Traffic Noise Technical Report

SH 5 from South of FM 1378 to South of CR 275

April 2020

Collin County
CSJ: 0047-05-054; 0047-09-034; and 0364-04-049

Texas Department of Transportation – Dallas District

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 9, 2019, and executed by FHWA and TxDOT.

Table of Contents

1.0 Introduction 1
2.0 Background 1
3.0 Noise Analysis Summary 3
4.0 Mitigation 14
5.0 Noise Planning Contours 19
6.0 Construction Noise 20
7.0 Local Coordination 20

List of Tables

Table 1: FHWA Noise Abatement Criteria 2
Table 2: Traffic Noise Levels (dB(A) Leq) 3
Table 3: Noise Barrier Proposal (Preliminary) 19
Table 4: Traffic Noise Contours [dB(A) Leq] 20

Appendix A: Exhibits
Appendix B: Traffic Volumes
Appendix C: Noise Measurements and Model Validation

1.0 Introduction

The Texas Department of Transportation (TXDOT) Dallas District is proposing improvements to approximately 7.2 miles of the SH 5 corridor, from south of FM 1378 to south of CR 275 in McKinney, Collin County, TX. The project limits are shown in **Appendix A**. Please refer to ECOS for the project description.

2.0 Background

This analysis was accomplished in accordance with TxDOT's (Federal Highway Administration [FHWA] approved) Guidelines for Analysis and Abatement of Roadway Traffic Noise (2011).

Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB."

Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dB(A)."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

The traffic noise analysis typically includes the following elements:

- Identification of land use activity areas that might be impacted by traffic noise.
- Determination of existing noise levels.
- Prediction of future noise levels.
- Identification of possible noise impacts.
- Consideration and evaluation of measures to reduce noise impacts.

The FHWA has established the following Noise Abatement Criteria (NAC) for various land use activity areas that are used as one of two means to determine when a traffic noise impact will occur. These criteria are outlined in **Table 1**.

Table 1: FHWA Noise Abatement Criteria

Activity Category	FHWA (dB(A) Leq)	Description of Land Use Activity Areas
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Residential.
C	67 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	-	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	-	Undeveloped lands that are not permitted.

Source: TXDOT Guidelines for Analysis and Abatement of Highway Traffic Noise (2011), 23CFR772.

A noise impact occurs when either the absolute or relative criterion is met:

Absolute criterion: the predicted noise level at a receiver approaches, equals or exceeds the NAC. "Approach" is defined as one dB(A) below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dB(A) or above.

Relative criterion: the predicted noise level substantially exceeds the existing noise level at a receiver even though the predicted noise level does not approach, equal or exceed the NAC. "Substantially exceeds" is defined as more than 10 dB(A). For example: a noise impact would occur at a Category B residence if the existing level is 54 dB(A) and the predicted level is 65 dB(A).

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive reasonable and feasible action taken to reduce the impact of traffic noise on an activity area.

3.0 Noise Analysis Summary

See **Appendix B** for the traffic data utilized in the SH 5 traffic noise models. Traffic data used for the SH 5 facility was provided by TxDOT's Transportation Planning and Programming Division (TPP). Traffic data used for cross streets in the project area was provided by a Traffic Memorandum upon which the TPP memo was based.

The FHWA traffic noise modeling software (TNM2.5) was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

Existing and predicted traffic noise levels were modeled at receiver locations (see **Table 2** and **Appendix A)** that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

Field measurement and validation was also performed as part of the analysis. The model validation results and field survey sheets are provided in **Appendix C.** Six field measurements were taken to validate the sound levels in the project study area (locations are shown in **Appendix A**.) The monitoring sites were chosen to be representative of the noise sensitive land uses adjacent to the project alternative and are characteristic of the existing background sound levels within the study area. and the. The results of the field measurement program are shown in **Appendix C, Table C-1**. The measured and monitored levels are within 3.0 dB(A) of each other. Therefore, the model is considered to be valid.

Please not that each receiver with a decrease in sound levels between existing and proposed was evaluated and the decreases were deemed reasonable due to either realignment of side streets that moved traffic further away from the receiver or changes in elevation along proposed SH 5 mainlanes in the vicinity of the receiver.

Table 2: Traffic Noise Levels (dB(A) Leq)

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-1	Single Family Residential	B	67	66	67	+1	**Y**
R-2	Single Family Residential	B	67	61	62	+1	N
R-3	Single Family Residential	B	67	61	62	+1	N
R-4	Single Family Residential	B	67	61	62	+1	N
R-5	Single Family Residential	B	67	61	62	+1	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-6	Single Family Residential	B	67	61	62	+1	N
R-7	Single Family Residential	B	67	62	62	0	N
R-8	Single Family Residential	B	67	62	62	0	N
R-9	Single Family Residential	B	67	62	63	+1	N
R-10	Single Family Residential	B	67	70	71	+1	**Y**
R-11	Single Family Residential	B	67	68	69	+1	**Y**
R-12	Place of Worship (Interior)	D	52	38	39	+1	N
R-13	Single Family Residential	B	67	63	65	2	N
R-14	Single Family Residential	B	67	61	63	2	N
R-15a1	Multi Family Residential	B	67	59	60	+1	N
R-15a2	Multi Family Residential	B	67	63	63	0	N
R-15b1	Multi Family Residential	B	67	59	60	+1	N
R-15b2	Multi Family Residential	B	67	63	63	0	N
R-15c1	Multi Family Residential	B	67	59	60	+1	N
R-15c2	Multi Family Residential	B	67	63	63	0	N
R-15d1	Multi Family Residential	B	67	59	60	+1	N
R-15d2	Multi Family Residential	B	67	63	63	0	N
R-15e1	Multi Family Residential	B	67	59	60	+1	N
R-15e2	Multi Family Residential	B	67	63	63	0	N
R-15f1	Multi Family Residential	B	67	59	60	+1	N
R-15f2	Multi Family Residential	B	67	62	62	0	N
R-16a1	Multi Family Residential	B	67	57	58	+1	N
R-16a2	Multi Family Residential	B	67	60	60	0	N
R-16a3	Multi Family Residential	B	67	62	61	-1	N
R-16b1	Multi Family Residential	B	67	59	60	+1	N
R-16b2	Multi Family Residential	B	67	63	63	0	N
R-16b3	Multi Family Residential	B	67	64	63	-1	N
R-16c1	Multi Family Residential	B	67	59	60	+1	N
R-16c2	Multi Family Residential	B	67	63	63	0	N
R-16c3	Multi Family Residential	B	67	64	63	-1	N
R-16d1	Multi Family Residential	B	67	59	60	+1	N
R-16d2	Multi Family Residential	B	67	63	63	0	N
R-16d3	Multi Family Residential	B	67	64	63	-1	N
R-16e1	Multi Family Residential	B	67	59	60	+1	N
R-16e2	Multi Family Residential	B	67	63	63	0	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-16e3	Multi Family Residential	B	67	64	63	-1	N
R-16f1	Multi Family Residential	B	67	59	60	+1	N
R-16f2	Multi Family Residential	B	67	63	63	0	N
R-16f3	Multi Family Residential	B	67	64	63	-1	N
R-16g1	Multi Family Residential	B	67	59	60	+1	N
R-16g2	Multi Family Residential	B	67	63	63	0	N
R-16g3	Multi Family Residential	B	72	64	63	-1	N
R-16h1	Multi Family Residential	B	67	59	60	+1	N
R-16h2	Multi Family Residential	B	67	63	63	0	N
R-16h3	Multi Family Residential	B	67	64	63	-1	N
R-16i1	Multi Family Residential	B	67	58	59	+1	N
R-16i2	Multi Family Residential	B	67	62	62	0	N
R-16i3	Multi Family Residential	B	67	63	63	0	N
R-17a1	Multi Family Residential	B	67	58	58	0	N
R-17a2	Multi Family Residential	B	67	61	62	+1	N
R-17a3	Multi Family Residential	B	67	63	63	0	N
R-17b1	Multi Family Residential	B	67	58	59	+1	N
R-17b2	Multi Family Residential	B	67	61	62	+1	N
R-17b3	Multi Family Residential	B	67	63	63	0	N
R-17c1	Multi Family Residential	B	67	58	60	2	N
R-17c2	Multi Family Residential	B	72	62	62	0	N
R-17c3	Multi Family Residential	B	67	63	63	0	N
R-17d1	Multi Family Residential	B	67	59	60	+1	N
R-17d2	Multi Family Residential	B	67	62	63	+1	N
R-17d3	Multi Family Residential	B	67	64	64	0	N
R-17e1	Multi Family Residential	B	67	59	61	2	N
R-17e2	Multi Family Residential	B	67	63	63	0	N
R-17e3	Multi Family Residential	B	67	64	64	0	N
R-17f3	Multi Family Residential	B	67	60	61	+1	N
R-17f4	Multi Family Residential	B	67	63	64	+1	N
R-17f5	Multi Family Residential	B	67	64	64	0	N
R-17g3	Multi Family Residential	B	67	60	62	2	N
R-17g4	Multi Family Residential	B	67	64	64	0	N
R-17g5	Multi Family Residential	B	67	65	65	0	N
R-18	Assisted Living Garden	C	67	55	54	-1	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-19	Single Family Residential	B	67	63	64	+1	N
R-20	Single Family Residential	B	67	64	64	0	N
R-21a1	Multi Family Residential	B	67	56	58	2	N
R-21a2	Multi Family Residential	B	67	59	62	3	N
R-21b1	Multi Family Residential	B	67	57	58	+1	N
R-21b2	Multi Family Residential	B	67	60	62	2	N
R-21c1	Multi Family Residential	B	67	57	59	2	N
R-21c2	Multi Family Residential	B	67	60	62	2	N
R-22a1	Multi Family Residential	B	67	58	59	+1	N
R-22a2	Multi Family Residential	B	67	61	63	2	N
R-22b1	Multi Family Residential	B	67	58	59	+1	N
R-22b2	Multi Family Residential	B	67	61	63	2	N
R-22c1	Multi Family Residential	B	67	58	59	+1	N
R-22c2	Multi Family Residential	B	67	61	63	2	N
R-23a1	Multi Family Residential	B	67	58	59	+1	N
R-23a2	Multi Family Residential	B	67	62	63	+1	N
R-23b1	Multi Family Residential	B	67	59	59	0	N
R-23b2	Multi Family Residential	B	67	62	63	+1	N
R-23c1	Multi Family Residential	B	67	59	59	0	N
R-23c2	Multi Family Residential	B	67	62	63	+1	N
R-24a1	Multi Family Residential	B	67	59	59	0	N
R-24a2	Multi Family Residential	B	67	62	63	+1	N
R-24b1	Multi Family Residential	B	67	59	59	0	N
R-24b2	Multi Family Residential	B	67	62	63	+1	N
R-24c1	Multi Family Residential	B	67	59	60	+1	N
R-24c2	Multi Family Residential	B	67	62	63	+1	N
R-25a1	Multi Family Residential	B	67	59	60	+1	N
R-25a2	Multi Family Residential	B	67	62	64	2	N
R-25b1	Multi Family Residential	B	67	59	60	+1	N
R-25b2	Multi Family Residential	B	67	62	64	2	N
R-25c1	Multi Family Residential	B	67	59	60	+1	N
R-25c2	Multi Family Residential	B	67	63	64	+1	N
R-26a1	Multi Family Residential	B	67	60	60	0	N
R-26a2	Multi Family Residential	B	67	63	64	+1	N
R-26b1	Multi Family Residential	B	67	60	61	+1	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-26b2	Multi Family Residential	B	67	63	64	+1	N
R-26c1	Multi Family Residential	B	67	60	61	+1	N
R-26c2	Multi Family Residential	B	67	63	64	+1	N
R-27a1	Multi Family Residential	B	67	61	61	0	N
R-27a2	Multi Family Residential	B	67	64	65	+1	N
R-27b1	Multi Family Residential	B	67	62	62	0	N
R-27b2	Multi Family Residential	B	67	64	65	+1	N
R-27c1	Multi Family Residential	B	67	62	62	0	N
R-27c2	Multi Family Residential	B	67	64	65	+1	N
R-28a1	Multi Family Residential	B	67	63	63	0	N
R-28a2	Multi Family Residential	B	67	65	65	0	N
R-28b1	Multi Family Residential	B	67	63	64	+1	N
R-28b2	Multi Family Residential	B	67	65	66	+1	**Y**
R-28c1	Multi Family Residential	B	67	63	64	+1	N
R-28c2	Multi Family Residential	B	67	65	66	+1	**Y**
R-29a1	Multi Family Residential	B	67	63	64	+1	N
R-29a2	Multi Family Residential	B	67	65	66	+1	**Y**
R-29b1	Multi Family Residential	B	67	64	64	0	N
R-29b2	Multi Family Residential	B	67	66	66	0	**Y**
R-29c1	Multi Family Residential	B	67	64	64	0	N
R-29c2	Multi Family Residential	B	67	66	66	0	**Y**
R-30a1	Multi Family Residential	B	67	64	65	+1	N
R-30a2	Multi Family Residential	B	67	66	67	+1	**Y**
R-30b1	Multi Family Residential	B	67	64	64	0	N
R-30b2	Multi Family Residential	B	67	66	66	0	**Y**
R-30c1	Multi Family Residential	B	67	64	65	+1	N
R-30c2	Multi Family Residential	B	67	66	66	0	**Y**
R-31	Single Family Residential	B	67	64	67	3	**Y**
R-32	Single Family Residential	B	67	67	69	2	**Y**
R-33	Single Family Residential	B	67	68	70	2	**Y**
R-34	Single Family Residential	B	67	68	70	2	**Y**
R-35	Single Family Residential	B	67	69	71	2	**Y**
R-36	Single Family Residential	B	67	69	71	2	**Y**
R-37	Single Family Residential	B	67	67	69	2	**Y**
R-38	Single Family Residential	B	67	68	70	2	**Y**

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-39	Single Family Residential	B	67	68	70	2	**Y**
R-40	Single Family Residential	B	67	69	72	3	**Y**
R-41	Single Family Residential	B	67	69	72	3	**Y**
R-42	Single Family Residential	B	67	60	60	0	N
R-43	Single Family Residential	B	67	60	60	0	N
R-44	Single Family Residential	B	67	59	59	0	N
R-45	Single Family Residential	B	67	57	57	0	N
R-46	Single Family Residential	B	67	59	59	0	N
R-47	Single Family Residential	B	67	58	59	+1	N
R-48	Single Family Residential	B	67	58	58	0	N
R-49	Single Family Residential	B	67	57	57	0	N
R-50	Single Family Residential	B	67	60	59	-1	N
R-51	Single Family Residential	B	67	59	60	+1	N
R-52	Single Family Residential	B	67	59	59	0	N
R-53	Single Family Residential	B	67	59	59	0	N
R-54	Single Family Residential	B	67	58	59	+1	N
R-55	Single Family Residential	B	67	58	58	0	N
R-56	Single Family Residential	B	67	57	58	+1	N
R-57	Single Family Residential	B	67	57	58	+1	N
R-58	Single Family Residential	B	67	57	58	+1	N
R-59	Single Family Residential	B	67	56	58	2	N
R-60	Single Family Residential	B	67	56	58	2	N
R-61	Single Family Residential	B	67	56	58	2	N
R-62	Single Family Residential	B	67	55	58	3	N
R-63	Single Family Residential	B	67	55	57	2	N
R-64	Single Family Residential	B	67	55	57	2	N
R-65	Single Family Residential	B	67	55	57	2	N
R-66	Single Family Residential	B	67	55	57	2	N
R-67	Single Family Residential	B	67	54	57	3	N
R-68	Single Family Residential	B	67	66	70	4	**Y**
R-69	Single Family Residential	B	67	64	66	2	**Y**
R-70	Cemetery Church Gazebo	C	67	71	71	0	**Y**
R-71	Single Family Residential	B	67	61	60	-1	N
R-72	Park Playground	C	67	58	57	-1	N
R-73	Daycare playground	C	67	49	47	-2	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-74	Place of Worship (Interior)	D	52	22	19	-3	N
R-75a1	Multi Family Residential	B	67	62	61	-1	N
R-75a2	Multi Family Residential	B	67	64	64	0	N
R-75a3	Multi Family Residential	B	67	64	64	0	N
R-75b1	Multi Family Residential	B	67	63	63	0	N
R-75b2	Multi Family Residential	B	67	65	65	0	N
R-75b3	Multi Family Residential	B	67	66	65	-1	N
R-75c1	Multi Family Residential	B	67	64	64	0	N
R-75c2	Multi Family Residential	B	67	66	66	0	**Y**
R-75c3	Multi Family Residential	B	67	66	66	0	**Y**
R-75d1	Multi Family Residential	B	67	67	67	0	**Y**
R-75d2	Multi Family Residential	B	67	68	67	-1	**Y**
R-75d3	Multi Family Residential	B	67	68	67	-1	**Y**
R-75e1	Multi Family Residential	B	67	67	67	0	**Y**
R-75e2	Multi Family Residential	B	67	68	68	0	**Y**
R-75e3	Multi Family Residential	B	67	68	68	0	**Y**
R-75f1	Multi Family Residential	B	67	67	66	-1	**Y**
R-75f2	Multi Family Residential	B	67	68	67	-1	**Y**
R-75f3	Multi Family Residential	B	67	67	67	0	**Y**
R-75g1	Multi Family Residential	B	67	65	65	0	N
R-75g2	Multi Family Residential	B	67	67	67	0	**Y**
R-75g3	Multi Family Residential	B	67	67	66	-1	**Y**
R-75h1	Multi Family Residential	B	67	63	62	-1	N
R-75h2	Multi Family Residential	B	67	65	65	0	N
R-75h3	Multi Family Residential	B	67	65	65	0	N
R-75i1	Multi Family Residential	B	67	62	62	0	N
R-75i2	Multi Family Residential	B	67	64	64	0	N
R-75i3	Multi Family Residential	B	67	65	64	-1	N
R-75j1	Multi Family Residential	B	67	61	61	0	N
R-75j2	Multi Family Residential	B	67	63	63	0	N
R-75j3	Multi Family Residential	B	67	64	64	0	N
R-76a1	Multi Family Residential	B	67	61	61	0	N
R-76a2	Multi Family Residential	B	67	63	63	0	N
R-76a3	Multi Family Residential	B	67	63	64	+1	N
R-76b1	Multi Family Residential	B	67	62	62	0	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-76b2	Multi Family Residential	B	67	64	64	0	N
R-76b3	Multi Family Residential	B	67	64	64	0	N
R-76c1	Multi Family Residential	B	67	63	64	+1	N
R-76c2	Multi Family Residential	B	67	65	65	0	N
R-76c3	Multi Family Residential	B	67	65	66	+1	**Y**
R-76d1	Multi Family Residential	B	67	64	65	+1	N
R-76d2	Multi Family Residential	B	67	66	66	0	**Y**
R-76d3	Multi Family Residential	B	67	66	66	0	**Y**
R-76e1	Multi Family Residential	B	67	67	67	0	**Y**
R-76e2	Multi Family Residential	B	67	68	68	0	**Y**
R-76e3	Multi Family Residential	B	67	68	67	-1	**Y**
R-76f1	Multi Family Residential	B	67	68	68	0	**Y**
R-76f2	Multi Family Residential	B	67	69	69	0	**Y**
R-76f3	Multi Family Residential	B	67	68	68	0	**Y**
R-76g1	Multi Family Residential	B	67	68	68	0	**Y**
R-76g2	Multi Family Residential	B	67	68	68	0	**Y**
R-76g3	Multi Family Residential	B	67	68	68	0	**Y**
R-76h1	Multi Family Residential	B	67	67	68	+1	**Y**
R-76h2	Multi Family Residential	B	67	68	68	0	**Y**
R-76h3	Multi Family Residential	B	67	68	68	0	**Y**
R-76i1	Multi Family Residential	B	67	67	67	0	**Y**
R-76i2	Multi Family Residential	B	67	68	68	0	**Y**
R-76i3	Multi Family Residential	B	67	68	68	0	**Y**
R-76j1	Multi Family Residential	B	67	66	67	+1	**Y**
R-76j2	Multi Family Residential	B	67	68	68	0	**Y**
R-76j3	Multi Family Residential	B	67	68	67	-1	**Y**
R-76k1	Multi Family Residential	B	67	64	64	0	N
R-76k2	Multi Family Residential	B	67	66	65	0	N
R-76k3	Multi Family Residential	B	67	66	66	0	**Y**
R-76l1	Multi Family Residential	B	67	62	63	+1	N
R-76l2	Multi Family Residential	B	67	64	65	+1	N
R-76l3	Multi Family Residential	B	67	65	65	0	N
R-76m1	Multi Family Residential	B	67	60	61	+1	N
R-76m2	Multi Family Residential	B	67	62	63	+1	N
R-76m3	Multi Family Residential	B	67	63	64	+1	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-76n1	Multi Family Residential	B	67	60	60	0	N
R-76n2	Multi Family Residential	B	67	62	63	+1	N
R-76n3	Multi Family Residential	B	67	63	63	0	N
R-76o1	Multi Family Residential	B	67	59	59	0	N
R-76o2	Multi Family Residential	B	67	61	62	+1	N
R-76o3	Multi Family Residential	B	67	62	62	0	N
R-77	Single Family Residential	B	67	63	59	-4	N
R-78	Single Family Residential	B	67	62	60	-2	N
R-79	Single Family Residential	B	67	59	58	-1	N
R-80	Single Family Residential	B	67	67	66	-1	**Y**
R-81	Single Family Residential	B	67	64	64	0	N
R-82	Single Family Residential	B	67	62	62	0	N
R-83	Single Family Residential	B	67	60	60	0	N
R-84	Place of Worship (Interior)	D	52	43	42	-1	N
R-85	Food outdoor seating	E	72	64	64	0	N
R-86	Single Family Residential	B	67	67	66	-1	**Y**
R-87	Single Family Residential	B	67	60	60	0	N
R-88	Single Family Residential	B	67	61	61	0	N
R-89	Single Family Residential	B	67	59	59	0	N
R-90	Single Family Residential	B	67	60	59	-1	N
R-91	Single Family Residential	B	67	60	59	-1	N
R-92	Single Family Residential	B	67	59	59	0	N
R-93	Single Family Residential	B	67	66	66	0	**Y**
R-94	Place of Worship (Interior)	D	52	39	38	-1	N
R-95	Single Family Residential	B	67	59	57	-2	N
R-96	Single Family Residential	B	67	68	68	0	**Y**
R-97	Place of Worship (Interior)	D	52	34	35	+1	N
R-98	Single Family Residential	B	67	62	62	0	N
R-99	Single Family Residential	B	67	63	65	2	N
R-100	Single Family Residential	B	67	67	66	-1	**Y**
R-101	Place of Worship (Interior)	D	52	41	42	+1	N
R-102	Single Family Residential	B	67	67	69	+2	**Y**
R-103	Single Family Residential	B	67	64	65	+1	N
R-104	Place of Worship (Interior)	D	52	35	34	-1	N
R-105	Single Family Residential	B	67	61	62	+1	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-106	Place of Worship (Interior)	D	52	34	34	0	N
R-107	Single Family Residential	B	67	67	67	0	**Y**
R-108	Place of Worship (Interior)	D	52	34	33	-1	N
R-109a1	Multi Family Residential	B	67	63	62	-1	N
R-109a2	Multi Family Residential	B	67	65	65	0	N
R-109 PG	Playground	C	67	63	60	-3	N
R-109d1	Multi Family Residential	B	67	65	63	-2	N
R-109d2	Multi Family Residential	B	67	66	65	-1	N
R-110a1	Multi Family Residential	B	67	68	67	-1	**Y**
R-110a2	Multi Family Residential	B	67	68	68	0	**Y**
R-110b1	Multi Family Residential	B	67	68	67	-1	**Y**
R-110b2	Multi Family Residential	B	67	68	68	0	**Y**
R-110c1	Multi Family Residential	B	67	68	67	-1	**Y**
R-110c2	Multi Family Residential	B	67	68	68	0	**Y**
R-110d1	Multi Family Residential	B	67	68	68	0	**Y**
R-110d2	Multi Family Residential	B	67	68	68	0	**Y**
R-111	Homeless Shelter Outdoor Area	C	67	48	51	+3	N
R-112	Homeless Shelter Outdoor Area	C	67	46	47	+1	N
R-113	Hospice Care Garden	C	67	45	46	+1	N
R-114	Baseball Field	C	67	51	53	+2	N
R-115a1	Multi Family Residential	B	67	60	62	+2	N
R-115a2	Multi Family Residential	B	67	62	64	+2	N
R-115b1	Multi Family Residential	B	67	57	59	+2	N
R-115b2	Multi Family Residential	B	67	59	62	+3	N
R-116a1	Multi Family Residential	B	67	65	67	+2	**Y**
R-116a2	Multi Family Residential	B	67	67	69	+2	**Y**
R-116b1	Multi Family Residential	B	67	65	67	+2	**Y**
R-116b2	Multi Family Residential	B	67	67	69	+2	**Y**
R-117	Pool	C	67	48	50	+2	N
R-118	Golf Course	C	67	64	65	+1	N
R-119	Single Family Residential	B	67	66	67	+1	**Y**
R-120	Single Family Residential	B	67	57	57	0	N
R-121	Pool	C	67	56	55	-1	N
R-122	Single Family Residential	B	67	67	66	-1	**Y**
R-123	Single Family Residential	B	67	62	61	-1	N

Receiver Number	Description	NAC Category	NAC Level	Modeled Results			
				Existing 2020	Predicted 2040	Change (+ /)	Noise Impact
R-124	Single Family Residential	B	67	63	62	-1	N
R-125	Single Family Residential	B	67	63	62	-1	N
R-126	Single Family Residential	B	67	59	59	0	N
R-127	Single Family Residential	B	67	61	61	0	N
R-128	Single Family Residential	B	67	61	62	+1	N
R-129	Single Family Residential	B	67	56	55	-1	N
R-130	Single Family Residential	B	67	60	60	0	N
R-131	Single Family Residential	B	67	63	63	0	N
R-132	Single Family Residential	B	67	66	66	0	**Y**
R-133	Single Family Residential	B	67	64	66	+2	**Y**
R-134	Single Family Residential	B	67	67	66	-1	**Y**
R-135	Single Family Residential	B	67	67	65	-2	N
R-136	Single Family Residential	B	67	48	49	+1	N
R-137	Single Family Residential	B	67	49	50	+1	N
R-138	Single Family Residential	B	67	49	49	0	N
R-139	Single Family Residential	B	67	38	37	-1	N
R-140	Community Pool	C	67	52	52	0	N
R-141	Single Family Residential	B	67	63	62	-1	N
R-142	Single Family Residential	B	67	52	51	-1	N
R-143	Single Family Residential	B	67	62	63	+1	N
R-144	Single Family Residential	B	67	67	65	-2	N

Note: The values marked in bold are locations that approach or exceed the FHWA NAC criteria and are considered to be impacted.

4.0 Mitigation

As indicated in Table 2, the proposed project would result in traffic noise impacts and the following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of noise barriers.

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. In order to be "feasible," the abatement measure must be able to reduce the noise level at greater than 50% of impacted, first row receivers by at least five dB(A); and to be "reasonable," it must not exceed the cost-effectiveness criterion of $25,000 for each receiver that would benefit by a reduction of at least five dB(A). Additionally, the abatement measure must be able to reduce the noise level for at least one impacted, first row receiver by at least seven dB(A).

Traffic management: control devices could be used to reduce the speed of the traffic; however, the minor benefit of one dB(A) per five mph reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

Alteration of horizontal and/or vertical alignments: any alteration of the existing alignment would displace existing businesses and residences, require additional right of way and not be cost effective/reasonable.

Buffer zone: the acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

NOISE BARRIER STUDY LOCATIONS (TNM Model File Name)

- R1 (Barrier South)
- R10-11 (Barrier South)
- R28b-30c (2nd floor only) (Barrier South)
- R31-41 (Barrier South)
- R68-69 (Barrier South)
- R70 (Barrier Mid1)
- R75c2-75f3, 75g2-75g3, 76c, 76d2-76j3, 76k3 (Bar75-76)
- R80 (Barrier Mid1)
- R86 (Barrier Mid2)
- R93 (Barrier Mid2)
- R96 (Barrier Mid2)
- R100 (Barrier Mid2)
- R102, R107 (Barrier Mid2)
- R109d2-110d2 (Bar 109-110)

- R116a1, 116a2, 116b2 (Barrier North)
- R119 (Barrier North)
- R122 (Barrier North)
- R132, R133 (Barrier North)

Noise barriers: this is the most commonly used noise abatement measure. Noise barriers were evaluated for each of the impacted receiver locations. Noise barriers would not be feasible and reasonable for any of the following impacted receivers and, therefore, are not proposed for incorporation into the project:

- Receiver R-1 (**Appendix A, Map 1**) represents a single-family residence located along southbound SH5, south of Country Club Road. A series of three barriers were placed along the TxDOT ROW adjacent to the parcel containing the impacted receivers and ending at the parcel boundary. Gaps were required to maintain driveway access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (1 out of 1, 100%) but would not achieve the design goal of a 7 dB(A) reduction for at least one first-row impacted receiver. Therefore, this barrier is not feasible or reasonable.
- Receivers R-10, R11 (**Appendix A, Map 1**) represents two single-family residences located along northbound SH5, north of Country Club Road. A series of two barriers were placed along the TxDOT ROW adjacent to the parcels containing the impacted receivers and ending at the parcel boundaries. Gaps were required to maintain driveway and cross-street access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would not meet the 7 dB(A) noise reduction design goal and would not achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (1 out of 2, 50%). Therefore, this barrier is not feasible or reasonable.
- Receivers R-28b-30c (second floor only) (**Appendix A, Map 16**) represents multifamily residences located along southbound SH399 Spur, north of Medical Center Drive. A series of two barriers were placed along the TxDOT ROW adjacent to the parcels containing the impacted receivers. A gap was required to maintain cross-street access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (7 out of 8, 88%) but would not achieve the design goal of a 7 dB(A) reduction for at least one first-row impacted receiver. Therefore, this barrier is not feasible or reasonable.
- Receivers R-68, R69 (**Appendix A, Map 3**) represents two single-family residences located along southbound SH5, south of Stewart Road. A series of two barriers were placed along the TxDOT ROW adjacent to the parcels containing the impacted receivers and ending at the parcel boundaries. Gaps were required to maintain driveway and

cross-street access. The barrier height was 15-18 feet, approximately 529 feet long and benefits two first-row receivers, meets the 7 dB(A) design goal reduction and 100% (2 out of 2) of the impacted first row receivers. The cost of the barrier is $158,078. The cost per benefited receiver is $79,039. Though this barrier would meet both noise reduction criteria, the estimated cost would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver. Therefore, this barrier is not feasible and reasonable.

- Receiver R-70 (**Appendix A, Map 4**) represents a cemetery gazebo located along northbound SH5, south of Industrial Boulevard. Two barrier locations were evaluated.

  A barrier was placed along the TxDOT ROW adjacent to the parcel along both SH5 and Industrial Boulevard containing the impacted receiver. At this time, the barrier may not be able to be placed along Industrial Boulevard between the sidewalk and the ROW. Nonetheless, the barrier height was 9 feet, approximately 491 feet long and benefits one first-row receiver, including the 7 dB(A) design goal reduction and 100% (1 out of 1) of the impacted first row receivers. The cost of the barrier is $79,502. The cost per benefited receiver is $79,502. Though this barrier would meet both noise reduction goal criteria, the estimated cost would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver. Therefore, this barrier is not feasible and reasonable.

  A barrier was also modeled exclusively along SH 5 (to account for the scenario that a barrier is not able to be placed along Industrial Boulevard). The results of this modeling showed that even at a 20 foot height the sound level reduction would not achieve the minimum 5 dB(A) reduction or the 7 dB(A) design goal and would not be considered feasible and reasonable.
- Receivers R75c2-75f3, 75g2-75g3, 76c, 76d2-76j3, 76k3 (**Appendix A, Map 5**) represents multi-family residences located along northbound SH5, north of McMakin Street. A series of two barriers were placed along the TxDOT ROW adjacent to the parcels containing the impacted receivers and ending at the parcel boundaries. Gaps were required to maintain driveway and cross-street access and for the auto dealership situated between the two building units. The results of this modeling showed that even at a 20 foot height, the sound level reduction would not achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (13 out of 30, 43%) and would not meet the 7dB(A) noise reduction design goal. Therefore, this barrier is not feasible or reasonable.
- Receiver R-80 (**Appendix A, Map 5**) represents a single-family residence located along southbound SH5, between Dorsey and Chestnut Streets. A barrier was placed along the TxDOT ROW adjacent to the parcel containing the impacted receiver and ending at the parcel boundary. The results of this modeling showed that even at a 20 foot height, the sound level reduction would achieve a 5 dB(A) noise reduction for greater than

50% of the first row impacted receivers (1 out of 1, 100%) but would not achieve the design goal of a 7 dB(A) reduction for at least one first-row impacted receiver. Therefore, this barrier is not feasible or reasonable.

- Receiver R-86 (**Appendix A, Map 5**) represents a single-family residence located along northbound SH5, between Colorado and Christian Streets. A series of two barriers were placed along the TxDOT ROW adjacent to the parcel containing the impacted receiver. Gaps were required to maintain driveway and cross-street access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would not the meet the 7 dB(A) noise reduction design goal and would not achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (0 out of 1, 0%). Therefore, this barrier is not feasible or reasonable.
- Receiver R-93, R-100 (**Appendix A, Map 6**) represents two single-family residences located along southbound SH5, south of Standifer Street. A series of five barriers were placed along the TxDOT ROW adjacent to the parcel containing the impacted receivers. Gaps were required to maintain driveway and cross-street access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would not the meet the 7 dB(A) noise reduction design goal and would not achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (1 out of 2, 50%). Therefore, this barrier is not feasible or reasonable.
- Receiver R-96 (**Appendix A, Map 6**) represents a single-family residence located along northbound SH5, south of Standifer Street. A barrier was placed along the TxDOT ROW adjacent to the parcel containing the impacted receiver and ending at the parcel boundaries. The barrier height was 12 feet, approximately 143 feet long and benefits one first-row receiver, meets the 7 dB(A) design goal reduction and 100% (1 out of 1) of the impacted first row receivers. The cost of the barrier is $30,910. The cost per benefited receiver is $30,910. Though this barrier would meet both noise reduction goal criteria, the estimated cost would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver. Therefore, this barrier is not feasible and reasonable.
- Receivers R-102 and R-107 (**Appendix A, Map 8)** represent single-family residences located along northbound SH5, north of Walker Street. A series of two barriers were placed along the TxDOT ROW adjacent to the parcels containing the impacted receivers. Gaps were required to maintain driveway and cross-street access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (2 out of 2, 100%) but would not achieve the design goal of a 7 dB(A) reduction for at least one first-row impacted receiver. Therefore, these barriers are not feasible or reasonable.
- Receivers R116a1-a2, 116b1-b2 (**Appendix A, Map 10**) represent multi-family residences located along southbound SH5, north of Interchange Street Drive. A barrier was placed near the TxDOT ROW. Gaps were required to maintain driveway access

and had to stop at the adjoining property line with the Samaritan Inn administration building. The results of this modeling showed that even at a 20-foot height, the sound level reduction would not the meet the 7 dB(A) noise reduction design goal and would not achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (2 out of 4, 50%). Therefore, this barrier is not feasible or reasonable.

- Receiver R-119 (**Appendix A, Map 11**) represents a single-family residence located along northbound SH5, south of Wilmeth Road. A series of two barriers were placed along the TxDOT ROW adjacent to the parcel containing the impacted receiver. A gap was required to maintain driveway access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (1 out of 1, 100%) but would not achieve the design goal of a 7 dB(A) reduction for at least one first-row impacted receiver. Therefore, these barriers are not feasible or reasonable.
- Receiver R-122 (**Appendix A, Map 12**) represents a single-family residence located along northbound SH5, south of Twin Knoll Drive. A barrier was placed along the TxDOT ROW adjacent to the parcel containing the impacted receiver. A gap was required to maintain cross-street access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would achieve a 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (1 out of 1, 100%) but would not achieve the design goal of a 7 dB(A) reduction for at least one first-row impacted receiver. Therefore, these barriers are not feasible or reasonable.
- Receiver R-132, R-133 (**Appendix A, Map 13**) represents single-family residences located along northbound SH5, north of Weston Road. A series of four barriers was placed along the TxDOT ROW adjacent to the parcels containing the impacted receivers. Gaps were required to maintain driveway access. The results of this modeling showed that even at a 20 foot height, the sound level reduction would not the meet the 7 dB(A) noise reduction design goal and would not achieve the 5 dB(A) noise reduction for greater than 50% of the first row impacted receivers (0 out of 2, 0%). Therefore, these barriers are not feasible or reasonable.

Noise barriers would be feasible and reasonable for any of the following impacted receivers and, therefore, are proposed for incorporation into the project:

- (Barrier 1) Receivers R-31 through R-41 (**Appendix A, Map 2**) represent single family residences located in the High Point Mobile Home Community along northbound SH5, east of the SH5/SH399 Spur interchange. Barriers were placed near the TxDOT ROW on the hill nearer to the top of slope and residences. The barrier set was placed north and south of Crestwood Road. The barrier is in two sections with a gap required to maintain access to the community at Crestwood Road. Although R-31 is not benefitted, this southernmost section of barrier was included at the same height for continuity within a single neighborhood community.

A 12 foot high barrier approximately 629 feet long was modeled and benefits 10 first-row receivers, including the 7 dB(A) design goal reduction and 91% (10 out of 11) of the impacted first row receivers. The cost of the barrier was $136,128. There are 10 total benefits. The cost per benefited receptor was $13,613. The noise barrier achieves the design goal of 7 dB(A), the minimum feasible reduction of 5 dB(A) and the reasonable, cost-effectiveness criterion of $25,000. Therefore, this barrier is both feasible and reasonable.

- (Barrier 2) Receivers R109d2-110d2 (**Appendix A, Map 9**) represent multi-family residences (currently under construction) located along southbound SH5, south of University Drive at the redeveloped McKinney Housing Authority - Merritt Homes community. A barrier was placed near the TxDOT ROW.

  A 13-foot-high barrier approximately 582 feet long was modeled and benefits 6 first-row receivers, including the 7 dB(A) design goal reduction and 67% (6 out of 9) of the impacted first row receivers. The cost of the barrier was $136,194. There are 10 total benefits. The cost per benefited receptor was $13,619. The noise barrier achieves the design goal of 7 dB(A), the minimum feasible reduction of 5 dB(A) and the reasonable, cost-effectiveness criterion of $25,000. Therefore, this barrier is both feasible and reasonable.

Table 3 shows the preliminary noise barrier proposal. Any subsequent project design changes may require a reevaluation of this preliminary noise barrier proposal. The final decision to construct the proposed noise barrier will not be made until completion of the project design, utility evaluation and polling of adjacent property owners.

Table 3: Noise Barrier Proposal (Preliminary)

Barrier	Representative Receptors (Impacted)	Total # Benefited	Length (feet)	Average Height (feet)	Total Cost	$/Benefited Receiver
1	R-31 through R-41	10	629	12	$136,128	$13,613
2	R109d2 through 110d2	10	619	13	$136,194	$13,619

5.0 Noise Planning Contours

To avoid noise impacts that may result from future development of properties adjacent to the proposed project, local officials responsible for land use control programs should ensure, to

the maximum extent possible, that no new activities are planned or constructed along or within the following predicted (2040) noise impact contours in **Table 4**.

Table 4: Traffic Noise Contours [dB(A) Leq]

Roadway Section	Land Use	NAC Categories B, C and E Sound Level Criteria[1]	Distance from Edge of Nearest Travel Lane (feet)
SH 5 between FM 1378 and Industrial Parkway	NAC Category B & C	66 dB(A)	145 ft
	NAC Category E	71 dB(A)	70 ft
SH 5 between Industrial Parkway and University Dr	NAC Category B & C	66 dB(A)	75 ft
	NAC Category E	71 dB(A)	20 ft
SH 5 between University Drive and CR 275	NAC Category B & C	66 dB(A)	70 ft
	NAC Category E	71 dB(A)	20 ft

[1] Impact contours are one dB(A) lower than the NAC per category to reflect impacts that would occur as a result of approaching the NAC for the respective contours.

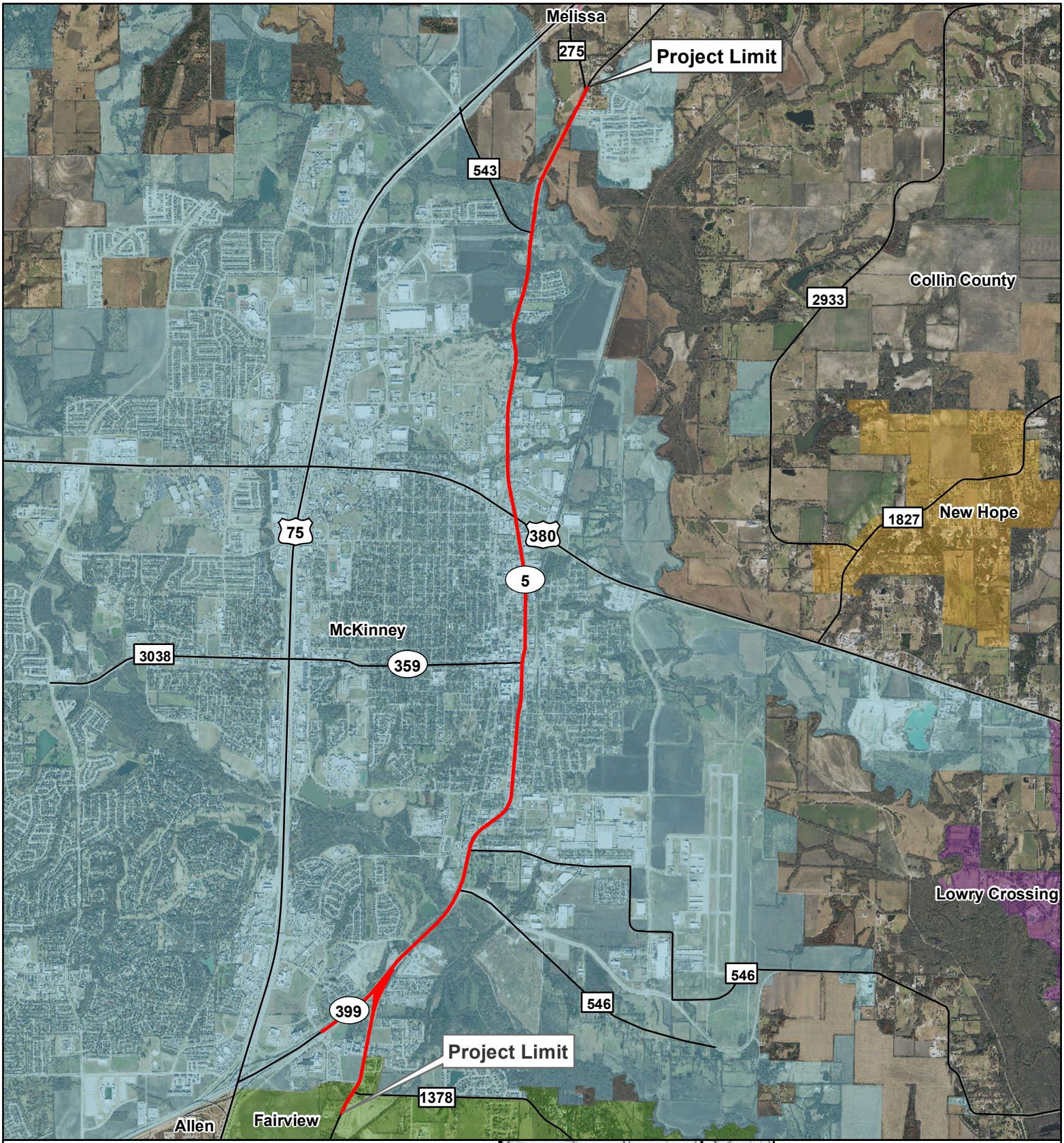
6.0 Construction Noise

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receivers is expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions will be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

7.0 Local Coordination

A copy of this traffic noise analysis will be available to local officials. On the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

Appendix A
Exhibits

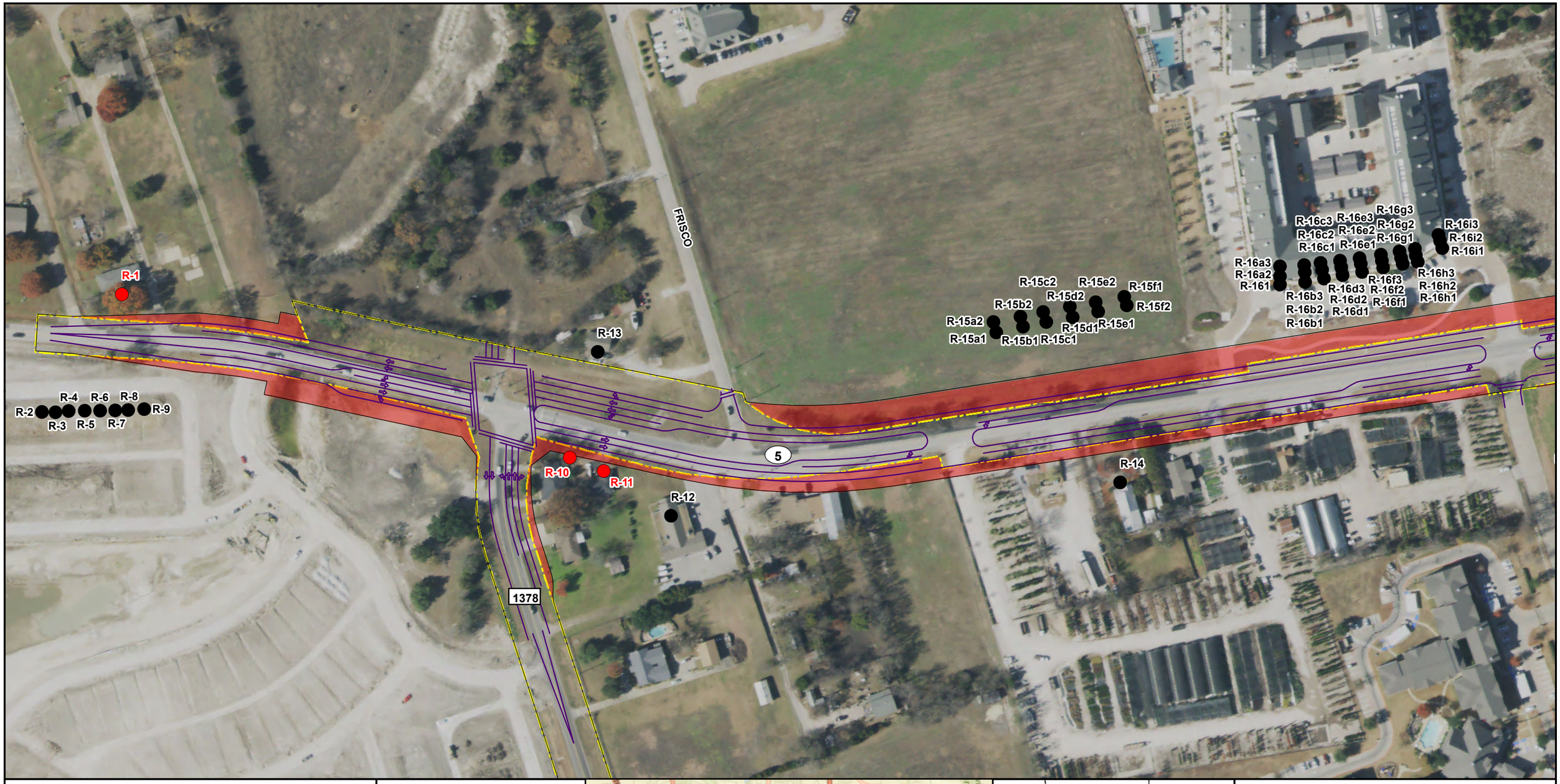


Project Location Map

SH 5
South of FM 1378
to South of CR 275
CSJs: 0047-05-054, etc.

Collin County, Texas

Sources: USGS Orthophoto Quarter Quad Imagery, Collin County GIS database, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), Mapmy India, OpenStreetMap contributors, and the GIS User Community, 2015.



Proposed Barrier
Ambient Receiver
Contour Point

Noise Receivers

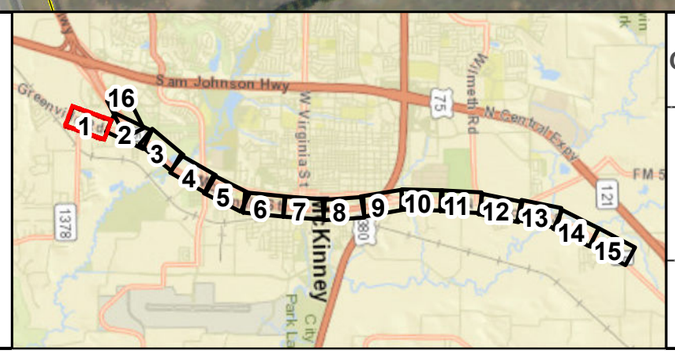
Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

N

0 75 150 300

Feet



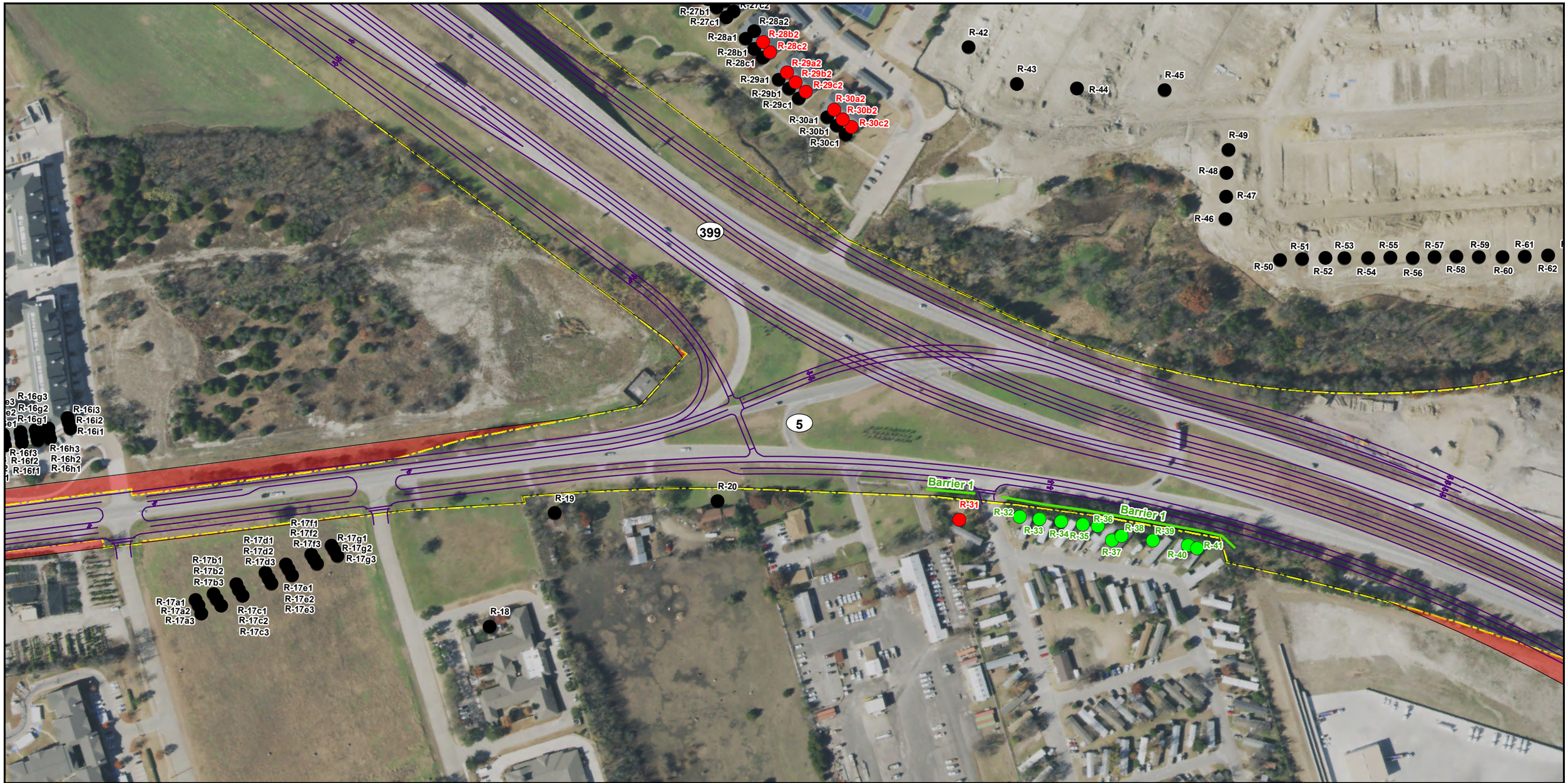
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 1 of 16



Proposed Barrier
Ambient Receiver
Contour Point

Noise Receivers

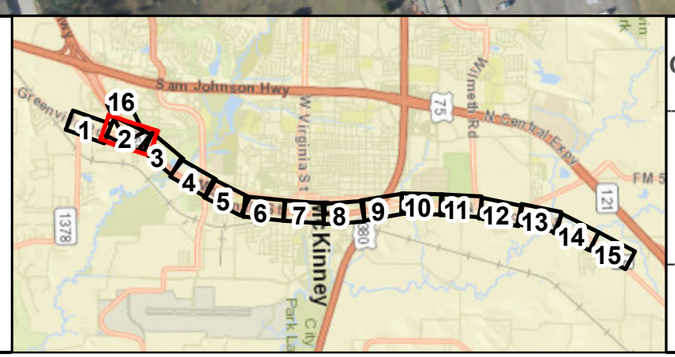
Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

N

0 75 150 300

Feet



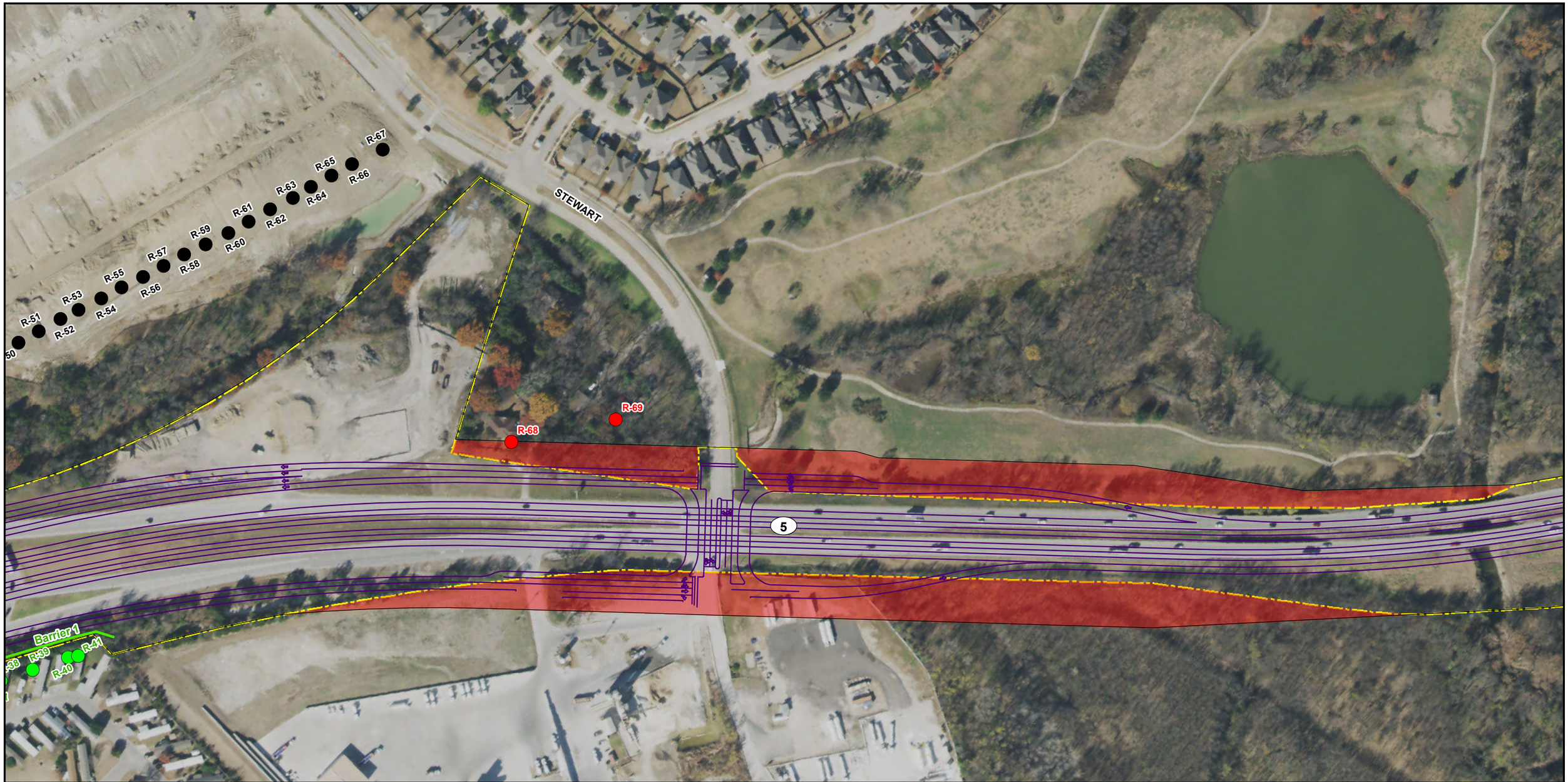
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 2 of 16



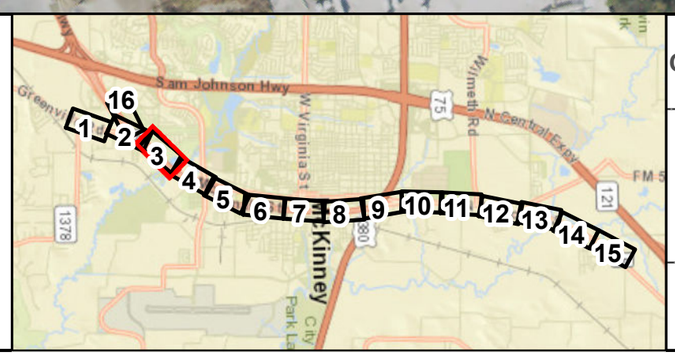
Proposed Barrier
Ambient Receiver
Contour Point

Noise Receivers

Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

0 75 150 300
Feet



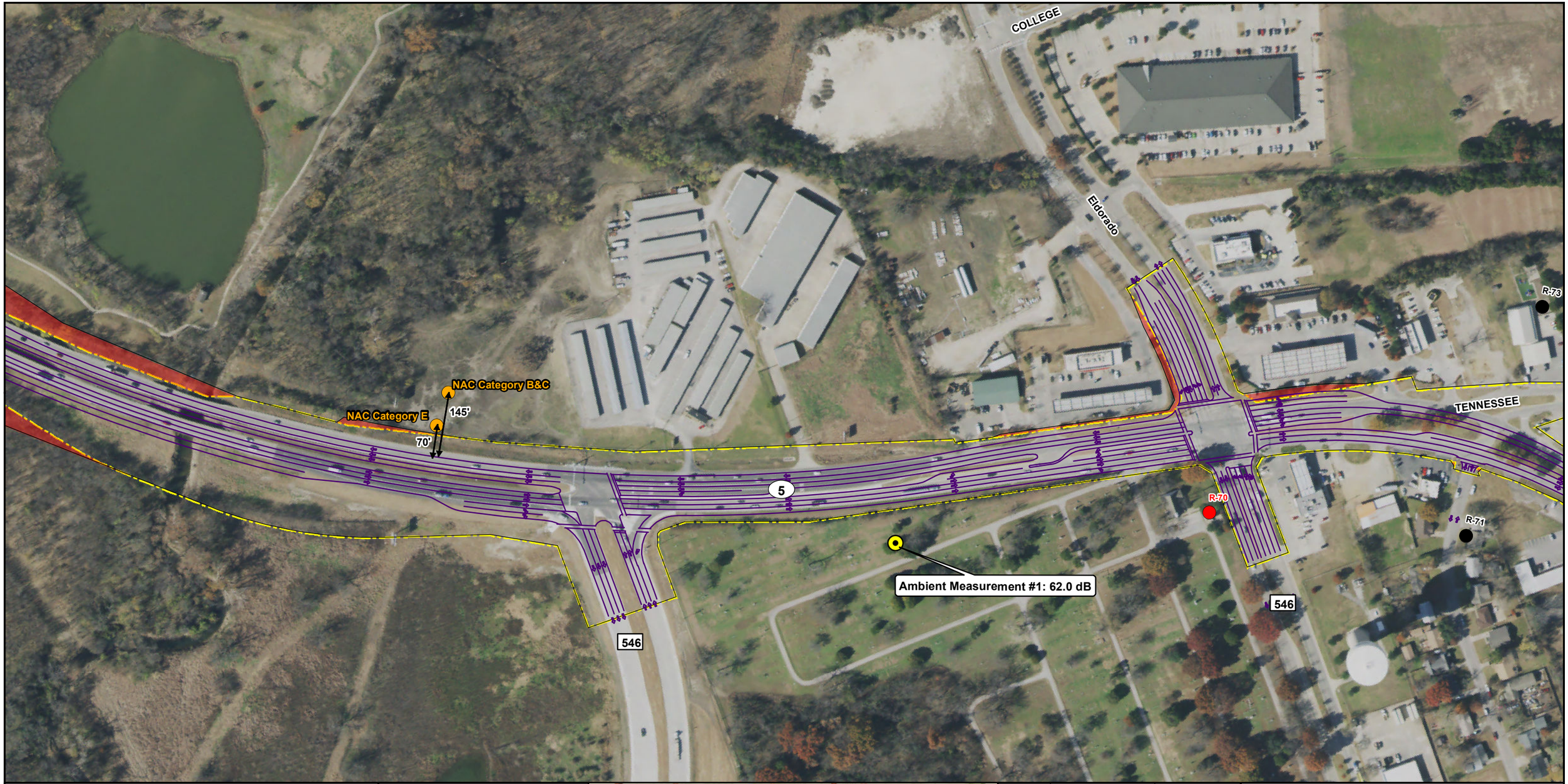
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 3 of 16



Proposed Barrier
Ambient Receiver
Contour Point

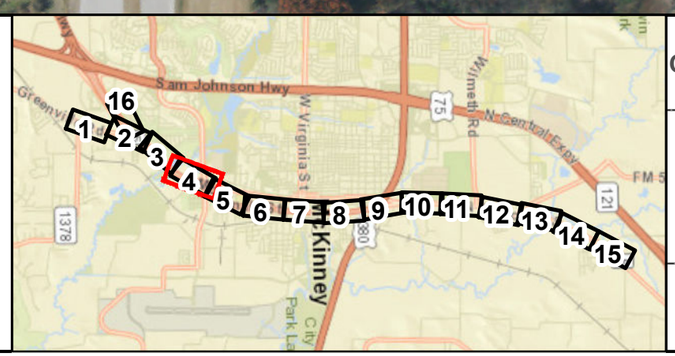
Noise Receivers

Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

N

0 75 150 300
Feet



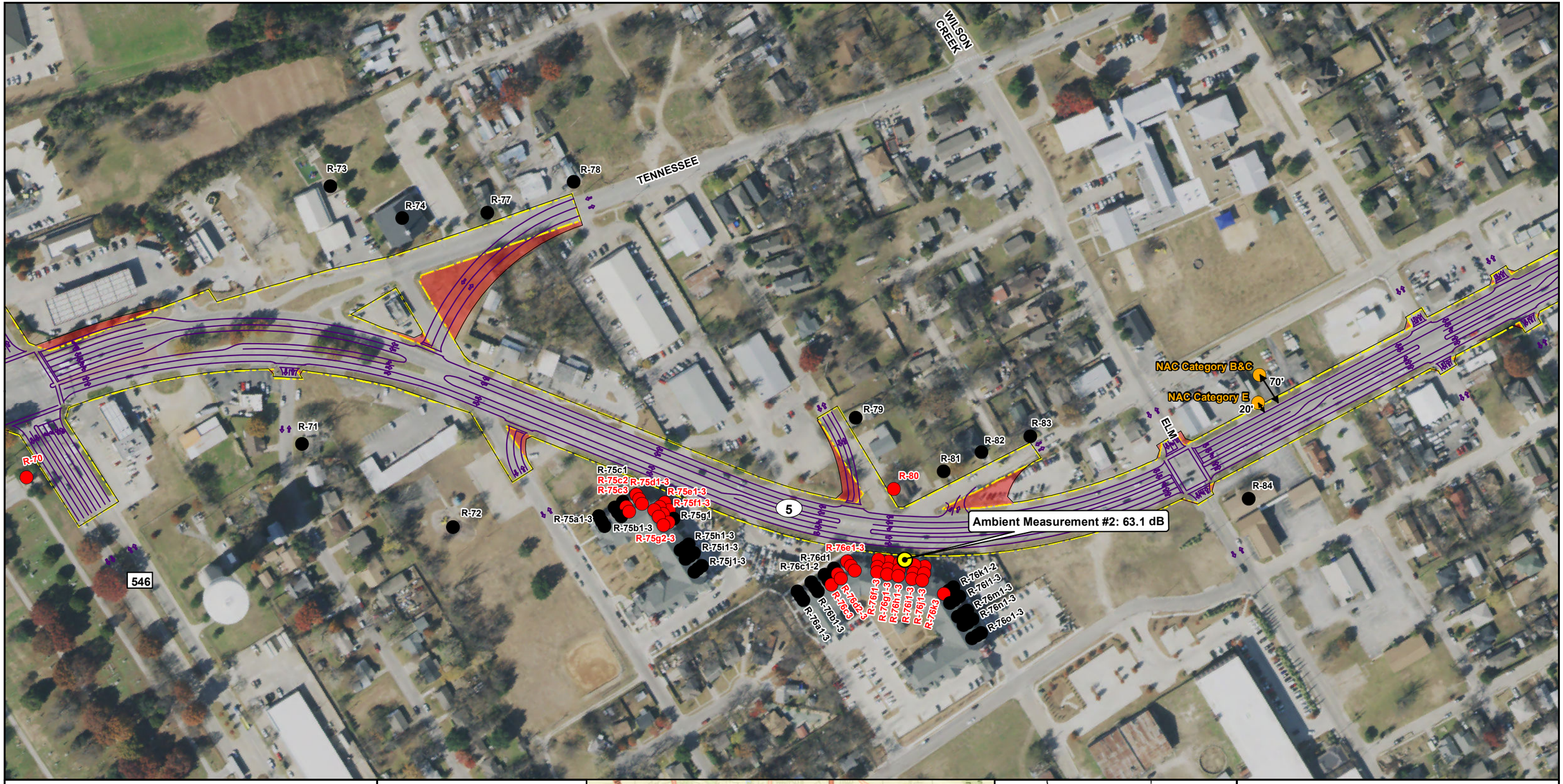
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map4 of 16



- Proposed Barrier
- Ambient Receiver
- Contour Point

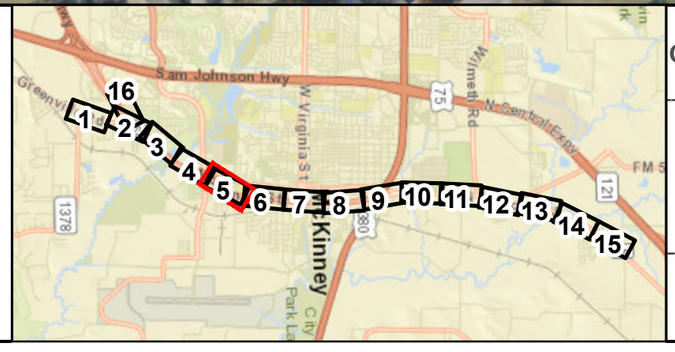
Noise Receivers

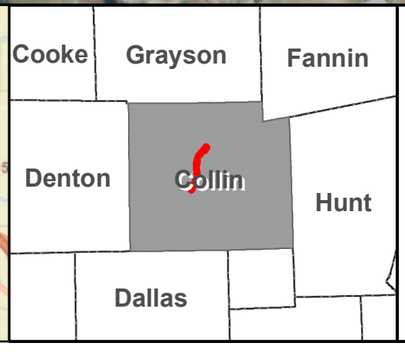
- Benefitted
- Impacted
- Not Impacted

- Proposed Design
- Project Footprint
- Proposed ROW
- Existing ROW

0 75 150 300

Feet





TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 5 of 16

Ambient Measurement #3: 65.4 dB

R-85 R-86 R-87 R-88 R-89 R-90 R-91 R-92 R-93 R-94 R-95 R-96 R-97 R-98 R-99 R-100 R-101

5

ANTHONY

Proposed Barrier
Ambient Receiver
Contour Point

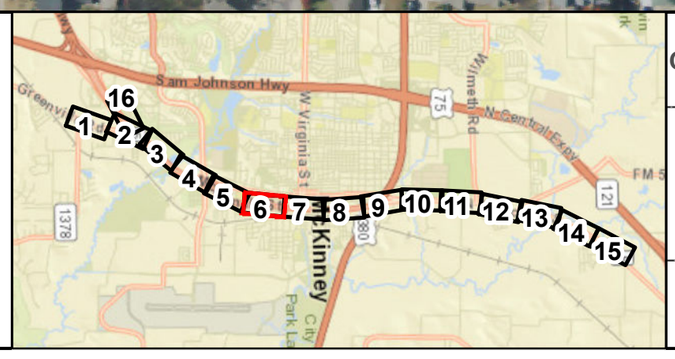
Noise Receivers

Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

N

0 75 150 300
Feet



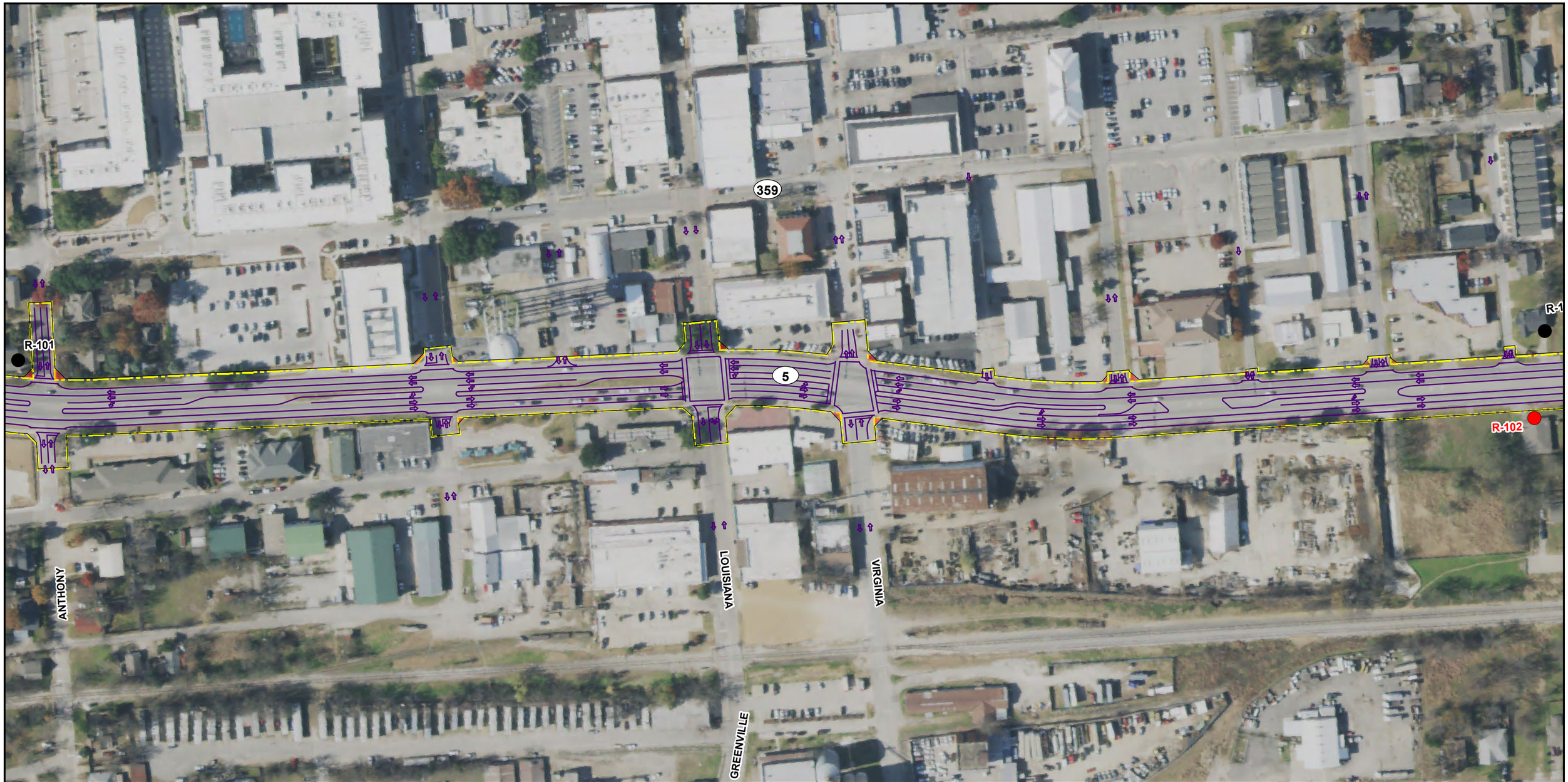
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map6 of 16



Proposed Barrier
Ambient Receiver
Contour Point

Noise Receivers

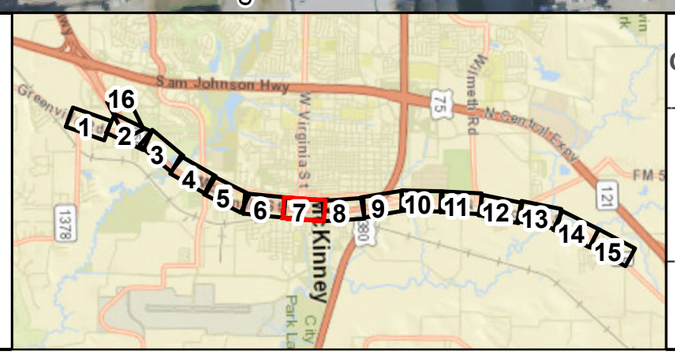
Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

N

0 75 150 300

Feet



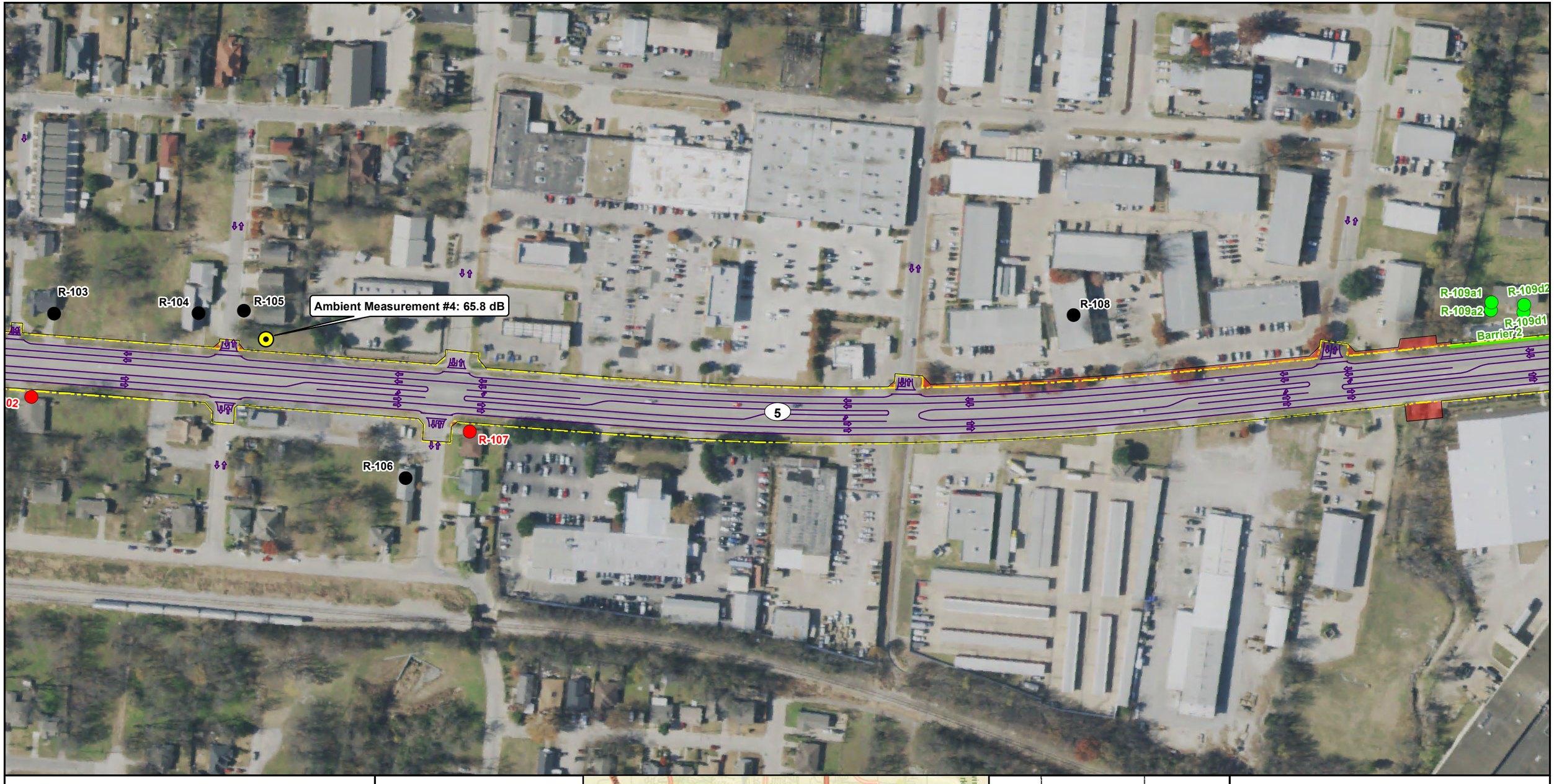
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 7 of 16



- Proposed Barrier
- Ambient Receiver
- Contour Point

Noise Receivers

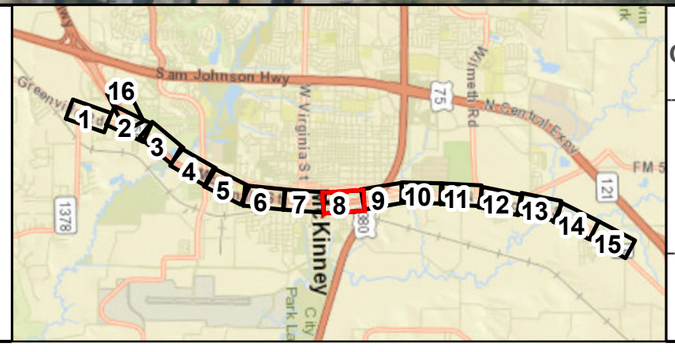
- Benefitted
- Impacted
- Not Impacted

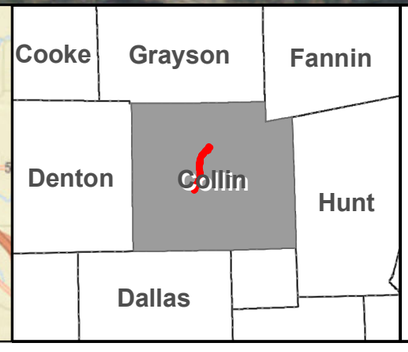
- Proposed Design
- Project Footprint
- Proposed ROW
- Existing ROW

N

0 75 150 300

Feet





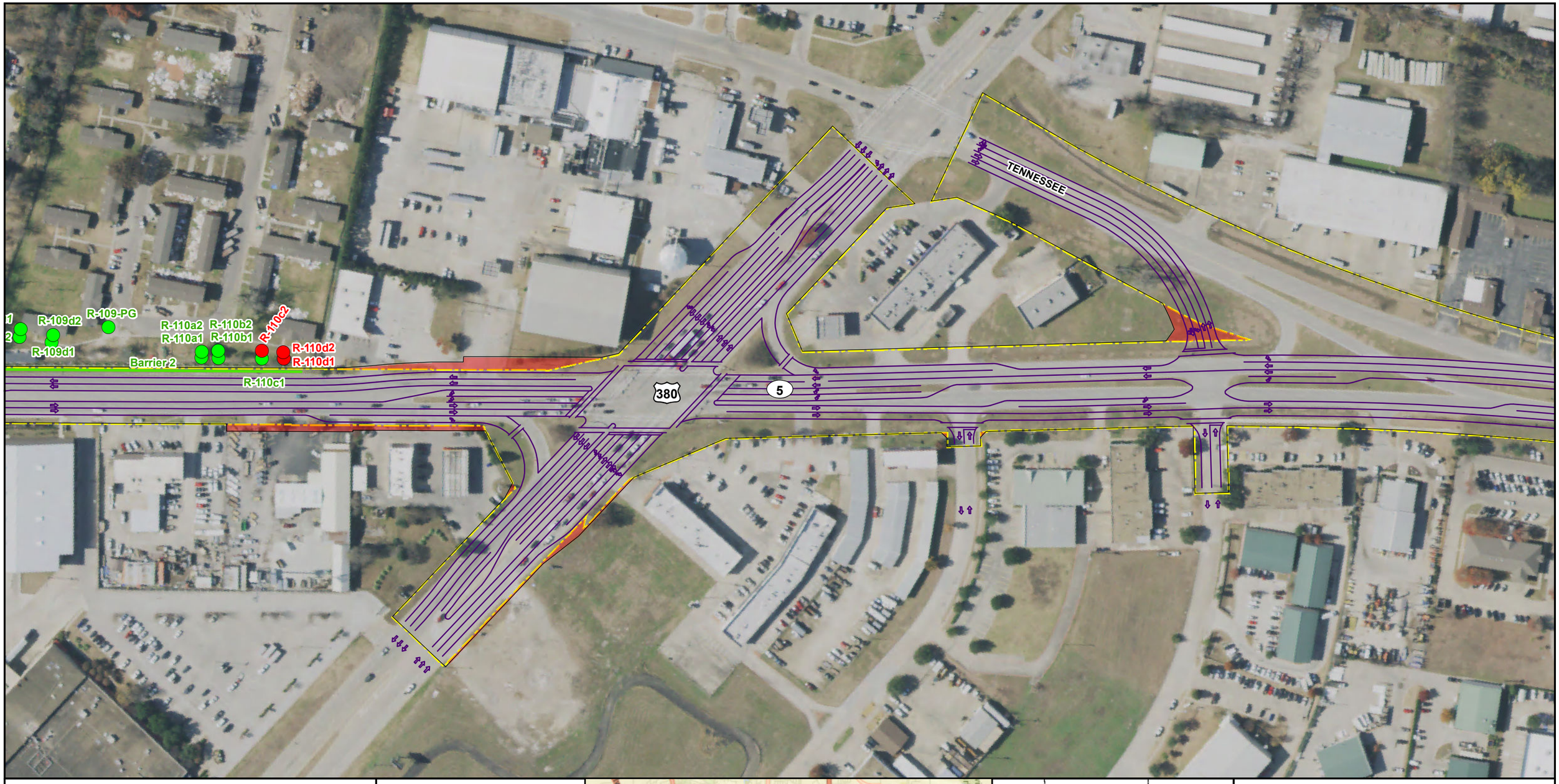
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 8 of 16



Proposed Barrier
Ambient Receiver
Contour Point

Noise Receivers

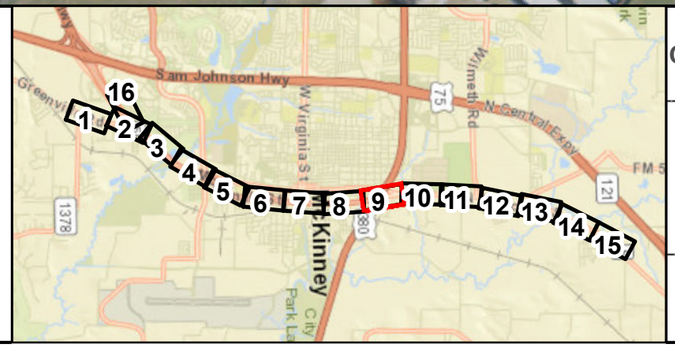
Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

N

0 75 150 300

Feet



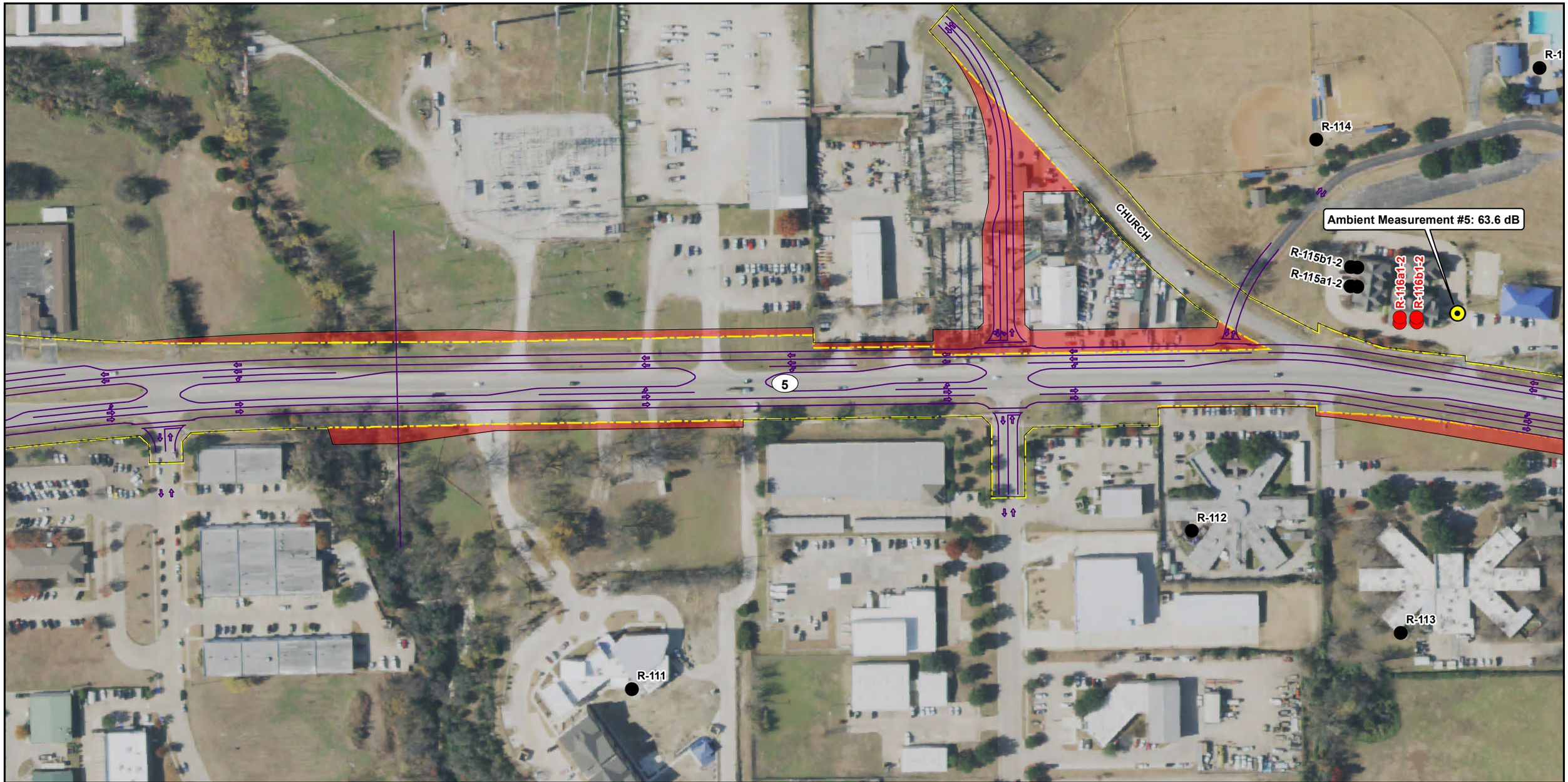
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 9 of 16



Proposed Barrier
Ambient Receiver
Contour Point

Noise Receivers

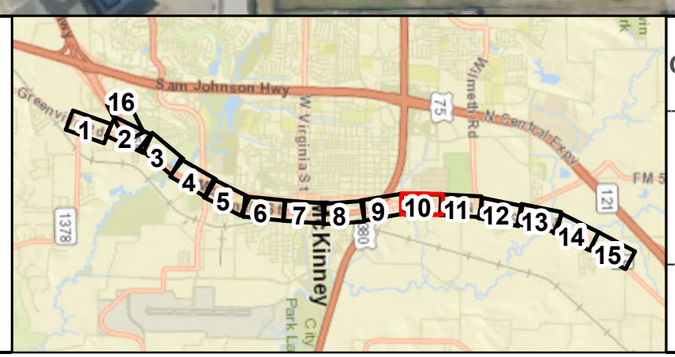
Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

N

0 75 150 300

Feet



TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 10 of 16

- Proposed Barrier
- Ambient Receiver
- Contour Point

Noise Receivers

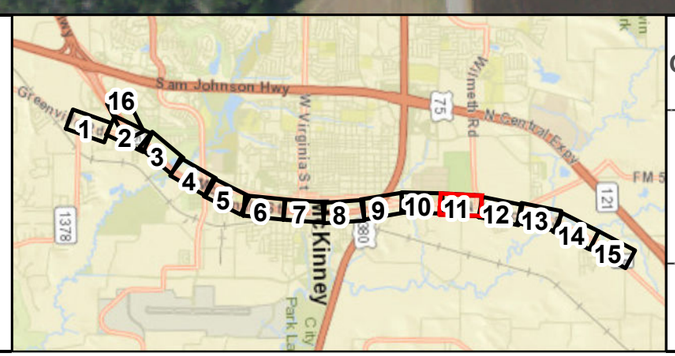
- Benefitted
- Impacted
- Not Impacted

- Proposed Design
- Project Footprint
- Proposed ROW
- Existing ROW

N

0 75 150 300

Feet



TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 11 of 16

Proposed Barrier
Ambient Receiver
Contour Point

Noise Receivers

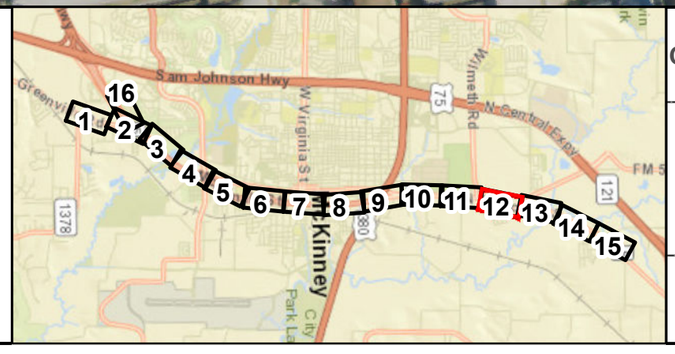
Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

N

0 75 150 300

Feet



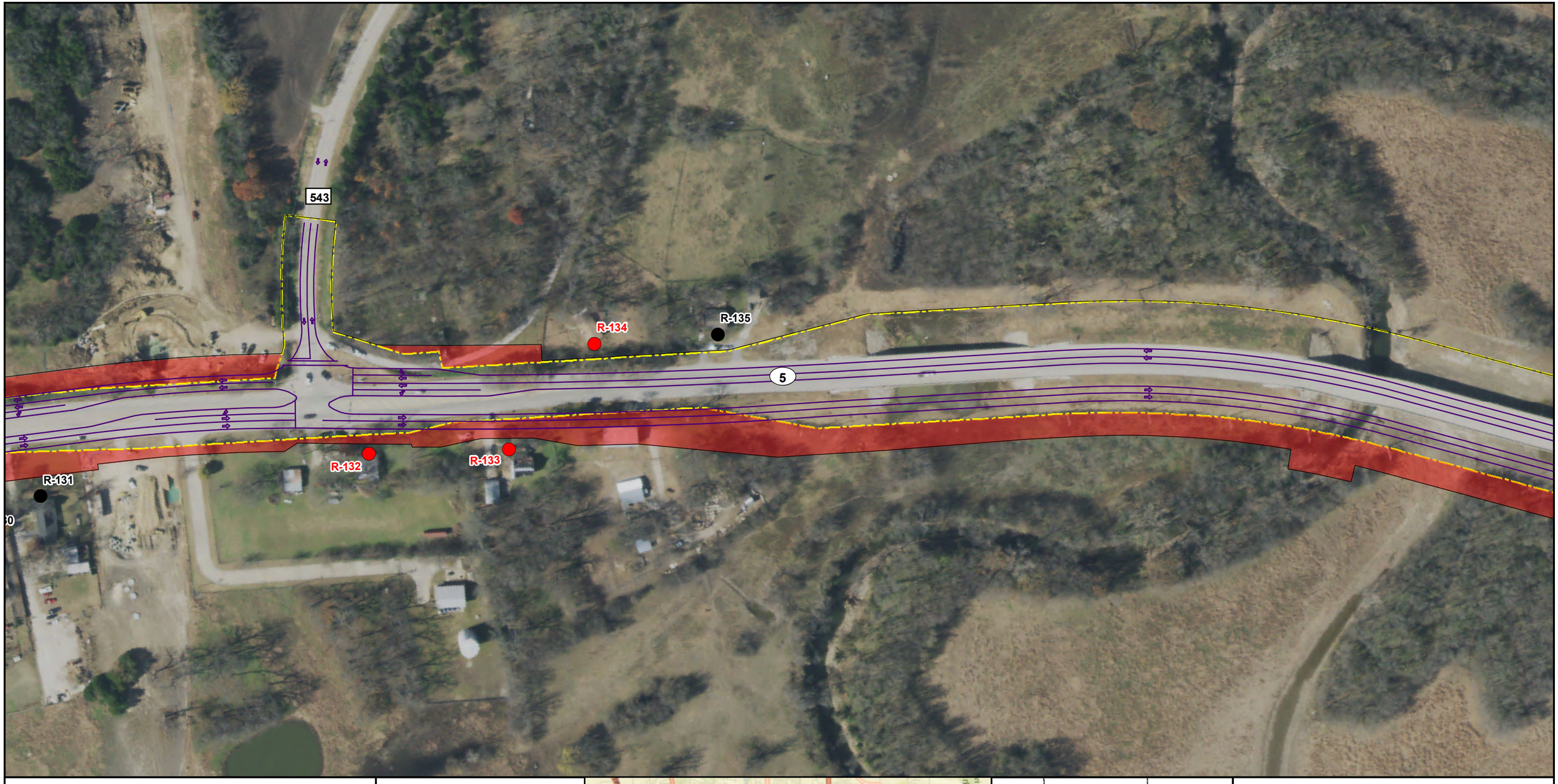
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 12 of 16



Noise Receivers

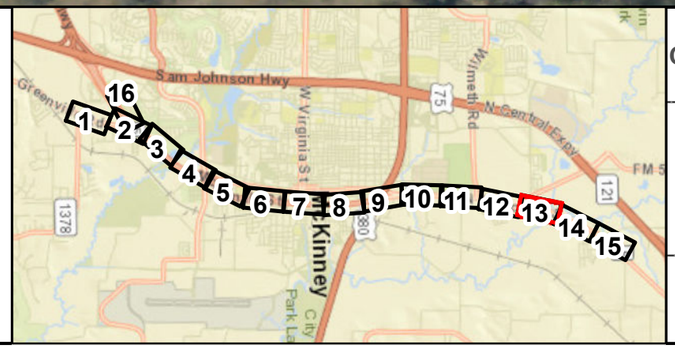
- Benefitted
- Impacted
- Not Impacted

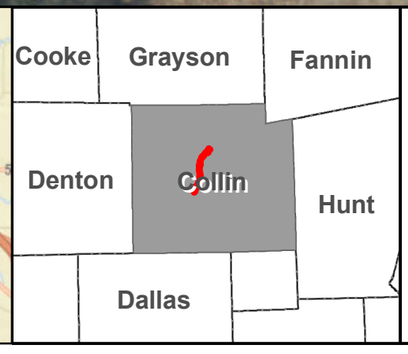
- Proposed Barrier
- Ambient Receiver
- Contour Point
- Proposed Design
- Project Footprint
- Proposed ROW
- Existing ROW

N

0 75 150 300

Feet





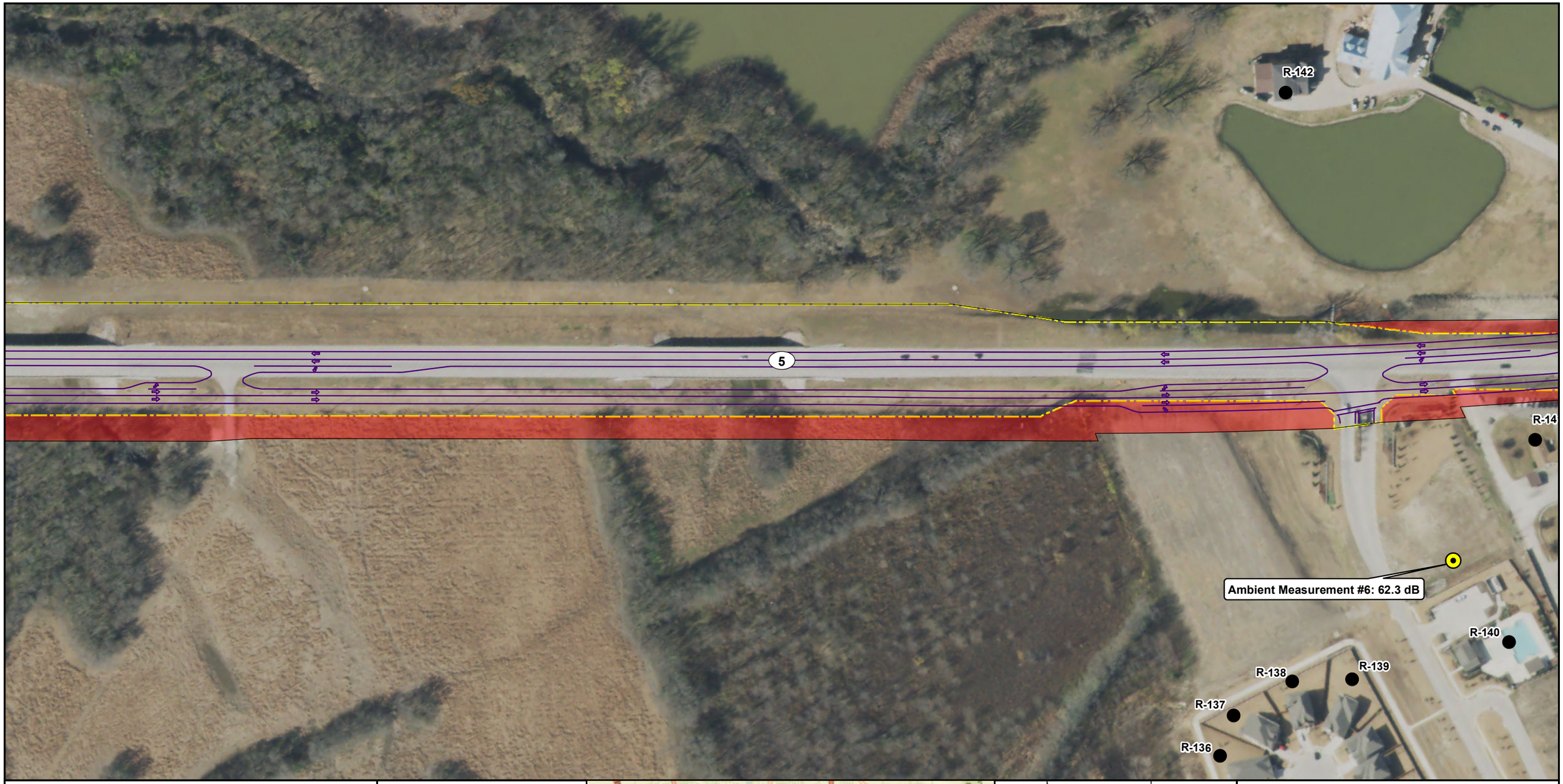
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 13 of 16



Proposed Barrier
Ambient Receiver
Contour Point

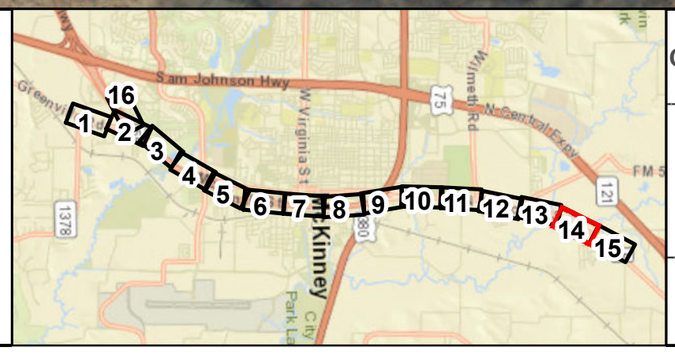
Noise Receivers

Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

0 75 150 300

Feet



TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 14 of 16

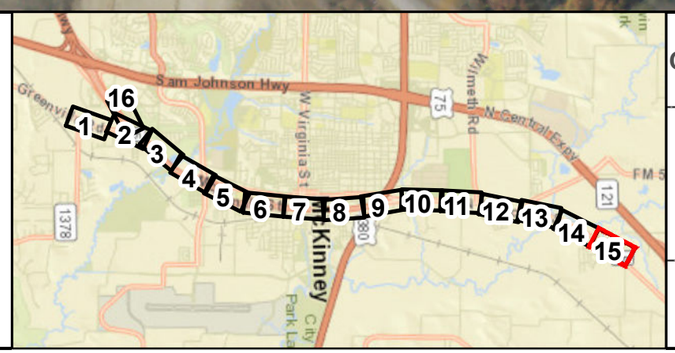
Proposed Barrier
Ambient Receiver
Contour Point

Noise Receivers

Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

0 75 150 300
Feet



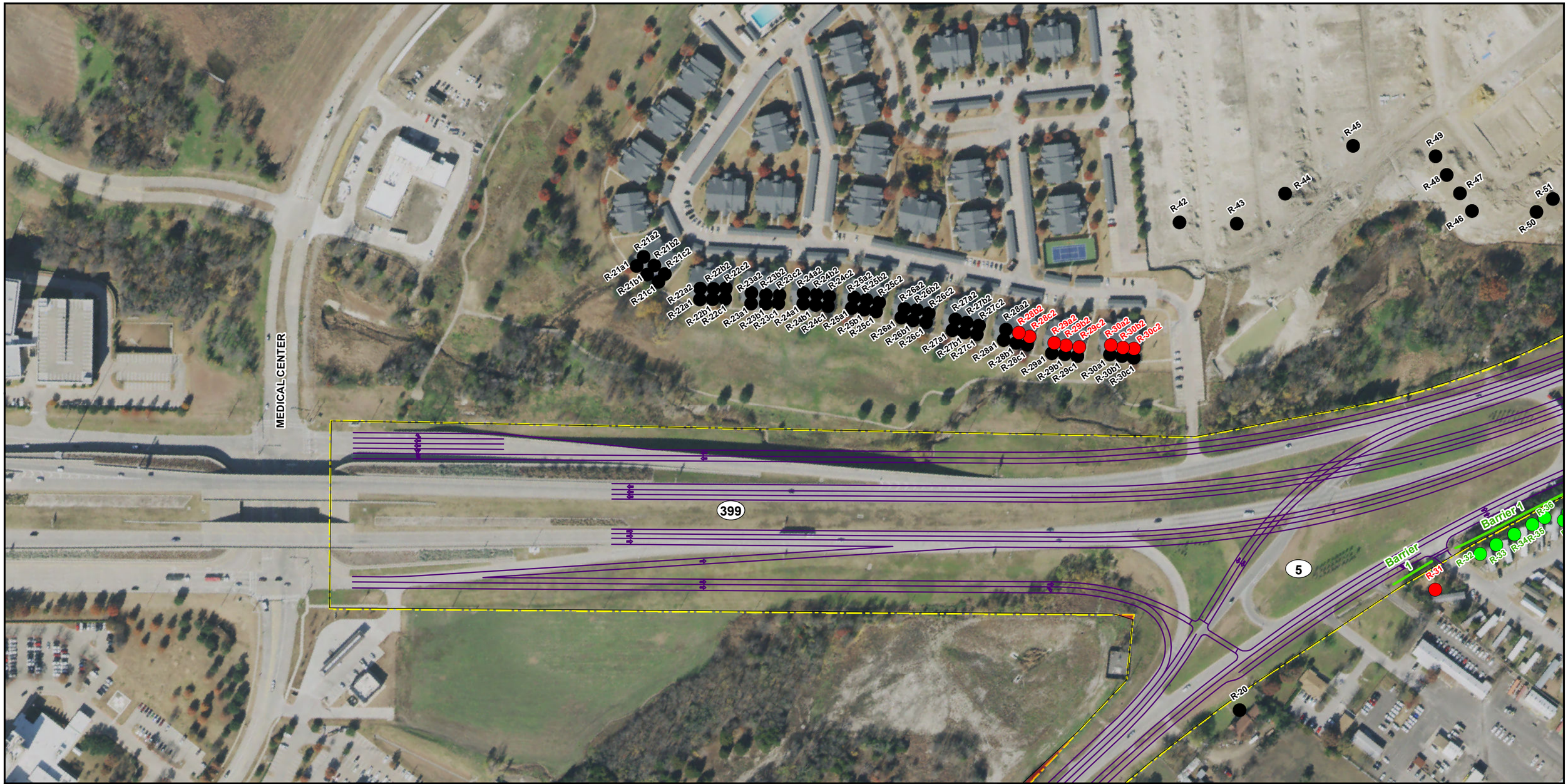
TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 15 of 16



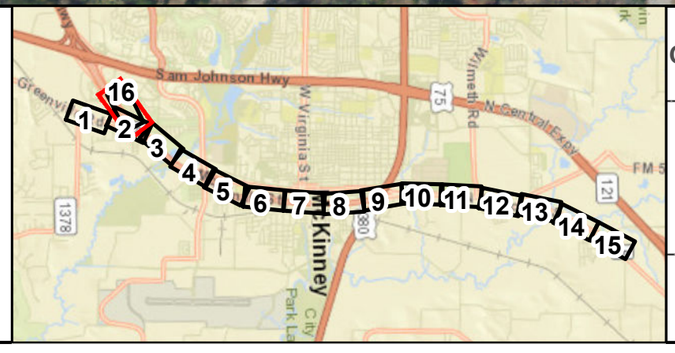
Proposed Barrier
Ambient Receiver
Contour Point

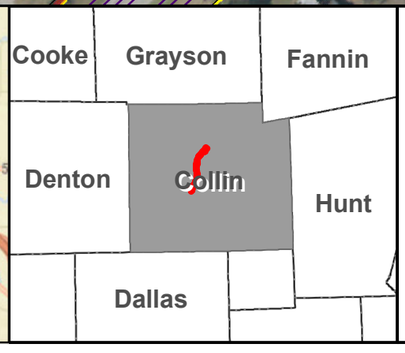
Noise Receivers

Benefitted
Impacted
Not Impacted

Proposed Design
Project Footprint
Proposed ROW
Existing ROW

0 75 150 300
Feet





TRAFFIC NOISE ANALYSIS

SH 5
from south of FM 1378 to South of CR 275

CSJs:0047-05-054, etc.

Collin County

Map 16 of 16

Appendix B
Traffic Volumes

Texas Department of Transportation

MEMO

January 31, 2019

To: Mohamed "Mo" K. Bur, District Engineer
Attention: Lacey Rodgers, P.E., Director of TPD

Through: William E. Knowles, P.E.
Traffic Analysis Section Director, TPP

From: Lee Theobald
Planner, TPP

Subject: Traffic Data
CSJ: 0047-05-054
SH 5:
From South of FM 1378
To South of Melissa Road
Collin County

Attached are diagrams depicting 2025, 2045 and 2055 average daily traffic volumes and turning movements on SH 5 from South of FM 1378 to South of Melissa Road for the proposed condition. Also attached are tabulations showing traffic analysis for highway design for the 2025 to 2045 twenty year period and 2025 to 2055 thirty year period for the described limits of the route. Also included are tabulations showing data for use in air and noise analysis.

Due to differences in traffic volumes the project was separated into four sections.

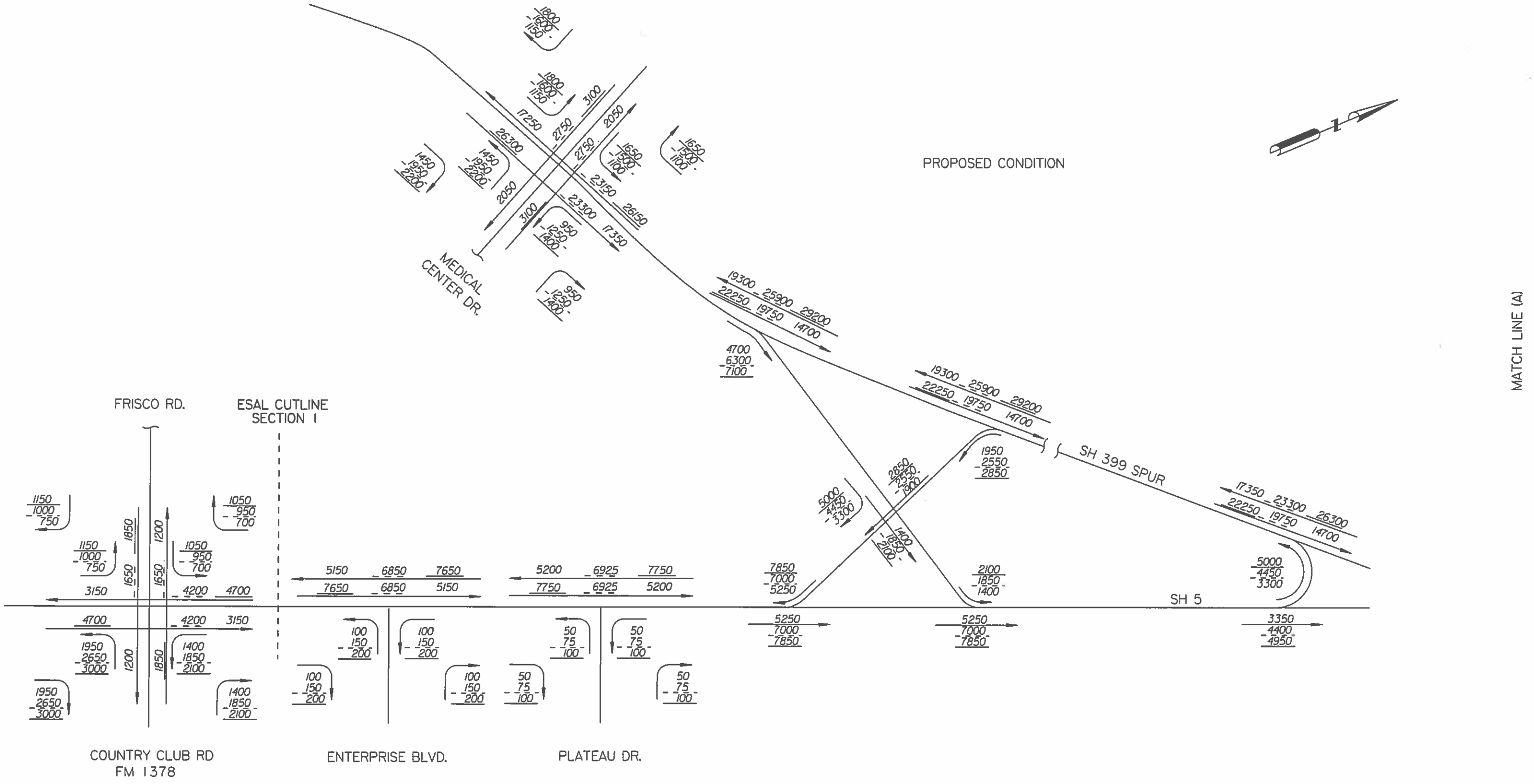
Section 1: From South of FM 1378 to SH 399 Spur
Section 2: From SH 399 Spur to Eldorado Pkwy.
Section 3: From Eldorado Pkwy. to West University Dr. (US 380)
Section 4: From West University Dr. (US 380) to South of Melissa Road

Please refer to your email request dated January 7, 2019.

If you have any questions or need additional information, please contact Lee Theobald at (512) 486-5143.

Attachments

CC: Matthew Atkinson, P.E.,
Transportation Engineer, Dallas District
Design Division

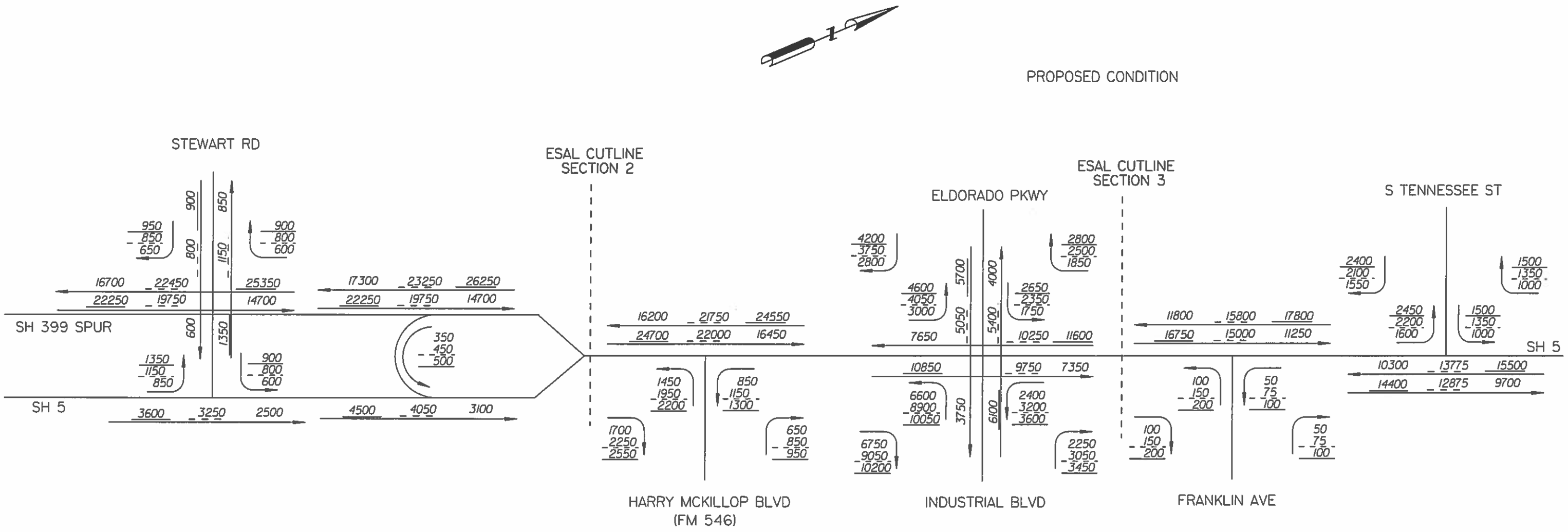


LEGEND
1000 - 2025 ADT
1000 - 2045 ADT
1000 - 2055 ADT

2025, 2045 AND 2055 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM SOUTH OF FM 1378 TO SOUTH OF MELISSA ROAD
COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
JANUARY 31, 2019

PROPOSED CONDITION



LEGEND

1000 - 2025 ADT
1000 - 2045 ADT
1000 - 2055 ADT

2025, 2045 AND 2055 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM SOUTH OF FM 1378 TO SOUTH OF MELISSA ROAD

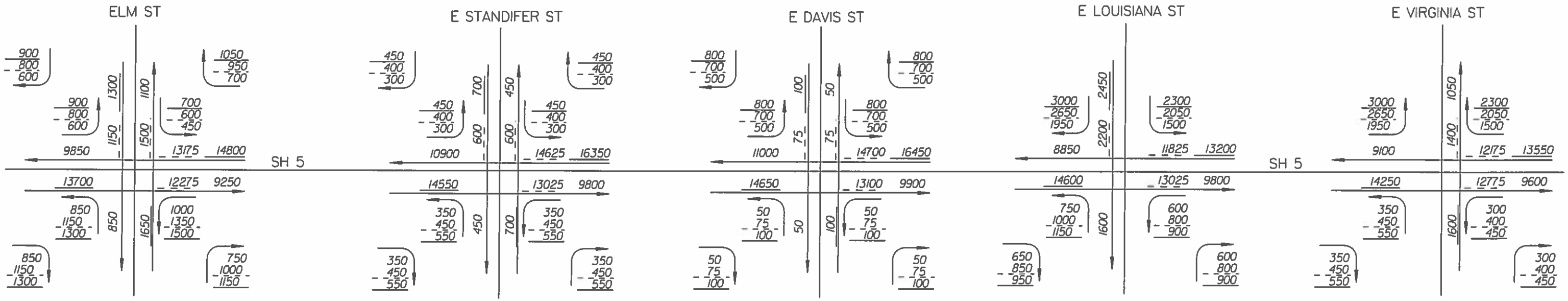
COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
JANUARY 31, 2019

PROPOSED CONDITION

MATCH LINE (B)

MATCH LINE (C)



LEGEND

1000 - 2025 ADT
1000 - 2045 ADT
1000 - 2055 ADT

2025, 2045 AND 2055 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM SOUTH OF FM 1378 TO SOUTH OF MELISSA ROAD

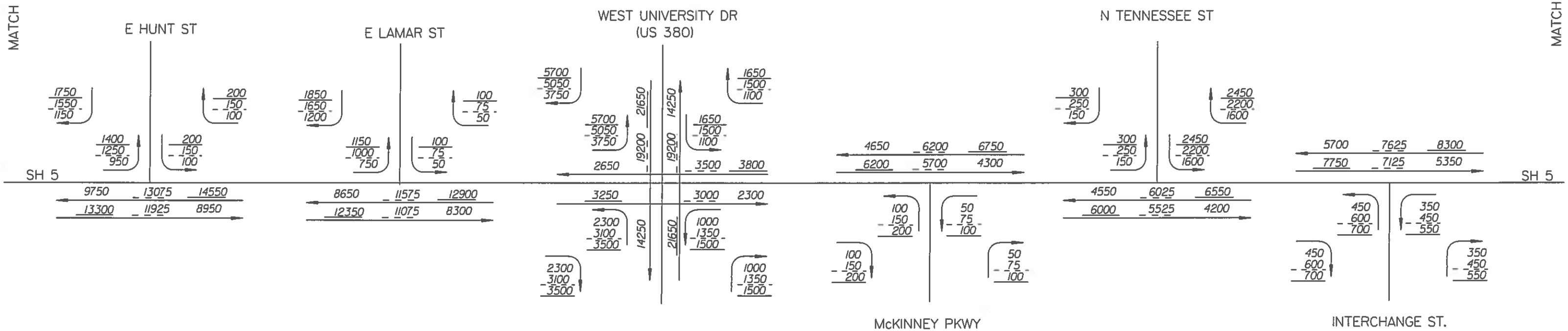
COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
JANUARY 31, 2019

PROPOSED CONDITION

MATCH LINE (C)

MATCH LINE (D)



LEGEND

1000 - 2025 ADT
1000 - 2045 ADT
1000 - 2055 ADT

2025, 2045 AND 2055 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM SOUTH OF FM 1378 TO SOUTH OF MELISSA ROAD COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
JANUARY 31, 2019

PROPOSED CONDITION

MATCH LINE (D)

N CHURCH ST

WILMETH RD

WESTON RD
(FM 543)

LACORE LN

SH 5

SH 5

TWIN KNOLL DR

CYPRESS HILL DR

MATCH LINE (E)

	N CHURCH ST	WILMETH RD	WESTON RD (FM 543)	LACORE LN
SH 5 NB	1050 / 950 / 700	4600 / 4050 / 3000	1500 / 1350 / 1000	75 / 50 / 25
SH 5 SB	600 / 550 / 400	2800 / 2500 / 1850	550 / 450 / 350	75 / 50 / 25

SH 5 NB	5350	7125	7800
SH 5 SB	7250	6625	5000

SH 5 NB	2750	3625	3800
SH 5 SB	3250	3125	2400

SH 5 NB	4450	5875	6300
SH 5 SB	5750	5375	4100

SH 5 NB	4350	5700	6100
SH 5 SB	5550	5200	4000

SH 5 NB	3400	4425	4700
SH 5 SB	4150	3925	3050

SH 5 NB	3725	4825	5175
SH 5 SB	4625	4325	3375

	TWIN KNOLL DR	CYPRESS HILL DR
SH 5 NB	150 / 250 / 300	150 / 250 / 300
SH 5 SB	50 / 75 / 100	50 / 75 / 100

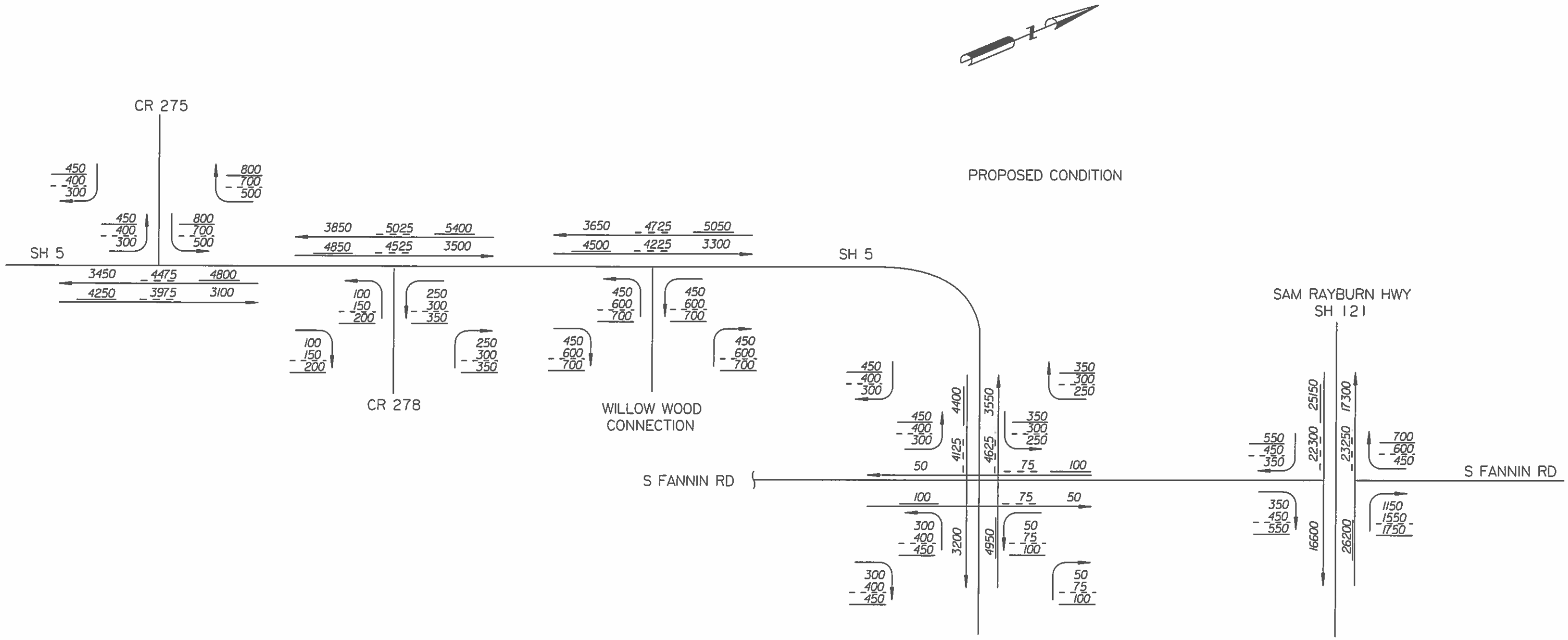
LEGEND

1000 - 2025 ADT
1000 - 2045 ADT
1000 - 2055 ADT

2025, 2045 AND 2055 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM SOUTH OF FM 1378 TO SOUTH OF MELISSA ROAD

COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
JANUARY 31, 2019



LEGEND

1000 - 2025 ADT
1000 - 2045 ADT
1000 - 2055 ADT

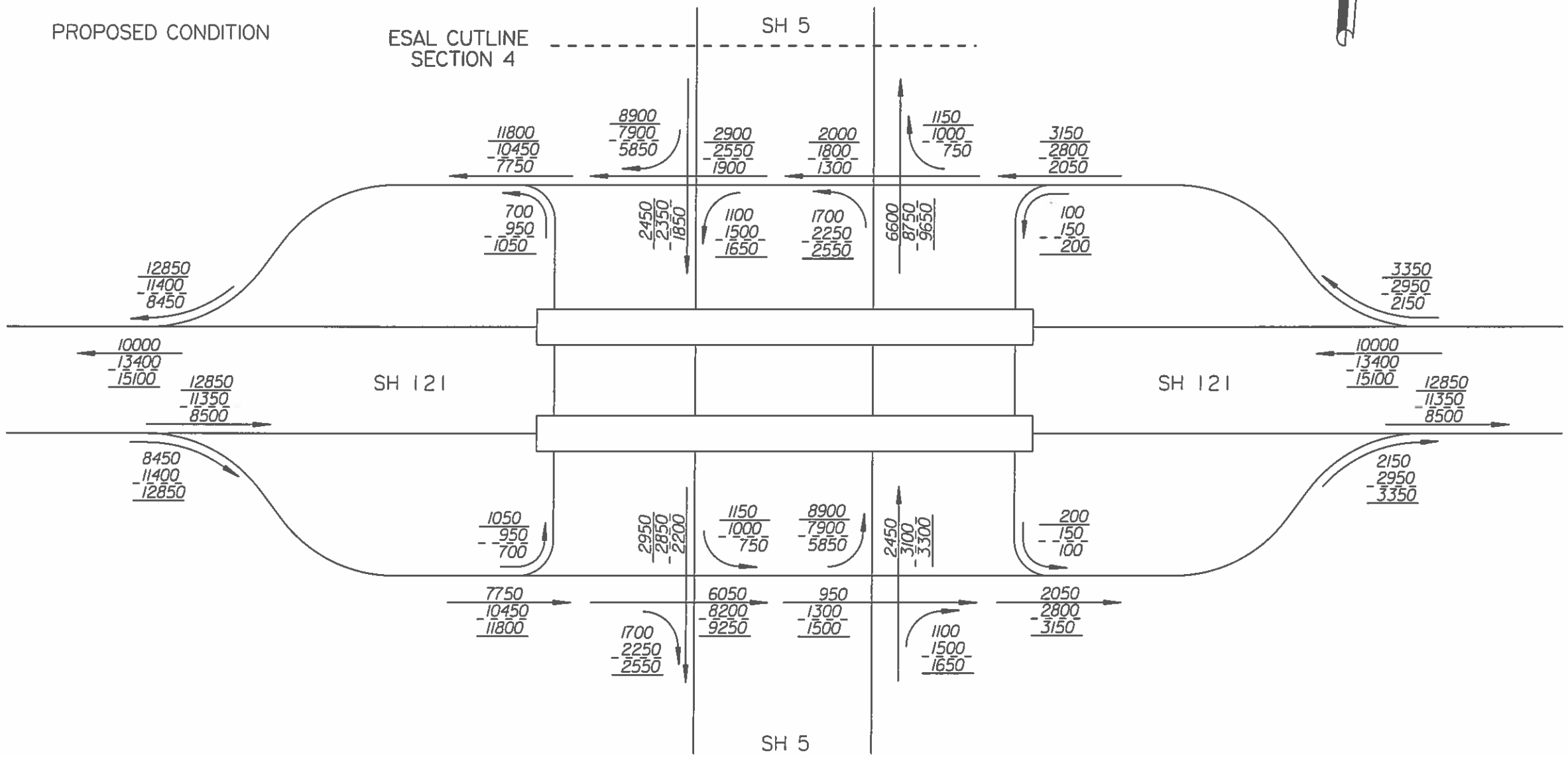
2025, 2045 AND 2055 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM SOUTH OF FM 1378 TO SOUTH OF MELISSA ROAD

COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
JANUARY 31, 2019

PROPOSED CONDITION

ESAL CUTLINE
SECTION 4



MATCH LINE (F)

LEGEND

1000 - 2025 ADT
1000 - 2045 ADT
1000 - 2055 ADT

2025, 2045 AND 2055 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM SOUTH OF FM 1378 TO SOUTH OF MELISSA ROAD

COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
JANUARY 31, 2019

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District

January 29, 2019

Description of Location	Average Daily Traffic 2025	Average Daily Traffic 2045	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2025 to 2045) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 (Proposed Condition) Section 1 From FM 1378 To SH 399 Spur Collin County	10,500	14,000	59 - 41	10.2	8.7	5.7	11,200	40	2,723,000	3	3,401,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	91.3	94.3
Medium Duty	4.6	3.0
Heavy Duty	4.1	2.7

Description of Location	Average Daily Traffic 2025	Average Daily Traffic 2055	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2025 to 2055) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 (Proposed Condition) Section 1 From FM 1378 To SH 399 Spur Collin County	10,500	15,700	59 - 41	10.2	8.7	5.7	11,300	40	4,367,000	3	5,456,000	8"

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District

January 29, 2019

Description of Location	Average Daily Traffic 2025	Average Daily Traffic 2045	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2025 to 2045) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 (Proposed Condition) Section 2 From SH 399 Spur To Eldorado Pkwy Collin County	35,800	47,950	59 - 41	10.2	5.2	3.4	11,900	30	5,601,000	3	6,975,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	94.8	96.6
Medium Duty	2.7	1.8
Heavy Duty	2.5	1.6

Description of Location	Average Daily Traffic 2025	Average Daily Traffic 2055	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2025 to 2055) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 (Proposed Condition) Section 2 From SH 399 Spur To Eldorado Pkwy Collin County	35,800	54,000	59 - 41	10.2	5.2	3.4	11,900	30	9,009,000	3	11,219,000	8"

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District

January 29, 2019

Description of Location	Average Daily Traffic 2025	Average Daily Traffic 2045	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2025 to 2045) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 (Proposed Condition) Section 3 From Eldorado Pkwy To West University Dr. (US 380) Collin County	23,250	31,100	59 - 41	10.2	6.0	4.0	11,600	30	4,185,000	3	5,216,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	94.0	96.0
Medium Duty	3.2	2.1
Heavy Duty	2.8	1.9

Description of Location	Average Daily Traffic 2025	Average Daily Traffic 2055	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2025 to 2055) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 (Proposed Condition) Section 3 From Eldorado Pkwy To West University Dr. (US 380) Collin County	23,250	34,950	59 - 41	10.2	6.0	4.0	11,700	30	6,721,000	3	8,378,000	8"

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District

January 29, 2019

Description of Location	Average Daily Traffic 2025	Average Daily Traffic 2045	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2025 to 2045) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 (Proposed Condition) Section 4 From West University Dr. (US 380) To South of Melissa Rd Collin County	15,050	20,000	59 - 41	10.2	7.2	4.8	11,400	40	3,230,000	3	4,032,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	92.8	95.2
Medium Duty	3.8	2.5
Heavy Duty	3.4	2.3

Description of Location	Average Daily Traffic 2025	Average Daily Traffic 2055	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2025 to 2055) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 (Proposed Condition) Section 4 From West University Dr. (US 380) To South of Melissa Rd Collin County	15,050	22,150	59 - 41	10.2	7.2	4.8	11,400	40	5,143,000	3	6,419,000	8"

Texas Department of Transportation

MEMO

April 28, 2017

To: James K. Selman, P.E., District Engineer
Mohamed "Mo" Bur, P.E., Director TPD

Through: William E. Knowles, P.E.
Traffic Analysis Section Director, TPP

From: Robert C. Williams
Planner, TPP

Subject: Traffic Data
CSJ: 0047-05-054 & 0047-09-034
SH 5:
From Frisco Road
To SH 121
Collin County

Attached are copies of schematics depicting 2020, 2040 and 2050 anticipated average daily traffic volumes and turning movements along SH 5. Also attached are tabulations showing traffic analysis for highway design for 2020 to 2040 twenty year period and 2020 to 2050 thirty year period for the described limits of the route for both existing and proposed conditions. Included are tabulations showing data for use in air and noise analysis.

Due to differences in traffic volumes this project was separated into three sections.

Section 1: From Frisco Road to SH 399 Spur
Section 2: From SH 399 Spur to West University Dr. (US 380)
Section 3: From West University Dr. (US 380) to SH 121

Please refer to your original memorandum dated May 13, 2016.

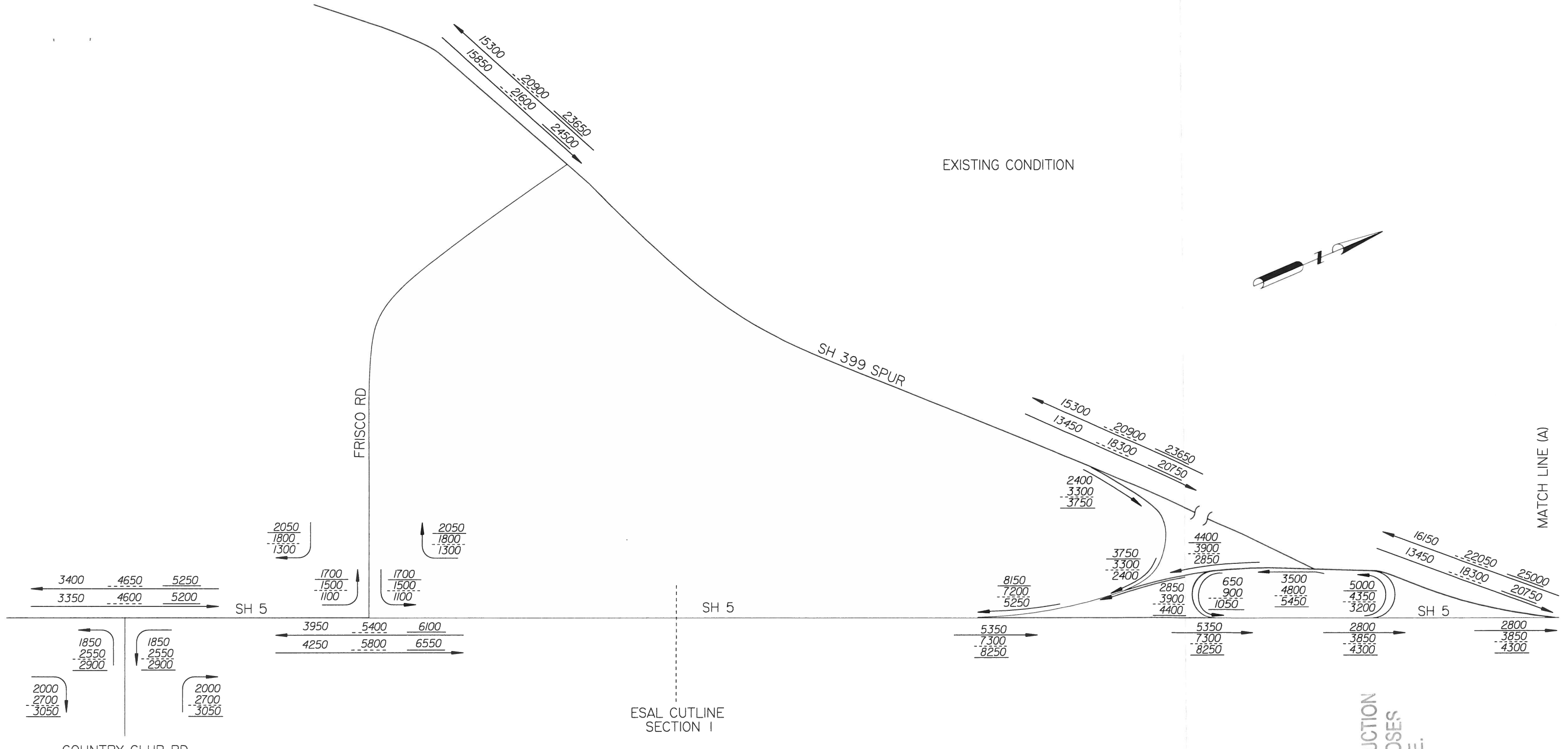
If you have any questions or need additional information, please contact Robert C. Williams at (512) 486-5145.

Attachments

CC: Godfrey Sendawula, Transportation Specialist, Dallas District
Design Division

MAY 0 3 2017

EXISTING CONDITION



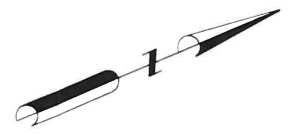
LEGEND

1000 - 2020 ADT
1000 - 2040 ADT
1000 - 2050 ADT

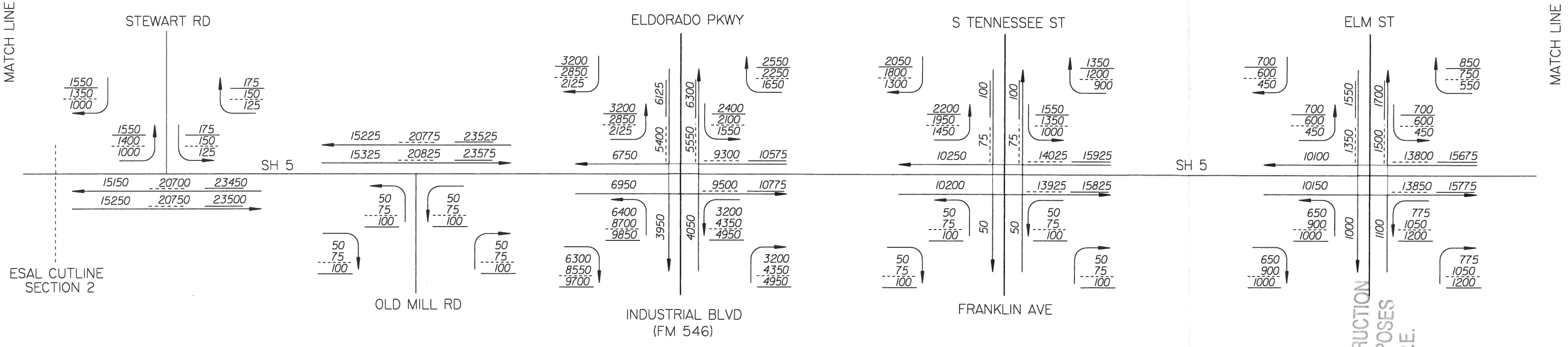
2020, 2040 AND 2050 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM FRISCO ROAD TO SH 121

COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
APRIL 25, 2017



EXISTING CONDITION



LEGEND

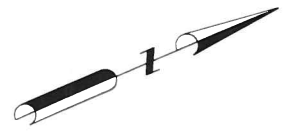
1000 - 2020 ADT
1000 - 2040 ADT
1000 - 2050 ADT

2020, 2040 AND 2050 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM FRISCO ROAD TO SH 121

COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
APRIL 25, 2017

EXISTING CONDITION

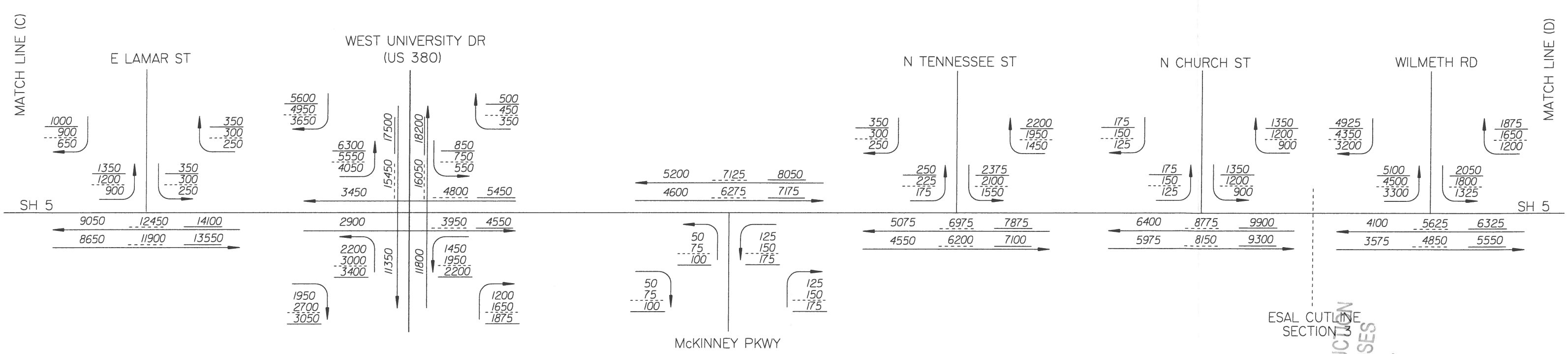


LEGEND
1000 - 2020 ADT
1000 - 2040 ADT
1000 - 2050 ADT

2020, 2040 AND 2050 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM FRISCO ROAD TO SH 121
COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
APRIL 25, 2017

EXISTING CONDITION



LEGEND

1000 - 2020 ADT
1000 - 2040 ADT
1000 - 2050 ADT

2020, 2040 AND 2050 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM FRISCO ROAD TO SH 121

COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
APRIL 25, 2017

MATCH LINE (E)

SHEET 5 OF 6

2020, 2040 AND 2050 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM FRISCO ROAD TO SH 121

COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION

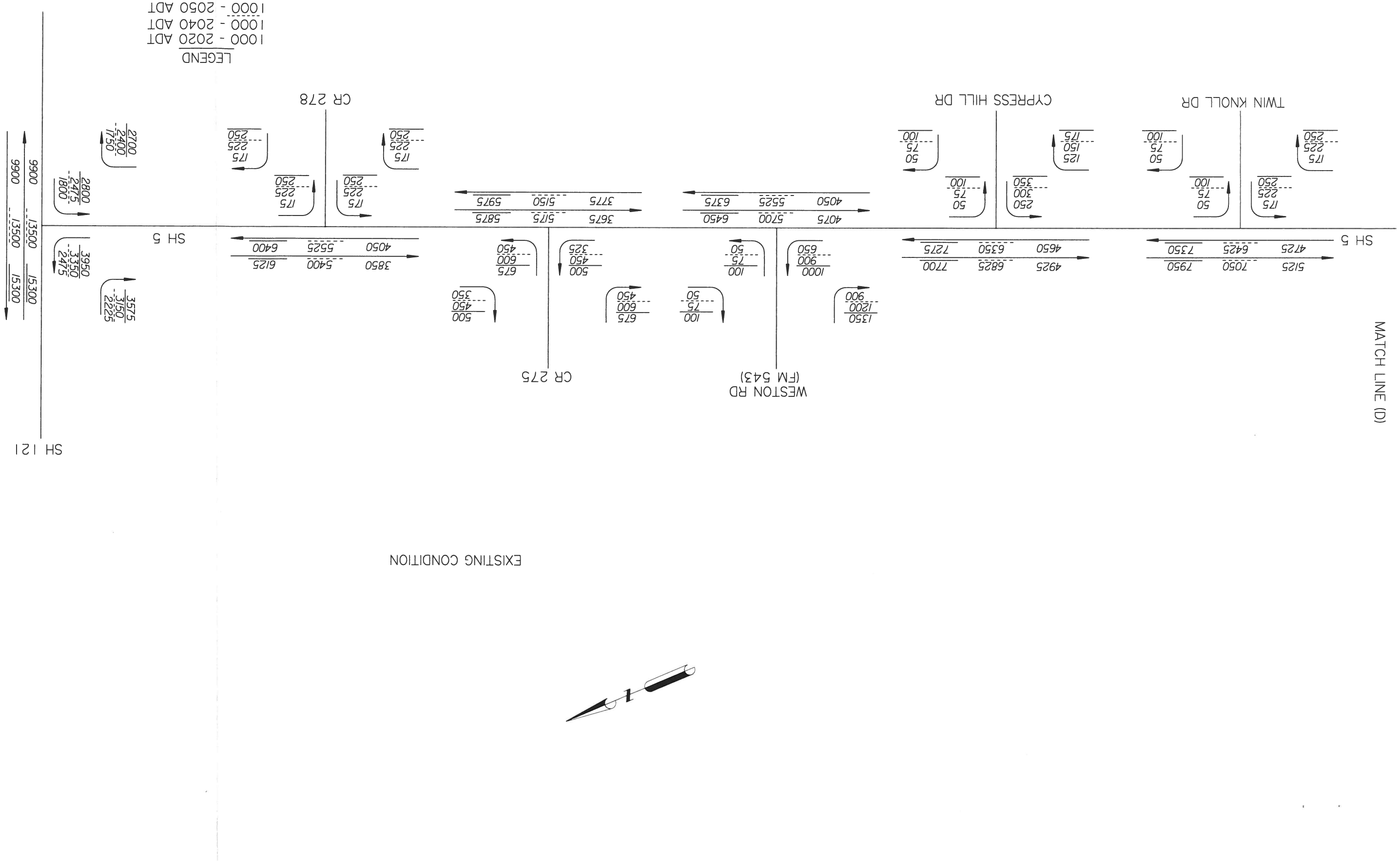
APRIL 25, 2017

LEGEND

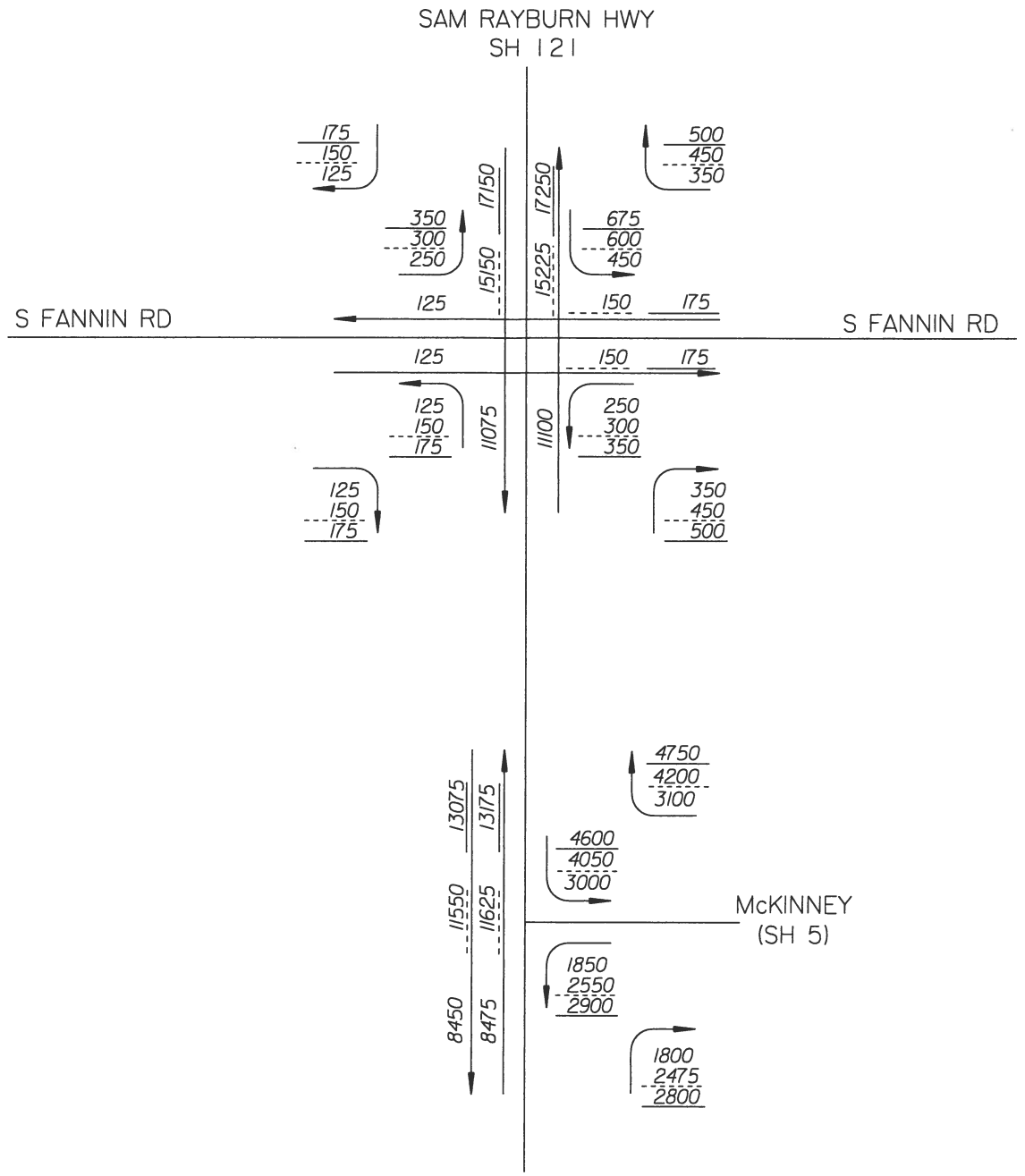
1000 - 2020 ADT

1000 - 2040 ADT

1000 - 2050 ADT



MATCH LINE (E)



EXISTING CONDITION

LEGEND
1000 - 2020 ADT
1000 - 2040 ADT
1000 - 2050 ADT

2020, 2040 AND 2050 ANTICIPATED AVERAGE DAILY TRAFFIC VOLUMES AND TURNING MOVEMENTS AT SPECIFIED POINTS ALONG SH 5 FROM FRISCO ROAD TO SH 121
COLLIN COUNTY

TRANSPORTATION PLANNING AND PROGRAMMING DIVISION
APRIL 25, 2017

SHEET 6 OF 6

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District **April 27, 2017**

Description of Location	Average Daily Traffic 2020	Average Daily Traffic 2040	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2020 to 2040) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 Existing and Proposed Conditions Section 1 From Frisco Road To SH 399 Spur Collin County	10,600	14,500	53 - 47	10.6	16.7	11.0	11,900	50	6,885,000	3	9,561,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	83.3	89.0
Medium Duty	5.8	3.8
Heavy Duty	10.9	7.2

Description of Location	Average Daily Traffic 2020	Average Daily Traffic 2050	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2020 to 2050) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 Existing and Proposed Conditions Section 1 From Frisco Road To SH 399 Spur Collin County	10,600	16,400	53 - 47	10.6	16.7	11.0	11,900	50	11,110,000	3	15,426,000	8"

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District

April 27, 2017

Description of Location	Average Daily Traffic 2020	Average Daily Traffic 2040	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2020 to 2040) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 Existing and Proposed Conditions Section 2 From SH 399 Spur To West University Dr (US 380) Collin County	32,400	44,200	53 - 47	10.6	10.8	7.1	12,200	40	13,620,000	3	18,889,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	89.2	92.9
Medium Duty	3.8	2.5
Heavy Duty	7.0	4.6

Description of Location	Average Daily Traffic 2020	Average Daily Traffic 2050	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2020 to 2050) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 Existing and Proposed Conditions Section 2 From SH 399 Spur To West University Dr (US 380) Collin County	32,400	50,050	53 - 47	10.6	10.8	7.1	12,300	40	21,990,000	3	30,497,000	8"

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District **April 26, 2017**

Description of Location	Base Year Average Daily Traffic 2020	Base Year Average Daily Traffic 2040	Dir Dist %	K Factor	Percent Trucks ADT	Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2020 to 2040) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 Existing and Proposed Conditions Section 3 From West Unviersity Dr (US 380) To SH 121 Collin County	14,175	19,325	53 - 47	10.6	14.5	9.6	11,900	50	7,984,000	3	11,082,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	85.5	90.4
Medium Duty	5.0	3.3
Heavy Duty	9.5	6.3

Description of Location	Base Year Average Daily Traffic 2020	Base Year Average Daily Traffic 2050	Dir Dist %	K Factor	Percent Trucks ADT	Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2020 to 2050) Flexible Pavement	S N	Rigid Pavement	SLAB
SH 5 Existing and Proposed Conditions Section 3 From West Unviersity Dr (US 380) To SH 121 Collin County	14,175	21,900	53 - 47	10.6	14.5	9.6	12,000	50	12,897,000	3	17,902,000	8"

Appendix C
Noise Measurements and Model Validation

Six (6) field measurements were taken to validate the sound levels in the Project Study Area. The monitoring sites were chosen to be representative of the noise sensitive land uses adjacent to the project alternative and are characteristic of the existing background sound levels within the study area. The results of the field measurement program are showed in Table C-1. The measured and monitored levels are within 3.0 dBA of each other. Therefore, the model is considered to be valid.

Table C-1: Measured Ambient Sound Levels (dBA)

Site	Location	Land Use (NAC)	Field Measured Sound Levels		Difference (dBA)	Primary Noise Source
			Measured	Modeled		
SH5-1	Pecan Grove Cemetery, South of Stewart St., ~100' from nearest SH5 NB travel lane.	C	62.0	64.5	2.5	SH 5
SH5-2	Multi-family residences, Newsome Homes, near McMakin St., at fence line.	B	63.1	60.7	2.4	SH 5
SH5-3	Mixed single family residences/Commercial, near Christian St., SB direction.	B	65.4	63.0	2.4	SH 5
SH5-4	St. James Place of Worship/single family residences, near Smith St.	C	65.8	64.8	1.0	SH 5
SH5-5	Multi-family residences, Gateway Apts/Samiritan Inn, near Church St.	B	63.6	64.5	0.9	SH 5
SH5-6	Willow Wood single family residences, Willowwood Rd., near entrance with SH 5.	B	62.3	61.0	1.3	SH 5

NOISE SURVEY SHEET

EQUIPMENT: METER Norsonics 132 CALIBRATOR EXTECH 407744

CALIBRATION: START / dB END / dB

RESPONSE: FAST ____ SLOW X A-WEIGHTING X BATTERY CHECK X

WEATHER DATA: 90°F, partly cloudy, calm

TRAFFIC DATA		
ROAD		
AUTOS		
MED TRKS		
HVY TRKS		
DURATION		

DATE: 6/18/19

SITE #: N-1

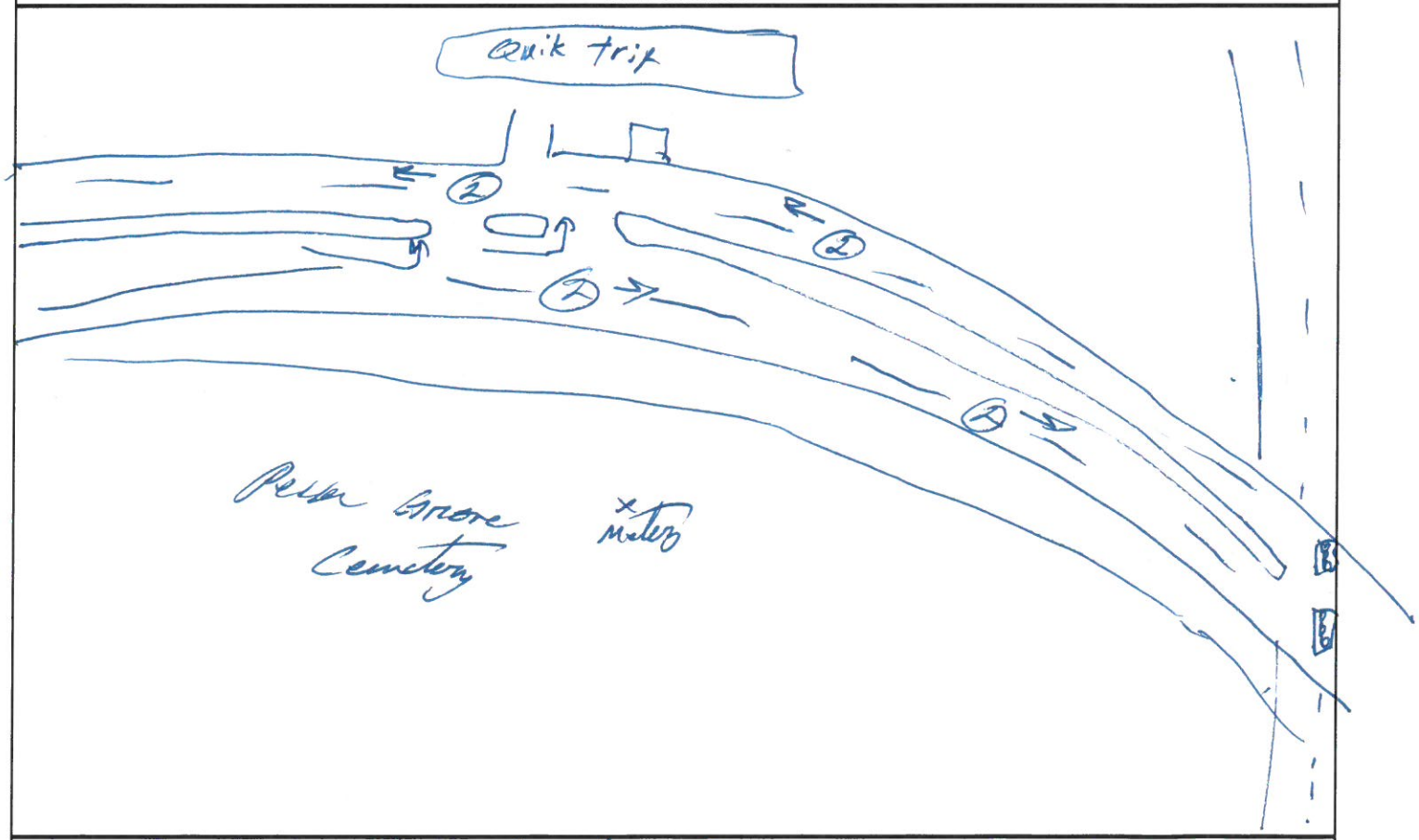
START: 20:27

END: 20:42

LEQ: 62.0

SPEED: 50

SITE SKETCH



BACKGROUND NOISE None

MAJOR SOURCES SH 5

UNUSUAL EVENTS

OTHER NOTES

NOISE SURVEY SHEET

EQUIPMENT: METER Norsonics 132 CALIBRATOR EXTECH 407744

CALIBRATION: START N-4 dB END " dB

RESPONSE: FAST ____ SLOW X A-WEIGHTING X BATTERY CHECK X

WEATHER DATA: ____

TRAFFIC DATA		
ROAD		
AUTOS		
MED TRKS		
HVY TRKS		
DURATION		

DATE: 6/18/19

SITE #: N-2

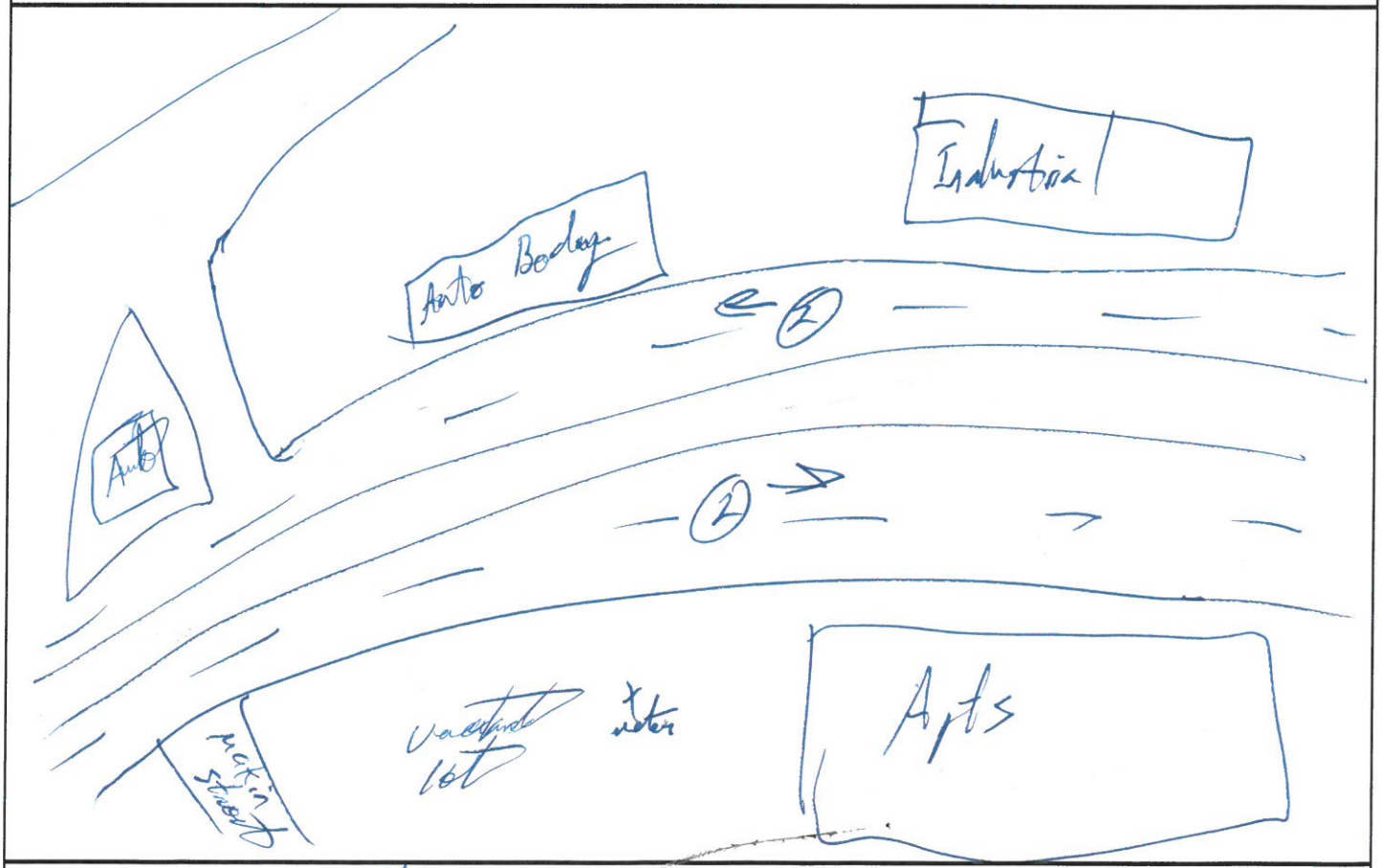
START: 20:05

END: 20:20

LEQ: 63.1

SPEED: 35 mph

SITE SKETCH



BACKGROUND NOISE None

MAJOR SOURCES SH 5

UNUSUAL EVENTS car w/ flat tire (20:06)

OTHER NOTES ____

NOISE SURVEY SHEET

EQUIPMENT: METER Norsonics 132 CALIBRATOR EXTECH 407744

CALIBRATION: START same as N-4 dB END ' ' dB

RESPONSE: FAST _____ SLOW X A-WEIGHTING X BATTERY CHECK X

WEATHER DATA: _____

TRAFFIC DATA		
ROAD		
AUTOS		
MED TRKS		
HVY TRKS		
DURATION		

DATE: 6/18/19

SITE #: N-3

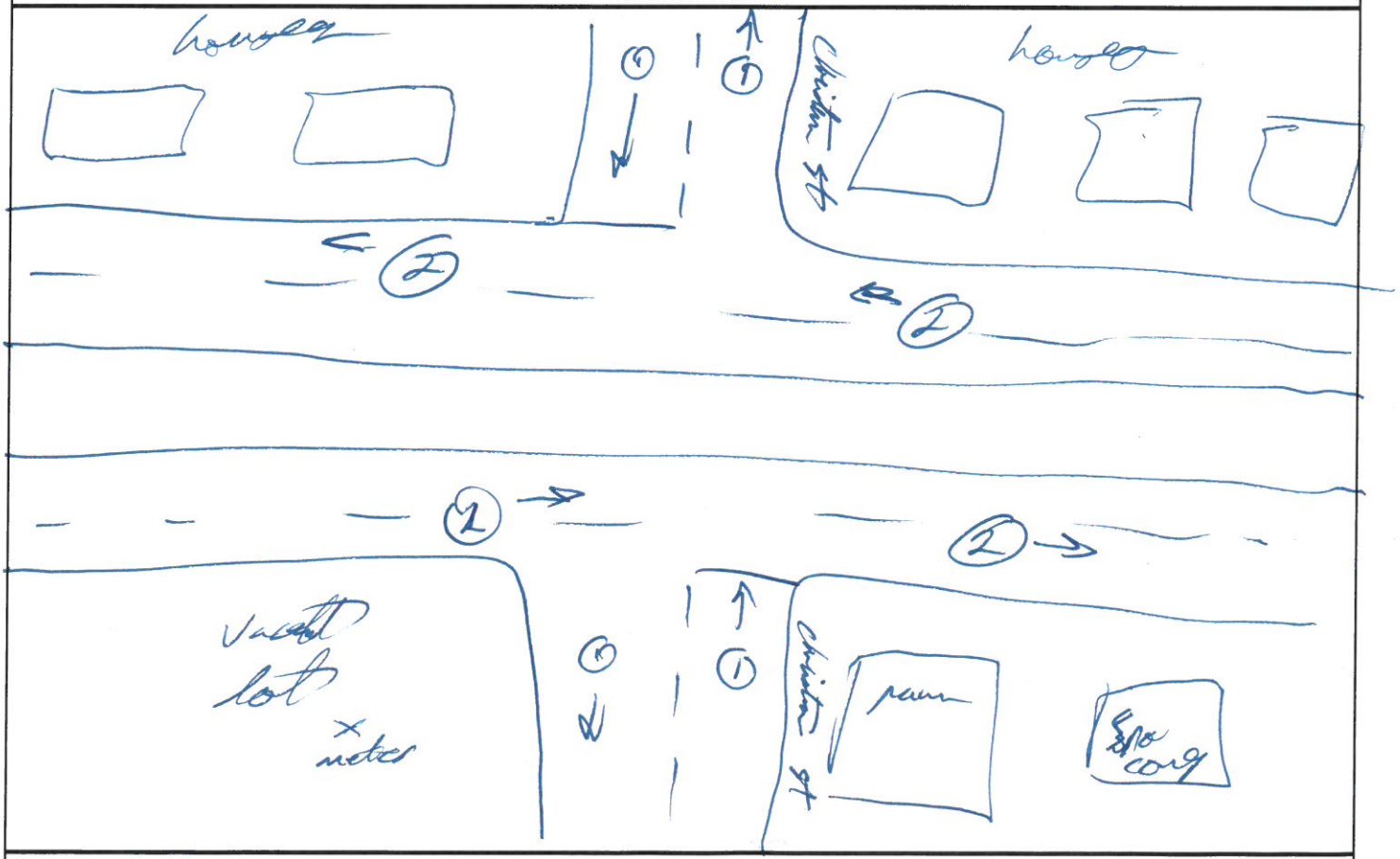
START: 1943

END: 19:58

LEQ: 65.4

SPEED: 35

SITE SKETCH



BACKGROUND NOISE None

MAJOR SOURCES SH 5

UNUSUAL EVENTS None

OTHER NOTES N/A

NOISE SURVEY SHEET

EQUIPMENT: METER Norsonics 132 CALIBRATOR EXTECH 407744

CALIBRATION: START 93.7 dB END 94 dB

RESPONSE: FAST ____ SLOW X A-WEIGHTING X BATTERY CHECK X

WEATHER DATA: PC, 90, Calm <5

TRAFFIC DATA		
ROAD		
AUTOS		
MED TRKS		
HVY TRKS		
DURATION		

DATE: 6/18/19

SITE #: N-4

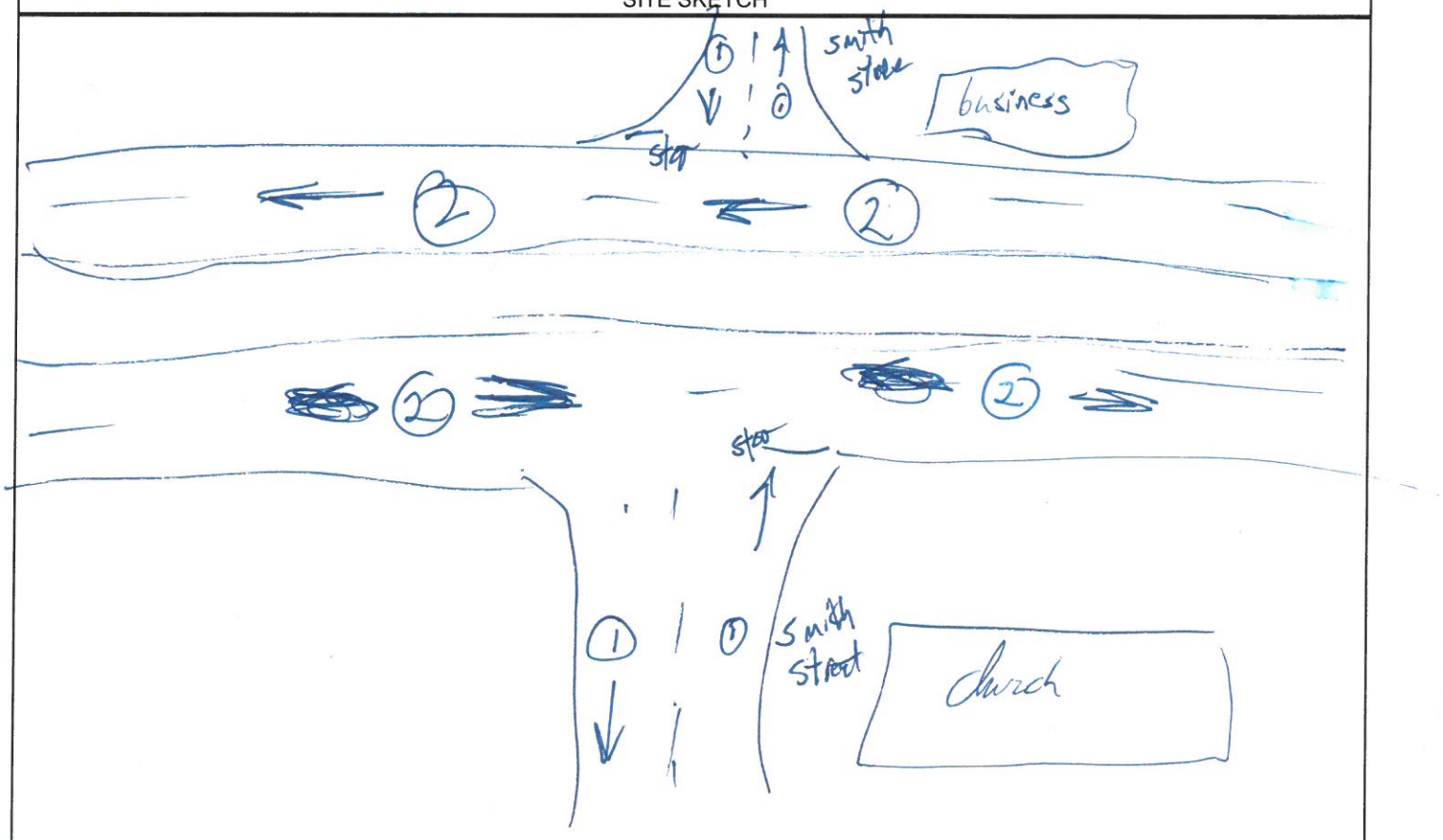
START: 1919

END: 19:34

LEQ: 65.9

SPEED: 35

SITE SKETCH



BACKGROUND NOISE N/A

MAJOR SOURCES SHS

UNUSUAL EVENTS car blasting stereo 19:27

OTHER NOTES ____

NOISE SURVEY SHEET

EQUIPMENT: METER Norsonics 132 CALIBRATOR EXTECH 407744

CALIBRATION: START _____ dB END _____ dB

RESPONSE: FAST _____ SLOW X A-WEIGHTING X BATTERY CHECK X

WEATHER DATA: PC 90° <5 mph

TRAFFIC DATA		
ROAD		
AUTOS		
MED TRKS		
HVY TRKS		
DURATION		

DATE: 6/18/19

SITE #: N-5

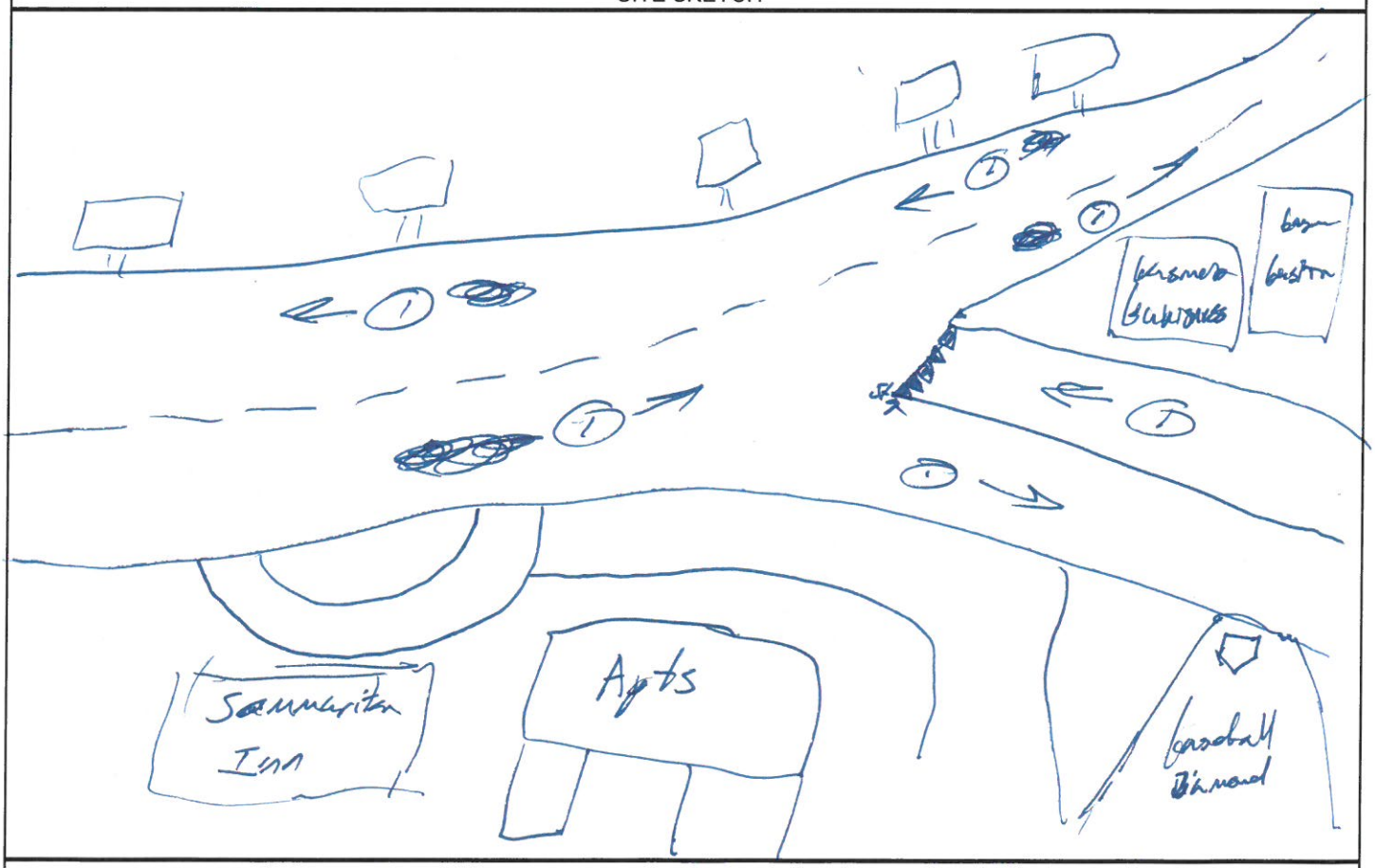
START: 18:50

END: 19:05

LEQ: 63.6

SPEED: 50 mph

SITE SKETCH



BACKGROUND NOISE Ast A/C compressor

MAJOR SOURCES SH-5

UNUSUAL EVENTS car honk exchange between cars (19:01)

OTHER NOTES N/A

NOISE SURVEY SHEET

EQUIPMENT: METER Norsonics 132 CALIBRATOR EXTECH 407744

CALIBRATION: START 93.8 dB END 94 dB

RESPONSE: FAST ____ SLOW X A-WEIGHTING X BATTERY CHECK X

WEATHER DATA: ~~clear~~ partly cloudy, 90°F, < 5mph

TRAFFIC DATA		
ROAD		
AUTOS		
MED TRKS		
HVY TRKS		
DURATION		

DATE: 6/18/19

SITE #: ~~N-2~~ N-6

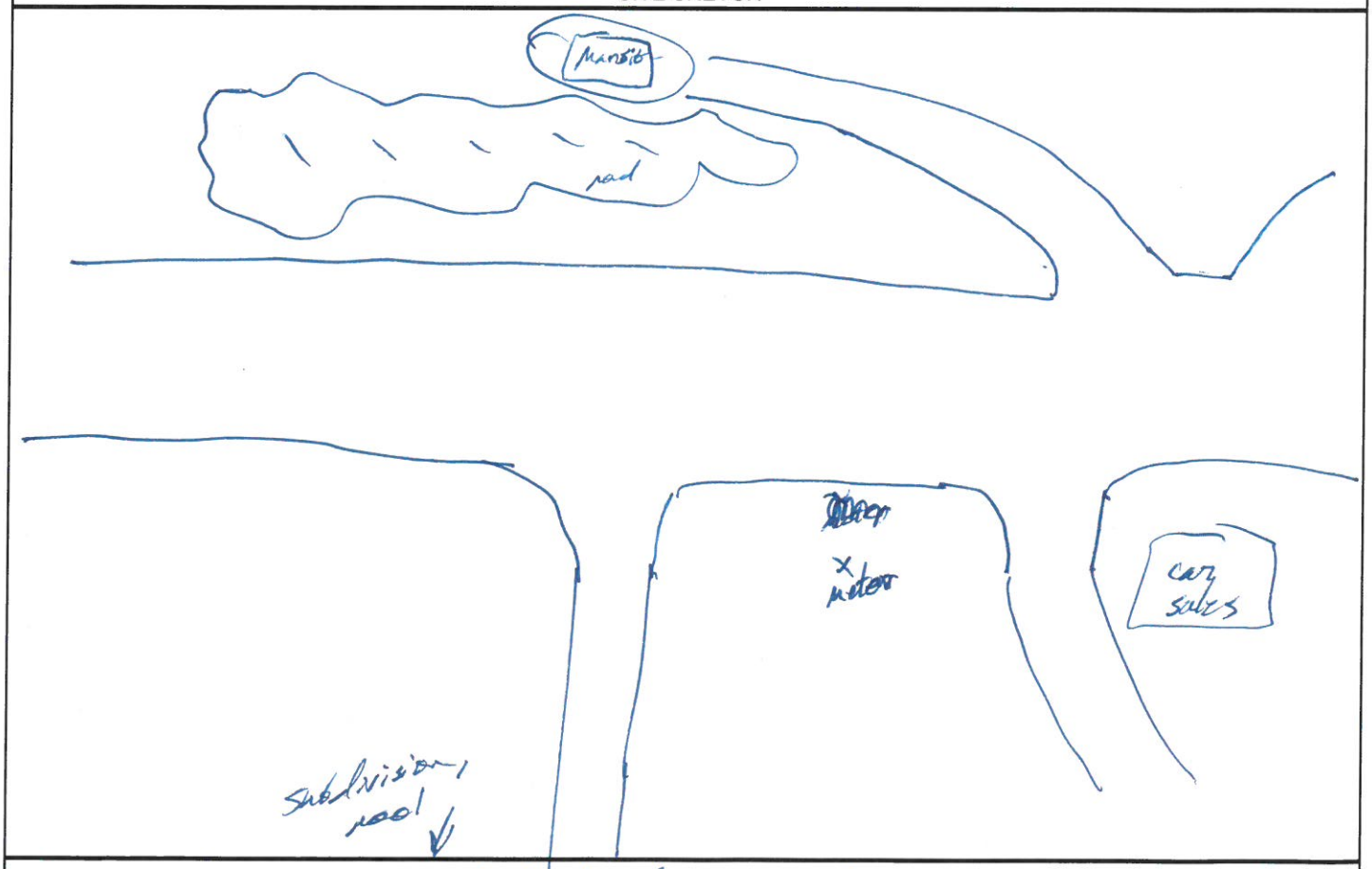
START: 18:22

END: 18:37

LEQ: 63.1

SPEED: 55

SITE SKETCH



BACKGROUND NOISE Neighborhood pool, construction at mansion

MAJOR SOURCES SHS

UNUSUAL EVENTS NA

OTHER NOTES NA