

# **Technical Memorandum**

## **Park West Boulevard**

### Capacity Analysis



**Stantec**

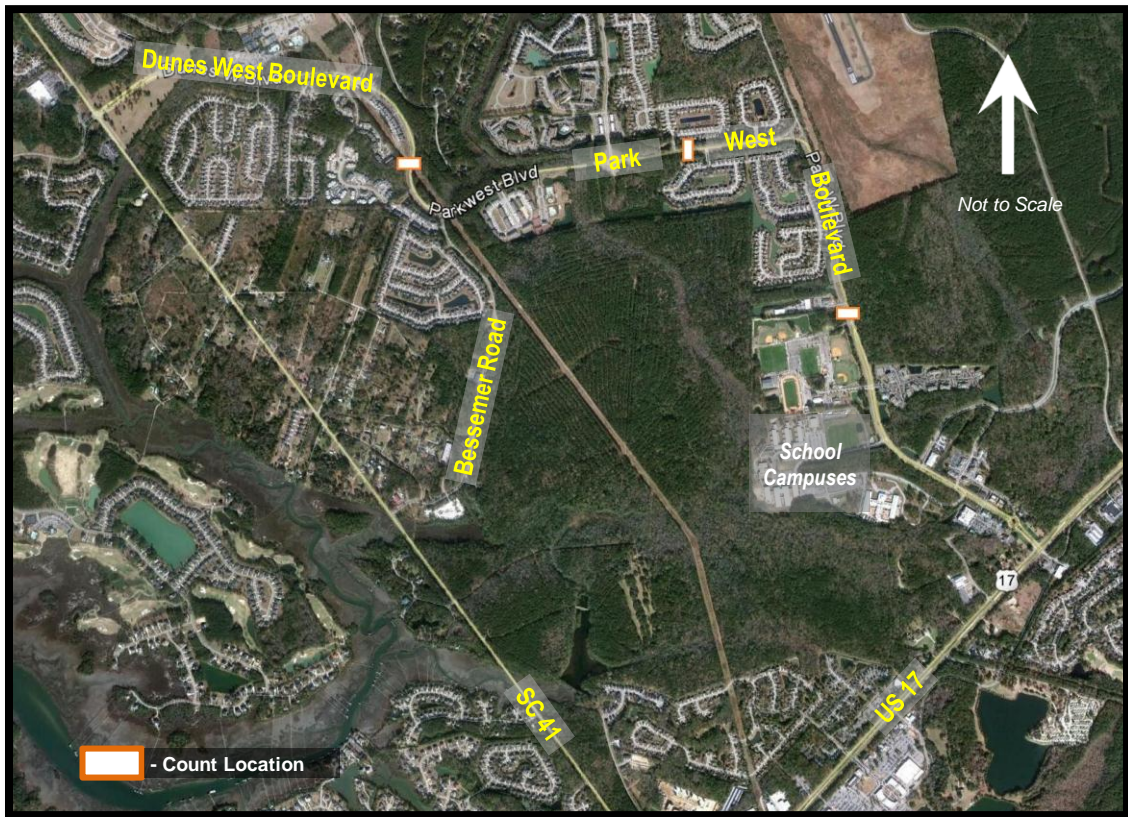
To: Brad Morrison, P.E.  
Town of Mount Pleasant  
File: 171001257.207

From: Rick Reiff, P.E., PTOE  
Stantec Consulting  
Date: May 23, 2013

### **Introduction**

The purpose of this memorandum is to document a capacity analysis for Park West Boulevard between Bessemer Road and the existing four-lane section to the east in the Town of Mount Pleasant, South Carolina. The location of Park West Boulevard is illustrated in Figure 1. It is understood that this roadway, which functions as the main collector for the Park West development, has been identified by the Town for future widening to a four-lane divided cross section. This memorandum summarizes the procedures and findings of the capacity analysis.

**Figure 1 – Project Location Map**





## Existing Conditions

Park West Boulevard extends between SC 41 on the north and west and US 17 on the south and east. The study corridor consists of the approximately 1.7-mile segment between Bessemer Road and the existing four-lane section, which currently is a two-lane undivided roadway that includes two roundabout intersections and no signalized intersections.

Field observations and 24-hour machine counts were conducted on Wednesday, January 23, 2013. The count were taken at three locations as shown in Figure 1, between Wando Plantation Way and Bessemer Road, between Wellesley Circle and Patmore Lane, and between Churchill Park Lane and the Town of Mount Pleasant Recreation Complex. The raw count information is provided in the Attachments.

Field observations revealed that traffic was dense at times along Park West Boulevard. However, due to the roundabouts that kept traffic flowing at two intersections, the only significant congestion was observed at the two-way stop-controlled intersection with Bessemer Road, with heavy queuing (more than 15 vehicles) observed in the AM peak period along the westbound Park West Boulevard approach to the intersection.

## Growth Rate Development

To develop a projected growth rate for use in the analysis, two data sources were considered, historical traffic count data and traffic projections of the CHATS model. Worksheets documenting the growth rate projection development are provided in the Attachments.

Historical traffic count data was obtained from the Town of Mount Pleasant's QRS model, which included 24-hour count data from 2002, 2004, and 2007. The counts were compared with the existing 2013 machine counts to develop an average growth rate of three locations along the study Park West Boulevard segment. Based upon the historical data between 2004 and 2013, Park West Boulevard has experienced an annual growth rate of 8.1%.

The CHATS model was run to review the 2010 base and 2035 existing and committed model traffic volumes along Park West Boulevard. Based upon the CHATS model results, traffic volumes along Park West Boulevard have an annual growth rate projection of 0.54% between 2010 and 2035.

## Service Volumes

Based upon SCDOT's *Maximum ADT by Level of Service for Urban Facilities for SCDOT Travel Demand Models* data, the generalized LOS E service volume for a two-lane undivided collector is 11,524, for a two-lane undivided minor arterial is 14,472, and for a two-lane undivided principal arterial is 19,564. Based upon the existing count data, sections of Park West Boulevard are operating at a LOS F today if it was to be considered to be a collector or minor arterial roadway.

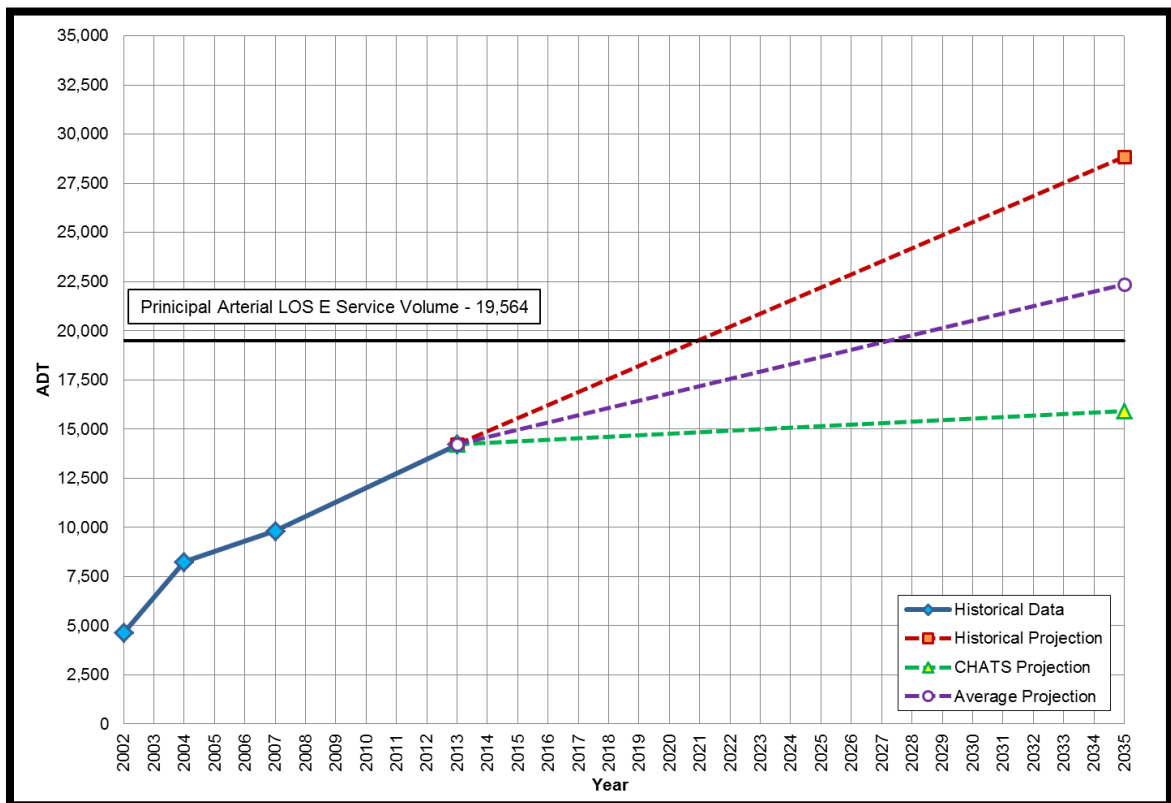
However, intersection operations control arterial operations, and if the intersections along an arterial are operating efficiently, the arterial can serve more traffic demand beyond the generalized service volumes. Therefore, due to the fact that the two existing roundabouts along Park West Boulevard are operating without any congestion issues, the roadway segment is operating at a higher level than a collector or minor arterial roadway, and the higher service volume of a principal arterial was assumed for this analysis. This service volume is similar to the generalized LOS D service volume for two-lane undivided uninterrupted-flow highways documented by FDOT.

**Future Traffic Volume Development**

Using the growth rates developed from the historical traffic count data and the CHATS growth projections, traffic volumes along Park West Boulevard were projected to 2035 conditions. Due to the disparity of rates between the two data sources, an average growth rate projection was also considered in the analysis.

Figure 2 shows the growth rate projections, which consist of continuing the respective growth trends from the existing 2013 counts to 2035. This procedure results in an effective annual growth rate projection between 2013 and 2035 of 4.7% and 0.54% for the historical data and CHATS model data, respectively. In addition, the effective annual growth rate projection between 2013 and 2035 for the average of the two data sources is 2.6%.

**Figure 2 – Park West Boulevard Traffic Volume Projections**





Based upon growth rate projections shown in the figure, the average traffic volumes along the Park West Boulevard study segment will meet the generalized LOS E service volumes in the year:

- 2021 using the historical data,
- 2027 using the average of the historical data and CHATS model data, and
- Beyond 2035 using the CHATS model data.

As previously noted, Park West Boulevard can only serve the higher service volume typical of a principal arterial as long as the intersections along the roadway are operating efficiently. Therefore, care should be taken to maintain efficient intersection operations along the study roadway segment to postpone roadway widening improvements as long as possible.

**Conclusion**

A capacity analysis was conducted for Park West Boulevard between Bessemer Road and the existing four-lane section to the east. The analysis indicates that the study Park West Boulevard roadway segment is likely operating with a generalized service volume of a principal arterial due to the efficient roundabout operations along the segment. It is projected that the study roadway segment will carry average traffic volumes greater than the LOS E generalized service volume, requiring roadway widening improvements, at some point between 2021 and 2027.

If you have any questions regarding this analysis, please do not hesitate to contact me.

Regards,

**STANTEC CONSULTING SERVICES INC.**

A handwritten signature in blue ink, appearing to read "Rick Reiff", is written over a circular stamp or seal.

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Attachments: A – 24-Hour Machine Counts  
B – Growth Rate Development Worksheet



**Stantec**

**ATTACHMENT A – 24-Hour Machine Counts**

# Short Counts

735 Maryland St.  
Columbia, SC 29201  
803 414 8437

Site Code: Parkwest Blvd  
Station ID: NB & SB Traffic  
Between Wando & Bessemer

Latitude: 0' 0.000 Undefined

Start Time	22-Jan-13 Tue	SB Traffic		NB Traffic		Combined		23-Jan- Wed	SB Traffic		NB Traffic		Combined	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		*	*	*	*	*	*		2	50	3	71	5	121
12:15		*	*	*	*	*	*		3	63	3	62	6	125
12:30		*	*	*	*	*	*		3	54	4	63	7	117
12:45		*	*	*	*	*	*		4	52	2	48	6	100
01:00		*	*	*	*	*	*		0	53	1	65	1	118
01:15		*	*	*	*	*	*		3	61	0	58	3	119
01:30		*	*	*	*	*	*		0	46	2	57	2	103
01:45		*	*	*	*	*	*		1	86	3	58	4	144
02:00		*	*	*	*	*	*		1	98	0	84	1	182
02:15		*	*	*	*	*	*		1	106	0	71	1	177
02:30		*	*	*	*	*	*		0	56	0	80	0	136
02:45		*	*	*	*	*	*		1	68	1	123	2	191
03:00		*	*	*	*	*	*		1	87	0	95	1	182
03:15		*	*	*	*	*	*		0	132	1	76	1	208
03:30		*	*	*	*	*	*		0	131	0	82	0	213
03:45		*	*	*	*	*	*		1	112	0	144	1	256
04:00		*	*	*	*	*	*		1	110	1	178	2	288
04:15		*	*	*	*	*	*		0	105	1	124	1	229
04:30		*	*	*	*	*	*		7	97	6	94	13	191
04:45		*	*	*	*	*	*		6	133	5	118	11	251
05:00		*	*	*	*	*	*		9	120	6	127	15	247
05:15		*	*	*	*	*	*		8	126	9	122	17	248
05:30		*	*	*	*	*	*		19	142	14	108	33	250
05:45		*	*	*	*	*	*		21	150	30	130	51	280
06:00		*	*	*	*	*	*		12	119	21	126	33	245
06:15		*	*	*	*	*	*		30	102	34	98	64	200
06:30		*	*	*	*	*	*		46	88	49	106	95	194
06:45		*	*	*	*	*	*		116	78	64	96	180	174
07:00		*	*	*	*	*	*		221	60	61	92	282	152
07:15		*	*	*	*	*	*		214	49	88	68	302	117
07:30		*	*	*	*	*	*		128	40	115	89	243	129
07:45		*	*	*	*	*	*		254	44	68	66	322	110
08:00		*	*	*	*	*	*		211	25	102	69	313	94
08:15		*	*	*	*	*	*		110	28	120	54	230	82
08:30		*	*	*	*	*	*		82	24	69	56	151	80
08:45		*	*	*	*	*	*		99	28	55	42	154	70
09:00		*	*	*	*	*	*		82	17	40	42	122	59
09:15		*	*	*	*	*	*		70	18	59	34	129	52
09:30		*	*	*	*	*	*		70	16	56	29	126	45
09:45		*	6	*	21	*	27		72	16	56	22	128	38
10:00		*	8	*	38	*	46		70	13	49	15	119	28
10:15		*	12	*	29	*	41		56	8	40	16	96	24
10:30		*	8	*	10	*	18		58	11	46	14	104	25
10:45		*	5	*	10	*	15		60	3	43	3	103	6
11:00		*	6	*	4	*	10		40	7	46	12	86	19
11:15		*	5	*	6	*	11		63	4	52	6	115	10
11:30		*	6	*	13	*	19		60	1	49	4	109	5
11:45		*	9	*	5	*	14		62	2	56	8	118	10
Total		0	65	0	136	0	201		2378	3039	1530	3405	3908	6444
Day Total		65		136		201			5417		4935		10352	
% Total		0.0%	32.3%	0.0%	67.7%				23.0%	29.4%	14.8%	32.9%		
Peak			09:45		09:45		09:45		07:00	05:00	07:30	03:45	07:15	05:00
Vol.			34		98		132		817	538	405	540	1180	1025
P.H.F.			0.708		0.645		0.717		0.804	0.897	0.844	0.758	0.916	0.915



# Short Counts

735 Maryland St.  
Columbia, SC 29201  
803 414 8437

Site Code: Parkwest Blvd  
Station ID: #2 EB & WB  
Between Wellesley & Patmore

Latitude: 0' 0.000 Undefined

Start Time	22-Jan-13 Tue	EB Traffic		WB Traffic		Combined		23-Jan- Wed	EB Traffic		WB Traffic		Combined	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		*	*	*	*	*	*		0	59	0	135	0	194
12:15		*	*	*	*	*	*		2	61	3	134	5	195
12:30		*	*	*	*	*	*		1	56	3	124	4	180
12:45		*	*	*	*	*	*		3	78	3	124	6	202
01:00		*	*	*	*	*	*		4	67	2	127	6	194
01:15		*	*	*	*	*	*		0	55	1	121	1	176
01:30		*	*	*	*	*	*		2	48	4	120	6	168
01:45		*	*	*	*	*	*		0	79	2	143	2	222
02:00		*	*	*	*	*	*		2	105	3	218	5	323
02:15		*	*	*	*	*	*		2	121	1	187	3	308
02:30		*	*	*	*	*	*		0	78	0	178	0	256
02:45		*	*	*	*	*	*		2	58	0	238	2	296
03:00		*	*	*	*	*	*		1	66	1	208	2	274
03:15		*	*	*	*	*	*		0	149	5	189	5	338
03:30		*	*	*	*	*	*		0	133	0	248	0	381
03:45		*	*	*	*	*	*		1	98	2	290	3	388
04:00		*	*	*	*	*	*		2	93	2	366	4	459
04:15		*	*	*	*	*	*		2	115	3	224	5	339
04:30		*	*	*	*	*	*		3	89	4	202	7	291
04:45		*	*	*	*	*	*		10	127	18	253	28	380
05:00		*	*	*	*	*	*		2	112	10	282	12	394
05:15		*	*	*	*	*	*		12	121	14	278	26	399
05:30		*	*	*	*	*	*		19	137	29	254	48	391
05:45		*	*	*	*	*	*		22	164	34	279	56	443
06:00		*	*	*	*	*	*		15	110	20	243	35	353
06:15		*	*	*	*	*	*		34	92	48	199	82	291
06:30		*	*	*	*	*	*		40	97	84	198	124	295
06:45		*	*	*	*	*	*		108	61	204	170	312	231
07:00		*	*	*	*	*	*		178	59	330	133	508	192
07:15		*	*	*	*	*	*		192	40	366	105	558	145
07:30		*	*	*	*	*	*		214	37	302	140	516	177
07:45		*	*	*	*	*	*		222	59	324	106	546	165
08:00		*	*	*	*	*	*		181	37	374	74	555	111
08:15		*	*	*	*	*	*		129	39	314	88	443	127
08:30		*	*	*	*	*	*		76	37	144	90	220	127
08:45		*	*	*	*	*	*		85	29	146	58	231	87
09:00		*	*	*	*	*	*		72	28	131	56	203	84
09:15		*	*	*	*	*	*		63	37	126	44	189	81
09:30		*	*	*	*	*	*		59	24	142	32	201	56
09:45		*	*	*	*	*	*		62	19	146	23	208	42
10:00		*	0	*	0	*	0		64	9	116	23	180	32
10:15		*	0	*	0	*	0		49	19	101	13	150	32
10:30		*	0	*	0	*	0		46	18	86	20	132	38
10:45		*	0	*	0	*	0		51	11	122	12	173	23
11:00		*	0	*	0	*	0		36	16	98	17	134	33
11:15		*	0	*	0	*	0		50	5	114	12	164	17
11:30		*	0	*	0	*	0		42	4	112	8	154	12
11:45		*	0	*	0	*	0		49	6	129	4	178	10
Total		0	0	0	0	0	0		2209	3162	4223	6790	6432	9952
Day Total		0		0		0			5371		11013		16384	
% Total		0.0%	0.0%	0.0%	0.0%				13.5%	19.3%	25.8%	41.4%		
Peak									07:15	05:00	07:15	03:30	07:15	05:00
Vol.									809	534	1366	1128	2175	1627
P.H.F.									0.911	0.814	0.913	0.770	0.974	0.886





# Short Counts

735 Maryland St.  
Columbia, SC 29201  
**803 414 8437**

Site Code: Parkwest Blvd  
Station ID: #3 NB & SB Traffic  
North of School Ath. Fields

Latitude: 0' 0.000 Undefined

Start Time	22-Jan-13 Tue	SB Traffic		NB Traffic		Combined		23-Jan- Wed	SB Traffic		NB Traffic		Combined	
		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
12:00		*	*	*	*	*	*		2	62	8	100	10	162
12:15		*	*	*	*	*	*		2	76	7	96	9	172
12:30		*	*	*	*	*	*		0	66	2	93	2	159
12:45		*	*	*	*	*	*		0	52	3	96	3	148
01:00		*	*	*	*	*	*		0	52	4	97	4	149
01:15		*	*	*	*	*	*		0	63	3	84	3	147
01:30		*	*	*	*	*	*		2	60	6	104	8	164
01:45		*	*	*	*	*	*		0	104	1	103	1	207
02:00		*	*	*	*	*	*		1	124	2	165	3	289
02:15		*	*	*	*	*	*		1	123	2	100	3	223
02:30		*	*	*	*	*	*		0	75	1	186	1	261
02:45		*	*	*	*	*	*		0	69	1	228	1	297
03:00		*	*	*	*	*	*		0	96	0	146	0	242
03:15		*	*	*	*	*	*		2	115	2	132	4	247
03:30		*	*	*	*	*	*		2	142	4	189	6	331
03:45		*	*	*	*	*	*		3	113	4	256	7	369
04:00		*	*	*	*	*	*		0	128	0	329	0	457
04:15		*	*	*	*	*	*		0	114	0	194	0	308
04:30		*	*	*	*	*	*		5	108	0	180	5	288
04:45		*	*	*	*	*	*		18	119	5	198	23	317
05:00		*	*	*	*	*	*		11	117	2	276	13	393
05:15		*	*	*	*	*	*		21	140	14	244	35	384
05:30		*	*	*	*	*	*		23	152	13	240	36	392
05:45		*	*	*	*	*	*		20	174	21	246	41	420
06:00		*	*	*	*	*	*		22	132	14	222	36	354
06:15		*	*	*	*	*	*		39	96	43	162	82	258
06:30		*	*	*	*	*	*		75	92	74	169	149	261
06:45		*	*	*	*	*	*		160	80	136	154	296	234
07:00		*	*	*	*	*	*		310	68	236	114	546	182
07:15		*	*	*	*	*	*		348	50	350	104	698	154
07:30		*	*	*	*	*	*		214	48	326	156	540	204
07:45		*	*	*	*	*	*		269	36	260	95	529	131
08:00		*	*	*	*	*	*		349	28	310	68	659	96
08:15		*	*	*	*	*	*		226	34	330	104	556	138
08:30		*	*	*	*	*	*		106	24	102	88	208	112
08:45		*	*	*	*	*	*		115	18	122	56	237	74
09:00		*	*	*	*	*	*		86	18	124	56	210	74
09:15		*	*	*	*	*	*		76	13	104	52	180	65
09:30		*	*	*	*	*	*		82	14	134	35	216	49
09:45		*	*	*	*	*	*		112	6	122	25	234	31
10:00		*	*	*	*	*	*		80	9	92	19	172	28
10:15		*	14	*	44	*	58		56	1	81	11	137	12
10:30		*	2	*	15	*	17		67	9	83	17	150	26
10:45		*	2	*	16	*	18		79	3	84	16	163	19
11:00		*	4	*	16	*	20		56	4	83	8	139	12
11:15		*	3	*	6	*	9		68	4	88	6	156	10
11:30		*	8	*	14	*	22		71	4	78	9	149	13
11:45		*	7	*	7	*	14		80	1	114	6	194	7
Total		0	40	0	118	0	158		3259	3236	3595	5834	6854	9070
Day Total		40		118		158		6495		9429		15924		
% Total		0.0%	25.3%	0.0%	74.7%			20.5%	20.3%	22.6%	36.6%			
Peak			10:15		10:15		10:15		07:15	05:15	07:15	05:00	07:15	05:00
Vol.			22		91		113		1180	598	1246	1006	2426	1589
P.H.F.			0.393		0.517		0.487		0.845	0.859	0.890	0.764	0.869	0.946





**Stantec**

**ATTACHMENT B – Growth Rate Development Worksheet**

### Growth Rate Development

<b>Historical Data</b>					
<b>Year</b>	<b>Data Source</b>	<b>Park West Boulevard Location</b>			<b>Average</b>
		Between Wando Plantation & Bessemer	Between Wellesley & Patmore	Between Churchill Park & 4-Lane	
<b>2004</b>	<b>QRS</b>	6,703	7,248	10,777	8,243
<b>2013</b>	<b>Machine Counts</b>	10,352	16,384	15,924	14,220
<b>Linear Growth Rate (9-Year)</b>		6.05%	14.01%	5.31%	<b>8.06%</b>

<b>CHATS Model Data</b>					
<b>Year</b>	<b>Data Source</b>	<b>Park West Boulevard Location</b>			<b>Average</b>
		Between Wando Plantation & Bessemer	Between Wellesley & Patmore	Between Churchill Park & 4-Lane	
<b>2010</b>	<b>CHATS</b>	6,837	3,369	9,456	6,554
<b>2035</b>	<b>CHATS</b>	7,603	3,934	10,791	7,443
<b>Linear Growth Rate (25-Year)</b>		0.45%	0.67%	0.56%	<b>0.54%</b>