

# HCS2000: Two-Lane Highways Release 4.1b

## TWO-WAY TWO-LANE HIGHWAY SEGMENT ANALYSIS

Highway	From/To	Jurisdiction
Rt. 2 (Savoy)	SavoyT-L./SouthCountyRd.	MassachusettsHighwayDept.

  

INPUT DATA											
Highway Class	Shoulder Width	Lane Width	Segment Length	Terrain Type	Peak-hour Factor (PHF)	Trucks & Buses	Recreational Vehicles	No-passing Zones	Access Points/mi.	Two-way Hourly Volume (V)	Directional Split
Class 2	6.0 ft.	13.0 ft.	4.5 mi.	Rolling	1.00	5%	0%	80%	0/mi.	148 veh/h	52/48%

## AVERAGE TRAVEL SPEED

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>
0.71	2.5	0.930	224 pc/h	116 pc/h

  

Field Measured Speed (SFM)	Observed Volume (Vf)	Base Free-Flow Speed (BFFS)	Adj. for Lane and Shoulder Width (fLS)	Adj. for Access Points (fA)	Free-Flow Speed (FFS)	Adjustment for No-Passing Zones (fnp)	Average Travel Speed (ATS)
— mi/h	— veh/h	50.0 mi/h	0.0 mi/h	0.0 mi/h	50.0 mi/h	2.8 mi/h	45.5 mi/h

## PERCENT TIME - SPENT - FOLLOWING

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>	Base Percent Time-Spent-Following (BPTSF)	Adjustment for Directional Distribution & No-Passing Zones (fd/np)	Percent Time-Spent-Following (PTSF)
0.77	1.8	0.962	200 pc/h	104 pc/h	16.1%	20.7	36.8%

## LEVEL OF SERVICE AND OTHER PERFORMANCE MEASURES

Level of Service (LOS)	Volume to Capacity Ratio (v/c)	Peak 15-min Vehicle-miles of Travel (VMT15)	Peak-hour Vehicle-miles of Travel (VMT60)	Peak 15-min Total Travel Time (TT15)
A	0.07	167 veh-mi	666 veh-mi	3.7 veh-h

Notes: 1. If vp > = 3200 pc/h, terminate analysis—the LOS is F.  
 2. If highest directional split vp > = 1700 pc/h, terminate analysis—the LOS is F.

**TWO-WAY TWO-LANE HIGHWAY SEGMENT ANALYSIS**

Highway	From/To	Jurisdiction
Rt. 2 (Florida and North Adams)	SouthCountyRd./Moore Road	MassachusettsHighwayDept.

  

INPUT DATA											
Highway Class	Shoulder Width	Lane Width	Segment Length	Terrain Type	Peak-hour Factor (PHF)	Trucks & Buses	Recreational Vehicles	No-passing Zones	Access Points/mi.	Two-way Hourly Volume (V)	Directional Split
Class 2	6.0 ft.	12.0 ft.	2.5 mi.	Rolling	1.00	5%	0%	40%	2/mi.	234 veh/h	50/50%

**AVERAGE TRAVEL SPEED**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>
0.71	2.5	1.1	0.930	354 pc/h	177 pc/h

  

Field Measured Speed (SFM)	Observed Volume (Vf)	Base Free-Flow Speed (BFFS)	Adj. for Lane and Shoulder Width (fLS)	Adj. for Access Points (fA)	Free-Flow Speed (FFS)	Adjustment for No-Passing Zones (fnp)	Average Travel Speed (ATS)
— mi/h	— veh/h	50.0 mi/h	0.0 mi/h	0.5 mi/h	49.5 mi/h	2.4 mi/h	44.4 mi/h

**PERCENT TIME - SPENT - FOLLOWING**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>	Base Percent Time-Spent-Following (BPTSF)	Adjustment for Directional Distribution & No-Passing Zones (fd/np)	Percent Time-Spent-Following (PTSF)
0.77	1.8	1.0	0.962	316 pc/h	158 pc/h	24.3%	10.1	34.4%

**LEVEL OF SERVICE AND OTHER PERFORMANCE MEASURES**

Level of Service (LOS)	Volume to Capacity Ratio (v/c)	Peak 15-min Vehicle-miles of Travel (VMT15)	Peak-hour Vehicle-miles of Travel (VMT60)	Peak 15-min Total Travel Time (TT15)
A	0.11	146 veh-mi	585 veh-mi	3.3 veh-h

**TWO-WAY TWO-LANE HIGHWAY SEGMENT ANALYSIS**

Highway	From/To	Jurisdiction									
Rt. 2 (North Adams)	Moore Road/W. Shaft Rd.	MassachusettsHighwayDept.									
INPUT DATA											
Highway Class	Shoulder Width	Lane Width	Segment Length	Terrain Type	Peak-hour Factor (PHF)	Trucks & Buses	Recreational Vehicles	No-passing Zones	Access Points/mi.	Two-way Hourly Volume (V)	Directional Split
Class 2	13.0 ft.	12.0 ft.	3.0 mi.	Level	1.00	7%	0%	1%	4/mi.	234 veh/h	55/45%

**AVERAGE TRAVEL SPEED**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>		
1.00	1.7	1.0	0.953	245 pc/h	135 pc/h		
Field Measured Speed (SFM)	Observed Volume (Vf)	Base Free-Flow Speed (BFFS)	Adj. for Lane and Shoulder Width (fLS)	Adj. for Access Points (fA)	Free-Flow Speed (FFS)	Adjustment for No-Passing Zones (fnp)	Average Travel Speed (ATS)
— mi/h	— veh/h	50.0 mi/h	0.0 mi/h	1.0 mi/h	49.0 mi/h	0.0 mi/h	47.1 mi/h

**PERCENT TIME - SPENT - FOLLOWING**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp)1	Highest Directional Split Proportion2	Base Percent Time-Spent- Following (BPTSF)	Adjustment for Directional Distribution & No-Passing Zones (fd/np)	Percent Time-Spent-Following (PTSF)
1.00	1.1	1.0	0.993	236 pc/h	130 pc/h	18.7%	0.8	19.5%

**LEVEL OF SERVICE AND OTHER PERFORMANCE MEASURES**

Level of Service (LOS)	Volume to Capacity Ratio (v/c)	Peak 15-min Vehicle-miles of Travel (VMT15)	Peak-hour Vehicle-miles of Travel (VMT60)	Peak 15-min Total Travel Time (TT15)
A	0.08	176 veh-mi	702 veh-mi	3.7 veh-h

**TWO - WAY TWO - LANE HIGHWAY SEGMENT ANALYSIS**

Highway	From/To	Jurisdiction
Rt. 2 (North Adams)	W. Shaft Rd./Rt. 8A	MassachusettsHighwayDept.

**INPUT DATA**

Highway Class	Shoulder Width	Lane Width	Segment Length	Terrain Type	Peak-hour Factor (PHF)	Trucks & Buses	Recreational Vehicles	No-passing Zones	Access Points/mi.	Two-way Hourly Volume (V)	Directional Split
Class 1	4.0 ft.	12.0 ft.	3.5 mi.	Level	1.00	5%	1%	0%	2/mi.	300 veh/h	50/50%

**AVERAGE TRAVEL SPEED**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>
1.00	1.7	1.0	0.966	310 pc/h	155 pc/h

  

Field Measured Speed (SFM)	Observed Volume (Vf)	Base Free-Flow Speed (BFFS)	Adj. for Lane and Shoulder Width (fLS)	Adj. for Access Points (fA)	Free-Flow Speed (FFS)	Adjustment for No-Passing Zones (fnp)	Average Travel Speed (ATS)
— mi/h	— veh/h	60.0 mi/h	1.3 mi/h	.5 mi/h	58.2 mi/h	0.0 mi/h	55.8 mi/h

**PERCENT TIME - SPENT - FOLLOWING**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp)1	Highest Directional Split Proportion2	Base Percent Time-Spent-Following (BPTSF)	Adjustment for Directional Distribution & No-Passing Zones (fd/np)	Percent Time-Spent-Following (PTSF)
1.00	1.1	1.0	0.995	302 pc/h	151 pc/h	23.3%	0.0	23.3%

**LEVEL OF SERVICE AND OTHER PERFORMANCE MEASURES**

Level of Service (LOS)	Volume to Capacity Ratio (v/c)	Peak 15-min Vehicle-miles of Travel (VMT15)	Peak-hour Vehicle-miles of Travel (VMT60)	Peak 15-min Total Travel Time (TT15)
A	0.10	236 veh-mi	1050 veh-mi	4.7 veh-h

**TWO-WAY TWO-LANE HIGHWAY SEGMENT ANALYSIS**

Highway	From/To	Jurisdiction
Rt. 2 (North Adams)	Rt. 8A/Rt. 8	MassachusettsHighwayDept.

**FREE - FLOW SPEED**

Direction	Lane Width	Right Edge	Lateral Clearance Left Edge	Total	Access Points Per Mile	Median Type	Free-Flow Speed	FFS or BFFS
1	12.0 ft.	2.0 ft.	6.0 ft.	8.0 ft.	4	Undivided	Base	50.0 mph
2	12.0 ft.	2.0 ft.	6.0 ft.	8.0 ft.	4	Undivided	Base	50.0 mph

Direction	Lane Width Adjustment (FLW)	Lateral Clearance Adjustment (FLC)	Median Type Adjustment (FM)	Access Points Adjustment (FA)	Free-Flow Speed
1	0.0 mph	0.9 mph	1.6 mph	1.0 mph	46.5 mph
2	0.0 mph	0.9 mph	1.6 mph	1.0 mph	46.5 mph

**VOLUME**

Direction	Volume (V)	Peak-Hour Factor (PHF)	Peak 15-Minute Volume (v15)	Trucks & Buses	Recreational Vehicles	Terrain Type	Grade	Segment Length
1	300 vph	1.00	75	5%	4%	Level	0.00%	0.00 mi
2	300 vph	1.00	75	5%	4%	Level	0.00%	0.00 mi

Direction	Number of Lanes	Driver Population Adjustment (FP)	Trucks & Buses (PCE, ET)	Recreational Vehicles (PCE, ER)	Heavy Vehicle Adjustment (FHV)	Flow Rate (vp)
1	2	1.00	1.5	1.2	0.968	154 pcphpl
2	2	1.00	1.5	1.2	0.968	154 pcphpl

**RESULTS**

Direction	Flow Rate (vp)	Free-Flow Speed (FFS)	Avg. Passenger-Car Travel Speed (S)	Level of Service (LOS)	Density (D)
1	154 pcphpl	46.5 mph	46.5 mph	A	3.3 pc/mi/ln
2	154 pcphpl	46.5 mph	46.5 mph	A	3.3 pc/mi/ln

Overall results are not computed when free-flow speed is less than 45 mph.

**TWO-WAY TWO-LANE HIGHWAY SEGMENT ANALYSIS**

Highway	From/To	Jurisdiction
Rt. 2 (North Adams)	Notch Rd/Williamstown T.L.	MassachusettsHighwayDept.

**INPUT DATA**

Highway Width	Shoulder Width	Lane Length	Segment Type	Terrain Factor	Peak-hour (PHF)	Trucks & Buses	Recreational Vehicles	No-passing Zones	Access Points/mi.	Two-way Hourly Volume (V)	Directional Split
Class 1	11.0 ft.	20.0 ft.	4.5 mi.	Level	1.00	5%	0%	38%	2/mi.	1400 veh/h	50/50%

**AVERAGE TRAVEL SPEED**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>
1.00	1.1	1.0	0.995	1407 pc/h	704 pc/h

Field Measured (SFM)	Observed Volume (Vf)	Base Free-Flow Speed (BFFS)	Adj. for Lane and Shoulder Width (fLS)	Adj. for Access Points (fA)	Free-Flow Speed (FFS)	Adjustment for No-Passing Zones (fnp)	Average Travel Speed (ATS)
— mi/h	— veh/h	50.0 mi/h	0.0 mi/h	0.5 mi/h	49.5 mi/h	0.9 mi/h	37.7 mi/h

**PERCENT TIME - SPENT - FOLLOWING**

Grade	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>	Base Percent Time-Spent-Following (BPTSF)	Adjustment for Directional Distribution & No-Passing Zones (fd/np)	Percent Time-Spent-Following (PTSF)
1.00	1.0	1.0	1.000	1400 pc/h	700 pc/h	70.8%	5.3	76.1%

**LEVEL OF SERVICE AND OTHER PERFORMANCE MEASURES**

Level of Service (LOS)	Volume to Capacity Ratio (v/c)	Peak 15-min Vehicle-miles of Travel (VMT15)	Peak-hour Vehicle-miles of Travel (VMT60)	Peak 15-min Total Travel Time (TT15)
E	0.44	1575 veh-mi	6300 veh-mi	41.8 veh-h

**TWO-WAY TWO-LANE HIGHWAY SEGMENT ANALYSIS**

Highway	From/To	Jurisdiction
Rt. 2 (North Adams)	Notch Rd/Williamstown T.L.	MassachusettsHighwayDept.

  

INPUT DATA											
Highway Class	Shoulder Width	Lane Width	Segment Length	Terrain Type	Peak-hour Factor (PHF)	Trucks & Buses	Recreational Vehicles	No-passing Zones	Access Points/mi.	Two-way Hourly Volume (V)	Directional Split
Class 1	11.0 ft.	20.0 ft.	4.5 mi.	Level	1.00	5%	0%	38%	2/mi.	710 veh/h	50/50%

**AVERAGE TRAVEL SPEED**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>
1.00	1.2	1.0	0.990	717 pc/h	359 pc/h

  

Field Measured Speed (SFM)	Observed Volume (Vf)	Base Free-Flow Speed (BFFS)	Adj. for Lane and Shoulder Width (fLS)	Adj. for Access Points (fA)	Free-Flow Speed (FFS)	Adjustment for No-Passing Zones (fnp)	Average Travel Speed (ATS)
— mi/h	— veh/h	50.0 mi/h	0.0 mi/h	0.5 mi/h	49.5 mi/h	2.0 mi/h	41.9 mi/h

**PERCENT TIME - SPENT - FOLLOWING**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp)1	Highest Directional Split Proportion2	Base Percent Time-Spent- Following (BPTSF)	Adjustment for Directional Distribution & No-Passing Zones (fd/np)	Percent Time-Spent-Following (PTSF)
1.00	1.1	1.0	0.995	714 pc/h	357 pc/h	46.6%	13.5	60.1%

**LEVEL OF SERVICE AND OTHER PERFORMANCE MEASURES**

Level of Service (LOS)	Volume to Capacity Ratio (v/c)	Peak 15-min Vehicle-miles of Travel (VMT15)	Peak-hour Vehicle-miles of Travel (VMT60)	Peak 15-min Total Travel Time (TT15)
D	0.22	799 veh-mi	3195 veh-mi	19.1 veh-h

**TWO - WAY TWO - LANE HIGHWAY SEGMENT ANALYSIS**

Highway	From/To	Jurisdiction
Rt. 2 (North Adams)	Notch Rd/Williamstown T.L.	MassachusettsHighwayDept.

  

INPUT DATA											
Highway Class	Shoulder Width	Lane Width	Segment Length	Terrain Type	Peak-hour Factor (PHF)	Trucks & Buses	Recreational Vehicles	No-passing Zones	Access Points/mi.	Two-way Hourly Volume (V)	Directional Split
Class 1	7.0 ft.	12.0 ft.	3.5 mi.	Level	1.00	5%	0%	43%	4/mi.	900 veh/h	50/50%

**AVERAGE TRAVEL SPEED**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Highest Directional Split Proportion <sup>2</sup>
1.00	1.2	1.0	0.990	909 pc/h	455 pc/h

  

Field Measured Speed (SFM)	Observed Volume (Vf)	Base Free-Flow Speed (BFFS)	Adj. for Lane and Shoulder Width (fLS)	Adj. for Access Points (fA)	Free-Flow Speed (FFS)	Adjustment for No-Passing Zones (fnp)	Average Travel Speed (ATS)
— mi/h	— veh/h	50.0 mi/h	0.0 mi/h	1.0 mi/h	49.0 mi/h	1.8 mi/h	40.1 mi/h

**PERCENT TIME - SPENT - FOLLOWING**

Grade Adjustment Factor (fG)	PCE for Trucks (ET)	PCE for RVs (ER)	Heavy-vehicle adjustment factor	Two-way Flow Rate (vp) <sup>1</sup>	Two-way Flow Split Proportion <sup>2</sup>	Highest Directional Split Proportion <sup>2</sup>	Base Percent Time-Spent- Following (BPTSF)	Adjustment for Directional Distribution & No-Passing Zones (fd/np)	Percent Time-Spent-Following (PTSF)
1.00	1.1	1.0	0.995	905 pc/h	453 pc/h	453 pc/h	54.9%	11.4	66.2%

**LEVEL OF SERVICE AND OTHER PERFORMANCE MEASURES**

Level of Service (LOS)	Volume to Capacity Ratio (v/c)	Peak 15-min Vehicle-miles of Travel (VMT15)	Peak 15-min Vehicle-miles of Travel (VMT60)	Peak 15-min Total Travel Time (TT15)
D	0.28	788 veh-mi	3150 veh-mi	19.6 veh-h