July 3, 2019

Carrie Shepheard, PE
Resident Engineer
VDOT Farmville Residency
637 Commerce Road
Farmville, VA 23901
434-505-3432
Carrie.Shepheard@VDOT.Virginia.gov

RE: Local traffic impact statement for proposed Green Ridge landfill, Cumberland County, VA (DAVENPORT Project Number 183002)

Ms. Shepheard,

We have reviewed the transportation impacts of the proposed Green Ridge Recycling and Disposal Facility to be located on the north side of Route 60 in eastern Cumberland County, Virginia. This memorandum summarizes the proposed site, its transportation-related impacts, and proposed improvements to accommodate future traffic.

Site Description

The proposed landfill site is located on the north side of Route 60 in eastern Cumberland County. Access to the landfill will be served by one (1) proposed access on Route 60 (Anderson Highway) approximately 1,620 feet east of Route 606 (Blenheim Road). This site access is located approximately 1,070 feet west of the Powhatan / Cumberland County border.

Existing Routes 654 and 685 currently run through the site and provide access to several homes located near the site. These routes will not be used by landfill operations. A section of these routes is proposed to be relocated in order to provide area for the southern cell of the landfill. This is conceptually shown in the site exhibit which follows.

Trip Generation

Table 1 on the following page summarizes the trip generation potential for this site. The components of site traffic are discussed below:

Regional Waste Hauling: The hauling of regional waste by large semi-trailer type trucks will be mostly during the nighttime hours: 80% is expected to occur after 6 pm and before 6 am. The remaining 20% will occur during daytime hours (6 am to 6 pm). The projected daily tonnage to be delivered to the site is 3,000 to 5,000 tons. Based on an approximate truck capacity of 20 tons per truck, this represents a maximum of 250 truckloads. Approximately 80% of truckloads will come from the east on Route 60, and 20% from the west on Route 60.

Leachate Hauling: Up to 31 trucks hauling leachate (6,000 to 8,000 gallon tanker trucks) per day may travel to and from the site. Again, 80% are estimated to come from the east on Route 60, and 20% from the west on Route 60. Trucks may arrive during both daytime and nighttime hours.

Local residents: Cumberland County residents will be able to drop off trash at a designated station on the site. Currently, there are three (3) other convenience centers in the County (Madison,

Randolph, and Hamilton Convenience Centers); however, it is understood that the City will be closing at least one of the existing Convenience Centers. The available information indicates approximately four (4) residents per hour may use the facility on weekdays, and a maximum of 30 vehicles per hour on Saturdays. 10 residents per hour on weekdays was assumed, to give more conservative results.

Local garbage trucks: Up to 15 local garbage trucks per day may use the site during daytime hours.

Employees, construction workers, and vendors: Approximately 15 employees may be on site during the daytime hours. Also, construction will occur periodically on site in order to prepare new sub-cells. This will occur approximately every other year, with potentially 15 construction workers on site. During the nighttime hours, approximately five (5) employees may be on site. Finally, up to three (3) vendors per day to the site may be expected.

The resulting trip generation numbers are shown in Table 1 below. These numbers reflect a conservative estimate of peak hour trips in order to give a worst-case scenario.

Table 1 - Trip Generation for Proposed Landfill

Average Weekday Driveway Volumes		24 Hour Two-Way	AM Peak Hour		PM Peak Hour	
Land Use	Component	Volume	Enter	Exit	Enter	Exit
Landfill	Regional waste hauling: 80% from 6 pm to 6 am, up to 250 trucks per day	500	4	4	50	50
	Leachate hauling: Up to 31 trucks per day, daytime and nighttime arrivals	62	1	1	1	1
	Local garbage trucks: Up to 15 trucks per day, operating during daytime hours	30	1	1	1	1
	Local residents (convenience center): Approximately 5 per hour on weekdays	180	0	0	10	10
	Employees: Approximately 15 daytime, 5 nighttime, 15 during construction	70	30	5	5	30
	Vendors: Up to 3 per day	6	1	1	1	1
Total Trips		**848**	**37**	**12**	**68**	**93**

Traffic Volumes and Turn Lanes

Existing traffic volumes on Route 60 were determined from a 24-hour traffic count collected by VDOT at the Cumberland / Powhatan County line, collected on June 25, 2018. This count indicated an annual average daily traffic (AADT) volume of 5,657 vehicles.

Through volumes were projected at 2% growth per year from the current year 2018, using a ten-year projection for analysis purposes. This growth rate was based on a ten-year review of historical volumes on Route 60 both west and east of the Cumberland / Powhatan County line. The one with the higher growth rate (east of the County line) was selected, yielding a 2% annual growth rate. Left and right turn volumes were computed based on the trip generation numbers shown in Table 1 above and based on expected trip distribution patterns associated with each component of site traffic. The resulting turning movement volumes during AM and PM peak hours are shown in Table 2 below.

Table 2 - Projected Volumes: Intersection of Route 60 and Proposed Access

	AM Peak Hour		PM Peak Hour	
	2018 Existing	2028 Future Build	2018 Existing	2028 Future Build
EB Left	0	18	0	25
EB Through	367	447	146	178
WB Through	78	95	334	407
WB Right	0	20	0	45
SB Left	0	9	0	57
SB Right	0	6	0	32

The need for left and right turn lanes at the proposed access on Route 60 was reviewed based on criteria in Appendix F of the VDOT Road Design Manual. Based on these projected volumes, the proposed access will warrant a right turn taper on Route 60. Volumes are slightly below the threshold for the warranting of a left turn lane; however, a left turn lane is warranted based on high truck volumes and safety considerations. The attached turn lane exhibit proposes a full left turn lane with 200 feet of storage and 200 feet of taper, and a full right turn lane with 200 feet of storage and 200 feet of taper. These turn lanes are expected to enhance traffic flow and safety at this access.

Access Management

According to Appendix F of the VDOT Road Design Manual, for a route such as Route 60, which is a principal arterial with a speed limit of 50 mph or greater, the minimum spacing standard between a full access entrance and other full accesses or unsignalized intersections is 750 feet. The proposed access is located approximately 1,150 feet west from Pine Cove Trail, and approximately 1,620 feet east from Route 606 (Blenheim Road). Therefore, this access satisfies VDOT spacing requirements.

Sight Distance

The adequacy of sight distance at the proposed access was reviewed based on criteria in the VDOT Road Design Manual Appendix F. For Route 60 with a speed limit of 55 mph and a design speed of 60 mph (speed limit plus 5 mph), the required intersection sight distance is 710 feet looking left and 750 feet looking right (from the stop-controlled approach). Based upon preliminary information that will be field-confirmed for the construction plans submittal, the available sight

distance is approximately 2,000 feet looking left and 2,000 feet looking right. Therefore, sight distance requirements are satisfied.

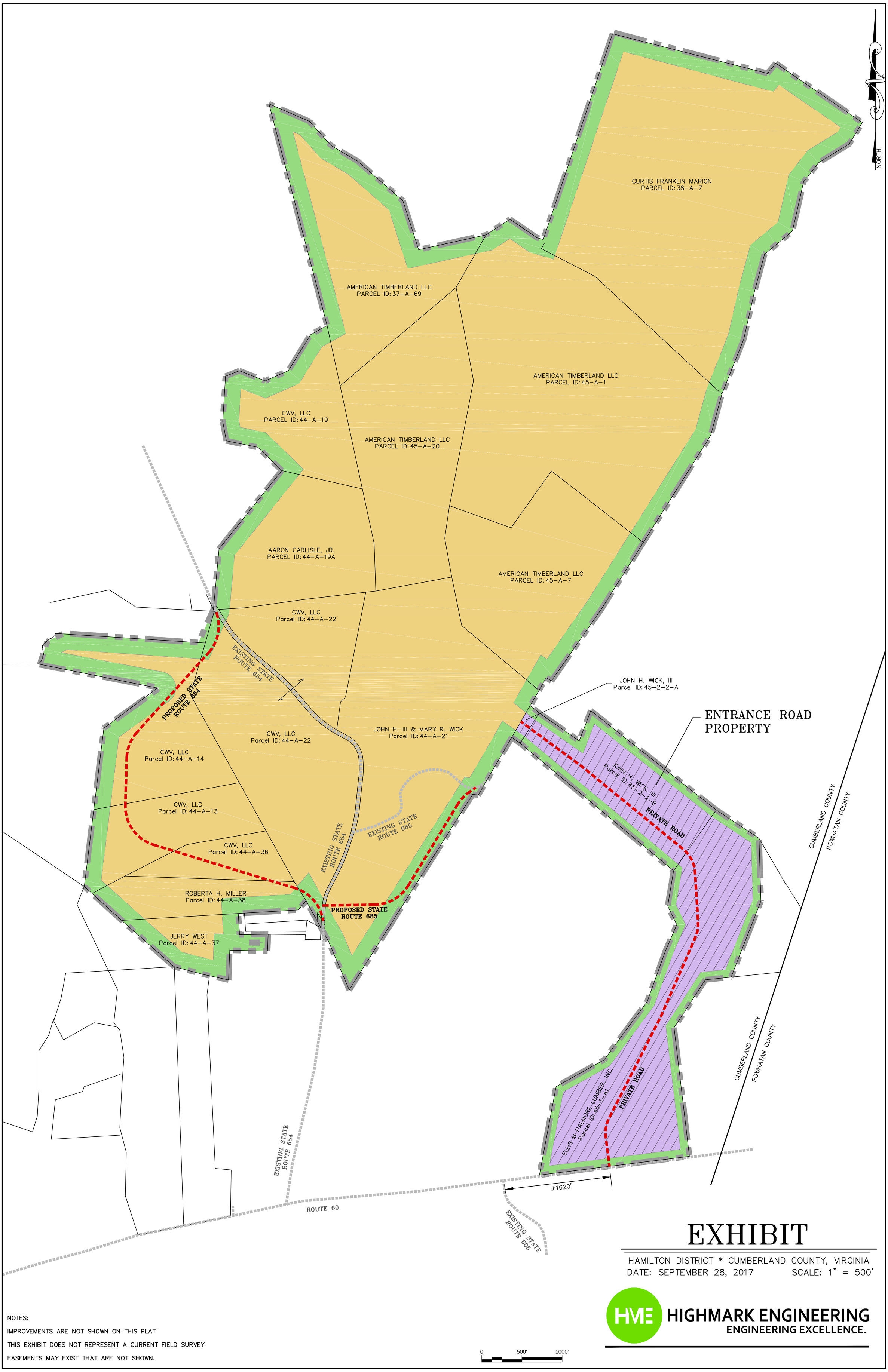
Lighting

Further review during the development of construction drawings should consider whether streetlights should be installed along Route 60 at this location, given the available sight distances on both the EB and WB approaches (approximately 2,000 feet) and the surrounding roadside environment.

Route Relocations

The site exhibit shows the approximate proposed relocation of a section of Route 654 (Pinegrove Road) and Route 685 (Miller Lane) internal to the site, in order to provide area for the southern cell of the proposed landfill. According to VDOT traffic counts taken in 2014, Route 654 has a volume of approximately 360 vehicles per day south of Route 685 and 270 vehicles per day north of Route 685. Route 685 has a volume of approximately 140 vehicles per day between Pinegrove Road and its dead end at the north. Note that these relocations are shown only conceptually at this stage. The exact design of these roadways and of the relocated intersection of Route 654 and 685 will be determined at the time of construction drawings review.

Additionally, the site access will intersect Route 685 internal to the site. The appropriate configuration for this intersection will be determined at the time of construction drawings review.



EXHIBIT

HAMILTON DISTRICT * CUMBERLAND COUNTY, VIRGINIA

DATE: SEPTEMBER 28, 2017 SCALE: 1" = 500'

HIGHMARK ENGINEERING
ENGINEERING EXCELLENCE.

NOTES:

IMPROVEMENTS ARE NOT SHOWN ON THIS PLAT

THIS EXHIBIT DOES NOT REPRESENT A CURRENT FIELD SURVEY

EASEMENTS MAY EXIST THAT ARE NOT SHOWN.

GRAPHIC SCALE

80 0 40 80 160

(IN FEET)
1 inch = 80ft.

Draper Aden Associates
Engineering • Surveying • Environmental Services

1030 Wilmer Avenue, Suite 100
Richmond, VA 23227
804-264-2228 Fax: 804-264-8773
www.daa.com

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• Virginia Beach, VA

SCHEMATIC ROAD & ENTRANCE PLAN & PROFILE
GREEN RIDGE RECYCLING & DISPOSAL FACILITY

CUMBERLAND COUNTY, VIRGINIA

REVISIONS

DESIGNED BY:	EEH
DRAWN BY:	EEH
CHECKED BY:	GWC
SCALE:	1" = 80'
DATE:	MAY 30, 2019
PROJECT NUMBER:	18020117-010303

C1.0

P:\2018\18020100\18020117\18020117-010303\CAD\18020117-010303_SDA18020117-010303_Site.dwg July 1, 2019 8:51:01 AM

Conclusion

In conclusion, we have reviewed transportation-related impacts of the proposed Green Ridge Recycling and Disposal Facility. Recommendations have been given to provide safe and efficient traffic flow at the site access on Route 60. We recognize that the exact design of the roadway improvements associated with this project will be determined through construction plans review and through further coordination with VDOT and County staff. We look forward to continuing to work with you on this project.

Sincerely,

Nick Liguori, PE

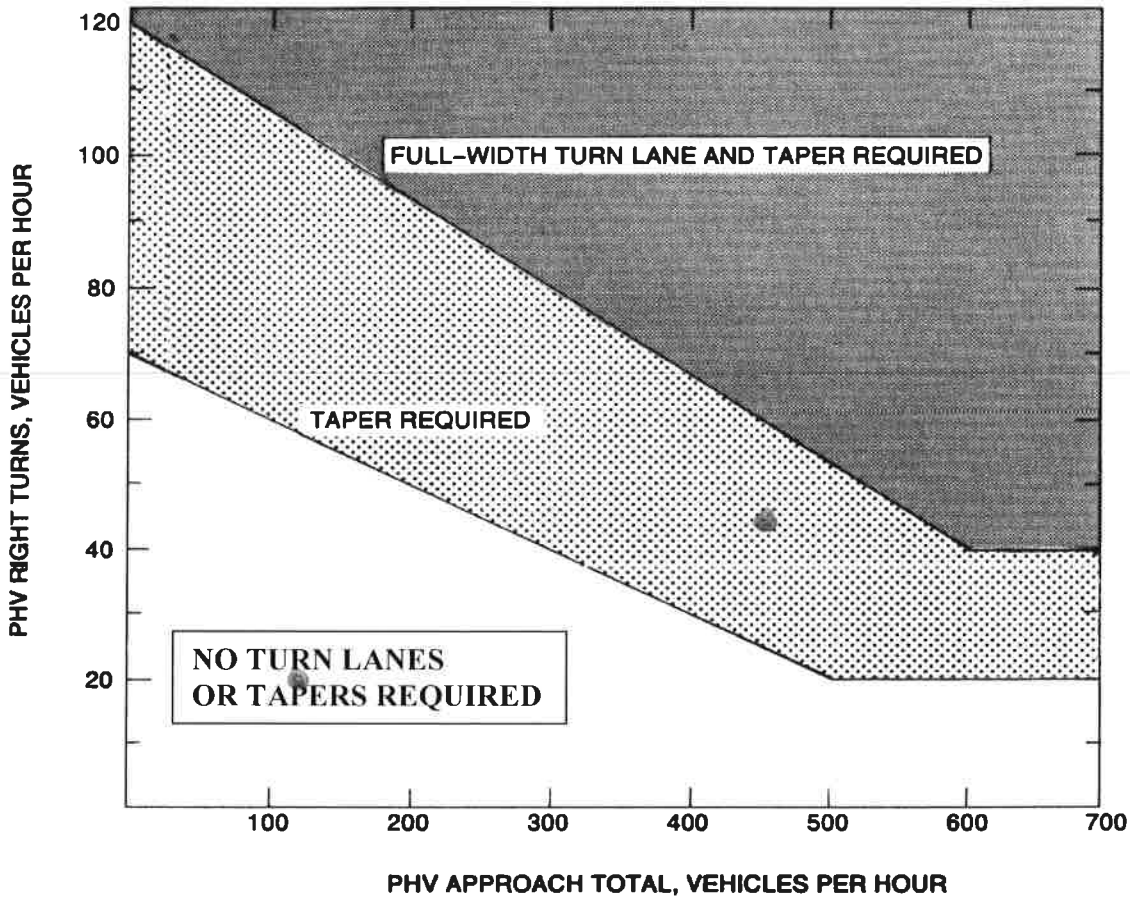
Transportation Engineer
John Davenport Engineering, d.b.a. DAVENPORT
(804) 554-0910
nliguori@davenportworld.com

Supporting Documents

Home Office
John Davenport Engineering, Incorporated
119 Brookstown Ave. Suite PH1
Winston-Salem, NC 27101
Main: 336.744.1636; Fax: 336.458.9377

Richmond Office:
John Davenport Engineering, Incorporated
16003 Continental Boulevard
South Chesterfield, VA 23834
Main: 804.554.0911

Serving the Southeast since 2002



Appropriate Radius required at all Intersections and Entrances (Commercial or Private).

LEGEND

PHV - Peak Hour Volume (also Design Hourly Volume equivalent)

Adjustment for Right Turns

For posted speeds at or under 45 mph, PHV right turns > 40, and PHV total < 300.
Adjusted right turns = PHV Right Turns - 20
If PHV is not known use formula: PHV = ADT x K x D

K = the percent of AADT occurring in the peak hour
D = the percent of traffic in the peak direction of flow

Note: An average of 11% for K x D will suffice.

When right turn facilities are warranted, see Figure 3-1 for design criteria.*

FIGURE 3-26 **WARRANTS** FOR RIGHT TURN **TREATMENT (2-LANE HIGHWAY)**

Route 60 at Site Access	V_A	V_R	
AM Peak Hour	115	20	=> Taper warranted (PM peak hour)
PM Peak Hour	452	45	

* Rev. 1/15

WARRANT FOR LEFT-TURN STORAGE LANES ON TWO-LANE HIGHWAY

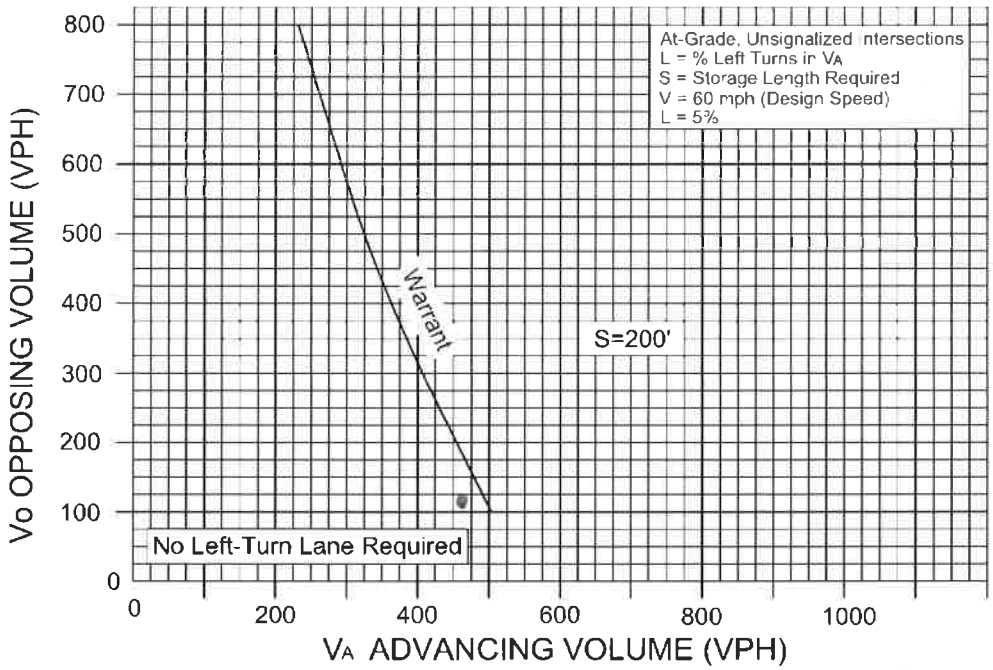
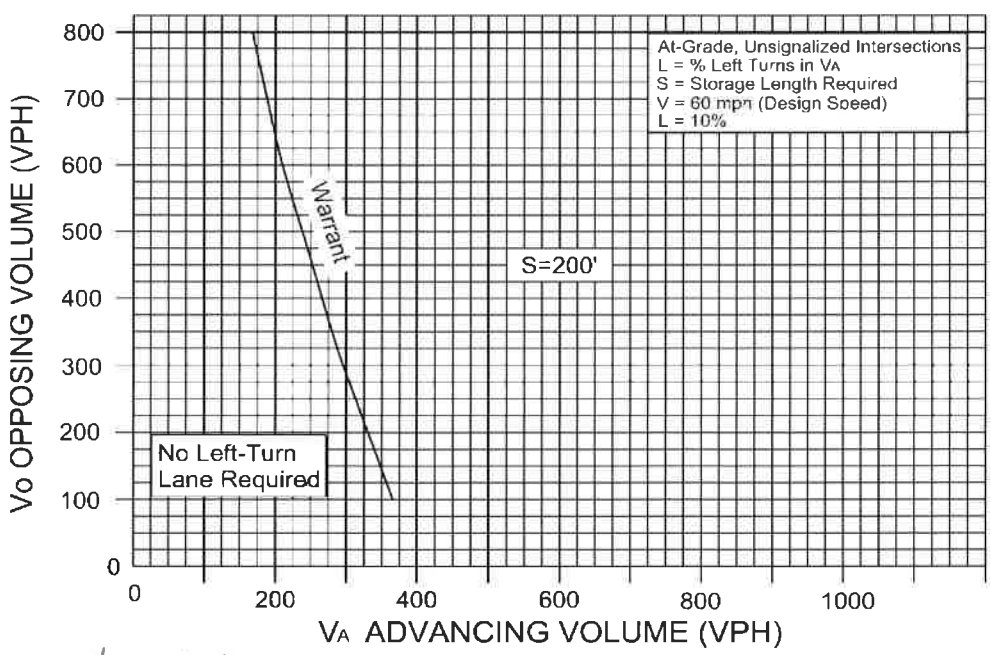


FIGURE 3-17



Route 60 at Site Access	V_A	V_O	%L
AM Peak Hour	465	115	39

FIGURE 3-18

→ Left turn lane not warranted (but recommended)

WARRANT FOR LEFT-TURN STORAGE LANES ON TWO-LANE HIGHWAY

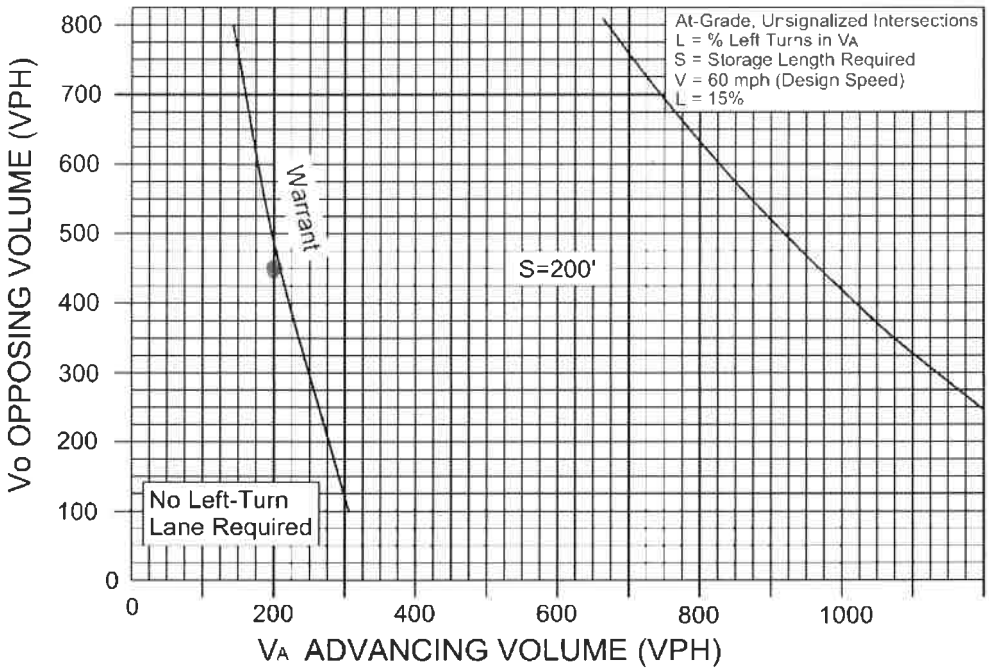
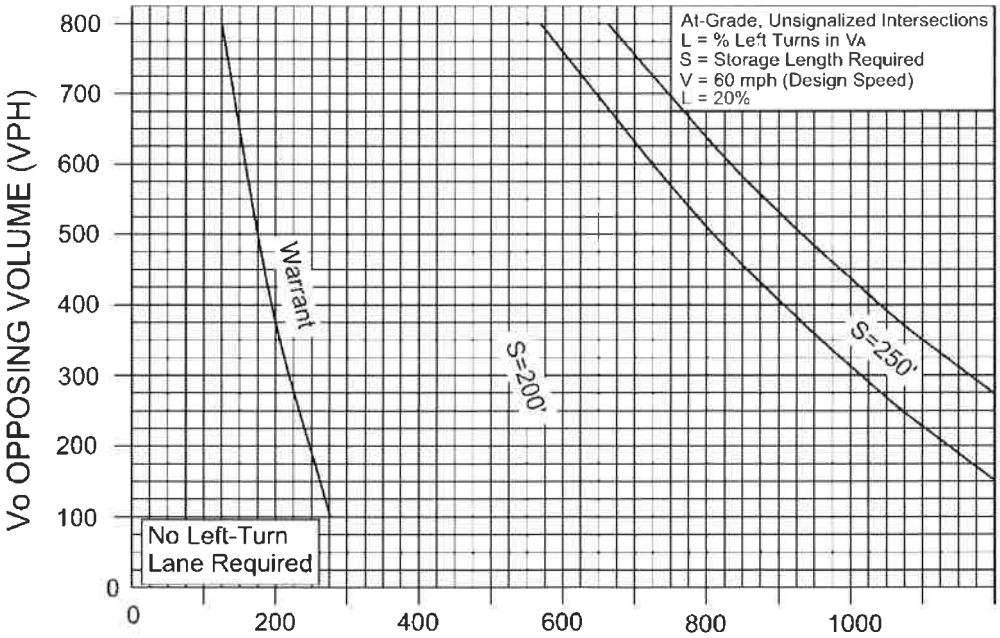


FIGURE 3-19



Route 60 at Site Access	VA	Vo	%L
PM Peak Hour	203	452	12.3

FIGURE 3-20

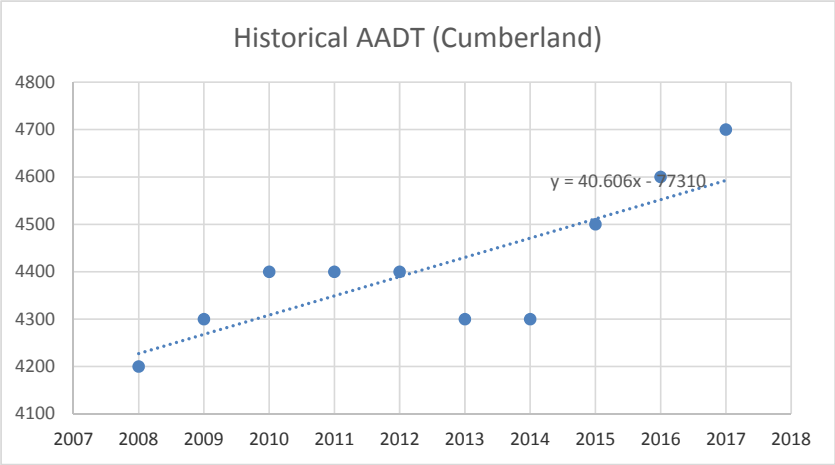
→ Left turn lane not warranted (but recommended)

Cumberland County:
Historical AADT: US 60 between SR 45 and Powhatan County line

2008	4200
2009	4300
2010	4400
2011	4400
2012	4400
2013	4300
2014	4300
2015	4500
2016	4600
2017	4700

Fitted trendline:

Slope	40.606
Growth Rate	0.86%
Growth Rate (Rounded)	**1.00%**

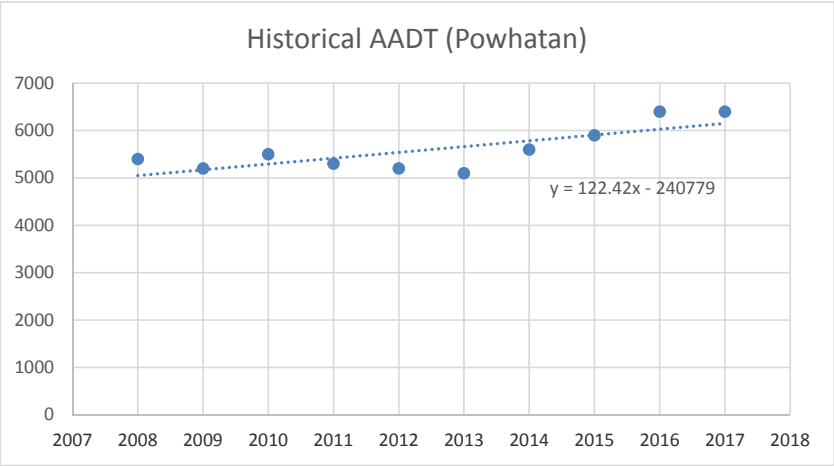


Powhatan County:
Historical AADT: Cumberland CL to Rte 629 Old Tavern Rd / Trenholm Rd

2008	5400
2009	5200
2010	5500
2011	5300
2012	5200
2013	5100
2014	5600
2015	5900
2016	6400
2017	6400

Fitted trendline:

Slope	122.42
Growth Rate	1.91%
Growth Rate (Rounded)	**2.00%**



Virginia Department of Transportation

Central Region Traffic Engineering

Route: 60
Location: Powhatan/Cumberland Line
County: Powhatan
Counted By: Ronnie Hall

Site Code:
Station ID: 60
EBL
WBL
Latitude: 0' 0.0000 Undefined

Start	25-Jun-18		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	EBL	WBL	EBL	WBL	EBL	WBL	EBL	WBL	EBL	WBL	EBL	WBL	EBL	WBL	EBL	WBL
12:00 AM	*	*	11	18	8	17	*	*	*	*	*	*	*	*	10	18
01:00	*	*	7	15	7	12	*	*	*	*	*	*	*	*	7	14
02:00	*	*	11	8	7	6	*	*	*	*	*	*	*	*	9	7
03:00	*	*	25	5	22	6	*	*	*	*	*	*	*	*	24	6
04:00	*	*	36	12	43	12	*	*	*	*	*	*	*	*	40	12
05:00	*	*	162	20	169	23	*	*	*	*	*	*	*	*	166	22
06:00	*	*	**366**	75	**368**	80	*	*	*	*	*	*	*	*	**367**	78
07:00	*	*	277	129	281	148	*	*	*	*	*	*	*	*	279	138
08:00	*	*	213	**130**	239	**150**	*	*	*	*	*	*	*	*	226	**140**
09:00	*	*	164	123	183	116	*	*	*	*	*	*	*	*	174	120
10:00	*	*	160	123	89	58	*	*	*	*	*	*	*	*	124	90
11:00	**153**	**140**	143	112	*	*	*	*	*	*	*	*	*	*	148	126
12:00 PM	157	144	130	135	*	*	*	*	*	*	*	*	*	*	144	140
01:00	157	155	160	151	*	*	*	*	*	*	*	*	*	*	158	153
02:00	148	187	**170**	182	*	*	*	*	*	*	*	*	*	*	159	184
03:00	161	191	167	212	*	*	*	*	*	*	*	*	*	*	**164**	202
04:00	**162**	278	159	321	*	*	*	*	*	*	*	*	*	*	160	300
05:00	156	**333**	137	**335**	*	*	*	*	*	*	*	*	*	*	146	**334**
06:00	119	293	102	253	*	*	*	*	*	*	*	*	*	*	110	273
07:00	79	130	78	166	*	*	*	*	*	*	*	*	*	*	78	148
08:00	72	109	48	108	*	*	*	*	*	*	*	*	*	*	60	108
09:00	53	88	36	121	*	*	*	*	*	*	*	*	*	*	44	104
10:00	28	78	19	60	*	*	*	*	*	*	*	*	*	*	24	69
11:00	13	40	11	40	*	*	*	*	*	*	*	*	*	*	12	40
Lane	1458	2166	2792	2854	1416	628	0	0	0	0	0	0	0	0	2833	2826
Day	3624		5646		2044		0		0		0		0		5659	
AM Peak	11:00	11:00	06:00	08:00	06:00	08:00	-	-	-	-	-	-	-	-	06:00	08:00
Vol.	153	140	366	130	368	150	-	-	-	-	-	-	-	-	367	140
PM Peak	16:00	17:00	14:00	17:00	-	-	-	-	-	-	-	-	-	-	15:00	17:00
Vol.	162	333	170	335	-	-	-	-	-	-	-	-	-	-	164	334

Comb. Total	3624	5646	2044	0	0	0	0	5659

ADT ADT 5,657 AADT 5,657

Virginia Department of Transportation
Traffic Engineering Division
2017
Annual Average Daily Traffic Volume Estimates By Section of Route
Cumberland Maintenance Area

Route	Length	AADT	QA	4Tire	Bus	Truck 2Axle	Truck 3+Axle	Truck 1Trail	Truck 2Trail	QC	K Factor	QK	Dir Factor	AAWDT	QW	Year
Cumberland County																
644 Forest Hill	1.20	**40**	From: 24-600 Stoney Point Rd **R** To: 24-631 Davenport Rd								NA			NA		03/27/2014
645 Goshen Rd	0.80	**300**	From: SR 13 Old Buckingham Rd **R** To: 24-646 Maxeys Mill Rd								NA			NA		05/25/2017
645 Goshen Rd	1.95	**190**	From: 24-646 Maxeys Mill Rd **R** To: 24-654 Frenchs Store Rd								NA			NA		05/25/2017
646 Maxeys Mill Rd	1.69	**30**	From: 24-645 Goshen Rd **R** To: US 60 W, Anderson Hwy								NA			NA		04/02/2014
646 Oak Forest Rd	1.10	**30**	From: US 60 E, Anderson Hwy **R** To: SR 45 Cartersville Rd								NA			NA		04/02/2014
647 Brown Rd	2.50	**30**	From: 24-601 Clinton Rd **R** To: 24-654 Pinegrove Rd								NA			NA		04/02/2014
648 Parker Rd	0.15	**20**	From: Dead End **R** To: 24-616 Deep Run Rd								NA			NA		04/02/2014
649 Tavern Rd	0.10	**40**	From: SR-45 N, Cartersville Rd **F** To: 24-665 High St; Tavern Rd	96%	1%	1%	1%	1%	0%	C	0.222		0.5	40	F	2017
649 High St	0.25	**160**	From: 24-665 High St; Tavern Rd **F** To: SR-45 S, Cartersville Rd	98%	1%	0%	1%	0%	0%	C	0.133		0.5	170	F	2017
650 Belle Rd	2.13	**320**	From: Buckingham County Line **F** To: 24-622 Trents Mill Rd	94%	1%	2%	3%	1%	0%	C	0.103		0.694	320	F	2017
651 Raines Tavern Rd	0.50	**60**	From: Dead End **R** To: 24-636 Cedar Lane								NA			NA		03/27/2014
652 CA IRA Rd	0.10	**250**	From: 24-632 CA IRA Rd **R** To: US 60 Anderson Hwy								NA			NA		04/06/2017
653 High Hill Rd	1.70	**150**	From: Dead End **R** To: 24-600 River Rd								NA			NA		03/21/2014
653 Cooks Rd	4.70	**230**	From: 24-600 River Rd **R** To: 24-638 John Randolph Rd								NA			NA		03/21/2014
654 Sunnyside Rd	0.50	**310**	From: 24-600 Stoney Point Rd **R** To: 24-674 Edge Hill Rd								NA			NA		04/11/2017
654 Sunnyside Rd	2.60	**260**	From: 24-674 Edge Hill Rd **R** To: SR 13 W, Old Buckingham Rd								NA			NA		04/11/2017
654 Frenchs Store Rd	6.00	**350**	From: SR 13 E, Old Buckingham Rd **R** To: US 60 Anderson Hwy								NA			NA		05/25/2017
654 Pinegrove Rd	0.90	**360**	From: US 60 Anderson Hwy **R** To: 24-685 Miller Lane								NA			NA		05/25/2017
654 Pinegrove Rd	1.20	**270**	From: 24-685 Miller Lane **R** To: 24-647 Brown Rd								NA			NA		04/02/2014
654 Pinegrove Rd	0.60	**210**	From: 24-647 Brown Rd **R** To: 24-661 Locust Grove								NA			NA		04/02/2014
654 Pinegrove Rd	1.50	**90**	From: 24-661 Locust Grove **R** To: 24-616 Deep Run Rd								NA			NA		04/02/2014