



Traffic Noise Technical Report

State Highway 123: From North of Cordova Road to IH 10

San Antonio District
Guadalupe County, Texas
CSJs: 0366-02-089
February 2022

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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1.0 ROADWAY NOISE IMPACT ANALYSIS

TxDOT is proposing to expand State Highway 123 (SH 123) from Cordova Road to Interstate 10 (I-10) in Guadalupe County, Texas. The proposed project would expand the existing roadway from two lanes to four 12-foot lanes with raised medians, five foot shoulders, a six foot shared-use path, and drainage ditches. The location of the proposed project can be seen in **Figure 1** in **Attachment A**.

This analysis was accomplished in accordance with TxDOT's (FHWA approved) Traffic Noise Toolkit, including Guidelines for Analysis and Abatement of Highway Traffic Noise (2011).

1.1 Characteristics of Noise

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.

As shown in **Table 1.1**, the FHWA has established the following Noise Abatement Criteria (NAC) for various land use activity areas that is used as one of two means to determine when a traffic noise impact would occur.

Table 1.1: 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 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, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or non-profit 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 non-profit 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 2019

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 action taken to reduce the impact of traffic noise on an activity area.

1.2 Existing and Predicted Noise Levels

The FHWA Traffic Noise Model (TNM) 2.5 software 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 modelled at receptor locations (**Table 1.2** and **Figure 2** in **Attachment 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. The traffic data can be seen in **Attachment B**.

Table 1.2: Traffic Noise Levels within the Proposed Project Area

Representative Receiver	NAC Category	NAC Level	Existing 2019	Predicted 2039	Change (+/-)	Noise Impact
R1 Residential	B	67	72	73	+1	Yes
R2 Residential	B	67	66	68	+2	Yes
R3 Day Care Playground	C	67	59	61	+2	No
R4 Church Interior	D	52	41	43	+2	No
R5 Residential	B	67	65	65	0	No
R6 Hotel Pool	E	72	56	58	+2	No
R7 Hotel Pool	E	72	61	62	+1	No

Source: Jacobs 2021

As indicated in **Table 1.2**, the proposed project would result in a traffic noise impact 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.

Feasibility and reasonableness considerations include constructability, the acoustic reductions provided by an abatement measure, a cost allowance, and whether the adjacent receptors desire

abatement. Receptors associated with an abatement measure that achieve a noise reduction of five dB(A) or greater are called benefited receptors.

Before any abatement measure can be recommended for incorporation into the proposed 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 percent of impacted, first-row receivers by at least 5 dB(A); and to be “reasonable”, it must not exceed the cost-effectiveness criterion of \$25,000 (using a construction cost of \$18.00 per square foot) for each receiver that would benefit by a reduction of at least 5 dB(A) and the abatement measure must be able to reduce the noise level at least one impacted, first row receiver by at least 7 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 barriers - This is the most commonly used noise abatement measure. Noise barriers were evaluated for each of the impacted receiver locations. The results can be seen below.

1.2.1 Results of Noise Abatement Analysis

The noise analysis conducted for the proposed project included seven representative receivers. Five of the seven representative receivers did not have noise impacts. A noise barrier analysis was conducted for the two impacted representative receivers.

Noise Abatement Not Recommended:

Noise barriers would not be feasible and reasonable for any of the impacted receivers described below; therefore, no abatement measures are proposed for this project.

R1 – This receiver represents a single residence. A continuous noise barrier would restrict access to this residence. A gap in the noise barrier would satisfy access requirements. A split noise barrier

approximately 390 feet in length and 20 feet in height would reduce noise levels by at least 5 dB(A) for the residence but would not be sufficient to achieve the noise reduction goal of 7 dB(A). Therefore, a noise barrier is not proposed for this location.

R2 – This receiver represents a single residence. A continuous noise barrier approximately 288 feet in length and 20 feet in height would reduce noise levels by at least 5 dB(A) for the residence but would not be sufficient to achieve the noise reduction goal of 7 dB(A). Therefore, a noise barrier is not proposed for this location.

1.3 Noise Impact Contour Analysis

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, no new activities are planned or constructed along or within the predicted (2040) noise impact contours. Noise Impact contours can be seen in **Table 1.3**.

Table 1.3: Traffic Noise Impact Contours

Land Use	Contour Area	Impact Contour	Distance from Right-of-Way
NAC category B & C	Laubach Rd/Cordova Rd to FM 20	66 dB(A)	129'
NAC category E	Laubach Rd/Cordova Rd to FM 20	71 dB(A)	53'
NAC category B & C	FM 20 to FM 101	66 dB(A)	80'
NAC category E	FM 20 to FM 101	71 dB(A)	30'
NAC category B & C	FM 101 to Martindale Rd/Heideke St	66 dB(A)	82'
NAC category E	FM 101 to Martindale Rd/Heideke St	71 dB(A)	28'

Source: Jacobs 2021

1.4 Noise from Construction

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 are 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.

2.0 SUMMARY

The proposed project was determined to result in noise impacts. A total two (2) representative receivers would be expected to have a noise increase at or above the NAC for absolute or relative impacts; therefore, noise abatement was considered for the proposed project. No noise abatement measures, including noise barriers, were found to be feasible and reasonable for incorporation into the proposed project.

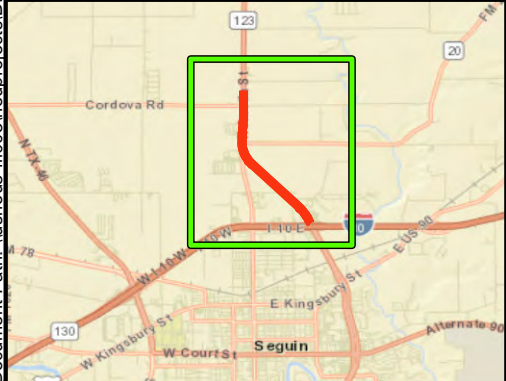
A copy of this traffic noise analysis will be available to local officials. On the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

LIST OF ATTACHMENTS

- A. Map Figures
 - Figure 1: Project Location Map
 - Figure 2: Noise Map
- B. Traffic Data

Attachment A: Map Figures

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PROJECT LOCATION MAP SH 123
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GUADALUPE COUNTY, TEXAS
 CSJ 0366-02-089
 From Cordova Road to I-10

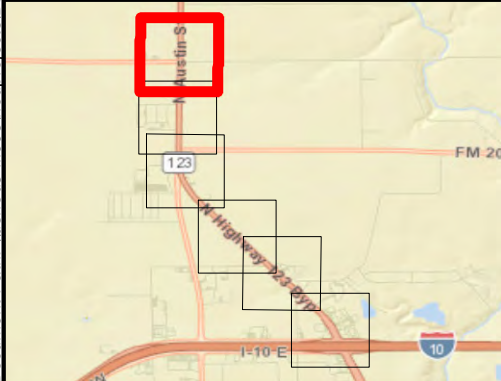
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 Project Alignment

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NOISE MAP
TEXAS DEPARTMENT OF TRANSPORTATION
GUADALUPE COUNTY, TEXAS
 CSJ 0366-02-089
 From Cordova Road to I-10

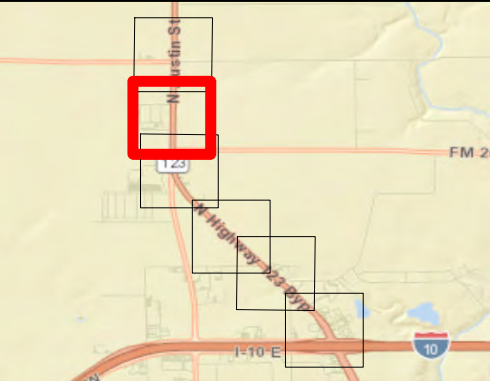
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 Page 1 of 6

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- - - - Existing ROW
- - - - Proposed ROW
- Proposed Design
- Impacted Receiver
- Non-Impacted Receiver








NOISE MAP
TEXAS DEPARTMENT OF TRANSPORTATION
GUADALUPE COUNTY, TEXAS
 CSJ 0366-02-089
 From Cordova Road to I-10

Figure No.: 2
 Project No.: WHXJ5502
 Page 2 of 6

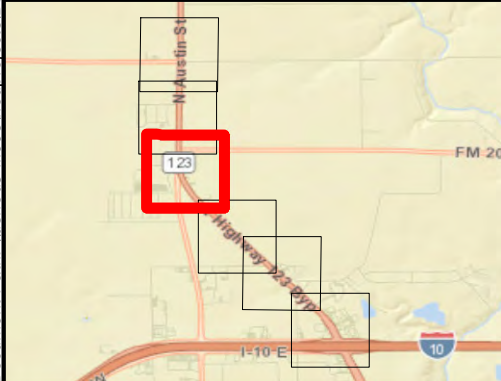
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 Existing ROW	 Impacted Receiver
 Proposed ROW	 Non-Impacted Receiver
 Proposed Design	

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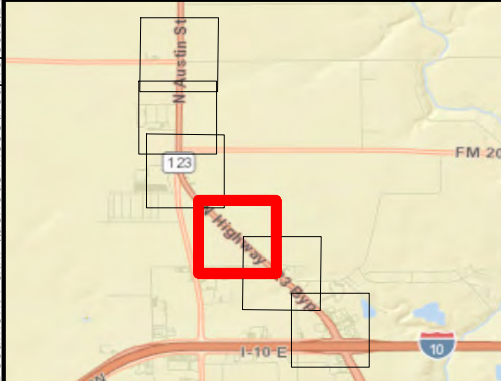
NOISE MAP
TEXAS DEPARTMENT OF TRANSPORTATION
GUADALUPE COUNTY, TEXAS
 CSJ 0366-02-089
 From Cordova Road to I-10

Figure No.: 2
 Project No.: WHXJ5502
 Page 3 of 6

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	Existing ROW
	Proposed ROW
	Proposed Design
	Impacted Receiver
	Non-Impacted Receiver

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NOISE MAP
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GUADALUPE COUNTY, TEXAS
 CSJ 0366-02-089
 From Cordova Road to I-10

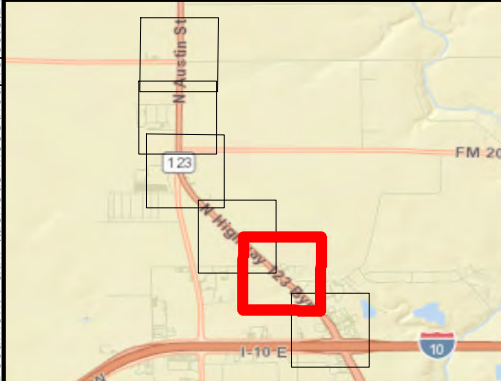
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 Page 4 of 6

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Legend

- - - Existing ROW
- - - Proposed ROW
- Proposed Design
- Impacted Receiver
- Non-Impacted Receiver

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NOISE MAP
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GUADALUPE COUNTY, TEXAS
 CSJ 0366-02-089
 From Cordova Road to I-10

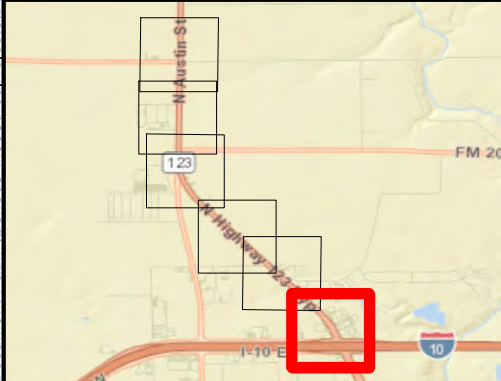
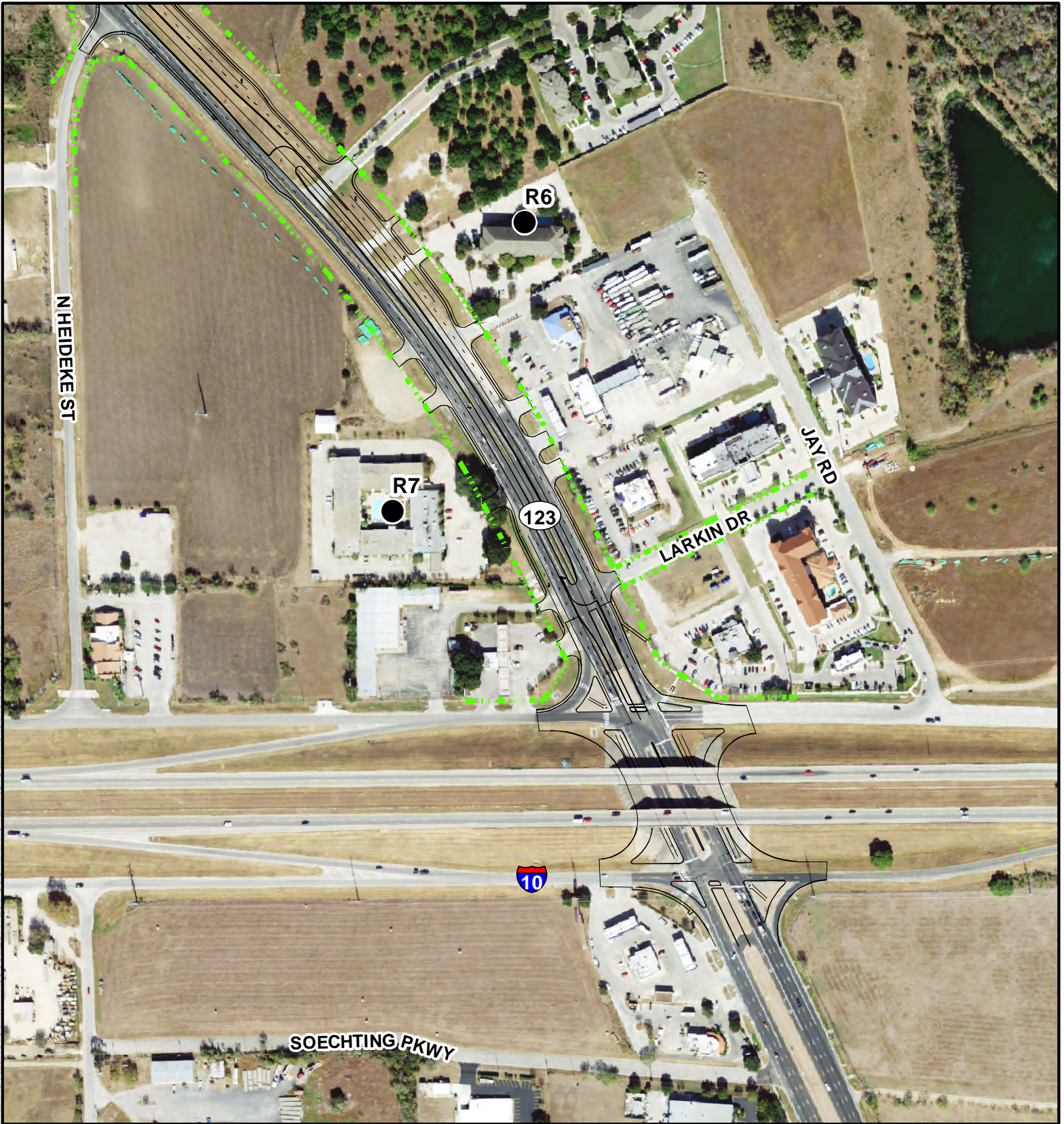
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 Page 5 of 6

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- Proposed Design
- Impacted Receiver
- Non-Impacted Receiver

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NOISE MAP
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GUADALUPE COUNTY, TEXAS
 CSJ 0366-02-089
 From Cordova Road to I-10

Figure No.: 2
 Project No.: WHXJ5502
 Page 6 of 6

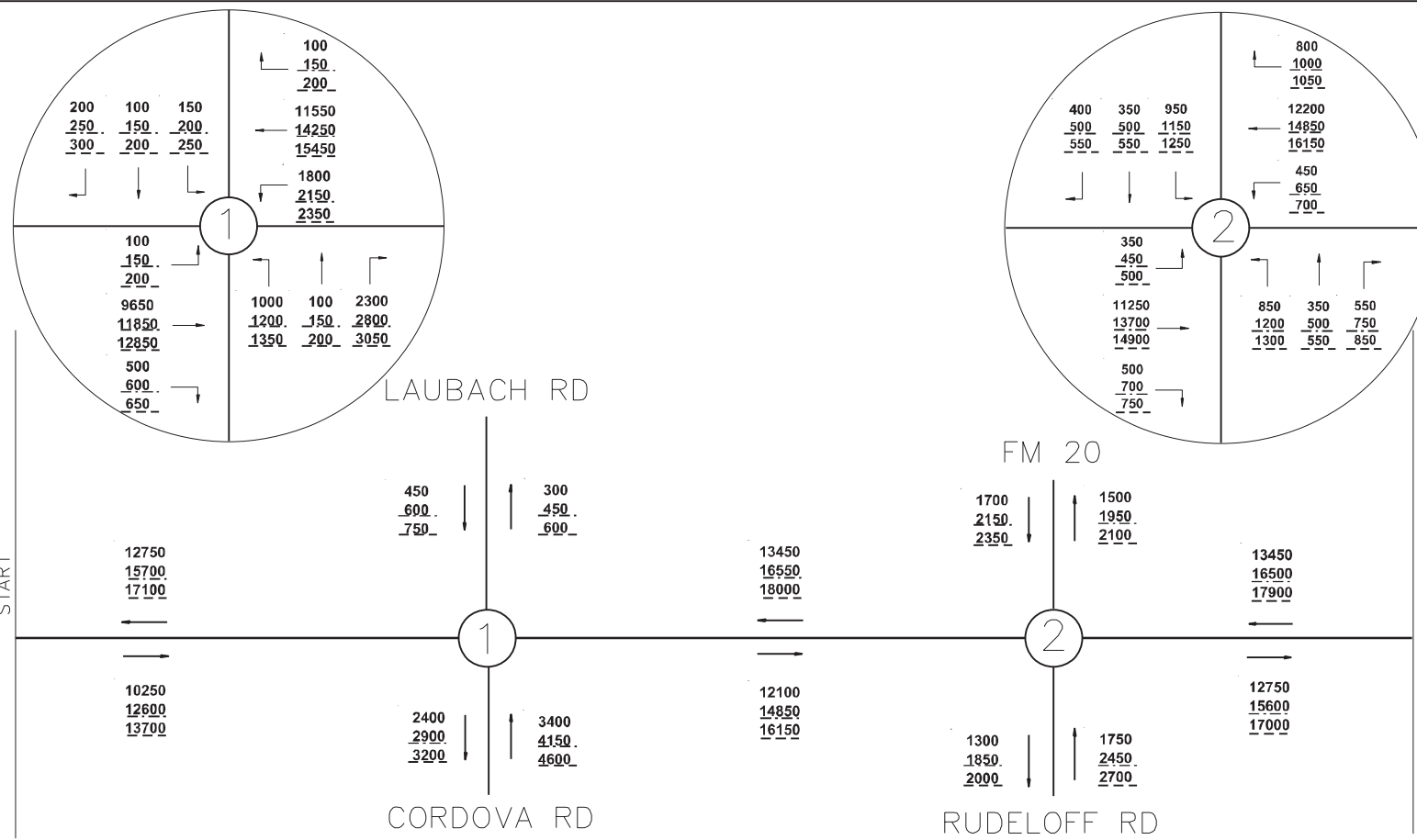
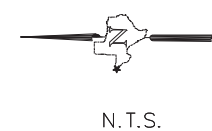
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Legend	
	Existing ROW
	Proposed ROW
	Proposed Design
	Impacted Receiver
	Non-Impacted Receiver

Attachment B: Traffic Data

Traffic Projections



LEGEND

→ = TRAVEL DIRECTION

- XX,XXX = YEAR 2027 DAILY TRAFFIC
- XX,XXX = YEAR 2047 DAILY TRAFFIC
- XX,XXX = YEAR 2057 DAILY TRAFFIC

FOR INTERIM REVIEW ONLY
NOT INTENDED FOR CONSTRUCTION
BIDDING OR PERMIT PURPOSES

JACOBS 911 CENTRAL PKWY, N. SUITE 425
SAN ANTONIO, TX 78238
Phone 210.494.0088
Firm Registration F-2966

Texas Department of Transportation
© 2018

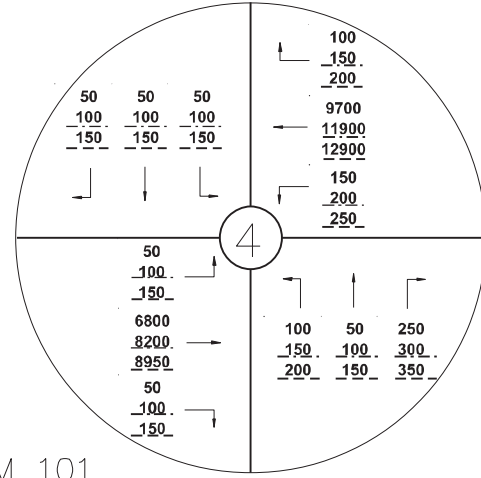
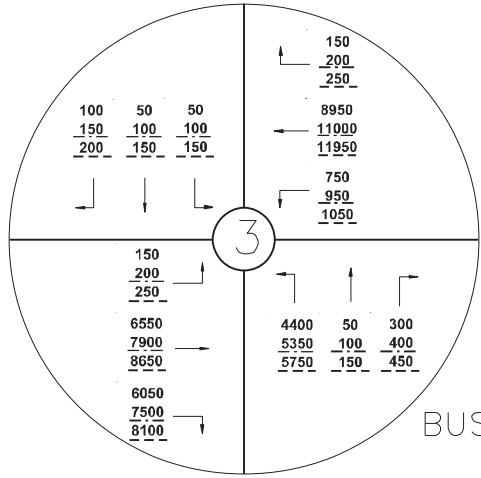
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TO IH 10)**

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CHECK PK	CONTROL	SECTION	1
	0366	02	089



N.T.S.



BUSINESS DRIVEWAY

FM 101 (STREPEL RD)



AUSTIN ST

FM 101 (STREPEL RD)

13450
16500
17900

12750
15600
17000

9850
12150
13250

6900
8400
9250

9950
12250
13350

7100
8600
9450

LEGEND

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- XX,XXX = YEAR 2027 DAILY TRAFFIC
- XX,XXX = YEAR 2047 DAILY TRAFFIC
- XX,XXX = YEAR 2057 DAILY TRAFFIC

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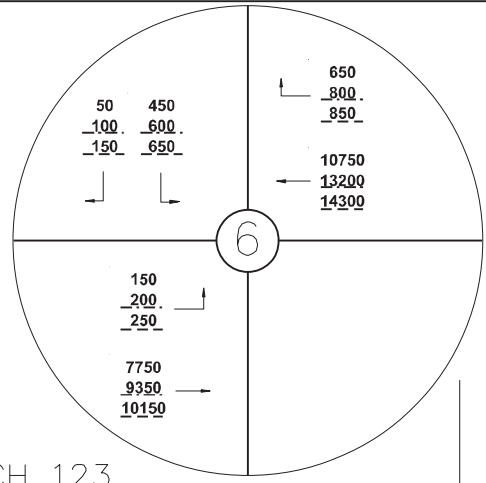
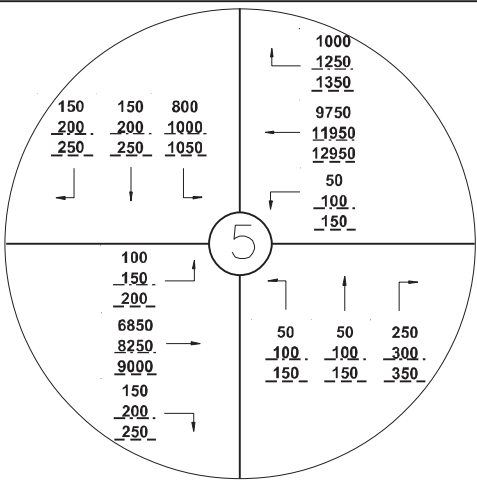
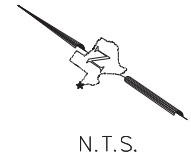
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TO IH 10)

SHEET 2 OF 5

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CHECK PK	0366	02	089	



E MARTINDALE RD

RANCH 123 APARTMENTS DRIVEWAY

N HEIDEKE ST

MATCHLINE B

MATCHLINE C

LEGEND

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XX,XXX = YEAR 2027 DAILY TRAFFIC
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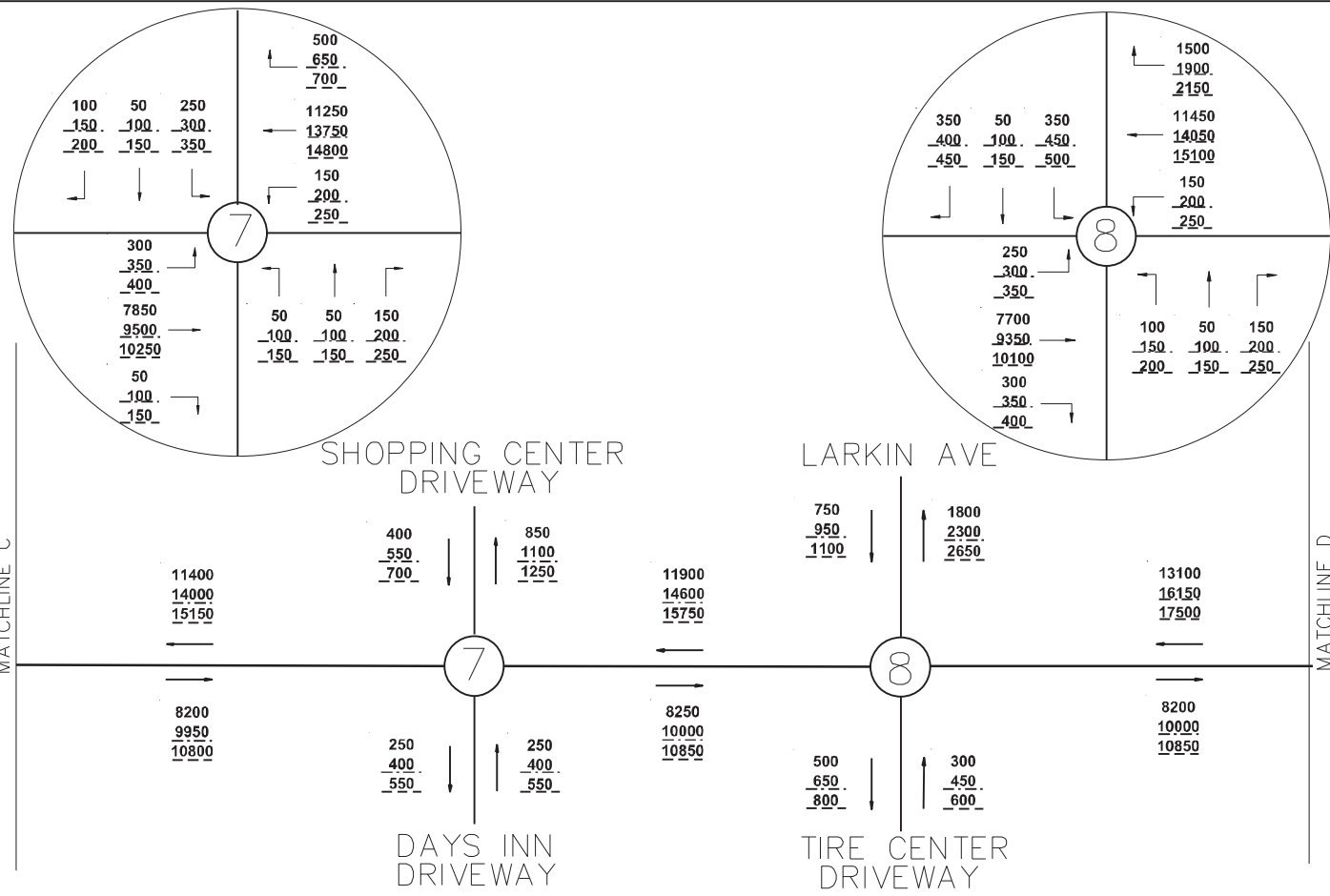
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 TO IH 10)

SHEET 3 OF 5

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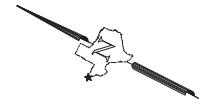
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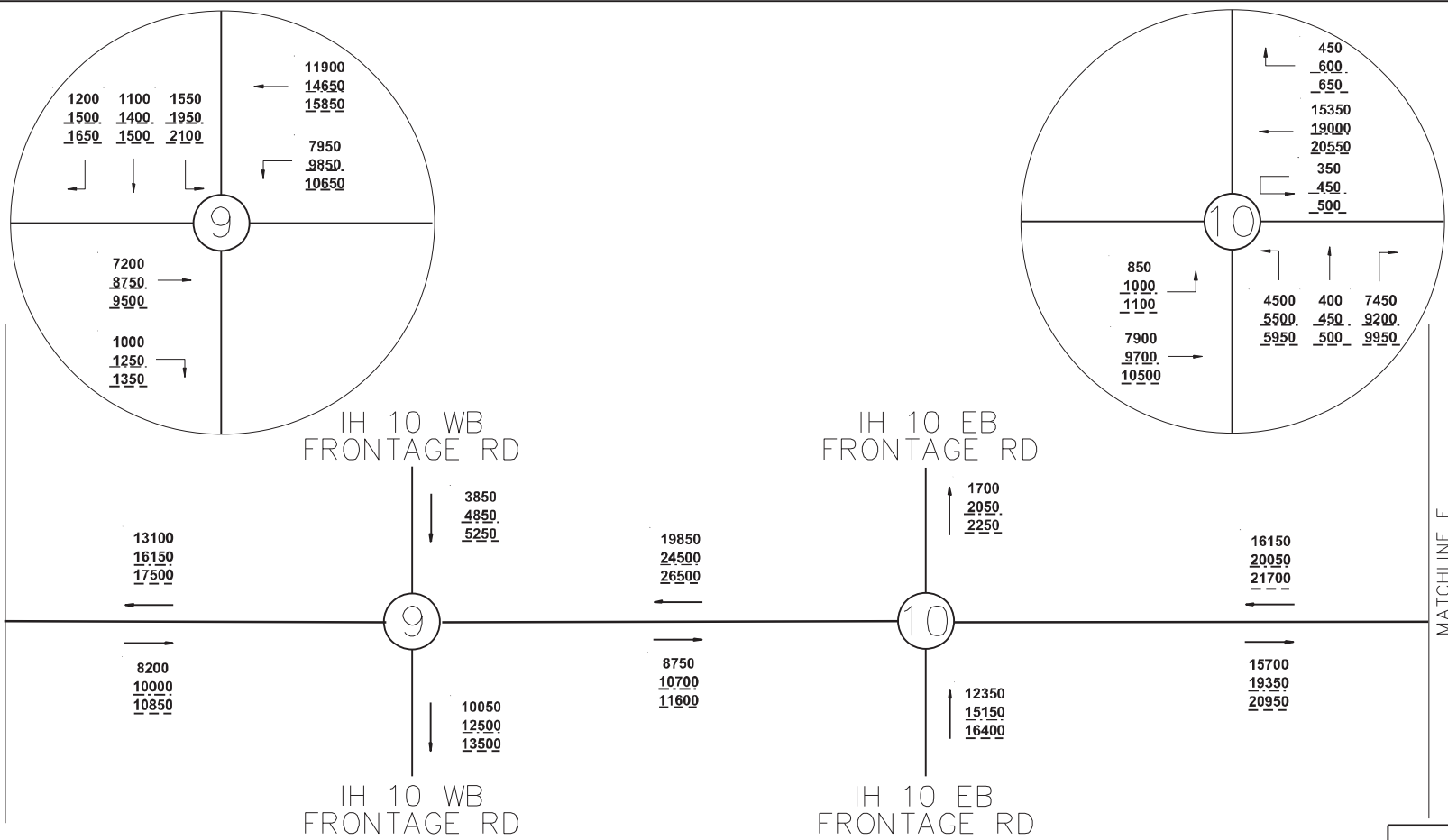
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SHEET 4 OF 5

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SH 123 TRAFFIC PROJECTIONS
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SHEET 5 OF 5

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TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

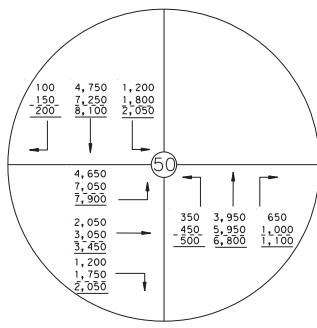
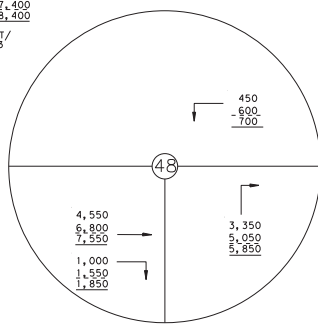
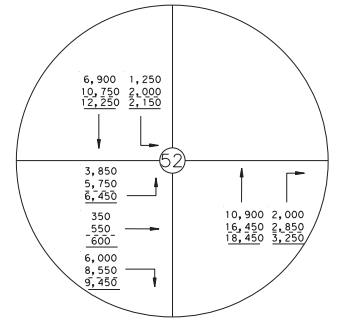
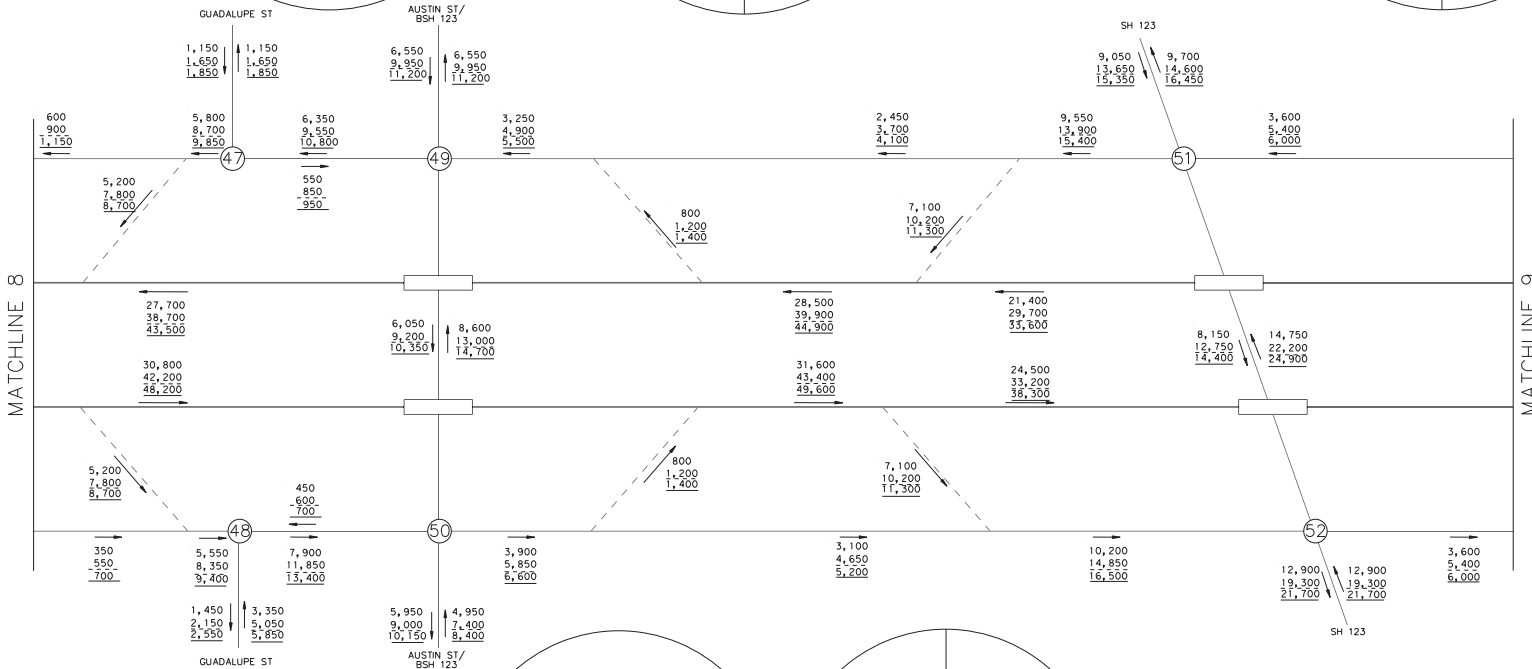
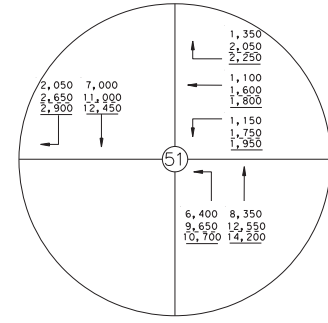
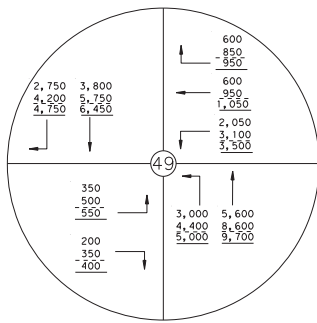
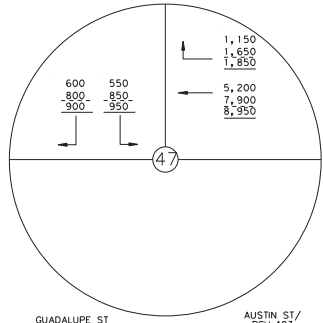
San Antonio District

June 26, 2019

Project FM 123 Corridor									Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Design Period (2027 to 2047)			
Description of Location	Average Daily Traffic		Dir Dist %	K Factor	Percent Trucks		ATHWLD	Percent Tandem Axles in ATHWLD	Flexible Pavement	S N	Rigid Pavement	SLAB
	2027	2047			ADT	DHV						
	Data for Use in Air & Noise Analysis											
Vehicle Class	Base Year											
	% of ADT	% of DHV										
SH 123												
From Cordova Road To IH 10 Guadalupe County	31,850	39,400	52-48	10.9	7.6	5.0						
Data for Use in Air & Noise Analysis												
Base Year												
Light Duty			96.8									
Medium Duty			1.3									
Heavy Duty			1.8									

Project FM 123 Corridor									Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Design Period (2027 to 2057)			
Description of Location	Average Daily Traffic		Dir Dist %	K Factor	Percent Trucks		ATHWLD	Percent Tandem Axles in ATHWLD	Flexible Pavement	S N	Rigid Pavement	SLAB
	2027	2057			ADT	DHV						
	SH 123											
From Cordova Road To IH 10 Guadalupe County	31,850	42,650	52-48	10.9	7.6	5.0						

Note: Growth Rate for years 2019 and 2039 is 1.08



LEGEND

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2020 DAILY TRAFFIC
- XX,XXX = YEAR 2040 DAILY TRAFFIC
- XX,XXX = YEAR 2050 DAILY TRAFFIC

FOR INTERIM REVIEW ONLY
NOT INTENDED FOR CONSTRUCTION
BIDDING OR PERMIT PURPOSES

JACOBS 911 CENTRAL PKWY N. SUITE 425
SAN ANTONIO, TX 78232
Phone: 210.474.0088
Firm Registration F-2966

Texas Department of Transportation
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I-10
TRAFFIC PROJECTIONS
NO-BUILD CONDITION

SHEET 9 OF 26

DESIGN SH	FED. RD. DIV. NO.	SECTION 1		HIGHWAY NO.
CHECK PK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS CC	TX	SAN ANTONIO	QUADALUPE	
CHECK PK	CONTROL	SECTION	JOB	9
	0025	03	097	