

MAP 21 – NHS IMPACT

AASHTO STANDARDS

LANE WIDTH/TRUCK VOLUME GUIDANCE

At the 1/30/2013 MAP 21- NHS Standards impact meeting with FHWA, ODOT, City and County Agency, and Local Program, discussion occurred concerning interpretation of AASHTO standards. One of the areas where the local agencies requested AASHTO interpretation was guidance of AASHTO lane width requirements when trucks are present. Below is a general discussion on the subject and recommended guidance. ODOT uses the Highway Design Manual for lane and shoulder width requirements on state highways. The discussion outlined below does not change the ODOT requirements for any project on the state highway system, and is only intended to provide guidance to local agencies who are looking for direction for local agency projects that are on local agency jurisdiction roadways only, do not have any state or federal funding involved, and the roadway in question is on the NHS.

AASHTO's *"A Policy on Geometric Design of Highways and Streets"* (Green Book), provides guidance on rural and urban arterials. Rural and Urban Principal arterials are the highest level of roadway functional classification (interstates, other freeways and expressways, and other principal arterials) and have the following characteristics: corridor movement with trip and length density for substantial statewide or interstate travel; movements between areas with populations over 25,000; carry most of the trips entering and leaving an urban area; carry important intra-urban as well as intercity bus routes; and provide continuity for all rural arterials that intercept the urban boundary. AASHTO provides separate discussion between rural arterials and urban arterials.

Rural Arterials - Section 7.2.3 (Cross-Sectional Elements) outlines roadway width requirements for rural arterials. Roadway widths (lane and shoulder) to be provided are related to traffic volume, design speed, and Average Daily Traffic (ADT). Table 7-3 outlines the minimum lane and shoulder width. For any design speed and ADT of over 2000, lane width and usable shoulder width requirements are 12' and 8' respectively. AASHTO does allow existing travel roadway widths to be maintained where alignments are satisfactory and where there is no crash pattern suggesting the need for widening. This section does not note specific requirements for trucks, although reference to chapter 4 notes that 12' lanes predominately being used on most high-speed, high volumes highways. The section also notes the 12' lane provides desirable clearances between large commercial vehicles traveling in opposite

directions on two-lane, two-way rural highways when high traffic volumes and particularly high percentages of commercial vehicles are expected.

Urban Arterials - Section 7.3.3 (Cross-Sectional Elements) outlines the lane width requirements for urban arterials. Below is AASHTO text regarding lane width:

“Lane widths may vary from 3.0 to 3.6 m [10 to 12 ft]. Lane widths of 3.0 m [10 ft] may be used in more constrained areas where truck and bus volumes are relatively low and speeds are less than 60 km/h [35 mph]. Lane widths of 3.3 m [11 ft] are used quite extensively for urban arterial street designs. The 3.6 m [12 ft] lane widths are desirable, where practical, on high-speed, free-flowing, principal arterials.”

“Under interrupted-flow operating conditions at low speeds (70 km/h [45 mph] or less), narrower lane widths are normally adequate and have some advantages. For example, reduced lane widths allow more lanes to be provided in areas with restrictive right-of-way and allow shorter pedestrian crossing times because of reduced crossing distances. Arterials with reduced lane widths are also more economical to construct. A 3.3 m [11-ft] lane width is adequate for through lanes, continuous two-way turn lanes, and lanes adjacent to a painted median. Left-turn and combination lanes used for parking during off-peak hours and for traffic during peak hours may be 3.0 [10 ft] in width. If provision for bicyclists is to be made, see the AASTHO Guide for the Development of Bicycle Facilities.”

“If substantial truck traffic is anticipated, additional lane width may be desirable. The widths needed for all lanes and intersection design controls should be evaluated collectively. For instance, a wider right-hand lane provides for right turns without encroachment on adjacent lanes may be attained by providing a narrower left-turn lane. Local practice and experience regarding lane widths should also be evaluated.”

In additions to AASHTO guidance, research has looked at lane widths. In literature review on the subject, the lane width topic, similar to AASHTO, discusses other features of the roadway and surrounding area in choosing an appropriate lane width. For example, truck volume is a significant feature that should be considered when arriving at a lane width. Although not specifically prescribing a lane width, research has indicated that there appears to be general agreement that narrower lanes do not lead to operational problems when truck volumes are less than 5 percent and use of narrower lanes should be discourage on streets with more than 10 percent trucks. TRB Special Report 214, “Designing Safer Roads” is the base document for 3R standards, and uses the 10% trucks (defined as heavy vehicles with six or more tires) as the measure of using a narrower lane width for preservation projects. Trucks are a greater concern

on streets with horizontal curves and tractor-trailer combination trucks typically being wider than single-unit trucks, trucks have off-tracking and encroachment considerations regarding turning at intersections. AASHTO notes that speeds should be low, less than 35 mph and bus volumes should be low.

Below are some general guidance and some additional factors that should be considered when arriving at a lane width for urban areas. As previously mentioned, this guidance is intended for local agencies that are looking for direction for local agency projects that are on local agency jurisdiction roadways only, do not have any state or federal funding involved, and the roadway in question is on the NHS. In discussions with FHWA, general direction has been to allow the Engineer to make a professional decision. The roadway jurisdiction's Engineer of Record is responsible for demonstrating that the selected lane width is within AASHTO guidance and includes consideration of the parameters below. Although a specific lane width is not prescribed, the parameters (not all inclusive) discussed below are intended to provide a thought process to use when arriving at a lane width.

- General Guidance- AASHTO
 - 12' lane widths are desirable, where practical, on high-speed, free-flowing, principal arterials
 - 11' lanes are used quite extensively for urban arterial street designs
 - ADT- AASHTO (Rural Arterials) - Uses ADTS over 2000 (at any speed) as the threshold for use of 12' lanes.
 - Additional lane width is desirable when significant truck traffic is anticipated
 - Speed- AASHTO- Lower speed areas (< 35 mph) may be locations to consider a narrower lane
- Jurisdictional Design Guidance
 - Does the jurisdiction have design standards?
 - What are the principal arterial standards?
 - Does the jurisdiction have truck accommodation guidance?
 - Does the jurisdiction have planning design guidance outside of design standard guidance?
- Other Considerations
 - Trucks - Consider the width of a standard truck (10.5' mirror to mirror)
 - Truck Volumes- <10% trucks (Six or more tires) has been used as the point where a narrower lanes are considered
 - Is the roadway a truck route?
 - Is the roadway part of a freight corridor?

- Is the roadway in an area where land uses (commercial, industrial) have regular freight deliveries made?
 - Are the trucks that use the roadway single-unit vehicles or tractor-trailer combinations?
 - Do over-dimensional loads use the route?
 - Are there multiple turns to and from the roadway? (off-tracking)
- Transit
 - Is the roadway part of a bus route?
 - Are there multiple bus routes on the roadway?
 - Are there multiple turns to and from the roadway? (off-tracking)
- Bicycle/Pedestrian
 - Does the roadway have bicycle lanes?
 - Are there significant numbers of bicyclists?
 - Does the roadway have sidewalks?
- Roadway Typical/Geometrics
 - Is the roadway a couplet or is it a two-way roadway?
 - Is the roadway multiple lanes?
 - Are there turn lanes separating opposing through lanes?
 - Is the route used by emergency response vehicles?
 - Does the roadway have on-street parking?
 - Do curb extensions impact off-tracking at intersections?
 - Is “shy” distance used?
 - Does the roadway have horizontal curvature? (off-tracking)
 - Is the roadway superelevated? (off-tracking)
- Land Use/Context
 - Are the land uses primarily residential, commercial, or industrial?
 - What are the primary land uses of the corridor?
 - Is the corridor used by thru vehicles that serve commercial and industrial vehicles?