TRAFFIC IMPACT STUDY
ADDENDUM

FOR

DRI 2519
ANVIL BLOCK ROAD DEVELOPMENT
CLAYTON COUNTY, GA

Prepared For:

Anvil Block Land Partners
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2470 Sandy Plains Rd
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December 21, 2015

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EXECUTIVE SUMMARY

This traffic impact study addendum should be considered supplementary to the traffic impact study dated November 17, 2015.

The original traffic impact study was conducted to determine the traffic impacts expected from the proposed Anvil Block development in the city of Ellenwood, GA. This development is under consideration as DRI 2519 and is planned to be completed in 2017. The development is located on Lunsford Drive, west of Bouldercrest Road and east of Interstate 675 (I-675). The development will be accessed via Lunsford Drive.

This addendum considers the impact of the future development plus the undeveloped commercial tracts of Ellenwood Village considered under DRI 390. Capacity analyses and level of service evaluations of the intersections in the vicinity of the development were conducted for the future condition with the proposed development and the future condition with the proposed development and Ellenwood Village commercial tracts. The evaluations were used to determine any potential mitigation that might be recommended to resolve any traffic issues resulting from the proposed development.

A widening and reconstruction project of Anvil Block Road by GDOT is currently underway. This work is being done under PI#0004638 and PI#771210, which was let for construction in early 2015. Construction is programmed for completion in late 2016. The project includes a typical section of four 12-foot travel lanes with a 20-foot raised median from Lunsford Drive to Bouldercrest Road.

All studied intersections are expected to continue to operate at an acceptable level of service with the full build out of the development as proposed as well as into the future with the Ellenwood Village commercial. The study concluded that with the proposed development there is no need for any additional lanes at any other intersections, and that the intersections operate at an acceptable level of service.

ANALYSIS ASSUMPTIONS

This addendum considers the impact of the future development plus the undeveloped commercial tracts of Ellenwood Village considered under DRI 390. Capacity analyses and level of service evaluations of the intersections in the vicinity of the development were conducted for the future condition with the proposed development and the future condition with the proposed development and Ellenwood Village commercial tracts. The evaluations were used to determine any potential mitigation that might be recommended to resolve any traffic issues resulting from the proposed development.

The study intersections for this addendum are:

- Anvil Block Road at Grant Road
- Anvil Block Road at Lunsford Drive
- Anvil Block Road at Bouldercrest Road

Intersection Geometry

No changes have been made from the original analysis to the intersection geometry or to the signal phasing for the intersections at Grant Road and Bouldercrest Road. At the intersection of Anvil Block Road and Lunsford Drive, we have assumed the construction of a fourth leg. A dedicated eastbound right turn lane and a dedicated westbound left

turn lane have been added to Anvil Block Road to serve the new leg. The outbound approach will include an exclusive left turn lane and a shared thru-right lane to mirror the alignment across the street.

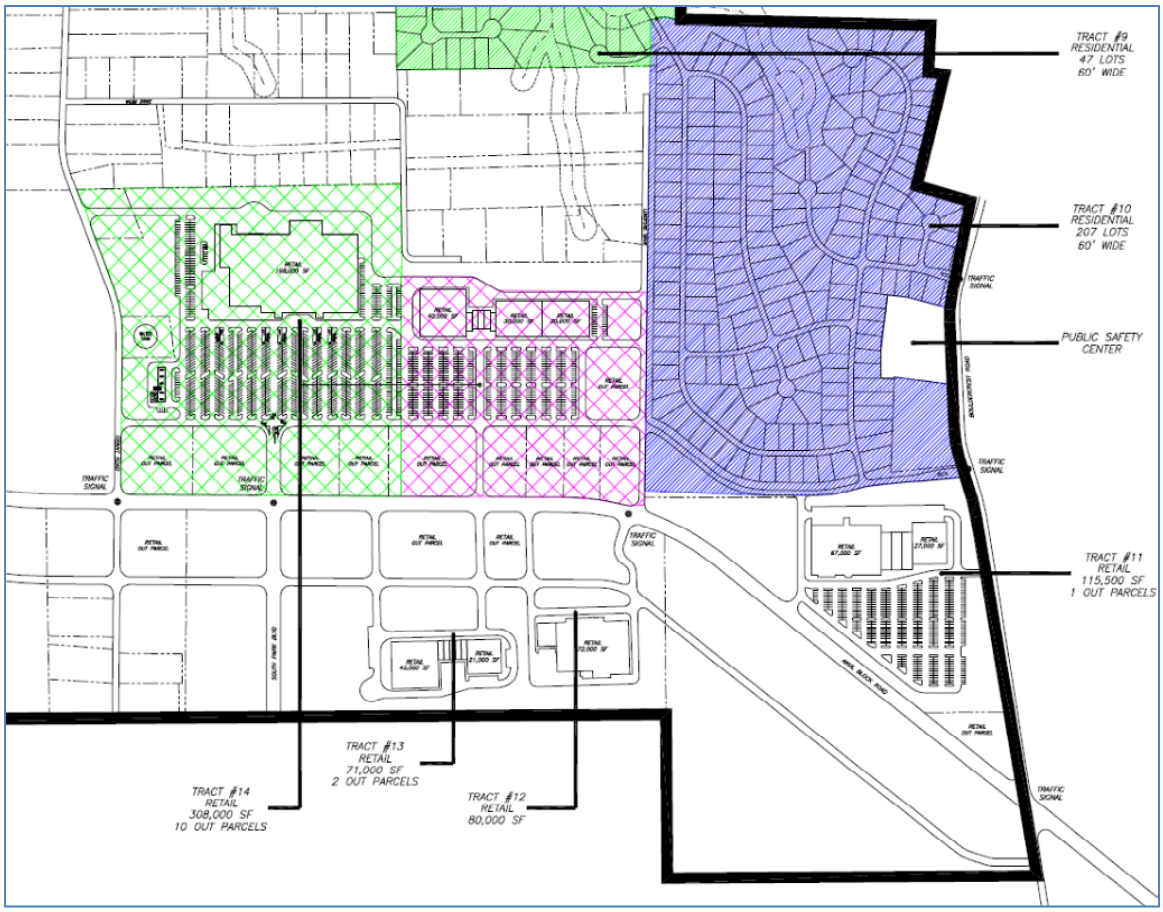


Figure 1: Villages of Ellenwood Master Plan Excerpt

Figure 1 shows the areas from the Villages of Ellenwood 2006 Master Plan that have been requested to be included in the traffic addendum. The full 2006 Master Plan has been included in the appendix. We will be considering the impacts to the intersections of Anvil Block Road at Grant Road, Lunsford Drive, and Bouldercrest Road. We will not be considering individual driveways and other signalized intersections as part of this addendum. We are considering the square footages assumed in the previous submittal, plus assuming square footages for the identified outparcels.

The request from Clayton County was to include the impacts of the undeveloped commercial parcels in tracts 11, 12, 13, and 14. The property under consideration for DRI 2519 is identified as Tract 10 and is shaded blue in Figure 1. As discussed with GRTA and Clayton County staff, the following land use assumptions have been made for each of the pods identified in Figure 2. These are not development plans, but merely assumptions based on reasonable development patterns. There is currently no anticipated construction date for any of these commercial parcels. Tracts 11, 12, and 13 are undeveloped. Tract 14 is composed of the existing shopping center plus ten outparcels. Two outparcels have been developed, a Wendy's and a Waffle House. Trip generation worksheets divided by pod have been included in the appendix. Trip

distribution follows the same patterns as for the original traffic impact study. Anticipated trips for these six pods are shown in Figure 3.

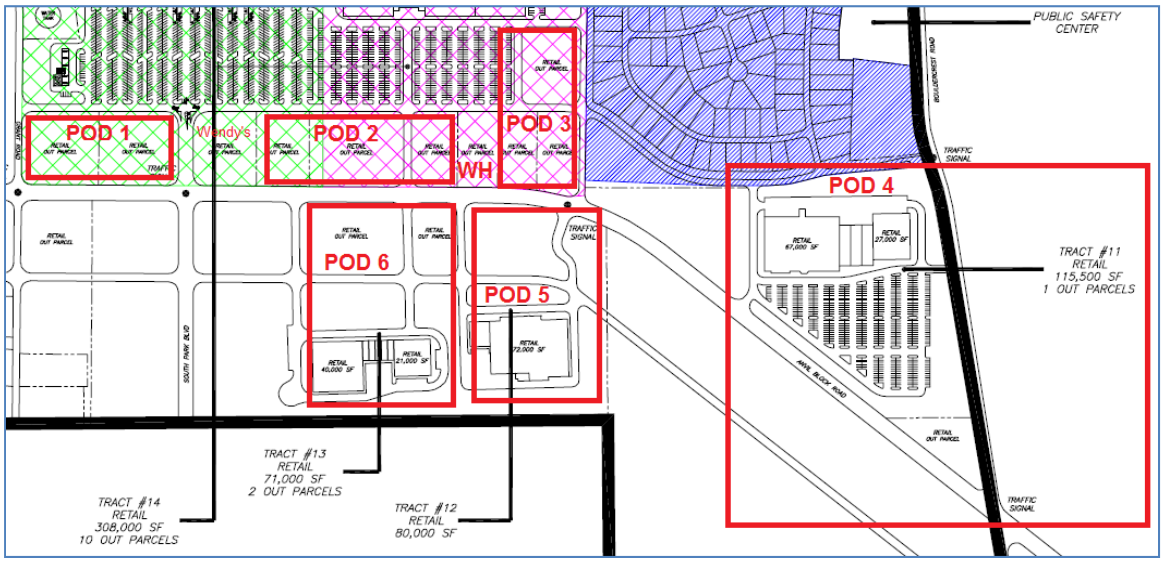


Figure 2: Villages of Ellenwood Master Plan Pod Assumptions

Pod 1:
Some of the trips were added to Grant Road and some to the general through using other driveways along Anvil Block. 5% of the new traffic was distributed to the north on Grant Road. Some of the Pass-By Trips were assigned to the intersection at Grant Road, and the appropriate through volumes were adjusted into turning volumes.

- 10,000 SF Drug store with drive-thru
- Gas station with 20 fuel stations

Pod 2:
All of the new trips were added as pass-through on the study intersections.

- 20,000 SF shopping center
- 10,000 SF high-turnover sit-down restaurant
- 5,000 SF coffee shop

Pod 3:
All of the new trips were added to Lunsford Drive. All of the Pass-By Trips were assigned to the intersection at Lunsford Drive, and the appropriate through volumes were adjusted into turning volumes.

- 10,000 SF high-turnover sit-down restaurant
- 5,000 SF fast food with drive thru
- 5,000 SF oil change

Pod 4 (Tract 11):
All of the new trips were proportionately to Bouldercrest Road and Anvil Block Road. We assumed full driveway access for this pod to both Bouldercrest Road and Anvil Block Road. 20% of the new traffic was distributed to the north on Bouldercrest Road.

- 115,500 SF Shopping Center
- 5,000 SF fast food with drive thru

Pod 5 (Tract 12):
A majority of the new trips and Pass-By Trips were assigned to Lunsford Drive, with a smaller portion using the right-in, right-out driveway.

- 80,000 SF Shopping Center
- 10,000 SF Drug store with drive-thru

Pod 6 (Tract 13):
All of the new trips were added as pass-through on the study intersections.

- 71,000 SF shopping center
- 20,000 SF shopping center
- 5,000 SF fast food with drive thru

ITE pass-by and internal capture rates were used for the individual pods. No transit reductions were applied. As trip generation by commercial property during the morning peak is not particularly robust, only the evening peak was considered for the analysis.

A widening and reconstruction project of Anvil Block Road by GDOT is currently underway. This work is being done under PI#0004638 and PI#771210, which was let for construction in early 2015. Construction is programmed for completion in late 2016, so the roadway project will be finished before the development is complete. The project includes a typical section of four 12-foot travel lanes with a 20-foot raised median from Lunsford Drive to Bouldercrest Road. The project continues along Anvil Block Road to the Henry County line with a two-lane section and a two-way left turn lane.

Trip Generation

The expected number of gross trips for these land uses was determined using Trafficware's Trip Generation software. This software estimates trips generated by the proposed land use in accordance with the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition, 2012. Full build-out and occupancy of the development was assumed when applying the trip generation rates and equations. The net new trips for the proposed mixed use development are provided in Table 1. The trip generation worksheet are attached in the appendix. Trip Distribution for all the traffic is shown in Figure 7.

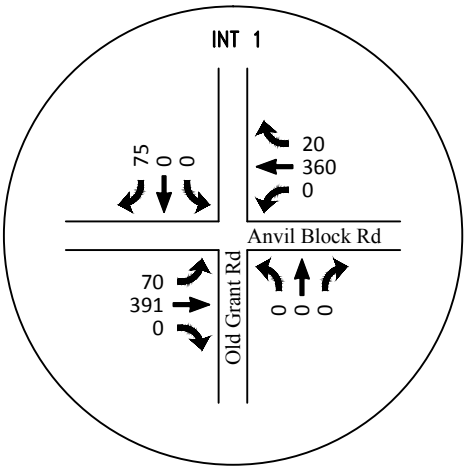
Table 1: Trip Generation

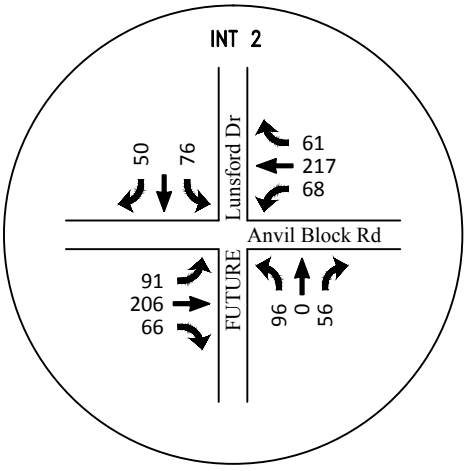
POD 1

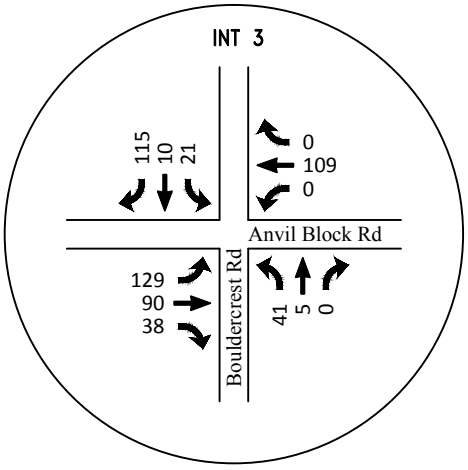
Land Use	ITE Code	Average Daily Trips	AM-Peak (7-9)		PM-Peak (4-6)	
			Enter	Exit	Enter	Exit
Pharmacy/Drugstore with Drive-Through Window (10,000 SF)	881	969	18	17	50	49
Gasoline/Service Station with Convenience Market (20 Fueling Positions)	945	3256	102	101	135	135
Unadjusted Volumes		4225	120	118	185	184
Internal Capture Trips		0	0	0	0	0
Pass-By Trips		326	63	63	100	100
Volume Added to Adjacent Streets		3899	57	55	85	84

POD 2						
Land Use	ITE Code	Average Daily Trips	AM-Peak (7-9)		PM-Peak (4-6)	
			Enter	Exit	Enter	Exit
Shopping Center (20,000 SF)	820	854	12	7	36	38
High-Turnover (Sit-Down) Restaurant (10,000 SF)	932	1272	59	49	59	40
Coffee/Donut Shop w/ Drive-Thru Window (5,000 SF)	937	4093	335	309	186	172
Unadjusted Volumes		6219	406	365	281	250
Internal Capture Trips		62	2	2	29	29
Pass-By Trips		55	0	0	30	25
Volume Added to Adjacent Streets		6102	404	363	222	196
POD 3						
Land Use	ITE Code	Average Daily Trips	AM-Peak (7-9)		PM-Peak (4-6)	
			Enter	Exit	Enter	Exit
High-Turnover (Sit-Down) Restaurant (10,000 SF)	932	1272	59	49	59	40
Fast-Food Restaurant with Drive-Through Window (5,000 SF)	934	2481	116	111	85	78
Automobile Care Center (5,000 SF)	942		7	4	8	8
Unadjusted Volumes		3753	182	164	152	126
Internal Capture Trips		0	0	0	0	0
Pass-By Trips		234	57	54	67	56
Volume Added to Adjacent Streets		3519	125	110	85	70
POD 4						
Land Use	ITE Code	Average Daily Trips	AM-Peak (7-9)		PM-Peak (4-6)	
			Enter	Exit	Enter	Exit
Shopping Center (115,500 SF)	820	4932	69	42	206	223
Fast-Food Restaurant with Drive-Through Window (5,000 SF)	934	2481	116	111	85	78
Unadjusted Volumes		7413	185	153	291	301
Internal Capture Trips		136	11	11	57	57
Pass-By Trips		284	54	51	89	90
Volume Added to Adjacent Streets		6993	120	91	145	154

POD 5						
Land Use	ITE Code	Average Daily Trips	AM-Peak (7-9)		PM-Peak (4-6)	
			Enter	Exit	Enter	Exit
Shopping Center (80,000 SF)	820	3416	48	29	143	154
Pharmacy/Drugstore with Drive-Through Window (10,000 SF)	881	969	18	17	50	49
Unadjusted Volumes		4385	66	46	193	203
Internal Capture Trips		0	0	0	0	0
Pass-By Trips		149	0	0	73	76
Volume Added to Adjacent Streets		4236	66	46	120	127
POD 6						
Land Use	ITE Code	Average Daily Trips	AM-Peak (7-9)		PM-Peak (4-6)	
			Enter	Exit	Enter	Exit
Shopping Center (71,000 SF)	820	3032	42	26	126	137
Shopping Center (20,000 SF)	820	854	12	7	36	38
Fast-Food Restaurant with Drive-Through Window (5,000 SF)	934	2481	116	111	85	78
Unadjusted Volumes		6367	170	144	247	253
Internal Capture Trips		130	8	8	57	57
Pass-By Trips		255	55	52	74	74
Volume Added to Adjacent Streets		5982	107	84	116	122







ELLENWOOD VILLAGE
PM PEAK HOUR VOLUME
ANVIL BLOCK DEVELOPMENT

FIGURE 7

Project No.	896-14-234
Design By:	DT
Drawn By:	DT
Checked By:	BAH
Date:	12/21/15
Scale:	NTS

SEI
SOUTHEASTERN ENGINEERING
2470 Sandy Plains Road
Marietta, Georgia • 30066
tel: 770-321-3936 fax: 770-321-3935

FUTURE CONDITONS - (2017) WITH PROPOSED DEVELOPMENT PLUS ELLENWOOD VILLAGE

Future Traffic Volumes

The future traffic volumes were determined by adding the Ellenwood Village site generated traffic to the future developed traffic volumes. The future traffic volumes for the proposed development are shown in Figure 8.

Future Level of Service

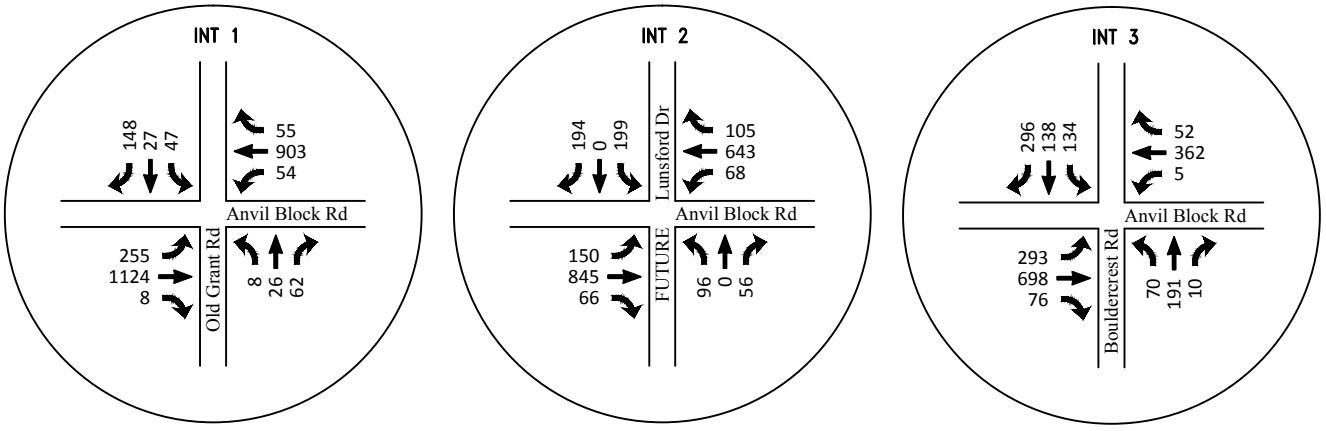
The level of service for the future condition with the proposed development was determined using the same methods as discussed in the previous study. Intersection capacity analyses were performed on calculated future traffic volumes with the proposed development as well as with the Ellenwood Village commercial tracts.

All the intersections operate at an acceptable level of service in the future with the development as proposed. The results of the intersection capacity analysis for the 2017 future year with the development are summarized in the Table 2. The intersection capacity analyses worksheets are included in the appendix.

Table 1: Future Background Level of Service with Proposed Development

Intersection	Type of Control*	Future Year-2017 With Development PM-Peak Delay (LOS)
Without Ellenwood Village Commercial		
Anvil Block Road at Old Grant Road	Signalized	8.8 (A)
Anvil Block Road at Lunsford Drive	Signalized	11.9 (B)
Anvil Block Road at Bouldercrest Road	Signalized	25.9 (C)
With Ellenwood Village Commercial		
Anvil Block Road at Old Grant Road	Signalized	9.2 (A)
Anvil Block Road at Lunsford Drive	Signalized	15.7 (B)
Anvil Block Road at Bouldercrest Road	Signalized	20.8 (C)

It is worth noting that the average delay for Anvil Block Road went down in the future condition. This is likely due to the preponderance of the traffic being added to the main street with much less to the side street. Anvil Block Road is the coordinated street, so more cars in an efficient fashion on the main line reduces the overall delay.



FUTURE YEAR 2017 DEVELOPED PLUS ELLENWOOD VILLAGE PM PEAK HOUR VOLUME

ANVIL BLOCK DEVELOPMENT

FIGURE 8

Project No.	896-14-234
Design By:	DT
Drawn By:	DT
Checked By:	BAH
Date:	12/21/15
Scale:	NTS

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TRAFFIC ANALYSIS CONCLUSIONS

The study intersections currently operate at acceptable levels of service. When the intersections were analyzed for the future year 2017 background peak hour volumes without the proposed development they continue to operate at an acceptable level of service well above the minimum LOS D. This and all future conditions include the road improvements that will be made on Anvil Block Road under PI#0004638 and PI#771210.

With the proposed development the study intersections are expected to continue to operate at acceptable levels of service with the site generated traffic. The level of service for the study intersections are expected to remain at acceptable levels in the future with the development as proposed, above the minimum LOS D.

With the proposed development plus the undeveloped commercial from Ellenwood Villages, the study intersections are expected to continue to operate at acceptable levels of service with the site generated traffic. The level of service for the study intersections are expected to remain at acceptable levels in the future with the development as proposed, above the minimum LOS D.

CONCLUSIONS AND RECOMMENDATIONS

The traffic impact of the Anvil Block Distribution Center (DRI 2519) and the undeveloped commercial portions of the Ellenwood Villages (DRI 390) is anticipated to be absorbed by the existing roadway capacity and the proposed improvements included as part of as part of PI#0004638 and PI#771210. No new traffic improvements beyond those previously required will be needed as part of this development upon build-out.

Anvil Block Distribution Center
City of Ellenwood, Clayton County, GA
Traffic Study Appendix

Appendix A: Ellenwood Village 2006 Master Plan

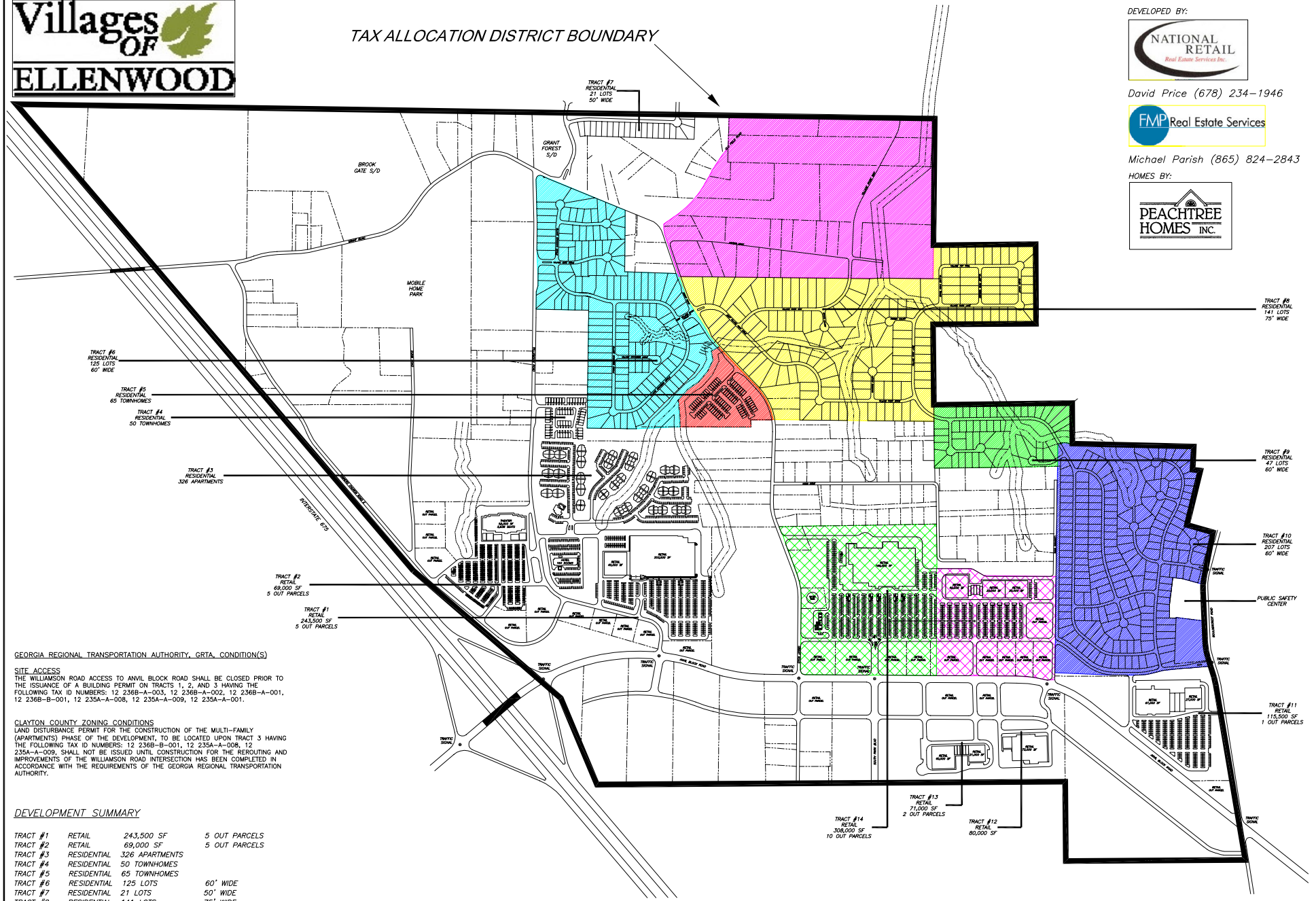
Appendix B: Trip Generation

Appendix C: Year-2017 ICAS with Ellenwood Village and the Development

Appendix A: Ellenwood Village 2006 Master Plan

Villages OF ELLENWOOD

TAX ALLOCATION DISTRICT BOUNDARY



DEVELOPED BY:

NATIONAL RETAIL
Real Estate Services Inc.

David Price (678) 234-1946

FMP Real Estate Services

Michael Parish (865) 824-2843

HOMES BY:

PEACHTREE HOMES INC.

GEORGIA REGIONAL TRANSPORTATION AUTHORITY, GRTA, CONDITION(S)

SITE ACCESS

THE WILLIAMSON ROAD ACCESS TO ANVIL BLOCK ROAD SHALL BE CLOSED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT ON TRACTS 1, 2, AND 3 HAVING THE FOLLOWING TAX ID NUMBERS: 12 236B-A-003, 12 236B-A-002, 12 236B-A-001, 12 236B-B-001, 12 235A-A-008, 12 235A-A-009, 12 235A-A-001.

CLAYTON COUNTY ZONING CONDITIONS

LAND DISTURBANCE PERMIT FOR THE CONSTRUCTION OF THE MULTI-FAMILY (APARTMENTS) PHASE OF THE DEVELOPMENT, TO BE LOCATED UPON TRACT 3 HAVING THE FOLLOWING TAX ID NUMBERS: 12 236B-B-001, 12 235A-A-008, 12 235A-A-009, SHALL NOT BE ISSUED UNTIL CONSTRUCTION FOR THE REROUTING AND IMPROVEMENTS OF THE WILLIAMSON ROAD INTERSECTION HAS BEEN COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE GEORGIA REGIONAL TRANSPORTATION AUTHORITY.

DEVELOPMENT SUMMARY

TRACT #1	RETAIL	243,500 SF	5 OUT PARCELS
TRACT #2	RETAIL	69,000 SF	5 OUT PARCELS
TRACT #3	RESIDENTIAL	326 APARTMENTS	
TRACT #4	RESIDENTIAL	50 TOWNHOMES	
TRACT #5	RESIDENTIAL	65 TOWNHOMES	
TRACT #6	RESIDENTIAL	125 LOTS	60' WIDE
TRACT #7	RESIDENTIAL	21 LOTS	50' WIDE
TRACT #8	RESIDENTIAL	141 LOTS	75' WIDE
TRACT #9	RESIDENTIAL	47 LOTS	60' WIDE
TRACT #10	RESIDENTIAL	207 LOTS	60' WIDE
TRACT #11	RETAIL	115,500 SF	1 OUT PARCELS
TRACT #12	RETAIL	80,000 SF	
TRACT #13	RETAIL	71,000 SF	2 OUT PARCELS
TRACT #14	RETAIL	308,000 SF	10 OUT PARCELS

SEI SOUTHEASTERN ENGINEERING

Villages OF ELLENWOOD

Date | Revision | No.

NORTH

Project No.	20406246
Design By:	NRA
Drawn By:	NRA
Checked By:	CAG
Date:	6/22/06
Scale:	1" = 300'

VILLAGES OF ELLENWOOD
MASTER SITE PLAN
CLAYTON COUNTY, GEORGIA

Appendix B: Trip Generation Worksheets

Trip Generation Summary - POD 1

Project: Anvil Block Undeveloped
Alternative: PODS 1 thru 3

Open Date: 12/17/2015
Analysis Date: 12/17/2015

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
881	STOREDRUGDT 1	485	484	969	18	17	35	50	49	99
	10 Gross Floor Area 1000 SF									
945	GASMARKET 1	1628	1628	3256	102	101	203	135	135	270
	20 Vehicle Fueling Positions									
Unadjusted Volume		2113	2112	4225	120	118	238	185	184	369
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	63	63	126	100	100	200
Volume Added to Adjacent Streets		2113	2112	4225	57	55	112	85	84	169

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - POD 2

Project: Anvil Block Undeveloped
Alternative: PODS 1 thru 3

Open Date: 12/17/2015
Analysis Date: 12/17/2015

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
820	CENTERSHOPPING 1	427	427	854	12	7	19	36	38	74
	20 Gross Leasable Area 1000 SF									
932	RESTAURANTHT 1	636	636	1272	59	49	108	59	40	99
	10 Gross Floor Area 1000 SF									
937	COFFEEDT 1	2047	2046	4093	335	309	644	186	172	358
	5 Gross Floor Area 1000 SF									
Unadjusted Volume		3110	3109	6219	406	365	771	281	250	531
Internal Capture Trips		0	0	0	2	2	4	29	29	58
Pass-By Trips		0	0	0	0	0	0	30	25	55
Volume Added to Adjacent Streets		3110	3109	6219	404	363	767	222	196	418

Total AM Peak Hour Internal Capture = 1 Percent

Total PM Peak Hour Internal Capture = 11 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - POD 3

Project: Anvil Block Undeveloped
Alternative: PODS 1 thru 3

Open Date: 12/17/2015
Analysis Date: 12/17/2015

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
932	RESTAURANTHT 2	636	636	1272	59	49	108	59	40	99
	10 Gross Floor Area 1000 SF									
934	FASTFOODDT 1	1241	1240	2481	116	111	227	85	78	163
	5 Gross Floor Area 1000 SF									
942	AUTOCARE 1				7	4	11	8	8	16
	5 Occupied Gross Leasable Area 1000									
Unadjusted Volume		1877	1876	3753	182	164	346	152	126	278
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	57	54	111	67	56	123
Volume Added to Adjacent Streets		1877	1876	3753	125	110	235	85	70	155

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - POD 4

Project: Anvil Block Undeveloped
Alternative: POD 4

Open Date: 12/17/2015
Analysis Date: 12/17/2015

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
820	CENTERSHOPPING 2	2466	2466	4932	69	42	111	206	223	429
	115.5 Gross Leasable Area 1000 SF									
934	FASTFOODDT 2	1241	1240	2481	116	111	227	85	78	163
	5 Gross Floor Area 1000 SF									
Unadjusted Volume		3707	3706	7413	185	153	338	291	301	592
Internal Capture Trips		0	0	0	11	11	22	57	57	114
Pass-By Trips		0	0	0	54	51	105	89	90	179
Volume Added to Adjacent Streets		3707	3706	7413	120	91	211	145	154	299

Total AM Peak Hour Internal Capture = 7 Percent

Total PM Peak Hour Internal Capture = 19 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - POD 5

Project: Anvil Block Undeveloped
Alternative: PODS 5 and 6

Open Date: 12/17/2015
Analysis Date: 12/17/2015

ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
820	CENTERSHOPPING 3	1708	1708	3416	48	29	77	143	154	297
	80 Gross Leasable Area 1000 SF									
881	STOREDRUGDT 2	485	484	969	18	17	35	50	49	99
	10 Gross Floor Area 1000 SF									
Unadjusted Volume		2193	2192	4385	66	46	112	193	203	396
Internal Capture Trips		0	0	0	0	0	0	0	0	0
Pass-By Trips		0	0	0	0	0	0	73	76	149
Volume Added to Adjacent Streets		2193	2192	4385	66	46	112	120	127	247

Total AM Peak Hour Internal Capture = 0 Percent

Total PM Peak Hour Internal Capture = 0 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Trip Generation Summary - POD 6

Project: Anvil Block Undeveloped
Alternative: PODS 5 and 6

Open Date: 12/17/2015
Analysis Date: 12/17/2015

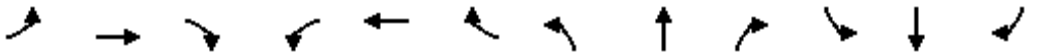
ITE	Land Use	Average Daily Trips			AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
820	CENTERSHOPPING 4	1516	1516	3032	42	26	68	126	137	263
71	Gross Leasable Area 1000 SF									
820	CENTERSHOPPING 5	427	427	854	12	7	19	36	38	74
20	Gross Leasable Area 1000 SF									
934	FASTFOODDT 3	1241	1240	2481	116	111	227	85	78	163
5	Gross Floor Area 1000 SF									
Unadjusted Volume		3184	3183	6367	170	144	314	247	253	500
Internal Capture Trips		0	0	0	8	8	16	57	57	114
Pass-By Trips		0	0	0	55	52	107	74	74	148
Volume Added to Adjacent Streets		3184	3183	6367	107	84	191	116	122	238

Total AM Peak Hour Internal Capture = 5 Percent

Total PM Peak Hour Internal Capture = 23 Percent

Source: Institute of Transportation Engineers, Trip Generation Manual 9th Edition, 2012

Appendix C: Year-2017 ICAS with Ellenwood Village and the Development

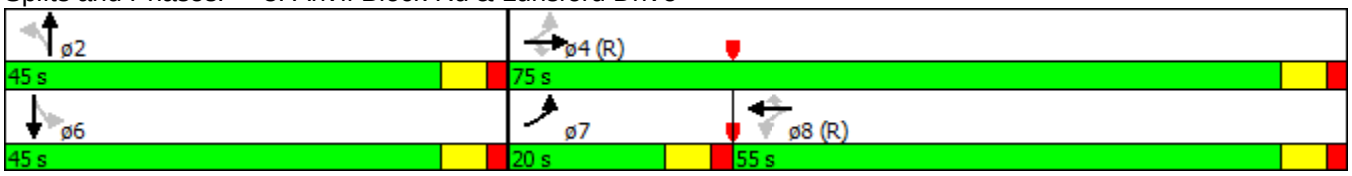


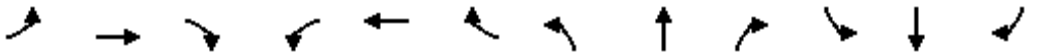
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	845	66	68	643	105	96	0	56	199	0	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	325		0	0		250	0		0	0		300
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1583	0	1770	1583	0
Flt Permitted	0.315			0.311			0.461			0.717		
Satd. Flow (perm)	587	3539	1583	579	3539	1583	859	1583	0	1336	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			72			114		133			331	
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1025			2021			586			369	
Travel Time (s)		15.5			30.6			13.3			8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	918	72	74	699	114	104	0	61	216	0	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	918	72	74	699	114	104	61	0	216	211	0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Minimum Split (s)	12.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	20.0	75.0	75.0	55.0	55.0	55.0	45.0	45.0		45.0	45.0	
Total Split (%)	16.7%	62.5%	62.5%	45.8%	45.8%	45.8%	37.5%	37.5%		37.5%	37.5%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	82.9	82.9	82.9	67.4	67.4	67.4	25.1	25.1		25.1	25.1	
Actuated g/C Ratio	0.69	0.69	0.69	0.56	0.56	0.56	0.21	0.21		0.21	0.21	
v/c Ratio	0.33	0.38	0.06	0.23	0.35	0.12	0.58	0.14		0.77	0.36	
Control Delay	9.3	9.1	2.2	16.8	14.6	2.5	54.2	0.7		62.3	1.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.1	0.1	
Total Delay	9.3	9.1	2.2	16.8	14.6	2.5	54.2	0.7		62.4	1.8	
LOS	A	A	A	B	B	A	D	A		E	A	
Approach Delay		8.7			13.2			34.4			32.5	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)	39	140	0	26	133	1	73	0		160	0	
Queue Length 95th (ft)	82	228	18	63	204	25	122	0		226	0	
Internal Link Dist (ft)		945			1941			506			289	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	325					250						
Base Capacity (vph)	543	2444	1115	324	1986	938	279	604		434	737	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		14	101	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.30	0.38	0.06	0.23	0.35	0.12	0.37	0.10		0.51	0.33	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 15.7		Intersection LOS: B	
Intersection Capacity Utilization 65.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Anvil Block Rd & Lunsford Drive





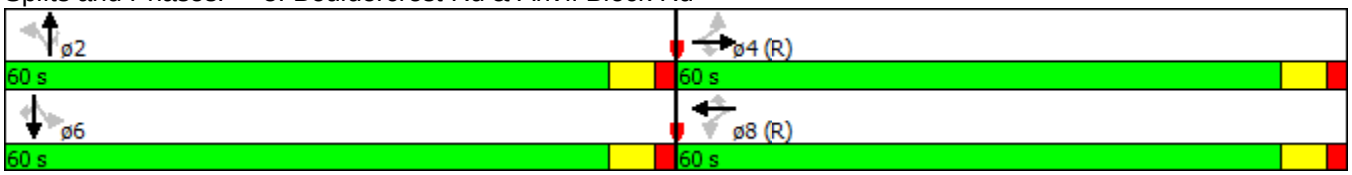
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	293	698	76	5	362	52	70	191	10	134	138	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0	250		250	250		250	250		250
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.508			0.294			0.576			0.437		
Satd. Flow (perm)	946	1863	1583	548	1863	1583	1073	1863	1583	814	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			66			57			27			322
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		2021			1467			1076			1236	
Travel Time (s)		30.6			22.2			16.3			18.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	318	759	83	5	393	57	76	208	11	146	150	322
Shared Lane Traffic (%)												
Lane Group Flow (vph)	318	759	83	5	393	57	76	208	11	146	150	322
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	4	4	4	8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	85.7	85.7	85.7	85.7	85.7	85.7	22.3	22.3	22.3	22.3	22.3	22.3
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71	0.19	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.47	0.57	0.07	0.01	0.30	0.05	0.38	0.60	0.03	0.97	0.43	0.58
Control Delay	8.6	8.7	1.3	7.6	8.0	2.2	45.9	50.8	3.5	112.3	45.3	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	8.7	1.3	7.6	8.0	2.2	45.9	50.8	3.5	112.3	45.3	8.3
LOS	A	A	A	A	A	A	D	D	A	F	D	A
Approach Delay		8.1			7.2			47.8			41.9	
Approach LOS		A			A			D			D	
Queue Length 50th (ft)	64	178	1	1	98	0	52	149	0	113	104	0
Queue Length 95th (ft)	129	272	8	6	193	16	91	205	6	#191	151	70
Internal Link Dist (ft)		1941			1387			996			1156	

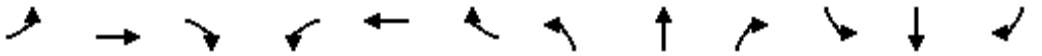
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	250			250		250	250		250	250		250
Base Capacity (vph)	675	1329	1149	391	1329	1146	482	838	727	366	838	889
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.57	0.07	0.01	0.30	0.05	0.16	0.25	0.02	0.40	0.18	0.36

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 20.8 Intersection LOS: C
Intersection Capacity Utilization 79.2% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Bouldercrest Rd & Anvil Block Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	1124	8	54	903	55	8	26	62	47	27	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	275		0	335		0	100		0	415		90
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.894				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3536	0	1770	3539	1583	1770	1665	0	1770	1863	1583
Flt Permitted	0.241			0.228			0.738			0.687		
Satd. Flow (perm)	449	3536	0	425	3539	1583	1375	1665	0	1280	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				82		67				161
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		512			722			506			512	
Travel Time (s)		7.8			10.9			9.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	1222	9	59	982	60	9	28	67	51	29	161
Shared Lane Traffic (%)												
Lane Group Flow (vph)	245	1231	0	59	982	60	9	95	0	51	29	161
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Detector Phase	7	4		8	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	12.0	24.0		24.0	24.0	24.0	24.0	24.0		24.0	24.0	24.0
Total Split (s)	30.0	90.0		60.0	60.0	60.0	30.0	30.0		30.0	30.0	30.0
Total Split (%)	25.0%	75.0%		50.0%	50.0%	50.0%	25.0%	25.0%		25.0%	25.0%	25.0%
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lead/Lag	Lead			Lag	Lag	Lag						
Lead-Lag Optimize?	Yes			Yes	Yes	Yes						
Recall Mode	None	C-Max		C-Max	C-Max	C-Max	Min	Min		Min	Min	Min
Act Effct Green (s)	97.8	97.8		82.0	82.0	82.0	10.2	10.2		10.2	10.2	10.2
Actuated g/C Ratio	0.82	0.82		0.68	0.68	0.68	0.08	0.08		0.08	0.08	0.08
v/c Ratio	0.52	0.43		0.20	0.41	0.05	0.08	0.47		0.47	0.18	0.57
Control Delay	6.7	3.9		10.9	9.7	1.1	49.8	26.6		65.4	52.0	15.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	6.7	3.9		10.9	9.7	1.1	49.8	26.6		65.4	52.0	15.9
LOS	A	A		B	A	A	D	C		E	D	B
Approach Delay		4.3			9.3			28.6			30.7	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	32	111		15	154	0	7	21		38	21	0
Queue Length 95th (ft)	62	173		46	256	10	23	72		78	50	64
Internal Link Dist (ft)		432			642			426			432	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	275			335			100			415		90
Base Capacity (vph)	630	2882		290	2417	1107	275	386		256	372	445
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.39	0.43		0.20	0.41	0.05	0.03	0.25		0.20	0.08	0.36

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.57			
Intersection Signal Delay: 9.2		Intersection LOS: A	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 14: Old Grant Rd & Anvil Block Rd