Pleasant Valley Road Corridor Improvement Study

Winchester, Virginia

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No-Build Conditions Summary

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VDOT

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4 Traffic Forecasting

To understand future traffic conditions in the study area and assess the long-term benefits of proposed improvements, traffic volumes were forecasted for 2035 traffic conditions. The following sections describe the methodology for developing traffic growth rates and projecting future traffic volumes for the study area.

4.1 Traffic Growth Rate Development

The Win-Fred Regional Travel Demand Model (TDM) was reviewed to determine growth rates to apply to existing traffic volumes to forecast 2035 traffic volumes. VDOT provided comparisons between 2015 and 2040 TDM volumes. ***Table 1*** summarizes the ADT volumes and annualized growth rates by roadway segments.

Table 1: Growth Rate Forecasting

Segment	2017 AAWDT VDOT Count	2015 Model ADT	2040 Model ADT	2015-2040 Model Annualized Growth Rate
Pleasant Valley Rd (Cork St to Millwood Ave)	24,000	26,200	37,100	1.7%
Pleasant Valley Rd (Millwood Ave to Jubal Early Dr)	27,000	21,800	29,400	1.4%
Pleasant Valley Rd (Jubal Early Dr to Papermill Rd)	23,000	19,400	24,700	1.1%
Tevis St (@ Pleasant Valley Rd)	No data	12,300	15,700	1.1%
Tevis St (Extension East of Pleasant Valley Rd)	-	-	25,200	-
Jubal Early Dr (Loudoun St to Millwood Ave)	23,000	25,700	31,800	0.9%
Millwood Ave (Cameron St to University Dr)	13,000	22,200	24,300	0.4%

Key items to note about the models include the following:

- Tevis Street was not in the 2015 model. The TAZ encapsulating Tevis Street was large and had 3 centroid connectors. ADT was based on volume for the TAZ centroid connector terminating at the Papermill Road intersection.
- VDOT counts and model ADT locations may not match up well in some instances, particularly Millwood Avenue, where the count was likely collected well to the north of where model ADT is reported.
- 2040 model assumed construction of funded SYIP projects, including extension of Tevis Street to US-522 and widening of I-81 to 6 lanes between Exits 313-317.

The SWG reviewed the traffic forecasts and growth rates and reached consensus of a global 1% annual linear growth rate to be applied on all routes within the study area.

4.2 Projected 2040 Traffic Volumes

The agreed upon linear traffic growth rate was applied to the 2019 existing traffic volumes to generate projected 2035 traffic volumes. The balanced 2035 PM peak hour traffic volumes are summarized in ***Figure 1.***

5 No-Build Conditions Analysis

Traffic operational analyses were conducted to evaluate the overall performance of the study corridor under No-Build (2035) PM peak hour conditions. The intent of the No-Build conditions analyses is to provide a general understanding of the baseline future traffic conditions as a starting point for developing future improvement strategies. No-Build conditions were modeled using Synchro, Version 10.

5.1 Traffic Analysis Assumptions

The existing conditions Synchro models were used as a basis to develop the No-Build models for the PM peak hour conditions. No geometric changes were made to the existing Synchro model, except for the signal optimization to take into account the adaptive signal controls. The models were updated with projected 2035 No-Build traffic volumes. Inputs, analysis methodologies, and calibration approaches were consistent with the *TOSAM*.

Figure 1: 2035 No-Build Traffic Volumes

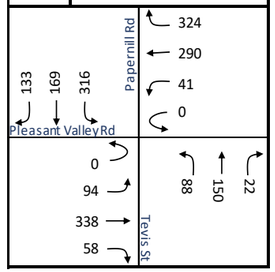
Legend:

(#) Signalized Intersection

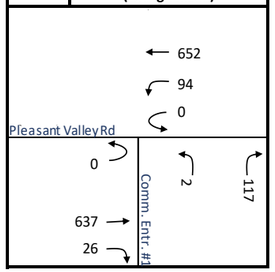
(#) Unsignalized Intersection

PM Peak Hour Volumes

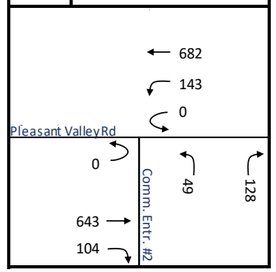
1 Pleasant Valley Road at Tevis Street/Papermill Road (Signalized)



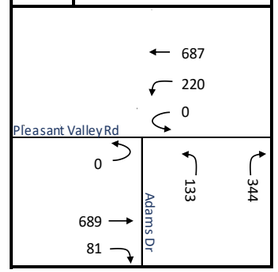
2 Pleasant Valley Road at Commercial Entrance #1 – Winchester Station (Unsignalized)



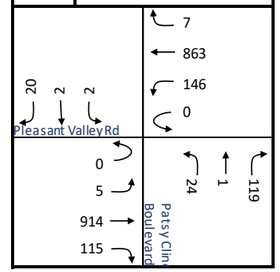
3 Pleasant Valley Road at Commercial Entrance #2 – Walmart (Unsignalized)



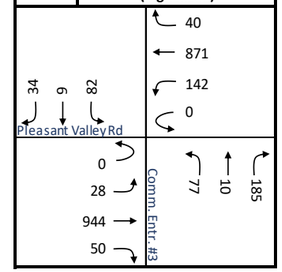
4 Pleasant Valley Road at Adams Drive (Signalized)



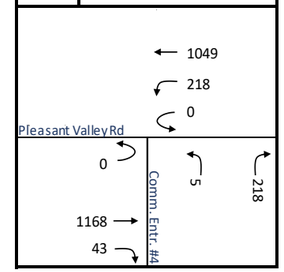
5 Pleasant Valley Road at Patsy Cline Boulevard (Unsignalized)



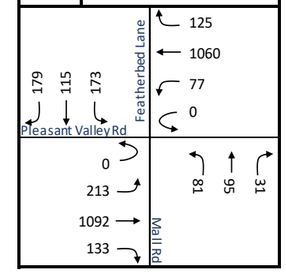
6 Pleasant Valley Road at Commercial Entrance #3 – Apple Blossom Corners (Signalized)

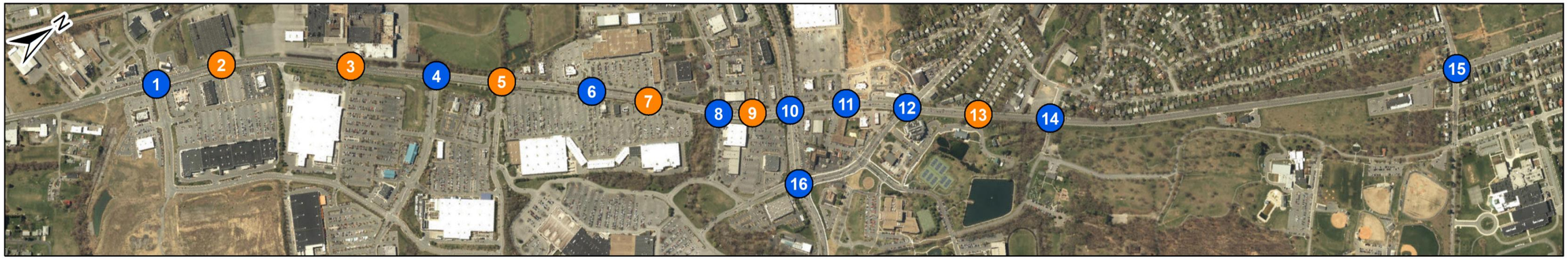


7 Pleasant Valley Road at Commercial Entrance #4 – BB&T (Unsignalized)

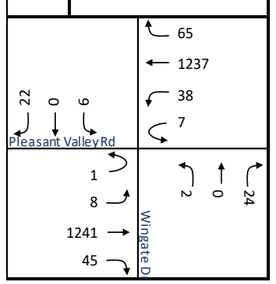


8 Pleasant Valley Road at Mall Road/ Featherbed Lane (Signalized)

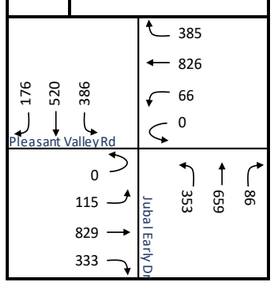




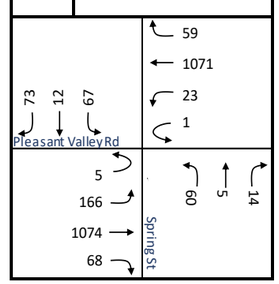
9 Pleasant Valley Road at Wingate Drive (Unsignalized)



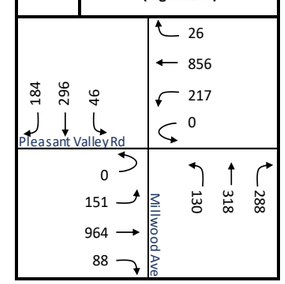
10 Pleasant Valley Road at East Jubal Early Drive (Signalized)



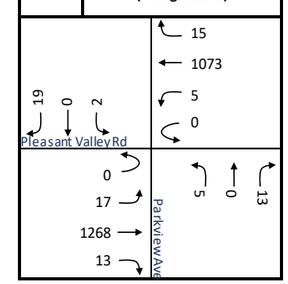
11 Pleasant Valley Road at Spring Street (Signalized)



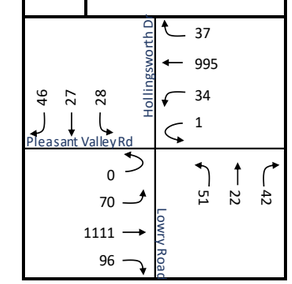
12 Pleasant Valley Road at Millwood Avenue (US 50/17) (Signalized)



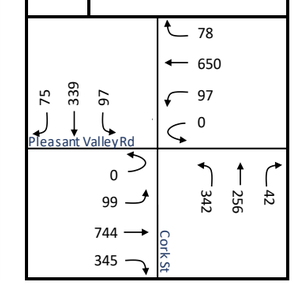
13 Pleasant Valley Road at Parkview Avenue (Unsignalized)



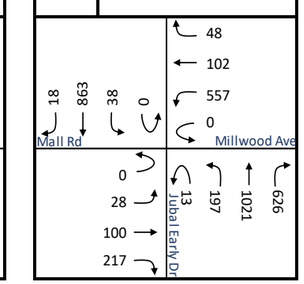
14 Pleasant Valley Road at Lowry Drive (Signalized)



15 Pleasant Valley Road at Cork Street (Signalized)



16 East Jubal Early Drive at Millwood Avenue (Signalized)



5.2 Traffic Analysis Results

The No-Build conditions traffic analysis results are summarized in the following section of the report.

The same methodologies used to analyze existing conditions were also used to analyze No-Build conditions. Refer to ***Section 2*** for the delay thresholds associated with each LOS category for signalized and unsignalized intersections.

5.2.1 LOS, Control Delay, V/C and Queue Results

Figure 2 shows a depictive representation of the projected control delay and LOS results in the study area. A table summarizing the No-Build conditions control delay, LOS, and v/c results by lane group, approach, and intersection at each study area intersection is provided in ***Table 2.*** The corresponding Synchro output sheets are included in ***Appendix G***.

Under 2035 No-Build PM conditions, intersections were projected to operate at or better than LOS C, except for the intersections of Pleasant Valley Road and the following. Intersections that operated at or better than LOS C in PM existing conditions are italicized.

- *Pleasant Valley Road at Mall Road/Feather Lane (Intersection 8) was projected to operate at LOS D*
- Pleasant Valley Road at East Jubal Early Drive (Intersection 10) was projected to operate at LOS E
- Pleasant Valley Road at Millwood Avenue (Intersection 12) was projected to operate at LOS D
- Pleasant Valley Road and Cork Street (Intersection 15) was projected to operate at LOS E
- Millwood Avenue and East Jubal Early Drive (Intersection 16) was projected to operate at LOS E

The following approaches were projected to operate at LOS D or worse in the PM peak hour. Approaches that operated at better LOS in existing conditions are italicized. Reference ***Figure 2*** for a depictive view of LOS reported by movement. The following side street approaches had a LOS D or greater during the PM Peak Hour:

- *Westbound Walmart Commercial Entrance #2 was projected to operate at LOS D*
- Westbound on Adams Drive was projected to operate at LOS D
- Eastbound and Westbound on Commercial Entrance # 3 (Apple Blossom Corners) were projected to operate at LOS D
- Eastbound and Westbound on Featherbed Lane/Mall Road were projected to operate at LOS E
- *Eastbound and Westbound on East Jubal Early Drive were projected to operate at LOS F*
- Eastbound and Westbound on Spring Street were projected to operate at LOS F
- Eastbound and *Westbound Millwood Avenue* was project to operate at LOS E and *LOS F,* respectively
- Eastbound Lowry Drive Road was projected to operate at LOS D
- Eastbound and Westbound on Cork Street were projected to operate at LOS E
- Northbound and Southbound on Millwood Avenue at E Jubal Early Drive operate at LOS F and LOS E, respectively

As shown ***Table 2***, five signalized intersections have the most significant delays, each with an overall LOS D. The following observations about the v/c ratios and queues experienced at these intersections are as follows:

Pleasant Valley Road at Mall Road/Feather Lane (Intersection 8): The v/c ratios were not projected to approach 1.0 nor are queue lengths exceeding the turn bay or block lengths at Mall Road/Feather Lane.

Pleasant Valley Road at East Jubal Early Drive (Intersection 10): The eastbound left and westbound through-right movements on E Jubal Early Drive have a v/c ratio exceeding 1.0 and queue lengths that exceed the length of the turn bay/block lengths: indicators that the movements have exceeded capacity.

Pleasant Valley Road at Millwood Avenue (Intersection 12): The northbound left movement queue on Pleasant Valley Road exceeds its storage length by at least 110 feet. This spillback of vehicles to the through lanes could cause additional queuing and delays in the northbound through movement. Additionally, the Millwood Avenue westbound right movement v/c ratio is projected to be near capacity at 0.96.

Pleasant Valley Road at Cork Street (Intersection 15): Although the eastbound left queues on Cork Street do not exceed capacity, the eastbound through queues are projected to be longer than 500 feet which is greater than the left turn bay at 255. The through movement therefore may be further blocking access for left turning vehicles – potentially creating more delay on the eastbound left movement. The Cork Street westbound left movement v/c ratio is projected to be near capacity 0.95.

East Jubal Early Drive at Millwood Avenue (Intersection 16): The Mall Drive northbound approach traffic volumes on are projected to exceed capacity at v/c ratio of 1.71 because of the priority given in phasing to the heavy opposing Millwood Avenue southbound left movement.

Figure 2: 2035 No-Build Pleasant Valley Road PM Analysis LOS

Table 2: 2035 No-Build Pleasant Valley Road Synchro Results

Intersection					
Approach	Movement	Storage Length	PM Peak Hour		
			LOS (Delay)	V/C Ratio	Queue (ft)
1. Pleasant Valley Road at Tevis Street/Papermill Road (Signalized)					
Eastbound (Papermill Road)	EBL	250	B (16.8)	0.67	183
	EBT		B (19.9)	0.42	132
	EBR		B (18.1)	0.1	39
	EB Approach		B (17.9)	--	--
Westbound (Tevis Street)	WBL		C (21.6)	0.35	55
	WBT		C (26.6)	0.49	71
	WBR		C (25.0)	0.02	0
	WB Approach		C (24.8)	--	--
Northbound (S Pleasant Valley Road)	NBL	220	B (13.0)	0.4	61
	NBTR		B (17.0)	0.41	131
	NB Approach		B (16.2)	--	--
Southbound (S Pleasant Valley Road)	SBL	125	B (14.5)	0.14	32
	SBTR		B (19.4)	0.54	144
	SB Approach		B (19.1)	--	--
Overall Intersection			B (18.8)		
2. Pleasant Valley Road at Commercial Entrance #1 – Winchester Station (Unsignalized)					
Westbound (Commercial Entrance #1 Winchester Station)	WBR		B (11.9)	0.2	18
Northbound (S Pleasant Valley Road)	NBT		A (0.0)	0.27	0
	NBR		A (0.0)	0.15	0
	NB Approach		A (0.0)	--	--
Southbound (S Pleasant Valley Road)	SBL	85	A (9.5)	0.11	9
	SBT		A (0.0)	0.21	0
	SB Approach		A (1.2)	--	--
Overall Intersection			N/A		
3. Pleasant Valley Road at Commercial Entrance #2 – Walmart (Unsignalized)					
Westbound (Commercial Entrance #2 Walmart)	WBL		**F (77.5)**	0.54	62
	WBR		B (13.0)	0.24	23
	WB Approach		D (30.8)	--	--
Northbound (S Pleasant Valley Road)	NBT		A (0.0)	0.28	0
	NBR		A (0.0)	0.21	0
	NB Approach		A (0.0)	--	--
Southbound (S Pleasant Valley Road)	SBL	255	B (10.6)	0.2	18
	SBT		A (0.0)	0.22	0
	SB Approach		A (1.8)	--	--
Overall Intersection			N/A		
4. Pleasant Valley Road at Adams Drive (Signalized)					
Westbound (Adams Drive)	WBL	185	D (36.6)	0.43	65
	WBR		D (40.9)	0.79	189
	WB Approach		D (39.7)	--	--
Northbound (S Pleasant Valley Road)	NBTR		A (9.7)	0.4	192
	NB Approach		A (9.7)	--	--
Southbound (S Pleasant Valley Road)	SBL	380	B (10.0)	0.44	122
	SBT		A (4.3)	0.27	132
	SB Approach		A (5.7)	--	--
Overall Intersection			B (14.6)		
5. Pleasant Valley Road at Patsy Cline Boulevard (Unsignalized)					
Eastbound (Patsy Cline Boulevard)	EBLTR		C (18.1)	0.09	7
	EB Approach		C (18.1)	--	--
Westbound (Patsy Cline Boulevard)	WBL	90	**F (55.3)**	0.27	25
	WBTR		B (12.3)	0.21	19
	WB Approach		C (19.5)	--	--
Northbound (S Pleasant Valley Road)	NBL	80	A (9.4)	0.01	0
	NBT		A (0.0)	0.39	0
	NBR		A (0.0)	0.27	0
	NB Approach		A (0.0)	--	--
Southbound (S Pleasant Valley Road)	SBL	245	B (11.7)	0.23	22
	SBT		A (0.0)	0.36	0
	SBR		A (0.0)	0.19	0
	SB Approach		A (1.7)	--	--
Overall Intersection			N/A		

Intersection					
Approach	Movement	Storage Length	PM Peak Hour		
			LOS (Delay)	V/C Ratio	Queue (ft)
6. Pleasant Valley Road at Commercial Entrance #3 – Apple Blossom Corners (Signalized)					
Eastbound (Commercial Entrance #3 Apple Blossom Corners)	EBL	60	E (58.7)	0.32	142
	EBT		D (52.1)	0.02	28
	EBR	85	A (0.0)	0.02	0
	EB Approach		D (42.1)	--	--
Westbound (Commercial Entrance #3 Apple Blossom Corners)	WBLT		E (57.5)	0.3	147
	WBR	75	D (53.6)	0.12	71
	WB Approach		D (54.9)	--	--
Northbound (S Pleasant Valley Road)	NBL	160	B (16.0)	0.08	m20
	NBTR		C (25.9)	0.55	544
	NB Approach		C (25.6)	--	--
Southbound (S Pleasant Valley Road)	SBL	235	B (12.4)	0.35	m34
	SBTR		A (6.7)	0.42	94
	SB Approach		A (7.5)	--	--
Overall Intersection			C (21.9)		
7. Pleasant Valley Road at Commercial Entrance #4 – BB&T (Unsignalized)					
Westbound (Commercial Entrance #4 BB&T)	WBL		E (37.6)	0.04	3
	WBR		B (11.3)	0.28	29
	WB Approach		B (11.9)	--	--
Northbound (S Pleasant Valley Road)	NBT		A (0.0)	0.47	0
	NBR		A (0.0)	0.26	0
	NB Approach		A (0.0)	--	--
Southbound (S Pleasant Valley Road)	SBL	115	B (13.6)	0.35	39
	SBT		A (0.0)	0.32	0
	SB Approach		A (2.3)	--	--
Overall Intersection			N/A		

Intersection					
Approach	Movement	Storage Length	PM Peak Hour		
			LOS (Delay)	V/C Ratio	Queue (ft)
8. Pleasant Valley Road at Mall Road/ Featherbed Lane (Signalized)					
Eastbound (Featherbed Lane)	EBL	300	D (51.4)	0.49	226
	EBTR		E (69.8)	0.69	391
	EB Approach		E (63.0)	--	--
Westbound (Mall Road)	WBL		E (61.1)	0.43	116
	WBTR		E (65.2)	0.38	193
	WB Approach		E (63.6)	--	--
Northbound (S Pleasant Valley Road)	NBL	285	D (54.7)	0.79	244
	NBTR		C (33.9)	0.63	602
	NB Approach		D (37.0)	--	--
Southbound (S Pleasant Valley Road)	SBL	100	C (21.3)	0.37	m45
	SBTR		C (25.0)	0.66	m584
	SB Approach		C (24.8)	--	--
Overall Intersection			D (37.7)		
9. Pleasant Valley Road at Wingate Drive (Unsignalized)					
Eastbound (Wingate Drive)	EBLTR		B (14.9)	0.07	6
	EB Approach		B (14.9)	--	--
Westbound (Wingate Drive)	WBLT		D (29.5)	0.01	1
	WBR		A (9.5)	0.03	2
	WB Approach		B (11.0)	--	--
Northbound (S Pleasant Valley Road)	NBL	70	B (11.5)	0.01	1
	NBT		A (0.0)	0.51	0
	NBR		A (0.0)	0.28	0
	NB Approach		A (0.1)	--	--
Southbound (S Pleasant Valley Road)	SBL	115	B (11.4)	0.07	5
	SBT		A (0.0)	0.51	0
	SBR		A (0.0)	0.3	0
	SB Approach		A (0.3)	--	--
Overall Intersection			N/A		

Intersection					
Approach	Movement	Storage Length	PM Peak Hour		
			LOS (Delay)	V/C Ratio	Queue (ft)
10. Pleasant Valley Road at East Jubal Early Drive (Signalized)					
Eastbound (East Jubal Early Drive)	EBL	315	**F (139.3)**	1.13	**#696**
	EBT		**E (70.8)**	0.79	385
	EBR	340	**E (57.6)**	0.2	109
	EB Approach		**F (93.1)**	--	--
Westbound (East Jubal Early Drive)	WBL		**E (60.0)**	0.98	#545
	WBTR		**F (134.2)**	1.16	#685
	WB Approach		**F (110.3)**	--	--
Northbound (S Pleasant Valley Road)	NBL	130	C (26.4)	0.48	74
	NBT		D (35.3)	0.53	413
	NBR	250	A (1.1)	0.31	13
	NB Approach		C (25.6)	--	--
Southbound (S Pleasant Valley Road)	SBL	200	B (18.0)	0.29	46
	SBT		C (23.5)	0.54	267
	SBR		A (5.7)	0.29	4
	SB Approach		B (17.8)	--	--
Overall Intersection			**E (58.6)**		
11. Pleasant Valley Road at Spring Street (Signalized)					
Eastbound (Spring Street)	EBLT		**F (94.6)**	0.73	155
	EBR		**E (72.0)**	0.05	55
	EB Approach		**F (83.8)**	--	--
Westbound (Spring Street)	WBL		**F (100.1)**	0.73	126
	WBTR		**E (72.0)**	0.05	35
	WB Approach		**F (93.4)**	--	--
Northbound (S Pleasant Valley Road)	NBL	125	A (5.0)	0.43	m16
	NBT		A (1.8)	0.42	m77
	NBR		A (0.0)	0	0
	NB Approach		A (2.2)	--	--
Southbound (S Pleasant Valley Road)	SBL	130	A (3.6)	0.07	m8
	SBT		A (4.5)	0.4	131
	SBR	105	A (3.5)	0.04	m7
	SB Approach		A (4.4)	--	--
Overall Intersection			B (10.4)		

Intersection					
Approach	Movement	Storage Length	PM Peak Hour		
			LOS (Delay)	V/C Ratio	Queue (ft)
12. Pleasant Valley Road at Millwood Avenue (US 50/17) (Signalized)					
Eastbound (Millwood Avenue)	EBL	100	**E (61.2)**	0.37	78
	EBT		**F (90.1)**	0.87	#512
	EBR	400	D (51.4)	0.42	245
	EB Approach		**E (74.0)**	--	--
Westbound (Millwood Avenue)	WBL	150	**F (90.1)**	0.87	m#199
	WBT		**F (83.6)**	0.88	#553
	WBR		**F (101.1)**	0.96	#549
	WB Approach		**F (91.6)**	--	--
Northbound (S Pleasant Valley Road)	NBL	225	**F (130.9)**	0.89	**#335**
	NBTR		B (19.5)	0.56	321
	NB Approach		C (33.5)	--	--
Southbound (S Pleasant Valley Road)	SBL	295	C (34.0)	0.74	192
	SBT		C (22.8)	0.48	343
	SBR	50	A (0.0)	0.02	m0
	SB Approach		C (24.5)	--	--
Overall Intersection			D (48.7)		
13. Pleasant Valley Road at Parkview Avenue (Unsignalized)					
Eastbound (Parkview Avenue)	EBLTR		B (11.7)	0.04	3
	EB Approach		B (11.7)	--	--
Westbound (Parkview Avenue)	WBLTR		C (15.5)	0.05	4
	WB Approach		C (15.5)	--	--
Northbound (S Pleasant Valley Road)	NBLT		A (0.7)	0.03	2
	NBTR		A (0.0)	0.39	0
	NB Approach		A (0.4)	--	--
Southbound (S Pleasant Valley Road)	SBLT		A (0.2)	0.01	1
	SBTR		A (0.0)	0.33	0
	SB Approach		A (0.1)	--	--
Overall Intersection			N/A		

Intersection					
Approach	Movement	Storage Length	PM Peak Hour		
			LOS (Delay)	V/C Ratio	Queue (ft)
14. Pleasant Valley Road at Lowry Drive (Signalized)					
Eastbound (Lowry Drive)	EBLTR		D (36.3)	0.43	78
	EB Approach		D (36.3)	--	--
Westbound (Lowry Drive)	WBLTR		D (48.0)	0.69	99
	WB Approach		D (48.0)	--	--
Northbound (S Pleasant Valley Road)	NBL	180	A (3.1)	0.18	m13
	NBTR		A (4.6)	0.51	m143
	NB Approach		A (4.5)	--	--
Southbound (S Pleasant Valley Road)	SBL	170	A (4.3)	0.11	11
	SBTR		A (7.6)	0.45	203
	SB Approach		A (7.5)	--	--
Overall Intersection			A (9.0)		
15. Pleasant Valley Road at Cork Street (Signalized)					
Eastbound (Cork Street)	EBL	255	D (48.4)	0.3	102
	EBT		**F (80.8)**	0.85	509
	EBR	85	D (54.4)	0.05	4
	EB Approach		E (70.8)	--	--
Westbound (Cork Street)	WBL		**F (82.8)**	0.95	#503
	WBTR		D (47.7)	0.5	366
	WB Approach		E (66.5)	--	--
Northbound (S Pleasant Valley Road)	NBL	190	C (31.4)	0.37	122
	NBTR		E (57.7)	0.86	#962
	NB Approach		E (55.5)	--	--
Southbound (S Pleasant Valley Road)	SBL	200	D (43.0)	0.61	143
	SBTR		D (43.6)	0.56	516
	SB Approach		D (43.5)	--	--
Overall Intersection			E (57.1)		

Intersection					
Approach	Movement	Storage Length	PM Peak Hour		
			LOS (Delay)	V/C Ratio	Queue (ft)
16. East Jubal Early Drive at Millwood Avenue (Signalized)					
Eastbound (East Jubal Early Drive)	EBL	275	C (31.5)	0.16	m35
	EBTR		D (37.3)	0.52	403
	EB Approach		D (37.1)	--	--
Westbound (East Jubal Early Drive)	WBL	450	C (25.1)	0.67	152
	WBT		C (28.2)	0.56	477
	WBR		C (26.7)	0.46	137
	WB Approach		C (27.3)	--	--
Northbound (Millwood Avenue)	NBL	200	E (68.0)	0.18	47
	NBT		**F (84.1)**	0.67	#218
	NBR		**F (427.8)**	1.71	#567
	NB Approach		**F (299.1)**	--	--
Southbound (Millwood Avenue)	SBL		E (66.8)	0.96	m#595
	SBTR		C (30.8)	0.28	m164
	SB Approach		E (59.2)	--	--
Overall Intersection			E (60.1)		