Texas A&M Transportation Institute

Development of San Antonio (SAN) On-Road Emissions Inventories for 2019 and 2023

FINAL REPORT

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FINAL REPORT

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EXECUTIVE SUMMARY

This project describes the development of on-road mobile emissions inventories for five counties within the San Antonio (SAN) area (Bexar, Comal, Guadalupe, Kendall, and Wilson 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 for each year to represent two periods and four day type scenarios for the five-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 inventories 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 San Antonio area travel demand model (TDM). 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;

[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).

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).

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 emissions inventories using the latest version of the MOtor Vehicle Emissions Simulator (MOVES), MOVES3, and associated Environmental Protection Agency (EPA) guidance documentation. The emissions inventories 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 emissions inventories using utilities developed and maintained by TTI and recently updated for use with MOVES3 (the TTI emission inventory utilities). The emissions inventory 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 activity and emissions inventory inputs to MOVES for all activity scenarios; and
- 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 the 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. San Antonio 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
Bexar	49,135,981	29.0	14.75	278.69	28.03	4.03	1.14	1.34	0.31	27,865.37
Comal	6,124,519	29.6	1.78	33.79	4.33	0.54	0.17	0.17	0.04	3,661.04
Guadalupe	4,693,511	34.8	1.50	26.84	3.77	0.39	0.14	0.13	0.03	2,905.53
Kendall	1,512,094	38.9	0.50	7.99	1.17	0.11	0.04	0.04	0.01	888.98
Wilson	1,512,745	32.9	0.54	9.43	1.20	0.13	0.04	0.04	0.01	930.99
Total	62,978,850	29.7	19.06	356.74	38.50	5.20	1.53	1.73	0.39	36,251.92

[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 3. San Antonio 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
Bexar	55,359,769	27.4	12.15	251.92	20.13	4.35	0.97	1.41	0.17	28,680.86
Comal	7,056,873	27.1	1.61	31.65	3.12	0.57	0.13	0.19	0.02	3,786.03
Guadalupe	6,745,988	28.7	1.49	32.12	3.92	0.59	0.15	0.18	0.02	4,008.56
Kendall	1,940,333	38.0	0.40	7.88	1.10	0.13	0.04	0.05	0.01	1,073.49
Wilson	2,183,316	24.7	0.59	11.70	1.32	0.22	0.05	0.06	0.01	1,344.23
Total	73,286,279	27.6	16.25	335.27	29.60	5.86	1.34	1.89	0.23	38,893.17

[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 4. San Antonio 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
Bexar	54,661,890	27.9	15.44	311.06	30.34	4.58	1.26	1.50	0.34	31,040.11
Comal	6,813,316	27.3	1.89	38.13	4.83	0.64	0.19	0.19	0.04	4,142.49
Guadalupe	5,221,348	33.4	1.57	29.98	4.12	0.44	0.15	0.15	0.03	3,229.53
Kendall	1,682,151	38.2	0.51	8.82	1.27	0.12	0.04	0.05	0.01	981.18
Wilson	1,682,889	30.8	0.57	10.58	1.37	0.16	0.05	0.05	0.01	1,060.18
Total	70,061,594	28.4	19.98	398.57	41.92	5.94	1.70	1.93	0.44	40,453.49

[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. San Antonio 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
Bexar	61,419,256	26.0	12.67	281.81	21.77	5.00	1.08	1.58	0.19	32,017.18
Comal	7,829,283	25.1	1.69	35.67	3.48	0.67	0.15	0.21	0.03	4,279.05
Guadalupe	7,484,298	26.1	1.58	36.39	4.40	0.71	0.17	0.20	0.03	4,521.43
Kendall	2,152,692	36.7	0.42	8.77	1.20	0.15	0.04	0.06	0.01	1,185.51
Wilson	2,422,269	22.4	0.63	13.30	1.55	0.27	0.06	0.07	0.01	1,553.58
Total	81,307,798	26.0	16.98	375.93	32.40	6.81	1.51	2.12	0.26	43,556.75

[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. San Antonio 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
Bexar	43,868,677	31.0	13.00	243.65	21.75	3.18	0.87	1.17	0.26	23,440.93
Comal	5,467,989	33.5	1.54	28.88	3.12	0.39	0.12	0.15	0.03	2,969.38
Guadalupe	4,190,369	36.7	1.32	23.43	2.86	0.29	0.10	0.12	0.02	2,406.62
Kendall	1,350,000	39.9	0.44	6.96	0.88	0.08	0.03	0.04	0.01	739.08
Wilson	1,350,587	37.3	0.46	8.11	0.84	0.09	0.03	0.04	0.01	739.21
Total	56,227,623	31.9	16.75	311.03	29.45	4.03	1.16	1.51	0.34	30,295.22

[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. San Antonio 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
Bexar	49,346,953	30.1	10.83	218.59	14.94	3.40	0.74	1.22	0.15	23,881.77
Comal	6,290,407	32.4	1.31	26.47	2.12	0.40	0.09	0.16	0.02	3,032.27
Guadalupe	6,013,276	32.9	1.42	27.73	2.77	0.42	0.11	0.16	0.02	3,232.70
Kendall	1,729,585	40.1	0.43	7.02	0.81	0.10	0.03	0.04	0.00	883.34
Wilson	1,946,184	30.8	0.50	9.78	0.84	0.14	0.03	0.05	0.01	1,028.80
Total	65,326,405	30.7	14.50	289.60	21.49	4.46	1.01	1.63	0.19	32,058.89

[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. San Antonio 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
Bexar	38,048,467	31.2	12.34	216.58	18.14	2.67	0.72	1.01	0.23	20,028.41
Comal	4,742,523	34.0	1.45	25.59	2.53	0.32	0.10	0.13	0.03	2,510.82
Guadalupe	3,634,404	37.0	1.25	20.85	2.34	0.24	0.08	0.10	0.02	2,033.62
Kendall	1,170,887	40.0	0.42	6.22	0.72	0.07	0.02	0.03	0.01	625.05
Wilson	1,171,392	37.7	0.44	7.24	0.68	0.07	0.02	0.03	0.01	620.18
Total	48,767,672	32.1	15.90	276.48	24.41	3.37	0.95	1.30	0.29	25,818.08

[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 9. San Antonio 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
Bexar	42,726,109	30.3	10.36	193.51	12.29	2.85	0.62	1.05	0.12	20,355.94
Comal	5,446,432	32.9	1.25	23.34	1.71	0.33	0.08	0.13	0.02	2,561.26
Guadalupe	5,206,478	33.5	1.35	24.49	2.22	0.34	0.09	0.13	0.02	2,715.44
Kendall	1,497,528	40.4	0.42	6.25	0.65	0.08	0.02	0.04	0.00	743.29
Wilson	1,685,072	31.7	0.48	8.63	0.65	0.12	0.03	0.04	0.01	855.59
Total	56,561,619	31.1	13.85	256.22	17.52	3.72	0.84	1.40	0.17	27,231.52

[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. San Antonio 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
Bexar	49,168,717	29.0	14.95	281.21	28.27	4.04	1.15	1.35	0.31	28,001.53
Comal	6,128,599	29.6	1.81	34.08	4.36	0.54	0.17	0.17	0.04	3,676.78
Guadalupe	4,696,638	34.8	1.52	27.09	3.80	0.39	0.14	0.13	0.03	2,916.99
Kendall	1,513,101	38.9	0.50	8.09	1.18	0.11	0.04	0.04	0.01	892.71
Wilson	1,513,752	32.9	0.54	9.53	1.21	0.13	0.04	0.04	0.01	934.79
Total	63,020,808	29.7	19.31	360.01	38.81	5.20	1.54	1.74	0.39	36,422.81

[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. San Antonio 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
Bexar	56,189,451	27.2	12.37	257.76	20.62	4.45	0.99	1.44	0.18	29,293.97
Comal	7,162,635	26.9	1.64	32.42	3.20	0.58	0.14	0.19	0.02	3,870.31
Guadalupe	6,847,091	28.4	1.52	32.88	4.02	0.61	0.15	0.19	0.02	4,095.79
Kendall	1,969,413	37.8	0.41	8.06	1.13	0.13	0.04	0.05	0.01	1,094.28
Wilson	2,216,038	24.4	0.61	12.00	1.36	0.23	0.05	0.06	0.01	1,374.59
Total	74,384,628	27.4	16.55	343.13	30.33	5.99	1.37	1.93	0.23	39,728.94

[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. San Antonio 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
Bexar	55,094,077	27.8	15.69	315.96	30.81	4.64	1.28	1.52	0.35	31,448.81
Comal	6,867,186	27.1	1.92	38.75	4.91	0.65	0.20	0.19	0.04	4,198.69
Guadalupe	5,262,631	33.3	1.59	30.47	4.18	0.45	0.15	0.15	0.03	3,269.28
Kendall	1,695,451	38.2	0.52	8.98	1.28	0.12	0.04	0.05	0.01	992.72
Wilson	1,696,195	30.6	0.58	10.76	1.39	0.16	0.05	0.05	0.01	1,073.95
Total	70,615,540	28.3	20.31	404.92	42.57	6.02	1.72	1.96	0.44	40,983.45

[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. San Antonio 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
Bexar	62,892,178	25.6	12.96	291.12	22.53	5.19	1.12	1.63	0.20	33,071.73
Comal	8,017,041	24.6	1.73	36.92	3.61	0.70	0.16	0.22	0.03	4,426.22
Guadalupe	7,663,782	25.5	1.62	37.67	4.58	0.75	0.18	0.21	0.03	4,679.82
Kendall	2,204,317	36.3	0.43	9.06	1.24	0.15	0.04	0.06	0.01	1,221.27
Wilson	2,480,358	21.8	0.65	13.79	1.61	0.28	0.07	0.07	0.01	1,610.45
Total	83,257,676	25.6	17.39	388.56	33.57	7.07	1.57	2.19	0.27	45,009.49

[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. San Antonio 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
Bexar	43,909,297	31.1	13.15	245.18	21.96	3.18	0.88	1.18	0.27	23,549.73
Comal	5,473,053	33.7	1.55	29.02	3.14	0.39	0.12	0.15	0.03	2,979.83
Guadalupe	4,194,249	36.8	1.33	23.57	2.88	0.29	0.10	0.12	0.02	2,416.86
Kendall	1,351,251	39.9	0.44	7.02	0.89	0.08	0.03	0.04	0.01	742.74
Wilson	1,351,838	37.4	0.47	8.16	0.85	0.09	0.03	0.04	0.01	741.91
Total	56,279,687	32.0	16.95	312.95	29.71	4.03	1.16	1.52	0.34	30,431.07

[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. San Antonio 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
Bexar	50,094,358	30.1	11.00	222.77	15.30	3.45	0.76	1.24	0.15	24,344.43
Comal	6,385,681	32.4	1.33	26.97	2.17	0.41	0.10	0.16	0.02	3,090.00
Guadalupe	6,104,353	33.0	1.44	28.25	2.84	0.43	0.11	0.16	0.02	3,294.26
Kendall	1,755,781	40.1	0.44	7.17	0.83	0.10	0.03	0.04	0.01	900.43
Wilson	1,975,661	30.8	0.51	9.97	0.86	0.15	0.04	0.05	0.01	1,047.94
Total	66,315,834	30.8	14.72	295.12	22.00	4.53	1.03	1.66	0.20	32,677.05

[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. San Antonio 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
Bexar	39,086,667	31.1	12.60	223.52	18.78	2.75	0.74	1.05	0.24	20,671.00
Comal	4,871,928	33.9	1.48	26.42	2.62	0.33	0.10	0.13	0.03	2,592.12
Guadalupe	3,733,573	36.9	1.28	21.52	2.42	0.25	0.08	0.10	0.02	2,098.18
Kendall	1,202,837	40.0	0.43	6.43	0.74	0.07	0.02	0.03	0.01	644.73
Wilson	1,203,354	37.6	0.45	7.48	0.71	0.08	0.02	0.03	0.01	640.00
Total	50,098,359	32.1	16.24	285.37	25.27	3.47	0.98	1.34	0.30	26,646.03

[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. San Antonio 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
Bexar	44,365,527	30.2	10.59	201.73	12.87	2.98	0.65	1.10	0.13	21,253.80
Comal	5,655,413	32.6	1.28	24.37	1.79	0.35	0.08	0.14	0.02	2,676.82
Guadalupe	5,406,252	33.2	1.38	25.56	2.33	0.36	0.09	0.14	0.02	2,838.36
Kendall	1,554,988	40.3	0.42	6.52	0.68	0.08	0.02	0.04	0.00	775.34
Wilson	1,749,728	31.3	0.49	9.02	0.69	0.12	0.03	0.04	0.01	895.78
Total	58,731,908	30.9	14.17	267.20	18.36	3.89	0.88	1.46	0.17	28,440.10

[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. San Antonio 2019 School Period Refueling Loss Emissions (Tons/Day).

County	Weekday VMT	Weekday VOC	Friday VMT	Friday VOC	Saturday VMT	Saturday VOC	Sunday VMT	Sunday VOC
Bexar	49,135,981	1.77	54,661,890	1.98	43,868,677	1.47	38,048,467	1.26
Comal	6,124,519	0.23	6,813,316	0.27	5,467,989	0.19	4,742,523	0.16
Guadalupe	4,693,511	0.19	5,221,348	0.21	4,190,369	0.16	3,634,404	0.13
Kendall	1,512,094	0.06	1,682,151	0.07	1,350,000	0.05	1,170,887	0.04
Wilson	1,512,745	0.07	1,682,889	0.08	1,350,587	0.06	1,171,392	0.05
Total	62,978,850	2.32	70,061,594	2.60	56,227,623	1.92	48,767,672	1.65

Table 19. San Antonio 2023 School Period Refueling Loss Emissions(Tons/Day).

County	Weekday VMT	Weekday VOC	Friday VMT	Friday VOC	Saturday VMT	Saturday VOC	Sunday VMT	Sunday VOC
Bexar	55,359,769	1.45	61,419,256	1.62	49,346,953	1.17	42,726,109	0.99
Comal	7,056,873	0.20	7,829,283	0.23	6,290,407	0.15	5,446,432	0.13
Guadalupe	6,745,988	0.22	7,484,298	0.25	6,013,276	0.17	5,206,478	0.14
Kendall	1,940,333	0.07	2,152,692	0.07	1,729,585	0.05	1,497,528	0.04
Wilson	2,183,316	0.08	2,422,269	0.10	1,946,184	0.06	1,685,072	0.05
Total	73,286,279	2.01	81,307,798	2.26	65,326,405	1.60	56,561,619	1.35

Table 20. San Antonio 2019 Summer Period Refueling Loss Emissions (Tons/Day).

County	Weekday VMT	Weekday VOC	Friday VMT	Friday VOC	Saturday VMT	Saturday VOC	Sunday VMT	Sunday VOC
Bexar	49,168,717	1.77	55,094,077	2.00	43,909,297	1.47	39,086,667	1.30
Comal	6,128,599	0.23	6,867,186	0.27	5,473,053	0.19	4,871,928	0.16
Guadalupe	4,696,638	0.19	5,262,631	0.21	4,194,249	0.16	3,733,573	0.14
Kendall	1,513,101	0.06	1,695,451	0.07	1,351,251	0.05	1,202,837	0.05
Wilson	1,513,752	0.07	1,696,195	0.08	1,351,838	0.06	1,203,354	0.05
Total	63,020,808	2.32	70,615,540	2.63	56,279,687	1.92	50,098,359	1.69

Table 21. San Antonio 2023 Summer Period Refueling Loss Emissions (Tons/Day).

County	Weekday VMT	Weekday VOC	Friday VMT	Friday VOC	Saturday VMT	Saturday VOC	Sunday VMT	Sunday VOC
Bexar	56,189,451	1.48	62,892,178	1.67	50,094,358	1.18	44,365,527	1.03
Comal	7,162,635	0.20	8,017,041	0.23	6,385,681	0.15	5,655,413	0.13
Guadalupe	6,847,091	0.22	7,663,782	0.26	6,104,353	0.17	5,406,252	0.15
Kendall	1,969,413	0.07	2,204,317	0.07	1,755,781	0.05	1,554,988	0.05
Wilson	2,216,038	0.08	2,480,358	0.10	1,975,661	0.06	1,749,728	0.05
Total	74,384,628	2.05	83,257,676	2.34	66,315,834	1.62	58,731,908	1.40

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 of air pollutants. TCEQ typically funds mobile source inventory work in support of the federal Clean Air Act Amendment (CAAA).

Accurate emissions inventories (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 San Antonio area (SAN) 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 San Antonio region EIs described in this report have been commissioned in parallel with similar inventories for the Houston-Galveston-Brazoria (HGB) region and for the whole 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 San Antonio 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 San Antonio region comprises five counties (Bexar, Comal, Guadalupe, Kendall, and Wilson). 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 San Antonio area is served by a Travel Demand Model (TDM) administered by the Alamo Area Metropolitan Planning Organization (AAMPO). 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 U.S. Environmental Protection Agencies on-road emissions inventory 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:

- 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 five-county San Antonio 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 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 the 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 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 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 two emission rate scenarios (weekday and weekend day) 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 types (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 (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; 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*: These were provided by TCEQ, based on 2019 weather station data.
- *Local fuel formulation input data*:
    - Consistent with TCEQ 2020 Summer Fuel Field Study conducted by Eastern Research Group (ERG) under contract to TCEQ, available at https://www.tceq.texas.gov/airquality/airmod/project/pj_report_mob.html.
    - MOVES individual fuel parameter inputs were used to model the Low Reid Vapor Pressure (RVP) gasoline control strategy for Bexar, Comal, Guadalupe, and Wilson counties, consistent with Sections 114.301-114.309 of TCEQ rules. Kendall County is not subject to Low RVP gasoline requirements; therefore, TTI used MOVES individual fuel parameter inputs for Kendall County as defined in the Code of Federal Regulations.[2]
- *Inspection and maintenance (I/M) program information*: Currently an I/M program is not administered in the San Antonio area, thus no I/M program was modeled.
- *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 Bexar, Comal, Guadalupe, and Wilson 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 TCEQ rules. This post-processing step was not applied for Kendall County, which is not subject to TxLED. NO, NO_2, HONO, and NO_X adjustment factors were provided by the TCEQ using reductions 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 AAMPO TDMs appropriate for the analysis years 2019 and 2023 were used (i.e., the nearest TDMs, 2020 and 2024).
- *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.

[2] Code of Federal Regulations, Title 40 – Protection of the Environment, Part 80 – Regulation of Fuels and Fuel Additives, Section 27 – Controls and Prohibitions on Gasoline Volatility.

- *Base hotelling hours data*: TTI's 2017 hotelling study.[3]
- *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 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.

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

- 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 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). Operational (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 SAN 2020 and 2024 TDMs, provided by the AAMPO. 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[4] 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. The ATR data for each county (Bexar, Comal,

[4] 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.

Guadalupe, Kendall, and Wilson) were combined to develop seasonal and day type factors representative of the entire San Antonio study area. TxDOT San Antonio District aggregate ATR data were also used.

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. Also, since 2019 and 2023 TDMs did not exist, the nearest TDM networks (2020 and 2024) were designated for use with each analysis year. For 2023, TTI also produced intermediate year growth factors using the bounding TDMs (i.e., 2020 and 2024) and applied these factors to the designated (2024) TDM network VMT to estimate the 2023 link VMT. 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 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- activity scenario adjustment factors.

The AADT-to-activity scenario adjustment factors were developed for each county using aggregated TxDOT San Antonio District ATR data for the years 2010 through 2019. These factors were calculated by dividing the activity scenario average day-of-week count by the AADT traffic count. Table 23 shows the San Antonio District AADT-to-activity scenario factors used in developing the 2019 VMT control totals.

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

TxDOT District	School Weekday	School Friday	School Saturday	School Sunday	Summer Weekday	Summer Friday	Summer Saturday	Summer Sunday
San Antonio	1.04995	1.16803	0.93739	0.81302	1.05065	1.17727	0.93826	0.83521

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 VMT from the TDM designated for the analysis year (TDM assignment VMT plus intrazonal VMT estimate). 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.

Table 26 and Table 27 provide the historical year county VMT summaries for each activity scenario from the TDM post-processing analysis detailed activity output.

2.1.2.2 Future Year Activity Scenarios – HPMS Adjustment Factor

For the 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. The HPMS factor used in this analysis (0.935466904) was based on the comparison of the AAMPO's 2015 TDM validation total VMT and the official 2015 HPMS VMT estimate for the region.

2.1.2.3 Future Year Activity Scenarios – Period Day Type Adjustment Factors

Seasonal adjustment factors were used to adjust the TDM and estimated intrazonal 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 five counties in the San Antonio region (Bexar, Comal, Guadalupe, Kendall, and Wilson). 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. SAN ANSWT-to-Activity Scenario Adjustment Factors.

TDM Region	School Weekday	School Friday	School Saturday	School Sunday	Summer Weekday	Summer Friday	Summer Saturday	Summer Sunday
San Antonio five TDM counties	1.00353	1.11336	0.89453	0.77451	1.01857	1.14006	0.90808	0.80423

2.1.2.4 Future Year Activity Scenarios – Intermediate Year Adjustment Factors

Since a 2023 TDM did not exist, intermediate year adjustment factors were used to estimate 2023 future analysis year VMT from the existing TDMs. These adjustment factors were developed using the bounding year 2020 and 2024 TDMs and were applied to the 2024 TDM. The intermediate year adjustment factors were based on the annually compounded growth rates between bounding year TDMs, as shown in Table 25.

Table 25. Growth Rates (Intermediate Year Adjustment Factors).

County	2020 TDM VMT[1]	2024 TDM VMT[1]	Growth Rate[2]
Bexar	54,889,197	60,397,762	0.976375
Comal	6,716,407	7,804,798	0.963150
Guadalupe	6,215,381	7,542,121	0.952782
Kendall	1,847,118	2,145,814	0.963220
Wilson	2,120,562	2,398,443	0.969684

[1] TDM VMT is unadjusted TDM VMT plus intrazonal VMT.
[2] Growth rates were applied to 2024 TDM VMT to produce the 2023 link VMT estimates.

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, the intermediate year 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 26, Table 27, Table 28, and Table 29 show the resulting activity scenario VMT summaries.[5]

Table 26. SAN 2019 School VMT Summary.

County	Weekday	Friday	Saturday	Sunday
Bexar	49,135,981	54,661,890	43,868,677	38,048,467
Comal	6,124,519	6,813,316	5,467,989	4,742,523
Guadalupe	4,693,511	5,221,348	4,190,369	3,634,404
Kendall	1,512,094	1,682,151	1,350,000	1,170,887
Wilson	1,512,745	1,682,889	1,350,587	1,171,392

Table 27. SAN 2019 Summer VMT Summary.

County	Weekday	Friday	Saturday	Sunday
Bexar	49,168,717	55,094,077	43,909,297	39,086,667
Comal	6,128,599	6,867,186	5,473,053	4,871,928
Guadalupe	4,696,638	5,262,631	4,194,249	3,733,573
Kendall	1,513,101	1,695,451	1,351,251	1,202,837
Wilson	1,513,752	1,696,195	1,351,838	1,203,354

Table 28. SAN 2023 School VMT Summary.

County	Weekday	Friday	Saturday	Sunday
Bexar	55,359,769	61,419,256	49,346,953	42,726,109
Comal	7,056,873	7,829,283	6,290,407	5,446,432
Guadalupe	6,745,988	7,484,298	6,013,276	5,206,478
Kendall	1,940,333	2,152,692	1,729,585	1,497,528
Wilson	2,183,316	2,422,269	1,946,184	1,685,072

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

Table 29. SAN 2023 Summer VMT Summary.

County	Weekday	Friday	Saturday	Sunday
Bexar	56,189,451	62,892,178	50,094,358	44,365,527
Comal	7,162,635	8,017,041	6,385,681	5,655,413
Guadalupe	6,847,091	7,663,782	6,104,353	5,406,252
Kendall	1,969,413	2,204,317	1,755,781	1,554,988
Wilson	2,216,038	2,480,358	1,975,661	1,749,728

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 2020 and 2024 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 32 and Table 33 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 30 and based on the 2024 TDM are shown in Table 31.

Table 30. Weekend Day Profile Factors for 2020 TDM.

Time Period	County	School Saturday	School Sunday	Summer Saturday	Summer Sunday
AM Peak	Bexar	0.52038610	0.33915119	0.51822429	0.34524265
AM Peak	Comal	0.56227221	0.36644962	0.55993640	0.37303139
AM Peak	Guadalupe	0.57582571	0.37528285	0.57343359	0.38202326
AM Peak	Kendall	0.59319365	0.38660205	0.59072938	0.39354577
AM Peak	Wilson	0.56368653	0.36737138	0.56134485	0.37396970
Mid-Day	Bexar	1.25789000	1.30185067	1.25429269	1.30199939
Mid-Day	Comal	1.18286136	1.22419993	1.17947861	1.22433978
Mid-Day	Guadalupe	1.14554121	1.18557552	1.14226520	1.18571096
Mid-Day	Kendall	1.13805520	1.17782788	1.13480060	1.17796245
Mid-Day	Wilson	1.19026042	1.23185756	1.18685651	1.23199829
PM Peak	Bexar	0.81473741	0.90402895	0.79496091	0.88270747
PM Peak	Comal	0.82543672	0.91590086	0.80540051	0.89429938
PM Peak	Guadalupe	0.81936123	0.90915952	0.79947250	0.88771703
PM Peak	Kendall	0.81338464	0.90252794	0.79364098	0.88124184
PM Peak	Wilson	0.81312175	0.90223622	0.79338447	0.88095702
Overnight	Bexar	1.37886750	1.34760258	1.41806696	1.37552360
Overnight	Comal	1.38120219	1.34988433	1.42046802	1.37785262
Overnight	Guadalupe	1.44266895	1.40995738	1.48368221	1.43917032
Overnight	Kendall	1.43756183	1.40496606	1.47842991	1.43407558
Overnight	Wilson	1.39757092	1.36588191	1.43730209	1.39418166

Table 31. Weekend Day Profile Factors for 2024 TDM.

Time Period	County	School Saturday	School Sunday	Summer Saturday	Summer Sunday
AM Peak	Bexar	0.52154774	0.33990827	0.51938110	0.34601333
AM Peak	Comal	0.55866105	0.36409612	0.55634024	0.37063562
AM Peak	Guadalupe	0.56099880	0.36561970	0.55866828	0.37218656
AM Peak	Kendall	0.59881913	0.39026835	0.59633149	0.39727792
AM Peak	Wilson	0.55744339	0.36330254	0.55512763	0.36982778
Mid-Day	Bexar	1.25236141	1.29612886	1.24877991	1.29627693
Mid-Day	Comal	1.18200535	1.22331399	1.17862505	1.22345375
Mid-Day	Guadalupe	1.15206878	1.19233121	1.14877410	1.19246742
Mid-Day	Kendall	1.12993096	1.16941972	1.12669959	1.16955332
Mid-Day	Wilson	1.19775060	1.23960952	1.19432528	1.23975113
PM Peak	Bexar	0.81943778	0.90924447	0.79954719	0.88779997
PM Peak	Comal	0.82597003	0.91649263	0.80592089	0.89487719
PM Peak	Guadalupe	0.82320019	0.91341922	0.80321827	0.89187626
PM Peak	Kendall	0.81117571	0.90007690	0.79148567	0.87884862
PM Peak	Wilson	0.81549797	0.90487287	0.79570301	0.88353148
Overnight	Bexar	1.37239229	1.34127419	1.41140767	1.36906409
Overnight	Comal	1.38957222	1.35806459	1.42907601	1.38620236
Overnight	Guadalupe	1.45277670	1.41983595	1.49407732	1.44925357
Overnight	Kendall	1.45003528	1.41715668	1.49125795	1.44651880
Overnight	Wilson	1.39125067	1.35970497	1.43080217	1.38787673

2.1.4.1 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 five-county SAN 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 activity scenario. Table 32 and Table 33 show the school and summer period hourly travel factors.

Table 32. 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	0.055716	0.286862	0.045778	0.281487	0.023391	0.233027	0.015021	0.229609
AM Peak	8	0.073924	0.380608	0.062462	0.384077	0.033545	0.334183	0.020892	0.319352
AM Peak	9	0.064586	0.332530	0.054389	0.334436	0.043443	0.432790	0.029507	0.451039
Mid-Day	10	0.050620	0.161712	0.046707	0.146746	0.051394	0.138004	0.042813	0.111080
Mid-Day	11	0.047696	0.152371	0.047030	0.147761	0.057358	0.154018	0.054916	0.142482
Mid-Day	12	0.049888	0.159373	0.051185	0.160815	0.062735	0.168457	0.064233	0.166655
Mid-Day	13	0.052190	0.166727	0.054852	0.172337	0.066367	0.178210	0.072100	0.187067
Mid-Day	14	0.054173	0.173062	0.056826	0.178539	0.067233	0.180535	0.075741	0.196514
Mid-Day	15	0.058459	0.186755	0.061684	0.193802	0.067323	0.180776	0.075621	0.196202
PM Peak	16	0.068574	0.236185	0.069907	0.246195	0.067166	0.262072	0.074707	0.262705
PM Peak	17	0.078577	0.270638	0.074918	0.263842	0.065829	0.256856	0.072924	0.256435
PM Peak	18	0.081026	0.279073	0.074664	0.262948	0.063566	0.248026	0.071015	0.249722
PM Peak	19	0.062163	0.214104	0.064461	0.227015	0.059727	0.233046	0.065730	0.231138
Overnight	20	0.043473	0.214779	0.050917	0.216542	0.051995	0.191918	0.056177	0.212165
Overnight	21	0.034632	0.171100	0.040339	0.171555	0.044464	0.164120	0.046884	0.177068
Overnight	22	0.028345	0.140039	0.034836	0.148152	0.040360	0.148972	0.037446	0.141423
Overnight	23	0.021369	0.105574	0.029950	0.127373	0.035478	0.130952	0.028184	0.106443
Overnight	24	0.014888	0.073554	0.022301	0.094843	0.027808	0.102642	0.019012	0.071803
Overnight	1	0.009036	0.044643	0.009509	0.040440	0.018305	0.067565	0.023204	0.087635
Overnight	2	0.006134	0.030305	0.006529	0.027767	0.011964	0.044160	0.014951	0.056466
Overnight	3	0.005443	0.026891	0.005926	0.025202	0.010428	0.038491	0.012924	0.048810
Overnight	4	0.005867	0.028986	0.005971	0.025394	0.007841	0.028942	0.008416	0.031785
Overnight	5	0.009683	0.047839	0.009019	0.038356	0.008512	0.031419	0.007430	0.028061
Overnight	6	0.023538	0.116290	0.019840	0.084376	0.013768	0.050819	0.010152	0.038341
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 33. 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	0.051526	0.285717	0.042931	0.279940	0.023981	0.239901	0.015525	0.233126
AM Peak	8	0.068891	0.382009	0.058399	0.380802	0.033352	0.333647	0.021393	0.321240
AM Peak	9	0.059922	0.332274	0.052028	0.339258	0.042629	0.426452	0.029677	0.445634
Mid-Day	10	0.050524	0.156856	0.047253	0.144900	0.051397	0.138407	0.042675	0.110709
Mid-Day	11	0.049235	0.152854	0.048588	0.148994	0.057937	0.156019	0.054703	0.141912
Mid-Day	12	0.052182	0.162003	0.053014	0.162566	0.063055	0.169801	0.064662	0.167748
Mid-Day	13	0.054718	0.169876	0.056469	0.173160	0.066068	0.177915	0.072330	0.187641
Mid-Day	14	0.056238	0.174595	0.058519	0.179447	0.066563	0.179248	0.075496	0.195854
Mid-Day	15	0.059208	0.183816	0.062265	0.190933	0.066326	0.178610	0.075604	0.196136
PM Peak	16	0.067545	0.236383	0.069233	0.247210	0.065724	0.262826	0.073854	0.265978
PM Peak	17	0.076433	0.267488	0.073582	0.262738	0.063989	0.255887	0.071760	0.258437
PM Peak	18	0.079853	0.279456	0.073814	0.263567	0.061945	0.247714	0.068658	0.247266
PM Peak	19	0.061913	0.216673	0.063429	0.226485	0.058409	0.233573	0.063397	0.228319
Overnight	20	0.043926	0.207383	0.050255	0.208980	0.050869	0.182573	0.054069	0.200060
Overnight	21	0.035241	0.166379	0.041168	0.171194	0.044404	0.159368	0.046078	0.170491
Overnight	22	0.031086	0.146762	0.037091	0.154240	0.042400	0.152176	0.039695	0.146874
Overnight	23	0.023891	0.112793	0.030889	0.128449	0.037466	0.134467	0.031759	0.117510
Overnight	24	0.016331	0.077101	0.022564	0.093831	0.028491	0.102256	0.021207	0.078467
Overnight	1	0.010165	0.047991	0.010401	0.043252	0.019107	0.068576	0.022583	0.083558
Overnight	2	0.006870	0.032434	0.007111	0.029571	0.012921	0.046374	0.015043	0.055660
Overnight	3	0.005901	0.027860	0.006390	0.026572	0.011322	0.040635	0.013241	0.048992
Overnight	4	0.006104	0.028818	0.006313	0.026252	0.008548	0.030679	0.008693	0.032165
Overnight	5	0.009621	0.045422	0.008981	0.037347	0.008984	0.032244	0.007661	0.028346
Overnight	6	0.022676	0.107057	0.019313	0.080312	0.014113	0.050652	0.010237	0.037877
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

For each TDM link, congested speeds were estimated using a speed model that calculates directional delay (as a function of volume and capacity) relative to the free flow speed of the link. Intrazonal link congested speeds (i.e., links not explicitly represented in the TDM) were estimated using the average operational speed of the TDM centroid connectors (for the corresponding traffic analysis zone [TAZ]). The congested speed formula is:

$$Congested\ Speed = \frac{60}{\frac{60}{Freeflow\ Speed} + Delay}$$

Free-flow speeds were derived from the TDM link data. The directional delay (in minutes per mile) due to congestion was calculated using the following volume/delay equation:

$$Delay = Min\left[A\, e^{B\left({}^{V}/_{C}\right)}, M\right]$$

Where:

Delay = congestion delay (in minutes/mile).
A & B = volume/delay equation coefficients.
M = maximum minutes of delay per mile.
V/C = time-of-day directional v/c ratio.

The delay model parameters (*A*, *B*, and *M*) were developed for the Dallas/Fort Worth area and verified for other Texas urban areas. Table 34 shows these parameters. Table 35 lists the facility types (link or road classifications) used in the TDMs and their capacity category.

Table 34. Volume/Delay Equation Parameters.

Facility Category	A	B	M
High-Capacity Facilities	0.015	3.5	5
Low-Capacity Facilities	0.050	3.0	10

Table 35. Functional Class Categories for Applying Delay Parameters.

Category	TDM Functional Class Codes	TDM Functional Class Categories
High-Capacity	1, 2, 3, 4, 5, 6, 7, 8	Freeways
High-Capacity	9, 10	Expressways
High-Capacity	22	Ramp (Freeway-to-Freeway Interchange)
Low-Capacity	0	Centroid Connector
Low-Capacity	11, 12, 13	Principal Arterials
Low-Capacity	14, 15, 16	Minor Arterials
Low-Capacity	17, 18, 19, 20	Collectors and Frontage
Low-Capacity	21	Ramp (between Frontage and Mainlanes)
Low-Capacity	23	Tolled Ramp (Mainlanes to Tolled Lanes)

The time-of-day directional v/c ratios were estimated using the directional volume (from the VMT estimation) and the time-of-day directional capacity.

Capacity data were not used for the centroid connector and intrazonal links. The traffic assignment speeds from the TDM were used to represent centroid connector operational speeds. Operational speeds for intrazonal trips were estimated for each TAZ as the average of the zone's centroid connector speeds.

The hourly and 24-hour speed summaries (VMT/vehicle hours traveled [VHT]) 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 the 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 36. These TxDMV vehicle categories were disaggregated to MOVES SUT and fuel type aggregations shown in the corresponding row of the second column of Table 36. For clarity, it is useful to distinguish between the vehicle registration data (provided by TxDMV and aggregated according to the first column of Table 36) 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 36).
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 35) 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 C.

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 36. TxDMV Registration Aggregations for Estimating Vehicle Populations.

Vehicle Registration[1] Aggregation	MOVES SUT and Fuel Type (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
n/a[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.

The estimated vehicle population by county and vehicle type is presented in Appendix E.

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 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[6]. 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., 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

[6] 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).

through 15 October) starts per vehicle estimates, the MOVES output summer period 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[7]) in several steps. First total hotelling hours were calculated using information from a TCEQ extended idling study[8]. 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[9].

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).

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

[8] *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

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

Total daily hotelling for each county in the 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.

2.2.5.2 Hotelling by Hour Estimation

For each EI scenario, 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 defaults based on SUT 62 model year data. The updated MOVES SHEI and APU hotelling distributions[10] are shown in Table 37. Note that only SHEI and diesel APU are used to calculate emissions.

Table 37. Hotelling Activity Distributions by Model Year.

First Model Year	Last Model Year	200 ExtendIdling	201 Diesel Aux	203 Battery AC	204 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

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

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 scale of:

- Each TxDOT District,
- 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[11], 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.

[11] *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.

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.
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).[12]

[12] 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.

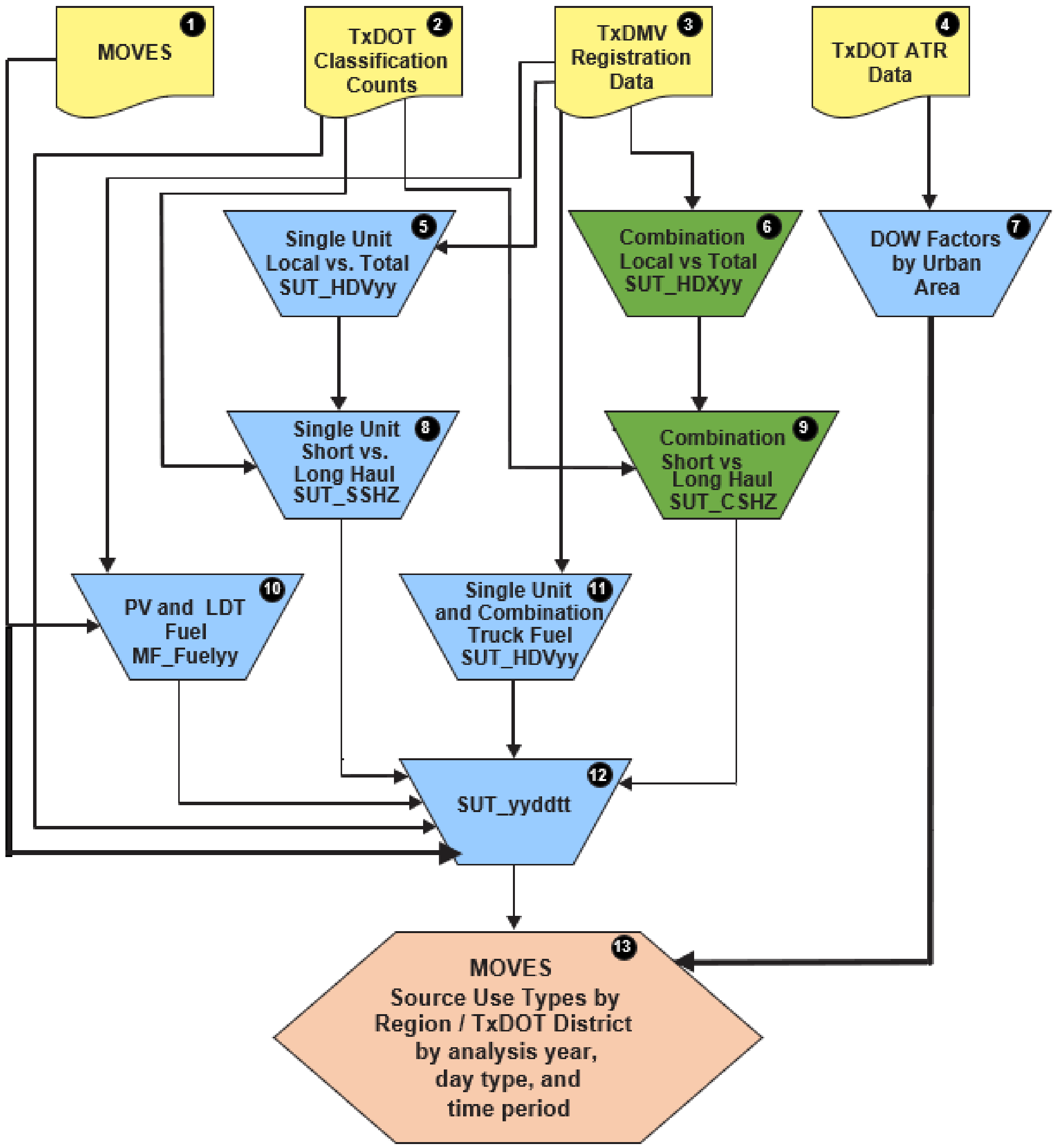

Figure 1. Simplified Overview of the VMT Mix Process.

The weekday VMT mix is presented in Appendix C.

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 (Appendix D). 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 38.

Table 38. 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*[13] 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.[14]

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 39 defines the rates produced for the external inventory calculations relative to traffic activity measures.

[13] 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.

[14] 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).

Another post-processing step adjusted diesel vehicle NO_X to account for TxLED fuel used in each county (except Kendall County, in which TxLED is not required).

Table 39. Emission/Energy Rates, MOVES Emissions Processes, and Activity Factors.

MOVES Emissions Process[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 rates 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 40 describes the MRS selections used, followed by sections describing the input data used per selection.

Table 40. MRS Selections by MOVES GUI Panel.

Navigation Panel	Detail Panel	Selection
Scale[1]	Model; Domain/Scale; Calculation Type	On-Road; County; Emissions 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 vehicle types. The VMT mixes specify the vehicle fleet as the gasoline and diesel SUTs designated as "on-road vehicles" selections in Table 40. 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 pollutants defined by 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). 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), H_2O (aerosol), and sulfate 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[15], 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.

[15] 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 41 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 41. CDB Input Tables.

Table	Data Source	Notes
auditlog	empty table used	Table must be present for MOVES to recognize CDB
year	MOVES default	Designates analysis year as 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 are 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[16].

Table 42 summarizes the data sources and aggregation levels used to estimate the local sourcetypeagedistribution and avft inputs to MOVES (inputs summarized in Appendix F).

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

Table 42. 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	SAN 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	SAN 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 was used to develop “county” (barometric pressure) and “zonemonthhour” (temperature and relative humidity) table inputs for the summer season. TCEQ provided these 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 input in the county table was set to low. Table 43 and Table 44 summarize the temperatures and relative humidity inputs (for each county) used for each emissions scenario. The summer period barometric pressure input used for all counties was 29.92 Inches of Mercury.

Table 43. Temperature Inputs to MOVES (degrees Fahrenheit)[1].

Hour	48029	48091	48187	48259	48493
1	79.41	79.11	78.10	79.11	78.73
2	78.28	77.96	77.18	77.96	77.63
3	77.38	77.02	76.52	77.02	76.75
4	76.81	76.38	75.97	76.38	76.08
5	76.45	75.97	75.78	75.97	75.66
6	76.18	75.64	75.41	75.64	75.38
7	75.91	75.36	75.08	75.36	75.15
8	76.49	76.04	76.68	76.04	75.86
9	78.50	78.28	79.78	78.28	78.94
10	80.91	80.90	82.78	80.90	82.76
11	83.44	83.59	85.91	83.59	86.39
12	85.97	86.25	88.83	86.25	89.42
13	88.21	88.59	91.12	88.59	92.00
14	90.09	90.53	93.07	90.53	93.80
15	91.59	92.02	93.98	92.02	94.71
16	92.78	93.13	94.68	93.13	95.06
17	93.29	93.63	94.79	93.63	95.64
18	93.22	93.49	94.20	93.49	95.05
19	92.43	92.51	92.48	92.51	93.02
20	90.31	90.24	89.44	90.24	90.74
21	87.13	86.85	85.26	86.85	86.78
22	84.52	84.17	82.67	84.17	83.61
23	82.60	82.26	80.92	82.26	81.56
24	80.85	80.55	79.43	80.55	79.99

[1] Source: Provided by TCEQ – developed from average hourly observations from multiple weather station data within each county. Data are from the period June through August 2019. Hours are 1 = midnight to 1 a.m.; 2 = 1 a.m. to 2 a.m.; etc. FIPS county codes from left to right are Bexar, Comal, Guadalupe, Kendall, and Wilson.

Table 44. Relative Humidity Inputs to MOVES (percent).

Hour	48029	48091	48187	48259	48493
1	76.21	76.43	79.89	76.43	76.43
2	78.80	79.44	82.78	79.44	79.44
3	81.51	82.37	85.03	82.37	82.37
4	83.06	84.29	85.97	84.29	84.29
5	83.81	85.56	86.48	85.56	85.56
6	84.79	86.75	87.44	86.75	86.75
7	85.48	87.61	88.21	87.61	87.61
8	84.16	86.46	86.35	86.46	86.46
9	78.39	80.77	79.29	80.77	80.77
10	70.69	72.88	70.86	72.88	72.88
11	63.81	65.20	62.28	65.20	65.20
12	56.87	58.17	55.32	58.17	58.17
13	51.83	52.63	50.44	52.63	52.63
14	48.22	48.43	46.37	48.43	48.43
15	44.55	44.83	44.28	44.83	44.83
16	42.46	42.59	42.74	42.59	42.59
17	41.82	41.62	42.20	41.62	41.62
18	42.02	41.69	43.05	41.69	41.69
19	44.14	43.82	45.72	43.82	43.82
20	49.22	48.84	51.37	48.84	48.84
21	56.93	56.64	60.16	56.64	56.64
22	62.67	62.66	66.37	62.66	62.66
23	66.87	67.49	71.31	67.49	67.49
24	72.04	72.38	75.83	72.38	72.38

[1] Source: Provided by TCEQ – developed from average hourly observations from multiple weather station data within each county. Data are from the period June through August 2019. Hours are 1 = midnight to 1 a.m.; 2 = 1 a.m. to 2 a.m.; etc. FIPS county codes from left to right are Bexar, Comal, Guadalupe, Kendall, and Wilson.

3.3.5 Fuels Inputs

TTI used various data sources to produce the best available Texas 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:

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

- fuelusagefraction (flex fuel vehicle fuel type usage).

As defined by the scope of the EIs, only gasoline and diesel fuels were modeled[17]. 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 percent ethanol and 15 percent gasoline, by volume]).

Since the analysis scope was gasoline and diesel, flex fuel vehicle fuel usage was set to 100 percent gasoline (via the fuelusagefraction table). With solely gasoline and diesel set by the avft and fuelusagefraction tables, the fuelformulation and fuelsupply table's gasoline and diesel fuel properties and market shares were then specified.

Fuel inputs were derived from local and default MOVES data. 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 fuel properties were used, and particular regulated properties were replaced with expected future year values (e.g., regulatory standards or limits, typically reflected in the MOVES analysis year and season default values).

Survey data consisted of TCEQ statewide summer gasoline and diesel retail outlet sampling surveys. The applicable survey data was the TCEQ 2020 (nearest data year to the analysis 2019 base year) summer season statewide gasoline and diesel surveys. TTI used the TCEQ E10 conventional gasoline (CG) fuel formulation processed and summarized in the TCEQ 2020 fuels study by MOVES fuel regions. For diesel, TTI calculated the statewide average (sulfur content), assumed for all counties (there is minimal variation in sulfur content sampled across Texas). The TCEQ survey-based diesel formulation was supplemented with a biodiesel volume content estimate based on the DOE Energy Information Administration's (EIA) diesel sales statistics (latest available). The biodiesel percentage was based on EIA State Energy Data System (SEDS) state-level 2018 (latest available) transportation sector biodiesel (BD) consumption estimates for Texas.

The fuel formulation development procedures in the TCEQ 2020 fuels study were performed using six MOVES fuel regions for Texas. In general, the sample data were aggregated and averaged by fuel grade within each MOVES fuel region (e.g., consistent

[17] 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.

with Texas fuel regulation jurisdictions and distribution networks), then weighted into gasoline composite averages using relative sales volumes by grade (results of this procedure are available in the TCEQ 2020 survey summary).

The summer fuel formulations represent a period from June through August, referenced in MOVES for this analysis by month ID 7 (for July).

The local, summer season, fuels inputs to MOVES were input using the CDB fuelsupply and fuelformulation tables. The fuel supply for each county and year consisted of one gasoline and one diesel formulation.

3.3.5.2 Fuel Formulations

Table 45 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 45. SAN Summer CG and Diesel MOVES Fuel Formulation Table Inputs.

Field	Units	2019[1] R1 CG	2019[1] R2 CG	2019[1] Diesel	2023[1] R1 CG	2023[1] R2 CG	2023[1] Diesel
fuelFormulationID	-	19701	19702	30585	14701	14702	30600
fuelSubtypeID[2]	-	12	12	21	12	12	21
RVP	psi	9.34	7.77	\N	10.00	7.80	\N
sulfurLevel	ppm	16.29	19.64	5.85	10.00	10.00	6.00
ETOHVolume	vol.%	8.96	9.56	\N	8.96	9.56	\N
MTBEVolume	vol.%	0	0	\N	0	0	\N
ETBEVolume	vol.%	0	0	\N	0	0	\N
TAMEVolume	vol.%	0	0	\N	0	0	\N
aromaticContent	vol.%	22.60	22.22	\N	22.60	22.22	\N
olefinContent	vol.%	9.77	8.69	\N	9.77	8.69	\N
benzeneContent	vol.%	0.68	0.58	\N	0.70	0.99	\N
e200	vap.%	53.34	49.64	\N	53.34	49.64	\N
e300	vap.%	85.68	84.60	\N	85.68	84.60	\N
BioDieselEster Volume	vol.%	\N	\N	4.86	\N	\N	4.86
T50	deg. F	183.10	202.53	\N	183.10	202.53	\N
T90	deg. F	316.17	319.75	\N	316.17	319.75	\N

[1] R1 CG is Federal 9.0 psi RVP limit CG with E10 RVP waiver (west Texas region); R2 CG is Texas 7.8 psi RVP limit with no RVP waiver (east Texas region). R1 applies to Kendall County and R2 applies to Bexar, Comal, Guadalupe, and Wilson Counties. 2019 CG source is the nearest (2020) TCEQ fuel survey summary, except with the MOVES default sulfur level (for expected 2019 Tier 3 transition level). 2023 CG source is the latest available (2020) TCEQ survey summary with MOVES defaults for RVP, sulfur level, benzene content (as expected future year values). 2019 biodiesel: TCEQ summer 2020 fuel survey data (statewide average) for sulfur level in absence of local 2019 survey data and EIA Texas 2018 (latest available) transportation sector fuel consumption data for biodiesel ester volume. 2023 biodiesel is the same as 2019 except sulfur level is set to MOVES default (expected future year value – very close to observed Texas values for recent years). "\N" is a null value.

[2] Fuel subtype IDs 12 and 21 are 10 percent ethanol-blend gasoline (in this case CG) and biodiesel, respectively.

3.3.6 I/M Inputs

Since San Antonio does not have a local I/M program. An empty table was used for the imcoverage file as input for the CDB.

3.3.7 Control Programs Modeling

Table 46 shows the modeling approaches used for emissions control strategies.

Table 46. 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.
CG formulations and Diesel Sulfur	Local input to MOVES – TTI used values reflecting consistency with the federal and state standards 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 (for all counties except Kendall) 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).
Federal On-board Refueling Vapor Recovery Program	MOVES defaults.

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

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 47) to the diesel vehicle NO_X (and NO_X subcomponent) emission rates in all five counties, except for Kendall County. 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.[18, 19] For on-road, these final rates inputs to the emissions calculator were merged into one on-road mobile rates input table, "ttiemissionrate."

Refueling Emission Rates:

1. The refueling emission rates were produced with no Stage II control effects (i.e., initial MOVES runs with countyyear table refuelingVaporProgramAdjust and refuelingSpillProgramAdjust field values set to zero). 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-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 rate 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

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

[19] 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/.

assembled in the TEC rate tables. The TEC rate tables produced are ttirateperdistanceTEC (includes ONI TEC), 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 47. 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 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* – 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 rates road type codes) (see Table 48).
- *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 vehicle 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 48). 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 emission 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 48. AAMPO 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]
1 - Radl IH Fwy ML 2 - Radl IH Fwy Toll/HOV 3 - Circ IH Fwy ML 4 - Circ IH Fwy Toll/HOV 5 - Radl Oth Fwy ML 6 - Radl Oth Fwy Tol/HOV 7 - Circ Oth Fwy ML 8 - Circ Oth Fwy Tol/HOV 9 - Radial Expressways 10 - Circ. Expressways 22 - Ramp (Fwy-to-Fwy) 23 – Ramp (Fwy-to-Fwy)T/HV	5 - Rural	2 – Rural Restricted Access
0 - Local (Cent Conn) 11 - Prin Art Div; 12 - Prin Art CLT Lane; 13 - Prin Art Undiv 14 - Min Art Div; 15 - Min Art CLT Lane; 16 - Min Art Undiv 17 - Coll Div; 18 - Coll CLT Lane; 19 - Coll Undiv 20 - Frontage Road 21 - Ramp (Between FR/ML)	5 - Rural	3 – Rural Unrestricted Access
1 - Radl IH Fwy ML 2 - Radl IH Fwy Toll/HOV 3 - Circ IH Fwy ML 4 - Circ IH Fwy Toll/HOV 5 - Radl Oth Fwy ML 6 - Radl Oth Fwy Tol/HOV 7 - Circ Oth Fwy ML 8 - Circ Oth Fwy Tol/HOV 9 - Radial Expressways 10 - Circ. Expressways 22 - Ramp (Fwy-to-Fwy) 23 – Ramp (Fwy-to-Fwy)T/HV	1 - CBD 2 - CBD Fringe 3 - Urban 4 - Suburban	4 – Urban Restricted Access
0 - Local (Cent Conn) 11 - Prin Art Div; 12 - Prin Art CLT Lane; 13 - Prin Art Undiv 14 - Min Art Div; 15 - Min Art CLT Lane; 16 - Min Art Undiv 17 - Coll Div; 18 - Coll CLT Lane; 19 - Coll Undiv 20 - Frontage Road 21 - Ramp (Between FR/ML) 40 - Local (Intrazonal)	1 - CBD 2 - CBD Fringe 3 - Urban 4 - Suburban	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 49), 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 49.

Table 49. Pollutants Inventoried.

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
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 emissions inventory 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 80 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 50 lists the 32 input tables produced and the sources of the data.

Table 50. 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 50. 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 40), 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 type 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,[20] 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),[21] 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 emissions inventories 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, to include the following.

- The product met the purpose of the emissions analysis.
- The full extent of the modeling domain was included.

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

- Agreed methods, models, tools, and data were used.
- 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 travel demand model 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 emissions inventories 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 the 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, 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.

REFERENCES

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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/SAN Counties.

TxDOT District	SAN County
San Antonio	Bexar
San Antonio	Comal
San Antonio	Guadalupe
San Antonio	Kendall
San Antonio	Wilson

VMT Mix Year/Analysis Year Correlations.

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

2020 Weekday VMT Mix – San Antonio 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	0.00061	0.00056	0.00068	0.00068	0.00054	0.00052	0.00065	0.00064	0.00057	0.00059	0.00071	0.00072	0.00047	0.00056	0.00067	0.00074
21_G	0.60424	0.55632	0.67522	0.67175	0.53019	0.51801	0.64766	0.63711	0.56409	0.57978	0.69982	0.70844	0.46276	0.55466	0.66121	0.73061
21_D	0.00549	0.00505	0.00613	0.00610	0.00482	0.00470	0.00588	0.00579	0.00512	0.00527	0.00636	0.00643	0.00420	0.00504	0.00600	0.00664
31_G	0.18568	0.23753	0.19502	0.20492	0.19154	0.24877	0.19965	0.22087	0.18689	0.24676	0.18427	0.20192	0.14080	0.21235	0.16476	0.18250
31_D	0.00340	0.00435	0.00357	0.00376	0.00351	0.00456	0.00366	0.00405	0.00343	0.00452	0.00338	0.00370	0.00258	0.00389	0.00302	0.00335
32_G	0.04561	0.05834	0.04790	0.05033	0.04705	0.06110	0.04904	0.05425	0.04590	0.06061	0.04526	0.04960	0.03458	0.05216	0.04047	0.04483
32_D	0.00255	0.00327	0.00268	0.00282	0.00263	0.00342	0.00274	0.00304	0.00257	0.00339	0.00253	0.00278	0.00194	0.00292	0.00226	0.00251
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	0.00024	0.00055	0.00027	0.00159	0.00037	0.00035	0.00023	0.00084	0.00023	0.00022	0.00017	0.00032	0.00052	0.00026	0.00023	0.00018
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	0.00048	0.00111	0.00053	0.00320	0.00073	0.00071	0.00047	0.00170	0.00046	0.00044	0.00034	0.00065	0.00104	0.00053	0.00046	0.00036
43_G	0.00001	0.00003	0.00001	0.00009	0.00002	0.00002	0.00001	0.00005	0.00001	0.00001	0.00001	0.00002	0.00003	0.00001	0.00001	0.00001
43_D	0.00132	0.00303	0.00146	0.00874	0.00200	0.00193	0.00128	0.00463	0.00126	0.00121	0.00094	0.00176	0.00283	0.00145	0.00126	0.00098
51_G	0.00064	0.00099	0.00049	0.00056	0.00075	0.00111	0.00062	0.00083	0.00053	0.00075	0.00033	0.00037	0.00063	0.00088	0.00037	0.00036
51_D	0.00081	0.00126	0.00062	0.00071	0.00096	0.00140	0.00079	0.00105	0.00068	0.00095	0.00041	0.00047	0.00080	0.00111	0.00047	0.00046
52_G	0.01327	0.02070	0.01027	0.01166	0.01576	0.02313	0.01300	0.01733	0.01117	0.01572	0.00681	0.00779	0.01313	0.01829	0.00778	0.00761
52_D	0.01682	0.02624	0.01302	0.01478	0.01998	0.02932	0.01647	0.02196	0.01415	0.01992	0.00863	0.00988	0.01664	0.02319	0.00986	0.00964
53_G	0.00111	0.00173	0.00086	0.00097	0.00131	0.00193	0.00108	0.00145	0.00093	0.00131	0.00057	0.00065	0.00110	0.00153	0.00065	0.00063
53_D	0.00140	0.00219	0.00109	0.00123	0.00167	0.00245	0.00137	0.00183	0.00118	0.00166	0.00072	0.00082	0.00139	0.00193	0.00082	0.00080
54_G	0.00048	0.00075	0.00037	0.00042	0.00057	0.00084	0.00047	0.00063	0.00040	0.00057	0.00025	0.00028	0.00048	0.00066	0.00028	0.00028
54_D	0.00061	0.00095	0.00047	0.00054	0.00072	0.00106	0.00060	0.00079	0.00051	0.00072	0.00031	0.00036	0.00060	0.00084	0.00036	0.00035
61_G	0.00236	0.00154	0.00081	0.00031	0.00358	0.00194	0.00111	0.00043	0.00327	0.00114	0.00078	0.00006	0.00642	0.00241	0.00203	0.00015
61_D	0.02714	0.01767	0.00926	0.00357	0.04119	0.02229	0.01279	0.00499	0.03766	0.01309	0.00899	0.00072	0.07384	0.02773	0.02333	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	0.08573	0.05583	0.02926	0.01126	0.13011	0.07043	0.04040	0.01575	0.11897	0.04136	0.02840	0.00226	0.23326	0.08759	0.07369	0.00533

2020 Friday VMT Mix – San Antonio 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	0.00058	0.00057	0.00064	0.00069	0.00051	0.00053	0.00062	0.00065	0.00054	0.00059	0.00067	0.00072	0.00046	0.00057	0.00063	0.00075
21_G	0.61521	0.55469	0.68064	0.67094	0.54418	0.51620	0.65456	0.63610	0.57706	0.57851	0.70455	0.70804	0.48273	0.55260	0.67077	0.73015
21_D	0.00559	0.00504	0.00618	0.00609	0.00494	0.00469	0.00594	0.00578	0.00524	0.00525	0.00640	0.00643	0.00438	0.00502	0.00609	0.00663
31_G	0.18905	0.23683	0.19659	0.20468	0.19659	0.24790	0.20178	0.22052	0.19118	0.24622	0.18552	0.20180	0.14687	0.21156	0.16714	0.18238
31_D	0.00347	0.00434	0.00360	0.00375	0.00360	0.00454	0.00370	0.00404	0.00350	0.00451	0.00340	0.00370	0.00269	0.00388	0.00306	0.00334
32_G	0.04644	0.05817	0.04829	0.05027	0.04829	0.06089	0.04956	0.05417	0.04696	0.06048	0.04557	0.04957	0.03608	0.05197	0.04105	0.04480
32_D	0.00260	0.00326	0.00270	0.00281	0.00270	0.00341	0.00277	0.00303	0.00263	0.00338	0.00255	0.00277	0.00202	0.00291	0.00230	0.00251
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	0.00023	0.00056	0.00025	0.00161	0.00035	0.00036	0.00022	0.00085	0.00022	0.00022	0.00016	0.00033	0.00050	0.00027	0.00022	0.00018
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	0.00046	0.00112	0.00050	0.00324	0.00070	0.00071	0.00044	0.00172	0.00044	0.00045	0.00032	0.00065	0.00101	0.00054	0.00044	0.00037
43_G	0.00001	0.00003	0.00001	0.00009	0.00002	0.00002	0.00001	0.00005	0.00001	0.00001	0.00001	0.00002	0.00003	0.00001	0.00001	0.00001
43_D	0.00126	0.00306	0.00137	0.00885	0.00192	0.00195	0.00121	0.00469	0.00120	0.00123	0.00089	0.00179	0.00276	0.00147	0.00120	0.00100
51_G	0.00060	0.00100	0.00046	0.00057	0.00072	0.00112	0.00059	0.00084	0.00051	0.00076	0.00031	0.00038	0.00061	0.00088	0.00035	0.00037
51_D	0.00077	0.00127	0.00059	0.00072	0.00092	0.00142	0.00075	0.00106	0.00065	0.00096	0.00039	0.00048	0.00078	0.00112	0.00045	0.00047
52_G	0.01191	0.02110	0.00913	0.01191	0.01426	0.02357	0.01158	0.01769	0.01007	0.01604	0.00605	0.00796	0.01207	0.01863	0.00696	0.00777
52_D	0.01510	0.02675	0.01157	0.01510	0.01808	0.02988	0.01468	0.02242	0.01277	0.02033	0.00766	0.01010	0.01530	0.02362	0.00882	0.00985
53_G	0.00099	0.00176	0.00076	0.00099	0.00119	0.00197	0.00097	0.00148	0.00084	0.00134	0.00050	0.00066	0.00101	0.00155	0.00058	0.00065
53_D	0.00126	0.00223	0.00096	0.00126	0.00151	0.00249	0.00122	0.00187	0.00106	0.00170	0.00064	0.00084	0.00128	0.00197	0.00074	0.00082
54_G	0.00046	0.00076	0.00035	0.00043	0.00055	0.00085	0.00044	0.00063	0.00039	0.00058	0.00023	0.00029	0.00046	0.00067	0.00027	0.00028
54_D	0.00058	0.00096	0.00044	0.00054	0.00069	0.00107	0.00056	0.00080	0.00049	0.00073	0.00029	0.00036	0.00059	0.00085	0.00034	0.00035
61_G	0.00212	0.00157	0.00072	0.00032	0.00324	0.00198	0.00099	0.00044	0.00295	0.00116	0.00069	0.00006	0.00591	0.00246	0.00181	0.00015
61_D	0.02436	0.01802	0.00823	0.00364	0.03727	0.02271	0.01140	0.00509	0.03397	0.01336	0.00798	0.00073	0.06791	0.02824	0.02086	0.00172
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	0.07696	0.05691	0.02601	0.01150	0.11774	0.07175	0.03600	0.01608	0.10731	0.04219	0.02521	0.00231	0.21454	0.08922	0.06591	0.00545

2020 Saturday VMT Mix – San Antonio 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	0.00055	0.00045	0.00060	0.00053	0.00049	0.00043	0.00058	0.00051	0.00052	0.00047	0.00062	0.00055	0.00044	0.00046	0.00060	0.00057
21_G	0.62690	0.58574	0.68629	0.68586	0.55934	0.55090	0.66180	0.65475	0.59102	0.60221	0.70949	0.71533	0.50514	0.59232	0.68088	0.73854
21_D	0.00569	0.00532	0.00623	0.00623	0.00508	0.00500	0.00601	0.00595	0.00537	0.00547	0.00644	0.00650	0.00459	0.00538	0.00618	0.00671
31_G	0.19265	0.25009	0.19822	0.20923	0.20207	0.26456	0.20401	0.22698	0.19581	0.25630	0.18682	0.20388	0.15369	0.22677	0.16966	0.18448
31_D	0.00353	0.00458	0.00363	0.00384	0.00370	0.00485	0.00374	0.00416	0.00359	0.00470	0.00342	0.00374	0.00282	0.00416	0.00311	0.00338
32_G	0.04732	0.06143	0.04869	0.05139	0.04963	0.06498	0.05011	0.05575	0.04810	0.06295	0.04589	0.05008	0.03775	0.05570	0.04167	0.04531
32_D	0.00265	0.00344	0.00272	0.00288	0.00278	0.00364	0.00280	0.00312	0.00269	0.00352	0.00257	0.00280	0.00211	0.00312	0.00233	0.00254
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	0.00022	0.00045	0.00023	0.00125	0.00033	0.00029	0.00021	0.00067	0.00021	0.00018	0.00015	0.00025	0.00049	0.00022	0.00021	0.00014
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	0.00044	0.00090	0.00047	0.00251	0.00067	0.00058	0.00042	0.00134	0.00042	0.00035	0.00030	0.00050	0.00098	0.00044	0.00041	0.00028
43_G	0.00001	0.00002	0.00001	0.00007	0.00002	0.00002	0.00001	0.00004	0.00001	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001
43_D	0.00119	0.00245	0.00129	0.00684	0.00184	0.00157	0.00114	0.00365	0.00114	0.00097	0.00083	0.00136	0.00268	0.00119	0.00113	0.00076
51_G	0.00057	0.00080	0.00043	0.00044	0.00069	0.00090	0.00055	0.00065	0.00049	0.00060	0.00029	0.00029	0.00060	0.00072	0.00033	0.00028
51_D	0.00073	0.00101	0.00055	0.00055	0.00088	0.00114	0.00070	0.00083	0.00062	0.00076	0.00036	0.00037	0.00075	0.00091	0.00042	0.00036
52_G	0.01046	0.01347	0.00793	0.00736	0.01264	0.01521	0.01009	0.01101	0.00889	0.01009	0.00525	0.00487	0.01089	0.01208	0.00609	0.00475
52_D	0.01326	0.01708	0.01006	0.00933	0.01602	0.01928	0.01280	0.01395	0.01127	0.01279	0.00665	0.00617	0.01381	0.01531	0.00772	0.00603
53_G	0.00087	0.00112	0.00066	0.00061	0.00105	0.00127	0.00084	0.00092	0.00074	0.00084	0.00044	0.00041	0.00091	0.00101	0.00051	0.00040
53_D	0.00111	0.00142	0.00084	0.00078	0.00134	0.00161	0.00107	0.00116	0.00094	0.00107	0.00055	0.00051	0.00115	0.00128	0.00064	0.00050
54_G	0.00043	0.00060	0.00033	0.00033	0.00052	0.00068	0.00042	0.00049	0.00037	0.00045	0.00022	0.00022	0.00045	0.00054	0.00025	0.00021
54_D	0.00055	0.00077	0.00042	0.00042	0.00066	0.00087	0.00053	0.00063	0.00047	0.00057	0.00027	0.00028	0.00057	0.00069	0.00032	0.00027
61_G	0.00186	0.00100	0.00062	0.00020	0.00287	0.00127	0.00086	0.00028	0.00261	0.00073	0.00060	0.00004	0.00533	0.00159	0.00159	0.00009
61_D	0.02140	0.01150	0.00716	0.00225	0.03303	0.01466	0.00993	0.00317	0.02999	0.00841	0.00693	0.00045	0.06127	0.01830	0.01826	0.00105
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	0.06761	0.03634	0.02261	0.00711	0.10433	0.04630	0.03138	0.01000	0.09475	0.02655	0.02189	0.00141	0.19355	0.05782	0.05768	0.00333

2020 Sunday VMT Mix – San Antonio 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	0.00042	0.00057	0.00048	0.00047	0.00039	0.00055	0.00046	0.00050	0.00043	0.00059	0.00050	0.00043	0.00042	0.00057	0.00052
21_G	0.63494	0.59560	0.69011	0.69040	0.56992	0.56206	0.66671	0.66047	0.60069	0.60959	0.71281	0.71751	0.52126	0.60518	0.68779	0.74106
21_D	0.00577	0.00541	0.00627	0.00627	0.00518	0.00510	0.00605	0.00600	0.00546	0.00554	0.00647	0.00652	0.00473	0.00550	0.00625	0.00673
31_G	0.19512	0.25430	0.19932	0.21061	0.20589	0.26992	0.20552	0.22897	0.19901	0.25944	0.18770	0.20450	0.15860	0.23170	0.17138	0.18511
31_D	0.00358	0.00466	0.00365	0.00386	0.00377	0.00495	0.00377	0.00420	0.00365	0.00476	0.00344	0.00375	0.00291	0.00425	0.00314	0.00339
32_G	0.04793	0.06246	0.04896	0.05173	0.05057	0.06630	0.05048	0.05624	0.04888	0.06373	0.04610	0.05023	0.03896	0.05691	0.04210	0.04547
32_D	0.00268	0.00350	0.00274	0.00290	0.00283	0.00371	0.00283	0.00315	0.00274	0.00357	0.00258	0.00281	0.00218	0.00319	0.00236	0.00254
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	0.00021	0.00041	0.00022	0.00114	0.00032	0.00027	0.00020	0.00061	0.00020	0.00016	0.00014	0.00023	0.00048	0.00020	0.00020	0.00013
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	0.00042	0.00082	0.00045	0.00228	0.00065	0.00053	0.00040	0.00122	0.00040	0.00032	0.00029	0.00045	0.00096	0.00040	0.00040	0.00025
43_G	0.00001	0.00002	0.00001	0.00006	0.00002	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001
43_D	0.00114	0.00225	0.00123	0.00623	0.00177	0.00145	0.00109	0.00333	0.00110	0.00088	0.00079	0.00124	0.00262	0.00110	0.00108	0.00069
51_G	0.00055	0.00074	0.00041	0.00040	0.00067	0.00083	0.00053	0.00060	0.00047	0.00055	0.00027	0.00026	0.00058	0.00066	0.00032	0.00026
51_D	0.00070	0.00093	0.00052	0.00050	0.00085	0.00106	0.00067	0.00076	0.00059	0.00070	0.00035	0.00033	0.00074	0.00084	0.00040	0.00032
52_G	0.00947	0.01105	0.00713	0.00598	0.01151	0.01252	0.00909	0.00896	0.00808	0.00824	0.00471	0.00394	0.01004	0.00995	0.00549	0.00385
52_D	0.01200	0.01401	0.00903	0.00758	0.01459	0.01587	0.01152	0.01135	0.01024	0.01045	0.00597	0.00499	0.01273	0.01262	0.00696	0.00488
53_G	0.00079	0.00092	0.00059	0.00050	0.00096	0.00104	0.00076	0.00075	0.00067	0.00069	0.00039	0.00033	0.00084	0.00083	0.00046	0.00032
53_D	0.00100	0.00117	0.00075	0.00063	0.00122	0.00132	0.00096	0.00095	0.00085	0.00087	0.00050	0.00042	0.00106	0.00105	0.00058	0.00041
54_G	0.00042	0.00056	0.00031	0.00030	0.00051	0.00063	0.00040	0.00045	0.00035	0.00041	0.00021	0.00020	0.00044	0.00050	0.00024	0.00019
54_D	0.00053	0.00071	0.00040	0.00038	0.00064	0.00080	0.00051	0.00057	0.00045	0.00053	0.00026	0.00025	0.00056	0.00064	0.00031	0.00025
61_G	0.00168	0.00082	0.00056	0.00016	0.00261	0.00105	0.00078	0.00022	0.00237	0.00060	0.00054	0.00003	0.00491	0.00131	0.00143	0.00007
61_D	0.01937	0.00944	0.00643	0.00183	0.03007	0.01206	0.00894	0.00258	0.02724	0.00686	0.00622	0.00036	0.05649	0.01509	0.01648	0.00085
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	0.06118	0.02981	0.02031	0.00577	0.09498	0.03811	0.02825	0.00814	0.08604	0.02168	0.01965	0.00114	0.17844	0.04766	0.05206	0.00270

2025 Weekday VMT Mix – San Antonio 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	0.00061	0.00056	0.00068	0.00068	0.00054	0.00052	0.00065	0.00064	0.00057	0.00059	0.00071	0.00072	0.00047	0.00056	0.00067	0.00074
21_G	0.60303	0.55520	0.67386	0.67039	0.52912	0.51696	0.64635	0.63582	0.56296	0.57861	0.69841	0.70701	0.46182	0.55354	0.65988	0.72913
21_D	0.00671	0.00618	0.00749	0.00746	0.00589	0.00575	0.00719	0.00707	0.00626	0.00644	0.00777	0.00786	0.00514	0.00616	0.00734	0.00811
31_G	0.18549	0.23729	0.19482	0.20471	0.19135	0.24851	0.19945	0.22064	0.18670	0.24650	0.18409	0.20171	0.14065	0.21214	0.16459	0.18231
31_D	0.00359	0.00460	0.00377	0.00396	0.00371	0.00481	0.00386	0.00427	0.00362	0.00477	0.00357	0.00391	0.00272	0.00411	0.00319	0.00353
32_G	0.04561	0.05834	0.04790	0.05033	0.04705	0.06110	0.04904	0.05425	0.04590	0.06061	0.04526	0.04960	0.03458	0.05216	0.04047	0.04483
32_D	0.00255	0.00327	0.00268	0.00282	0.00263	0.00342	0.00274	0.00304	0.00257	0.00339	0.00253	0.00278	0.00194	0.00292	0.00226	0.00251
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	0.00024	0.00055	0.00027	0.00159	0.00037	0.00035	0.00023	0.00084	0.00023	0.00022	0.00017	0.00032	0.00052	0.00026	0.00023	0.00018
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	0.00049	0.00112	0.00054	0.00323	0.00074	0.00071	0.00047	0.00171	0.00046	0.00045	0.00035	0.00065	0.00105	0.00054	0.00047	0.00036
43_G	0.00001	0.00003	0.00001	0.00009	0.00002	0.00002	0.00001	0.00005	0.00001	0.00001	0.00001	0.00002	0.00003	0.00001	0.00001	0.00001
43_D	0.00132	0.00302	0.00145	0.00872	0.00200	0.00193	0.00128	0.00462	0.00125	0.00121	0.00094	0.00176	0.00282	0.00145	0.00126	0.00098
51_G	0.00064	0.00099	0.00049	0.00056	0.00075	0.00111	0.00062	0.00083	0.00053	0.00075	0.00033	0.00037	0.00063	0.00088	0.00037	0.00036
51_D	0.00081	0.00126	0.00062	0.00071	0.00096	0.00140	0.00079	0.00105	0.00068	0.00095	0.00041	0.00047	0.00080	0.00111	0.00047	0.00046
52_G	0.01330	0.02075	0.01029	0.01169	0.01580	0.02318	0.01302	0.01737	0.01119	0.01575	0.00683	0.00781	0.01316	0.01833	0.00779	0.00762
52_D	0.01685	0.02630	0.01304	0.01481	0.02002	0.02939	0.01651	0.02201	0.01418	0.01997	0.00865	0.00990	0.01668	0.02324	0.00988	0.00966
53_G	0.00111	0.00173	0.00086	0.00098	0.00132	0.00193	0.00109	0.00145	0.00093	0.00131	0.00057	0.00065	0.00110	0.00153	0.00065	0.00064
53_D	0.00141	0.00219	0.00109	0.00124	0.00167	0.00245	0.00138	0.00184	0.00118	0.00167	0.00072	0.00083	0.00139	0.00194	0.00082	0.00081
54_G	0.00045	0.00070	0.00035	0.00039	0.00053	0.00078	0.00044	0.00059	0.00038	0.00053	0.00023	0.00026	0.00044	0.00062	0.00026	0.00026
54_D	0.00057	0.00089	0.00044	0.00050	0.00068	0.00099	0.00056	0.00074	0.00048	0.00067	0.00029	0.00033	0.00056	0.00079	0.00033	0.00033
61_G	0.00244	0.00159	0.00083	0.00032	0.00371	0.00201	0.00115	0.00045	0.00339	0.00118	0.00081	0.00006	0.00665	0.00250	0.00210	0.00015
61_D	0.02809	0.01830	0.00959	0.00369	0.04263	0.02308	0.01324	0.00516	0.03899	0.01355	0.00931	0.00074	0.07644	0.02870	0.02415	0.00175
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	0.08469	0.05516	0.02891	0.01113	0.12853	0.06957	0.03991	0.01556	0.11753	0.04086	0.02806	0.00223	0.23044	0.08653	0.07280	0.00527

2025 Friday VMT Mix – San Antonio 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	0.00058	0.00057	0.00064	0.00069	0.00051	0.00053	0.00062	0.00065	0.00054	0.00059	0.00067	0.00072	0.00046	0.00057	0.00063	0.00075
21_G	0.61397	0.55357	0.67926	0.66958	0.54308	0.51516	0.65324	0.63482	0.57590	0.57735	0.70313	0.70661	0.48176	0.55149	0.66942	0.72867
21_D	0.00683	0.00616	0.00756	0.00745	0.00604	0.00573	0.00727	0.00706	0.00641	0.00642	0.00782	0.00786	0.00536	0.00613	0.00745	0.00810
31_G	0.18886	0.23659	0.19639	0.20447	0.19640	0.24765	0.20157	0.22029	0.19099	0.24597	0.18533	0.20160	0.14673	0.21135	0.16697	0.18220
31_D	0.00366	0.00458	0.00380	0.00396	0.00380	0.00480	0.00390	0.00427	0.00370	0.00476	0.00359	0.00390	0.00284	0.00409	0.00323	0.00353
32_G	0.04644	0.05817	0.04829	0.05027	0.04829	0.06089	0.04956	0.05417	0.04696	0.06048	0.04557	0.04957	0.03608	0.05197	0.04105	0.04480
32_D	0.00260	0.00326	0.00270	0.00281	0.00270	0.00341	0.00277	0.00303	0.00263	0.00338	0.00255	0.00277	0.00202	0.00291	0.00230	0.00251
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	0.00023	0.00056	0.00025	0.00161	0.00035	0.00036	0.00022	0.00085	0.00022	0.00022	0.00016	0.00033	0.00050	0.00027	0.00022	0.00018
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	0.00046	0.00113	0.00051	0.00327	0.00071	0.00072	0.00045	0.00173	0.00044	0.00045	0.00033	0.00066	0.00102	0.00054	0.00044	0.00037
43_G	0.00001	0.00003	0.00001	0.00009	0.00002	0.00002	0.00001	0.00005	0.00001	0.00001	0.00001	0.00002	0.00003	0.00001	0.00001	0.00001
43_D	0.00125	0.00305	0.00137	0.00882	0.00192	0.00195	0.00121	0.00467	0.00120	0.00122	0.00088	0.00178	0.00275	0.00146	0.00119	0.00099
51_G	0.00060	0.00100	0.00046	0.00057	0.00072	0.00112	0.00059	0.00084	0.00051	0.00076	0.00031	0.00038	0.00061	0.00088	0.00035	0.00037
51_D	0.00077	0.00127	0.00059	0.00072	0.00092	0.00142	0.00075	0.00106	0.00065	0.00096	0.00039	0.00048	0.00078	0.00112	0.00045	0.00047
52_G	0.01194	0.02115	0.00915	0.01193	0.01429	0.02362	0.01161	0.01773	0.01009	0.01607	0.00606	0.00798	0.01210	0.01867	0.00697	0.00779
52_D	0.01513	0.02681	0.01159	0.01513	0.01812	0.02994	0.01471	0.02247	0.01279	0.02037	0.00768	0.01012	0.01534	0.02367	0.00884	0.00987
53_G	0.00100	0.00176	0.00076	0.00100	0.00119	0.00197	0.00097	0.00148	0.00084	0.00134	0.00051	0.00067	0.00101	0.00156	0.00058	0.00065
53_D	0.00126	0.00224	0.00097	0.00126	0.00151	0.00250	0.00123	0.00187	0.00107	0.00170	0.00064	0.00084	0.00128	0.00197	0.00074	0.00082
54_G	0.00043	0.00071	0.00033	0.00040	0.00051	0.00079	0.00042	0.00059	0.00036	0.00054	0.00022	0.00027	0.00043	0.00063	0.00025	0.00026
54_D	0.00054	0.00090	0.00042	0.00051	0.00065	0.00100	0.00053	0.00075	0.00046	0.00068	0.00028	0.00034	0.00055	0.00079	0.00032	0.00033
61_G	0.00219	0.00162	0.00074	0.00033	0.00335	0.00204	0.00103	0.00046	0.00306	0.00120	0.00072	0.00007	0.00611	0.00254	0.00188	0.00016
61_D	0.02522	0.01865	0.00852	0.00377	0.03858	0.02351	0.01180	0.00527	0.03516	0.01382	0.00826	0.00076	0.07030	0.02924	0.02160	0.00179
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	0.07603	0.05623	0.02569	0.01136	0.11632	0.07088	0.03557	0.01588	0.10601	0.04168	0.02491	0.00228	0.21195	0.08814	0.06511	0.00538

2025 Saturday VMT Mix – San Antonio 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	0.00055	0.00045	0.00060	0.00053	0.00049	0.00043	0.00058	0.00051	0.00052	0.00047	0.00062	0.00055	0.00044	0.00046	0.00060	0.00057
21_G	0.62564	0.58457	0.68491	0.68449	0.55822	0.54980	0.66047	0.65344	0.58983	0.60100	0.70806	0.71389	0.50413	0.59114	0.67951	0.73706
21_D	0.00696	0.00650	0.00762	0.00761	0.00621	0.00612	0.00735	0.00727	0.00656	0.00668	0.00788	0.00794	0.00561	0.00657	0.00756	0.00820
31_G	0.19245	0.24984	0.19802	0.20902	0.20187	0.26430	0.20380	0.22675	0.19561	0.25604	0.18663	0.20367	0.15354	0.22654	0.16949	0.18429
31_D	0.00373	0.00484	0.00384	0.00405	0.00391	0.00512	0.00395	0.00439	0.00379	0.00496	0.00361	0.00394	0.00297	0.00439	0.00328	0.00357
32_G	0.04732	0.06143	0.04869	0.05139	0.04963	0.06498	0.05011	0.05575	0.04810	0.06296	0.04589	0.05008	0.03775	0.05570	0.04167	0.04531
32_D	0.00265	0.00344	0.00272	0.00288	0.00278	0.00364	0.00280	0.00312	0.00269	0.00352	0.00257	0.00280	0.00211	0.00312	0.00233	0.00254
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	0.00022	0.00045	0.00023	0.00125	0.00033	0.00029	0.00021	0.00067	0.00021	0.00018	0.00015	0.00025	0.00049	0.00022	0.00021	0.00014
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	0.00044	0.00090	0.00047	0.00253	0.00068	0.00058	0.00042	0.00135	0.00042	0.00036	0.00031	0.00050	0.00099	0.00044	0.00042	0.00028
43_G	0.00001	0.00002	0.00001	0.00007	0.00002	0.00002	0.00001	0.00004	0.00001	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001
43_D	0.00118	0.00244	0.00128	0.00682	0.00183	0.00157	0.00114	0.00364	0.00114	0.00096	0.00083	0.00136	0.00267	0.00118	0.00112	0.00076
51_G	0.00057	0.00080	0.00043	0.00044	0.00069	0.00090	0.00055	0.00065	0.00049	0.00060	0.00029	0.00029	0.00060	0.00072	0.00033	0.00028
51_D	0.00073	0.00101	0.00055	0.00055	0.00088	0.00114	0.00070	0.00083	0.00062	0.00076	0.00036	0.00037	0.00075	0.00091	0.00042	0.00036
52_G	0.01049	0.01350	0.00795	0.00738	0.01267	0.01524	0.01012	0.01103	0.00891	0.01011	0.00526	0.00488	0.01092	0.01210	0.00610	0.00476
52_D	0.01329	0.01712	0.01008	0.00935	0.01606	0.01932	0.01282	0.01398	0.01130	0.01282	0.00667	0.00618	0.01384	0.01534	0.00773	0.00604
53_G	0.00087	0.00113	0.00066	0.00062	0.00106	0.00127	0.00084	0.00092	0.00074	0.00084	0.00044	0.00041	0.00091	0.00101	0.00051	0.00040
53_D	0.00111	0.00143	0.00084	0.00078	0.00134	0.00161	0.00107	0.00117	0.00094	0.00107	0.00056	0.00052	0.00115	0.00128	0.00065	0.00050
54_G	0.00040	0.00057	0.00031	0.00031	0.00049	0.00064	0.00039	0.00046	0.00034	0.00042	0.00020	0.00020	0.00042	0.00051	0.00024	0.00020
54_D	0.00051	0.00072	0.00039	0.00039	0.00062	0.00081	0.00049	0.00059	0.00044	0.00054	0.00026	0.00026	0.00053	0.00064	0.00030	0.00025
61_G	0.00193	0.00104	0.00064	0.00020	0.00297	0.00132	0.00089	0.00029	0.00270	0.00076	0.00062	0.00004	0.00552	0.00165	0.00164	0.00009
61_D	0.02215	0.01191	0.00741	0.00233	0.03419	0.01517	0.01028	0.00328	0.03105	0.00870	0.00717	0.00046	0.06342	0.01895	0.01890	0.00109
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	0.06679	0.03590	0.02234	0.00702	0.10307	0.04574	0.03100	0.00988	0.09360	0.02623	0.02162	0.00139	0.19121	0.05712	0.05698	0.00329

2025 Sunday VMT Mix – San Antonio 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	0.00042	0.00057	0.00048	0.00047	0.00039	0.00055	0.00046	0.00050	0.00043	0.00059	0.00050	0.00043	0.00042	0.00057	0.00052
21_G	0.63367	0.59441	0.68873	0.68902	0.56878	0.56094	0.66537	0.65915	0.59949	0.60837	0.71138	0.71607	0.52022	0.60398	0.68640	0.73957
21_D	0.00705	0.00661	0.00766	0.00766	0.00633	0.00624	0.00740	0.00733	0.00667	0.00677	0.00791	0.00796	0.00579	0.00672	0.00763	0.00823
31_G	0.19492	0.25405	0.19912	0.21040	0.20569	0.26966	0.20531	0.22874	0.19881	0.25918	0.18751	0.20430	0.15844	0.23146	0.17121	0.18492
31_D	0.00378	0.00492	0.00386	0.00408	0.00398	0.00522	0.00398	0.00443	0.00385	0.00502	0.00363	0.00396	0.00307	0.00448	0.00332	0.00358
32_G	0.04793	0.06246	0.04896	0.05173	0.05057	0.06630	0.05048	0.05624	0.04888	0.06373	0.04610	0.05023	0.03896	0.05691	0.04210	0.04547
32_D	0.00268	0.00350	0.00274	0.00290	0.00283	0.00371	0.00283	0.00315	0.00274	0.00357	0.00258	0.00281	0.00218	0.00319	0.00236	0.00254
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	0.00021	0.00041	0.00022	0.00114	0.00032	0.00027	0.00020	0.00061	0.00020	0.00016	0.00014	0.00023	0.00048	0.00020	0.00020	0.00013
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	0.00042	0.00083	0.00045	0.00230	0.00066	0.00054	0.00040	0.00123	0.00041	0.00033	0.00029	0.00046	0.00097	0.00041	0.00040	0.00026
43_G	0.00001	0.00002	0.00001	0.00006	0.00002	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001	0.00001	0.00003	0.00001	0.00001	0.00001
43_D	0.00114	0.00224	0.00122	0.00621	0.00177	0.00145	0.00109	0.00332	0.00110	0.00088	0.00079	0.00123	0.00262	0.00109	0.00108	0.00069
51_G	0.00055	0.00074	0.00041	0.00040	0.00067	0.00083	0.00053	0.00060	0.00047	0.00055	0.00027	0.00026	0.00058	0.00066	0.00032	0.00026
51_D	0.00070	0.00093	0.00052	0.00050	0.00085	0.00106	0.00067	0.00076	0.00059	0.00070	0.00035	0.00033	0.00074	0.00084	0.00040	0.00032
52_G	0.00949	0.01108	0.00714	0.00599	0.01153	0.01254	0.00911	0.00898	0.00809	0.00826	0.00472	0.00395	0.01006	0.00998	0.00551	0.00386
52_D	0.01203	0.01404	0.00905	0.00759	0.01462	0.01590	0.01154	0.01138	0.01026	0.01047	0.00598	0.00500	0.01276	0.01264	0.00698	0.00489
53_G	0.00079	0.00092	0.00060	0.00050	0.00096	0.00105	0.00076	0.00075	0.00068	0.00069	0.00039	0.00033	0.00084	0.00083	0.00046	0.00032
53_D	0.00100	0.00117	0.00076	0.00063	0.00122	0.00133	0.00096	0.00095	0.00086	0.00087	0.00050	0.00042	0.00106	0.00105	0.00058	0.00041
54_G	0.00039	0.00052	0.00029	0.00028	0.00047	0.00059	0.00037	0.00042	0.00033	0.00039	0.00019	0.00019	0.00041	0.00047	0.00023	0.00018
54_D	0.00049	0.00066	0.00037	0.00036	0.00060	0.00075	0.00047	0.00053	0.00042	0.00049	0.00025	0.00023	0.00052	0.00059	0.00029	0.00023
61_G	0.00174	0.00085	0.00058	0.00016	0.00271	0.00109	0.00080	0.00023	0.00245	0.00062	0.00056	0.00003	0.00508	0.00136	0.00148	0.00008
61_D	0.02005	0.00977	0.00666	0.00189	0.03112	0.01249	0.00926	0.00267	0.02819	0.00711	0.00644	0.00037	0.05847	0.01562	0.01706	0.00088
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	0.06044	0.02945	0.02007	0.00570	0.09383	0.03765	0.02790	0.00804	0.08500	0.02142	0.01941	0.00113	0.17629	0.04708	0.05143	0.00266

APPENDIX D:
TXDOT DISTRICT AGGREGATE WEEKDAY VMT MIX

TxDOT District/SAN Counties.

TxDOT District	SAN County
San Antonio	Bexar
San Antonio	Comal
San Antonio	Guadalupe
San Antonio	Kendall
San Antonio	Wilson

VMT Mix Year/Analysis Year Correlations.

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

Aggregate Weekday VMT Mix – San Antonio TxDOT District.

SUT/FT	2020[1]	2025[2]
11_G	0.00069	0.00069
21_G	0.68109	0.67971
21_D	0.00619	0.00756
31_G	0.18507	0.18488
31_D	0.00339	0.00358
32_G	0.04546	0.04546
32_D	0.00254	0.00254
41_G	0	0
41_D	0.00033	0.00033
42_G	0	0
42_D	0.00065	0.00066
43_G	0.00002	0.00002
43_D	0.00179	0.00178
51_G	0.00064	0.00064
51_D	0.00061	0.00061
52_G	0.01268	0.01271
52_D	0.01204	0.01207
53_G	0.00188	0.00188
53_D	0.00178	0.00179
54_G	0.00049	0.00046
54_D	0.00046	0.00043
61_G	0.00086	0.00089
61_D	0.00994	0.01029
62_G	0	0
62_D	0.03140	0.03102

[1] 2019 Analysis Year

[2] 2023 Analysis Year.

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

2019 Vehicle Population Estimates.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	20,552	4,711	3,069	1,031	982
21_G	1,123,176	109,509	92,418	35,314	24,927
21_D	10,205	995	840	321	226
31_G	253,134	33,686	28,396	10,826	12,394
31_D	4,642	618	521	199	227
32_G	62,172	8,274	6,974	2,659	3,044
32_D	3,478	463	390	149	170
41_G	0	0	0	0	0
41_D	299	74	50	30	32
42_G	0	0	0	0	0
42_D	608	150	101	61	65
43_G	21	5	3	2	2
43_D	1,649	406	275	167	176
51_G	618	152	103	63	66
51_D	783	193	131	79	84
52_G	12,883	3,171	2,150	1,303	1,378
52_D	16,326	4,018	2,725	1,651	1,746
53_G	1,072	264	179	108	115
53_D	1,360	335	227	138	146
54_G	464	114	77	47	50
54_D	587	145	98	59	63
61_G	1,477	374	140	41	40
61_D	16,998	4,310	1,606	477	456
62_G	0	0	0	0	0
62_D	53,697	13,615	5,073	1,508	1,439

2019 24-Hour School Weekday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	245,064	25,765	21,435	6,657	5,595
21_D	2,226	234	195	60	51
31_G	72,395	8,154	7,264	2,284	2,266
31_D	1,327	149	133	42	42
32_G	17,782	2,003	1,784	561	556
32_D	995	112	100	31	31
41_G	0	0	0	0	0
41_D	420	45	33	9	10
42_G	0	0	0	0	0
42_D	448	50	42	12	11
43_G	5	1	1	0	0
43_D	567	65	66	21	16
51_G	662	95	73	22	31
51_D	839	121	93	28	39
52_G	7,841	1,145	882	275	379
52_D	9,937	1,451	1,118	348	480
53_G	654	95	74	23	32
53_D	828	121	93	29	40
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	525	96	94	28	29
61_D	6,042	1,104	1,076	324	335
62_G	0	0	0	0	0
62_D	5,621	930	1,088	340	316

2019 24-Hour School Friday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	266,327	26,076	23,729	7,475	5,778
21_D	2,418	237	215	68	52
31_G	78,539	8,076	8,010	2,564	2,332
31_D	1,439	148	147	47	43
32_G	19,291	1,984	1,968	630	573
32_D	1,079	111	110	35	32
41_G	0	0	0	0	0
41_D	474	51	37	10	11
42_G	0	0	0	0	0
42_D	478	51	46	14	12
43_G	5	1	1	0	0
43_D	560	57	70	22	16
51_G	740	107	83	25	35
51_D	938	136	105	32	44
52_G	8,570	1,272	980	303	434
52_D	10,864	1,612	1,242	383	551
53_G	714	106	82	25	36
53_D	905	134	104	32	46
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	551	108	101	30	34
61_D	6,345	1,237	1,162	347	390
62_G	0	0	0	0	0
62_D	5,633	919	1,132	361	345

2019 24-Hour School Saturday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	212,259	24,109	18,346	5,643	5,390
21_D	1,928	219	167	51	49
31_G	62,984	7,759	6,243	1,936	2,195
31_D	1,154	142	114	35	40
32_G	15,470	1,906	1,533	476	539
32_D	866	107	86	27	30
41_G	0	0	0	0	0
41_D	269	29	22	6	6
42_G	0	0	0	0	0
42_D	313	36	30	9	8
43_G	4	1	1	0	0
43_D	451	56	50	15	14
51_G	565	79	62	19	25
51_D	718	100	78	24	32
52_G	6,817	959	746	232	298
52_D	8,642	1,215	945	294	377
53_G	570	80	62	19	25
53_D	719	101	79	25	32
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	338	56	60	18	16
61_D	3,886	648	688	207	181
62_G	0	0	0	0	0
62_D	3,687	597	692	213	180

2019 24-Hour School Sunday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	185,776	21,165	16,074	4,943	4,731
21_D	1,687	192	146	45	43
31_G	55,173	6,835	5,483	1,699	1,931
31_D	1,011	125	101	31	35
32_G	13,552	1,679	1,347	417	474
32_D	759	94	75	23	27
41_G	0	0	0	0	0
41_D	205	22	17	5	5
42_G	0	0	0	0	0
42_D	244	28	24	7	6
43_G	4	0	0	0	0
43_D	358	45	40	12	10
51_G	455	63	49	15	20
51_D	575	80	63	19	25
52_G	4,994	692	544	170	210
52_D	6,328	878	690	215	266
53_G	417	58	45	14	17
53_D	529	73	58	18	22
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	257	42	45	14	11
61_D	2,963	481	523	157	127
62_G	0	0	0	0	0
62_D	2,843	451	530	161	128

2019 24-Hour Summer Weekday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	261,056	27,589	22,646	7,009	5,969
21_D	2,371	251	206	64	54
31_G	77,137	8,759	7,676	2,405	2,418
31_D	1,414	161	141	44	44
32_G	18,947	2,151	1,885	591	594
32_D	1,060	120	106	33	33
41_G	0	0	0	0	0
41_D	421	45	33	9	10
42_G	0	0	0	0	0
42_D	448	50	42	12	11
43_G	5	1	1	0	0
43_D	567	65	66	21	16
51_G	662	95	73	22	31
51_D	839	121	93	28	39
52_G	7,845	1,145	883	275	379
52_D	9,943	1,451	1,119	348	481
53_G	654	96	74	23	32
53_D	828	121	93	29	40
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	525	96	94	28	29
61_D	6,045	1,104	1,076	324	335
62_G	0	0	0	0	0
62_D	5,626	931	1,089	340	317

2019 24-Hour Summer Friday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	286,017	28,164	25,271	7,931	6,203
21_D	2,597	256	229	72	56
31_G	84,369	8,756	8,531	2,720	2,505
31_D	1,546	160	156	50	46
32_G	20,724	2,151	2,096	668	615
32_D	1,159	120	117	37	34
41_G	0	0	0	0	0
41_D	479	51	38	10	11
42_G	0	0	0	0	0
42_D	481	51	47	14	12
43_G	5	1	1	0	0
43_D	561	57	70	23	16
51_G	747	108	83	25	35
51_D	946	137	106	32	44
52_G	8,646	1,282	989	305	438
52_D	10,960	1,626	1,253	387	555
53_G	721	107	82	25	37
53_D	913	136	105	32	46
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	556	109	102	30	34
61_D	6,404	1,250	1,173	350	394
62_G	0	0	0	0	0
62_D	5,668	921	1,140	363	346

2019 24-Hour Summer Saturday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	225,937	25,645	19,379	5,946	5,701
21_D	2,052	233	176	54	52
31_G	66,992	8,263	6,588	2,038	2,319
31_D	1,228	151	121	37	43
32_G	16,455	2,030	1,618	501	570
32_D	921	114	91	28	32
41_G	0	0	0	0	0
41_D	269	29	22	6	6
42_G	0	0	0	0	0
42_D	313	36	31	9	8
43_G	4	1	1	0	0
43_D	452	57	51	16	14
51_G	565	79	62	19	25
51_D	718	100	78	24	32
52_G	6,812	958	745	232	298
52_D	8,636	1,214	945	294	377
53_G	569	80	62	19	25
53_D	718	101	79	25	32
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	340	57	60	18	16
61_D	3,908	651	692	209	182
62_G	0	0	0	0	0
62_D	3,714	602	697	214	182

2019 24-Hour Summer Sunday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	202,551	23,030	17,423	5,351	5,134
21_D	1,840	209	158	49	47
31_G	60,127	7,441	5,939	1,839	2,095
31_D	1,102	136	109	34	38
32_G	14,769	1,828	1,459	452	514
32_D	827	102	82	25	29
41_G	0	0	0	0	0
41_D	211	23	18	5	5
42_G	0	0	0	0	0
42_D	251	29	25	7	6
43_G	4	0	0	0	0
43_D	367	46	41	13	11
51_G	468	65	51	16	20
51_D	591	82	65	20	26
52_G	5,141	714	560	175	216
52_D	6,514	905	710	221	274
53_G	429	60	47	15	18
53_D	544	75	59	18	23
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	266	43	47	14	11
61_D	3,062	497	541	162	132
62_G	0	0	0	0	0
62_D	2,935	466	547	167	132

2023 24-Hour School Weekday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	265,851	26,383	26,338	8,490	5,470
21_D	2,957	293	293	94	61
31_G	77,827	8,086	8,577	2,942	2,165
31_D	1,507	157	166	57	42
32_G	19,136	1,988	2,109	723	532
32_D	1,071	111	118	40	30
41_G	0	0	0	0	0
41_D	486	54	52	12	16
42_G	0	0	0	0	0
42_D	489	46	57	16	12
43_G	5	0	1	0	0
43_D	549	51	72	27	13
51_G	747	104	110	30	45
51_D	946	132	139	37	57
52_G	8,830	1,269	1,310	362	563
52_D	11,191	1,609	1,660	459	714
53_G	738	106	109	30	47
53_D	935	134	139	38	60
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	551	91	142	42	46
61_D	6,343	1,045	1,637	483	534
62_G	0	0	0	0	0
62_D	5,381	809	1,298	476	341

2023 24-Hour School Friday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	280,072	25,740	25,916	9,448	5,021
21_D	3,116	286	288	105	56
31_G	81,887	7,695	8,262	3,264	1,988
31_D	1,586	149	160	63	39
32_G	20,134	1,892	2,031	802	489
32_D	1,126	106	114	45	27
41_G	0	0	0	0	0
41_D	548	61	59	13	18
42_G	0	0	0	0	0
42_D	509	42	58	18	12
43_G	5	0	1	0	0
43_D	489	47	62	29	12
51_G	835	116	124	33	52
51_D	1,058	146	158	42	66
52_G	9,637	1,409	1,461	400	647
52_D	12,215	1,786	1,852	507	820
53_G	806	118	122	33	54
53_D	1,018	149	154	42	68
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	581	101	158	45	55
61_D	6,655	1,162	1,816	519	634
62_G	0	0	0	0	0
62_D	5,311	801	1,265	502	349

2023 24-Hour School Saturday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	238,940	27,972	24,817	7,240	6,841
21_D	2,658	311	276	81	76
31_G	70,161	8,775	8,183	2,515	2,693
31_D	1,359	170	158	49	52
32_G	17,251	2,157	2,012	618	662
32_D	965	121	113	35	37
41_G	0	0	0	0	0
41_D	307	35	34	8	10
42_G	0	0	0	0	0
42_D	351	41	43	12	11
43_G	5	1	1	0	0
43_D	483	60	65	21	16
51_G	635	88	91	25	38
51_D	808	112	116	31	49
52_G	7,666	1,068	1,103	304	456
52_D	9,716	1,354	1,399	385	578
53_G	640	89	92	25	38
53_D	812	113	117	32	48
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	350	53	87	27	24
61_D	4,029	606	999	306	277
62_G	0	0	0	0	0
62_D	3,550	521	876	300	215

2023 24-Hour School Sunday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	209,225	24,652	21,897	6,327	6,154
21_D	2,327	274	244	70	68
31_G	61,492	7,761	7,265	2,203	2,438
31_D	1,191	150	141	43	47
32_G	15,119	1,908	1,786	542	599
32_D	847	107	100	30	34
41_G	0	0	0	0	0
41_D	232	26	26	6	8
42_G	0	0	0	0	0
42_D	272	32	34	9	9
43_G	4	0	1	0	0
43_D	385	48	52	16	12
51_G	509	70	72	20	30
51_D	643	89	92	25	38
52_G	5,590	767	798	222	318
52_D	7,083	972	1,011	282	403
53_G	466	64	67	19	27
53_D	591	81	84	23	34
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	265	39	65	20	17
61_D	3,053	444	752	232	192
62_G	0	0	0	0	0
62_D	2,731	391	676	228	154

2023 24-Hour Summer Weekday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	287,128	28,605	28,413	9,070	5,975
21_D	3,193	318	316	101	66
31_G	84,078	8,783	9,267	3,143	2,360
31_D	1,628	170	179	61	46
32_G	20,673	2,159	2,278	773	580
32_D	1,157	121	128	43	32
41_G	0	0	0	0	0
41_D	494	55	53	12	16
42_G	0	0	0	0	0
42_D	494	46	57	17	12
43_G	5	0	1	0	0
43_D	547	51	71	27	13
51_G	760	106	112	30	46
51_D	962	134	142	38	58
52_G	8,978	1,290	1,333	368	573
52_D	11,379	1,635	1,689	467	726
53_G	750	108	111	31	48
53_D	951	137	141	39	61
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	560	93	145	43	47
61_D	6,455	1,065	1,669	491	544
62_G	0	0	0	0	0
62_D	5,447	816	1,309	484	341

2023 24-Hour Summer Friday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	303,772	28,122	27,875	10,173	5,453
21_D	3,379	313	310	113	61
31_G	88,850	8,417	8,886	3,512	2,159
31_D	1,720	163	172	68	42
32_G	21,846	2,070	2,185	863	531
32_D	1,222	116	122	48	30
41_G	0	0	0	0	0
41_D	563	63	60	13	18
42_G	0	0	0	0	0
42_D	514	41	58	18	11
43_G	4	0	1	0	0
43_D	476	47	61	29	12
51_G	858	118	128	34	53
51_D	1,088	150	163	43	67
52_G	9,901	1,448	1,503	411	664
52_D	12,550	1,835	1,905	522	842
53_G	828	121	125	34	55
53_D	1,046	153	159	44	70
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	598	104	164	46	57
61_D	6,855	1,200	1,882	535	657
62_G	0	0	0	0	0
62_D	5,402	805	1,275	513	347

2023 24-Hour Summer Saturday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	258,296	30,240	26,816	7,735	7,497
21_D	2,874	336	298	86	83
31_G	75,794	9,491	8,851	2,686	2,952
31_D	1,468	184	171	52	57
32_G	18,636	2,333	2,176	660	726
32_D	1,043	131	122	37	41
41_G	0	0	0	0	0
41_D	311	35	34	8	10
42_G	0	0	0	0	0
42_D	355	42	43	12	11
43_G	5	1	1	0	0
43_D	490	61	66	21	16
51_G	644	90	92	25	39
51_D	820	114	117	32	50
52_G	7,780	1,084	1,121	308	463
52_D	9,860	1,374	1,421	391	587
53_G	650	90	94	26	39
53_D	824	115	119	33	49
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	357	54	89	27	25
61_D	4,116	619	1,019	313	283
62_G	0	0	0	0	0
62_D	3,628	532	895	306	219

2023 24-Hour Summer Sunday ONI Hour Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	0	0	0	0	0
21_G	230,500	27,020	24,032	6,923	6,745
21_D	2,563	300	267	77	75
31_G	67,712	8,500	7,964	2,410	2,667
31_D	1,312	165	154	47	52
32_G	16,649	2,090	1,958	593	656
32_D	932	117	110	33	37
41_G	0	0	0	0	0
41_D	242	27	27	7	8
42_G	0	0	0	0	0
42_D	282	33	35	10	9
43_G	4	0	1	0	0
43_D	398	49	54	17	13
51_G	530	73	76	21	31
51_D	670	93	96	26	40
52_G	5,827	801	833	231	332
52_D	7,382	1,015	1,056	293	421
53_G	486	67	70	19	28
53_D	616	85	88	24	35
54_G	0	0	0	0	0
54_D	0	0	0	0	0
61_G	277	40	68	21	18
61_D	3,193	465	788	242	202
62_G	0	0	0	0	0
62_D	2,847	406	702	238	160

2019 24-Hour School Weekday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	492,100	112,941	73,572	24,726	23,537
21_G	25,572,709	2,471,558	2,113,561	817,029	566,169
21_D	232,359	22,457	19,204	7,424	5,144
31_G	5,665,562	756,629	646,101	249,393	284,432
31_D	103,901	13,876	11,849	4,574	5,216
32_G	1,391,493	185,833	158,686	61,253	69,858
32_D	77,849	10,397	8,878	3,427	3,908
41_G	0	0	0	0	0
41_D	5,903	1,630	1,103	700	740
42_G	0	0	0	0	0
42_D	12,431	3,360	2,271	1,431	1,514
43_G	442	116	79	49	52
43_D	34,333	9,179	6,207	3,894	4,119
51_G	13,296	3,425	2,314	1,452	1,517
51_D	16,841	4,338	2,931	1,839	1,922
52_G	282,869	72,184	48,849	30,437	31,873
52_D	358,446	91,471	61,901	38,570	40,390
53_G	23,529	6,005	4,064	2,532	2,652
53_D	29,873	7,623	5,158	3,214	3,366
54_G	10,461	2,639	1,790	1,105	1,161
54_D	13,250	3,343	2,267	1,400	1,470
61_G	33,756	8,667	3,059	910	857
61_D	388,489	99,746	35,202	10,470	9,859
62_G	0	0	0	0	0
62_D	1,240,731	317,657	113,516	33,756	31,888

2019 24-Hour School Friday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	491,938	112,916	73,560	24,723	23,532
21_G	25,368,710	2,444,511	2,097,784	812,988	561,109
21_D	230,508	22,212	19,061	7,387	5,098
31_G	5,605,108	747,432	640,661	247,998	282,344
31_D	102,798	13,708	11,750	4,548	5,178
32_G	1,376,642	183,573	157,350	60,910	69,345
32_D	77,023	10,271	8,803	3,408	3,880
41_G	0	0	0	0	0
41_D	5,713	1,606	1,090	697	735
42_G	0	0	0	0	0
42_D	12,136	3,322	2,249	1,426	1,506
43_G	434	115	78	49	52
43_D	33,601	9,084	6,152	3,881	4,100
51_G	13,087	3,385	2,290	1,446	1,505
51_D	16,576	4,287	2,901	1,832	1,907
52_G	279,735	71,488	48,472	30,346	31,644
52_D	354,467	90,587	61,422	38,453	40,099
53_G	23,269	5,947	4,032	2,525	2,632
53_D	29,539	7,549	5,118	3,204	3,341
54_G	10,365	2,618	1,779	1,103	1,155
54_D	13,135	3,317	2,254	1,397	1,463
61_G	33,638	8,612	3,030	903	838
61_D	387,123	99,123	34,875	10,394	9,650
62_G	0	0	0	0	0
62_D	1,237,340	316,121	112,708	33,569	31,371

2019 24-Hour School Saturday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	492,468	112,988	73,598	24,733	23,547
21_G	25,777,042	2,498,130	2,127,473	820,530	571,111
21_D	234,213	22,698	19,330	7,455	5,189
31_G	5,725,410	765,544	650,809	250,600	286,458
31_D	105,000	14,039	11,935	4,596	5,253
32_G	1,406,195	188,022	159,843	61,549	70,356
32_D	78,673	10,519	8,943	3,444	3,936
41_G	0	0	0	0	0
41_D	6,379	1,682	1,135	708	750
42_G	0	0	0	0	0
42_D	13,231	3,448	2,326	1,445	1,531
43_G	461	118	80	49	52
43_D	36,264	9,390	6,338	3,927	4,161
51_G	13,648	3,486	2,351	1,462	1,537
51_D	17,282	4,416	2,978	1,852	1,947
52_G	291,453	73,635	49,750	30,695	32,345
52_D	369,321	93,309	63,042	38,896	40,987
53_G	24,242	6,126	4,139	2,554	2,691
53_D	30,780	7,776	5,253	3,241	3,415
54_G	10,656	2,674	1,809	1,111	1,171
54_D	13,494	3,386	2,292	1,407	1,484
61_G	34,316	8,797	3,154	937	898
61_D	394,972	101,247	36,304	10,787	10,340
62_G	0	0	0	0	0
62_D	1,256,322	321,295	116,167	34,519	33,057

2019 24-Hour School Sunday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	492,627	113,006	73,610	24,736	23,551
21_G	25,930,737	2,515,342	2,139,023	823,901	574,543
21_D	235,610	22,855	19,435	7,486	5,220
31_G	5,770,855	771,212	654,676	251,736	287,831
31_D	105,832	14,143	12,006	4,617	5,278
32_G	1,417,356	189,414	160,792	61,828	70,693
32_D	79,296	10,597	8,996	3,459	3,955
41_G	0	0	0	0	0
41_D	6,572	1,702	1,149	712	754
42_G	0	0	0	0	0
42_D	13,561	3,482	2,351	1,452	1,539
43_G	471	119	81	49	52
43_D	37,061	9,474	6,399	3,943	4,178
51_G	13,884	3,521	2,376	1,470	1,548
51_D	17,589	4,460	3,010	1,862	1,960
52_G	296,262	74,331	50,254	30,847	32,561
52_D	375,423	94,192	63,682	39,089	41,261
53_G	24,645	6,184	4,181	2,566	2,709
53_D	31,281	7,849	5,307	3,257	3,438
54_G	10,752	2,688	1,819	1,114	1,175
54_D	13,617	3,404	2,304	1,411	1,489
61_G	34,592	8,848	3,201	951	914
61_D	398,101	101,829	36,844	10,950	10,517
62_G	0	0	0	0	0
62_D	1,264,130	322,746	117,515	34,925	33,499

2019 24-Hour Summer Weekday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	492,100	112,941	73,572	24,726	23,537
21_G	25,556,345	2,469,736	2,112,341	816,664	565,795
21_D	232,210	22,441	19,193	7,420	5,141
31_G	5,660,696	756,025	645,688	249,268	284,280
31_D	103,812	13,865	11,841	4,571	5,214
32_G	1,390,298	185,684	158,585	61,222	69,821
32_D	77,782	10,388	8,872	3,425	3,906
41_G	0	0	0	0	0
41_D	5,902	1,630	1,103	700	740
42_G	0	0	0	0	0
42_D	12,430	3,360	2,271	1,431	1,514
43_G	442	116	79	49	52
43_D	34,329	9,179	6,206	3,894	4,119
51_G	13,295	3,425	2,314	1,452	1,517
51_D	16,840	4,338	2,931	1,839	1,922
52_G	282,856	72,184	48,849	30,437	31,873
52_D	358,429	91,470	61,900	38,569	40,389
53_G	23,528	6,005	4,064	2,532	2,652
53_D	29,871	7,623	5,158	3,214	3,366
54_G	10,461	2,639	1,790	1,105	1,161
54_D	13,250	3,343	2,267	1,400	1,470
61_G	33,755	8,667	3,059	910	856
61_D	388,483	99,747	35,202	10,469	9,859
62_G	0	0	0	0	0
62_D	1,240,715	317,661	113,516	33,755	31,888

2019 24-Hour Summer Friday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	491,924	112,914	73,559	24,723	23,531
21_G	25,334,411	2,440,271	2,095,178	812,281	560,262
21_D	230,196	22,173	19,037	7,381	5,091
31_G	5,594,935	746,002	639,767	247,754	281,996
31_D	102,612	13,682	11,733	4,544	5,172
32_G	1,374,143	183,222	157,130	60,850	69,260
32_D	76,883	10,251	8,791	3,404	3,875
41_G	0	0	0	0	0
41_D	5,698	1,604	1,089	697	734
42_G	0	0	0	0	0
42_D	12,112	3,319	2,247	1,425	1,506
43_G	434	115	78	49	52
43_D	33,542	9,077	6,147	3,880	4,099
51_G	13,069	3,382	2,289	1,446	1,505
51_D	16,554	4,283	2,898	1,831	1,906
52_G	279,435	71,430	48,439	30,337	31,627
52_D	354,086	90,514	61,380	38,443	40,077
53_G	23,244	5,942	4,029	2,524	2,631
53_D	29,507	7,542	5,115	3,204	3,340
54_G	10,357	2,616	1,778	1,103	1,154
54_D	13,124	3,314	2,253	1,397	1,462
61_G	33,619	8,607	3,027	902	837
61_D	386,907	99,066	34,836	10,385	9,634
62_G	0	0	0	0	0
62_D	1,236,805	315,979	112,612	33,546	31,334

2019 24-Hour Summer Saturday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	492,469	112,989	73,598	24,733	23,547
21_G	25,764,555	2,496,999	2,126,563	820,230	570,857
21_D	234,099	22,688	19,322	7,453	5,187
31_G	5,722,043	765,225	650,536	250,506	286,367
31_D	104,939	14,034	11,930	4,594	5,252
32_G	1,405,368	187,944	159,776	61,526	70,334
32_D	78,627	10,515	8,939	3,442	3,935
41_G	0	0	0	0	0
41_D	6,381	1,683	1,135	708	750
42_G	0	0	0	0	0
42_D	13,234	3,448	2,326	1,445	1,531
43_G	461	118	80	49	52
43_D	36,272	9,391	6,338	3,927	4,161
51_G	13,650	3,487	2,351	1,462	1,537
51_D	17,283	4,416	2,978	1,852	1,947
52_G	291,476	73,642	49,752	30,694	32,346
52_D	369,349	93,318	63,044	38,896	40,988
53_G	24,244	6,126	4,139	2,554	2,691
53_D	30,782	7,776	5,254	3,241	3,416
54_G	10,657	2,674	1,809	1,111	1,171
54_D	13,495	3,386	2,292	1,407	1,484
61_G	34,311	8,797	3,153	937	898
61_D	394,907	101,244	36,294	10,783	10,338
62_G	0	0	0	0	0
62_D	1,256,160	321,286	116,142	34,509	33,052

2019 24-Hour Summer Sunday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	492,609	113,004	73,608	24,736	23,550
21_G	25,889,927	2,510,734	2,135,867	822,973	573,580
21_D	235,239	22,813	19,407	7,478	5,212
31_G	5,758,822	769,688	653,610	251,421	287,442
31_D	105,612	14,115	11,987	4,611	5,271
32_G	1,414,400	189,040	160,530	61,750	70,598
32_D	79,131	10,576	8,981	3,455	3,950
41_G	0	0	0	0	0
41_D	6,554	1,700	1,148	712	754
42_G	0	0	0	0	0
42_D	13,529	3,479	2,348	1,451	1,538
43_G	470	119	81	49	52
43_D	36,984	9,465	6,392	3,942	4,177
51_G	13,855	3,517	2,373	1,469	1,547
51_D	17,553	4,454	3,006	1,861	1,959
52_G	295,876	74,275	50,213	30,835	32,546
52_D	374,934	94,121	63,630	39,074	41,241
53_G	24,613	6,179	4,177	2,565	2,708
53_D	31,240	7,843	5,302	3,256	3,437
54_G	10,741	2,686	1,818	1,113	1,175
54_D	13,603	3,402	2,302	1,410	1,488
61_G	34,564	8,843	3,196	950	913
61_D	397,767	101,771	36,787	10,933	10,503
62_G	0	0	0	0	0
62_D	1,263,297	322,602	117,374	34,884	33,464

2023 24-Hour School Weekday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	553,974	144,279	94,157	24,464	34,444
21_G	28,657,881	3,156,141	2,663,035	797,843	817,205
21_D	318,576	35,085	29,603	8,869	9,084
31_G	6,353,535	969,160	813,484	243,227	412,141
31_D	123,140	18,784	15,766	4,714	7,988
32_G	1,562,058	238,275	200,000	59,799	101,328
32_D	87,391	13,331	11,189	3,346	5,669
41_G	0	0	0	0	0
41_D	6,569	2,078	1,376	686	1,073
42_G	0	0	0	0	0
42_D	13,866	4,292	2,847	1,403	2,202
43_G	494	148	99	48	75
43_D	38,123	11,638	7,752	3,797	5,954
51_G	14,931	4,405	2,905	1,420	2,205
51_D	18,912	5,579	3,679	1,799	2,793
52_G	318,491	92,881	61,627	29,914	46,426
52_D	403,642	117,713	78,103	37,911	58,837
53_G	26,418	7,707	5,113	2,482	3,853
53_D	33,534	9,782	6,490	3,151	4,890
54_G	10,968	3,155	2,109	1,015	1,575
54_D	14,116	4,059	2,714	1,305	2,026
61_G	38,142	11,185	3,813	857	1,225
61_D	438,468	128,586	43,834	9,855	14,083
62_G	0	0	0	0	0
62_D	1,335,383	389,930	135,762	30,682	43,717

2023 24-Hour School Friday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	553,762	144,247	94,127	24,460	34,432
21_G	28,407,846	3,123,059	2,631,960	792,163	806,383
21_D	315,791	34,717	29,258	8,806	8,964
31_G	6,280,184	958,328	802,680	241,223	407,689
31_D	121,722	18,574	15,557	4,675	7,902
32_G	1,544,021	235,611	197,344	59,306	100,233
32_D	86,388	13,182	11,041	3,318	5,608
41_G	0	0	0	0	0
41_D	6,330	2,044	1,346	682	1,062
42_G	0	0	0	0	0
42_D	13,490	4,242	2,802	1,395	2,187
43_G	485	147	98	48	75
43_D	37,238	11,498	7,644	3,780	5,911
51_G	14,679	4,361	2,855	1,412	2,181
51_D	18,594	5,523	3,616	1,788	2,762
52_G	314,650	92,074	60,777	29,778	45,956
52_D	398,768	116,690	77,025	37,739	58,243
53_G	26,095	7,639	5,042	2,471	3,813
53_D	33,139	9,698	6,401	3,137	4,840
54_G	10,851	3,132	2,084	1,011	1,562
54_D	13,966	4,029	2,682	1,300	2,010
61_G	37,997	11,136	3,737	846	1,186
61_D	436,937	128,039	42,968	9,725	13,636
62_G	0	0	0	0	0
62_D	1,331,790	388,643	133,722	30,376	42,665

2023 24-Hour School Saturday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	562,767	132,048	107,288	32,192	34,466
21_G	29,378,414	2,908,812	3,086,666	1,066,857	829,072
21_D	326,582	32,335	34,313	11,860	9,216
31_G	6,533,358	893,641	944,779	326,027	416,949
31_D	126,625	17,320	18,311	6,319	8,081
32_G	1,606,273	219,708	232,281	80,156	102,510
32_D	89,868	12,292	12,995	4,485	5,735
41_G	0	0	0	0	0
41_D	7,282	1,963	1,648	922	1,094
42_G	0	0	0	0	0
42_D	15,102	4,024	3,380	1,881	2,236
43_G	527	138	116	64	76
43_D	41,153	10,895	9,159	5,080	6,040
51_G	15,609	4,082	3,417	1,903	2,242
51_D	19,764	5,170	4,328	2,410	2,839
52_G	334,044	86,382	72,528	40,044	47,336
52_D	423,353	109,477	91,918	50,750	59,991
53_G	27,716	7,169	6,019	3,323	3,928
53_D	35,178	9,099	7,639	4,218	4,986
54_G	11,366	2,919	2,455	1,349	1,596
54_D	14,620	3,753	3,157	1,735	2,052
61_G	39,365	10,335	4,593	1,211	1,306
61_D	452,549	118,815	52,805	13,922	15,019
62_G	0	0	0	0	0
62_D	1,372,681	359,442	161,299	42,586	45,892

2023 24-Hour School Sunday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	562,956	132,070	107,307	32,196	34,473
21_G	29,561,287	2,930,207	3,105,737	1,071,202	835,343
21_D	328,622	32,574	34,525	11,908	9,286
31_G	6,587,173	900,512	951,243	327,515	419,459
31_D	127,663	17,453	18,436	6,347	8,129
32_G	1,619,504	221,398	233,870	80,522	103,127
32_D	90,606	12,386	13,084	4,505	5,770
41_G	0	0	0	0	0
41_D	7,509	1,988	1,672	927	1,101
42_G	0	0	0	0	0
42_D	15,487	4,067	3,420	1,890	2,248
43_G	538	139	117	64	77
43_D	42,083	10,998	9,256	5,101	6,070
51_G	15,881	4,122	3,458	1,913	2,260
51_D	20,119	5,221	4,380	2,423	2,863
52_G	339,589	87,180	73,348	40,244	47,708
52_D	430,388	110,489	92,958	51,004	60,463
53_G	28,181	7,235	6,087	3,340	3,959
53_D	35,769	9,183	7,726	4,239	5,026
54_G	11,470	2,934	2,471	1,353	1,603
54_D	14,756	3,773	3,178	1,740	2,061
61_G	39,658	10,384	4,668	1,232	1,333
61_D	455,915	119,383	53,666	14,161	15,329
62_G	0	0	0	0	0
62_D	1,380,707	360,796	163,351	43,157	46,631

2023 24-Hour Summer Weekday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	553,945	144,275	94,154	24,463	34,442
21_G	28,607,422	3,149,684	2,657,315	796,677	815,307
21_D	318,014	35,013	29,540	8,856	9,063
31_G	6,338,683	967,054	811,510	242,817	411,374
31_D	122,852	18,743	15,728	4,706	7,973
32_G	1,558,406	237,757	199,515	59,698	101,139
32_D	87,187	13,302	11,162	3,340	5,658
41_G	0	0	0	0	0
41_D	6,539	2,074	1,372	685	1,072
42_G	0	0	0	0	0
42_D	13,817	4,286	2,841	1,402	2,200
43_G	493	148	99	48	75
43_D	38,004	11,620	7,739	3,794	5,949
51_G	14,897	4,399	2,898	1,419	2,202
51_D	18,869	5,572	3,671	1,797	2,789
52_G	317,891	92,775	61,519	29,893	46,374
52_D	402,882	117,578	77,966	37,885	58,772
53_G	26,368	7,698	5,104	2,481	3,848
53_D	33,470	9,771	6,478	3,149	4,884
54_G	10,952	3,152	2,106	1,014	1,573
54_D	14,096	4,055	2,710	1,304	2,024
61_G	38,106	11,178	3,801	855	1,221
61_D	438,059	128,505	43,703	9,828	14,036
62_G	0	0	0	0	0
62_D	1,334,421	389,739	135,452	30,618	43,607

2023 24-Hour Summer Friday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	553,701	144,238	94,119	24,458	34,429
21_G	28,322,531	3,111,997	2,621,706	790,225	802,852
21_D	314,842	34,594	29,144	8,784	8,925
31_G	6,255,132	954,713	799,120	240,536	406,243
31_D	121,237	18,504	15,488	4,662	7,874
32_G	1,537,861	234,722	196,468	59,137	99,878
32_D	86,043	13,133	10,992	3,309	5,588
41_G	0	0	0	0	0
41_D	6,270	2,036	1,339	680	1,060
42_G	0	0	0	0	0
42_D	13,395	4,229	2,790	1,393	2,183
43_G	483	146	98	48	75
43_D	37,005	11,462	7,614	3,775	5,901
51_G	14,612	4,349	2,842	1,409	2,175
51_D	18,508	5,509	3,600	1,785	2,755
52_G	313,476	91,860	60,544	29,737	45,844
52_D	397,280	116,418	76,729	37,687	58,100
53_G	25,997	7,621	5,022	2,468	3,804
53_D	33,015	9,675	6,376	3,132	4,828
54_G	10,820	3,126	2,078	1,010	1,559
54_D	13,927	4,022	2,674	1,299	2,006
61_G	37,929	11,122	3,712	841	1,177
61_D	436,164	127,876	42,680	9,672	13,530
62_G	0	0	0	0	0
62_D	1,329,969	388,258	133,043	30,252	42,413

2023 24-Hour Summer Saturday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	562,754	132,046	107,286	32,192	34,466
21_G	29,342,616	2,904,760	3,083,055	1,065,967	827,936
21_D	326,184	32,290	34,273	11,850	9,204
31_G	6,523,146	892,379	943,588	325,728	416,507
31_D	126,427	17,295	18,288	6,313	8,072
32_G	1,603,762	219,398	231,988	80,083	102,401
32_D	89,727	12,275	12,979	4,480	5,729
41_G	0	0	0	0	0
41_D	7,270	1,961	1,647	922	1,094
42_G	0	0	0	0	0
42_D	15,081	4,022	3,378	1,880	2,235
43_G	526	138	116	64	76
43_D	41,103	10,890	9,153	5,079	6,038
51_G	15,589	4,079	3,414	1,902	2,240
51_D	19,739	5,167	4,324	2,409	2,838
52_G	333,747	86,340	72,484	40,033	47,318
52_D	422,976	109,424	91,862	50,736	59,969
53_G	27,691	7,165	6,015	3,322	3,927
53_D	35,147	9,094	7,635	4,217	4,984
54_G	11,358	2,918	2,454	1,349	1,595
54_D	14,611	3,752	3,156	1,735	2,052
61_G	39,340	10,331	4,587	1,209	1,305
61_D	452,259	118,771	52,735	13,901	15,000
62_G	0	0	0	0	0
62_D	1,371,991	359,338	161,133	42,536	45,846

2023 24-Hour Summer Sunday SHP Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	562,925	132,066	107,304	32,196	34,472
21_G	29,498,533	2,922,714	3,098,927	1,069,656	833,056
21_D	327,924	32,491	34,449	11,891	9,261
31_G	6,568,721	898,082	948,898	326,978	418,529
31_D	127,306	17,405	18,390	6,337	8,111
32_G	1,614,968	220,800	233,294	80,390	102,898
32_D	90,352	12,353	13,052	4,498	5,757
41_G	0	0	0	0	0
41_D	7,479	1,984	1,668	926	1,100
42_G	0	0	0	0	0
42_D	15,435	4,061	3,414	1,888	2,246
43_G	537	139	117	64	77
43_D	41,958	10,984	9,242	5,098	6,065
51_G	15,834	4,115	3,450	1,911	2,257
51_D	20,060	5,212	4,370	2,421	2,859
52_G	338,951	87,085	73,248	40,222	47,665
52_D	429,579	110,369	92,831	50,975	60,408
53_G	28,127	7,227	6,079	3,338	3,956
53_D	35,701	9,173	7,716	4,237	5,021
54_G	11,452	2,931	2,468	1,352	1,602
54_D	14,734	3,770	3,174	1,739	2,060
61_G	39,616	10,377	4,657	1,229	1,330
61_D	455,427	119,306	53,536	14,127	15,290
62_G	0	0	0	0	0
62_D	1,379,543	360,613	163,041	43,077	46,539

2019 24-Hour School Weekday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	2,901	665	433	146	139
21_G	4,232,047	412,617	348,203	133,058	93,914
21_D	39,428	3,854	3,267	1,241	887
31_G	1,006,908	134,021	112,984	43,070	49,317
31_D	18,684	2,474	2,079	796	906
32_G	263,896	35,117	29,609	11,287	12,925
32_D	13,551	1,799	1,514	578	662
41_G	0	0	0	0	0
41_D	1,951	480	326	197	209
42_G	0	0	0	0	0
42_D	4,436	1,092	740	448	474
43_G	72	18	12	7	8
43_D	6,731	1,657	1,123	680	720
51_G	448	110	75	45	48
51_D	1,392	343	232	141	149
52_G	276,558	68,065	46,154	27,960	29,579
52_D	318,711	78,440	53,189	32,222	34,088
53_G	1,553	382	259	157	166
53_D	1,760	433	294	178	188
54_G	220	54	37	22	24
54_D	296	73	49	30	32
61_G	8,536	2,164	806	240	229
61_D	102,369	25,957	9,671	2,875	2,743
62_G	0	0	0	0	0
62_D	27,942	7,085	2,640	785	749

2019 24-Hour School Friday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	2,901	665	433	146	139
21_G	4,232,047	412,617	348,203	133,058	93,914
21_D	39,428	3,854	3,267	1,241	887
31_G	1,006,908	134,021	112,984	43,070	49,317
31_D	18,684	2,474	2,079	796	906
32_G	263,896	35,117	29,609	11,287	12,925
32_D	13,551	1,799	1,514	578	662
41_G	0	0	0	0	0
41_D	1,951	480	326	197	209
42_G	0	0	0	0	0
42_D	4,436	1,092	740	448	474
43_G	72	18	12	7	8
43_D	6,731	1,657	1,123	680	720
51_G	448	110	75	45	48
51_D	1,392	343	232	141	149
52_G	276,558	68,065	46,154	27,960	29,579
52_D	318,711	78,440	53,189	32,222	34,088
53_G	1,553	382	259	157	166
53_D	1,760	433	294	178	188
54_G	220	54	37	22	24
54_D	296	73	49	30	32
61_G	8,536	2,164	806	240	229
61_D	102,369	25,957	9,671	2,875	2,743
62_G	0	0	0	0	0
62_D	27,942	7,085	2,640	785	749

2019 24-Hour School Saturday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	9,727	2,230	1,453	488	465
21_G	3,596,161	350,619	295,884	113,065	79,803
21_D	33,503	3,275	2,776	1,055	753
31_G	859,846	114,447	96,482	36,780	42,114
31_D	15,955	2,113	1,776	680	774
32_G	225,354	29,988	25,284	9,638	11,037
32_D	11,572	1,537	1,293	494	565
41_G	0	0	0	0	0
41_D	591	145	99	60	63
42_G	0	0	0	0	0
42_D	1,343	331	224	136	144
43_G	0	0	0	0	0
43_D	0	0	0	0	0
51_G	27	7	4	3	3
51_D	83	20	14	8	9
52_G	19,704	4,850	3,288	1,992	2,107
52_D	22,708	5,589	3,790	2,296	2,429
53_G	1,553	382	259	157	166
53_D	1,760	433	294	178	188
54_G	221	54	37	22	24
54_D	297	73	50	30	32
61_G	1,965	498	186	55	53
61_D	23,564	5,975	2,226	662	631
62_G	0	0	0	0	0
62_D	20,562	5,214	1,943	577	551

2019 24-Hour School Sunday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	9,727	2,230	1,453	488	465
21_G	3,596,161	350,619	295,884	113,065	79,803
21_D	33,503	3,275	2,776	1,055	753
31_G	859,846	114,447	96,482	36,780	42,114
31_D	15,955	2,113	1,776	680	774
32_G	225,354	29,988	25,284	9,638	11,037
32_D	11,572	1,537	1,293	494	565
41_G	0	0	0	0	0
41_D	591	145	99	60	63
42_G	0	0	0	0	0
42_D	1,343	331	224	136	144
43_G	0	0	0	0	0
43_D	0	0	0	0	0
51_G	27	7	4	3	3
51_D	83	20	14	8	9
52_G	19,704	4,850	3,288	1,992	2,107
52_D	22,708	5,589	3,790	2,296	2,429
53_G	1,553	382	259	157	166
53_D	1,760	433	294	178	188
54_G	221	54	37	22	24
54_D	297	73	50	30	32
61_G	1,965	498	186	55	53
61_D	23,564	5,975	2,226	662	631
62_G	0	0	0	0	0
62_D	20,562	5,214	1,943	577	551

2019 24-Hour Summer Weekday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	3,560	816	532	179	170
21_G	4,525,317	441,210	372,332	142,278	100,422
21_D	42,160	4,121	3,494	1,328	948
31_G	1,076,684	143,308	120,813	46,055	52,735
31_D	19,979	2,646	2,223	852	969
32_G	282,184	37,550	31,661	12,069	13,821
32_D	14,490	1,924	1,619	618	707
41_G	0	0	0	0	0
41_D	2,086	513	348	211	223
42_G	0	0	0	0	0
42_D	4,743	1,167	792	480	507
43_G	77	19	13	8	8
43_D	7,197	1,771	1,201	728	770
51_G	479	118	80	48	51
51_D	1,489	366	248	151	159
52_G	295,722	72,782	49,353	29,898	31,629
52_D	340,797	83,875	56,875	34,455	36,450
53_G	1,660	409	277	168	178
53_D	1,882	463	314	190	201
54_G	236	58	39	24	25
54_D	316	78	53	32	34
61_G	9,128	2,314	862	256	245
61_D	109,463	27,756	10,342	3,074	2,933
62_G	0	0	0	0	0
62_D	29,878	7,576	2,823	839	801

2019 24-Hour Summer Friday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	3,560	816	532	179	170
21_G	4,525,317	441,210	372,332	142,278	100,422
21_D	42,160	4,121	3,494	1,328	948
31_G	1,076,684	143,308	120,813	46,055	52,735
31_D	19,979	2,646	2,223	852	969
32_G	282,184	37,550	31,661	12,069	13,821
32_D	14,490	1,924	1,619	618	707
41_G	0	0	0	0	0
41_D	2,086	513	348	211	223
42_G	0	0	0	0	0
42_D	4,743	1,167	792	480	507
43_G	77	19	13	8	8
43_D	7,197	1,771	1,201	728	770
51_G	479	118	80	48	51
51_D	1,489	366	248	151	159
52_G	295,722	72,782	49,353	29,898	31,629
52_D	340,797	83,875	56,875	34,455	36,450
53_G	1,660	409	277	168	178
53_D	1,882	463	314	190	201
54_G	236	58	39	24	25
54_D	316	78	53	32	34
61_G	9,128	2,314	862	256	245
61_D	109,463	27,756	10,342	3,074	2,933
62_G	0	0	0	0	0
62_D	29,878	7,576	2,823	839	801

2019 24-Hour Summer Saturday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	11,938	2,737	1,783	599	570
21_G	3,845,366	374,916	316,387	120,900	85,333
21_D	35,825	3,502	2,969	1,128	806
31_G	919,432	122,378	103,168	39,329	45,033
31_D	17,061	2,259	1,899	727	828
32_G	240,970	32,066	27,037	10,306	11,802
32_D	12,374	1,643	1,383	528	604
41_G	0	0	0	0	0
41_D	632	156	105	64	68
42_G	0	0	0	0	0
42_D	1,437	354	240	145	154
43_G	0	0	0	0	0
43_D	0	0	0	0	0
51_G	29	7	5	3	3
51_D	89	22	15	9	9
52_G	21,070	5,186	3,516	2,130	2,254
52_D	24,281	5,976	4,052	2,455	2,597
53_G	1,660	409	277	168	178
53_D	1,882	463	314	190	201
54_G	236	58	39	24	25
54_D	317	78	53	32	34
61_G	2,101	533	199	59	56
61_D	25,197	6,389	2,381	708	675
62_G	0	0	0	0	0
62_D	21,987	5,575	2,077	617	589

2019 24-Hour Summer Sunday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	11,938	2,737	1,783	599	570
21_G	3,845,366	374,916	316,387	120,900	85,333
21_D	35,825	3,502	2,969	1,128	806
31_G	919,432	122,378	103,168	39,329	45,033
31_D	17,061	2,259	1,899	727	828
32_G	240,970	32,066	27,037	10,306	11,802
32_D	12,374	1,643	1,383	528	604
41_G	0	0	0	0	0
41_D	632	156	105	64	68
42_G	0	0	0	0	0
42_D	1,437	354	240	145	154
43_G	0	0	0	0	0
43_D	0	0	0	0	0
51_G	29	7	5	3	3
51_D	89	22	15	9	9
52_G	21,070	5,186	3,516	2,130	2,254
52_D	24,281	5,976	4,052	2,455	2,597
53_G	1,660	409	277	168	178
53_D	1,882	463	314	190	201
54_G	236	58	39	24	25
54_D	317	78	53	32	34
61_G	2,101	533	199	59	56
61_D	25,197	6,389	2,381	708	675
62_G	0	0	0	0	0
62_D	21,987	5,575	2,077	617	589

2023 24-Hour School Weekday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	3,266	850	555	144	203
21_G	4,756,205	526,158	445,040	131,449	137,246
21_D	52,902	5,850	4,932	1,461	1,528
31_G	1,129,549	170,580	144,121	42,471	71,932
31_D	23,525	3,538	2,988	881	1,490
32_G	296,389	44,745	37,819	11,143	18,878
32_D	15,866	2,400	2,014	596	1,002
41_G	0	0	0	0	0
41_D	2,197	613	417	195	305
42_G	0	0	0	0	0
42_D	4,994	1,395	948	444	695
43_G	84	23	16	7	12
43_D	7,521	2,100	1,427	668	1,046
51_G	348	97	66	31	48
51_D	1,559	435	296	139	217
52_G	313,295	87,487	59,456	27,843	43,568
52_D	355,239	99,199	67,416	31,570	49,401
53_G	1,753	489	333	156	244
53_D	1,956	546	371	174	272
54_G	233	65	44	21	32
54_D	311	87	59	28	43
61_G	10,011	2,880	1,075	247	349
61_D	114,819	33,033	12,335	2,834	4,001
62_G	0	0	0	0	0
62_D	30,016	8,635	3,225	741	1,046

2023 24-Hour School Friday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	3,266	850	555	144	203
21_G	4,756,205	526,158	445,040	131,449	137,246
21_D	52,902	5,850	4,932	1,461	1,528
31_G	1,129,549	170,580	144,121	42,471	71,932
31_D	23,525	3,538	2,988	881	1,490
32_G	296,389	44,745	37,819	11,143	18,878
32_D	15,866	2,400	2,014	596	1,002
41_G	0	0	0	0	0
41_D	2,197	613	417	195	305
42_G	0	0	0	0	0
42_D	4,994	1,395	948	444	695
43_G	84	23	16	7	12
43_D	7,521	2,100	1,427	668	1,046
51_G	348	97	66	31	48
51_D	1,559	435	296	139	217
52_G	313,295	87,487	59,456	27,843	43,568
52_D	355,239	99,199	67,416	31,570	49,401
53_G	1,753	489	333	156	244
53_D	1,956	546	371	174	272
54_G	233	65	44	21	32
54_D	311	87	59	28	43
61_G	10,011	2,880	1,075	247	349
61_D	114,819	33,033	12,335	2,834	4,001
62_G	0	0	0	0	0
62_D	30,016	8,635	3,225	741	1,046

2023 24-Hour School Saturday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	11,116	2,606	2,118	635	680
21_G	4,102,128	409,034	430,610	146,896	116,624
21_D	45,627	4,547	4,772	1,633	1,298
31_G	979,033	133,264	140,138	47,697	61,426
31_D	20,391	2,764	2,906	990	1,273
32_G	256,894	34,957	36,773	12,514	16,121
32_D	13,752	1,875	1,959	669	856
41_G	0	0	0	0	0
41_D	675	170	144	78	93
42_G	0	0	0	0	0
42_D	1,535	386	327	177	210
43_G	0	0	0	0	0
43_D	0	0	0	0	0
51_G	21	5	4	2	3
51_D	94	24	20	11	13
52_G	22,656	5,703	4,824	2,609	3,104
52_D	25,690	6,466	5,469	2,958	3,520
53_G	1,779	448	379	205	244
53_D	1,985	500	423	229	272
54_G	237	60	50	27	32
54_D	317	80	67	36	43
61_G	2,339	607	282	75	80
61_D	26,826	6,956	3,233	858	921
62_G	0	0	0	0	0
62_D	22,420	5,814	2,702	717	770

2023 24-Hour School Sunday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	11,116	2,606	2,118	635	680
21_G	4,102,128	409,034	430,610	146,896	116,624
21_D	45,627	4,547	4,772	1,633	1,298
31_G	979,033	133,264	140,138	47,697	61,426
31_D	20,391	2,764	2,906	990	1,273
32_G	256,894	34,957	36,773	12,514	16,121
32_D	13,752	1,875	1,959	669	856
41_G	0	0	0	0	0
41_D	675	170	144	78	93
42_G	0	0	0	0	0
42_D	1,535	386	327	177	210
43_G	0	0	0	0	0
43_D	0	0	0	0	0
51_G	21	5	4	2	3
51_D	94	24	20	11	13
52_G	22,656	5,703	4,824	2,609	3,104
52_D	25,690	6,466	5,469	2,958	3,520
53_G	1,779	448	379	205	244
53_D	1,985	500	423	229	272
54_G	237	60	50	27	32
54_D	317	80	67	36	43
61_G	2,339	607	282	75	80
61_D	26,826	6,956	3,233	858	921
62_G	0	0	0	0	0
62_D	22,420	5,814	2,702	717	770

2023 24-Hour Summer Weekday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	4,009	1,043	681	177	249
21_G	5,085,798	562,619	475,881	140,558	146,757
21_D	56,567	6,255	5,274	1,562	1,633
31_G	1,207,824	182,400	154,108	45,414	76,917
31_D	25,156	3,783	3,195	942	1,594
32_G	316,928	47,845	40,439	11,915	20,186
32_D	16,966	2,566	2,154	637	1,072
41_G	0	0	0	0	0
41_D	2,349	656	446	209	327
42_G	0	0	0	0	0
42_D	5,341	1,491	1,014	475	743
43_G	89	25	17	8	12
43_D	8,042	2,246	1,526	715	1,118
51_G	372	104	71	33	52
51_D	1,667	466	316	148	232
52_G	335,006	93,549	63,576	29,772	46,587
52_D	379,856	106,074	72,088	33,758	52,825
53_G	1,874	523	356	167	261
53_D	2,091	584	397	186	291
54_G	249	69	47	22	35
54_D	333	93	63	30	46
61_G	10,704	3,080	1,150	264	373
61_D	122,775	35,322	13,190	3,030	4,278
62_G	0	0	0	0	0
62_D	32,096	9,234	3,448	792	1,118

2023 24-Hour Summer Friday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	4,009	1,043	681	177	249
21_G	5,085,798	562,619	475,881	140,558	146,757
21_D	56,567	6,255	5,274	1,562	1,633
31_G	1,207,824	182,400	154,108	45,414	76,917
31_D	25,156	3,783	3,195	942	1,594
32_G	316,928	47,845	40,439	11,915	20,186
32_D	16,966	2,566	2,154	637	1,072
41_G	0	0	0	0	0
41_D	2,349	656	446	209	327
42_G	0	0	0	0	0
42_D	5,341	1,491	1,014	475	743
43_G	89	25	17	8	12
43_D	8,042	2,246	1,526	715	1,118
51_G	372	104	71	33	52
51_D	1,667	466	316	148	232
52_G	335,006	93,549	63,576	29,772	46,587
52_D	379,856	106,074	72,088	33,758	52,825
53_G	1,874	523	356	167	261
53_D	2,091	584	397	186	291
54_G	249	69	47	22	35
54_D	333	93	63	30	46
61_G	10,704	3,080	1,150	264	373
61_D	122,775	35,322	13,190	3,030	4,278
62_G	0	0	0	0	0
62_D	32,096	9,234	3,448	792	1,118

2023 24-Hour Summer Saturday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	13,643	3,198	2,599	780	835
21_G	4,386,395	437,379	460,450	157,076	124,706
21_D	48,788	4,863	5,103	1,746	1,388
31_G	1,046,877	142,499	149,849	51,002	65,683
31_D	21,804	2,956	3,107	1,058	1,361
32_G	274,696	37,379	39,322	13,381	17,238
32_D	14,705	2,005	2,094	716	915
41_G	0	0	0	0	0
41_D	722	182	154	83	99
42_G	0	0	0	0	0
42_D	1,642	413	350	189	225
43_G	0	0	0	0	0
43_D	0	0	0	0	0
51_G	23	6	5	3	3
51_D	101	25	21	12	14
52_G	24,226	6,098	5,158	2,790	3,319
52_D	27,470	6,914	5,848	3,163	3,764
53_G	1,902	479	405	219	261
53_D	2,122	534	452	244	291
54_G	253	64	54	29	35
54_D	339	85	72	39	46
61_G	2,501	649	301	80	86
61_D	28,685	7,438	3,457	917	985
62_G	0	0	0	0	0
62_D	23,973	6,217	2,889	767	823

2023 24-Hour Summer Sunday Starts Summaries.

SUT/FT	Bexar	Comal	Guadalupe	Kendall	Wilson
11_G	13,643	3,198	2,599	780	835
21_G	4,386,395	437,379	460,450	157,076	124,706
21_D	48,788	4,863	5,103	1,746	1,388
31_G	1,046,877	142,499	149,849	51,002	65,683
31_D	21,804	2,956	3,107	1,058	1,361
32_G	274,696	37,379	39,322	13,381	17,238
32_D	14,705	2,005	2,094	716	915
41_G	0	0	0	0	0
41_D	722	182	154	83	99
42_G	0	0	0	0	0
42_D	1,642	413	350	189	225
43_G	0	0	0	0	0
43_D	0	0	0	0	0
51_G	23	6	5	3	3
51_D	101	25	21	12	14
52_G	24,226	6,098	5,158	2,790	3,319
52_D	27,470	6,914	5,848	3,163	3,764
53_G	1,902	479	405	219	261
53_D	2,122	534	452	244	291
54_G	253	64	54	29	35
54_D	339	85	72	39	46
61_G	2,501	649	301	80	86
61_D	28,685	7,438	3,457	917	985
62_G	0	0	0	0	0
62_D	23,973	6,217	2,889	767	823

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
Bexar	18,734	14,016	971	19,197	14,362	995	13,886	10,389	720	10,681	7,991	554
Comal	6,213	4,648	322	6,601	4,939	342	4,347	3,252	225	3,273	2,448	170
Guadalupe	4,880	3,651	253	5,117	3,828	265	3,606	2,698	187	2,777	2,078	144
Kendall	1,234	923	64	1,302	974	67	891	667	46	681	509	35
Wilson	0	0	0	0	0	0	0	0	0	0	0	0

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
Bexar	18,747	14,026	972	19,349	14,476	1,003	13,987	10,464	725	11,027	8,250	572
Comal	6,217	4,651	322	6,654	4,978	345	4,377	3,275	227	3,378	2,527	175
Guadalupe	4,884	3,654	253	5,157	3,859	267	3,631	2,716	188	2,865	2,144	149
Kendall	1,235	924	64	1,312	981	68	897	671	47	702	525	36
Wilson	0	0	0	0	0	0	0	0	0	0	0	0

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
Bexar	18,098	12,146	1,946	18,457	12,387	1,985	13,254	8,895	1,425	10,132	6,800	1,089
Comal	5,546	3,722	596	5,893	3,955	634	3,816	2,561	410	2,836	1,903	305
Guadalupe	6,518	4,374	701	6,818	4,575	733	4,806	3,226	517	3,692	2,477	397
Kendall	1,718	1,153	185	1,801	1,209	194	1,248	837	134	956	641	103
Wilson	0	0	0	0	0	0	0	0	0	0	0	0

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
Bexar	18,370	12,328	1,975	18,900	12,684	2,032	13,542	9,088	1,456	10,576	7,098	1,137
Comal	5,630	3,778	605	6,034	4,050	649	3,897	2,615	419	2,960	1,986	318
Guadalupe	6,615	4,440	711	6,981	4,685	751	4,908	3,294	528	3,850	2,584	414
Kendall	1,744	1,171	188	1,844	1,238	198	1,274	855	137	997	669	107
Wilson	0	0	0	0	0	0	0	0	0	0	0	0

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

Bexar County Mid-Year 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.060068	0.087952	0.074745	0.074745	0.059425	0.059425	0.059425	0.061584	0.112341	0.108951	0.061584	0.083482	0.068825
1	0.060618	0.087490	0.064050	0.064050	0.056278	0.056049	0.056126	0.058783	0.104240	0.103650	0.059749	0.065901	0.059543
2	0.059868	0.074908	0.050696	0.050696	0.077657	0.089224	0.082493	0.031055	0.107439	0.111268	0.016870	0.061272	0.047903
3	0.065320	0.077364	0.049685	0.049685	0.074548	0.088197	0.075226	0.032240	0.086920	0.085755	0.017304	0.062571	0.060675
4	0.059968	0.080774	0.047034	0.047034	0.066205	0.075412	0.073770	0.039198	0.102726	0.102451	0.017642	0.087218	0.071965
5	0.057217	0.068666	0.049685	0.049685	0.062205	0.076463	0.069847	0.034777	0.059531	0.056032	0.016433	0.062287	0.057263
6	0.056117	0.064553	0.041997	0.041997	0.039216	0.057216	0.038513	0.030450	0.048401	0.050813	0.019981	0.052745	0.058116
7	0.047614	0.054731	0.036759	0.036759	0.034210	0.062000	0.038935	0.030412	0.070736	0.071436	0.010366	0.053922	0.060032
8	0.037711	0.043723	0.036308	0.036308	0.030011	0.048785	0.039295	0.022374	0.047359	0.048826	0.019524	0.026149	0.030871
9	0.026808	0.039508	0.033622	0.033622	0.032064	0.062349	0.035567	0.016303	0.016241	0.017043	0.003285	0.016363	0.019997
10	0.057817	0.031457	0.024323	0.024323	0.035851	0.059873	0.044399	0.029673	0.015976	0.016190	0.005810	0.025621	0.027428
11	0.056767	0.043483	0.043735	0.043735	0.035632	0.053319	0.044195	0.024857	0.040280	0.041381	0.021897	0.023063	0.024805
12	0.066720	0.041999	0.046411	0.046411	0.036334	0.036523	0.037978	0.071052	0.026784	0.027061	0.037079	0.073291	0.078722
13	0.056567	0.034748	0.042572	0.042572	0.044184	0.030999	0.035563	0.057430	0.029529	0.030204	0.049771	0.048887	0.050902
14	0.042663	0.031684	0.039419	0.039419	0.026523	0.022832	0.030633	0.048417	0.027106	0.025697	0.038754	0.045355	0.043087
15	0.029909	0.026961	0.044206	0.044206	0.025731	0.023757	0.033332	0.040846	0.020784	0.019228	0.060197	0.022738	0.024421
16	0.034860	0.023441	0.043360	0.043360	0.032993	0.023980	0.024239	0.044622	0.015559	0.015792	0.045168	0.021398	0.021618
17	0.027058	0.019385	0.041320	0.041320	0.030141	0.022019	0.028259	0.039990	0.014613	0.013489	0.042355	0.016323	0.016864
18	0.017355	0.015473	0.038253	0.038253	0.033912	0.019753	0.031018	0.042040	0.012493	0.013534	0.027663	0.018962	0.023545
19	0.013404	0.012612	0.028483	0.028483	0.039077	0.013221	0.026772	0.050535	0.009275	0.009828	0.051312	0.027895	0.032228
20	0.013054	0.009538	0.023004	0.023004	0.022574	0.008240	0.013980	0.040722	0.009029	0.009369	0.078902	0.020789	0.024374
21	0.007652	0.006340	0.016482	0.016482	0.017918	0.004294	0.012859	0.025282	0.004770	0.004506	0.035433	0.015836	0.018389
22	0.005952	0.004879	0.016352	0.016352	0.015873	0.001857	0.010981	0.016347	0.004543	0.004678	0.058982	0.011288	0.012671
23	0.005602	0.003204	0.011063	0.011063	0.011968	0.002405	0.009202	0.020428	0.002063	0.002323	0.030700	0.010963	0.012375
24	0.003501	0.002859	0.010819	0.010819	0.011735	0.000420	0.009873	0.022635	0.002253	0.002388	0.033527	0.010313	0.011774
25	0.003651	0.001953	0.009633	0.009633	0.008795	0.000749	0.004891	0.013931	0.001230	0.001414	0.035078	0.007065	0.008079
26	0.002501	0.001465	0.006325	0.006325	0.007540	0.000103	0.005571	0.010624	0.001136	0.001073	0.020622	0.005116	0.006273
27	0.002351	0.001084	0.004666	0.004666	0.004518	0.000147	0.004886	0.008302	0.000852	0.000713	0.019902	0.003330	0.003870
28	0.001250	0.000985	0.003315	0.003315	0.003881	0.000115	0.006055	0.010307	0.000965	0.000730	0.013178	0.003289	0.003640
29	0.001450	0.000733	0.002911	0.002911	0.005366	0.000132	0.006055	0.011368	0.000738	0.000653	0.019856	0.003533	0.003493
30	0.018606	0.006047	0.018767	0.018767	0.017635	0.000143	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Comal County Mid-Year 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.061118	0.061300	0.056731	0.056731	0.059425	0.059425	0.059425	0.061584	0.112341	0.108951	0.061584	0.083482	0.068825
1	0.063106	0.086097	0.064292	0.064292	0.056278	0.056049	0.056126	0.058783	0.104240	0.103650	0.059749	0.065901	0.059543
2	0.059627	0.088576	0.060267	0.060267	0.077657	0.089224	0.082493	0.031055	0.107439	0.111268	0.016870	0.061272	0.047903
3	0.062857	0.085080	0.059668	0.059668	0.074548	0.088197	0.075226	0.032240	0.086920	0.085755	0.017304	0.062571	0.060675
4	0.058137	0.086860	0.056867	0.056867	0.066205	0.075412	0.073770	0.039198	0.102726	0.102451	0.017642	0.087218	0.071965
5	0.060870	0.073449	0.057085	0.057085	0.062205	0.076463	0.069847	0.034777	0.059531	0.056032	0.016433	0.062287	0.057263
6	0.049441	0.070621	0.050204	0.050204	0.039216	0.057216	0.038513	0.030450	0.048401	0.050813	0.019981	0.052745	0.058116
7	0.045714	0.058419	0.043024	0.043024	0.034210	0.062000	0.038935	0.030412	0.070736	0.071436	0.010366	0.053922	0.060032
8	0.033043	0.044373	0.039869	0.039869	0.030011	0.048785	0.039295	0.022374	0.047359	0.048826	0.019524	0.026149	0.030871
9	0.026584	0.038600	0.037748	0.037748	0.032064	0.062349	0.035567	0.016303	0.016241	0.017043	0.003285	0.016363	0.019997
10	0.050932	0.029734	0.025102	0.025102	0.035851	0.059873	0.044399	0.029673	0.015976	0.016190	0.005810	0.025621	0.027428
11	0.054410	0.040750	0.040957	0.040957	0.035632	0.053319	0.044195	0.024857	0.040280	0.041381	0.021897	0.023063	0.024805
12	0.059627	0.038197	0.044357	0.044357	0.036334	0.036523	0.037978	0.071052	0.026784	0.027061	0.037079	0.073291	0.078722
13	0.051677	0.032774	0.043187	0.043187	0.044184	0.030999	0.035563	0.057430	0.029529	0.030204	0.049771	0.048887	0.050902
14	0.041988	0.028643	0.035708	0.035708	0.026523	0.022832	0.030633	0.048417	0.027106	0.025697	0.038754	0.045355	0.043087
15	0.033789	0.024681	0.041202	0.041202	0.025731	0.023757	0.033332	0.040846	0.020784	0.019228	0.060197	0.022738	0.024421
16	0.040994	0.022033	0.037857	0.037857	0.032993	0.023980	0.024239	0.044622	0.015559	0.015792	0.045168	0.021398	0.021618
17	0.027826	0.018410	0.035600	0.035600	0.030141	0.022019	0.028259	0.039990	0.014613	0.013489	0.042355	0.016323	0.016864
18	0.018634	0.013887	0.032962	0.032962	0.033912	0.019753	0.031018	0.042040	0.012493	0.013534	0.027663	0.018962	0.023545
19	0.018385	0.012150	0.027359	0.027359	0.039077	0.013221	0.026772	0.050535	0.009275	0.009828	0.051312	0.027895	0.032228
20	0.014161	0.009502	0.021131	0.021131	0.022574	0.008240	0.013980	0.040722	0.009029	0.009369	0.078902	0.020789	0.024374
21	0.007205	0.006652	0.012973	0.012973	0.017918	0.004294	0.012859	0.025282	0.004770	0.004506	0.035433	0.015836	0.018389
22	0.008199	0.004926	0.016644	0.016644	0.015873	0.001857	0.010981	0.016347	0.004543	0.004678	0.058982	0.011288	0.012671
23	0.007453	0.003612	0.010416	0.010416	0.011968	0.002405	0.009202	0.020428	0.002063	0.002323	0.030700	0.010963	0.012375
24	0.007453	0.002839	0.008567	0.008567	0.011735	0.000420	0.009873	0.022635	0.002253	0.002388	0.033527	0.010313	0.011774
25	0.003727	0.002256	0.007588	0.007588	0.008795	0.000749	0.004891	0.013931	0.001230	0.001414	0.035078	0.007065	0.008079
26	0.003975	0.001610	0.005575	0.005575	0.007540	0.000103	0.005571	0.010624	0.001136	0.001073	0.020622	0.005116	0.006273
27	0.003478	0.001261	0.003943	0.003943	0.004518	0.000147	0.004886	0.008302	0.000852	0.000713	0.019902	0.003330	0.003870
28	0.001739	0.001229	0.002937	0.002937	0.003881	0.000115	0.006055	0.010307	0.000965	0.000730	0.013178	0.003289	0.003640
29	0.001739	0.000985	0.001904	0.001904	0.005366	0.000132	0.006055	0.011368	0.000738	0.000653	0.019856	0.003533	0.003493
30	0.022112	0.010497	0.018276	0.018276	0.017635	0.000143	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Guadalupe County Mid-Year 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.046268	0.054603	0.045823	0.045823	0.059425	0.059425	0.059425	0.061584	0.112341	0.108951	0.061584	0.083482	0.068825
1	0.054036	0.073820	0.057908	0.057908	0.056278	0.056049	0.056126	0.058783	0.104240	0.103650	0.059749	0.065901	0.059543
2	0.059777	0.080155	0.055365	0.055365	0.077657	0.089224	0.082493	0.031055	0.107439	0.111268	0.016870	0.061272	0.047903
3	0.055724	0.082822	0.052651	0.052651	0.074548	0.088197	0.075226	0.032240	0.086920	0.085755	0.017304	0.062571	0.060675
4	0.058426	0.088112	0.052680	0.052680	0.066205	0.075412	0.073770	0.039198	0.102726	0.102451	0.017642	0.087218	0.071965
5	0.067882	0.075009	0.056679	0.056679	0.062205	0.076463	0.069847	0.034777	0.059531	0.056032	0.016433	0.062287	0.057263
6	0.059439	0.071275	0.046166	0.046166	0.039216	0.057216	0.038513	0.030450	0.048401	0.050813	0.019981	0.052745	0.058116
7	0.046268	0.060994	0.038767	0.038767	0.034210	0.062000	0.038935	0.030412	0.070736	0.071436	0.010366	0.053922	0.060032
8	0.039176	0.047479	0.039138	0.039138	0.030011	0.048785	0.039295	0.022374	0.047359	0.048826	0.019524	0.026149	0.030871
9	0.035461	0.040522	0.033625	0.033625	0.032064	0.062349	0.035567	0.016303	0.016241	0.017043	0.003285	0.016363	0.019997
10	0.055049	0.032575	0.024854	0.024854	0.035851	0.059873	0.044399	0.029673	0.015976	0.016190	0.005810	0.025621	0.027428
11	0.057413	0.044167	0.040795	0.040795	0.035632	0.053319	0.044195	0.024857	0.040280	0.041381	0.021897	0.023063	0.024805
12	0.067545	0.041844	0.043309	0.043309	0.036334	0.036523	0.037978	0.071052	0.026784	0.027061	0.037079	0.073291	0.078722
13	0.055387	0.035965	0.043681	0.043681	0.044184	0.030999	0.035563	0.057430	0.029529	0.030204	0.049771	0.048887	0.050902
14	0.037825	0.031664	0.039196	0.039196	0.026523	0.022832	0.030633	0.048417	0.027106	0.025697	0.038754	0.045355	0.043087
15	0.031408	0.027352	0.045195	0.045195	0.025731	0.023757	0.033332	0.040846	0.020784	0.019228	0.060197	0.022738	0.024421
16	0.044242	0.022784	0.042595	0.042595	0.032993	0.023980	0.024239	0.044622	0.015559	0.015792	0.045168	0.021398	0.021618
17	0.025667	0.019227	0.040110	0.040110	0.030141	0.022019	0.028259	0.039990	0.014613	0.013489	0.042355	0.016323	0.016864
18	0.022965	0.015471	0.038681	0.038681	0.033912	0.019753	0.031018	0.042040	0.012493	0.013534	0.027663	0.018962	0.023545
19	0.013847	0.012337	0.029168	0.029168	0.039077	0.013221	0.026772	0.050535	0.009275	0.009828	0.051312	0.027895	0.032228
20	0.015873	0.009291	0.024711	0.024711	0.022574	0.008240	0.013980	0.040722	0.009029	0.009369	0.078902	0.020789	0.024374
21	0.007768	0.006357	0.016912	0.016912	0.017918	0.004294	0.012859	0.025282	0.004770	0.004506	0.035433	0.015836	0.018389
22	0.007430	0.005001	0.016284	0.016284	0.015873	0.001857	0.010981	0.016347	0.004543	0.004678	0.058982	0.011288	0.012671
23	0.004390	0.003345	0.012399	0.012399	0.011968	0.002405	0.009202	0.020428	0.002063	0.002323	0.030700	0.010963	0.012375
24	0.004728	0.003245	0.011199	0.011199	0.011735	0.000420	0.009873	0.022635	0.002253	0.002388	0.033527	0.010313	0.011774
25	0.004390	0.002034	0.010427	0.010427	0.008795	0.000749	0.004891	0.013931	0.001230	0.001414	0.035078	0.007065	0.008079
26	0.002702	0.001712	0.006999	0.006999	0.007540	0.000103	0.005571	0.010624	0.001136	0.001073	0.020622	0.005116	0.006273
27	0.002364	0.001311	0.005457	0.005457	0.004518	0.000147	0.004886	0.008302	0.000852	0.000713	0.019902	0.003330	0.003870
28	0.002026	0.001267	0.003828	0.003828	0.003881	0.000115	0.006055	0.010307	0.000965	0.000730	0.013178	0.003289	0.003640
29	0.001013	0.000889	0.002743	0.002743	0.005366	0.000132	0.006055	0.011368	0.000738	0.000653	0.019856	0.003533	0.003493
30	0.013509	0.007369	0.022655	0.022655	0.017635	0.000143	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Kendall County Mid-Year 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.057927	0.069055	0.060535	0.060535	0.059425	0.059425	0.059425	0.061584	0.112341	0.108951	0.061584	0.083482	0.068825
1	0.046748	0.086701	0.067960	0.067960	0.056278	0.056049	0.056126	0.058783	0.104240	0.103650	0.059749	0.065901	0.059543
2	0.053862	0.084348	0.058565	0.058565	0.077657	0.089224	0.082493	0.031055	0.107439	0.111268	0.016870	0.061272	0.047903
3	0.065041	0.086760	0.053489	0.053489	0.074548	0.088197	0.075226	0.032240	0.086920	0.085755	0.017304	0.062571	0.060675
4	0.082317	0.091671	0.053792	0.053792	0.066205	0.075412	0.073770	0.039198	0.102726	0.102451	0.017642	0.087218	0.071965
5	0.061992	0.073143	0.060308	0.060308	0.062205	0.076463	0.069847	0.034777	0.059531	0.056032	0.016433	0.062287	0.057263
6	0.061992	0.071878	0.050913	0.050913	0.039216	0.057216	0.038513	0.030450	0.048401	0.050813	0.019981	0.052745	0.058116
7	0.059959	0.055056	0.042731	0.042731	0.034210	0.062000	0.038935	0.030412	0.070736	0.071436	0.010366	0.053922	0.060032
8	0.034553	0.046644	0.038185	0.038185	0.030011	0.048785	0.039295	0.022374	0.047359	0.048826	0.019524	0.026149	0.030871
9	0.023374	0.037557	0.032124	0.032124	0.032064	0.062349	0.035567	0.016303	0.016241	0.017043	0.003285	0.016363	0.019997
10	0.056911	0.027763	0.021820	0.021820	0.035851	0.059873	0.044399	0.029673	0.015976	0.016190	0.005810	0.025621	0.027428
11	0.049797	0.040380	0.042806	0.042806	0.035632	0.053319	0.044195	0.024857	0.040280	0.041381	0.021897	0.023063	0.024805
12	0.039634	0.037910	0.041746	0.041746	0.036334	0.036523	0.037978	0.071052	0.026784	0.027061	0.037079	0.073291	0.078722
13	0.041667	0.031057	0.042352	0.042352	0.044184	0.030999	0.035563	0.057430	0.029529	0.030204	0.049771	0.048887	0.050902
14	0.042683	0.027057	0.035912	0.035912	0.026523	0.022832	0.030633	0.048417	0.027106	0.025697	0.038754	0.045355	0.043087
15	0.025407	0.025381	0.039927	0.039927	0.025731	0.023757	0.033332	0.040846	0.020784	0.019228	0.060197	0.022738	0.024421
16	0.039634	0.019969	0.038488	0.038488	0.032993	0.023980	0.024239	0.044622	0.015559	0.015792	0.045168	0.021398	0.021618
17	0.025407	0.018999	0.038564	0.038564	0.030141	0.022019	0.028259	0.039990	0.014613	0.013489	0.042355	0.016323	0.016864
18	0.020325	0.015176	0.032578	0.032578	0.033912	0.019753	0.031018	0.042040	0.012493	0.013534	0.027663	0.018962	0.023545
19	0.017276	0.010823	0.024547	0.024547	0.039077	0.013221	0.026772	0.050535	0.009275	0.009828	0.051312	0.027895	0.032228
20	0.014228	0.008941	0.022881	0.022881	0.022574	0.008240	0.013980	0.040722	0.009029	0.009369	0.078902	0.020789	0.024374
21	0.008130	0.006147	0.014698	0.014698	0.017918	0.004294	0.012859	0.025282	0.004770	0.004506	0.035433	0.015836	0.018389
22	0.007114	0.004294	0.016138	0.016138	0.015873	0.001857	0.010981	0.016347	0.004543	0.004678	0.058982	0.011288	0.012671
23	0.009146	0.002676	0.011592	0.011592	0.011968	0.002405	0.009202	0.020428	0.002063	0.002323	0.030700	0.010963	0.012375
24	0.007114	0.003000	0.010607	0.010607	0.011735	0.000420	0.009873	0.022635	0.002253	0.002388	0.033527	0.010313	0.011774
25	0.006098	0.001853	0.007198	0.007198	0.008795	0.000749	0.004891	0.013931	0.001230	0.001414	0.035078	0.007065	0.008079
26	0.003049	0.001529	0.006137	0.006137	0.007540	0.000103	0.005571	0.010624	0.001136	0.001073	0.020622	0.005116	0.006273
27	0.003049	0.000971	0.004849	0.004849	0.004518	0.000147	0.004886	0.008302	0.000852	0.000713	0.019902	0.003330	0.003870
28	0.002033	0.001235	0.003712	0.003712	0.003881	0.000115	0.006055	0.010307	0.000965	0.000730	0.013178	0.003289	0.003640
29	0.003049	0.001265	0.002879	0.002879	0.005366	0.000132	0.006055	0.011368	0.000738	0.000653	0.019856	0.003533	0.003493
30	0.030488	0.010764	0.021971	0.021971	0.017635	0.000143	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Wilson County Mid-Year 2019 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.044681	0.054688	0.043929	0.043929	0.059425	0.059425	0.059425	0.061584	0.112341	0.108951	0.061584	0.083482	0.068825
1	0.056383	0.075077	0.058439	0.058439	0.056278	0.056049	0.056126	0.058783	0.104240	0.103650	0.059749	0.065901	0.059543
2	0.057447	0.076987	0.045050	0.045050	0.077657	0.089224	0.082493	0.031055	0.107439	0.111268	0.016870	0.061272	0.047903
3	0.076596	0.081430	0.046105	0.046105	0.074548	0.088197	0.075226	0.032240	0.086920	0.085755	0.017304	0.062571	0.060675
4	0.060638	0.088988	0.047688	0.047688	0.066205	0.075412	0.073770	0.039198	0.102726	0.102451	0.017642	0.087218	0.071965
5	0.063830	0.075367	0.051778	0.051778	0.062205	0.076463	0.069847	0.034777	0.059531	0.056032	0.016433	0.062287	0.057263
6	0.044681	0.069388	0.044324	0.044324	0.039216	0.057216	0.038513	0.030450	0.048401	0.050813	0.019981	0.052745	0.058116
7	0.043617	0.056598	0.038058	0.038058	0.034210	0.062000	0.038935	0.030412	0.070736	0.071436	0.010366	0.053922	0.060032
8	0.031915	0.043933	0.039048	0.039048	0.030011	0.048785	0.039295	0.022374	0.047359	0.048826	0.019524	0.026149	0.030871
9	0.036170	0.036500	0.032122	0.032122	0.032064	0.062349	0.035567	0.016303	0.016241	0.017043	0.003285	0.016363	0.019997
10	0.050000	0.032140	0.025988	0.025988	0.035851	0.059873	0.044399	0.029673	0.015976	0.016190	0.005810	0.025621	0.027428
11	0.059574	0.044099	0.043137	0.043137	0.035632	0.053319	0.044195	0.024857	0.040280	0.041381	0.021897	0.023063	0.024805
12	0.078723	0.042355	0.040762	0.040762	0.036334	0.036523	0.037978	0.071052	0.026784	0.027061	0.037079	0.073291	0.078722
13	0.067021	0.033635	0.047160	0.047160	0.044184	0.030999	0.035563	0.057430	0.029529	0.030204	0.049771	0.048887	0.050902
14	0.035106	0.033843	0.039641	0.039641	0.026523	0.022832	0.030633	0.048417	0.027106	0.025697	0.038754	0.045355	0.043087
15	0.030851	0.025911	0.046039	0.046039	0.025731	0.023757	0.033332	0.040846	0.020784	0.019228	0.060197	0.022738	0.024421
16	0.038298	0.024790	0.044060	0.044060	0.032993	0.023980	0.024239	0.044622	0.015559	0.015792	0.045168	0.021398	0.021618
17	0.022340	0.021468	0.044654	0.044654	0.030141	0.022019	0.028259	0.039990	0.014613	0.013489	0.042355	0.016323	0.016864
18	0.014894	0.016734	0.042873	0.042873	0.033912	0.019753	0.031018	0.042040	0.012493	0.013534	0.027663	0.018962	0.023545
19	0.018085	0.014990	0.034364	0.034364	0.039077	0.013221	0.026772	0.050535	0.009275	0.009828	0.051312	0.027895	0.032228
20	0.013830	0.011170	0.026779	0.026779	0.022574	0.008240	0.013980	0.040722	0.009029	0.009369	0.078902	0.020789	0.024374
21	0.003191	0.007308	0.018139	0.018139	0.017918	0.004294	0.012859	0.025282	0.004770	0.004506	0.035433	0.015836	0.018389
22	0.007447	0.005606	0.019656	0.019656	0.015873	0.001857	0.010981	0.016347	0.004543	0.004678	0.058982	0.011288	0.012671
23	0.005319	0.003945	0.014247	0.014247	0.011968	0.002405	0.009202	0.020428	0.002063	0.002323	0.030700	0.010963	0.012375
24	0.005319	0.003779	0.013258	0.013258	0.011735	0.000420	0.009873	0.022635	0.002253	0.002388	0.033527	0.010313	0.011774
25	0.005319	0.002782	0.012268	0.012268	0.008795	0.000749	0.004891	0.013931	0.001230	0.001414	0.035078	0.007065	0.008079
26	0.003191	0.002325	0.006992	0.006992	0.007540	0.000103	0.005571	0.010624	0.001136	0.001073	0.020622	0.005116	0.006273
27	0.004255	0.001744	0.005277	0.005277	0.004518	0.000147	0.004886	0.008302	0.000852	0.000713	0.019902	0.003330	0.003870
28	0.004255	0.001329	0.004221	0.004221	0.003881	0.000115	0.006055	0.010307	0.000965	0.000730	0.013178	0.003289	0.003640
29	0.001064	0.000997	0.003628	0.003628	0.005366	0.000132	0.006055	0.011368	0.000738	0.000653	0.019856	0.003533	0.003493
30	0.015957	0.010091	0.020315	0.020315	0.017635	0.000143	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Bexar County Mid-Year 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.060068	0.087952	0.074745	0.074745	0.055916	0.055916	0.055916	0.058180	0.112341	0.108951	0.058180	0.083482	0.068825
1	0.060618	0.087490	0.064050	0.064050	0.056272	0.056177	0.056259	0.058179	0.104240	0.103650	0.058578	0.065901	0.059543
2	0.059868	0.074908	0.050696	0.050696	0.053703	0.053595	0.053754	0.056574	0.107439	0.111268	0.057461	0.061272	0.047903
3	0.065320	0.077364	0.049685	0.049685	0.055079	0.054952	0.055275	0.057472	0.086920	0.085755	0.058467	0.062571	0.060675
4	0.059968	0.080774	0.047034	0.047034	0.057299	0.057046	0.057596	0.058908	0.102726	0.102451	0.060375	0.087218	0.071965
5	0.057217	0.068666	0.049685	0.049685	0.053587	0.052974	0.053667	0.055701	0.059531	0.056032	0.058115	0.062287	0.057263
6	0.056117	0.064553	0.041997	0.041997	0.072106	0.081694	0.076767	0.028881	0.048401	0.050813	0.016156	0.052745	0.058116
7	0.047614	0.054731	0.036759	0.036759	0.067500	0.078131	0.068119	0.029440	0.070736	0.071436	0.016327	0.053922	0.060032
8	0.037711	0.043723	0.036308	0.036308	0.057694	0.063477	0.064077	0.034826	0.047359	0.048826	0.016279	0.026149	0.030871
9	0.026808	0.039508	0.033622	0.033622	0.052840	0.062167	0.059003	0.030340	0.016241	0.017043	0.014941	0.016363	0.019997
10	0.057817	0.031457	0.024323	0.024323	0.032885	0.045715	0.032079	0.026323	0.015976	0.016190	0.018033	0.025621	0.027428
11	0.056767	0.043483	0.043735	0.043735	0.027950	0.047838	0.031525	0.025805	0.040280	0.041381	0.009215	0.023063	0.024805
12	0.066720	0.041999	0.046411	0.046411	0.024205	0.037017	0.031373	0.018806	0.026784	0.027061	0.017221	0.073291	0.078722
13	0.056567	0.034748	0.042572	0.042572	0.025189	0.045712	0.027598	0.013446	0.029529	0.030204	0.002852	0.048887	0.050902
14	0.042663	0.031684	0.039419	0.039419	0.027435	0.042348	0.033477	0.024021	0.027106	0.025697	0.004971	0.045355	0.043087
15	0.029909	0.026961	0.044206	0.044206	0.026908	0.037037	0.032845	0.019936	0.020784	0.019228	0.018594	0.022738	0.024421
16	0.034860	0.023441	0.043360	0.043360	0.026714	0.024469	0.027413	0.055915	0.015559	0.015792	0.031004	0.021398	0.021618
17	0.027058	0.019385	0.041320	0.041320	0.032058	0.020412	0.025303	0.044760	0.014613	0.013489	0.041292	0.016323	0.016864
18	0.017355	0.015473	0.038253	0.038253	0.018731	0.014509	0.021163	0.037012	0.012493	0.013534	0.031647	0.018962	0.023545
19	0.013404	0.012612	0.028483	0.028483	0.017689	0.014544	0.022359	0.030639	0.009275	0.009828	0.048417	0.027895	0.032228
20	0.013054	0.009538	0.023004	0.023004	0.022068	0.014159	0.015781	0.032824	0.009029	0.009369	0.035754	0.020789	0.024374
21	0.007652	0.006340	0.016482	0.016482	0.019618	0.012516	0.017856	0.028859	0.004770	0.004506	0.033019	0.015836	0.018389
22	0.005952	0.004879	0.016352	0.016352	0.021770	0.011016	0.019305	0.030050	0.004543	0.004678	0.021400	0.011288	0.012671
23	0.005602	0.003204	0.011063	0.011063	0.024396	0.007096	0.016162	0.035423	0.002063	0.002323	0.039074	0.010963	0.012375
24	0.003501	0.002859	0.010819	0.010819	0.013900	0.004343	0.008313	0.028262	0.002253	0.002388	0.059603	0.010313	0.011774
25	0.003651	0.001953	0.009633	0.009633	0.010880	0.002220	0.007530	0.017378	0.001230	0.001414	0.026560	0.007065	0.008079
26	0.002501	0.001465	0.006325	0.006325	0.009369	0.000923	0.006234	0.011017	0.001136	0.001073	0.043513	0.005116	0.006273
27	0.002351	0.001084	0.004666	0.004666	0.006966	0.001173	0.005145	0.013629	0.000852	0.000713	0.022466	0.003330	0.003870
28	0.001250	0.000985	0.003315	0.003315	0.006734	0.000201	0.005435	0.014955	0.000965	0.000730	0.024344	0.003289	0.003640
29	0.001450	0.000733	0.002911	0.002911	0.004904	0.000344	0.002609	0.009023	0.000738	0.000653	0.025065	0.003533	0.003493
30	0.018606	0.006047	0.018767	0.018767	0.017635	0.000280	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Comal County Mid-Year 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.061118	0.061300	0.056731	0.056731	0.055916	0.055916	0.055916	0.058180	0.112341	0.108951	0.058180	0.083482	0.068825
1	0.063106	0.086097	0.064292	0.064292	0.056272	0.056177	0.056259	0.058179	0.104240	0.103650	0.058578	0.065901	0.059543
2	0.059627	0.088576	0.060267	0.060267	0.053703	0.053595	0.053754	0.056574	0.107439	0.111268	0.057461	0.061272	0.047903
3	0.062857	0.085080	0.059668	0.059668	0.055079	0.054952	0.055275	0.057472	0.086920	0.085755	0.058467	0.062571	0.060675
4	0.058137	0.086860	0.056867	0.056867	0.057299	0.057046	0.057596	0.058908	0.102726	0.102451	0.060375	0.087218	0.071965
5	0.060870	0.073449	0.057085	0.057085	0.053587	0.052974	0.053667	0.055701	0.059531	0.056032	0.058115	0.062287	0.057263
6	0.049441	0.070621	0.050204	0.050204	0.072106	0.081694	0.076767	0.028881	0.048401	0.050813	0.016156	0.052745	0.058116
7	0.045714	0.058419	0.043024	0.043024	0.067500	0.078131	0.068119	0.029440	0.070736	0.071436	0.016327	0.053922	0.060032
8	0.033043	0.044373	0.039869	0.039869	0.057694	0.063477	0.064077	0.034826	0.047359	0.048826	0.016279	0.026149	0.030871
9	0.026584	0.038600	0.037748	0.037748	0.052840	0.062167	0.059003	0.030340	0.016241	0.017043	0.014941	0.016363	0.019997
10	0.050932	0.029734	0.025102	0.025102	0.032885	0.045715	0.032079	0.026323	0.015976	0.016190	0.018033	0.025621	0.027428
11	0.054410	0.040750	0.040957	0.040957	0.027950	0.047838	0.031525	0.025805	0.040280	0.041381	0.009215	0.023063	0.024805
12	0.059627	0.038197	0.044357	0.044357	0.024205	0.037017	0.031373	0.018806	0.026784	0.027061	0.017221	0.073291	0.078722
13	0.051677	0.032774	0.043187	0.043187	0.025189	0.045712	0.027598	0.013446	0.029529	0.030204	0.002852	0.048887	0.050902
14	0.041988	0.028643	0.035708	0.035708	0.027435	0.042348	0.033477	0.024021	0.027106	0.025697	0.004971	0.045355	0.043087
15	0.033789	0.024681	0.041202	0.041202	0.026908	0.037037	0.032845	0.019936	0.020784	0.019228	0.018594	0.022738	0.024421
16	0.040994	0.022033	0.037857	0.037857	0.026714	0.024469	0.027413	0.055915	0.015559	0.015792	0.031004	0.021398	0.021618
17	0.027826	0.018410	0.035600	0.035600	0.032058	0.020412	0.025303	0.044760	0.014613	0.013489	0.041292	0.016323	0.016864
18	0.018634	0.013887	0.032962	0.032962	0.018731	0.014509	0.021163	0.037012	0.012493	0.013534	0.031647	0.018962	0.023545
19	0.018385	0.012150	0.027359	0.027359	0.017689	0.014544	0.022359	0.030639	0.009275	0.009828	0.048417	0.027895	0.032228
20	0.014161	0.009502	0.021131	0.021131	0.022068	0.014159	0.015781	0.032824	0.009029	0.009369	0.035754	0.020789	0.024374
21	0.007205	0.006652	0.012973	0.012973	0.019618	0.012516	0.017856	0.028859	0.004770	0.004506	0.033019	0.015836	0.018389
22	0.008199	0.004926	0.016644	0.016644	0.021770	0.011016	0.019305	0.030050	0.004543	0.004678	0.021400	0.011288	0.012671
23	0.007453	0.003612	0.010416	0.010416	0.024396	0.007096	0.016162	0.035423	0.002063	0.002323	0.039074	0.010963	0.012375
24	0.007453	0.002839	0.008567	0.008567	0.013900	0.004343	0.008313	0.028262	0.002253	0.002388	0.059603	0.010313	0.011774
25	0.003727	0.002256	0.007588	0.007588	0.010880	0.002220	0.007530	0.017378	0.001230	0.001414	0.026560	0.007065	0.008079
26	0.003975	0.001610	0.005575	0.005575	0.009369	0.000923	0.006234	0.011017	0.001136	0.001073	0.043513	0.005116	0.006273
27	0.003478	0.001261	0.003943	0.003943	0.006966	0.001173	0.005145	0.013629	0.000852	0.000713	0.022466	0.003330	0.003870
28	0.001739	0.001229	0.002937	0.002937	0.006734	0.000201	0.005435	0.014955	0.000965	0.000730	0.024344	0.003289	0.003640
29	0.001739	0.000985	0.001904	0.001904	0.004904	0.000344	0.002609	0.009023	0.000738	0.000653	0.025065	0.003533	0.003493
30	0.022112	0.010497	0.018276	0.018276	0.017635	0.000280	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Guadalupe County Mid-Year 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.046268	0.054603	0.045823	0.045823	0.055916	0.055916	0.055916	0.058180	0.112341	0.108951	0.058180	0.083482	0.068825
1	0.054036	0.073820	0.057908	0.057908	0.056272	0.056177	0.056259	0.058179	0.104240	0.103650	0.058578	0.065901	0.059543
2	0.059777	0.080155	0.055365	0.055365	0.053703	0.053595	0.053754	0.056574	0.107439	0.111268	0.057461	0.061272	0.047903
3	0.055724	0.082822	0.052651	0.052651	0.055079	0.054952	0.055275	0.057472	0.086920	0.085755	0.058467	0.062571	0.060675
4	0.058426	0.088112	0.052680	0.052680	0.057299	0.057046	0.057596	0.058908	0.102726	0.102451	0.060375	0.087218	0.071965
5	0.067882	0.075009	0.056679	0.056679	0.053587	0.052974	0.053667	0.055701	0.059531	0.056032	0.058115	0.062287	0.057263
6	0.059439	0.071275	0.046166	0.046166	0.072106	0.081694	0.076767	0.028881	0.048401	0.050813	0.016156	0.052745	0.058116
7	0.046268	0.060994	0.038767	0.038767	0.067500	0.078131	0.068119	0.029440	0.070736	0.071436	0.016327	0.053922	0.060032
8	0.039176	0.047479	0.039138	0.039138	0.057694	0.063477	0.064077	0.034826	0.047359	0.048826	0.016279	0.026149	0.030871
9	0.035461	0.040522	0.033625	0.033625	0.052840	0.062167	0.059003	0.030340	0.016241	0.017043	0.014941	0.016363	0.019997
10	0.055049	0.032575	0.024854	0.024854	0.032885	0.045715	0.032079	0.026323	0.015976	0.016190	0.018033	0.025621	0.027428
11	0.057413	0.044167	0.040795	0.040795	0.027950	0.047838	0.031525	0.025805	0.040280	0.041381	0.009215	0.023063	0.024805
12	0.067545	0.041844	0.043309	0.043309	0.024205	0.037017	0.031373	0.018806	0.026784	0.027061	0.017221	0.073291	0.078722
13	0.055387	0.035965	0.043681	0.043681	0.025189	0.045712	0.027598	0.013446	0.029529	0.030204	0.002852	0.048887	0.050902
14	0.037825	0.031664	0.039196	0.039196	0.027435	0.042348	0.033477	0.024021	0.027106	0.025697	0.004971	0.045355	0.043087
15	0.031408	0.027352	0.045195	0.045195	0.026908	0.037037	0.032845	0.019936	0.020784	0.019228	0.018594	0.022738	0.024421
16	0.044242	0.022784	0.042595	0.042595	0.026714	0.024469	0.027413	0.055915	0.015559	0.015792	0.031004	0.021398	0.021618
17	0.025667	0.019227	0.040110	0.040110	0.032058	0.020412	0.025303	0.044760	0.014613	0.013489	0.041292	0.016323	0.016864
18	0.022965	0.015471	0.038681	0.038681	0.018731	0.014509	0.021163	0.037012	0.012493	0.013534	0.031647	0.018962	0.023545
19	0.013847	0.012337	0.029168	0.029168	0.017689	0.014544	0.022359	0.030639	0.009275	0.009828	0.048417	0.027895	0.032228
20	0.015873	0.009291	0.024711	0.024711	0.022068	0.014159	0.015781	0.032824	0.009029	0.009369	0.035754	0.020789	0.024374
21	0.007768	0.006357	0.016912	0.016912	0.019618	0.012516	0.017856	0.028859	0.004770	0.004506	0.033019	0.015836	0.018389
22	0.007430	0.005001	0.016284	0.016284	0.021770	0.011016	0.019305	0.030050	0.004543	0.004678	0.021400	0.011288	0.012671
23	0.004390	0.003345	0.012399	0.012399	0.024396	0.007096	0.016162	0.035423	0.002063	0.002323	0.039074	0.010963	0.012375
24	0.004728	0.003245	0.011199	0.011199	0.013900	0.004343	0.008313	0.028262	0.002253	0.002388	0.059603	0.010313	0.011774
25	0.004390	0.002034	0.010427	0.010427	0.010880	0.002220	0.007530	0.017378	0.001230	0.001414	0.026560	0.007065	0.008079
26	0.002702	0.001712	0.006999	0.006999	0.009369	0.000923	0.006234	0.011017	0.001136	0.001073	0.043513	0.005116	0.006273
27	0.002364	0.001311	0.005457	0.005457	0.006966	0.001173	0.005145	0.013629	0.000852	0.000713	0.022466	0.003330	0.003870
28	0.002026	0.001267	0.003828	0.003828	0.006734	0.000201	0.005435	0.014955	0.000965	0.000730	0.024344	0.003289	0.003640
29	0.001013	0.000889	0.002743	0.002743	0.004904	0.000344	0.002609	0.009023	0.000738	0.000653	0.025065	0.003533	0.003493
30	0.013509	0.007369	0.022655	0.022655	0.017635	0.000280	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Kendall County Mid-Year 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.057927	0.069055	0.060535	0.060535	0.055916	0.055916	0.055916	0.058180	0.112341	0.108951	0.058180	0.083482	0.068825
1	0.046748	0.086701	0.067960	0.067960	0.056272	0.056177	0.056259	0.058179	0.104240	0.103650	0.058578	0.065901	0.059543
2	0.053862	0.084348	0.058565	0.058565	0.053703	0.053595	0.053754	0.056574	0.107439	0.111268	0.057461	0.061272	0.047903
3	0.065041	0.086760	0.053489	0.053489	0.055079	0.054952	0.055275	0.057472	0.086920	0.085755	0.058467	0.062571	0.060675
4	0.082317	0.091671	0.053792	0.053792	0.057299	0.057046	0.057596	0.058908	0.102726	0.102451	0.060375	0.087218	0.071965
5	0.061992	0.073143	0.060308	0.060308	0.053587	0.052974	0.053667	0.055701	0.059531	0.056032	0.058115	0.062287	0.057263
6	0.061992	0.071878	0.050913	0.050913	0.072106	0.081694	0.076767	0.028881	0.048401	0.050813	0.016156	0.052745	0.058116
7	0.059959	0.055056	0.042731	0.042731	0.067500	0.078131	0.068119	0.029440	0.070736	0.071436	0.016327	0.053922	0.060032
8	0.034553	0.046644	0.038185	0.038185	0.057694	0.063477	0.064077	0.034826	0.047359	0.048826	0.016279	0.026149	0.030871
9	0.023374	0.037557	0.032124	0.032124	0.052840	0.062167	0.059003	0.030340	0.016241	0.017043	0.014941	0.016363	0.019997
10	0.056911	0.027763	0.021820	0.021820	0.032885	0.045715	0.032079	0.026323	0.015976	0.016190	0.018033	0.025621	0.027428
11	0.049797	0.040380	0.042806	0.042806	0.027950	0.047838	0.031525	0.025805	0.040280	0.041381	0.009215	0.023063	0.024805
12	0.039634	0.037910	0.041746	0.041746	0.024205	0.037017	0.031373	0.018806	0.026784	0.027061	0.017221	0.073291	0.078722
13	0.041667	0.031057	0.042352	0.042352	0.025189	0.045712	0.027598	0.013446	0.029529	0.030204	0.002852	0.048887	0.050902
14	0.042683	0.027057	0.035912	0.035912	0.027435	0.042348	0.033477	0.024021	0.027106	0.025697	0.004971	0.045355	0.043087
15	0.025407	0.025381	0.039927	0.039927	0.026908	0.037037	0.032845	0.019936	0.020784	0.019228	0.018594	0.022738	0.024421
16	0.039634	0.019969	0.038488	0.038488	0.026714	0.024469	0.027413	0.055915	0.015559	0.015792	0.031004	0.021398	0.021618
17	0.025407	0.018999	0.038564	0.038564	0.032058	0.020412	0.025303	0.044760	0.014613	0.013489	0.041292	0.016323	0.016864
18	0.020325	0.015176	0.032578	0.032578	0.018731	0.014509	0.021163	0.037012	0.012493	0.013534	0.031647	0.018962	0.023545
19	0.017276	0.010823	0.024547	0.024547	0.017689	0.014544	0.022359	0.030639	0.009275	0.009828	0.048417	0.027895	0.032228
20	0.014228	0.008941	0.022881	0.022881	0.022068	0.014159	0.015781	0.032824	0.009029	0.009369	0.035754	0.020789	0.024374
21	0.008130	0.006147	0.014698	0.014698	0.019618	0.012516	0.017856	0.028859	0.004770	0.004506	0.033019	0.015836	0.018389
22	0.007114	0.004294	0.016138	0.016138	0.021770	0.011016	0.019305	0.030050	0.004543	0.004678	0.021400	0.011288	0.012671
23	0.009146	0.002676	0.011592	0.011592	0.024396	0.007096	0.016162	0.035423	0.002063	0.002323	0.039074	0.010963	0.012375
24	0.007114	0.003000	0.010607	0.010607	0.013900	0.004343	0.008313	0.028262	0.002253	0.002388	0.059603	0.010313	0.011774
25	0.006098	0.001853	0.007198	0.007198	0.010880	0.002220	0.007530	0.017378	0.001230	0.001414	0.026560	0.007065	0.008079
26	0.003049	0.001529	0.006137	0.006137	0.009369	0.000923	0.006234	0.011017	0.001136	0.001073	0.043513	0.005116	0.006273
27	0.003049	0.000971	0.004849	0.004849	0.006966	0.001173	0.005145	0.013629	0.000852	0.000713	0.022466	0.003330	0.003870
28	0.002033	0.001235	0.003712	0.003712	0.006734	0.000201	0.005435	0.014955	0.000965	0.000730	0.024344	0.003289	0.003640
29	0.003049	0.001265	0.002879	0.002879	0.004904	0.000344	0.002609	0.009023	0.000738	0.000653	0.025065	0.003533	0.003493
30	0.030488	0.010764	0.021971	0.021971	0.017635	0.000280	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	0.016255

Wilson County Mid-Year 2023 Age Distribution Inputs to MOVES.

Age	MC	PC	PT	LCT	OBus	TBus	SBus	RT	SUShT	SULhT	MH	CShT	CLhT
0	0.044681	0.054688	0.043929	0.043929	0.055916	0.055916	0.055916	0.058180	0.112341	0.108951	0.058180	0.083482	0.068825
1	0.056383	0.075077	0.058439	0.058439	0.056272	0.056177	0.056259	0.058179	0.104240	0.103650	0.058578	0.065901	0.059543
2	0.057447	0.076987	0.045050	0.045050	0.053703	0.053595	0.053754	0.056574	0.107439	0.111268	0.057461	0.061272	0.047903
3	0.076596	0.081430	0.046105	0.046105	0.055079	0.054952	0.055275	0.057472	0.086920	0.085755	0.058467	0.062571	0.060675
4	0.060638	0.088988	0.047688	0.047688	0.057299	0.057046	0.057596	0.058908	0.102726	0.102451	0.060375	0.087218	0.071965
5	0.063830	0.075367	0.051778	0.051778	0.053587	0.052974	0.053667	0.055701	0.059531	0.056032	0.058115	0.062287	0.057263
6	0.044681	0.069388	0.044324	0.044324	0.072106	0.081694	0.076767	0.028881	0.048401	0.050813	0.016156	0.052745	0.058116
7	0.043617	0.056598	0.038058	0.038058	0.067500	0.078131	0.068119	0.029440	0.070736	0.071436	0.016327	0.053922	0.060032
8	0.031915	0.043933	0.039048	0.039048	0.057694	0.063477	0.064077	0.034826	0.047359	0.048826	0.016279	0.026149	0.030871
9	0.036170	0.036500	0.032122	0.032122	0.052840	0.062167	0.059003	0.030340	0.016241	0.017043	0.014941	0.016363	0.019997
10	0.050000	0.032140	0.025988	0.025988	0.032885	0.045715	0.032079	0.026323	0.015976	0.016190	0.018033	0.025621	0.027428
11	0.059574	0.044099	0.043137	0.043137	0.027950	0.047838	0.031525	0.025805	0.040280	0.041381	0.009215	0.023063	0.024805
12	0.078723	0.042355	0.040762	0.040762	0.024205	0.037017	0.031373	0.018806	0.026784	0.027061	0.017221	0.073291	0.078722
13	0.067021	0.033635	0.047160	0.047160	0.025189	0.045712	0.027598	0.013446	0.029529	0.030204	0.002852	0.048887	0.050902
14	0.035106	0.033843	0.039641	0.039641	0.027435	0.042348	0.033477	0.024021	0.027106	0.025697	0.004971	0.045355	0.043087
15	0.030851	0.025911	0.046039	0.046039	0.026908	0.037037	0.032845	0.019936	0.020784	0.019228	0.018594	0.022738	0.024421
16	0.038298	0.024790	0.044060	0.044060	0.026714	0.024469	0.027413	0.055915	0.015559	0.015792	0.031004	0.021398	0.021618
17	0.022340	0.021468	0.044654	0.044654	0.032058	0.020412	0.025303	0.044760	0.014613	0.013489	0.041292	0.016323	0.016864
18	0.014894	0.016734	0.042873	0.042873	0.018731	0.014509	0.021163	0.037012	0.012493	0.013534	0.031647	0.018962	0.023545
19	0.018085	0.014990	0.034364	0.034364	0.017689	0.014544	0.022359	0.030639	0.009275	0.009828	0.048417	0.027895	0.032228
20	0.013830	0.011170	0.026779	0.026779	0.022068	0.014159	0.015781	0.032824	0.009029	0.009369	0.035754	0.020789	0.024374
21	0.003191	0.007308	0.018139	0.018139	0.019618	0.012516	0.017856	0.028859	0.004770	0.004506	0.033019	0.015836	0.018389
22	0.007447	0.005606	0.019656	0.019656	0.021770	0.011016	0.019305	0.030050	0.004543	0.004678	0.021400	0.011288	0.012671
23	0.005319	0.003945	0.014247	0.014247	0.024396	0.007096	0.016162	0.035423	0.002063	0.002323	0.039074	0.010963	0.012375
24	0.005319	0.003779	0.013258	0.013258	0.013900	0.004343	0.008313	0.028262	0.002253	0.002388	0.059603	0.010313	0.011774
25	0.005319	0.002782	0.012268	0.012268	0.010880	0.002220	0.007530	0.017378	0.001230	0.001414	0.026560	0.007065	0.008079
26	0.003191	0.002325	0.006992	0.006992	0.009369	0.000923	0.006234	0.011017	0.001136	0.001073	0.043513	0.005116	0.006273
27	0.004255	0.001744	0.005277	0.005277	0.006966	0.001173	0.005145	0.013629	0.000852	0.000713	0.022466	0.003330	0.003870
28	0.004255	0.001329	0.004221	0.004221	0.006734	0.000201	0.005435	0.014955	0.000965	0.000730	0.024344	0.003289	0.003640
29	0.001064	0.000997	0.003628	0.003628	0.004904	0.000344	0.002609	0.009023	0.000738	0.000653	0.025065	0.003533	0.003493
30	0.015957	0.010091	0.020315	0.020315	0.017635	0.000280	0.010061	0.013416	0.004089	0.003525	0.031075	0.013034	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.