Traffic Noise Analysis Report

RM 2871 Widening Project

CSJ: 2855-01-022
Fort Worth

July 2023

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.

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This technical report identifies and assesses traffic noise impacts associated with the proposed reconstruction and improvements of Ranch-to-Market (RM) 2871, including widening the existing roadway to a 4-lane divided urban roadway with a 6-foot to 18-foot wide raised-curb median from US 377 in the City of Benbrook north to I-30 in the City of Fort Worth for approximately 5.12 miles along RM 2871. Additional improvements being evaluated include an overpass bridge of RM 2871 over the Union Pacific Railroad (UPRR) and Aledo Road. The proposed project would enhance safety and mobility. The proposed project is considered a Type I project due to the addition of through-traffic lanes; requiring a traffic noise analysis per 23 CFR 772.7.

Introduction

This analysis was accomplished in accordance with TxDOT's (FHWA-approved) Traffic Noise Policy (2019).

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 would occur.

Table 1. FHWA Noise Abatement Criteria (NAC)

Activity Category	FHWA (dB(A) Leq)	Description of Land Use Activity Areas
A	57 (exterior)	Lands on which serenity and quiet are of extra-ordinary 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.

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

Absolute criterion - The predicted noise level at a receptor 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 receptor 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 action taken to reduce the impact of traffic noise on an activity area.

Analysis

The FHWA traffic noise modeling software (TNM 2.5) 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.

A detailed map of the project location is included in **Attachment A, Figure 1.** The approved traffic data used in this analysis is included in **Attachment B**.

The project consists of reconstructing and widening the existing roadway to a 4-lane divided urban roadway with a 6-foot to 18-foot wide raised-curb median from US 377 in the City of Benbrook north to I-30 in the City of Fort Worth along RM 2871.

Validation

A validation study was performed in order to ensure that traffic noise is the main source of noise and to verify that the existing model accurately predicts existing traffic noise based on current conditions. Model validation compares field-collected sound level measurements to traffic noise levels calculated in an existing condition model that used field-collected traffic parameters. Differences between the measured and calculated levels for this project were within the +/- 3 dB(A) tolerance allowed by FHWA. Therefore, the existing noise model is considered validated for this project. Additional information on the validation study is included in **Attachment C.**

Results

Existing and predicted traffic noise levels were modeled at receiver locations (**Table 2** and **Figure 2**) 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.

Table 2. Traffic Noise Levels dB(A) Leq

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2045	Change (+/-)	Noise Impact (Yes/No)
R1 Benbrook Middle-High School Field Stands	C	67	57	58	+1	No
R2 Benbrook Middle-High School	C	67	52	55	+3	No
R3 Restoration Family Church Playground	C	67	53	56	+3	No
R4 Pebbelstone 1	B	67	61	63	+2	No
R5 Pebbelstone 2	B	67	60	63	+3	No
R6 Pebbelstone 3	B	67	60	63	+3	No
R7 Pebbelstone 4	B	67	60	63	+3	No
R8 Pebbelstone 5	B	67	60	63	+3	No
R9 Pebbelstone 6	B	67	61	62	+1	No
R10 Pebbelstone 7	B	67	61	62	+1	No
R11 Pebbelstone 8	B	67	62	62	0	No

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2045	Change (+/-)	Noise Impact (Yes/No)
R12 Pebbelstone 9	B	67	62	62	0	No
R13 Pebbelstone 10	B	67	61	62	+1	No
R14 Pebbelstone 11	B	67	62	62	0	No
R15 Westpark Elm Playground	C	67	51	53	+2	No
R16 Trevino Ln 1	B	67	58	59	+1	No
R17 Pebbelstone 12	B	67	60	61	+1	No
R18 Pebbelstone 13	B	67	60	62	+2	No
R19 Pebbelstone 14	B	67	60	63	+3	No
R20 Trevino Ln 2	B	67	55	57	+2	No
R21 Hogan Dr 1	B	67	55	58	+3	No
R22 Pebbelstone 15	B	67	59	62	+3	No
R23 Pebbelstone 16	B	67	60	63	+3	No
R24 Pebbelstone 17	B	67	61	63	+2	No
R25 Pebbelstone 18	B	67	58	61	+3	No
R26 Hogan Dr 2	B	67	55	58	+3	No
R27 Nelson Dr 1	B	67	55	57	+2	No
R28 Regent Row 1	B	67	60	62	+2	No
R29 Regent Row 2	B	67	61	63	+2	No
R30 Nelson Dr 2	B	67	56	57	+1	No
R31 January Cir 1	B	67	56	57	+1	No
R32 Regent Row 3	B	67	62	64	+2	No
R33 Regent Row 4	B	67	61	63	+2	No
R34 Wandering Way 1	B	67	62	65	+3	No
R35 Wandering Way 2	B	67	61	64	+3	No
R36 January Cir 2	B	67	55	58	+3	No

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2045	Change (+/-)	Noise Impact (Yes/No)
R37 Barber Ln 1	B	67	54	57	+3	No
R38 Wandering Way 3	B	67	61	64	+3	No
R39 Wandering Way 4	B	67	59	61	+2	No
R40 Barber Ln 2	B	67	55	58	+3	No
R41 Rolling Hills Dr	B	67	59	62	+3	No
R42 Trinity Hills Baptist Ch Playground	C	67	55	59	+4	No
R43 Fieldcrest Dr 1	B	67	59	62	+3	No
R44 Fieldcrest Dr 2	B	67	61	63	+2	No
R45 Fieldcrest Dr 3	B	67	61	62	+1	No
R46 Fieldcrest Dr 4	B	67	61	62	+1	No
R47 Fieldcrest Dr 5	B	67	61	64	+3	No
R48 Fieldcrest Dr 6	B	67	61	64	+3	No
R49 Tabernacle of Praise Playground	C	67	50	55	+5	No
R50 Fieldcrest Dr 7	B	67	62	65	+3	No
R51 Fieldcrest Dr 8	B	67	61	65	+4	No
R52 Fieldcrest Dr 9	B	67	62	65	+3	No
R53 Fieldcrest Dr 10	B	67	61	65	+4	No
R54 Fieldcrest Dr 11	B	67	61	65	+4	No
R55 High Ridge Church Playground	C	67	54	59	+5	No
R56 Concho Valley Trail 1	B	67	53	63	+10	**Yes**
R57 Concho Valley Trail 2	B	67	53	61	+8	No
R58 Aledo Rd	B	67	51	59	+8	No
R59 Westridge	B	67	55	60	+5	No
R60 Terroir Dr 8	B	67	47	52	+5	No

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2045	Change (+/-)	Noise Impact (Yes/No)
R61 Terroir Dr 7	B	67	48	53	+5	No
R62 Terroir Dr 6	B	67	48	53	+5	No
R63 Terroir Dr 5	B	67	49	55	+6	No
R64 Terroir Dr 4	B	67	50	56	+6	No
R65 Terroir Dr 3	B	67	49	55	+6	No
R66 SFH RM 2871 1	B	67	46	50	+4	No
R67 Terroir Dr 2	B	67	49	55	+6	No
R68 Terroir Dr 1	B	67	49	55	+6	No
R69 Loire Vly Trl 2	B	67	56	60	+4	No
R70 Bois d'arc Court	B	67	60	62	+2	No
R71 Creekside Dr 1	B	67	58	62	+4	No
R72 Loire Vly Trl 1	B	67	54	58	+4	No
R73 Creekside Dr 2	B	67	55	58	+3	No
R74 Church of the Holy Apostles Court Yard	C	67	57	61	+4	No
R75 SFH RM 2871 2	B	67	57	59	+2	No
R76 Fairland St S	B	67	58	60	+2	No
R77 Fairland St N	B	67	57	60	+3	No
R78 Maywood S	B	67	58	61	+3	No
R79 Maywood N	B	67	59	61	+2	No
R80 Longview Ave Baptist Church	C	67	60	61	+1	No
R81 SFH RM 2871 3	B	67	61	62	+1	No
R82 SFH RM 2871 4	B	67	65	67	+2	**Yes**
R83 Santa Paula	B	67	59	64	+5	No
R84 Antioch Christian Fellowship	C	67	53	58	+5	No

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2045	Change (+/-)	Noise Impact (Yes/No)
R85 Santa Monica	B	67	57	61	+4	No
R86 Santa Clara S	B	67	57	61	+4	No
R87 Santa Clara N	B	67	58	62	+4	No
R88 Hindu Temple of Greater Ft. Worth	C	67	52	55	+3	No
R89 All Saints Ep School	C	67	57	61	+4	No
R90 The Hills Church of Christ	C	67	60	62	+2	No

As indicated in **Table 2**, the proposed project would result in a traffic noise impact at one or more representative receiver locations.

Noise abatement measures were considered for each location with predicted noise impacts.

Abatement Analysis

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. Feasibility and reasonableness considerations include constructability, the predicted acoustic reductions provided by an abatement measure, a cost allowance, and whether the adjacent receptors desire abatement. Receptors associated with an abatement measure that achieves a noise reduction of five dB(A) or greater are called benefited receptors.

In order to be "feasible," the abatement measure must benefit a minimum of two impacted receptors AND reduce the predicted noise level by at least five dB(A) at greater than 50% of first-row impacted receptors.

In order to be "reasonable," the abatement measure must also reduce the predicted noise level by at least seven dB(A) for at least one benefited receptor (noise reduction design goal) and not exceed the standard barrier cost criteria per benefited receptor. In addition, an abatement measure may not be reasonable if the construction costs are unreasonably high due to site constraints, as determined through an alternate barrier cost assessment.

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.

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 barriers – Noise barriers in the form of noise walls are the most commonly used noise abatement measures and were considered for this project. Noise barriers were evaluated for each of the impacted receptor locations with the following results:

R56 - This receiver represents nine houses within a neighborhood, one of which has an increased noise level of 10 dB due to a new connecting roadway to the neighborhood. A noise barrier analysis was performed showing that only two of the nine first-row receivers benefitted from a greater than 5 dB(A) reduction, the reductions being 11 dB(A) and 6 dB(A). Noise abatement measures must potentially benefit a minimum of 50% of first-row receivers to get a 5 dB(A) reduction or more, thus noise abatement for this location is not feasible.

R82 - This receiver is a separate, isolated residence, which is not associated with a neighborhood or subdivision. Because a noise abatement measure must potentially benefit a minimum of two impacted receptors, noise abatement for this location is not feasible.

None of the above noise abatement measures would be both feasible and reasonable; therefore, no abatement measures are proposed for this project.

Noise Contours for Land Use Planning

To avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs must ensure, to the maximum extent possible, that no new activities are planned or constructed along or within the following predicted (2045) noise impact contours.

Table 3. Traffic Noise Contours

Land Use	Impact Contour	Distance from Right of Way
NAC category B & C (US 377 to Rolling Hills W)	66 dB(A)	90 ft
NAC category E (US 377 to Rolling Hills W)	71 dB(A)	20 ft
NAC category B & C (Rolling Hills W to Marywood)	66 dB(A)	70 ft
NAC category E (Rolling Hills W to Marywood)	71 dB(A)	20 ft
NAC category B & C (Marywood to I-30)	66 dB(A)	30 ft
NAC category E (Marywood to I-30)	71 dB(A)	Within Right-of-Way

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 receptors 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.

Local Official Notification and Date of Public Knowledge Statement

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

List of Attachments

A. Map figures

B. Traffic data

C. Existing model validation study

Attachment A

RM 2871 RECONSTRUCTION & WIDENING PROJECT

LOCATION MAP
CSJ: 2855-01-022
TARRANT COUNTY, TEXAS
FIGURE 1

Texas Department of Transportation

Project Area

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Date: 4/19/23

0 0.25 0.5 mi

RM 2871 RECONSTRUCTION & WIDENING PROJECT

LOCATION MAP
CSJ: 2855-01-022
TARRANT COUNTY, TEXAS
FIGURE 2 - SECTION 1

Texas Department of Transportation

0 250 500 ft

1:5,000
Created by: IDCUS
Date: 4/19/23

- Impacted Receiver
- Non-impacted Receiver
- Project Area

RM 2871 RECONSTRUCTION & WIDENING PROJECT

LOCATION MAP
CSJ: 2855-01-022
TARRANT COUNTY, TEXAS
FIGURE 2 - SECTION 2

Texas Department of Transportation

0 250 500 ft

1:5,000
Created by: IDCUS
Date: 4/19/23

- Impacted Receiver
- Non-impacted Receiver
- Project Area

RM 2871 RECONSTRUCTION & WIDENING PROJECT

LOCATION MAP
CSJ: 2855-01-022
TARRANT COUNTY, TEXAS
FIGURE 2 - SECTION 3

Texas Department of Transportation

0 250 500 ft

1:5,000
Created by: IDCUS
Date: 4/19/23

- Impacted Receiver
- Non-impacted Receiver
- Project Area

RM 2871 RECONSTRUCTION & WIDENING PROJECT

LOCATION MAP
CSJ: 2855-01-022
TARRANT COUNTY, TEXAS
FIGURE 2 - SECTION 4

Texas Department of Transportation

0 250 500 ft

1:5,000
Created by: IDCUS
Date: 4/19/23

- Impacted Receiver
- Non-impacted Receiver
- Project Area

RM 2871 RECONSTRUCTION & WIDENING PROJECT

LOCATION MAP
CSJ: 2855-01-022
TARRANT COUNTY, TEXAS
FIGURE 2 - SECTION 5

Texas Department of Transportation

0 250 500 ft

1:5,000
Created by: IDCUS
Date: 4/19/23

- Impacted Receiver
- Non-impacted Receiver
- Project Area

RM 2871 RECONSTRUCTION & WIDENING PROJECT

LOCATION MAP
CSJ: 2855-01-022
TARRANT COUNTY, TEXAS
FIGURE 2 - SECTION 6

Texas Department of Transportation

0 250 500 ft

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- Impacted Receiver
- Non-impacted Receiver
- Project Area

Attachment B

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MEMO

July 5, 2022

To: Carl L. Johnson, P.E., District Engineer
Attention: Ricardo Gonzalez, P.E., Director of TPD

Through: Roger A. Beall, P.E.
Deputy Director, TPP

DocuSigned by:
Roger A. Beall, P.E.
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From: Lee Theobald
Planner, TPP

Subject: Traffic Data
CSJ: 2855-01-022
RM 2871:
From I-30
To US 377
Tarrant County

Attached are diagrams depicting 2025, 2045 and 2055 average daily traffic volumes and turning movements on RM 2871 from I-30 to US 377 for no-build and build conditions. 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 three sections.

Section 1: From I-30 to I-20
Section 2: From I-20 to Veale Ranch Pkwy
Section 3: From Veale Ranch Pkwy to US 377

Please refer to your latest email dated June 22, 2022.

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

Attachments

CC: James Lance
Engineering Assistant, Fort Worth District
Design Division

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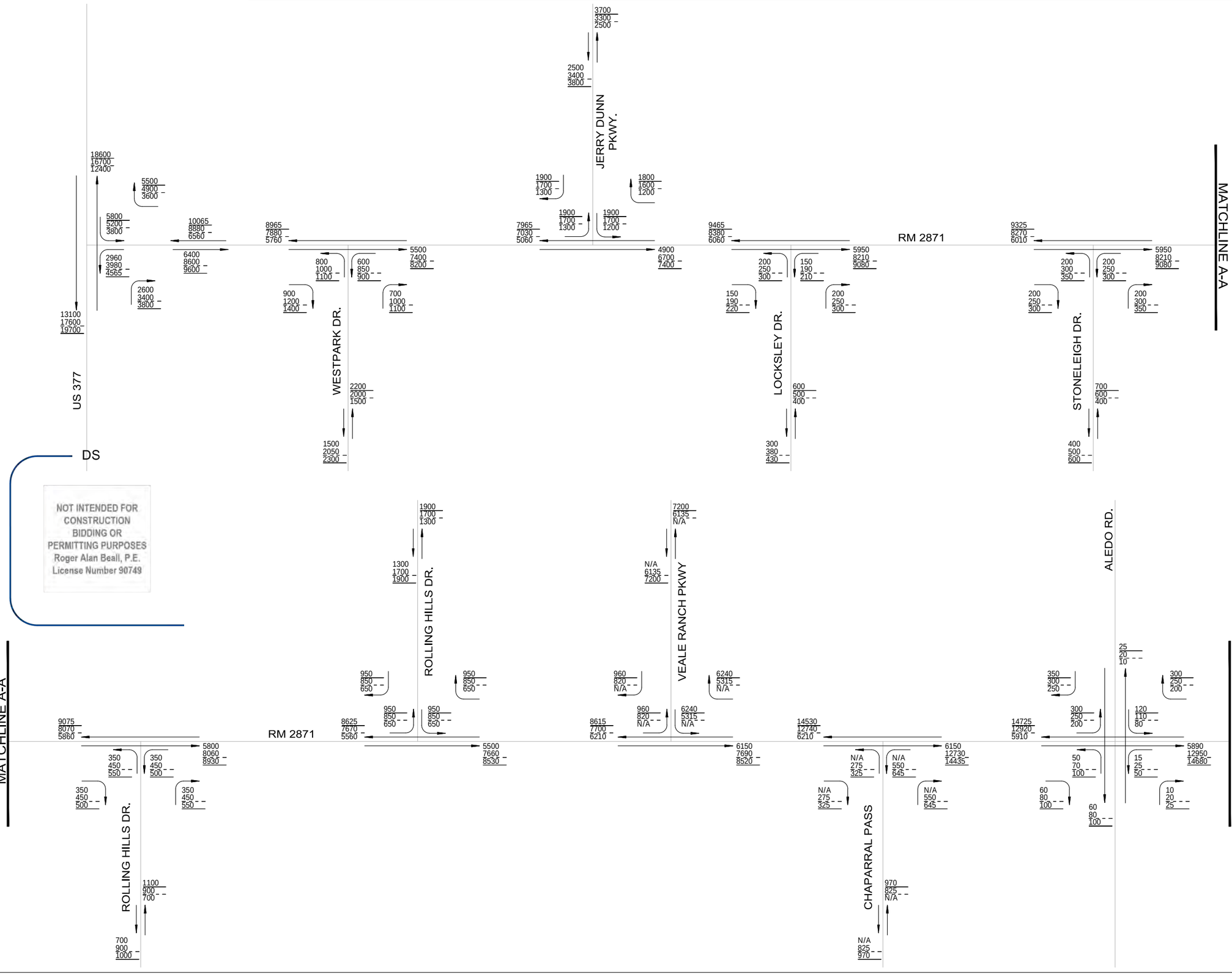

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Roger Alan Beall, P.E.
License Number 90749

LEGEND:
XXXX - 2025 VPD
XXXX - 2045 VPD
XXXX - 2055 VPD

TRUCK PERCENTAGE	NB	SB
	9.20%	7.90%

DIRECTIONAL DISTRIBUTION	NB	SB
AM	60%	40%
PM	40%	60%

K FACTOR	11.10%

FOR REVIEW ONLY
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Engineer: THOMAS D. DUNCAN,P.E.
P.E. No.: 98353
Date: JUNE 15, 2022

RM 2871
NO-BUILD DESIGN YEAR DAILY VOLUMES

SCALE: N.T.S.

WALTER P MOORE
WALTER P. MOORE AND ASSOCIATES, INC.
1301 McKINNEY, SUITE 1100
HOUSTON, TEXAS 77010
Texas Firm Registration No. F-1856

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.	.	4

STATE	STATE DIST. NO.	COUNTY	
TEXAS	.	TARRANT	
CONT.	SECT	JOB	HIGHWAY NO.
.	.	.	RM 2871

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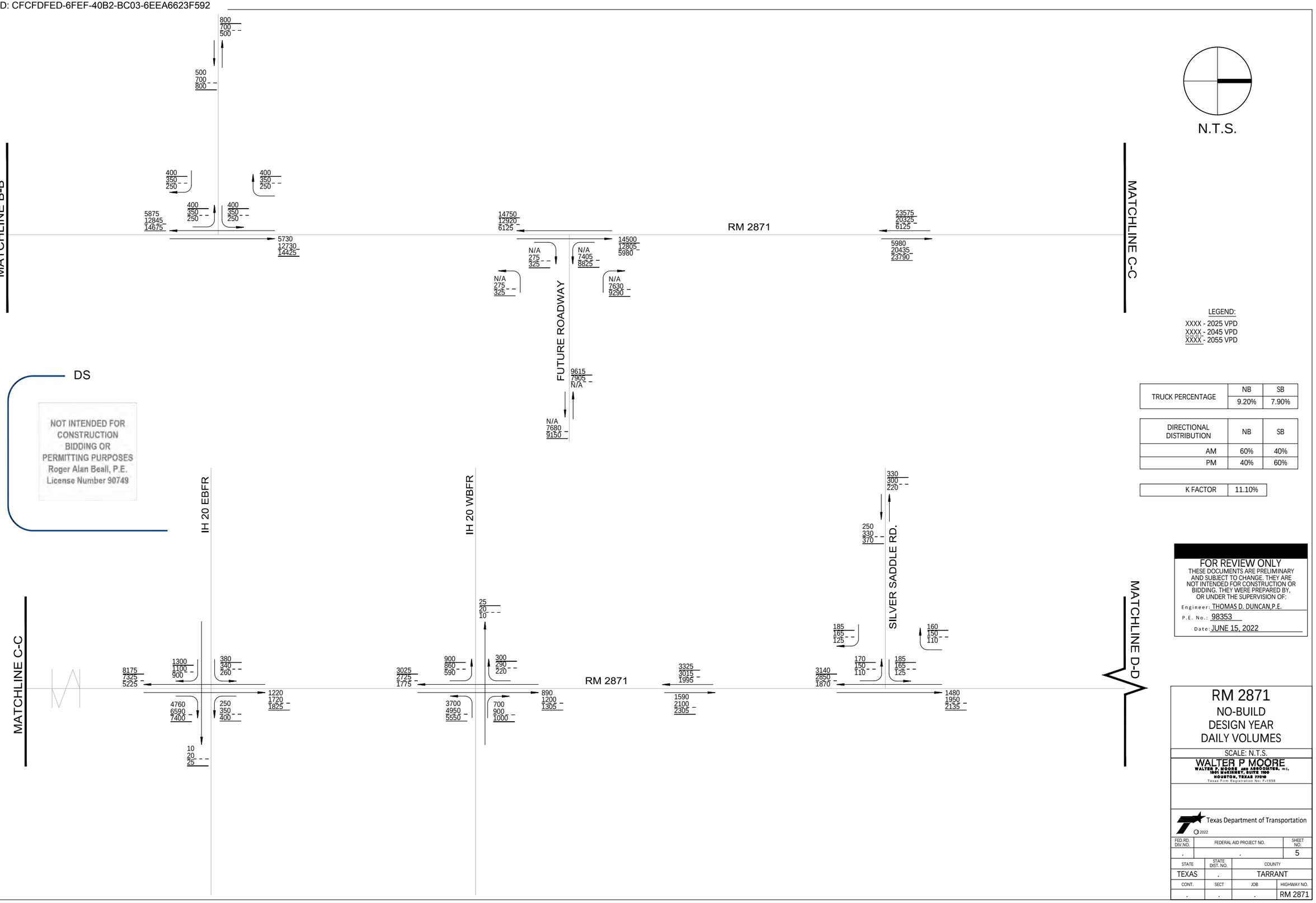

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XXXX - 2025 VPD
XXXX - 2045 VPD
XXXX - 2055 VPD

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RM 2871
NO-BUILD DESIGN YEAR DAILY VOLUMES

SCALE: N.T.S.

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STATE	STATE DIST. NO.	COUNTY	
TEXAS	.	TARRANT	
CONT.	SECT	JOB	HIGHWAY NO.
.	.	.	RM 2871

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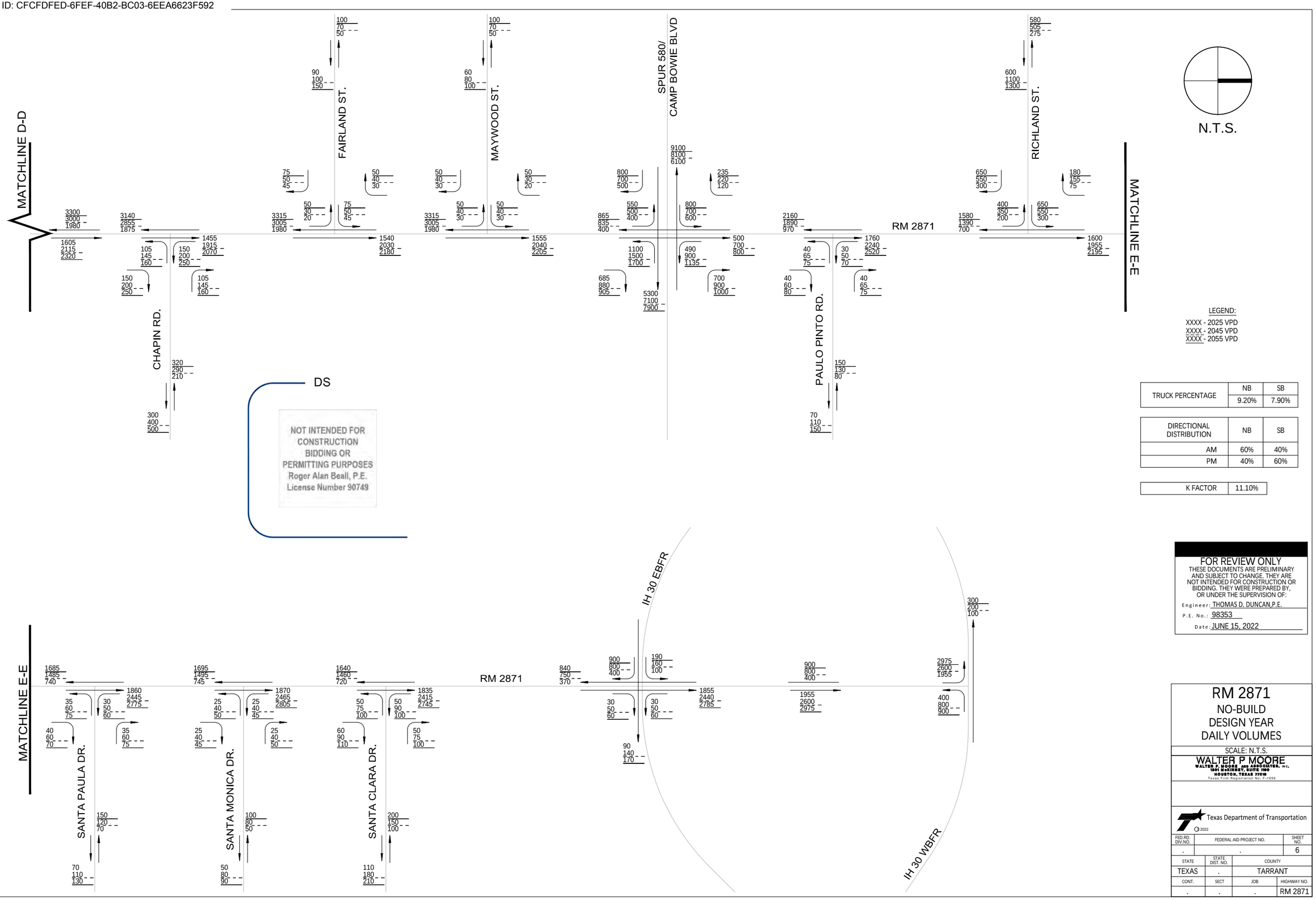

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LEGEND:
XXXX - 2025 VPD
XXXX - 2045 VPD
XXXX - 2055 VPD

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P.E. No.: 98353
Date: JUNE 15, 2022

RM 2871
NO-BUILD DESIGN YEAR DAILY VOLUMES

SCALE: N.T.S.

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.	.		6
STATE	STATE DIST. NO.	COUNTY	
TEXAS	.	TARRANT	
CONT.	SECT	JOB	HIGHWAY NO.
.	.	.	RM 2871

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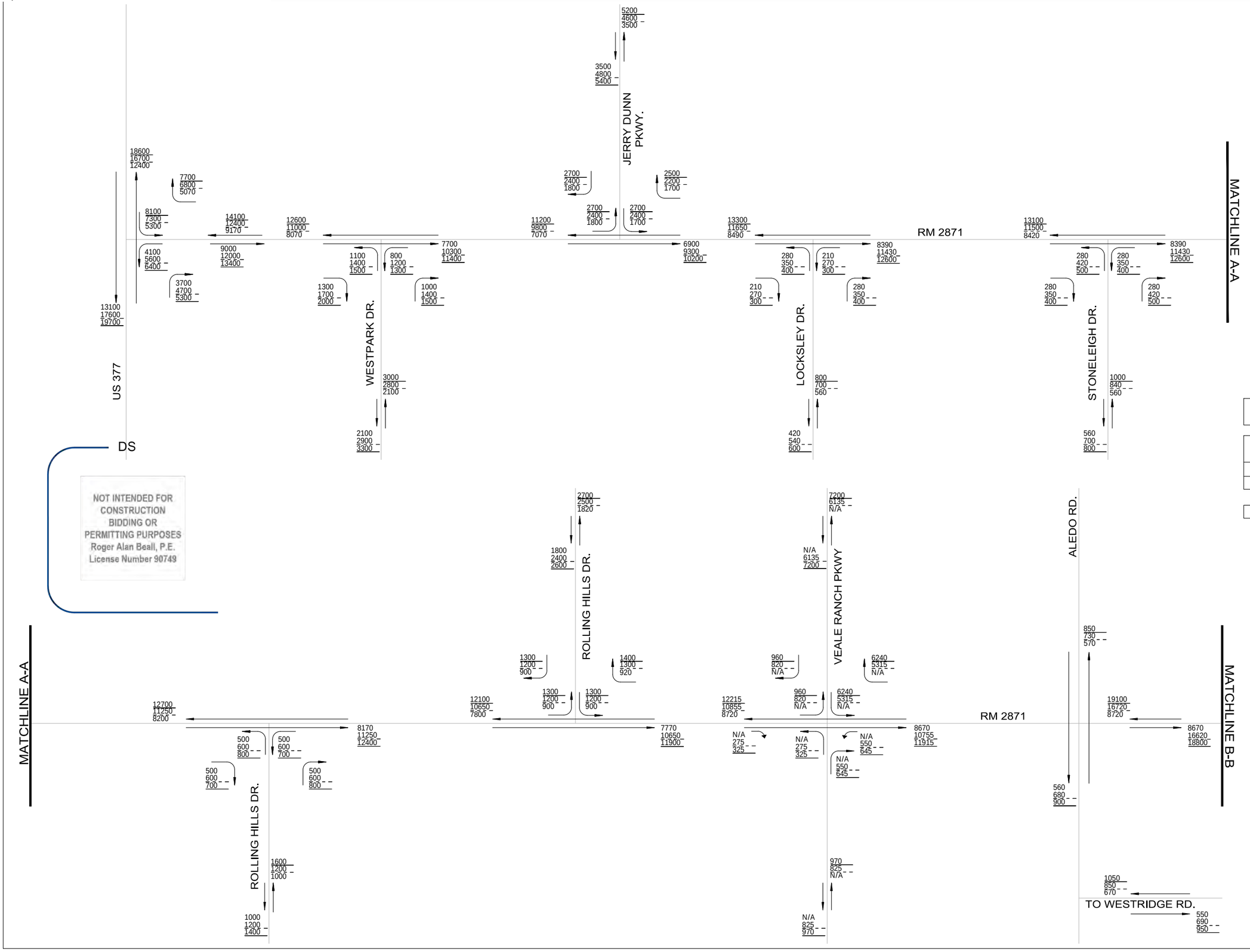

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Engineer: THOMAS D. DUNCAN,P.E.
P.E. No.: 98353
Date: JUNE 21, 2022

RM 2871
PROPOSED DESIGN YEAR DAILY VOLUMES

SCALE: N.T.S.

WALTER P MOORE
WALTER P. MOORE AND ASSOCIATES, INC.
1301 McKINNEY, SUITE 1100
HOUSTON, TEXAS 77010
Texas Firm Registration No. F-1856

Texas Department of Transportation
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FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.	SHEET NO.
.	.	7

STATE	STATE DIST. NO.	COUNTY	
TEXAS	.	TARRANT	
CONT.	SECT	JOB	HIGHWAY NO.
.	.	.	RM 2871

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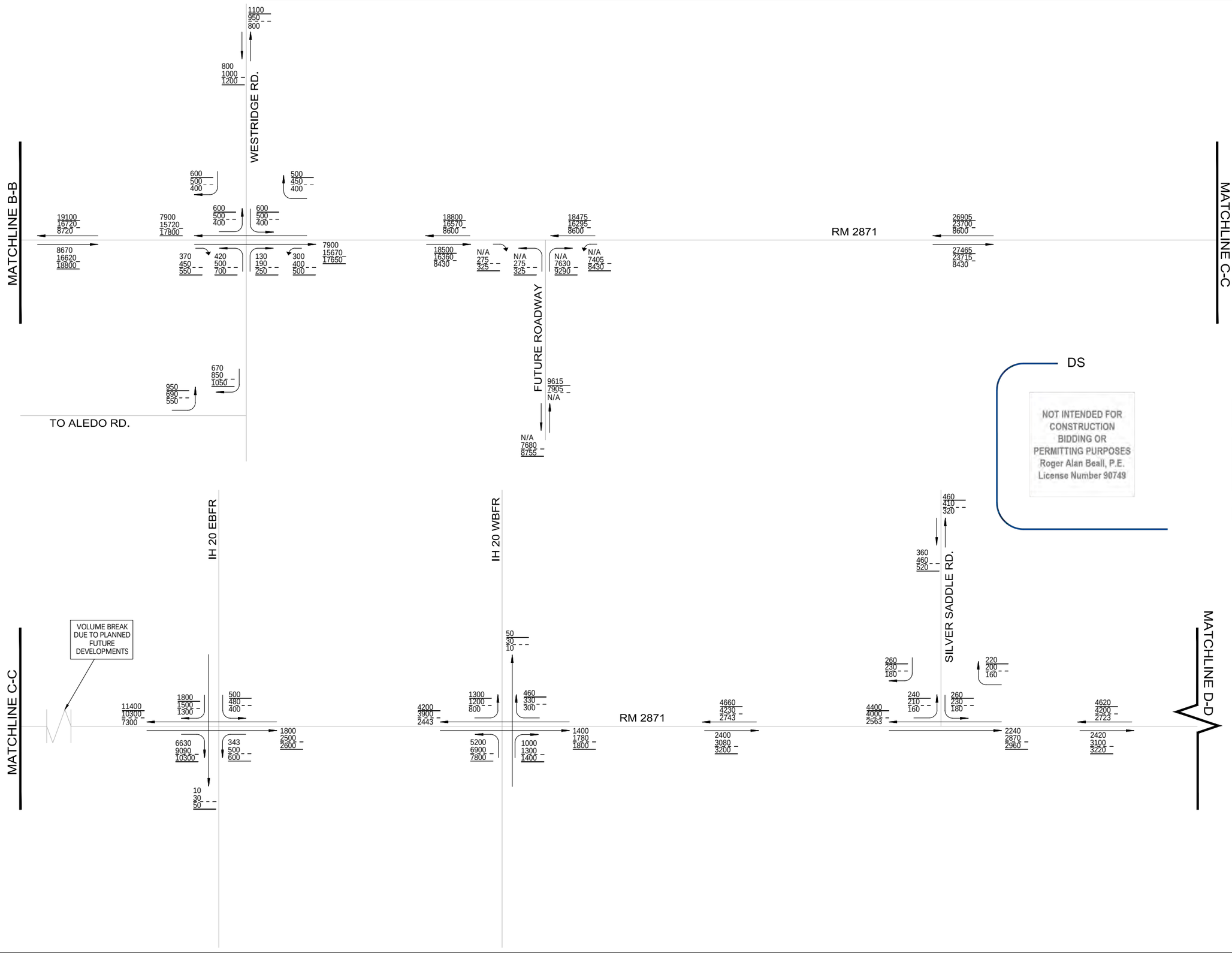

TRUCK PERCENTAGE	NB	SB
	9.20%	7.90%

DIRECTIONAL DISTRIBUTION	NB	SB
AM	60%	40%
PM	40%	60%

K FACTOR	11.10%

FOR REVIEW ONLY
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Engineer: THOMAS D. DUNCAN,P.E.
P.E. No.: 98353
Date: JUNE 21, 2022

RM 2871
PROPOSED DESIGN YEAR DAILY VOLUMES

SCALE: N.T.S.

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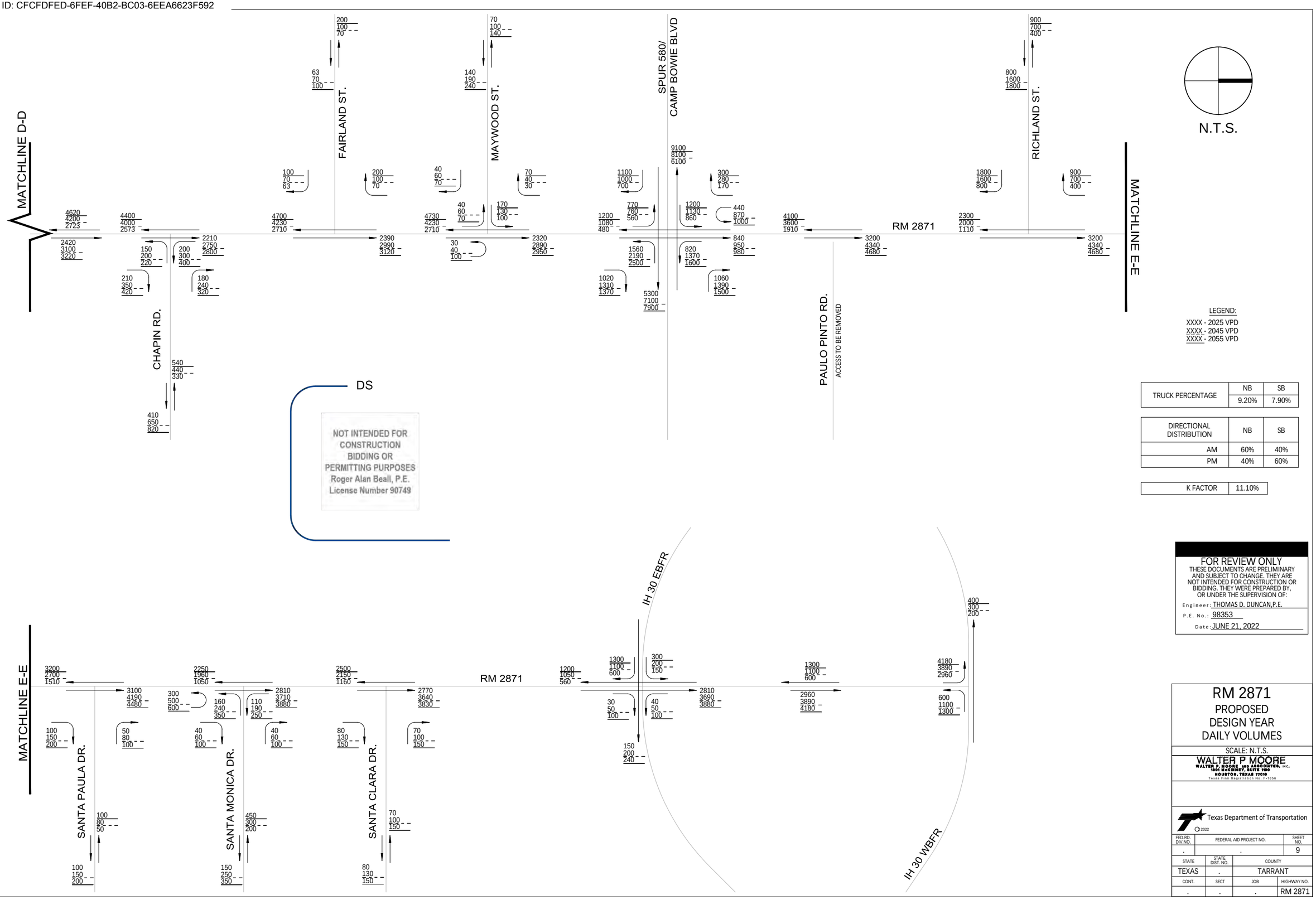

TRUCK PERCENTAGE	NB	SB
	9.20%	7.90%

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License Number 90749

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FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		SHEET NO.
.	.		9
STATE	STATE DIST. NO.	COUNTY	
TEXAS	.	TARRANT	
CONT.	SECT	JOB	HIGHWAY NO.
.	.	.	RM 2871

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TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Fort Worth District **June 28, 2022**

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
RM 2871 (No-Build) Section 1 From I-30 To I-20 Tarrant County	3,595	5,125	58 - 42	12.5	5.1	3.8	10,100	40	450,000	3	490,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	94.9	96.2
Medium Duty	4.1	3.1
Heavy Duty	1.0	0.7

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
RM 2871 (No-Build) Section 1 From I-30 To I-20 Tarrant County	3,595	5,620	58 - 42	12.5	5.1	3.8	10,100	30	713,500	3	777,000	8"

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RM 2871 (No-Build) Section 2 From I-20 To Veale Ranch Pkwy Tarrant County	12,105	40,760	58 - 42	12.5	3.8	2.9	11,100	20	2,048,500	3	2,224,500	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	96.2	97.1
Medium Duty	3.0	2.3
Heavy Duty	0.8	0.6

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	SN	Rigid Pavement	SLAB
RM 2871 (No-Build) Section 2 From I-20 To Veale Ranch Pkwy Tarrant County	12,105	47,365	58 - 42	12.5	3.8	2.9	11,200	20	3,457,000	3	3,754,000	8"

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Fort Worth District **June 28, 2022**

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
RM 2871 (No-Build) Section 3 From Veale Ranch Pkwy To US 377 Tarrant County	12,960	17,480	58 - 42	12.5	3.7	2.8	10,900	20	1,149,500	3	1,247,500	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	96.3	97.2
Medium Duty	2.9	2.2
Heavy Duty	0.8	0.6

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
RM 2871 (No-Build) Section 3 From Veale Ranch Pkwy To US 377 Tarrant County	12,960	19,665	58 - 42	12.5	3.7	2.8	10,900	20	1,848,000	3	2,006,000	8"

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Fort Worth District **June 28, 2022**

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
RM 2871 (Build Condition) Section 1 From I-30 To I-20 Tarrant County	5,170	7,320	58 - 42	12.5	5.6	4.2	10,400	30	706,500	3	770,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	94.4	95.8
Medium Duty	4.5	3.4
Heavy Duty	1.1	0.8

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
RM 2871 (Build Condition) Section 1 From I-30 To I-20 Tarrant County	5,170	8,020	58 - 42	12.5	5.6	4.2	10,500	30	1,119,000	3	1,219,500	8"

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Fort Worth District **June 28, 2022**

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	SN	Rigid Pavement	SLAB
RM 2871 (Build Condition) Section 2 From I-20 To Veale Ranch Pkwy Tarrant County	17,030	47,415	58 - 42	12.5	3.3	2.5	11,200	20	2,178,500	3	2,361,500	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	96.7	97.5
Medium Duty	2.6	2.0
Heavy Duty	0.7	0.5

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	SN	Rigid Pavement	SLAB
RM 2871 (Build Condition) Section 2 From I-20 To Veale Ranch Pkwy Tarrant County	17,030	54,370	58 - 42	12.5	3.3	2.5	11,200	20	3,620,500	3	3,924,500	8"

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Fort Worth District **June 28, 2022**

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
RM 2871 (Build Condition) Section 3 From Veale Ranch Pkwy To US 377 Tarrant County	18,170	24,400	58 - 42	12.5	3.2	2.4	10,900	20	1,397,000	3	1,513,500	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	96.8	97.6
Medium Duty	2.5	1.9
Heavy Duty	0.7	0.5

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
RM 2871 (Build Condition) Section 3 From Veale Ranch Pkwy To US 377 Tarrant County	18,170	27,500	58 - 42	12.5	3.2	2.4	11,000	20	2,248,000	3	2,436,000	8"

DS

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Roger Alan Beall, P.E.
License Number 90749

Memo

From: IDCUS, Inc.

To: Project Team

Date: March 31, 2023

Re: **K-factor Discrepancy- CSJ 2855-01-022 : RM 2871 Widening Project**

The provided traffic volume diagrams for the RM 2871 had a K-factors of 11.1%. The traffic data sheets had a k-factor of 12.5%. Based on guidance received from TxDOT FTW District on August 23, 2022, the K-factor of 12.5% was used in all design hourly volume calculations for the traffic noise analysis.

Attachment C

Existing Model Validation Study
RM 2871 Widening Project
Tarrant County, Texas
CSJ: 2855-01-022

A validation study was performed in order to verify that the existing model accurately predicts existing traffic noise based on current conditions and to ensure that traffic noise is the main source of the noise. Model validation compares field-collected sound level measurements to traffic noise levels calculated in an existing condition model that uses field-collected traffic parameters.

Two validation sites were selected along the project right of way (see Attachment) after consultation with TxDOT Fort Worth District noise subject matter experts. Field measurements for Site 1 were collected on September 7, 2023, between 5:00 PM and 5:15 PM. The weather was mostly sunny, the temperature was 94º F, and 38% humidity. Field measurements for Site 2 were collected on September 8, 2023, between 9:04 AM and 9:19 AM. The weather was mostly sunny, the temperature was 76º F, and 77% humidity. During the measurements, traffic was free-flowing and traveling at a relatively constant speed. A TSI SoundPro DL 2 sound level meter was used to measure sound levels in dB(A) Leq. The sound level meter was positioned on a tripod with the microphone facing the roadway and set at a height of five feet. The meter was calibrated before and after measurements were taken.

Concurrently with the sound level measurement, traffic conditions for all existing travel lanes adjacent to the noise meter were video recorded.

Upon return from the field, field data were reviewed to obtain traffic counts by vehicle classification (car, medium truck, heavy truck, bus, and motorcycle). Because the noise modeling software uses a vehicle per hour input, vehicle counts for the 15-minute measurement interval were multiplied by four to convert the values to the hourly condition.

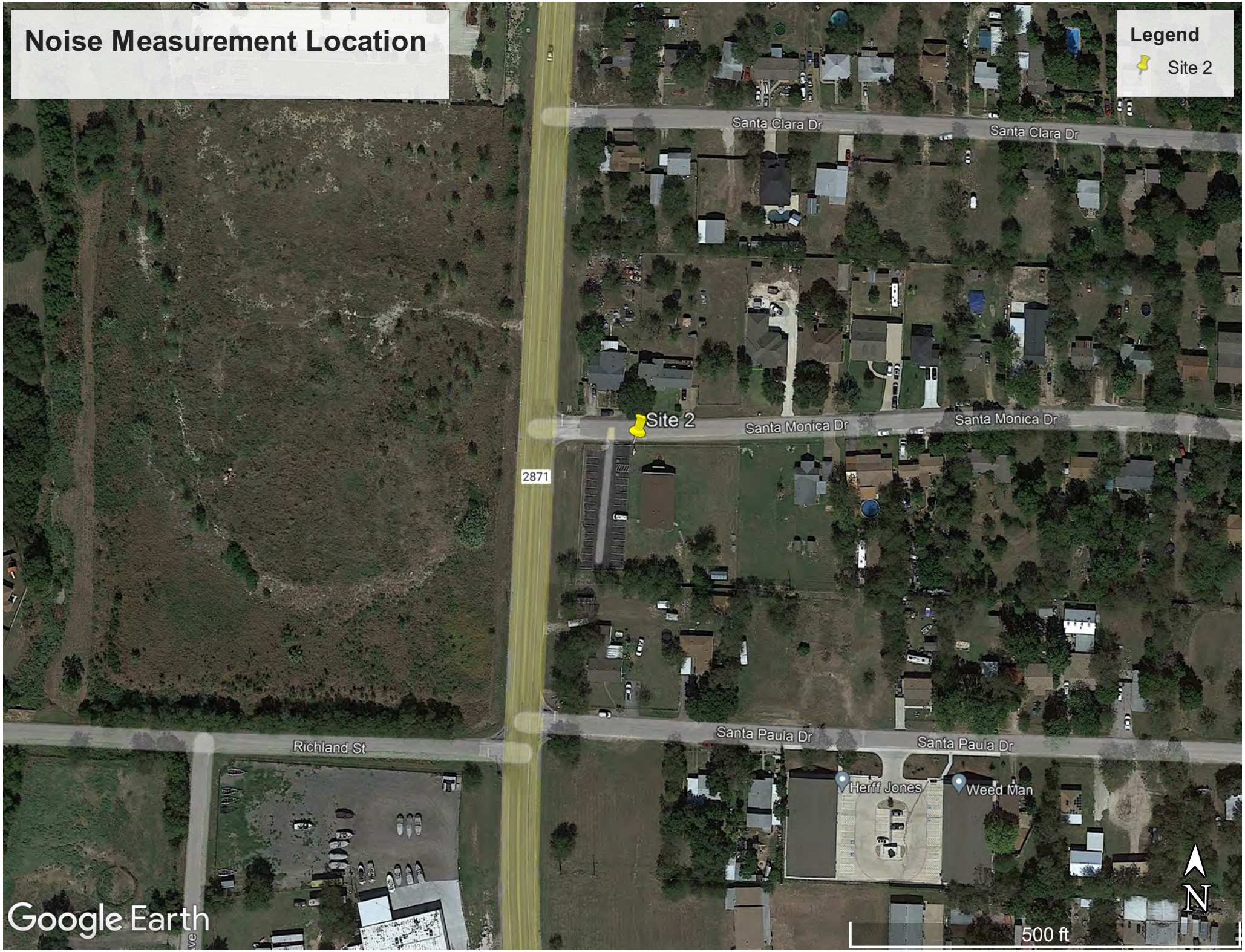
The FHWA traffic noise modeling software (TNM 2.5) was used to calculate existing traffic noise levels at the validation locations, based on the field-observed conditions. The validation model runs used the existing roadway parameters, observed hourly traffic counts, and observed speeds.

The traffic noise model validation results table:

Validation Site	Field-Measured Level Leq	Modeled Level Leq	Difference (+/-)	Validated?
Chapin Schl Rd by Church	57 dB(A)	60 dB(A)	+3 dB(A)	Yes
Santa Monica Rd by Church	56 dB(A)	58 dB(A)	+2 dB(A)	Yes

Differences between the measured and model-calculated sound levels were within the +/- 3 dB(A) tolerance allowed by FHWA. Therefore, the existing noise model is considered validated for this project.

Noise Measurement Location
Legend
Site 1
Encounter Church
Encounter Church FW Bishop Gary Oliver
2871
Rolling Hills Dr
Sorrel Ct
Chapin School Rd
Trinity Hills Baptist Church
Site 1
2871
Google Earth
N
400 ft


Noise Measurement Location
Legend
Site 2
Santa Clara Dr
Santa Clara Dr
Site 2
Santa Monica Dr
Santa Monica Dr
2871
Richland St
Santa Paula Dr
Santa Paula Dr
Herff Jones
Weed Man
N
500 ft
Google Earth