

CITY LIMITS

Quick Guide on Conducting a Safe Speed Study and Using the Risk Matrix



Using the Quick Guide

In December 2023, FHWA published the 11th Edition of the Manual on Uniform Traffic Control Devices (MUTCD). In this edition, **the MUTCD moves away from using the 85th percentile to set speed zones.** It now requires an engineering study that considers roadway context.

Jurisdictions are able to use speed limit setting tools and methods such as expert systems and those consistent with the safe system approach as part of the required engineering study for a non-statutory speed limit.

“Speed zones (other than statutory speed limits) shall only be established on the basis of an engineering study that has been performed in accordance with traffic engineering practices. The engineering study shall consider the roadway context.”

(MUTCD Section 2B.21, paragraph 6)

First published in 2020, NACTO’s *City Limits* provides cities with clear technical and policy guidance on setting safe speed limits on city streets. It includes a Safe Speed Study methodology that is consistent with a safe systems approach.

This *Quick Guide* demonstrates how to use the Safe Speed Study first published in *City Limits*. **With this tool, engineers analyze a street’s activity level and conflict density in determining the posted speed limit for a speed zone. The resultant speed limit will be compliant with the MUTCD.**

A Safe Speed Study is a contextually sensitive tool for engineers to use in determining a speed zone.

- The Safe Speed Study methodology analyzes **conflict density** and **activity level**, among other contextual factors, to determine the speed limit that will **best minimize the risk** of a person being killed or seriously injured.



CONFLICT DENSITY

How frequently potential conflicts arise on a given street



ACTIVITY LEVEL

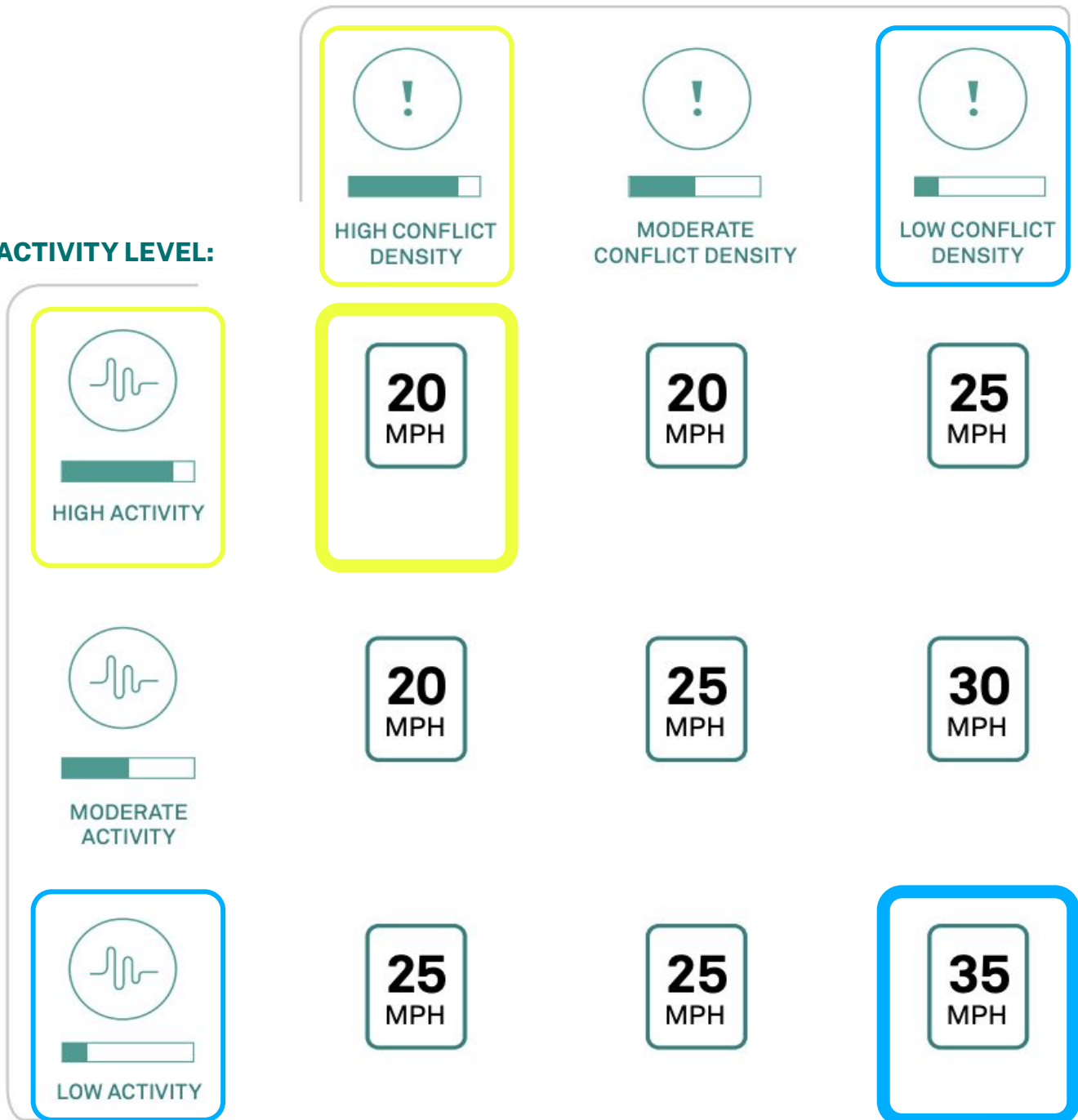
How active a street currently is or is expected to be

- **High conflict, high activity** streets will require **lower speed limits** since the risk of a crash is high, while somewhat higher speeds can be tolerated on low conflict, low activity streets.
- To conduct a Safe Speed Study:
 - Collect before data
 - Analyze existing conditions
 - Determine best option for speed management
 - Conduct an evaluation
- This *Quick Guide* describes how to use the Risk Matrix to analyze existing conditions. More details are provided in the full-length *City Limits*, available at nacto.org/city-limits.

The risk matrix is based on the idea that **high conflict, high activity** streets will require **lower speed limits** since the risk of a crash is high, while **low conflict, low activity** streets can tolerate **somewhat higher speed limits**.

CONFLICT DENSITY:

ACTIVITY LEVEL:





CONFLICT DENSITY

Two primary factors determine conflict density:

- **modal mixing:** how much physical separation the street offers people walking, biking, and rolling.
- **crossing point density:** how closely spaced intersections and other crossing locations are.



MODAL MIXING



HIGH

MODERATE

LOW

- No sidewalks or sidewalks directly adjacent to moving motor vehicle traffic
- Bicycle traffic expected to use a mixed-traffic lane or a designated shared bike/motor vehicle lane (e.g., sharrows)

- Urban Street Design Guide-compliant sidewalk, and/or a curbside loading/parking lane and sidewalk
- If designated as a bike route, a marked bike lane or better
- If not designated as a bike route, a full sidewalk that also permits bicycle use

- If designated as a bike route, a sidewalk compliant with the Urban Street Design Guide plus a vertically and horizontally protected bike lane, or a shared-use path/trail
- If not designated as a bike route, a full sidewalk that also legally permits bicycle use
- Passengers exiting parked or loading vehicles are not directly in motor vehicle traffic lanes



CROSSING POINT DENSITY



HIGH

MODERATE

LOW

3 or more “through” or “X” intersections, “T” intersections, driveways, curb cuts, or other crossing points per ¼ mile

1-3 “through” or “X” intersections, “T” intersections, driveways, curb cuts, or other crossing points per ¼ mile

0 “through” or “X” intersections, “T” intersections, driveways, curb cuts, or other crossing points per ¼ mile



**ACTIVITY
LEVEL**



How active a street currently is or is expected to be.



HIGH

Streets with lots of existing or expected pedestrian activity, active public spaces, important bike routes or planned bike routes, high curbside demand, and high density of transit stops

- Downtown / Central Business Districts
- Retail corridors
- High density residential and commercial streets

MODERATE

Streets with moderate existing or expected pedestrian activity, moderately used public spaces, some existing or expected bike traffic, frequent driveways, curbside parking/loading, and moderate density of transit stops

- Moderate density residential and commercial streets
- Streets with light retail activity
- Mixed use corridors

LOW

Streets with minimal expected pedestrian volumes, minimal expected or planned bike activity, low curbside demand, and few, if any, transit stops

- Low density industrial and residential streets



Conflict Density Analysis Checklist

IF any of these apply to the street...

No sidewalks

OR

Bicycle traffic in the traffic lane, even where marked or signed (e.g., sharrows)

OR

Sidewalks directly adjacent to moving traffic

OR

≥ 3 "through" or "T" intersections (signalized or unsignalized), major driveways, or other crossing points per 1/4 mile

If NOT, proceed...

...THEN the street has:

HIGH CONFLICT DENSITY

Proceed to the Activity Analysis.

IF the street has...

1-3 "through" or "T" intersections (signalized or unsignalized), major driveways, or other crossing points per 1/4 mile

AND

Curbside loading/parking lane and sidewalk, or a USDG-compliant sidewalk

AND EITHER:

A marked bike lane or better, if designated bike route

OR

A full sidewalk with permissible bike use, if not a designated bike route

If NOT, proceed...

...THEN the street has:

MODERATE CONFLICT DENSITY

Proceed to the Activity Analysis.

IF the street has...

No "through" or "T" intersections (signalized or unsignalized), major driveways, or other crossing points per 1/4 mile

AND

Curbside loading/parking lane and sidewalk, or a USDG-compliant sidewalk

AND

Passengers exiting parked or loading vehicles are not directly in general traffic lanes

AND EITHER:

Protected bike lane, shared use path, or USDG consistent sidewalk, if designated bike route

OR

Full sidewalk with legally permissible bike use, if not designated a bike lane

...THEN the street has:

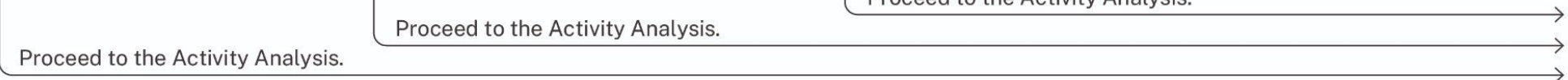
LOW CONFLICT DENSITY

Proceed to the Activity Analysis.

SAMPLE CONFLICT DENSITY METRICS

There are many metrics that a city can use to measure a street's conflict levels. The list below provides a starting point. Cities can set quantitative thresholds based on local conditions.

Pedestrian crossing volume per day or hour	Pedestrians walking in the street per hour
Left turn volume per day or hour	Motor vehicle lane blockage or bike-lane blockage percent per hour
Midblock or uncontrolled-intersection crossings per hour per 1/4 mile	





Activity Level Analysis Checklist

IF the street is any of the following...

- Downtown / Central Business District street
- OR
- Retail corridor
- OR
- High density residential or commercial street

...THEN the street has:

HIGH ACTIVITY

If NOT, proceed...

IF the street is a...

- Moderate density residential or commercial street
- OR
- Street with light retail activity
- OR
- Mixed use corridor

...THEN the street has:

MODERATE ACTIVITY

If NOT, proceed...

IF the street is a...

- Low density industrial or residential street

...THEN the street has:

LOW ACTIVITY

SAMPLE ACTIVITY LEVEL METRICS

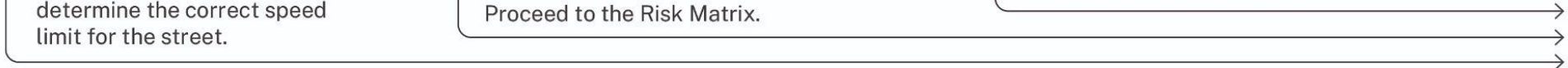
There are many metrics that a city can use to measure a street's activity levels. The list below provides a starting point. Cities can use land use metrics as an alternative in the absence of the volumes below. Cities can set quantitative high, medium, and low activity thresholds based on local conditions.

- Pedestrian sidewalk volume per day or hour
- Scheduled transit stops per hour
- Bicycle volume per day or hour
- Social and public space use volume per day or hour
- Parking or curbside loading maneuvers per hour
- Crash volumes by mode

Proceed to the Risk Matrix to determine the correct speed limit for the street.

Proceed to the Risk Matrix.

Proceed to the Risk Matrix.





Applying the **Conflict & Activity Level Analysis** to the Risk Matrix

