Austin Transportation Department
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MEMORANDUM

TO: Gina Fiandaca, Assistant City Manager for Mobility

FROM: Robert Spillar, P.E.,
Director, Austin Transportation Department
City Traffic Engineer

DATE: May 11, 2020

SUBJECT: **Recommendation of Speed Limit Changes**

Robert Spillar P.E.
5/11/2020

Traffic Engineers from the Austin Transportation Department have recently completed a year's long comprehensive engineering study of speed limits on City roadways throughout the City of Austin. Specifically, the engineering team evaluated Level 1, 2, and 3 streets as defined in the Austin Strategic Mobility Plan. These include neighborhood streets typically characterized as having residential units fronting on one or both sides of the street, neighborhood collectors, arterials within the central Austin freeway loop (defined by US 183, SH 71, and Loop 1), and downtown core streets serving as both residential and commercial oriented streets. These studies indicate that speed limit changes on a broad basis are warranted within the City of Austin.

Neighborhood Streets

As the City Traffic Engineer and based on an engineering study completed under my supervision and authority, I conclude the following general findings:

G1. For streets within Austin, characterized as having 36 feet or less in width between faces of curbs, or between edges of pavement in the absence of curbs, and having primarily front-facing residential land uses, a safe and prudent speed for vehicles traveling on these roadways is 25 MPH. This speed addresses the safety of the varied uses that these streets must accommodate, including: vehicular, freight, pedestrian, cycling, and other forms of personal mobility and active transportation.

G2. For streets within Austin, characterized as having between 36 and 40 feet in width between faces of curbs, or between edges of pavement in the absence of curbs, and having primarily front-facing residential land uses, a desired safe and prudent speed for vehicles traveling on these roadways is 25 MPH based on the varied activities we know to be occurring on these type roadways. Achieving this speed limit on these roadways, however, requires individual investigation and/or modification to the roadways by the City Traffic Engineer to sustain such a finding. This speed addresses the safety of the varied uses that these streets must accommodate, including: vehicular, local freight, pedestrian, cycling, and other forms of personal mobility and active transportation.

As City Traffic Engineer, and based on the engineering study completed under my supervision and authority, I further make the following specific findings related to safe and prudent speeds for streets that are exceptions to the above G1 and G2 general findings:

SP1. For the following street segments, engineering study indicates that 30 MPH is a safe and prudent speed:

- Berkman Drive from 51st Street (East) to Coronado Hills Drive
- Bilbrook Place from Samson Drive to Sweetwater River Drive
- Bull Creek Road from Jefferson Street to Hancock Drive
- Deer Lane from Brodie Lane to the end of Deer Lane
- Duval Street from 30th Street (East) to 51st Street (East)
- Exposition Blvd. from 35th Street (West) to Lake Austin Blvd.
- Hancock Drive from Balcones Drive to Burnet Road
- Jones Road from West Gate Blvd. to Menchaca Road
- Manor Road from I.H. 35 (North) East Frontage Road to Airport Blvd.
- McCarty Lane from Beckett Lane to U.S. 290 (West) (S.H. 71)
- Oak Springs Drive from Webberville Road/Ridgeway Drive to Springdale Road
- Parker Lane from Woodward Street to Riverside Drive (East)
- Lakeshore Blvd. (South) from Riverside Drive (East) to Pleasant Valley Road (South)
- St. Johns Avenue (East and West) from Lamar Blvd. (North) to Berkman Drive

SP2. For the following street segments, engineering study indicates that 35 MPH is a safe and prudent speed:

- Beckett Road from Kiva Drive to Slaughter Lane (West)
- Exchange Drive from Forbes Drive to Tuscany Way
- La Crosse Avenue from Escarpment Blvd. to Spruce Canyon Drive
- Latta Drive from Davis Lane to Convict Hill Road

Downtown Streets

As the City Traffic Engineer and based on an engineering study completed under my supervision and authority, I conclude the following general finding related to Downtown Streets:

G3. For downtown streets, regardless of their residential, governmental or commercial orientation, within the area bounded by Lamar Blvd. (North), E/W Martin Luther King Jr. Blvd., the West Frontage Road of I.H 35 (North), and Lady Bird Lake, a safe and prudent speed for vehicles traveling on these roadways is 25 MPH. This speed addresses the safety of the varied uses that these streets must accommodate, including: vehicular, freight, transit, pedestrian, cycling, and other forms of personal mobility and active transportation. This speed largely reflects speeds observed today under safe operating characteristics.

As City Traffic Engineer, I further make the following specific finding related to safe and prudent speeds for Downtown Streets that are exceptions to the above G3 general finding:

SP3. For the following street segments, engineering study indicates that 30 MPH is a safe and prudent speed:

- Guadalupe Street from Cesar Chavez Street (West) to Martin Luther King Jr. Blvd. (West)
- Lavaca Street from Cesar Chavez Street (West) to Martin Luther King Jr. Blvd. (West)
- Martin Luther King Jr. Blvd. (West) from Lamar Blvd. (North) to Congress Avenue
- Martin Luther King Jr. Blvd. (East) from I.H. 35 (North) West Frontage Road to Congress Avenue
- 15th Street (West) from Congress Avenue to Enfield Road
- 15th Street (East) from I.H. 35 (North) West Frontage Road to Congress Avenue
- Cesar Chavez Street (West) from Congress Avenue to 300 ft. west of Lamar Blvd. (North)
- Cesar Chavez Street (East) from Congress Avenue to the West Frontage Road of I.H. 35
- Lamar Blvd. (North) from 832 ft. north of Riverside Drive to Martin Luther King Jr. Blvd. (West)

Urban Core Arterial Streets

In addition to neighborhood and downtown streets, the Austin Transportation Department has evaluated speeds on urban core arterial streets in a comprehensive manner. The intent of this engineering evaluation was to assure consistent speed limits that can be better used to assure driver expectations and provide for a safe mobility environment within the urban core (defined as that area bound by US 183, SH 71 and Loop 1). As the City Traffic Engineer, and based on the engineering study completed under my supervision and authority, I make the following specific findings related to urban core arterial streets:

SP4. For the following street segments, engineering study indicates that 30 MPH is a safe and prudent speed:

- 7th Street (East) from I.H. 35 (North) East Frontage Road to Pleasant Valley Drive (North).
- 51st Street (East) from I.H. 35 (North) East Frontage Road to Berkman Drive.
- Manor Road from I.H. 35 (North) East Frontage Road to Berkman Drive.

SP5. For the following street segments, engineering study indicates that 35 MPH is a safe and prudent speed:

- 51st Street (East) from Berkman Drive to 250 ft. west of Waterbrook Drive
- Airport Blvd. from Lamar Blvd. (North) to the West Frontage Road of I.H. 35 (North)
- Airport Commerce Drive from Bastrop Highway Southbound-Ben White Blvd. Westbound Ramp to Riverside Drive (East).
- Burnet Road from White Horse Trail to U.S. 183.

- Congress Avenue (South) from 354 ft. south of Oltorf Street (East/West) to Ben White Blvd. (West).
- Guadalupe Street (West) from 45th Street (West) to Lamar Blvd. (North).
- Huntland Drive (East/West) from I.H. 35 (North) West Frontage Road to Airport Blvd..
- Lamar Blvd. (North) from Martin Luther King Jr. Blvd. (West) to Morrow Street.
- Lamar Blvd. (South) from Ben White Blvd. (West) to 66 ft. south of Gibson Street (West).
- Manor Road from Berkman Drive to U.S. 183.
- Pleasant Valley Road (North) from Webberville Road to Chestnut Avenue.
- Springdale Road from Martin Luther King Jr. Blvd. (East) to Manor Road.

SP6. For the following street segments, engineering study indicates that 40 MPH is a safe and prudent speed:

- 7th Street (East) from Shady Lane to Airport Blvd..
- Cesar Chavez Street (East) from 45 ft. east of Shady Lane to 1628 ft. east of Shady Lane.
- Oltorf Street (East) from Alvin Devane Blvd. to Montopolis Drive.

SP7. For the following street segment, engineering study indicates that 45 MPH is a safe and prudent speed:

- Martin Luther King Jr. Blvd. from J.J. Seabrook Drive to U.S. 183.

Recommendation

The City of Austin is a Vision Zero community with an established policy that seeks to eliminate serious injury crashes and fatalities on our transportation network. Data indicate that speed is one of the leading causes of serious injury and fatalities on our mobility networks, especially when a vulnerable roadway user is involved. Based on historical crash data, we know that speed on area roadways is a leading cause of serious and fatal incidents. Other cities across the nation are actively dropping speed limits to generate a safer traveling environment and finding positive outcomes when speeds are reduced over a wide area of their street networks. In accordance with Texas State Law, the Austin Transportation Department has completed an engineering analysis of speeds. Under the authority of the City Traffic Engineer, I have documented findings indicating that new speeds on a range of streets are warranted.

I am recommending that we pursue through a Request for Council Action (RCA) that we modify speed limits on neighborhood and downtown streets, and urban core arterial streets to meet the safe and prudent speeds identified by engineering analysis.

Furthermore, I recommend we request administrative authority to bring the identified street types and specific streets into conformity with State Law related to signage. In this way, the department will develop and deploy a robust public education effort and appropriate signage installation program that is consistent with our current staffing and financial capabilities. As streets are appropriately posted and the community informed, those streets will be eligible for enforcement of the established speed limits.

I am seeking a place on the June 11, 2020, Council Agenda to bring this item. This item is also scheduled to be reviewed by the Urban Transportation Commission and the Council Mobility Committee in May.

AUSTIN TRANSPORTATION DEPARTMENT

MEMORANDUM

TO: Robert Spillar, P.E., Director,
Austin Transportation Department

FROM: Eric Bollich, P.E., PTOE, Acting Assistant Director,
Austin Transportation Department

CC: Anna Martin, P.E. PTOE, Assistant Director,
Austin Transportation Department

Lewis Leff, Transportation Safety Officer,
Austin Transportation Department

5/7/20

DATE: May 7, 2020

SUBJECT: **Speed Modification Report – City of Austin Residential and Downtown Streets**

The Austin Transportation Department (ATD) completed an engineering study to recommend speed modifications for residential streets in the City of Austin. Downtown streets serve as both residential- and commercial-oriented streets and were also analyzed for speed modifications. This study summarizes the methodology, data, and recommendations to set speed limits based on the context and operating characteristics of streets meeting the criteria set herein.

Summary of Recommendations

The Office of the City Traffic Engineer has evaluated the current conditions for safe and prudent operation of vehicle traffic on neighborhood streets and on Downtown streets within the City of Austin.

Based on an engineering evaluation, the Office of the City Traffic Engineer has determined the following speed limit modifications should be entered into the City's Code of Ordinances based on ATD's evaluation of safe and prudent speeds for neighborhood and Downtown streets. ATD, under the authority of the Office of the City Traffic Engineer, intends to bring an item for Council action to set new speed limits on the identified streets based on the following recommendations:

- **Recommendation 1:** For streets 36 feet or less in width between faces of curbs, or between edges of pavement in absence of curbs, and having primarily front-facing residential land uses, establish a citywide speed limit of 25 miles per hour (mph), as determined to be a safe and prudent speed by means of engineering evaluation. For streets between 36 feet and 40 feet in width, establish a speed limit of 25 mph if the Office of the City Traffic Engineer is able to demonstrate administratively that such speed is reasonable and prudent based on individual evaluation or by implementation of appropriate speed mitigation measures.

- **Recommendation 2:** Lower the speed limits on eighteen (18) specific residential streets to be consistent with others having similar operating characteristics and which do not meet with criteria under Recommendation 1. Street segments affected by Recommendation 2 are detailed subsequently in this study.
- **Recommendation 3:** Set a speed limit of 25 mph on streets included on the street network bounded by N Lamar Boulevard, E/W Martin Luther King Jr Boulevard, IH-35 Southbound Frontage Road, and Lady Bird Lake (the downtown street network). Exceptions to this modification include the following:

    - Streets that shall remain at 30 mph within the extents of the boundaries of the downtown street network: N Lamar Boulevard, Guadalupe Street, Lavaca Street, and E/W Martin Luther King Jr Boulevard.
    - Streets that shall lower from 35 mph to 30 mph within the extents of the boundaries of the downtown street network: E/W 15th Street and E/W Cesar Chavez Street.

    Additionally, traffic signal timings should be reviewed and set to 25 mph progression speed where possible.

Per Texas Transportation Code, Section 545.356, speed limit modifications set by municipalities are effective when signs are posted messaging new speed limits.

- **Recommendation 4:** ATD will develop and install signage needed for residential streets affected by these speed limit modifications. Because of the number of streets being converted to 25 mph, signage need not be placed on every street indicating 25 mph, but rather signage indicating "Speed Limit on Neighborhood Streets 25 MPH Unless Otherwise Posted " or similar dispersed at a sufficient density as determined by the Office of the City Traffic Engineer shall constitute proper signage. The signage installation plan will include the design and placement of signage; prioritization of implementation based on documented safety concerns and geographic dispersion; and time and material cost estimations to complete sign installation. As part of the installation plan, the Office of the City Traffic Engineer shall establish a public notification process to inform Council and the public when speed limits are deemed enforceable under state law (see Recommendation 5).

ATD's review of best practices revealed that comprehensive speed limit modifications are most effective when coupled with public awareness efforts. The intent of the effort is to reach a broad audience with a focused, consistent message to bring attention to the purpose and desired outcomes of speed limit modifications.

- **Recommendation 5**: ATD will conduct a citywide public awareness effort to increase the public's awareness of the pending speed limit modifications. ATD will ensure that educational awareness materials are culturally relevant and that they explain the need for the change and their intended safety goal. ATD will partner with law enforcement agencies to achieve the intended speed outcome through targeted education and enforcement activities, particularly on residential and downtown streets with documented speeding concerns.

Methodology

Texas Transportation Code, Section 545.356, and City of Austin Code, Chapter 12, give authority to municipalities to alter speed limits based upon an engineering and traffic investigation. This report fulfills the engineering study requirement under authority of the Office of the City Traffic Engineer.

Residential streets are broadly defined as non-arterial (non-major) streets with some portion of adjacent front- or side-facing residential land use. ATD sampled existing traffic speeds on approximately 600 residential streets citywide and calculated statistical values using the Descriptive Statistics analysis tool in Microsoft Excel for approximately 100 streets to determine how traffic volume, pavement width, posted or prima facie speed limit, and adjacent land use influenced the prevailing (85th percentile) speed. This analysis, summarized in the following table, indicates *the sample of measured traffic speeds are normally distributed and indicative of the larger population of streets*. Additional data and statistical analysis are included in Appendix A. Based on the statistical analysis, the Office of the City Traffic Engineer determined that analysis of the sampled streets and their characteristics was sufficient to base an engineering decision upon related to overall neighborhood or local street network of similar characteristics.

Statistical Name	Statistical Value	Comment
Minimum	27.00	Minimum prevailing speed across the sample.
Maximum	41.20	Maximum prevailing speed across the sample.
Mean speed (μ)	33.96	Average prevailing speed across the sample.
Median speed	34.25	The prevailing speed falling in the middle of all data, ordered between minimum and maximum speeds. Value is close to the mean and indicates normal distribution of data.
Standard Deviation (σ)	3.22	Variation of speeds from the mean. Value indicates approximately 68% of streets are within ± 3.22 mph of the mean.
Coefficient of Variation (σ/μ)	0.09	Extent of variability in relation to the mean. Value is less than 0.10, which indicates data has relatively low variation around the mean.
Kurtosis	-0.40	Value is less than +1, which indicates normal distribution of data and not too peaked around the mean.
Skewness	-0.19	Value is between +1 and -1, which indicates normal distribution of data and falling evenly around the mean.
Standard Error	0.32	Reliability of the mean. Value is relatively small, which indicates the sample mean is an accurate reflection of the population mean.

ATD reviewed national best practice on setting speed limits using the approach of a single, comprehensive engineering study to develop recommended speed limit modifications for applicable streets rather than individual engineering studies for each street. ATD also reviewed impacts to actual operating speeds where municipalities have comprehensively modified speed limits. Finally, ATD consulted with one of these municipalities on its experiences in planning and implementing this process to help develop recommendations in this engineering study. National research and guidance materials on setting appropriate speed limits are included in Appendix B.

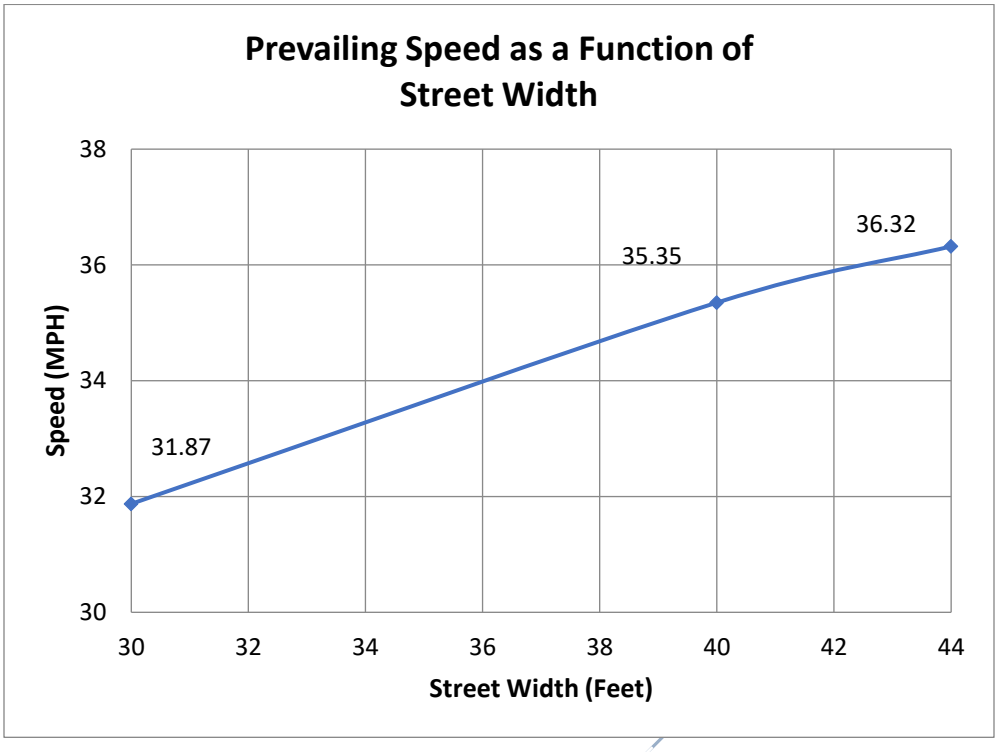
Findings and Recommendations

Residential Streets 36 Feet or Less in Width

Residential streets in the City were built to several widths. Approximately 90% of all residential street miles are less than 36 feet in width, with remaining residential street miles comprised of typical widths of 40 feet or 44 feet (one street mile is one contiguous mile of pavement, regardless of street width or number of lanes).

The data indicates the prevailing speed on most residential streets 30 feet wide or less falls between 25 mph and 32 mph regardless of the set speed limit due to operating characteristics that create traffic friction. The City of Austin modified speed limits of some residential streets to 25 mph after the Texas Legislature passed House Bill 87 in 2005, which allowed governing bodies of municipalities to declare a lower speed limit on narrower streets if the prima facie speed was determined to be unreasonable or unsafe. The Texas Legislature subsequently required municipalities to annually report speeding citations, which City staff determined to be impractical and therefore ceased modifying speed limits under these laws. The City modified speed limits and signage for approximately 600 street miles of these narrower streets before ceasing this practice, resulting in approximately 700 street miles unchanged at 30 mph. This led to a nearly equal distribution of 25 mph and 30 mph speed limits across the City despite these streets having few discernable differences in operating characteristics and prevailing speeds, regardless of posted speed limit.

The data indicates prevailing speeds increase in a nearly linear relationship to street width. Traffic speeds are impeded on narrower streets which create traffic friction from narrower pavement width, on-street parking utilization, impeded yield-flow operation, conflicts from driveways, and visual cues from adjacent front-facing residential land uses. For streets greater than 36 feet wide, a width in which yield-flow operations typically cease, prevailing speeds exceed 34 mph and continue to increase linearly over 36 mph as street widths increase. These findings of prevailing speed as a function of street width are presented in the following figure and in Appendix A.



A strong relationship between street width and prevailing speed was found. The data does not indicate prevailing speeds are strongly influenced by traffic volume, posted, or prima facie speed limit.

A speed limit of 25 mph for streets 36 feet or less in width is appropriate as the prevailing speed has been documented within reasonable conformance of this speed limit. Setting a speed limit below 30 mph for streets wider than 36 feet would likely introduce safety concerns with significant speed differentials between the posted speed limit and operating speed. Setting speed limits below 30 mph for streets greater than 36 feet in width would also not result in expected reasonable compliance with the posted speed limit, even if some level of reduction from signage alone were to occur.

It should be noted that the data suggests a small number of streets with primarily front-facing residential land use and greater than 36 feet in width but typically less than or equal to 40 feet in width have prevailing speeds more consistent with those typically found on streets less than 36 feet wide. In addition, street modifications such as restriping to narrower lane widths, assignment of portions of the street for alternative uses such as biking or parking lanes, change in parking utilization, etc., may impact the operating characteristic of a particular street. To address these non-standard conditions, ATD recommends the Office of the City Traffic Engineer have the administrative authority to modify speed limits on streets, where appropriate, based on documented traffic data and or street modification.

Recommendation 1: As determined by the Office of the City Traffic Engineer and posted with proper signage, set a citywide speed limit of 25 mph on streets 36 feet or less in width between faces of curbs, or between edges of pavement in absence of curbs, and having primarily front-facing residential land uses. Streets between 36 feet and 40 feet in width may be set at 25 mph if the Office of the Traffic Engineer determines it to be a reasonable and prudent speed based on individual evaluation apart from this engineering study.

Residential Streets Not Meeting Criteria of Recommendation 1

During the process of this engineering study, ATD recognized the opportunity and need to also analyze residential streets which would not meet the criteria for speed modifications under Recommendation 1. ATD identified approximately 45 street miles of residential streets needing analysis which have some portion of adjacent front- or side-facing residential land use, existing speed limits greater than 30 mph, and widths greater than 36 feet.

Based on the citywide findings that residential street widths greater than 40 feet have prevailing speed greater than 35 mph, ATD considered each residential street to determine whether more safe and prudent speed limits should be set consistent with other residential streets of similar operating characteristics.

Recommendation 2: Speed limits on 18 residential streets not meeting the criteria under Recommendation 1 should be set per the following table.

Street	Extents		Existing Speed Limit	Recommended Speed Limit
	From	To		
Beckett Road	Kiva Drive	Slaughter Lane (West)	40	35
Berkman Drive	51st Street (East)	Coronado Hills Drive	35	30
Bilbrook Place	Samson Drive	Sweetwater River Drive	35	30
Bull Creek Road	Jefferson Street	Hancock Drive	35	30
Deer Lane	Brodie Lane	End of Deer Lane	40	30
Duval Street	30th Street (East)	51st Street (East)	35	30
Exchange Drive	Forbes Drive	Tuscany Way	40	35
Exposition Boulevard	35th Street (West)	Lake Austin Boulevard	35	30
Hancock Drive	Burnet Road	Balcones Drive	35	30
Jones Road	West Gate Boulevard	Menchaca Road	35	30
La Crosse Avenue	Escarpment Boulevard	Spruce Canyon Drive	40	35
Latta Drive	Davis Lane	Convict Hill Road	40	35
Manor Road	I.H. 35 (North) East Frontage Road	Airport Boulevard	35	30
McCarty Lane	Beckett Lane	U.S. 290 (West) (S.H. 71)	35	30
Oak Springs Drive	Webberville Road/Ridgeway Drive	Springdale Road	35	30
Parker Lane	Woodward Street	Riverside Drive (East)	35	30
Lakeshore Boulevard (South)	Riverside Drive (East)	Pleasant Valley Road (South)	35	30
St. Johns Avenue (East and West)	Lamar Boulevard (North)	Berkman Drive	35	30

Downtown Street Network

Much of the street network in the downtown core of the City was built on a grid layout with consistent block lengths. Operation is typically controlled by traffic signals set at a progression speed or all-way stop signs, both of which produce consistent, and generally slower, prevailing speeds less than the nominally posted speed limit of 30 mph.

ATD reviewed the downtown core and determined that streets included in the network bounded by N Lamar Boulevard, E/W Martin Luther King Jr Boulevard, IH-35 Southbound Frontage Road, and Lady Bird Lake share operating characteristics which make speed limit modifications appropriate for recommendation.

Recommendation 3: Set a speed limit of 25 mph on streets included on the street network bounded by N Lamar Boulevard, E/W Martin Luther King Jr Boulevard, IH-35 Southbound Frontage Road, and Lady Bird Lake (the downtown street network). Exceptions to this modification include the following:

- N Lamar Boulevard, Guadalupe Street, Lavaca Street, and E/W Martin Luther King Jr Boulevard Streets shall remain at 30 mph within the extents of the boundaries of the downtown street network
- E/W 15th Street and E/W Cesar Chavez Street shall lower from 35 mph to 30 mph within the extents of the boundaries of the downtown street network

Additionally, traffic signal timings should be reviewed and set to 25 mph progression speed where possible.

Signage Plan

Per Texas Transportation Code, Section 545.356, speed limit modifications set by municipalities are effective when signs are posted messaging new speed limits. For residential streets in the City currently set at 25 mph, signs are posted citywide. Streets set at a 30 mph speed limit either have signs posted for this speed limit or are unsigned due to the statewide prima facie speed limit of 30 mph.

Recommendation 4: ATD will develop a signage installation plan to evaluate signage needed for residential streets impacted by speed limit modifications recommended in this engineering study. This plan will include the following:

- Design and place signage to set speed limits within neighborhoods. For example, signs could be placed at entrances to neighborhoods with the message “Speed Limit on Neighborhood Streets 25 MPH Unless Otherwise Posted” or similar to reduce the need to install multiple 25 mph speed limit signs for individual streets.
- Prioritize sign installation based on documented safety concerns and geographic dispersion. For example, these criteria could be applied to modify and add speed limit signs based on defined neighborhood boundaries, which would allow ATD to focus sign installation on smaller groups of streets to improve efficiency.
- Estimate the time needed to install all needed sign changes citywide based on staff availability and material costs to make set speed limits effective.

- Establish a public notification process to maintain Council and public awareness of streets as they change in regulatory speed by posting of signage (see Recommendation 5 below).

Education and Enforcement

ATD's review of best practices revealed that comprehensive speed limit modifications are most effective when coupled with public awareness efforts as they help reach a broad audience with a focused, consistent message to bring attention to the purpose and desired outcomes of speed limit modifications.

Recommendation 5: ATD will conduct a citywide public awareness effort to increase the public's awareness of the pending speed limit modifications. ATD will ensure that educational awareness materials are culturally relevant and that they explain the need for the change and their intended safety goal. ATD will partner with law enforcement agencies to achieve the intended speed outcome through targeted education and enforcement activities, particularly on residential and downtown streets with documented speeding concerns.

Conclusion

The speed limit modifications recommended in this engineering study are the result of a comprehensive, years-long engineering study of all residential streets in the City of Austin. It is a progressive and bold approach based on national best practice to modernize the speed limits on thousands of residential street miles and help increase the safety of all users of the residential street network by setting speed limits to safe and prudent levels.

APPENDIX A

Contents:

- Speed and Volume Data
- Speed Function Graphs
- Statistical Analysis of 85th Percentile Speeds

Speed and Volume Data **Street Width: 30 feet**

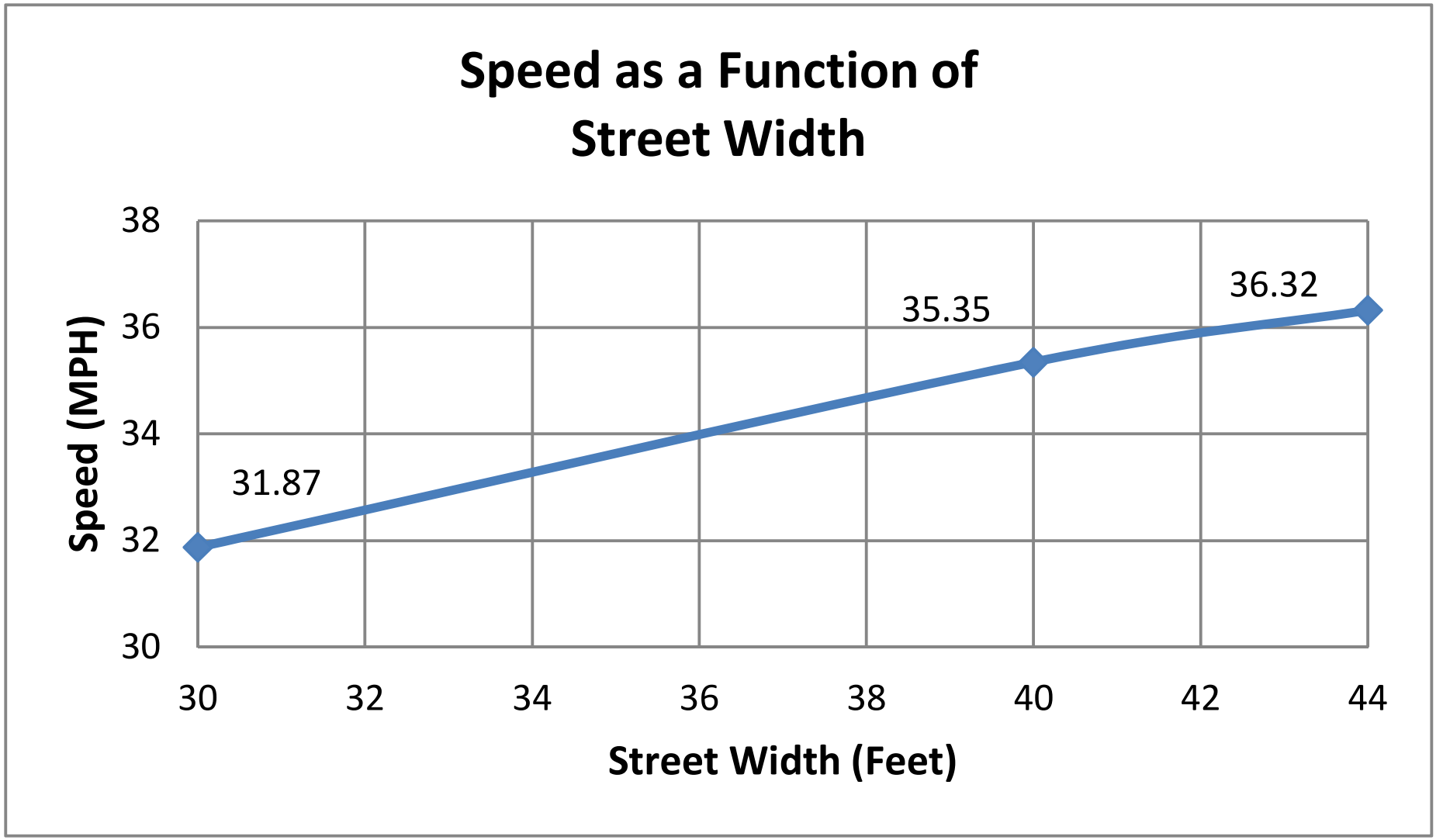
STREET	FROM	TO	WIDTH (FT)	VEH/DAY	SPEED LIMIT	85th %
Bridgeport Drive	Fairfield Drive	Payton Gin Road	30	181	25	28.4
Circle S Road	East William Cannon Drive	West Dittmar Road	30	1968	30	37.8
Coventry Lane	Rogge Lane	Manor Road	30	331	30	30.5
Deen Avenue	North Lamar Blvd	Georgian Drive	30	1121	25	32.6
Deep Eddy Avenue	Lake Austin Blvd	West 7th Street	30	604	25	27.0
East 2nd Street	Waller Street	Chicon Street	30	1757	30	32.8
East Powell Lane	Georgian Drive	IH 35 Frontage Rd	30	5594	25	34.7
Evanston Lane	Clydesdale Drive	Longview Road	30	344	25	29.2
Goodwin Avenue	Webberville Rd	Gunter St	30	945	30	35.6
Hammermill Run	Pleasant Valley Road	Candletree Lane	30	466	25	30.0
Hancock Dr	Balcones Dr	Ridge Oak Dr	30	1049	30	33.0
Harris Boulevard	Ethridge Avenue	Westover Road	30	2748	25	27.6
Hillcroft Drive	Ritchie Drive	Red Ridge Drive	30	622	25	32.6
Hudson Street	Fort Branch Boulevard	El Bluestein Boulevard	30	1206	30	41.2
Isabelle Drive	E Huntland Drive	Kenniston Drive	30	592	25	28.2
Jackson Avenue	West 35th Street	Bull Creek Road	30	2768	30	33.7
Jefferson Street	Northwood Road	West 29th Street	30	7871	25	31.5
Lansing Drive	Manchaca Road	Gladeview Drive	30	1100	25	30.6
Leona Street	Martin Luther King Jr. Boulevard	East 12th Street	30	583	30	34.3
Miles Avenue	Manchaca Road	Cannonleague Drive	30	317	25	30.6
Mt Vernon Drive	St. Elmo Circle	Nalide Street	30	1042	25	30.3
Nasco Drive	White Rock Drive	Allandale Road	30	356	25	30.6
Navasota Street	East 11th Street	East 12th Street	30	1318	25	32.9
Northridge Drive	Belfast Drive	Ridgehaven Drive	30	582	30	31.3
Northridge Drive	Cameron Road	Berkman Road	30	582	30	31.3
Pecos Street	Bowman Avenue	Greenlee Drive	30	4944	25	30.7
Perry Lane	Placid Place	Highland Terrace	30	1446	25	30.3
Placid Place	West 45th Street	Perry Lane	30	598	25	29.6
Ramble Lane	South 1st Street	Salem Walk	30	290	25	27.7
Salina Street	Martin Luther King Jr. Boulevard	East 12th Street	30	307	25	28.3
South 5th Street	West Oltorf Street	West Mary Street	30	5463	25	30.5
Twin Oaks Drive	Nasco Drive	Vine Drive	30	727	25	31.1
Walnut Hills Drive	Edgedale Drive	Manor Road	30	496	25	29.8
West Frances	Hancock Drive	West 50th Street	30	580	25	27.9
Westrock Drive	South Lamar Boulevard	Westhill Drive	30	405	25	27.4
Woodview Avenue	North Loop Boulevard	Northland Drive	30	539	25	29.2

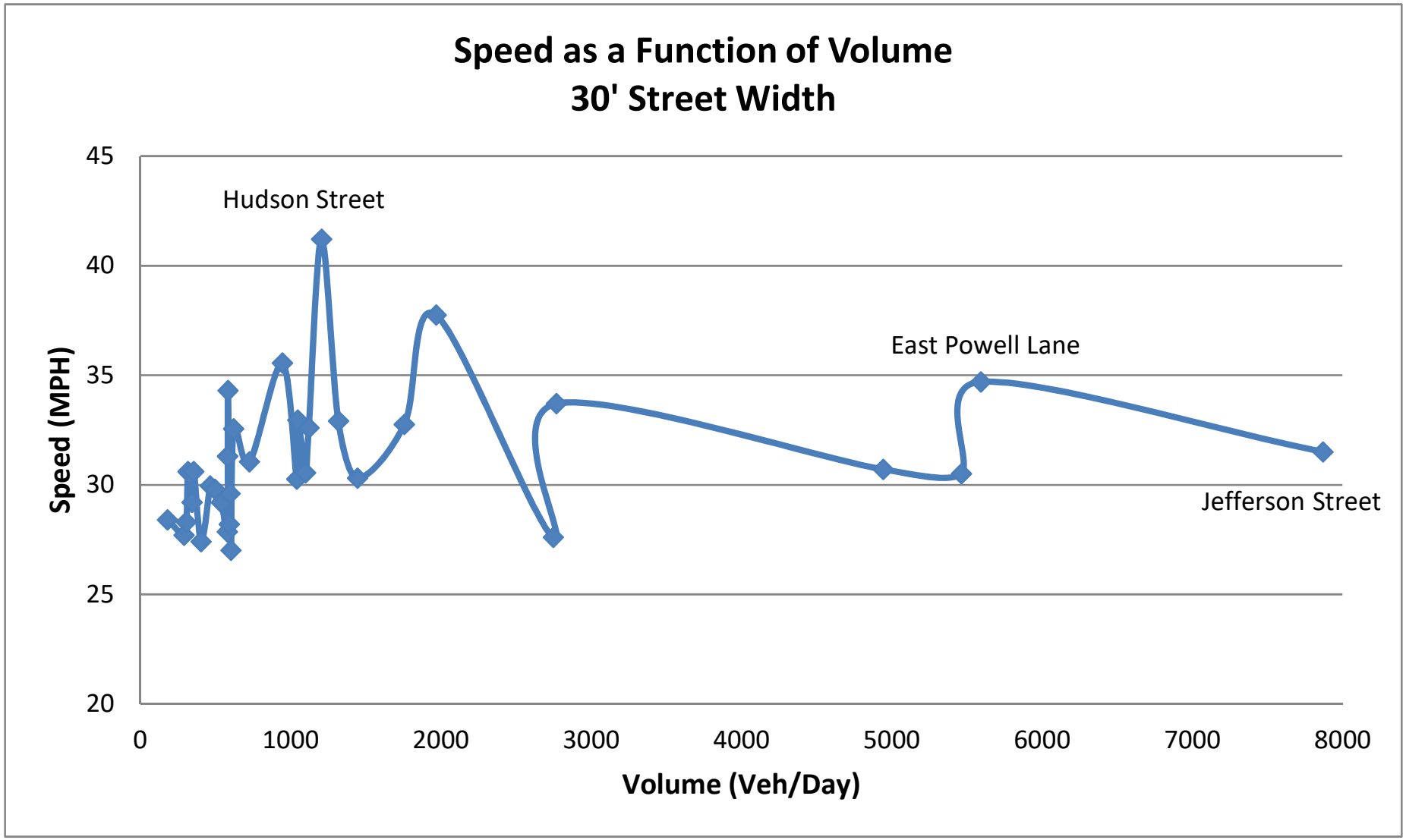
Speed and Volume Data **Street Width: 40 feet**

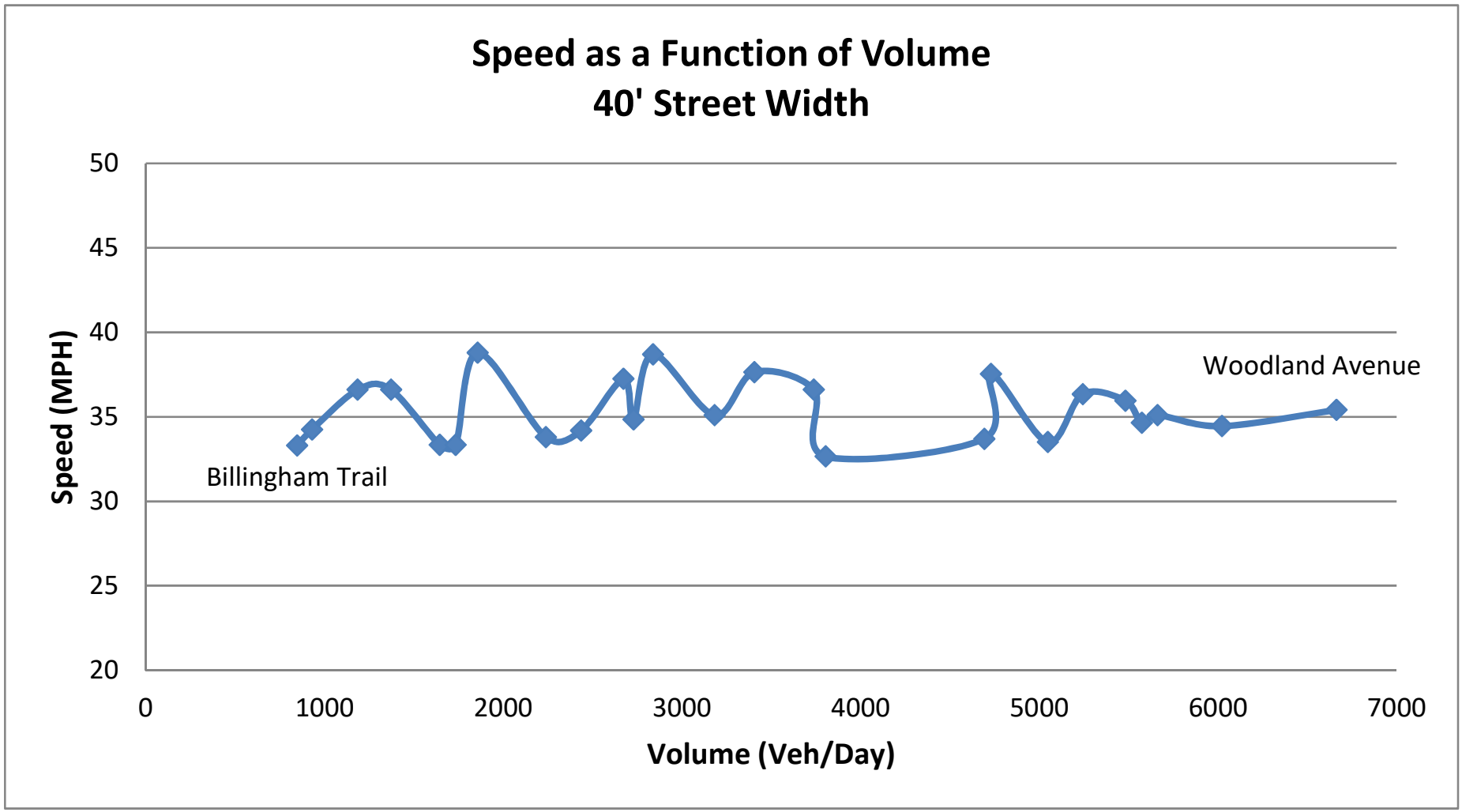
STREET	FROM	TO	WIDTH (FT)	VEH/DAY	SPEED LIMIT	85th %
Billingham Trail	Avery Ranch Blvd	Barrhead Cove	40	846	30	33.3
Copano Drive	Davis Lane	Moose Drive	40	2240	30	33.8
Denson Drive	North Lamar Blvd	Airport Blvd	40	6022	30	34.5
Dry Creek Drive	Firstview Drive	Westmont Drive	40	1858	30	38.8
Fairfield Drive	Lamar Boulevard	Highway 183	40	3183	30	35.1
Freidrich Lane	Ponciana Drive	Teri Road	40	5048	30	33.5
Govalle Avenue	Tillery Street	Springdale Road	40	2437	30	34.2
Greystone Drive	Waterline Road	Long Point Drive	40	3739	30	36.6
Holly Street	Comal Street	Robert T. Martinez Jr. Street	40	3806	30	32.7
Lost Horizon Dr	Skinner Cv	Staghorn Cv	40	2673	30	37.3
Marcus Abrams Boulevard	Manchaca Road	Frate Barker Road	40	1735	30	33.4
Mount Bonnell Road	Fall Trail	West 35th Street	40	2840	30	38.7
Mountainclimb Drive	Highland Hills Drive	Dry Creek Drive	40	1372	30	36.6
Pecos Street	West 35th Street	Scenic Drive	40	5574	30	34.7
Peppertree Parkway	Teri Road	Palmera Cove	40	1645	30	33.4
Robert E. Lee Road	Trailside Drive	Barton Hills Road	40	4693	30	33.7
Rogge Lane	Manor Rd	Springdale Rd	40	2729	30	34.9
Scotland Well Drive	Ashton Ridge	Lockleven Loop	40	4730	30	37.6
Shoal Creek	Greenlawn Parkway	Stoneway	40	5483	30	36.0
Shoal Creek Boulevard	Hancock Street	West 46th Street	40	5244	30	36.4
Shoal Creek Boulevard	White Rock Drive	Treadwell Boulevard	40	5662	30	35.1
Sierra Drive	Highland Hills Drive	Mesa Drive	40	1186	30	36.6
Sprinkle Cutoff Road	Pioneer Farms Drive	Trail Weary Drive	40	3407	30	37.7
Woodland Avenue	IH-35	Parker Lane	40	6664	30	35.4
Yandall Drive	Arroyo Blanco Drive	Buster Crabbee Drive	40	931	30	34.3

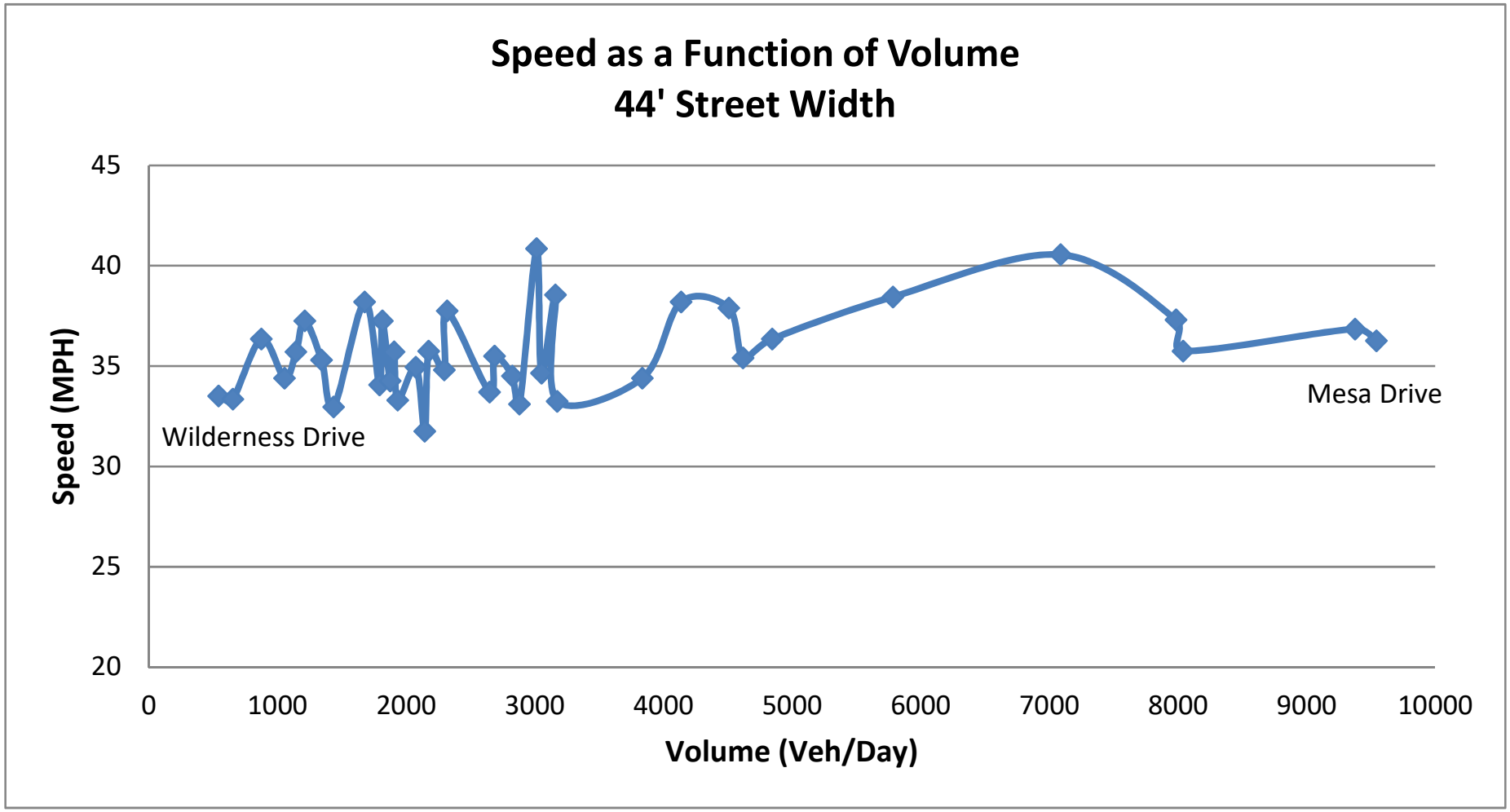
Speed and Volume Data **Street Width: 44 feet**

STREET	FROM	TO	WIDTH (FT)	VEH/DAY	SPEED LIMIT	85th %
Breckenridge Drive	Burleson Road	Vail Ridge Street	44	3015	30	40.9
Cima Serena Drive	MoPac Service Road	Mesa Drive	44	1793	30	34.1
Colony Loop	Kildare Cv	Siepel Dr	44	3174	30	33.3
Deaton Hill	William Cannon Drive	West Gate Boulevard	44	2298	30	34.8
Eberhart Lane	South 1st Street	Speer Lane	44	2826	30	34.5
Emerald Forest Drive	Turtle Creek Blvd	William Cannon Drive	44	4847	30	36.4
Great Britain Blvd	Palace Parkway	Wales Way	44	1678	30	38.2
Hart Lane	Greystone Drive	Executive Center Drive	44	4508	30	37.9
Lakewood Drive	Beauford Drive	Loop 360	44	4138	30	38.2
Lindshire Lane	Alcott Lane	Brantley Bend	44	1935	30	33.3
Los Indios Trail	Lady Suzannes Court	Sir Christophers Cove	44	2649	30	33.7
Lost Creek Boulevard	Quaker Ridge Drive	Wilson Heights Drive	44	9378	30	36.9
Loyola Lane	Greensboro Drive	Bridgewater Cove	44	8041	30	35.8
Lunar Drive	Dittmar Road	Meadow Lea Drive	44	1907	30	35.7
Mason Dells Lane	Kingsgate Drive	Currin Lane	44	1877	30	34.3
Mesa Drive	Greystone Drive	Myrick Drive	44	9545	30	36.3
Mesa Drive	First View Drive	Cross Valley Run	44	5785	30	38.5
Mesa Drive	Far West Boulevard	Greystone Drive	44	7986	30	37.3
Millwright Parkway	Anderson Mill Road	Woodland Village Drive	44	3837	30	34.4
North Pinehurst Drive	Colonial Club	Shinnecock Drive	44	1437	30	33.0
Palace Parkway Drive	West Dittmar Road	West Slaughter Lane	44	2177	30	35.8
Pecan Brook Drive	Tumblewwed Drive	Crystalbrook Drive	44	3052	30	34.7
Quaker Ridge Drive	Lost Creek Boulevard	Whitemarsh Valley Walk	44	1144	30	35.7
Rain Creek Parkway	Floral Park Drive	Raindrop Cove	44	1343	30	35.3
Ramble Lane	South Congress Avenue	South 1st Street	44	1056	30	34.4
Ravenscroft Drive	Manchaca Road	Kingsgate Drive	44	4621	30	35.4
River Plantation Drive	Prairie Dunes Drive	Olympia Fields Loop	44	875	30	36.4
Spring Meadow Road	Cypress Bend	Bergfield Drive	44	2145	30	31.8
Talleyran Drive	Rolling Oaks Trail	Old Lampasas Trail	44	1816	30	37.3
Teasdale Terrace	Aberdeen Way	Northcape Drive	44	653	30	33.4
Texas Oaks	Slaughter Lane	Independence Loop	44	2077	30	35.0
United Kingdom Dr	Slaughter Lane	Tetbury Lane	44	1212	30	37.3
Webberville Road	Heflin Lane	East Martin Luther King Jr Boulevard	44	7090	30	40.6
Wilderness Drive	Old Walsh Tarlton Lane	Goeth Circle	44	543	30	33.5
Winter Haven Road	Alum Rock Drive	Walkup Lane	44	2688	30	35.5
Woodhue Drive	William Cannon Drive	Turtle Creek Boulevard	44	2319	30	37.8
Yaupon Drive	Fittonia Drive	Spicewood Springs Road	44	3162	30	38.6
Zach Schott Street	Airport Blvd	Berkman Dr	44	2883	30	33.1


Speed as a Function of Street Width
Speed (MPH)
38
36
34
32
30
31.87
35.35
36.32
30
32
34
36
38
40
42
44
Street Width (Feet)


Speed as a Function of Volume
30' Street Width
Speed (MPH)
45
40
35
30
25
20
Hudson Street
East Powell Lane
Jefferson Street
0
1000
2000
3000
4000
5000
6000
7000
8000
Volume (Veh/Day)


Speed as a Function of Volume
40' Street Width
Speed (MPH)
50
45
40
35
30
25
20
0
1000
2000
3000
4000
5000
6000
7000
Volume (Veh/Day)
Billingham Trail
Woodland Avenue


Speed as a Function of Volume
44' Street Width
Speed (MPH)
45
40
35
30
25
20
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Volume (Veh/Day)
Wilderness Drive
Mesa Drive

85th Percentile Speed

Statisitcal Data Analysis	
Mean	33.96
Standard Error	0.32
Median	34.25
Mode	33.70
Standard Deviation	3.22
Sample Variance	10.34
Kurtosis	-0.40
Skewness	-0.19
Range	14.20
Minimum	27.00
Maximum	41.20
Sum	3362.05
Count	99.00

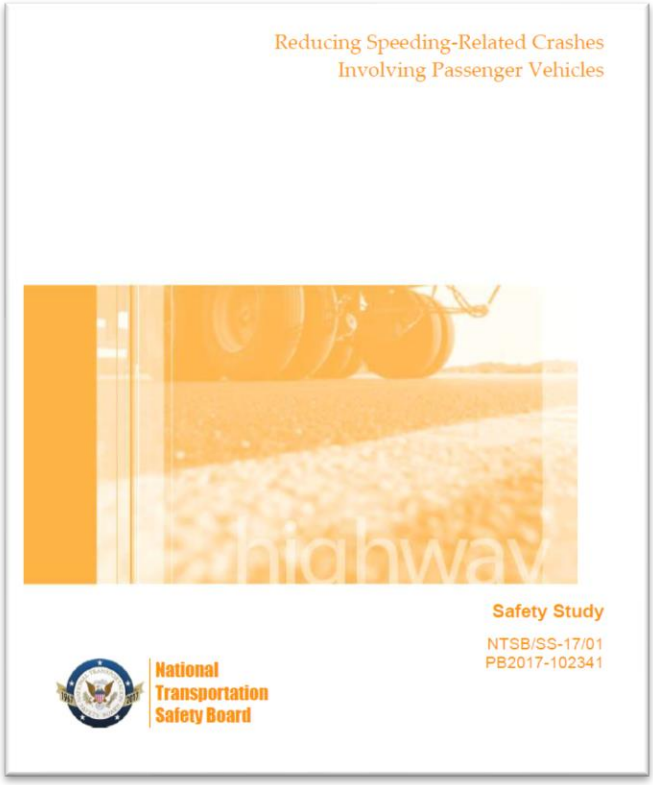
APPENDIX B

Contents:

- National Research and Guidance on Setting Appropriate Speed Limits

National Research and Guidance on Setting Appropriate Speed Limits

Numerous national studies and reports mention the critical role that speed plays in severe traffic crashes. The National Transportation Safety Board, the Governors Highway Safety Association, the Insurance Institute for Highway Safety, National Highway Traffic Safety Administration, and the Federal Highway Administration are just a few of the organizations whose work we have reviewed in order to better understand the need for a comprehensive speed management approach.



National Transportation Safety Board Safety Study - found that speed was a documented factor in 31% of all traffic fatality crashes nationally. “Speed—and therefore speeding—increases crash risk in two ways: (1) it increases the likelihood of being involved in a crash, and (2) it increases the severity of injuries sustained by all road users in a crash.” The study demonstrates how speeding presents different risks for different road users. People walking, biking, and riding scooters are all much more vulnerable to serious injury or fatality when a speeding car is involved. The risk for vulnerable users more than doubles from 20 MPH to 30 MPH and is increasingly worse at higher speeds. Speed influences the risk of crashes and crash injuries in three ways:

- The distance a vehicle travels from the time a driver detects an emergency to the time the driver reacts is increased.
- The distance needed to stop a vehicle once the driver starts to brake is increased.
- The exponential increase in crash energy. For example, when impact speed increases from 40 to 60 mph (a 50% increase), the energy increases by 125% (IIHS, 2018b).”

NCHRP 03-67 – This digest presents the results of the study titled “Expert System for Recommending Speed Limits in Speed Zones,” describing “research conducted to develop a knowledge-based expert system decision-support tool for recommending speed limits in speed zones on highways and local roads that are considered credible and enforceable.” It contains three sections: Research Scope and Motivation; Expert System Decision Rules and their Derivation; and Software Application and its Use.

May 2007

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Subject Area: IVA Highway Operations, Capacity, and Traffic Control

Responsible Senior Program Officer: Andrew C. Lemer

Research Results Digest 318

AN EXPERT SYSTEM FOR RECOMMENDING SPEED LIMITS IN SPEED ZONES

This digest presents the results of NCHRP Project 3-67, “Expert System for Recommending Speed Limits in Speed Zones.” The study was conducted by a team led by the University of North Carolina Highway Safety Research Center with Wade Trim Associates, Inc. and PB Farradyne, Inc. Raghavan Srinivasan, Senior Transportation Research Engineer at the Highway Safety Research Center, was the Principal Investigator.

CONTENTS

SUMMARY

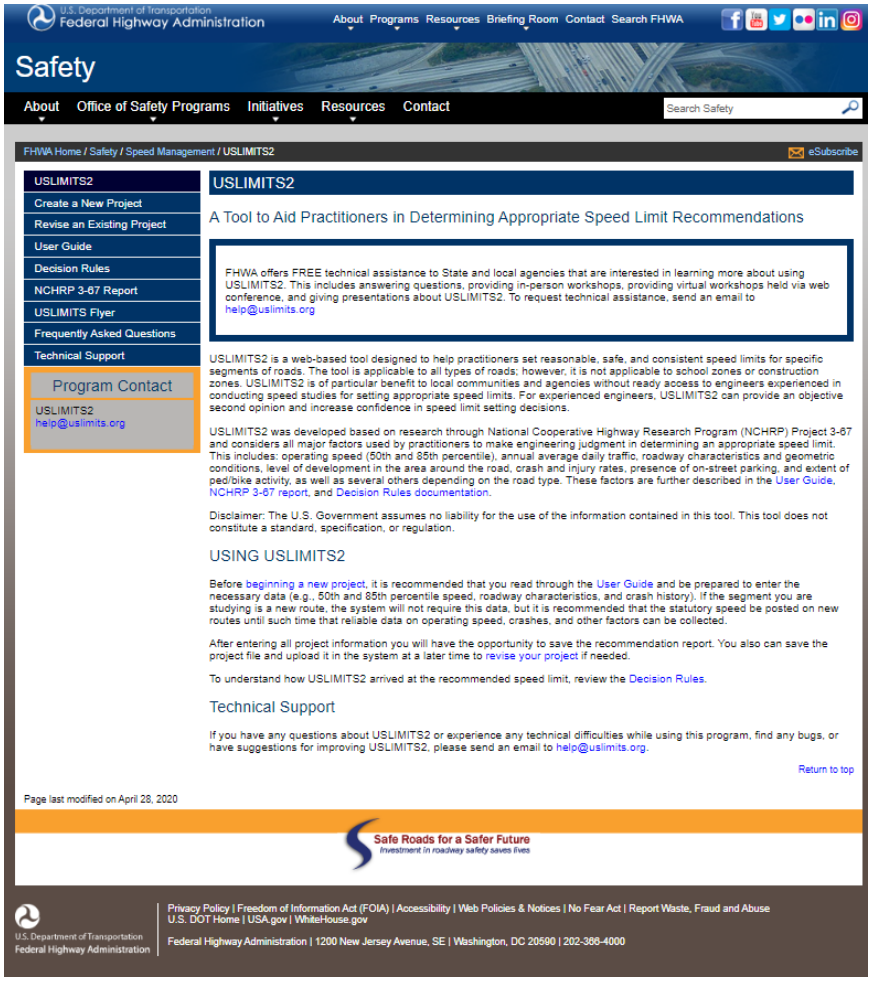
This digest describes research conducted to develop a knowledge-based expert system decision-support tool for recommending speed limits in speed zones on highways and local roads that are considered credible and enforceable. The tool is intended to assist responsible authorities in setting speed-zone limits to enhance traffic safety and operating efficiency. The system has been designed to be useful for all types of primary roadways, from rural two-lane segments to urban freeway segments. The system does not address statutory limits such as maximum limits set by legislatures for Interstates and other major classes of roadways, temporary or part-time speed limits such as those posted in work zones and school zones, or variable speed limits that change as a function of traffic, weather, and other conditions. The expert system is designed to be implemented as a web-based software application.

The digest is based primarily on the final report for NCHRP Project 3-67, “Expert System for Recommending Speed Limits in Speed Zones” (available from the project description page of the TRB website: http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=821). The project reviewed current literature on guidelines, criteria, and procedures used for setting speed limits in speed zones in the United States and experience with use of XLIMITS, USLIMITS, and other existing speed-limit expert systems. A group of subject-matter experts engaged in setting and enforcing speed limits was convened to provide underlying decision rules for the expert system. The software application was developed with consideration of user needs and requirements for long-term management and maintenance of the expert system. (The application can be accessed through the Internet at http://www2.uslimits.org and is available for download and installation on an Internet server from the TRB website at http://www.trb.org/news/blurb_detail.asp?id=7568.)

This digest is organized into three sections and an appendix. The first section describes the motivation for the research and the scope of NCHRP Project 3-67. The second section describes the decision rules embedded in the expert system and how

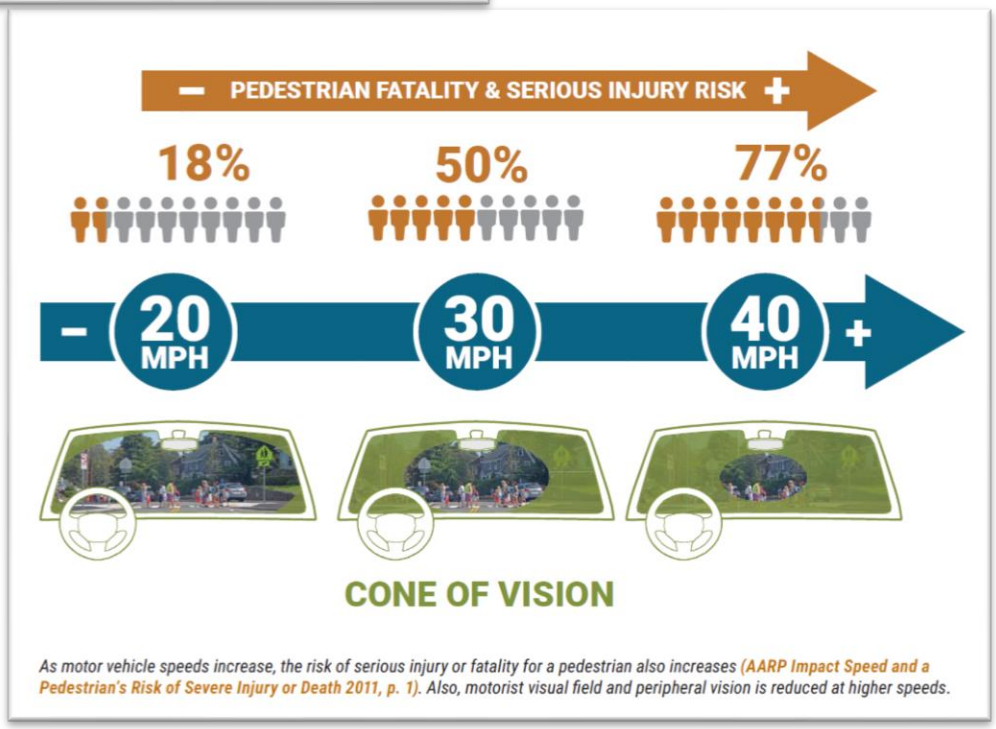
TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

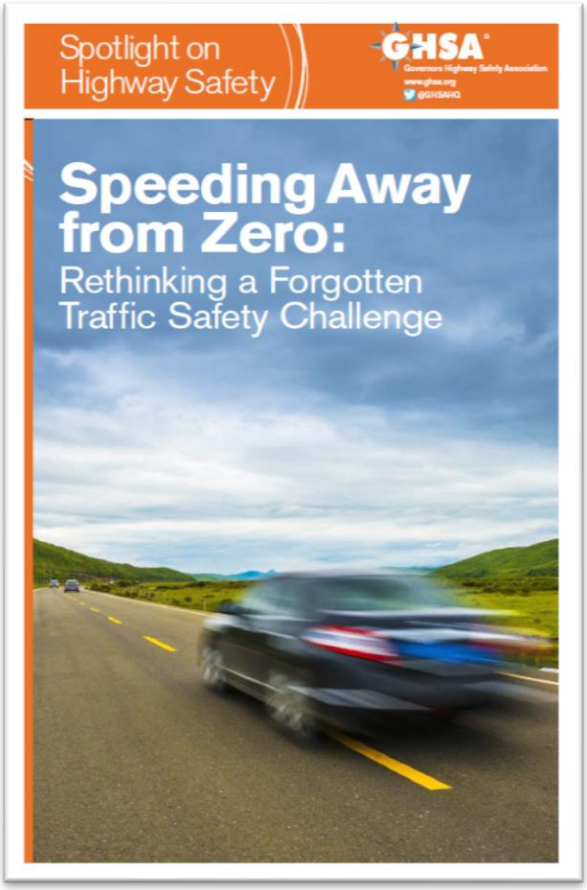
USLIMITS2 – The FHWA developed this web-based tool to “help practitioners set reasonable, safe, and consistent speed limits for specific segments of roads.” Its methodology was based on NCHRP 03-67 and uses several factors of street operating characteristics as inputs to develop recommended speed limits. The User Guide and Decision Rules documentation provide further details and guidance on how to use the USLIMITS2 tool.



[FHWA "Achieving Multimodal Networks"] – Safety as a Guiding Principal: "Where modes come together, the design should eliminate conflicts to the greatest extent possible. If it is not feasible to eliminate the conflict entirely, designers should minimize the speed differential between modes to ensure that if a crash occurs, the severity of the injury is likely to be lower...Designers have the flexibility to set design speeds lower than the posted speed limit."

Page 23:





Governors Highway Safety Association - ”Speeding remains a publicly-accepted driving behavior that is reinforced among motorists, policymakers and transportation stakeholders. National surveys of U.S. drivers have found that although drivers identify speeding as risky, drivers nonetheless continue to speed. Drivers have a minimal perception of risk of either getting a ticket, causing a crash, or violating social norms.“

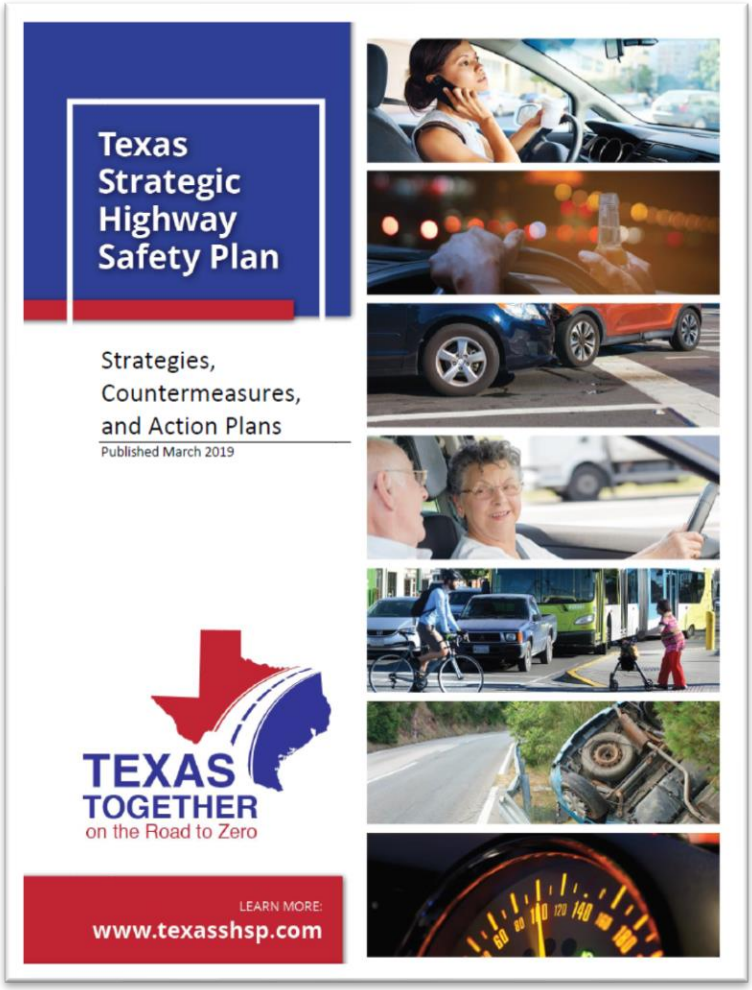
”Research has shown raising speed limits to match the 85th percentile speed increases the average operating speed of the roadway, consequently increasing the 85th percentile speed.“

“In 2013, the Washington legislature enacted a law allowing municipalities to establish a maximum speed limit of 20 mph in a residential or business district. This new law mandates that a reduced speed need not be based on any traffic or engineering studies, which were acknowledged as procedural roadblocks to making speed limit changes. The law also allows a municipality to reinstate a former speed limit if deemed necessary within a year of its change without a traffic or engineering study. New York City, which has a high-profile Vision Zero initiative, reduced its citywide speed limit to 25 mph as authorized by a 2014 New York State law. As of January 9, 2017, Boston reduced its default speed limit from 30 mph to 25 mph. IIHS evaluated the effects of this speed limit reduction and found that the reduction was associated with a 0.3% reduction in mean speeds. However, when looking at the odds of vehicles exceeding 25 mph, 30 mph, and 35 mph, reductions were increased to 2.9%, 8.5%, and 29.3% respectively. This study concluded that lowering the speed limit in urban areas is an effective countermeasure to reduce speeds and improve road safety (Hu and Cicchino, 2018b).”

Report Recommendation: Improve State and Local Policy

“Support Speed Limits According to Vision Zero Principles: States and localities should set reasonable speed limits in accordance with Vision Zero principles in built-up areas where there is a mix of vulnerable road users and motor vehicle traffic, at intersections and locations with a high risk of side collisions, and on rural roads without a median barrier to reduce the risk of head-on collisions.

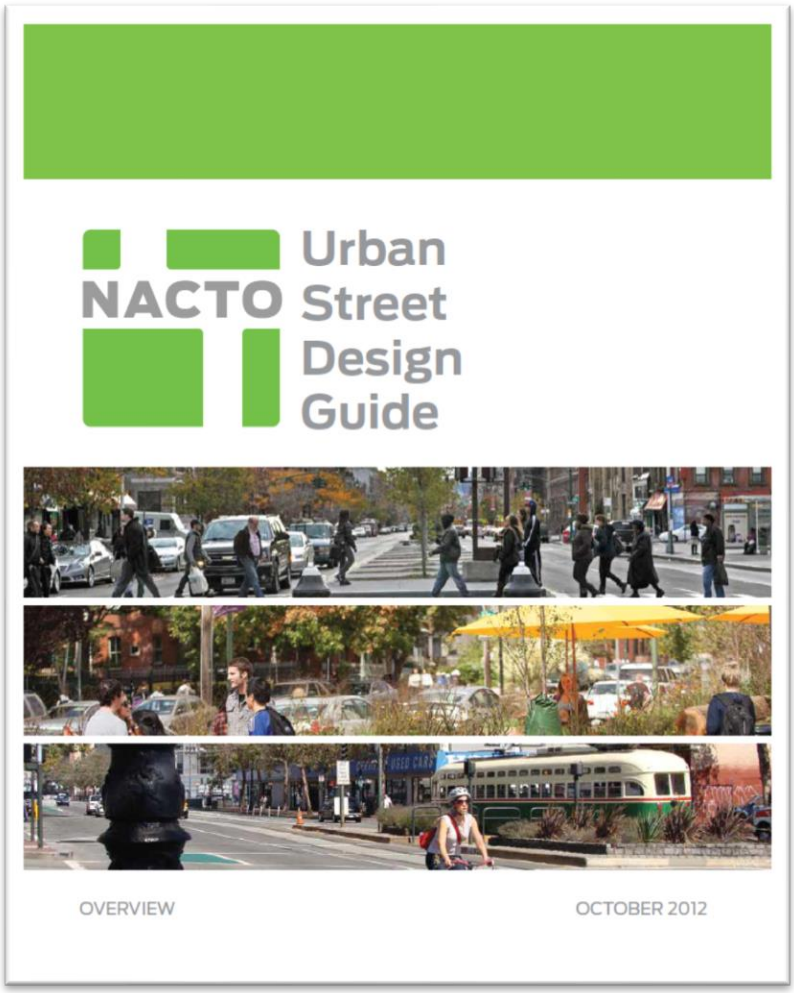
States should also provide local communities with discretion to set speed limits and deploy speed management countermeasures in order to meet local needs.”



[Texas Strategic Highway Safety Plan] - **Pedestrian Safety, Strategy 6A** - Encourage use of target speeds that consider pedestrians, land use, and the roadway context (e.g., a target speed of 35 mph or less on arterials). Other examples are to provide design flexibility guidance for techniques to reduce operating speeds on surface streets; encourage use of tree-lined medians, bicycle lanes, and safe and attractive pedestrian crossings and walkways; and support use of traffic calming for local streets.

All Users Safety, 6B - Design new roadways for a target speed appropriate for the adjacent environment and safety of all users rather than for a design speed intended to maximize motor vehicle speeds.

Speeding Strategy 1: Encourage use of target speeds for arterial, collector, and local roadways; encourage use of target speeds with pedestrian, land use, and roadway context, including options for target speeds of 35 mph or less on arterials and the evaluation of existing speed limits to appropriate target speeds.



NACTO Urban Street Design Guide - ”There is a direct correlation between higher speeds, crash risk, and the severity of injuries... Design streets using target speed, the speed you intend for drivers to go, rather than operating speed. The 85th percentile of observed target speeds should fall between 10–30 mph on most urban streets.”

AUSTIN TRANSPORTATION DEPARTMENT

MEMORANDUM

TO: Robert Spillar, P.E., Director,
Austin Transportation Department

FROM: Eric Bollich, P.E., PTOE, Acting Assistant Director,
Austin Transportation Department

CC: Anna Martin, P.E. PTOE, Assistant Director,
Austin Transportation Department

Lewis Leff, Transportation Safety Officer,
Austin Transportation Department

STATE OF TEXAS
ERIC A. BOLLICH
100435
LICENSED
PROFESSIONAL ENGINEER

5/7/20

DATE: May 7, 2020

SUBJECT: **Speed Modification Report – City of Austin Urban Core Streets**

The Austin Transportation Department (ATD) completed this engineering study to recommend speed modifications for Level 3 streets as classified in the Austin Strategic Mobility Plan (ASMP) within the Urban Core of the City of Austin. The Urban Core is defined as the street network bounded by US 183, SH 71/US 290, and Loop 1 (MoPac).

This study summarizes the background, methodology, and recommendations to set speed limits based on the context and operating characteristics of streets meeting the criteria set herein.

Summary of Recommendations

This engineering study resulted in the recommendation to modify speed limits on Level 3 Urban Core streets, along with two recommendations to implement the modifications. Additional details on these recommendations are provided in this engineering study.

Based on this engineering evaluation, the Office of the City Traffic Engineer has determined the following speed limit modifications should be entered into the City's Code of Ordinances based on ATD's evaluation of safe and prudent speeds. ATD under the authority of the Office of the City Traffic Engineer, intends to bring an item for Council action to set new speed limits on the identified streets based on the following recommendations:

- **Recommendation 1:** Modify speed limits on fifteen (15) Level 3 Urban Core streets, resulting in lowered speed limits to between 30 mph and 45 mph. Street segments impacted by Recommendation 1 are detailed in Recommendation Table 1.

Per Texas Transportation Code, Section 545.356, speed limit modifications set by municipalities are effective when signs are posted messaging new speed limits.

- **Recommendation 2:** ATD will develop a plan to install signage needed for Urban Core streets impacted by speed limit modifications recommended in this engineering study. The signage installation plan will include the design and placement of signage; prioritization of implementation based on documented safety concerns and geographic dispersion; and time and material cost estimations to complete sign installation. Given the quantity of signage requiring change, ATD will request Council authorize the speed changes, pending appropriate signage placement under the administrative authority of the Office of the City Traffic Engineer.

ATD's review of best practices revealed that comprehensive speed limit modifications are most effective when coupled with public awareness efforts. The intent of the effort is to reach a broad audience with a focused, consistent message to bring attention to the purpose and desired outcomes of speed limit modifications.

- **Recommendation 3**: ATD will conduct a citywide public awareness effort to increase the public's awareness of the pending speed limit modifications. ATD will ensure that educational awareness materials are culturally relevant and that they explain the need for the change and their intended safety goal. ATD will partner with law enforcement agencies to achieve the intended speed outcome through targeted education and enforcement activities, particularly on Urban Core streets with documented speeding concerns.

Background

Level 3 streets are broadly defined as arterial (major) streets designed to carry high volumes of traffic, normally at higher speeds than streets in residential settings. They provide access to a variety of land uses and generally accommodate longer intracity trips in the City. Austin has experienced decades of double-digit population growth, increasing the population density and changing the operating characteristics of the City's Urban Core network during this time. Most of the speed limits on Urban Core streets that were established before this rapid growth and have not been evaluated for appropriateness under current conditions.

High speeds in Austin are known to be one of the primary contributing factors of serious injuries and fatalities in the City. Based on ATD's review of citywide crash data, 8 percent of the City's street network contains nearly 70 percent of all serious and fatal crashes. This set of streets is known as the High-Injury Network, which ATD uses as a data-informed planning tool to identify locations where engineering, education, and enforcement interventions should be prioritized to have the most impact in improving safety at high crash locations.

Because a majority of the High-Injury Network falls within central Austin, ATD investigated posted speed limits and recommends speed limit modifications on Level 3 streets in the street network bounded by US 183, SH 71/US 290, and Loop 1 (MoPac), which ATD defined as the Urban Core.

Methodology

Texas Transportation Code, Section 545.356, and City of Austin Code, Chapter 12, give authority to municipalities to alter speed limits based an engineering and traffic investigation by a professional engineer. This speed modification report fulfills this engineering study requirement under authority of the Office of the City Traffic Engineer.

The Urban Core has approximately 90 street miles of Level 3 streets with existing speed limits greater than 35 mph, excluding access-controlled streets and their frontage roads. (One street mile is one contiguous mile of pavement, regardless of street width or number of lanes.) ATD focused on analyzing these streets with the premise that 1) crashes occurring at 35 mph or greater are most often associated with serious injuries and fatalities, and 2) speed limits above 35 mph are not typically compatible with the operating characteristics of urban streets. ATD also analyzed approximately 85 street miles of Level 3 streets with speed limits of 35 mph to determine whether they should be lowered to more appropriate speeds based on engineering studies.

ATD collected traffic speed data on streets which share similar operating characteristics using a statistical sampling approach. Ultimately, data were collected on 80 percent of all Level 3 street miles within the Urban Core to recommend speed limit modifications representative of the entire Urban Core street network.

The traditional transportation engineering methodology of investigating and recommending speed limits relies on the 85th percentile of vehicular speeds. This is based on the premise that drivers under unimpeded, free-flowing traffic conditions choose to travel at safe and prudent speeds for themselves and others. This methodology has limitations in urban settings where other considerations, such as turning conflicts, driveway density, and traffic signals, impede the natural flow of traffic and require more attention for drivers to operate safely.

Based on the knowledge that most serious injuries and fatalities in the City occur in the Urban Core, ATD researched emerging national practice for setting speed limits that are more applicable to this network and decided to use an expert systems methodology for this engineering study. Expert systems are credited with starting in Australia and were based on numerous data collection studies and observations by engineering experts. These findings were used to develop computer programs replicating the thought processes and judgments of these experts based on a variety of street operating characteristics. Completed in 2006, *NCHRP 03-67: Expert System for Recommending Speed Limits in Speed Zones* was one of the first studies in the United States "to develop a new knowledge-based expert system for recommending enforceable, credible speed limits in speed zones," resulting in the original USLIMITS methodology.

The Federal Highway Administration (FHWA) subsequently released USLIMITS2 as a web-based tool to develop credible and consistent speed limits. Rather than relying foremost on the 85th percentile of vehicular speeds, USLIMITS2 uses these additional inputs in its methodology:

- 50th percentile speed
- Section length of streets
- Annual average daily traffic
- Adverse alignment
- Statutory speed limit
- One- or two-way operation
- Divided or undivided streets
- Number of through lanes
- Area type (adjacent development)
- Number of driveways/uncontrolled access points
- Number of traffic signals

- On-street parking and usage
- Pedestrian and bicycle activity
- Crash data

After working with FHWA representatives for firsthand instruction on this tool, ATD used USLIMITS2, combined with engineering judgment, to develop speed limit modifications in this engineering study. Appendix A includes a detailed summary of USLIMITS2 input values used for each engineering study. National research and guidance materials on setting appropriate speed limits are included in Appendix B.

Findings and Recommendations

ATD analyzed Level 3 Urban Core streets using street characteristic inputs and USLIMITS2 methodology. Speed limit reductions on fifteen (15) of these streets were found to be appropriate, resulting in recommended reductions to between 30 mph and 35 mph on eleven (11) streets and reductions to between 40 mph and 45 mph on four (4) streets.

These latter segments being recommended for higher speed limits are typically located on the outskirts of the Urban Core where street characteristics demonstrate lower adjacent development; fewer driveways and traffic signals; and less pedestrian, bicycle, and parking activity.

The Office of the City Traffic Engineer applied engineering judgment to further reduce the speed limits on some streets resulting from the USLIMITS2 methodology based on continuity of speed limits on a street or consistency of speed limits with comparable Urban Core streets. This engineering judgment was applied to harmonize speeds along arterials and to also maintain driver expectation for the purposes of safety.

Recommendation 1: Speed limits should be modified on Urban Core streets per the following Recommendation Table 1.

Street	Extents		Existing Speed Limit	Recommended Speed Limit
	From	To		
7th Street (East)	71 feet west of the center line of Brushy Street	Pleasant Valley Drive (North)	35/40	30
7th Street (East)	Shady Lane	Airport Boulevard	45	40
51st Street (East)	I.H. 35 (North) East Frontage Road	Berkman Drive	40	30
51st Street (East)	Berkman Drive	250 feet west of Waterbrook Drive	40	35
Airport Boulevard	Lamar Boulevard (North)	I.H. 35 (North) West Frontage Road	40	35
Airport Commerce Drive	Bastrop Highway Southbound-Ben White Boulevard Westbound Ramp	Riverside Drive (East)	40	35
Burnet Road	White Horse Trail	US 183	40/45	35

Street	Extents		Existing Speed Limit	Recommended Speed Limit
	From	To		
Cesar Chavez Street (East) (eastbound)	45 feet east of Shady Lane	1838 feet east of Shady Lane	45	40
Cesar Chavez Street (East) (westbound)	45 feet east of Shady Lane	1628 feet east of Shady Lane	45	40
Cesar Chavez Street (West)	San Antonio Street	Lamar Boulevard (North)	35	30
Congress Avenue (South)	354 feet south of Oltorf Street (East/West)	Ben White Boulevard (West)	40	35
Guadalupe Street (West)	45th Street (West)	Lamar Boulevard (North)	40	35
Huntland Drive (East/West)	I.H. 35 (North) West Frontage Road	Airport Boulevard	40	35
Lamar Boulevard (North)	832 feet north of Riverside Drive	Martin Luther King Jr. Boulevard (West)	35	30
Lamar Boulevard (North)	30th Street (West)	Morrow Street	40	35
Lamar Boulevard (South)	Ben White Boulevard (West)	66 feet south of Gibson Street (West)	40	35
Manor Road	Airport Boulevard	Berkman Drive	40	30
Manor Road	Berkman Drive	300 feet south of Creekwood Road	40	35
Martin Luther King Jr Boulevard (East)	J.J. Seabrook Drive	U.S. 183	50	45
Oltorf Street (East)	Alvin Devane Boulevard	Montopolis Drive	45	40
Pleasant Valley Road (North)	Webberville Road	Chestnut Avenue	40	35
Springdale Road	Martin Luther King Jr Boulevard (East)	Manor Road	40	35

Signage Plan

Per Texas Transportation Code, Section 545.356, speed limit modifications set by municipalities are effective when signs are posted messaging new speed limits. All Urban Core streets have speed limit signs designating existing speed limits; those segments impacted by Recommendation 1 will require new speed limit signs. For operational purposes, ATD recommends Council approve the new speed limits pending placement of the signs as per our normal process, giving the Office of the City Traffic Engineer the administrative authority to place the signs as quickly as is feasible.

Recommendation 2: ATD will develop a signage installation plan to evaluate signage needed for Urban Core streets impacted by speed limit modifications recommended in this engineering study. This plan will include the following:

- Design and place signage to set speed limits on Urban Core streets. This includes methods to increase sign conspicuity, which could include increased sign size, non-typical colors, and supplemental safety messages. A standard sign spacing will be developed, which could include a maximum distance between speed limit signs and consistent placement before and after intersections with major streets.
- Prioritize sign installation based on documented safety concerns and geographic dispersion. For example, signs could be prioritized to the High-Injury Network with other streets to follow.
- Estimate the time needed to install all needed sign changes citywide based on staff availability and material costs to make set speed limits effective.

Education and Enforcement

ATD's review of best practices revealed that comprehensive speed limit modifications are most effective when coupled with public awareness efforts as they help reach a broad audience with a focused, consistent message to bring attention to the purpose and desired outcomes of speed limit modifications.

Recommendation 3: ATD will conduct a citywide public awareness effort to increase the public's awareness of the pending speed limit modifications. ATD will ensure that educational awareness materials are culturally relevant and that they explain the need for the change and their intended safety goal. ATD will partner with law enforcement agencies to achieve the intended speed outcome through targeted education and enforcement activities, particularly on Urban Core streets with documented speeding concerns.

Conclusion

The speed limit modifications recommended in this engineering study are the result of a comprehensive, years-long traffic investigation of all Level 3 Urban Core streets in the City of Austin. It is a progressive and bold approach based on national best practice to modernize the speed limits on Level 3 Urban Core streets which represent the highest propensity of serious injuries and fatalities in the City. These recommendations will help increase the safety of all users of the Urban Core street network by setting speed limits to safe and prudent levels.

APPENDIX A

Contents:

- USLIMITS2 Speed Zoning Reports

USLIMITS2 Analysis and Recommendations

Data Collection Location	85th% Average	50th% Average	Length of Section (miles)	Average AADT	Adverse Alignment	Statutory Speed Limit	Divided/ Undivided	# Thru Lanes (both directions)	Area Type	# Driveways	# Traffic Signals	Parking Usage	Ped/Bike Activity	# Crashes	# Injury & Fatal Crashes	National crash rate	Recommended Speed Limit
4900 Airport	40	34	2.50	21616	No	40	TWLTL	4	Developed	105	10	Not High	High	270	93		35
1100 N Pleasant Valley	39	34	0.78	11771	No	40	Undivided	2	Developed	14	2	Not High	High	9	2	216	35
900 E 51st	34	29	0.32	13486	No	30	Undivided	4	Developed	36	1	Not High	High	38	15		30
1200 E 51st	40	34	2.70	24752	No	40	Undivided	4	Developed	29	4	Not High	High	58	23		
1600 E 51st							Undivided	4									
1900 E 51st							TWLTL	3									35
2600 E 51st	38	34	1.50	9790	Yes	40	TWLTL	3	Developed	55	4	Not High	High	71	18		
3000 E 51st					No	35	TWLTL	3									
3600 E 51st					Yes	35	Divided	2									
4900 E 51st	43	38	0.85	4287	Yes	35	Divided	2	Developed	6	1	Not High	High	26	15		
5400 E 51st																	
2300 E 7th	31	26	1.35	20878	No	35	TWLTL	4	Developed	70	6	Not High	High	161	54	285	30
3000 E 7th	42	31	0.98	9559	No	40	TWLTL	4	Developed	42	3	Not High	High	162	64	285	40
4700 E 7th					No	40			Developed								
5200 E 7th	45	36	0.13	7205	No	45	Undivided	4	Developed	5	1	Not High	High	162	64	162	40
1000 W 15th	34	27	1.32	29193	No	35	Undivided	4	Developed	49	14	Not High	High	333	73		30
200 E 15th																	
400 W 15th							Divided										
1800 Manor	32	26	1.23	9325	No	35	Undivided	2	Developed	73	4	Not High	High	64	21		30
2400 Manor			1.23				Undivided										
2900 Manor	34	29	0.50	10883	No	35	TWLTL	2	Developed	32	3	Not High	High	19	8		
3100 Manor			0.50			40	TWLTL										
3500 Manor			0.50				TWLTL										
4000 Manor	43	39	1.12	6931	No	40	Undivided	2	Developed	28	2	Not High	High	16	4		35
4600 Manor			1.12														
5000 Manor			1.12			35											
5000 E MLK	55	49	1.00	22578	No	50	Undivided	4	Developed	31	3	Not High	High	102	53		45
5500 E MLK			1.00														
200 N Lamar	33	25	0.87	18774	No	35	TWLTL	4	Developed	46	6	Not High	High	86	26		30
600 N Lamar			0.87														
1400 N Lamar	38	29	1.62	27804	No	35	Divided	4	Developed	29	4	Not High	High	155	39		
2000 N Lamar			1.62		Yes	35	Divided	4	Developed			Not High	High				35
2700 N Lamar			1.62		Yes	35	Divided	4	Developed			Not High	High				
3100 N Lamar	40	32	1.24	28150	No	40	TWLTL	4	Developed	74	9	Not High	High	165	57		
3900 N Lamar												Not High	High				
4300 N Lamar												Not High	High				
4500 N Lamar	38	33	0.75	32105	No	40	Divided	4	Developed	33	3	Not High	High	90	27		
5200 N Lamar												Not High	High				
6000 N Lamar	49	42	2.00	24444	No	40	TWLTL	4	Developed	134	9	Not High	High	343	99		
6500 N Lamar							TWLTL					Not High	High				
8000 N Lamar							Divided					Not High	High				
5600 E Oltorf	48	43		10352	No	45	TWLTL	4	Developed	7	1	Not High	High			161	40
2800 S Congress																	35
3500 S Congress	40	33	2.70	28285	No	40	TWLTL	4	Developed	161	13	Not High	High	360	128	285	
4500 S Congress																	
5000 S Congress																	
4600 Springdale	44	39	1.79	16079	No	40	TWLTL	2	Developed							285	35

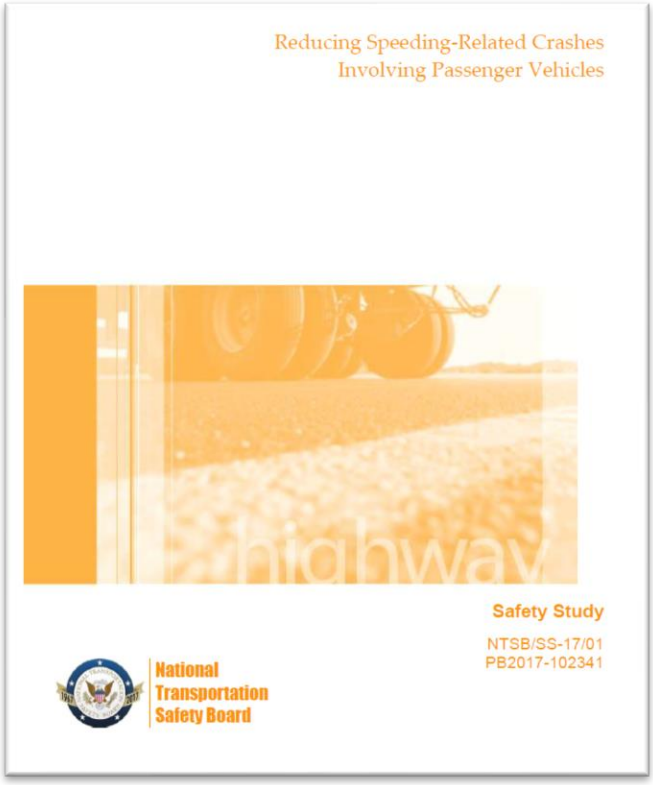
APPENDIX B

Contents:

- National Research and Guidance on Setting Appropriate Speed Limits

National Research and Guidance on Setting Appropriate Speed Limits

Numerous national studies and reports mention the critical role that speed plays in severe traffic crashes. The National Transportation Safety Board, the Governors Highway Safety Association, the Insurance Institute for Highway Safety, National Highway Traffic Safety Administration, and the Federal Highway Administration are just a few of the organizations whose work we have reviewed in order to better understand the need for a comprehensive speed management approach.



National Transportation Safety Board Safety Study - found that speed was a documented factor in 31% of all traffic fatality crashes nationally. “Speed—and therefore speeding—increases crash risk in two ways: (1) it increases the likelihood of being involved in a crash, and (2) it increases the severity of injuries sustained by all road users in a crash.” The study demonstrates how speeding presents different risks for different road users. People walking, biking, and riding scooters are all much more vulnerable to serious injury or fatality when a speeding car is involved. The risk for vulnerable users more than doubles from 20 MPH to 30 MPH and is increasingly worse at higher speeds. Speed influences the risk of crashes and crash injuries in three ways:

- The distance a vehicle travels from the time a driver detects an emergency to the time the driver reacts is increased.
- The distance needed to stop a vehicle once the driver starts to brake is increased.
- The exponential increase in crash energy. For example, when impact speed increases from 40 to 60 mph (a 50% increase), the energy increases by 125% (IIHS, 2018b).”

NCHRP 03-67 – This digest presents the results of the study titled “Expert System for Recommending Speed Limits in Speed Zones,” describing “research conducted to develop a knowledge-based expert system decision-support tool for recommending speed limits in speed zones on highways and local roads that are considered credible and enforceable.” It contains three sections: Research Scope and Motivation; Expert System Decision Rules and their Derivation; and Software Application and its Use.

May 2007

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Subject Area: IVA Highway Operations, Capacity, and Traffic Control

Responsible Senior Program Officer: Andrew C. Lemer

Research Results Digest 318

AN EXPERT SYSTEM FOR RECOMMENDING SPEED LIMITS IN SPEED ZONES

This digest presents the results of NCHRP Project 3-67, “Expert System for Recommending Speed Limits in Speed Zones.” The study was conducted by a team led by the University of North Carolina Highway Safety Research Center with Wade Trim Associates, Inc. and PB Farradyne, Inc. Raghavan Srinivasan, Senior Transportation Research Engineer at the Highway Safety Research Center, was the Principal Investigator.

CONTENTS

SUMMARY

This digest describes research conducted to develop a knowledge-based expert system decision-support tool for recommending speed limits in speed zones on highways and local roads that are considered credible and enforceable. The tool is intended to assist responsible authorities in setting speed-zone limits to enhance traffic safety and operating efficiency. The system has been designed to be useful for all types of primary roadways, from rural two-lane segments to urban freeway segments. The system does not address statutory limits such as maximum limits set by legislatures for Interstates and other major classes of roadways, temporary or part-time speed limits such as those posted in work zones and school zones, or variable speed limits that change as a function of traffic, weather, and other conditions. The expert system is designed to be implemented as a web-based software application.

The digest is based primarily on the final report for NCHRP Project 3-67, “Expert System for Recommending Speed Limits in Speed Zones” (available from the project description page of the TRB website: http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=821). The project reviewed current literature on guidelines, criteria, and procedures used for setting speed limits in speed zones in the United States and experience with use of XLIMITS, USLIMITS, and other existing speed-limit expert systems. A group of subject-matter experts engaged in setting and enforcing speed limits was convened to provide underlying decision rules for the expert system. The software application was developed with consideration of user needs and requirements for long-term management and maintenance of the expert system. (The application can be accessed through the Internet at http://www2.uslimits.org and is available for download and installation on an Internet server from the TRB website at http://www.trb.org/news/blurb_detail.asp?id=7568.)

This digest is organized into three sections and an appendix. The first section describes the motivation for the research and the scope of NCHRP Project 3-67. The second section describes the decision rules embedded in the expert system and how

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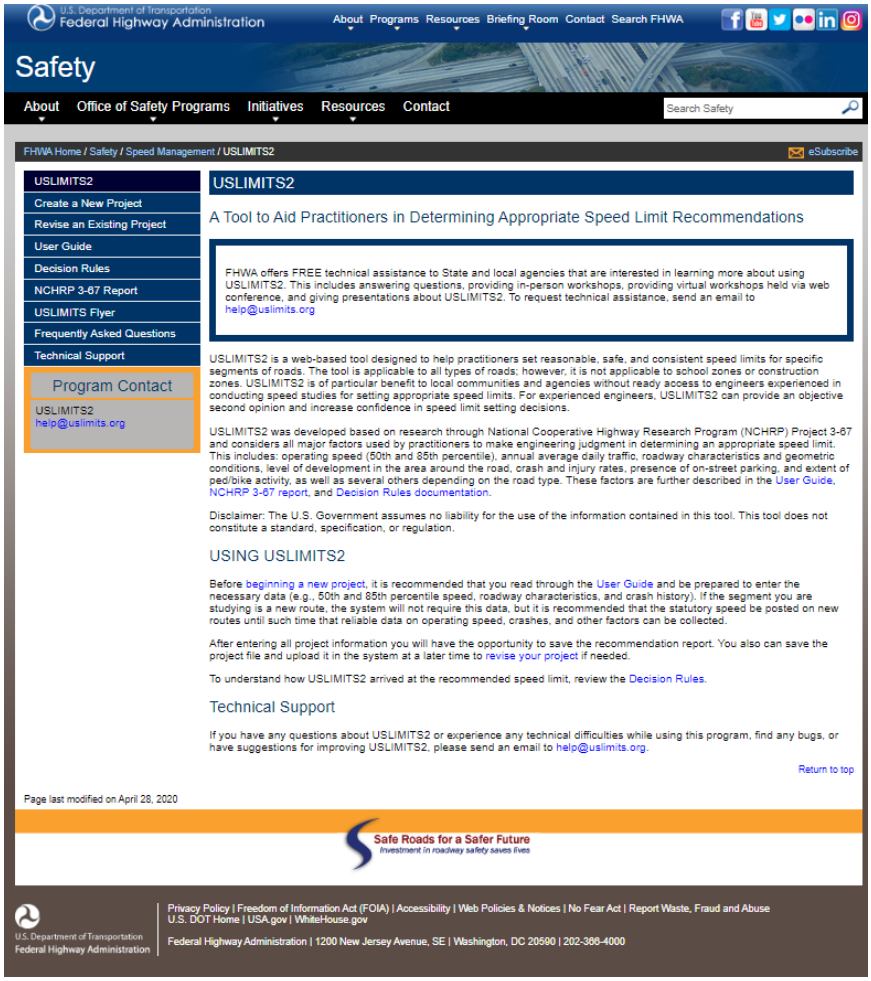
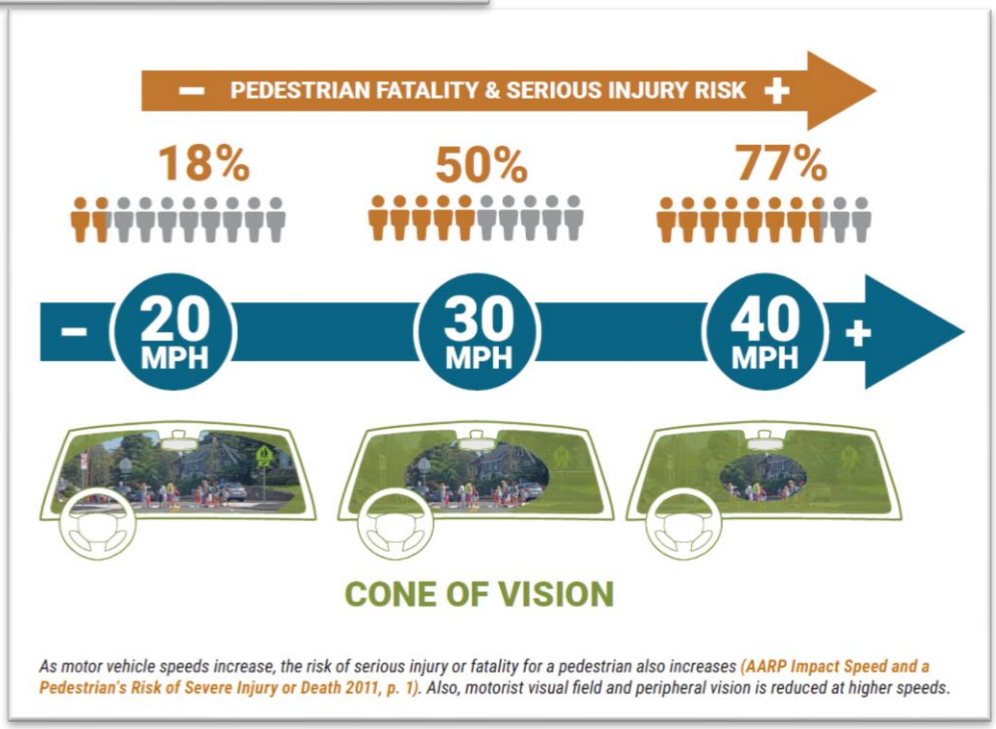
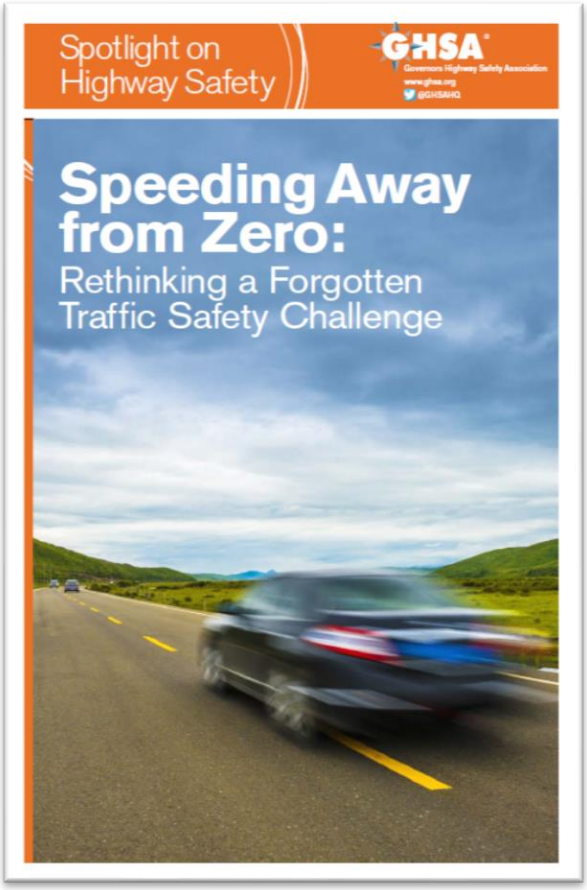
USLIMITS2 – The FHWA developed this web-based tool to “help practitioners set reasonable, safe, and consistent speed limits for specific segments of roads.” Its methodology was based on NCHRP 03-67 and uses several factors of street operating characteristics as inputs to develop recommended speed limits. The User Guide and Decision Rules documentation provide further details and guidance on how to use the USLIMITS2 tool.



[FHWA "Achieving Multimodal Networks"] – Safety as a Guiding Principal: "Where modes come together, the design should eliminate conflicts to the greatest extent possible. If it is not feasible to eliminate the conflict entirely, designers should minimize the speed differential between modes to ensure that if a crash occurs, the severity of the injury is likely to be lower...Designers have the flexibility to set design speeds lower than the posted speed limit."

Page 23:





Governors Highway Safety Association - ”Speeding remains a publicly-accepted driving behavior that is reinforced among motorists, policymakers and transportation stakeholders. National surveys of U.S. drivers have found that although drivers identify speeding as risky, drivers nonetheless continue to speed. Drivers have a minimal perception of risk of either getting a ticket, causing a crash, or violating social norms.“

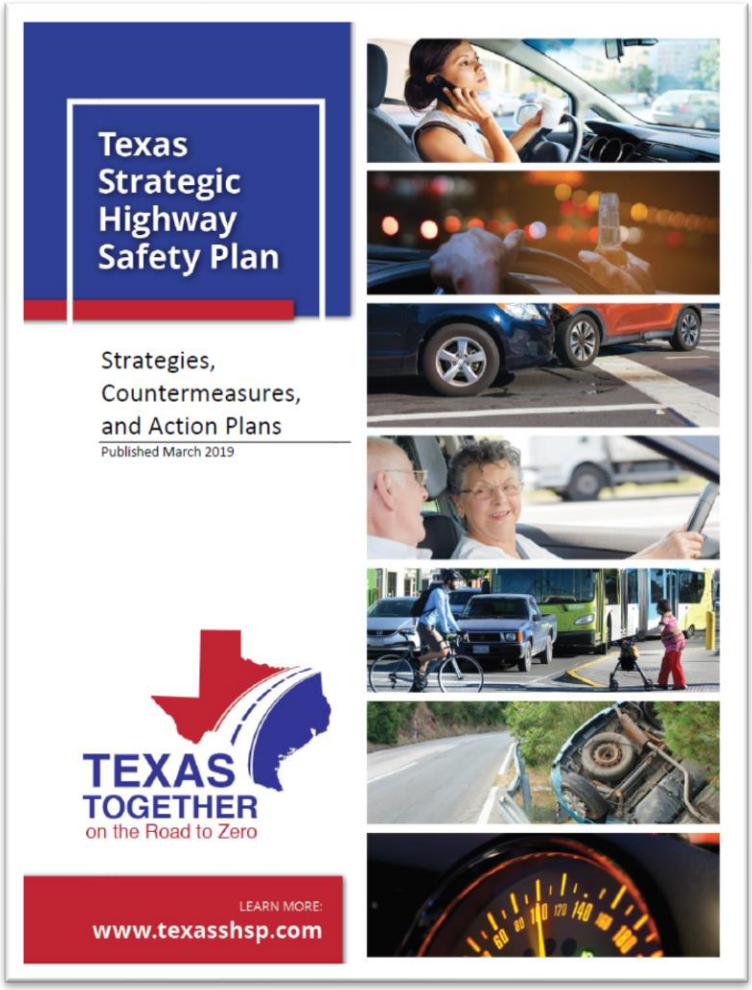
”Research has shown raising speed limits to match the 85th percentile speed increases the average operating speed of the roadway, consequently increasing the 85th percentile speed.“

“In 2013, the Washington legislature enacted a law allowing municipalities to establish a maximum speed limit of 20 mph in a residential or business district. This new law mandates that a reduced speed need not be based on any traffic or engineering studies, which were acknowledged as procedural roadblocks to making speed limit changes. The law also allows a municipality to reinstate a former speed limit if deemed necessary within a year of its change without a traffic or engineering study. New York City, which has a high-profile Vision Zero initiative, reduced its citywide speed limit to 25 mph as authorized by a 2014 New York State law. As of January 9, 2017, Boston reduced its default speed limit from 30 mph to 25 mph. IIHS evaluated the effects of this speed limit reduction and found that the reduction was associated with a 0.3% reduction in mean speeds. However, when looking at the odds of vehicles exceeding 25 mph, 30 mph, and 35 mph, reductions were increased to 2.9%, 8.5%, and 29.3% respectively. This study concluded that lowering the speed limit in urban areas is an effective countermeasure to reduce speeds and improve road safety (Hu and Cicchino, 2018b).”

Report Recommendation: Improve State and Local Policy

“Support Speed Limits According to Vision Zero Principles: States and localities should set reasonable speed limits in accordance with Vision Zero principles in built-up areas where there is a mix of vulnerable road users and motor vehicle traffic, at intersections and locations with a high risk of side collisions, and on rural roads without a median barrier to reduce the risk of head-on collisions.

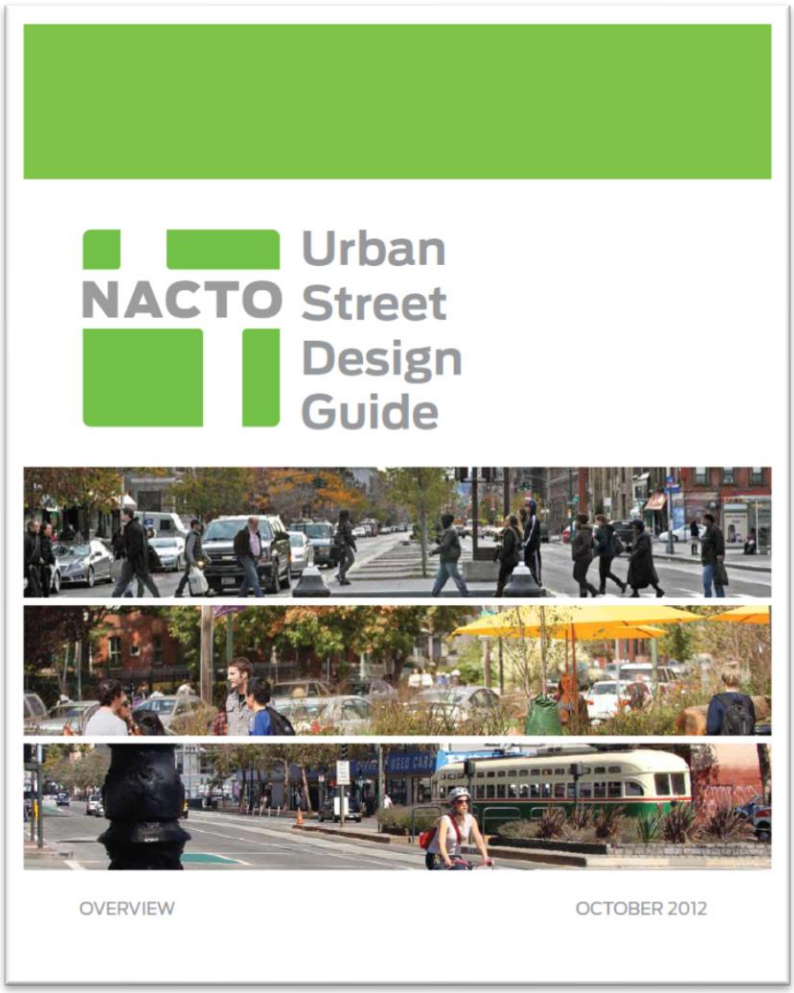
States should also provide local communities with discretion to set speed limits and deploy speed management countermeasures in order to meet local needs.”



[Texas Strategic Highway Safety Plan] - **Pedestrian Safety, Strategy 6A** - Encourage use of target speeds that consider pedestrians, land use, and the roadway context (e.g., a target speed of 35 mph or less on arterials). Other examples are to provide design flexibility guidance for techniques to reduce operating speeds on surface streets; encourage use of tree-lined medians, bicycle lanes, and safe and attractive pedestrian crossings and walkways; and support use of traffic calming for local streets.

All Users Safety, 6B - Design new roadways for a target speed appropriate for the adjacent environment and safety of all users rather than for a design speed intended to maximize motor vehicle speeds.

Speeding Strategy 1: Encourage use of target speeds for arterial, collector, and local roadways; encourage use of target speeds with pedestrian, land use, and roadway context, including options for target speeds of 35 mph or less on arterials and the evaluation of existing speed limits to appropriate target speeds.



NACTO Urban Street Design Guide - ”There is a direct correlation between higher speeds, crash risk, and the severity of injuries... Design streets using target speed, the speed you intend for drivers to go, rather than operating speed. The 85th percentile of observed target speeds should fall between 10–30 mph on most urban streets.”