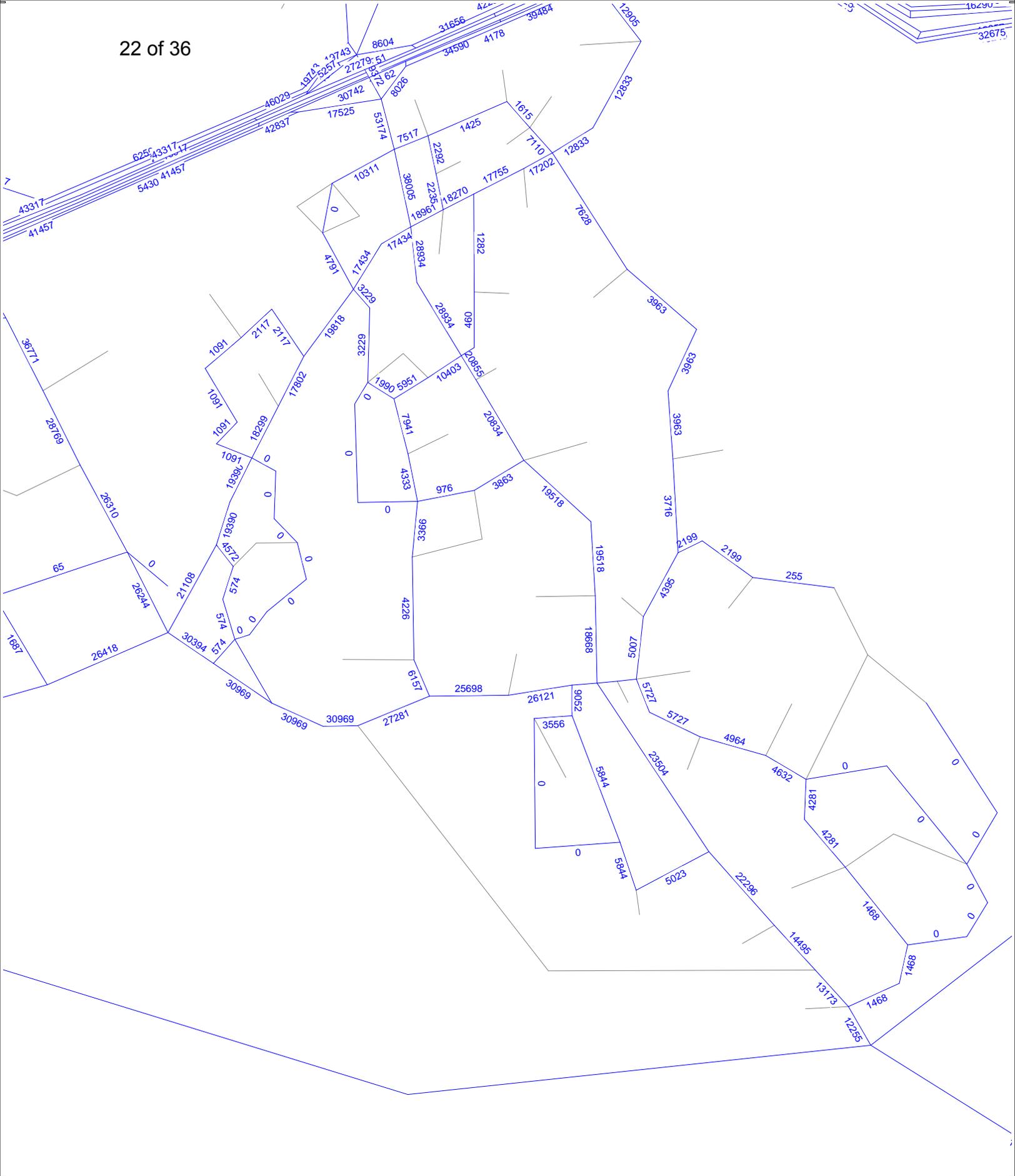
Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
12-1342 | 22-Alternative 5

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Attachment B

Alternatives Evaluation Matrix

Alternative #	Description/Notes	CRITICAL					
		White Rock/Latrobe Road Intersection Fix	Consistent with Sacramento County GP[1]	Consistent with Folsom SOI[2]	White Rock/Latrobe Road Intersection LOS at 2025		
		Yes - No	Yes - No	Yes - No	Ultimate Lane Configurations[3]	Comments	Rating
No Project	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road.	No	N/A	N/A	74 - E (39 - D)		
Alternative 1	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road. Consists of a four (4) lane Carson Crossing Drive connection from White Rock Road to Golden Foothill Parkway, Carson Crossing Drive would cross into Sacramento County west of the intersection of existing Four Seasons Drive. Assumes an existing four (4) to six (6) lane Empire Ranch Road connection to the Empire Ranch Interchange and a six (6) lane White Rock Road at the connector intersection (i.e., widening at the intersection).	Yes	Yes	Yes	52 - D (33 - C)	The No Project operates near LOS F. A three percent increase in volume through the intersection, or about two years of growth (i.e., 2027 conditions), would result in LOS F operations.

Ultimate Lane Configurations:

NB - One left-turn lane, four through lanes, and a right-turn lane.

SB - Two left-turn lanes, three through lanes, and a right-turn lane.

EB - Two left-turn lanes, two through lane, and a right-turn lane.

WB - Two left-turn lanes, two through lanes, and a right-turn lane.

The White Rock Road/Latrobe Road intersection would continue to provide acceptable operations with the Latrobe Road connector with a 30 percent increase in volume through the intersection, which would be about 20 years of growth (i.e., 2045 conditions) assuming annual regional growth projections. | |
Alternative 2	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road. Consists of a four (4) lane Carson Crossing Drive connection from White Rock Road to the existing Investment Boulevard. Existing Investment Boulevard currently connects to existing Latrobe Road. Carson Crossing Drive would cross into Sacramento County west of the intersection of existing Four Seasons Drive. Assumes an existing four (4) to six (6) lane Empire Ranch Road connection to the Empire Ranch Interchange and a six (6) lane White Rock Road at the connector intersection (i.e., widening at the intersection).	Yes	Yes	Yes	44 - D (30 - C)		
Alternative 2A	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road. Consists of a four (4) lane Carson Crossing Drive connection from White Rock Road to a proposed intersection located within the Carson Creek Specific Plan where the four (4) lanes would intersect at a two (2) lane Golden Foothill Parkway connection and a two (2) lane extension of existing Investment Boulevard (connecting to Latrobe Road). Carson Crossing Drive would cross into Sacramento County west of the intersection of existing Four Seasons Drive. Assumes an existing four (4) to six (6) lane Empire Ranch Road connection to the Empire Ranch Interchange and a six (6) lane White Rock Road at the connector intersection (i.e., widening at the intersection).	Yes	Yes	Yes	48 - D (33 - C)		
Alternative 5	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road. Consists of a four (4) lane Carson Crossing Drive connection to from White Rock Road to Golden Foothill Parkway. Carson Crossing Drive would cross into Sacramento County west of the intersection of existing Four Seasons Drive. This is similar to Alternative 1 with the exception Carson Crossing Drive would be located along the southern boundary of the existing Four Seasons age restricted subdivision where it will connect to existing Golden Foothills Parkway, a tee intersection would be proposed and existing Golden Foothill Parkway would be become a four (4) lane roadway. Assumes an existing four (4) to six (6) lane Empire Ranch Road connection to the Empire Ranch Interchange and a six (6) lane White Rock Road at the connector intersection (i.e., widening at the intersection).	Yes	Yes	Yes	46 - D (32 - C)		

Notes:

1. Consistency with the Sacramento County General Plan was determined to exist if there was a road connection to Empire Ranch Road only.

2. Consistency with Folsom SOI Plus Project alternative was determined to exist if there was a road connection between Latrobe Road and White Rock Road not connected to an extension to the Empire Ranch interchange.
    Consistency with Folsom SOI Mitigation alternative was determined to exist if there was a road connection between Latrobe Road and White Rock Road that extended to the Empire Ranch interchange.

3. XX - X = Delay - LOS; XX (XX)= AM Peak Hour (PM Peak Hour)

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Attachment B

Intersection LOS Analysis Worksheets

1: White Rock Road/Latrobe Road & No Project

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	470	230	200	270	770	250	300	1250	120	170	1620	360
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	250	217	293	837	272	326	1359	130	185	1761	391
RTOR Reduction (vph)	0	0	148	0	0	141	0	0	80	0	0	140
Lane Group Flow (vph)	511	250	69	293	837	131	326	1359	50	185	1761	251
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	15.1	41.3	41.3	13.1	39.3	39.3	18.1	51.8	51.8	11.5	45.2	45.2
Effective Green, g (s)	15.1	41.3	41.3	13.1	39.3	39.3	18.1	51.8	51.8	11.5	45.2	45.2
Actuated g/C Ratio	0.11	0.31	0.31	0.10	0.29	0.29	0.14	0.39	0.39	0.09	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	388	1093	489	336	1040	465	240	2483	613	295	1719	535
v/s Ratio Prot	c0.15	0.07		0.09	c0.24		c0.18	0.21		0.05	c0.35	
v/s Ratio Perm			0.04			0.08			0.03			0.16
v/c Ratio	1.32	0.23	0.14	0.87	0.80	0.28	1.36	0.55	0.08	0.63	1.02	0.47
Uniform Delay, d1	59.3	34.4	33.4	59.5	43.7	36.3	57.8	31.8	25.9	59.0	44.2	34.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	159.9	0.1	0.1	21.1	4.6	0.3	185.9	0.9	0.3	4.1	28.1	2.9
Delay (s)	219.2	34.5	33.5	80.6	48.3	36.7	243.7	32.7	26.2	63.2	72.4	37.7
Level of Service	F	C	C	F	D	D	F	C	C	E	E	D
Approach Delay (s)		130.8			52.8			70.1			65.9	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM Average Control Delay	74.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	133.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

2: White Rock Road/Latrobe Road & Alternative 1

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	560	180	50	460	710	230	70	880	130	230	1200	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	609	196	54	500	772	250	76	957	141	250	1304	457
RTOR Reduction (vph)	0	0	38	0	0	87	0	0	92	0	0	208
Lane Group Flow (vph)	609	196	16	500	772	163	76	957	49	250	1304	249
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.2	34.5	34.5	19.2	34.5	34.5	7.1	41.4	41.4	8.1	42.4	42.4
Effective Green, g (s)	19.2	34.5	34.5	19.2	34.5	34.5	7.1	41.4	41.4	8.1	42.4	42.4
Actuated g/C Ratio	0.16	0.29	0.29	0.16	0.29	0.29	0.06	0.35	0.35	0.07	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	553	1024	458	553	1024	458	105	2226	550	233	1809	563
v/s Ratio Prot	c0.18	0.06		0.15	c0.22		0.04	0.15		c0.07	c0.26	
v/s Ratio Perm			0.01			0.10			0.03			0.16
v/c Ratio	1.10	0.19	0.03	0.90	0.75	0.36	0.72	0.43	0.09	1.07	0.72	0.44
Uniform Delay, d1	50.0	31.9	30.4	49.1	38.5	33.6	55.1	29.8	26.2	55.6	33.3	29.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	69.0	0.1	0.0	18.2	3.2	0.5	21.7	0.6	0.3	79.7	2.5	2.5
Delay (s)	119.0	31.9	30.4	67.2	41.7	34.0	76.8	30.5	26.5	135.2	35.8	31.9
Level of Service	F	C	C	E	D	C	E	C	C	F	D	C
Approach Delay (s)		93.5			48.8			33.0			47.3	
Approach LOS		F			D			C			D	

Intersection Summary				
HCM Average Control Delay	51.8	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	119.2	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	76.0%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Existing Lane Configuration

AM Peak

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	530	200	90	430	720	230	90	970	130	230	1230	440
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	217	98	467	783	250	98	1054	141	250	1337	478
RTOR Reduction (vph)	0	0	69	0	0	95	0	0	79	0	0	212
Lane Group Flow (vph)	576	217	29	467	783	155	98	1054	62	250	1337	266
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.4	33.8	33.8	19.4	33.8	33.8	8.2	36.6	36.6	9.2	37.6	37.6
Effective Green, g (s)	19.4	33.8	33.8	19.4	33.8	33.8	8.2	36.6	36.6	9.2	37.6	37.6
Actuated g/C Ratio	0.17	0.29	0.29	0.17	0.29	0.29	0.07	0.32	0.32	0.08	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	579	1040	465	579	1040	465	126	2039	504	275	1663	518
v/s Ratio Prot	c0.17	0.06		0.14	c0.22		0.06	0.16		c0.07	c0.26	
v/s Ratio Perm			0.02			0.10			0.04			0.17
v/c Ratio	0.99	0.21	0.06	0.81	0.75	0.33	0.78	0.52	0.12	0.91	0.80	0.51
Uniform Delay, d1	47.7	30.5	29.2	46.0	36.8	31.8	52.5	32.0	27.8	52.5	35.3	31.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.9	0.1	0.1	8.1	3.1	0.4	25.4	0.2	0.1	31.2	2.9	0.9
Delay (s)	83.6	30.6	29.3	54.1	39.9	32.2	77.9	32.2	27.9	83.7	38.3	32.2
Level of Service	F	C	C	D	D	C	E	C	C	F	D	C
Approach Delay (s)		64.7			43.0			35.2			42.3	
Approach LOS		E			D			D			D	

Intersection Summary						
HCM Average Control Delay		44.4		HCM Level of Service		D
HCM Volume to Capacity ratio		0.81				
Actuated Cycle Length (s)		115.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		77.1%		ICU Level of Service		D
Analysis Period (min)		15				
c Critical Lane Group						

4: White Rock Road/Latrobe Road & Alternative 2A

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	540	180	50	460	690	240	70	880	130	230	1180	460
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	587	196	54	500	750	261	76	957	141	250	1283	500
RTOR Reduction (vph)	0	0	39	0	0	109	0	0	92	0	0	211
Lane Group Flow (vph)	587	196	15	500	750	152	76	957	49	250	1283	289
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.2	33.5	33.5	19.2	33.5	33.5	7.1	41.3	41.3	9.1	43.3	43.3
Effective Green, g (s)	19.2	33.5	33.5	19.2	33.5	33.5	7.1	41.3	41.3	9.1	43.3	43.3
Actuated g/C Ratio	0.16	0.28	0.28	0.16	0.28	0.28	0.06	0.35	0.35	0.08	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	553	995	445	553	995	445	106	2222	549	262	1849	576
v/s Ratio Prot	c0.17	0.06		0.15	c0.21		0.04	0.15		c0.07	c0.25	
v/s Ratio Perm			0.01			0.10			0.03			0.18
v/c Ratio	1.06	0.20	0.03	0.90	0.75	0.34	0.72	0.43	0.09	0.95	0.69	0.50
Uniform Delay, d1	49.9	32.6	31.1	49.0	39.0	34.0	55.0	29.9	26.2	54.8	32.3	29.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	55.6	0.1	0.0	18.2	3.3	0.5	20.5	0.6	0.3	42.8	2.2	3.1
Delay (s)	105.6	32.7	31.1	67.2	42.3	34.5	75.5	30.5	26.5	97.6	34.4	32.6
Level of Service	F	C	C	E	D	C	E	C	C	F	C	C
Approach Delay (s)		83.7			49.2			32.9			41.7	
Approach LOS		F			D			C			D	

Intersection Summary				
HCM Average Control Delay	48.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	119.1	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	74.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Existing Lane Configuration
AM Peak

5: White Rock Road/Latrobe Road & Alternative 5

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	580	180	50	520	680	230	70	750	130	220	1020	470
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	196	54	565	739	250	76	815	141	239	1109	511
RTOR Reduction (vph)	0	0	38	0	0	103	0	0	97	0	0	261
Lane Group Flow (vph)	630	196	16	565	739	147	76	815	44	239	1109	250
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	27.6	37.9	37.9	24.9	35.2	35.2	7.0	40.2	40.2	11.1	44.3	44.3
Effective Green, g (s)	27.6	37.9	37.9	24.9	35.2	35.2	7.0	40.2	40.2	11.1	44.3	44.3
Actuated g/C Ratio	0.21	0.29	0.29	0.19	0.27	0.27	0.05	0.31	0.31	0.09	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	728	1031	461	657	958	428	95	1980	489	293	1731	539
v/s Ratio Prot	c0.18	c0.06		0.16	c0.21		0.04	0.13		c0.07	c0.22	
v/s Ratio Perm			0.01			0.09			0.03			0.16
v/c Ratio	0.87	0.19	0.03	0.86	0.77	0.34	0.80	0.41	0.09	0.82	0.64	0.46
Uniform Delay, d1	49.5	34.6	33.0	50.9	43.7	38.2	60.9	35.6	31.9	58.5	36.2	33.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.5	0.1	0.0	10.9	3.9	0.5	36.6	0.6	0.4	15.9	1.8	2.9
Delay (s)	60.0	34.7	33.0	61.8	47.6	38.6	97.5	36.2	32.3	74.4	38.0	36.4
Level of Service	E	C	C	E	D	D	F	D	C	E	D	D
Approach Delay (s)		52.7			51.3			40.2			42.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	130.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: White Rock Road/Latrobe Road & No Project

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	150	460	250	210	460	210	290	1780	340	260	1350	350
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	500	272	228	500	228	315	1935	370	283	1467	380
RTOR Reduction (vph)	0	0	212	0	0	176	0	0	142	0	0	169
Lane Group Flow (vph)	163	500	60	228	500	52	315	1935	228	283	1467	211
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.9	26.8	26.8	10.1	28.0	28.0	26.3	54.9	54.9	13.9	42.5	42.5
Effective Green, g (s)	8.9	26.8	26.8	10.1	28.0	28.0	26.3	54.9	54.9	13.9	42.5	42.5
Actuated g/C Ratio	0.07	0.22	0.22	0.08	0.23	0.23	0.22	0.45	0.45	0.11	0.35	0.35
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	251	779	349	285	814	364	383	2891	714	392	1776	553
v/s Ratio Prot	0.05	c0.14		c0.07	0.14		c0.18	0.30		0.08	c0.29	
v/s Ratio Perm			0.04			0.03			0.14			0.13
v/c Ratio	0.65	0.64	0.17	0.80	0.61	0.14	0.82	0.67	0.32	0.72	0.83	0.38
Uniform Delay, d1	54.9	43.1	38.5	54.8	42.0	37.3	45.5	26.3	21.4	52.0	36.2	29.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	1.8	0.2	14.8	1.4	0.2	13.3	1.2	1.2	6.4	4.5	2.0
Delay (s)	60.6	44.9	38.7	69.6	43.4	37.5	58.8	27.5	22.6	58.5	40.8	31.7
Level of Service	E	D	D	E	D	D	E	C	C	E	D	C
Approach Delay (s)		45.8			48.2			30.6			41.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	121.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	200	380	50	280	380	260	90	1420	550	310	970	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	413	54	304	413	283	98	1543	598	337	1054	457
RTOR Reduction (vph)	0	0	42	0	0	122	0	0	217	0	0	221
Lane Group Flow (vph)	217	413	12	304	413	161	98	1543	381	337	1054	236
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.2	21.4	21.4	9.2	21.4	21.4	8.2	41.0	41.0	9.2	42.0	42.0
Effective Green, g (s)	9.2	21.4	21.4	9.2	21.4	21.4	8.2	41.0	41.0	9.2	42.0	42.0
Actuated g/C Ratio	0.10	0.22	0.22	0.10	0.22	0.22	0.08	0.42	0.42	0.10	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	326	782	350	326	782	350	150	2714	670	326	2206	687
v/s Ratio Prot	0.06	c0.12		c0.09	0.12		0.06	0.24		c0.10	0.21	
v/s Ratio Perm			0.01			0.10			c0.24			0.15
v/c Ratio	0.67	0.53	0.03	0.93	0.53	0.46	0.65	0.57	0.57	1.03	0.48	0.34
Uniform Delay, d1	42.3	33.2	29.6	43.5	33.2	32.7	42.9	21.2	21.2	43.8	19.6	18.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.6	0.0	32.6	0.6	1.0	9.8	0.9	3.5	58.8	0.7	1.4
Delay (s)	47.4	33.9	29.6	76.1	33.9	33.7	52.7	22.1	24.7	102.6	20.3	19.6
Level of Service	D	C	C	E	C	C	D	C	C	F	C	B
Approach Delay (s)		37.8			46.7			24.1			35.1	
Approach LOS		D			D			C			D	

Intersection Summary					
HCM Average Control Delay		33.2	HCM Level of Service		C
HCM Volume to Capacity ratio		0.65			
Actuated Cycle Length (s)		96.8	Sum of lost time (s)		16.0
Intersection Capacity Utilization		63.4%	ICU Level of Service		B
Analysis Period (min)		15			
c Critical Lane Group					

3: White Rock Road/Latrobe Road & Alternative 2

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	230	380	90	260	380	250	130	1490	470	320	1040	430
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	413	98	283	413	272	141	1620	511	348	1130	467
RTOR Reduction (vph)	0	0	76	0	0	147	0	0	186	0	0	223
Lane Group Flow (vph)	250	413	22	283	413	125	141	1620	325	348	1130	244
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.4	20.2	20.2	8.4	21.2	21.2	10.5	34.8	34.8	10.5	34.8	34.8
Effective Green, g (s)	7.4	20.2	20.2	8.4	21.2	21.2	10.5	34.8	34.8	10.5	34.8	34.8
Actuated g/C Ratio	0.08	0.22	0.22	0.09	0.24	0.24	0.12	0.39	0.39	0.12	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	283	795	356	321	835	373	207	2481	613	401	1968	613
v/s Ratio Prot	0.07	c0.12		c0.08	0.12		0.08	c0.25		c0.10	0.22	
v/s Ratio Perm			0.01			0.08			0.21			0.15
v/c Ratio	0.88	0.52	0.06	0.88	0.49	0.34	0.68	0.65	0.53	0.87	0.57	0.40
Uniform Delay, d1	40.8	30.6	27.4	40.3	29.7	28.5	38.1	22.6	21.2	39.0	21.7	20.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.0	0.6	0.1	23.4	0.5	0.5	8.9	0.6	0.8	17.6	0.4	0.4
Delay (s)	66.8	31.2	27.5	63.7	30.2	29.0	47.0	23.2	22.1	56.7	22.1	20.4
Level of Service	E	C	C	E	C	C	D	C	C	E	C	C
Approach Delay (s)		42.4			39.7			24.4			27.9	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM Average Control Delay	30.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	62.0%	ICU Level of Service	B	
Analysis Period (min)	15			
c Critical Lane Group				

Existing Lane Configuration
PM Peak

4: White Rock Road/Latrobe Road & Alternative 2A

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	210	400	50	280	350	260	90	1390	560	310	970	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	435	54	304	380	283	98	1511	609	337	1054	457
RTOR Reduction (vph)	0	0	42	0	0	121	0	0	208	0	0	236
Lane Group Flow (vph)	228	435	12	304	380	162	98	1511	401	337	1054	221
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.2	21.5	21.5	9.2	21.5	21.5	8.2	41.0	41.0	9.2	42.0	42.0
Effective Green, g (s)	9.2	21.5	21.5	9.2	21.5	21.5	8.2	41.0	41.0	9.2	42.0	42.0
Actuated g/C Ratio	0.09	0.22	0.22	0.09	0.22	0.22	0.08	0.42	0.42	0.09	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	326	785	351	326	785	351	150	2711	670	326	2204	686
v/s Ratio Prot	0.07	c0.12		c0.09	0.11		0.06	0.24		c0.10	0.21	
v/s Ratio Perm			0.01			0.10			c0.25			0.14
v/c Ratio	0.70	0.55	0.03	0.93	0.48	0.46	0.65	0.56	0.60	1.03	0.48	0.32
Uniform Delay, d1	42.5	33.4	29.6	43.5	32.9	32.7	43.0	21.1	21.6	43.9	19.6	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.9	0.0	32.6	0.5	1.0	9.8	0.8	3.9	58.8	0.7	1.2
Delay (s)	48.9	34.3	29.6	76.2	33.3	33.6	52.8	21.9	25.5	102.7	20.4	19.3
Level of Service	D	C	C	E	C	C	D	C	C	F	C	B
Approach Delay (s)		38.6			46.9			24.3			35.1	
Approach LOS		D			D			C			D	

Intersection Summary				
HCM Average Control Delay		33.4	HCM Level of Service	C
HCM Volume to Capacity ratio		0.67		
Actuated Cycle Length (s)		96.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization		64.6%	ICU Level of Service	C
Analysis Period (min)		15		
c Critical Lane Group				

5: White Rock Road/Latrobe Road & Alternative 5

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	260	350	50	250	330	280	90	1280	570	290	810	510
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	380	54	272	359	304	98	1391	620	315	880	554
RTOR Reduction (vph)	0	0	42	0	0	121	0	0	231	0	0	245
Lane Group Flow (vph)	283	380	12	272	359	183	98	1391	389	315	880	309
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.2	21.0	21.0	9.2	21.0	21.0	8.2	41.0	41.0	9.2	42.0	42.0
Effective Green, g (s)	9.2	21.0	21.0	9.2	21.0	21.0	8.2	41.0	41.0	9.2	42.0	42.0
Actuated g/C Ratio	0.10	0.22	0.22	0.10	0.22	0.22	0.09	0.43	0.43	0.10	0.44	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	328	771	345	328	771	345	151	2725	673	328	2215	690
v/s Ratio Prot	c0.08	0.11		0.08	0.10		0.06	0.22		c0.09	0.17	
v/s Ratio Perm			0.01			c0.12			c0.25			0.20
v/c Ratio	0.86	0.49	0.03	0.83	0.47	0.53	0.65	0.51	0.58	0.96	0.40	0.45
Uniform Delay, d1	43.0	33.0	29.7	42.8	32.8	33.3	42.7	20.3	21.1	43.4	18.6	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.2	0.5	0.0	15.7	0.4	1.5	9.2	0.7	3.6	39.0	0.5	2.1
Delay (s)	63.2	33.5	29.7	58.6	33.3	34.8	52.0	21.0	24.7	82.5	19.1	21.2
Level of Service	E	C	C	E	C	C	D	C	C	F	B	C
Approach Delay (s)		44.9			41.1			23.5			31.2	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM Average Control Delay	31.7	HCM Level of Service		C
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	96.4	Sum of lost time (s)		16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service		B
Analysis Period (min)	15			
c Critical Lane Group				

Existing Lane Configuration
AM Peak

3: White Rock Road/Latrobe Road & Alternative 2

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	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	684	258	116	555	929	297	116	1251	168	297	1587	568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	743	280	126	603	1010	323	126	1360	183	323	1725	617
RTOR Reduction (vph)	0	0	80	0	0	89	0	0	76	0	0	215
Lane Group Flow (vph)	743	280	46	603	1010	234	126	1360	107	323	1725	402
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	24.1	47.4	47.4	24.1	47.4	47.4	8.0	41.1	41.1	13.0	46.1	46.1
Effective Green, g (s)	24.1	47.4	47.4	24.1	47.4	47.4	8.0	41.1	41.1	13.0	46.1	46.1
Actuated g/C Ratio	0.17	0.33	0.33	0.17	0.33	0.33	0.06	0.29	0.29	0.09	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	3.0
Lane Grp Cap (vph)	584	1185	530	584	1185	530	100	1860	459	315	1655	515
v/s Ratio Prot	c0.22	0.08		0.18	c0.29		c0.07	0.21		c0.09	c0.34	
v/s Ratio Perm			0.03			0.15			0.07			0.25
v/c Ratio	1.27	0.24	0.09	1.03	0.85	0.44	1.26	0.73	0.23	1.03	1.04	0.78
Uniform Delay, d1	58.8	34.0	32.3	58.8	43.8	36.8	66.8	45.3	38.3	64.3	47.8	43.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	135.5	0.1	0.1	45.9	6.1	0.6	175.2	1.5	0.3	57.4	34.0	7.5
Delay (s)	194.3	34.1	32.3	104.6	49.9	37.4	242.0	46.8	38.5	121.7	81.8	50.7
Level of Service	F	C	C	F	D	D	F	D	D	F	F	D
Approach Delay (s)		137.5			64.9			60.6			79.4	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM Average Control Delay	80.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	141.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			