Development of Houston-Galveston-Brazoria (HGB) On-Road Emissions Inventories for 2019 and 2023

FINAL REPORT

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

This project describes the development of on-road mobile emissions inventories for eight counties within the Houston-Galveston-Brazoria (HGB) area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties) for the analysis years 2019 and 2023. Under the sponsorship of the Texas Commission on Environmental Quality (TCEQ), the Texas A&M Transportation Institute (TTI) developed eight emissions inventories (EI) for each year to represent two periods and four day type scenarios for the eight-county area. Table 1 presents the eight activity scenarios for each year.[1]

Table 1. Emissions Inventory Activity Scenarios.

Years	Periods[1]	Day Types[2]
2019 and 2023	School and Summer (non-school)	Weekday Friday Saturday Sunday

[1] The "school" period includes April 15th through May 15th and September 15th through October 15th combined, and the "summer" period includes June 10th through August 10th, excluding July 4th.

[2] The day type "Weekday" represents the average Monday through Thursday.

TTI developed the EIs to produce traffic activity and total emissions at a temporal scale of each hour of the day and a spatial scale of individual roadway links acquired from the HGB area travel demand model (TDM), provided by the Houston-Galveston Area Council (H-GAC). Thirty-three pollutants were included in the analysis, including most of the pollutants with National Ambient Air Quality Standards (NAAQS) and/or their precursors. TTI estimated on-road mobile source vehicle activity and emissions for on-network (roadways) and off-network (e.g., parking areas, driveways) activity categories. The following pollutants were modeled: carbon monoxide (CO); oxides of nitrogen (NO_X); methane (CH_4); ammonia (NH_3); sulfur dioxide (SO_2); nitrogen oxide (NO); nitrogen dioxide (NO_2); nitrous acid (HONO); nitrate (NO_3); ammonium (NH_4); chloride (Cl); sodium (Na); potassium (K); magnesium (Mg); calcium (Ca); titanium (Ti); silicon (Si); aluminum (Al); iron (Fe); volatile organic compounds (VOC); atmospheric carbon dioxide (CO_2); primary exhaust particulate matter of 10 micron threshold level (PM_{10}) – total; primary PM_{10} – brakewear particulate; primary PM_{10} – tirewear particulate; primary

[1] The TCEQ sponsored this work in support of TCEQ's future State Implementation Plan submissions to the U.S. Environmental Protection Agency, involving ozone attainment demonstration modeling (i.e., to show compliance with national ambient air quality standards for ozone).

exhaust particulate matter of 2.5 micron threshold level ($PM_{2.5}$) – total; organic carbon (OC); elemental carbon (EC); sulfate particulate (SO_4); primary $PM_{2.5}$ – brakewear particulate; primary $PM_{2.5}$ – tirewear particulate; aerosol H_2O (H_2O); and non-carbon organic matter (NCOM).

In addition to the on-road mobile source emissions estimates, TTI produced estimates of total energy consumption (TEC) and the area source category refueling loss emissions associated with each activity scenario described in Table 1.

TTI developed the EIs using the latest version of the MOtor Vehicle Emissions Simulator (MOVES), MOVES3, and associated Environmental Protection Agency (EPA) guidance documentation. The EIs were developed using a rates-per-activity approach, which develops and applies MOVES emission rates externally with local activity data. The inventory methods included gasoline and diesel-powered vehicle combinations modeled for on-network and off-network activity and emissions. The on-network or roadway-based activity consists of vehicle miles traveled (VMT) and average operational speeds and off-network activity consists of off-network idling hours, source hours parked, vehicle starts, source hours extended idling, and diesel auxiliary power unit hours. The inventories were calculated using a mix of local data inputs (e.g., registration data, local TDMs, traffic count data) and some MOVES defaults.

TTI calculated the EIs using utilities developed and maintained by TTI and recently updated for use with MOVES3 (the TTI EI utilities). The EI results were summarized into various formats specified and suitable for downstream air quality planning processes (a primary one being photochemical modeling of ozone) as described below.

- Link-level (with geographical coordinates) and county-level hourly estimates of emissions.
- MOVES inventory mode county-level local activity and emissions inventory inputs to MOVES for all activity scenarios.
- Summaries by county of activity by type and of emissions by pollutant and process.

Table 2 through Table 17 present the county and region aggregate, on-road inventory summaries for a subset of the inventoried pollutants, by period and day type, for 2019 and 2023. The tables present VMT, speed, and on-road emissions for VOC, CO, NO_X, PM_{10}, $PM_{2.5}$, NH_3, SO_2, and CO_2. Table 18 through Table 21 show the VOC refueling loss emissions estimates corresponding to each period and day type for 2019 and 2023.

Table 2. HGB 2019 School Period Weekday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	9,211,801	44.2	2.15	39.76	4.22	0.43	0.15	0.25	0.06	4,735.33
Chambers	3,097,940	59.4	0.50	14.17	3.05	0.15	0.09	0.09	0.02	2,139.67
Fort Bend	14,247,567	37.2	3.65	60.55	5.97	0.83	0.25	0.36	0.09	7,353.07
Galveston	7,442,609	39.9	1.86	33.43	2.97	0.38	0.12	0.20	0.05	3,739.87
Harris	125,757,025	36.2	26.90	557.13	53.89	7.50	2.17	3.38	0.79	64,845.37
Liberty	2,539,286	48.8	0.74	13.47	1.84	0.12	0.06	0.08	0.02	1,454.47
Montgomery	16,015,378	40.9	3.51	64.07	7.10	0.83	0.27	0.42	0.10	8,099.05
Waller	2,644,139	54.2	0.57	14.07	1.88	0.11	0.05	0.08	0.02	1,476.67
Total	180,955,745	37.7	39.90	796.65	80.90	10.37	3.16	4.85	1.12	93,843.50

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 3. HGB 2023 School Period Weekday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	9,907,417	42.7	1.82	33.91	2.79	0.43	0.12	0.24	0.03	4,580.96
Chambers	3,450,825	59.5	0.37	12.89	2.25	0.13	0.06	0.10	0.01	2,189.79
Fort Bend	17,650,501	37.1	3.13	58.68	4.87	0.96	0.24	0.42	0.05	8,254.45
Galveston	7,748,531	40.0	1.15	26.61	1.89	0.37	0.09	0.19	0.02	3,509.15
Harris	135,410,378	36.0	21.28	481.46	37.43	7.53	1.78	3.37	0.38	63,607.58
Liberty	3,328,586	48.9	0.74	14.23	1.57	0.14	0.05	0.09	0.01	1,784.80
Montgomery	18,033,463	40.7	2.94	57.08	5.24	0.86	0.22	0.44	0.05	8,295.35
Waller	3,005,231	53.3	0.39	12.60	1.33	0.10	0.04	0.08	0.01	1,540.19
Total	198,534,931	37.5	31.82	697.47	57.37	10.52	2.60	4.94	0.56	93,762.27

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 4. HGB 2019 School Period Friday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	9,927,424	44.0	2.19	42.45	4.32	0.46	0.16	0.27	0.06	5,022.04
Chambers	3,563,211	59.2	0.53	16.16	3.26	0.17	0.10	0.10	0.02	2,368.19
Fort Bend	15,354,416	36.9	3.73	64.71	6.22	0.90	0.26	0.39	0.10	7,863.42
Galveston	8,020,812	39.7	1.91	35.72	3.13	0.42	0.12	0.21	0.05	4,011.12
Harris	135,527,159	35.7	27.69	597.73	56.64	8.17	2.32	3.64	0.85	69,581.00
Liberty	2,920,653	48.6	0.78	15.24	2.04	0.14	0.06	0.09	0.02	1,652.01
Montgomery	17,259,569	40.5	3.60	68.60	7.34	0.90	0.28	0.45	0.10	8,633.59
Waller	2,849,546	54.0	0.59	15.13	1.85	0.11	0.05	0.09	0.02	1,530.86
Total	195,422,790	37.3	41.01	855.74	84.80	11.26	3.36	5.23	1.21	100,662.21

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 5. HGB 2023 School Period Friday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	10,693,735	42.4	1.86	36.29	2.91	0.47	0.13	0.26	0.03	4,900.55
Chambers	3,724,633	59.4	0.37	13.81	2.24	0.13	0.06	0.10	0.01	2,271.91
Fort Bend	19,051,359	36.6	3.19	62.99	5.08	1.05	0.25	0.46	0.05	8,848.23
Galveston	8,363,512	39.8	1.18	28.56	2.00	0.40	0.10	0.20	0.02	3,770.19
Harris	146,157,313	35.4	21.84	517.97	39.36	8.27	1.92	3.62	0.41	68,392.60
Liberty	3,592,737	48.7	0.76	15.25	1.63	0.15	0.05	0.10	0.01	1,901.22
Montgomery	19,464,703	40.2	3.00	61.21	5.42	0.93	0.24	0.48	0.05	8,856.79
Waller	3,243,734	53.1	0.40	13.57	1.29	0.11	0.04	0.09	0.01	1,597.51
Total	214,291,726	37.0	32.60	749.64	59.93	11.51	2.78	5.31	0.60	100,538.99

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 6. HGB 2019 School Period Saturday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	8,219,478	44.8	1.92	34.77	3.32	0.35	0.12	0.22	0.05	4,054.13
Chambers	2,859,040	59.5	0.43	12.95	2.35	0.12	0.07	0.08	0.02	1,804.16
Fort Bend	12,712,832	37.6	3.27	52.82	4.60	0.69	0.20	0.32	0.08	6,275.74
Galveston	6,640,917	40.3	1.67	29.18	2.26	0.31	0.09	0.17	0.04	3,184.73
Harris	112,211,164	37.0	23.78	488.79	41.51	6.09	1.68	2.98	0.69	55,244.33
Liberty	2,343,463	48.9	0.66	12.27	1.42	0.10	0.04	0.07	0.01	1,242.53
Montgomery	14,290,195	41.7	3.12	55.81	5.48	0.67	0.21	0.37	0.08	6,898.12
Waller	2,359,285	54.4	0.51	12.46	1.54	0.09	0.04	0.07	0.01	1,271.18
Total	161,636,374	38.4	35.36	699.05	62.48	8.43	2.45	4.28	0.99	79,974.92

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 7. HGB 2023 School Period Saturday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	8,867,722	43.4	1.63	29.67	2.08	0.35	0.09	0.22	0.02	3,903.29
Chambers	3,088,691	59.7	0.31	11.39	1.65	0.10	0.04	0.08	0.01	1,786.11
Fort Bend	15,798,258	37.9	2.81	51.24	3.65	0.79	0.19	0.37	0.04	7,034.49
Galveston	6,935,411	40.3	1.03	23.40	1.38	0.30	0.07	0.17	0.02	2,991.02
Harris	121,200,378	37.0	18.88	423.27	27.75	6.14	1.41	2.97	0.33	54,150.85
Liberty	2,979,282	49.4	0.65	12.58	1.13	0.11	0.04	0.08	0.01	1,472.56
Montgomery	16,141,006	41.7	2.62	49.86	3.92	0.70	0.18	0.39	0.04	7,063.27
Waller	2,689,844	53.7	0.34	11.22	1.08	0.09	0.03	0.07	0.01	1,329.78
Total	177,700,592	38.5	28.29	612.62	42.64	8.58	2.05	4.36	0.48	79,731.38

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 8. HGB 2019 School Period Sunday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	6,816,418	44.9	1.82	29.71	2.66	0.28	0.09	0.18	0.04	3,317.62
Chambers	2,554,784	59.6	0.40	11.66	1.97	0.10	0.06	0.07	0.01	1,559.20
Fort Bend	10,542,731	37.7	3.12	45.37	3.68	0.55	0.15	0.26	0.06	5,149.46
Galveston	5,507,289	40.4	1.59	24.90	1.82	0.25	0.07	0.14	0.03	2,612.17
Harris	93,056,097	37.1	22.23	415.36	33.12	4.90	1.33	2.46	0.57	45,250.67
Liberty	2,094,082	48.9	0.63	11.22	1.20	0.09	0.03	0.06	0.01	1,080.94
Montgomery	11,850,833	41.9	2.95	47.74	4.38	0.54	0.17	0.30	0.07	5,651.98
Waller	1,956,565	54.5	0.46	10.60	1.23	0.07	0.03	0.06	0.01	1,033.94
Total	134,378,800	38.6	33.19	596.55	50.06	6.79	1.94	3.55	0.82	65,655.98

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 9. HGB 2023 School Period Sunday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	7,345,497	43.6	1.56	25.29	1.67	0.29	0.08	0.18	0.02	3,197.93
Chambers	2,558,433	59.8	0.28	9.50	1.27	0.08	0.03	0.07	0.01	1,429.77
Fort Bend	13,086,330	38.0	2.69	43.72	2.88	0.64	0.15	0.31	0.04	5,755.60
Galveston	5,744,875	40.4	0.98	19.77	1.09	0.25	0.06	0.14	0.02	2,445.82
Harris	100,394,451	37.1	17.82	358.37	21.84	4.95	1.13	2.45	0.27	44,258.21
Liberty	2,467,839	49.5	0.62	10.75	0.88	0.09	0.03	0.06	0.01	1,187.13
Montgomery	13,370,196	41.9	2.50	42.46	3.11	0.56	0.14	0.32	0.04	5,775.98
Waller	2,228,094	53.7	0.31	9.47	0.85	0.07	0.03	0.06	0.01	1,078.97
Total	147,195,715	38.6	26.76	519.33	33.58	6.92	1.64	3.59	0.40	65,129.40

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 10. HGB 2019 Summer Period Weekday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	9,192,450	44.2	2.18	40.09	4.24	0.43	0.15	0.25	0.06	4,743.10
Chambers	3,083,588	59.4	0.50	14.18	3.05	0.15	0.09	0.09	0.02	2,133.40
Fort Bend	14,217,637	37.2	3.70	61.10	6.01	0.83	0.25	0.36	0.09	7,370.41
Galveston	7,426,974	39.9	1.89	33.72	2.99	0.38	0.12	0.20	0.05	3,747.94
Harris	125,492,839	36.2	27.22	560.53	54.20	7.49	2.17	3.39	0.79	64,965.90
Liberty	2,527,521	48.8	0.75	13.55	1.84	0.12	0.05	0.08	0.02	1,452.39
Montgomery	15,981,734	41.0	3.56	64.57	7.14	0.83	0.27	0.42	0.10	8,112.83
Waller	2,638,585	54.2	0.58	14.13	1.88	0.11	0.05	0.08	0.02	1,477.28
Total	180,561,327	37.7	40.39	801.88	81.36	10.35	3.16	4.86	1.13	94,003.25

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 11. HGB 2023 Summer Period Weekday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	9,893,290	42.8	1.85	34.20	2.82	0.43	0.12	0.24	0.03	4,592.69
Chambers	3,445,905	59.5	0.37	12.92	2.25	0.13	0.06	0.10	0.01	2,190.19
Fort Bend	17,625,332	37.1	3.18	59.13	4.91	0.96	0.24	0.43	0.05	8,278.17
Galveston	7,737,483	40.0	1.17	26.77	1.90	0.37	0.09	0.19	0.02	3,517.93
Harris	135,217,314	36.0	21.55	484.26	37.70	7.53	1.79	3.37	0.38	63,770.25
Liberty	3,323,840	48.9	0.75	14.35	1.58	0.14	0.05	0.09	0.01	1,787.93
Montgomery	18,007,750	40.7	2.98	57.50	5.28	0.86	0.23	0.44	0.05	8,315.50
Waller	3,000,946	53.3	0.39	12.64	1.33	0.10	0.04	0.08	0.01	1,541.66
Total	198,251,859	37.5	32.23	701.77	57.78	10.51	2.60	4.95	0.56	93,994.32

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 12. HGB 2019 Summer Period Friday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	9,842,483	44.0	2.22	42.54	4.32	0.45	0.15	0.26	0.06	4,997.67
Chambers	3,563,931	59.2	0.53	16.23	3.27	0.17	0.10	0.10	0.02	2,372.74
Fort Bend	15,223,040	37.0	3.77	64.88	6.23	0.89	0.26	0.39	0.09	7,830.05
Galveston	7,952,184	39.7	1.93	35.79	3.14	0.41	0.12	0.21	0.05	3,993.45
Harris	134,367,563	35.8	27.94	597.34	56.59	8.09	2.31	3.62	0.85	69,235.11
Liberty	2,921,243	48.6	0.79	15.38	2.05	0.14	0.06	0.09	0.02	1,657.38
Montgomery	17,111,891	40.6	3.63	68.68	7.34	0.89	0.28	0.45	0.10	8,590.88
Waller	2,825,165	54.1	0.59	15.09	1.84	0.11	0.05	0.09	0.02	1,521.71
Total	193,807,501	37.4	41.40	855.93	84.79	11.16	3.34	5.21	1.21	100,198.99

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 13. HGB 2023 Summer Period Friday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	10,576,836	42.4	1.88	36.26	2.92	0.47	0.12	0.26	0.03	4,865.61
Chambers	3,683,917	59.5	0.38	13.72	2.22	0.13	0.06	0.10	0.01	2,250.89
Fort Bend	18,843,097	36.7	3.23	62.87	5.07	1.03	0.25	0.45	0.05	8,785.85
Galveston	8,272,085	39.8	1.19	28.45	2.00	0.39	0.10	0.20	0.02	3,743.29
Harris	144,559,585	35.5	22.03	515.86	39.26	8.16	1.90	3.60	0.41	67,872.85
Liberty	3,553,463	48.7	0.77	15.23	1.63	0.15	0.05	0.10	0.01	1,886.34
Montgomery	19,251,924	40.3	3.03	61.07	5.41	0.92	0.24	0.47	0.05	8,791.13
Waller	3,208,275	53.2	0.40	13.48	1.28	0.11	0.04	0.09	0.01	1,583.88
Total	211,949,182	37.1	32.90	746.95	59.79	11.36	2.76	5.27	0.60	99,779.84

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 14. HGB 2019 Summer Period Saturday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	8,054,415	44.8	1.93	34.42	3.28	0.34	0.12	0.21	0.05	3,985.27
Chambers	2,893,713	59.5	0.43	13.15	2.40	0.12	0.07	0.08	0.02	1,832.72
Fort Bend	12,457,532	37.7	3.30	52.32	4.56	0.67	0.19	0.31	0.08	6,173.83
Galveston	6,507,554	40.3	1.68	28.92	2.24	0.31	0.09	0.17	0.04	3,134.36
Harris	109,957,732	37.0	23.88	482.87	41.07	5.97	1.65	2.93	0.68	54,342.19
Liberty	2,371,883	48.9	0.67	12.50	1.45	0.10	0.04	0.07	0.01	1,261.67
Montgomery	14,003,220	41.8	3.14	55.19	5.41	0.66	0.21	0.36	0.08	6,780.99
Waller	2,311,906	54.5	0.51	12.27	1.51	0.09	0.04	0.07	0.01	1,247.04
Total	158,557,953	38.5	35.54	691.64	61.92	8.27	2.41	4.22	0.97	78,758.08

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 15. HGB 2023 Summer Period Saturday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	8,657,499	43.5	1.55	28.98	2.04	0.35	0.09	0.21	0.02	3,818.30
Chambers	3,015,469	59.8	0.33	11.25	1.63	0.10	0.04	0.08	0.01	1,751.88
Fort Bend	15,423,735	37.9	3.09	51.20	3.66	0.77	0.19	0.37	0.04	6,909.98
Galveston	6,770,996	40.4	1.31	23.82	1.43	0.30	0.07	0.16	0.02	2,948.66
Harris	118,327,132	37.0	18.94	416.25	27.40	5.99	1.38	2.91	0.33	53,064.77
Liberty	2,908,654	49.4	0.63	12.30	1.11	0.11	0.04	0.08	0.01	1,441.44
Montgomery	15,758,358	41.8	2.64	49.07	3.86	0.68	0.17	0.38	0.04	6,917.68
Waller	2,626,077	53.7	0.41	11.19	1.07	0.09	0.03	0.07	0.01	1,302.42
Total	173,487,922	38.5	28.89	604.06	42.19	8.37	2.01	4.27	0.47	78,155.13

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 16. HGB 2019 Summer Period Sunday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	6,719,173	44.9	1.83	29.62	2.65	0.28	0.09	0.18	0.04	3,282.29
Chambers	2,634,106	59.6	0.41	12.06	2.04	0.11	0.06	0.08	0.02	1,613.42
Fort Bend	10,392,325	37.7	3.15	45.25	3.67	0.55	0.15	0.26	0.06	5,098.71
Galveston	5,428,722	40.4	1.60	24.85	1.82	0.25	0.07	0.14	0.03	2,587.29
Harris	91,728,539	37.1	22.40	413.09	33.03	4.83	1.31	2.44	0.57	44,797.53
Liberty	2,159,101	48.9	0.65	11.62	1.25	0.09	0.04	0.06	0.01	1,118.25
Montgomery	11,681,765	41.9	2.97	47.53	4.37	0.54	0.16	0.30	0.07	5,592.01
Waller	1,928,652	54.5	0.47	10.50	1.22	0.07	0.03	0.06	0.01	1,020.90
Total	132,672,383	38.6	33.48	594.50	50.05	6.71	1.92	3.52	0.81	65,110.40

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 17. HGB 2023 Summer Period Sunday On-Road Emissions (Tons/Day).

County	VMT	Speed[1]	VOC	CO	NO_X	PM_{10}[2]	$PM_{2.5}$[2]	NH_3	SO_2	CO_2
Brazoria	7,245,308	43.6	1.48	24.93	1.65	0.28	0.07	0.18	0.02	3,161.21
Chambers	2,523,538	59.8	0.30	9.49	1.27	0.08	0.03	0.07	0.01	1,417.21
Fort Bend	12,907,839	38.0	2.97	44.26	2.93	0.63	0.15	0.31	0.04	5,718.46
Galveston	5,666,518	40.4	1.26	20.46	1.15	0.25	0.06	0.14	0.02	2,439.95
Harris	99,025,134	37.2	17.95	356.18	21.83	4.89	1.12	2.43	0.27	43,841.73
Liberty	2,434,180	49.5	0.60	10.61	0.88	0.09	0.03	0.06	0.01	1,174.34
Montgomery	13,187,834	41.9	2.52	42.24	3.10	0.56	0.14	0.32	0.03	5,718.47
Waller	2,197,704	53.8	0.38	9.57	0.85	0.07	0.03	0.06	0.01	1,068.79
Total	145,188,055	38.6	27.46	517.74	33.67	6.84	1.64	3.56	0.40	64,540.17

[1] System speed in miles-per-hour (mph).
[2] Direct vehicle PM emissions (exhaust plus brake and tire wear), i.e., excludes re-suspended dust.

Table 18. HGB 2019 School Period Refueling Emissions (Tons/Day).

County	Weekday VMT	Weekday VOC	Friday VMT	Friday VOC	Saturday VMT	Saturday VOC	Sunday VMT	Sunday VOC
Brazoria	9,211,801	0.27	9,927,424	0.29	8,219,478	0.23	6,816,418	0.19
Chambers	3,097,940	0.11	3,563,211	0.12	2,859,040	0.09	2,554,784	0.08
Fort Bend	14,247,567	0.39	15,354,416	0.41	12,712,832	0.32	10,542,731	0.26
Galveston	7,442,609	0.21	8,020,812	0.22	6,640,917	0.17	5,507,289	0.14
Harris	125,757,025	3.69	135,527,159	3.96	112,211,164	3.08	93,056,097	2.52
Liberty	2,539,286	0.09	2,920,653	0.11	2,343,463	0.08	2,094,082	0.07
Montgomery	16,015,378	0.45	17,259,569	0.48	14,290,195	0.37	11,850,833	0.31
Waller	2,644,139	0.10	2,849,546	0.10	2,359,285	0.08	1,956,565	0.07
Total	180,955,745	5.31	195,422,790	5.69	161,636,374	4.44	134,378,800	3.64

Table 19. HGB 2023 School Period Refueling Emissions (Tons/Day).

County	Weekday VMT	Weekday VOC	Friday VMT	Friday VOC	Saturday VMT	Saturday VOC	Sunday VMT	Sunday VOC
Brazoria	9,907,417	0.22	10,693,735	0.23	8,867,722	0.18	7,345,497	0.14
Chambers	3,450,825	0.10	3,724,633	0.10	3,088,691	0.08	2,558,433	0.06
Fort Bend	17,650,501	0.37	19,051,359	0.39	15,798,258	0.30	13,086,330	0.24
Galveston	7,748,531	0.16	8,363,512	0.17	6,935,411	0.13	5,744,875	0.10
Harris	135,410,378	2.89	146,157,313	3.09	121,200,378	2.36	100,394,451	1.91
Liberty	3,328,586	0.09	3,592,737	0.09	2,979,282	0.07	2,467,839	0.06
Montgomery	18,033,463	0.38	19,464,703	0.40	16,141,006	0.31	13,370,196	0.25
Waller	3,005,231	0.08	3,243,734	0.08	2,689,844	0.07	2,228,094	0.06
Total	198,534,931	4.28	214,291,726	4.57	177,700,592	3.50	147,195,715	2.82

Table 20. HGB 2019 Summer Period Refueling Emissions (Tons/Day).

County	Weekday VMT	Weekday VOC	Friday VMT	Friday VOC	Saturday VMT	Saturday VOC	Sunday VMT	Sunday VOC
Brazoria	9,192,450	0.40	9,842,483	0.41	8,054,415	0.22	6,719,173	0.18
Chambers	3,083,588	0.18	3,563,931	0.20	2,893,713	0.10	2,634,106	0.08
Fort Bend	14,217,637	0.65	15,223,040	0.67	12,457,532	0.32	10,392,325	0.26
Galveston	7,426,974	0.26	7,952,184	0.28	6,507,554	0.17	5,428,722	0.14
Harris	125,492,839	6.59	134,367,563	6.82	109,957,732	3.02	91,728,539	2.49
Liberty	2,527,521	0.17	2,921,243	0.18	2,371,883	0.08	2,159,101	0.07
Montgomery	15,981,734	0.70	17,111,891	0.72	14,003,220	0.36	11,681,765	0.30
Waller	2,638,585	0.17	2,825,165	0.17	2,311,906	0.08	1,928,652	0.07
Total	180,561,327	9.11	193,807,501	9.45	158,557,953	4.35	132,672,383	3.59

Table 21. HGB 2023 Summer Period Refueling Emissions (Tons/Day).

County	Weekday VMT	Weekday VOC	Friday VMT	Friday VOC	Saturday VMT	Saturday VOC	Sunday VMT	Sunday VOC
Brazoria	9,893,290	0.22	10,576,836	0.23	8,657,499	0.17	7,245,308	0.14
Chambers	3,445,905	0.10	3,683,917	0.10	3,015,469	0.08	2,523,538	0.06
Fort Bend	17,625,332	0.37	18,843,097	0.39	15,423,735	0.29	12,907,839	0.24
Galveston	7,737,483	0.16	8,272,085	0.17	6,770,996	0.13	5,666,518	0.10
Harris	135,217,314	2.89	144,559,585	3.06	118,327,132	2.31	99,025,134	1.88
Liberty	3,323,840	0.09	3,553,463	0.09	2,908,654	0.07	2,434,180	0.06
Montgomery	18,007,750	0.38	19,251,924	0.40	15,758,358	0.30	13,187,834	0.25
Waller	3,000,946	0.08	3,208,275	0.08	2,626,077	0.07	2,197,704	0.05
Total	198,251,859	4.28	211,949,182	4.52	173,487,922	3.41	145,188,055	2.79

1.0 INTRODUCTION

The Texas Commission on Environmental Quality (TCEQ) works with local planning districts, the Texas Department of Transportation (TxDOT), and the Texas A&M Transportation Institute (TTI) to provide on-road, mobile source emissions inventories (EI) of air pollutants. TCEQ typically funds mobile source inventory work in support of the federal Clean Air Act Amendment (CAAA).

Accurate EIs are critical if state, local, and federal agencies are to attain, and maintain, the National Ambient Air Quality Standards (NAAQS) that the U.S. Environmental Protection Agency (EPA) has established for criteria pollutants such as ozone, particulate matter (PM), and carbon monoxide (CO), as well as to control hazardous air pollutant (HAP) emissions.

This report describes work conducted by TTI on behalf of TCEQ. The work involves the calculation of EIs for the Houston-Galveston-Brazoria area (HGB) for analysis years 2019 and 2023. For each year, eight EIs were calculated representing different traffic activity and emissions scenarios. These eight scenarios represent two activity periods (defined as school and summer) and four different day types within each period (weekday, Friday, Saturday, and Sunday). Emission rates for use with all eight activity scenarios were based on summer season inputs (e.g., summer meteorological and fuel property inputs).

The EIs have been commissioned to be used for air quality planning by the TCEQ. Specifically, the outputs of the 16 EI scenarios were developed to support photochemical modeling and ultimately revisions to the State Implementation Plan (SIP).

The HGB region EIs described in this report have been commissioned in parallel with similar inventories for the San Antonio (SAN) region and the entire state (254 counties), both conducted by TTI. A Dallas-Fort Worth (DFW) regional inventory is also being undertaken and is being conducted by the North Central Texas Council of Governments (NCTCOG). The methods used for these inventories are similar but described in different reports.

1.1 OBJECTIVE

The purpose of this document is to describe the methods and data used to develop on-road mobile source EIs for the HGB region. The EIs were developed for analysis years 2019 and 2023. For each of these analysis years, a total of eight inventories are described that represent different on-road mobile source traffic activity and emissions.

The HGB region comprises eight counties (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller). For each scenario-based EI, pollutants were estimated based on on-network and off-network traffic activity. On-network activity includes vehicle miles traveled on regional roadways. Off-network activity includes traffic activity such as vehicle starts, off-network idling (ONI), source hours parked, and long-haul truck hotelling. Vehicle refueling loss emissions also fall under the off-network category. In addition to estimating pollutant emissions, TTI also estimated the total energy consumption associated with these activity estimates.

The methods used to calculate the EIs are an extension of historically consistent traffic activity and emission rate methods developed by TTI. The HGB area is served by a Travel Demand Model (TDM) administered by the Houston-Galveston Area Council (H-GAC). As such, the EI calculations described in this document are based on an hourly, link-level analysis that uses the outputs of the regional TDM, other local data sources consistent with the region (e.g., seasonal, day type, and hourly travel factors; vehicle population data; and environmental inputs), and MOtor Vehicle Emissions Simulator (MOVES) default inputs. This report details all the data sources used to define each EI developed for this project.

At the request of TCEQ, the EIs were developed using the latest version of the EPA's on-road EI software – MOVES3. MOVES3 was released in November 2020 (and updated in March 2021) and replaced the MOVES2014b version of the software. The EI methods described in this document have been developed to incorporate the latest information on on-road mobile source emissions and methods outlined in the associated EPA guidance for conducting MOVES3 based EIs.

In addition to calculating EIs for the 16 aforementioned emissions scenarios (i.e., eight per analysis year), this project involves the development of electronic deliverables that were post-processed from each EI into formats suitable for downstream air quality planning. These outputs include the following.

- Tabular summaries of activity and emissions by county.
- Detailed link-level summaries (with geographical coordinates) of emissions by county and for each hour of the day.
- Input data for populating County Input Databases (CDBs) for all scenarios, suitable for MOVES3 inventory mode analyses, to include a populated set of summer weekday CDBs and the associated MOVES run specification files.

1.2 Summary of Modeling Methodology

Each EI was calculated using a detailed MOVES rates-per-activity method based on the HGB regional TDM. This approach calculates on-network emissions at the scale of each link defined by the regional TDM outputs. The methods are consistent with EPA guidance on the production of photochemical modeling EIs.

The TTI rates-activity estimation methods were performed in four basic steps, simplified below.

1. **Calculate Emission Rates:** MOVES3 was used to estimate regional, county-level emission rates (or factors) relevant to the analysis area. The rates were calculated based on local inputs to MOVES such as temperature and humidity, fuel formulations, etc.
2. **Estimate Traffic Activity:** The local TDM (designated for each analysis year) was processed to derive 24 hourly vehicle miles traveled (VMT) and speed estimates for all TDM links as well as for added intrazonal links. Further processing was used to convert VMT based on Highway Performance Monitoring System (HPMS) factors and seasonal and daily adjustment factors. Local automatic traffic recorder (ATR) traffic count data was used to process the TDM. After the on-network activity was estimated, off-network activity was calculated using outputs from the processed travel model, vehicle population data, and MOVES default inputs. The traffic activity was processed to replicate operating conditions described by each EI scenario.
3. **Calculate Total Emissions:** The emission rates calculated in Step 1 were multiplied by the on- and off-network activity calculated in Step 2. This yielded emissions estimates in units of mass calculated at a spatial scale of each link (on-network) or county (off-network) for each hour of the day.
4. **Postprocess EI Outputs:** Outputs (for each pollutant) were post-processed into a variety of formats and electronic deliverables for reporting purposes and for downstream air quality planning.

Subsequent sections of this report describe these simplified steps in more detail.

1.3 Emissions Inventory Scope

TTI developed the scope of the inventories in consultation with the TCEQ Project Manager. The following is a simplified view of the scope (entities modeled and data inputs) agreed upon with the TCEQ sponsor.

Emissions Inventory Scenarios:

Emissions inventories were developed to model the following emissions scenarios.

- Analysis years 2019 and 2023.
- For each analysis year, the following seasonal activity scenarios were modeled.
    - School period (typical of the period April 15th through May 15th and September 15th through October 15th).
    - Summer period (typical of the period June 10th through August 10th, excluding July 4th).
- For each seasonal activity scenario, the following day types were modeled.
    - Weekday (average Monday through Thursday).
    - Friday.
    - Saturday.
    - Sunday.

These EIs were estimated by combining traffic activity estimated for the 16 scenarios (eight per analysis year) listed above, with four emission rate scenarios (two weekday and two weekend day per analysis year) representative of peak ozone season (June through August) environmental conditions. The final 16 EI scenarios were calculated by multiplying the activity rate scenarios by the corresponding emission rate scenarios.

Source Use Types, Activity, and Pollutant Processes:

- *Source use type (SUT) and fuel types* (the various combinations of these are referred to as *vehicle types*) modeled: See Table 22.
- *Traffic activity modeled*: VMT, vehicle starts, hotelling hours (classified by auxiliary power unit [APU], engine on, engine off), source hours parked, off-network idling.
- *Vehicle-based emissions processes modeled*: running exhaust; crankcase running exhaust; start exhaust; crankcase start exhaust; extended idle exhaust; crankcase extended idle exhaust; auxiliary power exhaust; evaporative permeation; evaporative fuel vapor venting; evaporative liquid leaks; brakewear; tirewear.
- Refueling emissions processes modeled: displaced vapor loss; spillage loss.

Table 22. MOVES SUT/Fuel Types (Vehicle Types).

SUT ID	SUT Description	SUT Abbreviation[1]	Fuel Types
11	Motorcycle	MC	Gasoline
21	Passenger Car	PC	Gasoline, Diesel
31	Passenger Truck	PT	Gasoline, Diesel
32	Light Commercial Truck	LCT	Gasoline, Diesel
41	Other Buses	OBus	Gasoline, Diesel
42	Transit Bus	TBus	Gasoline, Diesel
43	School Bus	SBus	Gasoline, Diesel
51	Refuse Truck	RT	Gasoline, Diesel
52	Single Unit Short-Haul Truck	SUShT	Gasoline, Diesel
53	Single Unit Long-Haul Truck	SULhT	Gasoline, Diesel
54	Motor Home	MH	Gasoline, Diesel
61	Combination Short-Haul Truck	CShT	Gasoline, Diesel
62	Combination Long-Haul Truck	CLhT	Diesel

[1] The SUT/fuel type, or vehicle type, labels are the combined SUT abbreviation and fuel type names separated by an underscore (e.g., MC_Gas, RT_Diesel, and SBus_Gas are motorcycles, diesel-powered refuse trucks, and gasoline-powered school buses, respectively).

Pollutants (and Energy) Modeled:

- CO; oxides of nitrogen (NO_X); methane (CH_4); ammonia (NH_3); sulfur dioxide (SO_2); nitrogen oxide (NO); nitrogen dioxide (NO_2); nitrous acid (HONO); nitrate (NO_3); ammonium (NH_4); chloride (Cl); sodium (Na); potassium (K); magnesium (Mg); calcium (Ca); titanium (Ti); silicon (Si); aluminum (Al); iron (Fe); volatile organic compounds (VOC); atmospheric (CO_2); total energy consumption (TEC); primary exhaust particulate matter of 10 micron threshold level (PM_{10}) – total; primary PM_{10} – brakewear particulate; primary PM_{10} – tirewear particulate; primary exhaust particulate matter of 2.5 micron threshold level ($PM_{2.5}$) – total; organic carbon (OC); elemental carbon (EC); sulfate particulate (SO_4); primary $PM_{2.5}$ – brakewear particulate; primary $PM_{2.5}$ – tirewear particulate; aerosol H_2O (H_2O); and non-carbon organic matter (NCOM).

Emission Rate (MOVES) Input Data and Adjustments:

- *Emission rates:* EPA's latest Mobile Source Emission Rate Model – MOVES3.0.1 (herein abbreviated to MOVES). The latest version of the model was released in March 2021 – its installation suite was downloaded from the following link: https://www.epa.gov/moves/latest-versionmotor-vehicle-emission-simulator-moves.
- Local environmental inputs for MOVES emission rates: Provided by TCEQ.
- Local fuel formulation input data:

  - Consistent with TCEQ 2020 Summer Fuel Field Study conducted by Eastern Research Group (ERG) available at https://www.tceq.texas.gov/airquality/airmod/project/pj_report_mob.html.
  - MOVES individual summer reformulated gasoline (RFG) fuel parameters and/or survey data for Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties in the HGB area.
  - Since the quantity of fuel pumped by county is not reported on a seasonal, daily, or hourly basis, TTI used the ATR data referenced previously and assumed that the temporal distribution of fuel pumped coincided with VMT. It was not possible to distinguish between the VMT temporal distribution of gasoline versus diesel vehicles; TTI used the same temporal allocation of refueling emissions estimates for gasoline and diesel fuel.

- *Inspection and maintenance (I/M) program information*: Modeled the I/M program currently in place for Brazoria, Fort Bend, Galveston, Harris, and Montgomery Counties, consistent with Sections 114.50-114.87 of TCEQ rules.
- *Refueling controls*: Since Stage II refueling controls no longer apply, all eight HGB counties were modeled without Stage II refueling controls for both analysis years.
- *Federal motor vehicle control programs*: The effects of all the federal motor vehicle control programs that are included as default inputs in MOVES were modeled.
- *Texas Low Emission Diesel*: For all eight HGB area counties that are subject to the Texas Low Emission Diesel (TxLED) program, post-processed the diesel vehicle NO, NO_2, HONO, and NO_X emission factors consistent with Sections 114.312-114.319 of the TCEQ rules. NO, NO_2, HONO, and NO_X adjustment factors were provided by the TCEQ using a reduction of 4.8 percent for 2002-and-newer model year vehicles, and 6.2 percent for 2001-and-older model year vehicles.

Traffic Activity Input Data:

- *Traffic activity:* The validated H-GAC TDMs appropriate for the analysis years 2019 and 2023 were used. TDM output was available for 2020 and 2023, so 2020 was scaled using 2019 historical year county VMT control totals.
- *Traffic patterns:* TxDOT traffic count data from the area (multiple years through latest available 2019) was used to derive seasonal, day type, and hour of day traffic patterns.
- HPMS adjustment factors: HPMS data.
- Historical year county VMT control totals: HPMS data.
- *Base hotelling hours data*: TTI's 2017 hotelling study.[2]

[2] Heavy-Duty Vehicle Idle Activity Study Final Report, prepared by TTI for TCEQ, July 2019.

- *Hotelling mode distributions*: MOVES default.
- *Vehicle starts:* Number of starts per vehicle from MOVES (based on a combination of MOVES default and local data) and local vehicle type population estimates.
- *Vehicle population data*: End of year 2018 vehicle registrations and age class data classified by source use and fuel type provided by Texas Department of Motor Vehicles (TxDMV).
- Local fleet mix data:
    - TxDOT traffic classification data.
    - TxDMV vehicle registrations data.

Emissions Inventory Outputs:

The following output files were produced by county in formats consistent with the most recent on-road EIs submitted by TTI to the TCEQ for photochemical modeling.

- On-road files by season, day type, and hour that summarize TDM link-level on-network emissions outputs coded with A and B link nodes, link roadway classification, MOVES road type, vehicle type, pollutant, and process, with off-network emissions at county level (fixed format).
- Refueling loss files by season, day type, and hour, that summarize VOC emissions by vehicle type and refueling loss process, reported at the county level for the off-network category (fixed format).
- On-road files by season and day type that summarize emissions (by pollutant and process) and activity (by type) by roadway functional classification (including the off-network category), vehicle type, hour of day, and 24-hour day (tab-delimited).
- On-road files by season and day type that summarize TEC and activity (by type), by roadway functional classification (including the off-network category), vehicle type, hour of day, and 24-hour day (tab-delimited).
- Refueling loss files by season and day type that summarize VOC refueling loss emissions by vehicle type, refueling process, hour of day, and 24-hour day (tab-delimited).
- Local county input data files (tab-delimited) for populating CDBs for all scenarios, suitable for MOVES3 inventory mode analyses, to also include a ready-to-run fully populated set of summer weekday scenario CDBs and the associated MOVES run specification files.
- Output files that summarize the number of registered vehicles used to estimate vehicle populations for each year (tab-delimited files).

- On-road files by season and day type that summarize VMT by hour, road type, and area type; and similar files of vehicle hours traveled (VHT) by hour, road type, area type, and average speed bin (tab-delimited).

1.4 Report Structure

The remainder of this report provides a detailed description of the methods used to estimate the EI scenarios outlined in the summarized scope. The subsequent sections broadly follow the simplified analysis steps reported in Section 1.2.

- Section 2 details the data and calculations used to calculate regional on-network and off-network traffic activity.
- Section 3 details the calculation of emission rates via MOVES and subsequent rates modifications.
- Section 4 details the methods used to calculate regional emissions.
- Sections 5 and 6 detail the methods used to process the final EI outputs into formats and files suitable for downstream air quality planning.
- The references list and the appendices complete the report.

2.0 ESTIMATING TRAFFIC ACTIVITY

On-network and off-network activity are required to estimate mobile source emissions. TTI uses a method that calculates on-network emissions using VMT by hour and direction for each link in a TDM. Off-network emissions are calculated using county-level, hourly estimates of activity, including ONI hours, source hours parked (SHP), starts, source hours extended idling (SHEI), and APU hours. Both on- and off-network activity (and emissions) are divided into the various vehicle type components. This section describes the methods used to develop on- and off-network activity.

2.1 VEHICLE MILES OF TRAVEL

The hourly, link-based emissions process requires VMT estimates by hour and direction for each link in the TDM. VMT is adjusted for HPMS consistency and to reflect estimated traffic activity patterns characteristic of a typical seasonal day type scenario (i.e., 2019 and 2023 summer Weekday, Friday, Saturday, Sunday, and 2019 and 2023 school Weekday, Friday, Saturday, Sunday). Operation (congested) link speeds estimates corresponding to these traffic conditions are also required. All calculations were conducted using a suite of EI utilities developed by TTI (see Appendix A).

2.1.1 Data Sources

Directional link VMT and speeds were calculated using the latest available link data, trips data, and zonal radii data sets extracted from the HGB 2020 and 2023 TDMs. Since intrazonal VMT are not accounted for in the TDMs, the intrazonal VMT was estimated using the TDM trip matrix and zonal radii data.

Several other data sources were used to adjust the VMT for HPMS consistency and to estimate the season and day type-specific VMT. HPMS VMT estimates[3] were used to adjust the total TDM-based VMT.

Seasonal and day type scenario factors derived from local ATR data were used to translate the traffic activity scenario represented by the TDM to those defined for each emissions scenario. These seasonal and day type factors were estimated using ATR data collected from 2010 through 2019. Depending on the application, the data were either

[3] HPMS VMT estimates are based on traffic count data collected according to a statistical sampling procedure specified by the Federal Highway Administration (FHWA). The EPA and FHWA have endorsed HPMS as the appropriate source of VMT and require that VMT used to construct on-road mobile source emissions estimates be consistent with that reported through HPMS.

combined from the ATR stations within the eight-county region for use with all counties, or from within the TxDOT Beaumont District for use with Chambers and Liberty counties, and from within the TxDOT Houston District for use with Harris, Galveston, Fort Bend, Brazoria, Montgomery, and Waller counties.

2.1.2 VMT Adjustments

The following sections describe the steps TTI used to transform TDM-based VMT estimates for each specified analysis year to the activity scenario hourly VMT estimates required for emissions analysis.

The TDM VMT was adjusted for HPMS consistency and to represent the activity scenario period and day type. For 2019, which by definition is a historical year (i.e., HPMS VMT data exists for the year), county-level VMT control totals were used to develop VMT adjustment factors. For 2023, which is a future year (i.e., HPMS VMT data does not exist for the year), a regional HPMS factor and period day type factors were used. Hourly travel factors were also applied to distribute the 2019 and 2023 link VMT estimates over each hour of each day.

2.1.2.1 Historical Year Activity Scenario – VMT Control Totals and VMT Adjustments

To estimate the HPMS-consistent link VMT for the 2019 historical year activity scenarios, county-level 2019 activity scenario VMT control totals were used to develop county-level VMT adjustment factors. The VMT control totals are comprised of two key components: the analysis year county-level HPMS annual average daily traffic (AADT) VMT acquired from TxDOT and the AADT-to-seasonal day type activity scenario adjustment factors.

The AADT-to-activity scenario adjustment factors were developed for each county using aggregated TxDOT ATR data for the years 2010 through 2019. The HGB area spans two TxDOT districts, so two sets of adjustment factors were developed. One set of factors was developed for Liberty and Chambers counties (which are located in the Beaumont TxDOT District), and one set of factors was developed for Harris, Galveston, Fort Bend, Brazoria, Waller, and Montgomery counties (which are located in the Houston TxDOT District). These factors were calculated by dividing the activity scenario average day-of-week count by the AADT traffic count. Table 23 shows both TxDOT district AADT-to-activity scenario factors used in developing 2019 VMT control totals.

Table 23. HGB AADT-to-Activity Scenario Adjustment Factors.

TxDOT District	School Weekday	School Friday	School Saturday	School Sunday	Summer Weekday	Summer Friday	Summer Saturday	Summer Sunday
Beaumont[1]	1.00610	1.15720	0.92852	0.82971	1.00144	1.15743	0.93978	0.85547
Houston[2]	1.06845	1.15145	0.95335	0.79061	1.06621	1.14160	0.93421	0.77933

[1] Only used for Liberty and Chambers counties.
[2] Only used for Harris, Galveston, Fort Bend, Brazoria, Montgomery, and Waller counties.

The VMT control totals were calculated by multiplying the analysis year HPMS AADT VMT for each county by the activity scenario adjustment factors. To develop the county-level VMT adjustment factors, the county's control totals were then divided by the county total model VMT (TDM assignment VMT plus intrazonal VMT estimate) from the TDM designated for the analysis year. For each link in the TDM, the volume was multiplied by the corresponding VMT adjustment factor (based on the county where the link was located). The adjusted link volumes were then multiplied by the associated link lengths to produce the analysis year link-level HPMS consistent, activity scenario VMT estimates. This same adjustment was applied to the intrazonal VMT.

2.1.2.2 Future Year Activity Scenarios – HPMS Adjustment Factor

For future year activity scenarios, an HPMS adjustment factor was used to adjust the total model VMT (TDM assignment VMT plus intrazonal VMT estimate) from the TDM for HPMS consistency. While TTI typically calculates this factor, the HPMS factor used in this analysis (0.938371) was provided directly by H-GAC.

2.1.2.3 Future Year Activity Scenarios – Period Day Type Adjustment Factors

Seasonal adjustment factors were used to adjust the total model VMT for each season and day type. These adjustment factors were developed using aggregated ATR data for the years 2010 through 2019. One set of adjustment factors by season and day type was developed for the eight counties in the HGB region. These factors were calculated using local ATR data by dividing the average day-of-week traffic volumes by the average non-summer weekday (ANSWT) traffic volumes. Table 24 shows the seasonal adjustment factors.

Table 24. HGB ANSWT-to-Activity Scenario Adjustment Factors.

TDM Region	School Weekday	School Friday	School Saturday	School Sunday	Summer Weekday	Summer Friday	Summer Saturday	Summer Sunday
HGB eight TDM counties	1.00943	1.08954	0.90350	0.74840	1.00799	1.07763	0.88208	0.73819

2.1.3 Activity Scenario VMT Summaries

For each activity scenario, the final HPMS-consistent, VMT is comprised of two parts: the link-level VMT and the estimated intrazonal VMT. For the 2019 historical year, the volume for each link was multiplied by the county VMT control total-based VMT factor corresponding to the link's county code and by the link's respective length to estimate the link-level VMT. For the 2023 future year, the volume on each link was multiplied by the HPMS factor, the seasonal day type adjustment factor, and the link's respective length to estimate the link-level VMT. For Saturday and Sunday day types, weekend day profile factors were also applied for the temporal reallocation of volumes and VMT from the standard four-period ANSWT pattern to weekend day traffic patterns, and hourly factors for all activity scenarios were applied to distribute the resulting VMT over each hour of the day (discussed in a later section). These sets of factors were also applied to the associated intrazonal VMT estimates. Table 25, Table 26, Table 27, and Table 28 show the resulting activity scenario VMT summaries.[4]

Table 25. HGB 2019 School VMT Summary.

County	Weekday	Friday	Saturday	Sunday
Brazoria	9,211,801	9,927,424	8,219,478	6,816,418
Chambers	3,097,940	3,563,211	2,859,040	2,554,784
Fort Bend	14,247,567	15,354,416	12,712,832	10,542,731
Galveston	7,442,609	8,020,812	6,640,917	5,507,289
Harris	125,757,025	135,527,159	112,211,164	93,056,097
Liberty	2,539,286	2,920,653	2,343,463	2,094,082
Montgomery	16,015,378	17,259,569	14,290,195	11,850,833
Waller	2,644,139	2,849,546	2,359,285	1,956,565

[4] Small but insignificant differences may be noticed between control total VMT and post-processed VMT due to rounding in the process calculations (e.g., up to 0.001%).

Table 26. HGB 2019 Summer VMT Summary.

County	Weekday	Friday	Saturday	Sunday
Brazoria	9,192,450	9,842,483	8,054,415	6,719,173
Chambers	3,083,588	3,563,931	2,893,713	2,634,106
Fort Bend	14,217,637	15,223,040	12,457,532	10,392,325
Galveston	7,426,974	7,952,184	6,507,554	5,428,722
Harris	125,492,839	134,367,563	109,957,732	91,728,539
Liberty	2,527,521	2,921,243	2,371,883	2,159,101
Montgomery	15,981,734	17,111,891	14,003,220	11,681,765
Waller	2,638,585	2,825,165	2,311,906	1,928,652

Table 27. HGB 2023 School VMT Summary.

County	Weekday	Friday	Saturday	Sunday
Brazoria	9,907,417	10,693,735	8,867,722	7,345,497
Chambers	3,450,825	3,724,633	3,088,691	2,558,433
Fort Bend	17,650,501	19,051,359	15,798,258	13,086,330
Galveston	7,748,531	8,363,512	6,935,411	5,744,875
Harris	135,410,378	146,157,313	121,200,378	100,394,451
Liberty	3,328,586	3,592,737	2,979,282	2,467,839
Montgomery	18,033,463	19,464,703	16,141,006	13,370,196
Waller	3,005,231	3,243,734	2,689,844	2,228,094

Table 28. HGB 2023 Summer VMT Summary.

County	Weekday	Friday	Saturday	Sunday
Brazoria	9,893,290	10,576,836	8,657,499	7,245,308
Chambers	3,445,905	3,683,917	3,015,469	2,523,538
Fort Bend	17,625,332	18,843,097	15,423,735	12,907,839
Galveston	7,737,483	8,272,085	6,770,996	5,666,518
Harris	135,217,314	144,559,585	118,327,132	99,025,134
Liberty	3,323,840	3,553,463	2,908,654	2,434,180
Montgomery	18,007,750	19,251,924	15,758,358	13,187,834
Waller	3,000,946	3,208,275	2,626,077	2,197,704

2.1.4 VMT Temporal Allocation Factors

In addition to the various VMT adjustment factors applied as previously described, weekend day re-allocations and hourly distributions were needed. For weekend day analyses, the TDM total VMT and volumes by the four time periods were reallocated to replicate weekend day traffic profiles. Further, hourly distributions were applied for all

activity scenarios to allocate TDM time period total VMT and volumes to each hour of the day.

2.1.4.1 Weekend Day Profile Factors

Weekend day profile factors were used to reallocate the 2019 and 2023 TDM assignment and intrazonal VMT and volumes from the standard ANSWT four time period "weekday" proportions into four time period weekend day proportions. The weekend day profile factors by assignment period were developed for each inventory scenario weekend day type (i.e., school Saturday, school Sunday, summer Saturday, and summer Sunday) by county. These factors were not used for the Weekday and Friday inventory day types.

The weekend day profile factors were calculated using the county-level TDM total ANSWT VMT (assignment plus intrazonal) and the ATR-based Saturday and Sunday hourly travel factors (see the base factors in Table 31 and Table 32 in the Hourly Travel Factors section that follows). For each weekend day, the associated hourly travel factors were first aggregated by the four TDM time periods to produce four weekend day factors that sum to 1.0. These four travel factors were then multiplied by the county-level 24-hour total ANSWT VMT to produce the weekend day VMT by the four time periods for each county. For each time period, this weekend day time period VMT was then divided by the original county-level time period TDM total ANSWT VMT to produce the weekend day profile factors. The weekend day profile factors based on the 2020 TDM are shown in Table 29 and based on the 2023 TDM are shown in Table 30.

Table 29. Weekend Day Profile Factors for 2020 TDM

Time Period	County	School Saturday	School Sunday	Summer Saturday	Summer Sunday
AM Peak	Harris	0.60189093	0.39599494	0.58772439	0.39319834
AM Peak	Brazoria	0.63034424	0.41471489	0.61550801	0.41178609
AM Peak	Fort Bend	0.59342510	0.39042512	0.57945782	0.38766786
AM Peak	Waller	0.60708749	0.39941385	0.59279864	0.39659311
AM Peak	Montgomery	0.60688345	0.39927961	0.59259941	0.39645982
AM Peak	Liberty	0.63172909	0.41562600	0.61686026	0.41269077
AM Peak	Chambers	0.66451197	0.43719445	0.64887153	0.43410690
AM Peak	Galveston	0.64987207	0.42756260	0.63457621	0.42454307
Mid-Day	Harris	1.09979585	1.13817641	1.08205377	1.12549716
Mid-Day	Brazoria	1.07045322	1.10780978	1.05318449	1.09546882
Mid-Day	Fort Bend	1.11956297	1.15863336	1.10150200	1.14572622
Mid-Day	Waller	1.04009317	1.07639023	1.02331421	1.06439927
Mid-Day	Montgomery	1.10418899	1.14272286	1.08637604	1.12999297
Mid-Day	Liberty	1.06309552	1.10019532	1.04594549	1.08793917
Mid-Day	Chambers	1.04954179	1.08616860	1.03261041	1.07406871
Mid-Day	Galveston	1.04884003	1.08544233	1.03191997	1.07335054
PM Peak	Harris	0.79793512	0.87724585	0.79002446	0.85618487
PM Peak	Brazoria	0.81393128	0.89483195	0.80586203	0.87334875
PM Peak	Fort Bend	0.77702941	0.85426222	0.76932601	0.83375303
PM Peak	Waller	0.84780973	0.93207774	0.83940462	0.90970035
PM Peak	Montgomery	0.80407272	0.88399350	0.79610121	0.86277051
PM Peak	Liberty	0.84914161	0.93354201	0.84072330	0.91112947
PM Peak	Chambers	0.89707317	0.98623772	0.88817966	0.96256005
PM Peak	Galveston	0.81000753	0.89051820	0.80197719	0.86913857
Overnight	Harris	1.59010802	1.59490278	1.65125145	1.65816465
Overnight	Brazoria	1.54112909	1.54577617	1.60038917	1.60708942
Overnight	Fort Bend	1.63957270	1.64451662	1.70261817	1.70974642
Overnight	Waller	1.57742154	1.58217806	1.63807715	1.64493520
Overnight	Montgomery	1.54480842	1.54946659	1.60420999	1.61092623
Overnight	Liberty	1.45512565	1.45951340	1.51107869	1.51740504
Overnight	Chambers	1.31840364	1.32237912	1.36909940	1.37483133
Overnight	Galveston	1.56707046	1.57179576	1.62732804	1.63414108

Table 30. Weekend Day Profile Factors for 2023 TDM

Time Period	County	School Saturday	School Sunday	Summer Saturday	Summer Sunday
AM Peak	Harris	0.60291563	0.39666911	0.58872496	0.39386774
AM Peak	Brazoria	0.63151223	0.41548333	0.61664849	0.41254909
AM Peak	Fort Bend	0.59224817	0.38965079	0.57830858	0.38689899
AM Peak	Waller	0.60454486	0.39774101	0.59031585	0.39493207
AM Peak	Montgomery	0.60648846	0.39901974	0.59221370	0.39620177
AM Peak	Liberty	0.63018771	0.41461191	0.61535515	0.41168382
AM Peak	Chambers	0.66678300	0.43868861	0.65108911	0.43559049
AM Peak	Galveston	0.65114597	0.42840072	0.63582011	0.42537526
Mid-Day	Harris	1.10159020	1.14003337	1.08381907	1.12733333
Mid-Day	Brazoria	1.07293138	1.11037443	1.05562259	1.09800479
Mid-Day	Fort Bend	1.12307469	1.16226763	1.10495696	1.14931990
Mid-Day	Waller	1.05176504	1.08846943	1.03479772	1.07634382
Mid-Day	Montgomery	1.10603776	1.14463614	1.08819488	1.13188483
Mid-Day	Liberty	1.06422811	1.10136743	1.04705972	1.08909813
Mid-Day	Chambers	1.05069089	1.08735779	1.03374088	1.07524456
Mid-Day	Galveston	1.04947264	1.08609703	1.03254229	1.07399784
PM Peak	Harris	0.79663575	0.87581732	0.78873791	0.85479057
PM Peak	Brazoria	0.81141804	0.89206890	0.80337365	0.87065198
PM Peak	Fort Bend	0.77418930	0.85113982	0.76651400	0.83070553
PM Peak	Waller	0.83174057	0.91441139	0.82349470	0.89245806
PM Peak	Montgomery	0.80201732	0.88173380	0.79406613	0.86056501
PM Peak	Liberty	0.84682674	0.93099704	0.83843131	0.90864553
PM Peak	Chambers	0.89503946	0.98400187	0.88616605	0.96037781
PM Peak	Galveston	0.80759359	0.88786433	0.79958712	0.86654835
Overnight	Harris	1.58714602	1.59193186	1.64817538	1.65507570
Overnight	Brazoria	1.53991678	1.54456020	1.59913007	1.60582505
Overnight	Fort Bend	1.64491432	1.64987435	1.70816501	1.71531648
Overnight	Waller	1.60131581	1.60614438	1.66289004	1.66985196
Overnight	Montgomery	1.54800626	1.55267408	1.60753061	1.61426076
Overnight	Liberty	1.46175843	1.46616619	1.51796637	1.52432154
Overnight	Chambers	1.31650192	1.32047166	1.36712440	1.37284806
Overnight	Galveston	1.57040519	1.57514055	1.63079083	1.63761837

2.1.4.2 Hourly Travel Factors

Hourly travel factors were used to distribute the TDM and intrazonal VMT to each hour of the day. These hourly travel factors were developed using multi-year (2010 through 2019) aggregated ATR station data for the eight-county HGB region. To maintain VMT proportions within each of the four assignment time periods, the hourly fractions were normalized within each time period to produce the time period hourly travel factors. Each factor (i.e., 24, or one for each hour of the day) was then multiplied by the link

volume (in addition to the other VMT adjustment factors). These adjusted link volumes were then multiplied by their respective link lengths to estimate the link-level VMT for each inventory scenario. These factors were also multiplied by the estimated intrazonal VMT to produce the final hourly-adjusted VMT. Table 31 and Table 32 show the school and summer period hourly travel factors.

Table 31. 2019 and 2023 School Period Hourly Travel Factors.

Time Period	Hour ID[2]	Weekday Base Factor	Weekday Time Period Factor[1]	Friday Base Factor	Friday Time Period Factor[1]	Saturday Base Factor	Saturday Time Period Factor[1]	Sunday Base Factor	Sunday Time Period Factor[1]
AM Peak	7	0.066343	0.33963	0.05817	0.328908	0.029923	0.268404	0.018695	0.254881
AM Peak	8	0.069848	0.357573	0.063652	0.359904	0.03672	0.329372	0.023267	0.317214
AM Peak	9	0.059148	0.302797	0.055036	0.311188	0.044842	0.402224	0.031386	0.427905
Mid-Day	10	0.052483	0.165278	0.049988	0.155317	0.050803	0.142609	0.043799	0.118801
Mid-Day	11	0.050108	0.157799	0.050081	0.155605	0.055631	0.156161	0.055823	0.151416
Mid-Day	12	0.051353	0.16172	0.052642	0.163563	0.059771	0.167782	0.060729	0.164723
Mid-Day	13	0.052876	0.166516	0.054703	0.169966	0.062906	0.176583	0.067367	0.182728
Mid-Day	14	0.053696	0.169098	0.055649	0.172906	0.063332	0.177779	0.070907	0.192329
Mid-Day	15	0.057027	0.179589	0.058783	0.182643	0.063798	0.179086	0.070049	0.190003
PM Peak	16	0.063637	0.24034	0.063157	0.24908	0.064159	0.25658	0.070665	0.257051
PM Peak	17	0.06919	0.261312	0.065377	0.257835	0.063458	0.253777	0.070709	0.257211
PM Peak	18	0.071965	0.271793	0.066194	0.261058	0.062905	0.251566	0.06893	0.250739
PM Peak	19	0.059987	0.226555	0.058833	0.232027	0.059532	0.238077	0.064603	0.234999
Overnight	20	0.046113	0.2074	0.04994	0.201587	0.052953	0.18763	0.057534	0.203249
Overnight	21	0.034763	0.156351	0.03938	0.15896	0.045075	0.159716	0.04791	0.169251
Overnight	22	0.028585	0.128565	0.034043	0.137417	0.041066	0.145511	0.038858	0.137273
Overnight	23	0.021057	0.094707	0.029333	0.118405	0.035778	0.126773	0.028871	0.101992
Overnight	24	0.013373	0.060147	0.021629	0.087307	0.028168	0.099809	0.018824	0.066499
Overnight	1	0.008047	0.036192	0.009068	0.036604	0.017531	0.062118	0.025019	0.088384
Overnight	2	0.005298	0.023828	0.0061	0.024623	0.01193	0.042272	0.017185	0.060709
Overnight	3	0.005011	0.022538	0.005973	0.02411	0.011286	0.03999	0.015709	0.055495
Overnight	4	0.005974	0.026869	0.006187	0.024974	0.008216	0.029112	0.010066	0.03556
Overnight	5	0.013587	0.061109	0.012124	0.048939	0.010345	0.036656	0.009444	0.033363
Overnight	6	0.040531	0.182294	0.033958	0.137074	0.019872	0.070413	0.013651	0.048225
24-Hour Total	n/a	1.000000	4.000000	1.000000	4.000000	1.000000	4.000000	1.000000	4.000000

[1] Used in the VMT calculation process.

[2] Hour ID 1 means the hour from 0:00 to 1:00, etc.

Table 32. 2019 and 2023 Summer Period Hourly Travel Factors.

Time Period	Hour ID[2]	Weekday Base Factor	Weekday Time Period Factor[1]	Friday Base Factor	Friday Time Period Factor[1]	Saturday Base Factor	Saturday Time Period Factor[1]	Sunday Base Factor	Sunday Time Period Factor[1]
AM Peak	7	0.063918	0.336641	0.055917	0.326277	0.03037	0.27898	0.018877	0.259193
AM Peak	8	0.067908	0.357655	0.0616	0.359437	0.035716	0.328088	0.023312	0.320088
AM Peak	9	0.058044	0.305704	0.053862	0.314286	0.042775	0.392932	0.030641	0.420719
Mid-Day	10	0.052158	0.163098	0.050088	0.154134	0.049272	0.140579	0.042604	0.116863
Mid-Day	11	0.050402	0.157607	0.050674	0.155937	0.054688	0.156031	0.053994	0.148106
Mid-Day	12	0.0519	0.162291	0.053361	0.164206	0.05872	0.167535	0.059346	0.162786
Mid-Day	13	0.053768	0.168132	0.05545	0.170634	0.06196	0.176779	0.067141	0.184168
Mid-Day	14	0.054417	0.170162	0.05632	0.173312	0.062587	0.178568	0.071104	0.195038
Mid-Day	15	0.057151	0.17871	0.059071	0.181777	0.063267	0.180508	0.070375	0.193039
PM Peak	16	0.062782	0.239853	0.062926	0.249732	0.063634	0.257031	0.069551	0.259221
PM Peak	17	0.067971	0.259677	0.064878	0.257479	0.062909	0.254103	0.068931	0.256911
PM Peak	18	0.071568	0.273419	0.066077	0.262237	0.06206	0.250674	0.067015	0.24977
PM Peak	19	0.059431	0.227051	0.058093	0.230552	0.05897	0.238192	0.06281	0.234098
Overnight	20	0.045488	0.199001	0.049215	0.195546	0.052069	0.177666	0.055483	0.188527
Overnight	21	0.034912	0.152733	0.039475	0.156844	0.045158	0.154085	0.047916	0.162814
Overnight	22	0.030423	0.133094	0.034869	0.138543	0.043328	0.147841	0.042375	0.143986
Overnight	23	0.023071	0.100931	0.030079	0.119511	0.038194	0.130323	0.03297	0.112029
Overnight	24	0.015037	0.065784	0.022906	0.091011	0.02976	0.101545	0.02181	0.074108
Overnight	1	0.009085	0.039745	0.010045	0.039911	0.018928	0.064585	0.025183	0.085569
Overnight	2	0.005973	0.026131	0.006726	0.026724	0.013001	0.044361	0.017915	0.060873
Overnight	3	0.005454	0.02386	0.006492	0.025794	0.012193	0.041604	0.016512	0.056106
Overnight	4	0.006191	0.027084	0.006466	0.025691	0.008853	0.030208	0.010539	0.035811
Overnight	5	0.013655	0.059738	0.012338	0.049022	0.011058	0.037731	0.009809	0.03333
Overnight	6	0.039293	0.171899	0.033072	0.131403	0.02053	0.070051	0.013787	0.046847
24-Hour Total	n/a	1.000000	4.000000	1.000000	4.000000	1.000000	4.000000	1.000000	4.000000

[1] Used in the VMT calculation process.

[2] Hour ID 1 means the hour from 0:00 to 1:00, etc.

2.1.5 Link Speeds

The operational speeds for each link, excluding centroid connectors and the special intrazonal links, were calculated using the Houston speed model. The Houston speed model calculates these speeds using the travel model speed, speed factors (consisting of a free-flow speed factor and level of service [LOS] E speed factor), and a volume-to-capacity (V/C) ratio-based speed reduction factor (SRF) associated with each link.

The speed factors were used to convert the link-level travel model (input) speed to a free-flow speed and an LOS E speed (i.e., application of these factors results in two speeds). The free-flow speed factors (grouped by functional class and area type) were calculated by dividing the distance-weighted free-flow speed by the distance-weighted

input speed for each functional class/area type combination. The distance-weighted free-flow speeds were calculated using output from the detailed speed model used by H-GAC in the travel model development process (as provided by H-GAC) with link volumes set to 0 (i.e., V/C = 0). The LOS E speed factors were calculated in a similar manner (distance-weighted LOS E speed divided by distance-weighted input speed) using the detailed speed model output with link volumes set equal to capacity (i.e., V/C = 1). Appendix E shows the speed factors and the network functional class and functional group relationship.

The link-specific V/C ratio is calculated as the time period (hourly) volume divided by the time period capacity. The V/C ratio is expressed as:

$$v/c\ ratio = Vh / Ch$$

Where:

- Vh = the hourly link volume (travel model × HPMS factor × seasonal adjustment factor × hourly time period factor; Weekend profile factor is included for Saturday and Sunday); and
- Ch = the hourly link capacity (travel model capacity × hourly capacity factor). Appendix E shows the hourly capacity factors.

After the V/C ratio was calculated, the link-specific SRF was determined using the V/C ratio, the link-specific SRF area type, the link-specific SRF functional class, and the SRFs. The SRFs are for V/C ratios of 0 to 1 in 0.05 increments (i.e., 0, 0.05, 0.10, … , 0.95, 1.0). Appendix E shows these SRFs. The link-specific SRF was calculated using linear interpolation. For V/C ratios greater than 1.0, an SRF is not required.

The speed model (for V/C ratios from 0.00 to 1.00) is expressed as:

$$S_{V/C} = S_{0.0} - SRF_{V/C} \times (S_{0.0} - S_{1.0})$$

Where:

- $S_{V/C}$ = estimated directional speed for the forecast V/C ratio on the link in the given direction;
- $S_{0.0}$ = estimated free-flow speed for the V/C ratio equal to 0.0;
- $S_{1.0}$ = estimated LOS E speed for the V/C ratio equal to 1.0; and
- $SRF_{V/C}$ = SRF for the V/C ratio on the link. The V/C ratio can be 0.0 to 1.0.

For V/C ratios greater than 1.0 and less than 1.5, the following speed model extension was used.

$$S_{V/C} = S_{1.0} \times (1.15/(1.0 + (0.15 \times (v/c)^4)))$$

Where:

$S_{v/c}$ = estimated directional speed for the forecast V/C ratio on the link in the given direction;
$S_{1.0}$ = estimated LOS E speed for the V/C ratio equal to 1.0; and
v/c = the forecast V/C ratio on the link. The V/C ratio can be 1.0 to 1.5.

For V/C ratios greater than 1.5, the speed was calculated using the previous speed model extension, except the V/C ratio was set to 1.5.

These speed models were applied to all functional classes, excluding the centroid connector and intrazonal functional classes. For these functional classes, capacity data were not used. The centroid connector travel model input speeds were used as the centroid connector operational speeds estimates. Operational speeds for the intrazonal functional class were estimated by zone as the average of the zone's centroid connector speeds.

The hourly and 24-hour speed (VMT/VHT) summaries by county and road type were provided electronically to TCEQ (see Appendix B for electronic data descriptions).

2.2 Off-Network Activity

Off-network activity includes ONI hours, SHP, starts, and long-haul combination truck hotelling hours (split into various fractions of activity, such as SHEI and diesel APU hours). These quantities are estimated for each hour of the day at a spatial scale of a county and for each vehicle type.

2.2.1 Vehicle Populations

Vehicle population data were used to estimate SHP and vehicle starts off-network activity. The vehicle population estimates were derived from end of year 2018, county-specific vehicle registration data provided by the TxDMV, TxDOT district level VMT mix data, and HPMS-reported county-level VMT totals.

A single set of vehicle population data inputs were used for each EI analysis year (i.e., the model assumes that vehicle populations remain constant across seasons and day types).

The end of year 2018 TxDMV vehicle registration data was provided in the form of total vehicles registered by county, aggregated by the vehicle categories shown in the first column of Table 33. These TxDMV vehicle categories were disaggregated to MOVES SUT

and fuel type aggregations shown in the corresponding row of the second column of Table 33. For clarity, it is useful to distinguish between the vehicle registration data (provided by TxDMV and aggregated according to the first column of Table 33) and vehicle population data comprising estimates of the number of vehicles in each vehicle type (MOVES SUT and fuel type) classification. As previously mentioned, in MOVES emissions analyses we use the term vehicle type as synonymous with MOVES SUT and fuel type combination.

The following steps were used to disaggregate the TxDMV vehicle registration data to vehicle population data by vehicle type.

1. VMT mix data was used to calculate the proportional representation of each MOVES vehicle type within each TxDMV aggregation class (first column of Table 33).
2. The proportional fractions calculated in Step 1 were multiplied by the total number of vehicles reported in each TxDMV vehicle registration category to obtain the estimated number of vehicles (populations) for each modeled MOVES vehicle type.
3. The long-haul truck vehicle type populations (see the last row of Table 33) were estimated as an extension of their estimated short-haul vehicle type population counterparts. This was accomplished by multiplying a long-haul-to-short-haul ratio derived from the weekday vehicle type VMT mix, by the associated short-haul truck vehicle type populations, from Step 2.

The VMT mix data used in these calculations was the TxDOT district-level, 24-hour weekday VMT mix described in more detail in the "Vehicle Type VMT Mix" section and included in Appendix D.

The methods above yielded 2018 vehicle population data for each of the vehicle types modeled in the EIs.

Analysis year vehicle type populations were then calculated by applying a vehicle types population growth factor (VPGF). The VPGF was calculated using county-level HPMS reported total VMT for the registration data year (2018) and each analysis year (2019 and 2023).

$$VPGF = Analysis\ Year\ VMT / Registration\ Year\ VMT$$

Table 33. TxDMV Registration Aggregations for Estimating Vehicle Populations.

Vehicle Registration[1] Aggregation	Associated Vehicle Type[2]
Motorcycles	MC_Gas
Passenger Cars (PC)	PC_Gas; PC_Diesel
Trucks ≤ 8.5 K GVWR (pounds)	PT_Gas; PT_Diesel; LCT_Gas; LCT_Diesel
Trucks > 8.5 and ≤ 19.5 K GVWR	RT_Gas; RT_Diesel SUShT_Gas; SUShT_Diesel MH_Gas; MH_Diesel OBus_Gas: OBus_Diesel TBus_Gas; TBus_Diesel SBus_Gas; SBus_Diesel
Trucks > 19.5 K GVWR	CShT_Gas; CShT_Diesel
NA[1]	SULhT_Gas; SULhT_Diesel CLhT_Gas; CLhT_Diesel

[1] The four long-haul SUT/fuel type populations are estimated using a long-haul-to-short-haul weekday SUT VMT mix ratio applied to the short-haul SUT population estimate.
[2] The year-end TxDMV county registrations data extracts were used (consisting of 1—light-duty cars, trucks, and motorcycles; 2—heavy-duty diesel trucks; and 3—heavy-duty gasoline trucks) for estimating the vehicle populations.

2.2.2 ONI Hours

Off-network idling, or ONI, is idling activity that occurs while a vehicle is idling in a parking lot, drive-through, driveway while waiting to pick up passengers or loading/unloading cargo. ONI applies to all MOVES source types.

TTI estimates ONI hours activity (i.e., source hours idling [SHI] off-network) for each hour of the day using the following formula.

$$ONI\ hours = (SHO_{network} \times TIF - SHI_{network}) / (1 - TIF).$$

Where:

- $SHO_{network}$ is the source hours operating on each link. This is calculated by dividing the VMT associated with each link by the link's congested speed.
- $SHI_{network}$ is the total source hours idling that occurs on the network (idling that occurs as a component of drive cycles) and is calculated by multiplying $SHO_{network}$ by a road idle fraction (RIF). RIF is the proportion of idling (in units of time) that occurs within a drive-cycle at a specified operational speed. Default values for RIF were used as defined in the MOVES data table "roadidlefraction".
- TIF is the total idle fraction or total idling time on and off-network divided by total SHO on and off-network: $TIF = (SHI_{network} + ONI) / (SHO_{network} + ONI)$.

Default values for TIF were used as defined in the MOVES data table "totalidlefraction".

TTI estimated the ONI hours by day type and by summer and school periods using a combination of MOVES factors that vary by MOVES day type and/or month (roadidlefraction and totalidlefraction) in combination with local activity factors for each activity scenario.

2.2.3 SHP

County-level vehicle type SHP was calculated for each hour of the day and each vehicle type as the difference between the local vehicle population (total available vehicle hours) minus source operating hours (SHO).

Adjusted SHP was then calculated by subtracting ONI hours from the previously calculated SHP. Appendix E summarizes county-level 24-hour SHP and adjusted SHP by vehicle type for each analysis year and activity scenario. Hourly summaries were provided electronically to TCEQ; see Appendix B for electronic data descriptions.

2.2.4 Vehicle Starts

Vehicle starts were estimated using county-level vehicle type populations, and data from MOVES representing the average number of vehicle starts per vehicle type per hour.

The starts per vehicle were calculated using MOVES with data on the age distribution and fuel fractions of the local fleet[5]. TTI used local age distributions and fuel fractions inputs to MOVES combined with MOVES default parameters (startsageadjustment, startsmonthadjust [June through August average], and startspervehicle) to produce hourly starts per vehicle output representative of the June through August summer period. The output was then post-processed to produce the scenario-specific starts per vehicle for the summer (or non-school) and school periods defined by the study scope.

MOVES was used to calculate starts per vehicle (i.e., the average number of starts per vehicle type per hour) for both weekday and weekend-day day types for the June through August summer period. To produce the scenario-specific non-school period (10 June through 10 August) and school period (15 April through 15 May and 15 September through 15 October) starts per vehicle estimates, the MOVES output summer period

[5] Previously with MOVES2014, TTI used MOVES default start per vehicle (which varied only by MOVES day type) in combination with local vehicle populations to estimate vehicle starts activity. In MOVES3, vehicle starts per hour also vary by county (because age distributions also vary by county).

starts per vehicle were multiplied by conversion factors based on period weighted average MOVES default startsmonthadjust data. Using the startsmonthadjust default data, the non-school conversion factor is the ratio of non-school-period-to-average June through August summer period. For the school period, the conversion factor is the ratio of school period-to-average June through August summer period.

For each hour of the day, the MOVES starts per vehicle data were multiplied by the local vehicle type population estimates to produce the total number of starts by vehicle type per hour.

2.2.5 Hotelling: SHEI and APU Hours

Hotelling hours were calculated for heavy-duty, long-haul trucks only (i.e., SUT 62[6]) in several steps. First total hotelling hours were calculated using information from a TCEQ extended idling study[7]. Scaling factors were then used to convert these base hotelling hours to those relevant to each scenario (defined by analysis year, season, and day type), which were then allocated to each hour of the day. Estimations were then made of the proportions of hotelling hours that occur in each of the four hotelling categories: idling using the main engine (SHEI), diesel APU operation, electric APU operation, or main engine off and no auxiliary power[8].

2.2.5.1 Estimating 24-Hour Hotelling

County-level hotelling scaling factors were developed to transform base 2017 winter weekday total daily hotelling hours to daily hotelling hours for each EI scenario. Scaling factors were calculated using the ratio of heavy-duty long haul VMT for each EI scenario relative to heavy-duty long haul VMT for a 2017 winter weekday (scenario SUT 62 VMT divided by 2017 winter weekday SUT 62 VMT).

Total daily hotelling for each county and EI scenario was calculated by multiplying the appropriate scaling factor by the total daily hotelling hours contained in the 2017 winter weekday total daily hotelling hours study.

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[6] SUT 62 represents long-haul combination trucks, for which only diesel fuel types are modeled.

[7] *Heavy-Duty Vehicle Idle Activity Study, Final Report*. Texas A&M Transportation Institute, Environment and Air Quality Division. July 2019. https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/mob/582177430806-20190722-TTI-HeavyDutyIdleActivityStudyFinal.pdf

[8] Note that only SHEI and APU diesel hoteling generate emissions. The other fractions are calculated for completeness.

2.2.5.2 Hotelling by Hour Estimation

Daily hotelling hours were allocated to each hour of the day as a function of the inverse of activity scenario hourly VHT fractions for SUT 62. The hourly VHT fractions were calculated using the hourly VHT from the SHP estimation process (VHT = SHO). The inverses of these hourly VHT fractions were calculated and then normalized across all hours to produce the county-level, hotelling hours hourly distribution.

If the hourly hotelling hours (as calculated above) were greater than SHP (for SUT 62), the final hotelling hours estimate was set to the SHP.

2.2.5.3 SHEI and APU Hours

The hourly, county-level, hotelling estimates were then factored to calculate SHEI and diesel APU hours activity components using extended idle and APU fractions. The SHEI and APU fractions were derived using MOVES default SUT 62 hotelling operating mode distributions by model year. The MOVES SHEI and APU hotelling distributions[9] are shown in Table 34. Note that only SHEI and diesel APU are used to calculate emissions.

Table 34. Hotelling Activity Distributions by Model Year.

First Model Year	Last Model Year	200 Extended Idling	201 Hotelling Diesel Aux	203 Hotelling Battery AC	204 Hotelling APU Off
1960	2009	0.80	0	0	0.20
2010	2020	0.73	0.07	0	0.20
2021	2023	0.48	0.24	0.08	0.20
2024	2026	0.40	0.32	0.08	0.20
2027	2050	0.36	0.32	0.12	0.20

2.3 Vehicle Type VMT Mix

VMT mix represents the fraction of on-road fleet VMT attributable to each SUT by fuel type. It is used to subdivide the total VMT estimates on each link into VMT by vehicle type. Hourly VMT estimates by vehicle type are combined with the appropriate emission factors in the link-emissions calculations.

VMT mixes were calculated and applied at the following scales.

- Each TxDOT District.

[9] Current MOVES3 defaults (previously adopted while in draft stage for use in the TCEQ 2017 truck extended idling study).

- Each analysis year (EI analysis years plus 2017 base for hotelling calculations).
- Each MOVES roadway type.
- Day Type (Weekday, Friday, Saturday, and Sunday).
- Four time periods per day AM peak, midday, PM peak, and overnight.

VMT mixes were calculated using local vehicle classification count and ATR data, MOVES defaults, and local registration data. Figure 1 shows a simplified view of the method used to estimate VMT mix[10], which includes the following steps (numbered in Figure 1).

1. MOVES – Data files of MOVES default values extracted from MOVES databases or pro forma runs.
2. TxDOT Classification Counts – Data files of standard TxDOT classification data assembled and used for determining the in-use road fleet mix.
3. TxDMV Registration Data – Data files of standard TxDMV vehicle registration summary data assembled and used for determining the in-use road fleet mix.
4. TxDOT ATR Data – Data files of TxDOT ATR data assembled and used to allocate VMT by season and day of week.
5. Single Unit Local vs. Total SUT_HDVyy – Procedure based on registration data to generate factors to separate Single Unit versus Combined Unit trucks by region. (SUT_HDVyy has multiple outputs based on vehicle category and fuel.)
6. Combination Local vs. Total SUT_HDXyy – Procedure based on registration data to generate short-haul and long-haul combination truck proportions by region. This step is not used in the updated procedure for MOVES3.
7. Day of Week (DOW) Factors by Urban Area/TxDOT District – Seasonal day-of-week factors from TxDOT ATR data used to allocate VMT by season and day-of-week by urban area/TxDOT district.
8. Single Unit Short-Haul vs. Long-Haul SUT_SSHZ – Procedure to separate single unit short-haul versus single unit long-haul using factors generated at SUT_HDVyy and classification count data. Short-haul and long-haul are functionally defined as local and pass-through.

[10] *Developing MOVES Source Use Types and VMT Mix for Conformity Analysis* (TxDOT Air Quality / Conformity IAC-A - TTI Task 409252-0643: Maintain, Update and Enhance Traffic Activity Estimation and Forecasting Methods), Texas Department of Transportation, Austin, TX, August 2016.

9. Combination Short-Haul vs. Long-Haul SUT_CSHZ – Procedure to separate combined short-haul versus combined long-haul using factors generated at SUT_HDXyy and classification count data. Short-haul and long-haul are functionally defined as local and pass-through. This step is not used in the updated procedure for MOVES3.
10. PV and LDT Fuel MF_Fuelyy – Procedure to generate passenger vehicle and light truck fuel allocation by year based on MOVES national default values and local registration data.
11. Single Unit and Combination Truck Fuel SUT_HDVyy – Procedure to generate single unit and combined truck fuel allocation factors from registration data. (SUT_HDVyy has multiple outputs based on vehicle category and fuel.)
12. SUT_yyddtt – Procedure to generate SUT proportions by year, day type, and time period, based on the previous steps.
13. MOVES SUTs – Output file of MOVES SUTs by region, analysis year, day type, and time period. For MOVES3, P_ICB41D is renamed P_OB41D (per the redefined MOVES3 category equivalent to the previous MOVES2014 category), and P_OB41G is added and set to zero (since we have no data to support the proportion of the "Other Buses" category that is gasoline fueled).[11]

[11] Specifically, the intercity bus category (ICB41) is redefined and renamed "Other Buses" (OB41). Intercity bus was previously considered diesel only. While there is currently no data available to determine the proportion, or even existence of gas fueled "Other Buses" vehicles, the category is necessary to be consistent with MOVES3. Pending additional data, "Other Buses" (OB41) is treated as equivalent to "Intercity Bus" (ICB41) and a placeholder "null" gasoline fueled "Other Buses" (OB41G) is added. The rest of the procedure is identical to the current VMT mix procedure. Thus, these measures and procedures, as modified, provide a functional, hybrid region-specific, disaggregate link-level application of MOVES3 to the extent possible with the data currently available. This hybrid is consistent with previous applications in terms of activity inputs and fleet data.

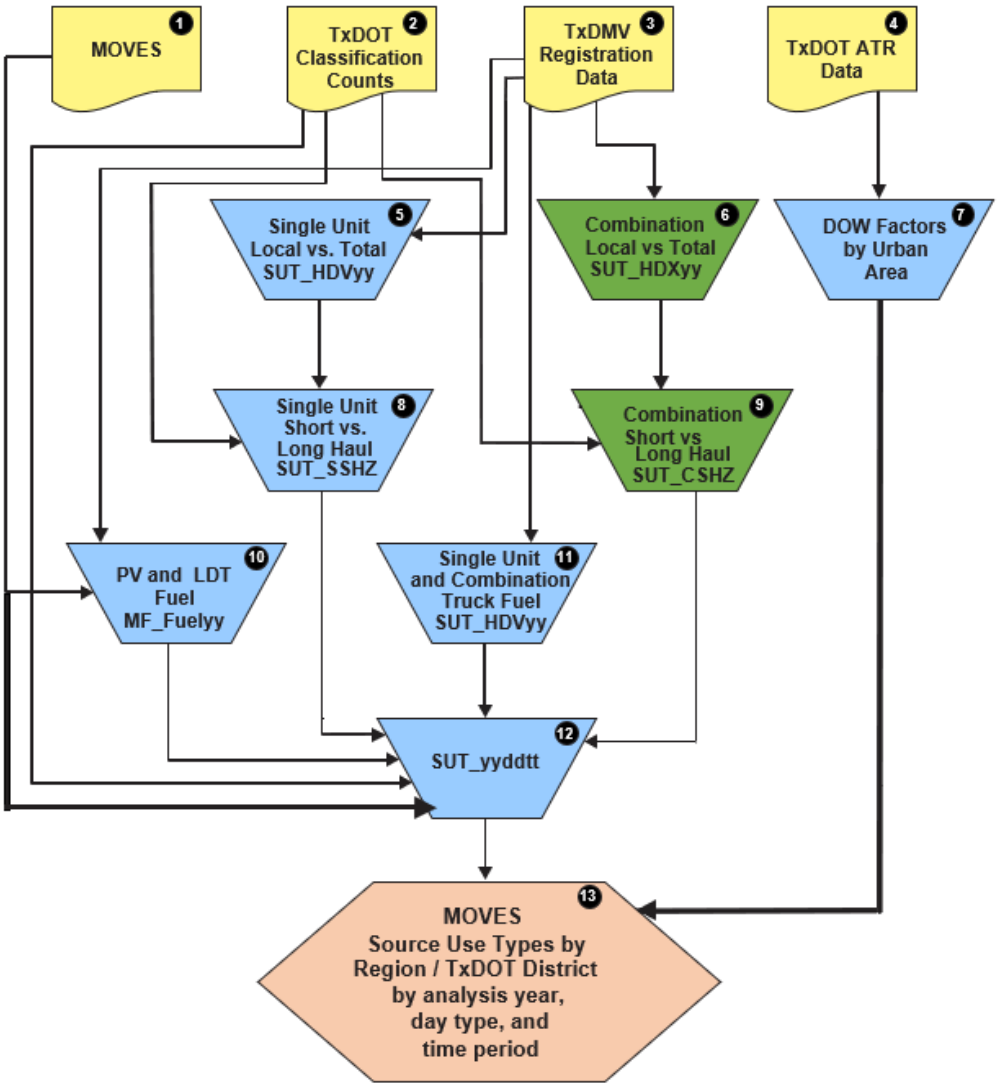

Figure 1. Simplified Overview of the VMT Mix Process.

Using the same data sets and a similar procedure, aggregate (i.e., all road-type categories), TxDOT district-level weekday vehicle type VMT mixes (used in the vehicle population estimation) were also produced. To ensure general applicability and consistency across all study areas, all VMT mixes were developed in five-year increments beginning with the year 2005 and applied to the analysis years based on Table 35.

Table 35. VMT Mix Year/Analysis Year Correlations.

VMT Mix Year	Analysis Years
2005	2003 through 2007
2010	2008 through 2012
2015	2013 through 2017
2020	2018 through 2022
2025	2023 through 2027
2030	2028 through 2032
2035	2033 through 2037
2040	2038 through 2042
2045	2043 through 2047
2050	2048 through 2050

3.0 EMISSION AND TOTAL ENERGY RATES

This section describes the development of the emission rates (for each pollutant) as well as Total Energy Consumption (TEC) rates. The emission rates were calculated using EPA's MOVES3 emission factor model parameterized using local and default data. The resultant MOVES3 emission rates were then post-processed using TTI's EI utilities to yield the emission rates used to calculate total emissions for each EI scenario. The emission rates were developed based on the *TTI Emissions Inventory Utilities User's Guide* methods and procedures but updated as needed to accommodate MOVES3 and EPA's *Technical Guidance*[12] applicable to MOVES3 inventory development.

The following sections describe the emission rates development process.

3.1 PROCESS OVERVIEW

MOVES emission rates mode runs were developed to produce MOVES output databases containing emissions, TEC, and activity data (some of which are used during the activity estimation methods described previously). Data contained in each MOVES output database were then post-processed into the final on-road emission rates and TEC rates and area source refueling emission rates used in each EI scenario.

Emission rates were developed for summer 2019 and summer 2023 for a weekday and a weekend day (i.e., the two MOVES day types). These emission rates were then used with the traffic activity rates associated with the corresponding activity scenario (which also distinguishes day type) to calculate the full EI.[13]

Post-processing used an on-road rates look-up table post-processor utility to convert the rates output by MOVES into the units defined by the on- and off-network activity detailed in the previous section (emissions per mile for VMT, emissions per start for vehicle starts, emissions per SHP, etc.). Table 36 defines the rates produced for the external inventory calculations relative to traffic activity measures.

Another post-processing step adjusted diesel vehicle NO_X to account for TxLED fuel used in each county.

[12] EPA. 2020. *MOVES3 Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity*, EPA-420-B-20-052, Office of Transportation and Air Quality. November 2020.

[13] Separate emission rates are needed by MOVES day type, since some emission rate output varies by day type (e.g., start emission rates, due to different weekday versus weekend cold start distributions by hour of day).

Table 36. Emission/Energy Rates, MOVES Emissions Processes, and Activity Factors.

MOVES Emissions Processes[1]	Activity[2]	Emission Rates[3]	Energy Rates
Running Exhaust[1]	VMT	mass/mile (mass/mi)	energy/mi
Crankcase Running Exhaust	VMT	mass/mi	
Brake Wear	VMT	mass/mi	
Tire Wear	VMT	mass/mi	
Start Exhaust[1]	starts	mass/start	energy/start
Crankcase Start Exhaust	starts	mass/start	
Extended Idle Exhaust[1]	SHEI	mass/hour	energy/hour
Crankcase Extended Idle Exhaust	SHEI	mass/hour	
Auxiliary Power Exhaust[1]	APU hours	mass/hour	energy/hour
Running exhaust (1) – Road Type 1 off-network	ONI hours	mass/hour	energy/hour
Evaporative Permeation Evaporative Fuel Vapor Venting Evaporative Fuel Leaks	VMT, SHP	mass/mi, mass/hour[3]	
Refueling Displacement Vapor Loss	VMT, starts	mass/mi, mass/start	
Refueling Spillage Loss	VMT, starts, SHEI, APU hours	mass/mi, mass/start, mass/hour, mass/hour	

[1] MOVES estimates refueling emissions in relation to the amount of energy (or fuel) expended per unit of activity, and associates fuel usage only with running exhaust, start exhaust, extended idle exhaust, and APU exhaust processes. The TEC estimates are based on these same processes.

[2] VMT, ONI hours, SHP, vehicle starts, and the SHEI and APU hours components of hotelling are the basic activity factors. SHEI and APU hours are for combination long-haul trucks only.

[3] All mass per activity rates shown are available in MOVES rate mode table output, except for mass/hour for SHP, and for mass per activity refueling rates, which were produced using the TTI rates post-processing utility.

3.2 MOVES Run Specification Input Files

The MOVES Run Specification (MRS) is a file (in extensible markup language [XML] format) that defines the place, time, road categories, vehicle and fuel types, pollutants and emissions processes, and the overall scale and level of output detail for the modeling scenario. TTI created an MRS for one county and scenario using the MOVES graphical user interface (GUI), then converted the MRS to a template from which all the required MRS files were built. Table 37 describes the MRS selections used, followed by sections describing the input data used per selection.

Table 37. MRS Selections by MOVES GUI Panel.

Navigation Panel	Detail Panel	Selection
Scale[1]	Model; Domain/Scale; Calculation Type	On-Road; County; Emission Rates
Time Spans[1]	Years – Months – Days – Hours	***<YEAR>*** - ***<MONTH>*** - ***<DAY TYPE>*** - All
Geographic Bounds[1]	States; Counties; Selections	Texas - ***<COUNTY>***;[1] ***<TX COUNTY SELECTION>***
On-Road Vehicles[2]	SUT/Fuel Combinations: 1 – Gasoline, 2 – Diesel, 3 – Compressed natural gas (CNG), 5 – E85 (85% ethanol-15% gasoline blend), 9 – Electric	SUT: — Fuel Types Motorcycle: 1 - - - - Passenger Car: 1 2 - 5 9 Passenger Truck: 1 2 - 5 9 Light Commercial Truck: 1 2 - 5 9 Other Buses: 1 2 3 - - Transit Bus: 1 2 3 - - School Bus: 1 2 3 - - Refuse Truck: 1 2 3 - - Single Unit Short-Haul Truck: 1 2 3 - - Single Unit Long-Haul Truck: 1 2 3 - - Motor Home: 1 2 3 - - Combination Short-Haul Truck: 1 2 3 - - Combination Long-Haul Truck: - 2 - - -
Road Type	Selected Road Types	Off-Network – Rural Restricted Access – Rural Unrestricted Access – Urban Restricted Access – Urban Unrestricted Access
Pollutants[3] and Processes	VOC; CO; NO_X; NO; NO_2; HONO; Atmospheric CO_2; SO_2; CH_4; N_2O; NH_3; $PM_{2.5}$: OC, EC, SO_4, H_2O, NCOM, NO_3, NH_4, Total Exhaust, Brakewear, and Tirewear; PM_{10}: Total Exhaust, Brakewear, and Tirewear; TEC	Dependent on pollutant: Running Exhaust, Start Exhaust, Extended Idle Exhaust, Auxiliary Power Exhaust, Crankcase Running Exhaust, Crankcase Start Exhaust, Crankcase Extended Idle Exhaust, Evap Permeation, Fuel Vapor Venting, Fuel Leaks; Refueling Displacement Vapor Loss, Refueling Spillage Loss, Brakewear, Tirewear
General Output	Output Database; Units; Activity	***<MOVES OUTPUT DATABASE NAME>***;[1] Grams, KiloJoules, Miles; Distance Travelled, Hotelling Hours, Population, Starts
Create Input Database	Domain Input Database	***<COUNTY INPUT DATABASE (CDB) NAME>***[1]
Output Emissions Detail	Output Aggregation; For All Vehicles/Equipment; On Road	Time: Hour, Geographic: Link; Fuel Type, Emissions Process; Road Type, Source Use Type
Advanced Features	Aggregation and Data Handling	Only the "clear BaseRateOutput after rate calculations" box is checked

[1] Limited to one county per County Scale run. County Federal Information Processing Standards (FIPS) code, year, and season/day type labels were included in the MRS file and output database names.
[2] Although MOVES requires all fuel types to be included in MRSs, only gasoline and diesel were modeled.
[3] Pre-requisite pollutants that were needed to model the reported pollutants are not shown.

3.2.1 Scale

The MOVES Domain/Scale "County" is required for SIP inventory estimates. The MOVES Calculation Type "Emission Rates" was selected for MOVES to produce the emissions and TEC rates with speed bin indexing required for the link-based inventory estimation process.

3.2.2 Time Span

The Time Spans parameters were specified to provide hourly rates, for all hours of the day, for the selected year, month, and day type One "Years" (2019 or 2023), "Months" (July), and "Days" (Weekdays or Weekend) selection were made per run.

3.2.3 Geographic Bounds

Per the MOVES County Scale, only one county was selected per run.

3.2.4 On-Road Vehicles and Road Type

The local VMT mixes developed for the study include the SUT/fuel type combinations modeled with MOVES, namely, gasoline and diesel. The VMT mixes specify the vehicle fleet as the gasoline and diesel SUTs designated as "on-road vehicles" selections in Table 37. These SUT/fuel type combinations were selected in all the MOVES RunSpecs. All other SUT/fuel type combinations available in MOVES were also selected as required by MOVES, but only gasoline and diesel were modeled. Fuel types output was controlled through adjustments to the MOVES default fuel engine fractions via the MOVES Alternate Vehicle and Fuel Technology (AVFT) table and to the MOVES default flex fuel vehicle fuel type usage fractions in the MOVES fuelusagefraction table (discussed later). All five MOVES road type categories were selected.

3.2.5 Pollutants and Processes

In addition to the required pollutants within the scope of the inventory, MOVES requires that additional pollutants be selected for "chained" pollutants (i.e., pollutants that are calculated as a function of another MOVES pollutant). Of the pollutants listed for the inventory, the following additional pollutants were selected, as required by the model, due to chaining: non-methane hydrocarbons and total gaseous hydrocarbons (for VOC); TEC (for CO_2 and SO_2); and Composite – NonECPM (non-elemental carbon) for Primary

Exhaust $PM_{2.5}$ - Total. All of the associated on-road processes available by the selected pollutants were included, including the two refueling emissions processes.

3.2.6 Output Features

The output units were grams, kilojoules, and miles. The activity categories were pre-set by MOVES rates mode (and not adjustable) for inclusion in the output database. The selected output detail level was by hour, link (in MOVES rates mode "link" is the combination of county, road type, and speed bin), pollutant, process, road type, SUT, and fuel type.

The MOVES model produces results at different aggregation levels that are specified in the MRS. The detailed, hourly, link-based inventory method required MOVES day type-specific rates (weekday and weekend day) at the following MOVES output detail level.

- Source use types.
- Fuel types.
- Road types (four actual MOVES road categories and off-network).
- Hours of day.
- Speed bin (16 – in miles-based rate tables).
- Pollutants.
- On-road emissions processes.

For each emissions scenario, the vehicle fleet fuel types were modeled using only the predominant on-road fuels of gasoline and diesel (alternate fuels were considered de minimis). The five road type categories in MOVES are Off-Network[14], Rural Restricted Access, Rural Unrestricted Access, Urban Restricted Access, and Urban Unrestricted Access. The rates for each of the actual four MOVES road types are indexed by the 16 MOVES speed bin average speeds: 2.5, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, and 75 mph.

3.3 MOVES County Input Databases

MOVES CDBs were created for each county and year with data to cover both MOVES day types. The CDBs were populated with local input data (such as local fleet age distributions, fuel formulations, meteorological conditions) as well as MOVES defaults.

[14] The Off-Network road type is not a 'real' road type and is instead used as a placeholder to define off-network emissions.

TTI developed procedures to build and check CDBs for each emissions scenario. The basic procedure was to write a MySQL script to produce one county scenario CDB and convert it to a template from which all of the CDB scripts were built. The scripts were then run in batch mode to produce all CDBs for the analysis.

Data for populating the CDBs were first prepared in the form of text files and/or MySQL databases (e.g., for local fuels, weather data), and some values were provided directly in the CDB builder MySQL script. Any default data used were selected from the MOVES default database, MOVESDB20210209. After running the scripts to produce the CDBs, the CDBs were checked to verify that all CDB tables were built and populated as intended.

Table 38 provides an outline and brief description of the CDBs, followed by a discussion of the development of the local data and the defaults contained therein. Unless otherwise stated, the CDB table data applies to all counties, years, and both MOVES day types.

Table 38. CDB Input Tables.

Table	Data Source	Notes
auditlog	empty table used	The table must be present for MOVES to recognize CDB
year	MOVES default	Designates analysis year as the base year (i.e., activity inputs supplied, not forecast by MOVES)
state	MOVES default	Identifies the state and idle region
hourvmtfraction	MOVES default	Hourly VMT fractions for each source type, road type, day type
dayvmtfraction	MOVES default	Weekend day and weekday period VMT fractions by month for each source type and road type
monthvmtfraction	MOVES default (3-month average)	Month VMT fractions by source type
hpmsvtypeyear	MOVES default	Annual VMT by HPMS vehicle type
roadtypedistribution	MOVES default	Source type VMT fractions by MOVES road type
avgspeeddistribution	MOVES default	Driving time fractions by speed bin for each source type, road type, day type, hour
sourcetypeyear	MOVES default	Source type populations
startsperdaypervehicle	MOVES default	Average starts per day by source type and day type
startshourfraction	MOVES default	Average hourly allocation of starts by source type and day type
startsmonthadjust	MOVES default (3-month average)	Average monthly multiplicative adjustment to startspervehicleperday

Table	Data Source	Notes
startsageadjustment	MOVES default	Starts by vehicle age within each source type, relative to the number of starts at age 0 (lower frequency of starts with age)
startsopmodedistribution	MOVES default	Distribution of engine start soak times by source type, age, day type, hour
totalidlefraction	MOVES default (3-month average)	Ratio of total source hours idling (SHI) and total source hours operating (SHO) for each source type by month, day type, idle region, county type (Metropolitan Statistical Area [MSA] or non-MSA)
hotellingactivitydistribution	MOVES default	Allocation of hoteling to four operating modes by zone (e.g., county) and model year group
hotellingagefraction	empty table used	Hourly hoteling distribution by age for each zone and day type – included to preempt commandline execution errors
hotellinghourfraction	empty table used	Zone and day type hoteling hourly allocations – included to preempt commandline execution errors
hotellinghoursperday	empty table used	Year, zone, day type hoteling hours – included to preempt commandline execution errors
hotellingmonthadjust	empty table used	Hotelling monthly adjustment for each zone and month – included to preempt commandline execution errors
zone	MOVES default (set factors = 1)	SHO geographic allocation factors, set to 1.0 for county scale runs
zoneroadtype	MOVES default (set factors = 1)	Road type VMT allocation factors to county road type VMT, set to 1.0 for county scale runs
fuelusagefraction	MOVES default (except usage for fueltype 5 = 0)	Flex fuel vehicle fuel type usage, set for Texas modeling assumptions, i.e., flex fuel vehicles operate totally on gasoline
fuelsupply	Local /defaults	Market shares of fuel formulations set to reflect Texas modeling assumptions of gasoline and diesel only, although all MOVES default fuels were included as required to run MOVES3 (i.e., CNG, E85, and electric are included but were not applied as specified in the AVFT and fuel usage configurations)
fuelformulation	Local /defaults	Gasoline and diesel formulations by fuel region based on Texas regional survey data and defaults as needed, with MOVES default CNG, E85, and electric as required to run MOVES3
avft	Local /defaults	Set for Texas modeling assumptions, i.e., gasoline and diesel only, but also including default flex fuel vehicle fractions which were set to 100% gasoline use via the fuelusagefraction table
sourcetypeagedistribution	local/default (actual analysis year default)	Distribution by 31 age categories for each source type, based on latest available county vehicle registrations, and MOVES defaults where needed (i.e., for buses, refuse trucks, motor homes)

Table	Data Source	Notes
imcoverage	local	Empty for non-I/M counties, or includes I/M program modeling parameters characterizing the local program applicable to the county, to include updated compliance factors based on TCEQ area-specific I/M program statistics
county	local	Identifies the county, barometric pressure, high or low altitude, and whether the county is an MSA or non-MSA county
zonemonthhour	local	Provides zone hourly temperatures and relative humidity by month using month ID 7 (July) to represent the summer season (populated with local, 2019 June through August averages)
countyyear	local	Stage II refueling control program adjustments, set to zero to reflect the program is no longer in effect

3.3.1 Year, State, and County Inputs

The year, state, and county tables were populated with data defining the analysis year, state, and county of the run.

The yearID field of the "year" table was populated with the analysis year value, and the year was set as a base year (to specify that certain user-input fleet and activity data were to be used, rather than forecast by MOVES during the model runs). As part of designating the appropriate fuel supply for the modeling scenario, the fuelyearID in the year table was also set to the analysis year. With MOVES3, an idleregionID was added to modify the state table.

StateID "48" (Texas) was inserted in the state table. In addition to identifying the county of analysis, the county table contains barometric pressure, and altitude information (discussed further with other meteorological inputs). The county data were selected from a prepared local "meteorology" database containing tables of weather data records for the analysis. Additionally, information on whether the county is in an MSA is included in the county table.

3.3.2 Activity and Vehicle Population Inputs

The TTI EI methodology uses an emission rate by activity method that calculates emissions by multiplying local activity estimates and MOVES-based emission rates external to MOVES. However, MOVES rates mode CDBs require activity inputs to calculate the emission rates per activity units used in the TTI EI method.

For this reason, default activity input parameters were used to populate the following MOVES tables: hourvmtfraction, dayvmtfraction, monthvmtfraction, hpmsvtypeyear, roadtypedistribution, avgspeeddistribution, sourcetypeyear, startsperdaypervehicle, startshourfraction, startsmonthadjust, startsageadjustment, startssopmodedistribution, totalidelfraction, and hotellingactivitydistribution. Data for all these tables were selected and inserted from the MOVES default database. In the case of the startsmonthadjust and totalidlefraction, which vary by month, the MOVES default data were averaged for the three-month summer season period (same for MOVES default monthvmtfraction, for consistency).

The zone and zoneroadtype tables contain zonal sub-allocation activity factors. For county scale analyses, county is equal to zone; therefore, these allocation factors were set to 1.0.

3.3.3 Age Distributions and Fuel Engine Fractions Inputs

Local age distributions, or age fractions for each SUT, and local fuel fractions by model year (or technology), were used, in conjunction with MOVES defaults as needed. These data were sourced from TxDMV 2018 year-end registration data for each county (this data was used for each analysis year). The age distributions and fuel engine fractions inputs were calculated and written to text files in preparation for loading the data into their CDB tables: the sourcetypeagedistribution table for age distributions and the avft table for fuel engine fractions.

The local TxDMV registration data provides fuel type fractions (proportion of gasoline or diesel-powered vehicles) for heavy-duty vehicles but does not for light-duty vehicles. MOVES default fuel fractions were therefore applied to estimate light-duty fuel fractions. Only gasoline and diesel vehicles were explicitly included in the CDBs[15].

Table 39 summarizes the data sources and aggregation levels used to estimate the local sourcetypeagedistribution and avft inputs to MOVES (inputs summarized in Appendix F).

[15] This was decided after consultation with the TCEQ sponsor.

Table 39. Sources and Aggregations for Age Distributions and Fuel Fractions.

SUT Name	SUT ID	TxDMV Category[1] Aggregations for Age Distributions and Fuel/Engine Fractions	Geographic Aggregation for Age Distributions	Geographic Aggregation for Fuel/Engine Fractions[2]
Motorcycle	11	Motorcycles	County	n/a – 100% gasoline, no Fuel/Engine Fractions
Passenger Car	21	Passenger Cars	County	MOVES default[2]
Passenger Truck	31	Total Trucks<=8500	County	MOVES default[2]
Light Commercial Truck	32	Total Trucks<=8500	County	MOVES default[2]
Single-Unit Short-Haul Truck	52	>8500+ >10000+ >14000+>16000	Region	Texas Statewide
Single-Unit Long-Haul Truck	53	>8500+ >10000+ >14000+>16000	Texas Statewide	Texas Statewide
Refuse Truck	51	MOVES default[3]	MOVES default[3]	MOVES default[3]
Motor Home	54	MOVES default[3]	MOVES default[3]	MOVES default[3]
Other Buses	41	MOVES default[3]	MOVES default[3]	MOVES default[3]
Transit Bus[2]	42	MOVES default[3]	MOVES default[3]	MOVES default[3]
School Bus	43	MOVES default[3]	MOVES default[3]	MOVES default[3]
Combination Short-Haul Truck	61	>19500+ >26000+ >33000+ >60000	Region	Texas Statewide
Combination Long-Haul Truck	62	>19500+ >26000+ >33000+ >60000	Texas Statewide	n/a – 100 % diesel, no Fuel/Engine Fractions

[1] TxDMV year-end 2018 (latest available, used for all years) county vehicle registrations data were used for developing local inputs (weights are GVWR in units of pounds). The MOVES model default age distributions were from the MOVESDB20210209 database.

[2] MOVES fuel engine fraction defaults (for gasoline, diesel, E85 capability) were used for light-duty SUTs (with E85 use set to zero in the fuelusagefraction table). MOVES default fuel engine fractions were taken from the MOVESDB20210209 sample vehicle population table.

[3] MOVES default values consistent with the analysis year.

3.3.4 Meteorological Inputs

Meteorological data were used to develop "county" (barometric pressure and altitude) and "zonemonthhour" (temperature and relative humidity) table inputs for the summer season. TCEQ developed these inputs as June through August hourly temperature and relative humidity, and 24-hour barometric pressure averages, using 2019 base year hourly data from multiple weather stations within each county. Altitude was set to low. Table 40 and Table 41 summarize the temperatures and relative humidity, respectively.

Barometric pressure for the period was 29.95 Inches of Mercury for Brazoria, Galveston, Harris, Montgomery, and Waller Counties; and 29.94 Inches of Mercury for Chambers, Fort Bend, and Liberty Counties.

Table 40. Temperature Inputs to MOVES (degrees Fahrenheit)[1].

Hour	48039	48071	48157	48167	48201	48291	48339	48473
1	79.95	83.09	77.29	82.73	80.63	79.30	77.37	78.03
2	79.53	82.77	76.80	82.44	80.06	78.78	76.61	77.41
3	79.27	82.61	76.35	82.16	79.60	78.41	76.00	76.92
4	78.95	82.50	76.04	81.84	79.23	78.10	75.55	76.50
5	78.66	82.24	75.64	81.53	78.87	77.79	75.04	76.05
6	78.33	82.09	75.28	81.26	78.48	77.37	74.60	75.64
7	78.12	81.75	75.08	80.96	78.18	77.12	74.35	75.33
8	79.50	81.70	77.13	81.40	79.25	78.09	76.30	77.07
9	82.65	82.15	80.62	82.67	81.69	80.55	79.53	81.03
10	85.02	82.89	83.61	83.87	83.86	82.68	82.26	84.29
11	86.53	83.67	85.75	84.62	85.80	84.35	84.54	86.86
12	87.74	84.43	87.41	85.45	87.46	85.55	86.61	88.86
13	88.65	85.34	88.52	86.22	88.54	86.42	88.27	90.31
14	89.01	85.83	89.34	86.38	88.97	86.87	89.28	91.41
15	89.12	86.17	89.83	86.56	89.20	87.24	89.68	91.83
16	89.08	86.34	89.93	86.60	89.45	87.19	89.89	91.82
17	88.60	86.35	89.30	86.49	89.32	86.96	89.54	91.29
18	87.77	86.14	88.45	86.30	88.71	86.47	88.73	90.53
19	86.47	85.71	86.83	85.78	87.55	85.43	87.10	89.07
20	84.56	84.93	84.45	84.72	85.95	83.75	84.62	86.39
21	82.35	84.14	81.87	83.80	84.06	81.77	81.93	83.16
22	81.29	83.72	80.12	83.39	82.83	80.81	80.32	81.27
23	80.73	83.58	79.00	83.15	81.97	80.23	79.21	80.02
24	80.35	83.35	78.05	83.01	81.23	79.75	78.24	78.89

[1] Source: TCEQ – developed from average hourly observations from multiple weather station data within each county. Data are from the period June through August 2019. FIPS county codes from left to right are Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller.

Table 41. Relative Humidity Inputs to MOVES (percent)[1].

Hour	48039	48071	48157	48167	48201	48291	48339	48473
1	86.48	89.08	93.44	78.68	80.46	89.08	89.00	91.59
2	87.58	90.07	94.77	79.57	82.29	90.07	90.25	93.31
3	87.79	90.83	95.37	80.67	83.61	90.83	91.39	94.28
4	88.47	91.28	95.71	80.93	84.76	91.28	91.93	95.35
5	88.87	91.64	96.35	81.46	85.77	91.64	92.12	97.07
6	89.42	91.97	96.99	82.12	86.49	91.97	92.74	97.52
7	89.64	92.20	96.87	81.93	86.87	92.20	93.06	97.85
8	86.35	90.31	94.59	79.95	83.81	90.31	89.67	96.10
9	78.70	83.68	87.64	76.26	76.83	83.68	82.19	86.83
10	72.00	76.96	79.31	73.19	70.33	76.96	75.09	76.86
11	66.88	71.43	72.55	71.40	63.94	71.43	68.24	68.40
12	62.89	67.32	67.36	69.51	58.80	67.32	62.30	62.02
13	60.91	64.45	64.26	68.22	55.81	64.45	58.11	57.94
14	59.89	63.16	62.28	68.19	54.67	63.16	55.72	55.13
15	59.84	62.10	61.09	68.67	54.00	62.10	54.79	53.87
16	60.39	62.47	60.60	68.55	53.80	62.47	54.95	53.87
17	61.23	63.50	62.58	68.62	54.50	63.50	56.53	54.86
18	62.83	65.11	64.34	69.52	56.42	65.11	59.05	56.50
19	66.02	68.46	67.38	71.33	59.59	68.46	64.18	59.42
20	71.74	73.74	72.79	74.29	63.68	73.74	72.96	66.32
21	77.87	81.21	79.33	76.16	68.98	81.21	80.13	74.85
22	81.09	84.76	84.74	76.88	72.82	84.76	83.07	80.53
23	83.61	86.62	88.55	77.35	76.05	86.62	85.09	84.87
24	85.10	87.94	91.34	78.15	78.40	87.94	87.12	88.86

[1] Source: TCEQ – developed from average hourly observations from multiple weather station data within each county. Data are from the period June through August 2019. FIPS county codes from left to right are Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller.

3.3.5 Fuels Inputs

TTI used various data sources to produce the best available Houston summer fuel formulation inputs to MOVES.

3.3.5.1 Overview and Assumptions

There are four MOVES fuels input tables that must be consistent for the fuel types defined by the scope of the inventory analysis. These are listed below.

- AVFT (SUT fuel type distributions by model year).
- fuelformulation (fuel properties for the fuels supplied in the study area).
- fuelsupply (market shares of each study area fuel formulation).

- fuelusagefraction (fuel types used by flex fuel vehicles).

As defined by the scope of the EIs, only gasoline and diesel fuels were modeled[16]. Therefore the AVFT model year fuel fractions were normalized for only gasoline, diesel, and flex fuel vehicles (i.e., vehicles with the capability to be powered by gasoline or E85 [a blend of 85% ethanol and 15% gasoline, by volume]). Flex fuel vehicle fuel usage was set to 100% gasoline via the fuelusagefraction table. Gasoline and diesel fuel properties and market shares were then specified in the fuelformulation and fuelsupply tables.

The gasoline and diesel fuel property inputs were sourced using local fuel survey data by season and year, supplemented as needed by defaults and other data (e.g., the U.S. Department of Energy [DOE] annual fuel sales statistics). For future years where no survey data was yet available, the latest available local survey-based fuel properties were used, and particular properties were replaced with expected future year values (e.g., regulatory standards or limits, reflected in the MOVES analysis year and season default values).

The local data included historical and current, latest available retail outlet seasonal fuel surveys of gasoline and diesel fuel, and annual, estimated state-level fuels sales statistics. The local data also included summaries from which to estimate biodiesel (BD) volumes relative to petroleum diesel sales volumes and gasoline sales estimates by the three grades (regular, mid-grade, premium).

Retail outlet summer survey data consisted of TCEQ statewide diesel surveys and EPA summer RFG compliance surveys for Houston. The TCEQ 2020 summer season statewide survey (closest year to 2019) was used for 2019 diesel properties. RFG survey data available for summer 2019 and 2020 (latest available) was used for 2019 and 2023 RFG. The diesel formulation was supplemented with BD volume content estimated based on the U.S. Department of Energy (DOE) Energy Information Administration's (EIA) diesel sales statistics. Biodiesel percentages were based on EIA State Energy Data System (SEDS) state-level 2018 (latest available) transportation sector BD consumption estimates for Texas.

The fuel formulation development procedures for RFG involved aggregating and averaging RFG properties for Houston by fuel grade, then weighting them into

[16] MOVES3 requires that inputs are developed for all on-road vehicle fuel types available in MOVES, regardless of the local inventory scope. Inclusion of all on-road fuels in the MOVES runspecs was needed to prevent MOVES "missing fuels inputs" run errors.

composite properties using relative sales volumes by grade. For diesel sulfur, consistently stable across the state, the statewide average was calculated.

The local, summer season, fuels inputs to MOVES were supplied in the CDB fuelsupply and fuelformulation tables. The fuel supply for each county, year, and month (July for summer) consisted of one local gasoline and one local diesel formulation. Each gasoline and diesel formulation market share in the fuel supply was therefore 1.0.

3.3.5.2 Fuel Formulations

Table 42 summarizes the gasoline and diesel fuel property inputs. Although not listed, the fields CetaneIndex and PAHContent are also included in the fuelformulation table but are not currently enabled for use in MOVES. Although not shown, as required to run MOVES, fuels inputs for the other fuel types in MOVES were input also.

Table 42. HGB Summer RFG and Diesel MOVES Fuel Formulation Table Inputs.

Field	Units	2019[1] RFG	2019[1] Diesel	2023[1] RFG	2023[1] Diesel
fuelFormulationID	-	19724	30585	14724	30600
fuelSubtypeID[2]	-	12	21	12	21
RVP	psi	7.27	\N	7.15	\N
sulfurLevel	ppm	21.27	5.85	10.00	6
ETOHVolume	vol.%	9.76	\N	9.56	\N
MTBEVolume	vol.%	0	\N	0	\N
ETBEVolume	vol.%	0	\N	0	\N
TAMEVolume	vol.%	0	\N	0	\N
aromaticContent	vol.%	15.41	\N	16.89	\N
olefinContent	vol.%	11.07	\N	10.29	\N
benzeneContent	vol.%	0.49	\N	0.42	\N
e200	vap.%	49.65	\N	48.26	\N
e300	vap.%	85.13	\N	84.89	\N
BioDieselEsterVolume	vol.%	\N	4.86	\N	4.86
T50	deg. F	200.57	\N	206.18	\N
T90	deg. F	324.94	\N	326.87	\N

[1] 2019 RFG based on EPA 2019 summer RFG compliance survey data, 2023 future year RFG based on EPA latest available (2020) summer RFG compliance survey data with sulfur level set to MOVES3 default (future year expected Tier 3 value). 2019 BD: TCEQ summer 2020 fuel survey data for sulfur level in absence of local 2019 survey data; EIA Texas 2018 (latest available) transportation sector fuel consumption data for BD ester volume. 2023 BD is the same as 2019 except sulfur level is set to MOVES default (expected future year value – very close to observed Texas values for many years).

[2] Fuel subtype IDs 12 and 21 are 10% ethanol-blend gasoline (in this case RFG) and BD, respectively.

3.3.6 I/M Inputs

To model a local I/M program design, it must be defined using MOVES I/M coverage parameters by source type, entered in the MOVES imcoverage table. The appropriate internal MOVES I/M factors for modeling a local I/M program are designated in a model run by the local program input data in the imcoverage table.[17]

MOVES adjusts emissions (Hydrocarbons [HC], CO, and NO_X) at the source-type level to incorporate the benefits of the local I/M program design specified using the MOVES I/M coverage table parameters. TTI previously produced a comprehensive set of MOVES imcoverage records for Texas I/M counties to use in place of MOVES defaults.

TTI produced the local I/M coverage input parameters to represent Texas I/M program designs as specified in the Texas I/M SIP and Texas rules. The I/M program requires annual emissions testing of gasoline vehicles within a 2-through-24 year vehicle age coverage window (motorcycles, military tactical vehicles, diesel-powered vehicles, and antique vehicles are excluded). A gas cap integrity test is required on all these vehicles, and depending on the model year, gross vehicle weight (GVW) (threshold of 8,500 GVW separating light-duty and heavy-duty class), and I/M area, current vehicle emissions testing may use On-Board Diagnostics (OBD) tests, the Acceleration Simulation Mode (ASM-2) test, or the Two-Speed Idle (TSI) test.

Table 43 and associated notes describe MOVES imcoverage records developed by TTI for the years available in MOVES applicable to each HGB I/M county. For additional I/M program details, see the current I/M SIP and/or pertinent Texas Administrative Code.[18]

Following is the general approach used to build the Texas imcoverage tables.

- Identified MOVES I/M test standards applicable to Texas I/M counties in consultation with TCEQ (see Table 43, column 4);
- Queried the MOVES database to determine the extent to which MOVES provides I/M effects corresponding to Texas I/M Programs (i.e., test frequency, fuel type, and test types). From the result, listed the SUTs, test standards, pollutant and

[17] In general, MOVES produces a local I/M program effect as an adjustment to the model's internal reference I/M program effect (i.e., represented as the "standard I/M difference" in the pair of MOVES emission rates [I/M – No I/M], which are specific to vehicle regulatory class categories of which the source types are composed). MOVES contains a large set of "I/M factors" by source type (in the MOVES imfactor table) computed specifically for adjusting the MOVES standard I/M difference to reflect the effects of local I/M program design alternatives.

[18] Revision to the State Implementation Plan Mobile Source Strategies, Inspection and Maintenance State Implementation Plan Revision, TCEQ, adopted February 12, 2014.

emissions process combinations with I/M effects in MOVES (i.e., with non-zero MOVES I/M factors and corresponding base emission rates with non-zero standard I/M differences);
- Categorized counties and years in groups under the pertinent MOVES test standards; and
- Assigned MOVES I/M Program IDs such that: 1) all MOVES default I/M Program IDs were excluded; and 2) for each year ID, each I/M Program ID represented a unique combination of test standard, test frequency, begin model year, and end model year.

Table 43. MOVES I/M Coverage Inputs for Annual Inspections of Gasoline Vehicles (Harris, Brazoria, Fort Bend, Galveston, Montgomery)

Year ID[1]	Begin Model Year ID[1]	End Model Year ID[1]	Test Standards ID[2]	Source TypeID[3]
2019	1995	1995	23 (A2525/5015 Phase)	21 (PC), 31 (PT), and 32 (LCT)
2019	1995	1995	41 (Evp Cap)	21 (PC), 31 (PT), and 32 (LCT)
2019	1996	2017	51 (Exh OBD)	21 (PC), 31 (PT), and 32 (LCT)
2019	1996	2017	45 (Evp Cap, OBD)	21 (PC), 31 (PT), and 32 (LCT)
2023	1999	2021	51 (Exh OBD)	21 (PC), 31 (PT), and 32 (LCT)
2023	1999	2021	45 (Evp Cap, OBD)	21 (PC), 31 (PT), and 32 (LCT)

[1] begmodelyearID and endmodelyearID, defining the full range of model years covered, were calculated as YearID – 24, and YearID – 2. The 1996 and newer model years use different I/M tests than do the 1995 and older model years.

[2] Pollutant/processes affected are starts and running exhaust HC, CO, NO_X, and tank vapor venting HC.

[3] Source TypeID 21 = passenger car; 31 = passenger truck; and 32 = light commercial truck. Source type compliance factor field input values were updated and provided by TCEQ for this analysis (March 2021), per Section 4.9.6, *MOVES Technical Guidance*, EPA, November 2020. The compliance factors were based on local I/M program statistics by analysis year, and the latest available data (2019) for future years. The HGB I/M county MOVES compliance factors by year, in percent, are:
2011: PC – 88.89; PT – 85.44; LCT – 66.90.
2017: PC – 95.50; PT – 91.79; LCT – 71.87.
2018: PC – 93.20; PT – 89.58; LCT – 70.14.
2019 and later: PC – 95.00; PT – 91.31; LCT – 71.49.

3.3.7 Control Programs Modeling

Table 44 summarizes the modeling approaches used for the emissions control strategies.

Table 44. Emissions Control Strategies and Modeling Approaches.

Control Strategy	Approach
Federal Motor Vehicle Control Program Standards	MOVES defaults.
Federal Heavy-Duty Diesel Engines Rebuild and 2004 Pull-Ahead Programs (to Mitigate NO_X Off-Cycle Effects)	MOVES defaults.
RFG Properties[1]	Local inputs to MOVES – TTI developed the RFG fuel formulation based on 2019 (for historical) and 2020 (latest available for future) Houston area retail outlet summer RFG survey data (EPA-provided RFG compliance survey data), with sulfur content set consistent with expected future year value (consistent with the Tier 3 gasoline sulfur standard).
Diesel Sulfur	Local input to MOVES – TTI used values reflecting consistency with the federal diesel sulfur standard and recent local observations.
TxLED	MOVES output post-processing – TTI adjusted diesel vehicle NO_X (and NO, NO_2, and HONO) rates for TxLED effects using evaluation-year-specific NO_X reduction factors (using 4.8% reductions for 2002 and later, and 6.2% reductions for 2001 and earlier model years).
I/M Program	Local input to MOVES – For affected counties (Brazoria, Fort Bend, Galveston, Harris, Montgomery), TTI used available MOVES I/M parameters for I/M vehicles (in terms of MOVES I/M "teststandards" and associated "imfactors"), consistent with the current program description and latest I/M modeling protocols and statistics for the Houston I/M program.
Federal On-board Refueling Vapor Recovery Program	MOVES defaults.
Federal Stage II Gasoline Vapor Recovery Program	Local inputs to MOVES – Stage II reductions were set to 0% since the Stage II control program is no longer in effect.

3.4 Checks and Runs

After completing the input data preparation, the CDBs were checked to verify that all tables were in the appropriate CDBs and the tables were populated with data as intended. The MOVES RunSpecs were executed in batches using the MOVES commandline tool. After completion, TTI verified that the MOVES runs were error-free (i.e., checked all run log text files for errors and warnings and compared record counts in each rate table between output databases).

3.5 Post-Processing Runs

Each MOVES output database was post-processed for on-road mobile emission rates, area source refueling emission rates, and TEC rates to produce the on-road, refueling, and TEC rate tables input to the inventory calculations. The following post-processing procedures were performed on the MOVES output database for each county, year, and MOVES day type. See the utility descriptions in Appendix A for more information.

On-Road Mobile Emission Rates:

1. This step calculated the mass/SHP off-network evaporative process rates using data from the CDB, the MOVES default database, and the MOVES rateperprofile and ratepervehicle emission rate output. The utility also copied the mass/mile, mass/start, and mass/hour rates along with the units into emission rate tables. The utility created the look-up tables ttirateperdistance (which also includes the rateperhour rates for off-network idling), ttirateperstart, ttirateperhour (for SHEI and APU hours), and ttiratepershp for each scenario.
2. This step applied TxLED adjustments (see factors provided by TCEQ in Table 45) to the diesel vehicle NO_X emission rates in all counties. TCEQ produced these average diesel SUT NO_X adjustments using 4.8 percent and 6.2 percent reductions for 2002 and later, and 2001 and earlier model years, respectively.[19, 20] For on-road, these final rates inputs to the emissions calculator were merged into one on-rates input table, "ttiemissionrate."

Refueling Emission Rates:

1. The refueling emission rates with no Stage II control effects (i.e., initial MOVES runs with countyyear table refuelingVaporProgramAdjust and refuelingSpillProgramAdjust field values set to zero for all counties). TTI produced these rates, in general, as described previously for the on-road rates, but for the two refueling emissions process categories, refueling displacement vapor loss and refueling spillage loss. In MOVES off-network refueling emission rates output, however, emissions are not directly linked to the activity categories (i.e., starts, SHEI, APU hours). To produce off-network emission rates by activity, TTI performed calculations as described in Appendix A. The refueling rates post-

[19] Reductions as detailed in the EPA Office of Transportation and Air Quality Memorandum, RE: Texas Low Emission Diesel [LED] Fuel Benefits, September 27, 2001.

[20] The TxLED counties list may be found at: http://www.tceq.texas.gov/airquality/mobilesource/txled/txled-affected-counties. For full details on the TCEQ TxLED factor development procedure, see TxLED estimation speadsheets at: ftp://amdaftp.tceq.texas.gov/pub/EI/onroad/txled/.

processor created three rate tables (ttirateperdistanceRF, ttirateperstartRF, and ttirateperhourRF for SHEI and APU hours). Since there was no MOVES activity type output specific to ONI, no ONI associated refueling rates were produced.
2. The VOC rates were extracted for subsequent input to the refueling emissions calculations. For refueling, these final rates inputs to the refueling emissions calculator were merged into one rates input table, "ttiRFemissionrate."

TEC Rates:

1. The TEC rates in terms of rate-per-activity (i.e., energy per mile, energy per start, and energy per SHEI and APU hour, and energy per ONI hour) were then assembled in the TEC rate tables. The TEC rate tables produced are ttirateperdistanceTEC, ttirateperstartTEC, and ttirateperhourTEC (for SHEI and APU hours only).
2. For subsequent input to the TEC calculations, these final rates tables were merged into one TEC rates input table, "ttiTECemissionrate."

Table 45. TxLED Adjustment Factors Summary.

Diesel Fuel Source Use Type	2019 Reduction	2019 Adjustment	2023 Reduction	2023 Adjustment
Passenger Car	4.94%	0.9506	4.86%	0.9514
Passenger Truck	5.30%	0.9470	5.11%	0.9489
Light Commercial Truck	5.34%	0.9466	5.15%	0.9485
Other Buses	5.39%	0.9461	5.19%	0.9481
Transit Bus	5.01%	0.9499	4.92%	0.9508
School Bus	5.24%	0.9476	5.06%	0.9494
Refuse Truck	5.26%	0.9474	5.05%	0.9495
Single Unit Short-Haul Truck	4.88%	0.9512	4.82%	0.9518
Single Unit Long-Haul Truck	4.88%	0.9512	4.84%	0.9516
Motor Home	5.47%	0.9453	5.33%	0.9467
Combination Short-Haul Truck	4.97%	0.9503	4.87%	0.9513
Combination Long-Haul Truck	5.12%	0.9488	4.93%	0.9507

Source: TCEQ, March 2021. The TCEQ procedure used MOVES3 and the latest available data (i.e., statewide age distributions and local AVFT inputs based on year-end 2018 TxDMV vehicle registrations data).

See Appendix A for more information on the TTI MOVES on-road and refueling emission rate and TEC rate calculation and adjustment utilities.

The resulting hourly on-road emission rates, refueling loss emission rates, and TEC rates were input to emissions/TEC utilities to calculate and summarize the separate on-road mobile source and area source refueling inventories and the TEC inventories for each county activity scenario.

4.0 EMISSIONS AND TOTAL ENERGY CONSUMPTION CALCULATIONS

TTI calculated hourly on-road mobile emissions by county for each inventory scenario using the TTI EI utilities. The TDM link-based inventory methodology calculated on- and off-network emissions by multiplying traffic activity by emission rates. The VMT-based emissions calculations used the TDM link-based VMT and congested speeds to estimate link-level emissions. The off-network emissions calculations used off-network activity (ONI hours, SHP, starts, SHEI, and APU hours) to estimate emissions at the county level.

The TTI EI utilities produced emissions outputs aggregated by county, hour, road functional class, road area type, vehicle type, pollutant, pollutant process, and link for on-network emissions; and county, hour, road functional class, vehicle type, pollutant, and pollutant process for off-network emissions. TEC outputs were produced at the scale of county, hour, road functional class, vehicle type, pollutant, and pollutant process (i.e., not at the link level) and refueling outputs were reported similarly, except independent of road functional class.

These outputs were then post-processed to produce electronic files in formats suitable for submission to the TCEQ sponsor.

4.1 EMISSIONS CALCULATIONS

County-level hourly link (on-network) and off-network emissions for each inventory scenario were calculated using TTI's EI utilities and the following inputs.

- *County of inventory* – from study area counties list, county FIPS, link data county code, TxDOT district ID, county group FIPS, TxLED flag, county type flag (MSA or non-MSA).
- *Vehicle type VMT mix* – day type and time period TxDOT district-level VMT mix by MOVES roadway type.
- *Time period designation* – the four VMT mix time periods to hour-of-day associations.
- *Roadway-based activity* – link (and intrazonal link)-specific, hourly, directional, operational VMT and speed estimates as developed by the EI utility to include A node, B node, county number, TDM road type (functional class) code, link length, congested (operational) speed, VMT, and TDM area type code.

- *TDM road type designations* – TDM road type and area type codes to MOVES road type codes (and to VMT mix road type, and to rates road type codes) (see Table 46).
- *Off-network activity* – county ONI hours, SHP, starts, SHEI, and APU hours by vehicle type.
- *Pollutant/process/units list* – for emissions.
- *Roadway-based emission factors* – MOVES-based, county level by pollutant, process, hour, average speed, MOVES road type, SUT, and fuel type (different input data sets for refueling and on-road category EI calculators).
- *Off-network (parked vehicle) emission factors* – MOVES-based, county level by pollutant, process, hour, SUT, and fuel type (different input data sets for refueling and on-road category EI calculators).

County information IDs were identified (link data county code, TxDOT district, etc.) and inputs for the subject county were selected for the inventory calculations based on these IDs.

4.1.1 VMT-Based On-network Emissions Calculations

The VMT-based emissions were calculated for each hour using the time-period TxDOT-level SUT/fuel type VMT mix, the link VMT and speeds estimates, the MOVES-based "on-network" emission factors, and the TDM link road type and area type-to-MOVES road type designations. For each link, the link was assigned a MOVES road type based on the link's road type and area type (see Table 46). The link VMT was distributed to each vehicle type using the VMT mix from the appropriate time period based on the link's MOVES road type. The time period VMT mixes were applied by the hour as follows: morning peak – 6 a.m. to 9 a.m.; mid-day – 9 a.m. to 3 p.m.; evening peak – 3 p.m. to 7 p.m.; and overnight – 7 p.m. to 6 a.m.

The emissions factors by hour for each vehicle type were selected based on the designated hour and MOVES road type of the link VMT and speed data. For link speeds falling between MOVES speed bin average speeds, emission factors were interpolated from bounding speeds. For link speeds falling outside of the MOVES speed range (less than 2.5 mph and greater than 75 mph), the emission factors for the associated bounding speeds were used. The mass/mi rates were multiplied by the link vehicle type VMT producing the link-level emissions estimates. This was performed for each hour of the day.

Table 46. H-GAC TDM Road Type & Area Type to MOVES Road Type Designations.

TDM Road Type (Code - Name)[1]	TDM Area Type (Code - Name)[1]	MOVES Road Type (Code - Name)[1, 2]
3 - Toll Roads	5 – Rural	2 – Rural Restricted Access
10 - Rural Interstate	5 – Rural	2 – Rural Restricted Access
11 - Rural Other Freeway	5 – Rural	2 – Rural Restricted Access
4 - Ramps (Fwy/Toll/Frnt)	5 – Rural	3 – Rural Unrestricted Access
8 - Local (Centroid Connector)	5 – Rural	3 – Rural Unrestricted Access
12 - Rural Principal Arterial	5 – Rural	3 – Rural Unrestricted Access
13 - Rural Other Arterial	5 – Rural	3 – Rural Unrestricted Access
14 - Rural Major Collector	5 – Rural	3 – Rural Unrestricted Access
15 - Rural Collector	5 – Rural	3 – Rural Unrestricted Access
1 - Urban Interstate	1 – CBD; 2 – Urban; 3 – Urban Fringe	4 – Urban Restricted Access
2 - Urban Other Freeway	2 – Urban; 3 – Urban Fringe	4 – Urban Restricted Access
3 - Toll Roads	1 – CBD; 2 – Urban; 3 – Urban Fringe; 4 – Suburban	4 – Urban Restricted Access
10 - Rural Interstate	2 – Urban; 3 – Urban Fringe; 4 – Suburban	4 – Urban Restricted Access
11 - Rural Other Freeway	3 - Urban Fringe; 4 – Suburban	4 – Urban Restricted Access
4 - Ramps (Fwy/Toll/Frnt)	1 – CBD; 2 – Urban; 3 – Urban Fringe; 4 – Suburban	5 – Urban Unrestricted Access
5 - Urban Principal Arterial	1 – CBD; 2 – Urban; 3 – Urban Fringe	5 – Urban Unrestricted Access
6 - Urban Other Arterial	1 – CBD; 2 – Urban; 3 – Urban Fringe; 4 – Suburban	5 – Urban Unrestricted Access
7 - Urban Collector	1 – CBD; 2 – Urban; 3 – Urban Fringe	5 – Urban Unrestricted Access
8 - Local (Centroid Connector)	1 – CBD; 2 – Urban; 3 – Urban Fringe; 4 – Suburban	5 – Urban Unrestricted Access
12 - Rural Principal Arterial	3 – Urban Fringe; 4 – Suburban	5 – Urban Unrestricted Access
13 - Rural Other Arterial	3 – Urban Fringe; 4 – Suburban	5 – Urban Unrestricted Access
14 - Rural Major Collector	3 – Urban Fringe; 4 – Suburban	5 – Urban Unrestricted Access
15 - Rural Collector	3 – Urban Fringe; 4 – Suburban	5 – Urban Unrestricted Access
40 - Local (Intrazonal)	40 – Local (Intrazonal)	5 – Urban Unrestricted Access

[1] The TDM road type and area type code combinations are also correlated to VMT mix road type codes and emission rate road type codes, which, for this analysis, are identical to the MOVES road type codes.

[2] The four period, time-of-day VMT mix to hour-of-day designations are: AM peak – three hours of 6 a.m. to 9 a.m.; mid-day – six hours of 9 a.m. to 3 p.m.; PM peak – four hours of 3 p.m. to 7 p.m.; and overnight – 11 hours of 7 p.m. to 6 a.m.

4.1.2 Off-Network Emissions Calculations

The hourly off-network emissions were calculated at the county level by multiplying the hourly MOVES-based vehicle type off-network emission factors by the appropriate county-level hourly vehicle type off-network activity, which was determined by the SUT/fuel type, pollutant process, and associated emission rates table. Additionally, for

selecting the ONI emission rates from the rate per distance table, the road type column was used (i.e., to look up rates with road-type ID 1 for off-network). The off-network emissions calculations used off-network activity (ONI hours, SHP, starts, SHEI, and APU hours) to estimate hourly emissions at the county level.

4.2 Emissions Output

The following output files were developed from the raw EI output (including refueling loss emissions), by year, county, and activity scenario.

- A tab-delimited summary output file consisting of one header section followed by hourly and 24-hour totals data blocks of activity and emissions (pounds):
  - *On-road mobile source*: hourly and 24-hour total summaries by road type and vehicle type of VMT, VHT, speed (VMT/VHT), pollutant totals, and pollutant process totals (with the "off-network" category listed as the last road type preceding the TOTALS row in each data block), and with starts, SHP, ONI hours, SHEI, and APU hours activity rows last in the activity data block for each time period; and
  - *Refueling*: hourly and 24-hour totals summaries by vehicle type of VMT, VHT, speed (VMT/VHT), ONI hours, SHEI, APU hours, and starts, and of VOC pollutant refueling loss emissions totals and subtotal for vapor displacement and spillage losses.
- 24 hourly link emissions output files of the individual link-level emissions (grams):
  - *On-road mobile source*: each link-emissions record includes the link A node and B node codes (corresponding to the input link VMT and speeds), TDM roadway class code, MOVES road type code, MOVES pollutant code (see Table 47), MOVES process code, and link emissions estimate for each vehicle type, and emissions units. For off-network emissions, these link emissions files also contain the county-level emissions in the same format, except the link nodes were set to 99999, the link road type code set to 99, and MOVES road type code was set to the off-network category code (1). Additional detail on emissions output files and coding are found in Appendix B, the electronic data submittal description, which also includes the TDM node coordinates file.
  - *Refueling*: the link-emissions records were written as described in the previous bullet for off-network emissions.

The pollutants reported are listed in Table 47.

Table 47. Pollutants Reported.

Pollutant ID	Pollutant Name
2	Carbon Monoxide (CO)
3	Oxides of Nitrogen (NO_X)
5	Methane (CH_4)
30	Ammonia (NH_3)
31	Sulfur Dioxide (SO_2)
32	Nitrogen Oxide (NO)
33	Nitrogen Dioxide (NO_2)
34	Nitrous Acid (HONO)
35	Nitrate (NO_3)
36	Ammonium (NH_4)
51	Chloride (Cl)
52	Sodium (Na)
53	Potassium (K)
54	Magnesium (Mg)
55	Calcium (Ca)
56	Titanium (Ti)
57	Silicon (Si)
58	Aluminum (Al)
59	Iron (Fe)
87	Volatile Organic Compounds (VOC)
90	Atmospheric CO_2
91	Total Energy Consumption (TEC)
100	Primary Exhaust PM_{10} – Total
106	Primary PM_{10} – Brakewear Particulate
107	Primary PM_{10} – Tirewear Particulate
110	Primary Exhaust $PM_{2.5}$ – Total
111	Organic Carbon (OC)
112	Elemental Carbon (EC)
115	Sulfate Particulate
116	Primary $PM_{2.5}$ – Brakewear Particulate
117	Primary $PM_{2.5}$ – Tirewear Particulate
118	Composite - NonECPM
119	Aerosol H_2O (H_2O)
122	Non-carbon Organic Matter (NCOM)

See Appendix A for further details on the utilities and Appendix B for descriptions of the EI electronic data files provided.

4.3 Total Energy Consumption

TTI used its inventory development utilities to calculate hourly total energy consumption for on-road mobile sources by year, county, and activity scenario. The TEC was

calculated using a similar procedure to that used to calculate the refueling emissions using MOVES-based "on-network" TEC rates (by process, hour, average speed, roadway type, SUT, and fuel type) and off-network TEC rates (by process, hour, SUT, and fuel type).

The hourly TEC data was output in the standard tab file format for each county activity scenario. The TEC standard tab file is described as a tab-delimited text summary output file that contains the hourly and 24-hour totals summaries of activity (VMT, VHT, speed, starts, ONI hours, SHEI, and APU hours) and TEC (in kilojoules) by vehicle type and road type. The "off-network" category is listed as the last road type preceding the TOTALS row in each data block, with starts, SHP, ONI hours, SHEI, and APU hours activity rows last in the activity data block for each time period.

Appendix B describes the emissions and energy inventory output files provided. See Appendix A for further details on the inventory production utilities.

5.0 ADDITIONAL MOVES INPUTS FOR INVENTORY MODE

The MOVES CDBs used to produce emission rates for the link-based inventory analyses were designed only for use in MOVES rates mode runs. TTI produced an extra set of MOVES inventory mode input data tables (32) as tab-delimited text files for each county, year, and activity scenario (total of 128 MOVES inventory mode input data sets). These input data files may be imported to MOVES CDBs for use in MOVES inventory mode runs designed to produce results close to results from the detailed, link-based inventories. Using these input data files, TTI subsequently prepared the inventory mode CDBs for the summer weekday scenario along with a corresponding set of MRS files for use in producing inventories consistent with the disaggregate, TDM link-based inventory results. One inventory mode CDB and MRS was built corresponding to each of the 2019 and 2023 summer weekday, link-based, county inventories.

5.1 MOVES Inventory Mode Inputs and Data Sources

The sources for the MOVES inventory mode input data sets for each county, year, and activity scenario consisted of inventory data from the link-based inventories (e.g., MOVES rates inputs, link-based activity outputs, off-network activity outputs, and particular MOVES defaults, or modified MOVES defaults consistent with the local inventories). TTI updated the utility to create the MOVES3 inventory mode inputs (MOVESactivityinputbuild). The utility accesses the data sources, performs needed processing of data into MOVES input form, and organizes the resulting MOVES input files in folders by county, year, period, and day type. Table 48 lists the 32 input tables produced and the sources of the data.

Table 48. MOVES Input Tables Developed for Local Inventory Mode Runs

MOVES Table	Data Source
totalidlefraction	Rates CDB (MOVES June - August average) post-processed to reflect summer and school periods activity)
avgspeeddistribution	Post-processed inventory activity output
hotellinghourfraction	Post-processed inventory activity output
hotellinghoursperday	Post-processed inventory activity output
hourvmtfraction	Post-processed inventory activity output
hpmsvtypeday	Post-processed inventory activity output
roadtypedistribution	Post-processed inventory activity output
sourcetypedayvmt	Post-processed inventory activity output
startshourfraction	Post-processed inventory activity output
startsperdaypervehicle	Post-processed inventory activity output
sourcetypeyear	Post-processed inventory vehicle population output
auditlog	Rates CDB
avft	Rates CDB
state	Rates CDB
dayvmtfraction	Rates CDB (update, set dayvmtfraction = 1.0)
monthvmtfraction	Rates CDB (update, set dayvmtfraction = 1.0)
startsmonthadjust	Rates CDB (update, set dayvmtfraction = 1.0)
county	Rates CDBs
countyyear	Rates CDBs
fuelformulation	Rates CDBs
fuelsupply	Rates CDBs
fuelusagefraction	Rates CDBs
hotellingactivitydistribution	Rates CDBs
imcoverage	Rates CDBs
sourcetypeagedistribution	Rates CDBs
year	Rates CDBs
zone	Rates CDBs
zonemonthhour	Rates CDBs
zoneroadtype	Rates CDBs
monthofanyyear	Updated MOVES default – set noOfDays = 7
dayofanyweek	Updated MOVES default – set noOfRealDays = 1
hotellingmonthadjust	Updated MOVES default – set monthadjust =1/12

Testing produced MOVES on-road inventory mode results comparable to the MOVES rates-mode-based, detailed link-based inventories, to within five percent, depending on the pollutant, but generally in the range of within two percent. Additional details on most of these MOVES inputs tables may be found in the MOVES3 inventory development guidance and MOVES technical information at EPA's MOVES model website.

Appendix B describes the files provided.

5.2 Summer Weekday Inventory Mode CDBs and MRSs

The set of summer weekday inventory mode CDBs provided was developed using the summer weekday MOVES input data tables developed with the local, detailed inventory data, as listed in Table 48. The set of corresponding summer weekday MRS files for the inventory mode runs were made like the rates mode run MRS files used in the link-based inventory analysis (Table 37), except with inventory mode specified instead of rates mode, the applicable inventory mode-specific CDBs specified in the MRS, and with output units of pounds specified.

The MOVES inventory mode summer weekday MRSs and CDBs were provided as a part of the electronic data submittal as described in Appendix B.

5.3 Additional Inventory Data Summaries

As a part of the inventory development and MOVES inventory mode inputs development, additional intermediate vehicle activity and population data summary (tab-delimited text) files were produced and provided. These include the following VMT and VHT summaries for each county scenario (year, season, day type) and the following vehicle registration data and vehicle population estimates by county and year.

- **VMT** summary by hour, TDM road type, and TDM area type.
- **VHT** summary by hour, TDM road type, TDM area type, and MOVES average speed bin.
- **Vehicle registration data** by category of car, light truck/s, and heavier truck weight categories (and fuel type for heavy-duty trucks) used in the estimation of vehicle populations.
- **Vehicle populations estimates** with main fields of year, source type, population.
- **Vehicle populations by fuel type estimate** with fields of year, source type, fuel type, population, source type description, fuel type description.

These files were also provided as a part of the data package as described in Appendix B.

6.0 QUALITY ASSURANCE

Analyses and results were subjected to appropriate internal review and QA/QC procedures, including independent verification and reasonableness checks. All work was completed consistent with applicable elements of American Society for Quality, American National Standard ASQ/ANSI: E4:2014: *Quality Management Systems for Environmental Information and Technology Programs – Requirements with Guidance for Use,* February 2014, and the TCEQ Quality Management Plan.

The Quality Assurance Project Plans (QAPP) category and project type most closely matching the intended use of this analysis are QAPP Category II (for important, highly visible Agency projects involving areas such as supporting the development of environmental regulations or standards) and Modeling for NAAQS Compliance. Internal review and quality control measures consistent with the QA category and project type-specific requirements provided in Guidance for Quality Assurance Project Plans for Modeling, EPA QA/G-5M,[21] along with appropriate audits or assessments of data and reporting of findings, were employed. These include but are not limited to the elements outlined, per EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5),[22] in the following description.

6.1 PROJECT MANAGEMENT

The definition and background of the problem addressed by this project, the project/task description, and project documents and records are as described in the Purpose and Background sections of the Grant Activity Description (GAD). No special training or certification was required. The TTI project manager ensured project personnel used the most current, approved version of the QAPP.

The objective was to produce EIs of the quality level required for air quality modeling, according to the guidance and methods documents as referenced, and in consultation with the TCEQ project manager.

Basic criteria were used to assure the acceptable quality of the product, including the following.

- The product met the purpose of the emissions analysis.
- The full extent of the modeling domain was included.
- Agreed methods, models, tools, and data were used.

[21] PDF available at: https://www.epa.gov/sites/production/files/2015-06/documents/g5m-final.pdf.
[22] PDF available at: https://www.epa.gov/sites/production/files/2016-06/documents/r5-final_0.pdf.

- The output data sets were produced in required formats.
- Any deficiencies found (as discussed in Section 6.5) were corrected.
- Aggregate results were comparable with available, similarly produced emissions estimates.

6.2 Measurement and Data Acquisition

Note that no sampling of data was involved in the EI development; thus, only existing data (non-direct measurements) were used for this project.

The data needed for project implementation was for the development of emission rate model inputs and adjustment factors and the development of the activity inputs for external emissions calculations. Existing data acquired from various organizations (e.g., TxDOT, MPOs, TCEQ, EPA) was reviewed by TTI for suitability, and in most cases was previously QA'd by the providing agency. These data sets may include: HPMS data (from TxDOT's Roadway Inventory Functional Classification Record [RIFCREC] report); regional TDM data; speed model data; vehicle registration data; ATR data; vehicle classification count data; meteorological data; fuels data; MOVES emissions model data; extended idling activity data; and vehicle I/M program design data.

Any significant problems found during review, verification, and/or validation (see QA criteria and methods discussed in Section 6.5) were corrected, and the QA procedure was repeated until satisfied. No significant problems were found.

6.3 Data Management

The project team used the same electronic project folder structure on each individual workstation. As various scripts, inputs, and outputs were developed in the process, data were shared within the team for crosschecking. To perform the MOVES model runs, a computer cluster (multiple computers) configuration or individual workstation configuration was used. After input data were QA'd, data sets were backed up and stored in compressed files.

After the final product was completed, all the project data archives were compiled on a set of optical data discs (CD-ROM or DVD, depending on size) or on an external drive for very large project data sets. A complete archive of the project data is kept by TTI (the computer models and EI development utilities used in the process included). The electronic data submittal package (containing the project deliverables as listed in Appendix B) was produced along with data description (and copied to a shared folder or

CD-ROM, DVD, or external hard drive, depending on needed storage space) and delivered to TCEQ.

6.4 Assessment and Oversight

The following assessments were performed.

- Verified that the overall scope was met (i.e., consistent with the intended purpose, for specified temporal resolution and geographic coverage, for specified sources, pollutants, and emissions processes).
- Checked that input data was prepared according to the plan.
- Checked that correct output data was produced. Records were kept of the checks performed.

In the case of any inconsistency or deficiency found, the issue was directly communicated to responsible staff for correction (or outside agency staff involved, if any). After any correction, QA checks were repeated to assure the additional work resulted in the intended result and were noted in the QA record.

Any major problems were reported to the project manager and communicated to the project team as needed, as well as when various data elements passed QA checks and were ready next steps. The project manager ensured all of the QA checks performed were compiled and maintained in the project archives.

In addition, technical systems audits were performed. Audits of data quality at the requisite 25 percent level were performed for any data produced as part of this study. QA findings were reported in both the draft and the final reports.

6.5 Data Validation

Erroneous or improper inputs at any point during the EI development process may produce inaccurate emissions estimates. The TTI project team performed QA checks at each step of the analysis to ensure data quality.

The criteria for passing quality checks are summarized in the following. These QA guidelines were used to ensure the development of EIs that were as accurate as possible and met the requirements of TCEQ's intended use.

As previously stated, TTI verified the overall scope of the emissions analysis to include the following.

- Purpose (i.e., needed for air quality modeling applications).
- Modeling domain (e.g., analysis years, geographic coverage, seasonal periods, days, sources, pollutants).
- Methods, models, and data (e.g., default versus local input data sources).
- Procedures, tools, and required emissions output data sets.

TTI performed checks on input data, model execution, and output, as follows.

- Input data preparation:
  - The basis of input data sets as planned (e.g., actual, historical, latest available, validated model); aggregation levels.
  - Depending on the procedure and input data set, verification of calculations.
  - Use of correct data dimensions, fields, coding, labeling, formats; distributions sum to 1.0 where appropriate.
  - Reasonability checks: (discussed in the next section).
  - External data sources quality assurance verification.
- Model or utility execution:
  - Correct number of utility or model run input files per application.
  - Utility control or model run specifications verification (e.g., per the applicable user guide, correct inputs, and output options).
- Output:
  - Correct output files by type and quantity.
  - Expected output file sizes.
  - Warnings and errors (e.g., checks of any written to output run logs).
  - Required data, proper coding/labeling, formats.
  - Assessment of any unusual results.

TTI performed further checks for consistency, completeness, and reasonability of data output from model or utility applications.

- Any activity, emission rate, or emissions adjustments were performed as intended.
- Noted whether directional differences were as expected (e.g., between scenarios with temporal or geographic variation).
- Checked for consistency (e.g., input data control totals versus output summaries, utility raw results versus post-processed results).
- Compared results to results from previous similar analyses where available.

Any additional data products required for the emissions analysis were subjected to the appropriate QA checks previously listed. Any issues found needing resolution were corrected, and appropriate QA checks were performed until satisfied, ensuring the project results met the TCEQ requirements, i.e., as outlined in the GAD and QAPP.

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APPENDIX A:
EMISSIONS ESTIMATION UTILITIES FOR MOVES-BASED EMISSIONS INVENTORIES (ELECTRONIC ONLY)

This appendix is available separately in an electronic format (e.g., .docx, .xlsx, .pdf, .txt, .zip, or other format) and can be provided upon request.

APPENDIX B:
ELECTRONIC DATA SUBMITTAL DESCRIPTION (ELECTRONIC ONLY)

This appendix is available separately in an electronic format (e.g., .docx, .xlsx, .pdf, .txt, .zip, or other format) and can be provided upon request.

APPENDIX C:
TXDOT DISTRICT VMT MIX BY DAY OF WEEK

TxDOT District/HGB Counties.

TxDOT District	HGB County
Beaumont	Liberty
Beaumont	Chambers
Houston	Harris
Houston	Galveston
Houston	Fort Bend
Houston	Brazoria
Houston	Montgomery
Houston	Waller

VMT Mix Year/Analysis Year Correlations.

VMT Mix Year	Analysis Years
2020	2018 through 2022
2025	2023 through 2027

2020 Weekday VMT Mix - Beaumont TxDOT District (2019 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00054	0.00052	0.00055	0.00067	0.00049	0.00051	0.00053	0.00064	0.00049	0.00057	0.00056	0.00069	0.00041	0.00054	0.00049	0.00069
21_G	0.52975	0.51862	0.54774	0.66612	0.48337	0.50496	0.52939	0.63212	0.48224	0.56419	0.55093	0.68348	0.40643	0.53825	0.48415	0.68137
21_D	0.00481	0.00471	0.00497	0.00605	0.00439	0.00459	0.00481	0.00574	0.00438	0.00512	0.00500	0.00621	0.00369	0.00489	0.00440	0.00619
31_G	0.22650	0.26264	0.20149	0.21977	0.22476	0.26380	0.19149	0.23697	0.22939	0.26955	0.19380	0.22492	0.20147	0.24828	0.15553	0.21572
31_D	0.00415	0.00481	0.00369	0.00403	0.00412	0.00484	0.00351	0.00434	0.00420	0.00494	0.00355	0.00412	0.00369	0.00455	0.00285	0.00395
32_G	0.05564	0.06451	0.04949	0.05398	0.05521	0.06480	0.04703	0.05821	0.05634	0.06621	0.04760	0.05525	0.04949	0.06098	0.03820	0.05299
32_D	0.00311	0.00361	0.00277	0.00302	0.00309	0.00363	0.00263	0.00326	0.00315	0.00371	0.00266	0.00309	0.00277	0.00341	0.00214	0.00297
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00030	0.00112	0.00043	0.00078	0.00018	0.00061	0.00045	0.00062	0.00023	0.00021	0.00037	0.00052	0.00030	0.00020	0.00053	0.00045
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00060	0.00225	0.00087	0.00156	0.00035	0.00123	0.00090	0.00124	0.00045	0.00042	0.00075	0.00105	0.00060	0.00041	0.00107	0.00091
43_G	0.00002	0.00006	0.00002	0.00004	0.00001	0.00003	0.00002	0.00003	0.00001	0.00001	0.00002	0.00003	0.00002	0.00001	0.00003	0.00002
43_D	0.00164	0.00614	0.00237	0.00426	0.00096	0.00335	0.00246	0.00339	0.00124	0.00114	0.00204	0.00286	0.00163	0.00112	0.00293	0.00247
51_G	0.00048	0.00075	0.00049	0.00041	0.00052	0.00080	0.00058	0.00056	0.00036	0.00053	0.00041	0.00020	0.00057	0.00055	0.00046	0.00030
51_D	0.00086	0.00133	0.00087	0.00072	0.00092	0.00142	0.00104	0.00100	0.00064	0.00094	0.00073	0.00036	0.00101	0.00099	0.00082	0.00054
52_G	0.01056	0.01632	0.01064	0.00887	0.01132	0.01739	0.01272	0.01225	0.00786	0.01156	0.00898	0.00435	0.01241	0.01209	0.01009	0.00666
52_D	0.01886	0.02915	0.01899	0.01584	0.02022	0.03105	0.02271	0.02187	0.01404	0.02064	0.01604	0.00777	0.02216	0.02159	0.01801	0.01190
53_G	0.00037	0.00057	0.00037	0.00031	0.00040	0.00061	0.00045	0.00043	0.00028	0.00041	0.00032	0.00015	0.00044	0.00043	0.00036	0.00023
53_D	0.00066	0.00103	0.00067	0.00056	0.00071	0.00109	0.00080	0.00077	0.00049	0.00073	0.00056	0.00027	0.00078	0.00076	0.00063	0.00042
54_G	0.00037	0.00056	0.00037	0.00031	0.00039	0.00060	0.00044	0.00042	0.00027	0.00040	0.00031	0.00015	0.00043	0.00042	0.00035	0.00023
54_D	0.00065	0.00101	0.00066	0.00055	0.00070	0.00107	0.00079	0.00076	0.00049	0.00071	0.00055	0.00027	0.00077	0.00075	0.00062	0.00041
61_G	0.00326	0.00187	0.00355	0.00028	0.00438	0.00218	0.00413	0.00036	0.00451	0.00112	0.00384	0.00010	0.00678	0.00232	0.00644	0.00027
61_D	0.03260	0.01868	0.03550	0.00283	0.04372	0.02179	0.04125	0.00358	0.04501	0.01117	0.03835	0.00099	0.06770	0.02322	0.06430	0.00269
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.10424	0.05972	0.11349	0.00904	0.13979	0.06966	0.13187	0.01144	0.14392	0.03573	0.12261	0.00316	0.21647	0.07423	0.20559	0.00860

2020 Weekday VMT Mix - Houston TxDOT District (2019 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00072	0.00065	0.00071	0.00073	0.00053	0.00058	0.00066	0.00068	0.00069	0.00066	0.00072	0.00074	0.00065	0.00068	0.00071	0.00074
21_G	0.70993	0.64134	0.70051	0.72261	0.52671	0.57114	0.65658	0.67779	0.67885	0.65583	0.70864	0.73632	0.63916	0.67388	0.70543	0.73287
21_D	0.00645	0.00582	0.00636	0.00656	0.00478	0.00519	0.00596	0.00616	0.00617	0.00596	0.00644	0.00669	0.00580	0.00612	0.00641	0.00666
31_G	0.18242	0.20795	0.18290	0.17768	0.15526	0.22677	0.19173	0.19083	0.16604	0.22159	0.18451	0.17482	0.19596	0.19098	0.16229	0.16263
31_D	0.00334	0.00381	0.00335	0.00326	0.00285	0.00416	0.00351	0.00350	0.00304	0.00406	0.00338	0.00320	0.00359	0.00350	0.00297	0.00298
32_G	0.04481	0.05108	0.04493	0.04364	0.03814	0.05570	0.04709	0.04687	0.04078	0.05443	0.04532	0.04294	0.04813	0.04691	0.03986	0.03995
32_D	0.00251	0.00286	0.00251	0.00244	0.00213	0.00312	0.00264	0.00262	0.00228	0.00305	0.00254	0.00240	0.00269	0.00263	0.00223	0.00224
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00059	0.00046	0.00045	0.00045	0.00018	0.00030	0.00028	0.00031	0.00003	0.00014	0.00032	0.00016	0.00059	0.00017	0.00032	0.00015
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00118	0.00092	0.00090	0.00091	0.00036	0.00060	0.00056	0.00062	0.00005	0.00028	0.00065	0.00033	0.00118	0.00034	0.00064	0.00030
43_G	0.00003	0.00003	0.00002	0.00003	0.00001	0.00002	0.00002	0.00002	0.00000	0.00001	0.00002	0.00001	0.00003	0.00001	0.00002	0.00001
43_D	0.00322	0.00251	0.00245	0.00249	0.00098	0.00163	0.00154	0.00170	0.00014	0.00075	0.00177	0.00089	0.00321	0.00093	0.00174	0.00082
51_G	0.00037	0.00077	0.00056	0.00045	0.00107	0.00111	0.00085	0.00074	0.00044	0.00055	0.00041	0.00036	0.00053	0.00058	0.00042	0.00035
51_D	0.00036	0.00073	0.00053	0.00043	0.00101	0.00105	0.00081	0.00070	0.00042	0.00052	0.00039	0.00034	0.00050	0.00055	0.00040	0.00033
52_G	0.00739	0.01515	0.01095	0.00896	0.02103	0.02181	0.01681	0.01462	0.00877	0.01087	0.00813	0.00703	0.01040	0.01136	0.00826	0.00687
52_D	0.00702	0.01438	0.01040	0.00851	0.01996	0.02070	0.01596	0.01388	0.00833	0.01032	0.00772	0.00667	0.00987	0.01079	0.00784	0.00653
53_G	0.00109	0.00224	0.00162	0.00133	0.00311	0.00323	0.00249	0.00217	0.00130	0.00161	0.00120	0.00104	0.00154	0.00168	0.00122	0.00102
53_D	0.00104	0.00213	0.00154	0.00126	0.00296	0.00307	0.00236	0.00206	0.00123	0.00153	0.00114	0.00099	0.00146	0.00160	0.00116	0.00097
54_G	0.00028	0.00058	0.00042	0.00034	0.00081	0.00084	0.00064	0.00056	0.00034	0.00042	0.00031	0.00027	0.00040	0.00044	0.00032	0.00026
54_D	0.00027	0.00055	0.00040	0.00033	0.00077	0.00079	0.00061	0.00053	0.00032	0.00040	0.00030	0.00026	0.00038	0.00041	0.00030	0.00025
61_G	0.00055	0.00094	0.00058	0.00036	0.00445	0.00160	0.00100	0.00069	0.00165	0.00055	0.00053	0.00030	0.00151	0.00095	0.00118	0.00070
61_D	0.00635	0.01084	0.00671	0.00414	0.05119	0.01842	0.01151	0.00792	0.01902	0.00637	0.00614	0.00342	0.01741	0.01094	0.01354	0.00802
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.02007	0.03426	0.02120	0.01308	0.16172	0.05819	0.03636	0.02502	0.06009	0.02012	0.01940	0.01082	0.05499	0.03456	0.04276	0.02535

2020 Friday VMT Mix - Beaumont TxDOT District (2019 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00053	0.00052	0.00053	0.00068	0.00049	0.00051	0.00051	0.00065	0.00048	0.00057	0.00053	0.00070	0.00041	0.00054	0.00047	0.00070
21_G	0.54235	0.52074	0.56012	0.66547	0.49830	0.50726	0.54340	0.63133	0.49682	0.56564	0.56387	0.68316	0.42528	0.54053	0.50255	0.68085
21_D	0.00493	0.00473	0.00509	0.00604	0.00453	0.00461	0.00493	0.00573	0.00451	0.00514	0.00512	0.00620	0.00386	0.00491	0.00456	0.00618
31_G	0.23189	0.26372	0.20604	0.21956	0.23170	0.26501	0.19656	0.23667	0.23632	0.27025	0.19835	0.22482	0.21082	0.24933	0.16144	0.21556
31_D	0.00425	0.00483	0.00378	0.00402	0.00425	0.00486	0.00360	0.00434	0.00433	0.00495	0.00364	0.00412	0.00386	0.00457	0.00296	0.00395
32_G	0.05696	0.06478	0.05061	0.05393	0.05691	0.06509	0.04828	0.05813	0.05805	0.06638	0.04872	0.05522	0.05178	0.06124	0.03965	0.05295
32_D	0.00319	0.00363	0.00283	0.00302	0.00319	0.00364	0.00270	0.00325	0.00325	0.00372	0.00273	0.00309	0.00290	0.00343	0.00222	0.00296
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00030	0.00112	0.00041	0.00079	0.00017	0.00061	0.00043	0.00063	0.00022	0.00021	0.00036	0.00053	0.00030	0.00020	0.00052	0.00046
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00059	0.00224	0.00083	0.00158	0.00035	0.00122	0.00087	0.00126	0.00045	0.00041	0.00071	0.00106	0.00060	0.00041	0.00104	0.00092
43_G	0.00002	0.00006	0.00002	0.00004	0.00001	0.00003	0.00002	0.00003	0.00001	0.00001	0.00002	0.00003	0.00002	0.00001	0.00003	0.00003
43_D	0.00162	0.00612	0.00227	0.00431	0.00096	0.00333	0.00237	0.00344	0.00123	0.00113	0.00195	0.00290	0.00164	0.00111	0.00285	0.00250
51_G	0.00048	0.00074	0.00047	0.00041	0.00051	0.00079	0.00056	0.00057	0.00036	0.00053	0.00039	0.00020	0.00057	0.00055	0.00045	0.00031
51_D	0.00085	0.00133	0.00083	0.00073	0.00092	0.00141	0.00100	0.00101	0.00064	0.00094	0.00070	0.00036	0.00102	0.00098	0.00080	0.00055
52_G	0.00936	0.01588	0.00959	0.00906	0.01010	0.01693	0.01151	0.01251	0.00701	0.01123	0.00811	0.00445	0.01123	0.01177	0.00923	0.00681
52_D	0.01670	0.02836	0.01712	0.01618	0.01803	0.03023	0.02055	0.02233	0.01251	0.02005	0.01447	0.00794	0.02006	0.02101	0.01648	0.01215
53_G	0.00033	0.00056	0.00034	0.00032	0.00036	0.00060	0.00041	0.00044	0.00025	0.00040	0.00029	0.00016	0.00040	0.00041	0.00032	0.00024
53_D	0.00059	0.00100	0.00060	0.00057	0.00063	0.00106	0.00072	0.00079	0.00044	0.00071	0.00051	0.00028	0.00071	0.00074	0.00058	0.00043
54_G	0.00036	0.00056	0.00035	0.00031	0.00039	0.00060	0.00042	0.00043	0.00027	0.00040	0.00030	0.00015	0.00043	0.00042	0.00034	0.00023
54_D	0.00064	0.00100	0.00063	0.00055	0.00069	0.00107	0.00075	0.00077	0.00048	0.00071	0.00053	0.00027	0.00077	0.00074	0.00060	0.00042
61_G	0.00289	0.00182	0.00320	0.00029	0.00390	0.00212	0.00374	0.00037	0.00402	0.00109	0.00346	0.00010	0.00613	0.00226	0.00589	0.00028
61_D	0.02887	0.01817	0.03200	0.00289	0.03898	0.02121	0.03733	0.00365	0.04011	0.01086	0.03461	0.00101	0.06128	0.02259	0.05885	0.00275
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.09231	0.05810	0.10232	0.00923	0.12464	0.06780	0.11935	0.01168	0.12825	0.03471	0.11065	0.00323	0.19591	0.07223	0.18815	0.00879

2020 Friday VMT Mix - Houston TxDOT District (2019 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00070	0.00065	0.00067	0.00074	0.00055	0.00058	0.00063	0.00069	0.00068	0.00066	0.00067	0.00075	0.00064	0.00068	0.00067	0.00075
21_G	0.71921	0.64210	0.70522	0.72194	0.57055	0.57221	0.66363	0.67673	0.69925	0.65632	0.71260	0.73579	0.65789	0.67459	0.71205	0.73203
21_D	0.00653	0.00583	0.00640	0.00656	0.00518	0.00520	0.00603	0.00615	0.00635	0.00596	0.00647	0.00668	0.00597	0.00613	0.00647	0.00665
31_G	0.18481	0.20820	0.18413	0.17751	0.16818	0.22719	0.19378	0.19054	0.17104	0.22176	0.18554	0.17470	0.20171	0.19119	0.16382	0.16245
31_D	0.00339	0.00382	0.00338	0.00325	0.00308	0.00416	0.00355	0.00349	0.00314	0.00406	0.00340	0.00320	0.00370	0.00350	0.00300	0.00298
32_G	0.04539	0.05114	0.04523	0.04360	0.04131	0.05580	0.04760	0.04680	0.04201	0.05447	0.04557	0.04291	0.04954	0.04696	0.04024	0.03990
32_D	0.00254	0.00286	0.00253	0.00244	0.00231	0.00312	0.00266	0.00262	0.00235	0.00305	0.00255	0.00240	0.00277	0.00263	0.00225	0.00223
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00057	0.00046	0.00042	0.00046	0.00018	0.00030	0.00027	0.00031	0.00003	0.00014	0.00030	0.00017	0.00058	0.00017	0.00030	0.00015
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00114	0.00092	0.00085	0.00092	0.00037	0.00060	0.00053	0.00063	0.00005	0.00028	0.00061	0.00033	0.00116	0.00034	0.00060	0.00031
43_G	0.00003	0.00003	0.00002	0.00003	0.00001	0.00002	0.00001	0.00002	0.00000	0.00001	0.00002	0.00001	0.00003	0.00001	0.00002	0.00001
43_D	0.00312	0.00250	0.00231	0.00252	0.00101	0.00163	0.00146	0.00172	0.00014	0.00075	0.00167	0.00091	0.00317	0.00093	0.00164	0.00083
51_G	0.00036	0.00077	0.00052	0.00046	0.00111	0.00111	0.00081	0.00075	0.00044	0.00055	0.00039	0.00036	0.00052	0.00058	0.00040	0.00035
51_D	0.00035	0.00073	0.00050	0.00044	0.00105	0.00105	0.00077	0.00071	0.00042	0.00052	0.00037	0.00034	0.00049	0.00055	0.00038	0.00034
52_G	0.00532	0.01494	0.00972	0.00915	0.01618	0.02153	0.01498	0.01492	0.00642	0.01072	0.00721	0.00718	0.00761	0.01121	0.00735	0.00702
52_D	0.00505	0.01419	0.00923	0.00869	0.01536	0.02044	0.01423	0.01417	0.00609	0.01017	0.00685	0.00682	0.00722	0.01064	0.00697	0.00666
53_G	0.00079	0.00221	0.00144	0.00136	0.00240	0.00319	0.00222	0.00221	0.00095	0.00159	0.00107	0.00106	0.00113	0.00166	0.00109	0.00104
53_D	0.00075	0.00210	0.00137	0.00129	0.00228	0.00303	0.00211	0.00210	0.00090	0.00151	0.00101	0.00101	0.00107	0.00158	0.00103	0.00099
54_G	0.00027	0.00058	0.00040	0.00035	0.00084	0.00084	0.00061	0.00057	0.00033	0.00042	0.00029	0.00027	0.00039	0.00044	0.00030	0.00027
54_D	0.00026	0.00055	0.00038	0.00033	0.00079	0.00079	0.00058	0.00054	0.00031	0.00039	0.00028	0.00026	0.00037	0.00041	0.00028	0.00025
61_G	0.00040	0.00093	0.00052	0.00037	0.00343	0.00158	0.00089	0.00070	0.00121	0.00055	0.00047	0.00030	0.00111	0.00094	0.00105	0.00071
61_D	0.00457	0.01070	0.00596	0.00423	0.03939	0.01819	0.01026	0.00809	0.01392	0.00628	0.00545	0.00350	0.01273	0.01079	0.01205	0.00819
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.01445	0.03380	0.01882	0.01336	0.12444	0.05745	0.03240	0.02554	0.04397	0.01985	0.01720	0.01105	0.04021	0.03410	0.03805	0.02589

2020 Saturday VMT Mix - Beaumont TxDOT District (2019 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00052	0.00048	0.00050	0.00052	0.00048	0.00047	0.00049	0.00050	0.00048	0.00051	0.00051	0.00053	0.00042	0.00050	0.00046	0.00053
21_G	0.55561	0.54470	0.57344	0.67735	0.51421	0.53338	0.55858	0.64593	0.51234	0.58169	0.57780	0.68888	0.44603	0.56621	0.52297	0.69046
21_D	0.00505	0.00495	0.00521	0.00615	0.00467	0.00484	0.00507	0.00587	0.00465	0.00528	0.00525	0.00626	0.00405	0.00514	0.00475	0.00627
31_G	0.23756	0.27585	0.21094	0.22347	0.23910	0.27865	0.20205	0.24215	0.24371	0.27791	0.20325	0.22670	0.22110	0.26118	0.16800	0.21860
31_D	0.00435	0.00506	0.00387	0.00410	0.00438	0.00511	0.00370	0.00444	0.00447	0.00509	0.00373	0.00416	0.00405	0.00479	0.00308	0.00401
32_G	0.05835	0.06776	0.05181	0.05489	0.05873	0.06845	0.04963	0.05948	0.05986	0.06826	0.04992	0.05568	0.05431	0.06415	0.04127	0.05369
32_D	0.00327	0.00379	0.00290	0.00307	0.00329	0.00383	0.00278	0.00333	0.00335	0.00382	0.00279	0.00312	0.00304	0.00359	0.00231	0.00301
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00029	0.00102	0.00039	0.00061	0.00017	0.00056	0.00041	0.00048	0.00022	0.00019	0.00034	0.00040	0.00030	0.00019	0.00050	0.00035
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00058	0.00206	0.00079	0.00122	0.00035	0.00113	0.00083	0.00097	0.00044	0.00037	0.00068	0.00081	0.00061	0.00037	0.00101	0.00070
43_G	0.00002	0.00006	0.00002	0.00003	0.00001	0.00003	0.00002	0.00003	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00003	0.00002
43_D	0.00159	0.00561	0.00216	0.00332	0.00095	0.00307	0.00226	0.00266	0.00121	0.00102	0.00185	0.00221	0.00165	0.00102	0.00275	0.00192
51_G	0.00047	0.00068	0.00044	0.00032	0.00051	0.00073	0.00053	0.00044	0.00035	0.00047	0.00037	0.00015	0.00058	0.00051	0.00043	0.00024
51_D	0.00084	0.00122	0.00079	0.00056	0.00091	0.00131	0.00095	0.00078	0.00063	0.00085	0.00067	0.00027	0.00103	0.00090	0.00077	0.00042
52_G	0.00808	0.01094	0.00847	0.00558	0.00879	0.01172	0.01020	0.00774	0.00609	0.00760	0.00716	0.00271	0.00994	0.00812	0.00828	0.00417
52_D	0.01443	0.01953	0.01511	0.00996	0.01569	0.02093	0.01821	0.01381	0.01088	0.01357	0.01279	0.00484	0.01774	0.01449	0.01479	0.00745
53_G	0.00028	0.00038	0.00030	0.00020	0.00031	0.00041	0.00036	0.00027	0.00021	0.00027	0.00025	0.00010	0.00035	0.00029	0.00029	0.00015
53_D	0.00051	0.00069	0.00053	0.00035	0.00055	0.00074	0.00064	0.00049	0.00038	0.00048	0.00045	0.00017	0.00062	0.00051	0.00052	0.00026
54_G	0.00035	0.00052	0.00033	0.00024	0.00038	0.00055	0.00040	0.00033	0.00027	0.00036	0.00028	0.00012	0.00044	0.00038	0.00033	0.00018
54_D	0.00063	0.00092	0.00060	0.00043	0.00069	0.00099	0.00072	0.00059	0.00048	0.00064	0.00051	0.00021	0.00078	0.00068	0.00058	0.00032
61_G	0.00250	0.00125	0.00283	0.00018	0.00340	0.00147	0.00331	0.00023	0.00349	0.00074	0.00306	0.00006	0.00543	0.00156	0.00529	0.00017
61_D	0.02495	0.01252	0.02825	0.00178	0.03393	0.01468	0.03308	0.00226	0.03489	0.00735	0.03057	0.00062	0.05421	0.01558	0.05280	0.00169
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.07977	0.04002	0.09031	0.00568	0.10850	0.04695	0.10577	0.00723	0.11156	0.02350	0.09775	0.00197	0.17332	0.04982	0.16880	0.00539

2020 Saturday VMT Mix - Houston TxDOT District (2019 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00071	0.00063	0.00062	0.00057	0.00054	0.00057	0.00059	0.00054	0.00068	0.00064	0.00063	0.00058	0.00064	0.00066	0.00063	0.00058
21_G	0.71146	0.65697	0.71014	0.73422	0.53356	0.59343	0.67104	0.69639	0.68217	0.66597	0.71672	0.74552	0.64222	0.68852	0.71899	0.74755
21_D	0.00646	0.00597	0.00645	0.00667	0.00485	0.00539	0.00609	0.00632	0.00620	0.00605	0.00651	0.00677	0.00583	0.00625	0.00653	0.00679
31_G	0.18282	0.21302	0.18542	0.18053	0.15727	0.23561	0.19595	0.19607	0.16686	0.22502	0.18661	0.17701	0.19690	0.19513	0.16541	0.16589
31_D	0.00335	0.00390	0.00340	0.00331	0.00288	0.00432	0.00359	0.00359	0.00306	0.00412	0.00342	0.00324	0.00361	0.00358	0.00303	0.00304
32_G	0.04491	0.05232	0.04554	0.04434	0.03863	0.05787	0.04813	0.04816	0.04098	0.05527	0.04584	0.04348	0.04836	0.04793	0.04063	0.04075
32_D	0.00251	0.00293	0.00255	0.00248	0.00216	0.00324	0.00269	0.00270	0.00229	0.00309	0.00257	0.00243	0.00271	0.00268	0.00227	0.00228
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00058	0.00044	0.00039	0.00035	0.00018	0.00029	0.00025	0.00024	0.00003	0.00013	0.00028	0.00013	0.00058	0.00016	0.00028	0.00012
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00117	0.00089	0.00079	0.00071	0.00036	0.00059	0.00050	0.00049	0.00005	0.00026	0.00057	0.00025	0.00117	0.00033	0.00056	0.00024
43_G	0.00003	0.00002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00001	0.00000	0.00001	0.00002	0.00001	0.00003	0.00001	0.00002	0.00001
43_D	0.00321	0.00243	0.00216	0.00194	0.00098	0.00161	0.00137	0.00134	0.00014	0.00072	0.00156	0.00069	0.00321	0.00090	0.00154	0.00064
51_G	0.00037	0.00074	0.00049	0.00035	0.00107	0.00109	0.00076	0.00058	0.00044	0.00053	0.00036	0.00028	0.00053	0.00056	0.00037	0.00027
51_D	0.00035	0.00071	0.00046	0.00034	0.00102	0.00103	0.00072	0.00055	0.00042	0.00050	0.00034	0.00026	0.00050	0.00053	0.00035	0.00026
52_G	0.00705	0.01097	0.00844	0.00563	0.02027	0.01603	0.01306	0.00929	0.00839	0.00780	0.00625	0.00440	0.00995	0.00821	0.00640	0.00433
52_D	0.00669	0.01042	0.00801	0.00534	0.01924	0.01521	0.01240	0.00882	0.00796	0.00741	0.00594	0.00418	0.00944	0.00779	0.00607	0.00412
53_G	0.00104	0.00163	0.00125	0.00083	0.00300	0.00237	0.00193	0.00138	0.00124	0.00116	0.00093	0.00065	0.00147	0.00122	0.00095	0.00064
53_D	0.00099	0.00154	0.00119	0.00079	0.00285	0.00225	0.00184	0.00131	0.00118	0.00110	0.00088	0.00062	0.00140	0.00115	0.00090	0.00061
54_G	0.00028	0.00056	0.00037	0.00027	0.00081	0.00082	0.00057	0.00044	0.00034	0.00040	0.00027	0.00021	0.00040	0.00042	0.00028	0.00021
54_D	0.00027	0.00053	0.00035	0.00025	0.00077	0.00078	0.00054	0.00042	0.00032	0.00038	0.00026	0.00020	0.00038	0.00040	0.00027	0.00020
61_G	0.00053	0.00068	0.00045	0.00023	0.00429	0.00118	0.00078	0.00044	0.00158	0.00040	0.00041	0.00019	0.00145	0.00069	0.00091	0.00044
61_D	0.00606	0.00786	0.00517	0.00260	0.04935	0.01354	0.00894	0.00503	0.01819	0.00458	0.00472	0.00214	0.01664	0.00791	0.01049	0.00506
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.01914	0.02482	0.01634	0.00822	0.15590	0.04277	0.02825	0.01589	0.05747	0.01445	0.01492	0.00677	0.05258	0.02498	0.03313	0.01598

2020 Sunday VMT Mix - Beaumont TxDOT District (2019 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00051	0.00046	0.00048	0.00048	0.00048	0.00045	0.00047	0.00046	0.00047	0.00049	0.00049	0.00048	0.00042	0.00048	0.00045	0.00049
21_G	0.56377	0.55343	0.58267	0.68094	0.52413	0.54297	0.56918	0.65038	0.52201	0.58740	0.58748	0.69059	0.45930	0.57559	0.53752	0.69335
21_D	0.00512	0.00503	0.00529	0.00618	0.00476	0.00493	0.00517	0.00591	0.00474	0.00533	0.00534	0.00627	0.00417	0.00523	0.00488	0.00630
31_G	0.24105	0.28027	0.21434	0.22466	0.24372	0.28366	0.20588	0.24381	0.24831	0.28064	0.20665	0.22726	0.22768	0.26550	0.17268	0.21952
31_D	0.00442	0.00514	0.00393	0.00412	0.00447	0.00520	0.00377	0.00447	0.00455	0.00514	0.00379	0.00417	0.00417	0.00487	0.00317	0.00402
32_G	0.05921	0.06884	0.05265	0.05518	0.05986	0.06967	0.05057	0.05989	0.06099	0.06893	0.05076	0.05582	0.05592	0.06521	0.04241	0.05392
32_D	0.00331	0.00385	0.00295	0.00309	0.00335	0.00390	0.00283	0.00335	0.00341	0.00386	0.00284	0.00312	0.00313	0.00365	0.00237	0.00302
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00029	0.00099	0.00038	0.00055	0.00017	0.00054	0.00040	0.00044	0.00022	0.00018	0.00033	0.00037	0.00030	0.00018	0.00049	0.00032
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00058	0.00199	0.00076	0.00111	0.00034	0.00109	0.00080	0.00089	0.00044	0.00036	0.00066	0.00074	0.00061	0.00036	0.00098	0.00064
43_G	0.00002	0.00005	0.00002	0.00003	0.00001	0.00003	0.00002	0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00003	0.00002
43_D	0.00157	0.00543	0.00208	0.00302	0.00094	0.00298	0.00218	0.00242	0.00120	0.00098	0.00179	0.00201	0.00166	0.00099	0.00268	0.00174
51_G	0.00046	0.00066	0.00043	0.00029	0.00050	0.00071	0.00052	0.00040	0.00035	0.00046	0.00036	0.00014	0.00058	0.00049	0.00042	0.00022
51_D	0.00083	0.00118	0.00076	0.00051	0.00090	0.00126	0.00092	0.00071	0.00062	0.00081	0.00064	0.00025	0.00103	0.00087	0.00075	0.00038
52_G	0.00730	0.00914	0.00769	0.00452	0.00797	0.00981	0.00929	0.00628	0.00553	0.00631	0.00651	0.00219	0.00911	0.00678	0.00761	0.00338
52_D	0.01304	0.01632	0.01372	0.00808	0.01424	0.01752	0.01658	0.01122	0.00987	0.01127	0.01162	0.00392	0.01626	0.01211	0.01358	0.00604
53_G	0.00026	0.00032	0.00027	0.00016	0.00028	0.00035	0.00033	0.00022	0.00019	0.00022	0.00023	0.00008	0.00032	0.00024	0.00027	0.00012
53_D	0.00046	0.00057	0.00048	0.00028	0.00050	0.00062	0.00058	0.00039	0.00035	0.00040	0.00041	0.00014	0.00057	0.00043	0.00048	0.00021
54_G	0.00035	0.00050	0.00032	0.00022	0.00038	0.00054	0.00039	0.00030	0.00026	0.00034	0.00027	0.00011	0.00044	0.00037	0.00032	0.00016
54_D	0.00062	0.00089	0.00058	0.00039	0.00068	0.00096	0.00070	0.00054	0.00047	0.00062	0.00049	0.00019	0.00078	0.00066	0.00057	0.00029
61_G	0.00226	0.00105	0.00257	0.00014	0.00308	0.00123	0.00302	0.00018	0.00317	0.00061	0.00278	0.00005	0.00497	0.00130	0.00485	0.00014
61_D	0.02253	0.01046	0.02564	0.00144	0.03079	0.01229	0.03012	0.00184	0.03165	0.00610	0.02777	0.00050	0.04969	0.01303	0.04848	0.00137
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.07205	0.03343	0.08199	0.00461	0.09844	0.03930	0.09629	0.00587	0.10118	0.01951	0.08880	0.00159	0.15887	0.04165	0.15502	0.00437

2020 Sunday VMT Mix - Houston TxDOT District (2019 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00070	0.00063	0.00059	0.00052	0.00055	0.00057	0.00056	0.00049	0.00068	0.00063	0.00060	0.00052	0.00064	0.00066	0.00060	0.00053
21_G	0.71687	0.65836	0.71345	0.73793	0.55896	0.59544	0.67606	0.70242	0.69406	0.66687	0.71949	0.74845	0.65312	0.68981	0.72368	0.75227
21_D	0.00651	0.00598	0.00648	0.00670	0.00508	0.00541	0.00614	0.00638	0.00630	0.00606	0.00653	0.00680	0.00593	0.00626	0.00657	0.00683
31_G	0.18421	0.21347	0.18628	0.18144	0.16476	0.23641	0.19741	0.19777	0.16976	0.22532	0.18733	0.17770	0.20024	0.19550	0.16649	0.16694
31_D	0.00338	0.00391	0.00341	0.00333	0.00302	0.00433	0.00362	0.00363	0.00311	0.00413	0.00343	0.00326	0.00367	0.00358	0.00305	0.00306
32_G	0.04525	0.05243	0.04576	0.04457	0.04047	0.05807	0.04849	0.04858	0.04170	0.05535	0.04601	0.04365	0.04919	0.04802	0.04090	0.04100
32_D	0.00253	0.00293	0.00256	0.00249	0.00226	0.00325	0.00271	0.00272	0.00233	0.00310	0.00258	0.00244	0.00275	0.00269	0.00229	0.00229
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00057	0.00044	0.00038	0.00032	0.00018	0.00029	0.00024	0.00022	0.00003	0.00013	0.00027	0.00011	0.00058	0.00016	0.00027	0.00011
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00115	0.00089	0.00075	0.00065	0.00037	0.00059	0.00048	0.00045	0.00005	0.00026	0.00054	0.00023	0.00116	0.00033	0.00054	0.00021
43_G	0.00003	0.00002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00001	0.00000	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001
43_D	0.00315	0.00242	0.00206	0.00176	0.00100	0.00160	0.00131	0.00122	0.00014	0.00072	0.00148	0.00063	0.00318	0.00089	0.00147	0.00059
51_G	0.00037	0.00074	0.00047	0.00032	0.00110	0.00108	0.00072	0.00053	0.00044	0.00053	0.00034	0.00025	0.00052	0.00056	0.00035	0.00025
51_D	0.00035	0.00070	0.00044	0.00031	0.00104	0.00103	0.00069	0.00051	0.00042	0.00050	0.00033	0.00024	0.00050	0.00053	0.00034	0.00024
52_G	0.00584	0.01060	0.00757	0.00456	0.01746	0.01550	0.01176	0.00756	0.00702	0.00754	0.00561	0.00356	0.00832	0.00793	0.00575	0.00352
52_D	0.00554	0.01007	0.00719	0.00433	0.01658	0.01472	0.01116	0.00717	0.00666	0.00715	0.00532	0.00338	0.00790	0.00753	0.00546	0.00334
53_G	0.00087	0.00157	0.00112	0.00068	0.00259	0.00230	0.00174	0.00112	0.00104	0.00112	0.00083	0.00053	0.00123	0.00117	0.00085	0.00052
53_D	0.00082	0.00149	0.00106	0.00064	0.00246	0.00218	0.00165	0.00106	0.00099	0.00106	0.00079	0.00050	0.00117	0.00112	0.00081	0.00049
54_G	0.00028	0.00056	0.00035	0.00024	0.00083	0.00082	0.00055	0.00040	0.00033	0.00040	0.00026	0.00019	0.00039	0.00042	0.00027	0.00019
54_D	0.00026	0.00053	0.00033	0.00023	0.00079	0.00078	0.00052	0.00038	0.00032	0.00038	0.00025	0.00018	0.00037	0.00040	0.00025	0.00018
61_G	0.00044	0.00066	0.00040	0.00018	0.00370	0.00114	0.00070	0.00036	0.00132	0.00038	0.00037	0.00015	0.00121	0.00066	0.00082	0.00036
61_D	0.00502	0.00759	0.00464	0.00211	0.04251	0.01310	0.00805	0.00409	0.01522	0.00442	0.00424	0.00174	0.01392	0.00764	0.00943	0.00411
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.01586	0.02398	0.01466	0.00666	0.13430	0.04138	0.02543	0.01293	0.04808	0.01396	0.01338	0.00548	0.04397	0.02413	0.02979	0.01298

2025 Weekday VMT Mix - Beaumont TxDOT District (2023 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00054	0.00052	0.00055	0.00067	0.00049	0.00051	0.00053	0.00064	0.00049	0.00057	0.00056	0.00069	0.00041	0.00054	0.00049	0.00069
21_G	0.52868	0.51758	0.54663	0.66478	0.48240	0.50394	0.52832	0.63084	0.48127	0.56305	0.54982	0.68210	0.40561	0.53717	0.48317	0.68000
21_D	0.00588	0.00576	0.00608	0.00739	0.00537	0.00560	0.00588	0.00702	0.00535	0.00626	0.00612	0.00759	0.00451	0.00597	0.00537	0.00756
31_G	0.22627	0.26238	0.20128	0.21955	0.22454	0.26354	0.19129	0.23673	0.22916	0.26928	0.19360	0.22469	0.20127	0.24803	0.15537	0.21550
31_D	0.00438	0.00508	0.00390	0.00425	0.00435	0.00510	0.00370	0.00458	0.00444	0.00522	0.00375	0.00435	0.00390	0.00480	0.00301	0.00417
32_G	0.05564	0.06451	0.04949	0.05398	0.05521	0.06480	0.04703	0.05821	0.05634	0.06621	0.04760	0.05525	0.04949	0.06098	0.03820	0.05299
32_D	0.00311	0.00361	0.00277	0.00302	0.00309	0.00363	0.00263	0.00326	0.00315	0.00371	0.00266	0.00309	0.00277	0.00341	0.00214	0.00297
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00030	0.00112	0.00043	0.00078	0.00018	0.00061	0.00045	0.00062	0.00023	0.00021	0.00037	0.00052	0.00030	0.00020	0.00053	0.00045
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00061	0.00227	0.00088	0.00157	0.00036	0.00124	0.00091	0.00125	0.00046	0.00042	0.00075	0.00106	0.00060	0.00041	0.00108	0.00091
43_G	0.00002	0.00006	0.00002	0.00004	0.00001	0.00003	0.00002	0.00003	0.00001	0.00001	0.00002	0.00003	0.00002	0.00001	0.00003	0.00002
43_D	0.00164	0.00613	0.00236	0.00424	0.00096	0.00334	0.00246	0.00338	0.00123	0.00114	0.00203	0.00285	0.00162	0.00111	0.00292	0.00246
51_G	0.00048	0.00075	0.00049	0.00041	0.00052	0.00080	0.00058	0.00056	0.00036	0.00053	0.00041	0.00020	0.00057	0.00055	0.00046	0.00030
51_D	0.00086	0.00133	0.00087	0.00072	0.00092	0.00142	0.00104	0.00100	0.00064	0.00094	0.00073	0.00036	0.00101	0.00099	0.00082	0.00054
52_G	0.01059	0.01636	0.01066	0.00889	0.01135	0.01743	0.01274	0.01227	0.00788	0.01158	0.00900	0.00436	0.01244	0.01212	0.01011	0.00668
52_D	0.01890	0.02921	0.01903	0.01588	0.02026	0.03112	0.02276	0.02191	0.01407	0.02068	0.01608	0.00779	0.02221	0.02164	0.01805	0.01192
53_G	0.00037	0.00058	0.00038	0.00031	0.00040	0.00061	0.00045	0.00043	0.00028	0.00041	0.00032	0.00015	0.00044	0.00043	0.00036	0.00024
53_D	0.00067	0.00103	0.00067	0.00056	0.00071	0.00110	0.00080	0.00077	0.00050	0.00073	0.00057	0.00027	0.00078	0.00076	0.00064	0.00042
54_G	0.00034	0.00053	0.00034	0.00029	0.00037	0.00056	0.00041	0.00040	0.00025	0.00037	0.00029	0.00014	0.00040	0.00039	0.00033	0.00022
54_D	0.00061	0.00094	0.00061	0.00051	0.00065	0.00100	0.00073	0.00071	0.00045	0.00067	0.00052	0.00025	0.00072	0.00070	0.00058	0.00038
61_G	0.00338	0.00194	0.00368	0.00029	0.00453	0.00226	0.00427	0.00037	0.00466	0.00116	0.00397	0.00010	0.00702	0.00241	0.00666	0.00028
61_D	0.03375	0.01933	0.03674	0.00293	0.04526	0.02255	0.04270	0.00370	0.04660	0.01157	0.03970	0.00102	0.07009	0.02403	0.06656	0.00279
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.10298	0.05899	0.11212	0.00893	0.13810	0.06882	0.13028	0.01130	0.14218	0.03529	0.12113	0.00312	0.21385	0.07333	0.20310	0.00850

2025 Weekday VMT Mix - Houston TxDOT District (2023 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00072	0.00065	0.00071	0.00073	0.00053	0.00058	0.00066	0.00068	0.00069	0.00066	0.00072	0.00074	0.00065	0.00068	0.00071	0.00074
21_G	0.70849	0.64005	0.69909	0.72115	0.52565	0.56999	0.65526	0.67642	0.67748	0.65450	0.70721	0.73484	0.63787	0.67252	0.70401	0.73140
21_D	0.00788	0.00712	0.00778	0.00802	0.00585	0.00634	0.00729	0.00752	0.00754	0.00728	0.00787	0.00817	0.00709	0.00748	0.00783	0.00813
31_G	0.18224	0.20774	0.18272	0.17749	0.15510	0.22653	0.19153	0.19064	0.16588	0.22137	0.18432	0.17464	0.19576	0.19079	0.16213	0.16247
31_D	0.00353	0.00402	0.00354	0.00344	0.00300	0.00439	0.00371	0.00369	0.00321	0.00429	0.00357	0.00338	0.00379	0.00370	0.00314	0.00315
32_G	0.04481	0.05108	0.04493	0.04364	0.03814	0.05570	0.04709	0.04687	0.04078	0.05443	0.04532	0.04294	0.04813	0.04691	0.03986	0.03995
32_D	0.00251	0.00286	0.00251	0.00244	0.00213	0.00312	0.00264	0.00262	0.00228	0.00305	0.00254	0.00240	0.00269	0.00263	0.00223	0.00224
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00059	0.00046	0.00045	0.00045	0.00018	0.00030	0.00028	0.00031	0.00003	0.00014	0.00032	0.00016	0.00059	0.00017	0.00032	0.00015
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00119	0.00093	0.00091	0.00092	0.00036	0.00060	0.00057	0.00063	0.00005	0.00028	0.00066	0.00033	0.00119	0.00034	0.00064	0.00030
43_G	0.00003	0.00003	0.00002	0.00003	0.00001	0.00002	0.00002	0.00002	0.00000	0.00001	0.00002	0.00001	0.00003	0.00001	0.00002	0.00001
43_D	0.00321	0.00250	0.00245	0.00248	0.00098	0.00163	0.00154	0.00169	0.00014	0.00075	0.00177	0.00089	0.00320	0.00092	0.00173	0.00082
51_G	0.00037	0.00077	0.00056	0.00045	0.00107	0.00111	0.00085	0.00074	0.00044	0.00055	0.00041	0.00036	0.00053	0.00058	0.00042	0.00035
51_D	0.00036	0.00073	0.00053	0.00043	0.00101	0.00105	0.00081	0.00070	0.00042	0.00052	0.00039	0.00034	0.00050	0.00055	0.00040	0.00033
52_G	0.00741	0.01518	0.01097	0.00898	0.02107	0.02185	0.01685	0.01465	0.00879	0.01089	0.00815	0.00704	0.01042	0.01139	0.00827	0.00689
52_D	0.00703	0.01441	0.01042	0.00852	0.02001	0.02075	0.01600	0.01391	0.00834	0.01034	0.00774	0.00669	0.00989	0.01081	0.00785	0.00654
53_G	0.00110	0.00225	0.00163	0.00133	0.00312	0.00324	0.00250	0.00217	0.00130	0.00161	0.00121	0.00104	0.00154	0.00169	0.00123	0.00102
53_D	0.00104	0.00213	0.00154	0.00126	0.00296	0.00307	0.00237	0.00206	0.00124	0.00153	0.00115	0.00099	0.00147	0.00160	0.00116	0.00097
54_G	0.00027	0.00054	0.00039	0.00032	0.00075	0.00078	0.00060	0.00052	0.00031	0.00039	0.00029	0.00025	0.00037	0.00041	0.00030	0.00025
54_D	0.00025	0.00052	0.00037	0.00031	0.00072	0.00074	0.00057	0.00050	0.00030	0.00037	0.00028	0.00024	0.00035	0.00039	0.00028	0.00023
61_G	0.00057	0.00098	0.00060	0.00037	0.00461	0.00166	0.00104	0.00071	0.00171	0.00057	0.00055	0.00031	0.00157	0.00098	0.00122	0.00072
61_D	0.00658	0.01123	0.00695	0.00429	0.05299	0.01907	0.01191	0.00820	0.01969	0.00659	0.00636	0.00354	0.01802	0.01133	0.01401	0.00831
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.01983	0.03384	0.02095	0.01293	0.15976	0.05749	0.03592	0.02472	0.05937	0.01988	0.01917	0.01069	0.05432	0.03415	0.04224	0.02504

2025 Friday VMT Mix - Beaumont TxDOT District (2023 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00053	0.00052	0.00053	0.00068	0.00049	0.00051	0.00051	0.00065	0.00048	0.00057	0.00053	0.00070	0.00041	0.00054	0.00047	0.00070
21_G	0.54126	0.51969	0.55899	0.66413	0.49729	0.50624	0.54230	0.63005	0.49582	0.56450	0.56273	0.68178	0.42443	0.53944	0.50154	0.67947
21_D	0.00602	0.00578	0.00622	0.00739	0.00553	0.00563	0.00603	0.00701	0.00551	0.00628	0.00626	0.00758	0.00472	0.00600	0.00558	0.00756
31_G	0.23166	0.26345	0.20583	0.21933	0.23147	0.26474	0.19636	0.23643	0.23608	0.26997	0.19814	0.22459	0.21060	0.24908	0.16128	0.21534
31_D	0.00449	0.00510	0.00399	0.00425	0.00448	0.00513	0.00380	0.00458	0.00457	0.00523	0.00384	0.00435	0.00408	0.00482	0.00312	0.00417
32_G	0.05696	0.06478	0.05061	0.05393	0.05691	0.06509	0.04828	0.05813	0.05805	0.06638	0.04872	0.05522	0.05178	0.06124	0.03965	0.05295
32_D	0.00319	0.00363	0.00283	0.00302	0.00319	0.00364	0.00270	0.00325	0.00325	0.00372	0.00273	0.00309	0.00290	0.00343	0.00222	0.00296
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00030	0.00112	0.00041	0.00079	0.00017	0.00061	0.00043	0.00063	0.00022	0.00021	0.00036	0.00053	0.00030	0.00020	0.00052	0.00046
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00060	0.00226	0.00084	0.00159	0.00035	0.00123	0.00087	0.00127	0.00045	0.00042	0.00072	0.00107	0.00061	0.00041	0.00105	0.00093
43_G	0.00002	0.00006	0.00002	0.00004	0.00001	0.00003	0.00002	0.00003	0.00001	0.00001	0.00002	0.00003	0.00002	0.00001	0.00003	0.00003
43_D	0.00162	0.00610	0.00226	0.00430	0.00095	0.00332	0.00236	0.00343	0.00123	0.00113	0.00194	0.00289	0.00164	0.00111	0.00284	0.00250
51_G	0.00048	0.00074	0.00047	0.00041	0.00051	0.00079	0.00056	0.00057	0.00036	0.00053	0.00039	0.00020	0.00057	0.00055	0.00045	0.00031
51_D	0.00085	0.00133	0.00083	0.00073	0.00092	0.00141	0.00100	0.00101	0.00064	0.00094	0.00070	0.00036	0.00102	0.00098	0.00080	0.00055
52_G	0.00938	0.01592	0.00961	0.00908	0.01012	0.01696	0.01153	0.01253	0.00702	0.01125	0.00812	0.00446	0.01126	0.01179	0.00925	0.00682
52_D	0.01674	0.02842	0.01716	0.01622	0.01806	0.03029	0.02059	0.02238	0.01254	0.02009	0.01451	0.00796	0.02010	0.02105	0.01652	0.01218
53_G	0.00033	0.00056	0.00034	0.00032	0.00036	0.00060	0.00041	0.00044	0.00025	0.00040	0.00029	0.00016	0.00040	0.00041	0.00033	0.00024
53_D	0.00059	0.00100	0.00060	0.00057	0.00064	0.00107	0.00072	0.00079	0.00044	0.00071	0.00051	0.00028	0.00071	0.00074	0.00058	0.00043
54_G	0.00034	0.00053	0.00033	0.00029	0.00036	0.00056	0.00039	0.00040	0.00025	0.00037	0.00028	0.00014	0.00041	0.00039	0.00032	0.00022
54_D	0.00060	0.00094	0.00059	0.00052	0.00065	0.00100	0.00070	0.00072	0.00045	0.00066	0.00050	0.00025	0.00072	0.00070	0.00057	0.00039
61_G	0.00299	0.00188	0.00332	0.00030	0.00404	0.00220	0.00387	0.00038	0.00416	0.00112	0.00359	0.00010	0.00635	0.00234	0.00610	0.00028
61_D	0.02989	0.01881	0.03313	0.00299	0.04035	0.02195	0.03864	0.00378	0.04152	0.01124	0.03582	0.00105	0.06343	0.02339	0.06092	0.00285
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.09119	0.05739	0.10109	0.00912	0.12313	0.06698	0.11790	0.01154	0.12669	0.03429	0.10931	0.00319	0.19355	0.07136	0.18588	0.00868

2025 Friday VMT Mix - Houston TxDOT District (2023 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00070	0.00065	0.00067	0.00074	0.00055	0.00058	0.00063	0.00069	0.00068	0.00066	0.00067	0.00075	0.00064	0.00068	0.00067	0.00075
21_G	0.71776	0.64081	0.70380	0.72048	0.56941	0.57105	0.66230	0.67536	0.69785	0.65500	0.71117	0.73430	0.65657	0.67323	0.71062	0.73055
21_D	0.00798	0.00713	0.00783	0.00801	0.00633	0.00635	0.00737	0.00751	0.00776	0.00729	0.00791	0.00817	0.00730	0.00749	0.00790	0.00813
31_G	0.18462	0.20799	0.18395	0.17733	0.16801	0.22696	0.19359	0.19034	0.17086	0.22153	0.18535	0.17452	0.20150	0.19099	0.16365	0.16228
31_D	0.00358	0.00403	0.00356	0.00343	0.00325	0.00440	0.00375	0.00369	0.00331	0.00429	0.00359	0.00338	0.00390	0.00370	0.00317	0.00314
32_G	0.04539	0.05114	0.04523	0.04360	0.04131	0.05580	0.04760	0.04680	0.04201	0.05447	0.04557	0.04291	0.04955	0.04696	0.04024	0.03990
32_D	0.00254	0.00286	0.00253	0.00244	0.00231	0.00312	0.00266	0.00262	0.00235	0.00305	0.00255	0.00240	0.00277	0.00263	0.00225	0.00223
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00057	0.00046	0.00042	0.00046	0.00018	0.00030	0.00027	0.00031	0.00003	0.00014	0.00030	0.00017	0.00058	0.00017	0.00030	0.00015
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00115	0.00093	0.00085	0.00093	0.00037	0.00060	0.00054	0.00064	0.00005	0.00028	0.00062	0.00033	0.00117	0.00034	0.00061	0.00031
43_G	0.00003	0.00003	0.00002	0.00003	0.00001	0.00002	0.00001	0.00002	0.00000	0.00001	0.00002	0.00001	0.00003	0.00001	0.00002	0.00001
43_D	0.00311	0.00250	0.00230	0.00252	0.00101	0.00163	0.00145	0.00171	0.00014	0.00075	0.00166	0.00090	0.00316	0.00092	0.00163	0.00083
51_G	0.00036	0.00077	0.00052	0.00046	0.00111	0.00111	0.00081	0.00075	0.00044	0.00055	0.00039	0.00036	0.00052	0.00058	0.00040	0.00035
51_D	0.00035	0.00073	0.00050	0.00044	0.00105	0.00105	0.00077	0.00071	0.00042	0.00052	0.00037	0.00034	0.00049	0.00055	0.00038	0.00034
52_G	0.00533	0.01498	0.00974	0.00917	0.01622	0.02158	0.01502	0.01496	0.00643	0.01074	0.00723	0.00719	0.00762	0.01123	0.00736	0.00704
52_D	0.00506	0.01422	0.00925	0.00871	0.01539	0.02048	0.01426	0.01420	0.00611	0.01019	0.00686	0.00683	0.00724	0.01066	0.00699	0.00668
53_G	0.00079	0.00222	0.00144	0.00136	0.00240	0.00320	0.00222	0.00222	0.00095	0.00159	0.00107	0.00107	0.00113	0.00166	0.00109	0.00104
53_D	0.00075	0.00211	0.00137	0.00129	0.00228	0.00303	0.00211	0.00210	0.00090	0.00151	0.00102	0.00101	0.00107	0.00158	0.00104	0.00099
54_G	0.00026	0.00054	0.00037	0.00033	0.00078	0.00078	0.00057	0.00053	0.00031	0.00039	0.00027	0.00026	0.00037	0.00041	0.00028	0.00025
54_D	0.00024	0.00052	0.00035	0.00031	0.00074	0.00074	0.00054	0.00050	0.00029	0.00037	0.00026	0.00024	0.00035	0.00039	0.00027	0.00024
61_G	0.00041	0.00096	0.00054	0.00038	0.00355	0.00164	0.00092	0.00073	0.00125	0.00057	0.00049	0.00031	0.00115	0.00097	0.00108	0.00074
61_D	0.00473	0.01108	0.00617	0.00438	0.04078	0.01883	0.01062	0.00837	0.01441	0.00650	0.00564	0.00362	0.01318	0.01117	0.01247	0.00848
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.01427	0.03339	0.01859	0.01320	0.12294	0.05676	0.03201	0.02523	0.04344	0.01961	0.01700	0.01092	0.03972	0.03368	0.03759	0.02557

2025 Saturday VMT Mix - Beaumont TxDOT District (2023 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00052	0.00048	0.00050	0.00052	0.00048	0.00047	0.00049	0.00050	0.00048	0.00051	0.00051	0.00053	0.00042	0.00050	0.00046	0.00053
21_G	0.55450	0.54362	0.57229	0.67599	0.51318	0.53232	0.55746	0.64463	0.51131	0.58053	0.57664	0.68750	0.44514	0.56508	0.52192	0.68907
21_D	0.00617	0.00605	0.00637	0.00752	0.00571	0.00592	0.00620	0.00717	0.00569	0.00646	0.00641	0.00765	0.00495	0.00629	0.00580	0.00766
31_G	0.23732	0.27558	0.21073	0.22325	0.23886	0.27838	0.20185	0.24190	0.24346	0.27763	0.20304	0.22647	0.22088	0.26092	0.16783	0.21838
31_D	0.00460	0.00534	0.00408	0.00432	0.00463	0.00539	0.00391	0.00469	0.00472	0.00538	0.00393	0.00439	0.00428	0.00505	0.00325	0.00423
32_G	0.05835	0.06776	0.05181	0.05489	0.05873	0.06845	0.04963	0.05948	0.05986	0.06826	0.04992	0.05568	0.05431	0.06415	0.04127	0.05369
32_D	0.00327	0.00379	0.00290	0.00307	0.00329	0.00383	0.00278	0.00333	0.00335	0.00382	0.00279	0.00312	0.00304	0.00359	0.00231	0.00301
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00029	0.00102	0.00039	0.00061	0.00017	0.00056	0.00041	0.00048	0.00022	0.00019	0.00034	0.00040	0.00030	0.00019	0.00050	0.00035
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00059	0.00207	0.00080	0.00123	0.00035	0.00114	0.00083	0.00098	0.00045	0.00038	0.00068	0.00082	0.00061	0.00038	0.00102	0.00071
43_G	0.00002	0.00006	0.00002	0.00003	0.00001	0.00003	0.00002	0.00003	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00003	0.00002
43_D	0.00159	0.00560	0.00215	0.00331	0.00094	0.00306	0.00225	0.00265	0.00121	0.00102	0.00185	0.00221	0.00165	0.00102	0.00274	0.00191
51_G	0.00047	0.00068	0.00044	0.00032	0.00051	0.00073	0.00053	0.00044	0.00035	0.00047	0.00037	0.00015	0.00058	0.00051	0.00043	0.00024
51_D	0.00084	0.00122	0.00079	0.00056	0.00091	0.00131	0.00095	0.00078	0.00063	0.00085	0.00067	0.00027	0.00103	0.00090	0.00077	0.00042
52_G	0.00810	0.01096	0.00848	0.00559	0.00881	0.01175	0.01022	0.00775	0.00611	0.00762	0.00718	0.00272	0.00996	0.00813	0.00830	0.00418
52_D	0.01447	0.01957	0.01515	0.00998	0.01572	0.02097	0.01825	0.01384	0.01091	0.01360	0.01282	0.00485	0.01778	0.01452	0.01482	0.00747
53_G	0.00029	0.00039	0.00030	0.00020	0.00031	0.00041	0.00036	0.00027	0.00021	0.00027	0.00025	0.00010	0.00035	0.00029	0.00029	0.00015
53_D	0.00051	0.00069	0.00053	0.00035	0.00055	0.00074	0.00064	0.00049	0.00038	0.00048	0.00045	0.00017	0.00063	0.00051	0.00052	0.00026
54_G	0.00033	0.00048	0.00031	0.00022	0.00036	0.00052	0.00038	0.00031	0.00025	0.00034	0.00026	0.00011	0.00041	0.00036	0.00031	0.00017
54_D	0.00059	0.00086	0.00056	0.00040	0.00064	0.00092	0.00067	0.00055	0.00045	0.00060	0.00047	0.00019	0.00073	0.00064	0.00055	0.00030
61_G	0.00259	0.00130	0.00293	0.00018	0.00352	0.00152	0.00343	0.00023	0.00362	0.00076	0.00317	0.00006	0.00562	0.00161	0.00547	0.00017
61_D	0.02583	0.01296	0.02924	0.00184	0.03513	0.01520	0.03424	0.00234	0.03612	0.00761	0.03165	0.00064	0.05612	0.01613	0.05465	0.00174
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.07880	0.03953	0.08922	0.00561	0.10719	0.04638	0.10449	0.00714	0.11021	0.02322	0.09657	0.00194	0.17123	0.04922	0.16676	0.00532

2025 Saturday VMT Mix - Houston TxDOT District (2023 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00071	0.00063	0.00062	0.00057	0.00054	0.00057	0.00059	0.00054	0.00068	0.00064	0.00063	0.00058	0.00064	0.00066	0.00063	0.00058
21_G	0.71002	0.65566	0.70871	0.73274	0.53248	0.59224	0.66969	0.69499	0.68080	0.66464	0.71528	0.74402	0.64092	0.68714	0.71754	0.74605
21_D	0.00790	0.00729	0.00788	0.00815	0.00592	0.00659	0.00745	0.00773	0.00757	0.00739	0.00796	0.00828	0.00713	0.00764	0.00798	0.00830
31_G	0.18263	0.21281	0.18523	0.18035	0.15711	0.23538	0.19575	0.19587	0.16669	0.22479	0.18642	0.17683	0.19670	0.19494	0.16525	0.16572
31_D	0.00354	0.00412	0.00359	0.00349	0.00304	0.00456	0.00379	0.00379	0.00323	0.00435	0.00361	0.00342	0.00381	0.00378	0.00320	0.00321
32_G	0.04491	0.05232	0.04554	0.04434	0.03863	0.05787	0.04813	0.04816	0.04098	0.05527	0.04584	0.04348	0.04836	0.04793	0.04063	0.04075
32_D	0.00251	0.00293	0.00255	0.00248	0.00216	0.00324	0.00269	0.00270	0.00229	0.00309	0.00257	0.00243	0.00271	0.00268	0.00227	0.00228
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00058	0.00044	0.00039	0.00035	0.00018	0.00029	0.00025	0.00024	0.00003	0.00013	0.00028	0.00013	0.00058	0.00016	0.00028	0.00012
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00118	0.00090	0.00080	0.00072	0.00036	0.00059	0.00051	0.00049	0.00005	0.00027	0.00058	0.00026	0.00118	0.00033	0.00057	0.00024
43_G	0.00003	0.00002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00001	0.00000	0.00001	0.00002	0.00001	0.00003	0.00001	0.00002	0.00001
43_D	0.00320	0.00242	0.00215	0.00193	0.00098	0.00160	0.00136	0.00133	0.00014	0.00072	0.00155	0.00069	0.00320	0.00089	0.00153	0.00064
51_G	0.00037	0.00074	0.00049	0.00035	0.00107	0.00109	0.00076	0.00058	0.00044	0.00053	0.00036	0.00028	0.00053	0.00056	0.00037	0.00027
51_D	0.00035	0.00071	0.00046	0.00034	0.00102	0.00103	0.00072	0.00055	0.00042	0.00050	0.00034	0.00026	0.00050	0.00053	0.00035	0.00026
52_G	0.00706	0.01100	0.00846	0.00564	0.02032	0.01606	0.01309	0.00931	0.00841	0.00782	0.00627	0.00441	0.00997	0.00823	0.00641	0.00434
52_D	0.00671	0.01044	0.00803	0.00535	0.01929	0.01525	0.01243	0.00883	0.00798	0.00743	0.00595	0.00418	0.00946	0.00781	0.00608	0.00412
53_G	0.00105	0.00163	0.00125	0.00084	0.00301	0.00238	0.00194	0.00138	0.00124	0.00116	0.00093	0.00065	0.00148	0.00122	0.00095	0.00064
53_D	0.00099	0.00155	0.00119	0.00079	0.00286	0.00226	0.00184	0.00131	0.00118	0.00110	0.00088	0.00062	0.00140	0.00116	0.00090	0.00061
54_G	0.00026	0.00053	0.00035	0.00025	0.00076	0.00077	0.00054	0.00041	0.00031	0.00037	0.00026	0.00020	0.00037	0.00039	0.00026	0.00019
54_D	0.00025	0.00050	0.00033	0.00024	0.00072	0.00073	0.00051	0.00039	0.00030	0.00036	0.00024	0.00019	0.00035	0.00037	0.00025	0.00018
61_G	0.00055	0.00071	0.00047	0.00023	0.00444	0.00122	0.00080	0.00045	0.00164	0.00041	0.00043	0.00019	0.00150	0.00071	0.00094	0.00046
61_D	0.00627	0.00813	0.00535	0.00269	0.05109	0.01401	0.00926	0.00521	0.01883	0.00474	0.00489	0.00222	0.01723	0.00819	0.01085	0.00524
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.01891	0.02452	0.01614	0.00812	0.15401	0.04225	0.02790	0.01570	0.05677	0.01428	0.01474	0.00669	0.05194	0.02468	0.03272	0.01579

2025 Sunday VMT Mix - Beaumont TxDOT District (2023 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00051	0.00046	0.00048	0.00048	0.00048	0.00045	0.00047	0.00046	0.00047	0.00049	0.00049	0.00048	0.00042	0.00048	0.00045	0.00049
21_G	0.56265	0.55234	0.58150	0.67958	0.52308	0.54189	0.56804	0.64907	0.52096	0.58623	0.58630	0.68920	0.45838	0.57444	0.53644	0.69196
21_D	0.00626	0.00614	0.00647	0.00756	0.00582	0.00603	0.00632	0.00722	0.00579	0.00652	0.00652	0.00767	0.00510	0.00639	0.00597	0.00770
31_G	0.24081	0.28000	0.21412	0.22443	0.24347	0.28338	0.20568	0.24357	0.24806	0.28036	0.20644	0.22703	0.22745	0.26524	0.17250	0.21929
31_D	0.00466	0.00542	0.00415	0.00435	0.00472	0.00549	0.00398	0.00472	0.00480	0.00543	0.00400	0.00440	0.00441	0.00514	0.00334	0.00425
32_G	0.05921	0.06884	0.05265	0.05518	0.05986	0.06968	0.05057	0.05989	0.06099	0.06893	0.05076	0.05582	0.05593	0.06522	0.04241	0.05392
32_D	0.00331	0.00385	0.00295	0.00309	0.00335	0.00390	0.00283	0.00335	0.00341	0.00386	0.00284	0.00312	0.00313	0.00365	0.00237	0.00302
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00029	0.00099	0.00038	0.00055	0.00017	0.00054	0.00040	0.00044	0.00022	0.00018	0.00033	0.00037	0.00030	0.00018	0.00049	0.00032
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00058	0.00201	0.00077	0.00112	0.00035	0.00110	0.00081	0.00089	0.00044	0.00036	0.00066	0.00074	0.00061	0.00037	0.00099	0.00064
43_G	0.00002	0.00005	0.00002	0.00003	0.00001	0.00003	0.00002	0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00003	0.00002
43_D	0.00157	0.00541	0.00207	0.00301	0.00094	0.00297	0.00218	0.00241	0.00120	0.00098	0.00178	0.00200	0.00165	0.00099	0.00267	0.00174
51_G	0.00046	0.00066	0.00043	0.00029	0.00050	0.00071	0.00052	0.00040	0.00035	0.00046	0.00036	0.00014	0.00058	0.00049	0.00042	0.00022
51_D	0.00083	0.00118	0.00076	0.00051	0.00090	0.00126	0.00092	0.00071	0.00062	0.00081	0.00064	0.00025	0.00103	0.00087	0.00075	0.00038
52_G	0.00732	0.00916	0.00770	0.00453	0.00799	0.00983	0.00931	0.00630	0.00554	0.00633	0.00652	0.00220	0.00913	0.00680	0.00762	0.00339
52_D	0.01307	0.01635	0.01375	0.00809	0.01427	0.01756	0.01662	0.01124	0.00989	0.01130	0.01164	0.00393	0.01630	0.01214	0.01361	0.00605
53_G	0.00026	0.00032	0.00027	0.00016	0.00028	0.00035	0.00033	0.00022	0.00019	0.00022	0.00023	0.00008	0.00032	0.00024	0.00027	0.00012
53_D	0.00046	0.00058	0.00048	0.00028	0.00050	0.00062	0.00058	0.00040	0.00035	0.00040	0.00041	0.00014	0.00057	0.00043	0.00048	0.00021
54_G	0.00033	0.00047	0.00030	0.00020	0.00036	0.00050	0.00036	0.00028	0.00025	0.00032	0.00026	0.00010	0.00041	0.00035	0.00030	0.00015
54_D	0.00058	0.00083	0.00054	0.00036	0.00064	0.00089	0.00065	0.00050	0.00044	0.00058	0.00046	0.00018	0.00073	0.00062	0.00053	0.00027
61_G	0.00234	0.00108	0.00266	0.00015	0.00319	0.00127	0.00312	0.00019	0.00328	0.00063	0.00288	0.00005	0.00515	0.00135	0.00502	0.00014
61_D	0.02333	0.01082	0.02655	0.00149	0.03187	0.01272	0.03118	0.00190	0.03276	0.00632	0.02875	0.00052	0.05144	0.01348	0.05019	0.00141
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.07118	0.03303	0.08100	0.00455	0.09725	0.03882	0.09513	0.00580	0.09995	0.01928	0.08772	0.00157	0.15695	0.04114	0.15314	0.00431

2025 Sunday VMT Mix - Houston TxDOT District (2023 Analysis Year).

SUT/FT	AM Peak RT2	AM Peak RT3	AM Peak RT4	AM Peak RT5	Mid-Day RT2	Mid-Day RT3	Mid-Day RT4	Mid-Day RT5	PM Peak RT2	PM Peak RT3	PM Peak RT4	PM Peak RT5	Over-night RT2	Over-night RT3	Over-night RT4	Over-night RT5
11_G	0.00070	0.00063	0.00059	0.00052	0.00055	0.00057	0.00056	0.00049	0.00068	0.00063	0.00060	0.00052	0.00064	0.00066	0.00060	0.00053
21_G	0.71543	0.65704	0.71201	0.73645	0.55784	0.59425	0.67470	0.70101	0.69266	0.66553	0.71804	0.74694	0.65181	0.68843	0.72223	0.75075
21_D	0.00796	0.00731	0.00792	0.00819	0.00620	0.00661	0.00750	0.00780	0.00770	0.00740	0.00799	0.00831	0.00725	0.00766	0.00803	0.00835
31_G	0.18402	0.21326	0.18609	0.18126	0.16460	0.23618	0.19721	0.19757	0.16959	0.22510	0.18714	0.17752	0.20004	0.19530	0.16632	0.16677
31_D	0.00356	0.00413	0.00360	0.00351	0.00319	0.00457	0.00382	0.00383	0.00328	0.00436	0.00362	0.00344	0.00387	0.00378	0.00322	0.00323
32_G	0.04525	0.05244	0.04576	0.04457	0.04047	0.05807	0.04849	0.04858	0.04170	0.05535	0.04601	0.04365	0.04919	0.04802	0.04090	0.04100
32_D	0.00253	0.00293	0.00256	0.00249	0.00226	0.00325	0.00271	0.00272	0.00233	0.00310	0.00258	0.00244	0.00275	0.00269	0.00229	0.00229
41_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
41_D	0.00057	0.00044	0.00038	0.00032	0.00018	0.00029	0.00024	0.00022	0.00003	0.00013	0.00027	0.00011	0.00058	0.00016	0.00027	0.00011
42_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
42_D	0.00116	0.00089	0.00076	0.00065	0.00037	0.00059	0.00048	0.00045	0.00005	0.00027	0.00055	0.00023	0.00117	0.00033	0.00054	0.00022
43_G	0.00003	0.00002	0.00002	0.00002	0.00001	0.00002	0.00001	0.00001	0.00000	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001
43_D	0.00314	0.00241	0.00205	0.00176	0.00100	0.00160	0.00130	0.00122	0.00014	0.00072	0.00148	0.00063	0.00317	0.00089	0.00146	0.00058
51_G	0.00037	0.00074	0.00047	0.00032	0.00110	0.00108	0.00072	0.00053	0.00044	0.00053	0.00034	0.00025	0.00052	0.00056	0.00035	0.00025
51_D	0.00035	0.00070	0.00044	0.00031	0.00104	0.00103	0.00069	0.00051	0.00042	0.00050	0.00033	0.00024	0.00050	0.00053	0.00034	0.00024
52_G	0.00585	0.01063	0.00759	0.00457	0.01750	0.01554	0.01178	0.00757	0.00703	0.00755	0.00562	0.00357	0.00833	0.00795	0.00576	0.00353
52_D	0.00556	0.01009	0.00721	0.00434	0.01661	0.01475	0.01119	0.00719	0.00668	0.00717	0.00534	0.00339	0.00791	0.00755	0.00547	0.00335
53_G	0.00087	0.00157	0.00112	0.00068	0.00259	0.00230	0.00175	0.00112	0.00104	0.00112	0.00083	0.00053	0.00123	0.00118	0.00085	0.00052
53_D	0.00082	0.00149	0.00107	0.00064	0.00246	0.00218	0.00166	0.00106	0.00099	0.00106	0.00079	0.00050	0.00117	0.00112	0.00081	0.00050
54_G	0.00026	0.00052	0.00033	0.00023	0.00077	0.00077	0.00051	0.00038	0.00031	0.00037	0.00024	0.00018	0.00037	0.00039	0.00025	0.00018
54_D	0.00025	0.00050	0.00031	0.00022	0.00074	0.00073	0.00049	0.00036	0.00030	0.00035	0.00023	0.00017	0.00035	0.00037	0.00024	0.00017
61_G	0.00045	0.00068	0.00042	0.00019	0.00383	0.00118	0.00072	0.00037	0.00137	0.00040	0.00038	0.00016	0.00125	0.00069	0.00085	0.00037
61_D	0.00520	0.00786	0.00481	0.00218	0.04401	0.01356	0.00833	0.00424	0.01576	0.00457	0.00438	0.00180	0.01441	0.00791	0.00976	0.00425
62_G	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
62_D	0.01567	0.02369	0.01449	0.00658	0.13268	0.04088	0.02512	0.01278	0.04750	0.01379	0.01322	0.00542	0.04344	0.02384	0.02943	0.01282

APPENDIX D:
TXDOT DISTRICT AGGREGATE WEEKDAY VMT MIX

TxDOT District/HGB Counties

TxDOT District	HGB County
Beaumont	Liberty
Beaumont	Chambers
Houston	Harris
Houston	Galveston
Houston	Fort Bend
Houston	Brazoria
Houston	Montgomery
Houston	Waller

VMT Mix Year/Analysis Year Correlations

VMT Mix Year	Analysis Years
2020	2018 through 2022
2025	2023 through 2027

2020[1] Aggregate Weekday VMT Mix

SUT/FT	Beaumont	Houston
11_G	0.00053	0.00069
21_G	0.52622	0.68109
21_D	0.00478	0.00619
31_G	0.21805	0.18507
31_D	0.00400	0.00339
32_G	0.05356	0.04546
32_D	0.00300	0.00254
41_G	-	-
41_D	0.00048	0.00033
42_G	-	-
42_D	0.00096	0.00065
43_G	0.00003	0.00002
43_D	0.00261	0.00179
51_G	0.00058	0.00064
51_D	0.00103	0.00061
52_G	0.01257	0.01268
52_D	0.02245	0.01204
53_G	0.00044	0.00188
53_D	0.00079	0.00178
54_G	0.00043	0.00049
54_D	0.00078	0.00046
61_G	0.00342	0.00086
61_D	0.03414	0.00994
62_G	-	-
62_D	0.10916	0.03140

[1] 2019 Analysis Year

2025 Aggregate Weekday VMT Mix

SUT/FT	Beaumont	Houston
11_G	0.00053	0.00069
21_G	0.52516	0.67971
21_D	0.00584	0.00756
31_G	0.21783	0.18488
31_D	0.00422	0.00358
32_G	0.05356	0.04546
32_D	0.00300	0.00254
41_G	-	-
41_D	0.00048	0.00033
42_G	-	-
42_D	0.00096	0.00066
43_G	0.00003	0.00002
43_D	0.00260	0.00178
51_G	0.00058	0.00064
51_D	0.00103	0.00061
52_G	0.01260	0.01271
52_D	0.02250	0.01207
53_G	0.00044	0.00188
53_D	0.00079	0.00179
54_G	0.00041	0.00046
54_D	0.00073	0.00043
61_G	0.00354	0.00089
61_D	0.03534	0.01029
62_G	-	-
62_D	0.10784	0.03102

[1] 2023 Analysis Year

APPENDIX E:
CAPACITY FACTORS, SPEED FACTORS, AND SPEED REDUCTION FACTORS

Capacity Factors

Time of Day Assignment	Capacity Factor[1]
AM Peak	0.3333333
Mid-Day	0.1666667
PM Peak	0.2500000
Overnight	0.0909091

[1] To obtain hourly capacities, a single capacity factor for each time-of-day assignment is used for all area types and functional classes

Free-Flow (V/C=0) Speed Factors for Houston/Galveston Speed Model

Functional Class Code and Description	Area Type Code and Description	Distance Weighted Input Speeds[1]	Distance Weighted Free-Flow Speeds[2]	Free-Flow Speed Factor[3]
1 - Urban Interstate	1 - CBD	50.85	56.40	1.10906
1 - Urban Interstate	2 - Urban	52.55	61.40	1.16842
2 - Urban Other Freeway	1 - CBD	N/A	58.00	1.21154
2 - Urban Other Freeway	2 - Urban	52.00	63.00	1.21154
3 - Toll Road	1 - CBD	N/A	34.50	0.62652
3 - Toll Road	2 - Urban	57.58	36.08	0.62652
3 - Toll Road	3 - Urban Fringe	61.69	36.14	0.58577
3 - Toll Road	4 - Suburban	64.34	37.99	0.59040
3 - Toll Road	5 - Rural	59.13	38.43	0.64991
4 - Ramp	1 - CBD	28.62	35.13	1.22734
4 - Ramp	2 - Urban	40.06	36.26	0.90509
4 - Ramp	3 - Urban Fringe	43.22	38.52	0.89119
4 - Ramp	4 - Suburban	44.82	45.71	1.01987
4 - Ramp	5 - Rural	55.16	52.11	0.94478
5 - Urban Principal Arterial	1 - CBD	24.72	26.52	1.07262
5 - Urban Principal Arterial	2 - Urban	35.78	29.69	0.82974
6 - Urban Other Arterial	1 - CBD	22.00	24.64	1.11996
6 - Urban Other Arterial	2 - Urban	34.57	27.31	0.79001
7 - Urban Collector	1 - CBD	20.94	24.17	1.15413
7 - Urban Collector	2 - Urban	35.36	25.78	0.72901
10 - Rural Interstate	3 - Urban Fringe	57.84	61.40	1.06152
10 - Rural Interstate	4 - Suburban	59.15	67.20	1.13613
10 - Rural Interstate	5 - Rural	62.00	68.57	1.10599
11 - Rural Other Freeway	3 - Urban Fringe	62.00	63.00	1.01613
11 - Rural Other Freeway	4 - Suburban	62.00	69.00	1.11290
11 - Rural Other Freeway	5 - Rural	64.00	71.00	1.10938
12 - Rural Principal Arterial	3 - Urban Fringe	40.23	33.75	0.83890
12 - Rural Principal Arterial	4 - Suburban	46.12	42.48	0.92125
12 - Rural Principal Arterial	5 - Rural	60.00	55.53	0.92536
13 - Rural Other Arterial	3 - Urban Fringe	39.05	30.51	0.78131
13 - Rural Other Arterial	4 - Suburban	43.03	39.85	0.92612
13 - Rural Other Arterial	5 - Rural	53.97	54.07	1.00194
14 - Rural Major Collector	3 - Urban Fringe	38.00	27.76	0.73061
14 - Rural Major Collector	4 - Suburban	41.00	49.22	1.20059
14 - Rural Major Collector	5 - Rural	53.00	54.06	1.02009
15 - Rural Collector	3 - Urban Fringe	36.00	24.07	0.66864
15 - Rural Collector	4 - Suburban	40.00	35.58	0.88938
15 - Rural Collector	5 - Rural	49.00	49.86	1.01762

[1] Based on 2012 TDM data.

[2] Calculated from detailed speed model runs by H-GAC with link volumes set to 0 (V/C=0).

[3] When input speeds are not available, speed factors are taken from the nearest area type.

LOS E (V/C=1) Speed Factors for Houston/Galveston Speed Model

Functional Class Code and Description	Area Type Code and Description	Distance Weighted Input Speeds[1]	Distance Weighted Free-Flow Speeds[2]	Free-Flow Speed Factor[3]
1 - Urban Interstate	1 - CBD	50.85	34.35	0.67549
1 - Urban Interstate	2 - Urban	52.55	34.35	0.65370
2 - Urban Other Freeway	1 - CBD	N/A	35.00	0.67308
2 - Urban Other Freeway	2 - Urban	52.00	35.00	0.67308
3 - Toll Road	1 - CBD	N/A	24.77	0.43011
3 - Toll Road	2 - Urban	57.58	24.77	0.43011
3 - Toll Road	3 - Urban Fringe	61.69	26.52	0.42983
3 - Toll Road	4 - Suburban	64.34	29.54	0.45920
3 - Toll Road	5 - Rural	59.13	29.70	0.50229
4 - Ramp	1 - CBD	28.62	31.68	1.10692
4 - Ramp	2 - Urban	40.06	30.03	0.74952
4 - Ramp	3 - Urban Fringe	43.22	33.24	0.76908
4 - Ramp	4 - Suburban	44.82	41.22	0.91979
4 - Ramp	5 - Rural	55.16	49.01	0.88861
5 - Urban Principal Arterial	1 - CBD	24.72	22.13	0.89529
5 - Urban Principal Arterial	2 - Urban	35.78	24.44	0.68294
6 - Urban Other Arterial	1 - CBD	22.00	20.80	0.94565
6 - Urban Other Arterial	2 - Urban	34.57	22.76	0.65833
7 - Urban Collector	1 - CBD	20.94	20.06	0.95782
7 - Urban Collector	2 - Urban	35.36	21.23	0.60033
10 - Rural Interstate	3 - Urban Fringe	57.84	39.25	0.67860
10 - Rural Interstate	4 - Suburban	59.15	49.08	0.82973
10 - Rural Interstate	5 - Rural	62.00	49.08	0.79157
11 - Rural Other Freeway	3 - Urban Fringe	62.00	40.00	0.64516
11 - Rural Other Freeway	4 - Suburban	62.00	50.00	0.80645
11 - Rural Other Freeway	5 - Rural	64.00	50.00	0.78125
12 - Rural Principal Arterial	3 - Urban Fringe	40.23	27.30	0.67871
12 - Rural Principal Arterial	4 - Suburban	46.12	32.64	0.70784
12 - Rural Principal Arterial	5 - Rural	60.00	38.32	0.63858
13 - Rural Other Arterial	3 - Urban Fringe	39.05	24.81	0.63540
13 - Rural Other Arterial	4 - Suburban	43.03	30.15	0.70070
13 - Rural Other Arterial	5 - Rural	53.97	38.46	0.71270
14 - Rural Major Collector	3 - Urban Fringe	38.00	22.22	0.58465
14 - Rural Major Collector	4 - Suburban	41.00	34.09	0.83151
14 - Rural Major Collector	5 - Rural	53.00	36.83	0.69499
15 - Rural Collector	3 - Urban Fringe	36.00	19.74	0.54845
15 - Rural Collector	4 - Suburban	40.00	26.40	0.65994
15 - Rural Collector	5 - Rural	49.00	34.33	0.70057

[1] Based on 2012 TDM data.

[2] Calculated from detailed speed model runs by H-GAC with link volumes set to 0 (V/C=0).

[3] When input speeds are not available, speed factors are taken from the nearest area type.

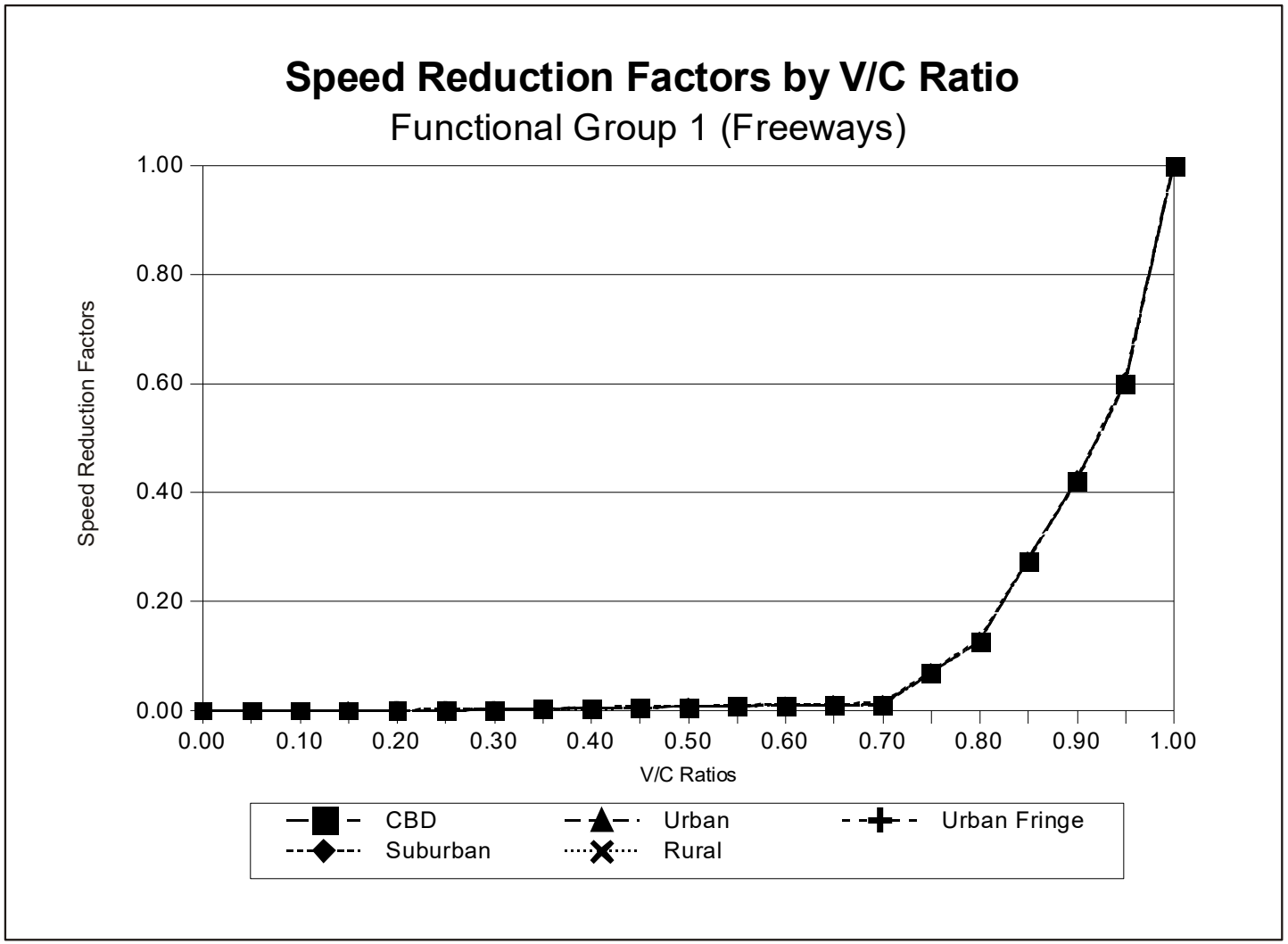

Figure 1. Freeway Speed Reduction Factors by V/C Ratio.

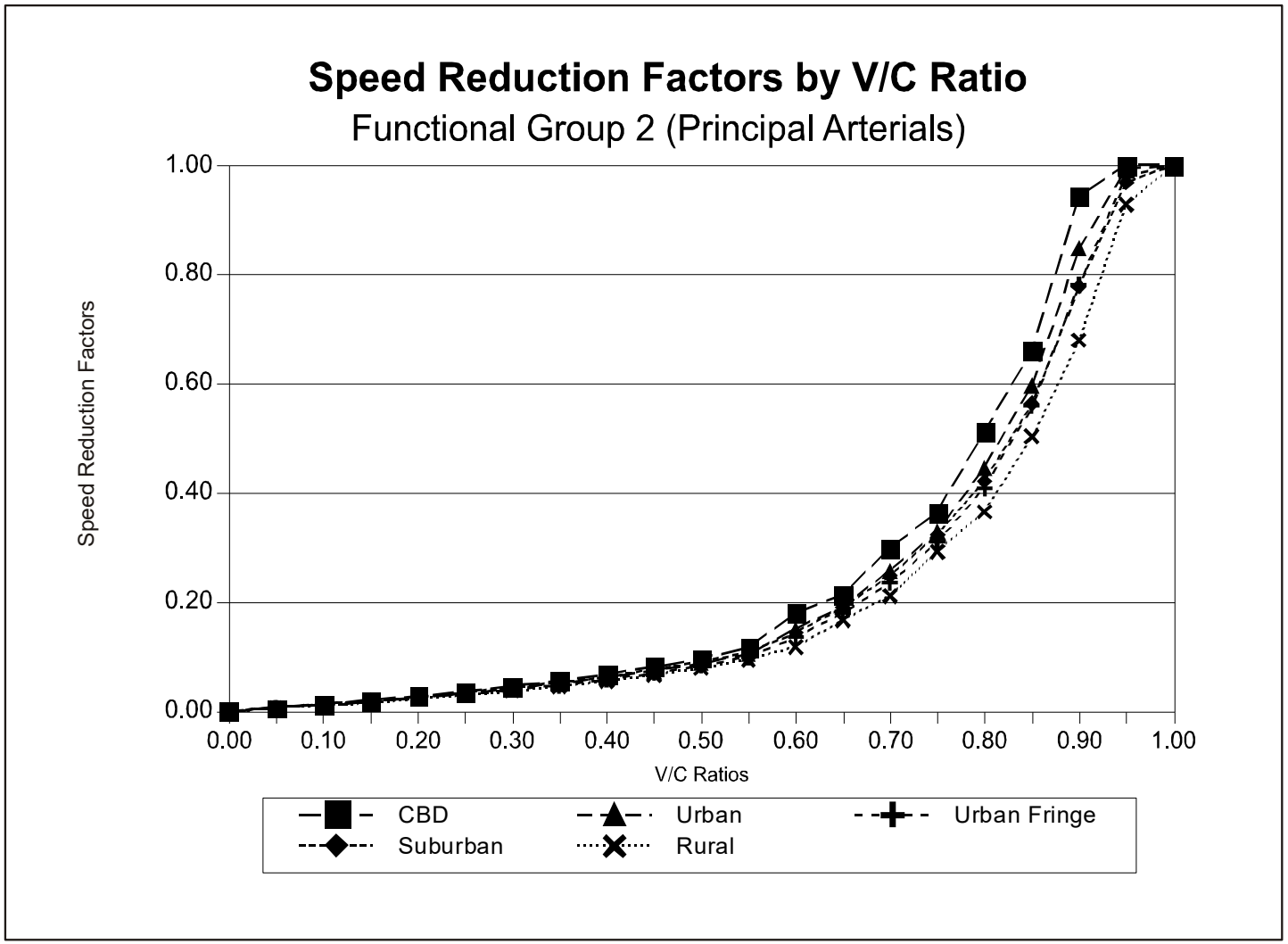

Figure 2. Principal Arterial Speed Reduction Factors by V/C Ratio.

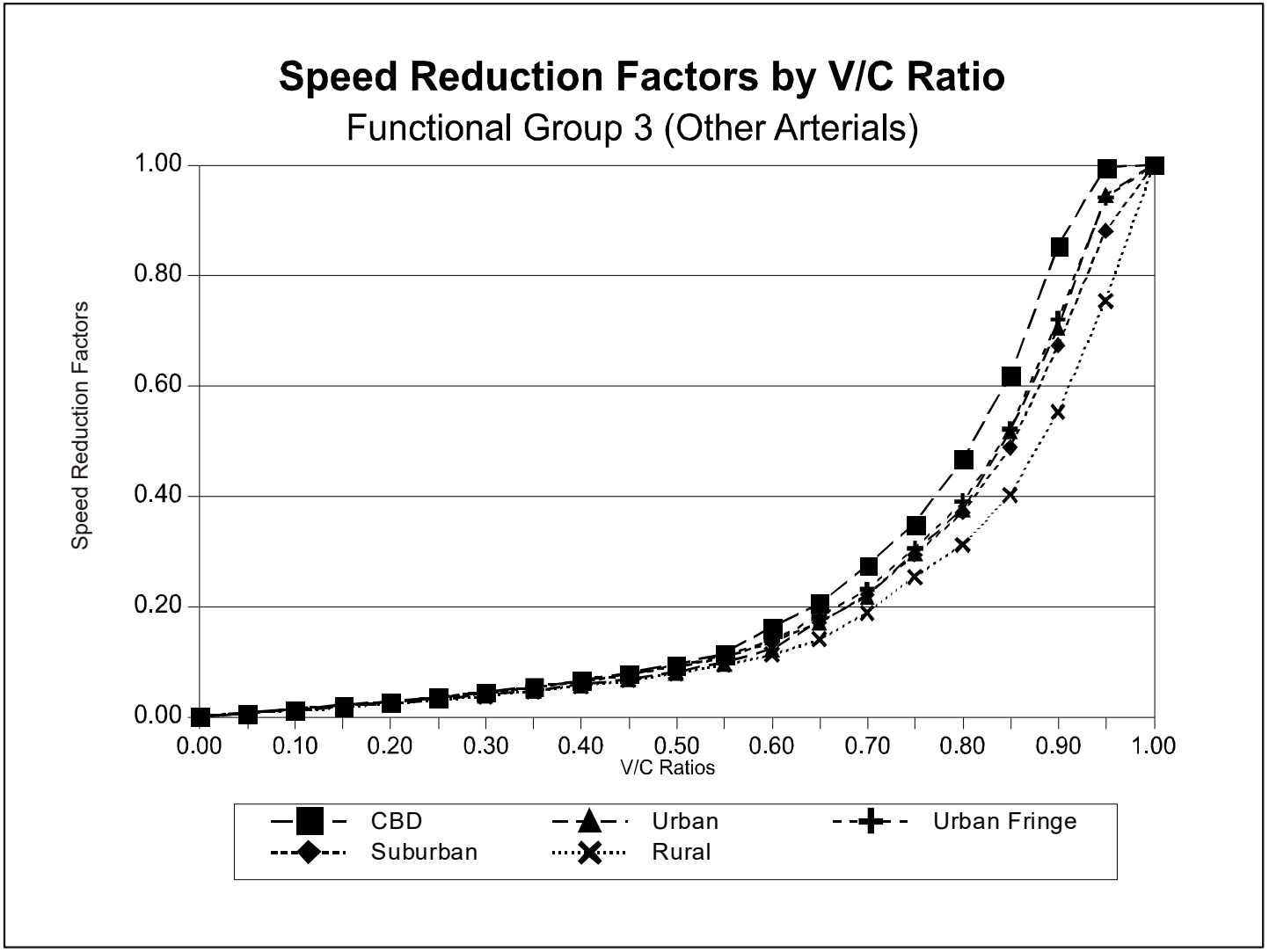

Figure 3. Other Arterial Speed Reduction Factors by V/C Ratio.

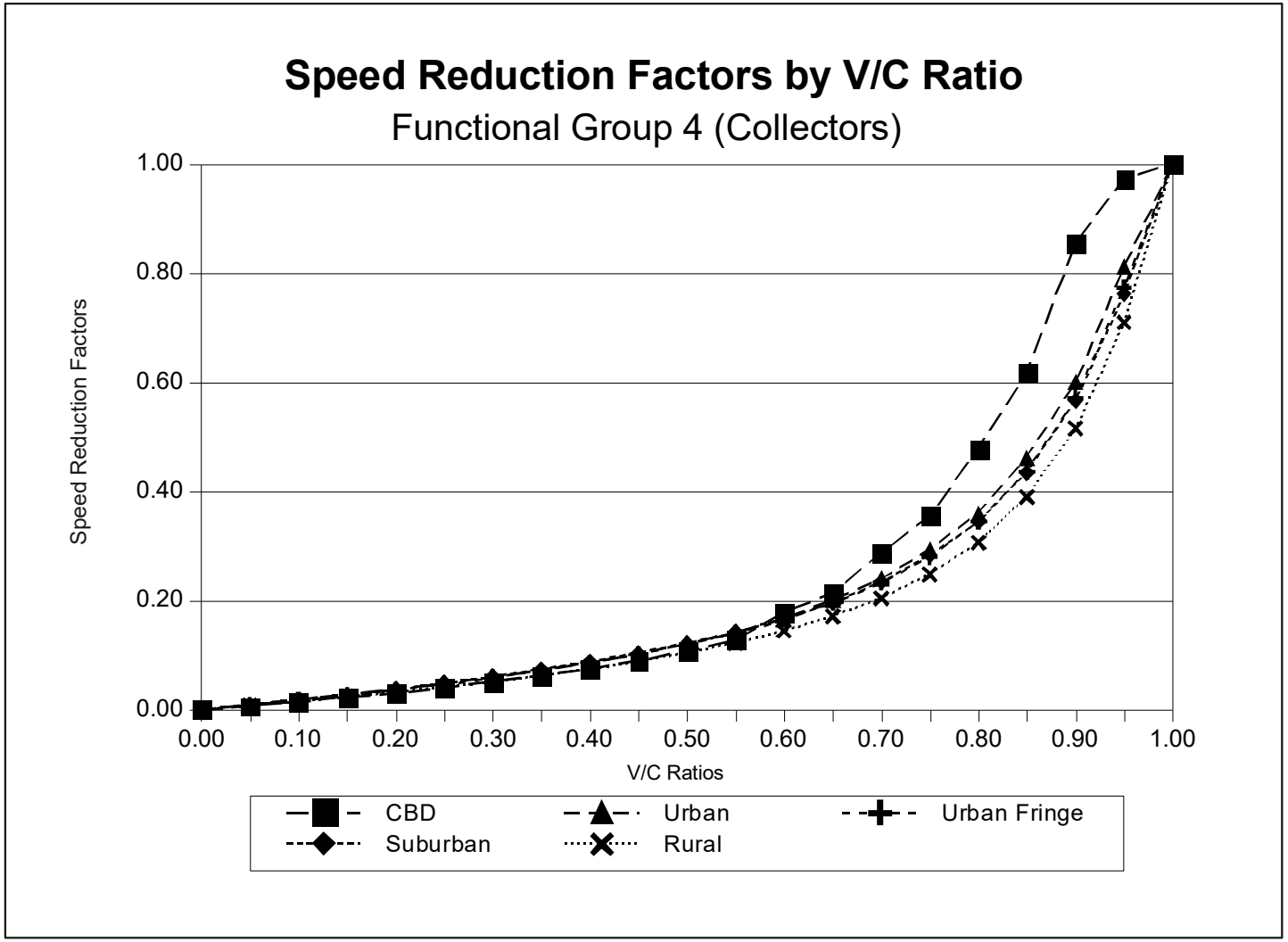

Figure 4. Collector Speed Reduction Factors by V/C Ratio.

Functional Classification to Functional Group Relationship for the Application of Speed Reduction Factors

Functional Group	Corresponding Network Functional Classifications
1. Freeways, Interstates	1. Urban Interstate Freeways 2. Urban Other Freeways 3. Toll Roads 10. Rural Interstate Freeways 11. Rural Other Freeways
2. Principal Arterials	5. Urban Principal Arterials 12. Rural Principal Arterials
3. Other Arterials, Major Collectors	6. Urban Other Arterials 13. Rural Other Arterials 14. Rural Major Collectors
4. Collectors	4. Ramps 7. Urban Collectors 15. Rural Collectors

APPENDIX F:
VEHICLE POPULATION ESTIMATES AND 24-HOUR ONI HOURS, SHP, STARTS, SHEI, AND APU HOURS SUMMARIES

2019 Vehicle Population Estimates.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	22,060	2,914	27,962	25,035	146,533	5,348	38,935	3,254
21_G	757,584	91,670	1,904,705	708,604	9,676,553	156,306	1,341,045	97,171
21_D	6,885	833	17,311	6,440	87,944	1,420	12,188	883
31_G	242,591	44,200	291,702	207,961	2,208,556	81,970	363,292	43,784
31_D	4,444	811	5,343	3,809	40,455	1,504	6,655	802
32_G	59,589	10,857	71,653	51,083	542,503	20,134	89,238	10,755
32_D	3,329	608	4,003	2,854	30,311	1,128	4,986	601
41_G	0	0	0	0	0	0	0	0
41_D	595	190	535	433	4,168	251	904	153
42_G	0	0	0	0	0	0	0	0
42_D	1,173	381	1,055	852	8,209	502	1,780	301
43_G	36	12	32	26	253	16	55	9
43_D	3,229	1,035	2,904	2,347	22,607	1,364	4,903	828
51_G	1,154	230	1,038	839	8,083	303	1,753	296
51_D	1,100	408	990	800	7,704	538	1,671	282
52_G	22,873	4,983	20,574	16,628	160,143	6,567	34,732	5,863
52_D	21,719	8,900	19,536	15,789	152,060	11,728	32,979	5,567
53_G	3,391	174	3,050	2,465	23,744	230	5,150	869
53_D	3,211	313	2,888	2,334	22,481	413	4,876	823
54_G	884	170	795	643	6,189	225	1,342	227
54_D	830	309	746	603	5,810	407	1,260	213
61_G	889	345	1,683	401	19,045	544	1,558	312
61_D	10,270	3,445	19,450	4,632	220,128	5,431	18,012	3,609
62_G	0	0	0	0	0	0	0	0
62_D	32,442	11,016	61,442	14,632	695,375	17,365	56,900	11,400

2019 24-Hour School Weekday ONI Hour Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	40,886	8,318	71,218	36,608	637,101	8,765	74,527	9,278
21_D	371	76	647	333	5,788	80	677	84
31_G	11,310	3,934	18,899	9,500	164,942	3,896	20,369	2,905
31_D	207	72	346	174	3,022	71	373	53
32_G	2,778	966	4,642	2,333	40,513	957	5,003	713
32_D	155	54	260	131	2,267	54	280	40
41_G	0	0	0	0	0	0	0	0
41_D	34	12	59	29	552	17	63	8
42_G	0	0	0	0	0	0	0	0
42_D	52	21	83	41	797	28	94	15
43_G	1	0	2	1	15	0	2	0
43_D	91	39	137	69	1,331	51	161	28
51_G	104	25	171	82	1,471	26	187	31
51_D	98	44	162	78	1,395	47	177	29
52_G	1,215	327	1,950	940	16,557	344	2,157	361
52_D	1,153	584	1,852	893	15,721	614	2,048	343
53_G	180	12	289	139	2,453	12	320	53
53_D	171	21	275	132	2,329	22	304	51
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	82	87	118	51	932	43	136	33
61_D	946	873	1,351	587	10,709	426	1,570	380
62_G	0	0	0	0	0	0	0	0
62_D	961	943	1,285	561	9,702	461	1,551	402

2019 24-Hour School Friday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	44,401	9,769	77,051	39,536	692,939	10,147	80,781	10,159
21_D	403	89	700	359	6,294	92	734	92
31_G	12,285	4,621	20,456	10,261	179,492	4,511	22,092	3,177
31_D	225	85	375	188	3,289	83	405	58
32_G	3,017	1,135	5,024	2,520	44,087	1,108	5,426	780
32_D	169	64	281	141	2,466	62	304	44
41_G	0	0	0	0	0	0	0	0
41_D	37	13	64	32	594	19	68	9
42_G	0	0	0	0	0	0	0	0
42_D	56	24	88	44	843	32	99	16
43_G	1	0	2	1	15	1	2	0
43_D	98	44	146	74	1,399	59	170	30
51_G	113	29	185	88	1,580	30	202	33
51_D	107	51	175	84	1,503	54	192	31
52_G	1,273	353	2,065	1,005	17,417	388	2,266	359
52_D	1,209	630	1,961	954	16,540	692	2,152	341
53_G	189	13	306	149	2,580	14	336	53
53_D	179	22	291	141	2,451	24	319	51
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	82	92	121	54	965	47	139	31
61_D	949	917	1,390	621	11,136	470	1,602	357
62_G	0	0	0	0	0	0	0	0
62_D	958	990	1,305	589	9,914	508	1,566	376

2019 24-Hour School Saturday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	34,438	7,544	59,887	30,940	532,025	7,834	62,822	7,855
21_D	313	69	544	281	4,831	71	570	71
31_G	9,500	3,581	15,861	7,980	136,983	3,480	17,102	2,453
31_D	174	66	291	146	2,509	64	313	45
32_G	2,334	880	3,896	1,960	33,647	855	4,201	602
32_D	131	49	218	110	1,883	48	235	34
41_G	0	0	0	0	0	0	0	0
41_D	24	9	41	20	375	12	44	7
42_G	0	0	0	0	0	0	0	0
42_D	38	17	60	29	556	21	68	12
43_G	1	0	1	1	10	0	1	0
43_D	69	32	102	50	957	39	122	24
51_G	93	25	148	68	1,236	25	166	30
51_D	88	45	141	65	1,172	44	157	29
52_G	1,055	298	1,673	771	14,094	287	1,869	345
52_D	1,002	533	1,589	732	13,384	513	1,775	327
53_G	156	10	248	114	2,088	10	277	51
53_D	148	19	236	109	1,985	18	263	48
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	54	58	76	31	579	26	88	23
61_D	619	582	867	349	6,639	262	1,006	268
62_G	0	0	0	0	0	0	0	0
62_D	609	608	797	321	5,805	273	964	274

2019 24-Hour School Sunday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	28,720	6,854	49,952	25,795	443,461	7,091	52,382	6,564
21_D	261	62	454	234	4,027	64	476	60
31_G	7,935	3,261	13,246	6,660	114,289	3,152	14,279	2,053
31_D	145	60	243	122	2,096	58	262	38
32_G	1,949	801	3,254	1,636	28,073	774	3,507	504
32_D	109	45	182	92	1,570	43	196	28
41_G	0	0	0	0	0	0	0	0
41_D	18	8	31	15	281	10	34	5
42_G	0	0	0	0	0	0	0	0
42_D	29	14	45	22	422	17	52	10
43_G	1	0	1	0	6	0	1	0
43_D	53	27	78	37	730	31	93	18
51_G	74	22	116	52	950	21	131	25
51_D	71	39	111	50	913	37	125	24
52_G	769	232	1,192	540	9,945	213	1,360	264
52_D	730	414	1,131	513	9,437	381	1,291	251
53_G	114	8	177	80	1,473	8	202	39
53_D	108	15	167	76	1,395	13	191	37
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	40	47	55	22	414	20	64	18
61_D	456	470	626	248	4,747	199	740	202
62_G	0	0	0	0	0	0	0	0
62_D	450	490	580	229	4,197	208	713	207

2019 24-Hour Summer Weekday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	42,878	8,671	74,915	38,440	670,709	9,155	78,275	9,717
21_D	390	79	681	349	6,093	83	711	88
31_G	11,858	4,101	19,871	9,972	173,559	4,069	21,385	3,042
31_D	217	75	364	183	3,180	75	392	56
32_G	2,912	1,007	4,881	2,449	42,630	999	5,253	747
32_D	163	56	273	137	2,385	56	294	42
41_G	0	0	0	0	0	0	0	0
41_D	34	12	59	29	550	17	63	8
42_G	0	0	0	0	0	0	0	0
42_D	52	21	83	41	795	28	93	15
43_G	1	0	2	1	15	0	2	0
43_D	91	39	137	69	1,328	51	161	28
51_G	104	25	170	82	1,467	26	187	31
51_D	98	44	161	78	1,392	46	177	29
52_G	1,212	326	1,946	938	16,517	342	2,152	361
52_D	1,151	582	1,847	891	15,682	611	2,043	342
53_G	180	11	288	139	2,447	12	319	53
53_D	171	20	274	132	2,324	22	303	51
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	82	87	117	51	929	42	136	33
61_D	944	869	1,348	586	10,682	424	1,566	379
62_G	0	0	0	0	0	0	0	0
62_D	959	939	1,282	560	9,679	459	1,547	401

2019 24-Hour Summer Friday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	46,251	10,235	80,529	41,246	724,416	10,651	84,298	10,568
21_D	420	93	731	375	6,580	97	766	96
31_G	12,793	4,841	21,368	10,702	187,545	4,735	23,043	3,305
31_D	234	89	391	196	3,436	87	422	61
32_G	3,142	1,189	5,249	2,629	46,065	1,163	5,660	812
32_D	176	67	294	147	2,577	65	317	45
41_G	0	0	0	0	0	0	0	0
41_D	36	13	64	32	588	19	67	9
42_G	0	0	0	0	0	0	0	0
42_D	55	24	88	44	835	32	99	16
43_G	1	0	2	1	14	1	2	0
43_D	97	44	145	73	1,385	59	169	29
51_G	112	29	183	88	1,564	30	200	33
51_D	106	51	174	83	1,488	54	190	31
52_G	1,261	353	2,046	996	17,246	388	2,245	356
52_D	1,198	631	1,943	946	16,378	692	2,132	338
53_G	187	13	303	148	2,555	14	333	53
53_D	178	22	288	140	2,427	24	316	50
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	82	92	120	53	956	47	138	31
61_D	940	917	1,378	615	11,026	470	1,587	354
62_G	0	0	0	0	0	0	0	0
62_D	949	990	1,294	584	9,823	509	1,552	373

2019 24-Hour Summer Saturday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	35,539	8,004	62,002	31,970	551,161	8,337	64,915	8,098
21_D	323	73	563	290	5,005	76	589	74
31_G	9,784	3,799	16,384	8,228	141,570	3,699	17,632	2,525
31_D	179	70	300	151	2,593	68	323	46
32_G	2,403	933	4,024	2,021	34,774	909	4,331	620
32_D	134	52	225	113	1,946	51	242	35
41_G	0	0	0	0	0	0	0	0
41_D	24	9	40	20	366	12	43	7
42_G	0	0	0	0	0	0	0	0
42_D	37	17	58	28	543	21	67	12
43_G	1	0	1	1	10	0	1	0
43_D	68	32	100	48	935	39	119	23
51_G	91	25	145	66	1,203	25	162	30
51_D	86	45	137	63	1,141	44	153	28
52_G	1,028	302	1,631	751	13,727	290	1,821	336
52_D	976	539	1,548	713	13,035	518	1,729	319
53_G	152	11	242	111	2,033	10	270	50
53_D	145	19	230	106	1,934	18	256	47
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	53	59	74	30	569	27	86	23
61_D	606	593	849	343	6,523	266	985	261
62_G	0	0	0	0	0	0	0	0
62_D	595	618	781	315	5,707	278	944	267

2019 24-Hour Summer Sunday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	29,811	7,407	52,013	26,808	462,170	7,686	54,437	6,805
21_D	271	67	472	243	4,197	70	494	62
31_G	8,222	3,524	13,765	6,909	118,860	3,413	14,810	2,126
31_D	151	65	252	127	2,179	63	272	39
32_G	2,019	865	3,381	1,697	29,196	838	3,638	522
32_D	113	48	189	95	1,633	47	204	29
41_G	0	0	0	0	0	0	0	0
41_D	18	8	30	15	277	10	33	5
42_G	0	0	0	0	0	0	0	0
42_D	29	15	45	21	415	17	52	10
43_G	1	0	1	0	6	0	1	0
43_D	52	28	77	37	719	32	92	18
51_G	73	23	114	51	933	22	128	25
51_D	69	40	109	49	897	38	123	23
52_G	755	239	1,171	531	9,767	220	1,336	259
52_D	717	427	1,111	504	9,268	392	1,268	246
53_G	112	8	174	79	1,447	8	198	38
53_D	106	15	164	74	1,370	14	188	37
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	39	49	54	21	410	21	64	17
61_D	449	487	618	246	4,702	206	730	199
62_G	0	0	0	0	0	0	0	0
62_D	443	508	573	227	4,158	216	704	204

2019 24-Hour School Weekday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	132,495	17,536	167,856	150,394	878,574	32,208	233,827	19,536
21_G	4,371,822	517,924	11,113,426	4,092,501	55,090,250	904,166	7,719,017	543,938
21_D	39,733	4,705	101,004	37,195	500,692	8,213	70,155	4,944
31_G	1,408,335	250,098	1,664,939	1,207,129	12,487,735	477,253	2,091,177	250,648
31_D	25,797	4,588	30,497	22,111	228,739	8,755	38,304	4,591
32_G	345,940	61,432	408,972	296,516	3,067,459	117,228	513,671	61,569
32_D	19,328	3,441	22,849	16,567	171,374	6,566	28,698	3,440
41_G	0	0	0	0	0	0	0	0
41_D	3,490	1,117	3,057	2,522	23,525	1,468	5,265	896
42_G	0	0	0	0	0	0	0	0
42_D	6,886	2,236	6,050	4,982	46,582	2,942	10,396	1,766
43_G	212	70	187	154	1,442	93	321	54
43_D	19,017	6,096	16,756	13,767	129,192	8,023	28,730	4,876
51_G	6,715	1,332	5,865	4,865	45,300	1,770	10,129	1,713
51_D	6,402	2,366	5,592	4,638	43,193	3,144	9,656	1,634
52_G	133,899	29,086	117,646	97,085	910,270	38,588	202,256	34,199
52_D	127,141	51,948	111,709	92,185	864,329	68,919	192,048	32,473
53_G	19,853	1,018	17,443	14,394	134,966	1,351	29,988	5,071
53_D	18,795	1,828	16,513	13,628	127,765	2,425	28,390	4,800
54_G	5,222	1,006	4,623	3,789	35,831	1,332	7,901	1,336
54_D	4,901	1,825	4,338	3,556	33,615	2,416	7,415	1,254
61_G	5,088	1,816	9,743	2,247	111,478	3,151	8,942	1,777
61_D	58,821	18,127	112,634	25,982	1,288,683	31,451	103,375	20,544
62_G	0	0	0	0	0	0	0	0
62_D	187,838	59,809	358,787	83,367	4,094,995	101,463	329,964	65,695

2019 24-Hour School Friday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	132,482	17,532	167,832	150,383	878,368	32,204	233,804	19,534
21_G	4,355,731	511,862	11,084,417	4,078,593	54,804,256	898,094	7,688,149	540,145
21_D	39,588	4,650	100,741	37,069	498,099	8,158	69,875	4,909
31_G	1,403,917	247,240	1,657,300	1,203,546	12,414,257	474,558	2,082,803	249,474
31_D	25,716	4,536	30,357	22,046	227,393	8,706	38,151	4,570
32_G	344,855	60,730	407,096	295,636	3,049,411	116,567	511,615	61,280
32_D	19,267	3,402	22,744	16,517	170,366	6,529	28,584	3,424
41_G	0	0	0	0	0	0	0	0
41_D	3,482	1,112	3,042	2,515	23,401	1,462	5,250	894
42_G	0	0	0	0	0	0	0	0
42_D	6,872	2,227	6,027	4,971	46,381	2,930	10,372	1,763
43_G	212	70	187	153	1,440	92	320	54
43_D	18,984	6,075	16,700	13,740	128,691	7,993	28,673	4,869
51_G	6,696	1,325	5,833	4,851	45,047	1,762	10,095	1,708
51_D	6,383	2,352	5,561	4,624	42,943	3,129	9,624	1,628
52_G	133,715	29,010	117,261	96,876	907,138	38,462	201,890	34,203
52_D	126,966	51,813	111,342	91,986	861,344	68,694	191,700	32,476
53_G	19,826	1,015	17,387	14,364	134,503	1,346	29,934	5,071
53_D	18,769	1,823	16,458	13,598	127,323	2,417	28,338	4,801
54_G	5,214	1,003	4,609	3,782	35,716	1,328	7,886	1,333
54_D	4,894	1,820	4,326	3,550	33,514	2,410	7,402	1,252
61_G	5,087	1,803	9,731	2,238	111,349	3,137	8,932	1,783
61_D	58,802	17,994	112,487	25,868	1,287,047	31,317	103,250	20,613
62_G	0	0	0	0	0	0	0	0
62_D	187,794	59,477	358,429	83,088	4,091,014	101,128	329,659	65,867

2019 24-Hour School Saturday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	132,252	17,459	167,576	150,115	877,433	32,065	233,406	19,500
21_G	4,383,353	517,055	11,128,516	4,102,245	55,347,735	902,084	7,743,331	547,097
21_D	39,839	4,697	101,142	37,284	503,043	8,194	70,377	4,972
31_G	1,411,205	249,614	1,671,725	1,209,570	12,560,902	475,989	2,098,052	251,506
31_D	25,849	4,579	30,622	22,156	230,082	8,732	38,431	4,607
32_G	346,644	61,313	410,638	297,115	3,085,424	116,918	515,359	61,779
32_D	19,367	3,434	22,942	16,600	172,377	6,549	28,793	3,452
41_G	0	0	0	0	0	0	0	0
41_D	3,507	1,117	3,100	2,542	23,966	1,473	5,304	898
42_G	0	0	0	0	0	0	0	0
42_D	6,916	2,236	6,124	5,016	47,361	2,949	10,462	1,769
43_G	213	70	189	155	1,467	93	323	55
43_D	19,084	6,093	16,930	13,845	131,027	8,035	28,881	4,883
51_G	6,739	1,329	5,926	4,896	45,939	1,769	10,181	1,715
51_D	6,424	2,360	5,649	4,667	43,798	3,141	9,705	1,635
52_G	134,661	29,182	119,250	97,847	925,024	38,713	203,770	34,349
52_D	127,865	52,119	113,231	92,908	878,332	69,142	193,486	32,616
53_G	19,966	1,021	17,681	14,507	137,153	1,355	30,213	5,093
53_D	18,903	1,834	16,738	13,735	129,836	2,433	28,603	4,822
54_G	5,231	1,004	4,652	3,801	36,128	1,329	7,923	1,337
54_D	4,910	1,821	4,365	3,568	33,903	2,412	7,436	1,254
61_G	5,154	1,883	9,841	2,301	112,272	3,180	9,059	1,798
61_D	59,585	18,799	113,768	26,609	1,297,856	31,745	104,728	20,788
62_G	0	0	0	0	0	0	0	0
62_D	189,572	61,364	361,328	84,839	4,115,024	102,066	333,045	66,241

2019 24-Hour School Sunday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	132,275	17,462	167,622	150,138	877,852	32,068	233,452	19,504
21_G	4,410,420	520,080	11,178,640	4,127,206	55,803,554	905,483	7,794,245	553,035
21_D	40,084	4,724	101,597	37,510	507,179	8,225	70,839	5,026
31_G	1,418,553	251,015	1,684,778	1,215,919	12,676,436	477,485	2,111,694	253,339
31_D	25,984	4,605	30,859	22,272	232,187	8,759	38,680	4,640
32_G	348,449	61,657	413,844	298,675	3,113,803	117,286	518,710	62,229
32_D	19,468	3,454	23,122	16,687	173,969	6,570	28,981	3,477
41_G	0	0	0	0	0	0	0	0
41_D	3,523	1,121	3,129	2,556	24,230	1,479	5,333	902
42_G	0	0	0	0	0	0	0	0
42_D	6,945	2,244	6,175	5,041	47,835	2,961	10,516	1,777
43_G	214	70	191	156	1,482	93	324	55
43_D	19,154	6,112	17,054	13,906	132,183	8,063	29,012	4,901
51_G	6,777	1,336	5,993	4,928	46,533	1,776	10,252	1,726
51_D	6,459	2,372	5,711	4,697	44,335	3,155	9,771	1,645
52_G	135,363	29,342	120,465	98,424	935,659	38,890	205,037	34,544
52_D	128,531	52,405	114,386	93,457	888,449	69,458	194,690	32,801
53_G	20,070	1,027	17,861	14,593	138,729	1,361	30,400	5,122
53_D	19,002	1,844	16,911	13,817	131,349	2,444	28,783	4,849
54_G	5,246	1,006	4,678	3,814	36,360	1,332	7,951	1,341
54_D	4,924	1,826	4,391	3,580	34,127	2,417	7,463	1,258
61_G	5,201	1,920	9,913	2,331	112,849	3,200	9,137	1,817
61_D	60,125	19,162	114,589	26,954	1,304,456	31,946	105,619	20,999
62_G	0	0	0	0	0	0	0	0
62_D	190,921	62,281	363,381	85,703	4,131,521	102,574	335,271	66,768

2019 24-Hour Summer Weekday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	132,216	17,455	167,503	150,078	876,729	32,059	233,336	19,495
21_G	4,360,593	515,137	11,086,308	4,082,015	54,940,863	899,550	7,698,999	542,340
21_D	39,631	4,679	100,758	37,099	499,335	8,171	69,973	4,929
31_G	1,404,813	248,756	1,660,450	1,204,105	12,452,855	474,852	2,085,752	249,979
31_D	25,732	4,564	30,414	22,056	228,100	8,711	38,205	4,579
32_G	345,075	61,102	407,869	295,773	3,058,892	116,639	512,339	61,404
32_D	19,279	3,423	22,787	16,525	170,895	6,533	28,624	3,431
41_G	0	0	0	0	0	0	0	0
41_D	3,482	1,111	3,050	2,517	23,477	1,462	5,254	894
42_G	0	0	0	0	0	0	0	0
42_D	6,871	2,226	6,037	4,971	46,486	2,929	10,374	1,762
43_G	212	70	187	153	1,439	92	320	54
43_D	18,977	6,068	16,721	13,738	128,924	7,986	28,670	4,866
51_G	6,701	1,326	5,852	4,855	45,207	1,762	10,108	1,710
51_D	6,388	2,355	5,580	4,628	43,103	3,129	9,636	1,630
52_G	133,618	28,951	117,400	96,881	908,379	38,410	201,833	34,127
52_D	126,875	51,707	111,475	91,992	862,534	68,600	191,646	32,405
53_G	19,811	1,013	17,407	14,364	134,686	1,344	29,926	5,060
53_D	18,756	1,820	16,478	13,599	127,500	2,414	28,331	4,790
54_G	5,211	1,001	4,613	3,781	35,756	1,325	7,884	1,333
54_D	4,891	1,817	4,329	3,548	33,544	2,405	7,399	1,251
61_G	5,077	1,808	9,722	2,242	111,245	3,136	8,923	1,773
61_D	58,698	18,043	112,398	25,927	1,285,993	31,305	103,160	20,501
62_G	0	0	0	0	0	0	0	0
62_D	187,444	59,533	358,035	83,192	4,086,436	100,993	329,274	65,557

2019 24-Hour Summer Friday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	132,205	17,451	167,482	150,068	876,545	32,054	233,315	19,493
21_G	4,345,768	508,832	11,059,639	4,069,239	54,678,577	893,218	7,670,596	538,809
21_D	39,497	4,622	100,516	36,984	496,957	8,114	69,715	4,897
31_G	1,400,742	245,784	1,653,425	1,200,814	12,385,464	472,042	2,078,045	248,887
31_D	25,658	4,509	30,286	21,996	226,865	8,660	38,064	4,559
32_G	344,075	60,373	406,144	294,965	3,042,339	115,949	510,446	61,136
32_D	19,224	3,382	22,691	16,480	169,971	6,495	28,519	3,416
41_G	0	0	0	0	0	0	0	0
41_D	3,475	1,107	3,037	2,511	23,366	1,455	5,241	893
42_G	0	0	0	0	0	0	0	0
42_D	6,859	2,217	6,017	4,962	46,308	2,916	10,353	1,759
43_G	212	70	186	153	1,438	92	320	54
43_D	18,947	6,046	16,671	13,713	128,480	7,955	28,618	4,860
51_G	6,684	1,318	5,824	4,842	44,981	1,754	10,078	1,705
51_D	6,371	2,340	5,552	4,616	42,880	3,114	9,607	1,625
52_G	133,461	28,871	117,061	96,694	905,676	38,278	201,518	34,138
52_D	126,725	51,564	111,152	91,813	859,957	68,366	191,347	32,415
53_G	19,788	1,010	17,357	14,337	134,287	1,339	29,879	5,062
53_D	18,734	1,814	16,430	13,573	127,118	2,406	28,286	4,792
54_G	5,204	998	4,601	3,775	35,653	1,322	7,871	1,331
54_D	4,884	1,811	4,318	3,543	33,455	2,399	7,388	1,249
61_G	5,078	1,793	9,714	2,234	111,141	3,122	8,916	1,780
61_D	58,700	17,897	112,282	25,827	1,284,635	31,165	103,070	20,577
62_G	0	0	0	0	0	0	0	0
62_D	187,451	59,168	357,754	82,947	4,083,138	100,642	329,057	65,746

2019 24-Hour Summer Saturday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	132,254	17,458	167,580	150,117	877,470	32,064	233,411	19,500
21_G	4,384,834	516,306	11,131,303	4,103,614	55,374,259	901,236	7,746,211	547,405
21_D	39,852	4,690	101,168	37,296	503,284	8,187	70,403	4,975
31_G	1,411,686	249,260	1,672,593	1,209,989	12,568,929	475,630	2,098,979	251,619
31_D	25,858	4,573	30,637	22,164	230,230	8,725	38,448	4,609
32_G	346,762	61,226	410,851	297,218	3,087,395	116,830	515,587	61,807
32_D	19,374	3,430	22,954	16,606	172,488	6,544	28,806	3,453
41_G	0	0	0	0	0	0	0	0
41_D	3,509	1,117	3,103	2,543	23,992	1,473	5,307	898
42_G	0	0	0	0	0	0	0	0
42_D	6,919	2,236	6,129	5,019	47,408	2,949	10,467	1,770
43_G	213	70	190	155	1,468	93	323	55
43_D	19,090	6,092	16,942	13,852	131,143	8,034	28,894	4,884
51_G	6,743	1,329	5,934	4,900	46,006	1,769	10,189	1,717
51_D	6,428	2,359	5,657	4,671	43,862	3,140	9,713	1,636
52_G	134,727	29,173	119,358	97,896	925,967	38,706	203,890	34,370
52_D	127,927	52,104	113,333	92,955	879,226	69,130	193,599	32,635
53_G	19,976	1,021	17,697	14,515	137,293	1,355	30,230	5,096
53_D	18,912	1,834	16,754	13,742	129,969	2,433	28,620	4,825
54_G	5,233	1,004	4,655	3,803	36,154	1,329	7,926	1,337
54_D	4,912	1,821	4,368	3,569	33,928	2,412	7,440	1,255
61_G	5,158	1,880	9,846	2,303	112,308	3,179	9,065	1,800
61_D	59,629	18,766	113,826	26,630	1,298,261	31,732	104,797	20,809
62_G	0	0	0	0	0	0	0	0
62_D	189,683	61,280	361,475	84,891	4,116,036	102,033	333,217	66,293

2019 24-Hour Summer Sunday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	132,277	17,461	167,624	150,139	877,873	32,068	233,454	19,505
21_G	4,410,854	518,824	11,179,481	4,127,618	55,811,443	904,098	7,795,121	553,121
21_D	40,088	4,713	101,605	37,514	507,251	8,213	70,847	5,027
31_G	1,418,725	250,420	1,685,093	1,216,073	12,679,326	476,883	2,112,036	253,378
31_D	25,987	4,594	30,865	22,275	232,241	8,748	38,686	4,641
32_G	348,491	61,511	413,921	298,713	3,114,513	117,138	518,794	62,239
32_D	19,471	3,446	23,126	16,690	174,009	6,561	28,986	3,477
41_G	0	0	0	0	0	0	0	0
41_D	3,524	1,121	3,130	2,557	24,243	1,478	5,334	902
42_G	0	0	0	0	0	0	0	0
42_D	6,946	2,243	6,178	5,043	47,859	2,959	10,518	1,777
43_G	214	70	191	156	1,483	93	325	55
43_D	19,157	6,109	17,060	13,909	132,240	8,060	29,018	4,902
51_G	6,780	1,335	5,997	4,930	46,568	1,775	10,257	1,726
51_D	6,462	2,370	5,715	4,698	44,369	3,152	9,775	1,646
52_G	135,396	29,324	120,518	98,448	936,114	38,875	205,098	34,555
52_D	128,563	52,372	114,437	93,480	888,881	69,430	194,747	32,811
53_G	20,075	1,026	17,869	14,596	138,796	1,361	30,409	5,123
53_D	19,007	1,843	16,918	13,820	131,413	2,443	28,791	4,851
54_G	5,247	1,006	4,680	3,815	36,374	1,332	7,953	1,341
54_D	4,925	1,825	4,392	3,581	34,140	2,416	7,465	1,259
61_G	5,203	1,914	9,915	2,332	112,863	3,198	9,140	1,818
61_D	60,146	19,107	114,616	26,963	1,304,616	31,923	105,651	21,010
62_G	0	0	0	0	0	0	0	0
62_D	190,974	62,140	363,447	85,724	4,131,921	102,515	335,350	66,795

2019 24-Hour School Weekday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	780	103	989	885	5,182	190	1,377	115
21_G	715,124	86,760	1,798,064	668,890	9,133,911	147,905	1,266,006	91,711
21_D	6,671	801	16,633	6,243	85,584	1,403	11,670	874
31_G	241,803	44,161	290,717	207,278	2,201,409	81,922	362,015	43,653
31_D	4,454	818	5,375	3,822	40,540	1,506	6,719	798
32_G	63,361	11,570	76,161	54,308	576,803	21,469	94,861	11,440
32_D	3,246	596	3,914	2,785	29,640	1,104	4,876	586
41_G	0	0	0	0	0	0	0	0
41_D	973	312	876	708	6,816	411	1,478	250
42_G	0	0	0	0	0	0	0	0
42_D	2,143	697	1,927	1,558	15,003	919	3,254	549
43_G	31	10	28	23	220	14	48	8
43_D	3,302	1,061	2,970	2,400	23,116	1,398	5,013	846
51_G	210	42	188	152	1,467	55	318	54
51_D	490	182	441	356	3,431	240	744	126
52_G	123,085	26,883	110,714	89,480	861,768	35,427	186,901	31,551
52_D	106,177	43,619	95,506	77,189	743,389	57,483	161,227	27,217
53_G	1,231	63	1,107	895	8,617	84	1,869	315
53_D	1,041	102	936	757	7,287	134	1,580	267
54_G	105	20	95	76	736	27	160	27
54_D	105	39	94	76	733	52	159	27
61_G	1,289	502	2,440	581	27,619	791	2,260	453
61_D	15,492	5,210	29,341	6,987	332,064	8,213	27,171	5,444
62_G	0	0	0	0	0	0	0	0
62_D	4,229	1,440	8,010	1,908	90,653	2,270	7,418	1,486

2019 24-Hour School Friday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	780	103	989	885	5,182	190	1,377	115
21_G	715,124	86,760	1,798,064	668,891	9,133,912	147,905	1,266,006	91,711
21_D	6,671	801	16,633	6,243	85,584	1,403	11,670	874
31_G	241,803	44,161	290,717	207,278	2,201,410	81,922	362,015	43,653
31_D	4,454	818	5,375	3,822	40,540	1,506	6,719	798
32_G	63,361	11,570	76,161	54,308	576,804	21,469	94,861	11,440
32_D	3,246	596	3,914	2,785	29,640	1,104	4,876	586
41_G	0	0	0	0	0	0	0	0
41_D	973	312	876	708	6,816	411	1,478	250
42_G	0	0	0	0	0	0	0	0
42_D	2,143	697	1,927	1,558	15,003	919	3,254	549
43_G	31	10	28	23	220	14	48	8
43_D	3,302	1,061	2,970	2,400	23,116	1,398	5,013	846
51_G	210	42	188	152	1,467	55	318	54
51_D	490	182	441	356	3,431	240	744	126
52_G	123,085	26,883	110,714	89,480	861,768	35,427	186,901	31,551
52_D	106,177	43,619	95,506	77,189	743,389	57,483	161,227	27,217
53_G	1,231	63	1,107	895	8,617	84	1,869	315
53_D	1,041	102	936	757	7,287	134	1,580	267
54_G	105	20	95	76	736	27	160	27
54_D	105	39	94	76	733	52	159	27
61_G	1,289	502	2,440	581	27,619	791	2,260	453
61_D	15,492	5,210	29,341	6,987	332,065	8,213	27,171	5,444
62_G	0	0	0	0	0	0	0	0
62_D	4,229	1,440	8,010	1,908	90,653	2,270	7,418	1,486

2019 24-Hour School Saturday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	2,610	345	3,309	2,962	17,338	633	4,607	385
21_G	606,396	73,382	1,524,684	567,192	7,745,175	125,099	1,073,522	77,767
21_D	5,657	677	14,104	5,294	72,571	1,187	9,896	741
31_G	206,053	37,536	247,736	176,633	1,875,938	69,633	308,492	37,199
31_D	3,796	696	4,580	3,257	34,546	1,280	5,726	680
32_G	53,993	9,834	64,901	46,279	491,525	18,248	80,836	9,749
32_D	2,766	506	3,335	2,373	25,258	939	4,155	499
41_G	0	0	0	0	0	0	0	0
41_D	294	94	265	214	2,060	124	447	75
42_G	0	0	0	0	0	0	0	0
42_D	648	210	583	471	4,534	277	983	166
43_G	0	0	0	0	0	0	0	0
43_D	0	0	0	0	0	0	0	0
51_G	12	2	11	9	87	3	19	3
51_D	29	11	26	21	204	14	44	7
52_G	8,751	1,907	7,872	6,362	61,271	2,512	13,288	2,243
52_D	7,549	3,093	6,790	5,488	52,854	4,077	11,463	1,935
53_G	1,228	63	1,105	893	8,599	83	1,865	315
53_D	1,039	101	934	755	7,272	134	1,577	266
54_G	105	20	95	77	737	27	160	27
54_D	105	39	94	76	734	51	159	27
61_G	296	115	561	133	6,344	181	519	104
61_D	3,559	1,194	6,740	1,605	76,277	1,882	6,241	1,250
62_G	0	0	0	0	0	0	0	0
62_D	3,106	1,055	5,882	1,401	66,571	1,662	5,447	1,091

2019 24-Hour School Sunday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	2,610	345	3,309	2,962	17,338	633	4,607	385
21_G	606,396	73,382	1,524,684	567,192	7,745,175	125,099	1,073,522	77,767
21_D	5,657	677	14,104	5,294	72,571	1,187	9,896	741
31_G	206,053	37,536	247,736	176,633	1,875,938	69,633	308,492	37,199
31_D	3,796	696	4,580	3,257	34,546	1,280	5,726	680
32_G	53,993	9,834	64,901	46,279	491,525	18,248	80,836	9,749
32_D	2,766	506	3,335	2,373	25,258	939	4,155	499
41_G	0	0	0	0	0	0	0	0
41_D	294	94	265	214	2,060	124	447	75
42_G	0	0	0	0	0	0	0	0
42_D	648	210	583	471	4,534	277	983	166
43_G	0	0	0	0	0	0	0	0
43_D	0	0	0	0	0	0	0	0
51_G	12	2	11	9	87	3	19	3
51_D	29	11	26	21	204	14	44	7
52_G	8,751	1,907	7,872	6,362	61,271	2,512	13,288	2,243
52_D	7,549	3,093	6,790	5,488	52,854	4,077	11,463	1,935
53_G	1,228	63	1,105	893	8,599	83	1,865	315
53_D	1,039	101	934	755	7,272	134	1,577	266
54_G	105	20	95	77	737	27	160	27
54_D	105	39	94	76	734	51	159	27
61_G	296	115	561	133	6,344	181	519	104
61_D	3,559	1,194	6,740	1,605	76,277	1,882	6,241	1,250
62_G	0	0	0	0	0	0	0	0
62_D	3,106	1,055	5,882	1,401	66,571	1,662	5,447	1,091

2019 24-Hour Summer Weekday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	955	126	1,211	1,084	6,346	232	1,686	141
21_G	763,073	92,342	1,918,625	713,740	9,746,345	157,422	1,350,893	97,860
21_D	7,119	852	17,748	6,661	91,322	1,493	12,453	933
31_G	258,016	47,003	310,210	221,176	2,349,015	87,193	386,288	46,580
31_D	4,753	871	5,735	4,078	43,258	1,603	7,170	851
32_G	67,610	12,314	81,268	57,950	615,478	22,850	101,221	12,207
32_D	3,463	634	4,176	2,972	31,628	1,175	5,203	625
41_G	0	0	0	0	0	0	0	0
41_D	1,039	332	934	755	7,273	438	1,577	266
42_G	0	0	0	0	0	0	0	0
42_D	2,286	742	2,057	1,662	16,008	978	3,472	586
43_G	34	11	30	24	235	15	51	9
43_D	3,523	1,129	3,169	2,561	24,666	1,488	5,350	903
51_G	224	45	201	163	1,565	59	340	57
51_D	523	194	470	380	3,661	256	794	134
52_G	131,338	28,613	118,138	95,480	919,550	37,707	199,433	33,667
52_D	113,296	46,426	101,909	82,364	793,233	61,182	172,037	29,042
53_G	1,313	68	1,181	955	9,195	89	1,994	337
53_D	1,111	108	999	807	7,776	143	1,686	285
54_G	112	22	101	82	786	29	170	29
54_D	112	42	100	81	782	55	170	29
61_G	1,375	534	2,604	620	29,471	842	2,411	483
61_D	16,531	5,546	31,308	7,456	354,330	8,742	28,993	5,809
62_G	0	0	0	0	0	0	0	0
62_D	4,513	1,532	8,547	2,035	96,731	2,416	7,915	1,586

2019 24-Hour Summer Friday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	955	126	1,211	1,084	6,346	232	1,686	141
21_G	763,073	92,342	1,918,625	713,740	9,746,344	157,422	1,350,892	97,860
21_D	7,119	852	17,748	6,661	91,322	1,493	12,453	933
31_G	258,016	47,003	310,210	221,176	2,349,015	87,193	386,288	46,580
31_D	4,753	871	5,735	4,078	43,258	1,603	7,170	851
32_G	67,610	12,314	81,268	57,950	615,478	22,850	101,221	12,207
32_D	3,463	634	4,176	2,972	31,628	1,175	5,203	625
41_G	0	0	0	0	0	0	0	0
41_D	1,039	332	934	755	7,273	438	1,577	266
42_G	0	0	0	0	0	0	0	0
42_D	2,286	742	2,057	1,662	16,008	978	3,472	586
43_G	34	11	30	24	235	15	51	9
43_D	3,523	1,129	3,169	2,561	24,666	1,488	5,350	903
51_G	224	45	201	163	1,565	59	340	57
51_D	523	194	470	380	3,661	256	794	134
52_G	131,338	28,613	118,138	95,480	919,550	37,707	199,433	33,667
52_D	113,296	46,426	101,909	82,364	793,233	61,182	172,037	29,042
53_G	1,313	68	1,181	955	9,195	89	1,994	337
53_D	1,111	108	999	807	7,776	143	1,686	285
54_G	112	22	101	82	786	29	170	29
54_D	112	42	100	81	782	55	170	29
61_G	1,375	534	2,604	620	29,471	842	2,411	483
61_D	16,531	5,546	31,308	7,456	354,330	8,742	28,993	5,809
62_G	0	0	0	0	0	0	0	0
62_D	4,513	1,532	8,547	2,035	96,731	2,416	7,915	1,586

2019 24-Hour Summer Saturday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	3,204	423	4,061	3,636	21,279	777	5,654	473
21_G	648,418	78,467	1,630,342	606,498	8,281,904	133,769	1,147,916	83,156
21_D	6,049	724	15,081	5,660	77,601	1,269	10,582	793
31_G	220,332	40,138	264,903	188,873	2,005,938	74,458	329,870	39,777
31_D	4,059	744	4,898	3,482	36,940	1,369	6,123	727
32_G	57,735	10,516	69,399	49,486	525,587	19,513	86,438	10,424
32_D	2,958	541	3,566	2,538	27,008	1,004	4,443	534
41_G	0	0	0	0	0	0	0	0
41_D	315	101	283	229	2,203	133	478	81
42_G	0	0	0	0	0	0	0	0
42_D	692	225	623	503	4,848	296	1,052	178
43_G	0	0	0	0	0	0	0	0
43_D	0	0	0	0	0	0	0	0
51_G	13	3	12	10	93	4	20	3
51_D	31	12	28	23	218	15	47	8
52_G	9,358	2,039	8,417	6,803	65,517	2,687	14,209	2,399
52_D	8,072	3,308	7,261	5,868	56,517	4,359	12,257	2,069
53_G	1,313	68	1,181	955	9,195	89	1,994	337
53_D	1,111	108	999	807	7,776	143	1,686	285
54_G	113	22	101	82	788	29	171	29
54_D	112	42	101	81	784	55	170	29
61_G	316	123	599	143	6,784	194	555	111
61_D	3,805	1,277	7,207	1,716	81,563	2,012	6,674	1,337
62_G	0	0	0	0	0	0	0	0
62_D	3,321	1,128	6,290	1,498	71,185	1,778	5,825	1,167

2019 24-Hour Summer Sunday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	3,204	423	4,061	3,636	21,279	777	5,654	473
21_G	648,419	78,467	1,630,344	606,498	8,281,912	133,769	1,147,917	83,156
21_D	6,049	724	15,081	5,660	77,601	1,269	10,582	793
31_G	220,332	40,138	264,904	188,873	2,005,940	74,458	329,870	39,777
31_D	4,059	744	4,898	3,482	36,940	1,369	6,123	727
32_G	57,735	10,516	69,399	49,486	525,587	19,513	86,438	10,424
32_D	2,958	541	3,566	2,538	27,008	1,004	4,443	534
41_G	0	0	0	0	0	0	0	0
41_D	315	101	283	229	2,203	133	478	81
42_G	0	0	0	0	0	0	0	0
42_D	692	225	623	503	4,848	296	1,052	178
43_G	0	0	0	0	0	0	0	0
43_D	0	0	0	0	0	0	0	0
51_G	13	3	12	10	93	4	20	3
51_D	31	12	28	23	218	15	47	8
52_G	9,358	2,039	8,417	6,803	65,517	2,687	14,209	2,399
52_D	8,072	3,308	7,261	5,868	56,517	4,359	12,257	2,069
53_G	1,313	68	1,181	955	9,195	89	1,994	337
53_D	1,111	108	999	807	7,776	143	1,686	285
54_G	113	22	101	82	788	29	171	29
54_D	112	42	101	81	784	55	170	29
61_G	316	123	599	143	6,784	194	555	111
61_D	3,805	1,277	7,207	1,716	81,563	2,012	6,674	1,337
62_G	0	0	0	0	0	0	0	0
62_D	3,321	1,128	6,290	1,498	71,185	1,778	5,825	1,167

2023 24-Hour School Weekday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	45,024	9,223	88,051	38,071	686,646	11,281	83,970	10,688
21_D	501	103	979	423	7,636	125	934	119
31_G	12,591	4,367	23,511	9,890	178,123	5,041	22,991	3,342
31_D	244	85	455	192	3,450	98	445	65
32_G	3,096	1,074	5,781	2,432	43,795	1,239	5,653	822
32_D	173	60	323	136	2,451	69	316	46
41_G	0	0	0	0	0	0	0	0
41_D	37	13	74	31	597	22	71	10
42_G	0	0	0	0	0	0	0	0
42_D	56	23	104	43	874	36	107	17
43_G	1	0	2	1	16	1	2	0
43_D	97	43	171	72	1,442	66	182	32
51_G	117	28	214	85	1,593	34	212	35
51_D	110	49	203	81	1,511	61	201	33
52_G	1,366	364	2,447	980	17,962	453	2,444	417
52_D	1,297	649	2,324	931	17,056	809	2,320	395
53_G	202	13	362	145	2,662	16	362	62
53_D	192	23	344	138	2,526	29	344	59
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	87	101	154	55	1,045	61	159	40
61_D	1,007	1,013	1,774	632	12,033	609	1,835	460
62_G	0	0	0	0	0	0	0	0
62_D	972	1,044	1,615	577	10,403	628	1,727	465

2023 24-Hour School Friday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	48,953	10,163	95,614	41,182	749,187	12,272	91,251	11,734
21_D	545	113	1,064	458	8,333	136	1,015	131
31_G	13,695	4,813	25,545	10,699	194,474	5,484	24,999	3,666
31_D	265	93	495	207	3,766	106	484	71
32_G	3,367	1,183	6,281	2,631	47,816	1,348	6,147	901
32_D	188	66	351	147	2,675	75	344	50
41_G	0	0	0	0	0	0	0	0
41_D	40	14	80	33	645	23	77	10
42_G	0	0	0	0	0	0	0	0
42_D	61	25	111	46	928	39	114	18
43_G	1	0	2	1	16	1	2	0
43_D	105	46	181	76	1,515	71	192	34
51_G	127	30	232	92	1,717	37	229	38
51_D	120	53	221	88	1,633	66	218	36
52_G	1,459	367	2,597	1,050	18,958	478	2,576	414
52_D	1,385	656	2,465	997	17,998	854	2,445	393
53_G	216	13	385	156	2,810	17	382	61
53_D	205	23	365	148	2,665	30	362	58
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	91	100	159	58	1,089	63	163	37
61_D	1,047	997	1,826	669	12,543	629	1,878	431
62_G	0	0	0	0	0	0	0	0
62_D	1,006	1,027	1,639	607	10,645	649	1,748	434

2023 24-Hour School Saturday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	38,003	8,110	74,072	32,284	573,528	9,762	70,815	9,058
21_D	423	90	824	359	6,380	109	788	101
31_G	10,587	3,854	19,739	8,336	147,959	4,358	19,315	2,827
31_D	205	75	382	161	2,864	84	374	55
32_G	2,603	948	4,853	2,050	36,380	1,071	4,749	695
32_D	146	53	272	115	2,036	60	266	39
41_G	0	0	0	0	0	0	0	0
41_D	26	10	51	21	406	15	50	8
42_G	0	0	0	0	0	0	0	0
42_D	41	18	76	30	611	26	78	14
43_G	1	0	1	1	11	0	1	0
43_D	73	34	128	52	1,033	49	137	27
51_G	104	27	187	71	1,339	31	188	35
51_D	99	48	177	67	1,270	56	178	33
52_G	1,161	322	2,108	806	15,312	367	2,119	401
52_D	1,102	574	2,001	764	14,529	656	2,011	381
53_G	172	11	312	119	2,267	13	314	59
53_D	163	20	296	113	2,152	23	298	56
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	55	66	99	33	648	36	102	29
61_D	632	655	1,145	377	7,472	365	1,177	328
62_G	0	0	0	0	0	0	0	0
62_D	589	652	1,013	331	6,248	364	1,075	320

2023 24-Hour School Sunday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	31,611	6,829	61,700	26,885	477,114	8,188	58,975	7,562
21_D	352	76	686	299	5,307	91	656	84
31_G	8,819	3,253	16,461	6,949	123,193	3,657	16,107	2,365
31_D	171	63	319	135	2,386	71	312	46
32_G	2,168	800	4,047	1,709	30,291	899	3,960	581
32_D	121	45	226	96	1,695	50	222	33
41_G	0	0	0	0	0	0	0	0
41_D	20	8	38	15	304	12	38	6
42_G	0	0	0	0	0	0	0	0
42_D	31	14	57	23	460	20	60	11
43_G	1	0	1	0	7	0	1	0
43_D	56	27	98	39	788	37	105	21
51_G	82	22	146	55	1,027	25	148	29
51_D	79	39	139	52	987	44	142	27
52_G	849	232	1,504	564	10,780	253	1,540	306
52_D	806	414	1,428	536	10,238	452	1,463	291
53_G	126	8	223	83	1,596	9	228	45
53_D	119	15	211	79	1,515	16	216	43
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	41	49	72	23	464	26	75	22
61_D	467	490	828	267	5,331	258	865	247
62_G	0	0	0	0	0	0	0	0
62_D	437	488	739	236	4,510	257	795	241

2023 24-Hour Summer Weekday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	47,262	9,646	92,687	39,999	723,408	11,823	88,265	11,201
21_D	526	107	1,031	445	8,045	131	982	125
31_G	13,213	4,567	24,736	10,387	187,569	5,283	24,156	3,503
31_D	256	88	479	201	3,633	102	468	68
32_G	3,249	1,123	6,082	2,554	46,118	1,299	5,939	861
32_D	182	63	340	143	2,581	73	332	48
41_G	0	0	0	0	0	0	0	0
41_D	37	13	74	31	596	22	71	10
42_G	0	0	0	0	0	0	0	0
42_D	56	23	104	43	872	36	107	17
43_G	1	0	2	1	16	1	2	0
43_D	97	43	171	72	1,440	66	181	32
51_G	116	28	214	85	1,590	34	211	35
51_D	110	49	202	81	1,508	61	200	33
52_G	1,363	363	2,443	979	17,930	452	2,440	416
52_D	1,294	648	2,320	930	17,025	808	2,317	395
53_G	202	13	362	145	2,657	16	361	62
53_D	192	23	343	138	2,521	28	343	58
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	87	101	154	55	1,043	61	159	40
61_D	1,005	1,011	1,771	631	12,009	608	1,832	460
62_G	0	0	0	0	0	0	0	0
62_D	970	1,042	1,613	576	10,384	627	1,724	464

2023 24-Hour Summer Friday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	50,867	10,526	99,667	42,854	781,047	12,735	94,989	12,176
21_D	566	117	1,109	477	8,688	142	1,057	135
31_G	14,226	4,984	26,613	11,130	202,628	5,691	26,009	3,804
31_D	276	97	515	216	3,924	110	504	74
32_G	3,498	1,225	6,543	2,737	49,821	1,399	6,395	935
32_D	196	69	366	153	2,787	78	358	52
41_G	0	0	0	0	0	0	0	0
41_D	40	14	79	33	636	23	76	10
42_G	0	0	0	0	0	0	0	0
42_D	60	24	110	46	916	39	112	18
43_G	1	0	2	1	16	1	2	0
43_D	103	45	179	76	1,495	70	190	34
51_G	125	29	229	91	1,695	37	227	38
51_D	119	53	218	87	1,612	65	215	36
52_G	1,441	363	2,565	1,039	18,715	473	2,545	409
52_D	1,368	648	2,435	986	17,768	844	2,416	388
53_G	214	13	380	154	2,774	17	377	61
53_D	203	23	361	146	2,631	30	358	58
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	90	99	157	58	1,075	62	161	37
61_D	1,034	986	1,804	662	12,381	622	1,856	426
62_G	0	0	0	0	0	0	0	0
62_D	994	1,015	1,621	600	10,519	642	1,728	429

2023 24-Hour Summer Saturday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	39,075	8,298	76,376	33,232	591,705	10,018	72,903	9,303
21_D	435	92	850	370	6,582	111	811	103
31_G	10,861	3,943	20,306	8,562	152,277	4,468	19,840	2,900
31_D	210	76	393	166	2,948	87	384	56
32_G	2,671	970	4,993	2,105	37,442	1,098	4,878	713
32_D	149	54	279	118	2,095	61	273	40
41_G	0	0	0	0	0	0	0	0
41_D	25	10	50	20	394	15	49	8
42_G	0	0	0	0	0	0	0	0
42_D	40	18	74	30	594	26	76	14
43_G	1	0	1	1	11	0	1	0
43_D	71	33	125	50	1,005	47	133	27
51_G	101	26	181	69	1,298	30	182	34
51_D	96	47	172	65	1,231	54	173	32
52_G	1,127	314	2,046	782	14,846	357	2,057	390
52_D	1,069	561	1,942	742	14,087	638	1,952	370
53_G	167	11	303	116	2,198	13	305	58
53_D	158	20	288	110	2,087	22	289	55
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	53	64	97	32	634	36	100	28
61_D	616	643	1,117	369	7,309	357	1,148	319
62_G	0	0	0	0	0	0	0	0
62_D	574	640	988	324	6,115	356	1,049	311

2023 24-Hour Summer Sunday ONI Hours Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	0	0	0	0	0	0	0	0
21_G	32,841	7,060	64,264	27,956	497,472	8,489	61,327	7,844
21_D	365	79	715	311	5,533	94	682	87
31_G	9,144	3,362	17,110	7,212	128,179	3,789	16,717	2,450
31_D	177	65	331	140	2,483	73	324	47
32_G	2,248	827	4,207	1,773	31,517	932	4,110	602
32_D	126	46	235	99	1,763	52	230	34
41_G	0	0	0	0	0	0	0	0
41_D	19	8	38	15	299	11	37	6
42_G	0	0	0	0	0	0	0	0
42_D	31	14	56	22	453	19	59	11
43_G	1	0	1	0	7	0	1	0
43_D	55	26	97	38	776	36	104	21
51_G	81	21	143	54	1,009	24	145	28
51_D	77	38	137	52	970	43	139	27
52_G	835	229	1,478	554	10,592	249	1,514	301
52_D	792	409	1,403	526	10,060	445	1,437	286
53_G	124	8	219	82	1,568	9	224	45
53_D	117	14	208	78	1,489	16	213	42
54_G	0	0	0	0	0	0	0	0
54_D	0	0	0	0	0	0	0	0
61_G	40	49	71	23	460	26	74	21
61_D	461	486	818	265	5,282	256	854	243
62_G	0	0	0	0	0	0	0	0
62_D	431	484	730	234	4,470	255	786	237

2023 24-Hour School Weekday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	153,816	17,066	186,089	114,466	945,995	45,075	262,914	16,452
21_G	5,074,039	498,374	12,253,764	3,062,842	59,183,853	1,266,662	8,659,245	444,876
21_D	56,436	5,542	136,292	34,067	658,271	14,086	96,312	4,948
31_G	1,635,148	240,955	1,832,032	906,061	13,427,716	668,841	2,348,163	207,095
31_D	31,663	4,668	35,475	17,545	260,011	12,958	45,469	4,010
32_G	402,066	59,246	450,479	222,791	3,301,746	164,454	577,390	50,923
32_D	22,464	3,319	25,168	12,447	184,463	9,212	32,258	2,845
41_G	0	0	0	0	0	0	0	0
41_D	4,056	1,083	3,367	1,898	25,322	2,059	5,918	748
42_G	0	0	0	0	0	0	0	0
42_D	8,129	2,168	6,774	3,812	50,924	4,125	11,869	1,498
43_G	247	68	206	116	1,552	130	361	46
43_D	21,978	5,892	18,379	10,326	138,262	11,204	32,116	4,055
51_G	7,804	1,290	6,449	3,654	48,757	2,482	11,386	1,424
51_D	7,440	2,290	6,149	3,483	46,489	4,408	10,855	1,357
52_G	155,951	28,250	129,896	73,284	982,151	54,214	227,911	28,561
52_D	148,099	50,447	123,356	69,594	932,701	96,812	216,436	27,123
53_G	23,067	986	19,212	10,839	145,260	1,893	33,710	4,224
53_D	21,964	1,771	18,296	10,322	138,333	3,399	32,100	4,023
54_G	5,695	931	4,793	2,689	36,218	1,779	8,340	1,049
54_D	5,322	1,658	4,476	2,512	33,827	3,168	7,792	980
61_G	5,929	1,718	10,725	1,659	119,864	4,405	10,032	1,460
61_D	68,560	17,152	124,027	19,194	1,385,998	43,975	116,013	16,888
62_G	0	0	0	0	0	0	0	0
62_D	208,743	54,388	377,618	59,188	4,204,053	135,417	353,534	51,831

2023 24-Hour School Friday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	153,801	17,063	186,058	114,454	945,760	45,072	262,886	16,449
21_G	5,055,739	494,473	12,214,997	3,048,100	58,858,691	1,262,246	8,622,807	440,356
21_D	56,232	5,499	135,860	33,902	654,646	14,037	95,906	4,898
31_G	1,630,055	239,114	1,821,765	902,259	13,343,972	666,870	2,338,277	205,696
31_D	31,564	4,632	35,276	17,471	258,389	12,919	45,278	3,983
32_G	400,814	58,793	447,954	221,856	3,281,153	163,970	574,959	50,579
32_D	22,394	3,293	25,027	12,395	183,313	9,184	32,123	2,826
41_G	0	0	0	0	0	0	0	0
41_D	4,047	1,080	3,349	1,891	25,180	2,054	5,901	746
42_G	0	0	0	0	0	0	0	0
42_D	8,113	2,163	6,743	3,800	50,689	4,116	11,840	1,495
43_G	246	68	206	116	1,550	130	360	45
43_D	21,941	5,880	18,306	10,298	137,706	11,184	32,049	4,046
51_G	7,781	1,285	6,407	3,638	48,467	2,476	11,347	1,417
51_D	7,418	2,282	6,108	3,468	46,204	4,397	10,816	1,351
52_G	155,663	28,239	129,383	73,059	978,512	54,141	227,467	28,566
52_D	147,827	50,426	122,871	69,381	929,255	96,681	216,015	27,128
53_G	23,023	986	19,135	10,805	144,717	1,890	33,643	4,225
53_D	21,924	1,770	18,224	10,290	137,824	3,394	32,037	4,023
54_G	5,686	930	4,775	2,682	36,091	1,777	8,323	1,047
54_D	5,314	1,655	4,461	2,507	33,723	3,163	7,778	978
61_G	5,917	1,723	10,707	1,648	119,693	4,399	10,017	1,468
61_D	68,428	17,199	123,824	19,068	1,384,038	43,912	115,848	16,975
62_G	0	0	0	0	0	0	0	0
62_D	208,432	54,500	377,143	58,892	4,199,458	135,269	353,147	52,038

2023 24-Hour School Saturday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	153,856	17,071	186,181	114,505	946,768	45,084	262,994	16,458
21_G	5,097,206	501,379	12,304,247	3,081,744	59,599,877	1,271,183	8,706,430	449,911
21_D	56,693	5,575	136,852	34,276	662,887	14,136	96,836	5,004
31_G	1,641,783	242,320	1,845,559	911,199	13,538,479	670,876	2,361,249	208,703
31_D	31,792	4,694	35,738	17,645	262,163	12,997	45,723	4,041
32_G	403,697	59,582	453,804	224,054	3,328,973	164,955	580,607	51,318
32_D	22,555	3,337	25,353	12,518	185,984	9,240	32,438	2,867
41_G	0	0	0	0	0	0	0	0
41_D	4,085	1,090	3,429	1,924	25,857	2,075	5,976	753
42_G	0	0	0	0	0	0	0	0
42_D	8,180	2,182	6,883	3,859	51,888	4,154	11,970	1,506
43_G	248	68	210	117	1,582	130	364	46
43_D	22,099	5,925	18,640	10,438	140,575	11,274	32,358	4,074
51_G	7,848	1,295	6,541	3,697	49,558	2,494	11,469	1,429
51_D	7,481	2,299	6,236	3,524	47,248	4,428	10,934	1,363
52_G	157,191	28,534	132,219	74,291	1,000,331	54,647	230,125	28,811
52_D	149,277	50,955	125,565	70,552	949,992	97,584	218,540	27,360
53_G	23,250	996	19,556	10,988	147,958	1,908	34,038	4,261
53_D	22,138	1,789	18,622	10,463	140,891	3,426	32,410	4,058
54_G	5,717	935	4,837	2,709	36,596	1,785	8,381	1,053
54_D	5,342	1,664	4,520	2,531	34,195	3,178	7,832	984
61_G	6,019	1,814	10,881	1,723	121,030	4,472	10,193	1,490
61_D	69,601	18,108	125,818	19,928	1,399,409	44,642	117,862	17,227
62_G	0	0	0	0	0	0	0	0
62_D	211,133	56,604	381,727	60,881	4,234,911	136,973	357,778	52,600

2023 24-Hour School Sunday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	153,883	17,075	186,238	114,529	947,224	45,090	263,046	16,463
21_G	5,127,703	506,991	12,366,656	3,107,890	60,096,655	1,278,433	8,764,330	456,793
21_D	57,032	5,638	137,546	34,567	668,416	14,217	97,480	5,081
31_G	1,650,155	244,946	1,861,921	917,858	13,664,701	674,095	2,376,791	210,827
31_D	31,953	4,745	36,054	17,773	264,598	13,059	46,024	4,082
32_G	405,756	60,227	457,827	225,692	3,360,009	165,746	584,428	51,840
32_D	22,670	3,374	25,579	12,610	187,725	9,284	32,653	2,896
41_G	0	0	0	0	0	0	0	0
41_D	4,103	1,096	3,465	1,939	26,144	2,085	6,009	757
42_G	0	0	0	0	0	0	0	0
42_D	8,212	2,193	6,948	3,886	52,420	4,173	12,032	1,515
43_G	249	69	211	118	1,599	131	366	46
43_D	22,175	5,952	18,793	10,501	141,822	11,320	32,505	4,095
51_G	7,892	1,306	6,625	3,730	50,206	2,507	11,551	1,442
51_D	7,521	2,318	6,313	3,555	47,835	4,452	11,008	1,374
52_G	157,957	28,751	133,743	74,896	1,011,940	54,921	231,567	29,040
52_D	150,003	51,340	127,008	71,125	960,983	98,073	219,907	27,578
53_G	23,364	1,004	19,782	11,078	149,678	1,918	34,252	4,295
53_D	22,247	1,803	18,837	10,548	142,524	3,443	32,614	4,090
54_G	5,732	938	4,867	2,721	36,829	1,789	8,410	1,057
54_D	5,357	1,671	4,548	2,543	34,414	3,186	7,860	988
61_G	6,066	1,867	10,974	1,755	121,672	4,506	10,283	1,512
61_D	70,149	18,640	126,896	20,302	1,406,873	44,984	118,909	17,487
62_G	0	0	0	0	0	0	0	0
62_D	212,440	57,887	384,296	61,772	4,252,679	137,799	360,271	53,221

2023 24-Hour Summer Weekday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	153,816	17,066	186,090	114,466	946,001	45,075	262,914	16,452
21_G	5,072,078	497,999	12,249,733	3,061,126	59,152,315	1,266,180	8,655,494	444,418
21_D	56,414	5,538	136,247	34,048	657,921	14,080	96,270	4,943
31_G	1,634,602	240,778	1,830,964	905,618	13,419,587	668,625	2,347,142	206,951
31_D	31,652	4,665	35,454	17,536	259,853	12,953	45,449	4,007
32_G	401,932	59,202	450,216	222,682	3,299,747	164,402	577,139	50,887
32_D	22,456	3,316	25,153	12,441	184,351	9,209	32,244	2,843
41_G	0	0	0	0	0	0	0	0
41_D	4,057	1,083	3,368	1,898	25,325	2,059	5,919	748
42_G	0	0	0	0	0	0	0	0
42_D	8,129	2,168	6,774	3,812	50,930	4,125	11,869	1,498
43_G	247	68	206	116	1,552	130	361	46
43_D	21,979	5,893	18,381	10,326	138,276	11,204	32,117	4,055
51_G	7,805	1,290	6,450	3,654	48,764	2,482	11,387	1,424
51_D	7,440	2,290	6,150	3,484	46,495	4,408	10,856	1,357
52_G	155,958	28,252	129,909	73,289	982,257	54,216	227,923	28,563
52_D	148,106	50,450	123,369	69,599	932,802	96,815	216,448	27,125
53_G	23,068	986	19,214	10,840	145,275	1,893	33,712	4,225
53_D	21,965	1,771	18,298	10,322	138,348	3,399	32,101	4,023
54_G	5,695	931	4,793	2,689	36,221	1,779	8,340	1,049
54_D	5,322	1,658	4,477	2,512	33,830	3,168	7,793	980
61_G	5,929	1,719	10,726	1,660	119,871	4,405	10,033	1,460
61_D	68,566	17,157	124,036	19,197	1,386,077	43,977	116,023	16,890
62_G	0	0	0	0	0	0	0	0
62_D	208,756	54,399	377,641	59,195	4,204,240	135,424	353,557	51,836

2023 24-Hour Summer Friday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	153,803	17,064	186,063	114,456	945,801	45,072	262,890	16,450
21_G	5,055,981	494,475	12,215,658	3,048,166	58,867,201	1,262,273	8,623,411	440,364
21_D	56,234	5,499	135,867	33,903	654,741	14,037	95,912	4,898
31_G	1,630,121	239,114	1,821,937	902,274	13,346,144	666,881	2,338,435	205,699
31_D	31,565	4,632	35,279	17,471	258,431	12,920	45,281	3,983
32_G	400,830	58,793	447,997	221,860	3,281,688	163,973	574,998	50,579
32_D	22,395	3,293	25,029	12,395	183,343	9,185	32,125	2,826
41_G	0	0	0	0	0	0	0	0
41_D	4,049	1,081	3,351	1,892	25,204	2,055	5,904	747
42_G	0	0	0	0	0	0	0	0
42_D	8,116	2,164	6,748	3,802	50,734	4,118	11,845	1,495
43_G	246	68	206	116	1,551	130	360	45
43_D	21,946	5,882	18,318	10,302	137,814	11,187	32,060	4,048
51_G	7,785	1,286	6,413	3,641	48,519	2,477	11,353	1,418
51_D	7,421	2,283	6,114	3,471	46,253	4,399	10,822	1,352
52_G	155,717	28,251	129,485	73,096	979,319	54,157	227,566	28,580
52_D	147,878	50,448	122,967	69,416	930,021	96,710	216,109	27,142
53_G	23,031	986	19,150	10,811	144,837	1,891	33,658	4,227
53_D	21,932	1,771	18,238	10,295	137,937	3,395	32,051	4,025
54_G	5,687	930	4,777	2,683	36,111	1,777	8,325	1,047
54_D	5,315	1,655	4,464	2,508	33,742	3,164	7,780	978
61_G	5,920	1,726	10,714	1,651	119,741	4,401	10,024	1,469
61_D	68,468	17,233	123,897	19,092	1,384,588	43,934	115,921	16,990
62_G	0	0	0	0	0	0	0	0
62_D	208,526	54,580	377,314	58,950	4,200,752	135,322	353,318	52,073

2023 24-Hour Summer Saturday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	142,334	19,511	207,747	156,394	945,462	42,169	263,000	22,178
21_G	4,704,600	578,489	13,774,873	4,266,935	59,551,669	1,186,748	8,711,024	620,845
21_D	52,326	6,433	153,209	47,458	662,351	13,197	96,887	6,905
31_G	1,515,932	279,532	2,071,728	1,259,367	13,529,955	626,522	2,362,658	285,748
31_D	29,355	5,415	40,117	24,387	261,998	12,138	45,751	5,533
32_G	372,752	68,731	509,417	309,665	3,326,877	154,049	580,953	70,263
32_D	20,826	3,850	28,461	17,301	185,867	8,629	32,458	3,926
41_G	0	0	0	0	0	0	0	0
41_D	3,776	1,250	3,846	2,650	25,852	1,940	5,979	1,021
42_G	0	0	0	0	0	0	0	0
42_D	7,562	2,502	7,716	5,310	51,872	3,883	11,977	2,044
43_G	230	78	235	161	1,581	122	364	62
43_D	20,431	6,791	20,884	14,351	140,513	10,540	32,376	5,523
51_G	7,251	1,489	7,353	5,105	49,568	2,330	11,481	1,951
51_D	6,912	2,644	7,010	4,866	47,258	4,137	10,944	1,860
52_G	145,298	32,736	148,278	102,236	1,000,040	51,082	230,280	39,167
52_D	137,983	58,458	140,815	97,090	949,716	91,219	218,688	37,195
53_G	21,491	1,143	21,932	15,122	147,915	1,784	34,061	5,793
53_D	20,463	2,052	20,884	14,399	140,850	3,203	32,432	5,516
54_G	5,285	1,071	5,417	3,720	36,573	1,669	8,385	1,427
54_D	4,939	1,907	5,062	3,476	34,175	2,971	7,836	1,334
61_G	5,560	2,107	12,186	2,396	120,903	4,178	10,201	2,041
61_D	64,289	21,032	140,908	27,705	1,397,943	41,705	117,958	23,599
62_G	0	0	0	0	0	0	0	0
62_D	195,086	65,503	427,160	84,309	4,230,133	127,998	358,005	71,790

2023 24-Hour Summer Sunday Adjusted SHP Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	142,359	19,516	207,800	156,416	945,891	42,175	263,048	22,183
21_G	4,733,115	583,715	13,833,194	4,291,413	60,014,756	1,193,510	8,765,144	627,294
21_D	52,643	6,491	153,858	47,731	667,505	13,272	97,489	6,977
31_G	1,523,727	281,976	2,086,957	1,265,577	13,647,139	629,518	2,377,130	287,731
31_D	29,505	5,463	40,411	24,506	264,258	12,196	46,030	5,572
32_G	374,669	69,332	513,161	311,192	3,355,690	154,786	584,511	70,750
32_D	20,933	3,884	28,671	17,387	187,484	8,670	32,657	3,953
41_G	0	0	0	0	0	0	0	0
41_D	3,792	1,256	3,880	2,664	26,119	1,949	6,011	1,026
42_G	0	0	0	0	0	0	0	0
42_D	7,591	2,513	7,776	5,335	52,368	3,901	12,035	2,052
43_G	230	79	237	162	1,597	122	366	62
43_D	20,501	6,817	21,027	14,410	141,674	10,582	32,512	5,542
51_G	7,291	1,499	7,431	5,136	50,169	2,342	11,556	1,963
51_D	6,949	2,661	7,081	4,895	47,800	4,160	11,013	1,871
52_G	146,015	32,941	149,709	102,807	1,010,937	51,341	231,632	39,381
52_D	138,662	58,823	142,171	97,630	960,030	91,681	219,969	37,398
53_G	21,597	1,150	22,144	15,206	149,529	1,793	34,261	5,825
53_D	20,565	2,065	21,085	14,479	142,382	3,219	32,623	5,546
54_G	5,299	1,075	5,445	3,731	36,789	1,673	8,412	1,431
54_D	4,953	1,913	5,088	3,487	34,377	2,979	7,861	1,338
61_G	5,604	2,158	12,274	2,426	121,511	4,210	10,286	2,062
61_D	64,804	21,538	141,927	28,061	1,405,009	42,031	118,944	23,843
62_G	0	0	0	0	0	0	0	0
62_D	196,313	66,723	429,586	85,156	4,246,953	128,783	360,354	72,371

2023 24-Hour School Weekday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	906	101	1,096	674	5,579	265	1,548	97
21_G	828,695	84,291	1,990,177	508,351	9,817,776	206,619	1,420,792	77,150
21_D	9,163	933	21,891	5,633	108,702	2,305	15,775	862
31_G	279,665	42,828	321,195	157,233	2,361,785	114,229	405,580	36,652
31_D	5,797	888	6,653	3,257	48,939	2,365	8,424	756
32_G	73,357	11,230	84,222	41,236	619,513	29,976	106,375	9,620
32_D	3,936	609	4,547	2,219	33,195	1,596	5,735	509
41_G	0	0	0	0	0	0	0	0
41_D	1,130	304	971	539	7,339	575	1,662	210
42_G	0	0	0	0	0	0	0	0
42_D	2,526	679	2,170	1,204	16,403	1,286	3,715	470
43_G	38	10	33	18	246	20	56	7
43_D	3,806	1,027	3,270	1,815	24,720	1,946	5,598	708
51_G	168	28	144	80	1,090	53	247	31
51_D	566	177	486	270	3,675	334	832	105
52_G	143,721	26,321	123,482	68,524	933,337	49,868	211,380	26,742
52_D	122,048	42,030	104,861	58,191	792,590	79,631	179,504	22,710
53_G	1,433	62	1,231	683	9,303	117	2,107	267
53_D	1,199	98	1,030	572	7,785	185	1,763	223
54_G	115	19	99	55	748	36	169	21
54_D	112	35	96	53	727	67	165	21
61_G	1,564	511	2,829	463	31,087	1,157	2,656	399
61_D	17,911	5,051	32,401	5,298	356,088	11,447	30,426	4,568
62_G	0	0	0	0	0	0	0	0
62_D	4,685	1,337	8,476	1,386	93,152	3,031	7,960	1,195

2023 24-Hour School Friday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	906	101	1,096	674	5,579	265	1,548	97
21_G	828,695	84,291	1,990,177	508,351	9,817,776	206,619	1,420,792	77,150
21_D	9,163	933	21,891	5,633	108,702	2,305	15,775	862
31_G	279,665	42,828	321,195	157,233	2,361,785	114,229	405,580	36,652
31_D	5,797	888	6,653	3,257	48,939	2,365	8,424	756
32_G	73,357	11,230	84,222	41,236	619,513	29,976	106,375	9,620
32_D	3,936	609	4,547	2,219	33,195	1,596	5,735	509
41_G	0	0	0	0	0	0	0	0
41_D	1,130	304	971	539	7,339	575	1,662	210
42_G	0	0	0	0	0	0	0	0
42_D	2,526	679	2,170	1,204	16,403	1,286	3,715	470
43_G	38	10	33	18	246	20	56	7
43_D	3,806	1,027	3,270	1,815	24,720	1,946	5,598	708
51_G	168	28	144	80	1,090	53	247	31
51_D	566	177	486	270	3,675	334	832	105
52_G	143,721	26,321	123,482	68,524	933,337	49,868	211,380	26,742
52_D	122,048	42,030	104,861	58,191	792,590	79,631	179,504	22,710
53_G	1,433	62	1,231	683	9,303	117	2,107	267
53_D	1,199	98	1,030	572	7,785	185	1,763	223
54_G	115	19	99	55	748	36	169	21
54_D	112	35	96	53	727	67	165	21
61_G	1,564	511	2,829	463	31,087	1,157	2,656	399
61_D	17,911	5,051	32,401	5,298	356,088	11,447	30,426	4,568
62_G	0	0	0	0	0	0	0	0
62_D	4,685	1,337	8,476	1,386	93,152	3,031	7,960	1,195

2023 24-Hour School Saturday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	3,036	337	3,676	2,260	18,708	890	5,191	325
21_G	704,179	71,626	1,691,142	431,969	8,342,613	175,573	1,207,310	65,558
21_D	7,786	793	18,602	4,787	92,369	1,959	13,405	732
31_G	238,819	36,573	274,283	134,269	2,016,840	97,546	346,344	31,299
31_D	4,950	758	5,681	2,781	41,791	2,019	7,193	645
32_G	62,643	9,589	71,921	35,213	529,032	25,598	90,839	8,215
32_D	3,361	520	3,883	1,895	28,347	1,363	4,898	434
41_G	0	0	0	0	0	0	0	0
41_D	342	92	294	163	2,223	174	503	64
42_G	0	0	0	0	0	0	0	0
42_D	765	206	657	365	4,968	389	1,125	142
43_G	0	0	0	0	0	0	0	0
43_D	0	0	0	0	0	0	0	0
51_G	10	2	9	5	65	3	15	2
51_D	34	11	29	16	219	20	50	6
52_G	10,240	1,875	8,798	4,882	66,499	3,553	15,061	1,905
52_D	8,696	2,995	7,471	4,146	56,471	5,674	12,789	1,618
53_G	1,433	62	1,231	683	9,303	117	2,107	267
53_D	1,199	98	1,030	572	7,785	185	1,763	223
54_G	116	19	99	55	751	36	170	22
54_D	112	35	97	54	730	67	165	21
61_G	360	118	651	106	7,156	266	611	92
61_D	4,123	1,163	7,458	1,220	81,967	2,635	7,004	1,052
62_G	0	0	0	0	0	0	0	0
62_D	3,448	984	6,238	1,020	68,551	2,231	5,857	879

2023 24-Hour School Sunday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	3,036	337	3,676	2,260	18,708	890	5,191	325
21_G	704,179	71,626	1,691,142	431,969	8,342,613	175,573	1,207,310	65,558
21_D	7,786	793	18,602	4,787	92,369	1,959	13,405	732
31_G	238,819	36,573	274,283	134,269	2,016,840	97,546	346,344	31,299
31_D	4,950	758	5,681	2,781	41,791	2,019	7,193	645
32_G	62,643	9,589	71,921	35,213	529,032	25,598	90,839	8,215
32_D	3,361	520	3,883	1,895	28,347	1,363	4,898	434
41_G	0	0	0	0	0	0	0	0
41_D	342	92	294	163	2,223	174	503	64
42_G	0	0	0	0	0	0	0	0
42_D	765	206	657	365	4,968	389	1,125	142
43_G	0	0	0	0	0	0	0	0
43_D	0	0	0	0	0	0	0	0
51_G	10	2	9	5	65	3	15	2
51_D	34	11	29	16	219	20	50	6
52_G	10,240	1,875	8,798	4,882	66,499	3,553	15,061	1,905
52_D	8,696	2,995	7,471	4,146	56,471	5,674	12,789	1,618
53_G	1,433	62	1,231	683	9,303	117	2,107	267
53_D	1,199	98	1,030	572	7,785	185	1,763	223
54_G	116	19	99	55	751	36	170	22
54_D	112	35	97	54	730	67	165	21
61_G	360	118	651	106	7,156	266	611	92
61_D	4,123	1,163	7,458	1,220	81,967	2,635	7,004	1,052
62_G	0	0	0	0	0	0	0	0
62_D	3,448	984	6,238	1,020	68,551	2,231	5,857	879

2023 9 24-Hour Summer Weekday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	1,111	123	1,346	827	6,847	326	1,900	119
21_G	886,121	90,132	2,128,091	543,579	10,498,122	220,937	1,519,250	82,496
21_D	9,798	998	23,408	6,024	116,235	2,465	16,868	922
31_G	299,045	45,796	343,453	168,129	2,525,451	122,145	433,686	39,192
31_D	6,198	950	7,114	3,483	52,330	2,529	9,007	808
32_G	78,441	12,008	90,059	44,093	662,443	32,053	113,747	10,287
32_D	4,209	651	4,862	2,372	35,495	1,707	6,133	544
41_G	0	0	0	0	0	0	0	0
41_D	1,208	325	1,038	576	7,847	615	1,777	225
42_G	0	0	0	0	0	0	0	0
42_D	2,701	726	2,320	1,288	17,539	1,375	3,972	503
43_G	40	11	35	19	263	21	60	8
43_D	4,070	1,098	3,497	1,941	26,433	2,081	5,986	757
51_G	179	30	154	86	1,165	57	264	33
51_D	605	189	520	288	3,929	358	890	113
52_G	153,680	28,145	132,039	73,273	998,015	53,324	226,028	28,596
52_D	130,505	44,942	112,127	62,223	847,514	85,149	191,943	24,283
53_G	1,532	66	1,316	730	9,948	125	2,253	285
53_D	1,282	105	1,101	611	8,325	198	1,885	239
54_G	123	20	106	59	800	38	181	23
54_D	120	38	103	57	778	71	176	22
61_G	1,672	546	3,025	495	33,241	1,238	2,840	426
61_D	19,152	5,401	34,646	5,665	380,764	12,240	32,535	4,885
62_G	0	0	0	0	0	0	0	0
62_D	5,010	1,430	9,063	1,482	99,608	3,241	8,511	1,278

2023 24-Hour Summer Friday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	1,111	123	1,346	827	6,847	326	1,900	119
21_G	886,121	90,132	2,128,091	543,579	10,498,122	220,937	1,519,250	82,496
21_D	9,798	998	23,408	6,024	116,235	2,465	16,868	922
31_G	299,045	45,796	343,453	168,129	2,525,451	122,145	433,686	39,192
31_D	6,198	950	7,114	3,483	52,330	2,529	9,007	808
32_G	78,441	12,008	90,059	44,093	662,443	32,053	113,747	10,287
32_D	4,209	651	4,862	2,372	35,495	1,707	6,133	544
41_G	0	0	0	0	0	0	0	0
41_D	1,208	325	1,038	576	7,847	615	1,777	225
42_G	0	0	0	0	0	0	0	0
42_D	2,701	726	2,320	1,288	17,539	1,375	3,972	503
43_G	40	11	35	19	263	21	60	8
43_D	4,070	1,098	3,497	1,941	26,433	2,081	5,986	757
51_G	179	30	154	86	1,165	57	264	33
51_D	605	189	520	288	3,929	358	890	113
52_G	153,680	28,145	132,039	73,273	998,015	53,324	226,028	28,596
52_D	130,505	44,942	112,127	62,223	847,514	85,149	191,943	24,283
53_G	1,532	66	1,316	730	9,948	125	2,253	285
53_D	1,282	105	1,101	611	8,325	198	1,885	239
54_G	123	20	106	59	800	38	181	23
54_D	120	38	103	57	778	71	176	22
61_G	1,672	546	3,025	495	33,241	1,238	2,840	426
61_D	19,152	5,401	34,646	5,665	380,764	12,240	32,535	4,885
62_G	0	0	0	0	0	0	0	0
62_D	5,010	1,430	9,063	1,482	99,608	3,241	8,511	1,278

2023 24-Hour Summer Saturday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	3,448	473	5,034	3,788	22,928	1,021	6,371	538
21_G	696,618	87,522	2,017,468	630,723	8,908,008	175,608	1,290,974	94,416
21_D	7,703	969	22,191	6,990	98,629	1,959	14,334	1,055
31_G	236,255	44,690	327,210	196,048	2,153,526	97,565	370,345	45,077
31_D	4,897	927	6,777	4,061	44,623	2,020	7,692	929
32_G	61,971	11,718	85,800	51,415	564,885	25,603	97,134	11,831
32_D	3,325	635	4,632	2,766	30,268	1,363	5,237	626
41_G	0	0	0	0	0	0	0	0
41_D	339	112	351	238	2,373	174	538	92
42_G	0	0	0	0	0	0	0	0
42_D	757	251	784	533	5,304	390	1,203	205
43_G	0	0	0	0	0	0	0	0
43_D	0	0	0	0	0	0	0	0
51_G	10	2	10	7	69	3	16	3
51_D	33	13	35	24	234	20	53	9
52_G	10,130	2,291	10,496	7,129	71,006	3,554	16,104	2,744
52_D	8,602	3,659	8,913	6,054	60,298	5,675	13,676	2,330
53_G	1,417	76	1,468	997	9,933	117	2,253	384
53_D	1,186	119	1,229	835	8,313	185	1,885	321
54_G	114	23	118	80	802	36	182	31
54_D	111	43	115	78	779	67	177	30
61_G	356	144	777	155	7,641	266	654	132
61_D	4,079	1,421	8,897	1,781	87,522	2,635	7,489	1,515
62_G	0	0	0	0	0	0	0	0
62_D	3,411	1,203	7,441	1,489	73,197	2,231	6,263	1,267

2023 24-Hour Summer Sunday Starts Summaries.

SUT/FT	Brazoria	Chambers	Fort Bend	Galveston	Harris	Liberty	Montgomery	Waller
11_G	3,448	473	5,034	3,788	22,928	1,021	6,371	538
21_G	696,618	87,522	2,017,468	630,723	8,908,008	175,608	1,290,974	94,416
21_D	7,703	969	22,191	6,990	98,629	1,959	14,334	1,055
31_G	236,255	44,690	327,210	196,048	2,153,526	97,565	370,345	45,077
31_D	4,897	927	6,777	4,061	44,623	2,020	7,692	929
32_G	61,971	11,718	85,800	51,415	564,885	25,603	97,134	11,831
32_D	3,325	635	4,632	2,766	30,268	1,363	5,237	626
41_G	0	0	0	0	0	0	0	0
41_D	339	112	351	238	2,373	174	538	92
42_G	0	0	0	0	0	0	0	0
42_D	757	251	784	533	5,304	390	1,203	205
43_G	0	0	0	0	0	0	0	0
43_D	0	0	0	0	0	0	0	0
51_G	10	2	10	7	69	3	16	3
51_D	33	13	35	24	234	20	53	9
52_G	10,130	2,291	10,496	7,129	71,006	3,554	16,104	2,744
52_D	8,602	3,659	8,913	6,054	60,298	5,675	13,676	2,330
53_G	1,417	76	1,468	997	9,933	117	2,253	384
53_D	1,186	119	1,229	835	8,313	185	1,885	321
54_G	114	23	118	80	802	36	182	31
54_D	111	43	115	78	779	67	177	30
61_G	356	144	777	155	7,641	266	654	132
61_D	4,079	1,421	8,897	1,781	87,522	2,635	7,489	1,515
62_G	0	0	0	0	0	0	0	0
62_D	3,411	1,203	7,441	1,489	73,197	2,231	6,263	1,267

2019 24-Hour School SHEI and APU Hours Summaries (CLhT_Diesel Only).

County	Weekday Hotelling	Weekday SHEI	Weekday APU	Friday Hotelling	Friday SHEI	Friday APU	Saturday Hotelling	Saturday SHEI	Saturday APU	Sunday Hotelling	Sunday SHEI	Sunday APU
Brazoria	1,364	1,021	71	1,326	992	69	1,021	764	53	756	565	39
Chambers	4,479	3,351	232	4,673	3,496	242	3,300	2,469	171	2,676	2,002	139
Fort Bend	5,183	3,877	269	5,225	3,909	271	3,757	2,811	195	2,742	2,051	142
Galveston	476	356	25	492	368	26	322	241	17	232	173	12
Harris	49,154	36,774	2,549	49,853	37,297	2,585	34,603	25,888	1,794	25,056	18,746	1,299
Liberty	1,607	1,202	83	1,759	1,316	91	1,095	820	57	841	629	44
Montgomery	7,043	5,270	365	6,978	5,221	362	5,147	3,851	267	3,811	2,851	198
Waller	4,635	3,467	240	4,237	3,170	220	3,669	2,745	190	2,756	2,062	143

2019 24-Hour Summer SHEI and APU Hours Summaries (CLhT_Diesel Only).

County	Weekday Hotelling	Weekday SHEI	Weekday APU	Friday Hotelling	Friday SHEI	Friday APU	Saturday Hotelling	Saturday SHEI	Saturday APU	Sunday Hotelling	Sunday SHEI	Sunday APU
Brazoria	1,361	1,018	71	1,315	984	68	998	747	52	744	557	39
Chambers	4,458	3,335	231	4,674	3,497	242	3,360	2,513	174	2,775	2,076	144
Fort Bend	5,172	3,869	268	5,180	3,875	269	3,683	2,755	191	2,708	2,026	140
Galveston	475	355	25	488	365	25	316	237	16	230	172	12
Harris	49,050	36,697	2,543	49,426	36,978	2,563	34,035	25,464	1,765	24,826	18,574	1,287
Liberty	1,599	1,197	83	1,759	1,316	91	1,113	833	58	871	652	45
Montgomery	7,029	5,258	364	6,919	5,176	359	5,042	3,772	261	3,761	2,814	195
Waller	4,625	3,460	240	4,200	3,142	218	3,579	2,678	186	2,709	2,027	140

2023 24-Hour School SHEI and APU Hours Summaries (CLhT_Diesel Only).

County	Weekday Hotelling	Weekday SHEI	Weekday APU	Friday Hotelling	Friday SHEI	Friday APU	Saturday Hotelling	Saturday SHEI	Saturday APU	Sunday Hotelling	Sunday SHEI	Sunday APU
Brazoria	1,302	874	140	1,318	885	142	932	625	100	695	466	75
Chambers	4,964	3,331	534	4,858	3,260	522	3,550	2,383	382	2,669	1,791	287
Fort Bend	6,456	4,333	694	6,503	4,364	699	4,723	3,169	508	3,452	2,316	371
Galveston	489	328	53	507	340	54	331	222	36	238	160	26
Harris	52,493	35,229	5,644	53,290	35,764	5,730	37,119	24,911	3,991	26,869	18,032	2,889
Liberty	2,210	1,483	238	2,262	1,518	243	1,475	990	159	1,054	708	113
Montgomery	7,834	5,257	842	7,778	5,220	836	5,740	3,852	617	4,247	2,850	457
Waller	5,229	3,509	562	4,777	3,206	514	4,174	2,801	449	3,131	2,101	337

2023 24-Hour Summer SHEI and APU Hours Summaries (CLhT_Diesel Only).

County	Weekday Hotelling	Weekday SHEI	Weekday APU	Friday Hotelling	Friday SHEI	Friday APU	Saturday Hotelling	Saturday SHEI	Saturday APU	Sunday Hotelling	Sunday SHEI	Sunday APU
Brazoria	1,300	873	140	1,304	875	140	909	610	98	685	460	74
Chambers	4,956	3,326	533	4,805	3,225	517	3,486	2,339	375	2,648	1,777	285
Fort Bend	6,447	4,327	693	6,432	4,316	692	4,611	3,095	496	3,410	2,289	367
Galveston	488	327	52	501	336	54	325	218	35	236	158	25
Harris	52,418	35,179	5,636	52,708	35,373	5,668	36,373	24,411	3,911	26,638	17,877	2,864
Liberty	2,207	1,481	237	2,238	1,502	241	1,446	970	155	1,046	702	112
Montgomery	7,823	5,250	841	7,693	5,163	827	5,602	3,760	602	4,194	2,815	451
Waller	5,221	3,504	561	4,725	3,171	508	4,057	2,722	436	3,079	2,066	331

APPENDIX G:
SOURCE TYPE AGE AND FUEL ENGINE FRACTIONS INPUTS TO MOVES

Brazoria County 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.061795	0.061189	0.051236	0.051236	0.059425	0.059425	0.059425	0.061584	0.107326	0.108951	0.061584	0.054796	0.068825
1	0.060500	0.084498	0.069065	0.069065	0.056278	0.056049	0.056126	0.058783	0.098838	0.103650	0.059749	0.056698	0.059543
2	0.060130	0.085123	0.057148	0.057148	0.077657	0.089224	0.082493	0.031055	0.113632	0.111268	0.016870	0.044354	0.047903
3	0.053284	0.080094	0.054475	0.054475	0.074548	0.088197	0.075226	0.032240	0.089706	0.085755	0.017304	0.053668	0.060675
4	0.055134	0.089629	0.059136	0.059136	0.066205	0.075412	0.073770	0.039198	0.101333	0.102451	0.017642	0.064806	0.071965
5	0.056429	0.074963	0.058544	0.058544	0.062205	0.076463	0.069847	0.034777	0.056427	0.056032	0.016433	0.056252	0.057263
6	0.046994	0.069592	0.049366	0.049366	0.039216	0.057216	0.038513	0.030450	0.053431	0.050813	0.019981	0.057525	0.058116
7	0.045328	0.057499	0.039964	0.039964	0.034210	0.062000	0.038935	0.030412	0.069221	0.071436	0.010366	0.063625	0.060032
8	0.032562	0.047228	0.041399	0.041399	0.030011	0.048785	0.039295	0.022374	0.048059	0.048826	0.019524	0.032744	0.030871
9	0.028307	0.039774	0.034974	0.034974	0.032064	0.062349	0.035567	0.016303	0.017683	0.017043	0.003285	0.021855	0.019997
10	0.058464	0.031670	0.028719	0.028719	0.035851	0.059873	0.044399	0.029673	0.017940	0.016190	0.005810	0.028546	0.027428
11	0.053839	0.046170	0.046351	0.046351	0.035632	0.053319	0.044195	0.024857	0.044072	0.041381	0.021897	0.026198	0.024805
12	0.064755	0.043650	0.049287	0.049287	0.036334	0.036523	0.037978	0.071052	0.028590	0.027061	0.037079	0.087920	0.078722
13	0.061795	0.033678	0.045745	0.045745	0.044184	0.030999	0.035563	0.057430	0.030257	0.030204	0.049771	0.056383	0.050902
14	0.045143	0.030181	0.037120	0.037120	0.026523	0.022832	0.030633	0.048417	0.023951	0.025697	0.038754	0.048250	0.043087
15	0.037743	0.024954	0.039582	0.039582	0.025731	0.023757	0.033332	0.040846	0.018410	0.019228	0.060197	0.028953	0.024421
16	0.034598	0.020635	0.037778	0.037778	0.032993	0.023980	0.024239	0.044622	0.014718	0.015792	0.045168	0.022498	0.021618
17	0.036078	0.018056	0.039056	0.039056	0.030141	0.022019	0.028259	0.039990	0.013232	0.013489	0.042355	0.018760	0.016864
18	0.022202	0.014281	0.033604	0.033604	0.033912	0.019753	0.031018	0.042040	0.013138	0.013534	0.027663	0.025502	0.023545
19	0.014801	0.012135	0.026783	0.026783	0.039077	0.013221	0.026772	0.050535	0.010719	0.009828	0.051312	0.035354	0.032228
20	0.013136	0.008846	0.021819	0.021819	0.022574	0.008240	0.013980	0.040722	0.009528	0.009369	0.078902	0.027142	0.024374
21	0.008881	0.005942	0.013497	0.013497	0.017918	0.004294	0.012859	0.025282	0.003893	0.004506	0.035433	0.020163	0.018389
22	0.007586	0.004517	0.014353	0.014353	0.015873	0.001857	0.010981	0.016347	0.004563	0.004678	0.058982	0.013407	0.012671
23	0.007586	0.002589	0.010205	0.010205	0.011968	0.002405	0.009202	0.020428	0.002344	0.002323	0.030700	0.012108	0.012375
24	0.004255	0.002296	0.008783	0.008783	0.011735	0.000420	0.009873	0.022635	0.002225	0.002388	0.033527	0.012069	0.011774
25	0.004440	0.001692	0.007282	0.007282	0.008795	0.000749	0.004891	0.013931	0.001247	0.001414	0.035078	0.007491	0.008079
26	0.002960	0.001180	0.004596	0.004596	0.007540	0.000103	0.005571	0.010624	0.001003	0.001073	0.020622	0.005785	0.006273
27	0.001850	0.000913	0.003792	0.003792	0.004518	0.000147	0.004886	0.008302	0.000740	0.000713	0.019902	0.003739	0.003870
28	0.002220	0.000913	0.002713	0.002713	0.003881	0.000115	0.006055	0.010307	0.000677	0.000730	0.013178	0.002912	0.003640
29	0.001480	0.000657	0.002436	0.002436	0.005366	0.000132	0.006055	0.011368	0.000533	0.000653	0.019856	0.002335	0.003493
30	0.015726	0.005456	0.011193	0.011193	0.017635	0.000143	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Chambers County 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.067365	0.074170	0.061786	0.061786	0.059425	0.059425	0.059425	0.061584	0.107326	0.108951	0.061584	0.054796	0.068825
1	0.074850	0.102367	0.085650	0.085650	0.056278	0.056049	0.056126	0.058783	0.098838	0.103650	0.059749	0.056698	0.059543
2	0.059880	0.099585	0.070976	0.070976	0.077657	0.089224	0.082493	0.031055	0.113632	0.111268	0.016870	0.044354	0.047903
3	0.086826	0.089212	0.060009	0.060009	0.074548	0.088197	0.075226	0.032240	0.089706	0.085755	0.017304	0.053668	0.060675
4	0.061377	0.094964	0.061863	0.061863	0.066205	0.075412	0.073770	0.039198	0.101333	0.102451	0.017642	0.064806	0.071965
5	0.047904	0.075538	0.063176	0.063176	0.062205	0.076463	0.069847	0.034777	0.056427	0.056032	0.016433	0.056252	0.057263
6	0.052395	0.065871	0.050587	0.050587	0.039216	0.057216	0.038513	0.030450	0.053431	0.050813	0.019981	0.057525	0.058116
7	0.035928	0.056017	0.041628	0.041628	0.034210	0.062000	0.038935	0.030412	0.069221	0.071436	0.010366	0.063625	0.060032
8	0.019461	0.040881	0.043173	0.043173	0.030011	0.048785	0.039295	0.022374	0.048059	0.048826	0.019524	0.032744	0.030871
9	0.029940	0.032676	0.032592	0.032592	0.032064	0.062349	0.035567	0.016303	0.017683	0.017043	0.003285	0.021855	0.019997
10	0.055389	0.027773	0.027495	0.027495	0.035851	0.059873	0.044399	0.029673	0.017940	0.016190	0.005810	0.028546	0.027428
11	0.055389	0.040834	0.045876	0.045876	0.035632	0.053319	0.044195	0.024857	0.044072	0.041381	0.021897	0.026198	0.024805
12	0.050898	0.039655	0.045181	0.045181	0.036334	0.036523	0.037978	0.071052	0.028590	0.027061	0.037079	0.087920	0.078722
13	0.071856	0.028150	0.039002	0.039002	0.044184	0.030999	0.035563	0.057430	0.030257	0.030204	0.049771	0.056383	0.050902
14	0.043413	0.023199	0.032901	0.032901	0.026523	0.022832	0.030633	0.048417	0.023951	0.025697	0.038754	0.048250	0.043087
15	0.034431	0.023152	0.035218	0.035218	0.025731	0.023757	0.033332	0.040846	0.018410	0.019228	0.060197	0.028953	0.024421
16	0.038922	0.016645	0.034600	0.034600	0.032993	0.023980	0.024239	0.044622	0.014718	0.015792	0.045168	0.022498	0.021618
17	0.017964	0.015466	0.034909	0.034909	0.030141	0.022019	0.028259	0.039990	0.013232	0.013489	0.042355	0.018760	0.016864
18	0.011976	0.010798	0.030816	0.030816	0.033912	0.019753	0.031018	0.042040	0.013138	0.013534	0.027663	0.025502	0.023545
19	0.017964	0.010232	0.020853	0.020853	0.039077	0.013221	0.026772	0.050535	0.010719	0.009828	0.051312	0.035354	0.032228
20	0.010479	0.007591	0.017300	0.017300	0.022574	0.008240	0.013980	0.040722	0.009528	0.009369	0.078902	0.027142	0.024374
21	0.019461	0.005847	0.010504	0.010504	0.017918	0.004294	0.012859	0.025282	0.003893	0.004506	0.035433	0.020163	0.018389
22	0.005988	0.004149	0.012975	0.012975	0.015873	0.001857	0.010981	0.016347	0.004563	0.004678	0.058982	0.013407	0.012671
23	0.011976	0.002499	0.010040	0.010040	0.011968	0.002405	0.009202	0.020428	0.002344	0.002323	0.030700	0.012108	0.012375
24	0.001497	0.002310	0.006796	0.006796	0.011735	0.000420	0.009873	0.022635	0.002225	0.002388	0.033527	0.012069	0.011774
25	0.004491	0.001980	0.005329	0.005329	0.008795	0.000749	0.004891	0.013931	0.001247	0.001414	0.035078	0.007491	0.008079
26	0.004491	0.001273	0.003167	0.003167	0.007540	0.000103	0.005571	0.010624	0.001003	0.001073	0.020622	0.005785	0.006273
27	0.000000	0.000754	0.002858	0.002858	0.004518	0.000147	0.004886	0.008302	0.000740	0.000713	0.019902	0.003739	0.003870
28	0.000000	0.000660	0.001699	0.001699	0.003881	0.000115	0.006055	0.010307	0.000677	0.000730	0.013178	0.002912	0.003640
29	0.001497	0.000236	0.001931	0.001931	0.005366	0.000132	0.006055	0.011368	0.000533	0.000653	0.019856	0.002335	0.003493
30	0.005988	0.005517	0.009113	0.009113	0.017635	0.000143	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Fort Bend County 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.056937	0.063854	0.059009	0.059009	0.059425	0.059425	0.059425	0.061584	0.107326	0.108951	0.061584	0.054796	0.068825
1	0.075769	0.085558	0.075577	0.075577	0.056278	0.056049	0.056126	0.058783	0.098838	0.103650	0.059749	0.056698	0.059543
2	0.064587	0.088792	0.063943	0.063943	0.077657	0.089224	0.082493	0.031055	0.113632	0.111268	0.016870	0.044354	0.047903
3	0.068118	0.085781	0.060124	0.060124	0.074548	0.088197	0.075226	0.032240	0.089706	0.085755	0.017304	0.053668	0.060675
4	0.065029	0.094456	0.062762	0.062762	0.066205	0.075412	0.073770	0.039198	0.101333	0.102451	0.017642	0.064806	0.071965
5	0.066500	0.081303	0.063767	0.063767	0.062205	0.076463	0.069847	0.034777	0.056427	0.056032	0.016433	0.056252	0.057263
6	0.056348	0.075357	0.054704	0.054704	0.039216	0.057216	0.038513	0.030450	0.053431	0.050813	0.019981	0.057525	0.058116
7	0.050611	0.060597	0.043556	0.043556	0.034210	0.062000	0.038935	0.030412	0.069221	0.071436	0.010366	0.063625	0.060032
8	0.034133	0.050231	0.043225	0.043225	0.030011	0.048785	0.039295	0.022374	0.048059	0.048826	0.019524	0.032744	0.030871
9	0.026482	0.042140	0.035874	0.035874	0.032064	0.062349	0.035567	0.016303	0.017683	0.017043	0.003285	0.021855	0.019997
10	0.051935	0.033392	0.026745	0.026745	0.035851	0.059873	0.044399	0.029673	0.017940	0.016190	0.005810	0.028546	0.027428
11	0.052082	0.043067	0.045179	0.045179	0.035632	0.053319	0.044195	0.024857	0.044072	0.041381	0.021897	0.026198	0.024805
12	0.058702	0.040085	0.048004	0.048004	0.036334	0.036523	0.037978	0.071052	0.028590	0.027061	0.037079	0.087920	0.078722
13	0.053700	0.030779	0.041205	0.041205	0.044184	0.030999	0.035563	0.057430	0.030257	0.030204	0.049771	0.056383	0.050902
14	0.042960	0.025314	0.033997	0.033997	0.026523	0.022832	0.030633	0.048417	0.023951	0.025697	0.038754	0.048250	0.043087
15	0.026924	0.021278	0.036492	0.036492	0.025731	0.023757	0.033332	0.040846	0.018410	0.019228	0.060197	0.028953	0.024421
16	0.035015	0.017481	0.034450	0.034450	0.032993	0.023980	0.024239	0.044622	0.014718	0.015792	0.045168	0.022498	0.021618
17	0.027218	0.014401	0.034251	0.034251	0.030141	0.022019	0.028259	0.039990	0.013232	0.013489	0.042355	0.018760	0.016864
18	0.018685	0.011207	0.030134	0.030134	0.033912	0.019753	0.031018	0.042040	0.013138	0.013534	0.027663	0.025502	0.023545
19	0.012358	0.009129	0.022904	0.022904	0.039077	0.013221	0.026772	0.050535	0.010719	0.009828	0.051312	0.035354	0.032228
20	0.009710	0.006637	0.017661	0.017661	0.022574	0.008240	0.013980	0.040722	0.009528	0.009369	0.078902	0.027142	0.024374
21	0.008092	0.004649	0.012771	0.012771	0.017918	0.004294	0.012859	0.025282	0.003893	0.004506	0.035433	0.020163	0.018389
22	0.005002	0.003228	0.011270	0.011270	0.015873	0.001857	0.010981	0.016347	0.004563	0.004678	0.058982	0.013407	0.012671
23	0.003531	0.001920	0.007771	0.007771	0.011968	0.002405	0.009202	0.020428	0.002344	0.002323	0.030700	0.012108	0.012375
24	0.004561	0.001445	0.006546	0.006546	0.011735	0.000420	0.009873	0.022635	0.002225	0.002388	0.033527	0.012069	0.011774
25	0.002207	0.001124	0.006270	0.006270	0.008795	0.000749	0.004891	0.013931	0.001247	0.001414	0.035078	0.007491	0.008079
26	0.002354	0.000856	0.003709	0.003709	0.007540	0.000103	0.005571	0.010624	0.001003	0.001073	0.020622	0.005785	0.006273
27	0.001913	0.000672	0.003002	0.003002	0.004518	0.000147	0.004886	0.008302	0.000740	0.000713	0.019902	0.003739	0.003870
28	0.000883	0.000565	0.002417	0.002417	0.003881	0.000115	0.006055	0.010307	0.000677	0.000730	0.013178	0.002912	0.003640
29	0.000441	0.000482	0.002031	0.002031	0.005366	0.000132	0.006055	0.011368	0.000533	0.000653	0.019856	0.002335	0.003493
30	0.017213	0.004221	0.010652	0.010652	0.017635	0.000143	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Galveston County 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.059392	0.059266	0.050818	0.050818	0.059425	0.059425	0.059425	0.061584	0.107326	0.108951	0.061584	0.054796	0.068825
1	0.068727	0.085363	0.072307	0.072307	0.056278	0.056049	0.056126	0.058783	0.098838	0.103650	0.059749	0.056698	0.059543
2	0.061323	0.090480	0.063375	0.063375	0.077657	0.089224	0.082493	0.031055	0.113632	0.111268	0.016870	0.044354	0.047903
3	0.059231	0.081649	0.057840	0.057840	0.074548	0.088197	0.075226	0.032240	0.089706	0.085755	0.017304	0.053668	0.060675
4	0.056333	0.088141	0.058295	0.058295	0.066205	0.075412	0.073770	0.039198	0.101333	0.102451	0.017642	0.064806	0.071965
5	0.053275	0.073997	0.061828	0.061828	0.062205	0.076463	0.069847	0.034777	0.056427	0.056032	0.016433	0.056252	0.057263
6	0.050056	0.068880	0.054079	0.054079	0.039216	0.057216	0.038513	0.030450	0.053431	0.050813	0.019981	0.057525	0.058116
7	0.039433	0.055310	0.041552	0.041552	0.034210	0.062000	0.038935	0.030412	0.069221	0.071436	0.010366	0.063625	0.060032
8	0.028811	0.045595	0.041082	0.041082	0.030011	0.048785	0.039295	0.022374	0.048059	0.048826	0.019524	0.032744	0.030871
9	0.027523	0.038449	0.036639	0.036639	0.032064	0.062349	0.035567	0.016303	0.017683	0.017043	0.003285	0.021855	0.019997
10	0.052953	0.032268	0.028753	0.028753	0.035851	0.059873	0.044399	0.029673	0.017940	0.016190	0.005810	0.028546	0.027428
11	0.051666	0.043966	0.048301	0.048301	0.035632	0.053319	0.044195	0.024857	0.044072	0.041381	0.021897	0.026198	0.024805
12	0.060357	0.042011	0.046799	0.046799	0.036334	0.036523	0.037978	0.071052	0.028590	0.027061	0.037079	0.087920	0.078722
13	0.053114	0.034009	0.042341	0.042341	0.044184	0.030999	0.035563	0.057430	0.030257	0.030204	0.049771	0.056383	0.050902
14	0.047964	0.029856	0.035259	0.035259	0.026523	0.022832	0.030633	0.048417	0.023951	0.025697	0.038754	0.048250	0.043087
15	0.034444	0.025043	0.039141	0.039141	0.025731	0.023757	0.033332	0.040846	0.018410	0.019228	0.060197	0.028953	0.024421
16	0.038468	0.021730	0.036320	0.036320	0.032993	0.023980	0.024239	0.044622	0.014718	0.015792	0.045168	0.022498	0.021618
17	0.033639	0.018405	0.036472	0.036472	0.030141	0.022019	0.028259	0.039990	0.013232	0.013489	0.042355	0.018760	0.016864
18	0.021407	0.014511	0.033378	0.033378	0.033912	0.019753	0.031018	0.042040	0.013138	0.013534	0.027663	0.025502	0.023545
19	0.020924	0.012172	0.024158	0.024158	0.039077	0.013221	0.026772	0.050535	0.010719	0.009828	0.051312	0.035354	0.032228
20	0.013842	0.008949	0.019684	0.019684	0.022574	0.008240	0.013980	0.040722	0.009528	0.009369	0.078902	0.027142	0.024374
21	0.011106	0.006593	0.013285	0.013285	0.017918	0.004294	0.012859	0.025282	0.003893	0.004506	0.035433	0.020163	0.018389
22	0.006921	0.004694	0.012799	0.012799	0.015873	0.001857	0.010981	0.016347	0.004563	0.004678	0.058982	0.013407	0.012671
23	0.009013	0.002880	0.008872	0.008872	0.011968	0.002405	0.009202	0.020428	0.002344	0.002323	0.030700	0.012108	0.012375
24	0.005150	0.002463	0.007507	0.007507	0.011735	0.000420	0.009873	0.022635	0.002225	0.002388	0.033527	0.012069	0.011774
25	0.002897	0.001944	0.006839	0.006839	0.008795	0.000749	0.004891	0.013931	0.001247	0.001414	0.035078	0.007491	0.008079
26	0.004024	0.001392	0.004565	0.004565	0.007540	0.000103	0.005571	0.010624	0.001003	0.001073	0.020622	0.005785	0.006273
27	0.001288	0.001082	0.002881	0.002881	0.004518	0.000147	0.004886	0.008302	0.000740	0.000713	0.019902	0.003739	0.003870
28	0.001449	0.000981	0.002199	0.002199	0.003881	0.000115	0.006055	0.010307	0.000677	0.000730	0.013178	0.002912	0.003640
29	0.002414	0.000800	0.002002	0.002002	0.005366	0.000132	0.006055	0.011368	0.000533	0.000653	0.019856	0.002335	0.003493
30	0.022855	0.007123	0.010631	0.010631	0.017635	0.000143	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Harris County 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.067022	0.060996	0.050704	0.050704	0.059425	0.059425	0.059425	0.061584	0.107326	0.108951	0.061584	0.054796	0.068825
1	0.073186	0.079200	0.064064	0.064064	0.056278	0.056049	0.056126	0.058783	0.098838	0.103650	0.059749	0.056698	0.059543
2	0.061329	0.076245	0.050862	0.050862	0.077657	0.089224	0.082493	0.031055	0.113632	0.111268	0.016870	0.044354	0.047903
3	0.063540	0.075379	0.048647	0.048647	0.074548	0.088197	0.075226	0.032240	0.089706	0.085755	0.017304	0.053668	0.060675
4	0.062075	0.083557	0.051486	0.051486	0.066205	0.075412	0.073770	0.039198	0.101333	0.102451	0.017642	0.064806	0.071965
5	0.057100	0.072572	0.055214	0.055214	0.062205	0.076463	0.069847	0.034777	0.056427	0.056032	0.016433	0.056252	0.057263
6	0.053341	0.068192	0.046605	0.046605	0.039216	0.057216	0.038513	0.030450	0.053431	0.050813	0.019981	0.057525	0.058116
7	0.045852	0.057464	0.040483	0.040483	0.034210	0.062000	0.038935	0.030412	0.069221	0.071436	0.010366	0.063625	0.060032
8	0.030844	0.047021	0.041143	0.041143	0.030011	0.048785	0.039295	0.022374	0.048059	0.048826	0.019524	0.032744	0.030871
9	0.025565	0.041397	0.034951	0.034951	0.032064	0.062349	0.035567	0.016303	0.017683	0.017043	0.003285	0.021855	0.019997
10	0.053784	0.035266	0.029555	0.029555	0.035851	0.059873	0.044399	0.029673	0.017940	0.016190	0.005810	0.028546	0.027428
11	0.051103	0.047958	0.053325	0.053325	0.035632	0.053319	0.044195	0.024857	0.044072	0.041381	0.021897	0.026198	0.024805
12	0.062324	0.046919	0.054891	0.054891	0.036334	0.036523	0.037978	0.071052	0.028590	0.027061	0.037079	0.087920	0.078722
13	0.054502	0.037948	0.047402	0.047402	0.044184	0.030999	0.035563	0.057430	0.030257	0.030204	0.049771	0.056383	0.050902
14	0.041181	0.032786	0.041876	0.041876	0.026523	0.022832	0.030633	0.048417	0.023951	0.025697	0.038754	0.048250	0.043087
15	0.030181	0.027263	0.043250	0.043250	0.025731	0.023757	0.033332	0.040846	0.018410	0.019228	0.060197	0.028953	0.024421
16	0.037505	0.023986	0.040752	0.040752	0.032993	0.023980	0.024239	0.044622	0.014718	0.015792	0.045168	0.022498	0.021618
17	0.029545	0.019987	0.040158	0.040158	0.030141	0.022019	0.028259	0.039990	0.013232	0.013489	0.042355	0.018760	0.016864
18	0.019955	0.015696	0.036866	0.036866	0.033912	0.019753	0.031018	0.042040	0.013138	0.013534	0.027663	0.025502	0.023545
19	0.014510	0.013126	0.028642	0.028642	0.039077	0.013221	0.026772	0.050535	0.010719	0.009828	0.051312	0.035354	0.032228
20	0.011663	0.009768	0.021304	0.021304	0.022574	0.008240	0.013980	0.040722	0.009528	0.009369	0.078902	0.027142	0.024374
21	0.008015	0.006721	0.014751	0.014751	0.017918	0.004294	0.012859	0.025282	0.003893	0.004506	0.035433	0.020163	0.018389
22	0.006357	0.004944	0.014138	0.014138	0.015873	0.001857	0.010981	0.016347	0.004563	0.004678	0.058982	0.013407	0.012671
23	0.006191	0.003024	0.009339	0.009339	0.011968	0.002405	0.009202	0.020428	0.002344	0.002323	0.030700	0.012108	0.012375
24	0.004201	0.002288	0.008224	0.008224	0.011735	0.000420	0.009873	0.022635	0.002225	0.002388	0.033527	0.012069	0.011774
25	0.003814	0.001584	0.006870	0.006870	0.008795	0.000749	0.004891	0.013931	0.001247	0.001414	0.035078	0.007491	0.008079
26	0.002487	0.001192	0.004385	0.004385	0.007540	0.000103	0.005571	0.010624	0.001003	0.001073	0.020622	0.005785	0.006273
27	0.002073	0.000922	0.003318	0.003318	0.004518	0.000147	0.004886	0.008302	0.000740	0.000713	0.019902	0.003739	0.003870
28	0.001106	0.000832	0.002499	0.002499	0.003881	0.000115	0.006055	0.010307	0.000677	0.000730	0.013178	0.002912	0.003640
29	0.001492	0.000640	0.002173	0.002173	0.005366	0.000132	0.006055	0.011368	0.000533	0.000653	0.019856	0.002335	0.003493
30	0.018158	0.005128	0.012123	0.012123	0.017635	0.000143	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Liberty County 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.055821	0.052213	0.042145	0.042145	0.059425	0.059425	0.059425	0.061584	0.107326	0.108951	0.061584	0.054796	0.068825
1	0.049442	0.074386	0.057456	0.057456	0.056278	0.056049	0.056126	0.058783	0.098838	0.103650	0.059749	0.056698	0.059543
2	0.050239	0.072547	0.046869	0.046869	0.077657	0.089224	0.082493	0.031055	0.113632	0.111268	0.016870	0.044354	0.047903
3	0.063796	0.068085	0.038317	0.038317	0.074548	0.088197	0.075226	0.032240	0.089706	0.085755	0.017304	0.053668	0.060675
4	0.047049	0.074602	0.043652	0.043652	0.066205	0.075412	0.073770	0.039198	0.101333	0.102451	0.017642	0.064806	0.071965
5	0.043062	0.065895	0.047113	0.047113	0.062205	0.076463	0.069847	0.034777	0.056427	0.056032	0.016433	0.056252	0.057263
6	0.045455	0.057864	0.041575	0.041575	0.039216	0.057216	0.038513	0.030450	0.053431	0.050813	0.019981	0.057525	0.058116
7	0.040670	0.050023	0.036974	0.036974	0.034210	0.062000	0.038935	0.030412	0.069221	0.071436	0.010366	0.063625	0.060032
8	0.034290	0.043182	0.038236	0.038236	0.030011	0.048785	0.039295	0.022374	0.048059	0.048826	0.019524	0.032744	0.030871
9	0.029506	0.038017	0.030499	0.030499	0.032064	0.062349	0.035567	0.016303	0.017683	0.017043	0.003285	0.021855	0.019997
10	0.059011	0.033853	0.027201	0.027201	0.035851	0.059873	0.044399	0.029673	0.017940	0.016190	0.005810	0.028546	0.027428
11	0.055821	0.049455	0.050533	0.050533	0.035632	0.053319	0.044195	0.024857	0.044072	0.041381	0.021897	0.026198	0.024805
12	0.060606	0.052808	0.050330	0.050330	0.036334	0.036523	0.037978	0.071052	0.028590	0.027061	0.037079	0.087920	0.078722
13	0.057416	0.044885	0.049638	0.049638	0.044184	0.030999	0.035563	0.057430	0.030257	0.030204	0.049771	0.056383	0.050902
14	0.055024	0.042019	0.044425	0.044425	0.026523	0.022832	0.030633	0.048417	0.023951	0.025697	0.038754	0.048250	0.043087
15	0.035088	0.031095	0.046991	0.046991	0.025731	0.023757	0.033332	0.040846	0.018410	0.019228	0.060197	0.028953	0.024421
16	0.044657	0.030555	0.047032	0.047032	0.032993	0.023980	0.024239	0.044622	0.014718	0.015792	0.045168	0.022498	0.021618
17	0.040670	0.026120	0.047968	0.047968	0.030141	0.022019	0.028259	0.039990	0.013232	0.013489	0.042355	0.018760	0.016864
18	0.023126	0.021875	0.045566	0.045566	0.033912	0.019753	0.031018	0.042040	0.013138	0.013534	0.027663	0.025502	0.023545
19	0.025518	0.016954	0.034368	0.034368	0.039077	0.013221	0.026772	0.050535	0.010719	0.009828	0.051312	0.035354	0.032228
20	0.021531	0.014412	0.027486	0.027486	0.022574	0.008240	0.013980	0.040722	0.009528	0.009369	0.078902	0.027142	0.024374
21	0.007177	0.009978	0.020604	0.020604	0.017918	0.004294	0.012859	0.025282	0.003893	0.004506	0.035433	0.020163	0.018389
22	0.015152	0.006976	0.019627	0.019627	0.015873	0.001857	0.010981	0.016347	0.004563	0.004678	0.058982	0.013407	0.012671
23	0.006380	0.004759	0.013071	0.013071	0.011968	0.002405	0.009202	0.020428	0.002344	0.002323	0.030700	0.012108	0.012375
24	0.007974	0.004516	0.013519	0.013519	0.011735	0.000420	0.009873	0.022635	0.002225	0.002388	0.033527	0.012069	0.011774
25	0.007974	0.002839	0.010099	0.010099	0.008795	0.000749	0.004891	0.013931	0.001247	0.001414	0.035078	0.007491	0.008079
26	0.001595	0.001622	0.005782	0.005782	0.007540	0.000103	0.005571	0.010624	0.001003	0.001073	0.020622	0.005785	0.006273
27	0.000797	0.001325	0.004153	0.004153	0.004518	0.000147	0.004886	0.008302	0.000740	0.000713	0.019902	0.003739	0.003870
28	0.001595	0.001055	0.003868	0.003868	0.003881	0.000115	0.006055	0.010307	0.000677	0.000730	0.013178	0.002912	0.003640
29	0.001595	0.000730	0.002606	0.002606	0.005366	0.000132	0.006055	0.011368	0.000533	0.000653	0.019856	0.002335	0.003493
30	0.011962	0.005354	0.012297	0.012297	0.017635	0.000143	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Montgomery County 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.060102	0.106494	0.079624	0.079624	0.059425	0.059425	0.059425	0.061584	0.107326	0.108951	0.061584	0.054796	0.068825
1	0.066549	0.098530	0.076806	0.076806	0.056278	0.056049	0.056126	0.058783	0.098838	0.103650	0.059749	0.056698	0.059543
2	0.058230	0.081980	0.056214	0.056214	0.077657	0.089224	0.082493	0.031055	0.113632	0.111268	0.016870	0.044354	0.047903
3	0.068317	0.080777	0.055472	0.055472	0.074548	0.088197	0.075226	0.032240	0.089706	0.085755	0.017304	0.053668	0.060675
4	0.053135	0.082808	0.056362	0.056362	0.066205	0.075412	0.073770	0.039198	0.101333	0.102451	0.017642	0.064806	0.071965
5	0.060726	0.072633	0.059676	0.059676	0.062205	0.076463	0.069847	0.034777	0.056427	0.056032	0.016433	0.056252	0.057263
6	0.056463	0.067981	0.049253	0.049253	0.039216	0.057216	0.038513	0.030450	0.053431	0.050813	0.019981	0.057525	0.058116
7	0.051159	0.054177	0.041543	0.041543	0.034210	0.062000	0.038935	0.030412	0.069221	0.071436	0.010366	0.063625	0.060032
8	0.028803	0.043392	0.039083	0.039083	0.030011	0.048785	0.039295	0.022374	0.048059	0.048826	0.019524	0.032744	0.030871
9	0.024436	0.036786	0.033685	0.033685	0.032064	0.062349	0.035567	0.016303	0.017683	0.017043	0.003285	0.021855	0.019997
10	0.052927	0.029062	0.025809	0.025809	0.035851	0.059873	0.044399	0.029673	0.017940	0.016190	0.005810	0.028546	0.027428
11	0.046584	0.040771	0.045180	0.045180	0.035632	0.053319	0.044195	0.024857	0.044072	0.041381	0.021897	0.026198	0.024805
12	0.062494	0.037624	0.045799	0.045799	0.036334	0.036523	0.037978	0.071052	0.028590	0.027061	0.037079	0.087920	0.078722
13	0.051055	0.030082	0.041770	0.041770	0.044184	0.030999	0.035563	0.057430	0.030257	0.030204	0.049771	0.056383	0.050902
14	0.045336	0.026070	0.035821	0.035821	0.026523	0.022832	0.030633	0.048417	0.023951	0.025697	0.038754	0.048250	0.043087
15	0.031923	0.022208	0.038412	0.038412	0.025731	0.023757	0.033332	0.040846	0.018410	0.019228	0.060197	0.028953	0.024421
16	0.038578	0.018665	0.035159	0.035159	0.032993	0.023980	0.024239	0.044622	0.014718	0.015792	0.045168	0.022498	0.021618
17	0.028907	0.015398	0.035080	0.035080	0.030141	0.022019	0.028259	0.039990	0.013232	0.013489	0.042355	0.018760	0.016864
18	0.021628	0.012350	0.032402	0.032402	0.033912	0.019753	0.031018	0.042040	0.013138	0.013534	0.027663	0.025502	0.023545
19	0.017365	0.009965	0.024282	0.024282	0.039077	0.013221	0.026772	0.050535	0.010719	0.009828	0.051312	0.035354	0.032228
20	0.013622	0.007440	0.018456	0.018456	0.022574	0.008240	0.013980	0.040722	0.009528	0.009369	0.078902	0.027142	0.024374
21	0.010606	0.005373	0.012996	0.012996	0.017918	0.004294	0.012859	0.025282	0.003893	0.004506	0.035433	0.020163	0.018389
22	0.007175	0.003961	0.013048	0.013048	0.015873	0.001857	0.010981	0.016347	0.004563	0.004678	0.058982	0.013407	0.012671
23	0.004783	0.002340	0.008626	0.008626	0.011968	0.002405	0.009202	0.020428	0.002344	0.002323	0.030700	0.012108	0.012375
24	0.005407	0.001992	0.008068	0.008068	0.011735	0.000420	0.009873	0.022635	0.002225	0.002388	0.033527	0.012069	0.011774
25	0.004575	0.001331	0.006184	0.006184	0.008795	0.000749	0.004891	0.013931	0.001247	0.001414	0.035078	0.007491	0.008079
26	0.003327	0.001128	0.004317	0.004317	0.007540	0.000103	0.005571	0.010624	0.001003	0.001073	0.020622	0.005785	0.006273
27	0.001976	0.000841	0.003114	0.003114	0.004518	0.000147	0.004886	0.008302	0.000740	0.000713	0.019902	0.003739	0.003870
28	0.001144	0.000778	0.002355	0.002355	0.003881	0.000115	0.006055	0.010307	0.000677	0.000730	0.013178	0.002912	0.003640
29	0.001664	0.000733	0.002259	0.002259	0.005366	0.000132	0.006055	0.011368	0.000533	0.000653	0.019856	0.002335	0.003493
30	0.021004	0.006328	0.013144	0.013144	0.017635	0.000143	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Waller County 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.044529	0.047336	0.037599	0.037599	0.059425	0.059425	0.059425	0.061584	0.107326	0.108951	0.061584	0.054796	0.068825
1	0.068702	0.065493	0.048997	0.048997	0.056278	0.056049	0.056126	0.058783	0.098838	0.103650	0.059749	0.056698	0.059543
2	0.072519	0.070307	0.041818	0.041818	0.077657	0.089224	0.082493	0.031055	0.113632	0.111268	0.016870	0.044354	0.047903
3	0.055980	0.068618	0.040856	0.040856	0.074548	0.088197	0.075226	0.032240	0.089706	0.085755	0.017304	0.053668	0.060675
4	0.055980	0.079301	0.045074	0.045074	0.066205	0.075412	0.073770	0.039198	0.101333	0.102451	0.017642	0.064806	0.071965
5	0.054707	0.068702	0.048257	0.048257	0.062205	0.076463	0.069847	0.034777	0.056427	0.056032	0.016433	0.056252	0.057263
6	0.043257	0.068618	0.045222	0.045222	0.039216	0.057216	0.038513	0.030450	0.053431	0.050813	0.019981	0.057525	0.058116
7	0.041985	0.054894	0.037821	0.037821	0.034210	0.062000	0.038935	0.030412	0.069221	0.071436	0.010366	0.063625	0.060032
8	0.025445	0.044633	0.035379	0.035379	0.030011	0.048785	0.039295	0.022374	0.048059	0.048826	0.019524	0.032744	0.030871
9	0.035623	0.036652	0.032122	0.032122	0.032064	0.062349	0.035567	0.016303	0.017683	0.017043	0.003285	0.021855	0.019997
10	0.048346	0.031205	0.025831	0.025831	0.035851	0.059873	0.044399	0.029673	0.017940	0.016190	0.005810	0.028546	0.027428
11	0.044529	0.049278	0.048849	0.048849	0.035632	0.053319	0.044195	0.024857	0.044072	0.041381	0.021897	0.026198	0.024805
12	0.059796	0.045900	0.050699	0.050699	0.036334	0.036523	0.037978	0.071052	0.028590	0.027061	0.037079	0.087920	0.078722
13	0.055980	0.041973	0.046703	0.046703	0.044184	0.030999	0.035563	0.057430	0.030257	0.030204	0.049771	0.056383	0.050902
14	0.048346	0.038975	0.043446	0.043446	0.026523	0.022832	0.030633	0.048417	0.023951	0.025697	0.038754	0.048250	0.043087
15	0.039440	0.035005	0.047147	0.047147	0.025731	0.023757	0.033332	0.040846	0.018410	0.019228	0.060197	0.028953	0.024421
16	0.031807	0.031416	0.044704	0.044704	0.032993	0.023980	0.024239	0.044622	0.014718	0.015792	0.045168	0.022498	0.021618
17	0.034351	0.026940	0.049737	0.049737	0.030141	0.022019	0.028259	0.039990	0.013232	0.013489	0.042355	0.018760	0.016864
18	0.022901	0.022380	0.047073	0.047073	0.033912	0.019753	0.031018	0.042040	0.013138	0.013534	0.027663	0.025502	0.023545
19	0.024173	0.019382	0.033306	0.033306	0.039077	0.013221	0.026772	0.050535	0.010719	0.009828	0.051312	0.035354	0.032228
20	0.019084	0.012752	0.029383	0.029383	0.022574	0.008240	0.013980	0.040722	0.009528	0.009369	0.078902	0.027142	0.024374
21	0.007634	0.008867	0.018429	0.018429	0.017918	0.004294	0.012859	0.025282	0.003893	0.004506	0.035433	0.020163	0.018389
22	0.006361	0.007221	0.022722	0.022722	0.015873	0.001857	0.010981	0.016347	0.004563	0.004678	0.058982	0.013407	0.012671
23	0.012723	0.004645	0.014655	0.014655	0.011968	0.002405	0.009202	0.020428	0.002344	0.002323	0.030700	0.012108	0.012375
24	0.008906	0.003420	0.013989	0.013989	0.011735	0.000420	0.009873	0.022635	0.002225	0.002388	0.033527	0.012069	0.011774
25	0.007634	0.002407	0.011102	0.011102	0.008795	0.000749	0.004891	0.013931	0.001247	0.001414	0.035078	0.007491	0.008079
26	0.001272	0.002449	0.006883	0.006883	0.007540	0.000103	0.005571	0.010624	0.001003	0.001073	0.020622	0.005785	0.006273
27	0.001272	0.001267	0.006809	0.006809	0.004518	0.000147	0.004886	0.008302	0.000740	0.000713	0.019902	0.003739	0.003870
28	0.002545	0.001267	0.003923	0.003923	0.003881	0.000115	0.006055	0.010307	0.000677	0.000730	0.013178	0.002912	0.003640
29	0.002545	0.000845	0.003479	0.003479	0.005366	0.000132	0.006055	0.011368	0.000533	0.000653	0.019856	0.002335	0.003493
30	0.021628	0.007854	0.017985	0.017985	0.017635	0.000143	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Brazoria County 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.061795	0.061189	0.051236	0.051236	0.055916	0.055916	0.055916	0.058180	0.107326	0.108951	0.058180	0.054796	0.068825
1	0.060500	0.084498	0.069065	0.069065	0.056272	0.056177	0.056259	0.058179	0.098838	0.103650	0.058578	0.056698	0.059543
2	0.060130	0.085123	0.057148	0.057148	0.053703	0.053595	0.053754	0.056574	0.113632	0.111268	0.057461	0.044354	0.047903
3	0.053284	0.080094	0.054475	0.054475	0.055079	0.054952	0.055275	0.057472	0.089706	0.085755	0.058467	0.053668	0.060675
4	0.055134	0.089629	0.059136	0.059136	0.057299	0.057046	0.057596	0.058908	0.101333	0.102451	0.060375	0.064806	0.071965
5	0.056429	0.074963	0.058544	0.058544	0.053587	0.052974	0.053667	0.055701	0.056427	0.056032	0.058115	0.056252	0.057263
6	0.046994	0.069592	0.049366	0.049366	0.072106	0.081694	0.076767	0.028881	0.053431	0.050813	0.016156	0.057525	0.058116
7	0.045328	0.057499	0.039964	0.039964	0.067500	0.078131	0.068119	0.029440	0.069221	0.071436	0.016327	0.063625	0.060032
8	0.032562	0.047228	0.041399	0.041399	0.057694	0.063477	0.064077	0.034826	0.048059	0.048826	0.016279	0.032744	0.030871
9	0.028307	0.039774	0.034974	0.034974	0.052840	0.062167	0.059003	0.030340	0.017683	0.017043	0.014941	0.021855	0.019997
10	0.058464	0.031670	0.028719	0.028719	0.032885	0.045715	0.032079	0.026323	0.017940	0.016190	0.018033	0.028546	0.027428
11	0.053839	0.046170	0.046351	0.046351	0.027950	0.047838	0.031525	0.025805	0.044072	0.041381	0.009215	0.026198	0.024805
12	0.064755	0.043650	0.049287	0.049287	0.024205	0.037017	0.031373	0.018806	0.028590	0.027061	0.017221	0.087920	0.078722
13	0.061795	0.033678	0.045745	0.045745	0.025189	0.045712	0.027598	0.013446	0.030257	0.030204	0.002852	0.056383	0.050902
14	0.045143	0.030181	0.037120	0.037120	0.027435	0.042348	0.033477	0.024021	0.023951	0.025697	0.004971	0.048250	0.043087
15	0.037743	0.024954	0.039582	0.039582	0.026908	0.037037	0.032845	0.019936	0.018410	0.019228	0.018594	0.028953	0.024421
16	0.034598	0.020635	0.037778	0.037778	0.026714	0.024469	0.027413	0.055915	0.014718	0.015792	0.031004	0.022498	0.021618
17	0.036078	0.018056	0.039056	0.039056	0.032058	0.020412	0.025303	0.044760	0.013232	0.013489	0.041292	0.018760	0.016864
18	0.022202	0.014281	0.033604	0.033604	0.018731	0.014509	0.021163	0.037012	0.013138	0.013534	0.031647	0.025502	0.023545
19	0.014801	0.012135	0.026783	0.026783	0.017689	0.014544	0.022359	0.030639	0.010719	0.009828	0.048417	0.035354	0.032228
20	0.013136	0.008846	0.021819	0.021819	0.022068	0.014159	0.015781	0.032824	0.009528	0.009369	0.035754	0.027142	0.024374
21	0.008881	0.005942	0.013497	0.013497	0.019618	0.012516	0.017856	0.028859	0.003893	0.004506	0.033019	0.020163	0.018389
22	0.007586	0.004517	0.014353	0.014353	0.021770	0.011016	0.019305	0.030050	0.004563	0.004678	0.021400	0.013407	0.012671
23	0.007586	0.002589	0.010205	0.010205	0.024396	0.007096	0.016162	0.035423	0.002344	0.002323	0.039074	0.012108	0.012375
24	0.004255	0.002296	0.008783	0.008783	0.013900	0.004343	0.008313	0.028262	0.002225	0.002388	0.059603	0.012069	0.011774
25	0.004440	0.001692	0.007282	0.007282	0.010880	0.002220	0.007530	0.017378	0.001247	0.001414	0.026560	0.007491	0.008079
26	0.002960	0.001180	0.004596	0.004596	0.009369	0.000923	0.006234	0.011017	0.001003	0.001073	0.043513	0.005785	0.006273
27	0.001850	0.000913	0.003792	0.003792	0.006966	0.001173	0.005145	0.013629	0.000740	0.000713	0.022466	0.003739	0.003870
28	0.002220	0.000913	0.002713	0.002713	0.006734	0.000201	0.005435	0.014955	0.000677	0.000730	0.024344	0.002912	0.003640
29	0.001480	0.000657	0.002436	0.002436	0.004904	0.000344	0.002609	0.009023	0.000533	0.000653	0.025065	0.002335	0.003493
30	0.015726	0.005456	0.011193	0.011193	0.017635	0.000280	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Chambers County 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.067365	0.074170	0.061786	0.061786	0.055916	0.055916	0.055916	0.058180	0.107326	0.108951	0.058180	0.054796	0.068825
1	0.074850	0.102367	0.085650	0.085650	0.056272	0.056177	0.056259	0.058179	0.098838	0.103650	0.058578	0.056698	0.059543
2	0.059880	0.099585	0.070976	0.070976	0.053703	0.053595	0.053754	0.056574	0.113632	0.111268	0.057461	0.044354	0.047903
3	0.086826	0.089212	0.060009	0.060009	0.055079	0.054952	0.055275	0.057472	0.089706	0.085755	0.058467	0.053668	0.060675
4	0.061377	0.094964	0.061863	0.061863	0.057299	0.057046	0.057596	0.058908	0.101333	0.102451	0.060375	0.064806	0.071965
5	0.047904	0.075538	0.063176	0.063176	0.053587	0.052974	0.053667	0.055701	0.056427	0.056032	0.058115	0.056252	0.057263
6	0.052395	0.065871	0.050587	0.050587	0.072106	0.081694	0.076767	0.028881	0.053431	0.050813	0.016156	0.057525	0.058116
7	0.035928	0.056017	0.041628	0.041628	0.067500	0.078131	0.068119	0.029440	0.069221	0.071436	0.016327	0.063625	0.060032
8	0.019461	0.040881	0.043173	0.043173	0.057694	0.063477	0.064077	0.034826	0.048059	0.048826	0.016279	0.032744	0.030871
9	0.029940	0.032676	0.032592	0.032592	0.052840	0.062167	0.059003	0.030340	0.017683	0.017043	0.014941	0.021855	0.019997
10	0.055389	0.027773	0.027495	0.027495	0.032885	0.045715	0.032079	0.026323	0.017940	0.016190	0.018033	0.028546	0.027428
11	0.055389	0.040834	0.045876	0.045876	0.027950	0.047838	0.031525	0.025805	0.044072	0.041381	0.009215	0.026198	0.024805
12	0.050898	0.039655	0.045181	0.045181	0.024205	0.037017	0.031373	0.018806	0.028590	0.027061	0.017221	0.087920	0.078722
13	0.071856	0.028150	0.039002	0.039002	0.025189	0.045712	0.027598	0.013446	0.030257	0.030204	0.002852	0.056383	0.050902
14	0.043413	0.023199	0.032901	0.032901	0.027435	0.042348	0.033477	0.024021	0.023951	0.025697	0.004971	0.048250	0.043087
15	0.034431	0.023152	0.035218	0.035218	0.026908	0.037037	0.032845	0.019936	0.018410	0.019228	0.018594	0.028953	0.024421
16	0.038922	0.016645	0.034600	0.034600	0.026714	0.024469	0.027413	0.055915	0.014718	0.015792	0.031004	0.022498	0.021618
17	0.017964	0.015466	0.034909	0.034909	0.032058	0.020412	0.025303	0.044760	0.013232	0.013489	0.041292	0.018760	0.016864
18	0.011976	0.010798	0.030816	0.030816	0.018731	0.014509	0.021163	0.037012	0.013138	0.013534	0.031647	0.025502	0.023545
19	0.017964	0.010232	0.020853	0.020853	0.017689	0.014544	0.022359	0.030639	0.010719	0.009828	0.048417	0.035354	0.032228
20	0.010479	0.007591	0.017300	0.017300	0.022068	0.014159	0.015781	0.032824	0.009528	0.009369	0.035754	0.027142	0.024374
21	0.019461	0.005847	0.010504	0.010504	0.019618	0.012516	0.017856	0.028859	0.003893	0.004506	0.033019	0.020163	0.018389
22	0.005988	0.004149	0.012975	0.012975	0.021770	0.011016	0.019305	0.030050	0.004563	0.004678	0.021400	0.013407	0.012671
23	0.011976	0.002499	0.010040	0.010040	0.024396	0.007096	0.016162	0.035423	0.002344	0.002323	0.039074	0.012108	0.012375
24	0.001497	0.002310	0.006796	0.006796	0.013900	0.004343	0.008313	0.028262	0.002225	0.002388	0.059603	0.012069	0.011774
25	0.004491	0.001980	0.005329	0.005329	0.010880	0.002220	0.007530	0.017378	0.001247	0.001414	0.026560	0.007491	0.008079
26	0.004491	0.001273	0.003167	0.003167	0.009369	0.000923	0.006234	0.011017	0.001003	0.001073	0.043513	0.005785	0.006273
27	0.000000	0.000754	0.002858	0.002858	0.006966	0.001173	0.005145	0.013629	0.000740	0.000713	0.022466	0.003739	0.003870
28	0.000000	0.000660	0.001699	0.001699	0.006734	0.000201	0.005435	0.014955	0.000677	0.000730	0.024344	0.002912	0.003640
29	0.001497	0.000236	0.001931	0.001931	0.004904	0.000344	0.002609	0.009023	0.000533	0.000653	0.025065	0.002335	0.003493
30	0.005988	0.005517	0.009113	0.009113	0.017635	0.000280	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Fort Bend County 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.056937	0.063854	0.059009	0.059009	0.055916	0.055916	0.055916	0.058180	0.107326	0.108951	0.058180	0.054796	0.068825
1	0.075769	0.085558	0.075577	0.075577	0.056272	0.056177	0.056259	0.058179	0.098838	0.103650	0.058578	0.056698	0.059543
2	0.064587	0.088792	0.063943	0.063943	0.053703	0.053595	0.053754	0.056574	0.113632	0.111268	0.057461	0.044354	0.047903
3	0.068118	0.085781	0.060124	0.060124	0.055079	0.054952	0.055275	0.057472	0.089706	0.085755	0.058467	0.053668	0.060675
4	0.065029	0.094456	0.062762	0.062762	0.057299	0.057046	0.057596	0.058908	0.101333	0.102451	0.060375	0.064806	0.071965
5	0.066500	0.081303	0.063767	0.063767	0.053587	0.052974	0.053667	0.055701	0.056427	0.056032	0.058115	0.056252	0.057263
6	0.056348	0.075357	0.054704	0.054704	0.072106	0.081694	0.076767	0.028881	0.053431	0.050813	0.016156	0.057525	0.058116
7	0.050611	0.060597	0.043556	0.043556	0.067500	0.078131	0.068119	0.029440	0.069221	0.071436	0.016327	0.063625	0.060032
8	0.034133	0.050231	0.043225	0.043225	0.057694	0.063477	0.064077	0.034826	0.048059	0.048826	0.016279	0.032744	0.030871
9	0.026482	0.042140	0.035874	0.035874	0.052840	0.062167	0.059003	0.030340	0.017683	0.017043	0.014941	0.021855	0.019997
10	0.051935	0.033392	0.026745	0.026745	0.032885	0.045715	0.032079	0.026323	0.017940	0.016190	0.018033	0.028546	0.027428
11	0.052082	0.043067	0.045179	0.045179	0.027950	0.047838	0.031525	0.025805	0.044072	0.041381	0.009215	0.026198	0.024805
12	0.058702	0.040085	0.048004	0.048004	0.024205	0.037017	0.031373	0.018806	0.028590	0.027061	0.017221	0.087920	0.078722
13	0.053700	0.030779	0.041205	0.041205	0.025189	0.045712	0.027598	0.013446	0.030257	0.030204	0.002852	0.056383	0.050902
14	0.042960	0.025314	0.033997	0.033997	0.027435	0.042348	0.033477	0.024021	0.023951	0.025697	0.004971	0.048250	0.043087
15	0.026924	0.021278	0.036492	0.036492	0.026908	0.037037	0.032845	0.019936	0.018410	0.019228	0.018594	0.028953	0.024421
16	0.035015	0.017481	0.034450	0.034450	0.026714	0.024469	0.027413	0.055915	0.014718	0.015792	0.031004	0.022498	0.021618
17	0.027218	0.014401	0.034251	0.034251	0.032058	0.020412	0.025303	0.044760	0.013232	0.013489	0.041292	0.018760	0.016864
18	0.018685	0.011207	0.030134	0.030134	0.018731	0.014509	0.021163	0.037012	0.013138	0.013534	0.031647	0.025502	0.023545
19	0.012358	0.009129	0.022904	0.022904	0.017689	0.014544	0.022359	0.030639	0.010719	0.009828	0.048417	0.035354	0.032228
20	0.009710	0.006637	0.017661	0.017661	0.022068	0.014159	0.015781	0.032824	0.009528	0.009369	0.035754	0.027142	0.024374
21	0.008092	0.004649	0.012771	0.012771	0.019618	0.012516	0.017856	0.028859	0.003893	0.004506	0.033019	0.020163	0.018389
22	0.005002	0.003228	0.011270	0.011270	0.021770	0.011016	0.019305	0.030050	0.004563	0.004678	0.021400	0.013407	0.012671
23	0.003531	0.001920	0.007771	0.007771	0.024396	0.007096	0.016162	0.035423	0.002344	0.002323	0.039074	0.012108	0.012375
24	0.004561	0.001445	0.006546	0.006546	0.013900	0.004343	0.008313	0.028262	0.002225	0.002388	0.059603	0.012069	0.011774
25	0.002207	0.001124	0.006270	0.006270	0.010880	0.002220	0.007530	0.017378	0.001247	0.001414	0.026560	0.007491	0.008079
26	0.002354	0.000856	0.003709	0.003709	0.009369	0.000923	0.006234	0.011017	0.001003	0.001073	0.043513	0.005785	0.006273
27	0.001913	0.000672	0.003002	0.003002	0.006966	0.001173	0.005145	0.013629	0.000740	0.000713	0.022466	0.003739	0.003870
28	0.000883	0.000565	0.002417	0.002417	0.006734	0.000201	0.005435	0.014955	0.000677	0.000730	0.024344	0.002912	0.003640
29	0.000441	0.000482	0.002031	0.002031	0.004904	0.000344	0.002609	0.009023	0.000533	0.000653	0.025065	0.002335	0.003493
30	0.017213	0.004221	0.010652	0.010652	0.017635	0.000280	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Galveston County 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.059392	0.059266	0.050818	0.050818	0.055916	0.055916	0.055916	0.058180	0.107326	0.108951	0.058180	0.054796	0.068825
1	0.068727	0.085363	0.072307	0.072307	0.056272	0.056177	0.056259	0.058179	0.098838	0.103650	0.058578	0.056698	0.059543
2	0.061323	0.090480	0.063375	0.063375	0.053703	0.053595	0.053754	0.056574	0.113632	0.111268	0.057461	0.044354	0.047903
3	0.059231	0.081649	0.057840	0.057840	0.055079	0.054952	0.055275	0.057472	0.089706	0.085755	0.058467	0.053668	0.060675
4	0.056333	0.088141	0.058295	0.058295	0.057299	0.057046	0.057596	0.058908	0.101333	0.102451	0.060375	0.064806	0.071965
5	0.053275	0.073997	0.061828	0.061828	0.053587	0.052974	0.053667	0.055701	0.056427	0.056032	0.058115	0.056252	0.057263
6	0.050056	0.068880	0.054079	0.054079	0.072106	0.081694	0.076767	0.028881	0.053431	0.050813	0.016156	0.057525	0.058116
7	0.039433	0.055310	0.041552	0.041552	0.067500	0.078131	0.068119	0.029440	0.069221	0.071436	0.016327	0.063625	0.060032
8	0.028811	0.045595	0.041082	0.041082	0.057694	0.063477	0.064077	0.034826	0.048059	0.048826	0.016279	0.032744	0.030871
9	0.027523	0.038449	0.036639	0.036639	0.052840	0.062167	0.059003	0.030340	0.017683	0.017043	0.014941	0.021855	0.019997
10	0.052953	0.032268	0.028753	0.028753	0.032885	0.045715	0.032079	0.026323	0.017940	0.016190	0.018033	0.028546	0.027428
11	0.051666	0.043966	0.048301	0.048301	0.027950	0.047838	0.031525	0.025805	0.044072	0.041381	0.009215	0.026198	0.024805
12	0.060357	0.042011	0.046799	0.046799	0.024205	0.037017	0.031373	0.018806	0.028590	0.027061	0.017221	0.087920	0.078722
13	0.053114	0.034009	0.042341	0.042341	0.025189	0.045712	0.027598	0.013446	0.030257	0.030204	0.002852	0.056383	0.050902
14	0.047964	0.029856	0.035259	0.035259	0.027435	0.042348	0.033477	0.024021	0.023951	0.025697	0.004971	0.048250	0.043087
15	0.034444	0.025043	0.039141	0.039141	0.026908	0.037037	0.032845	0.019936	0.018410	0.019228	0.018594	0.028953	0.024421
16	0.038468	0.021730	0.036320	0.036320	0.026714	0.024469	0.027413	0.055915	0.014718	0.015792	0.031004	0.022498	0.021618
17	0.033639	0.018405	0.036472	0.036472	0.032058	0.020412	0.025303	0.044760	0.013232	0.013489	0.041292	0.018760	0.016864
18	0.021407	0.014511	0.033378	0.033378	0.018731	0.014509	0.021163	0.037012	0.013138	0.013534	0.031647	0.025502	0.023545
19	0.020924	0.012172	0.024158	0.024158	0.017689	0.014544	0.022359	0.030639	0.010719	0.009828	0.048417	0.035354	0.032228
20	0.013842	0.008949	0.019684	0.019684	0.022068	0.014159	0.015781	0.032824	0.009528	0.009369	0.035754	0.027142	0.024374
21	0.011106	0.006593	0.013285	0.013285	0.019618	0.012516	0.017856	0.028859	0.003893	0.004506	0.033019	0.020163	0.018389
22	0.006921	0.004694	0.012799	0.012799	0.021770	0.011016	0.019305	0.030050	0.004563	0.004678	0.021400	0.013407	0.012671
23	0.009013	0.002880	0.008872	0.008872	0.024396	0.007096	0.016162	0.035423	0.002344	0.002323	0.039074	0.012108	0.012375
24	0.005150	0.002463	0.007507	0.007507	0.013900	0.004343	0.008313	0.028262	0.002225	0.002388	0.059603	0.012069	0.011774
25	0.002897	0.001944	0.006839	0.006839	0.010880	0.002220	0.007530	0.017378	0.001247	0.001414	0.026560	0.007491	0.008079
26	0.004024	0.001392	0.004565	0.004565	0.009369	0.000923	0.006234	0.011017	0.001003	0.001073	0.043513	0.005785	0.006273
27	0.001288	0.001082	0.002881	0.002881	0.006966	0.001173	0.005145	0.013629	0.000740	0.000713	0.022466	0.003739	0.003870
28	0.001449	0.000981	0.002199	0.002199	0.006734	0.000201	0.005435	0.014955	0.000677	0.000730	0.024344	0.002912	0.003640
29	0.002414	0.000800	0.002002	0.002002	0.004904	0.000344	0.002609	0.009023	0.000533	0.000653	0.025065	0.002335	0.003493
30	0.022855	0.007123	0.010631	0.010631	0.017635	0.000280	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Harris County 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.067022	0.060996	0.050704	0.050704	0.055916	0.055916	0.055916	0.058180	0.107326	0.108951	0.058180	0.054796	0.068825
1	0.073186	0.079200	0.064064	0.064064	0.056272	0.056177	0.056259	0.058179	0.098838	0.103650	0.058578	0.056698	0.059543
2	0.061329	0.076245	0.050862	0.050862	0.053703	0.053595	0.053754	0.056574	0.113632	0.111268	0.057461	0.044354	0.047903
3	0.063540	0.075379	0.048647	0.048647	0.055079	0.054952	0.055275	0.057472	0.089706	0.085755	0.058467	0.053668	0.060675
4	0.062075	0.083557	0.051486	0.051486	0.057299	0.057046	0.057596	0.058908	0.101333	0.102451	0.060375	0.064806	0.071965
5	0.057100	0.072572	0.055214	0.055214	0.053587	0.052974	0.053667	0.055701	0.056427	0.056032	0.058115	0.056252	0.057263
6	0.053341	0.068192	0.046605	0.046605	0.072106	0.081694	0.076767	0.028881	0.053431	0.050813	0.016156	0.057525	0.058116
7	0.045852	0.057464	0.040483	0.040483	0.067500	0.078131	0.068119	0.029440	0.069221	0.071436	0.016327	0.063625	0.060032
8	0.030844	0.047021	0.041143	0.041143	0.057694	0.063477	0.064077	0.034826	0.048059	0.048826	0.016279	0.032744	0.030871
9	0.025565	0.041397	0.034951	0.034951	0.052840	0.062167	0.059003	0.030340	0.017683	0.017043	0.014941	0.021855	0.019997
10	0.053784	0.035266	0.029555	0.029555	0.032885	0.045715	0.032079	0.026323	0.017940	0.016190	0.018033	0.028546	0.027428
11	0.051103	0.047958	0.053325	0.053325	0.027950	0.047838	0.031525	0.025805	0.044072	0.041381	0.009215	0.026198	0.024805
12	0.062324	0.046919	0.054891	0.054891	0.024205	0.037017	0.031373	0.018806	0.028590	0.027061	0.017221	0.087920	0.078722
13	0.054502	0.037948	0.047402	0.047402	0.025189	0.045712	0.027598	0.013446	0.030257	0.030204	0.002852	0.056383	0.050902
14	0.041181	0.032786	0.041876	0.041876	0.027435	0.042348	0.033477	0.024021	0.023951	0.025697	0.004971	0.048250	0.043087
15	0.030181	0.027263	0.043250	0.043250	0.026908	0.037037	0.032845	0.019936	0.018410	0.019228	0.018594	0.028953	0.024421
16	0.037505	0.023986	0.040752	0.040752	0.026714	0.024469	0.027413	0.055915	0.014718	0.015792	0.031004	0.022498	0.021618
17	0.029545	0.019987	0.040158	0.040158	0.032058	0.020412	0.025303	0.044760	0.013232	0.013489	0.041292	0.018760	0.016864
18	0.019955	0.015696	0.036866	0.036866	0.018731	0.014509	0.021163	0.037012	0.013138	0.013534	0.031647	0.025502	0.023545
19	0.014510	0.013126	0.028642	0.028642	0.017689	0.014544	0.022359	0.030639	0.010719	0.009828	0.048417	0.035354	0.032228
20	0.011663	0.009768	0.021304	0.021304	0.022068	0.014159	0.015781	0.032824	0.009528	0.009369	0.035754	0.027142	0.024374
21	0.008015	0.006721	0.014751	0.014751	0.019618	0.012516	0.017856	0.028859	0.003893	0.004506	0.033019	0.020163	0.018389
22	0.006357	0.004944	0.014138	0.014138	0.021770	0.011016	0.019305	0.030050	0.004563	0.004678	0.021400	0.013407	0.012671
23	0.006191	0.003024	0.009339	0.009339	0.024396	0.007096	0.016162	0.035423	0.002344	0.002323	0.039074	0.012108	0.012375
24	0.004201	0.002288	0.008224	0.008224	0.013900	0.004343	0.008313	0.028262	0.002225	0.002388	0.059603	0.012069	0.011774
25	0.003814	0.001584	0.006870	0.006870	0.010880	0.002220	0.007530	0.017378	0.001247	0.001414	0.026560	0.007491	0.008079
26	0.002487	0.001192	0.004385	0.004385	0.009369	0.000923	0.006234	0.011017	0.001003	0.001073	0.043513	0.005785	0.006273
27	0.002073	0.000922	0.003318	0.003318	0.006966	0.001173	0.005145	0.013629	0.000740	0.000713	0.022466	0.003739	0.003870
28	0.001106	0.000832	0.002499	0.002499	0.006734	0.000201	0.005435	0.014955	0.000677	0.000730	0.024344	0.002912	0.003640
29	0.001492	0.000640	0.002173	0.002173	0.004904	0.000344	0.002609	0.009023	0.000533	0.000653	0.025065	0.002335	0.003493
30	0.018158	0.005128	0.012123	0.012123	0.017635	0.000280	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Liberty County 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.055821	0.052213	0.042145	0.042145	0.055916	0.055916	0.055916	0.058180	0.107326	0.108951	0.058180	0.054796	0.068825
1	0.049442	0.074386	0.057456	0.057456	0.056272	0.056177	0.056259	0.058179	0.098838	0.103650	0.058578	0.056698	0.059543
2	0.050239	0.072547	0.046869	0.046869	0.053703	0.053595	0.053754	0.056574	0.113632	0.111268	0.057461	0.044354	0.047903
3	0.063796	0.068085	0.038317	0.038317	0.055079	0.054952	0.055275	0.057472	0.089706	0.085755	0.058467	0.053668	0.060675
4	0.047049	0.074602	0.043652	0.043652	0.057299	0.057046	0.057596	0.058908	0.101333	0.102451	0.060375	0.064806	0.071965
5	0.043062	0.065895	0.047113	0.047113	0.053587	0.052974	0.053667	0.055701	0.056427	0.056032	0.058115	0.056252	0.057263
6	0.045455	0.057864	0.041575	0.041575	0.072106	0.081694	0.076767	0.028881	0.053431	0.050813	0.016156	0.057525	0.058116
7	0.040670	0.050023	0.036974	0.036974	0.067500	0.078131	0.068119	0.029440	0.069221	0.071436	0.016327	0.063625	0.060032
8	0.034290	0.043182	0.038236	0.038236	0.057694	0.063477	0.064077	0.034826	0.048059	0.048826	0.016279	0.032744	0.030871
9	0.029506	0.038017	0.030499	0.030499	0.052840	0.062167	0.059003	0.030340	0.017683	0.017043	0.014941	0.021855	0.019997
10	0.059011	0.033853	0.027201	0.027201	0.032885	0.045715	0.032079	0.026323	0.017940	0.016190	0.018033	0.028546	0.027428
11	0.055821	0.049455	0.050533	0.050533	0.027950	0.047838	0.031525	0.025805	0.044072	0.041381	0.009215	0.026198	0.024805
12	0.060606	0.052808	0.050330	0.050330	0.024205	0.037017	0.031373	0.018806	0.028590	0.027061	0.017221	0.087920	0.078722
13	0.057416	0.044885	0.049638	0.049638	0.025189	0.045712	0.027598	0.013446	0.030257	0.030204	0.002852	0.056383	0.050902
14	0.055024	0.042019	0.044425	0.044425	0.027435	0.042348	0.033477	0.024021	0.023951	0.025697	0.004971	0.048250	0.043087
15	0.035088	0.031095	0.046991	0.046991	0.026908	0.037037	0.032845	0.019936	0.018410	0.019228	0.018594	0.028953	0.024421
16	0.044657	0.030555	0.047032	0.047032	0.026714	0.024469	0.027413	0.055915	0.014718	0.015792	0.031004	0.022498	0.021618
17	0.040670	0.026120	0.047968	0.047968	0.032058	0.020412	0.025303	0.044760	0.013232	0.013489	0.041292	0.018760	0.016864
18	0.023126	0.021875	0.045566	0.045566	0.018731	0.014509	0.021163	0.037012	0.013138	0.013534	0.031647	0.025502	0.023545
19	0.025518	0.016954	0.034368	0.034368	0.017689	0.014544	0.022359	0.030639	0.010719	0.009828	0.048417	0.035354	0.032228
20	0.021531	0.014412	0.027486	0.027486	0.022068	0.014159	0.015781	0.032824	0.009528	0.009369	0.035754	0.027142	0.024374
21	0.007177	0.009978	0.020604	0.020604	0.019618	0.012516	0.017856	0.028859	0.003893	0.004506	0.033019	0.020163	0.018389
22	0.015152	0.006976	0.019627	0.019627	0.021770	0.011016	0.019305	0.030050	0.004563	0.004678	0.021400	0.013407	0.012671
23	0.006380	0.004759	0.013071	0.013071	0.024396	0.007096	0.016162	0.035423	0.002344	0.002323	0.039074	0.012108	0.012375
24	0.007974	0.004516	0.013519	0.013519	0.013900	0.004343	0.008313	0.028262	0.002225	0.002388	0.059603	0.012069	0.011774
25	0.007974	0.002839	0.010099	0.010099	0.010880	0.002220	0.007530	0.017378	0.001247	0.001414	0.026560	0.007491	0.008079
26	0.001595	0.001622	0.005782	0.005782	0.009369	0.000923	0.006234	0.011017	0.001003	0.001073	0.043513	0.005785	0.006273
27	0.000797	0.001325	0.004153	0.004153	0.006966	0.001173	0.005145	0.013629	0.000740	0.000713	0.022466	0.003739	0.003870
28	0.001595	0.001055	0.003868	0.003868	0.006734	0.000201	0.005435	0.014955	0.000677	0.000730	0.024344	0.002912	0.003640
29	0.001595	0.000730	0.002606	0.002606	0.004904	0.000344	0.002609	0.009023	0.000533	0.000653	0.025065	0.002335	0.003493
30	0.011962	0.005354	0.012297	0.012297	0.017635	0.000280	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Montgomery County 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.060102	0.106494	0.079624	0.079624	0.055916	0.055916	0.055916	0.058180	0.107326	0.108951	0.058180	0.054796	0.068825
1	0.066549	0.098530	0.076806	0.076806	0.056272	0.056177	0.056259	0.058179	0.098838	0.103650	0.058578	0.056698	0.059543
2	0.058230	0.081980	0.056214	0.056214	0.053703	0.053595	0.053754	0.056574	0.113632	0.111268	0.057461	0.044354	0.047903
3	0.068317	0.080777	0.055472	0.055472	0.055079	0.054952	0.055275	0.057472	0.089706	0.085755	0.058467	0.053668	0.060675
4	0.053135	0.082808	0.056362	0.056362	0.057299	0.057046	0.057596	0.058908	0.101333	0.102451	0.060375	0.064806	0.071965
5	0.060726	0.072633	0.059676	0.059676	0.053587	0.052974	0.053667	0.055701	0.056427	0.056032	0.058115	0.056252	0.057263
6	0.056463	0.067981	0.049253	0.049253	0.072106	0.081694	0.076767	0.028881	0.053431	0.050813	0.016156	0.057525	0.058116
7	0.051159	0.054177	0.041543	0.041543	0.067500	0.078131	0.068119	0.029440	0.069221	0.071436	0.016327	0.063625	0.060032
8	0.028803	0.043392	0.039083	0.039083	0.057694	0.063477	0.064077	0.034826	0.048059	0.048826	0.016279	0.032744	0.030871
9	0.024436	0.036786	0.033685	0.033685	0.052840	0.062167	0.059003	0.030340	0.017683	0.017043	0.014941	0.021855	0.019997
10	0.052927	0.029062	0.025809	0.025809	0.032885	0.045715	0.032079	0.026323	0.017940	0.016190	0.018033	0.028546	0.027428
11	0.046584	0.040771	0.045180	0.045180	0.027950	0.047838	0.031525	0.025805	0.044072	0.041381	0.009215	0.026198	0.024805
12	0.062494	0.037624	0.045799	0.045799	0.024205	0.037017	0.031373	0.018806	0.028590	0.027061	0.017221	0.087920	0.078722
13	0.051055	0.030082	0.041770	0.041770	0.025189	0.045712	0.027598	0.013446	0.030257	0.030204	0.002852	0.056383	0.050902
14	0.045336	0.026070	0.035821	0.035821	0.027435	0.042348	0.033477	0.024021	0.023951	0.025697	0.004971	0.048250	0.043087
15	0.031923	0.022208	0.038412	0.038412	0.026908	0.037037	0.032845	0.019936	0.018410	0.019228	0.018594	0.028953	0.024421
16	0.038578	0.018665	0.035159	0.035159	0.026714	0.024469	0.027413	0.055915	0.014718	0.015792	0.031004	0.022498	0.021618
17	0.028907	0.015398	0.035080	0.035080	0.032058	0.020412	0.025303	0.044760	0.013232	0.013489	0.041292	0.018760	0.016864
18	0.021628	0.012350	0.032402	0.032402	0.018731	0.014509	0.021163	0.037012	0.013138	0.013534	0.031647	0.025502	0.023545
19	0.017365	0.009965	0.024282	0.024282	0.017689	0.014544	0.022359	0.030639	0.010719	0.009828	0.048417	0.035354	0.032228
20	0.013622	0.007440	0.018456	0.018456	0.022068	0.014159	0.015781	0.032824	0.009528	0.009369	0.035754	0.027142	0.024374
21	0.010606	0.005373	0.012996	0.012996	0.019618	0.012516	0.017856	0.028859	0.003893	0.004506	0.033019	0.020163	0.018389
22	0.007175	0.003961	0.013048	0.013048	0.021770	0.011016	0.019305	0.030050	0.004563	0.004678	0.021400	0.013407	0.012671
23	0.004783	0.002340	0.008626	0.008626	0.024396	0.007096	0.016162	0.035423	0.002344	0.002323	0.039074	0.012108	0.012375
24	0.005407	0.001992	0.008068	0.008068	0.013900	0.004343	0.008313	0.028262	0.002225	0.002388	0.059603	0.012069	0.011774
25	0.004575	0.001331	0.006184	0.006184	0.010880	0.002220	0.007530	0.017378	0.001247	0.001414	0.026560	0.007491	0.008079
26	0.003327	0.001128	0.004317	0.004317	0.009369	0.000923	0.006234	0.011017	0.001003	0.001073	0.043513	0.005785	0.006273
27	0.001976	0.000841	0.003114	0.003114	0.006966	0.001173	0.005145	0.013629	0.000740	0.000713	0.022466	0.003739	0.003870
28	0.001144	0.000778	0.002355	0.002355	0.006734	0.000201	0.005435	0.014955	0.000677	0.000730	0.024344	0.002912	0.003640
29	0.001664	0.000733	0.002259	0.002259	0.004904	0.000344	0.002609	0.009023	0.000533	0.000653	0.025065	0.002335	0.003493
30	0.021004	0.006328	0.013144	0.013144	0.017635	0.000280	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Waller County 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.044529	0.047336	0.037599	0.037599	0.055916	0.055916	0.055916	0.058180	0.107326	0.108951	0.058180	0.054796	0.068825
1	0.068702	0.065493	0.048997	0.048997	0.056272	0.056177	0.056259	0.058179	0.098838	0.103650	0.058578	0.056698	0.059543
2	0.072519	0.070307	0.041818	0.041818	0.053703	0.053595	0.053754	0.056574	0.113632	0.111268	0.057461	0.044354	0.047903
3	0.055980	0.068618	0.040856	0.040856	0.055079	0.054952	0.055275	0.057472	0.089706	0.085755	0.058467	0.053668	0.060675
4	0.055980	0.079301	0.045074	0.045074	0.057299	0.057046	0.057596	0.058908	0.101333	0.102451	0.060375	0.064806	0.071965
5	0.054707	0.068702	0.048257	0.048257	0.053587	0.052974	0.053667	0.055701	0.056427	0.056032	0.058115	0.056252	0.057263
6	0.043257	0.068618	0.045222	0.045222	0.072106	0.081694	0.076767	0.028881	0.053431	0.050813	0.016156	0.057525	0.058116
7	0.041985	0.054894	0.037821	0.037821	0.067500	0.078131	0.068119	0.029440	0.069221	0.071436	0.016327	0.063625	0.060032
8	0.025445	0.044633	0.035379	0.035379	0.057694	0.063477	0.064077	0.034826	0.048059	0.048826	0.016279	0.032744	0.030871
9	0.035623	0.036652	0.032122	0.032122	0.052840	0.062167	0.059003	0.030340	0.017683	0.017043	0.014941	0.021855	0.019997
10	0.048346	0.031205	0.025831	0.025831	0.032885	0.045715	0.032079	0.026323	0.017940	0.016190	0.018033	0.028546	0.027428
11	0.044529	0.049278	0.048849	0.048849	0.027950	0.047838	0.031525	0.025805	0.044072	0.041381	0.009215	0.026198	0.024805
12	0.059796	0.045900	0.050699	0.050699	0.024205	0.037017	0.031373	0.018806	0.028590	0.027061	0.017221	0.087920	0.078722
13	0.055980	0.041973	0.046703	0.046703	0.025189	0.045712	0.027598	0.013446	0.030257	0.030204	0.002852	0.056383	0.050902
14	0.048346	0.038975	0.043446	0.043446	0.027435	0.042348	0.033477	0.024021	0.023951	0.025697	0.004971	0.048250	0.043087
15	0.039440	0.035005	0.047147	0.047147	0.026908	0.037037	0.032845	0.019936	0.018410	0.019228	0.018594	0.028953	0.024421
16	0.031807	0.031416	0.044704	0.044704	0.026714	0.024469	0.027413	0.055915	0.014718	0.015792	0.031004	0.022498	0.021618
17	0.034351	0.026940	0.049737	0.049737	0.032058	0.020412	0.025303	0.044760	0.013232	0.013489	0.041292	0.018760	0.016864
18	0.022901	0.022380	0.047073	0.047073	0.018731	0.014509	0.021163	0.037012	0.013138	0.013534	0.031647	0.025502	0.023545
19	0.024173	0.019382	0.033306	0.033306	0.017689	0.014544	0.022359	0.030639	0.010719	0.009828	0.048417	0.035354	0.032228
20	0.019084	0.012752	0.029383	0.029383	0.022068	0.014159	0.015781	0.032824	0.009528	0.009369	0.035754	0.027142	0.024374
21	0.007634	0.008867	0.018429	0.018429	0.019618	0.012516	0.017856	0.028859	0.003893	0.004506	0.033019	0.020163	0.018389
22	0.006361	0.007221	0.022722	0.022722	0.021770	0.011016	0.019305	0.030050	0.004563	0.004678	0.021400	0.013407	0.012671
23	0.012723	0.004645	0.014655	0.014655	0.024396	0.007096	0.016162	0.035423	0.002344	0.002323	0.039074	0.012108	0.012375
24	0.008906	0.003420	0.013989	0.013989	0.013900	0.004343	0.008313	0.028262	0.002225	0.002388	0.059603	0.012069	0.011774
25	0.007634	0.002407	0.011102	0.011102	0.010880	0.002220	0.007530	0.017378	0.001247	0.001414	0.026560	0.007491	0.008079
26	0.001272	0.002449	0.006883	0.006883	0.009369	0.000923	0.006234	0.011017	0.001003	0.001073	0.043513	0.005785	0.006273
27	0.001272	0.001267	0.006809	0.006809	0.006966	0.001173	0.005145	0.013629	0.000740	0.000713	0.022466	0.003739	0.003870
28	0.002545	0.001267	0.003923	0.003923	0.006734	0.000201	0.005435	0.014955	0.000677	0.000730	0.024344	0.002912	0.003640
29	0.002545	0.000845	0.003479	0.003479	0.004904	0.000344	0.002609	0.009023	0.000533	0.000653	0.025065	0.002335	0.003493
30	0.021628	0.007854	0.017985	0.017985	0.017635	0.000280	0.010061	0.013416	0.002564	0.003525	0.031075	0.008160	0.016255

Texas Statewide 2019 Fuel Engine Fractions Summary by Model Year.

SUT	Fuel Type	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
MC	Gas	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
PC	Gas	0.9668	0.9693	0.9698	0.9486	0.9375	0.9437	0.9402	0.9397	0.9031	0.9357	0.9466	0.9478	0.9692	0.9575	0.9812	0.9871
PC	Diesel	0.0033	0.0011	0.0003	0.0012	0.0242	0.0150	0.0135	0.0126	0.0118	0.0106	0.0078	0.0007	0.0005	0.0069	0.0049	0.0034
PT	Gas	0.8276	0.8358	0.8436	0.8232	0.7684	0.7749	0.6941	0.6859	0.7573	0.7941	0.8410	0.8867	0.8563	0.9113	0.9105	0.8919
PT	Diesel	0.0551	0.0465	0.0389	0.0347	0.0303	0.0237	0.0201	0.0264	0.0234	0.0133	0.0172	0.0300	0.0279	0.0440	0.0359	0.0406
LCT	Gas	0.8276	0.8358	0.8436	0.8232	0.7684	0.6161	0.5943	0.6265	0.6230	0.6382	0.7656	0.8132	0.8157	0.8518	0.8698	0.8597
LCT	Diesel	0.0551	0.0465	0.0389	0.0347	0.0303	0.0263	0.0312	0.0562	0.0601	0.0348	0.0465	0.0802	0.0679	0.0998	0.0852	0.0927
OBus	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OBus	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
TBus	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TBus	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
SBus	Gas	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0370	0.0450	0.0314	0.0389	0.0275	0.0130	0.0078	0.0101	0.0066	0.0038
SBus	Diesel	0.9921	0.9921	0.9921	0.9921	0.9921	0.9921	0.9630	0.9550	0.9686	0.9611	0.9725	0.9870	0.9922	0.9899	0.9934	0.9962
RT	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0066	0.0000	0.0000	0.0000	0.0046	0.0020	0.0023	0.0009	0.0007	0.0000
RT	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9934	1.0000	1.0000	1.0000	0.9954	0.9980	0.9977	0.9991	0.9993	1.0000
SUShT	Gas	0.5186	0.4743	0.4991	0.4898	0.4429	0.4001	0.4214	0.2754	0.2837	0.3323	0.3834	0.3310	0.2717	0.2733	0.2492	0.2572
SUShT	Diesel	0.4814	0.5257	0.5009	0.5102	0.5571	0.5999	0.5786	0.7246	0.7163	0.6677	0.6166	0.6690	0.7283	0.7267	0.7508	0.7428
SULhT	Gas	0.5186	0.4743	0.4991	0.4898	0.4429	0.4001	0.4214	0.2754	0.2837	0.3323	0.3834	0.3310	0.2717	0.2733	0.2492	0.2572
SULhT	Diesel	0.4814	0.5257	0.5009	0.5102	0.5571	0.5999	0.5786	0.7246	0.7163	0.6677	0.6166	0.6690	0.7283	0.7267	0.7508	0.7428
MH	Gas	0.5797	0.5797	0.5797	0.5797	0.5797	0.5797	0.7076	0.7251	0.7013	0.0059	0.5339	0.3808	0.4420	0.5778	0.3493	0.6016
MH	Diesel	0.4203	0.4203	0.4203	0.4203	0.4203	0.4203	0.2924	0.2749	0.2987	0.9941	0.4661	0.6192	0.5580	0.4222	0.6507	0.3984
CShT	Gas	0.0806	0.0910	0.1062	0.0930	0.0730	0.0976	0.0870	0.0811	0.0645	0.0768	0.0769	0.0790	0.0543	0.0649	0.0607	0.0769
CShT	Diesel	0.9194	0.9090	0.8938	0.9070	0.9270	0.9024	0.9130	0.9189	0.9355	0.9232	0.9231	0.9210	0.9457	0.9351	0.9393	0.9231
CLhT	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

[1] Conventional internal combustion engine technology only.

Texas Statewide 2019 Fuel Engine Fractions Summary by Model Year – Continued.

SUT	Fuel Type	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989
MC	Gas	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
PC	Gas	0.9816	0.9874	0.9872	0.9844	0.9812	0.9888	0.9991	0.9988	0.9991	0.9998	0.9993	0.9988	0.9972	0.9989	0.9991
PC	Diesel	0.0042	0.0046	0.0034	0.0031	0.0019	0.0022	0.0009	0.0012	0.0009	0.0002	0.0007	0.0012	0.0028	0.0011	0.0009
PT	Gas	0.8574	0.8724	0.9215	0.9056	0.9099	0.9721	0.9555	0.9575	0.9609	0.9662	0.9575	0.9619	0.9660	0.9692	0.9741
PT	Diesel	0.0386	0.0347	0.0410	0.0297	0.0392	0.0128	0.0445	0.0425	0.0391	0.0338	0.0425	0.0381	0.0340	0.0308	0.0259
LCT	Gas	0.8401	0.8430	0.8820	0.8728	0.8633	0.9414	0.8988	0.9070	0.9083	0.9212	0.9056	0.9222	0.9187	0.9259	0.9376
LCT	Diesel	0.0841	0.0848	0.0882	0.0773	0.0986	0.0450	0.1012	0.0930	0.0917	0.0788	0.0944	0.0778	0.0813	0.0741	0.0624
OBus	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OBus	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
TBus	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TBus	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
SBus	Gas	0.0055	0.0260	0.0117	0.0257	0.0100	0.0100	0.0100	0.0415	0.1143	0.1475	0.1205	0.0100	0.0895	0.1240	0.2290
SBus	Diesel	0.9945	0.9740	0.9883	0.9743	0.9900	0.9900	0.9900	0.9585	0.8857	0.8525	0.8795	0.9900	0.9105	0.8760	0.7710
RT	Gas	0.0004	0.0000	0.0000	0.0000	0.1688	0.4036	0.0193	0.0253	0.0235	0.1050	0.0315	0.2103	0.1012	0.2040	0.0294
RT	Diesel	0.9996	1.0000	1.0000	1.0000	0.8312	0.5964	0.9807	0.9747	0.9765	0.8950	0.9685	0.7897	0.8988	0.7960	0.9706
SUShT	Gas	0.2512	0.2749	0.3024	0.3629	0.3252	0.4135	0.4154	0.3828	0.6233	0.5018	0.4900	0.4938	0.5069	0.5453	0.7823
SUShT	Diesel	0.7488	0.7251	0.6976	0.6371	0.6748	0.5865	0.5846	0.6172	0.3767	0.4982	0.5100	0.5062	0.4931	0.4547	0.2177
SULhT	Gas	0.2512	0.2749	0.3024	0.3629	0.3252	0.4135	0.4154	0.3828	0.6233	0.5018	0.4900	0.4938	0.5069	0.5453	0.7823
SULhT	Diesel	0.7488	0.7251	0.6976	0.6371	0.6748	0.5865	0.5846	0.6172	0.3767	0.4982	0.5100	0.5062	0.4931	0.4547	0.2177
MH	Gas	0.5619	0.6028	0.5459	0.6539	0.7975	0.6494	0.8361	0.8008	0.8510	0.8084	0.7276	0.7869	0.8497	0.9199	0.9513
MH	Diesel	0.4381	0.3972	0.4541	0.3461	0.2025	0.3506	0.1639	0.1992	0.1490	0.1916	0.2724	0.2131	0.1503	0.0801	0.0487
CShT	Gas	0.0859	0.0932	0.0957	0.1104	0.1105	0.1092	0.1217	0.1185	0.2083	0.1003	0.1042	0.1162	0.1415	0.1370	0.2556
CShT	Diesel	0.9141	0.9068	0.9043	0.8896	0.8895	0.8908	0.8783	0.8815	0.7917	0.8997	0.8958	0.8838	0.8585	0.8630	0.7444
CLhT	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

[1] Conventional internal combustion engine technology only.

Texas Statewide 2023 Fuel Engine Fractions Summary by Model Year.

SUT	Fuel Type	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
MC	Gas	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
PC	Gas	0.9602	0.9617	0.9631	0.9643	0.9668	0.9693	0.9698	0.9486	0.9375	0.9437	0.9402	0.9397	0.9031	0.9357	0.9466	0.9478
PC	Diesel	0.0092	0.0078	0.0066	0.0057	0.0033	0.0011	0.0003	0.0012	0.0242	0.0150	0.0135	0.0126	0.0118	0.0106	0.0078	0.0007
PT	Gas	0.8156	0.8167	0.8185	0.8201	0.8276	0.8358	0.8436	0.8232	0.7684	0.7749	0.6941	0.6859	0.7573	0.7941	0.8410	0.8867
PT	Diesel	0.0678	0.0663	0.0644	0.0628	0.0551	0.0465	0.0389	0.0347	0.0303	0.0237	0.0201	0.0264	0.0234	0.0133	0.0172	0.0300
LCT	Gas	0.8156	0.8167	0.8185	0.8201	0.8276	0.8358	0.8436	0.8232	0.7684	0.6161	0.5943	0.6265	0.6230	0.6382	0.7656	0.8132
LCT	Diesel	0.0678	0.0663	0.0644	0.0628	0.0551	0.0465	0.0389	0.0347	0.0303	0.0263	0.0312	0.0562	0.0601	0.0348	0.0465	0.0802
OBus	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OBus	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
TBus	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TBus	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
SBus	Gas	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0370	0.0450	0.0314	0.0389	0.0275	0.0130
SBus	Diesel	0.9921	0.9921	0.9921	0.9921	0.9921	0.9921	0.9921	0.9921	0.9921	0.9921	0.9630	0.9550	0.9686	0.9611	0.9725	0.9870
RT	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0066	0.0000	0.0000	0.0000	0.0046	0.0020
RT	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9934	1.0000	1.0000	1.0000	0.9954	0.9980
SUShT	Gas	0.5186	0.5186	0.5186	0.5186	0.5186	0.4743	0.4991	0.4898	0.4429	0.4001	0.4214	0.2754	0.2837	0.3323	0.3834	0.3310
SUShT	Diesel	0.4814	0.4814	0.4814	0.4814	0.4814	0.5257	0.5009	0.5102	0.5571	0.5999	0.5786	0.7246	0.7163	0.6677	0.6166	0.6690
SULhT	Gas	0.5186	0.5186	0.5186	0.5186	0.5186	0.4743	0.4991	0.4898	0.4429	0.4001	0.4214	0.2754	0.2837	0.3323	0.3834	0.3310
SULhT	Diesel	0.4814	0.4814	0.4814	0.4814	0.4814	0.5257	0.5009	0.5102	0.5571	0.5999	0.5786	0.7246	0.7163	0.6677	0.6166	0.6690
MH	Gas	0.5797	0.5797	0.5797	0.5797	0.5797	0.5797	0.5797	0.5797	0.5797	0.5797	0.7076	0.7251	0.7013	0.0059	0.5339	0.3808
MH	Diesel	0.4203	0.4203	0.4203	0.4203	0.4203	0.4203	0.4203	0.4203	0.4203	0.4203	0.2924	0.2749	0.2987	0.9941	0.4661	0.6192
CShT	Gas	0.0806	0.0806	0.0806	0.0806	0.0806	0.0910	0.1062	0.0930	0.0730	0.0976	0.0870	0.0811	0.0645	0.0768	0.0769	0.0790
CShT	Diesel	0.9194	0.9194	0.9194	0.9194	0.9194	0.9090	0.8938	0.9070	0.9270	0.9024	0.9130	0.9189	0.9355	0.9232	0.9231	0.9210
CLhT	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

[1] Conventional internal combustion engine technology only.

Texas Statewide 2023 Fuel Engine Fractions Summary by Model Year – Continued.

SUT	Fuel Type	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993
MC	Gas	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
PC	Gas	0.9692	0.9575	0.9812	0.9871	0.9816	0.9874	0.9872	0.9844	0.9812	0.9888	0.9991	0.9988	0.9991	0.9998	0.9993
PC	Diesel	0.0005	0.0069	0.0049	0.0034	0.0042	0.0046	0.0034	0.0031	0.0019	0.0022	0.0009	0.0012	0.0009	0.0002	0.0007
PT	Gas	0.8563	0.9113	0.9105	0.8919	0.8574	0.8724	0.9215	0.9056	0.9099	0.9721	0.9555	0.9575	0.9609	0.9662	0.9575
PT	Diesel	0.0279	0.0440	0.0359	0.0406	0.0386	0.0347	0.0410	0.0297	0.0392	0.0128	0.0445	0.0425	0.0391	0.0338	0.0425
LCT	Gas	0.8157	0.8518	0.8698	0.8597	0.8401	0.8430	0.8820	0.8728	0.8633	0.9414	0.8988	0.9070	0.9083	0.9212	0.9056
LCT	Diesel	0.0679	0.0998	0.0852	0.0927	0.0841	0.0848	0.0882	0.0773	0.0986	0.0450	0.1012	0.0930	0.0917	0.0788	0.0944
OBus	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OBus	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
TBus	Gas	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TBus	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
SBus	Gas	0.0078	0.0101	0.0066	0.0038	0.0055	0.0260	0.0117	0.0257	0.0100	0.0100	0.0100	0.0415	0.1143	0.1475	0.1205
SBus	Diesel	0.9922	0.9899	0.9934	0.9962	0.9945	0.9740	0.9883	0.9743	0.9900	0.9900	0.9900	0.9585	0.8857	0.8525	0.8795
RT	Gas	0.0023	0.0009	0.0007	0.0000	0.0004	0.0000	0.0000	0.0000	0.1688	0.4036	0.0193	0.0253	0.0235	0.1050	0.0315
RT	Diesel	0.9977	0.9991	0.9993	1.0000	0.9996	1.0000	1.0000	1.0000	0.8312	0.5964	0.9807	0.9747	0.9765	0.8950	0.9685
SUShT	Gas	0.2717	0.2733	0.2492	0.2572	0.2512	0.2749	0.3024	0.3629	0.3252	0.4135	0.4154	0.3828	0.6233	0.5018	0.4900
SUShT	Diesel	0.7283	0.7267	0.7508	0.7428	0.7488	0.7251	0.6976	0.6371	0.6748	0.5865	0.5846	0.6172	0.3767	0.4982	0.5100
SULhT	Gas	0.2717	0.2733	0.2492	0.2572	0.2512	0.2749	0.3024	0.3629	0.3252	0.4135	0.4154	0.3828	0.6233	0.5018	0.4900
SULhT	Diesel	0.7283	0.7267	0.7508	0.7428	0.7488	0.7251	0.6976	0.6371	0.6748	0.5865	0.5846	0.6172	0.3767	0.4982	0.5100
MH	Gas	0.4420	0.5778	0.3493	0.6016	0.5619	0.6028	0.5459	0.6539	0.7975	0.6494	0.8361	0.8008	0.8510	0.8084	0.7276
MH	Diesel	0.5580	0.4222	0.6507	0.3984	0.4381	0.3972	0.4541	0.3461	0.2025	0.3506	0.1639	0.1992	0.1490	0.1916	0.2724
CShT	Gas	0.0543	0.0649	0.0607	0.0769	0.0859	0.0932	0.0957	0.1104	0.1105	0.1092	0.1217	0.1185	0.2083	0.1003	0.1042
CShT	Diesel	0.9457	0.9351	0.9393	0.9231	0.9141	0.9068	0.9043	0.8896	0.8895	0.8908	0.8783	0.8815	0.7917	0.8997	0.8958
CLhT	Diesel	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

[1] Conventional internal combustion engine technology only.