COMPREHENSIVE ROADWAY SAFETY ACTION PLAN

High Injury Network Overview and Methodology

September 2024

Introduction

The development of a High Injury Network (HIN) is a key element of a safety plan that helps identify where fatal and serious injury crashes have occurred at the greatest density over a period of time. The HIN development process involves counting fatal and serious injury crashes along each corridor throughout the region, calculating severity-weighted crash density scores for each corridor, and identifying roadway segments that meet an established score threshold for each transportation mode. The HIN for the Doña Ana County Safety Action Plan is part of the overall Priority Safety Network, and is used to prioritize the selection of safety improvement projects. This memorandum describes the crash data sources, methodologies, and thresholds for the development of an HIN for Doña Ana County.

Crash Data Sources and Study Area

Crash data for the 5-year period of 2018-2022 was acquired from the New Mexico Department of Transportation (NMDOT) for the Safety Action Plan study area, which includes non-Interstate roads and highways outside of the municipal boundaries for the City of Las Cruces. The HIN maps use fatal and injury crash data and include a composite conditions map and individual maps by mode of transportation.

High Injury Network Analysis Methodology

The process of defining scoring thresholds and examining the segments that should be included in the HIN utilizes the following steps:

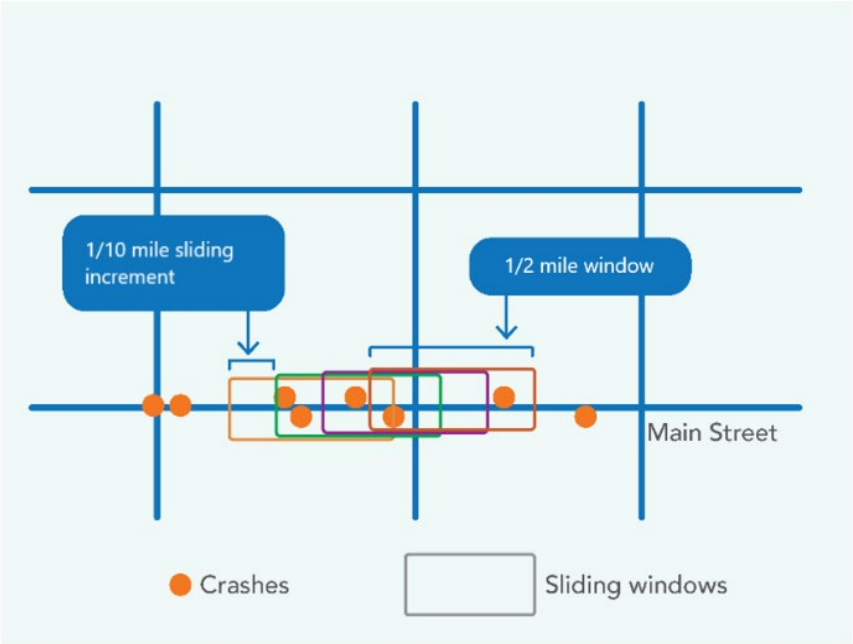
1. Map the sliding window analysis results for all modes collectively and each mode individually.
2. For each mode, determine the threshold score required to be included in the HIN for that mode. This step eliminates streets that have a lower severity-weighted crash density, prioritizing segments that have higher frequencies of severe crashes.
3. Produce maps that show the segments that meet the threshold for all modes collectively and each mode individually.

Sliding Window Analysis: The HIN was developed using a sliding window analysis, which helps safety professionals better understand and quantify safety performance along a transportation network, identifying segments with the highest densities of severe crashes. The analysis works by determining the number and severity of crashes along a roadway segment (i.e., the window) and sliding that window along

the network at set intervals. In this approach, the window is moved along a corridor, counting the number of crashes by density and severity by mode that occurred within each successive segment.

Segmentation: To perform this HIN analysis, all roads were split based on road segments, and then combined into corridors based on name and functional class. The analysis segment windows extended 0.5 miles in length and slid along the network at 0.1-mile increments. A lateral buffer of 25 feet on either side of the segment was used to capture crashes that may not be precisely aligned within the roadway.

Figure 1: Example of Slide Window Analysis



Both intersection and segment crashes were included in this evaluation, as the focus was on overall corridor conditions. Crash events occurring within the bounds of an intersection were counted on both corridors for the purposes of identifying the HIN. An example of a sliding windows analysis is shown in Figure 1. The sliding windows analysis was conducted for transportation modes that include bicycle, pedestrian, motorcycle, and motor vehicle. For crashes involving multiple modes, a crash was assigned a single mode based on the most vulnerable mode involved. For example, a crash between a motor vehicle and a bicyclist would be classified as a bicycle crash, but it would not be included in the "motor vehicles only" HIN analysis.

Scoring and Evaluation Process: A score for each window was determined based on the frequency and severity of crashes by mode using the KABCO injury classification scale. Fatal and serious injury (K+A) crashes were given a weight of 3, other visibility injury (B) a weight of 1, complaint of pain (C) crashes a weight of zero, and PDO (O) crashes a weight of zero. Once the weights are established and applied to the crashes, the number of crashes is aggregated to each window, incorporating the crash severity weighting.

For example, if a segment had one K crash, two A crashes, zero B crashes, two C crashes, and five O crashes, it would receive a score of 9; (1x3) + (2x3) + (0x1) + (2x0) + (5x0). This method of weighting places a greater focus on fatal and serious injury crashes.

High Injury Network Thresholds: Setting the sliding windows score threshold for each mode will determine which corridors are selected for inclusion in the HIN. These scores may differ by transportation mode. For example, a score of 3 may be high for the bicycle network, but relatively low for a motor vehicle network since there are generally more motor vehicle crashes than bicycle crashes. A segment that meets or exceeds the score threshold for that mode will be included in that mode's HIN. **The HIN for all modes contains 28% of the fatal and injury crashes on just 3% of the County's roadway miles.** The threshold scores used for the Doña Ana County CSAP are listed below.

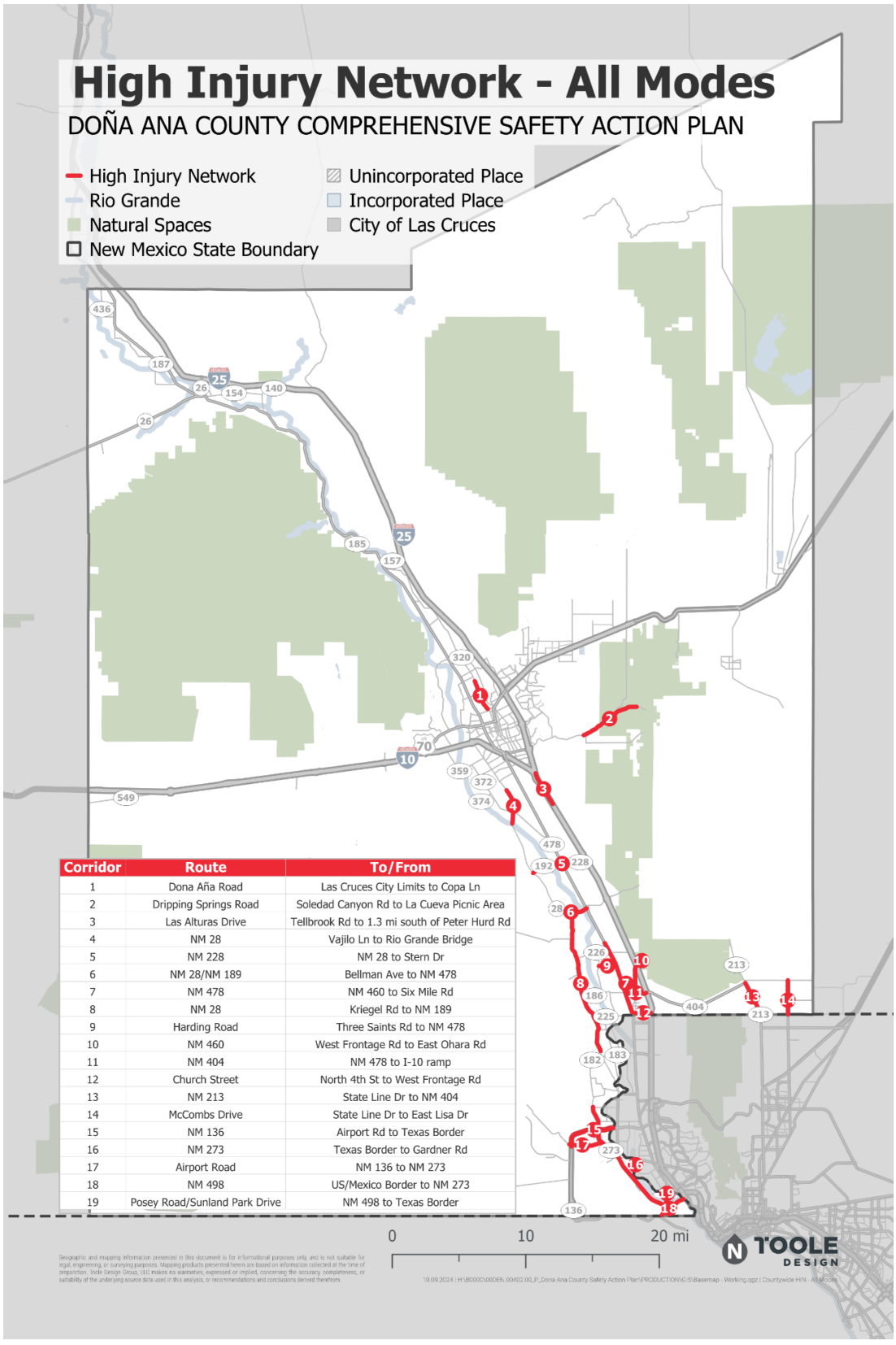
Table 1: HIN Threshold Score by Mode

Mode	Threshold Score
All Modes	8
Pedestrian	3
Bicycle	3
Motorcycle	5
Motor Vehicle Only	7

HIN Network Maps

Figure 2 to **Figure 6** show the HINs for all crashes, pedestrian, bicycle, motorcycle, and motor vehicle modes, respectively, within the Safety Action Plan study area.

Figure 2: High Injury Network – All Modes



Corridor	Route	To/From
1	Dona Aña Road	Las Cruces City Limits to Copa Ln
2	Dripping Springs Road	Soledad Canyon Rd to La Cueva Picnic Area
3	Las Alturas Drive	Tellbrook Rd to 1.3 mi south of Peter Hurd Rd
4	NM 28	Vajilo Ln to Rio Grande Bridge
5	NM 228	NM 28 to Stern Dr
6	NM 28/NM 189	Bellman Ave to NM 478
7	NM 478	NM 460 to Six Mile Rd
8	NM 28	Kriegel Rd to NM 189
9	Harding Road	Three Saints Rd to NM 478
10	NM 460	West Frontage Rd to East Ohara Rd
11	NM 404	NM 478 to I-10 ramp
12	Church Street	North 4th St to West Frontage Rd
13	NM 213	State Line Dr to NM 404
14	McCombs Drive	State Line Dr to East Lisa Dr
15	NM 136	Airport Rd to Texas Border
16	NM 273	Texas Border to Gardner Rd
17	Airport Road	NM 136 to NM 273
18	NM 498	US/Mexico Border to NM 273
19	Posey Road/Sunland Park Drive	NM 498 to Texas Border

Figure 3: High Injury Network – Pedestrians

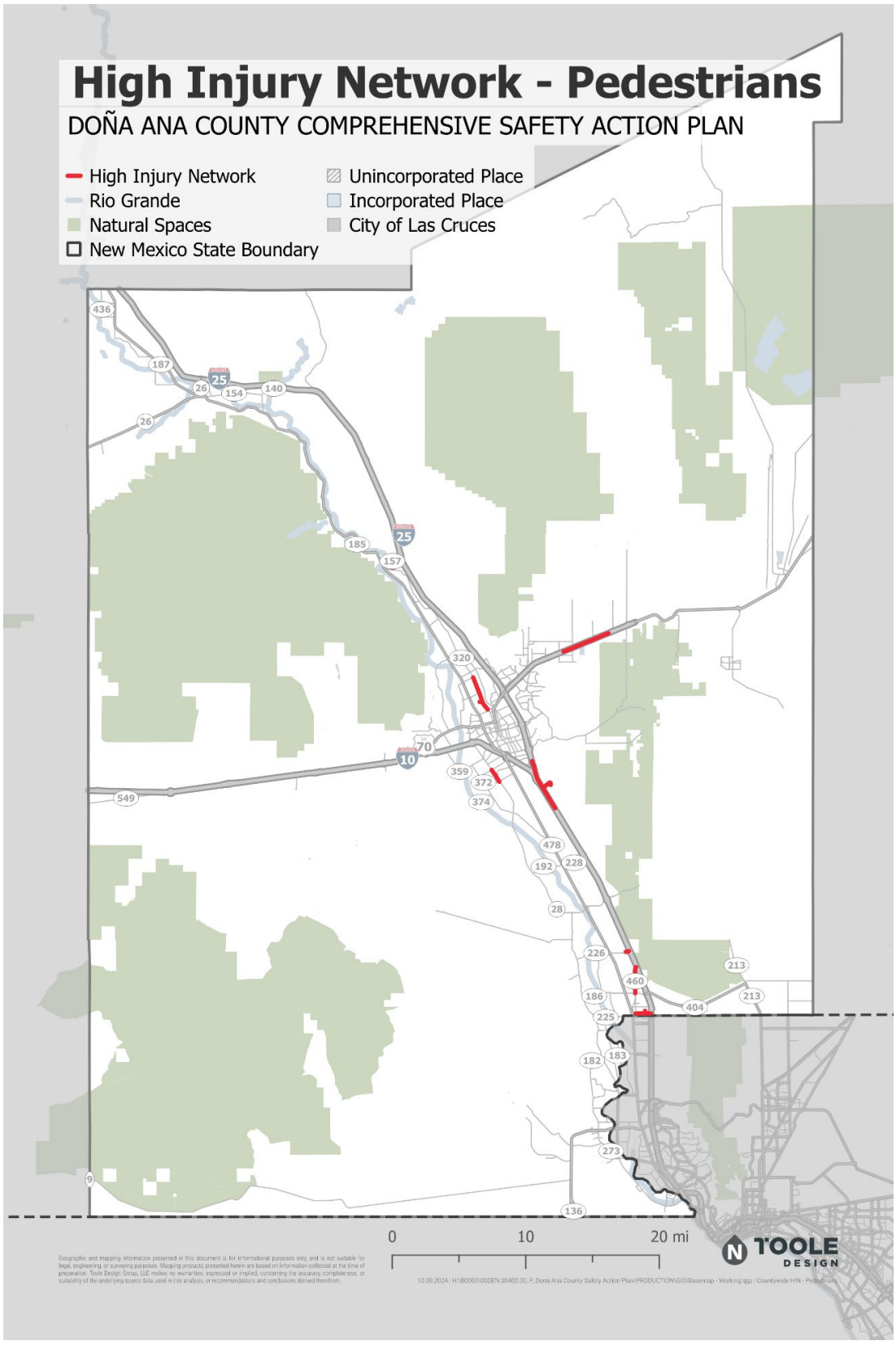


Figure 4: High Injury Network – Bicyclists



Figure 5: High Injury Network – Motorcycles

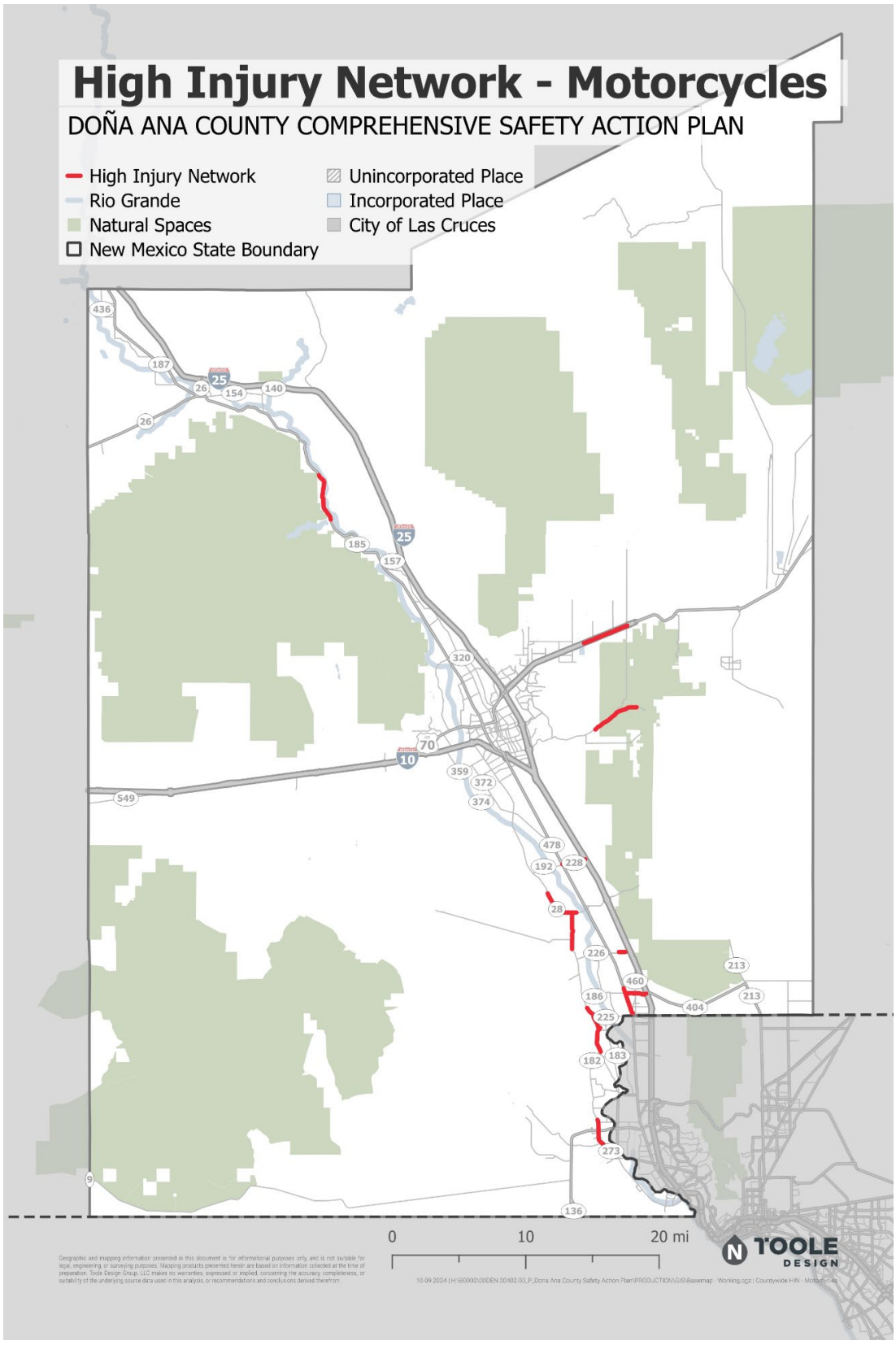


Figure 6: High Injury Network – Motor Vehicles

