



Draft Traffic Noise Technical Report

SH 130 from SH 45 N to SH 71
Travis County, Texas
CSJ: 0440-06-017 & 0440-06-018

Prepared by: TxDOT Austin District
Date: August 2017

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 16, 2014, and executed by FHWA and TxDOT.



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1.0 INTRODUCTION

The Texas Department of Transportation (TxDOT) Austin District proposes to widen the existing State Highway (SH) 130 to include additional travel lanes and auxiliary lanes. The proposed project is located on SH 130 and extends from SH 45 to SH 71 for a total project length of approximately 22 miles (see **Figure 1** in **Appendix A**). The proposed project includes adding a mainlane in each direction and auxiliary lanes between ramps (where warranted); widening bridges and culverts; and crossover improvements.

The existing SH 130 facility consists of two to three 12-foot-wide lanes in each direction with 12-foot-wide outside shoulders and 6-foot-wide inside shoulders. Directions of travel are separated by a depressed grassy median, usually 135 feet in width. If completed, the mainlanes of the SH 130 facility would consist of three to five 12-foot-wide lanes in each direction with 12-foot-wide outside shoulders and 10- to 12-foot-wide inside shoulders.

The proposed improvements would be constructed within the existing right of way; therefore, no new ROW would be required. No displacements are anticipated.

2.0 TRAFFIC NOISE ANALYSIS

This traffic noise analysis was conducted in accordance with TxDOT's 2011 *Guidelines for Analysis and Abatement of Roadway Traffic Noise*, which has been approved by the Federal Highway Administration (FHWA).

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 the 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.

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 (see **Table 2-1**).

| Table 2-1 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 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, amphitheatres, 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 receiver approaches, equals or exceeds the NAC. "Approach" is defined as one dB(A) below the FHWA 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) (11 dB[A] increase).

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.

3.0 RESULTS OF TRAFFIC NOISE ANALYSIS

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 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 (see **Plates 1-1** through **1-29** in **Appendix B** and **Table 3-1**).

| Table 3-1 Traffic Noise Levels dB(A) Leq | | | | | | |
|--|--------------|----------|---------------|----------------|--------------|--------------|
| Representative Receiver | NAC Category | FHWA NAC | Existing 2017 | Predicted 2040 | Change (+/-) | Noise Impact |
| R-01 - Medical Facility | D | 52 | 47 | 48 | +1 | No |
| R-02 - Restaurant | E | 72 | 63 | 65 | +2 | No |
| R-03 - Restaurant | E | 72 | 61 | 62 | +1 | No |
| R-04 - Water Park | E | 72 | 68 | 69 | +1 | No |
| R-05 - Sports Field | C | 67 | 65 | 67 | +2 | Yes |
| R-06 - Residence | B | 67 | 69 | 70 | +1 | Yes |
| R-07 - Medical Facility | D | 52 | 44 | 46 | +2 | No |
| R-08 - Residence | B | 67 | 71 | 72 | +1 | Yes |
| R-09 - Residence | B | 67 | 69 | 70 | +1 | Yes |
| R-10 - Residence | B | 67 | 66 | 67 | +1 | Yes |
| R-11 - Event Facility | D | 52 | 41 | 43 | +2 | No |
| R-12 - Residence | B | 67 | 69 | 71 | +2 | Yes |
| R-13 - Residence | B | 67 | 67 | 69 | +2 | Yes |

Source: SH 130 Noise Study Team 2017; FHWA Traffic Noise Model v2.5.

3.1 Discussion of Noise Abatement Measures

As indicated in **Table 3-1**, the proposed project would result in traffic noise impacts at seven modeled receivers, representing 72 impacted receivers. 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 percent of impacted, first row receivers by at least 5 dB(A). 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 5 dB(A), and the abatement measure must be able to reduce the noise level for 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 miles per hour (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 could displace existing businesses and residences, require additional right of way and would 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 walls: this is the most commonly used noise abatement measure. Noise walls were evaluated for impacted receiver locations for the proposed project. It was determined that noise walls would not be feasible and reasonable for the impacted receiver locations discussed below; therefore, noise walls are not proposed at these locations for incorporation into the proposed project.

R-5: This receiver represents three impacted receivers located at an outdoor practice field at Hendrickson High School east of SH 130 at Farm-to-Market (FM) 685 (see **Plate 1-2** in **Appendix B**). A noise wall was modeled at a length of 1,300 feet along the edge of the right of way at a height of 20 feet. This noise wall would not be sufficient to achieve the minimum, feasible reduction of 5 dB(A) at greater than 50 percent of impacted, first row receivers and would not reduce noise levels for at least one impacted, first row receiver by at least 7 dB(A). Therefore, this noise wall is not feasible and reasonable and is not proposed for incorporation into the project.

R-8: This receiver represents two impacted receivers at single-family residences located north of FM 734 and west of SH 130 (see **Plate 1-12** in **Appendix B**). A noise wall was modeled at a length of 630 feet along the edge of the right of way at a height of 20 feet. This noise wall would be sufficient to achieve the minimum, feasible reduction of 5 dB(A) at greater than 50 percent of impacted, first row receivers but would not reduce noise levels for at least one impacted, first row receiver by at least 7 dB(A). Therefore, this noise wall is not feasible and reasonable and is not proposed for incorporation into the project.

R-9: This receiver represents four impacted receivers at single-family residences located south of FM 734 and east of SH 130 (see **Plate 1-13** in **Appendix B**). A noise wall was modeled at a length of 1,650 feet along the edge of the right of way at a height of 20 feet. This noise wall would not be sufficient to achieve the minimum, feasible reduction of 5 dB(A) at greater than 50 percent of impacted, first row receivers and would not reduce noise levels for at least one impacted, first row receiver by at least 7 dB(A). Therefore, this noise wall is not feasible and reasonable and is not proposed for incorporation into the project.

R-10: This receiver represents four impacted receivers at single-family residences located south of FM 973 and west of SH 130 (see **Plate 1-19** in **Appendix B**). A continuous noise wall would restrict access to driveways, and therefore five separate segments were modeled along the edge of the right of way at a total length of 2,520 feet and a height of 20 feet. These noise walls would not be sufficient to achieve the minimum, feasible reduction of 5 dB(A) at greater than 50 percent of impacted, first row receivers and would not reduce noise levels for at least one impacted, first row receiver by at least 7 dB(A). Therefore, these noise walls are not feasible and reasonable and are not proposed for incorporation into the project.

R-12: This receiver represents two impacted receivers at single-family residences located along Gilbert Road east of SH 130 (see **Plate 1-20** in **Appendix B**). A noise wall was modeled at a length of 765 feet along the edge of the right of way at a height of 20 feet. This noise wall would not be sufficient to achieve the minimum, feasible reduction of 5 dB(A) at greater than 50 percent of impacted, first row receivers and would not reduce noise levels for at least one impacted, first row receiver by at least 7 dB(A). Therefore, this noise wall is not feasible and reasonable and is not proposed for incorporation into the project.

R-13: This receiver represents one impacted single-family residence located north of FM 969 and west of SH 130 (see **Plate 1-22** in **Appendix B**). Because there is only one receiver in this location, a noise wall that reduces noise levels by at least 7 dbA is assumed to not be cost-effective based on previous traffic modeling results on other TxDOT projects. Therefore, no noise barrier is proposed in this location.

3.2 Proposed Noise Walls

The following noise wall would be feasible and reasonable for the following receiver and, therefore, is proposed for incorporation into the project (see **Table 3-2** and **Plates 1-2** and **1-3** in **Appendix B**). A noise wall workshop would be held with the property owners adjacent to the proposed wall to determine whether this wall would be incorporated into the final design of the proposed project.

| Table 3-2 Noise Wall Proposal (Preliminary) | | | | | | |
|--|--------------------------|------------------------------|---------------|---------------------|-------------|------------------------------|
| Proposed Noise Barrier | Representative Receiver | Total # Benefitted Receivers | Height (feet) | Total Length (feet) | Total Cost* | Cost per Benefitted Receiver |
| B | R-6 – Estraya Apartments | 29 | 20 | 1,370 | \$493,202 | \$17,007 |
| *Minor inconsistencies in total barrier costs are due to rounding of total wall lengths. | | | | | | |

Source: SH 130 Noise Study Team 2017.

3.2.1 Barrier B – Estraya Apartment Complex

R-6: This receiver represents 56 impacted receivers in an apartment complex under construction on the east side of SH 130 at East Pflugerville Parkway. A continuous noise wall at the right of way line would restrict access to the apartment complex from the northbound service road; therefore, a wall was modeled along the northbound mainlanes at a length of 1,370 feet and a height of 20 feet (see **Plate 1-2** and **1-3** in **Appendix B**). The wall would reduce the noise levels by at least 5 dB(A) for 19 first row, impacted receivers (95%) and would reduce noise levels by at least 7 dB(A) for one first row, impacted receiver at a total cost of \$493,202, or \$17,007 per benefitted receiver. The noise wall is proposed for incorporation into the project.

4.0 CONCLUSION

Any subsequent project design changes may require a reevaluation of traffic noise impacts and the feasibility and reasonableness of the proposed barriers. 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 following predicted (2037) noise impact contours (see **Table 4-1**).

| Table 4-1 Year 2040 Predicted Noise Impact Contours | | | |
|---|-------------------------|----------------|----------------------------|
| Area | Land Use Category (NAC) | Impact Contour | Distance From Right of Way |
| East of SH 130 and South of Pfluger Ln. and North of Pecan St. | B and C | 66 dB(A) | 500 ft |
| | E | 71 dB(A) | 255 ft |
| West of SH 130 and South of Howard Ln. and North of Parmer Ln. | B and C | 66 dB(A) | 575 ft |
| | E | 71 dB(A) | 205 ft |
| East of SH 130 and South US 290 and North of Blue Bluff Rd. | B and C | 66 dB(A) | 695 ft |
| | E | 71 dB(A) | 355 ft |
| West of SH 130 and South of Decker Lake Rd and North of Webberville Rd. | B and C | 66 dB(A) | 610 ft |
| | E | 71 dB(A) | 350 ft |
| East of SH 130 and South of Colorado River and North of SH 71. | B and C | 66 dB(A) | 570 ft |
| | E | 71 dB(A) | 170 ft |

Source: SH 130 Noise Study Team 2017.

Noise associated with the construction of the proposed 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 would 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.

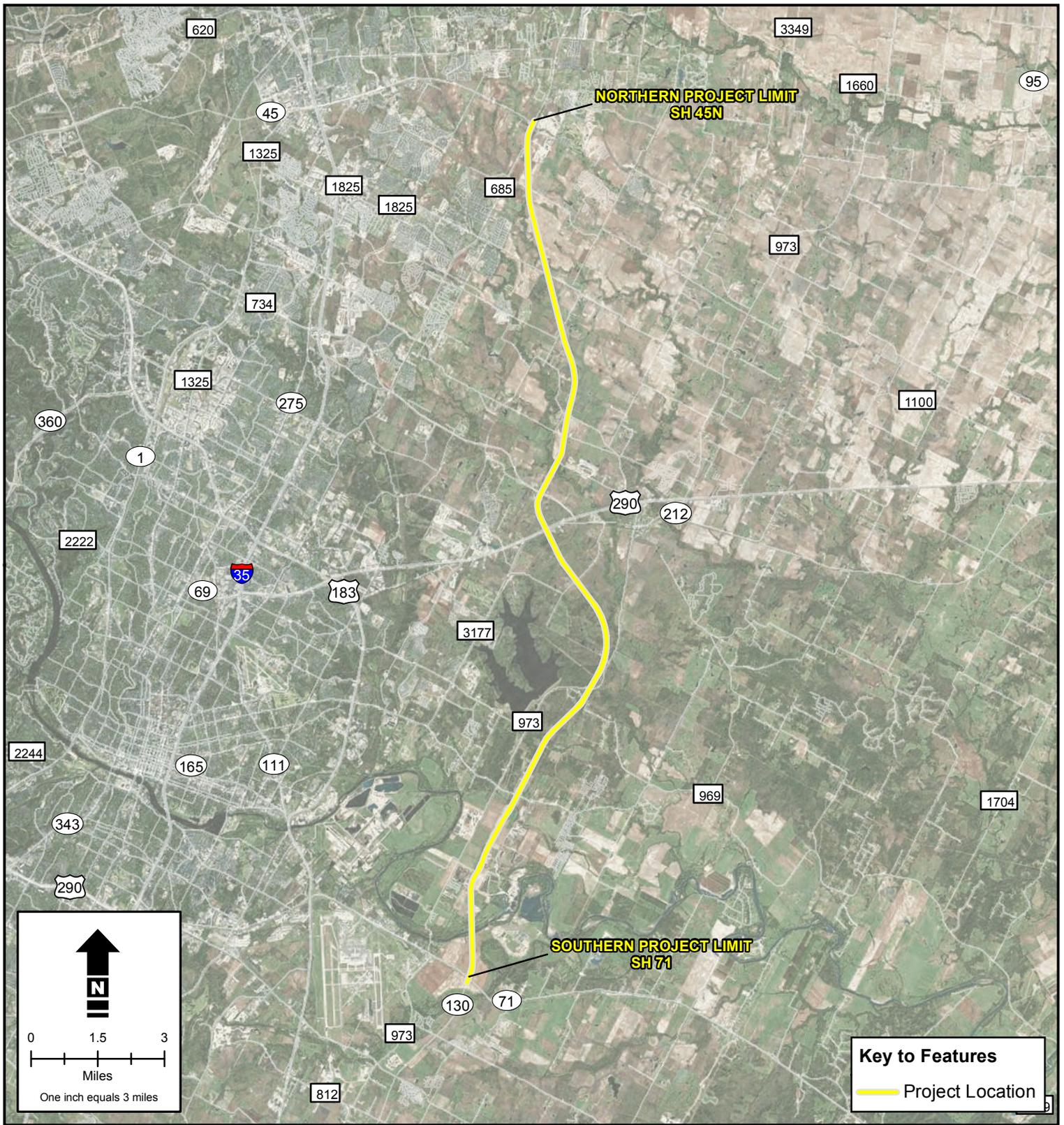
A copy of this traffic noise analysis will be made available to local officials. On the date of approval of this document (Date of Public Knowledge), TxDOT is no longer responsible for providing noise abatement for new development adjacent to the proposed project.

5.0 REFERENCES

Federal Highway Administration. 2004. FHWA Traffic Noise Model (computer software). Version 2.5 LOS1. McTrans: University of Florida. License 65917.

Texas Department of Transportation. 2011. Guidelines for Analysis and Abatement of Roadway Traffic Noise. March 2011.

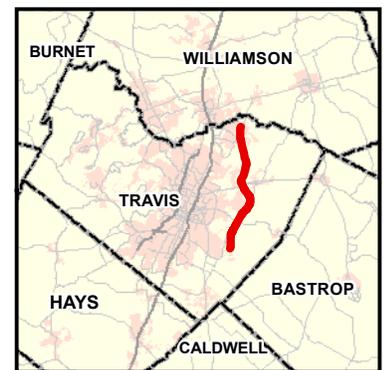
APPENDIX A
FIGURES



**Figure 1
Project Location**

SH 130 from SH 45N to SH 71

CSJ: 0440-06-017 and 0440-06-018

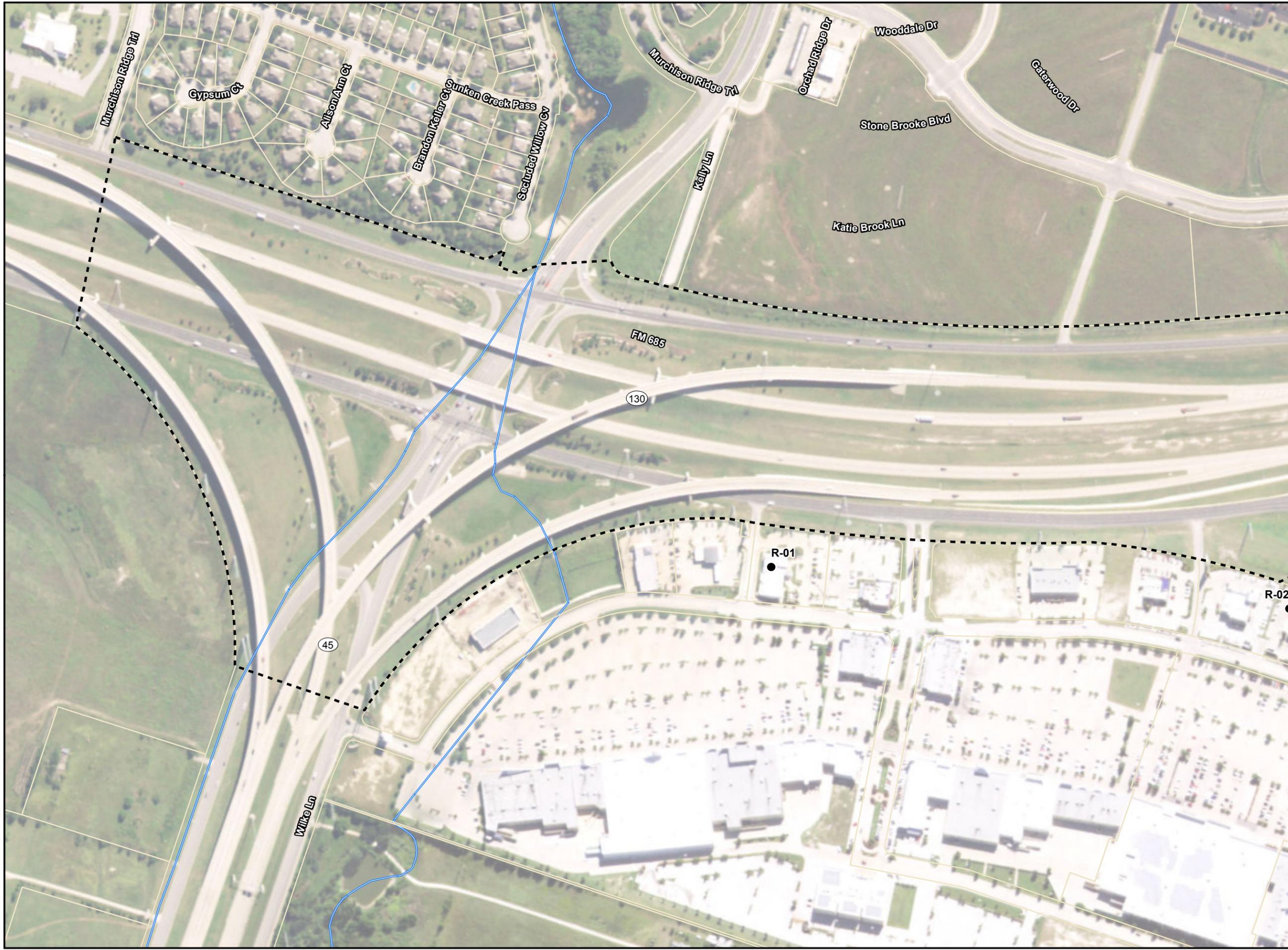
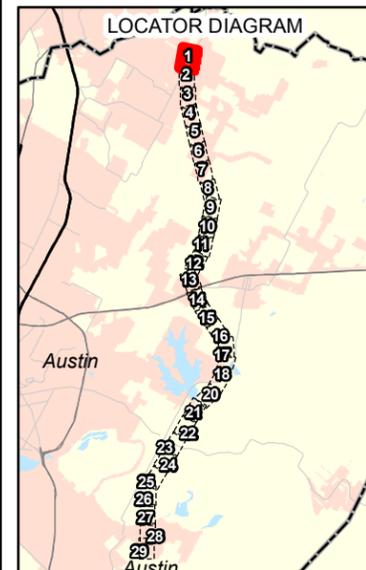


APPENDIX B

PLATES

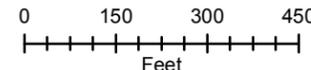
TRAFFIC NOISE STUDIES

SH 130 from SH 45 to SH 71
 CSJ: 0440-06-017 and 0440-06-018



Key to Features

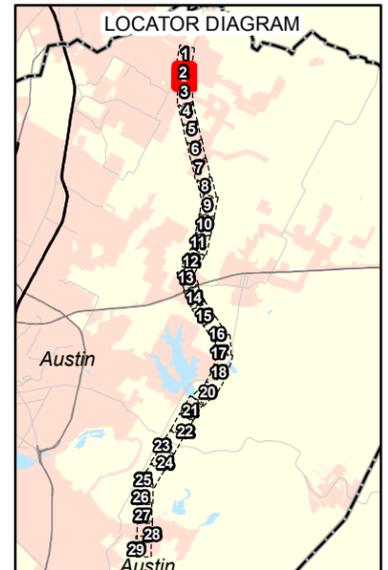
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- Impacted Receivers
- Non-impacted Receivers
- Proposed Barrier
- Streams (COA)
- Property Boundaries
- Existing ROW



One inch equals 300 ft

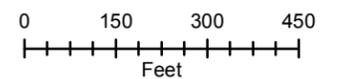
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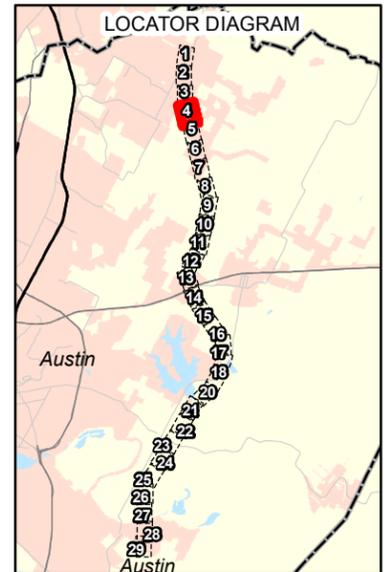
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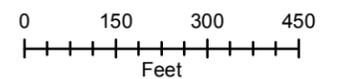
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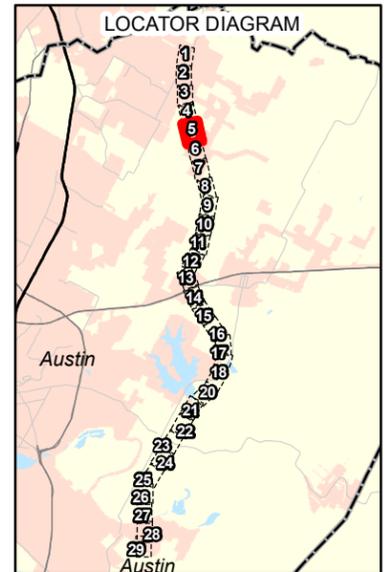
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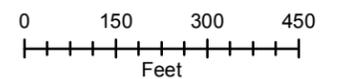
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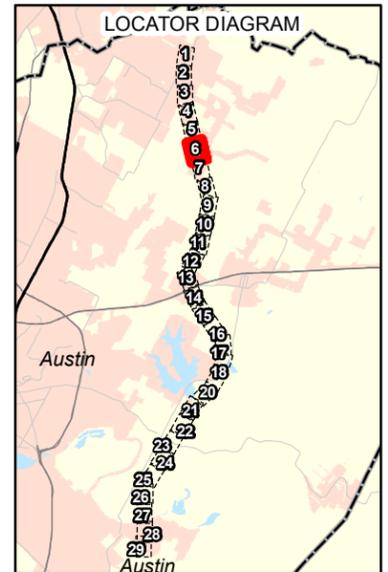


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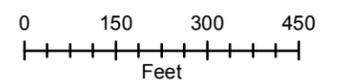
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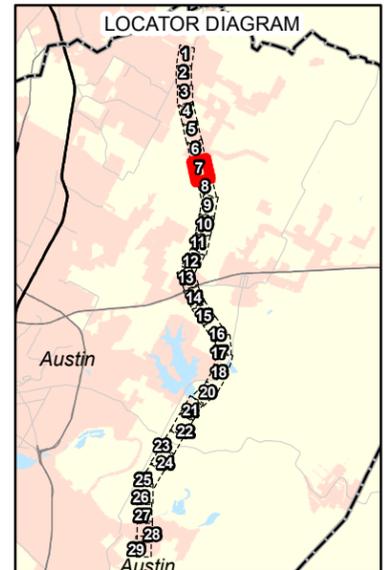
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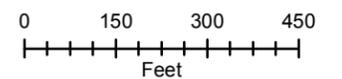
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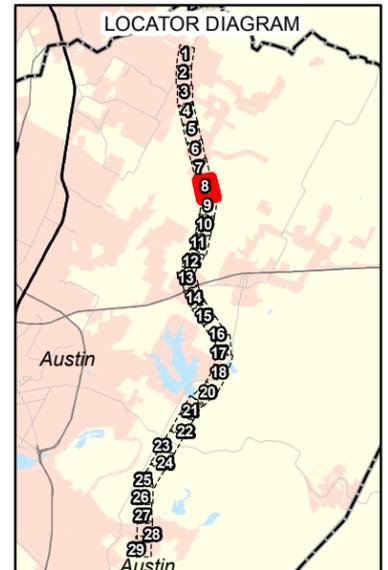
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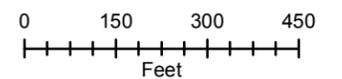
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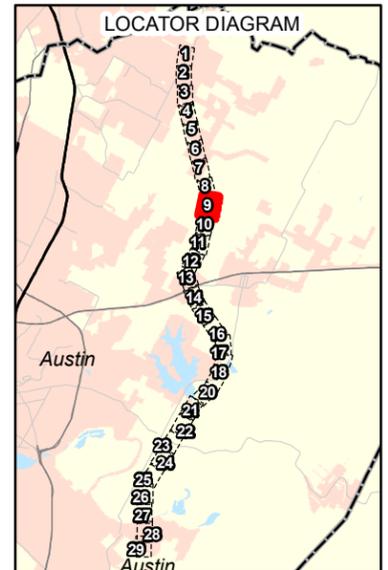
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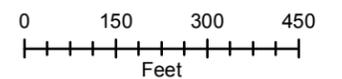
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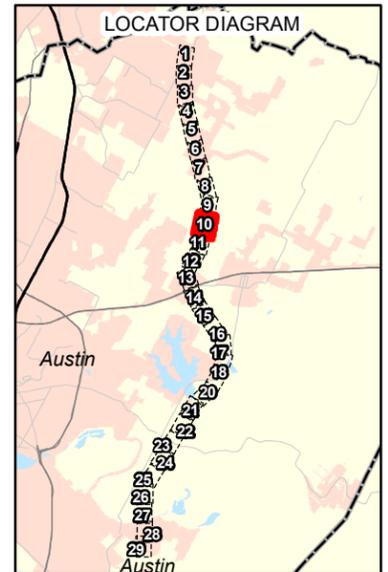
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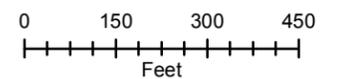
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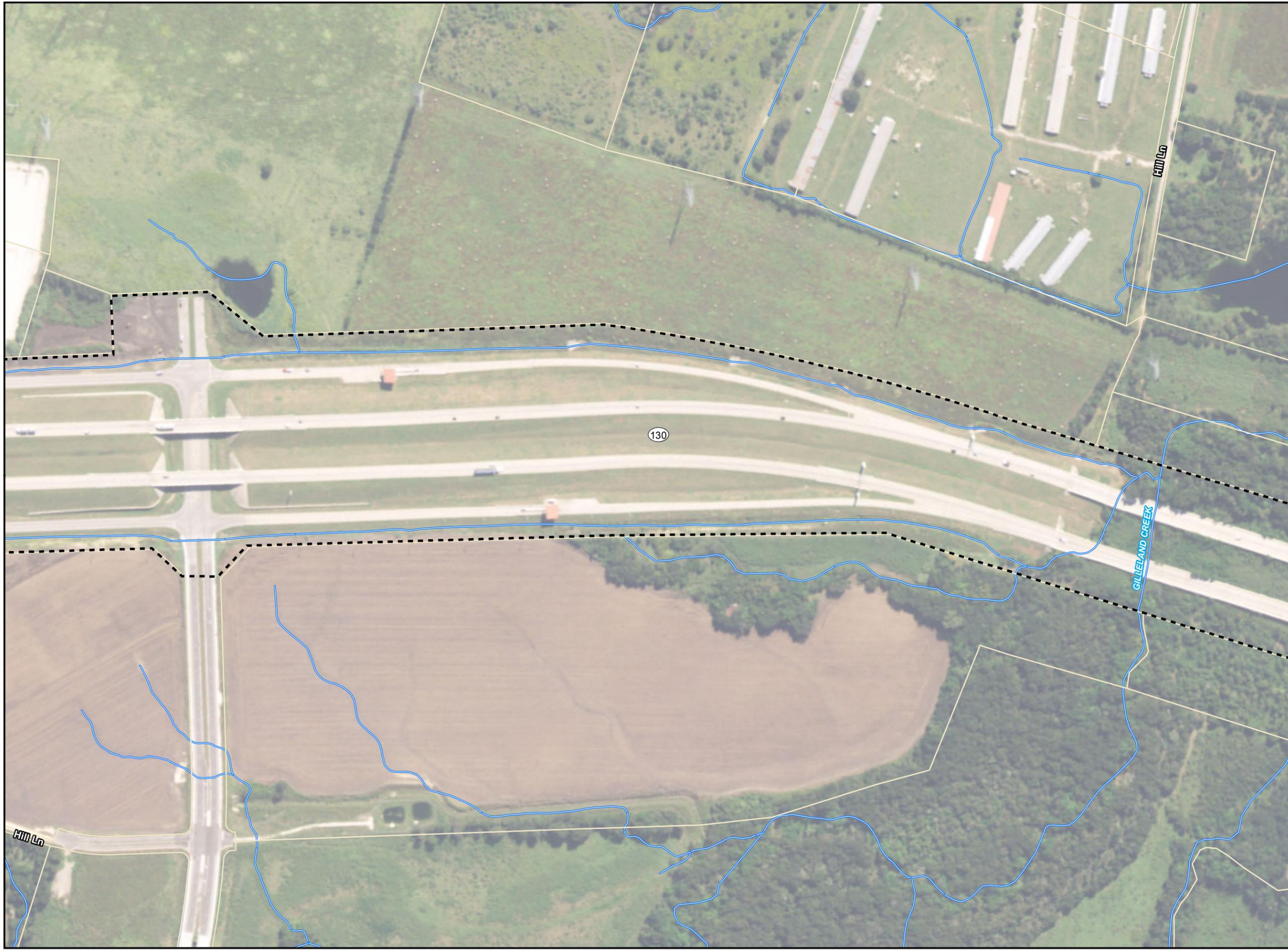
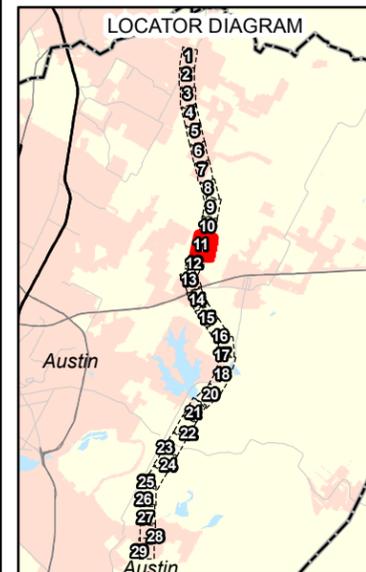
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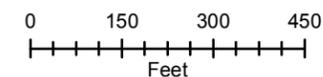
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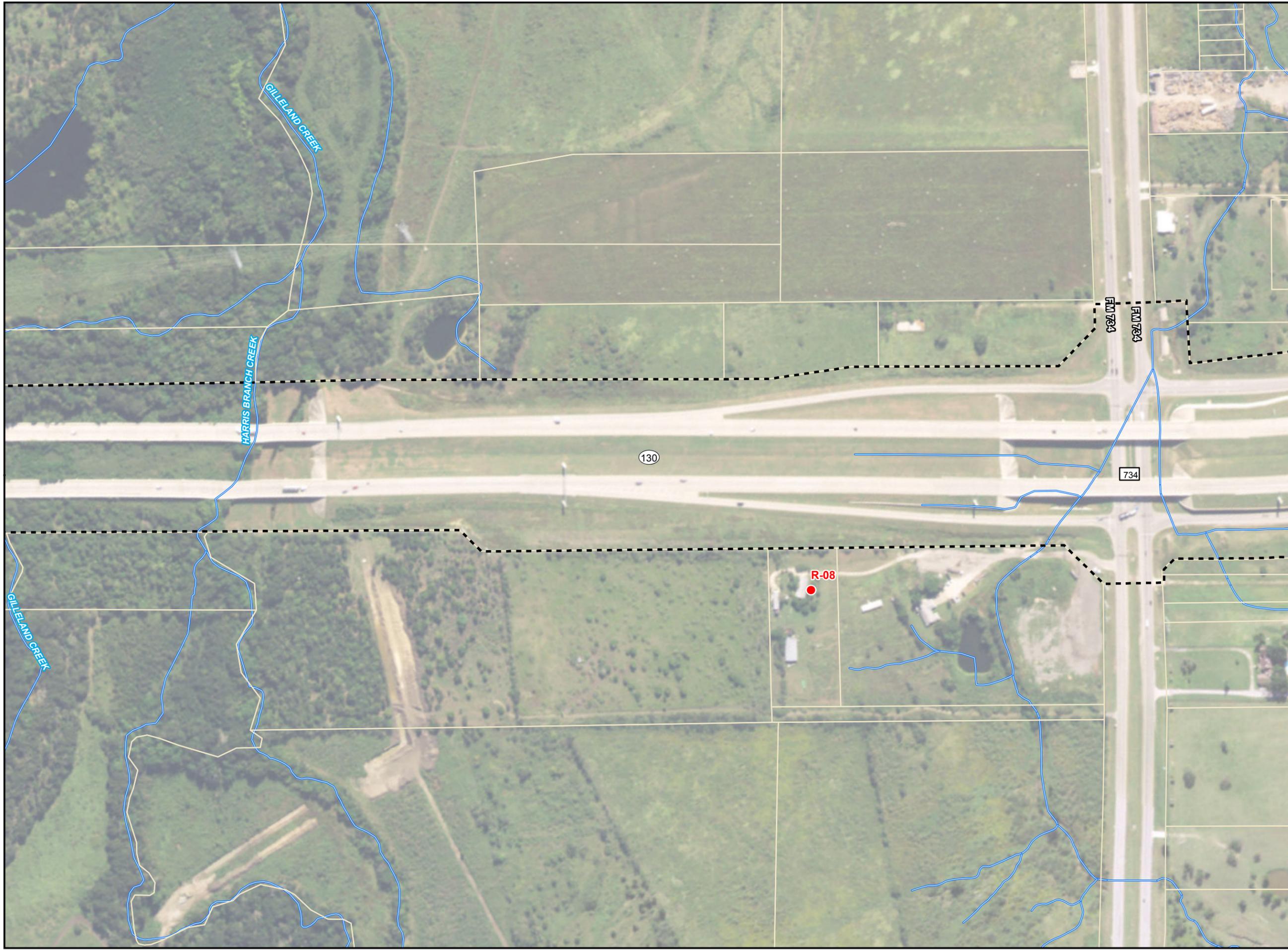
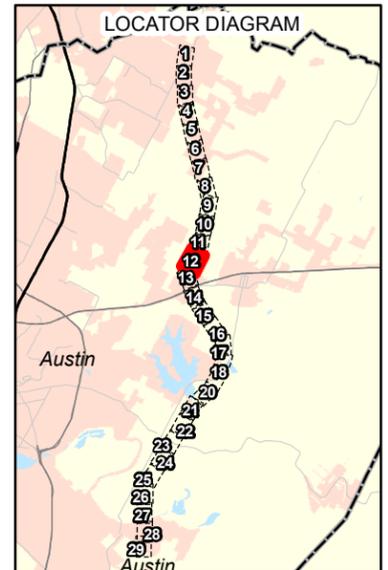
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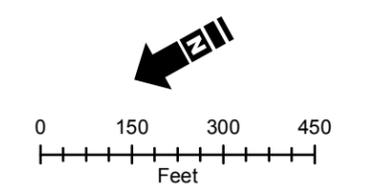
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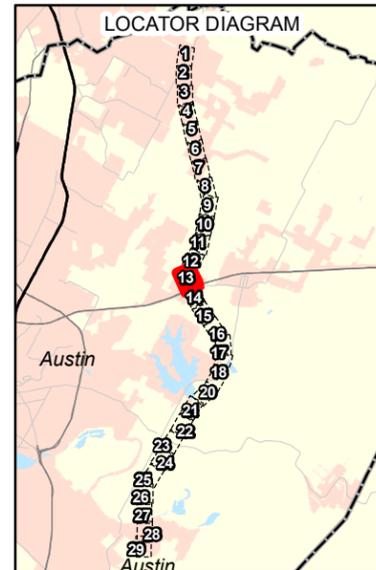
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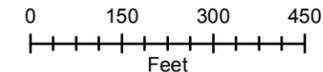
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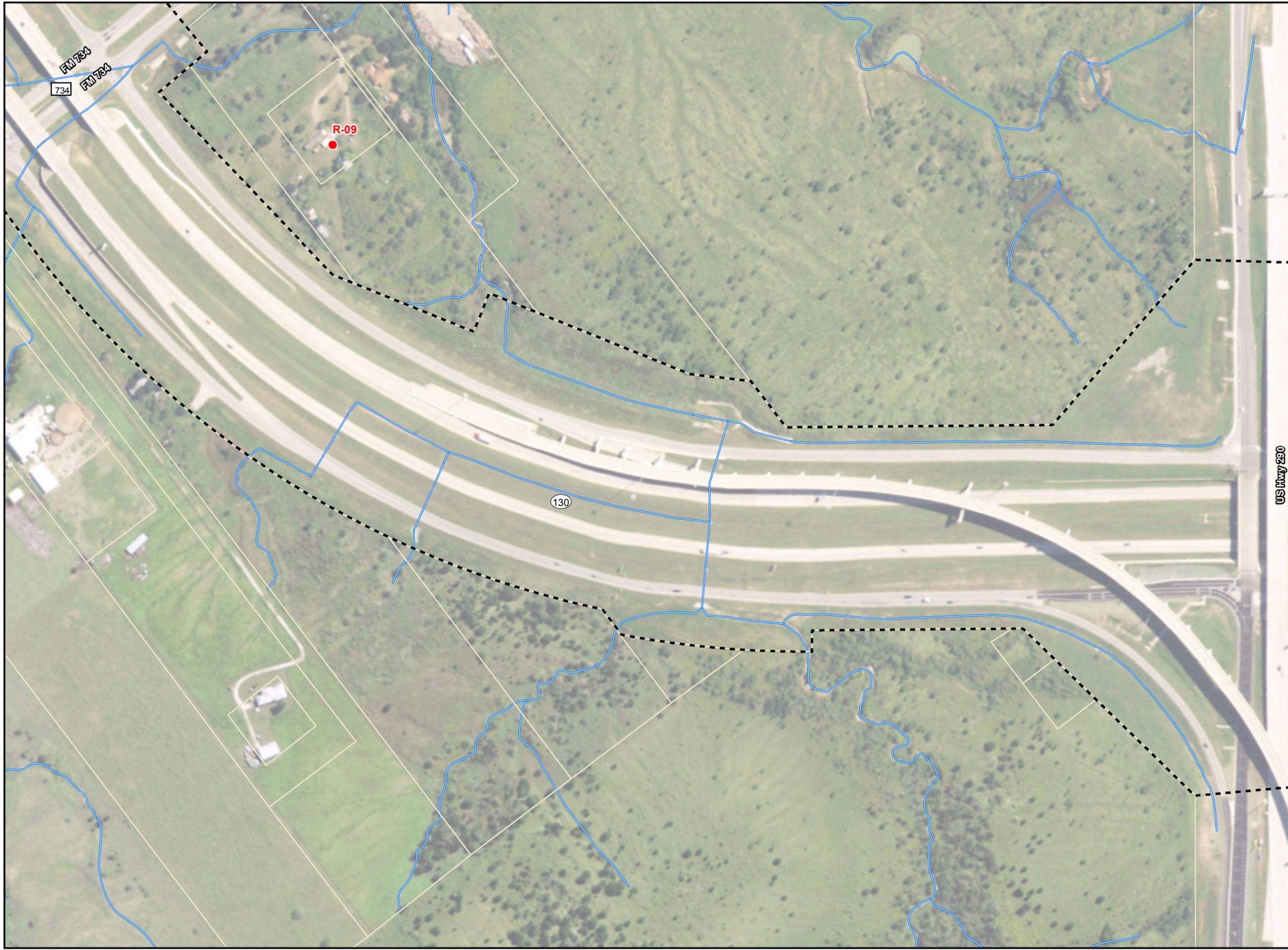
US Hwy 290

Key to Features

- Benefitted Receivers
- Impacted Receivers
- Non-impacted Receivers
- Proposed Barrier
- Streams (COA)
- Property Boundaries
- - - Existing ROW

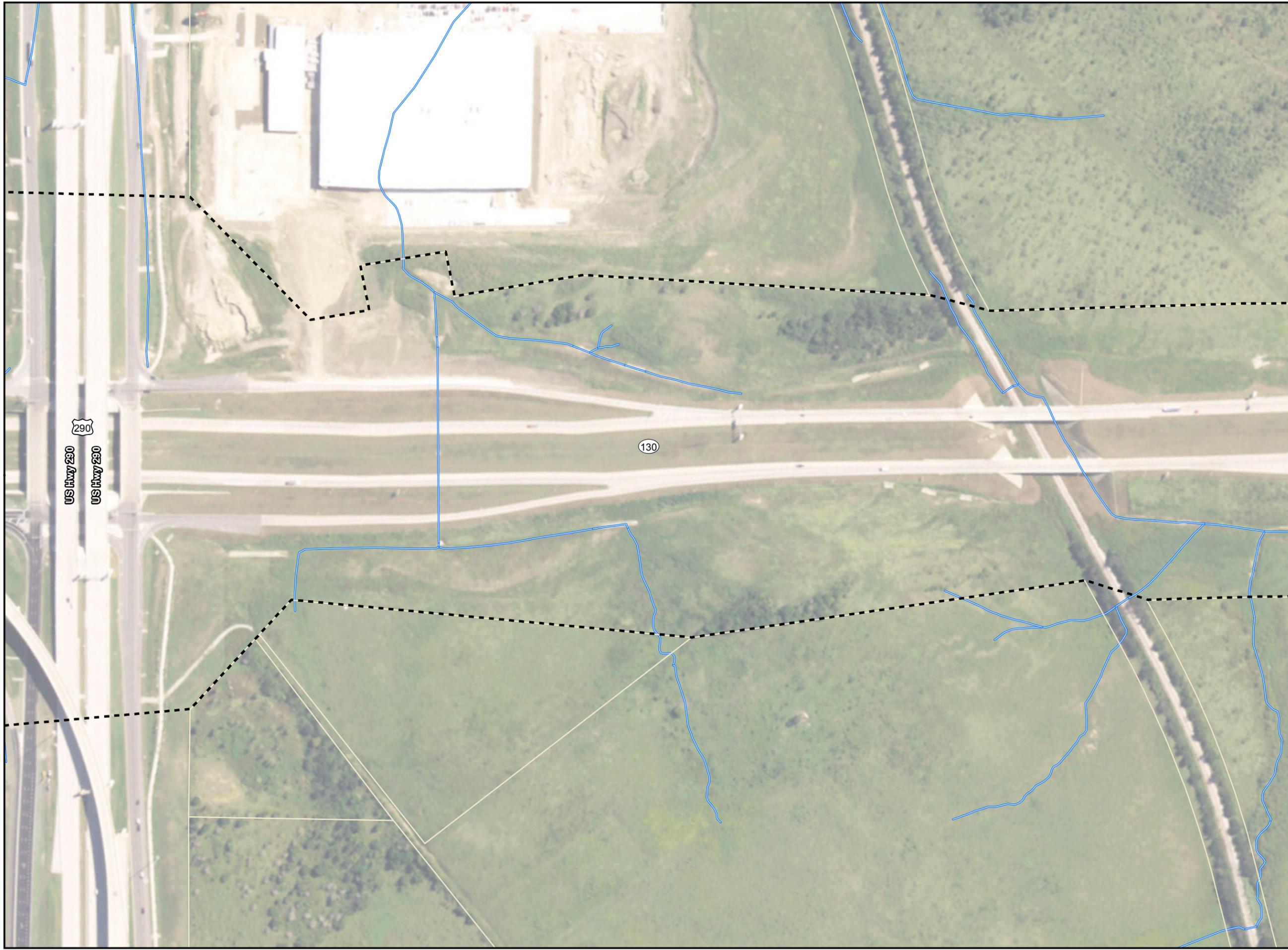
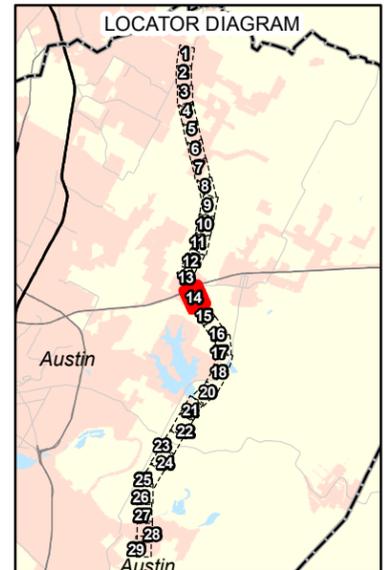


One inch equals 300 ft



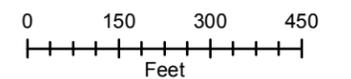
TRAFFIC NOISE STUDIES

SH 130 from SH 45 to SH 71
CSJ: 0440-06-017 and 0440-06-018



Key to Features

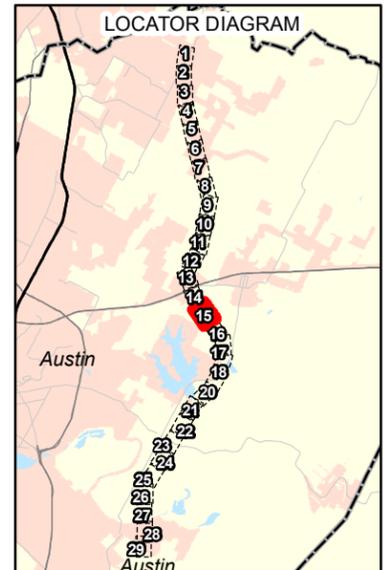
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One inch equals 300 ft

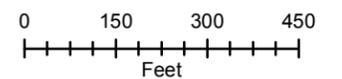
TRAFFIC NOISE STUDIES

SH 130 from SH 45 to SH 71
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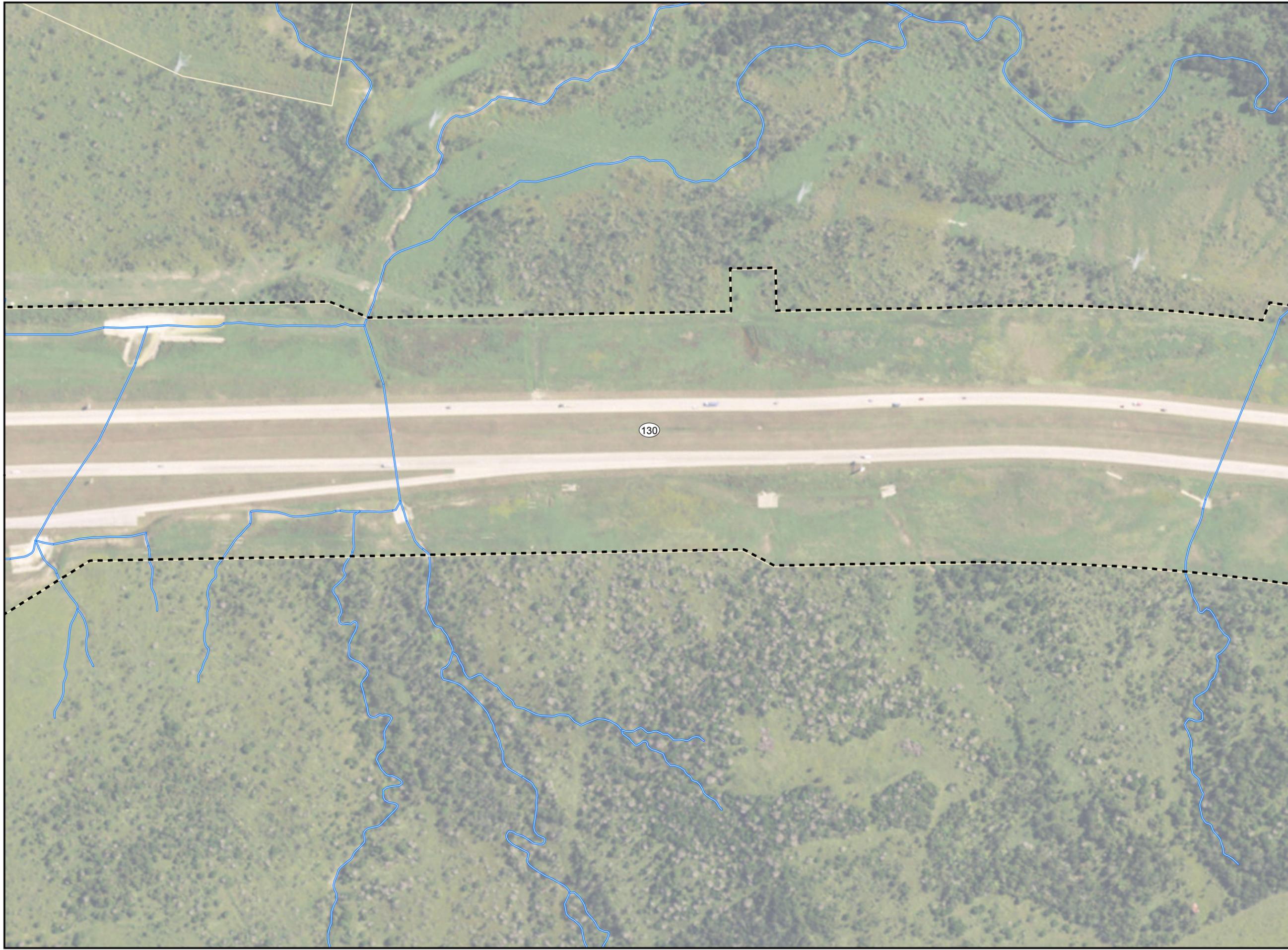
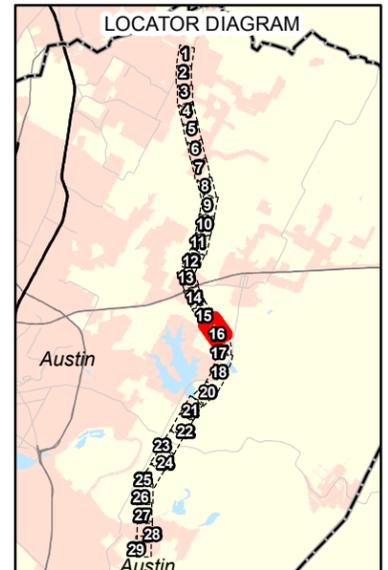
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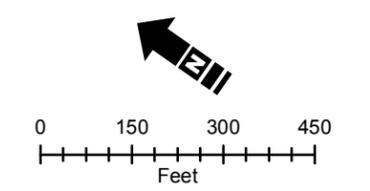
TRAFFIC NOISE STUDIES

SH 130 from SH 45 to SH 71
CSJ: 0440-06-017 and 0440-06-018



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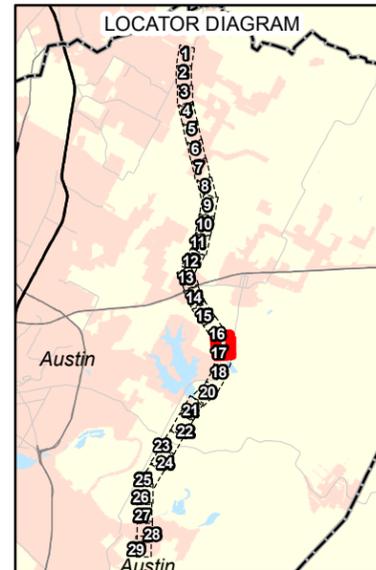
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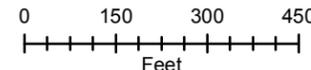
TRAFFIC NOISE STUDIES

SH 130 from SH 45 to SH 71
CSJ: 0440-06-017 and 0440-06-018



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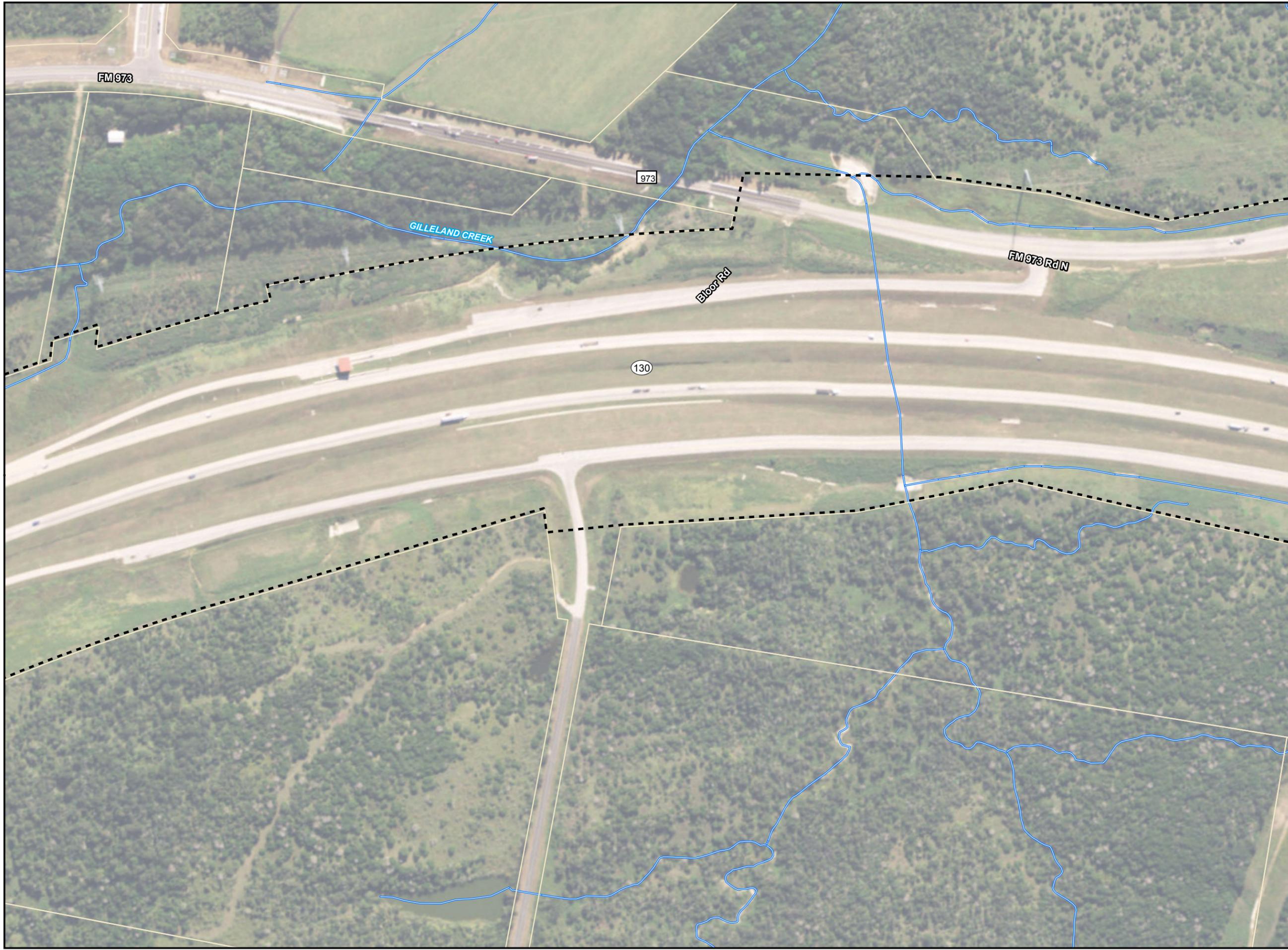
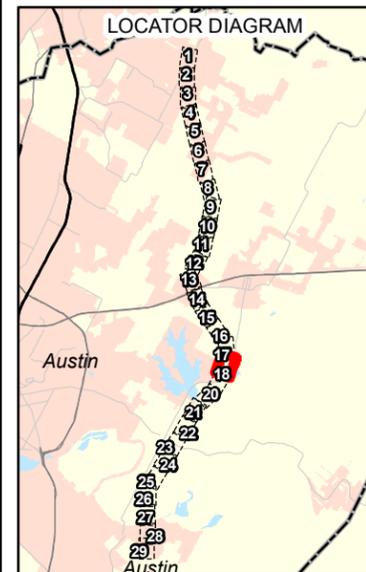
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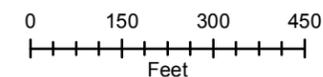
TRAFFIC NOISE STUDIES

SH 130 from SH 45 to SH 71
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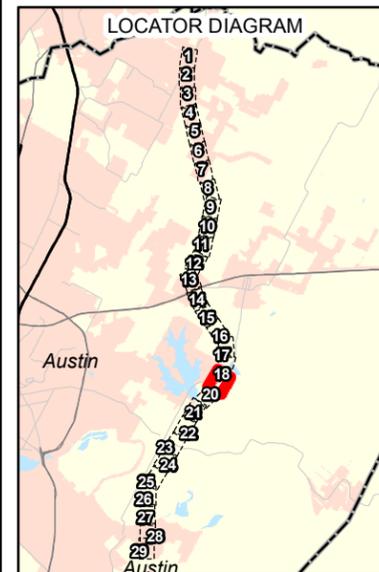
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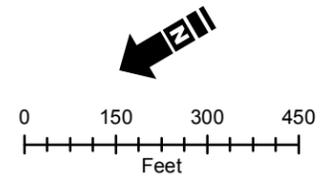
TRAFFIC NOISE STUDIES

SH 130 from SH 45 to SH 71
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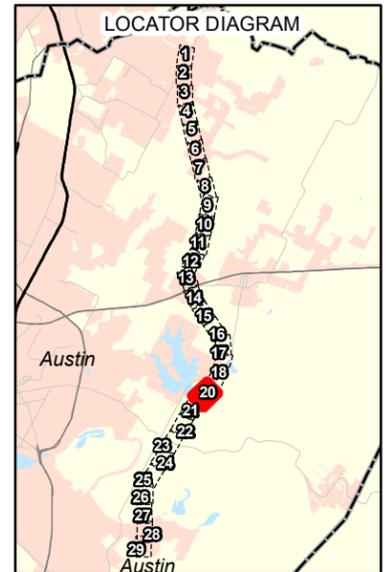
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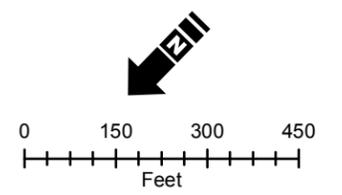
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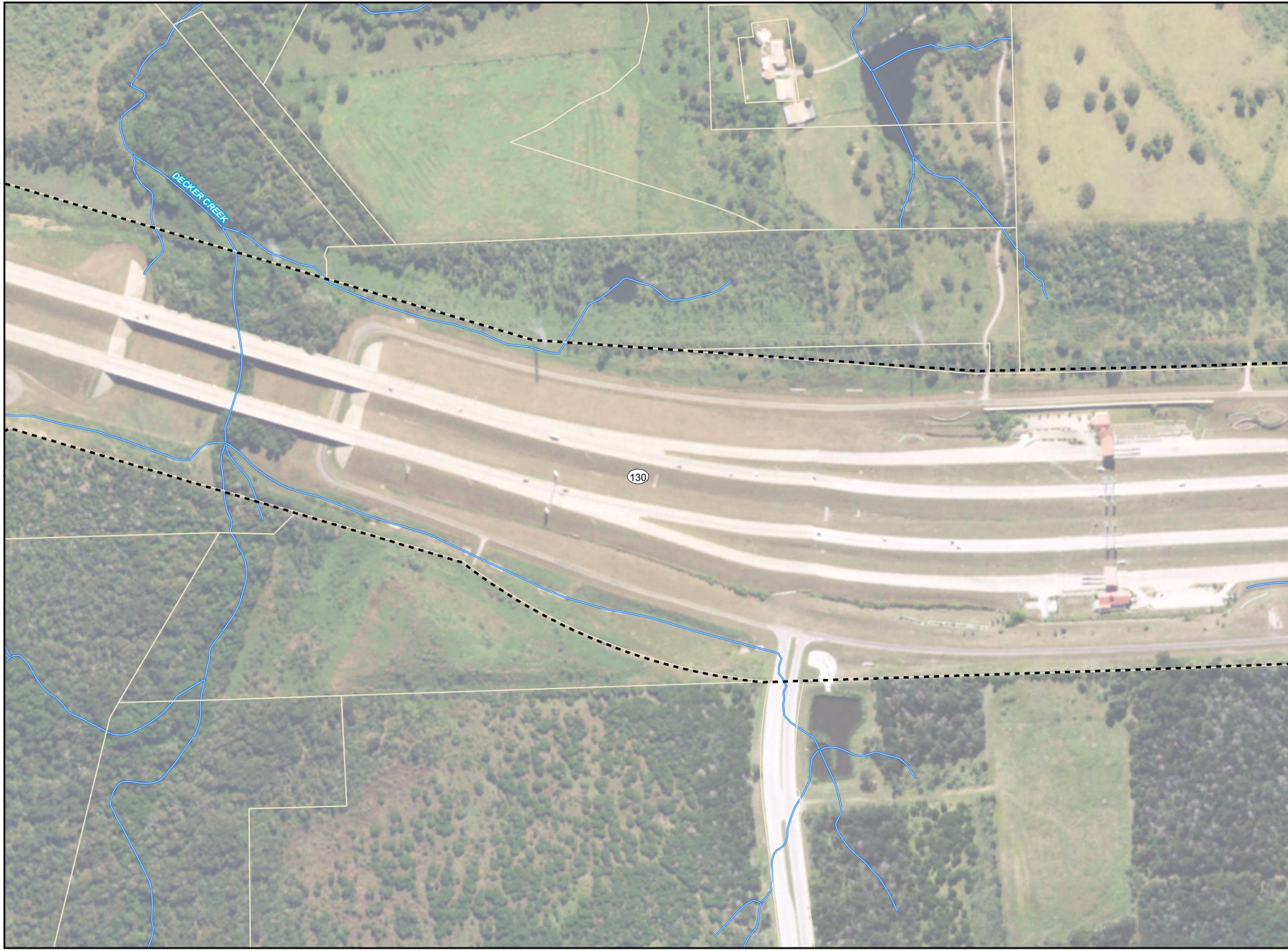
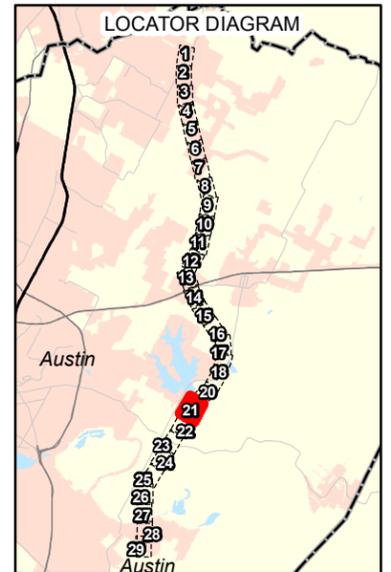
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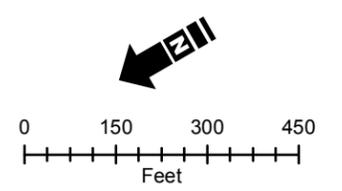
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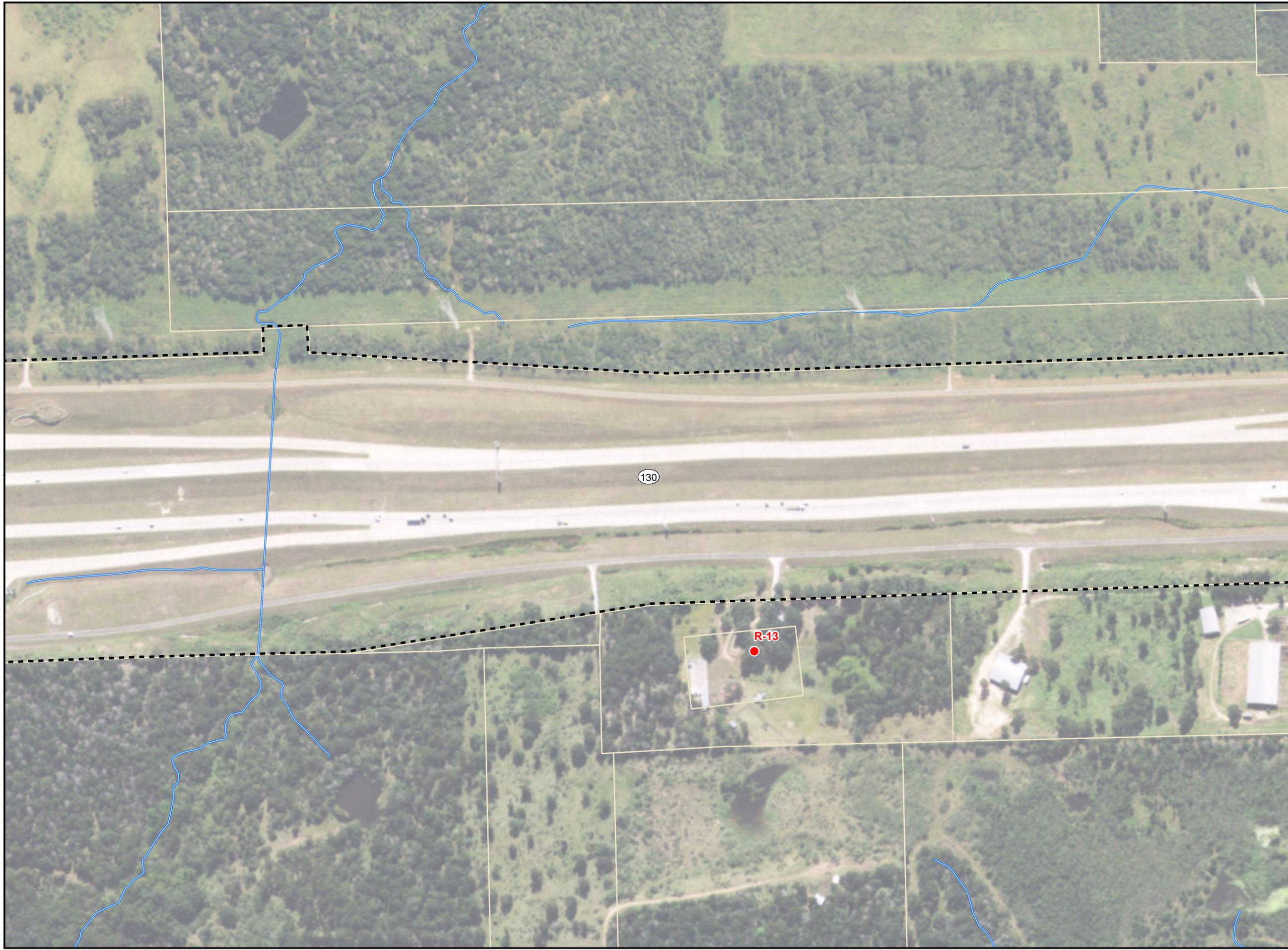
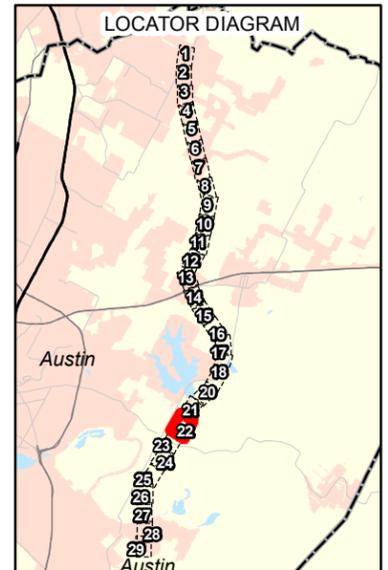
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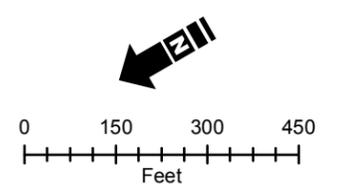
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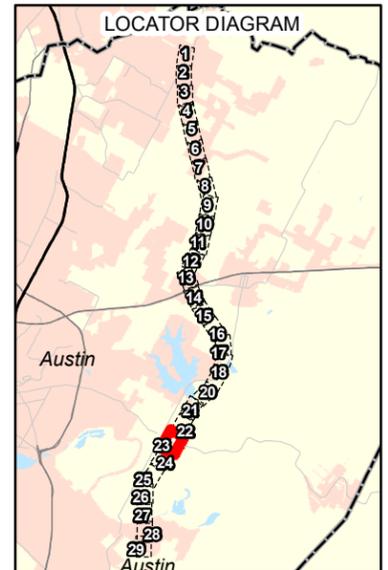
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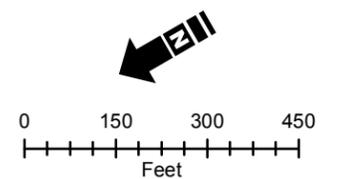
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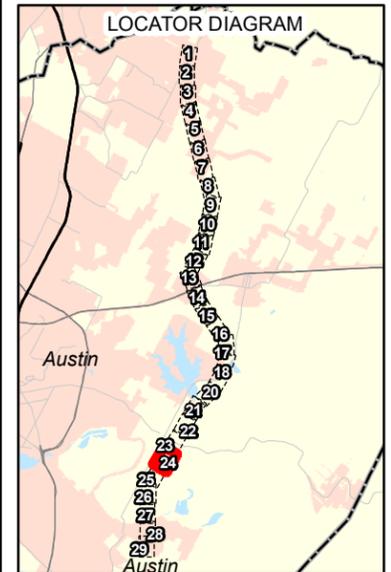
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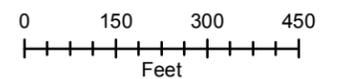
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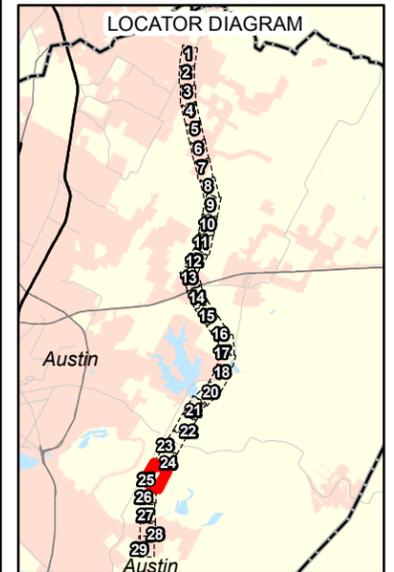


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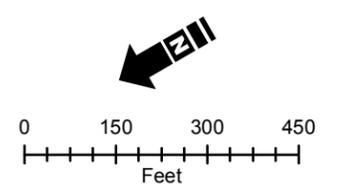
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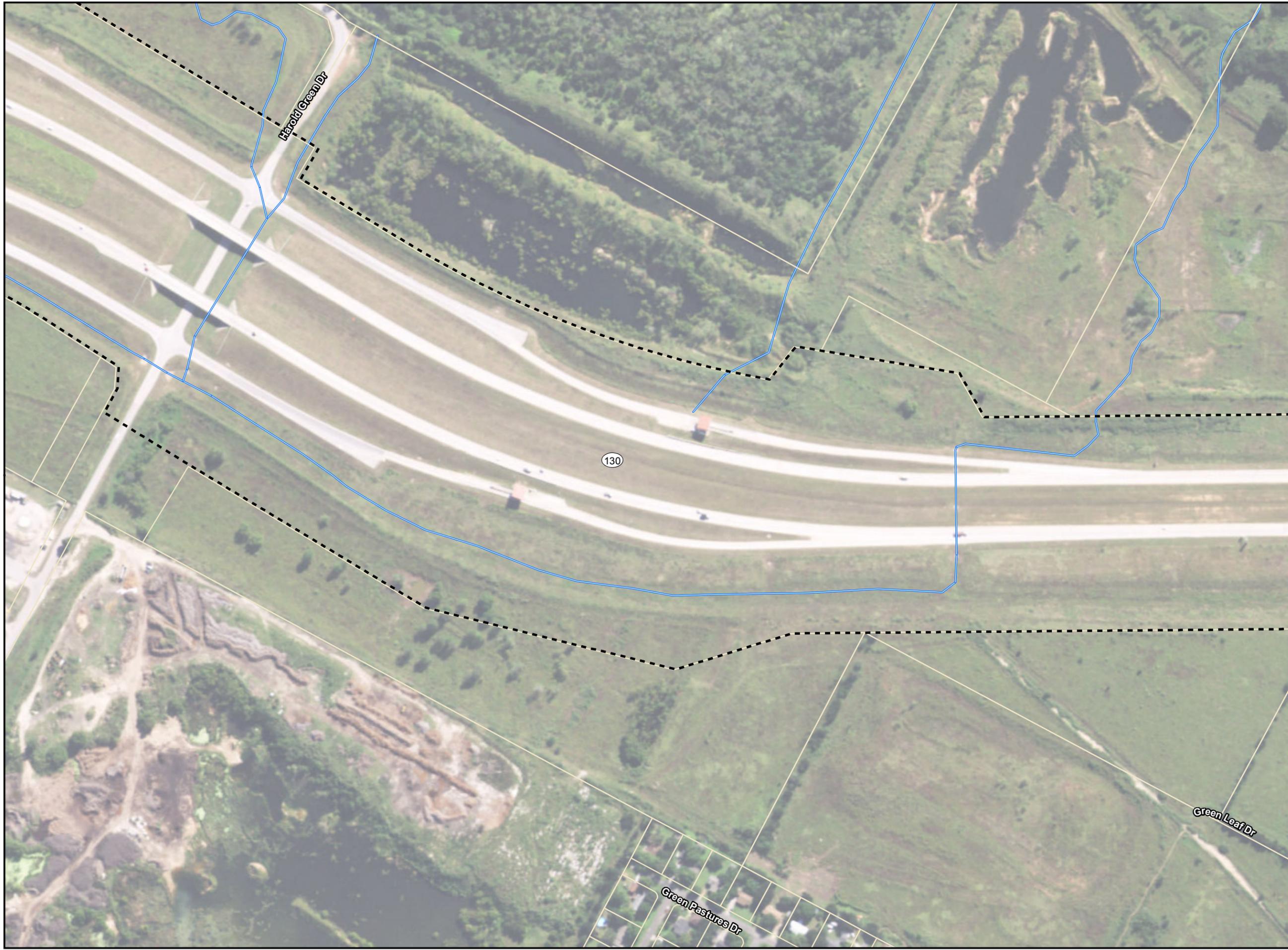
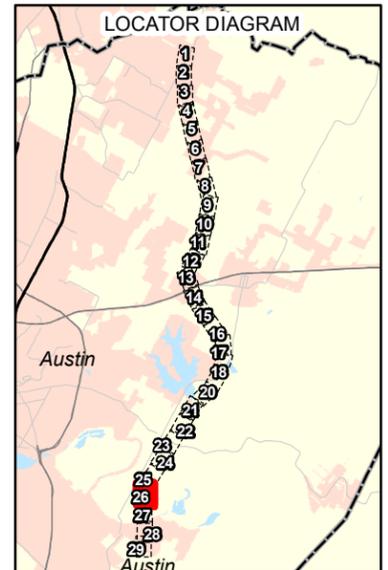
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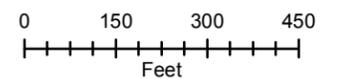
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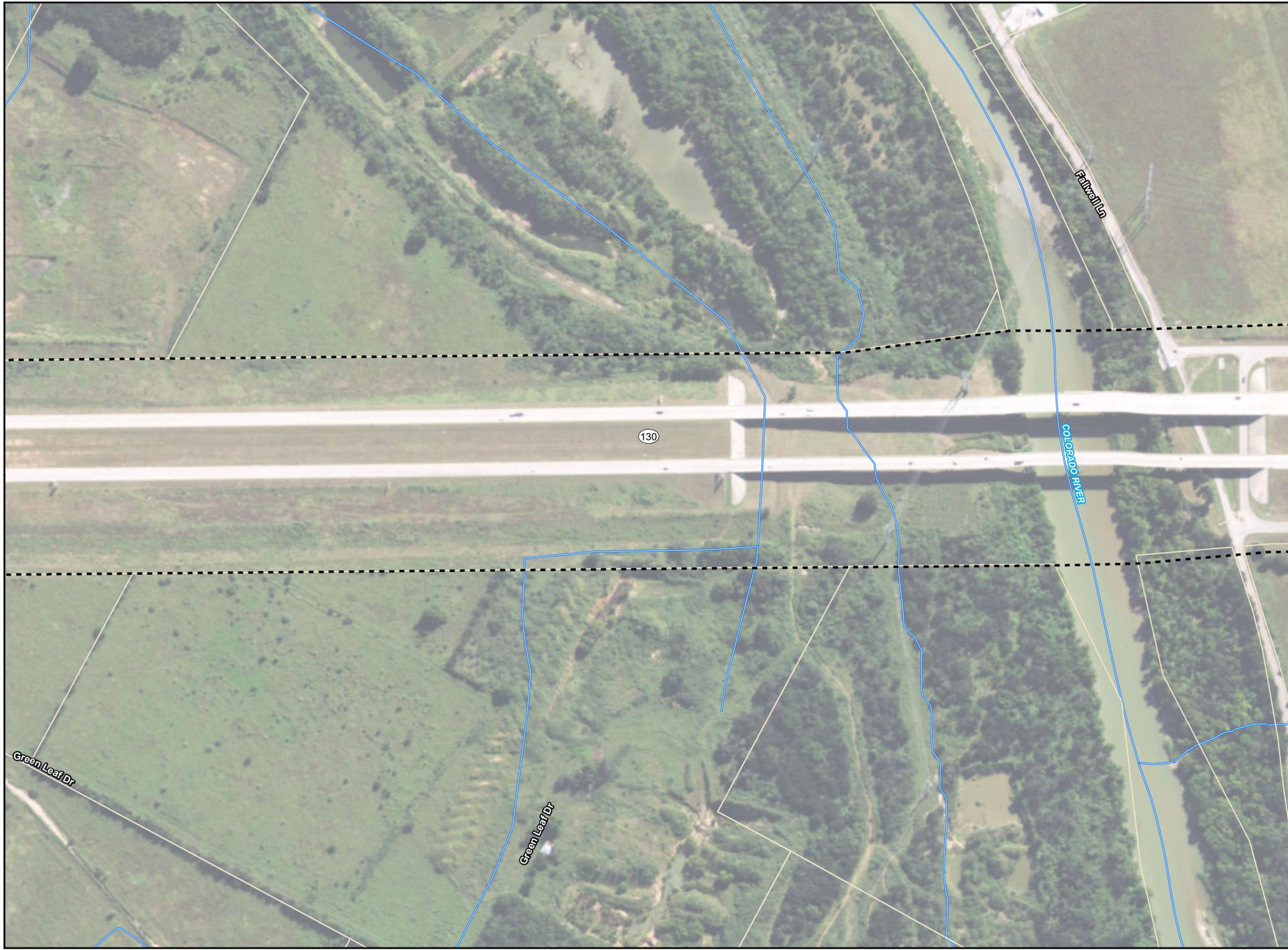
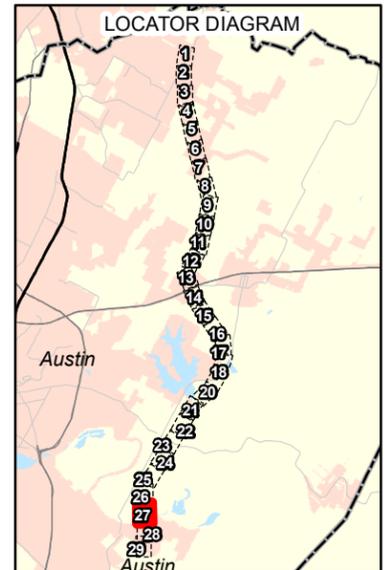
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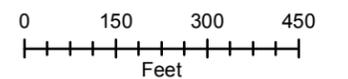
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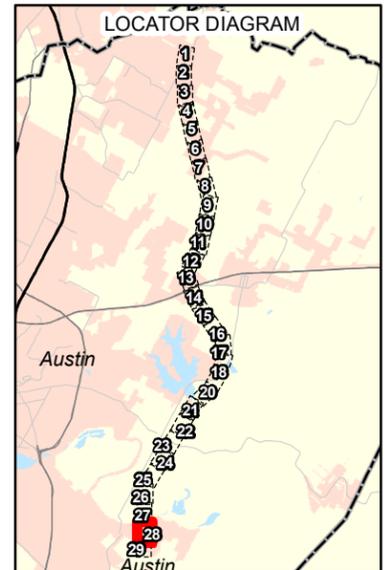
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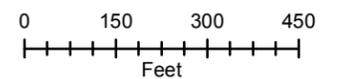
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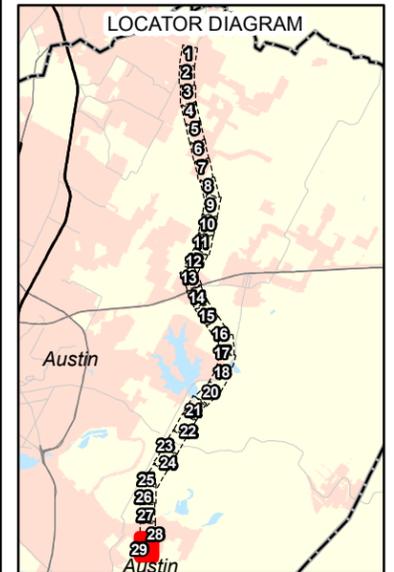


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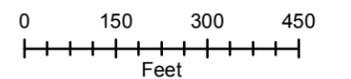
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