APPENDIX F. OPERATIONS ANALYSIS RESULTS

APPENDIX F-1: EXISTING CONDITIONS HCS RESULTS

APPENDIX F-2: NO-BUILD CONDITIONS HCS RESULTS

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APPENDIX F-4: EXISTING CONDITIONS SYNCHRO RESULTS

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APPENDIX F-7: EXISTING CONDITIONS SIMTRAFFIC RESULTS

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APPENDIX F-9: BUILD CONDITIONS SIMTRAFFIC RESULTS

APPENDIX F-10: BUILD CONDITIONS SIDRA RESULTS

APPENDIX F-1: EXISTING CONDITIONS HCS RESULTS

HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2019
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.927	2653	7200	0.37	72.2	12.2	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.85	0.927	0.947	2653	916	7200	2100	0.37	0.44	68.2	64.9	13.0	20.8	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.918	1807	7200	0.25	72.2	8.3	A

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.85	0.918	0.960	2487	680	7200	2100	0.35	0.32	68.3	66.0	12.1	15.0	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.929	2435	7200	0.34	72.0	11.2	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	71.3	11.0	10.2	2.40	B

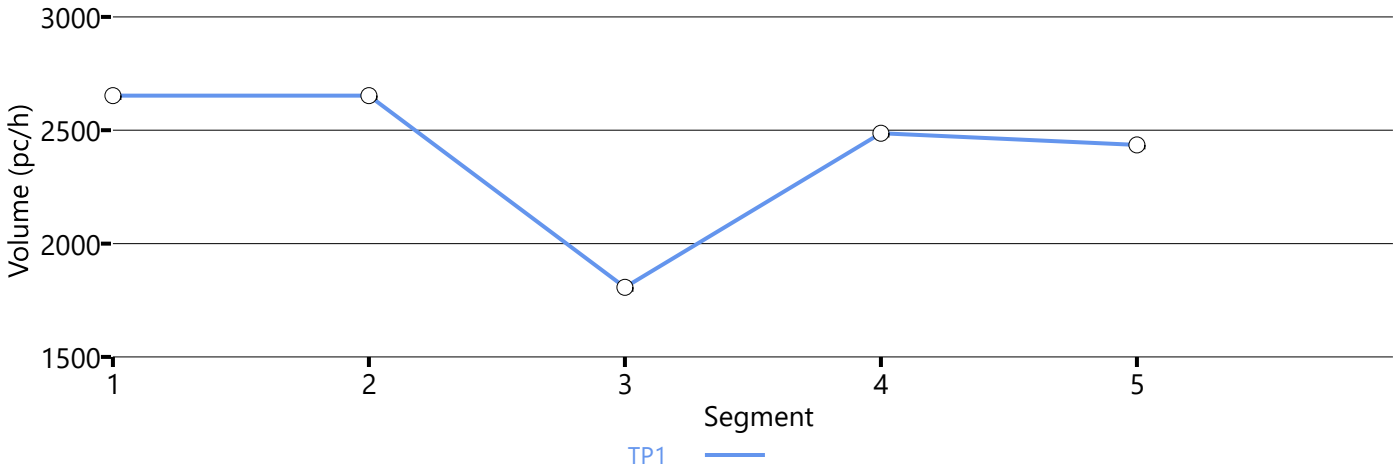
Facility Overall Results

Space Mean Speed, mi/h	71.3	Density, veh/mi/ln	10.2
Average Travel Time, min	2.40	Density, pc/mi/ln	11.0

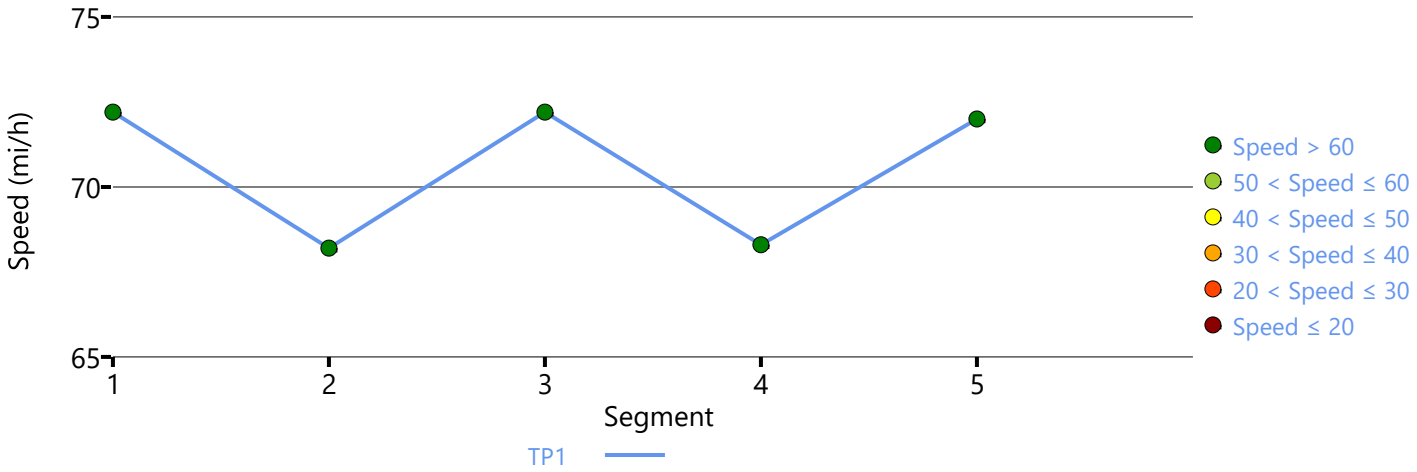
Messages

Comments

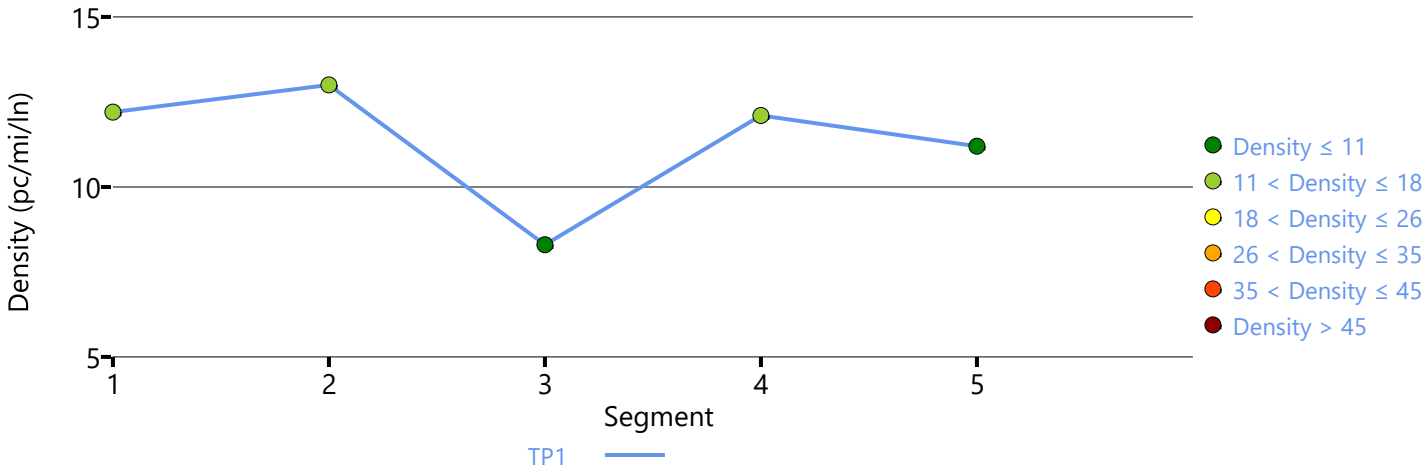
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2019
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 WB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.951	4583	7200	0.64	70.2	21.8	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.88	0.951	0.991	4583	1973	7200	2100	0.64	0.94	65.8	61.7	23.2	32.6	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.922	2699	7200	0.37	72.1	12.5	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.88	0.922	0.984	3323	624	7200	2100	0.46	0.30	67.9	65.5	16.3	18.7	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.933	3296	7200	0.46	72.0	15.2	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.0	17.7	16.6	2.40	B

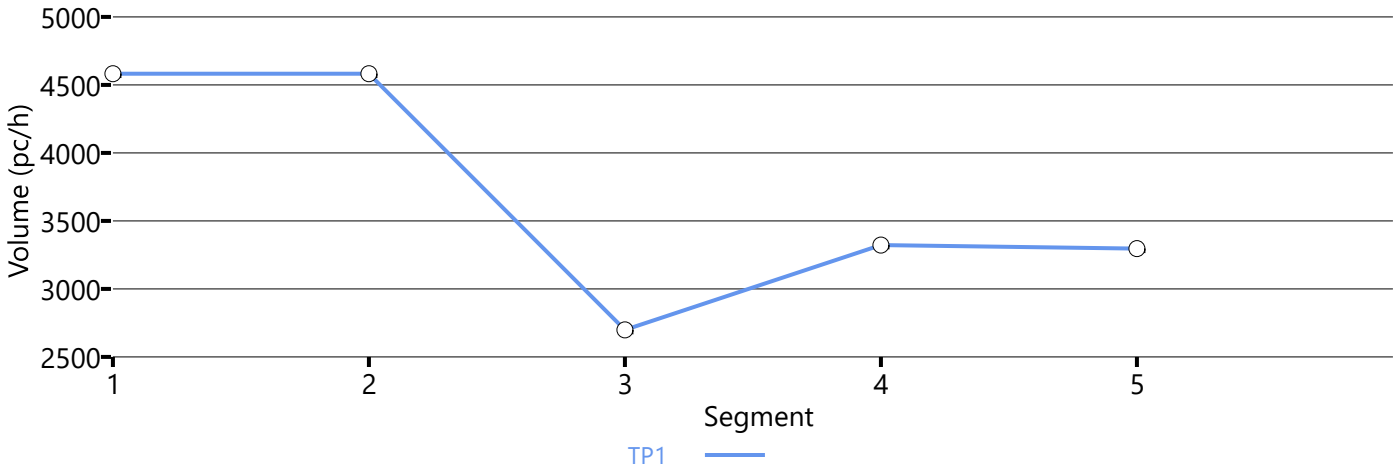
Facility Overall Results

Space Mean Speed, mi/h	70.0	Density, veh/mi/ln	16.6
Average Travel Time, min	2.40	Density, pc/mi/ln	17.7

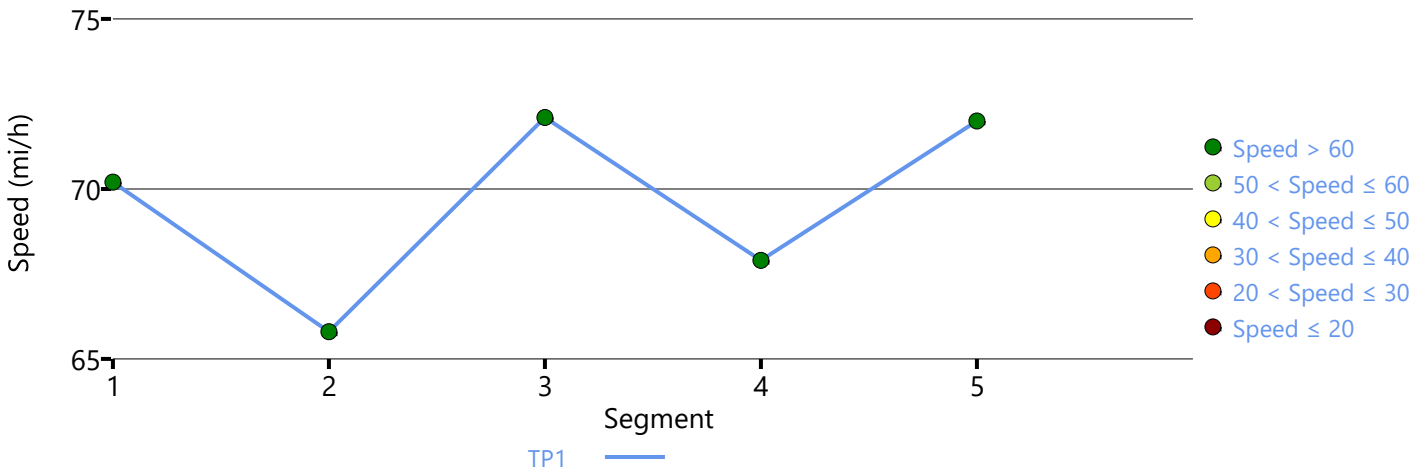
Messages

Comments

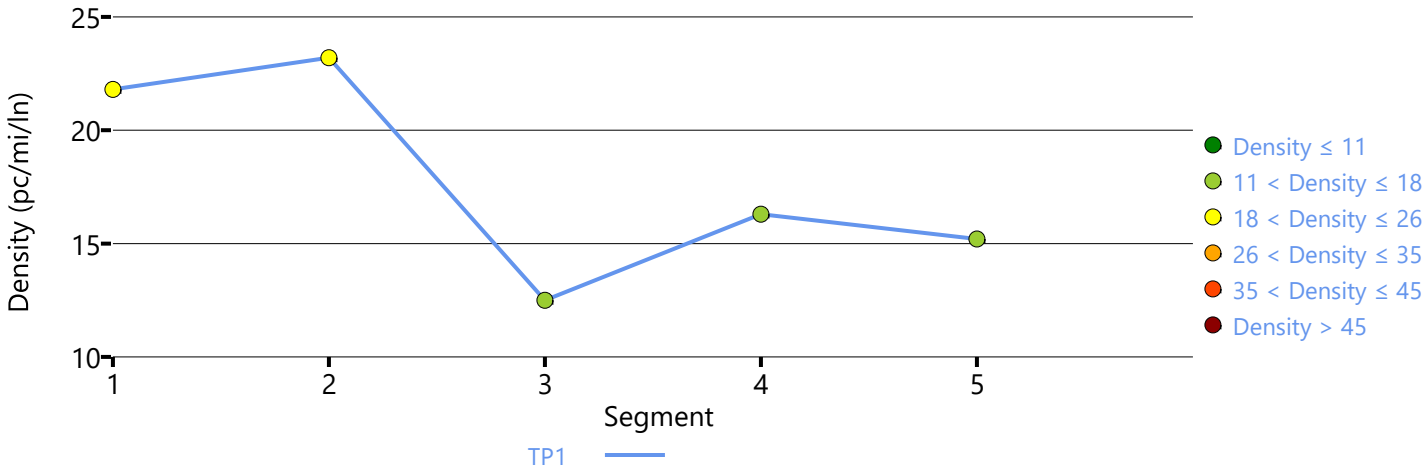
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2019
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.90		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	750	3
2	Diverge	Diverge	I-182 WB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 WB at Broadmoor	3800	3
4	Merge	Merge	I-182 WB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.911	2475	7200	0.34	72.2	11.4	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.88	0.911	0.951	2475	490	7200	2100	0.34	0.23	69.7	66.1	11.8	18.2	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.901	2007	7200	0.28	72.2	9.3	A

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.88	0.901	0.979	3630	1623	7200	2100	0.50	0.77	66.1	64.0	18.3	23.9	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.934	3563	7200	0.49	72.0	16.5	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.5	13.0	11.8	1.60	B

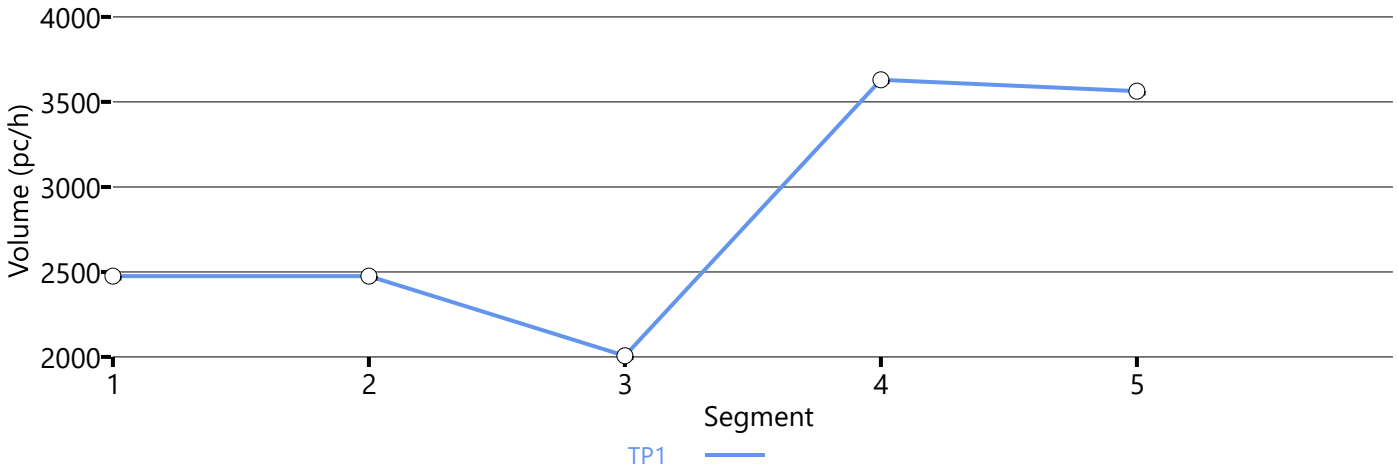
Facility Overall Results

Space Mean Speed, mi/h	70.5	Density, veh/mi/ln	11.8
Average Travel Time, min	1.60	Density, pc/mi/ln	13.0

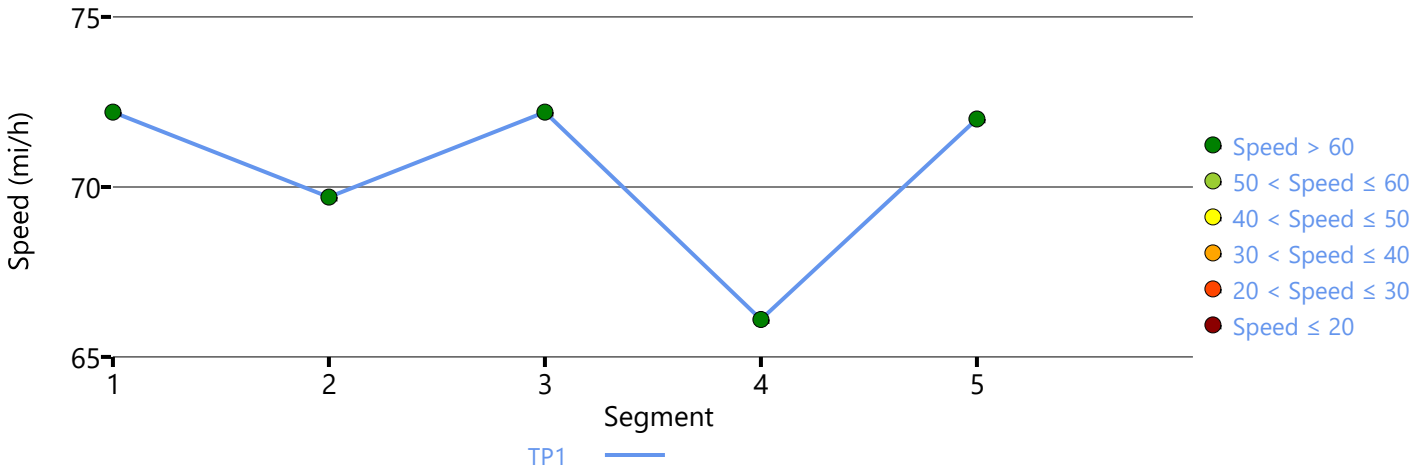
Messages

Comments

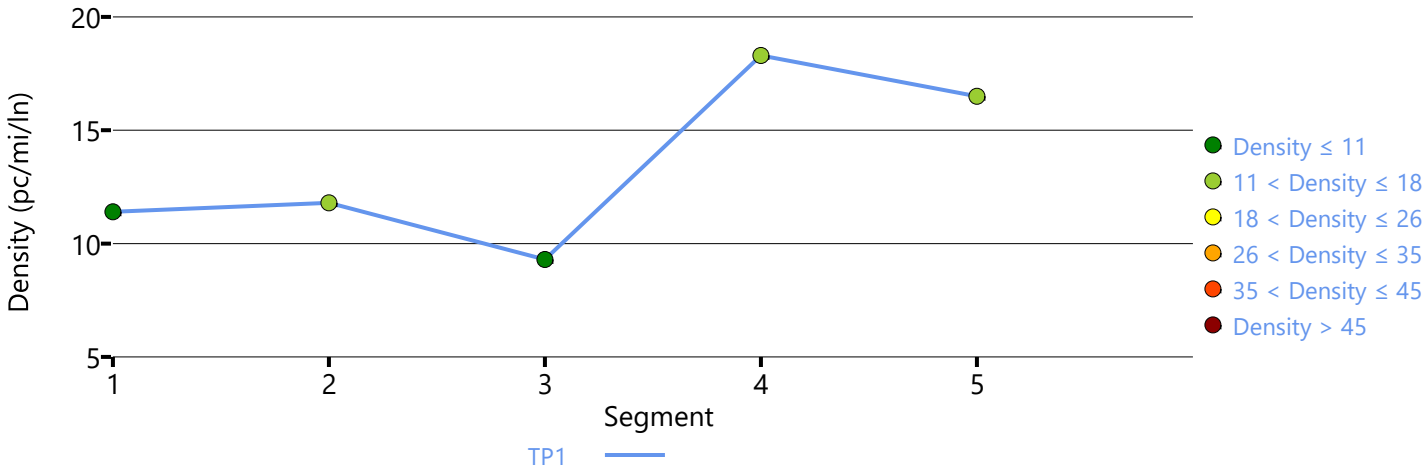
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2019
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.90		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	750	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	3800	3
4	Merge	Merge	I-182 WB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.953	2916	7200	0.41	72.2	13.5	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.86	0.953	0.991	2916	661	7200	2100	0.41	0.31	69.4	65.6	14.0	20.9	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.943	2298	7200	0.32	72.2	10.6	A

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.86	0.943	0.986	3484	1186	7200	2100	0.48	0.56	66.8	64.5	17.4	22.0	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.957	3407	7200	0.47	72.0	15.7	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.7	13.6	12.9	1.60	B

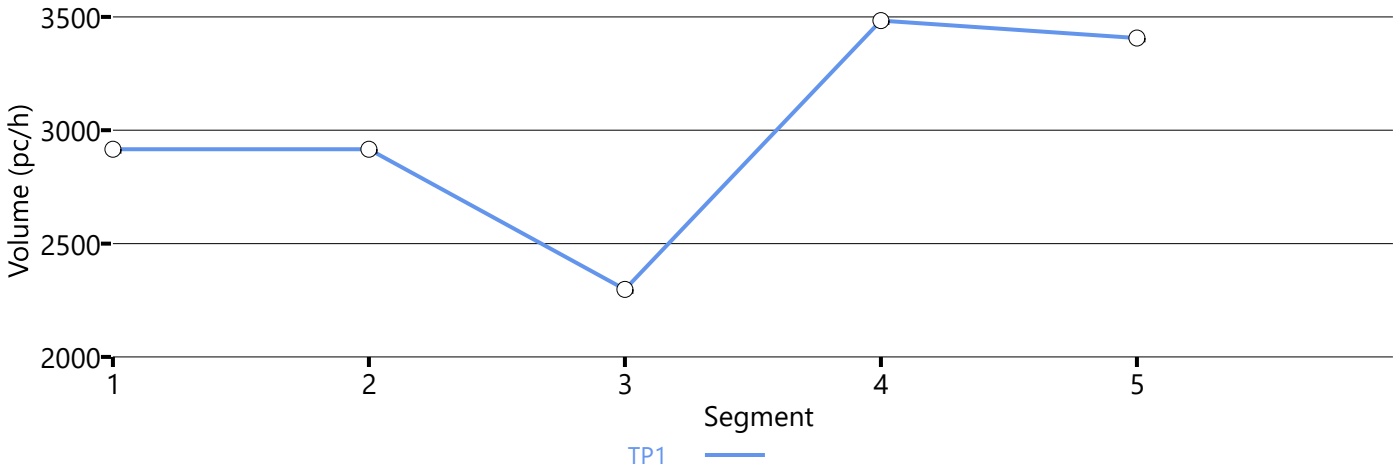
Facility Overall Results

Space Mean Speed, mi/h	70.7	Density, veh/mi/ln	12.9
Average Travel Time, min	1.60	Density, pc/mi/ln	13.6

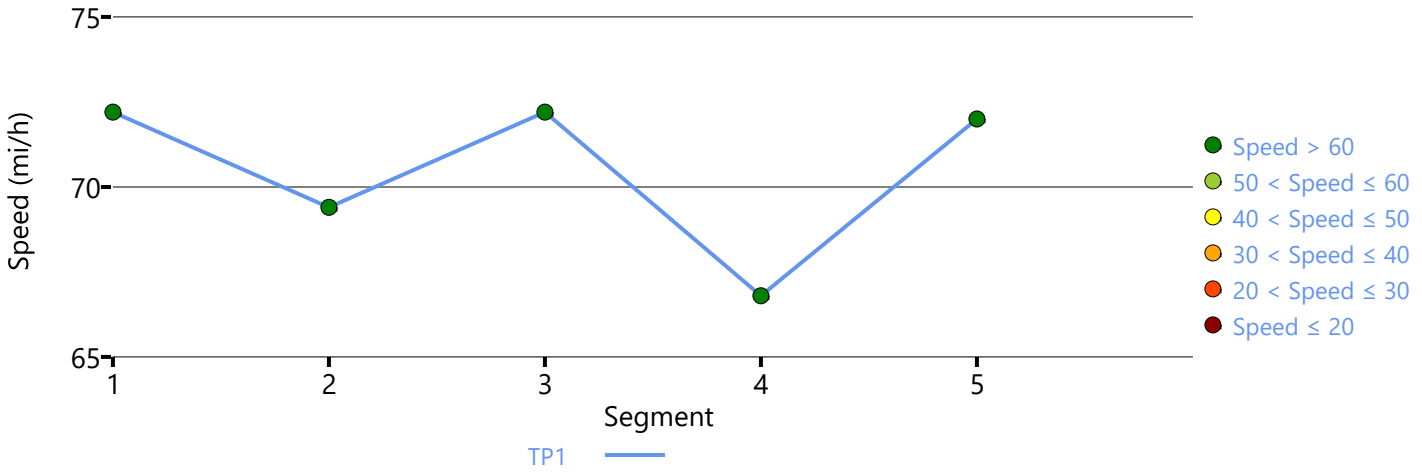
Messages

Comments

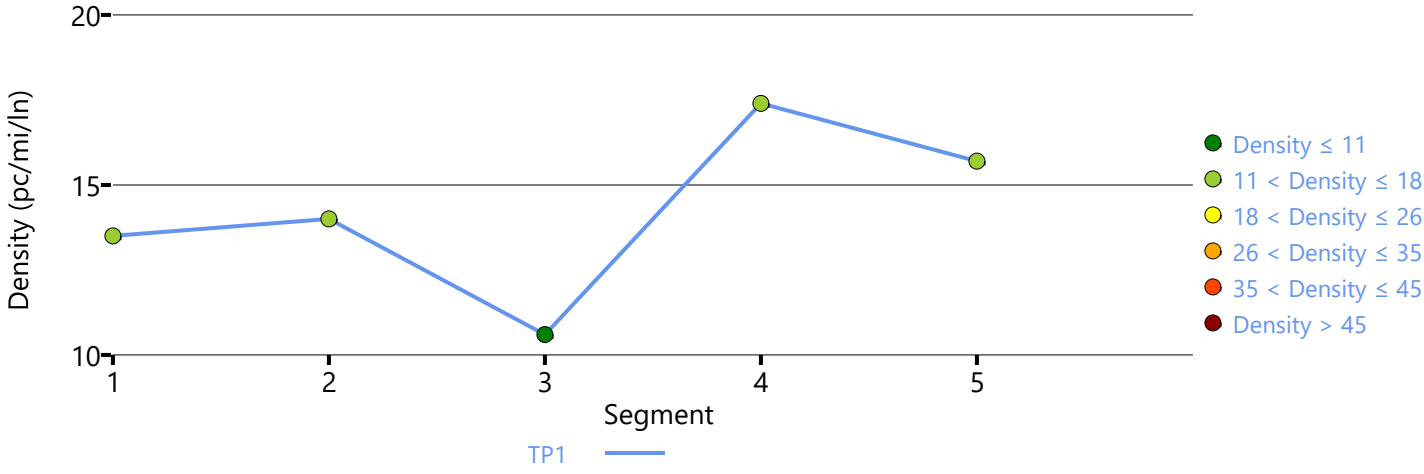
Volume Distribution



Speed Distribution



Density Distribution



APPENDIX F-2: NO-BUILD CONDITIONS HCS RESULTS

HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.927	2920	7200	0.41	72.2	13.5	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.927	0.947	2920	872	7200	2100	0.41	0.42	68.6	65.0	14.2	22.1	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.919	2046	7200	0.28	72.2	9.4	A

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.919	0.960	2946	900	7200	2100	0.41	0.43	67.9	65.7	14.5	17.7	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.931	2948	7200	0.41	72.0	13.6	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	71.3	12.6	11.6	2.40	B

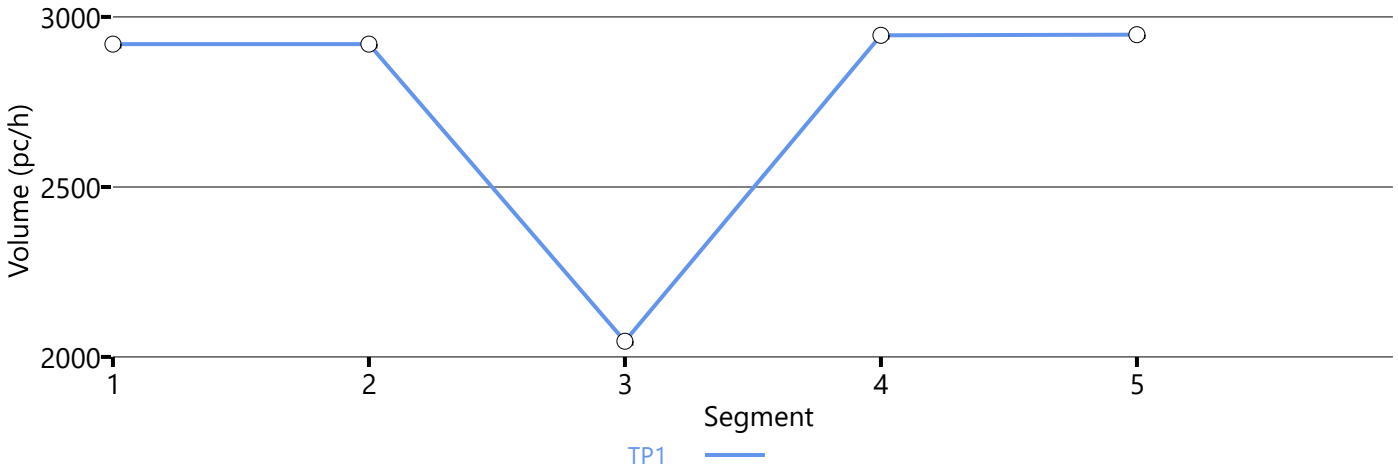
Facility Overall Results

Space Mean Speed, mi/h	71.3	Density, veh/mi/ln	11.6
Average Travel Time, min	2.40	Density, pc/mi/ln	12.6

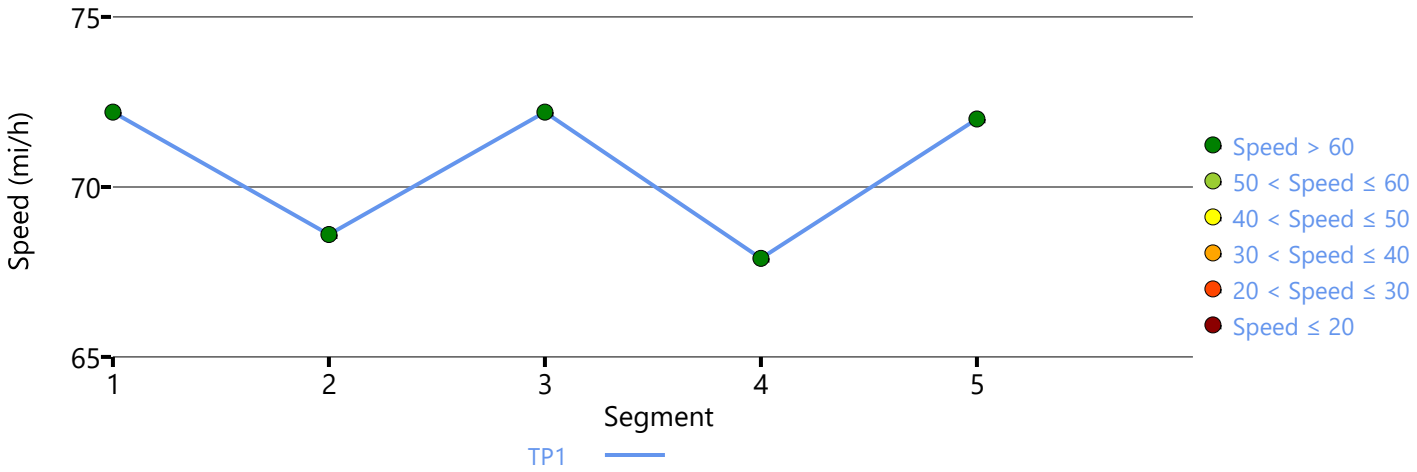
Messages

Comments

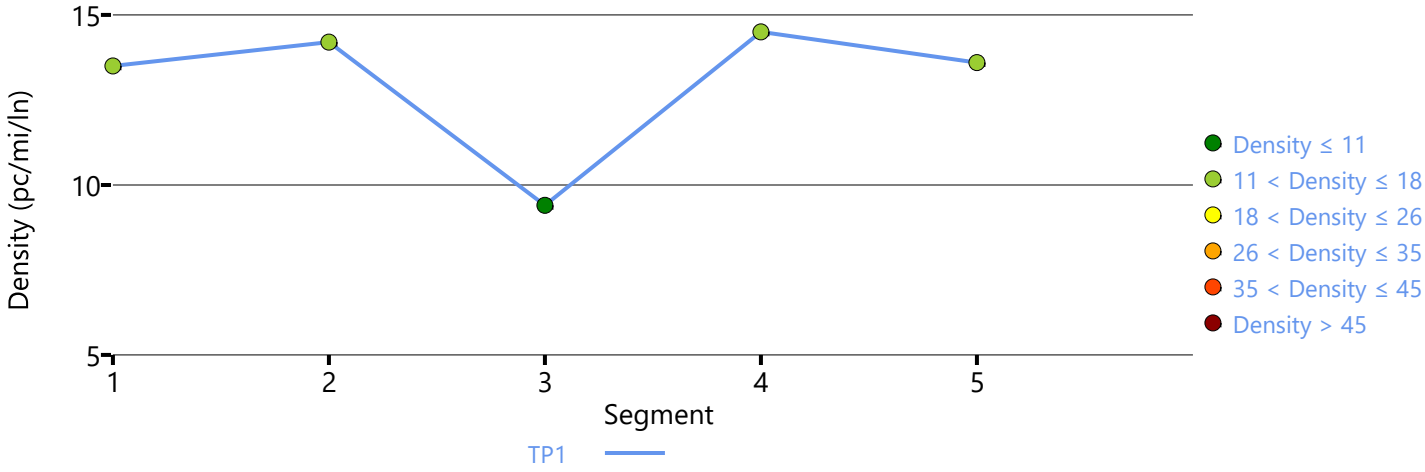
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.951	5109	7200	0.71	68.2	25.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.951	0.991	5109	2238	7200	2100	0.71	1.07	53.3	60.9	45.0	35.5	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.919	2871	7200	0.40	72.0	13.3	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.919	0.984	3227	735	7200	2100	0.50	0.35	67.9	65.6	15.8	18.6	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.932	3227	7200	0.50	72.0	14.9	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.9	21.1	19.9	2.50	F

Facility Overall Results

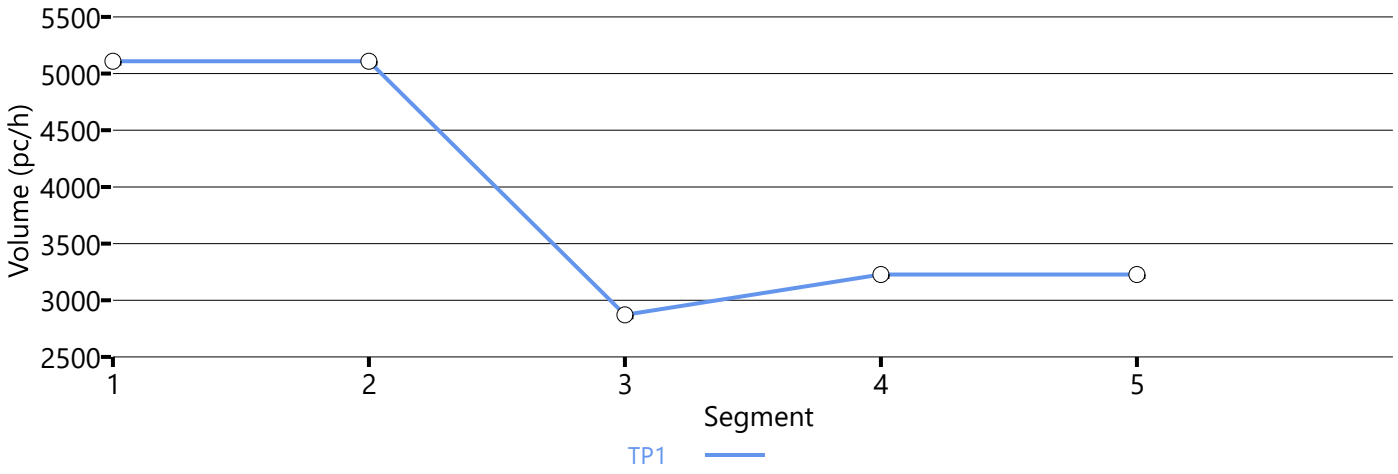
Space Mean Speed, mi/h	66.9	Density, veh/mi/ln	19.9
Average Travel Time, min	2.50	Density, pc/mi/ln	21.1

Messages

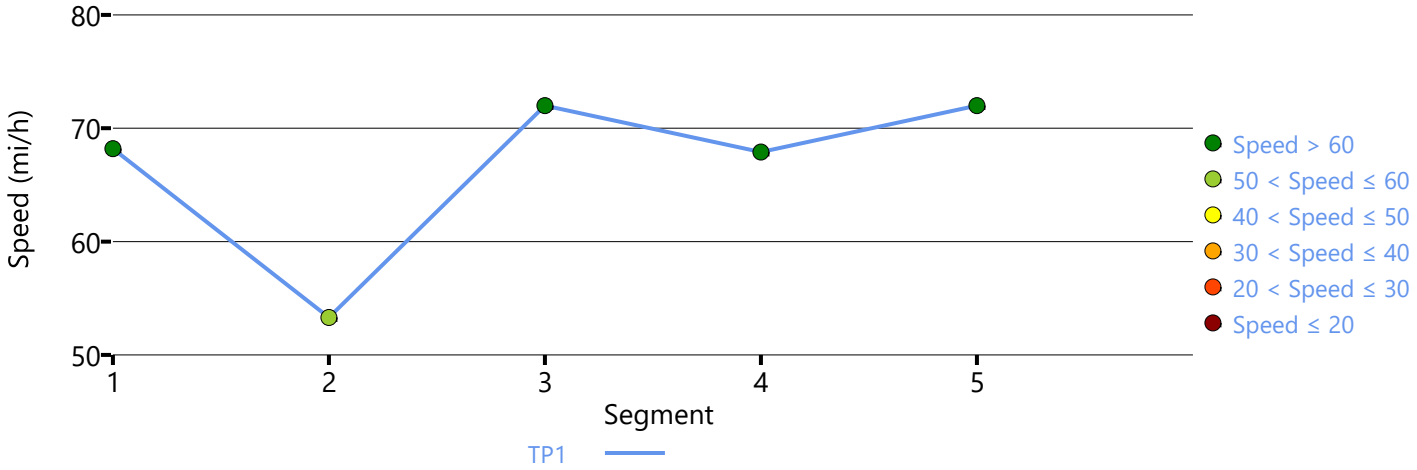
WARNING 1	Oversaturated conditions currently exist in boundary time period 1. Results may not be reliable. Consider expanding analysis in time and/or space to resolve this warning.
WARNING 2	Diverge capacity is less than diverge demand on segment 2. This may result in an off-ramp queue affecting the mainline flow. This is not currently modeled in HCM methodologies. Use caution when reviewing results.

Comments

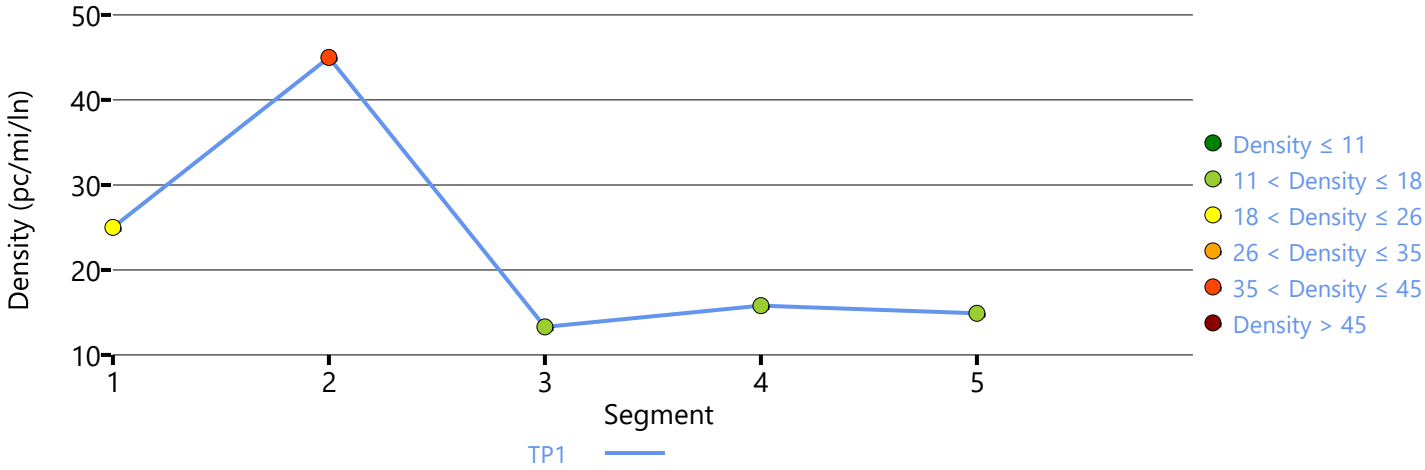
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.90		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	750	3
2	Diverge	Diverge	I-182 WB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 WB at Broadmoor	3800	3
4	Merge	Merge	I-182 WB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.911	2702	7200	0.38	72.2	12.5	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.911	0.951	2702	686	7200	2100	0.38	0.33	69.1	65.5	13.0	19.8	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.897	2018	7200	0.28	72.2	9.3	A

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.897	0.979	3950	1932	7200	2100	0.55	0.92	65.2	63.2	20.2	26.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.937	3950	7200	0.55	71.7	18.4	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.1	14.0	12.7	1.60	B

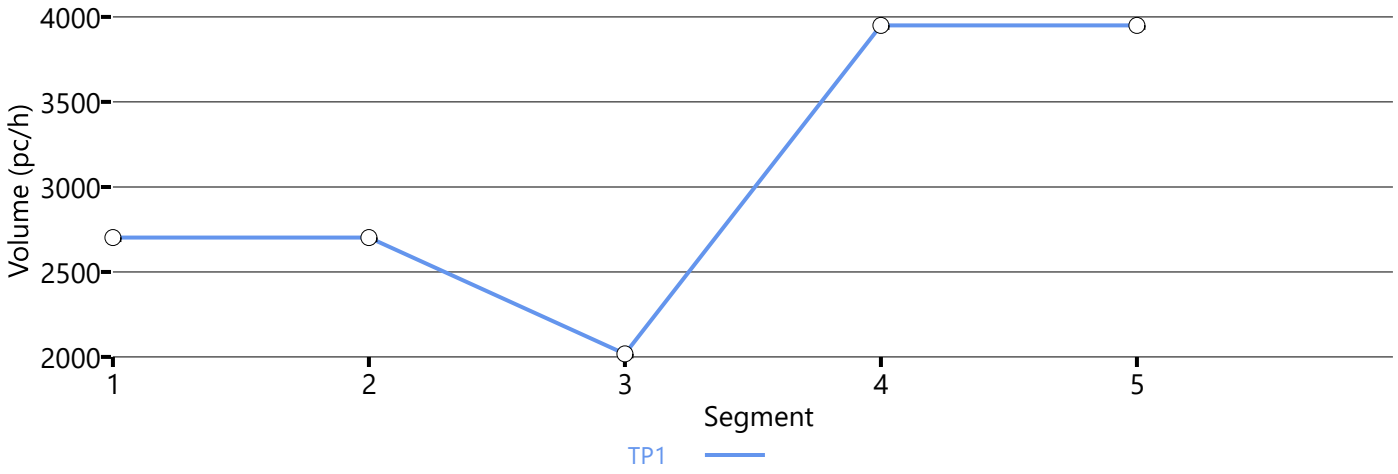
Facility Overall Results

Space Mean Speed, mi/h	70.1	Density, veh/mi/ln	12.7
Average Travel Time, min	1.60	Density, pc/mi/ln	14.0

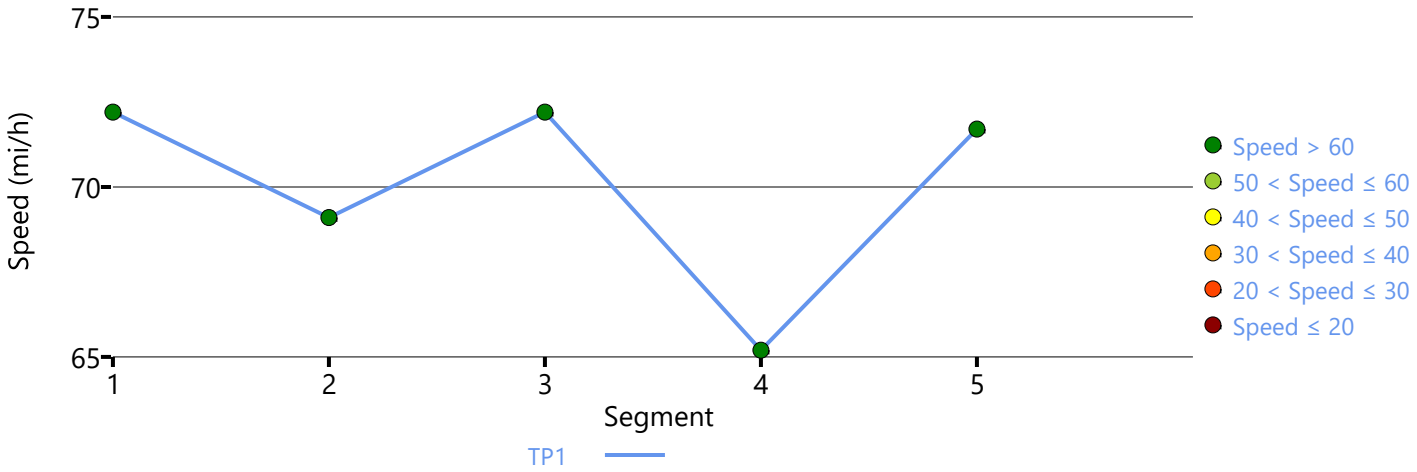
Messages

Comments

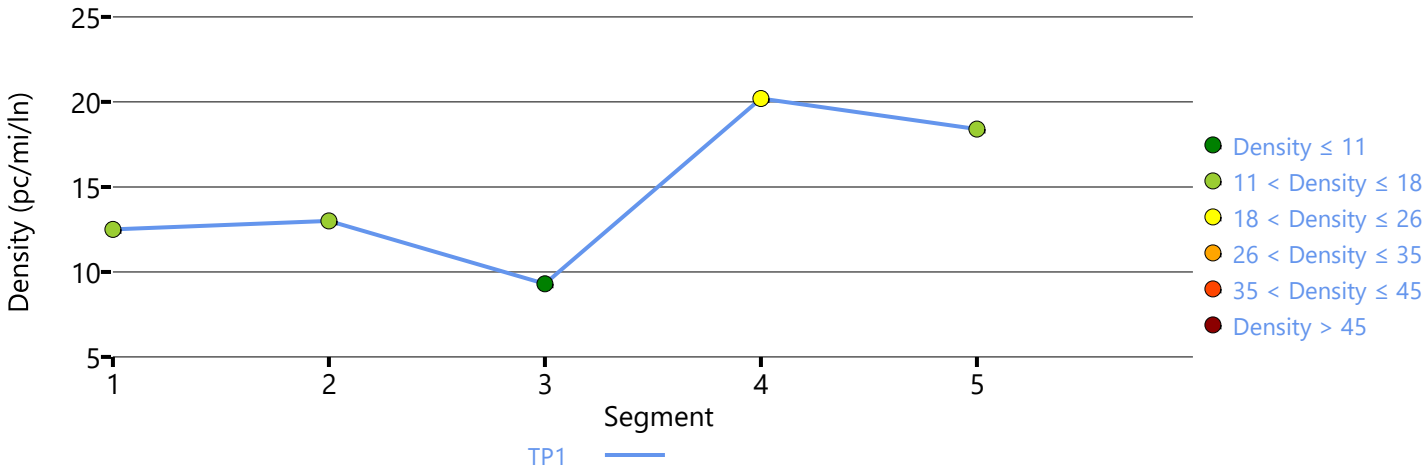
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.90		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	750	3
2	Diverge	Diverge	I-182 WB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 WB at Broadmoor	3800	3
4	Merge	Merge	I-182 WB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.953	3222	7200	0.45	72.2	14.9	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.953	0.991	3222	828	7200	2100	0.45	0.39	69.0	65.1	15.6	22.8	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.940	2394	7200	0.33	72.2	11.1	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.940	0.986	3888	1494	7200	2100	0.54	0.71	66.0	63.8	19.6	24.7	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.957	3890	7200	0.54	71.8	18.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.4	15.1	14.3	1.60	B

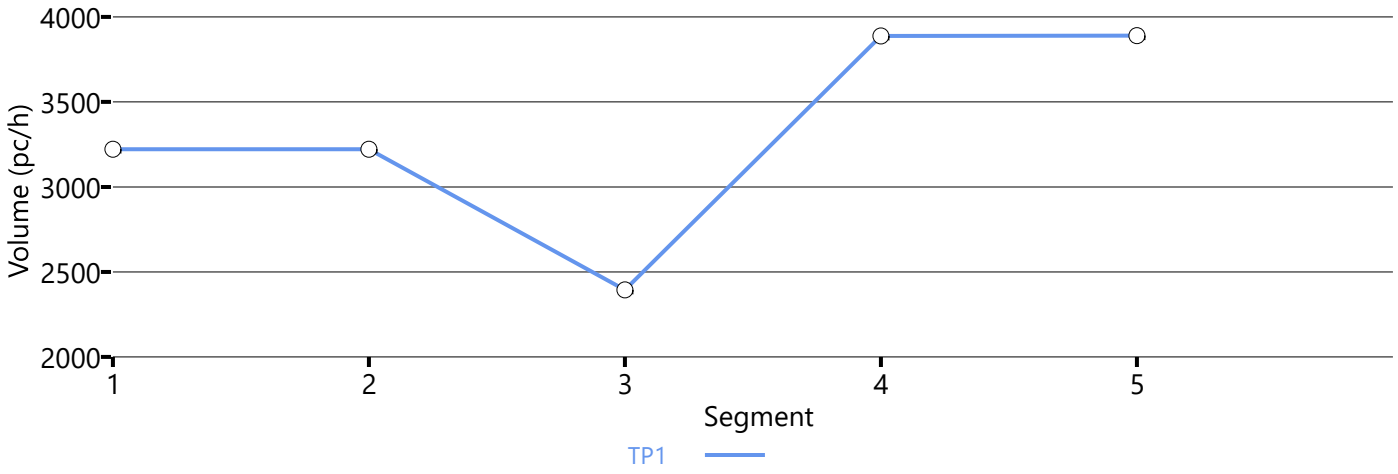
Facility Overall Results

Space Mean Speed, mi/h	70.4	Density, veh/mi/ln	14.3
Average Travel Time, min	1.60	Density, pc/mi/ln	15.1

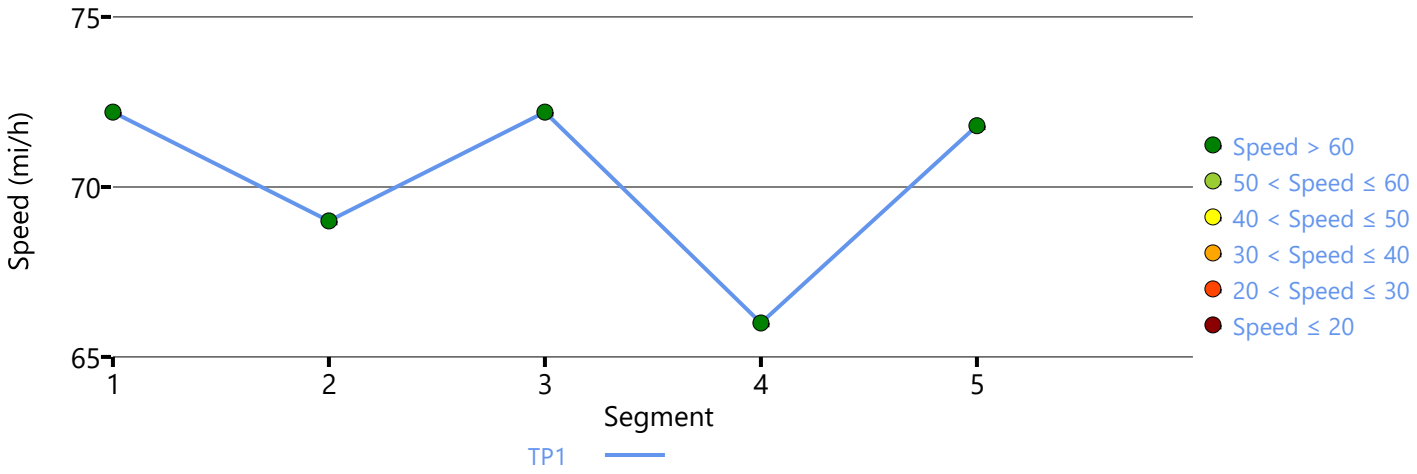
Messages

Comments

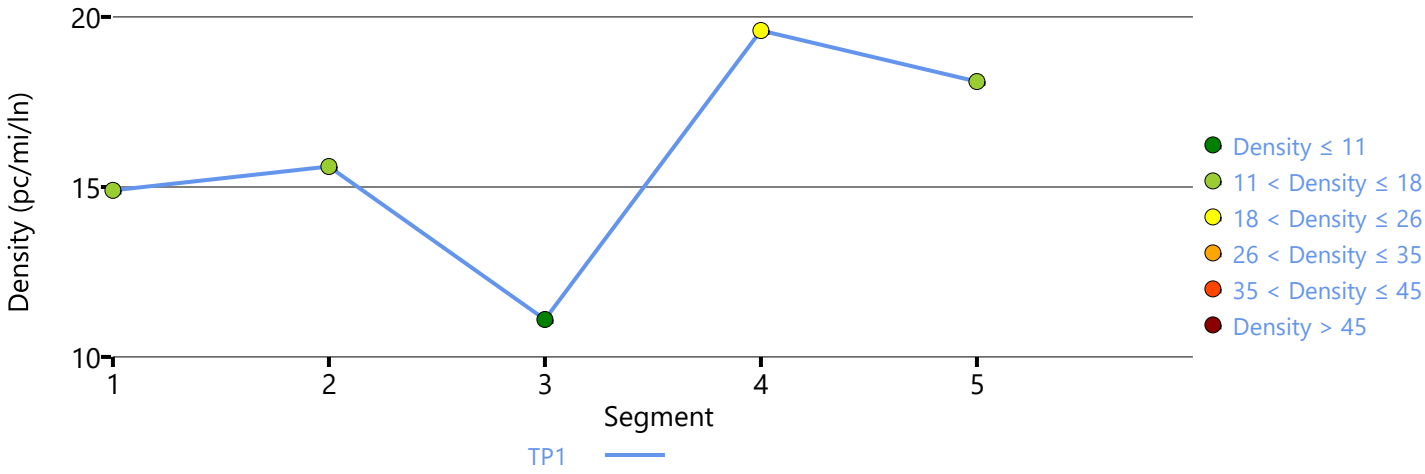
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.927	3997	7200	0.56	71.6	18.6	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.927	0.947	3997	1399	7200	2100	0.56	0.67	67.5	63.4	19.7	28.5	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.917	2595	7200	0.36	72.1	12.0	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.917	0.960	3897	1302	7200	2100	0.54	0.62	66.7	64.5	19.5	23.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	1.00	0.931	3899	7200	0.54	71.8	18.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.7	16.9	15.6	2.40	B

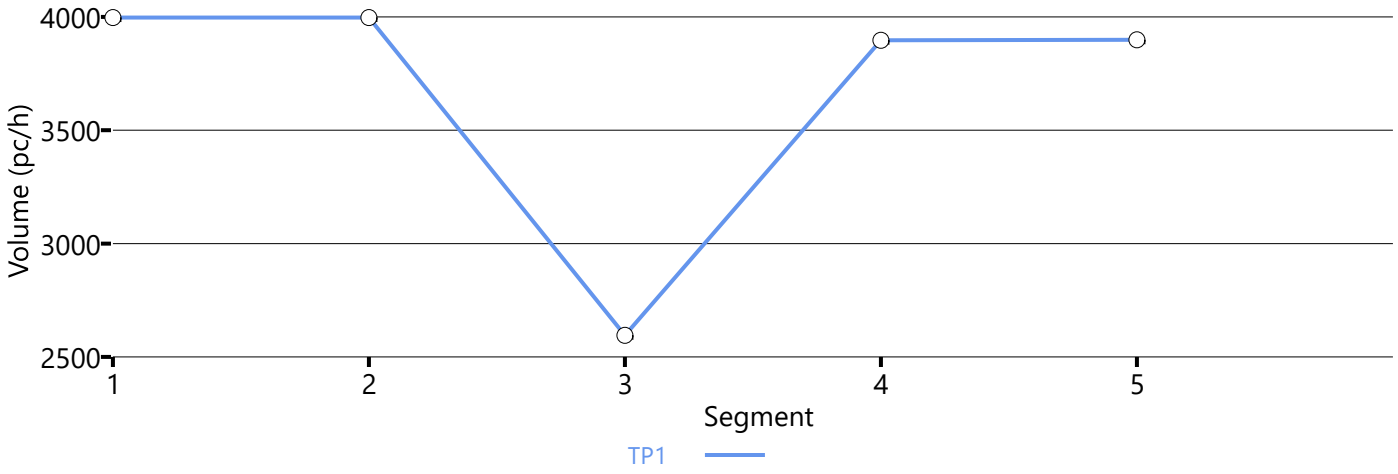
Facility Overall Results

Space Mean Speed, mi/h	70.7	Density, veh/mi/ln	15.6
Average Travel Time, min	2.40	Density, pc/mi/ln	16.9

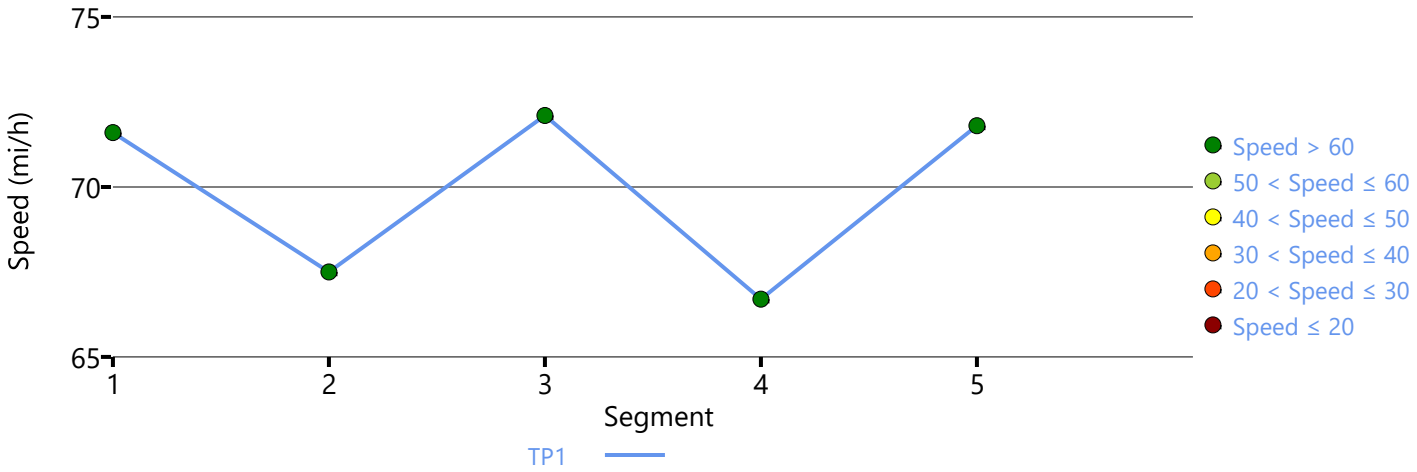
Messages

Comments

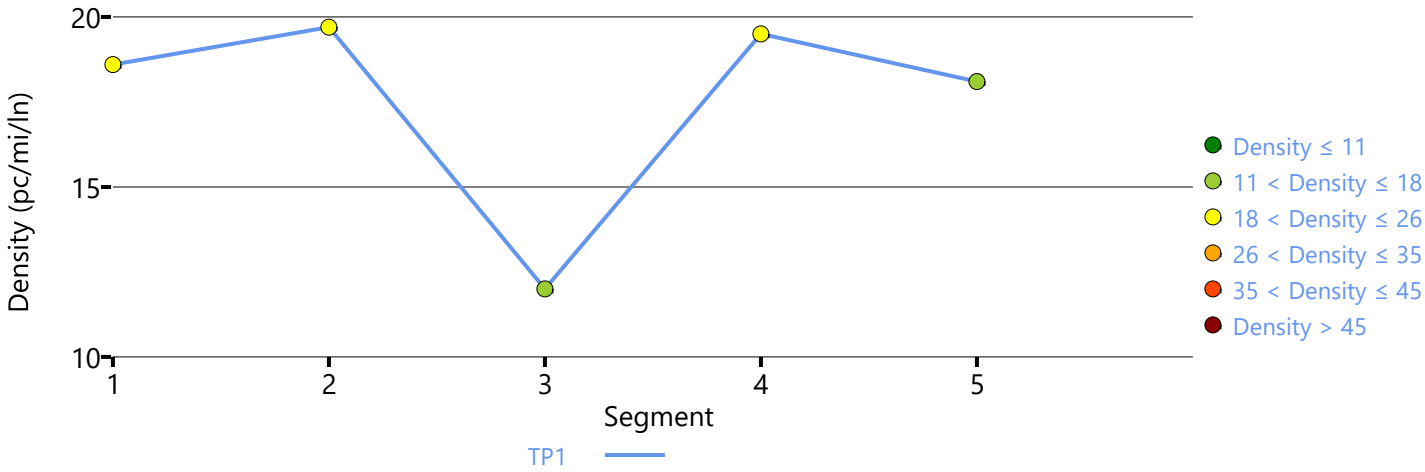
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.951	5678	7200	0.79	65.3	29.0	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.950	0.991	5678	2356	7200	2100	0.79	1.12	53.3	60.5	45.0	38.0	F

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.922	3322	7200	0.46	72.0	15.3	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.922	0.984	3683	1021	7200	2100	0.60	0.49	67.2	65.0	18.3	21.5	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	1.00	0.936	3683	7200	0.60	72.0	17.1	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	65.6	23.8	22.4	2.60	F

Facility Overall Results

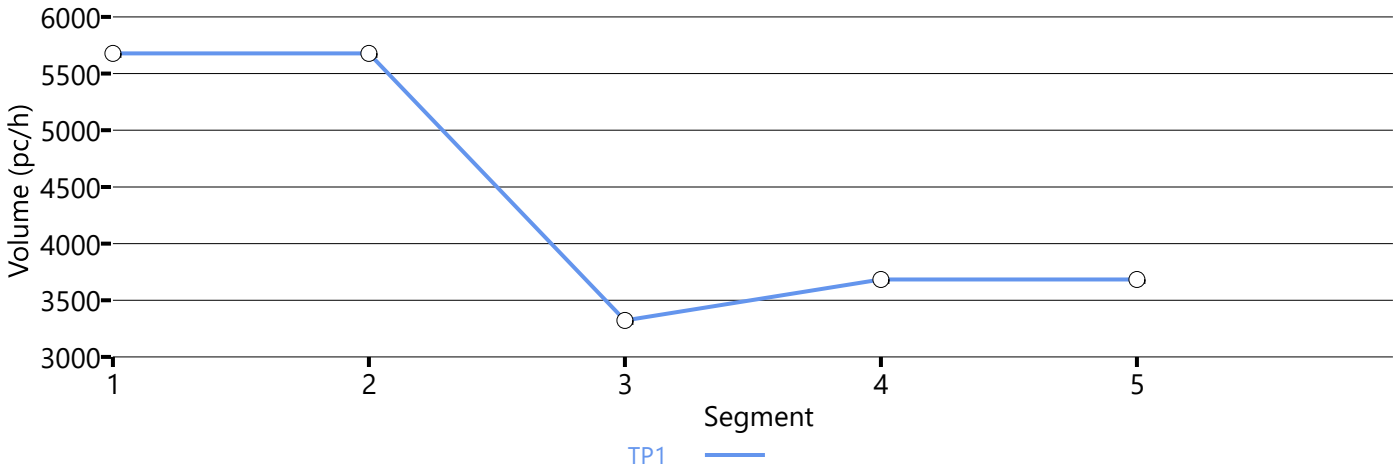
Space Mean Speed, mi/h	65.6	Density, veh/mi/ln	22.4
Average Travel Time, min	2.60	Density, pc/mi/ln	23.8

Messages

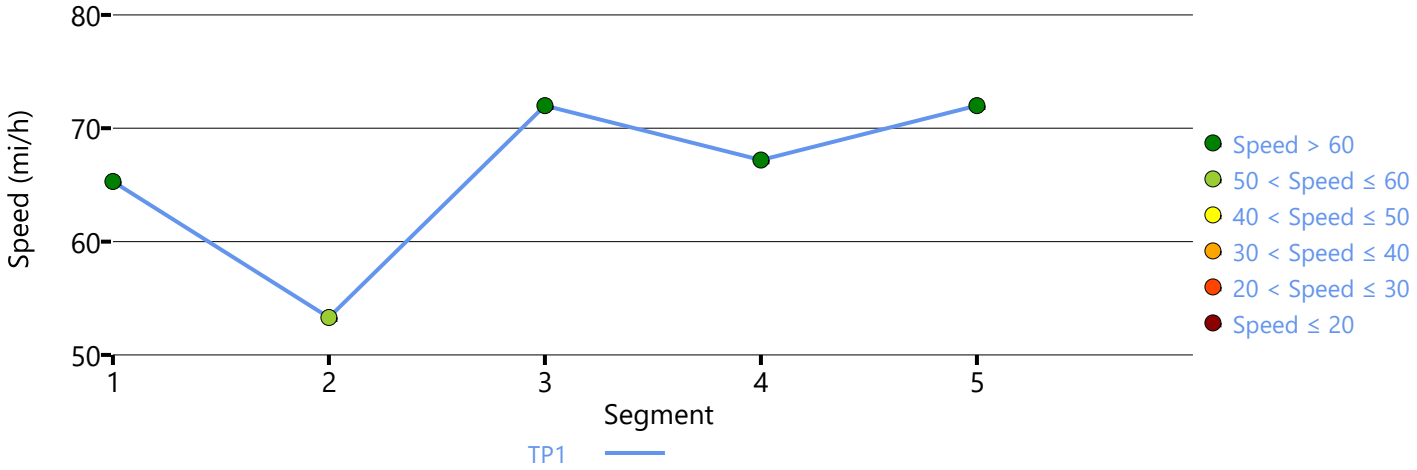
WARNING 1	Oversaturated conditions currently exist in boundary time period 1. Results may not be reliable. Consider expanding analysis in time and/or space to resolve this warning.
WARNING 2	Diverge capacity is less than diverge demand on segment 2. This may result in an off-ramp queue affecting the mainline flow. This is not currently modeled in HCM methodologies. Use caution when reviewing results.

Comments

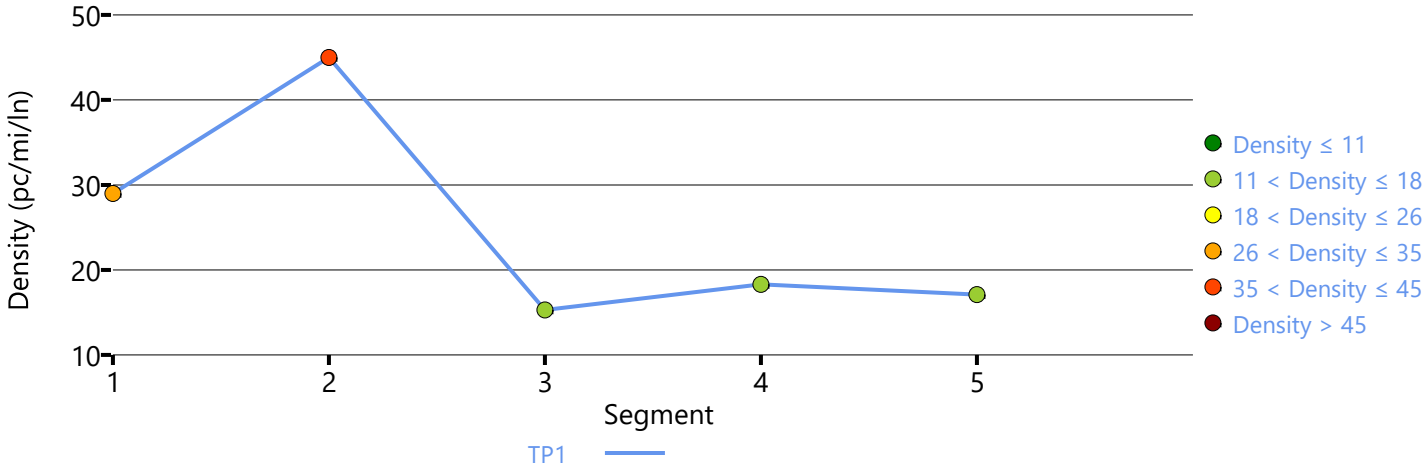
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.90		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	750	3
2	Diverge	Diverge	I-182 WB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 WB at Broadmoor	3800	3
4	Merge	Merge	I-182 WB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.911	4341	7200	0.60	70.9	20.4	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.911	0.951	4341	1025	7200	2100	0.60	0.49	68.8	64.5	21.0	28.5	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.898	3318	7200	0.46	72.2	15.3	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.898	0.979	5698	2380	7200	2100	0.79	1.13	59.4	56.2	32.0	35.5	E

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	1.00	0.932	5697	7200	0.79	65.2	29.1	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.6	22.5	20.4	1.70	C

Facility Overall Results

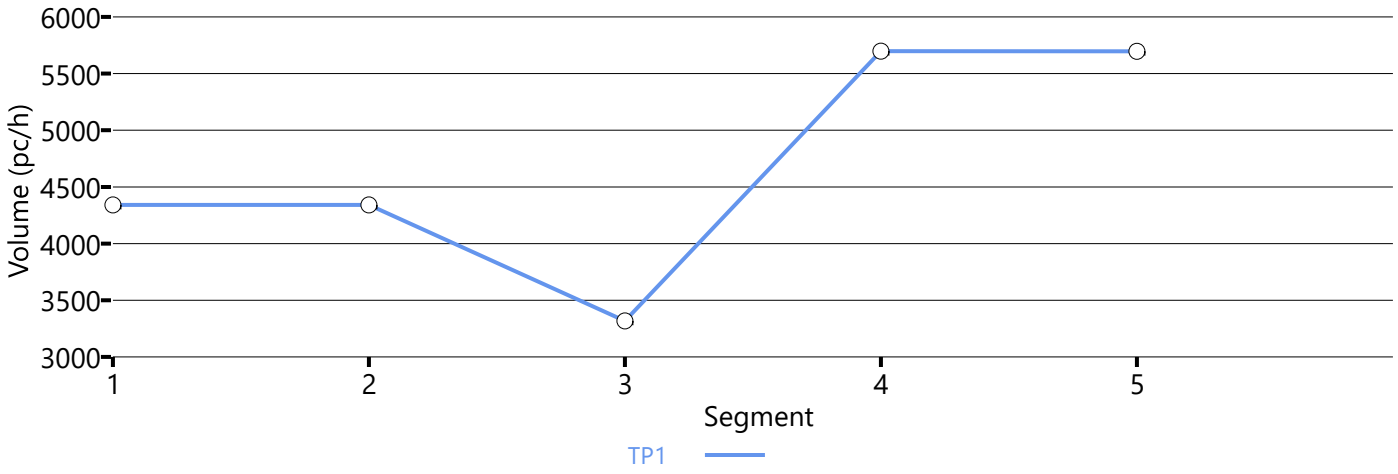
Space Mean Speed, mi/h	66.6	Density, veh/mi/ln	20.4
Average Travel Time, min	1.70	Density, pc/mi/ln	22.5

Messages

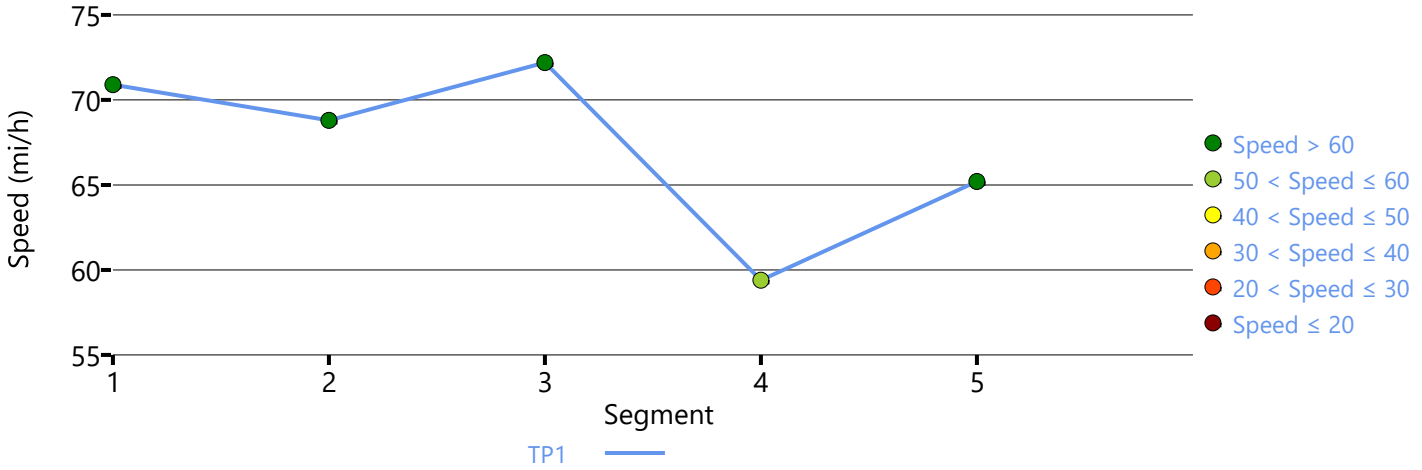
WARNING 1	Merge capacity is less than merge demand on segment 4.

Comments

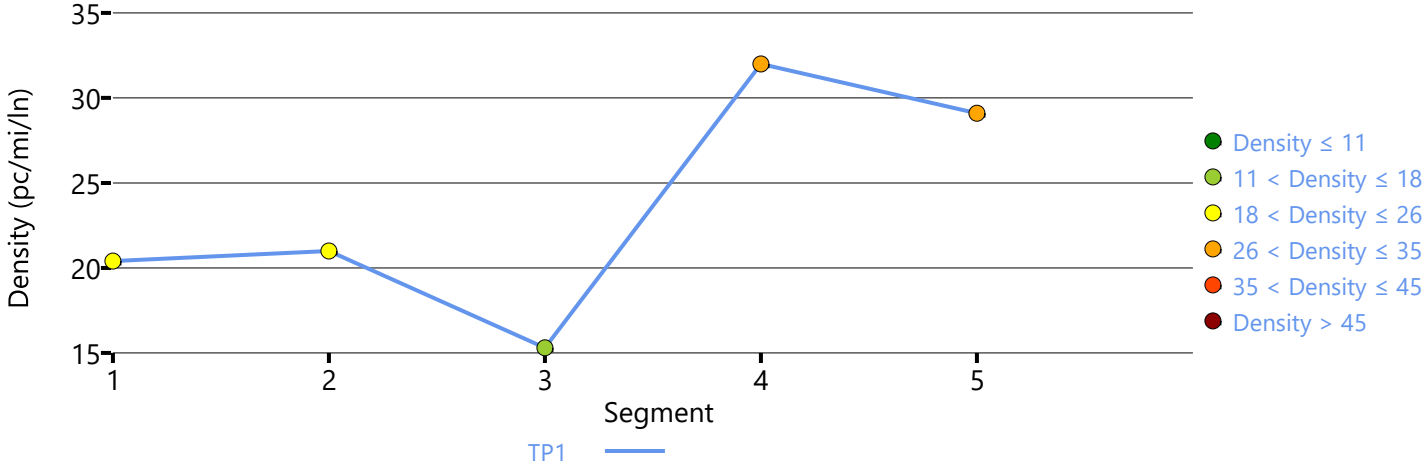
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	1.90		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	750	3
2	Diverge	Diverge	I-182 WB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 WB at Broadmoor	3800	3
4	Merge	Merge	I-182 WB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.953	4969	7200	0.69	68.8	24.1	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.953	0.991	4969	1468	7200	2100	0.69	0.70	67.7	63.2	24.5	32.2	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.937	3501	7200	0.49	72.1	16.2	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.937	0.986	5438	1937	7200	2100	0.76	0.92	62.0	59.0	29.2	33.1	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	1.00	0.957	5423	7200	0.75	66.7	27.1	D

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.6	22.7	21.5	1.70	C

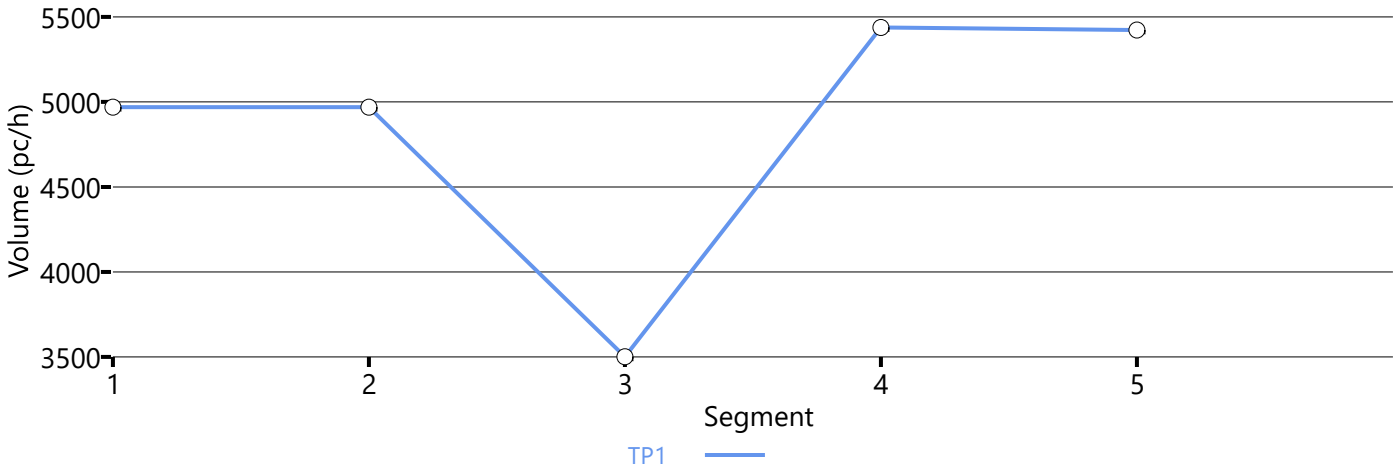
Facility Overall Results

Space Mean Speed, mi/h	67.6	Density, veh/mi/ln	21.5
Average Travel Time, min	1.70	Density, pc/mi/ln	22.7

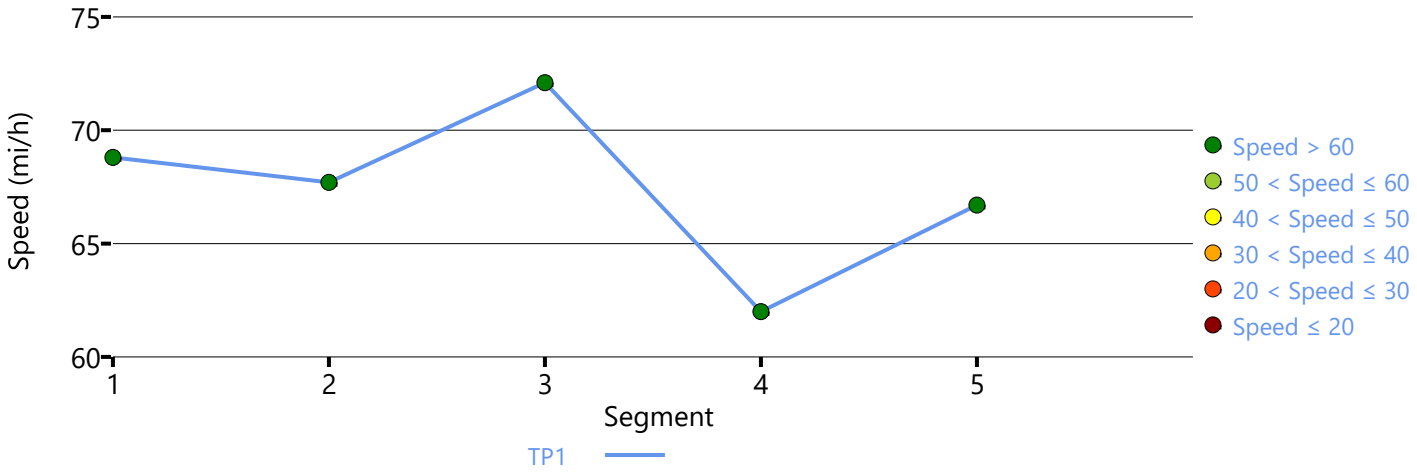
Messages

Comments

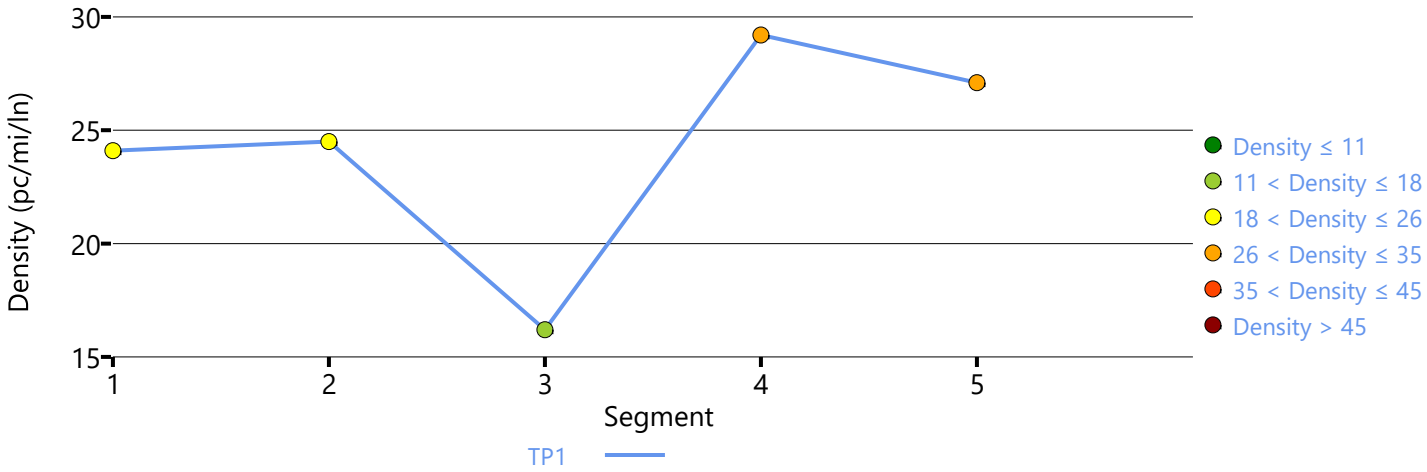
Volume Distribution



Speed Distribution



Density Distribution



APPENDIX F-3: BUILD CONDITIONS HCS RESULTS

F-E-1 RESULTS

HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB to SB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 between two Off-ramps	430	3
4	Diverge	Diverge	I-182 EB to NB Broadmoor Loop Ramp	1500	3
5	Basic	Basic	I-182 EB at Broadmoor	2170	3
6	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
7	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.927	2920	7200	0.41	72.2	13.5	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.927	0.947	2920	379	7200	2100	0.41	0.18	70.5	66.5	13.8	21.1	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.927	2533	7200	0.35	73.0	11.5	B

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.927	0.947	2533	494	7200	2000	0.35	0.25	64.3	59.6	13.1	13.6	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.919	2046	7200	0.28	71.8	9.4	A

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.919	0.960	2946	900	7200	2100	0.41	0.43	67.9	65.7	14.5	17.7	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.931	2948	7200	0.41	72.0	13.6	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.7	13.0	12.0	2.40	B

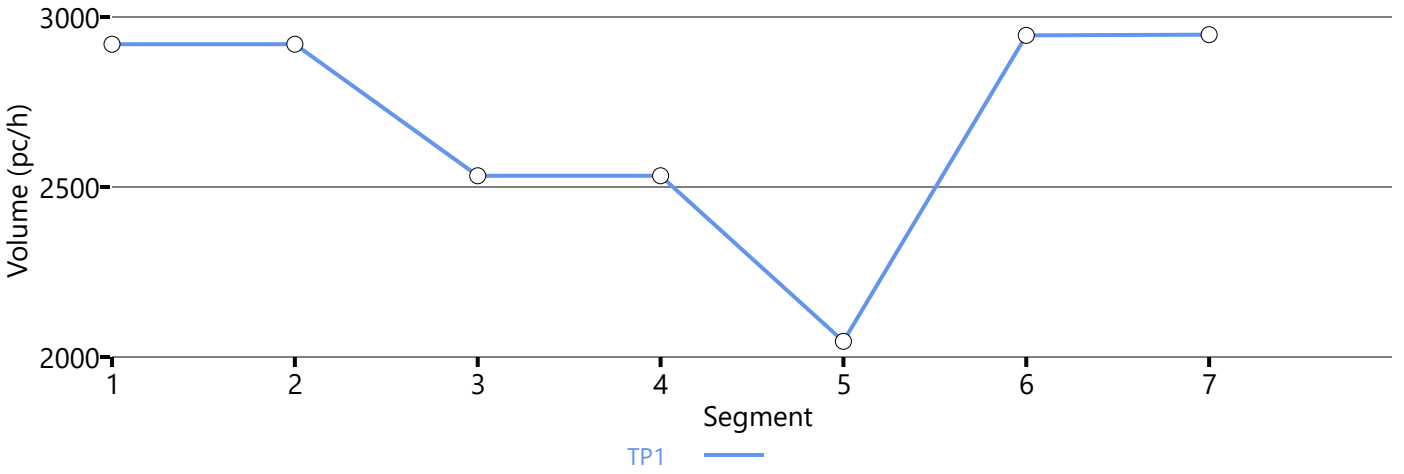
Facility Overall Results

Space Mean Speed, mi/h	70.7	Density, veh/mi/ln	12.0
Average Travel Time, min	2.40	Density, pc/mi/ln	13.0

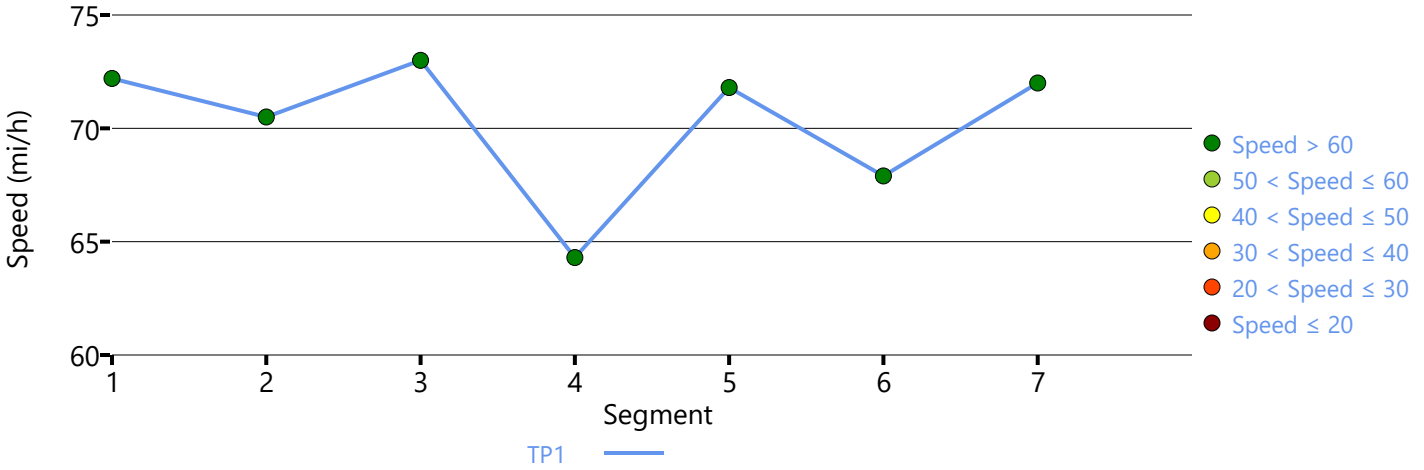
Messages

Comments

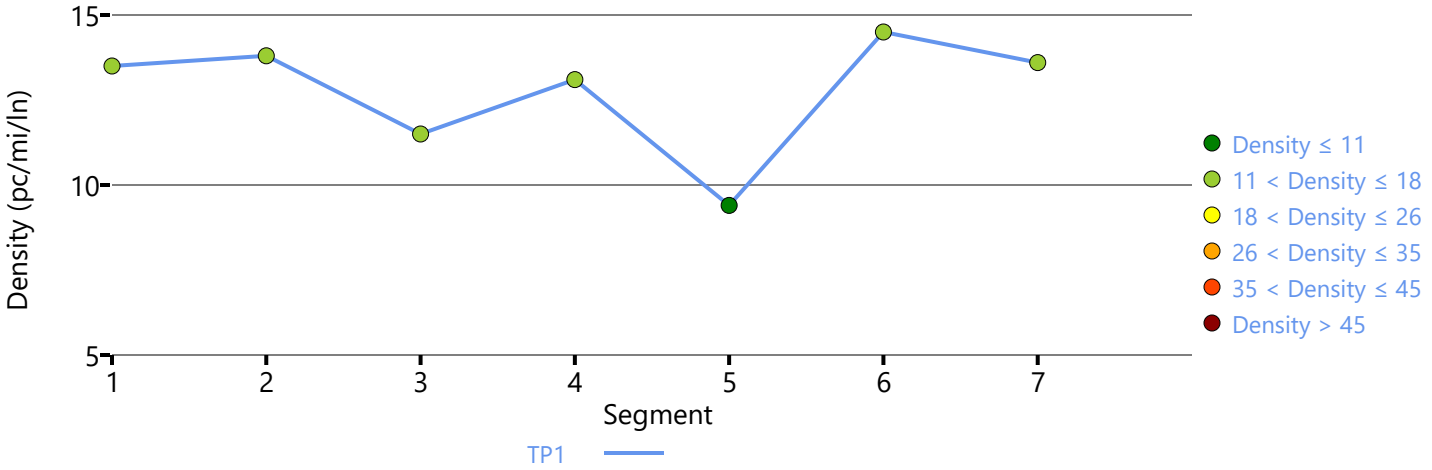
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB to SB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 between two off-ramps	430	3
4	Diverge	Diverge	I-182 EB to NB Braodmoor Loop Ramp	1500	3
5	Basic	Basic	I-182 EB at Broadmoor	2170	3
6	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
7	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.951	5109	7200	0.71	68.2	25.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.951	0.991	5109	790	7200	2100	0.71	0.38	69.5	65.2	24.5	32.1	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.951	4286	7200	0.60	72.0	19.8	C

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.951	0.952	4286	1501	7200	2000	0.60	0.75	61.8	56.6	23.1	24.4	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.919	2880	7200	0.40	71.7	13.3	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.919	0.984	3615	735	7200	2100	0.50	0.35	67.5	65.2	17.9	20.4	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.932	3615	7200	0.50	72.0	16.7	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	68.5	20.8	19.6	2.50	C

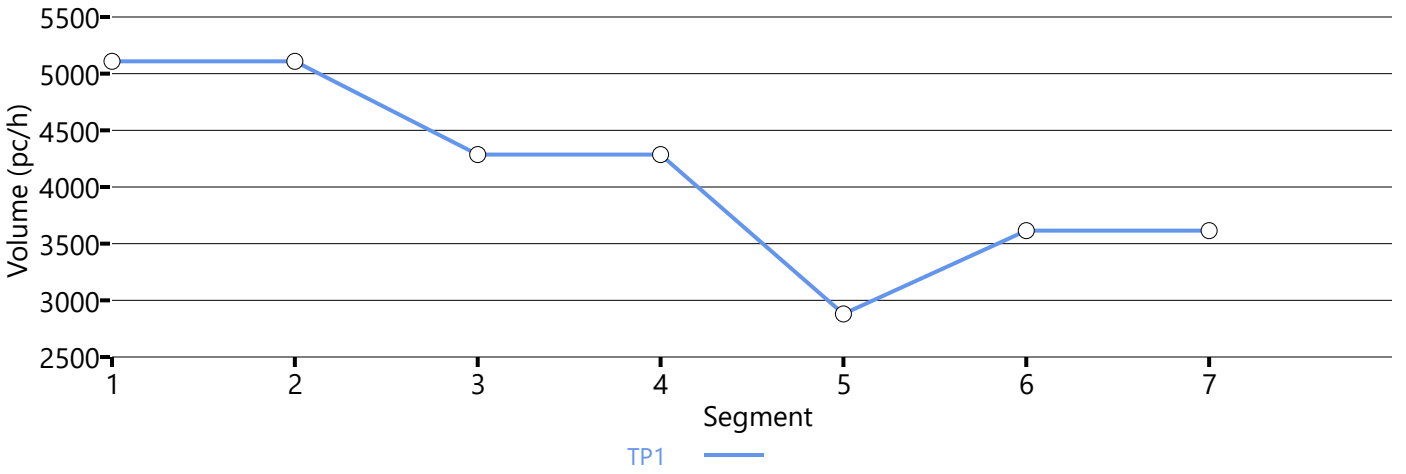
Facility Overall Results

Space Mean Speed, mi/h	68.5	Density, veh/mi/ln	19.6
Average Travel Time, min	2.50	Density, pc/mi/ln	20.8

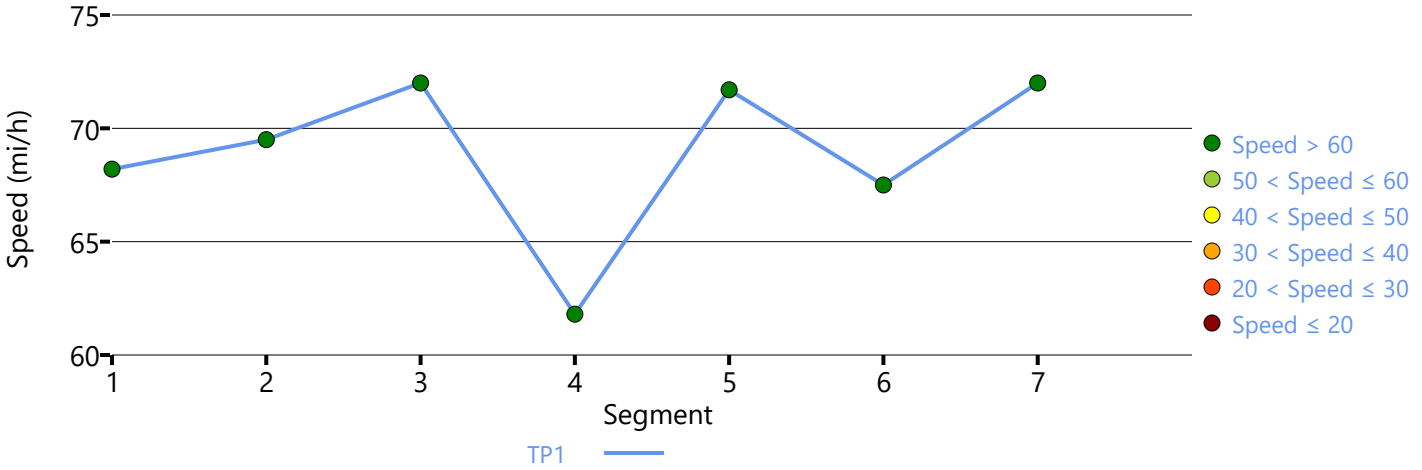
Messages

Comments

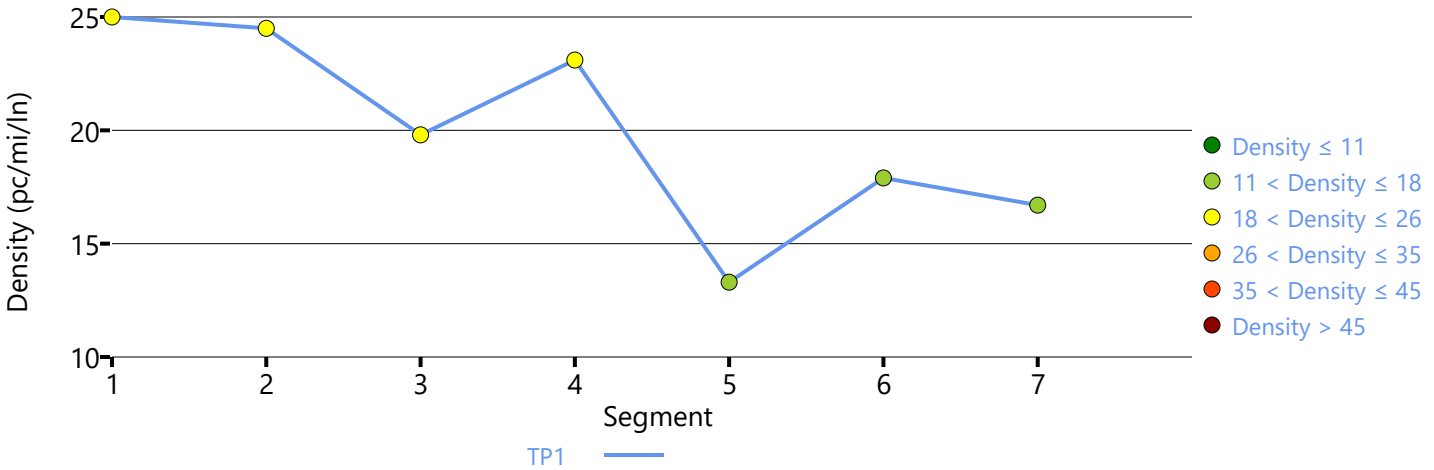
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB to SB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 between two off-ramps	430	3
4	Diverge	Diverge	I-182 EB to NB Broadmoor Loop Ramp	1500	3
5	Basic	Basic	I-182 EB at Broadmoor	2170	3
6	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
7	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.927	3997	7200	0.56	71.6	18.6	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.927	0.947	3997	370	7200	2100	0.56	0.18	70.7	66.5	18.8	26.4	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.927	3619	7200	0.50	73.0	16.5	B

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.927	0.947	3619	1030	7200	2000	0.50	0.52	63.1	58.0	19.1	20.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.917	2595	7200	0.36	71.7	12.0	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.917	0.960	3897	1302	7200	2100	0.54	0.62	66.7	64.5	19.5	23.2	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.931	3899	7200	0.54	71.8	18.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.1	17.7	16.3	2.40	B

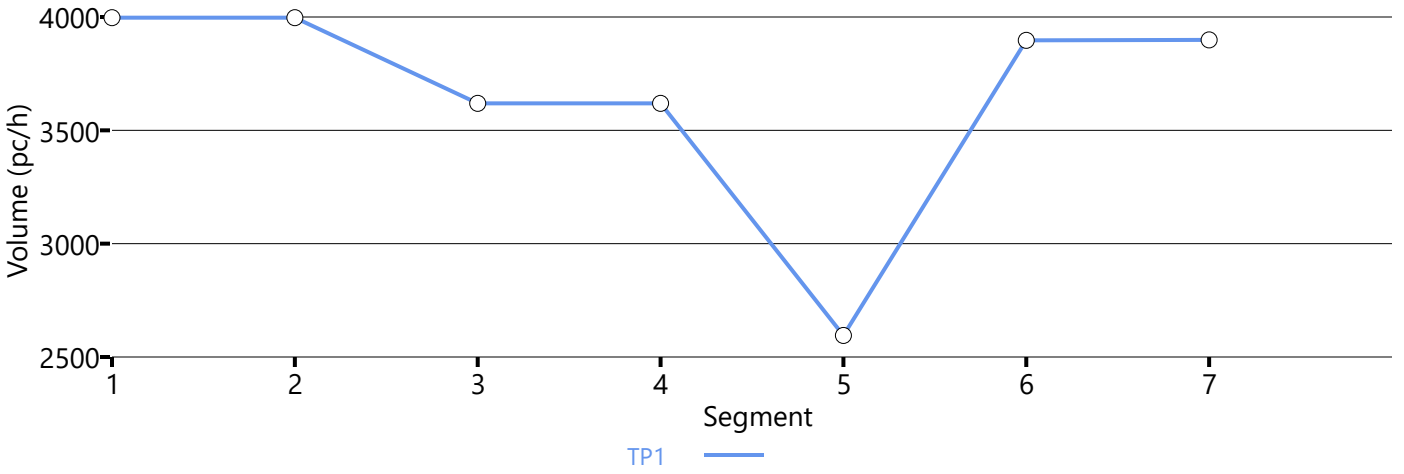
Facility Overall Results

Space Mean Speed, mi/h	70.1	Density, veh/mi/ln	16.3
Average Travel Time, min	2.40	Density, pc/mi/ln	17.7

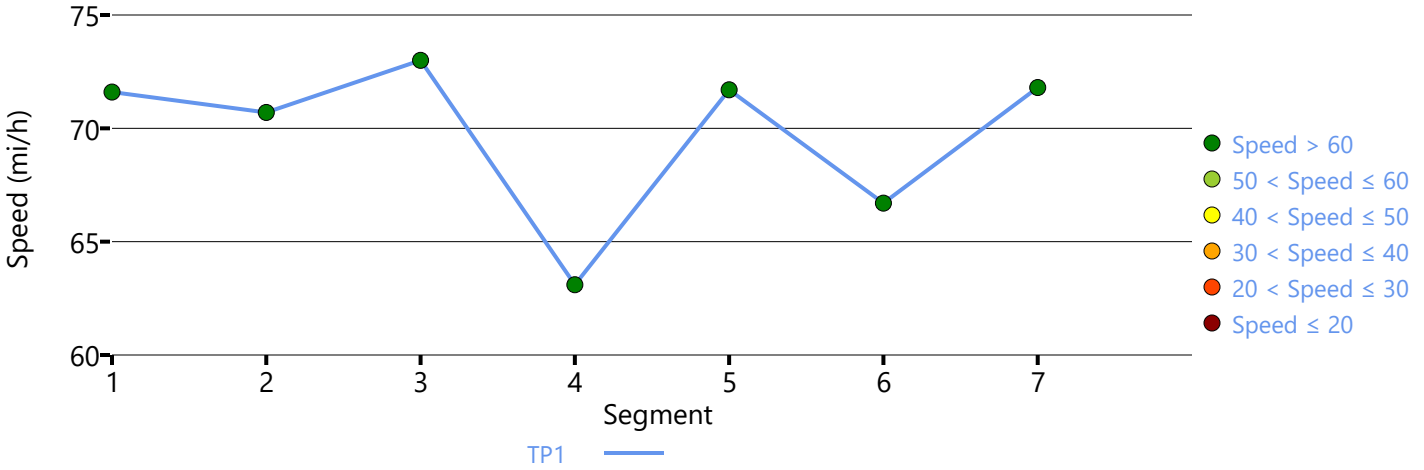
Messages

Comments

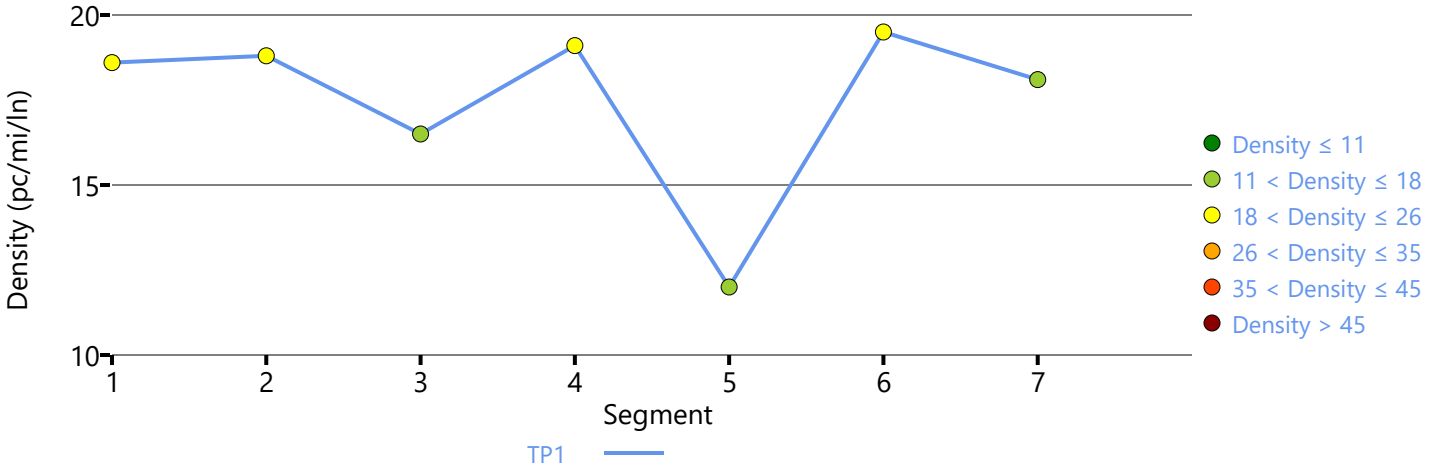
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor to SB Off-Ramp	1500	3
3	Basic	Basic	I-182 between off-ramps	430	3
4	Diverge	Diverge	I-182 EB to NB Broadmoor Loop Ramp	1500	3
5	Basic	Basic	I-182 EB at Broadmoor	2170	3
6	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
7	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.951	5678	7200	0.79	65.3	29.0	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.950	0.991	5684	752	7200	2100	0.79	0.36	69.6	65.3	27.2	34.4	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.950	4900	7200	0.68	69.9	23.4	C

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.950	0.991	4900	1599	7200	2000	0.68	0.80	61.8	56.3	26.4	27.3	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.922	3330	7200	0.46	71.7	15.4	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.922	0.984	4351	1021	7200	2100	0.60	0.49	66.4	64.1	21.8	24.6	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.936	4354	7200	0.60	70.9	20.5	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.0	24.3	22.9	2.50	C

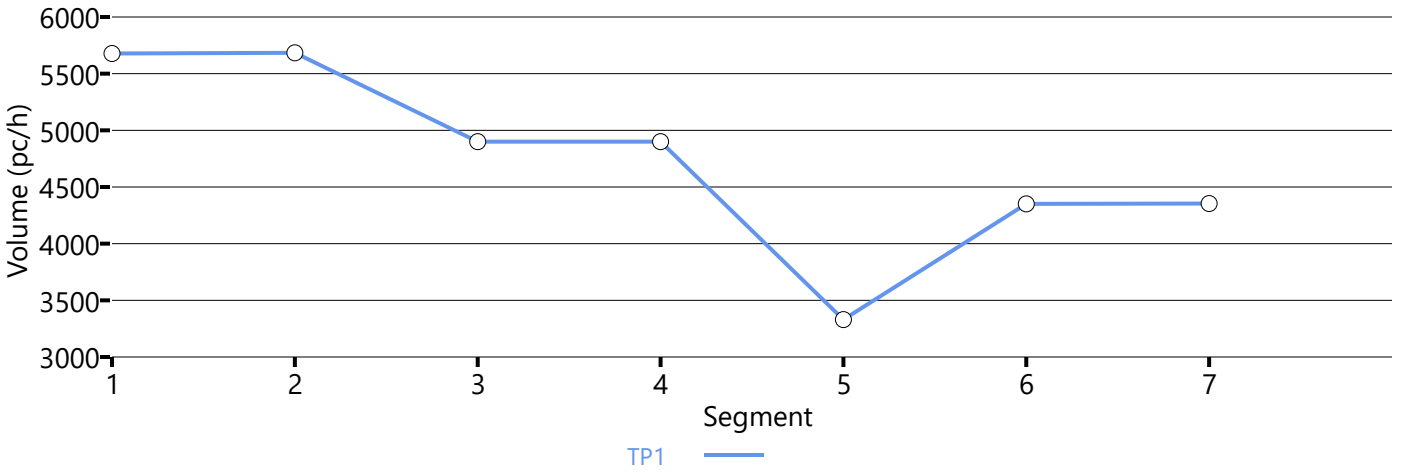
Facility Overall Results

Space Mean Speed, mi/h	67.0	Density, veh/mi/ln	22.9
Average Travel Time, min	2.50	Density, pc/mi/ln	24.3

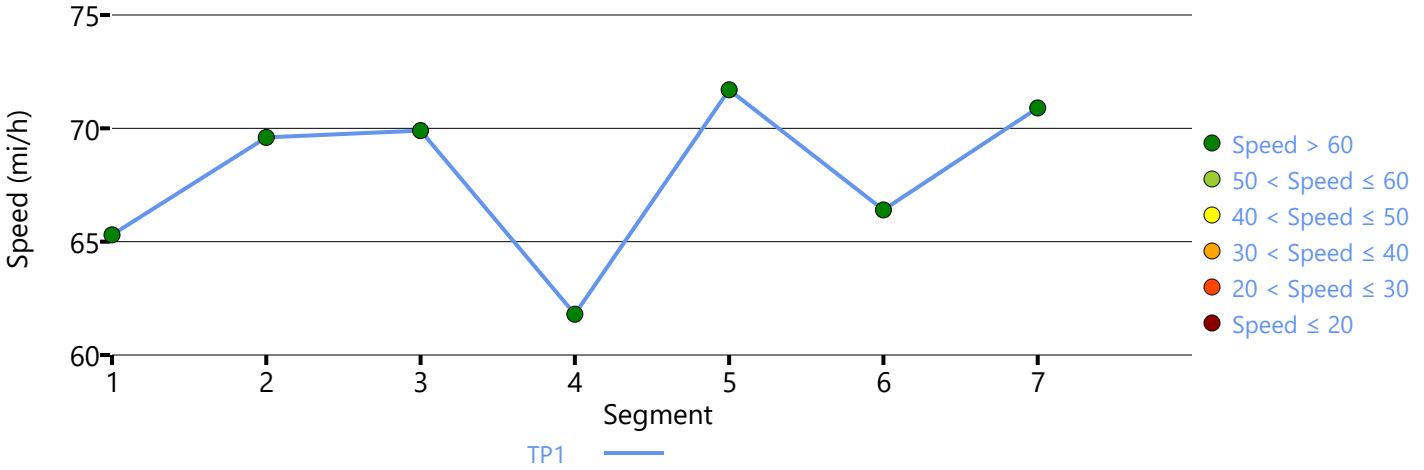
Messages

Comments

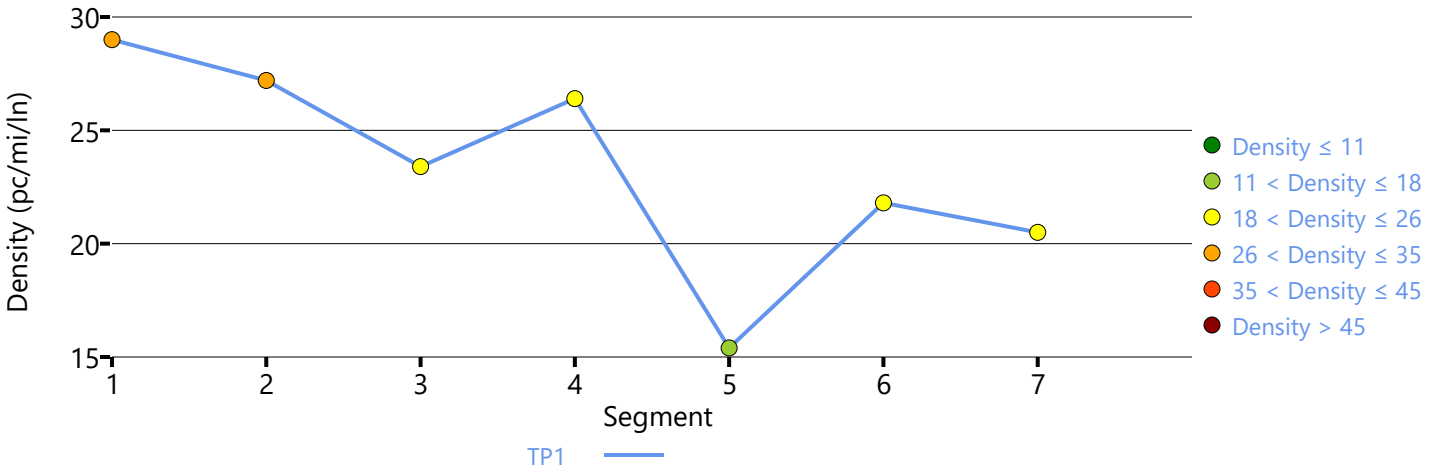
Volume Distribution



Speed Distribution



Density Distribution



F-E-2 RESULTS

HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB to SB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 between two Off-ramps	430	3
4	Diverge	Diverge	I-182 EB to NB Broadmoor Loop Ramp	1500	3
5	Basic	Basic	I-182 EB at Broadmoor	2170	3
6	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
7	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.927	2920	7200	0.41	72.2	13.5	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.927	0.947	2920	379	7200	2100	0.41	0.18	70.5	66.5	13.8	10.9	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.927	2533	7200	0.35	73.0	11.5	B

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.927	0.947	2533	494	7200	2000	0.35	0.25	64.3	59.6	13.1	13.6	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.919	2046	7200	0.28	71.8	9.4	A

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.919	0.960	2946	900	7200	2100	0.41	0.43	67.9	65.7	14.5	17.7	B

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.931	2948	7200	0.41	72.0	13.6	B

Facility Time Period Results

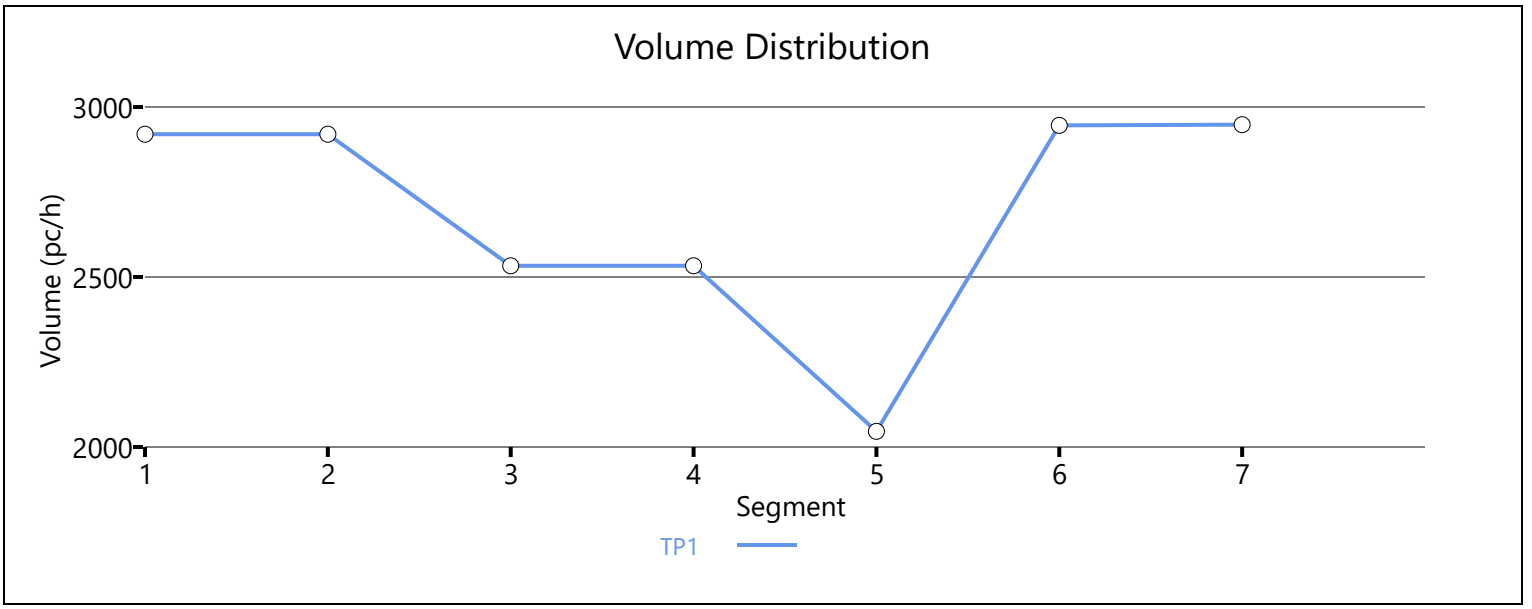
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.7	13.0	12.0	2.40	B

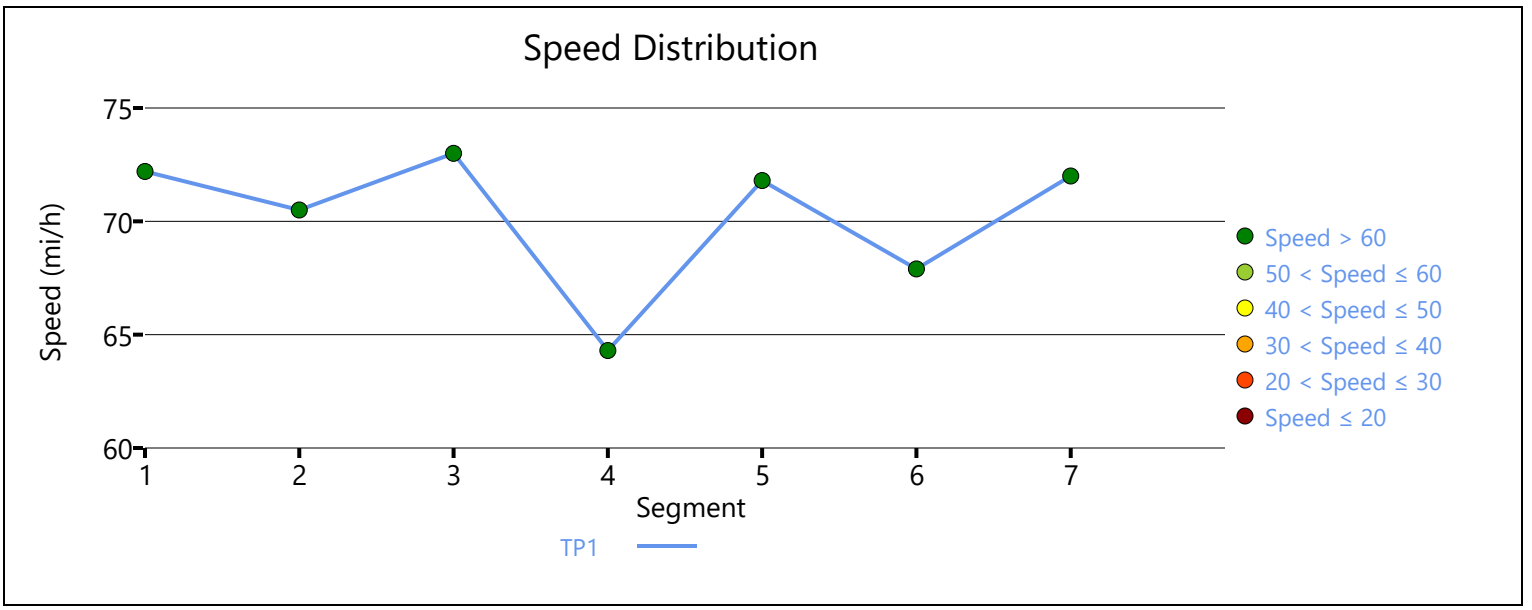
Facility Overall Results

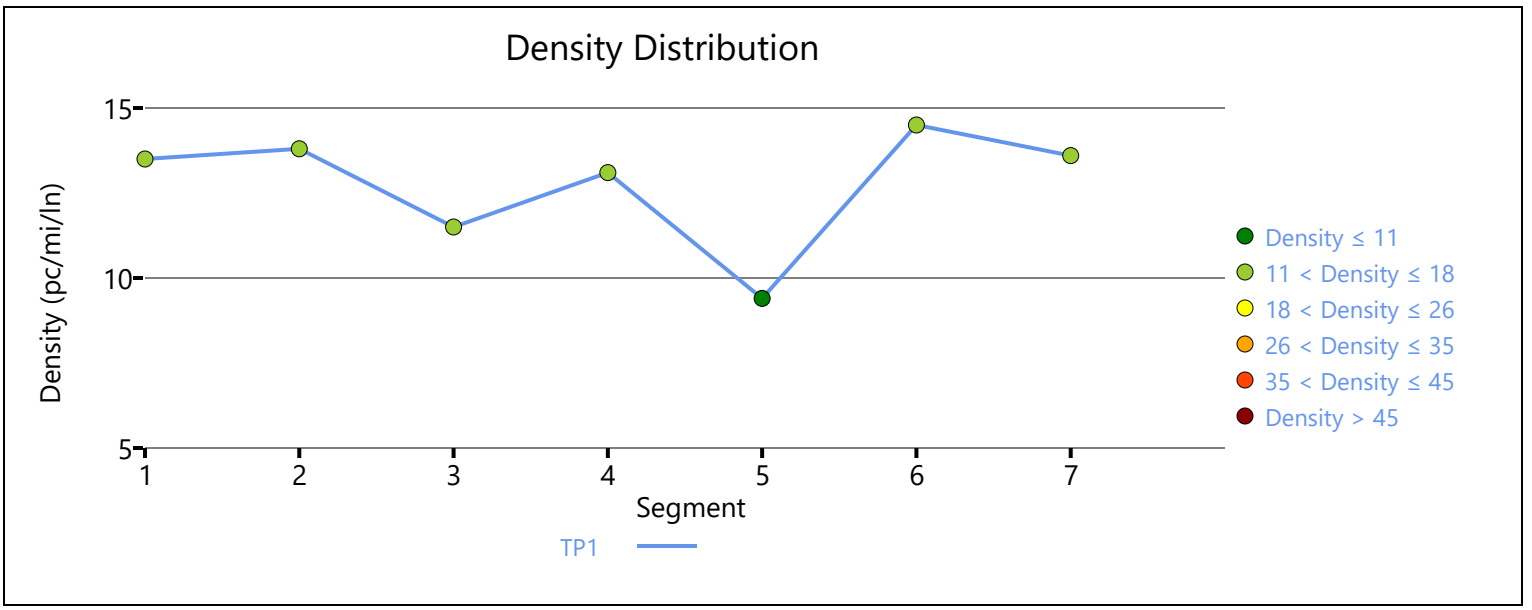
Space Mean Speed, mi/h	70.7	Density, veh/mi/ln	12.0
Average Travel Time, min	2.40	Density, pc/mi/ln	13.0

Messages

Comments







HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB to SB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 between two off-ramps	430	3
4	Diverge	Diverge	I-182 EB to NB Braodmoor Loop Ramp	1500	3
5	Basic	Basic	I-182 EB at Broadmoor	2170	3
6	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
7	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.951	5109	7200	0.71	68.2	25.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.951	0.991	5109	790	7200	2100	0.71	0.38	69.5	65.2	24.5	21.9	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.951	4286	7200	0.60	72.0	19.8	C

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.951	0.952	4286	1501	7200	2000	0.60	0.75	61.8	56.6	23.1	24.4	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.919	2880	7200	0.40	71.7	13.3	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.919	0.984	3615	735	7200	2100	0.50	0.35	67.5	65.2	17.9	20.4	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.932	3615	7200	0.50	72.0	16.7	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	68.5	20.8	19.6	2.50	C

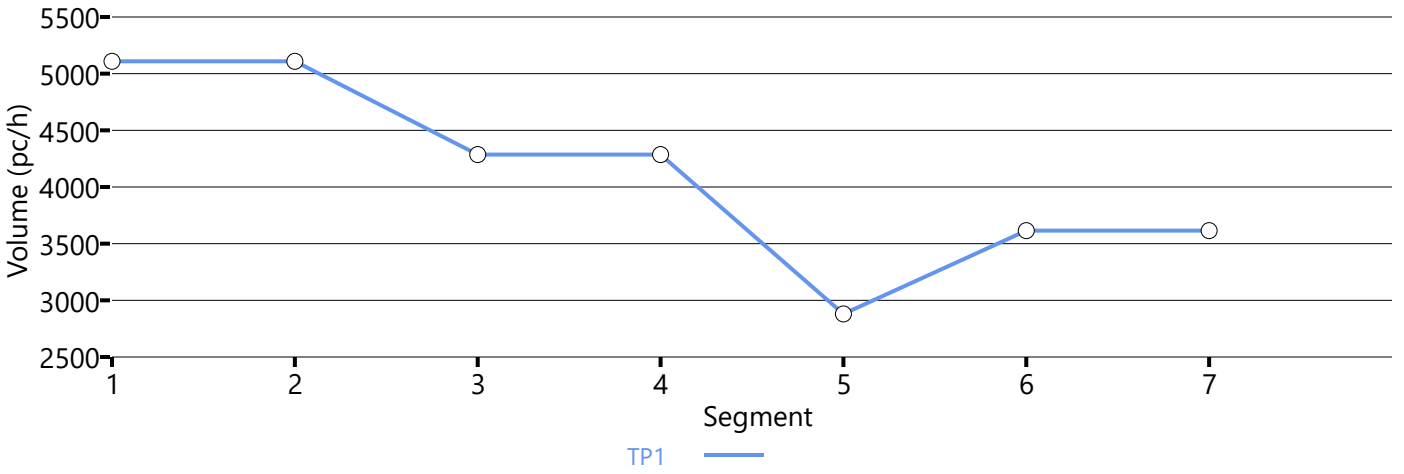
Facility Overall Results

Space Mean Speed, mi/h	68.5	Density, veh/mi/ln	19.6
Average Travel Time, min	2.50	Density, pc/mi/ln	20.8

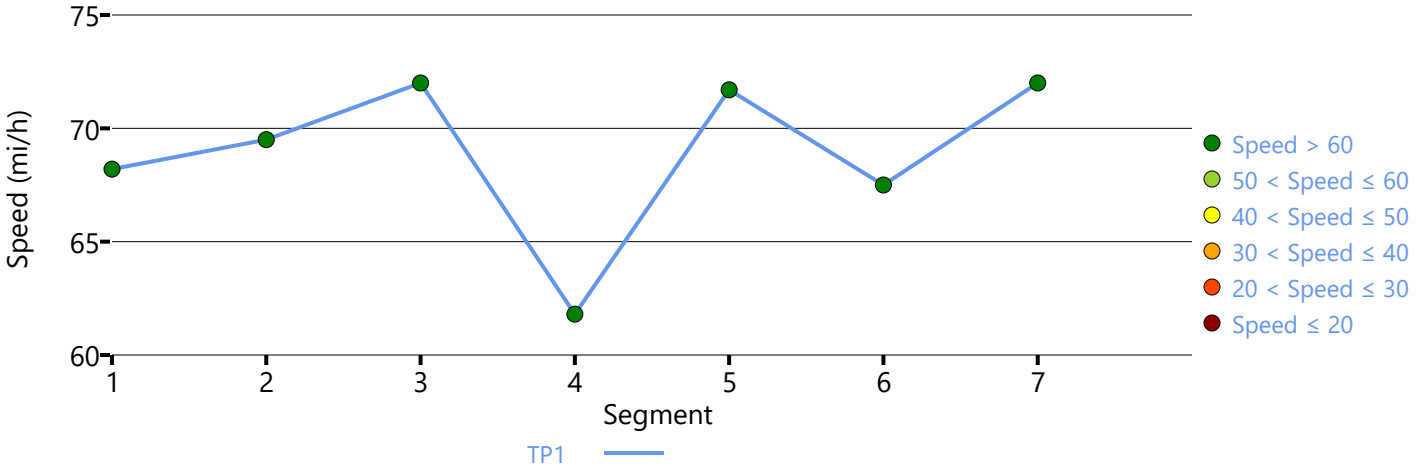
Messages

Comments

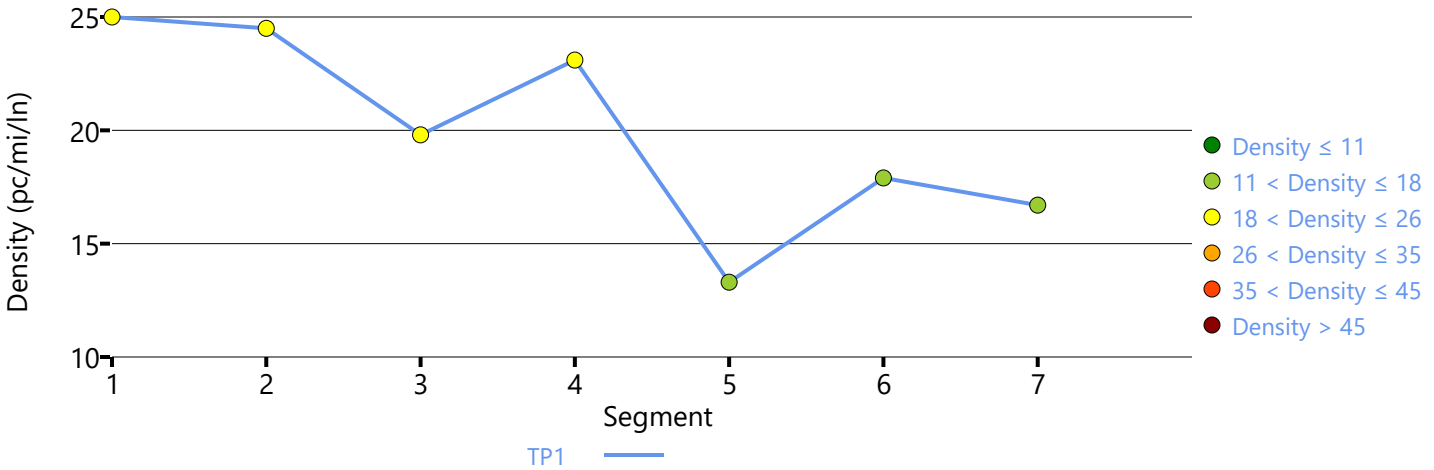
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB to SB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 between two off-ramps	430	3
4	Diverge	Diverge	I-182 EB to NB Broadmoor Loop Ramp	1500	3
5	Basic	Basic	I-182 EB at Broadmoor	2170	3
6	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
7	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.927	3997	7200	0.56	71.6	18.6	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.927	0.947	3997	370	7200	2100	0.56	0.18	70.7	66.5	18.8	16.2	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.927	3619	7200	0.50	73.0	16.5	B

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.927	0.947	3619	1030	7200	2000	0.50	0.52	63.1	58.0	19.1	20.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.917	2595	7200	0.36	71.7	12.0	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.917	0.960	3897	1302	7200	2100	0.54	0.62	66.7	64.5	19.5	23.2	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.931	3899	7200	0.54	71.8	18.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.1	17.7	16.3	2.40	B

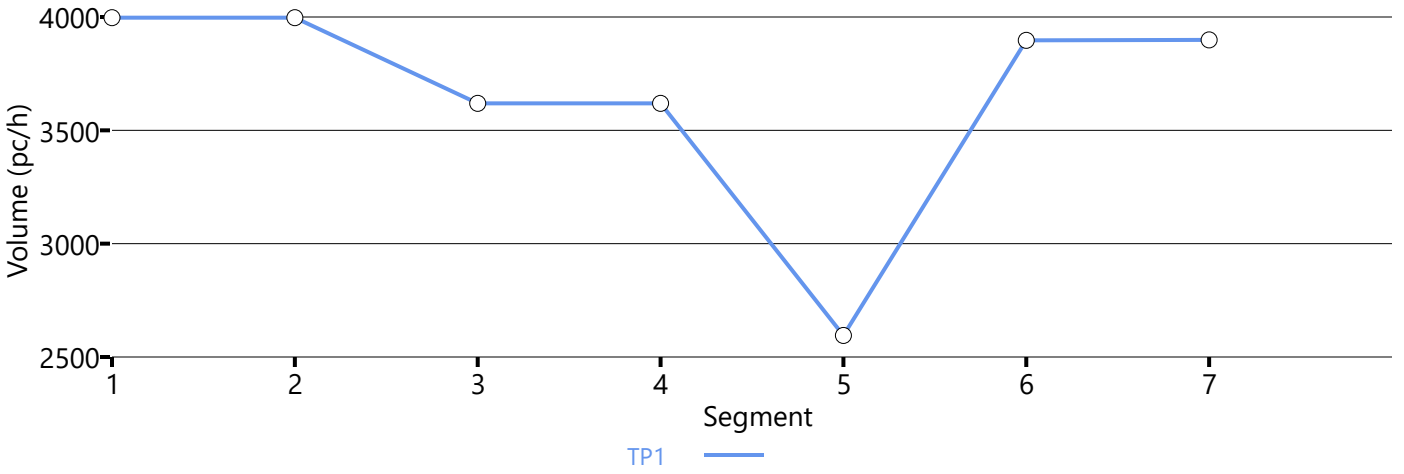
Facility Overall Results

Space Mean Speed, mi/h	70.1	Density, veh/mi/ln	16.3
Average Travel Time, min	2.40	Density, pc/mi/ln	17.7

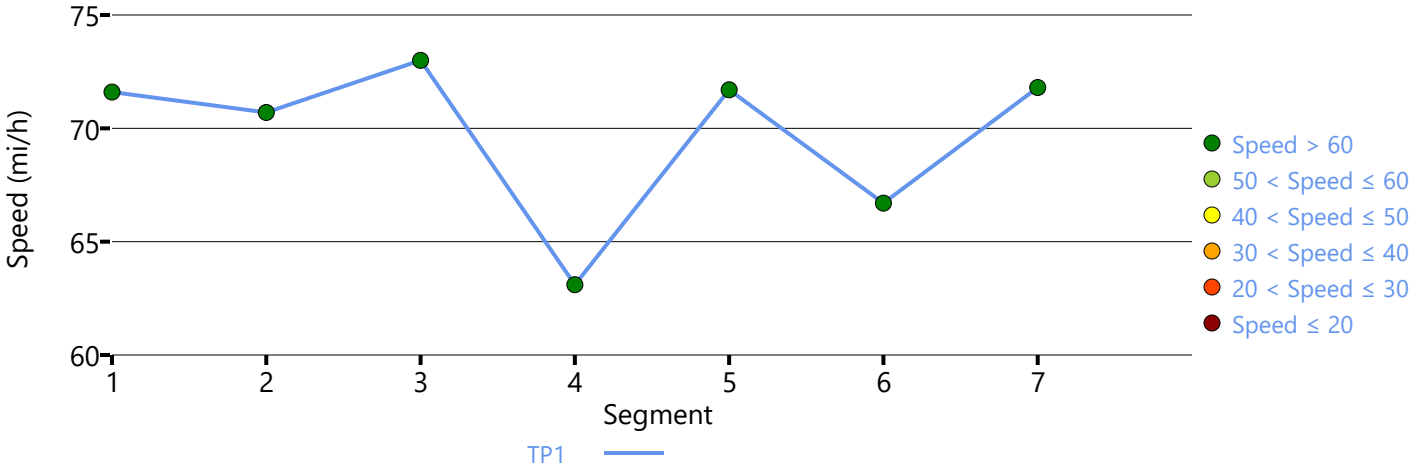
Messages

Comments

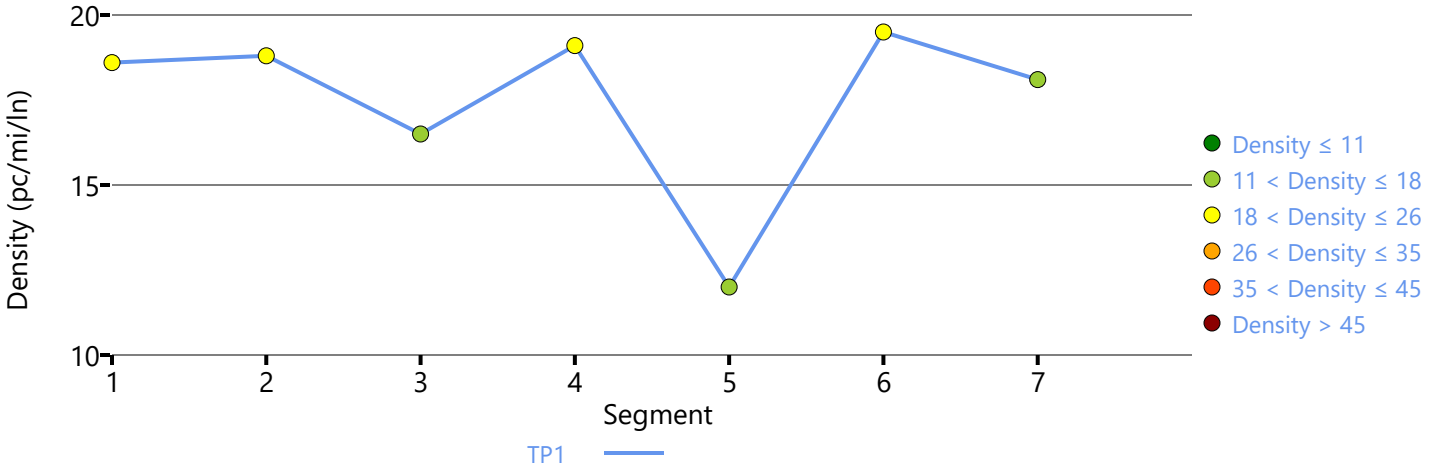
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	7
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor to SB Off-Ramp	1500	3
3	Basic	Basic	I-182 between off-ramps	430	3
4	Diverge	Diverge	I-182 EB to NB Broadmoor Loop Ramp	1500	3
5	Basic	Basic	I-182 EB at Broadmoor	2170	3
6	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
7	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.951	5678	7200	0.79	65.3	29.0	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.950	0.991	5684	752	7200	2100	0.79	0.36	69.6	65.3	27.2	24.2	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.950	4900	7200	0.68	69.9	23.4	C

Segment 4: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.950	0.991	4900	1599	7200	2000	0.68	0.80	61.8	56.3	26.4	27.3	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.922	3330	7200	0.46	71.7	15.4	B

Segment 6: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.922	0.984	4351	1021	7200	2100	0.60	0.49	66.4	64.1	21.8	24.6	C

Segment 7: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.936	4354	7200	0.60	70.9	20.5	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.0	24.3	22.9	2.50	C

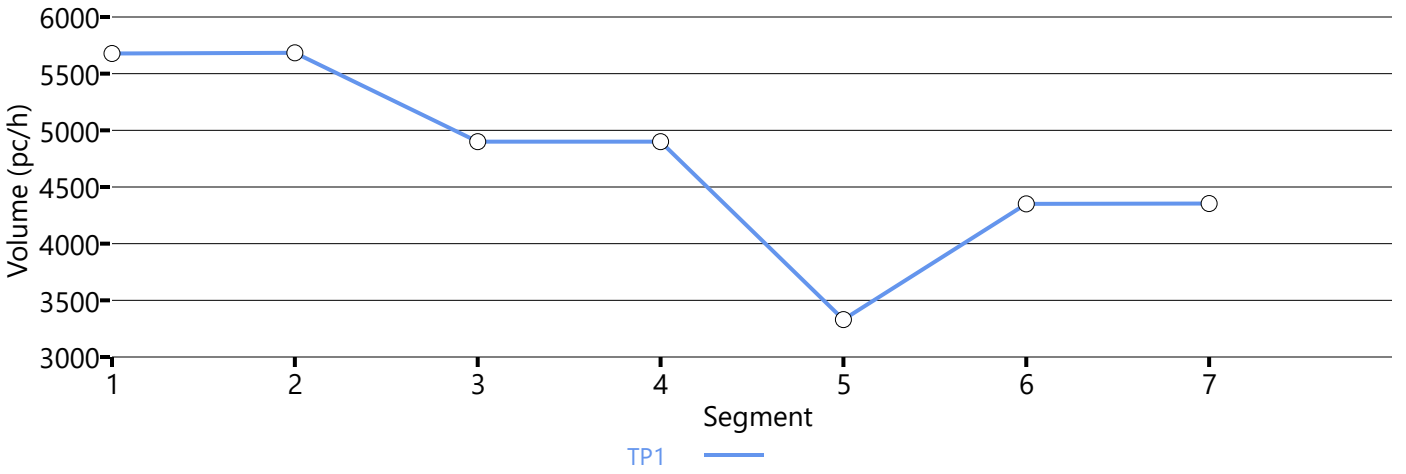
Facility Overall Results

Space Mean Speed, mi/h	67.0	Density, veh/mi/ln	22.9
Average Travel Time, min	2.50	Density, pc/mi/ln	24.3

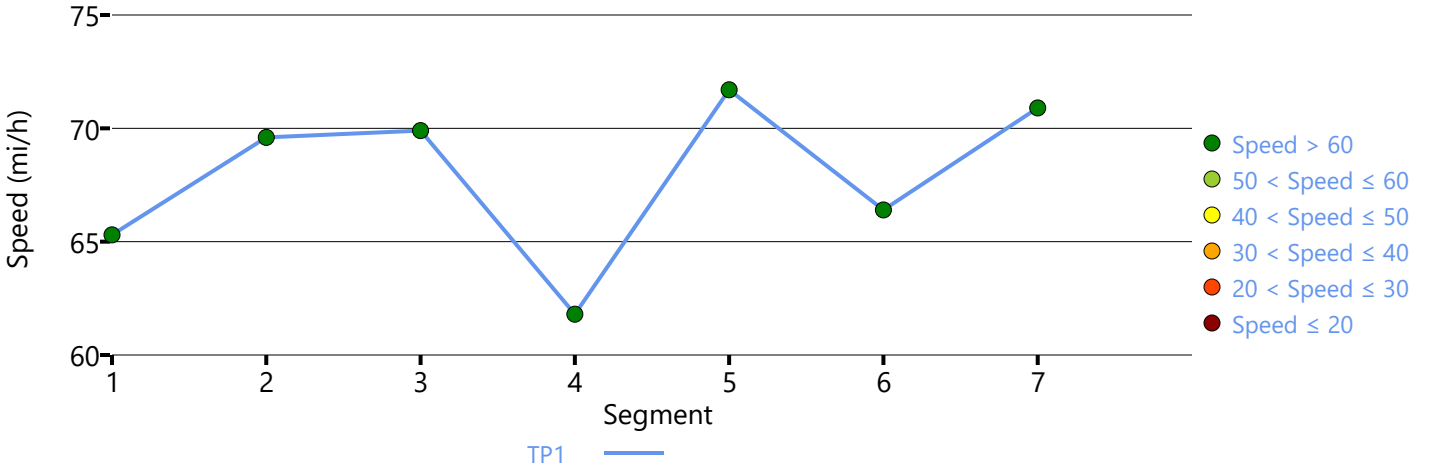
Messages

Comments

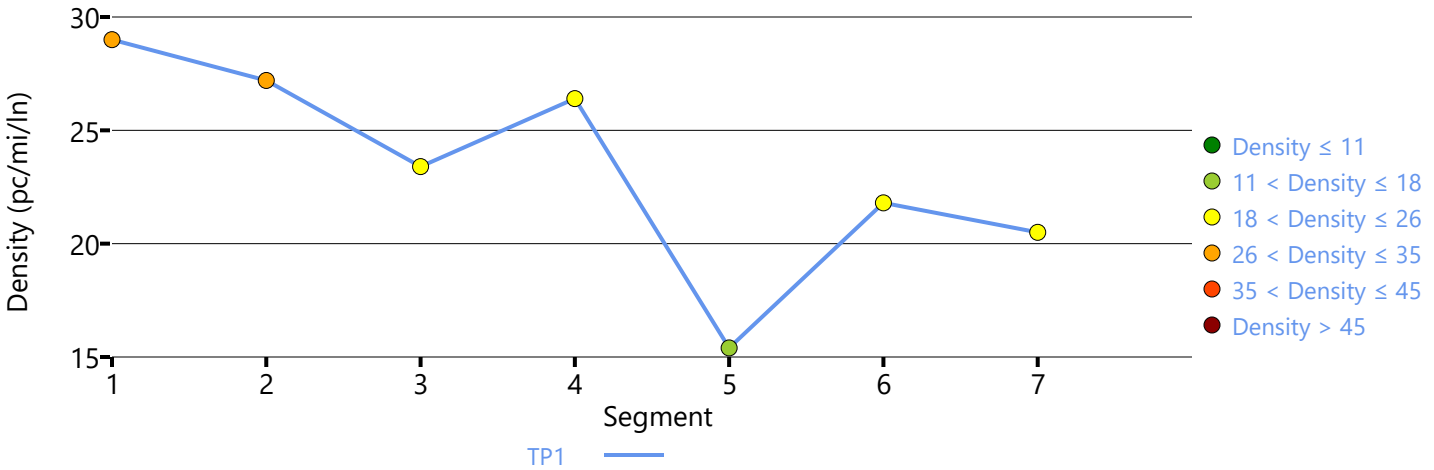
Volume Distribution



Speed Distribution



Density Distribution



F-E-4 RESULTS

HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project F-E-4	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.927	2920	7200	0.41	72.2	13.5	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.927	0.947	2920	872	7200	4200	0.41	0.21	70.7	65.0	13.8	6.2	A

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.919	2046	7200	0.28	72.2	9.4	A

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.919	0.960	2946	900	7200	2100	0.41	0.43	67.9	65.7	14.5	17.7	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.931	2948	7200	0.41	72.0	13.6	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	71.5	12.5	11.6	2.40	B

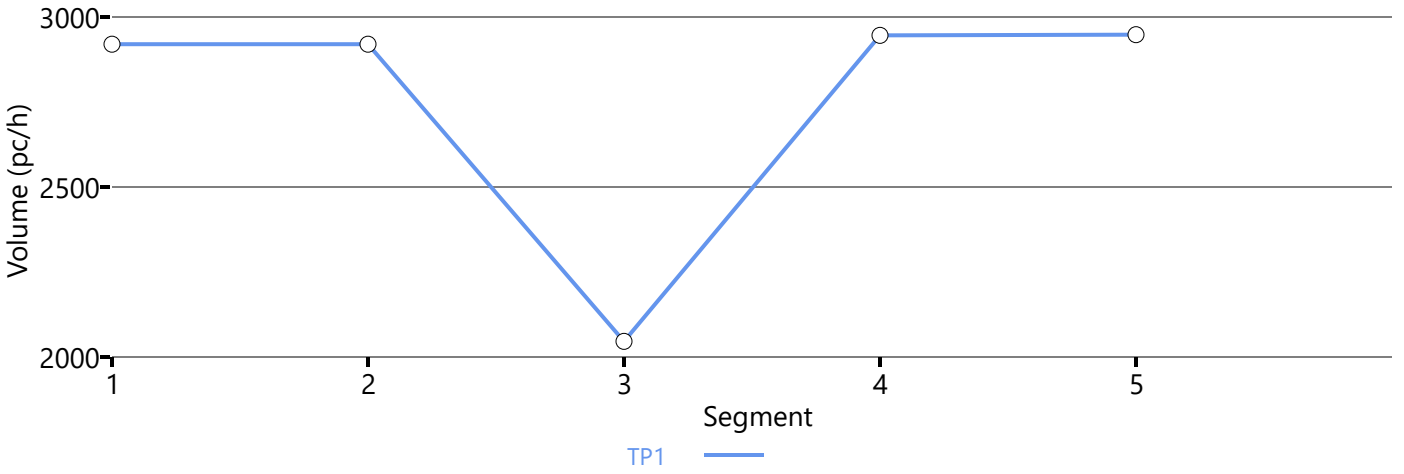
Facility Overall Results

Space Mean Speed, mi/h	71.5	Density, veh/mi/ln	11.6
Average Travel Time, min	2.40	Density, pc/mi/ln	12.5

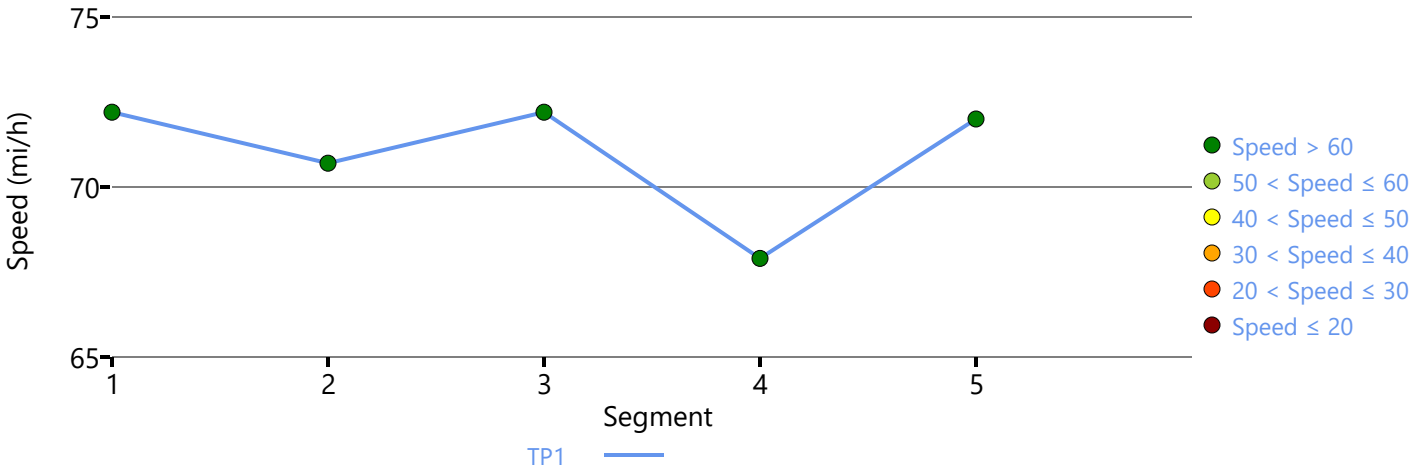
Messages

Comments

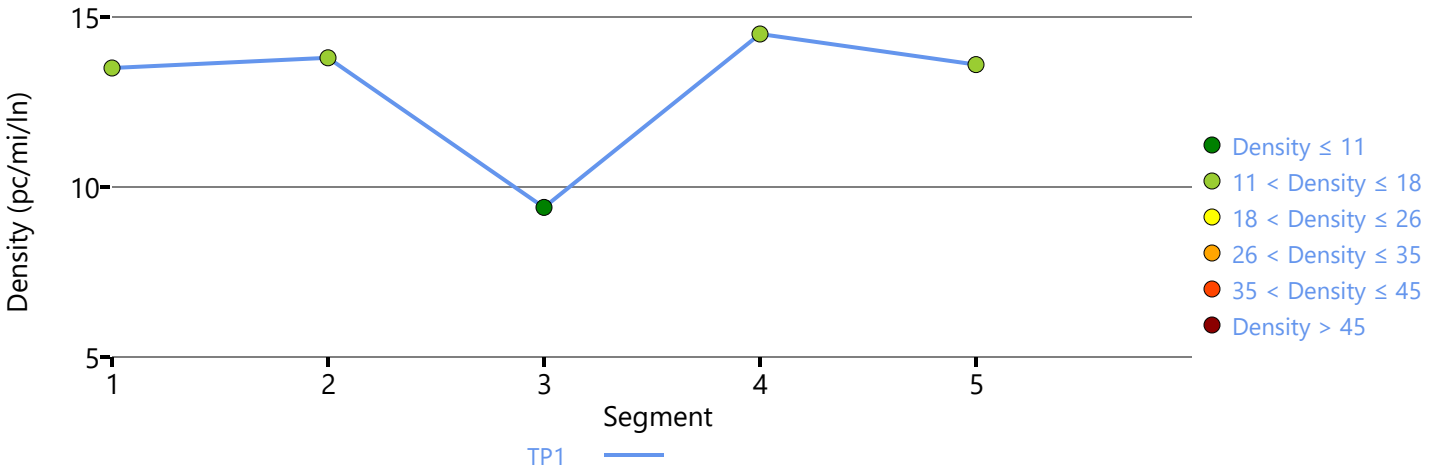
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2025
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project Alt F-E-4	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.951	5109	7200	0.71	68.2	25.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.951	0.991	5109	2238	7200	4200	0.71	0.53	65.9	60.9	25.8	21.1	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.919	2874	7200	0.40	72.1	13.3	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.919	0.984	3609	735	7200	2100	0.50	0.35	67.6	65.3	17.8	20.4	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	0.92	0.932	3610	7200	0.50	72.0	16.7	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	69.1	19.7	18.6	2.40	C

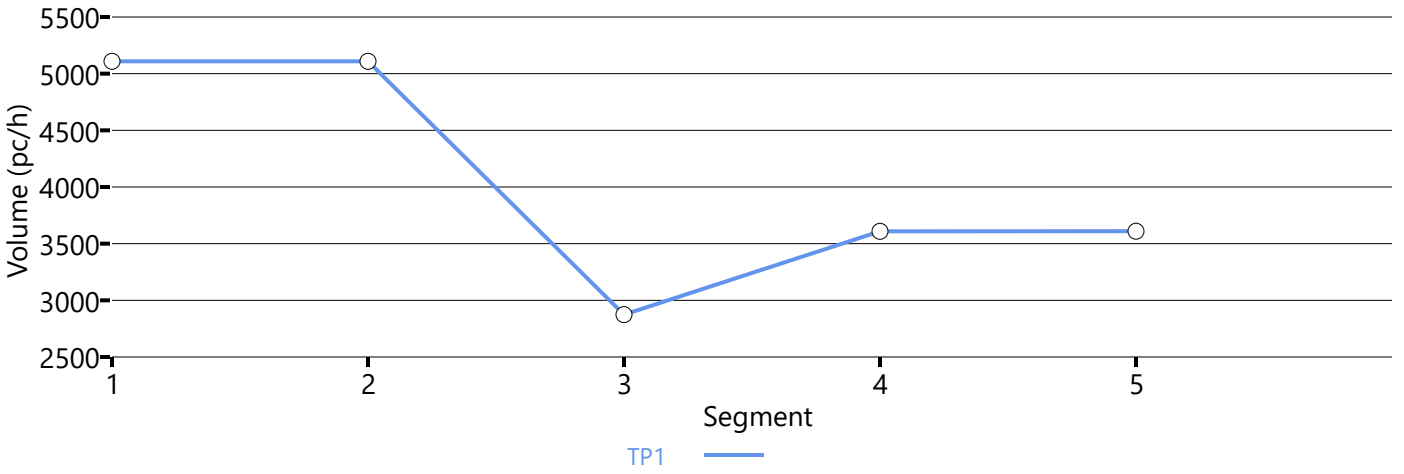
Facility Overall Results

Space Mean Speed, mi/h	69.1	Density, veh/mi/ln	18.6
Average Travel Time, min	2.40	Density, pc/mi/ln	19.7

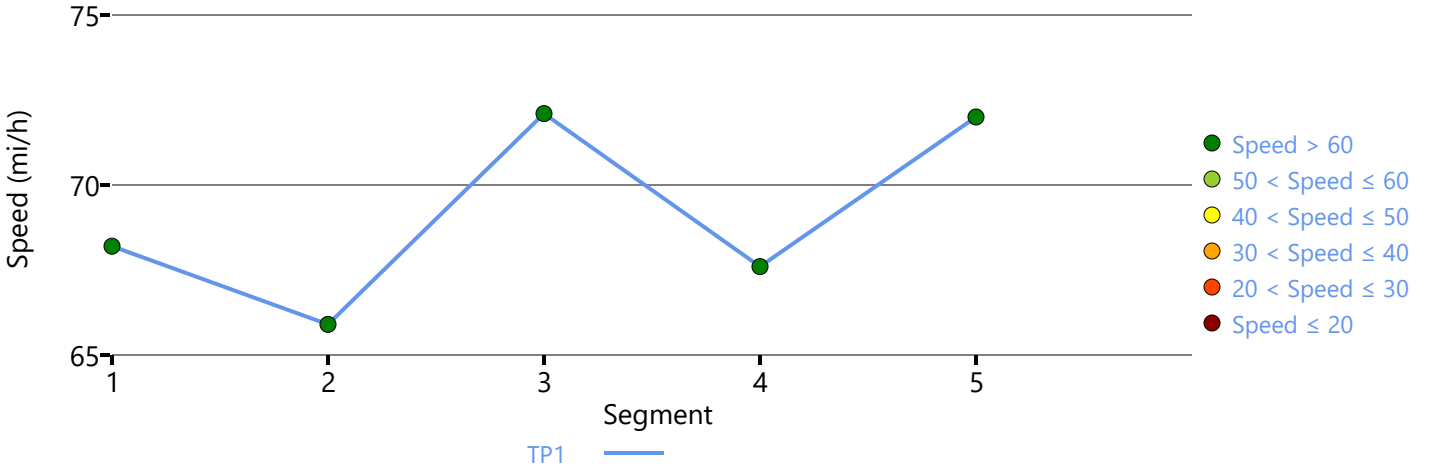
Messages

Comments

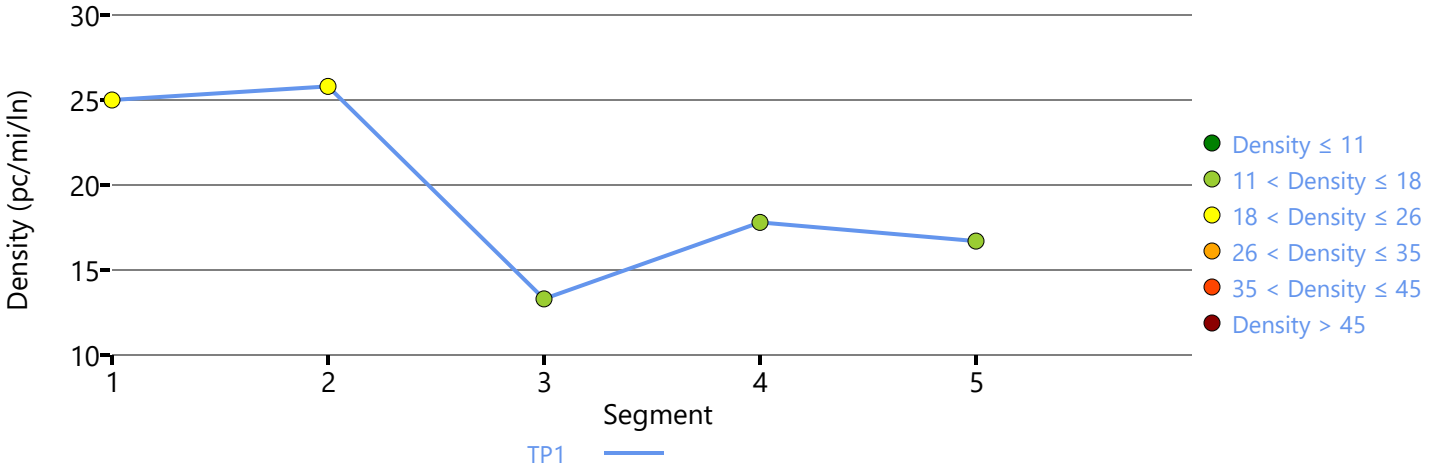
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	AM Peak
Project Description	Broadmoor Interchange Project Alt F-E-4	Unit	United States Customary

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-182	5280	3
2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.927	3997	7200	0.56	71.6	18.6	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.927	0.947	3997	1399	7200	4200	0.56	0.33	68.7	63.4	19.4	12.8	B

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.917	2595	7200	0.36	72.2	12.0	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.917	0.960	3897	1302	7200	2100	0.54	0.62	66.7	64.5	19.5	23.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	1.00	0.931	3899	7200	0.54	71.8	18.1	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	70.8	16.9	15.6	2.40	B

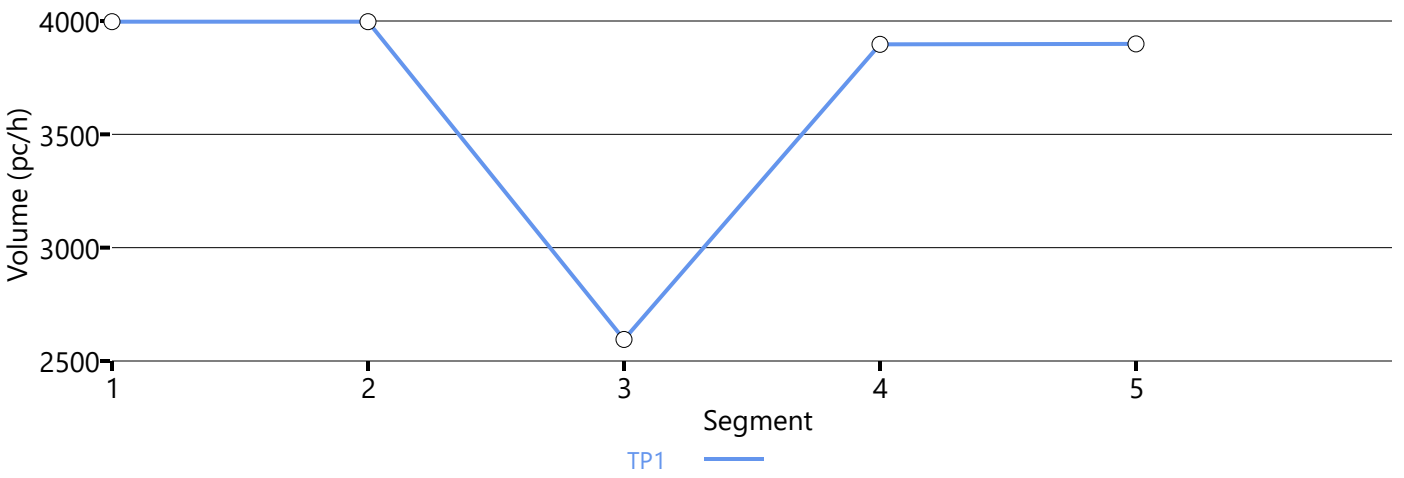
Facility Overall Results

Space Mean Speed, mi/h	70.8	Density, veh/mi/ln	15.6
Average Travel Time, min	2.40	Density, pc/mi/ln	16.9

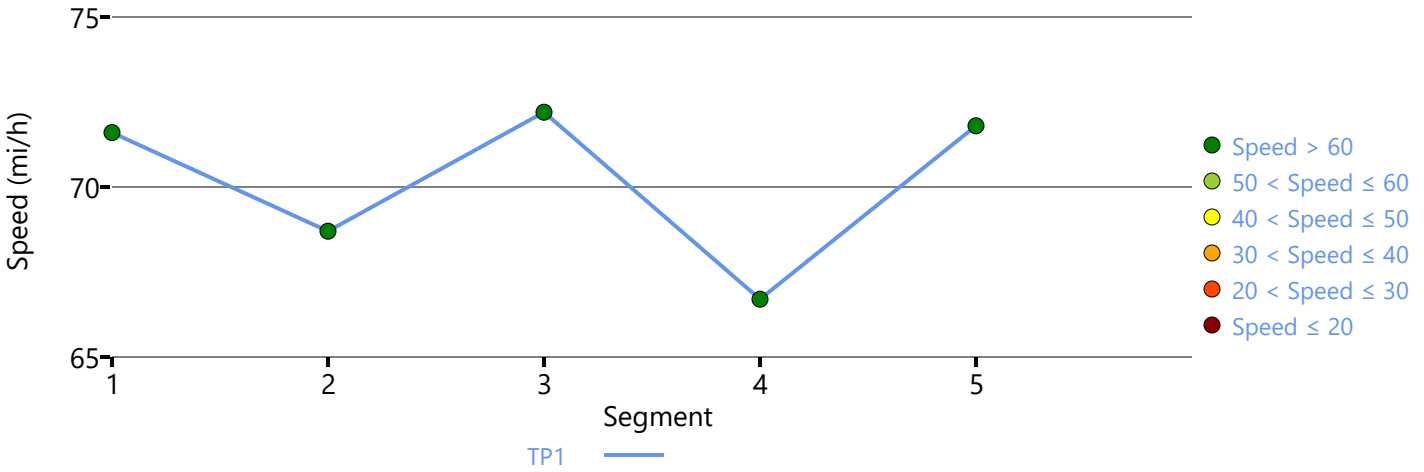
Messages

Comments

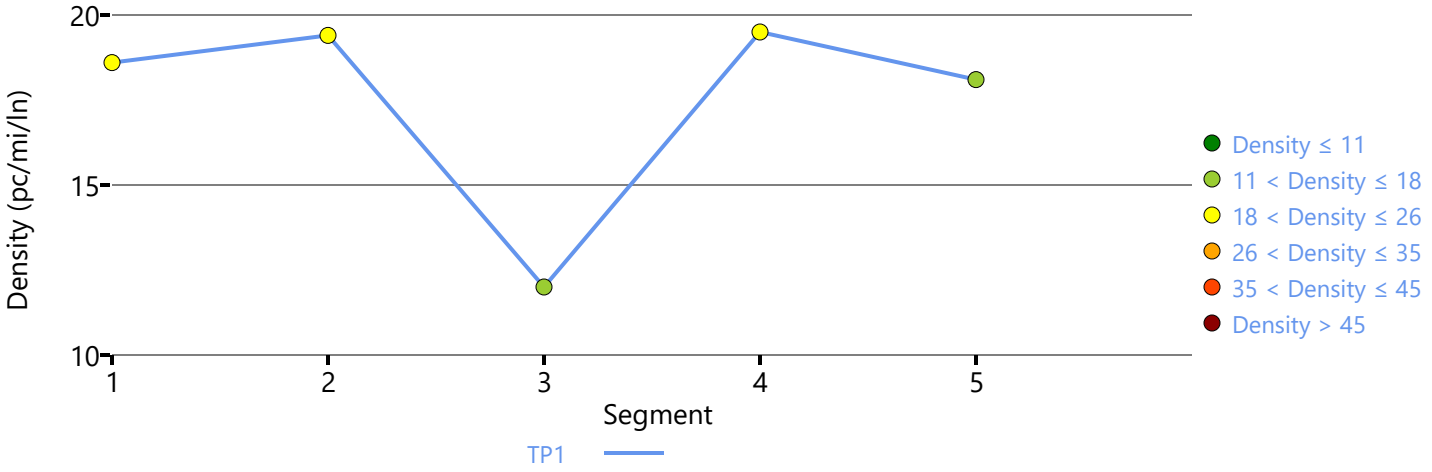
Volume Distribution



Speed Distribution



Density Distribution



HCS7 Freeway Facilities Report

Project Information

Analyst	DKS Associates	Date	10/29/2021
Agency		Analysis Year	2045
Jurisdiction		Time Period Analyzed	PM Peak
Project Description	Broadmoor Interchange Project Alt F-E-4	Unit	United States Customary

Facility Global Input

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Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15
Facility Length, mi	2.82		

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
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2	Diverge	Diverge	I-182 EB Broadmoor Off-Ramp	1500	3
3	Basic	Basic	I-182 EB at Broadmoor	4100	3
4	Merge	Merge	I-182 EB Broadmoor On-Ramp	1500	3
5	Basic	Basic	I-182	2500	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.951	5678	7200	0.79	65.3	29.0	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.950	0.991	5684	2356	7200	4200	0.79	0.56	65.5	60.5	28.9	23.9	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	1.00	0.922	3324	7200	0.46	72.1	15.3	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	1.00	1.00	0.922	0.984	4345	1021	7200	2100	0.60	0.49	66.5	64.1	21.8	24.6	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS

1	1.00	0.936	4348	7200	0.60	70.9	20.4	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.5	23.0	21.7	2.50	C

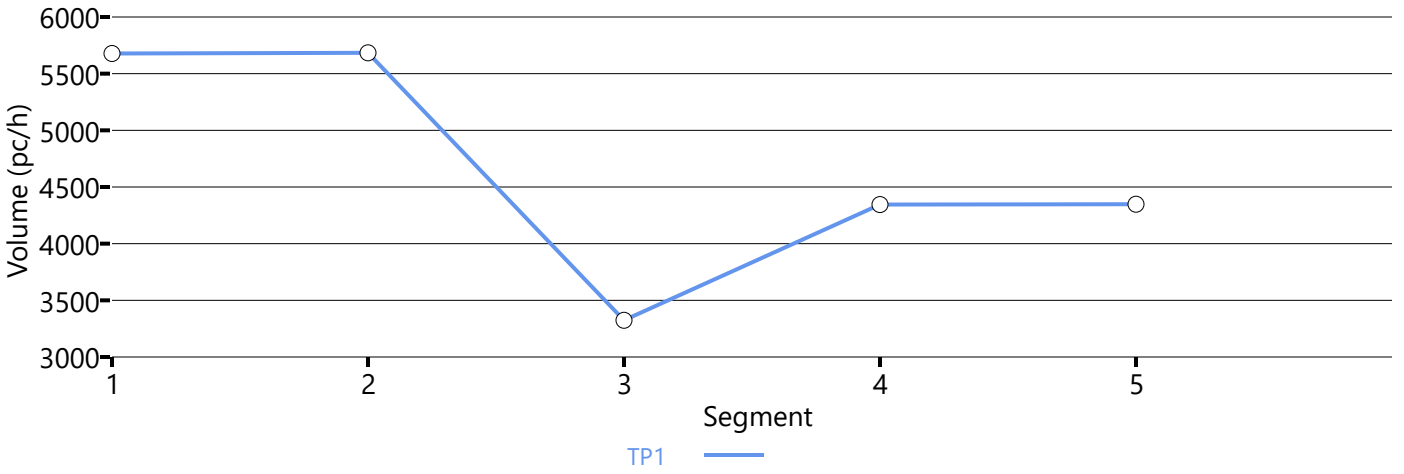
Facility Overall Results

Space Mean Speed, mi/h	67.5	Density, veh/mi/ln	21.7
Average Travel Time, min	2.50	Density, pc/mi/ln	23.0

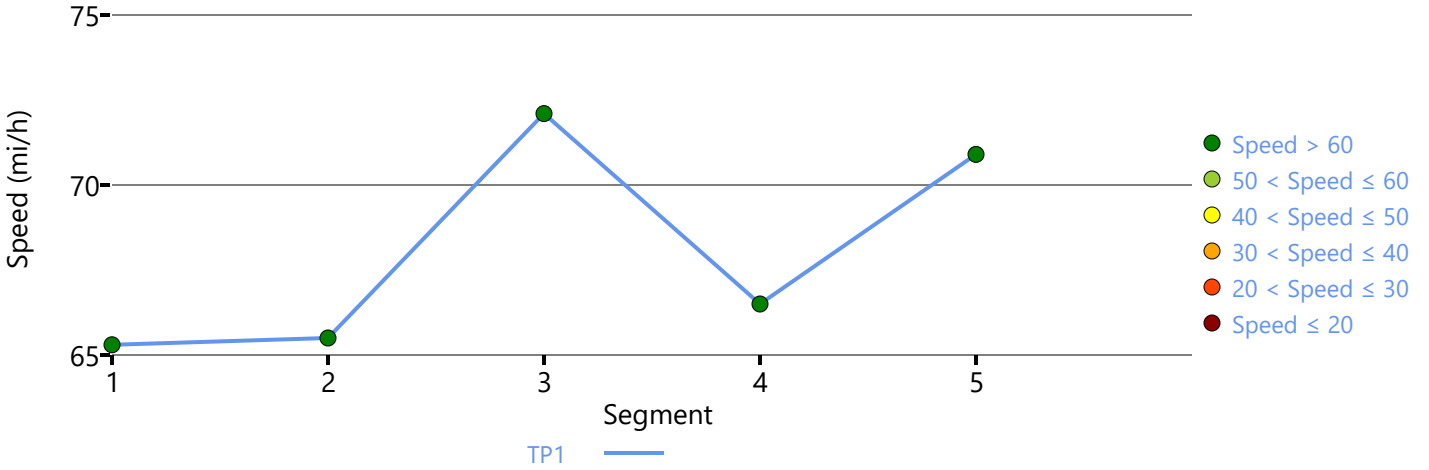
Messages

Comments

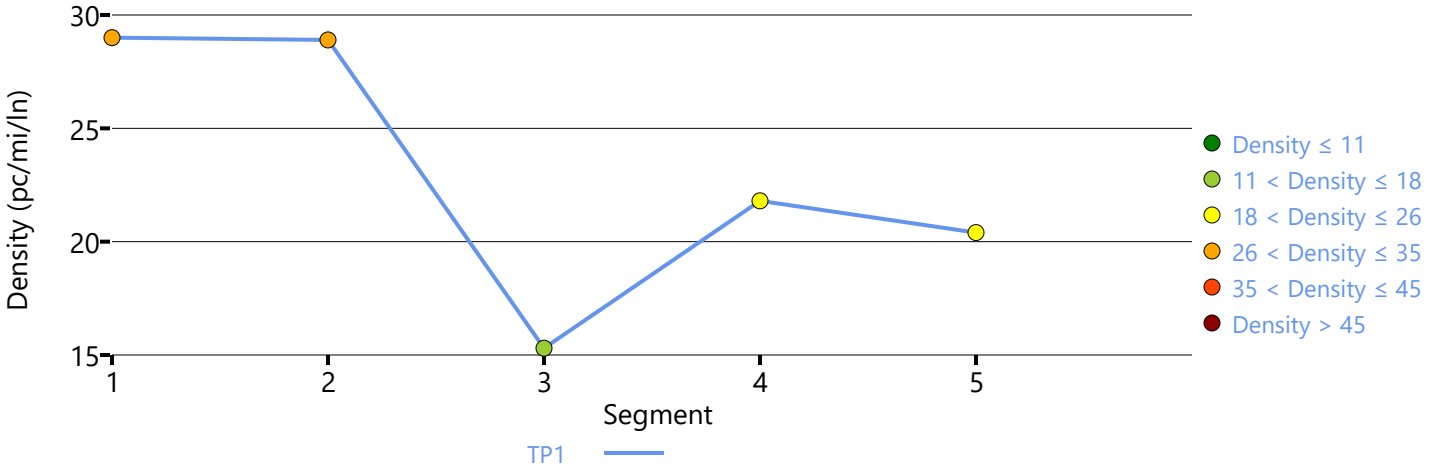
Volume Distribution



Speed Distribution



Density Distribution



APPENDIX F-4: EXISTING CONDITIONS SYNCHRO RESULTS

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	666	34	329	401	33	620
Future Volume (veh/h)	666	34	329	401	33	620
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1870	1870	1885	1856	1870
Adj Flow Rate, veh/h	757	11	374	0	38	705
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	2	2	1	3	2
Cap, veh/h	1127	581	915		426	1513
Arrive On Green	0.32	0.32	0.26	0.00	0.04	0.43
Sat Flow, veh/h	3483	1585	3647	1598	1767	3647
Grp Volume(v), veh/h	757	11	374	0	38	705
Grp Sat Flow(s),veh/h/ln	1742	1585	1777	1598	1767	1777
Q Serve(g_s), s	7.5	0.2	3.5	0.0	0.6	5.7
Cycle Q Clear(g_c), s	7.5	0.2	3.5	0.0	0.6	5.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1127	581	915		426	1513
V/C Ratio(X)	0.67	0.02	0.41		0.09	0.47
Avail Cap(c_a), veh/h	2183	1061	2227		1458	4899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	11.7	8.1	12.3	0.0	9.0	8.2
Incr Delay (d2), s/veh	0.8	0.0	0.3	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.2	1.1	0.0	0.2	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.5	8.1	12.6	0.0	9.1	8.4
LnGrp LOS	B	A	B		A	A
Approach Vol, veh/h	768		374	A		743
Approach Delay, s/veh	12.4		12.6			8.5
Approach LOS	B		B			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		22.0		17.9	6.7	15.3
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		55.0		25.0	25.0	25.0
Max Q Clear Time (g_c+I1), s		7.7		9.5	2.6	5.5
Green Ext Time (p_c), s		5.5		3.4	0.1	2.2

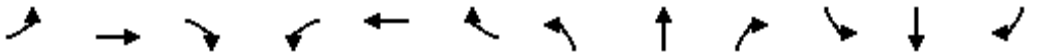
Intersection Summary	
HCM 6th Ctrl Delay	10.9
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

04/08/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	225	0	185	0	622	559	0	500	839
Future Volume (veh/h)	0	0	0	225	0	185	0	622	559	0	500	839
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	0	1885	0	1885	1885	0	1885	1870
Adj Flow Rate, veh/h				262	0	196	0	723	0	0	581	0
Peak Hour Factor				0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %				1	0	1	0	1	1	0	1	2
Cap, veh/h				325	0	290	0	2333		0	2333	
Arrive On Green				0.18	0.00	0.18	0.00	1.00	0.00	0.00	0.65	0.00
Sat Flow, veh/h				1795	0	1598	0	3676	1598	0	3676	1585
Grp Volume(v), veh/h				262	0	196	0	723	0	0	581	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	0	1791	1598	0	1791	1585
Q Serve(g_s), s				7.7	0.0	6.3	0.0	0.0	0.0	0.0	3.7	0.0
Cycle Q Clear(g_c), s				7.7	0.0	6.3	0.0	0.0	0.0	0.0	3.7	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				325	0	290	0	2333		0	2333	
V/C Ratio(X)				0.81	0.00	0.68	0.00	0.31		0.00	0.25	
Avail Cap(c_a), veh/h				503	0	447	0	2333		0	2333	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.73	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				21.6	0.0	21.0	0.0	0.0	0.0	0.0	4.0	0.0
Incr Delay (d2), s/veh				2.6	0.0	1.0	0.0	0.3	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.1	0.0	2.2	0.0	0.1	0.0	0.0	0.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				24.2	0.0	22.0	0.0	0.3	0.0	0.0	4.2	0.0
LnGrp LOS				C	A	C	A	A		A	A	
Approach Vol, veh/h					458			723	A		581	A
Approach Delay, s/veh					23.3			0.3			4.2	
Approach LOS					C			A			A	

Timer - Assigned Phs	2		6		8							
Phs Duration (G+Y+Rc), s	40.4		40.4		14.6							
Change Period (Y+Rc), s	4.6		4.6		4.6							
Max Green Setting (Gmax), s	30.4		30.4		15.4							
Max Q Clear Time (g_c+I1), s	2.0		5.7		9.7							
Green Ext Time (p_c), s	4.9		4.0		0.3							

Intersection Summary		
HCM 6th Ctrl Delay	7.6	
HCM 6th LOS	A	

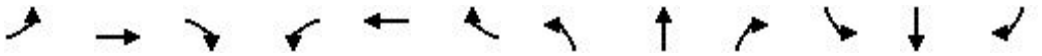
Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

04/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	409	0	328	0	0	0	0	772	345	210	515	0
Future Volume (veh/h)	409	0	328	0	0	0	0	772	345	210	515	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1885				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	465	0	0				0	877	161	239	585	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	0	1				0	2	2	1	1	0
Cap, veh/h	619	0					0	1712	761	472	1245	0
Arrive On Green	0.17	0.00	0.00				0.00	0.48	0.48	0.03	0.22	0.00
Sat Flow, veh/h	3591	0	1598				0	3647	1580	1795	1885	0
Grp Volume(v), veh/h	465	0	0				0	877	161	239	585	0
Grp Sat Flow(s),veh/h/ln	1795	0	1598				0	1777	1580	1795	1885	0
Q Serve(g_s), s	6.8	0.0	0.0				0.0	9.3	3.2	3.2	14.9	0.0
Cycle Q Clear(g_c), s	6.8	0.0	0.0				0.0	9.3	3.2	3.2	14.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	619	0					0	1712	761	472	1245	0
V/C Ratio(X)	0.75	0.00					0.00	0.51	0.21	0.51	0.47	0.00
Avail Cap(c_a), veh/h	1005	0					0	1712	761	707	1245	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.33	0.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.92	0.92	0.00
Uniform Delay (d), s/veh	21.6	0.0	0.0				0.0	9.8	8.2	7.4	13.1	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0				0.0	1.1	0.6	0.3	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	0.0	0.0				0.0	2.8	0.9	0.7	7.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	0.0	0.0				0.0	10.9	8.9	7.7	14.3	0.0
LnGrp LOS	C	A					A	B	A	A	B	A
Approach Vol, veh/h		465	A					1038			824	
Approach Delay, s/veh		22.3						10.6			12.4	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	9.8	31.1		14.1		40.9						
Change Period (Y+Rc), s	4.6	4.6		4.6		4.6						
Max Green Setting (Gmax), s	12.4	13.4		15.4		30.4						
Max Q Clear Time (g_c+I1), s	5.2	11.3		8.8		16.9						
Green Ext Time (p_c), s	0.2	1.2		0.6		2.9						

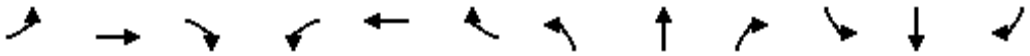
Intersection Summary												
HCM 6th Ctrl Delay			13.6									
HCM 6th LOS			B									

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	92	6	11	19	5	381	0	602	15	275	440	26
Future Volume (veh/h)	92	6	11	19	5	381	0	602	15	275	440	26
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	94	6	9	19	5	173	0	614	10	281	449	23
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	380	391	348	399	256	229	390	1093	18	502	930	48
Arrive On Green	0.11	0.22	0.22	0.04	0.14	0.15	0.00	0.30	0.27	0.15	0.52	0.49
Sat Flow, veh/h	1810	1805	1610	1810	1805	1610	1810	3635	59	1810	1792	92
Grp Volume(v), veh/h	94	6	9	19	5	173	0	305	319	281	0	472
Grp Sat Flow(s),veh/h/ln	1810	1805	1610	1810	1805	1610	1810	1805	1889	1810	0	1883
Q Serve(g_s), s	2.1	0.1	0.2	0.5	0.1	5.7	0.0	7.8	7.8	5.5	0.0	8.8
Cycle Q Clear(g_c), s	2.1	0.1	0.2	0.5	0.1	5.7	0.0	7.8	7.8	5.5	0.0	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.05
Lane Grp Cap(c), veh/h	380	391	348	399	256	229	390	543	568	502	0	978
V/C Ratio(X)	0.25	0.02	0.03	0.05	0.02	0.76	0.00	0.56	0.56	0.56	0.00	0.48
Avail Cap(c_a), veh/h	509	427	381	728	493	440	717	1036	1084	897	0	1424
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.2	16.9	17.0	18.7	20.3	22.4	0.0	16.2	16.2	11.0	0.0	8.5
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.0	0.0	7.1	0.0	1.3	1.2	1.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.1	0.1	0.2	0.1	2.4	0.0	2.8	2.9	1.7	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	16.9	17.0	18.8	20.3	29.5	0.0	17.5	17.4	12.0	0.0	9.0
LnGrp LOS	B	B	B	B	C	C	A	B	B	B	A	A
Approach Vol, veh/h		109			197			624			753	
Approach Delay, s/veh		15.7			28.2			17.4			10.1	
Approach LOS		B			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	32.5	10.1	12.3	12.0	20.5	6.0	16.4
Change Period (Y+Rc), s	4.0	5.5	4.0	4.5	4.0	5.5	4.0	4.5
Max Green Setting (Gmax), s	10.0	40.0	10.0	15.0	20.0	30.0	12.0	13.0
Max Q Clear Time (g_c+I1), s	0.0	10.8	4.1	7.7	7.5	9.8	2.5	2.2
Green Ext Time (p_c), s	0.0	4.2	0.1	0.7	0.6	4.7	0.0	0.0

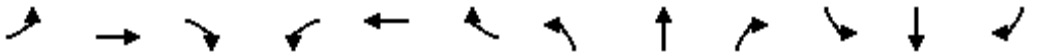
Intersection Summary	
HCM 6th Ctrl Delay	15.3
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
7: Road 68 & I 182 WB On/Off Ramp/I 182 WB On Ramp

12/22/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	193	3	463	0	620	329	0	1231	667
Future Volume (veh/h)	0	0	0	193	3	463	0	620	329	0	1231	667
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1826	1826	1826	0	1856	1856	0	1870	1870
Adj Flow Rate, veh/h				212	3	0	0	681	0	0	1353	0
Peak Hour Factor				0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %				5	5	5	0	3	3	0	2	2
Cap, veh/h				349	189		0	2582		0	2603	
Arrive On Green				0.10	0.10	0.00	0.00	1.00	0.00	0.00	0.73	0.00
Sat Flow, veh/h				3374	1826	1547	0	3618	1572	0	3647	1585
Grp Volume(v), veh/h				212	3	0	0	681	0	0	1353	0
Grp Sat Flow(s),veh/h/ln				1687	1826	1547	0	1763	1572	0	1777	1585
Q Serve(g_s), s				3.4	0.1	0.0	0.0	0.0	0.0	0.0	9.2	0.0
Cycle Q Clear(g_c), s				3.4	0.1	0.0	0.0	0.0	0.0	0.0	9.2	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				349	189		0	2582		0	2603	
V/C Ratio(X)				0.61	0.02		0.00	0.26		0.00	0.52	
Avail Cap(c_a), veh/h				1410	763		0	2582		0	2603	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00	0.00	0.86	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				24.0	22.5	0.0	0.0	0.0	0.0	0.0	3.2	0.0
Incr Delay (d2), s/veh				1.3	0.0	0.0	0.0	0.2	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.3	0.0	0.0	0.0	0.1	0.0	0.0	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				25.3	22.6	0.0	0.0	0.2	0.0	0.0	4.0	0.0
LnGrp LOS				C	C		A	A		A	A	
Approach Vol, veh/h					215	A		681	A		1353	A
Approach Delay, s/veh					25.3			0.2			4.0	
Approach LOS					C			A			A	

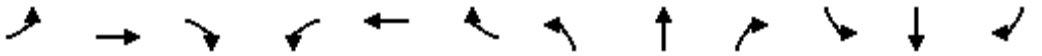
Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	45.6		45.6		10.4			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	23.4		23.4		23.4			
Max Q Clear Time (g_c+I1), s	2.0		11.2		5.4			
Green Ext Time (p_c), s	3.0		8.7		0.5			

Intersection Summary	
HCM 6th Ctrl Delay	4.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	287	0	131	0	0	0	0	662	361	0	539	885
Future Volume (veh/h)	287	0	131	0	0	0	0	662	361	0	539	885
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	0	1856				0	1856	1856	0	1841	1841
Adj Flow Rate, veh/h	305	0	0				0	704	313	0	573	0
Peak Hour Factor	0.94	0.94	0.94				0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	3	0	3				0	3	3	0	4	4
Cap, veh/h	432	0					0	1654	735	0	2438	
Arrive On Green	0.13	0.00	0.00				0.00	0.70	0.70	0.00	1.00	0.00
Sat Flow, veh/h	3428	0	1572				0	2466	1055	0	3589	1560
Grp Volume(v), veh/h	305	0	0				0	523	494	0	573	0
Grp Sat Flow(s),veh/h/ln	1714	0	1572				0	1763	1666	0	1749	1560
Q Serve(g_s), s	4.8	0.0	0.0				0.0	7.2	7.2	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.8	0.0	0.0				0.0	7.2	7.2	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		0.63	0.00		1.00
Lane Grp Cap(c), veh/h	432	0					0	1229	1161	0	2438	
V/C Ratio(X)	0.71	0.00					0.00	0.43	0.43	0.00	0.24	
Avail Cap(c_a), veh/h	1433	0					0	1229	1161	0	2438	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.67	1.67
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.00	0.81	0.00
Uniform Delay (d), s/veh	23.5	0.0	0.0				0.0	3.7	3.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0				0.0	1.1	1.1	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0				0.0	1.7	1.6	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	0.0	0.0				0.0	4.7	4.8	0.0	0.2	0.0
LnGrp LOS	C	A					A	A	A	A	A	
Approach Vol, veh/h		305	A					1017			573	A
Approach Delay, s/veh		24.3						4.8			0.2	
Approach LOS		C						A			A	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		44.3		11.7		44.3						
Change Period (Y+Rc), s		5.3		4.6		5.3						
Max Green Setting (Gmax), s		22.7		23.4		22.7						
Max Q Clear Time (g_c+I1), s		9.2		6.8		2.0						
Green Ext Time (p_c), s		4.0		0.3		3.1						

Intersection Summary												
HCM 6th Ctrl Delay			6.5									
HCM 6th LOS			A									

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	728	44	534	945	30	365
Future Volume (veh/h)	728	44	534	945	30	365
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1885	1870	1870	1885	1856	1870
Adj Flow Rate, veh/h	827	22	607	0	34	415
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	2	2	1	3	2
Cap, veh/h	1171	594	1003		341	1546
Arrive On Green	0.34	0.34	0.28	0.00	0.04	0.44
Sat Flow, veh/h	3483	1585	3647	1598	1767	3647
Grp Volume(v), veh/h	827	22	607	0	34	415
Grp Sat Flow(s),veh/h/ln	1742	1585	1777	1598	1767	1777
Q Serve(g_s), s	9.0	0.4	6.5	0.0	0.5	3.3
Cycle Q Clear(g_c), s	9.0	0.4	6.5	0.0	0.5	3.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1171	594	1003		341	1546
V/C Ratio(X)	0.71	0.04	0.61		0.10	0.27
Avail Cap(c_a), veh/h	1990	967	2031		1283	4468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	12.6	8.7	13.6	0.0	9.8	7.9
Incr Delay (d2), s/veh	1.0	0.0	0.6	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	2.1	0.0	0.2	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.6	8.7	14.2	0.0	9.9	8.0
LnGrp LOS	B	A	B		A	A
Approach Vol, veh/h	849		607	A		449
Approach Delay, s/veh	13.5		14.2			8.1
Approach LOS	B		B			A

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		24.0		19.7	6.7	17.3
Change Period (Y+Rc), s		5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s		55.0		25.0	25.0	25.0
Max Q Clear Time (g_c+I1), s		5.3		11.0	2.5	8.5
Green Ext Time (p_c), s		2.9		3.7	0.1	3.6

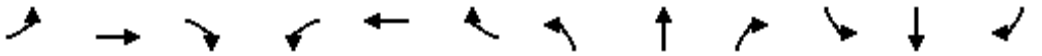
Intersection Summary	
HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

04/08/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	325	0	238	0	1296	351	0	464	655
Future Volume (veh/h)	0	0	0	325	0	238	0	1296	351	0	464	655
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	0	1885	0	1885	1885	0	1885	1870
Adj Flow Rate, veh/h				378	0	258	0	1507	0	0	540	0
Peak Hour Factor				0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %				1	0	1	0	1	1	0	1	2
Cap, veh/h				429	0	382	0	2255		0	2255	
Arrive On Green				0.24	0.00	0.24	0.00	1.00	0.00	0.00	0.63	0.00
Sat Flow, veh/h				1795	0	1598	0	3676	1598	0	3676	1585
Grp Volume(v), veh/h				378	0	258	0	1507	0	0	540	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	0	1791	1598	0	1791	1585
Q Serve(g_s), s				14.2	0.0	10.3	0.0	0.0	0.0	0.0	4.6	0.0
Cycle Q Clear(g_c), s				14.2	0.0	10.3	0.0	0.0	0.0	0.0	4.6	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				429	0	382	0	2255		0	2255	
V/C Ratio(X)				0.88	0.00	0.68	0.00	0.67		0.00	0.24	
Avail Cap(c_a), veh/h				651	0	580	0	2255		0	2255	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.56	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				25.7	0.0	24.2	0.0	0.0	0.0	0.0	5.7	0.0
Incr Delay (d2), s/veh				6.3	0.0	0.8	0.0	0.9	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				6.4	0.0	3.7	0.0	0.3	0.0	0.0	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				32.0	0.0	25.0	0.0	0.9	0.0	0.0	5.9	0.0
LnGrp LOS				C	A	C	A	A		A	A	
Approach Vol, veh/h					636			1507	A		540	A
Approach Delay, s/veh					29.1			0.9			5.9	
Approach LOS					C			A			A	

Timer - Assigned Phs	2		6		8							
Phs Duration (G+Y+Rc), s	48.7		48.7		21.3							
Change Period (Y+Rc), s	4.6		4.6		4.6							
Max Green Setting (Gmax), s	35.4		35.4		25.4							
Max Q Clear Time (g_c+I1), s	2.0		6.6		16.2							
Green Ext Time (p_c), s	13.8		3.8		0.5							

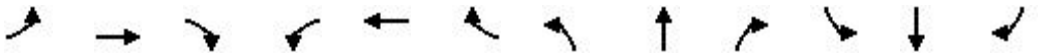
Intersection Summary		
HCM 6th Ctrl Delay	8.6	
HCM 6th LOS	A	

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

04/09/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1002	3	716	0	0	0	0	645	281	194	595	0
Future Volume (veh/h)	1002	3	716	0	0	0	0	645	281	194	595	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1885	1900	1885				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	1141	0	0				0	733	88	220	676	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	1	0	1				0	2	2	1	1	0
Cap, veh/h	1286	0					0	1215	540	402	962	0
Arrive On Green	0.36	0.00	0.00				0.00	0.34	0.34	0.21	1.00	0.00
Sat Flow, veh/h	3591	0	1598				0	3647	1578	1795	1885	0
Grp Volume(v), veh/h	1141	0	0				0	733	88	220	676	0
Grp Sat Flow(s),veh/h/ln	1795	0	1598				0	1777	1578	1795	1885	0
Q Serve(g_s), s	20.9	0.0	0.0				0.0	12.0	2.7	5.3	0.0	0.0
Cycle Q Clear(g_c), s	20.9	0.0	0.0				0.0	12.0	2.7	5.3	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1286	0					0	1215	540	402	962	0
V/C Ratio(X)	0.89	0.00					0.00	0.60	0.16	0.55	0.70	0.00
Avail Cap(c_a), veh/h	1611	0					0	1215	540	407	962	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.88	0.88	0.00
Uniform Delay (d), s/veh	21.1	0.0	0.0				0.0	19.1	16.0	11.6	0.0	0.0
Incr Delay (d2), s/veh	4.7	0.0	0.0				0.0	2.2	0.6	0.7	3.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	0.0				0.0	4.6	1.0	1.5	1.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.8	0.0	0.0				0.0	21.3	16.7	12.3	3.8	0.0
LnGrp LOS	C	A					A	C	B	B	A	A
Approach Vol, veh/h		1141	A					821			896	
Approach Delay, s/veh		25.8						20.8			5.9	
Approach LOS		C						C			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	11.8	28.5		29.7		40.3
Change Period (Y+Rc), s	4.6	4.6		4.6		4.6
Max Green Setting (Gmax), s	7.4	17.4		31.4		29.4
Max Q Clear Time (g_c+I1), s	7.3	14.0		22.9		2.0
Green Ext Time (p_c), s	0.0	1.6		1.9		4.5

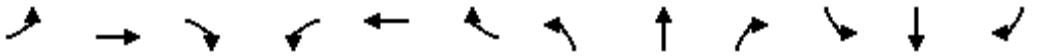
Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	2	2	33	8	301	3	424	21	578	574	87
Future Volume (veh/h)	64	2	2	33	8	301	3	424	21	578	574	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	65	2	0	34	8	91	3	433	16	590	586	85
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	328	436	0	355	162	145	327	985	36	749	872	127
Arrive On Green	0.09	0.12	0.00	0.06	0.09	0.10	0.01	0.28	0.25	0.27	0.54	0.51
Sat Flow, veh/h	1810	3705	0	1810	1805	1610	1810	3550	131	1810	1622	235
Grp Volume(v), veh/h	65	2	0	34	8	91	3	220	229	590	0	671
Grp Sat Flow(s),veh/h/ln	1810	1805	0	1810	1805	1610	1810	1805	1876	1810	0	1858
Q Serve(g_s), s	1.8	0.0	0.0	1.0	0.2	3.2	0.1	6.0	6.0	12.9	0.0	15.6
Cycle Q Clear(g_c), s	1.8	0.0	0.0	1.0	0.2	3.2	0.1	6.0	6.0	12.9	0.0	15.6
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.07	1.00		0.13
Lane Grp Cap(c), veh/h	328	436	0	355	162	145	327	501	520	749	0	999
V/C Ratio(X)	0.20	0.00	0.00	0.10	0.05	0.63	0.01	0.44	0.44	0.79	0.00	0.67
Avail Cap(c_a), veh/h	472	789	0	615	455	406	620	956	993	874	0	1296
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	23.0	0.0	22.0	24.7	25.9	16.4	17.7	17.7	10.2	0.0	10.0
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.1	0.2	6.2	0.0	0.9	0.8	4.2	0.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	0.0	0.4	0.1	1.4	0.0	2.2	2.3	4.2	0.0	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.2	23.0	0.0	22.1	24.9	32.1	16.4	18.6	18.6	14.4	0.0	11.3
LnGrp LOS	C	C	A	C	C	C	B	B	B	B	A	B
Approach Vol, veh/h		67			133			452			1261	
Approach Delay, s/veh		21.3			29.1			18.6			12.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.4	36.0	9.3	9.9	19.9	20.5	7.4	11.7
Change Period (Y+Rc), s	4.0	5.5	4.0	4.5	4.0	5.5	4.0	4.5
Max Green Setting (Gmax), s	10.0	40.0	10.0	15.0	20.0	30.0	12.0	13.0
Max Q Clear Time (g_c+I1), s	2.1	17.6	3.8	5.2	14.9	8.0	3.0	2.0
Green Ext Time (p_c), s	0.0	6.2	0.1	0.4	1.0	3.3	0.0	0.0

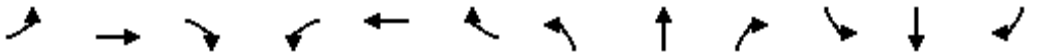
Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th Signalized Intersection Summary
7: Road 68 & I 182 WB On/Off Ramp/I 182 WB On Ramp

12/22/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	0	1108	0	1749	219	0	1334	653
Future Volume (veh/h)	0	0	0	195	0	1108	0	1749	219	0	1334	653
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	0	1900	1900	0	1885	1885
Adj Flow Rate, veh/h				201	0	0	0	1803	0	0	1375	0
Peak Hour Factor				0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %				0	0	0	0	0	0	0	1	1
Cap, veh/h				360	195		0	2647		0	2626	
Arrive On Green				0.10	0.00	0.00	0.00	0.49	0.00	0.00	0.73	0.00
Sat Flow, veh/h				3510	1900	1610	0	3705	1610	0	3676	1598
Grp Volume(v), veh/h				201	0	0	0	1803	0	0	1375	0
Grp Sat Flow(s),veh/h/ln				1755	1900	1610	0	1805	1610	0	1791	1598
Q Serve(g_s), s				3.1	0.0	0.0	0.0	21.4	0.0	0.0	9.3	0.0
Cycle Q Clear(g_c), s				3.1	0.0	0.0	0.0	21.4	0.0	0.0	9.3	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				360	195		0	2647		0	2626	
V/C Ratio(X)				0.56	0.00		0.00	0.68		0.00	0.52	
Avail Cap(c_a), veh/h				1467	794		0	2647		0	2626	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	0.53	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				23.9	0.0	0.0	0.0	9.2	0.0	0.0	3.2	0.0
Incr Delay (d2), s/veh				1.0	0.0	0.0	0.0	0.8	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.2	0.0	0.0	0.0	8.2	0.0	0.0	1.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				24.9	0.0	0.0	0.0	10.0	0.0	0.0	4.0	0.0
LnGrp LOS				C	A		A	B		A	A	
Approach Vol, veh/h					201	A		1803	A		1375	A
Approach Delay, s/veh					24.9			10.0			4.0	
Approach LOS					C			B			A	

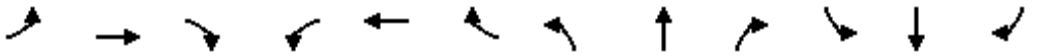
Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	45.7		45.7		10.3			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	23.4		23.4		23.4			
Max Q Clear Time (g_c+I1), s	23.4		11.3		5.1			
Green Ext Time (p_c), s	0.0		8.8		0.5			

Intersection Summary		
HCM 6th Ctrl Delay	8.4	
HCM 6th LOS	A	

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1225	0	539	0	0	0	0	743	167	0	708	821
Future Volume (veh/h)	1225	0	539	0	0	0	0	743	167	0	708	821
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	0	1900				0	1885	1885	0	1885	1885
Adj Flow Rate, veh/h	1289	0	0				0	782	139	0	745	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0				0	1	1	0	1	1
Cap, veh/h	1291	0					0	1389	247	0	1637	
Arrive On Green	0.37	0.00	0.00				0.00	0.46	0.46	0.00	0.76	0.00
Sat Flow, veh/h	3510	0	1610				0	3132	540	0	3676	1598
Grp Volume(v), veh/h	1289	0	0				0	461	460	0	745	0
Grp Sat Flow(s),veh/h/ln	1755	0	1610				0	1791	1787	0	1791	1598
Q Serve(g_s), s	20.5	0.0	0.0				0.0	10.5	10.5	0.0	4.2	0.0
Cycle Q Clear(g_c), s	20.5	0.0	0.0				0.0	10.5	10.5	0.0	4.2	0.0
Prop In Lane	1.00		1.00				0.00		0.30	0.00		1.00
Lane Grp Cap(c), veh/h	1291	0					0	819	817	0	1637	
V/C Ratio(X)	1.00	0.00					0.00	0.56	0.56	0.00	0.45	
Avail Cap(c_a), veh/h	1291	0					0	819	817	0	1637	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.67	1.67
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.00	0.81	0.00
Uniform Delay (d), s/veh	17.7	0.0	0.0				0.0	11.1	11.1	0.0	4.1	0.0
Incr Delay (d2), s/veh	24.6	0.0	0.0				0.0	2.8	2.8	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.5	0.0	0.0				0.0	4.1	4.1	0.0	1.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.3	0.0	0.0				0.0	13.9	13.9	0.0	4.8	0.0
LnGrp LOS	D	A					A	B	B	A	A	
Approach Vol, veh/h		1289	A					921			745	A
Approach Delay, s/veh		42.3						13.9			4.8	
Approach LOS		D						B			A	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		30.9		25.1		30.9						
Change Period (Y+Rc), s		5.3		4.5		5.3						
Max Green Setting (Gmax), s		25.6		20.6		25.6						
Max Q Clear Time (g_c+I1), s		12.5		22.5		6.2						
Green Ext Time (p_c), s		3.4		0.0		4.1						

Intersection Summary												
HCM 6th Ctrl Delay		24.0										
HCM 6th LOS		C										

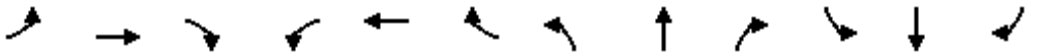
Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX F-5: NO-BUILD CONDITIONS SYNCHRO RESULTS

HCM 6th Signalized Intersection Summary
1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

12/13/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	10	15	20	5	390	5	695	15	340	525	40
Future Volume (veh/h)	120	10	15	20	5	390	5	695	15	340	525	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	130	11	14	22	5	194	5	755	11	370	571	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	187	325	290	208	249	222	249	1223	18	733	2260	154
Arrive On Green	0.07	0.18	0.18	0.03	0.14	0.14	0.01	0.34	0.32	0.32	0.66	0.65
Sat Flow, veh/h	1810	1805	1610	1810	1805	1610	1810	3642	53	1810	3429	234
Grp Volume(v), veh/h	130	11	14	22	5	194	5	374	392	370	300	310
Grp Sat Flow(s),veh/h/ln	1810	1805	1610	1810	1805	1610	1810	1805	1890	1810	1805	1858
Q Serve(g_s), s	5.2	0.7	1.0	1.5	0.3	16.5	0.3	24.3	24.3	9.9	9.5	9.6
Cycle Q Clear(g_c), s	5.2	0.7	1.0	1.5	0.3	16.5	0.3	24.3	24.3	9.9	9.5	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.13
Lane Grp Cap(c), veh/h	187	325	290	208	249	222	249	606	635	733	1190	1225
V/C Ratio(X)	0.69	0.03	0.05	0.11	0.02	0.87	0.02	0.62	0.62	0.50	0.25	0.25
Avail Cap(c_a), veh/h	239	355	316	304	329	293	347	606	635	733	1190	1225
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.6	47.4	47.5	54.5	52.2	58.9	33.8	39.0	39.0	30.9	9.8	9.8
Incr Delay (d2), s/veh	5.9	0.1	0.1	0.2	0.0	21.6	0.0	4.7	4.5	0.6	0.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.3	0.4	0.7	0.2	8.0	0.1	11.3	11.8	9.2	3.7	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.5	47.4	47.6	54.7	52.2	80.5	33.9	43.6	43.4	31.5	10.3	10.3
LnGrp LOS	E	D	D	D	D	F	C	D	D	C	B	B
Approach Vol, veh/h		155			221			771			980	
Approach Delay, s/veh		64.3			77.3			43.5			18.3	
Approach LOS		E			E			D			B	

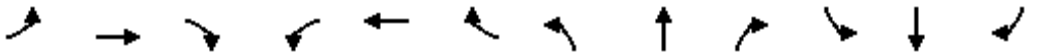
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	96.3	14.5	23.8	50.7	51.0	8.6	29.7
Change Period (Y+Rc), s	4.0	5.5	4.5	* 4.5	5.5	* 5.5	4.0	4.5
Max Green Setting (Gmax), s	9.0	73.5	14.0	* 26	37.0	* 46	12.0	27.5
Max Q Clear Time (g_c+I1), s	2.3	11.6	7.2	18.5	11.9	26.3	3.5	3.0
Green Ext Time (p_c), s	0.0	5.7	0.2	0.8	3.2	5.9	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	36.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	430	0	330	0	0	0	0	900	345	450	575	0
Future Volume (veh/h)	430	0	330	0	0	0	0	900	345	450	575	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1885	0	1885				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	467	0	0				0	978	154	489	625	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	0	1				0	2	2	1	1	0
Cap, veh/h	580	0					0	1664	740	541	1326	0
Arrive On Green	0.17	0.00	0.00				0.00	0.47	0.47	0.23	0.94	0.00
Sat Flow, veh/h	3483	0	1598				0	3647	1580	1795	1885	0
Grp Volume(v), veh/h	467	0	0				0	978	154	489	625	0
Grp Sat Flow(s),veh/h/ln	1742	0	1598				0	1777	1580	1795	1885	0
Q Serve(g_s), s	9.0	0.0	0.0				0.0	14.1	4.0	9.3	2.7	0.0
Cycle Q Clear(g_c), s	9.0	0.0	0.0				0.0	14.1	4.0	9.3	2.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	580	0					0	1664	740	541	1326	0
V/C Ratio(X)	0.81	0.00					0.00	0.59	0.21	0.90	0.47	0.00
Avail Cap(c_a), veh/h	721	0					0	1664	740	785	1326	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.88	0.88	0.00
Uniform Delay (d), s/veh	28.1	0.0	0.0				0.0	13.7	11.0	10.6	0.8	0.0
Incr Delay (d2), s/veh	5.4	0.0	0.0				0.0	1.5	0.6	7.2	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	0.0				0.0	4.9	1.3	3.9	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	0.0				0.0	15.2	11.6	17.8	1.8	0.0
LnGrp LOS	C	A					A	B	B	B	A	A
Approach Vol, veh/h		467	A					1132			1114	
Approach Delay, s/veh		33.5						14.7			8.8	
Approach LOS		C						B			A	

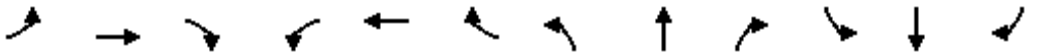
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	16.5	37.4		16.2		53.8
Change Period (Y+Rc), s	4.6	4.6		4.5		4.6
Max Green Setting (Gmax), s	21.4	20.4		14.5		46.4
Max Q Clear Time (g_c+I1), s	11.3	16.1		11.0		4.7
Green Ext Time (p_c), s	0.6	2.5		0.6		4.2

Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



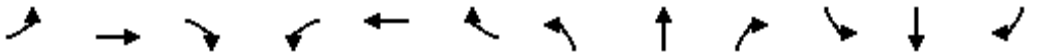
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	305	0	295	0	735	595	0	720	1145
Future Volume (veh/h)	0	0	0	305	0	295	0	735	595	0	720	1145
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	0	1885	0	1885	1885	0	1885	1870
Adj Flow Rate, veh/h				332	0	304	0	799	0	0	783	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				1	0	1	0	1	1	0	1	2
Cap, veh/h				395	0	352	0	2323		0	2323	
Arrive On Green				0.22	0.00	0.22	0.00	1.00	0.00	0.00	0.65	0.00
Sat Flow, veh/h				1795	0	1598	0	3676	1598	0	3676	1585
Grp Volume(v), veh/h				332	0	304	0	799	0	0	783	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	0	1791	1598	0	1791	1585
Q Serve(g_s), s				12.4	0.0	12.8	0.0	0.0	0.0	0.0	6.9	0.0
Cycle Q Clear(g_c), s				12.4	0.0	12.8	0.0	0.0	0.0	0.0	6.9	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				395	0	352	0	2323		0	2323	
V/C Ratio(X)				0.84	0.00	0.86	0.00	0.34		0.00	0.34	
Avail Cap(c_a), veh/h				754	0	671	0	2323		0	2323	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.61	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				26.1	0.0	26.3	0.0	0.0	0.0	0.0	5.5	0.0
Incr Delay (d2), s/veh				1.9	0.0	2.5	0.0	0.2	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.1	0.0	4.8	0.0	0.1	0.0	0.0	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				28.0	0.0	28.8	0.0	0.2	0.0	0.0	5.9	0.0
LnGrp LOS				C	A	C	A	A		A	A	
Approach Vol, veh/h					636			799	A		783	A
Approach Delay, s/veh					28.4			0.2			5.9	
Approach LOS					C			A			A	

Timer - Assigned Phs	2		6		8							
Phs Duration (G+Y+Rc), s	50.0		50.0		20.0							
Change Period (Y+Rc), s	4.6		4.6		4.6							
Max Green Setting (Gmax), s	31.4		31.4		29.4							
Max Q Clear Time (g_c+I1), s	2.0		8.9		14.8							
Green Ext Time (p_c), s	5.5		5.5		0.6							

Intersection Summary		
HCM 6th Ctrl Delay	10.3	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	60	295	555	115	35	155	450	385	40	1015	20
Future Volume (veh/h)	10	60	295	555	115	35	155	450	385	40	1015	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1870	1870	1870	1870	1885	1856	1870	1870
Adj Flow Rate, veh/h	11	65	321	603	125	11	168	489	418	43	1103	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	1	2	2	2	2	1	3	2	2
Cap, veh/h	234	455	533	673	1034	90	218	1801	1118	364	1693	754
Arrive On Green	0.01	0.13	0.13	0.19	0.31	0.31	0.06	0.51	0.51	0.03	0.48	0.48
Sat Flow, veh/h	1781	3554	2790	3483	3308	288	3456	3554	1596	1767	3554	1583
Grp Volume(v), veh/h	11	65	321	603	67	69	168	489	418	43	1103	22
Grp Sat Flow(s),veh/h/ln	1781	1777	1395	1742	1777	1819	1728	1777	1596	1767	1777	1583
Q Serve(g_s), s	0.7	2.3	14.7	23.6	3.7	3.8	6.7	11.0	14.9	1.7	33.0	1.0
Cycle Q Clear(g_c), s	0.7	2.3	14.7	23.6	3.7	3.8	6.7	11.0	14.9	1.7	33.0	1.0
Prop In Lane	1.00		1.00	1.00		0.16	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	234	455	533	673	555	568	218	1801	1118	364	1693	754
V/C Ratio(X)	0.05	0.14	0.60	0.90	0.12	0.12	0.77	0.27	0.37	0.12	0.65	0.03
Avail Cap(c_a), veh/h	276	609	654	771	647	662	284	1801	1118	376	1693	754
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.0	54.2	51.8	55.1	34.4	34.4	64.6	19.7	8.5	17.7	27.8	19.5
Incr Delay (d2), s/veh	0.1	0.2	1.3	12.3	0.1	0.1	9.2	0.4	1.0	0.1	2.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.0	5.3	11.5	1.7	1.7	3.2	4.7	5.3	0.7	14.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.1	54.4	53.1	67.4	34.5	34.5	73.8	20.1	9.5	17.9	29.8	19.5
LnGrp LOS	D	D	D	E	C	C	E	C	A	B	C	B
Approach Vol, veh/h		397			739			1075			1168	
Approach Delay, s/veh		53.3			61.3			24.4			29.2	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	71.7	32.1	22.9	9.1	75.9	6.2	48.8
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	5.0	5.0	4.5	* 5
Max Green Setting (Gmax), s	11.5	54.0	31.0	24.0	5.0	60.0	5.0	* 51
Max Q Clear Time (g_c+I1), s	8.7	35.0	25.6	16.7	3.7	16.9	2.7	5.8
Green Ext Time (p_c), s	0.1	7.8	1.4	1.2	0.0	5.3	0.0	0.8

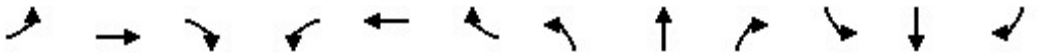
Intersection Summary	
HCM 6th Ctrl Delay	37.5
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
7: Road 68 & I 182 WB On/Off Ramp/I 182 WB On Ramp

12/08/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	205	5	535	0	870	370	0	1285	815
Future Volume (veh/h)	0	0	0	205	5	535	0	870	370	0	1285	815
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1826	1826	1826	0	1856	1856	0	1870	1870
Adj Flow Rate, veh/h				223	5	0	0	946	0	0	1397	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				5	5	5	0	3	3	0	2	2
Cap, veh/h				356	193		0	2575		0	2595	
Arrive On Green				0.11	0.11	0.00	0.00	1.00	0.00	0.00	0.73	0.00
Sat Flow, veh/h				3374	1826	1547	0	3618	1572	0	3647	1585
Grp Volume(v), veh/h				223	5	0	0	946	0	0	1397	0
Grp Sat Flow(s),veh/h/ln				1687	1826	1547	0	1763	1572	0	1777	1585
Q Serve(g_s), s				3.5	0.1	0.0	0.0	0.0	0.0	0.0	9.8	0.0
Cycle Q Clear(g_c), s				3.5	0.1	0.0	0.0	0.0	0.0	0.0	9.8	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				356	193		0	2575		0	2595	
V/C Ratio(X)				0.63	0.03		0.00	0.37		0.00	0.54	
Avail Cap(c_a), veh/h				1410	763		0	2575		0	2595	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00	0.00	0.74	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				24.0	22.5	0.0	0.0	0.0	0.0	0.0	3.4	0.0
Incr Delay (d2), s/veh				1.4	0.0	0.0	0.0	0.3	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.4	0.1	0.0	0.0	0.1	0.0	0.0	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				25.3	22.5	0.0	0.0	0.3	0.0	0.0	4.2	0.0
LnGrp LOS				C	C		A	A		A	A	
Approach Vol, veh/h					228	A		946	A		1397	A
Approach Delay, s/veh					25.3			0.3			4.2	
Approach LOS					C			A			A	

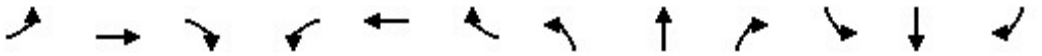
Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	45.5		45.5		10.5			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	23.4		23.4		23.4			
Max Q Clear Time (g_c+I1), s	2.0		11.8		5.5			
Green Ext Time (p_c), s	4.5		8.6		0.5			

Intersection Summary		
HCM 6th Ctrl Delay	4.6	
HCM 6th LOS	A	

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	460	0	185	0	0	0	0	780	390	0	555	935
Future Volume (veh/h)	460	0	185	0	0	0	0	780	390	0	555	935
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	0	1856				0	1856	1856	0	1841	1841
Adj Flow Rate, veh/h	500	0	0				0	848	351	0	603	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	0	3				0	3	3	0	4	4
Cap, veh/h	635	0					0	1553	640	0	2231	
Arrive On Green	0.19	0.00	0.00				0.00	0.64	0.64	0.00	1.00	0.00
Sat Flow, veh/h	3428	0	1572				0	2527	1004	0	3589	1560
Grp Volume(v), veh/h	500	0	0				0	613	586	0	603	0
Grp Sat Flow(s),veh/h/ln	1714	0	1572				0	1763	1675	0	1749	1560
Q Serve(g_s), s	7.8	0.0	0.0				0.0	10.8	10.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	7.8	0.0	0.0				0.0	10.8	10.9	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		0.60	0.00		1.00
Lane Grp Cap(c), veh/h	635	0					0	1125	1069	0	2231	
V/C Ratio(X)	0.79	0.00					0.00	0.55	0.55	0.00	0.27	
Avail Cap(c_a), veh/h	1433	0					0	1125	1069	0	2231	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.67	1.67
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.00	0.79	0.00
Uniform Delay (d), s/veh	21.8	0.0	0.0				0.0	5.6	5.6	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0				0.0	1.9	2.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	0.0				0.0	3.2	3.1	0.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	0.0				0.0	7.5	7.7	0.0	0.2	0.0
LnGrp LOS	C	A					A	A	A	A	A	
Approach Vol, veh/h		500	A					1199			603	A
Approach Delay, s/veh		22.6						7.6			0.2	
Approach LOS		C						A			A	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		41.0		15.0		41.0						
Change Period (Y+Rc), s		5.3		4.6		5.3						
Max Green Setting (Gmax), s		22.7		23.4		22.7						
Max Q Clear Time (g_c+I1), s		12.9		9.8		2.0						
Green Ext Time (p_c), s		4.1		0.6		3.2						

Intersection Summary		
HCM 6th Ctrl Delay		8.9
HCM 6th LOS		A

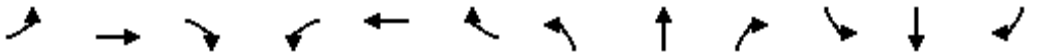
Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

12/13/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	5	5	35	10	305	5	450	25	710	630	135
Future Volume (veh/h)	105	5	5	35	10	305	5	450	25	710	630	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	114	5	3	38	11	102	5	489	22	772	685	143
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	182	251	137	139	145	130	124	759	34	1014	2130	444
Arrive On Green	0.07	0.11	0.11	0.04	0.08	0.08	0.01	0.22	0.20	0.50	0.72	0.71
Sat Flow, veh/h	1810	2255	1229	1810	1805	1610	1810	3519	158	1810	2973	620
Grp Volume(v), veh/h	114	4	4	38	11	102	5	250	261	772	416	412
Grp Sat Flow(s),veh/h/ln	1810	1805	1679	1810	1805	1610	1810	1805	1872	1810	1805	1788
Q Serve(g_s), s	4.4	0.3	0.3	2.8	0.8	8.7	0.3	17.7	17.8	37.4	11.9	12.0
Cycle Q Clear(g_c), s	4.4	0.3	0.3	2.8	0.8	8.7	0.3	17.7	17.8	37.4	11.9	12.0
Prop In Lane	1.00		0.73	1.00		1.00	1.00		0.08	1.00		0.35
Lane Grp Cap(c), veh/h	182	201	187	139	145	130	124	389	404	1014	1293	1281
V/C Ratio(X)	0.63	0.02	0.02	0.27	0.08	0.79	0.04	0.64	0.65	0.76	0.32	0.32
Avail Cap(c_a), veh/h	182	352	327	163	326	291	217	389	404	1014	1293	1281
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.4	55.4	55.4	62.4	59.5	62.9	46.7	50.0	50.1	23.9	7.3	7.4
Incr Delay (d2), s/veh	6.7	0.0	0.1	1.0	0.3	13.7	0.1	7.9	7.7	3.4	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.1	0.1	1.3	0.4	4.0	0.1	8.7	9.0	19.2	4.3	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.1	55.4	55.5	63.4	59.8	76.6	46.8	57.9	57.8	27.3	8.0	8.1
LnGrp LOS	E	E	E	E	E	E	D	E	E	C	A	A
Approach Vol, veh/h		122			151			516			1600	
Approach Delay, s/veh		67.3			72.1			57.8			17.3	
Approach LOS		E			E			E			B	

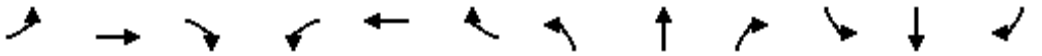
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	104.3	14.5	15.8	75.5	34.2	10.2	20.1
Change Period (Y+Rc), s	4.0	5.5	4.5	* 4.5	5.5	* 5.5	4.0	4.5
Max Green Setting (Gmax), s	8.6	78.1	10.0	* 25	58.0	* 29	8.0	27.3
Max Q Clear Time (g_c+I1), s	2.3	14.0	6.4	10.7	39.4	19.8	4.8	2.3
Green Ext Time (p_c), s	0.0	8.7	0.1	0.6	7.3	2.5	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	32.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1315	0	720	0	0	0	0	710	285	380	755	0
Future Volume (veh/h)	1315	0	720	0	0	0	0	710	285	380	755	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1885	0	1885				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	1429	0	0				0	772	89	413	821	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	0	1				0	2	2	1	1	0
Cap, veh/h	1219	0					0	961	426	477	980	0
Arrive On Green	0.35	0.00	0.00				0.00	0.27	0.27	0.18	0.52	0.00
Sat Flow, veh/h	3483	0	1598				0	3647	1576	1795	1885	0
Grp Volume(v), veh/h	1429	0	0				0	772	89	413	821	0
Grp Sat Flow(s),veh/h/ln	1742	0	1598				0	1777	1576	1795	1885	0
Q Serve(g_s), s	24.5	0.0	0.0				0.0	14.2	3.1	10.8	25.9	0.0
Cycle Q Clear(g_c), s	24.5	0.0	0.0				0.0	14.2	3.1	10.8	25.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1219	0					0	961	426	477	980	0
V/C Ratio(X)	1.17	0.00					0.00	0.80	0.21	0.87	0.84	0.00
Avail Cap(c_a), veh/h	1219	0					0	961	426	491	980	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.86	0.86	0.00
Uniform Delay (d), s/veh	22.8	0.0	0.0				0.0	23.8	19.7	15.0	14.3	0.0
Incr Delay (d2), s/veh	86.5	0.0	0.0				0.0	7.1	1.1	12.4	7.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.6	0.0	0.0				0.0	6.2	1.1	5.1	10.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	109.2	0.0	0.0				0.0	30.9	20.9	27.4	21.7	0.0
LnGrp LOS	F	A					A	C	C	C	C	A
Approach Vol, veh/h		1429	A					861			1234	
Approach Delay, s/veh		109.2						29.8			23.6	
Approach LOS		F						C			C	

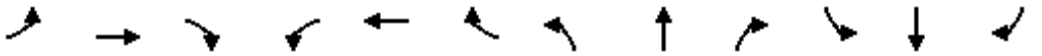
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	17.5	23.5		29.0		41.0						
Change Period (Y+Rc), s	4.6	4.6		4.5		4.6						
Max Green Setting (Gmax), s	13.4	18.4		24.5		36.4						
Max Q Clear Time (g_c+I1), s	12.8	16.2		26.5		27.9						
Green Ext Time (p_c), s	0.1	1.1		0.0		3.4						

Intersection Summary												
HCM 6th Ctrl Delay			59.8									
HCM 6th LOS			E									

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



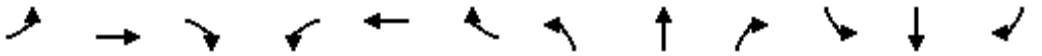
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	325	0	430	0	1670	355	0	810	1000
Future Volume (veh/h)	0	0	0	325	0	430	0	1670	355	0	810	1000
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	0	1885	0	1885	1885	0	1885	1870
Adj Flow Rate, veh/h				353	0	450	0	1815	0	0	880	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				1	0	1	0	1	1	0	1	2
Cap, veh/h				552	0	491	0	2009		0	2009	
Arrive On Green				0.31	0.00	0.31	0.00	1.00	0.00	0.00	0.56	0.00
Sat Flow, veh/h				1795	0	1598	0	3676	1598	0	3676	1585
Grp Volume(v), veh/h				353	0	450	0	1815	0	0	880	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	0	1791	1598	0	1791	1585
Q Serve(g_s), s				11.9	0.0	19.0	0.0	0.0	0.0	0.0	10.0	0.0
Cycle Q Clear(g_c), s				11.9	0.0	19.0	0.0	0.0	0.0	0.0	10.0	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				552	0	491	0	2009		0	2009	
V/C Ratio(X)				0.64	0.00	0.92	0.00	0.90		0.00	0.44	
Avail Cap(c_a), veh/h				651	0	580	0	2009		0	2009	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				20.9	0.0	23.4	0.0	0.0	0.0	0.0	8.9	0.0
Incr Delay (d2), s/veh				0.9	0.0	16.4	0.0	0.7	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.7	0.0	8.7	0.0	0.2	0.0	0.0	3.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				21.8	0.0	39.7	0.0	0.7	0.0	0.0	9.6	0.0
LnGrp LOS				C	A	D	A	A		A	A	
Approach Vol, veh/h					803			1815	A		880	A
Approach Delay, s/veh					31.8			0.7			9.6	
Approach LOS					C			A			A	

Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	43.9		43.9		26.1			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	35.4		35.4		25.4			
Max Q Clear Time (g_c+I1), s	2.0		12.0		21.0			
Green Ext Time (p_c), s	18.1		6.4		0.5			

Intersection Summary		
HCM 6th Ctrl Delay	10.1	
HCM 6th LOS	B	

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	125	535	665	140	45	665	655	740	30	610	20
Future Volume (veh/h)	40	125	535	665	140	45	665	655	740	30	610	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1870	1870	1870	1870	1885	1856	1870	1870
Adj Flow Rate, veh/h	43	136	582	723	152	22	723	712	804	33	663	22
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	1	2	2	2	2	1	3	2	2
Cap, veh/h	285	533	1048	794	1100	157	780	1612	1088	185	914	407
Arrive On Green	0.03	0.15	0.15	0.23	0.35	0.35	0.23	0.45	0.45	0.03	0.26	0.26
Sat Flow, veh/h	1781	3554	2790	3483	3123	445	3456	3554	1595	1767	3554	1581
Grp Volume(v), veh/h	43	136	582	723	85	89	723	712	804	33	663	22
Grp Sat Flow(s),veh/h/ln	1781	1777	1395	1742	1777	1790	1728	1777	1595	1767	1777	1581
Q Serve(g_s), s	2.8	4.7	21.0	28.3	4.6	4.7	28.7	19.2	45.3	1.9	23.9	1.5
Cycle Q Clear(g_c), s	2.8	4.7	21.0	28.3	4.6	4.7	28.7	19.2	45.3	1.9	23.9	1.5
Prop In Lane	1.00		1.00	1.00		0.25	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	285	533	1048	794	626	631	780	1612	1088	185	914	407
V/C Ratio(X)	0.15	0.26	0.56	0.91	0.14	0.14	0.93	0.44	0.74	0.18	0.73	0.05
Avail Cap(c_a), veh/h	298	533	1048	871	659	664	832	1612	1088	202	914	407
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	52.6	34.5	52.7	30.8	30.9	53.1	26.1	14.3	36.7	47.5	39.2
Incr Delay (d2), s/veh	0.2	0.3	0.7	13.1	0.1	0.1	15.7	0.9	4.5	0.5	5.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	2.2	8.0	13.8	2.0	2.1	14.0	8.3	16.8	0.9	11.2	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	52.9	35.2	65.8	30.9	31.0	68.7	27.0	18.8	37.1	52.5	39.4
LnGrp LOS	D	D	D	E	C	C	E	C	B	D	D	D
Approach Vol, veh/h		761			897			2239			718	
Approach Delay, s/veh		39.1			59.0			37.6			51.4	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.1	41.0	36.9	26.0	8.6	68.5	8.6	54.3
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	5.0	5.0	4.5	* 5
Max Green Setting (Gmax), s	33.7	30.8	35.0	21.0	5.0	59.0	5.1	* 52
Max Q Clear Time (g_c+I1), s	30.7	25.9	30.3	23.0	3.9	47.3	4.8	6.7
Green Ext Time (p_c), s	0.9	1.9	1.6	0.0	0.0	6.3	0.0	1.1

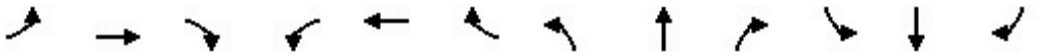
Intersection Summary	
HCM 6th Ctrl Delay	44.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
7: Road 68 & I 182 WB On/Off Ramp/I 182 WB On Ramp

12/08/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	215	0	1180	0	2155	285	0	1465	820
Future Volume (veh/h)	0	0	0	215	0	1180	0	2155	285	0	1465	820
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	0	1900	1900	0	1885	1885
Adj Flow Rate, veh/h				234	0	0	0	2342	0	0	1592	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				0	0	0	0	0	0	0	1	1
Cap, veh/h				373	202		0	2633		0	2613	
Arrive On Green				0.11	0.00	0.00	0.00	0.49	0.00	0.00	0.73	0.00
Sat Flow, veh/h				3510	1900	1610	0	3705	1610	0	3676	1598
Grp Volume(v), veh/h				234	0	0	0	2342	0	0	1592	0
Grp Sat Flow(s),veh/h/ln				1755	1900	1610	0	1805	1610	0	1791	1598
Q Serve(g_s), s				3.6	0.0	0.0	0.0	32.9	0.0	0.0	12.1	0.0
Cycle Q Clear(g_c), s				3.6	0.0	0.0	0.0	32.9	0.0	0.0	12.1	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				373	202		0	2633		0	2613	
V/C Ratio(X)				0.63	0.00		0.00	0.89		0.00	0.61	
Avail Cap(c_a), veh/h				1467	794		0	2633		0	2613	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				24.0	0.0	0.0	0.0	12.3	0.0	0.0	3.7	0.0
Incr Delay (d2), s/veh				1.3	0.0	0.0	0.0	0.5	0.0	0.0	1.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.4	0.0	0.0	0.0	12.4	0.0	0.0	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				25.3	0.0	0.0	0.0	12.8	0.0	0.0	4.8	0.0
LnGrp LOS				C	A		A	B		A	A	
Approach Vol, veh/h					234	A		2342	A		1592	A
Approach Delay, s/veh					25.3			12.8			4.8	
Approach LOS					C			B			A	

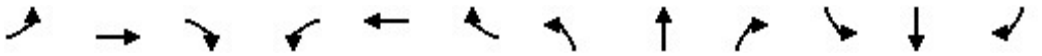
Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	45.4		45.4		10.6			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	23.4		23.4		23.4			
Max Q Clear Time (g_c+I1), s	34.9		14.1		5.6			
Green Ext Time (p_c), s	0.0		7.7		0.5			

Intersection Summary	
HCM 6th Ctrl Delay	10.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1595	0	720	0	0	0	0	845	190	0	780	900
Future Volume (veh/h)	1595	0	720	0	0	0	0	845	190	0	780	900
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	0	1900				0	1885	1885	0	1885	1885
Adj Flow Rate, veh/h	1734	0	0				0	918	169	0	848	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0				0	1	1	0	1	1
Cap, veh/h	1291	0					0	1380	254	0	1637	
Arrive On Green	0.37	0.00	0.00				0.00	0.46	0.46	0.00	0.76	0.00
Sat Flow, veh/h	3510	0	1610				0	3114	556	0	3676	1598
Grp Volume(v), veh/h	1734	0	0				0	544	543	0	848	0
Grp Sat Flow(s),veh/h/ln	1755	0	1610				0	1791	1784	0	1791	1598
Q Serve(g_s), s	20.6	0.0	0.0				0.0	13.3	13.3	0.0	5.2	0.0
Cycle Q Clear(g_c), s	20.6	0.0	0.0				0.0	13.3	13.3	0.0	5.2	0.0
Prop In Lane	1.00		1.00				0.00		0.31	0.00		1.00
Lane Grp Cap(c), veh/h	1291	0					0	819	816	0	1637	
V/C Ratio(X)	1.34	0.00					0.00	0.66	0.67	0.00	0.52	
Avail Cap(c_a), veh/h	1291	0					0	819	816	0	1637	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.67	1.67
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.00	0.71	0.00
Uniform Delay (d), s/veh	17.7	0.0	0.0				0.0	11.9	11.9	0.0	4.2	0.0
Incr Delay (d2), s/veh	159.5	0.0	0.0				0.0	4.2	4.3	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	35.7	0.0	0.0				0.0	5.3	5.3	0.0	1.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	177.2	0.0	0.0				0.0	16.1	16.1	0.0	5.0	0.0
LnGrp LOS	F	A					A	B	B	A	A	
Approach Vol, veh/h		1734	A					1087			848	A
Approach Delay, s/veh		177.2						16.1			5.0	
Approach LOS		F						B			A	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	30.9	25.1	30.9
Change Period (Y+Rc), s	5.3	4.5	5.3
Max Green Setting (Gmax), s	25.6	20.6	25.6
Max Q Clear Time (g_c+I1), s	15.3	22.6	7.2
Green Ext Time (p_c), s	3.7	0.0	4.7

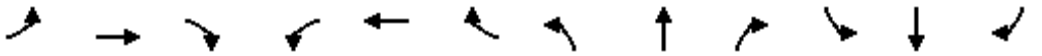
Intersection Summary	
HCM 6th Ctrl Delay	89.7
HCM 6th LOS	F

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

12/13/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	10	20	20	15	510	5	850	20	340	555	60
Future Volume (veh/h)	190	10	20	20	15	510	5	850	20	340	555	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	200	11	19	21	16	314	5	895	16	358	584	59
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	226	482	430	291	360	321	225	1218	22	538	1897	191
Arrive On Green	0.10	0.27	0.27	0.03	0.20	0.20	0.01	0.34	0.32	0.24	0.57	0.56
Sat Flow, veh/h	1810	1805	1610	1810	1805	1610	1810	3628	65	1810	3311	334
Grp Volume(v), veh/h	200	11	19	21	16	314	5	445	466	358	318	325
Grp Sat Flow(s),veh/h/ln	1810	1805	1610	1810	1805	1610	1810	1805	1888	1810	1805	1840
Q Serve(g_s), s	11.2	0.6	1.2	1.3	1.0	27.2	0.3	30.4	30.5	15.8	12.8	12.9
Cycle Q Clear(g_c), s	11.2	0.6	1.2	1.3	1.0	27.2	0.3	30.4	30.5	15.8	12.8	12.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.03	1.00		0.18
Lane Grp Cap(c), veh/h	226	482	430	291	360	321	225	606	634	538	1034	1054
V/C Ratio(X)	0.89	0.02	0.04	0.07	0.04	0.98	0.02	0.73	0.73	0.67	0.31	0.31
Avail Cap(c_a), veh/h	284	482	430	368	360	321	318	606	634	538	1034	1054
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.8	37.8	38.0	47.1	45.3	55.5	34.1	41.0	41.0	43.4	15.5	15.6
Incr Delay (d2), s/veh	23.1	0.0	0.1	0.1	0.1	44.4	0.0	7.7	7.4	3.1	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.3	0.5	0.6	0.5	14.9	0.1	14.5	15.1	11.1	5.3	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.9	37.8	38.1	47.2	45.4	99.9	34.2	48.7	48.4	46.5	16.3	16.3
LnGrp LOS	F	D	D	D	D	F	C	D	D	D	B	B
Approach Vol, veh/h		230			351			916			1001	
Approach Delay, s/veh		77.9			94.2			48.5			27.1	
Approach LOS		E			F			D			C	

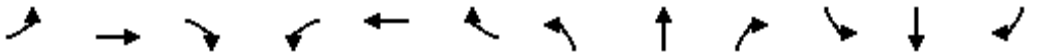
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	84.2	18.0	32.4	38.6	51.0	8.5	41.9
Change Period (Y+Rc), s	4.0	5.5	4.5	* 4.5	5.5	* 5.5	4.0	4.5
Max Green Setting (Gmax), s	8.6	67.5	18.0	* 28	30.6	* 46	10.4	35.5
Max Q Clear Time (g_c+I1), s	2.3	14.9	13.2	29.2	17.8	32.5	3.3	3.2
Green Ext Time (p_c), s	0.0	6.0	0.2	0.0	2.3	5.8	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	49.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	975	0	350	0	0	0	0	1245	345	905	605	0
Future Volume (veh/h)	975	0	350	0	0	0	0	1245	345	905	605	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1885	0	1885				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	1026	0	0				0	1311	149	953	637	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	0	1				0	2	2	1	1	0
Cap, veh/h	921	0					0	883	392	626	1142	0
Arrive On Green	0.26	0.00	0.00				0.00	0.25	0.25	0.29	0.61	0.00
Sat Flow, veh/h	3483	0	1598				0	3647	1575	1795	1885	0
Grp Volume(v), veh/h	1026	0	0				0	1311	149	953	637	0
Grp Sat Flow(s),veh/h/ln	1742	0	1598				0	1777	1575	1795	1885	0
Q Serve(g_s), s	18.5	0.0	0.0				0.0	17.4	5.5	20.4	14.1	0.0
Cycle Q Clear(g_c), s	18.5	0.0	0.0				0.0	17.4	5.5	20.4	14.1	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	921	0					0	883	392	626	1142	0
V/C Ratio(X)	1.11	0.00					0.00	1.48	0.38	1.52	0.56	0.00
Avail Cap(c_a), veh/h	921	0					0	883	392	626	1142	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.58	0.58	0.00
Uniform Delay (d), s/veh	25.8	0.0	0.0				0.0	26.3	21.8	18.2	8.2	0.0
Incr Delay (d2), s/veh	66.3	0.0	0.0				0.0	223.9	2.8	239.7	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.5	0.0	0.0				0.0	34.0	2.1	48.4	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.1	0.0	0.0				0.0	250.2	24.6	257.9	9.4	0.0
LnGrp LOS	F	A					A	F	C	F	A	A
Approach Vol, veh/h		1026	A					1460			1590	
Approach Delay, s/veh		92.1						227.2			158.3	
Approach LOS		F						F			F	

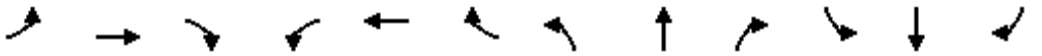
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	25.0	22.0		23.0		47.0
Change Period (Y+Rc), s	4.6	4.6		4.5		4.6
Max Green Setting (Gmax), s	20.4	17.4		18.5		42.4
Max Q Clear Time (g_c+I1), s	22.4	19.4		20.5		16.1
Green Ext Time (p_c), s	0.0	0.0		0.0		4.1

Intersection Summary		
HCM 6th Ctrl Delay		166.3
HCM 6th LOS		F

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



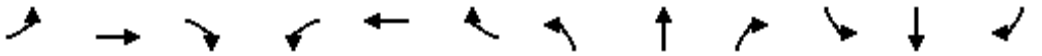
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	305	0	670	0	1515	705	0	1205	1625
Future Volume (veh/h)	0	0	0	305	0	670	0	1515	705	0	1205	1625
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	0	1885	0	1885	1885	0	1885	1870
Adj Flow Rate, veh/h				321	0	688	0	1595	0	0	1268	0
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	1	0	1	2
Cap, veh/h				803	0	714	0	1509		0	1509	
Arrive On Green				0.45	0.00	0.45	0.00	0.84	0.00	0.00	0.42	0.00
Sat Flow, veh/h				1795	0	1598	0	3676	1598	0	3676	1585
Grp Volume(v), veh/h				321	0	688	0	1595	0	0	1268	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	0	1791	1598	0	1791	1585
Q Serve(g_s), s				8.4	0.0	29.3	0.0	29.5	0.0	0.0	22.2	0.0
Cycle Q Clear(g_c), s				8.4	0.0	29.3	0.0	29.5	0.0	0.0	22.2	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				803	0	714	0	1509		0	1509	
V/C Ratio(X)				0.40	0.00	0.96	0.00	1.06		0.00	0.84	
Avail Cap(c_a), veh/h				805	0	717	0	1509		0	1509	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				13.0	0.0	18.8	0.0	5.5	0.0	0.0	18.1	0.0
Incr Delay (d2), s/veh				0.1	0.0	24.5	0.0	27.4	0.0	0.0	5.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.0	0.0	14.1	0.0	7.5	0.0	0.0	9.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				13.1	0.0	43.3	0.0	32.9	0.0	0.0	23.9	0.0
LnGrp LOS				B	A	D	A	F		A	C	
Approach Vol, veh/h					1009			1595	A		1268	A
Approach Delay, s/veh					33.7			32.9			23.9	
Approach LOS					C			C			C	

Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	34.1		34.1		35.9			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	29.4		29.4		31.4			
Max Q Clear Time (g_c+I1), s	31.5		24.2		31.3			
Green Ext Time (p_c), s	0.0		3.5		0.0			

Intersection Summary		
HCM 6th Ctrl Delay	30.2	
HCM 6th LOS	C	

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	180	880	555	255	35	630	1000	515	40	1395	20
Future Volume (veh/h)	40	180	880	555	255	35	630	1000	515	40	1395	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1870	1870	1870	1870	1885	1856	1870	1870
Adj Flow Rate, veh/h	42	189	926	584	268	11	663	1053	542	42	1468	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	2	2	2	2	1	3	2	2
Cap, veh/h	205	330	807	597	832	34	679	2005	1174	223	1421	633
Arrive On Green	0.03	0.09	0.09	0.17	0.24	0.24	0.20	0.56	0.56	0.03	0.40	0.40
Sat Flow, veh/h	1781	3554	2790	3483	3479	142	3456	3554	1596	1767	3554	1583
Grp Volume(v), veh/h	42	189	926	584	136	143	663	1053	542	42	1468	21
Grp Sat Flow(s),veh/h/ln	1781	1777	1395	1742	1777	1845	1728	1777	1596	1767	1777	1583
Q Serve(g_s), s	3.0	7.1	13.0	23.4	8.9	8.9	26.7	25.7	19.0	1.9	56.0	1.1
Cycle Q Clear(g_c), s	3.0	7.1	13.0	23.4	8.9	8.9	26.7	25.7	19.0	1.9	56.0	1.1
Prop In Lane	1.00		1.00	1.00		0.08	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	205	330	807	597	425	441	679	2005	1174	223	1421	633
V/C Ratio(X)	0.21	0.57	1.15	0.98	0.32	0.32	0.98	0.53	0.46	0.19	1.03	0.03
Avail Cap(c_a), veh/h	300	330	807	597	425	441	679	2005	1174	235	1421	633
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.3	60.8	49.7	57.7	43.9	43.9	55.9	18.9	7.4	23.4	42.0	25.5
Incr Delay (d2), s/veh	0.5	2.7	80.6	31.2	0.4	0.4	28.7	1.0	1.3	0.4	32.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.4	23.1	12.9	4.0	4.2	14.2	10.6	6.5	0.8	30.4	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.8	63.5	130.4	89.0	44.3	44.3	84.6	19.9	8.7	23.8	74.7	25.6
LnGrp LOS	E	E	F	F	D	D	F	B	A	C	F	C
Approach Vol, veh/h		1157			863			2258			1531	
Approach Delay, s/veh		116.7			74.5			36.2			72.6	
Approach LOS		F			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.0	61.0	29.0	18.0	9.0	84.0	8.5	38.5
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	5.0	5.0	4.5	* 5
Max Green Setting (Gmax), s	27.5	56.0	24.0	13.0	5.0	78.0	11.5	* 27
Max Q Clear Time (g_c+I1), s	28.7	58.0	25.4	15.0	3.9	27.7	5.0	10.9
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	13.5	0.0	1.3

Intersection Summary	
HCM 6th Ctrl Delay	67.5
HCM 6th LOS	E

Notes

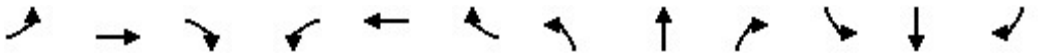
User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
7: Road 68 & I 182 WB On/Off Ramp/I 182 WB On Ramp

12/08/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	300	5	615	0	925	470	0	1390	1515
Future Volume (veh/h)	0	0	0	300	5	615	0	925	470	0	1390	1515
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1826	1826	1826	0	1856	1856	0	1870	1870
Adj Flow Rate, veh/h				300	5	0	0	925	0	0	1390	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				5	5	5	0	3	3	0	2	2
Cap, veh/h				447	242		0	2480		0	2499	
Arrive On Green				0.13	0.13	0.00	0.00	1.00	0.00	0.00	0.70	0.00
Sat Flow, veh/h				3374	1826	1547	0	3618	1572	0	3647	1585
Grp Volume(v), veh/h				300	5	0	0	925	0	0	1390	0
Grp Sat Flow(s),veh/h/ln				1687	1826	1547	0	1763	1572	0	1777	1585
Q Serve(g_s), s				4.7	0.1	0.0	0.0	0.0	0.0	0.0	10.7	0.0
Cycle Q Clear(g_c), s				4.7	0.1	0.0	0.0	0.0	0.0	0.0	10.7	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				447	242		0	2480		0	2499	
V/C Ratio(X)				0.67	0.02		0.00	0.37		0.00	0.56	
Avail Cap(c_a), veh/h				1410	763		0	2480		0	2499	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	1.00	0.00	0.00	0.65	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				23.1	21.1	0.0	0.0	0.0	0.0	0.0	4.0	0.0
Incr Delay (d2), s/veh				1.3	0.0	0.0	0.0	0.3	0.0	0.0	0.9	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.8	0.1	0.0	0.0	0.1	0.0	0.0	2.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				24.4	21.2	0.0	0.0	0.3	0.0	0.0	4.9	0.0
LnGrp LOS				C	C		A	A		A	A	
Approach Vol, veh/h					305	A		925	A		1390	A
Approach Delay, s/veh					24.4			0.3			4.9	
Approach LOS					C			A			A	

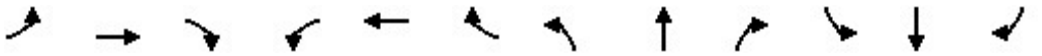
Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	44.0		44.0		12.0			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	23.4		23.4		23.4			
Max Q Clear Time (g_c+I1), s	2.0		12.7		6.7			
Green Ext Time (p_c), s	4.4		8.0		0.7			

Intersection Summary	
HCM 6th Ctrl Delay	5.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	750	0	230	0	0	0	0	645	680	0	505	1145
Future Volume (veh/h)	750	0	230	0	0	0	0	645	680	0	505	1145
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1856	0	1856				0	1856	1856	0	1841	1841
Adj Flow Rate, veh/h	750	0	0				0	645	613	0	505	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	3	0	3				0	3	3	0	4	4
Cap, veh/h	887	0					0	995	888	0	1974	
Arrive On Green	0.26	0.00	0.00				0.00	0.56	0.56	0.00	0.94	0.00
Sat Flow, veh/h	3428	0	1572				0	1856	1572	0	3589	1560
Grp Volume(v), veh/h	750	0	0				0	645	613	0	505	0
Grp Sat Flow(s),veh/h/ln	1714	0	1572				0	1763	1572	0	1749	1560
Q Serve(g_s), s	11.6	0.0	0.0				0.0	14.1	15.6	0.0	0.6	0.0
Cycle Q Clear(g_c), s	11.6	0.0	0.0				0.0	14.1	15.6	0.0	0.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	887	0					0	995	888	0	1974	
V/C Ratio(X)	0.85	0.00					0.00	0.65	0.69	0.00	0.26	
Avail Cap(c_a), veh/h	1433	0					0	995	888	0	1974	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.67	1.67
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.00	0.77	0.00
Uniform Delay (d), s/veh	19.7	0.0	0.0				0.0	8.4	8.7	0.0	0.7	0.0
Incr Delay (d2), s/veh	1.3	0.0	0.0				0.0	3.3	4.4	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	0.0				0.0	4.8	5.0	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	0.0	0.0				0.0	11.6	13.1	0.0	1.0	0.0
LnGrp LOS	C	A					A	B	B	A	A	
Approach Vol, veh/h		750	A					1258			505	A
Approach Delay, s/veh		21.0						12.4			1.0	
Approach LOS		C						B			A	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		36.9		19.1		36.9						
Change Period (Y+Rc), s		5.3		4.6		5.3						
Max Green Setting (Gmax), s		22.7		23.4		22.7						
Max Q Clear Time (g_c+I1), s		17.6		13.6		2.6						
Green Ext Time (p_c), s		2.8		0.9		2.6						

Intersection Summary		
HCM 6th Ctrl Delay		12.7
HCM 6th LOS		B

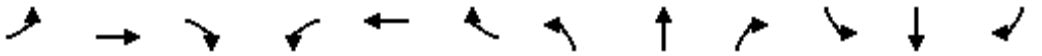
Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

12/13/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	10	10	65	35	305	15	420	40	755	665	200
Future Volume (veh/h)	185	10	10	65	35	305	15	420	40	755	665	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	195	11	9	68	37	98	16	442	37	795	700	207
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	194	217	157	147	143	128	127	728	61	1013	1907	564
Arrive On Green	0.08	0.11	0.11	0.05	0.08	0.08	0.03	0.22	0.20	0.49	0.69	0.68
Sat Flow, veh/h	1810	2001	1444	1810	1805	1610	1810	3373	281	1810	2747	812
Grp Volume(v), veh/h	195	10	10	68	37	98	16	236	243	795	460	447
Grp Sat Flow(s),veh/h/ln	1810	1805	1640	1810	1805	1610	1810	1805	1849	1810	1805	1754
Q Serve(g_s), s	11.0	0.7	0.8	5.1	2.7	8.3	1.0	16.5	16.6	39.2	14.6	14.8
Cycle Q Clear(g_c), s	11.0	0.7	0.8	5.1	2.7	8.3	1.0	16.5	16.6	39.2	14.6	14.8
Prop In Lane	1.00		0.88	1.00		1.00	1.00		0.15	1.00		0.46
Lane Grp Cap(c), veh/h	194	196	178	147	143	128	127	389	399	1013	1253	1217
V/C Ratio(X)	1.01	0.05	0.06	0.46	0.26	0.77	0.13	0.61	0.61	0.79	0.37	0.37
Avail Cap(c_a), veh/h	194	365	332	155	326	291	190	389	399	1013	1253	1217
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	63.0	55.9	56.0	63.6	60.6	62.9	47.3	49.5	49.7	24.5	8.8	9.0
Incr Delay (d2), s/veh	66.6	0.1	0.2	2.2	1.3	12.7	0.4	6.8	6.8	4.1	0.8	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	0.3	0.3	2.4	1.3	3.8	0.5	8.0	8.3	20.4	5.4	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	129.6	56.1	56.2	65.8	61.9	75.7	47.7	56.4	56.5	28.6	9.6	9.8
LnGrp LOS	F	E	E	E	E	E	D	E	E	C	A	A
Approach Vol, veh/h		215			203			495			1702	
Approach Delay, s/veh		122.8			69.9			56.1			18.5	
Approach LOS		F			E			E			B	

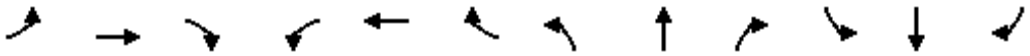
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	101.2	15.5	15.6	74.7	34.2	11.4	19.7
Change Period (Y+Rc), s	4.0	5.5	4.5	* 4.5	5.5	* 5.5	4.0	4.5
Max Green Setting (Gmax), s	8.6	77.1	11.0	* 25	57.0	* 29	8.0	28.3
Max Q Clear Time (g_c+I1), s	3.0	16.8	13.0	10.3	41.2	18.6	7.1	2.8
Green Ext Time (p_c), s	0.0	10.0	0.0	0.8	6.9	2.5	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	38.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1585	0	745	0	0	0	0	720	330	675	875	0
Future Volume (veh/h)	1585	0	745	0	0	0	0	720	330	675	875	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1885	0	1885				0	1870	1870	1885	1885	0
Adj Flow Rate, veh/h	1668	0	0				0	758	133	711	921	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	0	1				0	2	2	1	1	0
Cap, veh/h	1120	0					0	731	324	600	1034	0
Arrive On Green	0.32	0.00	0.00				0.00	0.21	0.21	0.19	0.37	0.00
Sat Flow, veh/h	3483	0	1598				0	3647	1573	1795	1885	0
Grp Volume(v), veh/h	1668	0	0				0	758	133	711	921	0
Grp Sat Flow(s),veh/h/ln	1742	0	1598				0	1777	1573	1795	1885	0
Q Serve(g_s), s	22.5	0.0	0.0				0.0	14.4	5.1	19.4	32.2	0.0
Cycle Q Clear(g_c), s	22.5	0.0	0.0				0.0	14.4	5.1	19.4	32.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	1120	0					0	731	324	600	1034	0
V/C Ratio(X)	1.49	0.00					0.00	1.04	0.41	1.18	0.89	0.00
Avail Cap(c_a), veh/h	1120	0					0	731	324	600	1034	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.48	0.48	0.00
Uniform Delay (d), s/veh	23.7	0.0	0.0				0.0	27.8	24.1	21.0	20.2	0.0
Incr Delay (d2), s/veh	225.2	0.0	0.0				0.0	43.2	3.8	91.3	6.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	43.3	0.0	0.0				0.0	9.8	2.1	23.0	15.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	249.0	0.0	0.0				0.0	71.0	27.9	112.2	26.2	0.0
LnGrp LOS	F	A					A	F	C	F	C	A
Approach Vol, veh/h		1668	A					891			1632	
Approach Delay, s/veh		249.0						64.6			63.7	
Approach LOS		F						E			E	

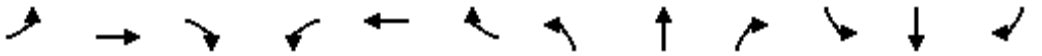
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	24.0	19.0		27.0		43.0
Change Period (Y+Rc), s	4.6	4.6		4.5		4.6
Max Green Setting (Gmax), s	19.4	14.4		22.5		38.4
Max Q Clear Time (g_c+I1), s	21.4	16.4		24.5		34.2
Green Ext Time (p_c), s	0.0	0.0		0.0		2.3

Intersection Summary		
HCM 6th Ctrl Delay		137.6
HCM 6th LOS		F

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [EBR] is excluded from calculations of the approach delay and intersection delay.



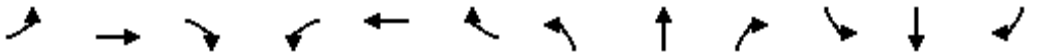
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	325	0	1130	0	1600	705	0	1225	1205
Future Volume (veh/h)	0	0	0	325	0	1130	0	1600	705	0	1225	1205
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1885	0	1885	0	1885	1885	0	1885	1870
Adj Flow Rate, veh/h				342	0	1172	0	1684	0	0	1289	0
Peak Hour Factor				0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	1	0	1	2
Cap, veh/h				857	0	762	0	1402		0	1402	
Arrive On Green				0.48	0.00	0.48	0.00	0.78	0.00	0.00	0.39	0.00
Sat Flow, veh/h				1795	0	1598	0	3676	1598	0	3676	1585
Grp Volume(v), veh/h				342	0	1172	0	1684	0	0	1289	0
Grp Sat Flow(s),veh/h/ln				1795	0	1598	0	1791	1598	0	1791	1585
Q Serve(g_s), s				8.6	0.0	33.4	0.0	27.4	0.0	0.0	23.9	0.0
Cycle Q Clear(g_c), s				8.6	0.0	33.4	0.0	27.4	0.0	0.0	23.9	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				857	0	762	0	1402		0	1402	
V/C Ratio(X)				0.40	0.00	1.54	0.00	1.20		0.00	0.92	
Avail Cap(c_a), veh/h				857	0	762	0	1402		0	1402	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				11.8	0.0	18.3	0.0	7.6	0.0	0.0	20.2	0.0
Incr Delay (d2), s/veh				0.1	0.0	248.4	0.0	91.2	0.0	0.0	11.2	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.0	0.0	62.9	0.0	20.2	0.0	0.0	11.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				11.9	0.0	266.7	0.0	98.8	0.0	0.0	31.4	0.0
LnGrp LOS				B	A	F	A	F		A	C	
Approach Vol, veh/h					1514			1684	A		1289	A
Approach Delay, s/veh					209.2			98.8			31.4	
Approach LOS					F			F			C	

Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	32.0		32.0		38.0			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	27.4		27.4		33.4			
Max Q Clear Time (g_c+I1), s	29.4		25.9		35.4			
Green Ext Time (p_c), s	0.0		1.1		0.0			

Intersection Summary		
HCM 6th Ctrl Delay		116.7
HCM 6th LOS		F

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	380	850	735	390	45	700	1085	905	30	845	90
Future Volume (veh/h)	160	380	850	735	390	45	700	1085	905	30	845	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1885	1870	1870	1870	1870	1885	1856	1870	1870
Adj Flow Rate, veh/h	168	400	895	774	411	21	737	1142	953	32	889	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	1	2	2	2	2	1	3	2	2
Cap, veh/h	295	503	1033	796	1076	55	791	1641	1102	137	930	414
Arrive On Green	0.06	0.14	0.14	0.23	0.31	0.31	0.23	0.46	0.46	0.03	0.26	0.26
Sat Flow, veh/h	1781	3554	2790	3483	3440	175	3456	3554	1596	1767	3554	1581
Grp Volume(v), veh/h	168	400	895	774	212	220	737	1142	953	32	889	95
Grp Sat Flow(s),veh/h/ln	1781	1777	1395	1742	1777	1839	1728	1777	1596	1767	1777	1581
Q Serve(g_s), s	8.5	15.2	19.8	30.9	13.0	13.1	29.3	35.7	64.3	1.8	34.5	6.6
Cycle Q Clear(g_c), s	8.5	15.2	19.8	30.9	13.0	13.1	29.3	35.7	64.3	1.8	34.5	6.6
Prop In Lane	1.00		1.00	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	295	503	1033	796	556	575	791	1641	1102	137	930	414
V/C Ratio(X)	0.57	0.80	0.87	0.97	0.38	0.38	0.93	0.70	0.86	0.23	0.96	0.23
Avail Cap(c_a), veh/h	295	503	1033	796	562	582	832	1641	1102	155	930	414
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.6	58.1	40.9	53.6	37.5	37.5	52.9	29.9	16.7	36.5	50.9	40.6
Incr Delay (d2), s/veh	2.6	8.9	8.0	25.2	0.4	0.4	16.5	2.5	9.1	0.9	20.6	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	7.5	15.4	16.3	5.8	6.0	14.4	15.6	24.4	0.8	17.8	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.2	67.0	48.8	78.7	38.0	38.0	69.4	32.4	25.8	37.3	71.5	41.9
LnGrp LOS	D	E	D	E	D	D	E	C	C	D	E	D
Approach Vol, veh/h		1463			1206			2832			1016	
Approach Delay, s/veh		54.2			64.1			39.8			67.6	
Approach LOS		D			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.6	41.6	37.0	24.8	8.6	69.6	13.0	48.8
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	5.0	5.0	4.5	* 5
Max Green Setting (Gmax), s	33.7	35.0	32.0	19.8	5.0	63.2	8.5	* 44
Max Q Clear Time (g_c+I1), s	31.3	36.5	32.9	21.8	3.8	66.3	10.5	15.1
Green Ext Time (p_c), s	0.8	0.0	0.0	0.0	0.0	0.0	0.0	2.7

Intersection Summary	
HCM 6th Ctrl Delay	51.9
HCM 6th LOS	D

Notes

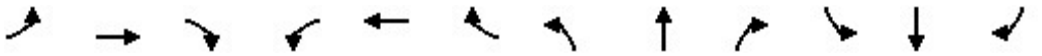
User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

HCM 6th Signalized Intersection Summary
7: Road 68 & I 182 WB On/Off Ramp/I 182 WB On Ramp

12/08/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	305	0	1315	0	1915	435	0	1445	1565
Future Volume (veh/h)	0	0	0	305	0	1315	0	1915	435	0	1445	1565
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	0	1900	1900	0	1885	1885
Adj Flow Rate, veh/h				305	0	0	0	1915	0	0	1445	0
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				0	0	0	0	0	0	0	1	1
Cap, veh/h				457	247		0	2547		0	2527	
Arrive On Green				0.13	0.00	0.00	0.00	0.47	0.00	0.00	0.71	0.00
Sat Flow, veh/h				3510	1900	1610	0	3705	1610	0	3676	1598
Grp Volume(v), veh/h				305	0	0	0	1915	0	0	1445	0
Grp Sat Flow(s),veh/h/ln				1755	1900	1610	0	1805	1610	0	1791	1598
Q Serve(g_s), s				4.6	0.0	0.0	0.0	24.3	0.0	0.0	11.2	0.0
Cycle Q Clear(g_c), s				4.6	0.0	0.0	0.0	24.3	0.0	0.0	11.2	0.0
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				457	247		0	2547		0	2527	
V/C Ratio(X)				0.67	0.00		0.00	0.75		0.00	0.57	
Avail Cap(c_a), veh/h				1467	794		0	2547		0	2527	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	0.67	0.67	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.00	0.24	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				23.2	0.0	0.0	0.0	10.8	0.0	0.0	4.1	0.0
Incr Delay (d2), s/veh				1.3	0.0	0.0	0.0	0.5	0.0	0.0	0.9	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				1.9	0.0	0.0	0.0	9.3	0.0	0.0	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				24.5	0.0	0.0	0.0	11.3	0.0	0.0	5.0	0.0
LnGrp LOS				C	A		A	B		A	A	
Approach Vol, veh/h					305	A		1915	A		1445	A
Approach Delay, s/veh					24.5			11.3			5.0	
Approach LOS					C			B			A	

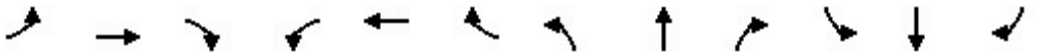
Timer - Assigned Phs	2		6		8			
Phs Duration (G+Y+Rc), s	44.1		44.1		11.9			
Change Period (Y+Rc), s	4.6		4.6		4.6			
Max Green Setting (Gmax), s	23.4		23.4		23.4			
Max Q Clear Time (g_c+I1), s	26.3		13.2		6.6			
Green Ext Time (p_c), s	0.0		7.9		0.7			

Intersection Summary	
HCM 6th Ctrl Delay	9.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1650	0	495	0	0	0	0	700	370	0	810	940
Future Volume (veh/h)	1650	0	495	0	0	0	0	700	370	0	810	940
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	0	1900				0	1885	1885	0	1885	1885
Adj Flow Rate, veh/h	1650	0	0				0	700	335	0	810	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	0				0	1	1	0	1	1
Cap, veh/h	1291	0					0	1074	514	0	1637	
Arrive On Green	0.37	0.00	0.00				0.00	0.46	0.46	0.00	0.61	0.00
Sat Flow, veh/h	3510	0	1610				0	2443	1124	0	3676	1598
Grp Volume(v), veh/h	1650	0	0				0	534	501	0	810	0
Grp Sat Flow(s),veh/h/ln	1755	0	1610				0	1791	1681	0	1791	1598
Q Serve(g_s), s	20.6	0.0	0.0				0.0	12.9	12.9	0.0	7.1	0.0
Cycle Q Clear(g_c), s	20.6	0.0	0.0				0.0	12.9	12.9	0.0	7.1	0.0
Prop In Lane	1.00		1.00				0.00		0.67	0.00		1.00
Lane Grp Cap(c), veh/h	1291	0					0	819	769	0	1637	
V/C Ratio(X)	1.28	0.00					0.00	0.65	0.65	0.00	0.49	
Avail Cap(c_a), veh/h	1291	0					0	819	769	0	1637	
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.33	1.33
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	1.00	0.00	0.76	0.00
Uniform Delay (d), s/veh	17.7	0.0	0.0				0.0	11.8	11.8	0.0	7.3	0.0
Incr Delay (d2), s/veh	131.1	0.0	0.0				0.0	4.0	4.3	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	30.6	0.0	0.0				0.0	5.2	4.9	0.0	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	148.8	0.0	0.0				0.0	15.8	16.0	0.0	8.2	0.0
LnGrp LOS	F	A					A	B	B	A	A	
Approach Vol, veh/h		1650	A					1035			810	A
Approach Delay, s/veh		148.8						15.9			8.2	
Approach LOS		F						B			A	

Timer - Assigned Phs	2	4	6
Phs Duration (G+Y+Rc), s	30.9	25.1	30.9
Change Period (Y+Rc), s	5.3	4.5	5.3
Max Green Setting (Gmax), s	25.6	20.6	25.6
Max Q Clear Time (g_c+I1), s	14.9	22.6	9.1
Green Ext Time (p_c), s	3.7	0.0	4.2

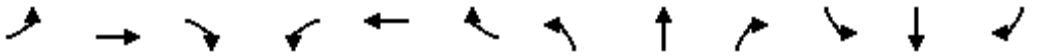
Intersection Summary	
HCM 6th Ctrl Delay	76.8
HCM 6th LOS	E

Notes

Unsignalized Delay for [EBR, SBR] is excluded from calculations of the approach delay and intersection delay.

APPENDIX F-6: BUILD CONDITIONS SYNCHRO RESULTS

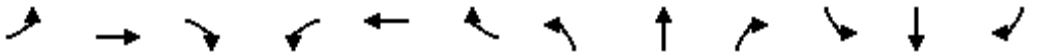
WS-1 SYNCHRO RESULTS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	305	0	295	0	735	595	0	720	1145
Future Volume (vph)	0	0	0	305	0	295	0	735	595	0	720	1145
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
Lane Util. Factor				1.00		0.88		0.95	1.00		1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	1.00
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1787		2814		3574	1565		1881	1823
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1787		2814		3574	1565		1881	1823
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)	0	0	0	332	0	321	0	799	647	0	783	1245
RTOR Reduction (vph)	0	0	0	0	0	142	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	332	0	179	0	799	647	0	783	1245
Confl. Peds. (#/hr)							3		3	3		3
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	1%	2%
Turn Type				Prot		Prot		NA	Free		NA	Free
Protected Phases				8!		8		2			6 8!	
Permitted Phases				8!		8			Free			Free
Actuated Green, G (s)				19.8		19.8		41.0	70.0		70.0	70.0
Effective Green, g (s)				20.4		20.4		41.6	70.0		70.0	70.0
Actuated g/C Ratio				0.29		0.29		0.59	1.00		1.00	1.00
Clearance Time (s)				4.6		4.6		4.6				
Vehicle Extension (s)				1.5		1.5		3.0				
Lane Grp Cap (vph)				520		820		2123	1565		1881	1823
v/s Ratio Prot				0.19		0.06		0.22			0.42	
v/s Ratio Perm									0.41			c0.68
v/c Ratio				0.64		0.22		0.38	0.41		0.42	0.68
Uniform Delay, d1				21.6		18.8		7.4	0.0		0.0	0.0
Progression Factor				1.00		1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2				1.9		0.0		0.5	0.8		0.0	1.5
Delay (s)				23.5		18.8		7.9	0.8		0.0	1.5
Level of Service				C		B		A	A		A	A
Approach Delay (s)		0.0			21.2			4.7			1.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

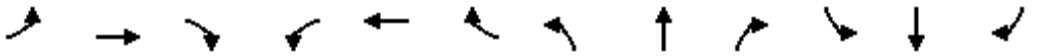
! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	325	0	430	0	1670	355	0	810	1000
Future Volume (vph)	0	0	0	325	0	430	0	1670	355	0	810	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.6		4.6		4.6	4.0		4.6	4.0
Lane Util. Factor				1.00		0.88		0.95	1.00		1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1787		2814		3574	1565		1881	1549
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1787		2814		3574	1565		1881	1549
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)	0	0	0	353	0	467	0	1815	386	0	880	1087
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	353	0	442	0	1815	386	0	880	1087
Confl. Peds. (#/hr)							3		3	3		3
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	1%	2%
Turn Type				Prot		Prot		NA	Free		NA	Free
Protected Phases				8!		8		2			6 8!	
Permitted Phases				8!		8			Free			Free
Actuated Green, G (s)				22.8		22.8		58.0	90.0		90.0	90.0
Effective Green, g (s)				22.8		22.8		58.0	90.0		90.0	90.0
Actuated g/C Ratio				0.25		0.25		0.64	1.00		1.00	1.00
Clearance Time (s)				4.6		4.6		4.6				
Vehicle Extension (s)				1.5		1.5		3.0				
Lane Grp Cap (vph)				452		712		2303	1565		1881	1549
v/s Ratio Prot				0.20		0.16		c0.51			0.47	
v/s Ratio Perm									0.25			c0.70
v/c Ratio				0.78		0.62		0.79	0.25		0.47	0.70
Uniform Delay, d1				31.3		29.8		11.6	0.0		0.0	0.0
Progression Factor				1.00		1.00		0.75	1.00		1.00	1.00
Incremental Delay, d2				7.9		1.2		1.2	0.3		0.1	2.7
Delay (s)				39.2		31.0		9.9	0.3		0.1	2.7
Level of Service				D		C		A	A		A	A
Approach Delay (s)		0.0			34.5			8.2			1.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

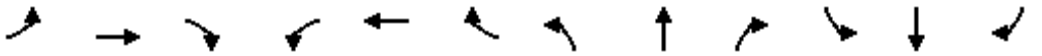
! Phase conflict between lane groups.
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	305	0	670	0	1515	705	0	1205	1625
Future Volume (vph)	0	0	0	305	0	670	0	1515	705	0	1205	1625
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.6		4.6		4.6	4.0		4.6	4.0
Lane Util. Factor				1.00		0.88		0.95	1.00		1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	1.00
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1787		2814		3574	1565		1881	1823
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1787		2814		3574	1565		1881	1823
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	321	0	705	0	1595	742	0	1268	1711
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	321	0	680	0	1595	742	0	1268	1711
Confl. Peds. (#/hr)							3		3	3		3
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	1%	2%
Turn Type				Prot		Prot		NA	Free		NA	Free
Protected Phases				8!		8		2			6 8!	
Permitted Phases				8!		8			Free			Free
Actuated Green, G (s)				21.5		21.5		39.3	70.0		70.0	70.0
Effective Green, g (s)				21.5		21.5		39.3	70.0		70.0	70.0
Actuated g/C Ratio				0.31		0.31		0.56	1.00		1.00	1.00
Clearance Time (s)				4.6		4.6		4.6				
Vehicle Extension (s)				1.5		1.5		3.0				
Lane Grp Cap (vph)				548		864		2006	1565		1881	1823
v/s Ratio Prot				0.18		0.24		0.45			0.67	
v/s Ratio Perm									0.47			c0.94
v/c Ratio				0.59		0.79		0.80	0.47		0.67	0.94
Uniform Delay, d1				20.5		22.2		12.2	0.0		0.0	0.0
Progression Factor				1.00		1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2				1.0		4.4		3.4	1.0		0.1	1.3
Delay (s)				21.5		26.6		15.5	1.0		0.1	1.3
Level of Service				C		C		B	A		A	A
Approach Delay (s)		0.0			25.0			10.9			0.8	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

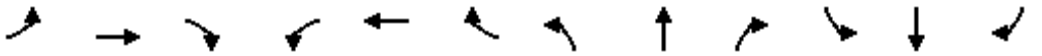


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	325	0	1130	0	1600	705	0	1225	1205
Future Volume (vph)	0	0	0	325	0	1130	0	1600	705	0	1225	1205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.6		4.6		4.6	4.0		4.6	4.0
Lane Util. Factor				1.00		0.88		0.95	1.00		1.00	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1787		2814		3574	1565		1881	1549
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1787		2814		3574	1565		1881	1549
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	342	0	1189	0	1684	742	0	1289	1268
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	342	0	1178	0	1684	742	0	1289	1268
Confl. Peds. (#/hr)							3		3	3		3
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	1%	2%
Turn Type				Prot		Prot		NA	Free		NA	Free
Protected Phases				8!		8		2			6 8!	
Permitted Phases				8!		8			Free			Free
Actuated Green, G (s)				36.4		36.4		44.4	90.0		90.0	90.0
Effective Green, g (s)				36.4		36.4		44.4	90.0		90.0	90.0
Actuated g/C Ratio				0.40		0.40		0.49	1.00		1.00	1.00
Clearance Time (s)				4.6		4.6		4.6				
Vehicle Extension (s)				1.5		1.5		3.0				
Lane Grp Cap (vph)				722		1138		1763	1565		1881	1549
v/s Ratio Prot				0.19		c0.42		c0.47			0.69	
v/s Ratio Perm									0.47			0.82
v/c Ratio				0.47		1.03		0.96	0.47		0.69	0.82
Uniform Delay, d1				19.7		26.8		21.8	0.0		0.0	0.0
Progression Factor				1.00		1.00		0.84	1.00		1.00	1.00
Incremental Delay, d2				0.2		36.1		1.8	0.8		0.8	4.9
Delay (s)				19.9		62.9		20.2	0.8		0.8	4.9
Level of Service				B		E		C	A		A	A
Approach Delay (s)		0.0			53.3			14.2			2.9	
Approach LOS		A			D			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

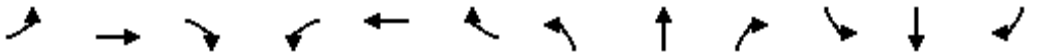
WS-2 SYNCHRO RESULTS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	305	0	295	0	735	595	0	720	1145
Future Volume (vph)	0	0	0	305	0	295	0	735	595	0	720	1145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.6		4.6		4.6	4.0		4.6	4.0
Lane Util. Factor				1.00		0.88		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1787		2814		3574	1565		3574	1549
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1787		2814		3574	1565		3574	1549
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)	0	0	0	332	0	321	0	799	647	0	783	1245
RTOR Reduction (vph)	0	0	0	0	0	134	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	332	0	187	0	799	647	0	783	1245
Confl. Peds. (#/hr)							3		3	3		3
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	1%	2%
Turn Type				Prot		Prot		NA	Free		NA	Free
Protected Phases				8		8		2			6	
Permitted Phases				8		8			Free			Free
Actuated Green, G (s)				17.3		17.3		43.5	70.0		43.5	70.0
Effective Green, g (s)				17.3		17.3		43.5	70.0		43.5	70.0
Actuated g/C Ratio				0.25		0.25		0.62	1.00		0.62	1.00
Clearance Time (s)				4.6		4.6		4.6			4.6	
Vehicle Extension (s)				1.5		1.5		3.0			3.0	
Lane Grp Cap (vph)				441		695		2220	1565		2220	1549
v/s Ratio Prot				0.19		0.07		0.22			0.22	
v/s Ratio Perm									0.41			c0.80
v/c Ratio				0.75		0.27		0.36	0.41		0.35	0.80
Uniform Delay, d1				24.4		21.3		6.5	0.0		6.4	0.0
Progression Factor				1.00		1.00		1.00	1.00		1.09	1.00
Incremental Delay, d2				6.4		0.1		0.5	0.8		0.3	3.3
Delay (s)				30.7		21.3		6.9	0.8		7.3	3.3
Level of Service				C		C		A	A		A	A
Approach Delay (s)		0.0			26.1			4.2			4.8	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

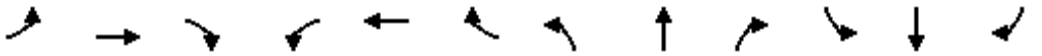
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	325	0	430	0	1670	355	0	810	1000
Future Volume (vph)	0	0	0	325	0	430	0	1670	355	0	810	1000
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.6		4.6		4.6	4.0		4.6	4.0
Lane Util. Factor				1.00		0.88		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1787		2814		3574	1565		3574	1549
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1787		2814		3574	1565		3574	1549
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)	0	0	0	353	0	467	0	1815	386	0	880	1087
RTOR Reduction (vph)	0	0	0	0	0	26	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	353	0	441	0	1815	386	0	880	1087
Confl. Peds. (#/hr)							3		3	3		3
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	1%	2%
Turn Type				Prot		Prot		NA	Free		NA	Free
Protected Phases				8		8		2			6	
Permitted Phases				8		8			Free			Free
Actuated Green, G (s)				20.9		20.9		59.9	90.0		59.9	90.0
Effective Green, g (s)				20.9		20.9		59.9	90.0		59.9	90.0
Actuated g/C Ratio				0.23		0.23		0.67	1.00		0.67	1.00
Clearance Time (s)				4.6		4.6		4.6			4.6	
Vehicle Extension (s)				1.5		1.5		3.0			3.0	
Lane Grp Cap (vph)				414		653		2378	1565		2378	1549
v/s Ratio Prot				0.20		0.16		c0.51			0.25	
v/s Ratio Perm									0.25			c0.70
v/c Ratio				0.85		0.68		0.76	0.25		0.37	0.70
Uniform Delay, d1				33.1		31.5		10.2	0.0		6.7	0.0
Progression Factor				1.00		1.00		0.71	1.00		1.00	1.00
Incremental Delay, d2				15.0		2.2		1.0	0.3		0.4	2.7
Delay (s)				48.1		33.6		8.3	0.3		7.1	2.7
Level of Service				D		C		A	A		A	A
Approach Delay (s)		0.0			39.8			6.9			4.7	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

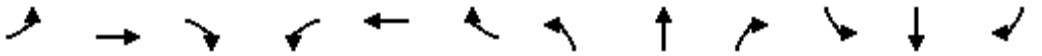
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	305	0	670	0	1515	705	0	1205	1625
Future Volume (vph)	0	0	0	305	0	670	0	1515	705	0	1205	1625
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.6		4.6		4.6	4.0		4.6	4.0
Lane Util. Factor				1.00		0.88		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1787		2814		3574	1565		3574	1549
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1787		2814		3574	1565		3574	1549
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	321	0	705	0	1595	742	0	1268	1711
RTOR Reduction (vph)	0	0	0	0	0	26	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	321	0	679	0	1595	742	0	1268	1711
Confl. Peds. (#/hr)							3		3	3		3
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	1%	2%
Turn Type				Prot		Prot		NA	Free		NA	Free
Protected Phases				8		8		2			6	
Permitted Phases				8		8			Free			Free
Actuated Green, G (s)				19.8		19.8		41.0	70.0		41.0	70.0
Effective Green, g (s)				19.8		19.8		41.0	70.0		41.0	70.0
Actuated g/C Ratio				0.28		0.28		0.59	1.00		0.59	1.00
Clearance Time (s)				4.6		4.6		4.6			4.6	
Vehicle Extension (s)				1.5		1.5		3.0			3.0	
Lane Grp Cap (vph)				505		795		2093	1565		2093	1549
v/s Ratio Prot				0.18		0.24		0.45			0.35	
v/s Ratio Perm									0.47			c1.10
v/c Ratio				0.64		0.85		0.76	0.47		0.61	1.10
Uniform Delay, d1				21.9		23.7		10.9	0.0		9.3	35.0
Progression Factor				1.00		1.00		1.00	1.00		0.86	1.00
Incremental Delay, d2				1.9		8.6		2.7	1.0		0.1	48.1
Delay (s)				23.9		32.3		13.5	1.0		8.1	83.1
Level of Service				C		C		B	A		A	F
Approach Delay (s)		0.0			29.7			9.6			51.2	
Approach LOS		A			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

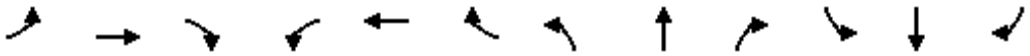


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	325	0	1130	0	1600	705	0	1225	1205
Future Volume (vph)	0	0	0	325	0	1130	0	1600	705	0	1225	1205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.6		4.6		4.6	4.0		4.6	4.0
Lane Util. Factor				1.00		0.88		0.95	1.00		0.95	1.00
Frpb, ped/bikes				1.00		1.00		1.00	0.98		1.00	0.98
Flpb, ped/bikes				1.00		1.00		1.00	1.00		1.00	1.00
Frt				1.00		0.85		1.00	0.85		1.00	0.85
Flt Protected				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)				1787		2814		3574	1565		3574	1549
Flt Permitted				0.95		1.00		1.00	1.00		1.00	1.00
Satd. Flow (perm)				1787		2814		3574	1565		3574	1549
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	342	0	1189	0	1684	742	0	1289	1268
RTOR Reduction (vph)	0	0	0	0	0	11	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	342	0	1178	0	1684	742	0	1289	1268
Confl. Peds. (#/hr)							3		3	3		3
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	0%	1%	2%
Turn Type				Prot		Prot		NA	Free		NA	Free
Protected Phases				8		8		2			6	
Permitted Phases				8		8			Free			Free
Actuated Green, G (s)				36.4		36.4		44.4	90.0		44.4	90.0
Effective Green, g (s)				36.4		36.4		44.4	90.0		44.4	90.0
Actuated g/C Ratio				0.40		0.40		0.49	1.00		0.49	1.00
Clearance Time (s)				4.6		4.6		4.6			4.6	
Vehicle Extension (s)				1.5		1.5		3.0			3.0	
Lane Grp Cap (vph)				722		1138		1763	1565		1763	1549
v/s Ratio Prot				0.19		c0.42		c0.47			0.36	
v/s Ratio Perm									0.47			0.82
v/c Ratio				0.47		1.03		0.96	0.47		0.73	0.82
Uniform Delay, d1				19.7		26.8		21.8	0.0		18.1	0.0
Progression Factor				1.00		1.00		0.84	1.00		1.00	1.00
Incremental Delay, d2				0.2		36.1		1.8	0.8		2.7	4.9
Delay (s)				19.9		62.9		20.2	0.8		20.8	4.9
Level of Service				B		E		C	A		C	A
Approach Delay (s)		0.0			53.3			14.2			12.9	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

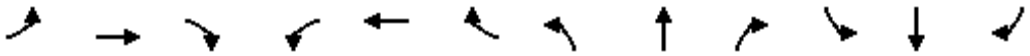
ES-1 SYNCHRO RESULTS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	330	0	0	430	0	900	345	450	575	0
Future Volume (vph)	0	0	330	0	0	430	0	900	345	450	575	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.6		4.6	4.6	4.6	4.6	
Lane Util. Factor			1.00			0.88		0.95	1.00	1.00	1.00	
Frpb, ped/bikes			0.99			1.00		1.00	0.97	1.00	1.00	
Flpb, ped/bikes			1.00			1.00		1.00	1.00	1.00	1.00	
Frt			0.86			0.85		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1606			2814		3539	1539	1787	1881	
Flt Permitted			1.00			1.00		1.00	1.00	0.25	1.00	
Satd. Flow (perm)			1606			2814		3539	1539	476	1881	
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)	0	0	359	0	0	467	0	978	375	489	625	0
RTOR Reduction (vph)	0	0	0	0	0	114	0	0	93	0	0	0
Lane Group Flow (vph)	0	0	359	0	0	353	0	978	282	489	625	0
Confl. Peds. (#/hr)			3	3			3		3	3		3
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type			Free			Over		NA	Perm	pm+pt	NA	
Protected Phases						1		2		1	6	
Permitted Phases			Free						2	6		
Actuated Green, G (s)			105.0			18.6		77.2	77.2	100.4	105.0	
Effective Green, g (s)			105.0			18.6		77.2	77.2	100.4	105.0	
Actuated g/C Ratio			1.00			0.18		0.74	0.74	0.96	1.00	
Clearance Time (s)						4.6		4.6	4.6	4.6	4.6	
Vehicle Extension (s)						2.0		3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)			1606			498		2602	1131	687	1881	
v/s Ratio Prot						0.13		0.28		c0.13	0.33	
v/s Ratio Perm			0.22						0.18	c0.55		
v/c Ratio			0.22			0.71		0.38	0.25	0.71	0.33	
Uniform Delay, d1			0.0			40.6		5.1	4.5	5.4	0.0	
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2			0.3			3.8		0.4	0.5	2.9	0.5	
Delay (s)			0.3			44.4		5.5	5.0	8.3	0.5	
Level of Service			A			D		A	A	A	A	
Approach Delay (s)		0.3			44.4			5.4			3.9	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

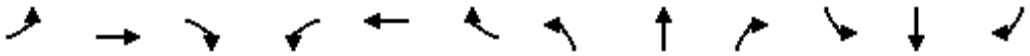
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	720	0	0	1315	0	710	285	380	755	0
Future Volume (vph)	0	0	720	0	0	1315	0	710	285	380	755	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.6		4.6	4.6	4.6	4.6	
Lane Util. Factor			1.00			0.88		0.95	1.00	1.00	1.00	
Frpb, ped/bikes			0.99			1.00		1.00	0.97	1.00	1.00	
Flpb, ped/bikes			1.00			1.00		1.00	1.00	1.00	1.00	
Frt			0.86			0.85		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1606			2814		3539	1541	1787	1881	
Flt Permitted			1.00			1.00		1.00	1.00	0.21	1.00	
Satd. Flow (perm)			1606			2814		3539	1541	395	1881	
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)	0	0	783	0	0	1429	0	772	310	413	821	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	192	0	0	0
Lane Group Flow (vph)	0	0	783	0	0	1429	0	772	118	413	821	0
Confl. Peds. (#/hr)			3	3			3		3	3		3
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type			Free			pm+ov		NA	Perm	pm+pt	NA	
Protected Phases						1		2		1	6	
Permitted Phases			Free			8			2	6		
Actuated Green, G (s)			90.0			46.4		34.4	34.4	85.4	90.0	
Effective Green, g (s)			90.0			46.4		34.4	34.4	85.4	90.0	
Actuated g/C Ratio			1.00			0.52		0.38	0.38	0.95	1.00	
Clearance Time (s)						4.6		4.6	4.6	4.6	4.6	
Vehicle Extension (s)						2.0		3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)			1606			1450		1352	589	1092	1881	
v/s Ratio Prot						c0.51		c0.22		0.19	0.44	
v/s Ratio Perm			0.49						0.08	0.16		
v/c Ratio			0.49			0.99		0.57	0.20	0.38	0.44	
Uniform Delay, d1			0.0			21.5		22.0	18.6	4.0	0.0	
Progression Factor			1.00			1.00		1.00	1.00	0.98	1.00	
Incremental Delay, d2			1.1			20.0		1.8	0.8	0.1	0.6	
Delay (s)			1.1			41.5		23.7	19.4	4.0	0.6	
Level of Service			A			D		C	B	A	A	
Approach Delay (s)		1.1			41.5			22.5			1.7	
Approach LOS		A			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.7
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

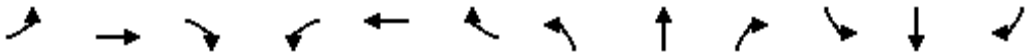
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	350	0	0	975	0	1245	345	905	605	0
Future Volume (vph)	0	0	350	0	0	975	0	1245	345	905	605	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.6		4.6	4.6	4.6	4.6	
Lane Util. Factor			1.00			0.88		0.95	1.00	1.00	1.00	
Frpb, ped/bikes			0.99			1.00		1.00	0.97	1.00	1.00	
Flpb, ped/bikes			1.00			1.00		1.00	1.00	1.00	1.00	
Frt			0.86			0.85		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1606			2814		3539	1539	1787	1881	
Flt Permitted			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)			1606			2814		3539	1539	1787	1881	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	368	0	0	1026	0	1311	363	953	637	0
RTOR Reduction (vph)	0	0	0	0	0	8	0	0	61	0	0	0
Lane Group Flow (vph)	0	0	368	0	0	1018	0	1311	302	953	637	0
Confl. Peds. (#/hr)			3	3			3		3	3		3
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type			Free			Over		NA	Perm	Prot	NA	
Protected Phases						1		2		1	6	
Permitted Phases			Free						2			
Actuated Green, G (s)			105.0			55.4		40.4	40.4	55.4	105.0	
Effective Green, g (s)			105.0			55.4		40.4	40.4	55.4	105.0	
Actuated g/C Ratio			1.00			0.53		0.38	0.38	0.53	1.00	
Clearance Time (s)						4.6		4.6	4.6	4.6	4.6	
Vehicle Extension (s)						2.0		3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)			1606			1484		1361	592	942	1881	
v/s Ratio Prot						0.36		c0.37		c0.53	0.34	
v/s Ratio Perm			0.23						0.20			
v/c Ratio			0.23			0.69		0.96	0.51	1.01	0.34	
Uniform Delay, d1			0.0			18.4		31.6	24.7	24.8	0.0	
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2			0.3			1.1		17.1	3.1	32.2	0.5	
Delay (s)			0.3			19.4		48.6	27.9	57.0	0.5	
Level of Service			A			B		D	C	E	A	
Approach Delay (s)		0.3			19.4			44.1			34.4	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	92.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	745	0	0	1585	0	720	330	675	875	0
Future Volume (vph)	0	0	745	0	0	1585	0	720	330	675	875	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.6		4.6	4.6	4.6	4.6	
Lane Util. Factor			1.00			0.88		0.95	1.00	1.00	1.00	
Frpb, ped/bikes			0.99			1.00		1.00	0.97	1.00	1.00	
Flpb, ped/bikes			1.00			1.00		1.00	1.00	1.00	1.00	
Frt			0.86			0.85		1.00	0.85	1.00	1.00	
Flt Protected			1.00			1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1606			2814		3539	1541	1787	1881	
Flt Permitted			1.00			1.00		1.00	1.00	0.16	1.00	
Satd. Flow (perm)			1606			2814		3539	1541	292	1881	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	784	0	0	1668	0	758	347	711	921	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	244	0	0	0
Lane Group Flow (vph)	0	0	784	0	0	1668	0	758	103	711	921	0
Confl. Peds. (#/hr)			3	3			3		3	3		3
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type			Free			pm+ov		NA	Perm	pm+pt	NA	
Protected Phases						1		2		1	6	
Permitted Phases			Free			8			2	6		
Actuated Green, G (s)			90.0			54.0		26.8	26.8	85.4	90.0	
Effective Green, g (s)			90.0			54.0		26.8	26.8	85.4	90.0	
Actuated g/C Ratio			1.00			0.60		0.30	0.30	0.95	1.00	
Clearance Time (s)						4.6		4.6	4.6	4.6	4.6	
Vehicle Extension (s)						2.0		3.0	3.0	2.0	3.0	
Lane Grp Cap (vph)			1606			1688		1053	458	1174	1881	
v/s Ratio Prot						c0.59		c0.21		0.36	0.49	
v/s Ratio Perm			0.49						0.07	0.21		
v/c Ratio			0.49			0.99		0.72	0.23	0.61	0.49	
Uniform Delay, d1			0.0			17.7		28.2	23.8	7.5	0.0	
Progression Factor			1.00			1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2			1.1			18.9		4.2	1.1	0.4	0.7	
Delay (s)			1.1			36.6		32.5	24.9	8.0	0.7	
Level of Service			A			D		C	C	A	A	
Approach Delay (s)		1.1			36.6			30.1			3.9	
Approach LOS		A			D			C			A	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.7
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX F-7: EXISTING CONDITIONS SIMTRAFFIC RESULTS

Intersection: 1: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	T	T	R
Maximum Queue (ft)	386	187	124	187	89	138	55
Average Queue (ft)	143	64	50	91	30	33	2
95th Queue (ft)	421	159	104	165	77	138	38
Link Distance (ft)	1578		1120	1120		296	296
Upstream Blk Time (%)	0					2	0
Queuing Penalty (veh)	0					12	0
Storage Bay Dist (ft)		350			100		
Storage Blk Time (%)	2				1	2	
Queuing Penalty (veh)	5				3	6	

Intersection: 2: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	T	R	L	T
Maximum Queue (ft)	250	352	643	282	306	200	688	745
Average Queue (ft)	103	144	72	122	266	175	166	278
95th Queue (ft)	217	295	504	259	355	260	614	823
Link Distance (ft)			1642	244	244		1120	1120
Upstream Blk Time (%)			0	1	31		2	5
Queuing Penalty (veh)			0	5	176		6	17
Storage Bay Dist (ft)	230	230				175		
Storage Blk Time (%)	3	3	5		34	2		
Queuing Penalty (veh)	9	11	22		118	9		

Intersection: 4: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB	SB
Directions Served	R	T	TR	L	T
Maximum Queue (ft)	175	304	390	222	90
Average Queue (ft)	55	54	147	114	15
95th Queue (ft)	139	240	413	228	104
Link Distance (ft)	297	377	377	184	184
Upstream Blk Time (%)	0	0	4	18	2
Queuing Penalty (veh)	0	0	23	73	8
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Road 100 & Bedford St

Movement	NB	NB	SB	SB
Directions Served	T	TR	T	T
Maximum Queue (ft)	3	9	24	29
Average Queue (ft)	0	0	3	1
95th Queue (ft)	3	6	36	15
Link Distance (ft)		296	60	60
Upstream Blk Time (%)			1	0
Queuing Penalty (veh)			9	2
Storage Bay Dist (ft)	130			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Road 100 & Harris Rd

Movement	EB	NB	SB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	95	79	46	89
Average Queue (ft)	33	31	5	10
95th Queue (ft)	75	67	62	82
Link Distance (ft)	425	60	306	306
Upstream Blk Time (%)		3	1	1
Queuing Penalty (veh)		6	4	4
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Road 100 & Vincenzo Dr

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (ft)	84	8	35
Average Queue (ft)	35	0	3
95th Queue (ft)	68	5	20
Link Distance (ft)	560	118	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			150
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Road 100 & Buckingham Dr

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	53	13
Average Queue (ft)	21	1
95th Queue (ft)	51	8
Link Distance (ft)	542	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		150
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Road 100 & Nottingham Dr

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	58	30
Average Queue (ft)	26	2
95th Queue (ft)	56	17
Link Distance (ft)	355	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		75
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 15: Road 100 & Delta HS South Leg

Movement	SB	SB	SB
Directions Served	L	T	T
Maximum Queue (ft)	56	26	27
Average Queue (ft)	15	2	2
95th Queue (ft)	46	32	31
Link Distance (ft)		288	288
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)	75		
Storage Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	

Intersection: 17: Road 100 & Delta HS North Leg

Movement	WB	WB	WB	SB
Directions Served	L	L	R	T
Maximum Queue (ft)	52	51	9	3
Average Queue (ft)	8	11	0	0
95th Queue (ft)	34	39	5	3
Link Distance (ft)	333	333	333	118
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 20: Road 100 & Burns Rd

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	L	LTR
Maximum Queue (ft)	152	109	28	61	27
Average Queue (ft)	73	47	3	19	1
95th Queue (ft)	124	88	17	49	11
Link Distance (ft)	1421	2006	2006		1392
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				95	
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 21: Road 100 & Sandifur Parkway

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	T	T	R	L	T	T
Maximum Queue (ft)	120	374	55	145	135	5	84	193	197
Average Queue (ft)	103	177	17	70	54	0	25	91	110
95th Queue (ft)	143	323	47	127	108	5	66	160	182
Link Distance (ft)		302	302	306	306	306		239	239
Upstream Blk Time (%)		3						0	1
Queuing Penalty (veh)		11						2	2
Storage Bay Dist (ft)	100						100		
Storage Blk Time (%)	7	15					0	4	
Queuing Penalty (veh)	25	51					0	1	

Intersection: 22: Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	TR	L	TR
Maximum Queue (ft)	142	98	46	60	233	644	464	524	325	370
Average Queue (ft)	70	11	12	17	18	312	215	301	144	148
95th Queue (ft)	133	70	39	50	145	746	521	582	275	308
Link Distance (ft)		333	333		2646	2646	807	807		377
Upstream Blk Time (%)							2	3	0	1
Queuing Penalty (veh)							0	0	0	4
Storage Bay Dist (ft)	135			250					300	
Storage Blk Time (%)	4						9		1	1
Queuing Penalty (veh)	0						0		5	2

Intersection: 26: Sandifur Parkway

Movement	WB	WB	WB	NB
Directions Served	L	T	T	LR
Maximum Queue (ft)	32	85	56	114
Average Queue (ft)	7	16	13	36
95th Queue (ft)	29	159	146	102
Link Distance (ft)		551	551	298
Upstream Blk Time (%)		1	1	1
Queuing Penalty (veh)		3	2	0
Storage Bay Dist (ft)	100			
Storage Blk Time (%)		2		
Queuing Penalty (veh)		0		

Intersection: 27: Sandifur Parkway

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	59	42	57	58	48	55	44	70
Average Queue (ft)	20	9	8	8	15	23	13	32
95th Queue (ft)	48	34	111	104	46	52	41	60
Link Distance (ft)			1133	1133		396		386
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	100	100			100		100	
Storage Blk Time (%)		0	1		1	0		0
Queuing Penalty (veh)		0	0		0	0		0

Intersection: 34: Road 100

Movement	NB	NB	SB	SB	SB
Directions Served	T	T	T	T	R
Maximum Queue (ft)	209	291	36	285	225
Average Queue (ft)	44	171	8	57	32
95th Queue (ft)	166	368	36	246	190
Link Distance (ft)	184	184		244	244
Upstream Blk Time (%)	1	21		9	5
Queuing Penalty (veh)	5	117		38	19
Storage Bay Dist (ft)			25		
Storage Blk Time (%)			11	2	
Queuing Penalty (veh)			45	8	

Intersection: 35: Chapel Hill Rd

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	10	35
Average Queue (ft)	0	14
95th Queue (ft)	6	40
Link Distance (ft)		120
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

Network wide Queuing Penalty: 869

Intersection: 1: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	T	T	R	T	T
Maximum Queue (ft)	376	233	362	450	121	105	135
Average Queue (ft)	179	112	96	162	10	37	35
95th Queue (ft)	370	224	268	358	101	87	121
Link Distance (ft)	1591		1108	1108			295
Upstream Blk Time (%)							1
Queuing Penalty (veh)							3
Storage Bay Dist (ft)		350			230	100	
Storage Blk Time (%)	2			3		1	2
Queuing Penalty (veh)	5			11		2	4

Intersection: 2: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	T	R	L	T
Maximum Queue (ft)	355	479	1866	287	320	200	483	840
Average Queue (ft)	241	301	386	139	251	156	158	362
95th Queue (ft)	379	485	1482	278	373	261	457	872
Link Distance (ft)			1842	258	258		1108	1108
Upstream Blk Time (%)			5	2	23		0	2
Queuing Penalty (veh)			0	10	105		1	8
Storage Bay Dist (ft)	230	230				175		
Storage Blk Time (%)	14	22	1		29	1		
Queuing Penalty (veh)	98	158	11		83	4		

Intersection: 4: Road 100

Movement	WB	NB	NB	SB	SB
Directions Served	R	T	TR	L	T
Maximum Queue (ft)	245	194	307	102	232
Average Queue (ft)	69	12	43	39	75
95th Queue (ft)	177	106	198	82	240
Link Distance (ft)	297	377	377	184	184
Upstream Blk Time (%)	1	0	1		7
Queuing Penalty (veh)	0	0	3		45
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Road 100

Movement	NB	SB	SB
Directions Served	TR	T	T
Maximum Queue (ft)	25	17	14
Average Queue (ft)	1	1	1
95th Queue (ft)	13	19	12
Link Distance (ft)	295	60	60
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		2	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Road 100

Movement	EB	NB	NB	SB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	100	51	54	25	71
Average Queue (ft)	29	14	2	1	3
95th Queue (ft)	77	44	23	25	35
Link Distance (ft)	425	60	60	306	306
Upstream Blk Time (%)		0	0		
Queuing Penalty (veh)		1	0		
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Road 100

Movement	WB	SB
Directions Served	LTR	L
Maximum Queue (ft)	93	26
Average Queue (ft)	34	2
95th Queue (ft)	69	14
Link Distance (ft)	560	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		150
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Road 100

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	35	10
Average Queue (ft)	9	0
95th Queue (ft)	33	6
Link Distance (ft)	542	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		150
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Road 100

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	48	20
Average Queue (ft)	13	1
95th Queue (ft)	41	11
Link Distance (ft)	355	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		75
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 15: Road 100

Movement	SB
Directions Served	L
Maximum Queue (ft)	10
Average Queue (ft)	0
95th Queue (ft)	6
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	75
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 17: Road 100

Movement	WB	WB	WB	SB
Directions Served	L	L	R	T
Maximum Queue (ft)	46	49	5	5
Average Queue (ft)	8	9	0	0
95th Queue (ft)	33	35	4	4
Link Distance (ft)	333	333	333	123
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 20: Road 100 & Dent Rd/Edelman Rd

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	L	LTR
Maximum Queue (ft)	90	85	35	86	17
Average Queue (ft)	50	37	6	26	1
95th Queue (ft)	79	68	27	63	10
Link Distance (ft)	1421	2006	2006		1392
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				95	
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Intersection: 21: Road 100 & Sandifur Parkway

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	T	T	R	L	T	T
Maximum Queue (ft)	120	383	53	246	224	143	61	129	147
Average Queue (ft)	107	192	18	127	74	9	21	59	66
95th Queue (ft)	142	338	47	209	162	86	53	109	115
Link Distance (ft)		302	302	306	306	306		239	239
Upstream Blk Time (%)		3		0		0			
Queuing Penalty (veh)		10		0		0			
Storage Bay Dist (ft)	100						100		
Storage Blk Time (%)	6	16					0	1	
Queuing Penalty (veh)	24	58					0	0	

Intersection: 22: Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	TR
Maximum Queue (ft)	97	32	34	76	46	222	28	244	314	377	488
Average Queue (ft)	41	2	3	27	8	101	3	78	153	303	319
95th Queue (ft)	82	16	19	62	32	175	16	174	251	441	577
Link Distance (ft)		333	333		2646	2646		807	807		377
Upstream Blk Time (%)										4	10
Queuing Penalty (veh)										0	120
Storage Bay Dist (ft)	135			250			80			300	
Storage Blk Time (%)	0							5		26	3
Queuing Penalty (veh)	0							0		170	19

Intersection: 26: Sandifur Parkway

Movement	EB	WB	WB	WB	NB
Directions Served	TR	L	T	T	LR
Maximum Queue (ft)	3	53	117	9	199
Average Queue (ft)	0	12	7	0	86
95th Queue (ft)	3	41	57	7	201
Link Distance (ft)	302		551	551	298
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (ft)		100			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 27: Sandifur Parkway

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	55	2	46	2	51	70	48	70
Average Queue (ft)	17	0	15	0	14	26	15	32
95th Queue (ft)	47	2	42	2	43	58	44	57
Link Distance (ft)		551		1133		396		386
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	100		100		100		100	
Storage Blk Time (%)	0					0		0
Queuing Penalty (veh)	0					0		0

Intersection: 34: Road 100

Movement	NB	NB	SB	SB	SB
Directions Served	T	T	T	T	R
Maximum Queue (ft)	174	281	39	339	345
Average Queue (ft)	26	90	3	209	79
95th Queue (ft)	126	266	24	447	305
Link Distance (ft)	184	184		258	258
Upstream Blk Time (%)	0	10		13	7
Queuing Penalty (veh)	1	48		86	42
Storage Bay Dist (ft)			25		
Storage Blk Time (%)			0	6	
Queuing Penalty (veh)			0	37	

Intersection: 35: Chapel Hill Rd

Movement	WB	NB
Directions Served	L	LTR
Maximum Queue (ft)	20	35
Average Queue (ft)	1	8
95th Queue (ft)	9	32
Link Distance (ft)		120
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Network Summary

Network wide Queuing Penalty: 1171

APPENDIX F-8: NO-BUILD CONDITIONS SIMTRAFFIC RESULTS

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	220	134	70	71	133	655	112	878	917	390	151	173
Average Queue (ft)	114	20	14	17	8	344	8	463	510	218	67	87
95th Queue (ft)	213	125	69	50	78	741	50	1028	1065	351	127	153
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)								0	0	2		
Queuing Penalty (veh)								0	0	5		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	5							42				
Queuing Penalty (veh)	0							2				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB
Directions Served	R	T	TR	T
Maximum Queue (ft)	772	400	390	10
Average Queue (ft)	453	191	269	0
95th Queue (ft)	983	478	510	5
Link Distance (ft)	922	376	376	
Upstream Blk Time (%)	14	2	9	
Queuing Penalty (veh)	0	13	53	
Storage Bay Dist (ft)				200
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	T	R	L	T
Maximum Queue (ft)	255	306	111	526	537	225	506	162
Average Queue (ft)	140	174	11	388	488	222	248	65
95th Queue (ft)	254	287	110	568	601	253	460	130
Link Distance (ft)			1581	483	483		1107	1107
Upstream Blk Time (%)				5	42			
Queuing Penalty (veh)				30	260			
Storage Bay Dist (ft)	230	230				200		
Storage Blk Time (%)	4	7	0		60	2		
Queuing Penalty (veh)	12	23	0		207	8		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	T	T	T
Maximum Queue (ft)	244	164	200	422	137	108
Average Queue (ft)	131	78	39	93	62	31
95th Queue (ft)	202	134	145	289	121	84
Link Distance (ft)	1772		1107	1107	282	282
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		350				
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	35	107	48	172	195	654	715	350	89	108	138	184
Average Queue (ft)	10	43	12	62	98	407	427	72	33	52	83	96
95th Queue (ft)	33	90	37	144	193	687	716	257	74	102	131	164
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)		1				2	4					
Queuing Penalty (veh)		0				6	10					

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	188	89	230	990	992	250
Average Queue (ft)	102	14	79	691	702	80
95th Queue (ft)	165	58	237	1247	1251	271
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)				58	65	
Queuing Penalty (veh)				23	13	

Intersection: 7: Road 100 & Bedford St

Movement	NB	SB	SB
Directions Served	TR	T	T
Maximum Queue (ft)	4	349	411
Average Queue (ft)	0	32	67
95th Queue (ft)	4	196	296
Link Distance (ft)	282	408	408
Upstream Blk Time (%)		0	1
Queuing Penalty (veh)		1	10
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 677

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	181	64	32	96	50	243	70	472	517	469	158	194
Average Queue (ft)	86	8	5	31	13	105	5	177	253	314	43	70
95th Queue (ft)	160	60	22	75	41	191	34	427	487	469	108	144
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)										8		
Queuing Penalty (veh)										39		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	1							15				
Queuing Penalty (veh)	0							1				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB	SB	SB
Directions Served	R	T	TR	T	T	T
Maximum Queue (ft)	805	362	391	87	200	45
Average Queue (ft)	437	61	159	8	10	0
95th Queue (ft)	1026	259	410	60	126	0
Link Distance (ft)	922	376	376		483	483
Upstream Blk Time (%)	26	0	3		0	
Queuing Penalty (veh)	0	0	12		0	
Storage Bay Dist (ft)				200		
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	T	R	L	T
Maximum Queue (ft)	355	480	1435	519	536	225	832	908
Average Queue (ft)	250	298	244	288	446	206	366	499
95th Queue (ft)	389	487	1078	531	649	291	767	1023
Link Distance (ft)			1581	483	483		1107	1107
Upstream Blk Time (%)			4	2	34		0	2
Queuing Penalty (veh)			0	8	170		0	10
Storage Bay Dist (ft)	230	230				200		
Storage Blk Time (%)	25	36			59	1		
Queuing Penalty (veh)	182	259			168	3		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	T	T	T	T
Maximum Queue (ft)	348	303	239	285	144	132
Average Queue (ft)	143	152	89	136	75	64
95th Queue (ft)	259	256	177	227	135	117
Link Distance (ft)	1772		1107	1107	282	282
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		350				
Storage Blk Time (%)	0	1		1		
Queuing Penalty (veh)	1	2		4		

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	88	141	101	245	253	665	834	533	114	266	297	220
Average Queue (ft)	32	75	32	128	151	470	541	189	42	170	196	122
95th Queue (ft)	72	129	76	229	243	802	1104	759	91	246	271	194
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)							2	1				
Queuing Penalty (veh)							0	0				
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	0	9				15	15			0	0	
Queuing Penalty (veh)	0	4				49	50			0	1	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	216	166	230	652	671	250
Average Queue (ft)	128	40	77	429	437	68
95th Queue (ft)	192	116	231	731	732	251
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)				64	68	
Queuing Penalty (veh)				19	13	

Intersection: 7: Road 100 & Bedford St

Movement	NB	SB	SB
Directions Served	TR	T	T
Maximum Queue (ft)	7	80	100
Average Queue (ft)	0	5	5
95th Queue (ft)	5	74	50
Link Distance (ft)	282	408	408
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 997

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	250	709	473	61	2637	2662	116	1690	1690	305	167	195
Average Queue (ft)	243	590	49	13	1526	2069	7	1517	1527	157	76	96
95th Queue (ft)	282	918	243	43	3116	3155	50	2023	2007	274	145	175
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)		60	0		27	37		64	68	0		
Queuing Penalty (veh)		0	0		0	0		0	0	1		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	93							74				
Queuing Penalty (veh)	5							4				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB
Directions Served	R	T	TR
Maximum Queue (ft)	922	429	418
Average Queue (ft)	725	357	374
95th Queue (ft)	1097	503	483
Link Distance (ft)	922	376	376
Upstream Blk Time (%)	31	8	29
Queuing Penalty (veh)	0	65	226
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	T	R	L	T
Maximum Queue (ft)	355	480	1632	544	546	225	1150	1153
Average Queue (ft)	353	479	1599	491	511	218	1103	1052
95th Queue (ft)	370	481	1663	620	591	273	1290	1401
Link Distance (ft)			1581	483	483		1107	1107
Upstream Blk Time (%)			94	42	69		35	21
Queuing Penalty (veh)			0	336	545		266	157
Storage Bay Dist (ft)	230	230				200		
Storage Blk Time (%)	93	99			78	1		
Queuing Penalty (veh)	325	348			268	4		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	R	T	T	R
Maximum Queue (ft)	904	374	362	688	60	282	358	100
Average Queue (ft)	315	275	131	197	2	264	306	4
95th Queue (ft)	931	425	265	445	44	341	445	59
Link Distance (ft)	1772		1107	1107		282	282	282
Upstream Blk Time (%)	1		0	0		31	55	0
Queuing Penalty (veh)	0		0	1		293	523	0
Storage Bay Dist (ft)		350			230			
Storage Blk Time (%)	2	13		2				
Queuing Penalty (veh)	14	39		12				

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	104	928	953	650	575	800	1690	1705	201	292	320	254
Average Queue (ft)	28	493	773	618	558	782	1484	1345	80	184	211	127
95th Queue (ft)	71	1157	1294	759	651	863	2064	2288	170	263	291	212
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)		6	63				69	58				0
Queuing Penalty (veh)		0	0				0	0				0
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	0	20	2	69	71	89	91	0	0	0	1	
Queuing Penalty (veh)	0	8	13	61	64	247	253	1	0	1	4	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	239	96	230	2296	2294	250
Average Queue (ft)	138	19	77	2239	2236	63
95th Queue (ft)	210	67	250	2424	2424	242
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)				92	92	
Queuing Penalty (veh)				0	0	
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)				84	90	
Queuing Penalty (veh)				33	18	

Intersection: 7: Road 100 & Bedford St

Movement	NB	SB	SB
Directions Served	T	T	T
Maximum Queue (ft)	6	499	487
Average Queue (ft)	0	449	438
95th Queue (ft)	5	600	583
Link Distance (ft)	282	408	408
Upstream Blk Time (%)		37	68
Queuing Penalty (veh)		518	969
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 5624

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	250	709	378	112	171	553	99	1690	1690	460	201	250
Average Queue (ft)	241	649	33	44	29	300	10	1535	1559	262	87	120
95th Queue (ft)	256	859	219	93	104	543	51	2047	2019	408	169	215
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)		77	0					70	75	3		
Queuing Penalty (veh)		0	0					0	0	19		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	98							10				
Queuing Penalty (veh)	5							2				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB
Directions Served	R	T	TR	T
Maximum Queue (ft)	934	377	404	38
Average Queue (ft)	902	243	381	1
95th Queue (ft)	1013	515	427	16
Link Distance (ft)	922	376	376	
Upstream Blk Time (%)	85	0	38	
Queuing Penalty (veh)	0	1	174	
Storage Bay Dist (ft)				200
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	T	T	R	L	T
Maximum Queue (ft)	355	480	1614	518	534	225	1134	1111
Average Queue (ft)	334	422	701	225	513	216	973	818
95th Queue (ft)	405	548	1874	529	527	280	1374	1374
Link Distance (ft)			1581	483	483		1107	1107
Upstream Blk Time (%)			17	3	72		13	4
Queuing Penalty (veh)			0	13	379		100	28
Storage Bay Dist (ft)	230	230				200		
Storage Blk Time (%)	61	78			83	1		
Queuing Penalty (veh)	458	585			273	2		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	R	T	T	T	T	R
Maximum Queue (ft)	1828	375	240	383	279	345	65
Average Queue (ft)	1787	375	109	182	248	279	2
95th Queue (ft)	1925	376	195	314	333	414	49
Link Distance (ft)	1772		1107	1107	282	282	282
Upstream Blk Time (%)	94				11	27	0
Queuing Penalty (veh)	0				92	218	1
Storage Bay Dist (ft)		350					
Storage Blk Time (%)	0	72		2			
Queuing Penalty (veh)	4	233		16			

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	175	538	575	541	513	800	1696	1706	243	214	252	261
Average Queue (ft)	152	269	242	316	313	774	1404	1269	101	127	150	144
95th Queue (ft)	218	489	507	515	502	882	2087	2284	201	188	215	223
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)		0	1				60	52				
Queuing Penalty (veh)		0	0				0	0				
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	36	65	1	4	4	81	82	1	1		0	
Queuing Penalty (veh)	68	104	7	8	7	299	302	1	1		0	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	248	197	230	2284	2286	250
Average Queue (ft)	155	73	76	1859	1857	168
95th Queue (ft)	224	161	244	2709	2699	359
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)				50	48	
Queuing Penalty (veh)				0	0	
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)				86	83	
Queuing Penalty (veh)				25	74	

Intersection: 7: Road 100 & Bedford St

Movement	NB	NB	SB	SB
Directions Served	T	T	T	T
Maximum Queue (ft)	6	2	444	475
Average Queue (ft)	0	0	274	257
95th Queue (ft)	6	2	650	621
Link Distance (ft)	282	282	408	408
Upstream Blk Time (%)			22	28
Queuing Penalty (veh)			269	341
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 4108

APPENDIX F-9: BUILD CONDITIONS SIMTRAFFIC RESULTS

WS-1/ES-1 SIMTRAFFIC RESULTS

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	192	39	47	73	31	350	54	300	354	444	131	163
Average Queue (ft)	99	5	11	15	5	188	5	186	230	258	60	77
95th Queue (ft)	171	26	36	48	22	305	41	288	331	422	116	138
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)										7		
Queuing Penalty (veh)										22		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	0							27				
Queuing Penalty (veh)	0							1				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB
Directions Served	R	T	TR	T
Maximum Queue (ft)	117	34	37	74
Average Queue (ft)	36	1	2	9
95th Queue (ft)	82	19	20	64
Link Distance (ft)	922	376	376	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				200
Storage Blk Time (%)				0
Queuing Penalty (veh)				0

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	WB	WB	NB	NB	NB	SB
Directions Served	R	R	T	T	R	L
Maximum Queue (ft)	185	190	268	398	225	332
Average Queue (ft)	110	120	113	192	130	165
95th Queue (ft)	164	181	230	339	252	272
Link Distance (ft)	634		449	449		1132
Upstream Blk Time (%)				0		
Queuing Penalty (veh)				1		
Storage Bay Dist (ft)		500			200	
Storage Blk Time (%)				5	1	
Queuing Penalty (veh)				17	6	

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	R	R	T	T	R	R
Maximum Queue (ft)	235	107	84	198	307	253	129
Average Queue (ft)	120	42	43	68	130	12	5
95th Queue (ft)	196	79	74	156	235	102	68
Link Distance (ft)		1763		1132	1132		269
Upstream Blk Time (%)							0
Queuing Penalty (veh)							1
Storage Bay Dist (ft)	350		350			230	
Storage Blk Time (%)					1	0	
Queuing Penalty (veh)					5	0	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	40	91	48	164	191	725	1688	1696	126	120	142	143
Average Queue (ft)	7	42	10	51	91	671	1209	861	49	53	81	71
95th Queue (ft)	29	83	35	133	179	847	2008	2016	101	108	130	121
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)							32	24				
Queuing Penalty (veh)							0	0				
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)		1				32	61					
Queuing Penalty (veh)		0				89	168					

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	153	102	174	592	620	200
Average Queue (ft)	69	16	59	311	333	36
95th Queue (ft)	128	65	173	531	557	162
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)			0	30	33	0
Queuing Penalty (veh)			0	12	7	0

Intersection: 7: Road 100 & Bedford St

Movement	NB	SB	SB
Directions Served	TR	T	T
Maximum Queue (ft)	10	291	288
Average Queue (ft)	0	19	31
95th Queue (ft)	8	159	197
Link Distance (ft)	269	408	408
Upstream Blk Time (%)		0	1
Queuing Penalty (veh)		1	9
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: I 182 EB On Ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 338

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	190	62	34	87	46	250	48	506	551	473	193	227
Average Queue (ft)	91	5	6	34	10	119	4	184	268	454	72	99
95th Queue (ft)	163	37	25	74	35	215	28	458	536	543	156	188
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)										58		
Queuing Penalty (veh)										284		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	0							20				
Queuing Penalty (veh)	0							1				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB	SB	SB
Directions Served	R	T	TR	T	T	T
Maximum Queue (ft)	843	355	385	335	483	552
Average Queue (ft)	415	52	155	246	266	286
95th Queue (ft)	941	247	394	461	639	708
Link Distance (ft)	922	376	376		442	442
Upstream Blk Time (%)	15	1	4		18	20
Queuing Penalty (veh)	0	2	15		136	151
Storage Bay Dist (ft)				200		
Storage Blk Time (%)				49	0	
Queuing Penalty (veh)				242	0	

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	R	T	T	R	L	T
Maximum Queue (ft)	465	267	299	475	491	225	681	908
Average Queue (ft)	96	174	222	284	433	216	279	307
95th Queue (ft)	411	243	294	502	567	274	869	997
Link Distance (ft)	1581	720		442	442		1132	1132
Upstream Blk Time (%)				2	33		2	4
Queuing Penalty (veh)				9	165		10	21
Storage Bay Dist (ft)			500			200		
Storage Blk Time (%)					58	1		
Queuing Penalty (veh)					165	4		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	R	R	T	T	R	T
Maximum Queue (ft)	333	537	208	1130	1117	305	123
Average Queue (ft)	201	165	67	696	747	222	25
95th Queue (ft)	345	586	145	1221	1232	445	157
Link Distance (ft)		1763		1132	1132		269
Upstream Blk Time (%)		1		1	1		3
Queuing Penalty (veh)		0		6	10		27
Storage Bay Dist (ft)	350		350			230	
Storage Blk Time (%)	7	0			37		
Queuing Penalty (veh)	28	0			132		

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	85	152	128	252	262	800	1616	1589	134	398	475	444
Average Queue (ft)	31	76	34	126	148	703	1076	720	50	302	340	249
95th Queue (ft)	69	132	88	223	245	951	1867	1814	108	431	492	460
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)							21	13		1	11	5
Queuing Penalty (veh)							0	0		0	79	34
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	0	9				57	62			17	30	
Queuing Penalty (veh)	0	4				190	206			58	98	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	416	314	230	501	498	250
Average Queue (ft)	222	119	71	295	308	44
95th Queue (ft)	406	255	219	478	486	200
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)	1					
Queuing Penalty (veh)	4					
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)	0	0		49	49	
Queuing Penalty (veh)	1	0		15	10	

Intersection: 7: Road 100 & Bedford St

Movement	NB	NB	NB	SB	SB
Directions Served	T	T	TR	T	T
Maximum Queue (ft)	166	236	141	96	169
Average Queue (ft)	31	31	23	20	21
95th Queue (ft)	155	171	144	170	173
Link Distance (ft)	269	269	269	408	408
Upstream Blk Time (%)	0	1	0	1	1
Queuing Penalty (veh)	3	5	3	9	8
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: I 182 EB On Ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 2136

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	250	415	166	48	2076	2563	89	1690	1690	390	183	197
Average Queue (ft)	185	102	19	12	896	1616	4	1324	1336	230	87	107
95th Queue (ft)	282	380	127	40	2253	2850	37	2098	2088	363	149	171
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)					6	12		44	50	1		
Queuing Penalty (veh)					0	0		0	0	4		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	21							70				
Queuing Penalty (veh)	1							4				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB
Directions Served	R	T	TR	T
Maximum Queue (ft)	927	422	416	7
Average Queue (ft)	700	338	371	0
95th Queue (ft)	1112	484	446	7
Link Distance (ft)	922	376	376	
Upstream Blk Time (%)	43	7	17	
Queuing Penalty (veh)	0	52	128	
Storage Bay Dist (ft)				200
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	WB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	T	T	R	L	T
Maximum Queue (ft)	458	436	507	505	225	825	737
Average Queue (ft)	223	248	465	482	224	489	209
95th Queue (ft)	459	428	525	495	242	976	879
Link Distance (ft)	634		449	449		1132	1132
Upstream Blk Time (%)	2		34	57		2	2
Queuing Penalty (veh)	17		267	449		14	18
Storage Bay Dist (ft)		500			200		
Storage Blk Time (%)	4	2		67	5		
Queuing Penalty (veh)	19	10		231	29		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	R	T	T	R	T	R
Maximum Queue (ft)	282	547	261	1204	1169	305	76	190
Average Queue (ft)	147	215	129	648	696	200	25	11
95th Queue (ft)	282	707	236	1350	1353	438	160	109
Link Distance (ft)		1763		1132	1132		269	269
Upstream Blk Time (%)		0		5	7		3	0
Queuing Penalty (veh)		0		55	73		44	3
Storage Bay Dist (ft)	350		350			230		
Storage Blk Time (%)	3				40			
Queuing Penalty (veh)	24				282			

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	125	926	954	650	575	800	1697	1692	186	400	500	501
Average Queue (ft)	34	443	704	611	555	726	1257	1051	94	376	437	397
95th Queue (ft)	84	1076	1281	739	634	945	2080	2218	160	455	543	588
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)		5	41				48	39		2	50	33
Queuing Penalty (veh)		0	0				0	0		0	358	236
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	1	26	2	53	53	70	71			59	75	
Queuing Penalty (veh)	1	10	19	47	48	195	198			185	235	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	468	375	230	2300	2292	250
Average Queue (ft)	339	92	85	2227	2224	66
95th Queue (ft)	534	307	252	2470	2466	247
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)	5			89	87	
Queuing Penalty (veh)	33			0	0	
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)	2	0		70	81	
Queuing Penalty (veh)	10	0		28	16	

Intersection: 7: Road 100 & Bedford St

Movement	NB	NB	NB	SB	SB
Directions Served	T	T	TR	T	T
Maximum Queue (ft)	320	311	292	473	485
Average Queue (ft)	148	137	119	202	274
95th Queue (ft)	377	367	337	541	612
Link Distance (ft)	269	269	269	408	408
Upstream Blk Time (%)	7	7	3	3	28
Queuing Penalty (veh)	54	48	25	38	407
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: I 182 EB On Ramp

Movement	SB
Directions Served	R
Maximum Queue (ft)	198
Average Queue (ft)	42
95th Queue (ft)	322
Link Distance (ft)	1341
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 3914

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	250	709	408	117	651	1033	92	1690	1690	473	200	252
Average Queue (ft)	243	646	24	48	109	425	8	1548	1577	420	109	145
95th Queue (ft)	265	906	172	100	570	1075	46	1998	1973	554	177	216
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)		80						63	75	41		
Queuing Penalty (veh)		0						0	0	218		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	97				0		0	13				
Queuing Penalty (veh)	5				0		0	2				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB	SB	SB
Directions Served	R	T	TR	T	T	T
Maximum Queue (ft)	924	386	401	277	318	354
Average Queue (ft)	893	241	384	133	108	103
95th Queue (ft)	1004	524	408	369	424	437
Link Distance (ft)	922	376	376		442	442
Upstream Blk Time (%)	89	2	43		5	7
Queuing Penalty (veh)	0	10	197		42	57
Storage Bay Dist (ft)				200		
Storage Blk Time (%)				21	0	
Queuing Penalty (veh)				113	0	

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	R	T	T	R	L	T
Maximum Queue (ft)	150	264	311	476	486	225	505	581
Average Queue (ft)	21	170	219	203	470	219	151	129
95th Queue (ft)	156	241	286	502	481	277	523	615
Link Distance (ft)	1581	720		442	442		1132	1132
Upstream Blk Time (%)				3	75		1	1
Queuing Penalty (veh)				16	393		4	8
Storage Bay Dist (ft)			500			200		
Storage Blk Time (%)					84	1		
Queuing Penalty (veh)					275	4		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	R	R	T	T	R	T
Maximum Queue (ft)	218	283	296	1181	1162	305	86
Average Queue (ft)	112	200	211	907	941	255	11
95th Queue (ft)	185	266	274	1320	1337	439	94
Link Distance (ft)		1763		1132	1132		269
Upstream Blk Time (%)				2	4		1
Queuing Penalty (veh)				18	40		14
Storage Bay Dist (ft)	350		350			230	
Storage Blk Time (%)					59		
Queuing Penalty (veh)					417		

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	175	603	517	377	391	800	1702	1697	260	387	439	440
Average Queue (ft)	156	273	231	255	259	774	1424	1301	120	277	312	282
95th Queue (ft)	212	478	440	354	357	894	2093	2273	220	400	452	440
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)		0	0				58	50		0	6	4
Queuing Penalty (veh)		0	0				0	0		0	50	31
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	48	62	0			80	83	1	1	10	20	
Queuing Penalty (veh)	92	100	1			295	306	3	2	36	68	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	449	366	230	2290	2295	250
Average Queue (ft)	273	197	84	1850	1848	182
95th Queue (ft)	417	337	249	2692	2684	364
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)	1			44	43	
Queuing Penalty (veh)	11			0	0	
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)	1	1		80	81	
Queuing Penalty (veh)	5	3		24	73	

Intersection: 7: Road 100 & Bedford St

Movement	NB	NB	NB	SB	SB
Directions Served	T	T	TR	T	T
Maximum Queue (ft)	89	100	99	164	50
Average Queue (ft)	15	13	11	15	8
95th Queue (ft)	96	86	84	148	102
Link Distance (ft)	269	269	269	408	408
Upstream Blk Time (%)	0	0	0	1	0
Queuing Penalty (veh)	0	0	1	7	4
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: I 182 EB On Ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 2946

WS-2/ES-1 SIMTRAFFIC RESULTS

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	194	44	52	65	35	329	74	310	362	447	141	167
Average Queue (ft)	96	6	13	16	5	180	4	172	222	242	65	81
95th Queue (ft)	165	25	39	48	24	292	33	285	330	405	129	150
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)										4		
Queuing Penalty (veh)										11		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	0							22				
Queuing Penalty (veh)	0							1				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB
Directions Served	R	T	TR	T
Maximum Queue (ft)	91	8	22	27
Average Queue (ft)	35	0	1	1
95th Queue (ft)	75	5	12	12
Link Distance (ft)	922	376	376	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				200
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	WB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	T	T	R	L	T
Maximum Queue (ft)	156	172	301	430	225	378	136
Average Queue (ft)	72	84	115	201	134	190	11
95th Queue (ft)	126	143	238	353	256	317	67
Link Distance (ft)	634		449	449		1132	1132
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				1			
Storage Bay Dist (ft)		500			200		
Storage Blk Time (%)				7	1		
Queuing Penalty (veh)				25	2		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	R	R	T	T	T	T	R
Maximum Queue (ft)	245	94	83	154	246	128	92	64
Average Queue (ft)	140	47	43	49	111	47	22	2
95th Queue (ft)	218	83	70	120	200	104	65	47
Link Distance (ft)		1772		1132	1132	268	268	268
Upstream Blk Time (%)								0
Queuing Penalty (veh)								0
Storage Bay Dist (ft)	350		350					
Storage Blk Time (%)					0			
Queuing Penalty (veh)					3			

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	52	116	62	176	203	800	1697	1672	119	114	142	136
Average Queue (ft)	8	46	12	61	104	696	1134	816	43	52	81	68
95th Queue (ft)	33	89	43	151	200	957	1983	1969	101	101	123	117
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)							27	16				
Queuing Penalty (veh)							0	0				
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)		1				61	65					
Queuing Penalty (veh)		0				169	180					

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	135	83	229	508	504	250
Average Queue (ft)	61	12	43	292	319	25
95th Queue (ft)	118	52	154	470	486	149
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)				29	37	
Queuing Penalty (veh)				12	7	

Intersection: 7: Road 100 & Bedford St

Movement	SB	SB
Directions Served	T	T
Maximum Queue (ft)	290	420
Average Queue (ft)	19	36
95th Queue (ft)	146	209
Link Distance (ft)	408	408
Upstream Blk Time (%)	0	1
Queuing Penalty (veh)	0	7
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: I 182 EB On Ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 418

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	197	39	30	82	44	287	54	373	402	473	234	233
Average Queue (ft)	89	4	5	33	12	114	7	140	228	457	72	104
95th Queue (ft)	162	22	23	73	37	205	32	274	350	527	168	197
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)										57	0	
Queuing Penalty (veh)										279	0	
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	0							18				
Queuing Penalty (veh)	0							1				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB	SB	SB
Directions Served	R	T	TR	T	T	T
Maximum Queue (ft)	813	226	348	335	479	546
Average Queue (ft)	356	29	122	237	272	299
95th Queue (ft)	853	171	331	467	645	724
Link Distance (ft)	922	376	376		442	442
Upstream Blk Time (%)	11	0	1		20	22
Queuing Penalty (veh)	0	0	4		142	161
Storage Bay Dist (ft)				200		
Storage Blk Time (%)				49	0	
Queuing Penalty (veh)				242	0	

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	R	T	T	R	L	T
Maximum Queue (ft)	462	220	267	468	491	225	975	993
Average Queue (ft)	107	159	216	251	419	212	269	367
95th Queue (ft)	386	206	262	462	577	278	766	1128
Link Distance (ft)	1581	720		442	442		1132	1132
Upstream Blk Time (%)				1	29		0	9
Queuing Penalty (veh)				6	145		1	50
Storage Bay Dist (ft)			500			200		
Storage Blk Time (%)					52	2		
Queuing Penalty (veh)					150	6		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	R	T	T	R	T	T
Maximum Queue (ft)	353	903	185	1027	1018	305	152	143
Average Queue (ft)	217	211	91	543	595	185	70	54
95th Queue (ft)	359	773	154	1116	1147	430	128	117
Link Distance (ft)		1772		1132	1132		268	268
Upstream Blk Time (%)		2		0	0			
Queuing Penalty (veh)		0		1	4			
Storage Bay Dist (ft)	350		350			230		
Storage Blk Time (%)	9				32			
Queuing Penalty (veh)	38				112			

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	70	159	133	264	257	800	1470	1426	119	400	478	473
Average Queue (ft)	27	77	33	129	137	643	895	509	46	311	351	246
95th Queue (ft)	60	133	86	238	236	949	1681	1516	99	438	499	470
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)							14	11		0	10	4
Queuing Penalty (veh)							0	0		0	68	29
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	0	10				42	45			17	30	
Queuing Penalty (veh)	0	4				139	149			57	100	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	434	317	230	427	419	200
Average Queue (ft)	218	116	52	258	264	30
95th Queue (ft)	411	248	177	405	404	165
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)	1					
Queuing Penalty (veh)	4					
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)	0	0		37	37	
Queuing Penalty (veh)	1	0		11	7	

Intersection: 7: Road 100 & Bedford St

Movement	NB	NB	NB	SB	SB
Directions Served	T	T	TR	T	T
Maximum Queue (ft)	120	124	84	148	123
Average Queue (ft)	18	12	5	4	5
95th Queue (ft)	97	90	51	67	69
Link Distance (ft)	268	268	268	408	408
Upstream Blk Time (%)	0	0	0	0	0
Queuing Penalty (veh)	1	1	0	1	1
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: I 182 EB On Ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1916

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	250	432	200	117	2339	2610	109	1690	1690	438	167	195
Average Queue (ft)	183	109	16	14	1115	1874	12	1369	1387	252	88	107
95th Queue (ft)	284	445	75	68	2465	2947	72	2071	2061	407	141	169
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)		6			7	15		45	51	4		
Queuing Penalty (veh)		0			0	0		0	0	13		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	25							67				
Queuing Penalty (veh)	1							3				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB
Directions Served	R	T	TR	T
Maximum Queue (ft)	922	428	412	37
Average Queue (ft)	718	348	378	2
95th Queue (ft)	1118	489	435	28
Link Distance (ft)	922	376	376	
Upstream Blk Time (%)	47	7	21	
Queuing Penalty (veh)	0	54	159	
Storage Bay Dist (ft)				200
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	WB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	T	T	R	L	T
Maximum Queue (ft)	344	339	504	502	225	585	121
Average Queue (ft)	173	213	466	482	217	295	6
95th Queue (ft)	279	304	541	493	274	492	67
Link Distance (ft)	634		449	449		1132	1132
Upstream Blk Time (%)	0		37	57			
Queuing Penalty (veh)	1		290	454			
Storage Bay Dist (ft)		500			200		
Storage Blk Time (%)	1	0		65	5		
Queuing Penalty (veh)	3	1		226	28		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	R	T	T	R	T	T	R
Maximum Queue (ft)	278	272	216	1108	1052	305	185	123	128
Average Queue (ft)	134	143	120	433	478	158	105	46	7
95th Queue (ft)	226	222	211	965	997	409	168	108	83
Link Distance (ft)		1772		1132	1132		268	268	268
Upstream Blk Time (%)				2	3				0
Queuing Penalty (veh)				18	27				2
Storage Bay Dist (ft)	350		350			230			
Storage Blk Time (%)		0	0		26				
Queuing Penalty (veh)		3	1		184				

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	114	934	957	650	575	800	1695	1704	232	392	479	478
Average Queue (ft)	30	524	802	619	557	767	1393	1215	101	338	384	335
95th Queue (ft)	76	1182	1285	776	665	916	2078	2257	192	451	529	554
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)		5	51				53	43		1	28	17
Queuing Penalty (veh)		0	0				0	0		0	203	124
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	0	21	2	59	63	82	85	0	0	38	52	
Queuing Penalty (veh)	0	8	14	53	57	227	235	1	0	120	165	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	452	372	230	2296	2294	250
Average Queue (ft)	289	83	75	2211	2207	61
95th Queue (ft)	492	274	238	2508	2507	237
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)	3			87	86	
Queuing Penalty (veh)	21			0	0	
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)	1	0		72	83	
Queuing Penalty (veh)	5	0		29	17	

Intersection: 7: Road 100 & Bedford St

Movement	NB	NB	NB	SB	SB
Directions Served	T	T	TR	T	T
Maximum Queue (ft)	188	168	217	484	484
Average Queue (ft)	82	73	59	228	309
95th Queue (ft)	281	260	229	577	637
Link Distance (ft)	268	268	268	408	408
Upstream Blk Time (%)	4	4	1	2	34
Queuing Penalty (veh)	31	26	6	30	477
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: I 182 EB On Ramp

Movement	SB
Directions Served	R
Maximum Queue (ft)	52
Average Queue (ft)	1
95th Queue (ft)	20
Link Distance (ft)	1341
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 3316

Intersection: 1: Broadmoor Blvd/Road 100 & Chapel Hill Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	250	709	230	125	380	628	39	1690	1690	473	221	252
Average Queue (ft)	245	668	18	46	62	286	6	1573	1604	424	112	145
95th Queue (ft)	259	838	119	100	331	732	27	1967	1948	555	190	225
Link Distance (ft)		694	694		2646	2646		1675	1675	376	376	376
Upstream Blk Time (%)		82						67	82	40		
Queuing Penalty (veh)		0						0	0	214		
Storage Bay Dist (ft)	225			250			80					
Storage Blk Time (%)	98							7				
Queuing Penalty (veh)	5							1				

Intersection: 2: Road 100 & St Thomas Dr

Movement	WB	NB	NB	SB	SB	SB
Directions Served	R	T	TR	T	T	T
Maximum Queue (ft)	925	398	401	297	288	326
Average Queue (ft)	899	233	382	127	103	106
95th Queue (ft)	979	520	396	354	416	443
Link Distance (ft)	922	376	376		442	442
Upstream Blk Time (%)	72	1	38		5	5
Queuing Penalty (veh)	0	6	174		40	44
Storage Bay Dist (ft)				200		
Storage Blk Time (%)				19	0	
Queuing Penalty (veh)				102	0	

Intersection: 3: Road 100 & I 182 EB Off Ramp/I 182 EB On Ramp

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	R	T	T	R	L	T
Maximum Queue (ft)	113	259	312	466	488	225	483	523
Average Queue (ft)	20	172	222	207	471	216	153	147
95th Queue (ft)	133	234	288	499	480	287	534	680
Link Distance (ft)	1581	720		442	442		1132	1132
Upstream Blk Time (%)				3	74		0	3
Queuing Penalty (veh)				16	391		3	21
Storage Bay Dist (ft)			500			200		
Storage Blk Time (%)					84	1		
Queuing Penalty (veh)					276	4		

Intersection: 4: Road 100 & I 182 WB On Ramp/I 182 WB On/Off Ramp

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	R	T	T	R	T	T	R
Maximum Queue (ft)	226	569	294	1177	1160	305	242	255	51
Average Queue (ft)	121	239	212	933	969	235	156	141	2
95th Queue (ft)	211	623	270	1368	1365	445	238	244	37
Link Distance (ft)		1772		1132	1132		268	268	268
Upstream Blk Time (%)		1		2	4		0	1	0
Queuing Penalty (veh)		0		19	47		2	7	0
Storage Bay Dist (ft)	350		350			230			
Storage Blk Time (%)	1	0	0		59				
Queuing Penalty (veh)	9	0	0		418				

Intersection: 6: Road 100 & Sandifur Parkway

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	R	L	L	T	TR	L	L	T
Maximum Queue (ft)	175	405	568	418	393	800	1700	1702	261	382	429	437
Average Queue (ft)	148	245	206	260	264	781	1435	1324	124	239	267	248
95th Queue (ft)	217	376	396	372	368	886	2067	2259	219	351	390	383
Link Distance (ft)		908	908				1661	1661			408	408
Upstream Blk Time (%)			0				57	49		0	1	1
Queuing Penalty (veh)			0				0	0		0	7	5
Storage Bay Dist (ft)	100			500	500	700			250	300		
Storage Blk Time (%)	33	65	0	0		84	85	1	1	3	7	
Queuing Penalty (veh)	63	103	0	0		308	314	3	2	10	26	

Intersection: 6: Road 100 & Sandifur Parkway

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	R	L	T	T	R
Maximum Queue (ft)	414	360	230	2289	2282	250
Average Queue (ft)	247	209	63	1804	1803	178
95th Queue (ft)	359	343	219	2674	2661	361
Link Distance (ft)	408			2244	2244	
Upstream Blk Time (%)	0			39	38	
Queuing Penalty (veh)	2			0	0	
Storage Bay Dist (ft)		350	150			175
Storage Blk Time (%)	0	0		81	82	
Queuing Penalty (veh)	2	1		24	73	

Intersection: 7: Road 100 & Bedford St

Movement	NB	NB	NB	SB	SB
Directions Served	T	T	TR	T	T
Maximum Queue (ft)	32	57	39	197	171
Average Queue (ft)	2	3	1	22	16
95th Queue (ft)	24	30	21	182	140
Link Distance (ft)	268	268	268	408	408
Upstream Blk Time (%)				1	0
Queuing Penalty (veh)				10	1
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: I 182 EB On Ramp

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 2753

APPENDIX F-10: BUILD CONDITIONS SIDRA RESULTS

MOVEMENT SUMMARY

Site: 101 [WB ramp AM W-R-1 2025 (Site Folder: 2025)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	795	2.0	837	2.0	0.253	4.1	LOS A	0.0	0.0	0.00	0.38	0.00	38.3
18	R2	595	2.0	626	2.0	0.381	3.9	LOS A	0.0	0.0	0.00	0.45	0.00	37.0
Approach		1390	2.0	1463	2.0	0.381	4.0	LOS A	0.0	0.0	0.00	0.41	0.00	37.7
East: WB ramp														
1	L2	305	2.0	321	2.0	0.282	11.8	LOS B	1.1	27.9	0.51	0.80	0.51	33.9
16	R2	295	2.0	311	2.0	0.329	6.6	LOS A	1.3	32.6	0.54	0.76	0.54	35.3
Approach		600	2.0	632	2.0	0.329	9.2	LOS A	1.3	32.6	0.53	0.78	0.53	34.5
North: Broadmoor Blvd														
4	T1	720	2.0	758	2.0	0.293	5.4	LOS A	2.0	49.9	0.53	0.51	0.53	36.2
14	R2	1145	2.0	1205	2.0	0.734	4.3	LOS A	0.0	0.0	0.00	0.44	0.00	36.5
Approach		1865	2.0	1963	2.0	0.734	4.7	LOS A	2.0	49.9	0.20	0.47	0.20	36.4
All Vehicles		3855	2.0	4058	2.0	0.734	5.2	LOS A	2.0	49.9	0.18	0.49	0.18	36.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [WB ramp AM W-R-1 (Site Folder: 2045)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	1515	1.0	1595	1.0	0.477	4.0	LOS A	0.0	0.0	0.00	0.38	0.00	38.3
18	R2	705	1.0	742	1.0	0.448	3.9	LOS A	0.0	0.0	0.00	0.45	0.00	37.0
Approach		2220	1.0	2337	1.0	0.477	4.0	LOS A	0.0	0.0	0.00	0.40	0.00	37.9
East: WB ramp														
1	L2	305	1.0	321	1.0	0.459	16.6	LOS B	2.3	58.2	0.72	0.97	0.94	31.9
16	R2	670	1.0	705	1.0	0.717	12.4	LOS B	6.0	152.0	0.81	1.09	1.38	32.4
Approach		975	1.0	1026	1.0	0.717	13.7	LOS B	6.0	152.0	0.78	1.05	1.24	32.2
North: Broadmoor Blvd														
4	T1	1205	1.0	1268	1.0	0.492	5.7	LOS A	4.1	104.4	0.65	0.53	0.65	35.7
14	R2	1625	2.0	1711	2.0	1.042	14.9	LOS F	0.0	0.0	0.00	0.23	0.00	27.1
Approach		2830	1.6	2979	1.6	1.042	11.0	LOS B	4.1	104.4	0.27	0.36	0.27	30.2
All Vehicles		6025	1.3	6342	1.3	1.042	8.8	LOS A	6.0	152.0	0.26	0.49	0.33	33.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [WB ramp PM W-R-1 - 2025 (Site Folder: 2025)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	1670	2.0	1758	2.0	0.505	3.3	LOS A	0.0	0.0	0.00	0.31	0.00	39.5
18	R2	355	2.0	374	2.0	0.228	3.4	LOS A	0.0	0.0	0.00	0.40	0.00	37.7
Approach		2025	2.0	2132	2.0	0.505	3.3	LOS A	0.0	0.0	0.00	0.33	0.00	39.2
East: WB ramp														
1	L2	325	2.0	342	2.0	0.506	18.6	LOS B	2.8	71.9	0.76	1.01	1.07	31.9
16	R2	430	2.0	453	2.0	0.452	9.3	LOS A	2.8	70.0	0.76	0.93	0.96	34.3
Approach		755	2.0	795	2.0	0.506	13.3	LOS B	2.8	71.9	0.76	0.97	1.01	33.2
North: Broadmoor Blvd														
4	T1	810	2.0	853	2.0	0.320	4.7	LOS A	2.4	61.4	0.58	0.44	0.58	36.9
14	R2	1000	2.0	1053	2.0	0.641	3.7	LOS A	0.0	0.0	0.00	0.39	0.00	37.4
Approach		1810	2.0	1905	2.0	0.641	4.1	LOS A	2.4	61.4	0.26	0.42	0.26	37.2
All Vehicles		4590	2.0	4832	2.0	0.641	5.3	LOS A	2.8	71.9	0.23	0.47	0.27	37.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [WB ramp PM W-R-1 (Site Folder: 2045)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	1600	1.0	1684	1.0	0.479	3.3	LOS A	0.0	0.0	0.00	0.31	0.00	39.5
18	R2	705	1.0	742	1.0	0.448	3.5	LOS A	0.0	0.0	0.00	0.40	0.00	37.6
Approach		2305	1.0	2426	1.0	0.479	3.4	LOS A	0.0	0.0	0.00	0.34	0.00	38.9
East: WB ramp														
1	L2	325	1.0	342	1.0	0.865	28.0	LOS D	9.7	243.2	0.91	1.37	2.21	29.2
16	R2	1130	1.0	1189	1.0	0.865	18.6	LOS D	11.9	298.7	0.90	1.37	2.17	29.7
Approach		1455	1.0	1532	1.0	0.865	20.7	LOS C	11.9	298.7	0.90	1.37	2.18	29.6
North: Broadmoor Blvd														
4	T1	1225	1.0	1289	1.0	0.485	4.9	LOS A	4.3	109.5	0.68	0.47	0.68	36.5
14	R2	1205	2.0	1268	2.0	0.773	3.9	LOS A	0.0	0.0	0.00	0.39	0.00	37.1
Approach		2430	1.5	2558	1.5	0.773	4.4	LOS A	4.3	109.5	0.34	0.43	0.34	36.8
All Vehicles		6190	1.2	6516	1.2	0.865	7.8	LOS A	11.9	298.7	0.35	0.62	0.65	35.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [EB ramp AM E-R-1 loop 2025 (Site Folder: 2025)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	900	2.0	947	2.0	0.361	5.9	LOS A	2.0	51.8	0.51	0.55	0.51	36.2
18	R2	345	2.0	363	2.0	0.221	3.9	LOS A	0.0	0.0	0.00	0.45	0.00	37.1
Approach		1245	2.0	1311	2.0	0.361	5.3	LOS A	2.0	51.8	0.37	0.52	0.37	36.4
East: RoadName														
16	R2	430	1.0	467	1.0	0.264	6.4	LOS A	1.2	31.3	0.63	0.74	0.63	35.1
Approach		430	1.0	467	1.0	0.264	6.4	LOS A	1.2	31.3	0.63	0.74	0.63	35.1
North: RoadName														
7	L2	450	1.0	474	1.0	0.366	9.8	LOS A	0.0	0.0	0.00	0.65	0.00	35.4
4	T1	575	1.0	605	1.0	0.366	4.0	LOS A	0.0	0.0	0.00	0.40	0.00	38.0
Approach		1025	1.0	1079	1.0	0.366	6.6	LOS A	0.0	0.0	0.00	0.51	0.00	36.8
West: EB off ramp														
2	T1	1	2.0	1	2.0	0.179	6.9	LOS A	0.6	16.0	0.54	0.75	0.54	36.4
12	R2	330	2.0	347	2.0	0.179	6.5	LOS A	0.7	16.7	0.53	0.73	0.53	35.3
Approach		331	2.0	348	2.0	0.179	6.5	LOS A	0.7	16.7	0.53	0.73	0.53	35.3
All Vehicles		3031	1.5	3205	1.5	0.366	6.0	LOS A	2.0	51.8	0.30	0.57	0.30	36.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [EB ramp AM E-R-1 loop (Site Folder: 2045)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	1245	2.0	1311	2.0	0.681	16.3	LOS B	9.4	239.9	0.92	1.14	1.48	31.8
18	R2	345	2.0	363	2.0	0.221	3.9	LOS A	0.0	0.0	0.00	0.45	0.00	37.1
Approach		1590	2.0	1674	2.0	0.681	13.6	LOS B	9.4	239.9	0.72	0.99	1.16	32.8
East: RoadName														
16	R2	975	1.0	1060	1.0	0.888	19.3	LOS D	10.4	261.3	0.99	1.27	1.83	29.4
Approach		975	1.0	1060	1.0	0.888	19.3	LOS B	10.4	261.3	0.99	1.27	1.83	29.4
North: RoadName														
7	L2	905	1.0	953	1.0	0.626	9.8	LOS A	0.0	0.0	0.00	0.67	0.00	35.1
4	T1	605	1.0	637	1.0	0.472	4.0	LOS A	0.0	0.0	0.00	0.38	0.00	38.3
Approach		1510	1.0	1589	1.0	0.626	7.5	LOS A	0.0	0.0	0.00	0.55	0.00	36.3
West: EB off ramp														
2	T1	1	0.0	1	0.0	0.230	9.4	LOS A	0.9	23.8	0.68	0.83	0.68	35.0
12	R2	350	1.0	368	1.0	0.230	8.7	LOS A	1.0	26.3	0.67	0.83	0.67	34.2
Approach		351	1.0	369	1.0	0.230	8.7	LOS A	1.0	26.3	0.67	0.83	0.67	34.2
All Vehicles		4426	1.4	4692	1.4	0.888	12.4	LOS B	10.4	261.3	0.53	0.89	0.88	33.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [EB ramp PM E-R-1 loop 2025 (Site Folder: 2025)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	710	2.0	747	2.0	0.292	5.8	LOS A	1.7	43.9	0.51	0.54	0.51	36.2
18	R2	285	2.0	300	2.0	0.183	4.8	LOS A	0.0	0.0	0.00	0.45	0.00	37.1
Approach		995	2.0	1047	2.0	0.292	5.5	LOS A	1.7	43.9	0.36	0.52	0.36	36.4
East: EB on ramp														
16	R2	1315	1.0	1429	1.0	0.731	9.1	LOS A	6.4	160.6	0.80	1.00	1.08	34.0
Approach		1315	1.0	1429	1.0	0.731	9.1	LOS A	6.4	160.6	0.80	1.00	1.08	34.0
North: Broadmoor Blvd														
7	L2	380	1.0	400	1.0	0.405	9.8	LOS A	0.0	0.0	0.00	0.61	0.00	36.1
4	T1	755	1.0	795	1.0	0.405	4.0	LOS A	0.0	0.0	0.00	0.43	0.00	37.7
Approach		1135	1.0	1195	1.0	0.405	6.0	LOS A	0.0	0.0	0.00	0.49	0.00	37.2
West: EB off ramp														
12	R2	720	2.0	758	2.0	0.401	7.6	LOS A	1.8	46.7	0.62	0.82	0.70	34.8
Approach		720	2.0	758	2.0	0.401	7.6	LOS A	1.8	46.7	0.62	0.82	0.70	34.8
All Vehicles		4165	1.4	4429	1.4	0.731	7.1	LOS A	6.4	160.6	0.45	0.72	0.55	35.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [EB ramp PM E-R-1 loop (Site Folder: 2045)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	720	2.0	758	2.0	0.359	8.0	LOS A	2.5	62.9	0.71	0.72	0.71	35.5
18	R2	330	2.0	347	2.0	0.212	6.2	LOS A	0.0	0.0	0.00	0.45	0.00	37.1
Approach		1050	2.0	1105	2.0	0.359	7.4	LOS A	2.5	62.9	0.49	0.64	0.49	35.9
East: EB on ramp														
16	R2	1585	1.0	1723	1.0	0.926	16.1	LOS D	14.6	368.8	0.99	1.33	1.89	30.7
Approach		1585	1.0	1723	1.0	0.926	16.1	LOS B	14.6	368.8	0.99	1.33	1.89	30.7
North: Broadmoor Blvd														
7	L2	675	1.0	711	1.0	0.554	9.8	LOS A	0.0	0.0	0.00	0.65	0.00	35.4
4	T1	875	1.0	921	1.0	0.554	4.0	LOS A	0.0	0.0	0.00	0.40	0.00	38.0
Approach		1550	1.0	1632	1.0	0.554	6.6	LOS A	0.0	0.0	0.00	0.51	0.00	36.8
West: EB off ramp														
12	R2	745	1.0	784	1.0	0.463	9.7	LOS A	2.5	63.9	0.71	0.91	0.91	33.7
Approach		745	1.0	784	1.0	0.463	9.7	LOS A	2.5	63.9	0.71	0.91	0.91	33.7
All Vehicles		4930	1.2	5244	1.2	0.926	10.4	LOS B	14.6	368.8	0.53	0.87	0.86	34.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [EB ramp AM E-R-2 2025 (Site Folder: 2025)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	900	2.0	947	2.0	0.457	7.9	LOS A	3.3	82.8	0.75	0.76	0.83	35.3
18	R2	345	2.0	363	2.0	0.221	5.1	LOS A	0.0	0.0	0.00	0.45	0.00	37.1
Approach		1245	2.0	1311	2.0	0.457	7.1	LOS A	3.3	82.8	0.54	0.68	0.60	35.8
North: RoadName														
7	L2	450	1.0	474	1.0	0.366	9.8	LOS A	0.0	0.0	0.00	0.65	0.00	35.4
4	T1	575	1.0	605	1.0	0.366	4.0	LOS A	0.0	0.0	0.00	0.40	0.00	38.0
Approach		1025	1.0	1079	1.0	0.366	6.6	LOS A	0.0	0.0	0.00	0.51	0.00	36.8
West: EB off ramp														
5	L2	430	3.0	453	3.0	0.414	13.5	LOS B	1.9	48.6	0.61	0.89	0.70	33.7
2	T1	1	2.0	1	2.0	0.414	6.9	LOS A	1.9	48.6	0.59	0.83	0.66	35.7
12	R2	330	2.0	347	2.0	0.414	7.0	LOS A	1.9	48.6	0.59	0.83	0.66	34.5
Approach		761	2.6	801	2.6	0.414	10.7	LOS B	1.9	48.6	0.60	0.86	0.69	34.0
All Vehicles		3031	1.8	3191	1.8	0.457	7.8	LOS A	3.3	82.8	0.38	0.67	0.42	35.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [EB ramp AM E-R-2 (Site Folder: 2045)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	1245	2.0	1311	2.0	1.596	309.3	LOS F	113.2	2876.3	1.00	3.64	8.40	6.2
18	R2	345	2.0	363	2.0	0.221	8.3	LOS A	0.0	0.0	0.00	0.45	0.00	37.1
Approach		1590	2.0	1674	2.0	1.596	244.0	LOS F	113.2	2876.3	0.78	2.95	6.58	7.5
North: RoadName														
7	L2	905	1.0	953	1.0	0.626	9.8	LOS A	0.0	0.0	0.00	0.67	0.00	35.1
4	T1	605	1.0	637	1.0	0.472	4.0	LOS A	0.0	0.0	0.00	0.38	0.00	38.3
Approach		1510	1.0	1589	1.0	0.626	7.5	LOS A	0.0	0.0	0.00	0.55	0.00	36.3
West: EB off ramp														
5	L2	975	1.0	1026	1.0	0.868	27.8	LOS D	11.8	297.3	0.91	1.39	2.23	28.0
2	T1	1	0.0	1	0.0	0.868	19.9	LOS D	11.8	297.3	0.90	1.40	2.21	29.0
12	R2	350	1.0	368	1.0	0.868	20.0	LOS D	11.8	297.3	0.90	1.40	2.21	28.3
Approach		1326	1.0	1396	1.0	0.868	25.7	LOS C	11.8	297.3	0.91	1.39	2.23	28.1
All Vehicles		4426	1.4	4659	1.4	1.596	97.9	LOS F	113.2	2876.3	0.55	1.67	3.03	14.8

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [EB ramp PM E-R-2 2025 (Site Folder: 2025)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	710	2.0	747	2.0	0.524	11.0	LOS B	4.3	108.1	0.91	1.02	1.15	34.3
18	R2	285	2.0	300	2.0	0.183	4.8	LOS A	0.0	0.0	0.00	0.45	0.00	37.1
Approach		995	2.0	1047	2.0	0.524	9.2	LOS A	4.3	108.1	0.65	0.86	0.82	35.0
North: Broadmoor Blvd														
7	L2	380	1.0	400	1.0	0.405	9.8	LOS A	0.0	0.0	0.00	0.61	0.00	36.1
4	T1	755	1.0	795	1.0	0.405	4.0	LOS A	0.0	0.0	0.00	0.43	0.00	37.7
Approach		1135	1.0	1195	1.0	0.405	6.0	LOS A	0.0	0.0	0.00	0.49	0.00	37.2
West: EB off ramp														
5	L2	1315	3.0	1384	3.0	0.586	13.8	LOS B	3.8	97.2	0.67	0.97	0.88	33.1
2	T1	5	2.0	5	2.0	0.586	7.4	LOS A	3.8	97.2	0.65	0.95	0.85	33.4
12	R2	720	2.0	758	2.0	0.533	6.8	LOS A	3.5	88.1	0.62	0.78	0.71	35.2
Approach		2040	2.6	2147	2.6	0.586	11.3	LOS B	3.8	97.2	0.65	0.90	0.82	33.8
All Vehicles		4170	2.0	4389	2.0	0.586	9.4	LOS A	4.3	108.1	0.47	0.78	0.60	34.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [EB ramp PM E-R-2 (Site Folder: 2045)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor Blvd														
8	T1	720	2.0	758	2.0	0.877	53.3	LOS D	16.0	407.0	1.00	1.55	2.57	21.0
18	R2	330	2.0	347	2.0	0.212	6.2	LOS A	0.0	0.0	0.00	0.45	0.00	37.1
Approach		1050	2.0	1105	2.0	0.877	38.5	LOS D	16.0	407.0	0.69	1.20	1.76	24.2
North: Broadmoor Blvd														
7	L2	675	1.0	711	1.0	0.552	9.8	LOS A	0.0	0.0	0.00	0.65	0.00	35.5
4	T1	875	1.0	921	1.0	0.552	4.0	LOS A	0.0	0.0	0.00	0.40	0.00	38.0
Approach		1550	1.0	1632	1.0	0.552	6.6	LOS A	0.0	0.0	0.00	0.51	0.00	36.8
West: EB off ramp														
5	L2	1585	1.0	1668	1.0	0.791	19.8	LOS B	9.4	236.9	0.84	1.22	1.65	30.6
2	T1	1	0.0	1	0.0	0.791	13.5	LOS B	9.4	236.9	0.85	1.24	1.65	30.7
12	R2	745	1.0	784	1.0	0.589	8.9	LOS A	5.1	129.5	0.74	0.90	0.95	34.2
Approach		2331	1.0	2454	1.0	0.791	16.3	LOS B	9.4	236.9	0.81	1.12	1.43	31.6
All Vehicles		4931	1.2	5191	1.2	0.877	18.0	LOS B	16.0	407.0	0.53	0.95	1.05	31.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM WB DDI RAB Option_2025 (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: I-182 Westbound Off														
16	R2	295	2.0	321	2.0	0.195	3.1	LOS A	0.0	0.0	0.00	0.38	0.00	38.1
Approach		295	2.0	321	2.0	0.195	3.1	LOS A	0.0	0.0	0.00	0.38	0.00	38.1
North: Broadmoor SB														
7a	L1	720	2.0	783	2.0	0.540	8.9	LOS A	0.0	0.0	0.00	0.62	0.00	36.0
14	R2	1145	2.0	1245	2.0	0.758	3.7	LOS A	0.0	0.0	0.00	0.38	0.00	37.3
Approach		1865	2.0	2027	2.0	0.758	5.7	LOS A	0.0	0.0	0.00	0.47	0.00	36.7
SouthWest: Broadmoor NB entering														
5ax	L1	735	2.0	799	2.0	0.478	15.4	LOS B	3.5	89.3	0.77	0.94	0.90	32.7
Approach		735	2.0	799	2.0	0.478	15.4	LOS B	3.5	89.3	0.77	0.94	0.90	32.7
All Vehicles		2895	2.0	3147	2.0	0.758	7.9	LOS A	3.5	89.3	0.19	0.58	0.23	35.7

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM WB DDI RAB Option_2045 (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: I-182 Westbound Off														
16	R2	670	2.0	728	2.0	0.444	3.2	LOS A	0.0	0.0	0.00	0.38	0.00	37.9
Approach		670	2.0	728	2.0	0.444	3.2	LOS A	0.0	0.0	0.00	0.38	0.00	37.9
North: Broadmoor SB														
7a	L1	1205	2.0	1310	2.0	0.822	8.9	LOS A	0.0	0.0	0.00	0.62	0.00	36.0
14	R2	1625	2.0	1766	2.0	1.076	20.2	LOS F	0.0	0.0	0.00	0.00	0.00	23.4
Approach		2830	2.0	3076	2.0	1.076	15.4	LOS B	0.0	0.0	0.00	0.27	0.00	27.7
SouthWest: Broadmoor NB entering														
5ax	L1	1515	2.0	1647	2.0	1.650	337.8	LOS F	143.4	3642.3	1.00	4.22	9.69	5.9
Approach		1515	2.0	1647	2.0	1.650	337.8	LOS F	143.4	3642.3	1.00	4.22	9.69	5.9
All Vehicles		5015	2.0	5451	2.0	1.650	111.2	LOS F	143.4	3642.3	0.30	1.47	2.93	13.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM WB DDI RAB Option_2025 (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: I-182 Westbound Off														
16	R2	430	2.0	467	2.0	0.285	3.1	LOS A	0.0	0.0	0.00	0.38	0.00	38.0
Approach		430	2.0	467	2.0	0.285	3.1	LOS A	0.0	0.0	0.00	0.38	0.00	38.0
North: Broadmoor SB														
7a	L1	810	2.0	880	2.0	0.608	8.9	LOS A	0.0	0.0	0.00	0.62	0.00	36.0
14	R2	1000	2.0	1087	2.0	0.662	3.5	LOS A	0.0	0.0	0.00	0.38	0.00	37.5
Approach		1810	2.0	1967	2.0	0.662	5.9	LOS A	0.0	0.0	0.00	0.49	0.00	36.8
SouthWest: Broadmoor NB entering														
5ax	L1	1670	2.0	1815	2.0	1.180	114.8	LOS F	70.0	1778.4	1.00	3.09	6.53	13.6
Approach		1670	2.0	1815	2.0	1.180	114.8	LOS F	70.0	1778.4	1.00	3.09	6.53	13.6
All Vehicles		3910	2.0	4250	2.0	1.180	52.1	LOS D	70.0	1778.4	0.43	1.59	2.79	21.2

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM WB DDI RAB Option_2045 (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: I-182 Westbound Off														
16	R2	1130	2.0	1228	2.0	0.748	3.6	LOS A	0.0	0.0	0.00	0.37	0.00	37.5
Approach		1130	2.0	1228	2.0	0.748	3.6	LOS A	0.0	0.0	0.00	0.37	0.00	37.5
North: Broadmoor SB														
7a	L1	1225	2.0	1332	2.0	0.835	8.9	LOS A	0.0	0.0	0.00	0.62	0.00	36.0
14	R2	1205	2.0	1310	2.0	0.798	3.9	LOS A	0.0	0.0	0.00	0.37	0.00	37.1
Approach		2430	2.0	2641	2.0	0.835	6.4	LOS A	0.0	0.0	0.00	0.50	0.00	36.5
SouthWest: Broadmoor NB entering														
5ax	L1	1600	2.0	1739	2.0	1.819	411.7	LOS F	168.7	4283.9	1.00	4.46	10.36	4.9
Approach		1600	2.0	1739	2.0	1.819	411.7	LOS F	168.7	4283.9	1.00	4.46	10.36	4.9
All Vehicles		5160	2.0	5609	2.0	1.819	131.5	LOS F	168.7	4283.9	0.31	1.70	3.21	12.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM EB DDI RAB Option_2025 (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor NB														
3a	L1	900	2.0	978	2.0	0.675	8.9	LOS A	0.0	0.0	0.00	0.62	0.00	36.0
18	R2	345	2.0	375	2.0	0.228	3.3	LOS A	0.0	0.0	0.00	0.39	0.00	37.9
Approach		1245	2.0	1353	2.0	0.675	7.3	LOS A	0.0	0.0	0.00	0.56	0.00	36.5
NorthEast: Braodmoor SB approach entering														
1ax	L1	575	1.0	625	1.0	0.443	18.1	LOS B	3.3	84.3	0.84	0.98	0.99	31.5
Approach		575	1.0	625	1.0	0.443	18.1	LOS B	3.3	84.3	0.84	0.98	0.99	31.5
West: I-182 Eastbound Off-Ramp														
12	R2	330	2.0	359	2.0	0.191	5.2	LOS A	0.9	22.5	0.56	0.61	0.56	35.9
Approach		330	2.0	359	2.0	0.191	5.2	LOS A	0.9	22.5	0.56	0.61	0.56	35.9
All Vehicles		2150	1.7	2337	1.7	0.675	9.9	LOS A	3.3	84.3	0.31	0.68	0.35	34.9

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM EB DDI RAB Option_2045 (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor NB														
3a	L1	1245	2.0	1353	2.0	0.849	8.9	LOS A	0.0	0.0	0.00	0.62	0.00	36.0
18	R2	345	2.0	375	2.0	0.228	3.3	LOS A	0.0	0.0	0.00	0.39	0.00	37.9
Approach		1590	2.0	1728	2.0	0.849	7.7	LOS A	0.0	0.0	0.00	0.57	0.00	36.3
NorthEast: Braodmoor SB approach entering														
1ax	L1	605	1.0	658	1.0	0.710	53.8	LOS D	11.7	295.4	1.00	1.45	2.22	21.4
Approach		605	1.0	658	1.0	0.710	53.8	LOS D	11.7	295.4	1.00	1.45	2.22	21.4
West: I-182 Eastbound Off-Ramp														
12	R2	350	2.0	380	2.0	0.193	5.1	LOS A	1.0	25.0	0.59	0.59	0.59	35.8
Approach		350	2.0	380	2.0	0.193	5.1	LOS A	1.0	25.0	0.59	0.59	0.59	35.8
All Vehicles		2545	1.8	2766	1.8	0.849	18.3	LOS B	11.7	295.4	0.32	0.78	0.61	31.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM EB DDI RAB Option_2025 (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor NB														
3a	L1	710	2.0	772	2.0	0.533	8.9	LOS A	0.0	0.0	0.00	0.62	0.00	36.0
18	R2	285	2.0	310	2.0	0.189	3.2	LOS A	0.0	0.0	0.00	0.39	0.00	37.9
Approach		995	2.0	1082	2.0	0.533	7.3	LOS A	0.0	0.0	0.00	0.56	0.00	36.5
NorthEast: Broadmoor SB approach entering														
1ax	L1	755	1.0	821	1.0	0.466	14.5	LOS B	3.2	81.7	0.73	0.91	0.84	33.1
Approach		755	1.0	821	1.0	0.466	14.5	LOS B	3.2	81.7	0.73	0.91	0.84	33.1
West: I-182 Eastbound Off-Ramp														
12	R2	720	2.0	783	2.0	0.461	6.5	LOS A	2.6	67.2	0.70	0.79	0.78	35.5
Approach		720	2.0	783	2.0	0.461	6.5	LOS A	2.6	67.2	0.70	0.79	0.78	35.5
All Vehicles		2470	1.7	2685	1.7	0.533	9.3	LOS A	3.2	81.7	0.43	0.73	0.48	35.1

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [PM EB DDI RAB Option_2045 (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: Broadmoor NB														
3a	L1	720	2.0	783	2.0	0.491	8.9	LOS A	0.0	0.0	0.00	0.62	0.00	36.0
18	R2	330	2.0	359	2.0	0.218	3.2	LOS A	0.0	0.0	0.00	0.39	0.00	37.9
Approach		1050	2.0	1141	2.0	0.491	7.1	LOS A	0.0	0.0	0.00	0.55	0.00	36.5
NorthEast: Broadmoor SB approach entering														
1ax	L1	875	1.0	951	1.0	0.490	14.4	LOS B	3.7	93.8	0.75	0.91	0.87	33.2
Approach		875	1.0	951	1.0	0.490	14.4	LOS B	3.7	93.8	0.75	0.91	0.87	33.2
West: I-182 Eastbound Off-Ramp														
12	R2	745	2.0	810	2.0	0.459	6.5	LOS A	2.8	71.5	0.74	0.78	0.81	35.4
Approach		745	2.0	810	2.0	0.459	6.5	LOS A	2.8	71.5	0.74	0.78	0.81	35.4
All Vehicles		2670	1.7	2902	1.7	0.491	9.3	LOS A	3.7	93.8	0.45	0.73	0.51	35.0

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
Intersection and Approach LOS values are based on average delay for all movements (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix G. Safety Analysis Results

APPENDIX G-1: EXISTING CONDITIONS HSM RESULTS

APPENDIX G-2: 2025 NO-BUILD CONDITIONS HSM RESULTS

APPENDIX G-3: 2045 NO-BUILD CONDITIONS HSM RESULTS

APPENDIX G-4: NO-BUILD/BUILD CONDITIONS ISATE RESULTS

APPENDIX G-5: BUILD CONDITIONS CMF RESULTS

APPENDIX G-1: EXISTING CONDITIONS HSM RESULTS

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	Sandifur Pkwy. To Harris Rd.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.07
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	32,150
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	10
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	229
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	3
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	2.46	1.01	1.00	1.00	2.49

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.413	1.000	0.413	2.49	1.00	1.026
Fatal and Injury (FI)	-12.76	1.28	1.31	0.118	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.271	0.112	2.49	1.00	0.278
Property Damage Only (PDO)	-12.81	1.38	1.34	0.317	$(5)_{TOTAL}-(5)_{FI}$ = 0.729	0.301	2.49	1.00	0.748

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.278	1.000	0.748	1.026
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.832	0.232	0.662	0.495	0.727
Head-on collision	0.020	0.006	0.007	0.005	0.011
Angle collision	0.040	0.011	0.036	0.027	0.038
Sideswipe, same direction	0.050	0.014	0.223	0.167	0.181
Sideswipe, opposite direction	0.010	0.003	0.001	0.001	0.004
Other multiple-vehicle collision	0.048	0.013	0.071	0.053	0.066

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-5.05	0.47	0.86	0.059	1.000	0.059	2.49	1.00	0.146
Fatal and Injury (FI)	-8.71	0.66	0.28	0.011	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.184	0.011	2.49	1.00	0.027
Property Damage Only (PDO)	-5.04	0.45	1.06	0.048	$(5)_{TOTAL}-(5)_{FI}$ = 0.816	0.048	2.49	1.00	0.120

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.027	1.000	0.120	0.146
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.063	0.008	0.008
Collision with fixed object	0.500	0.013	0.813	0.097	0.111
Collision with other object	0.028	0.001	0.016	0.002	0.003
Other single-vehicle collision	0.471	0.013	0.108	0.013	0.026

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.033	1.106	0.000	
Minor commercial	0	0.011	1.106	0.000	
Major industrial/institutional	0	0.036	1.106	0.000	
Minor industrial/institutional	0	0.005	1.106	0.000	--
Major residential	0	0.018	1.106	0.000	
Minor residential	0	0.003	1.106	0.000	
Other	0	0.005	1.106	0.000	
Total	--	--	--	0.000	1.39

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	2.49	1.00	0.000
Fatal and injury (FI)	--	0.284	0.000	2.49	1.00	0.000
Property damage only (PDO)	--	0.716	0.000	2.49	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	1.026	0.146	0.000	1.173	0.019	0.022
Fatal and injury (FI)	--	--	--	--	--	0.022

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	1.026	0.146	0.000	1.173	0.005	0.006
Fatal and injury (FI)	--	--	--	--	--	0.006

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.232	0.495	0.727
Head-on collisions (from Worksheet 1D)	0.006	0.005	0.011
Angle collisions (from Worksheet 1D)	0.011	0.027	0.038
Sideswipe, same direction (from Worksheet 1D)	0.014	0.167	0.181
Sideswipe, opposite direction (from Worksheet 1D)	0.003	0.001	0.004
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.013	0.053	0.066
Subtotal	0.278	0.748	1.026
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.008	0.008
Collision with fixed object (from Worksheet 1F)	0.013	0.097	0.111
Collision with other object (from Worksheet 1F)	0.001	0.002	0.003
Other single-vehicle collision (from Worksheet 1F)	0.013	0.013	0.026
Collision with pedestrian (from Worksheet 1I)	0.022	0.000	0.022
Collision with bicycle (from Worksheet 1J)	0.006	0.000	0.006
Subtotal	0.055	0.120	0.175
Total	0.333	0.867	1.201

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	1.2	0.07	17.2
Fatal and injury (FI)	0.3	0.07	4.8
Property damage only (PDO)	0.9	0.07	12.4

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	Harris Rd. To I-182 WB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.09
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	28,789
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	133
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	5
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.62	1.00	0.92	1.00	1.48

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.683	1.000	0.683	1.48	1.00	1.012
Fatal and Injury (FI)	-12.08	1.25	0.99	0.191	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.292	0.199	1.48	1.00	0.296
Property Damage Only (PDO)	-12.53	1.38	1.08	0.464	$(5)_{TOTAL}-(5)_{FI}$ = 0.708	0.483	1.48	1.00	0.716

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.296	1.000	0.716	1.012
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.151	0.506	0.362	0.513
Head-on collision	0.077	0.023	0.004	0.003	0.026
Angle collision	0.181	0.054	0.130	0.093	0.147
Sideswipe, same direction	0.093	0.027	0.249	0.178	0.206
Sideswipe, opposite direction	0.082	0.024	0.031	0.022	0.046
Other multiple-vehicle collision	0.056	0.017	0.080	0.057	0.074

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.125	1.000	0.125	1.48	1.00	0.185
Fatal and Injury (FI)	-7.37	0.61	0.54	0.030	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.226	0.028	1.48	1.00	0.042
Property Damage Only (PDO)	-8.50	0.84	0.97	0.102	$(5)_{TOTAL}-(5)_{FI}$ = 0.774	0.097	1.48	1.00	0.143

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.042	1.000	0.143	0.185
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.026	0.809	0.116	0.141
Collision with other object	0.020	0.001	0.029	0.004	0.005
Other single-vehicle collision	0.367	0.015	0.161	0.023	0.038

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	1	0.182	1.172	0.391	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.391	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.391	1.000	0.391	1.48	1.00	0.579
Fatal and injury (FI)	--	0.342	0.134	1.48	1.00	0.198
Property damage only (PDO)	--	0.658	0.257	1.48	1.00	0.381

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	1.012	0.185	0.579	1.776	0.009	0.016
Fatal and injury (FI)	--	--	--	--	--	0.016

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	1.012	0.185	0.579	1.776	0.002	0.004
Fatal and injury (FI)	--	--	--	--	--	0.004

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.151	0.362	0.513
Head-on collisions (from Worksheet 1D)	0.023	0.003	0.026
Angle collisions (from Worksheet 1D)	0.054	0.093	0.147
Sideswipe, same direction (from Worksheet 1D)	0.027	0.178	0.206
Sideswipe, opposite direction (from Worksheet 1D)	0.024	0.022	0.046
Driveway-related collisions (from Worksheet 1H)	0.198	0.381	0.579
Other multiple-vehicle collision (from Worksheet 1D)	0.017	0.057	0.074
Subtotal	0.494	1.097	1.591
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.026	0.116	0.141
Collision with other object (from Worksheet 1F)	0.001	0.004	0.005
Other single-vehicle collision (from Worksheet 1F)	0.015	0.023	0.038
Collision with pedestrian (from Worksheet 1I)	0.016	0.000	0.016
Collision with bicycle (from Worksheet 1J)	0.004	0.000	0.004
Subtotal	0.061	0.143	0.205
Total	0.555	1.241	1.796

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	1.8	0.09	20.0
Fatal and injury (FI)	0.6	0.09	6.2
Property damage only (PDO)	1.2	0.09	13.8

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	I-182 WB Ramps to I-182 EB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.22
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	28,852
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	18
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	1.00	1.00	1.01

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	1.673	1.000	1.673	1.01	1.00	1.687
Fatal and Injury (FI)	-12.08	1.25	0.99	0.469	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.292	0.489	1.01	1.00	0.493
Property Damage Only (PDO)	-12.53	1.38	1.08	1.137	$(5)_{TOTAL}-(5)_{FI}$ = 0.708	1.185	1.01	1.00	1.194

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.493	1.000	1.194	1.687
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.252	0.506	0.604	0.856
Head-on collision	0.077	0.038	0.004	0.005	0.043
Angle collision	0.181	0.089	0.130	0.155	0.244
Sideswipe, same direction	0.093	0.046	0.249	0.297	0.343
Sideswipe, opposite direction	0.082	0.040	0.031	0.037	0.077
Other multiple-vehicle collision	0.056	0.028	0.080	0.096	0.123

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.306	1.000	0.306	1.01	1.00	0.308
Fatal and Injury (FI)	-7.37	0.61	0.54	0.073	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.226	0.069	1.01	1.00	0.070
Property Damage Only (PDO)	-8.50	0.84	0.97	0.250	$(5)_{TOTAL}-(5)_{FI}$ = 0.774	0.237	1.01	1.00	0.238

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.070	1.000	0.238	0.308
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.043	0.809	0.193	0.236
Collision with other object	0.020	0.001	0.029	0.007	0.008
Other single-vehicle collision	0.367	0.026	0.161	0.038	0.064

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.000	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	1.01	1.00	0.000
Fatal and injury (FI)	--	0.342	0.000	1.01	1.00	0.000
Property damage only (PDO)	--	0.658	0.000	1.01	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	1.687	0.308	0.000	1.995	0.009	0.018
Fatal and injury (FI)	--	--	--	--	--	0.018

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	1.687	0.308	0.000	1.995	0.002	0.004
Fatal and injury (FI)	--	--	--	--	--	0.004

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.252	0.604	0.856
Head-on collisions (from Worksheet 1D)	0.038	0.005	0.043
Angle collisions (from Worksheet 1D)	0.089	0.155	0.244
Sideswipe, same direction (from Worksheet 1D)	0.046	0.297	0.343
Sideswipe, opposite direction (from Worksheet 1D)	0.040	0.037	0.077
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.028	0.096	0.123
Subtotal	0.493	1.194	1.687
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.043	0.193	0.236
Collision with other object (from Worksheet 1F)	0.001	0.007	0.008
Other single-vehicle collision (from Worksheet 1F)	0.026	0.038	0.064
Collision with pedestrian (from Worksheet 1I)	0.018	0.000	0.018
Collision with bicycle (from Worksheet 1J)	0.004	0.000	0.004
Subtotal	0.092	0.238	0.330
Total	0.584	1.433	2.017

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	2.0	0.22	9.2
Fatal and injury (FI)	0.6	0.22	2.7
Property damage only (PDO)	1.4	0.22	6.5

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	I-182 EB Ramps to St. Thomas Dr.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	27,941
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	27
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	3
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.14	1.00	0.92	1.00	1.05

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.802	1.000	0.802	1.05	1.00	0.842
Fatal and Injury (FI)	-12.08	1.25	0.99	0.225	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.293	0.235	1.05	1.00	0.247
Property Damage Only (PDO)	-12.53	1.38	1.08	0.544	$(5)_{TOTAL}-(5)_{FI}$ = 0.707	0.567	1.05	1.00	0.595

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.247	1.000	0.595	0.842
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.126	0.506	0.301	0.427
Head-on collision	0.077	0.019	0.004	0.002	0.021
Angle collision	0.181	0.045	0.130	0.077	0.122
Sideswipe, same direction	0.093	0.023	0.249	0.148	0.171
Sideswipe, opposite direction	0.082	0.020	0.031	0.018	0.039
Other multiple-vehicle collision	0.056	0.014	0.080	0.048	0.061

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.149	1.000	0.149	1.05	1.00	0.156
Fatal and Injury (FI)	-7.37	0.61	0.54	0.036	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.227	0.034	1.05	1.00	0.035
Property Damage Only (PDO)	-8.50	0.84	0.97	0.122	$(5)_{TOTAL}-(5)_{FI}$ = 0.773	0.115	1.05	1.00	0.121

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.035	1.000	0.121	0.156
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.022	0.809	0.098	0.119
Collision with other object	0.020	0.001	0.029	0.004	0.004
Other single-vehicle collision	0.367	0.013	0.161	0.019	0.032

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.000	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	1.05	1.00	0.000
Fatal and injury (FI)	--	0.342	0.000	1.05	1.00	0.000
Property damage only (PDO)	--	0.658	0.000	1.05	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	0.842	0.156	0.000	0.998	0.009	0.009
Fatal and injury (FI)	--	--	--	--	--	0.009

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	0.842	0.156	0.000	0.998	0.002	0.002
Fatal and injury (FI)	--	--	--	--	--	0.002

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.126	0.301	0.427
Head-on collisions (from Worksheet 1D)	0.019	0.002	0.021
Angle collisions (from Worksheet 1D)	0.045	0.077	0.122
Sideswipe, same direction (from Worksheet 1D)	0.023	0.148	0.171
Sideswipe, opposite direction (from Worksheet 1D)	0.020	0.018	0.039
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.014	0.048	0.061
Subtotal	0.247	0.595	0.842
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.022	0.098	0.119
Collision with other object (from Worksheet 1F)	0.001	0.004	0.004
Other single-vehicle collision (from Worksheet 1F)	0.013	0.019	0.032
Collision with pedestrian (from Worksheet 1I)	0.009	0.000	0.009
Collision with bicycle (from Worksheet 1J)	0.002	0.000	0.002
Subtotal	0.046	0.121	0.167
Total	0.293	0.716	1.009

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	1.0	0.11	9.2
Fatal and injury (FI)	0.3	0.11	2.7
Property damage only (PDO)	0.7	0.11	6.5

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	St. Thomas Dr. To Chapel Hill Blvd.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.09
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	23,923
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	44
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	8
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.12	1.00	0.92	1.00	1.03

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.534	1.000	0.534	1.03	1.00	0.551
Fatal and Injury (FI)	-12.08	1.25	0.99	0.152	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.297	0.159	1.03	1.00	0.164
Property Damage Only (PDO)	-12.53	1.38	1.08	0.359	$(5)_{TOTAL}-(5)_{FI}$ = 0.703	0.375	1.03	1.00	0.387

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.164	1.000	0.387	0.551
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.084	0.506	0.196	0.279
Head-on collision	0.077	0.013	0.004	0.002	0.014
Angle collision	0.181	0.030	0.130	0.050	0.080
Sideswipe, same direction	0.093	0.015	0.249	0.096	0.112
Sideswipe, opposite direction	0.082	0.013	0.031	0.012	0.025
Other multiple-vehicle collision	0.056	0.009	0.080	0.031	0.040

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.107	1.000	0.107	1.03	1.00	0.111
Fatal and Injury (FI)	-7.37	0.61	0.54	0.027	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.233	0.025	1.03	1.00	0.026
Property Damage Only (PDO)	-8.50	0.84	0.97	0.087	$(5)_{TOTAL}-(5)_{FI}$ = 0.767	0.082	1.03	1.00	0.085

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.026	1.000	0.085	0.111
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.016	0.809	0.069	0.085
Collision with other object	0.020	0.001	0.029	0.002	0.003
Other single-vehicle collision	0.367	0.009	0.161	0.014	0.023

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	
Minor commercial	1	0.058	1.172	0.100	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.100	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.100	1.000	0.100	1.03	1.00	0.103
Fatal and injury (FI)	--	0.342	0.034	1.03	1.00	0.035
Property damage only (PDO)	--	0.658	0.066	1.03	1.00	0.068

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	0.551	0.111	0.103	0.765	0.009	0.007
Fatal and injury (FI)	--	--	--	--	--	0.007

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	0.551	0.111	0.103	0.765	0.002	0.002
Fatal and injury (FI)	--	--	--	--	--	0.002

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.084	0.196	0.279
Head-on collisions (from Worksheet 1D)	0.013	0.002	0.014
Angle collisions (from Worksheet 1D)	0.030	0.050	0.080
Sideswipe, same direction (from Worksheet 1D)	0.015	0.096	0.112
Sideswipe, opposite direction (from Worksheet 1D)	0.013	0.012	0.025
Driveway-related collisions (from Worksheet 1H)	0.035	0.068	0.103
Other multiple-vehicle collision (from Worksheet 1D)	0.009	0.031	0.040
Subtotal	0.199	0.455	0.654
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.016	0.069	0.085
Collision with other object (from Worksheet 1F)	0.001	0.002	0.003
Other single-vehicle collision (from Worksheet 1F)	0.009	0.014	0.023
Collision with pedestrian (from Worksheet 1I)	0.007	0.000	0.007
Collision with bicycle (from Worksheet 1J)	0.002	0.000	0.002
Subtotal	0.034	0.085	0.119
Total	0.233	0.540	0.773

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	0.8	0.09	8.6
Fatal and injury (FI)	0.2	0.09	2.6
Property damage only (PDO)	0.5	0.09	6.0

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	Sandifur Pkwy
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ = 58,100 (veh/day)	--	23,425
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ = 16,400 (veh/day)	--	6,893
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			2
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	5
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.86	0.93	0.92	1.00	0.91	1.00	0.67

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	3.805	1.000	3.805	0.67	1.00	2.556
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	1.204	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.333	1.266	0.67	1.00	0.850
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	2.415	$(5)_{TOTAL}-(5)_{FI}$ = 0.667	2.539	0.67	1.00	1.706

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	0.850	1.000	1.706	2.556
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	0.467	0.546	0.931	1.398
Head-on collision	0.038	0.032	0.020	0.034	0.066
Angle collision	0.280	0.238	0.204	0.348	0.586
Sideswipe	0.076	0.065	0.032	0.055	0.119
Other multiple-vehicle collision	0.057	0.048	0.198	0.338	0.386

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.284	1.000	0.284	0.67	1.00	0.191
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.080	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.291	0.083	0.67	1.00	0.056
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.195	$(5)_{TOTAL}-(5)_{FI}$ = 0.709	0.201	0.67	1.00	0.135

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.056	1.000	0.135	0.191
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.000	0.000
Collision with fixed object	0.653	0.036	0.895	0.121	0.157
Collision with other object	0.091	0.005	0.069	0.009	0.014
Other single-vehicle collision	0.045	0.002	0.018	0.002	0.005
Single-vehicle noncollision	0.209	0.012	0.014	0.002	0.013

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.00	3.75

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.004	3.75	1.00	0.013
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.013

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	2.556	0.191	2.746	0.011	0.030
Fatal and injury (FI)	--	--	--	--	0.030

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.467	0.931	1.398
Head-on collisions (from Worksheet 2D)	0.032	0.034	0.066
Angle collisions (from Worksheet 2D)	0.238	0.348	0.586
Sideswipe (from Worksheet 2D)	0.065	0.055	0.119
Other multiple-vehicle collision (from Worksheet 2D)	0.048	0.338	0.386
Subtotal	0.850	1.706	2.556
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.036	0.121	0.157
Collision with other object (from Worksheet 2F)	0.005	0.009	0.014
Other single-vehicle collision (from Worksheet 2F)	0.002	0.002	0.005
Single-vehicle noncollision (from Worksheet 2F)	0.012	0.002	0.013
Collision with pedestrian (from Worksheet 2G or 2I)	0.013	0.000	0.013
Collision with bicycle (from Worksheet 2J)	0.030	0.000	0.030
Subtotal	0.099	0.135	0.234
Total	0.949	1.841	2.790

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	2.8
Fatal and injury (FI)	0.9
Property damage only (PDO)	1.8

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections						
General Information				**Location Information**		
Analyst	Caleb Trapp			Roadway	Broadmoor Blvd.	
Agency or Company	DKS Associates			Intersection	Harris Rd.	
Date Performed	01/04/22			Jurisdiction	Pasco, WA	
				Analysis Year	2019	
Input Data				**Base Conditions**	**Site Conditions**	
Intersection type (3ST, 3SG, 4ST, 4SG)				--	3ST	
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ =	45,700	(veh/day)	--	28,464	
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ =	9,300	(veh/day)	--	480	
Intersection lighting (present/not present)				Not Present	Present	
Calibration factor, C_i				1.00	1.00	
Data for unsignalized intersections only:				--	--	
Number of major-road approaches with left-turn lanes (0,1,2)				0	1	
Number of major-road approaches with right-turn lanes (0,1,2)				0	0	
Data for signalized intersections only:				--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]				--	2	
Type of left-turn signal phasing for Leg #1				Permissive	Protected / Permissive	
Type of left-turn signal phasing for Leg #2				--	Protected	
Type of left-turn signal phasing for Leg #3				--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)				--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]				0	0	
Intersection red light cameras (present/not present)				Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only					0	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})				--	5	
Number of bus stops within 300 m (1,000 ft) of the intersection				0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)				Not Present	Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection				0	0	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.67	1.00	1.00	1.00	0.91	1.00	0.61

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-13.36	1.11	0.41	0.80	1.743	1.000	1.743	0.61	1.00	1.062
Fatal and Injury (FI)	-14.01	1.16	0.30	0.69	0.771	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.417	0.726	0.61	1.00	0.443
Property Damage Only (PDO)	-15.38	1.20	0.51	0.77	1.079	$(5)_{TOTAL}-(5)_{FI}$ = 0.583	1.017	0.61	1.00	0.620

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	0.443	1.000	0.620	1.062
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.421	0.186	0.440	0.273	0.459
Head-on collision	0.045	0.020	0.023	0.014	0.034
Angle collision	0.343	0.152	0.262	0.162	0.314
Sideswipe	0.126	0.056	0.040	0.025	0.081
Other multiple-vehicle collision	0.065	0.029	0.235	0.146	0.174

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-6.81	0.16	0.51	1.14	0.133	1.000	0.133	0.61	1.00	0.081
Fatal and Injury (FI)	--	--	--	--	0.041	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.312	0.041	0.61	1.00	0.025
Property Damage Only (PDO)	-8.36	0.25	0.55	1.29	0.091	$(5)_{TOTAL}-(5)_{FI}$ = 0.688	0.091	0.61	1.00	0.056

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.025	1.000	0.056	0.081
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.003	0.000	0.000
Collision with animal	0.003	0.000	0.018	0.001	0.001
Collision with fixed object	0.762	0.019	0.834	0.046	0.066
Collision with other object	0.090	0.002	0.092	0.005	0.007
Other single-vehicle collision	0.039	0.001	0.023	0.001	0.002
Single-vehicle noncollision	0.105	0.003	0.030	0.002	0.004

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	1.062	0.081	1.143	0.021	0.024
Fatal and injury (FI)	--	--	--	--	0.024

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
--	--	--	--

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	--	--	--	--	--	--	--	--	1.00	--
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	--

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	1.062	0.081	1.143	0.016	0.018
Fatal and injury (FI)	--	--	--	--	0.018

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.186	0.273	0.459
Head-on collisions (from Worksheet 2D)	0.020	0.014	0.034
Angle collisions (from Worksheet 2D)	0.152	0.162	0.314
Sideswipe (from Worksheet 2D)	0.056	0.025	0.081
Other multiple-vehicle collision (from Worksheet 2D)	0.029	0.146	0.174
Subtotal	0.443	0.620	1.062
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.019	0.046	0.066
Collision with other object (from Worksheet 2F)	0.002	0.005	0.007
Other single-vehicle collision (from Worksheet 2F)	0.001	0.001	0.002
Single-vehicle noncollision (from Worksheet 2F)	0.003	0.002	0.004
Collision with pedestrian (from Worksheet 2G or 2I)	0.024	0.000	0.024
Collision with bicycle (from Worksheet 2J)	0.018	0.000	0.018
Subtotal	0.068	0.056	0.123
Total	0.510	0.675	1.186

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	1.2
Fatal and injury (FI)	0.5
Property damage only (PDO)	0.7

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	I-182 WB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ = 58,100 (veh/day)	--	34,073
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ = 16,400 (veh/day)	--	5,630
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	1
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	3
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	0
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Not Applicable
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			6
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	4
Number of bus stops within 300 m (1,000 ft) of the intersection		0	1
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.93	1.00	0.88	1.00	0.91	1.00	0.75

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	5.472	1.000	5.472	0.75	1.00	4.100
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	1.704	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.328	1.797	0.75	1.00	1.347
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	3.484	$(5)_{TOTAL}-(5)_{FI}$ = 0.672	3.674	0.75	1.00	2.753

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	1.347	1.000	2.753	4.100
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	0.739	0.546	1.503	2.243
Head-on collision	0.038	0.051	0.020	0.055	0.106
Angle collision	0.280	0.377	0.204	0.562	0.939
Sideswipe	0.076	0.102	0.032	0.088	0.190
Other multiple-vehicle collision	0.057	0.077	0.198	0.545	0.622

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.307	1.000	0.307	0.75	1.00	0.230
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.080	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.270	0.083	0.75	1.00	0.062
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.216	$(5)_{TOTAL}-(5)_{FI}$ = 0.730	0.224	0.75	1.00	0.168

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.062	1.000	0.168	0.230
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.001	0.001
Collision with fixed object	0.653	0.041	0.895	0.150	0.191
Collision with other object	0.091	0.006	0.069	0.012	0.017
Other single-vehicle collision	0.045	0.003	0.018	0.003	0.006
Single-vehicle noncollision	0.209	0.013	0.014	0.002	0.015

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.00	3.75

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.004	3.75	1.00	0.017
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.017

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	4.100	0.230	4.330	0.011	0.048
Fatal and injury (FI)	--	--	--	--	0.048

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.739	1.503	2.243
Head-on collisions (from Worksheet 2D)	0.051	0.055	0.106
Angle collisions (from Worksheet 2D)	0.377	0.562	0.939
Sideswipe (from Worksheet 2D)	0.102	0.088	0.190
Other multiple-vehicle collision (from Worksheet 2D)	0.077	0.545	0.622
Subtotal	1.347	2.753	4.100
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.041	0.150	0.191
Collision with other object (from Worksheet 2F)	0.006	0.012	0.017
Other single-vehicle collision (from Worksheet 2F)	0.003	0.003	0.006
Single-vehicle noncollision (from Worksheet 2F)	0.013	0.002	0.015
Collision with pedestrian (from Worksheet 2G or 2I)	0.017	0.000	0.017
Collision with bicycle (from Worksheet 2J)	0.048	0.000	0.048
Subtotal	0.126	0.168	0.294
Total	1.473	2.921	4.394

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	4.4
Fatal and injury (FI)	1.5
Property damage only (PDO)	2.9

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	I-182 EB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2019

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ = 58,100 (veh/day)	--	23,465
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ = 16,400 (veh/day)	--	16,400
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			9
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	5
Number of bus stops within 300 m (1,000 ft) of the intersection		0	1
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	1

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.86	0.93	0.92	1.00	0.91	1.00	0.67

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	4.776	1.000	4.776	0.67	1.00	3.208
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	1.397	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.308	1.471	0.67	1.00	0.988
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	3.138	$(5)_{TOTAL}-(5)_{FI}$ 0.692	3.305	0.67	1.00	2.220

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	0.988	1.000	2.220	3.208
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	0.543	0.546	1.212	1.754
Head-on collision	0.038	0.038	0.020	0.044	0.082
Angle collision	0.280	0.277	0.204	0.453	0.730
Sideswipe	0.076	0.075	0.032	0.071	0.146
Other multiple-vehicle collision	0.057	0.056	0.198	0.439	0.496

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.402	1.000	0.402	0.67	1.00	0.270
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.125	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.324	0.130	0.67	1.00	0.088
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.260	$(5)_{TOTAL}-(5)_{FI}$ 0.676	0.272	0.67	1.00	0.182

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.088	1.000	0.182	0.270
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.001	0.001
Collision with fixed object	0.653	0.057	0.895	0.163	0.220
Collision with other object	0.091	0.008	0.069	0.013	0.021
Other single-vehicle collision	0.045	0.004	0.018	0.003	0.007
Single-vehicle noncollision	0.209	0.018	0.014	0.003	0.021

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.12	4.20

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.008	4.20	1.00	0.034
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.034

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	3.208	0.270	3.478	0.011	0.038
Fatal and injury (FI)	--	--	--	--	0.038

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.543	1.212	1.754
Head-on collisions (from Worksheet 2D)	0.038	0.044	0.082
Angle collisions (from Worksheet 2D)	0.277	0.453	0.730
Sideswipe (from Worksheet 2D)	0.075	0.071	0.146
Other multiple-vehicle collision (from Worksheet 2D)	0.056	0.439	0.496
Subtotal	0.988	2.220	3.208
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.057	0.163	0.220
Collision with other object (from Worksheet 2F)	0.008	0.013	0.021
Other single-vehicle collision (from Worksheet 2F)	0.004	0.003	0.007
Single-vehicle noncollision (from Worksheet 2F)	0.018	0.003	0.021
Collision with pedestrian (from Worksheet 2G or 2I)	0.034	0.000	0.034
Collision with bicycle (from Worksheet 2J)	0.038	0.000	0.038
Subtotal	0.160	0.182	0.343
Total	1.148	2.402	3.551

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	3.6
Fatal and injury (FI)	1.1
Property damage only (PDO)	2.4

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections						
General Information				**Location Information**		
Analyst	Caleb Trapp			Roadway	Broadmoor Blvd.	
Agency or Company	DKS Associates			Intersection	St. Thomas Dr.	
Date Performed	01/04/22			Jurisdiction	Pasco, WA	
				Analysis Year	2019	
Input Data				**Base Conditions**	**Site Conditions**	
Intersection type (3ST, 3SG, 4ST, 4SG)				--	3ST	
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ =	45,700	(veh/day)	--	25,019	
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ =	9,300	(veh/day)	--	1,440	
Intersection lighting (present/not present)				Not Present	Present	
Calibration factor, C_i				1.00	1.00	
Data for unsignalized intersections only:				--	--	
Number of major-road approaches with left-turn lanes (0,1,2)				0	1	
Number of major-road approaches with right-turn lanes (0,1,2)				0	0	
Data for signalized intersections only:				--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	1	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]				--	2	
Type of left-turn signal phasing for Leg #1				Permissive	Protected	
Type of left-turn signal phasing for Leg #2				--	Protected	
Type of left-turn signal phasing for Leg #3				--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)				--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]				0	0	
Intersection red light cameras (present/not present)				Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only					9	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})				--	4	
Number of bus stops within 300 m (1,000 ft) of the intersection				0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)				Not Present	Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection				0	1	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.67	1.00	1.00	1.00	0.91	1.00	0.61

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-13.36	1.11	0.41	0.80	2.370	1.000	2.370	0.61	1.00	1.445
Fatal and Injury (FI)	-14.01	1.16	0.30	0.69	0.923	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.363	0.861	0.61	1.00	0.524
Property Damage Only (PDO)	-15.38	1.20	0.51	0.77	1.619	$(5)_{TOTAL}-(5)_{FI}$ = 0.637	1.510	0.61	1.00	0.920

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	0.524	1.000	0.920	1.445
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.421	0.221	0.440	0.405	0.626
Head-on collision	0.045	0.024	0.023	0.021	0.045
Angle collision	0.343	0.180	0.262	0.241	0.421
Sideswipe	0.126	0.066	0.040	0.037	0.103
Other multiple-vehicle collision	0.065	0.034	0.235	0.216	0.250

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-6.81	0.16	0.51	1.14	0.227	1.000	0.227	0.61	1.00	0.139
Fatal and Injury (FI)	--	--	--	--	0.071	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.305	0.069	0.61	1.00	0.042
Property Damage Only (PDO)	-8.36	0.25	0.55	1.29	0.161	$(5)_{TOTAL}-(5)_{FI}$ = 0.695	0.158	0.61	1.00	0.096

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.042	1.000	0.096	0.139
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.003	0.000	0.000
Collision with animal	0.003	0.000	0.018	0.002	0.002
Collision with fixed object	0.762	0.032	0.834	0.080	0.113
Collision with other object	0.090	0.004	0.092	0.009	0.013
Other single-vehicle collision	0.039	0.002	0.023	0.002	0.004
Single-vehicle noncollision	0.105	0.004	0.030	0.003	0.007

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	1.445	0.139	1.583	0.021	0.033
Fatal and injury (FI)	--	--	--	--	0.033

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
--	--	--	--

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	--	--	--	--	--	--	--	--	1.00	--
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	--

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	1.445	0.139	1.583	0.016	0.025
Fatal and injury (FI)	--	--	--	--	0.025

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.221	0.405	0.626
Head-on collisions (from Worksheet 2D)	0.024	0.021	0.045
Angle collisions (from Worksheet 2D)	0.180	0.241	0.421
Sideswipe (from Worksheet 2D)	0.066	0.037	0.103
Other multiple-vehicle collision (from Worksheet 2D)	0.034	0.216	0.250
Subtotal	0.524	0.920	1.445
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.002	0.002
Collision with fixed object (from Worksheet 2F)	0.032	0.080	0.113
Collision with other object (from Worksheet 2F)	0.004	0.009	0.013
Other single-vehicle collision (from Worksheet 2F)	0.002	0.002	0.004
Single-vehicle noncollision (from Worksheet 2F)	0.004	0.003	0.007
Collision with pedestrian (from Worksheet 2G or 2I)	0.033	0.000	0.033
Collision with bicycle (from Worksheet 2J)	0.025	0.000	0.025
Subtotal	0.101	0.096	0.197
Total	0.625	1.017	1.642

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	1.6
Fatal and injury (FI)	0.6
Property damage only (PDO)	1.0

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information				**Location Information**	
Analyst	Caleb Trapp			Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates			Intersection	Chapel Hill Blvd.
Date Performed	01/04/22			Jurisdiction	Pasco, WA
				Analysis Year	2019
Input Data				**Base Conditions**	**Site Conditions**
Intersection type (3ST, 3SG, 4ST, 4SG)				--	4SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ =	67,700	(veh/day)	--	18,834
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ =	33,400	(veh/day)	--	4,607
Intersection lighting (present/not present)				Not Present	Present
Calibration factor, C_i				1.00	1.00
Data for unsignalized intersections only:				--	--
Number of major-road approaches with left-turn lanes (0,1,2)				0	2
Number of major-road approaches with right-turn lanes (0,1,2)				0	0
Data for signalized intersections only:				--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	0
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]				--	4
Type of left-turn signal phasing for Leg #1				Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2				--	Protected / Permissive
Type of left-turn signal phasing for Leg #3				--	Protected / Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)				--	Protected / Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]				0	0
Intersection red light cameras (present/not present)				Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only					6
Maximum number of lanes crossed by a pedestrian (n_{lanesx})				--	5
Number of bus stops within 300 m (1,000 ft) of the intersection				0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)				Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection				0	1

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.96	1.00	1.00	0.91	1.00	0.58

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	4.404	1.000	4.404	0.58	1.00	2.543
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	1.392	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.329	1.448	0.58	1.00	0.836
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	2.843	$(5)_{TOTAL}-(5)_{FI}$ 0.671	2.956	0.58	1.00	1.707

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	0.836	1.000	1.707	2.543
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.450	0.376	0.483	0.824	1.201
Head-on collision	0.049	0.041	0.030	0.051	0.092
Angle collision	0.347	0.290	0.244	0.416	0.707
Sideswipe	0.099	0.083	0.032	0.055	0.137
Other multiple-vehicle collision	0.055	0.046	0.211	0.360	0.406

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.290	1.000	0.290	0.58	1.00	0.167
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.076	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.265	0.077	0.58	1.00	0.044
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.212	$(5)_{TOTAL}-(5)_{FI}$ 0.735	0.213	0.58	1.00	0.123

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.044	1.000	0.123	0.167
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.000
Collision with fixed object	0.744	0.033	0.870	0.107	0.140
Collision with other object	0.072	0.003	0.070	0.009	0.012
Other single-vehicle collision	0.040	0.002	0.023	0.003	0.005
Single-vehicle noncollision	0.141	0.006	0.034	0.004	0.010

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.00	1.12	3.11

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.008	3.11	1.00	0.024
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.024

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	2.543	0.167	2.710	0.015	0.041
Fatal and injury (FI)	--	--	--	--	0.041

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.376	0.824	1.201
Head-on collisions (from Worksheet 2D)	0.041	0.051	0.092
Angle collisions (from Worksheet 2D)	0.290	0.416	0.707
Sideswipe (from Worksheet 2D)	0.083	0.055	0.137
Other multiple-vehicle collision (from Worksheet 2D)	0.046	0.360	0.406
Subtotal	0.836	1.707	2.543
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.033	0.107	0.140
Collision with other object (from Worksheet 2F)	0.003	0.009	0.012
Other single-vehicle collision (from Worksheet 2F)	0.002	0.003	0.005
Single-vehicle noncollision (from Worksheet 2F)	0.006	0.004	0.010
Collision with pedestrian (from Worksheet 2G or 2I)	0.024	0.000	0.024
Collision with bicycle (from Worksheet 2J)	0.041	0.000	0.041
Subtotal	0.109	0.123	0.232
Total	0.945	1.830	2.775

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	2.8
Fatal and injury (FI)	0.9
Property damage only (PDO)	1.8

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment_1	1.026	0.278	0.748	0.000	1.320	0.425	0.436
Segment_2	1.012	0.296	0.716	0.000	1.010	0.495	0.500
Segment_3	1.687	0.493	1.194	1.600	1.010	0.370	1.632
Segment_4	0.842	0.247	0.595	0.800	1.010	0.541	0.822
Segment_5	0.551	0.164	0.387	0.800	1.010	0.643	0.640
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Single-vehicle							
Segment_1	0.146	0.027	0.120	0.000	0.860	0.888	0.130
Segment_2	0.185	0.042	0.143	0.000	0.910	0.856	0.158
Segment_3	0.308	0.070	0.238	0.200	0.910	0.781	0.284
Segment_4	0.156	0.035	0.121	0.000	0.910	0.875	0.137
Segment_5	0.111	0.026	0.085	0.200	0.910	0.908	0.119
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Multiple-vehicle driveway-related							
Segment_1	0.000	0.000	0.000	0.000	1.390	1.000	0.000
Segment_2	0.579	0.198	0.381	0.000	0.810	0.681	0.394
Segment_3	0.000	0.000	0.000	0.000	0.810	1.000	0.000
Segment_4	0.000	0.000	0.000	0.000	0.810	1.000	0.000
Segment_5	0.103	0.035	0.068	0.200	0.810	0.923	0.111
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment Totals:	6.706	1.910	4.796	3.800			5.364
INTERSECTIONS							
Multiple-vehicle							
Intersection_1	2.556	0.850	1.706	3.400	0.330	0.542	2.942
Intersection_2	1.062	0.443	0.620	0.000	0.800	0.541	0.574
Intersection_3	4.100	1.347	2.753	2.000	0.330	0.425	2.892
Intersection_4	3.208	0.988	2.220	8.600	0.330	0.486	5.981
Intersection_5	1.445	0.524	0.920	1.800	0.800	0.464	1.635
Intersection_6	2.543	0.836	1.707	6.000	0.390	0.502	4.264
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Single-vehicle							
Intersection_1	0.191	0.056	0.135	0.200	0.360	0.936	0.191
Intersection_2	0.081	0.025	0.056	0.000	1.140	0.916	0.074
Intersection_3	0.230	0.062	0.168	0.000	0.360	0.924	0.212

Intersection_4	0.270	0.088	0.182	0.000	0.360	0.911	0.246
Intersection_5	0.139	0.042	0.096	0.000	1.140	0.864	0.120
Intersection_6	0.167	0.044	0.123	0.200	0.360	0.943	0.169
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection Totals:	15.991	5.305	10.686	22.200			19.301
COMBINED (sum of column)	22.697	7.215	15.482	26.000	--	--	24.666

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1) Site Type	(2) N_{ped}	(3) N_{bike}
ROADWAY SEGMENTS		
Segment_1	0.022	0.006
Segment_2	0.016	0.004
Segment_3	0.018	0.004
Segment_4	0.009	0.002
Segment_5	0.007	0.002
Segment_6	0.000	0.000
Segment_7	0.000	0.000
Segment_8	0.000	0.000
INTERSECTIONS		
Intersection_1	0.013	0.030
Intersection_2	0.024	0.018
Intersection_3	0.017	0.048
Intersection_4	0.034	0.038
Intersection_5	0.033	0.025
Intersection_6	0.024	0.041
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.218	0.217

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	$N_{predicted}$	N_{ped}	N_{bike}	$N_{expected\ (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	22.697	0.218	0.217	24.666	25.101
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	7.215	0.218	0.217	7.841	8.276
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	15.482	0.000	0.000	16.825	16.825

Worksheet 4A -- Predicted Crashes by Collision and Site Type and Observed Crashes Using the Project-Level EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Collision type / Site type	**Predicted crashes**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	$N_{predicted\ w0}$ Equation A-8 $(6)*(2)^2$	$N_{predicted\ w1}$ Equation A-9 sqrt((6)*(2))	W_0 Equation A-10	N_0 Equation A-11	w_1 Equation A-12	N_1 Equation A-13	$N_{expected/comb}$ Equation A-14
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)									
ROADWAY SEGMENTS												
Multiple-vehicle nondriveway												
Segment_1	1.026	0.278	0.748	--	1.320	1.390	1.164	--	--	--	--	--
Segment_2	1.012	0.296	0.716	--	1.010	1.034	1.011	--	--	--	--	--
Segment_3	1.687	0.493	1.194	--	1.010	2.874	1.305	--	--	--	--	--
Segment_4	0.842	0.247	0.595	--	1.010	0.715	0.922	--	--	--	--	--
Segment_5	0.551	0.164	0.387	--	1.010	0.306	0.746	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	5.117	1.477	3.640									
Single-vehicle												
Segment_1	0.146	0.027	0.120	--	0.860	0.018	0.355	--	--	--	--	--
Segment_2	0.185	0.042	0.143	--	0.910	0.031	0.410	--	--	--	--	--
Segment_3	0.308	0.070	0.238	--	0.910	0.086	0.529	--	--	--	--	--
Segment_4	0.156	0.035	0.121	--	0.910	0.022	0.377	--	--	--	--	--
Segment_5	0.111	0.026	0.085	--	0.910	0.011	0.318	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	0.907	0.200	0.707									
Multiple-vehicle driveway-related												
Segment_1	0.000	0.000	0.000	--	1.390	0.000	0.000	--	--	--	--	--
Segment_2	0.579	0.198	0.381	--	0.810	0.272	0.685	--	--	--	--	--
Segment_3	0.000	0.000	0.000	--	0.810	0.000	0.000	--	--	--	--	--
Segment_4	0.000	0.000	0.000	--	0.810	0.000	0.000	--	--	--	--	--
Segment_5	0.103	0.035	0.068	--	0.810	0.009	0.289	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	0.683	0.233	0.449									
INTERSECTIONS												
Multiple-vehicle												
Intersection_1	2.556	0.850	1.706	--	0.330	2.156	0.918	--	--	--	--	--
Intersection_2	1.062	0.443	0.620	--	0.800	0.903	0.922	--	--	--	--	--
Intersection_3	4.100	1.347	2.753	--	0.330	5.547	1.163	--	--	--	--	--
Intersection_4	3.208	0.988	2.220	--	0.330	3.396	1.029	--	--	--	--	--
Intersection_5	1.445	0.524	0.920	--	0.800	1.669	1.075	--	--	--	--	--
Intersection_6	2.543	0.836	1.707	--	0.390	2.522	0.996	--	--	--	--	--
Intersection_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection Totals:	14.914	4.988	9.925									
Single-vehicle												
Intersection_1	0.191	0.056	0.135	--	0.360	0.013	0.262	--	--	--	--	--
Intersection_2	0.081	0.025	0.056	--	1.140	0.007	0.304	--	--	--	--	--
Intersection_3	0.230	0.062	0.168	--	0.360	0.019	0.288	--	--	--	--	--
Intersection_4	0.270	0.088	0.182	--	0.360	0.026	0.312	--	--	--	--	--
Intersection_5	0.139	0.042	0.096	--	1.140	0.022	0.398	--	--	--	--	--
Intersection_6	0.167	0.044	0.123	--	0.360	0.010	0.245	--	--	--	--	--

Intersection_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection Totals:	1.077	0.317	0.760									
COMBINED (sum of column)	22.697	7.215	15.482	34	--	23.060	16.023	0.496	28.393	0.586	27.374	27.884

Worksheet 4B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	**N_{ped}**	**N_{bike}**
ROADWAY SEGMENTS		
Segment_1	0.022	0.006
Segment_2	0.016	0.004
Segment_3	0.018	0.004
Segment_4	0.009	0.002
Segment_5	0.007	0.002
Segment_6	0.000	0.000
Segment_7	0.000	0.000
Segment_8	0.000	0.000
INTERSECTIONS		
Intersection_1	0.013	0.030
Intersection_2	0.024	0.018
Intersection_3	0.017	0.048
Intersection_4	0.034	0.038
Intersection_5	0.033	0.025
Intersection_6	0.024	0.041
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.218	0.217

Worksheet 4C -- Project-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	**$N_{predicted}$**	**N_{ped}**	**N_{bike}**	$N_{expected\ (vehicle)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 4A	$(2)_{COMB}$ from Worksheet 4B	$(3)_{COMB}$ from Worksheet 4B	$(13)_{COMB}$ Worksheet 4A	(3)+(4)+(5)
	22.697	0.218	0.217	27.884	28.319
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 4A	$(2)_{COMB}$ from Worksheet 4B	$(3)_{COMB}$ from Worksheet 4B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	7.215	0.218	0.217	8.864	9.299
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 4A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	15.482	0.000	0.000	19.020	19.020

APPENDIX G-2: 2025 NO-BUILD CONDITIONS HSM RESULTS

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	Sandifur Pkwy. To Harris Rd.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2025

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.07
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	40,063
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	10
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	229
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	3
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	2.46	1.01	1.00	1.00	2.49

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.557	1.000	0.557	2.49	1.00	1.384
Fatal and Injury (FI)	-12.76	1.28	1.31	0.157	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.267	0.149	2.49	1.00	0.370
Property Damage Only (PDO)	-12.81	1.38	1.34	0.430	$(5)_{TOTAL}-(5)_{FI}$ = 0.733	0.408	2.49	1.00	1.014

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.370	1.000	1.014	1.384
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.832	0.307	0.662	0.672	0.979
Head-on collision	0.020	0.007	0.007	0.007	0.014
Angle collision	0.040	0.015	0.036	0.037	0.051
Sideswipe, same direction	0.050	0.018	0.223	0.226	0.245
Sideswipe, opposite direction	0.010	0.004	0.001	0.001	0.005
Other multiple-vehicle collision	0.048	0.018	0.071	0.072	0.090

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-5.05	0.47	0.86	0.065	1.000	0.065	2.49	1.00	0.162
Fatal and Injury (FI)	-8.71	0.66	0.28	0.013	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.191	0.012	2.49	1.00	0.031
Property Damage Only (PDO)	-5.04	0.45	1.06	0.053	$(5)_{TOTAL}-(5)_{FI}$ = 0.809	0.053	2.49	1.00	0.131

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.031	1.000	0.131	0.162
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.063	0.008	0.008
Collision with fixed object	0.500	0.016	0.813	0.107	0.122
Collision with other object	0.028	0.001	0.016	0.002	0.003
Other single-vehicle collision	0.471	0.015	0.108	0.014	0.029

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.033	1.106	0.000	
Minor commercial	0	0.011	1.106	0.000	
Major industrial/institutional	0	0.036	1.106	0.000	
Minor industrial/institutional	0	0.005	1.106	0.000	--
Major residential	0	0.018	1.106	0.000	
Minor residential	0	0.003	1.106	0.000	
Other	0	0.005	1.106	0.000	
Total	--	--	--	0.000	1.39

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	2.49	1.00	0.000
Fatal and injury (FI)	--	0.284	0.000	2.49	1.00	0.000
Property damage only (PDO)	--	0.716	0.000	2.49	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	1.384	0.162	0.000	1.547	0.019	0.029
Fatal and injury (FI)	--	--	--	--	--	0.029

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	1.384	0.162	0.000	1.547	0.005	0.008
Fatal and injury (FI)	--	--	--	--	--	0.008

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.307	0.672	0.979
Head-on collisions (from Worksheet 1D)	0.007	0.007	0.014
Angle collisions (from Worksheet 1D)	0.015	0.037	0.051
Sideswipe, same direction (from Worksheet 1D)	0.018	0.226	0.245
Sideswipe, opposite direction (from Worksheet 1D)	0.004	0.001	0.005
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.018	0.072	0.090
Subtotal	0.370	1.014	1.384
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.008	0.008
Collision with fixed object (from Worksheet 1F)	0.016	0.107	0.122
Collision with other object (from Worksheet 1F)	0.001	0.002	0.003
Other single-vehicle collision (from Worksheet 1F)	0.015	0.014	0.029
Collision with pedestrian (from Worksheet 1I)	0.029	0.000	0.029
Collision with bicycle (from Worksheet 1J)	0.008	0.000	0.008
Subtotal	0.068	0.131	0.200
Total	0.438	1.146	1.584

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	1.6	0.07	22.6
Fatal and injury (FI)	0.4	0.07	6.3
Property damage only (PDO)	1.1	0.07	16.4

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	Harris Rd. To I-182 WB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2025

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.09
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	40,063
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	133
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	5
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.62	1.00	0.92	1.00	1.48

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	1.059	1.000	1.059	1.48	1.00	1.570
Fatal and Injury (FI)	-12.08	1.25	0.99	0.289	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.283	0.300	1.48	1.00	0.445
Property Damage Only (PDO)	-12.53	1.38	1.08	0.732	$(5)_{TOTAL}-(5)_{FI}$ = 0.717	0.759	1.48	1.00	1.125

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.445	1.000	1.125	1.570
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.227	0.506	0.569	0.797
Head-on collision	0.077	0.034	0.004	0.005	0.039
Angle collision	0.181	0.081	0.130	0.146	0.227
Sideswipe, same direction	0.093	0.041	0.249	0.280	0.322
Sideswipe, opposite direction	0.082	0.036	0.031	0.035	0.071
Other multiple-vehicle collision	0.056	0.025	0.080	0.090	0.115

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.163	1.000	0.163	1.48	1.00	0.242
Fatal and Injury (FI)	-7.37	0.61	0.54	0.036	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.213	0.035	1.48	1.00	0.051
Property Damage Only (PDO)	-8.50	0.84	0.97	0.135	$(5)_{TOTAL}-(5)_{FI}$ = 0.787	0.128	1.48	1.00	0.190

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.051	1.000	0.190	0.242
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.032	0.809	0.154	0.185
Collision with other object	0.020	0.001	0.029	0.006	0.007
Other single-vehicle collision	0.367	0.019	0.161	0.031	0.050

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	1	0.182	1.172	0.576	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.576	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.576	1.000	0.576	1.48	1.00	0.853
Fatal and injury (FI)	--	0.342	0.197	1.48	1.00	0.292
Property damage only (PDO)	--	0.658	0.379	1.48	1.00	0.561

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	1.570	0.242	0.853	2.665	0.009	0.024
Fatal and injury (FI)	--	--	--	--	--	0.024

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	1.570	0.242	0.853	2.665	0.002	0.005
Fatal and injury (FI)	--	--	--	--	--	0.005

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.227	0.569	0.797
Head-on collisions (from Worksheet 1D)	0.034	0.005	0.039
Angle collisions (from Worksheet 1D)	0.081	0.146	0.227
Sideswipe, same direction (from Worksheet 1D)	0.041	0.280	0.322
Sideswipe, opposite direction (from Worksheet 1D)	0.036	0.035	0.071
Driveway-related collisions (from Worksheet 1H)	0.292	0.561	0.853
Other multiple-vehicle collision (from Worksheet 1D)	0.025	0.090	0.115
Subtotal	0.737	1.687	2.424
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.032	0.154	0.185
Collision with other object (from Worksheet 1F)	0.001	0.006	0.007
Other single-vehicle collision (from Worksheet 1F)	0.019	0.031	0.050
Collision with pedestrian (from Worksheet 1I)	0.024	0.000	0.024
Collision with bicycle (from Worksheet 1J)	0.005	0.000	0.005
Subtotal	0.081	0.190	0.271
Total	0.818	1.877	2.695

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	2.7	0.09	29.9
Fatal and injury (FI)	0.8	0.09	9.1
Property damage only (PDO)	1.9	0.09	20.9

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	I-182 WB Ramps to I-182 EB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2025

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.22
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	37,306
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	18
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	1.00	1.00	1.01

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	2.355	1.000	2.355	1.01	1.00	2.374
Fatal and Injury (FI)	-12.08	1.25	0.99	0.647	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.285	0.672	1.01	1.00	0.677
Property Damage Only (PDO)	-12.53	1.38	1.08	1.621	$(5)_{TOTAL}-(5)_{FI}$ = 0.715	1.683	1.01	1.00	1.697

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.677	1.000	1.697	2.374
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.346	0.506	0.859	1.205
Head-on collision	0.077	0.052	0.004	0.007	0.059
Angle collision	0.181	0.123	0.130	0.221	0.343
Sideswipe, same direction	0.093	0.063	0.249	0.423	0.486
Sideswipe, opposite direction	0.082	0.056	0.031	0.053	0.108
Other multiple-vehicle collision	0.056	0.038	0.080	0.136	0.174

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.376	1.000	0.376	1.01	1.00	0.379
Fatal and Injury (FI)	-7.37	0.61	0.54	0.085	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.216	0.081	1.01	1.00	0.082
Property Damage Only (PDO)	-8.50	0.84	0.97	0.310	$(5)_{TOTAL}-(5)_{FI}$ = 0.784	0.295	1.01	1.00	0.298

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.082	1.000	0.298	0.379
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.050	0.809	0.241	0.291
Collision with other object	0.020	0.002	0.029	0.009	0.010
Other single-vehicle collision	0.367	0.030	0.161	0.048	0.078

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.000	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	1.01	1.00	0.000
Fatal and injury (FI)	--	0.342	0.000	1.01	1.00	0.000
Property damage only (PDO)	--	0.658	0.000	1.01	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	2.374	0.379	0.000	2.754	0.009	0.025
Fatal and injury (FI)	--	--	--	--	--	0.025

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	2.374	0.379	0.000	2.754	0.002	0.006
Fatal and injury (FI)	--	--	--	--	--	0.006

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.346	0.859	1.205
Head-on collisions (from Worksheet 1D)	0.052	0.007	0.059
Angle collisions (from Worksheet 1D)	0.123	0.221	0.343
Sideswipe, same direction (from Worksheet 1D)	0.063	0.423	0.486
Sideswipe, opposite direction (from Worksheet 1D)	0.056	0.053	0.108
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.038	0.136	0.174
Subtotal	0.677	1.697	2.374
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.050	0.241	0.291
Collision with other object (from Worksheet 1F)	0.002	0.009	0.010
Other single-vehicle collision (from Worksheet 1F)	0.030	0.048	0.078
Collision with pedestrian (from Worksheet 1I)	0.025	0.000	0.025
Collision with bicycle (from Worksheet 1J)	0.006	0.000	0.006
Subtotal	0.112	0.298	0.410
Total	0.789	1.994	2.784

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	2.8	0.22	12.7
Fatal and injury (FI)	0.8	0.22	3.6
Property damage only (PDO)	2.0	0.22	9.1

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	I-182 EB Ramps to St. Thomas Dr.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2025

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	30,693
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	27
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	3
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.14	1.00	0.92	1.00	1.05

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.908	1.000	0.908	1.05	1.00	0.954
Fatal and Injury (FI)	-12.08	1.25	0.99	0.253	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.290	0.264	1.05	1.00	0.277
Property Damage Only (PDO)	-12.53	1.38	1.08	0.619	$(5)_{TOTAL}-(5)_{FI}$ = 0.710	0.645	1.05	1.00	0.677

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.277	1.000	0.677	0.954
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.142	0.506	0.342	0.484
Head-on collision	0.077	0.021	0.004	0.003	0.024
Angle collision	0.181	0.050	0.130	0.088	0.138
Sideswipe, same direction	0.093	0.026	0.249	0.168	0.194
Sideswipe, opposite direction	0.082	0.023	0.031	0.021	0.044
Other multiple-vehicle collision	0.056	0.016	0.080	0.054	0.070

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.161	1.000	0.161	1.05	1.00	0.169
Fatal and Injury (FI)	-7.37	0.61	0.54	0.038	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.223	0.036	1.05	1.00	0.038
Property Damage Only (PDO)	-8.50	0.84	0.97	0.132	$(5)_{TOTAL}-(5)_{FI}$ = 0.777	0.125	1.05	1.00	0.131

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.038	1.000	0.131	0.169
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.023	0.809	0.106	0.129
Collision with other object	0.020	0.001	0.029	0.004	0.005
Other single-vehicle collision	0.367	0.014	0.161	0.021	0.035

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.000	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	1.05	1.00	0.000
Fatal and injury (FI)	--	0.342	0.000	1.05	1.00	0.000
Property damage only (PDO)	--	0.658	0.000	1.05	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	0.954	0.169	0.000	1.122	0.009	0.010
Fatal and injury (FI)	--	--	--	--	--	0.010

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	0.954	0.169	0.000	1.122	0.002	0.002
Fatal and injury (FI)	--	--	--	--	--	0.002

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.142	0.342	0.484
Head-on collisions (from Worksheet 1D)	0.021	0.003	0.024
Angle collisions (from Worksheet 1D)	0.050	0.088	0.138
Sideswipe, same direction (from Worksheet 1D)	0.026	0.168	0.194
Sideswipe, opposite direction (from Worksheet 1D)	0.023	0.021	0.044
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.016	0.054	0.070
Subtotal	0.277	0.677	0.954
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.023	0.106	0.129
Collision with other object (from Worksheet 1F)	0.001	0.004	0.005
Other single-vehicle collision (from Worksheet 1F)	0.014	0.021	0.035
Collision with pedestrian (from Worksheet 1I)	0.010	0.000	0.010
Collision with bicycle (from Worksheet 1J)	0.002	0.000	0.002
Subtotal	0.050	0.131	0.181
Total	0.327	0.808	1.135

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	1.1	0.11	10.3
Fatal and injury (FI)	0.3	0.11	3.0
Property damage only (PDO)	0.8	0.11	7.3

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	St. Thomas Dr. To Chapel Hill Blvd.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2025

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.09
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	27,297
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	44
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	8
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.12	1.00	0.92	1.00	1.03

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.636	1.000	0.636	1.03	1.00	0.656
Fatal and Injury (FI)	-12.08	1.25	0.99	0.179	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.294	0.187	1.03	1.00	0.193
Property Damage Only (PDO)	-12.53	1.38	1.08	0.431	$(5)_{TOTAL}-(5)_{FI}$ = 0.706	0.449	1.03	1.00	0.464

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.193	1.000	0.464	0.656
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.098	0.506	0.235	0.333
Head-on collision	0.077	0.015	0.004	0.002	0.017
Angle collision	0.181	0.035	0.130	0.060	0.095
Sideswipe, same direction	0.093	0.018	0.249	0.115	0.133
Sideswipe, opposite direction	0.082	0.016	0.031	0.014	0.030
Other multiple-vehicle collision	0.056	0.011	0.080	0.037	0.048

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.120	1.000	0.120	1.03	1.00	0.123
Fatal and Injury (FI)	-7.37	0.61	0.54	0.029	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.228	0.027	1.03	1.00	0.028
Property Damage Only (PDO)	-8.50	0.84	0.97	0.098	$(5)_{TOTAL}-(5)_{FI}$ = 0.772	0.092	1.03	1.00	0.095

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.028	1.000	0.095	0.123
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.017	0.809	0.077	0.094
Collision with other object	0.020	0.001	0.029	0.003	0.003
Other single-vehicle collision	0.367	0.010	0.161	0.015	0.026

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
	from Table 12-7	from Table 12-7		Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	--
Minor commercial	1	0.058	1.172	0.117	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.117	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.117	1.000	0.117	1.03	1.00	0.121
Fatal and injury (FI)	--	0.342	0.040	1.03	1.00	0.041
Property damage only (PDO)	--	0.658	0.077	1.03	1.00	0.079

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	0.656	0.123	0.121	0.900	0.009	0.008
Fatal and injury (FI)	--	--	--	--	--	0.008

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	0.656	0.123	0.121	0.900	0.002	0.002
Fatal and injury (FI)	--	--	--	--	--	0.002

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.098	0.235	0.333
Head-on collisions (from Worksheet 1D)	0.015	0.002	0.017
Angle collisions (from Worksheet 1D)	0.035	0.060	0.095
Sideswipe, same direction (from Worksheet 1D)	0.018	0.115	0.133
Sideswipe, opposite direction (from Worksheet 1D)	0.016	0.014	0.030
Driveway-related collisions (from Worksheet 1H)	0.041	0.079	0.121
Other multiple-vehicle collision (from Worksheet 1D)	0.011	0.037	0.048
Subtotal	0.234	0.543	0.777
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.017	0.077	0.094
Collision with other object (from Worksheet 1F)	0.001	0.003	0.003
Other single-vehicle collision (from Worksheet 1F)	0.010	0.015	0.026
Collision with pedestrian (from Worksheet 1I)	0.008	0.000	0.008
Collision with bicycle (from Worksheet 1J)	0.002	0.000	0.002
Subtotal	0.038	0.095	0.133
Total	0.272	0.638	0.910

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	0.9	0.09	10.1
Fatal and injury (FI)	0.3	0.09	3.0
Property damage only (PDO)	0.6	0.09	7.1

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			**Location Information**		
Analyst	Caleb Trapp		Roadway	Broadmoor Blvd.	
Agency or Company	DKS Associates		Intersection	Sandifur Pkwy	
Date Performed	01/04/22		Jurisdiction	Pasco, WA	
			Analysis Year	2025	
Input Data			**Base Conditions**	**Site Conditions**	
Intersection type (3ST, 3SG, 4ST, 4SG)			--	3SG	
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ =	58,100 (veh/day)	--	25,438	
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ =	16,400 (veh/day)	--	6,339	
Intersection lighting (present/not present)			Not Present	Present	
Calibration factor, C_i			1.00	1.00	
Data for unsignalized intersections only:			--	--	
Number of major-road approaches with left-turn lanes (0,1,2)			0	1	
Number of major-road approaches with right-turn lanes (0,1,2)			0	0	
Data for signalized intersections only:			--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]			0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]			0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]			--	2	
Type of left-turn signal phasing for Leg #1			Permissive	Protected / Permissive	
Type of left-turn signal phasing for Leg #2			--	Protected	
Type of left-turn signal phasing for Leg #3			--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)			--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]			0	0	
Intersection red light cameras (present/not present)			Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only				2	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})			--	5	
Number of bus stops within 300 m (1,000 ft) of the intersection			0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)			Not Present	Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection			0	0	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.86	0.93	0.92	1.00	0.91	1.00	0.67

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	4.080	1.000	4.080	0.67	1.00	2.740
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	1.291	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.333	1.358	0.67	1.00	0.912
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	2.587	$(5)_{TOTAL}-(5)_{FI}$ 0.667	2.722	0.67	1.00	1.828

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	0.912	1.000	1.828	2.740
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	0.501	0.546	0.998	1.499
Head-on collision	0.038	0.035	0.020	0.037	0.071
Angle collision	0.280	0.255	0.204	0.373	0.628
Sideswipe	0.076	0.069	0.032	0.059	0.128
Other multiple-vehicle collision	0.057	0.052	0.198	0.362	0.414

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.284	1.000	0.284	0.67	1.00	0.191
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.078	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.285	0.081	0.67	1.00	0.054
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.197	$(5)_{TOTAL}-(5)_{FI}$ 0.715	0.203	0.67	1.00	0.137

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.054	1.000	0.137	0.191
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.000	0.000
Collision with fixed object	0.653	0.036	0.895	0.122	0.158
Collision with other object	0.091	0.005	0.069	0.009	0.014
Other single-vehicle collision	0.045	0.002	0.018	0.002	0.005
Single-vehicle noncollision	0.209	0.011	0.014	0.002	0.013

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.00	3.75

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.003	3.75	1.00	0.013
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.013

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	2.740	0.191	2.931	0.011	0.032
Fatal and injury (FI)	--	--	--	--	0.032

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.501	0.998	1.499
Head-on collisions (from Worksheet 2D)	0.035	0.037	0.071
Angle collisions (from Worksheet 2D)	0.255	0.373	0.628
Sideswipe (from Worksheet 2D)	0.069	0.059	0.128
Other multiple-vehicle collision (from Worksheet 2D)	0.052	0.362	0.414
Subtotal	0.912	1.828	2.740
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.036	0.122	0.158
Collision with other object (from Worksheet 2F)	0.005	0.009	0.014
Other single-vehicle collision (from Worksheet 2F)	0.002	0.002	0.005
Single-vehicle noncollision (from Worksheet 2F)	0.011	0.002	0.013
Collision with pedestrian (from Worksheet 2G or 2I)	0.013	0.000	0.013
Collision with bicycle (from Worksheet 2J)	0.032	0.000	0.032
Subtotal	0.099	0.137	0.236
Total	1.012	1.965	2.976

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	3.0
Fatal and injury (FI)	1.0
Property damage only (PDO)	2.0

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	I-182 WB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2025

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ = 58,100 (veh/day)	--	47,320
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ = 16,400 (veh/day)	--	7,550
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	1
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	3
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	0
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Not Applicable
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			7
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	4
Number of bus stops within 300 m (1,000 ft) of the intersection		0	1
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.93	1.00	0.88	1.00	0.91	1.00	0.75

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	8.503	1.000	8.503	0.75	1.00	6.372
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	2.504	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.312	2.650	0.75	1.00	1.985
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	5.532	$(5)_{TOTAL}-(5)_{FI}$ = 0.688	5.853	0.75	1.00	4.386

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	1.985	1.000	4.386	6.372
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	1.090	0.546	2.395	3.485
Head-on collision	0.038	0.075	0.020	0.088	0.163
Angle collision	0.280	0.556	0.204	0.895	1.451
Sideswipe	0.076	0.151	0.032	0.140	0.291
Other multiple-vehicle collision	0.057	0.113	0.198	0.868	0.982

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.396	1.000	0.396	0.75	1.00	0.297
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.101	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.269	0.106	0.75	1.00	0.080
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.275	$(5)_{TOTAL}-(5)_{FI}$ = 0.731	0.289	0.75	1.00	0.217

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.080	1.000	0.217	0.297
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.001	0.001
Collision with fixed object	0.653	0.052	0.895	0.194	0.246
Collision with other object	0.091	0.007	0.069	0.015	0.022
Other single-vehicle collision	0.045	0.004	0.018	0.004	0.007
Single-vehicle noncollision	0.209	0.017	0.014	0.003	0.020

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.00	3.75

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.005	3.75	1.00	0.018
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.018

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	6.372	0.297	6.668	0.011	0.073
Fatal and injury (FI)	--	--	--	--	0.073

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	1.090	2.395	3.485
Head-on collisions (from Worksheet 2D)	0.075	0.088	0.163
Angle collisions (from Worksheet 2D)	0.556	0.895	1.451
Sideswipe (from Worksheet 2D)	0.151	0.140	0.291
Other multiple-vehicle collision (from Worksheet 2D)	0.113	0.868	0.982
Subtotal	1.985	4.386	6.372
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.052	0.194	0.246
Collision with other object (from Worksheet 2F)	0.007	0.015	0.022
Other single-vehicle collision (from Worksheet 2F)	0.004	0.004	0.007
Single-vehicle noncollision (from Worksheet 2F)	0.017	0.003	0.020
Collision with pedestrian (from Worksheet 2G or 2I)	0.018	0.000	0.018
Collision with bicycle (from Worksheet 2J)	0.073	0.000	0.073
Subtotal	0.171	0.217	0.388
Total	2.157	4.603	6.759

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	6.8
Fatal and injury (FI)	2.2
Property damage only (PDO)	4.6

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			**Location Information**		
Analyst	Caleb Trapp		Roadway	Broadmoor Blvd.	
Agency or Company	DKS Associates		Intersection	I-182 EB Ramps	
Date Performed	01/04/22		Jurisdiction	Pasco, WA	
			Analysis Year	2025	
Input Data			**Base Conditions**	**Site Conditions**	
Intersection type (3ST, 3SG, 4ST, 4SG)			--	3SG	
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ =	58,100 (veh/day)	--	28,405	
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ =	16,400 (veh/day)	--	16,400	
Intersection lighting (present/not present)			Not Present	Present	
Calibration factor, C_i			1.00	1.00	
Data for unsignalized intersections only:			--	--	
Number of major-road approaches with left-turn lanes (0,1,2)			0	1	
Number of major-road approaches with right-turn lanes (0,1,2)			0	0	
Data for signalized intersections only:			--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]			0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]			0	2	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]			--	2	
Type of left-turn signal phasing for Leg #1			Permissive	Protected / Permissive	
Type of left-turn signal phasing for Leg #2			--	Protected	
Type of left-turn signal phasing for Leg #3			--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)			--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]			0	0	
Intersection red light cameras (present/not present)			Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only				10	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})			--	5	
Number of bus stops within 300 m (1,000 ft) of the intersection			0	1	
Schools within 300 m (1,000 ft) of the intersection (present/not present)			Not Present	Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection			0	1	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.86	0.93	0.92	1.00	0.91	1.00	0.67

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	5.904	1.000	5.904	0.67	1.00	3.966
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	1.698	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.303	1.790	0.67	1.00	1.202
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	3.902	$(5)_{TOTAL}-(5)_{FI}$ = 0.697	4.114	0.67	1.00	2.763

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	1.202	1.000	2.763	3.966
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	0.660	0.546	1.509	2.169
Head-on collision	0.038	0.046	0.020	0.055	0.101
Angle collision	0.280	0.337	0.204	0.564	0.900
Sideswipe	0.076	0.091	0.032	0.088	0.180
Other multiple-vehicle collision	0.057	0.069	0.198	0.547	0.616

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.436	1.000	0.436	0.67	1.00	0.293
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.131	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.317	0.138	0.67	1.00	0.093
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.283	$(5)_{TOTAL}-(5)_{FI}$ = 0.683	0.298	0.67	1.00	0.200

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.093	1.000	0.200	0.293
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.001	0.001
Collision with fixed object	0.653	0.061	0.895	0.179	0.239
Collision with other object	0.091	0.008	0.069	0.014	0.022
Other single-vehicle collision	0.045	0.004	0.018	0.004	0.008
Single-vehicle noncollision	0.209	0.019	0.014	0.003	0.022

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.12	4.20

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.008	4.20	1.00	0.035
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.035

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	3.966	0.293	4.258	0.011	0.047
Fatal and injury (FI)	--	--	--	--	0.047

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.660	1.509	2.169
Head-on collisions (from Worksheet 2D)	0.046	0.055	0.101
Angle collisions (from Worksheet 2D)	0.337	0.564	0.900
Sideswipe (from Worksheet 2D)	0.091	0.088	0.180
Other multiple-vehicle collision (from Worksheet 2D)	0.069	0.547	0.616
Subtotal	1.202	2.763	3.966
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.061	0.179	0.239
Collision with other object (from Worksheet 2F)	0.008	0.014	0.022
Other single-vehicle collision (from Worksheet 2F)	0.004	0.004	0.008
Single-vehicle noncollision (from Worksheet 2F)	0.019	0.003	0.022
Collision with pedestrian (from Worksheet 2G or 2I)	0.035	0.000	0.035
Collision with bicycle (from Worksheet 2J)	0.047	0.000	0.047
Subtotal	0.174	0.200	0.374
Total	1.376	2.963	4.340

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	4.3
Fatal and injury (FI)	1.4
Property damage only (PDO)	3.0

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections						
General Information				**Location Information**		
Analyst	Caleb Trapp			Roadway	Broadmoor Blvd.	
Agency or Company	DKS Associates			Intersection	St. Thomas Dr.	
Date Performed	01/04/22			Jurisdiction	Pasco, WA	
				Analysis Year	2025	
Input Data				**Base Conditions**	**Site Conditions**	
Intersection type (3ST, 3SG, 4ST, 4SG)				--	3ST	
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ =	45,700	(veh/day)	--	27,735	
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ =	9,300	(veh/day)	--	1,450	
Intersection lighting (present/not present)				Not Present	Present	
Calibration factor, C_i				1.00	1.00	
Data for unsignalized intersections only:				--	--	
Number of major-road approaches with left-turn lanes (0,1,2)				0	0	
Number of major-road approaches with right-turn lanes (0,1,2)				0	0	
Data for signalized intersections only:				--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	2	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	1	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]				--	2	
Type of left-turn signal phasing for Leg #1				Permissive	Protected	
Type of left-turn signal phasing for Leg #2				--	Protected	
Type of left-turn signal phasing for Leg #3				--	Not Applicable	
Type of left-turn signal phasing for Leg #4 (if applicable)				--	Not Applicable	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]				0	0	
Intersection red light cameras (present/not present)				Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only					10	
Maximum number of lanes crossed by a pedestrian (n_{lanesx})				--	4	
Number of bus stops within 300 m (1,000 ft) of the intersection				0	2	
Schools within 300 m (1,000 ft) of the intersection (present/not present)				Not Present	Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection				0	1	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	1.00	1.00	0.91	1.00	0.91

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-13.36	1.11	0.41	0.80	2.665	1.000	2.665	0.91	1.00	2.424
Fatal and Injury (FI)	-14.01	1.16	0.30	0.69	1.042	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.362	0.964	0.91	1.00	0.877
Property Damage Only (PDO)	-15.38	1.20	0.51	0.77	1.839	$(5)_{TOTAL}-(5)_{FI}$ = 0.638	1.701	0.91	1.00	1.547

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	0.877	1.000	1.547	2.424
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.421	0.369	0.440	0.681	1.050
Head-on collision	0.045	0.039	0.023	0.036	0.075
Angle collision	0.343	0.301	0.262	0.405	0.706
Sideswipe	0.126	0.110	0.040	0.062	0.172
Other multiple-vehicle collision	0.065	0.057	0.235	0.364	0.421

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-6.81	0.16	0.51	1.14	0.232	1.000	0.232	0.91	1.00	0.211
Fatal and Injury (FI)	--	--	--	--	0.072	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.303	0.070	0.91	1.00	0.064
Property Damage Only (PDO)	-8.36	0.25	0.55	1.29	0.166	$(5)_{TOTAL}-(5)_{FI}$ = 0.697	0.162	0.91	1.00	0.147

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.064	1.000	0.147	0.211
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.003	0.000	0.001
Collision with animal	0.003	0.000	0.018	0.003	0.003
Collision with fixed object	0.762	0.049	0.834	0.123	0.171
Collision with other object	0.090	0.006	0.092	0.014	0.019
Other single-vehicle collision	0.039	0.002	0.023	0.003	0.006
Single-vehicle noncollision	0.105	0.007	0.030	0.004	0.011

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	2.424	0.211	2.635	0.021	0.055
Fatal and injury (FI)	--	--	--	--	0.055

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
--	--	--	--

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	--	--	--	--	--	--	--	--	1.00	--
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	--

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	2.424	0.211	2.635	0.016	0.042
Fatal and injury (FI)	--	--	--	--	0.042

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.369	0.681	1.050
Head-on collisions (from Worksheet 2D)	0.039	0.036	0.075
Angle collisions (from Worksheet 2D)	0.301	0.405	0.706
Sideswipe (from Worksheet 2D)	0.110	0.062	0.172
Other multiple-vehicle collision (from Worksheet 2D)	0.057	0.364	0.421
Subtotal	0.877	1.547	2.424
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.001
Collision with animal (from Worksheet 2F)	0.000	0.003	0.003
Collision with fixed object (from Worksheet 2F)	0.049	0.123	0.171
Collision with other object (from Worksheet 2F)	0.006	0.014	0.019
Other single-vehicle collision (from Worksheet 2F)	0.002	0.003	0.006
Single-vehicle noncollision (from Worksheet 2F)	0.007	0.004	0.011
Collision with pedestrian (from Worksheet 2G or 2I)	0.055	0.000	0.055
Collision with bicycle (from Worksheet 2J)	0.042	0.000	0.042
Subtotal	0.161	0.147	0.309
Total	1.038	1.694	2.733

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	2.7
Fatal and injury (FI)	1.0
Property damage only (PDO)	1.7

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information				**Location Information**	
Analyst	Caleb Trapp			Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates			Intersection	Chapel Hill Blvd.
Date Performed	01/04/22			Jurisdiction	Pasco, WA
				Analysis Year	2025
Input Data				**Base Conditions**	**Site Conditions**
Intersection type (3ST, 3SG, 4ST, 4SG)				--	4SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ =	67,700	(veh/day)	--	21,625
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ =	33,400	(veh/day)	--	5,225
Intersection lighting (present/not present)				Not Present	Present
Calibration factor, C_i				1.00	1.00
Data for unsignalized intersections only:				--	--
Number of major-road approaches with left-turn lanes (0,1,2)				0	2
Number of major-road approaches with right-turn lanes (0,1,2)				0	0
Data for signalized intersections only:				--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]				0	0
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]				--	4
Type of left-turn signal phasing for Leg #1				Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2				--	Protected / Permissive
Type of left-turn signal phasing for Leg #3				--	Protected / Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)				--	Protected / Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]				0	0
Intersection red light cameras (present/not present)				Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only					7
Maximum number of lanes crossed by a pedestrian (n_{lanesx})				--	5
Number of bus stops within 300 m (1,000 ft) of the intersection				0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)				Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection				0	1

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.96	1.00	1.00	0.91	1.00	0.58

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	5.256	1.000	5.256	0.58	1.00	3.035
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	1.685	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.333	1.751	0.58	1.00	1.011
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	3.373	$(5)_{TOTAL}-(5)_{FI}$ 0.667	3.505	0.58	1.00	2.024

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	1.011	1.000	2.024	3.035
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.450	0.455	0.483	0.978	1.432
Head-on collision	0.049	0.050	0.030	0.061	0.110
Angle collision	0.347	0.351	0.244	0.494	0.845
Sideswipe	0.099	0.100	0.032	0.065	0.165
Other multiple-vehicle collision	0.055	0.056	0.211	0.427	0.483

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.329	1.000	0.329	0.58	1.00	0.190
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.084	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ 0.257	0.085	0.58	1.00	0.049
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.243	$(5)_{TOTAL}-(5)_{FI}$ 0.743	0.245	0.58	1.00	0.141

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.049	1.000	0.141	0.190
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.000
Collision with fixed object	0.744	0.036	0.870	0.123	0.159
Collision with other object	0.072	0.004	0.070	0.010	0.013
Other single-vehicle collision	0.040	0.002	0.023	0.003	0.005
Single-vehicle noncollision	0.141	0.007	0.034	0.005	0.012

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.00	1.12	3.11

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.009	3.11	1.00	0.027
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.027

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	3.035	0.190	3.225	0.015	0.048
Fatal and injury (FI)	--	--	--	--	0.048

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.455	0.978	1.432
Head-on collisions (from Worksheet 2D)	0.050	0.061	0.110
Angle collisions (from Worksheet 2D)	0.351	0.494	0.845
Sideswipe (from Worksheet 2D)	0.100	0.065	0.165
Other multiple-vehicle collision (from Worksheet 2D)	0.056	0.427	0.483
Subtotal	1.011	2.024	3.035
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.036	0.123	0.159
Collision with other object (from Worksheet 2F)	0.004	0.010	0.013
Other single-vehicle collision (from Worksheet 2F)	0.002	0.003	0.005
Single-vehicle noncollision (from Worksheet 2F)	0.007	0.005	0.012
Collision with pedestrian (from Worksheet 2G or 2I)	0.027	0.000	0.027
Collision with bicycle (from Worksheet 2J)	0.048	0.000	0.048
Subtotal	0.124	0.141	0.266
Total	1.135	2.165	3.300

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	3.3
Fatal and injury (FI)	1.1
Property damage only (PDO)	2.2

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment_1	1.384	0.370	1.014	0.000	1.320	0.354	0.490
Segment_2	1.570	0.445	1.125	0.000	1.010	0.387	0.607
Segment_3	2.374	0.677	1.697	0.000	1.010	0.294	0.699
Segment_4	0.954	0.277	0.677	0.000	1.010	0.509	0.486
Segment_5	0.656	0.193	0.464	0.000	1.010	0.601	0.395
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Single-vehicle							
Segment_1	0.162	0.031	0.131	0.000	0.860	0.877	0.143
Segment_2	0.242	0.051	0.190	0.000	0.910	0.820	0.198
Segment_3	0.379	0.082	0.298	0.000	0.910	0.743	0.282
Segment_4	0.169	0.038	0.131	0.000	0.910	0.867	0.146
Segment_5	0.123	0.028	0.095	0.000	0.910	0.899	0.111
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Multiple-vehicle driveway-related							
Segment_1	0.000	0.000	0.000	0.000	1.390	1.000	0.000
Segment_2	0.853	0.292	0.561	0.000	0.810	0.591	0.505
Segment_3	0.000	0.000	0.000	0.000	0.810	1.000	0.000
Segment_4	0.000	0.000	0.000	0.000	0.810	1.000	0.000
Segment_5	0.121	0.041	0.079	0.000	0.810	0.911	0.110
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment Totals:	8.988	2.525	6.463	0.000			4.170
INTERSECTIONS							
Multiple-vehicle							
Intersection_1	2.740	0.912	1.828	0.000	0.330	0.525	1.439
Intersection_2	0.000	0.000	0.000	0.000	0.800	1.000	0.000
Intersection_3	6.372	1.985	4.386	0.000	0.330	0.322	2.054
Intersection_4	3.966	1.202	2.763	0.000	0.330	0.433	1.718
Intersection_5	2.424	0.877	1.547	0.000	0.800	0.340	0.825
Intersection_6	3.035	1.011	2.024	0.000	0.390	0.458	1.390
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Single-vehicle							
Intersection_1	0.191	0.054	0.137	0.200	0.360	0.936	0.192
Intersection_2	0.000	0.000	0.000	0.000	1.140	1.000	0.000
Intersection_3	0.297	0.080	0.217	0.000	0.360	0.904	0.268

Intersection_4	0.293	0.093	0.200	0.000	0.360	0.905	0.265
Intersection_5	0.211	0.064	0.147	0.000	1.140	0.806	0.170
Intersection_6	0.190	0.049	0.141	0.000	0.360	0.936	0.178
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection Totals:	19.718	6.327	13.390	0.200			8.497
COMBINED (sum of column)	28.706	8.852	19.854	0.200	--	--	12.667

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1) Site Type	(2) N_{ped}	(3) N_{bike}
ROADWAY SEGMENTS		
Segment_1	0.029	0.008
Segment_2	0.024	0.005
Segment_3	0.025	0.006
Segment_4	0.010	0.002
Segment_5	0.008	0.002
Segment_6	0.000	0.000
Segment_7	0.000	0.000
Segment_8	0.000	0.000
INTERSECTIONS		
Intersection_1	0.013	0.032
Intersection_2	0.000	0.000
Intersection_3	0.018	0.073
Intersection_4	0.035	0.047
Intersection_5	0.055	0.042
Intersection_6	0.027	0.048
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.244	0.266

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	$N_{predicted}$	N_{ped}	N_{bike}	$N_{expected\ (VEHICLE)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	28.706	0.244	0.266	12.667	13.177
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	8.852	0.244	0.266	3.906	4.416
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	19.854	0.000	0.000	8.761	8.761

Worksheet 4A -- Predicted Crashes by Collision and Site Type and Observed Crashes Using the Project-Level EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Collision type / Site type	**Predicted crashes**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	$N_{predicted\ w0}$ Equation A-8 $(6)*(2)^2$	$N_{predicted\ w1}$ Equation A-9 sqrt((6)*(2))	W_0 Equation A-10	N_0 Equation A-11	w_1 Equation A-12	N_1 Equation A-13	$N_{expected/comb}$ Equation A-14
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)									
ROADWAY SEGMENTS												
Multiple-vehicle nondriveway												
Segment_1	1.384	0.370	1.014	--	1.320	2.529	1.352	--	--	--	--	--
Segment_2	1.570	0.445	1.125	--	1.010	2.491	1.259	--	--	--	--	--
Segment_3	2.374	0.677	1.697	--	1.010	5.693	1.549	--	--	--	--	--
Segment_4	0.954	0.277	0.677	--	1.010	0.918	0.981	--	--	--	--	--
Segment_5	0.656	0.193	0.464	--	1.010	0.435	0.814	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	6.938	1.962	4.977									
Single-vehicle												
Segment_1	0.162	0.031	0.131	--	0.860	0.023	0.374	--	--	--	--	--
Segment_2	0.242	0.051	0.190	--	0.910	0.053	0.469	--	--	--	--	--
Segment_3	0.379	0.082	0.298	--	0.910	0.131	0.588	--	--	--	--	--
Segment_4	0.169	0.038	0.131	--	0.910	0.026	0.392	--	--	--	--	--
Segment_5	0.123	0.028	0.095	--	0.910	0.014	0.335	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	1.076	0.230	0.845									
Multiple-vehicle driveway-related												
Segment_1	0.000	0.000	0.000	--	1.390	0.000	0.000	--	--	--	--	--
Segment_2	0.853	0.292	0.561	--	0.810	0.590	0.831	--	--	--	--	--
Segment_3	0.000	0.000	0.000	--	0.810	0.000	0.000	--	--	--	--	--
Segment_4	0.000	0.000	0.000	--	0.810	0.000	0.000	--	--	--	--	--
Segment_5	0.121	0.041	0.079	--	0.810	0.012	0.313	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	0.974	0.333	0.641									
INTERSECTIONS												
Multiple-vehicle												
Intersection_1	2.740	0.912	1.828	--	0.330	2.478	0.951	--	--	--	--	--
Intersection_2	0.000	0.000	0.000	--	0.800	0.000	0.000	--	--	--	--	--
Intersection_3	6.372	1.985	4.386	--	0.330	13.397	1.450	--	--	--	--	--
Intersection_4	3.966	1.202	2.763	--	0.330	5.190	1.144	--	--	--	--	--
Intersection_5	2.424	0.877	1.547	--	0.800	4.702	1.393	--	--	--	--	--
Intersection_6	3.035	1.011	2.024	--	0.390	3.592	1.088	--	--	--	--	--
Intersection_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection Totals:	18.537	5.988	12.549									
Single-vehicle												
Intersection_1	0.191	0.054	0.137	--	0.360	0.013	0.262	--	--	--	--	--
Intersection_2	0.000	0.000	0.000	--	1.140	0.000	0.000	--	--	--	--	--
Intersection_3	0.297	0.080	0.217	--	0.360	0.032	0.327	--	--	--	--	--
Intersection_4	0.293	0.093	0.200	--	0.360	0.031	0.325	--	--	--	--	--
Intersection_5	0.211	0.064	0.147	--	1.140	0.051	0.491	--	--	--	--	--
Intersection_6	0.190	0.049	0.141	--	0.360	0.013	0.262	--	--	--	--	--

Intersection_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection Totals:	1.181	0.340	0.842									
COMBINED (sum of column)	28.706	8.852	19.854	34	--	42.412	16.947	0.404	31.863	0.629	30.671	31.267

Worksheet 4B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	**N_{ped}**	**N_{bike}**
ROADWAY SEGMENTS		
Segment_1	0.029	0.008
Segment_2	0.024	0.005
Segment_3	0.025	0.006
Segment_4	0.010	0.002
Segment_5	0.008	0.002
Segment_6	0.000	0.000
Segment_7	0.000	0.000
Segment_8	0.000	0.000
INTERSECTIONS		
Intersection_1	0.013	0.032
Intersection_2	0.000	0.000
Intersection_3	0.018	0.073
Intersection_4	0.035	0.047
Intersection_5	0.055	0.042
Intersection_6	0.027	0.048
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.244	0.266

Worksheet 4C -- Project-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	**$N_{predicted}$**	**N_{ped}**	**N_{bike}**	$N_{expected\ (vehicle)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 4A	$(2)_{COMB}$ from Worksheet 4B	$(3)_{COMB}$ from Worksheet 4B	$(13)_{COMB}$ Worksheet 4A	(3)+(4)+(5)
	28.706	0.244	0.266	31.267	31.777
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 4A	$(2)_{COMB}$ from Worksheet 4B	$(3)_{COMB}$ from Worksheet 4B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	8.852	0.244	0.266	9.642	10.152
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 4A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	19.854	0.000	0.000	21.625	21.625

APPENDIX G-3: 2045 NO-BUILD CONDITIONS HSM RESULTS

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	Sandifur Pkwy. To Harris Rd.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4D
Length of segment, L (mi)		--	0.07
AADT (veh/day)	$AADT_{MAX}$ = 66,000 (veh/day)	--	55,250
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	10
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	320
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	3
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	3.06	1.01	1.00	1.00	3.09

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-12.34	1.36	1.32	0.862	1.000	0.862	3.09	1.00	2.661
Fatal and Injury (FI)	-12.76	1.28	1.31	0.236	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.261	0.225	3.09	1.00	0.694
Property Damage Only (PDO)	-12.81	1.38	1.34	0.670	$(5)_{TOTAL}-(5)_{FI}$ = 0.739	0.637	3.09	1.00	1.967

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.694	1.000	1.967	2.661
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.832	0.577	0.662	1.302	1.879
Head-on collision	0.020	0.014	0.007	0.014	0.028
Angle collision	0.040	0.028	0.036	0.071	0.099
Sideswipe, same direction	0.050	0.035	0.223	0.439	0.473
Sideswipe, opposite direction	0.010	0.007	0.001	0.002	0.009
Other multiple-vehicle collision	0.048	0.033	0.071	0.140	0.173

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-5.05	0.47	0.86	0.076	1.000	0.076	3.09	1.00	0.235
Fatal and Injury (FI)	-8.71	0.66	0.28	0.016	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.202	0.015	3.09	1.00	0.047
Property Damage Only (PDO)	-5.04	0.45	1.06	0.062	$(5)_{TOTAL}-(5)_{FI}$ = 0.798	0.061	3.09	1.00	0.187

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.047	1.000	0.187	0.235
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.063	0.012	0.012
Collision with fixed object	0.500	0.024	0.813	0.152	0.176
Collision with other object	0.028	0.001	0.016	0.003	0.004
Other single-vehicle collision	0.471	0.022	0.108	0.020	0.043

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.033	1.106	0.000	
Minor commercial	0	0.011	1.106	0.000	
Major industrial/institutional	0	0.036	1.106	0.000	
Minor industrial/institutional	0	0.005	1.106	0.000	--
Major residential	0	0.018	1.106	0.000	
Minor residential	0	0.003	1.106	0.000	
Other	0	0.005	1.106	0.000	
Total	--	--	--	0.000	1.39

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	3.09	1.00	0.000
Fatal and injury (FI)	--	0.284	0.000	3.09	1.00	0.000
Property damage only (PDO)	--	0.716	0.000	3.09	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	2.661	0.235	0.000	2.896	0.019	0.055
Fatal and injury (FI)	--	--	--	--	--	0.055

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	2.661	0.235	0.000	2.896	0.005	0.014
Fatal and injury (FI)	--	--	--	--	--	0.014

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)** (3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	**Property damage only (PDO)** (5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	**Total** (6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.577	1.302	1.879
Head-on collisions (from Worksheet 1D)	0.014	0.014	0.028
Angle collisions (from Worksheet 1D)	0.028	0.071	0.099
Sideswipe, same direction (from Worksheet 1D)	0.035	0.439	0.473
Sideswipe, opposite direction (from Worksheet 1D)	0.007	0.002	0.009
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.033	0.140	0.173
Subtotal	0.694	1.967	2.661
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.012	0.012
Collision with fixed object (from Worksheet 1F)	0.024	0.152	0.176
Collision with other object (from Worksheet 1F)	0.001	0.003	0.004
Other single-vehicle collision (from Worksheet 1F)	0.022	0.020	0.043
Collision with pedestrian (from Worksheet 1I)	0.055	0.000	0.055
Collision with bicycle (from Worksheet 1J)	0.014	0.000	0.014
Subtotal	0.117	0.187	0.304
Total	0.811	2.154	2.965

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	3.0	0.07	42.4
Fatal and injury (FI)	0.8	0.07	11.6
Property damage only (PDO)	2.2	0.07	30.8

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	Harris Rd. To I-182 WB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.09
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	40,100
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	1
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	171
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	5
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.80	1.00	0.92	1.00	1.65

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	1.061	1.000	1.061	1.65	1.00	1.754
Fatal and Injury (FI)	-12.08	1.25	0.99	0.290	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.283	0.301	1.65	1.00	0.497
Property Damage Only (PDO)	-12.53	1.38	1.08	0.733	$(5)_{TOTAL}-(5)_{FI}$ = 0.717	0.760	1.65	1.00	1.257

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.497	1.000	1.257	1.754
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.254	0.506	0.636	0.890
Head-on collision	0.077	0.038	0.004	0.005	0.043
Angle collision	0.181	0.090	0.130	0.163	0.253
Sideswipe, same direction	0.093	0.046	0.249	0.313	0.359
Sideswipe, opposite direction	0.082	0.041	0.031	0.039	0.080
Other multiple-vehicle collision	0.056	0.028	0.080	0.101	0.128

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.163	1.000	0.163	1.65	1.00	0.270
Fatal and Injury (FI)	-7.37	0.61	0.54	0.036	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ / 0.213	0.035	1.65	1.00	0.057
Property Damage Only (PDO)	-8.50	0.84	0.97	0.135	$(5)_{TOTAL}-(5)_{FI}$ / 0.787	0.128	1.65	1.00	0.212

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.057	1.000	0.212	0.270
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.035	0.809	0.172	0.207
Collision with other object	0.020	0.001	0.029	0.006	0.007
Other single-vehicle collision	0.367	0.021	0.161	0.034	0.055

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	1	0.182	1.172	0.576	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.576	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.576	1.000	0.576	1.65	1.00	0.953
Fatal and injury (FI)	--	0.342	0.197	1.65	1.00	0.326
Property damage only (PDO)	--	0.658	0.379	1.65	1.00	0.627

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	1.754	0.270	0.953	2.977	0.009	0.027
Fatal and injury (FI)	--	--	--	--	--	0.027

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	1.754	0.270	0.953	2.977	0.002	0.006
Fatal and injury (FI)	--	--	--	--	--	0.006

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)** (3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	**Property damage only (PDO)** (5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	**Total** (6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.254	0.636	0.890
Head-on collisions (from Worksheet 1D)	0.038	0.005	0.043
Angle collisions (from Worksheet 1D)	0.090	0.163	0.253
Sideswipe, same direction (from Worksheet 1D)	0.046	0.313	0.359
Sideswipe, opposite direction (from Worksheet 1D)	0.041	0.039	0.080
Driveway-related collisions (from Worksheet 1H)	0.326	0.627	0.953
Other multiple-vehicle collision (from Worksheet 1D)	0.028	0.101	0.128
Subtotal	0.823	1.884	2.707
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.035	0.172	0.207
Collision with other object (from Worksheet 1F)	0.001	0.006	0.007
Other single-vehicle collision (from Worksheet 1F)	0.021	0.034	0.055
Collision with pedestrian (from Worksheet 1I)	0.027	0.000	0.027
Collision with bicycle (from Worksheet 1J)	0.006	0.000	0.006
Subtotal	0.090	0.212	0.303
Total	0.913	2.096	3.009

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)** (Total) from Worksheet 1K	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)** (2) / (3)
Total	3.0	0.09	33.4
Fatal and injury (FI)	0.9	0.09	10.1
Property damage only (PDO)	2.1	0.09	23.3

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	I-182 WB Ramps to I-182 EB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.22
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	**45,332**
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Not Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	20
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	15
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.01	1.00	1.00	1.00	1.01

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	3.052	1.000	3.052	1.01	1.00	3.092
Fatal and Injury (FI)	-12.08	1.25	0.99	0.825	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.280	0.855	1.01	1.00	0.866
Property Damage Only (PDO)	-12.53	1.38	1.08	2.121	$(5)_{TOTAL}-(5)_{FI}$ = 0.720	2.197	1.01	1.00	2.226

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.866	1.000	2.226	3.092
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.443	0.506	1.126	1.569
Head-on collision	0.077	0.067	0.004	0.009	0.076
Angle collision	0.181	0.157	0.130	0.289	0.446
Sideswipe, same direction	0.093	0.081	0.249	0.554	0.635
Sideswipe, opposite direction	0.082	0.071	0.031	0.069	0.140
Other multiple-vehicle collision	0.056	0.049	0.080	0.178	0.227

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.441	1.000	0.441	1.01	1.00	0.446
Fatal and Injury (FI)	-7.37	0.61	0.54	0.096	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.208	0.092	1.01	1.00	0.093
Property Damage Only (PDO)	-8.50	0.84	0.97	0.365	$(5)_{TOTAL}-(5)_{FI}$ = 0.792	0.349	1.01	1.00	0.353

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.093	1.000	0.353	0.446
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.057	0.809	0.286	0.343
Collision with other object	0.020	0.002	0.029	0.010	0.012
Other single-vehicle collision	0.367	0.034	0.161	0.057	0.091

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15{,}000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.000	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	1.01	1.00	0.000
Fatal and injury (FI)	--	0.342	0.000	1.01	1.00	0.000
Property damage only (PDO)	--	0.658	0.000	1.01	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	3.092	0.446	0.000	3.538	0.009	0.032
Fatal and injury (FI)	--	--	--	--	--	0.032

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	3.092	0.446	0.000	3.538	0.002	0.007
Fatal and injury (FI)	--	--	--	--	--	0.007

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.443	1.126	1.569
Head-on collisions (from Worksheet 1D)	0.067	0.009	0.076
Angle collisions (from Worksheet 1D)	0.157	0.289	0.446
Sideswipe, same direction (from Worksheet 1D)	0.081	0.554	0.635
Sideswipe, opposite direction (from Worksheet 1D)	0.071	0.069	0.140
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.049	0.178	0.227
Subtotal	0.866	2.226	3.092
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.057	0.286	0.343
Collision with other object (from Worksheet 1F)	0.002	0.010	0.012
Other single-vehicle collision (from Worksheet 1F)	0.034	0.057	0.091
Collision with pedestrian (from Worksheet 1I)	0.032	0.000	0.032
Collision with bicycle (from Worksheet 1J)	0.007	0.000	0.007
Subtotal	0.132	0.353	0.485
Total	0.998	2.579	3.577

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	3.6	0.22	16.3
Fatal and injury (FI)	1.0	0.22	4.5
Property damage only (PDO)	2.6	0.22	11.7

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	I-182 EB Ramps to St. Thomas Dr.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.11
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	33,030
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	15
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	0
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	33
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	3
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.18	1.00	0.92	1.00	1.09

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	1.002	1.000	1.002	1.09	1.00	1.088
Fatal and Injury (FI)	-12.08	1.25	0.99	0.278	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.289	0.289	1.09	1.00	0.314
Property Damage Only (PDO)	-12.53	1.38	1.08	0.685	$(5)_{TOTAL}-(5)_{FI}$ = 0.711	0.713	1.09	1.00	0.774

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.314	1.000	0.774	1.088
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.160	0.506	0.392	0.552
Head-on collision	0.077	0.024	0.004	0.003	0.027
Angle collision	0.181	0.057	0.130	0.101	0.158
Sideswipe, same direction	0.093	0.029	0.249	0.193	0.222
Sideswipe, opposite direction	0.082	0.026	0.031	0.024	0.050
Other multiple-vehicle collision	0.056	0.018	0.080	0.062	0.080

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.170	1.000	0.170	1.09	1.00	0.185
Fatal and Injury (FI)	-7.37	0.61	0.54	0.040	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.220	0.038	1.09	1.00	0.041
Property Damage Only (PDO)	-8.50	0.84	0.97	0.140	$(5)_{TOTAL}-(5)_{FI}$ = 0.780	0.133	1.09	1.00	0.144

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.041	1.000	0.144	0.185
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.025	0.809	0.117	0.142
Collision with other object	0.020	0.001	0.029	0.004	0.005
Other single-vehicle collision	0.367	0.015	0.161	0.023	0.038

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
		from Table 12-7	from Table 12-7	Equation 12-16 $n_j * N_j * (AADT/15{,}000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	
Minor commercial	0	0.058	1.172	0.000	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.000	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.000	1.000	0.000	1.09	1.00	0.000
Fatal and injury (FI)	--	0.342	0.000	1.09	1.00	0.000
Property damage only (PDO)	--	0.658	0.000	1.09	1.00	0.000

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	1.088	0.185	0.000	1.274	0.009	0.011
Fatal and injury (FI)	--	--	--	--	--	0.011

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	1.088	0.185	0.000	1.274	0.002	0.003
Fatal and injury (FI)	--	--	--	--	--	0.003

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.160	0.392	0.552
Head-on collisions (from Worksheet 1D)	0.024	0.003	0.027
Angle collisions (from Worksheet 1D)	0.057	0.101	0.158
Sideswipe, same direction (from Worksheet 1D)	0.029	0.193	0.222
Sideswipe, opposite direction (from Worksheet 1D)	0.026	0.024	0.050
Driveway-related collisions (from Worksheet 1H)	0.000	0.000	0.000
Other multiple-vehicle collision (from Worksheet 1D)	0.018	0.062	0.080
Subtotal	0.314	0.774	1.088
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.025	0.117	0.142
Collision with other object (from Worksheet 1F)	0.001	0.004	0.005
Other single-vehicle collision (from Worksheet 1F)	0.015	0.023	0.038
Collision with pedestrian (from Worksheet 1I)	0.011	0.000	0.011
Collision with bicycle (from Worksheet 1J)	0.003	0.000	0.003
Subtotal	0.055	0.144	0.199
Total	0.369	0.919	1.288

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	1.3	0.11	11.7
Fatal and injury (FI)	0.4	0.11	3.4
Property damage only (PDO)	0.9	0.11	8.4

Worksheet 1A -- General Information and Input Data for Urban and Suburban Roadway Segments

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Roadway Section	St. Thomas Dr. To Chapel Hill Blvd.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Roadway type (2U, 3T, 4U, 4D, ST)		--	4U
Length of segment, L (mi)		--	0.09
AADT (veh/day)	$AADT_{MAX}$ = 40,100 (veh/day)	--	29,464
Type of on-street parking (none/parallel/angle)		None	None
Proportion of curb length with on-street parking		--	0
Median width (ft) - for divided only		15	Not Present
Lighting (present / not present)		Not Present	Present
Auto speed enforcement (present / not present)		Not Present	Not Present
Major commercial driveways (number)		--	0
Minor commercial driveways (number)		--	1
Major industrial / institutional driveways (number)		--	0
Minor industrial / institutional driveways (number)		--	0
Major residential driveways (number)		--	0
Minor residential driveways (number)		--	0
Other driveways (number)		--	0
Speed Category		--	Posted Speed Greater than 30 mph
Roadside fixed object density (fixed objects / mi)		0	57
Offset to roadside fixed objects (ft) [If greater than 30 or Not Present, input 30]		30	8
Calibration Factor, Cr		1.00	1.00

Worksheet 1B -- Crash Modification Factors for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
CMF for On-Street Parking	CMF for Roadside Fixed Objects	CMF for Median Width	CMF for Lighting	CMF for Automated Speed Enforcement	Combined CMF
CMF 1r	*CMF 2r*	*CMF 3r*	*CMF 4r*	*CMF 5r*	*CMF comb*
from Equation 12-32	from Equation 12-33	from Table 12-22	from Equation 12-34	from Section 12.7.1	(1)*(2)*(3)*(4)*(5)
1.00	1.17	1.00	0.92	1.00	1.08

Worksheet 1C -- Multiple-Vehicle Nondriveway Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brmv}**	**Proportion of Total Crashes**	**Adjusted N_{brmv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brmv}**
	from Table 12-3		from Table 12-3	from Equation 12-10		$(4)_{TOTAL}$*(5)	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-11.63	1.33	1.01	0.704	1.000	0.704	1.08	1.00	0.757
Fatal and Injury (FI)	-12.08	1.25	0.99	0.197	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.292	0.205	1.08	1.00	0.221
Property Damage Only (PDO)	-12.53	1.38	1.08	0.479	$(5)_{TOTAL}-(5)_{FI}$ = 0.708	0.499	1.08	1.00	0.536

Worksheet 1D -- Multiple-Vehicle Nondriveway Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brmv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brmv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brmv\ (TOTAL)}$ (crashes/year)**
	from Table 12-4	$(9)_{FI}$ from Worksheet 1C	from Table 12-4	$(9)_{PDO}$ from Worksheet 1C	$(9)_{TOTAL}$ from Worksheet 1C
Total	1.000	0.221	1.000	0.536	0.757
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.511	0.113	0.506	0.271	0.384
Head-on collision	0.077	0.017	0.004	0.002	0.019
Angle collision	0.181	0.040	0.130	0.070	0.110
Sideswipe, same direction	0.093	0.021	0.249	0.134	0.154
Sideswipe, opposite direction	0.082	0.018	0.031	0.017	0.035
Other multiple-vehicle collision	0.056	0.012	0.080	0.043	0.055

Worksheet 1E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**		**Overdispersion Parameter, k**	**Initial N_{brsv}**	**Proportion of Total Crashes**	**Adjusted N_{brsv}**	**Combined CMFs**	**Calibration Factor, Cr**	**Predicted N_{brsv}**
	from Table 12-5		from Table 12-5	from Equation 12-13		$(4)_{TOTAL}*(5)$	(6) from Worksheet 1B		(6)*(7)*(8)
	a	b							
Total	-7.99	0.81	0.91	0.127	1.000	0.127	1.08	1.00	0.137
Fatal and Injury (FI)	-7.37	0.61	0.54	0.030	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.225	0.029	1.08	1.00	0.031
Property Damage Only (PDO)	-8.50	0.84	0.97	0.104	$(5)_{TOTAL}-(5)_{FI}$ = 0.775	0.099	1.08	1.00	0.106

Worksheet 1F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{brsv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{brsv\ (PDO)}$ (crashes/year)**	**Predicted N $_{brsv\ (TOTAL)}$ (crashes/year)**
	from Table 12-6	$(9)_{FI}$ from Worksheet 1E	from Table 12-6	$(9)_{PDO}$ from Worksheet 1E	$(9)_{TOTAL}$ from Worksheet 1E
Total	1.000	0.031	1.000	0.106	0.137
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with animal	0.001	0.000	0.001	0.000	0.000
Collision with fixed object	0.612	0.019	0.809	0.086	0.105
Collision with other object	0.020	0.001	0.029	0.003	0.004
Other single-vehicle collision	0.367	0.011	0.161	0.017	0.028

Worksheet 1G -- Multiple-Vehicle Driveway-Related Collisions by Driveway Type for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)
Driveway Type	**Number of driveways, n_j**	**Crashes per driveway per year, N_j**	**Coefficient for traffic adjustment, t**	**Initial N_{brdwy}**	**Overdispersion parameter, k**
	from Table 12-7	from Table 12-7		Equation 12-16 $n_j * N_j * (AADT/15,000)^t$	from Table 12-7
Major commercial	0	0.182	1.172	0.000	
Minor commercial	1	0.058	1.172	0.128	
Major industrial/institutional	0	0.198	1.172	0.000	
Minor industrial/institutional	0	0.026	1.172	0.000	--
Major residential	0	0.096	1.172	0.000	
Minor residential	0	0.018	1.172	0.000	
Other	0	0.029	1.172	0.000	
Total	--	--	--	0.128	0.81

Worksheet 1H -- Multiple-Vehicle Driveway-Related Collisions by Severity Level for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**Initial N_{brdwy}**	**Proportion of total crashes (f_{dwy})**	**Adjusted N_{brdwy}**	**Combined CMFs**	**Calibration factor, C_r**	**Predicted N_{brdwy}**
	$(5)_{TOTAL}$ from Worksheet 1G	from Table 12-7	$(2)_{TOTAL}$ * (3)	(6) from Worksheet 1B		(4)*(5)*(6)
Total	0.128	1.000	0.128	1.08	1.00	0.138
Fatal and injury (FI)	--	0.342	0.044	1.08	1.00	0.047
Property damage only (PDO)	--	0.658	0.084	1.08	1.00	0.091

Worksheet 1I -- Vehicle-Pedestrian Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{pedr}**	**Predicted N_{pedr}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-8	(5)*(6)
Total	0.757	0.137	0.138	1.032	0.009	0.009
Fatal and injury (FI)	--	--	--	--	--	0.009

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-19

Worksheet 1J -- Vehicle-Bicycle Collisions for Urban and Suburban Roadway Segments

(1)	(2)	(3)	(4)	(5)	(6)	(8)*
Crash Severity Level	**Predicted N_{brmv}**	**Predicted N_{brsv}**	**Predicted N_{brdwy}**	**Predicted N_{br}**	**f_{biker}**	**Predicted N_{biker}**
	(9) from Worksheet 1C	(9) from Worksheet 1E	(7) from Worksheet 1H	(2)+(3)+(4)	from Table 12-9	(5)*(6)
Total	0.757	0.137	0.138	1.032	0.002	0.002
Fatal and injury (FI)	--	--	--	--	--	0.002

* Column 7 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-20

Worksheet 1K -- Crash Severity Distribution for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J	(5) from Worksheet 1D and 1F; and (7) from Worksheet 1H	(6) from Worksheet 1D and 1F; (7) from Worksheet 1H; and (8) from Worksheet 1I and 1J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 1D)	0.113	0.271	0.384
Head-on collisions (from Worksheet 1D)	0.017	0.002	0.019
Angle collisions (from Worksheet 1D)	0.040	0.070	0.110
Sideswipe, same direction (from Worksheet 1D)	0.021	0.134	0.154
Sideswipe, opposite direction (from Worksheet 1D)	0.018	0.017	0.035
Driveway-related collisions (from Worksheet 1H)	0.047	0.091	0.138
Other multiple-vehicle collision (from Worksheet 1D)	0.012	0.043	0.055
Subtotal	0.268	0.627	0.895
SINGLE-VEHICLE			
Collision with animal (from Worksheet 1F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 1F)	0.019	0.086	0.105
Collision with other object (from Worksheet 1F)	0.001	0.003	0.004
Other single-vehicle collision (from Worksheet 1F)	0.011	0.017	0.028
Collision with pedestrian (from Worksheet 1I)	0.009	0.000	0.009
Collision with bicycle (from Worksheet 1J)	0.002	0.000	0.002
Subtotal	0.042	0.106	0.148
Total	0.310	0.733	1.043

Worksheet 1L -- Summary Results for Urban and Suburban Roadway Segments			
(1)	(2)	(3)	(4)
Crash Severity Level	**Predicted average crash frequency, $N_{predicted\ rs}$ (crashes/year)**	**Roadway segment length, L (mi)**	**Crash rate (crashes/mi/year)**
	(Total) from Worksheet 1K		(2) / (3)
Total	1.0	0.09	11.6
Fatal and injury (FI)	0.3	0.09	3.4
Property damage only (PDO)	0.7	0.09	8.1

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	Sandifur Pkwy
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3SG
AADT $_{major}$ (veh/day)	$AADT_{MAX}$ = 58,100 (veh/day)	--	35,813
AADT $_{minor}$ (veh/day)	$AADT_{MAX}$ = 16,400 (veh/day)	--	6,964
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			3
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	5
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	*CMF $_{COMB}$*
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.86	0.93	0.92	1.00	0.91	1.00	0.67

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	6.111	1.000	6.111	0.67	1.00	4.105
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	1.859	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.321	1.962	0.67	1.00	1.318
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	3.930	$(5)_{TOTAL}-(5)_{FI}$ = 0.679	4.149	0.67	1.00	2.787

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	1.318	1.000	2.787	4.105
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	0.724	0.546	1.522	2.245
Head-on collision	0.038	0.050	0.020	0.056	0.106
Angle collision	0.280	0.369	0.204	0.569	0.938
Sideswipe	0.076	0.100	0.032	0.089	0.189
Other multiple-vehicle collision	0.057	0.075	0.198	0.552	0.627

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.341	1.000	0.341	0.67	1.00	0.229
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.090	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.276	0.094	0.67	1.00	0.063
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.237	$(5)_{TOTAL}-(5)_{FI}$ = 0.724	0.247	0.67	1.00	0.166

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.063	1.000	0.166	0.229
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.000	0.001
Collision with fixed object	0.653	0.041	0.895	0.148	0.190
Collision with other object	0.091	0.006	0.069	0.011	0.017
Other single-vehicle collision	0.045	0.003	0.018	0.003	0.006
Single-vehicle noncollision	0.209	0.013	0.014	0.002	0.016

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.00	3.75

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.004	3.75	1.00	0.014
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.014

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	4.105	0.229	4.334	0.011	0.048
Fatal and injury (FI)	--	--	--	--	0.048

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.724	1.522	2.245
Head-on collisions (from Worksheet 2D)	0.050	0.056	0.106
Angle collisions (from Worksheet 2D)	0.369	0.569	0.938
Sideswipe (from Worksheet 2D)	0.100	0.089	0.189
Other multiple-vehicle collision (from Worksheet 2D)	0.075	0.552	0.627
Subtotal	1.318	2.787	4.105
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.001
Collision with fixed object (from Worksheet 2F)	0.041	0.148	0.190
Collision with other object (from Worksheet 2F)	0.006	0.011	0.017
Other single-vehicle collision (from Worksheet 2F)	0.003	0.003	0.006
Single-vehicle noncollision (from Worksheet 2F)	0.013	0.002	0.016
Collision with pedestrian (from Worksheet 2G or 2I)	0.014	0.000	0.014
Collision with bicycle (from Worksheet 2J)	0.048	0.000	0.048
Subtotal	0.125	0.166	0.291
Total	1.443	2.953	4.396

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	4.4
Fatal and injury (FI)	1.4
Property damage only (PDO)	3.0

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	I-182 WB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3SG
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 58,100 (veh/day)	--	58,100
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 16,400 (veh/day)	--	14,550
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	1
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	3
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	0
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Not Applicable
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	4
Number of bus stops within 300 m (1,000 ft) of the intersection		0	1
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	CMF_{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.93	1.00	0.88	1.00	0.91	1.00	0.75

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	12.664	1.000	12.664	0.75	1.00	9.490
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	3.452	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.289	3.654	0.75	1.00	2.738
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	8.511	$(5)_{TOTAL}-(5)_{FI}$ = 0.711	9.010	0.75	1.00	6.752

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	2.738	1.000	6.752	9.490
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	1.503	0.546	3.686	5.190
Head-on collision	0.038	0.104	0.020	0.135	0.239
Angle collision	0.280	0.767	0.204	1.377	2.144
Sideswipe	0.076	0.208	0.032	0.216	0.424
Other multiple-vehicle collision	0.057	0.156	0.198	1.337	1.493

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.561	1.000	0.561	0.75	1.00	0.420
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.150	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.285	0.160	0.75	1.00	0.120
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.375	$(5)_{TOTAL}-(5)_{FI}$ = 0.715	0.401	0.75	1.00	0.300

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.120	1.000	0.300	0.420
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.001	0.001
Collision with fixed object	0.653	0.078	0.895	0.269	0.347
Collision with other object	0.091	0.011	0.069	0.021	0.032
Other single-vehicle collision	0.045	0.005	0.018	0.005	0.011
Single-vehicle noncollision	0.209	0.025	0.014	0.004	0.029

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.00	3.75

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.006	3.75	1.00	0.024
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.024

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	9.490	0.420	9.910	0.011	0.109
Fatal and injury (FI)	--	--	--	--	0.109

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	1.503	3.686	5.190
Head-on collisions (from Worksheet 2D)	0.104	0.135	0.239
Angle collisions (from Worksheet 2D)	0.767	1.377	2.144
Sideswipe (from Worksheet 2D)	0.208	0.216	0.424
Other multiple-vehicle collision (from Worksheet 2D)	0.156	1.337	1.493
Subtotal	2.738	6.752	9.490
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.078	0.269	0.347
Collision with other object (from Worksheet 2F)	0.011	0.021	0.032
Other single-vehicle collision (from Worksheet 2F)	0.005	0.005	0.011
Single-vehicle noncollision (from Worksheet 2F)	0.025	0.004	0.029
Collision with pedestrian (from Worksheet 2G or 2I)	0.024	0.000	0.024
Collision with bicycle (from Worksheet 2J)	0.109	0.000	0.109
Subtotal	0.252	0.300	0.553
Total	2.991	7.052	10.043

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	10.0
Fatal and injury (FI)	3.0
Property damage only (PDO)	7.1

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	I-182 EB Ramps
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3SG
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 58,100 (veh/day)	--	33,889
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 16,400 (veh/day)	--	16,400
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	1
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			15
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	5
Number of bus stops within 300 m (1,000 ft) of the intersection		0	1
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	1

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	CMF_{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.86	0.93	0.92	1.00	0.91	1.00	0.67

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-12.13	1.11	0.26	0.33	7.182	1.000	7.182	0.67	1.00	4.824
Fatal and Injury (FI)	-11.58	1.02	0.17	0.30	2.033	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.299	2.145	0.67	1.00	1.441
Property Damage Only (PDO)	-13.24	1.14	0.30	0.36	4.772	$(5)_{TOTAL}-(5)_{FI}$ = 0.701	5.036	0.67	1.00	3.383

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	1.441	1.000	3.383	4.824
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.549	0.791	0.546	1.847	2.638
Head-on collision	0.038	0.055	0.020	0.068	0.122
Angle collision	0.280	0.404	0.204	0.690	1.094
Sideswipe	0.076	0.110	0.032	0.108	0.218
Other multiple-vehicle collision	0.057	0.082	0.198	0.670	0.752

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-9.02	0.42	0.40	0.36	0.469	1.000	0.469	0.67	1.00	0.315
Fatal and Injury (FI)	-9.75	0.27	0.51	0.24	0.138	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.310	0.145	0.67	1.00	0.098
Property Damage Only (PDO)	-9.08	0.45	0.33	0.53	0.306	$(5)_{TOTAL}-(5)_{FI}$ = 0.690	0.324	0.67	1.00	0.217

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	$(9)_{FI}$ from Worksheet 2E	from Table 12-13	$(9)_{PDO}$ from Worksheet 2E	$(9)_{PDO}$ from Worksheet 2E
Total	1.000	0.098	1.000	0.217	0.315
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.003	0.001	0.001
Collision with fixed object	0.653	0.064	0.895	0.195	0.258
Collision with other object	0.091	0.009	0.069	0.015	0.024
Other single-vehicle collision	0.045	0.004	0.018	0.004	0.008
Single-vehicle noncollision	0.209	0.020	0.014	0.003	0.023

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.35	1.12	4.20

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-6.60	0.05	0.24	0.41	0.09	0.52	0.009	4.20	1.00	0.039
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.039

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	4.824	0.315	5.139	0.011	0.057
Fatal and injury (FI)	--	--	--	--	0.057

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.791	1.847	2.638
Head-on collisions (from Worksheet 2D)	0.055	0.068	0.122
Angle collisions (from Worksheet 2D)	0.404	0.690	1.094
Sideswipe (from Worksheet 2D)	0.110	0.108	0.218
Other multiple-vehicle collision (from Worksheet 2D)	0.082	0.670	0.752
Subtotal	1.441	3.383	4.824
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.064	0.195	0.258
Collision with other object (from Worksheet 2F)	0.009	0.015	0.024
Other single-vehicle collision (from Worksheet 2F)	0.004	0.004	0.008
Single-vehicle noncollision (from Worksheet 2F)	0.020	0.003	0.023
Collision with pedestrian (from Worksheet 2G or 2I)	0.039	0.000	0.039
Collision with bicycle (from Worksheet 2J)	0.057	0.000	0.057
Subtotal	0.193	0.217	0.411
Total	1.635	3.600	5.235

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	5.2
Fatal and injury (FI)	1.6
Property damage only (PDO)	3.6

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	St. Thomas Dr.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 45,700 (veh/day)	--	29,946
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 9,300 (veh/day)	--	1,500
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	0
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	0
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	1
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	2
Type of left-turn signal phasing for Leg #1		Permissive	Protected
Type of left-turn signal phasing for Leg #2		--	Protected
Type of left-turn signal phasing for Leg #3		--	Not Applicable
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Not Applicable
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			15
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	4
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	1

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	CMF_{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	1.00	1.00	0.91	1.00	0.91

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-13.36	1.11	0.41	0.80	2.943	1.000	2.943	0.91	1.00	2.677
Fatal and Injury (FI)	-14.01	1.16	0.30	0.69	1.151	$\frac{(4)_{FI}/((4)_{FI}+(4)_{PDO})}{0.359}$	1.058	0.91	1.00	0.962
Property Damage Only (PDO)	-15.38	1.20	0.51	0.77	2.051	$\frac{(5)_{TOTAL}-(5)_{FI}}{0.641}$	1.885	0.91	1.00	1.715

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	0.962	1.000	1.715	2.677
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.421	0.405	0.440	0.754	1.159
Head-on collision	0.045	0.043	0.023	0.039	0.083
Angle collision	0.343	0.330	0.262	0.449	0.779
Sideswipe	0.126	0.121	0.040	0.069	0.190
Other multiple-vehicle collision	0.065	0.063	0.235	0.403	0.465

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-6.81	0.16	0.51	1.14	0.239	1.000	0.239	0.91	1.00	0.217
Fatal and Injury (FI)	--	--	--	--	0.074	$\frac{(4)_{FI}/((4)_{FI}+(4)_{PDO})}{0.301}$	0.072	0.91	1.00	0.065
Property Damage Only (PDO)	-8.36	0.25	0.55	1.29	0.172	$\frac{(5)_{TOTAL}-(5)_{FI}}{0.699}$	0.167	0.91	1.00	0.152

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	$(9)_{FI}$ from Worksheet 2E	from Table 12-13	$(9)_{PDO}$ from Worksheet 2E	$(9)_{PDO}$ from Worksheet 2E
Total	1.000	0.065	1.000	0.152	0.217
		$(2)*(3)_{FI}$		$(4)*(5)_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.003	0.000	0.001
Collision with animal	0.003	0.000	0.018	0.003	0.003
Collision with fixed object	0.762	0.050	0.834	0.127	0.177
Collision with other object	0.090	0.006	0.092	0.014	0.020
Other single-vehicle collision	0.039	0.003	0.023	0.003	0.006
Single-vehicle noncollision	0.105	0.007	0.030	0.005	0.011

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	2.677	0.217	2.894	0.021	0.061
Fatal and injury (FI)	--	--	--	--	0.061

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
--	--	--	--

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	--	--	--	--	--	--	--	--	1.00	--
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	--

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	2.677	0.217	2.894	0.016	0.046
Fatal and injury (FI)	--	--	--	--	0.046

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
	Fatal and injury (FI)	**Property damage only (PDO)**	**Total**
Collision type	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.405	0.754	1.159
Head-on collisions (from Worksheet 2D)	0.043	0.039	0.083
Angle collisions (from Worksheet 2D)	0.330	0.449	0.779
Sideswipe (from Worksheet 2D)	0.121	0.069	0.190
Other multiple-vehicle collision (from Worksheet 2D)	0.063	0.403	0.465
Subtotal	0.962	1.715	2.677
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.001
Collision with animal (from Worksheet 2F)	0.000	0.003	0.003
Collision with fixed object (from Worksheet 2F)	0.050	0.127	0.177
Collision with other object (from Worksheet 2F)	0.006	0.014	0.020
Other single-vehicle collision (from Worksheet 2F)	0.003	0.003	0.006
Single-vehicle noncollision (from Worksheet 2F)	0.007	0.005	0.011
Collision with pedestrian (from Worksheet 2G or 2I)	0.061	0.000	0.061
Collision with bicycle (from Worksheet 2J)	0.046	0.000	0.046
Subtotal	0.173	0.152	0.325
Total	1.135	1.867	3.001

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	3.0
Fatal and injury (FI)	1.1
Property damage only (PDO)	1.9

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections

General Information		Location Information	
Analyst	Caleb Trapp	Roadway	Broadmoor Blvd.
Agency or Company	DKS Associates	Intersection	Chapel Hill Blvd.
Date Performed	01/04/22	Jurisdiction	Pasco, WA
		Analysis Year	2045

Input Data		Base Conditions	Site Conditions
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG
$AADT_{major}$ (veh/day)	$AADT_{MAX}$ = 67,700 (veh/day)	--	22,972
$AADT_{minor}$ (veh/day)	$AADT_{MAX}$ = 33,400 (veh/day)	--	6,854
Intersection lighting (present/not present)		Not Present	Present
Calibration factor, C_i		1.00	1.00
Data for unsignalized intersections only:		--	--
Number of major-road approaches with left-turn lanes (0,1,2)		0	2
Number of major-road approaches with right-turn lanes (0,1,2)		0	0
Data for signalized intersections only:		--	--
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	0
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive
Type of left-turn signal phasing for Leg #3		--	Protected / Permissive
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected / Permissive
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0
Intersection red light cameras (present/not present)		Not Present	Not Present
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10
Maximum number of lanes crossed by a pedestrian (n_{lanesx})		--	5
Number of bus stops within 300 m (1,000 ft) of the intersection		0	2
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	1

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	*CMF 2i*	*CMF 3i*	*CMF 4i*	*CMF 5i*	*CMF 6i*	CMF_{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.96	1.00	1.00	0.91	1.00	0.58

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bimv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bimv}**
	from Table 12-10			from Table 12-10	from Equation 12-21		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	5.968	1.000	5.968	0.58	1.00	3.446
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	1.921	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.334	1.994	0.58	1.00	1.151
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	3.829	$(5)_{TOTAL}-(5)_{FI}$ = 0.666	3.975	0.58	1.00	2.295

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bimv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bimv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bimv\ (TOTAL)}$ (crashes/year)**
	from Table 12-11	$(9)_{FI}$ from Worksheet 2C	from Table 12-11	$(9)_{PDO}$ from Worksheet 2C	$(9)_{PDO}$ from Worksheet 2C
Total	1.000	1.151	1.000	2.295	3.446
		(2)*$(3)_{FI}$		(4)*$(5)_{PDO}$	(3)+(5)
Rear-end collision	0.450	0.518	0.483	1.108	1.626
Head-on collision	0.049	0.056	0.030	0.069	0.125
Angle collision	0.347	0.399	0.244	0.560	0.959
Sideswipe	0.099	0.114	0.032	0.073	0.187
Other multiple-vehicle collision	0.055	0.063	0.211	0.484	0.548

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	**SPF Coefficients**			**Overdispersion Parameter, k**	**Initial N_{bisv}**	**Proportion of Total Crashes**	**Adjusted N_{bimv}**	**Combined CMFs**	**Calibration Factor, C_i**	**Predicted N_{bisv}**
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		$(4)_{TOTAL}$*(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.369	1.000	0.369	0.58	1.00	0.213
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.093	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$ = 0.255	0.094	0.58	1.00	0.054
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.273	$(5)_{TOTAL}-(5)_{FI}$ = 0.745	0.275	0.58	1.00	0.159

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	**Proportion of Collision Type$_{(FI)}$**	**Predicted N $_{bisv\ (FI)}$ (crashes/year)**	**Proportion of Collision Type $_{(PDO)}$**	**Predicted N $_{bisv\ (PDO)}$ (crashes/year)**	**Predicted N $_{bisv\ (TOTAL)}$ (crashes/year)**
	from Table 12-13	(9)$_{FI}$ from Worksheet 2E	from Table 12-13	(9)$_{PDO}$ from Worksheet 2E	(9)$_{PDO}$ from Worksheet 2E
Total	1.000	0.054	1.000	0.159	0.213
		(2)*(3)$_{FI}$		(4)*(5)$_{PDO}$	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.000
Collision with fixed object	0.744	0.040	0.870	0.138	0.179
Collision with other object	0.072	0.004	0.070	0.011	0.015
Other single-vehicle collision	0.040	0.002	0.023	0.004	0.006
Single-vehicle noncollision	0.141	0.008	0.034	0.005	0.013

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{pedi}**	**Predicted N_{pedi}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF_{1p}	CMF_{2p}	CMF_{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
2.78	1.00	1.12	3.11

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections

(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	**SPF Coefficients**					**Overdispersion Parameter, k**	**$N_{pedbase}$**	**Combined CMF**	**Calibration factor, C_i**	**Predicted N_{pedi}**
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.011	3.11	1.00	0.035
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.035

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	**Predicted N_{bimv}**	**Predicted N_{bisv}**	**Predicted N_{bi}**	**f_{bikei}**	**Predicted N_{bikei}**
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	3.446	0.213	3.659	0.015	0.055
Fatal and injury (FI)	--	--	--	--	0.055

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)
Collision type	**Fatal and injury (FI)**	**Property damage only (PDO)**	**Total**
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.518	1.108	1.626
Head-on collisions (from Worksheet 2D)	0.056	0.069	0.125
Angle collisions (from Worksheet 2D)	0.399	0.560	0.959
Sideswipe (from Worksheet 2D)	0.114	0.073	0.187
Other multiple-vehicle collision (from Worksheet 2D)	0.063	0.484	0.548
Subtotal	1.151	2.295	3.446
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.040	0.138	0.179
Collision with other object (from Worksheet 2F)	0.004	0.011	0.015
Other single-vehicle collision (from Worksheet 2F)	0.002	0.004	0.006
Single-vehicle noncollision (from Worksheet 2F)	0.008	0.005	0.013
Collision with pedestrian (from Worksheet 2G or 2I)	0.035	0.000	0.035
Collision with bicycle (from Worksheet 2J)	0.055	0.000	0.055
Subtotal	0.144	0.159	0.303
Total	1.295	2.454	3.749

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections

(1)	(2)
Crash severity level	**Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)**
	(Total) from Worksheet 2K
Total	3.7
Fatal and injury (FI)	1.3
Property damage only (PDO)	2.5

Worksheet 3A -- Predicted Crashes by Severity and Site Type and Observed Crashes Using the Site-Specific EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collision type / Site type	**Predicted average crash frequency (crashes/year)**			**Observed crashes, $N_{observed}$** (crashes/year)	**Overdispersion Parameter, k**	**Weighted adjustment, w**	**Expected average crash frequency,**
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-5 from Part C Appendix	Equation A-4 from Part C Appendix
ROADWAY SEGMENTS							
Multiple-vehicle nondriveway							
Segment_1	2.661	0.694	1.967	0.000	1.320	0.222	0.590
Segment_2	1.754	0.497	1.257	0.000	1.010	0.361	0.633
Segment_3	3.092	0.866	2.226	0.000	1.010	0.243	0.750
Segment_4	1.088	0.314	0.774	0.000	1.010	0.476	0.518
Segment_5	0.757	0.221	0.536	0.000	1.010	0.567	0.429
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Single-vehicle							
Segment_1	0.235	0.047	0.187	0.000	0.860	0.832	0.195
Segment_2	0.270	0.057	0.212	0.000	0.910	0.803	0.217
Segment_3	0.446	0.093	0.353	0.000	0.910	0.711	0.317
Segment_4	0.185	0.041	0.144	0.000	0.910	0.856	0.159
Segment_5	0.137	0.031	0.106	0.000	0.910	0.889	0.122
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Multiple-vehicle driveway-related							
Segment_1	0.000	0.000	0.000	0.000	1.390	1.000	0.000
Segment_2	0.953	0.326	0.627	0.000	0.810	0.564	0.538
Segment_3	0.000	0.000	0.000	0.000	0.810	1.000	0.000
Segment_4	0.000	0.000	0.000	0.000	0.810	1.000	0.000
Segment_5	0.138	0.047	0.091	0.000	0.810	0.900	0.124
Segment_6	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Segment Totals:	11.716	3.234	8.482	0.000			4.591
INTERSECTIONS							
Multiple-vehicle							
Intersection_1	4.105	1.318	2.787	0.000	0.330	0.425	1.743
Intersection_2	0.000	0.000	0.000	0.000	0.800	1.000	0.000
Intersection_3	9.490	2.738	6.752	0.000	0.330	0.242	2.297
Intersection_4	4.824	1.441	3.383	0.000	0.330	0.386	1.861
Intersection_5	2.677	0.962	1.715	0.000	0.800	0.318	0.852
Intersection_6	3.446	1.151	2.295	0.000	0.390	0.427	1.470
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Single-vehicle							
Intersection_1	0.229	0.063	0.166	0.000	0.360	0.924	0.211
Intersection_2	0.000	0.000	0.000	0.000	1.140	1.000	0.000
Intersection_3	0.420	0.120	0.300	0.000	0.360	0.869	0.365

Intersection_4	0.315	0.098	0.217	0.000	0.360	0.898	0.283
Intersection_5	0.217	0.065	0.152	0.000	1.140	0.801	0.174
Intersection_6	0.213	0.054	0.159	0.000	0.360	0.929	0.198
Intersection_7	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection_8	0.000	0.000	0.000	0.000	0.000	1.000	0.000
Intersection Totals:	25.936	8.011	17.925	0.000			9.455
COMBINED (sum of column)	37.652	11.245	26.407	0.000	--	--	14.046

Worksheet 3B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1) Site Type	(2) N_{ped}	(3) N_{bike}
ROADWAY SEGMENTS		
Segment_1	0.055	0.014
Segment_2	0.027	0.006
Segment_3	0.032	0.007
Segment_4	0.011	0.003
Segment_5	0.009	0.002
Segment_6	0.000	0.000
Segment_7	0.000	0.000
Segment_8	0.000	0.000
INTERSECTIONS		
Intersection_1	0.014	0.048
Intersection_2	0.000	0.000
Intersection_3	0.024	0.109
Intersection_4	0.039	0.057
Intersection_5	0.061	0.046
Intersection_6	0.035	0.055
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.308	0.347

Worksheet 3C -- Site-Specific EB Method Summary Results for Urban and Suburban Arterials

(1) Crash severity level	(2) $N_{predicted}$	(3) N_{ped}	(4) N_{bike}	(5) $N_{expected\ (VEHICLE)}$	(6) $N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(8)_{COMB}$ Worksheet 3A	(3)+(4)+(5)
	37.652	0.308	0.347	14.046	14.701
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 3A	$(2)_{COMB}$ from Worksheet 3B	$(3)_{COMB}$ from Worksheet 3B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	11.245	0.308	0.347	4.195	4.849
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 3A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	26.407	0.000	0.000	9.851	9.851

Worksheet 4A -- Predicted Crashes by Collision and Site Type and Observed Crashes Using the Project-Level EB Method for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Collision type / Site type	**Predicted crashes**			**Observed crashes,** $N_{observed}$ (crashes/year)	**Overdispersion Parameter, k**	$N_{predicted\ w0}$	$N_{predicted\ w1}$	W_0	N_0	w_1	N_1	$N_{expected/comb}$
	$N_{predicted}$ (TOTAL)	$N_{predicted}$ (FI)	$N_{predicted}$ (PDO)			Equation A-8 (6)*(2)^2	Equation A-9 sqrt((6)*(2))	Equation A-10	Equation A-11	Equation A-12	Equation A-13	Equation A-14
ROADWAY SEGMENTS												
Multiple-vehicle nondriveway												
Segment_1	2.661	0.694	1.967	--	1.320	9.346	1.874	--	--	--	--	--
Segment_2	1.754	0.497	1.257	--	1.010	3.107	1.331	--	--	--	--	--
Segment_3	3.092	0.866	2.226	--	1.010	9.655	1.767	--	--	--	--	--
Segment_4	1.088	0.314	0.774	--	1.010	1.197	1.048	--	--	--	--	--
Segment_5	0.757	0.221	0.536	--	1.010	0.579	0.875	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	9.352	2.592	6.761									
Single-vehicle												
Segment_1	0.235	0.047	0.187	--	0.860	0.047	0.449	--	--	--	--	--
Segment_2	0.270	0.057	0.212	--	0.910	0.066	0.496	--	--	--	--	--
Segment_3	0.446	0.093	0.353	--	0.910	0.181	0.637	--	--	--	--	--
Segment_4	0.185	0.041	0.144	--	0.910	0.031	0.411	--	--	--	--	--
Segment_5	0.137	0.031	0.106	--	0.910	0.017	0.353	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	1.273	0.269	1.004									
Multiple-vehicle driveway-related												
Segment_1	0.000	0.000	0.000	--	1.390	0.000	0.000	--	--	--	--	--
Segment_2	0.953	0.326	0.627	--	0.810	0.735	0.879	--	--	--	--	--
Segment_3	0.000	0.000	0.000	--	0.810	0.000	0.000	--	--	--	--	--
Segment_4	0.000	0.000	0.000	--	0.810	0.000	0.000	--	--	--	--	--
Segment_5	0.138	0.047	0.091	--	0.810	0.015	0.334	--	--	--	--	--
Segment_6	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Segment Totals:	1.090	0.373	0.718									
INTERSECTIONS												
Multiple-vehicle												
Intersection_1	4.105	1.318	2.787	--	0.330	5.561	1.164	--	--	--	--	--
Intersection_2	0.000	0.000	0.000	--	0.800	0.000	0.000	--	--	--	--	--
Intersection_3	9.490	2.738	6.752	--	0.330	29.719	1.770	--	--	--	--	--
Intersection_4	4.824	1.441	3.383	--	0.330	7.680	1.262	--	--	--	--	--
Intersection_5	2.677	0.962	1.715	--	0.800	5.732	1.463	--	--	--	--	--
Intersection_6	3.446	1.151	2.295	--	0.390	4.631	1.159	--	--	--	--	--
Intersection_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection Totals:	24.542	7.611	16.931									
Single-vehicle												
Intersection_1	0.229	0.063	0.166	--	0.360	0.019	0.287	--	--	--	--	--
Intersection_2	0.000	0.000	0.000	--	1.140	0.000	0.000	--	--	--	--	--
Intersection_3	0.420	0.120	0.300	--	0.360	0.064	0.389	--	--	--	--	--
Intersection_4	0.315	0.098	0.217	--	0.360	0.036	0.337	--	--	--	--	--
Intersection_5	0.217	0.065	0.152	--	1.140	0.054	0.498	--	--	--	--	--
Intersection_6	0.213	0.054	0.159	--	0.360	0.016	0.277	--	--	--	--	--

Intersection_7	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection_8	0.000	0.000	0.000	--	0.000	0.000	0.000	--	--	--	--	--
Intersection Totals:	1.395	0.400	0.994									
COMBINED (sum of column)	37.652	11.245	26.407	34	--	78.489	19.059	0.324	35.184	0.664	36.425	35.804

Worksheet 4B -- Predicted Pedestrian and Bicycle Crashes for Urban and Suburban Arterials

(1)	(2)	(3)
Site Type	**N_{ped}**	**N_{bike}**
ROADWAY SEGMENTS		
Segment_1	0.055	0.014
Segment_2	0.027	0.006
Segment_3	0.032	0.007
Segment_4	0.011	0.003
Segment_5	0.009	0.002
Segment_6	0.000	0.000
Segment_7	0.000	0.000
Segment_8	0.000	0.000
INTERSECTIONS		
Intersection_1	0.014	0.048
Intersection_2	0.000	0.000
Intersection_3	0.024	0.109
Intersection_4	0.039	0.057
Intersection_5	0.061	0.046
Intersection_6	0.035	0.055
Intersection_7	0.000	0.000
Intersection_8	0.000	0.000
COMBINED (sum of column)	0.308	0.347

Worksheet 4C -- Project-Specific EB Method Summary Results for Urban and Suburban Arterials

(1)	(2)	(3)	(4)	(5)	(6)
Crash severity level	**$N_{predicted}$**	**N_{ped}**	**N_{bike}**	$N_{expected\ (vehicle)}$	$N_{expected}$
Total	$(2)_{COMB}$ from Worksheet 4A	$(2)_{COMB}$ from Worksheet 4B	$(3)_{COMB}$ from Worksheet 4B	$(13)_{COMB}$ Worksheet 4A	(3)+(4)+(5)
	37.652	0.308	0.347	35.804	36.458
Fatal and injury (FI)	$(3)_{COMB}$ from Worksheet 4A	$(2)_{COMB}$ from Worksheet 4B	$(3)_{COMB}$ from Worksheet 4B	$(5)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$	(3)+(4)+(5)
	11.245	0.308	0.347	10.693	11.347
Property damage only (PDO)	$(4)_{COMB}$ from Worksheet 4A	--	--	$(5)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$	(3)+(4)+(5)
	26.407	0.000	0.000	25.111	25.111

APPENDIX G-4: NO-BUILD/BUILD CONDITIONS ISATE RESULTS

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

			Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
Basic Intersection Data								
Ramp terminal configuration:			A4	A4	A4	A4	A4	A4
Ramp terminal description:			2025 Baseline	2025 WS1	2025 WS2	2045 Baseline	2045 WS1	2045 WS2
Ramp terminal traffic control type:			Signal	Signal	Signal	Signal	Signal	Signal
Is a non-ramp public street leg present at the terminal (I_{ps})?:			No	No	No	No	No	No
Alignment Data								
Exit ramp skew angle (I_{sk}), degrees:								
Distance to the next public street intersection on the outside crossroad leg (L_{str}), mi:			0.06	0.06	0.06	0.06	0.06	0.06
Distance to the adjacent ramp terminal (L_{rmp}), mi:			0.23	0.23	0.23	0.23	0.23	0.23
Traffic Control								
Left-Turn Operational Mode								
Crossroad	Inside approach	Protected-only mode ($I_{p,lt,in}$)?:						
	Outside approach	Protected-only mode ($I_{p,lt,out}$)?:						
Right-Turn Control Type								
Ramp	Exit ramp approach	Right-turn control type:	Signal	Signal	Signal	Signal	Signal	Signal
Cross Section Data								
Crossroad median width (W_m), ft:			0	0	0	0	0	0
Number of Lanes								
Crossroad	Both approaches	Lanes serving through vehicles (n_{th}):	4	3	4	4	3	4
	Inside approach	Lanes serving through vehicles ($n_{th,in}$):	2	2	2	2	2	2
	Outside approach	Lanes serving through vehicles ($n_{th,out}$):	2	1	2	2	1	2
Ramp	Exit ramp approach	All lanes (n_{ex}):	2	3	3	2	3	3
Right-Turn Channelization		see note: →						
Crossroad	Inside approach	Channelization present ($I_{ch,in}$)?:	No	No	No	No	No	No
	Outside approach	Channelization present ($I_{ch,out}$)?:	Yes	Yes	Yes	Yes	Yes	Yes
Ramp	Exit ramp approach	Channelization present ($I_{ch,ex}$)?:	No	No	No	No	No	No
Left-Turn Lane or Bay								
Crossroad	Inside approach	Lane or bay present ($I_{bay,lt,in}$)?:						
		Width of lane or bay ($W_{b,in}$), ft:						
	Outside approach	Lane or bay present ($I_{bay,lt,out}$)?:						
		Width of lane or bay ($W_{b,out}$), ft:						
Right-Turn Lane or Bay								
Crossroad	Inside approach	Lane or bay present ($I_{bay,rt,in}$)?:	Yes	Yes	Yes	Yes	Yes	Yes
	Outside approach	Lane or bay present ($I_{bay,rt,out}$)?:	Yes	Yes	Yes	Yes	Yes	Yes
Access Data								
Number of driveways on the outside crossroad leg (n_{dw}):			0	0	0	0	0	0
Number of public street approaches on the outside crossroad leg (n_{ps}):								

Traffic Data	Year						
Inside Crossroad Leg Data	2016						
Average daily traffic ($AADT_{in}$) by year, veh/d:	2017						
(enter data only for those years for which	2018						
it is available, leave other years blank)	2019						
	2020						
	2021						
	2022						
	2023						
	2024						
	2025	24695	24695	24695	28110	28110	28110
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1	Terminal 2	Terminal 3	Terminal 4	Terminal 5	Terminal 6
		Study Period	**Study Period**	**Study Period**	**Study Period**	**Study Period**	**Study Period**
	2036						
	2037						
	2038						
	2039						
Outside Crossroad Leg Data	2016						
Average daily traffic ($AADT_{out}$) by year, veh/d:	2017						
(enter data only for those years for which	2018						
it is available, leave other years blank)	2019						
	2020						
	2021						
	2022						
	2023						
	2024						
	2025	22625	22625	22625	30375	30375	30375
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						
	2036						
	2037						
	2038						
	2039						
Exit Ramp Data	2016						
Average daily traffic ($AADT_{ex}$) by year, veh/d:	2017						
(enter data only for those years for which	2018						
it is available, leave other years blank)	2019						
	2020						
For a B4 terminal configuration, enter the AADT for the	2021						
diagonal exit ramp (not the loop exit ramp).	2022						
	2023						
	2024						
	2025	7550	7550	7550	14550	14550	14550
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						
	2036						
	2037						
	2038						
	2039						
Entrance Ramp Data	2016						
Average daily traffic ($AADT_{en}$) by year, veh/d:	2017						
(enter data only for those years for which	2018						
it is available, leave other years blank)	2019						
	2020						
For an A4 terminal configuration, enter the AADT for the	2021						
diagonal entrance ramp (not the loop entrance ramp).	2022						
	2023						
	2024						

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1	Terminal 2	Terminal 3	Terminal 4	Terminal 5	Terminal 6
		Study Period	**Study Period**	**Study Period**	**Study Period**	**Study Period**	**Study Period**
	2025	12500	12500	12500	15063	15063	15063
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						
	2036						
	2037						
	2038						
	2039						
Crash Data	**Year**		Ramp Terminal Crashes -->				
Count of Fatal-and-Injury (FI) Crashes by Year							
($N_{o,w,ac,at,fi}$)	2016						
	2017						
	2018						
	2019						
	2020						
Count of Property-Damage-Only (PDO) Crashes by Year							
($N_{o,w,ac,at,pdo}$)	2016						
	2017						
	2018						
	2019						
	2020						

Advisory Messages

Variable Limits

Number of Lanes							
	Both approaches	6	6	6	6	6	6
	Ramp	4	4	4	4	4	4

Output Worksheet for Crossroad Ramp Terminals								
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
Crash Modification Factors								
Fatal-and-Injury Crash CMFs								
Non-ramp public street leg ($CMF_{19,w,SG,at,fi}$):	Signal		1.000	1.000	1.000	1.000	1.000	1.000
Segment length ($CMF_{14,w,x,at,fi}$):	Signal	Unsig	0.682	0.682	0.682	0.682	0.682	0.682
Protected left-turn operation ($CMF_{16,w,SG,at,fi}$):	Signal							
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
		2029						
		2030						
		2031						
		2032						
		2033						
		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Channelized right turn on crossroad ($CMF_{17,w,SG,at,fi}$):	Signal							
	Year:	2016	1.199	1.199	1.199	1.205	1.205	1.205
		2017	1.199	1.199	1.199	1.205	1.205	1.205
		2018	1.199	1.199	1.199	1.205	1.205	1.205
		2019	1.199	1.199	1.199	1.205	1.205	1.205
		2020	1.199	1.199	1.199	1.205	1.205	1.205
		2021	1.199	1.199	1.199	1.205	1.205	1.205
		2022	1.199	1.199	1.199	1.205	1.205	1.205
		2023	1.199	1.199	1.199	1.205	1.205	1.205
		2024	1.199	1.199	1.199	1.205	1.205	1.205
		2025	1.199	1.199	1.199	1.205	1.205	1.205
		2026						
		2027						
		2028						
		2029						
		2030						
		2031						
		2032						
		2033						
		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Channelized right turn on exit ramp ($CMF_{18,w,SG,at,fi}$):	Signal							
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000

Output Worksheet for Crossroad Ramp Terminals								
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
		2029						
		2030						
		2031						
		2032						
		2033						
		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Access point frequency ($CMF_{13,w,x,at,fi}$):	Signal	Unsig						
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
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		2035						
		2036						
		2037						
		2038						
		2039						
Crossroad left-turn lane ($CMF_{11,w,x,at,fi}$):	Signal	Unsig						
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
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Output Worksheet for Crossroad Ramp Terminals								
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Crossroad right-turn lane ($CMF_{12,w,x,at,fi}$):	Signal	Unsig						
	Year:	2016	0.839	0.839	0.839	0.847	0.847	0.847
		2017	0.839	0.839	0.839	0.847	0.847	0.847
		2018	0.839	0.839	0.839	0.847	0.847	0.847
		2019	0.839	0.839	0.839	0.847	0.847	0.847
		2020	0.839	0.839	0.839	0.847	0.847	0.847
		2021	0.839	0.839	0.839	0.847	0.847	0.847
		2022	0.839	0.839	0.839	0.847	0.847	0.847
		2023	0.839	0.839	0.839	0.847	0.847	0.847
		2024	0.839	0.839	0.839	0.847	0.847	0.847
		2025	0.839	0.839	0.839	0.847	0.847	0.847
		2026						
		2027						
		2028						
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		2030						
		2031						
		2032						
		2033						
		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Median width ($CMF_{15,w,x,at,fi}$):	Signal	Unsig						
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
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		2036						
		2037						
		2038						
		2039						
Exit ramp capacity ($CMF_{10,w,x,at,fi}$):	Signal	Unsig						
	Year:	2016	1.074	1.045	1.045	1.271	1.151	1.151
		2017	1.074	1.045	1.045	1.271	1.151	1.151
		2018	1.074	1.045	1.045	1.271	1.151	1.151
		2019	1.074	1.045	1.045	1.271	1.151	1.151

Output Worksheet for Crossroad Ramp Terminals								
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
		2020	1.074	1.045	1.045	1.271	1.151	1.151
		2021	1.074	1.045	1.045	1.271	1.151	1.151
		2022	1.074	1.045	1.045	1.271	1.151	1.151
		2023	1.074	1.045	1.045	1.271	1.151	1.151
		2024	1.074	1.045	1.045	1.271	1.151	1.151
		2025	1.074	1.045	1.045	1.271	1.151	1.151
		2026						
		2027						
		2028						
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		2035						
		2036						
		2037						
		2038						
		2039						
Skew angle ($CMF_{20,w,ST,at,fi}$):		Unsig						
	Year:	2016						
		2017						
		2018						
		2019						
		2020						
		2021						
		2022						
		2023						
		2024						
		2025						
		2026						
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		2038						
		2039						
All-way stop control (CMF_{awsc}):		Unsig						
Property-Damage-Only Crash CMFs								
Non-ramp public street leg ($CMF_{19,w,SG,at,pdo}$):	Signal		1.000	1.000	1.000	1.000	1.000	1.000
Segment length ($CMF_{14,w,x,at,pdo}$):	Signal		0.681	0.681	0.681	0.681	0.681	0.681
Protected left-turn operation ($CMF_{16,w,SG,at,pdo}$):	Signal							
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						

Output Worksheet for Crossroad Ramp Terminals								
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
		2027						
		2028						
		2029						
		2030						
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		2034						
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		2036						
		2037						
		2038						
		2039						
Channelized right turn on crossroad ($CMF_{17,w,SG,at,pdo}$):	Signal							
	Year:	2016	1.199	1.199	1.199	1.204	1.204	1.204
		2017	1.199	1.199	1.199	1.204	1.204	1.204
		2018	1.199	1.199	1.199	1.204	1.204	1.204
		2019	1.199	1.199	1.199	1.204	1.204	1.204
		2020	1.199	1.199	1.199	1.204	1.204	1.204
		2021	1.199	1.199	1.199	1.204	1.204	1.204
		2022	1.199	1.199	1.199	1.204	1.204	1.204
		2023	1.199	1.199	1.199	1.204	1.204	1.204
		2024	1.199	1.199	1.199	1.204	1.204	1.204
		2025	1.199	1.199	1.199	1.204	1.204	1.204
		2026						
		2027						
		2028						
		2029						
		2030						
		2031						
		2032						
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		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Channelized right turn on exit ramp ($CMF_{18,w,SG,at,pdo}$):	Signal							
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
		2029						
		2030						
		2031						
		2032						
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		2036						
		2037						
		2038						

Output Worksheet for Crossroad Ramp Terminals								
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
		2039						
Access point frequency ($CMF_{13,w,x,at,pdo}$):	Signal							
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
		2029						
		2030						
		2031						
		2032						
		2033						
		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Crossroad left-turn lane ($CMF_{11,w,x,at,pdo}$):	Signal	Unsig						
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
		2029						
		2030						
		2031						
		2032						
		2033						
		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Crossroad right-turn lane ($CMF_{12,w,x,at,pdo}$):	Signal	Unsig						
	Year:	2016	0.958	0.958	0.958	0.961	0.961	0.961
		2017	0.958	0.958	0.958	0.961	0.961	0.961
		2018	0.958	0.958	0.958	0.961	0.961	0.961
		2019	0.958	0.958	0.958	0.961	0.961	0.961
		2020	0.958	0.958	0.958	0.961	0.961	0.961
		2021	0.958	0.958	0.958	0.961	0.961	0.961
		2022	0.958	0.958	0.958	0.961	0.961	0.961
		2023	0.958	0.958	0.958	0.961	0.961	0.961
		2024	0.958	0.958	0.958	0.961	0.961	0.961

Output Worksheet for Crossroad Ramp Terminals								
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
		2025	0.958	0.958	0.958	0.961	0.961	0.961
		2026						
		2027						
		2028						
		2029						
		2030						
		2031						
		2032						
		2033						
		2034						
		2035						
		2036						
		2037						
		2038						
		2039						
Median width ($CMF_{15,w,x,at,pdo}$):	Signal							
	Year:	2016	1.000	1.000	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000	1.000	1.000
		2026						
		2027						
		2028						
		2029						
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		2037						
		2038						
		2039						
Predicted Average Crash Frequency								
Fatal-and-Injury Crash Frequency								
Ramp Terminal Crash Analysis		**Year**						
Overdispersion parameter ($k_{w,x,at,fi}$):								
Observed crash count ($N^*_{o,w,x,at,fi}$), crashes:								
Reference year (r):								
Predicted average crash freq. for reference year ($N_{p,w,x,at,fi,r}$), crashes/yr:								
Equivalent years associated with crash count ($C_{b,w,x,at,fi,r}$), yr:								
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,fi,r}$), crashes/yr:								
Predicted average crash frequency		2016	2.836	2.352	2.760	4.306	3.321	3.897
($N_{p,w,x,at,fi}$), crashes/yr:		2017	2.836	2.352	2.760	4.306	3.321	3.897
		2018	2.836	2.352	2.760	4.306	3.321	3.897
		2019	2.836	2.352	2.760	4.306	3.321	3.897
		2020	2.836	2.352	2.760	4.306	3.321	3.897
		2021	2.836	2.352	2.760	4.306	3.321	3.897
		2022	2.836	2.352	2.760	4.306	3.321	3.897
		2023	2.836	2.352	2.760	4.306	3.321	3.897
		2024	2.836	2.352	2.760	4.306	3.321	3.897
		2025	2.836	2.352	2.760	4.306	3.321	3.897
		2026						
		2027						

Output Worksheet for Crossroad Ramp Terminals							
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models	Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						
	2036						
	2037						
	2038						
	2039						
Property-Damage-Only Crash Frequency							
Ramp Terminal Crash Analysis	**Year**						
Overdispersion parameter ($k_{w,x,at,pdo}$):							
Observed crash count ($N^*_{o,w,x,at,pdo}$), crashes:							
Reference year (r):							
Predicted average crash freq. for reference year ($N_{p,w,x,at,pdo,r}$), crashes/yr:							
Equivalent years associated with crash count ($C_{b,w,x,at,pdo,r}$), yr:							
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,pdo,r}$), crashes/yr:							
Predicted average crash frequency ($N_{p,w,x,at,pdo}$), crashes/yr:	2016	3.879	3.552	3.879	5.370	4.918	5.370
	2017	3.879	3.552	3.879	5.370	4.918	5.370
	2018	3.879	3.552	3.879	5.370	4.918	5.370
	2019	3.879	3.552	3.879	5.370	4.918	5.370
	2020	3.879	3.552	3.879	5.370	4.918	5.370
	2021	3.879	3.552	3.879	5.370	4.918	5.370
	2022	3.879	3.552	3.879	5.370	4.918	5.370
	2023	3.879	3.552	3.879	5.370	4.918	5.370
	2024	3.879	3.552	3.879	5.370	4.918	5.370
	2025	3.879	3.552	3.879	5.370	4.918	5.370
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						
	2036						
	2037						
	2038						
	2039						
Crash Severity Distribution (during Study Period)							
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:		0.033	0.028	0.032	0.051	0.039	0.046
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:		0.834	0.691	0.811	1.266	0.976	1.146
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:		4.972	4.123	4.839	7.548	5.821	6.831
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:		22.520	18.677	21.918	34.193	26.369	30.944
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:		28.359	23.520	27.600	43.058	33.205	38.967
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:		38.788	35.524	38.788	53.703	49.184	53.703
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:		67.147	59.044	66.388	96.761	82.389	92.670
Intermediate Results	**Year**						
Proportion of total leg AADT on the crossroad (P_{xrd}):	2016	0.702	0.702	0.702	0.664	0.664	0.664
	2017	0.702	0.702	0.702	0.664	0.664	0.664
	2018	0.702	0.702	0.702	0.664	0.664	0.664
	2019	0.702	0.702	0.702	0.664	0.664	0.664
	2020	0.702	0.702	0.702	0.664	0.664	0.664
	2021	0.702	0.702	0.702	0.664	0.664	0.664

Output Worksheet for Crossroad Ramp Terminals							
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models	Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
	2022	0.702	0.702	0.702	0.664	0.664	0.664
	2023	0.702	0.702	0.702	0.664	0.664	0.664
	2024	0.702	0.702	0.702	0.664	0.664	0.664
	2025	0.702	0.702	0.702	0.664	0.664	0.664
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						
	2036						
	2037						
	2038						
	2039						
Proportion of total leg AADT on the inside crossroad leg (P_{in}):	2016	0.367	0.367	0.367	0.319	0.319	0.319
	2017	0.367	0.367	0.367	0.319	0.319	0.319
	2018	0.367	0.367	0.367	0.319	0.319	0.319
	2019	0.367	0.367	0.367	0.319	0.319	0.319
	2020	0.367	0.367	0.367	0.319	0.319	0.319
	2021	0.367	0.367	0.367	0.319	0.319	0.319
	2022	0.367	0.367	0.367	0.319	0.319	0.319
	2023	0.367	0.367	0.367	0.319	0.319	0.319
	2024	0.367	0.367	0.367	0.319	0.319	0.319
	2025	0.367	0.367	0.367	0.319	0.319	0.319
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						
	2036						
	2037						
	2038						
	2039						
Proportion of total leg AADT on the outside crossroad leg (P_{out}):	2016	0.336	0.336	0.336	0.345	0.345	0.345
	2017	0.336	0.336	0.336	0.345	0.345	0.345
	2018	0.336	0.336	0.336	0.345	0.345	0.345
	2019	0.336	0.336	0.336	0.345	0.345	0.345
	2020	0.336	0.336	0.336	0.345	0.345	0.345
	2021	0.336	0.336	0.336	0.345	0.345	0.345
	2022	0.336	0.336	0.336	0.345	0.345	0.345
	2023	0.336	0.336	0.336	0.345	0.345	0.345
	2024	0.336	0.336	0.336	0.345	0.345	0.345
	2025	0.336	0.336	0.336	0.345	0.345	0.345
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						

Output Worksheet for Crossroad Ramp Terminals							
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models	Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
	2036						
	2037						
	2038						
	2039						
Proportion of total leg AADT on the exit ramp leg (P_{ex}):	2016	0.112	0.112	0.112	0.165	0.165	0.165
	2017	0.112	0.112	0.112	0.165	0.165	0.165
	2018	0.112	0.112	0.112	0.165	0.165	0.165
	2019	0.112	0.112	0.112	0.165	0.165	0.165
	2020	0.112	0.112	0.112	0.165	0.165	0.165
	2021	0.112	0.112	0.112	0.165	0.165	0.165
	2022	0.112	0.112	0.112	0.165	0.165	0.165
	2023	0.112	0.112	0.112	0.165	0.165	0.165
	2024	0.112	0.112	0.112	0.165	0.165	0.165
	2025	0.112	0.112	0.112	0.165	0.165	0.165
	2026						
	2027						
	2028						
	2029						
	2030						
	2031						
	2032						
	2033						
	2034						
	2035						
	2036						
	2037						
	2038						
	2039						
Traffic Data	**Year**						
Inside Crossroad Leg Data	2016	24695	24695	24695	28110	28110	28110
Average daily traffic ($AADT_{in}$) by year, veh/d:	2017	24695	24695	24695	28110	28110	28110
	2018	24695	24695	24695	28110	28110	28110
	2019	24695	24695	24695	28110	28110	28110
	2020	24695	24695	24695	28110	28110	28110
	2021	24695	24695	24695	28110	28110	28110
	2022	24695	24695	24695	28110	28110	28110
	2023	24695	24695	24695	28110	28110	28110
	2024	24695	24695	24695	28110	28110	28110
	2025	24695	24695	24695	28110	28110	28110
	2026	24695	24695	24695	28110	28110	28110
	2027	24695	24695	24695	28110	28110	28110
	2028	24695	24695	24695	28110	28110	28110
	2029	24695	24695	24695	28110	28110	28110
	2030	24695	24695	24695	28110	28110	28110
	2031	24695	24695	24695	28110	28110	28110
	2032	24695	24695	24695	28110	28110	28110
	2033	24695	24695	24695	28110	28110	28110
	2034	24695	24695	24695	28110	28110	28110
	2035	24695	24695	24695	28110	28110	28110
	2036	24695	24695	24695	28110	28110	28110
	2037	24695	24695	24695	28110	28110	28110
	2038	24695	24695	24695	28110	28110	28110
	2039	24695	24695	24695	28110	28110	28110
Outside Crossroad Leg Data	2016	22625	22625	22625	30375	30375	30375
Average daily traffic ($AADT_{out}$) by year, veh/d:	2017	22625	22625	22625	30375	30375	30375
	2018	22625	22625	22625	30375	30375	30375
	2019	22625	22625	22625	30375	30375	30375
	2020	22625	22625	22625	30375	30375	30375
	2021	22625	22625	22625	30375	30375	30375
	2022	22625	22625	22625	30375	30375	30375
	2023	22625	22625	22625	30375	30375	30375

Output Worksheet for Crossroad Ramp Terminals								
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
		2024	22625	22625	22625	30375	30375	30375
		2025	22625	22625	22625	30375	30375	30375
		2026	22625	22625	22625	30375	30375	30375
		2027	22625	22625	22625	30375	30375	30375
		2028	22625	22625	22625	30375	30375	30375
		2029	22625	22625	22625	30375	30375	30375
		2030	22625	22625	22625	30375	30375	30375
		2031	22625	22625	22625	30375	30375	30375
		2032	22625	22625	22625	30375	30375	30375
		2033	22625	22625	22625	30375	30375	30375
		2034	22625	22625	22625	30375	30375	30375
		2035	22625	22625	22625	30375	30375	30375
		2036	22625	22625	22625	30375	30375	30375
		2037	22625	22625	22625	30375	30375	30375
		2038	22625	22625	22625	30375	30375	30375
		2039	22625	22625	22625	30375	30375	30375
Exit Ramp Data		2016	7550	7550	7550	14550	14550	14550
Average daily traffic ($AADT_{ex}$) by year, veh/d:		2017	7550	7550	7550	14550	14550	14550
		2018	7550	7550	7550	14550	14550	14550
		2019	7550	7550	7550	14550	14550	14550
		2020	7550	7550	7550	14550	14550	14550
		2021	7550	7550	7550	14550	14550	14550
		2022	7550	7550	7550	14550	14550	14550
		2023	7550	7550	7550	14550	14550	14550
		2024	7550	7550	7550	14550	14550	14550
		2025	7550	7550	7550	14550	14550	14550
		2026	7550	7550	7550	14550	14550	14550
		2027	7550	7550	7550	14550	14550	14550
		2028	7550	7550	7550	14550	14550	14550
		2029	7550	7550	7550	14550	14550	14550
		2030	7550	7550	7550	14550	14550	14550
		2031	7550	7550	7550	14550	14550	14550
		2032	7550	7550	7550	14550	14550	14550
		2033	7550	7550	7550	14550	14550	14550
		2034	7550	7550	7550	14550	14550	14550
		2035	7550	7550	7550	14550	14550	14550
		2036	7550	7550	7550	14550	14550	14550
		2037	7550	7550	7550	14550	14550	14550
		2038	7550	7550	7550	14550	14550	14550
		2039	7550	7550	7550	14550	14550	14550
Entrance Ramp Data		2016	12500	12500	12500	15063	15063	15063
Average daily traffic ($AADT_{en}$) by year, veh/d:		2017	12500	12500	12500	15063	15063	15063
		2018	12500	12500	12500	15063	15063	15063
		2019	12500	12500	12500	15063	15063	15063
		2020	12500	12500	12500	15063	15063	15063
		2021	12500	12500	12500	15063	15063	15063
		2022	12500	12500	12500	15063	15063	15063
		2023	12500	12500	12500	15063	15063	15063
		2024	12500	12500	12500	15063	15063	15063
		2025	12500	12500	12500	15063	15063	15063
		2026	12500	12500	12500	15063	15063	15063
		2027	12500	12500	12500	15063	15063	15063
		2028	12500	12500	12500	15063	15063	15063
		2029	12500	12500	12500	15063	15063	15063
		2030	12500	12500	12500	15063	15063	15063
		2031	12500	12500	12500	15063	15063	15063
		2032	12500	12500	12500	15063	15063	15063
		2033	12500	12500	12500	15063	15063	15063
		2034	12500	12500	12500	15063	15063	15063
		2035	12500	12500	12500	15063	15063	15063
		2036	12500	12500	12500	15063	15063	15063
		2037	12500	12500	12500	15063	15063	15063

Output Worksheet for Crossroad Ramp Terminals							
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models	Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period	Terminal 5 Study Period	Terminal 6 Study Period
	2038	12500	12500	12500	15063	15063	15063
	2039	12500	12500	12500	15063	15063	15063

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

			Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
Basic Intersection Data						
Ramp terminal configuration:			D4	B4	D4	B4
Ramp terminal description:			2025 Baseline	2025 ES1	2045 Baseline	2045 ES1
Ramp terminal traffic control type:			Signal	Signal	Signal	Signal
Is a non-ramp public street leg present at the terminal (I_{ps})?:			No	No	No	No
Alignment Data						
Exit ramp skew angle (I_{sk}), degrees:						
Distance to the next public street intersection on the outside crossroad leg (L_{str}), mi:			0.1	0.1	0.1	0.1
Distance to the adjacent ramp terminal (L_{rmp}), mi:			0.23	0.23	0.23	0.23
Traffic Control						
Left-Turn Operational Mode						
Crossroad	Inside approach	Protected-only mode ($I_{p,lt,in}$)?:	No	No	No	No
	Outside approach	Protected-only mode ($I_{p,lt,out}$)?:				
Right-Turn Control Type						
Ramp	Exit ramp approach	Right-turn control type:	Yield	Yield	Yield	Yield
Cross Section Data						
Crossroad median width (W_m), ft:			0	0	0	0
Number of Lanes						
Crossroad	Both approaches	Lanes serving through vehicles (n_{th}):	3	3	3	3
	Inside approach	Lanes serving through vehicles ($n_{th,in}$):	1	1	1	1
	Outside approach	Lanes serving through vehicles ($n_{th,out}$):	2	2	2	2
Ramp	Exit ramp approach	All lanes (n_{ex}):	3	1	3	1
Right-Turn Channelization		see note: →				
Crossroad	Inside approach	Channelization present ($I_{ch,in}$)?:				
	Outside approach	Channelization present ($I_{ch,out}$)?:	No	No	No	No
Ramp	Exit ramp approach	Channelization present ($I_{ch,ex}$)?:	Yes		Yes	
Left-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,lt,in}$)?:	Yes	Yes	Yes	Yes
		Width of lane or bay ($W_{b,in}$), ft:	12	12	12	12
	Outside approach	Lane or bay present ($I_{bay,lt,out}$)?:				
		Width of lane or bay ($W_{b,out}$), ft:				
Right-Turn Lane or Bay						
Crossroad	Inside approach	Lane or bay present ($I_{bay,rt,in}$)?:				
	Outside approach	Lane or bay present ($I_{bay,rt,out}$)?:	Yes	Yes	Yes	Yes
Access Data						
Number of driveways on the outside crossroad leg (n_{dw}):			0	0	0	0
Number of public street approaches on the outside crossroad leg (n_{ps}):						

Traffic Data	Year				
Inside Crossroad Leg Data	2016				
Average daily traffic ($AADT_{in}$) by year, veh/d:	2017				
(enter data only for those years for which	2018				
it is available, leave other years blank)	2019				
	2020				
	2021				
	2022				
	2023				
	2024				

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1	Terminal 2	Terminal 3	Terminal 4
		Study Period	**Study Period**	**Study Period**	**Study Period**
	2025	12611	12611	17222	17222
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
	2033				
	2034				
	2035				
	2036				
	2037				
	2038				
	2039				
Outside Crossroad Leg Data	2016				
Average daily traffic ($AADT_{out}$) by year, veh/d:	2017				
(enter data only for those years for which	2018				
it is available, leave other years blank)	2019				
	2020				
	2021				
	2022				
	2023				
	2024				
	2025	15793	15793	16666	16666
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
	2033				
	2034				
	2035				
	2036				
	2037				
	2038				
	2039				
Exit Ramp Data	2016				
Average daily traffic ($AADT_{ex}$) by year, veh/d:	2017				
(enter data only for those years for which	2018				
it is available, leave other years blank)	2019				
	2020				
For a B4 terminal configuration, enter the AADT for the	2021				
diagonal exit ramp (not the loop exit ramp).	2022				
	2023				
	2024				
	2025	20400	7200	23350	7450
	2026				
	2027				

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
	2028				
	2029				
	2030				
	2031				
	2032				
	2033				
	2034				
	2035				
	2036				
	2037				
	2038				
	2039				
Entrance Ramp Data	2016				
Average daily traffic ($AADT_{en}$) by year, veh/d:	2017				
(enter data only for those years for which	2018				
it is available, leave other years blank)	2019				
	2020				
For an A4 terminal configuration, enter the AADT for the	2021				
diagonal entrance ramp (not the loop entrance ramp).	2022				
	2023				
	2024				
	2025	8796	8796	12788	12788
	2026				
	2027				
	2028				
	2029				
	2030				
	2031				
	2032				
	2033				
	2034				
	2035				
	2036				
	2037				
	2038				
	2039				

Crash Data	**Year**		Ramp Terminal Crashes -->			
Count of Fatal-and-Injury (FI) Crashes by Year						
($N_{o,w,ac,at,fi}$)	2016					
	2017					
	2018					
	2019					
	2020					
Count of Property-Damage-Only (PDO) Crashes by Year						
($N_{o,w,ac,at,pdo}$)	2016					
	2017					
	2018					
	2019					
	2020					

Input Worksheet for Crossroad Ramp Terminals

Clear | Echo Input Values (View results in Column T) | Check Input Values (View results in Advisory Messages)

	Terminal 1	Terminal 2	Terminal 3	Terminal 4
	Study Period	**Study Period**	**Study Period**	**Study Period**
Advisory Messages				
Variable Limits				
Number of Lanes				
Both approaches	6	6	6	6
Ramp	4	4	4	4

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
Crash Modification Factors						
Fatal-and-Injury Crash CMFs						
Non-ramp public street leg ($CMF_{19,w,SG,at,fi}$):	Signal		1.000	1.000	1.000	1.000
Segment length ($CMF_{14,w,x,at,fi}$):	Signal	Unsig	0.772	0.772	0.772	0.772
Protected left-turn operation ($CMF_{16,w,SG,at,fi}$):	Signal					
	Year:	2016	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				
		2038				
		2039				
Channelized right turn on crossroad ($CMF_{17,w,SG,at,fi}$):	Signal					
	Year:	2016	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2036				
		2037				
		2038				
		2039				
Channelized right turn on exit ramp ($CMF_{18,w,SG,at,fi}$):	Signal					
	Year:	2016	1.601	1.000	1.566	1.000
		2017	1.601	1.000	1.566	1.000
		2018	1.601	1.000	1.566	1.000
		2019	1.601	1.000	1.566	1.000
		2020	1.601	1.000	1.566	1.000
		2021	1.601	1.000	1.566	1.000
		2022	1.601	1.000	1.566	1.000
		2023	1.601	1.000	1.566	1.000
		2024	1.601	1.000	1.566	1.000
		2025	1.601	1.000	1.566	1.000
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				
		2038				
		2039				
Access point frequency ($CMF_{13,w,x,at,fi}$):	Signal	Unsig				
	Year:	2016	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2037				
		2038				
		2039				
Crossroad left-turn lane ($CMF_{11,w,x,at,fi}$):	Signal	Unsig				
	Year:	2016	0.923	0.901	0.914	0.889
		2017	0.923	0.901	0.914	0.889
		2018	0.923	0.901	0.914	0.889
		2019	0.923	0.901	0.914	0.889
		2020	0.923	0.901	0.914	0.889
		2021	0.923	0.901	0.914	0.889
		2022	0.923	0.901	0.914	0.889
		2023	0.923	0.901	0.914	0.889
		2024	0.923	0.901	0.914	0.889
		2025	0.923	0.901	0.914	0.889
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				
		2038				
		2039				
Crossroad right-turn lane ($CMF_{12,w,x,at,fi}$):	Signal	Unsig				
	Year:	2016	0.934	0.915	0.943	0.926
		2017	0.934	0.915	0.943	0.926
		2018	0.934	0.915	0.943	0.926
		2019	0.934	0.915	0.943	0.926
		2020	0.934	0.915	0.943	0.926
		2021	0.934	0.915	0.943	0.926
		2022	0.934	0.915	0.943	0.926
		2023	0.934	0.915	0.943	0.926
		2024	0.934	0.915	0.943	0.926
		2025	0.934	0.915	0.943	0.926
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2038				
		2039				
Median width ($CMF_{15,w,x,at,fi}$):	Signal	Unsig				
	Year:	2016	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000
		2026				
		2027				
		2028				
		2029				
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		2038				
		2039				
Exit ramp capacity ($CMF_{10,w,x,at,fi}$):	Signal	Unsig				
	Year:	2016	1.524	1.262	1.610	1.235
		2017	1.524	1.262	1.610	1.235
		2018	1.524	1.262	1.610	1.235
		2019	1.524	1.262	1.610	1.235
		2020	1.524	1.262	1.610	1.235
		2021	1.524	1.262	1.610	1.235
		2022	1.524	1.262	1.610	1.235
		2023	1.524	1.262	1.610	1.235
		2024	1.524	1.262	1.610	1.235
		2025	1.524	1.262	1.610	1.235
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				
		2038				

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2039				
Skew angle ($CMF_{20,w,ST,at,fi}$):		Unsig				
	Year:	2016				
		2017				
		2018				
		2019				
		2020				
		2021				
		2022				
		2023				
		2024				
		2025				
		2026				
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		2037				
		2038				
		2039				
All-way stop control (CMF_{awsc}):		Unsig				
Property-Damage-Only Crash CMFs						
Non-ramp public street leg ($CMF_{19,w,SG,at,pdo}$):	Signal		1.000	1.000	1.000	1.000
Segment length ($CMF_{14,w,x,at,pdo}$):	Signal		0.771	0.771	0.771	0.771
Protected left-turn operation ($CMF_{16,w,SG,at,pdo}$):	Signal					
	Year:	2016	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2035				
		2036				
		2037				
		2038				
		2039				
Channelized right turn on crossroad ($CMF_{17,w,SG,at,pdo}$):	Signal					
	Year:	2016	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000
		2026				
		2027				
		2028				
		2029				
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		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				
		2038				
		2039				
Channelized right turn on exit ramp ($CMF_{18,w,SG,at,pdo}$):	Signal					
	Year:	2016	2.124	1.000	2.059	1.000
		2017	2.124	1.000	2.059	1.000
		2018	2.124	1.000	2.059	1.000
		2019	2.124	1.000	2.059	1.000
		2020	2.124	1.000	2.059	1.000
		2021	2.124	1.000	2.059	1.000
		2022	2.124	1.000	2.059	1.000
		2023	2.124	1.000	2.059	1.000
		2024	2.124	1.000	2.059	1.000
		2025	2.124	1.000	2.059	1.000
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2036				
		2037				
		2038				
		2039				
Access point frequency ($CMF_{13,w,x,at,pdo}$):	Signal					
	Year:	2016	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				
		2038				
		2039				
Crossroad left-turn lane ($CMF_{11,w,x,at,pdo}$):	Signal	Unsig				
	Year:	2016	0.930	0.909	0.921	0.898
		2017	0.930	0.909	0.921	0.898
		2018	0.930	0.909	0.921	0.898
		2019	0.930	0.909	0.921	0.898
		2020	0.930	0.909	0.921	0.898
		2021	0.930	0.909	0.921	0.898
		2022	0.930	0.909	0.921	0.898
		2023	0.930	0.909	0.921	0.898
		2024	0.930	0.909	0.921	0.898
		2025	0.930	0.909	0.921	0.898
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2037				
		2038				
		2039				
Crossroad right-turn lane ($CMF_{12,w,x,at,pdo}$):	Signal	Unsig				
	Year:	2016	0.984	0.979	0.986	0.982
		2017	0.984	0.979	0.986	0.982
		2018	0.984	0.979	0.986	0.982
		2019	0.984	0.979	0.986	0.982
		2020	0.984	0.979	0.986	0.982
		2021	0.984	0.979	0.986	0.982
		2022	0.984	0.979	0.986	0.982
		2023	0.984	0.979	0.986	0.982
		2024	0.984	0.979	0.986	0.982
		2025	0.984	0.979	0.986	0.982
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				
		2038				
		2039				
Median width ($CMF_{15,w,x,at,pdo}$):	Signal					
	Year:	2016	1.000	1.000	1.000	1.000
		2017	1.000	1.000	1.000	1.000
		2018	1.000	1.000	1.000	1.000
		2019	1.000	1.000	1.000	1.000
		2020	1.000	1.000	1.000	1.000
		2021	1.000	1.000	1.000	1.000
		2022	1.000	1.000	1.000	1.000
		2023	1.000	1.000	1.000	1.000
		2024	1.000	1.000	1.000	1.000
		2025	1.000	1.000	1.000	1.000
		2026				
		2027				
		2028				
		2029				
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		2031				
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		2036				
		2037				

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models	Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
	2038				
	2039				
Predicted Average Crash Frequency					
Fatal-and-Injury Crash Frequency					
Ramp Terminal Crash Analysis	**Year**				
Overdispersion parameter ($k_{w,x,at,fi}$):					
Observed crash count ($N^*_{o,w,x,at,fi}$), crashes:					
Reference year (r):					
Predicted average crash freq. for reference year ($N_{p,w,x,at,fi,r}$), crashes/yr:					
Equivalent years associated with crash count ($C_{b,w,x,at,fi,r}$), yr:					
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,fi,r}$), crashes/yr:					
Predicted average crash frequency ($N_{p,w,x,at,fi}$), crashes/yr:	2016	4.915	2.956	6.435	3.745
	2017	4.915	2.956	6.435	3.745
	2018	4.915	2.956	6.435	3.745
	2019	4.915	2.956	6.435	3.745
	2020	4.915	2.956	6.435	3.745
	2021	4.915	2.956	6.435	3.745
	2022	4.915	2.956	6.435	3.745
	2023	4.915	2.956	6.435	3.745
	2024	4.915	2.956	6.435	3.745
	2025	4.915	2.956	6.435	3.745
	2026				
	2027				
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	2033				
	2034				
	2035				
	2036				
	2037				
	2038				
	2039				
Property-Damage-Only Crash Frequency					
Ramp Terminal Crash Analysis	**Year**				
Overdispersion parameter ($k_{w,x,at,pdo}$):					
Observed crash count ($N^*_{o,w,x,at,pdo}$), crashes:					
Reference year (r):					
Predicted average crash freq. for reference year ($N_{p,w,x,at,pdo,r}$), crashes/yr:					
Equivalent years associated with crash count ($C_{b,w,x,at,pdo,r}$), yr:					
Expected average crash freq. for reference year given N^*_o ($N_{a,w,x,at,pdo,r}$), crashes/yr:					
Predicted average crash frequency ($N_{p,w,x,at,pdo}$), crashes/yr:	2016	11.183	2.968	14.115	4.089
	2017	11.183	2.968	14.115	4.089
	2018	11.183	2.968	14.115	4.089
	2019	11.183	2.968	14.115	4.089
	2020	11.183	2.968	14.115	4.089
	2021	11.183	2.968	14.115	4.089

Output Worksheet for Crossroad Ramp Terminals

Signal = signalized intersection model
Unsig = unsignalized intersection model

	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2022	11.183	2.968	14.115	4.089
		2023	11.183	2.968	14.115	4.089
		2024	11.183	2.968	14.115	4.089
		2025	11.183	2.968	14.115	4.089
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				
		2038				
		2039				
Crash Severity Distribution (during Study Period)						
Fatal crash frequency ($N^*_{e,w,x,at,K}$), crashes:			0.058	0.035	0.076	0.044
Incapacitating injury crash freq. ($N^*_{e,w,x,at,A}$), crashes:			1.445	0.869	1.892	1.101
Non-incapacitating inj. crash freq. ($N^*_{e,w,x,at,B}$), crashes:			8.616	5.182	11.281	6.566
Possible injury crash freq. ($N^*_{e,w,x,at,C}$), crashes:			39.029	23.472	51.101	29.743
Total fatal-and-injury crash freq. ($N^*_{e,w,x,at,fi}$), crashes:			49.148	29.557	64.349	37.454
Property-damage-only crash freq. ($N^*_{e,w,x,at,pdo}$), crashes:			111.833	29.682	141.154	40.892
Total crash frequency ($N^*_{e,w,x,at,as}$), crashes:			160.980	59.239	205.503	78.346
Intermediate Results		**Year**				
Proportion of total leg AADT on the crossroad (P_{xrd}):		2016	0.493	0.640	0.484	0.626
		2017	0.493	0.640	0.484	0.626
		2018	0.493	0.640	0.484	0.626
		2019	0.493	0.640	0.484	0.626
		2020	0.493	0.640	0.484	0.626
		2021	0.493	0.640	0.484	0.626
		2022	0.493	0.640	0.484	0.626
		2023	0.493	0.640	0.484	0.626
		2024	0.493	0.640	0.484	0.626
		2025	0.493	0.640	0.484	0.626
		2026				
		2027				
		2028				
		2029				
		2030				
		2031				
		2032				
		2033				
		2034				
		2035				
		2036				
		2037				

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
		2038				
		2039				
Proportion of total leg AADT on the inside crossroad leg (P_{in}):		2016	0.219	0.284	0.246	0.318
		2017	0.219	0.284	0.246	0.318
		2018	0.219	0.284	0.246	0.318
		2019	0.219	0.284	0.246	0.318
		2020	0.219	0.284	0.246	0.318
		2021	0.219	0.284	0.246	0.318
		2022	0.219	0.284	0.246	0.318
		2023	0.219	0.284	0.246	0.318
		2024	0.219	0.284	0.246	0.318
		2025	0.219	0.284	0.246	0.318
		2026				
		2027				
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		2031				
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		2039				
Proportion of total leg AADT on the outside crossroad leg (P_{out}):		2016	0.274	0.356	0.238	0.308
		2017	0.274	0.356	0.238	0.308
		2018	0.274	0.356	0.238	0.308
		2019	0.274	0.356	0.238	0.308
		2020	0.274	0.356	0.238	0.308
		2021	0.274	0.356	0.238	0.308
		2022	0.274	0.356	0.238	0.308
		2023	0.274	0.356	0.238	0.308
		2024	0.274	0.356	0.238	0.308
		2025	0.274	0.356	0.238	0.308
		2026				
		2027				
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		2038				
		2039				

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models	Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
Proportion of total leg AADT on the exit ramp leg (P_{ex}):	2016	0.354	0.162	0.333	0.138
	2017	0.354	0.162	0.333	0.138
	2018	0.354	0.162	0.333	0.138
	2019	0.354	0.162	0.333	0.138
	2020	0.354	0.162	0.333	0.138
	2021	0.354	0.162	0.333	0.138
	2022	0.354	0.162	0.333	0.138
	2023	0.354	0.162	0.333	0.138
	2024	0.354	0.162	0.333	0.138
	2025	0.354	0.162	0.333	0.138
	2026				
	2027				
	2028				
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	2035				
	2036				
	2037				
	2038				
	2039				
Traffic Data	**Year**				
Inside Crossroad Leg Data	2016	12611	12611	17222	17222
Average daily traffic ($AADT_{in}$) by year, veh/d:	2017	12611	12611	17222	17222
	2018	12611	12611	17222	17222
	2019	12611	12611	17222	17222
	2020	12611	12611	17222	17222
	2021	12611	12611	17222	17222
	2022	12611	12611	17222	17222
	2023	12611	12611	17222	17222
	2024	12611	12611	17222	17222
	2025	12611	12611	17222	17222
	2026	12611	12611	17222	17222
	2027	12611	12611	17222	17222
	2028	12611	12611	17222	17222
	2029	12611	12611	17222	17222
	2030	12611	12611	17222	17222
	2031	12611	12611	17222	17222
	2032	12611	12611	17222	17222
	2033	12611	12611	17222	17222
	2034	12611	12611	17222	17222
	2035	12611	12611	17222	17222
	2036	12611	12611	17222	17222
	2037	12611	12611	17222	17222
	2038	12611	12611	17222	17222
	2039	12611	12611	17222	17222
Outside Crossroad Leg Data	2016	15793	15793	16666	16666

Output Worksheet for Crossroad Ramp Terminals						
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models		Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
Average daily traffic ($AADT_{out}$) by year, veh/d:		2017	15793	15793	16666	16666
		2018	15793	15793	16666	16666
		2019	15793	15793	16666	16666
		2020	15793	15793	16666	16666
		2021	15793	15793	16666	16666
		2022	15793	15793	16666	16666
		2023	15793	15793	16666	16666
		2024	15793	15793	16666	16666
		2025	15793	15793	16666	16666
		2026	15793	15793	16666	16666
		2027	15793	15793	16666	16666
		2028	15793	15793	16666	16666
		2029	15793	15793	16666	16666
		2030	15793	15793	16666	16666
		2031	15793	15793	16666	16666
		2032	15793	15793	16666	16666
		2033	15793	15793	16666	16666
		2034	15793	15793	16666	16666
		2035	15793	15793	16666	16666
		2036	15793	15793	16666	16666
		2037	15793	15793	16666	16666
		2038	15793	15793	16666	16666
		2039	15793	15793	16666	16666
Exit Ramp Data		2016	20400	7200	23350	7450
Average daily traffic ($AADT_{ex}$) by year, veh/d:		2017	20400	7200	23350	7450
		2018	20400	7200	23350	7450
		2019	20400	7200	23350	7450
		2020	20400	7200	23350	7450
		2021	20400	7200	23350	7450
		2022	20400	7200	23350	7450
		2023	20400	7200	23350	7450
		2024	20400	7200	23350	7450
		2025	20400	7200	23350	7450
		2026	20400	7200	23350	7450
		2027	20400	7200	23350	7450
		2028	20400	7200	23350	7450
		2029	20400	7200	23350	7450
		2030	20400	7200	23350	7450
		2031	20400	7200	23350	7450
		2032	20400	7200	23350	7450
		2033	20400	7200	23350	7450
		2034	20400	7200	23350	7450
		2035	20400	7200	23350	7450
		2036	20400	7200	23350	7450
		2037	20400	7200	23350	7450
		2038	20400	7200	23350	7450
		2039	20400	7200	23350	7450
Entrance Ramp Data		2016	8796	8796	12788	12788
Average daily traffic ($AADT_{en}$) by year, veh/d:		2017	8796	8796	12788	12788
		2018	8796	8796	12788	12788

Output Worksheet for Crossroad Ramp Terminals					
Signal = signalized intersection model Unsig = unsignalized intersection model	Applicable Models	Terminal 1 Study Period	Terminal 2 Study Period	Terminal 3 Study Period	Terminal 4 Study Period
	2019	8796	8796	12788	12788
	2020	8796	8796	12788	12788
	2021	8796	8796	12788	12788
	2022	8796	8796	12788	12788
	2023	8796	8796	12788	12788
	2024	8796	8796	12788	12788
	2025	8796	8796	12788	12788
	2026	8796	8796	12788	12788
	2027	8796	8796	12788	12788
	2028	8796	8796	12788	12788
	2029	8796	8796	12788	12788
	2030	8796	8796	12788	12788
	2031	8796	8796	12788	12788
	2032	8796	8796	12788	12788
	2033	8796	8796	12788	12788
	2034	8796	8796	12788	12788
	2035	8796	8796	12788	12788
	2036	8796	8796	12788	12788
	2037	8796	8796	12788	12788
	2038	8796	8796	12788	12788
	2039	8796	8796	12788	12788

APPENDIX G-5: BUILD CONDITIONS CMF RESULTS

Ramp Terminal Applied CMFs (Roundabout Alternatives)

Model	Study Intersection	Method of Analysis	Fatal/Injury	PDO	TOTAL
			Predicted	Predicted	Predicted
Baseline 2025	WB Ramp Terminal	ISAT-e	2.836	3.879	**6.715**
W-S-1 2025	WB Ramp Terminal	ISAT-e	2.352	3.552	**5.904**
W-S-2 2025	WB Ramp Terminal	ISAT-e	2.760	3.879	**6.639**
W-R-1 2025	WB Ramp Terminal	CMF*	0.822	3.142	**3.964**
Baseline 2025	EB Ramp Terminal	ISAT-e	4.915	11.183	**16.098**
E-S-1 2025	EB Ramp Terminal	ISAT-e	2.956	2.968	**5.924**
E-R-1 2025	EB Ramp Terminal	CMF*	1.425	9.058	**10.484**
E-R-2 2025	EB Ramp Terminal	CMF*	1.425	9.058	**10.484**

Model	Study Intersection	Method of Analysis	Fatal/Injury	PDO	TOTAL
			Predicted	Predicted	Predicted
Baseline 2045	WB Ramp Terminal	ISAT-e	4.306	5.370	**9.676**
W-S-1 2045	WB Ramp Terminal	ISAT-e	3.321	4.918	**8.239**
W-S-2 2045	WB Ramp Terminal	ISAT-e	3.897	5.370	**9.267**
W-R-1 2045	EB Ramp Terminal	CMF*	1.249	4.350	**5.598**
Baseline 2045	EB Ramp Terminal	ISAT-e	6.435	14.115	**20.550**
E-S-1 2045	EB Ramp Terminal	ISAT-e	3.745	4.089	**7.834**
E-R-1 2045	EB Ramp Terminal	CMF*	1.866	11.433	**13.299**
E-R-2 2045	EB Ramp Terminal	CMF*	1.866	11.433	**13.299**

* Study Citation: Gross, F., Lyon, C., Persaud, B., Srinivasan, R., "Safety Effectiveness of Converting Signalized Intersections to Roundabouts." Presented at the 91st Annual Meeting of the Transportation Research Board, Paper No. 12-1658, Washington, D.C., (2012) Results also published in Accident Analysis and Prevention, Volume 50, January 2013, pages 234-241.

Model	Study Intersection	Method of Analysis	Fatal/Injury	PDO	TOTAL
			Predicted	Predicted	Predicted
Baseline 2025	WB Ramp Terminal	ISAT-e	2.836	3.879	6.715
Baseline 2025	EB Ramp Terminal	ISAT-e	4.915	11.183	16.098
Baseline 2025	Between ramp Segment	HSM Smart Spreadsheet	0.759	1.994	2.754
System total			**8.510**	**17.056**	**25.567**

Model	Study Intersection	Method of Analysis	Fatal/Injury	PDO	TOTAL
			Predicted	Predicted	Predicted
C-P-3 2025	WB Ramp Terminal	CMF*	0.822	3.142	3.964
C-P-3 2025	EB Ramp Terminal	CMF*	1.425	9.058	10.484
C-P-3 2025	Between ramp Segment	CMF**	0.424	1.835	2.258
System total			**2.671**	**14.035**	**16.706**

Model	Study Intersection	Method of Analysis	Fatal/Injury	PDO	TOTAL
			Predicted	Predicted	Predicted
Baseline 2045	WB Ramp Terminal	ISAT-e	1.24874	4.3497	5.59844
Baseline 2045	EB Ramp Terminal	ISAT-e	1.86615	11.43315	13.2993
Baseline 2045	Between ramp Segment	HSM Smart Spreadsheet	9.725	8.482	18.207
System total			**12.840**	**24.264**	**37.105**

Model	Study Intersection	Method of Analysis	Fatal/Injury	PDO	TOTAL
			Predicted	Predicted	Predicted
C-P-3 2045	WB Ramp Terminal	CMF*	1.866	11.433	13.299
C-P-3 2045	EB Ramp Terminal	CMF*	0.000	0.000	0.000
C-P-3 2045	Between ramp Segment	CMF**	5.427	7.803	13.230
System total			**7.293**	**19.236**	**26.529**

* Study Citation: Gross, F., Lyon, C., Persaud, B., Srinivasan, R., "Safety Effectiveness of Converting Signalized Intersections to Roundabouts." Presented at the 91st Annual Meeting of the Transportation Research Board, Paper No. 12-1658, Washington, D.C., (2012) Results also published in Accident Analysis and Prevention, Volume 50, January 2013, pages 234-241.

** Study Citation: Abdelrahman, A., M. Abdel-Aty, J. Yuan, and M. Al-Omari. "Systematic Safety Evaluation of Diverging Diamond Interchanges Based on Nationwide Implementation Data". Presented at the 100th Annual Meeting of the Transportation Research Board, Paper No. 21-00026, Washington, D.C., (2021).

APPENDIX H. ACTIVE TRANSPORTATION ANALYSIS SUPPORTING MATERIALS

NOT FOR CONSTRUCTION - FOR DISCUSSION PURPOSES ONLY

kpff
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DRAFTED:

DESIGNED:

0 100' 200' 400'
1 inch = 200 feet

I-182 AND BROADMOOR INTERCHANGE

PEDESTRIAN GRADES

Z:\210001-210999\210616 Pasco I-182 & Broadmoor (Phase 1)\CADD\Exhibits\03_Level 1 Refined Concept Figures\04_Active Transportation\A-E-2a\A-E-2a Exhibit.dwg, 2/3/2022

APPENDIX I. COST ESTIMATES

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: F-E-1

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	2.35	$ 7,200.00	$ 16,914.71	1.5%
Sawcut	LF	706	$ 25.00	$ 17,650.00	1.6%
Removing Bituminous Pavement	SY	453	$ 10.00	$ 4,534.44	0.4%
Removing Paint Line	LF	0	$ 1.00	$ -	0.0%
Removing Painted Traffic Marking	EA	0	$ 120.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
Earthwork					
Excavation	CY	21935	$ 15.00	$ 329,025.00	29.8%
Gravel Borrow	TON	342	$ 40.00	$ 13,686.49	1.2%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	2000	$ 40.00	$ 80,006.33	7.2%
Roadway HMA	TON	2046	$ 130.00	$ 265,967.00	24.1%
Trail HMA	TON	0	$ 80.00	$ -	0.0%
PCCP (including truck aprons)	SY	0	$ 30.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Under Bridge)	SF	600	$ 150.00	$ 90,000.00	8.2%
Drainage					
Media Filter Ditch	LF	1363	$ 40.00	$ 54,520.00	4.9%
12" Pipe	LF	600	$ 75.00	$ 45,000.00	4.1%
Type 1 CB	EA	1	$ 2,000.00	$ 2,000.00	0.2%
Other					
ADA Ramps	EA	0	$ 3,000.00	$ -	0.0%
Conc. Sidewalk	SY	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	2	$ 10,000.00	$ 20,000.00	1.8%
Pavement Markings	LF	2956	$ 5.00	$ 14,780.00	1.3%
Permanent Signing	LS	1	$ 150,000.00	$ 150,000.00	13.6%
			Item Sub-Total	**$ 1,104,083.98**	
Lump Sum Percentages					
Mobilization (7%)	LS	1	$ 77,285.88	$ 77,285.88	
Landscaping (5%)	LS	1	$ 55,204.20	$ 55,204.20	
Maintenance of Traffic (5%)	LS	1	$ 55,204.20	$ 55,204.20	
			Lump Sum Sub-Total	**$ 187,694.28**	
			Item + Lump Sum Total	**$ 1,291,778.25**	
Design Contingency	20%			$ 258,355.65	
			Sub-Total	**$ 1,550,133.90**	
Design & Permitting	20%			$ 310,026.78	
Construction Admin	20%			$ 310,026.78	
Misc. Construction	10%			$ 155,013.39	
			Sub-Total	**$ 2,325,200.85**	
ROW Acquisition	SF				
			Sub-total	**$ 2,325,200.85**	
General Contingency	20%			$ 465,040.17	
			Grand Total	**$ 2,790,241.02**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: F-E-2

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	2.50	$ 7,200.00	$ 17,976.20	1.2%
Sawcut	LF	2212	$ 25.00	$ 55,300.00	3.6%
Removing Bituminous Pavement	SY	1649	$ 10.00	$ 16,486.67	1.1%
Removing Paint Line	LF	0	$ 1.00	$ -	0.0%
Removing Painted Traffic Marking	EA	0	$ 120.00	$ -	0.0%
Trafifc Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
Earthwork					
Excavation	CY	21300	$ 15.00	$ 319,500.00	20.6%
Gravel Borrow	TON	635	$ 40.00	$ 25,400.00	1.6%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	2643	$ 40.00	$ 105,723.80	6.8%
Roadway HMA	TON	2704	$ 130.00	$ 351,460.20	22.7%
Trail HMA	TON	0	$ 80.00	$ -	0.0%
PCCP (including truck aprons)	SY	0	$ 30.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Under Bridge)	SF	600	$ 150.00	$ 90,000.00	5.8%
Retaining Wall (adjacent to ramp)	SF	1425	$ 80.00	$ 114,000.00	7.4%
Drainage					
Media Filter Ditch	LF	1600	$ 40.00	$ 64,000.00	4.1%
12" Pipe	LF	600	$ 75.00	$ 45,000.00	2.9%
Type 1 CB	EA	1	$ 2,000.00	$ 2,000.00	0.1%
Other					
ADA Ramps	EA	0	$ 3,000.00	$ -	0.0%
Conc. Sidewalk	SY	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	2	$ 10,000.00	$ 20,000.00	1.3%
Pavement Markings	LF	4290	$ 5.00	$ 21,450.00	1.4%
Permanent Signing	LS	1	$ 300,000.00	$ 300,000.00	19.4%
			Sub-Total	**$ 1,548,296.87**	

Lump Sum Percentages					
Mobilization (7%)	LS	1	$ 108,380.78	$ 108,380.78	
Landscaping (5%)	LS	1	$ 77,414.84	$ 77,414.84	
Maintenance of Traffic (5%)	LS	1	$ 77,414.84	$ 77,414.84	
			Lump Sum Sub-Total	**$ 263,210.47**	
			Item + Lump Sum Total	**$ 1,811,507.33**	
Design Contingency	20%			$ 362,301.47	
			Sub-Total	**$ 2,173,808.80**	

Design & Permitting	20%			$ 434,761.76	
Construction Admin	20%			$ 434,761.76	
Misc. Construction	10%			$ 217,380.88	
			Sub-Total	**$ 3,260,713.20**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: F-E-4

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.63	$ 7,200.00	$ 4,560.99	0.4%
Sawcut	LF	2470	$ 25.00	$ 61,750.00	4.8%
Removing Bituminous Pavement	SY	2842	$ 10.00	$ 28,420.00	2.2%
Removing Paint Line	LF	0	$ 1.00	$ -	0.0%
Removing Painted Traffic Marking	EA	0	$ 120.00	$ -	0.0%
Trafifc Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
Earthwork					
Excavation	CY	19459	$ 15.00	$ 291,877.78	22.8%
Gravel Borrow	TON	65	$ 40.00	$ 2,618.62	0.2%
Shoring & Extra Excavation	CY	800	$ 30.00	$ 24,000.00	1.9%
Surfacing					
CSBC	TON	1893	$ 40.00	$ 75,700.49	5.9%
Roadway HMA	TON	1936	$ 130.00	$ 251,652.99	19.7%
Trail HMA	TON	0	$ 80.00	$ -	0.0%
PCCP (including truck aprons)	SY	0	$ 30.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Adjacent to ramp)	SF	1675	$ 80.00	$ 134,000.00	10.5%
Drainage					
Media Filter Ditch	LF	1000	$ 40.00	$ 40,000.00	3.1%
12" Pipe	LF	0	$ 75.00	$ -	0.0%
Type 1 CB	EA	0	$ 2,000.00	$ -	0.0%
Other					
ADA Ramps	EA	0	$ 3,000.00	$ -	0.0%
Conc. Sidewalk	SY	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	4	$ 10,000.00	$ 40,000.00	3.1%
Pavement Markings	LF	4775	$ 5.00	$ 23,875.00	1.9%
Permanent Signing	LS	1	$ 300,000.00	$ 300,000.00	23.5%
			Sub-Total	**$ 1,278,455.87**	
Lump Sum Percentages					
Mobilization (7%)	LS	1	$ 89,491.91	$ 89,491.91	
Landscaping (5%)	LS	1	$ 63,922.79	$ 63,922.79	
Maintenance of Traffic (5%)	LS	1	$ 63,922.79	$ 63,922.79	
			Lump Sum Sub-Total	**$ 217,337.50**	
			Item + Lump Sum Total	**$ 1,495,793.37**	
Design Contingency	20%			$ 255,691.17	
			Sub-Total	**$ 1,751,484.54**	
Design & Permitting	20%			$ 350,296.91	
Construction Admin	20%			$ 350,296.91	
Misc. Construction	10%			$ 175,148.45	
			Sub-Total	**$ 2,627,226.81**	
ROW Acquisition	SF				
			Sub-total	**$ 2,627,226.81**	
General Conitngency	20%			$ 525,445.36	
			Grand Total	**$ 3,152,672.17**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: W-R-1

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.48	$ 7,200.00	$ 3,480.17	0.4%
Sawcut	LF	1300	$ 25.00	$ 32,500.00	4.2%
Removing Bituminous Pavement	SY	3649	$ 10.00	$ 36,494.44	4.7%
Removing Paint Line	LF	610	$ 1.00	$ 610.00	0.1%
Removing Pavement Traffic Marking	EA	3	$ 120.00	$ 360.00	0.0%
Traffic Signal Removal	LS	1	$ 40,000.00	$ 40,000.00	5.1%
Light Pole Removal	EA	3	$ 5,000.00	$ 15,000.00	1.9%
Earthwork					0.0%
Excavation	CY	812	$ 15.00	$ 12,180.00	1.6%
Gravel Borrow	TON	335	$ 40.00	$ 13,400.00	1.7%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	1707	$ 40.00	$ 68,293.09	8.8%
Roadway HMA	TON	1746	$ 130.00	$ 227,028.39	29.2%
Trail HMA	TON	0	$ 60.00	$ -	0.0%
PCCP (including truck aprons)	CY	0	$ 30.00	$ -	0.0%
Structural					0.0%
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	0	$ 40.00	$ -	0.0%
12" Pipe	LF	200	$ 75.00	$ 15,000.00	1.9%
Type 1 CB	EA	6	$ 2,000.00	$ 12,000.00	1.5%
Other					
ADA Ramps	EA	10	$ 3,000.00	$ 30,000.00	3.9%
Conc. Sidewalk	SF	700	$ 100.00	$ 70,000.00	9.0%
Curb & Gutter	LF	500	$ 50.00	$ 25,000.00	3.2%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	4	$ 10,000.00	$ 40,000.00	5.1%
Pavement Markings	LF	2512	$ 5.00	$ 12,560.00	1.6%
			Item Sub-Total	**$ 653,906.09**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 45,773.43	$ 45,773.43	5.9%
Landscaping (5%)	LS	1	$ 32,695.30	$ 32,695.30	4.2%
Permanent Signing (2%)	LS	1	$ 13,078.12	$ 13,078.12	1.7%
Maintenance of Traffic (5%)	LS	1	$ 32,695.30	$ 32,695.30	4.2%
			Lump Sum Sub-Total	**$ 124,242.16**	16.0%
			Item + Lump Sum Total	**$ 778,148.25**	100.0%
Design Contingency	20%			$ 155,629.65	
			Sub-Total	**$ 933,777.90**	
Design & Permitting	20%			$ 186,755.58	
Construction Admin	20%			$ 186,755.58	
Misc. Constrcution	10%			$ 93,377.79	
			Sub-Total	**$ 1,400,666.85**	
ROW Acquisition	SF				
			Sub-total	**$ 1,400,666.85**	
General Contingency	20%			$ 280,133.37	
			Grand Total	**$ 1,680,800.22**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: W-S-1

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.12	$ 7,200.00	$ 864.00	0.2%
Sawcut	LF	1197	$ 25.00	$ 29,925.00	7.8%
Removing Bituminous Pavement	SY	156	$ 10.00	$ 1,560.00	0.4%
Removing Paint Line	LF	3340	$ 1.00	$ 3,340.00	0.9%
Removing Pavement Traffic Marking	EA	0	$ 120.00		
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	2	$ 5,000.00	$ 10,000.00	2.6%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	759	$ 40.00	$ 30,360.00	7.9%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	586	$ 40.00	$ 23,440.00	6.1%
Roadway HMA	TON	347	$ 130.00	$ 45,110.00	11.7%
Trail HMA	TON	0	$ 80.00	$ -	0.0%
PCCP (including truck aprons)	CY	0	$ 30.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00	$ -	0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	585	$ 40.00	$ 23,400.00	6.1%
12" Pipe	LF	0	$ 75.00	$ -	0.0%
Type 1 CB	EA	0	$ 2,000.00	$ -	0.0%
Other					
ADA Ramps	EA	0	$ 3,000.00	$ -	0.0%
Concrete Barrier	LF	300	$ 150.00	$ 45,000.00	11.7%
Impact Attenuator	EA	2	$ 30,000.00	$ 60,000.00	15.6%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	2	$ 10,000.00	$ 20,000.00	5.2%
Pavement Markings	LF	3340	$ 5.00	$ 16,700.00	4.3%
			Sub-Total	**$ 309,699.00**	80.6%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 21,678.93	$ 21,678.93	5.6%
Landscaping (5%)	LS	1	$ 15,484.95	$ 15,484.95	4.0%
Permanent Signing (2%)	LS	1	$ 6,193.98	$ 6,193.98	1.6%
Maintenance of Traffic (10%)	LS	1	$ 30,969.90	$ 30,969.90	8.1%
			Sub-Total	**$ 74,327.76**	19.4%
			Item/Lump Sum Total	**$ 384,026.76**	100.0%
Design Contingency	20%			$ 76,805.35	
			Sub-Total	**$ 460,832.11**	
Design & Permitting	20%			$ 92,166.42	
Construction Admin	20%			$ 92,166.42	
Misc. Construction	10%			$ 46,083.21	
			Sub-Total	**$ 691,248.17**	
ROW Acquisition	SF				
			Sub-total	**$ 691,248.17**	
General Contingency	20%			$ 138,249.63	
			Grand Total	**$ 829,497.80**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: W-S-2

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.12	$ 7,200.00	$ 864.00	0.4%
Sawcut	LF	585	$ 25.00	$ 14,625.00	6.5%
Removing Bituminous Pavement	SY	20	$ 10.00	$ 200.00	0.1%
Removing Paint Line	LF	2340	$ 1.00	$ 2,340.00	1.0%
Removing Pavement Traffic Markin	EA	0	$ 120.00		
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	2	$ 5,000.00	$ 10,000.00	4.4%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	759	$ 40.00	$ 30,360.00	13.5%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	586	$ 40.00	$ 23,440.00	10.4%
Roadway HMA	TON	347	$ 130.00	$ 45,110.00	20.0%
Trail HMA	TON	0	$ 80.00	$ -	0.0%
PCCP (including truck aprons)	CY	0	$ 30.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00		0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	585	$ 40.00	$ 23,400.00	10.4%
12" Pipe	LF	0	$ 75.00	$ -	0.0%
Type 1 CB	EA	0	$ 2,000.00	$ -	0.0%
Other					
ADA Ramps	EA	0	$ 3,000.00	$ -	0.0%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	2	$ 10,000.00	$ 20,000.00	8.9%
Pavement Markings	LF	2320	$ 5.00	$ 11,600.00	5.1%
			Sub-Total	**$ 181,939.00**	80.6%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 12,735.73	$ 12,735.73	5.6%
Landscaping (5%)	LS	1	$ 9,096.95	$ 9,096.95	4.0%
Permanent Signing (2%)	LS	1	$ 3,638.78	$ 3,638.78	1.6%
Maintenance of Traffic (10%)	LS	1	$ 18,193.90	$ 18,193.90	8.1%
			Sub-Total	**$ 43,665.36**	19.4%
			Item/Lump Sum Total	**$ 225,604.36**	100.0%
Design Contingency	20%			$ 45,120.87	
			Sub-Total	**$ 270,725.23**	
Design & Permitting	20%			$ 54,145.05	
Construction Admin	20%			$ 54,145.05	
Misc. Constrcution	10%			$ 27,072.52	
			Sub-Total	**$ 406,087.85**	
ROW Acquisition	SF				
			Sub-total	**$ 406,087.85**	
General Contingency	20%			$ 81,217.57	
			Grand Total	**$ 487,305.42**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: E-R-1

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.48	$ 7,200.00	$ 3,480.17	0.4%
Sawcut	LF	1855	$ 25.00	$ 46,375.00	5.6%
Removing Bituminous Pavement	SY	5441	$ 10.00	$ 54,405.56	6.5%
Removing Paint Line	LF	530	$ 1.00	$ 530.00	0.1%
Removing Pavement Traffic Markin	EA	1	$ 120.00		
Traffic Signal Removal	LS	1	$ 40,000.00	$ 40,000.00	4.8%
Light Pole Removal	EA	3	$ 5,000.00	$ 15,000.00	1.8%
Earthwork					
Excavation	CY	812	$ 15.00	$ 12,180.00	1.5%
Gravel Borrow	TON	355	$ 40.00	$ 14,183.78	1.7%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	2045	$ 40.00	$ 81,818.10	9.8%
Roadway HMA	TON	2092	$ 130.00	$ 271,989.90	32.6%
Trail HMA	TON	0	$ 80.00	$ -	0.0%
PCCP (including truck aprons)	SY	1048	$ 30.00	$ 31,433.33	3.8%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall	SF	0	$ 150.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	0	$ 40.00	$ -	0.0%
12" Pipe	LF	200	$ 75.00	$ 15,000.00	1.8%
Type 1 CB	EA	6	$ 2,000.00	$ 12,000.00	1.4%
Other					
ADA Ramps	EA	10	$ 3,000.00	$ 30,000.00	3.6%
Conc. Sidewalk	SY	700	$ 100.00	$ 70,000.00	8.4%
Curb & Gutter	LF	500	$ 50.00	$ 25,000.00	3.0%
Traffic Signal	LS	0	$ 250,000.00	$ -	0.0%
Light Pole	EA	6	$ 15,000.00	$ 90,000.00	10.8%
Pavement Markings	LF	4302	$ 5.00	$ 21,510.00	2.6%
			Item Sub-Total	**$ 834,905.84**	
Lump Sum Percentages					
Mobilization (7%)	LS	1	$ 58,443.41	$ 58,443.41	
Landscaping (5%)	LS	1	$ 41,745.29	$ 41,745.29	
Permanent Signing (4%)	LS	1	$ 33,396.23	$ 33,396.23	
Maintenance of Traffic (10%)	LS	1	$ 83,490.58	$ 83,490.58	
			Lump Sum Sub-Total	**$ 217,075.52**	
			Item + Lump Sum Total	**$ 1,051,981.36**	
Design Contingency	20%			$ 210,396.27	
			Sub-Total	**$ 1,262,377.63**	
Design & Permitting	20%			$ 252,475.53	
Construction Admin	20%			$ 252,475.53	
Misc. Construction	10%			$ 126,237.76	
			Sub-Total	**$ 1,893,566.44**	
ROW Acquisition	SF				
			Sub-total	**$ 1,893,566.44**	
General Contingency	20%			$ 378,713.29	
			Grand Total	**$ 2,272,279.73**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: E-R-2

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.16	$ 7,200.00	$ 1,158.68	0.2%
Sawcut	LF	757	$ 25.00	$ 18,925.00	2.7%
Removing Bituminous Pavement	SY	4600	$ 10.00	$ 46,001.11	6.6%
Removing Paint Line	LF	155	$ 1.00	$ 155.00	0.0%
Removing Pavement Traffic Marking	EA	1	$ 120.00	$ 120.00	0.0%
Traffic Signal Removal	LS	1	$ 40,000.00	$ 40,000.00	5.8%
Light Pole Removal	EA	3	$ 5,000.00	$ 15,000.00	2.2%
Earthwork					
Excavation	CY	812	$ 15.00	$ 12,180.00	1.8%
Gravel Borrow	TON	355	$ 40.00	$ 14,183.78	2.0%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	1353	$ 40.00	$ 54,108.94	7.8%
Roadway HMA	TON	1384	$ 130.00	$ 179,875.66	25.9%
Trail HMA	TON	0	$ 80.00	$ -	0.0%
PCCP (including truck aprons)	SY	1013	$ 30.00	$ 30,400.00	4.4%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall	SF	0	$ 150.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	0	$ 40.00	$ -	0.0%
12" Pipe	LF	600	$ 75.00	$ 45,000.00	6.5%
Type 1 CB	EA	6	$ 2,000.00	$ 12,000.00	1.7%
Other					
ADA Ramps	EA	10	$ 3,000.00	$ 30,000.00	4.3%
Conc. Sidewalk	SY	700	$ 100.00	$ 70,000.00	10.1%
Curb & Gutter	LF	360	$ 50.00	$ 18,000.00	2.6%
Traffic Signal	LS	0	$ 250,000.00	$ -	0.0%
Light Pole	EA	6	$ 15,000.00	$ 90,000.00	13.0%
Pavement Markings	LF	3460	$ 5.00	$ 17,300.00	2.5%
			Sub-Total	**$ 694,408.17**	
Lump Sum Percentages					
Mobilization (7%)	LS	1	$ 48,608.57	$ 48,608.57	
Landscaping (5%)	LS	1	$ 34,720.41	$ 34,720.41	
Permanent Signing (4%)	LS	1	$ 27,776.33	$ 27,776.33	
Maintenance of Traffic (10%)	LS	1	$ 69,440.82	$ 69,440.82	
			Lump Sum Sub-Total	**$ 180,546.12**	
			Item + Lump Sum Total	**$ 874,954.29**	
Design Contingency	20%			$ 138,881.63	
			Sub-Total	**$ 1,013,835.92**	
Design & Permitting	20%			$ 202,767.18	
Construction Admin	20%			$ 202,767.18	
Misc. Construction	10%			$ 101,383.59	
			Sub-Total	**$ 1,520,753.88**	
ROW Acquisition	SF				
			Sub-total	**$ 1,520,753.88**	
General Conitngency	20%			$ 304,150.78	
			Grand Total	**$ 1,824,904.66**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: E-S-1

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.21	$ 7,200.00	$ 1,505.79	0.3%
Sawcut	LF	600	$ 25.00	$ 15,000.00	3.4%
Removing Bituminous Pavement	SY	648	$ 10.00	$ 6,483.33	1.5%
Removing Paint Line	LF	0	$ 1.00	$ -	0.0%
Removing Pavement Traffic Marking	EA	2	$ 120.00	$ 240.00	0.1%
Trafifc Signal Removal	LS	1	$ 40,000.00	$ 40,000.00	9.1%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	547	$ 40.00	$ 21,881.08	5.0%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	445	$ 40.00	$ 17,814.81	4.0%
Roadway HMA	TON	456	$ 130.00	$ 59,222.22	13.4%
Trail HMA	TON	0	$ 80.00	$ -	0.0%
PCCP (including truck aprons)	SY	0	$ 30.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall	SF	0	$ 150.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	0	$ 40.00	$ -	0.0%
12" Pipe	LF	150	$ 75.00	$ 11,250.00	2.6%
Type 1 CB	EA	1	$ 2,000.00	$ 2,000.00	0.5%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.7%
Conc. Sidewalk	SY	50	$ 100.00	$ 5,000.00	1.1%
Curb & Gutter	LF	75	$ 50.00	$ 3,750.00	0.9%
Traffic Signal	LS	1	$ 250,000.00	$ 250,000.00	56.7%
Light Pole	EA	0	$ 15,000.00	$ -	0.0%
Pavement Markings	LF	700	$ 5.00	$ 3,500.00	0.8%
			Sub-Total	**$ 440,647.24**	
Lump Sum Percentages					
Mobilization (7%)	LS	1	$ 30,845.31	$ 30,845.31	
Landscaping (2%)	LS	1	$ 8,812.94	$ 8,812.94	
Permanent Signing (2%)	LS	1	$ 8,812.94	$ 8,812.94	
Maintenance of Traffic (5%)	LS	1	$ 22,032.36	$ 22,032.36	
			Lump Sum Sub-Total	**$ 70,503.56**	
			Item + Lump Sum Total	**$ 511,150.79**	
Design Contingency	20%			$ 88,129.45	
			Sub-Total	**$ 599,280.24**	
Design & Permitting	20%			$ 119,856.05	
Construction Admin	20%			$ 119,856.05	
Misc. Construction	10%			$ 59,928.02	
			Sub-Total	**$ 898,920.36**	
ROW Acquisition	SF				
			Sub-total	**$ 898,920.36**	
General Conitngency	20%			$ 179,784.07	
			Grand Total	**$ 1,078,704.44**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: A-N-1

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.35	$ 7,200.00	$ 2,520.00	0.1%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
					0.0%
Earthwork					0.0%
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0		$ -	0.0%
					0.0%
Surfacing					0.0%
CSBC	TON	333	$ 40.00	$ 13,320.00	0.3%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	143	$ 80.00	$ 11,440.00	0.3%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					0.0%
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	5680	$ 550.00	$ 3,124,000.00	77.5%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	1600	$ 80.00	$ 128,000.00	3.2%
Structural Borrow	TON	552	$ 45.00	$ 24,840.00	0.6%
Pedestrian Railing on Walls	LF	40	$ 400.00	$ 16,000.00	0.4%
				$ -	0.0%
Drainage					
Media Filter Ditch	LF	400	$ 40.00	$ 16,000.00	0.4%
12" Pipe	LF	50	$ 75.00	$ 3,750.00	0.1%
Type 1 CB	EA	2	$ 2,000.00	$ 4,000.00	0.1%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.1%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	4	$ 10,000.00	$ 40,000.00	1.0%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
			Sub-Total	**$ 3,386,870.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 237,080.90	$ 237,080.90	5.9%
Landscaping (5%)	LS	1	$ 169,343.50	$ 169,343.50	4.2%
Permanent Signing (2%)	LS	1	$ 67,737.40	$ 67,737.40	1.7%
Maintenance of Traffic (5%)	LS	1	$ 169,343.50	$ 169,343.50	4.2%
			Sub-Total	**$ 643,505.30**	16.0%
			Item/Lump Sum Total	**$ 4,030,375.30**	100.0%
Design Contingency	20%			$ 806,075.06	
			Sub-Total	**$ 4,192,945.06**	
Design & Permitting	20%			$ 838,589.01	
Construction Admin	20%			$ 838,589.01	
Misc. Constrcution	10%			$ 419,294.51	
			Sub-Total	**$ 6,289,417.59**	
ROW Acquisition	SF				
			Sub-total	**$ 6,289,417.59**	
General Contingency	20%			$ 1,257,883.52	
			Grand Total	**$ 7,547,301.11**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: A-N-2

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.35	$ 7,200.00	$ 2,520.00	0.1%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
Surfacing					
CSBC	TON	731	$ 40.00	$ 29,240.00	0.9%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	314	$ 80.00	$ 25,120.00	0.7%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	5680	$ 550.00	$ 3,124,000.00	91.4%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	1600	$ 80.00	$ 128,000.00	3.7%
Structural Borrow	TON	552	$ 45.00	$ 24,840.00	0.7%
Pedestrian Railing on Walls	LF	40	$ 400.00	$ 16,000.00	0.5%
Drainage					
Media Filter Ditch	LF	400	$ 40.00	$ 16,000.00	0.5%
12" Pipe	LF	50	$ 75.00	$ 3,750.00	0.1%
Type 1 CB	EA	2	$ 2,000.00	$ 4,000.00	0.1%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.1%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	4	$ 10,000.00	$ 40,000.00	1.2%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
Bridge Abutment	LS	1	$ -	$ -	
			Sub-Total	**$ 3,416,470.00**	
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 239,152.90	$ 239,152.90	7.0%
Landscaping (5%)	LS	1	$ 170,823.50	$ 170,823.50	5.0%
Permanent Signing (2%)	LS	1	$ 68,329.40	$ 68,329.40	2.0%
Maintenance of Traffic (5%)	LS	1	$ 170,823.50	$ 170,823.50	5.0%
			Sub-Total	**$ 649,129.30**	
			Item/Lump Sum Total	**$ 4,065,599.30**	119.0%
Design Contingency	20%			$ 813,119.86	
			Sub-Total	**$ 4,878,719.16**	
Design & Permitting	20%			$ 975,743.83	
Construction Admin	20%			$ 975,743.83	
Misc. Construction	10%			$ 487,871.92	
			Sub-Total	**$ 7,318,078.74**	
ROW Acquisition	SF				
			Sub-total	**$ 7,318,078.74**	
General Contingency	20%			$ 1,463,615.75	
			Grand Total	**$ 8,781,694.49**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: A-N-3

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.14	$ 7,200.00	$ 1,008.00	0.0%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
					0.0%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
					0.0%
Surfacing					
CSBC	TON	103.6	$ 40.00	$ 4,144.00	0.1%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	65.6	$ 80.00	$ 5,248.00	0.1%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	4480	$ 550.00	$ 2,464,000.00	60.6%
Retaining Wall (Below EG)	SF	3420	$ 150.00	$ 513,000.00	12.6%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	1877.75	$ 45.00	$ 84,498.75	2.1%
Pedestrian Railing on Walls	LF	760	$ 400.00	$ 304,000.00	7.5%
Drainage					
Media Filter Ditch	LF	200	$ 40.00	$ 8,000.00	0.2%
12" Pipe	LF	50	$ 75.00	$ 3,750.00	0.1%
Type 1 CB	EA	2	$ 2,000.00	$ 4,000.00	0.1%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.1%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	2	$ 10,000.00	$ 20,000.00	0.5%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
					0.0%
			Sub-Total	**$ 3,414,648.75**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 239,025.41	$ 239,025.41	5.9%
Landscaping (5%)	LS	1	$ 170,732.44	$ 170,732.44	4.2%
Permanent Signing (2%)	LS	1	$ 68,292.98	$ 68,292.98	1.7%
Maintenance of Traffic (5%)	LS	1	$ 170,732.44	$ 170,732.44	4.2%
			Sub-Total	**$ 648,783.26**	16.0%
			Item/Lump Sum Total	**$ 4,063,432.01**	119.0%
Design Contingency	20%			$ 812,686.40	
			Sub-Total	**$ 4,876,118.42**	
Design & Permitting	20%			$ 975,223.68	
Construction Admin	20%			$ 975,223.68	
Misc. Construction	10%			$ 487,611.84	
			Sub-Total	**$ 7,314,177.62**	
ROW Acquisition	SF				
			Sub-total	**$ 7,314,177.62**	
General Contingency	20%			$ 1,462,835.52	
			Grand Total	**$ 8,777,013.15**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: A-E-1a

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.14	$ 7,200.00	$ 1,008.00	0.1%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
Earthwork					
Excavation	CY	2141	$ 15.00	$ 32,115.00	2.1%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
					0.0%
Surfacing					0.0%
CSBC	TON	170.3	$ 40.00	$ 6,812.00	0.4%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	107.8	$ 80.00	$ 8,624.00	0.6%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Undercrossing Structure	LS	1	$ 322,000.00	$ 322,000.00	21.1%
Retaining Wall (Below EG)	SF	5780	$ 150.00	$ 867,000.00	56.8%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00	$ -	0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	0	$ 40.00	$ -	0.0%
12" Pipe	LF	200	$ 75.00	$ 15,000.00	1.0%
Type 1 CB	EA	4	$ 2,000.00	$ 8,000.00	0.5%
					0.0%
Other					0.0%
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.2%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	2	$ 10,000.00	$ 20,000.00	1.3%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
			Sub-Total	**$ 1,283,559.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 89,849.13	$ 89,849.13	5.9%
Landscaping (5%)	LS	1	$ 64,177.95	$ 64,177.95	4.2%
Permanent Signing (2%)	LS	1	$ 25,671.18	$ 25,671.18	1.7%
Maintenance of Traffic (5%)	LS	1	$ 64,177.95	$ 64,177.95	4.2%
			Sub-Total	**$ 243,876.21**	16.0%
			Item/Lump Sum Total	**$ 1,527,435.21**	100.0%
Design Contingency	20%			$ 305,487.04	
			Sub-Total	**$ 1,589,046.04**	
Design & Permitting	20%			$ 317,809.21	
Construction Admin	20%			$ 317,809.21	
Misc. Constrcution	10%			$ 158,904.60	
			Sub-Total	**$ 2,383,569.06**	
ROW Acquisition	SF				
			Sub-total	**$ 2,383,569.06**	
General Contingency	20%			$ 476,713.81	
			Grand Total	**$ 2,860,282.88**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: A-E-2a

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.14	$ 7,200.00	$ 1,008.00	0.1%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
Earthwork					
Excavation	CY	1136.8	$ 15.00	$ 17,052.00	1.7%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
					0.0%
Surfacing					0.0%
CSBC	TON	146.9	$ 40.00	$ 5,876.00	0.6%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	93.1	$ 80.00	$ 7,448.00	0.7%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Undercrossing Structure	LS	1	$ 322,000.00	$ 322,000.00	31.2%
Retaining Wall (Below EG)	SF	3138	$ 150.00	$ 470,700.00	45.6%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00	$ -	0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	0	$ 40.00	$ -	0.0%
12" Pipe	LF	200	$ 75.00	$ 15,000.00	1.5%
Type 1 CB	EA	4	$ 2,000.00	$ 8,000.00	0.8%
					0.0%
Other					0.0%
ADA Ramps	EA	0	$ 3,000.00	$ -	0.0%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	2	$ 10,000.00	$ 20,000.00	1.9%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
			Sub-Total	**$ 867,084.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 60,695.88	$ 60,695.88	5.9%
Landscaping (5%)	LS	1	$ 43,354.20	$ 43,354.20	4.2%
Permanent Signing (2%)	LS	1	$ 17,341.68	$ 17,341.68	1.7%
Maintenance of Traffic (5%)	LS	1	$ 43,354.20	$ 43,354.20	4.2%
			Sub-Total	**$ 164,745.96**	16.0%
			Item/Lump Sum Total	**$ 1,031,829.96**	100.0%
Design Contingency	20%			$ 206,365.99	
			Sub-Total	**$ 1,238,195.95**	
Design & Permitting	20%			$ 247,639.19	
Construction Admin	20%			$ 247,639.19	
Misc. Constrcution	10%			$ 123,819.60	
			Sub-Total	**$ 1,857,293.93**	
ROW Acquisition	SF				
			Sub-total	**$ 1,857,293.93**	
General Contingency	20%			$ 371,458.79	
			Grand Total	**$ 2,228,752.71**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: A-W-1a

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.35	$ 7,200.00	$ 2,520.00	0.2%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	0	$ 5,000.00	$ -	0.0%
Earthwork					
Excavation	CY	1208	$ 15.00	$ 18,120.00	1.7%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
					0.0%
Surfacing					0.0%
CSBC	TON	119	$ 40.00	$ 4,760.00	0.4%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	75.3	$ 80.00	$ 6,024.00	0.6%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Undercrossing Structure	LS	1	$ 322,000.00	$ 322,000.00	30.4%
Retaining Wall (Below EG)	SF	3264	$ 150.00	$ 489,600.00	46.3%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00	$ -	0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF		$ 40.00	$ -	0.0%
12" Pipe	LF	200	$ 75.00	$ 15,000.00	1.4%
Type 1 CB	EA	4	$ 2,000.00	$ 8,000.00	0.8%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.3%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	2	$ 10,000.00	$ 20,000.00	1.9%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
			Sub-Total	**$ 889,024.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 62,231.68	$ 62,231.68	5.9%
Landscaping (5%)	LS	1	$ 44,451.20	$ 44,451.20	4.2%
Permanent Signing (2%)	LS	1	$ 17,780.48	$ 17,780.48	1.7%
Maintenance of Traffic (5%)	LS	1	$ 44,451.20	$ 44,451.20	4.2%
			Sub-Total	**$ 168,914.56**	16.0%
			Item/Lump Sum Total	**$ 1,057,938.56**	100.0%
Design Contingency	20%			$ 211,587.71	
			Sub-Total	**$ 1,269,526.27**	
Design & Permitting	20%			$ 253,905.25	
Construction Admin	20%			$ 253,905.25	
Misc. Construction	10%			$ 126,952.63	
			Sub-Total	**$ 1,904,289.41**	
ROW Acquisition	SF				
			Sub-total	**$ 1,904,289.41**	
General Contingency	20%			$ 380,857.88	
			Grand Total	**$ 2,285,147.29**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: A-W-2b

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.5	$ 7,200.00	$ 3,600.00	0.1%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	2	$ 5,000.00	$ 10,000.00	0.3%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
Surfacing					
CSBC	TON	268.6	$ 40.00	$ 10,744.00	0.3%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	170.2	$ 80.00	$ 13,616.00	0.4%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	2080	$ 550.00	$ 1,144,000.00	30.0%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	16722	$ 80.00	$ 1,337,760.00	35.0%
Structural Borrow	TON	7511	$ 45.00	$ 337,995.00	8.9%
Pedestrian Railing on Walls	LF	600	$ 400.00	$ 240,000.00	6.3%
		4			
Drainage					
Media Filter Ditch	LF	0	$ 40.00	$ -	0.0%
12" Pipe	LF	430	$ 75.00	$ 32,250.00	0.8%
Type 1 CB	EA	8	$ 2,000.00	$ 16,000.00	0.4%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.1%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	6	$ 10,000.00	$ 60,000.00	1.6%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
					0.0%
			Item Sub-Total	**$ 3,208,965.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 224,627.55	$ 224,627.55	5.9%
Landscaping (5%)	LS	1	$ 160,448.25	$ 160,448.25	4.2%
Permanent Signing (2%)	LS	1	$ 64,179.30	$ 64,179.30	1.7%
Maintenance of Traffic (5%)	LS	1	$ 160,448.25	$ 160,448.25	4.2%
			Lump Sum Sub-Total	**$ 609,703.35**	16.0%
			Item/Lump Sum Total	**$ 3,818,668.35**	100.0%
Design Contingency	20%			$ 763,733.67	
			Sub-Total	**$ 3,972,698.67**	
Design & Permitting	20%			$ 794,539.73	
Construction Admin	20%			$ 794,539.73	
Misc. Constrcution	10%			$ 397,269.87	
			Sub-Total	**$ 5,959,048.01**	
ROW Acquisition	SF				
			Sub-total	**$ 5,959,048.01**	
General Contingency	20%			$ 1,191,809.60	
			Grand Total	**$ 7,150,857.61**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: A-I-1 Bridge Cantilever

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.32	$ 7,200.00	$ 2,304.00	0.1%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	2	$ 5,000.00	$ 10,000.00	0.4%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
Surfacing					
CSBC	TON	297.5	$ 40.00	$ 11,900.00	0.4%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	127.5	$ 80.00	$ 10,200.00	0.4%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
					0.0%
Structural					0.0%
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Cantilever Structure	SF	3320	$ 660.00	$ 2,191,200.00	78.4%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00	$ -	0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	50	$ 40.00	$ 2,000.00	0.1%
12" Pipe	LF	100	$ 75.00	$ 7,500.00	0.3%
Type 1 CB	EA	2	$ 2,000.00	$ 4,000.00	0.1%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.1%
Conc. Barrier	LF	450	$ 150.00	$ 67,500.00	2.4%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	4	$ 10,000.00	$ 40,000.00	1.4%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
			Sub-Total	**$ 2,349,604.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 164,472.28	$ 164,472.28	5.9%
Landscaping (5%)	LS	1	$ 117,480.20	$ 117,480.20	4.2%
Permanent Signing (2%)	LS	1	$ 46,992.08	$ 46,992.08	1.7%
Maintenance of Traffic (5%)	LS	1	$ 117,480.20	$ 117,480.20	4.2%
			Sub-Total	**$ 446,424.76**	16.0%
			Item/Lump Sum Total	**$ 2,796,028.76**	100.0%
Design Contingency	20%			$ 559,205.75	
			Sub-Total	**$ 3,355,234.51**	
Design & Permitting	20%			$ 671,046.90	
Construction Admin	20%			$ 671,046.90	
Misc. Constrcution	10%			$ 335,523.45	
			Sub-Total	**$ 5,032,851.77**	
ROW Acquisition	SF				
			Sub-total	**$ 5,032,851.77**	
General Contingency	20%			$ 1,006,570.35	
			Grand Total	**$ 6,039,422.12**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: A-I-1 Bridge Widening

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.32	$ 7,200.00	$ 2,304.00	0.0%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	2	$ 5,000.00	$ 10,000.00	0.2%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
Surfacing					
CSBC	TON	297.5	$ 40.00	$ 11,900.00	0.2%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	127.5	$ 80.00	$ 10,200.00	0.2%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
					0.0%
Structural					0.0%
Bridge Widening	SF	6640	$ 600.00	$ 3,984,000.00	80.8%
Cantilever Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00	$ -	0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	50	$ 40.00	$ 2,000.00	0.0%
12" Pipe	LF	100	$ 75.00	$ 7,500.00	0.2%
Type 1 CB	EA	2	$ 2,000.00	$ 4,000.00	0.1%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	0.1%
Conc. Barrier	LF	450	$ 150.00	$ 67,500.00	1.4%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	4	$ 10,000.00	$ 40,000.00	0.8%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
			Sub-Total	**$ 4,142,404.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 289,968.28	$ 289,968.28	5.9%
Landscaping (5%)	LS	1	$ 207,120.20	$ 207,120.20	4.2%
Permanent Signing (2%)	LS	1	$ 82,848.08	$ 82,848.08	1.7%
Maintenance of Traffic (5%)	LS	1	$ 207,120.20	$ 207,120.20	4.2%
			Sub-Total	**$ 787,056.76**	16.0%
			Item/Lump Sum Total	**$ 4,929,460.76**	100.0%
Design Contingency	20%			$ 985,892.15	
			Sub-Total	**$ 5,915,352.91**	
Design & Permitting	20%			$ 1,183,070.58	
Construction Admin	20%			$ 1,183,070.58	
Misc. Constrcution	10%			$ 591,535.29	
			Sub-Total	**$ 8,873,029.37**	
ROW Acquisition	SF				
			Sub-total	**$ 8,873,029.37**	
General Contingency	20%			$ 1,774,605.87	
			Grand Total	**$ 10,647,635.24**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: A-I-2/3

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.16	$ 7,200.00	$ 1,152.00	0.8%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	4000	$ 5.00	$ 20,000.00	13.3%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	2	$ 5,000.00	$ 10,000.00	6.7%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0		$ -	0.0%
Surfacing					
CSBC	TON	72.6	$ 40.00	$ 2,904.00	1.9%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	85.1	$ 80.00	$ 6,808.00	4.5%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00	$ -	0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	50	$ 40.00	$ 2,000.00	1.3%
12" Pipe	LF	100	$ 75.00	$ 7,500.00	5.0%
Type 1 CB	EA	4	$ 2,000.00	$ 8,000.00	5.3%
					0.0%
Other					
ADA Ramps	EA	1	$ 3,000.00	$ 3,000.00	2.0%
Flexible Marker	LF	500	$ 10.00	$ 5,000.00	3.3%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	4	$ 10,000.00	$ 40,000.00	26.6%
Pavement Markings	LF	4000	$ 5.00	$ 20,000.00	13.3%
			Sub-Total	**$ 126,364.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 8,845.48	$ 8,845.48	5.9%
Landscaping (5%)	LS	1	$ 6,318.20	$ 6,318.20	4.2%
Permanent Signing (2%)	LS	1	$ 2,527.28	$ 2,527.28	1.7%
Maintenance of Traffic (5%)	LS	1	$ 6,318.20	$ 6,318.20	4.2%
			Sub-Total	**$ 24,009.16**	16.0%
			Item/Lump Sum Total	**$ 150,373.16**	100.0%
Design Contingency	20%			$ 4,801.83	
			Sub-Total	**$ 131,165.83**	
Design & Permitting	20%			$ 26,233.17	
Construction Admin	20%			$ 26,233.17	
Misc. Constrcution	10%			$ 13,116.58	
			Sub-Total	**$ 196,748.75**	
ROW Acquisition	SF				
			Sub-total	**$ 196,748.75**	
General Contingency	20%			$ 39,349.75	
			Grand Total	**$ 236,098.50**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate
Alternative: A-P-2

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	0.16	$ 7,200.00	$ 1,152.00	0.5%
Sawcut	LF	0	$ 25.00	$ -	0.0%
Pavement Removal	SY	0	$ 10.00	$ -	0.0%
Pavement Marking Removal	LF	0	$ 5.00	$ -	0.0%
Traffic Signal Removal	LS	0	$ 40,000.00	$ -	0.0%
Light Pole Removal	EA	2	$ 5,000.00	$ 10,000.00	4.5%
Earthwork					
Excavation	CY	0	$ 15.00	$ -	0.0%
Gravel Borrow	TON	0	$ 40.00	$ -	0.0%
Shoring & Extra Excavation	CY	0	$ -	$ -	0.0%
Surfacing					
CSBC	TON	709.5	$ 40.00	$ 28,380.00	12.7%
Roadway HMA	TON	0	$ 150.00	$ -	0.0%
Trail HMA	TON	304.2	$ 80.00	$ 24,336.00	10.9%
PCCP (including truck aprons)	CY	0	$ 300.00	$ -	0.0%
Structural					
Bridge Widening	SF	0	$ 600.00	$ -	0.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall (Below EG)	SF	0	$ 150.00	$ -	0.0%
Retaining Wall (Above EG)	SF	0	$ 80.00	$ -	0.0%
Structural Borrow	TON	0	$ 45.00	$ -	0.0%
Pedestrian Railing on Walls	LF	0	$ 400.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	1670	$ 40.00	$ 66,800.00	29.8%
12" Pipe	LF	100	$ 75.00	$ 7,500.00	3.3%
Type 1 CB	EA	2	$ 2,000.00	$ 4,000.00	1.8%
					0.0%
Other					
ADA Ramps	EA	2	$ 3,000.00	$ 6,000.00	2.7%
Conc. Sidewalk	SF	0	$ 100.00	$ -	0.0%
Curb & Gutter	LF	0	$ 50.00	$ -	0.0%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	4	$ 10,000.00	$ 40,000.00	17.9%
Pavement Markings	LF	0	$ 5.00	$ -	0.0%
			Sub-Total	**$ 188,168.00**	84.0%
Lump Sum (Percentages)					
Mobilization (7%)	LS	1	$ 13,171.76	$ 13,171.76	5.9%
Landscaping (5%)	LS	1	$ 9,408.40	$ 9,408.40	4.2%
Permanent Signing (2%)	LS	1	$ 3,763.36	$ 3,763.36	1.7%
Maintenance of Traffic (5%)	LS	1	$ 9,408.40	$ 9,408.40	4.2%
			Sub-Total	**$ 35,751.92**	16.0%
			Item/Lump Sum Total	**$ 223,919.92**	100.0%
Design Contingency	20%			$ 44,783.98	
			Sub-Total	**$ 268,703.90**	
Design & Permitting	20%			$ 53,740.78	
Construction Admin	20%			$ 53,740.78	
Misc. Constrcution	10%			$ 26,870.39	
			Sub-Total	**$ 403,055.86**	
ROW Acquisition	SF				
			Sub-total	**$ 403,055.86**	
General Contingency	20%			$ 80,611.17	
			Grand Total	**$ 483,667.03**	

I-182 & Broadmoor Interchange
Level 2 Screening Analysis

Conceptual Cost Estimate

Alternative: C-E-3

Item	Unit	Quantity	Unit Cost	Cost	%
Preparation					
Clearing & Grubbing	AC	2.37	$ 7,200.00	$ 17,096.53	0.2%
Sawcut	LF	1892	$ 25.00	$ 47,300.00	0.4%
Removing Asphalt Conc Pavement	SY	22903	$ 10.00	$ 229,034.44	2.0%
Removing Paint Line	LF	1100	$ 1.00	$ 1,100.00	0.0%
Removing Painted Traffic Marking	EA	3	$ 120.00	$ 360.00	0.0%
Traffic Signal Removal	LS	2	$ 40,000.00	$ 80,000.00	0.7%
Light Pole Removal	EA	7	$ 5,000.00	$ 35,000.00	0.3%
Earthwork					
Excavation	CY	5976	$ 15.00	$ 89,640.00	0.8%
Gravel Borrow	TON	6968	$ 40.00	$ 278,724.32	2.5%
Shoring & Extra Excavation	CY	0	$ 30.00	$ -	0.0%
Surfacing					
CSBC	TON	7087	$ 40.00	$ 283,499.62	2.5%
Roadway HMA	TON	7250	$ 130.00	$ 942,444.68	8.4%
Trail HMA	TON	0	$ 60.00	$ -	0.0%
PCCP (including truck aprons)	SY	8478	$ 30.00	$ 254,340.00	2.3%
Structural					
Bridge Widening	SF	13824	$ 600.00	$ 8,294,400.00	74.0%
Bridge Structure	SF	0	$ 550.00	$ -	0.0%
Retaining Wall	SF	0	$ 150.00	$ -	0.0%
Drainage					
Media Filter Ditch	LF	0	$ 40.00	$ -	0.0%
12" Pipe	LF	1000	$ 75.00	$ 75,000.00	0.7%
Type 1 CB	EA	16	$ 2,000.00	$ 32,000.00	0.3%
Other					
ADA Ramps	EA	16	$ 3,000.00	$ 48,000.00	0.4%
Conc. Sidewalk	SY	1000	$ 100.00	$ 100,000.00	0.9%
Curb & Gutter	LF	2000	$ 50.00	$ 100,000.00	0.9%
Traffic Signal	LS	0	$ 350,000.00	$ -	0.0%
Light Pole	EA	24	$ 10,000.00	$ 240,000.00	2.1%
Pavement Markings	LF	11200	$ 5.00	$ 56,000.00	0.5%
			Item Sub-Total	**$ 11,203,939.59**	
Lump Sum Percentages					
Mobilization (7%)	LS	1	$ 784,275.77	$ 784,275.77	
Landscaping (5%)	LS	1	$ 560,196.98	$ 560,196.98	
Permanent Signing (3%)	LS	1	$ 336,118.19	$ 336,118.19	
Maintenance of Traffic (5%)	LS	1	$ 560,196.98	$ 560,196.98	
			Lump Sum Sub-Total	**$ 2,240,787.92**	
			Item + Lump Sum Total	**$ 13,444,727.51**	
Design Contingency	20%			$ 2,688,945.50	
			Sub-Total	**$ 13,892,885.10**	
Design & Permitting	20%			$ 2,778,577.02	
Construction Admin	20%			$ 2,778,577.02	
Misc. Construction	10%			$ 1,389,288.51	
			Sub-Total	**$ 20,839,327.64**	
ROW Acquisition	SF				
			Sub-total	**$ 20,839,327.64**	
General Conitngency	20%			$ 4,167,865.53	
			Grand Total	**$ 25,007,193.17**	

APPENDIX J. PUBLIC INVOLVEMENT PLAN

BROADMOOR INTERCHANGE PROJECT – PUBLIC INVOLVEMENT PLAN

DATE: November 22, 2021

TO: Steve Worley | City of Pasco

FROM: Veronica Sullivan | DKS Associates

Kendall Flint | DKS Associates

SUBJECT: Broadmoor Interchange Project – Public Involvement Plan Project #21-044

INTRODUCTION

Broadmoor Boulevard is the primary arterial connection between the regional freeway system (I-182) and existing residential and agricultural land uses as well as expected commercial and residential growth west of Broadmoor Boulevard (known as the "Broadmoor Area"). The City of Pasco has identified several local improvements to Broadmoor Boulevard both north and south of the I-182/Broadmoor Boulevard interchange to serve both the short and long-term needs of the Broadmoor Area. The I-182/Broadmoor Boulevard interchange project is intended to select and design a solution that addresses the short-term interchange needs for all modes of travel while also providing capacity to serve some of the longer-term interchange needs.

The purpose of this memorandum is to document the Public Involvement Plan for the Broadmoor Interchange Project. The following sections highlight the importance of public outreach, key audience, key messages, goals, tactics, and tools that will be used for this effort. Public outreach will allow the City's project team to capture the stories from the community including staff, parents, students and other vulnerable road users, and then provide the feedback to the project stakeholders as input into the improvement selection process.

GOALS

1. Educate users of the interchange about the purpose and need for the project.
2. Gather feedback and experiences from people who live, travel, or work in the study area and use it guide transportation improvements.
3. Ensure inclusion and diversity of participants in the outreach process.

KEY AUDIENCES

The following audience groups will be encouraged to participate in the public outreach process:

- Users of the Interchange
    - Drivers
    - Goods movement
    - Bike/Ped Interests
- Businesses/Residents in proximity to the interchange
- Public Agencies

AGENCY	NAME	TITLE
FHWA	Gary Martindale	SC & SW Region Area Engineer
	Joel Barnett	Safety and Geometric Design Engineer
	Sharon Love	Environmental Program Manager
WSDOT HEADQUARTERS	TBD	Multimodal Division Representative
	Rick Keniston	Assistant State Design Engineer (ASDE)
	Brian Walsh	State Traffic Design Engineer
	Scott Davis	Assistant State Traffic Design Engineer
WSDOT SOUTH CENTRAL REGION	Paul Gonseth	Region Planning Engineer
	Jacob Prilucik	Transportation Engineer
	Jeff Minnick	Design Engineering Manager
	Bill Sauriol	Environmental Manager
	Kara Shute	Maintenance Superintendent
	Larry Wilhelm	Maintenance
	Todd Daley	Traffic Engineer

	Alex Sangino	Construction
	Andres Mendoza	Construction
	Brian White	Assistant Regional Administrator for Construction and Development
	Randy Giles	Region Program Management Engineer
	LisaRene Schilperoort	Assistant Traffic Engineer
CITY OF PASCO	Steve Worley	Public Works Director
	Dan Ford	City Engineer
	Maria Serra	CIP Manager
	Jon Funfar	Communications Program Manager
	Jacob Gonzalez	Senior Planning Manager
FRANKLIN COUNTY	Craig Erdmann	Assistant Public Works Director
	Matt Mahoney	Public Works Director
BEN-FRANKLIN TRANSIT (BFT)	Kevin Sliger	Principal Planner/Capital Projects
	Keith Hall	Director
BENTON-FRANKLIN COUNCIL OF GOVERNMENTS (BFCG)	Erin Braich	Transportation Manager

KEY MESSAGES

Key messages for this project are as follows:

1. The purpose of the project is to plan for and reduce congestion in and around the interchange ramp terminals and off-ramps in the future.

2. These improvements will support safety for all modes of travel, with a special focus on bicyclists and pedestrians.
3. The public is encouraged to share its concerns and ideas about potential issues and impacts associated with the interchange.

TACTICS & TOOLS

- Events, including virtual workshops, meetings, and Council Work Sessions.
- Digital notifications via the City's existing eNews database.
- Social Media including Facebook, City Website and others.
- Project website including online capabilities for comment capture and surveys.
- Development of a Social Pinpoint Site to capture comments (Spanish and English) in a Google map format, to be hosted on the City's website.
- Bilingual postcard mailer to all homes/businesses within a one-mile radius of the project (approximately 2,500).
- Partnership with local faith based and community organizations.

IMPLEMENTATION

This section details the specific tactics that will be used as part of this outreach program.

WORKSHOPS (THREE)

The purpose of the workshops is to provide education and then collect feedback from the community on various topics associated with the Broadmoor Interchange Project. In order to gather thoughts and input from a large range of stakeholders in the community, workshops will be held in a virtual format and then made available online.

Each workshop will be structured as a family-friendly event and use techniques that engage the interest of participants, maximize opportunities for input and discussion, and incorporate residents' input into the planning process. Workshop methods will include:

- Pre-meeting advertisement that clearly explains the intent, topics, and format of the event.
- Opportunities before and after workshops submit comments/questions.

- Live-polling activities as part of our online presentations.
- Recording of the workshops for future reference.
- Development of a “virtual workshop” on the project website following the “live” meeting.
- Accommodation for Spanish language translation.

PROMOTION TIMELINES:

- ✓ Three-Four weeks prior:
  - Social Media Event Posts
  - Website Updates
  - News Release
  - City Council Announcements
- ✓ Two weeks prior:
  - Social Media Posts re: Workshop Format and Goals
  - Stakeholder Outreach (Chamber/Community Groups/Faith Based Groups)
  - Website Updates
  - eBlasts
- ✓ One week prior:
  - Social Media
  - eBlast Reminders
  - Spanish Radio Messages

SOCIAL MEDIA

The project team will develop social media materials promoting the process, upcoming workshops, and opportunities for participation via Facebook, Next Door, and others as appropriate.

E-NEWS

Over the course of the project DKS will provide content for us in the City’s Community Newsletter. This will include:

- Promote website launch,
- Promote upcoming workshops,
- Provide information regarding the Plan process,
- Conduct topic-specific surveys, and
- Promote opportunities to review proposed strategies and Plan documents.

Collateral Development & Translation Services

The project team will develop the following materials and make them available in English and Spanish:

- Project (Plan) Description
- Frequently Asked Questions
- Flyers/Posters for Workshops

Diversity and Inclusion Outreach

Our team will work collaboratively with local churches, faith-based organizations, and the Spanish speaking community to ensure maximum participation across all socio-economic population groups. We will provide opportunities for Spanish language meetings and one-on-one communication throughout the engagement process.

EVALUATION

DKS will prepare a summary of outreach efforts once the project has been completed. We hope to evaluation the success of the campaign by detailing:

- Number of participants for each activity;
- Diversity of participants to ensure inclusion based on socio-economic indicators; and
- Summary of comments and concerns.

APPENDIX K. CONCEPTUAL SIGNING PLAN

I-182 AND BROADMOOR INTERCHANGE
CONCEPTUAL SIGNING PLAN

NOT FOR CONSTRUCTION - FOR DISCUSSION PURPOSES ONLY

DKS

I-182 AND BROADMOOR INTERCHANGE

Legend

- Proposed Sign Bridge
- Existing Sign Support
- Proposed Sign Support
- (X) New Sign (Number = X)
- (EX) Existing Sign (Number = X)

APPENDIX L: BROADMOOR INTERCHANGE 30% DESIGN ADA MEMORANDUM

MEMO

Date:	December 2, 2022
To:	City of Pasco, WSDOT and DKS Associates
From:	KPFF Consulting Engineers
Subject:	Pedestrian ADA Memorandum
Project:	Pasco I-182 Broadmoor Interchange Project

Project Description:

The project will improve motor vehicle operations and safety deficiencies at the I-182/Broadmoor Blvd (Road 100) interchange, by constructing a new deceleration lane for the eastbound off-ramp to Broadmoor Blvd from I-182, a new loop off-ramp west bound exit to Broadmoor Blvd and a new roundabout at the intersection of Broadmoor Blvd and terminus of the I-182 off-ramps. The project will also complete a safe north-south route for cyclists and pedestrians with new sidewalk and an interim two-way shared use path on the west side Broadmoor Blvd (Road 100) overpass through the interchange. A future phase of the interchange project will construct a separate pedestrian bridge over I-182, west of the existing Broadmoor Blvd overpass connecting to the proposed first phase (Phase 1A) shared-use trail.

Existing Pedestrian Facilities

The existing north/south route for pedestrians through the Broadmoor Interchange is on the east side of Broadmoor Blvd, starting south of the eastbound ramp terminus on the existing sidewalk adjacent to the Northwest Farm Credit Services building, and ending at the westbound I-182 ramp terminus, north of I-182. There are north/south marked crosswalks and push buttons crossing the eastbound I-182 on-ramp and the westbound offramp terminus, on the east side of Broadmoor Blvd. The existing pedestrian route requires pedestrians to walk on the east side shoulder of the Broadmoor Blvd overpass to cross over I-182. The existing pedestrian route does not have ADA ramps or detectable warning plate at the marked on/off-ramp crossings. Refer to Figure 1 in the Appendix showing the existing pedestrian route through the interchange.

Proposed ADA Route:

The proposed north/south pedestrian ADA route for the project will be on the west side of Broadmoor Blvd. At the south end of the project, pedestrians will be routed from the east side of Broadmoor Blvd to the west side via a marked crossing south of proposed roundabout at the eastbound ramp terminus. The existing sidewalk from on the east side of Broadmoor Blvd from the Northwest Farm Credit Services building to the existing eastbound on-ramp to I-182 will be removed, and pedestrians travelling north on the east side of Broadmoor Blvd will be forced to cross the street to the new west side sidewalk. Heading north, pedestrians will then cross the west

leg of the new roundabout along a new shared-use pedestrian/bicycle path until they reach the west side of the Broadmoor Blvd overpass bridge. Pedestrians will then cross northbound on the west side of the re-channelized Broadmoor Blvd overpass via a two-way striped pedestrian/bicycle path separated from vehicular traffic by traffic delineators. During the interim condition, until the pedestrian bridge is constructed over I-182, the existing Broadmoor Blvd (Road 100) bridge running north/south over I-182 will be re-channelized to provide a pedestrian/bicycle shared-use path across the bridge. Refer the Interim Bridge Channelization in the Appendix, Figure 2.

After crossing the Broadmoor Blvd overpass, pedestrians will then cross east at the westbound ramp terminus intersection terminus, north of Broadmoor Blvd, to the east side of Broadmoor Blvd. Pedestrians will then head north across the east side of the intersection, to a new connection on the northeast corner of the intersection to the I-182 trail. New ADA compliant curb ramps will be constructed on the northeast and southeast corners of the westbound ramp terminus intersection that will be ADA compliant. Refer to Figure 3 in the Appendix showing the proposed pedestrian ADA route through the interchange.

All pedestrian curb ramps and sidewalks within the project limits will meet ADA requirements.

Attachments

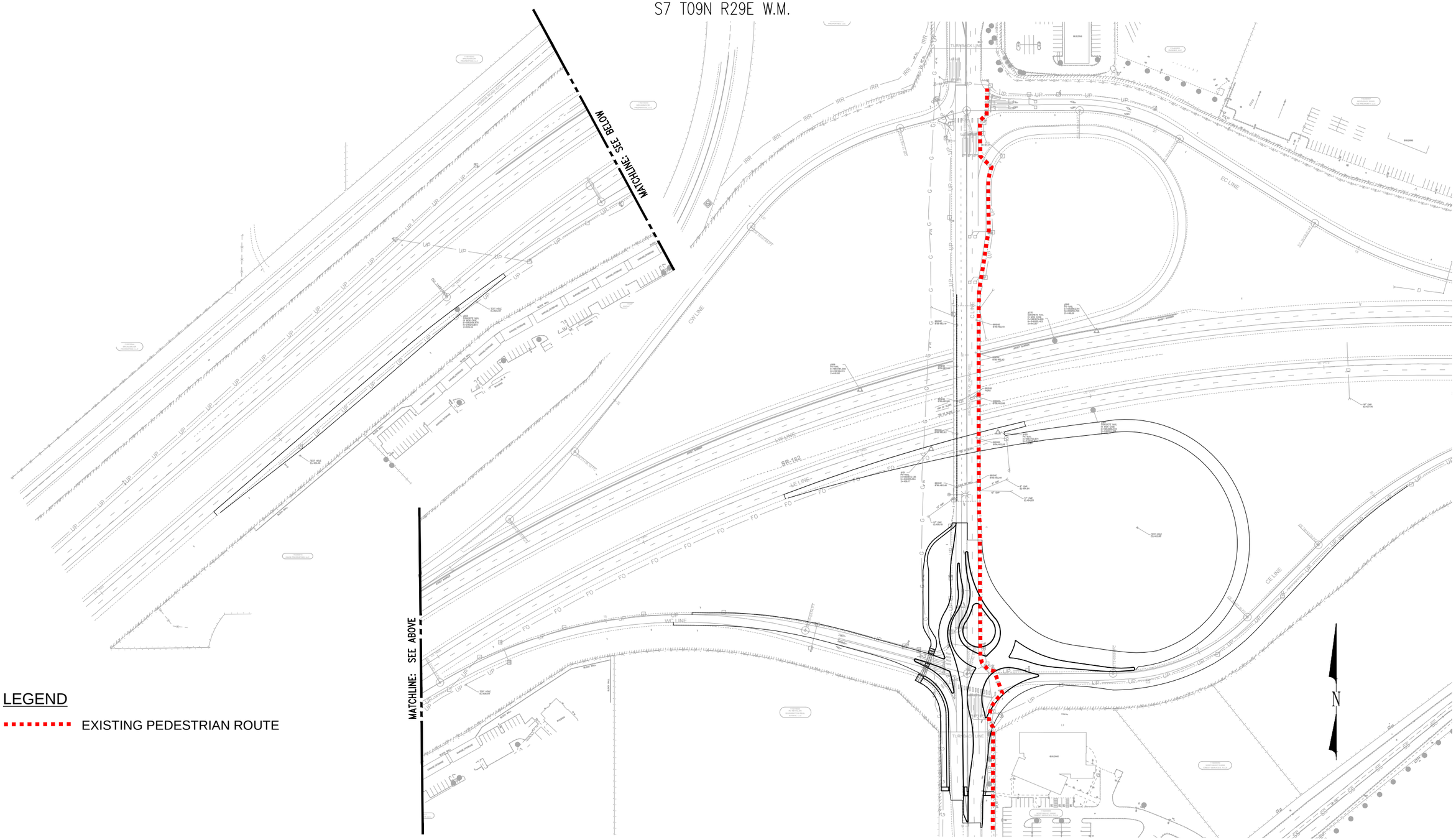
Figure 1, Existing Pedestrian Route

Figure 2, Interim Bridge Channelization

Figure 3, Proposed ADA Pedestrian Route

Figures 4 and 5, ADA Ramp Details (To be added with the next design submittal when the ADA Memorandum is resubmitted)

S7 T09N R29E W.M.



LEGEND

EXISTING PEDESTRIAN ROUTE

30% DESIGN - NOT FOR CONSTRUCTION

NO.	DATE	BY	CHD.	APPR.	REVISION

DRAWN BY MRV | DESIGNED BY TAM
CHECKED BY SCB | APPROVED BY RJL
DATE 11/2022
JOB No. :2100739

811 Know what's below. Call before you dig.

SCALE: 1"=100'

kpff
1601 5th Avenue, Suite 1600
Seattle, WA 98101
206.622.5822
www.kpff.com

City of Pasco Washington

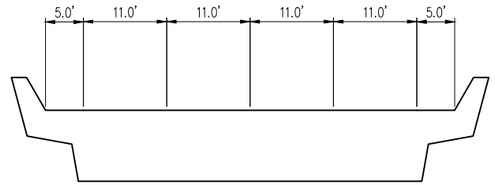
I-182 AND BROADMOOR BOULEVARD INTERCHANGE
PASCO, WA

SHT. 1 OF 1

EXISTING PEDESTRIAN ROUTE

FG 01

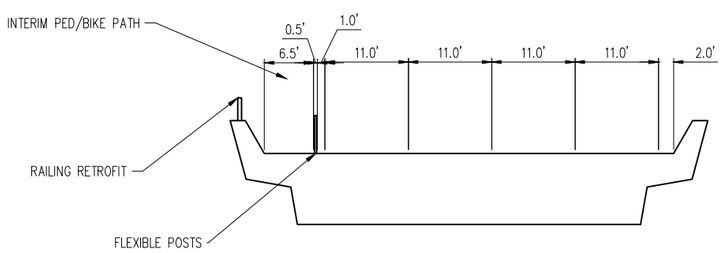
TOTAL WIDTH = 54'



EXISTING BRIDGE SECTION

0 5' 10' 20'
1 inch = 10 feet

TOTAL WIDTH = 54'



PROPOSED "INTERIM" BRIDGE SECTION

0 5' 10' 20'
1 inch = 10 feet

NOT FOR CONSTRUCTION - FOR DISCUSSION PURPOSES ONLY

FG 02

kpff
1601 5th Avenue, Suite 1600
Seattle, WA 98101
206.622.5822
www.kpff.com

DRAFTED: MRV

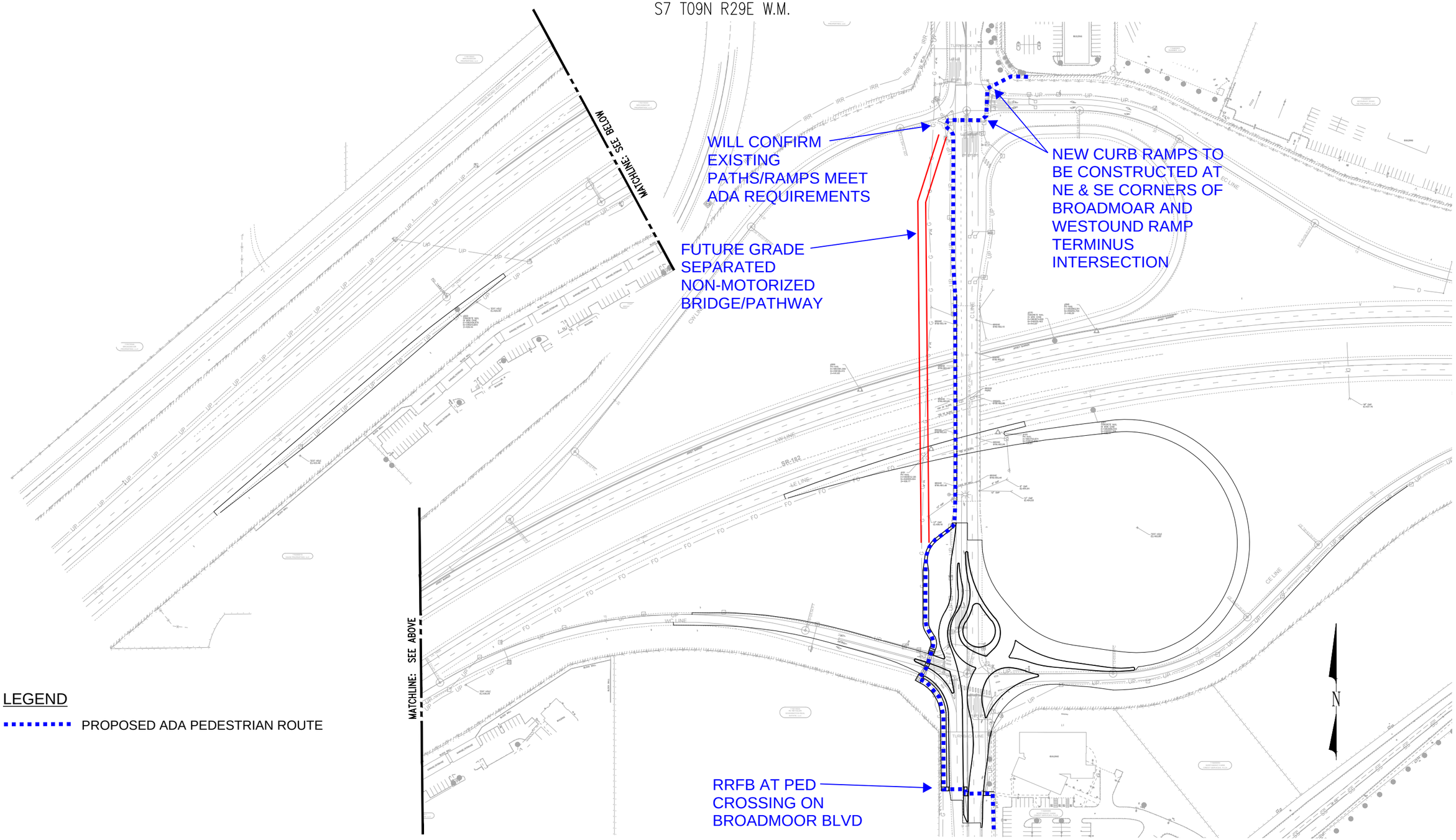
DESIGNED: TAM

DATE: 10/5/2022

I-182 AND BROADMOOR INTERCHANGE

INTERIM BRIDGE CHANNELIZATION

S7 T09N R29E W.M.



LEGEND

PROPOSED ADA PEDESTRIAN ROUTE

30% DESIGN - NOT FOR CONSTRUCTION

NO.	DATE	BY	CHD.	APPR.	REVISION

DRAWN BY: MRV | DESIGNED BY: TAM
CHECKED BY: SCB | APPROVED BY: RJL
DATE: 11/2022
JOB No. :2100739

811 Know what's below. Call before you dig.

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City of Pasco Washington

I-182 AND BROADMOOR BOULEVARD INTERCHANGE
PASCO, WA

SHT. 1 OF 1

PROPOSED ADA PEDESTRIAN ROUTE

FG 03