Appendix

Field Inventory

Kimley-Horn and Associates, Inc.

Project Description:

FIELD SURVEY NOTES (1 of 2)

Intersection: US 521 at Van Wyck Road — Date: 1/21/2014

Main Street: US 521 — Visited By: DT and LR

NB Approach: US 521 — Posted Speed: 45 MPH

SB Approach: US 521 — Posted Speed: 45 MPH

EB Approach: Van Wyck Road — Posted Speed: 50 MPH

WB Approach: 6 Mile Church Road — Posted Speed: not posted

Other: — Posted Speed:

Approach	Head Types (L to R)	LT Phase Type	RT Overlap?	Ped Heads	Push Buttons?	X-walk?	On-Street Parking?	Pre-emption?
NB	JJJ	Prot (Perm) P+P Split	Y (N)	N	Y (N)	Y (N)	Y (N)	RR EMS
SB	JJ	Prot (Perm) P+P Split	Y (N)	N	Y (N)	Y (N)	Y (N)	RR EMS
EB	JJJ	Prot (Perm) P+P Split	Y (N)	N	Y (N)	Y (N)	Y (N)	RR EMS
WB	JJ	Prot (Perm) P+P Split	Y (N)	N	Y (N)	Y (N)	Y (N)	RR EMS
		Prot (Perm) P+P Split	Y N		Y N	Y N	Y N	RR EMS

Approach	Laneage (L to R)	# of Receiving Lanes	LT Storage Length	RT Storage Length	Signal Support
NB	↰↑↑↱	2	150'	—	MA (SW)
SB	↑↑↱	2	TWLTL	—	MA (SW)
EB	↰↑↱	1	150'	—	MA (SW)
WB	↰↑↱	1	—	—	MA (SW)
					MA SW

Photos:

1)
2)
3)
4)
5)
6)
7)
8)

Prot = Protected Left Turn (green arrow)

Perm = Permitted Left Turn (green ball)

P+P = Protected/Permitted Left Turn (green arrow to green ball)

Split = Split Phase (all lanes on the approach simultaneous)

MA = Mast Arms — SW = Span Wire

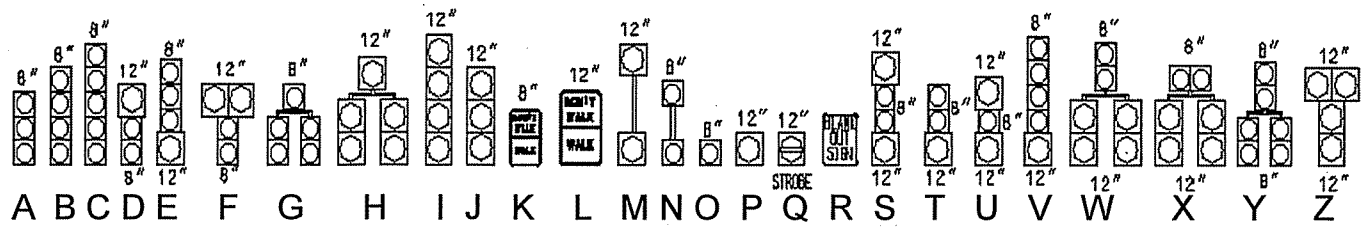
L = Left Turn Only Lane — LT = Left/Thru Lane

T = Thru Lane — TR = Thru/Right Lane

LTR = Left/Thru/Right Lane — R = Right Turn Only Lane

Notes:

Signal Inventory ID #: 4497



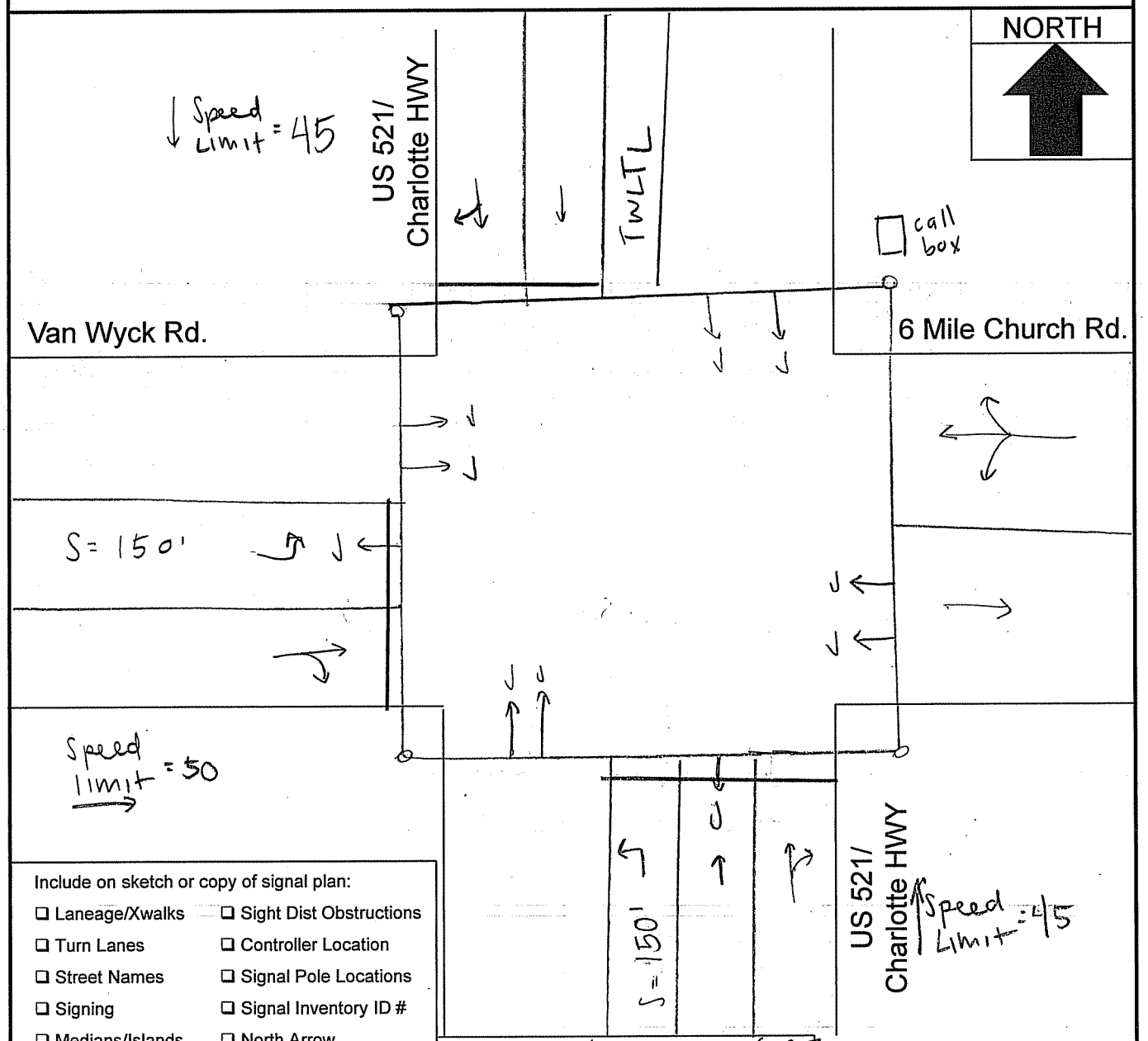
Kimley-Horn and Associates, Inc.

Project Description:

FIELD SURVEY NOTES (2 of 2)

Intersection: US 521 at Van Wyck Road Date : 1/21/2014

SKETCH OF INTERSECTION



Include on sketch or copy of signal plan:

- ❑ Laneage/Xwalks
- ❑ Turn Lanes
- ❑ Street Names
- ❑ Signing
- ❑ Medians/Islands
- ❑ Sight Dist Obstructions
- ❑ Controller Location
- ❑ Signal Pole Locations
- ❑ Signal Inventory ID #
- ❑ North Arrow

Signal Inventory ID #: 4497 Drawn By: DT and LR

Notes:

- poor WB sight distance
- alot of existing potholes / deterioration along Van Wyck Rd

Turning Movement Counts

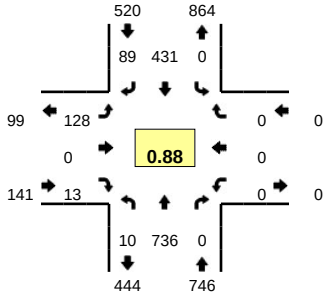
Type of peak hour being reported: Intersection Peak

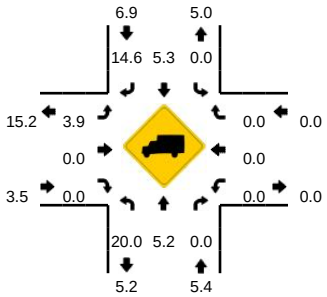
Method for determining peak hour: Total Entering Volume

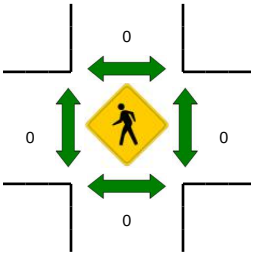
LOCATION: US 521 -- Van Wyck Rd/6 Mile Church Rd
CITY/STATE: Fort Mill, SC

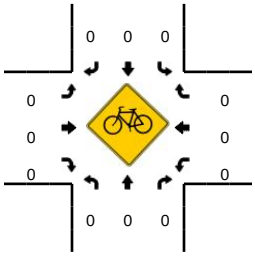
QC JOB #: 12006901
DATE: Tue, Jan 14 2014

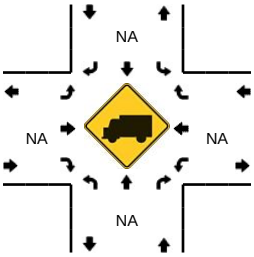
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

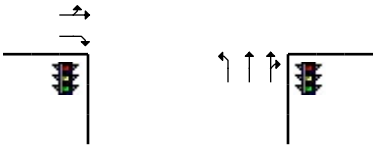


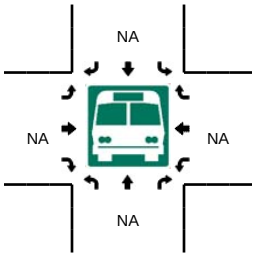












15-Min Count Period Beginning At	US 521 (Northbound)				US 521 (Southbound)				Van Wyck Rd/6 Mile Church Rd (Eastbound)				Van Wyck Rd/6 Mile Church Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	162	0	0	0	79	23	0	27	0	2	0	0	0	0	0	293	
7:15 AM	1	165	0	0	0	117	24	0	29	0	5	0	0	0	0	0	341	
7:30 AM	3	213	0	0	0	124	23	0	36	0	2	0	0	0	0	0	401	
7:45 AM	3	197	0	0	0	84	23	0	33	0	5	0	0	0	0	0	345	1380
8:00 AM	3	161	0	0	0	106	19	0	30	0	1	0	0	0	0	0	320	1407
8:15 AM	2	149	0	0	0	75	18	0	31	0	3	0	0	0	0	0	278	1344
8:30 AM	5	161	0	0	0	72	17	0	42	0	2	0	0	0	0	0	299	1242
8:45 AM	4	126	0	0	0	80	17	0	33	0	0	0	0	0	0	0	260	1157

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	852	0	0	0	496	92	0	144	0	8	0	0	0	0	0	1604
Heavy Trucks	4	32	0		0	20	8		12	0	0		0	0	0		76
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/15/2014 1:09 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

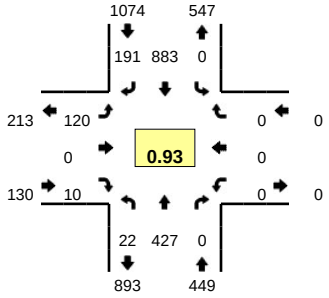
Type of peak hour being reported: Intersection Peak

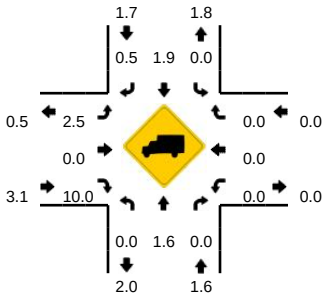
Method for determining peak hour: Total Entering Volume

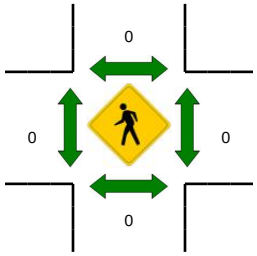
LOCATION: US 521 -- Van Wyck Rd/6 Mile Church Rd
CITY/STATE: Fort Mill, SC

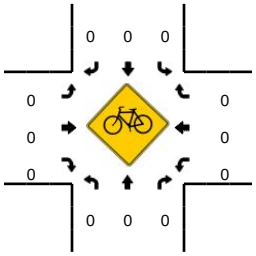
QC JOB #: 12006902
DATE: Tue, Jan 14 2014

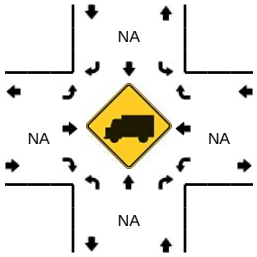
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

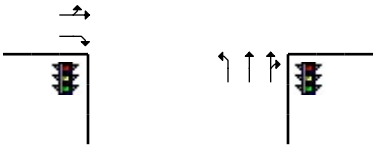


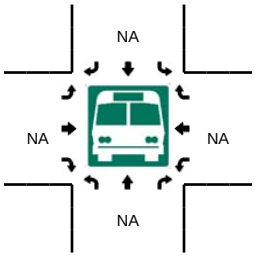












15-Min Count Period Beginning At	US 521 (Northbound)				US 521 (Southbound)				Van Wyck Rd/6 Mile Church Rd (Eastbound)				Van Wyck Rd/6 Mile Church Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	96	0	0	0	167	35	0	23	0	7	0	0	0	0	0	331	
4:15 PM	7	109	0	0	0	198	39	1	29	0	4	0	0	0	1	0	388	
4:30 PM	4	116	0	0	0	175	51	0	38	0	6	0	0	0	0	0	390	
4:45 PM	5	112	0	0	0	182	53	0	27	0	4	0	0	0	0	0	383	1492
5:00 PM	6	87	0	0	0	248	45	0	26	0	1	0	0	0	0	0	413	1574
5:15 PM	5	108	0	0	0	217	49	0	33	0	1	0	0	0	0	0	413	1599
5:30 PM	6	120	0	0	0	236	44	0	34	0	4	0	0	0	0	0	444	1653
5:45 PM	2	87	0	0	0	156	33	0	30	0	2	0	0	0	0	0	310	1580

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	480	0	0	0	944	176	0	136	0	16	0	0	0	0	0	1776
Heavy Trucks	0	8	0		0	20	0		0	0	0		0	0	0		28
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 1/15/2014 1:09 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Intersection Volume Development

INTERSECTION VOLUME DEVELOPMENT

US 521 and Van Wyck Road
AM PEAK HOUR

Description	US 521 Northbound Left	US 521 Northbound Through	US 521 Northbound Right	US 521 Southbound Left	US 521 Southbound Through	US 521 Southbound Right	Van Wyck Road Eastbound Left	Van Wyck Road Eastbound Through	Van Wyck Road Eastbound Right	6 Mile Church Rd. Westbound Left	6 Mile Church Rd. Westbound Through	6 Mile Church Rd. Westbound Right
Observed Volumes	10	736	0	0	431	89	128	0	13	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2014 Existing Traffic	10	736	0	0	431	89	128	0	13	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	20%	5%	2%	2%	5%	15%	4%	2%	2%	2%	2%	2%
Annual Growth Rate	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
2024 Background Traffic (No AD)	12	875	0	0	513	106	152	0	15	0	0	0
2024 Background Traffic	12	875	0	0	513	106	152	0	15	0	0	0
Percent Inbound Assignment	10%	0%	0%	0%	0%	85%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	85%	0%	10%	0%	0%	0%
Residential Project Trips	14	0	0	0	0	122	363	0	43	0	0	0
Project Trips (Total)	14	0	0	0	0	122	363	0	43	0	0	0
2024 Buildout Total	26	875	0	0	513	228	515	0	58	0	0	0

PM PEAK HOUR

Description	US 521 Northbound Left	US 521 Northbound Through	US 521 Northbound Right	US 521 Southbound Left	US 521 Southbound Through	US 521 Southbound Right	Van Wyck Road Eastbound Left	Van Wyck Road Eastbound Through	Van Wyck Road Eastbound Right	6 Mile Church Rd. Westbound Left	6 Mile Church Rd. Westbound Through	6 Mile Church Rd. Westbound Right
Observed Volumes	22	427	0	0	883	191	120	0	10	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2014 Existing Traffic	22	427	0	0	883	191	120	0	10	0	0	0
PHF	0.92	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	3%	2%	10%	2%	2%	2%
Annual Growth Rate	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
2024 Background Traffic (No AD)	26	508	0	0	1,050	227	143	0	12	0	0	0
2024 Background Traffic	26	508	0	0	1,050	227	143	0	12	0	0	0
Percent Inbound Assignment	10%	0%	0%	0%	0%	85%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	0%	0%	85%	0%	10%	0%	0%	0%
Residential Project Trips	43	0	0	0	0	366	215	0	25	0	0	0
Project Trips (Total)	43	0	0	0	0	366	215	0	25	0	0	0
2024 Buildout Total	69	508	0	0	1,050	593	358	0	37	0	0	0

INTERSECTION VOLUME DEVELOPMENT

Van Wyck Road and Access #1
AM PEAK HOUR

Description	Van Wyck Road Northbound Left	Van Wyck Road Northbound Through	Van Wyck Road Northbound Right	Van Wyck Road Southbound Left	Van Wyck Road Southbound Through	Van Wyck Road Southbound Right	- Eastbound Left	- Eastbound Through	- Eastbound Right	Access #1 Westbound Left	Access #1 Westbound Through	Access #1 Westbound Right
Observed Volumes	0	0	0	0	0	0	0	0	0	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2014 Existing Traffic	0	141	0	0	99	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	4%	2%	2%	15%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
2024 Background Traffic (No AD)	0	168	0	0	118	0	0	0	0	0	0	0
2024 Background Traffic	0	168	0	0	118	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	2%	50%	45%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	45%	0%	0%	0%	0%	0%	0%	0%	2%	0%	50%
Residential Project Trips	0	192	3	72	64	0	0	0	0	9	0	214
Project Trips (Total)	0	192	3	72	64	0	0	0	0	9	0	214
2024 Buildout Total	0	360	3	72	182	0	0	0	0	9	0	214

PM PEAK HOUR

Description	Van Wyck Road Northbound Left	Van Wyck Road Northbound Through	Van Wyck Road Northbound Right	Van Wyck Road Southbound Left	Van Wyck Road Southbound Through	Van Wyck Road Southbound Right	- Eastbound Left	- Eastbound Through	- Eastbound Right	Access #1 Westbound Left	Access #1 Westbound Through	Access #1 Westbound Right
Observed Volumes	0	0	0	0	0	0	0	0	0	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2014 Existing Traffic	0	130	0	0	213	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
2024 Background Traffic (No AD)	0	155	0	0	253	0	0	0	0	0	0	0
2024 Background Traffic	0	155	0	0	253	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	0%	2%	50%	45%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	45%	0%	0%	0%	0%	0%	0%	0%	2%	0%	50%
Residential Project Trips	0	114	9	215	194	0	0	0	0	5	0	127
Project Trips (Total)	0	114	9	215	194	0	0	0	0	5	0	126
2024 Buildout Total	0	269	9	215	447	0	0	0	0	5	0	126

INTERSECTION VOLUME DEVELOPMENT

Van Wyck Road and Access #2
AM PEAK HOUR

Description	Van Wyck Road Northbound Left	Van Wyck Road Northbound Through	Van Wyck Road Northbound Right	Van Wyck Road Southbound Left	Van Wyck Road Southbound Through	Van Wyck Road Southbound Right	- Eastbound Left	- Eastbound Through	- Eastbound Right	Access #2 Westbound Left	Access #2 Westbound Through	Access #2 Westbound Right
Observed Volumes	0	0	0	0	0	0	0	0	0	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2014 Existing Traffic	0	141	0	0	99	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.93	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	4%	2%	2%	15%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
2024 Background Traffic (No AD)	0	168	0	0	118	0	0	0	0	0	0	0
2024 Background Traffic	0	168	0	0	118	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	2%	3%	45%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	2%	0%	0%	0%	0%	3%	0%	45%
Residential Project Trips	0	3	4	64	9	0	0	0	0	13	0	192
Project Trips (Total)	0	3	4	64	9	0	0	0	0	12	0	192
2024 Buildout Total	0	171	4	64	127	0	0	0	0	12	0	192

PM PEAK HOUR

Description	Van Wyck Road Northbound Left	Van Wyck Road Northbound Through	Van Wyck Road Northbound Right	Van Wyck Road Southbound Left	Van Wyck Road Southbound Through	Van Wyck Road Southbound Right	- Eastbound Left	- Eastbound Through	- Eastbound Right	Access #2 Westbound Left	Access #2 Westbound Through	Access #2 Westbound Right
Observed Volumes	0	0	0	0	0	0	0	0	0	0	0	0
Balanced Volumes	0	0	0	0	0	0	0	0	0	0	0	0
2014 Existing Traffic	0	130	0	0	213	0	0	0	0	0	0	0
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicle %	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Annual Growth Rate	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%	1.8%
2024 Background Traffic (No AD)	0	155	0	0	253	0	0	0	0	0	0	0
2024 Background Traffic	0	155	0	0	253	0	0	0	0	0	0	0
Percent Inbound Assignment	0%	2%	3%	45%	0%	0%	0%	0%	0%	0%	0%	0%
Percent Outbound Assignment	0%	0%	0%	0%	2%	0%	0%	0%	0%	3%	0%	45%
Residential Project Trips	0	9	13	194	5	0	0	0	0	8	0	114
Project Trips (Total)	0	9	12	194	5	0	0	0	0	8	0	114
2024 Buildout Total	0	164	12	194	258	0	0	0	0	8	0	114

Signal Timing Plan

—SIGNAL EQUIPMENT—

ONE (1) 8 PHASE FULLY ACTUATED STANDARD 170 CONTROLLER WITH FLASHER, SIGNAL MONITOR UNIT, AND POLE/BASE-MOUNTED 336S/332A CABINET. EXT. ☐ PROP. ■

3 MODEL 222, (2)-CHANNEL VEHICLE DETECTOR UNITS

PEDESTRIAN SIGNALS: EXT. △P PROP. ▲P W/ACT. & SIGN

VEHICLE SIGNALS: EXT. ○→▷ PROP. ●→▶

SIGNAL NUMBER	2*	4	6*	8			
LENS	Ⓡ Ⓨ Ⓖ	Ⓡ Ⓨ Ⓖ	Ⓡ Ⓨ Ⓖ	Ⓡ Ⓨ Ⓖ			
PHASE	2			8			
SIZE	12"	12"	12"	12"			
QUANTITY	3	2	3	3			

OLA=____ OLC=____
OLB=____ OLD=____
METAL POLES AS NECESSARY: EXT. ○ PROP. ●M
WOOD POLES AS NECESSARY: EXT. ◒ PROP. ●W

* INSTALL BACKPLATES WITH RELECTIVE BORDERS ON Ø2 & 6 HEADS.

SIGNAL DISPLAY SEQUENCE (PREFERENTIAL PHASING)

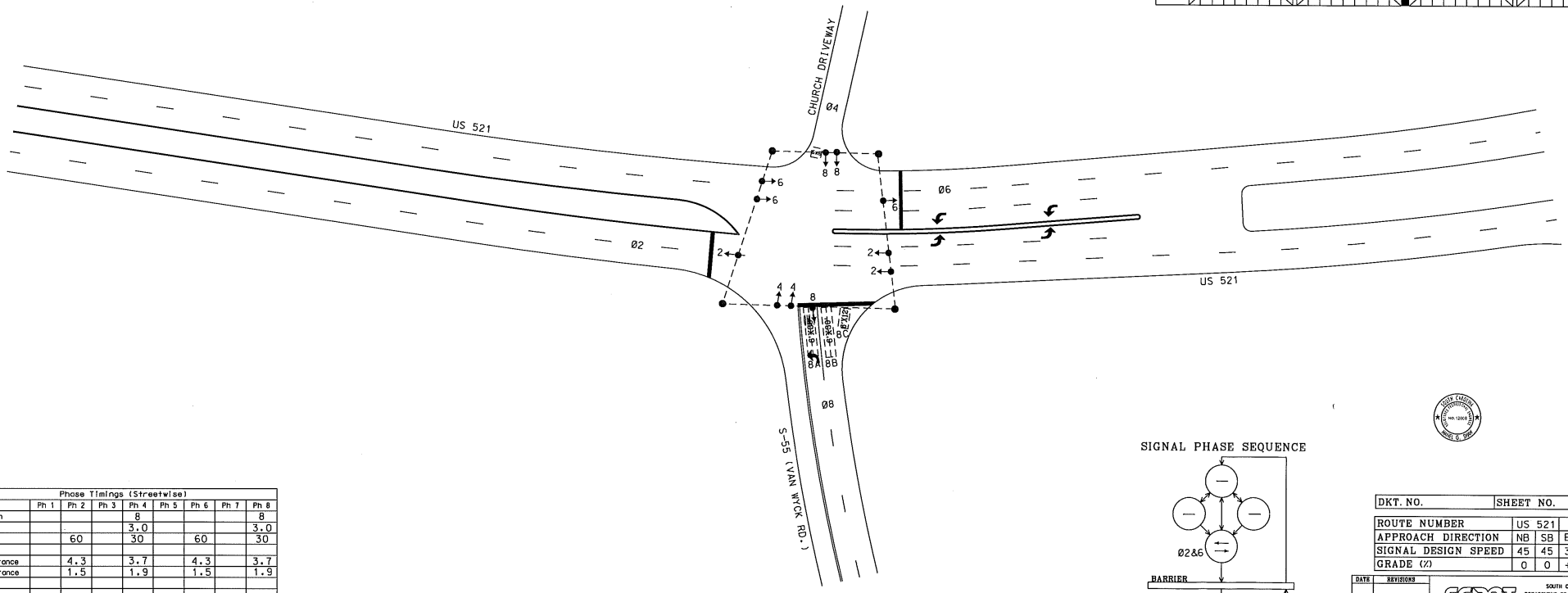
SIGNAL HEAD NUMBER	Ø1 — Ø6 CLEAR TO W: Ø2-Ø8	Ø1-Ø5	Ø2-Ø5	BARR.	Ø2 — Ø6 CLEAR TO W: Ø1-Ø5	BARR.	Ø3 — Ø7 CLEAR TO W: Ø4-Ø8	Ø3-Ø6	Ø4-Ø7	BARR.	Ø4 — Ø8 CLEAR TO W: Ø3-Ø7	BARR.
Y	2				G	Y R					R	R R
R	4				R	R R					G	Y R
Y	6				G	Y R					R	R R
R	8				R	R R					G	Y R

BARRIER

ALTERNATE PHASES

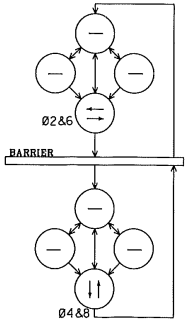
SIGNAL HEAD NUMBER	Ø1 — Ø6 CLEAR TO W: Ø1-Ø5	Ø2-Ø6	Ø2-Ø5	BARR.	Ø2 — Ø5 CLEAR TO W: Ø1-Ø5	Ø2-Ø6	Ø1-Ø6	BARR.	Ø3 — Ø8 CLEAR TO W: Ø3-Ø7	Ø4-Ø6	Ø4-Ø7	BARR.	Ø4 — Ø7 CLEAR TO W: Ø3-Ø7	Ø4-Ø8	Ø3-Ø8	BARR.

BARRIER



0 30 60 90

SIGNAL PHASE SEQUENCE



Phase Timings (Streetwise)	Ph 1	Ph 2	Ph 3	Ph 4	Ph 5	Ph 6	Ph 7	Ph 8
Min Green				8				8
Gap, Ext				3.0				3.0
Max 1		60		30		60		30
Max 2								
Yel Clearance		4.3		3.7		4.3		3.7
Red Clearance		1.5		1.9		1.5		1.9
Walk								
Ped Clearance								
Red Revert								
Add Initial								
Max Initial								
Time B4 Reduct								
Cars B4 Reduct								
Time To Reduce								
Reduce By								
Min Gap								
DyMaxLim								
Max Step								
Recall		MAX		OFF		MAX		OFF

DKT. NO.	SHEET NO.

ROUTE NUMBER	US 521		S-55	
APPROACH DIRECTION	NB	SB	EB	WB
SIGNAL DESIGN SPEED	45	45	35	25
GRADE (%)	0	0	+4	-1

DATE	REVISIONS

SCDOT — SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION DISTRICT 4 TRAFFIC ENGINEERING CHESTER, S.C.

SUBJECT TITLE: TRAFFIC SIGNAL

SPECIFIC LOCATION: US 521 @ S-55 (VAN WYCK RD.)

CITY: | COUNTY: LANCASTER

APPROVED BY: DISTRICT 4 TRAFFIC ENGINEER | DATE

DESIGNED
DRAWN: DWC
RECOMMENDED: MGS
CONSTRUCTED

SCALE	DATE	SHEET NO.	INDEX NO.
—	5/10	1 OF 1	29-521-55

Intersection Capacity Analysis

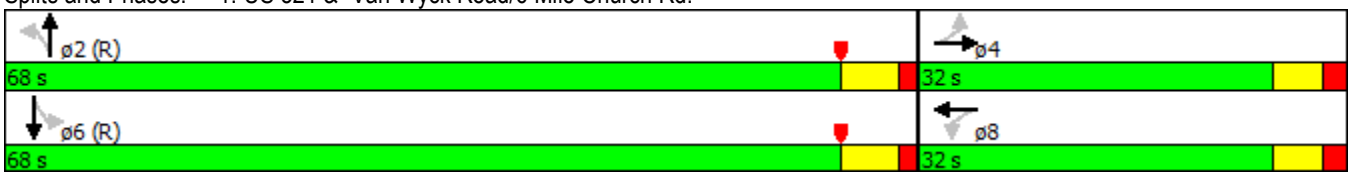
2014 Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	128	0	13	0	0	0	10	736	0	0	431	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	150		0	75		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850									0.975	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1736	1583	0	0	1863	0	1504	3438	0	1863	3300	0
Flt Permitted	0.950						0.436					
Satd. Flow (perm)	1736	1583	0	0	1863	0	690	3438	0	1863	3300	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		404									44	
Link Speed (mph)		50			25			45			45	
Link Distance (ft)		1667			237			1867			1782	
Travel Time (s)		22.7			6.5			28.3			27.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	20%	5%	2%	2%	5%	15%
Adj. Flow (vph)	142	0	14	0	0	0	11	818	0	0	479	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	14	0	0	0	0	11	818	0	0	575	0
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.6	13.6		13.6	13.6		20.8	20.8		20.8	20.8	
Total Split (s)	32.0	32.0		32.0	32.0		68.0	68.0		68.0	68.0	
Total Split (%)	32.0%	32.0%		32.0%	32.0%		68.0%	68.0%		68.0%	68.0%	
Maximum Green (s)	26.4	26.4		26.4	26.4		62.2	62.2		62.2	62.2	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	15.6	15.6					73.0	73.0			73.0	
Actuated g/C Ratio	0.16	0.16					0.73	0.73			0.73	
v/c Ratio	0.53	0.02					0.02	0.33			0.24	
Control Delay	44.9	0.1					5.2	5.7			4.8	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	44.9	0.1					5.2	5.7			4.8	
LOS	D	A					A	A			A	
Approach Delay		40.8						5.7			4.8	
Approach LOS		D						A			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	84	0					2	82			48	
Queue Length 95th (ft)	135	0					8	140			87	
Internal Link Dist (ft)		1587			157			1787			1702	
Turn Bay Length (ft)	150						150					
Base Capacity (vph)	458	715					504	2511			2422	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.31	0.02					0.02	0.33			0.24	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 27 (27%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 36.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: US 521 & Van Wyck Road/6 Mile Church Rd.



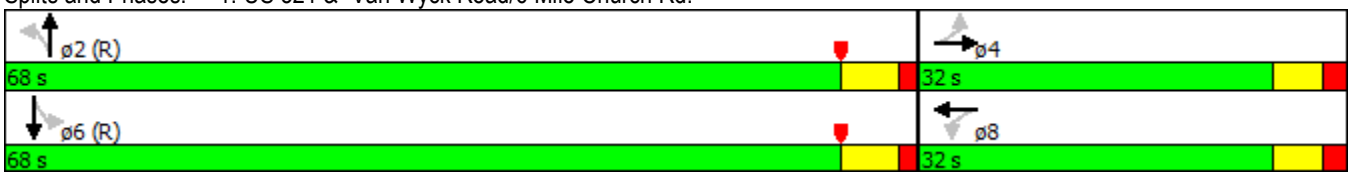
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	0	10	0	0	0	22	427	0	0	883	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	150		0	75		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850									0.973	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1752	1468	0	0	1863	0	1770	3539	0	1863	3444	0
Flt Permitted	0.950						0.210					
Satd. Flow (perm)	1752	1468	0	0	1863	0	391	3539	0	1863	3444	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		136									49	
Link Speed (mph)		50			25			45			45	
Link Distance (ft)		1667			237			1867			1782	
Travel Time (s)		22.7			6.5			28.3			27.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	2%	10%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	133	0	11	0	0	0	24	474	0	0	981	212
Shared Lane Traffic (%)												
Lane Group Flow (vph)	133	11	0	0	0	0	24	474	0	0	1193	0
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.6	13.6		13.6	13.6		20.8	20.8		20.8	20.8	
Total Split (s)	32.0	32.0		32.0	32.0		68.0	68.0		68.0	68.0	
Total Split (%)	32.0%	32.0%		32.0%	32.0%		68.0%	68.0%		68.0%	68.0%	
Maximum Green (s)	26.4	26.4		26.4	26.4		62.2	62.2		62.2	62.2	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	14.8	14.8					73.8	73.8			73.8	
Actuated g/C Ratio	0.15	0.15					0.74	0.74			0.74	
v/c Ratio	0.51	0.03					0.08	0.18			0.47	
Control Delay	45.2	0.2					5.6	4.6			6.2	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	45.2	0.2					5.6	4.6			6.2	
LOS	D	A					A	A			A	
Approach Delay		41.8						4.7			6.2	
Approach LOS		D						A			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	79	0					4	40			127	
Queue Length 95th (ft)	129	0					14	72			213	
Internal Link Dist (ft)		1587			157			1787			1702	
Turn Bay Length (ft)	150						150					
Base Capacity (vph)	462	487					288	2610			2553	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.29	0.02					0.08	0.18			0.47	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 24 (24%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 8.6 Intersection LOS: A
Intersection Capacity Utilization 46.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: US 521 & Van Wyck Road/6 Mile Church Rd.



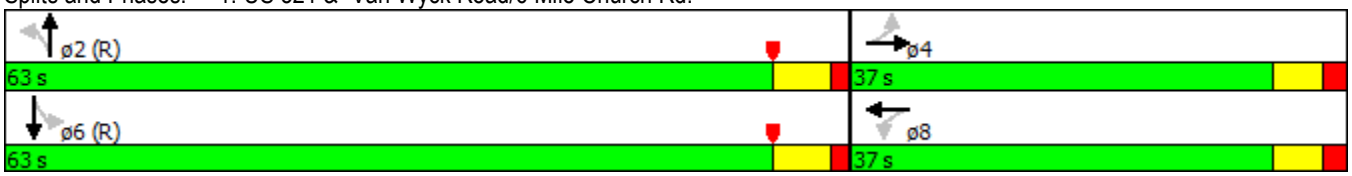
2024 Background Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	152	0	15	0	0	0	12	875	0	0	513	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	150		0	75		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850									0.975	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1736	1583	0	0	1863	0	1504	3438	0	1863	3300	0
Flt Permitted	0.950						0.384					
Satd. Flow (perm)	1736	1583	0	0	1863	0	608	3438	0	1863	3300	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		299									39	
Link Speed (mph)		50			25			45			45	
Link Distance (ft)		1667			237			1867			1782	
Travel Time (s)		22.7			6.5			28.3			27.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	20%	5%	2%	2%	5%	15%
Adj. Flow (vph)	169	0	17	0	0	0	13	972	0	0	570	114
Shared Lane Traffic (%)												
Lane Group Flow (vph)	169	17	0	0	0	0	13	972	0	0	684	0
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.6	13.6		13.6	13.6		20.8	20.8		20.8	20.8	
Total Split (s)	37.0	37.0		37.0	37.0		63.0	63.0		63.0	63.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		63.0%	63.0%		63.0%	63.0%	
Maximum Green (s)	31.4	31.4		31.4	31.4		57.2	57.2		57.2	57.2	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	17.5	17.5					71.1	71.1			71.1	
Actuated g/C Ratio	0.18	0.18					0.71	0.71			0.71	
v/c Ratio	0.56	0.03					0.03	0.40			0.29	
Control Delay	43.7	0.1					6.1	7.1			5.9	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	43.7	0.1					6.1	7.1			5.9	
LOS	D	A					A	A			A	
Approach Delay		39.7						7.0			5.9	
Approach LOS		D						A			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	99	0					2	114			67	
Queue Length 95th (ft)	152	0					10	190			118	
Internal Link Dist (ft)		1587			157			1787			1702	
Turn Bay Length (ft)	150						150					
Base Capacity (vph)	545	702					432	2442			2356	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.31	0.02					0.03	0.40			0.29	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 27 (27%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 9.9	Intersection LOS: A
Intersection Capacity Utilization 42.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: US 521 & Van Wyck Road/6 Mile Church Rd.

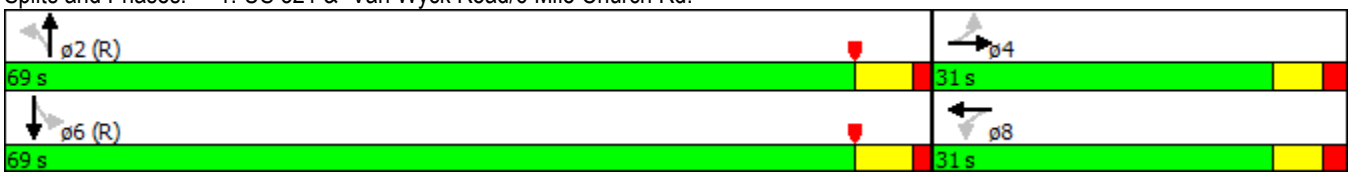


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	0	12	0	0	0	26	508	0	0	1050	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	150		0	75		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850									0.973	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1752	1468	0	0	1863	0	1770	3539	0	1863	3444	0
Flt Permitted	0.950						0.151					
Satd. Flow (perm)	1752	1468	0	0	1863	0	281	3539	0	1863	3444	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		94									50	
Link Speed (mph)		50			25			45			45	
Link Distance (ft)		1667			237			1867			1782	
Travel Time (s)		22.7			6.5			28.3			27.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	2%	10%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	159	0	13	0	0	0	28	564	0	0	1167	252
Shared Lane Traffic (%)												
Lane Group Flow (vph)	159	13	0	0	0	0	28	564	0	0	1419	0
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.6	13.6		13.6	13.6		20.8	20.8		20.8	20.8	
Total Split (s)	31.0	31.0		31.0	31.0		69.0	69.0		69.0	69.0	
Total Split (%)	31.0%	31.0%		31.0%	31.0%		69.0%	69.0%		69.0%	69.0%	
Maximum Green (s)	25.4	25.4		25.4	25.4		63.2	63.2		63.2	63.2	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	16.6	16.6					72.0	72.0			72.0	
Actuated g/C Ratio	0.17	0.17					0.72	0.72			0.72	
v/c Ratio	0.55	0.04					0.14	0.22			0.57	
Control Delay	44.4	0.2					7.7	5.4			8.1	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	44.4	0.2					7.7	5.4			8.1	
LOS	D	A					A	A			A	
Approach Delay		41.1						5.5			8.1	
Approach LOS		D						A			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	94	0					5	54			185	
Queue Length 95th (ft)	147	0					19	94			306	
Internal Link Dist (ft)		1587			157			1787			1702	
Turn Bay Length (ft)	150						150					
Base Capacity (vph)	445	442					202	2548			2494	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.36	0.03					0.14	0.22			0.57	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 24 (24%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 10.0	Intersection LOS: B
Intersection Capacity Utilization 53.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: US 521 & Van Wyck Road/6 Mile Church Rd.



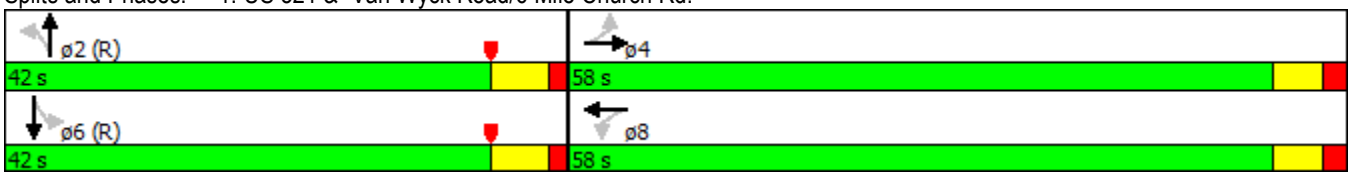
2024 Build-out Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	515	0	58	0	0	0	26	875	0	0	513	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	150		0	75		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850									0.955	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1736	1583	0	0	1863	0	1504	3438	0	1863	3192	0
Flt Permitted	0.950						0.241					
Satd. Flow (perm)	1736	1583	0	0	1863	0	382	3438	0	1863	3192	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		137									75	
Link Speed (mph)		50			25			45			45	
Link Distance (ft)		1667			237			1867			1782	
Travel Time (s)		22.7			6.5			28.3			27.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	20%	5%	2%	2%	5%	15%
Adj. Flow (vph)	572	0	64	0	0	0	29	972	0	0	570	245
Shared Lane Traffic (%)												
Lane Group Flow (vph)	572	64	0	0	0	0	29	972	0	0	815	0
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.6	13.6		13.6	13.6		20.8	20.8		20.8	20.8	
Total Split (s)	58.0	58.0		58.0	58.0		42.0	42.0		42.0	42.0	
Total Split (%)	58.0%	58.0%		58.0%	58.0%		42.0%	42.0%		42.0%	42.0%	
Maximum Green (s)	52.4	52.4		52.4	52.4		36.2	36.2		36.2	36.2	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	47.0	47.0					41.6	41.6			41.6	
Actuated g/C Ratio	0.47	0.47					0.42	0.42			0.42	
v/c Ratio	0.70	0.08					0.18	0.68			0.59	
Control Delay	25.5	0.2					25.3	28.0			23.7	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	25.5	0.2					25.3	28.0			23.7	
LOS	C	A					C	C			C	
Approach Delay		23.0						28.0			23.7	
Approach LOS		C						C			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	264	0					12	272			197	
Queue Length 95th (ft)	361	0					37	366			276	
Internal Link Dist (ft)		1587			157			1787			1702	
Turn Bay Length (ft)	150						150					
Base Capacity (vph)	909	894					159	1430			1372	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.63	0.07					0.18	0.68			0.59	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 27 (27%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 25.3	Intersection LOS: C
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: US 521 & Van Wyck Road/6 Mile Church Rd.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	9	214	360	3	72	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.870		0.999			
Flt Protected	0.998					0.986
Satd. Flow (prot)	1617	0	1825	0	0	1684
Flt Permitted	0.998					0.986
Satd. Flow (perm)	1617	0	1825	0	0	1684
Link Speed (mph)	25		50			50
Link Distance (ft)	433		414			859
Travel Time (s)	11.8		5.6			11.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.93
Heavy Vehicles (%)	2%	2%	4%	2%	2%	15%
Adj. Flow (vph)	10	238	400	3	80	196
Shared Lane Traffic (%)						
Lane Group Flow (vph)	248	0	403	0	0	276
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.4%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	9	214	360	3	72	182
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.93
Hourly flow rate (vph)	10	238	400	3	80	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	757	402			403	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	757	402			403	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	63			93	
cM capacity (veh/h)	349	649			1155	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	248	403	276
Volume Left	10	0	80
Volume Right	238	3	0
cSH	627	1700	1155
Volume to Capacity	0.40	0.24	0.07
Queue Length 95th (ft)	47	0	6
Control Delay (s)	14.4	0.0	2.9
Lane LOS	B		A
Approach Delay (s)	14.4	0.0	2.9
Approach LOS	B		

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	12	192	171	4	64	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.873		0.997			
Flt Protected	0.997					0.983
Satd. Flow (prot)	1621	0	1822	0	0	1689
Flt Permitted	0.997					0.983
Satd. Flow (perm)	1621	0	1822	0	0	1689
Link Speed (mph)	25		50			50
Link Distance (ft)	502		1948			414
Travel Time (s)	13.7		26.6			5.6
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.93
Heavy Vehicles (%)	2%	2%	4%	2%	2%	15%
Adj. Flow (vph)	13	213	190	4	71	137
Shared Lane Traffic (%)						
Lane Group Flow (vph)	226	0	194	0	0	208
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 42.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	192	171	4	64	127
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.93
Hourly flow rate (vph)	13	213	190	4	71	137
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	471	192			194	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	471	192			194	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	75			95	
cM capacity (veh/h)	523	849			1379	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	227	194	208
Volume Left	13	0	71
Volume Right	213	4	0
cSH	819	1700	1379
Volume to Capacity	0.28	0.11	0.05
Queue Length 95th (ft)	28	0	4
Control Delay (s)	11.1	0.0	2.9
Lane LOS	B		A
Approach Delay (s)	11.1	0.0	2.9
Approach LOS	B		

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

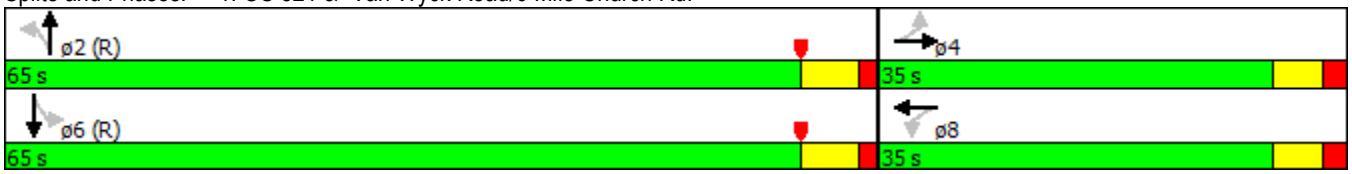
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	358	0	37	0	0	0	69	508	0	0	1050	593
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	150		0	75		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850									0.946	
Flt Protected	0.950						0.950					
Satd. Flow (prot)	1752	1468	0	0	1863	0	1770	3539	0	1863	3348	0
Flt Permitted	0.950						0.068					
Satd. Flow (perm)	1752	1468	0	0	1863	0	127	3539	0	1863	3348	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		79									193	
Link Speed (mph)		50			25			45			45	
Link Distance (ft)		1667			237			1867			1782	
Travel Time (s)		22.7			6.5			28.3			27.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	2%	10%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	398	0	41	0	0	0	75	564	0	0	1167	659
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	41	0	0	0	0	75	564	0	0	1826	0
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.6	13.6		13.6	13.6		20.8	20.8		20.8	20.8	
Total Split (s)	35.0	35.0		35.0	35.0		65.0	65.0		65.0	65.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		65.0%	65.0%		65.0%	65.0%	
Maximum Green (s)	29.4	29.4		29.4	29.4		59.2	59.2		59.2	59.2	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	29.4	29.4					59.2	59.2			59.2	
Actuated g/C Ratio	0.29	0.29					0.59	0.59			0.59	
v/c Ratio	0.77	0.08					1.00	0.27			0.89	
Control Delay	44.0	1.6					133.1	10.3			22.3	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	44.0	1.6					133.1	10.3			22.3	
LOS	D	A					F	B			C	
Approach Delay		40.0						24.7			22.3	
Approach LOS		D						C			C	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	231	0					44	85			447	
Queue Length 95th (ft)	#372	7					#95	114			577	
Internal Link Dist (ft)		1587			157			1787			1702	
Turn Bay Length (ft)	150						150					
Base Capacity (vph)	515	487					75	2095			2060	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.77	0.08					1.00	0.27			0.89	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 24 (24%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 25.5 Intersection LOS: C
Intersection Capacity Utilization 86.7% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: US 521 & Van Wyck Road/6 Mile Church Rd.



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	5	126	269	9	215	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.996			
Flt Protected	0.998					0.984
Satd. Flow (prot)	1619	0	1821	0	0	1833
Flt Permitted	0.998					0.984
Satd. Flow (perm)	1619	0	1821	0	0	1833
Link Speed (mph)	25		50			50
Link Distance (ft)	318		470			811
Travel Time (s)	8.7		6.4			11.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%
Adj. Flow (vph)	6	140	299	10	239	497
Shared Lane Traffic (%)						
Lane Group Flow (vph)	146	0	309	0	0	736
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 68.2%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	126	269	9	215	447
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	140	299	10	239	497
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1278	304			309	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1278	304			309	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	81			81	
cM capacity (veh/h)	148	736			1252	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	146	309	736
Volume Left	6	0	239
Volume Right	140	10	0
cSH	639	1700	1252
Volume to Capacity	0.23	0.18	0.19
Queue Length 95th (ft)	22	0	18
Control Delay (s)	12.3	0.0	4.3
Lane LOS	B		A
Approach Delay (s)	12.3	0.0	4.3
Approach LOS	B		

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	8	114	164	12	194	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.874		0.991			
Flt Protected	0.997					0.979
Satd. Flow (prot)	1623	0	1813	0	0	1824
Flt Permitted	0.997					0.979
Satd. Flow (perm)	1623	0	1813	0	0	1824
Link Speed (mph)	30		30			30
Link Distance (ft)	503		1734			470
Travel Time (s)	11.4		39.4			10.7
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%
Adj. Flow (vph)	9	127	182	13	216	287
Shared Lane Traffic (%)						
Lane Group Flow (vph)	136	0	195	0	0	503
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 51.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	8	114	164	12	194	258
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	127	182	13	216	287
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	907	189			196	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	907	189			196	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	85			84	
cM capacity (veh/h)	258	853			1377	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	136	196	502
Volume Left	9	0	216
Volume Right	127	13	0
cSH	741	1700	1377
Volume to Capacity	0.18	0.12	0.16
Queue Length 95th (ft)	17	0	14
Control Delay (s)	10.9	0.0	4.3
Lane LOS	B		A
Approach Delay (s)	10.9	0.0	4.3
Approach LOS	B		

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

2024 Build-out Conditions
Improved

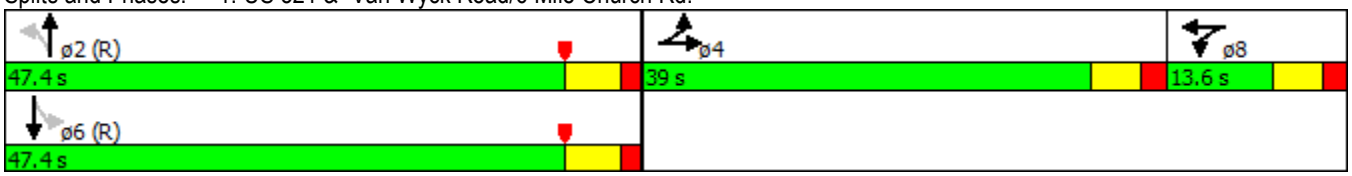
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	515	0	58	0	0	0	26	875	0	0	513	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	150		0	75		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.970									0.955	
Flt Protected	0.950	0.962					0.950					
Satd. Flow (prot)	1649	1626	0	0	1863	0	1504	3438	0	1863	3192	0
Flt Permitted	0.950	0.962					0.314					
Satd. Flow (perm)	1649	1626	0	0	1863	0	497	3438	0	1863	3192	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		92									82	
Link Speed (mph)		50			25			45			45	
Link Distance (ft)		1667			237			1867			1782	
Travel Time (s)		22.7			6.5			28.3			27.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.93
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%	20%	5%	2%	2%	5%	15%
Adj. Flow (vph)	572	0	64	0	0	0	29	972	0	0	570	245
Shared Lane Traffic (%)	44%											
Lane Group Flow (vph)	320	316	0	0	0	0	29	972	0	0	815	0
Turn Type	Split	NA		Split			Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.6	13.6		13.6	13.6		20.8	20.8		20.8	20.8	
Total Split (s)	39.0	39.0		13.6	13.6		47.4	47.4		47.4	47.4	
Total Split (%)	39.0%	39.0%		13.6%	13.6%		47.4%	47.4%		47.4%	47.4%	
Maximum Green (s)	33.4	33.4		8.0	8.0		41.6	41.6		41.6	41.6	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	25.1	25.1					63.5	63.5			63.5	
Actuated g/C Ratio	0.25	0.25					0.64	0.64			0.64	
v/c Ratio	0.77	0.66					0.09	0.45			0.40	
Control Delay	47.1	29.5					10.2	11.0			9.4	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	47.1	29.5					10.2	11.0			9.4	
LOS	D	C					B	B			A	
Approach Delay		38.3						11.0			9.4	
Approach LOS		D						B			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	198	133					7	153			109	
Queue Length 95th (ft)	271	207					23	245			183	
Internal Link Dist (ft)		1587			157			1787			1702	
Turn Bay Length (ft)	150						150					
Base Capacity (vph)	550	604					315	2182			2056	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.58	0.52					0.09	0.45			0.40	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 17.6 Intersection LOS: B
Intersection Capacity Utilization 49.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 1: US 521 & Van Wyck Road/6 Mile Church Rd.



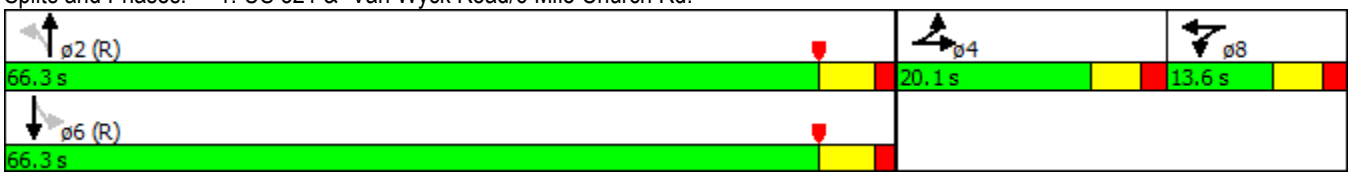
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	358	0	37	0	0	0	69	508	0	0	1050	593
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	0		0	150		0	75		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.972									0.946	
Flt Protected	0.950	0.961					0.950					
Satd. Flow (prot)	1665	1616	0	0	1863	0	1770	3539	0	1863	3348	0
Flt Permitted	0.950	0.961					0.084					
Satd. Flow (perm)	1665	1616	0	0	1863	0	156	3539	0	1863	3348	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		92									199	
Link Speed (mph)		50			25			45			45	
Link Distance (ft)		1667			834			1867			1782	
Travel Time (s)		22.7			22.7			28.3			27.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	2%	10%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Adj. Flow (vph)	398	0	41	0	0	0	75	564	0	0	1167	659
Shared Lane Traffic (%)	44%											
Lane Group Flow (vph)	223	216	0	0	0	0	75	564	0	0	1826	0
Turn Type	Split	NA		Split			Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	
Permitted Phases							2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	13.6	13.6		13.6	13.6		20.8	20.8		20.8	20.8	
Total Split (s)	20.1	20.1		13.6	13.6		66.3	66.3		66.3	66.3	
Total Split (%)	20.1%	20.1%		13.6%	13.6%		66.3%	66.3%		66.3%	66.3%	
Maximum Green (s)	14.5	14.5		8.0	8.0		60.5	60.5		60.5	60.5	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.3	4.3		4.3	4.3	
All-Red Time (s)	1.9	1.9		1.9	1.9		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.6	5.6			5.6		5.8	5.8		5.8	5.8	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	14.5	14.5					74.1	74.1			74.1	
Actuated g/C Ratio	0.14	0.14					0.74	0.74			0.74	
v/c Ratio	0.93	0.69					0.65	0.22			0.72	
Control Delay	85.4	35.8					38.1	4.2			8.3	
Queue Delay	0.0	0.0					0.0	0.0			0.0	
Total Delay	85.4	35.8					38.1	4.2			8.3	
LOS	F	D					D	A			A	
Approach Delay		61.0						8.2			8.3	
Approach LOS		E						A			A	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	149	78					20	48			250	
Queue Length 95th (ft)	#297	#180					#115	65			324	
Internal Link Dist (ft)		1587			754			1787			1702	
Turn Bay Length (ft)	150						150					
Base Capacity (vph)	241	312					115	2622			2532	
Starvation Cap Reductn	0	0					0	0			0	
Spillback Cap Reductn	0	0					0	0			0	
Storage Cap Reductn	0	0					0	0			0	
Reduced v/c Ratio	0.93	0.69					0.65	0.22			0.72	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 16.2 Intersection LOS: B
Intersection Capacity Utilization 77.9% 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: 1: US 521 & Van Wyck Road/6 Mile Church Rd.



Turn Lane Warrants

5C-4 Approach Grade and Side Slope

On streets or higher-volume driveways or when curb and gutter are present, the approach profile should be as flat as practical but consideration must be given to obtaining positive drainage. Intersection areas or landing areas in the range of 75 to 100 feet should be established for minor roads as shown in Figure A-6 in Appendix A. The landing area is the portion of intersecting highways, local roads, and public and private approaches that are used for the storage of stopped vehicles. This landing area should provide for minimum grade changes to provide adequate sight distance and minimize acceleration time for vehicles using the crossroads. Desirably, the landing area will slope away from the intersection on a gradient not to exceed 3 percent, downward or upward. However, an upward sloping landing area should be avoided if practical, because this will require the stopped motorist to apply brakes while waiting to cross or turn. Where the use of grades less than 3 percent may be cost prohibitive, the designer may, with corresponding adjustments to other intersection design elements, use an approach gradient up to 5 percent. See Chapter 15 of the *SCHDM* for more in-depth design criteria.

5D AUXILIARY LANES

On roadways with substantial traffic volumes and/or higher speeds, lanes for deceleration, or turn storage may be required by the Department or as the result of a traffic impact study. The design and construction of auxiliary lanes, as well as the acquisition of additional right-of-way where necessary, shall be the responsibility of the permittee and shall be accomplished at no expense to the Department.

When adding left-turn lanes, the entire roadway at the site shall be resurfaced to prevent differential settlement, to eliminate undesirable pavement contrast, and to provide proper pavement markings. When the through travel way shifts alignment to a new location, the entire roadway within the limits of the shift shall be resurfaced. However, when a right turn lane only is added, resurfacing of the entire area may not be required. In addition, the road should be brought up to the latest standards requiring the following:

- Minimum 2-foot paved shoulders, matching the paved shoulder width currently provided on the road, or the width called for in state or local bicycle/pedestrian plans.
- 10 foot shoulders on arterials, and 6-8 foot shoulders on collectors, and 4-6 foot shoulders local roads based on guidance in the SCHDM.
- All projects in which turn lanes are added shall have cross sections submitted with the permit application showing the pavement, shoulder width, cut and fill ditches, and the right-of-way. If additional right-of-way is needed, this shall be indicated on the plans, and the permittee shall be responsible for acquisition at no cost to the Department. Additional right-of-way shall be quit claimed to the Department for maintenance purposes and shall take place prior to approval of the permit.

5D-1 Right-turn Storage Lanes

The use of right-turn lanes at intersections can significantly improve operations. Consider exclusive right-turn lanes:

- At the free-flowing leg of any unsignalized intersection on a two-lane urban or rural highway;
- At the free-flowing leg of any unsignalized intersection on a high-speed, four-lane urban or rural highway;
- At any intersection where a capacity analysis determines a right-turn lane is necessary to meet the level-of-service criteria;
- As a general rule, at any signalized intersection where the projected right-turning volume is greater than 300 vehicles per hour and where there is greater than 300 vehicles per hour per lane on the mainline;
- For uniformity of intersection design along the highway if other intersections have right-turn lanes;
- At railroad crossings where the railroad is parallel to the facility and is located close to the intersection and where a right-turn lane would be desirable to store queued vehicles avoiding interference with the movement of through traffic; or
- At any intersection where the crash experience, existing traffic operations, sight distance restrictions (e.g., intersection beyond a crest vertical curve), or engineering judgment indicates a significant conflict related to right-turning vehicles.

5D-2 Left-Turn Storage Lanes

The accommodation of left turns is often the critical factor in proper intersection design. Left-turn lanes can significantly improve both the level of service and intersection safety. Always use an exclusive left-turn lane at all intersections with public roads on divided urban and rural highways with a median wide enough to accommodate a left-turn lane, regardless of traffic volumes. Consider using an exclusive left-turn lane for the following:

- At any signalized intersection. At locations where you have 300 vehicles per hour, consider a traffic study to determine if dual left-turn lanes are required;
- At all entrances to major residential, commercial and industrial developments;
- At all median crossovers;
- For uniformity of intersection design along the highway if other intersections have left-turn lanes (i.e., to satisfy driver expectancy); or
- At any intersection where the crash experience, traffic operations, sight distance restrictions (e.g., intersection beyond a crest vertical curve), or engineering judgment indicates a significant conflict related to left-turning vehicles.

5D-3 Multiple-Turn Lanes

At signalized intersections with high-turning volumes, dual left- and/or right-turn lanes may be considered. However, multiple turn lanes may cause problems with right of way, lane alignment, crossing pedestrians and lane confusion for approaching drivers. Consider dual right- and left-turn lanes where:

- Based on the capacity analysis, the necessary time for a protected left-turn phase becomes unattainable to meet the level-of-service criteria (average delay per vehicle); and/or
- There is insufficient space to provide the calculated length of a single-turn lane because of site restrictions (e.g., closely spaced intersections).

Dual right-turn lanes do not work as well as dual left-turn lanes because of the more restrictive space available for two-abreast right turns. If practical, the designer should find an alternative means to accommodate the high number of right-turning vehicles.

Triple left-turn lanes require more specific justification and detail in the design than dual left-turn lanes. Because triple left-turn lanes are not common in South Carolina, early coordination with the Traffic Engineering division is recommended.

5D-4 Auxiliary Lane Design

The length of a right-turn and left-turn lane at an intersection should allow for both safe vehicular deceleration and storage of turning vehicles outside of the through lanes. The length of auxiliary lanes will be determined by a combination of its taper length (Figure 5-21), deceleration length, and storage length (Table 5-8 and Table 5-9). When widening is necessary to accommodate a turn lane, the methods presented in Figure A-8 should be used.

Table 5-8: Right-Turn Lane Lengths

Turning Volume (vph)	Percent of Trucks in Turning Volume				
	0% to 10%	20%	40%	60%	100%
50	Minimum length of 100 ft.				
100					125 ft
150		125 ft	175 ft	175 ft	175 ft
200	150 ft	175 ft	225 ft	225 ft	250 ft
250	200 ft	225 ft	275 ft	275 ft	325 ft
300	250 ft	275 ft	325 ft	350 ft	400 ft
350	300 ft	325 ft	375 ft	425 ft	475 ft
400	350 ft	375 ft	425 ft	500 ft	550 ft

Table 5-9: Left-Turn Lane Lengths

Turning Volume (vph)	Percent of Trucks in Turning Volume				
	0% to 10%	20%	40%	60%	100%
50	Minimum length of 150 ft. in Urban Areas Minimum length of 200 ft. in Rural Areas				
100					
150			175 ft	175 ft	175 ft
200		175 ft	225 ft	225 ft	250 ft
250	200 ft	225 ft	275 ft	275 ft	325 ft
300	250 ft	275 ft	325 ft	350 ft	400 ft
350	300 ft	325 ft	375 ft	425 ft	475 ft
400	350 ft	375 ft	425 ft	500 ft	550 ft

NOTES: 1) SCDOT Traffic Engineering should review the design to determine if longer turn lane lengths are required. 2) Consider providing dual turn lanes if volumes are greater than 300 vph.