APPENDIX H

VISSIM Driver Behaviors

Car Following	Freeway		Weave		Merge		Diverge		Freeway (SB I-41 @ STH 441)		Weave (SB I-41 @ STH 441/CTH E)		Freeway (SB I-41 @ CTH E)		Merge (SB I-41 @ CTH E)		Notes
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
Look Ahead Distance (ft)	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	0.00 - 820.21	Default
Look Ahead Distance Observed Veh	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	WisDOT recommended
Look Back Distance (ft)	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	0.00 - 492.13	Default
Temporary Lack of Attention (sec)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Default
Temporary Lack of Attention Probability (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Default
Smooth Closeup Behavior	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Default
Standstill Distance for Static Objects	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Default
Car Following Model	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Wiedmann 99	Default
CC0 - Standstill Distance (ft)	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	Default
CC1 - Headway Time (sec)	1.0	1.0	1.3	1.3	1.3	1.3	1.3	1.3	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	Increased headway helps to streamline merging and diverging movements. The headway near STH 441 & CTH E is slightly higher to help with backups at and on the CTH E entrance ramp.
CC2 - Following Variation (ft)	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	13.12	Default
CC3 - Threshold for Entering Following	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	Default
CC4 - Negative Following Threshold	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-0.35	-3.5	Default
CC5 - Positive Following Threshold	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	Default
CC6 - Speed Dependency of Oscillation	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	11.44	Default
CC7 - Oscillation Acceleration (ft/sec^2)	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	Default
CC8 - Standstill Acceleration (ft/sec^2)	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	11.48	Default
CC9 - 50 mph Acceleration (ft/sec^2)	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	Default

Lane Change	Freeway		Weave		Merge		Diverge		Freeway (SB I-41 @ STH 441)		Weave (SB I-41 @ STH 441/CTH E)		Freeway (SB I-41 @ CTH E)		Merge (SB I-41 @ CTH E)		Notes
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
General Behavior	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Free Lane	Default
Own Maximum Deceleration (ft/sec^2)	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	-13.12	Default
Own -1 ft/sec^2 Distance (ft)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	Default
Own Accepted Deceleration (ft/sec^2)	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	-3.28	Default
Trailing Maximum Deceleration (ft/sec^2)	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	Default
Trailing -1 ft/sec^2 Distance (ft)	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	Default
Trailing Accepted Deceleration (ft/sec^2)	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	-1.64	Default
Waiting Time Before Diffusion (sec)	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	Increased waiting time before diffusion helps to prevent vehicles being removed from the model before they are able to make their movement.
Minimum Headway (ft)	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	1.64	Default
To Slower Lane if Collision Time is Above	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Default
Safety Distance Reduction Factor	0.6	0.6	0.6	0.6	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.4	0.4	
Maximum Deceleration for Cooperative Braking (ft/sec^2)	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	-9.84	Default
Overtake Reduced Speed Areas	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Default
Advanced Merging	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Default
Vehicle Routing Decisions Look Ahead	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Default
Cooperative Lane Change	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Selecting the cooperative lane change option helps to improve operations everywhere, but especially in diverge, merge, and weave segments.
Maximum Speed Difference (mph)	6.71	6.71	6.71	6.71	8.71	8.71	6.71	6.71	6.71	6.71	6.71	6.71	6.71	6.71	8.71	8.71	Increased maximum speed difference at the CTH E merge allows cars to merge earlier, reducing the backup on the entrance ramp.
Maximum Collision Time (sec)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	Default
Rear Correction of Lateral Position	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Default
Maximum Speed (mph)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Default
Active During Time Period After Lane Change Start (sec)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Default

- Car Following
  - Look Ahead Distance (ft)
    - Default
  - Look Ahead Distance Observed Veh
    - The number of observed vehicles for all freeway, diverge, merge, and weave segments was increased. The default value of 2 vehicles was changed to 4 vehicles, which is the suggested value from WisDOT. Changing the look ahead distance observed vehicles affects the driver's ability to react to surrounding network objects, which implies a larger value increases the driver's awareness.
  - Look Back Distance (ft)
    - Default
  - Temporary Lack of Attention (sec)
    - Default
  - Temporary Lack of Attention Probability (%)
    - Default
  - Smooth Closeup Behavior
    - Default
  - Standstill Distance for Static Objects
    - Default
  - Car Following Model
    - Default – Wiedemann 99
  - CC0 - Standstill Distance (ft)
    - Default
  - CC1 - Headway Time (sec)
    - The headway value was altered for all segments. In the AM and PM peak hours the diverge, merge, and weave segments' headway was increased from 0.9 to 1.3 seconds and the freeways' headway was increased from 0.9 to 1.0 seconds. The headway was increased from 0.9 to 1.1 seconds on I-41 SB near CTH E/STH 441. To be more specific, the links are the freeway section between the STH 441 exit and STH 441 entrance ramps, the weave section between STH 441 and CTH E, the freeway section between the CTH E exit and CTH E entrance ramps, and the merge section at the CTH E entrance ramp. All alterations to the headway time are within the suggested range defined by WisDOT.
    - Increasing these values affected the distance between moving vehicles, allowing for easier lane changes in the freeway, diverge, merge, and weave sections.
  - CC2 - Following Variation (ft)
    - Default
  - CC3 - Threshold for Entering Following
    - Default
  - CC4 - Negative Following Threshold
    - Default
  - CC5 - Positive Following Threshold
    - Default
  - CC6 - Speed Dependency of Oscillation

- ▪ Default
  - o CC7 - Oscillation Acceleration (ft/sec2)
    - ▪ Default
  - o CC8 - Standstill Acceleration (ft/sec2)
    - ▪ Default
  - o CC9 - 50 mph Acceleration (ft/sec2)
    - ▪ Default
- Lane Change
  - o General Behavior
    - ▪ Default
  - o Own Maximum Deceleration (ft/sec2)
    - ▪ Default
  - o Own -1 ft/sec2 Distance (ft)
    - ▪ Default
  - o Own Accepted Deceleration (ft/sec2)
    - ▪ Default
  - o Trailing Maximum Deceleration (ft/sec2)
    - ▪ Default
  - o Trailing -1 ft/sec2 Distance (ft)
    - ▪ Default
  - o Trailing Accepted Deceleration (ft/sec2)
    - ▪ Default
  - o Waiting Time Before Diffusion (sec)
    - ▪ The time before diffusion was increased from the default value of 60 to 360 seconds for all freeway, diverge, merge, and weave segments. This is shorter than the value suggested by WisDOT, which is the maximum allowed (999999 seconds). The traffic conditions in our model did not show a need to increase the waiting time before diffusion to such a large value.
  - o Minimum Headway (ft)
    - ▪ Default
  - o To Slower Lane if Collision Time is Above
    - ▪ Default
  - o Safety Distance Reduction Factor
    - ▪ The safety distance reduction factor was decreased from the default value of 0.6 to 0.4 in the AM and PM peak hour for the all the merge segments, including the merge segment along I-41 SB at CTH E. This reduced safety distance reduction factor allowed for more frequent merging.
  - o Maximum Deceleration for Cooperative Braking (ft/sec2)
    - ▪ Default
  - o Overtake Reduced Speed Areas
    - ▪ Default
  - o Advanced Merging
    - ▪ Default
  - o Vehicle Routing Decisions Look Ahead

- Default
  - Cooperative Lane Change
    - The cooperative lane change option was selected, which alerts trailing vehicles when a leading vehicle is trying to make a lane change. This option streamlines diverging, merging, and weaving movements.
  - Maximum Speed Difference (mph)
    - The maximum speed difference was increased at all the merge sections, including at the CTH E entrance ramp merge along I-41 SB, from 6.71 to 8.71 mph in the AM and PM peak hours. Increasing the maximum speed difference reduces backups on the entrance ramp by allowing vehicles to merge earlier.
  - Maximum Collision Time (sec)
    - Default
  - Rear Correction of Lateral Position
    - Default
  - Maximum Speed (mph)
    - Default
  - Active During Time Period After Lane Change Start (sec)
    - Default
- Lateral
    - DEFAULT FOR ALL
  - Desired Position at Free Flow
  - Observe Adjacent Lanes
  - Diamond Shaped Queuing
  - Consider Next Turning Direction
  - Collision Time Gain (sec)
  - Minimum Longitudinal Speed (mph)
  - Time Between Direction Changes (sec)
  - Overtake on Same Lane - Left
  - Overtake on Same Lane - Right
  - Minimal Lateral Distance - Standing (ft)
  - Minimum Lateral Distance - Driving (ft)