

APPENDIX B

B.2 TRANSMODELER ANALYSIS RESULTS

Eastern Corridor Segments II & III (PID 86462)**Summary of TransModeler Results**

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The purpose of this memorandum is to present the results of the TransModeler analysis results for several study areas within the Eastern Corridor Traffic Segments II & III project area. Analysis was performed for the 2042 AM and PM peak hours. An existing conditions analysis and calibration was not conducted in this scope of work. The simulation models were intended to be high-level planning tools, designed to understand the relative benefit of the alternatives.

The network was built using TransModeler 5.0 following the *NCDOT Congestion Management Simulation Guidelines – TransModeler*. For the more complex scenarios, origin-destination (OD) matrices generated by utilizing projected turning movement counts (TMCs) and functionality within TransModeler that allows for the conversion of TMCs to OD matrices.

Traffic volumes used in the analysis were based on the Certified Traffic Plates. Traffic volumes were manually reassigned for alternatives which displaced movements. For more complex alternatives that involve new travel patterns, the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) and Miami Valley Regional Planning Commission (MVRPC) 2040 Existing plus Committed Travel Demand Model was used to estimate the reassigned traffic volumes.

One advantage that a micro simulation software like TransModeler provides over a deterministic software like HCS, is that it considers the initial queue delay that builds and dissipates over the peak-hour from unmet demand, spillback queues from auxiliary lanes that may block thru lanes, and impacts from upstream/downstream intersections. The TransModeler analysis was used to supplement the HCS analysis results as well as to create simulation videos to help with public buy-in of alternatives.

Study Areas

Multiple alternatives were analyzed within each of the five study areas. The simulations used for output generation ran for a period of 60 minutes with a 15-minute warmup period. Random seeds were assigned from 5 to 50, in increments of 5. An average of 10 simulation runs were used to generate the results shown in this report. It should be noted that the delays were determined using simulation, not by using a deterministic methodology, and that levels of service shown in this report and associated appendices are simulated level-of-service. Simulation videos were created from the last five minutes of the worst 15-minute period. A brief description of each alternative evaluated is provided below as well as a summary of the overall results.



Eastern Corridor Segments II & III (PID 86462)
Summary of TransModeler Results

1) ANCOR/SR 32 Hill Focus Area Alternatives

Within the ANCOR/SR 32 Hill Focus Area, two build alternatives were evaluated at the SR 32 and 8-Mile Road intersection. Additionally, one alternative was evaluated at the SR 32 and Little Dry Run intersection. However, due to the proximity of the SR 32 and Little Dry Run signalized intersection with the other signalized intersections within the Village of Newtown, it was included as part of the Newtown Focus Area analysis. The alternatives evaluated include:

- I-3: SR 32 and 8-Mile Road intersection (No Build)
 - I-3e: New alignment and grade separation of EB SR 32 over 8-Mile Road. Stop control for the WB to SB left turn.
 - I-3h: Construct a roundabout at a relocated SR 32 and 8-Mile Road intersection.

The results of the ANCOR/SR 32 Hill Focus Area TransModeler analysis are summarized in **Table 1** and the summary output is attached in the Appendix. During the AM peak-hour, the roundabout alternative increases delay at the intersection. Based on the results of the TransModeler analysis, as well as collaboration with the advisory committee, the roundabout alternative at the relocated SR 32 and 8-Mile Road intersection was eliminated.

Table 1: ANCOR/SR 32 Hill Focus Area Intersection Summary

Identifier	Description	Time Period	TransModeler Results		
			2042 Delay (sec/veh)	2042 LOS	Percent Reduction
I-3	SR 32 & 8-Mile Road Intersection No Build ¹	AM	11.7	B	--
		PM	84.3	F	--
I-3e	New Alignment and Grade Separation of Eastbound SR 32 at 8-Mile Road ²	AM	2.6	A	78%
		PM	3.4	A	96%
I-3h	Relocated SR 32 & 8-Mile Road Intersection with Roundabout	AM	19.7	C	-68%
		PM	64.0	F	24%

1. The overall delay shown is an aggregate which includes the effects of the SR 32 free-flow movements.

2. The overall delay shown is an aggregate delay which includes the effects of the EB thru overpass movement.

Simulation videos were created comparing the I-3e and I-3h build alternatives to the no-build alternative for the PM peak-hour conditions. The simulation videos can be found on the Eastern Corridor Segments II & III project website.



Eastern Corridor Segments II & III (PID 86462)
Summary of TransModeler Results

2) Newtown Focus Area Alternatives

Within the Newtown Focus Area, build alternatives were evaluated at the Little Dry Run, Round Bottom Road, and Church Street intersections with SR 32. Each build alternative evaluated the specific intersection improvement as well as the impacts to the other three adjacent signalized intersections within the coordinated signal system along the SR 32 corridor. This includes the Ivy Hills Place intersection where build alternatives were not identified. The alternatives evaluated include:

- I-4: SR 32 and Little Dry Run intersection (No Build)
 - I-4c: Construct a signalized green tee intersection.
- I-5: SR 32 and Round Bottom Road intersection (No Build)
 - I-5a: Construct a second EB thru lane and dual SB left turn lanes.
 - I-5b-2: Construct a roundabout and relocate fountain.
- I-6: SR 32 and Church Street intersection (No Build)
 - I-6a: Construct a second WB thru lane.

The results of the Newtown Focus Area TransModeler analysis are summarized in **Table 2** and the summary output is attached in the Appendix. All build alternatives reduce vehicular delay during both the AM and PM peak hours; however, the roundabout alternative at Round Bottom Road has a failing level-of-service. Based on the results of the TransModeler analysis, as well as collaboration with the advisory committee, the roundabout alternative at the SR 32 and Round Bottom Road intersection was eliminated.

Table 2: Newtown Focus Area Intersection Summary

Identifier	Description	Time Period	TransModeler Results		
			2042 Delay (sec/veh)	2042 LOS	Percent Reduction
I-4	SR 32 & Little Dry Run No Build	AM	14.8	B	--
		PM	40.3	D	--
I-4c	SR 32 & Little Dry Run Signalized Green Tee ¹	AM	7.9	A	46%
		PM	16.8	B	58%
I-5	SR 32 & Round Bottom Road Intersection No Build	AM	36.6	D	--
		PM	63.1	E	--
I-5a	Dual SBL and 2nd EBT at SR 32 & Round Bottom Road Intersection	AM	18.7	B	49%
		PM	32.9	C	48%
I-5b-2	SR 32 & Round Bottom Road Roundabout	AM	13.0	B	64%
		PM	60.1	F	5%
I-6	SR 32 & Church Street Intersection No Build	AM	57.1	E	--
		PM	73.1	E	--
I-6a	2nd WBT at SR 32 & Church Street Intersection	AM	33.5	C	41%
		PM	55.6	E	24%

1. The overall delay shown is an aggregate delay which includes the effects of the free-flow WB thru movement.



Eastern Corridor Segments II & III (PID 86462) Summary of TransModeler Results

Simulation videos were created comparing the I-4c build alternative to the no-build alternative for the PM peak-hour conditions and the I-5b-2 and I-5a/I-6a build alternatives to the no-build alternative for the AM and PM peak-hour conditions. The simulation videos can be found on the Eastern Corridor Segments II & III project website.

3) SR 125/SR 32 Focus Area Alternatives

Within the SR 125/SR 32 Focus Area, build alternatives were evaluated at the SR 32 and Clough Pike intersection. In addition, a roundabout alternative was evaluated at the east side of the SR 32 and SR 125 interchange where the SR 32 ramps connect with SR 125. This was done to allow for a multi-use path connection along SR 125 without widening the existing bridge over Clough Creek, help calm traffic speeds approaching the Elstun Road intersection, and allow for connectivity from SR 125 to SR 32 during flood events when the SR 32 ramps under SR 125 are submerged. The alternatives evaluated include:

- I-7: SR 32 and Clough Pike intersection (No Build)
 - I-7b: Remove signal at Clough Pike and construct a flyover from Clough Pike onto SR 32 SB.
 - I-7c: Construct a roundabout.
 - I-7d: Improve intersection to allow full movements by constructing a signalized green tee intersection.
- X-1G: Partial conversion of SR 32 at SR 125 interchange ramp connections to roundabout.

The results of the SR 125/SR 32 Focus Area TransModeler analysis are summarized in **Table 3** and the summary output is attached in the Appendix. All build alternatives at SR 32 and Clough Pike reduce vehicular delay during both the AM and PM peak hours except for the roundabout alternative during the AM peak-hour. The roundabout at the SR 125 and SR 32 interchange operates at level-of-service E during the PM peak-hour, primarily due to the failing SR 32 on-ramp approach. Based on the results of the TransModeler analysis, as well as collaboration with the advisory committee, the flyover and roundabout alternatives at the SR 32 and Clough Pike intersection were eliminated as well as the partial conversion of SR 32 at SR 125 interchange ramp connections to roundabout.



**Eastern Corridor Segments II & III (PID 86462)
Summary of TransModeler Results**

Table 3: SR 125/SR 32 Focus Area Intersection Summary

Identifier	Description	Time Period	TransModeler Results		
			2042 Delay (sec/veh)	2042 LOS	Percent Reduction
I-7	SR 32 & Clough Pike No Build	AM	49.9	D	--
		PM	13.0	B	--
I-7b	SR 32 & Clough Pike unsignalized intersection with Clough to SR 32 Flyover	AM	0.2	A	100%
		PM	0.2	A	98%
I-7c	SR 32 & Clough Pike Roundabout ¹	AM	17.1	C	66%
		PM	27.1	D	-108%
I-7d	SR 32 & Clough Pike Signalized Green Tee ²	AM	9.5	A	81%
		PM	10.9	B	16%
X-1g	SR 125 & EB SR 32 Ramp Roundabout	AM	14.4	B	--
		PM	44.7	E	--

1. The overall delay shown is an aggregate delay which includes the effects of the free-flow NB right-turn movement.
2. The overall delay shown is an aggregate delay which includes the effects of the free-flow SB thru movement.

Simulation videos were created comparing the I-7b, I-7c, and I-7d build alternatives to the no-build alternative for the AM peak-hour conditions and the X-1g build alternative to the no-build alternative for the PM peak-hour conditions. The simulation videos can be found on the Eastern Corridor Segments II & III project website.

4) Combined Linwood-Eastern Interchange and US 50/Red Bank Interchange Focus Area Alternatives

Within the Linwood-Eastern Interchange portion of the Focus Area, build alternatives were evaluated at the SR 125 and US 50 interchange, the SR 125 and Beechmont Circle interchange, and Beechmont Avenue and Linwood Avenue intersection. The alternatives evaluated include:

- X-3a-2: Construct additional ramps at SR 125 and US 50 interchange and add additional eastbound lane on the SR 125 viaduct.

This alternative allows westbound SR 125 to northbound US 50 traffic and southbound US 50 to SR 125 traffic to use the SR 125 and US 50 interchange. The existing conditions require vehicles to use either Eastern Avenue or Wooster Road. The OKI and MVRPC 2040 Existing plus Committed Travel Demand Model was used to determine the shift of traffic from Eastern Avenue and Wooster Road onto US 50 and indicates it is about 5,000 vehicles a day. To evaluate the traffic impact, the average arterial speeds were calculated and summarized in **Table 4a**. The summary output is attached in the Appendix. The increased traffic on US 50 created by the interchange improvements does not impact the operations of US 50 as travel speeds are within 3% of the no-build travel speeds. This indicates that this section of US 50 is underutilized. The interchange improvements, and resulting shift in traffic, do provide relief to the congested Wooster Road/Beechmont Circle/Wilmer Avenue corridor during the PM peak-hour by almost doubling the



Eastern Corridor Segments II & III (PID 86462)
Summary of TransModeler Results

average travel speed. Based on collaboration with the advisory committee, primarily due to cost and right-of-way impacts, build alternative X-3a-2 was eliminated.

Table 4a: X-3a-2 Arterial Speed Summary

Roadway	Time Period	Direction	TransModeler Results				Percent Reduction
			No Build		X-3a-2		
			2042 Travel Speed (mph)	2042 LOS	2042 Travel Speed (mph)	2042 LOS	
US 50	AM	NB	47.2	B	46.5	B	1%
		SB	45.1	B	44.5	B	1%
	PM	NB	44.9	B	44.6	B	1%
		SB	46.3	B	45.1	B	3%
Wooster Road / Beechmont Circle / Wilmer Avenue	AM	NB	30.3	B	30.6	B	-1%
		SB	30.1	C	31.7	C	-5%
	PM	NB	18.6	D	28.8	B	-55%
		SB	15.3	E	29.8	C	-95%

- I-29: Beechmont Avenue and Linwood Avenue intersection (No Build)
 - I-29a (in conjunction with X-3b): Construct a roundabout in conjunction with the closure of the hook ramp from Eastern Avenue to the US 50 eastbound off-ramp.
 - I-29b (in conjunction with X-3b): Install a traffic signal in conjunction with the closure of the hook ramp from Eastern Avenue to the US 50 eastbound off-ramp.

The results of the TransModeler analysis are summarized in **Table 4b** and the summary output is attached in the Appendix. Both build alternatives reduce vehicular delay during the AM peak-hour but increase vehicular delay during the PM peak-hour. While the overall intersection PM peak-hour delay is increased by the two build alternatives, they do allow the minor street approach to operate at an acceptable level of service, unlike the no build conditions.

Table 4b: I-29 Intersection Summary

Identifier	Description	Time Period	TransModeler Results		
			2042 Delay (sec/veh)	2042 LOS	Percent Reduction
I-29	Beechmont Avenue & Linwood Avenue Intersection No Build ¹	AM	28.8	D	--
		PM	22.5	C	--
I-29a	Beechmont Avenue & Linwood Avenue Roundabout	AM	16.9	C	41%
		PM	24.5	C	-9%
I-29b	Beechmont Avenue & Linwood Avenue Signalized Intersection	AM	18.4	B	36%
		PM	40.6	D	-80%

1. The overall delay shown is an aggregate which includes the effects of the Beechmont Avenue free-flow movements.



**Eastern Corridor Segments II & III (PID 86462)
Summary of TransModeler Results**

- X-2b: SR 125 and Beechmont Circle Interchange Alternatives
 - X-2b-2: Construct a grade separated interchange to connect Wilmer Avenue to Wooster Road using signalized ramp connections.
 - X-2b-5: Construct a grade separated interchange to connect Wilmer Avenue to Wooster Road using roundabouts at ramp connections.

The results of the TransModeler analysis are summarized in **Table 4c** and the summary output is attached in the Appendix. The signalized ramp connection build alternative functions better than the roundabout ramp connection build alternative. Based on the results of the TransModeler analysis, as well as collaboration with the advisory committee, build alternative X-2b-5 was eliminated.

Table 4c: X-2b Intersection Summary

Identifier	Description	Time Period	TransModeler Results	
			2042 Delay (sec/veh)	2042 LOS
X-2b-2	Wooster Road & SR 125 WB Ramps Signalized Intersection	AM	13.9	B
		PM	46.4	D
	Wilmer Avenue & SR 125 EB Ramps Signalized Intersection	AM	10.8	B
		PM	39.3	D
X-2b-5	Wooster Road & SR 125 WB Ramps Roundabout	AM	6.0	A
		PM	12.6	B
	Wilmer Avenue & SR 125 EB Ramps Roundabout	AM	11.1	B
		PM	73.6	F

Simulation videos were created comparing the X-2b-2 and X-2b-5 build alternatives to the no-build alternative for the PM peak-hour conditions. The simulation videos can be found on the Eastern Corridor Segments II & III project website.



Eastern Corridor Segments II & III (PID 86462)

Summary of TransModeler Results

Within the US 50/Red Bank Interchange portion of the Focus Area, build alternatives were evaluated at the at the Red Bank Road and Wooster Road intersection, Red Bank Road and Colbank Road intersection, and realignment of Wooster Road through the US 50 and Red bank Road interchange. Additionally, one alternative was evaluated at the US 50 and Meadowlark Lane intersection. However, due to the proximity of the intersection to the Watterson signalized intersection, it was included as part of the US 50 Corridor Focus Area analysis. The alternatives evaluated include:

- I-20: Wooster Road and Red Bank Road / Wooster Pike intersection (No Build)
- I-25: Red Bank Road and Colbank Road intersection (No Build)
 - I-25b: Construct dual WB right turn lanes and second NB thru lane. Also includes incorporating a coordinated traffic signal at Colbank Road and WB US 50 ramps.
 - I-25c: Eliminate the Red Bank Road and Colbank Road intersection so that traffic to/from US 50 EB is the thru movement. Realign the south leg of Red Bank Road to align with the current US 50 WB ramp terminal intersection.
- X-4d: Extend Wooster Road to tie directly into Colbank Road with signalized intersections at the US 50 EB, US 50 WB and Wooster Pike intersections.
- X-4d-1: Extend Wooster Road to tie directly into Colbank Road with an unsignalized intersection at the US 50 EB intersection, a signal at the US 50 WB intersection, and a roundabout at the Wooster Pike intersection.

The results of the TransModeler analysis are summarized in **Table 4d** and the summary output is attached in the Appendix. All build alternatives reduce vehicular delay during both the AM and PM peak hours. Based on the results of the TransModeler analysis, as well as collaboration with the advisory committee, build alternative I-25c and alternative X-4d were eliminated. Alternative I-25b provides similar reduction in delay benefits with significantly lower construction cost and right-of-way impacts. Alternative X-4d provides similar reduction in delay benefits but does not allow for a shared use path on the Wooster Road bridge over the railroad that can work in conjunction with alternative X-4d-1.



Eastern Corridor Segments II & III (PID 86462)
Summary of TransModeler Results

Table 4d: US 50/Red Bank Interchange Focus Area Intersection Summary

Identifier	Description	Time Period	TransModeler Results		
			2042 Delay	2042 LOS	Percent Reduction
I-25	Red Bank Road & Colbank Road Intersection No Build	AM	58.8	E	--
		PM	39.9	D	--
I-25b	Red Bank Road & Colbank Road Intersection with dual WB right-turn lanes and two NB thru lanes	AM	20.0	C	66%
		PM	21.0	C	47%
1-25c	Relocated 4-leg Red Bank Road & Colbank Road Intersection ¹	AM	19.9	B	66%
		PM	12.6	B	68%
I-20	Wooster Road & Red Bank Rd / Wooster Pike Intersection No Build	AM	27.3	C	--
		PM	31.2	C	--
I-25	Red Bank Road & Colbank Road Intersection No Build	AM	58.8	E	--
		PM	39.9	D	--
X-4d	Relocated 3-leg Red Bank Road & Colbank Road Signalized Intersection	AM	7.9	A	87%
		PM	11.9	B	70%
	Red Bank Road & US 50 EB Ramp Signalized Intersection	AM	2.7	A	--
		PM	2.9	A	--
	Wooster Road & Red Bank Rd / Wooster Pike Signalized Intersection	AM	11.9	B	56%
		PM	13.4	B	57%
I-20	Wooster Road & Red Bank Rd / Wooster Pike Intersection No Build	AM	27.3	C	--
		PM	31.2	C	--
I-25	Red Bank Road & Colbank Road Intersection No Build	AM	58.8	E	--
		PM	39.9	D	--
X-4d-1	Relocated 3-leg Red Bank Road & Colbank Road Signalized Intersection	AM	10.8	B	82%
		PM	13.6	B	66%
	Red Bank Road & US 50 EB Ramp Unsignalized Intersection	AM	7.2	A	--
		PM	2.1	A	--
	Wooster Road & Red Bank Rd / Wooster Pike Intersection Roundabout	AM	15.7	C	42%
		PM	14.1	B	55%

1. The overall delay shown is an aggregate delay which includes the effects of the free-flow SB right-turn movement.
2. The overall delay shown is an aggregate which includes the effects of the Red Bank Road free-flow movements.

Simulation videos were created comparing the I-25c, X-4d, and X-4d-1 build alternatives to the no-build alternative for the AM and PM peak-hour conditions. The simulation videos can be found on the Eastern Corridor Segments II & III project website.



**Eastern Corridor Segments II & III (PID 86462)
Summary of TransModeler Results**

5) US 50 Corridor Focus Area Alternatives

Within the US 50 Corridor Focus Area, build alternatives were evaluated at the US 50 and Meadowlark Lane/Wooster Pike intersection, US 50 and Watterson Road intersection, and on US 50 east of Mariemont Square to Newtown Road. The alternatives evaluated include:

- I-16: US 50 and Meadowlark Lane/Wooster Pike intersection (No Build)
 - I-16b: Construct a roundabout.
- I-15: US 50 and Watterson Road intersection (No Build)
 - I-15a: Extend SB right turn lane.
- US 50 Corridor east of Mariemont Square to Newtown Road (No Build)
 - 50-5: Eliminate pinch point on US 50 east of the Mariemont Square between East Street and Petoskey Avenue.
 - 50-8: US 50 road diet from east of Mariemont Square to Newtown Road.

The results of the US 50 Corridor Focus Area TransModeler intersection analysis are summarized in **Table 5a** and the results of the arterial analysis are summarized in **Table 5b**. The summary output is attached in the Appendix. All build alternatives at reduce vehicular delay during both the AM and PM peak hours except for the US 50 road diet. The road diet causes a significant increase in delay in the peak-direction during both the AM and PM peak hours. Based on the results of the TransModeler analysis, as well as collaboration with the advisory committee, the US 50 road diet alternative was eliminated.

Table 5a: US 50 Corridor Focus Area Intersection Summary

Identifier	Description	Time Period	TransModeler Results				
			2042 Delay (sec/veh)	2042 LOS	Percent Reduction	Max SB Queue (ft)	Percent Reduction
I-16	US 50 & Meadowlark Lane / Wooster Pike Intersection No Build	AM	15.9	B	--		
		PM	41.2	D	--		
I-16b	US 50 & Meadowlark Lane / Wooster Pike Roundabout	AM	15.1	C	5%		
		PM	17.4	C	58%		
I-15	US 50 & Watterson Road No Build	AM	11.3	B	--	150	--
		PM	39.8	D	--	550	--
I-15a	US 50 & Watterson Road extend SB RT	AM	10.9	B	4%	146	3%
		PM	30.7	C	23%	405	26%



**Eastern Corridor Segments II & III (PID 86462)
Summary of TransModeler Results**

Table 5b: US 50 Corridor Focus Area Arterial Summary

Roadway	Time Period	Direction	TransModeler Results							
			No Build		50-5			50-8		
			2042 Travel Speed (mph)	2042 LOS	2042 Travel Speed (mph)	2042 LOS	Percent Reduction	2042 Travel Speed (mph)	2042 LOS	Percent Reduction
US 50	AM	EB	25.8	C	27.6	C	-7%	25.3	C	2%
		WB	20.9	D	23.2	C	-11%	15.3	E	27%
	PM	EB	22.5	C	25.4	C	-13%	11.5	F	49%
		WB	21.0	D	23.2	C	-10%	21.2	D	-1%

Simulation videos were created comparing the I-16b build alternative to the no-build alternative for the PM peak-hour conditions and the 50-5 and 50-8 build alternatives to the no-build alternative for the AM and PM peak-hour conditions. The simulation videos can be found on the Eastern Corridor Segments II & III project website.

Appendix 1

ANCOR/SR 32 Hill Focus Area Alternatives

Signalized
Unsignalized
Roundabout

ANCOR/SR 32 Hill Focus Area -- 2042 No Build										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ 8 Mile Road	Overall		11.7	84.3						
	SR 32 EB	T	7.0	9.3	A	A	-	-		
	SR 32 WB	L	15.0	283.9	C	F	34	1145		1360
	8 Mile Road	L	22.5	3179.0	C	F	63	2782	76	3757

ANCOR/SR 32 Hill Focus Area -- 2042 Build I-3e										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ 8 Mile Road	Overall		12.6	14.5						
	SR 32 EB	T	0.0	0.0	A	A	-	-		
	SR 32 WB	L	20.2	21.1	C	C	53	60	83	105
	8 Mile Road	L	2.7	3.4	A	A	-	-		

ANCOR/SR 32 Hill Focus Area -- 2042 Build I-3h										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ 8 Mile Road	Overall		19.7	64.0						
	SR 32 EB	T	21.1	49.7	C	E	52	296	80	672
		TR	21.3	58.4	C	F	46	380		
	SR 32 WB	LT	21.1	19.2	C	C	128	82	149	119
		T	20.0	18.6	C	C	84	50		
	8 Mile Road	L	14.6	136.2	B	F	65	44	84	1244
R		15.8	308.1	C	F	63	1074			

Appendix 2
Newtown Focus Area Alternatives

Signalized
Unsignalized
Roundabout

Newtown Focus Area -- 2042 No Build										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ Church St	Overall		57.1	73.1	E	E				
	SR 32 EB	L	35.5	66.2	D	E	113	77	391	1006
		TR	19.2	59.3	B	E	253	878		
	SR 32 WB	L	40.4	79.9	D	E	55	168	997	681
		TR	38.3	33.7	D	C	745	518		
	Church St NB	L	143.4	272.9	F	F	51	282	1017	1469
		TR	123.7	158.8	F	F	840	1262		
	Church St SB	L	241.8	190.7	F	F	47	30	312	777
TR		56.2	64.3	E	E	300	577			
SR 32 @ Round Bottom Rd / River Hills Dr	Overall		36.6	63.1	D	E				
	SR 32 EB	L	63.0	97.9	E	F	86	88	286	1560
		TR	14.9	91.2	B	F	274	1313		
	SR 32 WB	L	37.6	119.3	D	F	41	74	1037	697
		T	32.9	38.7	C	D	627	436		
		R	25.5	16.3	C	B	219	137		
	River Hills Dr	L	61.8	45.7	E	D	92	79	133	221
		TR	87.7	98.0	F	F	88	154		
Round Bottom Rd	L	86.1	85.6	F	F	334	769	432	990	
	T	90.3	78.3	F	E	57	54			
SR 32 @ Ivy Hills Pl	Overall		13.6	15.7	B	B				
	SR 32 EB	TR	2.6	16.8	A	B	210	445	344	1210
	SR 32 WB	L	23.0	174.4	C	F	34	203	753	229
		T	17.5	4.8	B	A	546	210		
	Ivy Hills Pl	L	38.4	45.4	D	D	70	62	79	87
R		4.7	28.4	A	C	26	55			
SR 32 @ Little Dry Run Rd	Overall		14.8	40.3	B	D				
	SR 32 EB	TR	8.4	56.7	A	E	308	893	468	1890
	SR 32 WB	L	21.3	64.3	C	E	22	70	534	233
		T	11.4	4.1	B	A	352	216		
	Little Dry Run Rd	L	66.8	87.4	E	F	228	176	352	240
R		20.2	35.8	C	D	29	47			

Signalized
Unsignalized
Roundabout

Newtown Focus Area -- 2042 Build I-5a-I-6a										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ Church St	Overall		33.5	55.6	C	E				
	SR 32 EB	L	35.4	77.8	D	E	102	75	333	1113
		TR	25.3	71.7	C	E	277	932		
	SR 32 WB	L	24.8	48.9	C	D	78	176	446	260
		T	25.2	18.2	C	B	366	204		
		TR	23.1	22.4	C	C	127	118		
	Church St NB	L	67.4	148.7	E	F	55	237	621	566
		TR	58.7	62.7	E	E	503	472		
Church St SB	L	99.8	116.0	F	F	177	41	349	609	
	TR	37.2	55.3	D	E	273	484			
SR 32 @ Round Bottom Rd / River Hills Dr	Overall		18.7	32.9	B	C				
	SR 32 EB	L	21.2	23.8	C	C	57	81	146	333
		T	6.0	15.8	A	B	100	139		
		TR	5.4	14.3	A	B	94	138		
	SR 32 WB	L	10.4	30.2	B	C	35	40	394	322
		T	11.9	19.0	B	B	301	237		
		R	6.8	7.9	A	A	244	147		
	River Hills Dr	L	60.0	54.4	E	D	91	98	130	189
TR		79.6	107.7	E	F	95	149			
Round Bottom Rd	L	78.4	75.0	E	E	171	401	205	582	
	T	89.3	72.3	F	E	64	69			
SR 32 @ Ivy Hills Pl	Overall		6.9	3.9	A	A				
	SR 32 EB	T	2.0	3.0	A	A	144	142	240	379
		TR	1.9	2.0	A	A	66	97		
	SR 32 WB	L	12.7	21.6	B	C	35	50	319	244
		T	8.3	3.9	A	A	211	168		
	Ivy Hills Pl	L	34.4	34.4	C	C	62	65	71	82
R		3.7	12.1	A	B	27	43			
SR 32 @ Little Dry Run Rd	Overall		12.7	12.8	B	B				
	SR 32 EB	T	7.2	14.2	A	B	203	466	369	936
		R	4.2	4.7	A	A	32	33		
	SR 32 WB	L	18.5	26.7	B	C	36	53	494	275
		T	10.9	4.6	B	A	330	209		
	Little Dry Run Rd	L	45.8	60.9	D	E	172	131	231	178
R		11.7	32.3	B	C	29	51			

Signalized
Unsignalized
Roundabout

Newtown Focus Area -- 2042 Build I-5b-2										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ Church St	Overall		37.1	73.3	D	E				
	SR 32 EB	L	31.6	120.7	C	F	84	61	310	1515
		TR	18.4	120.0	B	F	251	1201		
	SR 32 WB	L	24.5	43.2	C	D	65	109	599	424
		TR	27.2	22.5	C	C	445	256		
	Church St NB	L	85.9	181.1	F	F	51	547	834	860
		TR	69.2	93.5	E	F	545	994		
	Church St SB	L	179.8	65.6	F	E	36	30	279	460
TR		51.2	35.5	D	D	254	372			
SR 32 @ Round Bottom Rd / River Hills Dr	Overall		13.0	60.1	B	F				
	SR 32 EB	LT	11.4	33.1	B	D	101	133	125	913
		TR	9.3	14.2	A	B	52	135		
	SR 32 WB	LT	14.0	129.3	B	F	104	261	201	1640
		R	5.6	29.1	A	D	94	95		
	River Hills Dr	LTR	14.9	726.1	B	F	70	1088	108	1127
	Round Bottom Rd	L	34.2	35.3	D	E	148	465	214	726
		TR	32.2	29.8	D	D	76	131		
SR 32 @ Ivy Hills Pl	Overall		5.1	45.2	A	D				
	SR 32 EB	TR	1.8	51.1	A	D	90	1127	209	1657
	SR 32 WB	L	11.9	116.0	B	F	35	113	423	1303
		T	5.1	38.8	A	D	201	824		
	Ivy Hills Pl	L	54.5	65.3	D	E	59	73	84	90
		R	5.0	40.4	A	D	36	51		
SR 32 @ Little Dry Run Rd	Overall		11.8	49.6	B	D				
	SR 32 EB	TR	6.4	76.3	A	E	209	789	374	2818
	SR 32 WB	L	13.4	39.4	B	D	22	49	395	300
		T	8.8	4.1	A	A	295	197		
	Little Dry Run Rd	L	53.3	57.7	D	E	173	123	261	143
		R	13.0	28.4	B	C	31	48		

Signalized
Unsignalized
Roundabout

Newtown Focus Area -- 2042 Build I-4c										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ Church St	Overall		32.1	109.2	C	F				
	SR 32 EB	L	29.4	148.0	C	F	77	80	248	2063
		TR	18.4	144.3	B	F	203	1464		
	SR 32 WB	L	18.5	58.6	B	E	57	118	726	515
		TR	18.5	34.5	B	C	274	396		
	Church St NB	L	87.0	487.6	F	F	60	1546	716	2640
		TR	74.6	291.8	E	F	591	1855		
	Church St SB	L	81.7	76.0	F	E	210	-	236	498
TR		22.8	38.0	C	D	168	393			
SR 32 @ Round Bottom Rd / River Hills Dr	Overall		39.7	64.9	D	E				
	SR 32 EB	L	49.4	97.3	D	F	57	78	276	1446
		TR	20.1	139.7	C	F	227	1260		
	SR 32 WB	L	48.7	84.0	D	F	40	68	1198	387
		T	45.6	24.0	D	C	694	212		
	River Hills Dr	R	37.8	8.3	D	A	213	126	122	313
		L	41.8	31.5	D	C	67	60		
	Round Bottom Rd	TR	49.2	136.6	D	F	75	241	285	645
L		55.5	58.0	E	E	221	514			
T	67.8	43.9	E	D	56	46				
SR 32 @ Ivy Hills Pl	Overall		16.6	6.1	B	A				
	SR 32 EB	TR	1.4	5.2	A	A	150	206	339	698
	SR 32 WB	L	26.5	45.6	C	D	23	61	927	214
		T	22.0	2.6	C	A	486	142		
	Ivy Hills Pl	L	56.7	53.7	E	D	72	74	82	101
R		4.6	19.8	A	B	34	49			
SR 32 @ Little Dry Run Rd	Overall		21.4	23.8	C	C				
	SR 32 EB	T	10.4	19.9	B	B	215	339	307	549
		R	4.6	14.6	A	B	33	46		
	SR 32 WB	L	81.9	72.7	F	E	49	52	77	87
	Little Dry Run Rd	L	50.3	58.2	D	E	159	128	222	168
R		50.0	46.0	D	D	37	48			

Appendix 3

SR 125/SR 32 Focus Area Alternatives

Signalized
Unsignalized
Roundabout

SR 125/SR 32 Focus Area -- 2042 No Build										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ Clough Pike	Overall		49.9	13.0	D	B				
	SR 32 NB	T	14.2	9.3	B	A	118	186	164	267
		R	0.6	1.2	A	A	-	-		
	SR 32 SB	T	16.6	7.3	B	A	214	119	312	155
Clough Pike	TR	113.6	48.1	F	D	1383	295	1952	425	

SR 125/SR 32 Focus Area -- 2042 Build I-7b										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ Clough Pike	Overall		0.2	0.2	A	A				
	SR 32 NB	T	0.1	0.1	A	A	-	27		
		R	0.0	0.0	A	A	-	-		
	SR 32 SB	T	0.0	0.0	A	A	-	-		
Clough Pike	R	16.7	22.5	C	C	35	-			

SR 125/SR 32 Focus Area -- 2042 Build I-7c										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ Clough Pike	Overall		19.5	40.1	C	E				
	SR 32 NB	T	15.9	17.7	C	C	105	81		89
	SR 32 SB	LT	26.5	19.7	D	C	81	34	91	82
		T	22.0	18.4	C	C	54	19		
	Clough Pike	L	17.1	85.6	C	F	79	288	120	709
LR		18.3	124.7	C	F	71	528			

SR 125/SR 32 Focus Area -- 2042 Build I-7d										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 32 @ Clough Pike	Overall		14.1	13.2	B	B				
	SR 32 NB	T	25.4	17.2	C	B	131	220	186	277
		R	1.7	2.7	A	A	49	107		
	SR 32 SB	L	53.0	61.1	D	E	24	34		
Clough Pike	TR	13.2	25.6	B	C	194	171	360	285	

Signalized
Unsignalized
Roundabout

SR 125/SR 32 Focus Area -- 2042 Build X-1g										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
SR 125 @ SR 32 Ramps	Overall		14.4	44.7	B	E				
	SR 125 EB	LT	13.4	17.7	B	C	-	87		95
		T	4.9	16.9	A	C	-	21		
	SR 125 WB	LT	18.3	14.8	C	B	-	37		383
		T	14.0	14.0	B	B	-	393		
SR 32 On-Ramp	R	12.0	1271.0	B	F	-	1407		1956	

Appendix 4

Combined Linwood-Eastern Interchange and US 50/Red Bank Interchange Focus Area Alternatives

Signalized
Unsignalized
Roundabout

Linwood-Eastern Interchange Focus Area -- 2042 No Build										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Beechmont Ave @ Linwood Ave	Overall		28.8	22.5	D	C				
	Beechmont Ave SB	L	143.9	17.4	F	C	257	50	303	172
		T	0.3	1.2	A	A	24	33		
	Beechmont Ave NB	TR	4.4	1.9	A	A	-	21		
	Linwood Ave	L	2308.9	2454.4	F	F	588	531	1343	863
R		461.9	386.5	F	F	255	165			

Linwood-Eastern Interchange Focus Area -- 2042 Build I-29a-X-3b										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Beechmont Ave @ Linwood Ave	Overall		16.9	24.5	C	C				
	Beechmont Ave SB	LT	14.4	32.9	B	D	73	248	171	342
		T	13.2	25.6	B	D	64	201		
	Beechmont Ave NB	T	14.1	12.1	B	B	80	74		
		TR	13.4	11.2	B	B	64	56		
	Linwood Ave	L	73.0	41.2	F	E	146	202	164	319
LR		38.5	35.0	E	D	85	207			

Linwood-Eastern Interchange Focus Area -- 2042 Build I-29b-X-3b										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Beechmont Ave @ Linwood Ave	Overall		18.4	40.6	B	D				
	Beechmont Ave SB	L	19.6	65.9	B	E	60	72	297	1277
		T	4.8	56.2	A	E	210	538		
	Beechmont Ave NB	T	26.7	17.5	C	B	323	252	503	383
		TR	18.2	13.0	B	B	113	126		
	Linwood Ave	L	46.0	62.9	D	E	88	212	107	251
R		27.3	31.6	C	C	57	86			

Signalized
Unsignalized
Roundabout

Linwood-Eastern Interchange Focus Area -- 2042 Build X-2b-2										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Wooster Rd @ Beechmont Cir	Overall		13.9	46.4	B	D				
	Wooster Rd NB	T	13.6	2.1	B	A	330	66	395	104
		R	8.0	0.7	A	A	26	33		
	Wooster Rd SB	L	10.9	64.8	B	E	57	60	123	550
		T	4.6	61.0	A	E	98	414		
SR 125 WB Ramp	L	64.2	48.2	E	D	101	67	144	89	
Wilmer Ave @ Beechmont Cir	Overall		10.8	39.3	B	D				
	Wilmer Ave SB	L	8.6	33.8	A	C	56	369	95	518
		T	2.3	5.4	A	A	74	127		
	Wilmer Ave NB	T	8.9	31.4	A	C	213	226	332	312
		R	2.0	20.1	A	C	47	179		
	SR 125 EB Ramp	L	59.8	289.1	E	F	112	546	163	1558
		R	18.0	120.6	B	F	127	68		

Linwood-Eastern Interchange Focus Area -- 2042 Build X-2b-5										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Wooster Rd @ Beechmont Cir	Overall		6.0	12.6	A	B				
	Wooster Rd NB	LTR	0.7	1.0	A	A	51	51	220	
	Wooster Rd SB	LT	10.8	16.3	B	C	43	91	66	259
		T	10.5	15.1	B	C	35	116		
SR 125 WB Ramp	L	22.5	11.1	C	B	66	38	118		
Wilmer Ave @ Beechmont Cir	Overall		11.1	73.6	B	F				
	Wilmer Ave SB	L	12.3	16.8	B	C	27	128		206
		T	0.1	1.4	A	A	-	-		
	Wilmer Ave NB	T	16.3	441.8	C	F	85	1880	106	2351
	SR 125 EB Ramp	L	24.1	13.2	C	B	66	51	99	118

US 50 No Build

US 50 Northbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
SR 125 Off Ramp	0.47	0.47	47.0	0.60	43.3	0.66
End of Network	0.56	1.04	47.4	0.71	46.3	0.73
			47.2	1.32	44.9	1.39

Wooster Rd / Beechmont Circle / Wilmer Ave Northbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
End Wilmer Ave, Start Beechmont Circle	0.42	0.42	31.0	0.82	20.9	1.22
End Beechmont Circle, Start Wooster Rd	0.34	0.77	26.8	0.77	12.1	1.70
End of Network	0.29	1.06	34.6	0.51	35.4	0.50
			30.3	2.10	18.6	3.42

US 50 Build Alternative X-3a-2

US 50 Northbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
SR 125 Off Ramp	0.47	0.47	47.0	0.60	43.4	0.65
SR 125 WB On Ramp	0.31	0.79	46.8	0.40	46.0	0.41
End of Network	0.24	1.03	45.1	0.32	45.3	0.32
			46.5	1.33	44.6	1.39

Wooster Rd / Beechmont Circle / Wilmer Ave Northbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
End Wilmer Ave, Start Beechmont Circle	0.42	0.42	31.4	0.81	28.0	0.91
End Beechmont Circle, Start Wooster Rd	0.34	0.77	26.7	0.77	25.3	0.81
End of Network	0.29	1.06	35.2	0.50	36.2	0.48
			30.6	2.07	28.8	2.20

US 50 No Build

US 50 Southbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
SR 125 WB On Ramp	0.35	0.35	48.7	0.43	49.2	0.4
SR 125 EB On Ramp	0.19	0.54	42.1	0.27	44.1	0.3
End of Network	0.49	1.04	44.0	0.68	45.3	0.7
			45.1	1.38	46.3	1.34

Wooster Rd / Beechmont Circle / Wilmer Ave Southbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
End Wooster Rd, Start Beechmont Circle	0.29	0.29	34.6	0.51	11.2	1.6
End Beechmont Circle, Start Wilmer Ave	0.33	0.62	21.5	0.92	10.6	1.9
End of Network	0.42	1.05	38.5	0.66	37.9	0.7
			30.1	2.09	15.3	4.12

US 50 Build Alternative X-3a-2

US 50 Southbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
SR 125 WB On Ramp	0.34	0.34	47.2	0.44	46.3	0.4
SR 125 Off Ramp	0.09	0.43	37.7	0.14	37.6	0.1
SR 125 EB On Ramp	0.10	0.54	45.0	0.14	46.6	0.1
End of Network	0.49	1.03	44.0	0.67	45.6	0.7
			44.5	1.39	45.1	1.37

Wooster Rd / Beechmont Circle / Wilmer Ave Southbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
End Wooster Rd, Start Beechmont Circle	0.29	0.29	34.3	0.52	33.3	0.5
End Beechmont Circle, Start Wilmer Ave	0.33	0.62	24.4	0.80	22.1	0.9
End of Network	0.42	1.05	38.4	0.66	37.2	0.7
			31.7	1.98	29.8	2.11

Signalized
Unsignalized
Roundabout

US 50/Red Bank Interchnage Focus Area -- 2042 No Build										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Wooster Rd @ Red Bank Rd / Wooster Pike	Overall		27.3	31.2	C	C				
	Red Bank Rd EB	T	38.1	38.6	D	D	92	81	192	409
		R	10.3	20.0	B	B	133	368		
	Wooster Pike WB	L	43.7	72.7	D	E	93	215	120	401
		T	29.5	14.9	C	B	35	51		
	Wooster Rd NB	L	37.6	50.3	D	D	610	392	821	751
R		5.2	3.4	A	A	49	49			
Red Bank Rd @ Colbank Rd	Overall		58.8	39.9	E	D				
	Colbank Rd WB	L	15.9	28.4	B	C	72	61	325	204
		R	18.7	9.6	B	A	272	142		
	Red Bank Rd NB	TR	125.9	26.6	F	C	1232	377	2298	605
	Red Bank Rd SB	L	46.3	121.7	D	F	115	632	204	639
		T	11.5	7.9	B	A	131	195		

Signalized
Unsignalized
Roundabout

US 50/Red Bank Interchnage Focus Area -- 2042 Build I-25b										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Red Bank Rd @ Colbank Rd	Overall		20.0	21.0	C	C				
	Colbank Rd WB	L	51.6	40.0	D	D	39	58	272	118
		R	14.0	9.2	B	A	135	126		
	Red Bank Rd NB	T	17.8	29.7	B	C	263	329	290	604
		TR	18.6	29.8	B	C	285	388		
	Red Bank Rd SB	L	54.6	40.9	D	D	114	351	185	567
T		7.5	6.0	A	A	90	215			
Colbank Rd @ US 50 WB Ramp	Overall		4.3	4.9	A	A				
	Colbank Rd EB	L	0.1	0.1	A	A	66	25		
		T	0.0	0.0	A	A	-	-		
	Colbank Rd WB	T	6.2	14.2	A	B	145	145	85	170

US 50/Red Bank Interchnage Focus Area -- 2042 Build I-25c										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Red Bank Rd @ Colbank Rd	Overall		24.2	18.7	C	B				
	Red Bank Rd EB	L	40.6	41.1	D	D	240	242	394	318
		TR	21.0	23.7	C	C	27	47		
	US 50 Ramps WB	LT	0.0	0.0	A	A	-	-	92	85
		R	13.4	8.1	B	A	64	61		
	Colbank Rd NB	L	31.8	31.7	C	C	49	32	211	161
		T	24.7	33.3	C	C	114	91		
		TR	24.9	31.3	C	C	107	96		
	Red Bank Rd SB	L	26.0	26.8	C	C	62	161	84	245
		T	20.8	16.4	C	B	61	62		

Signalized
Unsignalized
Roundabout

US 50/Red Bank Interchnage Focus Area -- 2042 Build X-4d										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Red Bank Rd @ US 50 WB	Overall		7.9	11.9	A	B				
	US 50 WB Ramps WB	L	46.2	69.8	D	E	45	42	74	88
		R	13.9	9.6	B	A	54	59		
	Red Bank Rd NB	T	6.8	13.5	A	B	132	161	314	327
		TR	9.0	14.2	A	B	119	154		
	Red Bank Rd SB	L	20.3	26.0	C	C	70	254	120	305
T		3.7	4.4	A	A	120	167			
Red Bank Rd @ US 50 EB	Overall		2.7	2.9	A	A				
	US 50 EB Ramps WB	L	62.9	79.9	E	E	40	34	39	41
	Red Bank Rd NB	TR	2.9	2.4	A	A	198	64	153	11
	Red Bank Rd SB	L	4.2	3.7	A	A	45	53	108	93
		T	1.2	2.5	A	A	-	185		
Wooster Rd @ Red Bank Rd / Wooster Pike	Overall		11.9	13.4	B	B				
	Old Red Bank Rd EB	L	58.9	58.8	E	E	29	49	66	62
		TR	34.6	40.0	C	D	52	51		
	Wooster Pike WB	L	44.3	52.7	D	D	80	114	120	134
		TR	30.3	26.1	C	C	55	55		
	Wooster Rd NB	L	12.7	22.1	B	C	39	21	473	233
		TR	10.9	9.2	B	A	122	236		
	Red Bank Rd SB	L	21.8	17.7	C	B	43	45	75	588
TR		3.5	7.8	A	A	77	167			

Signalized
Unsignalized
Roundabout

US 50/Red Bank Interchnage Focus Area -- 2042 Build X-4d										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
Red Bank Rd @ US 50 WB	Overall		10.8	13.6	B	B				
	US 50 WB Ramps WB	L	44.4	58.2	D	E	46	36	89	88
		R	14.0	8.8	B	A	50	55		
	Red Bank Rd NB	T	12.1	16.2	B	B	173	185	817	303
		TR	12.0	17.2	B	B	156	167		
	Red Bank Rd SB	L	20.5	30.0	C	C	66	265	122	402
T		3.9	4.8	A	A	154	170			
Red Bank Rd @ US 50 EB	Overall		7.2	2.1	A	A				
	US 50 EB Ramps WB	L	362.4	52.8	F	F	98	36	115	36
	Red Bank Rd NB	TR	0.0	0.0	A	A	-	-		
	Red Bank Rd SB	L	75.9	13.7	F	B	168	52	203	58
		T	1.1	1.2	A	A	-	-		
Wooster Rd @ Red Bank Rd / Wooster Pike	Overall		15.7	14.1	C	B				
	Old Red Bank Rd EB	LTR	13.4	20.8	B	C	30	48	19	53
	Wooster Pike WB	LTR	5.0	4.0	A	A	37	56	34	63
	Wooster Rd NB	LTR	19.0	13.3	C	B	174	84	369	137
	Red Bank Rd SB	LTR	12.0	16.9	B	C	80	204	98	349

Appendix 5
US 50 Corridor Focus Area Alternatives

Signalized
Unsignalized
Roundabout

US 50 Corridor Focus Area -- 2042 No Build										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
			Overall			15.9	41.2	B	D	
US 50 @ Wooster Pike / Meadowlark Ln	US 50 EB	L	30.4	63.8	C	E	34	62	199	1522
		T	10.5	72.6	B	E	158	1212		
		R	3.9	22.6	A	C	57	107		
	US 50 WB	L	19.2	43.6	B	D	50	130	718	632
		TR	15.3	13.8	B	B	420	328		
	Wooster Pike NB	LT	44.0	49.4	D	D	79	197	109	410
		R	9.5	27.0	A	C	59	175		
	Meadowlark Ln SB	LT	52.6	74.4	D	E	97	97	163	148
R		23.3	22.4	C	C	50	58			
Overall			11.3	39.8	B	D				
US 50 @ Watterson Rd	US 50 EB	L	31.9	68.6	C	E	56	27	300	2158
		TR	5.4	56.7	A	E	206	782		
	US 50 WB	L	21.1	59.0	C	E	38	28	639	557
		TR	11.1	9.1	B	A	300	296		
	Driveway NB	LTR	38.8	30.1	D	C	36	56	29	55
	Watteron Rd SB	LT	31.1	62.6	C	E	82	370	150	550
R		20.1	48.4	C	D	60	58			

Signalized
Unsignalized
Roundabout

US 50 Corridor Focus Area -- 2042 Build I-16b										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
US 50 @ Wooster Pike / Meadowlark Ln	Overall		15.1	17.4	C	C				
	US 50 EB	LT	13.6	14.3	B	B	62	118	106	181
		TR	12.9	13.2	B	B	45	60		
	US 50 WB	LT	17.4	16.0	C	C	52	111	149	202
		TR	17.0	15.5	C	C	81	100		
	Wooster Pike NB	LT	14.0	39.6	B	E	41	425	35	716
		R	10.5	22.8	B	C	27	93		
Meadowlark Ln SB	LTR	15.3	10.1	C	B	57	33	84	36	
US 50 @ Watterson Rd	Overall		11.4	42.4	B	D				
	US 50 EB	L	29.0	35.7	C	D	60	36	259	1750
		TR	4.0	26.5	A	C	173	664		
	US 50 WB	L	21.1	52.1	C	D	27	25	673	399
		TR	9.9	8.6	A	A	287	259		
	Driveway NB	LTR	56.0	38.3	E	D	28	47	31	59
	Watteron Rd SB	LT	44.0	167.2	D	F	123	769	197	773
R		20.6	149.3	C	F	50	125			

Signalized
Unsignalized
Roundabout

US 50 Corridor Focus Area -- 2042 Build I-15a										
Intersection	Approach	Lane Group	Delay (s)		Level of Service		95th % Queue (ft)		Maximum Queue Length (ft)	
			AM	PM	AM	PM	AM	PM	AM	PM
US 50 @ Watterson Rd	Overall		10.9	30.7	B	C				
	US 50 EB	L	24.2	54.3	C	D	48	32	286	1130
		TR	2.8	39.5	A	D	157	177		
	US 50 WB	L	19.2	50.7	B	D	26	25	621	156
		TR	10.1	8.8	B	A	360	134		
	Driveway NB	LTR	57.5	37.2	E	D	29	43	30	58
	Watteron Rd SB	LT	44.6	60.3	D	E	111	292	146	405
		R	20.2	10.8	C	B	51	58		

US 50 No Build

US 50 Eastbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
Madisonville Rd	0.12	0.12	17.4	0.40	12.7	0.54
Pocahontas Ave	0.30	0.42	23.4	0.77	22.4	0.80
Mariemont Plaza	0.10	0.51	25.2	0.24	21.5	0.28
Spring Hill Dr	0.15	0.66	20.4	0.44	17.9	0.50
Walton Creek Rd	0.16	0.82	22.1	0.43	16.0	0.60
Newtown Rd	0.45	1.28	29.1	0.93	27.2	1.00
End of Network	0.31	1.59	39.3	0.48	36.8	0.51
			25.8	3.69	22.5	4.23

US 50 No Build

US 50 Westbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
Newtown Rd	0.31	0.31	20.0	0.94	23.3	0.8
Walton Creek Rd	0.45	0.77	28.6	0.95	27.9	1.0
Spring Hill Dr	0.16	0.93	22.5	0.43	21.8	0.4
Mariemont Plaza	0.15	1.07	17.1	0.52	21.6	0.4
Pocahontas Ave	0.10	1.17	10.5	0.56	8.1	0.7
Miami Rd	0.27	1.45	22.0	0.75	22.5	0.7
Madisonville Rd	0.02	1.47	10.2	0.14	8.3	0.2
End of Network	0.12	1.59	26.6	0.27	27.0	0.3
			20.9	4.56	21.0	4.54

US 50 Build Alternative 50-5

US 50 Eastbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
Madisonville Rd	0.12	0.12	16.4	0.42	12.9	0.53
Pocahontas Ave	0.33	0.44	26.2	0.75	26.6	0.74
Mariemont Plaza	0.10	0.54	27.6	0.21	25.1	0.24
Spring Hill Dr	0.15	0.69	23.3	0.38	20.9	0.43
Walton Creek Rd	0.16	0.85	24.3	0.40	19.9	0.48
Newtown Rd	0.45	1.30	31.0	0.88	30.1	0.90
End of Network	0.31	1.62	40.3	0.46	38.0	0.49
			27.6	3.51	25.4	3.81

US 50 Build Alternative 50-5

US 50 Westbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
Newtown Rd	0.31	0.31	21.8	0.86	23.0	0.8
Walton Creek Rd	0.45	0.77	25.5	1.07	28.1	1.0
Spring Hill Dr	0.16	0.93	26.7	0.36	21.3	0.5
Mariemont Plaza	0.15	1.07	27.3	0.33	25.7	0.3
Pocahontas Ave	0.10	1.17	18.3	0.32	17.9	0.3
Miami Rd	0.29	1.47	22.4	0.79	22.8	0.8
Madisonville Rd	0.02	1.49	8.9	0.16	6.9	0.2
End of Network	0.12	1.61	26.3	0.27	26.9	0.3
			23.2	4.16	23.2	4.16

US 50 Build Alternative 50-8

US 50 Eastbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
Madisonville Rd	0.12	0.12	15.9	0.44	4.8	1.43
Pocahontas Ave	0.30	0.42	22.1	0.82	6.2	2.90
Mariemont Plaza	0.09	0.51	25.2	0.23	8.5	0.66
Spring Hill Dr	0.15	0.66	20.5	0.45	8.4	1.09
Walton Creek Rd	0.16	0.82	21.1	0.45	11.6	0.82
Newtown Rd	0.45	1.28	29.7	0.92	30.5	0.89
End of Network	0.31	1.59	39.8	0.47	39.7	0.47
			25.3	3.77	11.5	8.28

US 50 Build Alternative 50-8

US 50 Westbound	Segment Distance (mi)	Cumul. Distance (mi)	AM		PM	
			Avg. Speed (mph)	Avg. Travel Time (min)	Avg. Speed (mph)	Avg. Travel Time (min)
Start of Network	0.00	0.00				
Newtown Rd	0.31	0.31	21.8	0.86	22.8	0.8
Walton Creek Rd	0.45	0.77	12.9	2.11	25.1	1.1
Spring Hill Dr	0.16	0.93	11.7	0.82	18.5	0.5
Mariemont Plaza	0.15	1.08	11.5	0.80	23.0	0.4
Pocahontas Ave	0.09	1.17	9.6	0.59	12.8	0.4
Miami Rd	0.28	1.45	25.9	0.64	22.7	0.7
Madisonville Rd	0.02	1.47	9.3	0.16	5.9	0.2
End of Network	0.12	1.59	27.1	0.27	26.6	0.3
			15.3	6.24	21.2	4.52