

## *APPENDIX H: UT's Guadalupe Street Corridor Safety Study and Recommendations*



May 11, 2016 Public Meeting

## FINAL REPORT

**DATE:** October 14, 2016  
**TO:** Mr. David L. Rea  
**FROM:** Brian D. Van De Walle, P.E. PTOE  
**JOB NUMBER:** 069225002  
**RE:** Safety Study  
Guadalupe Street Corridor



A handwritten signature in blue ink that reads "Brian D. Van De Walle".

This memorandum documents the results of a safety study for Guadalupe Street from Martin Luther King, Jr. Boulevard to 29<sup>th</sup> Street in the City of Austin, Texas. Crash data was analyzed for both Guadalupe Street and Dean Keeton corridors near the University of Texas Campus, however the top seven crash locations all occurred along Guadalupe. The following pages document the results of crash data analysis and walk audits of areas of high crash rates (hot spots) along the corridors. Collision diagrams are presented along with details of each accident in table format, followed by field observations and possible safety countermeasures. Safety countermeasures are presented based on selection by the review committee and approved for implementation by City of Austin staff.

Guadalupe Street is an undivided four-lane arterial with a posted speed limit of 35 mph and runs in a general North-South direction from Martin Luther King, Jr. Boulevard to 29<sup>th</sup> Street. Guadalupe Street has right turn bays at 24<sup>th</sup> Street and Martin Luther King (MLK), Jr. Boulevard in the southbound direction. Guadalupe Street is a primary arterial street which runs bi-directional from Martin Luther King, Jr. Boulevard north to 45<sup>th</sup> Street and southbound only from Martin Luther King, Jr. Boulevard south to Cesar Chavez Street. It services most of the automobile, bicycle, and pedestrian traffic for the University of Texas at Austin, supplemented by alternative, unsignalized routes with many stop signs running in a general North-South direction to the west in an area known colloquially as "West Campus".

## CRASH DATA ANALYSIS

### SCORING SYSTEM AND HOT SPOT SELECTION

After completion of the crash analysis by intersection along the corridor, determination of seven (7) hot spots were determined based on frequency of accidents and crash severity based upon injuries incurred. A summary of the scoring system, with associated weights, is shown in **Table 1**. During the walk audits with both the University and the City, the pedestrian crossing in front of the West Mall was added.

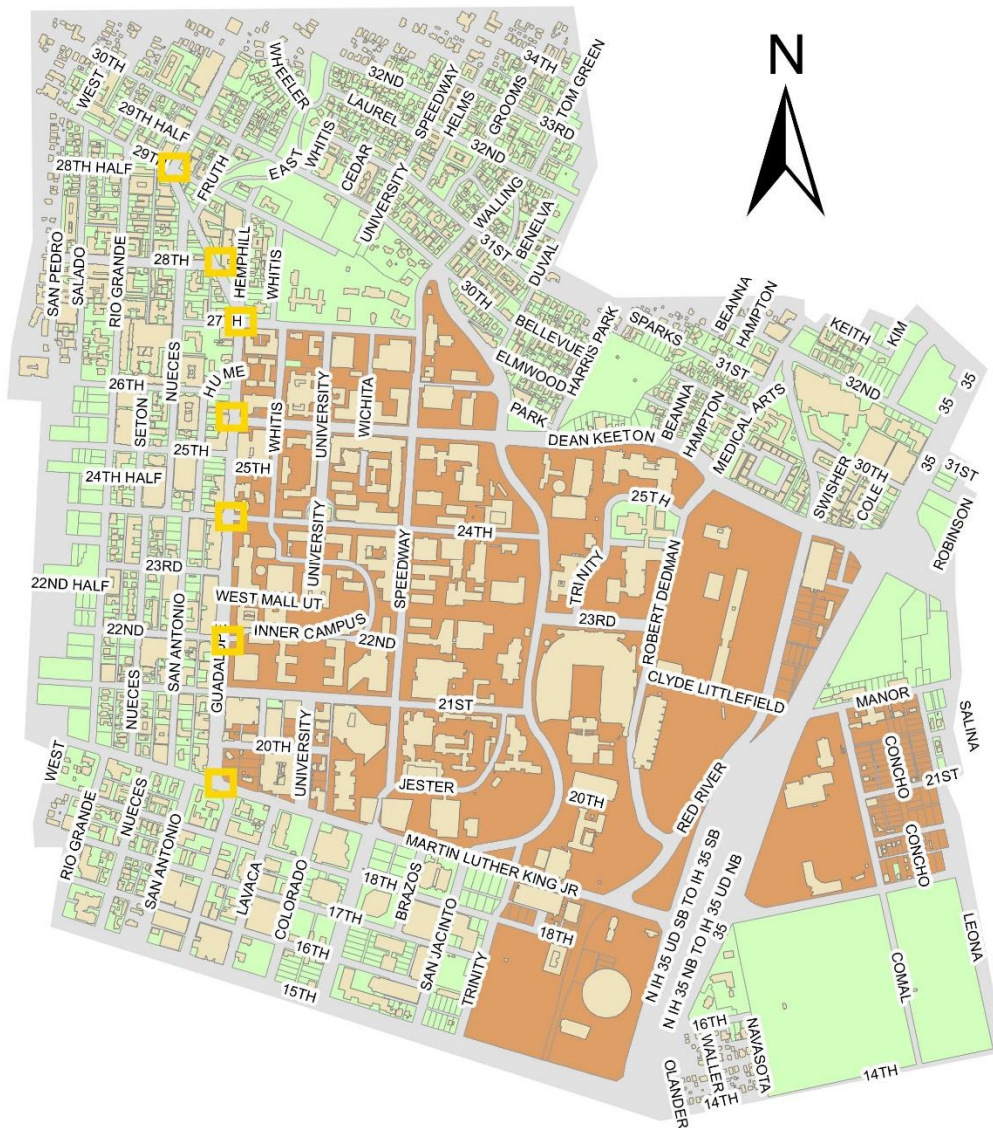
Table 1 – Accident Evaluation

Accident Evaluation By Severity													
Rank	Intersection	Accidents By Type						Weighting Factors					Score
			1	2	3	4	5	1000	25	50	100000	1	
		Total	Incap	Non-Incap	Possible Injury	Killed	No Injury	Incap	Non-Incap	Possible Injury	Killed	No Injury	
1	Guadalupe / 27th	20	2	6	3	0	9	2000	150	150	0	9	2309
2	Guadalupe / MLK	22	1	5	4	0	12	1000	125	200	0	12	1325
3	Guadalupe / Dean Keeton	11	1	5	3	0	2	1000	125	150	0	2	1277
4	Guadalupe / 22nd	10	1	4	2	0	3	1000	100	100	0	3	1203
5	Guadalupe / 24th	12	1	4	1	0	6	1000	100	50	0	6	1156
6	Guadalupe / 29th	16	0	5	3	0	8	0	125	150	0	8	283
7	Guadalupe / 28th	19	0	4	3	0	12	0	100	150	0	12	262
8	Guadalupe / 25th	8	0	1	4	0	3	0	25	200	0	3	228
9	Dean Keeton / Red River	12	0	2	3	0	7	0	50	150	0	7	207
10	Guadalupe / Nueces	9	0	4	2	0	3	0	100	100	0	3	203
11	Dean Keeton / Speedway	5	0	0	4	0	1	0	0	200	0	1	201
12	Guadalupe / 26th	11	0	2	1	0	8	0	50	50	0	8	108
13	Guadalupe / 21st	15	0	1	1	0	13	0	25	50	0	13	88
14	Dean Keeton / San Jacinto	4	0	2	0	0	2	0	50	0	0	2	52
15	Dean Keeton / Whitus	2	0	0	1	0	1	0	0	50	0	1	51
16	Dean Keeton / Harris Park	3	0	2	0	0	1	0	50	0	0	1	51
17	Dean Keeton / University	1	0	1	0	0	0	0	25	0	0	0	25
18	Dean Keeton / Wichita	1	0	1	0	0	0	0	25	0	0	0	25
19	Dean Keeton / Medical Arts	1	0	0	0	0	1	0	0	0	0	1	1

## SHORT TERM RECOMMENDATIONS

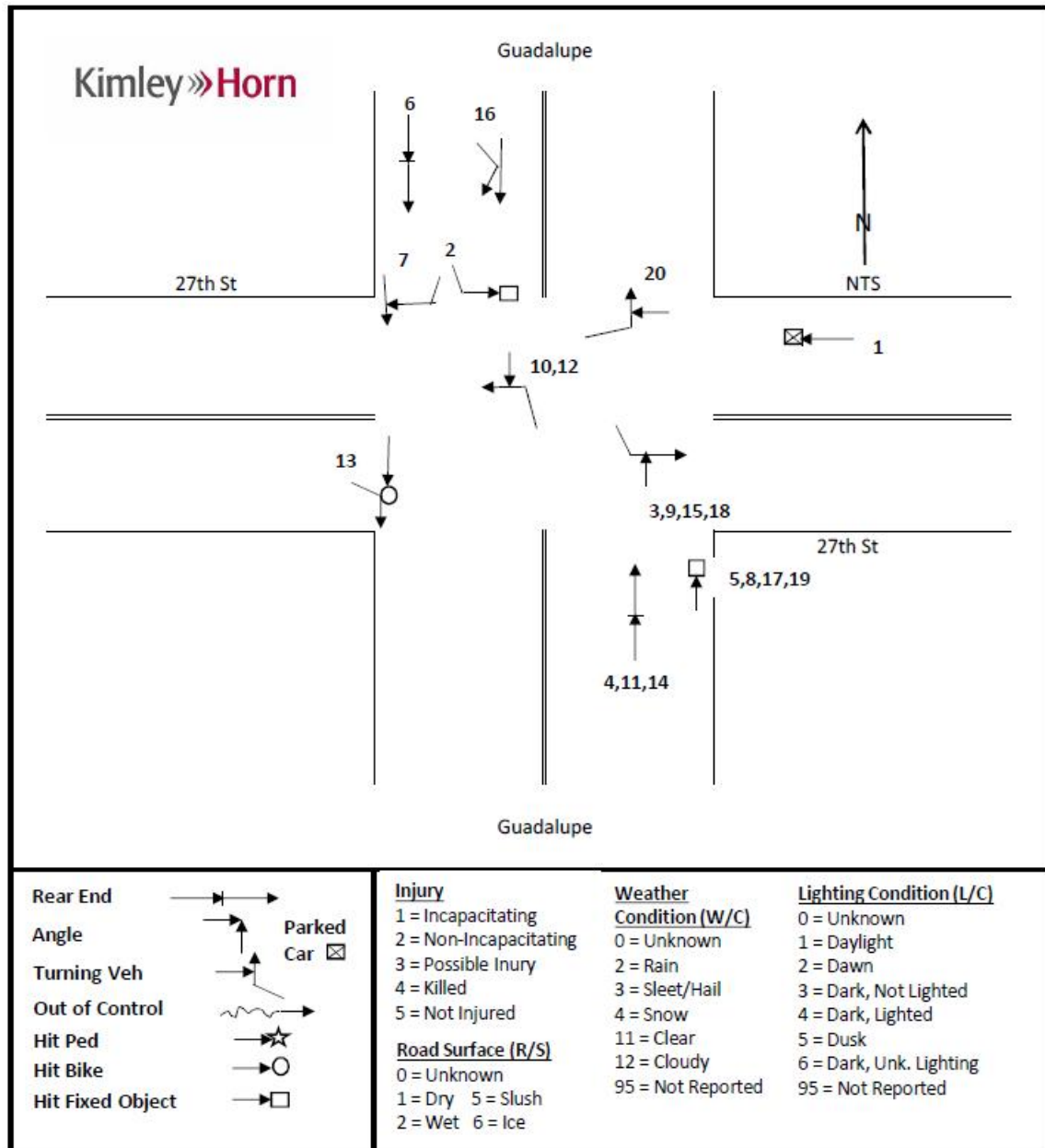
After evaluation of crash data and walk audits of the seven (7) hot spots with the City and the University, impacts of potential safety improvements were developed. Recommended countermeasures for short-term safety improvements by intersection are described in the following section. **Figure 1** shows locations of the top seven (7) hot spots.

Figure 1 – Top 7 Hot Spot Accident Locations by Score



### 1. GUADALUPE AND 27<sup>TH</sup> STREET

#### COLLISION DIAGRAM



### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	1/27/2013	SUN	3:46 AM	5	1	11	4		
2	2/28/2013	THU	2:35 AM	5	1	11	4		
3	3/12/2013	TUE	4:18 PM	5	1	11	0		
4	3/14/2013	THU	2:29 PM	2	1	11	1		
5	7/26/2013	FRI	1:56 PM	5	1	11	1		
6	8/11/2013	SUN	12:51 PM	3	1	11	1		
7	9/24/2013	TUE	11:50 AM	1	1	11	1		
8	12/17/2013	TUE	12:58 AM	5	1	11	4		
9	2/22/2014	SAT	10:38 PM	2	1	11	4		
10	2/27/2014	THU	2:11 PM	1	1	11	1		
11	6/6/2014	FRI	4:11 PM	3	1	11	1		
12	7/11/2014	FRI	3:51 PM	5	1	11	1		
13	7/30/2014	WED	4:49 PM	2	1	11	1		
14	11/14/2014	FRI	7:53 AM	2	1	12	1		
15	12/4/2014	THU	12:12 PM	2	2	2	1		
16	3/11/2015	WED	8:10 AM	5	1	12	1		
17	3/22/2015	SUN	2:25 AM	2	1	11	4		
18	8/28/2015	FRI	9:51 PM	3	1	11	4		
19	11/22/2015	SUN	4:56 PM	3	1	11	1		
20	12/5/2015	SAT	9:57 PM	5	1	11	4		

### FIELD OBSERVATIONS

Accidents occurring at the intersection of Guadalupe and 27<sup>th</sup> can be characterized as being caused by permitted left turns in the north and south direction, as well as rear ends and sideswipes from passing to move around turning and stopped traffic in the northbound and southbound directions. **1 bicycle** accident and **0 pedestrian** accidents were recorded at this location. The lone bicycle accident was caused by a right-turning wrong-way driver from the west on 27<sup>th</sup> Street.

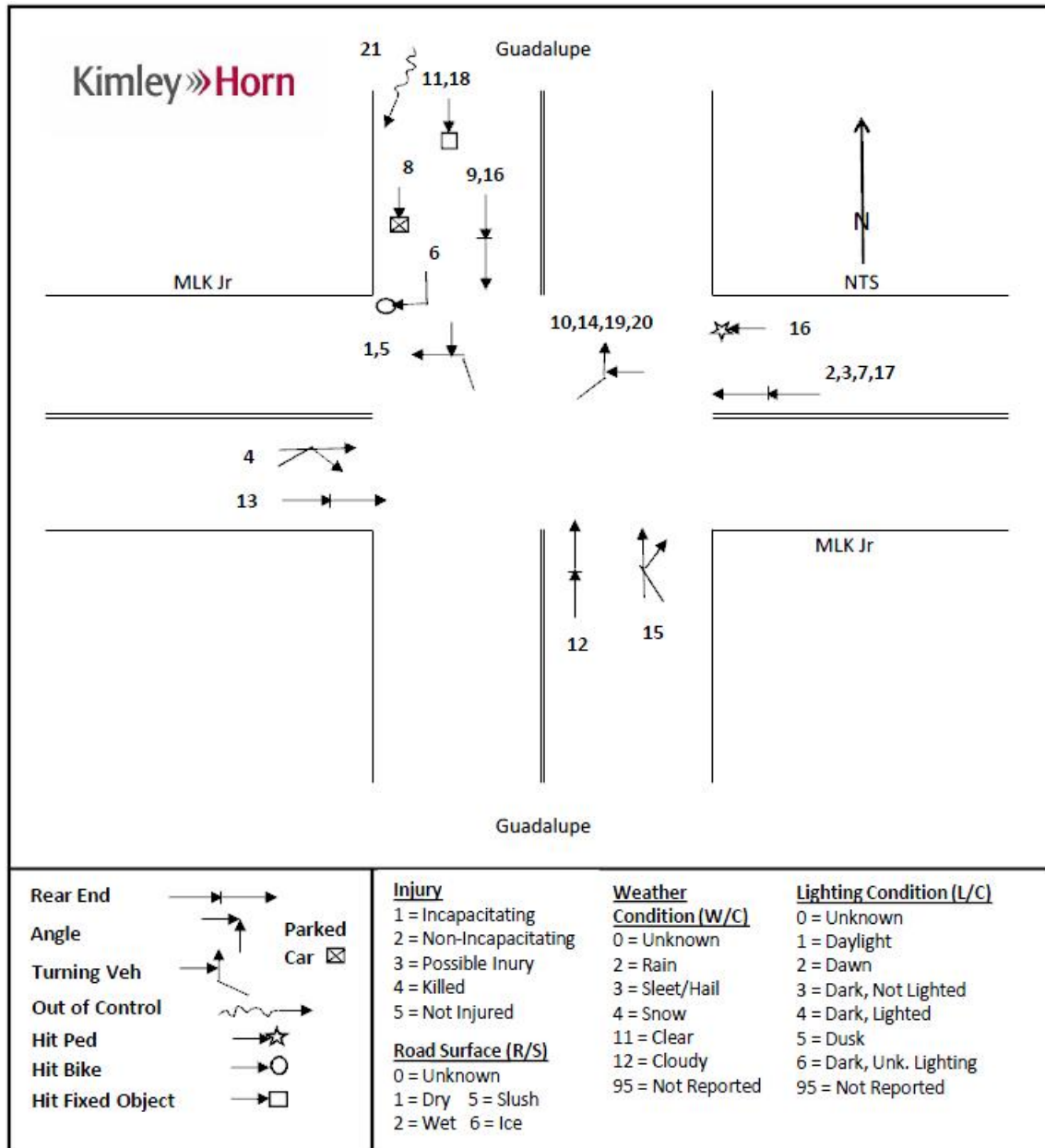
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## POSSIBLE SAFETY COUNTERMEASURES

- **Re-Stripe Crosswalks.** Because most accidents can be linked to the northbound crosswalk area, it is recommended that this crosswalk and westbound lanes be re-striped to improve visibility.
- **Northbound Right Turn Bay.** Consideration of a right-turn bay in the northbound direction could help mitigate rear end and angle accidents from southbound right-turners.
- **Modify Left Turn Signals (Flashing Yellow Arrow).** Changing the left-turn signal heads to flashing yellow arrows and increasing clearance intervals may help reduce accidents from left-turners.
- **Pedestrian Detection for Turning Vehicle Conflicts.** A possible innovative improvement at this intersection would be a pedestrian detection device that changes the left turn indication to a red arrow in off-peak traffic periods.
- **Advisory Speed Signs.** Sharp curves cause dangerous situations for pedestrians and cyclists on this part of Guadalupe, and a slower speed may help mitigate dangerous vehicular behavior. It is suggested to add an advisory speed sign of 25 mph through the curves.

### 2. GUADALUPE AND MARTIN LUTHER KING, JR BLVD

#### COLLISION DIAGRAM



### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	4/13/2013	SAT	2:48 AM	5	1	11	4		
2	5/17/2013	FRI	12:18 PM	2	1	11	1		
3	6/12/2013	WED	3:18 PM	5	1	11	1		
4	7/8/2013	MON	12:07 PM	2	2	2	1		
5	7/10/2013	WED	4:08 PM	2	1	11	1		
6	7/26/2013	FRI	11:53 AM	3	1	11	1		
7	8/9/2013	FRI	12:52 PM	2	1	11	1		
8	10/2/2013	WED	6:11 PM	5	1	11	1		
9	10/14/2013	MON	7:32 PM	3	1	11	4		
10	11/23/2013	SAT	9:41 PM	5	1	11	4		
11	12/15/2013	SUN	2:50 AM	5	1	11	3		
12	1/3/2014	FRI	1:26 AM	5	1	11	4		
13	8/9/2014	SAT	2:52 PM	5	1	11	1		
14	11/5/2014	WED	1:28 PM	5	2	2	1		
15	11/25/2014	TUE	5:00 PM	5	1	11	1		
16	12/28/2014	SUN	2:37 AM	5	1	12	4		
17	3/18/2015	WED	11:44 PM	1	1	11	4		
18	4/10/2015	FRI	4:43 PM	3	1	11	1		
19	5/20/2015	WED	4:51 AM	5	1	11	4		
20	5/28/2015	THU	10:18 PM	5	1	11	4		
21	6/19/2015	FRI	4:02 PM	3	1	11	1		
22	9/19/2015	SAT	10:53 PM	2	1	11	4		

### FIELD OBSERVATIONS

Accidents occurring at the intersection of Guadalupe Street and MLK, Jr. Boulevard. can be characterized as being caused by left turns in the eastbound direction on MLK, right-turners not recognizing the early channelized left on westbound MLK, eastbound traffic turning from MLK onto northbound Guadalupe Street and trying to change lanes around buses or cars, and high activity areas on southbound Guadalupe Street north of the intersection with several parking maneuvers, backing vehicles, and a bike lane crossing at the entry to a channelized right. It was also noted that 10 of 22 accidents occur in the evening hours when it is dark. **1 bicycle** and **1 pedestrian** accident were recorded at the intersection. The bicyclist was hit by a southbound right-turning vehicle and the pedestrian was hit by a westbound vehicle while crossing the crosswalk on the east.

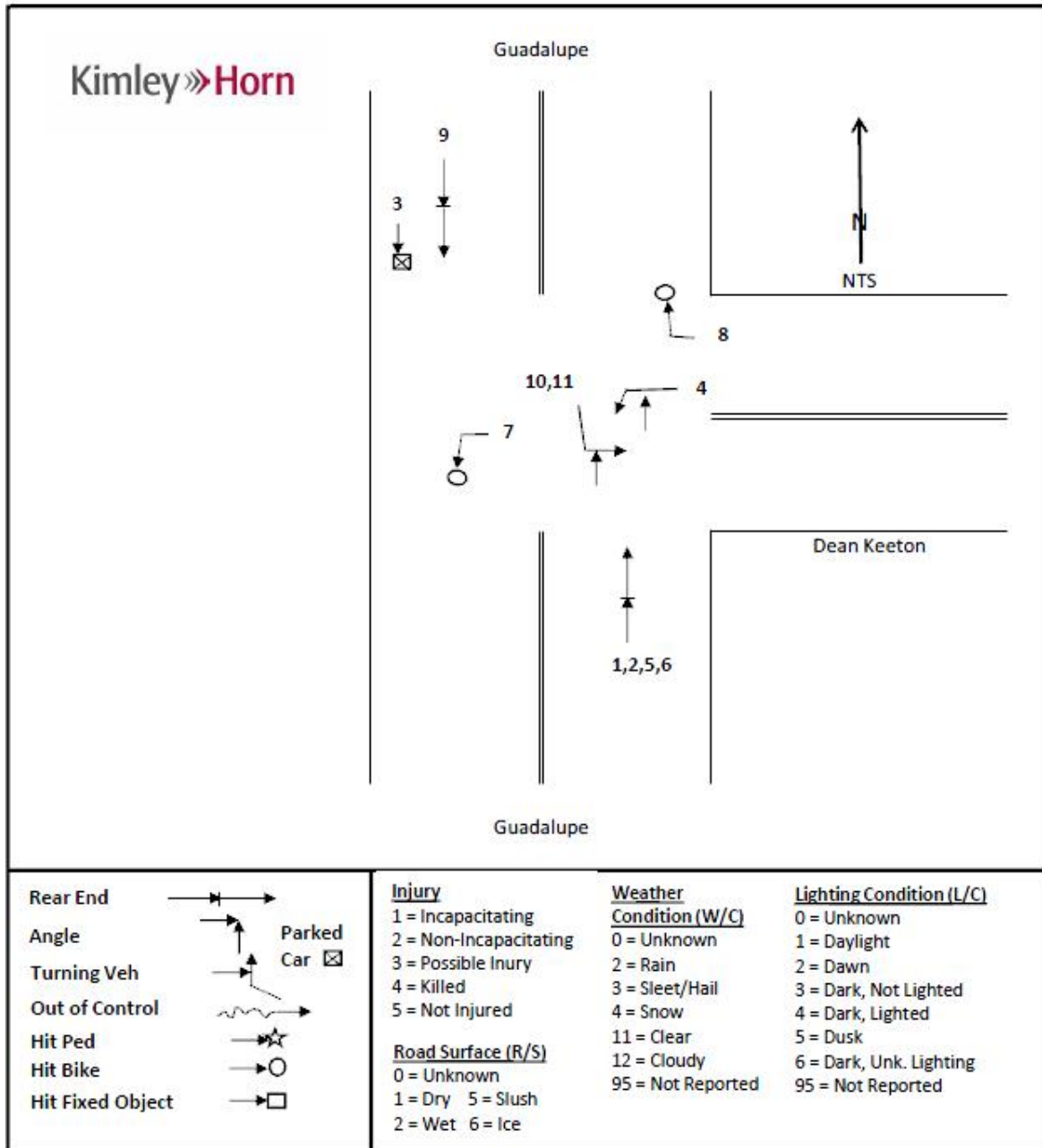
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## POSSIBLE SAFETY COUNTERMEASURES

- **Improve Lighting.** It is recommended that a luminaire be installed on the northwest corner pole of the intersection.
- **Realign/Restripe Southbound Bike Lane/Travel Lanes.** To help reduce southbound accidents and increase cyclist comfort, it is recommended to move cyclist away from curb and adjacent to the outermost travel lane north of the driveway across from 20<sup>th</sup> street. Then, a larger area can be striped off for vehicles turning right in the southbound direction and the cyclists and backing vehicles can be in better view. Per the City of Austin staff, an improvement similar this to address the crossing issue is **in progress**.
- **Add Signage (“Yield to Bikes”).** Additional signage about the crossing traffic and backing vehicles may also be helpful to drivers, such as a “Yield to Bikes” sign. To mitigate accidents for left-turning vehicles in the eastbound direction, it is recommended to install a “No Right Turn on Red” sign in the westbound direction.
- **Change Signal Timing (Extend Clearance Interval).** To mitigate accidents for left-turning vehicles in the eastbound direction, it is recommended to extend the clearance interval.
- **Close Advanced Left Turn Westbound.** For westbound left-turners, pedestrians crossing in the eastbound direction and heading south should be moved to the intersection and cut through area near the island be closed off to traffic. This will help create a more familiar situation for drivers and will allow for safer travel for pedestrians in the area.
- **Adjust Crosswalk Location Southbound.** Lastly, the crosswalk in the channelized right-turn southbound should be pulled back from the intersection where most pedestrians coming southbound are crossing.

### 3. GUADALUPE AND DEAN KEETON STREET

#### COLLISION DIAGRAM



### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	3/11/2013	MON	1:49 PM	2	1	11	1		
2	5/15/2013	WED	10:11 AM	2	2	12	1		
3	7/1/2013	MON	12:06 AM	3	1	11	4		
4	7/12/2013	FRI	1:38 PM	3	1	11	1		
5	7/24/2013	WED	2:54 PM	2	1	11	1		
6	4/21/2014	MON	2:13 AM	5	1	11	4		
7	6/8/2014	SUN	10:04 AM	2	1	11	1		
8	9/5/2014	FRI	9:57 AM	2	1	11	1		
9	5/31/2015	SUN	1:20 AM	5	1	11	4		
10	9/17/2015	THU	12:23 AM	3	1	11	4		
11	10/4/2015	SUN	11:04 AM	1	1	11	1		

### FIELD OBSERVATIONS

Accidents occurring at the intersection of Guadalupe and Dean Keeton can be characterized as being caused by lane change movements and unexpected parking maneuvers at the intersection in the north and southbound directions, respectively. In addition, severe southbound left-turn accidents may be caused by the new dual-service southbound left-turn movement (both occurring after September 1, 2015). **2 bicycle** accidents and **0 pedestrian** accidents occurred at this location during the years 2013-2015. Both bicycle accidents involved turning vehicles (one left, one right) from westbound Dean Keeton.

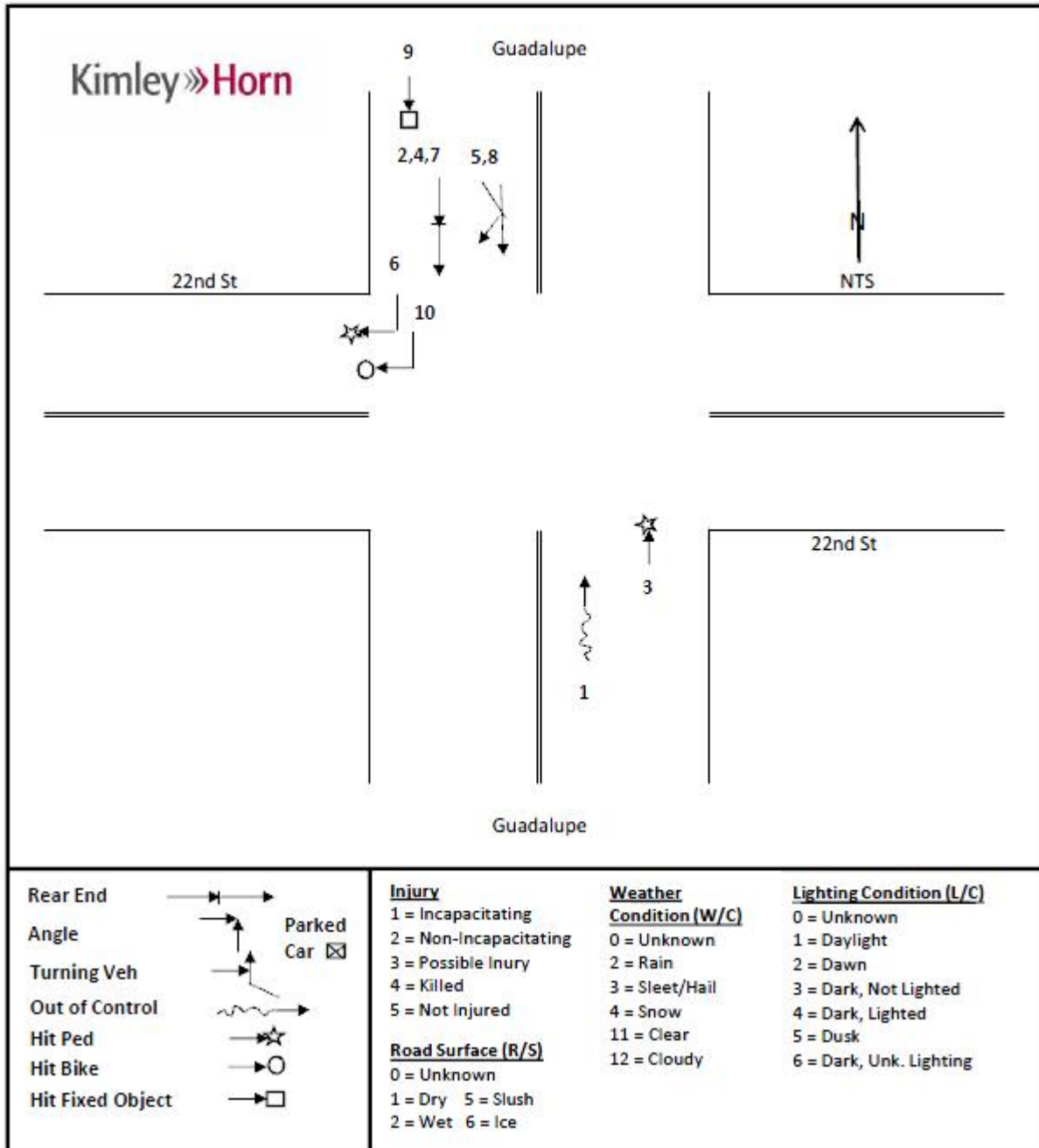
### POSSIBLE SAFETY COUNTERMEASURES

- **Relocate Bus Stop.** To mitigate the most frequent accident (northbound rear-ends), it is recommended to move the bus stop to the far side of the intersection in the northbound direction. A large number of vehicles trying to turn right onto Dean Keeton are frustrated by long stacking buses due to multiple bus stops near this signal, causing aggressive behavior. The 640 university shuttle is the only observed bus turning left at this location, and can be serviced by a nearby stop south of Whitis on Dean Keeton. Coordination with Cap Metro will be required.
- **Re-time Off-Peak Signal Timing Plans (Extend Clearance Interval).** Both of the southbound left accidents occur during off-peak times, and may result from an issue with signal timing, and should be further investigated for the off-peak timing plan.

**Remove/Reduce Commercial Parking Space.** Due to the lane shift and far-side parking on the southbound Guadalupe approach at Dean Keeton, a dangerous situation was observed in the field where the two receiving lanes were too narrow for 2 vehicles to fit through, causing braking and near accidents. It is recommended that the parking for commercial vehicles be eliminated until a full lane width for the outside lane is available next to parking, and to shift deliveries to the rear of the building where there is access. Per the City of Austin staff, an improvement to address the issue is **in progress**.

### 4. GUADALUPE AND 22<sup>ND</sup> STREET

#### COLLISION DIAGRAM



### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	5/4/2013	SAT	12:37 AM	2	1	11	4		
2	10/16/2013	WED	12:33 PM	2	2	2	1		
3	11/25/2013	MON	9:54 AM	1	2	2	1		
4	7/16/2014	WED	1:44 PM	3	1	11	1		
5	9/24/2014	WED	3:38 PM	5	1	11	1		
6	11/5/2014	WED	4:45 PM	3	2	2	1		
7	12/8/2014	MON	7:13 PM	2	1	11	4		
8	1/18/2015	SUN	9:57 AM	5	1	11	1		
9	7/31/2015	FRI	4:34 PM	5	1	11	1		
10	9/28/2015	MON	9:48 AM	2	1	11	1		

### FIELD OBSERVATIONS

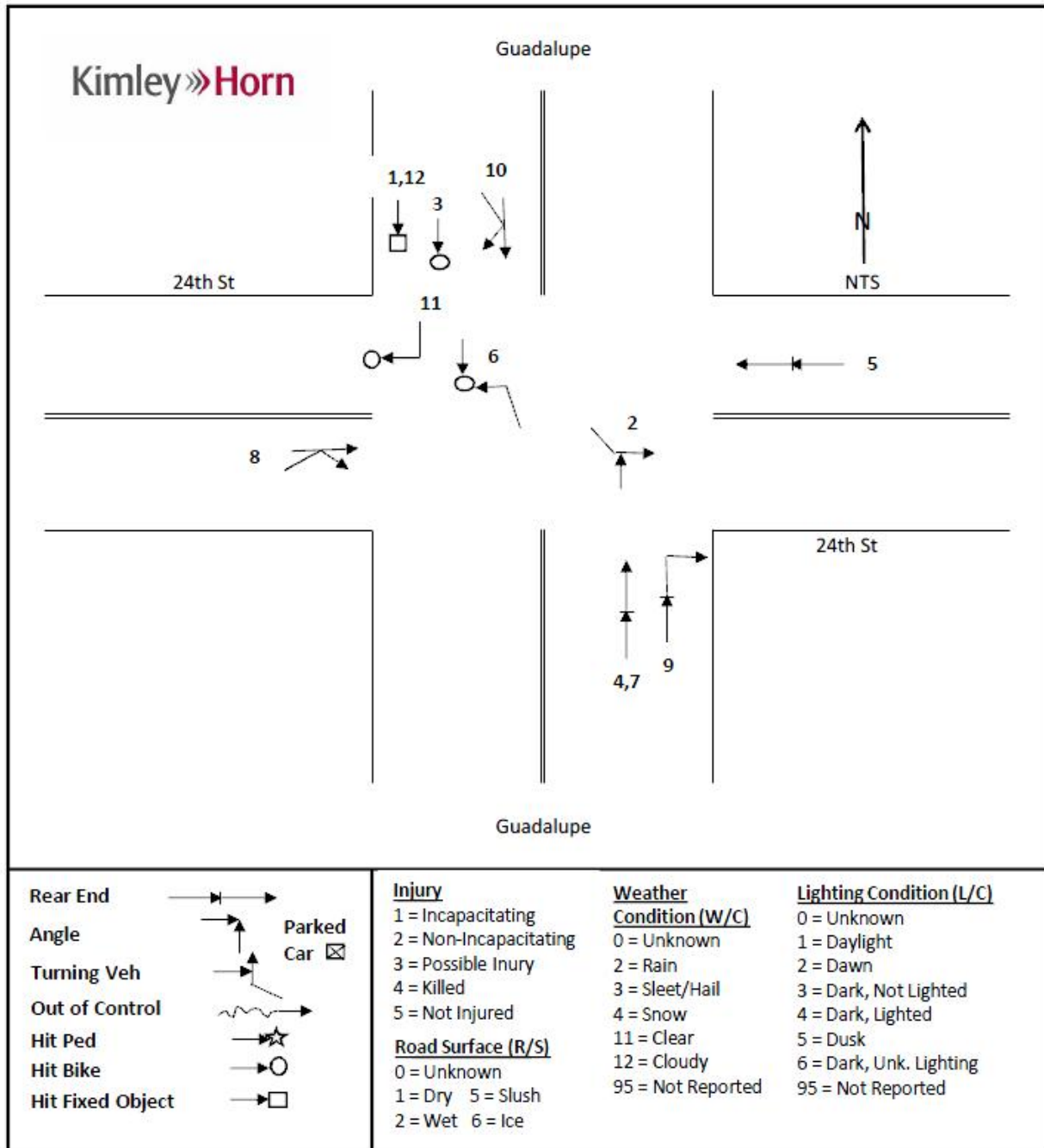
80% of the accidents at the intersection of Guadalupe and 22<sup>nd</sup> street occur on the southbound approach to the intersection. The other 20% of accidents at the intersection occur in the northbound direction. 1 **bicycle** accident and 2 **pedestrian** accidents occurred at this location. One of the pedestrian involved accidents resulted in an incapacitating injury to the pedestrian, occurring in the morning off-peak hours. The incapacitating accident occurred due to a vehicle hitting a pedestrian in the crosswalk on the south side of the intersection. The two other accidents involving bicyclists and pedestrians resulted in non-incapacitating injuries due to right turning vehicles headed southbound.

### POSSIBLE SAFETY COUNTERMEASURES

- **Change signage (“Yield to Bikes” sign).** For the accidents in the southbound direction, it is recommended that a sign with “Yield to Bikes” be placed in a visible area as the intersection at 21<sup>st</sup> also has currently installed. The amount of signs at the intersection are overwhelming and could be consolidated to simplify messages to automobiles.
- **Prohibit Southbound Right Turns.** Prohibiting vehicular right turns may be best at this location, as the visibility of pedestrians crossing is occluded due to parked cars and heavy amounts of pedestrians waiting in the corners.
- **Prohibit Westbound Left Turns.** Prohibiting left turns from Inner Campus Drive onto Guadalupe will help reduce pedestrian and bicycle crossing conflicts where there is currently an unprotected turn movement.
- **Add Leading Pedestrian Interval (LPI).** Adding an LPI will help move pedestrians into the crosswalk prior to a signal green phase to make them more visible to vehicles. This is a possible alternative if prohibiting southbound right turns is not possible.
- **Expand Pedestrian Space.** Crowding of the corners is especially present on the University side (east side) of the intersection, where significant improvements can be made by pulling back the architectural walls and widening sidewalks through the area. It was observed and noted by University employees that the level of pedestrian and bicycle traffic has increased dramatically as student housing development has accelerated in the “West Campus” area, causing problems for eastbound and westbound turners who do not have time during signal cycles to make a safe movement.

### 5. GUADALUPE AND 24<sup>TH</sup> STREET

#### COLLISION DIAGRAM



### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	2/12/2013	TUE	2:43 AM	5	2	2	4		
2	10/15/2013	TUE	8:24 AM	3	1	11	1		
3	1/21/2014	TUE	5:45 PM	2	1	11	1		
4	2/17/2014	MON	9:50 AM	1	1	12	1		
5	7/18/2014	FRI	12:35 AM	5	2	2	4		
6	10/31/2014	FRI	9:24 AM	2	1	11	1		
7	12/4/2014	THU	4:57 PM	5	2	5	1		
8	12/12/2014	FRI	10:33 AM	5	1	12	1		
9	12/25/2014	THU	7:41 PM	2	1	11	4		
10	1/18/2015	SUN	9:57 AM	5	1	11	1		
11	9/28/2015	MON	9:48 AM	2	1	11	1		
12	7/31/2015	FRI	4:34 PM	5	1	11	1		

### FIELD OBSERVATIONS

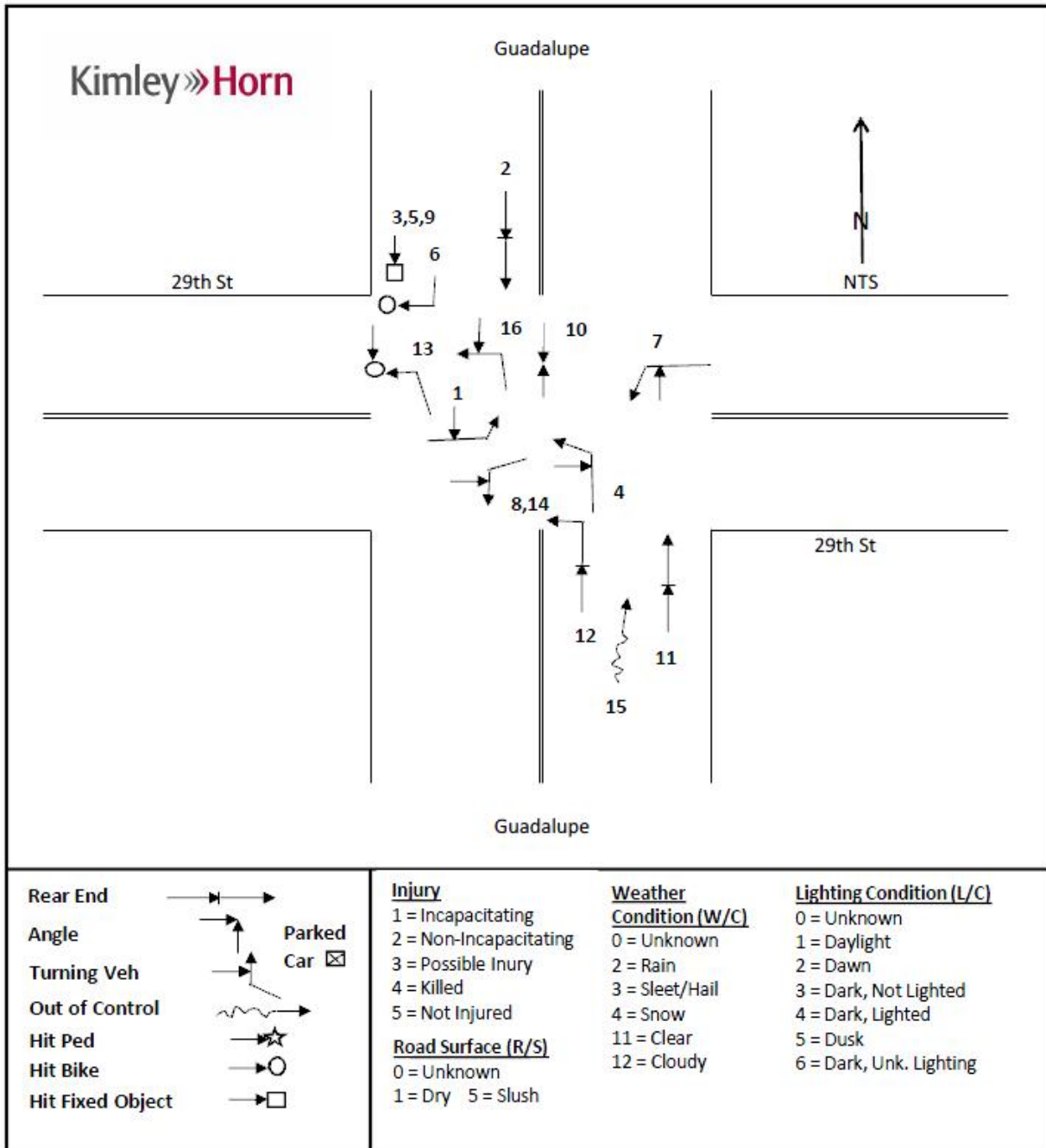
As with Guadalupe and 22<sup>nd</sup>, accidents occurring at the intersection of Guadalupe and 24<sup>th</sup> Street are primarily occurring in the southbound direction, and secondarily in the northbound direction, likely attributed to aggressive behavior for lane changing due to buses, or unexpected pedestrians in the crosswalk. **3 bicycle** accidents and **0 pedestrian** accidents occurred at this intersection. 25% of the accidents at this location involved bicycles in the southbound direction, suggesting that visibility of bicycles to motorists may be an issue. One accident involved an illegal left turn in the northbound direction around the time of the morning peak on a Friday.

### POSSIBLE SAFETY COUNTERMEASURES

- **Relocate Bus Stops.** It would be beneficial to move near-side bus stops to the far side of the intersection, especially in the southbound direction, as buses stop a few hundred feet from the intersection and bikes squeeze by on the outside lane to the beginning of a bike lane, occluded from view from motorists. Moving the bus stop on the northbound side to the far side of the intersection will hopefully help mitigate accidents at this location.
- **Re-stripe Southbound Approach (add Bike Box).** The lane width of the southbound right turn is below the acceptable minimum lane width at 7.5' wide. It is suggested that a sharrow pavement marking (as on Guadalupe between 27<sup>th</sup> and 29<sup>th</sup> Streets) replace the bike lane with a bike box in front of the stop bar for safer operation.
- **Expand Pedestrian Space.** The architectural wall on the southeast corner could be moved back to improve visibility of pedestrians for right turners.

### 6. GUADALUPE AND 29<sup>TH</sup> STREET

#### COLLISION DIAGRAM



### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	3/10/2013	SUN	1:46 AM	2	2	2	4		
2	4/15/2013	MON	7:02 PM	2	1	12	1		
3	7/31/2013	WED	4:12 AM	5	1	11	4		
4	8/4/2013	SUN	11:53 AM	5	1	11	1		
5	8/8/2013	THU	3:15 AM	5	1	11	4		
6	10/29/2013	TUE	12:10 PM	2	1	11	1		
7	11/13/2013	WED	6:55 PM	5	1	11	4		
8	1/23/2014	THU	5:59 PM	5	2	2	4		
9	3/23/2014	SUN	2:49 AM	3	1	11	4		
10	5/12/2014	MON	10:44 AM	3	1	2	1		
11	7/1/2014	TUE	2:41 PM	5	1	11	1		
12	8/23/2014	SAT	12:09 AM	5	1	11	4		
13	10/14/2014	TUE	5:00 PM	3	1	11	1		
14	6/11/2015	THU	2:05 PM	2	1	11	1		
15	3/24/2015	TUE	12:38 PM	2	1	11	1		
16	9/12/2015	SAT	1:12 PM	5	1	11	1		

### FIELD OBSERVATIONS

At the intersection of Guadalupe and 29<sup>th</sup>, accidents occur primarily in southbound direction (over 50%) and almost 50 percent of all accidents are left turns, many of which occur in the off-peak period. In addition, 5 of 16 accidents occur after midnight. It appears that most accidents could be attributed to high speeds and poor sight distance due to the curvature of Guadalupe at the intersection as well. **2 bicyclist** accidents and **0 pedestrian** accidents occurred at this intersection. Of particular concern is bike accidents and vehicles hitting "fixed objects" which has been previously mislabeled in a report for a cyclist, but could also be a stopped vehicle, such as the buses at the southbound bus stop.

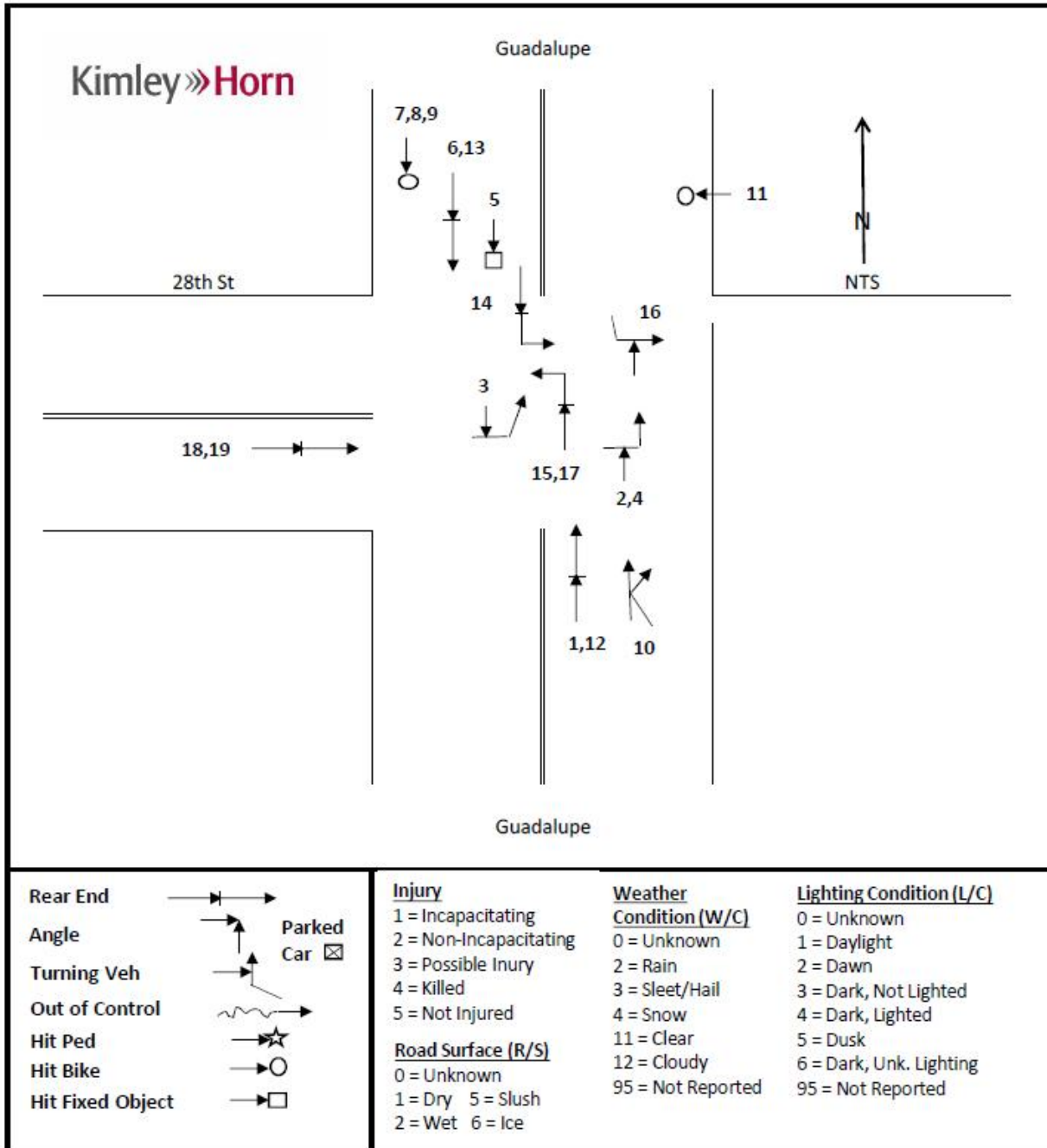
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## POSSIBLE SAFETY COUNTERMEASURES

- **Advisory Speed Signs.** Sharp curves cause dangerous situations for pedestrians and cyclists on this part of Guadalupe, and a slower speed may help mitigate dangerous vehicular behavior. It is suggested to add an advisory speed sign of 25 mph through the curves.
- **Relocate Bus Stops.** It is suggested to move the bus stop to a more advantageous location away from the intersection, either further back on the segment at 30<sup>th</sup> street or to the far side.
- **Improve Lighting.** Lighting should be improved at the northeast corner of the intersection where there is no luminaire and the existing pole has enough height for an arm to be added.
- **Add Protected Left Turns (Eastbound/Westbound).** Consideration should be given to adding a protected left turn in the east and west directions during the off-peak.
- **Restripe Crosswalk and Replace Ramps.** The southbound pedestrian crosswalk can also be repaired by placing ADA compliant ramps that are perpendicular to the curb, rather than diagonal, and restriping the crosswalk with high-visibility continental (bar) style pavement markings.
- **Reconstruct Southwest Corner (Curb Extensions).** Right turners from the eastbound direction can also be coerced to reduce speed by extending the curb to the north and east at the southwest corner of the intersection. This will also help reduce the crossing distance for pedestrians and provide space to stand.

### 7. GUADALUPE AND 28<sup>TH</sup> STREET

#### COLLISION DIAGRAM



### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	2/25/2013	MON	11:44 PM	5	1	11	4		
2	3/22/2013	FRI	11:28 PM	5	1	11	4		
3	4/2/2013	TUE	6:39 PM	2	2	2	1		
4	6/22/2013	SAT	12:23 AM	5	1	11	4		
5	11/6/2013	WED	8:42 AM	5	2	12	1		
6	12/3/2013	TUE	8:30 AM	3	1	11	1		
7	2/22/2014	SAT	1:58 AM	3	1	11	4		
8	3/7/2014	FRI	10:53 AM	2	1	11	1		
9	4/4/2014	FRI	5:57 PM	2	1	11	1		
10	4/15/2014	TUE	7:41 AM	5	1	11	1		
11	5/9/2014	FRI	1:16 PM	3	1	12	1		
12	9/7/2014	SUN	2:56 PM	2	1	11	1		
13	12/7/2014	SUN	1:20 PM	5	1	12	1		
14	3/30/2015	MON	1:39 PM	5	1	12	1		
15	5/11/2015	MON	5:23 PM	5	1	12	1		
16	7/29/2015	WED	4:15 PM	5	1	11	1		
17	11/10/2015	TUE	9:16 PM	5	1	12	4		
18	5/11/2015	MON	3:33 PM	5	1	12	1		
19	11/20/2015	FRI	2:37 AM	5	1	11	4		

### FIELD OBSERVATIONS

Although the intersection of Guadalupe and 28<sup>th</sup> Street was not one of the 6 hot spots, it did have the highest number of accidents at 19, and is thus being included as a “hot spot” for countermeasures. **4 bicyclist** accidents and **0 pedestrian** accidents occurred at this location. The bicycle accidents can likely be attributed to high speeds in a shared lane in vicinity of this intersection, as well as many unprotected left and right-turning vehicles trying to access businesses along the segment. In addition, backing traffic from the east side where there is a 220' stretch of no curb results in dangerous backing maneuvers onto Guadalupe from pull-in spots.

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**POSSIBLE SAFETY COUNTERMEASURES**

- **Add a Pedestrian Hybrid Beacon (PHB).** A PHB near the intersection would be helpful, but it would require a ramp and curbed area to be installed on the east side where there is currently no curb. Per the Guadalupe Corridor Plan, not yet finalized, the intersection at Guadalupe and 28<sup>th</sup> or Guadalupe and Nueces may become signalized, allowing for a pedestrian crossing at one of those locations in the long-term.
- **Re-Route Cyclists.** Bicyclists could benefit from not having a shared lane and being pushed onto either Nueces Street going southbound or onto Hemphill Park going northbound for detour routes.
- **Prohibit Left-Turns.** Left turns could also be prohibited at 28<sup>th</sup> street by adding a sign on the east side of Guadalupe near the intersection.
- **Improve 28<sup>th</sup> Street Crossing (Pull in Curbs).** To improve the crossing of 28<sup>th</sup> on the west side of the intersection, pulling in curb radiuses would slow down eastbound right turners and shorten crossing distance for pedestrians. This could also be aided by a stop bar and striped crosswalk.

## 8. GUADALUPE AND PEDESTRIAN CROSSING (23<sup>RD</sup> STREET)

### COLLISION DIAGRAM

No Collision diagram was made because there were no reported accidents at this location from the CRIS Accident reporting system managed by the Texas Department of Transportation.

### ACCIDENT TABLES

No Accident tables were created because there were no reported accidents at this location.

### FIELD OBSERVATIONS

Not included in the seven (7) hot spots, the pedestrian signal at the former 23<sup>rd</sup> Street and Guadalupe does not have any reported accidents, although safety improvements could be made at this high-visibility location and primary pedestrian access to the University from “West Campus” and “The Drag” section of Guadalupe Street. One specific concern is that cyclists are going at high speeds with vision for pedestrians crossing obstructed by the transit platform to the north of the intersection on the west side. In addition, pedestrian space is constrained on the east (University) side because of the configuration of architectural walls.

### POSSIBLE SAFETY COUNTERMEASURES

- **Re-stripe Crosswalk.** At a minimum, crosswalk piano key style bars should extend across the entire pedestrian crossing area rather than short markings the north and south ends.
- **Raised Intersection.** The intersection could be converted to a raised intersection, or pedestrian table, to span Guadalupe to warn of possible pedestrians, which would also eliminate insufficient ramps on either side of the intersection.
- **Relocate Architectural Walls.** Architectural walls can be removed on the east side near campus to open up pedestrian waiting space and widen the existing sidewalk and bus stop.
- **Improve Pedestrian Crossings on Bike Lane.** By extending a pedestrian table across the bike lane to the existing curb, vertical deflection of the cyclist path and words in the bike lane with “SLOW” could help mitigate this issue. See example application in **Figure 2**. Specific thought is needed to handle drainage, however, on either side of the intersection.

Figure 2 – Example Raised Crosswalk over Bike Lane



## 9. ADDITIONAL SAFETY COUNTERMEASURES

In addition to the seven (7) hot spots and the pedestrian crossing location at the West Mall/23<sup>rd</sup> Street, a few other safety countermeasures should be considered and are detailed below:

- **Speed Reduction Pavement Markings.** Pavement markings on the outside edges of lanes have shown to visually reduce the lane width for motorists and cause a reduction in speed, which correlates to a safer travel environment for all modes. Installing such markings as zig zags or horizontal “tick marks” in the four-lane section between 27<sup>th</sup> and 29<sup>th</sup> streets should be considered as a safety countermeasure along the high-accident stretch of Guadalupe.
- **Realign Skewed Intersection (Nueces and 29<sup>th</sup>).** The intersection of Nueces and Guadalupe meets at a severe angle, causing vehicles heading southbound to turn right at high speeds. The pedestrian and bicycle lane crossing of this opening is also very long, at over 100 feet. It is recommended that the intersection be realigned at a 90 degree angle in order to force vehicles heading southbound to slow down when turning right. In addition, this improvement is being considered in the Guadalupe Corridor study, not yet finalized, where there may also be the addition of a traffic signal.

## COUNTERMEASURE EVALUATION

Each countermeasure suggested in the previous sections are evaluated to determine the benefit of implementing each for safety of bicyclists and pedestrians. This analysis is based on figures documented and published in "Desktop Reference for Crash Reduction Factors" FHWA Report No. FHWA-SA-08-011 as well as PEDSAFE and BIKESAFE – a pedestrian/bicycle safety guide and countermeasure selection system developed by the FHWA.

**Table 1: Countermeasures Evaluation**

Time Frame	Countermeasure	Intersections	Direction	% Reduction Ped	% Reduction Bike	% Reduction Auto	Cost	Unit
In Progress	Realign Bike Lane	Guadalupe and MLK Jr Blvd	S. of 20th	N/A	Unknown	N/A	\$5,000	Each
	Remove Parking Near Intersection	Guadalupe and Dean Keeton	SB Far Side	30	Unknown	49	\$250	Per Space
Short-Term	Re-Stripe Crosswalks (Continental Bar Style)	Guadalupe and 27th	NB, SB	25/37	N/A	N/A	\$2,540	Each X-Walk
		Guadalupe and MLK Jr Blvd	SB Rt. Trn					
		Guadalupe and 29th	NB, SB					
		Guadalupe and Ped Xing	Full Width					
		Guadalupe and 28th	SB					
	Flashing Yellow Arrow	Guadalupe and 27th	NB, SB	Unknown	Unknown	Unknown	\$2,500	Per Approach
	Add Bike Box	Guadalupe and 24th	SB	N/A	36	N/A	\$11.50	Sq. Ft.
	"Yield to Bikes" Sign	Guadalupe and MLK Jr Blvd	SB Rt. Trn	N/A	67	N/A	\$300 -	Each
		Guadalupe and 22nd	SB Rt. Trn				\$3,200	
	Extend Clearance Interval	Guadalupe and MLK Jr Blvd	All	Unknown	N/A	15	\$1,000	Intersection
	Add Leading Pedestrian Interval (LPI)	Guadalupe and Dean Keeton	NB, SB	58.7	N/A	N/A	\$500	Intersection
		Guadalupe and 22nd	SB Xing					
	Prohibit Left Turn	Guadalupe and 28th	NB	10	Unknown	45	\$500	Per Approach
		Guadalupe and Inner Campus	WB					
	Add Protected Left Turn Phase	Guadalupe and 29th	EB, WB	44.85	Unknown	1 (99)	\$3,500	Per Approach
	Re-Route Cyclists (Signs)	Guadalupe and 28th	NB, SB	N/A	Unknown	N/A	\$500	Per Segment
	Ped Detection for Turn Mvmt	Guadalupe and 27th	NB Xing	Unknown	N/A	N/A	\$5,000	Each
	Prohibit Right Turn	Guadalupe and 22nd	SB	Unknown	Unknown	45	\$500	Per Approach
	Advisory Speed Signs	Guadalupe and 27th	SB, NB	34.2	Up to 48	29	\$500	Per Sign
		Guadalupe and 29th	SB, NB					
	Speed Reduction Pavement Markings	Guadalupe, 27th to 29th	NB, SB	Unknown	Unknown	18	\$2,000	Per Segment
Medium-Term	Improve Lighting	Guadalupe and MLK Jr Blvd	SW Corner	42	60 (Night)	4-30	\$5,000	Each
		Guadalupe and 29th	NE Corner					
	Relocate Bus Stops to Far Side	Guadalupe and Dean Keeton	NB	1	Unknown	1	\$5,000 -	Bus Stop
		Guadalupe and 24th	SB					
	Add Pedestrian Hybrid Beacon (PHB)	Guadalupe and 29th	SB	69	Unknown	29	\$57,680	Per Location
		Guadalupe near 28th	N/A					
Long-Term	Add Right-Turn Bay	Guadalupe and 27th	NB	N/A	N/A	Rear-End: 65 RT: 50-56 Rt. Angle: 50	\$70,000	Each Approach
	Raised Bike Lane Crossings	Guadalupe and Ped Xing	W. Side	N/A	Unknown	N/A	\$2,500	Each
	Close Advanced Left Turn	Guadalupe and MLK Jr Blvd	WB Lt. Trn	Unknown	N/A	Unknown	\$150,000	Intersection
	Expand Pedestrian Space	Guadalupe and 22nd	All Corners	12 (at corners)	N/A	N/A	Unknown	Sq. Ft.
		Guadalupe and 24th	All Corners					
		Guadalupe and Ped Xing	E. Side					
	Raised Intersection/Crosswalk	Guadalupe and Ped Xing	N/A	45*	N/A	N/A	\$25,000 - \$100,000	Per Crossing
	Adjust Crossing Width (Pull in Curbs)	Guadalupe and 28th	SB	21.5*	Unknown	25	\$21	Linear Foot
		Guadalupe and 29th	SB					
	Replace Ramps	Guadalupe and 29th	SB	37	N/A	Unknown	\$3,000	Per Ramp
	Realign Skewed Intersection	Guadalupe and Nueces	EB	33	33	33	\$100,000	Per Approach

\*Yielding increase by vehicles

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## **ADDITIONAL SAFETY COUNTERMEASURES**

The intent of this section of the final report is to document the sources of information in Table 1, including the percent reduction in accidents for each countermeasure and approximate costs (if present in the PEDSAFE/BIKESAFE study information). Other costs in Table 1 are the engineer's estimate are not intended to represent actual implementation costs. Countermeasures with reduction in accidents and costs marked as "Unknown" are due to lack of information available from the aforementioned resources and are included based on engineering judgment.

### **Countermeasures in Progress (Per City of Austin Staff)**

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#### **RE-ALIGN BIKE LANE**

While neither the Desktop Reference Manual or BIKESAFE have any crash reduction factors for specific intersection treatments of bike lanes or separated bike lanes, BIKESAFE emphasized the importance of bicycle visibility at intersections. Right turns across the bike lane southbound at 22<sup>nd</sup> Street and MLK Jr Blvd are areas where bicycle and pedestrian accidents are occurring, and are cited as a concern by students to Parking and Transportation Services.

At MLK Jr Blvd it is recommended to move the bike lane next to the right-most travel lane in advance of the driveway north of the channelized right turn lane. Again, BIKESAFE and the Desktop Reference Manual do not provide crash reduction factors, but the NACTO Urban Bikeway Design Guide offers guidance:

"The approach to an intersection from a cycle track should be designed to reduce turn conflicts for bicyclists and/or to provide connections to intersecting bicycle facility types. This is typically achieved by removing the protected cycle track barrier or parking lane (or lowering a raised cycle track to street level), and shifting the bicycle lane to be closer to or shared with the adjacent motor vehicle lane... Parking should be prohibited 30 to 50 feet in advance of where the cycle track buffer ends to promote visibility between bicyclists and motorists."

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#### **REMOVE PARKING NEAR INTERSECTION**

The Desktop Reference Manual shows a 49% reduction in all accidents and a 30% reduction in pedestrian accidents when parking is restricted near intersections. It is believed that this application will be helpful regarding a commercial vehicle parking space south of the intersection of Dean Keeton and Guadalupe that causes unsafe outside lane width.

### **Short-Term Countermeasures**

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#### **RE-STRIPE CROSSWALKS**

Per the Desktop Reference Manual, Improving pedestrian crossing pavement markings can reduce pedestrian related crashes by up to 25%. This is a simple, cost effective measure to help increase visibility of pedestrians in areas where pedestrian accidents have been documented. Per additional studies from PEDSAFE, high-visibility crosswalks (continental, bars, ladder) are recommended over the traditional transverse or standard crosswalk (two parallel lines across lanes). These have been shown to reduce accidents involving pedestrians by up to 37% based on a 2010 study at school sites in San Francisco, California. Additional benefits may be observed when paired with curb extensions.

---

### FLASHING YELLOW ARROW

The flashing yellow arrow was adopted into the Manual on Uniform Traffic Control Devices in 2006 after an FHWA study revealed that they are better interpreted by motorists for permissive left turn movements than a solid green circular signal indication. There are not documented crash reduction rates in either of the resources used in this report, but the City of Austin and Texas as a whole have begun implementing the flashing yellow arrow on new signals and retrofitting many older ones.

---

### ADD BIKE BOX

Bike boxes are areas at an intersection designated for bicyclists in front of the stop bar to be used as a refuge area to increase visibility of cyclists and can help significantly at places where left and right turns occur. The Desktop Reference Manual shows a reduction in bicycle accidents of 36% at locations where a bicycle box is installed. BIKESAFE estimates that a bike box costs \$11.50 per square foot.

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### “YIELD TO BIKES” SIGN

At 22<sup>nd</sup> Street and MLK Jr Blvd, a “Yield to Bikes Sign” should be installed similarly to the one at 21<sup>st</sup> Street in the southbound direction. It should be in a location that is highly visible, although that may be a challenge due to the large tree on the southwest corner. Cost estimates for such signage from BIKESAFE are around \$300 for metal signs, but up to \$3,200 for electronic signs. BIKESAFE suggest bicycle signs such as “Share the Road” and “Bikes May Use Full Lane” have helped to increase the space vehicles pass cyclists at, but they do not have any conclusive study on “Yield to Bikes Sign” at protected bike lanes. However, a study of a flashing “Yield to Bikes Sign” activated by loop detectors in the bike lane on NE Couch St in Portland, Oregon showed a decrease in conflicts of 67%, suggesting significant benefits to safety.

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### EXTEND CLEARANCE INTERVAL

Per the Desktop Reference Manual, all red clearance intervals reduce right-turn auto collisions by up to 15%. However, the Manual does not show the effectiveness of extending yellow clearance interval or all-red times.

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### LEADING PEDESTRIAN INTERVAL

For situations where pedestrian conflicts are evident, like at Guadalupe and 22<sup>nd</sup> for southbound right turns by automobiles, a Leading Pedestrian Interval (LPI) has been shown as an effective way to improve pedestrian behavior and safety. PEDSAFE cites numerous studies that have examined this countermeasure and have found up to 58.7% reduction in accidents. This is especially effective with a “No Right Turn on Red” sign in urban environments.

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### PROHIBIT LEFT TURNS

Prohibiting permissive left turns or left turns entirely helps reduce pedestrian and bicycle vehicle conflicts significantly. In situations where no separate left turn lane is provided, rear end conflicts are also reduced for the inside lane. Per the Desktop Reference Manual, pedestrian crashes are reduced by 10% and all accidents are reduced by 45% (mostly automobile).

---

### ADD PROTECTED LEFT TURN PHASE

Per the Desktop Reference Manual, there is a 1% reduction in total accidents at an intersection by converting permissive left turns to protected only. However, 99 percent of accidents attributed to left turns

are eliminated when implementing this. A study on PEDSAFE from New York conducted in 2012 found that pedestrian crashes were reduced by 44.85% when converting from permissive to protected left turn operations at signals.

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#### RE-ROUTE CYCLISTS

One option to eliminate safety issues for cyclist on shared lanes would be to re-route them off of Guadalupe around the segment between 27<sup>th</sup> and 29<sup>th</sup> streets. This method doesn't have any crash reduction factors in any resources, but could get cyclists out of harm's way. However, it is unclear what sort of capture rate would be realized with simple wayfinding via signs and markings.

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#### PEDESTRIAN DETECTION FOR TURNING INDICATION

This countermeasure would be experimental in nature, as there is not much evidence to suggest that pedestrian detection has been used to terminate a permissive turn indication. However, it would provide safety for pedestrians attempting to cross 27<sup>th</sup> street by eliminating the permissive movement when they are present.

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#### PROHIBIT RIGHT TURN

Per the Desktop Reference Manual, a 45% reduction in all types of crashes are reduced by eliminating left or right turns. It is believed that this number is not reflective of the reduction in number of crashes directly attributable to right turns, so it would likely be higher, but not 100% due to non-compliance.

---

#### ADVISORY SPEED (CURVE ADVANCE WARNING)

Several studies on the BIKESAFE website cite a significant benefit of reducing speeds to 20 mph with reduction in incidents as high as 48%. The Desktop Reference Manual cites reductions in crashes of 5% up to 44% for fatal accidents, especially effective when coupled with enforcement. Similar to BIKESAFE, PEDSAFE reports reduction in speeds to 20 mph resulting in a crash reduction rate of 34.2%. Per the Desktop Reference Manual, curve advance warning signs with an advisory speed resulted in an overall crash reduction rate of 29%.

---

#### SPEED TREATMENT PAVEMENT MARKINGS

Transverse lane markings have been shown to give visual narrowing of the road to motorists causing a slowing of speeds and could be beneficial to install. The Desktop Reference Manual shows installation of transverse pavement markings as reducing overall crash rates by 18%.

### **Medium-Term Improvements**

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#### IMPROVE LIGHTING

BIKESAFE notes that 22 percent of bicycle crashes and 40 percent of bicyclist fatalities occur after sunset. In addition, PEDSAFE notes that 2/3 of pedestrian accidents occurring after sunset are at locations that are not well lit. Observing that a high number of crashes during evening at hours on several locations along Guadalupe, a lack of light poles was confirmed to be insufficient in several locations. At a cost of approximately \$5,000 per light fixture, a reduction in 42% of pedestrian accidents and 60% of night-time bicycle accidents is a significant benefit.

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#### RELOCATE BUS STOPS TO FAR SIDE

The Desktop Reference Manual states a 1% reduction in pedestrian and auto related accidents by installing far side bus stops as opposed to near side bus stops. Although this is a small reduction in crashes, we believe that the benefit may actually be higher due to external effects of buses causing erratic behavior by automobiles trying to get around the buses and from buses blocking bicycle lanes northbound on Guadalupe.

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#### ADD PEDESTRIAN HYBRID BEACON (PHB)

Both PEDSAFE and BIKESAFE cite a 2010 FHWA study of a reduction in total accidents by 29% and pedestrian accidents of 69% where pedestrian hybrid beacons are installed. The average cost for one of these on average is \$57,680, but varies from \$51,460 up to \$128,660 in a study of 9 locations. It should be noted that a PHB would not be necessary if a traffic signal is installed at either 28<sup>th</sup> Street or Nueces Street on Guadalupe Street.

#### **Long-Term Improvements**

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#### ADD RIGHT TURN BAY

While there are no indications of improvement for pedestrian or cyclist safety by installing a right turn lane at an intersection, there are significant reductions in rear-end and right-angle accidents for automobiles. Because the behavior at Guadalupe and 27<sup>th</sup> suggests that many of these accidents may be caused by pedestrians passing on the northbound crosswalk, installing a right turn bay, especially a channelized one, would likely increase visibility of pedestrians for right-turners and give them a place to slow down. Reduction in rear-end accidents, per the Desktop Reference Manual, are 65% for rear-ends, 50% for right angle crashes, and 50-56% for right-turning crashes.

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#### RAISED BIKE LANE CROSSINGS

At the Pedestrian Crossing, it is recommended to bring the protected bike line up to the same level as the sidewalk and adding the word "SLOW" in the bike lanes. This should aid in increasing visibility of bicyclists to pedestrians and slowing bicycles down in the vicinity of the pedestrian crossing. An example of this can be found Figure 2, located on Broadway Street in Seattle, Washington.

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#### CLOSE ADVANCED LEFT TURN

At MLK Jr Blvd and Guadalupe, the westbound left turn is placed in advance of the signalized intersection with a cut-through behind the island on the southeast corner of the intersection. It is evident from the worn path along the island that pedestrians are not crossing at opening for the cut through, and are making unsafe crossings at the southern point of the island. By closing the advanced left turn and moving left turns to the intersection, a familiar situation is created for drivers and pedestrians who may be unaware that left turns are occurring prior to the intersection. Due to the unique nature of this advanced left turn, there is no known study for safety benefits of such an operation, but intuitively should improve behavior and reduce rear end automobile collisions westbound.

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#### EXPAND PEDESTRIAN SPACE

The Desktop Reference Manual provides a crash reduction factor for pedestrian crashes by increasing pedestrian space at corners of 12%, but is highly variable with a large standard error in analysis.

However, the Highway Capacity Manual 2010 edition gives guidelines and methodology for evaluating pedestrian level of service (LOS) which is a direct function of available pedestrian space along segments and at intersections. By increasing pedestrian LOS, it is believed that a more comfortable walking environment will enhance perceived safety and elicit better awareness by motorists of pedestrians.

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#### RAISED INTERSECTION/CROSSWALK

Raised crosswalks or entire raised intersections have the marked effect of raising the height of the pedestrian and placing a vertical obstacle to the speed of vehicles. A study from PEDSAFE in Cambridge, Massachusetts found that vehicles yielded 45% more to pedestrians in a non-raised crosswalk. Raised crosswalks vary from \$2,000 to \$20,000 depending on drainage conditions and materials, while raised intersections depend on the size of the road, from \$25,000 to \$100,000.

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#### REDUCE CROSSING WIDTH (PULL IN CURBS)

The Desktop Reference Manual shows a 25% reduction in auto and pedestrian related accidents when a crosswalk is improved, but does not state the kind of improvement that results in this reduction. PEDSAFE cites the use of curb extensions at intersections as increasing driver *yielding* by 21.5 percent, but does not tell the reduction in crashes from any study. BIKESAFE cites reducing curb radius as helping to slow vehicles and increase yielding to bikes, but also does not provide information on bike crash reductions. The cost of adjusting curb radiuses or extending curbs varies widely by location from as little as \$5,000 to as much as \$40,000 per corner. BIKESAFE provides an average cost per linear foot of curb and gutter at \$21 per linear foot.

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#### REPLACE RAMPS

There is no specific information in PEDSAFE or BIKESAFE explicitly linked to a reduction in accidents by the installation of ramps. However, the Desktop Reference manual shows that proper crossing installation (markings, ramps, and signs) showed a reduction in accidents of up to 37%. It is important to maintain proper ramps for accessible crossings per the Americans with Disabilities Act Accessible Guidelines (ADAAG), as these are enforced by the Texas Department of Licensing and Review (TDLR).

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#### REALIGN SKEWED INTERSECTION

The Desktop Reference Manual, PEDSAFE, and BIKESAFE all mention realigning skewed intersections to be at 90 degree angles with an intersection as a method to improve sight distance and visibility of all modes of transportation. Per the equation in the Desktop Reference Manual for 3 leg intersections, aligning the approach of Nueces at Guadalupe from its current skew of approximately 150 degrees to 90 degrees would result in a reduction of all accidents by 33%. PEDSAFE and BIKESAFE do not have any studies to support crash reduction rates.

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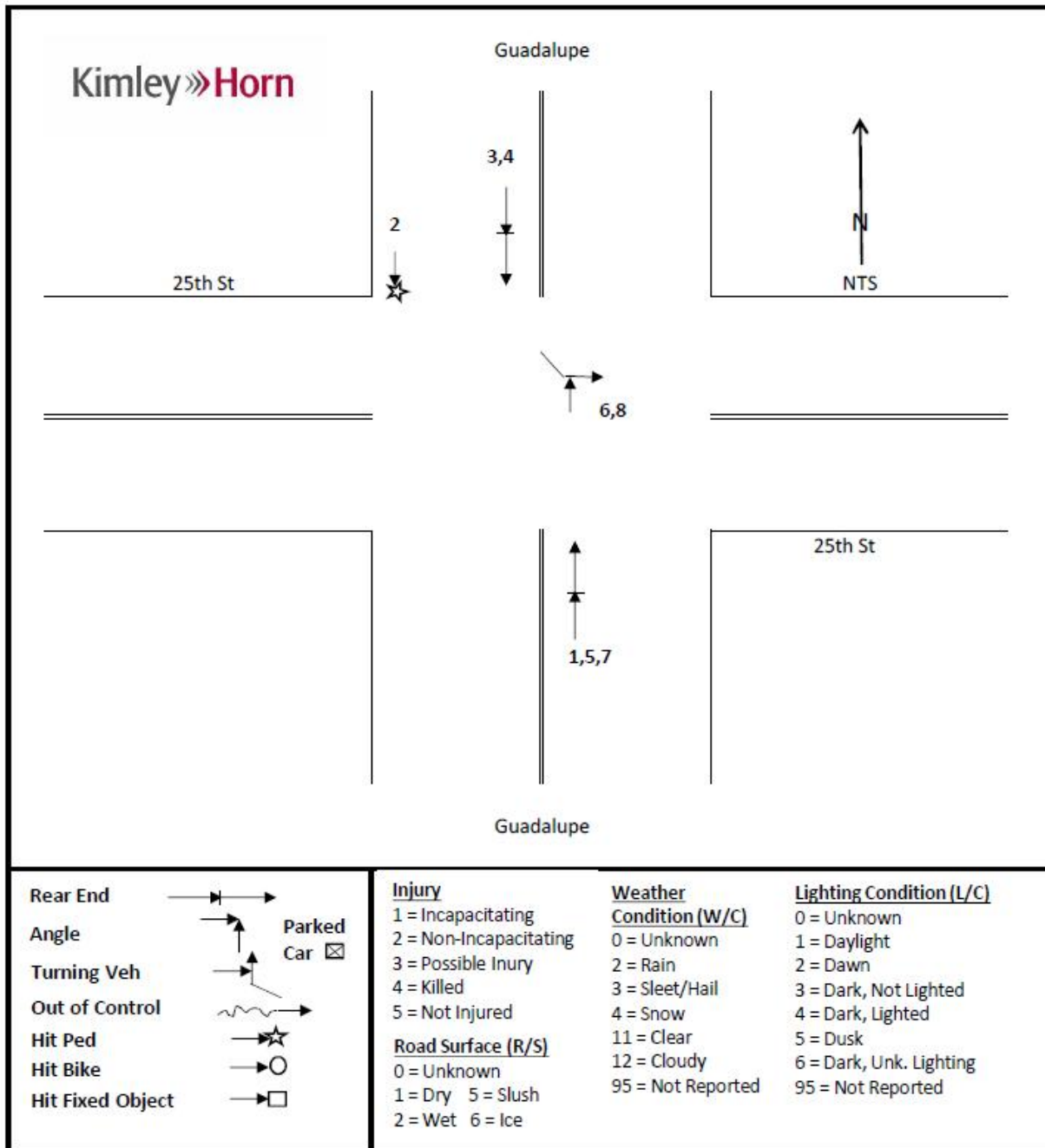
# APPENDIX

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# Appendix A: Additional Collision Diagrams

### GUADALUPE AND 25<sup>TH</sup> STREET

#### COLLISION DIAGRAM

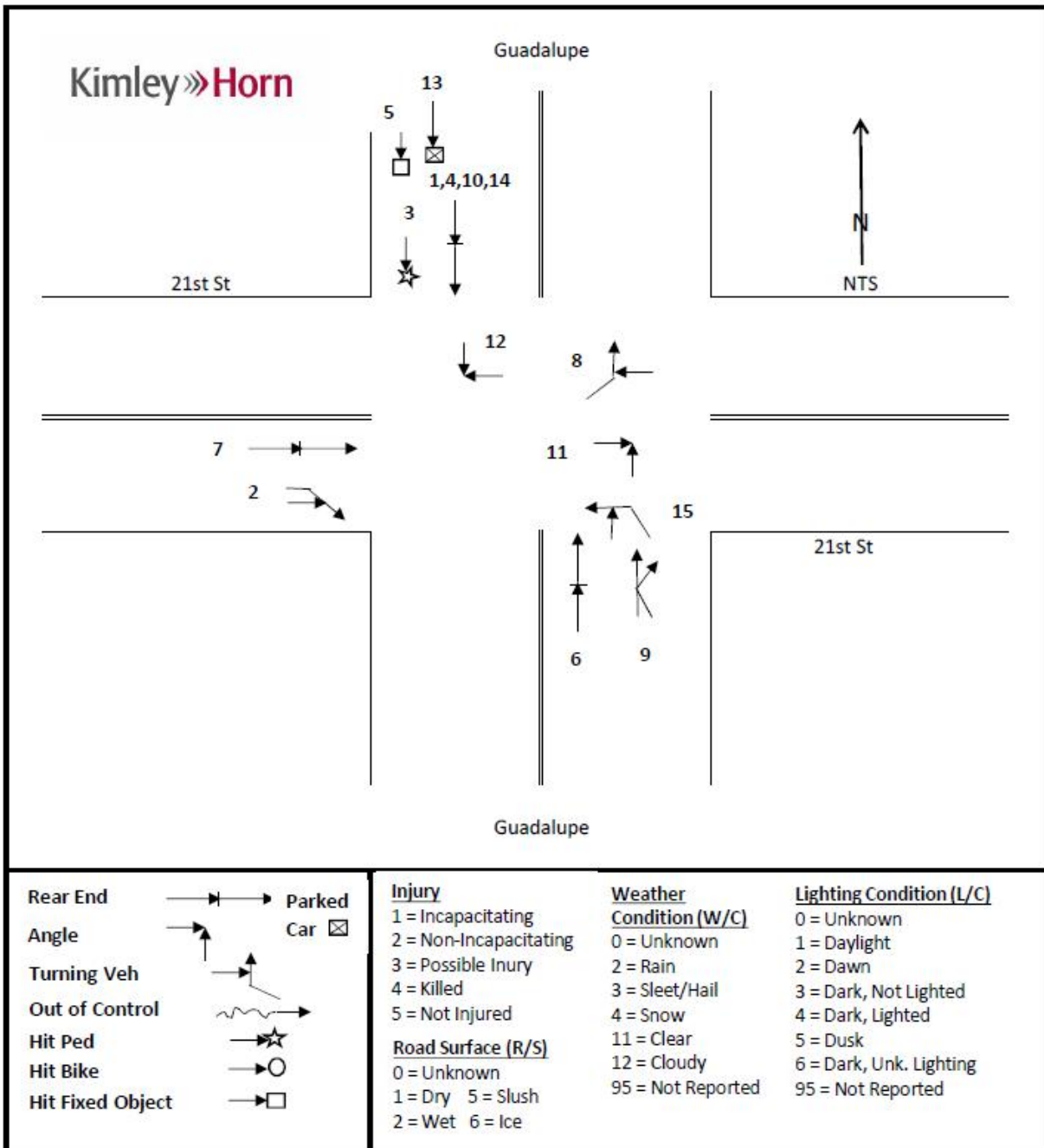


### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	1/10/2013	THU	12:43 PM	3	1	11	1		
2	1/13/2013	SUN	2:23 AM	2	1	11	4		
3	6/12/2013	WED	9:55 AM	3	1	11	1		
4	6/19/2013	WED	1:28 PM	5	1	11	1		
5	10/9/2013	WED	7:27 PM	3	1	11	4		
6	1/20/2015	TUE	10:25 AM	5	1	11	1		
7	6/24/2015	WED	9:35 PM	3	1	11	4		
8	7/27/2015	MON	7:35 PM	5	1	11	1		

### GUADALUPE AND 21<sup>ST</sup> STREET

#### COLLISION DIAGRAM

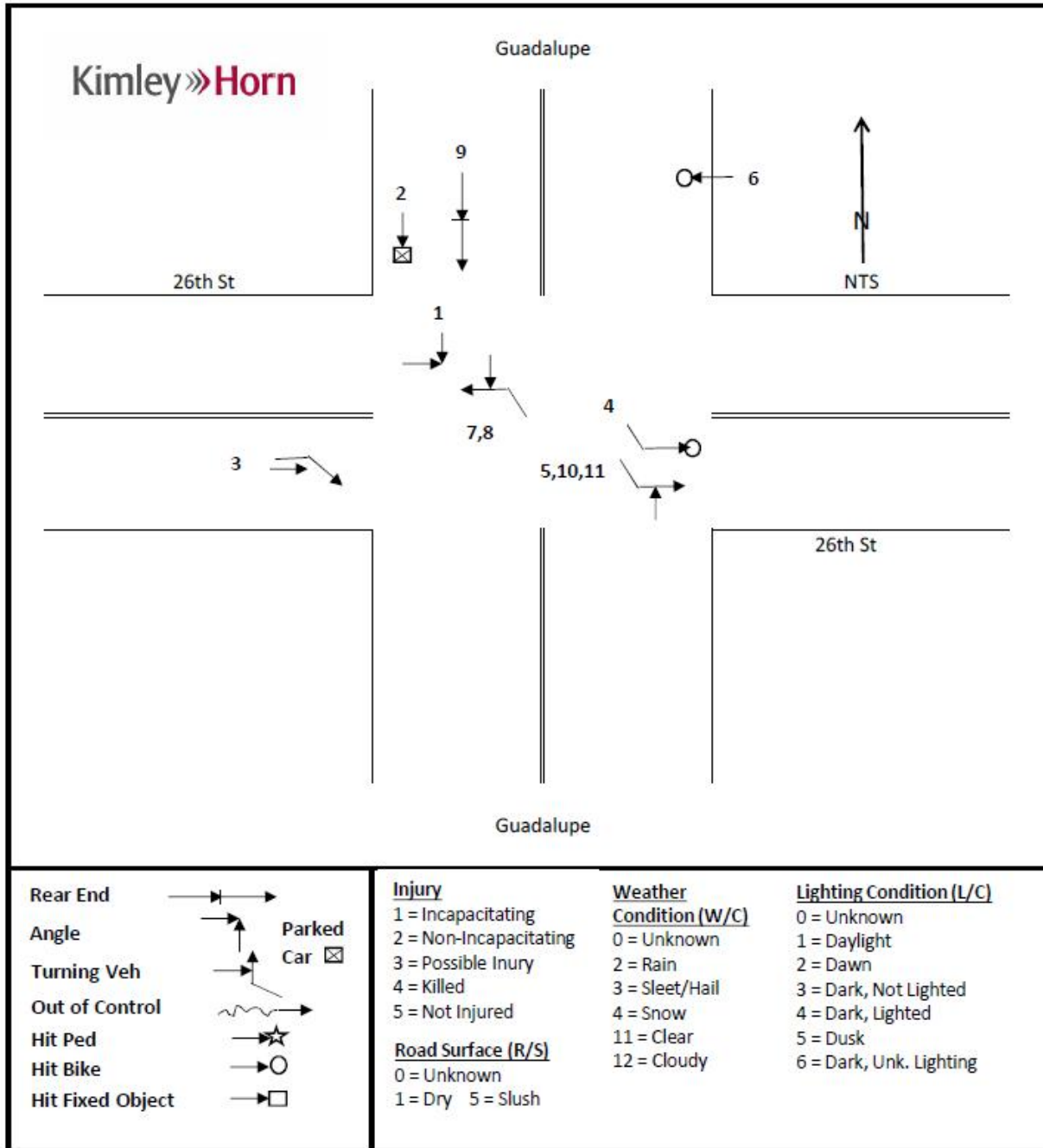


### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	1/22/2013	TUE	1:16 PM	5	1	12	1		
2	3/16/2013	SAT	3:00 PM	5	1	11	1		
3	3/24/2013	SUN	2:06 AM	2	1	11	4		
4	4/4/2013	THU	9:30 AM	5	1	11	1		
5	9/25/2013	WED	1:14 AM	5	1	11	4		
6	1/3/2014	FRI	1:26 AM	5	1	11	4		
7	8/9/2014	SAT	2:52 PM	5	1	11	1		
8	11/5/2014	WED	1:28 PM	5	2	2	1		
9	11/25/2014	TUE	5:00 PM	5	1	11	1		
10	12/28/2014	SUN	2:37 AM	5	1	12	4		
11	1/16/2015	FRI	2:36 AM	5	1	8	8		
12	3/4/2015	WED	4:48 PM	5	1	2	1		
13	4/3/2015	FRI	2:56 PM	5	1	11	1		
14	6/14/2015	SUN	2:33 PM	3	1	11	1		
15	11/3/2015	TUE	7:38 PM	5	1	11	4		

### GUADALUPE AND 26<sup>TH</sup> STREET

#### COLLISION DIAGRAM

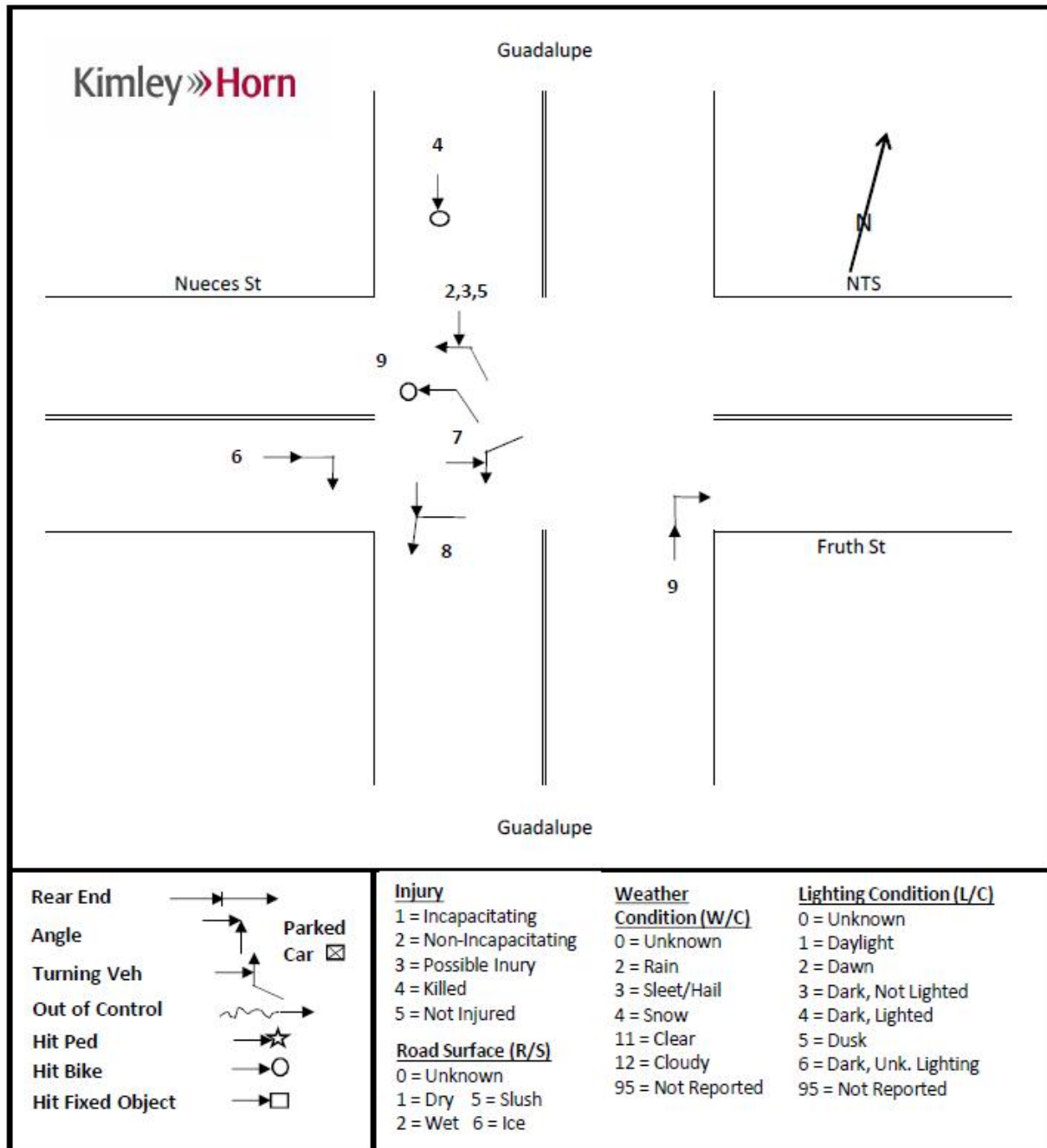


### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	4/17/2013	WED	10:50 PM	5	2	2	4		
2	6/24/2013	MON	9:20 PM	5	1	11	4		
3	7/13/2013	SAT	1:44 PM	5	1	11	1		
4	10/21/2013	MON	4:33 PM	3	1	11	1		
5	10/30/2013	WED	7:49 PM	5	1	12	4		
6	1/14/2014	TUE	11:26 AM	5	1	11	1		
7	6/22/2014	SUN	4:37 PM	5	1	12	1		
8	8/21/2014	THU	11:10 PM	5	1	11	4		
9	2/10/2015	TUE	2:04 AM	2	1	11	4		
10	8/11/2015	TUE	12:00 PM	2	1	11	1		
11	9/16/2015	WED	12:44 PM	5	1	12	1		

### GUADALUPE AND NUECES

#### COLLISION DIAGRAM



### ACCIDENT TABLES

#	Date	Day	Time	Injury	R/S	W/C	L/C		
1	2/6/2013	WED	3:29 PM	5	1	11	1		
2	9/6/2013	FRI	12:28 PM	2	1	11	1		
3	11/18/2013	MON	7:59 PM	3	1	11	4		
4	2/25/2014	TUE	10:09 PM	2	2	2	4		
5	2/26/2014	WED	4:55 PM	2	1	12	1		
6	3/6/2014	THU	12:56 PM	5	1	11	1		
7	9/11/2014	THU	10:28 AM	5	1	11	1		
8	1/5/2015	MON	9:10 AM	2	1	11	1		
9	9/18/2015	FRI	9:15 PM	3	1	11	4		