

October 11, 2021

Township of Montgomery
Zoning Board of Adjustment
2261 Van Horne Road – Route 206 North
Belle Mead, NJ 08502

**RE: Traffic Supplement
Proposed Dunkin' Restaurant
Route 206 & Georgetown-Franklin
Turnpike (CR 518)
Township of Montgomery
Somerset County, NJ
DT# 3334-99-001TE**

Dear Board Members:

Dynamic Traffic has prepared the following to supplement our October 9, 2020 Traffic Impact Assessment for the above referenced project as well as to provide responses to the Traffic Impact Study related comments in the September 12, 2021 review letter from the Board's Traffic Consultant, Bright View Engineering. Specifically, an updated analysis was prepared for the most critical weekday morning peak hour. Dunkin' restaurants generate their peak traffic demand simultaneous with the peak roadway demand during this time period. During the weekday evening peak hour, the Dunkin' traffic generation is less than half of that of the morning. On Saturdays, the peak time period for a Dunkin' restaurant occurs in the morning while the roadway network peak demand occurs during the midday and early afternoon. Therefore, from a traffic impact perspective, the weekday morning peak hour is the most critical.

Updated Analysis Summary

The following is a summary of the updated analysis which followed a similar procedure to that described in our initial Traffic Impact Assessment:

- Manual Turning Movement (MTM) traffic counts were conducted at the intersection of Route 206 and County Route (CR) 518 from 7:00 AM to 9:00 AM on Thursday, October 7, 2021. It is noted that the prior Traffic Impact Assessment relied on data collected in 2013 with a growth rate applied which likely overestimated the overall traffic volumes and would not account for changes in traffic patterns that may have occurred at the intersection over the past 8 years. The traffic count data is appended and the weekday morning peak hour volumes are shown graphically on Figure 1.

- A background growth of 1.25%, identified from the New Jersey Department of Transportation Annual Background Growth Rate Table was applied to the counted traffic volumes. Additionally, as was done in our initial analysis, traffic volumes from the adjacent developments of Sharbell, Baker Auto, Enrollment Management Associates, Montgomery Walk and King Interest Montgomery Redevelopment were added to generate the Future No Build traffic volumes shown on Figure 2.
- Site generated traffic was assigned to the adjacent roadway network which is expanded to display the utilization of the “loop” roads of Brecknell Way and Village Drive which are currently being constructed. The pass-by traffic distribution was modified to account for diversions from all turning movements at the adjacent intersection with additional “weight” given to the movements destined to the west on CR 518 that do not require a diversion to access the Dunkin’ and continue on their route. Primary and pass-by distributions are shown on Figures 3 and 4, respectively. Primary and pass-by site generated traffic volumes are shown on Figures 5 and 6, respectively and the total site generated traffic volumes are shown on Figure 7.
- The total site generated traffic volumes shown in Figure 7 were added to the Future No Build traffic volumes shown in Figure 2 in order to establish the Future Build traffic volumes as shown in Figure 8.
- Capacity analyses were conducted for the intersection of Route 206 with CR 518 under the No Build and Build conditions, as well as the site driveway intersection with CR 518 under the Build condition. The analyses were prepared using the SYNCHRO software package as well as the Highway Capacity Software (HCS) and all analysis printouts are appended. The following table summarizes the results of the capacity analyses in terms of Level of Service (LOS) and delay (seconds per vehicle).

Table I
Future Build Levels of Service

Intersection	Direction/ Movement		AM PSH					
			No Build		Build		Bld. w/ Mit.	
			LOS	Delay	LOS	Delay	LOS	Delay
Route 206 & CR 518	EB	L	D	54.9	D	53.0	D	52.4
		TR	E	71.7	E	69.8	E	66.1
	WB	L	D	39.5	D	38.5	D	36.8
		TR	F	94.3	F	99.0	F	91.3
	NB	L	B	18.7	C	21.3	C	22.9
		TR	C	23.8	C	23.8	C	24.1
	SB	L	B	14.9	B	15.1	B	15.8
		TR	C	33.1	C	33.8	C	34.3
	Overall		D	46.7	D	47.4	D	45.7
CR 518 & Site Driveway	EB	L	N/A	N/A	A	8.7	A	8.7
	SB	R	N/A	N/A	B	13.4	B	13.4

- As shown, consistent with our initial analysis, the signalized intersection of Route 206 and CR 518 experiences capacity constraints with or without the proposed development. However, as was identified in the initial analysis, a minor shift in signal timing will mitigate the intersection operation within NJDOT degradation criteria. This continues to demonstrate the minimal impact the Project will have on the adjacent signalized intersection. The site driveway on CR 518 will operate at Level of Service “B” with a 95th percentile queue length of less than one (1) vehicle.

Response to Bright View Engineering Comments

Below are responses to the comments offered by Bright View Engineering in their September 21, 2021 review letter:

Traffic Impact Study

11. The parking table for the project indicates 16 spaces are provided whereas 5 are required. The ITE parking generation manual identifies an 85th percentile parking demand of 23 spaces for a drive through coffee shop of this size. Justification for the discrepancy between the proposed parking supply and the ITE projected parking demand is required.
 - a. **The Township requirement continues to be five (5) spaces whereas the latest plans depict the provision of eleven (11) parking spaces or 6.01 spaces per 1,000 square feet. This is compliant with the number of parking spaces that Dunkin’ typically seeks to provide and is consistent with the average peak demand of 5.22 spaces per 1,000 square feet as published by ITE. Additionally, our office has conducted research parking counts at three (3) Dunkin’ locations in Middlesex County:**
 - i. **Applegarth Road in Monroe Township**
 - ii. **Route 9 NB in Old Bridge**
 - iii. **Route 1 NB in North Brunswick****Based on these locations, the average peak parking demand was found to be 6.32 spaces per 1,000 square feet on weekday mornings and 5.70 spaces per 1,000 square feet on Saturday mornings. It is important to note these counts were conducted prior to the Covid-19 pandemic which has resulted in a higher reliance on drive-thru usage and mobile ordering. Furthermore, the locations on Route 1 and Route 9 are far more highway oriented and do not have a residential population within walking distance. The location in Monroe Township is most similar to the location in Montgomery and its peak weekday morning demand was 6.00 spaces per 1,000 square feet. It is my professional opinion that 11 parking spaces is appropriate for this site and consistent with a Dunkin’ restaurant with drive-thru.**
12. The TIS states that 16 vehicles can be stored in the queueing area for the site. A queueing analysis indicating if the provided storage is sufficient shall be provided.
 - a. **The revised plans provide stacking for 13 vehicles within the drive-thru system, however, the relocated drive-thru entrance obviates the concern of NJDOT for vehicles stacking into Route 206. Our office has made observations of drive-thru queueing at nine (9) Dunkin’ locations throughout New Jersey and found the maximum queue at any time was nine (9) vehicles. Therefore, the drive-thru**

queueing system is expected to be more than adequate to accommodate the maximum anticipated demand.

13. Additional information / testimony is required regarding internal site circulation, particularly the anticipated queue for vehicles exiting the site onto CR 518. This office is concerned if more than one vehicle is queued to exit the site, internal circulation will be compromised.
 - a. **As described above, the 95th percentile queue for right-turn egress onto CR 518 is calculated to be less than one (1) vehicle.**
14. Additional information / testimony is required regarding the origins and destinations of vehicles to and from the site. For instance, how will pass-by vehicles traveling northbound on Route 206 return to Rt 206 northbound after exiting the site? Additional study locations may be appropriate depending on the identified routing.
 - a. **The traffic volume figures have been expanded to identify the maximum potential use of the “loop” roads of Brecknell Way and Village Drive which both provide access back to Route 206 from westbound CR 518.**
15. Vehicles routinely queue past the site driveways on both US 206 and CR 518. Additional information / testimony should be provided how these queues affect internal site circulation and the ability of large wheelbase vehicles to access the site. This particularly important for large wheelbase vehicles entering the site from US 206, as according to the turning templates provided, they must make the right turn into the site from the dedicated left turn lane.
 - a. **Extended queues along the site frontage will not impact internal circulation as egress is not provided to Route 206 and only right-turn egress is provided along CR 518. Truck volumes are anticipated to be very infrequent and occur outside of peak hours.**
16. The applicant should confirm with the board clerk all of the approved developments which must be taken into account as part of the TIS. At a minimum, the recently approved Country Classics residential development located on US 206 northbound north of the site shall be included as a planned development.
 - a. **Additional development proposals have been included as described above. It is our understanding that the Country Classics residential development was fully completed at the time of the updated traffic counts. Furthermore, this residential development would generate minimal traffic volumes at the subject intersection as compared to the developments that were specifically accounted for and the background traffic growth rate is sufficient to account for these more distant developments.**
17. The applicant's traffic engineer is encouraged to contact this office directly to discuss the trip distributions utilized in the traffic study. This office has concerns that the pass-by routing is not reflective of likely traffic patterns. For instance, zero pass-by traffic was assumed to come from the Rt 206 northbound traffic stream. Similarly, pass-by has not been applied to eastbound traffic on CR 518.

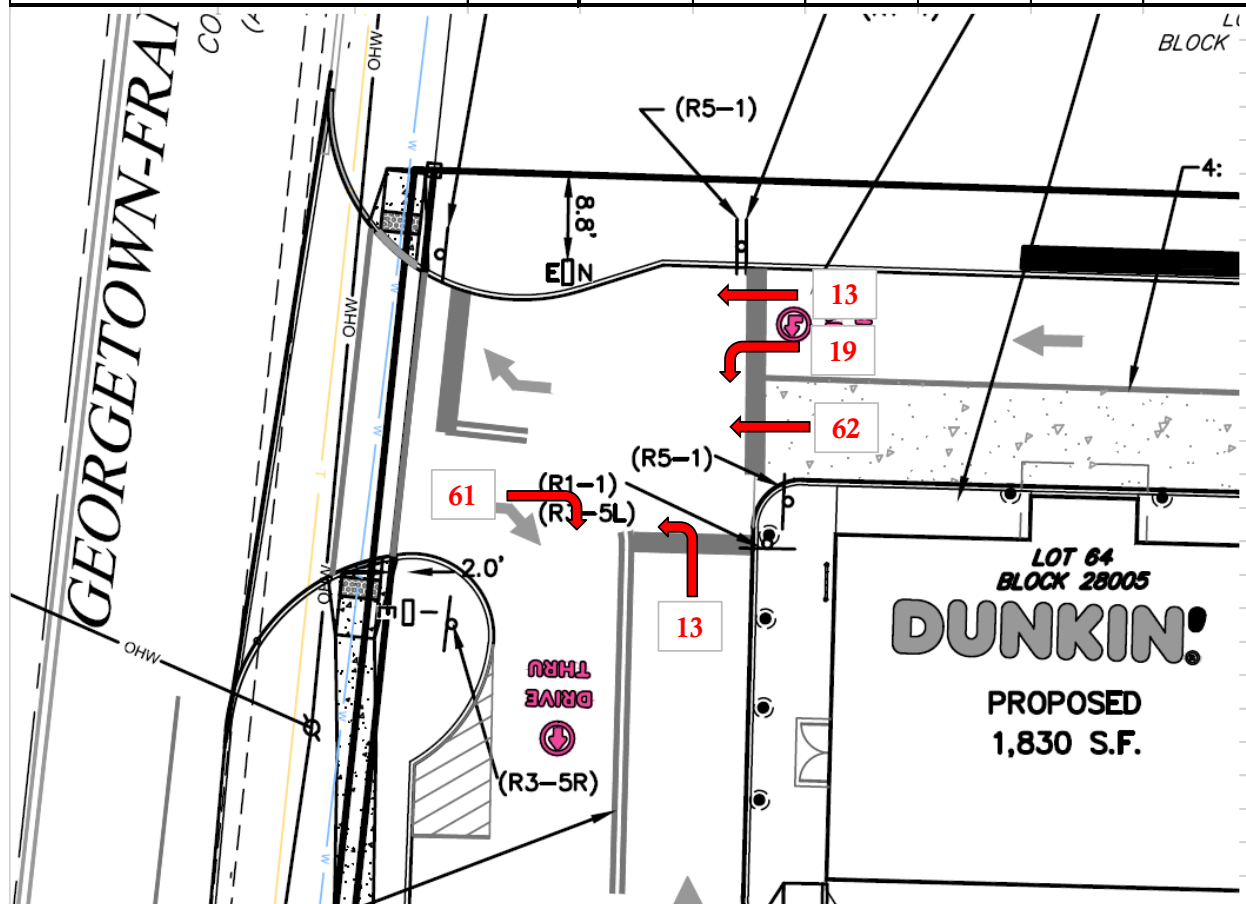
- a. **NJDOT policy is that pass-by traffic only be accounted for at site driveways as a diversion into and out of the site on the same path of travel. The usage of the loop roads would be considered “diverted linked” trips and NJDOT does not allow consideration of this type of trip making. However, we agree that the presence of the “loop” roads will allow for pass-by type of activity for all vehicles entering the adjacent intersection. Therefore, the revised analysis includes this activity and accounts for diverted/pass-by trips for all traffic entering the intersection with additional weight given to the more convenient routing of the traffic flow destined to the west along CR 518. We concur with Bright View that this represents a much more accurate projection of future traffic movements and allows for a more realistic analysis which was performed as described above.**
18. Additional commentary regarding the LOS analysis presented in the TIS will be provided once revisions to the trip distribution/ routing are addressed. An updated traffic study was not provided with the September, 2021 submission. All traffic impact study related comments identified above remain.
- a. **Updated analyses were provided as described above.**

Additional Commentary on Updated Plans

19. As discussed at the recent Site Plan Sub-Committee Meeting, off site directional signage is recommended to direct patrons of the proposed site back to US Route 206. This office recommends trailblazer signs be provided along the loop roads in the vicinity of the site as appropriate.
- a. **Attached is an exhibit depicting the requested trailblazer/wayfinding signage. Our office concurs with Bright View that this signage is appropriate. However, the signage is proposed within the Somerset County right-of-way and is therefore ultimately subject to their approval.**
20. Testimony should be provided regarding the anticipated operation of the area on site where the drive through exit, by-pass lane exit, and CR 518 entrance converge. Of particular concern of this office is what interactions at this location could causing queuing onto CR 518 or otherwise hamper on site circulation.
- a. **An assessment was made of the traffic volumes traversing the internal intersection as tabulated and shown graphically below. Pursuant to transactional data sourced from 27 Dunkin' restaurants, provided to our office by another operator, and, based on the experience of the Applicant, approximately 70% of the site generated traffic utilizes the drive-thru system with 30% parking and walking into the restaurant. This was the basis of the internal routing of the site generated traffic as shown in Table II.**

Table II
Internal Intersection Volume Routing

In From	Total	To	%	AM Volume	NBR	From Bypass Lane		From Drive-Thru		WBL
						SBL	SBT	SBL	SBT	
Route 206	27	Parking	30%	8	0	0	4	0	0	4
		Drive-Thru	70%	19	0	19	0	0	19	0
CR 518	61	Parking	30%	18	18	0	9	0	0	9
		Drive-Thru	70%	43	43	0	0	0	43	0
Total				88	61	19	13	0	62	13



A capacity analysis was prepared with SYNCHRO using the latest Highway Capacity Manual methodology and is appended. The analysis indicates that all movements at the intersection will operate with minimal delay at Level of Service "A" during the critical weekday morning peak hour. Furthermore, the calculated 95th percentile queue lengths are calculated to be less than one (1) vehicle for all approaches. Therefore, it is anticipated that the internal intersection will operate efficiently.

Conclusion

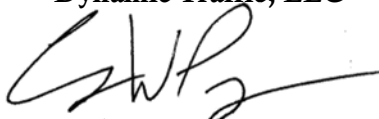
Based upon our initial Traffic Impact Assessment and the supplemental analyses contained herein, it remains the professional opinion of Dynamic Traffic that the adjacent street system of Montgomery Township and NJDOT will not experience any significant degradation in operating conditions with

the redevelopment of the site. The site driveways are located to provide safe access to the adjacent roadway system. The site plan as proposed provides for good circulation throughout the site and provides adequate parking to accommodate The Project's needs.

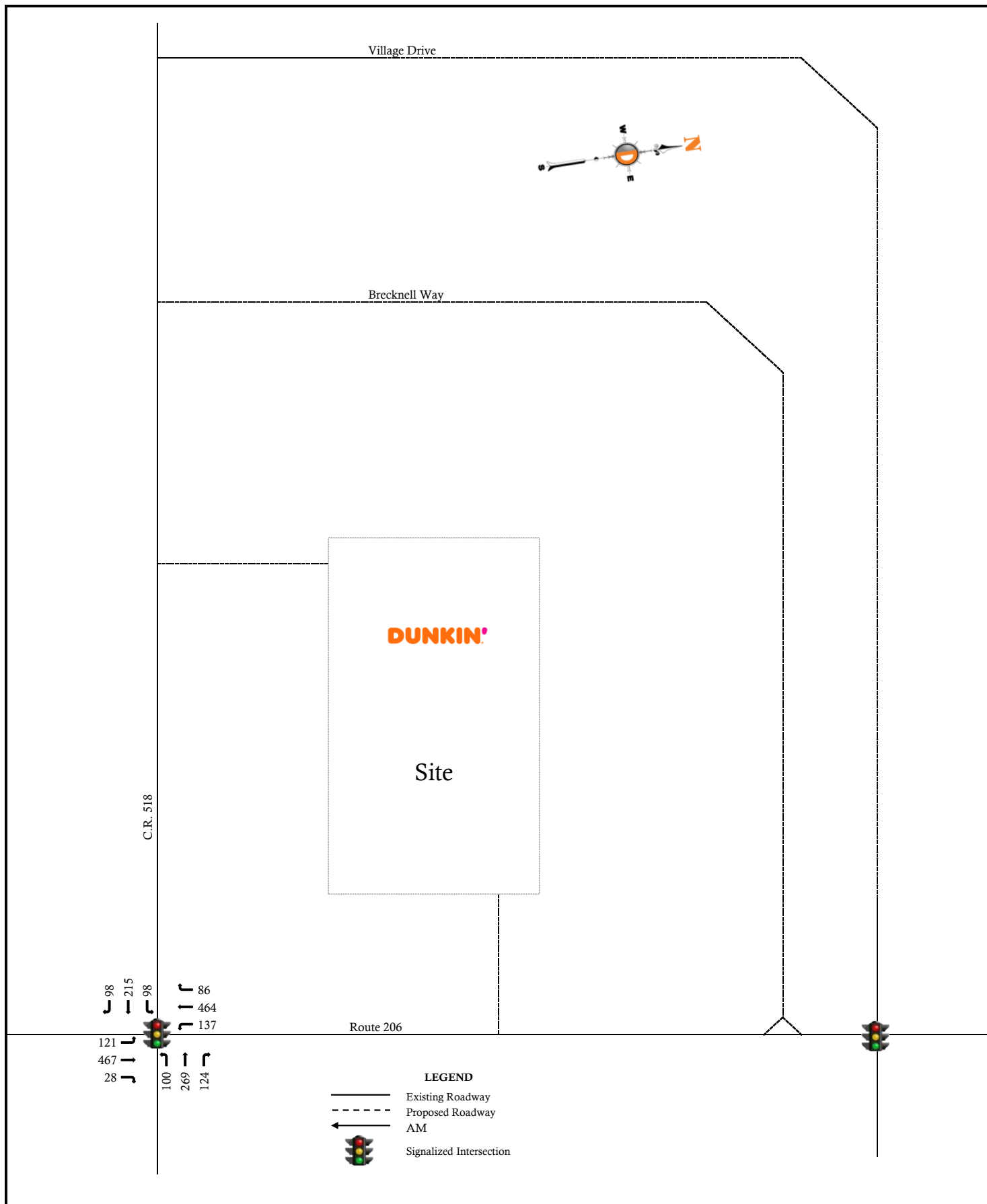
If you have any questions on the above, please do not hesitate to contact me.

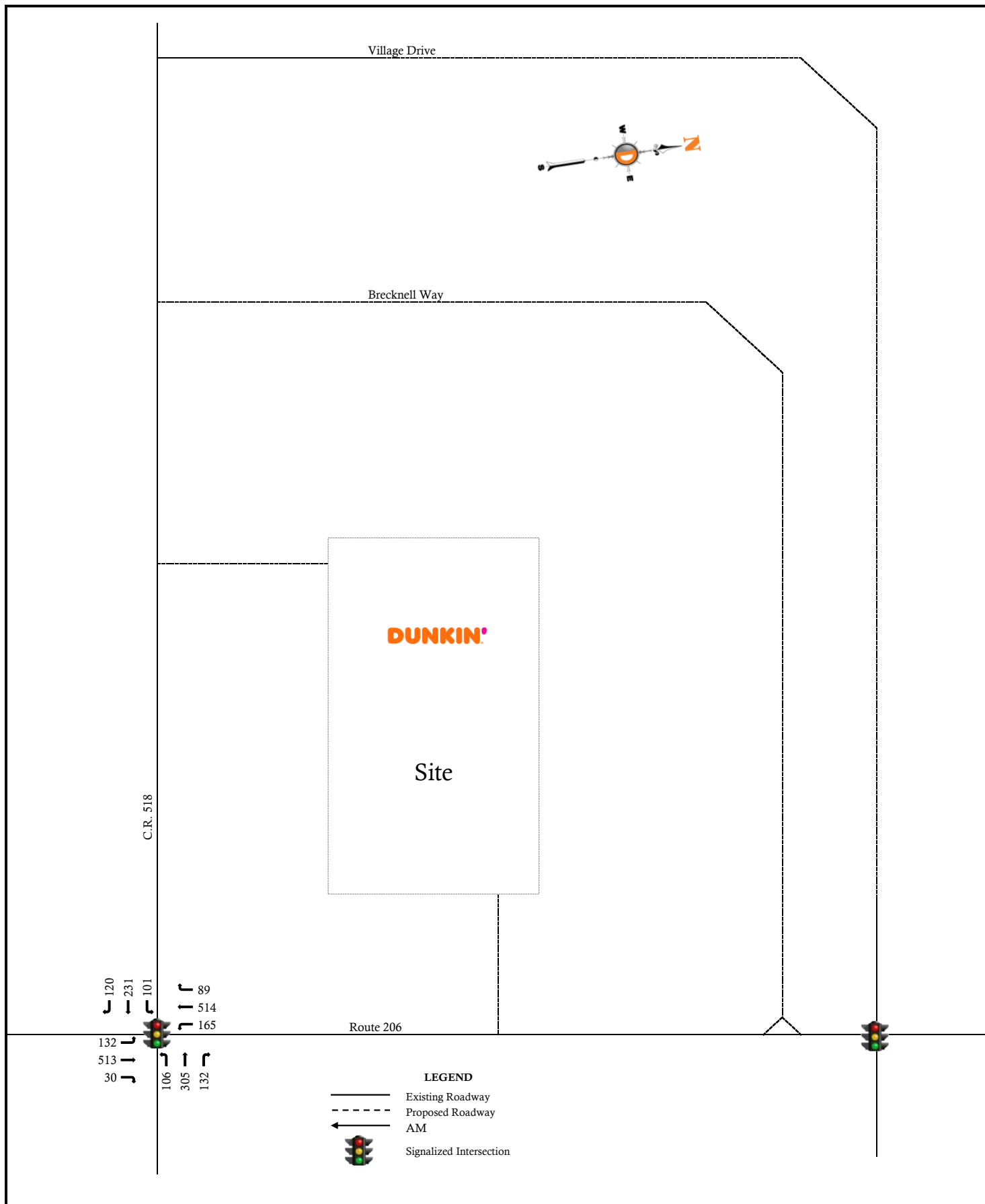
Sincerely,

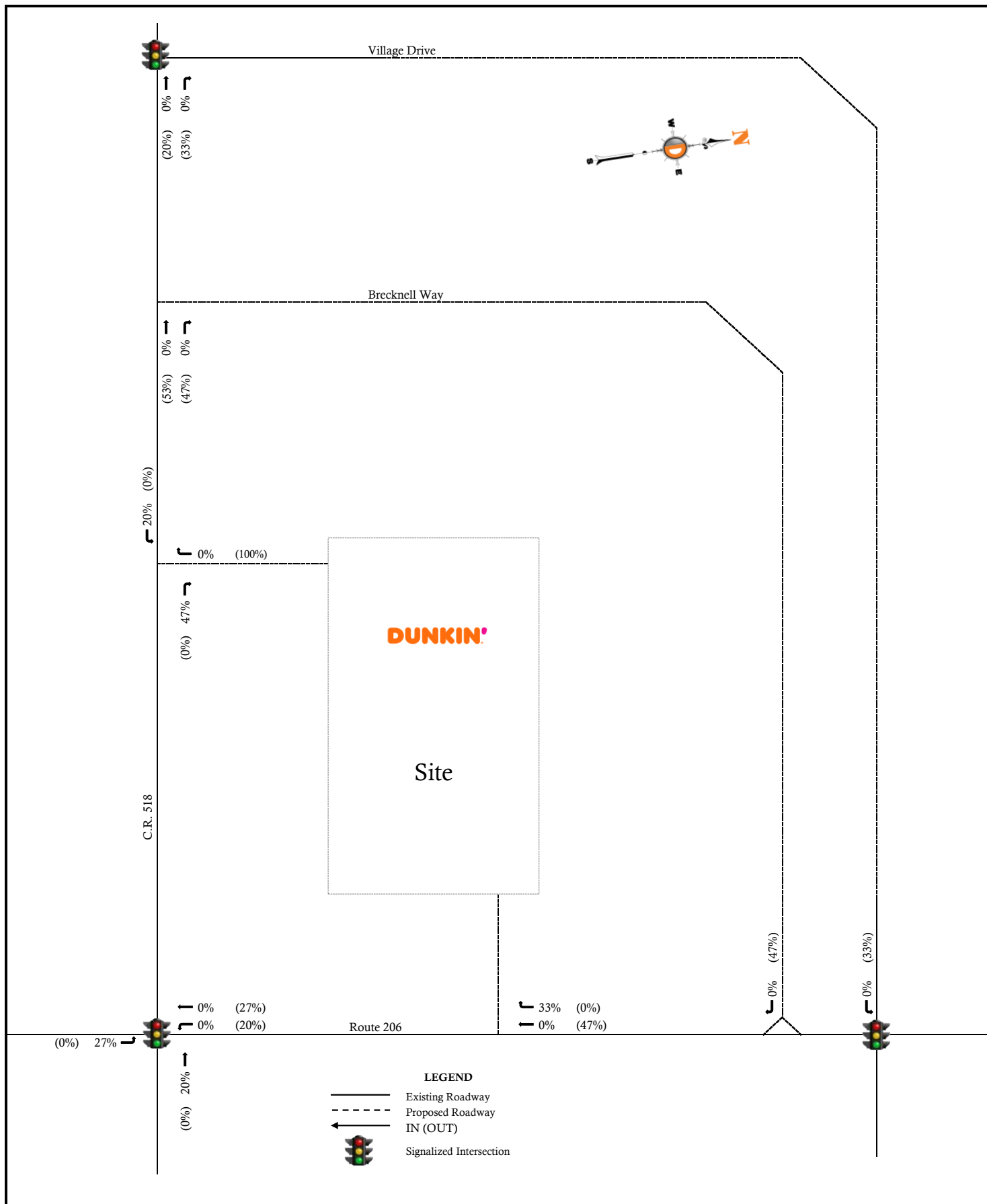
Dynamic Traffic, LLC

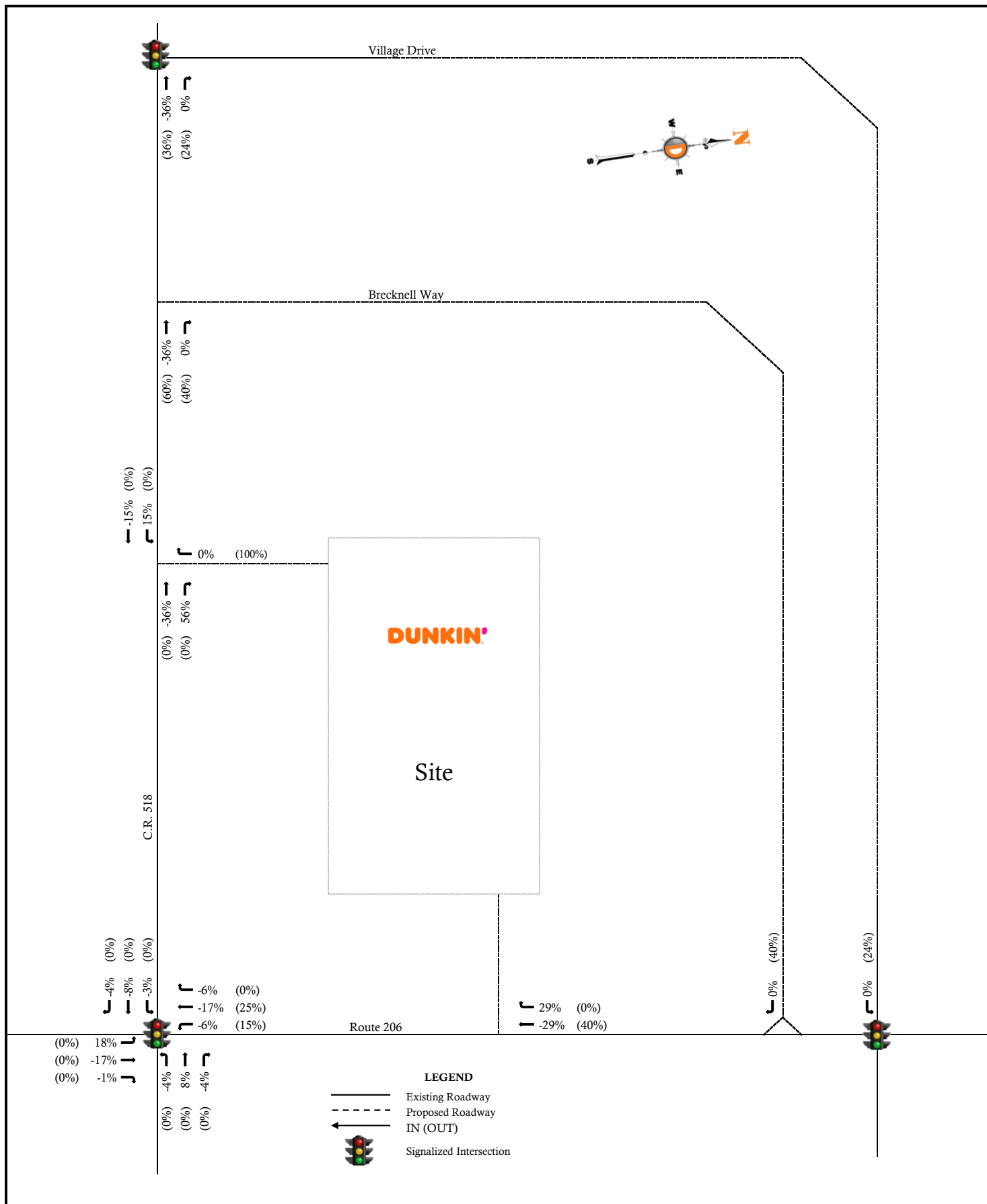
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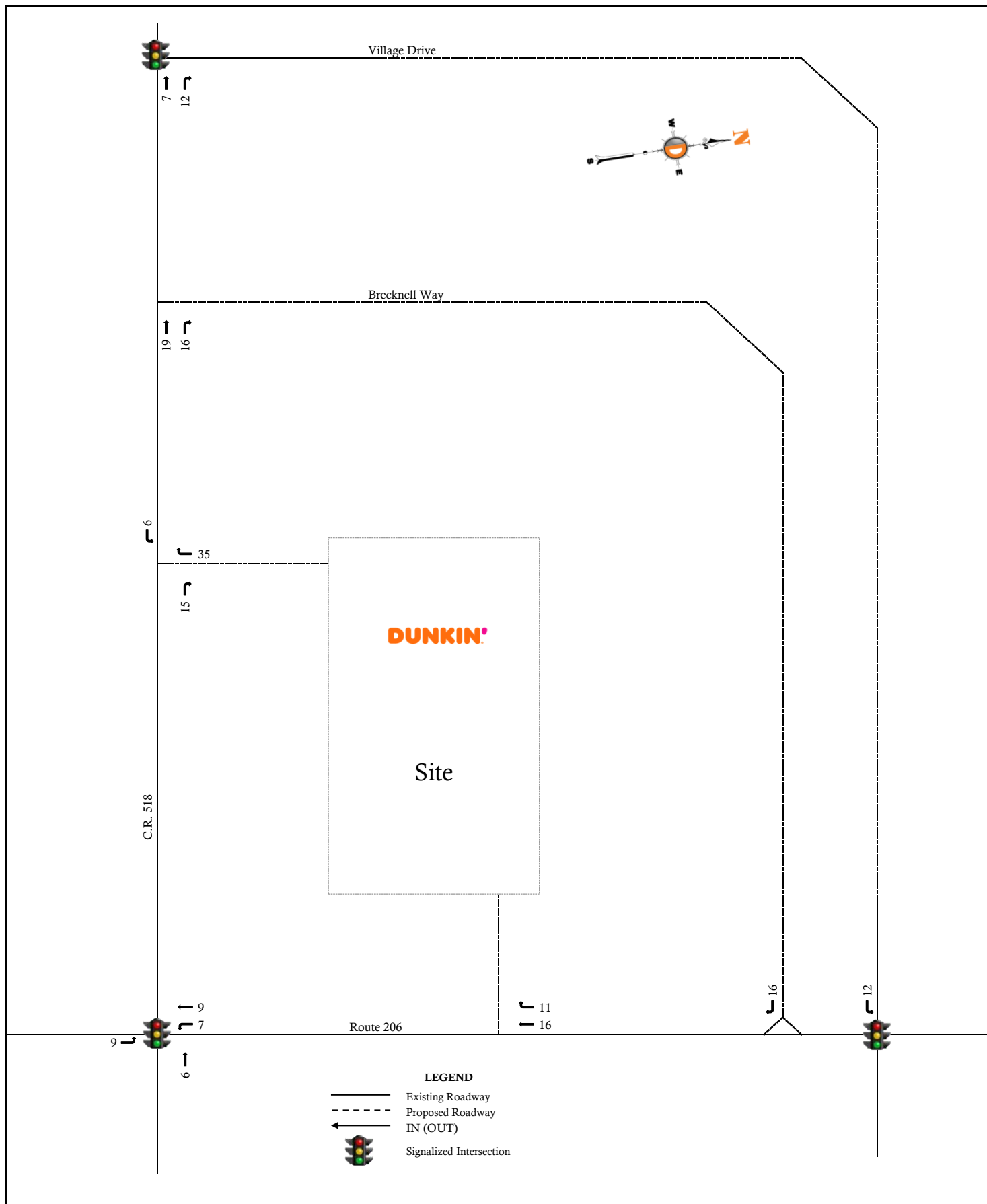
Craig W. Peregoy, PE
Principal
NJ PE License 45880

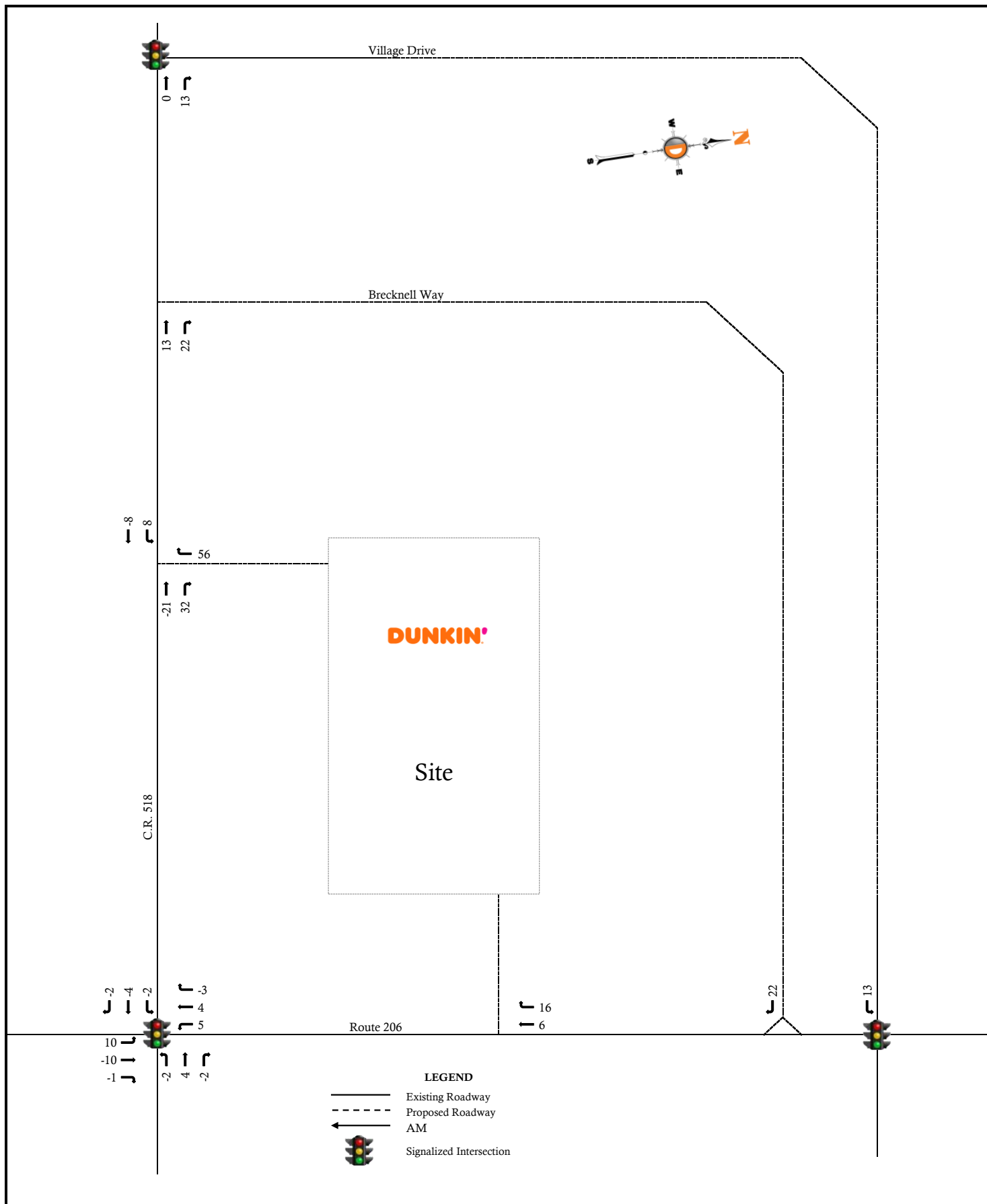


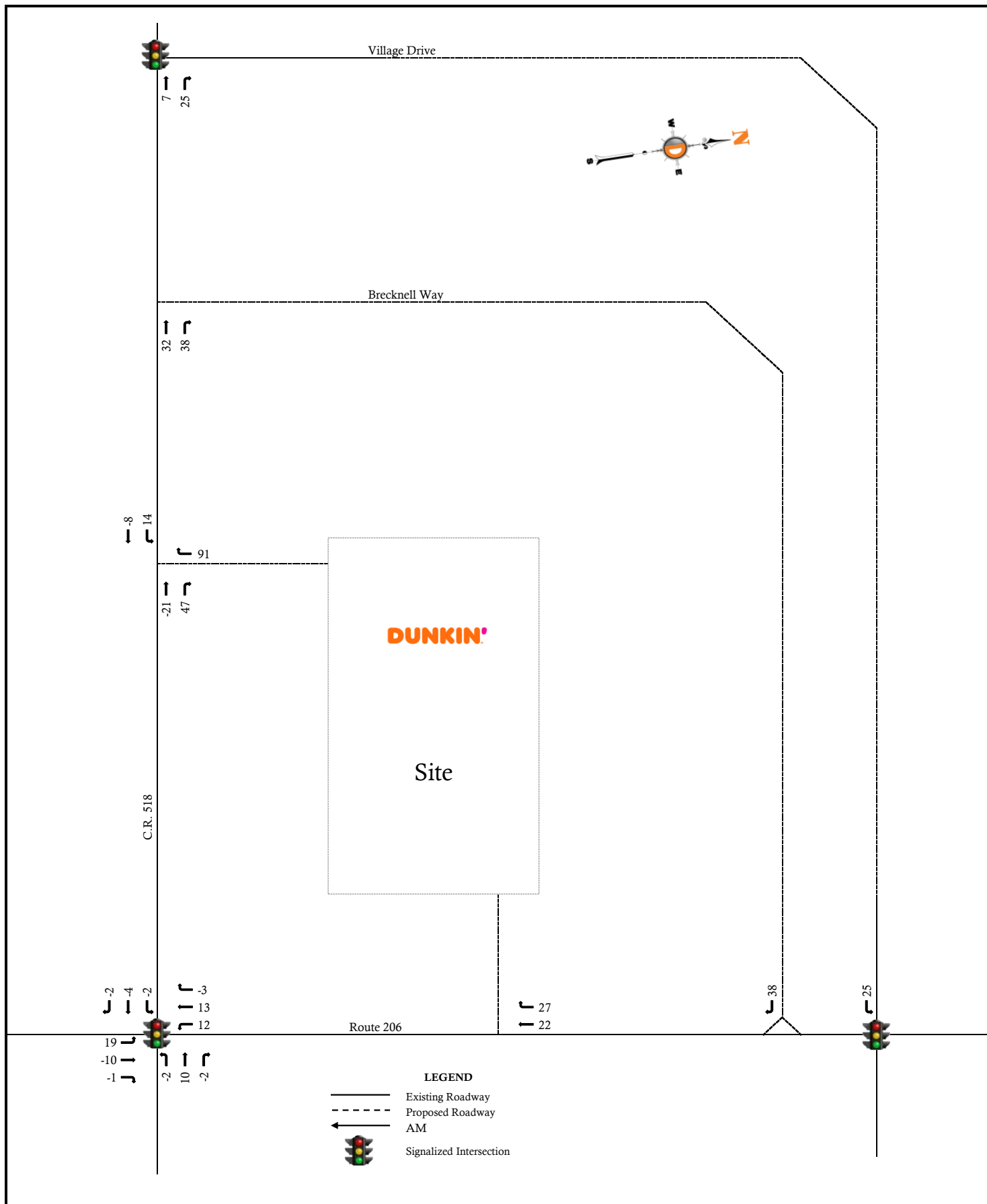


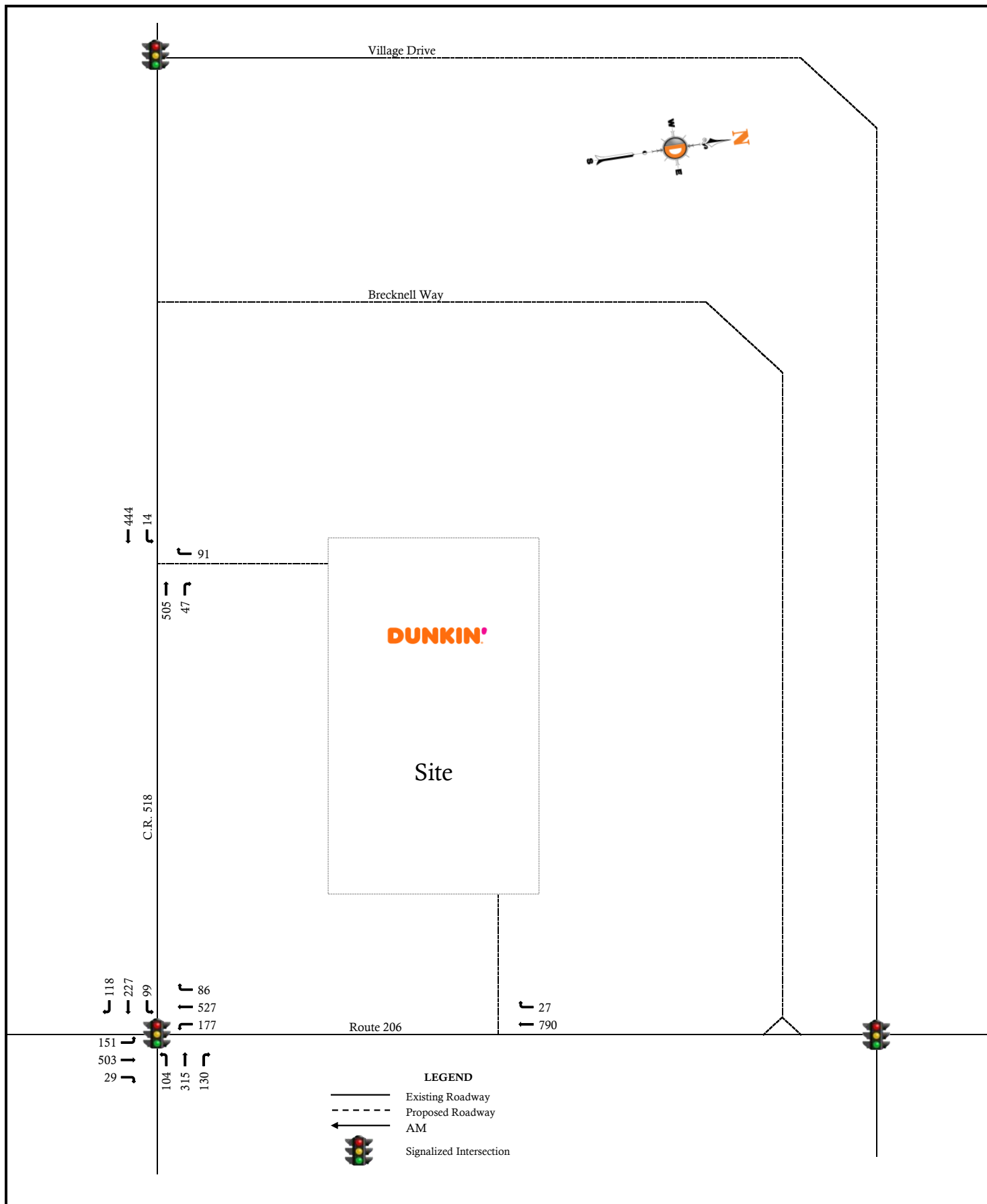












Dynamic Traffic, LLC

1904 Main Street, Lake Como, NJ 07719
245 Main Street - Suite 110, Chester, NJ 07930
732-681-0760

E/W: CR 518

N/S: Rt 206

Town/County: Montgomery/Somerset

Job #: 3334-99-001TE

File Name : Rt 206 & Georgetown Franklin Tpke - AM

Site Code : 00000000

Start Date : 10/7/2021

Page No : 1





















Groups Printed- Cars - Trucks (SU) - Trucks (TT)

	Georgetown Franklin Turnpike (CR 518) Eastbound					Georgetown Franklin Turnpike (CR 518) Westbound					Route 206 Northbound					Route 206 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	12	37	7	0	56	6	48	20	0	74	18	105	7	0	130	33	94	16	0	143	403
07:15 AM	11	32	21	0	64	13	54	11	0	78	40	87	7	0	134	46	123	8	0	177	453
07:30 AM	22	64	27	0	113	30	64	19	0	113	18	108	6	0	132	39	129	14	0	182	540
07:45 AM	22	54	20	0	96	25	68	29	0	122	38	113	7	0	158	31	134	21	0	186	562
Total	67	187	75	0	329	74	234	79	0	387	114	413	27	0	554	149	480	59	0	688	1958
08:00 AM	18	47	20	0	85	24	71	31	0	126	29	108	5	0	142	24	127	19	0	170	523
08:15 AM	27	64	15	0	106	12	69	34	0	115	20	106	6	0	132	34	121	21	0	176	529
08:30 AM	23	45	27	0	95	32	74	30	0	136	31	117	5	0	153	45	114	18	0	177	561
08:45 AM	30	59	36	0	125	32	55	29	0	116	41	136	12	0	189	34	102	28	0	164	594
Total	98	215	98	0	411	100	269	124	0	493	121	467	28	0	616	137	464	86	0	687	2207
Grand Total	165	402	173	0	740	174	503	203	0	880	235	880	55	0	1170	286	944	145	0	1375	4165
Apprch %	22.3	54.3	23.4	0		19.8	57.2	23.1	0		20.1	75.2	4.7	0		20.8	68.7	10.5	0		
Total %	4	9.7	4.2	0	17.8	4.2	12.1	4.9	0	21.1	5.6	21.1	1.3	0	28.1	6.9	22.7	3.5	0	33	
Cars	163	386	144	0	693	171	483	195	0	849	214	840	47	0	1101	278	904	135	0	1317	3960
% Cars	98.8	96	83.2	0	93.6	98.3	96	96.1	0	96.5	91.1	95.5	85.5	0	94.1	97.2	95.8	93.1	0	95.8	95.1
Trucks (SU)	2	16	28	0	46	3	18	6	0	27	20	16	7	0	43	7	28	9	0	44	160
% Trucks (SU)	1.2	4	16.2	0	6.2	1.7	3.6	3	0	3.1	8.5	1.8	12.7	0	3.7	2.4	3	6.2	0	3.2	3.8
Trucks (TT)	0	0	1	0	1	0	2	2	0	4	1	24	1	0	26	1	12	1	0	14	45
% Trucks (TT)	0	0	0.6	0	0.1	0	0.4	1	0	0.5	0.4	2.7	1.8	0	2.2	0.3	1.3	0.7	0	1	1.1

	Georgetown Franklin Turnpike (CR 518) Eastbound					Georgetown Franklin Turnpike (CR 518) Westbound					Route 206 Northbound					Route 206 Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	18	47	20	0	85	24	71	31	0	126	29	108	5	0	142	24	127	19	0	170	523
08:15 AM	27	64	15	0	106	12	69	34	0	115	20	106	6	0	132	34	121	21	0	176	529
08:30 AM	23	45	27	0	95	32	74	30	0	136	31	117	5	0	153	45	114	18	0	177	561
08:45 AM	30	59	36	0	125	32	55	29	0	116	41	136	12	0	189	34	102	28	0	164	594
Total Volume	98	215	98	0	411	100	269	124	0	493	121	467	28	0	616	137	464	86	0	687	2207
% App. Total	23.8	52.3	23.8	0		20.3	54.6	25.2	0		19.6	75.8	4.5	0		19.9	67.5	12.5	0		
PHF	.817	.840	.681	.000	.822	.781	.909	.912	.000	.906	.738	.858	.583	.000	.815	.761	.913	.768	.000	.970	.929
Cars	97	208	87	0	392	97	259	119	0	475	109	453	26	0	588	132	440	81	0	653	2108
% Cars	99.0	96.7	88.8	0	95.4	97.0	96.3	96.0	0	96.3	90.1	97.0	92.9	0	95.5	96.4	94.8	94.2	0	95.1	95.5
Trucks (SU)	1	7	10	0	18	3	8	4	0	15	12	7	2	0	21	4	16	4	0	24	78
% Trucks (SU)	1.0	3.3	10.2	0	4.4	3.0	3.0	3.2	0	3.0	9.9	1.5	7.1	0	3.4	2.9	3.4	4.7	0	3.5	3.5
Trucks (TT)	0	0	1	0	1	0	2	1	0	3	0	7	0	0	7	1	8	1	0	10	21
% Trucks (TT)	0	0	1.0	0	0.2	0	0.7	0.8	0	0.6	0	1.5	0	0	1.1	0.7	1.7	1.2	0	1.5	1.0













3334-99-001TE
Proposed Dunkin

No Build AM Peak Hour
5: US Route 206 & Georgetown-Franklin Turnpike

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	231	120	106	305	132	132	513	30	165	514	89
Future Volume (vph)	101	231	120	106	305	132	132	513	30	165	514	89
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Lane Width (ft)	11	11	11	11	12	12	11	12	12	12	15	13
Storage Length (ft)	150		0	150		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			25			25			200		
Right Turn on Red			No			Yes			No			No
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		744			946			886			778	
Travel Time (s)		14.5			18.4			15.1			13.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	3%	11%	3%	4%	4%	10%	3%	7%	5%	5%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	377	0	114	470	0	142	584	0	177	649	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	62.0		7.0	62.0	
Minimum Split (s)	10.0	15.0		10.0	15.0		10.0	69.0		10.0	69.0	
Total Split (s)	10.0	42.0		10.0	42.0		14.0	69.0		14.0	69.0	
Total Split (%)	7.4%	31.1%		7.4%	31.1%		10.4%	51.1%		10.4%	51.1%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	0.0	3.0		0.0	3.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	8.0		3.0	8.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	46.0	34.0		46.0	34.0		76.6	63.2		77.4	63.6	
Actuated g/C Ratio	0.34	0.25		0.34	0.25		0.57	0.47		0.57	0.47	
v/c Ratio	0.70	0.88		0.53	1.02		0.50	0.35		0.37	0.69	
Control Delay	54.9	71.7		39.5	94.3		18.7	23.8		14.9	33.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	54.9	71.7		39.5	94.3		18.7	23.8		14.9	33.1	
LOS	D	E		D	F		B	C		B	C	
Approach Delay		67.9			83.6			22.8			29.2	
Approach LOS		E			F			C			C	
Queue Length 50th (ft)	65	320		68	~424		53	170		67	439	
Queue Length 95th (ft)	#123	#500		115	#644		86	217		104	595	
Internal Link Dist (ft)		664			866			806			698	
Turn Bay Length (ft)	150			150			150			200		
Base Capacity (vph)	155	426		217	462		303	1665		491	939	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	

3334-99-001TE
Proposed Dunkin

No Build AM Peak Hour
5: US Route 206 & Georgetown-Franklin Turnpike

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.70	0.88		0.53	1.02		0.47	0.35		0.36	0.69	

Intersection Summary

Area Type: Other

Cycle Length: 135

Actuated Cycle Length: 135

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection

Natural Cycle: 125

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 46.7

Intersection LOS: D

Intersection Capacity Utilization 109.0%

ICU Level of Service H

Analysis Period (min) 15









~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.























Queue shown is maximum after two cycles.

Splits and Phases: 5: US Route 206 & Georgetown-Franklin Turnpike

 Ø1	 Ø2 (R)	 Ø3	 Ø4
14 s	69 s	10 s	42 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
14 s	69 s	10 s	42 s













Build AM Peak Hour
Proposed Dunkin

Build AM Peak Hour
5: US Route 206 & Georgetown-Franklin Turnpike

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	227	118	104	315	130	151	503	29	177	527	86
Future Volume (vph)	99	227	118	104	315	130	151	503	29	177	527	86
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Lane Width (ft)	11	11	11	11	12	12	11	12	12	12	15	13
Storage Length (ft)	150		0	150		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			25			25			200		
Right Turn on Red			No			Yes			No			No
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		744			946			886			778	
Travel Time (s)		14.5			18.4			15.1			13.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	3%	11%	3%	4%	4%	10%	3%	7%	5%	5%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	371	0	112	479	0	162	572	0	190	659	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	62.0		7.0	62.0	
Minimum Split (s)	10.0	15.0		10.0	15.0		10.0	69.0		10.0	69.0	
Total Split (s)	10.0	42.0		10.0	42.0		14.0	69.0		14.0	69.0	
Total Split (%)	7.4%	31.1%		7.4%	31.1%		10.4%	51.1%		10.4%	51.1%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	0.0	3.0		0.0	3.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	8.0		3.0	8.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	46.0	34.0		46.0	34.0		76.7	62.9		77.3	63.2	
Actuated g/C Ratio	0.34	0.25		0.34	0.25		0.57	0.47		0.57	0.47	
v/c Ratio	0.68	0.87		0.50	1.04		0.58	0.34		0.39	0.70	
Control Delay	53.0	69.8		38.5	99.0		21.3	23.8		15.1	33.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	53.0	69.8		38.5	99.0		21.3	23.8		15.1	33.8	
LOS	D	E		D	F		C	C		B	C	
Approach Delay		66.1			87.5			23.3			29.7	
Approach LOS		E			F			C			C	
Queue Length 50th (ft)	63	313		67	~441		61	166		73	455	
Queue Length 95th (ft)	#116	#490		113	#663		97	212		111	607	
Internal Link Dist (ft)		664			866			806			698	
Turn Bay Length (ft)	150			150			150			200		
Base Capacity (vph)	155	426		222	462		293	1659		497	935	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	

Build AM Peak Hour
Proposed Dunkin

Build AM Peak Hour
5: US Route 206 & Georgetown-Franklin Turnpike

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.68	0.87		0.50	1.04		0.55	0.34		0.38	0.70	

Intersection Summary

Area Type: Other

Cycle Length: 135

Actuated Cycle Length: 135

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection

Natural Cycle: 125

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 47.4

Intersection LOS: D

Intersection Capacity Utilization 110.1%

ICU Level of Service H

Analysis Period (min) 15











~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.





















Queue shown is maximum after two cycles.

Splits and Phases: 5: US Route 206 & Georgetown-Franklin Turnpike

				
Ø1	Ø2 (R)		Ø3	Ø4
14 s	69 s		10 s	42 s
				
Ø5	Ø6 (R)		Ø7	Ø8
14 s	69 s		10 s	42 s













Build AM Peak Hour with Mitigation
Proposed Dunkin

Build AM Peak Hour with Mitigation
5: US Route 206 & Georgetown-Franklin Turnpike

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	227	118	104	315	130	151	503	29	177	527	86
Future Volume (vph)	99	227	118	104	315	130	151	503	29	177	527	86
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Lane Width (ft)	11	11	11	11	12	12	11	12	12	12	15	13
Storage Length (ft)	150		0	150		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			25			25			200		
Right Turn on Red			No			Yes			No			No
Link Speed (mph)		35			35			40			40	
Link Distance (ft)		744			946			886			778	
Travel Time (s)		14.5			18.4			15.1			13.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	3%	11%	3%	4%	4%	10%	3%	7%	5%	5%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	371	0	112	479	0	162	572	0	190	659	0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	61.0		7.0	61.0	
Minimum Split (s)	10.0	15.0		10.0	15.0		10.0	68.0		10.0	68.0	
Total Split (s)	10.0	43.0		10.0	43.0		13.0	69.0		13.0	69.0	
Total Split (%)	7.4%	31.9%		7.4%	31.9%		9.6%	51.1%		9.6%	51.1%	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	0.0	3.0		0.0	3.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	8.0		3.0	8.0		3.0	7.0		3.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Act Effect Green (s)	47.0	35.0		47.0	35.0		75.8	62.5		76.2	62.7	
Actuated g/C Ratio	0.35	0.26		0.35	0.26		0.56	0.46		0.56	0.46	
v/c Ratio	0.68	0.85		0.48	1.01		0.60	0.35		0.40	0.71	
Control Delay	52.4	66.1		36.8	91.3		22.9	24.1		15.8	34.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	52.4	66.1		36.8	91.3		22.9	24.1		15.8	34.3	
LOS	D	E		D	F		C	C		B	C	
Approach Delay		63.0			81.0			23.8			30.2	
Approach LOS		E			F			C			C	
Queue Length 50th (ft)	62	310		66	~417		62	166		74	458	
Queue Length 95th (ft)	#117	#478		112	#650		99	212		114	607	
Internal Link Dist (ft)		664			866			806			698	
Turn Bay Length (ft)	150			150			150			200		
Base Capacity (vph)	155	438		232	475		276	1648		482	927	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	

Build AM Peak Hour with Mitigation Proposed Dunkin

Build AM Peak Hour with Mitigation 5: US Route 206 & Georgetown-Franklin Turnpike

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.68	0.85		0.48	1.01		0.59	0.35		0.39	0.71	

Intersection Summary

Area Type: Other

Cycle Length: 135

Actuated Cycle Length: 135

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection

Natural Cycle: 125

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 45.7

Intersection LOS: D

Intersection Capacity Utilization 109.3%

ICU Level of Service H

Analysis Period (min) 15

















~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: US Route 206 & Georgetown-Franklin Turnpike

							
Ø1	Ø2 (R)			Ø3	Ø4		
13 s	69 s			10 s	43 s		
							
Ø5	Ø6 (R)			Ø7	Ø8		
13 s	69 s			10 s	43 s		

HCS7 Two-Way Stop-Control Report

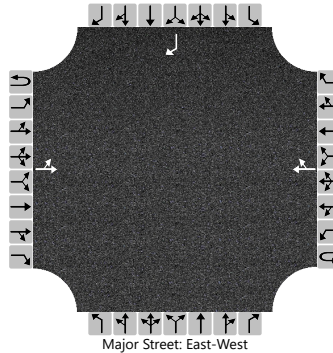
General Information

Analyst	CWP
Agency/Co.	Dynamic Traffic, LLC
Date Performed	10/11/2021
Analysis Year	
Time Analyzed	Build AM Peak Hour
Intersection Orientation	East-West
Project Description	Dunkin - Montgomery

Site Information

Intersection	Site Driveway & CR 518
Jurisdiction	Somerset County
East/West Street	CR. 518
North/South Street	Site Driveway
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	1
Configuration		LT						TR								R
Volume (veh/h)		14	444				505	47								91
Percent Heavy Vehicles (%)		0														0
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized													No			
Median Type Storage	Undivided															




Critical and Follow-up Headways

Base Critical Headway (sec)		4.1														6.2
Critical Headway (sec)		4.10														6.20
Base Follow-Up Headway (sec)		2.2														3.3
Follow-Up Headway (sec)		2.20														3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		15														98
Capacity, c (veh/h)		992														526
v/c Ratio		0.02														0.19
95% Queue Length, Q ₉₅ (veh)		0.0														0.7
Control Delay (s/veh)		8.7														13.4
Level of Service (LOS)		A														B
Approach Delay (s/veh)	0.4												13.4			
Approach LOS													B			

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations								
Traffic Vol, veh/h	13	0	0	0	19	13	62	0
Future Vol, veh/h	13	0	0	0	19	13	62	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2
Mvmt Flow	14	0	0	0	21	14	67	0
Number of Lanes	1	0	0	0	0	1	1	0

Approach	WB	SB	SW
Opposing Approach		NB	
Opposing Lanes	0	1	0
Conflicting Approach Left	NB	SW	WB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	SB		SB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.5	7.5	7.7
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1	SWLn1
Vol Left, %	0%	100%	59%	100%
Vol Thru, %	0%	0%	41%	0%
Vol Right, %	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	61	13	32	62
LT Vol	0	13	19	62
Through Vol	0	0	13	0
RT Vol	61	0	0	0
Lane Flow Rate	66	14	35	67
Geometry Grp	1	1	1	1
Degree of Util (X)	0.064	0.017	0.041	0.08
Departure Headway (Hd)	3.47	4.393	4.295	4.271
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	1025	809	829	838
Service Time	1.515	2.45	2.347	2.302
HCM Lane V/C Ratio	0.064	0.017	0.042	0.08
HCM Control Delay	6.8	7.5	7.5	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.1	0.1	0.3

