HCS Freeway Weaving Report

Project Information

Segment Number	2	Segment Name	A1 - EB SR 518 from SR 509 NB Off Ramp to DMM EB off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	140	Number of Maneuver Lanes (N_{WL}), ln	2
Weaving Configuration	One-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	0
Interchange Density (ID), int/mi	0.67	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten
Proportion of CAVs in Traffic Stream	0	Final Capacity Adjustment Factor (CAF)	0.900

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	1750	300	7	40
Peak Hour Factor (PHF)	0.96	0.86	0.94	0.79
Total Trucks, %	2.00	3.00	0.00	0.00
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.971	1.000	1.000
Flow Rate (v_i), pc/h	1860	359	7	51
Weaving Flow Rate (v_W), pc/h	410	Ideal Conditions Capacity (c_{IFL}), pc/h/ln		2350
Non-Weaving Flow Rate (v_{NW}), pc/h	1867	Density-Based Capacity ($c_{IWL} \times N \times f_{HV}$), veh/h		5960
Total Flow Rate (v), pc/h	2277	Demand Flow-Based Capacity ($c_{IW} \times f_{HV}$), veh/h		13055
Volume Ratio (VR)	0.180	Weaving Area Capacity (c_W), veh/h		5960
Minimum Lane Change Rate (LC_{MIN}), lc/h	410	Adjusted Weaving Area Capacity (c_{WA}), veh/h		5364
Maximum Weaving Length (L_{MAX}), ft	4333	Volume-to-Capacity Ratio (v/c)		0.42

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	17	Average Weaving Speed (S_W), mi/h	47.7
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	0	Average Non-Weaving Speed (S_{NW}), mi/h	58.4
Weaving Lane Change Rate (LC_W), lc/h	410	Average Speed (S), mi/h	56.1
Weaving Lane Change Rate (LC_{All}), lc/h	410	Density (D), pc/mi/ln	13.5
Weaving Intensity Factor (W)	0.528	Level of Service (LOS)	B

HCS Basic Freeway Report

Project Information

Segment Number	3	Segment Name	A2 - EB SR 518 from DMM EB off Ramp to DMM Interchange
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	1290	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.33
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	2050	Heavy Vehicle Adjustment Factor (f_{HV})	0.980
Peak Hour Factor (PHF)	0.95	Flow Rate (v_p), pc/h/ln	1101
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.55
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	64.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	17.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	B
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	B1 - WB SR 518 from DMM Undercrossing to Diverge Influence Point
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	940	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.17
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	60.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	2290	Heavy Vehicle Adjustment Factor (f_{HV})	0.980
Peak Hour Factor (PHF)	0.99	Flow Rate (v_p), pc/h/ln	1180
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2300
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1960
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.60
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	60.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	19.7
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	60.0		

HCS Freeway Diverge Report

Project Information

Segment Number	2	Segment Name	B2 - WB SR 518 from DMM Diverge Influence Point to SR 509 NB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	2	1
Free-Flow Speed (FFS), mi/h	60.0	35.0
Segment Length (L) / Deceleration Length (LD), ft	1500	890
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor (CAF)	0.852	0.950
Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten	-

Demand and Capacity

Demand Volume (V_i), veh/h	2290	1040
Peak Hour Factor (PHF)	0.98	0.95
Total Trucks, %	2.00	1.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.990
Flow Rate (v_i), pc/h	2384	1106
Capacity (c_{md}), pc/h	4600	2000
Adjusted Capacity (c_{md}), pc/h	3919	1900
Volume-to-Capacity Ratio (v/c)	0.61	0.58

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	0
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.528
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	50.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	1.000	Outer Lanes Freeway Speed (S_O), mi/h	65.8
Flow in Lanes 1 and 2 (v_{12}), pc/h	2384	Ramp Junction Speed (S), mi/h	50.5

Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	23.6
Level of Service (LOS)	B	Density in Ramp Influence Area (D_R), pc/mi/ln	16.7

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	C1 - EB SR 518 from 51st St Off Ramp to I-5 NB Off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	3	Terrain Type	Level
Segment Length (L), ft	1030	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.700
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	3140	Heavy Vehicle Adjustment Factor (f_{HV})	0.952
Peak Hour Factor (PHF)	0.97	Flow Rate (v_p), pc/h/ln	1473
Total Trucks, %	5.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1554
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.95
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	38.8
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	38.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	C2 - EB SR 518 from I-5 NB Off Ramp to I-5 SB Off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	650	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.700
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	2290	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor (PHF)	0.95	Flow Rate (v_p), pc/h/ln	1662
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1554
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.07
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	34.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	45.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	C4 - NB I-405 from I-5 SB On Ramp to I-5 NB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	670	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.700
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	3980	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor (PHF)	0.96	Flow Rate (v_p), pc/h/ln	2858
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1554
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.84
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	34.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	45.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	C5 - NB I-405 from I-5 NB On Ramp to Southcenter Pkwy
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	3	Terrain Type	Level
Segment Length (L), ft	1180	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.700
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5620	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	2635
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1554
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.70
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	34.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	45.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	D1 - SB I-405 from Interurban Ave S 3-Lane Start Point to I-5 NB Off/ Southcenter Off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	3	Terrain Type	Level
Segment Length (L), ft	1820	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.700
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	4640	Heavy Vehicle Adjustment Factor (f_{HV})	0.952
Peak Hour Factor (PHF)	0.99	Flow Rate (v_p), pc/h/ln	2133
Total Trucks, %	5.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1554
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.37
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	34.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	45.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	D2 - SB I-405 from I-5 NB Off Ramp to I-5 NB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	1350	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.700
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	2870	Heavy Vehicle Adjustment Factor (f_{HV})	0.952
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	2000
Total Trucks, %	5.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1554
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.29
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	34.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	45.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Freeway Weaving Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	D3 - SB I-405 from I-5 NB On Ramp to I-5 SB Off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	3	Segment Type	Freeway
Segment Length (L_S), ft	570	Number of Maneuver Lanes (N_{WL}), ln	0
Weaving Configuration	Two-Sided	Ramp-to-Freeway Lane Changes (LC_{RF}), lc	1
Terrain Type	Level	Freeway-to-Ramp Lane Changes (LC_{FR}), lc	1
Percent Grade, %	-	Ramp-to-Ramp Lane Changes (LC_{RR}), lc	2
Interchange Density (ID), int/mi	0.67	Cross Weaving Managed Lane	No

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.700
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten
Proportion of CAVs in Traffic Stream	0	Final Capacity Adjustment Factor (CAF)	0.900

Demand and Capacity

	FF	RF	RR	FR
Demand Volume (V_i), veh/h	2145	1040	442	1220
Peak Hour Factor (PHF)	0.98	0.94	0.96	0.97
Total Trucks, %	5.00	2.00	2.00	4.00
Heavy Vehicle Adjustment Factor (f_{HV})	0.952	0.980	0.980	0.962
Flow Rate (v_i), pc/h	2989	1412	588	1700
Weaving Flow Rate (v_w), pc/h	588	Ideal Conditions Capacity (c_{IFL}), pc/h/ln		2200
Non-Weaving Flow Rate (v_{NW}), pc/h	6101	Density-Based Capacity ($c_{IWL} \times N \times f_{HV}$), veh/h		5029
Total Flow Rate (v), pc/h	6689	Demand Flow-Based Capacity ($c_{IW} \times f_{HV}$), veh/h		-
Volume Ratio (VR)	0.090	Weaving Area Capacity (c_W), veh/h		5029
Minimum Lane Change Rate (LC_{MIN}), lc/h	1176	Adjusted Weaving Area Capacity (c_{WA}), veh/h		4526
Maximum Weaving Length (L_{MAX}), ft	6575	Volume-to-Capacity Ratio (v/c)		1.00

Speed and Density

Non-Weaving Vehicle Index (I_{NW})	232	Average Weaving Speed (S_W), mi/h	33.3
Non-Weaving Lane Change Rate (LC_{NW}), lc/h	988	Average Non-Weaving Speed (S_{NW}), mi/h	26.3
Weaving Lane Change Rate (LC_W), lc/h	1263	Average Speed (S), mi/h	26.8

Weaving Lane Change Rate (LC_{All}), lc/h	2251	Density (D), pc/mi/ln	83.2
Weaving Intensity Factor (W)	0.668	Level of Service (LOS)	F

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	D4 - WB SR 518 from I-5 SB Off Ramp to I-5 SB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	2	Terrain Type	Level
Segment Length (L), ft	1280	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	65.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	10		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.700
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	2690	Heavy Vehicle Adjustment Factor (f_{HV})	0.980
Peak Hour Factor (PHF)	0.90	Flow Rate (v_p), pc/h/ln	1982
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1554
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.28
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	0.0	Average Speed (S), mi/h	34.5
Right-Side Lateral Clearance Adj. (f_{RLC})	0.0	Density (D), pc/mi/ln	45.0
Total Ramp Density Adjustment	0.0	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	D5 - WB SR 518 from I-5 SB On Ramp to 51st St On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	3	Terrain Type	Level
Segment Length (L), ft	760	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.700
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	3520	Heavy Vehicle Adjustment Factor (f_{HV})	0.980
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	1588
Total Trucks, %	2.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1554
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	1.02
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	34.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	45.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Freeway Diverge Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	E1 - SB I-5 at Southcenter Blvd/ SR 518 Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	6	2
Free-Flow Speed (FFS), mi/h	65.0	45.0
Segment Length (L) / Deceleration Length (LD), ft	1500	840
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided Major Diverge

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	0.600	1.000
Demand Adjustment Factor (DAF)	1.300	1.300
Capacity Adjustment Factor (CAF)	0.800	0.950
Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten	-

Demand and Capacity

Demand Volume (V_i), veh/h	7730	1870
Peak Hour Factor (PHF)	0.94	0.98
Total Trucks, %	15.00	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.870	0.917
Flow Rate (v_i), pc/h	12288	2705
Capacity (c_{md}), pc/h	13500	4200
Adjusted Capacity (c_{md}), pc/h	10800	3990
Volume-to-Capacity Ratio (v/c)	1.14	0.68

Density and LOS

Average Density (D), pc/mi/ln	35.8	Average Speed (S), mi/h	39.0
Density in Ramp Influence Area (D_{MD}), pc/mi/ln	35.8	Level of Service (LOS)	E

HCS Basic Freeway Report

Project Information

Segment Number	2	Segment Name	E2 - SB I-5 from Southcenter Blvd/SR 518 Off Ramp to I-405 NB Off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	6	Terrain Type	Level
Segment Length (L), ft	2240	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.17
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.600
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.800
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5299	Heavy Vehicle Adjustment Factor (f_{HV})	0.855
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	1370
Total Trucks, %	17.00	Capacity (c), pc/h/ln	2200
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1760
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.78
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	39.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	35.1
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	39.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	4/4/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	E3 - SB I-5 from I-405 NB Off Ramp to I-405 SB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	620	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.600
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.800
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	3550	Heavy Vehicle Adjustment Factor (f_{HV})	0.800
Peak Hour Factor (PHF)	0.99	Flow Rate (v_p), pc/h/ln	1457
Total Trucks, %	25.00	Capacity (c), pc/h/ln	2200
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1760
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.83
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	39.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	37.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	E
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	39.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	4/4/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	E4 - SB I-5 from I-405 SB On Ramp to Klickitat SB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	5	Terrain Type	Level
Segment Length (L), ft	4330	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.17
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.800
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	4770	Heavy Vehicle Adjustment Factor (f_{HV})	0.840
Peak Hour Factor (PHF)	0.97	Flow Rate (v_p), pc/h/ln	1522
Total Trucks, %	19.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1776
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.78
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	27.7
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	49.8
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Freeway Merge Report

Project Information

Segment Number	2	Segment Name	E5 - SB I-5 at Klickitat SB On Ramp Merge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	5	1
Free-Flow Speed (FFS), mi/h	65.0	45.0
Segment Length (L) / Acceleration Length (LA), ft	1500	1500
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	0.800	1.000
Demand Adjustment Factor (DAF)	1.000	1.300
Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten	-
Final Capacity Adjustment Factor (CAF)	0.800	0.950

Demand and Capacity

Demand Volume (V_i), veh/h	6201	1070
Peak Hour Factor (PHF)	0.97	0.92
Total Trucks, %	19.00	0.02
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.840	1.000
Flow Rate (v_i), pc/h	7610	1512
Capacity (c_{md}), pc/h	11250	2100
Adjusted Capacity (c_{md}), pc/h	9000	1995
Volume-to-Capacity Ratio (v/c)	0.85	0.76

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.342
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1633
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	48.6
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.029	Outer Lanes Freeway Speed (S_O), mi/h	47.9
Flow in Lanes 1 and 2 (v_{12}), pc/h	2176	Ramp Junction Speed (S), mi/h	24.3
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	3688	Average Density (D), pc/mi/ln	63.3

Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	24.2

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	E6 - SB I-5 from Klickitat SB On Ramp Merge Area to 188th St SB Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	5	Terrain Type	Level
Segment Length (L), ft	2000	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.17
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.800
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5840	Heavy Vehicle Adjustment Factor (f_{HV})	0.862
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	1797
Total Trucks, %	16.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1776
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.91
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	27.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	58.7
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Freeway Diverge Report

Project Information

Segment Number	2	Segment Name	E7 - SB I-5 at 188th St SB Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	5	1
Free-Flow Speed (FFS), mi/h	65.0	45.0
Segment Length (L) / Deceleration Length (LD), ft	1500	240
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	0.800	1.000
Demand Adjustment Factor (DAF)	1.000	1.300
Capacity Adjustment Factor (CAF)	0.800	0.950
Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten	-

Demand and Capacity

Demand Volume (V_i), veh/h	7592	680
Peak Hour Factor (PHF)	0.98	0.90
Total Trucks, %	16.00	9.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.862	0.917
Flow Rate (v_i), pc/h	8987	1071
Capacity (c_{md}), pc/h	11250	2100
Adjusted Capacity (c_{md}), pc/h	9000	1995
Volume-to-Capacity Ratio (v/c)	0.87	0.54

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.394
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1725
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	48.1
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.436	Outer Lanes Freeway Speed (S_O), mi/h	54.2
Flow in Lanes 1 and 2 (v_{12}), pc/h	3739	Ramp Junction Speed (S), mi/h	27.0
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	57.9

Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	34.2

HCS Basic Freeway Report

Project Information

Segment Number	3	Segment Name	E8 - SB I-5 from 188th St SB Off Ramp Diverge Area to Lane Reduction Point
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	5	Terrain Type	Level
Segment Length (L), ft	1080	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.17
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	0.800
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.800
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	6708	Heavy Vehicle Adjustment Factor (f_{HV})	0.855
Peak Hour Factor (PHF)	0.97	Flow Rate (v_p), pc/h/ln	1618
Total Trucks, %	17.00	Capacity (c), pc/h/ln	2220
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	1776
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.74
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	16.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	79.5
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	52.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	E9 - SB I-5 from Lane Reduction Point to 188th St SB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	2330	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.50
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.300
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5160	Heavy Vehicle Adjustment Factor (f_{HV})	0.855
Peak Hour Factor (PHF)	0.97	Flow Rate (v_p), pc/h/ln	2022
Total Trucks, %	17.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.77
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	19.9
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	77.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Merge Report

Project Information

Segment Number	2	Segment Name	E10 - SB I-5 at 188th St SB On Ramp Merge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	35.0
Segment Length (L) / Acceleration Length (LA), ft	1440	520
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.300
Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten	-
Final Capacity Adjustment Factor (CAF)	0.852	0.950

Demand and Capacity

Demand Volume (V_i), veh/h	6708	920
Peak Hour Factor (PHF)	0.97	0.99
Total Trucks, %	17.00	4.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.855	0.962
Flow Rate (v_i), pc/h	8088	1256
Capacity (c_{md}), pc/h	9400	2000
Adjusted Capacity (c_{md}), pc/h	8009	1900
Volume-to-Capacity Ratio (v/c)	0.88	0.66

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.633
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2427
Distance to Downstream Ramp (L_{DOWN}), ft	2940	On-Ramp Influence Area Speed (S_R), mi/h	50.4
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.061	Outer Lanes Freeway Speed (S_O), mi/h	57.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	3235	Ramp Junction Speed (S), mi/h	31.6
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4491	Average Density (D), pc/mi/ln	55.7

Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	36.7

HCS Overlap Freeway Report

Project Information

Segment Number	3	Segment Name	E11 - SB I-5 from 188th St SB On Ramp Merge Area to 200th St SB Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	60	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.50
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	7904	Heavy Vehicle Adjustment Factor (f_{HV})	0.870
Peak Hour Factor (PHF)	0.97	Flow Rate (v_p), pc/h/ln	2342
Total Trucks, %	15.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.88
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	29.4
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	58.7
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Diverge Report

Project Information

Segment Number	4	Segment Name	E12 - SB I-5 at 200th St SB Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	35.0
Segment Length (L) / Deceleration Length (LD), ft	1440	180
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.300
Capacity Adjustment Factor (CAF)	0.852	0.950
Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten	-

Demand and Capacity

Demand Volume (V_i), veh/h	7904	180
Peak Hour Factor (PHF)	0.97	0.80
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.870	0.962
Flow Rate (v_i), pc/h	9366	304
Capacity (c_{md}), pc/h	9400	2000
Adjusted Capacity (c_{md}), pc/h	8009	1900
Volume-to-Capacity Ratio (v/c)	0.86	0.16

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	2940	Speed Index (D_S)	0.455
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2556
Distance to Downstream Ramp (L_{DOWN}), ft	1730	Off-Ramp Influence Area Speed (S_R), mi/h	54.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.436	Outer Lanes Freeway Speed (S_O), mi/h	65.2
Flow in Lanes 1 and 2 (v_{12}), pc/h	4255	Ramp Junction Speed (S), mi/h	29.4
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4255	Average Density (D), pc/mi/ln	58.7

Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	39.2

HCS Basic Freeway Report

Project Information

Segment Number	5	Segment Name	E13 - SB I-5 from 200th St SB Off Ramp to 200th St SB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	1730	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.50
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	7670	Heavy Vehicle Adjustment Factor (f_{HV})	0.870
Peak Hour Factor (PHF)	0.97	Flow Rate (v_p), pc/h/ln	2272
Total Trucks, %	15.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.80
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	23.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	70.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	F
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Merge Report

Project Information

Segment Number	6	Segment Name	E14 - SB I-5 at 200th St SB On Ramp Merge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	35.0
Segment Length (L) / Acceleration Length (LA), ft	1500	470
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.300
Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten	-
Final Capacity Adjustment Factor (CAF)	0.852	0.950

Demand and Capacity

Demand Volume (V_i), veh/h	7670	650
Peak Hour Factor (PHF)	0.96	0.96
Total Trucks, %	14.00	2.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.877	0.980
Flow Rate (v_i), pc/h	9110	898
Capacity (c_{md}), pc/h	9400	2000
Adjusted Capacity (c_{md}), pc/h	8009	1900
Volume-to-Capacity Ratio (v/c)	0.91	0.47

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	1730	Speed Index (M_S)	0.676
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	2700
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	49.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.106	Outer Lanes Freeway Speed (S_O), mi/h	56.1
Flow in Lanes 1 and 2 (v_{12}), pc/h	3710	Ramp Junction Speed (S), mi/h	31.3
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	4608	Average Density (D), pc/mi/ln	58.0

Level of Service (LOS)	F	Density in Ramp Influence Area (D_R), pc/mi/ln	38.1

HCS Freeway Diverge Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	F1 - NB I-5 at Military Rd NB Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	35.0
Segment Length (L) / Deceleration Length (LD), ft	1500	290
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor (CAF)	1.000	0.852
Capacity Adj. Factor for CAVs, CAF_{CAV}	1.000	-

Demand and Capacity

Demand Volume (V_i), veh/h	5440	310
Peak Hour Factor (PHF)	0.97	0.93
Total Trucks, %	7.00	3.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.971
Flow Rate (v_i), pc/h	5998	343
Capacity (c_{md}), pc/h	9400	2000
Adjusted Capacity (c_{md}), pc/h	9400	1704
Volume-to-Capacity Ratio (v/c)	0.64	0.20

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (D_S)	0.459
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1595

Distance to Downstream Ramp (LDOWN), ft	900	Off-Ramp Influence Area Speed (SR), mi/h	54.4
Prop. Freeway Vehicles in Lane 1 and 2 (PFD)	0.436	Outer Lanes Freeway Speed (SO), mi/h	69.0
Flow in Lanes 1 and 2 (v12), pc/h	2809	Ramp Junction Speed (S), mi/h	61.3
Flow Entering Ramp-Infl. Area (vR12), pc/h	-	Average Density (D), pc/mi/ln	24.5
Level of Service (LOS)	C	Density in Ramp Influence Area (DR), pc/mi/ln	25.8

HCS Basic Freeway Report

Project Information

Segment Number	2	Segment Name	F2 - NB I-5 from Military Rd NB Off Ramp to Military Rd NB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	900	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	1.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5130	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor (PHF)	0.97	Flow Rate (v_p), pc/h/ln	1414
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.71
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	61.7
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	22.9
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Merge Report

Project Information

Segment Number	3	Segment Name	F3 - NB I-5 at Military Rd NB On Ramp Merge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	35.0
Segment Length (L) / Acceleration Length (LA), ft	1500	710
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten	-
Final Capacity Adjustment Factor (CAF)	0.852	0.950

Demand and Capacity

Demand Volume (V_i), veh/h	5130	510
Peak Hour Factor (PHF)	0.97	0.97
Total Trucks, %	7.00	1.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.990
Flow Rate (v_i), pc/h	5656	531
Capacity (c_{md}), pc/h	9400	2000
Adjusted Capacity (c_{md}), pc/h	8009	1900
Volume-to-Capacity Ratio (v/c)	0.77	0.28

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	900	Speed Index (M_S)	0.335
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1697
Distance to Downstream Ramp (L_{DOWN}), ft	5090	On-Ramp Influence Area Speed (S_R), mi/h	57.3
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.151	Outer Lanes Freeway Speed (S_O), mi/h	60.7
Flow in Lanes 1 and 2 (v_{12}), pc/h	2262	Ramp Junction Speed (S), mi/h	59.1
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	2793	Average Density (D), pc/mi/ln	26.2

Level of Service (LOS)	C	Density in Ramp Influence Area (D_R), pc/mi/ln	22.6

HCS Basic Freeway Report

Project Information

Segment Number	4	Segment Name	F4 - NB I-5 from Military Rd NB On Ramp to 188th St NB Off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	2090	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	1.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5640	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	1539
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.77
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.2
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	26.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Diverge Report

Project Information

Segment Number	5	Segment Name	F5 - NB I-5 at 188th St NB Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	45.0
Segment Length (L) / Deceleration Length (LD), ft	1500	180
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor (CAF)	0.852	0.950
Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten	-

Demand and Capacity

Demand Volume (V_i), veh/h	5640	530
Peak Hour Factor (PHF)	0.98	0.95
Total Trucks, %	7.00	8.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.926
Flow Rate (v_i), pc/h	6155	602
Capacity (c_{md}), pc/h	9400	2100
Adjusted Capacity (c_{md}), pc/h	8009	1995
Volume-to-Capacity Ratio (v/c)	0.77	0.30

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	5090	Speed Index (D_S)	0.352
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1566
Distance to Downstream Ramp (L_{DOWN}), ft	2260	Off-Ramp Influence Area Speed (S_R), mi/h	56.9
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.436	Outer Lanes Freeway Speed (S_O), mi/h	69.1
Flow in Lanes 1 and 2 (v_{12}), pc/h	3023	Ramp Junction Speed (S), mi/h	62.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	24.6

Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	28.6

HCS Basic Freeway Report

Project Information

Segment Number	6	Segment Name	F6 - NB I-5 from 188th St NB Off Ramp to 188th St NB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	2260	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	1.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5110	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor (PHF)	0.99	Flow Rate (v_p), pc/h/ln	1380
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.69
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	62.2
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	22.2
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Merge Report

Project Information

Segment Number	7	Segment Name	F7 - NB I-5 at 188th St NB On Ramp Merge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	45.0
Segment Length (L) / Acceleration Length (LA), ft	1500	570
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten	-
Final Capacity Adjustment Factor (CAF)	0.852	0.950

Demand and Capacity

Demand Volume (V_i), veh/h	5110	1130
Peak Hour Factor (PHF)	0.99	0.92
Total Trucks, %	7.00	2.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.980
Flow Rate (v_i), pc/h	5520	1253
Capacity (c_{md}), pc/h	9400	2100
Adjusted Capacity (c_{md}), pc/h	8009	1995
Volume-to-Capacity Ratio (v/c)	0.85	0.63

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	2260	Speed Index (M_S)	0.394
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1656
Distance to Downstream Ramp (L_{DOWN}), ft	7350	On-Ramp Influence Area Speed (S_R), mi/h	55.9
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.061	Outer Lanes Freeway Speed (S_O), mi/h	60.8
Flow in Lanes 1 and 2 (v_{12}), pc/h	2208	Ramp Junction Speed (S), mi/h	58.2
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	3461	Average Density (D), pc/mi/ln	29.1

Level of Service (LOS)	D	Density in Ramp Influence Area (D_R), pc/mi/ln	28.4

HCS Basic Freeway Report

Project Information

Segment Number	8	Segment Name	F8 - NB I-5 from 188th St NB On Ramp to Southcenter Pkwy Off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	4350	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	1.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	6240	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	1688
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.84
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	55.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	30.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	D
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Diverge Report

Project Information

Segment Number	9	Segment Name	F9 - NB I-5 at Southcenter Pkwy Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	45.0
Segment Length (L) / Deceleration Length (LD), ft	1500	840
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor (CAF)	0.852	0.950
Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten	-

Demand and Capacity

Demand Volume (V_i), veh/h	6240	650
Peak Hour Factor (PHF)	0.98	0.91
Total Trucks, %	6.00	2.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.943	0.980
Flow Rate (v_i), pc/h	6752	729
Capacity (c_{md}), pc/h	9400	2100
Adjusted Capacity (c_{md}), pc/h	8009	1995
Volume-to-Capacity Ratio (v/c)	0.84	0.37

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	7350	Speed Index (D_S)	0.364
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1699
Distance to Downstream Ramp (L_{DOWN}), ft	-	Off-Ramp Influence Area Speed (S_R), mi/h	56.6
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FD})	0.436	Outer Lanes Freeway Speed (S_O), mi/h	68.6
Flow in Lanes 1 and 2 (v_{12}), pc/h	3355	Ramp Junction Speed (S), mi/h	62.1
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	-	Average Density (D), pc/mi/ln	27.2

Level of Service (LOS)	C	Density in Ramp Influence Area (D_R), pc/mi/ln	25.5

HCS Basic Freeway Report

Project Information

Segment Number	10	Segment Name	F10 - NB I-5 from Southcenter Pkwy Off Ramp to SR 518 WB/I-405 EB Off Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	110	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	1.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5590	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	1512
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.76
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	59.8
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	25.3
Total Ramp Density Adjustment	-	Level of Service (LOS)	C
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Diverge Report

Project Information

Segment Number	11	Segment Name	F11 - NB I-5 at SR 518 WB/I-405 EB Off Ramp Diverge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	2
Free-Flow Speed (FFS), mi/h	65.0	35.0
Segment Length (L) / Deceleration Length (LD), ft	1500	400
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided Major Diverge

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor (CAF)	0.852	0.950
Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten	-

Demand and Capacity

Demand Volume (V_i), veh/h	5590	2680
Peak Hour Factor (PHF)	0.98	0.97
Total Trucks, %	6.00	5.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.943	0.952
Flow Rate (v_i), pc/h	6049	2902
Capacity (c_{md}), pc/h	9400	4000
Adjusted Capacity (c_{md}), pc/h	8009	3800
Volume-to-Capacity Ratio (v/c)	0.76	0.76

Density and LOS

Average Density (D), pc/mi/ln	26.5	Average Speed (S), mi/h	57.1
Density in Ramp Influence Area (D_{MD}), pc/mi/ln	26.5	Level of Service (LOS)	C

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	F12 - NB I-5 from SR 518 WB/I-405 EB Off Ramp to I-405 WB HOV On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	3	Terrain Type	Level
Segment Length (L), ft	2130	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	2910	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor (PHF)	0.98	Flow Rate (v_p), pc/h/ln	1059
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.53
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	65.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	16.3
Total Ramp Density Adjustment	-	Level of Service (LOS)	B
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	F13 - NB I-5 from I-405 WB HOV On Ramp to I-405 WB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	4	Terrain Type	Level
Segment Length (L), ft	150	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.17
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	3130	Heavy Vehicle Adjustment Factor (f_{HV})	0.935
Peak Hour Factor (PHF)	0.96	Flow Rate (v_p), pc/h/ln	872
Total Trucks, %	7.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.44
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	65.0
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	13.4
Total Ramp Density Adjustment	-	Level of Service (LOS)	B
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Merge Report

Project Information

Segment Number	2	Segment Name	F14 - NB I-5 at I-405 WB On Ramp Merge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	4	1
Free-Flow Speed (FFS), mi/h	65.0	45.0
Segment Length (L) / Acceleration Length (LA), ft	1500	1130
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten	-
Final Capacity Adjustment Factor (CAF)	0.852	0.950

Demand and Capacity

Demand Volume (V_i), veh/h	3130	1180
Peak Hour Factor (PHF)	0.96	0.99
Total Trucks, %	7.00	5.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.935	0.952
Flow Rate (v_i), pc/h	3487	1252
Capacity (c_{md}), pc/h	9400	2100
Adjusted Capacity (c_{md}), pc/h	8009	1995
Volume-to-Capacity Ratio (v/c)	0.59	0.63

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.274
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1046
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	58.7
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.061	Outer Lanes Freeway Speed (S_O), mi/h	63.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	1395	Ramp Junction Speed (S), mi/h	60.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	2647	Average Density (D), pc/mi/ln	19.6

Level of Service (LOS)	B	Density in Ramp Influence Area (D_R), pc/mi/ln	18.5

HCS Basic Freeway Report

Project Information

Analyst	Concord Engineering	Date	3/2/2023
Agency		Analysis Year	2022 - Existing Conditions
Jurisdiction		Time Analyzed	PM Peak
Project Description	SAMP	Units	U.S. Customary
Segment Number	1	Segment Name	F15 - NB I-5 from SR 518 EB On Ramp to Southcenter Blvd NB On Ramp
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

Number of Lanes (N), ln	5	Terrain Type	Level
Segment Length (L), ft	700	Percent Grade, %	-
Measured or Base Free-Flow Speed	Measured	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	-	Total Ramp Density (TRD), ramps/mi	0.17
Lane Width, ft	-	Free-Flow Speed (FFS), mi/h	65.0
Right-Side Lateral Clearance, ft	-		

Adjustment Factors

Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Weather Type	Non-Severe Weather	Demand Adjustment Factor (DAF)	1.000
Incident Type	No Incident	Capacity Adjustment Factor (CAF)	0.852
Proportion of CAVs in Traffic Stream	0	Capacity Adj. Factor for CAVs, CAF_{CAV}	Overwritten

Demand and Capacity

Demand Volume (V), veh/h	5160	Heavy Vehicle Adjustment Factor (f_{HV})	0.943
Peak Hour Factor (PHF)	0.94	Flow Rate (v_p), pc/h/ln	1164
Total Trucks, %	6.00	Capacity (c), pc/h/ln	2350
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (c_{adj}), pc/h/ln	2002
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.58
Passenger Car Equivalent (E_T)	2.00		

Speed and Density

Lane Width Adjustment (f_{LW})	-	Average Speed (S), mi/h	64.5
Right-Side Lateral Clearance Adj. (f_{RLC})	-	Density (D), pc/mi/ln	18.0
Total Ramp Density Adjustment	-	Level of Service (LOS)	B
Adjusted Free-Flow Speed (FFS_{adj}), mi/h	65.0		

HCS Freeway Merge Report

Project Information

Segment Number	2	Segment Name	F16 - NB I-5 at Southcenter Blvd NB On Ramp Merge Area
Analysis Period Number	1	Segment Analysis Period	16:45-17:00

Geometric Data

	Freeway	Ramp
Number of Lanes (N), ln	5	1
Free-Flow Speed (FFS), mi/h	65.0	35.0
Segment Length (L) / Acceleration Length (LA), ft	1500	1070
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Type	Freeway	Right-Sided One-Lane

Adjustment Factors

Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Proportion of CAVs in Traffic Stream	0	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000
Capacity Adjustment Factor for CAVs, CAF_{CAV}	Overwritten	-
Final Capacity Adjustment Factor (CAF)	0.852	0.950

Demand and Capacity

Demand Volume (V_i), veh/h	5160	860
Peak Hour Factor (PHF)	0.94	0.95
Total Trucks, %	6.00	5.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f_{HV})	0.943	0.952
Flow Rate (v_i), pc/h	5821	951
Capacity (c_{md}), pc/h	11750	2000
Adjusted Capacity (c_{md}), pc/h	10011	1900
Volume-to-Capacity Ratio (v/c)	0.68	0.50

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Number of Outer Lanes on Freeway (N_O), ln	2
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_S)	0.305
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	1327
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	58.0
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	0.099	Outer Lanes Freeway Speed (S_O), mi/h	62.0
Flow in Lanes 1 and 2 (v_{12}), pc/h	1770	Ramp Junction Speed (S), mi/h	59.9
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	2721	Average Density (D), pc/mi/ln	17.9

Level of Service (LOS)	B	Density in Ramp Influence Area (D_R), pc/mi/ln	19.6