Work Zone Designer Series
Oversize/Overweight Vehicle Accommodation in Work Zones

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16. Abstract

Most State and many other transportation departments in the U.S. maintain roadway and/or work zone design manuals containing State specific regulations, policies, and design guidance for their designers and consultants to use to prepare their project work zone transportation management plans. However, those manuals vary widely in the depth of coverage and the work zone design topics offered. This series of publications are for work zone design manual decision makers, editors, and subject matter experts to develop or enhance their own guidance materials.

"Work Zone Designer Series - Accommodating Oversize/Overweight Vehicles in Work Zones" provides information on how to consider accommodating and mitigating oversize and overweight vehicles in work zones. This publication is not intended to be a stand-alone document for designing work zone traffic control plans. State, county, local, and tribal transportation agency subject matter experts, can use this material as reference material to augment their own work zone transportation management planning manuals and guidance materials, and work zone design policies and procedures.

The material has been gathered from existing State design manuals, considered as noteworthy state-of-the-practices by the authors and worthy of sharing with other states, and from state-of-the-art work zone safety and traffic management research documents developed by the U.S. General Accountability Office, the FHWA and other transportation research institutions.

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0. Introduction

This document is intended to serve two purposes. The first purpose is to provide background information to help highway agency work zone management staff develop a better understanding on the importance of considering vehicles that exceed standard width, height, weight, or length limits in their work zone transportation management plan (TMP) development processes. Vehicles that exceed one or more legal limit desiring to operate on a specific highway are termed, "oversize/overweight (OS/OW) vehicles", and these vehicles usually require special permits to operate beyond legal limits. The second purpose is to provide information and suggestions on how to accommodate OS/OW vehicles in a safe manner while construction operations are underway. The overall goal is to assist agencies to enhance their work zone TMP development processes. Information and suggestions are mostly from practices of state DOTs which are proactively considering and implementing OS/OW vehicles in their TMP processes, and ideas and opinions from the authors' experience.

The information presented is intended for agency decision makers and design manual editors to assist with enhancing their design directives, processes, and other guidance manuals for considering OS/OW freight movement in work zones. Agencies can augment this material with their own state laws, regulations, organizational structures, and previously established policy and guidance directives regarding OS/OW permitting requirements. Examples presented represent

the authors' opinions of good practices, but these practices are not intended to serve as standards or policies without further study by individual agencies.

1. Background on Oversize and Overweight (OS/OW) Freight Movement on Highways in the United States.

In 2013, the U.S. General Accountability Office (GAO) undertook a review to study the role of federal and state agencies in administering the movement of oversize and overweight freight on highways in the United States. The GAO final report titled, "Federal Highway Administration (FHWA) Should Conduct Research to Determine Best Practices in Permitting Oversize Vehicles" [1] dated 2015 is the basis for the majority of information about laws and regulations discussed in Section 1.

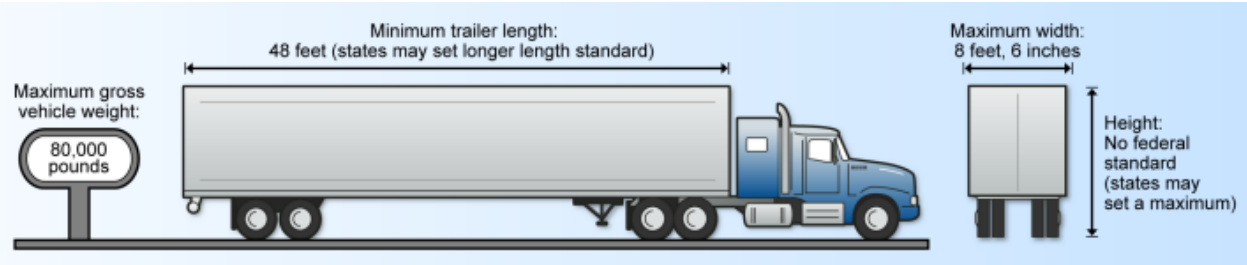
1.1 Federal Vehicle Size and Weight Laws

The United States has approximately 4.1 million miles of highways. Federal truck length and width standards are found in the U.S. Code (U.S.C.), 49 U.S.C. §§ 31111 and 31113 [2]. The FHWA regulations for implementing these laws are in 23 Code of Federal Regulations (CFR) Part 658 [3]. These laws and regulations are for the states to follow to provide a National Network system [4]for freight commerce with high quality, uniform highways in the US. National Network routes are listed in 23 CFR Part 658 [3]Appendix A, and the network comprises approximately 200,000 miles of highways, including the 47,000 mile Interstate highway system. National Network routes are intended for and capable of safely accommodating commercial motor vehicles, which are defined in section 5 of 23 CFR Part 658 [3]. As an example, the National Network highways typically have 12-foot wide traffic lanes. While FHWA width and length regulations apply to the entire 200,000 mile National Network, vehicle weight laws only apply to the 47,000 mile Interstate Highway System portion of the National Network. Interstate Highway truck weight laws are codified in 23 U.S.C. § 127 [5].

Section 11 in 23 CFR Part 658 [3]allows states to impose reasonable restrictions without FHWA approval on the National Network, including for construction zones. The following FHWA guidance interprets this regulation to make necessary work zone restrictions. "States may impose reasonable restrictions on the National Network in work zones for trucks without approval from the FHWA. Construction zones may include restrictions to the mainline or ramp(s) of a long or short duration, and include all travel lanes, or specific travel lanes. Information on construction zone restrictions should be disseminated under established State and local procedures. Notice of the restrictions should be provided in advance to the public and to neighboring State and Local DOTs that are affected by the construction." [6]

"The federal width standards generally require states to allow vehicles up to, but not exceeding, 8 feet 6 inches wide" [1]. The weight standards are more complicated with exceptions and special exemptions based on grandfathered state laws for higher limits, but "generally require states to allow vehicles up to, but not exceeding 80,000 pounds in total vehicle weight. States cannot set lower width or weight maximums where these federal standards apply" [1]. Figure 1 is

a sketch of federal size and weight limitations for a typical semi-trailer truck.



Source: GAO Report 15-236

Figure 1. Pictorial Diagram of Semi-Trailer Truck Showing Federal Vehicle Size and Weight Standards

There are no federal laws or regulations on vehicle height, since height clearances varied from state to state at the beginning of the Interstate highway era, and therefore the Congress does not give FHWA the authority to establish height limits. However, most states have set a maximum height at, or above, the standard semitrailer height of 13 feet-6 inches.

The federal length standards do not establish a maximum overall length for a vehicle, only a minimum length. This minimum length standard will ensure interstate commerce is not impeded by any state's requirements. The FHWA "regulation provides only that states may not require permits for vehicles with trailers that are less than a specific length, which depends on the type of vehicle. For example, states cannot require truck tractors with a single trailer to obtain a permit for a trailer length that is less than 48 feet" [1]. Some states have federal permission per 23 CFR 658.23 and 23 CFR 658.23 Appendix C to allow truck tractor-semitrailers to travel without requiring a permit.

1.2 State Vehicle Width, Length, Height, and Weight Laws

Every state and the District of Columbia (D.C.) have their own state laws and regulations to set size and weight limits for vehicles operating in that state, following applicable federal regulations. "Maximum vehicle width and weight requirements are usually set at the federal standard (8 feet 6 inches wide and 80,000 pounds for gross vehicle weight)" [1]. However, states can set their own limits for other vehicle dimensions that are not mandated by Federal laws and regulations. States often set size requirements for vehicle length and height that best accommodate their own highway conditions and economic needs. "For example, 37 states have set 53 feet 0 inches as the maximum legal length for a semitrailer. Length limits for the remaining 13 states and D.C. vary from 48 feet 0 inches to 65 feet 0 inches. Further, 29 states and D.C. set maximum vehicle height at 13 feet 6 inches, while the other 21 states allow vehicles to be from 14 feet 0 inches to 15 feet 0 inches." [1] An overview of state's general size and weight limitation laws is provided in Table 1.

Therefore, it is suggested state specific width, length, height, and weight laws and regulations be reviewed when state specific statewide work zone manuals and guidance materials are prepared.

Type of Requirement	Description
Maximum weight for a legal vehicle	• 48 states set maximum gross vehicle weight at 80,000 pounds, which is the federally mandated standard. • 3 states set higher gross vehicle weight limits.
Maximum length for a legal semitrailer	• 37 states set maximum length at 53 feet for a semitrailer. • Maximum lengths vary between the minimum federal standard of 48 feet and 65 feet for a semitrailer. • Maximum length requirements vary for other types of vehicles, depending upon the number of trailers, type of load, and type of highway traveled
Maximum height for a legal vehicle	• 30 states set maximum height at 13 feet 6 inches. • 21 states have at least a 14 foot height maximum, including Alaska, with the highest maximum at 15 feet.

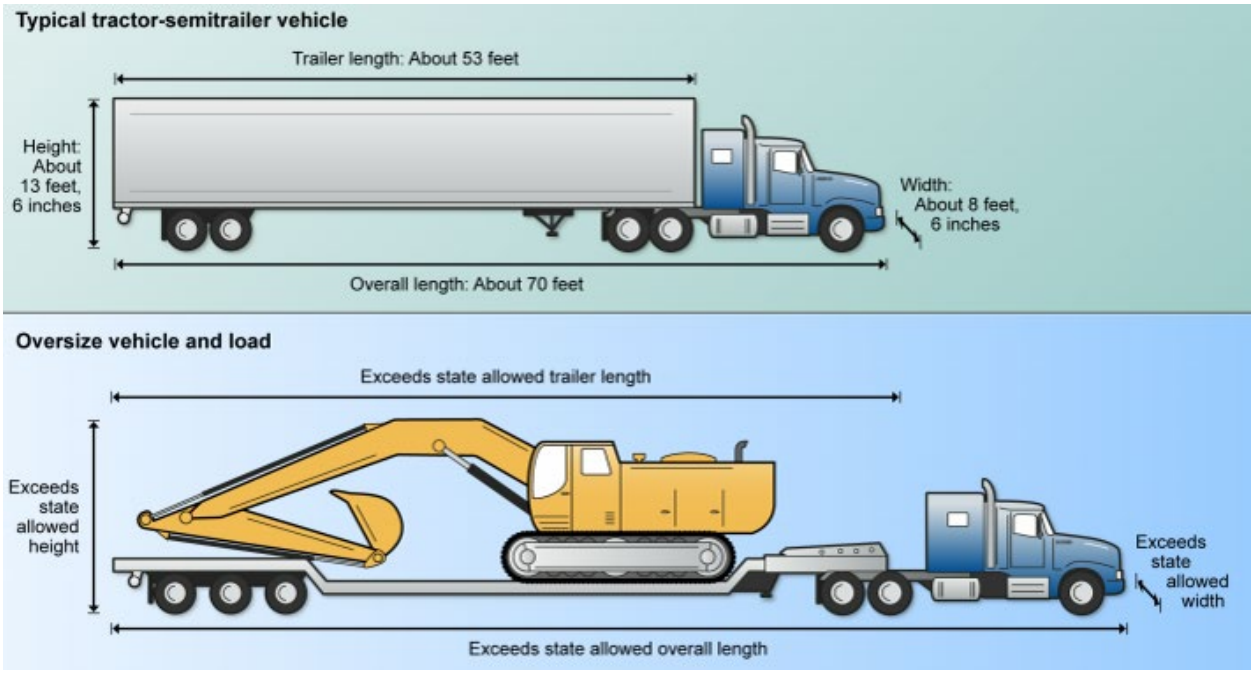
Note: Data collected for all 50 states and the District of Columbia (D.C.). D.C. description data is referred to as a state in the table. Detailed data for specific state and D.C. are available in GAO report GAO-15-235SP.

Source: GAO Report 15-236

Table 1. Summary of Vehicle Size and Weight Requirements in the 50 States and D.C.

1.3 Federal and State OS/OW Responsibilities

A vehicle and load is considered oversized when the vehicle and the cargo exceed the legal dimensions of length or width, as defined by federal requirements, or length, height or width as defined by state requirements for the state and highways in which the vehicle will be traveling (see Table 1). Figure 2 shows a pictorial diagram of a typical semi-trailer truck dimensions compared to an example of an OS/OW vehicle and load.



Source: GAO Report 15-236

Figure 2. Typical Semi-Trailer Truck and Oversize Vehicle and Load

States and local governments are responsible for regulating the movement of OS/OW loads on the roads within their jurisdiction to ensure safe operations, and to minimize highway and bridge damage. When motor carrier companies determine large loads and the vehicles used to carry these large loads will exceed legal weights and dimensions on the roadways needed to move the cargo, companies request permission to operate on a route that best fits their needs to reach a destination. These large loads and vehicles that exceed one or more of these legal limits desiring to operate on a specific highway are termed, "oversize/overweight (OS/OW)". The procedures for obtaining permission and documentation used for the approval is termed "permitting" process. Issuance of permits is not a federal responsibility. The oversize and overweight permitting process is complex and every state has their own laws, regulations, and processes for granting permission and issuing their permits. Perhaps the most important factor an agency charged with granting permits must decide is whether the route requested is feasible to accommodate the load. In addition, making decisions on a timely basis affects the efficient and safe movement of freight, which directly influences national and local commerce.

1.4 State OS/OW Permit Processes

Every state has a process for OS/OW permit office staff to obtain information about highway authority assets, such as existing infrastructure dimensions, typically width and height, and weight limitations, in order to safely grant permits for transporting OS/OW freight. In 32 states, the unit of government responsible for granting the permits resides within the state Department of Transportation offices, according to the GAO [1]. However, in the other states another Department or unit of state government is responsible for issuing permits, such as a Department

of Motor Vehicles, Department of Revenue, or state law enforcement office. The degree of cooperation and communication between the infrastructure development units in a DOT and OS/OW permit issuing agency varies widely and may present challenges to assure safe work zone operations. The DOT infrastructure units, OS/OW permit issuing agency, and OS/OW freight shippers and carriers are all interested parties, and therefore are stakeholders in OS/OW freight mobility.

Permit Processes	**Description**
Permit issuing agency	• 32 states issue permits from their department of transportation. • In other states, permits are issued by their department of motor vehicles, department of revenue, or other agency.
Permit system	• 45 states offer on-line permit applications.
Automated routing system	• 23 states offer automated truck routing.
Escort vehicles	• 44 states require escort vehicles above a certain height. • 51 states may require escort vehicles beyond a certain width.
Certification of escort vehicle drivers	• 13 states require certification for escort vehicle drivers.

Note: Data collected for all 50 states and the District of Columbia (D.C.). D.C. description data is referred to as a state in the table. Detailed data for specific state and D.C. are available in GAO report GAO-15-235SP.

Source: GAO Report 15-236

Table 2. Summary of Permit Processes for Oversize and Overweight Vehicles in the 50 States and the District of Columbia

A well-organized state OS/OW permitting process encompasses numerous subsystems, regardless how automated, and is impacted by not only permanent infrastructure restrictions, but other infrastructure conditions that can change on a more frequent basis, with work zones as the most common condition. Work zones are temporary, but any restrictions from normal conditions are an important part in assuring the OS/OW permitting process system performs accurately. It is therefore important for states to enter timely and accurate information about work zone width, length, height, and weight restrictions into a state's asset management system. This type of system serves several state purposes, including real-time traveler information system (frequently referred to as 511-traveler information) and OS/OW permit issuing system, including automated permit routing system. Since work zone conditions are useful to OS/OW stakeholders to maintain accurate and timely data changes for their operations, it is beneficial for the infrastructure development units in the state DOTs to assist OS/OW stakeholders by maintaining a working relationship with the OS/OW permit issuing agency in their respective state.

There are no national standard definitions for types of OS/OW loads but there are terms frequently used to describe different OS/OW loads. NCHRP Report 830 [7] found states have between one and 23 different types of permits, with an average of six per state. In order to discuss possible mitigation strategies OS/OW can be broken into three categories, recognizing

there may be overlap and differences in a specific state. The three category terms used in NCHRP Report 830 were routine OS/OW load, super load, and mega load. In general, each category is progressively more restrictive either by triggering additional regulations or by increasing the degree and depth of oversight, analysis, or planning required before and during the move. Generally, states west of the Mississippi river require load permits once loads reach larger dimensions, (i.e. width and height), and higher weights compared to states east of the Mississippi river [7]. Similarly, routine OS/OW and super loads start at higher thresholds in the west. These differences in OS/OW regulations have a direct impact on designing work zones in different regions of the country. Common reductions in width and height in work zones in one section of the country may be acceptable, but unacceptable in another region because of impacts on the movement of OS/OW commerce. Table 2 shows a summary of several state permit processes for OS/OW vehicles.

OS/OW freight movements are among the fastest growing segments in the truck freight industry. NCHRP Report 830 provides FHWA data from 2014 that shows a 26 percent increase in the number of permits issued nationally by all states from 2005 to 2012, with some states reporting up to a 50 percent increase [7]. With this increase in OS/OW permits, a great deal of resources are required to process the permit requests. All states have management systems that have the ability to store and retrieve information about their infrastructure, but advances in OS/OW permit issuing computer software systems implemented by some states have enabled them to be more efficient and timely for issuing permits. Some enhancements include customer generated on-line vehicle routing automation and computer-generated approved permits that do not require human review. A 2018 FHWA report on best practices in permitting OS/OW found 30 states have various forms of automated vehicle routing systems with additional states currently developing an automated system [8].

2. Importance of OS/OW Freight Movement in Long-Range Transportation Plans and Improvement Program Planning

2.1 Long-Range Transportation Planning

The Fixing America's Surface Transportation Act (FAST Act) included a provision that requires each State that receives funding under the National Highway Freight Program (NHFP) to develop by the end of 2017 a comprehensive plan for the immediate and long-range planning activities and investments for improving freight movement in their State [9]. While OS/OW freight movement is not a specific required element of their State Freight Plans, some states have included optional OS/OW freight movement plans as part of these required long-range freight plans. An example is Oregon DOT's Freight Plan [10], which includes strategies for monitoring, preserving, and improving routes that accommodate OS/OW freight movement using a data driven, economic analysis process to identify needed improvements. The process includes using past requests for OS/OW permits and input from stakeholders and shippers. If OS/OW issues and strategies are part of these state freight plans, incorporating this information is invaluable in developing multi-year improvement development plans to improve OS/OW freight movement.

The FAST Act also suggests states establish State Freight Advisory Committees (FAC) [9]. The purpose envisioned for these committees is to provide input into the State Freight Plan, but also serve as a forum for discussion of State transportation decisions affecting freight mobility. If a State FAC exists, the committee can be a useful source of information on OS/OW work zone mobility issues.

2.2 Multi-Year Improvement Program Planning

Development of a process to include OS/OW freight as an element of improvement program planning is important because of the significance this industry has to a states' economy. Early identification, knowledge, and consideration about the needs of hauling OS/OW freight in a state is a desirable goal as states update their long-range infrastructure highway plans and develop multi-year infrastructure spending programs. Freight movement is a normal consideration in long range planning, but a subset of truck freight movement, is OS/OW freight. This type of freight has infrastructure limitations and restrictions that typically require more attention to maintain movement cost-effectively and safely. Therefore, to enhance program development efficiencies, identifying OS/OW constraints on important OS/OW routes early can lessen mobility issues later during an individual project plan development.

Issues that can cause costly economic hardship to OS/OW freight movement include restrictions on parallel preferred OS/OW routes, multiple closures of major bridge crossings, mountain passes, or tunnels. Identifying significant OS/OW constraints early in program development allows consideration of program level mitigation options or strategies.

OS/OW mobility may be included with other major planning considerations, such as improvement budgets and overall travel delays for all traffic. Identifying and addressing accommodation of significant, high-density OS/OW freight that is important to a state's economy early in improvement program development is a noteworthy practice. If no reasonable program level adjustments are possible to accommodate OS/OW and no feasible OS/OW detours are identified, then project level TMP mitigation strategies can be considered and project budgets adjusted to cover these higher mitigation costs.

Oregon DOT (ODOT) has implemented an early program planning process that includes OS/OW using "critical route pairs." ODOT has a policy and is committed to keeping freight moving safely and efficiently in support of their state economy. If restrictions on a route are anticipated that affect mobility, the state policy is to collaborate with the freight industry to minimize, where possible, the mobility impact during improvement projects. ODOT developed a process for identifying "critical route pairs" and if a route will be temporarily restricted, State policy is to make sure the paired critical route on the list is not restricted. Table 3 are the listing of Oregon critical route pairs. The critical route pair concept and policy is described in the Oregon 2015

Mobility Procedures Manual. [11]The Mobility Procedures Manual emphasizes the importance to communicate within State regional offices, between regional offices, and statewide in developing, constructing, and maintenance operations to ensure identified alternate route pairs will not concurrently restrict OS/OW freight movement.

Highway	Paired Highway(s)	Area of State
I-5	OR 212, US 26, US 97	Washington to California
I-84	OR 212, US 26, US 97, US 20	Portland to Ontario
US 30	US 26	Portland to Pacific coast
OR 22 & OR 18	US 20 (upon completion of the Pioneer & Eddyville project)	Willamette valley to Pacific coast
OR 126	OR 38	Willamette valley to Pacific coast
OR 38	OR 42	I-5 to Pacific coast
OR 126	OR 58	I-5 to central Oregon

Source: Oregon DOT Mobility Procedures Manual April 2015

Table 3. Oregon Critical Route Pairs

3. Work Zone Transportation Management Planning (TMP)

3.1 FHWA Regulations and Guidelines Overview

In September 2004, the Federal Highway Administration (FHWA) published updates to the work zone regulations in 23 CFR 630 Subpart J [12].The updated work zone regulation is referred to as the Work Zone Safety and Mobility Rule (Rule) [13] and applies to all state and local government projects that receive federal-aid highway funding. The comprehensive rule change addressed issues affecting work zone safety and mobility by:

- Fostering systematic assessment of work zone impacts of road projects, and development and implementation of transportation management strategies that help manage these impacts.
- Expanding thinking beyond the project work zone itself to address corridor, network, and regional issues while planning and designing road projects.
- Expanding work zone impacts management beyond just traffic safety and control, to address mobility for all highway users, and to address the broader concepts of transportation operations and public information.
- Advocating innovative thinking in work zone planning, design, and management, to consider alternative/innovative design, construction, contracting, and transportation management strategies.

Work zone TMP strategies include temporary traffic control measures and devices for the safety and control of all highway users on all projects. In addition, the level of effort in developing formal TMP operational strategies such as travel demand management on the project and

transportation corridor/network, work zone safety management, and traffic/incident management and enforcement are required depending on the significance or size of impacts the project will have on the network or community. Early TMP rule implementation emphasis focused on mitigating passenger vehicle congestion and improving safety and mobility for other major highway user groups, such as pedestrians, bicyclists, and transit users. The traffic operation planning in work zones included strategies for demand management, corridor /network management, requires states to implement a policy for the systematic consideration and management of work zone impacts on all Federal-aid highway projects and are useful for any construction or large-scale maintenance projects where work zones are used.

To assist states in complying with the rule changes, FHWA has prepared resource guides, and other materials and examples [14] for states to help them develop their TMP policies and guidance material for their designers to comply with the new Rule. The resource guide titles are:

- Implementing the Rule on Work Zone Safety and Mobility [15]
- Work Zone Impacts Assessment: An Approach to Assess and Manage Work Zone Safety and Mobility Impacts of Road Projects [16]
- Developing and Implementing Transportation Management Plans for Work Zones [17]
- Work Zone Public Information and Outreach Strategies [18]

The focus of these original guides was on efforts to minimize traffic congestion and improve safety, and assure non-motorized users are considered in planning, designing, and implementing work zones. However, there was little information or discussion on strategies for maintaining the movement of freight in a work zone project or corridor, except for suggesting that detouring trucks from work zones to reduce congestion was a viable mitigation strategy. There was no guidance or discussion about movement of OS/OW vehicles. Therefore, this publication contains information, practices, and suggestions typically not found in many existing State work zone traffic management planning guidance documents.

The intent of developing TMP's is to use the document throughout the life of the project, including the construction phase, to ensure commitments made during the planning process are adhered to during construction. An effective practice used by states is to include the approved project TMP as part of the construction contract document to reinforce these commitments.

Note by the authors of this Guide: While not specifically mentioned in the rule language, mobility of OS/OW freight clearly fits into this discussion. The authors believe that OS/OW freight consideration will be useful when included in state work zone transportation management planning processes and systems, and ultimately in approved project TMP's.

3.2 Work Zone Event Data Systems

States use legacy architecture systems for sharing width and height restrictions caused by construction operations in work zones with their traveler information 511 systems, and often for use in issuing OS/OW permits. States have their own regulations and/or procedures for the

timing requirements for sharing their data files for OS/OW use, but typically, most state systems are based around imminent project construction scheduling.

Work zone performance management and data sharing depends upon the ability to integrate work zone event data with other agency data sources promptly. A noteworthy practice is for states to have work zone event data modeled using commonly accepted definitions, scope, and set of data elements.

In the past, work zone data gathering and sharing requirements were often only for a specific business need. This has often resulted in states collecting and managing multiple data sets in a piecemeal fashion, with each data set used only for a specific requirement, such as for traveler information or lane closure scheduling. The U.S. Department of Transportation agencies, including FHWA, is undertaking a multiple-year work zone data initiative that is helping states develop repositories for their Work Zone Event Data (WZED) with uniform specifications that will help states improve their work zone data system capabilities for multiple users [19]. These data repositories are referred to as work zone data systems, or WZDS. The initiative will eventually include developing a conceptual system architecture framework to standardize the description of collected work zone event data, how to consistently manage the data, and communicate the data with internal and external stakeholders. This framework may eventually include a repository for OS/OW traveler information and route permit issuance systems.

3.3 Incorporate Interagency OS/OW Coordination Process into State Work Zone Data Systems (WZDS).

As states make incremental improvements in their work zone data systems by using WZED framework architecture and WZED products, a noteworthy practice is for states to incorporate OS/OW freight mobility into their TMP project planning processes. The use of historical OS/OW data can be an invaluable improvement to the TMP processes by considering OS/OW freight movement at multiple stages in the infrastructure program development and implementation. This can be achieved by enhancing the flow of OS/OW data into and out of state work zone data systems.

Having OS/OW data more readily available will allow infrastructure improvement development staff to consider OS/OW freight mobility throughout the TMP development process, including much earlier in the program planning stages than currently done in most states. The benefit of including OS/OW mobility throughout TMP development allows states to include OS/OW business needs along with other highway users. Legacy WZDS typically allow dimensional limitation data entered by state construction units through permit granting OS/OW partners data systems. Access to portions of their state's WZED, will allow OS/OW stakeholders knowledge about pending changes to their preferred routes. Access to past permit data can also be a valuable data source for design staff.

4. Advanced Planning for OS/OW Freight Movement in Work Zones

4.1 Communication and Coordination between Program and Project Development Offices, and OS/OW Permits Issuing Agency

Having earlier communication and coordination during infrastructure program development between all parties can have significant benefits to States and OS/OW stakeholders. An effective practice is for program and project development offices to coordinate with their permit granting office throughout all program development phases, and not just as construction changes are scheduled to occur in the short term. The permit granting offices have a great deal of knowledge on the issues facing OS/OW carriers, OS/OW trends, and where restricting routes without sufficient accommodation will have significant impacts to carriers, and therefore potentially to a state's economy. This involvement can only take place if there is a communication and coordination network established between infrastructure development and OS/OW permit granting offices.

An initial step for improving communication and coordination is for states, if they have not previously done so, identify and document their existing coordination process. Define the coordination process between state DOT units that plan and implement infrastructure assets, and state agencies that have responsibility to use, or could use, the asset data for assisting OS/OW freight stakeholders. If no significant coordination currently exists, such as when a state permit agency is not in the state DOT, starting this communication is a noteworthy practice. There are multiple safety and work load efficiencies that potentially can be achieved when coordination exists between a permit granting agency, state DOT, and all freight hauling stakeholders, besides just work zone safety. This coordination will not only help improve communication, but also gain a better understanding of each other's business needs and potentially result in improved agency and freight hauling efficiency.

An effective practice example on the importance of communication and coordination between the state and the freight hauling industry, including OS/OW freight carriers, are policies and practices used by Oregon Department of Transportation (ODOT). ODOT developed and documented their policies and practices in a Mobility Procedures Manual [11] for use by ODOT Highway, Transportation Development, and Motor Carrier Transportation Divisions. The ODOT Motor Carrier Transportation Division is responsible for granting OS/OW permits in Oregon. The manual provides an overview of the expectations on communication of mobility issues, description of mobility roles and responsibilities for ODOT and the trucking industry, and process for resolving mobility issues. Among the ODOT policy guidance statements is "appropriate and timely communication within ODOT and with industry stake-holders affects the success of traffic mobility on Oregon's transportation system. Actions that affect mobility require specific notification and communication processes. These processes include collaboration with key industry stakeholders in initial and continuing conversations about alternatives and mitigation requirements." To achieve ODOT mobility goals, specific roles and responsibilities are defined for ODOT staff and consultants working on infrastructure planning and project

designs. The overall Oregon goal for traffic mobility is "minimize disruptions to motorists, the freight industry and communities without compromising public or worker safety, or the quality of work being performed." ODOT highway development offices annually meet with Motor Carrier Transportation Division staff to review OS/OW freight trends to confirm or update type of OS/OW freight, preferred routes, destinations, and maintain lines of communications. Maintaining these lines of communications can also help when conditions suddenly change, such as during emergencies, i.e. weather related flooding or emergency closures or limitations due to failed infrastructure.

State OS/OW permit granting offices need key data elements about infrastructure limitations on highway networks in order to grant authority to freight hauling operators to transport an OS/OW permitted load. OS/OW freight hauling companies also frequently use permit granting agencies as a resource for planning upcoming freight movements.

New York DOT Highway Design Manual [20] provides an excellent example about useful information for work zone designers about New York oversize vehicle laws, regulations, and permit system. Guidance is provided on how the permit system may affect their projects, and their coordination procedures with permit agents are outlined. The State has planned designated 16-feet wide load routes and designers are directed to contact their regional permit engineer to determine if their project is on a designated wide load route and discuss alternatives for accommodating oversize loads in the corridor. Based on coordination consultation, permit restrictions on a temporary basis or appropriate mitigations are resolved. If the decision is to use temporary permit restrictions, advanced planned project dimension restrictions are identified for permit agents to implement, and the type and timing of advance warning sign installations are developed to inform annual permit holders about planned restrictions.

DOT managers of permanent infrastructure conditions data and limitations are typically located in infrastructure asset management offices. However, infrastructure conditions frequently change during construction operations and these infrastructure changes are important for the OS/OW permit granting agencies to ensure safety and mobility on the highway system in their State. DOT offices have management systems for tracking changing conditions and have processes for disseminating these changes. These permit granting offices are stakeholders that need to work with construction operations and maintenance work zone schedules to allow them to identify continuous routes with adequate capacity to support the payload and travel requirements of OS/OW loads.

4.2 Identify OS/OW Dimensions and Weights for Common OS/OW Loads

States have different OS/OW movement limitations and requirements, depending on type and amount of cargo, infrastructure bottlenecks, and size of individual loads. Movement limitations vary by state and are often based on a state's economic sectors. Examples of significant economy sectors that require OS/OW movement include:

- wind energy equipment
- modular homes and buildings
- agricultural planting and harvesting equipment
- forest products
- road and bridge construction equipment and materials
- oil and gas exploration
- mining equipment
- electrical distribution equipment, transformers and generators,
- heavy and large manufactured products

Shown in Figure 3 is an example of an agricultural planting equipment permitted load approaching and traversing an Interstate construction work zone. Some of these unique OS/OW loads may fall into categories permitted by grandfathered state law, such as raw timber and agriculture products.

Source: TOPS Lab

Figure 3. Over-width permitted agricultural planting equipment load approaching and traversing an Interstate construction work zone.

The Wisconsin DOT (WisDOT) Facilities Development Manual (FDM) [21] provides background information and guidance on common OS/OW vehicle dimensions for designers, including wind tower corridor and high clearance requirements. This information is useful to designers to consider in developing OS/OW accommodations in work zones. Example dimensions for wind tower loads are 15 feet 8 inches high, 15 feet 1 inch in width, and 205 feet in length. This dimensional information was used by WisDOT to develop preferred OS/OW truck routes and is discussed further in Section 4.3.

4.3 Identify Preferred OS/OW Corridor Routes

A noteworthy practice coordination endeavor between highway development units in a DOT and the OS/OW permit granting unit is to identify preferred OS/OW corridor routes for various types of OS/OW sectors common to their state. Identifying preferred routes serves several valuable

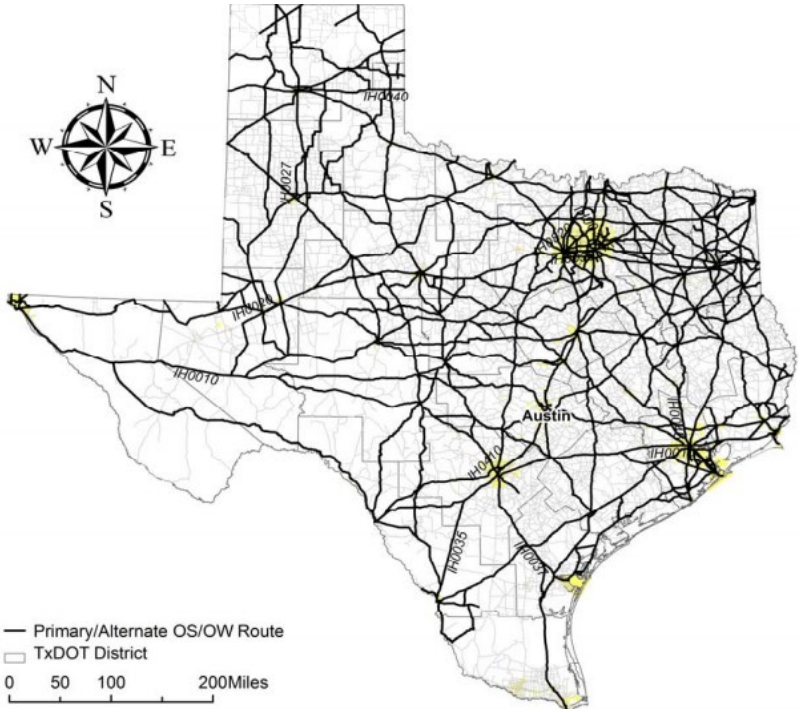
purposes. When there is no construction that impacts the preferred routes, freight carriers and state reviewers can achieve time saving efficiencies during the permitting process. Another significant advantage of planned preferred OS/OW corridors is during improvement program development phases. This information can be used by highway planners and designers to identify and address mobility needs early during program planning stages, as well as in individual project TMP development. The preferred corridors are also useful for designers during individual project development to assure state commitments to OS/OW stakeholders are addressed and appropriate mitigations are provided in the project TMPs. If potential bottlenecks caused by improvement project construction are not identified and remedied, undesirable economic impacts are possible.

Developing the preferred routes involves gaining knowledge and understanding about OS/OW routes significant to a state's economy. This knowledge can be obtained by reviewing past approved OS/OW permits and routing information, or conducting freight hauling summit meetings involving shippers and carriers. The goal of having preferred routing is to ensure the most common over-width, over-height, and over-weight freight can be accommodated throughout the state during infrastructure improvement projects.

Following are several state examples of methods used to identify corridors frequently used for safely hauling OS/OW freight, and products that are available to state infrastructure planners and designers, OS/OW permit granting offices, as well as OS/OW shippers and carriers.

The Texas Transportation Institute conducted a study for the state of Texas to more efficiently accommodate movement of OS/OW freight [22]. The study included identifying the most common OS/OW dimensions and weight groups, and criteria for assigning these groups to road networks now and in the future. Source: Texas Transportation Institute Report FHWA/TX-12/0-6404-1

Figure 4 is a state map showing recommended primary and alternate networks for the most common origins and destinations. The study purpose was to improve the efficiency of accommodating OS/OW freight that is important to the state's economy, including during construction projects. Keeping important OS/OW corridors available for OS/OW freight was a project goal. The study outputs also revealed a comprehensive picture of historical OS/OW routing useful to the state planners to develop a Texas Permit Routing Optimization System.



Source: Texas Transportation Institute Report FHWA/TX-12/0-6404-1

Figure 4. Texas Primary and Alternate OS/OW Routes Map

In Wisconsin, a 2018 State Freight Plan identified and mapped OS/OW and High Clearance routes. These preferred OS/OW truck route maps are available to freight carriers, WisDOT Division of Motor Vehicles Permit Issuing Unit, and highway design staff. The WisDOT FDM [21] guidance for planning projects on the mapped freight routes suggests work zone project designers verify that OS/OW vehicles can safely navigate throughout construction if no adequate OS/OW detour is available. If designers are unable to accommodate all necessary vehicles throughout construction on the mapped routes for OS/OW and high clearance, reasons are documented in the TMP, and mitigation techniques are proposed. Figure 5 shows Wisconsin's statewide OS/OW freight map and Figure 6 illustrates a regional map with more detail about local road connections. These maps are used by designers for planning purposes, including TMP development. The types of OS/OW vehicles and loads that were used as the representative OS/OW loads for the map planning process included 5-axle expandable-deck lowboy trailers, wind tower sections and wind tower blades, and 165 feet long bridge girders. These OS/OW vehicle types were selected because of their challenging turning maneuvers at intersections. Vehicle tracking design software was used to assure the vehicles could negotiate the routes. APPENDIX A is a WisDOT Inventory of OS/OW Design Vehicle drawings that shows the technical dimensions used for OS/OW vehicle types considered in the route identification study.

A separate WisDOT survey and planning process identified a 20 feet clearance statewide planned route system. While most of the system already exists, state policy is all replacement structures on the planned routes have a 20 feet vertical clearance for all replacement structures.

The planned system is to allow high clearance loads up to 19 feet 6 inches, and still have a 3 inch future pavement overlay and 3 inch load clearance. To assure safety, high clearance freight carriers are still required to complete a route survey on all routes before requesting their permits.

WisDOT continues to further enhance their knowledge and deployment of OS/OW routing in Wisconsin. In 2019, WisDOT sponsored a research project by University of Wisconsin-Milwaukee [23] to evaluate origin and destination of OS/OW loads using past permit history to identify the most frequently used and less used routes. This research primarily focused on streamlining the permit granting process, but an additional outcome is WisDOT may also reduce their higher design standards and added investments needed for efficiently accommodating OS/OW. The researchers collaborated with WisDOT regional freight engineers to identify a plan to reduce the total mileage on OS/OW preferred truck routes from 5,784 miles to 3,963 miles, and reduce the number of OS/OW intersections from 269 to 151. This reduction in higher standards on fewer routes will also assist to lessen the impact on work zones on these less important routes.

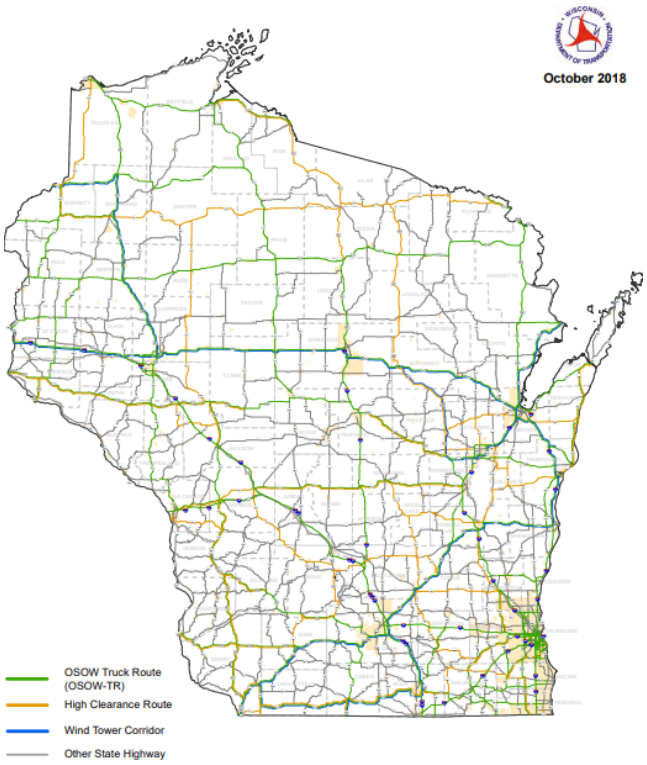


Figure 5. Wisconsin OS/OW Freight Route Map

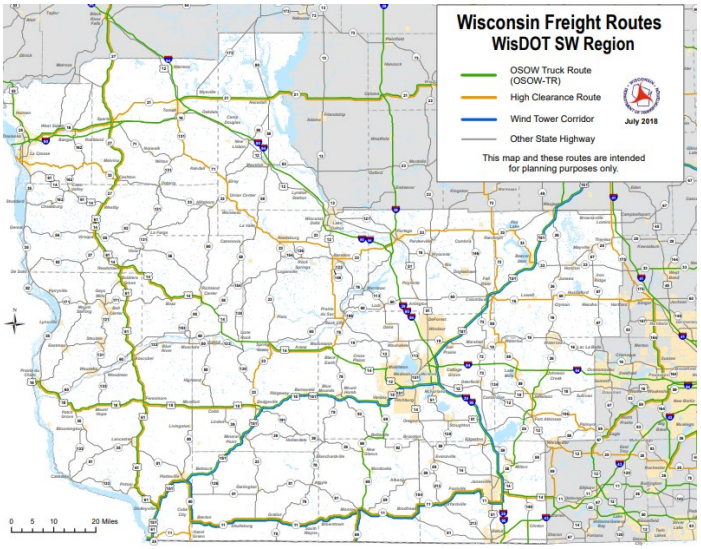


Figure 5 and 6 source: WisDOT Facilities Development Manual

Figure 6. Southwest Wisconsin Region OS/OW, High Clearance, and Wind Corridor Freight Routes

4.4 Include OS/OW Mobility Consideration when Coordination Planning occurs between Adjoining State Program Development Offices

Sharing long and short range development program plans among adjoining states has advantages for work zone mobility. These communication opportunities can potentially help each state better coordinate the timing for undertaking major projects or phases of construction to minimize mobility hardships. Discussions between states is often done to improve mobility at bottleneck locations at major bridge crossings and significant highways on each side of their border. These discussions may also be done on a regional basis in certain parts of the country.

When long range program planning activities occur, a good practice is to consider OS/OW freight mobility as part of the coordination process. If an important OS/OW commodity is important to a state or a region's economy, special effort may be necessary to minimize mobility disruption. If a state makes special (and often costly) OS/OW accommodation in work zone plans, this effort may be lost if the OS/OW freight movement is stopped at the state border because the load can't be accommodated in the adjoining state due to incompatible work zone planning. The involvement of each state's permit issuing agency may be useful in these coordination activities.

5. Overview of Project TMP Development Process

This section provides information and suggestions for states to consider when inserting OS/OW freight mobility into existing state TMP policies, guidelines, practices, and/or checklists.

If states have developed advance planning processes for dealing with OS/OW on project specific procedures, discussed in Section 4, incorporate this information into project TMP development guidance. These policies, processes, procedures, and practices may include:

- Communication and coordination procedures with OS/OW permit issuing agencies and stakeholders.
- Lists of important OS/OW dimensions and weights for common OS/OW loads.
- Maps of preferred OS/OW corridor routes.
- Interagency OS/OW Coordination procedures in their State Work Zone Data System (WZDS).
- OS/OW plans based on their state long-range transportation plans.
- Multi-Year Improvement Program Planning

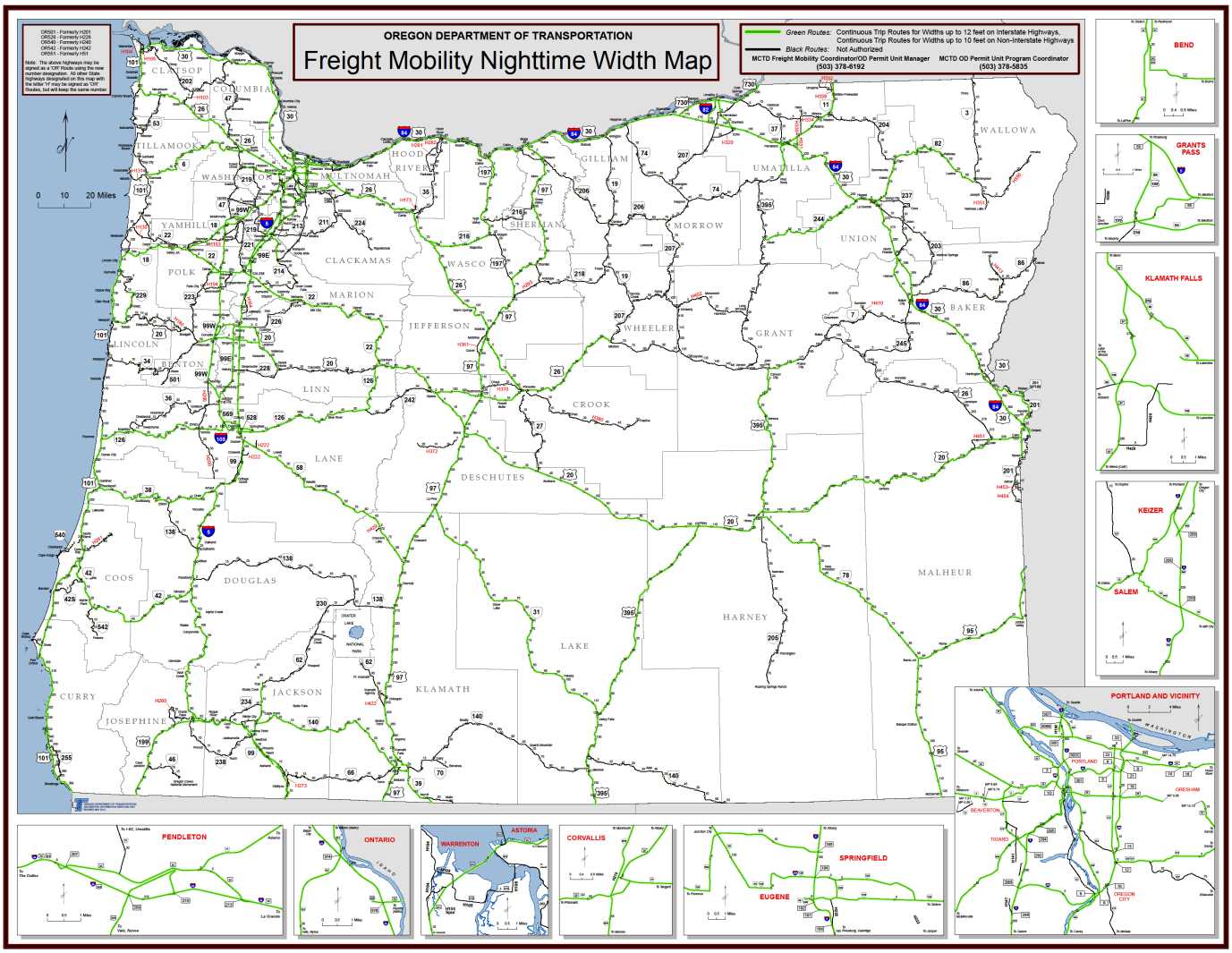
5.1 OS/OW Permit and Restriction Information Needed During TMP Development

States and local highway agencies have statutes and regulations to control transporting OS/OW dimensional freight on their highways. Many highway agencies have a central permit granting agency that is responsible for determining if permission is granted or denied. Permission is granted or denied based on factors such as physical restrictions that can accommodate the OS/OW freight dimensions or weights, or safety restrictions. If a permit is issued, typically the agency places restrictions for the permit holder to follow, and the restrictions may apply to a specific route or statewide. Some basic examples include restricting all OS/OW movement only to daylight, specific time of day, or only weekday operations. Also, permit approval may be granted only for a specific time period for a single trip or for multiple trips for a certain time, such as the entire year. States typically have established notification procedures during construction for informing annual permit holders about changed conditions affecting their permits. Additional discussion about this important topic for multiple trip permits, i.e. annual permits, is provided in Section 7.1.1. The type of escort and dimension safety equipment required is another common requirement on the permit. Therefore, it is helpful for designers to have a basic understanding of their state OS/OW permit regulations, and how these rules may apply to their specific project. The types of restrictions and OS/OW requirements is important information that may have a bearing on their TMP decision-making process.

One type of specific restriction useful for designers to know is the type of time measurement used in their state permit rules, especially if they intend to apply using this restricted time period for their construction contract operations. Caution is especially necessary if a time restriction, such as “daylight” is used, since that time changes throughout the year.

Oregon has no nighttime OS/OW travel restrictions for loads that are over height, overweight, or over length. However, nighttime travel for annual and single permit holders for hauling loads up to 12 feet wide is allowed only on Interstate highways and 10 feet wide on specific non-Interstate

highways identified on an ODOT state map titled, “Freight Mobility Nighttime Width Map” as shown in Figure 7. State highways where no over width loads are permitted at night is also shown on the map. This map information is useful for designers as they start their TMP development to plan on lane and shoulder widths that will be available, and when those widths are to be maintained. Locations where a restricted time period apply, designers may wish to expand their work area during hours that OS/OW loads are restricted. By taking advantage of reducing roadway dimensions during these restricted operations hours, certain types of construction operations may benefit from increased working area. The TMP needs to assure traffic control hardware is adjusted to permit wider loads during daylight hours when wider OS/OW loads are permitted on the route.



Source: ODOT Mobility Procedures Manual

Figure 7. ODOT Freight Mobility Nighttime Width Map

ODOT also maintains a "Freight Mobility Daylight Width Map" that shows routes capable to accommodate load widths up to 14 feet and 12 feet. The map is primarily used by annual permit holders, but is also useful for designers. The ODOT state width route maps, as well as an over height clearance route map, for designers to use during TMP development are and maintained in their Oregon Mobility Procedures Manual [11].

5.2 Identify Possible Traffic Mitigation Strategies, including Detour Routes, for Accommodating OS/OW Freight

Identifying TMP project mitigation strategies can be done concurrently with identifying the level and type of infrastructure improvements appropriate for the site conditions. Generating a preliminary list of possible methods of traffic management techniques early when scoping the project will usually alleviate work zone issues later in the final design process. Early traffic management ideas are often based on past practice and contractor capabilities for the type of construction project proposed. However, a noteworthy practice is to determine if traditional traffic management concepts are the most cost-effective solution for dealing with mobility for all users, including OS/OW freight.

Important information about type of OS/OW traffic, traffic volumes, and geometric limitations are used to develop a good traffic mitigation strategy to adequately accommodate OS/OW mobility. The following list of typical geometric issues examined and addressed, if necessary, if some or all OS/OW freight traffic will use the route under construction:

1. What are bridge weight limits, bridge and pavement widths, vertical clearances, and lane and shoulder widths for each stage of construction?
2. Are portable temporary concrete barriers or other positive protection on the project, and if so, what offset distance from the driving lanes?
3. What are turning movement limits at intersections and ramps for each stage of construction?

A part of this preliminary TMP development step is to identify potentially available detour routes if the type of construction would benefit from using a detour or alternate route, for some or all traffic. A preliminary detour examination includes whether effects of increasing traffic volumes on the potential detour route is environmentally feasible as well as whether there are significant geometric feature limitations for all or certain types of traffic, i.e. OS/OW freight.

The following is a list of questions and information important for considering OS/OW on potential detour/alternate routes:

1. Can potential detour/alternate route's pavement infrastructure condition handle additional traffic, including heavier vehicle weights?
2. What are the limitations for bridge weight limits, bridge and pavement widths, height clearances, and lane widths?
3. Are other construction projects also using the detour route?
4. What are turning movement limits at intersections, roundabouts, and ramps?

5. Identify low vehicle clearance locations, such as at-grade railroad crossings.
6. Are hauling of hazardous materials restricted on the detour?

If the potential detour route engineering study concludes that adding or modifying geometric features is necessary, and other factors do not preclude the detour/alternate route for use, an engineering study should be done to determine if the geometric features should be upgraded. This detour study should include as a separate part of the evaluation whether OS/OW loads can be accommodated, especially if no or only minimum increase in investment is involved beyond what is planned for accommodating other types of traffic.

The optimum time to explore and evaluate traffic mitigation strategies not previously used by an agency, as well as innovative or experimental mitigation alternatives, is early in project TMP development. Studying deployment can include whether OS/OW freight movement will benefit from each mitigation strategy under investigation. Examples of previously untried strategies may include using a barrier system that can close and open lanes on a frequent basis or using innovative construction materials to reduce lane closure times and detours. Additional individual mitigation strategies, and how they impact OS/OW traffic are discussed in Section 6.2., 6.3., and 6.4.

5.3 Evaluating Alternate/Detour Routes

Identify potentially available detour routes if the type of construction project would benefit from using a detour route for all or certain types of vehicles as a traffic management technique. Detour or alternate routes may be used in combination with other traffic management techniques.

A noteworthy practice is to complete an engineering and environmental impacts review on potential routes if the preliminary decision is to detour all or a portion of the traffic from the construction zone. This review will typically examine whether the route is feasible for detouring all traffic, only certain size trucks, or all trucks including OS/OW freight. Factors that are commonly reviewed include:

- Existing size and weight restrictions
- Overhead obstructions
- Intersection turning movements and lane off tracking
- Existing movement of hazardous material restrictions
- Any emergency services response time issues
- Any restrictions due to construction planned on the route
- Other projects planning to use the same detour route

If appropriate, determine which type of geometric limitations exist, if any, and if so can the limitations be reasonably mitigated.

Detour or alternate routes may involve several different strategies. The most common strategy alternative is to detour only OS/OW carriers and maintain the remaining traffic within the project

limits. Another alternative is to offer a detour route as an alternate route for drivers to consider using during long travel delays due to the construction. This latter technique will involve further planning on the communication methods to the driver. Deployment techniques can range from basic static signing in place at all times to enhanced travel demand management intelligent transportation systems.

As TMP development continues and alternate/detour route(s) are determined as a viable traffic management technique for the project, complete a detailed engineering study to identify geometric features requiring cost-effective mitigation.

5.4 TMP Guidelines and Checklists

Planners and designers collect information and data about existing conditions for use early in scoping project plan development, and additional information is necessary as the design process moves forward for use to evaluate project alternatives. Preliminary decisions are analyzed using the information and help determine which design(s) are taken forward for ultimate approval. These check-in approval steps are also necessary as part of state's public involvement process. States have their own check-in approval steps on level of design details, including proposed project costs, construction time, constructability issues, construction materials, and construction traffic management. As project designs become more refined, TMPs become more detailed. An example checklist form used by Oregon DOT to track possible/viable traffic mitigation concepts, impacts, stakeholders' input, and decision status at each plan development stage is provided in APPENDIX B - Oregon DOT Work Zone Decision Tree.

Typically, states have focused their TMP attention on issues specifically included in the FHWA TMP regulations and guidance documents. The TMPs show how traffic congestion is minimized, traffic safety is assured, and non-motorized users are considered in developing work zone traffic control plans, special provisions, and project estimates.

Most states currently address truck congestion on construction projects concurrently with auto congestion, but most states typically do not include OS/OW freight movement issues as a factor in TMP development. However, there are some excellent examples of states that do currently identify and evaluate OS/OW freight movement in their TMP guidance, procedures, and checklists.

The Oregon Mobility Procedures Manual [11] provides project TMP guidance that considers OS/OW freight mobility concurrently with traffic mobility issues for all users. ODOT designers use a checklist guide to identify and evaluate mobility issues. Mobility categories considered on the checklist include: critical route pairs; delay; road closure; lane or ramp closure; vertical clearance; length restrictions; width restrictions; weight restrictions; local/special events; holiday travel days; and detours/on-site diversions. Designers initiate the project checklist form at the start of project. A copy of the first four pages from the checklist form is included as APPENDIX C - Oregon DOT TMP Mobility Considerations Checklist. Designers document general project information, existing route and potential detour route dimension and weight information, and

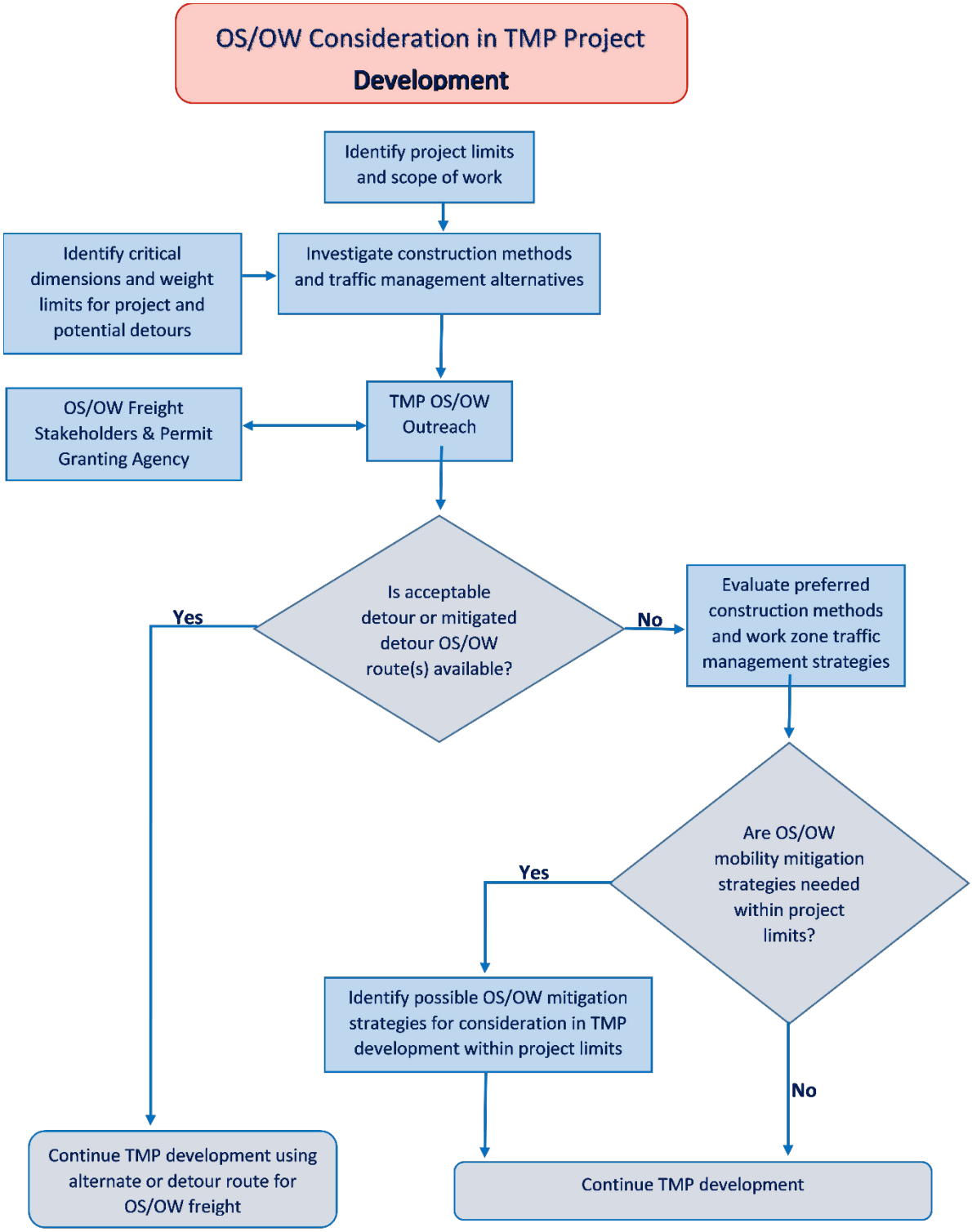
identify possible temporary clearance mitigation treatments. The checklist/worksheet also serves as documentation about mobility communication with OS/OW stakeholders. The checklist is a useful tool throughout the design process, including to the construction project manager for use with any requests for project change orders, and ultimately becomes part of the TMP historical documentation.

Project mobility guidance and checklist forms, that includes OS/OW freight mobility, are useful to assist designers assess potential project mobility impacts for all users. Another example of a state that includes OS/OW consideration in their TMP development process is the North Carolina DOT (NCDOT) TMP Design Manual – Part 3 Guidelines for Transportation Management Plan Development [24]. The NCDOT OS/OW TMP guidance includes coordination with the NCDOT Permit Section, as well as OS/OW inclusion in their scoping checklist and scoping meetings, and conceptual traffic management documentation. The NCDOT guidance reminds their designers temporary traffic patterns may impact OS/OW vehicles and to coordinate with the appropriate group to consider OS/OW mitigation. Mitigation usually involves either providing an approved detour, or if a detour is not possible providing enough clear roadway width within the project limits.

5.5 Develop Project TMP's Considering OS/OW Impacts

States have different procedures and protocols for informing and coordinating with stakeholders about individual improvement project TMP development. Many states currently give minimal consideration to OS/OW freight in project TMP development. However, OS/OW freight mobility can be part of this coordination and outreach process. Figure 8 is a simplistic example flowchart showing how OS/OW freight may be considered earlier in project TMP development. Additional steps could also be added to this flowchart, such as, by including a decision step to check state work zone design policies to try to maintain certain size dimensions within the work zone. Some states have work zone policies to try to maintain certain minimum widths for lane(s) and shoulders, capable of accommodating common over width loads. This allows these loads not need to be detoured.

The steps in a state developed flowchart could be incorporated into existing TMP development guidelines/checklists, or a separate OS/OW freight mobility standalone procedure as part of the overall TMP process. In the example flowchart, outreach to OS/OW stakeholders, and the permit grant agency is done early in TMP development. Establishing the timing for communicating and coordination steps with OS/OW stakeholders and agency's permit granting agency is a state decision best made through a collaborative process involving multiple state infrastructure improvement development agencies, such as state DOT, toll authorities, and local agencies.



Source: TOPS Lab

Figure 8. Example Flowchart Considering OS/OW in Project TMP Development Process

Documenting the communication and coordination processes is a noteworthy practice. Also, making the process available with work zone program planners and designers, as well as OS/OW permit offices, and freight stakeholders is a noteworthy practice.

6. Work zone and Alternative Route OS/OW Mitigation Strategies

Requiring OS/OW freight carriers to use alternate routes in lieu of traveling through construction zones is highly desirable and is often the preferred alternative for OS/OW freight movement. However, if there are no reasonable existing alternate routes capable of use by OS/OW, evaluating and adding mitigation(s) to accommodate OS/OW within the project limits may be necessary. Mitigation techniques are presented in Section 6.4. The preferred time to make decisions about alternate routes, and alternate or project route mitigation is early in the project TMP development.

Designers have a wide variety of different work zone traffic control techniques, innovative construction methods, innovative construction materials, and contract work schedule tools to mitigate mobility challenges, including OS/OW freight movement. Not all techniques and methods may work to satisfy all users' accommodations, and in some cases, some techniques may degrade mobility for other users, such as pedestrians or bicyclists. Techniques or methods that reduce the amount of time the route is under construction may come at a higher cost and in some cases a significantly higher cost, but may offer significant mobility advantages for users. The designer examines all reasonable alternatives and take the best ideas forward for consideration in the TMP development process. Including OS/OW stakeholders with all other users in the TMP evaluation process is an effective practice for assuring mobility for this important user group.

6.1 Work Zone Traffic Management Alternatives for OS/OW Freight Movement Within Project Work Zones

6.1.1 Use One-Lane, Two-Way Traffic Control

Alternating traffic on one-lane of roadway in a work zone is a traffic management technique that allows construction work in the closed lane. This technique only applies to two-lane roadways and is generally limited to lower volume roadways. For effective OS/OW use, the single available, open travel lane, will have sufficient width and other dimensions compatible for the OS/OW loads. This traffic control method has OS/OW advantages since pilot vehicles provided by the work zone operation or operating as part of the OS/OW permit requirement can dictate traffic speeds through the work zone. Since this type of work zone traffic control is used on short term or intermittent projects, with proper coordination, the OS/OW permits can be timed or adjusted to accommodate the work operations. The only negative OS/OW attribute is a reduction in capacity.

This traffic management technique involves adherence to Part 6 in the MUTCD. A key consideration that a designer considers before using this technique, besides only being applicable to two-way roadways, is the impact the technique will have on capacity. Capacity reduction

increases as the length of the one-way segment increases. In addition, construction operations will take place in close proximity to traffic operations.

6.1.2 Use Intermittent or Short-term Closure

Short term or intermittent closure is a work zone strategy where all traffic stops in one or both directions for a relatively short time to allow a specific construction operation to use the entire road. Several construction operations that benefit from this technique include erecting bridge beams over a road, conducting demolition or blasting operations, placing transverse overhead utility lines, or moving cranes or other large construction equipment across travel lanes within the work zone. Since the strategy focuses on a specific short-term work operation, identifying the best time for undertaking the construction operation, including OS/OW freight, is necessary.

Agency policy may restrict the use of a complete stoppage strategy for certain types of facilities, such as freeways, to only a certain time of the day, such as 2 a.m., or allow a maximum closure time, such as 10 minutes, and usually require involvement of law enforcement assistance to initiate this strategy.

This strategy is usually compatible for use on OS/OW freight routes and have no negative impacts for OS/OW freight mobility. If longer work operation periods require closure, such as demolition of a bridge passing over or near a traveled road, this strategy may still work for OS/OW freight routes if work schedules are planned for non-OS/OW freight movement times.

6.1.3 Use Lane and/or Shoulder Closure

Creating space for work operations and safety for workers can be accomplished by frequent lane and/or shoulder closures. To allow OS/OW traffic through a project, opening the road during certain times is necessary. During closure times, achieving OS/OW compliance to not travel on the road only requires restrictions placed on the OS/OW permit. This technique of closing and opening the road at certain periods has a strong advantage for OS/OW mobility since it is usually compatible with traffic mobility, such as conventional freight and automobile traffic. Knowledge about OS/OW freight using the route and OS/OW dimensional requirements is beneficial and may be accomplished by obtaining input from OS/OW freight stakeholders.

If lane and/or shoulder closures are only allowed for a portion of time to satisfy both traffic mobility and work operations, developing a work schedule to meet a contract completion date is necessary. Estimating the time closures will be acceptable involves estimating the level of contractor effort and time needed to complete the work operations and before traffic can use the area again, and maintain acceptable traffic mobility. This planned work schedule is an important factor for contractors to estimate a level of effort needed in preparing their contract bids. The necessary schedule is usually included as part of the PS&E documents. Additional discussion about planning the mandated work schedule is included in Section 6.2.

These opening and closing operations may be used throughout the entire construction sequence, and are frequently repeated, usually on a daily basis when work operations are scheduled. Once an estimated closure schedule is established, designers then investigate alternatives to identify

traffic control methods to achieve the necessary opening and closing procedures safely and cost effectively. The duration a lane is closed, the frequency of closures, and the safety of workers and traffic, will affect the type of devices used to separate open traffic lanes and workspace.

MUTCD Sections 6F.63 through 6F.73 provide information on various channelizing devices that may be used to separate work areas from travel lanes. Channelizing devices include cones, tubular markers, vertical panels, drums, barricades, and other longitudinal channelizing devices. These devices are relatively lightweight and lateral movement to close, open, and adjust travel lane widths in work zones can be accomplished in a relatively short time period.

When positive protection is justified for the safety of all highway users and workers, temporary portable concrete barrier (TPCB) is often used to separate traffic from opposing directions and shield traffic from work operations. This hardware is frequently the most readily available and cost effective. However, TPCB has drawbacks due to the difficulty in moving it frequently or quickly because of its weight. However, there are several barrier systems available for making frequent barrier moves in a short time. These include steel barriers with a jacking system with internal wheels used for repositioning. The most innovative positive protection system is the proprietary Road Zipper® (also known as the Quick Change Barrier.) The system uses hinged three feet long concrete barrier sections that are lifted off the pavement by a special transfer machine to reposition the barrier. The Road Zipper® has some significant advantages over other barrier systems, the most important are the short time needed to move lengthy sections of barrier to close and open lanes/shoulders, and limited number of workers needed to implement the changes. The higher cost of equipment purchase or rental is the biggest negative factor. A cost benefit study is appropriate to determine if these techniques are specified in contract bid specifications.

6.1.4 Use Two-way Operation on One-side of a Divided Highway

Two-way traffic operation on one side of a normally divided highway is a traffic management strategy used on expressways and freeways and on rural and urban divided highways. If OS/OW traffic access is desired using this strategy, extra precautions may be desirable. Due to the extra temporary construction, costs may preclude this technique from application for OS/OW application. However, on significantly complex and large projects, and maintaining OS/OW operation on the project is necessary, the extra temporary design features may be an acceptable option. The extra temporary construction involved for handling OS/OW dimensions may also benefit the safety and mobility of other traffic.

Moving all traffic to the other roadway often allows for accelerated construction by allowing construction on the closed side of the divided highway without any interference from proximity to driving lanes and time of day restrictions. In addition, traffic and worker safety is enhanced by separating traffic from work areas usually by a wide median or positive protection devices. This technique may also expedite material delivery to the work area.

For allowable OS/OW operation, temporary roadway median crossovers and two-way operation lane designs need careful design consideration. Using wider than standard lane widths often needed to allow OS/OW vehicles rear wheels to over track through crossovers. Widening lanes may be needed in the two-way operating section. Obtaining the extra lane width can come from using multiple same direction lanes, if available, temporary or permanent embankment widening, and/or using permanent or temporary shoulders. Studying amount and directionality of OS/OW operation on the route may allow the use of unbalanced lane widths in the cross-section available. Creating lane width in the main direction wide enough to handle OS/OW anticipated. Buffer space at the beginning and end of crossovers are evaluated to assure OS/OW will not hit any temporary or permanent barrier systems. Substantial grade differences between one-way roadways and median topography can also influence the feasibility and cost of temporary crossovers. Even under favorable conditions, temporary crossover roadways are a significant cost consideration.

6.1.5 Use Shoulder as a Driving Lane

Using shoulders as a driving lane is a common traffic management alternative. Shoulders, even if already paved, are frequently strengthened or upgraded to account for the additional vehicle loading pavement design. Therefore, OS/OW operation on a shoulder used as a driving lane is usually feasible and worthy of consideration during the TMP design. A negative attribute for this technique are the cost for extra temporary or permanent embankment widening that may be necessary.

6.1.6 Construct Temporary Bypass Lane(s)

Constructing temporary roadways for diverting vehicles in one or both directions from a route under construction to temporary lanes is also a feasible method for accommodating OS/OW traffic. A bypass diversion strategy provides substantial separation of traffic away from the new construction work, although generally not as much as detours. In some cases, substantial costs may be involved for constructing the temporary facilities, which may include extra right-of-way. Bridge reconstruction and replacement projects often divert traffic onto a temporary bypass structure. The time and cost to construct this throwaway feature is a negative factor. If a satisfactory detour route is not available for OS/OW traffic, a noteworthy design practice for temporary bypasses is to consider the size and weight of typical OS/OW traffic accommodated on the route.

6.2 Restrict/Mandate Work Zone Schedules

When considering work zone traffic management alternatives in Section 7.1 to accommodate traffic mobility, including OS/OW freight movement, restricting or mandating contractor construction operations are frequently used. TMP developed contractor restricted/mandated work schedules are included in the Plans, Specifications and Estimate for contractors to prepare their bids and plan their method of operations. Coordinating and communicating with the OS/OW permit granting office and stakeholders when OS/OW movement may occur will allow efficient movement of OS/OW freight on the project.

6.2.1 Night or Time of Day Operations

Restricting construction operations to occur only during the least congested hours in the day is an alternative that can benefit OS/OW operation. When lane or shoulder closures are used for night operations, the lane or shoulder may be used for OS/OW during non-work hours. An OS/OW permit will restrict any movement through the project when work operations are underway.

6.2.2 Day of Week Operations

Requiring or allowing contractor operations only during certain days in the week is another technique that allows contractors to accelerate their operations, but also allow OS/OW operation during non-work periods in the week. This mandated work schedule may also be useful for the mobility of all highway users, by scheduling the permitted work periods when traffic is least congested. Working continuously for a portion of the week, say Monday through Thursday and restricting OS/OW traffic to only Friday, requires OS/OW stakeholders to plan their movements to a shorter, but consistent time window.

6.3 Innovative Construction Methods, Construction Materials, and Contract Strategies to Expedite Completion and Minimize OS/OW Impacts

There are innovative accelerated bridge, pavement, and embankment construction techniques that can minimize OS/OW mobility, without severely impacting contractor operations, safety, or project durability. Many of these strategies and techniques work equally as well to minimize mobility issues for all users and are therefore beneficial to users besides just OS/OW stakeholders.

During the design process, conducting a constructability review can be used to determine the appropriate space needed for construction operations. Determining the appropriate space is a balancing act to assure construction can be accomplished safely and efficiently, and to provide as much lane width as possible. This strategy can assist OS/OW mobility as well as for all highway users. Determining if space can be adjusted during the construction periods can also be done, and specifying the movement of traffic control hardware to increase lane widths when the space is not needed for construction operations is a noteworthy practice. An example for applying this strategy is for bridge repaving/concrete overlay projects on four lane divided roadways. During concrete demolition work, temporary concrete barriers can be moved towards the work area to provide an additional 12 to 18 inches of travel lane width. This may allow OS/OW wide loads to operate through the project during this period of time. During the deck concrete placement and initial curing period, the barriers are moved to increase the work area and lane widths are narrowed (and restricting OS/OW operations). After the initial cure period is completed, the temporary concrete barrier can be moved back 12 to 18 inches towards work area that may allow OS/OW operations on the route.

A common mitigation construction practice is rapid curing concrete that can reduce the time before pavement sections are reopened. An innovative new technique is constructing bridge superstructures away from the new road alignment and moving them into place by rolling,

launching, sliding, or lifting it into place. This technique can greatly reduce durations of bridge closures or detours. Replacing bridges within one work shift is now possible instead of using conventional construction that may take months or even years. Another new technique is using prefabricated reinforced concrete panel sections that will accelerate concrete joint replacement and repair time. This technique allows work to be performed during periods when OS/OW are more easily restricted.

Contracting strategies inserted into contract specifications to expedite completion of key OS/OW obstacles is another tool that may reduce OS/OW inconvenience, and improve all user mobility. Incentive/disincentive contract bidding, interim completion/work windows for key OS/OW infrastructure elements are methods to specify when lane closures are prohibited.

Providing advanced notification of planning and scheduling the necessary restrictions are key for all of these methods to work efficiently for OS/OW stakeholders. Establishing coordination methods between construction staff and OS/OW stakeholders is important and usually established as part of the TMP development process to achieve optimum mobility for OS/OW stakeholders, and safety for all users, including construction workers.

An innovative communication strategy is being tried in Oregon to improve coordination, safety, and efficiency between project contractors and OS/OW stakeholders. On projects that are using work zone channelization devices, and with infrequent OS/OW loads, project contract specifications and OS/OW permits include a "call ahead" telephone number. OS/OW permit carrier calls the project traffic control staff telling the time the pending load will arrive to traverse the project. The project contractor will adjust the channelizing devices, i.e. cones, drums, or tubes to accommodate the appropriate width needed. This strategy allows contractors to have more space available for their operations and minimizes the amount of time the project operations using the extra area is curtailed. Benefits for this type of operation include efficiencies for both the contractor and OS/OW stakeholders, and also minimizes damage done to contractor work zone hardware.

6.4 OS/OW Mitigation Strategies for Geometric Limitations within Work Zones and on Detour Routes

All strategies in this section for mitigating geometric limitations for OS/OW impacts will usually improve mobility for all vehicle traffic.

6.4.1 Strategies for Wide Loads - Horizontal Clearances

A common geometric limitation for many OS/OW carriers is horizontal clearance. Design strategy alternatives include widening and/or strengthening existing shoulders for use as a driving lane; building new temporary bypass pavements and bridges; and eliminating the use of temporary positive protection barriers. The elimination or movement of temporary positive protection can be achieved, and also provide safety for workers and traffic, usually by combining this strategy with methods provided in Sections 6.1.1, 6.1.2, and 6.1.3.

6.4.2 Strategies for Over-height Vehicles – Vertical Clearances

Frequently long-term height clearance reductions and limitations occur during bridge repair and construction work when temporary false work is used. Several strategies that are available to mitigate vertical clearance limitations include contract specifications requiring a minimum height clearance when construction zone traffic will pass beneath the structure using false work; specifying adequate vertical clearance for at least a portion of the open lanes;

To prevent vehicles, especially over-sized vehicles, from damaging false work structures and traffic mobility and safety issues, consider requiring false work illumination and/or delineation for all false work locations. An extra prevention strategy is to specify the use of temporary over-height vehicle warning systems, especially for complex false work structures and high volume roadways.

A frequent strategy to minimize height clearance issues for all traffic, including OS/OW, is to specify work schedules when height clearances may be reduced or for certain construction operations. This technique is frequently used for old structure demolition and erection of bridge girders.

6.4.3 Evaluating and Accommodating Over-length Vehicles

A common state design policy or practice is to use intersection geometric configurations where state legal length vehicles deviate from their designated lanes to navigate through an intersection not only during construction operations but normal operations. State intersection turning radii design policies are typically based on factors such as route functional classifications, traffic volumes, and number of deviations anticipated for a certain amount of time. States sometimes refer to these deviations as "degree of encroachment." Some states have developed special mapped long truck routes where there are no or limited number of intersections which involve lane deviations. These mapped routes are commonly developed and used for specific types of oversize freight movement, such as wind towers. Intersection construction on these designated long truck routes involves special attention to preserve the level of service to this economic sector.

During TMP development, decisions on geometric turning radii for temporary intersection configurations is an important part of engineering studies for work zone geometric standards. The use of turning templates or automated vehicle tracking design software is suggested to determine lengths of various vehicle configurations that can be accommodated and determine an appropriate turning radii design. Design dimension plan sheets have been created and available for common oversize vehicles and loads for use with turning templates and design trailer, and 124.4 foot long low-boy tractor and trailer. Appendix A shows the WisDOT oversize vehicle design plan inventory sheet.

If long and over-length vehicles will be allowed on a project route, a good design practice is to evaluate intersections and tight curves. Temporary intersections, interchange ramps, and curve design plans can be checked to determine if geometric configurations are acceptable. If

geometric problems are identified, resolve conflicts by making alterations to geometric plans or modifying traffic control measures. Examples include:

- Restriping lane widths, stop bar location and pavement marking configurations at intersections.
- Eliminating parking near intersections.
- Enlarging intersection radius.
- Pave and/or widen shoulders at tight curves.
- Make traffic control device supports removable near intersections
- Modify traffic signal phasing to eliminate or reduce opposing vehicles in adjoining lanes.
- Use contractor flagging or law enforcement to control traffic at time OS/OW are at the restricted location.

6.4.4 Strategies for Over-weight Vehicles

The best alternative is to find an acceptable detour route that can accommodate over-weight vehicles. If an acceptable detour route is not available, several possible strategies can be evaluated.

Upgrading existing structures or designing temporary structures that can accommodate the anticipated OS/OW loads is usually a significant engineering and economic decision, and is best made early in the TMP.

A potentially lower cost solution is to limit the use of a structure to only the over-weight load. A design analysis is conducted during the TMP on any existing or temporary structures to determine maximum over-weight load that can be accommodated with only the heavy load on the structure by itself. This strategy requires special traffic control, such as flagging or temporary traffic signals, to assure only the over-weight load is on the structure. A low speed limit is often also imposed on the overweight permit.

These strategies can be expensive or interfere with other user mobility. Therefore, justification usually requires significant economic importance to the state.

7. Coordination with OS/OW Stakeholders during Improvement Project Implementation

When infrastructure improvement projects are underway, dimensions and weight limits below existing conditions are often involved to improve work zone safety for workers and efficiently construct a project. During highway improvements, i.e. typically work zones, or during emergencies, a communication process can be implemented to assure current or anticipated changes in highway dimensions and weight limits are correct and always available to all OS/OW stakeholders.

Collecting, updating, and disseminating information about temporary infrastructure dimension changes is usually a responsibility in highway construction offices. All states have 511 traveler

information systems, and this dimension and loading information is useful for an effective and efficient 511 system, as well as key for the state OS/OW permitting system.

7.1 Work Zone Schedule Notification Requirements

Sharing accurate information about contractor-initiated work zone schedules affecting dimension and weight limitation changes are important pieces of information to OS/OW stakeholders. Advance notification time is necessary for OS/OW stakeholders to plan and execute their route movements and permit granting offices to respond to new permit requests.

The contractor notification time requirements and procedures are state specific and usually are contained in the states Standard Specifications and/other policy documents that have been developed by law or regulations. States may also use special provisions to modify time notification requirements before certain construction operations may commence where changes will have significant economic or mobility impacts.

States have laws and regulations on types of OS/OW permits they use to grant authority for carriers to exceed legal dimension and weight limits, including permits for multiple trips over periods. The permits are usually dependent on how much the dimensional loads are above legal size and weight limits, and the frequency at which the stakeholder will be transporting these loads. States have different permit notification methods for notifying stakeholders when permit changes are about to commence, and are usually permit type dependent.

7.1.1 Multiple-Trip OS/OW Routine Permits

Multiple-trip OS/OW permits, also known as annual or seasonal permits by some states, are typically granted for specific commodities or industries, and/or for repetitive loads. These permits are usually for loads that are over the legal weight or dimensions, but pose minimal safety risks and provide efficiency to OS/OW stakeholders and a permit granting agency. Once issued by the state permit granting agency, the stakeholder has ease of traveling throughout the state and only needs to follow the conditions on their permits before operating, and does not require waiting for specific approval for each load.

Notifying these permit holders when work zone operations will alter or amend the permit conditions is accomplished by following state developed and specified notification procedures and methods. Notification method examples used to communicate with permit holders include mass emails, letters from the permit granting agency, or advanced placement of static signs. The static sign technique contains route condition information and time the change will be in effect. The static signs are often placed by contractors prior to the start of construction, and are usually a contract specification prepared by designers. Regardless of communication method used by a state, notifying OS/OW stakeholders about work zone route conditions are important for maintaining safety and mobility.

7.1.2 Single-Trip Routine OS/OW Permits

Single-trip routine OS/OW permits grant authority to move a specific load one time from an origin to a destination in a specified period over a specified route. Maximum dimensions and

weight limits for routine single-trip OS/OW permits are state specific, but are generally 100 to 150 feet in length, 14 feet 6 inches to 16 feet wide, and 15 feet 6 inches high. [7]

OS/OW carriers request single-trip permit authority on an "as needed" basis shortly prior to transporting an identified load within or to the state border. If approved, permits are typically valid for a set number of days or specific date, and are valid only for a specific route. Therefore, establishing contractor notification periods prior to changing roadway dimensions and bridge loading is important in order for the permit granting agency to identify correctly whether a single trip permit request is safe to approve. Each state has their own criteria for permit conditions the OS/OW carrier adheres to, such as: the number and type of vehicle escorts; whether a height pole is required on the lead escort; and restrictions on the light conditions or hours of travel. States typically place a greater level of scrutiny and additional operational requirements when OS/OW loads begin to exceed state-specific thresholds.

Each state has their own established procedures for issuing these of types of permits. Many states have developed electronic submission, computer review, and computer-generated permit systems. These systems have shown cost and time savings to their staff and to OS/OW stakeholders. Regardless of application and approval system used, accuracy of construction conditions, the times reductions will be in place, and advance contractor notification are important to maintain safety and efficiency on the route.

7.1.3 Super-load and Mega-load Permits

Super-load and mega-load terms define OS/OW loads that exceed or far exceed threshold limits of routine single-trip or multi-trip permits. Super-load permits often trigger additional human review and often require greater processing time prior to issuance of approval. Steps in permit review may include detailed route specific field reviews for bridge loading, lane and bridge widths and all possible height obstacle clearances, etc. If super-loads are anticipated to traverse a construction project, coordination procedures with the construction field staff and contractor is a noteworthy practice in project special provisions.

Mega-loads are OS/OW loads that far exceed super-loads, and often take months or years to plan. Since these types of OS/OW loads are not typically compatible on most types of construction projects, most states will have restrictions for granting authority to mega loads on most types of construction projects. However, if mega-loads are known, or anticipated, that may require accommodation during construction and project special provisions may be needed. Some states require mega-load permit carriers include their own rolling work zone, with flagging and extra signing. These type of situations may require coordination with the construction contractor through the work zone. The project special provisions may include requiring contractor involvement in the planning for these types of movements through the construction project, and any contractor installed removable roadside hardware, removable traffic control devices, or extra geometric features, such as curve widening, with compensation from the carrier to avoid costly change orders.

8. Summary

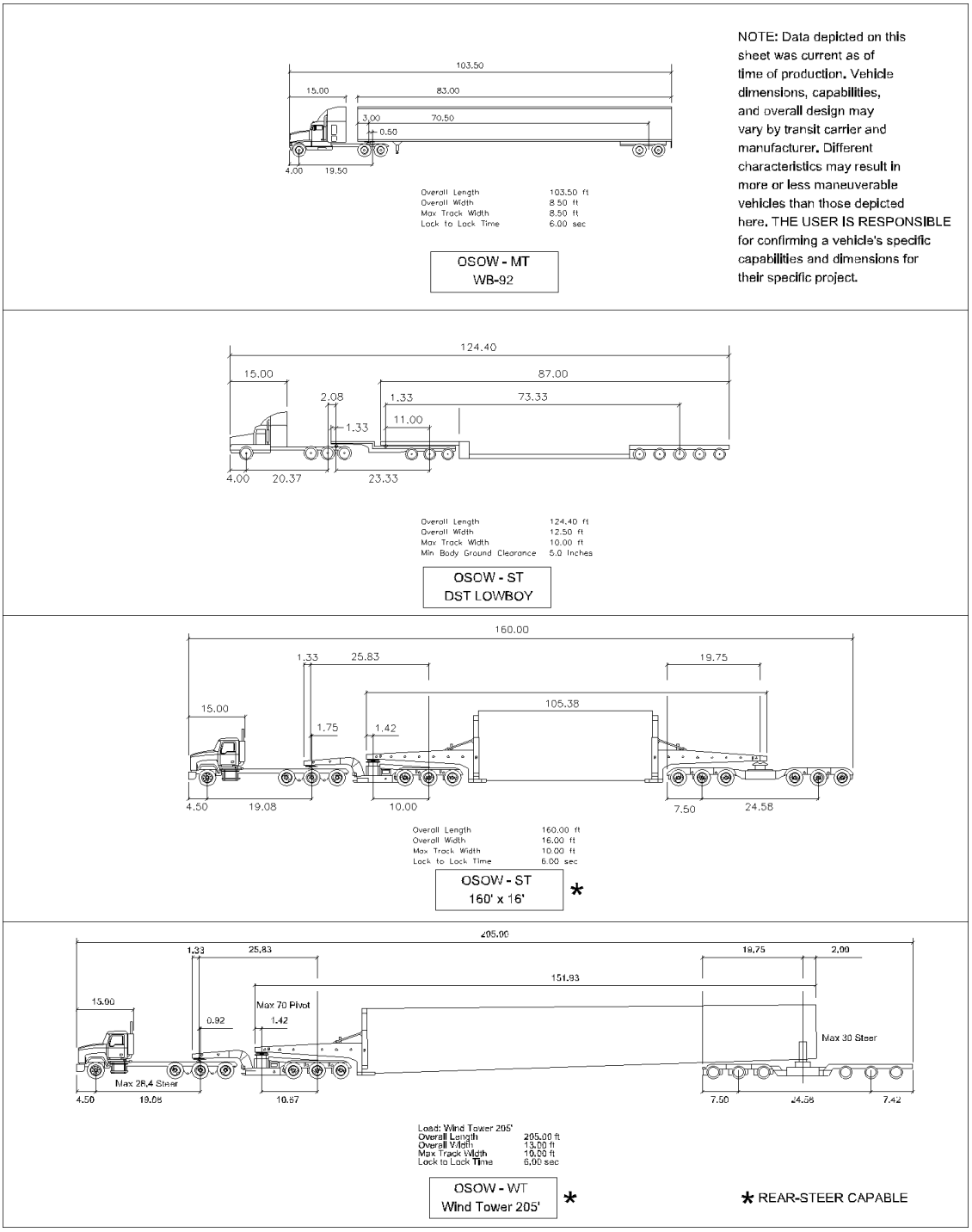
OS/OW freight transportation is an important economic sector, and mobility and safety is justified for inclusion in state TMP processes as an important highway user group. OS/OW freight movement is among the fastest growing segments in the truck freight industry and is an important part of state economies. Improving communication and cooperation between highway program and project development offices, OS/OW permits issuing agency, and OS/OW freight carrier associations is an important initial step to address this important user group in state TMP processes. Noteworthy practices are described on why identifying preferred OS/OW route and corridor information can be useful throughout project TMP development. Also, as state work zone data systems are enhanced, collected OS/OW data can be linked into a WZED warehouse to optimize the benefits of obtaining and using this information in project TMP's.

Detouring OS/OW freight is usually the best option for accommodation on many project work zones. If detouring traffic is identified as desirable as a project traffic management strategy, the process usually includes conducting an engineering study to examine geometry and other traffic operations data on potential alternate routes. The review process often includes whether OS/OW freight can be accommodated. The study will determine if mitigation measures are appropriate to make the detour route safe and feasible for all detoured traffic.

In cases where detour routes are not available, or not feasible for environmental or financial reasons, early project planning to minimize OS/OW impacts in work zones is an effective practice. Work zone traffic management techniques and effect on OS/OW freight movement are available for consideration. Innovative construction methods, construction materials, and contract strategies to expedite completion which can minimize OS/OW impacts are also offered. Strategies for accommodating specific types of OS/OW loads such as over width, over height, over length, and overweight have been identified.

A state TMP guide or policy process with OS/OW provisions can include assuring highway agency design and planning staff have at least a basic knowledge about state OS/OW laws and regulations, including permit regulations. A clear understanding on the importance on chain of communication and timing for changing roadway dimensions is important information for designers to include in their project TMP's to assure OS/OW stakeholder mobility is not impaired. While these protocols are typically standardized in each state, they can be reviewed during project TMP development to assure notification time is sufficient where construction operation changes will have significant OS/OW economic or mobility impacts, and if not sufficient special provisions can be included in contracts to lengthen the notification time. The most important elements for a state to have for an effective TMP process that incorporates OS/OW mobility and safety is to assure communication and coordination procedures are in place with their OS/OW partner agencies and businesses.

9. APPENDIX A - WisDOT Inventory of OS/OW Design Vehicles



Source: WisDOT Facilities Development Manual 11-25 Attachment 2.1

10. APPENDIX B - Oregon DOT Work Zone Decision Tree Form

Oregon Department of Transportation

Work Zone Decision Tree

Evaluate Separation Opportunities, WZ Concepts, WZ Devices

Print Form

Project Name (Section) | Key No. | Contract No.

Highway | Project Leader / Project Manager | Agency Project Manager | Region

Phase: ☐ 1 – Scoping ☐ 2 – Project Initiation to DAP ☐ 3 – DAP to Final PS&E ☐ 4 – Construction

Contractor

Opportunities to Evaluate	Phase	Possible / Viable	Impacts	Stakeholders & Input	Status Recommendation (R) / Decision (D)
Road closure (full closure, directional closure)	1				
Crossover/on-site diversion	1				
Rigid barrier (concrete, steel, temporary guardrail)	1				
Work at night	1				
Staged construction with temporary widening	1				
Standard lane closures with channelizing devices	1				
Law enforcement overtime	1				
Smart Work Zone System/Work Zone ITS	1				
Accelerated contracting strategies	1				
Accelerated construction strategies	1				
Automated Flagger Assistance Devices (AFAD)	1				
Temporary Transverse Rumble Strips (TTRS)	1				
Radar speed trailers	1				
Construction Speed Zone Reductions	1				
Increased lateral buffer space	1				
Public information campaigns	1				
Other:	1				
	2				
	3				
	4				

ADD ANOTHER ITEM

DELETE ADDED ITEM

734-5042 (03-19-2019)

1 of 1

Source: Oregon DOT

11. APPENDIX C - Oregon DOT TMP Mobility Considerations Checklist

(Pages 1 through 4 of 6)

Oregon Department of Transportation

MOBILITY CONSIDERATIONS CHECKLIST

SECTION 1

PROJECT NAME	KEY NUMBER	PS&E DATE
HIGHWAY NAME AND NUMBER		
ROUTE NUMBER		
MILE POST RANGE		
DESCRIBE "TYPE" OF PROJECT (E.G. ADA, CULVERT, BRIDGE DECK REPAIR, PRESERVATION, ETC.)		

NOTE 1: Per the Mobility Procedures Manual and Project Delivery Operational Notice, PD-16: Transportation Project Managers, Resident Engineers, Resident Engineers - Consultant Projects and Project Delivery Teams are responsible for completing this checklist initiated and signed by a Transportation Project Manager during the project development phase. The checklist is submitted with the PS&E Package to the Office of Project Letting, and provided to the Resident Engineer when transitioning the project to the construction phase.

NOTE 2: Off-system projects that create a mobility impact on the state system must also comply with **PD-16** and this checklist. Transportation Project Managers with projects (both on-system and off-system) that have **no** mobility impacts should check the "No Mobility Impacts" box and sign the checklist (Mobility Program signature is **not** required for a "no mobility impact" project) before submitting it with the PS&E package.

NOTE 3: The **Statewide Mobility Progam website** has information on project requirements and guidance as well as policies and tools related to mobility, including the **Mobility Procedures Manual.**

Indicate Current Stage of Project			
☐ Early Communication	☐ DAP	☐ Preliminary	☐ Advanced

Impact on Mobility	
☐ No Mobility Impacts	☐ Mobility Impacts
*See mobility considerations below to determine. Mobility Program signature is **not** required for a project that has no mobility impacts.*	*Describe all mobility impacts on worksheet below.*

SECTION 2

MOBILITY RESTRICTION CONSIDERATIONS WORKSHEET

All fields must be filled out or form may be returned

Project Information, Duration, and Hours	Notes
1. Project anticipated start and end date?	
2. How many construction seasons, and which year(s)?	
3. List the various stages and/or phases, resulting restriction, mile point range, and anticipated duration of each.	
4. Are there ways to provide windows of opportunity for unrestricted freight movement between stages? If so, describe proposed plans.	
5. What are the allowable full, lane, or ramp closure days, hours, and months per standard specifications 00220.40(e). Indicate type of closure (e.g. full, lane, or ramp).	

Source: Oregon DOT

6. Is this project on a route that is being used as a detour route for another project, and if so is work being coordinated to prevent conflicts?	
7. Is this project on an ORS 366.215 Reduction Review Route and does it have a potential reduction in vehicle carrying capacity? If yes, has the project been shared with the Stakeholder Forum and received a Record of Support per OAR 731-012-0010 and ORS 366.215?	

SECTION 3

Work Zone Safety Considerations	Notes
1. Have you considered a full range of options for roadway and work zone design per the Work Zone Safety Guiding Principle?	
2. Have you updated the Work Zone Decision Tree throughout the project milestones?	
3. If this is a paving project, what is the estimated number of shifts and hours per shift?	

SECTION 4

Road Closure Considerations	Notes
If full road closures are planned, list direction of travel and duration of the closure.	

SECTION 5

Lane Closures / Width Restriction Considerations	Notes
1. If lane closures are planned, indicate which lanes will be closed, whether the work zone is on a curve or straight section, and how much paved width will be available to traffic between barriers/traffic control devices (e.g. barrels, cones, candlesticks, equipment, concrete barriers, etc.). If the width* will vary depending on the stage/phase of the project, list the available width, mile point range, and duration of each stage/phase. **Note: Width generally refers to the paved width of the lane and any shoulders which are capable of supporting the freight traffic loads without failure. On a case by case basis, unpaved/aggregate shoulders may be determined to be useable.*	
2. Will there be lane closures under structures? If so, is there an "up and over" diversion available?	
3. Have travel lane widths been reduced? If so, what are the lane widths?	
4. Will there be less than 28-feet for two lanes of one-way traffic, or for two opposing lanes of head-to-head traffic? If so, how much width will you have and describe the traffic control method. (Provide staging plans if available).	
5. Does the available horizontal width between traffic control devices restrict annual permits? *Contact the ODOT Statewide Mobility Team for help determining.*	

6. Can all unannounced (no advanced notice required) oversize loads be accommodated safely through the restricted work zone by moving equipment and traffic control devices out of the way and waving them through with a slight delay (e.g. less than 20 minutes)? Indicate how long the anticipated delay will be. Will the travelling public also be delayed as a result?	
7. If unannounced loads cannot be accommodated, can loads with advance notice be accommodated on a case by case basis? If yes, how much advance notice will be required? If the answer is no, provide the oversize load detour route per Q.3 under Section 7 (Detour Route Considerations).	

SECTION 6

Ramp Width Restriction or Closure Considerations	Notes
1. If ramp closures are planned, list the ramps by name, number, and whether they are "on" or "off" ramps.	
2. How long will each ramp be closed? Indicate hours and days needed for each.	
3. Will any ramps be width restricted? If so, how much paved width will be available to traffic between barriers/traffic control devices? What are the days/hours of the width restriction?	

SECTION 7

Detour Route Considerations	Notes
1. For "road-closures" what is the approved detour route?	
2. Will the detour route accommodate the same sized vehicles (annual permitted dimensions and/or single-trip permitted dimensions), that are normally allowed on the proposed route that is going to be restricted? *Contact the ODOT Statewide Mobility Team for help determining.*	
3. If the detour route cannot accommodate the same size vehicles as the proposed restricted route, has an additional detour route been identified? If so, please describe.	
4. Has the detour route been checked for overhead obstructions to ensure all vehicles can travel the entire route? (E.g. structures, wires, signal heads, overhanging trees, etc.)	
5. Has the detour route been checked for weight restrictions over structures? *Contact the ODOT Statewide Mobility Team for help.*	
6. Have turning movements been evaluated to see if they provide safe turning movements and off tracking? *Contact the ODOT Statewide Mobility Team to obtain oversize load information, including truck diagrams.*	
7. If the detour route uses city streets/county roads, has it been approved by the local jurisdiction? List approver.	
8. The District road authority must approve detour routes when requested to allow increased oversize load dimensions to accommodate the vehicles routinely allowed on the restricted route. *Contact the ODOT Statewide Mobility Team for help determining if approval will be needed.*	
9. Will the detour route be signed?	

10. For "ramp-closures", what are the detour routes? If using the next exit, how will this be communicated to drivers?	
11. If routed to the next exit and instructed to reverse direction, has the highway undercrossing been evaluated for height?	

SECTION 8

Special Detour Route Considerations	Notes
1. How will the detour route affect emergency services response times?	
2. Will vehicles transporting hazardous materials be able to use the planned detour route?	
3. Are there other projects along the proposed detour route which will restrict traffic?	

SECTION 9

Critical Route Pair Considerations	Notes
1. Is the project on a critical route pair? See *Mobility Procedures Manual* for help.	
2. If the project is on a critical route pair, is work taking place on the paired route that also has restrictions, and/or delays that exceed allowable thresholds? If yes, name the project and describe restrictions and/or delays.	
3. If there are no conflicts identified, who confirmed this information? (E.g. the Transportation Project Manager or Mobility Liaison? Traffic Engineer?)	

SECTION 10

Height, Length & Weight Considerations	Notes
1. If your project has bridge work that has load rating factors showing insufficient load capacity for unrestricted use by Permit Vehicles, ODOT's Weight Restrictions Policy (PMT 06-01) must be followed. If your work will require restricting the bridge, please describe the restriction (annual, single trip) per the Bridge Unit. Weight restrictions will be posted on the Road and Bridge Restriction list.	
2. When projects have work zones that have a high degree of curvature (more than 5 degrees) the overall length of oversize loads may need to be restricted. Is a length restriction necessary? If so, please describe.	
3. Are there any traffic control devices or construction tools in the work zone that temporarily reduce the overall height available to loads? (E.g. temporary signals, falsework, containment systems, etc.)	

SECTION 11

MOBILITY COMMUNICATIONS CHECKLIST			
YES	**NO**	**NA**	**ACTION**
☐	☐	☐	Contacted the ODOT Statewide Mobility Team early in project development, *prior to DAP*, to identify potential mobility and work zone safety impacts, and allow time for review.
☐	☐	☐	Provided the ODOT Statewide Mobility Team with current copy of TMP/Work Zone Decision Tree/Traffic Control Plan.

12. References

[1] United States Government Accountability Office, "Transportation Safety- FHWA Should Conduct Research to Determine Best Practices in Permitting Oversize Vehicles, GAO Report 15-236," GAO, Washington, D.C., 2015.

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