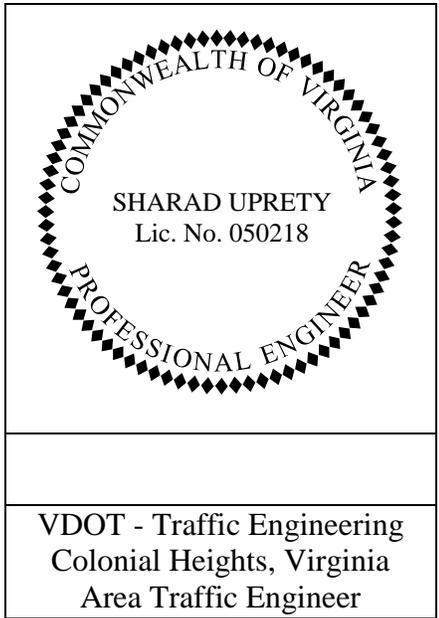


**ROUTE 622 SAFETY STUDY
FROM ROUTE 623 TO ROUTE 271/620**

**GOOCHLAND COUNTY (Length: 2.35 miles)
HANOVER COUNTY (Length: 1.60 miles)**

March 2016

This report provides results of a safety analysis along Route 622 (Rockville Road) in Goochland and Hanover counties. Study termini include Route 622 in Goochland from Route 623 to Hanover County line and in Hanover from Goochland County line to Routes 271/620. The total length in both counties measures 3.95 miles. Via Ashland Residency, citizens requested studies on Routes 621 and 622 to alleviate crashes, including fatalities, narrow road width (and close proximity of fixed objects) and heavy traffic. The study for Route 621 appears in a separate report.



VDOT - Traffic Engineering
Colonial Heights, Virginia
Area Traffic Engineer

Existing Conditions Assessment

Route 622 consists of a two-lane roadway with pavement and shoulder widths noted in Table 1 below. All such features appear in good or better condition. This roadway includes rolling vertical alignment and horizontal curves, some comfortably negotiated at existing posted speed limits.

Table 1

| ROUTE 622 PAVEMENT/SHOULDER WIDTHS | | |
|---|------------------------|------------------------|
| Road Section | Pavement Widths | Shoulder Widths |
| Route 623 – Hanover County Line (Goochland) | 18'-22' | 2'-4' |
| Goochland County Line – Route 271/620 (Hanover) | 18'-20' | 2'-4' |

From Route 623 to about ½-mile north Route 622 consists mainly of 22 feet of pavement width but narrows to 18 to 20 feet beyond through remainder of the study area.

According to 2014 published traffic count data, Route 622 in Goochland between Route 623 and Hanover County line conveys 2,200 vehicles per day. In Hanover, Route 622 conveys 1,700 vehicles per day between Goochland County line and Route 771, and 1,400 vehicles between Route 771 and Routes 271/620.

Pavement and shoulder conditions in both counties vary from good to very good condition. Severe pavement drop-offs/crumbling pavement edges generally do not exist. During the course of this study, VDOT applied stone to areas alongside Route 622 in Goochland with pavement drop offs/rutted shoulders. The section in Hanover does not have this treatment but no locations exist with problematic pavement edges/drop offs.

Table 2 presents frequency of public street connections and entrances along the corridor in both counties. Note that public street connections include intersecting state-maintained roadways and driveways serving multiple residences.

Table 2

| ROUTE 622 STREET/DRIVEWAY FREQUENCY | | | | | | | |
|-------------------------------------|-----------------------------|-------------|------------|---------------|------------|-----------|------------|
| County | Termini | Residential | | Public Street | | Other | |
| | | # of Conn | # per mile | # of Conn | # per mile | # of Conn | # per mile |
| Goochland | Route 623 – Hanover CL | 27 | 11.5 | 6 | 2.6 | 0 | 0.0 |
| Hanover | Goochland CL – Rts. 271/620 | 29 | 18.1 | 7 | 4.4 | 4 | 2.5 |

Access connections noted as “other” include a law office, café, small office center and Hanover Fire and Rescue. All entrances reside along Route 622 from Route 271/620 to about 550 feet south of the intersection.

Relatively low traffic volumes on Route 622 and various public street connections and residential driveways result in few vehicular conflicts. Published 2014 VDOT traffic counts indicate less than one percent of the total traffic stream consists of trucks in Hanover and one percent in Goochland. Crash analyses indicated no trucks consisting of three-axle single unit trucks or larger involved in any collision. However, a single unit truck (two axles) collided with a vehicle in an angle collision at Route 623.

Centerline pavement markings (but no edge lines) exist along the entire study area, but prohibits passing throughout the entire corridor. All markings appear in good or better condition. No pavement markers are present along Route 622 in either county.

Speed limit signs indicate lawful speeds of 45 mph in Goochland and Hanover with signs installed at appropriate locations. Both ends of the study area feature “Stop” signs with “Stop Ahead” signs installed 570 feet in advance of Route 271/620 and 450 feet in advance of Route 623.

All horizontal curves have required warning signs with appropriate advisory speeds or comfortably traversed at posted speed limits. One curve also features chevrons delineating outside of said curve. All devices appear in good or better condition.

Route 622 consists of 30-foot prescriptive right of way along certain locations with trees and utility poles present within clear zones, typical conditions along rural secondary routes. Majority of utility poles reside at least 10 feet off edge of pavement except a 0.20 mile section near Route 660, where poles reside closer than 10 feet to virtually at edge of pavement. The most critical section includes three poles in succession that reside approximately 1000 feet north of Route 660. This road traverses through rural land uses (farmland, other open and wooded areas), small business establishments and a fire/rescue facility at and near Route 271/620, and residential areas.

Roadway Capacity

An analysis of roadway capacity determined whether Route 622 can accommodate prevailing traffic volumes. Two-Lane Highways methodology found in the *Highway Capacity Manual* (HCM) reported an acceptable level of service B, defined as percent of time a vehicle must spend following another vehicle (PTSF). HCM calculated a PTSF of 52.7 percent based on PM peak hour volumes representing the highest four consecutive 15-minute periods of the day along Route 622 in Goochland.

Speed Zone Assessment

Staff from this office collected speed samples from four locations along the corridor. These included samples taken from two locations in Goochland County and two locations in Hanover County on 3-4 February 2016, with the following results noted in Table 3:

Table 3

| Route 622 Speed Data | | | |
|---------------------------------------|---|------------|------------|
| Sample Location | 85 th Percentile Speed | Mean Speed | Pace Speed |
| 0.50 mile north Route 705 (Goochland) | 46.4 | 36.0 | 38-47 |
| 0.50 mile north Route 771 (Hanover) | 48.0 | 38.5 | 40-49 |

Table 3 indicates good compliance with the 45 mph speed limit along Route 622 in Goochland between I-64 and Hanover County line, showing a weighted average 85th percentile speed of 46.4 mph. Similarly, the segment in Hanover shows a weighted 85th percentile average speed of 48.0 mph, also in a 45 mph zone. All operating speeds fall within 10-mph pace speeds. This illustrates virtual compliance with the posted 45 mph speed limit throughout the study area.

Crash Analyses

A query of Roadway Network System (RNS) and Traffic Records Electronic Data System (TREDS) for crash history over the latest three-year reporting period ending 31 October 2015 resulted in 12 crashes with four injuries (one Type A – incapacitating injury) and one fatality. One crash analysis considers Route 622 in Goochland and one analysis considers Route 622 in Hanover.

Crash Analysis from Route 623 to Hanover County Line (Goochland)

Inspection of crash rates noted lower overall and injury rates than comparable rates for secondary roadways in VDOT's Richmond District but a higher fatality rate (see Table 4) due to one fatal crash.

Table 4

| Route 622 Crash Rate Comparison | | | |
|---------------------------------|---------|--------|-------|
| | Overall | Injury | Fatal |
| Route 622 section | 106 | 35.3 | 17.66 |
| District-wide secondary | 251 | 115.6 | 2.58 |

NOTE: Overall rates in vehicle crashes per 100 million vehicle miles traveled. Injury and fatality rates in individuals injured or killed per 100 million vehicle miles traveled.

Of six crashes along this section of Route 622, the analysis revealed three run off road/fixed object collisions, with one angle, one fixed object in road and one deer-related. All crashes occurred at random locations. Three happened in darkness and five during clear/cloudy weather conditions. However, law enforcement noted snowy and icy road conditions in two crashes that apparently occurred in non-threatening weather.

The fatal crash transpired in darkness and on dry pavement with the driver running off road/left through the outside of a curve posted with curve warning and 40 mph advisory speed signs. The vehicle then hit trees, travelled down an embankment and rolled over, ejecting the victim. This occurred immediately south of the Goochland/Hanover County line. Law enforcement did not indicate alcohol/drug use or vehicle speed before the crash.

The collision that occurred on snowy road conditions involved a motorist traveling south running off road to avoid a utility truck then re-entered and ran off road left, striking a utility pole. This pole resides along the section of Route 622 with a series of poles residing less than 10 feet from edge of pavement.

Crash Analysis from Goochland County Line to Routes 271/620 (Hanover)

Table 5 notes overall crash, injury and fatality rates within this segment of Route 622 lower than District-wide rates for secondary roads.

Table 5

| Route 622 Crash Rate Comparison | | | |
|---------------------------------|---------|--------|-------|
| | Overall | Injury | Fatal |
| Route 622 section | 214 | 71.3 | 0.00 |
| District-wide secondary | 251 | 115.6 | 2.58 |

NOTE: Overall rates in vehicle crashes per 100 million vehicle miles traveled. Injury and fatality rates in individuals injured or killed per 100 million vehicle miles traveled.

The analysis revealed six crashes, all run off road/fixed object. Three of the six occurred within a curve at Foxwood Lane, with remaining collisions transpiring at random locations. Two collisions resulted in personal injury, including a Type A (incapacitating) injury to the operator of a moped.

All crashes within the curve at Foxwood Lane occurred northbound. Snowy road conditions contributed to one crash. Other run off road collisions included drivers attempting to proceed around the curve at speeds greater than 45 mph speed limit and 35 mph advisory speed. Law enforcement noted vehicle speeds of 55 and 50 mph. Police also noted alcohol as a contributing factor with the individual driving at a pre-crash 55 mph speed. The collision involving alcohol occurred during dark conditions.

Guardrail Needs

A cursory review of guardrail needs indicated one location in Goochland that could benefit from new guardrail installation. However, some non-standard guardrail exists at various other sites. Future maintenance paving projects should consider guardrail condition and compliance with current standards and upgrade existing installations as appropriate.

Field review of the fatal crash location uncovered the need for guardrail installation along the western flank of Route 622 to preclude vehicles running off road and down an embankment. The entire guardrail assembly should run about 360 feet (including end treatments) commencing at the initial chevron assembly northbound to about 15 feet north of the county line. Installation will also require shoulder work to accommodate guardrail.

Conclusions/Recommendations

Results of this safety evaluation indicated lower overall and injury rates on Route 622 in both counties with Richmond District average rates on secondary roads. Due to the fatal crash discussed on page 4, the Goochland fatality rate fell above the District-wide rate.

All horizontal curves that require curve warning signs have these devices in place with appropriate advisory speed signs as needed.

Recommendations for corrective action in Goochland County include the following:

- Install guardrail around outside of horizontal curve from approximately 15 feet north of Goochland/Hanover County line to about 345 feet south of Goochland/Hanover County line. This will protect errant vehicles from departing roadway and down an embankment. This will probably require minor shoulder widening or grading to obtain minimum shoulder width and cross slope for proper guardrail installation.
- Consider relocating utility poles less than ten feet from edge of pavement along east flank of Route 622 for about a 1000-foot section near Route 660. The most critical section includes three poles about 1000 feet north of Route 660. Although one crash occurred involving a utility pole, an initial event (avoidance of another vehicle) led to a

second event (collision with pole). Relocating said poles will provide fewer obstacles within clear zones.

A recommendation for corrective action in Hanover County includes the following:

- Install two chevron sign assemblies (double-faced) around outside of curve at Foxwood Lane (private street), one approximately 100 feet north of Foxwood and one 100 feet south. This curve measures about 200 feet in length. Also, clean out brush and tree limbs from along the inside of said curve to gain greater visibility to this upcoming condition, especially of benefit to northbound drivers. As noted all run off road crashes (three) occurred with northbound vehicles.

In the event of increased crash activity at this curve, VDOT may consider implementation of a project to improve horizontal alignment. Such consideration could include an HSIP project if resulting benefit/cost calculations indicate feasibility of HSIP application submission.