

14. Highway Work Zone Safety and Traffic Control Plans

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1400.1. Introduction

Works zones directly impact the safety and mobility of road users and highway workers. Addressing these safety and mobility issues starts early in the project development process and continues through project completion.

This section provides guidance and establishes procedures for developing Traffic Control Plans, Traffic Management Plans, and Traffic Operations Plans in accordance with 23 CFR 630, Subparts J & K, and P&P 05.05.015.

1400.2. Definitions

Positive Protection Devices: Traffic barriers that contain and/or redirect vehicles and meet the crashworthiness evaluation criteria contained in NCHRP Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features, 1993, or MASH 2016.

Project: Any work in the highway right of way that may have an impact on traffic.

Public Information Plan: A communications plan to inform affected road users, the general public, area residences and businesses, and appropriate public entities of project scope, expected work zone impacts, closure details, and recommended action (if any) to avoid impacts and changing conditions during construction.

Significant Project: A significant project falls into either a Category 1 or Category 2 classification.

A Category 1 significant project occupies a location for more than three consecutive days with either intermittent or continuous lane closures on Interstate Highways within a Transportation Management Area.

A Category 2 significant project is one that, alone or in combination with other concurrent projects nearby, is anticipated to require greater than normal attention to traffic control to eliminate sustained work zone

impacts greater than what would be considered acceptable.

Traffic Control Plan (TCP): A plan identifying what traffic control devices to use and showing their location and operation in a work zone to ensure traffic flow. TCPs also include phased staging and traffic routing plans where needed. TCPs may include positive protection devices or on-project law enforcement to improve worker and motorist safety.

Transportation Management Area (TMA):

1) An urbanized area with a population of over 200,000 or 2) any urbanized area for which TMA designation has been requested by the Governor and the area's metropolitan planning organization and granted by the Secretary of the United States Department of Transportation (USDOT.) Currently, Anchorage is the only TMA in Alaska. Its boundary coincides with the Anchorage Metropolitan Area Transportation System boundary. Check with Planning for any changes in TMA designations.

Transportation Management Plan (TMP): A plan to manage work zone impacts of a highway project. It includes a Traffic Control Plan and may include Transportation Operations and Public Information Plans. Neither the TMP nor its three component plans are standalone documents. Plan provisions are included in project plans, specifications, or agreements with other parties and are scaled as appropriate for the complexity of individual projects.

Transportation Operations Plan (TOP): A plan to minimize project impacts not covered under a Public Information Plan or TCP. In general, these activities consist of coordination with external agencies, events, projects and systems, and may include:

- Plans for on-project law enforcement and other activities by external agencies
- Coordination with other projects to minimize cumulative impact
- Coordination with agencies that manage signal operations
- Plans to maintain access for emergency vehicles, school buses, transit, etc.
- Plans to minimize impacts to major traffic-generating events

- Travel demand management

1400.3. State & Federally Funded Projects and Work on State Highways

Every project will have a TMP. A TMP must include a TCP and may contain a TOP and a Public Information Plan.

The regional design section working in conjunction with the regional construction and traffic sections, and in coordination with external agencies, events, projects, and systems, as necessary, should prepare a project specific TMP.

Emergency incidents are exempt from the requirements of this section, except for development of a TCP, which is done in accordance with section 1400.3.5. Emergency incidents may benefit from the other TMP elements.

1400.3.1 Transportation Management Plan

All Projects

For all projects, the Project Manager should:

1. Involve stakeholders as appropriate.
2. Provide information on potential construction impacts on traffic mobility during public hearings and meetings.
3. Identify existing road users, including vulnerable road users.
4. Consider whether road capacity under anticipated construction conditions needs to be analyzed.
5. Consider whether there are particular safety concerns that need to be addressed.
6. Consider whether it is appropriate to include a TOP and/or Public Information Plan or portions thereof.
7. Consider access requirements for the contractor, inspectors, and other agency stakeholders to get in and out of: work zones; storage and stockpile areas; and the project office.
8. Consider whether any utilities hinder access to perform the work.
9. Coordinate with the Division of Measurement Standards and Commercial Vehicle Enforcement (MSCVE) to identify existing and pending

oversize/overweight vehicle permits that will require accommodation on the project.

10. Consider whether there is adequate room and ROW to perform the work with the size and types of equipment expected.
11. Ensure anticipated temporary construction impacts are consistent with the relevant section in the Environmental Document.
12. Prepare a TCP.

Significant Projects

Refer to the definitions in Section 1400.2. The Project Manager is responsible for determining whether the project is “significant”. When a project may be significant under Category 2, seek concurrence in the determination from the Preconstruction Engineer. Document whether a project is significant or not in the *Preliminary Work Zone Traffic Control* section of the DSR.

When projects are “significant”, prepare a full TMP for the design, including TOP, Public Information Plan, and TCP unless exempted.

Outreach on a significant project should begin no later than the scoping process. Development and analysis of traffic impacts, stakeholder involvement, and agreements with law enforcement and other parties take effort. Addressing the elements of a TMP late in the project development can lead to significant delays and unexpected costs.

Exempt Significant Projects

Some significant projects may be exempt from requiring a full TMP as anticipated traffic impacts are minimal or insignificant. For an exempt significant project, a TCP is still required, but the TOP and Public Information Plans are optional.

For a significant project, an exemption is requested in accordance with 23 CFR 630.1010 (d) by the Preconstruction Engineer. The Preconstruction Engineer sends a memo to the FHWA Division Administrator requesting an exemption and includes a discussion of the justification. If approved, copy the exemption request and FHWA approval memos to the Chief Engineer.

Example justification for exemptions may be:

- lane-closures occur only at night,

- lane-closures occur only during off-peak and weekend hours,
- roadway capacity under construction conditions substantially exceeds traffic volumes; or
- alternate routes and intersections are available and provide reserve capacity without unreasonable delay.

Include a discussion and documentation of exemptions in the *Preliminary Work Zone Traffic Control* section of the DSR.

1400.3.2 Transportation Operations Plans

The design and construction sections share joint responsibility for developing TOPs. Some of these tasks are prepared in design but are not finalized until the project is under construction. Coordination between design and construction is essential and inclusion of TMPs is important in plan reviews.

When agreements made under the TOP place requirements on the contractor, include the requirements in the construction contract. Agreements made under the TOP that are not incorporated in project plans or specifications shall be retained in project files.

Law Enforcement

Development of the TOP should consider the use of law enforcement on projects with high traffic speeds and volumes, and where the work zone is expected to result in substantial disruption to or changes in normal traffic flow patterns, and where work zone risks may be mitigated by improved driver behavior and awareness of the work zone such as;

- frequent worker presence adjacent to high speed traffic without positive protection devices;
- during traffic control setup or removal that presents significant risks to workers and road users;
- complex or very short term changes in traffic patterns with significant potential for road user confusion;
- night work operations that create substantial traffic safety risk for workers and road users;
- when work zone operations require brief stoppage of all traffic in one or both directions; and
- where unexpected or sudden traffic queuing is anticipated on high speed roadways especially if the queue forms a considerable distance in

advance of the work zone or immediately adjacent to the work space.

Participation of law enforcement is dependent upon the law enforcement agency being willing and able to provide resources. Participation requires an agreement outlining the responsibilities of both parties, communication requirements, and how law enforcement will be reimbursed. Develop agreements in coordination with the construction section.

Consider prearranged regional agreements with police departments, rather than project-by-project agreements.

Coordination with Other Projects

Project Managers should investigate whether other department or municipal projects in the vicinity will be constructed concurrently.

If the advanced warning area for traffic control plans would overlap, the projects should address coordination of traffic control devices.

If the area where expected traffic impacts extends outside of the projects overlap, the projects should coordinate impacts.

Signal Coordination

Impacts to signals may extend beyond the physical limits of construction; consult with regional traffic and safety staff for assistance in identifying which signals may be impacted. When traffic signals are impacted by the project, the signal timing or function may require adjustment. Additionally, equipment may need to be moved or adjusted to accommodate changes to lanes or the presence of traffic control devices.

The Project Manager should coordinate with the operator of any signals to develop a plan for ensuring the intersection will function as required during the construction of the project.

Emergency Services

Project Managers should coordinate with emergency services to ensure they can respond throughout construction. This may require wider lanes than necessary for normal traffic, construction of turn-arounds, coordination on alternate routes, etc. If emergency services are within the project limits, consider how the construction will impact access to the facilities.

School Bus and Transit

Project Managers should coordinate with schools and transit operators. Timing restrictions, relocating stops, alternate access to stops, or additional signing may be required to keep impacts at an acceptable level.

Special Events

Project Managers should become familiar with major special events that may occur during construction. Coordinate with organizers of these events to either hold them outside of the construction duration, or include restrictions in the contract that will enable the events to occur. ROW should have a file of reoccurring permitted special events.

Travel Demand Management

If capacity during construction is a concern, consider traffic demand management strategies that may reduce the travel demand to meet the available capacity.

Work Zone Speed Limits

If work zone speed limits are established, set them in accordance with P&P 05.05.020 - "Establishment of Speed Limits and Zones."

1400.3.3 Public Information Plans

The Public Information Plan outlines what information needs to be given to the public, when it is given, and how it is given. The standard specifications in 643-3.03 requires the contractor to give notice before major changes, delays, lane restrictions, road closures, and traffic signal shutdowns. If the Public Information Plan requires the contractor to do more, include the requirements in the project special provisions.

The public involvement plan during the environmental process may identify interested businesses, property owners, government entities, tourist venues, and other organizations that request additional notice. It benefits construction if a contact list of known interested parties is passed to the construction team. The Project Manager should consider whether the public involvement during the environmental process indicates a need for additional public involvement beyond the standard specification.

When MSCVE has existing or pending oversize/overweight vehicle permits, include the permittees in the Public Information Plan.

When multiple projects overlap, the Project Managers should meet with the regional public information

officer and determine a strategy for the adjoining projects.

When a Public Information Plan is used, the information may be distributed directly by:

- Social media thru the regional public information officer
- The Department's construction section thru the Department's Navigator and 511 systems <https://www.alaskanavigator.org/> <http://511.alaska.gov/>
- Television, radio and/or newspaper advertisements
- The contractor
- Other location-specific communication tools

1400.3.4 Traffic Control Plans

Traffic control plans are required on all highway projects where work occurs in a State maintained right-of-way.

Do not seal TCPs, except as noted below, as TCPs are commonly field modified during construction. When TCPs are not sealed, do not include them in the plans.

Seal temporary traffic signal systems and geometric designs for 45 mph posted speed (prior to construction), or higher, detour or bypass routes.

On projects where the work is outside the clear zone but the activities may impact traffic flow, consider whether a TCP is desirable or necessary. Signing and flagging for truck crossings are examples of traffic control that may be desirable or necessary when work is accomplished outside the clear zone only.

Phasing

TMPs assume a certain phasing of events. For example, the designer expects new embankment to be built first, and traffic routed onto it.

The contract documents should inform the contractor the assumed phasing. If the contractor does not know the assumed phasing and plans to construct the project differently, the TOP, Public Information Plan, and TCPs may no longer work.

Scope, Preparation and Detail

Prepare all TCPs to be consistent with the ATM and Chapter 9 of the AASHTO Roadside Design Guide.

The ATM sets forth basic principles and prescribes standards for the application, installation, and maintenance of various traffic control devices for highway and street construction. However, it does not address all potential traffic situations in work zones. Tailor TCPs to specific project conditions and requirements.

The scope and detail of a TCP will depend on project complexity and the extent to which construction interferes with traffic flow. TCPs may include:

- Plans and detail drawings
- Special provisions
- Typical applications from the ATM.

In developing a TCP:

- Consider if there is enough room within the right-of-way for both the construction activity and a travel route. If not, consider obtaining temporary construction permits.
- Verify that any temporary, constructed diversions meet acceptable geometric and structural standards for the posted speed limit and design vehicle. Detours routed onto existing streets do not require adjustment to geometric standards, but should be evaluated for the ability of the design vehicle to travel on the detour.
- Confirm that any detours or diversions comply with the environmental document and project permits.
- Verify that traffic volumes can be adequately handled with available lanes at all hours.
- Provide access to businesses, residences and work zones if feasible. If access cannot be provided to businesses or residences, coordinate with the ROW section to see if specific agreements are needed.
- Provide for non-motorized traffic accommodations, including ADA accessible routes when they currently exist.

For all projects:

1. Establish times and dates, if any, when lane and/or road closures are prohibited. This may include requirements for night and/or weekend work.

2. Provide guidance for mitigation of specific safety concerns, when any exist.
3. Consider establishing allowable delay/queue standards.
4. Consider whether road volumes under anticipated construction conditions need evaluation.
5. To minimize worker exposure to traffic and exposure of road users to construction activities, consider including the following exposure control measures:
 - a. Road or ramp closures
 - b. Detours
 - c. Median crossovers
 - d. Accelerated construction techniques
 - e. Night or off-peak work hours* (noise permits or variances may be necessary for night work.)

* A detailed procedure for assessing the feasibility of performing highway work at night is provided in NCHRP Report 475, "A Procedure for Assessing and Planning Nighttime Highway Construction and Maintenance."
6. Identify whether and under what conditions to install positive protection devices. In making this determination, consider the following factors:
 - a. Project scope and duration
 - b. Anticipated traffic speeds through the work zone
 - c. Anticipated traffic volumes
 - d. Vehicle mix
 - e. Type of work (as related to worker exposure and crash risks)
 - f. Distance between traffic and workers, and degree of worker exposure
 - g. Escape paths available for workers to avoid vehicle intrusion into the work space
 - h. Time of day the work occurs (e.g., night work)
 - i. Work area restrictions (including impact on worker exposure)
 - j. Consequences from/to road users resulting from roadway departure
 - k. Potential hazard to workers and road users presented by device itself and during device placement and removal

- l. Geometrics that may increase crash risks (e.g., poor sight distance and sharp curves)
- m. Access to/from work space
- n. Roadway traffic volume and speed
- o. Impacts on project cost and duration

In particular, consider installation of positive protection devices under the following conditions:

- a. Work zones that provide workers no means of escape from motorized traffic (e.g., tunnels, bridges, trenches, etc.)
 - b. Long term stationary work zones
 - c. Projects with anticipated operating speeds of 45 mph or greater, especially when combined with high traffic volumes
 - d. Work operations that place workers close to travel lanes open to traffic
 - e. Roadside hazards, such as drop-offs or unfinished bridge decks, that will remain in place overnight or longer
7. Consider truck mounted attenuators for short duration or mobile work on roads with a posted speed of 45 mph or greater and in other areas as appropriate.
8. Consider a visit to the project site during preparation of TCPs to verify access, location of signs and other devices, presence of utilities or other obstructions to the work, and adequacy of detour routes.

Work Zone Roadside Safety

Provide direction in the specifications or drawings on

- How to treat roadside slope or obstacle hazards
- Required construction clear zone
- How to treat pavement drop-offs
- Acceptable channelization devices, barriers, and barrier end treatments

Pre-existing roadside safety hardware should be preserved or improved for use until the progress of construction necessitates its removal. From that time until permanent roadside safety hardware is installed, describe how to maintain roadside safety hardware in the plans and specifications.

1400.3.5 Payment for Traffic Control

Payment for traffic control can vary depending on project size, duration, and complexity. Do not make

payment for work zone traffic control features and operations incidental to the contract or other items of work not related to traffic control and safety.

Consult with construction regarding choice of pay items. It is best to provide flexibility here so the contractor can submit their own TCP based on their sequencing and schedule. The contractor's plan may differ from the TCP preparer's assumptions.

Traffic control devices may be paid for by lump sum, contingent sum, unit price, or a combination thereof. Contingent sum is the most common method of paying for most traffic control items.

Lump Sum

Traffic control may be paid for as lump sum only on projects, or portions thereof, where:

- 1. Traffic control is not complex,
- 2. The contractor can readily evaluate the required traffic control work, and
- 3. The number and placement of traffic control devices is easily determined

Use contingent sum and/or unit price payment strategies on all projects that do not meet these conditions.

When lump sum payment is an option, consider the following when deciding whether to use it:

- 1. Lump sum traffic control is more difficult to monitor and change because the contractor is not paid for individual traffic control items and it requires closer oversight to ensure all necessary traffic control items are in place.
- 2. The use of lump sum traffic control payment requires a detailed TCP. All necessary traffic control devices need be shown on the TCP to reduce disagreement between the engineer and the contractor about what is required and to reduce the potential for claims for increased traffic control payments from the contractor.

If the use of lump sum for traffic control is questionable, consult the FHWA Alaska Division for guidance.

Traffic Maintenance

Include a Traffic Maintenance item – either Pay Item 643.0001.0000 or 643.0002.0000 - on all projects with traffic control, except for lump sum projects, where it

is optional. Inclusion of this pay item allows the contractor to directly allocate costs associated with:

- Providing a Worksite Traffic Supervisor.
- Preparing TCPs.
- Preparing and publishing public information notices.
- Preparing a Construction Phasing Plan.
- Maintaining all roadways, approaches, crossings, intersections and pedestrian and bicycle facilities.
- Providing any traffic control devices required, but not shown on the bid schedule.

Traffic Control Devices

There are two types of unit price pay items used to pay for traffic control devices:

- Contractor bid unit price
- Department-set (fixed) unit price

In contractor bid unit price, the contractor establishes the payment price for particular traffic control items. A list of common unit price pay items is contained in the SSHC. New pay items are established by special provision for specific or special needs.

When Department-set unit price is used, a Traffic Control Rate Schedule (TCRS) is provided in the special provisions. The TCRS includes a list of all the commonly used traffic control devices and their respective predetermined fixed prices. When using this method of payment, use SSHC Pay Item 643.0025.0000 and allocate an appropriate amount of contingent sum money to pay for these devices.

Contractor bid unit price items should be considered when

- The contractor has little control over the bid quantity, or
- There is a firm estimate on the bid quantity, and the Department has control of the actual quantity required during the project, or
- The bid item in question is high cost and likely to have one time or limited use by the contractor.

Use of a TCRS and the inclusion of a 643.0025.0000 Pay Item is the most common way to pay for traffic control devices. This reduces the opportunity for bid unbalancing by contractors.

Positive Protection Devices

Pay for positive protection devices separately from other types of traffic control devices in contract documents. This may be through separate bid items, or through rates for individual devices in the traffic control rate schedule table.

Separate payment for positive protection devices may be either lump sum, unit price or contingent sum. If used on a project with lump sum payment for traffic control, positive protection devices must still be paid for as a separate pay item.

Flagging

Flagging is primarily used for public safety or at the convenience of the contractor to support his operations.

The Department is responsible for paying for flagging required for construction of the project. Contractors should pay for flagging solely for their own convenience, benefit or productivity.

When not included in a lump sum pay item, pay for flagging by contingent sum at the Department's approved rate or by the hour. See the Statewide Construction Standards Resources webpage for the current rate,

<https://dot.alaska.gov/stwddes/dcsconst/index.shtml>

Traffic Price Adjustment

Special consideration should be given in the use of the contingent sum Traffic Price Adjustment pay item. Traffic Price Adjustment is a liquidated damage charge assessed for unauthorized contractor activity or traffic control that results in any lane of traffic not being open to full use by the public. Set the bid amount on the bid schedule for this pay item to \$0 (zero).

Estimates

Total traffic control costs typically range from 5 to 15% of the total construction cost. The lower end of this range is for rural, low-volume projects with simple traffic control plans and low impacts to traffic, while the upper end represents urban, high-volume projects with complex traffic control.

1400.4. References

1. Code of Federal Regulations 23 CFR 630 Subparts J & K

2. Part 6 of the *Alaska Traffic Manual (ATM)*. The ATM consists of the *Manual on Uniform Traffic Control Devices (MUTCD)* and the *Alaska Traffic Manual Supplement*
3. *Alaska Construction Manual*
4. *Alaska Standard Specifications for Highway Construction*, Section 643
5. Alaska Standard Plans (“C & G” Series)
6. P&P 05.05.015 – *Work Zone Safety and Mobility*
7. P&P 05.05.020 - *Establishment of Speed Limits and Zones*

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