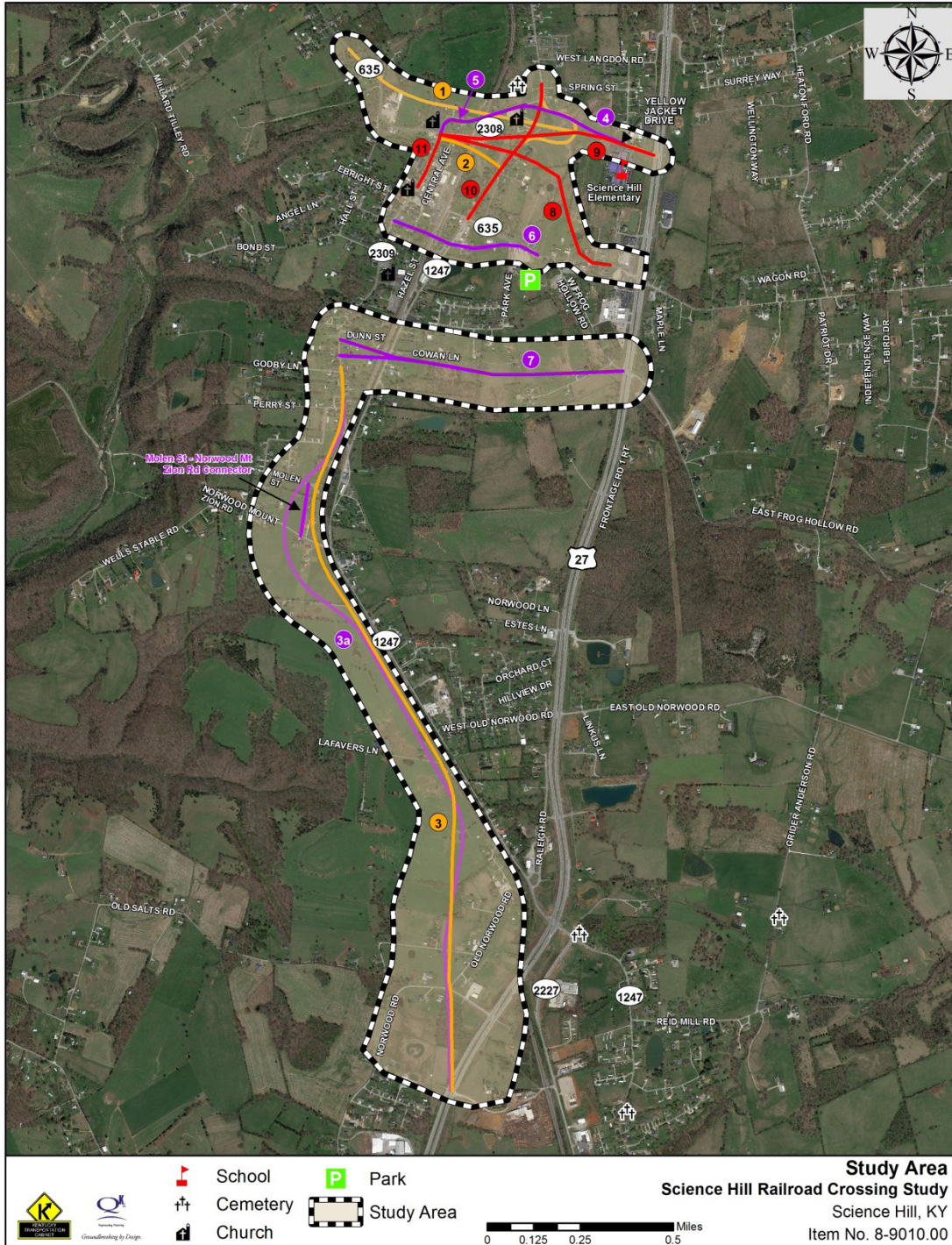


## Science Hill Railroad Crossing Scoping Study Pulaski County Item Number: 8-9010.00

The purpose of this project is to improve safety and reliability for travelers—especially emergency responders—in Science Hill, as the railroad tracks form a barrier between the eastern and western portions of town. The study area is illustrated in **Figure 1**. Preliminary alternatives were identified during the February 22, 2018 Scoping Meeting. The project is in Pulaski County which has a population 2010 census population of 63,063 and a projected 2040 population of 71,296 according to the Kentucky Data Center (Table 1).



**Figure 1: Study Area and Preliminary Alternatives**

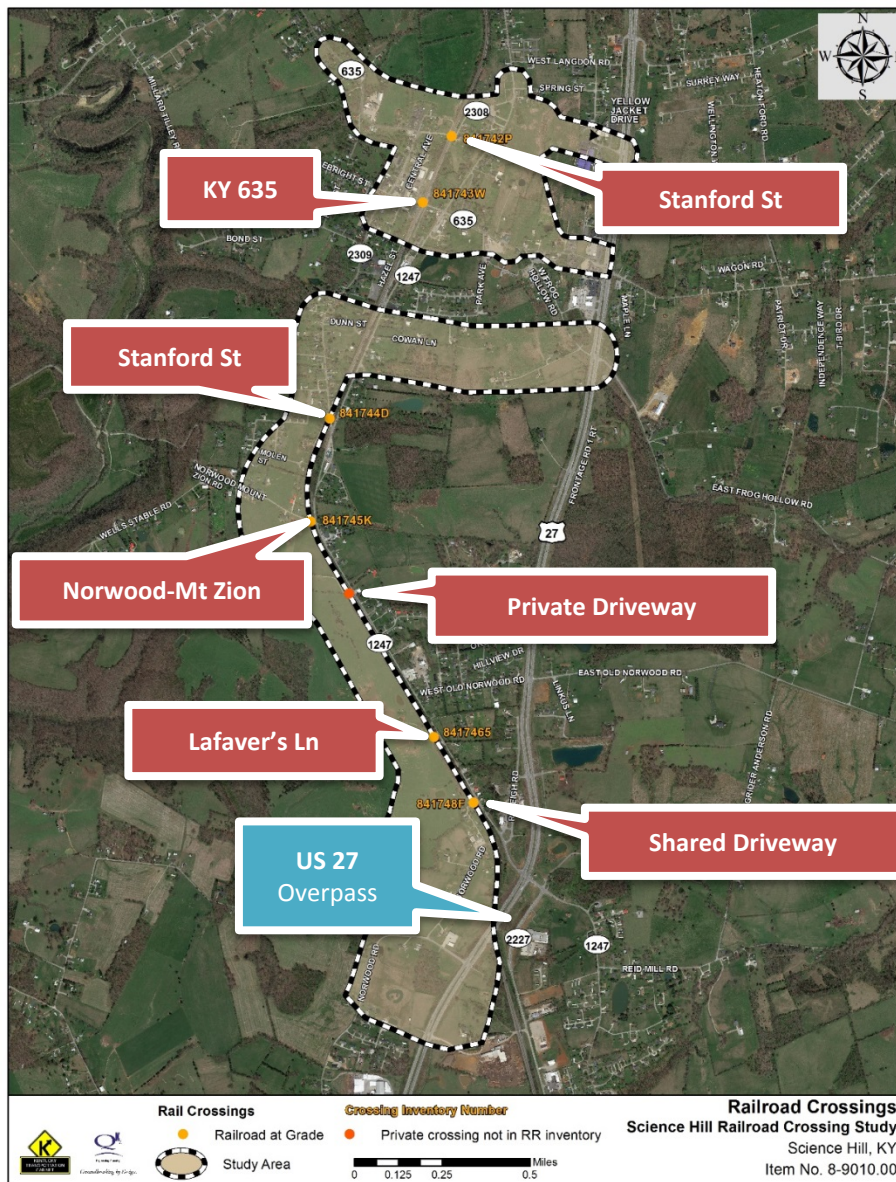
**Table 1: Population Growth**

	Census				Estimate	Projections				
	1980	1990	2000	2010	2015	2020	2025	2030	2035	2040
Pulaski	45,803	49,489	56,217	63,063	63,782	65,677	67,345	68,854	70,180	71,296
Kentucky	3,660,777	3,685,296	4,041,769	4,339,367	4,425,092	4,533,464	4,634,415	4,726,382	4,808,682	4,886,381

Source: Kentucky Data Center

**BACKGROUND**

The study area has seven at-grade railroad crossings and a US 27 bridge over the railroad at the southern end.



**Figure 2: Study Area Railroad Crossings**

Today, if trains block the tracks, some motorists and emergency vehicles may turn around and travel a different route. If crossings are blocked by a train, Figure 3 shows three detour routes to reach the other side of Science Hill. These routes range from 7-21 miles in length.

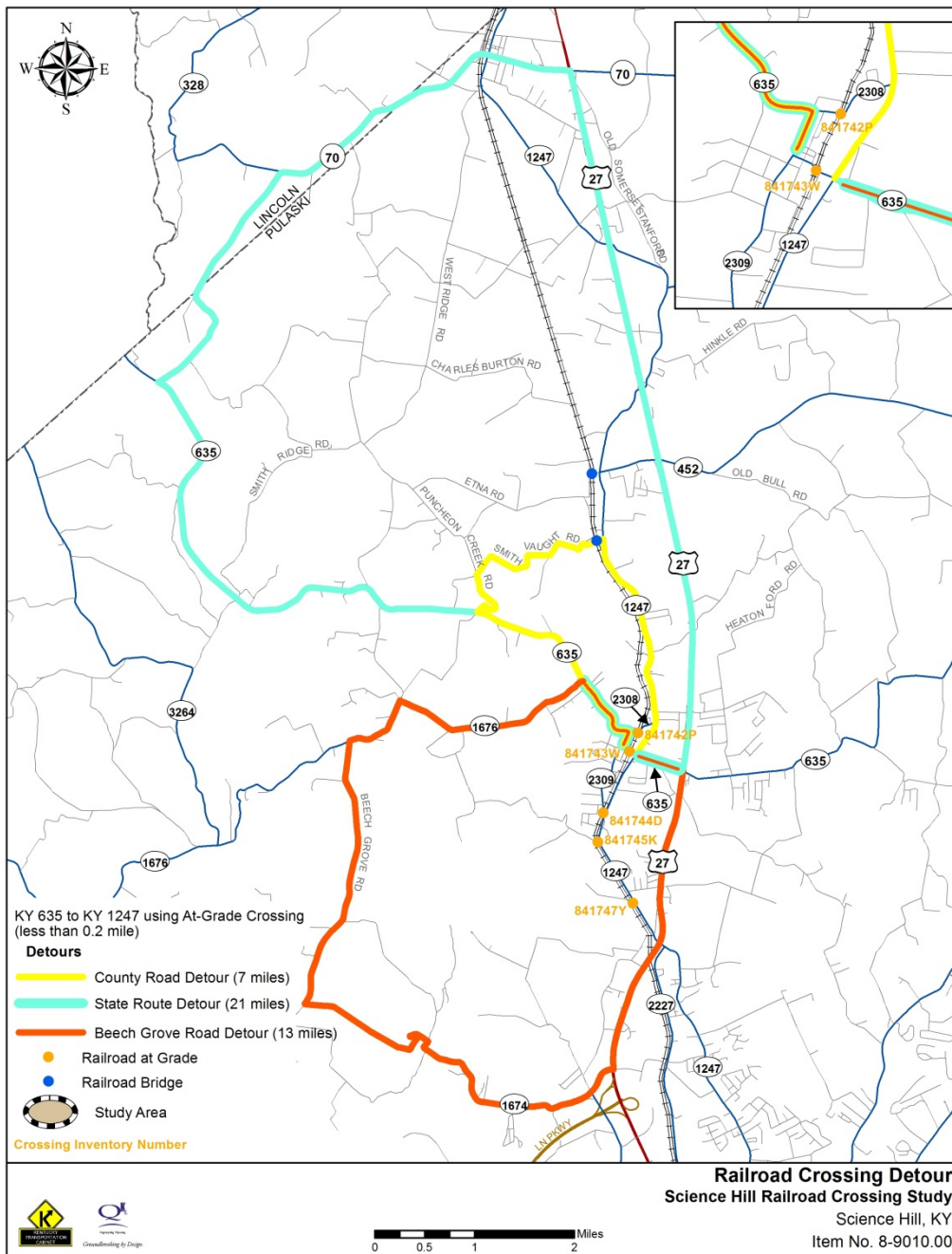


Figure 3: Study Area Detour Routes When Train Blocks Tracks

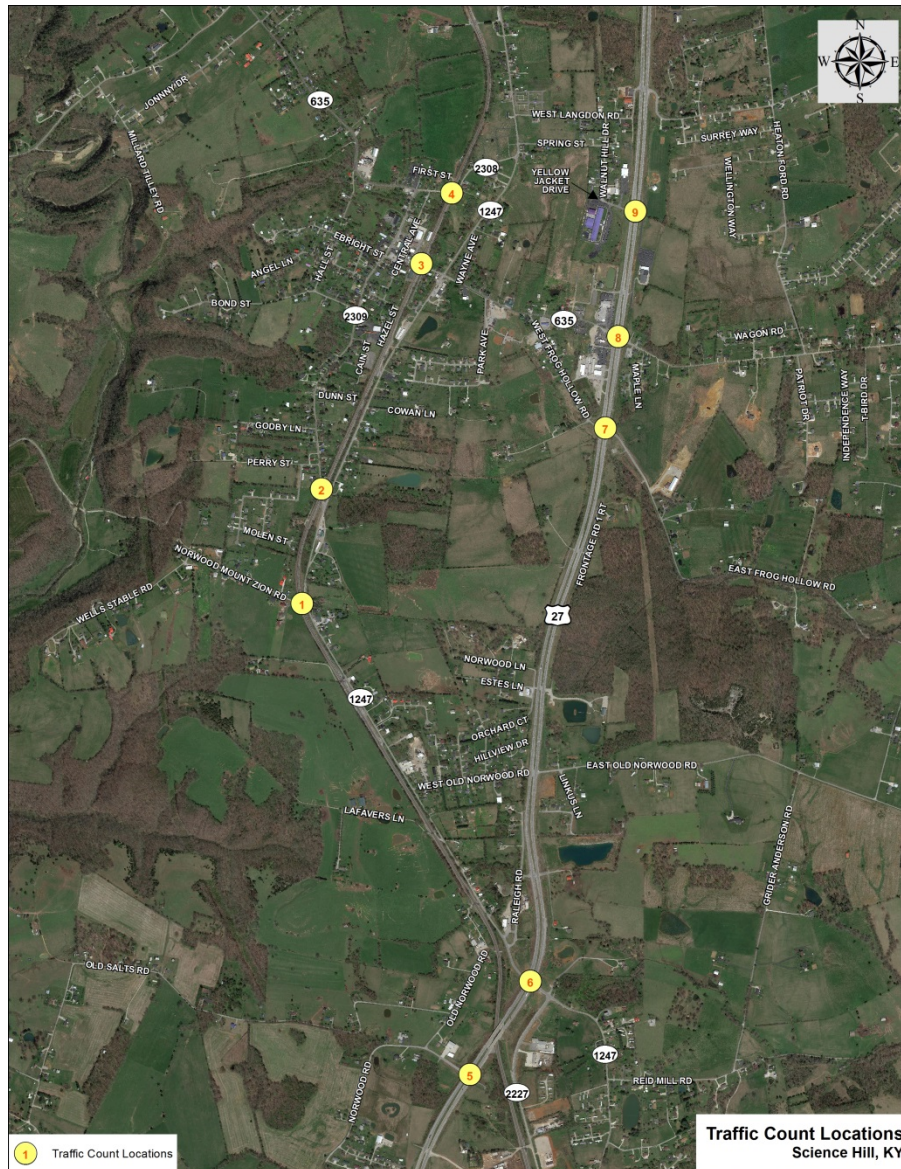
### Data Collection

Twenty-four hour counts were conducted at each of the railroad crossings in Table 2 and Figure 4. Twelve-hour turning movement counts were taken at Intersections 5-9. All counts used Miovision technology. This data was transmitted to KYTC June 8, 2018 via email. Data showed 35 trains blocked

the tracks in the 24-hour period for an average of three minutes each, with one to three crossings taking over five minutes to clear the tracks depending on the location. The longest time the tracks were blocked was 12 minutes. The trains have 80-130 cars each. Each car is usually about 50 feet in length.

**Table 2: Study Traffic Counts**

Railroad Crossings		Intersections	
1	Norwood/Mt. Zion Road	5	US 27/Norwood Road
2	KY 2309	6	US 27/KY 1247
3	KY 635	7	US 27/W Frog Hollow Road
4	KY 2308	8	US 27/KY 635
		9	US 27/Yellow Jacket Drive



**Figure 4: Traffic Count Locations**

### Model Adjustments

Speed data was collected during field reviews along the entire corridor and many other routes in the study area. This data was collected with a datalogger (provided by KYTC) during non-peak times,

travelling a comfortable, normal speed and without train interruption. This information was used to update speeds in the Laurel-Pulaski Travel Demand Model (LPTDM ). In addition, speeds were lowered three to four miles per hour (MPH) at the rail crossings to account for trains blocking the tracks for nearly two hours/day.

### Traffic Projections for Segments

KYTC historical traffic counts and data collected from the 2018 intersection counts shown in Table 2 were used to provide a base year 2018 ADT. The count database was used to obtain the most recent traffic count history for highway segments US 27, KY 1247, and KY 635, along with Frog Hollow Road, Norwood Connector and Yellow Jacket Drive. Using the count history, the most recent traffic counts were projected to year 2018 based on historical growth rates for each route. The existing model was run; and model assignments compared to current traffic counts to determine appropriate adjustment ratios to be applied to future year (2040) model runs. Any 2040 model output was adjusted with that same ratio to determine future year 2040 daily volumes. The 2040 adjusted volumes were used as the 2040 No Build ADTs for the intersections and roadway segments. Trucks were assumed to grow at the same rate as cars. Centroid Connectors were not adjusted to improve Root Mean Square Error.

### Model Runs

The LPTDM was modified to include each alternative shown in Figure 5. Then, eight Build scenarios (Table 4) were individually modeled to obtain daily volumes for both the new crossing and residual traffic. Adjusted model output was used to Table 3 shows the results of the modeling effort. Figure 6 illustrates Table 4 heading locations.

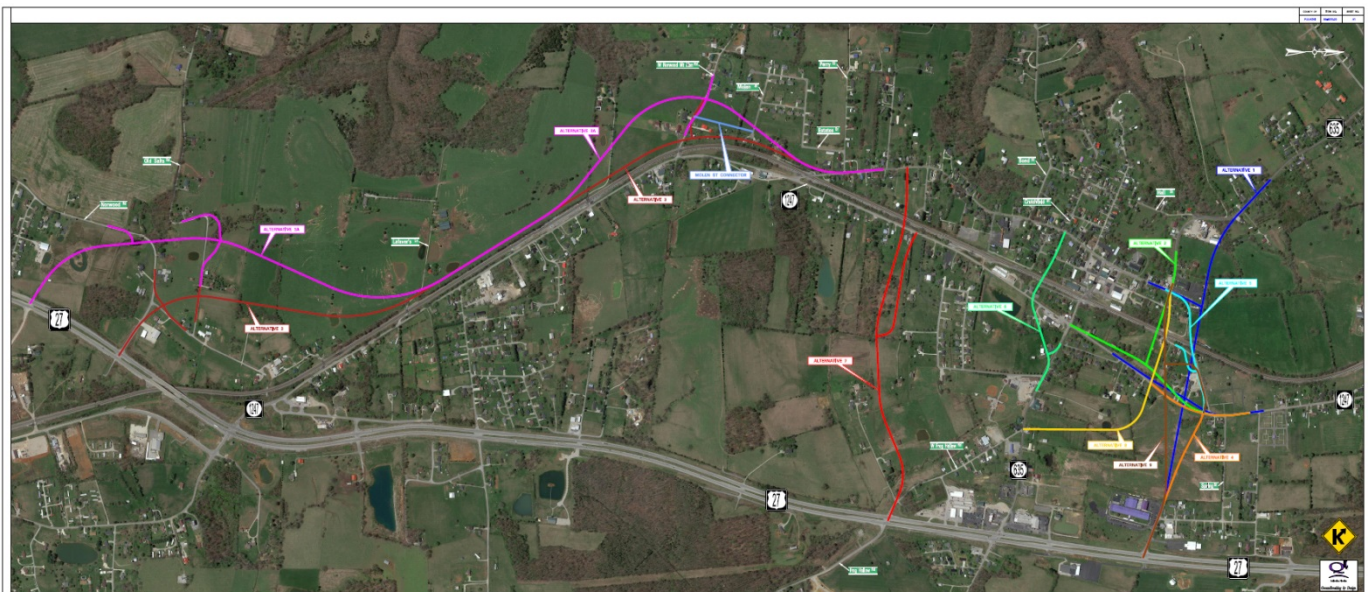


Figure 5: Build Alternatives



Table 3: Existing, No Build and Build Output

	Railroad Crossing Location	Stanford St (N)	KY 635	Stanford St (S)	Norwood Rd	Proposed Crossing
	Existing Count	570	2570	2580	390	n/a
	Existing Truck Percentage	6.30%	3.60%	2.60%	0.10%	n/a
	Existing Model Assignment	442	3545	1830	1450	n/a
	count/model Ratio	1.29	0.72	1.41	0.27	n/a
	(count-model) Difference	128	-975	750	-1060	n/a
	Future E+C Model Assignment	532	4082	2046	1653	n/a
	Ratio Adjusted Future Year	686	2959	2885	445	n/a
	Difference Adjusted Future Year	660	3107	2796	593	n/a
	Average Adjusted Future Year	673	3033	2840	519	n/a
N	Alternative 1	closed	138	1905	520	4501
N	Alternative 2	closed	328	1962	520	4255
N	Alternative 4+5	closed	505	1987	520	4053
N	Alternative 8	closed	477	1954	520	4114
N	Alternative 9	closed	139	1914	520	4493
M	Alternative 6	685	closed	2205	520	3655
M	Alternative 7	closed	4045	1900	520	600
S	Alternative 3	closed	4066	closed	closed	2999



Figure 6: Locations Associated with Table 4

Qk4 will return the modified model and documentation to the KYTC at the conclusion of the study.