

# Appendix Q

## MAP 21 - NHS Standards

### Roles and Responsibilities Lane Width / Truck Volume Guidance

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# MAP 21 - NHS STANDARDS

## NHS EXPANSION WORKING GROUP

### A.1 Roles and Responsibilities (FHWA, ODOT, LOCAL AGENCY)

Some of the current process and procedures (Local Agency Guidelines) established between local agencies and ODOT for project review have changed with the additional National Highway System (NHS) routes. FHWA, through a letter of authority dated March 13 2013, authorizes ODOT to allow certified Local Public Agencies to perform work, in areas in which they have been certified, on federal-aid projects when the projects are on locally owned arterials that are part of the National Highway System. Additionally, ODOT may, at the discretion of FHWA and ODOT, allow Certified Local Public Agencies to administer federal-aid projects that are part of the National Highway system on ODOT-owned arterials subject to the Stewardship Agreement between FHWA and ODOT. ODOT shall assure that the projects on the NHS will follow AASHTO design standards or ODOT design standards if on an ODOT facility.

Other Certified Agency projects (federally funded), non-certified local agency projects (regardless of funding source) on state jurisdiction roadways, and non-certified local agency projects on local agency jurisdiction projects (federally funded) will continue to use the current processes and procedures in place between the local agency and the ODOT Regions. The addition of NHS routes will not change how these projects are processed. The only remaining type of projects that will follow a new procedure are those local agency projects on local agency jurisdiction roadways that have no federal or state funding associated with those projects, and are on roadways that were added to the NHS by MAP-21. These local projects will need to be submitted to ODOT's Technical Services Traffic-Roadway Section for review via the established audit process outlined below. Certified Agency NHS projects on local agency jurisdiction roadways, which have no federal dollars, will also need to be submitted to ODOT Technical Service's Traffic-Roadway Section for review via the audit process. Below is a matrix to assist in providing direction for local agencies and ODOT to address MAP-21 and the addition of NHS routes, followed by a discussion on roles and responsibilities.

Table Q-1: MAP-21 NHS Roles/Responsibility Matrix

PROJECT CATEGORY	PROJECT TYPE (CERTIFIED AND NON-CERTIFIED) ON NATIONAL HIGHWAY SYSTEM			
	CERTIFIED AGENCY (CA)	NON-CERTIFIED AGENCY		NON-CERTIFIED AGENCY AND CERTIFIED AGENCY (CA)
PROJECT JURISDICTION (STATE/LOCAL AGENCY)	Local Agency Project on Local Agency Roadway	Local Agency Project on State Jurisdiction Roadway	Local Agency Project on Local Agency Roadway	Local Agency Project on Local Agency Roadway
FUNDING SOURCE	Federal	Local/State/or	Federal	Local
TYPES of PROJECTS	New Construction/Reconstruction (4R), Reconstruction, Resurfacing, Restoration, Rehabilitation (3R), Development Review			
DESIGN EXCEPTIONS	<b>Approved by CA</b> ODOT will approve design exceptions for all projects on an ODOT facility and on bridges on the ODOT inventory list. Audit process as identified by Local Program agreements. No change in process for CA's	<b>Approved by ODOT</b> No change from current process used by Local Agency and ODOT Region	<b>Approved by ODOT</b> No change from current process used by Local Agency and ODOT Region	<b>Approved by Local Agency</b> Local Agency provides ODOT with list of projects, contract plans, specifications, and design exceptions on project by project or yearly basis for audit. Local Agencies submit information to ODOT Technical Services Traffic-Roadway Section for audit procedures.
PLAN REVIEWS (New Construction Reconstruction) (Resurfacing, Restoration, Rehabilitation-3R) (Development Review)	<b>Approved by CA</b> Audit process as identified by Local Program agreements. No change in process for CA's	<b>Reviewed by ODOT</b> No change from current process used by Local Agency and ODOT Region	<b>Reviewed by ODOT</b> No change from current process used by Local Agency and ODOT Region	<b>Reviewed by Local Agency</b> As with Design Exceptions, Local Agency provides ODOT with a list of projects, contract plans on a project by project or yearly basis for audit. Local Agencies submit information to ODOT Technical Services Traffic-Roadway Section for audit procedures.
<b>AUDIT PROCEDURES</b>				Audit Procedure- ODOT shall select a percentage of projects to perform a quality assurance type audit. Projects selected should consist of a sample of modernization, preservation, and developmental review projects.

## **A.2 Local Agencies**

### **A.2.1 Certified Agencies**

Certified Agencies are to use the same review process for projects as they do today with the following caveat. Those Certified Agency projects on the NHS that use local agency dollars only and are on local agency jurisdiction roadways are to submit those projects to ODOT Technical Services' Traffic-Roadway Section for audit purposes. Submittals are to include a listing of project or projects (if on a yearly basis), contract plans, specifications, and signed design exceptions. Submittals are also to include a design narrative providing justification for those projects that use lane widths less than 12 feet and vertical clearances of less than 16 feet. Types of projects to be submitted include: new construction and reconstruction (4R); resurfacing, restoration, and rehabilitation (3R); and development review. Design exceptions are to be approved by the Certified Agency.

### **A.2.2 Non-Certified Local Agencies**

Non-Certified Local Agencies are to use the current process development for non-certified local agencies projects that use federal, state, or local dollars on state jurisdiction roadways and non-certified local agency projects that use federal dollars on local agency jurisdiction roadways. Those non-certified local agency projects on the NHS that use local agency dollars, and are on local agency jurisdiction roadways are to submit those projects to ODOT Technical Services' Traffic-Roadway Section on a project by project or yearly basis for audit purposes. Design exceptions are to be approved by the local agency. Submittals are to include a listing of project or projects (if on a yearly basis), contract plans, and signed design exceptions. Submittals are also to include a design narrative providing justification for those projects that use lane widths less than 12 feet and vertical clearances of less than 16 feet. Types of projects to be submitted include: new construction and reconstruction; all resurfacing, restoration, and rehabilitation (3R); and development review.

### **A.3 Region Tech Centers**

Region Tech Centers are to continue with the review process that is currently in place today for Certified and Non-Certified Local Agency projects with the following caveat: Local projects on the NHS that use local agency funding and on local agency jurisdiction roadways will be submitted by the Local Agency directly to Technical Services' Traffic-Roadway Section. Information submitted to Engineering and Technical Services Branch will include; a listing of project or projects (if on a yearly basis), project plans, and signed design exceptions. This same procedure will be used for Certified Agency NHS projects on local jurisdiction roadways that use local agency only funding.

### **A.4 Technical Services (Traffic-Roadway)**

Technical Services Staff shall perform an audit on those projects received. Initially, a percentage of the projects received will be selected for audit. Primary purpose of the audit is to review the projects for compliance with AASHTO design standards and to review local agency approved design exceptions for adequacy. Audit results will be used by ODOT to determine the effectiveness of current process and to determine if adjustments in the establish project review process are needed.

## **MAP 21 – NHS IMPACT AASHTO STANDARDS**

### **A.5 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.

### **A.5.1 Rural Arterials**

Section 311 (Rural Arterials/Collectors/Local Routes) 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 300-28 outlines the minimum lane and shoulder width for 3R projects. 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.

### **A.5.2 Urban Arterials**

Sections 303 through 308 outline the lane width and cross-sectional 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.”*

### A.5.3 Lane Width Guidance

In addition 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 discouraged 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.

### **A. 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

### **B. 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?

### **C. Other Considerations**

1. 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)

2. 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)

3. Bicycle/Pedestrian

Does the roadway have bicycle lanes?

Are there significant numbers of bicyclists?

Does the roadway have sidewalks?

4. 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)

5. 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?