

## U.S. 322 Safety Study Proposed Project Summary

Project Key	Station Location	Description	Project Cost Estimate	Benefit-Cost Ratio	Priority
A	310+00 to 700+00	<b>Mill Centerline Rumble Strip in entire corridor (310+00 - 703+00)</b> OR <b>Add a 2 to 3 foot wide Concrete Median with Rumble Strip along entire corridor</b> Crash history indicates numerous crossover/head-on crashes throughout corridor. Areas with passing zones would have milled centerline rumble strip.	\$ 135,000	139.167	HIGH
			\$ 20,998,000	1.342	
B	310+00 to 532+00	<b>Add Shoulder Rumble Strips from Elks Club (310+00) / Bear Meadows Road to Neff Road (530+00).</b> Shoulder rumble strips were installed from Neff Road to PA 144 in 2006. Crash history indicates 4 clear zone crashes between Elks Club Road/Bear Meadows Road to Neff Road.	\$ 34,000	5.194	HIGH
C	329+00 to 334+00	<b>Add Street Lighting at SAG Curves with Insufficient Sight Distance and Crash History (330+00)</b> Calculated sight distance does not meet standards Crash history indicates 1 property damage only crash that may be attributed to sight distance. Includes night crashes only.	\$ 32,800	0.210	LOW
D	316+00 to 346+00	<b>Improve Profile at Crest Vertical Curve with Insufficient Sight Distance and Crash History</b> Calculated stopping sight distance does not standards Crash history indicates 1 property damage only crash that may be attributed to insufficient sight distance.	\$ 4,881,000	0.002	LOW
E	389+90 to 394+30	<b>Ditch Safety Improvement</b> Existing ditch is 3-4 feet deep, U-shaped section with existing concrete Type D-E endwall at cross-pipe. Propose to re-grade ditch section within R/W for a safer roadside OR place open-joint pipe in ditch and fill to surface with rip-rap stone. Replace D-E endwall with end section / pipe / inlet to direct ditch flow into cross-pipe, similar to what was done in the 2006 project closer to Potters Mills.	\$ 93,000	0.148	MEDIUM
F	448+00 to 487+00	<b>Construct Continuous Center Turn Lane and Intersection Improvements</b> Due to number of businesses and turning movements, a Center Turn Lane should be considered here, according to AASHTO guidance for left-turn lanes on two-way highways. Several crashes on this segment were associated with vehicles turning on-to or off-of U.S. 322. Observed vehicles using the shoulder to pass vehicles waiting to make a left-turn. The crash rates on these segments are below the Statewide Homogeneous Rate. Wagner Road Left Turn Lane: One of the three intersection crashes was related to left-turns from U.S. 322 to Wagner Road. Traffic volumes are heavy on the U.S. 322 through movements. Volume of left turns is low (6 left-turns in the PM peak hour). A left-turn lane should be considered here, according to AASHTO guidance for left-turn lanes on two-way highways. Taylor Hill Rd Right Turn Lane: No reportable crashes were documented. Observed 36 PM peak hour vehicles using the shoulder as a right-turn deceleration lane. Vehicles attempting to pass a right-turning vehicle encroach on centerline in advance of S-curve east of Taylor Hill Road. Difference in free flow speeds are moderate (20 mph range between highest and lowest speeds observed). Potential environmental impacts due to roadway widening. ITS Vehicle Detection and warning lights would alert drivers on US 322 when cross traffic is detected on Wagner Road or Taylor Hill Road.	\$ 3,808,000	Center Turn Lane	HIGH
			\$ 90,000	Vehicle Detection	
			<b>Total</b> \$ 3,898,000	<b>0.224</b>	
F-MOD	448+00 to 486+00	<b>Re-Align Taylor Hill Road</b> An option to Project F would be to re-align Taylor Hill Road to make a four-leg intersection at Wagner Road. Environmental Impacts due to Sinkhole	\$ 3,631,000	Center Turn Lane	OPTIONAL
			\$ 1,905,000	Taylor Hill Road	
			\$ 90,000	Vehicle Detection	
<b>Total</b>	<b>\$ 5,626,000</b>	<b>0.155</b>			
G	483+00 to 680+00	<b>Adjust Profile for 60 MPH Design Speed</b> Numerous vertical curves in this section have sight distance issues	\$ 28,656,000	0.010	DEFERRED

## U.S. 322 Safety Study Proposed Project Summary

Project Key	Station Location	Description	Project Cost Estimate	Benefit-Cost Ratio	Priority
		<p>Speeds in this section are high (85th % speed of 65 mph) and highly variable (25 mph range between highest and lowest speeds observed).            If this project is completed, projects H, I, K, L, and M would be incorporated into the profile adjustment and reconstruction.            This improvement would be very impactful.            The crash rates for Segments 0680 to 0750 are all below the Statewide homogeneous Rate.            The crash rate for Segment 0770 is above the Statewide Homogeneous Rate, mostly due to the crash cluster at the PA 144 intersection.            Alternative to reconstruction would be to lower the posted speed limit to 45 mph.            Justification would be founded on the existing geometric features of the roadway profile—vertical and horizontal curvature, sight distances, etc.</p>			
<b>H</b>	<b>533+00 to 537+00</b>	<p><b>Add Street Lighting at SAG Curve with Insufficient Sight Distance and Crash History</b>            Calculated stopping sight distance does not meet standards            Crash history indicates 1 property damage only crash that may be attributed to sight distance. Includes night crashes only.</p>	\$ 27,200	0.254	LOW
<b>I</b>	<b>535+50 to 559+75 and 588+75</b>	<p><b>Intersection Improvements &amp; Roadway Closure: Church Hill Road (545+00) / Dogtown Road (585+00)</b>            Both of these intersections have Intersection Sight Distance issues and low traffic volumes.            It is recommended to improve one intersection and close the other.            The Township has previously stated that they will look at the long term use of the Church Hill Road intersection if improvements are made at the Taylor Hill intersection            Two consecutive vertical curves near Church Hill Road have insufficient sight distance</p>	\$ 3,136,000	0.028	HIGH
<b>J</b>	<b>568+00 to 605+50</b>	<p><b>Modify or Remove Passing Zone (Near SPCA)</b>            The existing passing zone may have been designed assuming an 85th percentile speed of 55 mph. Observed 85th percentile speed was 65 mph.            The existing passing zone may require modification, according the current operating speeds.            Seven of the 17 reportable crashes were speed-related. Three of these crashes were specifically related to vehicle passing.            The crash rates on these segments are below the Statewide Homogeneous Rate.            Location of passing zone is problematic -- Westbound passing maneuver ends on an uphill grade entering a vertical curve.</p>	\$ 8,000	11.575	HIGH
<b>K</b>	<b>600+00 to 610+50</b>	<p><b>Improve Intersection Sight Distance at Cider Press Road or Close Cider Press Road</b>            IMPROVE            Intersection Sight Distance to the left is insufficient            ISD to the right is adequate.            Existing intersection skew of ~70 degrees.            CLOSE            Potential to close this intersection and redirect traffic to Geary Road &amp; Red Mill Road to US 322.            Traffic volumes on Cider Press are minimal (15 AM peak; 3 PM peak) and are primarily associated with residences along Cider Press Road.            Residents of the area understand the safety issues, and some report avoiding the intersection in favor of using PA 45 to reach Boalsburg and State College.            Emergency service accommodations, roadway closure design, and environmental clearance must be considered.</p>	\$ 1,810,000  \$ 25,000	0.000  0.000	LOW
<b>L</b>	<b>600+00 to 640+00</b>	<p><b>Improve Profile at Crest Vertical Curve with Insufficient Sight Distance and Crash History</b>            Calculated stopping sight distance does not meet standards            Crash history indicates 1 moderate injury crash that may be attributed to sight distance.</p>	\$ 11,248,000	0.015	MEDIUM
<b>M</b>	<b>677+25 to 680+20</b>	<p><b>Ditch Safety Improvement</b>            Existing ditch is 3 feet deep, U-shaped section.            Propose to re-grade ditch section within R/W for a safer roadside OR place open-joint pipe in ditch and fill to surface with rip-rap stone.            Previous D-E endwall was replaced with end section / pipe / inlet to direct ditch flow into cross-pipe in 2006. Grading at the inlet was improved for safer approach slope.</p>	\$ 44,000	0.000	LOW
<b>N</b>	<b>699+00</b>	<p><b>Utilize Existing ITS Technologies at PA 144 Intersection</b>            Crash history indicates that 8 of 10 crashes at PA 144 were weather-related.            ITS weather detection system would alert drivers when icy, slippery, or otherwise hazardous weather/roadway conditions are present in the vicinity of the intersection.</p>	\$ 90,000	2.991	LOW

## U.S. 322 Safety Study Proposed Project Summary

Project Key	Station Location	Description	Project Cost Estimate	Benefit-Cost Ratio	Priority
		<p>Eight of the ten reportable crashes at the PA 144 intersection were weather-related.</p> <p>Slippery roadway conditions would activate a dynamic signage (DMS), located within 1500 feet of the PA 144 intersection.</p> <p>Weather detection system could also activate a warning message on the existing DMS, located further east on U.S. 322 within the 4-lane section.</p> <p>ITS vehicle detection would alert drivers on U.S. 322 when cross-traffic is detected on PA 144.</p> <p>Side-street vehicle detection and actuated signs would be used in place of the more typical "Left-Turns and Cross-Traffic Ahead" signage.</p> <p>Actuated signs are likely to attract more attention to the actual presence of vehicles on the side-street.</p>			