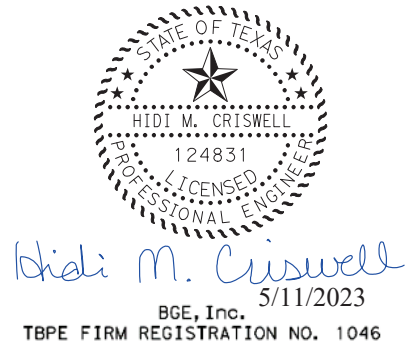




Technical Memorandum

To: Fort Bend County Toll Road Authority
From: Hidi M. Criswell, PE, PTOE
Date: May 11, 2023
Subject: Speed Limit Study: SH 99 at Peek Road



This technical memorandum documents a speed limit study conducted on the mainlanes of SH 99 between Westpark Toll Road and Peek Road as well as the northbound and southbound SH 99 exit and entrance ramps to/from Peek Road located in Fort Bend County, Texas.

SH 99 Mainlanes and Ramps at Peek Road

The SH 99/Peek Road spot speed study was performed for both northbound and southbound traffic on SH 99. Locations measured included an area north of the Peek Road toll gantry for the mainlanes and on Peek Road to capture the northbound and southbound ramps. Data was collected on Wednesday, May 10, 2023 between 1:50 PM and 3:50 PM. The speed of 125 northbound and 125 southbound vehicles were collected on both the mainlanes and ramps using a standard velocity speed gun.

Based on field observations, the 85th percentile speed for northbound mainlanes vehicles was 74 miles per hour (mph) and the 85th percentile speed for southbound mainlanes vehicles was 68 mph. The highest recorded speed in the northbound direction was 84 mph, and the highest recorded speed in the southbound direction was 73 mph. Of the 125 vehicles, there were 45 vehicles traveling at 65 mph or less in the northbound direction, and 80 vehicles traveling at 65 mph or less in the southbound direction.

Based on field observations, the 85th percentile speed for northbound ramp vehicles was 52 miles per hour (mph) and the 85th percentile speed for southbound mainlanes vehicles was 51 mph. The highest recorded speed in the northbound and southbound directions was 60 mph. Of the 125 vehicles, there were 50 vehicles traveling at 45 mph or less in the northbound direction, and 69 vehicles traveling at 45 mph or less in the southbound direction.

Speed Zone Design

Posted speeds are typically within 5 mph of the 85th percentile speed, and end in a value to the nearest 5 or 0. Based on the TxDOT Procedures for Establishing Speed Zones, considerations for

lower posted speeds include narrow roadway pavement, horizontal curves, high driveway density, lack of shoulders, area development, and crash history. SH 99 improvements included the following:

1. Construction of the SH 99 Mainlanes with northbound and southbound U-turns
2. Peek Road Connection to the ramps (Current Condition: Peek Road-not open to traffic)

During field observations, vehicles are traveling at high speed along the mainlanes within this segment of SH 99. The field visit was conducted when the roadway was wet and had vehicles traveling in the 70s and 80s mph. The southbound direction had lower traffic volumes than the northbound direction. It is recommended the speed limit be posted at 65 mph. By posting the speed limit to 65 mph, it will be consistent with the other segments of SH 99 and reduce the severity of potential crashes in the future. The 5-10 mph difference from the measured 85th percentile speeds is within the acceptable range permitted when setting a posted speed.

During field observations, it was noted that concrete barriers are located on both the eastbound and westbound approaches of Peek Road. The ramps are currently operating under free flow condition. Under future conditions, Peek Road will have east and west connection and be operating with a traffic signal intersection control. The current configuration with free flow ramp traffic would be removed. It is recommended the posted speed limit on the ramps be 45 mph. This will accommodate the upcoming change in lane configuration and nearby ramp/frontage road operations and falls within the acceptable range for setting a posted speed limit. By posting the speed limit at 45 mph it will be consistent with other ramps in the area.

Conclusion

It is recommended that Fort Bend County Toll Road Authority post the speed limit at 65 mph along the SH 99 mainlanes and 45 mph along the SH 99 northbound and southbound ramps at Peek Road. The recommended speed limits adheres to the 85th percentile speed methodology outlined in the TxDOT Procedures for Establishing Speed Zones.

Attached is the spot speed study worksheet for this speed limit study.



RADAR MOTOR VEHICLE SPEED Field Tally Sheet (Low Speed)

Date: 5/10/2023 County: Fort Bend Hwy: SH 99 Location: NB/SB Ramps at Peek Road

Time (from): 1:51 PM (to): 2:39 PM Weather: Cloudy/Intermittent Light Rain

Surface type: Concrete Surface condition: Wet or Dry / Smooth or Rough

M.P.H.	AUTOMOBILES		AUTOMOBILES		AUTOMOBILES		M.P.H.	M.P.H.
	Direction: SB		Direction: NB		Direction:	Direction:		
>60		125					125	>60
59		122					124	59
58		121						58
57							123	57
56								56
55		119					121	55
54		117					117	54
53	###	116	###				113	53
52		110	###				107	52
51	###	106	###				102	51
50	###	98	###				88	50
49	###	92	###				81	49
48	###	86	###				75	48
47	###	79	###				70	47
46	###	74	###				60	46
45	###	69	###				50	45
44	###	60	###				43	44
43	###	49	###				33	43
42	###	42	###				27	42
41	###	33					20	41
40	###	23					16	40
39	###	15	###				12	39
38	###	10					7	38
37		4					6	37
36		3					5	36
35		2					4	35
34							2	34
33							1	33
32								32
31								31
30								30
29								29
28								28
27								27
26								26
25								25
24								24
23								23
22								22
21								21
20								20
19								19
18								18
17								17
16								16
15								15
14								14
13								13
12								12
11								11
<10								<10
Total Automobiles		125	Total Automobiles		125			
		x 0.85			x 0.85			
85th Percentile Automobile:		106	85th Percentile Automobile:		106			
85th Percentile Speed (m.p.h.):		51	85th Percentile Speed (m.p.h.):		52			

Total No. of Cars	85% Car No.	Total No. of Cars	85% Car No.	Total No. of Cars	85% Car No.	Total No. of Cars	85% Car No.
80	68	120	102	160	136	200	170
81	69	121	103	161	137	201	171
82	70	122	104	162	138	202	172
83	71	123	105	163	139	203	173
84	71	124	105	164	139	204	173
85	72	125	106	165	140	205	174
86	73	126	107	166	141	206	175
87	74	127	108	167	142	207	176
88	75	128	109	168	143	208	177
89	76	129	110	169	144	209	178
90	77	130	111	170	145	210	179
91	77	131	111	171	145	211	179
92	78	132	112	172	146	212	180
93	79	133	113	173	147	213	181
94	80	134	114	174	148	214	182
95	81	135	115	175	149	215	183
96	82	136	116	176	150	216	184
97	82	137	116	177	150	217	184
98	83	138	117	178	151	218	185
99	84	139	118	179	152	219	186
100	85	140	119	180	153	220	187
101	86	141	120	181	154	221	188
102	87	142	121	182	155	222	189
103	88	143	122	183	156	223	190
104	88	144	122	184	156	224	190
105	89	145	123	185	157	225	191
106	90	146	124	186	158	226	192
107	91	147	125	187	159	227	193
108	92	148	126	188	160	228	194
109	93	149	127	189	161	229	195
110	94	150	128	190	162	230	196
111	94	151	128	191	162	231	196
112	95	152	129	192	163	232	197
113	96	153	130	193	164	233	198
114	97	154	131	194	165	234	199
115	98	155	132	195	166	235	200
116	99	156	133	196	167	236	201
117	99	157	133	197	167	237	201
118	100	158	134	198	168	238	202
119	101	159	135	199	169	239	203



RADAR MOTOR VEHICLE SPEED Field Tally Sheet (High Speed)

Date: 5/10/2023 County: Fort Bend Hwy: SH 99 Location: Mainlanes between Westprk and Peek Road
 Time (from): 2:49 PM (to): 3:49 PM Weather: Cloudy/Intermittent Light Rain

Surface type: Concrete Surface condition: Wet or Dry / Smooth or Rough

M.P.H.	AUTOMOBILES		AUTOMOBILES		AUTOMOBILES		M.P.H.
	Direction: SB		Direction: NB		Direction:	Direction:	
>95							>95
94							94
93							93
92							92
91							91
90							90
89							89
88							88
87							87
86							86
85							85
84					125		84
83					123		83
82					122		82
81					120		81
80							80
79					119		79
78					116		78
77					112		77
76					107		76
75			###		101		75
74			###		92		74
73		125	###		87		73
72		122	###		81		72
71		121	###		76		71
70		117	###		71		70
69	###	116	###		56		69
68	###	110	###	###	48		68
67	###	103	###		45		67
66	###	93			32		66
65	###	80	###		24		65
64	###	65	###		18		64
63	###	53	###		13		63
62	###	47	###		9		62
61	###	41	###		2		61
60	###	32	###				60
59	###	24					59
58		19					58
57		17					57
56		15					56
55		14					55
54		11					54
53		7					53
52		6					52
51		4					51
50		1					50
49							49
48							48
47							47
46							46
<45							<45
Total Automobiles		125	Total Automobiles		125		
		x 0.85			x 0.85		
85th Percentile Automobile:		106	85th Percentile Automobile:		106		
85th Percentile Speed (m.p.h.):		68	85th Percentile Speed (m.p.h.):		74		

Total No. of Cars	85% Car No.	Total No. of Cars	85% Car No.	Total No. of Cars	85% Car No.	Total No. of Cars	85% Car No.
80	68	120	102	160	136	200	170
81	69	121	103	161	137	201	171
82	70	122	104	162	138	202	172
83	71	123	105	163	139	203	173
84	71	124	105	164	139	204	173
85	72	125	106	165	140	205	174
86	73	126	107	166	141	206	175
87	74	127	108	167	142	207	176
88	75	128	109	168	143	208	177
89	76	129	110	169	144	209	178
90	77	130	111	170	145	210	179
91	77	131	111	171	145	211	179
92	78	132	112	172	146	212	180
93	79	133	113	173	147	213	181
94	80	134	114	174	148	214	182
95	81	135	115	175	149	215	183
96	82	136	116	176	150	216	184
97	82	137	116	177	150	217	184
98	83	138	117	178	151	218	185
99	84	139	118	179	152	219	186
100	85	140	119	180	153	220	187
101	86	141	120	181	154	221	188
102	87	142	121	182	155	222	189
103	88	143	122	183	156	223	190
104	88	144	122	184	156	224	190
105	89	145	123	185	157	225	191
106	90	146	124	186	158	226	192
107	91	147	125	187	159	227	193
108	92	148	126	188	160	228	194
109	93	149	127	189	161	229	195
110	94	150	128	190	162	230	196
111	94	151	128	191	162	231	196
112	95	152	129	192	163	232	197
113	96	153	130	193	164	233	198
114	97	154	131	194	165	234	199
115	98	155	132	195	166	235	200
116	99	156	133	196	167	236	201
117	99	157	133	197	167	237	201
118	100	158	134	198	168	238	202
119	101	159	135	199	169	239	203