

TAFT 2019 MODEL VALIDATION

Model & Data Development
February 2025



TAFT 2019 MODEL VALIDATION

- Outlines
 - Performance measures
 - Traffic count comparison, by functional class and by time of day
 - Percentage link vs. absolute %error (freeway and arterials, day)
 - Traffic count comparison, toll road (by time of day)
 - Traffic count comparison, by area type and by time of day
 - Traffic count comparison, by county (Collin, Dallas, Tarrant)
 - Screen line analysis
 - Traffic count comparison on freeway corridors, day
 - Travel time comparison, freeway and arterial, by time of day
 - Transit validation



PERFORMANCE MEASURE STATISTICS

- $\%Error = \frac{\sum_i Model_i - \sum_i Count_i}{\sum_i Count_i} \times 100\%$
- $R = \frac{\sum_{i=1}^n [(Model_i - \overline{Model}) \times (Count_i - \overline{Count})]}{\sqrt{\sum_{i=1}^n (Model_i - \overline{Model})^2 \times \sum_{i=1}^n (Count_i - \overline{Count})^2}}, R^2 = R \times R$
- $\%RMSE = \frac{\sqrt{\frac{\sum_i (Model_i - Count_i)^2}{Number\ of\ counts}}}{\frac{\sum_i Count_i}{Number\ of\ counts}} \times 100\%$
- $MAE = \frac{\sum_i \frac{Absolute(Model_i - Count_i)}{Count_i}}{Number\ of\ counts} \times 100\%$



MODEL VS. COUNT COMPARISONS BY FUNCTIONAL CLASS, DAY

Func1	2019 Day			
	#Observations	%Error	R ²	%RMSE
1	1,292	4%	0.77	21%
2	2,396	4%	0.54	36%
3	4,534	11%	0.45	52%
4	2,348	-10%	0.26	77%
6	317	33%	0.29	101%
7	482	-14%	0.57	72%
All	11,369	5%	0.92	41%



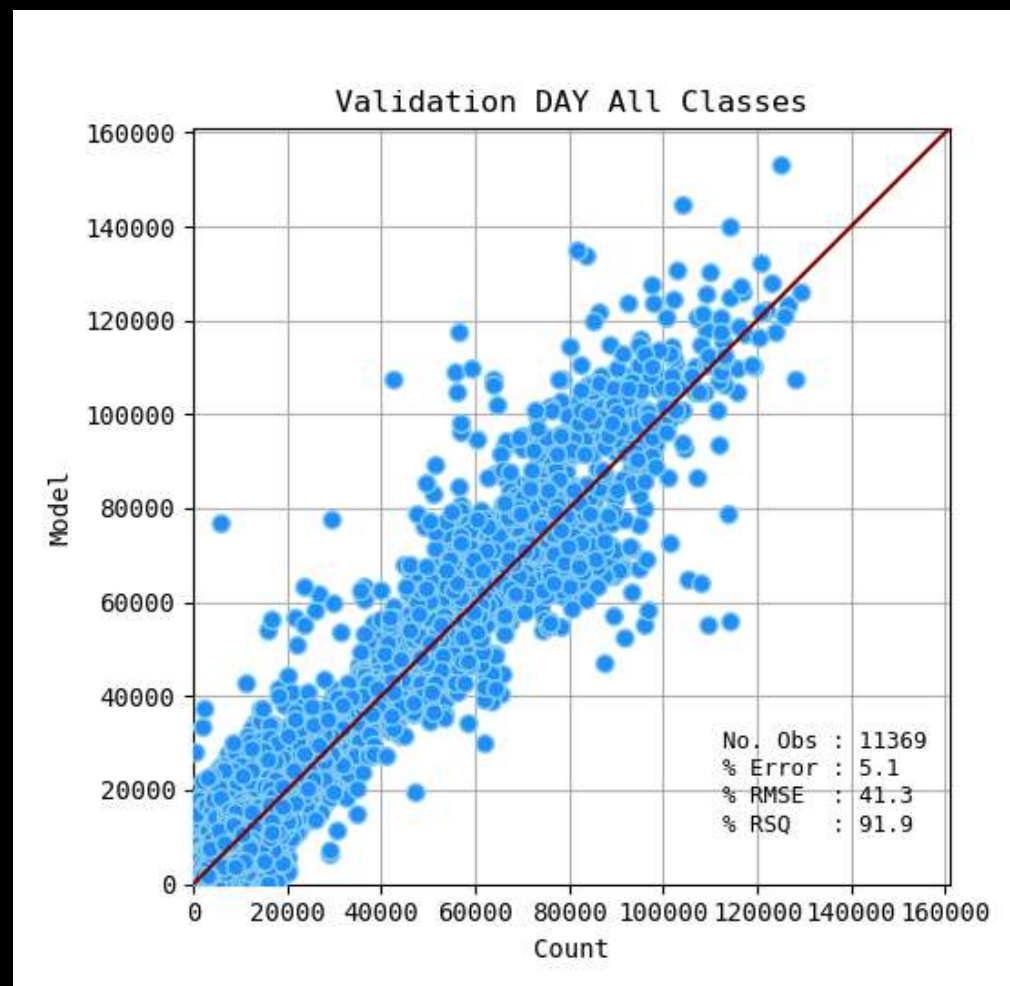
STANDARDS OF VOLUME-OVER-COUNT PERCENT ERROR

Standards	Statistic Acceptable
Freeway volume over count	+/- 7%
Principal arterial volume over count	+/- 10%
Minor arterial volume-over-count	+/- 15%
Collector volume-over-count	+/- 25%
Frontage Road volume-over-count	+/- 25%



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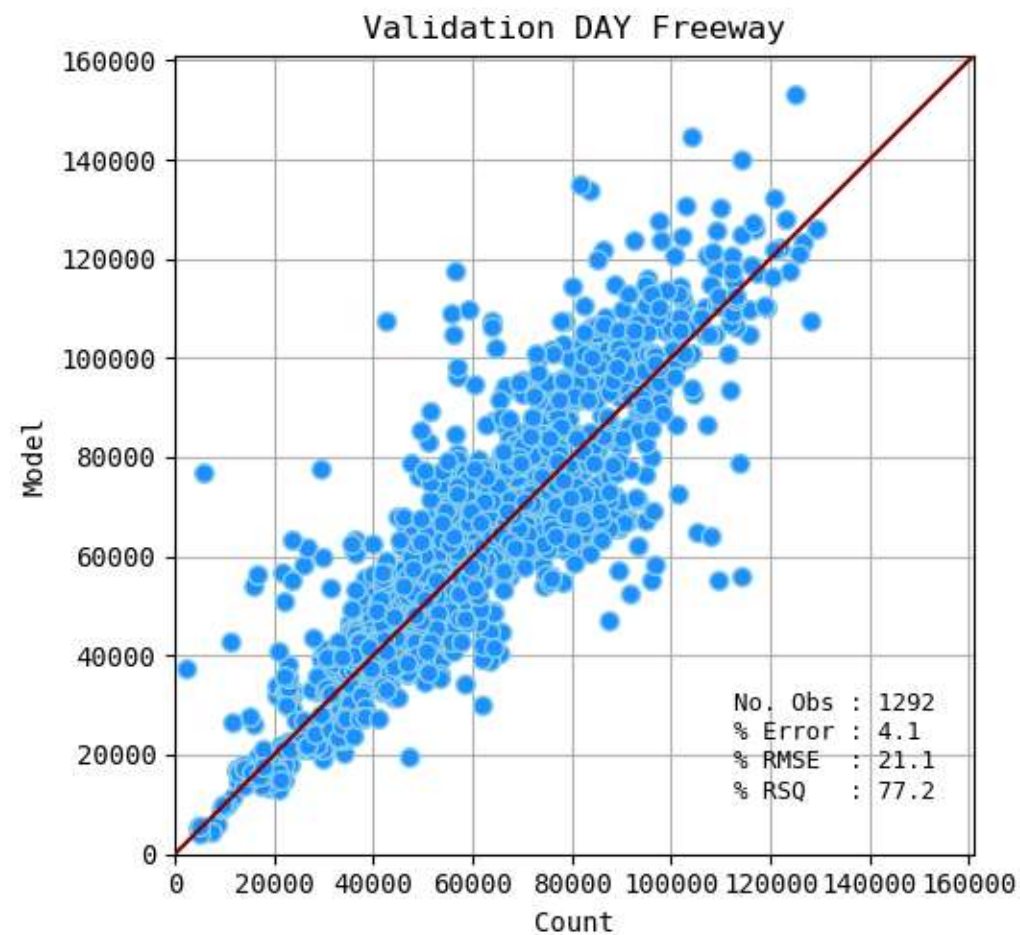
MODEL VS. COUNT COMPARISON ALL LINKS, DAY





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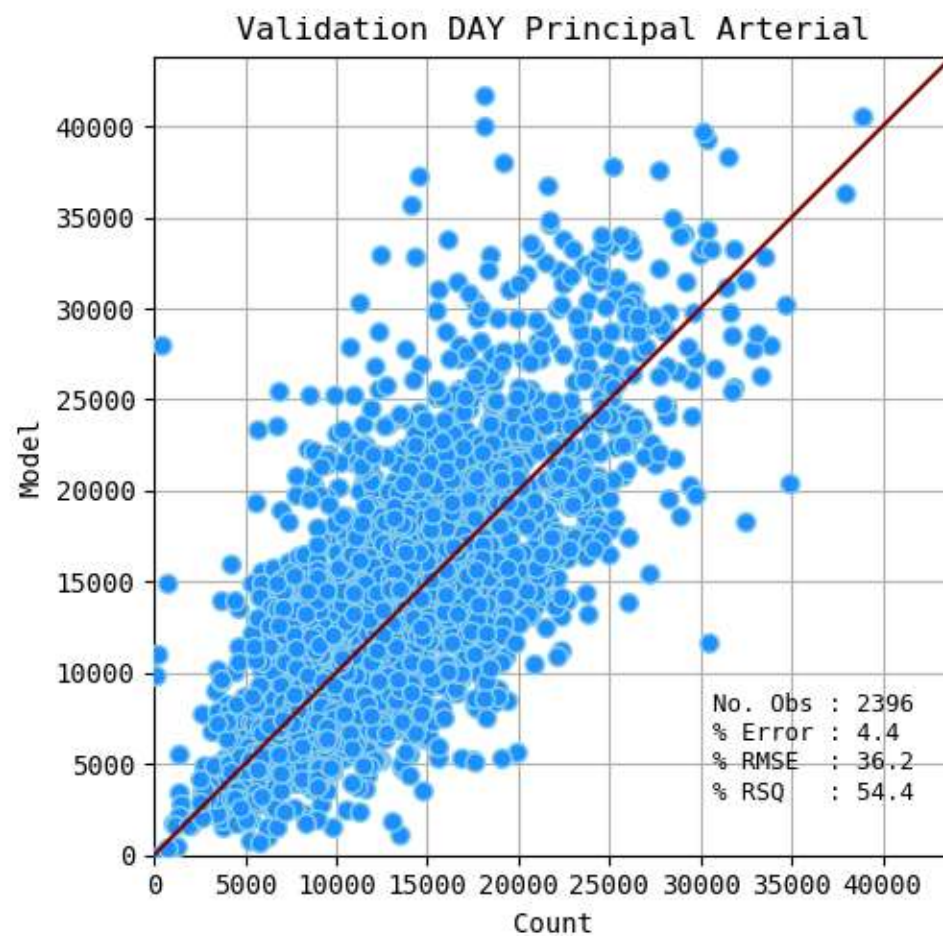
MODEL VS. COUNT COMPARISON FREEWAY, DAY





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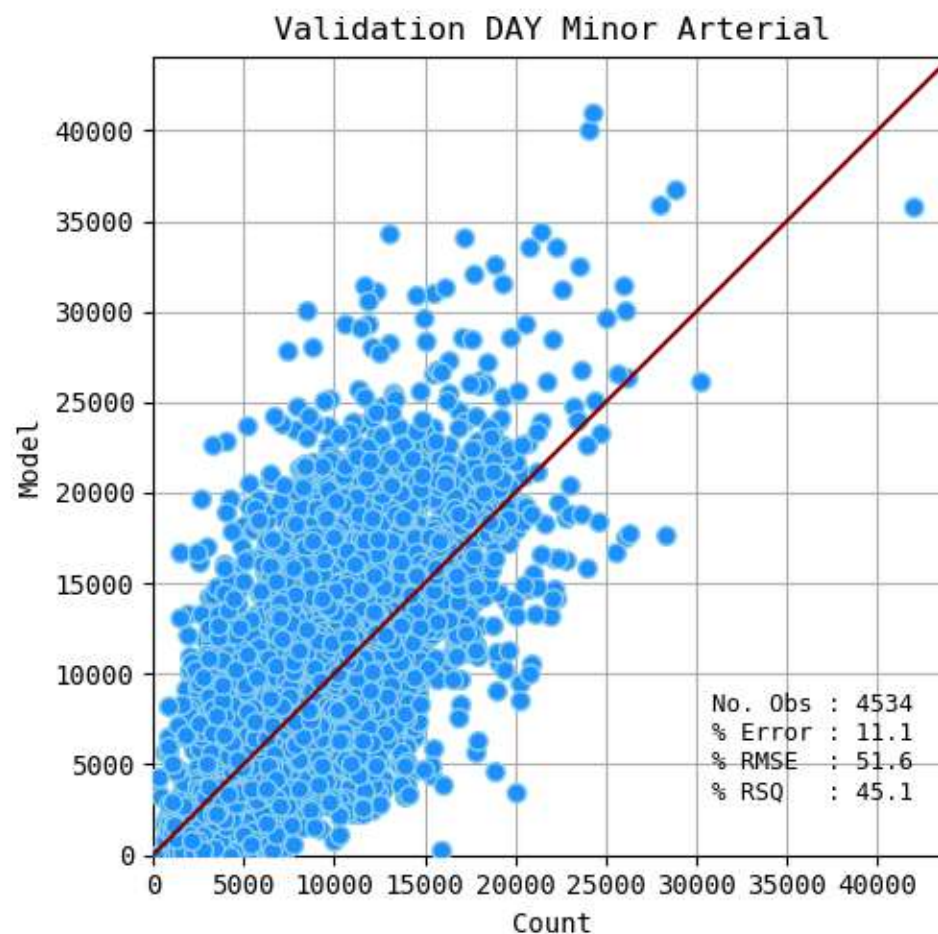
MODEL VS. COUNT COMPARISON PRINCIPAL ARTERIAL, DAY





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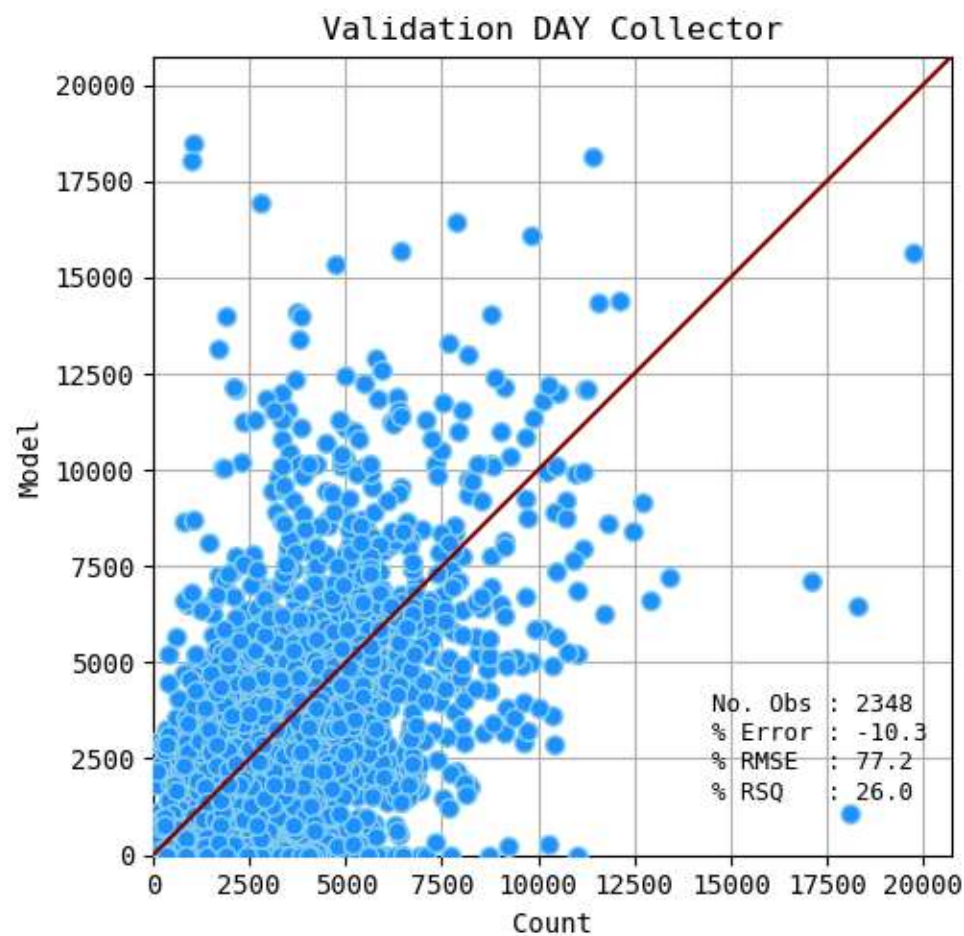
MODEL VS. COUNT COMPARISON MINOR ARTERIAL, DAY





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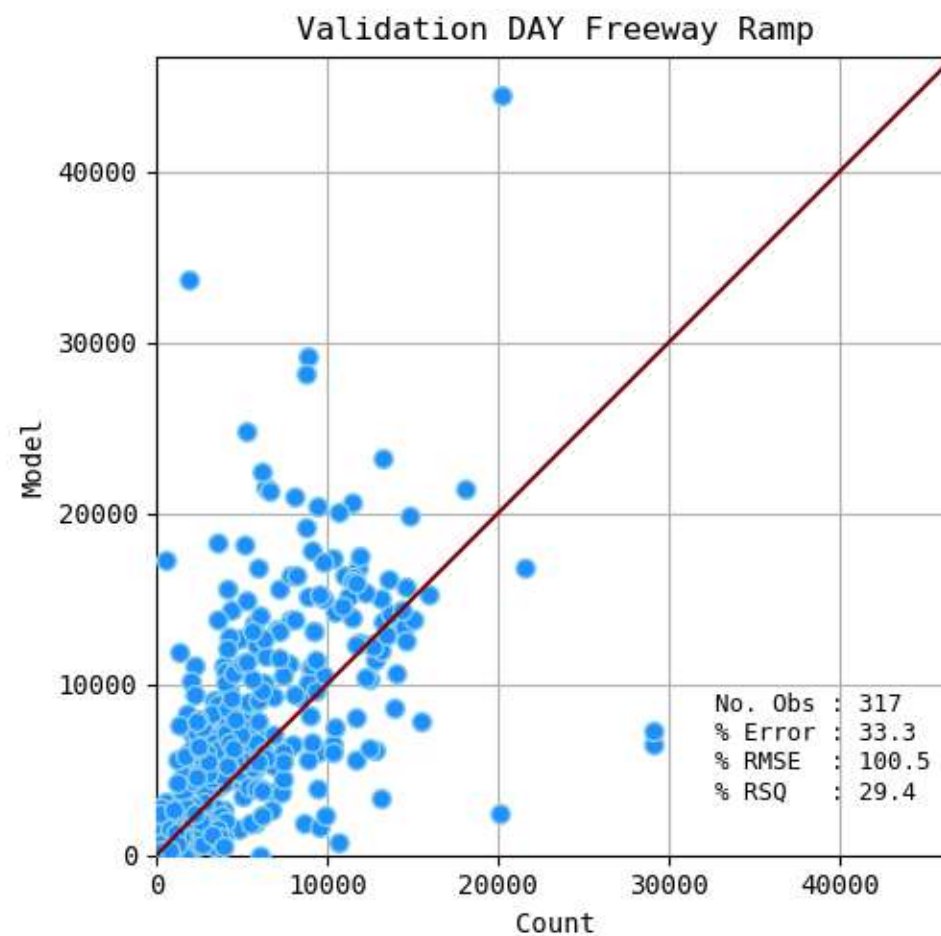
MODEL VS. COUNT COMPARISON COLLECTOR, DAY





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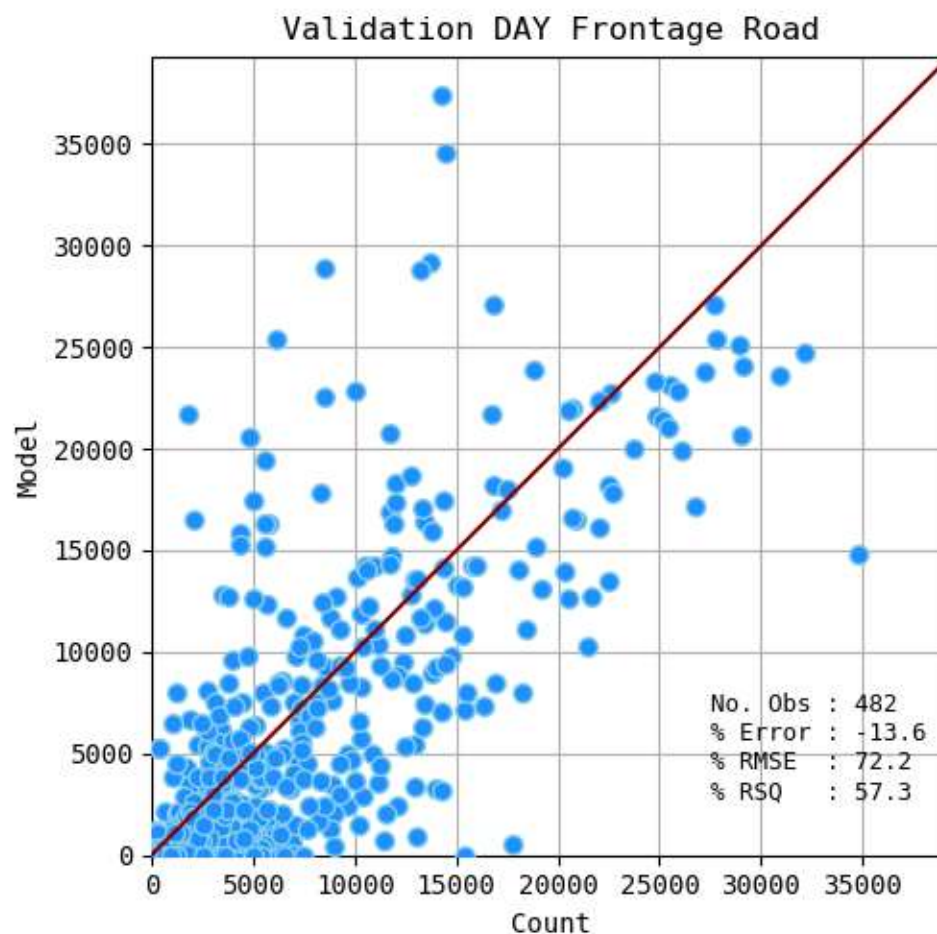
MODEL VS. COUNT COMPARISON FREEWAY RAMPS, DAY





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MODEL VS. COUNT COMPARISON FRONTAGE ROADS, DAY





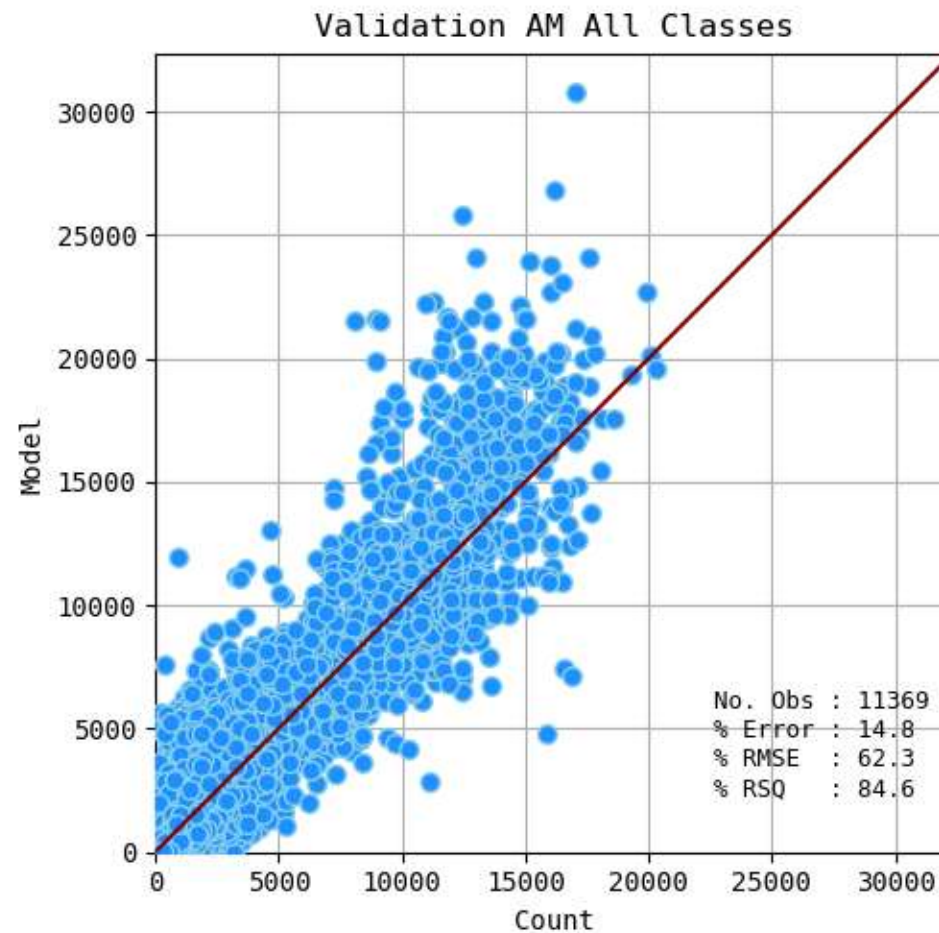
MODEL COMPARISON BY FUNCTIONAL CLASS AM

Func1	2019 AM			
	#Observations	%Error	R ²	%RMSE
1	1,292	11%	0.65	33%
2	2,396	13%	0.53	54%
3	4,534	26%	0.49	77%
4	2,348	3%	0.26	98%
6	317	47%	0.31	115%
7	482	3%	0.51	95%
All	11,369	15%	0.85	62%



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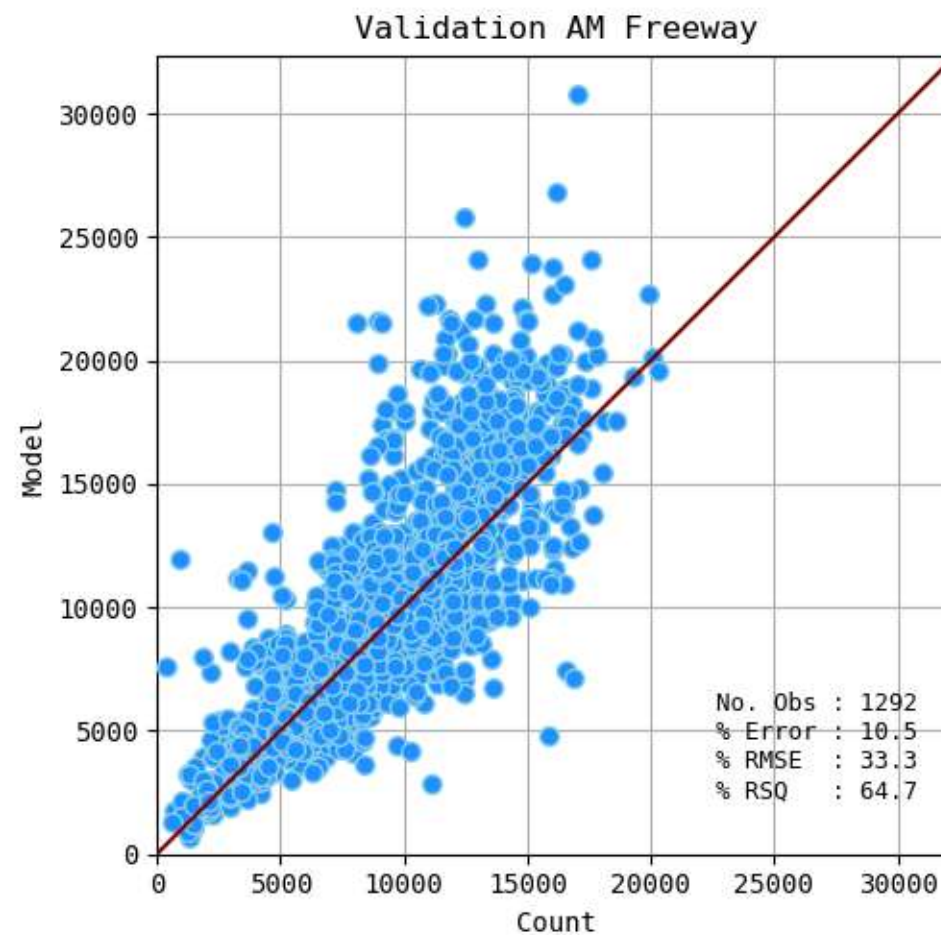
MODEL VS. COUNT COMPARISON ALL LINKS, AM





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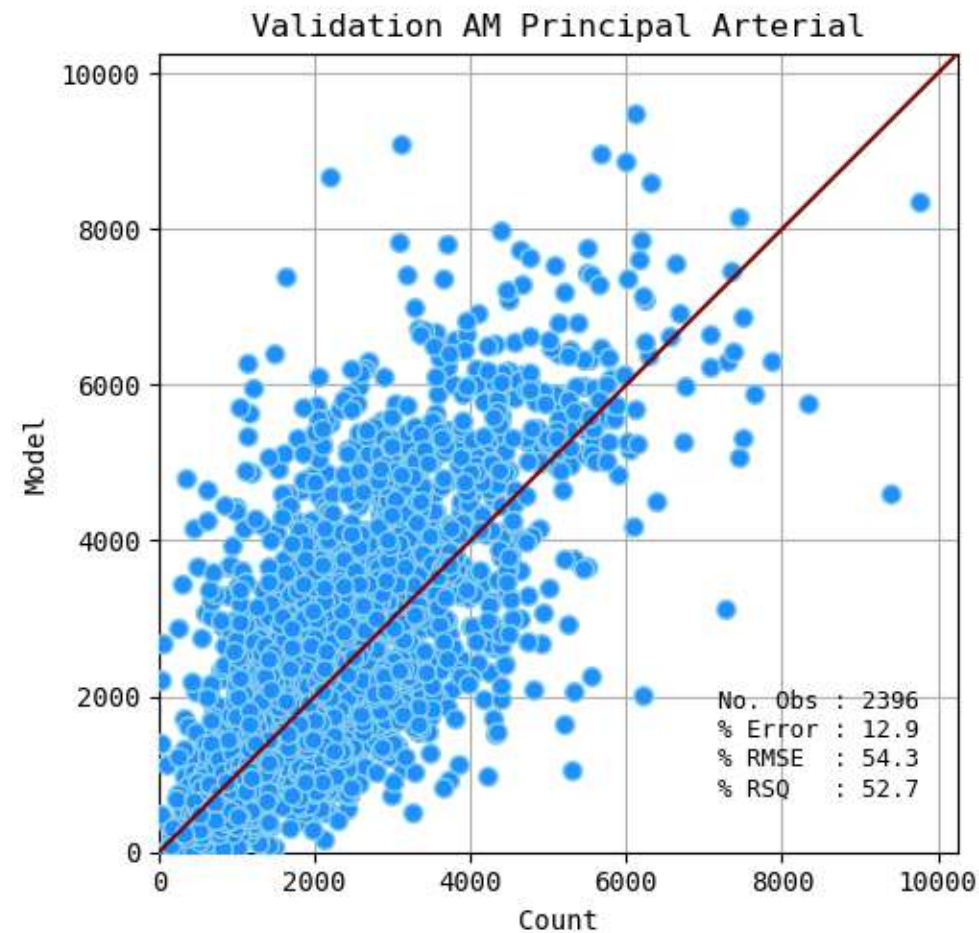
MODEL VS. COUNT COMPARISON FREEWAY, AM





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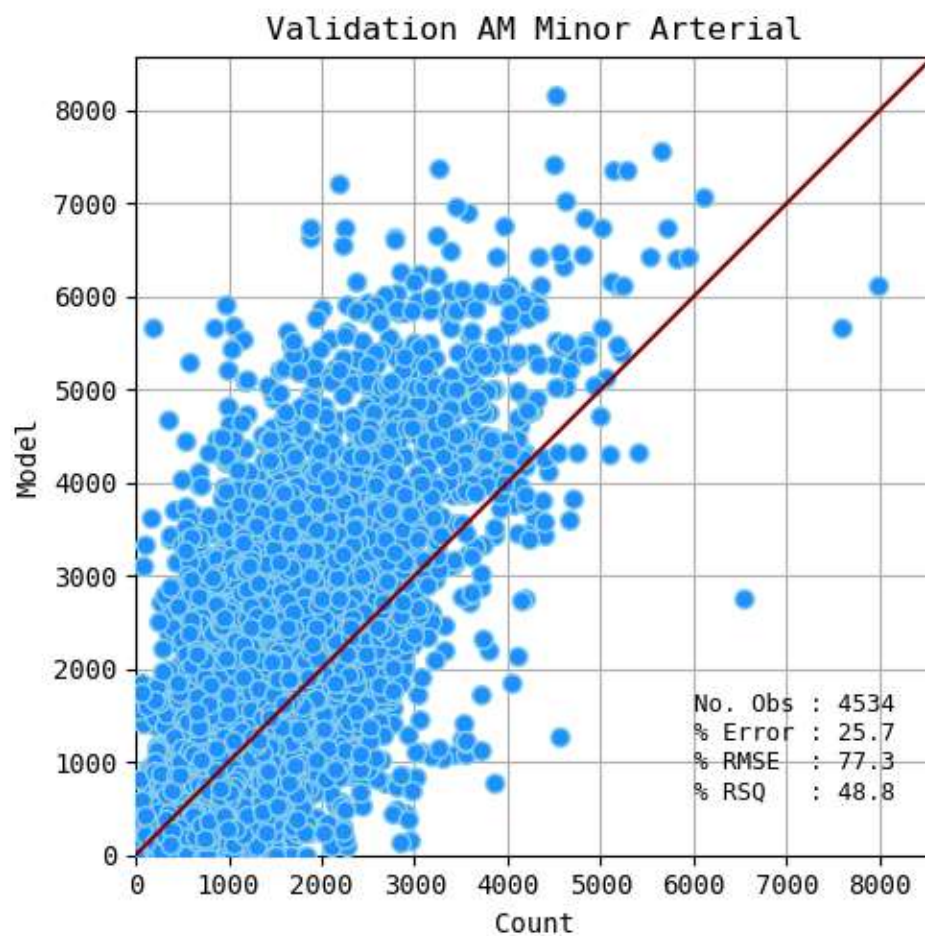
MODEL VS. COUNT COMPARISON PRINCIPAL ARTERIAL, AM





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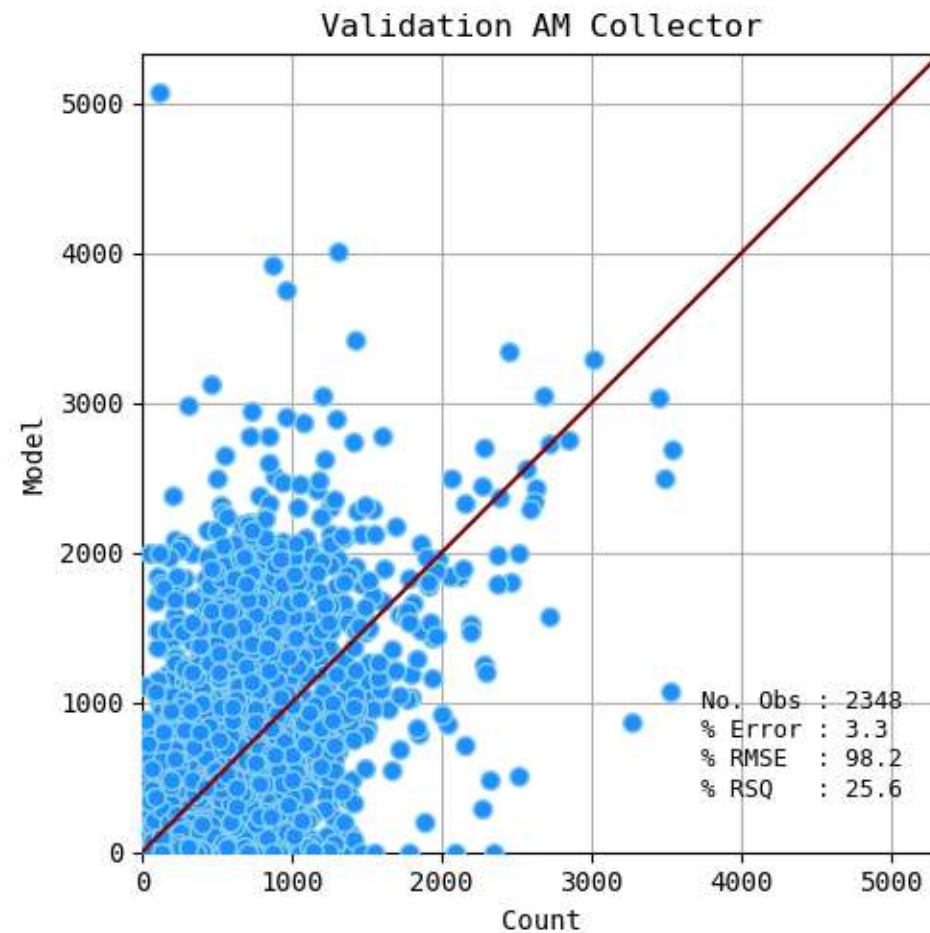
MODEL VS. COUNT COMPARISON MINOR ARTERIAL, AM





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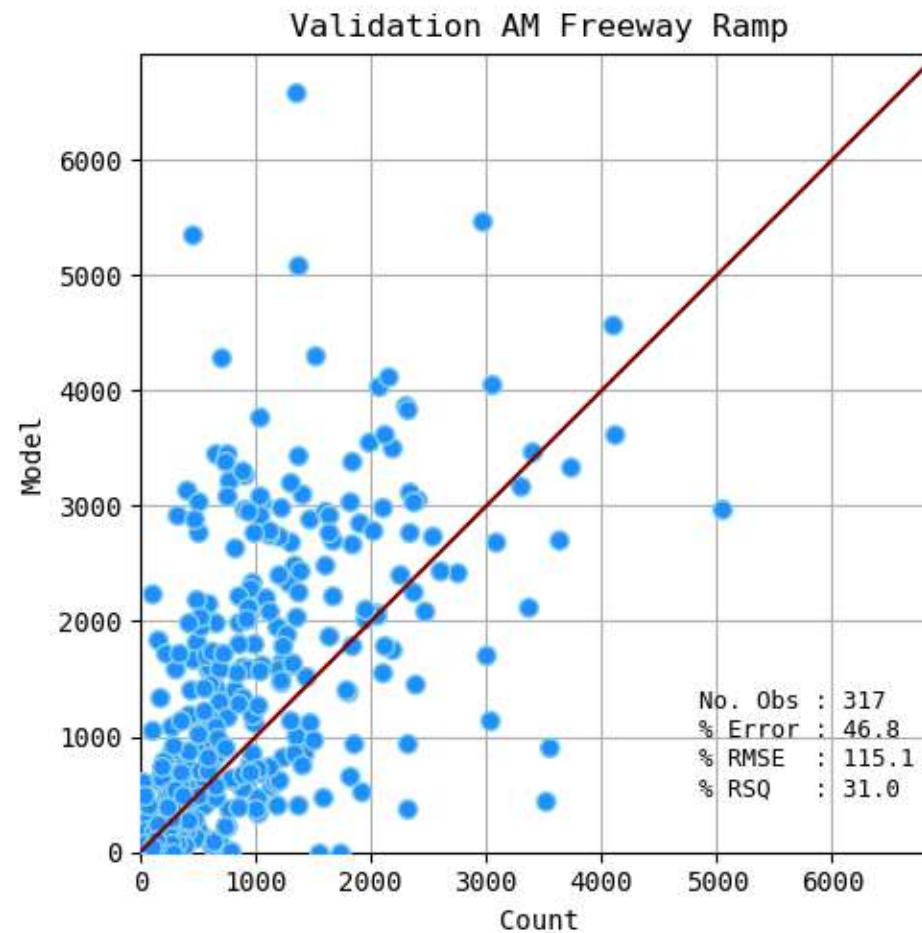
MODEL VS. COUNT COMPARISON COLLECTOR, AM





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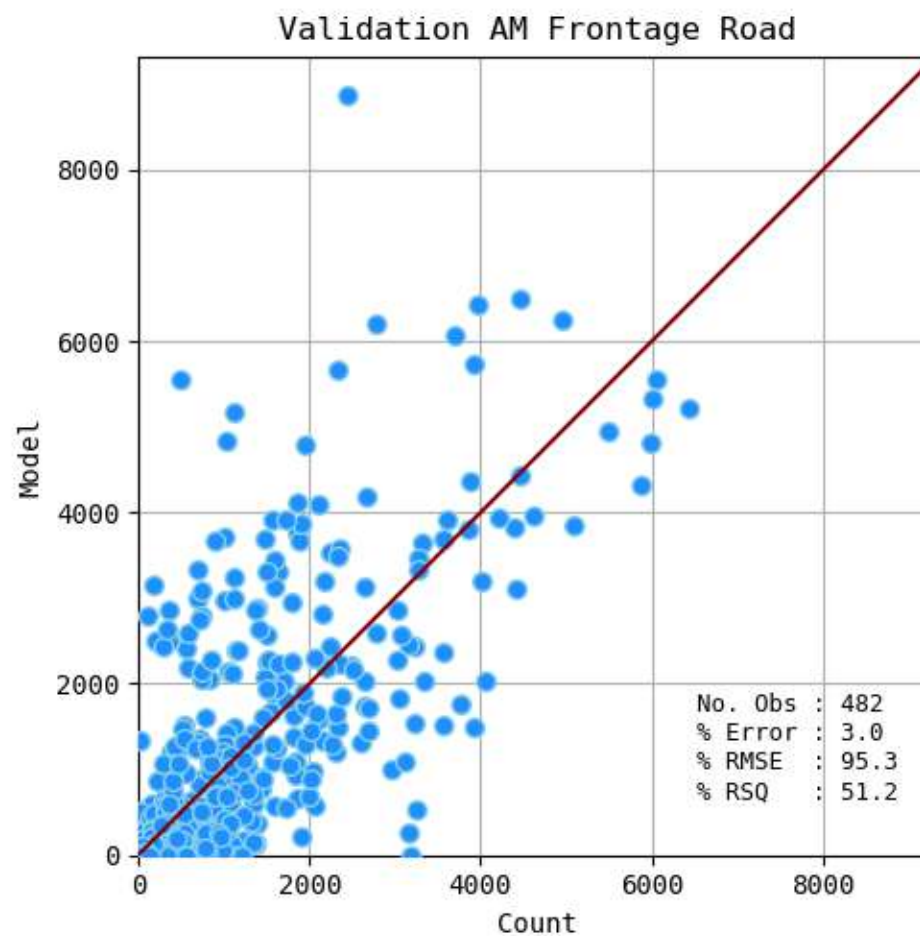
MODEL VS. COUNT COMPARISON FREEWAY RAMPS, AM





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MODEL VS. COUNT COMPARISON FRONTAGE ROADS, AM





MODEL COMPARISON BY FUNCTIONAL CLASS PM

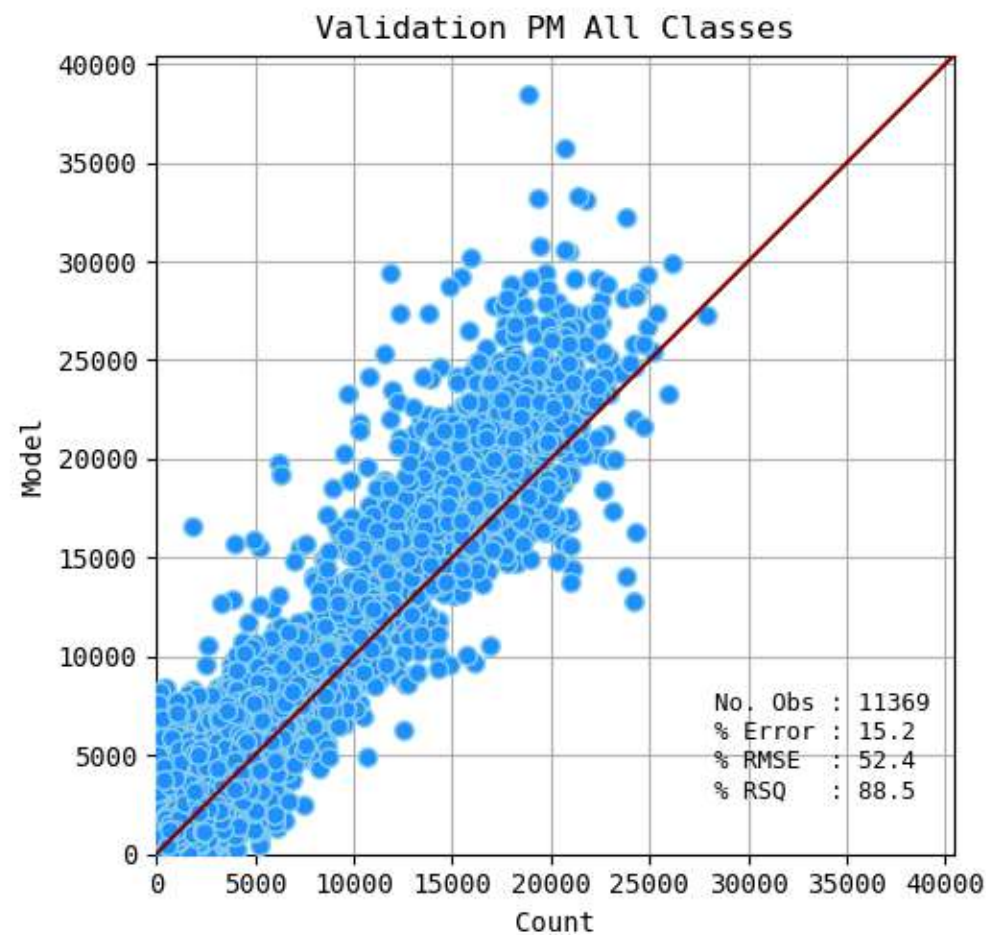
Func1	2019 PM			
	#Observations	%Error	R^2	%RMSE
1	1,292	18%	0.71	31%
2	2,396	11%	0.51	42%
3	4,534	20%	0.45	60%
4	2,348	-5%	0.25	83%
6	317	33%	0.35	93%
7	482	-7%	0.58	72%
All	11,369	15%	0.89	52%





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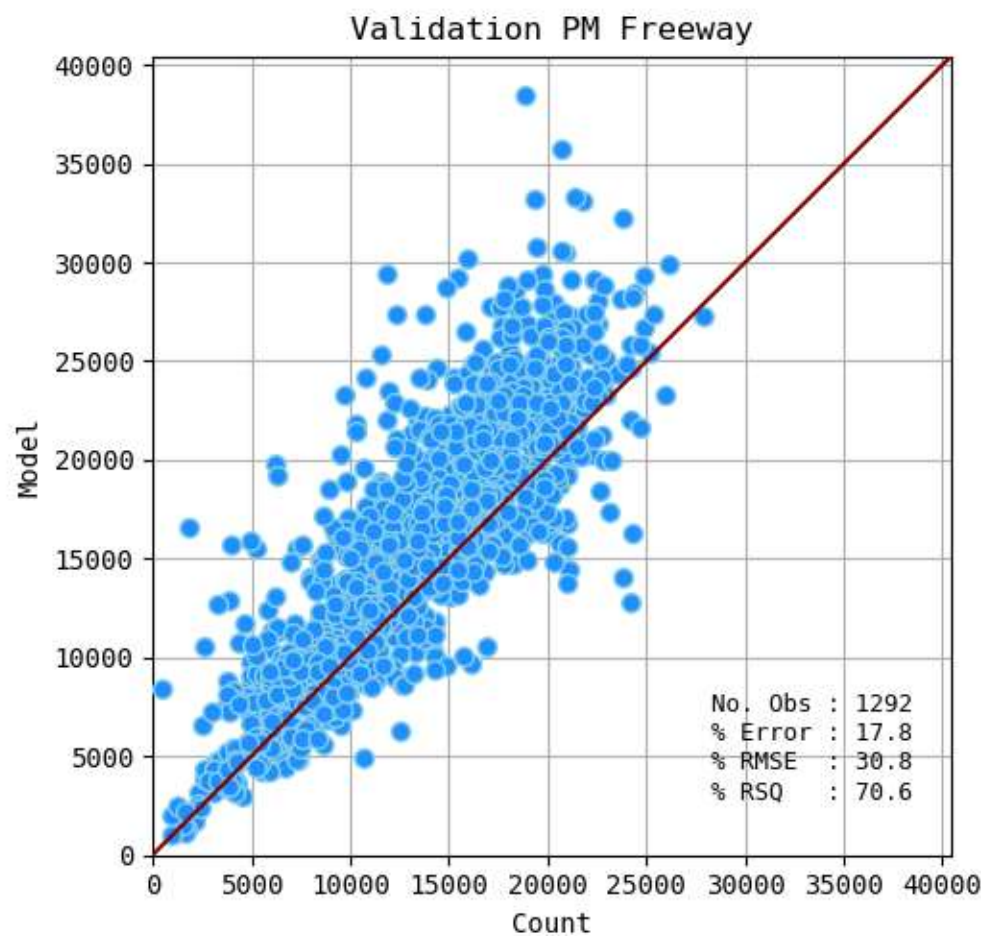
MODEL VS. COUNT COMPARISON ALL LINKS, PM





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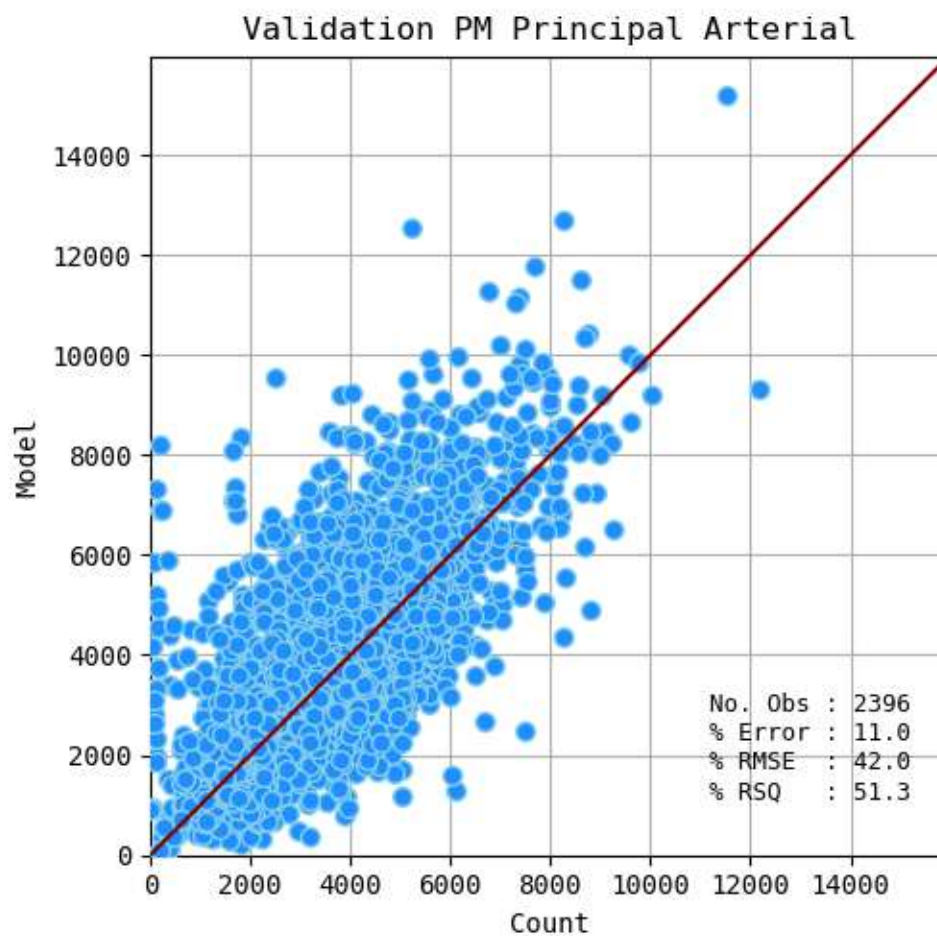
MODEL VS. COUNT COMPARISON FREEWAY, PM





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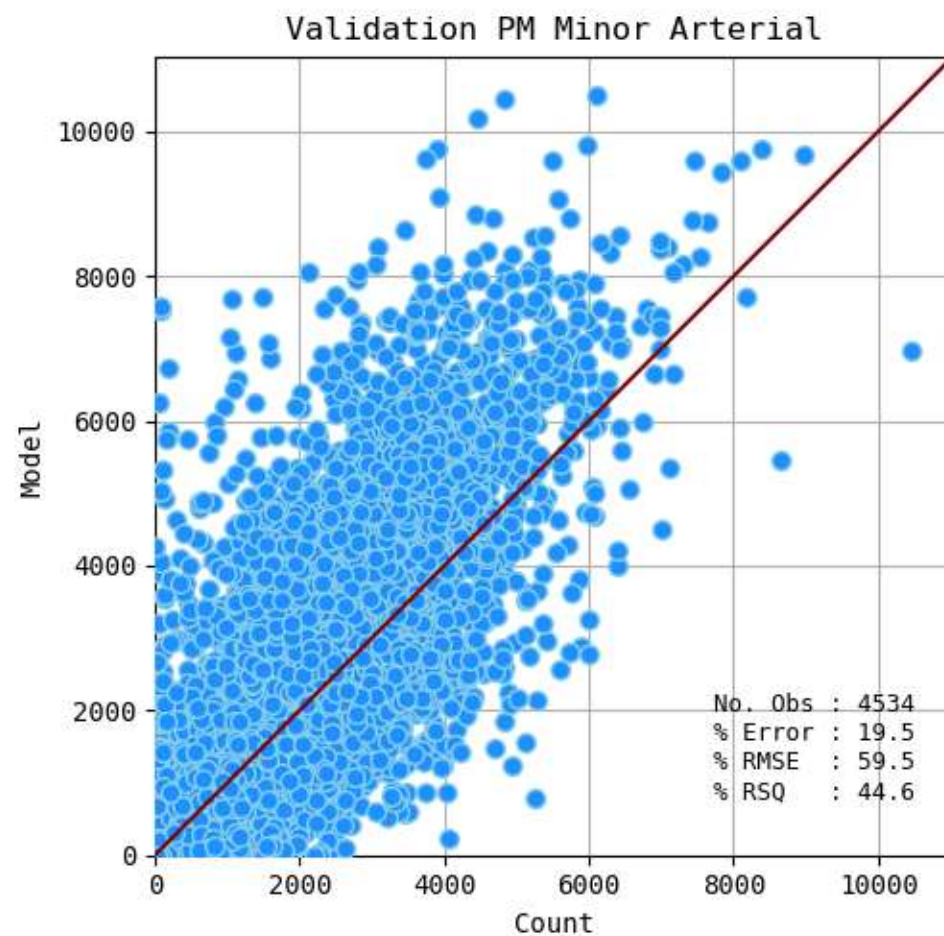
MODEL VS. COUNT COMPARISON PRINCIPAL ARTERIAL, PM





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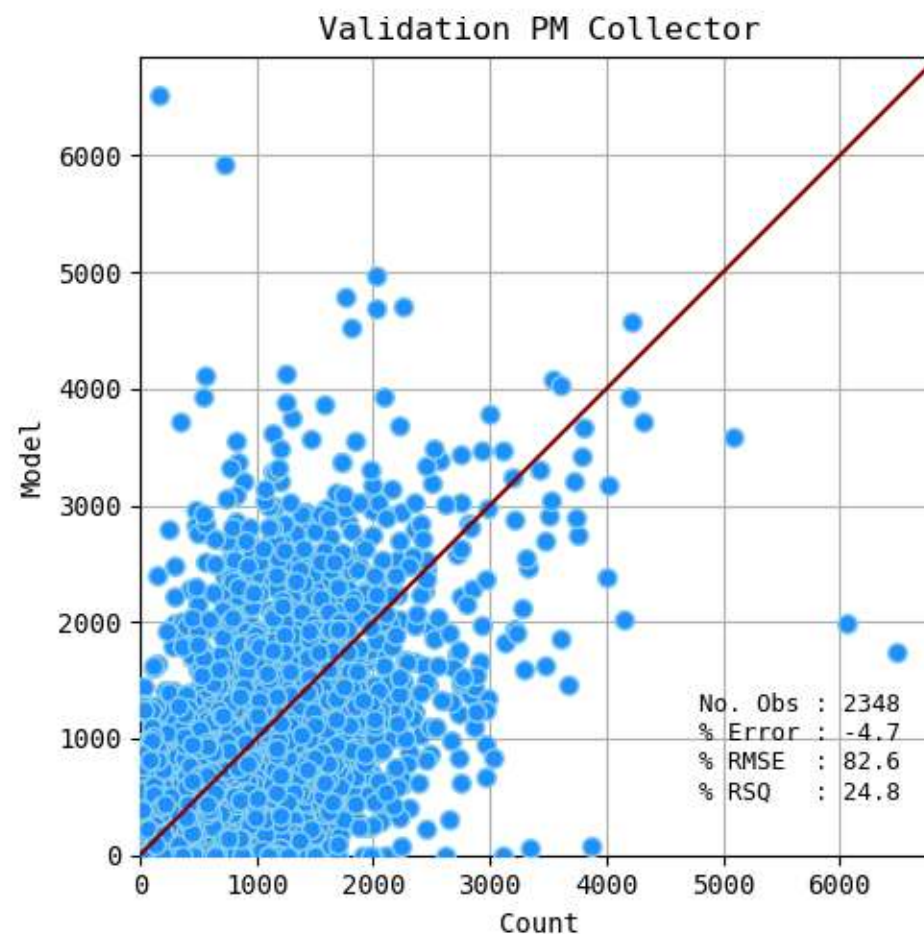
MODEL VS. COUNT COMPARISON MINOR ARTERIAL, PM





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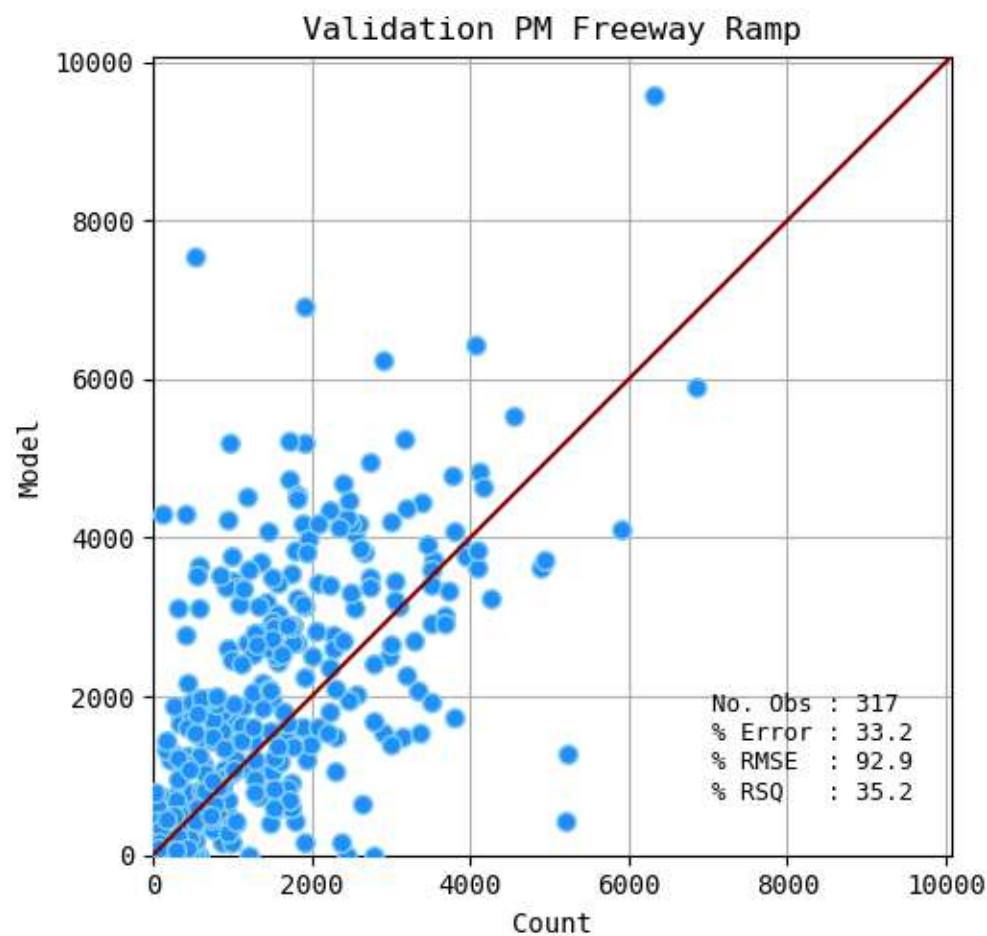
MODEL VS. COUNT COMPARISON COLLECTOR, PM





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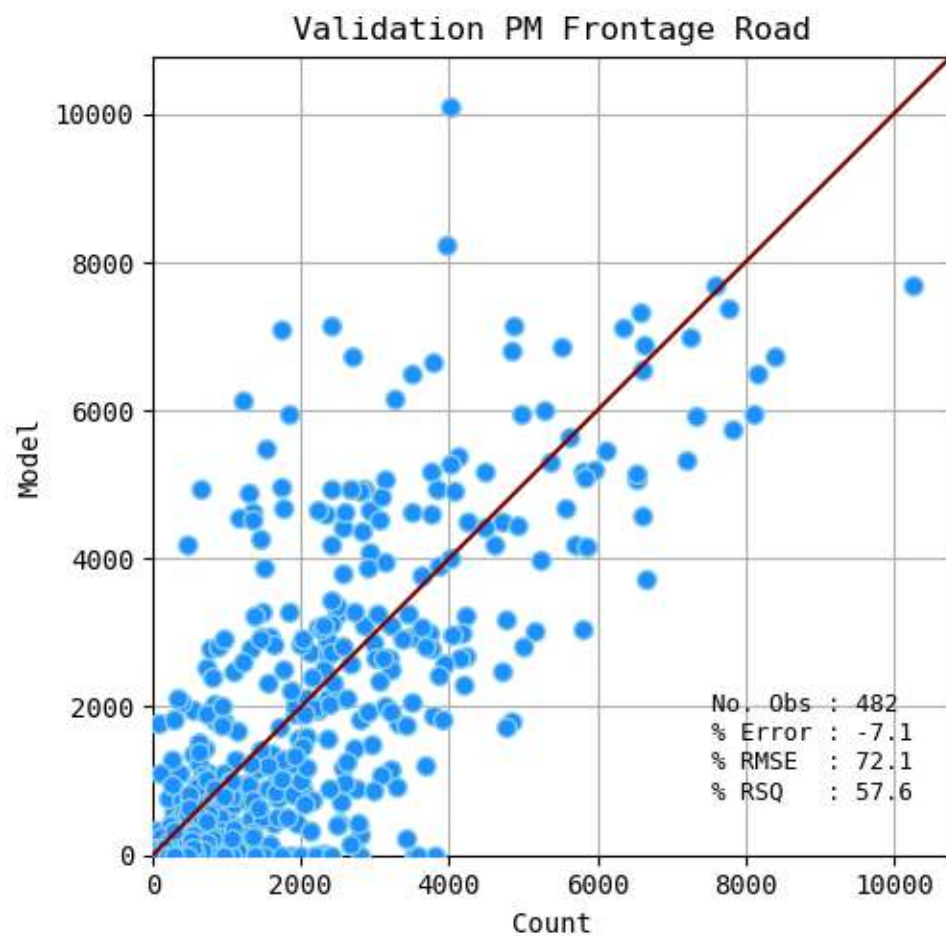
MODEL VS. COUNT COMPARISON FREEWAY RAMPS, PM





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MODEL VS. COUNT COMPARISON FRONTAGE ROADS, PM





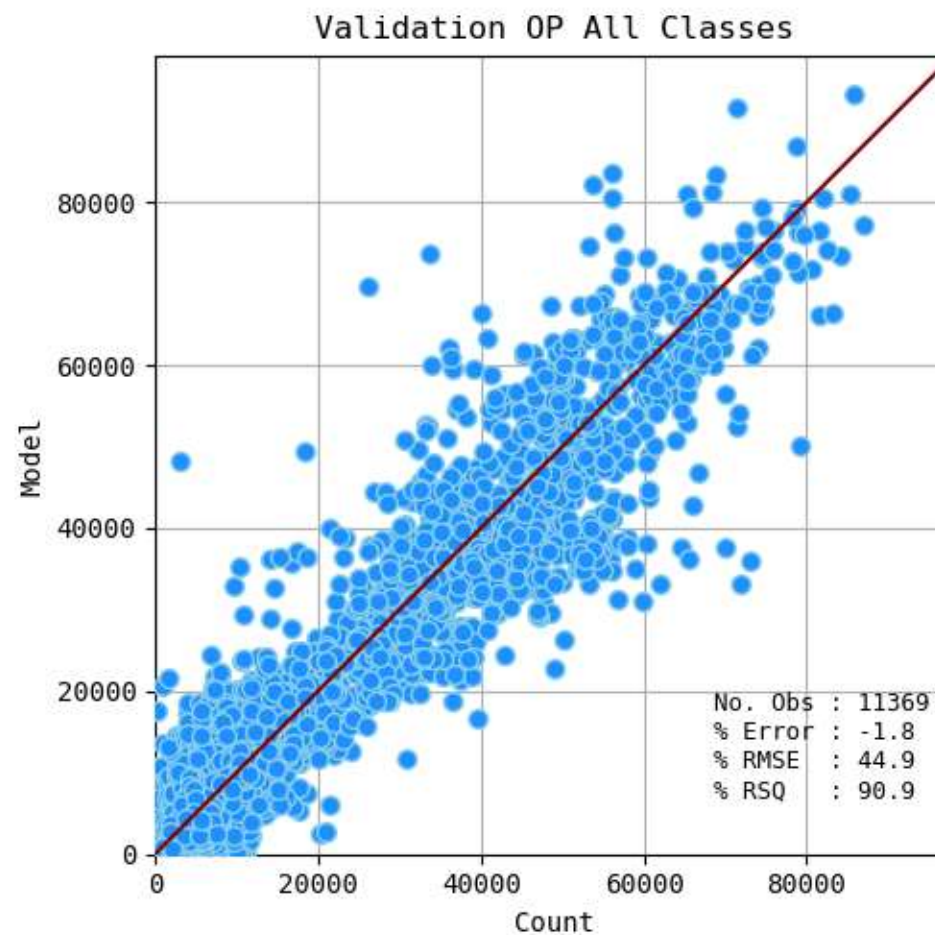
MODEL COMPARISON BY FUNCTIONAL CLASS OP

Func1	2019 OP			
	#Observations	%Error	R^2	%RMSE
1	1,292	-2%	0.75	22%
2	2,396	-1%	0.49	41%
3	4,534	2%	0.38	57%
4	2,348	-18%	0.22	87%
6	317	29%	0.22	115%
7	482	-21%	0.53	81%
All	11,369	-2%	0.91	45%



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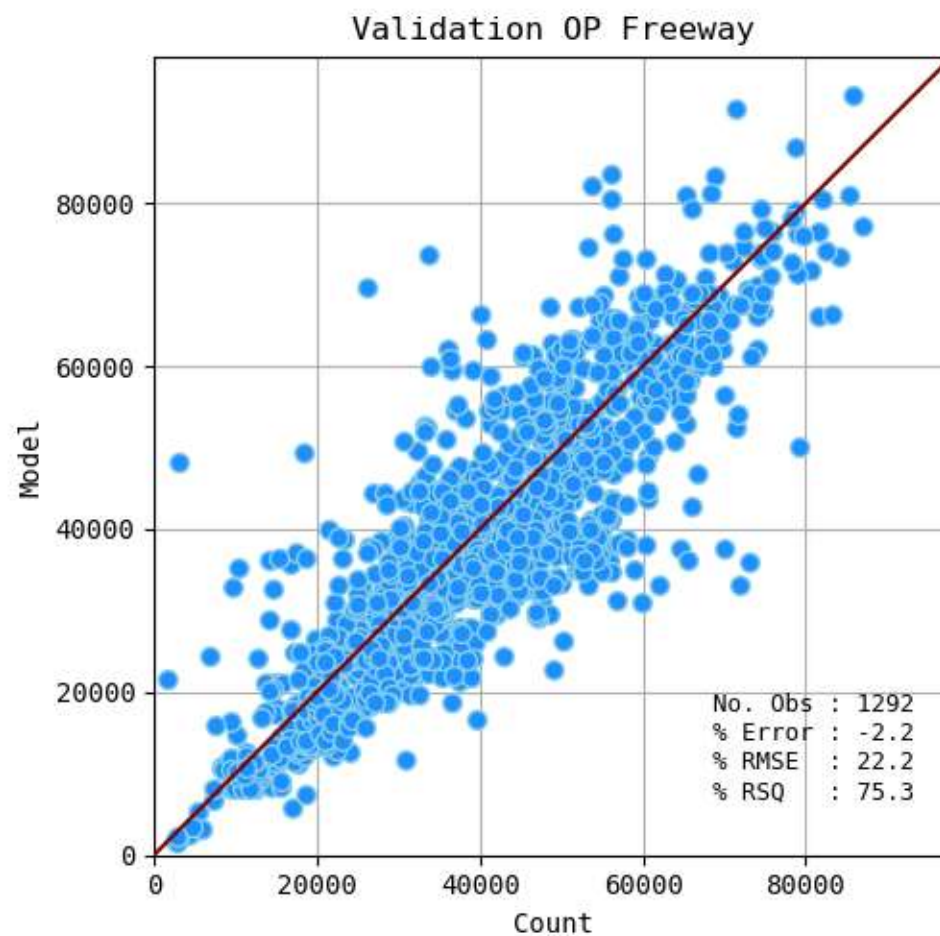
MODEL VS. COUNT COMPARISON ALL LINKS, OP





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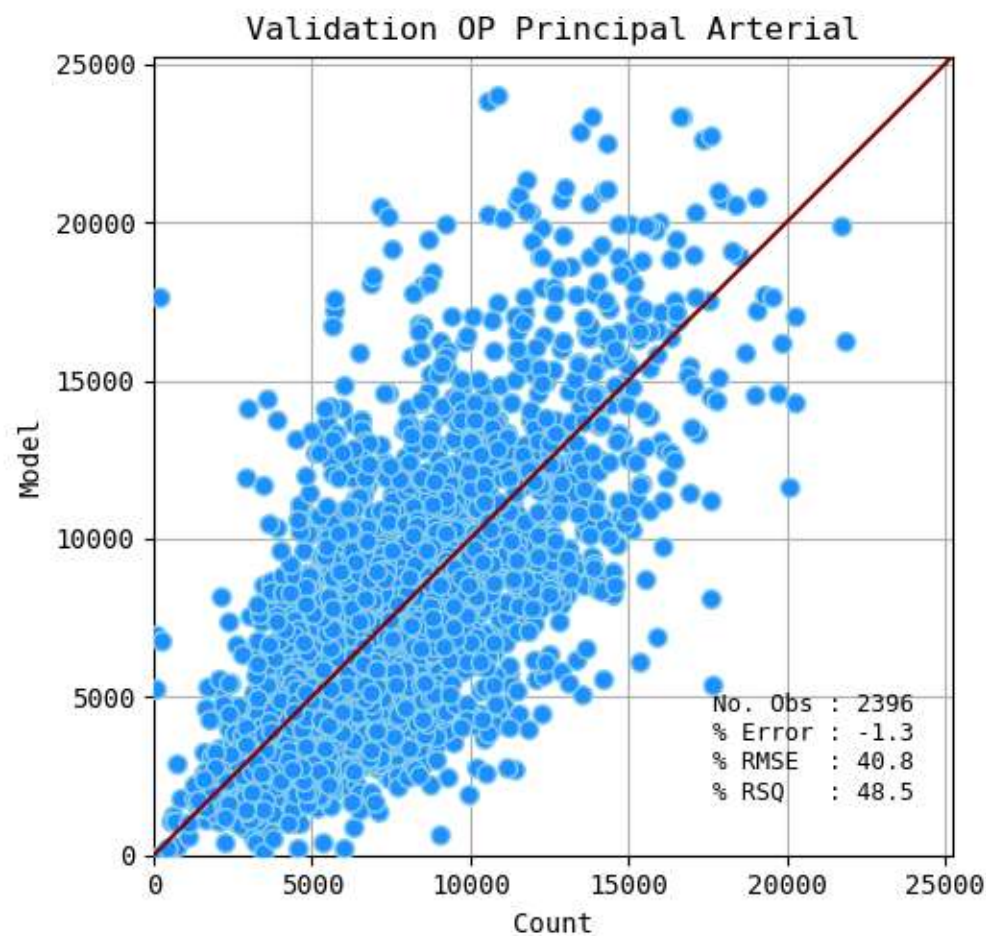
MODEL VS. COUNT COMPARISON FREEWAY, OP





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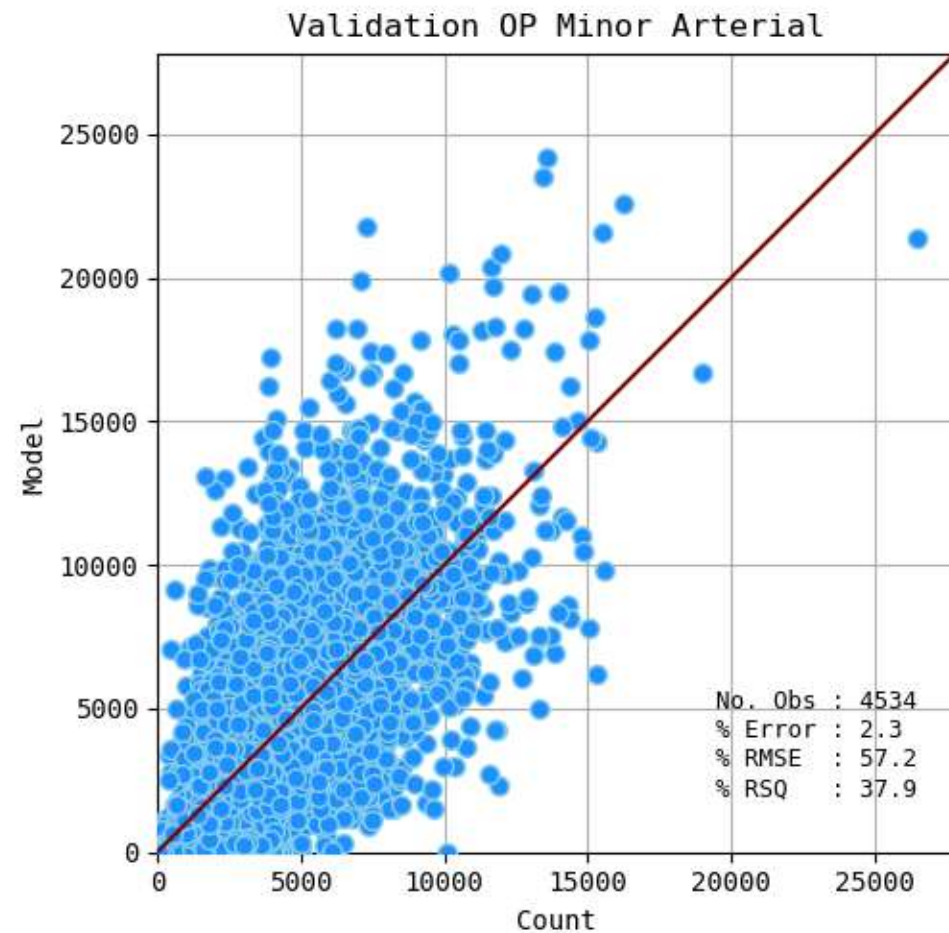
MODEL VS. COUNT COMPARISON PRINCIPAL ARTERIAL, OP





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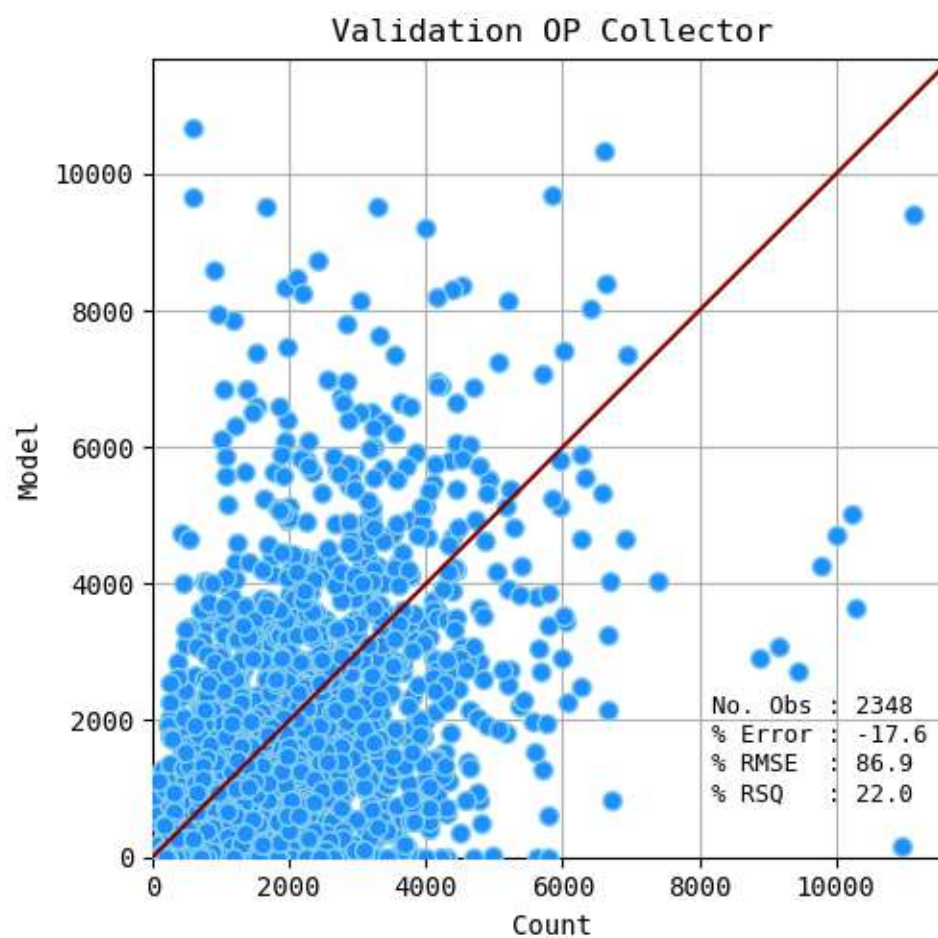
MODEL VS. COUNT COMPARISON MINOR ARTERIAL, OP





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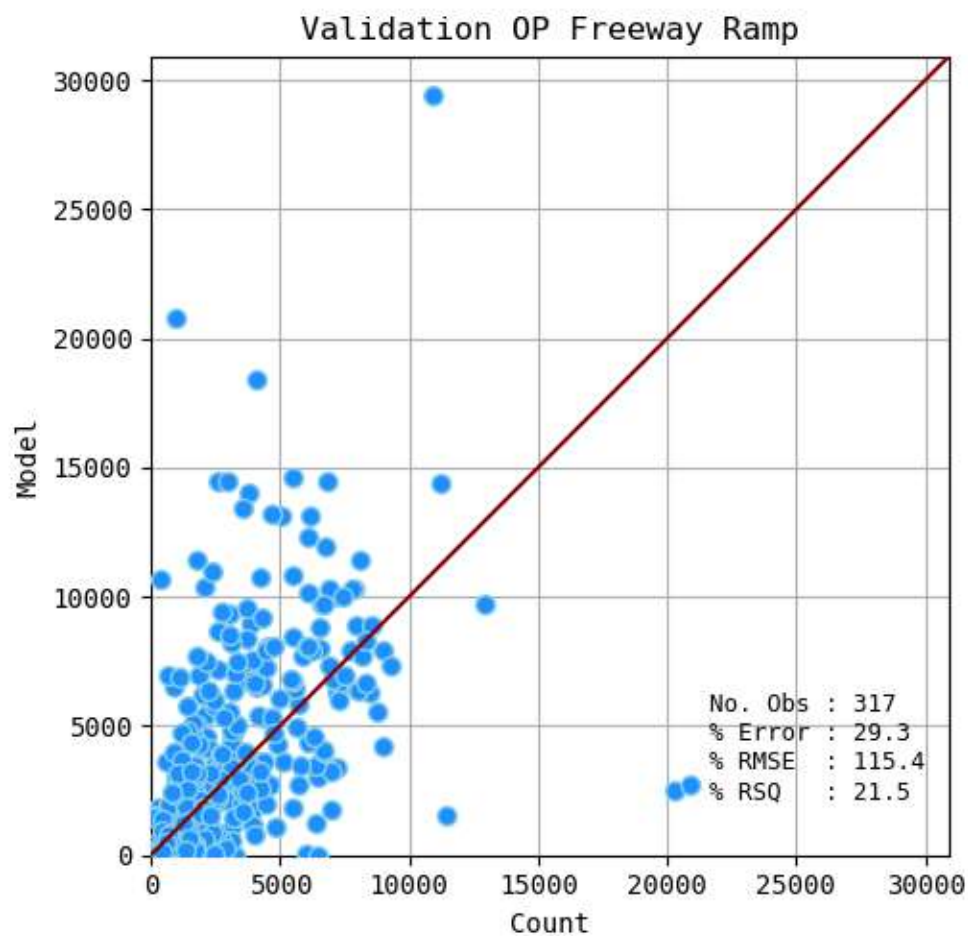
MODEL VS. COUNT COMPARISON COLLECTORS, OP





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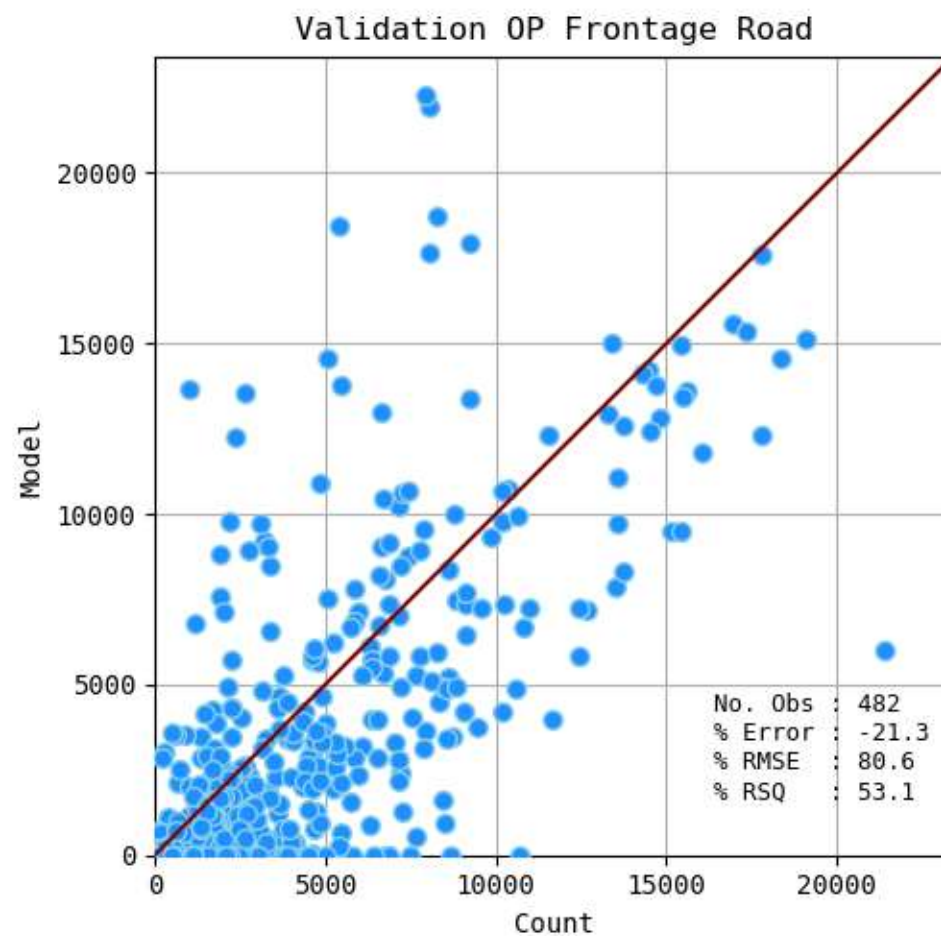
MODEL VS. COUNT COMPARISON FREEWAY RAMPS, OP





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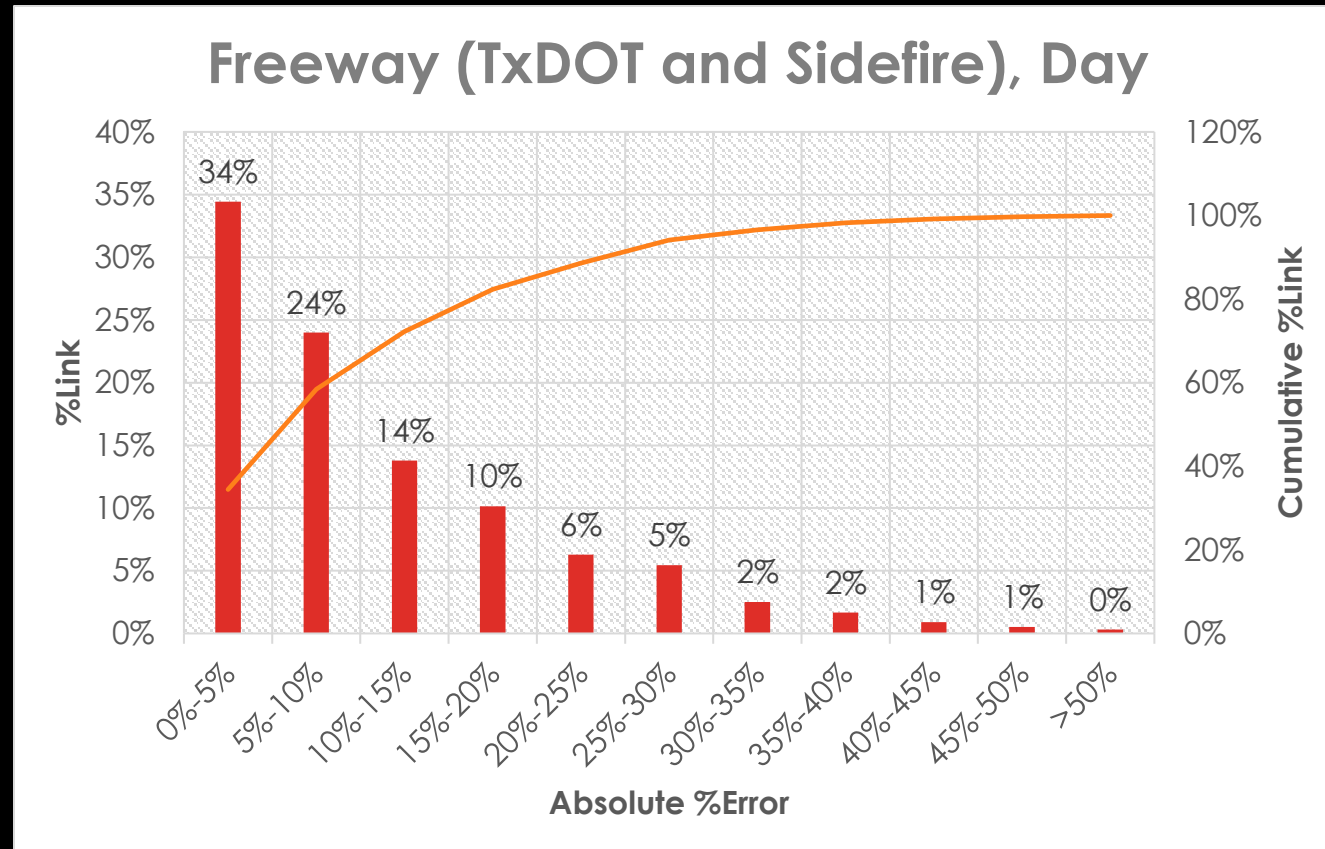
MODEL VS. COUNT COMPARISON FRONTAGE ROADS, OP





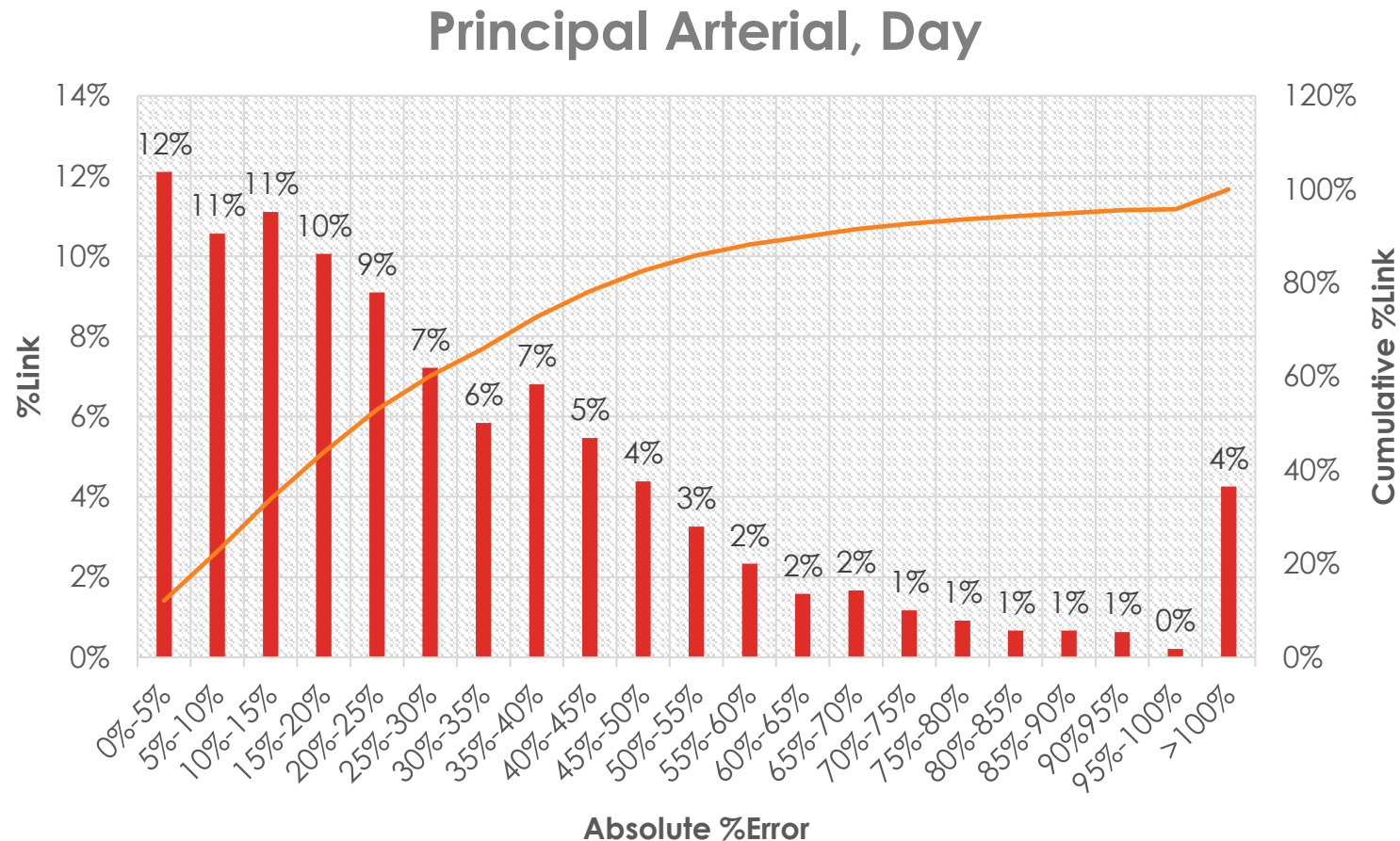
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PERCENTAGE LINK VS. ABSOLUTE %ERROR, FREEWAY (TXDOT, SIDEFIRE), DAY





PERCENTAGE LINK VS. ABSOLUTE %ERROR, PRINCIPAL ARTERIAL, DAILY





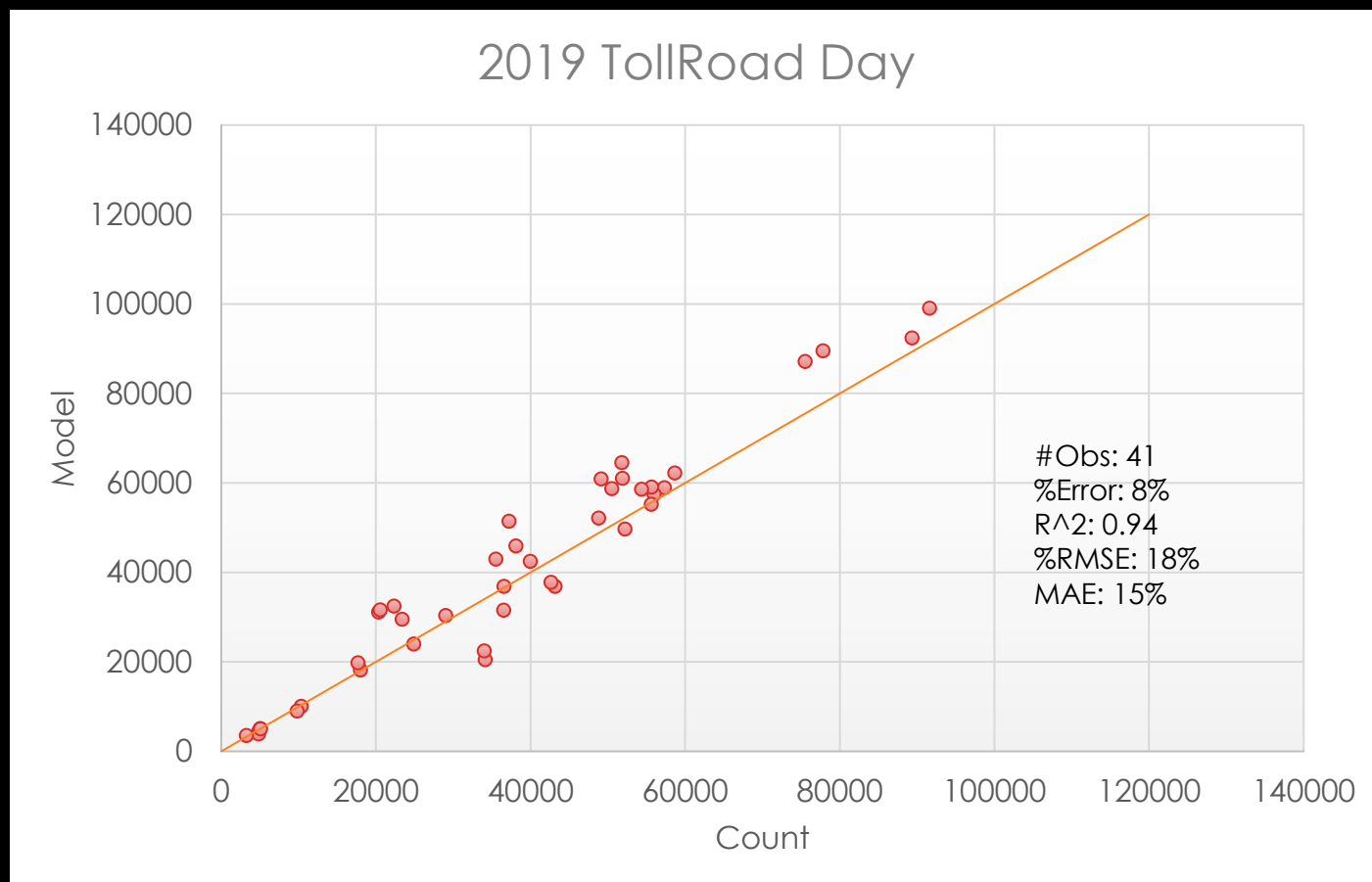
TOLL ROAD, TIME OF DAY

Toll Road	#Observation	%Error	R^2	%RMSE	MAE(%)
AM	41	25%	0.8	42%	44%
PM	41	23%	0.87	34%	34%
OP	41	-4%	0.91	22%	24%
DAY	41	8%	0.94	18%	15%



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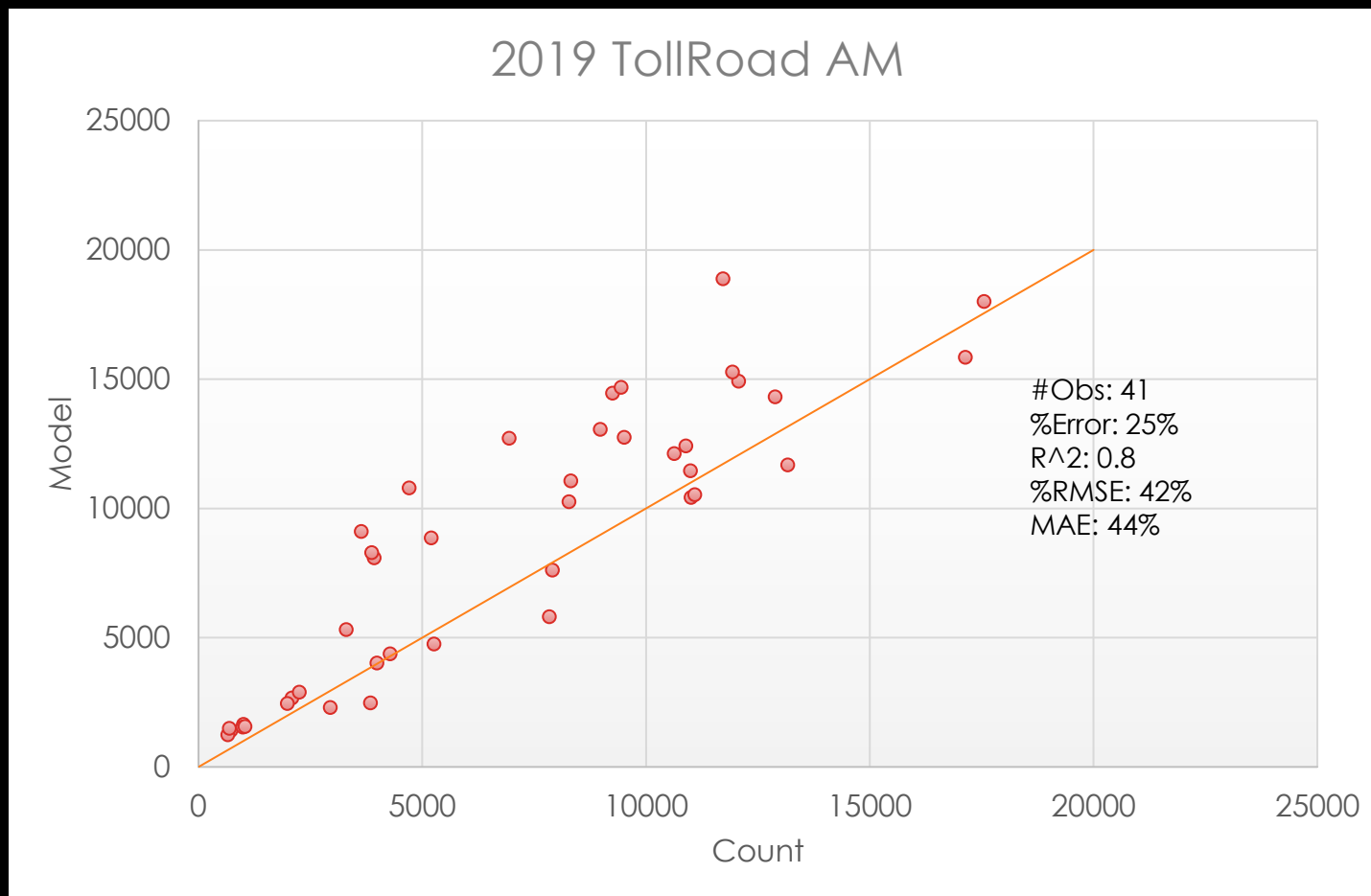
MODEL VS. COUNT COMPARISON, TOLL ROAD, DAY





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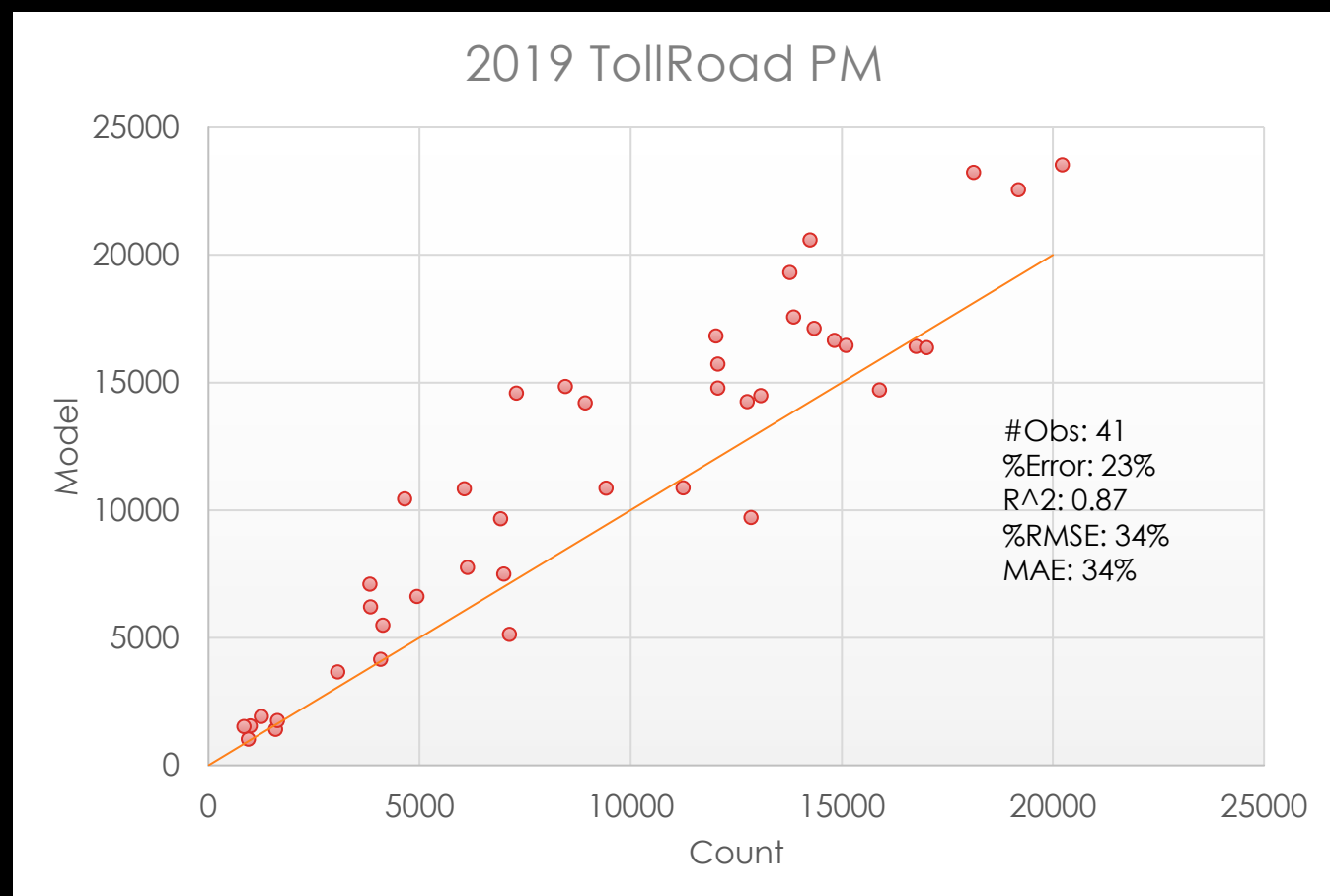
MODEL VS. COUNT COMPARISON TOLL ROAD, AM





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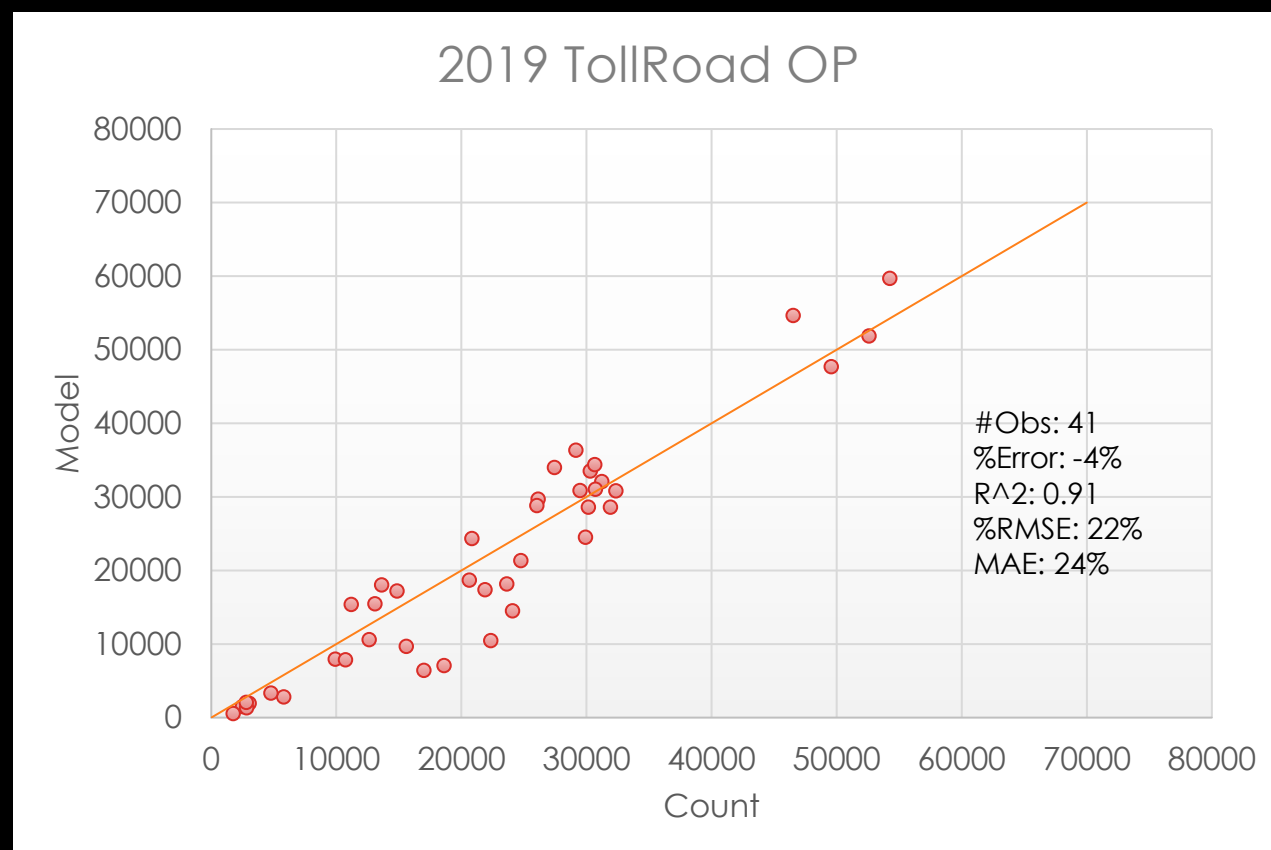
MODEL VS. COUNT COMPARISON TOLL ROAD, PM





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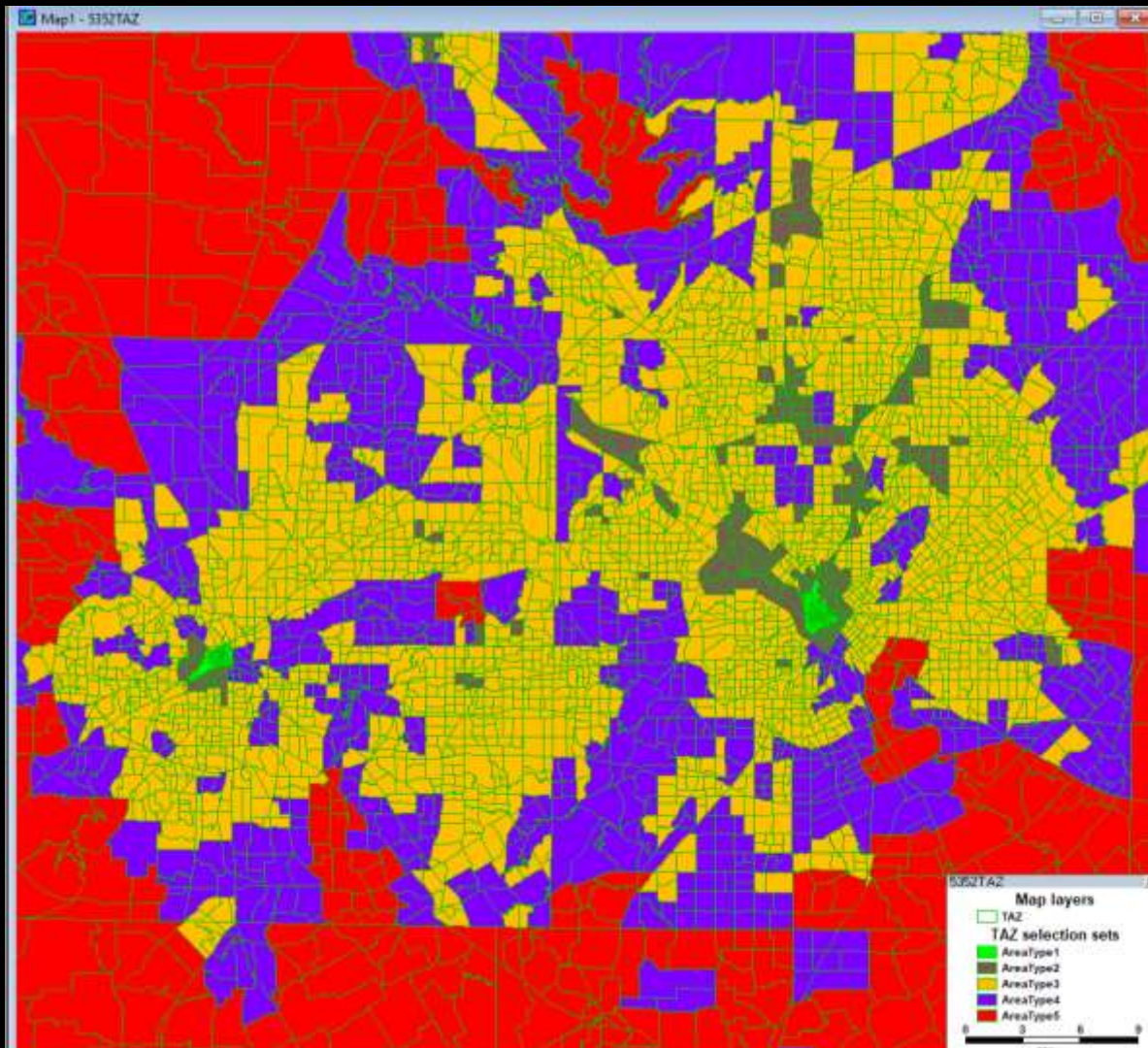
MODEL VS. COUNT COMPARISON TOLL ROAD, OP





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AREA TYPE DEFINITION





MODEL COMPARISON BY AREA TYPE, DAY

Area Type	2019 Day				
	#Obs	%Error	R ²	%RMSE	MAE
1	133	43%	0.8	71%	116%
2	779	18%	0.91	41%	76%
3	7,070	5%	0.92	40%	49%
4	2,380	1%	0.91	42%	51%
5	1,007	-4%	0.9	38%	56%



MODEL COMPARISON BY AREA TYPE, TOD

Area Type	AM				PM				OP			
	#Obs	%Error	R^2	%RMSE	#Obs	%Error	R^2	%RMSE	#Obs	%Error	R^2	%RMSE
1	133	43%	0.67	98%	133	55%	0.66	85%	133	37%	0.82	70%
2	779	22%	0.81	62%	779	34%	0.82	59%	779	11%	0.91	41%
3	7070	15%	0.83	60%	7070	15%	0.86	51%	7070	-3%	0.91	44%
4	2380	12%	0.84	63%	2380	10%	0.88	51%	2380	-6%	0.89	49%
5	1007	6%	0.83	57%	1007	3%	0.87	44%	1007	-9%	0.87	41%





MODEL COMPARISON BY VOLUME, DAY

Volume (vehicle per day)	#Obs	%Error	R ²	%RMSE	MAE(%)
<5,000	3,158	-39	0.21	70	60
5000-9,999	2,698	-6	0.07	42	44
10,000-14,999	1,888	13	0.05	39	57
15,000-19,999	1,118	21	0.04	40	52
20,000-24,999	508	31	0.04	46	57
25,000-29,999	194	42	0.00	55	125
30,000-34,999	90	39	0.00	48	67
35,000-39,999	29	24	0.07	37	41
40,000-44,999	21	5	0.04	32	32
45,000-50,000	6	15	0.02	30	32
50,000+	98	6	0.68	17	14
All	9,808	6	0.79	48	54



MODEL COMPARISON BY COUNTY

Func1	Collin, Day				
	#Obs	%Error	R ²	%RMSE	MAE (%)
1	58	9.2	0.73	17.6	14.2
2	187	4.3	0.65	29.8	62.6
3	636	21.2	0.34	57.4	55.8
4	283	-5	0.29	77	101.2
6	54	41	0.2	104.3	95.5
7	39	-18.5	0.11	79.8	89.1
All	1257	12	0.9	47.5	67.8



MODEL COMPARISON BY COUNTY

Func1	Dallas, Day				
	#Obs	%Error	R ²	%RMSE	MAE (%)
1	613	5	0.62	20.7	17.1
2	894	7.3	0.48	37.8	33.2
3	2189	12.7	0.47	51	48.1
4	1004	-5.1	0.28	76.8	73.8
6	119	51.1	0.28	94.4	114.6
7	85	9	0.48	65.5	64.1
All	4904	7.2	0.93	40.6	48.7





MODEL COMPARISON BY COUNTY

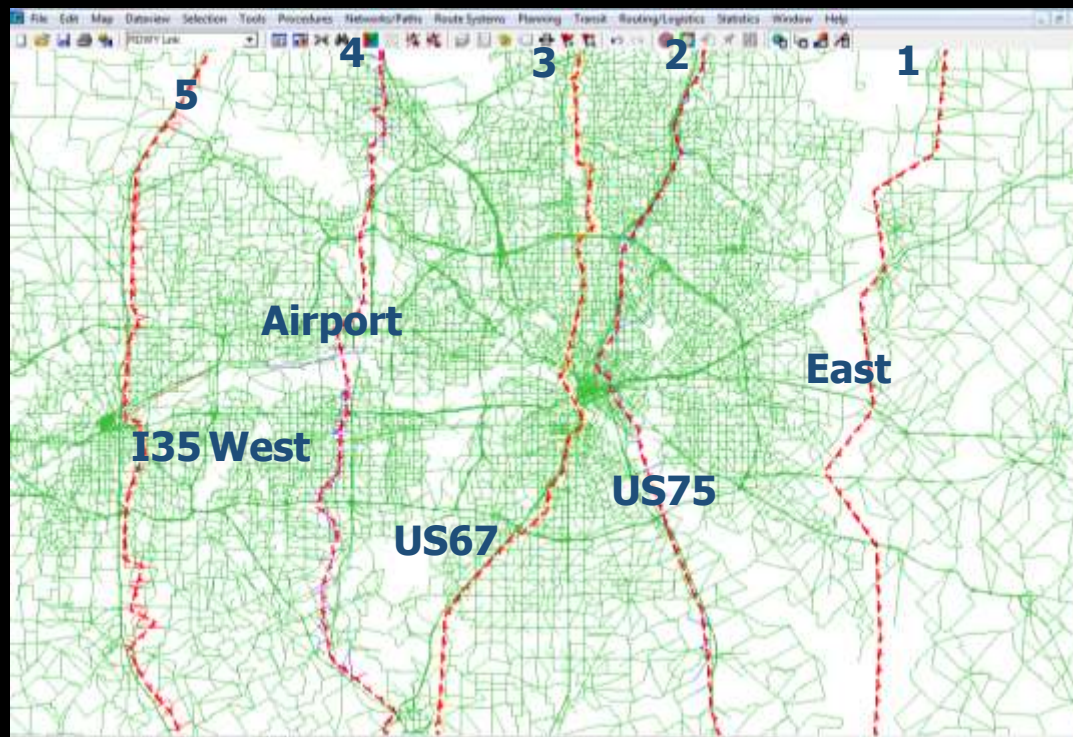
Func1	Tarrant, Day				
	#Obs	%Error	R^2	%RMSE	MAE (%)
1	341	1.9	0.71	21.9	25.2
2	641	7.3	0.48	36.6	47.8
3	1153	1.4	0.41	45.4	43.1
4	656	-14.8	0.21	73.9	72.2
6	81	8.7	0.21	102	92.7
7	200	-14.6	0.66	60.6	76.9
All	3072	1.5	0.9	41.2	51.8





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SCREEN LINE ANALYSIS-1





SCREEN LINE ANALYSIS - 1

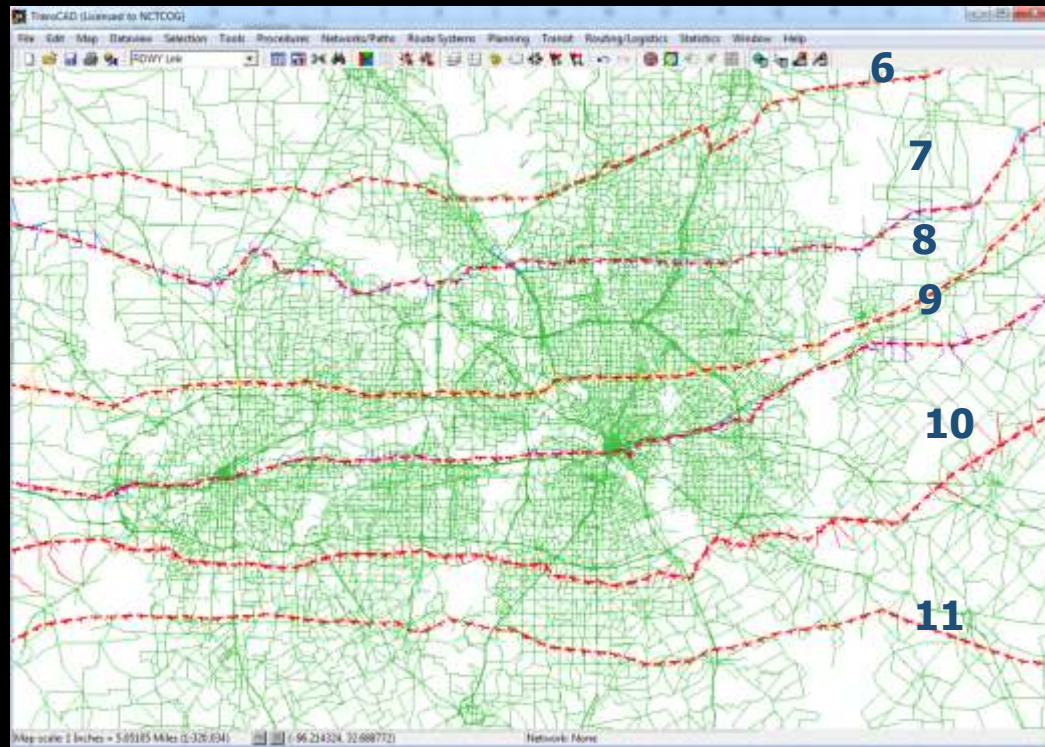
Screen Line	#Obs	Total flow	Total Count	%Error	%RMSE
1	40	150,212	170,544	-11.9	36.75
2	220	999,094	972,941	2.7	37.72
3	219	1,681,630	1,570,979	7.0	39.18
4	169	827,320	783,586	5.6	43.48
5	148	432,304	445,795	-3.0	42.66





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SCREEN LINE ANALYSIS - 2





SCREEN LINE ANALYSIS - 2

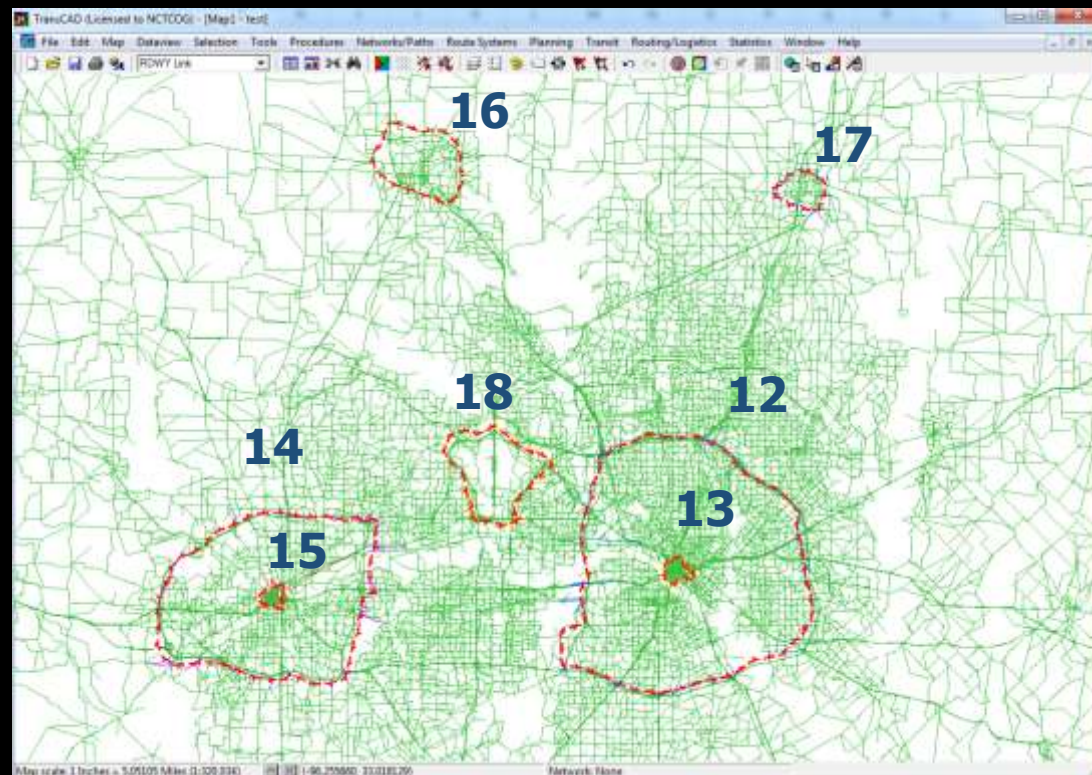
Screen Line	#Obs	Total flow	Total Count	%Error	%RMSE
6	138	1,203,947	1,107,136	8.7	27.48
7	200	1,527,477	1,323,016	15.5	31.9
8	252	1,763,096	1,736,919	1.5	25.85
9	323	1,297,557	1,159,769	11.9	47.06
10	185	781,043	855,943	-8.8	48.92
11	114	421,403	398,256	5.8	40.49





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SCREEN LINE ANALYSIS - 3





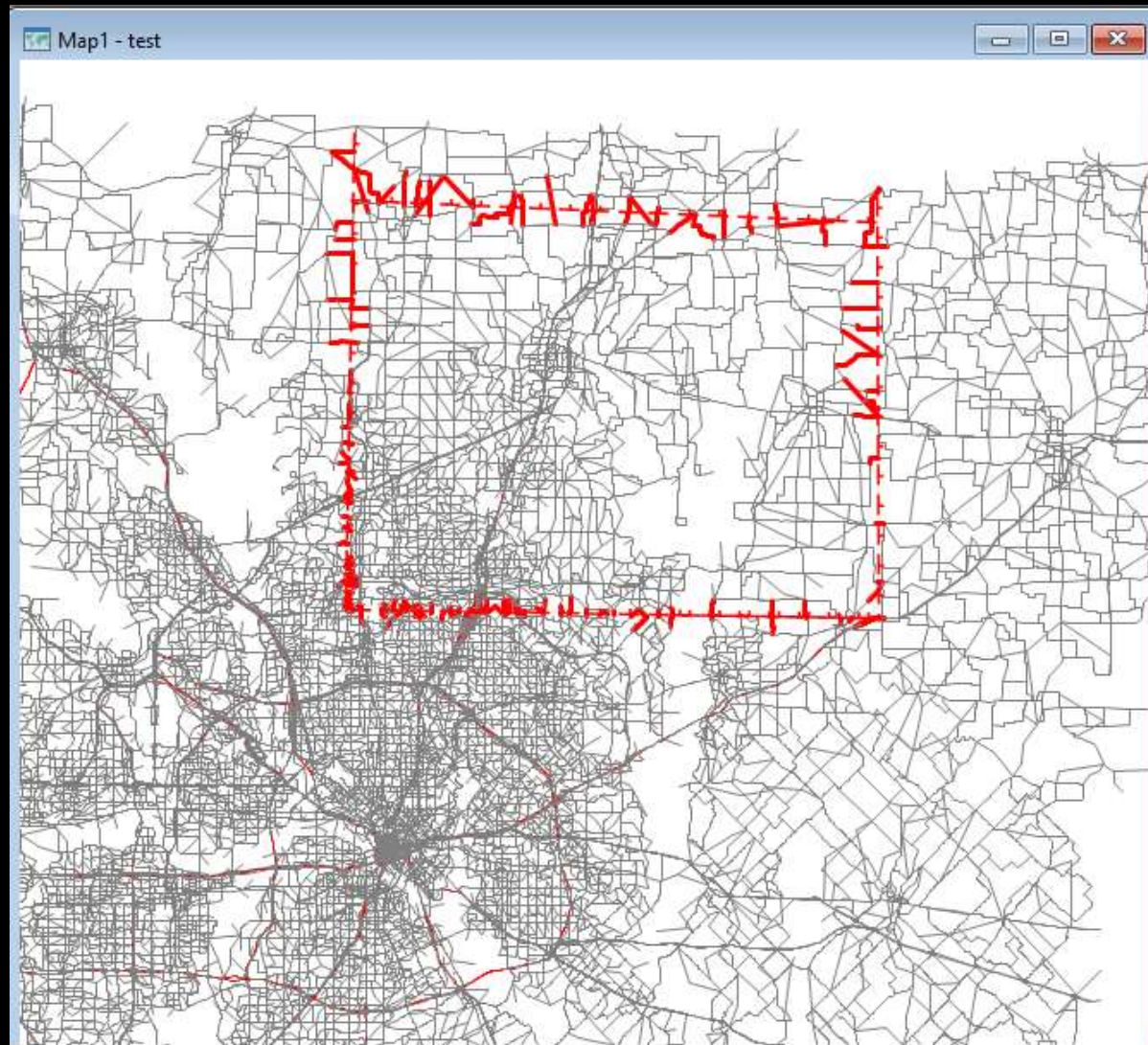
SCREEN LINE ANALYSIS - 3

Screen Line	#Obs	Total flow	Total Count	%Error	%RMSE
12	274	2,069,812	1,948,550	6.2	36.22
13	108	664,626	562,674	18.1	48.55
14	189	1,007,052	1,116,551	-9.8	26.75
15	62	305,547	244,780	24.8	41.40
16	46	162,815	141,364	15.2	37.58
17	29	170,550	158,398	7.7	29.12
18	111	971,400	811,151	19.8	59.27





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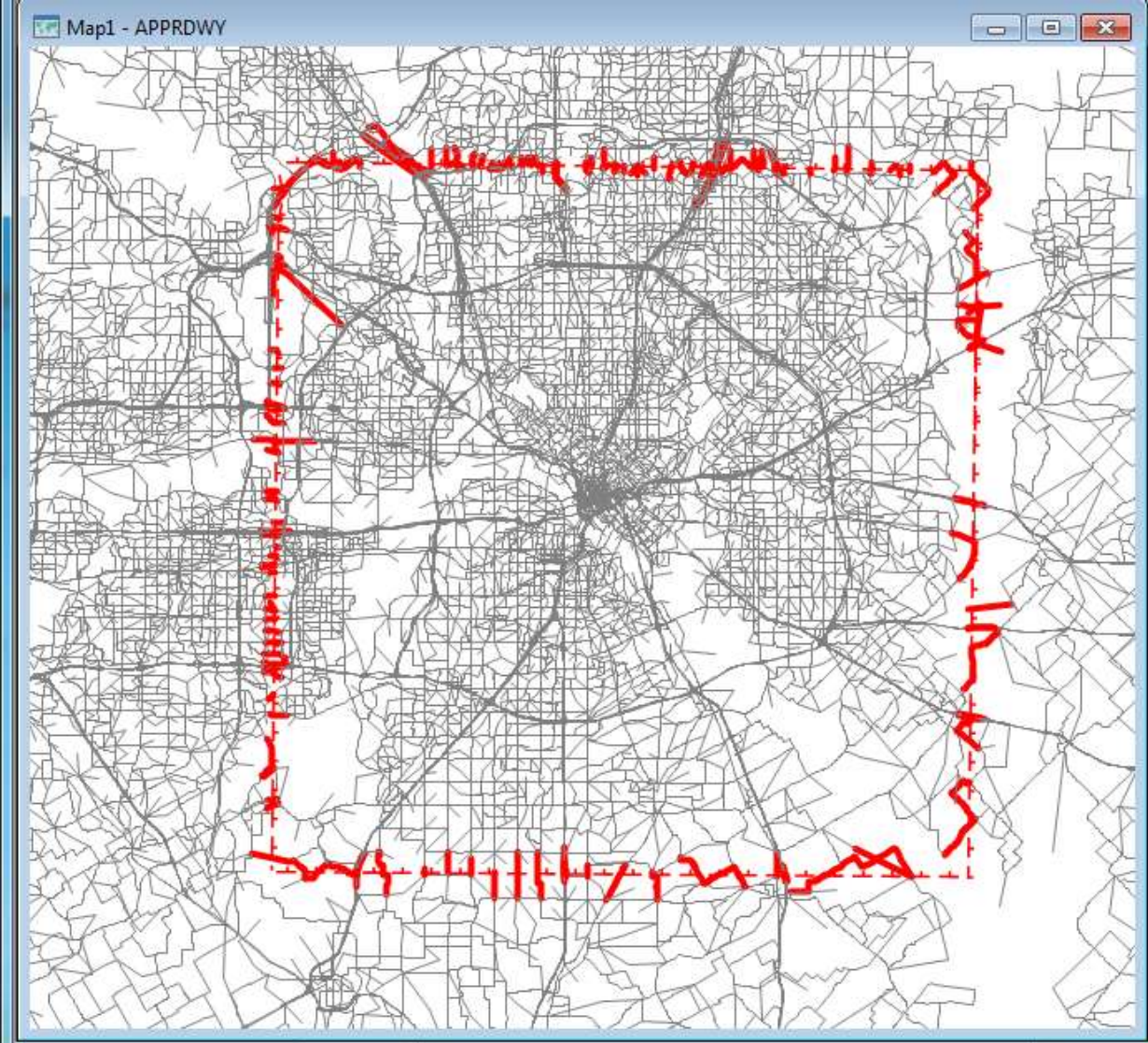
SCREEN LINE ANALYSIS BY COUNTY COLLIN

Collin, Day	#Obs	Total counts	Total Model	%Error	%RMSE
South	67	654,498	708,115	8%	27%
North	19	13,595	11,156	-18%	18%
East	17	32,628	25,672	-21%	21%
West	55	568,532	615,965	8%	26%





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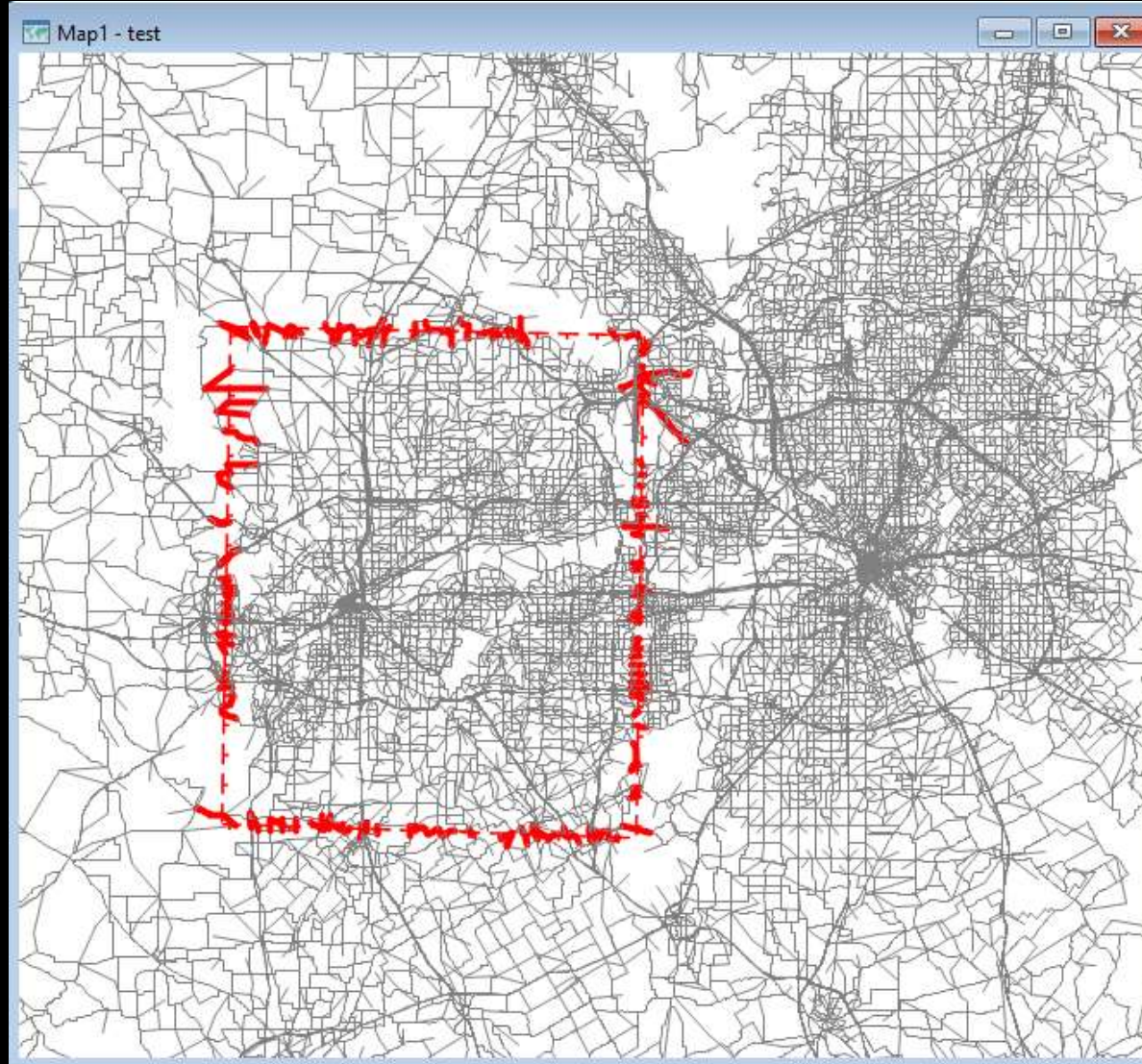


SCREEN LINE ANALYSIS BY COUNTY DALLAS

Dallas, Day	#Obs	Total counts	Total Model	%Error	%RMSE
South	33	109,780	119,572	9%	29%
North	97	1,373,238	1,539,839	12%	23%
East	71	177,193	165,443	-7%	10%
West	32	425,838	536,951	26%	62%



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SCREEN LINE ANALYSIS BY COUNTY TARRANT

Tarrant, Day	#Obs	Total counts	Total Model	%Error	%RMSE
South	38	197,881	177,612	-10%	22%
North	34	76,815	106,387	38%	147%
East	71	425,838	536,951	26%	62%
West	37	120,407	102,988	-14%	38%



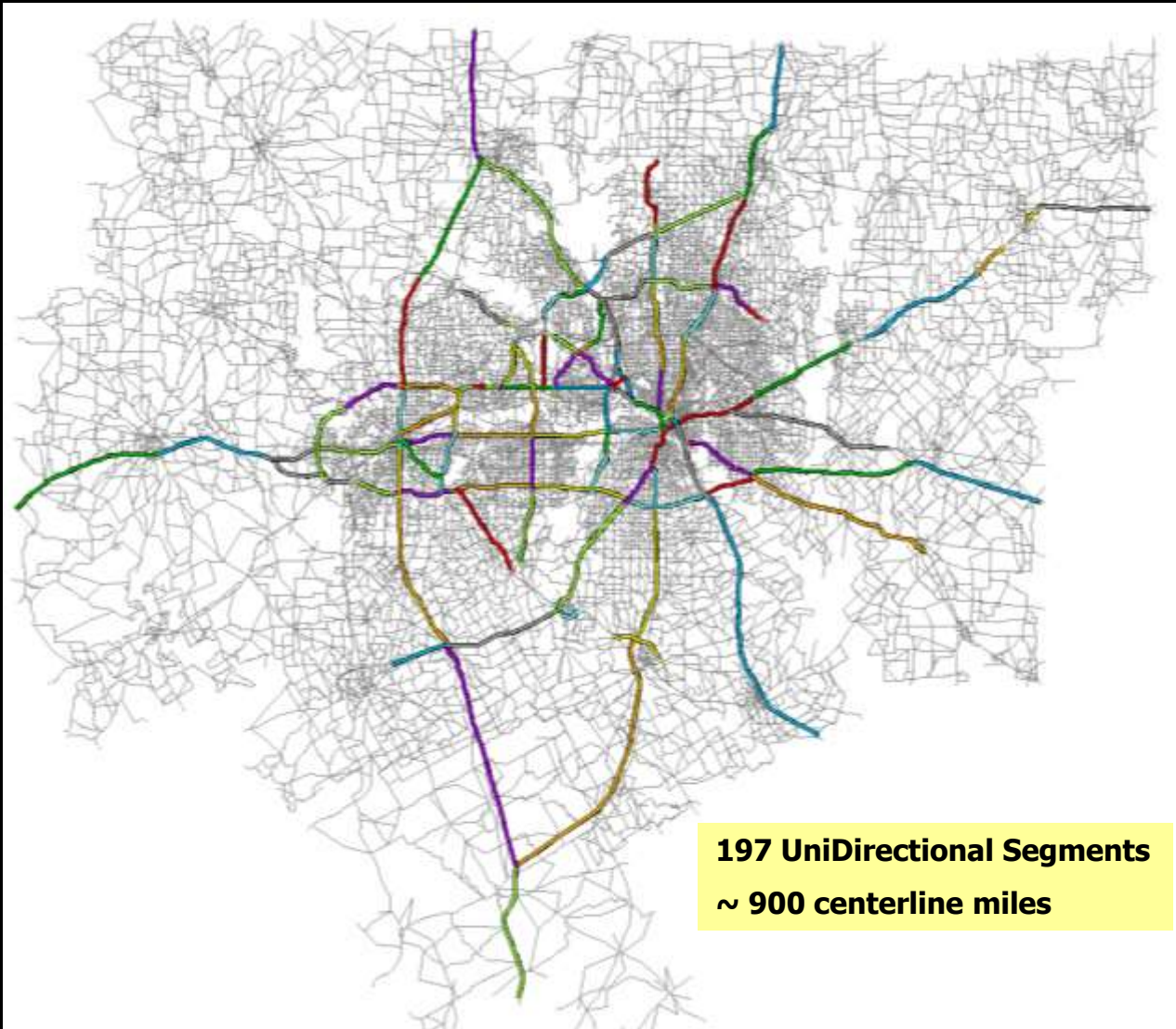
MODEL COMPARISON ON FREEWAY CORRIDORS, DAY

Freeway	#Obs	Corridor length (mile)	Corridor length with counts (mile)	Start Point	End Point	%Error	R^2	%RMSE	MAE
IH30 WB	80	108	47	Hunt	IH20 & IH30	0.1	0.77	17.9	17.2
IH30 EB	80	109	47	IH20 & IH30	Hunt	2.5	0.69	20.9	17.2
IH20 WB	61	117	37	Kaufman	Parker	-1.4	0.76	17	14.7
IH20 EB	61	122	39	Parker	Kaufman	-2.3	0.74	18	14.9
IH35W SB	37	85	29	Denton	Hill	2.5	0.67	27	18.8
IH35W NB	41	85	32	Hill	Denton	8	0.37	39.1	56.1
IH35E SB	99	96	50	Denton	Hill	3.8	0.71	19.7	15.9
IH35E NB	93	95	42	Hill	Denton	4.8	0.80	16.6	13.3
US75 SB	48	44	23	Collin	Dallas	9.7	0.50	20.1	15.4
US75 NB	42	44	20	Dallas	Collin	7.6	0.63	17.4	14
IH635 WB	11	18	6	US75	SH121	5.2	0.90	15.4	10.8
IH635 EB	15	18	8	SH121	US75	2.5	0.65	19	12.3
IH635 SB	26	18	12	US75	IH20	-3.1	0.23	18.3	16.3
IH635 NB	26	19	12	IH20	US75	-2.1	0.58	14.2	12.2
SH360 SB	27	26	14	SH121	US287	5.8	0.87	25.9	8.6
SH360 NB	29	26	14	US287	SH121	8.6	0.88	28.2	56.8
IH45 SB	16	41	11	Dallas	Ellis	6.7	0.93	13	12.7
IH45 NB	14	41	10	Ellis	Dallas	7.5	0.78	22.6	17.2



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TRAVEL TIME COMPARISON FREEWAY

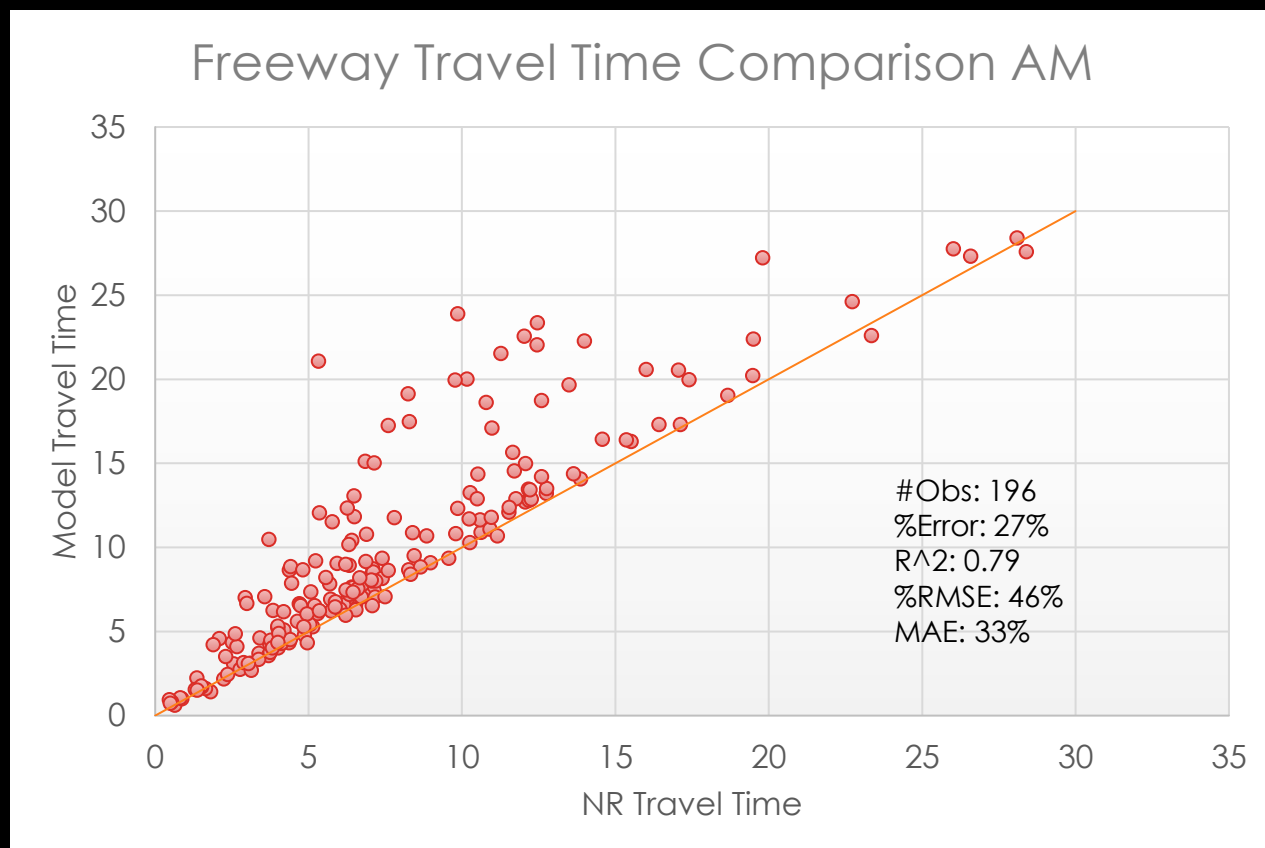


197 UniDirectional Segments
~ 900 centerline miles



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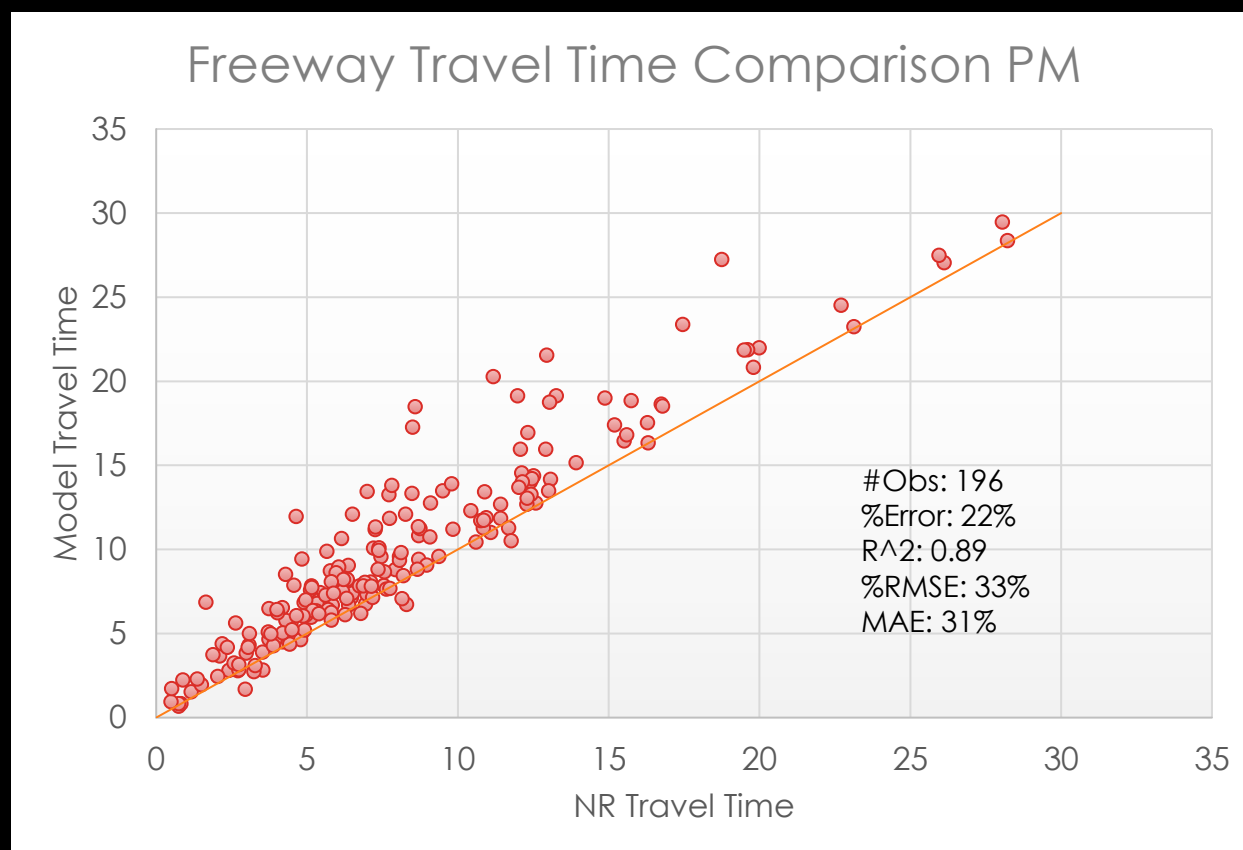
FREEWAY TRAVEL TIME COMPARISON, AM





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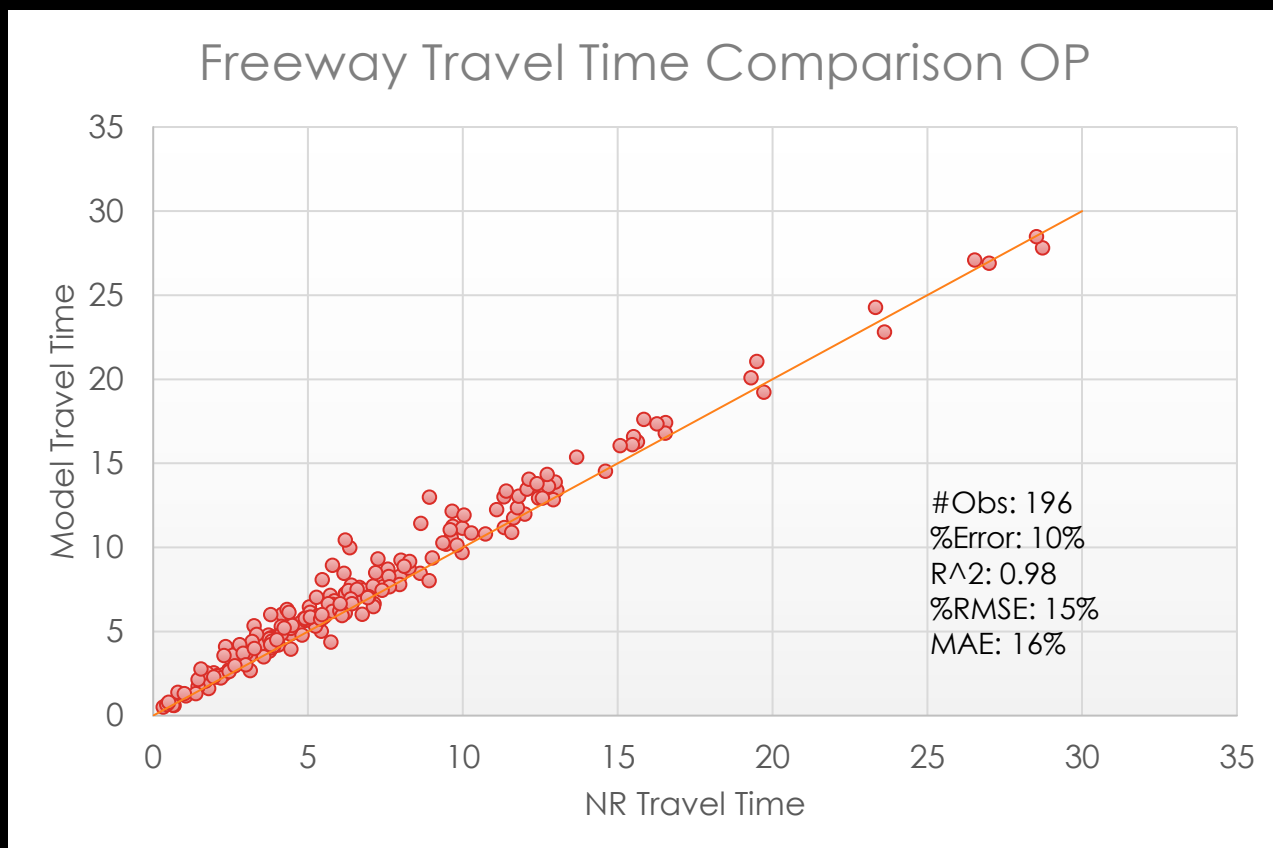
FREEWAY TRAVEL TIME COMPARISON, PM





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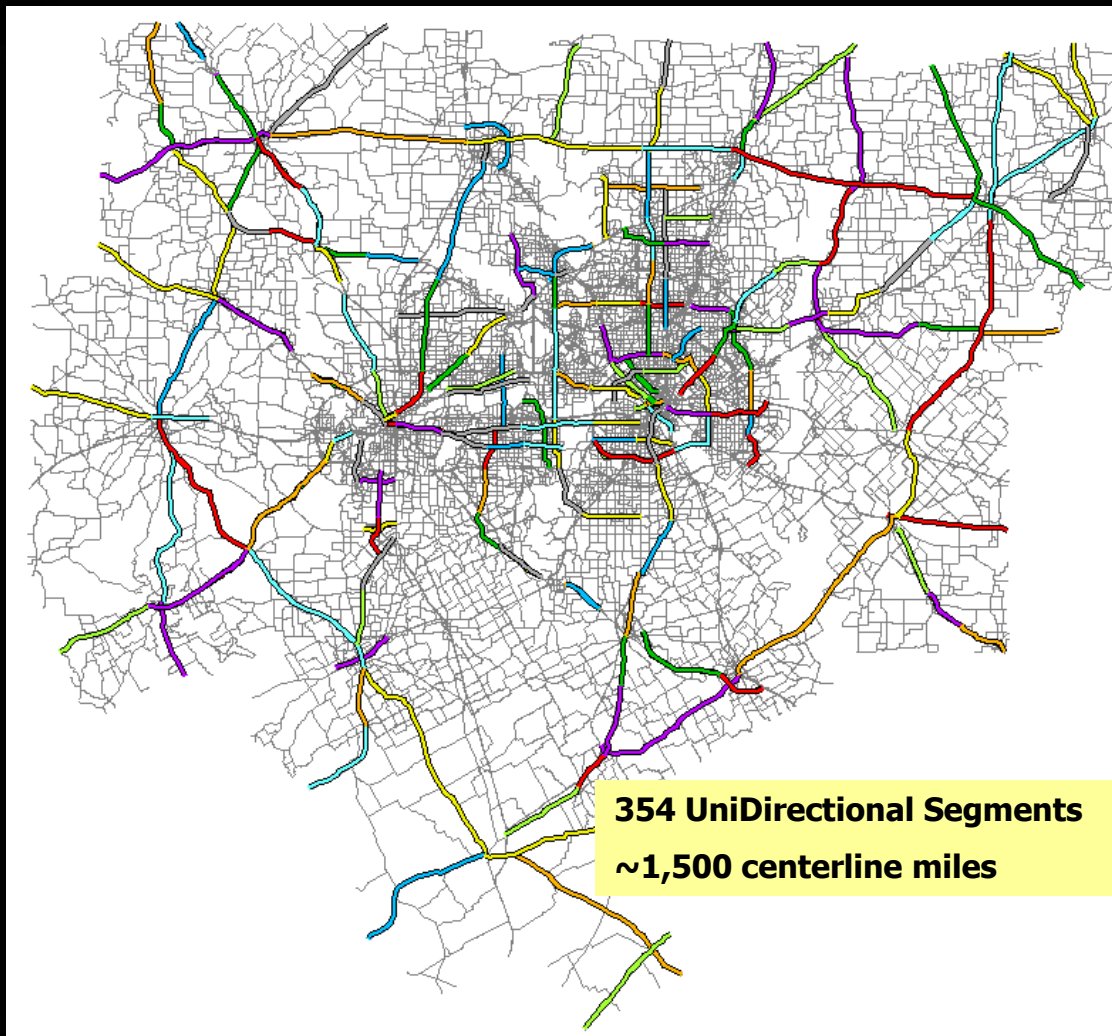
FREEWAY TRAVEL TIME COMPARISON, OP





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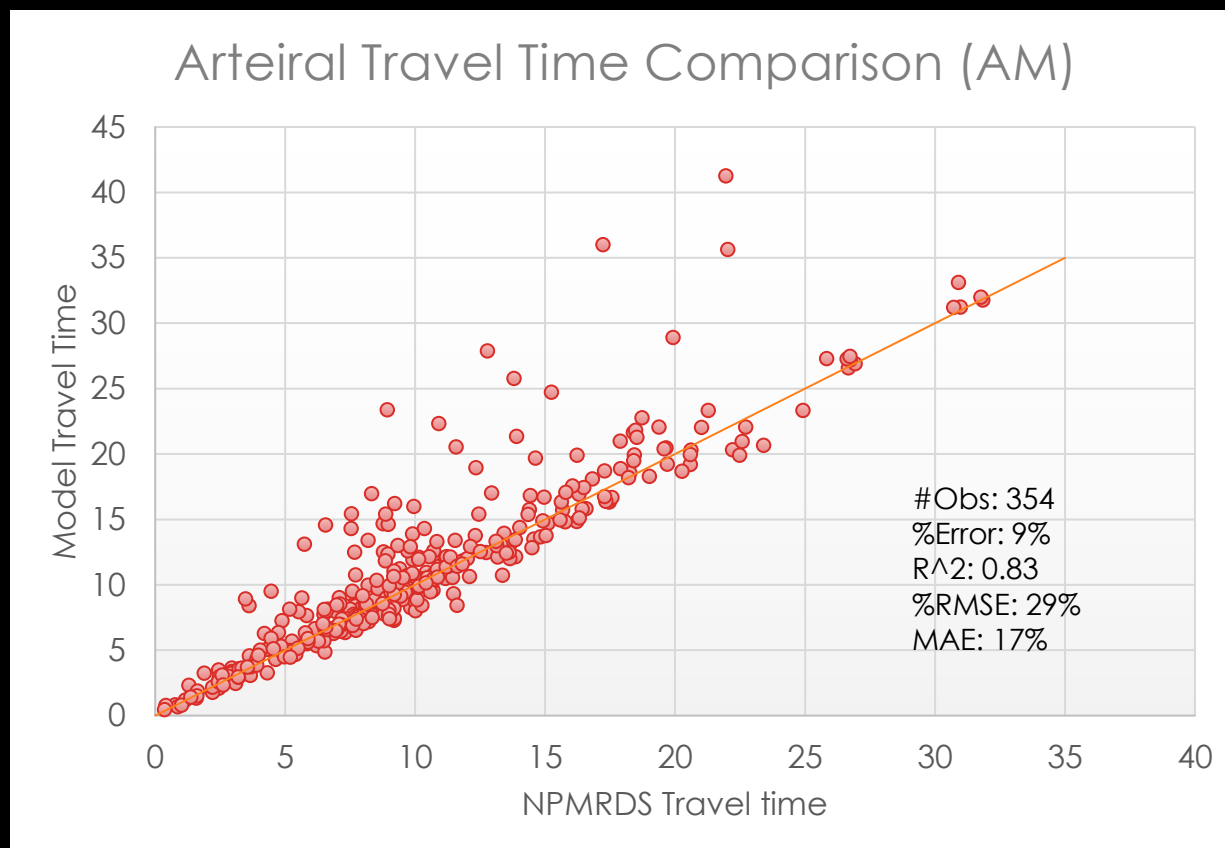
TRAVEL TIME COMPARISON ARTERIAL





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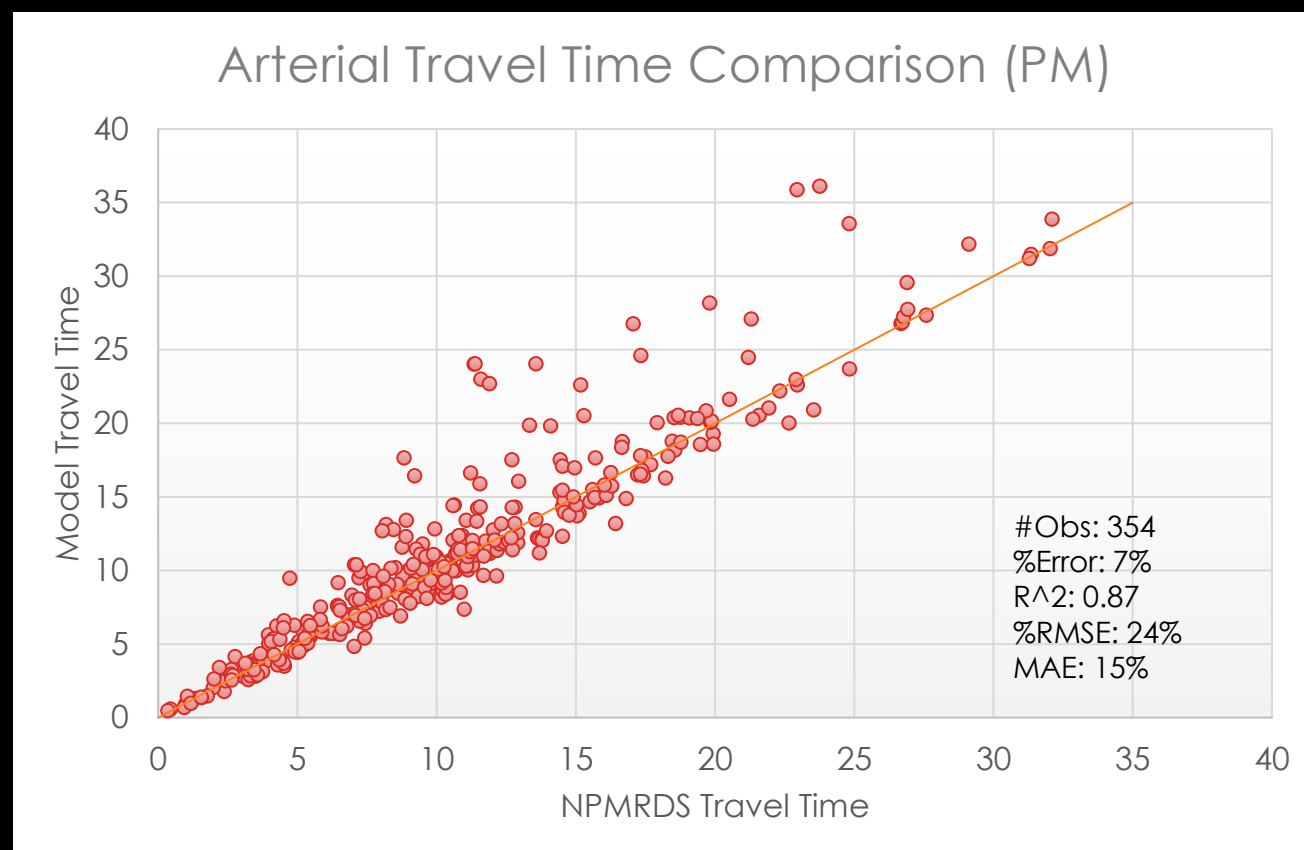
ARTERIAL TRAVEL TIME COMPARISON, AM





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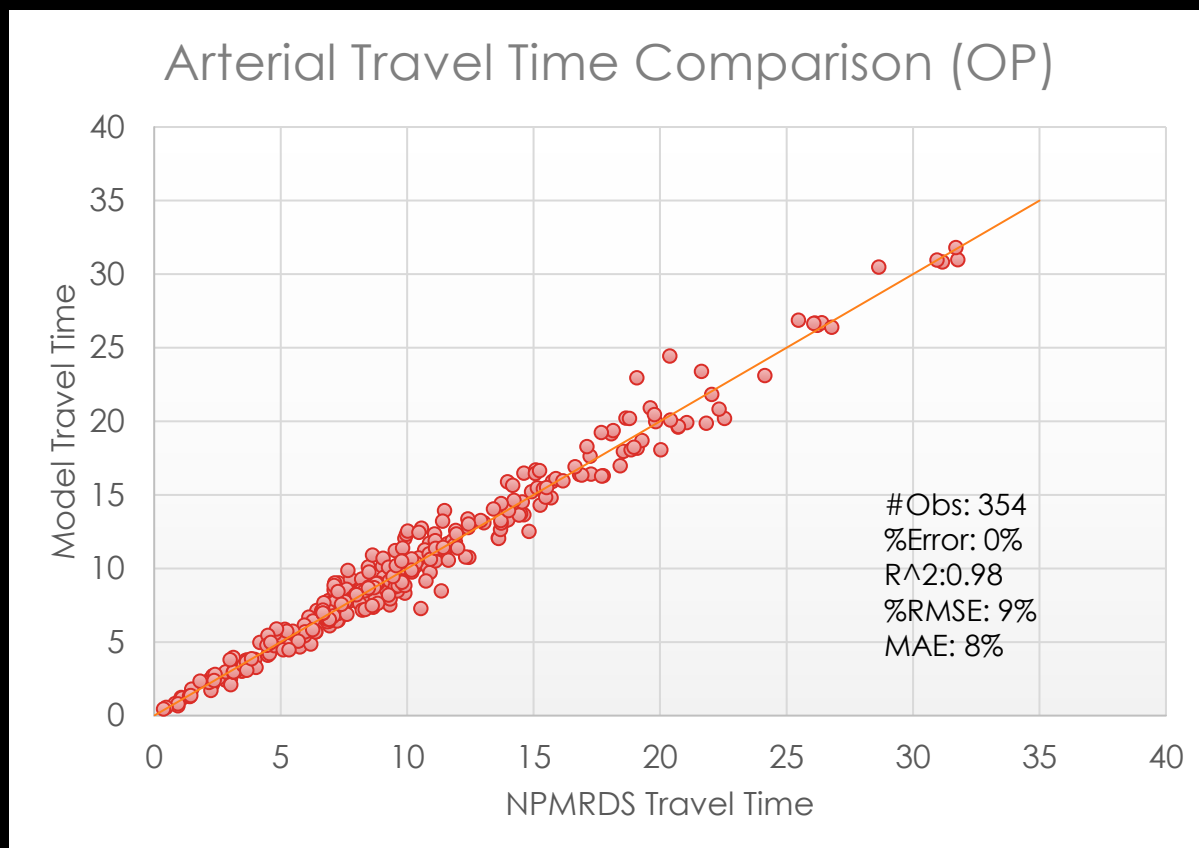
ARTERIAL TRAVEL TIME COMPARISON, PM





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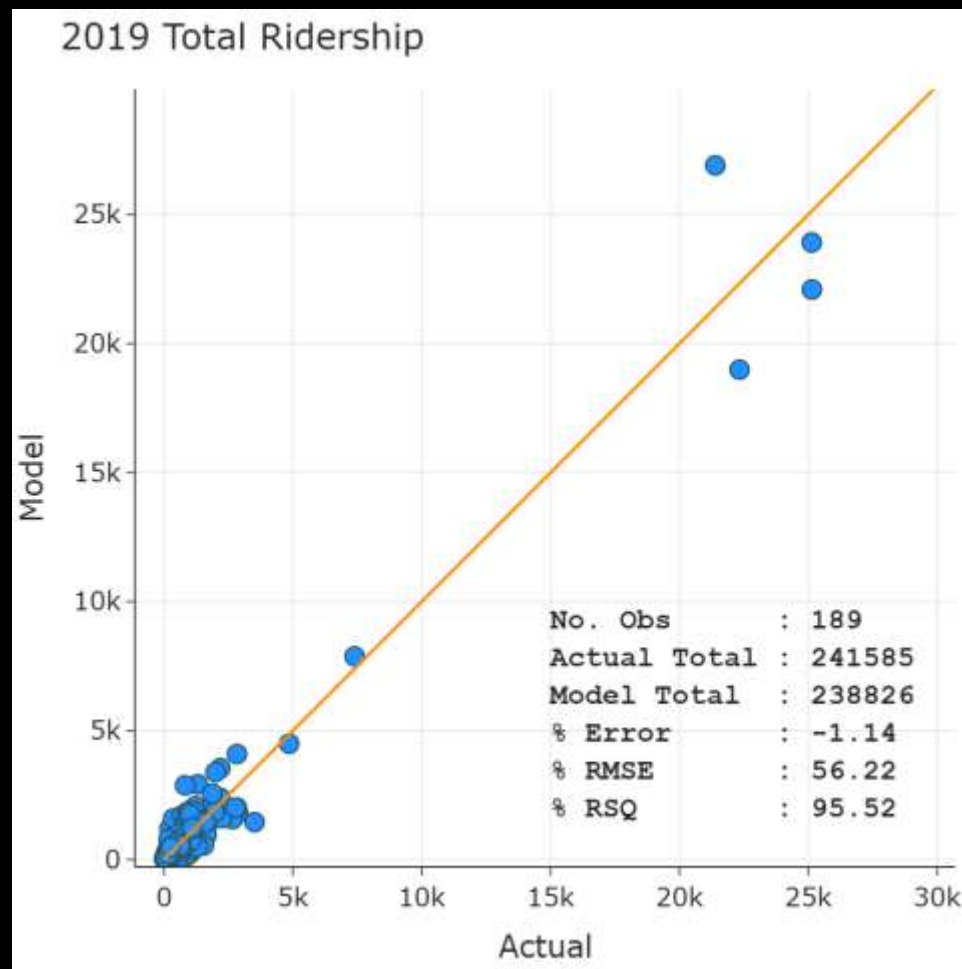
ARTERIAL TRAVEL TIME COMPARISON, OP





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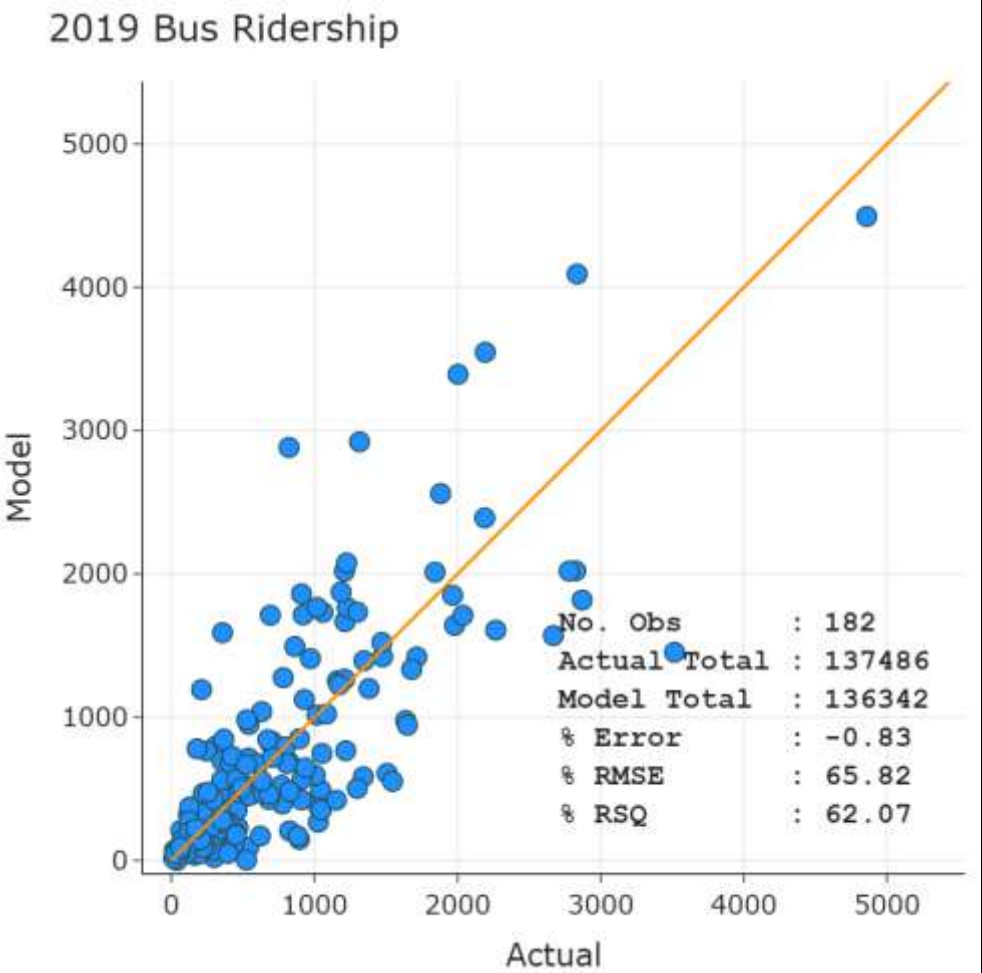
2019 TOTAL TRANSIT RIDERSHIP COMPARISON





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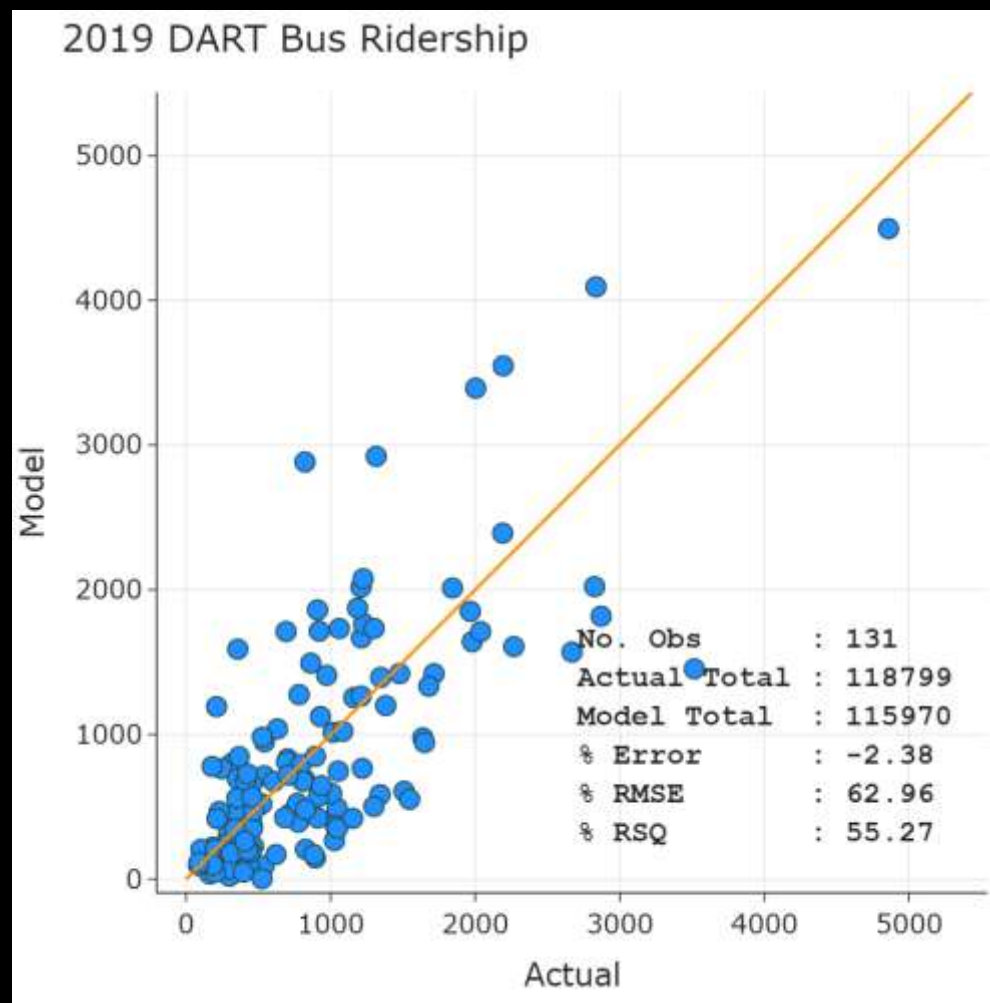
2019 BUS RIDERSHIP COMPARISON





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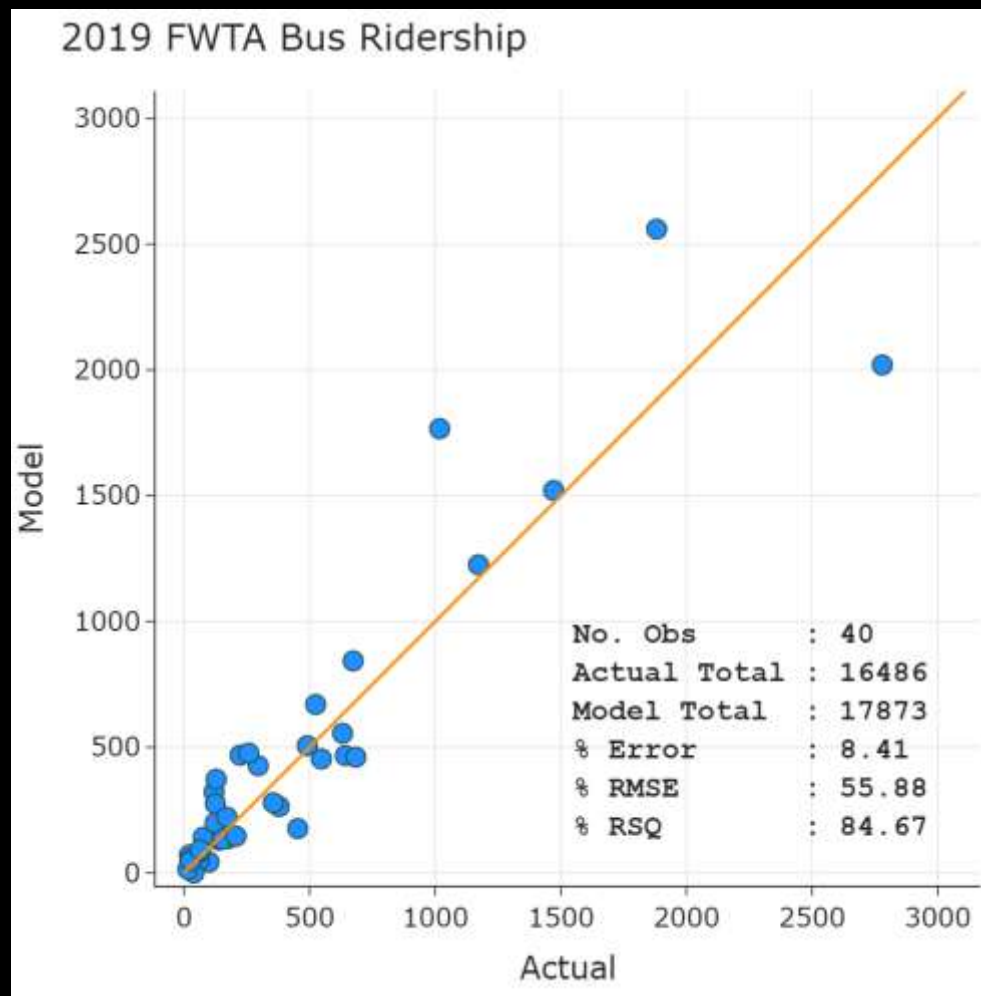
2019 DART BUS RIDERSHIP COMPARISON





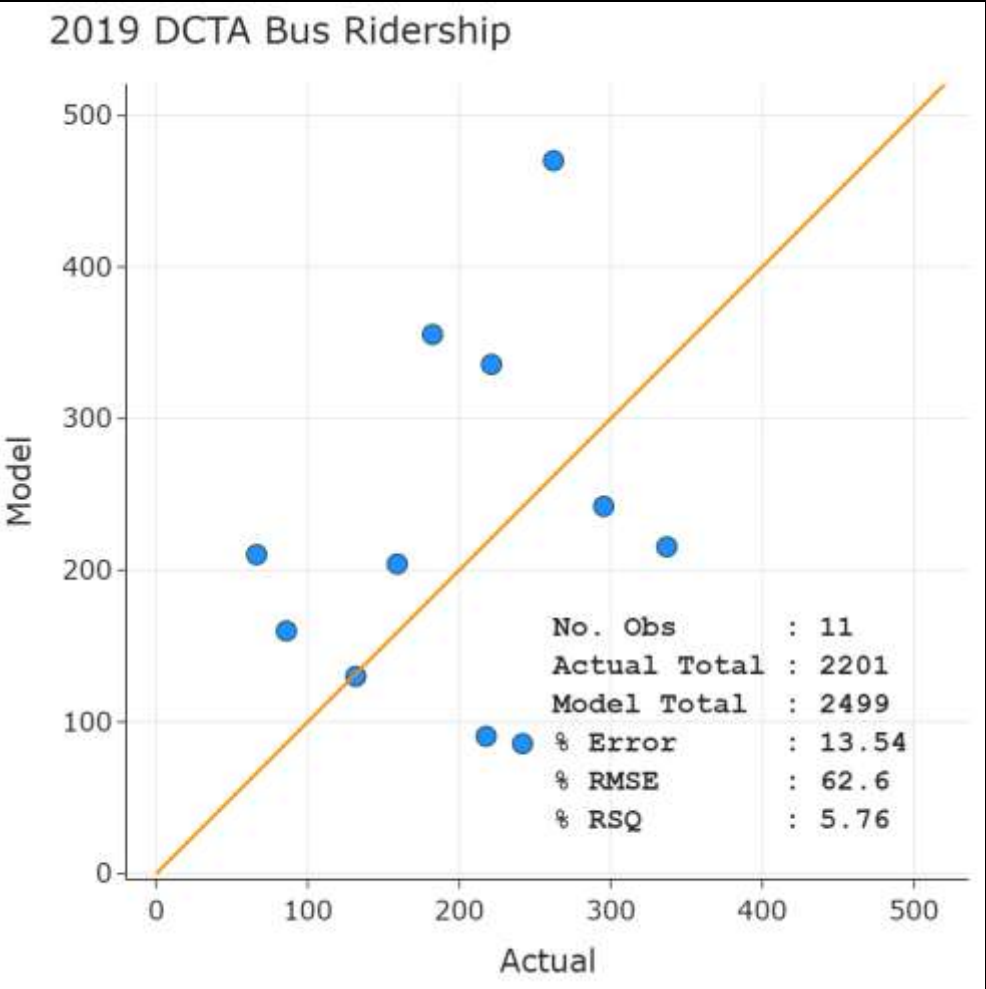
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2019 FWTA BUS RIDERSHIP COMPARISON





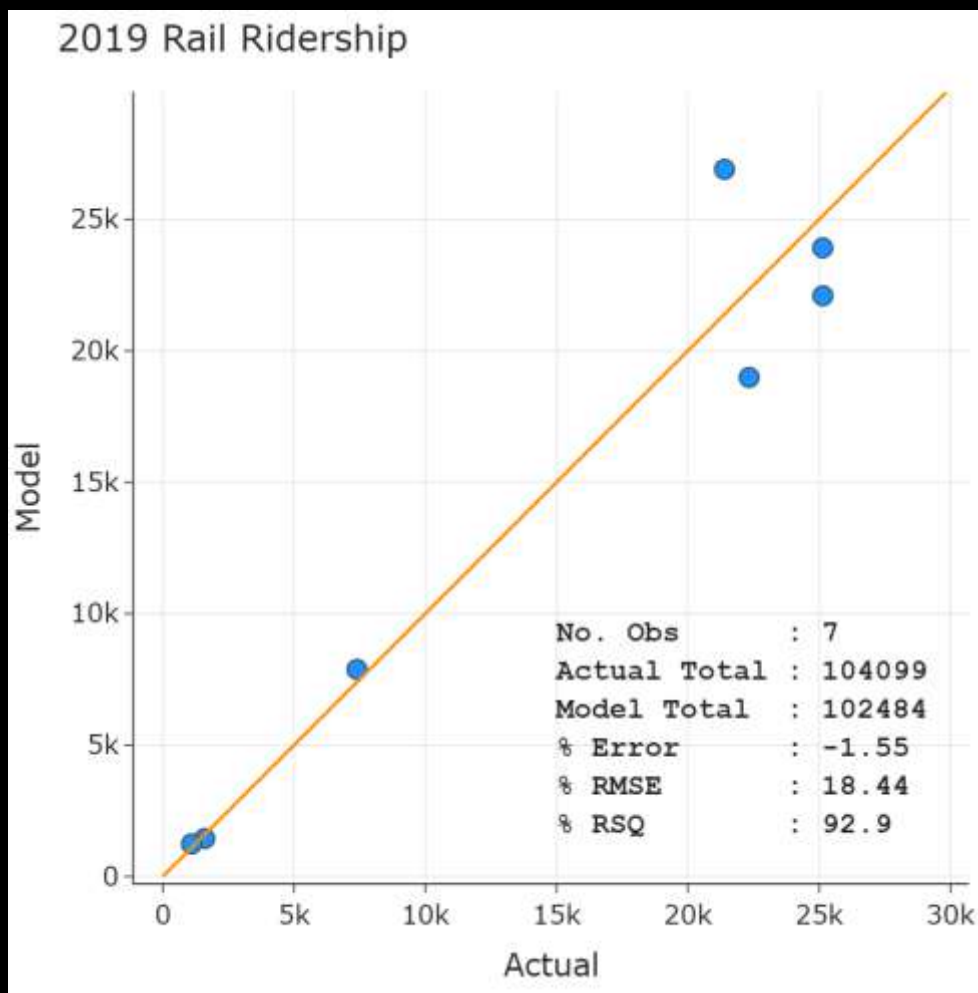
2019 DCTA BUS RIDERSHIP COMPARISON





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2019 RAIL ROUTE RIDERSHIP COMPARISON





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2019 RAIL STATION RIDERSHIP COMPARISON

