

September 19, 2014

Ms. Kathy Runge
Village Clerk / Controller
Village of Twin Oaks
1393 Big Bend Road, Suite F
Twin Oaks, MO 63021

Subject: Roadway Safety Audit for Crescent Avenue, Crescent Road, Boly Lane and Autumn Leaf Trail within the limits of Twin Oaks, Missouri

Dear Ms. Runge:

This technical letter lists varying improvements to increase safety on the subject roads per the request of the Village.

All of the streets in the Village have a speed limit of 20 mph. The 6th edition of AASHTO's "A Policy on Geometric Designs of Highways and Streets" lists 115 ft as the Stopping Sight Distance (SSD) for 20 mph. The Intersection Sight Distance (ISD) according to AASHTO is 225 ft for a left turn from a stop or 195 ft for a right turn from a stop. For no traffic control, the ISD is 90 ft.

After reviewing the existing 2006 and 2009 studies that the Village provided, we concur with the alternatives and options previously presented.

I conducted a site investigation on September 5, 2014, of the subject roads. The following are descriptions of current conditions as well as recommendations based on each site's uniqueness and Village's concerns with each site.

Speeding – All Roadways

The stealth radar data provided by the Village shows the 85th percentile speed on Boly Lane and Autumn Leaf Drive are approximately 5 mph over the 20 mph speed limit and the 85th percentile speed on Crescent Avenue is approximately 10 mph over the 20 mph speed limit. This suggests that drivers feel that the roadways are posted too low in relation to their comfort level rather than the actual design speed. Crescent Avenue feels like a collector from the village limits to Meramec Station Road as opposed to a subdivision street. This does not necessarily mean the we are recommending the speed limits be changed to the 85th percentile speed but doing so after a thorough horizontal/vertical criteria investigation may be warranted.

Crescent Avenue / Valley School Drive

This is an all-way stop controlled three-leg intersection. Crescent Avenue comprises the east and west legs of the intersection while Valley School Drive is the south leg. Slightly west of the intersection is the entrance to Twin Oaks Park. The horizontal curvature and vertical profile on the west leg can obscure an approaching driver from the view of drivers on the east and south legs. It is recommended to leave the intersection as all-way stop controlled. It does appear that the obstruction could be removed by lowering the profile on the west leg and performing some grading in the southwest quadrant. A capacity analysis of the intersection should be performed to verify that the configuration would operate satisfactorily as a one-way stop controlled intersection.



Crescent Avenue / Golden Oak Court

This is an all-way stop controlled three-leg intersection. Crescent Avenue comprises the north and south legs of the intersection while Golden Oak Court is the west leg. Golden Oak Court intersects Crescent Avenue within a curve. Sight distance for the northbound left-turning vehicle is hindered by trees along the east side of Crescent Avenue. Unless these trees can be removed or cut back, it is recommended to maintain the all-way stop controlled configuration. It is recommended to replace the "3-WAY" plaques with "ALL-WAY" plaques per the MUTCD.

Crescent Avenue / Crescent Road

This is an all-way stop controlled three-leg intersection. Crescent Avenue comprises the northeast and southwest legs of the intersection while Crescent Road is the west leg. Crescent Road has an acute angle of intersection (approx. 45°) with Crescent Avenue. Timber and vegetation located in the southwest quadrant of the intersection creates a visual obstruction for eastbound Crescent Road traffic. To convert this intersection to one-way stop control, approximately 25' of the timber and vegetation would need to be cleared to provide enough sight distance for Crescent Avenue. It is recommended to maintain the all-way stop controlled configuration if there are no improvements. It is also recommended to add the "ALL-WAY" plaques to the stop signs per the MUTCD.

Alternative – If Crescent Road were converted to one-way traffic, away from Crescent Ave through the use of semi-diverters, the all-way stop configuration could be removed since the movement with the sight distance concern would be eliminated. Possible un-striped two-way bicycle access could be provided with the use of "Share the Road" signs and curb cuts through the semi-diverters.

Crescent Road / Laws Court

This is a partial stop-controlled three-leg intersection. The east and west legs are Crescent Road and Laws Court is the south leg. The east leg is signed for no entry at the intersection, has approaching traffic only and is stop controlled. This allows a free flowing left turn from Laws Court and a free flowing right turn from the west leg of Crescent Road. Improved signage is recommended here. The one-way sign across from Laws Court should be removed. Likewise, it is recommended to apply a yellow centerline stripe and arrow markings consisting of a right turn arrow with "ONLY" on eastbound Crescent Road and a left turn arrow with "ONLY" on Laws Court. It is also recommended to add a "Right Turn Only" sign on Crescent Road at the intersection with Laws Court. It is also recommended, on Crescent Road, to replace the left side white stripe with a yellow stripe from the last residential entrance to Laws Court to further emphasize the "Exit Only" configuration (see Exhibit – pages 1 and 2).

Big Bend Road / Boly Lane

This is a partial stop-controlled three-leg intersection. Big Bend Road is the major road while Boly Lane is the minor road that is stop controlled. The sight lines are acceptable at this location for both left and right turns from the minor road. The curbed median and existing signage are both outside of the clear zone of Big Bend Road. It is recommended to add yellow taper striping with 12" diagonals from the curbed island tapering to a point approximately 45' south of the island. (See Exhibit – page 3)

Boly Lane / Autumn Leaf Drive

This is a partial stop-controlled three-leg intersection. Boly Lane comprises the north and south legs while Autumn Leaf Drive is the east leg. Due to the steep profile of the approach to Boly Lane, Autumn Leaf Drive is uncontrolled and both legs of Boly Lane are stop controlled. This allows for traffic



approaching the intersection from Autumn Leaf Drive to be allowed to operate unimpeded while experiencing low levels of traction (i.e. snow, ice, or rain). The vegetation in the southeast quadrant does hinder visibility for a northbound vehicle on Boly Lane; however, there is sufficient room past the stop bar for this vehicle to advance forward to gain a clear view of oncoming traffic from the right. This ability is only made possible by the positive stop control on the southbound Boly Lane approach. Due to the site and right-of-way constraints, it is recommended that this intersection remain as is so that safety is not negatively affected. It is recommended that a "TRAFFIC FROM THE LEFT DOES NOT STOP" sign be added to the north leg and a "TRAFFIC FROM THE RIGHT DOES NOT STOP" sign be added to the south leg.

Autumn Leaf Drive Curvature prior to Boly Lane

There are many possible safety enhancements for this curve. They are listed in decreasing magnitude of cost/disturbance. The enhancements are the addition of guardrail, installation of chevron signs, adding delineators along the northeast radius of Autumn Leaf Drive and painting the curb with a high-type white reflective paint.

Autumn Leaf Drive / Birnamwood Trail Drive

This is a partial stop controlled three-leg intersection. Autumn Leaf Drive comprises the north and south legs while Birnamwood Trail Drive is the west leg. The north and west legs are stop controlled. A site inspection reveals that there are no sight distance issues on any approach. The stop sign on the north leg should be able to be removed without any detrimental impact to safety. Another alternative is a stop sign could be added to the south leg to make this an all-way stop condition. If this option is chosen, it is recommended to add the "ALL-WAY" plaques to the stop signs per the MUTCD. A crosswalk could be added at the path to the park to better delineate the entrance. Pedestrian crossing signs could also be added to further reinforce the markings.

Path Feasibility

It is not recommended to attempt to place any type of non-vehicular path on a roadway facility without a positive barrier or 5' of separation behind a curb.

Crescent Avenue Path Feasibility - This facility is approximately 18' wide and has no parking along one side of the road. There are numerous obstructions and ROW constraints outside of the roadway. It appears that construction of an off-road path would be very cost prohibitive due to Right-of-Way (ROW) needs.

Crescent Road Path Feasibility - This facility essentially operates as a one-way road with the exception of the two-way traffic by the handful of properties that have full access. Parking is not prohibited but is very difficult due to side slopes and drainage features. There would be sufficient width for one direction of traffic and a walking path, but the road would need to be fully converted to one-way, a barrier or curbed section with 5' of separation would need to be constructed, additional signage for the properties with access to Crescent Road added, and modifications made at the intersection of Crescent Avenue and Crescent Road.

Boly Lane / Autumn Leaf Drive Path Feasibility - These facilities vary from 22' to 24' in width. Parking is restricted on one side. There would not be enough room to have two travel lanes, a parking lane, a barrier and a path within the existing roadway footprint. There are numerous obstructions and ROW constraints outside of the roadway that would make an off roadway path cost prohibitive.



Roadway Striping

It is not recommended to stripe the edge on a curbed section where parking is allowed. It is recommended to stripe the edge of the roadway in an uncurbed section, regardless of parking allowance. If a line is present then it denotes the edge of the travelled way. While specific state statutes or ordinances detailing this could not be found, it is specifically stated in the Missouri Rules of the Road, that, "No-Parking Zones; Do not park blocking the normal traffic flow"

It is recommended that on Boly and Autumn Leaf Drive to follow the normal subdivision style of not striping either edge and leave the No Parking enforcement to the existing signs.

It is recommended that Crescent Avenue and Crescent Road be fully striped (center and edges), leaving the existing signs to denote the no parking areas.

Should you need anything else with regards to this project or if there is something that Horner & Shifrin can assist the Village with, please contact me. We will be happy to help.

Very truly yours,

Brian D. Schmidt, P.E., P.T.O.E.
Project Manager

attachment



LAWS COURT LOOKING AT
CRESCENT ROAD

ONLY



EASTBOUND CRESCENT ROAD
LOOKING AT LAWS COURT



NORTHBOUND BOLDY LANE
LOOKING AT BIG BEND ROAD