

**TRAFFIC SPEED STUDY
FOR
CLEAR SPRING ROAD (T-376)**

**NORTH ANNVILLE TOWNSHIP
LEBANON COUNTY**

MARCH 2024

ELA PROJECT 1273-001

PREPARED BY: MARK L. HENISE, P.E.



**ELA GROUP, INC.
LITITZ, PA**



**TRAFFIC SPEED STUDY
FOR
CLEAR SPRING ROAD (T-376)
NORTH ANNVILLE TOWNSHIP
LEBANON COUNTY**

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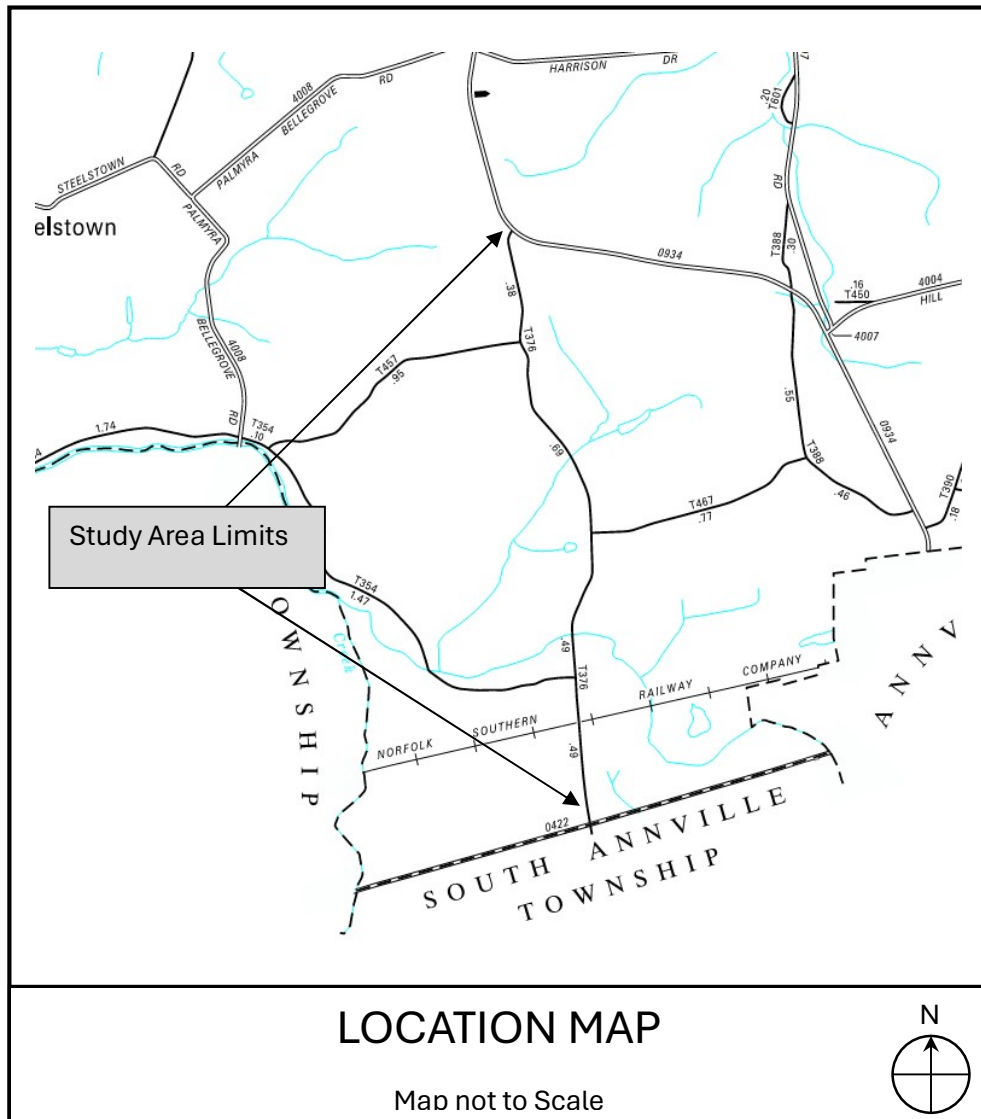
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**TRAFFIC SPEED STUDY
FOR
CLEAR SPRING ROAD (T-376)
NORTH ANNVILLE TOWNSHIP
LEBANON COUNTY**

I. INTRODUCTION

This report presents the findings and results of a traffic engineering study conducted by ELA Group, Inc. for North Annville Township. The purpose of the study was to conduct all necessary engineering and traffic studies in order to justify the installation of proper regulatory speed limit signs along Clear Spring Road (T-376) from US Route 422 to Bellegrove Road (SR 0934), a distance of 10,824 feet (2.05 miles). The study area is shown on the site location map on the following page.

In order to justify the installation of the signs along the route, specific engineering and traffic studies were conducted and documented in accordance with 67 Pa. Code § 212. The following section outlines the specific standards used in conducting this study.



Source: PennDOT Type 5 Map – North Annville Township, Lebanon County

**CLEAR SPRING ROAD (T-376)
TRAFFIC SPEED STUDY**

North Annville Township
Lebanon County

Exhibit 1 – Location Map

II. STANDARDS AND GUIDELINES

A. Establishing Speed Limits

Based on the criteria established in 67 Pa. Code § 212, speed limits shall be established as follows:

1. *General.* This section applies to maximum speed limits established according to 75 Pa. C.S. §§ 3362 and 3363 (relating to maximum speed limits; and alteration of maximum speed limits). Engineering and traffic studies are not required for statutory speed limits, but documentation should be on file for urban districts and residence districts to show that the requirements defined in the Vehicle Code are satisfied.
2. *Engineering and traffic studies.* Speed limits established in accordance with 75 Pa. C.S. § 3363 may be established in multiples of 5 miles per hour up to the maximum lawful speed. The speed limit should be within 5 miles per hour of the average 85th percentile speed or the safe running speed on the section of highway, except the speed limit may be reduced up to 10 miles per hour below either of these values if one or more of the following conditions are satisfied:
 - a. A major portion of the highway has insufficient stopping sight distance if traveling at the 85th percentile speed or the safe running speed.
 - b. The available corner sight distance on side roads is less than the necessary stopping sight distance values for through vehicles.
 - c. The majority of crashes are related to excessive speed and the crash rate during a minimum 12-month period is greater than the applicable rate in the most recent high-crash rate or high-crash severity rate table included in the appendix of Official Traffic Control Devices (Department Publication 212). Crashes related to excessive speed include those crashes with causation factors of driving too fast for conditions, turning without clearance or failing to yield right-of-way.
3. *Variable speed limits.* To improve safety, speed limits may be changed as a function of traffic speeds or densities, weather or roadway conditions or other factors.
4. *Special speed limits.*
 - a. Within a rest area or welcome center, a 25 mile per hour speed limit may be established without the need for an engineering and traffic study if pedestrians walk across the access roadways between the parking lot and the rest facilities.

- b. Within a toll plaza or a truck weight station, an appropriate speed limit may be established without an engineering and traffic study by the authorities in charge to enforce the safety of the operations or to protect the scales.
5. *Posting of speed limits.* A Speed Limit Sign (R2-1) or variable speed limit sign showing the maximum speed limit shall be placed on the right side of the highway at the beginning of each numerical change in speed limit, but an additional sign may also be installed on the left side of the highway. If the new speed limit begins at an intersection, the first sign should be installed within 200 feet beyond the intersection. The placement of this sign must satisfy both the requirement to post the beginning of the new speed limit and the requirement to post the end of the previous speed limit. Additional requirements for posting are as follows:
- a. Speed limits of 50 miles per hour or less should be posted as follows:
 - i) A Reduced Speed (____) Ahead Sign (R2-5), or a Speed Reduction Sign (W3-5), shall be placed on the right side of the highway 500 to 1,000 feet before the beginning of every speed reduction unless one of the following applies:
 - a) The speed reduction is 10 miles per hour or less.
 - b) The speed reduction begins at an intersection and all traffic entering the roadway with the speed reduction has to either stop at a Stop Sign (R1-1) or make a turn.
 - c) The new speed limit is posted on variable speed limit signs.
 - ii) Speed limit signs (R2-1) or a variable speed limit sign showing the maximum speed shall be placed on the right side of the highway at the beginning of the speed limit and at intervals not greater than ½ mile throughout the area with the speed limit.
 - iii) The end of a speed limit is typically identified by the placement of a sign indicating a new speed limit, but the End Plaque (R2-10) may be placed above a Speed Limit Sign (R2-1) at the end of the zone if the appropriate speed limit is not known on the following section of roadway.
 - b. On freeways, a Speed Limit Sign (R2-1) shall be installed after each interchange unless insufficient space exists for the signs.

B. Safe Running Speed

Safe running speed is defined in 67 Pa. Code § 212.1 as follows:

The average speed for a portion of highway determined by making a minimum of five test runs while periodically recording the speed at different locations while driving at a speed which is reasonable and prudent, considering the available corner and stopping sight distance, spacing of intersections, roadside development and other conditions.

III. STUDY RESULTS

ELA Group, Inc. conducted five trial runs in each direction along Clear Spring Road on Friday February 2, 2024, in accordance with the criteria set forth in 67 Pa. Code § 212. The weather was cloudy, and the pavement was dry when the trial runs were conducted. The result of those trial runs was an average safe running speed of 40.4 miles per hour in the northbound direction and 41.4 miles per hour in the southbound direction, and the aggregate safe running speed is 40.9 mph. Based upon these results, a posted speed limit of 40 mph or 45 mph may be recommended. The results are summarized in Table 1. A Safe Running Speed Study Worksheet is provided in Appendix A, showing the data collected during each individual trial run. It should be noted that the length shown on the worksheet is slightly shorter than the overall length of the road because the study was stopped short of the intersections on either end so that they did not skew the safe running speed calculations.

Table 1 – Safe Running Speed Study Results

Roadway	Township Route	Length (feet)	Safe Running Speed	
			Northbound/(mph)	Southbound/(mph)
Clear Spring Road	T-376	10,824	NB / 40.4	SB / 41.4

In addition to the trial runs, ELA also conducted stopping sight distance measurements at several locations along Clear Spring Road to determine if there are any locations of insufficient sight distance based upon the potential recommended speed limits. Four (4) locations were found to have insufficient stopping sight distance based upon a 40 mph posted speed limit. The locations, measurements and minimum requirements are summarized in Table 2.

Based on these four (4) locations having insufficient stopping sight distance for vehicles traveling at 40 mph, it is recommended that the posted speed limit be reduced another 5 mph to 35 mph in accordance with 67 Pa. Code § 212.108.(b)(1).

Table 2 – Safe Stopping Sight Distance Evaluation

Location	Measured Sight Distance	Minimum Safe Stopping Sight Dist. @ 40 mph	Restriction
Bridge Over Railroad	272 feet	345 feet	Road Profile
Vertical Curve approx. 800' south of Shanamantown Road	282 feet	360 feet	Road Profile
Vertical Curve approx. 400' north of Shanamantown Road.	309 feet	338 feet	Road Profile
Horizontal Curve approx. 400' south of School Creek Lane	165 feet	338 feet	Bank inside Horizontal Curve

IV. CONCLUSIONS AND RECOMMENDATIONS

- A. Clear Spring Road in North Annville Township from US Route 422 to Bellegrove Road (SR 0934), a distance of 10,824 feet (2.05 miles), should be posted at a speed limit of 35 mph in both directions.
- B. Speed limit signs, R2-1 (24" x 30"), shall be placed on the right side of the roadway at intervals no greater than ½ mile and within 200 feet of the intersection with US Route 422 in the northbound direction and within 200 feet of the intersection with Bellegrove Road in the southbound direction. Speed limit signs should also be placed within 200 feet on either side of the intersections with Syner Road, Shanamantown Road, and School Creek Lane. All existing 40 mph signs should be removed.
- C. All recommended sign locations are shown on the signing plan in Appendix C.



APPENDIX A - SAFE RUNNING SPEED STUDY WORKSHEET



APPENDIX B - DETAILS FOR RECOMMENDED SIGNS

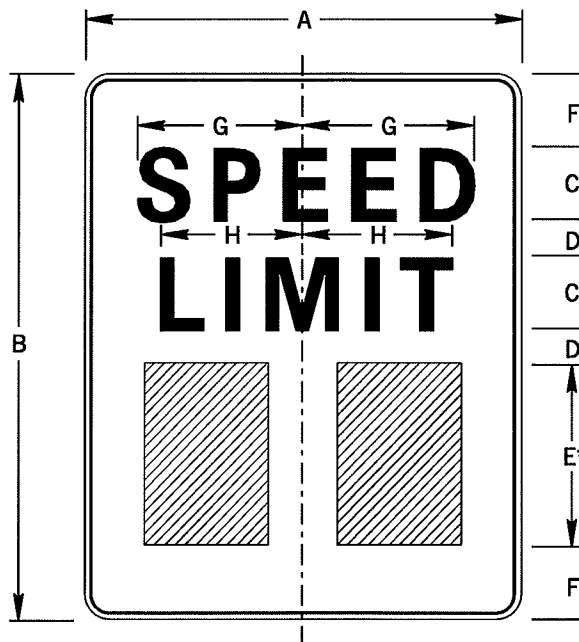
R2-1

SPEED LIMIT SIGN

The Speed Limit Sign (R2-1) shall be authorized for use to display the maximum legal speed limit on a highway. When used as a variable speed limit sign, speed display module(s) may be attached to the sign or inserted through cut-outs in the sign substrate.

The R2-1 Sign shall be placed at intervals as specified in Department regulations. The standard size signs shall be as follows:

- (1) 24" x 30". All single lane conventional highways having any speed limit.
- (2) 30" x 36". Multi-lane conventional highways regardless of speed limit.
- (3) 48" x 60". Expressways and freeways.



DIMENSIONS - IN									
SIGN SIZE A x B	C	D	E	F	G	H	MAR- GIN	BOR- DER	BLANK STD.
24" x 30"	4E	2	10E	4	9.6	7.3	0.4	0.6	B5-3024
30" x 36"	5E	2	12E	5	12	9.1	0.6	0.8	B5-3630
48" x 60"	8E	6	20E	6	19.1	14.6	0.8	1.2	B5-6048

* OPTICALLY SPACE NUMERALS ABOUT VERTICAL $\text{\textcircled{C}}$

COLOR:

LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)

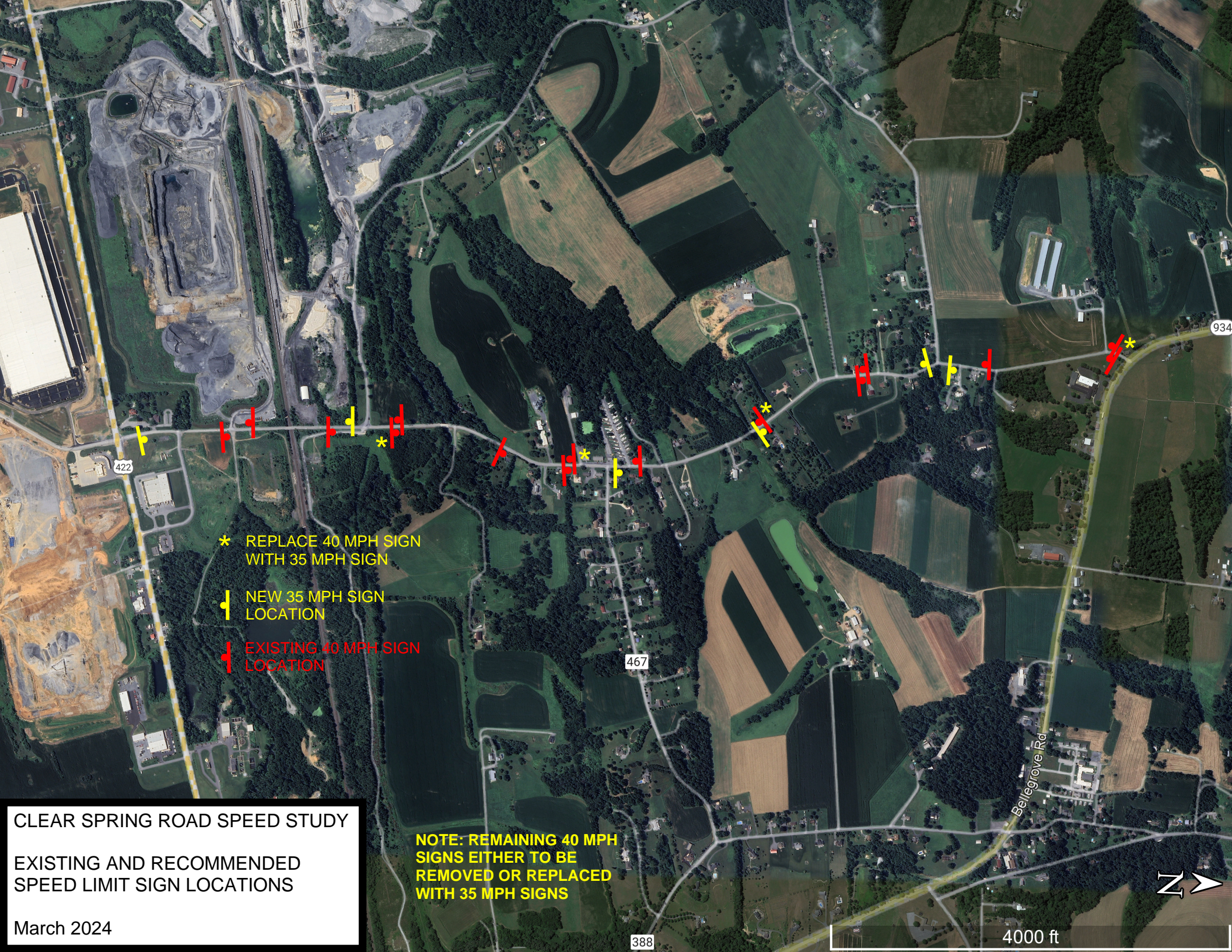
BACKGROUND:
WHITE (REFLECTORIZED)

APPROVED FOR THE SECRETARY OF TRANSPORTATION

By : Alan C. Brown Date : 02-29-12
Chief, Traffic Engineering and Permits Section
Bureau of Maintenance and Operations



APPENDIX C - SIGNING PLAN



- * REPLACE 40 MPH SIGN WITH 35 MPH SIGN
- ┆ NEW 35 MPH SIGN LOCATION
- ┆ EXISTING 40 MPH SIGN LOCATION

NOTE: REMAINING 40 MPH SIGNS EITHER TO BE REMOVED OR REPLACED WITH 35 MPH SIGNS

CLEAR SPRING ROAD SPEED STUDY
EXISTING AND RECOMMENDED SPEED LIMIT SIGN LOCATIONS
 March 2024

4000 ft



388

467

422

934