



TDOT

Department of
Transportation

Highway System Access Manual

HSAM

Agenda

Benefits of Access Management

Manual Organization & Policy

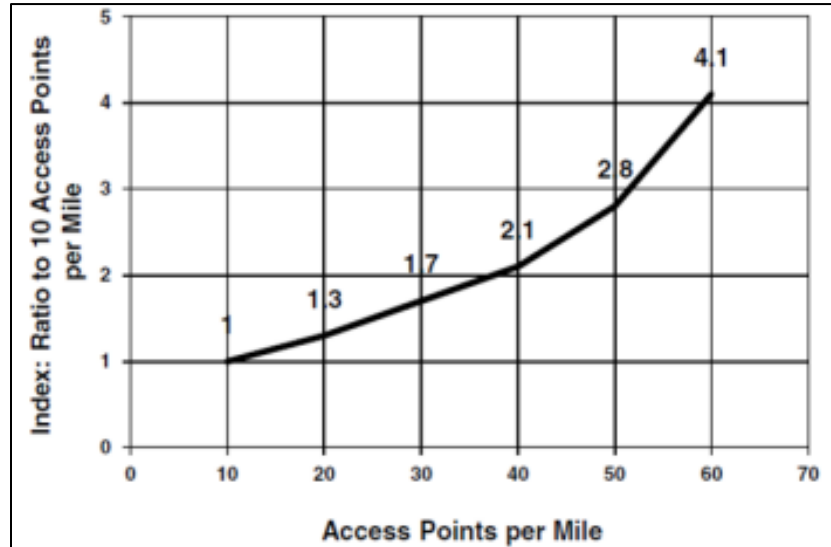
Volume 1

Volume 2

Volume 3

Benefits of Access Management

- 50% Crash Reduction
- 45% \square Increased roadway capacity
- 60% reduced travel time and delay

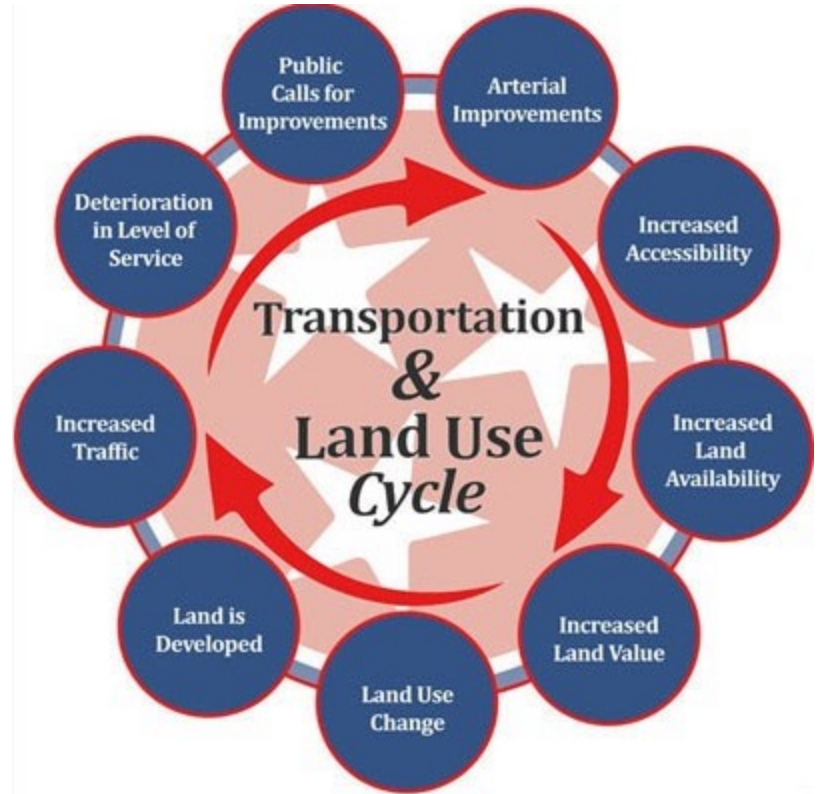


Composite Crash Rate Indexes

Source: TRB

Benefits of Access Management

“An effective access management program can slow or reduce the cycle shown . . . Without adversely affecting economic development.”
(TRB)



Benefits of Access Management

Table INTRO-1: Effects of Access Management Techniques

Summary of Research on Effects of Access Management Techniques

Treatment	Effect
Add continuous Two-Way Left-Turn Lane (TWLTL)	35% reduction in total crashes 30% decrease in delay 30% increase in capacity
Add non-traversable median	> 55% reduction in total crashes 30% decrease in delay 30% increase in capacity
Replace TWLTL with non-traversable median	15% to 57% reduction in crashes on four-lane roads 25% to 50% reduction in crashes on six-lane roads
Add left-turn bay	25% to 50% reduction in crashes on four-lane roads Up to 75% reduction in total crashes at unsignalized access 25% increase in capacity

Type of left-turn improvement	
- Painted	32% reduction in total crashes
- Separator or raised divider	67% reduction in total crashes
Add right-turn bay	20% reduction in total crashes Limit right-turn interference with platooned flow, increased capacity
Visual cue at driveways, driveway illumination	42% reduction in crashes
Long signal spacing with limited access	42% reduction in total vehicle hours of travel 59% reduction in delay 57,500 gallons of fuel saved per mile per year

Source: TRB Access Management Manual 2nd Edition, 2014, pg. 30

Project History & Purpose



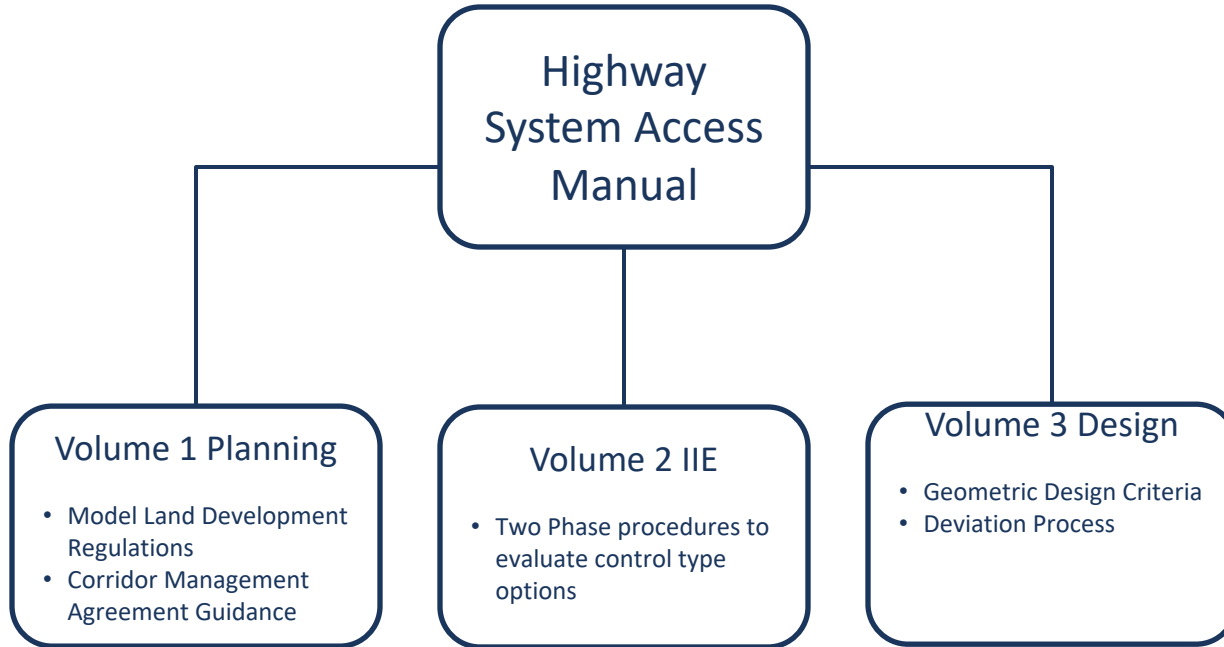
Why Update TDOT's Standards?

- Safety
 - 55% of all vehicular crashes involve access activity
 - 360 access related crashes estimated per day in TN



Manual Organization & Policy

Manual Organization



Policy

- Policy 385-01 “Application of the HSAM on TDOT Projects” became effective on February 1, 2022
- The HSAM Volume 2: Intersection and Interchange Evaluation shall be used during the project planning process to evaluate intersections on all projects.
 - Projects implemented by in-house maintenance, private driveways, other than street type intersections, and intersections where the major and minor approach have less than 400 vehicles per hour are not required to be evaluated under this policy.
- The HSAM Volume 3: Geometric Design shall be used on the following projects:
 - New Alignments
 - Roadway Widening
 - Major Reconstruction
- TDOT Rule – Adoption process underway to update current permit process for private driveways.


Adoption

- TDOT has adopted the manual for TDOT projects
- Entrance Rule update underway
- Local agencies may adopt for use in their jurisdictions (TDOT follows stricter guidance)
- Some local agencies have MOU to issue driveway permits, have agreed to follow TDOT Requirements or to be stricter



HSAM Volume 1: Corridor Management Agreements and Model Land use Guidance

Corridor Management Agreements



A collaborative agreement among multiple communities or agencies that addresses the development, management, and operations of a roadway corridor.

Corridor Management Agreements

Overview of
corridor
management
agreements

History of
CMAs in
Tennessee

Outlines the
process to
successfully
implement
a CMA
agreement

Model Land Development Regulations

- Local agencies are responsible for land use regulations and planning.
- TDOT is willing to provide input or assistance as requested by the local agency.

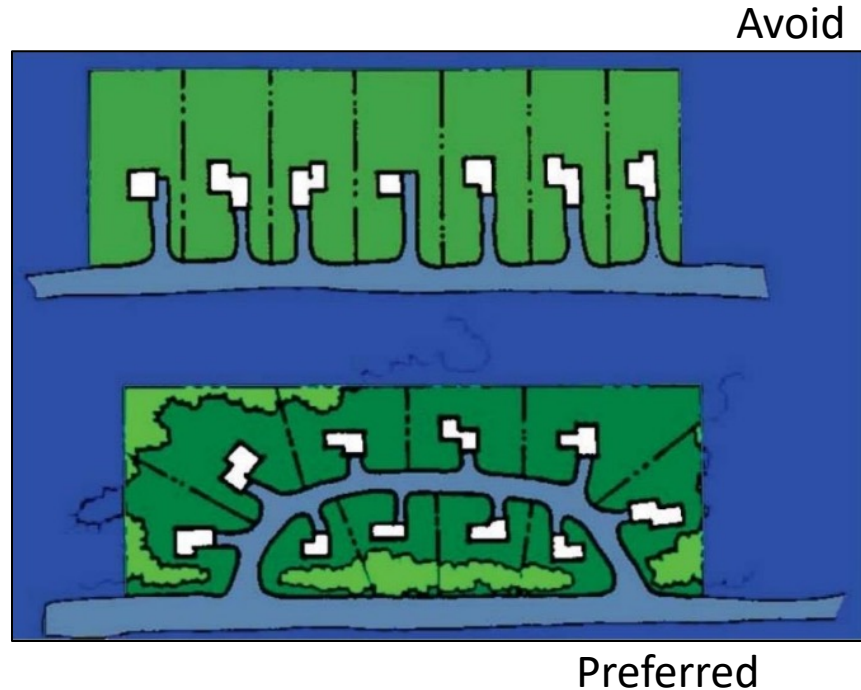


Model Land Development Regulations

For local jurisdictions wishing to better promote sound access management by way of their land development regulations.

This guide provides the following:

- Overview of national best practices
- An introduction to the various planning and regulatory tools
- Model ordinance language that may be adopted and incorporated into the local regulatory code

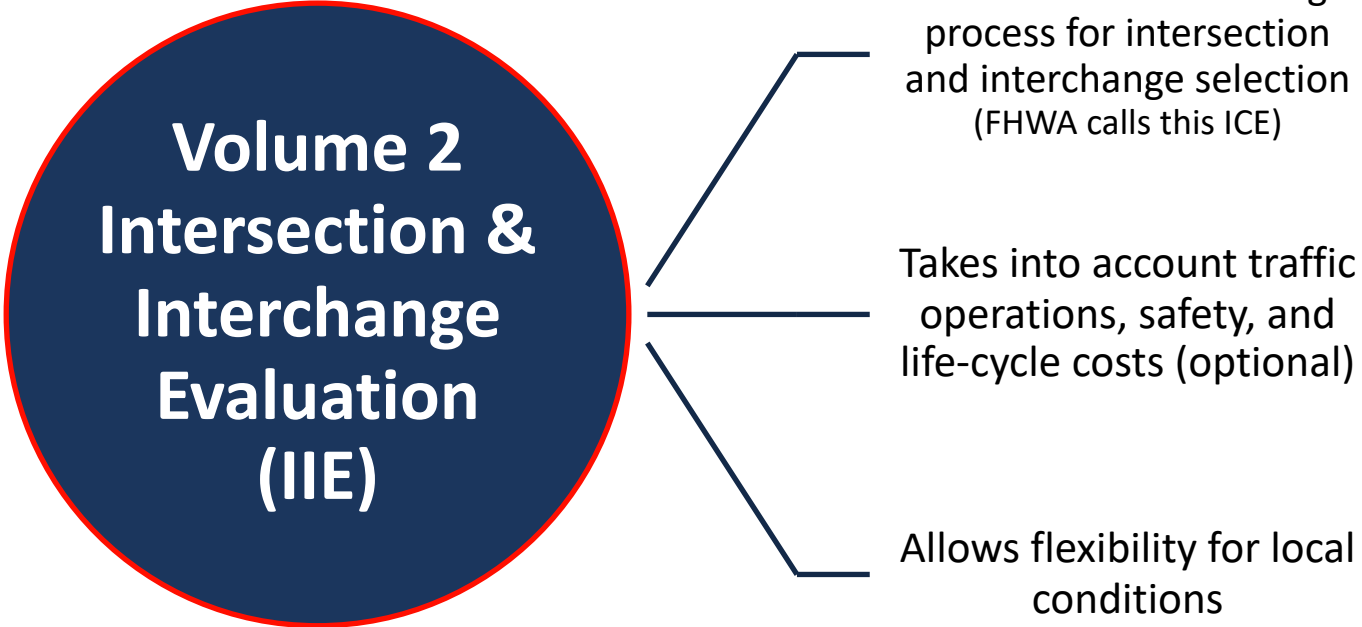


Model Land Development Regulations

- Regulations provide standards to a site before its development, they can be quite effective in promoting good access management.
- Provisions included in the land division and subdivision regulations can designate:
 - Lot size
 - Block size
 - Street network and connectivity
 - Driveway spacing and location
 - Pedestrian and bicycle access
 - Location and placement of transit access



HSAM Volume 2: Intersection and Interchange Evaluation



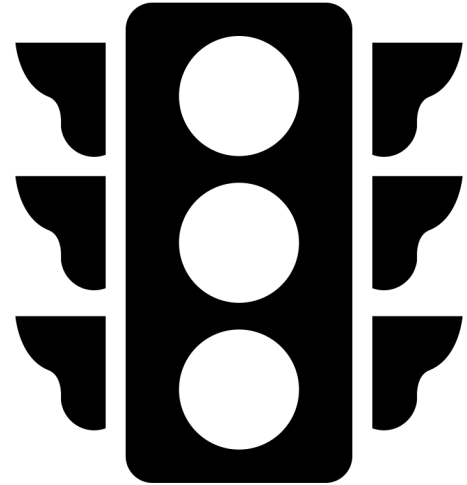
Volume 2 Intersection & Interchange Evaluation (IIE)

Documented screening
process for intersection
and interchange selection
(FHWA calls this ICE)

Takes into account traffic
operations, safety, and
life-cycle costs (optional)

Allows flexibility for local
conditions

- When should an IIE be done?
 - Anytime a signal is being considered.
 - May be done with 2-way and all way stop as well.



Vol. 2 IIE

Alternative Intersections/Interchanges: Informational Report (AIR)

PUBLICATION NO. FHWA-HRT-09-060

APRIL 2010



U.S. Department of Transportation
Federal Highway Administration

Research, Development, and Technology
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, VA 22101-2296

TN

Vol. 2 IIE – Intersection Options



Signalized



Quadrant Intersection



Displaced Left Turn

Continuous Green T



Roundabout



J-Turn or R-Cut



Vol. 2 IIE – Interchange Options



Diamond



Diverging Diamond

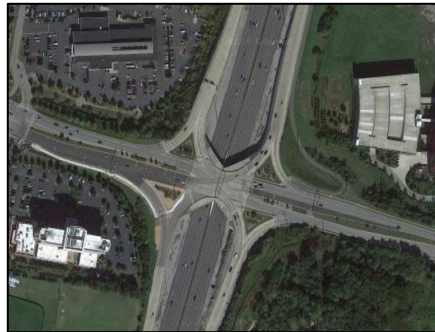


Parclo

SPUI with Roundabout



SPUI



Diamond with Roundabouts



TDOT's IIE process is implemented in two stages:

- "Stage I – Scoping" step to determine the short list of all possible options that merit further consideration and analysis because they meet project needs and are practical to pursue.
- "Stage II – Preferred Option Selection" step to determine the preferred option based on more detailed evaluations conducted during typical preliminary engineering activities.

TDOT HSAM Vol. 2 IIE

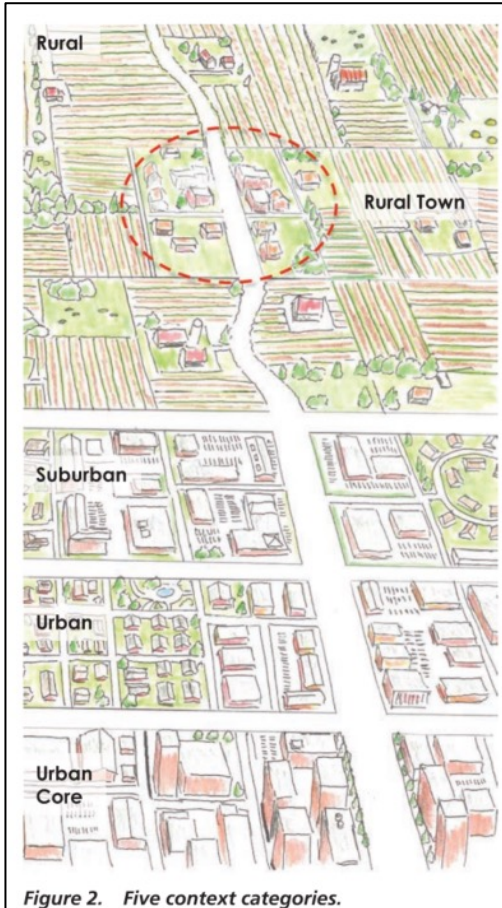
- Documented Intersection Control Evaluation (ICE) Methodology
- Utilization of CAP-X for capacity screening
- Documented life-cycle cost approach (optional)
- Documented predictive crash analysis (optional)
- All scalable to the project needs

- NCHRP Report 1087: Guide for Intersection Control Evaluations recently published
 - Provides guidance on doing intersection evaluations



HSAM Volume 3: Access Geometric Design

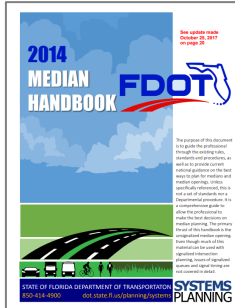
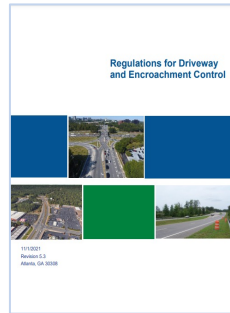
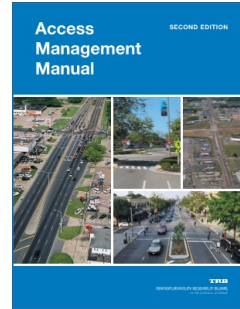
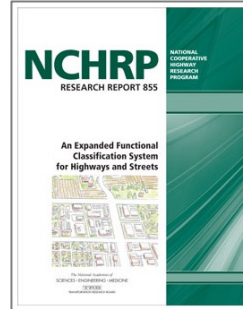
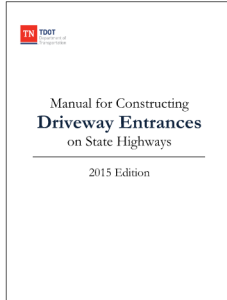
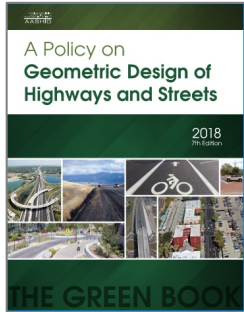
Context / Functional Classification



Context \ Roadway	Rural	Rural Town	Suburban	Urban	Urban Core
Principal Arterial	H speed H mobility- L access	L/M speed M mobility- H access	M/H speed M mobility- M access	L/M speed M mobility- M access	L speed M mobility- M access
Minor Arterial	H speed H mobility- M access	L/M speed M mobility- H access	M speed M mobility- M access	L/M speed M mobility- M/H access	L speed M mobility- M/H access
Collector	M speed M mobility- M access	L speed M mobility- H access	M speed M mobility- H access	L speed M mobility- H access	L speed M mobility- H access
Local	M speed M mobility- M access	L speed M mobility- H access	L speed L mobility- H access	L speed L mobility- H access	L speed L mobility- H access

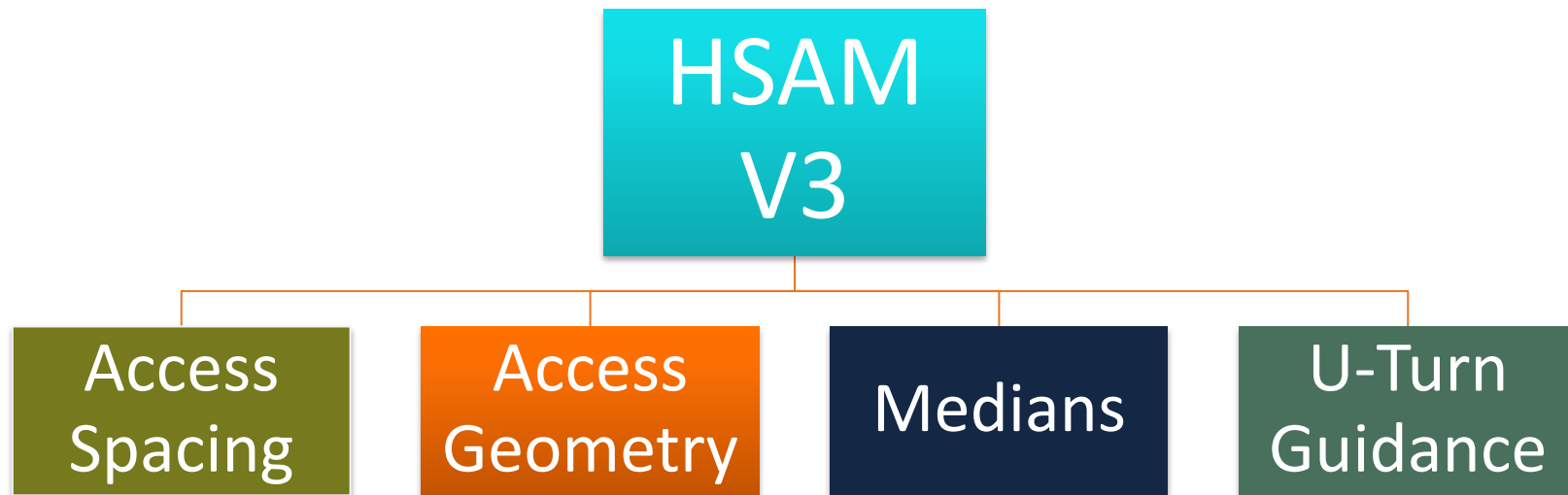
H = high, M = medium, L = low

HSAM: Sources

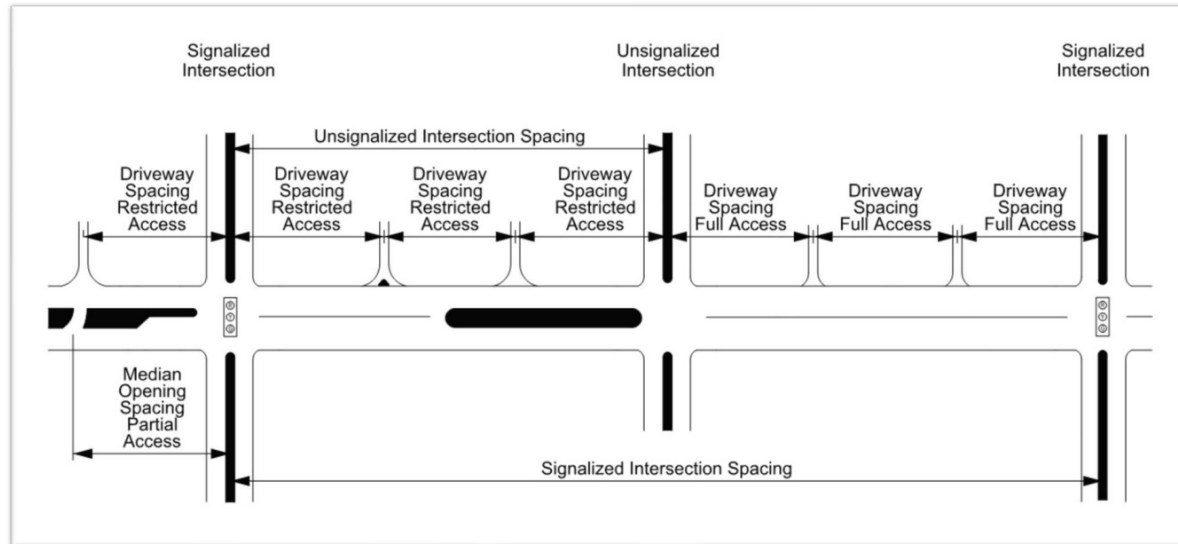
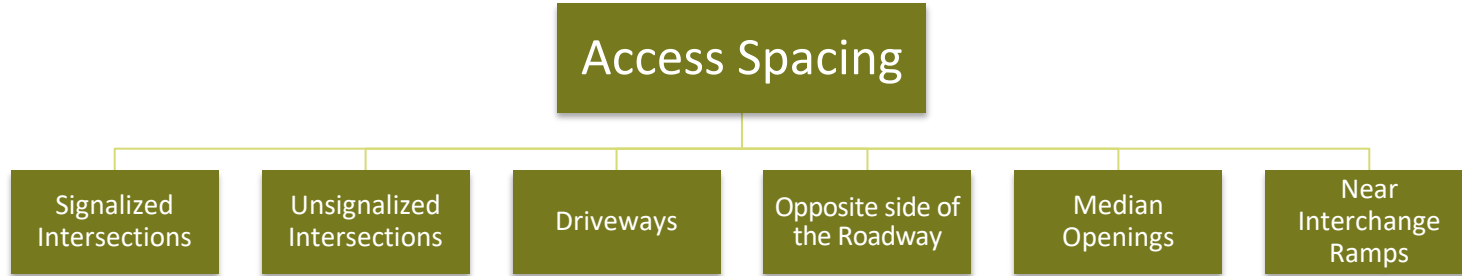


The cover is white with the TN DOT logo in the top left. The title 'Access Management Report' is in large black font, with 'December 2017' below it. The text 'Prepared by: The University of Tennessee, Knoxville Center for Transportation Research' is in the middle. At the bottom left, it says 'Airton Kehls, Ph.D. Mareike Ortman'. On the right side, there is a large aerial photograph of a complex highway interchange with multiple lanes and overpasses.

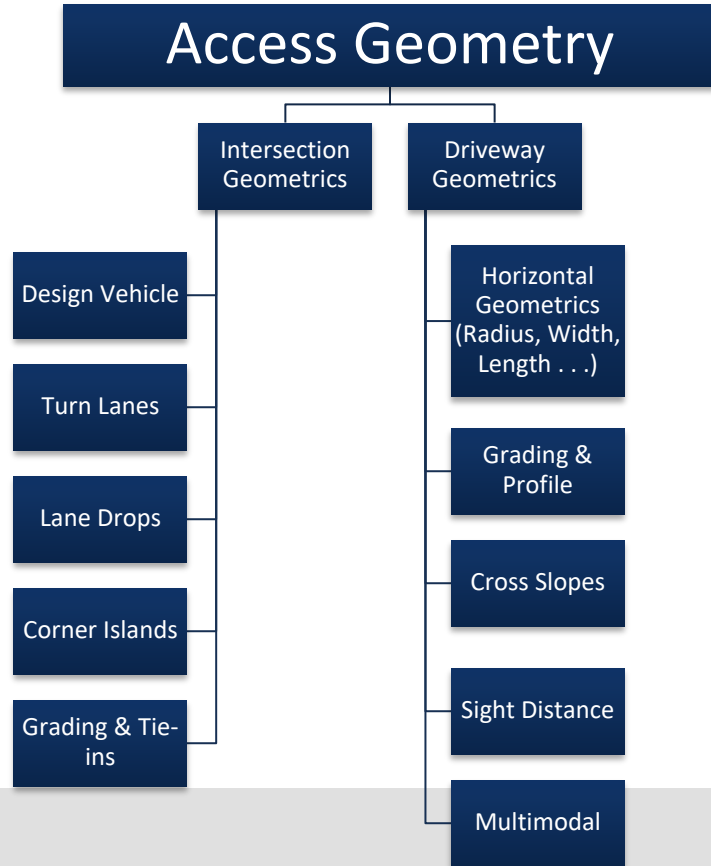
HSAM V3: Content Overview



Access Spacing Overview

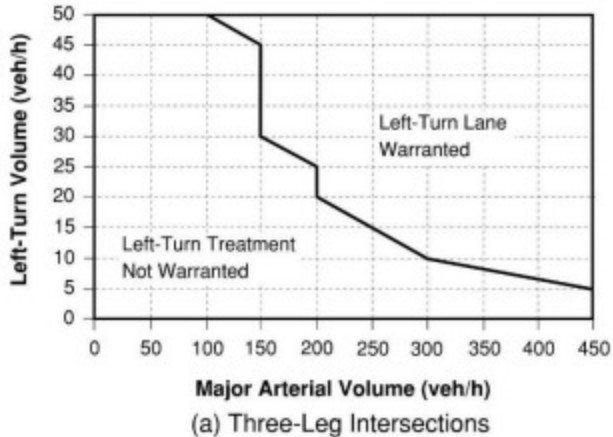


Access Geometry

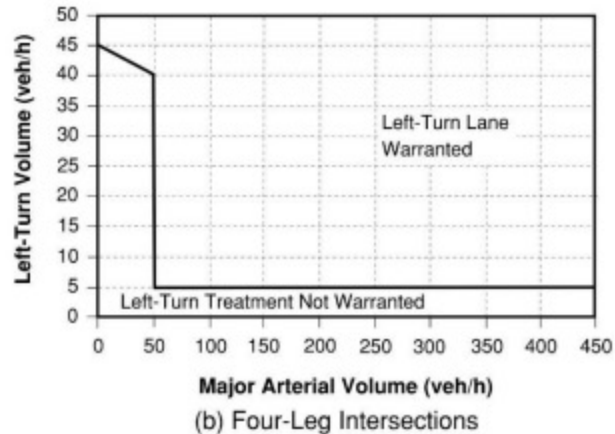


Left Turn Lane Warrants (unsignalized)

“ . . . Warrants indicate situations where a left-turn lane would help mitigate traffic conflicts, not necessarily situations where a left-turn lane is required. . . ”



3-Leg Intersection



4-Leg Intersection

Urban &
Suburban

Access Geometry - Throat Length

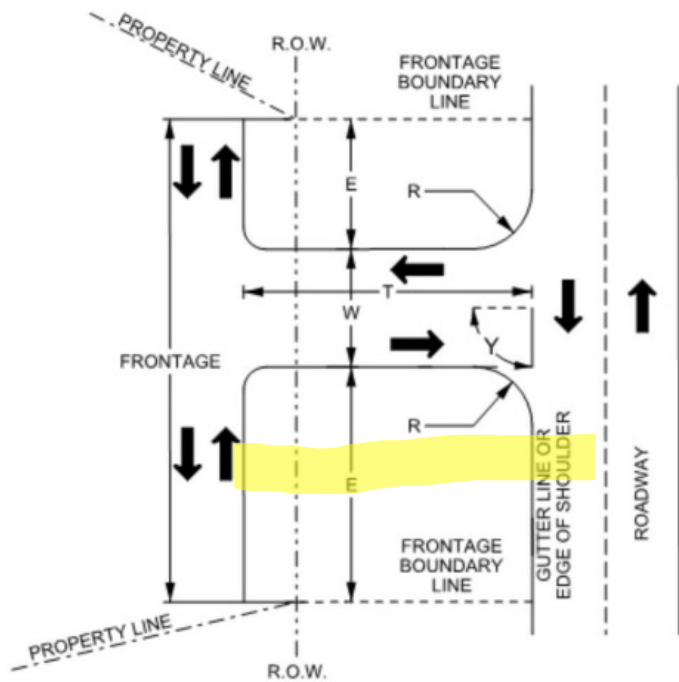


Figure 3-24: Horizontal Driveway Geometrics.

Table 3-17: Minimum Driveway Throat Length Requirements^{29, 30}

Minimum Driveway Throat Length (T)	
Number of Egress Lanes (left, thru and right)	Minimum Throat Length Feet
1	35 ft. *
2	75 ft.
3	200 ft.
4	300 ft.

* Inadequate driveway length can also provide hazards to entering traffic on site. Particularly where the on-site parking can back out of and block the entrance and prevent a vehicle from entering. To avoid this problem, a distance of at least 50 feet is used on entrance length where back out parking may interfere with entry movement, as shown in Figure 3-25.

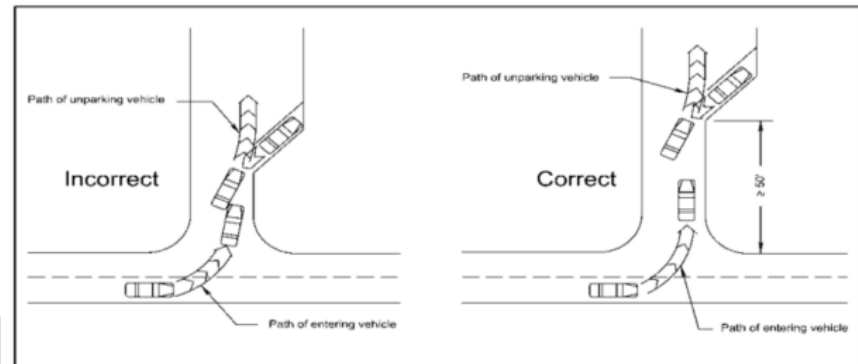
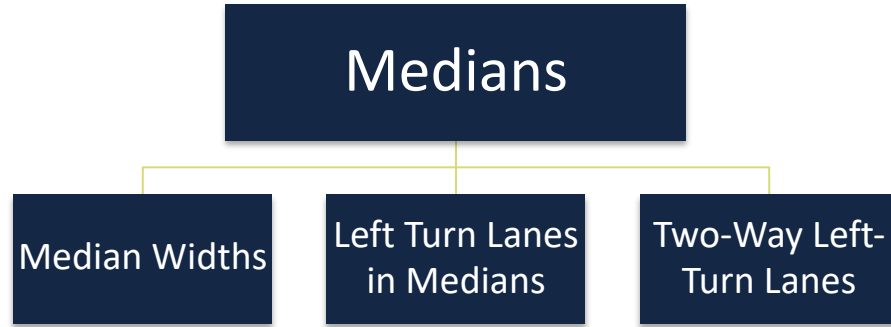


Figure 3-25: Driveway Throat Length Accommodation for Parking Conflicts²⁰

Medians



Two Way Left Turn Lanes (TWLTL)

HSAM Recommendations for TWLTL:

- Non-traversable median should be considered first
- 3-Lane TWLTL should have ADT < 17,000 VPD
- 5-Lane TWLTL should have ADT < 28,000 VPD
- Posted Speed should be < 45 MPH to warrant TWLTL
- 7-Lane TWLTL is strongly discouraged
- Unsignalized Left-Turning movements across 3+ Lanes of Opposing traffic is strongly discouraged



SR-153 (7-lane Section) Note one of the highest Crash Rates in R2

Deviations

- Process:
 - Complete Deviation Request form (different form for TDOT project or private development project)
 - Submit to Region Traffic Engineer for approval and submittal to Deviation Committee
 - Committee meets once a month

Deviations

Implementing Access Management on established routes will have difficulties. When criteria can't be met, deviations should be mitigated.

Mitigations:

- Limiting Access points to right-in / right-out
- Consider use of frontage or backage roads to consolidate access
- Consider joint access driveways
- Reducing the number of driveways for properties with multiple access points
- Limit corner lot access to minor roadway

Using the Manual

- Vol 1 – Use as a reference or adopt included language for local land use planning regulations.
- Vol 1 – Coordinate with TDOT Region if interested in a CMA.
- Vol 2 – Use as a guide for determining the best intersection control type. A signal is not always best.
- Vol 3 – Use for access design to ensure the integrity of the roadway is maintained as adjacent land is developed.

Questions???

Manual website:



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