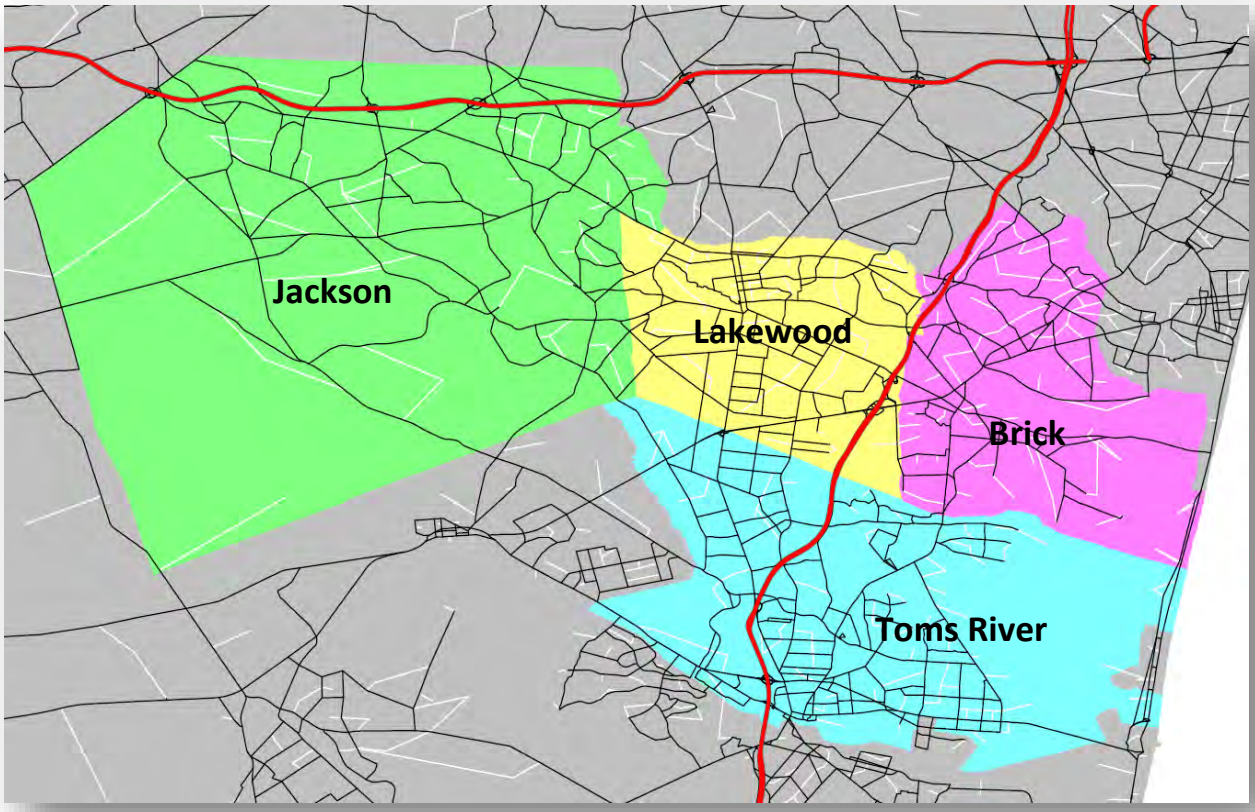
Ocean County Transportation Model:

2017 MODEL UPDATE

Draft Report

LIMITED CALIBRATION FOCUSING ON LAKEWOOD, BRICK, TOMS RIVER, AND JACKSON



Prepared by:

Stantec

August 31, 2017

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EXECUTIVE SUMMARY

Introduction (Chapter 1)

The objectives of the OCTM (Ocean County Transportation Model) Update are as follows:

- The model calibration will be performed primarily on the highway assignment module, and to lesser extent, the trip generation module.

- The highway assignment calibration will be focused in replicating traffic counts in the four townships including Lakewood, Brick, Toms River, and Jackson, with an extra focus on Lakewood Townships. These four northern townships are the focus region of this calibration / validation.

- The MPO's SED estimates will be reviewed and discussed with the four townships, and the SED will be adjusted if necessary to reflect the township estimates, based on various housing and commercial permits applications and townships' development plans.

- The hot-spot locations in those four townships will be identified in base and future year scenarios. Selected highway improvements will be tested and the impact of these improvements to the traffic congestion will be assessed.

The level of estimates provided by the Regional / County Model is limited to 'macroscopic' level. Given the geographic coverage of the model, it is nearly impossible to replicate all observed data at detail-level. For example, it is nearly impossible for the model to estimate traffic volumes that replicate traffic counts at all roadways. The macroscopic model is designed to provide 'general' trend of the traffic, such as growth trend, hot-spot locations, due to increased future travel demand driven by socioeconomic data including population, household, and employments. The regional model can also be used to estimate traffic diversion trend due to certain roadway improvements that potentially re-route traffic from one roadway to another.

For the more detail studies, such as traffic impact studies at *corridor level*, a more refined modeling platform, such as microscopic model or traffic simulation model, should be used in order to accurately estimate traffic at this level.

OCTM Model Update (Chapter 2)

The OCTM Model Update included refinements to the TAZ (Traffic Analysis Zones) System, SED, and highway network, as follows:

- TAZ System Update:
  The TAZ system was slightly adjusted to be consistent with the updated NJRTM-E, that is currently on-going, and the MCTDM (Monmouth County Travel Demand Model), that was recently completed. In this refinement, the TAZs outside Ocean and Monmouth Counties

were kept consistent with the updated NJRTM-E, while the TAZs within Monmouth and Ocean Counties were further refined.

- SED Update:
  As part of the on-going NJRTM-E Revalidation, NJTPA's FY2018 Regional Conformity Determination, and the recently completed MCTDM Model Development Projects, NJTPA provided a newer SED estimates. These estimates are based on the MPOs's latest SED projections and were used as the baseline SED in this project.

- Highway Network Update:
  The OCTM highway network was updated to be consistent with the MCTDM. The highway network consists of 3248 TAZs and additional roadway refinements were done within Monmouth County. The comparison the current and updated highway network is shown in Figure E-1. The comparison was focused on the Monmouth and Ocean Counties. The highway network within Ocean County was very similar to the original OCTM since the refinements were done when the OCTM was updated in 2013.

Data Collection (Chapter 3)

Data collection effort was primarily focused on the obtaining traffic counts data within three years of the calibration year (2015). The count data between 2012 and 2017 were collected from various sources including:

- The Ocean County traffic count data provided by the County Project Manager.
- The NJDOT count database which is available on NJDOT's website.
- Garden State Parkway (GSP) count data from New Jersey Turnpike Authority (NJTA).
- Traffic count data from the recent MCTDM Project, especially the counts along roadways near the focus region (the four townships).

As part of the calibration process, Ocean County and Stantec staff have contacted and discussed with Township Engineers from the four townships. As part of the discussions, Turning Movement Counts (TMC) were provided to Stantec. However, these counts could not be used in the County Model Update. Only Automatic Traffic Recording (ATR) counts were used in the calibration process. Figure E-2 shows roadway segments within Ocean County that have traffic counts data.

Figure E-1 OCTM10 and OCTM15 Highway Network Comparison

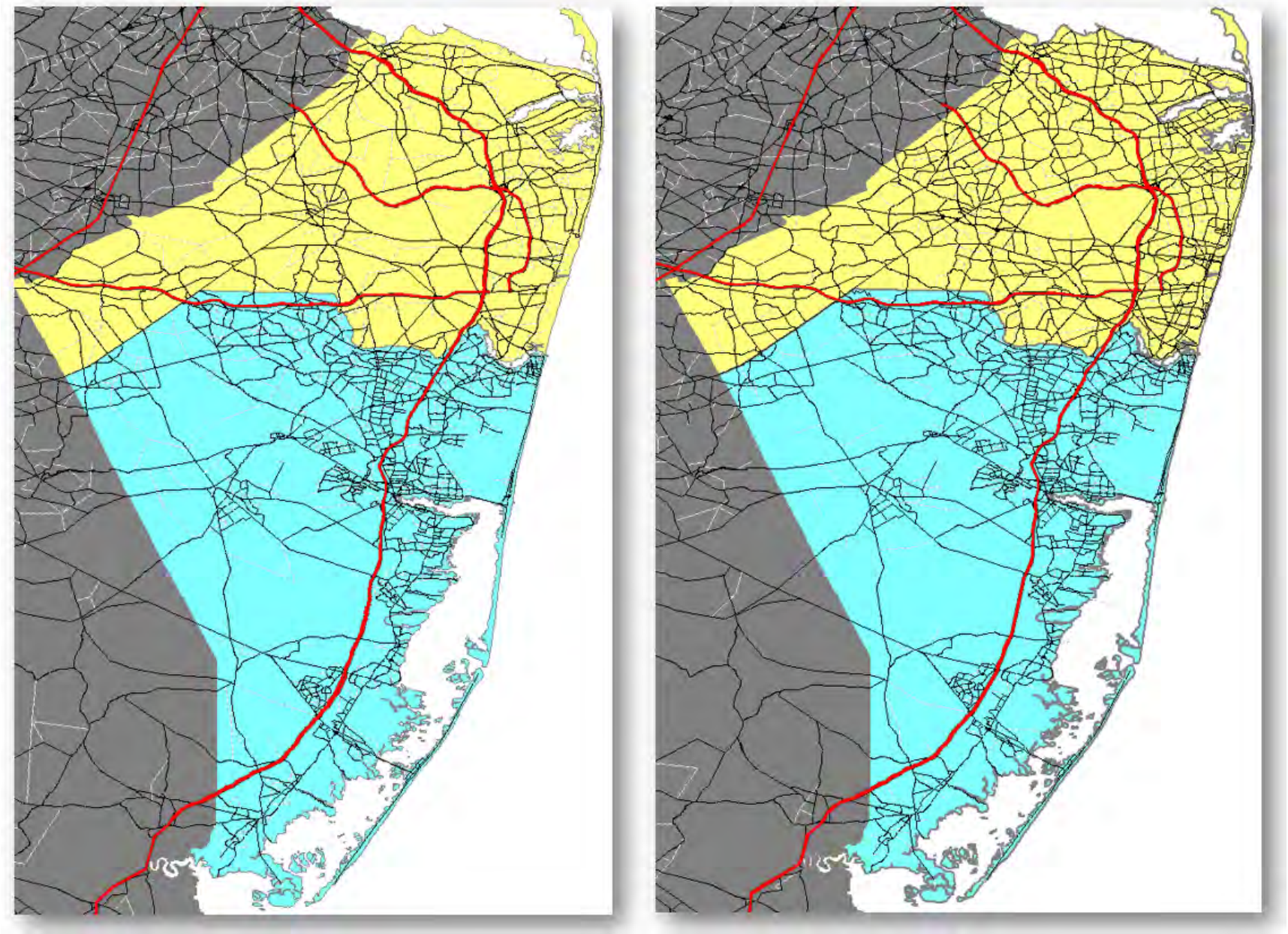
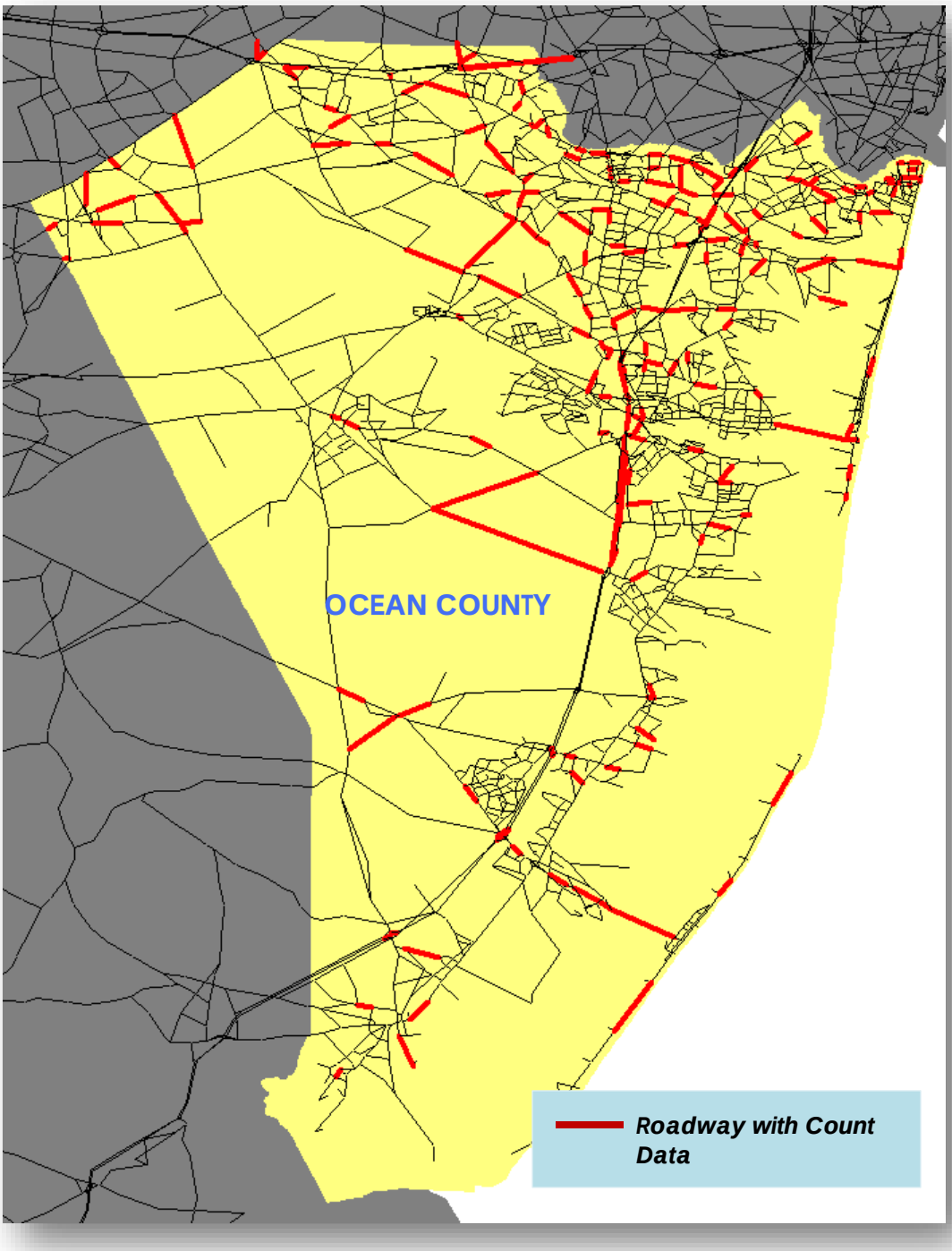


Figure E-2 Roadway Segments Within Ocean County with Count Data



Model Validation (Chapter 4)

Adjusted Socioeconomic Data

Prior to model validation process, Ocean County and Stantec Staff met with the four townships' engineers and other staff in March 2017 to discuss the baseline socioeconomic data provided by NJTPA for reasonableness check. The NJTPA's baseline socioeconomic data were provided to each township for review and comments. Table E-1 to E-4 show the NJTPA's baseline socioeconomic data by TAZ for the four townships by Traffic Analysis Zones (TAZs). Figure E-3 to E-6 display the TAZ system for the four townships.

A discussion with Lakewood Township Engineer concluded that the NJTPA's SED estimates for base year (2015) are slightly too low. Lakewood Township estimated that the base year population is 115,765 compared to NJTPA's estimate of 95,277. The township's household estimate is 26,022, slightly higher than the NJTPA's estimate of 24,918. Similarly, the average household size estimated by NJTPA and Lakewood Township is 3.8 and 4.5, respectively. The average household size is calculated as total population divided by total households. The Lakewood Township socioeconomic data was adjusted to match the control total provided by the townships, and the zonal SED was increased proportionately. Table E-5 shows the adjusted base year SED for Lakewood Township.

The SED for Brick Township was also adjusted based on the inputs from the township, Three TAZs were adjusted to reflect the current and future development plans and more realistic estimates. The three adjusted TAZs include TAZs 3196, 3216, and 3227. Table 4.6 lists the adjusted SED by TAZ for Brick Township.

After reviewing the baseline SED from NJTPA, Toms River and Jackson Township Staff deemed that the data is reasonable. Therefore, there SED for the two townships were not adjusted.

It should be noted there is no additional information was provided to Ocean County and Stantec regarding any updates on socioeconomic adjustments after these meetings.

Figure E-3 Lakewood Township TAZ System

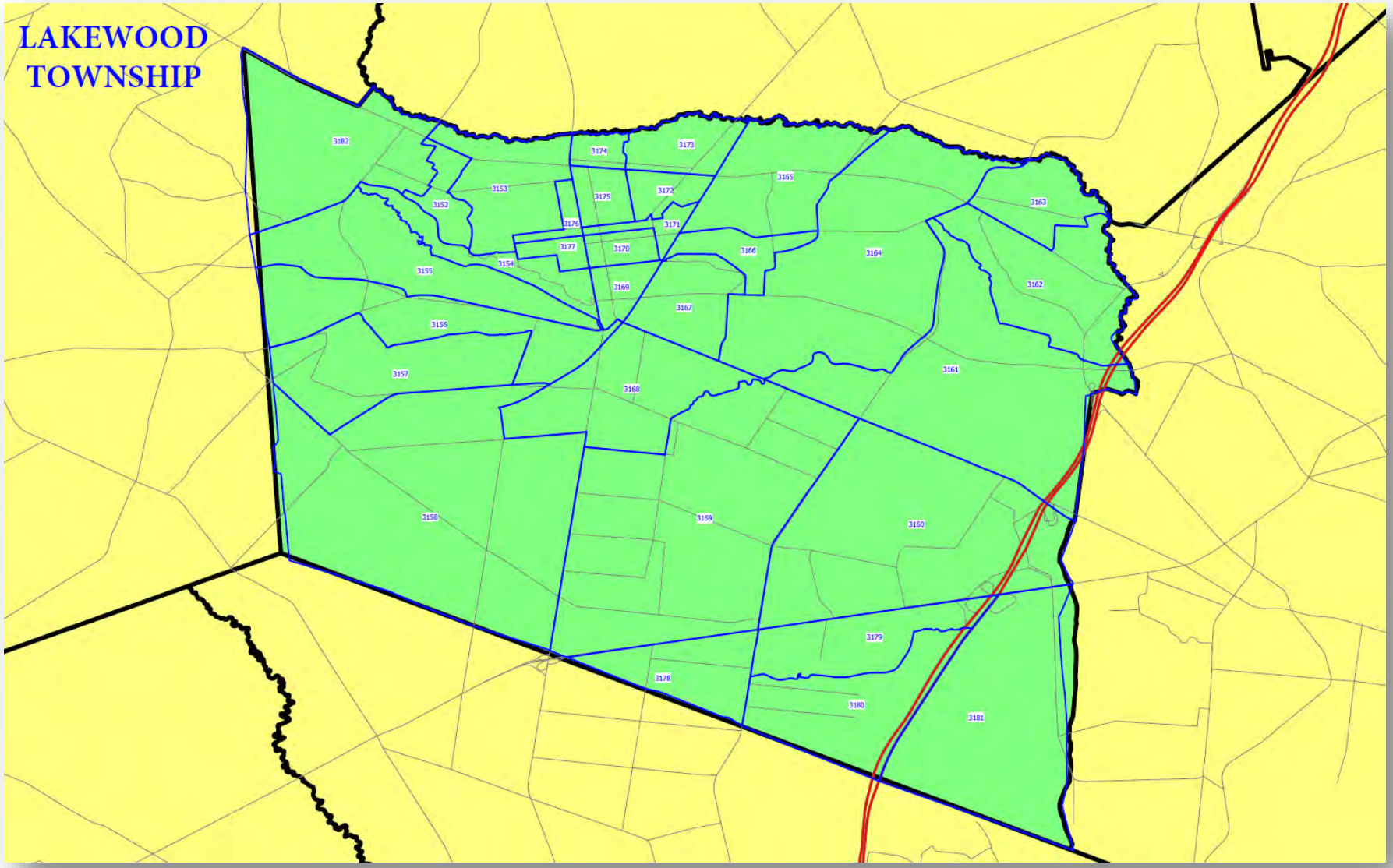


Table E-1 Baseline SED for Lakewood Township

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3152	1,532	241	64	1,644	260	68	2,010	323	73
3153	2,856	418	1,652	3,064	452	1,747	3,747	561	1,887
3154	2,585	538	357	2,724	570	383	3,166	671	422
3155	3,973	1,029	168	4,177	1,087	194	4,828	1,271	236
3156	6,496	1,051	404	6,829	1,110	467	7,894	1,297	568
3157	1,360	263	24	1,429	278	28	1,652	325	34
3158	9,687	2,896	3,641	10,509	3,166	3,818	12,312	3,754	4,103
3159	5,901	1,404	4,047	6,727	1,620	4,193	9,279	2,289	4,420
3160	0	0	5,774	0	0	5,983	0	0	6,307
3161	2,628	873	5,120	2,783	930	5,301	3,316	1,123	5,610
3162	1,804	507	40	1,911	540	41	2,277	652	43
3163	1,259	309	126	1,334	329	130	1,589	397	138
3164	3,249	722	348	3,442	769	361	4,100	929	382
3165	5,716	838	595	6,069	894	632	6,882	1,024	691
3166	2,958	507	345	3,141	542	366	3,562	620	400
3167	4,803	1,053	458	5,099	1,124	486	5,783	1,287	532
3168	6,596	1,271	1,850	7,082	1,374	1,946	8,394	1,650	2,092
3169	655	165	2,141	692	175	2,216	810	208	2,332
3170	3,165	675	633	3,342	717	655	3,912	849	690
3171	2,031	399	286	2,145	424	296	2,511	502	311
3172	2,345	357	95	2,458	376	101	2,821	436	109
3173	3,985	890	448	4,177	937	474	4,794	1,087	516
3174	991	396	233	1,039	417	246	1,193	484	268
3175	1,974	259	703	2,069	273	744	2,375	316	810
3176	1,514	346	482	1,596	366	518	1,855	431	571
3177	2,217	447	158	2,336	473	169	2,716	556	186
3178	2,241	1,153	536	2,385	1,232	598	2,853	1,484	701
3179	1,670	1,220	639	1,754	1,276	708	2,023	1,449	827
3180	2,748	1,466	2	2,887	1,533	3	3,329	1,742	3
3181	4,225	2,764	575	4,472	2,899	660	5,272	3,330	801
3182	2,113	461	214	2,267	498	226	2,772	618	244
TOTAL	**95,277**	**24,918**	**32,158**	**101,583**	**26,641**	**33,758**	**120,027**	**31,665**	**36,307**

Figure E-4 Brick Township TAZ System

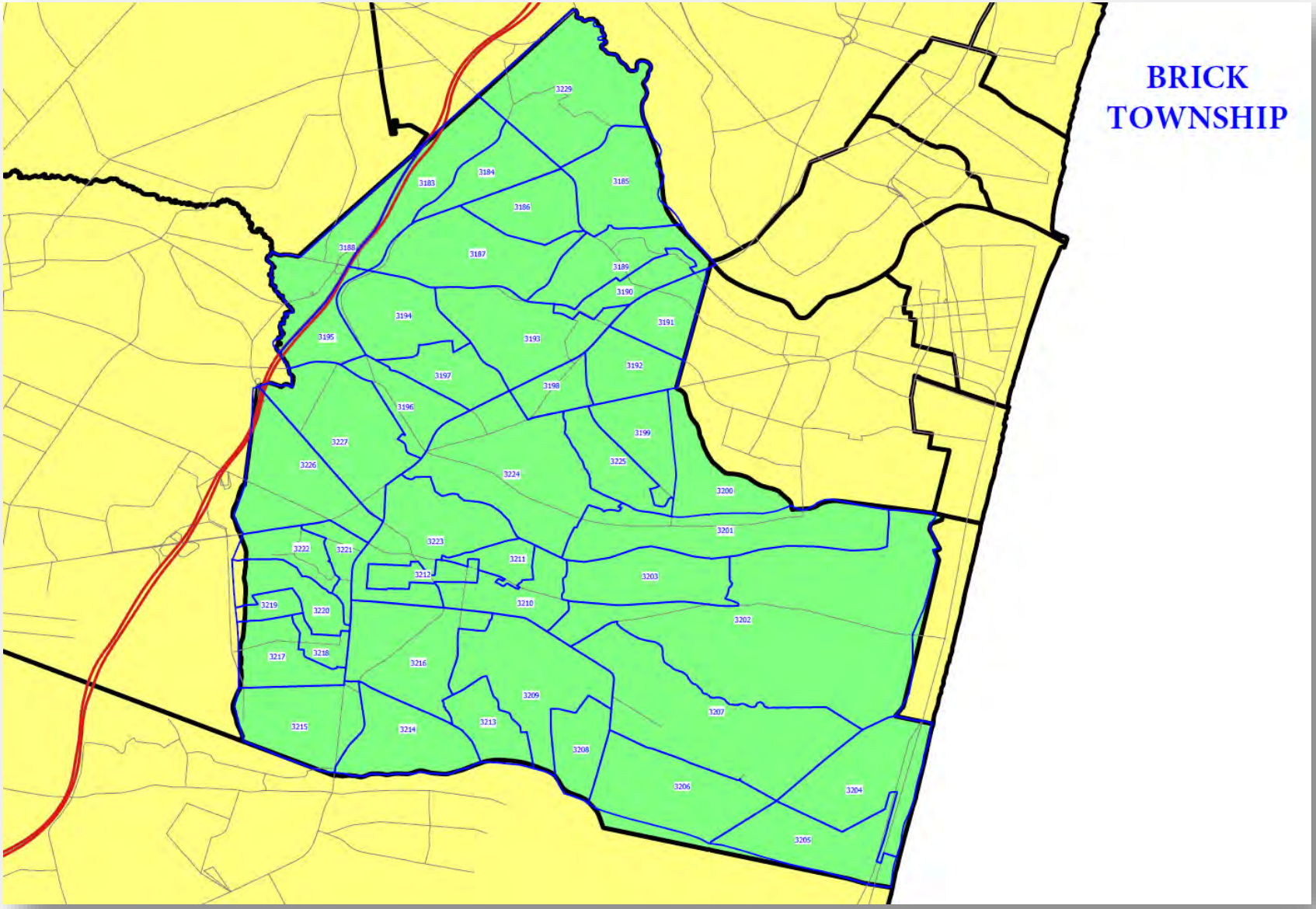


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Table E-2 Baseline SED for Brick Township

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3183	2,564	973	77	2,707	1,032	102	3,009	1,161	131
3184	1,351	449	104	1,426	477	139	1,585	536	179
3185	1,175	534	91	1,256	574	112	1,512	701	145
3186	2,891	1,078	62	3,018	1,130	68	3,427	1,296	77
3187	2,054	1,045	724	2,145	1,095	793	2,435	1,256	899
3188	3,079	1,212	23	3,232	1,278	24	3,729	1,491	25
3189	2,550	921	279	2,656	963	294	2,997	1,096	318
3190	1,520	555	165	1,583	580	173	1,787	661	188
3191	903	440	91	944	463	111	1,062	525	144
3192	1,870	650	122	1,957	683	149	2,200	775	193
3193	2,761	1,019	1,196	2,876	1,066	1,258	3,245	1,214	1,363
3194	2,646	1,451	304	2,772	1,526	323	3,185	1,766	358
3195	1,131	352	99	1,188	371	103	1,370	433	108
3196	1,007	373	4,035	1,057	393	4,171	1,220	459	4,386
3197	1,617	713	943	1,694	750	1,002	1,946	868	1,109
3198	1,573	708	40	1,645	744	48	1,850	845	62
3199	2,383	812	187	2,517	862	216	2,884	1,000	262
3200	1,206	455	14	1,280	486	21	1,423	546	28
3201	1,389	616	89	1,474	658	132	1,638	740	174
3202	2,283	816	599	2,402	863	654	2,791	1,014	746
3203	1,277	538	45	1,344	569	49	1,561	669	56
3204	506	253	134	544	274	148	616	314	160
3205	241	122	135	260	132	149	294	151	161
3206	725	314	9	759	331	14	866	381	23

Table E-2 Continued

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3207	2,725	1,046	60	2,853	1,100	95	3,254	1,267	154
3208	977	396	21	1,057	432	22	1,200	495	26
3209	2,776	1,068	164	3,006	1,165	179	3,411	1,335	205
3210	1,506	544	389	1,569	569	404	1,771	648	425
3211	872	344	37	908	360	38	1,025	410	40
3212	1,496	509	68	1,559	532	71	1,759	606	75
3213	1,039	417	7	1,125	455	7	1,276	522	9
3214	1,829	771	2	1,922	814	2	2,229	955	3
3215	1,400	785	1,687	1,472	829	1,780	1,707	972	1,918
3216	1,628	581	578	1,762	634	631	2,000	727	722
3217	1,766	753	208	1,843	789	221	2,089	903	244
3218	744	258	110	777	270	117	880	309	129
3219	1,382	470	58	1,441	493	62	1,634	564	69
3220	814	282	16	849	295	17	962	338	18
3221	837	304	637	873	319	677	989	365	749
3222	697	241	124	728	252	131	825	289	145
3223	2,561	1,020	3,395	2,667	1,067	3,528	3,011	1,216	3,707
3224	3,125	1,308	1,180	3,308	1,392	1,252	3,906	1,665	1,378
3225	1,390	469	194	1,468	498	225	1,682	578	272
3226	1,712	598	2,543	2,024	718	2,639	2,378	854	2,788
3227	2,232	1,163	1,029	2,638	1,397	1,068	3,099	1,662	1,128
Total	**76,225**	**29,726**	**22,074**	**80,610**	**31,680**	**23,419**	**91,759**	**36,578**	**25,499**

Figure E-5 Toms River Township TAZ System

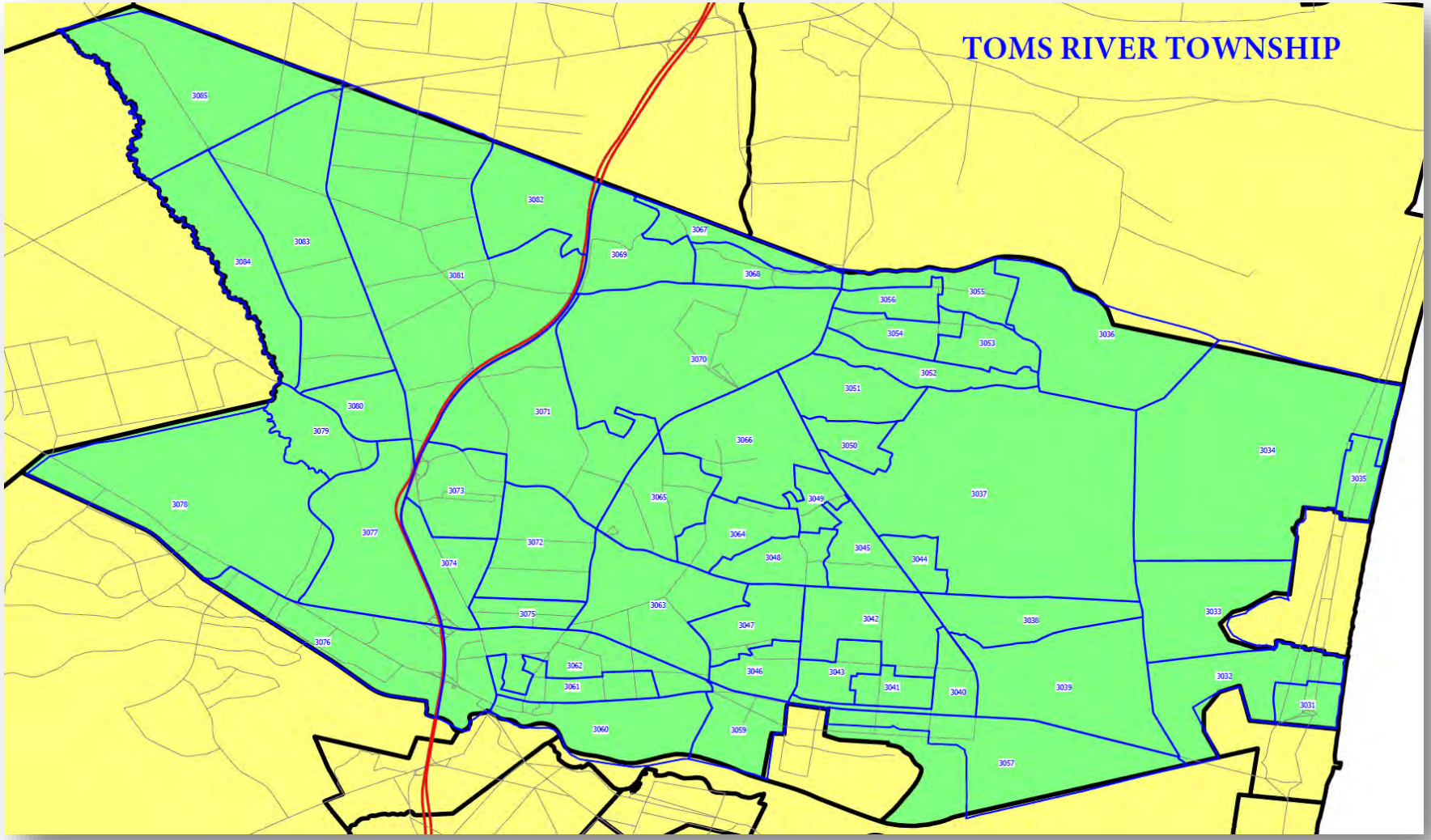

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Table E-3 Baseline SED for Toms River Township

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3031	452	239	19	490	259	30	490	259	30
3032	741	430	66	804	466	106	804	466	106
3034	866	487	76	945	529	88	1,002	560	92
3035	346	220	259	378	238	299	401	252	313
3036	1,564	667	42	1,654	709	49	1,742	751	56
3037	1,277	430	431	1,339	453	461	1,519	519	510
3038	1,322	567	300	1,395	602	336	1,476	640	372
3039	1,923	790	169	2,029	838	190	2,147	892	210
3040	1,063	382	445	1,119	404	508	1,186	431	567
3041	1,637	600	26	1,723	635	30	1,826	678	33
3042	2,136	697	169	2,250	738	193	2,384	787	215
3043	1,868	670	38	1,968	709	43	2,085	756	48
3044	1,127	398	178	1,181	419	190	1,340	480	211
3045	1,849	632	118	1,977	680	161	2,049	707	176
3046	1,552	482	244	1,647	515	257	1,867	591	278
3047	1,981	662	63	2,102	706	66	2,383	811	71
3048	1,586	519	105	1,696	558	143	1,757	581	157
3049	1,042	356	16	1,114	383	22	1,154	399	24
3050	667	299	33	699	315	35	793	361	39
3051	1,061	475	196	1,132	510	239	1,272	581	278
3052	1,599	633	142	1,706	679	173	1,915	772	201
3053	1,304	487	77	1,391	522	94	1,562	594	109
3054	1,462	471	129	1,547	501	153	1,629	531	175
3055	1,115	392	153	1,179	417	181	1,241	441	206

Table E-3 Continued

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3056	1,387	460	179	1,467	489	213	1,545	518	243
3057	1,724	717	156	1,871	785	228	1,871	785	230
3059	1,261	515	239	1,382	569	264	1,539	641	287
3060	1,123	457	751	1,232	506	830	1,371	570	900
3061	1,193	464	3,952	1,276	500	4,080	1,543	614	4,258
3062	3,033	1,131	4,463	3,243	1,217	4,608	3,924	1,495	4,808
3063	2,844	907	2,171	3,018	968	2,282	3,421	1,112	2,470
3064	1,488	480	70	1,599	520	73	1,956	646	76
3065	1,688	647	5,887	1,814	700	6,142	2,219	869	6,440
3066	1,545	509	1,246	1,660	550	1,300	2,031	684	1,363
3067	921	628	53	986	669	66	1,196	794	85
3068	675	388	101	723	413	125	877	490	162
3069	885	510	152	949	542	188	1,150	644	243
3070	2,262	726	619	2,433	787	653	2,980	979	710
3071	1,792	539	1,320	1,927	584	1,391	2,360	726	1,512
3072	2,863	985	1,585	3,061	1,060	1,673	3,703	1,301	1,816
3073	2,842	1,079	575	3,015	1,151	618	3,423	1,324	688
3074	2,249	868	908	2,386	926	976	2,710	1,064	1,087
3075	1,962	706	812	2,098	760	857	2,538	933	930
3076	2,670	986	5,450	2,885	1,073	5,634	3,629	1,374	5,919
3077	1,121	383	925	1,211	417	956	1,524	533	1,005
3078	1,641	508	2,691	1,773	553	2,782	2,231	707	2,923
3079	680	219	22	880	290	23	1,015	339	25
3080	1,062	544	954	1,374	722	1,000	1,585	843	1,058
3081	4,795	1,441	2,520	5,091	1,539	2,682	6,033	1,848	2,940
3082	1,913	1,164	25	2,031	1,243	27	2,407	1,493	29
3083	4,206	1,557	2,758	5,444	2,065	2,890	6,280	2,411	3,058
3084	2,296	869	253	2,971	1,154	265	3,427	1,347	281
3085	5,045	2,288	357	5,318	2,424	445	6,194	2,856	597
TOTAL	**92,721**	**34,660**	**44,688**	**100,608**	**37,961**	**47,318**	**114,746**	**43,780**	**50,620**

Figure E-6 Jackson Township TAZ System

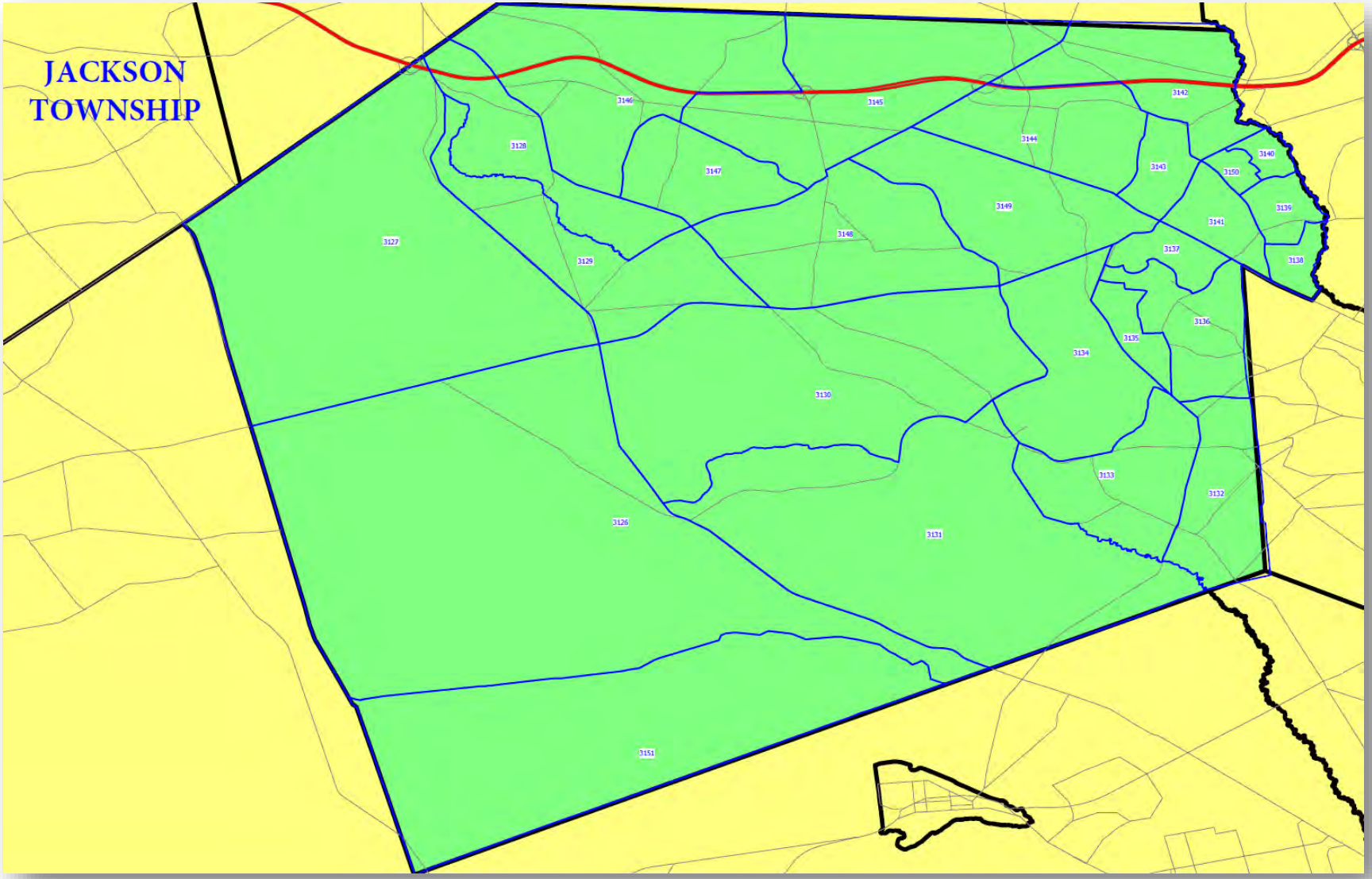

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Table E-4 Baseline SED for Jackson Township

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3126	830	294	167	991	357	216	1,396	517	279
3127	947	309	107	1,068	352	123	1,362	458	141
3128	2,220	634	1,373	2,504	723	1,574	3,193	940	1,807
3129	2,998	910	257	3,382	1,038	295	4,312	1,349	339
3130	2,817	958	968	3,365	1,163	1,257	4,740	1,683	1,624
3131	2,245	868	282	2,682	1,053	366	3,778	1,524	473
3132	1,282	426	504	1,413	474	535	1,675	569	572
3133	1,375	447	239	1,516	497	254	1,797	597	271
3134	5,020	2,256	4,266	5,534	2,509	4,532	6,560	3,014	4,845
3135	1,415	696	242	1,483	733	286	1,696	847	355
3136	2,884	1,044	105	3,023	1,099	125	3,456	1,269	154
3137	3,232	1,241	224	3,388	1,307	265	3,873	1,510	328
3138	1,897	555	116	1,992	586	125	2,189	651	135
3139	954	287	87	1,017	308	117	1,017	308	117
3140	948	295	4	1,010	316	6	1,010	316	6
3141	2,744	1,114	913	2,882	1,176	982	3,166	1,306	1,058
3142	2,675	794	458	2,815	840	494	3,238	977	543
3143	2,958	877	555	3,113	927	599	3,581	1,078	658
3144	3,214	909	703	3,383	961	759	3,891	1,118	834
3145	2,463	1,115	385	3,344	1,556	472	3,705	1,743	531
3146	2,551	751	1,118	3,463	1,048	1,372	3,838	1,174	1,544
3147	1,598	549	38	2,169	766	47	2,403	859	52
3148	2,183	684	150	2,964	955	184	3,284	1,070	207
3149	4,862	1,980	271	5,324	2,186	355	6,074	2,523	472
3150	989	306	74	1,054	328	99	1,054	328	99
3151	50	14	0	50	14	0	50	14	0
TOTAL	**57,351**	**20,313**	**13,606**	**64,929**	**23,272**	**15,439**	**76,338**	**27,742**	**17,444**

Table E-5 Adjusted SED by TAZ for Lakewood Township

TAZ	2015		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3152	1,861	252	67
3153	3,470	437	1,725
3154	3,141	562	373
3155	4,827	1,075	175
3156	7,893	1,098	422
3157	1,652	275	25
3158	11,770	3,024	3,802
3159	7,170	1,466	4,226
3160	0	0	6,030
3161	3,193	912	5,347
3162	2,192	529	42
3163	1,530	323	132
3164	3,948	754	363
3165	6,945	875	621
3166	3,594	529	360
3167	5,836	1,100	478
3168	8,014	1,327	1,932
3169	796	172	2,236
3170	3,846	705	661
3171	2,468	417	299
3172	2,849	373	99
3173	4,842	929	468
3174	1,204	414	243
3175	2,398	270	734
3176	1,840	361	503
3177	2,694	467	165
3178	2,723	1,204	560
3179	2,029	1,274	667
3180	3,339	1,531	2
3181	5,134	2,886	600
3182	2,567	481	223
TOTAL	**115,765**	**26,022**	**33,580**

Table E-6 Adjusted SED by TAZ for Brick Township

TAZ	2015		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3183	2,564	973	77
3184	1,351	449	104
3185	1,175	534	91
3186	2,891	1,078	62
3187	2,054	1,045	724
3188	3,079	1,212	23
3189	2,550	921	279
3190	1,520	555	165
3191	903	440	91
3192	1,870	650	122
3193	2,761	1,019	1,196
3194	2,646	1,451	304
3195	1,131	352	99
3196	1,007	373	4,310
3197	1,617	713	943
3198	1,573	708	40
3199	2,383	812	187
3200	1,206	455	14
3201	1,389	616	89
3202	2,283	816	599
3203	1,277	538	45
3204	506	253	134
3205	241	122	135
3206	725	314	9
3207	2,725	1,046	60
3208	977	396	21
3209	2,776	1,068	164
3210	1,506	544	389
3211	872	344	37
3212	1,496	509	68
3213	1,039	417	7
3214	1,829	771	2
3215	1,400	785	1,687
3216	1,828	652	578
3217	1,766	753	208
3218	744	258	110
3219	1,382	470	58
3220	814	282	16
3221	837	304	637
3222	697	241	124
3223	2,561	1,020	3,395
3224	3,125	1,308	1,180
3225	1,390	469	194
3226	1,712	598	2,543
3227	2,682	1,397	1,029

Adjusted TAZ

Validation Results

The focus of the model validation is to compare the estimated traffic volumes to the traffic counts focusing on the four-township region. Although the focus is on the four-township, the county-wide comparison is also provided to ensure that the county-wide performance is still within a reasonable tolerance. The average weekday traffic volume comparison at county-level is shown on Table E-7.

Table E-7 Observed and Estimated Traffic Volume Comparison at County-Level

FACILITY TYPE	VOLUME			
	OBSERVED	ESTIMATED	EST/OBS	COUNTS
Limited-Access Facility	1,353,726	1,325,032	0.98	33
Expressway	--	--	--	--
Principal Arterial Divided	346,036	334,685	0.97	22
Principal Arterial Undivided	447,186	458,756	1.03	46
Minor Arterial Divided	--	--	--	--
Minor Arterial Undivided	976,295	1,020,221	1.04	120
Minor Arterials	528,281	494,334	0.94	118
Collector/Local	121,083	120,614	1.00	40
TOTAL	**3,772,607**	**3,753,642**	**0.99**	**379**

At County-Level the total estimated traffic volumes replicated the observed traffic counts well. At a more disaggregated comparison, the difference between the observed traffic count data and estimated traffic volumes by facility-type is generally within ten percent, which is within reasonable tolerance for a Regional Travel Demand Model.

The traffic volume comparison by township is shown in Table E-8. The difference between observed and estimated traffic volumes is between six percent lower in Brick Township and fourteen percent higher in Jackson.

Table E-8 Observed and Estimated Traffic Volume Comparison at County-Level

TOWNSHIP	VOLUME			
	OBSERVED	ESTIMATED	EST/OBS	COUNTS
Lakewood	549,655	584,163	1.06	43
Toms River	1,189,752	1,133,803	0.95	68
Brick	194,291	186,352	0.96	24
Jackson	313,421	337,799	1.08	50
TOTAL	**2,247,119**	**2,242,117**	**1.00**	**185**

In addition to the traffic volume comparison, the congestion level or hot-spots in the four townships were also assessed as part of the model validation process. The OCTM highway assignment module consists of four time-of-day periods model, including:

- AM Peak period between 6AM and 9AM
- Midday period between 9AM and 3PM
- PM Peak period between 3PM and 6PM
- Night between 6PM and 6AM

The estimated hot-spots locations along major corridors by township, including their lane configurations, are provided in Table E-9 to Table E-12.

These tables only focus on major corridors in the townships. It is important to note that the regional model may not be able to estimate the congestion at local roads accurately since many local roads were not included in the highway network. The regional model can only estimate the hot-spots caused by traffic demand, and not by traffic control devices such as intersection delays. Additional studies at microscopic-level (microsimulation) for selected corridors may be warranted to provide more detail estimates on various congestion measures, such as model estimated traffic volumes on a more refined time-period (hourly instead of by period), intersection delays, etc.

Table E-9 Estimated Hot-Spot Locations in Lakewood Township for Year 2015

ROAD NAME	JURISDICTION	LIMIT	NO. OF LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
US 9	NJDOT	Between County Line Rd. and Route 88	2	1.1
		Between Route 88 and NJ 70	1	1.2
County Line Rd.	COUNTY	Between Heathwood Ave. and Brook Rd.	1	1.0
CR 88	COUNTY	Between US 9 and Garden State Parkway (localized congestion)	1	0.9
Cedar Bridge Ave.	COUNTY	Between Hurley Ave. and Garden State Parkway	2	0.9
NJ 70	NJDOT	Between US 9 and Garden State Parkway	2	0.9
Central Ave.	COUNTY	Between Cross St. and US 9	1	1.0
Hope Chapel Rd	COUNTY	Between County Line Rd. and Miller Rd.	1	1.4
New Hampshire Ave.	COUNTY	Between N. Maple Ave (Township Boundary Line) and Route 88	2	1.0
7th Ave / Ridge Ave.	COUNTY	Between US 9 and County Line Rd. (localized congestion)	1	0.9
Clifton Rd. / Hurley Rd.	COUNTY	Between US 9 and County Line Rd.	1	1.3

Table E-10 Estimated Hot-Spot Locations in Toms River Township for Year 2015

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
US 9	NJDOT	Between CR70 and Garden State Parkway	1	1.3
Hooper Ave.	COUNTY	Between NJ 37 and Church Rd.	2	1.0
NJ 70	NJDOT	Beween Whitesville Rd. and US 9	2	1.3

Table E-11 Estimated Hot-Spot Locations in Brick Township for Year 2015

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
NJ 70	NJDOT	Between Shorrock St. and Route 34	2	1.0
Route 88	COUNTY	Between Princeton Ave. and Jordan Rd.	1	0.9
Brick Blvd.	NJDOT	Church Rd. and Drum Point Rd.	2	1.2

Table E-12 Estimated Hot-Spot Locations in Jackson Township for Year 2015

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
Cooks Bridge Road	County	Between N. Hope Chapel Rd. and N. County Line Rd..	1	1.0
N. Hope Chapel Rd.	County	Between E. Veteran Highways and S. Cooks Bridge Rd.	1	0.9

FUTURE YEAR FORECASTS (Chapter 5)

Future Year Socioeconomic Data

The future socioeconomic data was also adjusted for Lakewood and Brick Township, consistent with the adjustment made for the base year SED. The SED adjustments were made by incorporating the projected SED information provided by the two townships. The updated 2025 and 2040 SED for the two townships are shown in Table E-13 and E-14, respectively. As previously discussed, the SED for Toms River and Jackson Townships were not adjusted, and they are shown in Table E-3 and Table E-4, respectively.

Table E-13 Adjusted 2025 and 2040 SED for Lakewood Township

TAZ	2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3152	2,605	295	77	3,710	369	83
3153	4,855	512	1,979	6,916	641	2,157
3154	4,316	646	434	5,843	767	482
3155	6,619	1,231	220	8,911	1,453	270
3156	10,821	1,257	529	14,570	1,483	649
3157	2,264	315	32	3,049	372	39
3158	16,652	3,587	4,325	22,724	4,291	4,690
3159	10,659	1,835	4,750	17,126	2,617	5,052
3160	0	0	6,778	0	0	7,209
3161	4,410	1,054	6,006	6,120	1,284	6,413
3162	3,028	612	46	4,203	745	49
3163	2,114	373	147	2,933	454	158
3164	5,454	871	409	7,567	1,062	437
3165	9,617	1,013	716	12,702	1,171	790
3166	4,977	614	415	6,574	709	457
3167	8,080	1,273	551	10,673	1,471	608
3168	11,222	1,557	2,205	15,492	1,886	2,391
3169	1,096	198	2,511	1,495	238	2,666
3170	5,296	812	742	7,220	970	789
3171	3,399	480	335	4,634	574	355
3172	3,895	426	114	5,207	498	125
3173	6,619	1,062	537	8,848	1,243	590
3174	1,646	472	279	2,202	553	306
3175	3,278	309	843	4,383	361	926
3176	2,529	415	587	3,424	493	653
3177	3,701	536	191	5,013	636	213
3178	3,779	1,396	677	5,266	1,696	801
3179	2,779	1,446	802	3,734	1,656	945
3180	4,575	1,737	3	6,144	1,991	3
3181	7,086	3,284	748	9,730	3,806	916
3182	3,592	564	256	5,116	706	279
TOTAL	**160,963**	**30,182**	**38,244**	**221,528**	**36,196**	**41,501**

Table E-14 Adjusted 2025 and 2040 SED for Brick Township

TAZ	2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3183	2,707	1,032	102	3,009	1,161	131
3184	1,426	477	139	1,585	536	179
3185	1,256	574	112	1,512	701	145
3186	3,018	1,130	68	3,427	1,296	77
3187	2,145	1,095	793	2,435	1,256	899
3188	3,232	1,278	24	3,729	1,491	25
3189	2,656	963	294	2,997	1,096	318
3190	1,583	580	173	1,787	661	188
3191	944	463	111	1,062	525	144
3192	1,957	683	149	2,200	775	193
3193	2,876	1,066	1,258	3,245	1,214	1,363
3194	2,772	1,526	323	3,185	1,766	358
3195	1,188	371	103	1,370	433	108
3196	1,057	393	4,455	1,220	459	4,685
3197	1,694	750	1,002	1,946	868	1,109
3198	1,645	744	48	1,850	845	62
3199	2,517	862	216	2,884	1,000	262
3200	1,280	486	21	1,423	546	28
3201	1,474	658	132	1,638	740	174
3202	2,402	863	654	2,791	1,014	746
3203	1,344	569	49	1,561	669	56
3204	544	274	148	616	314	160
3205	260	132	149	294	151	161
3206	759	331	14	866	381	23
3207	2,853	1,100	95	3,254	1,267	154
3208	1,057	432	22	1,200	495	26
3209	3,006	1,165	179	3,411	1,335	205
3210	1,569	569	404	1,771	648	425
3211	908	360	38	1,025	410	40
3212	1,559	532	71	1,759	606	75
3213	1,125	455	7	1,276	522	9
3214	1,922	814	2	2,229	955	3
3215	1,472	829	1,780	1,707	972	1,918
3216	1,978	711	631	2,246	816	722
3217	1,843	789	221	2,089	903	244
3218	777	270	117	880	309	129
3219	1,441	493	62	1,634	564	69
3220	849	295	17	962	338	18
3221	873	319	677	989	365	749
3222	728	252	131	825	289	145
3223	2,667	1,067	3,528	3,011	1,216	3,707
3224	3,308	1,392	1,252	3,906	1,665	1,378
3225	1,468	498	225	1,682	578	272
3226	2,024	718	2,639	2,378	854	2,788
3227	3,170	1,678	1,068	3,724	1,996	1,128
TOTAL	**79,333**	**32,038**	**23,703**	**90,590**	**37,001**	**25,798**

Adjusted TAZ

Estimated Future Traffic and Hot-Spot Locations

The estimated future traffic and hot-spot locations were prepared for the 2025 and 2040 model year runs. The estimated daily traffic growth patterns between 2015 and 2025, and between 2025 and 2040 are shown schematically in Figure E-7 to E-14 for the four townships. The estimated 2025 and 2040 hot-spot locations by township are shown in Table E-15 to Table E-18.

Figure E-7 Traffic Growth Pattern between 2015 and 2025 in Lakewood Township

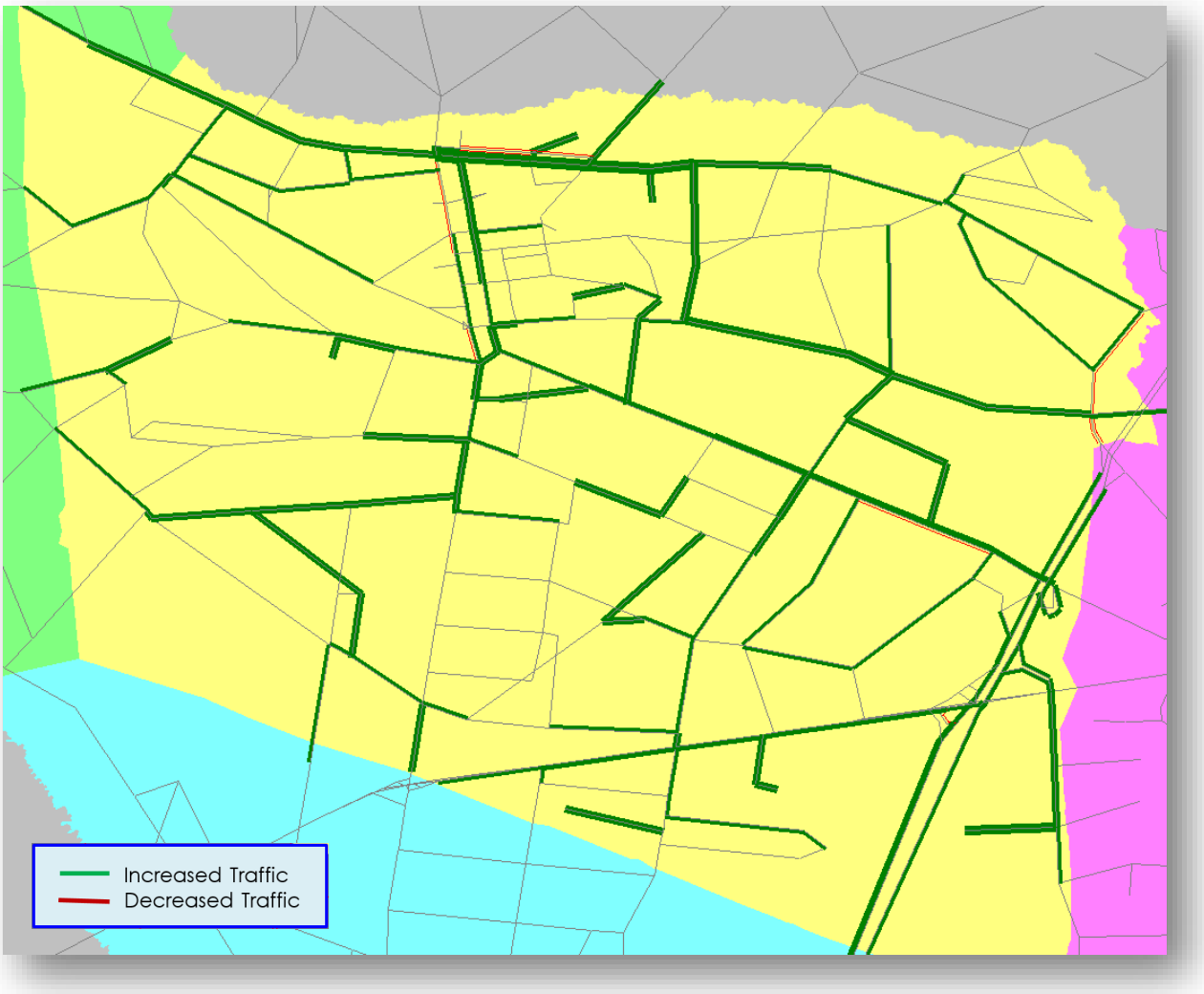

Figure E-8 Traffic Growth Pattern between 2025 and 2040 in Lakewood Township

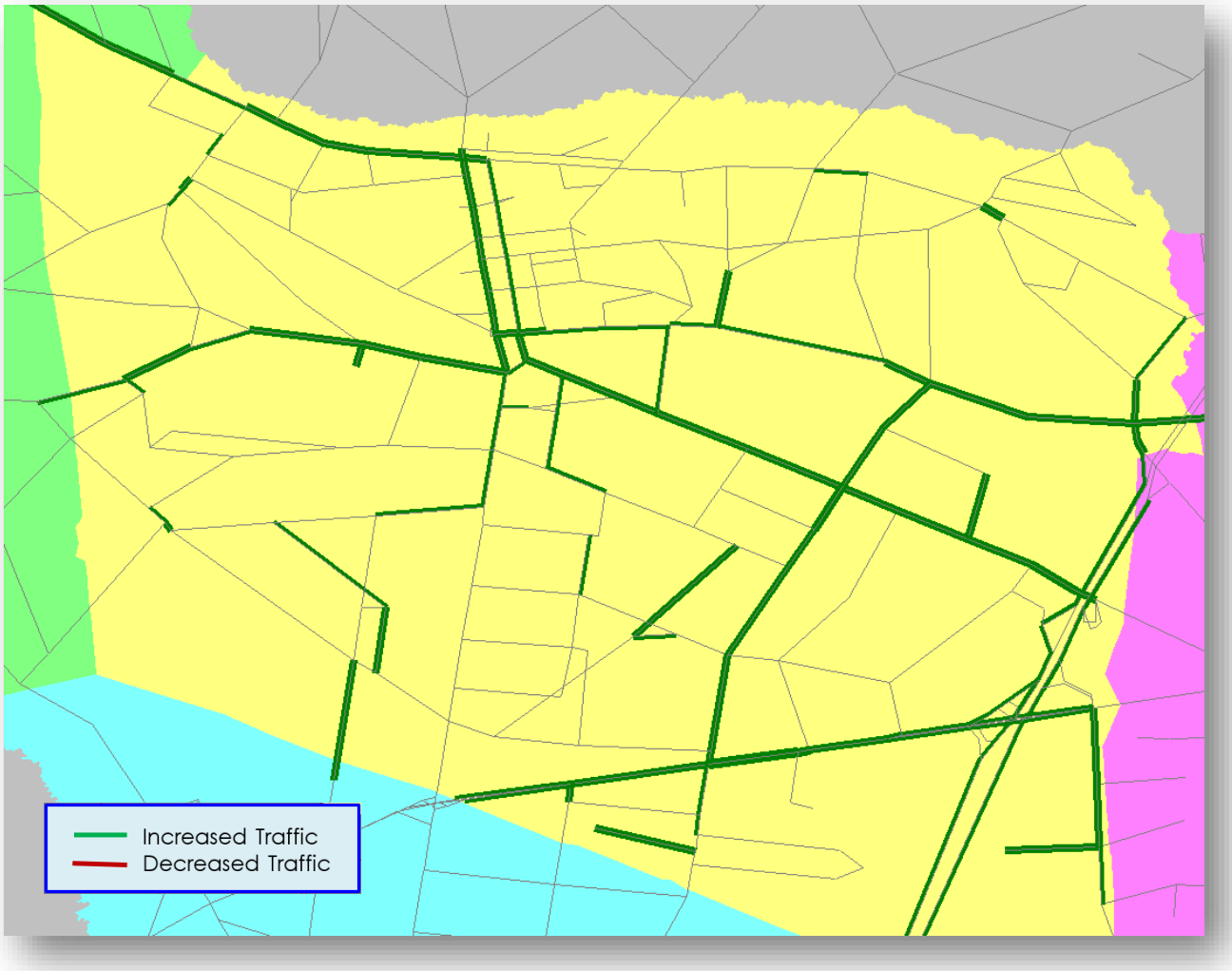

Figure E-9 Traffic Growth Pattern between 2015 and 2025 in Toms River Township

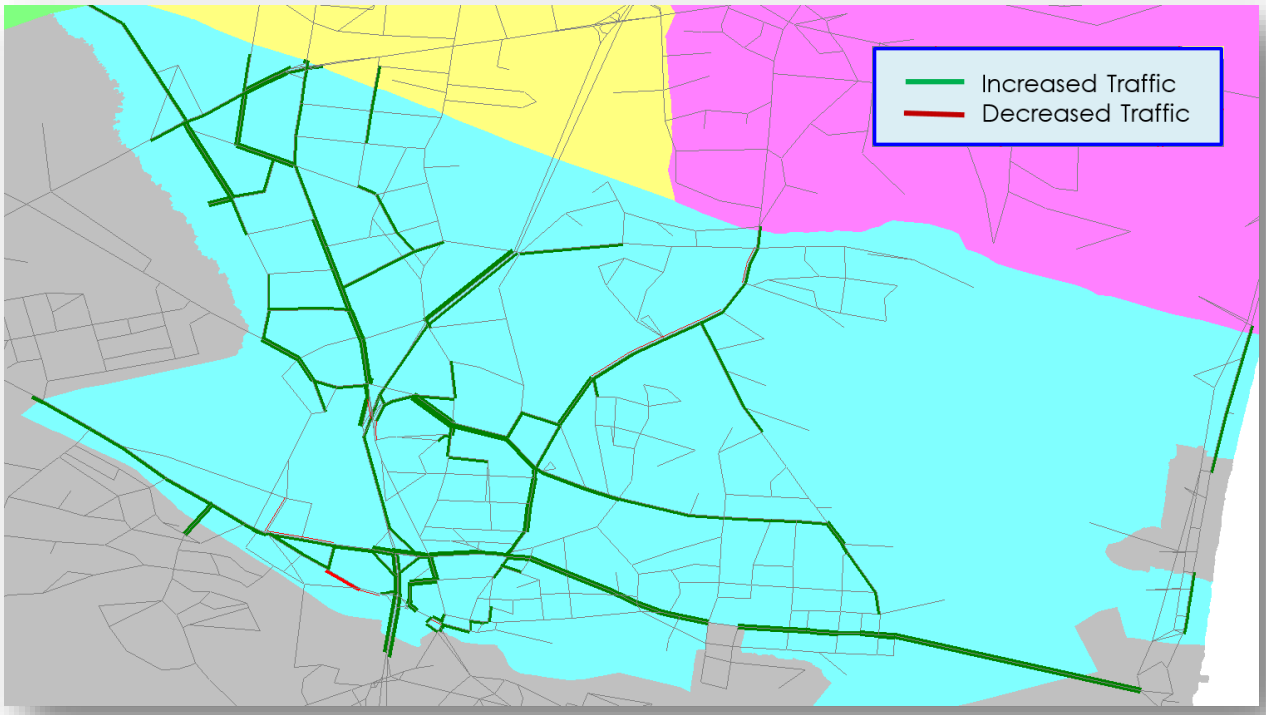

Figure E-10 Traffic Growth Pattern between 2025 and 2040 in Toms River Township

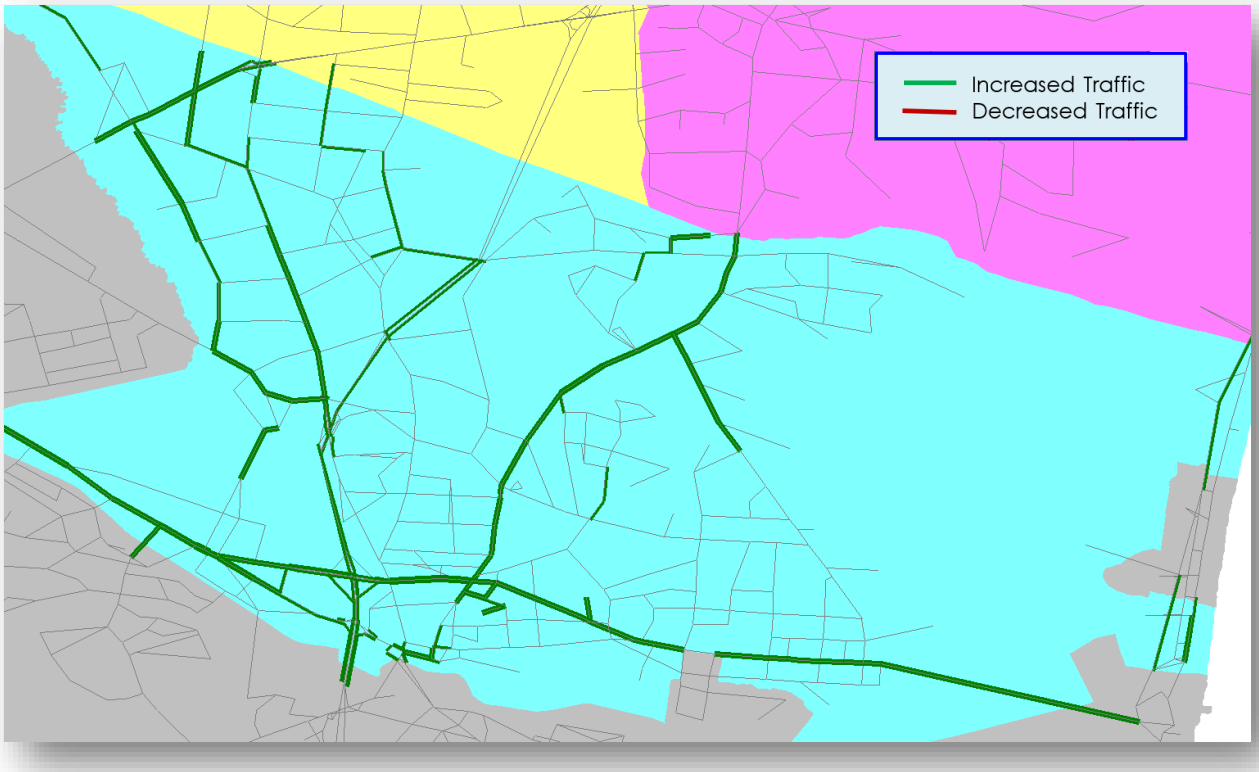

Figure E-11 Traffic Growth Pattern between 2015 and 2025 in Brick Township

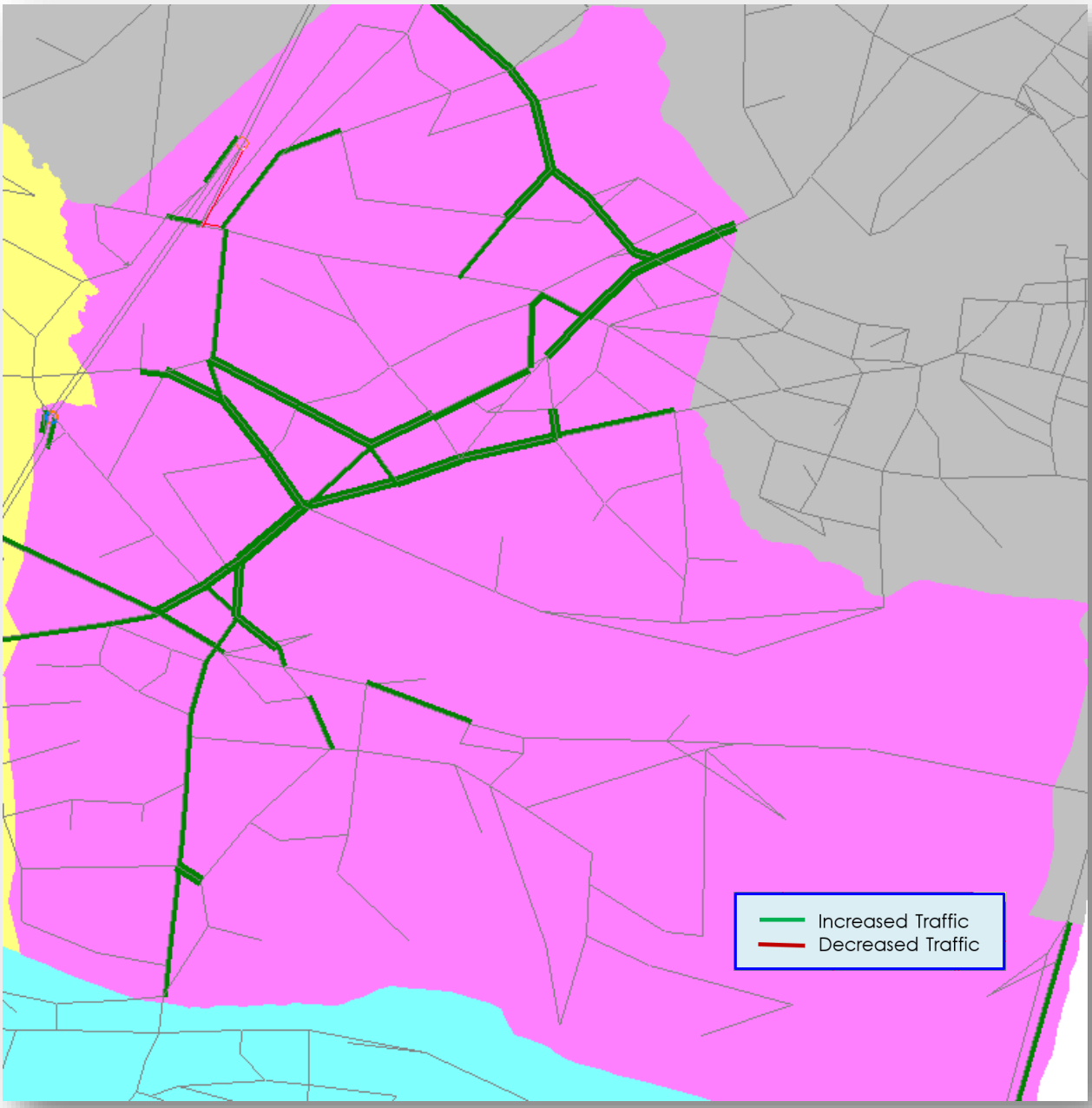

Figure E-12 Traffic Growth Pattern between 2025 and 2040 in Brick Township

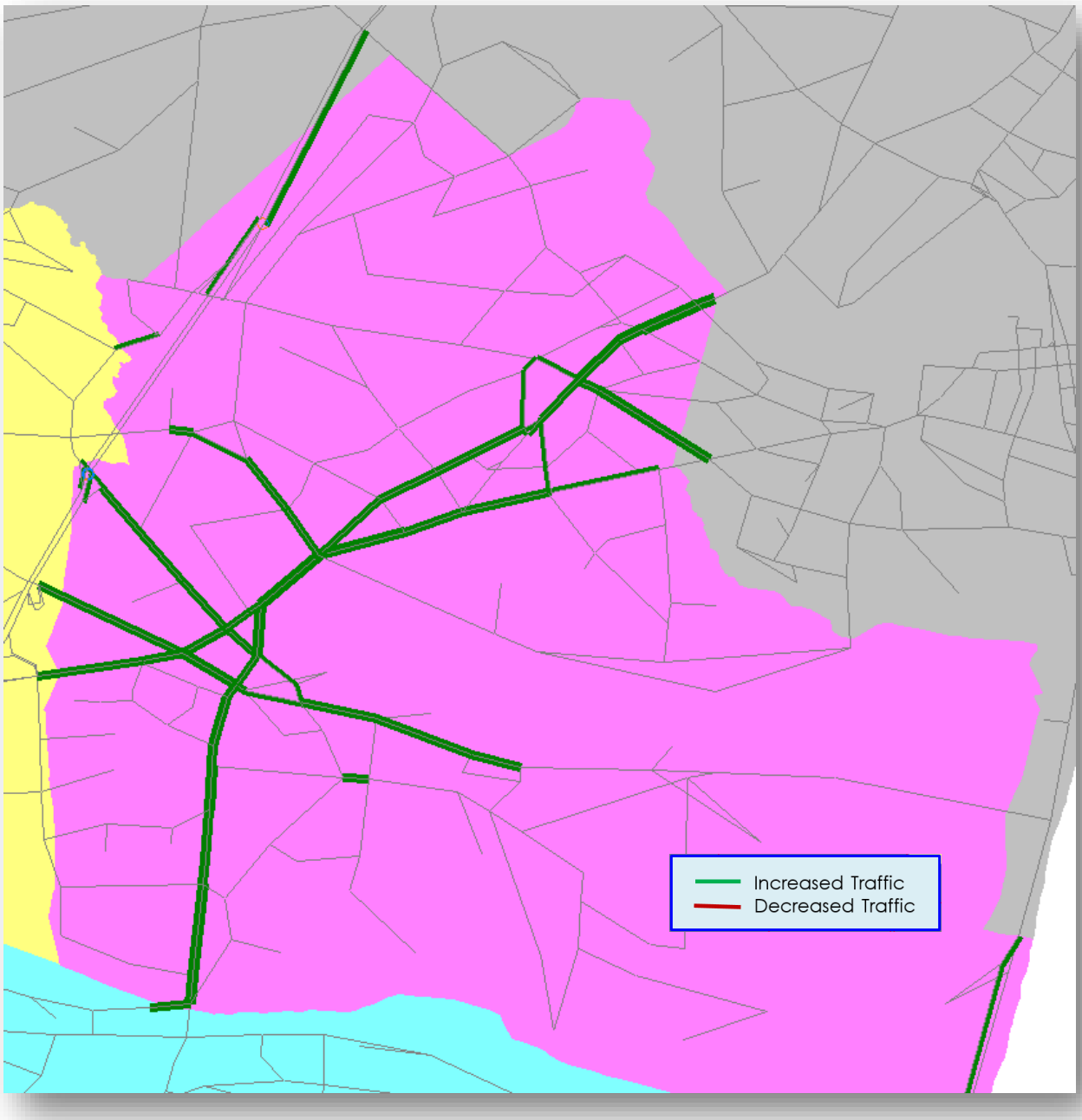

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Figure E-13 Traffic Growth Pattern between 2015 and 2025 in Jackson Township

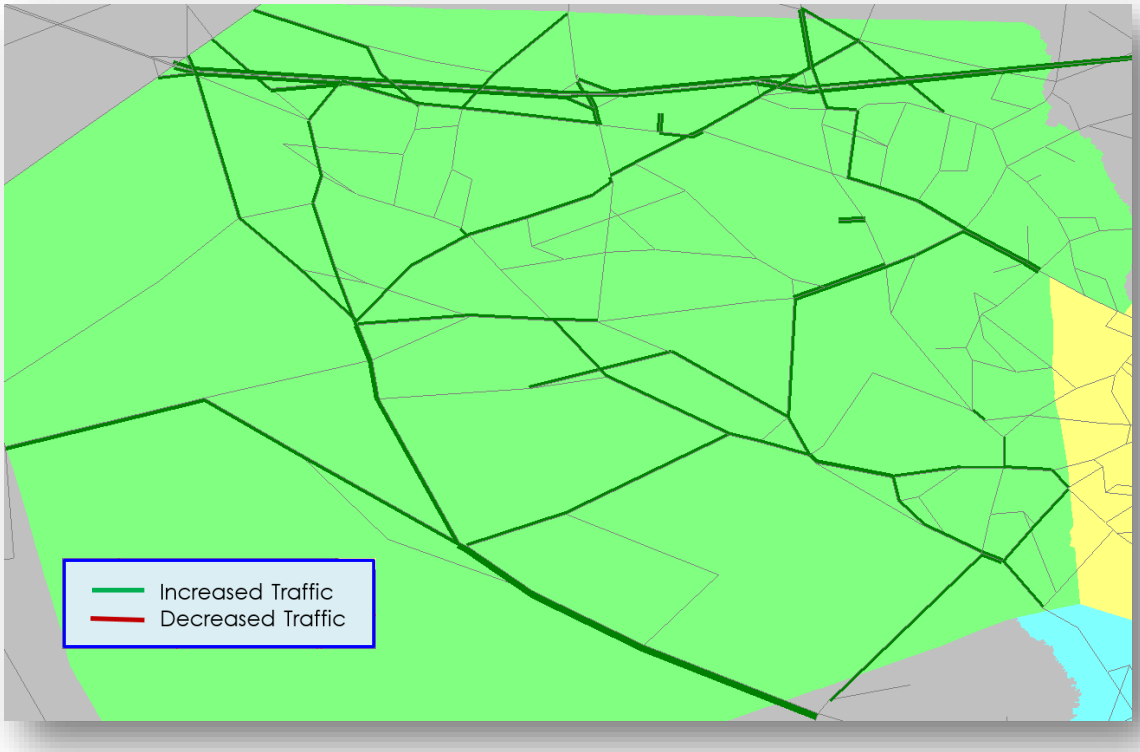


Figure E-14 Traffic Growth Pattern between 2025 and 2040 in Jackson Township

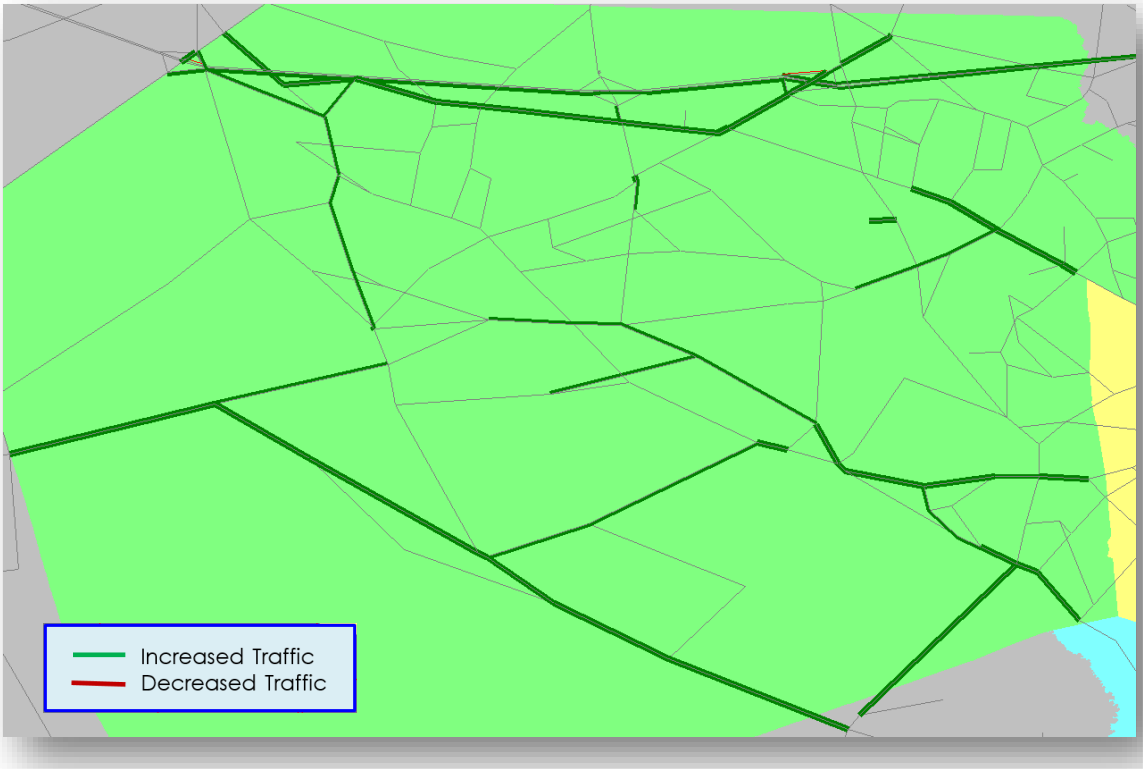


Table E-15 Estimated 2025 and 2040 Hot-Spot Locations in Lakewood Township

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
2025 Estimated Hot Spot Locations				
US 9	NJDOT	Between County Line Rd. and Route 88	2	1.1
		Between Route 88 and NJ 70	1	1.4
County Line Rd.	County	Between Heathwood Ave. and Ridge Ave.	1	1.1
NJ 88	NJDOT	Between US 9 and Garden State Parkway (localized congestion)	1	0.9
Cedar Bridge Ave.	County	Between Hurley Ave. and Garden State Parkway	2	0.9
NJ 70	NJDOT	Between US 9 and Garden State Parkway	2	0.9
Central Ave. / New Egypt Rd.	County	Between Cross St. and US 9	1	1.1
Hope Chapel Rd	County	Between County Line Rd. and Miller Rd.	1	1.4
New Hampshire Ave.	County	Between N. Maple Ave (Township Bpundary Line) and Route 88	2	1.1
		Between Route 88 and Ridge Ave	1	0.9
7th Ave / Ridge Ave.	County	Between US 9 and County Line Rd.	1	0.9
Clifton Rd. / Hurley Rd.	County	Between US 9 and County Line Rd.	1	1.6
Prospect Rd.	County	Between Cross St and US 9	1	1.0
Pine St. Corridorr	County	Between US 9 and New Hampshire Ave.	1	0.9
Kennedy Blvd.	County	Between US 9 and Squankum Rd. (CR 547)	1	1.0
Cross Street	County	Between E Veteran Highway and US 9	1	0.9
2040 Estimated Hot Spot Locations				
US 9	NJDOT	Between County Line Rd. and Route 88	2	1.1
		Between Route 88 and NJ 70	1	1.4
County Line Rd.	County	Between Heathwood Ave. and Ridge Ave.	1	1.2
NJ 88	NJDOT	Between US 9 and Garden State Parkway.	1	1.1
Cedar Bridge Ave.	County	Between Hurley Ave. and Garden State Parkway	2	1.0
NJ 70	NJDOT	Between US 9 and Garden State Parkway	2	1.1
Central Ave. / New Egypt Rd.	County	Between Cross St. and US 9	1	1.2
Hope Chapel Rd	County	Between County Line Rd. and Miller Rd.	1	1.5
New Hampshire Ave.	County	Between N. Maple Ave (Township Bpundary Line) and Route 88	2	1.1
		Between Route 88 and Ridge Ave	1	0.8
7th Ave / Ridge Ave.	County	Between US 9 and County Line Rd.	1	0.9
Clifton Rd. / Hurley Rd.	County	Between US 9 and County Line Rd.	1	1.9
Prospect Rd.	County	Between Cross St and US 9	1	1.1
Pine St. / James St.	County	Between Sunset Rd. and New Hampshire Ave.	1	1.0
Kennedy Blvd.	County	Between US 9 and Squankum Rd. (CR 547)	1	1.2
Cross Street	County	Between E Veteran Highway and US 9	1	1.0

Table E-16 Estimated 2025 and 2040 Hot-Spot Locations in Toms River Township

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
2025 Estimated Hot Spot Locations				
US 9	NJDOT	Between NJ R70 and Garden State Parkway	1	1.5
Hooper Ave. / Brick Blvd	County	Between NJ 37 and Church Rd.	2	1.1
NJ 70	NJDOT	Beween Whitesville Rd. and US 9	2	1.3
Whitesville Ave. (CR 527)	County	Between Ridgeway Rd. and NJ 70	1	1.1
Church Rd.	County	Between Old Freehold Rd. and Hooper Ave.	1	0.9
2040 Estimated Hot Spot Locations				
US9	NJDOT	Between NJ 70 and Garden State Parkway	1	1.5
Hooper Ave. / Brick Blvd	County	Between NJ 37 and Church Rd.	2	1.2
NJ 70	NJDOT	Beween Whitesville Rd. and US 9	2	1.5
Whitesville Ave. (CR 527)	County	Between Ridgeway Rd. and NJ 70	1	1.3
Church Rd.	County	Between Old Freehold Rd. and Hooper Ave.	1	1.0
Old Freehold Rd. / Cox Cro Rd.	County	Between Bay Lea Rd. and Whitesville Ave.	1	1.1
New Hampshire Ave.	County	Between Church Rd. and Hickory St. (Township Line Boundary)	1	1.1

Table E-17 Estimated 2025 and 2040 Hot-Spot Locations in Brick Township

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
2025 Estimated Hot Spot Locations				
NJ 70	NJDOT	Between Shorrock St. and Route 34	2	1.0
NJ 88	NJDOT	Between Princeton Ave. and Midstream Rd.	1	1.0
Brick Blvd.	County	Church Rd. and Drum Point Rd.	2	1.2
Princeton Ave. / Rt. 88	County	Between Brushy Neck Dr. and Burnt Tavern Rd.	1	1.0
Mantoloking Rd.	County	Between Garden State Parkway and Adamston Rd.	1	0.8
2040 Estimated Hot Spot Locations				
NJ 70	NJDOT	Between Shorrock St. and Route 34	2	1.2
NJ 88	NJDOT	Between Princeton Ave. and Midstream Rd.	1	1.3
Brick Blvd.	County	Church Rd. and Mantoloking Rd.	2	1.5
Princeton Ave. / Rt. 88	County	Between Brushy Neck Dr. and Burnt Tavern Rd.	1	1.1
Mantoloking Rd.	County	Between Garden State Parkway and Adamston Rd.	1	0.9

Table E-18 Estimated 2025 and 2040 Hot-Spot Locations in Jackson Township

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
2025 Estimated Hot Spot Locations				
Cooks Bridge Road	County	Between N. Hope Chapel Rd. and N. County Line Rd.	1	1.1
N. Hope Chapel Rd.	County	Between E. Veteran Highways and Clear Stream Rd. / Township Boundary Line.	1	0.9
Toms River Rd. (CR 571)	County	Between S. Hope Chapel Rd. and Freehold Rd.	1	1.1
W. Veteran Highway (CR 528)	County	Between S. Stump Tavern Rd. and Hawkin Rd. (CR 640)	1	1.3
2040 Estimated Hot Spot Locations				
S. Hope Chapel Rd. / Cooks Bridge Road	County	Between Toms River Rd. and N. County Line Rd..	1	1.2
N. Hope Chapel Rd.	County	Between E. Veteran Highways and Clear Stream Rd. / Township Boundary Line.	1	1.0
Toms River Rd. (CR 571)	County	Between S. Hope Chapel Rd. and W. Commodore Blvd.	1	1.2
W. Veteran Highway (CR 528)	County	Between S. Stump Tavern Rd. and Pinehurst Rd.	1	1.6
Bennetts Mills Rd.	County	Between Butterfly Rd. and S. New Prospect Rd.	1	1.1
W. Commodore Blvd. (CR 526)	County	Bestween Cassville Rd. and Jackson Mills Rd.	1	1.2

Proposed Improvements

The wish-list items / proposed improvements were either submitted by the four townships or developed based on the model estimated hot-spot locations that were validated through the analysis.

A. LAKEWOOD TOWNSHIP

A coordinated effort has been conducted between Ocean County and Lakewood Township to prepare the proposed improvements to alleviate congestion in Lakewood Township. Table E-19 shows a series of improvements obtained from "Draft – Progress Submission – Transportation Improvement Study" for Lakewood Township and prepared by MASER Consulting, P.A. The improvements listed in Table E-19 are only a subset of all improvements proposed in the above study. Many improvements, such as traffic signal and intersections improvements, cannot be evaluated accurately in the Regional / County Model, and they are better suited for microsimulation models. Those improvements were excluded from this analysis.

Table E-19 Proposed Improvements for Lakewood Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
Oak Street Corridor	County	From US-9 to New Hampshire Avenue (CR 623)	1	1.0	Add TWLTL	0.7
Pine Street Corridor	County	From Marc Dr. to Avenue of States	1	1.1	Add TWLTL	0.7
Prospect Street (CR 628) Corridor	County	From Cross St. to US 9	1	1.1	Add TWLTL	0.7
Kennedy Blvd.	County	From US-9 to Squankum Rd.	1	1.2	Add TWLTL	0.8
Route 88	County	From Railroad St. to New Hampshire Ave.	1	1.0	Add TWLTL	0.7
Vine Street Extension	County	From Cedar Bridge Ave. (CR 528) to Pine Street	N/A	N/A	Extend Vine Street	N/A
Massachusetts Avenue(CR 637) and Sunset Road Extension	County	Massachusetts Ave. From Prospect St. (CR 628) to James St. (CR 32); Sunset Rd. from Rt. 70 to N. Lake Dr.	N/A	N/A	Extend Massachusetts Avenue(CR 637) and Sunset Road	N/A
Hurley Avenue(CR 528) Extension	County	From Cedar Bridge Ave. (CR 528) / Route 88 to Lexington Ave./Railroad St.	N/A	N/A	Extend Hurley Avenue	N/A
New Hampshire Avenue(CR 623) Extension	County	From New Hampshire Ave. to Brook Rd.	N/A	N/A	Extend New Hampshire Road (Lakewood Bypass Phase 1)	N/A
Locust Avenue Extension	County	From Locust Ave. to Lakewood Farmingdale Rd.	N/A	N/A	Extend Locust Avenue (Lakewood Bypass Phase 2)	N/A

Note: TWLTL = Two-Way Left Turn Lane
[1]Model estimated V/C Ratio for 2040 PM Peak.
[2]V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic)

In addition to the above list, additional "wish list" improvements along major corridors were also added, the improvements locations were selected using the estimated 2040 hot-spot locations as a guidance. Table E-20 shows the model estimated volume capacity ratios during PM Peak Period, where the congestion is at its worst at these selected locations, as well as its corresponding proposed improvements.

Table E-20 Additional "Wish List" Improvements for Lakewood Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
US 9	NJDOT	Between County Line Rd. and Central Ave.	2	1.1	Add one lane per direction	0.87
		Between Central Ave. and Indian Head Rd.	1	1.4	Add one lane per direction	0.80
NJ 70	NJDOT	Between US 9 and Garden State Parkway	2	1.1	Add one lane per direction	0.80
County Line Road	County	Between Heathwood Ave. and Ridge Ave.	1	1.2	Add one lane per direction	0.65
Cross Street	County	Between E. Veteran Highway and US 9	1	1.0	Add one lane per direction	0.50
Central Ave.	County	Between Cross St. and US 9	1	1.2	Add one lane per direction	0.85

Note:
[1]Model estimated V/C Ratio for 2040 PM Peak at the congested location.
[2]Estmated V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic)

While the segment of Cross Street between Prospect Street and Massachusetts Avenue does not demonstrate diminished capacity due to future growth, it is anticipated that this segment will be improved consistent with the segments of roadway east and west of this segment as validated through a microsimulation.

It is important to note that all proposed improvements shown in Table E-19 and Table E-20 require further analysis to determine the ultimate final configuration.

B. TOMS RIVER TOWNSHIP

The "wish list" improvements for Toms River township were prepared based on current hot-spot locations, observed and estimated, and model estimated future hot-spot locations. The proposed improvements are listed in Table E-21.

Table E-21 Proposed "Wish List" Improvements for Toms River Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
Hooper Ave. / Brick Blvd.	County	Between NJ 37 and Church Rd.	2 Lanes with median	1.2	Traffic Signal Improvements	N/A
Whitesville Rd.	County	Between Rideway Rd. and NJ 70	1	1.3	Add one lane per direction	0.65
NJ 70	NJDOT	Between Whitesville Rd. and US 9	1 and 2	1.5	Add one lane per direction	0.75

Note:
[1]Model estimated V/C Ratio for 2040 PM Peak along the congested locations.
[2]Estimated V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic), and TWLTL is assumed to add ½ lanes capacity to the roadway.

Hooper Ave. / Brick Blvd is currently a divided roadway with jug handles throughout. The roadway consists of two lane per-direction. With the current configuration, improving traffic signal optimization, may alleviate the congestion problem along this corridor. Since the County Model will not be able to estimate the impact of traffic signal optimization or improvements accurately, this improvement was not coded / included. A microsimulation model is a more suitable tool to assess the impact of these improvements than the macroscopic county model.

It is important to note that all proposed improvements shown in Table E-21 require further analysis to determine the ultimate final configuration.

C. BRICK TOWNSHIP

Using the estimated future hot-spot results as a guidance, the wish list improvements are presented in Table E-22 below.

Table E-22 Proposed Improvements for Brick Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
Brick Blvd.	County	Between Church Rd. and Mantoloking Rd.	2 and 3	1.5	Traffic Signal Improvements	N/A
NJ 88	NJDOT	Between Princeton Ave. and Midstream Rd.	1	1.3	Add TWLTL	0.86
NJ 70	NJDOT	Between Shorrock St. and Route 34	2	1.2	Add TWLTL	0.96

Note:
[1]Model estimated V/C Ratio for 2040 PM Peak along the congested locations.
[2]Estimated V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic), and TWLTL is assumed to add ½ lanes capacity to the roadway.

It is important to note that all proposed improvements shown in Table E-22 require further analysis to determine the ultimate final configuration.

D. BRICK TOWNSHIP

The proposed wish list improvements for Jackson Township are listed in Table E-23.

Table E-23 Proposed Improvements for Jackson Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
S. Cooks Bridge Rd.	County	Between N. Hope Chapel Rd. and Bennetts Mills Rd.	1	1.2	Add TWLTL	0.80
N. Hope Chapel Rd.	County	Between E. Veteran Hwy. and W. county Line Rd.	1	1.0	Add TWLTL	0.67

[1]Model estimated V/C Ratio for 2040 PM Peak along the congested locations.
[2]Estimated V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic), and TWLTL is assumed to add ½ lanes capacity to the roadway.

It is important to note that all proposed improvements shown in Table E-23 require further analysis to determine the ultimate final configuration.

1.0 INTRODUCTION

1.1 INTRODUCTION

The Ocean County Transportation Model (OCTM) was developed based on the North Jersey Regional Travel Demand Model – Enhanced (NJRTM-E) and last calibrated to the 2010 traffic conditions. With the recent completion of the Monmouth County Travel Demand Model (MCTDM), it was deemed beneficial to update the OCTM to be compatible with the MCTDM considering the proximity of the two counties and how traffic from each county impact the other.

As part of this model update, the OCTM Traffic Analysis Zones (TAZ) system was revised to be the same as the MCTDM. The model's TAZs were refined from 3063 zones to 3148 zones. Most TAZ refinements were done in Monmouth County, with some minor adjustments in Ocean County. Figure 1.1 shows the TAZs comparisons in Monmouth and Ocean Counties between the current OCTM and the updated OCTM. To simplify the discussion, the current OCTM is labeled as OCTM10, or OCTM calibrated to the 2010 traffic condition, while the updated OCTM is labeled as OCTM15, or OCTM calibrated to the 2015 traffic condition.

Table 1.1 TAZs Comparison Between OCTM13 and OCTM15

COUNTY	NUMBER OF TAZs		
	OCTM10	MCTDM	OCTM15
Ocean	352	354	354
Monmouth	153	228	228

The complete TAZ system of the OCTM15 is presented in Section 2 of this report. The other updates that were applied to the OCTM15 include, but not limited to:

- The newer version of socioeconomic data (SED) provided by the North Jersey Transportation Planning Agency (NJTPA). This socioeconomic data is consistent with the SED used in the MCTDM, as well as the on-going NJRTM-E Revalidation Project and the NJTPA's FY 2018 Regional Conformity Analysis Project.
- Highway network refinements within Monmouth County. Additional local roads were added to the model's highway network to give a more detail roadway representation in Monmouth County.
- As mentioned in the above paragraph, the updated model was calibrated to the 2015 traffic condition. The model calibration was focused primarily on the trip generation and highway assignment modules.

1.2 THE OBJECTIVES

When the original model was calibrated in 2013, Hurricane Sandy just hit the New Jersey Shore areas. Although the model was calibrated to the 2010 traffic conditions, there were additional traffic counts that were collected between 2013 and 2014 that were used for the model calibration. It was expected that traffic count data that were collected during that time were still impacted by the post-Sandy recovery period. By calibrating the OCTM to the more recent traffic condition (2015), it was anticipated that the traffic is already, or nearly, back to normal.

The objectives of the OCTM Model Update are as follows:

- The model calibration will be performed primarily on the highway assignment module, and to lesser extent, the trip generation module.
- The highway assignment calibration will be focused in replicating traffic counts in the four townships including Lakewood, Brick, Toms River, and Jackson, with an extra focus on Lakewood Townships. These four northern townships are the focus region of this calibration / validation.
- The MPO's SED estimates will be reviewed and discussed with the four townships, and the SED will be adjusted if necessary to reflect the township estimates, based on various housing and commercial permits applications and townships' development plans.
- The hot-spot locations in those four townships will be identified in base and future year scenarios. Selected highway improvements will be tested and the impact of these improvements to the traffic congestion will be assessed.

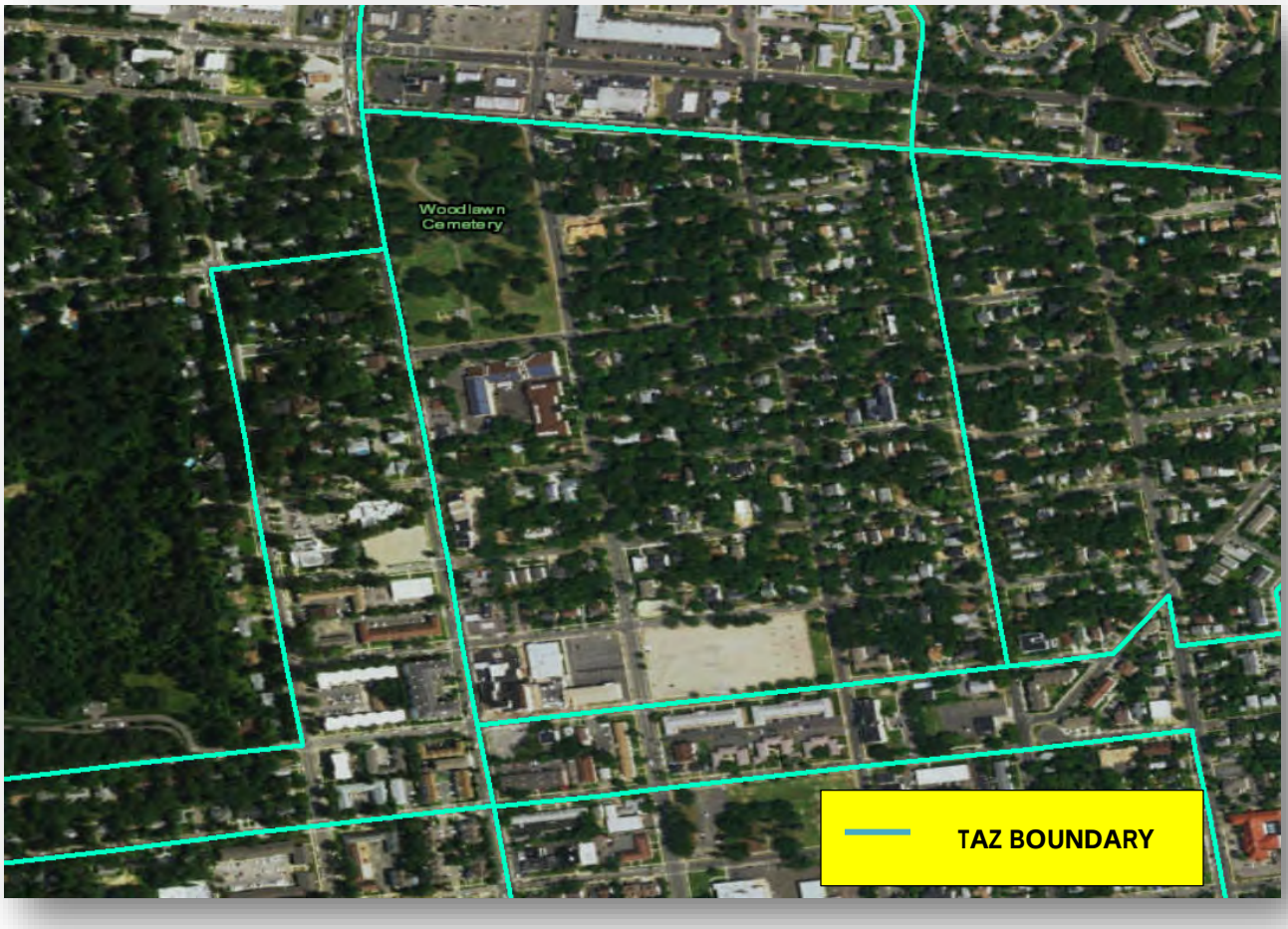
1.3 MODEL LIMITATIONS

The level of estimates provided by the Regional / County Model is limited to 'macroscopic' level. Given the geographic coverage of the model, it is nearly impossible to replicate all observed data at detail-level. For example, it is nearly impossible for the model to estimate traffic volumes that replicate traffic counts at all roadways. The macroscopic model is designed to provide 'general' trend of the traffic, such as growth trend, hot-spot locations, due to increased future travel demand driven by socioeconomic data including population, household, and employments. The regional model can also be used to estimate traffic diversion trend due to certain roadway improvements that potentially re-route traffic from one roadway to another.

For the more detail studies, such as traffic impact studies at *corridor level*, a more refined modeling platform, such as microscopic model or traffic simulation model, should be used in order to accurately estimate traffic at this level. The regional model may not be a suitable tool for estimating traffic at this level due to some of its limitations, such as:

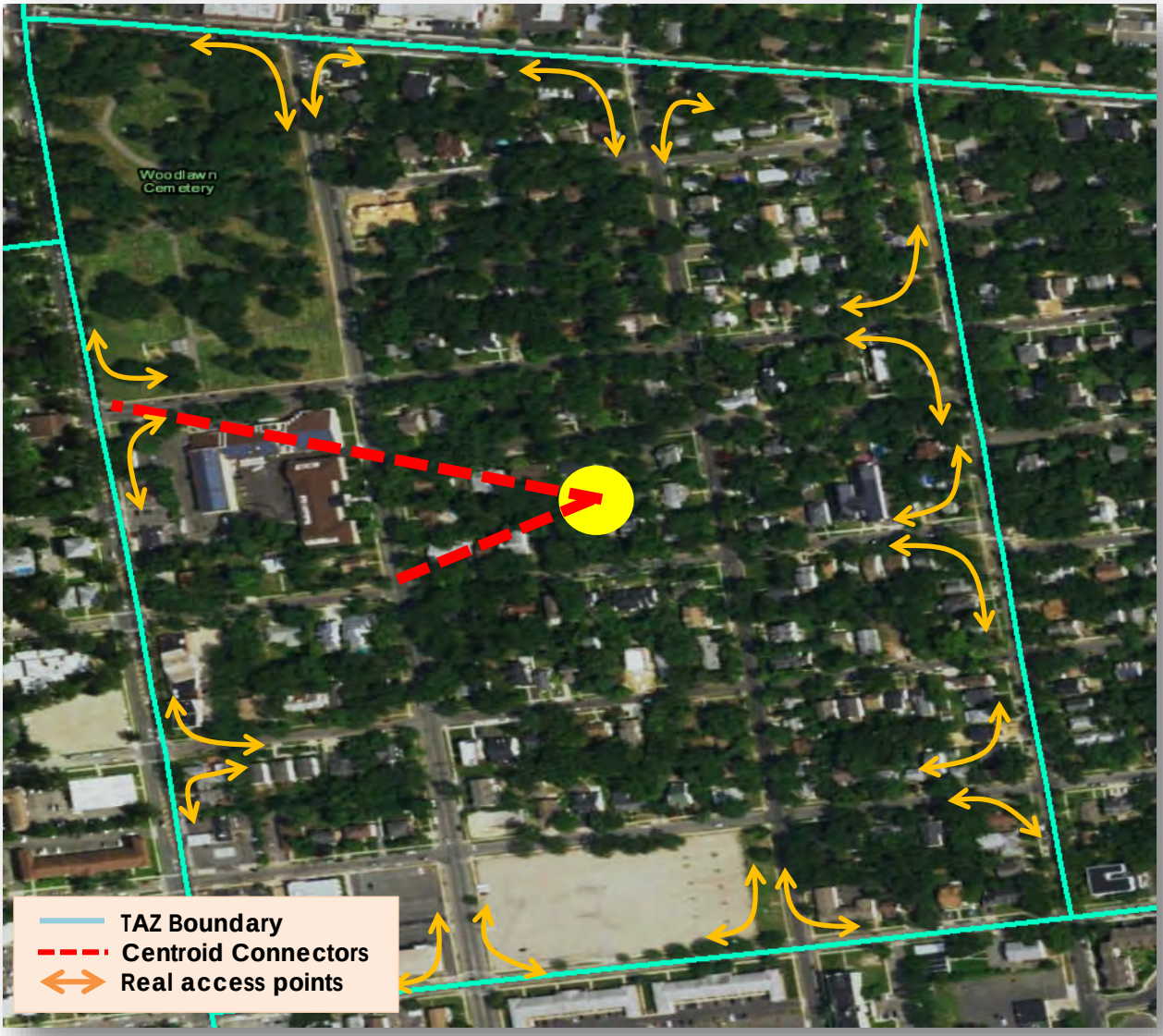
- The trip estimation was conducted at an aggregate level. The smallest unit of geography used in the conventional four-step (regional model) is a traffic analysis zone (TAZ). A TAZ can encompass several city/town blocks. The high density urban areas usually have smaller TAZ size. Conversely, low density areas, such as suburban and rural areas, have larger TAZ size. Figure 1.1 illustrates a sample of TAZ coverage in Lakewood Township used

Figure 1.1 A Sample of TAZ Coverage



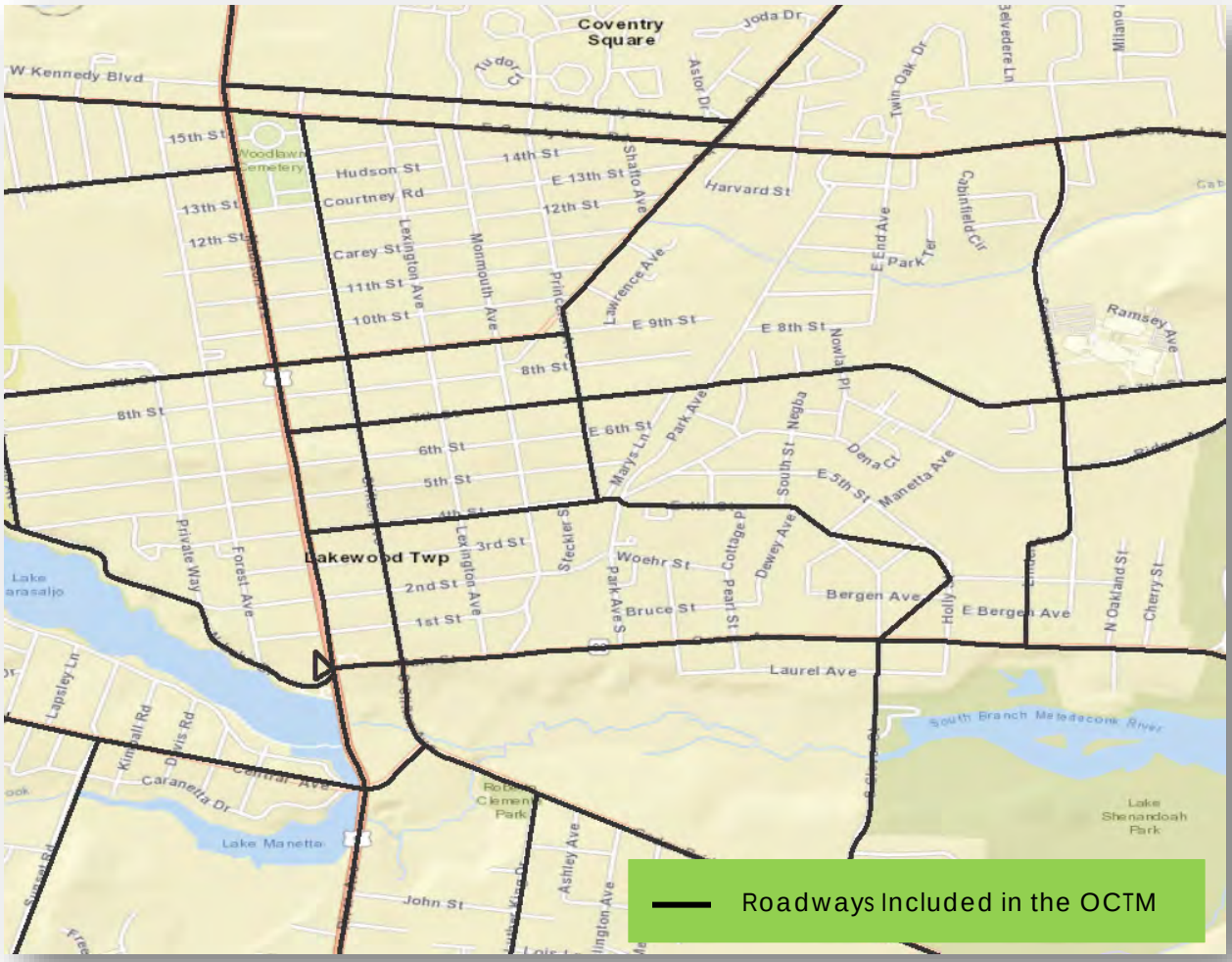
- Access to each TAZ is simplified via several (limited) imaginary links, also known as "centroid connectors", that connect the model's highway network to the center of TAZ. Figure 1.2 shows the schematic diagram of simplified access-egress link to a zone. In reality, each TAZ can be accessed by many more access points.

Figure 1.2 A Sample of Simplified Access to a TAZ



- Local roads are usually under represented. It is common in the conventional four-step model to have very limited local roads. Figure 1.3 illustrates the highway representation of the OCTM in Lakewood area. As shown in this figure, many local roads in this area are not included in the model. The under representation of local roadways can also distort the loading of the trips into the highway network, especially along local roads. This often creates some difficulties in replicating traffic counts along the lower facility roadways.

Figure 1.3 A Sample of Local Road Representation in Lakewood Area



- Regional/County models usually estimated traffic volumes by time-of-day periods instead of hourly. The models divide one-day period into several time periods. The OCTM has four time-of-day periods, including AM Peak Period (6AM - 9AM), Midday (9AM – 3PM), PM Peak Period (3PM – 6PM), and Night Period (6PM – 6AM); and the highway assignment analysis is performed at period level. For some areas that have shorter peak duration, the regional model may not be able to estimate the congestion accurately. For example, if an area has an AM Peak from 7-8 AM, and normal traffic between 6-7AM and 8-9AM, the AM period analysis may slightly underestimate the congestion in this area.

2.0 OCTM MODEL UPDATES

As previously mentioned in Section 1, the OCTM Model Update included refinements to the TAZ System, SED, and highway networks. Each model refinement will be discussed in the following sections.

2.1 TAZ SYSTEM REFINEMENT

The TAZ system was slightly adjusted to be consistent with the updated NJRTM-E, that is currently on-going, and the MCTDM, that was recently completed. In this refinement, the TAZs outside Ocean and Monmouth Counties were kept consistent with the updated NJRTM-E, while the TAZs within Monmouth and Ocean Counties were further refined. The TAZ refinement within Ocean County was very similar to the OCTM10 TAZ system as shown in Table 1.1. Only minor refinements were done within Ocean County. The TAZs within Monmouth County, on the other hand, underwent major refinements. Its TAZs were disaggregated from 153 zones to 228 zones. The comparison of the OCTM10 and OCTM15 TAZ system is shown in Table 2.1

2.2 SED UPDATE

As part of the on-going NJRTM-E Revalidation, NJTPA's FY2018 Regional Conformity Determination, and the recently completed MCTDM Model Development Projects, NJTPA provided a newer SED estimates. These estimates are based on the MPOs's latest SED projections and were used as the baseline SED in this project as well. The updated SED for base year (2015) and future years (2025 and 2040) are shown in Table 2.2.

2.3 NETWORK UPDATE

The OCTM highway network was updated to be consistent with the MCTDM as previously mentioned in Section 1. The highway network consists of 3248 TAZs and additional roadway refinements were done within Monmouth County. The comparison the current and updated highway network is shown in Figure 2.1. The comparison was focused on the Monmouth and Ocean Counties. The highway network within Ocean County was very similar to the original OCTM since the refinements were done when the OCTM was updated in 2013.

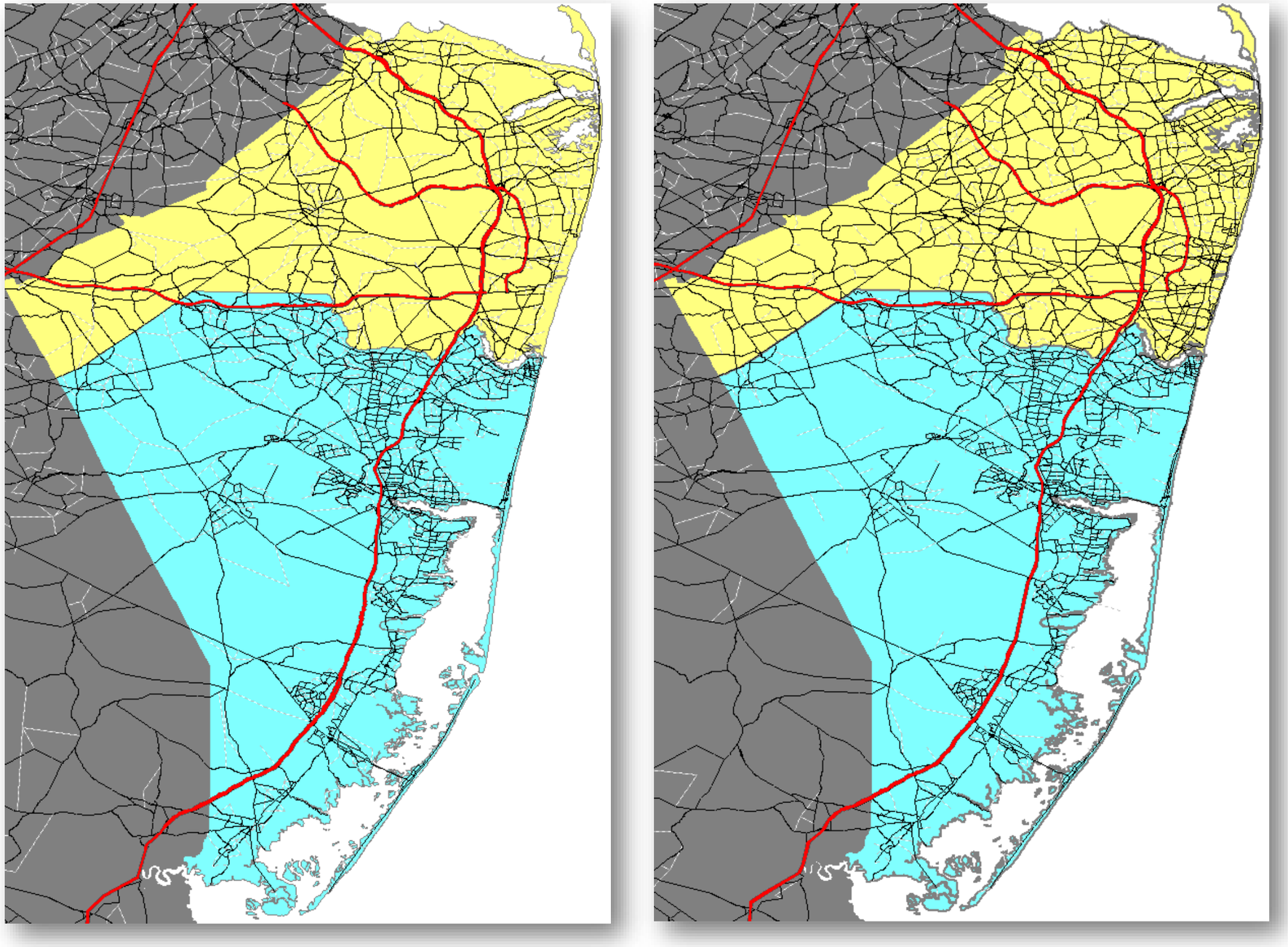
Table 2.1 The Updated OCTM TAZ System

Region	County	OCTM10				OCTM15			
		Existing Zones		Reserved Zones		Existing Zones		Reserved Zones	
		Zone Numbers	No. of Zones	Zone Numbers	No. of Zones	Zone Numbers	No. of Zones	Zone Numbers	No. of Zones
New Jersey	Atlantic	1 - 25	**25**		0	1 - 25	**25**		0
	Bergen	26 - 215	**190**	216 - 225	10	26 - 213	**188**	214 - 225	12
	Burlington	226 - 369	**144**		0	226 - 366	**141**	368 - 369	2
	Essex	370 - 600	**231**	601 - 610	10	370 - 598	**229**	599 - 610	12
	Hudson	611 - 791	**181**	792 - 831	40	611 - 796	**186**	797 - 831	35
	Hunterdon	832 - 863	**32**	864 - 873	10	832 - 863	**32**	864 - 872	9
	Mercer	874 - 997	**124**	998 - 1007	10	874 - 997	**124**	998 - 1007	10
	Middlesex	1008 - 1202	**195**	1219 - 1226	8				
		1204 - 1214	**11**	1203	1				
		1216 - 1218	**3**	1215	1	1008 - 1216	**209**	1217 - 1226	10
	Monmouth	1227 - 1379	**153**	1380 - 1389	10	1227 - 1379	**153**	1380 - 1389	10
						2951 - 3025	**75**	2901 - 2950	50
	Morris	1390 - 1490	**101**	1491 - 1500	10	1390 - 1490	**101**	1491 - 1500	10
	Ocean	1501 - 1636	**352**	1637 - 1646	10	1501 - 1636	**136**	1637 - 1646	10
		2848 - 3063				3031 - 3248	**218**	3026 - 3030	5
	Passaic	1647 - 1747	**101**	1748 - 1757	10	1647 - 1747	**101**	1748 - 1757	10
	Somerset	1758 - 1837	**80**	1838 - 1847	10	1758 - 1838	**81**	1839 - 1847	9
	Sussex	1848 - 1891	**44**	1892 - 1901	10	1848 - 1891	**44**	1892 - 1901	10
	Union	1902 - 2014	**113**	2015 - 2034	20	1902 - 2016	**115**	2017 - 2034	18
	Warren	2035 - 2061	**27**	2062 - 2071	10	2035 - 2061	**27**	2062 - 2070	9
New York	Bronx	2072 - 2077	**6**	-	0	2072 - 2077	**6**	-	0
	Dutches	2078 - 2079	**2**	-	0	2078 - 2079	**2**	-	0
	Kings	2080 - 2097	**18**	-	0	2080 - 2097	**18**	-	0
	Nassau	2098 - 2099	**2**	-	0	2098 - 2099	**2**	-	0
	New York (Manhattan)	2100 - 2336	**237**	2337 - 2366	30	2100 - 2389	**290**	-	0
	Orange	2367 - 2394	**28**	-	0	2390 - 2417	**28**	-	0
	Putnam	2395 - 2395	**1**	-	0	2418 - 2418	**1**	-	0
	Queens	2396 - 2406	**11**	-	0	2419 - 2429	**11**	-	0
	Richmond	2407 - 2423	**17**	2424 - 2433	10	2430 - 2480	**51**	2481 - 2489	9
	Rockland	2434 - 2491	**58**	2492 - 2501	10	2490 - 2554	**65**	-	0
	Suffolk	2502 - 2502	**1**	-	0	2555 - 2555	**1**	-	0
	Sullivan	2503 - 2503	**1**	-	0	2556 - 2556	**1**	-	0
	Westchester	2504 - 2530	**27**	-	0	2557 - 2583	**27**	-	0
Pennsylvania	Bucks	2531 - 2601	**71**	-	0	2584 - 2654	**71**	-	0
	Carbon	2602 - 2602	**1**	-	0	2655 - 2655	**1**	-	0
	Lackawanna	2603 - 2643	**41**	-	0	2656 - 2696	**41**	-	0
	Lehigh	2644 - 2670	**27**	-	0	2697 - 2723	**27**	-	0
	Luzerne	2671 - 2746	**76**	-	0	2724 - 2799	**76**	-	0
	Monroe	2747 - 2766	**20**	-	0	2800 - 2819	**20**	-	0
	Northampton	2767 - 2804	**38**	-	0	2820 - 2857	**38**	-	0
	Pike	2805 - 2817	**13**	-	0	2858 - 2870	**13**	-	0
	Wayne	2818 - 2845	**28**	-	0	2871 - 2898	**28**	-	0
Connecticut	Bridgeport	2846 - 2846	**1**	-	0	2899 - 2899	**1**	-	0
	Fairfield Co. Other	2847 - 2847	**1**	-	0	2900 - 2900	**1**	-	0
Total Internal Zones			**2,833**		**230**		**3,005**		**240**
External Zones	NJ Turnpike Southern Terminus					367	**1**		
	I-80 Western Terminus					2071	**1**		
	I-78 Western Terminus					873	**1**		
Total Monmouth County Model					**3,063**				**3,248**

Table 2.2 The Updated SED

Ocean County MCD	2015			2025			2040		
	POP	HH	EMP	POP	HH	EMP	POP	HH	EMP
Barnegat	21,765	8,504	2,864	23,407	9,269	3,424	27,149	10,933	4,108
Barnegat Light	568	276	135	597	292	146	640	315	156
Bay Head	971	462	353	1,098	529	419	1,186	576	442
Beach Haven	1,170	534	358	1,219	560	371	1,341	620	398
Beachwood	11,086	3,708	1,049	11,561	3,885	1,204	11,672	3,927	1,234
Berkeley	41,697	20,589	6,531	44,477	21,868	7,527	52,017	25,289	8,896
Brick	76,225	29,726	22,074	80,610	31,680	23,419	91,759	36,578	25,499
Eagleswood	1,732	668	853	1,826	709	993	1,826	709	993
Harvey Cedars	337	169	68	364	184	80	367	188	84
Island Heights	2,520	1,045	380	2,734	1,141	447	2,838	1,189	482
Jackson	57,351	20,313	13,606	64,929	23,272	15,439	76,338	27,742	17,444
Lacey	27,746	10,256	6,333	28,823	10,714	6,671	31,655	11,911	7,133
Lakehurst	2,662	887	1,379	2,793	936	1,439	2,994	1,011	1,484
Lakewood	95,277	24,918	32,158	101,583	26,641	33,758	120,027	31,665	36,307
Lavallette	1,837	952	400	1,914	994	425	2,032	1,060	450
Little Egg Harbor	20,917	8,393	3,572	22,514	9,082	4,059	26,478	10,782	4,733
Long Beach	3,045	1,550	1,273	3,180	1,624	1,332	3,436	1,762	1,394
Manchester	43,598	23,160	6,337	46,842	24,869	7,692	54,422	28,912	8,884
Mantoloking	297	163	35	349	192	65	381	209	75
Ocean	8,692	3,631	1,445	9,883	4,179	1,894	13,397	5,797	2,614
Ocean Gate	2,018	838	155	2,157	901	204	2,359	996	249
Pine Beach	2,137	824	263	2,289	888	316	2,289	888	334
Plumsted	8,454	2,956	1,477	9,244	3,261	1,779	10,521	3,765	2,040
Point Pleasant	4,665	2,000	2,721	4,925	2,122	2,843	5,769	2,514	3,049
Point Pleasant Beach	18,428	7,326	4,694	19,418	7,758	5,059	22,330	9,031	5,638
Seaside Heights	2,890	1,386	1,325	3,028	1,459	1,380	3,462	1,685	1,483
Seaside Park	1,546	839	153	1,616	877	173	1,696	922	193
Ship Bottom	1,156	560	533	1,204	585	554	1,339	655	589
South Toms River	3,696	1,106	328	3,900	1,174	377	4,041	1,221	415
Stafford	26,661	10,169	10,787	28,312	10,856	11,468	33,683	13,062	12,526
Surf City	1,205	626	429	1,253	653	448	1,352	708	466
Toms River	92,721	34,660	44,688	100,608	37,961	47,318	114,746	43,780	50,620
Tuckerton	3,353	1,406	548	3,553	1,498	617	4,210	1,798	736
Total	**588,423**	**224,600**	**169,304**	**632,210**	**242,613**	**183,338**	**729,752**	**282,200**	**201,150**

Figure 2.1 OCTM10 and OCTM15 Highway Network Comparison



3.0 DATA COLLECTION

Data collection effort was primarily focused on the obtaining traffic counts data within three years of the calibration year (2015). The count data between 2012 and 2017 were collected from various sources including:

- The Ocean County traffic count data provided by the County Project Manager.
- The NJDOT count database which is available on NJDOT's website.
- Garden State Parkway (GSP) count data from New Jersey Turnpike Authority (NJTA).
- Traffic count data from the recent MCTDM Project, especially the counts along roadways near the focus region (the four townships).

As part of the calibration process, Ocean County and Stantec staff have contacted and discussed with Township Engineers from the four townships. As part of the discussions, Turning Movement Counts (TMC) were provided to Stantec. However, these counts could not be used in the County Model Update. Only Automatic Traffic Recording (ATR) counts were used in the calibration process.

In addition to the counts from the above sources, Stantec assisted by its subconsultant, Amercom, conducted additional traffic collection within the four townships. Table 3.1 shows the new traffic count locations.

Table 3.1 Traffic Counts Collected by AmerCom

Location Number	Street Name	Description	Municipality
1	NJ 88	Between RT 549 Lanes Mill Rd and Flintoft Avenue	Brick
2	RT 549 Chambersbridge Road	North of NJ 70	Brick
3	CO 639 Hope Chapel Rd	Between S Cooks Bridge Rd and New Central Ave	Jackson
4	S Cooks Bridge Rd	South of Manhattan Street	Jackson
5	NJ 88	Between CO 623 New Hampshire Avenue and Clover St	Lakewood
6	NJ 70	West of CO 623 New Hampshire Avenue	Lakewood
7	RT 528 Cedar Bridge Avenue	West of CO 623 New Hampshire Avenue	Lakewood
8	US 9	South of County Line Road	Lakewood
9	US 9	South of Ninth St	Lakewood
10	US 9	North of Oak Str	Lakewood
11	RT 526 County Line Rd	West of US 9	Lakewood

Two additional counts were collected by the Ocean County Engineering Division, and their locations are listed in Table 3.2. Figure 3.1 shows the roadway segments within Ocean County that have traffic counts from one of the above sources listed at the beginning of this section, as well as from data collection as shown in Tables 3.1 and Table 3.2. Figure 3.2 shows the roadway segments with counts in the vicinity of the four townships.

Table 3.2 Traffic Counts Collected by Ocean County

Location Number	Street Name	Description	Municipality
1	New Hampshire Ave	Between NJ 88 and Ridge Ave	Lakewood
2	New Egypt Rd	East of N Hope Chapel Rd	Jackson

Figure 3.1 The Roadway Segments Within Ocean County with Count Data

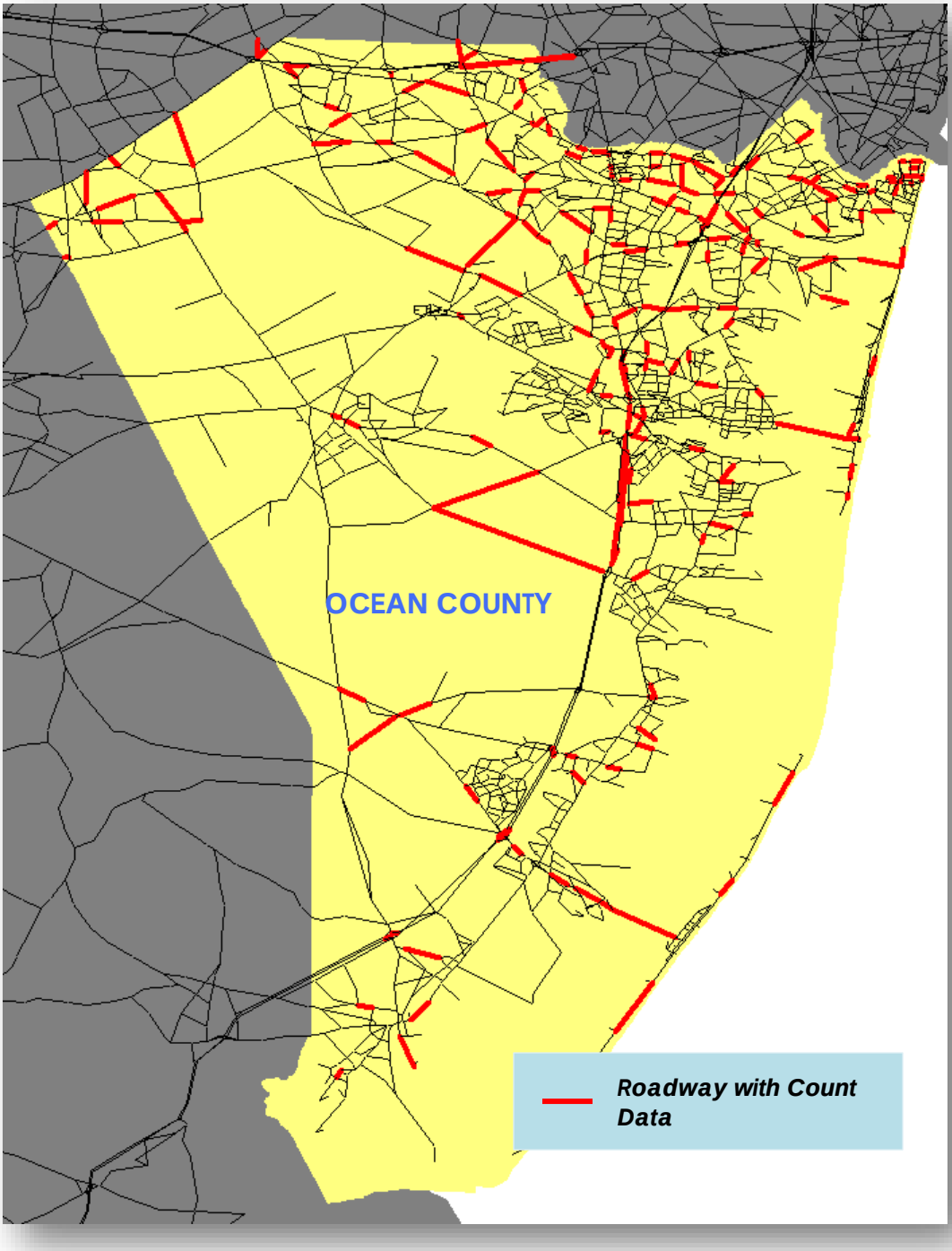
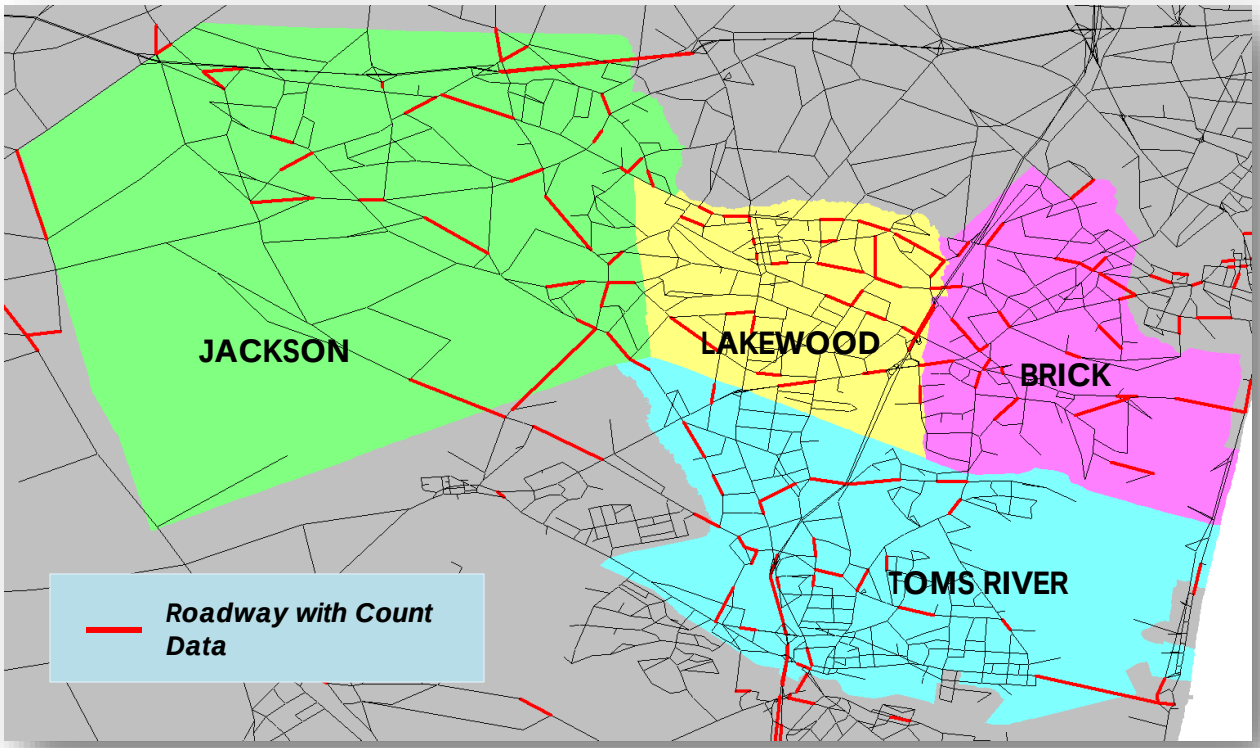


Figure 3.2 The Roadway Segments with Count Data in the Vicinity of the Four Townships



4.0 MODEL VALIDATION

4.1 ADJUSTED BASE YEAR SOCIOECONOMIC DATA

Prior to model validation process, Ocean County and Stantec Staff met with the four townships' engineers and other staff in March 2017 to discuss the baseline socioeconomic data provided by NJTPA for reasonableness check. The NJTPA's baseline socioeconomic data were provided to each township for review and comments. Table 4.1 to 4.4 show the NJTPA's baseline socioeconomic data by TAZ for the four townships by Traffic Analysis Zones (TAZs). Figure 4.1 to 4.4 display the TAZ system for the four townships.

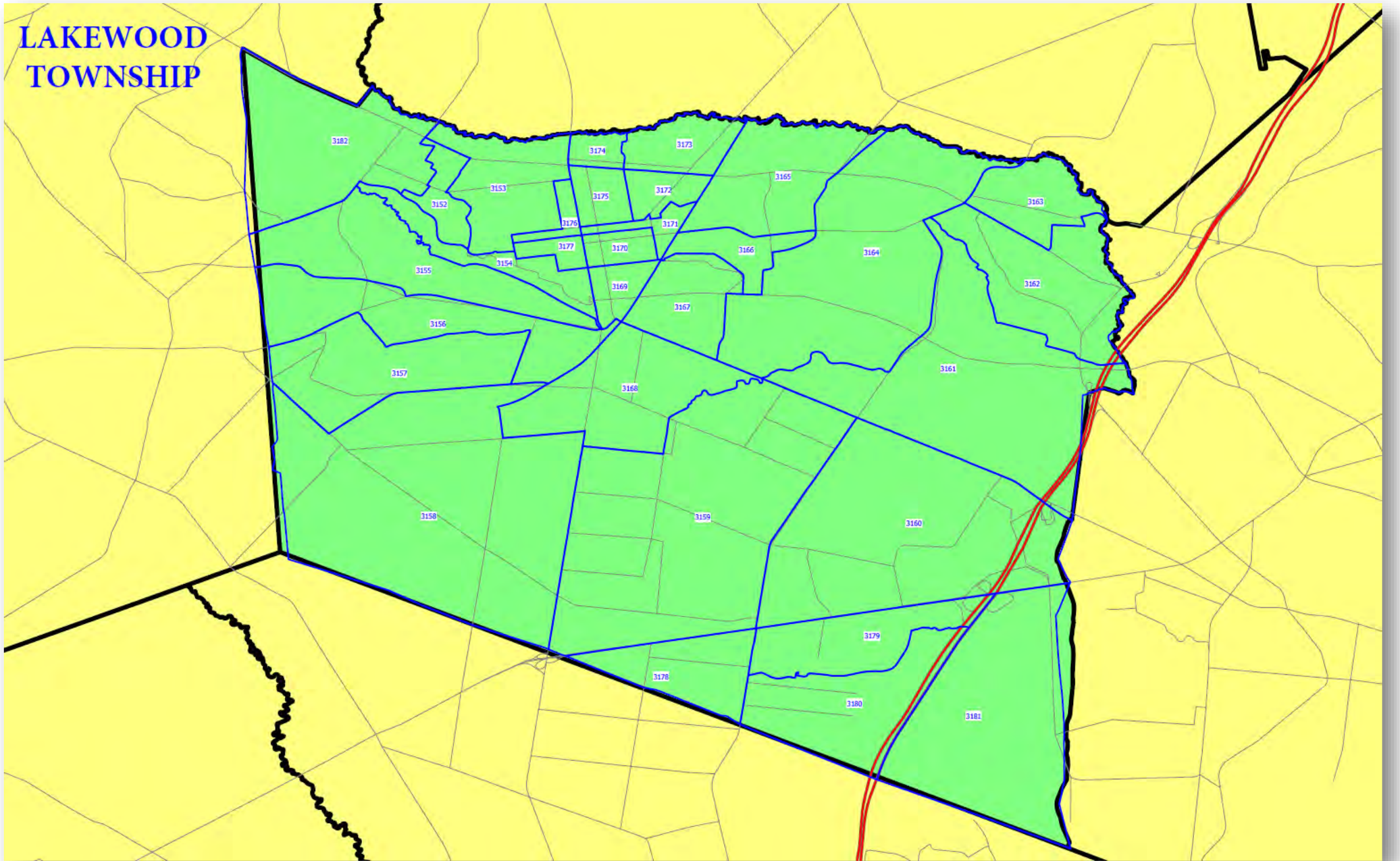
A discussion with Lakewood Township Engineer concluded that the NJTPA's SED estimates for base year (2015) are slightly too low. Lakewood Township estimated that the base year population is 115,765 compared to NJTPA's estimate of 95,277. The township's household estimate is 26,022, slightly higher than the NJTPA's estimate of 24,918. Similarly, the average household size estimated by NJTPA and Lakewood Township is 3.8 and 4.5, respectively. The average household size is calculated as total population divided by total households. The Lakewood Township socioeconomic data was adjusted to match the control total provided by the townships, and the zonal SED was increased proportionately. Table 4.5 shows the adjusted base year SED for Lakewood Township.

The SED for Brick Township was also adjusted based on the inputs from the township, Three TAZs were adjusted to reflect the current and future development plans and more realistic estimates. The three adjusted TAZs include TAZs 3196, 3216, and 3227. Table 4.6 lists the adjusted SED by TAZ for Brick Township.

After reviewing the baseline SED from NJTPA, Toms River and Jackson Township Staff deemed that the data is reasonable. Therefore, there SED for the two townships were not adjusted.

It should be noted there is no additional information was provided to Ocean County and Stantec regarding any updates on socioeconomic adjustments after these meetings.

Figure 4.1 Lakewood Township TAZ System

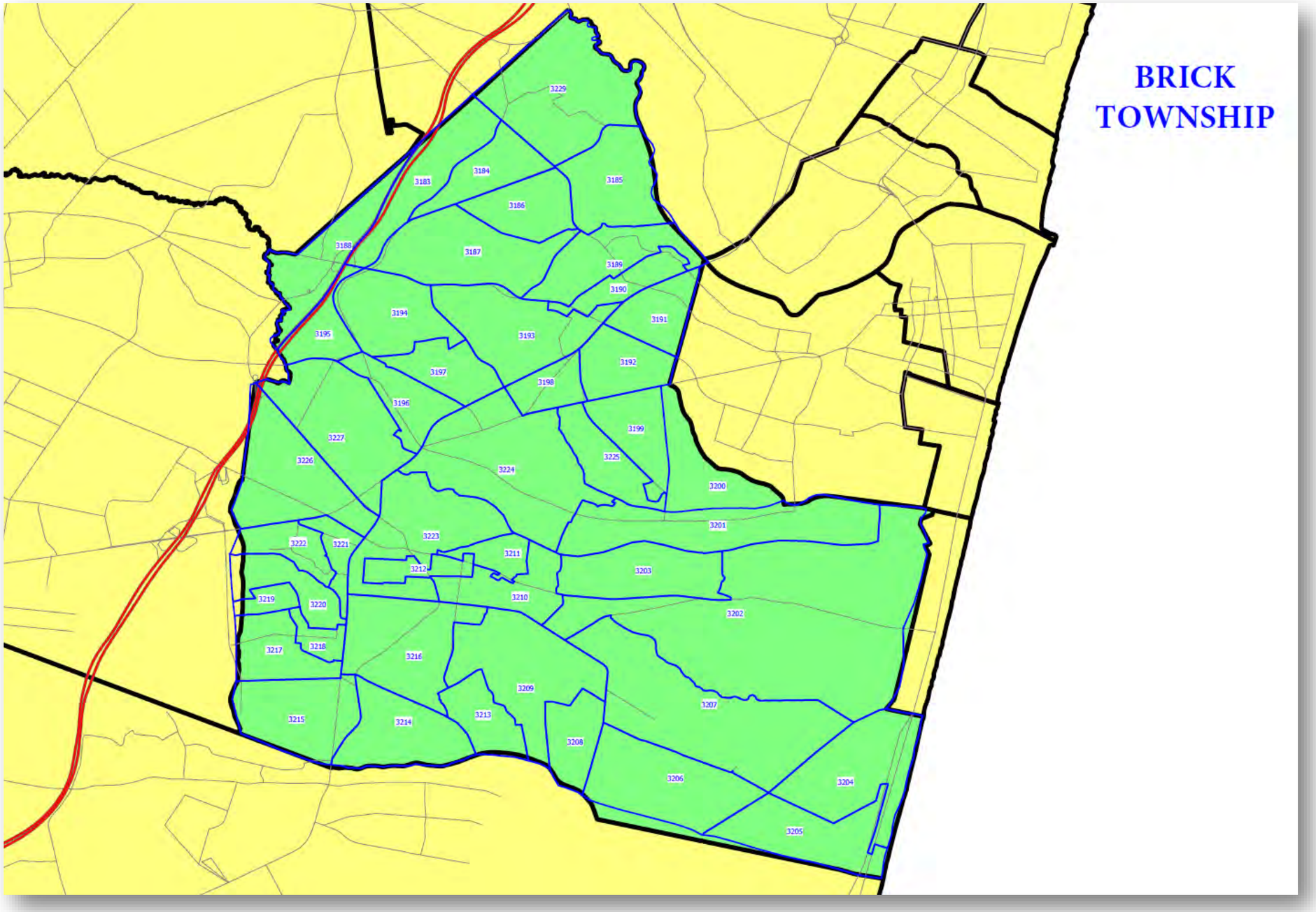


Stantec

Table 4.1 Baseline SED for Lakewood Township

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3152	1,532	241	64	1,644	260	68	2,010	323	73
3153	2,856	418	1,652	3,064	452	1,747	3,747	561	1,887
3154	2,585	538	357	2,724	570	383	3,166	671	422
3155	3,973	1,029	168	4,177	1,087	194	4,828	1,271	236
3156	6,496	1,051	404	6,829	1,110	467	7,894	1,297	568
3157	1,360	263	24	1,429	278	28	1,652	325	34
3158	9,687	2,896	3,641	10,509	3,166	3,818	12,312	3,754	4,103
3159	5,901	1,404	4,047	6,727	1,620	4,193	9,279	2,289	4,420
3160	0	0	5,774	0	0	5,983	0	0	6,307
3161	2,628	873	5,120	2,783	930	5,301	3,316	1,123	5,610
3162	1,804	507	40	1,911	540	41	2,277	652	43
3163	1,259	309	126	1,334	329	130	1,589	397	138
3164	3,249	722	348	3,442	769	361	4,100	929	382
3165	5,716	838	595	6,069	894	632	6,882	1,024	691
3166	2,958	507	345	3,141	542	366	3,562	620	400
3167	4,803	1,053	458	5,099	1,124	486	5,783	1,287	532
3168	6,596	1,271	1,850	7,082	1,374	1,946	8,394	1,650	2,092
3169	655	165	2,141	692	175	2,216	810	208	2,332
3170	3,165	675	633	3,342	717	655	3,912	849	690
3171	2,031	399	286	2,145	424	296	2,511	502	311
3172	2,345	357	95	2,458	376	101	2,821	436	109
3173	3,985	890	448	4,177	937	474	4,794	1,087	516
3174	991	396	233	1,039	417	246	1,193	484	268
3175	1,974	259	703	2,069	273	744	2,375	316	810
3176	1,514	346	482	1,596	366	518	1,855	431	571
3177	2,217	447	158	2,336	473	169	2,716	556	186
3178	2,241	1,153	536	2,385	1,232	598	2,853	1,484	701
3179	1,670	1,220	639	1,754	1,276	708	2,023	1,449	827
3180	2,748	1,466	2	2,887	1,533	3	3,329	1,742	3
3181	4,225	2,764	575	4,472	2,899	660	5,272	3,330	801
3182	2,113	461	214	2,267	498	226	2,772	618	244
TOTAL	**95,277**	**24,918**	**32,158**	**101,583**	**26,641**	**33,758**	**120,027**	**31,665**	**36,307**

Figure 4.2 Brick Township TAZ System



Stantec

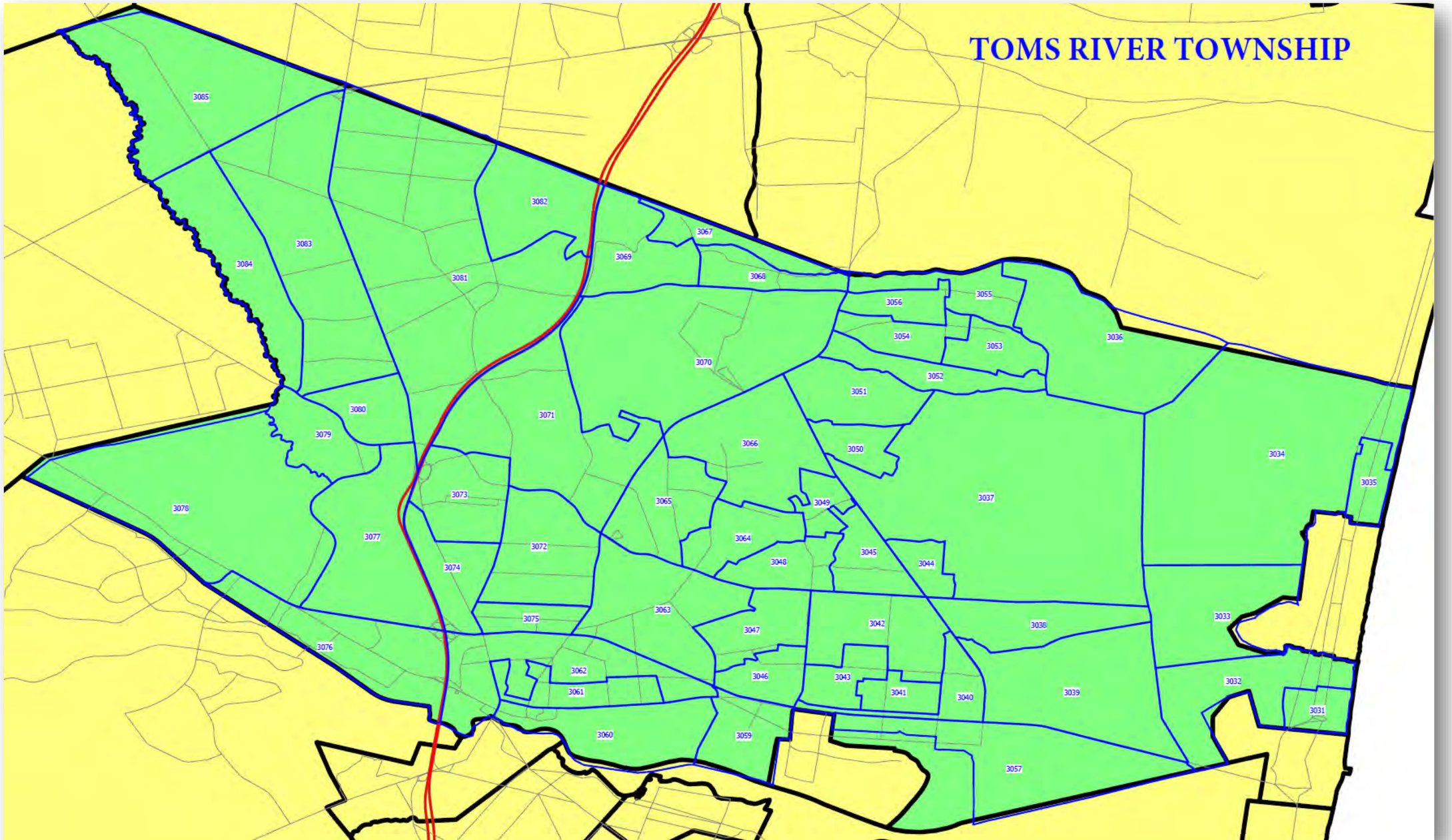
Table 4.2 Baseline SED for Brick Township

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3183	2,564	973	77	2,707	1,032	102	3,009	1,161	131
3184	1,351	449	104	1,426	477	139	1,585	536	179
3185	1,175	534	91	1,256	574	112	1,512	701	145
3186	2,891	1,078	62	3,018	1,130	68	3,427	1,296	77
3187	2,054	1,045	724	2,145	1,095	793	2,435	1,256	899
3188	3,079	1,212	23	3,232	1,278	24	3,729	1,491	25
3189	2,550	921	279	2,656	963	294	2,997	1,096	318
3190	1,520	555	165	1,583	580	173	1,787	661	188
3191	903	440	91	944	463	111	1,062	525	144
3192	1,870	650	122	1,957	683	149	2,200	775	193
3193	2,761	1,019	1,196	2,876	1,066	1,258	3,245	1,214	1,363
3194	2,646	1,451	304	2,772	1,526	323	3,185	1,766	358
3195	1,131	352	99	1,188	371	103	1,370	433	108
3196	1,007	373	4,035	1,057	393	4,171	1,220	459	4,386
3197	1,617	713	943	1,694	750	1,002	1,946	868	1,109
3198	1,573	708	40	1,645	744	48	1,850	845	62
3199	2,383	812	187	2,517	862	216	2,884	1,000	262
3200	1,206	455	14	1,280	486	21	1,423	546	28
3201	1,389	616	89	1,474	658	132	1,638	740	174
3202	2,283	816	599	2,402	863	654	2,791	1,014	746
3203	1,277	538	45	1,344	569	49	1,561	669	56
3204	506	253	134	544	274	148	616	314	160
3205	241	122	135	260	132	149	294	151	161
3206	725	314	9	759	331	14	866	381	23

Table 4.2 - Continued

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3207	2,725	1,046	60	2,853	1,100	95	3,254	1,267	154
3208	977	396	21	1,057	432	22	1,200	495	26
3209	2,776	1,068	164	3,006	1,165	179	3,411	1,335	205
3210	1,506	544	389	1,569	569	404	1,771	648	425
3211	872	344	37	908	360	38	1,025	410	40
3212	1,496	509	68	1,559	532	71	1,759	606	75
3213	1,039	417	7	1,125	455	7	1,276	522	9
3214	1,829	771	2	1,922	814	2	2,229	955	3
3215	1,400	785	1,687	1,472	829	1,780	1,707	972	1,918
3216	1,628	581	578	1,762	634	631	2,000	727	722
3217	1,766	753	208	1,843	789	221	2,089	903	244
3218	744	258	110	777	270	117	880	309	129
3219	1,382	470	58	1,441	493	62	1,634	564	69
3220	814	282	16	849	295	17	962	338	18
3221	837	304	637	873	319	677	989	365	749
3222	697	241	124	728	252	131	825	289	145
3223	2,561	1,020	3,395	2,667	1,067	3,528	3,011	1,216	3,707
3224	3,125	1,308	1,180	3,308	1,392	1,252	3,906	1,665	1,378
3225	1,390	469	194	1,468	498	225	1,682	578	272
3226	1,712	598	2,543	2,024	718	2,639	2,378	854	2,788
3227	2,232	1,163	1,029	2,638	1,397	1,068	3,099	1,662	1,128
Total	**76,225**	**29,726**	**22,074**	**80,610**	**31,680**	**23,419**	**91,759**	**36,578**	**25,499**

Figure 4.3 Toms River Township TAZ System



Stantec

Table 4.3 Baseline SED for Toms River Township

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3031	452	239	19	490	259	30	490	259	30
3032	741	430	66	804	466	106	804	466	106
3034	866	487	76	945	529	88	1,002	560	92
3035	346	220	259	378	238	299	401	252	313
3036	1,564	667	42	1,654	709	49	1,742	751	56
3037	1,277	430	431	1,339	453	461	1,519	519	510
3038	1,322	567	300	1,395	602	336	1,476	640	372
3039	1,923	790	169	2,029	838	190	2,147	892	210
3040	1,063	382	445	1,119	404	508	1,186	431	567
3041	1,637	600	26	1,723	635	30	1,826	678	33
3042	2,136	697	169	2,250	738	193	2,384	787	215
3043	1,868	670	38	1,968	709	43	2,085	756	48
3044	1,127	398	178	1,181	419	190	1,340	480	211
3045	1,849	632	118	1,977	680	161	2,049	707	176
3046	1,552	482	244	1,647	515	257	1,867	591	278
3047	1,981	662	63	2,102	706	66	2,383	811	71
3048	1,586	519	105	1,696	558	143	1,757	581	157
3049	1,042	356	16	1,114	383	22	1,154	399	24
3050	667	299	33	699	315	35	793	361	39
3051	1,061	475	196	1,132	510	239	1,272	581	278
3052	1,599	633	142	1,706	679	173	1,915	772	201
3053	1,304	487	77	1,391	522	94	1,562	594	109
3054	1,462	471	129	1,547	501	153	1,629	531	175
3055	1,115	392	153	1,179	417	181	1,241	441	206

Table 4.3 - Continued

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3056	1,387	460	179	1,467	489	213	1,545	518	243
3057	1,724	717	156	1,871	785	228	1,871	785	230
3059	1,261	515	239	1,382	569	264	1,539	641	287
3060	1,123	457	751	1,232	506	830	1,371	570	900
3061	1,193	464	3,952	1,276	500	4,080	1,543	614	4,258
3062	3,033	1,131	4,463	3,243	1,217	4,608	3,924	1,495	4,808
3063	2,844	907	2,171	3,018	968	2,282	3,421	1,112	2,470
3064	1,488	480	70	1,599	520	73	1,956	646	76
3065	1,688	647	5,887	1,814	700	6,142	2,219	869	6,440
3066	1,545	509	1,246	1,660	550	1,300	2,031	684	1,363
3067	921	628	53	986	669	66	1,196	794	85
3068	675	388	101	723	413	125	877	490	162
3069	885	510	152	949	542	188	1,150	644	243
3070	2,262	726	619	2,433	787	653	2,980	979	710
3071	1,792	539	1,320	1,927	584	1,391	2,360	726	1,512
3072	2,863	985	1,585	3,061	1,060	1,673	3,703	1,301	1,816
3073	2,842	1,079	575	3,015	1,151	618	3,423	1,324	688
3074	2,249	868	908	2,386	926	976	2,710	1,064	1,087
3075	1,962	706	812	2,098	760	857	2,538	933	930
3076	2,670	986	5,450	2,885	1,073	5,634	3,629	1,374	5,919
3077	1,121	383	925	1,211	417	956	1,524	533	1,005
3078	1,641	508	2,691	1,773	553	2,782	2,231	707	2,923
3079	680	219	22	880	290	23	1,015	339	25
3080	1,062	544	954	1,374	722	1,000	1,585	843	1,058
3081	4,795	1,441	2,520	5,091	1,539	2,682	6,033	1,848	2,940
3082	1,913	1,164	25	2,031	1,243	27	2,407	1,493	29
3083	4,206	1,557	2,758	5,444	2,065	2,890	6,280	2,411	3,058
3084	2,296	869	253	2,971	1,154	265	3,427	1,347	281
3085	5,045	2,288	357	5,318	2,424	445	6,194	2,856	597
TOTAL	**92,721**	**34,660**	**44,688**	**100,608**	**37,961**	**47,318**	**114,746**	**43,780**	**50,620**

Figure 4.4 Jackson Township TAZ System

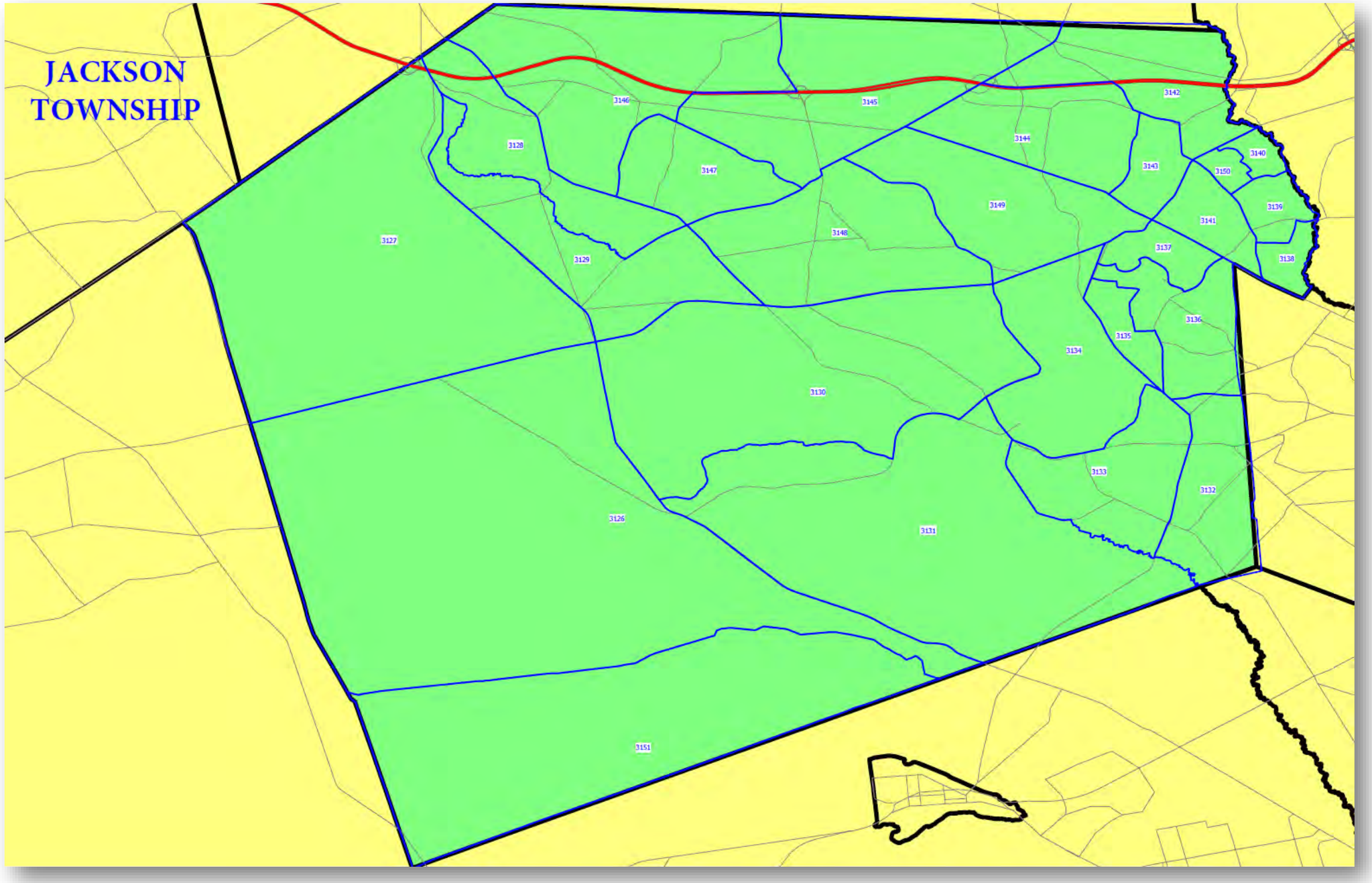


Table 4.4 Baseline SED for Jackson Township

TAZ	2015			2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3126	830	294	167	991	357	216	1,396	517	279
3127	947	309	107	1,068	352	123	1,362	458	141
3128	2,220	634	1,373	2,504	723	1,574	3,193	940	1,807
3129	2,998	910	257	3,382	1,038	295	4,312	1,349	339
3130	2,817	958	968	3,365	1,163	1,257	4,740	1,683	1,624
3131	2,245	868	282	2,682	1,053	366	3,778	1,524	473
3132	1,282	426	504	1,413	474	535	1,675	569	572
3133	1,375	447	239	1,516	497	254	1,797	597	271
3134	5,020	2,256	4,266	5,534	2,509	4,532	6,560	3,014	4,845
3135	1,415	696	242	1,483	733	286	1,696	847	355
3136	2,884	1,044	105	3,023	1,099	125	3,456	1,269	154
3137	3,232	1,241	224	3,388	1,307	265	3,873	1,510	328
3138	1,897	555	116	1,992	586	125	2,189	651	135
3139	954	287	87	1,017	308	117	1,017	308	117
3140	948	295	4	1,010	316	6	1,010	316	6
3141	2,744	1,114	913	2,882	1,176	982	3,166	1,306	1,058
3142	2,675	794	458	2,815	840	494	3,238	977	543
3143	2,958	877	555	3,113	927	599	3,581	1,078	658
3144	3,214	909	703	3,383	961	759	3,891	1,118	834
3145	2,463	1,115	385	3,344	1,556	472	3,705	1,743	531
3146	2,551	751	1,118	3,463	1,048	1,372	3,838	1,174	1,544
3147	1,598	549	38	2,169	766	47	2,403	859	52
3148	2,183	684	150	2,964	955	184	3,284	1,070	207
3149	4,862	1,980	271	5,324	2,186	355	6,074	2,523	472
3150	989	306	74	1,054	328	99	1,054	328	99
3151	50	14	0	50	14	0	50	14	0
TOTAL	**57,351**	**20,313**	**13,606**	**64,929**	**23,272**	**15,439**	**76,338**	**27,742**	**17,444**

Table 4.5 Adjusted SED by TAZ for Lakewood Township

TAZ	2015		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3152	1,861	252	67
3153	3,470	437	1,725
3154	3,141	562	373
3155	4,827	1,075	175
3156	7,893	1,098	422
3157	1,652	275	25
3158	11,770	3,024	3,802
3159	7,170	1,466	4,226
3160	0	0	6,030
3161	3,193	912	5,347
3162	2,192	529	42
3163	1,530	323	132
3164	3,948	754	363
3165	6,945	875	621
3166	3,594	529	360
3167	5,836	1,100	478
3168	8,014	1,327	1,932
3169	796	172	2,236
3170	3,846	705	661
3171	2,468	417	299
3172	2,849	373	99
3173	4,842	929	468
3174	1,204	414	243
3175	2,398	270	734
3176	1,840	361	503
3177	2,694	467	165
3178	2,723	1,204	560
3179	2,029	1,274	667
3180	3,339	1,531	2
3181	5,134	2,886	600
3182	2,567	481	223
TOTAL	**115,765**	**26,022**	**33,580**

Table 4.6 Adjusted SED by TAZ for Brick Township

TAZ	2015		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3183	2,564	973	77
3184	1,351	449	104
3185	1,175	534	91
3186	2,891	1,078	62
3187	2,054	1,045	724
3188	3,079	1,212	23
3189	2,550	921	279
3190	1,520	555	165
3191	903	440	91
3192	1,870	650	122
3193	2,761	1,019	1,196
3194	2,646	1,451	304
3195	1,131	352	99
3196	1,007	373	4,310
3197	1,617	713	943
3198	1,573	708	40
3199	2,383	812	187
3200	1,206	455	14
3201	1,389	616	89
3202	2,283	816	599
3203	1,277	538	45
3204	506	253	134
3205	241	122	135
3206	725	314	9
3207	2,725	1,046	60
3208	977	396	21
3209	2,776	1,068	164
3210	1,506	544	389
3211	872	344	37
3212	1,496	509	68
3213	1,039	417	7
3214	1,829	771	2
3215	1,400	785	1,687
3216	1,828	652	578
3217	1,766	753	208
3218	744	258	110
3219	1,382	470	58
3220	814	282	16
3221	837	304	637
3222	697	241	124
3223	2,561	1,020	3,395
3224	3,125	1,308	1,180
3225	1,390	469	194
3226	1,712	598	2,543
3227	2,682	1,397	1,029

4.2 VALIDATION RESULTS

The focus of the model validation is to compare the estimated traffic volumes to the traffic counts focusing on the four-township region. Although the focus is on the four-township, the county-wide comparison is also provided to ensure that the county-wide performance is still within a reasonable tolerance. The average weekday traffic volume comparison at county-level is shown on Table 4.7.

Table 4.7 Observed and Estimated Traffic Volume Comparison at County-Level

FACILITY TYPE	VOLUME			
	OBSERVED	ESTIMATED	EST/OBS	COUNTS
Limited-Access Facility	1,353,726	1,325,032	0.98	33
Expressway	--	--	--	--
Principal Arterial Divided	346,036	334,685	0.97	22
Principal Arterial Undivided	447,186	458,756	1.03	46
Minor Arterial Divided	--	--	--	--
Minor Arterial Undivided	976,295	1,020,221	1.04	120
Minor Arterials	528,281	494,334	0.94	118
Collector/Local	121,083	120,614	1.00	40
TOTAL	**3,772,607**	**3,753,642**	**0.99**	**379**

At County-Level the total estimated traffic volumes replicated the observed traffic counts well. At a more disaggregated comparison, the difference between the observed traffic count data and estimated traffic volumes by facility-type is generally within ten percent, which is within reasonable tolerance for a Regional Travel Demand Model.

The traffic volume comparison by township is shown in Table 4.8. The difference between observed and estimated traffic volumes is between six percent lower in Brick Township and fourteen percent higher in Jackson. Figures 4.5 to 4.8 show the plots of traffic comparison by roadway for each township.

Table 4.8 Observed and Estimated Traffic Volume Comparison at County-Level

TOWNSHIP	VOLUME			
	OBSERVED	ESTIMATED	EST/OBS	COUNTS
Lakewood	549,655	584,163	1.06	43
Toms River	1,189,752	1,133,803	0.95	68
Brick	194,291	186,352	0.96	24
Jackson	313,421	337,799	1.08	50
TOTAL	**2,247,119**	**2,242,117**	**1.00**	**185**

Figure 4.5 Traffic Comparison by Roadway for Lakewood Township

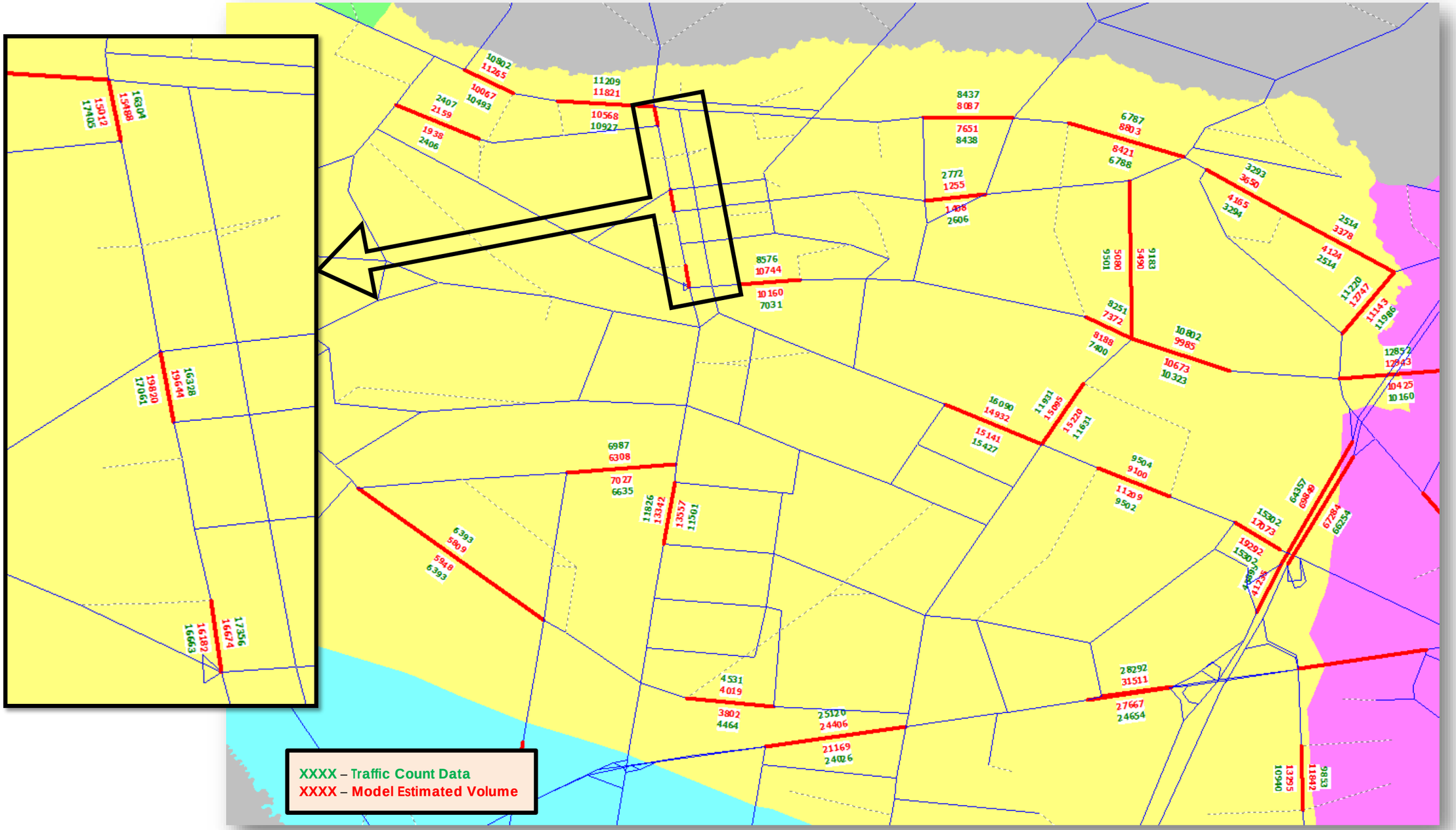


Figure 4.6 Traffic Comparison by Roadway for Toms River Township

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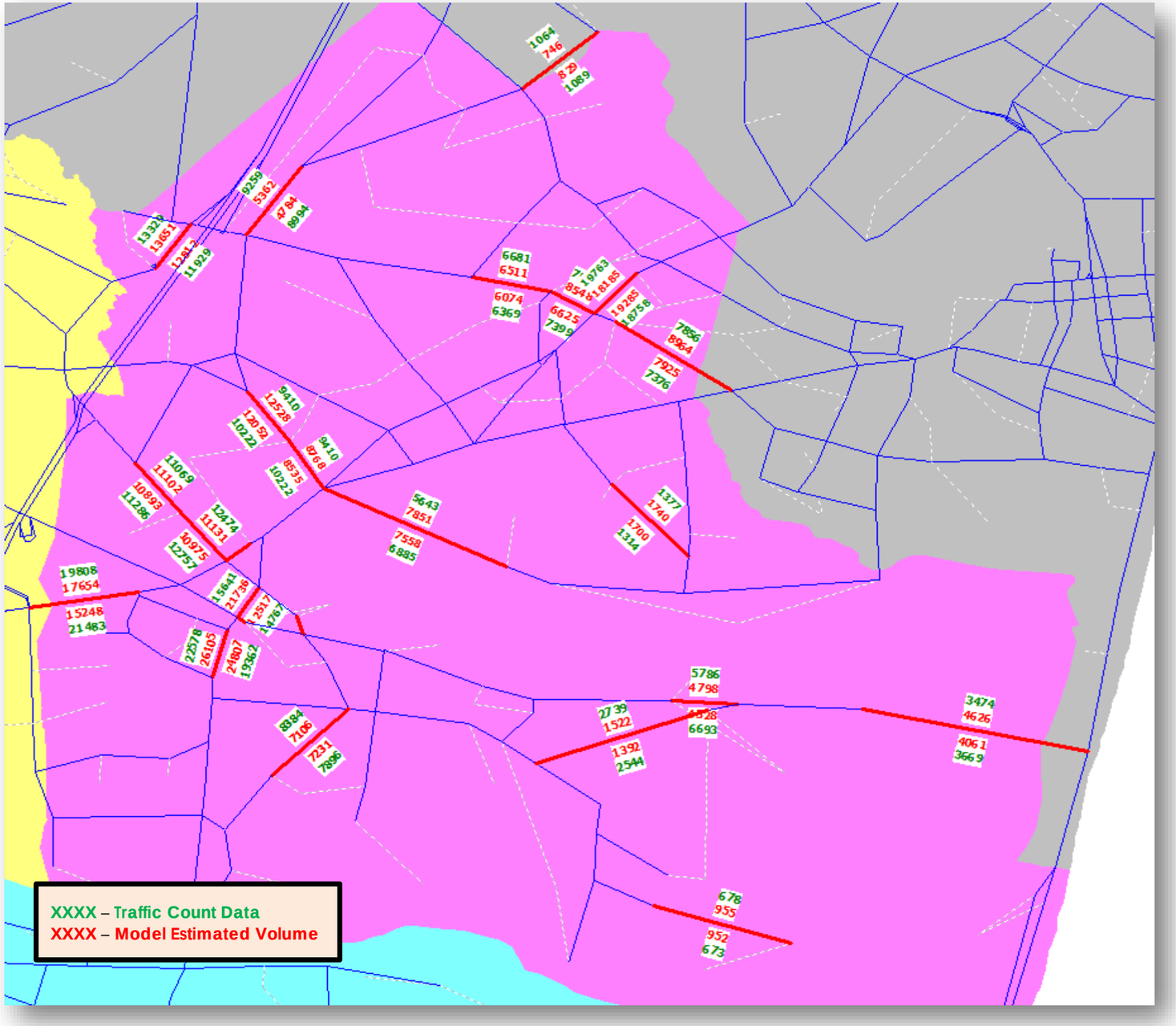
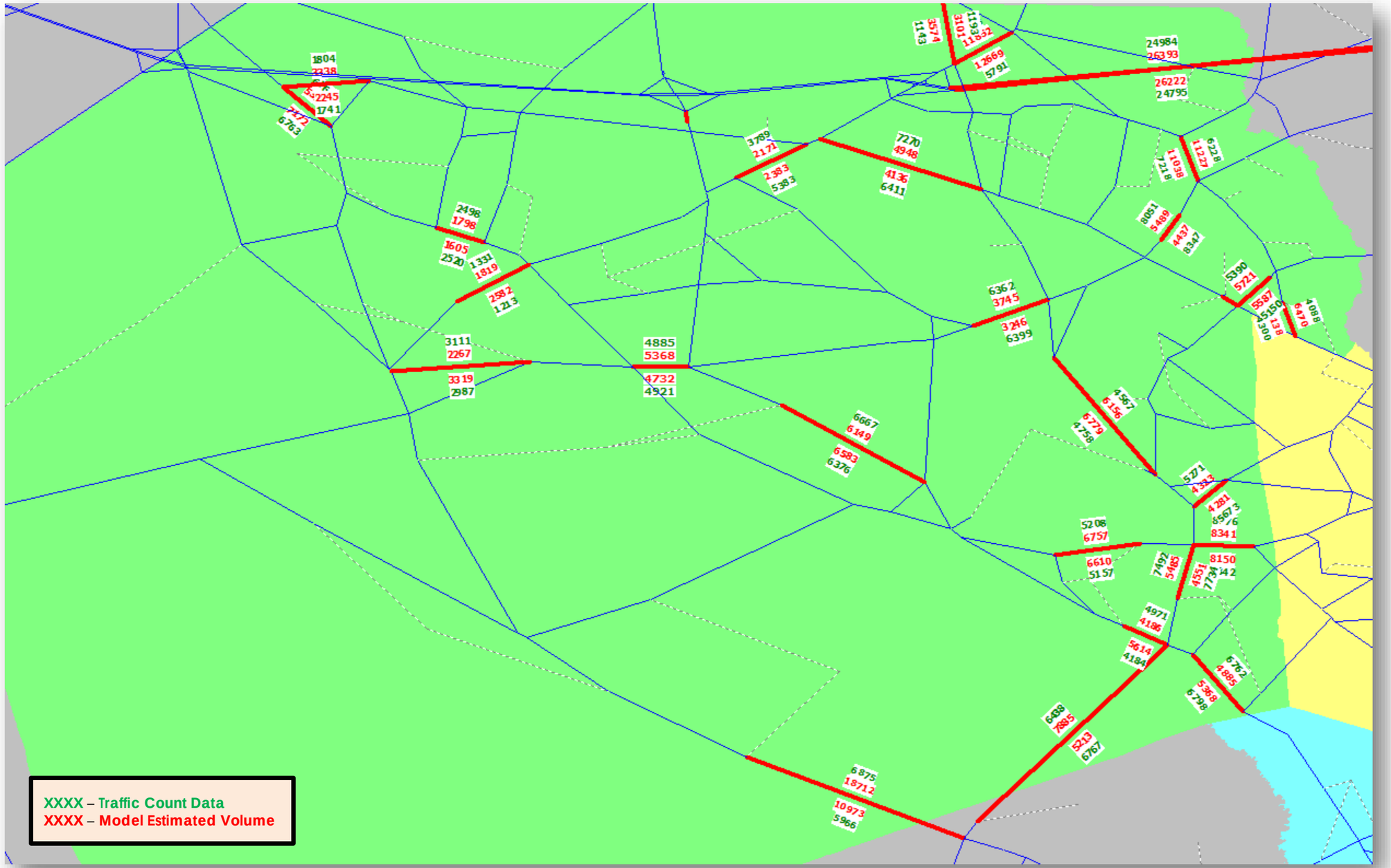
Figure 4.7 Traffic Comparison by Roadway for Brick Township



Stantec

Figure 4.8 Traffic Comparison by Roadway for Jackson Township



Stantec

In addition to the traffic volume comparison, the congestion level or hot-spots in the four townships were also assessed as part of the model validation process. The OCTM highway assignment module consists of four time-of-day periods model, including:

- AM Peak period between 6AM and 9AM
- Midday period between 9AM and 3PM
- PM Peak period between 3PM and 6PM
- Night between 6PM and 6AM

The observed hot-spots locations were provided by the township (Lakewood) and obtained from the Google Map congestion data for a typical weekday. The Lakewood hot-spots map is included in Appendix A. The hot-spot comparison was performed for the AM Peak and PM Peak periods when the congestion is most likely to occur. Figures 4.9 to 4.16 shows the observed and estimated hot-spot locations for the four townships by time-of-day. It should be noted that the congestion level estimated by the model is for the whole "period", for example, the AM Peak period analysis estimated the congestion between 6AM and 9AM. Therefore, the estimates may not be as refined as hourly estimate from a microscopic model. Additionally, some observed hot-spots locations were caused by intersection delays due to poor signal timings, the lack of exclusive right or left turn bays, etc. It is usually beyond a Regional / County Model to estimate this type of delays accurately. In the urbanized areas, such as Lakewood, Brick, and Toms River townships, the congestion is usually worse in the PM Peak Period as shown by the observed data and the model estimated results.

For the comparison purposes, the estimated hot-spot locations are identified of those with V/C ratio equals to 0.9 or higher (or approximately Level-of-Service E or worse). The results indicated that, even in the base year, congestion is a problem for many roadways in Lakewood, especially along Route 9 corridor. The congestion is less of a problem in Jackson Township, as expected. The estimated hot-spots for Brick and Toms River are also compared to the observed data.

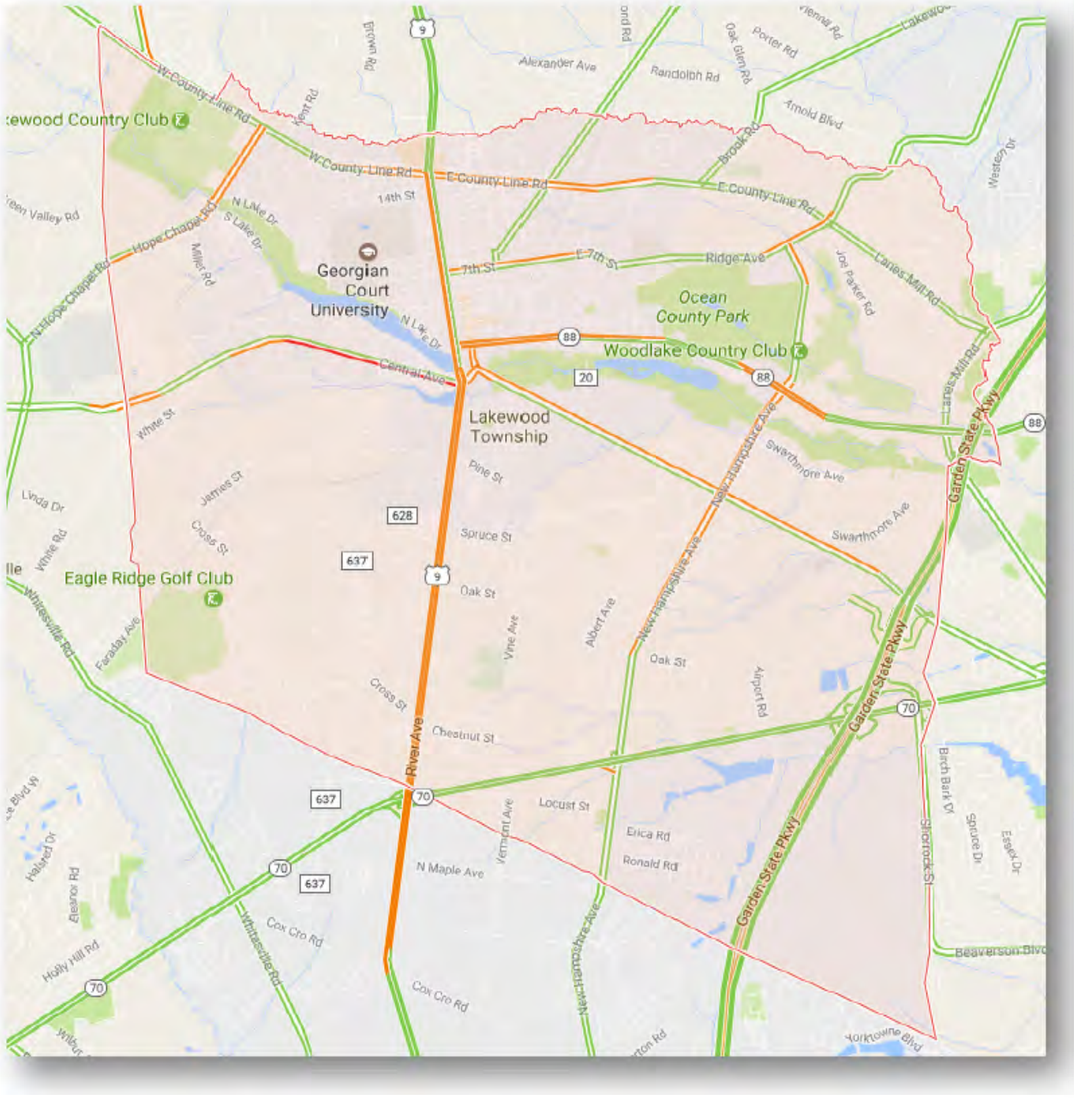
The traffic volume comparison shown in Figures 4.5 to 4.8, and the hot-spots comparison shown in Figure 4.9 to 4.16, indicated that the model estimated volumes and congestion-level replicated the observed data reasonably well for a macroscopic-level model. The estimated hot-spots locations along major corridors by township, including their lane configurations, are provided in Table 4.9 to Table 4.12.

These tables only focus on major corridors in the townships. As previously mentioned in Chapter 1, the regional model may not be able to estimate the congestion at local roads accurately since many local roads were not included in the highway network.

It should be noted that the regional model can only estimate the hot-spots caused by traffic demand, and not by traffic control devices such as intersection delays. Additional studies at microscopic-level (microsimulation) for selected corridors may be warranted to provide more detail estimates on various congestion measures, such as model estimated traffic volumes on a more refined time-period (hourly instead of by period), intersection delays, etc.

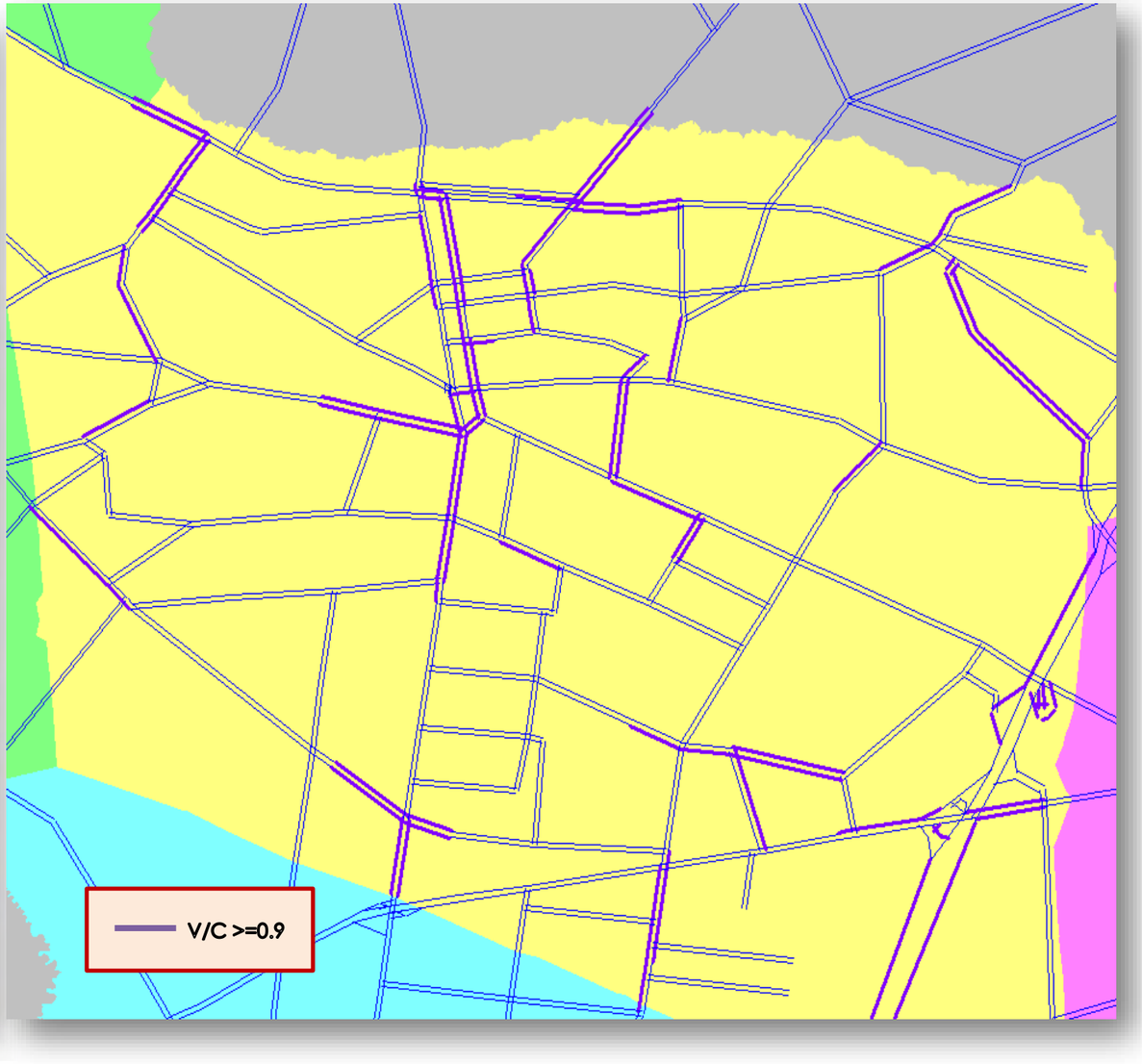
Figure 4.9 AM Peak Hot-Spots Comparison for Lakewood Township for Year 2015

Typical Wednesday Congestion at 9:15 AM (Current Day)



Source: Google Maps

Model Estimated AM Peak Congestion (6AM – 9AM)

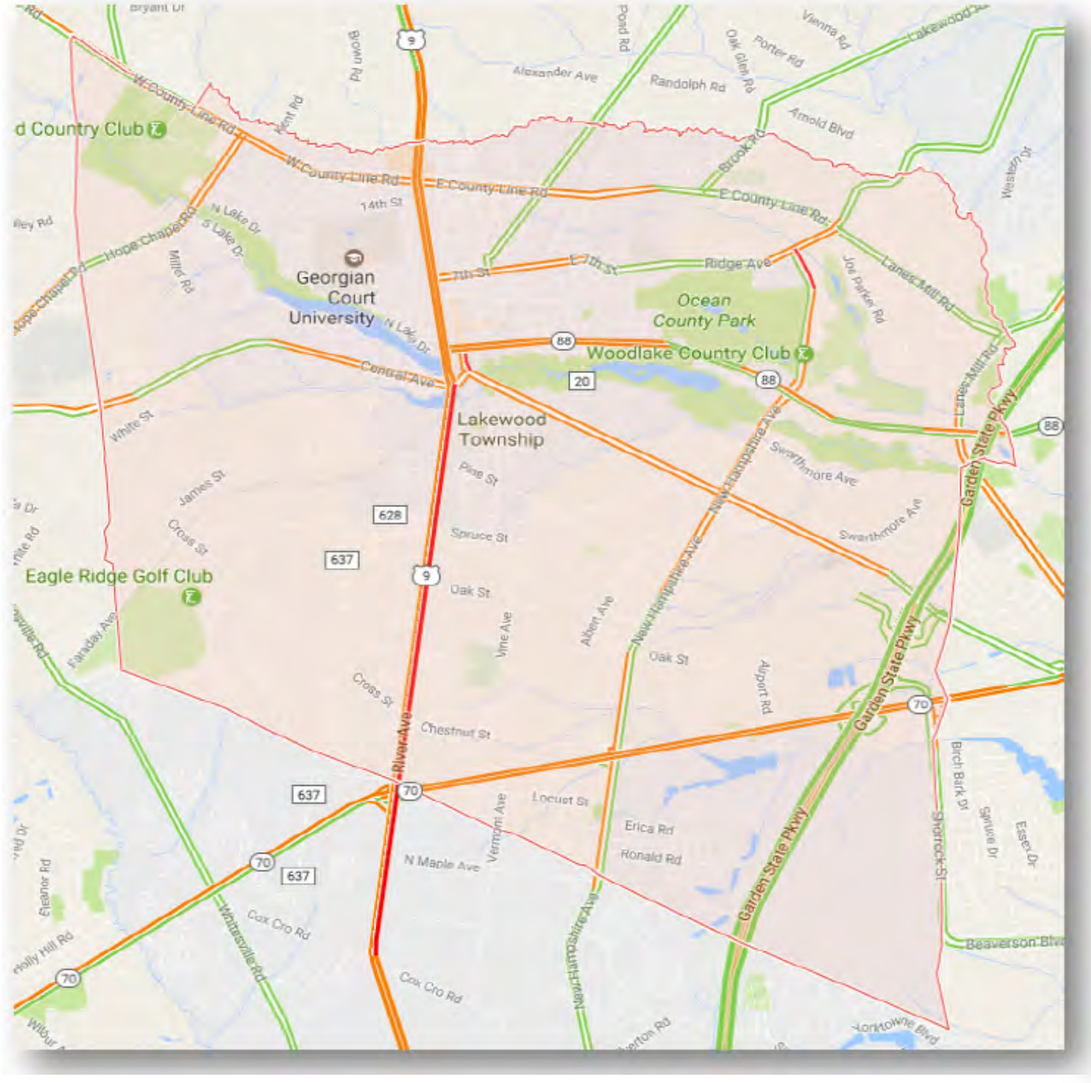


Source: OCTM

Stantec

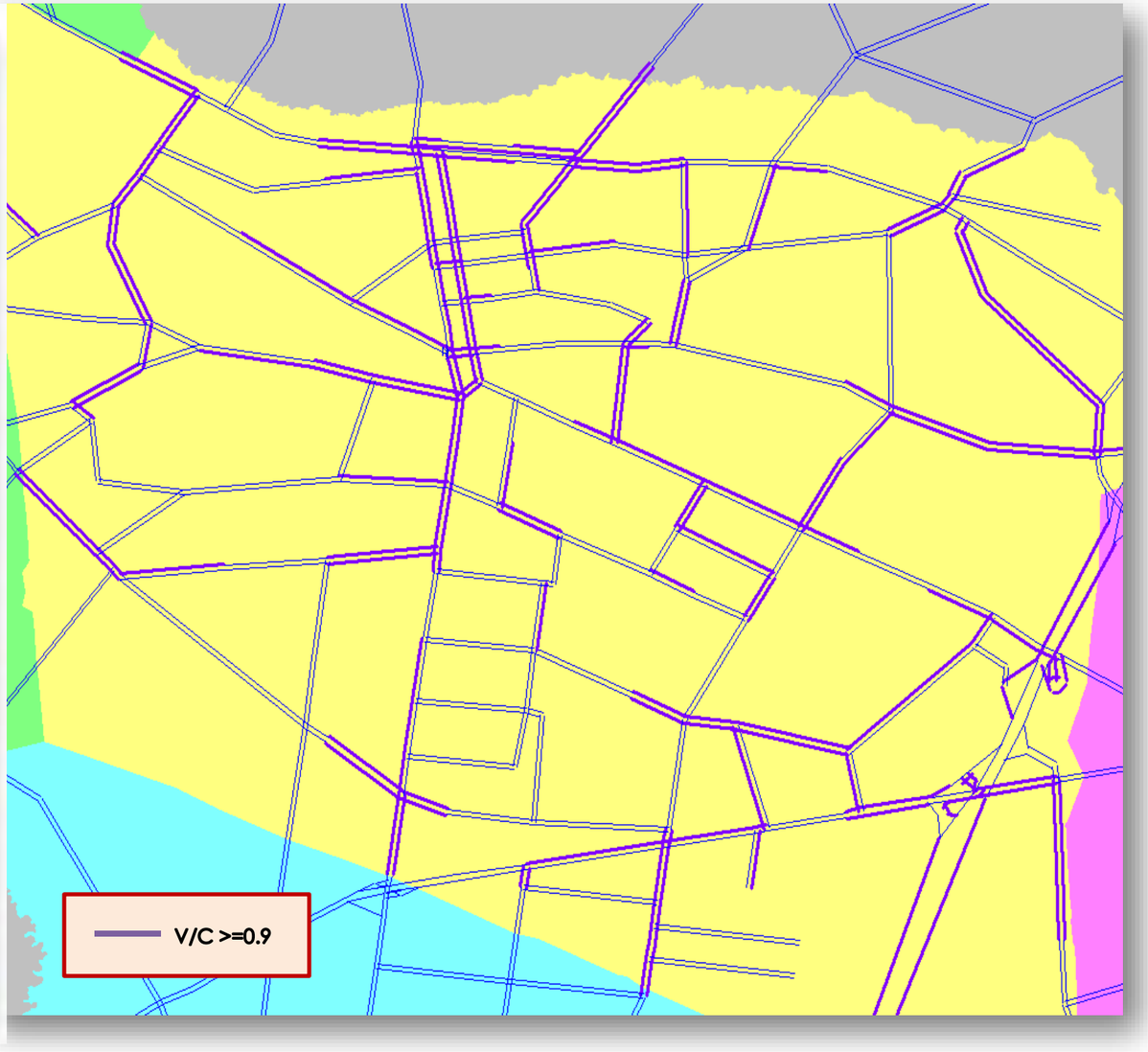
Figure 4.10 PM Peak Hot-Spots Comparison for Lakewood Township for Year 2015

Typical Wednesday Congestion at 4:15 PM (Current Day)



Source: Google Maps

Model Estimated PM Peak Congestion (3PM – 6PM)

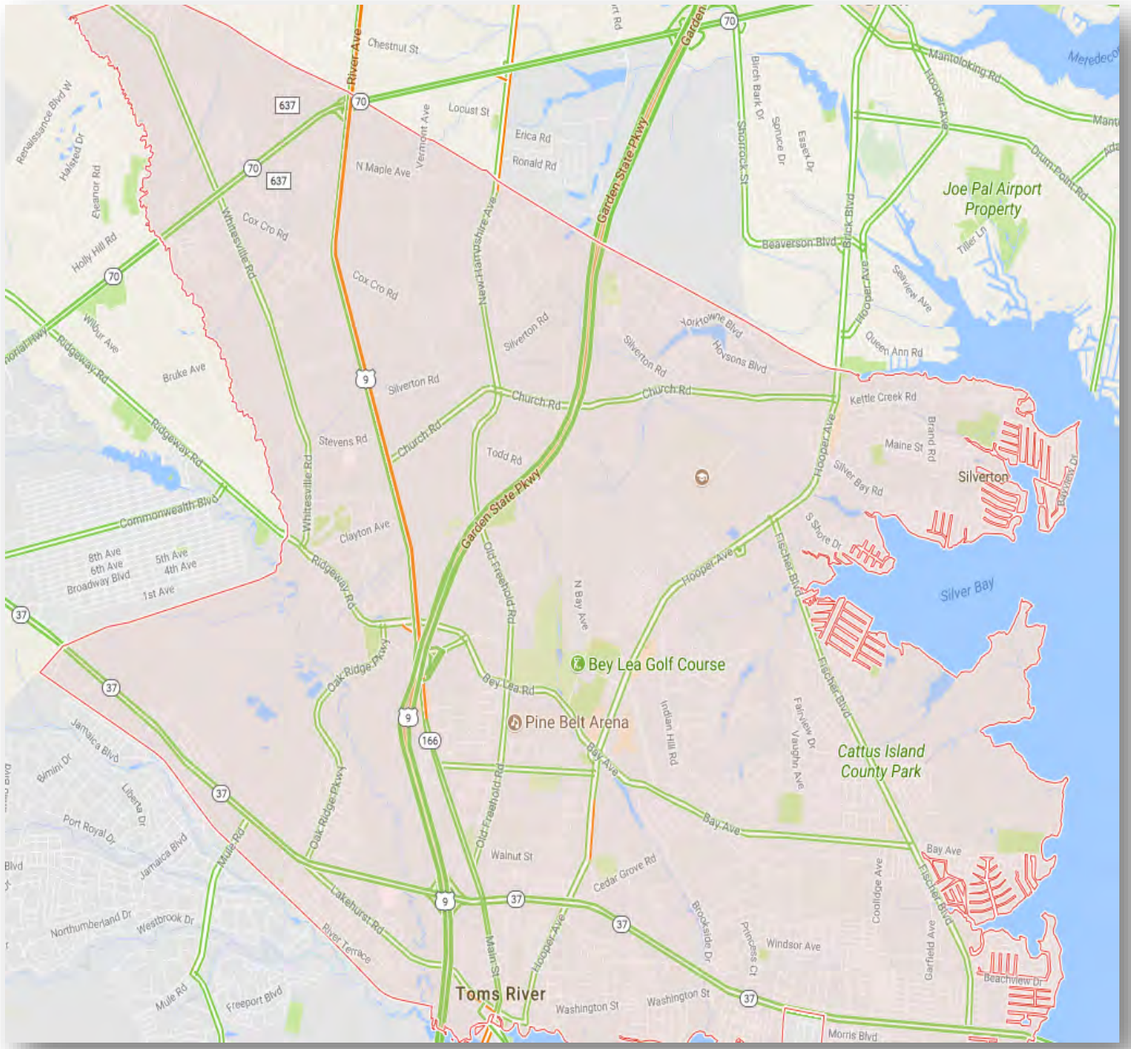


Source: OCTM

Stantec

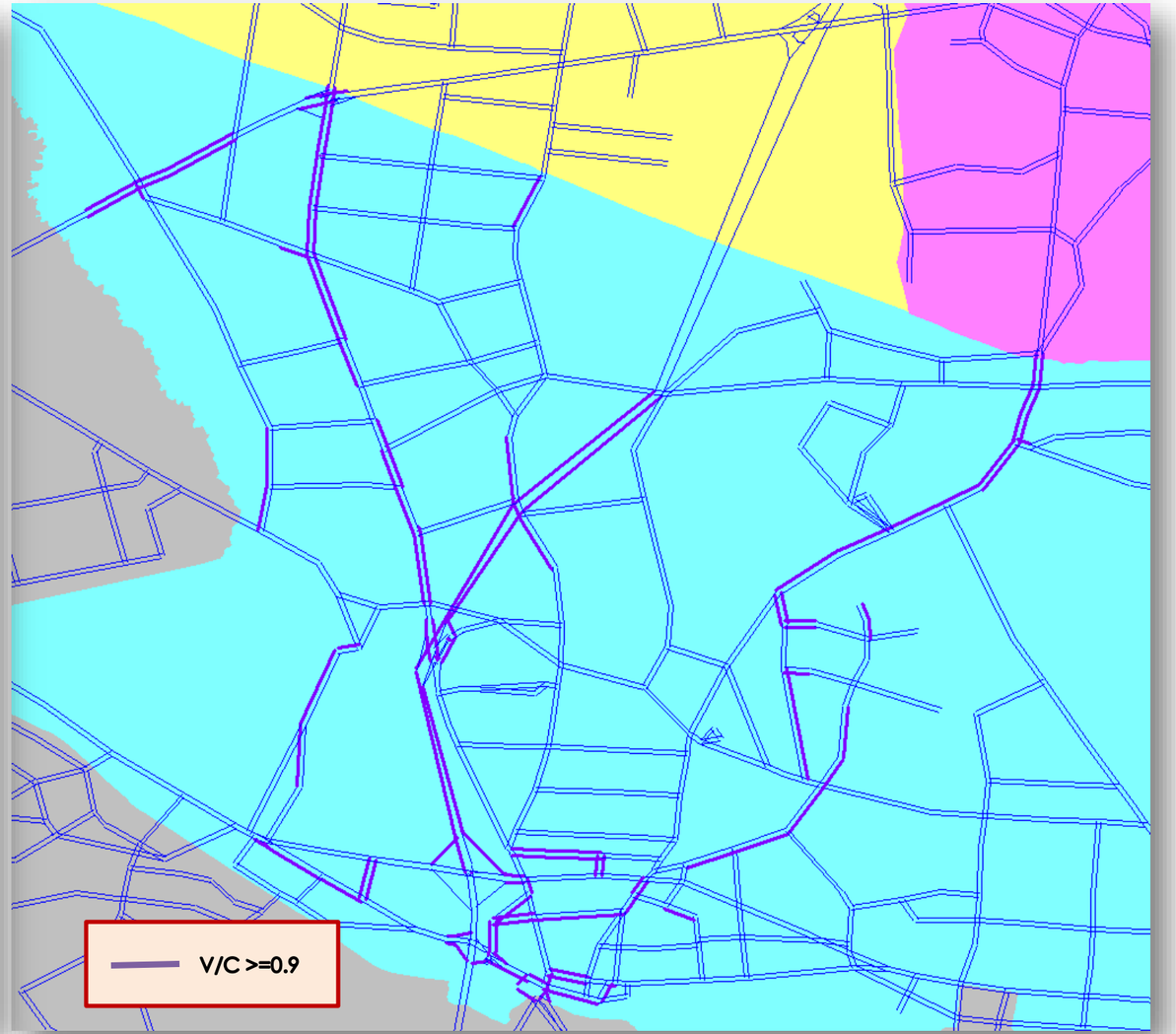
Figure 4.11 AM Peak Hot-Spots Comparison for Toms River Township for Year 2015

Typical Wednesday Congestion at 8:05 AM (Current Day)



Source: Google Maps

Model Estimated AM Peak Congestion (6AM – 9AM)

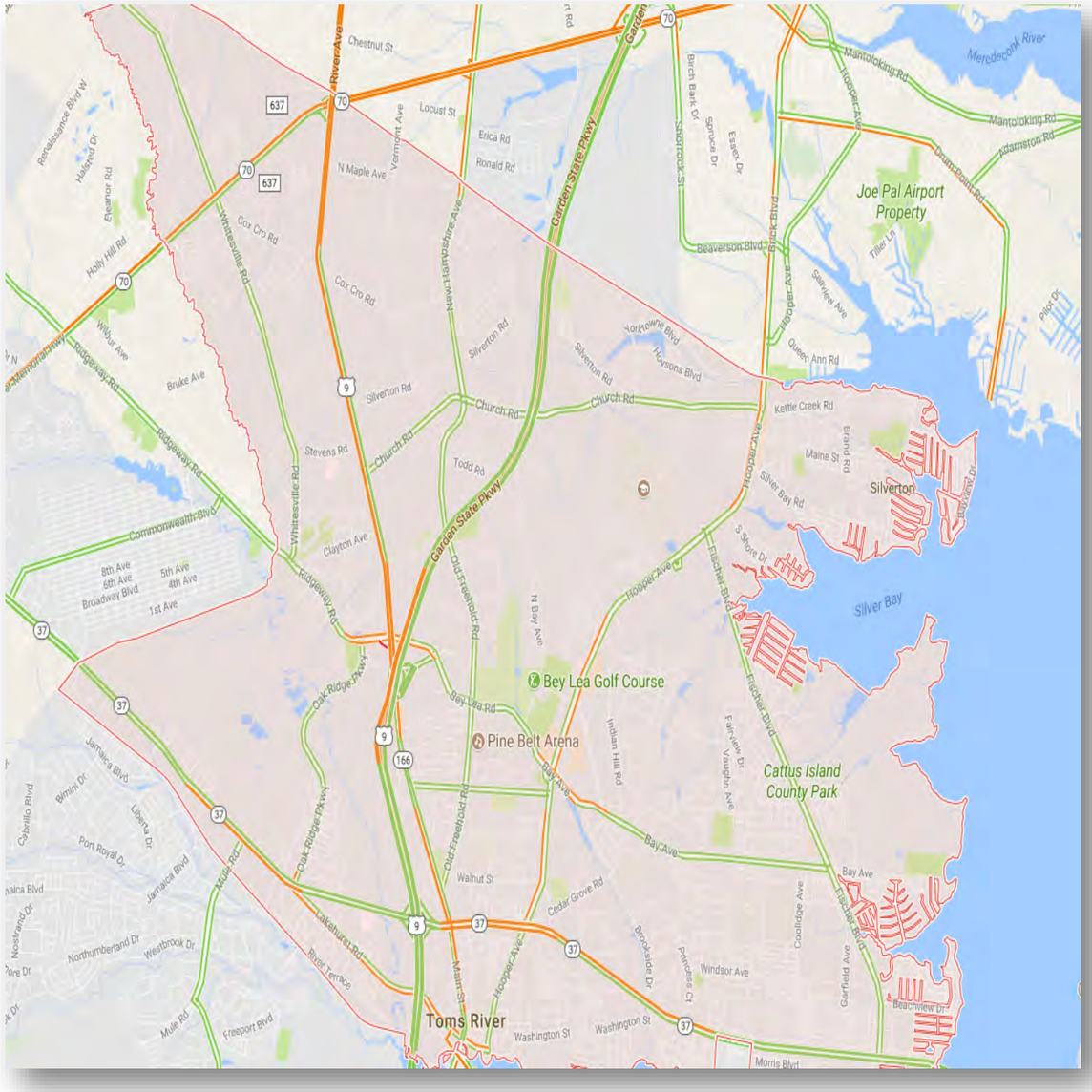


Source: OCTM

Stantec

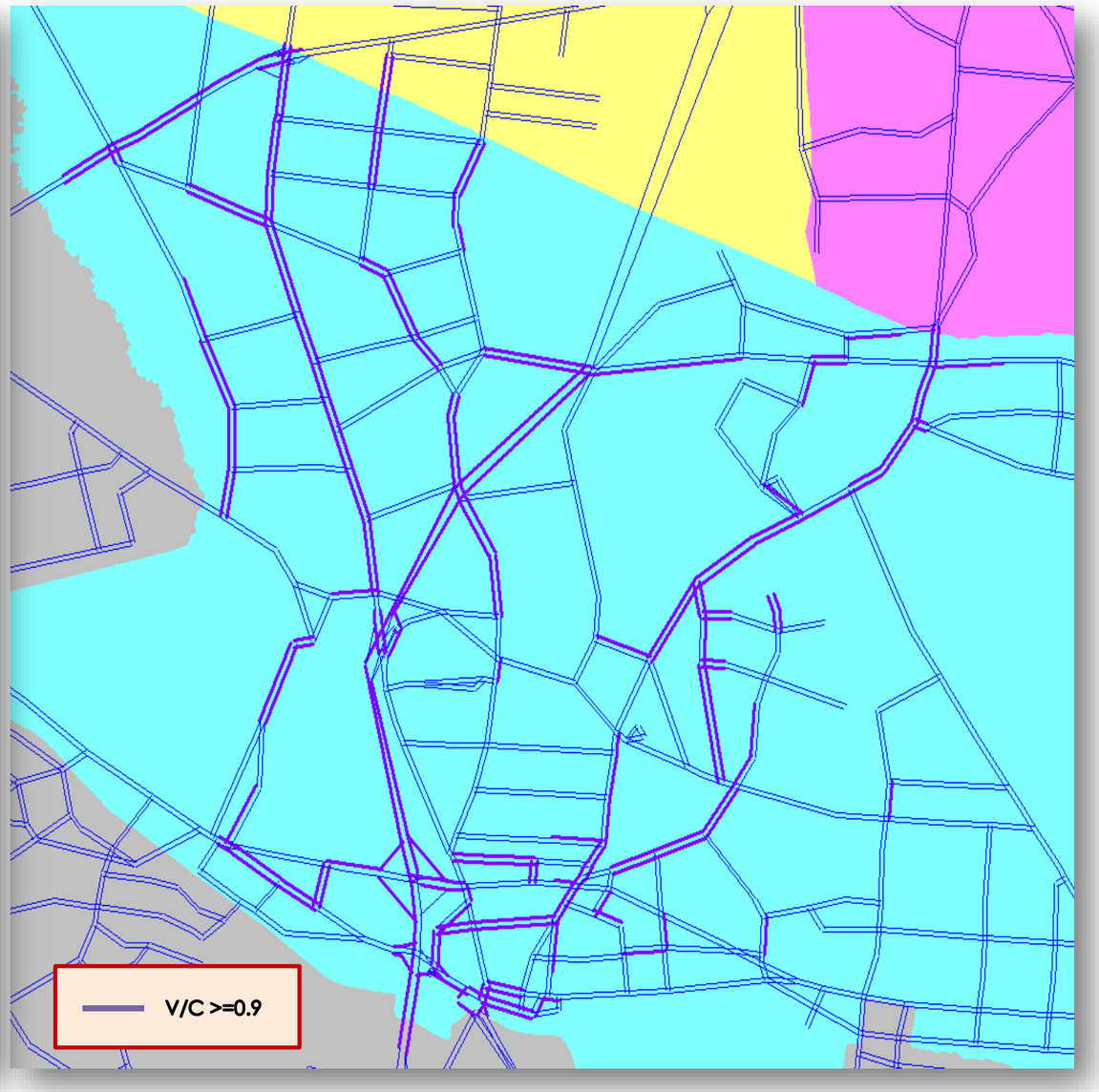
Figure 4.12 PM Peak Hot-Spots Comparison for Toms River Township for Year 2015

Typical Wednesday Congestion at 5:45 PM (Current Day)



Source: Google Maps

Model Estimated PM Peak Congestion (3PM – 6PM)

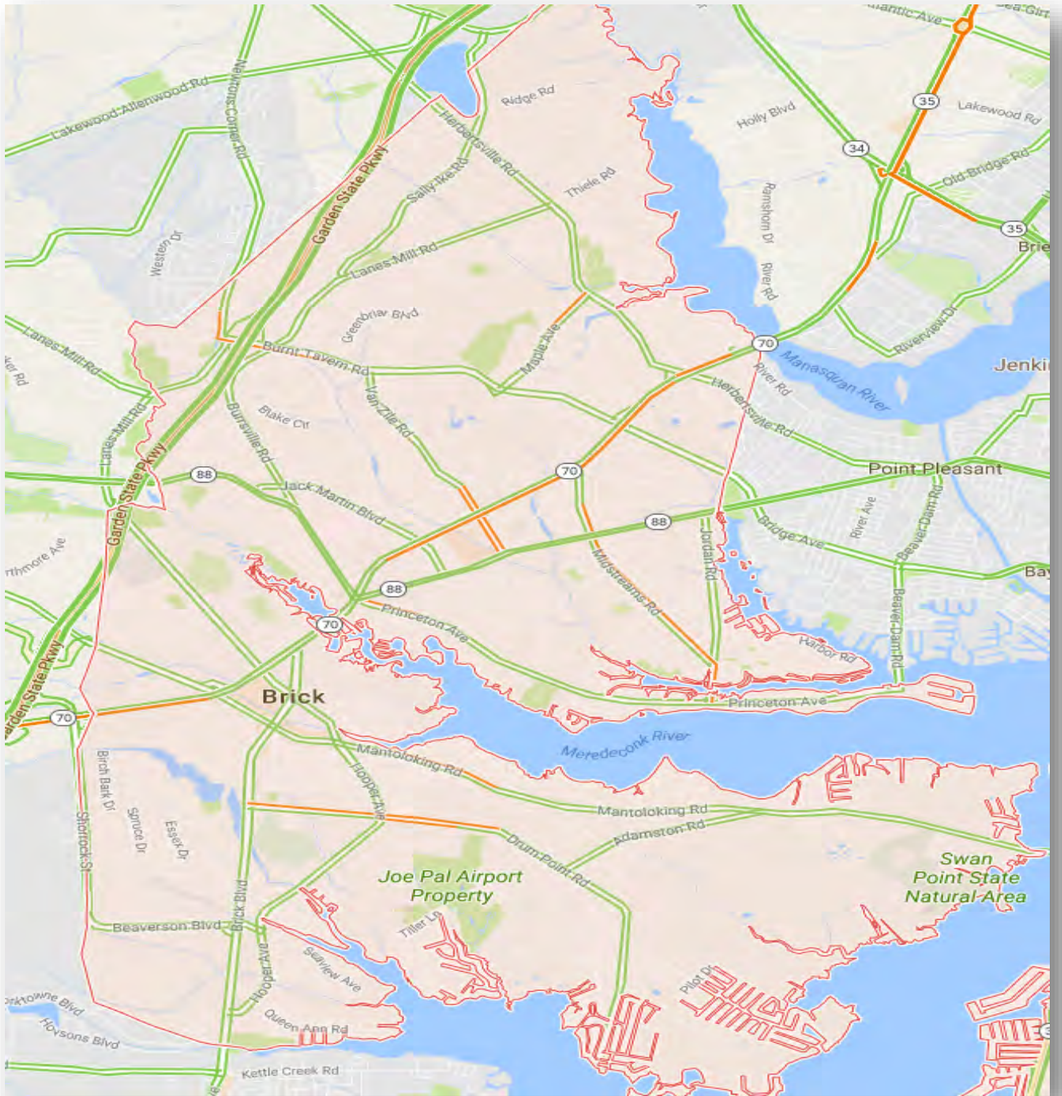


Source: OCTM

Stantec

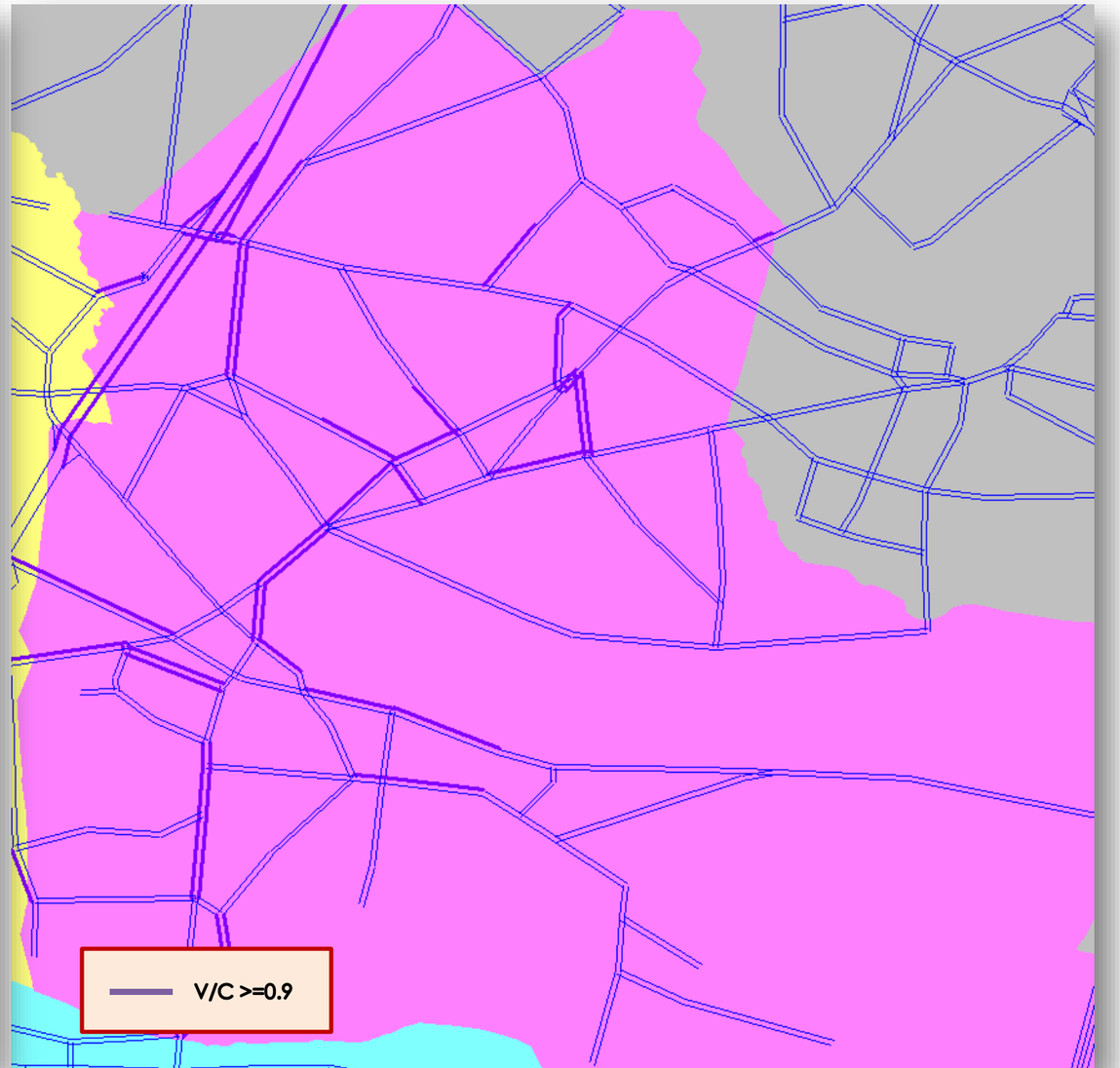
Figure 4.13 AM Peak Hot-Spots Comparison for Brick Township for Year 2015

Typical Wednesday Congestion at 8:45 AM (Current Day)



Source: Google Maps

Model Estimated AM Peak Congestion (6AM – 9AM)

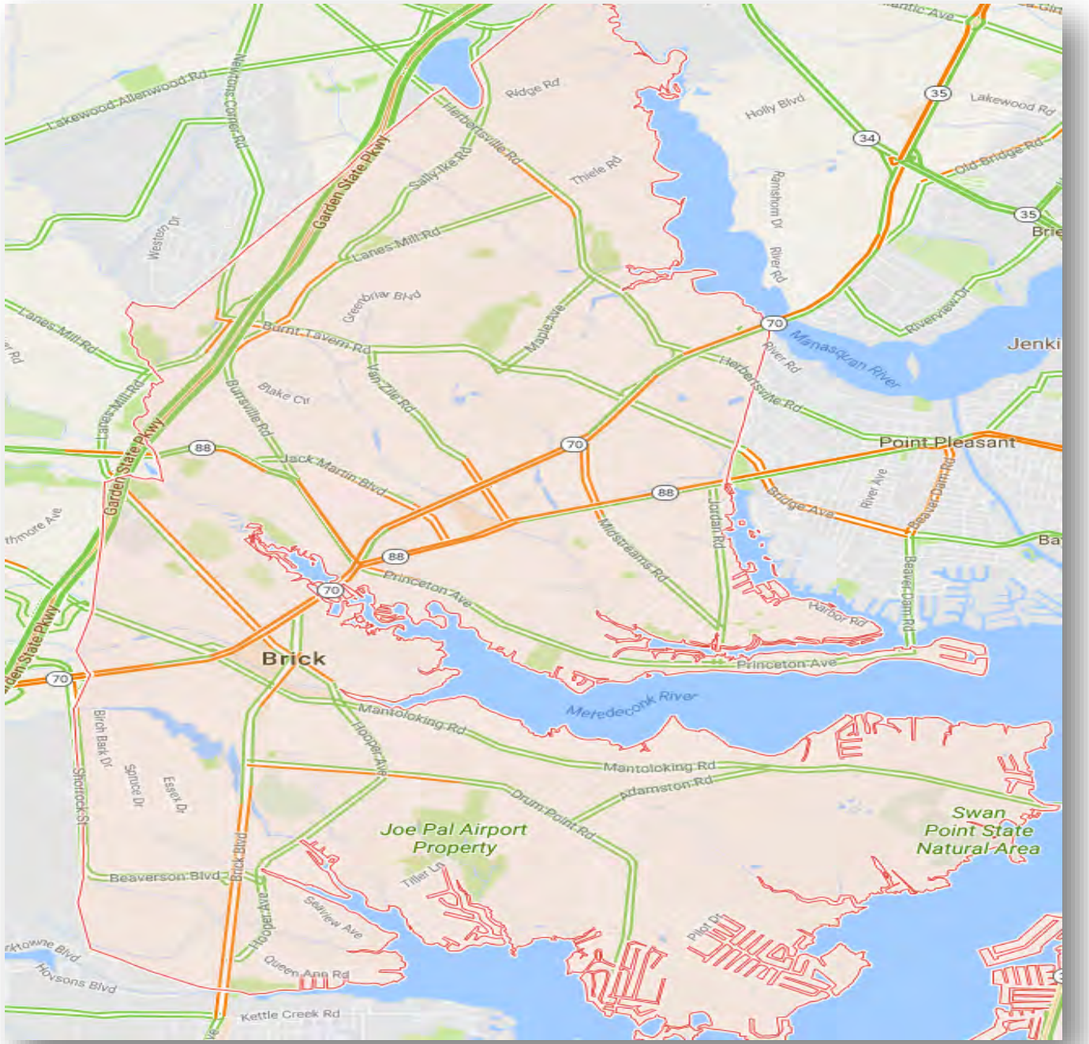


Source: OCTM

Stantec

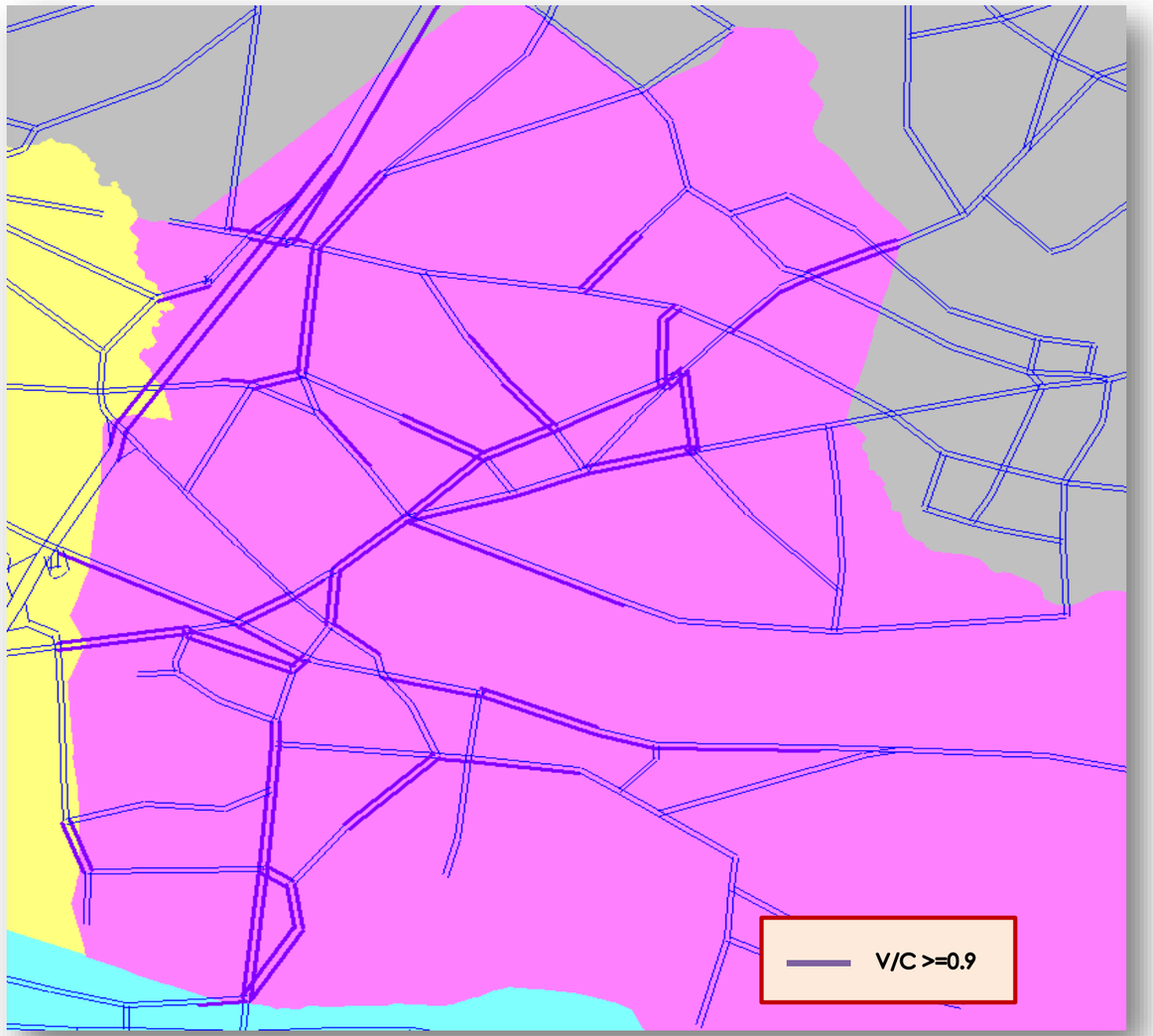
Figure 4.14 PM Peak Hot-Spots Comparison for Brick Township for Year 2015

Typical Wednesday Congestion at 3:10 PM (Current Day)



Source: Google Maps

Model Estimated PM Peak Congestion (3PM – 6PM)

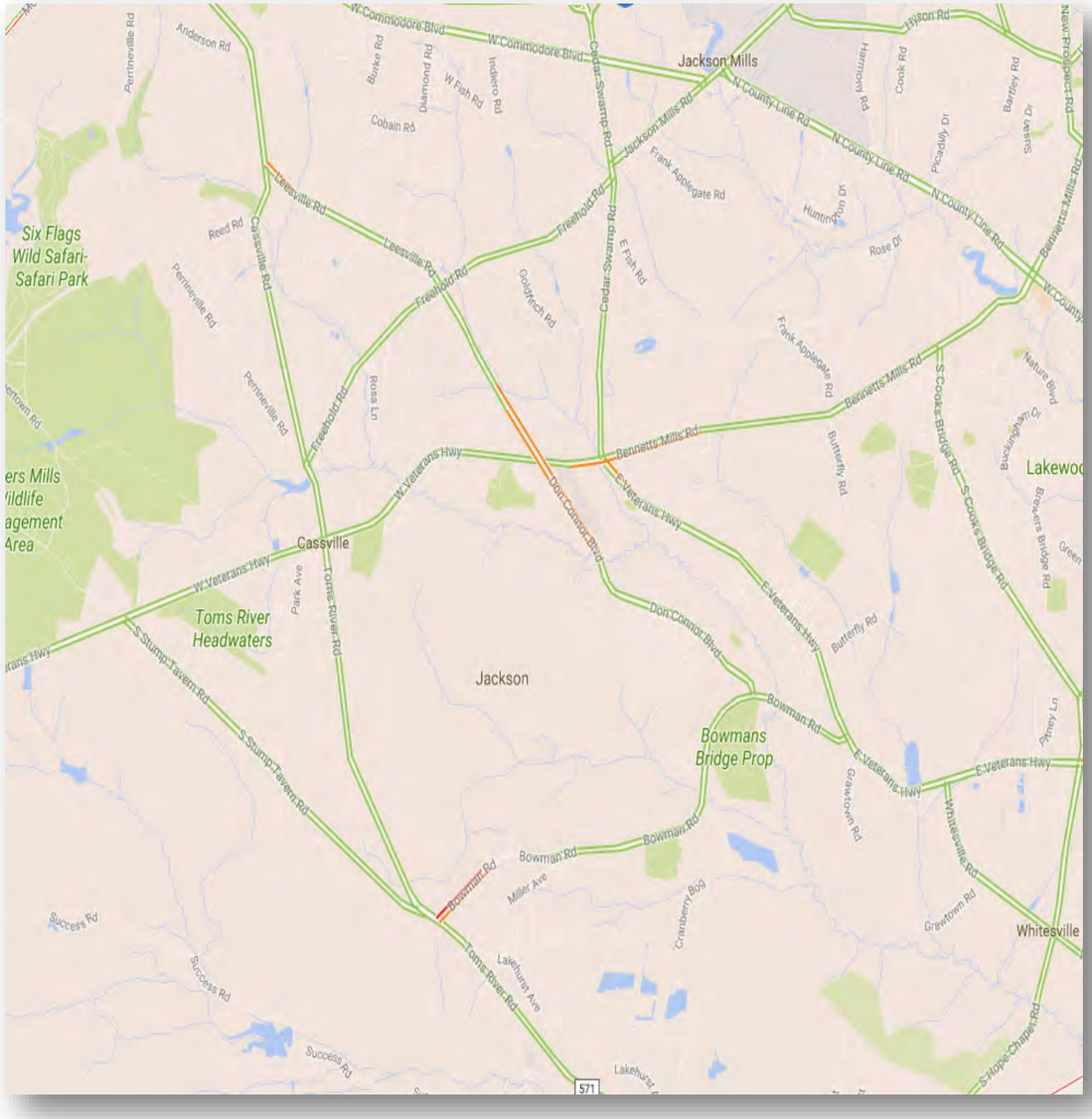


Source: OCTM

Stantec

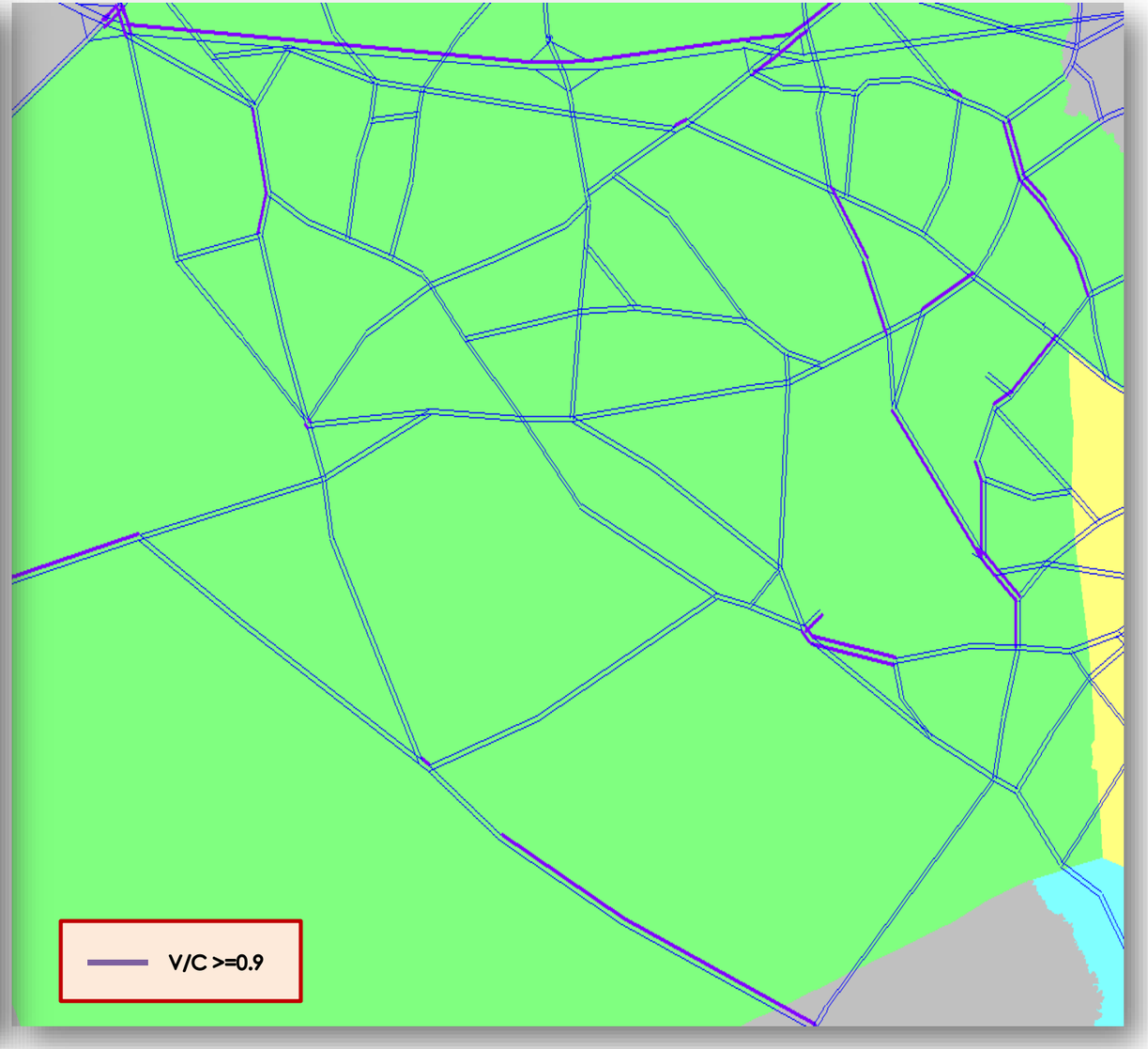
Figure 4.15 AM Peak Hot-Spots Comparison for Jackson Township Year 2015

Typical Wednesday Congestion at 7:10 AM (Current Day)



Source: Google Maps

Model Estimated AM Peak Congestion (6AM – 9AM)

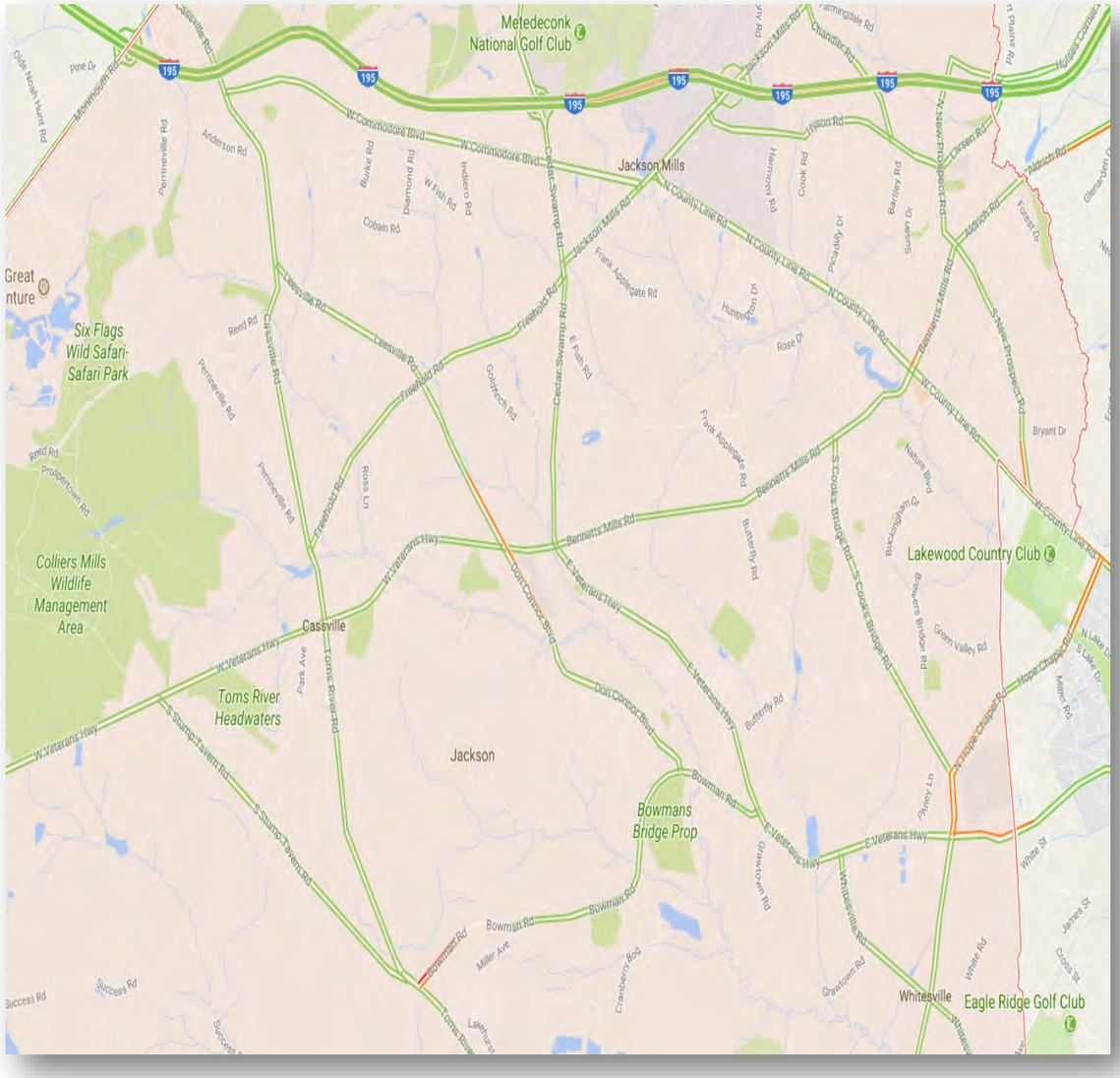


Source: OCTM

Stantec

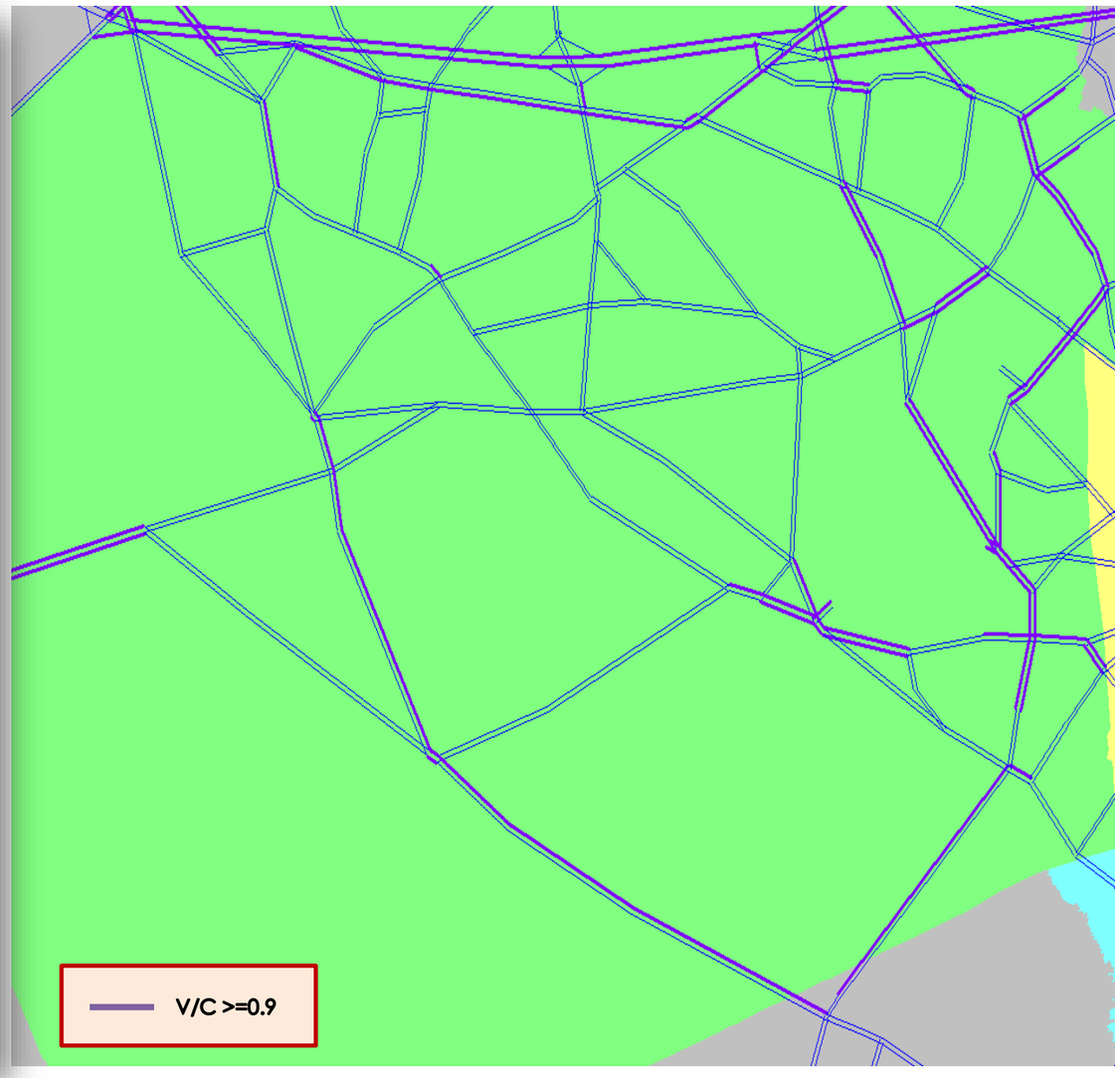
Figure 4.16 PM Peak Hot-Spots Comparison for Jackson Township for Year 2015

Typical Wednesday Congestion at 3:30 PM (Current Day)



Source: Google Maps

Model Estimated PM Peak Congestion (3PM – 6PM)



Source: OCTM

Stantec

Table 4.9 Estimated Hot-Spot Locations in Lakewood Township for Year 2015

ROAD NAME	JURISDICTION	LIMIT	NO. OF LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
US 9	NJDOT	Between County Line Rd. and Route 88	2	1.1
		Between Route 88 and NJ 70	1	1.2
County Line Rd.	COUNTY	Between Heathwood Ave. and Brook Rd.	1	1.0
CR 88	COUNTY	Between US 9 and Garden State Parkway (localized congestion)	1	0.9
Cedar Bridge Ave.	COUNTY	Between Hurley Ave. and Garden State Parkway	2	0.9
NJ 70	NJDOT	Between US 9 and Garden State Parkway	2	0.9
Central Ave.	COUNTY	Between Cross St. and US 9	1	1.0
Hope Chapel Rd	COUNTY	Between County Line Rd. and Miller Rd.	1	1.4
New Hampshire Ave.	COUNTY	Between N. Maple Ave (Township Boundary Line) and Route 88	2	1.0
7th Ave / Ridge Ave.	COUNTY	Between US 9 and County Line Rd. (localized congestion)	1	0.9
Clifton Rd. / Hurley Rd.	COUNTY	Between US 9 and County Line Rd.	1	1.3

Table 4.10 Estimated Hot-Spot Locations in Toms River Township for Year 2015

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
US 9	NJDOT	Between CR70 and Garden State Parkway	1	1.3
Hooper Ave.	COUNTY	Between NJ 37 and Church Rd.	2	1.0
NJ 70	NJDOT	Beween Whitesville Rd. and US 9	2	1.3

Table 4.11 Estimated Hot-Spot Locations in Brick Township for Year 2015

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
NJ 70	NJDOT	Between Shorrock St. and Route 34	2	1.0
Route 88	COUNTY	Between Princeton Ave. and Jordan Rd.	1	0.9
Brick Blvd.	NJDOT	Church Rd. and Drum Point Rd.	2	1.2

Table 4.12 Estimated Hot-Spot Locations in Jackson Township for Year 2015

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
Cooks Bridge Road	County	Between N. Hope Chapel Rd. and N. County Line Rd..	1	1.0
N. Hope Chapel Rd.	County	Between E. Veteran Highways and S. Cooks Bridge Rd.	1	0.9

5.0 FUTURE YEAR FORECASTS

5.1 FUTURE YEAR HIGHWAY NETWORK

As part of this project, two future year scenarios were prepared and executed, including 2025 and 2040 model years. The future year highway networks were built by implementing future projects to the base year highway network. Future projects were obtained from the NJTPA's TIP and Long Range Plan from FY 2016 Conformity Projects. Only projects within Ocean, Monmouth, Middlesex, Burlington, and Mercer Counties were selected due to the proximity of these counties to Ocean County. Appendix B shows the list of the future projects.

The GSP Interchange 83 Improvement project was also included in the future years' highway network. The project plan was obtained from the "Garden State Parkway Interchange 83 Improvements – Local Concept Development Study" by Greenman-Pedersen Inc., and Alternative 3A alignment was stated as the preferred alternative. This project was estimated to start in June 2022, It was assumed that the construction will be completed by 2025. With all future projects were estimated to complete by 2025, the 2040 highway network is the same as the 2025

5.2 FUTURE YEAR SOCIOECONOMIC DATA

The future socioeconomic data was also adjusted for Lakewood and Brick Township, consistent with the adjustment made for the base year SED. The SED adjustments were made by incorporating the projected SED information provided by the two townships. The updated 2025 and 2040 SED for the two townships are shown in Table 5.1 and 5.2, respectively. A discussion with Toms River's Township Engineer and other staff concluded that the SED projections provided by NJTPA are reasonable for use in this project. Additionally, Toms River staff also provided the socioeconomic projections that were developed using two approaches as attached in Appendix F:

- Linear Regression Projections
- Survival Method Population Projections

Table 5.3 compares the SED projections from these two methods to the most current NJTPA's projections. This comparison also indicated that the current SED projections provided by NJTPA are reasonable. No additional SED adjustments were provided by Jackson Township. During the meeting with the Jackson Township staff, it was mentioned that the township has received a permit application for Jackson Crossing II, an indoor/outdoor recreation facility. The township provided a concept plan of this development as attached in the Appendix G. Considering that this is still a conceptual local development, the impact of this development on the Jackson Township SED was not included in this study. The traffic impact of this development is more suitable for a detail traffic study, such as traffic microsimulation analysis, which is beyond the scope of the regional model.

Table 5.4 shows the SED growth summary between 2015 and 2040 for the four townships, as well as Ocean County total, and NJTPA's region. As expected, the average household size in Lakewood Township is significantly higher than in the other regions, including the three townships, Ocean County, and NJTPA's region. In 2015, the average household size in Lakewood is approximately 80% and 60% higher than the county average and NJTPA's average, respectively; and in 2040, it is more than doubled of both the county and NJTPA's average. It was also estimated that the household size in Lakewood Township continues to grow from 4.45 in 2015 to 6.12 in 2040, while the household size in other regions remain almost constant.

The population and household growth in Lakewood is also the highest among the four townships. The population is estimated to grow by 91% in 25 years, while household will grow by 39% in the same span of time. Employment in Lakewood is estimated to increase by 24% in 2040, which is lower compared to the population and household growth. The SED growth at the other three townships is more in-line with the county's SED growth.

Table 5.1 Adjusted 2025 and 2040 SED for Lakewood Township

TAZ	2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3152	2,605	295	77	3,710	369	83
3153	4,855	512	1,979	6,916	641	2,157
3154	4,316	646	434	5,843	767	482
3155	6,619	1,231	220	8,911	1,453	270
3156	10,821	1,257	529	14,570	1,483	649
3157	2,264	315	32	3,049	372	39
3158	16,652	3,587	4,325	22,724	4,291	4,690
3159	10,659	1,835	4,750	17,126	2,617	5,052
3160	0	0	6,778	0	0	7,209
3161	4,410	1,054	6,006	6,120	1,284	6,413
3162	3,028	612	46	4,203	745	49
3163	2,114	373	147	2,933	454	158
3164	5,454	871	409	7,567	1,062	437
3165	9,617	1,013	716	12,702	1,171	790
3166	4,977	614	415	6,574	709	457
3167	8,080	1,273	551	10,673	1,471	608
3168	11,222	1,557	2,205	15,492	1,886	2,391
3169	1,096	198	2,511	1,495	238	2,666
3170	5,296	812	742	7,220	970	789
3171	3,399	480	335	4,634	574	355
3172	3,895	426	114	5,207	498	125
3173	6,619	1,062	537	8,848	1,243	590
3174	1,646	472	279	2,202	553	306
3175	3,278	309	843	4,383	361	926
3176	2,529	415	587	3,424	493	653
3177	3,701	536	191	5,013	636	213
3178	3,779	1,396	677	5,266	1,696	801
3179	2,779	1,446	802	3,734	1,656	945
3180	4,575	1,737	3	6,144	1,991	3
3181	7,086	3,284	748	9,730	3,806	916
3182	3,592	564	256	5,116	706	279
TOTAL	**160,963**	**30,182**	**38,244**	**221,528**	**36,196**	**41,501**

Table 5.2 Adjusted 2025 and 2040 SED for Brick Township

TAZ	2025			2040		
	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT	POPULATION	HOUSEHOLD	TOTAL EMPLOYMENT
3183	2,707	1,032	102	3,009	1,161	131
3184	1,426	477	139	1,585	536	179
3185	1,256	574	112	1,512	701	145
3186	3,018	1,130	68	3,427	1,296	77
3187	2,145	1,095	793	2,435	1,256	899
3188	3,232	1,278	24	3,729	1,491	25
3189	2,656	963	294	2,997	1,096	318
3190	1,583	580	173	1,787	661	188
3191	944	463	111	1,062	525	144
3192	1,957	683	149	2,200	775	193
3193	2,876	1,066	1,258	3,245	1,214	1,363
3194	2,772	1,526	323	3,185	1,766	358
3195	1,188	371	103	1,370	433	108
3196	1,057	393	4,455	1,220	459	4,685
3197	1,694	750	1,002	1,946	868	1,109
3198	1,645	744	48	1,850	845	62
3199	2,517	862	216	2,884	1,000	262
3200	1,280	486	21	1,423	546	28
3201	1,474	658	132	1,638	740	174
3202	2,402	863	654	2,791	1,014	746
3203	1,344	569	49	1,561	669	56
3204	544	274	148	616	314	160
3205	260	132	149	294	151	161
3206	759	331	14	866	381	23
3207	2,853	1,100	95	3,254	1,267	154
3208	1,057	432	22	1,200	495	26
3209	3,006	1,165	179	3,411	1,335	205
3210	1,569	569	404	1,771	648	425
3211	908	360	38	1,025	410	40
3212	1,559	532	71	1,759	606	75
3213	1,125	455	7	1,276	522	9
3214	1,922	814	2	2,229	955	3
3215	1,472	829	1,780	1,707	972	1,918
3216	1,978	711	631	2,246	816	722
3217	1,843	789	221	2,089	903	244
3218	777	270	117	880	309	129
3219	1,441	493	62	1,634	564	69
3220	849	295	17	962	338	18
3221	873	319	677	989	365	749
3222	728	252	131	825	289	145
3223	2,667	1,067	3,528	3,011	1,216	3,707
3224	3,308	1,392	1,252	3,906	1,665	1,378
3225	1,468	498	225	1,682	578	272
3226	2,024	718	2,639	2,378	854	2,788
3227	3,170	1,678	1,068	3,724	1,996	1,128
TOTAL	**79,333**	**32,038**	**23,703**	**90,590**	**37,001**	**25,798**

Adjusted TAZ

Table 5.3 Projected 2025 and 2040 SED for Toms River Township

POPULATION PROJECTION	2025[1]	2040
Linear Regression Projection (Toms River)	104,672	115,508
Survival Method Projection (Toms River)	93,155	87,489
Current NJTPA's Projection	100,608	114,746

HOUSEHOLD PROJECTION	2025[1]	2040
Linear Regression Projection (Toms River)	40,017	45,955
Survival Method Projection (Toms River)[2]	35,614	34,808
Current NJTPA's Projection	37,961	43,780

TOTAL EMPLOYMENT PROJECTION	2025[1]	2040
Linear Regression Projection (Toms River)	43,576	43,577
Current NJTPA's Projection	47,318	50,620

NOTE:

[1] Interpolated from 2020 and 2030

[2] Calculated assuming the household size is the same as Liner Regression

Table 5.4 SED Growth between 2015 and 2040

Townships	Population			Household			Employment			Average HH Size	
	2015	2040	%Growth	2015	2040	%Growth	2015	2040	%Growth	2015	2040
Lakewood	115,765	221,528	91%	26,022	36,196	39%	33,580	41,501	24%	4.45	6.12
Toms River	92,721	114,746	24%	34,660	43,780	26%	44,688	50,620	13%	2.68	2.62
Brick	74,860	90,590	21%	30,031	37,001	23%	22,349	25,798	15%	2.49	2.45
Jackson	57,351	76,338	33%	20,313	27,742	37%	13,606	17,444	28%	2.82	2.75
Ocean County	558,423	729,752	31%	224,600	282,200	26%	169,304	201,150	19%	2.49	2.59
NJTPA Region	6,704,651	7,527,248	12%	2,450,626	2,828,582	15%	3,010,848	3,373,265	12%	2.74	2.66

5.3 ESTIMATED FUTURE TRAFFIC AND HOT-SPOTS LOCATIONS

The 2025 and 2040 scenarios were prepared and executed using the updated highway network and SED. The estimated future traffic and hot-spot locations were prepared for the 2025, and 2040 model year runs. The local trip growth between base year and 2040 were summarized for the four townships and are provided in Table 5.5 to 5.8. The local traffic growth is more in line with the household and employment growth than the population growth as the model was derived based on Household Survey Data, and trip rates were generally developed based on household information, including household size, and employment data.

The comparison of the 2015, 2025, and 2040 estimated traffic volumes by township are shown in Figure 5.1 to 5.4. The traffic growth patterns between 2015 and 2025, and between 2025 and 2040 are shown schematically in Figure 5.5 to 5.12 for the four townships. The estimated 2025 and 2040 hot-spot locations by township are shown in Figure 5.13 to 5.20.

Table 5.5 Local Trips Growth Between 2015 and 2040 in Lakewood

TAZ	2015	2025	%Growth (2015-2025)	2040	%Growth (2025-2040)
3152	1,699	1,973	16%	2,409	22%
3153	9,408	10,803	15%	12,333	14%
3154	4,777	5,407	13%	6,180	14%
3155	7,406	8,718	18%	10,351	19%
3156	8,725	10,201	17%	12,169	19%
3157	1,686	1,952	16%	2,311	18%
3158	18,968	22,745	20%	25,883	14%
3159	15,899	18,258	15%	21,721	19%
3160	16,505	18,417	12%	19,897	8%
3161	17,147	19,576	14%	21,986	12%
3162	2,859	3,537	24%	4,261	20%
3163	2,213	2,540	15%	3,024	19%
3164	5,568	6,506	17%	7,705	18%
3165	7,692	8,826	15%	9,981	13%
3166	4,432	5,046	14%	5,631	12%
3167	7,838	8,894	13%	9,946	12%
3168	16,338	18,796	15%	21,427	14%
3169	7,844	8,740	11%	9,471	8%
3170	5,473	5,997	10%	6,460	8%
3171	3,002	3,341	11%	3,714	11%
3172	2,399	2,706	13%	3,066	13%
3173	7,268	8,204	13%	9,264	13%
3174	2,998	3,530	18%	4,185	19%
3175	5,174	5,872	13%	6,492	11%
3176	3,427	3,884	13%	4,358	12%
3177	2,877	3,194	11%	3,531	11%
3178	5,391	6,537	21%	8,002	22%
3179	5,120	6,109	19%	7,282	19%
3180	4,557	5,607	23%	6,841	22%
3181	10,621	13,255	25%	16,466	24%
3182	3,408	3,977	17%	4,825	21%
Total	**218,720**	**253,149**	**16%**	**291,171**	**15%**

Table 5.6 Local Trips Growth Between 2015 and 2040 in Toms River

TAZ	2015	2025	%Growth (2015-2025)	2040	%Growth (2025-2040)
3031	927	1,098	18%	1,108	1%
3032	1,866	2,291	23%	2,317	1%
3034	1,728	1,899	10%	2,026	7%
3035	1,701	1,911	12%	2,028	6%
3036	2,476	2,666	8%	2,866	7%
3037	3,884	4,129	6%	4,688	14%
3038	3,836	4,164	9%	4,552	9%
3039	3,724	4,013	8%	4,353	8%
3040	3,212	3,551	11%	3,936	11%
3041	2,245	2,397	7%	2,558	7%
3042	3,297	3,557	8%	3,866	9%
3043	2,568	2,744	7%	2,959	8%
3044	2,377	2,525	6%	2,862	13%
3045	2,399	2,692	12%	2,838	5%
3046	2,471	2,607	5%	2,947	13%
3047	2,328	2,487	7%	2,853	15%
3048	2,349	2,655	13%	2,816	6%
3049	1,383	1,515	10%	1,578	4%
3050	1,196	1,271	6%	1,445	14%
3051	2,397	2,691	12%	3,093	15%
3052	2,751	3,039	10%	3,470	14%
3053	2,022	2,219	10%	2,557	15%
3054	2,319	2,522	9%	2,754	9%
3055	2,077	2,292	10%	2,512	10%
3056	2,516	2,774	10%	3,021	9%
3057	3,056	3,519	15%	3,563	1%
3059	2,407	2,665	11%	2,996	12%
3060	3,709	4,087	10%	4,549	11%

Table 5.6 - Continued

TAZ	2015	2025	%Growth (2015-2025)	2040	%Growth (2025-2040)
3061	12,090	12,532	4%	13,520	8%
3062	15,161	15,783	4%	17,311	10%
3063	11,811	12,450	5%	13,833	11%
3064	1,676	1,783	6%	2,147	20%
3065	20,680	21,629	5%	23,292	8%
3066	6,624	6,931	5%	7,564	9%
3067	1,471	1,593	8%	1,948	22%
3068	1,228	1,345	10%	1,629	21%
3069	1,563	1,716	10%	2,078	21%
3070	3,931	4,186	6%	4,914	17%
3071	5,640	5,948	5%	6,766	14%
3072	7,076	7,504	6%	8,619	15%
3073	5,966	6,431	8%	7,371	15%
3074	6,809	7,281	7%	8,307	14%
3075	4,392	4,672	6%	5,428	16%
3076	19,021	19,648	3%	20,115	2%
3077	4,289	4,503	5%	5,167	15%
3078	9,937	10,355	4%	11,443	10%
3079	896	1,168	30%	1,351	16%
3080	3,715	4,265	15%	4,767	12%
3081	10,873	11,653	7%	13,256	14%
3082	2,848	3,073	8%	3,721	21%
3083	10,488	12,075	15%	13,567	12%
3084	3,454	4,347	26%	5,082	17%
3085	6,354	6,840	8%	8,204	20%
Total	**249,230**	**267,715**	**7%**	**296,550**	**11%**

Table 5.7 Local Trips Growth Between 2015 and 2040 in Brick Township

TAZ	2015	2025	%Growth (2015-2025)	2040	%Growth (2025-2040)
3183	3,653	3,880	6%	4,407	14%
3184	2,173	2,409	11%	2,822	17%
3185	1,835	1,970	7%	2,423	23%
3186	4,248	4,494	6%	5,190	15%
3187	4,813	5,150	7%	5,921	15%
3188	3,565	3,700	4%	4,345	17%
3189	3,945	4,131	5%	4,681	13%
3190	2,630	2,761	5%	3,133	13%
3191	1,923	2,104	9%	2,497	19%
3192	3,023	3,288	9%	3,880	18%
3193	8,706	9,087	4%	10,160	12%
3194	4,068	4,251	4%	4,887	15%
3195	1,490	1,622	9%	1,858	15%
3196	13,929	14,363	3%	15,462	8%
3197	5,102	5,392	6%	6,157	14%
3198	2,434	2,598	7%	2,963	14%
3199	3,308	3,586	8%	4,193	17%
3200	1,371	1,499	9%	1,720	15%
3201	2,229	2,564	15%	3,034	18%
3202	6,695	7,179	7%	8,420	17%
3203	1,976	2,108	7%	2,484	18%
3204	1,085	1,172	8%	1,317	12%
3205	818	890	9%	991	11%
3206	955	1,024	7%	1,215	19%
3207	3,444	3,758	9%	4,547	21%
3208	1,427	1,567	10%	1,810	16%
3209	3,749	4,084	9%	4,744	16%
3210	3,008	3,149	5%	3,506	11%
3211	1,292	1,356	5%	1,547	14%
3212	2,171	2,280	5%	2,592	14%
3213	1,278	1,400	10%	1,618	16%
3214	2,196	2,334	6%	2,736	17%
3215	7,430	7,961	7%	8,857	11%

Table 5.7 - continued

TAZ	2015	2025	%Growth (2015-2025)	2040	%Growth (2025-2040)
3216	4,148	4,498	8%	5,179	15%
3217	2,823	3,002	6%	3,446	15%
3218	1,274	1,349	6%	1,546	15%
3219	2,021	2,141	6%	2,441	14%
3220	1,072	1,133	6%	1,310	16%
3221	3,323	3,497	5%	3,952	13%
3222	1,244	1,315	6%	1,507	15%
3223	14,804	15,428	4%	16,768	9%
3224	7,005	7,449	6%	8,508	14%
3225	2,139	2,335	9%	2,764	18%
3226	10,120	9,380	-7%	10,294	10%
3227	8,095	9,003	11%	10,239	14%
Total	**172,050**	**181,665**	**6%**	**206,114**	**13%**

Table 5.8 Local Trips Growth Between 2015 and 2040 in Jackson Township

TAZ	2015	2025	%Growth (2015-2025)	2040	%Growth (2025-2040)
3126	1,378	1,703	24%	2,371	39%
3127	1,158	1,319	14%	1,619	23%
3128	7,065	8,067	14%	9,433	17%
3129	3,424	3,879	13%	4,814	24%
3130	5,153	6,367	24%	8,551	34%
3131	3,140	3,853	23%	5,325	38%
3132	3,304	3,562	8%	4,022	13%
3133	1,844	2,016	9%	2,327	15%
3134	14,815	15,884	7%	16,963	7%
3135	2,602	2,842	9%	3,388	19%
3136	3,287	3,532	7%	4,124	17%
3137	4,750	5,085	7%	5,960	17%
3138	2,527	2,668	6%	2,975	12%
3139	1,292	1,478	14%	1,503	2%
3140	1,048	1,120	7%	1,134	1%
3141	5,942	6,324	6%	7,005	11%
3142	3,840	4,092	7%	4,635	13%
3143	4,339	4,633	7%	5,264	14%
3144	5,099	5,424	6%	6,135	13%
3145	3,627	4,841	33%	5,465	13%
3146	3,975	5,013	26%	5,649	13%
3147	1,631	2,208	35%	2,462	11%
3148	1,897	2,557	35%	2,855	12%
3149	6,238	7,094	14%	8,405	18%
3150	1,283	1,447	13%	1,472	2%
3151	42	42	1%	43	1%
Total	**94,701**	**107,051**	**13%**	**123,899**	**16%**

Figure 5.1 2015, 2025 and 2040 Estimated Traffic Comparison for Lakewood Township

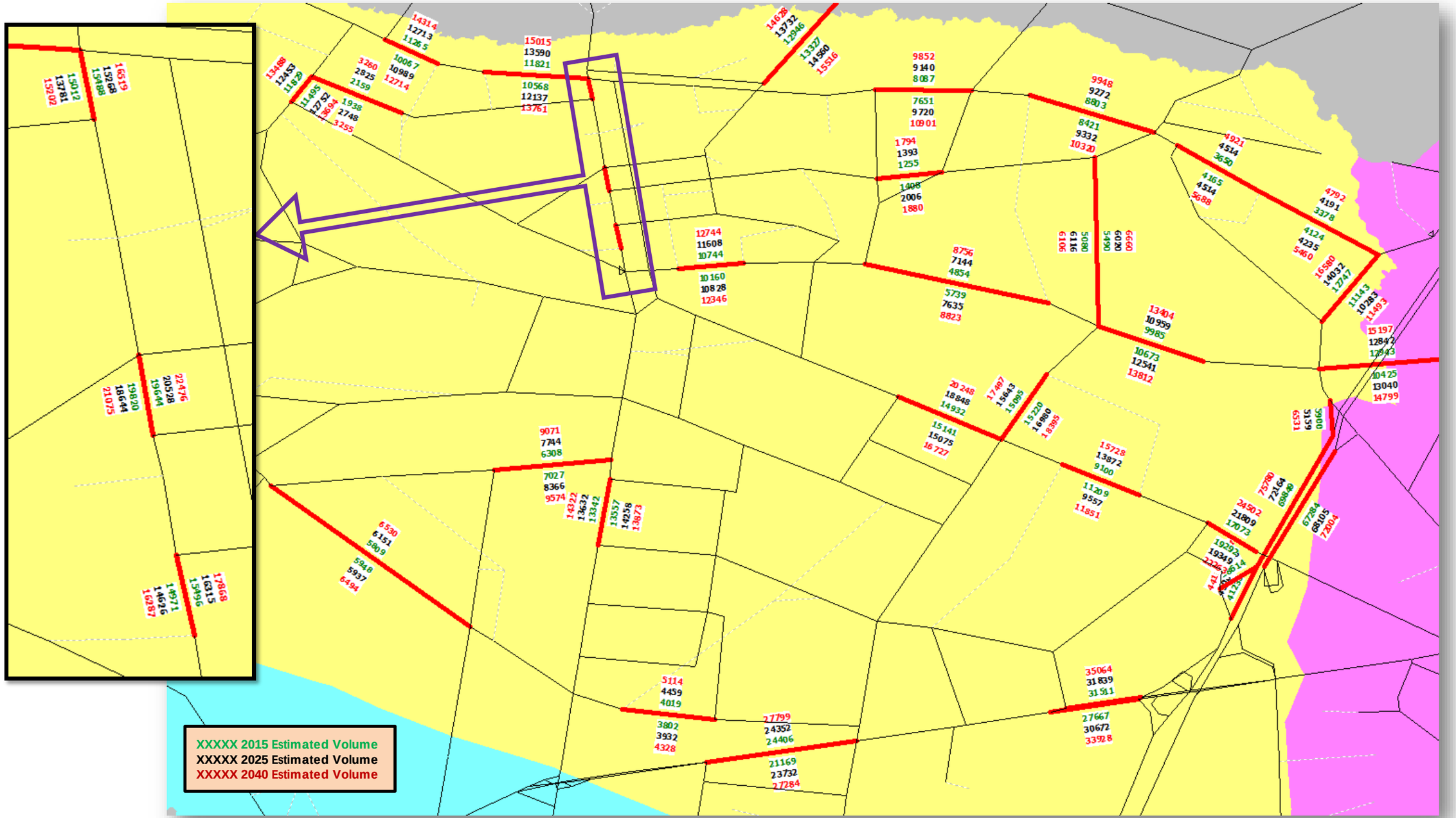


Figure 5.2 2015 and 2040 Estimated Traffic Comparison for Toms River Township

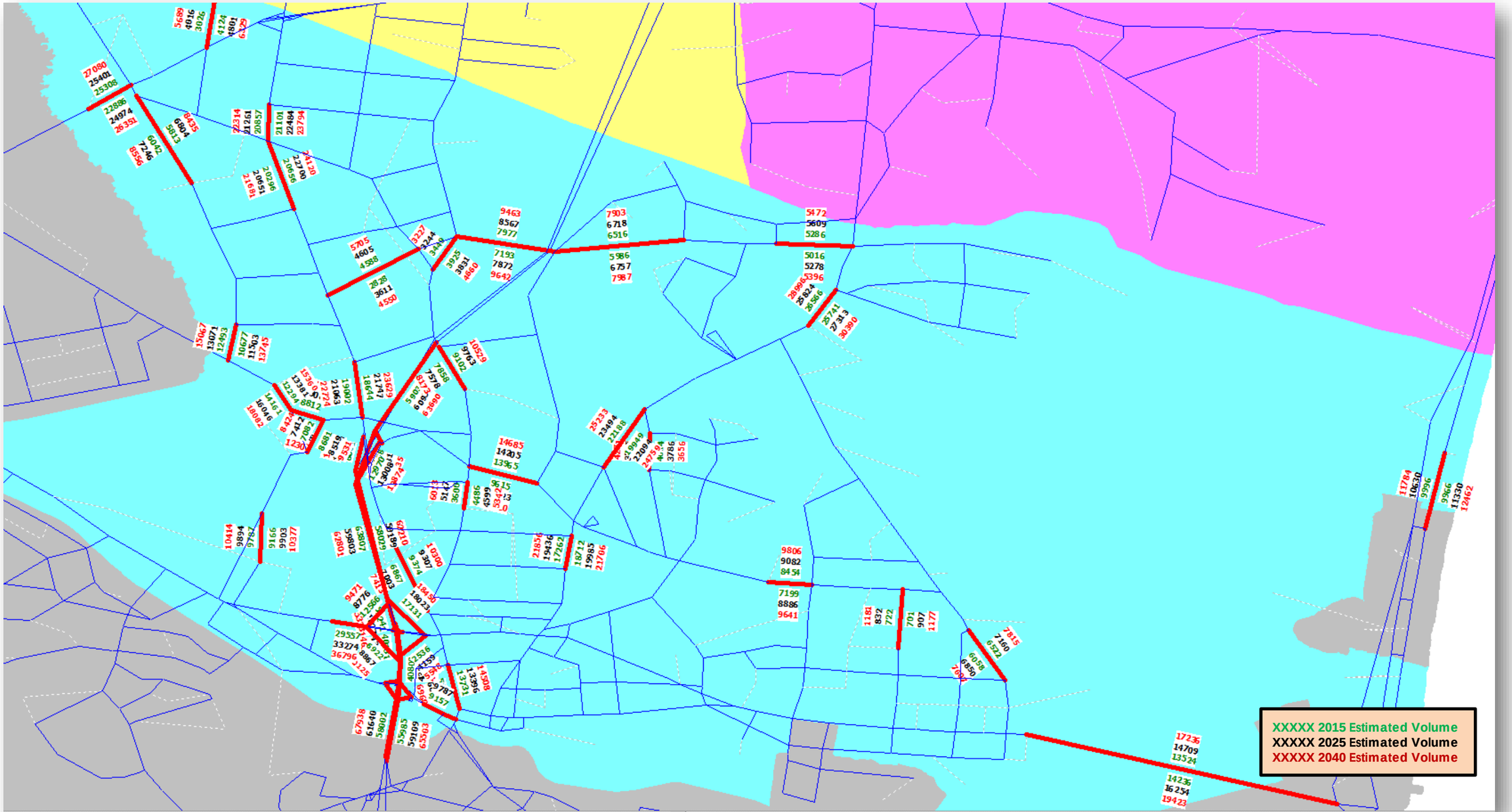


Figure 5.3 2015 and 2040 Estimated Traffic Comparison for Brick Township

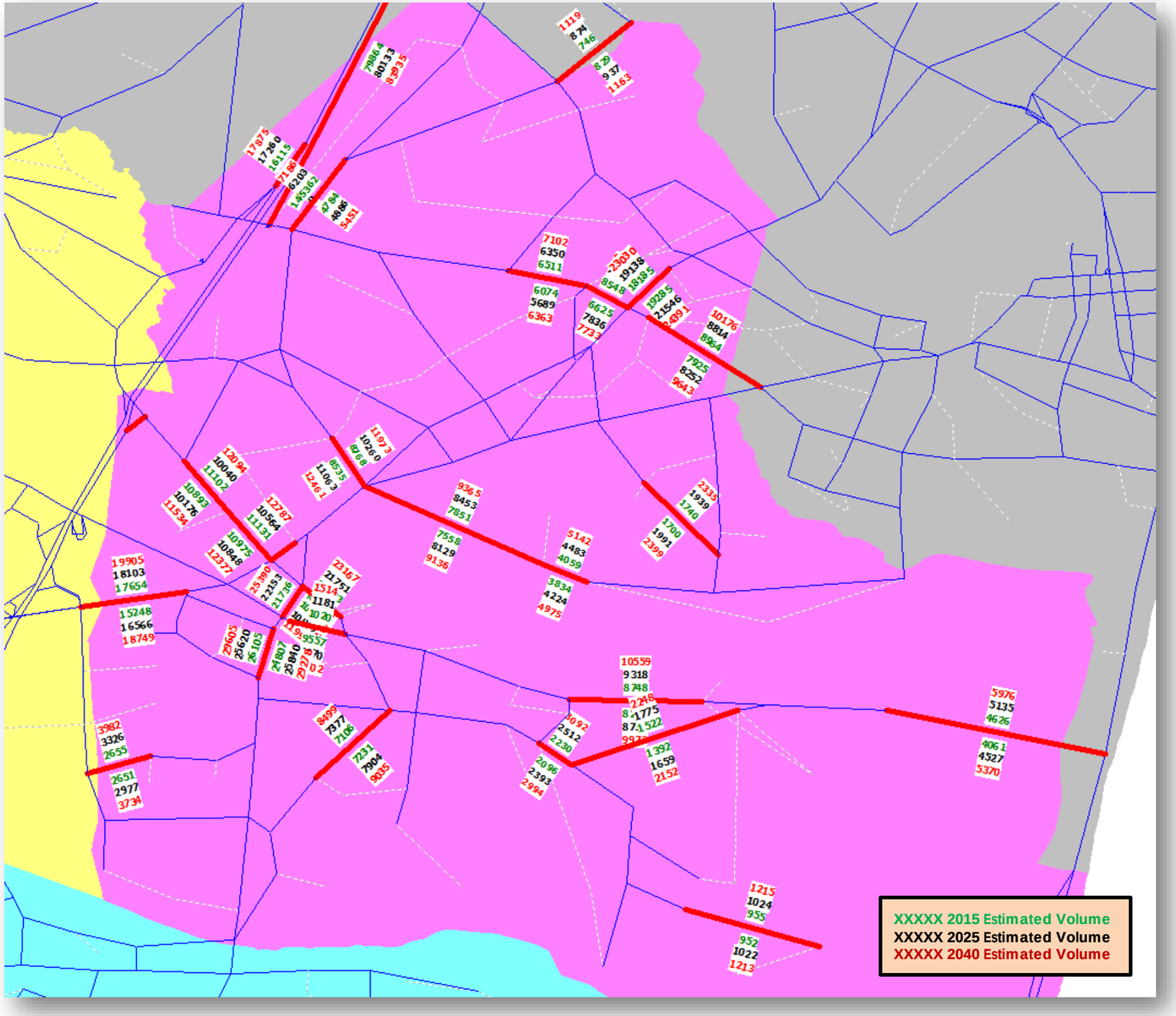


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Figure 5.4 2015 and 2040 Estimated Traffic Comparison for Jackson Township

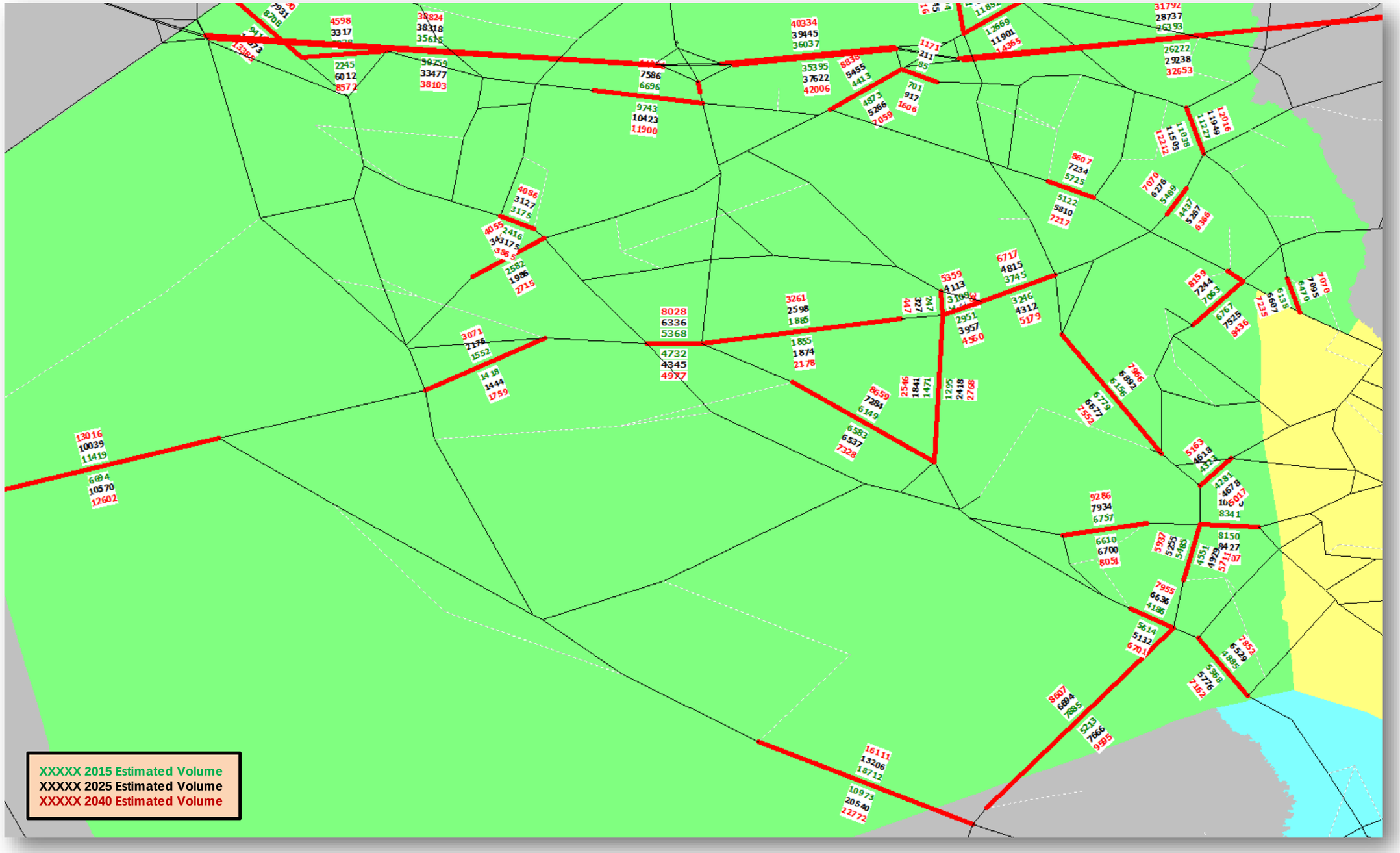

Figure 5.5 Traffic Growth Pattern between 2015 and 2025 in Lakewood Township

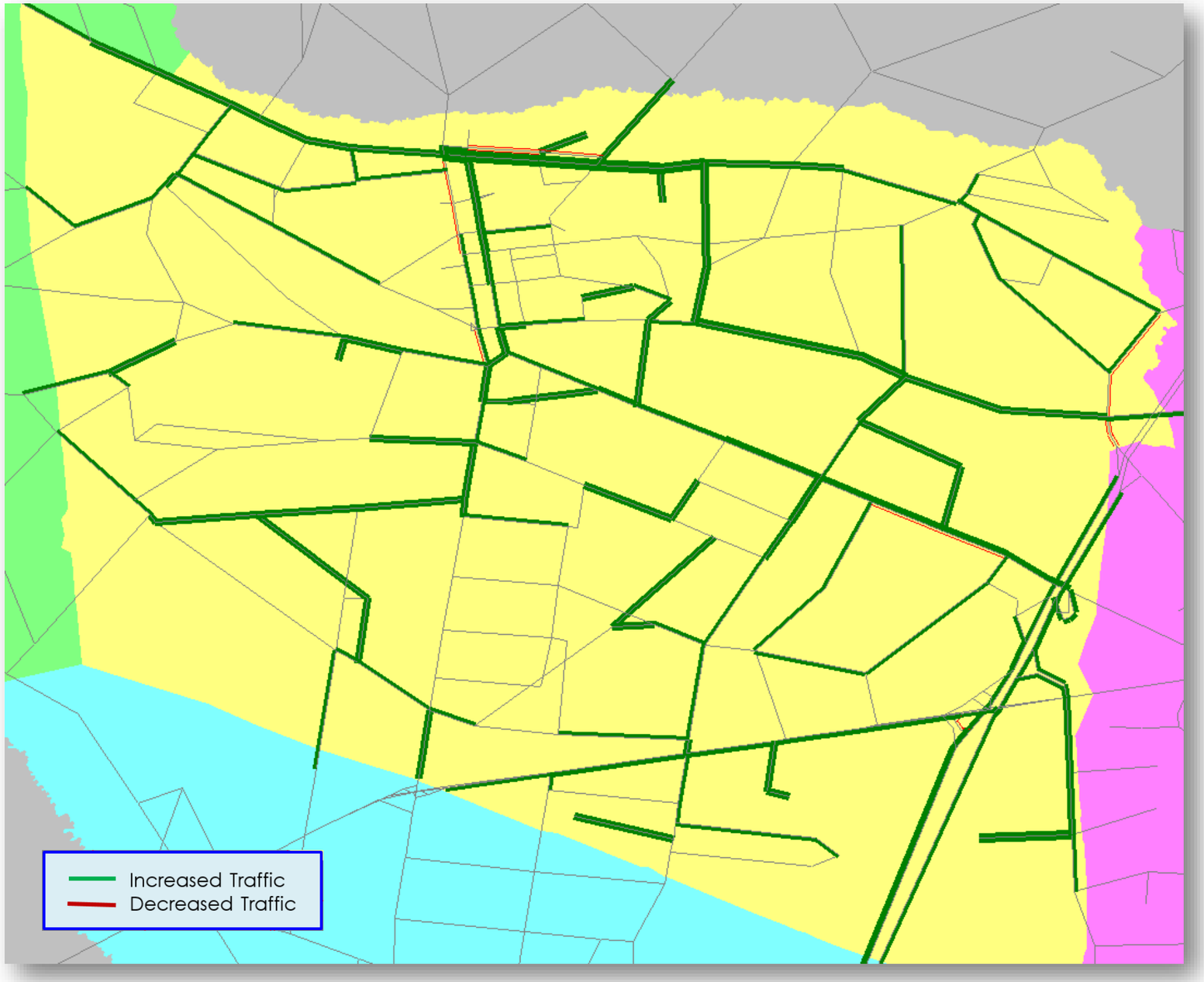

Figure 5.6 Traffic Growth Pattern between 2025 and 2040 in Lakewood Township

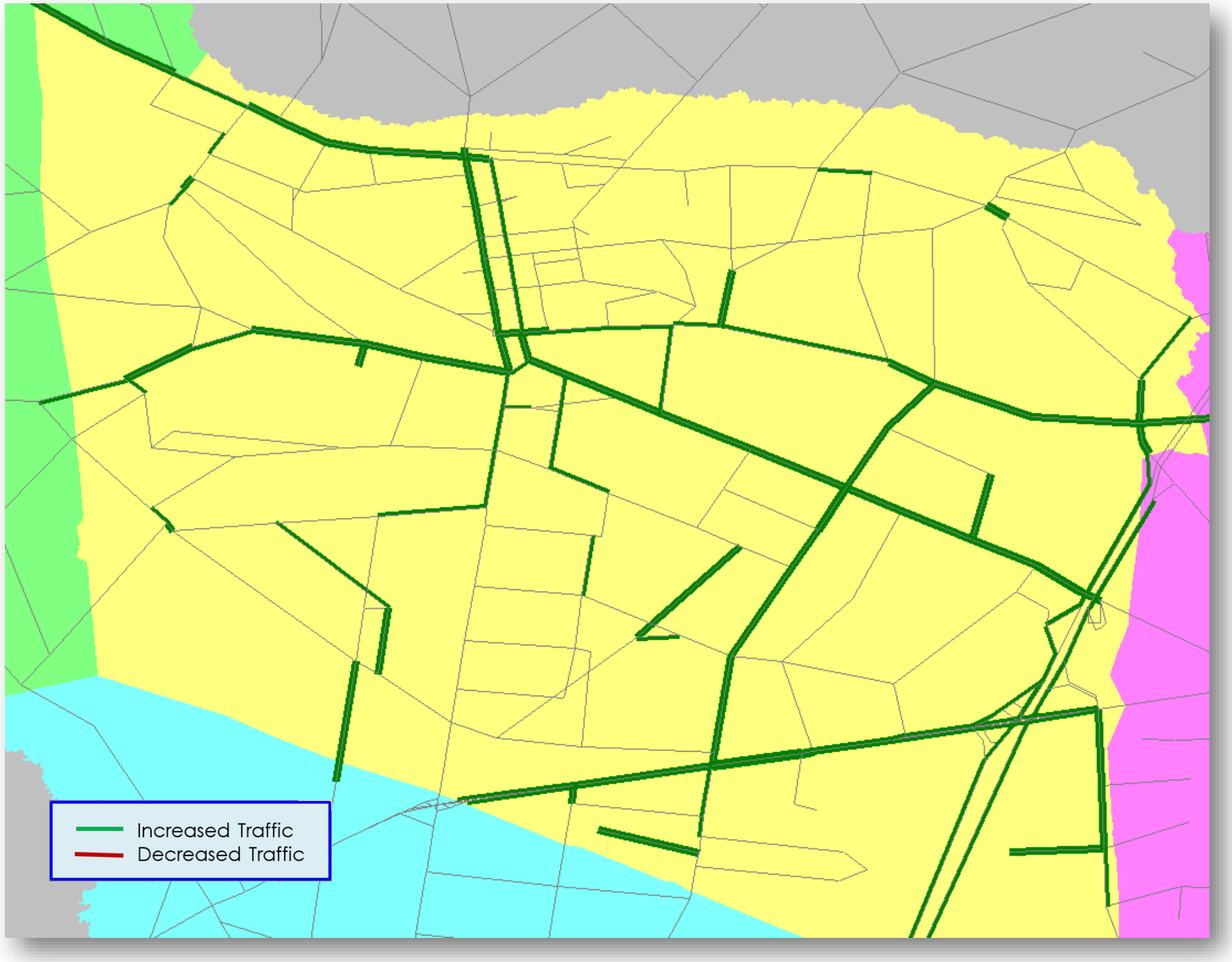

Figure 5.7 Traffic Growth Pattern between 2015 and 2025 in Toms River Township

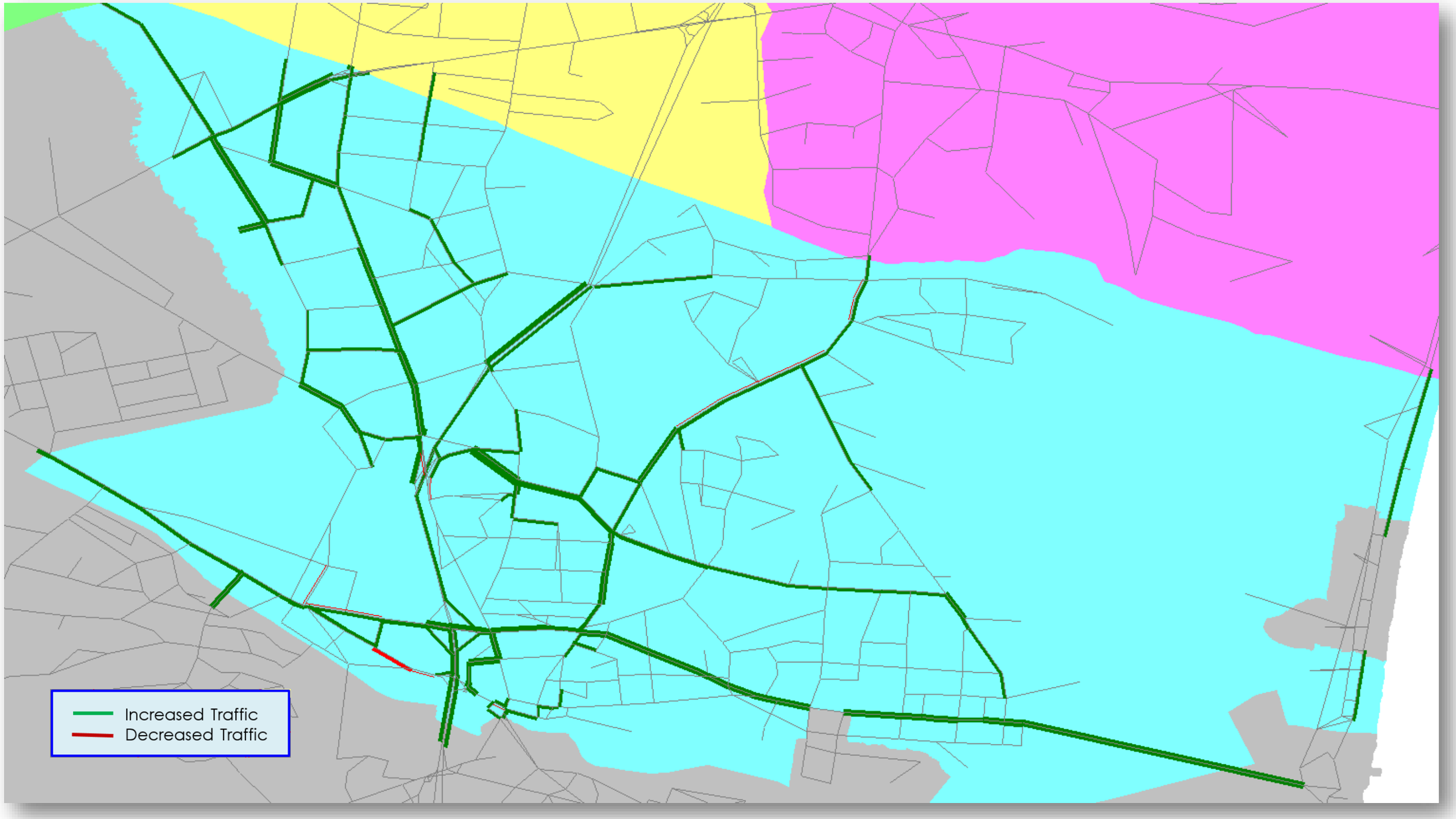

Figure 5.8 Traffic Growth Pattern between 2025 and 2040 in Toms River Township

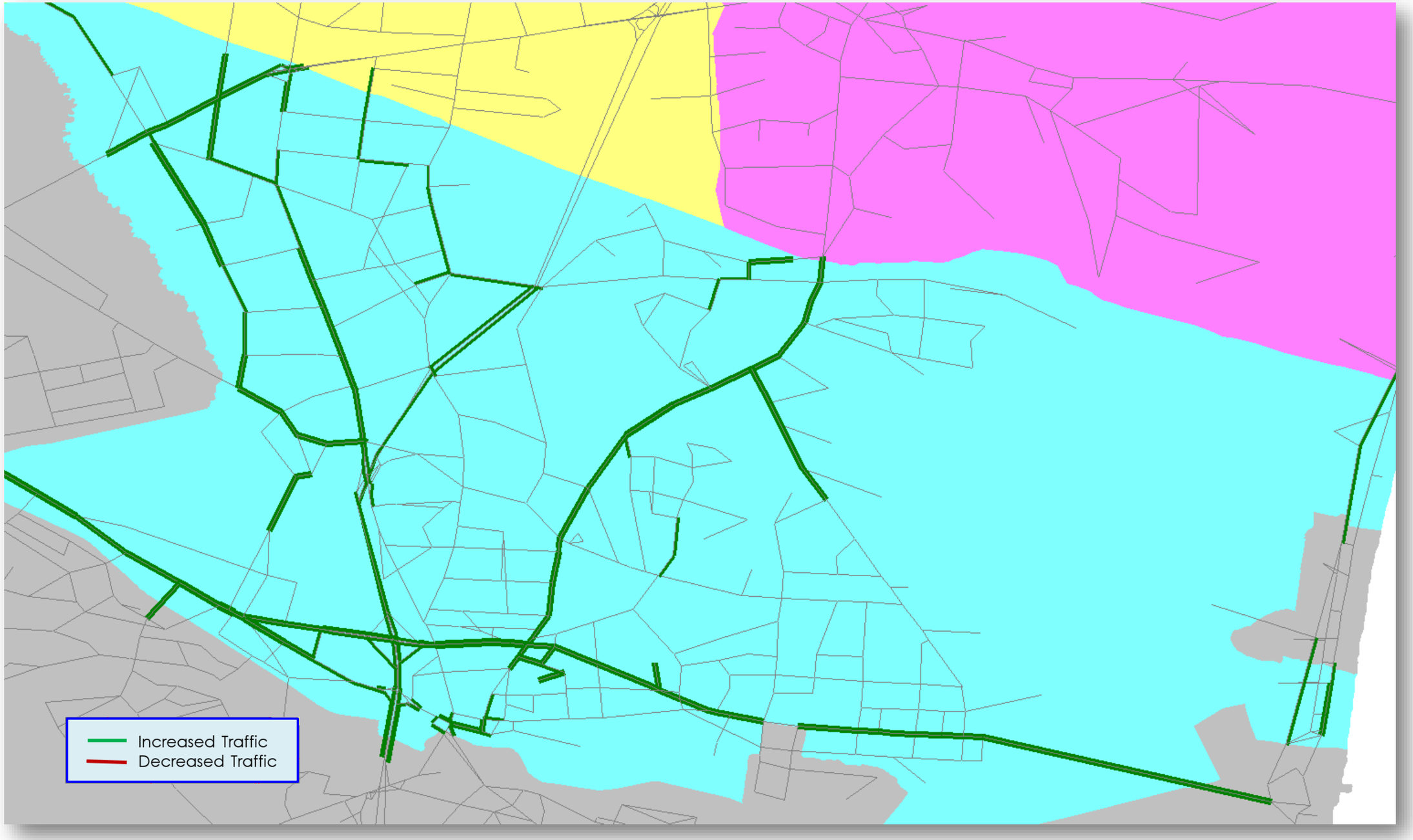

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Figure 5.9 Traffic Growth Pattern between 2015 and 2025 in Brick Township

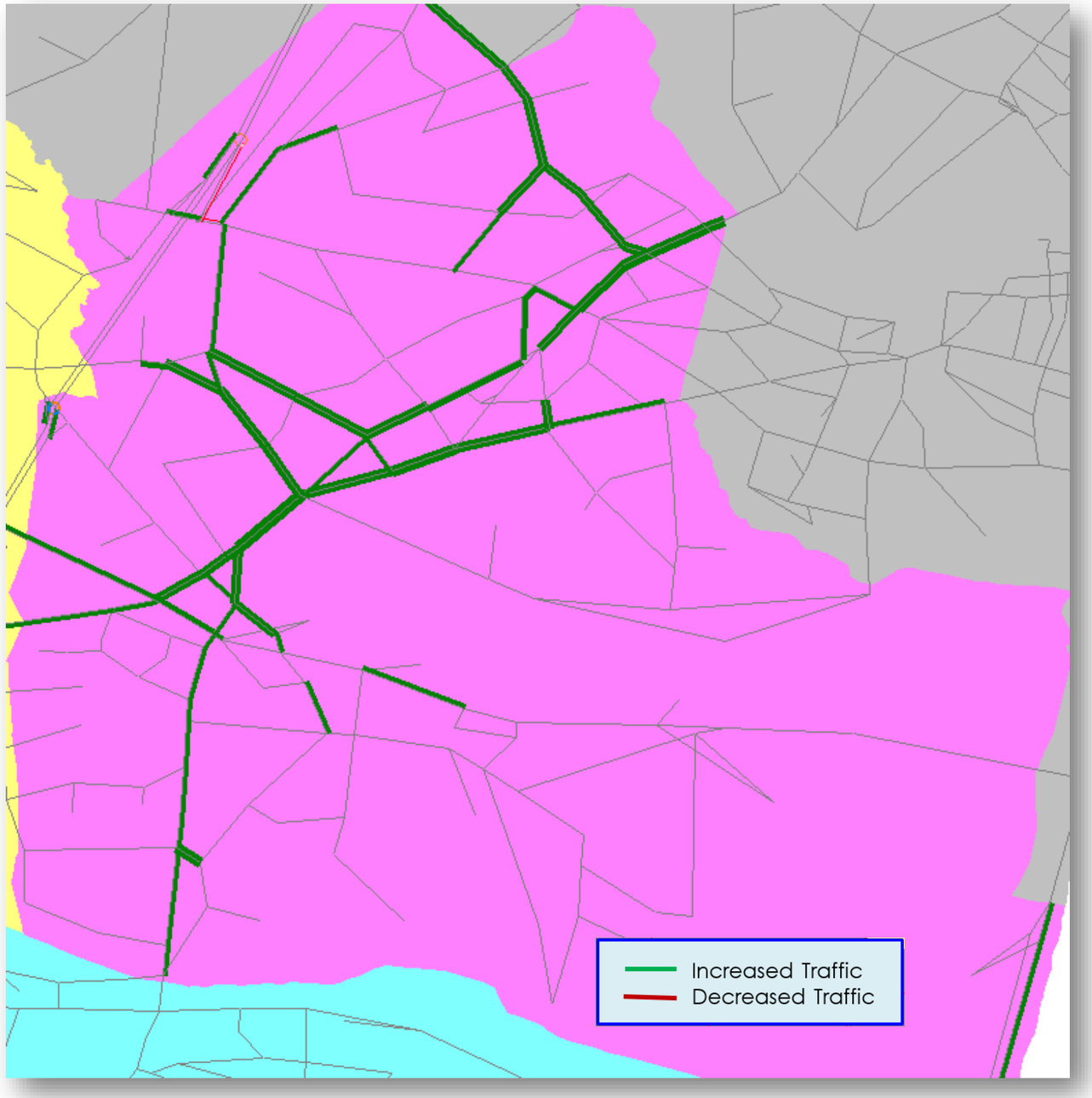

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Figure 5.10 Traffic Growth Pattern between 2025 and 2040 in Brick Township

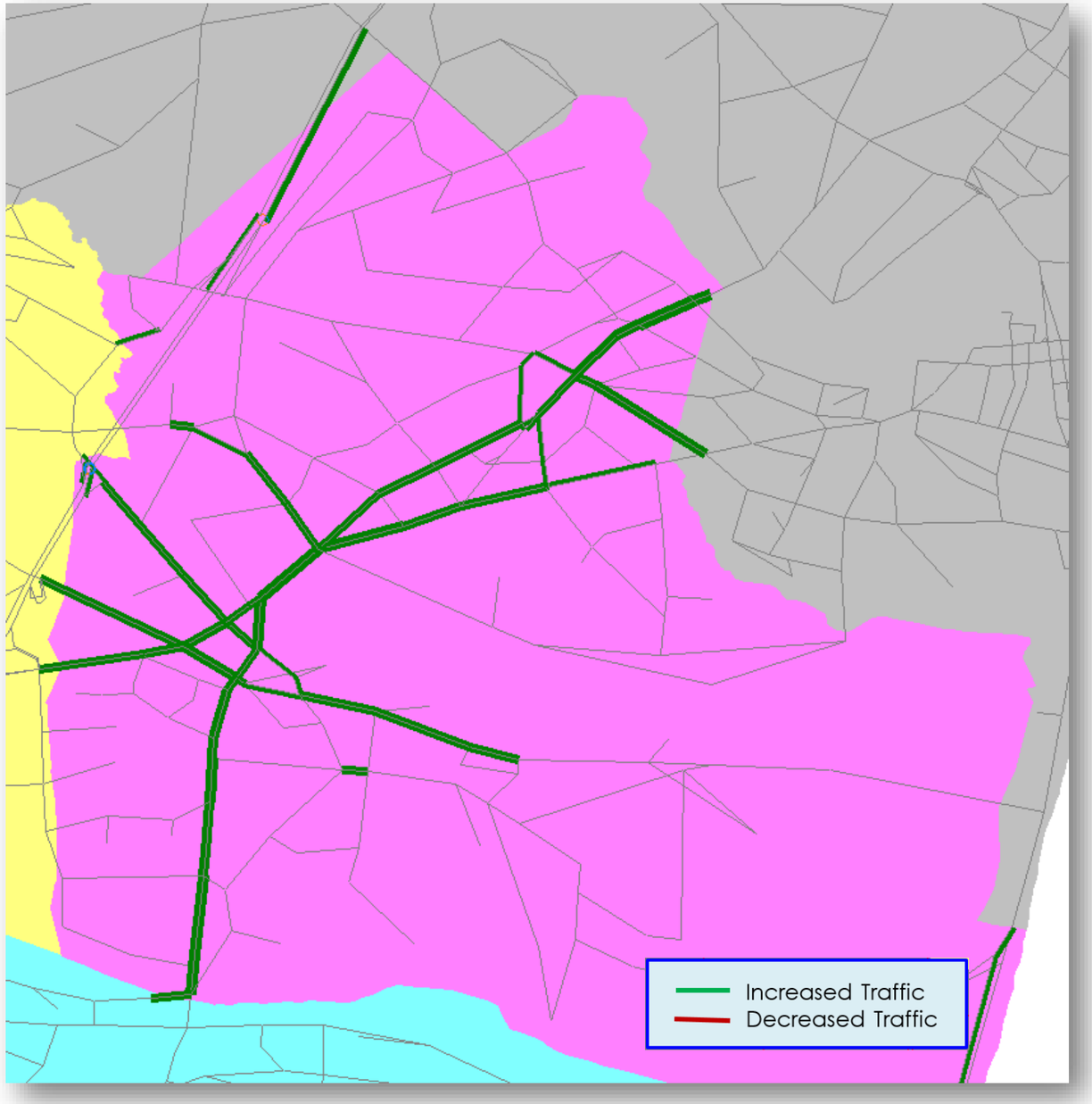

Figure 5.11 Traffic Growth Pattern between 2015 and 2025 in Jackson Township

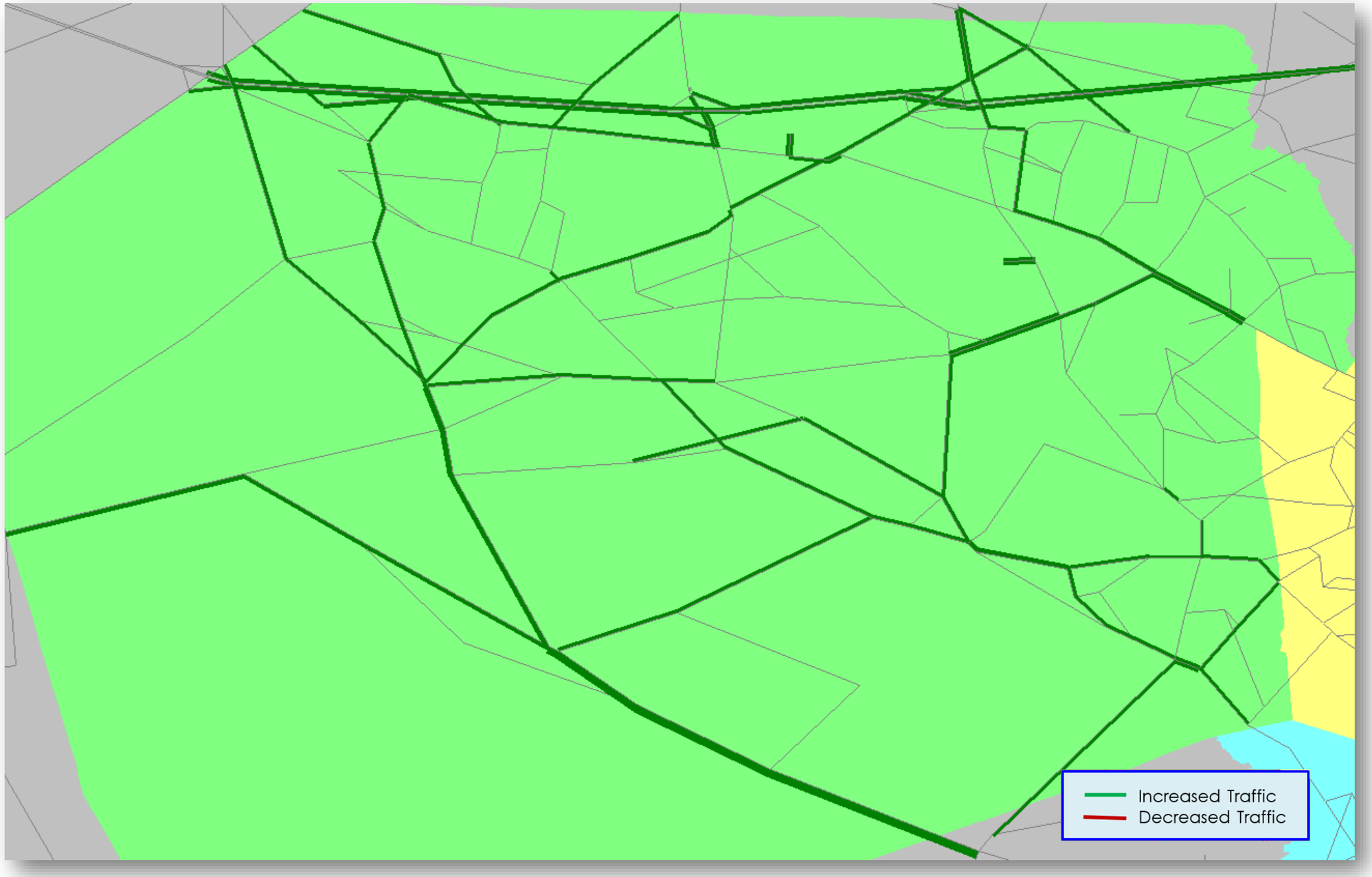

Figure 5.12 Traffic Growth Pattern between 2025 and 2040 in Jackson Township

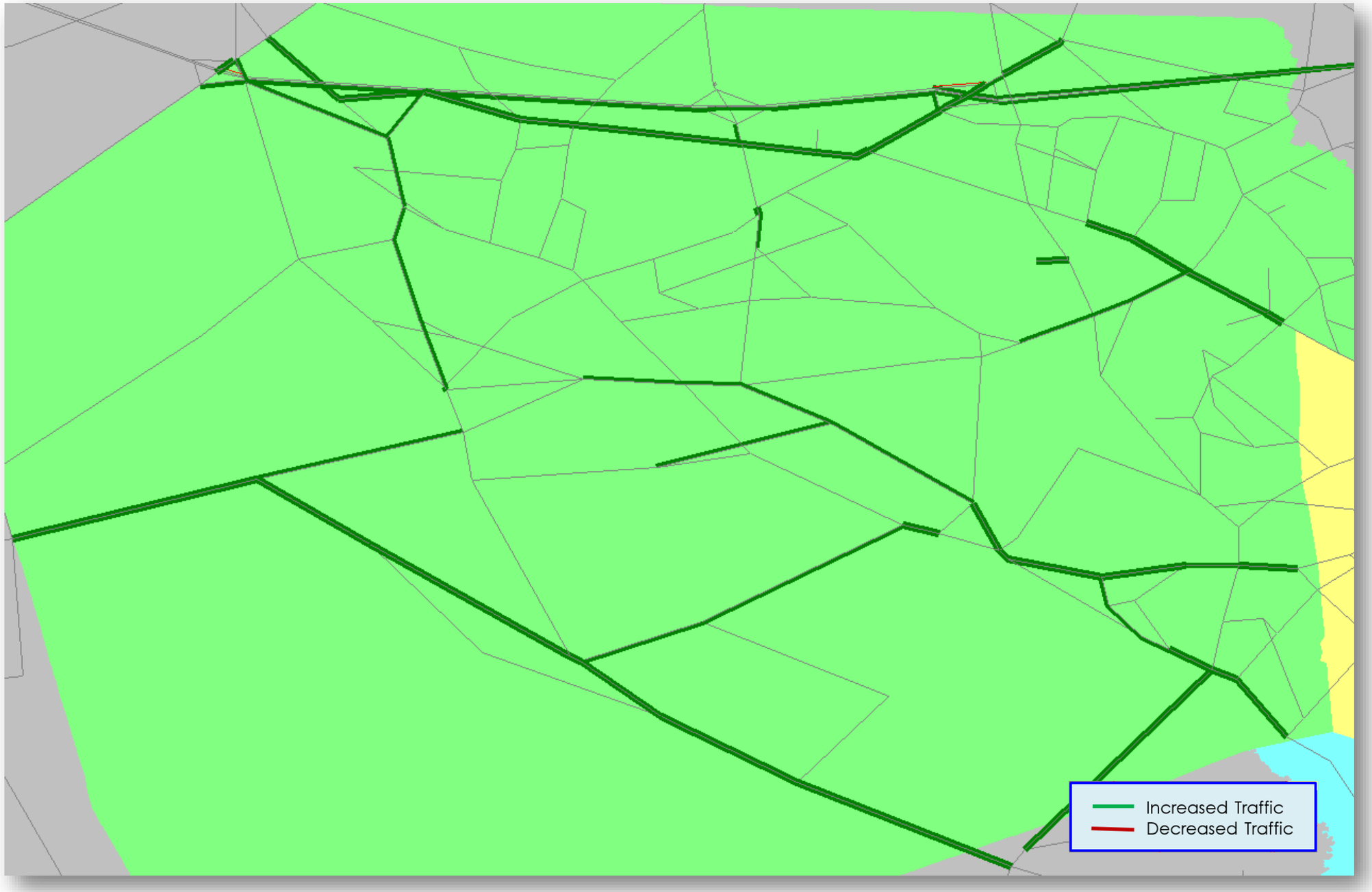

Figure 5.13 The Estimated 2025 Hot-Spot Locations in Lakewood Township

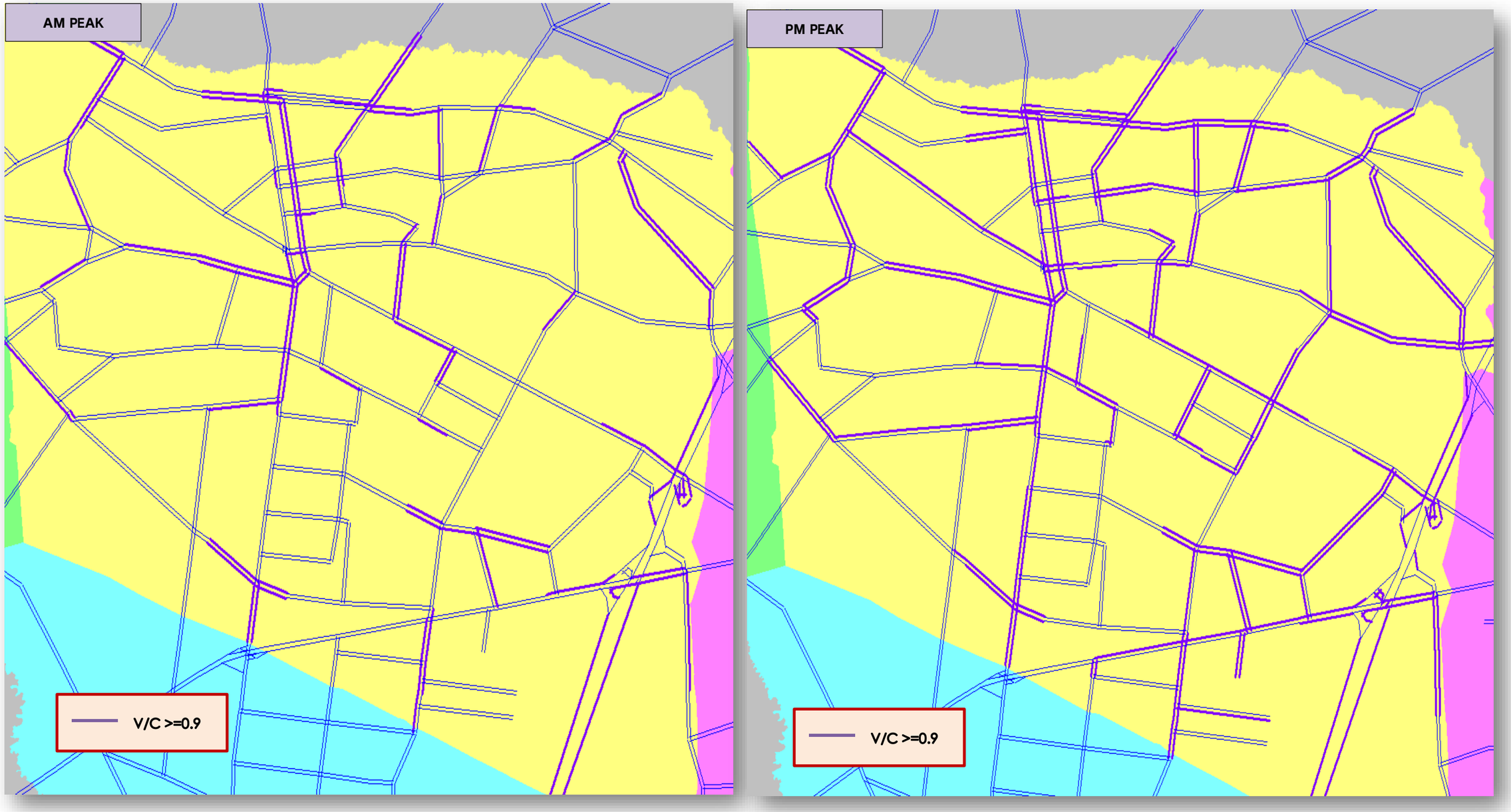

Figure 5.14 The Estimated 2040 Hot-Spot Locations in Lakewood Township

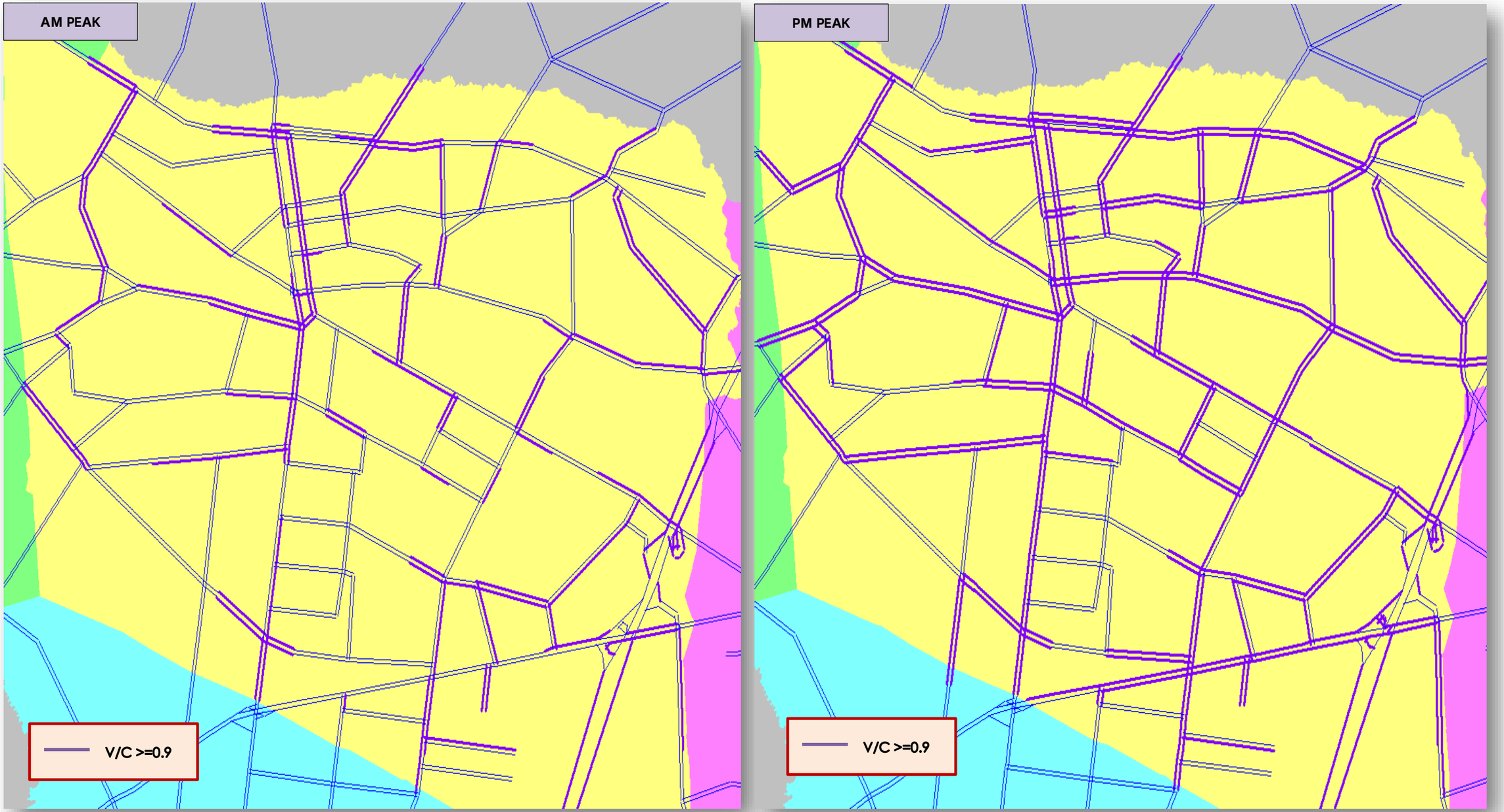

Figure 5.15 The Estimated 2025 Hot-Spot Locations in Toms River Township

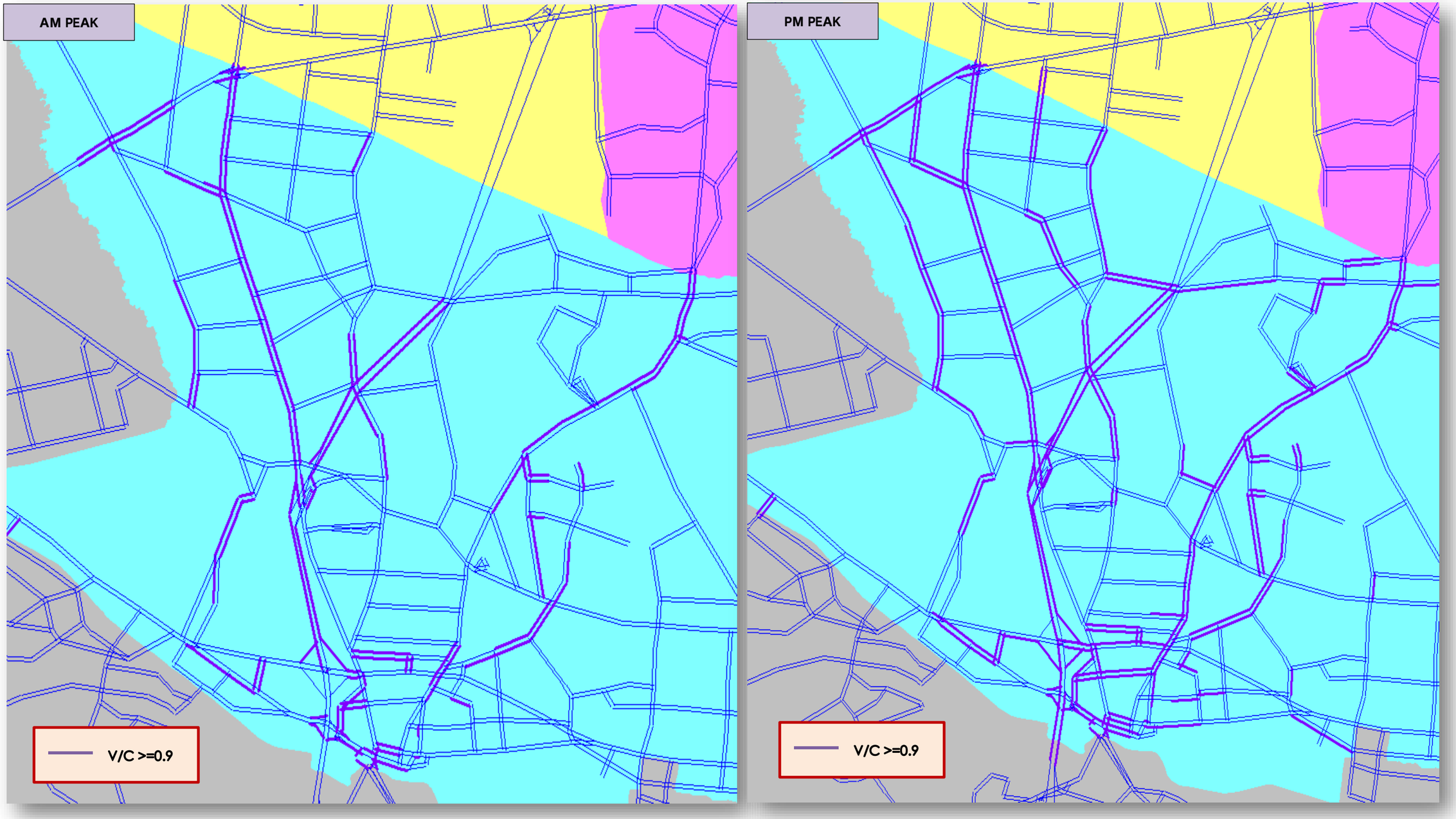

Figure 5.16 The Estimated 2040 Hot-Spot Locations in Toms River Township

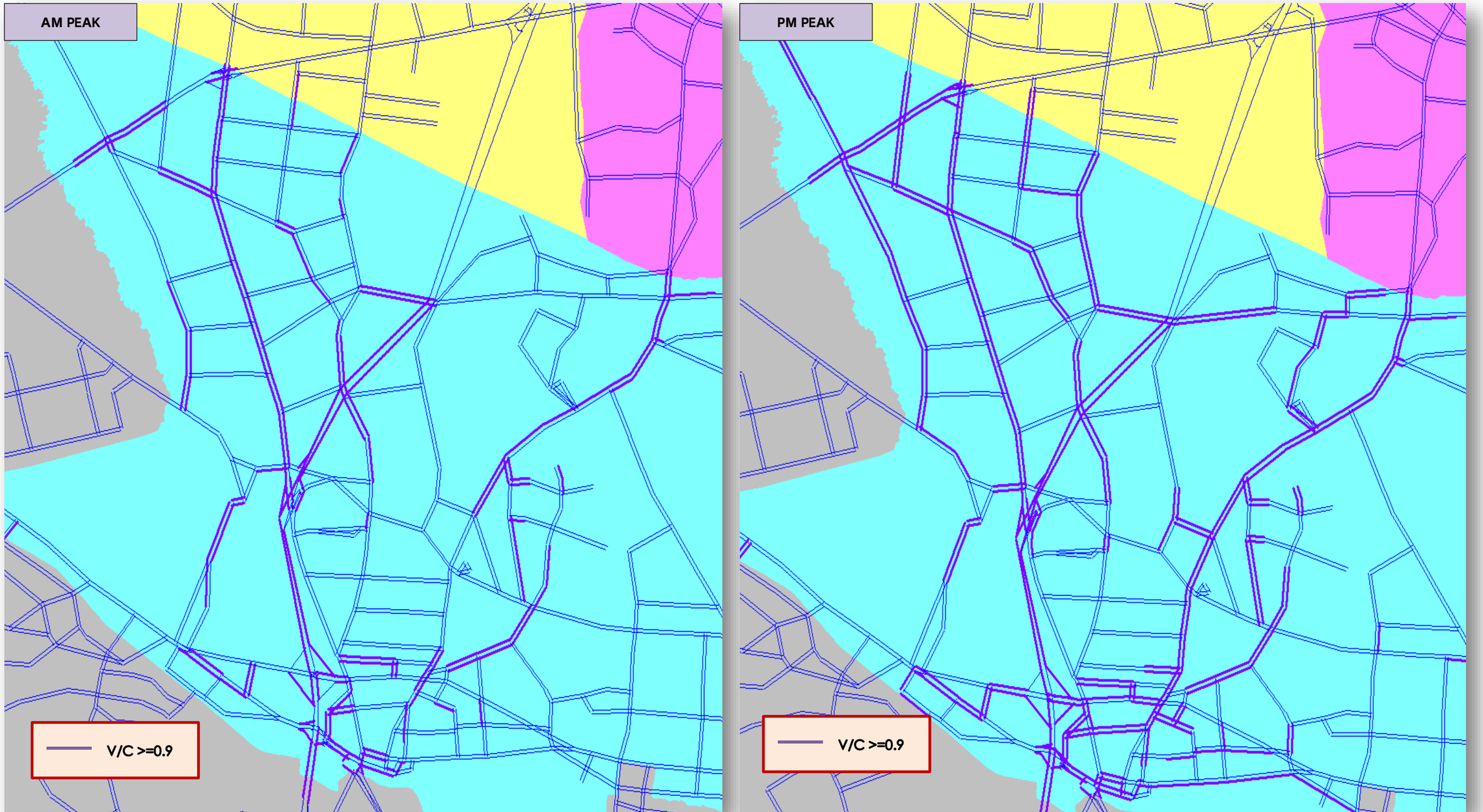

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Figure 5.17 The Estimated 2025 Hot-Spot Locations in Brick Township

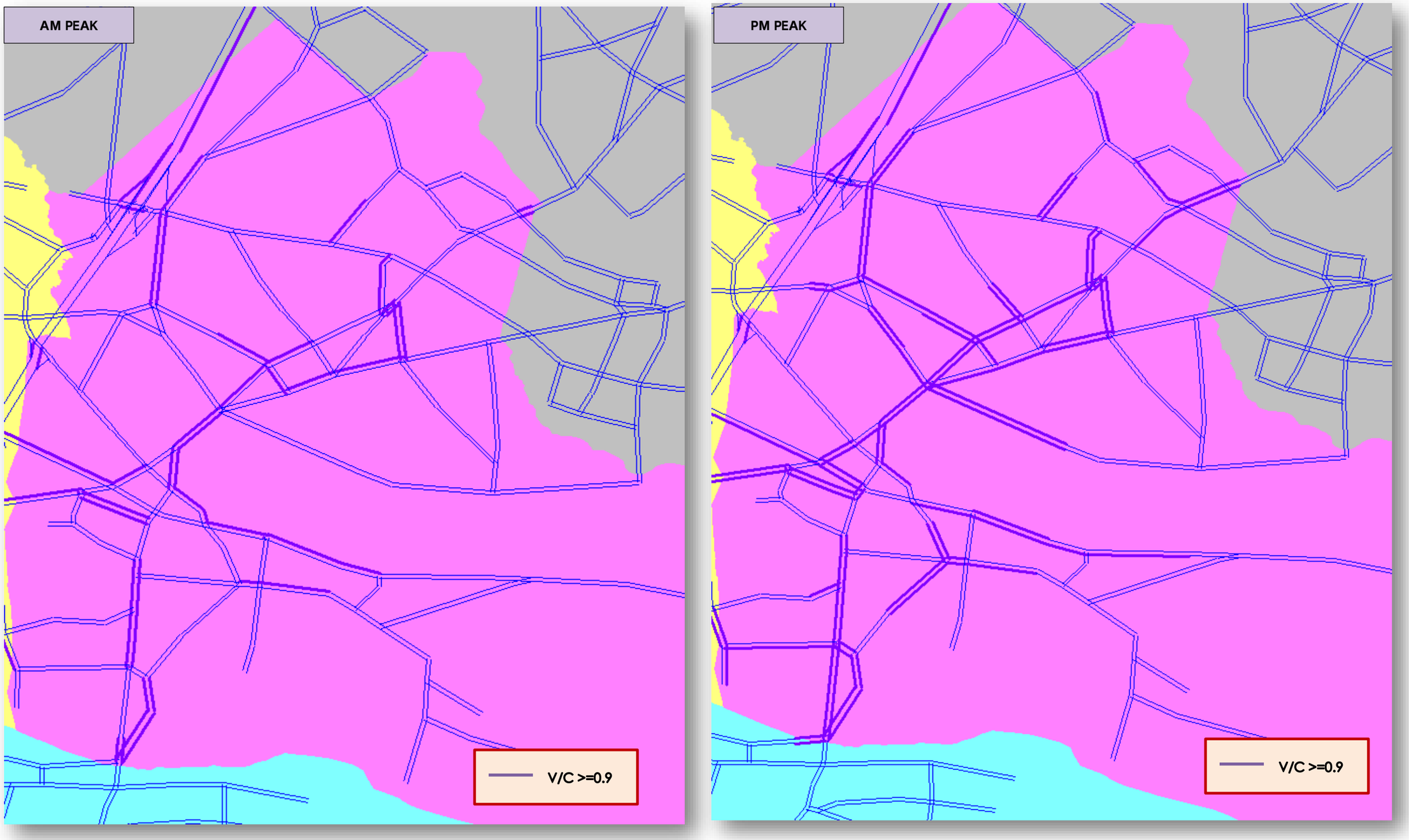


Figure 5.18 The Estimated 2040 Hot-Spot Locations in Brick Township

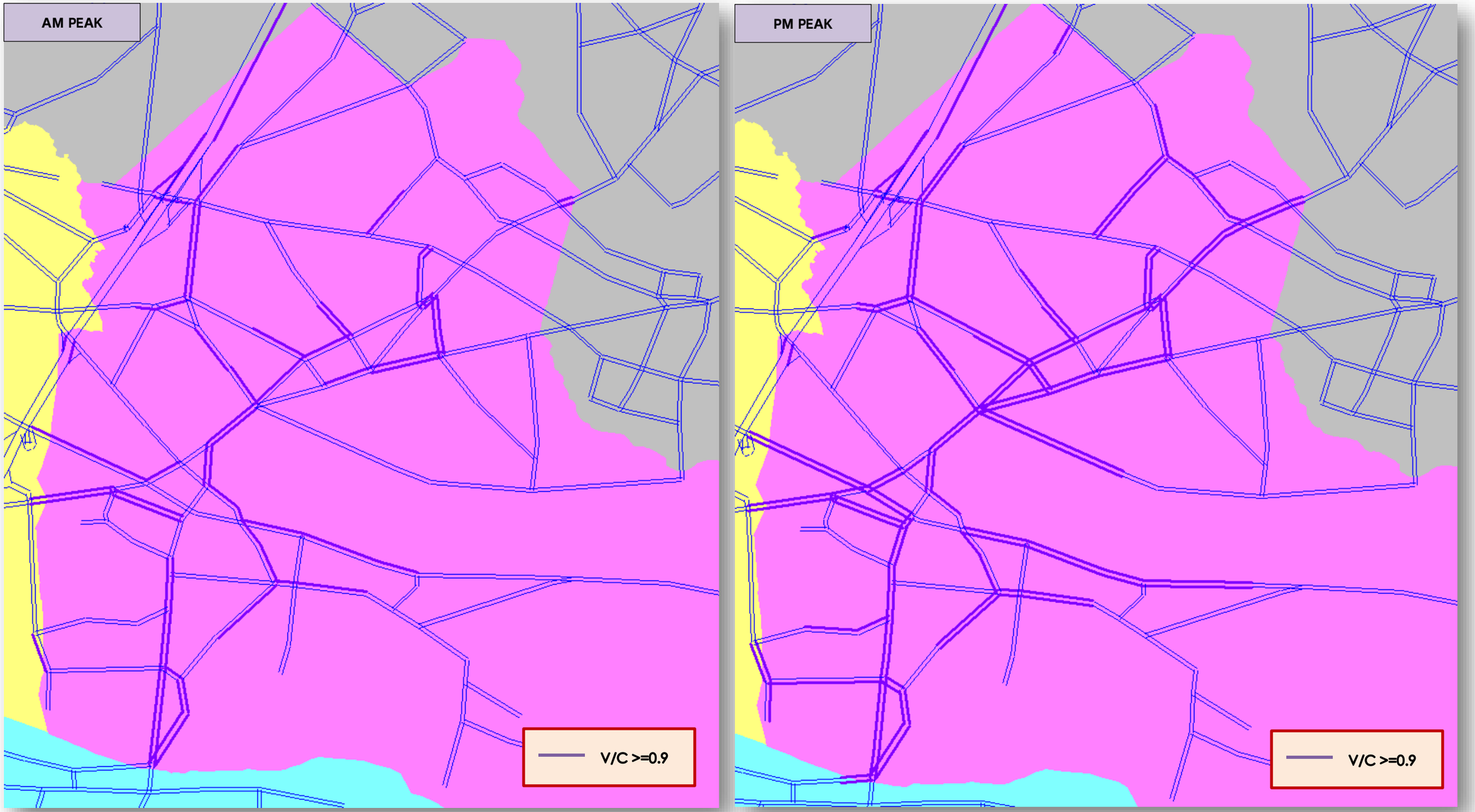


Figure 5.19 The Estimated 2025 Hot-Spot Locations in Jackson Township

Figure 5.20 The Estimated 2040 Hot-Spot Locations in Jackson Township

Many roadways in Lakewood has experienced congestion since 2015, especially during the PM Peak Period, and the congestion worsens in the future as shown in Figure 5.13 and 5.14. The level congestion is slightly less severe in the other townships. The estimated hot-spot locations for the four townships are listed in Table 5.9 to 5.12. These tables also include the estimated V/C ratio for the PM Peak Period. PM Peak was selected because this period generally has higher congestions than the other time periods. Only V/C ratios of the congested segments of these roadways (V/C>=0.9) are included in the table.

Table 5.9 Estimated 2025 and 2040 Hot-Spot Locations in Lakewood Township

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
2025 Estimated Hot Spot Locations				
US 9	NJDOT	Between County Line Rd. and Route 88	2	1.1
		Between Route 88 and NJ 70	1	1.4
County Line Rd.	County	Between Heathwood Ave. and Ridge Ave.	1	1.1
NJ 88	NJDOT	Between US 9 and Garden State Parkway (localized congestion)	1	0.9
Cedar Bridge Ave.	County	Between Hurley Ave. and Garden State Parkway	2	0.9
NJ 70	NJDOT	Between US 9 and Garden State Parkway	2	0.9
Central Ave. / New Egypt Rd.	County	Between Cross St. and US 9	1	1.1
Hope Chapel Rd	County	Between County Line Rd. and Miller Rd.	1	1.4
New Hampshire Ave.	County	Between N. Maple Ave (Township Bpundary Line) and Route 88	2	1.1
		Between Route 88 and Ridge Ave	1	0.9
7th Ave / Ridge Ave.	County	Between US 9 and County Line Rd.	1	0.9
Clifton Rd. / Hurley Rd.	County	Between US 9 and County Line Rd.	1	1.6
Prospect Rd.	County	Between Cross St and US 9	1	1.0
Pine St. Corridorr	County	Between US 9 and New Hampshire Ave.	1	0.9
Kennedy Blvd.	County	Between US 9 and Squankum Rd. (CR 547)	1	1.0
Cross Street	County	Between E Veteran Highway and US 9	1	0.9
2040 Estimated Hot Spot Locations				
US 9	NJDOT	Between County Line Rd. and Route 88	2	1.1
		Between Route 88 and NJ 70	1	1.4
County Line Rd.	County	Between Heathwood Ave. and Ridge Ave.	1	1.2
NJ 88	NJDOT	Between US 9 and Garden State Parkway.	1	1.1
Cedar Bridge Ave.	County	Between Hurley Ave. and Garden State Parkway	2	1.0
NJ 70	NJDOT	Between US 9 and Garden State Parkway	2	1.1
Central Ave. / New Egypt Rd.	County	Between Cross St. and US 9	1	1.2
Hope Chapel Rd	County	Between County Line Rd. and Miller Rd.	1	1.5
New Hampshire Ave.	County	Between N. Maple Ave (Township Bpundary Line) and Route 88	2	1.1
		Between Route 88 and Ridge Ave	1	0.8
7th Ave / Ridge Ave.	County	Between US 9 and County Line Rd.	1	0.9
Clifton Rd. / Hurley Rd.	County	Between US 9 and County Line Rd.	1	1.9
Prospect Rd.	County	Between Cross St and US 9	1	1.1
Pine St. / James St.	County	Between Sunset Rd. and New Hampshire Ave.	1	1.0
Kennedy Blvd.	County	Between US 9 and Squankum Rd. (CR 547)	1	1.2
Cross Street	County	Between E Veteran Highway and US 9	1	1.0

Table 5.10 Estimated 2025 and 2040 Hot-Spot Locations in Toms River Township

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
2025 Estimated Hot Spot Locations				
US 9	NJDOT	Between NJ R70 and Garden State Parkway	1	1.5
Hooper Ave. / Brick Blvd	County	Between NJ 37 and Church Rd.	2	1.1
NJ 70	NJDOT	Beween Whitesville Rd. and US 9	2	1.3
Whitesville Ave. (CR 527)	County	Between Ridgeway Rd. and NJ 70	1	1.1
Church Rd.	County	Between Old Freehold Rd. and Hooper Ave.	1	0.9
2040 Estimated Hot Spot Locations				
US9	NJDOT	Between NJ 70 and Garden State Parkway	1	1.5
Hooper Ave. / Brick Blvd	County	Between NJ 37 and Church Rd.	2	1.2
NJ 70	NJDOT	Beween Whitesville Rd. and US 9	2	1.5
Whitesville Ave. (CR 527)	County	Between Ridgeway Rd. and NJ 70	1	1.3
Church Rd.	County	Between Old Freehold Rd. and Hooper Ave.	1	1.0
Old Freehold Rd. / Cox Cro Rd.	County	Between Bay Lea Rd. and Whitesville Ave.	1	1.1
New Hampshire Ave.	County	Between Church Rd. and Hickory St. (Township Line Boundary)	1	1.1

Table 5.11 Estimated 2025 and 2040 Hot-Spot Locations in Brick Township

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
2025 Estimated Hot Spot Locations				
NJ 70	NJDOT	Between Shorrock St. and Route 34	2	1.0
NJ 88	NJDOT	Between Princeton Ave. and Midstream Rd.	1	1.0
Brick Blvd.	County	Church Rd. and Drum Point Rd.	2	1.2
Princeton Ave. / Rt. 88	County	Between Brushy Neck Dr. and Burnt Tavern Rd.	1	1.0
Mantoloking Rd.	County	Between Garden State Parkway and Adamston Rd.	1	0.8
2040 Estimated Hot Spot Locations				
NJ 70	NJDOT	Between Shorrock St. and Route 34	2	1.2
NJ 88	NJDOT	Between Princeton Ave. and Midstream Rd.	1	1.3
Brick Blvd.	County	Church Rd. and Mantoloking Rd.	2	1.5
Princeton Ave. / Rt. 88	County	Between Brushy Neck Dr. and Burnt Tavern Rd.	1	1.1
Mantoloking Rd.	County	Between Garden State Parkway and Adamston Rd.	1	0.9

Table 5.12 Estimated 2025 and 2040 Hot-Spot Locations in Jackson Township

ROAD NAME	JURISDICTION	LIMIT	NO OF THROUGH LANES/DIR	MODEL ESTIMATED PM PEAK V/C RATIO
2025 Estimated Hot Spot Locations				
Cooks Bridge Road	County	Between N. Hope Chapel Rd. and N. County Line Rd.	1	1.1
N. Hope Chapel Rd.	County	Between E. Veteran Highways and Clear Stream Rd. / Township Boundary Line.	1	0.9
Toms River Rd. (CR 571)	County	Between S. Hope Chapel Rd. and Freehold Rd.	1	1.1
W. Veteran Highway (CR 528)	County	Between S. Stump Tavern Rd. and Hawkin Rd. (CR 640)	1	1.3
2040 Estimated Hot Spot Locations				
S. Hope Chapel Rd. / Cooks Bridge Road	County	Between Toms River Rd. and N. County Line Rd..	1	1.2
N. Hope Chapel Rd.	County	Between E. Veteran Highways and Clear Stream Rd. / Township Boundary Line.	1	1.0
Toms River Rd. (CR 571)	County	Between S. Hope Chapel Rd. and W. Commodore Blvd.	1	1.2
W. Veteran Highway (CR 528)	County	Between S. Stump Tavern Rd. and Pinehurst Rd.	1	1.6
Bennetts Mills Rd.	County	Between Butterfly Rd. and S. New Prospect Rd.	1	1.1
W. Commodore Blvd. (CR 526)	County	Bestween Cassville Rd. and Jackson Mills Rd.	1	1.2

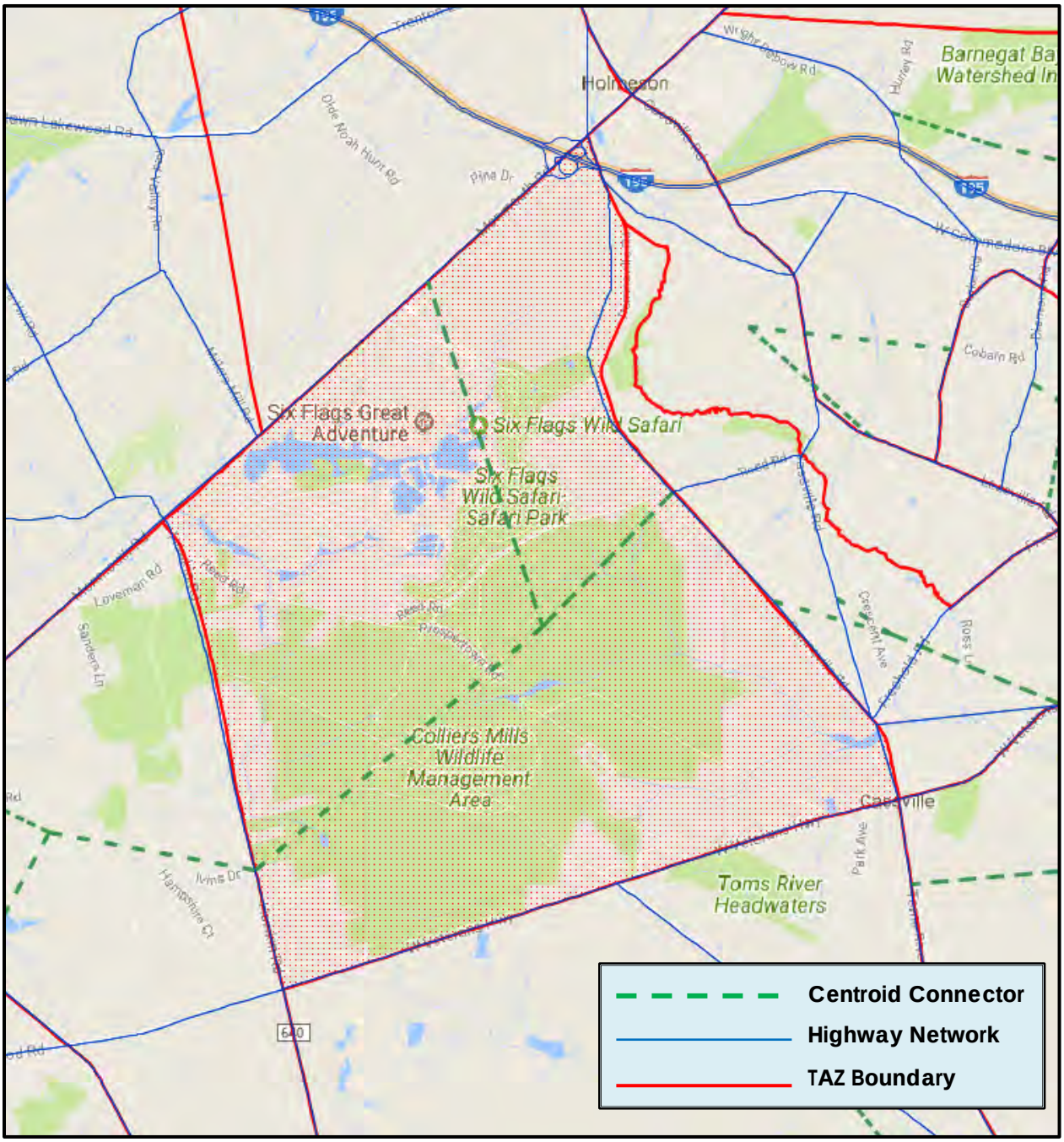
A series of "wish list" improvements were analyzed and discussed in Appendix H. The impact of these improvements on the roadway congestion was also evaluated and discussed.

5.4 ROUTE 537 IN JACKSON TOWNSHIP

In Appendix H, it briefly discussed the congestion along Route 537 that particularly occurred in the Summer weekend-night at the time when Six Flag Great Adventure (SFGA) Amusement Park closed. A great number of SFGA visitors leaving the park in a small window of time has caused serious congestion along this corridor. Although it was discussed that the County Model may not be a proper model to perform the traffic impact study at this level, the model can be used to estimate general traffic demand in the corridor.

In the County Model, the SFGA area is included in on Traffic Analysis Zone (TAZ) as shown in Figure 5.21. The TAZ has three centroid connectors that connect the TAZ with Route 537, Perrineville Rd., and Hawkin Rd. (Route 640). The connection to Route 537 represents combined entrances to the Hurricane Harbor Water Park and SFGA.

Figure 5.21 The Estimated 2040 Hot-Spot Locations in Jackson Township



The County Model provides four time-of-day sub-models that include AM Peak, PM Peak, Midday, and Night. The three-hour PM Peak Model was selected as a proxy to the weekend evening analysis for this purpose. The worst condition during this period was constructed by adding the highest three consecutive hours of weekend afternoon/evening traffic obtained from the traffic count data provided by Jackson Township Staff, as shown in Appendix I. Table 5.13 shows the highest 3 hours from several weekend data for the following turning movements: Main Exit to Route 537EB and Hurricane Harbor Exit to Route 537 EB. On average, the SFGA and Hurricane Harbor will contribute approximately 4,000 vehicles in the 3-hour periods to Route 537 EB.

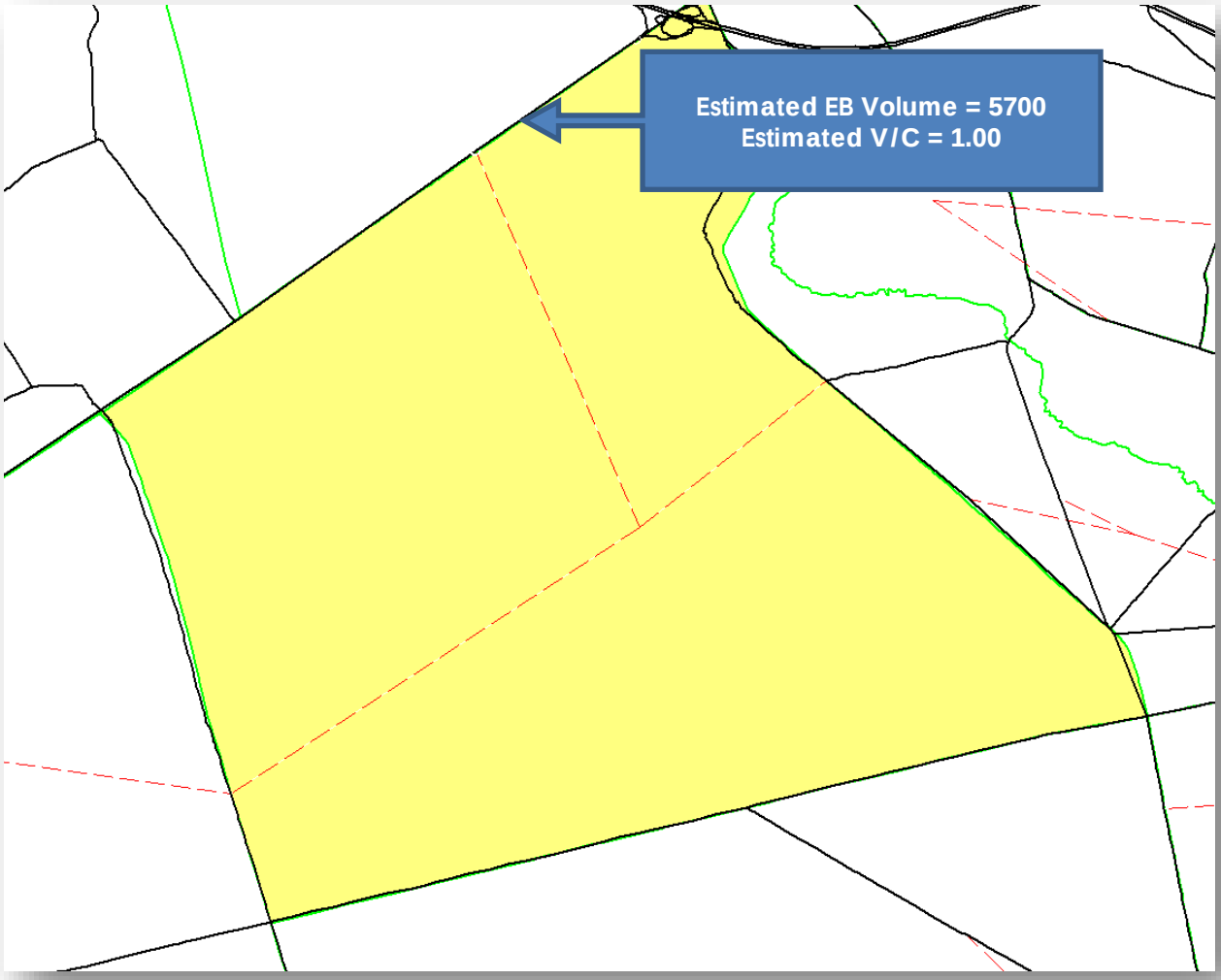
Table 5.13 Average 3-Hour Summer Evening Weekend Trip from SFGA

Location	Hour	Sat - 7/2/2016	Sun - 7/3/2016	Sat - 7/9/2016	Sun- 7/10/2016	Sat - 7/16/2016	Sun - 7/17/2016	Average
Main Exit to Route 537 EB	1	779	801	416	867	362	805	**672**
	2	718	2,113	418	925	496	955	**938**
	3	1,845	1,610	386	1,100	1,320	963	**1,204**
	Total							**2,813**
Location		**Sat - 7/2/2016**	**Sun - 7/3/2016**	**Sat - 7/9/2016**	**Sun- 7/10/2016**	**Sat - 7/16/2016**	**Sun - 7/17/2016**	**Average**
Hurricane Harbor Exit to Route 537 EB	1	393	391	81	460	607	489	**404**
	2	501	458	95	559	251	538	**400**
	3	285	348	121	420	519	580	**379**
	Total							**1,183**
Total								**3,996**

The PM peak period demand from SFGA TAZ was adjusted based on the above traffic counts, and assuming that there will be approximately additional 30% traffic originating from elsewhere that will also use Route 357 during the PM Peak Period. The 30% additional traffic assumption was based on a professional judgment since the hourly counts on Route 537 EB was not available at the time of analysis. This assumption can and shall be adjusted when the new count on Route 537 is available in the future.

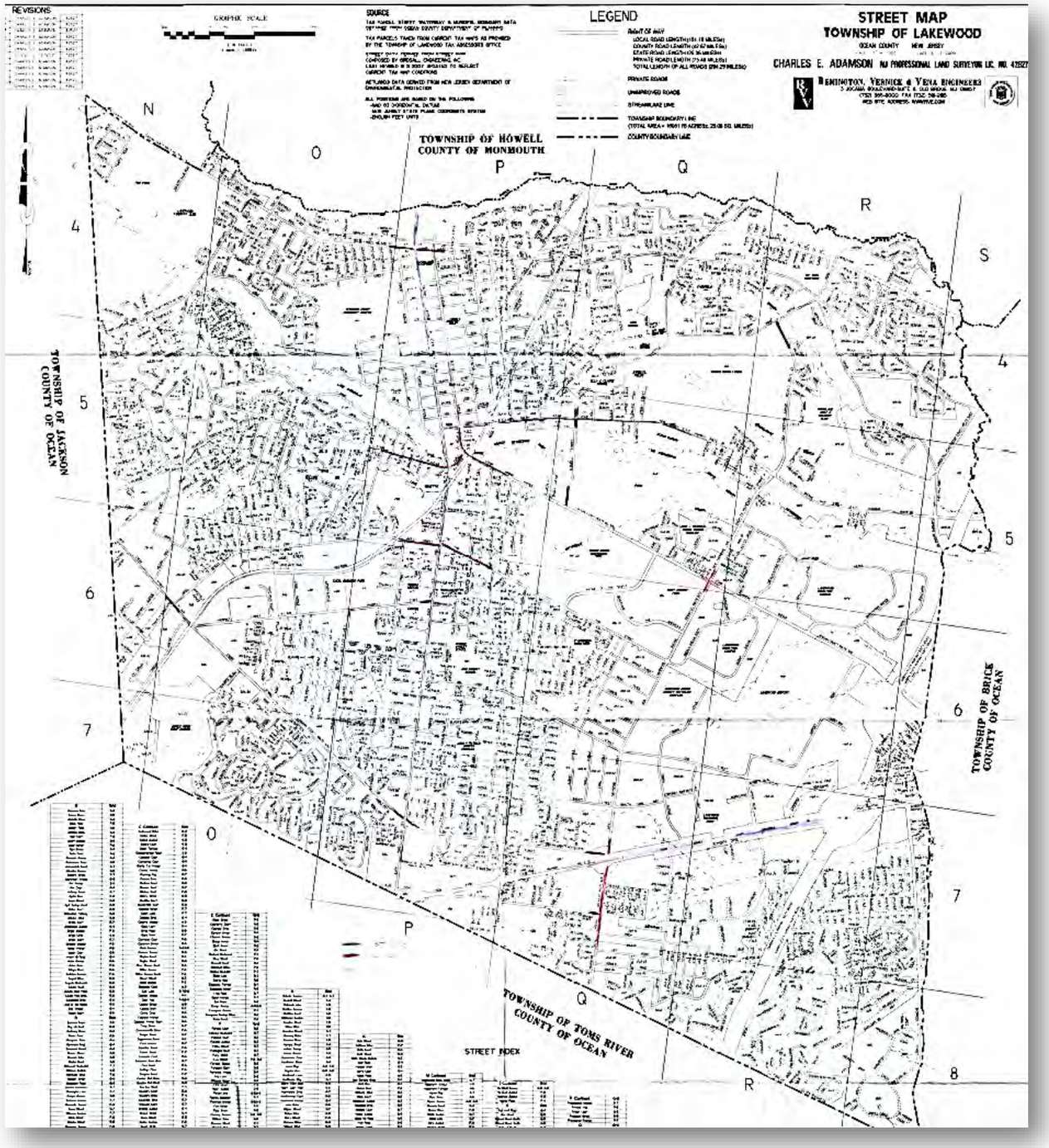
The PM Peak Time-of-Day model was executed with adjusted demand for the SFGA TAZ. The estimated traffic volume on Route 537 EB, between SFGA exit and I-195, and its Volume / Capacity ratio is shown in Figure 5.22. Currently, Route 537 EB is two per direction along this segment. If Jackson II Crossing Development, as shown in the Appendix G, is approved, this may increase the level of congestion along this corridor. Hypothetically, adding one-lane on this direction will increase the capacity by approximately 30%, and this will improve the V/C ratio to approximately 0.70, or slightly higher if Jackson Crossing II Development is built.

Figure 5.22 The Estimated 2040 Hot-Spot Locations in Jackson Township



As mentioned in the beginning of this section, the traffic impact analysis at this level should be performed using a more refined model, such as traffic simulation model. The microsimulation model will be able to capture the impact of other operational characteristics, including traffic signal delays, turn bays, etc. It also has a capability to model detail entrance and exit along the corridor, such as from SFGA and Hurricane Harbor. It could also be used to assess the impact of Jackson Crossing II on the already congested corridor during this weekend peak period. The model can also provide more refined estimate at smaller time intervals, such as hourly.

APPENDIX A – INFORMATION PERTAINING TO HOT-SPOT LOCATIONS PROVIDED BY LAKEWOOD TOWNSHIP


REVISIONS
GRAPHIC SCALE
SOURCE
LEGEND
STREET MAP
TOWNSHIP OF LAKEWOOD
OCEAN COUNTY NEW JERSEY
CHARLES E. ADAMSON NJ PROFESSIONAL LAND SURVEYOR LIC. NO. 42527
BENNETT, VERNICK & VETA ENGINEERS
TOWNSHIP OF HOWELL
COUNTY OF MONMOUTH
TOWNSHIP OF JACKSON
COUNTY OF OCEAN
TOWNSHIP OF BRICK
COUNTY OF OCEAN
TOWNSHIP OF TOMS RIVER
COUNTY OF OCEAN
STREET INDEX
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APPENDIX B – FUTURE YEAR PROJEC LIST OBTAINED FROM NJTPA'S FY2015 TIP AND LRP

Ocean County and Surrounding Counties Future Year Project List

Including Ocean, Monmouth, Middlesex, Burlington, and Mercer Counties

County	No	DBNUM	COMPLETION YEAR	ROUTE	Project Name	M_POSTS	DESCRIPTION
Monmouth	48	96040	2016	34	Route 34, Colts Neck, Intersection Improvements (CR 537)	12.90 - 13.60	In support of the Access Management Plan for Rt. 34 in Colts Neck, this project will provide for operational/safety improvements to the intersection of State Rt. 34 and County Rt. 537. This will include considerations for bicycle and pedestrian activities. Please note: This is a "revisit". Previous efforts to provide operational improvements at this intersection resulted in a scheme that had prohibitive environmental impacts and very high costs.
Monmouth	49	97071	2016	Route 9, Craig Road/East Freehold Road		116.18-116.31	On the Route 9 and Craig Road intersection, it is proposed to add an additional lane in each direction. The majority of the widening will be in the existing grass median. A concrete barrier will be installed for safety. A reverse-loop jug handle for Route 9 northbound is proposed on the northern side of the Getty gas station. A deceleration lane for the jug handle will begin in advance of the traffic signal. Right and left turns will be permitted from the jug handle onto Pond Road. Route 9 northbound traffic destined for Pond Road southbound will continue to use the existing ramp which will be restricted to right turns. The Access Design unit has granted a waiver for cars and smaller trucks only, with ingress to the Getty gas station from the deceleration lane on Route 9 northbound. All vehicles will exit from the rear of the gas station onto Pond Road. A traffic signal is proposed at the intersection of Craig/East Freehold Road and Pond Road. The signal will be coordinated with the Route 9 traffic signal. Left turns will be prohibited from Craig Road eastbound to Pond Road northbound.
Monmouth	97	HP01002	2018		Halls Mill Road	N/A	Improvements to Halls Mill Road from Rt. 33 Bypass to CR 524 will include realignment and widening to four travel lanes as well as other improvements.
Monmouth	99	N09670	2018	33	Route 33, Operational and Pedestrian Improvements, Neptune	40.42 - 41.82	A total of 491 crashes were recorded on this section of NJ SR-33 during the four-year period from 2003 to 2006. Of those, 180 (37%) involved personal injury and 311 (63%) involved only property damage. There were no crash-related fatalities recorded during this period. Eleven crashes (2%) involved pedestrians or bicycles. Several intersections warrant attention, as does the segment as a whole. The busy four lane undivided roadway within a constrained right-of-way limits the uniform application of left turn lanes. Improvements are suggested at the Oxford Way, Wakefield Road, Jersey Shore Medical Center main entrance and Neptune Blvd. intersections, as well as a segment-wide improvement to pedestrian facilities including restriped, crosshatched crosswalks and pedestrian countdown heads. *A further corridor wide traffic study of NJ SR-33 to determine whether lane reconfiguration might aid safety and provide turn lane capacity is also suggested.*
Monmouth	94	GSP1405	2019	GSP, Interchange 109 Improvements			This project will provide for a New semi-direct NB entrance Ramp from Newman Springs Road and replacement of all four GSP bridges over Newman Springs Road to facilitate improvements to the roadway and interchange ramps.
Monmouth	96	HP01001	2019	71	Route 71, Wyckoff Road, CR 547	15.62 - 15.84	This project will provide intersection improvements at Rt. 71 and Wycoff Road. Improvements will include widening of Rt. 71 and the provision of a traffic signal. The outside lanes will be made bicycle compatible. Sidewalks will be reconstructed. The following special Federal appropriation was allocated to this project. FY2001/Section 378/45A $149,670
Monmouth	115		2019	GSP Interchange 109			The purpose of this project is to improve the safety and operations of Interchange 109 in Middletown Township, Monmouth County. Proposed improvements will eliminate vehicular traffic queues extending onto the Garden State Parkway northbound mainline local roadway from the northbound exit ramp at Interchange 109; and improve traffic flow of traffic destined to/from the Garden State Parkway by mitigating peak hour traffic congestion along Newman Springs Road within the vicinity of the interchange. **Additional Info from NJTA website**: Interchange 109 is the connection between the Garden State Parkway and Newman Springs Road (CR 520). During peak travel periods, congestion causes traffic exiting onto northbound Newman Springs Road to back up from the exit ramp onto the northbound Parkway. The planned improvements include reconfiguring several intersections on Newman Springs Road; eliminating the existing eastbound jug handle at Half Mile Road; constructing an eastbound entrance loop ramp and bridge over Newman Springs Road to the northbound Parkway; adding lanes to Newman Springs Road; and replacing four functionally obsolete Parkway bridges over Newman Springs Road to accommodate the new lanes.

County	No	DBNUM	COMPLETION YEAR	ROUTE	Project Name	M_POSTS	DESCRIPTION
Monmouth	104	NS0403	2022		County Route 537 Corridor, Section A, NJ Rt. 33 Business and Gravel Hill Road	48.93 - 51.56	CR 537 serves regional travel between Burlington, Ocean and Monmouth Counties. This roadway also serves as a link between rapidly developing areas of Mercer and Ocean Counties to recreational and commercial activities within Monmouth County. As a result, traffic volumes along this corridor have significantly increased, resulting in high congestion along this section of CR 537. As a result of the Local Concept Development phase the county is proposing improvements for the nearly 2.1 mile long segment of the Monmouth County Route 537 (CR 537) corridor. Improvements will include but are not limited to: providing missing sidewalk segments, enhancing public transportation services, providing 15' outside lanes, ITS improvements, access management strategies, eliminating the substandard thorough lane drop transition, addition of east bound lane onto Iron Bridge Road, addition of both left turn lane and right turn lanes on the north bound side at Redwood Lane, widening at Stillwells Corner Road and Wemrock Road Intersection, widening at Wal-Mart drive, and widening at Trotters Way. **From Liz's email:** I wanted to bring to your attention a project that is on the 2016 project list and is currently being modeled. It's DB# NS0403, Rt. 537 in Monmouth County. Our completion date of 2022 remains unchanged. The mileposts have changed slightly as a result of the Concept Development. They are now 48.85 to 51.65. The project description reads as if it's still in the study phase. It is now in preliminary engineering. There will be a widening of the road. The segment is 2.8 miles in length. This would classify the project as non-exempt. The curious thing about this project in determining whether or not it is regionally significant is that the road is classified as an Urban Minor Roadway in the western segment of the study area and an Urban Principal Roadway in the eastern section of the roadway.
Ocean	82	94071A	2018	72	Route 72, East Road	21.73 - 22.54	The improvements include intersection reconfiguration to improve geometry and installation of a median barrier to replace the existing grass median. The conversion to a median barrier will allow for the addition of a Rt. 72 westbound auxiliary lane and an eastbound outside shoulder. By maintaining the existing curb line, this improvement will have minimal Right of Way impacts.
Ocean	36	11385	2020	72	Route 72, Manahawkin Bay Bridges, Contract 1A & 1B	25.38 - 26.14 28.24 - 28.74	Contract 1A will include Rt. 72 and Marsha Drive Intersection Improvements, reconstruction and widening of Rt. 72 and Marsha Drive, and reconstruction of a traffic signal. The project also includes the installation of new storm drainage systems, a detention basin, ITS improvements, highway lighting and utility relocations. Contract 1B will include operational and safety improvements in Ship Bottom Borough, on Long Beach Island. Approx. 3000' feet of Rt. 72 (locally known as 8th and 9th Streets) and three cross roads (Barnegat Avenue, Central Avenue and Long Beach Boulevard) will be widened. Two-way traffic will be restored along Barnegat Avenue, Central Avenue and Long Beach Boulevard. Five traffic signals will be reconstructed. A new traffic signal will be installed at the intersection of 8th Street and Long Beach Boulevard. In order to reduce frequent flooding along Rt.72 and the intersections, a new storm drainage system and a pump station along with a sand filter will be installed. The project also includes the installation of bicycle and pedestrian accommodations, ITS improvements, highway lighting and utility relocations.
Ocean	54	00357A TO C	2020	Manahawkin Bay Bridges			These structurally deficient structures are 2,400 feet long, carry four lanes of traffic and are in overall poor condition due to the condition of the superstructure. Fatigue cracks were observed in the steel floor beam webs at numerous locations during the 1995 inspection and painting operation for this bridge. Necessary retrofit was accomplished by drilling holes at the tip of the cracks in 1995. The 1999 inspection revealed propagation of cracks in the floor beam webs and bracket connection angles beyond the holes drilled in 1995 and also development of additional fatigue cracks. Heavy pitting and section loss in stringers, floor beams and thru-girders was noted at random locations. Construction of a new parallel bridge over Manahawkin Bay to the south of the existing structure. Rehabilitation of the three Trestle bridges (over Hilliards Thorofare, West Thorofare, and East Thorofare) to provide the structural/safety improvements and to extend service life 20+ years. Bridge replacement eliminated. Construction of Marsha Drive intersection improvements. This project is anticipated to be bicycle/pedestrian compatible. This is a multi-year funded project under the provisions of Section 13 of P.L. 1995, c. 108. Total funding needed for construction is anticipated to be $189,000,000.
Ocean	35	09322	2021	88	Route 88, Bridge over Beaver Dam Creek	7.60	This is a full bridge replacement project. Superstructure rating=4, deck rating=5, SR=44.90.

County	No	DBNUM	COMPLETION YEAR	ROUTE	Project Name	M_POSTS	DESCRIPTION
Ocean	106	NS0414	2016	Garden State Parkway Interchange 91			Garden State Parkway Interchange 91 Improvements and Burnt Tavern Road RoadThe current configuration of Exit 91 allows only northbound entrance and southbound exit to and from the Parkway. This limited access causes motorists to those areas east and west of the interchange to have to find alternative routes to access the Garden State Parkway thus increasing travel miles. In the southeast quadrant of the interchange, the County will construct an exit ramp from northbound Garden State Parkway (GSP) to Burrsville Road and an entrance ramp to northbound GSP from Burrsville Road with a signalized intersection. This will require widening of northbound GSP to accommodate the access ramp and widening of Burrsville Road for vehicles turning left into the entrance ramp. The existing access road between Burnt Tavern Road and Burrsville Road will be eliminated. In the southwest quadrant of the interchange, the applicant proposes the construction of a new entrance ramp to southbound GSP from Lanes Mill Road West with a signalized intersection. The existing southbound GSP service road shall be extended to the Dorado Park & Ride and a new connector road shall be constructed from Herborn Avenue to Lanes Mill Road West, intersecting with the new southbound GSP ramps.
Middlesex	50	98541	2016		South Amboy Intermodal Center	N/A	This is an intermodal project linking several major regional routes and modes of transportation into one central point of transfer. Improvements in the vicinity of the South Amboy waterfront may include rail and bus transit plazas, arterial and site access road improvements, bridge reconfiguration, bulkheading and breakwater development, ferry terminal, and pedestrian access to rail and bus facilities.
Middlesex	90	FS09644	2017	Bridge over Route 1			The project includes widening of the Rt. 18 NB structure by one lane to create an accel/decel lane for the ramps to and from Rt. 1. This widening will then allow the existing lane to be used as a third thru lane on Rt. 18 NB which will eliminate a merge conflict between Rt. 18 NB traffic and NJ Turnpike traffic eliminating backups on Rt. 18 NB and the NJ Turnpike. The project will also modify Ramp D from Rt. 18 NB to Rt. 1 SB and replacement of the entire Rt. 18 NB/SB super structure utilizing precast superstructure units.
Middlesex	91	GSP1003	2018	GSP Interchange 125 Improvements			This project will provide for the reconfiguation of the existing ramps and construction of new ramps to provide full access between the Parkway and Chevalier Avenue. Interchange 125 is presently configured with a southbound entrance and northern exit ramp. This project will provide a northbound entrance and southbound exit ramp. The southbound exit ramp will be tolled to be consistent with one-way tolls at the Raritan Toll Plaza. The improvements are necessary to complete what is currently a partial interchange and to provide access to a waterfront development being constructed by Sayreville Seaport Associates.
Middlesex	92	GSP1403	2018	GSP Widening, Interchange 35 to Interchange 48			This project will provide for the widening of the Garden State Parkway between Interchanges 35 and 48 from 2 lanes to 3 lanes in each direction. Project will also include improvements to Interchanges 36, 37 and 38
Middlesex	23	00321	2019		Schalk's Crossing Road Bridge, CR 683	0.70	Funding is being provided for the replacement of the bridge deck that will maintain the existing steel superstructure and provide bicycle/pedestrian accessibility. A shared bicycle/pedestrian sidewalk lane will be provided through cantilever addition on the through girders along both the east and west sides of Schalk's Crossing Road. Repairs will be made to the substructure. Prior to any bridge rehabilitation, the railroad catenary system will be modified. Roadway improvements would include milling and resurfacing the existing roadway approaches for tie-ins to bridge.
Middlesex	32	9227	2019	34	Route 34, Amboy Road/Morristown Road (5)	24.60 - 24.80	This project will address proposed intersection improvements. Two closely aligned roads intersect Rt. 34 at acute angles, which creates traffic movement and sight distance problems. Morristown Road, in particular, has heavy left turning movements from Rt. 34 southbound with no traffic control.
Middlesex	76	9169Q	2019	287	Route 287, Interchange 10 Ramp Improvements	10.27-10.6	This project will provide operational improvements to the on and off-ramps to/from Easton Avenue by lengthening the acceleration lanes along I-287 NB.
Middlesex	77	9169R	2019	287	Route 287, River Road (CR 622), Interchange Improvements	9.8 - 10.2	This project is to make operational improvements to the on-ramp from River Road to reduce the number of vehicles in queue entering the interstate and weaving conditions.
Middlesex	30	08417	2020	1	Route 1, Forrestal Road to Aaron Road	13.30 - 22.50	A project to address the deficiencies along the portion of Route 1 in South Brunswick between MP 13.30 and 22.50. This stretch of the roadway currently accommodates only two travel lanes in each direction. Sections of Route 1 both north and south carry three lanes of travel. The 3 Intersections of Ridge Road, New Road, and Deans Lane/Henderson Road will be advanced into Concept Development under this agreement.
Middlesex	52	99316	2020		Oak Tree Road Bridge, CR 604	RR 24.81	The bridge is structurally deficient and functionally obsolete. It needs to be widened due to increased traffic volume and to meet wider approach roadway width. The bridge acts as a major link between South Plainfield and Woodbridge Townships.

County	No	DBNUM	COMPLETION YEAR	ROUTE	Project Name	M_POSTS	DESCRIPTION
Middlesex	64	079A	2022	9	Route 9/35, Main Street Interchange	129.82	Rt. 9/35 over Main Street Interchange is a breakout from the Rt 9/35 over Main St. Bridge. The lack of an acceleration lane from Rt. 9 Northbound to Rt. 9/35 Northbound ramp has created a safety condition for vehicles attempting to merge. Furthermore, the tight radius and heavy truck traffic from this ramp have contributed to the congestion and the queue on Rt. 9 Northbound which extends for about a mile causing more safety concerns. Rt. 9/35 Southbound to Rt. 9 Southbound ramp is a also a safety problem at this interchange, as this ramp is also substandard and is contributing to the extensive queue which extends from Rt. 9/35 to the Edison Bridge. Both ramps will be investigated separately and may graduate as two individual projects.
Mercer		DVRHNC36	2020		I-95 at Scudders Falls Bridge - Widening		One lane in each direction
Mercer		DVRHNC67	2020		New Jersey Turnpike - Widening		One lane in each direction
Mercer	88	DB08004	2021	I-95/Scudder Falls Improvement Project			Widening of I-95 from PA 332 to the River Bridge. Replacement and Widening of the River Bridge. Reconfiguation of the NJ 29 & I-95 Interchange and repaving of I-95 to CR 579 Bear Tavern Road.

APPENDIX C – LAKEWOOD TOWNSHIP PROPOSED IMPROVEMENTS OBTAINED FROM THE ”DRAFT – PROGRESS SUBMISSION TRANSPORTATION IMPROVEMENT STUDY” PREPARED BY MASER CONSULTING P.A.

Proposed improvements as listed in the "Draft – Progress Submission Transportation Improvement Study" dated May 2017 and prepared by Maser Consulting, P.A.

1. **SHORT-TERM PARKING SOLUTIONS AT INTERSECTIONS:**

a. Parking prohibition at Stop Signs

b. Parking prohibition at Congested Intersections:

Table 1 – Short-Term Parking Prohibition at Intersections

Roadway to Prohibit Parking	Roadway's Intersection with	Parking Prohibition Length	Jurisdictional Note
Cross Street / Chestnut Street	Route 9	Adjacent to turning lanes + 150' from intersection	May require NJDOT notification
Finchley Boulevard / Ford Avenue	Route 9	100' from intersection	May require NJDOT notification
Oak Street	Route 9	250' from intersection	May require NJDOT notification
Spruce Street	Route 9	250' from intersection	May require NJDOT notification
James Street	Route 9	250' from intersection	May require NJDOT notification
1st Street	Route 9	100' from intersection	May require NJDOT notification
2nd Street	Route 9	100' from intersection	May require NJDOT notification
3rd Street	Route 9	100' from intersection	May require NJDOT notification
4th Street	Route 9	100' from intersection	May require NJDOT notification
5th Street	Route 9	100' from intersection	May require NJDOT notification
6th Street	Route 9	100' from intersection	May require NJDOT notification
7th Street	Route 9	100' from intersection	May require NJDOT notification
8th Street	Route 9	100' from intersection	May require NJDOT notification
9th Street	Route 9	100' from intersection	May require NJDOT notification
10th Street	Route 9	100' from intersection	May require NJDOT notification
11th Street	Route 9	100' from intersection	May require NJDOT notification
Chestnut Street	New Hampshire Avenue	500' from intersection	May require County notification
Oak Street	New Hampshire Avenue	250' from intersection	May require County notification
Spruce Street	New Hampshire Avenue	250' from intersection	May require County notification
Pine Street	New Hampshire Avenue	Adjacent to turning lanes + 250' from intersection	May require County notification
7th Street	Ridge Avenue	100' from intersection	May require County notification
Ridge Avenue	7th Street	100' from intersection	May require County notification
7th Street	Somerset Avenue	100' from intersection	May require County notification
Somerset Avenue	7th Street	100' from intersection	May require County notification
Park Avenue	Route 88	100' from intersection	May require NJDOT notification
Clover Street	Route 88	(NB) 300' from intersection, (SB) 150' from intersection	May require NJDOT notification
Holly Street	Route 88	100' from intersection	May require NJDOT notification
Linden Avenue	Route 88	100' from intersection	May require NJDOT notification
Park Avenue	County Line Road	200' from Intersection	May require County notification
Clover Street	Cedar Bridge Avenue	350' from intersection	May require County notification
MLK Drive	Cedar Bridge Avenue	250' from intersection	May require County notification
Pine Street	MLK Drive	150' from intersection	-
14th Street	Hope Chapel Road	150' from intersection	-

2. POTENTIAL INTERSECTION IMPROVEMENTS

a. Intersections that may benefit from All-Way Stop Control and Traffic Signals

No	Intersection Location
Intersections that may benefit from All-Way Stop Control	
1	Clifton Avenue & 7th Street
2	Lexington Aveue & 7th Street
3	Somerset Avenue & Ridge Avenue
4	Somerset Avenue & 7th Street
5	Monmouth Avenue / Railroad Street and 1st Street
6	Washington Avenue & Spruce Street
Intersections that may benefit from Traffic Signals	
a. Local Intersections	
1	Pine Street & Dr. Martin Luther King Drive
2	Oak Street & Vine Street
3	Oak Street & Albert Avenue
4	Clifton Avenue & 1st Street
5	Forrest Avenue & 7th Street
6	Park Avenue & 7th Street
7	Park Avenue & 4th Street & Ridge Avenue
b. County Intersections	
1	Hope Chapel Road (CR 639) & Miller Road
2	Prospect Street (CR 628) & Massachusetts Avenue (CR 637)
3	Chesnut Street (CR 40) & New Hampshire Avenue (CR 623)
4	James Street (CR 32) and Williams Street
5	Prospect Street (CR 628) & Cross Street (CR 626)
6	Cross Street (CR 626) & Augusta Boulevard
7	Hope Chapel Road (CR 639) & 14th Street
C. State Intersections	
1	Route 9 & Oak Street
2	Route 9 & 7th Street
3	Route 9 & Finchley Boulevard / Ford Avenue
4	Route 88 & Clover Street
5	Route 88 & Linden Avenue
6	Route 88 & Park Avenue
7	Route 88 & Lexington Avenue
8	Route 88 & Holly Street

b. Intersections that may benefit from Striping Improvements to Increase Capacity

Table 2 – Recommended Striping Improvements to Increase Capacity

Location	Striping Recommendations	Jurisdictional Notes
Route 88 & New Hampshire Avenue (CR 623)	Review extending the New Hampshire Avenue (CR 623) NB left-turn lane. Extending the lane will require the lane shift taper to be extended but can be partially accommodated in existing shoulder. It is recommended to meet the gore striped median to the south.	NJDOT Street Intersection Permit Required and County coordination.
Princeton Avenue Corridor	Review providing 75' long dedicated right-turn lanes at intersections in lieu of parking from 4th Street to 6th Street.	-
Monmouth Avenue Corridor	Review providing 75' long dedicated right-turn lanes at intersections in lieu of parking from 2nd Street to 7th Street.	-
Clifton Avenue Corridor	Review providing alternating left-turns lanes at intersections from 6th Street to Courtney Road	-
Princeton Avenue & 7th Street	Princeton NB/SB approaches are 26' wide. Review providing a shared left-turn/through lane and a dedicated right-turn lane to both approaches. Prohibit parking within 75'.	-
Route 9 & Spruce Street	Review striping Route 9 NB/SB with left-turn lanes. Will lose shoulder at intersection and require signal upgrades.	NJDOT Street Intersection Permit Required. May require shoulder waiver.
Forest Avenue & 6th Street	Review providing Forest Avenue NB/SB left-turn lanes.	-
Gudz Road & Miller Road	Review providing two 10' approach lanes and a 12' receiving lane on Gudz Road EB.	-
Pine Street & Warren Street / Pondersoa Drive	Review providing left-turn lanes in lieu of shoulders at Warren Street / Pondersoa Drive.	-
Squankum Road (CR 547) & Princeton Avenue	Princeton Avenue NB approach is 26' wide. Review providing a dedicated through lane and a dedicated right-turn lane. Prohibit parking within 100'.	County Approval Required.
Route 9 & Sherwood Drive	Implement a DO NOT BLOCK THE BOX striping on Route 9 due to the proximity to Prospect Street.	NJDOT HOP Permit Required.
Shafto Avenue & 12th Street	Missing stop bars at stop signs. Stripe stop bars.	-

Source: "Draft – Progress Submission Transportation Improvement Study" dated May 2017 and prepared by Maser Consulting, P.A.

c. Intersections that may benefit from Pedestrian, Safety and Traffic Calming Upgrades

No	Intersection Improvements
	Pedestrian Improvements
1	Install pedestrian signal equipment and restripe the existing crosswalks at Monmouth Avenue & 4th Street
2	Improve the existing ADA curb ramps and crosswalks as well as stripe stop bars at Monmouth Avenue & 2nd Street
3	Installation of Rapid Flashing Beacons with solar panels at crosswalks along Route 9 at unsignalized intersections.
4	Install crosswalks on all four approaches with signange at Lexington Avenue & 10th Street and Lexingston Avenue & 9th Street
5	It was recommended by a member of the public to install a 'right-turns yield to pedestrians' sign at the egress driveway of the Shopping Center across from James Street as well as on Sunset Road SB at James Street.
	Pot Holes
1	Based upon discussion with the public, the following roadways are currently in need of mill and overlay: (1) Congress Street; (2) Stirling Avenue; (3) Somerset Avenue; (4) Ridge Avenue; (5) Oak Street (Between Albert Avenue and New Hampshire Avenue).
	Sight Distance and Operation
1	The driveway of Chateau Drive intersecting Route 9 opposite to Boradway is currently designed with a mountable curb righ-in/right-out driveway. It is recommended improve sight distance to the soth and install additional no-left turn signs on the Route 9NB side and install a new stop bar for Chateau Drive EB.
	Traffic Calming
1	Caranetta Drive and S. Lake Drive between Freeman Riad and Central Avenue (CR 528) are suitable candidate locations to implement speed humps to reduce cut-through traffic in residential areas.

d. Intersections that may benefit from Traffic Signal Upgrades or Roadway Widening.

Table 3 – Recommended Traffic Signal Upgrades or Roadway Widening – Medium-Term

Location	Improvement	Jurisdictional Notes
Medium-Term		
County Line Road (CR 526) & East End Avenue / Twin Oaks Drive	*Short-Term:* Review the implementation of a Twin Oaks Drive SB right-turn overlap phase during the County Line Road EB/WB left-turn phase and install associated traffic signal equipment. *Medium Term:* Review partial property dedication of either the southwest adjacent lot to provide an East End Avenue NB left-turn lane. The existing East End Avenue pavement width is 30' where 35' would be required to have a SB receiving lane, a NB dedicated left-turn lane and a shared through/right-turn lane. Reconstruct traffic signal and optimize timings.	Requires County Approval.
Cedar Bridge Avenue (CR 528) & Clover Street	Implement a Cedar Bridge Avenue EB lead left phase. Restripe and update traffic signal equipment to support a Clover Street SB left-turn and right-turn lane.	Requires County Approval.
County Line Road (CR 526) & Ridge Avenue	Review phasing at signal to enhance left-turn mobility.	Requires County Approval.
County Line Road (CR 526) & Princeton Avenue	Coordinate with County to determine if opposing NB/SB left-turn lanes are feasible. Based upon preliminary analysis, a dedicated left-turn and a through/right-turn lane for the NB/SB approach may fit into the existing pavement width.	Requires County Approval.
County Line Road (CR 526) & Lexington Avenue		Requires County Approval.
County Line Road (CR 526) & Monmouth Avenue		Requires County Approval.
Kennedy Boulevard & Princeton Avenue	Coordinate with County to determine if opposing NB/SB left-turn lanes are feasible. Based upon preliminary analysis, a dedicated left-turn and a through/right-turn lane for the NB/SB approach may fit into the existing pavement width.	-
Kennedy Boulevard & Lexington Avenue		-
Kennedy Boulevard & Monmouth Avenue		-
Route 9 & County Line Road (CR 526)	Review providing EB/WB left-turn protected/permitted phasing. The EB/WB approaches at both intersections have left-turn lanes but the traffic signal only provides a permitted ROW phase.	Requires an NJDOT Street Intersection Permit.
Route 9 & Kennedy Blvd		

Source: "Draft – Progress Submission Transportation Improvement Study" dated May 2017 and prepared by Maser Consulting, P.A.

Table 4 – Recommended Traffic Signal Upgrades or Roadway Widening – Medium-Term

Location	Improvement	Location
Medium-Term		
Route 9 and Pine Street / James Street (CR 32)	Preform a traffic analysis on protected/permitting left-turn phasing and left-turn arrow signal heads for all approaches.	Requires an NJDOT Street Intersection Permit.
Pine Street & Washington Avenue	Review converting the shoulder along Pine Street to provide a Pine Street WB left-turn lane. Recommended to widen Washington Avenue to provide a NB left-turn and a right-turn. Consider new traffic signal during the Vine Street Extension Project.	-
Squankum Road (CR 547) & Kennedy Blvd	Review implementing a Kennedy Blvd EB No Turn on Red Regulation but install signal equipment to support an EB right-turn overlap phase.	Requires County Approval.
Squankum Road (CR 547) & County Line Road (CR 526)	Review installing signal equipment to support a County Line Road (CR 526) WB right-turn overlap phase.	Requires County Approval.
Route 9 & Cross Street (CR 626) / Chestnut Street (CR 40)	Review Cross Street EB (CR 626) lane configuration and storage length. Associated with removing parking on the north side of Cross Street (CR 626) additional capacity or longer storage lengths may be obtained. The Chestnut Street (CR 40) WB lanes assignment should be reviewed to make sure approach and receiving lanes are lined up with Cross Street (CR 626) EB.	Requires an NJDOT Street Intersection Permit.
Oak Street & New Hampshire Avenue (CR 623)	Review restriping Oak Street EB to remove shoulders and provide two approach lanes. The Oak Street WB lanes assignment should be reviewed to make sure approach and receiving lanes are lined up with Oak Street EB. New signal equipment would be required.	Requires County Approval.
Cedar Bridge Avenue (CR 528) & MLK Drive	Review restriping MLK Drive NB to provide a dedicated left-turn lane and a dedicated right-turn lane. New signal equipment would be required.	Requires County Approval.

Source: "Draft – Progress Submission Transportation Improvement Study" dated May 2017 and prepared by Maser Consulting, P.A.

Table 5 – Recommended Traffic Signal Upgrades or Roadway Widening – Long-Term

Location	Improvement	Jurisdictional Notes
Long-Term		
New Hampshire Avenue (CR 623) & Cedar Bridge Avenue (CR 528)	Review extending New Hampshire Avenue (CR 623) NB left-turn lane. Due to the existing lane shift configuration, it is anticipated roadway widening will be required.	Requires County Approval.
New Hampshire Avenue (CR 623) & Ridge Avenue	Review constructing a Ridge Avenue WB left-turn and a New Hampshire Avenue (CR 623) dedicated left-turn lane and a dedicated right-turn lane.	Requires County Approval.
Central Avenue (CR 528) & Sunset Road	Review dedication and widening on Sunset Road (southwest corner) to provide for a NB left-turn lane	Requires County Approval.
James Street (CR 32) and Cross Street (CR 626)	Review roadway widening along James Street and Cross Street. Recommended to increase capacity by providing Cross Street NB/SB left-turn lanes and providing a James Street WB left-turn lane and a shared through/right-turn lane. This improvement will also reduce the offset between James Street and Franklin Boulevard. New signal equipment would be required.	Requires County Approval.
Cedar Bridge Avenue (CR 528) & Avenue of the States	Recommended to review traffic signal warrants and/or performing analyses at this intersection. Currently, the northbound approach fails during the AM peak hour and police presence is needed during events at FirstEnergy Park. This signal may benefit from having "adaptive" control due to events at FirstEnergy Park.	Requires County Approval.
Route 9 & Route 88 / 1st Street	Review prohibiting Route 9 NB left-turns onto 1st Street and convert the NB left-turn lane into additional left-turn storage for Route 9 SB at Route 88.	Requires an NJDOT Street Intersection Permit.
Route 88 & Clifton Avenue	Review converting the Clifton Avenue SB right-turn lane to a SB shared through/right-turn lane, remove parking on Clifton Ave SB just south of Route 88, and restripe parking area as travel lane. Additionally, it is highly recommended to stripe lane termination symbols and additional lane termination signage for the Clifton Avenue NB right lane termination.	Requires an NJDOT Street Intersection Permit.
Cedar Bridge Avenue (CR 528) & Hurley Avenue (CR 528)	Roadway widening along Cedar Bridge Avenue to provide a WB left-turn lane and two through lanes. Currently, the inside through lane terminates into the left-turn lane; however, there are two receiving lanes. This improvement will require shifting both travel lanes and widening. An existing rail crossing exists 200' southeast of the intersection crossing Cedar Bridge Avenue (CR 528).	Requires County Approval and NJDOT/FRA approval for modifications to the rail crossing.

Source: "Draft – Progress Submission Transportation Improvement Study" dated May 2017 and prepared by Maser Consulting, P.A.

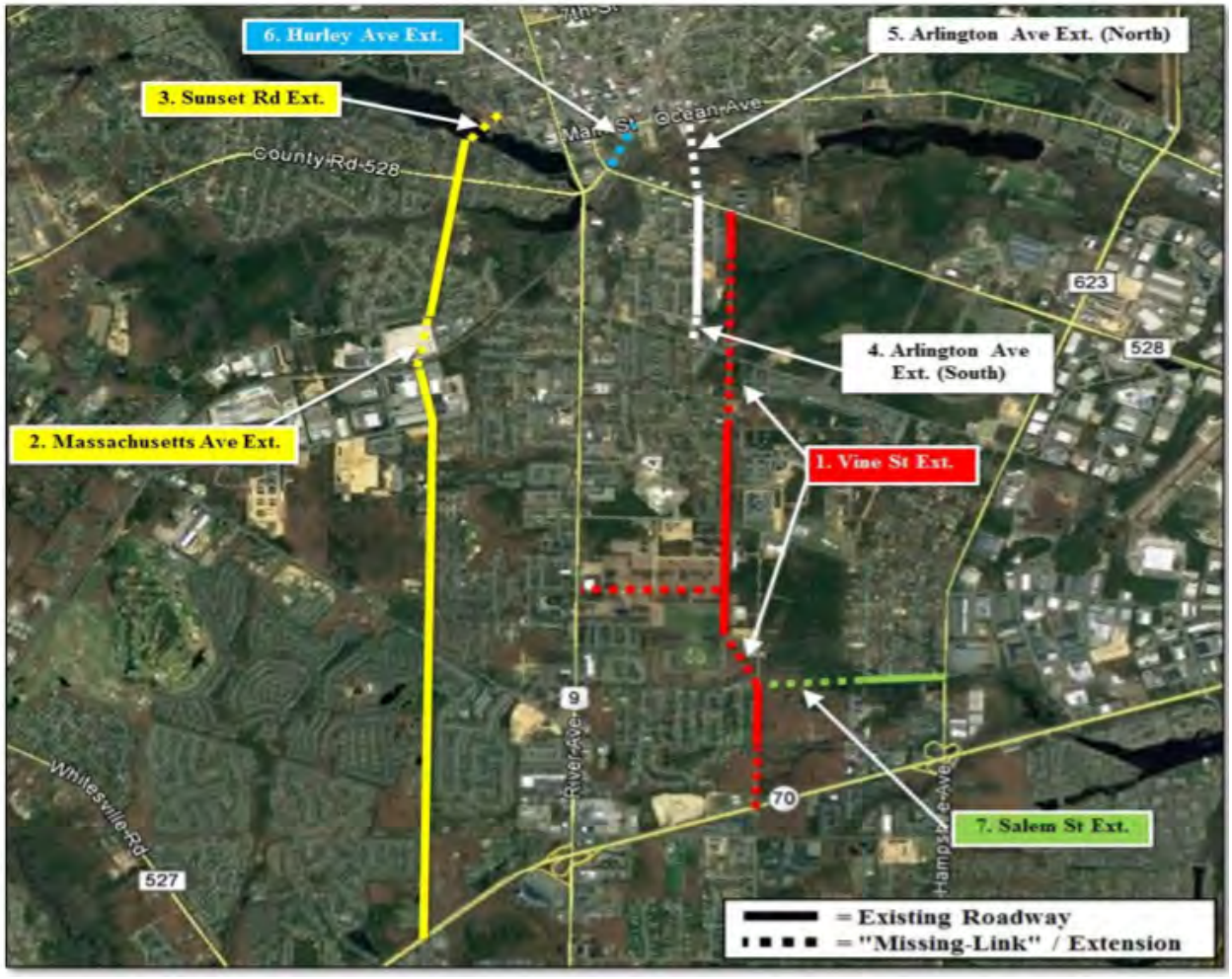
3. POTENTIAL ROADWAY CORRIDOR IMPROVEMENTS

No	Corridor Improvements
1	Oak Street Corridor - Implementing a Two-Way-Left-Turn (TWLTL) lane along Oak Street will provide a safe turning space for traffic bound towards the adjacent school and residential areas. Two 12' wide travel lanes with 14' wide TWLTL can be accomodated using the existing pavement width of Oal Street. The TWLTL should convert into a dedicated left-turn lane at signalized intersections.
2	Pine Street Corridor - Implementing a Two-Way-Left-Turn (TWLTL) lane along Pine Street between Marc Drive and Avenue of the States will provide a safe turning space for traffic bound towards the adjacent residential areas. Two 12' wide travel lanes with 14' wide TWLTL can be accomodated using the existing pavement width of Pine Street between Marc Drive and Avenue of the State. The TWLTL should convert into a dedicated left-turn lane at signalized intersections.
3	Prospect Street (CR 628) Corridor - Implementing a Two-Way-Left-Turn (TWLTL) lane along Prospect (CR 628) Street will reduce large tractor trailer turning, deceleration and acceleratation impacts to transient traffic. With other residential projects in construction along Prospect Street (CR 628) the demand for additional capacity oincreases. Two 12' wide travel lanes with a 14' wide TWLTL can be accomodated using the existing pavement width of Prospect Street (CR 628). The TWLTL should convert into a dedicated left-turn lane at signalized intersections.
4	Kennedy Boulevard - It is recommended to restripe Kennedy Boulevard east of Route 9 with 7' wide on-street parking, two 12' wide travel lanes and a 13' wide TWLTL. The TWTL should convert into a dedicated left-turn lane at signalized intersections.
5	Spruce Street - The pavement width of Spruce Street varies between 24' to 32'. In areas where Spruce Street is 32', it is acceptable to provide on-street parking on one side of the roadway to maintain 12' minimum travel lanes. Parking on both side of Spruce Street prsent conflicts when two opposing vehicles pass on-street parked vehicles.
6	Lexington Avenue - It is acceptable to provide on-street parking on one side of the roadway to maintain 12' minimum travel lanes. Parking on both side of Lexington Avenue between County Line Road (CR 526) and 9TH Street presents conflicts when two opposing vehicles pass on-street parked vehicles.
7	Clifton Avenue - It is recommended to review installing NB/SB left-turn lanes at the proposed traffic signal installation at Clifton Avenue & 1ST Street as well as a Clifton Avenue NB left-turn lane at 3rd Street.
8	Route 88 - It is recommended to to prepare Conceptial Plans to understand the magnitude of partial dedications necessary to install 14' two-way-left-tuen lane throughout the Route 88 Corridor from Railroad Street to New Hampshire Avenue (CR 623). Based upon the New Jersey Access Code and discussion with NJDOT, it is anticipated 38' would be required at a minimum to provide two travel lanes and a TWLTL. Route 88 would have decicated left-turn lanes at traffic signals.
9	Route 9 - The NJTPA report "US 9 Corridor Study - Managing and Accomidating Growth in Lakewood and Toms River, Ocean Co", recommends a two-way left turn lane (TWLTL). More detail discussion is provided in the Maser's Report.

4. POTENTIAL ROADWAY EXTENSIONS AND BY-PASS

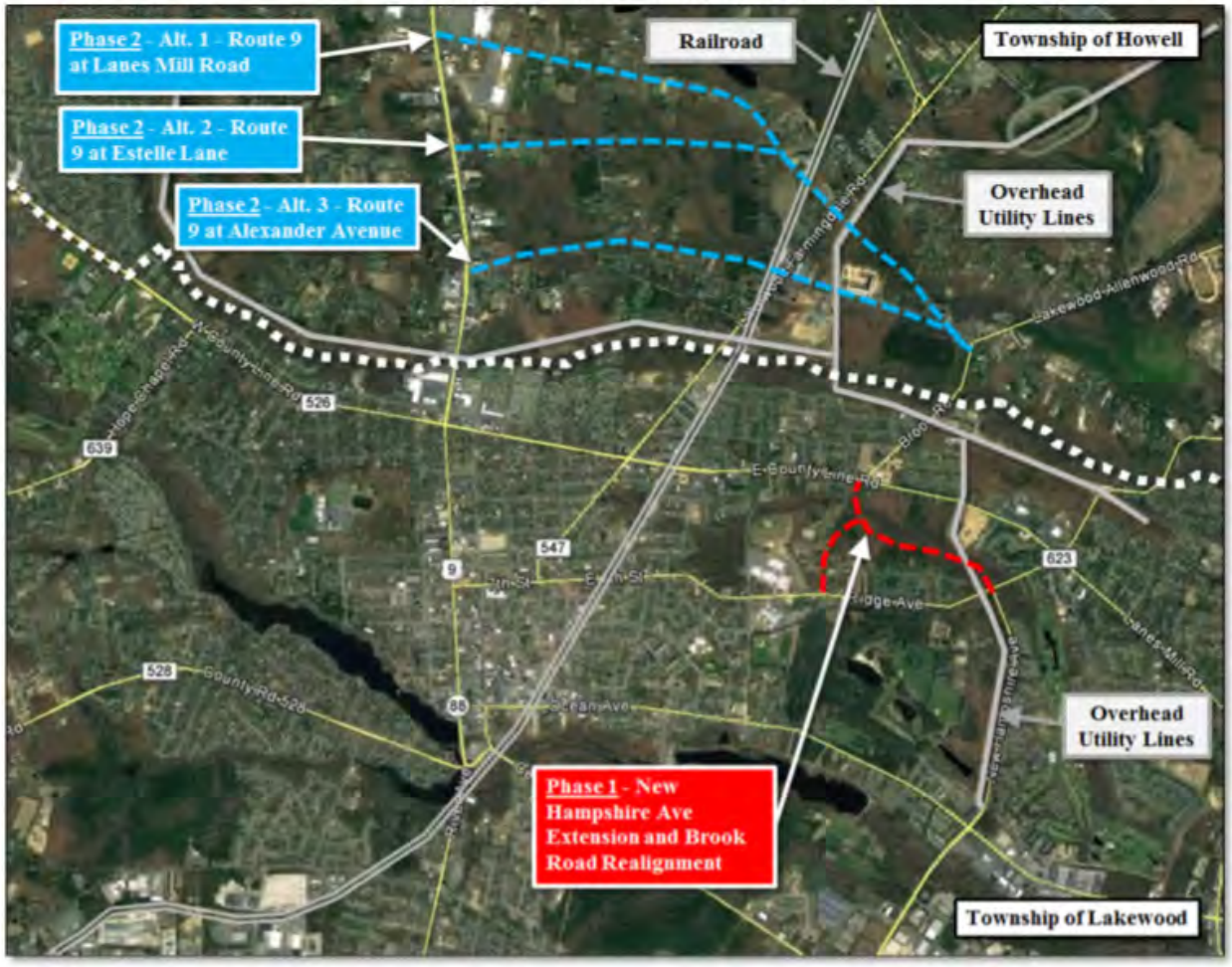
No	Proposed Improvements
	Extensions
1	Vine Street Extension from Cedar Bridge Avenue (CR 528) to Pine Street and Vermont Avenue Extension to Route 70.
2	Massachusetts Avenue and Sunset Road Extensiom From Route 70 to N. Lake Drive.
3	Arlington Avenue Extension (South).
4	Arlington Avenue Extension (North).
5	Hurley Avenue (CR 528) Extension.
6	Salem Street Extension
	By-Pass
1	Lakewood By-Pass

Potential Roadway Extensions



Source: "Draft – Progress Submission Transportation Improvement Study" dated May 2017 and prepared by Maser Consulting, P.A.

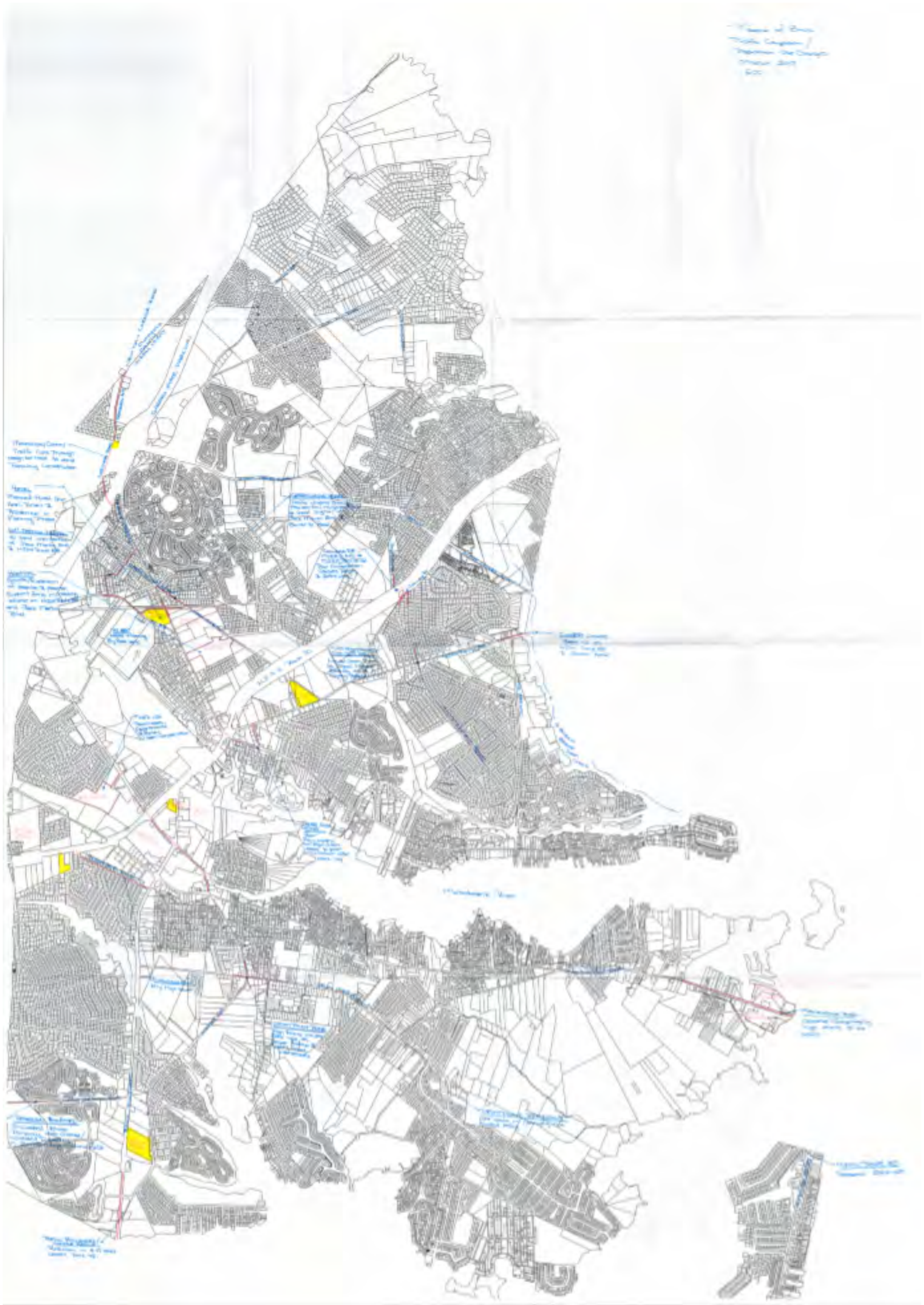
Long-Term Lakewood Bypass Sketch



Source: "Draft – Progress Submission Transportation Improvement Study" dated May 2017 and prepared by Maser Consulting, P.A.

APPENDIX D – HOT-SPOT LOCATIONS PROVIDED BY BRICK TOWNSHIP

TRAFFIC CONGESTION / POPULATION – LAND USE CHANGES (PROVIDED BY BRICK TOWNSHIP)



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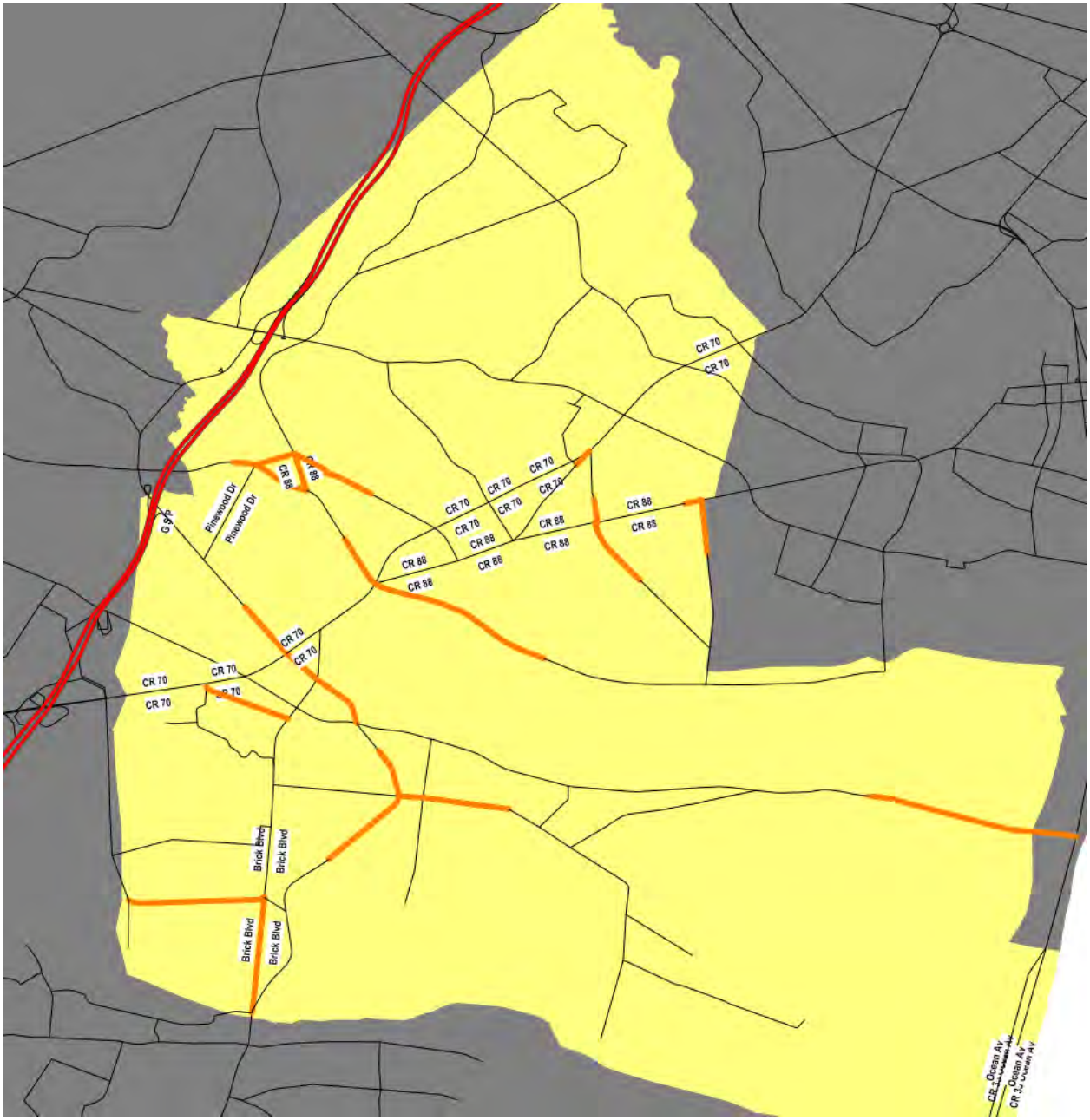
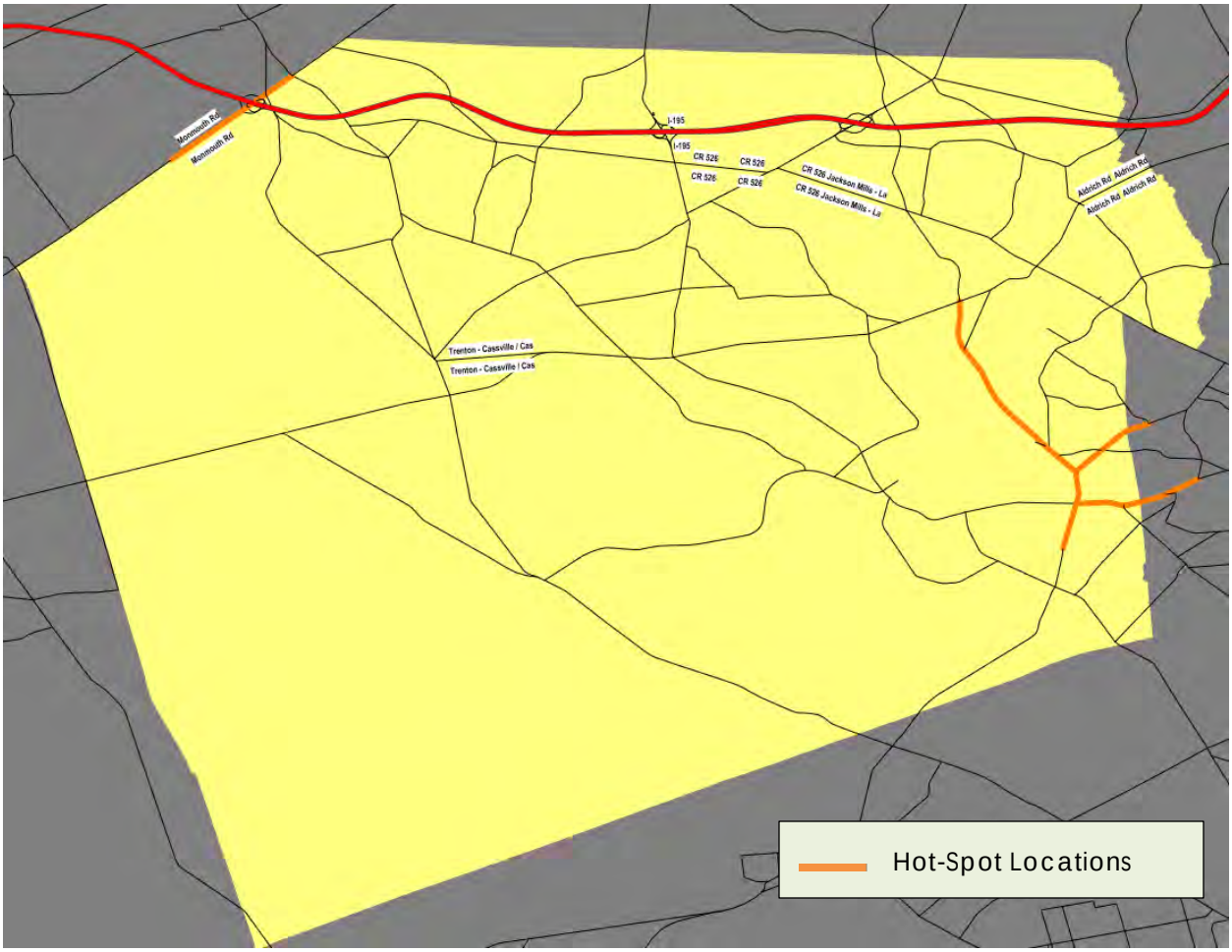
Hot-Spot Locations – plot to County Model's Highway Network



APPENDIX E – JACKSON TOWNSHIP HOT-SPOT LOCATIONS


Monmouth Rd
Monmouth Rd
I-195
I-195
CR 526
CR 526
CR 526
CR 526
CR 526 Jackson Mills - La
CR 526 Jackson Mills - La
Aldrich Rd Aldrich Rd
Aldrich Rd Aldrich Rd
Trenton - Cassville / Cas
Trenton - Cassville / Cas
Hot-Spot Locations

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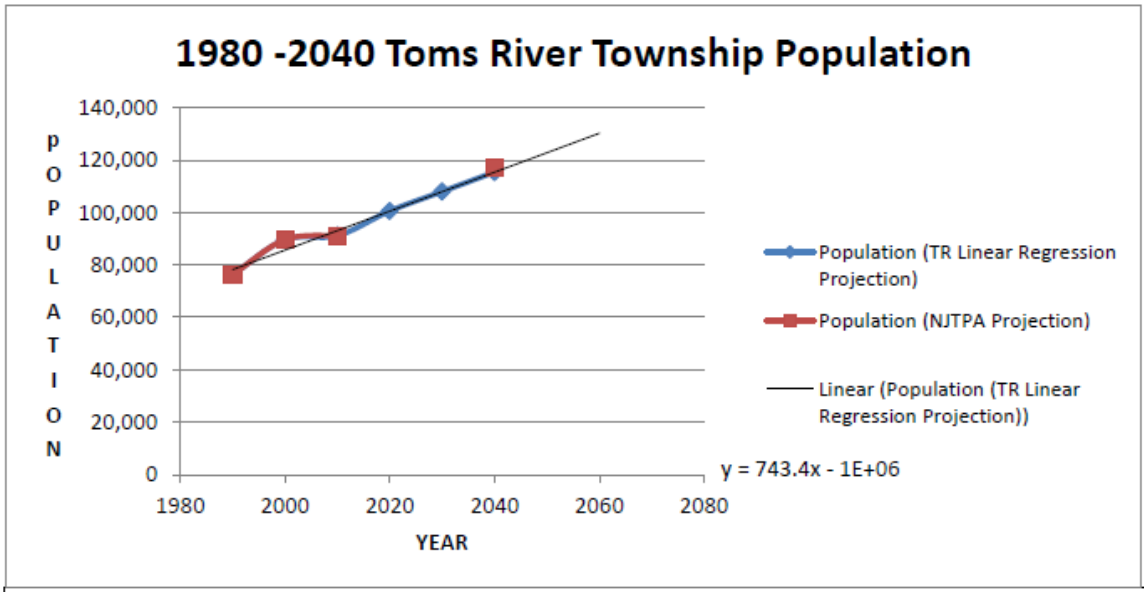
APPENDIX F – TOMS RIVER SOCIOECONOMIC DATA PROJECTIONS

Division of Community Development
Township of Toms River

POPULATION, HOUSEHOLD AND EMPLOYMENT PROJECTIONS

Toms River Township has performed a linear regression model and utilized the survival method to forecast population trends from 2020 to 2040. The Linear Model method is in line with the North Jersey Transportation forecast method for 2040. The NJTPA predicts a population of 117,430 in 2040, while the Township's linear regression model predicts a population of 115,508. NJTPA does not provide population figures for 2020 or 2030, however utilizing the Township's linear regression modeling should provide figures that are in line with the NJTPA projections. The Township's linear regression model predicts a population of 100,640 for 2020 and 108074 for 2030.



Toms River Township Population & Projections						
	POPULATION			PROJECTED POPULATION		
Year	**1990**	**2000**	**2010**	**2020**	**2030**	**2040**
Population (TR Linear Regression Projection)	76,371	89,706	91239	100640	108074	115508
Population (NJTPA Projection)	76,371	89,706	91239			117430

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Township of Toms River

Survival Rates				
Year	2000	2010	change (10 years later)	Survival Rate
Births (2001-2005)	4780			
Births (2006-2010)	4586			
under 5 years	4,869	4,611	**25**	0.005
5 to 9 years	5697	5081	301	0.063
10 to 14 years	6179	5897	1,028	0.211
15 to 19 years	5793	6073	376	0.066
20 to 24 years	4328	4980	-1199	-0.194
25 to 34 years	9986	9685	-436	-0.043
35 to 44 years	13673	12050	2064	0.207
45 to 54 years	12793	14774	1101	0.081
55 to 59 years	4818	6354	-6439	-0.503
60 to 64 years	3825	5952		
65 to 74 years	7810	7838	-805	-0.093
75 to 84 years	4957	5624	-2186	-0.280
85 years and older	1599	2320	-2637	-0.532
Average Survival Rate:				-0.084
*Survival Rate was rounded in this table				

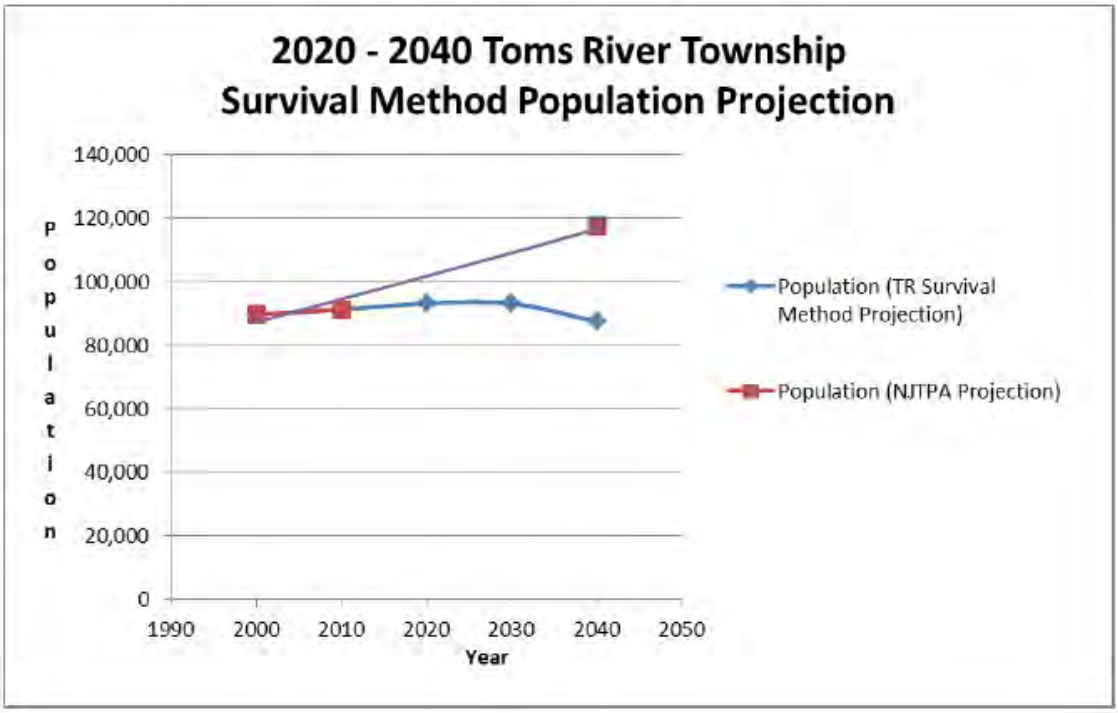
The Township performed a Survival Method forecast to the year 2040. The survival method utilized the average birthrate over the time period from 2001 to 2010 to project future births. The death and migration rates were computed by comparing the 2000 and 2010 population change by age category. These rates were then utilized to predict future population growth by age category. The rates and change of the population for the ten years is provided in the table above.

The survival method projects a population increase in 2020 to 93,169 followed by a decline in 2030 to 93,141 and further population decline in 2040 to 87,489. The decline in population in 2030 and 2040 is attributed to a declining birth rate and the baby boomers migration and death. It should be noted that the survival method utilizes a stagnant birth rate and migration rates for the 30 year projected time period. Population trends such as changing demographics with a higher or lower birth rate and higher or lower migration/death rates could alter the projections significantly for a 2040 population projection. The survival method may not be the best method to predict a 2040 population projection due to the fact that it does not account for birth and migration/death rate variability over a thirty year time span.

Most likely the population will fall somewhere in between the survival method projections and the linear regression projection for the 10 year time period. In

Division of Community Development
Township of Toms River

2020 the Township's population is projected to be between 93,169 and 100,640 individuals.



Toms River Township Population & Survival Method Projections					
	POPULATION		PROJECTED POPULATION		
Year	**2000**	**2010**	**2020**	**2030**	**2040**
Population (TR Survival Method Projection)	89,706	91239	93169	93141	87489
Population (NJTPA Projection)	89,706	91239			117430

Division of Community Development
Township of Toms River

Household and Employment Forecasting:

Toms River Household and Employment Projections					
	Existing		Projected		
Year	2000	2010	2020	2030	2040
Households (TR Projected- straight line projection)	31674	34770	38158	41875	45955
Households (NJTPA Projected)	31674	34770			45280
Employment (TR Projected – straight line projection)	43521	43574	43575	43576	43577
Employment (NJTPA Projected)	43521	43574			52200

The Township utilized a flat growth projection based on the difference between the 2000 and 2010 Census to estimate the household and employment growth of Toms River Township. The flat growth rate and the NJTPA projections are similar. It should be noted that the average household growth rate did not take into account the population growth. Should the population decline in accordance with the Survival Method model, the number of households could decline. Employment trends may not be as impacted by the population growth, due to the fact that the 2000 employment numbers and the 2010 employment numbers were similar despite a population growth. This is attributed to the fact that the unemployment rate in 2000 was lower than in 2010.

Housing Projections			
Smart Growth Plan Components			
	2010 (Units)	2030 (Units)	2010-2030 (units)
Downtown Regional Center	4142	4847	705
Ortley Beach Center	2658	2686	28
North Beach Center	4127	4127	0
Industrial Center	0	0	0
Route 9 Highway Core	1112	2363	1251
Route 70 Highway Core	780	909	129
Route 37 East Highway Core	26	26	0
Route 37 West Highway Core	47	134	87
Fischer Boulevard	262	262	0
Hooper Avenue	732	872	140
Balance of Township	29448	29528	80
Total:	43334	45754	2420
Source: Toms River Township staff utilizing development approvals, aerials, and 2010 Census data, and proposed developments Note: 2030 unit count includes units currently under construction			

Division of Community Development
Township of Toms River

It is anticipated that 3,388 new households will have to be accommodated for the year 2020 and a total of 7,105 new households in 2030 utilizing a straight line projection. The Township has projected a total of 2,420 housing units will be constructed by the year 2030. It should be noted that the projection does not include any housing potential for the Ciba Geigy Site or the Route 37 (Coates Pointe) redevelopment sites which are anticipated to produce some housing unit developments. It is unknown how many housing units will be developed at both of these locations. It should also be a noted that the anticipated housing unit potential for 2030 includes large sites under construction, with site plan approval, or in the concept stage. Infill development and housing units created through small lot subdivisions were not calculated in the projection count. Therefore the projected number should be considered a conservative number. A total of 4,685 households will have to be absorbed by other communities.

EXISTING LAND USES

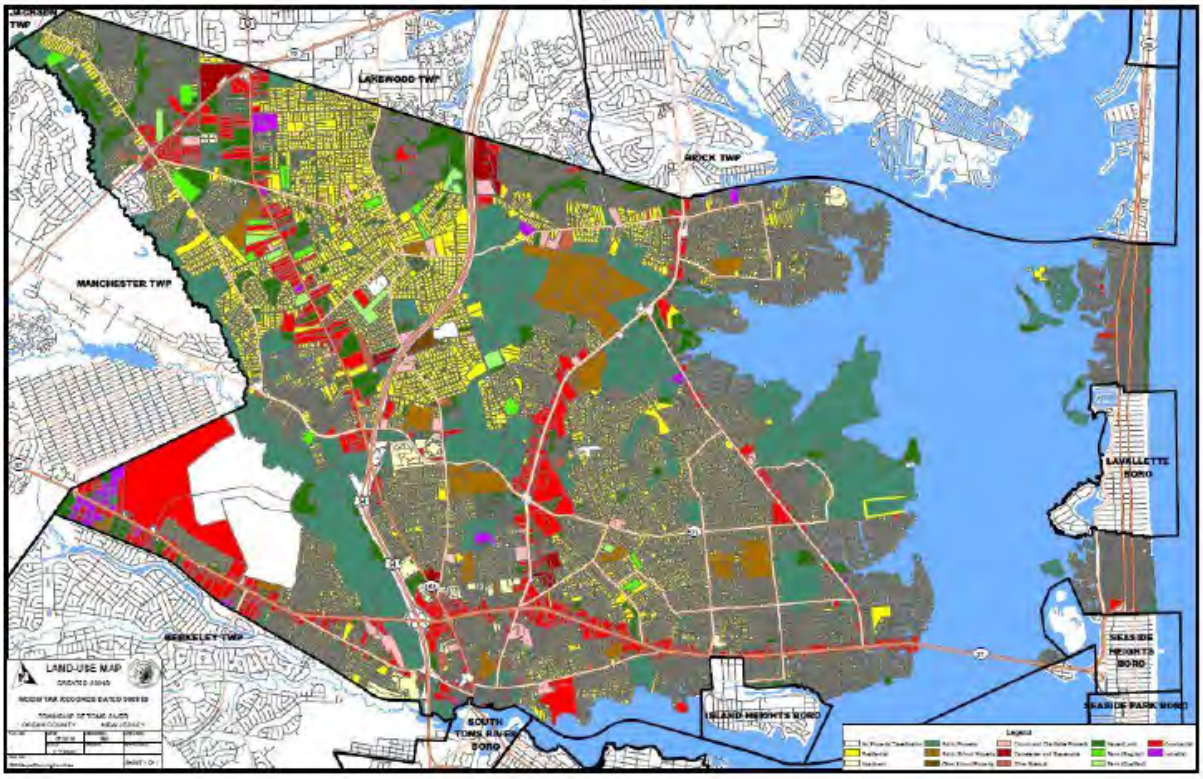


Figure 1: Preliminary Existing Land Use Map: Source MODIV Data

Stantec

Division of Community Development
Township of Toms River

The Township is predominantly built out, mostly with single family dwellings. The former Ciba Geigy property has the most vacant land available in the Township. The Township has 6 commercial corridors located on the mainland: Route 37 West, Route 37 East, Fischer Boulevard, Hooper Avenue, Route 70 and Route 9. The active industrial zone is located on Route 37 adjacent to the Manchester Border and former Ciba Geigy property. Preserved land is mostly located adjacent to the Barnegat Bay, Toms River, and Ocean County College.

APPENDIX G – CONCEPT PLAN FOR JACKSON CROSSING II, JACKSON TOWNSHIP

McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

Kevin P. McDonough (1953-1994)
John H. Rea, P.E.
Jay S. Troutman, Jr., P.E.
Scott T. Kennel

March 20, 2017

Ian M. Borden, PP
Professional Design Services
1245 Airport Road, Suite 1A
Lakewood, NJ 08701

Re: Jackson Crossing II
Lots 2-6, 19 & 20 in Block 3001
Jackson Township, Ocean County
MRA File No. 17-111

Dear Mr. Borden:

As requested, McDonough & Rea Associates (MRA) has reviewed a *Concept Plan* for *Jackson Crossing II*, an indoor/outdoor recreation facility proposed for the noted property. Specifically, we have been asked to evaluate the location with respect to the availability of the adjacent roadway network (County Route 537) to accommodate the development and have evaluated the proposed parking supply. The following represents our review.

TRAFFIC

The property is located on the south side of County Route 537 and will have a right-in/right-out access from and to the eastbound lanes of CR 537 just west of the Pine Road jughandle and signalized intersection. The *Concept Plan* you have prepared shows a 25,000 SF recreation center which will offer the following activities:

- Personal training and physical therapy
- Academic center, tutoring, meetings and seminars
- Birthday parties
- Summer camps
- Food service
- Video arcade

In addition to the 25,000 SF recreation center, a 99,000 SF building attached to the recreation center will contain 5 basketball courts and an indoor turf field measuring 270 feet by 170 feet. Also provided are 3 outdoor athletic fields to the south of the recreation center buildings and parking field.

Please reply to:
☒ 1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
☐ 105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

McDonough & Rea Associates, Inc.
Traffic and Transportation Consulting
1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-8673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

We understand that the proposed hours of operation are from 7:00 AM until 11:00 PM, 7 days per week.

CR 537 experiences high seasonal traffic volume fluctuations in this area due to it being the access roadway to *Six Flags Great Adventure* and the *Hurricane Harbor* waterpark. MRA anticipates that Monmouth County, which has jurisdiction over CR 537 in this area, and the Ocean County Planning Board will require conduct of summer traffic volumes in the area in order to evaluate the impact of this proposed facility.

Although summer seasonal volumes on CR 537 in the area are higher than non-summer volumes, it is important to note that the indoor recreation center will be more active during non-summer months as that is when the indoor facility will be most popular. Although there will be some indoor activity during summer months, it will be higher during non-summer months when physical activity on the outdoor fields is problematic.

CR 537 in this area is a median divided roadway providing for 3 westbound travel lanes and 2 eastbound travel lanes. Traffic approaching the site from the west will make a right turn into the proposed site driveway. Traffic approaching the site from the east will make a U-turn at the signalized jughandle intersection west of this property. The traffic will then travel in an easterly direction and make a right turn into the site driveway.

Traffic wishing to leave the site and travel west on CR 537 will need to utilize the near side jughandle at Pine Road in order to make a U-turn and return to the west.

Given the population density surrounding the site and the existence of Interstate 195 just to the north of the site, it is MRA's expectation that a significant majority of site generated traffic flows will be oriented to and from the east and north as opposed to the west and south. Therefore, utilization of the Pine Road jughandle for U-turning traffic to return to the west on CR 537 will not be significant in our opinion. Utilization of the signalized far side jughandle to the west for traffic entering the site from the north and east will be heavier; however, this far side jughandle has significant stacking capacity and is currently very lightly used.

In summary, the site for the proposed recreation center is appropriate from a traffic standpoint and is expected to not overburden the operation of the adjacent traffic signals and jughandles.

McDonough & Rea Associates, Inc.
Traffic and Transportation Consulting
1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

PARKING

The *Concept Plan* provided shows approximately 600 spaces surrounding the indoor recreation buildings and approximately an additional 70 spaces for the outdoor fields. MRA believes that such a parking supply will be more than adequate for this facility.

We have had experience in evaluating the parking needs of other indoor recreation facilities such as the *Monroe Sports and Recreation Center* on Perrineville Road off Route 33 in Monroe Township and the *Sportika* indoor sports facility currently under construction on Woodward Road in Manalapan Township. The Monroe facility contains a building of approximately 77,000 SF with indoor turf fields, basketball courts, etc. It has a paved parking supply of approximately 150 parking spaces with additional areas for overflow parking. The *Sportika* complex in Manalapan Township, which has a building larger than the one proposed for Jackson Township (approximately 145,000 SF versus 124,000 SF) provides for 394 parking spaces. The anticipated parking demand at this facility was evaluated through an analysis of the maximum number of participants and employees that may be within the building at any point in time. MRA therefore believes that the 600 parking spaces that can be provided surrounding the *Jackson Crossing II* building will be more than adequate and we further recommend that a substantial number of these spaces be *green banked* and only constructed if necessary.

CONCLUSIONS

The proposed location for the *Jackson Crossing II* recreation center on CR 537 is appropriate from both a traffic and parking perspective as the cross section of CR 537, and the signalized intersections east and west of the proposed site driveway, can adequately handle incoming and outgoing traffic flows from this facility. Furthermore, the property is substantial enough to provide for an adequate parking field for both the indoor building and the outdoor fields.

We hope the foregoing information is helpful.

Very truly yours,

John H. Rea, PE
Principal

Scott T. Kennel
Sr. Associate

cc: Vito Cardinale
Randy Johnson

STATEMENT OF OPERATION

Jackson Crossing II

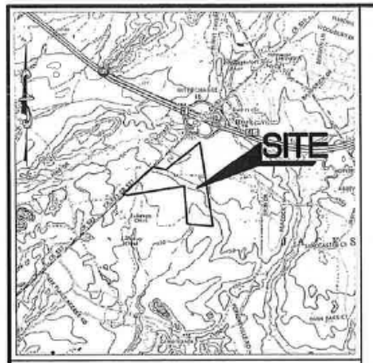
Preliminary and Final Major Site Plan
Block 3001 Lot 2
Jackson Township, Ocean County
PDS #16641

The first phase of Jackson Crossing II is an indoor recreational use comprised of indoor facilities providing sports & entertainment and outdoor fields. The mission is to provide varied sports and entertainment experiences with the following activities proposed:

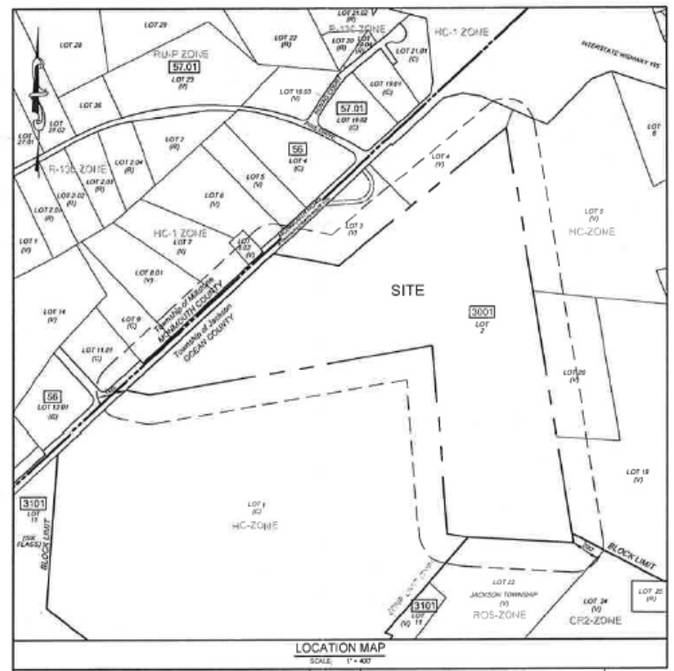
1. Indoor & Outdoor fields for soccer, lacrosse, football, baseball, softball and indoor courts for volleyball & basketball:
    - Training & development programs
    - Leagues
    - Competition
2. Personal Training & Physical Therapy
3. Academic center; tutoring, meetings & seminars
4. Birthday Parties
5. Summer camps
6. Food service
7. Video arcade
8. Public assembly

The normal hours of operation are typically from 7:00 a.m. until 11:00 p.m, seven (7) days per week.

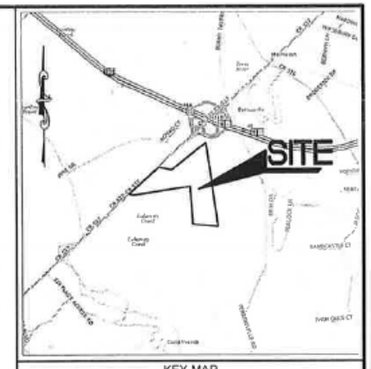
PRELIMINARY & FINAL - MAJOR SITE PLANS
FOR
JACKSON CROSSING II
BLOCK 3001 - LOT 2
TOWNSHIP OF JACKSON
OCEAN COUNTY NEW JERSEY



ZONE MAP
SCALE: 1" = 2000'



LOCATION MAP
SCALE: 1" = 400'



KEY MAP
SCALE: 1" = 2000'

PROPERTY OWNERS LIST

SUPPLIED BY THE TOWNSHIP OF JACKSON ON FEBRUARY 15, 2017

BLOCK 56, LOT 1
DEER TRAIL FARMS LLC
PLAZA DI AGRIFOGLIO ASSOC L.L.C
5 ATTENBURY PLACE
FREEHOLD, NJ 07728
959 MONMOUTH RD
OCEAN RIDGE NJ 08514

BLOCK 56, LOT 8
DEER TRAIL FARMS LLC
PLAZA DI AGRIFOGLIO ASSOC L.L.C
5 ATTENBURY PLACE
FREEHOLD, NJ 07728
959 MONMOUTH (RT)
OCEAN RIDGE NJ 08514

BLOCK 56, LOT 7
R/B FLAGS THEME PARKS INC C/O PTS
PLAZA DI AGRIFOGLIO ASSOC L.L.C
5 ATTENBURY PLACE
FREEHOLD, NJ 07728
PO BOX 540185
DALLAS TX 75354

BLOCK 56, LOT 8.01
PLAZA DI AGRIFOGLIO ASSOC L.L.C
5 ATTENBURY PLACE
FREEHOLD, NJ 07728
SIX FLAGS THEME PARKS INC C/O PTS
PO BOX 540185
DALLAS TX 75354

BLOCK 56, LOT 9
TOMCAT REALTY CO., L.L.C.
P.O. BOX 620
CLARKSBURG, NJ 08510
SIX FLAGS THEME PARKS INC C/O PTS
PO BOX 540185
DALLAS TX 75354

BLOCK 56, LOT 13.01
564 MONMOUTH ROAD HOLDING CO
3 CARLIN COURT
JAMESBURG, NJ 08831
SIX FLAGS THEME PARKS INC C/O PTS
PO BOX 540185
DALLAS TX 75354

SPLIT ENERGY
CUSTOMER SERVICE/ENGINEERING
571-575 MAIN STREET
ALLENHURST, NJ 07711
SIX FLAGS THEME PARKS INC C/O PTS
PO BOX 540185
DALLAS TX 75354

VERIZON
540 BROAD ST. 29TH FLOOR
NEWARK, NJ 07101
TOWNSHIP OF JACKSON
95 WEST VETERANS HWY
JACKSON, NJ 08527

PUBLIC SERVICE GAS & ELECTRIC
605 WHITEHEAD ROAD
LAWRENCE, NJ 08648
NJ NATURAL GAS CO
P. O. BOX 1464
WALL, NJ 07719

NJ NATURAL GAS
1415 WYCOFF ROAD
WALL, NJ 07719
JCP&L CO
300 MADISON AVE
P. O. BOX 1911
MORRISTOWN NJ 07962

MONMOUTH CABLEVISION
ATTN: CLAIRE O'GRADY
40 PINE STREET
TINTON FALLS, NJ 07753
MONMOUTH CABLEVISION ASSOC
1501 16TH AVE
P. O. BOX 58
WALL, NJ 07719

MILLSTONE TOWNSHIP CLERK
470 STAGECOACH ROAD
MILLSTONE TOWNSHIP, NJ 08510
VERIZON NEW JERSEY, INC
777 PARKWAY AVE
TRENTON, NJ 08618

NEW JERSEY DEPARTMENT OF TRANSPORTATION
1035 PARKWAY BOULEVARD
TRENTON, NJ 08625
OCEAN COUNTY
PLANNING BOARD
119 HOOPER AVENUE
TOMS RIVER, NJ 08753

MONMOUTH COUNTY PLANNING BOARD
HALL OF RECORDS
FREEHOLD, NJ 07728
MONMOUTH COUNTY CLERK
P.O. BOX 1251
FREEHOLD, NJ 07728

NOTIFY:
D. KLEE
OWEN, LITTLE & ASSOCIATES
443 ATLANTIC CITY BOULEVARD
BEACHWOOD, NJ 08722

OCEAN COUNTY PLANNING BOARD
129 HOOPER AVENUE
TOMS RIVER, NJ 08753

UTILITIES:
NJ NATURAL GAS COMPANY
PO BOX 1464
WALL, NJ 07719

JCP&L COMPANY
300 MADISON AVENUE
MORRISTOWN, NJ 07962

MONMOUTH CABLEVISION ASSOCIATION
1501 16TH AVENUE
WALL TOWNSHIP, NJ 07719

VERIZON NEW JERSEY, INC
777 PARKWAY AVENUE
TRENTON, NJ 08618

APPROVED BY:
THE JACKSON TOWNSHIP
ZONING BOARD

BOARD CHAIRMAN DATE

BOARD SECRETARY DATE

BOARD ENGINEER DATE

SHEET INDEX

No.	DESCRIPTION
1	COVER SHEET
2	OVERALL SITE PLAN
3	SITE PLAN
4	SITE PLAN
5	SITE PLAN
6	OVERALL GRADING PLAN
7	OVERALL STORM DRAINAGE PLAN
8	GRADING & STORM DRAINAGE PLAN
9	GRADING & STORM DRAINAGE PLAN
10	GRADING & STORM DRAINAGE PLAN
11	UTILITY PLAN
12	LANDSCAPE PLAN & DETAILS
13	LANDSCAPE PLAN
14	LANDSCAPE PLAN
15	OVERALL LIGHTING PLAN
16	CONSTRUCTION DETAILS
17	CONSTRUCTION DETAILS
18	CONSTRUCTION DETAILS

SHEET INDEX

No.	DESCRIPTION
19	PRE-DEVELOPMENT DRAINAGE AREA PLAN
20	POST-DEVELOPMENT DRAINAGE AREA PLAN
21	COLLECTION SYSTEM DRAINAGE AREA PLAN
22	SOIL EROSION & SEDIMENT CONTROL PLAN
23	SOIL EROSION & SEDIMENT CONTROL NOTES & DETAILS

SUPPLEMENTAL DRAWINGS

No.	DESCRIPTION
1 OF 1	TRANSITION AREA WAIVER - AVERAGING PLAN

JACKSON LAND USE ZONE

HC	HIGHWAY COMMERCIAL
ROS	RECREATION AND OPEN SPACE
CR-2	COMMERCIAL RECREATION 2

MILLSTONE LAND USE ZONE

RU-P	RURAL PRESERVATION
R-130	RURAL RESIDENTIAL
HC-1	HIGHWAY COMMERCIAL

LAND USE

(C)	COMMERCIAL
(R)	RESIDENTIAL
(V)	VACANT

250 0 250 500 1000
GRAPHIC SCALE
1" = 250'

GENERAL NOTES

1. PROPERTY IS KNOWN AS BLOCK 3001 – LOT 2 AS SHOWN ON THE JACKSON TOWNSHIP TAX MAP SHEET 30 AND CONTAINS 75.29 ACRES.
2. OUTBOUND INFORMATION TAKEN FROM A MAP ENTITLED "BOUNDARY & TOPOGRAPHIC SURVEY OF TAX LOTS 3 – TAX BLOCK 3001, TOWNSHIP OF JACKSON, OCEAN COUNTY, NEW JERSEY," AS PREPARED BY PROFESSIONAL DESIGN SURVEYING, LLC, DATED, 2017.
3. THE PROPERTY IS CURRENTLY LOCATED WITHIN THE HC, HIGHWAY COMMERCIAL ZONE.
4. IT IS PROPOSED TO CONSTRUCT A NEW INDOOR COMMERCIAL HEALTH/RECREATIONAL FACILITY AND COMMERCIAL RECREATION USE. THE PROPOSED USES ARE PERMITTED IN THE HIGHWAY COMMERCIAL ZONE UNDER §244-57.
5. THE WETLANDS BOUNDARY HAS BEEN VERIFIED BY THE NJDEP ON JULY 16, 2014 – FILE NUMBER 1515-13-0015.1.
6. POTABLE WATER SERVICE IS TO BE PROVIDED BY PRIVATE WELL.
7. SEWAGE DISPOSAL TO BE PROVIDED BY THE JACKSON TOWNSHIP MUNICIPAL AUTHORITY. SEWAGE DISPOSAL FOR MAIN BUILDING, FIELD COMFORT STATION TO BE PROVIDED BY SEPTIC SYSTEM.
8. ALL UTILITIES (ELECTRIC, TELEPHONE, ETC.) TO BE PROVIDED UNDERGROUND. THE CONTRACTOR MUST VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
9. SOLID WASTE IS TO BE PICKED UP BY A PRIVATE GARBAGE HAULER. THE REFUSE AREA SHALL CONTAIN AN AREA FOR THE COLLECTION OF RECYCLABLE MATERIALS.
10. MAINTENANCE OF THE STORMWATER SYSTEM SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER AND SUBJECT TO INSPECTION BY THE TOWNSHIP OF JACKSON.
11. ALL TRAFFIC CONTROL SIGNAGE INCLUDING PAVEMENT MARKINGS WILL BE PROVIDED IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
12. ALL DISTURBED AREAS WILL BE VEGETATIVELY STABILIZED IN ACCORDANCE WITH THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN UPON COMPLETION OF THE GRADING ACTIVITIES.
13. EXISTING CONDITIONS AND DIMENSIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
14. ALL CONSTRUCTION TO BE IN CONFORMANCE WITH APPLICABLE CODES, ORDINANCES AND MANUFACTURER'S REQUIREMENTS.
15. TRAFFIC DIRECTION ARROWS, FIRE LANE MARKINGS, ETC. SHALL BE IN CONFORMANCE WITH JACKSON TOWNSHIP FIRE PREVENTION BUREAU AND TOWNSHIP ENGINEERING DEPARTMENT REQUIREMENTS.
16. THE OWNER OR HIS REPRESENTATIVE, IS TO DESIGNATE AN INDIVIDUAL RESPONSIBLE FOR CONSTRUCTION SITE SAFETY DURING THE COURSE OF SITE IMPROVEMENTS PURSUANT TO NJAC 5:23-2.21(a) OF THE NJ UNIFORM CONSTRUCTION CODE AND CFR 1926.32(f) (OSHA COMPETENT PERSON). PROFESSIONAL DESIGN SERVICES, LLC ASSUMES NO RESPONSIBILITY FOR CONSTRUCTION SITE SAFETY.
17. ALL HANDICAP PARKING SPACES SHALL BE CONSTRUCTED TO MEET ADA REQUIREMENTS.

OWNER / APPLICANT

CARDINALE & JACKSON CROSSING 2
23 SOUTH HOPE CHAPEL ROAD, SUITE 203
JACKSON, NJ 08527

NO.	DATE	DESCRIPTION	BY

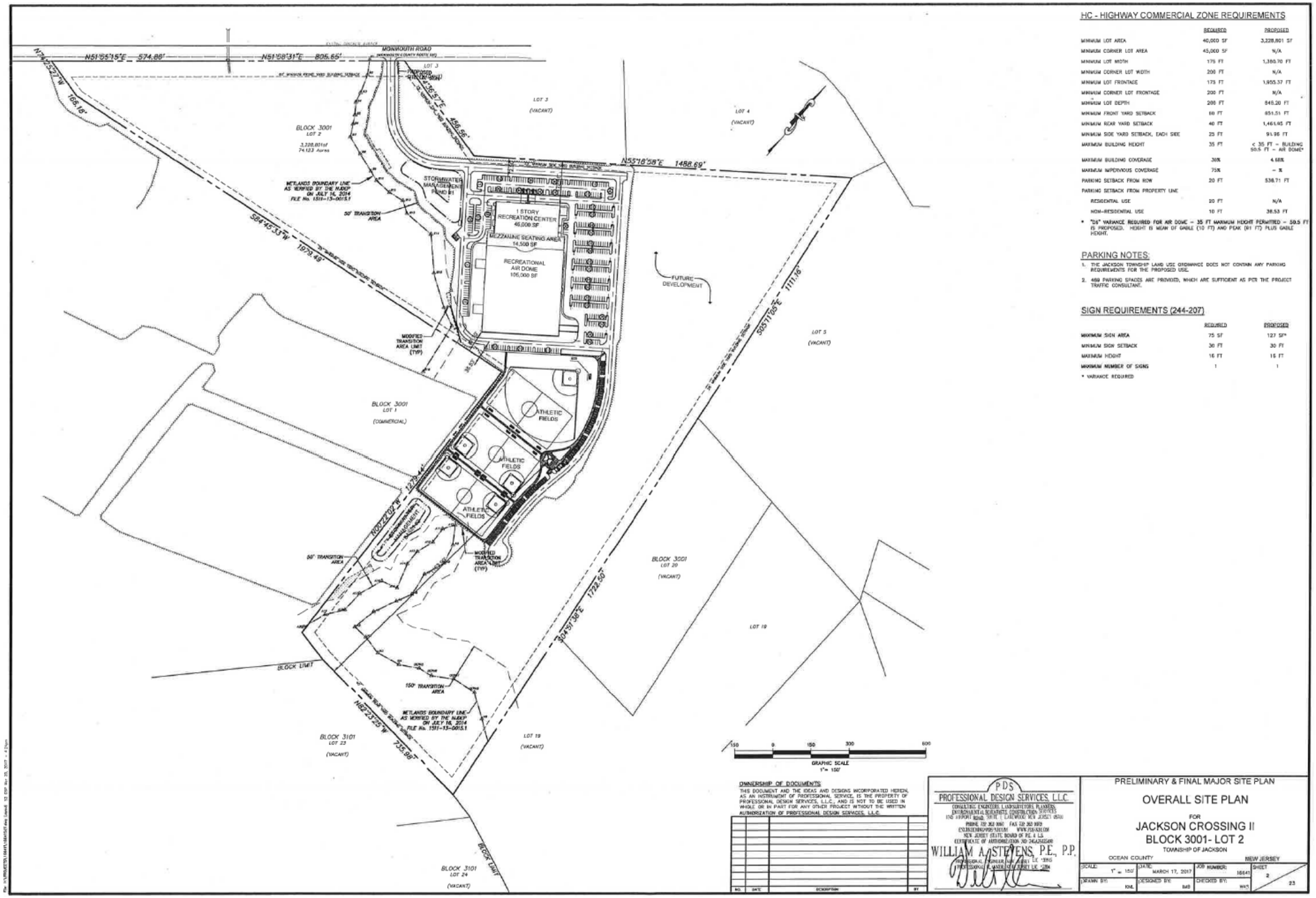
PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1750 AIRPORT ROAD, SUITE 1 | LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 1166 FAX 732 363 0973
LICENSED IN NJ/PA/DE/MD/NY WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA27935400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER AND PLANNER IN NEW JERSEY, NEW YORK & PENNSYLVANIA

PRELIMINARY & FINAL MAJOR SITE PLAN

COVER SHEET

FOR
JACKSON CROSSING II
BLOCK 3001- LOT 2
TOWNSHIP OF JACKSON
OCEAN COUNTY NEW JERSEY

SCALE: 1" = 40'	DATE: MARCH 17, 2017	JOB NUMBER: 16615	SHEET 1 / 23
DRAWN BY: KNL	DESIGNED BY: MB	CHECKED BY: WAS	



HC - HIGHWAY COMMERCIAL ZONE REQUIREMENTS

	REQUIRED	PROPOSED
MINIMUM LOT AREA	40,000 SF	3,228,801 SF
MINIMUM CORNER LOT AREA	45,000 SF	N/A
MINIMUM LOT WIDTH	175 FT	1,350.70 FT
MINIMUM CORNER LOT WIDTH	200 FT	N/A
MINIMUM LOT FRONTAGE	175 FT	1,955.37 FT
MINIMUM CORNER LOT FRONTAGE	200 FT	N/A
MINIMUM LOT DEPTH	200 FT	845.20 FT
MINIMUM FRONT YARD SETBACK	80 FT	851.51 FT
MINIMUM REAR YARD SETBACK	40 FT	1,461.95 FT
MINIMUM SIDE YARD SETBACK, EACH SIDE	25 FT	91.96 FT
MAXIMUM BUILDING HEIGHT	35 FT	≤ 35 FT – BUILDING 50.5 FT – AIR DOME*
MAXIMUM BUILDING COVERAGE	30%	4.68%
MAXIMUM IMPERVIOUS COVERAGE	75%	– %
PARKING SETBACK FROM ROW	20 FT	538.71 FT
PARKING SETBACK FROM PROPERTY LINE		
RESIDENTIAL USE	20 FT	N/A
NON-RESIDENTIAL USE	10 FT	38.53 FT

* "D5" VARIANCE REQUIRED FOR AIR DOME – 35 FT MAXIMUM HEIGHT PERMITTED – 50.5 FT IS PROPOSED. HEIGHT IS MEAN OF GABLE (10 FT) AND PEAK (81 FT) PLUS GABLE HEIGHT.

PARKING NOTES:

1. THE JACKSON TOWNSHIP LAND USE ORDINANCE DOES NOT CONTAIN ANY PARKING REQUIREMENTS FOR THE PROPOSED USE.
2. 469 PARKING SPACES ARE PROVIDED, WHICH ARE SUFFICIENT AS PER THE PROJECT TRAFFIC CONSULTANT.

SIGN REQUIREMENTS (244-207)

	REQUIRED	PROPOSED
MAXIMUM SIGN AREA	75 SF	127 SF*
MINIMUM SIGN SETBACK	30 FT	30 FT
MAXIMUM HEIGHT	15 FT	15 FT
MAXIMUM NUMBER OF SIGNS	1	1

* VARIANCE REQUIRED

OWNERSHIP OF DOCUMENTS

THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PROFESSIONAL DESIGN SERVICES, L.L.C. AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PROFESSIONAL DESIGN SERVICES, L.L.C.

NO.	DATE	DESCRIPTION	BY

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
AND REPORTS 1040 STATE ROUTE 9 CAPE MAY COURT HOUSE, NEW JERSEY 08210
PHONE: 609 463 0460 FAX: 609 463 0469
EMAIL: INFO@PDSNJ.COM WWW.PDSNJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28025400

WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER AND PLANNER, NEW JERSEY LIC. #39615
PROFESSIONAL PLANNER, NEW JERSEY LIC. #3584

PRELIMINARY & FINAL MAJOR SITE PLAN

OVERALL SITE PLAN

FOR

JACKSON CROSSING II
BLOCK 3001- LOT 2

TOWNSHIP OF JACKSON

OCEAN COUNTY NEW JERSEY

SCALE: 1" = 150'	DATE: MARCH 17, 2017	JOB NUMBER: 16641	SHEET 2 / 23
DRAWN BY: KNL	DESIGNED BY: MS	CHECKED BY: WAS	

Stantec

APPENDIX H – HIGHWAY IMPROVEMENT WISH LIST FOR THE FOUR TOWNSHIPS

The wish-list items / proposed improvements were either submitted by the four townships or developed based on the model estimated hot-spot locations that were validated through the analysis.

LAKEWOOD TOWNSHIP

A coordinated effort has been conducted between Ocean County and Lakewood Township to prepare the proposed improvements to alleviate congestion in Lakewood Township. Table 1 shows a series of improvements obtained from "Draft – Progress Submission – Transportation Improvement Study" for Lakewood Township and prepared by MASER Consulting, P.A. The improvements listed in Table 1 are only a subset of all improvements proposed in the above study. The complete list of proposed improvements is provided in Appendix C. Many improvements, such as traffic signal and intersections improvements, cannot be evaluated accurately in the Regional / County Model, and they are better suited for microsimulation models. Those improvements were excluded in this analysis.

Table 1 Proposed Improvements for Lakewood Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[(1)]	Proposed Improvements	Improved V/C Ratio[(2)]
Oak Street Corridor	County	From US-9 to New Hampshire Avenue (CR 623)	1	1.0	Add TWLTL	0.7
Pine Street Corridor	County	From Marc Dr. to Avenue of States	1	1.1	Add TWLTL	0.7
Prospect Street (CR 628) Corridor	County	From Cross St. to US 9	1	1.1	Add TWLTL	0.7
Kennedy Blvd.	County	From US-9 to Squankum Rd.	1	1.2	Add TWLTL	0.8
Route 88	County	From Railroad St. to New Hampshire Ave.	1	1.0	Add TWLTL	0.7
Vine Street Extension	County	From Cedar Bridge Ave. (CR 528) to Pine Street	N/A	N/A	Extend Vine Street	N/A
Massachusetts Avenue(CR 637) and Sunset Road Extension	County	Massachusetts Ave. From Prospect St. (CR 628) to James St. (CR 32); Sunset Rd. from Rt. 70 to N. Lake Dr.	N/A	N/A	Extend Massachusetts Avenue(CR 637) and Sunset Road	N/A
Hurley Avenue(CR 528) Extension	County	From Cedar Bridge Ave. (CR 528) / Route 88 to Lexington Ave./Railroad St.	N/A	N/A	Extend Hurley Avenue	N/A
New Hampshire Avenue(CR 623) Extension	County	From New Hampshire Ave. to Brook Rd.	N/A	N/A	Extend New Hampshire Road (Lakewood Bypass Phase 1)	N/A
Locust Avenue Extension	County	From Locust Ave. to Lakewood Farmingdale Rd.	N/A	N/A	Extend Locust Avenue (Lakewood Bypass Phase 2)	N/A

Note: TWLTL = Two-Way Left Turn Lane
(1)Model estimated V/C Ratio for 2040 PM Peak.
(2)V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic)

In addition to the above list, additional "wish list" improvements along major corridors were also added, the improvements locations were selected using the estimated 2040 hot-spot locations, shown in Figure 5.14 and Table 5.9, as a guidance. Table 2 shows the model estimated volume capacity ratios during PM Peak Period, where the congestion is at its worst, at these selected locations, as well as its corresponding proposed improvements. Figure 1 shows the locations of the improvements.

Table 2 Additional "Wish List" Improvements for Lakewood Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
US 9	NJDOT	Between County Line Rd. and Central Ave.	2	1.1	Add one lane per direction	0.87
		Between Central Ave. and Indian Head Rd.	1	1.4	Add one lane per direction	0.80
NJ 70	NJDOT	Between US 9 and Garden State Parkway	2	1.1	Add one lane per direction	0.80
County Line Road	County	Between Heathwood Ave. and Ridge Ave.	1	1.2	Add one lane per direction	0.65
Cross Street	County	Between E. Veteran Highway and US 9	1	1.0	Add one lane per direction	0.50
Central Ave.	County	Between Cross St. and US 9	1	1.2	Add one lane per direction	0.85

Note:
[1]Model estimated V/C Ratio for 2040 PM Peak at the congested location.
[2]Estmated V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic)

While the segment of Cross Street between Prospect Street and Massachusetts Avenue does not demonstrate diminished capacity due to future growth, as shown in Figure 2 and 4, it is anticipated that this segment will be improved consistent with the segments of roadway east and west of this segment as validated through a microsimulation.

It is important to note that all proposed improvements shown in Table 1 and Table 2 require further analysis to determine the ultimate final configuration.

Figure 1 – "Wish-list" Improvement Locations in Lakewood Township

The model estimated V/C ratio shown in Table 2 was obtained from the 2040 PM Peak model results at one location along the corresponding corridor. This location was deemed to be representative of the congestion level at this corridor. The selection of this segment was based on professional judgement. The "improved V/C ratio" shown in the same table is an estimated V/C ratio after the corresponding improvements are executed. The estimate also assumed that there is no traffic diversion caused by the improvement. In other words, the traffic demand along the corridor is assumed to be constant. In reality, traffic is dynamic and travelers will find a better and more attractive route. The improved roadways are usually better and more attractive and, therefore, they will divert traffic from their competing roadways. The traffic diversion is discussed later in this section.

The proposed improvements shown in Table 1 and 2 were applied to the 2025 model year scenario to assess the short-term impact of these improvements. The scenario with the improvements is referred as the "Build" scenario, while the original 2025 model is referred as the "No-Build" scenario. Figure 2 shows the comparison of hot-spots location between no-build (without improvements) and build (with improvements) scenarios during PM Peak Period. PM Peak period is selected for comparison because its congestion level is higher than the AM Peak Period. This comparison shows

that congestion on the following corridors were partially of fully relieved by implementing the improvements listed in Table 1 and 2 above:

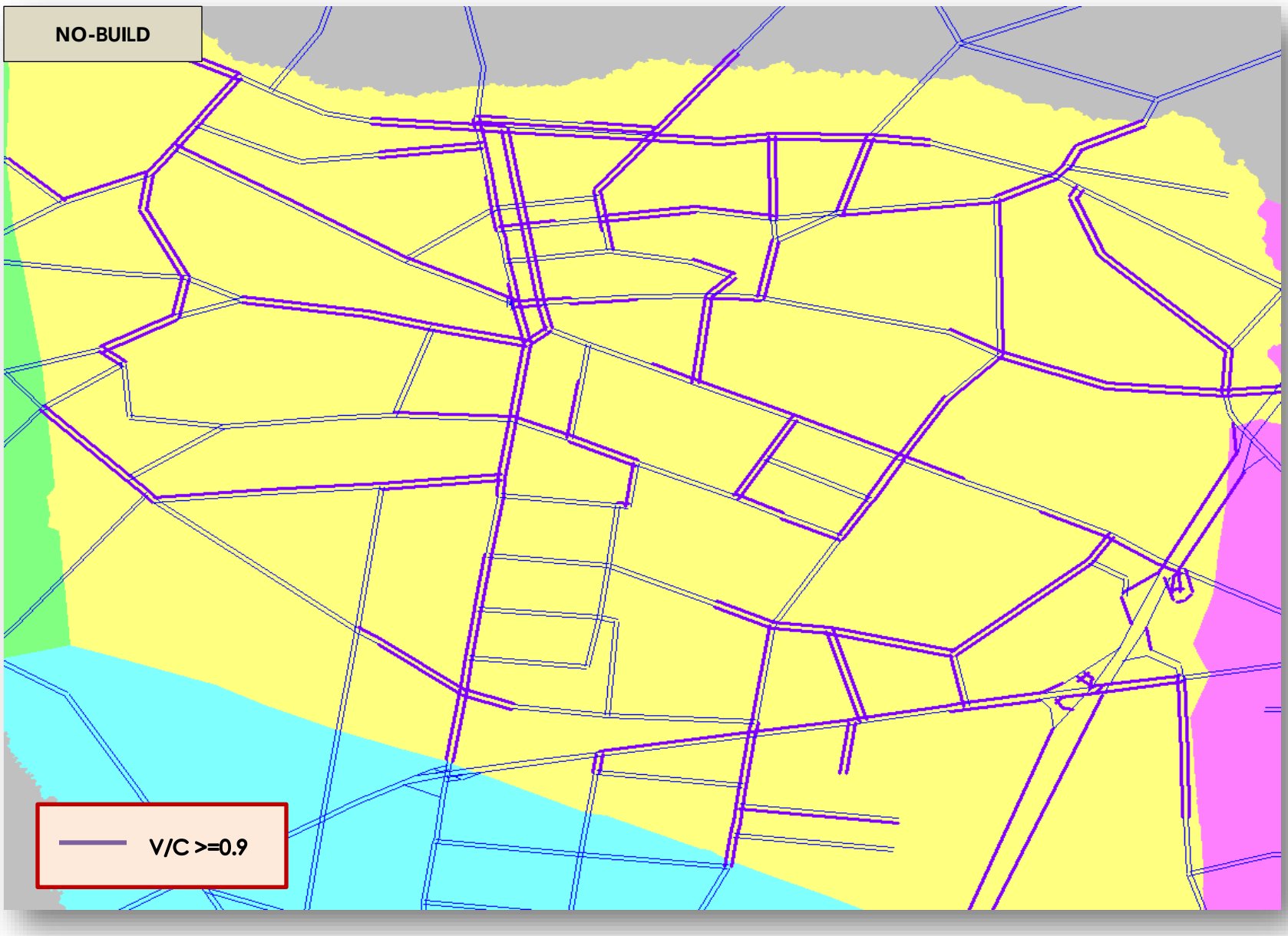
- US 9
- Route 88
- NJ 70
- County Line Rd. and Kennedy Blvd.
- Central Ave. / New Egypt Rd.
- Pine St. Corridor
- Prospect St.

The above roadway improvements do not only mitigate the congestion along the improved roadway segments, but they also divert traffic from one roadway to another. Figure 3 shows the diversion pattern caused by these improvements. As expected, the roadway extension projects, such as Vine Street Extension, Massachusetts Avenue Extension, and New Hampshire Avenue extension would draw more traffic since these new roadway extensions would provide better access routes between roadways. For example, Massachusetts Avenue extension and Sunset Road Extension, which is parallel to US 9, will provide an alternative route to travel between US 9 and Prospect / Cross Street, in the south, and N. Lake Drive, in the North, and eventually back to US 9, while avoiding all the congestion along Route 9 in downtown Lakewood. The Lakewood Bypass, combined with County Line Road extension will also provide a more direct access from Route 88 east of New Hampshire Ave. to US 9. The US 9 widening north of Route 88 will divert some traffic from Clifton Ave. As the corridors improved, expectedly, they will divert traffic from the more congested roadways. The traffic pattern shown in Figure 6.2 exhibits ***cumulative impacts*** or ***combined impact*** of those corridor improvements. Some improvements may draw more traffic into specific corridors, while reduce traffic in other corridors. Please also note that impact of the roadway improvements is not only limited to internal traffic within Lakewood, they also divert or impact some external traffic that pass through Lakewood. The impact of individual improvement was not analyzed in this study, and it is more suitable to be analyzed using a more refined modeling tool, such as microsimulation model.

To assess the long-term impact of these improvements, the 2040 build scenario was prepared and executed. The estimated hot-spot locations for the 2040 build scenario are compared to the no-build scenario and shown in Figure 4. The level of congestion in 2040 is slightly worse than the 2025 condition. The estimated traffic diversion pattern due to these improvements is shown in Figure 5. As expected the improved roadways attracted more traffic from their competing roadways. For example, the improved US 9 diverted some traffic from Clifton Ave, and to a lesser extent, from New Hampshire Ave.

As previously mentioned that only limited improvements can be modeled in the regional / county model. Projects, such as traffic signal and intersection improvements, cannot be modeled accurately by the regional model, and they are not included in the analysis. Combining the above roadway improvements with traffic signal and intersection improvements will only reduce the level of congestion further.

Figure 2 PM Peak Hot-Spot Comparison for 2025 Scenarios in Lakewood Township



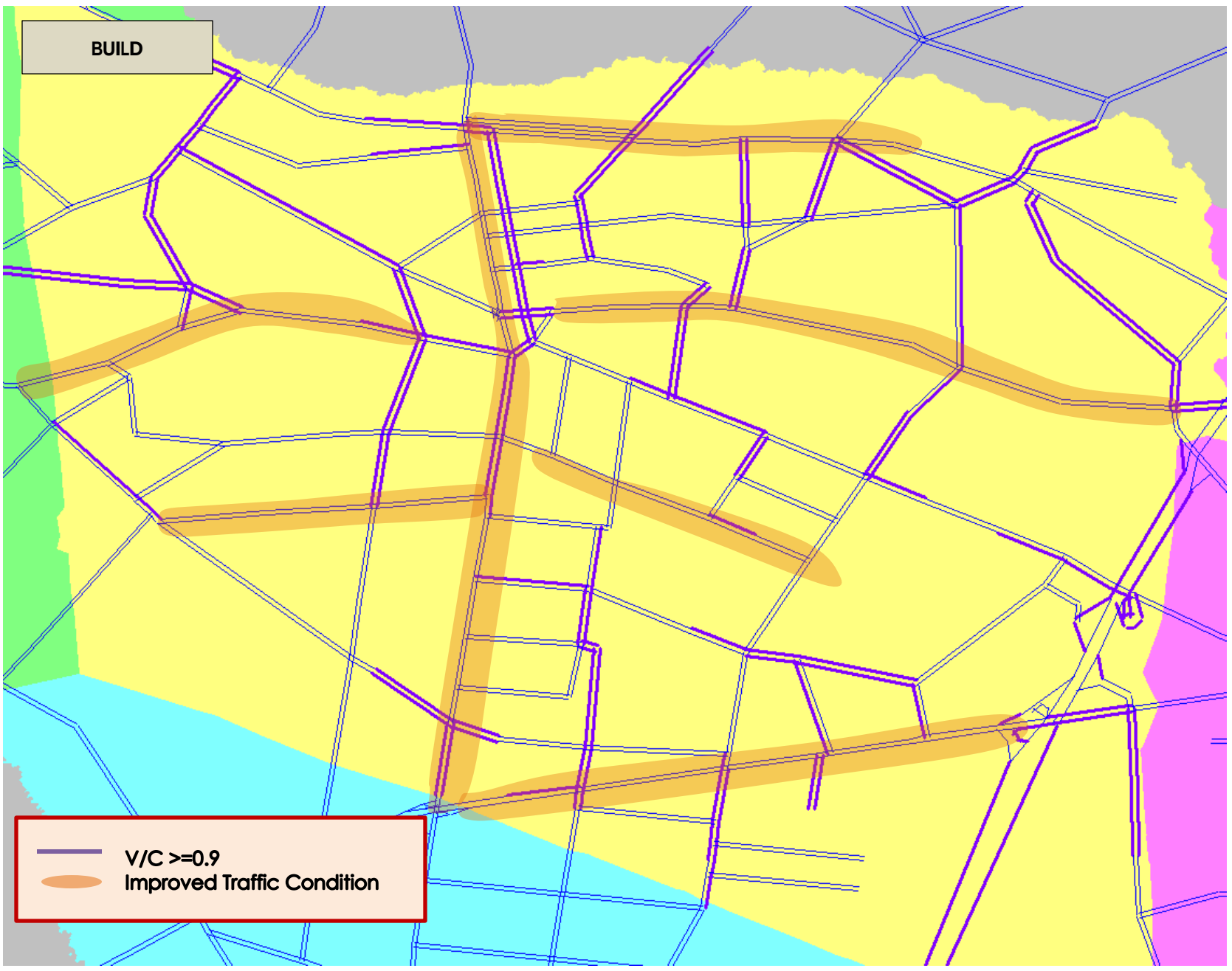


Figure 3 Model Estimated Traffic Diversion Pattern during PM Peak Period for 2025 Model Year – Lakewood Township

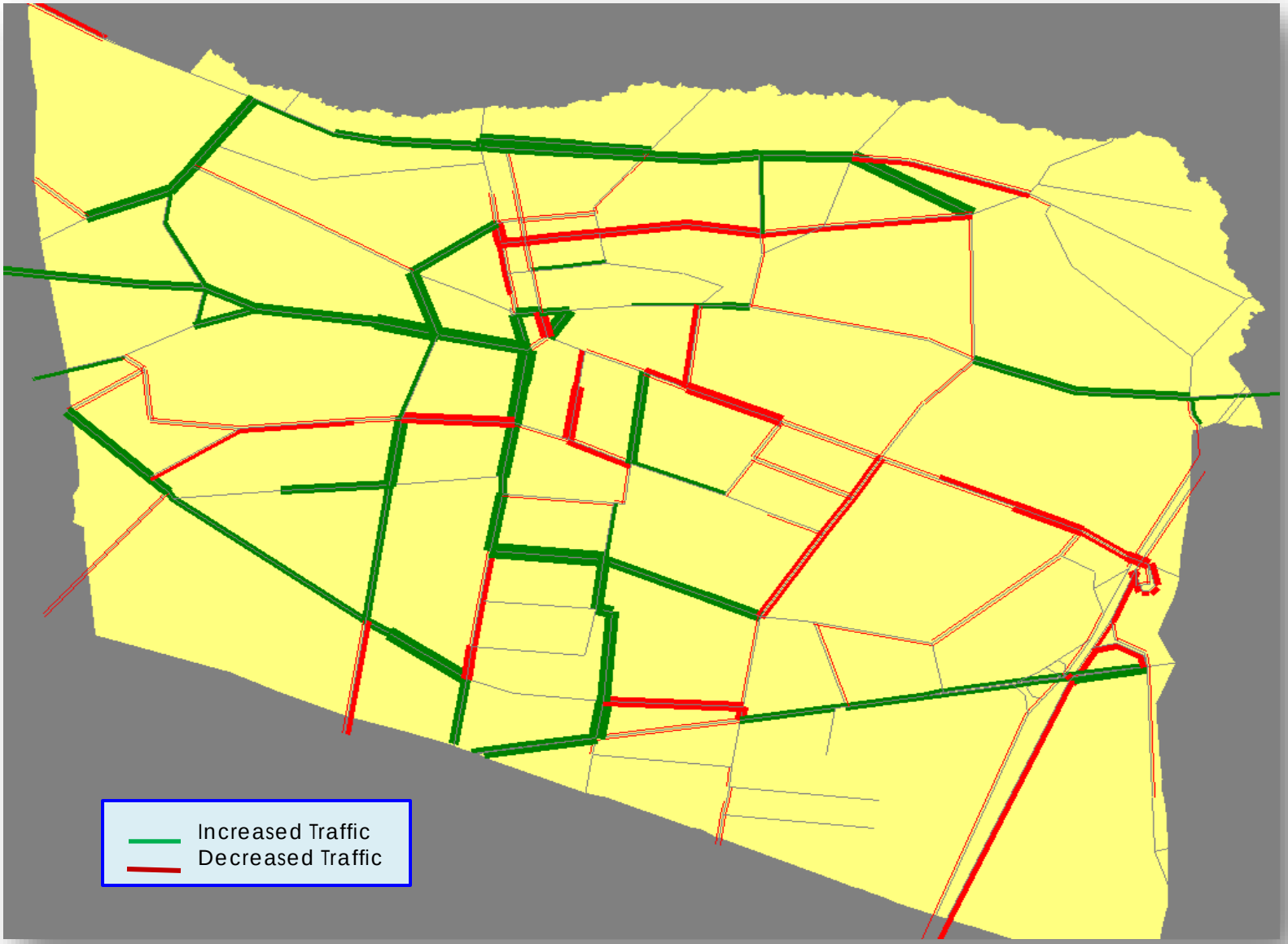


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Figure 4 PM Peak Hot-Spot Comparison for 2040 Scenarios in Lakewood Township

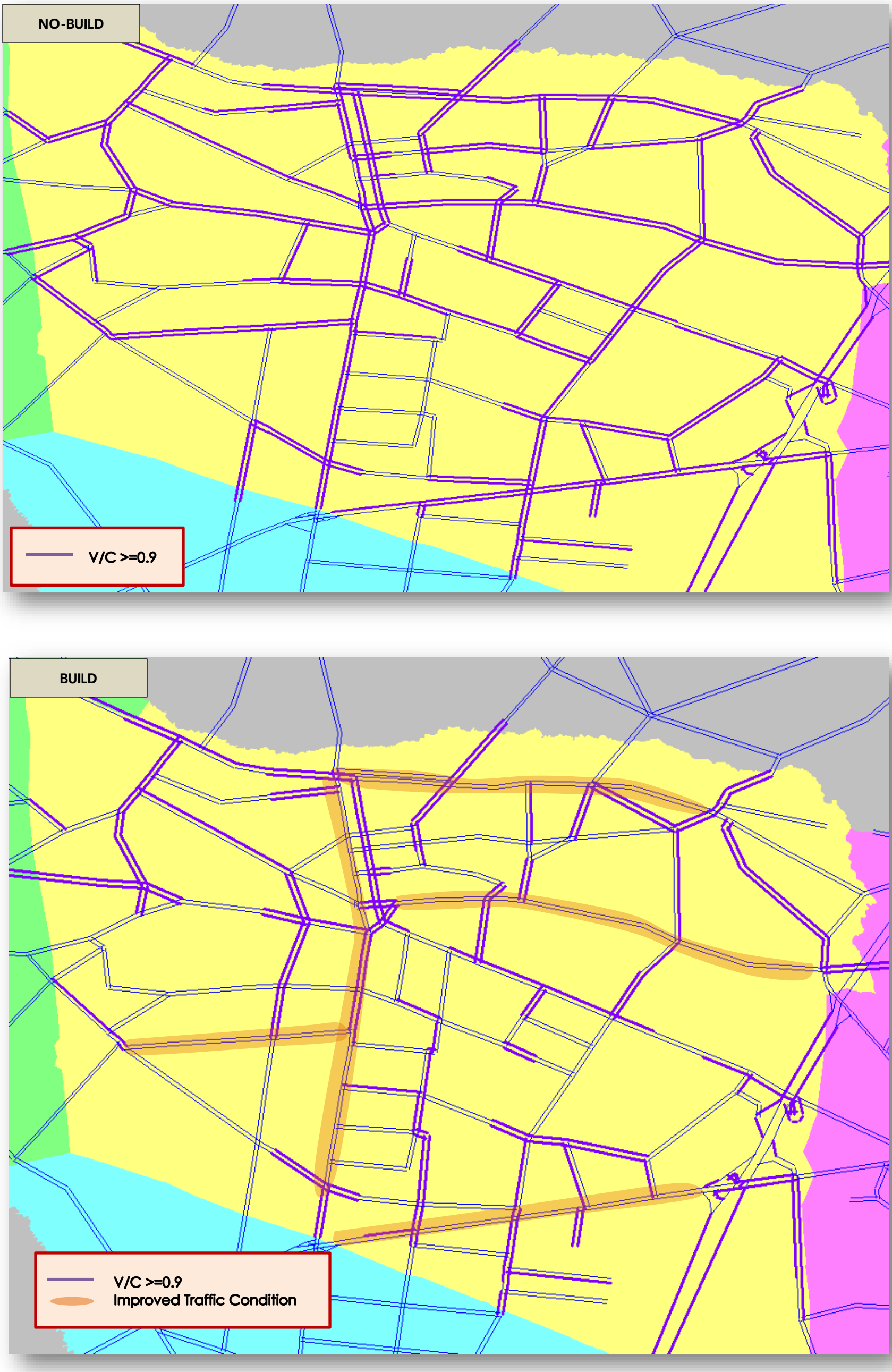
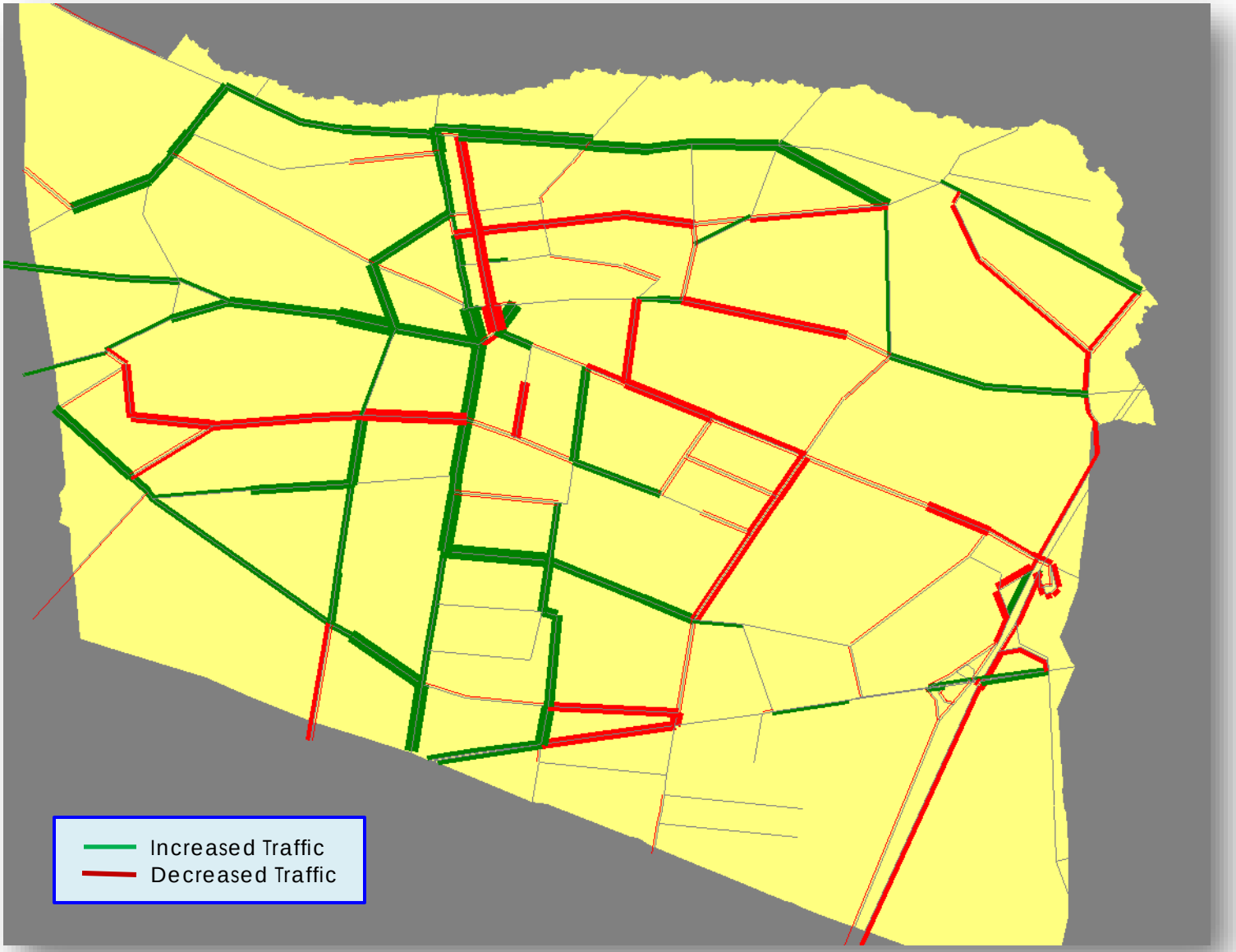


Figure 5 Model Estimated Traffic Diversion Pattern during PM Peak Period for 2040 Model Year



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TOMS RIVER TOWNSHIP

The "wish list" improvements for Toms River township were prepared based on current hot-spot locations, observed and estimated, described in Section 4, and model estimated future hot-spot locations presented in Chapter 5. The proposed improvements are listed in Table 3.

Table 3 Proposed "Wish List" Improvements for Toms River Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
Hooper Ave. / Brick Blvd.	County	Between NJ 37 and Church Rd.	2 Lanes with median	1.2	Traffic Signal Improvements	N/A
Whitesville Rd.	County	Between Rideway Rd. and NJ 70	1	1.3	Add one lane per direction	0.65
NJ 70	NJDOT	Between Whitesville Rd. and US 9	1 and 2	1.5	Add one lane per direction	0.75

Note:
[1]Model estimated V/C Ratio for 2040 PM Peak along the congested locations.
[2]Estimated V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic), and TWLTL is assumed to add ½ lanes capacity to the roadway.

Hooper Ave. / Brick Blvd is currently a divided roadway with jug handles throughout. The roadway consists of two lane per-direction. With the current configuration, improving traffic signal optimization, may alleviate the congestion problem along this corridor. Since the County Model will not be able to estimate the impact of traffic signal optimization or improvements accurately, this improvement was not coded / included. A microsimulation model is a more suitable tool to assess the impact of these improvements than the macroscopic county model.

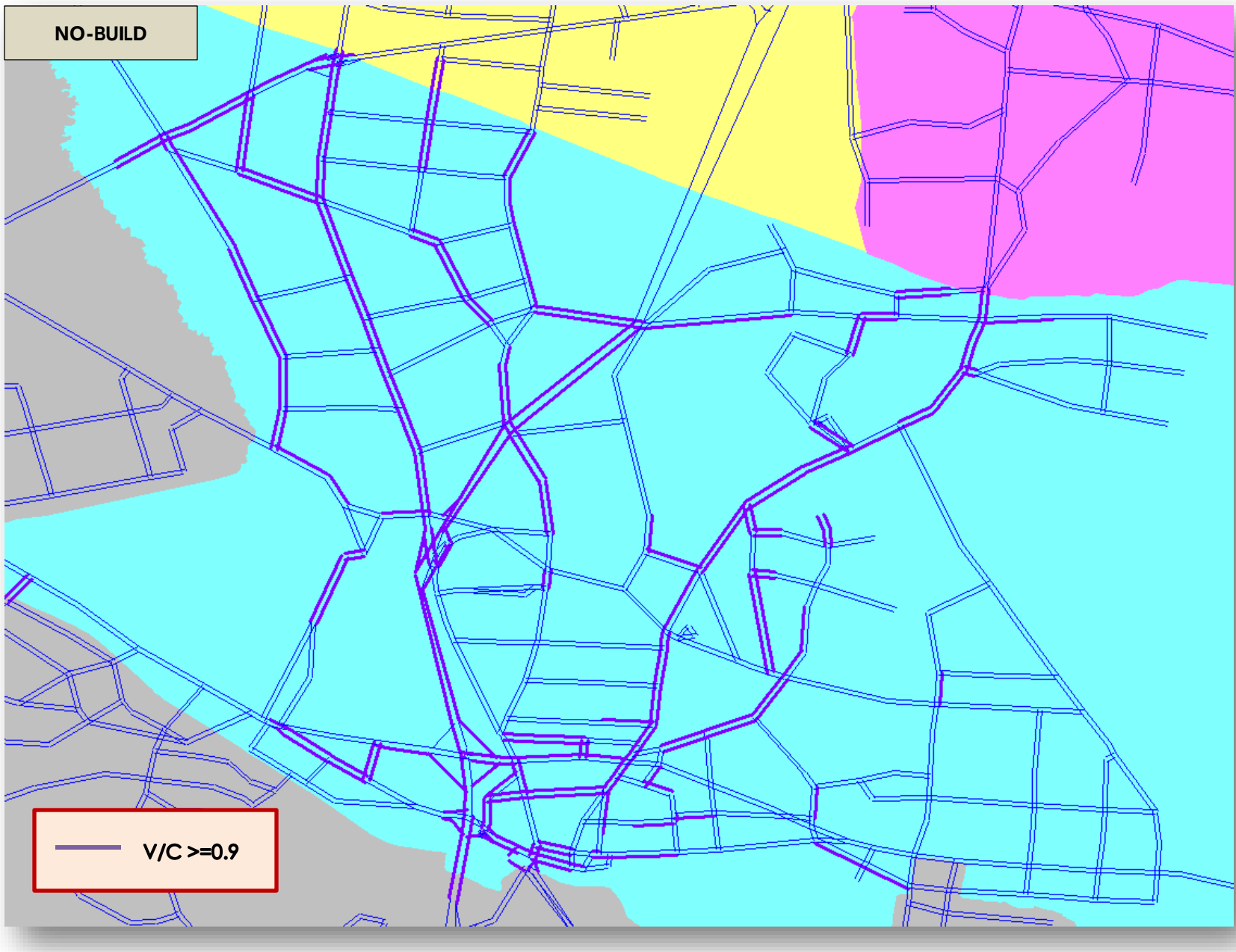
The short-term and long-term impacts of these improvements were evaluated by executing the 2025 and 2040 model years, respectively. The build and no-build scenarios were prepared for each model year, and the results were compared. Figure 6 shows the comparison of the hot-spot locations between the 2025 build and no-build scenarios, and Table 7 shows the traffic diversion pattern during PM Peak period for the 2025 model year.

As expected, the widening of US 9 (included in the Lakewood Wish List), US 9 attracted more traffic and diverted some traffic some its competing roadways, such as New Hampshire Ave. and Old Freehold Rd. Widening on Hooper Ave. / Brick Blvd. also attracted more traffic to this improved facility. As a result, the congestion level along this facility does not improve significantly.

The long-term impact of these improvements was evaluated by comparing the no-build and build scenarios of the 2040 model year. Figure 8 shows the comparison of the congestion level between the build and no-build scenarios, and Figure 9 shows the traffic diversion pattern between these two scenarios. Similarly, the widening of US 9 and Hooper Ave. attracted more traffic from surrounding roadways to these improved facilities. Interestingly, the widening along NJ 70 between Whitesville Rd. and US 9 did not attract more traffic, instead the traffic decreases along this segment. It should be noted, that the evaluation was performed for "all projects". Assessment of an individual project may yield a slightly different result.

It is important to note that all proposed improvements shown in Table 3 require further analysis to determine the ultimate final configuration.

Figure 6 PM Peak Hot-Spot Comparison for 2025 Scenarios in Toms River Township



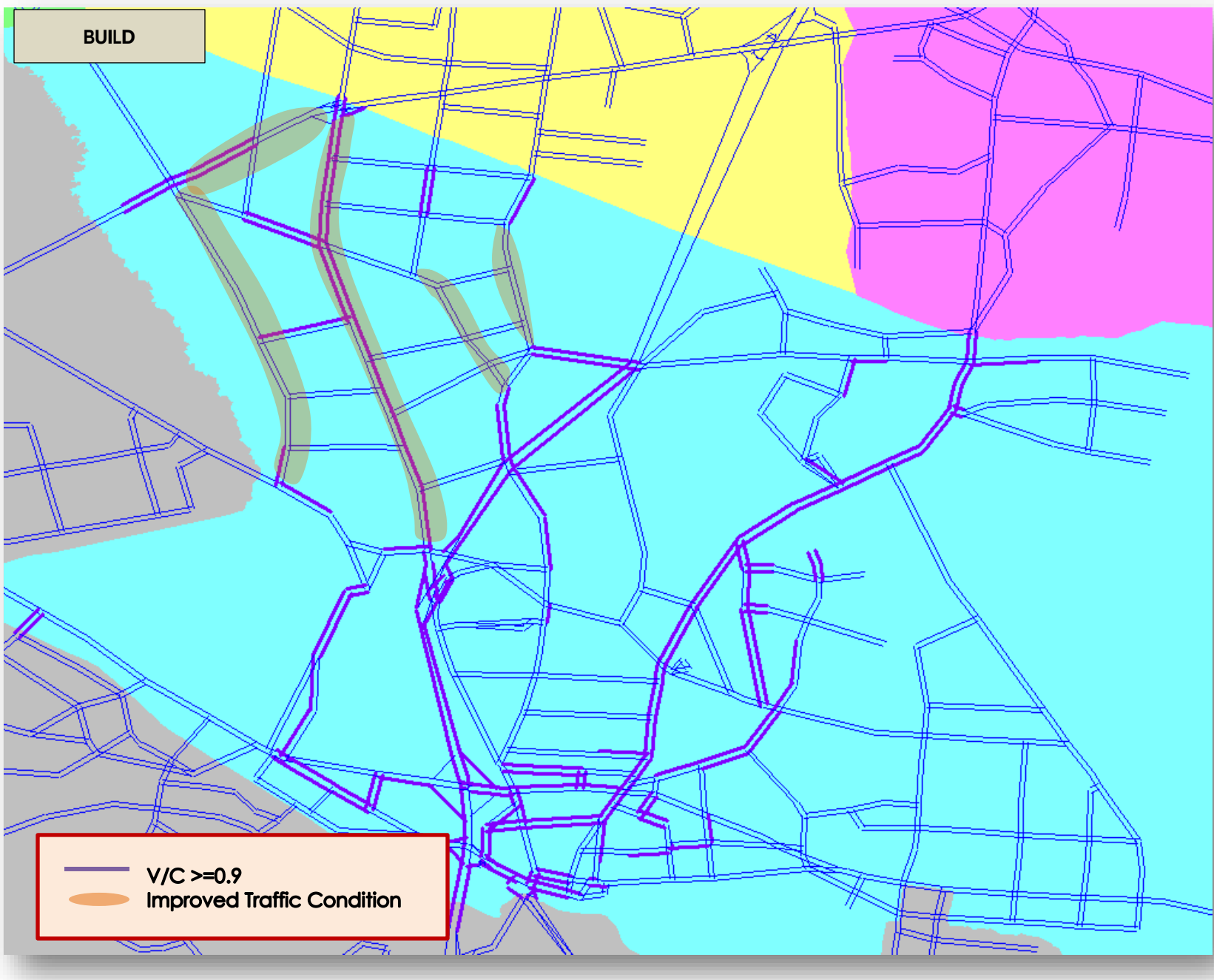


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Figure 7 Model Estimated Traffic Diversion Pattern during PM Peak Period for 2025 Model Year – Toms River Township

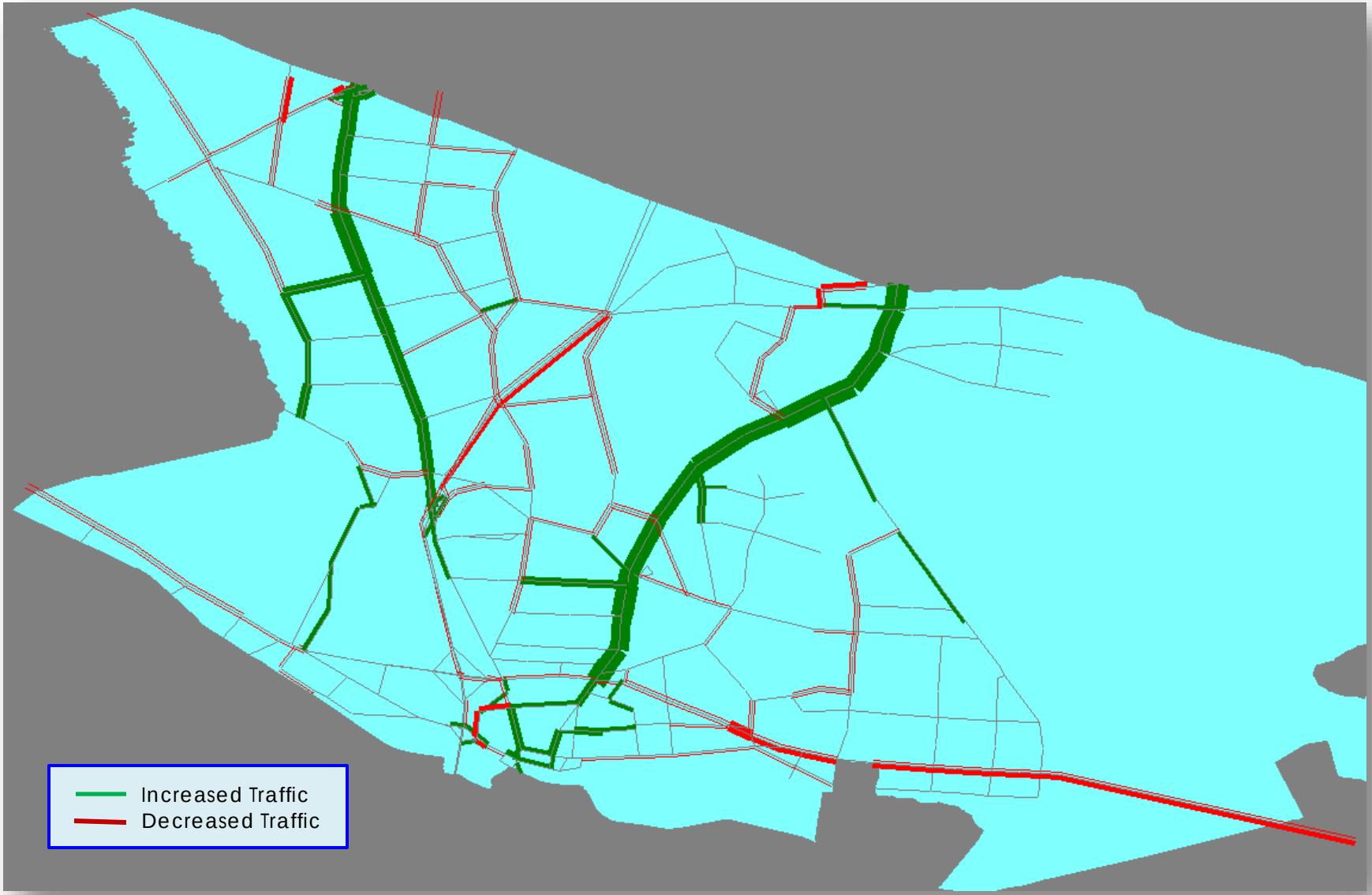
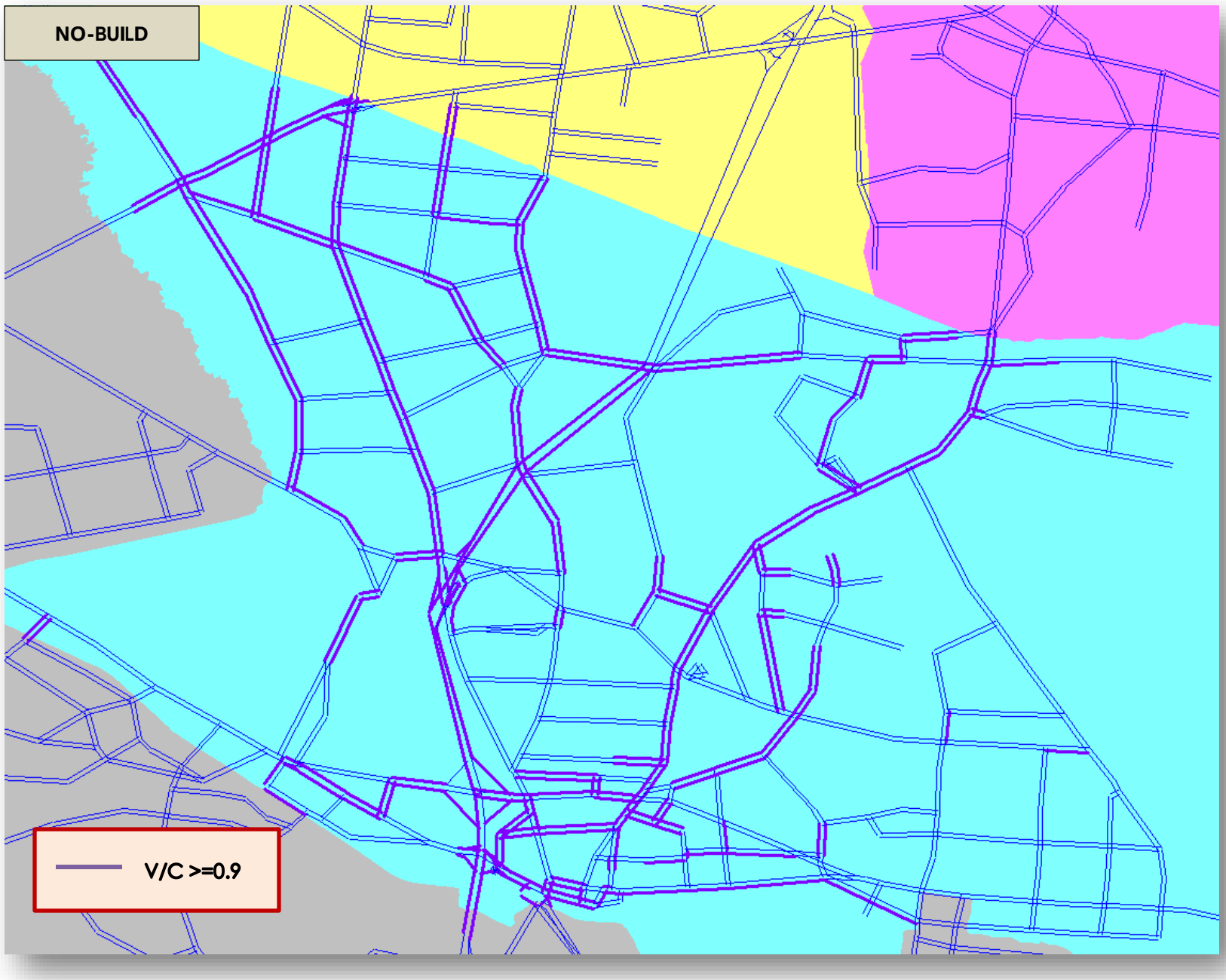


Figure 8 PM Peak Hot-Spot Comparison for 2040 Scenarios in Toms River Township



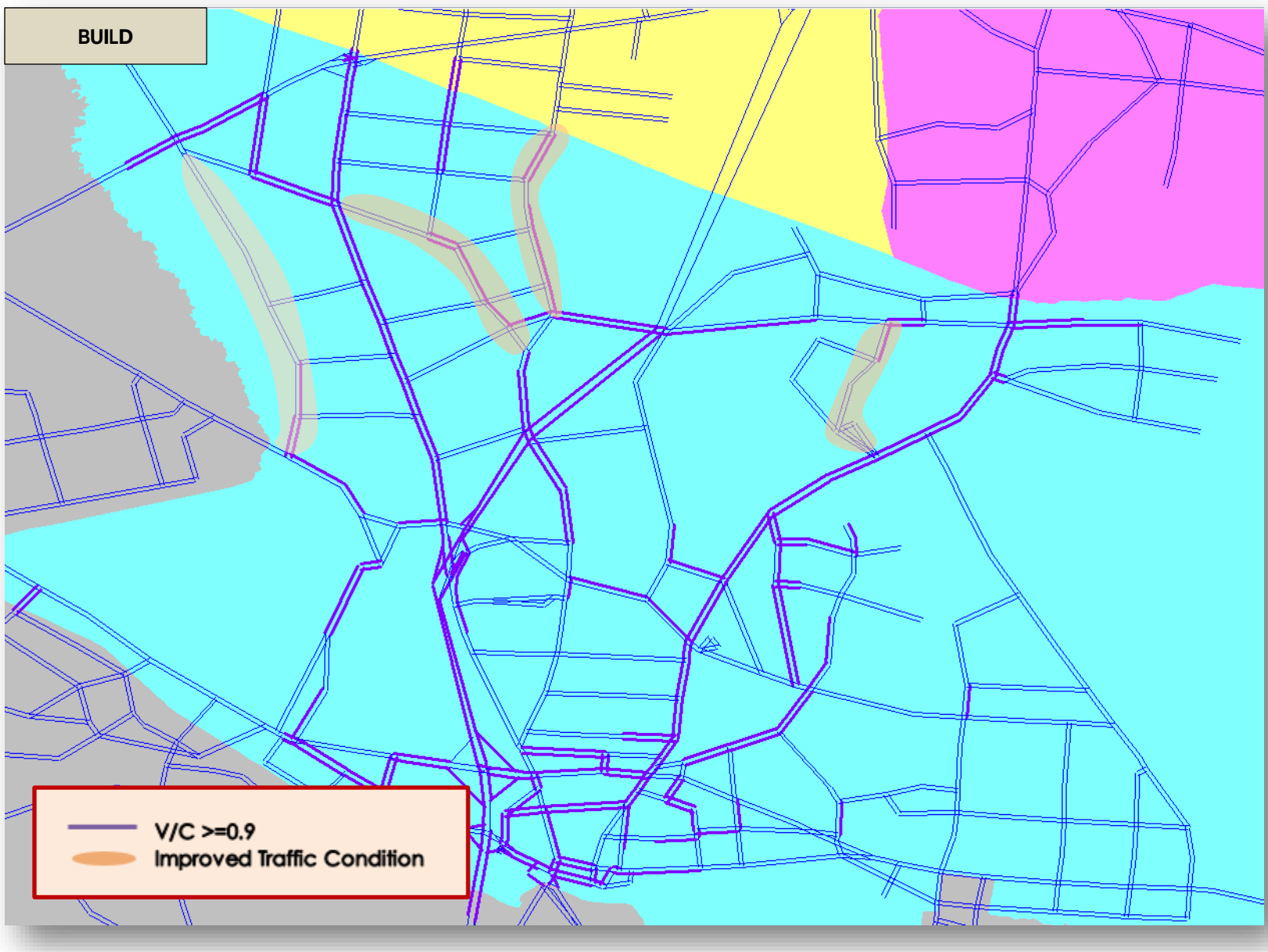
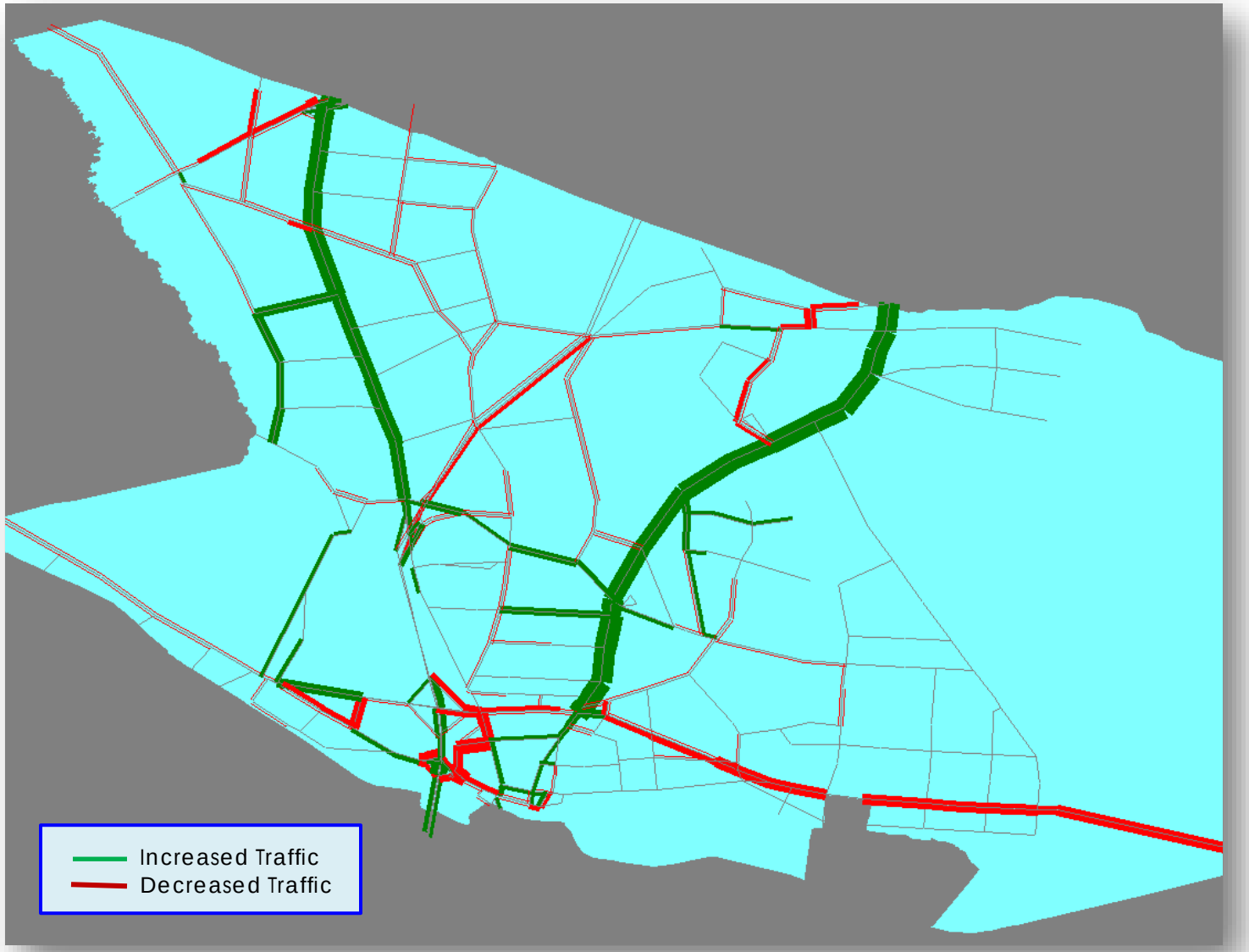


Figure 9 Model Estimated Traffic Diversion Pattern during PM Peak Period for 2040 Model Year – Toms River Township



BRICK TOWNSHIP

As part of this study, the Brick Township engineer provided a series of traffic impact studies as summarized in Table 4, as well as an information regarding the current hot-spot locations within the township as shown in Appendix D.

Table 4 Traffic Studies Provided by Brick Township

No	Traffic Impact Study	Date	Location	Conclusion
1	Boulevard at Brick Apartment Complex	October 15, 2013	Brick Boulevard and Hooper Avenue	Driveway from Brick Boulevard and Hooper Avenue will operate at level of service C or better.
2	Traffic Impact Assessment for Laurelton Plaza	November 21, 2013	Route 88 and Jack Martin Boulevard	Route 88 and Jack Martin Boulevard have adequate capacity to allow traffic to continue operating safely and efficiently.
3	Ocean Pointe Development (Hotel, Retail Space, and Residential Apartments)	September 18, 2014	Route 88 and Burrsville Squankum Road	Certain off-site improvements will be required at the Route 88 & Jack Martin Boulevard intersection as well as the Route 88 & Burrsville Squankum Road intersection in order to achieve acceptable 2024 levels of service.
4	QuickCheck Convenience Store and Fuel Station	April 10, 2015	Route 70 and Brick Boulevard (CR 631)	With minor signal timing adjustments, the signalized intersection of Route 70 and Brick Boulevard (CR 631) is calculated to continue to operate at No-Build Levels of Service or better during each of the study peak hours with one exception in the weekday evening peak hour: a minor increase in northbound right-turn delay which causes the No-Build marginal Level of Service D to change to a marginal Level of Service E
5	Wawa Store	September 28, 2016	Eastbound lanes of Route 70 just west of its intersection with Duquesne Boulevard	The exiting movements at the Route 70 driveway from Wawa convenience store with gas sales and quick service restaurant will do so at acceptable levels of service for the 2019 design year. Levels of service at the exit to North Lane Shore Drive will also be acceptable for the 2019 design year.
6	Proposed Fast-Food Restaurant with Drive-Through Window and Convenience Store with Fuel Pump Expansion	February 20, 2017	Lanes Mill Road and Burnt Tavern Road	The additional site-generated trips associated with the proposed development would not have a significant adverse impact on the traffic operation of the existing site driveways and the adjacent roadway network.

Most of these studies indicated that the roadway capacities in the vicinity of each project were generally adequate to serve the traffic. These studies did not identify any required improvements to the roadways surrounding the projects that can be modeled at regional- or county-level model. Using the hot-spot results from Chapter 5 as a guidance, the wish list improvements are presented in Table 5 below.

Table 5 Proposed Improvements for Brick Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
Brick Blvd.	County	Between Church Rd. and Mantoloking Rd.	2 and 3	1.5	Traffic Signal Improvements	N/A
NJ 88	NJDOT	Between Princeton Ave. and Midstream Rd.	1	1.3	Add TWLTL	0.86
NJ 70	NJDOT	Between Shorrock St. and Route 34	2	1.2	Add TWLTL	0.96

Note:
[1]Model estimated V/C Ratio for 2040 PM Peak along the congested locations.
[2]Estimated V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic), and TWLTL is assumed to add ½ lanes capacity to the roadway.

The estimated improved V/C ratio for NJ 70 is still higher than 0.9. However, with additional "soft improvements", such as traffic signal optimization, the congestion level along this corridor may be improved. As previously mentioned, the microsimulation model is a more suitable tool to assess the impact of these soft improvements than the macroscopic county model.

Similar to the other two townships, the short-term and long-term impact of these improvements were assessed by executing the 2025 and 2040 model years, respectively. The no-build and build scenarios for each model year were prepared and executed. Figure 10 shows a hot-spot comparison between no-build and build scenario for 2025 model year. There are some marginal improvements on the traffic congestion since improving the facilities would also attract additional traffic as shown in Figure 11.

The long-term impact of these improvements is shown by comparing the 2040 no-build scenario to the 2040 build scenario as displayed in Figure 12. Again, the improvements only alleviate the traffic congestion marginally. This is also due the improved facilities attracting new traffic from their neighboring roadways. The wish list improvements provided in Table 5 are mainly adding one-lane Two Way Left Turn Lane (TWLTL). Combining these improvements with intersections and traffic signal improvements would help to reduce to congestion further.

It is important to note that all proposed improvements shown in Table 5 require further analysis to determine the ultimate final configuration.

Figure 10 PM Peak Hot-Spot Comparison for 2025 Scenarios in Brick Township

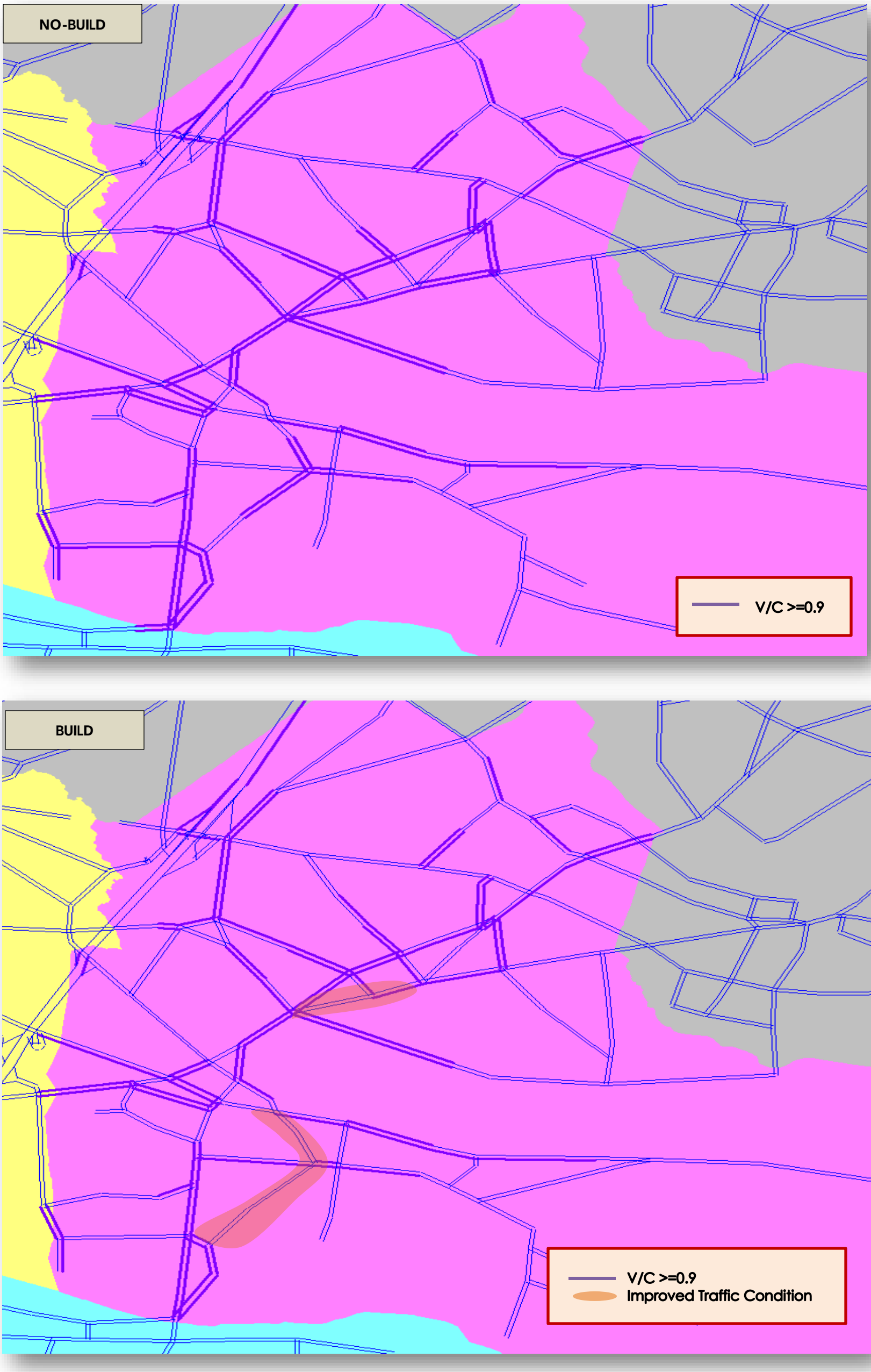


Figure 11 Model Estimated Traffic Diversion Pattern during PM Peak Period for 2025 Model Year – Brick Township

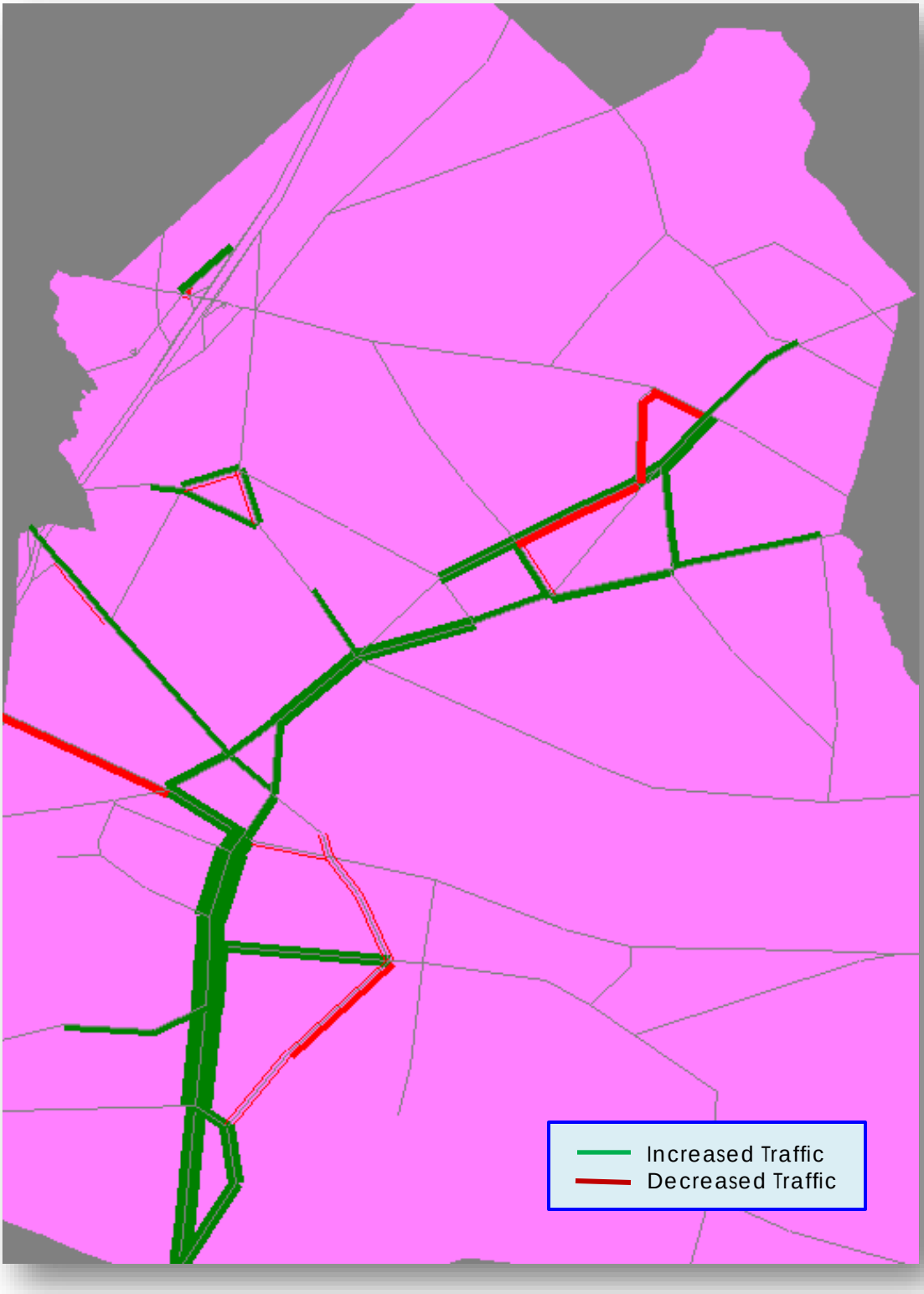


Figure 12 PM Peak Hot-Spot Comparison for 2040 Scenarios in Brick River Township

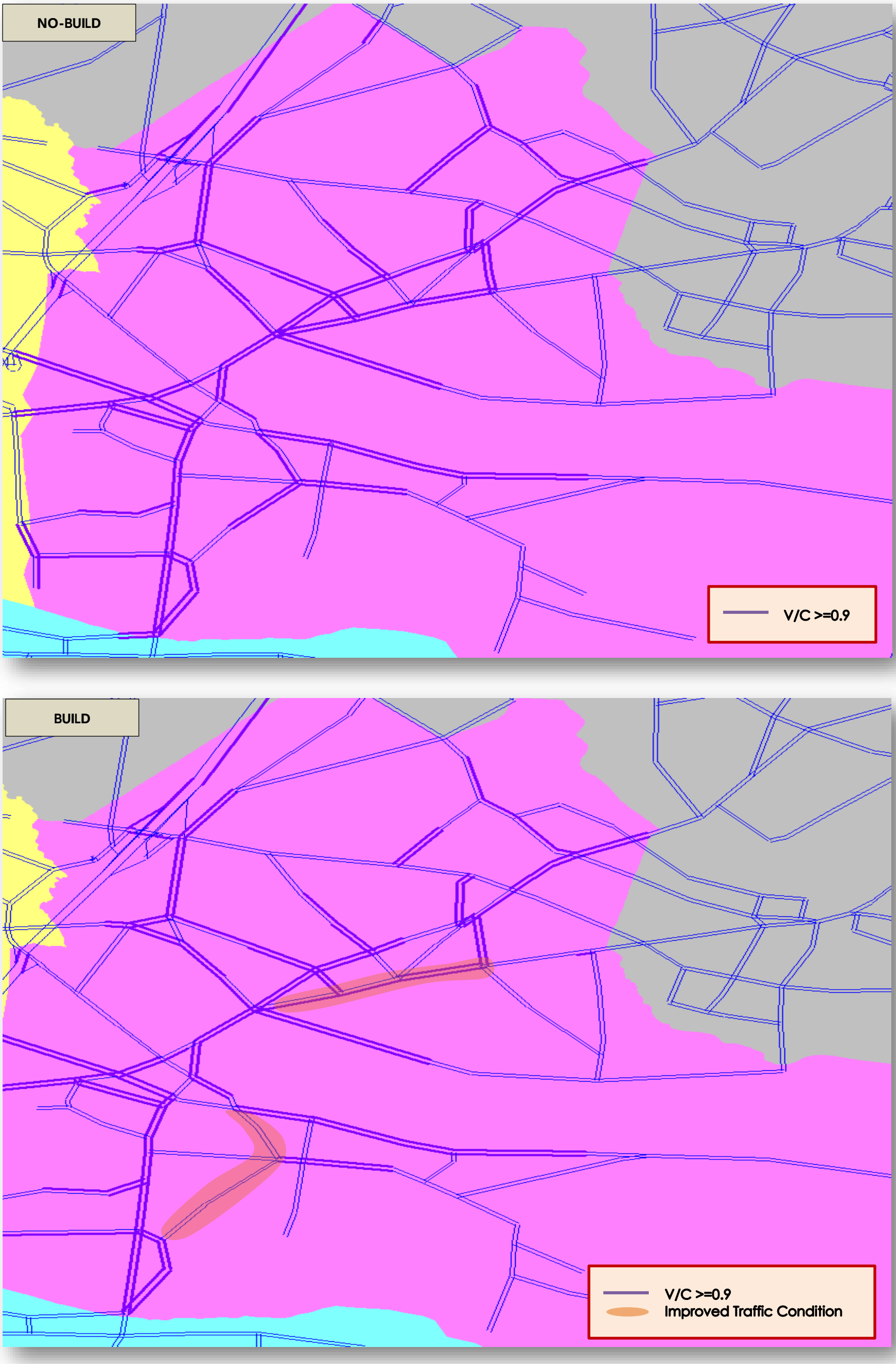
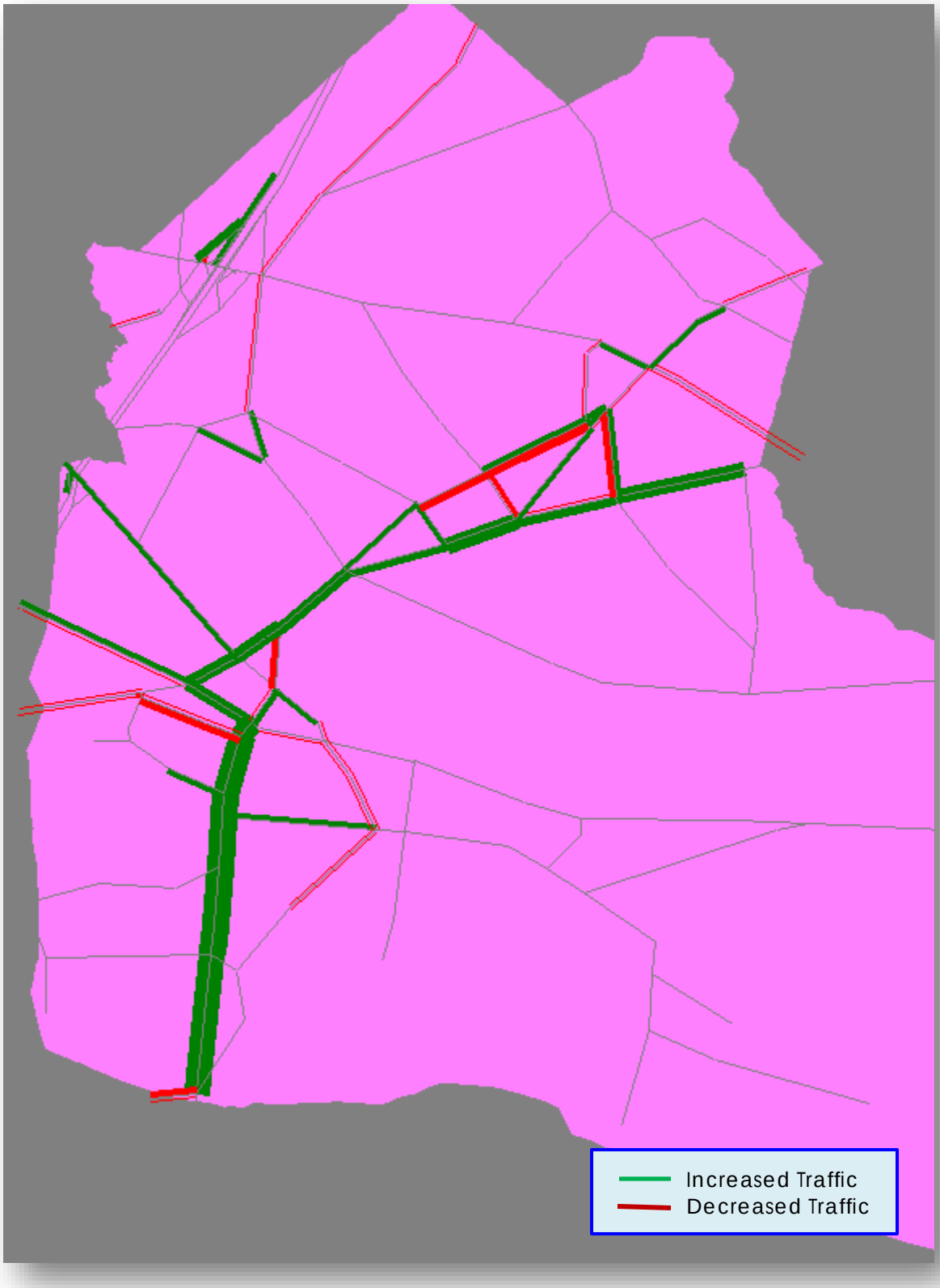


Figure 13 Model Estimated Traffic Diversion Pattern during PM Peak Period for 2040 Model Year – Brick Township



JACKSON TOWNSHIP

In the model validation process as shown in Chapter 4, the congestion level in Jackson Township was slightly overestimated compared to the observed data obtained from Google. For example, the OCTM estimated a congestion along Toms River Rd. (Route 571), while the observed data did not.

Additional information was also received during a meeting with township officials. The township staff raised a concern that CR 537 experienced a massive traffic congestion during the evening hours of weekends or holidays due to traffic leaving the Six Flags Adventure Amusement Park.

Since the regional / county model is geared towards estimating "an average weekday traffic", and not for a special event traffic that only occurs at a shorter time periods (several hours). The model did not show any congestion along CR 537. The county model is not a proper tool for this type of traffic impact study. The better tool suitable for this type of analysis is microscopic model, or traffic simulation, where signal timings, turning lanes, and other traffic operational characteristics, that contribute to congestion, can be represented and analyzed more accurately, and the analysis can be performed and focused on the shorter duration such as morning peak hour or evening peak hour, or any time duration of interest.

The second concern raised by the township staff, was related to the area around the intersection of East Veteran Highway and N/S Hope Chapel Roads. The number of lanes appeared inadequate to accommodate the current volume of traffic, especially during rush hours. Drivers routinely occupy the median area along center line prior to the roadways turn lane starting. In addition to the increased demand from Lakewood, the lack of sufficient operational characteristics such as the length of turning lanes also contribute to the congestion in this area. Similarly, this problem is better analyzed using a traffic simulation model. In the model validation and future year forecasts chapters, the OCTM estimated some congestion in this area, especially along S. Cook Bridge Rd. Using this information, the wish list improvements for Jackson Township are listed in Table 6.

Table 6 Proposed Improvements for Jackson Township

Roadway	Jurisdiction	Location	No. of Lanes per Direction	Model Estimated V/C Ratio[1]	Proposed Improvements	Improved V/C Ratio[2]
S. Cooks Bridge Rd.	County	Between N. Hope Chapel Rd. and Bennetts Mills Rd.	1	1.2	Add TWLTL	0.80
N. Hope Chapel Rd.	County	Between E. Veteran Hwy. and W. county Line Rd.	1	1.0	Add TWLTL	0.67

[1]Model estimated V/C Ratio for 2040 PM Peak along the congested locations.
[2]Estimated V/C ratio with the improvement in-place assuming there is no traffic diversion (constant traffic), and TWLTL is assumed to add ½ lanes capacity to the roadway.

The short-term and long-term impact of these improvements were analyzed using the 2025 and 2040 model years, respectively. The comparison of the no-build and build scenarios for each model year, as well as the traffic diversion patterns are shown in Figure 14 to Figure 17.

Figure 14 PM Peak Hot-Spot Comparison for 2025 Scenarios in Jackson Township

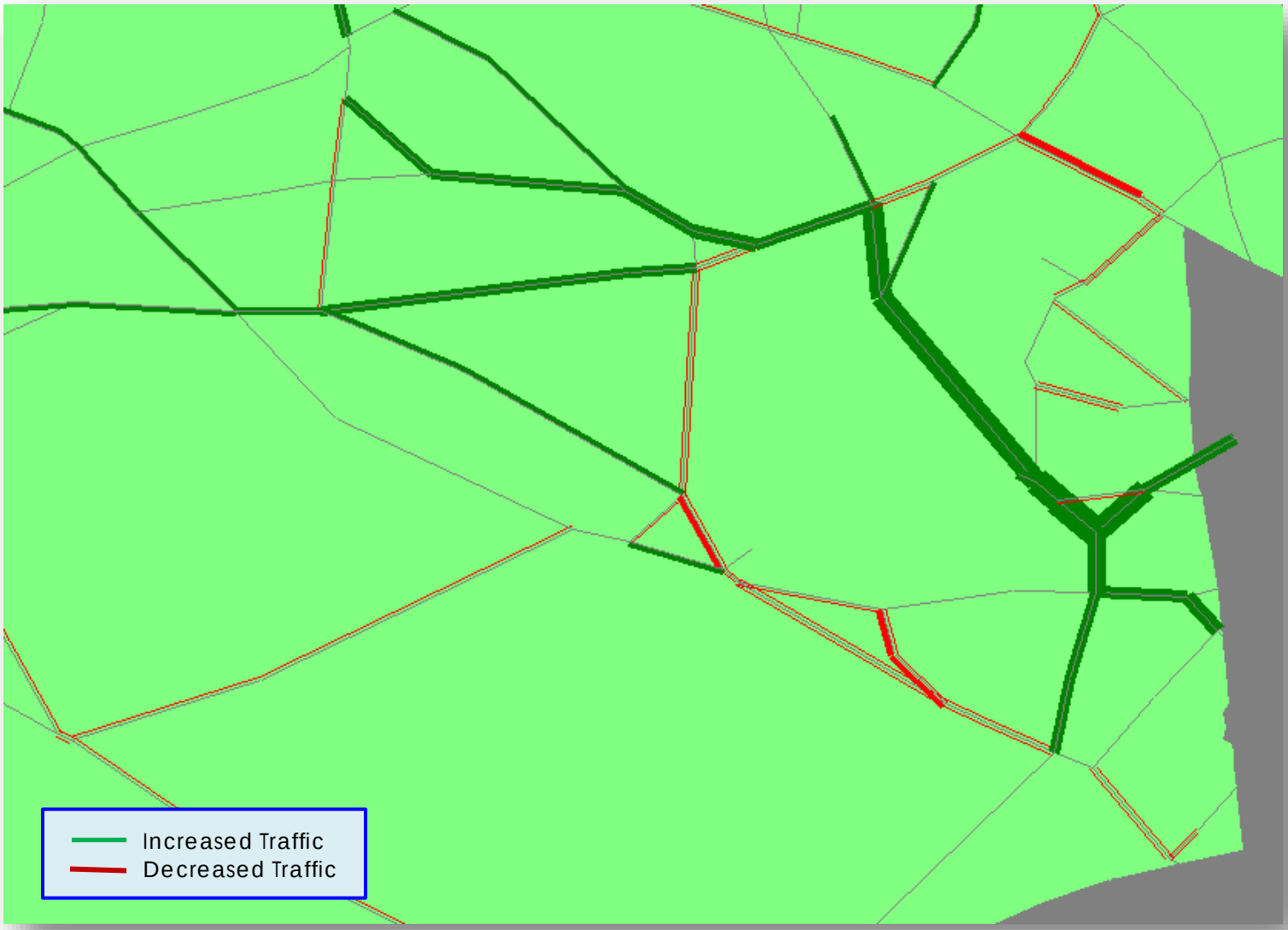
Figure 15 Model Estimated Traffic Diversion Pattern during PM Peak Period for 2025 Model Year – Jackson Township

The comparison of hot-spot locations between build and no-build scenarios indicated that the improved roadways do not seem to lessen congestion, which is counterintuitive. However, the traffic diversion pattern reveals that these improved facilities attracted more traffic from surrounding roadways such that the level-of-congestion does not significantly decrease, and in some locations, it even increases. The long-term impact of these improvements also shows similar traffic diversion patterns.

It is important to note that all proposed improvements shown in Table 6 require further analysis to determine the ultimate final configuration.

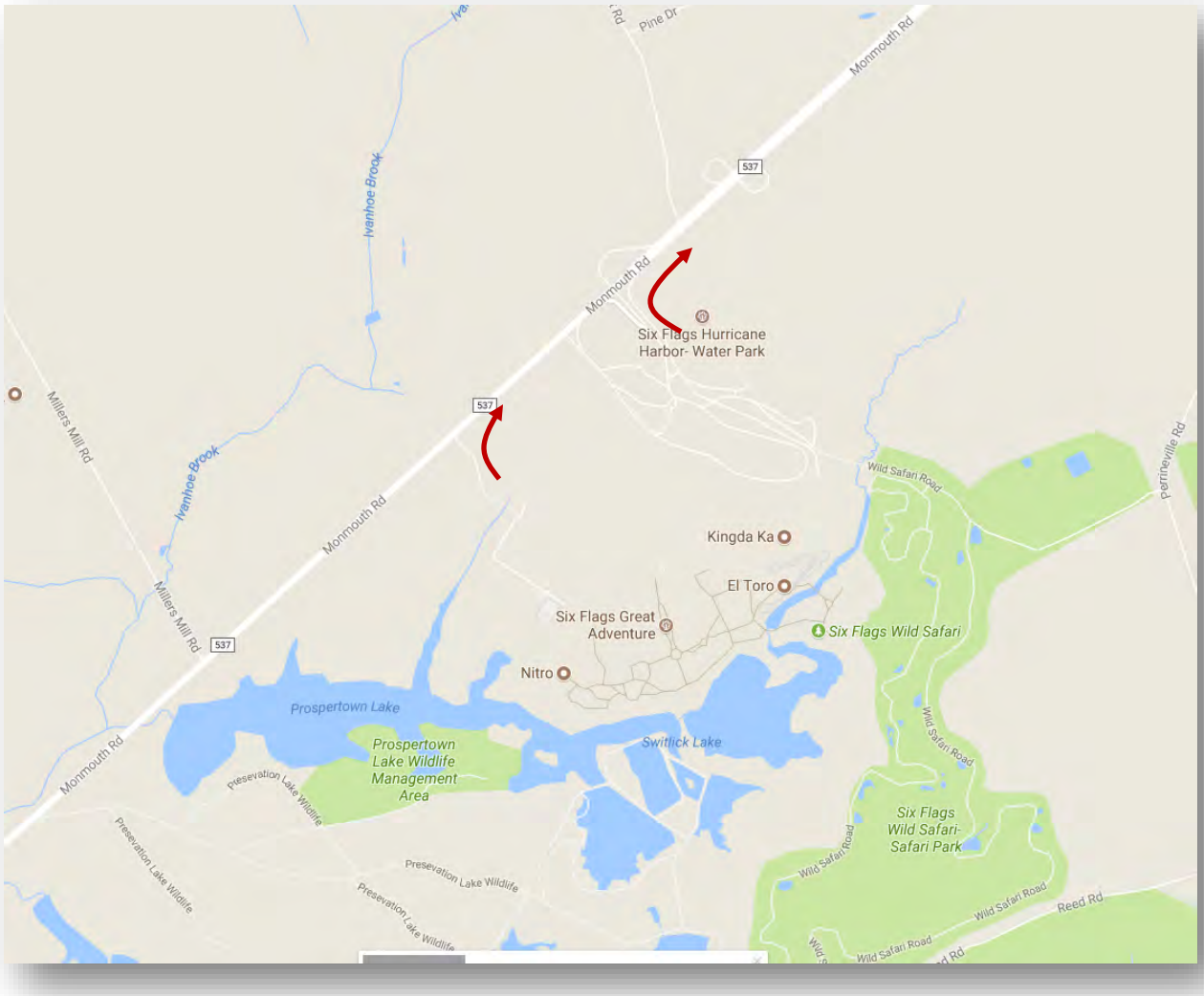
Figure 16 PM Peak Hot-Spot Comparison for 2040 Scenarios in Jackson Township

Figure 17 Model Estimated Traffic Diversion Pattern during PM Peak Period for 2045 Model Year – Jackson Township



APPENDIX I – TRAFFIC COUNT DATA AT THE SFGA AND HURRICANE HARBOR ENTRANCE PROVIDED BY JACKSON TOWNSHIP

Figure 1 Traffic Count Locations



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MAIN EXIT TO ROUTE 537 EB

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Page 1

Site Code: 000000000000
Station ID:

Main Exit to 537 E/B

Latitude: 0' 0.0000 South

Start Time	Mon 27-Jun-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	*	*	*	*	*	*	0	8	4
01:00	*	*	*	*	*	*	0	0	0
02:00	*	*	*	*	*	*	0	0	0
03:00	*	*	*	*	*	*	0	0	0
04:00	*	*	*	*	*	*	0	0	0
05:00	*	*	*	*	*	*	0	0	0
06:00	*	*	*	*	*	*	0	3	2
07:00	*	*	*	*	*	*	3	0	2
08:00	*	*	*	*	*	*	9	7	8
09:00	*	*	*	*	*	*	33	31	32
10:00	*	*	*	*	**48**	**48**	79	66	64
11:00	*	*	*	*	37	37	**85**	**81**	**68**
12:00 PM	*	*	*	*	48	48	91	104	81
01:00	*	*	*	*	98	98	135	157	130
02:00	*	*	*	*	313	313	182	205	233
03:00	*	*	*	*	341	341	221	255	272
04:00	*	*	*	*	**439**	**439**	329	340	169
05:00	*	*	*	*	183	183	417	439	346
06:00	*	*	*	*	133	133	484	510	376
07:00	*	*	*	*	165	165	636	653	485
08:00	*	*	*	*	181	181	779	662	441
09:00	*	*	*	*	169	169	718	801	563
10:00	*	*	*	*	5	5	**1845**	**2113**	**1321**
11:00	*	*	*	*	0	0	589	1610	733
Total	0	0	0	0	2160	2160	6635	8045	5630
% Avg. WkDay	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%			
% Avg. Week	0.0%	0.0%	0.0%	0.0%	38.4%	38.4%	117.9%	142.9%	
AM Peak	-	-	-	-	10:00	10:00	11:00	11:00	11:00
Vol.	-	-	-	-	48	48	85	81	68
PM Peak	-	-	-	-	16:00	16:00	22:00	22:00	22:00
Vol.	-	-	-	-	439	439	1845	2113	1321

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Site Code: 000000000000
Station ID:

Latitude: 0' 0.0000 South

Start Time	Mon 04-Jul-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	47	0	0	0	0	9	0	0	7
01:00	0	0	2	3	1	1	3	1	1
02:00	3	0	0	0	2	1	0	0	1
03:00	0	0	0	0	0	0	0	0	0
04:00	0	0	0	4	0	1	0	0	1
05:00	0	2	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0
07:00	0	0	4	1	0	1	2	0	1
08:00	4	0	1	3	5	3	4	2	3
09:00	17	8	17	13	16	14	12	26	16
10:00	53	39	69	51	40	50	**37**	52	49
11:00	**55**	**46**	**73**	**55**	**45**	**55**	25	**64**	**52**
12:00 PM	99	64	92	61	77	79	40	91	75
01:00	125	94	114	93	93	104	83	150	107
02:00	182	140	175	196	143	167	108	224	167
03:00	291	185	229	221	364	258	140	278	244
04:00	310	327	321	142	344	289	248	423	302
05:00	406	295	366	202	244	303	335	557	344
06:00	507	380	415	244	**547**	419	377	658	447
07:00	506	358	471	342	328	401	416	749	453
08:00	538	433	525	333	197	405	**418**	867	478
09:00	821	413	620	388	96	468	386	925	521
10:00	**1540**	**464**	**652**	**432**	5	**619**	341	**1100**	**648**
11:00	20	7	14	8	0	10	8	126	26
Total	5524	3255	4160	2792	2547	3657	2983	6293	3938
% Avg. WkDay	151.1%	89.0%	113.8%	76.3%	69.6%	100.0%			
% Avg. Week	140.3%	82.7%	105.6%	70.9%	64.7%	92.9%	75.7%	159.8%	
AM Peak	11:00	11:00	11:00	11:00	11:00	11:00	10:00	11:00	11:00
Vol.	55	46	73	55	45	55	37	64	52
PM Peak	22:00	22:00	22:00	22:00	18:00	22:00	20:00	22:00	22:00
Vol.	1540	464	652	432	547	619	418	1100	648

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Site Code: 000000000000
Station ID:

Latitude: 0' 0.0000 South

Start Time	Mon 11-Jul-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	27	6	4	0	2	8	0	1	6
01:00	0	0	2	0	2	1	2	0	1
02:00	3	0	0	3	0	1	0	0	1
03:00	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0
05:00	2	0	3	0	0	1	0	0	1
06:00	0	0	0	1	0	0	0	0	0
07:00	2	0	0	0	0	0	0	0	0
08:00	1	3	4	0	1	2	3	4	2
09:00	8	17	9	16	15	13	19	25	16
10:00	52	**67**	58	**46**	49	54	85	56	59
11:00	**59**	60	**66**	36	**62**	**57**	**105**	**98**	**69**
12:00 PM	51	82	77	48	62	64	108	112	77
01:00	119	100	116	99	100	107	196	154	126
02:00	192	153	166	181	158	170	454	361	238
03:00	228	231	258	191	213	224	226	450	257
04:00	296	308	293	257	271	285	663	508	371
05:00	360	367	343	293	299	332	689	632	426
06:00	436	362	384	314	354	370	633	599	440
07:00	524	437	415	283	414	415	362	704	448
08:00	618	542	**530**	319	438	489	496	805	535
09:00	674	**624**	528	402	644	574	**1320**	955	**735**
10:00	**899**	617	526	**421**	**748**	**642**	283	**963**	637
11:00	260	26	24	22	19	70	7	78	62
Total	4811	4002	3806	2932	3851	3879	5651	6505	4507
% Avg. WkDay	124.0%	103.2%	98.1%	75.6%	99.3%	100.0%			
% Avg. Week	106.7%	88.8%	84.4%	65.1%	85.4%	86.1%	125.4%	144.3%	
AM Peak	11:00	10:00	11:00	10:00	11:00	- 11:00	- 11:00	11:00	- 11:00 - -
Vol.	59	67	66	46	62	- 57	- 105	98	- 69 - -
PM Peak	22:00	21:00	20:00	22:00	22:00	- 22:00	- 21:00	22:00	- 21:00 - -
Vol.	899	624	530	421	748	- 642	- 1320	963	- 735 - -

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#1 in Traffic Counts!

Site Code: 000000000000
Station ID:

Latitude: 0' 0.0000 South

Start Time	Mon 18-Jul-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	2	0	0	0	*	0	*	*	0
01:00	0	2	2	2	*	2	*	*	2
02:00	2	0	0	0	*	0	*	*	0
03:00	0	0	0	0	*	0	*	*	0
04:00	0	0	0	0	*	0	*	*	0
05:00	0	0	2	0	*	0	*	*	0
06:00	0	1	0	0	*	0	*	*	0
07:00	0	0	0	0	*	0	*	*	0
08:00	4	4	3	**3**	*	4	*	*	4
09:00	8	17	19	*	*	15	*	*	15
10:00	**42**	51	69	*	*	54	*	*	54
11:00	39	**60**	**74**	*	*	**58**	*	*	**58**
12:00 PM	72	70	82	*	*	75	*	*	75
01:00	85	96	151	*	*	111	*	*	111
02:00	121	138	182	*	*	147	*	*	147
03:00	195	207	256	*	*	219	*	*	219
04:00	**579**	277	367	*	*	408	*	*	408
05:00	426	341	391	*	*	386	*	*	386
06:00	111	398	511	*	*	340	*	*	340
07:00	188	432	551	*	*	390	*	*	390
08:00	361	453	657	*	*	490	*	*	490
09:00	508	**687**	810	*	*	668	*	*	668
10:00	519	668	**922**	*	*	**703**	*	*	**703**
11:00	13	10	41	*	*	21	*	*	21
Total	3275	3912	5090	5	0	4091	0	0	4091
% Avg. WkDay	80.1%	95.6%	124.4%	0.1%	0.0%	100.0%			
% Avg. Week	80.1%	95.6%	124.4%	0.1%	0.0%	100.0%	0.0%	0.0%	
AM Peak	10:00	11:00	11:00	08:00	-	11:00	-	-	11:00
Vol.	42	60	74	3	-	58	-	-	58
PM Peak	16:00	21:00	22:00	-	-	22:00	-	-	22:00
Vol.	579	687	922	-	-	703	-	-	703
Total	13610	11169	13056	5729	8558	13787	15269	20843	18166

ADT ADT 4,412 AADT 4,412

HURRICANE HARBOR TO ROUTE 537 EB

Add a Second Report Title

A Different Town

#1 in Traffic Counts!

Hurricane Harbor to 537 E/B

Site Code: 000000000000
Station ID:
SFGA HH exit to 537 e/b

Latitude: 0' 0.0000 Undefined

Start Time	Mon 27-Jun-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	*	*	*	*	*	*	0	1	0
01:00	*	*	*	*	*	*	3	0	2
02:00	*	*	*	*	*	*	0	0	0
03:00	*	*	*	*	*	*	0	0	0
04:00	*	*	*	*	*	*	0	0	0
05:00	*	*	*	*	*	*	0	0	0
06:00	*	*	*	*	*	*	9	2	6
07:00	*	*	*	*	*	*	0	0	0
08:00	*	*	*	*	*	*	7	9	8
09:00	*	*	*	*	*	*	**30**	19	24
10:00	*	*	*	*	**29**	**29**	27	**31**	**29**
11:00	*	*	*	*	29	29	25	20	25
12:00 PM	*	*	*	*	30	30	48	32	37
01:00	*	*	*	*	73	73	93	79	82
02:00	*	*	*	*	**322**	**322**	205	149	225
03:00	*	*	*	*	212	212	217	231	220
04:00	*	*	*	*	178	178	273	313	255
05:00	*	*	*	*	45	45	393	391	276
06:00	*	*	*	*	11	11	**501**	**458**	**323**
07:00	*	*	*	*	3	3	285	348	212
08:00	*	*	*	*	2	2	37	53	41
09:00	*	*	*	*	2	2	18	21	14
10:00	*	*	*	*	1	1	17	45	21
11:00	*	*	*	*	0	0	9	19	9
Total	0	0	0	0	937	937	2197	2221	1799
% Avg. WkDay	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%			
% Avg. Week	0.0%	0.0%	0.0%	0.0%	52.1%	52.1%	122.1%	123.5%	
AM Peak	-	-	-	-	10:00	10:00	09:00	10:00	10:00
Vol.	-	-	-	-	29	29	30	31	29
PM Peak	-	-	-	-	14:00	14:00	18:00	18:00	18:00
Vol.	-	-	-	-	322	322	501	458	323

Add a Second Report Title

A Different Town

#1 in Traffic Counts!

Site Code: 000000000000
Station ID:
SFGA HH exit to 537 e/b

Latitude: 0° 0.0000 Undefined

Start Time	Mon 04-Jul-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	2	0	0	0	0	0	0	0	0
01:00	0	0	2	2	2	1	2	3	2
02:00	0	0	0	0	2	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0
04:00	0	3	0	3	0	1	0	0	1
05:00	2	0	0	0	0	0	0	3	1
06:00	0	0	3	0	0	1	3	0	1
07:00	2	0	0	0	3	1	3	0	1
08:00	8	5	12	9	0	7	3	1	5
09:00	**31**	25	28	32	**34**	30	**21**	23	28
10:00	21	**35**	**38**	**37**	32	**33**	20	21	**29**
11:00	26	20	26	12	24	22	18	**33**	23
12:00 PM	42	22	60	56	53	47	28	52	45
01:00	75	29	149	147	123	105	32	150	101
02:00	140	74	256	**421**	164	211	61	131	178
03:00	209	70	311	276	525	278	53	244	241
04:00	322	106	366	82	**562**	288	70	272	254
05:00	**388**	141	381	164	98	234	81	460	245
06:00	377	**215**	**531**	367	332	**364**	95	**559**	**354**
07:00	220	119	436	233	40	210	**121**	420	227
08:00	25	16	50	25	4	24	3	61	26
09:00	10	2	7	3	6	6	1	13	6
10:00	22	2	19	2	1	9	3	11	9
11:00	1	1	1	3	0	1	1	0	1
Total	1923	885	2676	1874	2005	1873	619	2457	1778
% Avg. WkDay	102.7%	47.3%	142.9%	100.1%	107.0%	100.0%			
% Avg. Week	108.2%	49.8%	150.5%	105.4%	112.8%	105.3%	34.8%	138.2%	
AM Peak	09:00	10:00	10:00	10:00	09:00	10:00	09:00	11:00	10:00
Vol.	31	35	38	37	34	33	21	33	29
PM Peak	17:00	18:00	18:00	14:00	16:00	18:00	19:00	18:00	18:00
Vol.	388	215	531	421	562	364	121	559	354

Add a Second Report Title

A Different Town

#1 in Traffic Counts!

Site Code: 000000000000
Station ID:
SFGA HH exit to 537 e/b

Latitude: 0° 0.0000 Undefined

Start Time	Mon 11-Jul-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	1	1	0	0	0	0	0	0	0
01:00	0	5	3	2	2	2	3	2	2
02:00	3	2	0	0	0	1	0	0	1
03:00	0	0	0	0	0	0	0	0	0
04:00	3	0	2	2	0	1	0	0	1
05:00	0	0	2	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0
07:00	2	2	0	0	3	1	0	0	1
08:00	6	3	6	9	8	6	1	2	5
09:00	21	**27**	27	**28**	26	26	**27**	27	26
10:00	19	16	**34**	23	**52**	**29**	27	22	**28**
11:00	**22**	18	17	23	47	25	20	**31**	25
12:00 PM	30	35	38	30	31	33	44	49	37
01:00	78	91	93	77	120	92	134	133	104
02:00	147	133	246	137	225	178	**607**	230	246
03:00	181	205	**257**	179	265	217	251	321	237
04:00	205	276	197	206	329	243	519	363	299
05:00	251	299	212	210	378	270	305	489	306
06:00	**358**	**370**	219	**343**	**537**	**365**	464	538	**404**
07:00	266	250	206	148	386	251	22	**580**	265
08:00	30	30	18	24	32	27	16	46	28
09:00	5	6	3	14	8	7	17	12	9
10:00	6	5	16	29	3	12	6	14	11
11:00	0	1	2	61	1	13	1	1	10
Total	1634	1775	1598	1545	2453	1799	2464	2860	2045
% Avg. WkDay	90.8%	98.7%	88.8%	85.9%	136.4%	100.0%			
% Avg. Week	79.9%	86.8%	78.1%	75.6%	120.0%	88.0%	120.5%	139.9%	
AM Peak	11:00	09:00	10:00	09:00	10:00	10:00	09:00	11:00	10:00
Vol.	22	27	34	28	52	29	27	31	28
PM Peak	18:00	18:00	15:00	18:00	18:00	18:00	14:00	19:00	18:00
Vol.	358	370	257	343	537	365	607	580	404

Add a Second Report Title

A Different Town

#1 in Traffic Counts!

Site Code: 000000000000
Station ID:
SFGA HH exit to 537 e/b

Latitude: 0' 0.0000 Undefined

Start Time	Mon 18-Jul-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	0	0	0	0	0	0	0	0	0
01:00	3	0	2	2	0	1	0	0	1
02:00	0	2	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0
04:00	0	0	2	3	0	1	0	0	1
05:00	0	2	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0
07:00	0	0	2	0	0	0	0	0	0
08:00	8	3	12	6	0	6	0	0	4
09:00	**33**	**31**	23	**17**	0	**21**	0	0	**15**
10:00	23	21	**41**	0	**1**	17	0	0	12
11:00	33	16	23	1	1	15	0	0	11
12:00 PM	41	34	33	0	0	22	0	0	15
01:00	100	91	93	0	0	57	0	0	41
02:00	183	167	193	0	0	109	0	0	78
03:00	240	239	235	0	0	143	0	0	102
04:00	**587**	284	249	0	0	**224**	0	0	**160**
05:00	473	269	260	0	0	200	0	0	143
06:00	112	**392**	**413**	0	0	183	0	0	131
07:00	116	266	231	0	0	123	0	0	88
08:00	11	30	28	0	0	14	0	0	10
09:00	7	17	10	0	0	7	0	0	5
10:00	2	27	39	0	0	14	0	0	10
11:00	4	6	2	0	0	2	0	0	2
Total	1976	1897	1891	29	2	1159	0	0	829
% Avg. WkDay	170.5%	163.7%	163.2%	2.5%	0.2%	100.0%			
% Avg. Week	238.4%	228.8%	228.1%	3.5%	0.2%	139.8%	0.0%	0.0%	
AM Peak	09:00	09:00	10:00	09:00	10:00	09:00	-	-	09:00
Vol.	33	31	41	17	1	21	-	-	15
PM Peak	16:00	18:00	18:00	-	-	16:00	-	-	16:00
Vol.	587	392	413	-	-	224	-	-	160

Add a Second Report Title

A Different Town

#1 in Traffic Counts!

Site Code: 000000000000
Station ID:
SFGA HH exit to 537 e/b

Latitude: 0' 0.0000 Undefined

Start Time	Mon 25-Jul-16	Tue	Wed	Thu	Fri	Average Day	Sat	Sun	Week Average
12:00 AM	0	0	*	*	*	0	*	*	0
01:00	0	0	*	*	*	0	*	*	0
02:00	0	0	*	*	*	0	*	*	0
03:00	0	0	*	*	*	0	*	*	0
04:00	0	0	*	*	*	0	*	*	0
05:00	0	0	*	*	*	0	*	*	0
06:00	0	0	*	*	*	0	*	*	0
07:00	0	*	*	*	*	0	*	*	0
08:00	0	*	*	*	*	0	*	*	0
09:00	0	*	*	*	*	0	*	*	0
10:00	0	*	*	*	*	0	*	*	0
11:00	0	*	*	*	*	0	*	*	0
12:00 PM	0	*	*	*	*	0	*	*	0
01:00	0	*	*	*	*	0	*	*	0
02:00	0	*	*	*	*	0	*	*	0
03:00	0	*	*	*	*	0	*	*	0
04:00	0	*	*	*	*	0	*	*	0
05:00	0	*	*	*	*	0	*	*	0
06:00	0	*	*	*	*	0	*	*	0
07:00	0	*	*	*	*	0	*	*	0
08:00	0	*	*	*	*	0	*	*	0
09:00	0	*	*	*	*	0	*	*	0
10:00	0	*	*	*	*	0	*	*	0
11:00	0	*	*	*	*	0	*	*	0
Total	0	0	0	0	0	0	0	0	0
% Avg. WkDay	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
% Avg. Week	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	-	-	-	-	-	-	-	-	-
Vol.	-	-	-	-	-	-	-	-	-
PM Peak	-	-	-	-	-	-	-	-	-
Vol.	-	-	-	-	-	-	-	-	-
Total	5533	4557	6165	3448	5397	5768	5280	7538	6451

ADT ADT 1,518 AADT 1,518