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Traffic Engineering Instructions (TEI)

Distribution: Director of Highway Division, Chief of Contract Administration, Director of Maintenance and Operations, Director of Policy, Planning and Intermodal Development, Director of Project Delivery, Director of Municipal Assistance, District Administrators, District Project Managers and Technicians, Highway Safety & Design Project Managers, Municipal Assistance Project Managers, Maintenance Administrator, Program Development Section Managers, Structures Project Managers, Consultant designers

Approved: _____ **Date:** 1 April 2016
Joshua Schultz, PE
Transportation Systems Management and Operations Manager

Subject: Rolling Roadblock Temporary Traffic Control Plan Guidance

Administrative Information:

Effective Date:	TEI 16 - 601 shall be effective from the date of approval.
Superseded TEI:	Not Applicable
Exceptions:	Not Applicable
Disposition of TEI Content:	The content of TEI 16 - 601 will be incorporated into future revisions to the Vermont Agency of Transportation Standard Drawings, Traffic Design Manual and/or other applicable design guidance documentation.

Purpose:
The purpose of this TEI is to provide guidance in the development and implementation of traffic control plans for rolling roadblocks on limited access highways, for construction projects and for utility permits.

Implementation:
The content of TEI 16 - 601 is to be implemented beginning immediately for all work zones on the State Highway System that meet the guidance set forth in this Traffic Engineering Instruction.

General Information:

Rolling roadblocks are used when short duration roadway construction activities are taking place in/or above all lanes of a limited access highway, thus requiring traffic to be temporarily slowed rather than completely stopped. Traffic is paced at a safe speed (not less than 20 mph on freeways/expressways) to provide a gap in traffic that allows the work activities to be performed. The pacing of traffic is controlled by pilot vehicles (law enforcement vehicles with blue lights flashing) driven by uniformed law enforcement personnel. Any on-ramps between the beginning point of the pacing area and the work area shall be blocked until the pilot vehicle has passed. Two-way radio contact is necessary to provide constant communication between the pilot vehicle, contractor's workers, flaggers stationed at the on-ramp locations, and the project engineer. Advance warning signs are necessary to provide adequate warning to motorist of the traffic pacing area and the potential for a stopped condition.

Activities which may warrant the use of rolling roadblocks:

- Setting bridge beams and girders
- Pulling wires or cable across the roadway
- Placing overhead or cantilever signs
- Installing sign structures
- Blasting
- Other types of construction where the entire travel way must be temporarily closed to traffic.

Traffic Control Requirements

1. Rolling roadblocks shall only be conducted on limited access highways within the State of Vermont.

2. All traffic control devices used to warn or guide traffic shall comply with the latest Manual on Uniform Traffic Control Devices (MUTCD), Vermont State Standards, and their latest revisions or any additional traffic control deemed necessary by the Project Manager. Failure to utilize proper measures shall be considered sufficient grounds to order cessation of the work immediately.

3. All diamond shaped signs shall be 48"x48" black legend and border on fluorescent orange background.

4. All roll-up sign material shall have retroreflective sheeting equal to or exceeding the American Association of State Highway and Transportation Officials (AASHTO) M 268 [American Society of Testing and Materials (ASTM) D 4956] Type VI and Type VII unless otherwise noted.

5. All sign stands shall meet National Cooperative Highway Research Program (NCHRP) Report 350 or the AASHTO Manual for assessing Safety Hardware (MASH). The appropriate resource shall be determined as described in the MASH publication.

6. Portable signs shall be placed on the edge of the roadway a minimum of one foot above the travelled way. All vegetation that interferes with visibility of the signs shall be removed. When placed behind guardrail, the bottom of the sign face shall be above the top of the guardrail.

7. If it is anticipated that traffic will back-up beyond the lead warning sign, then a Uniform Traffic Officer (UTO) with operating blue lights shall be parked ½ mile or more prior to where the traffic is expected to back-up. (During design, the anticipated queue length shall be checked to verify if stopping sight distance is adequate to the anticipated back-of-queue; additional measures may be necessary to ensure back-of-queue vehicular safety).

8. All traffic control personnel and personnel that are present to work within the highway shall all wear ANSI Class 2 retroreflective vests or an approved equivalent (law enforcement) for the duration of the operation.

Typical Special Conditions - to be included in the 1111 permit or adapted for use in the project plans (in which case the term Contractor should be substituted for Permit Holder, and notes that are not applicable should be omitted).

1. All work shall be accomplished in accordance with the attached plan dated, _____

2. Failure to complete all the work, approved under this permit, by the "work completion date" may result in suspension of the permit (by separate correspondence) until work is completed and approved by the Vermont Agency of Transportation.

3. Permit Holder shall perform work *within a set area at a specified time*, not during inclement weather, and only during off-peak hours when traffic volumes are at their lowest. *(Insert specific details in this note)*

4. All emergency service providers shall be notified of the planned closure and notified immediately following reopening to traffic.
    a. All on-call emergency response vehicles (i.e. fire, police, ambulances, etc.) shall be allowed unrestricted passage through the Work Zone.

5. The Permit Holder shall provide the District Transportation Administrator and the Work Zone Traffic Management Engineer with a traffic control plan showing the method to control to control traffic. This plan must be approved by the District Transportation Administrator.

6. The length of the rolling roadblock should be designed to accommodate the planned work period without stopping traffic. However, if this is not viable then traffic shall NOT be stopped for more than ten (10) minutes.

7. A pre-construction/preparation meeting with all parties involved must be held prior to the Permit Holder's employees or contractor beginning work to discuss how the project will

be completed. All logistics including communication issues and scheduling issues shall be resolved during this meeting. Note that the Permit Holder is required to notify the District Transportation Administrator five (5) working days in advance of such meeting.

8. The Permit Holder shall provide uniformed traffic officers (State Police, local authorities, or sheriffs) to stop traffic during the closure.

9. The District Transportation Administrator and the appropriate unit of the State Police/Sherriff's department are to be notified a minimum of 72 hours, prior to commencement of work.

10. Except by special permission from the District Transportation Administrator, the only vehicles allowed within the highway right-of-way for construction purposes will be necessary to support the work that is being performed.

11. It is the responsibility of the Permit Holder to verify the appropriate safety measures needed, prior to construction, so proper traffic control devices and/or personnel are available when and as necessary.

12. Additional restrictions and conditional requirements necessary to achieve the work associated with the rolling roadblock can be found in 19 VSA Section 1111 authorized state highway access and work permit and/or the special provisions form the contract document for the project.

Typical Implementation Sequence

1. Portable Changeable Message Signs (PCMS) shall be installed seven (7) days in advance of the closure. These shall be placed at or in advance of the beginning of the rolling roadblock.

2. Prior to the start of work, place all necessary signs faced down on the shoulder as per approved traffic control plan, in advance of implementing the rolling roadblock.

3. The day of the event, all signs placed face down earlier are to be installed as to be visible to approaching traffic.

4. At the beginning of the rolling roadblock, one UTO (blue lights flashing) per lane shall begin escorting traffic toward the work area, stopping1500 feet in advance of the work area if necessary.

5. Prior to the release of the blue light escort, all Flaggers stationed at ramp locations will stop all traffic from entering the main line

6. Once the blue lights begin escorting the traffic to the work area the contractor shall provide a sweep vehicle in each direction of travel with amber strobe lights activated to follow the last vehicle traveling in advance of the rolling roadblock to ensure there are no

parked vehicles and no open ramps or other access points and that the roadway is clear before the work is to begin.

7. PCMS board are to be changed to their event messages once sweep vehicle movement begins.

8. All uniform traffic officers (UTOs), sweep vehicles, and on-site supervisors shall be in direct radio contact in case something unexpected should happen. Cell phones or walkie-talkies, if radios are not workable, shall be used to communicate during the rolling roadblock implementation.

9. A contingency plan shall be coordinated for concerns which could stop the rolling roadblock or delay the operation shall be made. (Planners and designers should pay special attention to possible ways to detour or clear traffic if needed. This plan should be developed as part of the Traffic Control Plan (TCP) as part of the rolling roadblock).

10. Once permit work is completed the roadway will return to normal conditions. If additional work is required on the shoulder then additional traffic control devices and signs will be required.

11. When work is completed the PCMS board messages shall be changed to the after-event messages or be turned off.

12. Deployment and pick up of all traffic control devices shall conform to the current MUTCD, Part 6 guidance.

13. If multiple closures are required to achieve the work at hand, then a successive rolling roadblock should not be started until the traffic from the preceding rolling roadblock has been sufficiently cleared from the work location.

Pacing Design Considerations

The design shall evaluate the actual distance required for the pacing operation based on site specific features such as: roadway geometrics, pacing speeds, regulatory speeds, interchange spacing, work duration, availability of traffic control officers, traffic volumes and maximum queue length.

The starting point of a traffic pacing operation must consider the following factors: the speed of the pacing vehicles, the location of entrance ramps, and horizontal and vertical alignment of the facility.

In some cases it may be necessary to close a lane at the work site to position a crane(s) and the materials to be lifted. All material to be installed shall be on-site before the traffic pacing operation begins.

It may be necessary to install temporary barrier walls to protect pre-positioned and assembled materials in the right of way.

The **minimum speed allowed** for a pacing operation is 10 mph, with 20 mph the preferred speed.
The **maximum allowed work duration** is ½ hour (30 minutes).
The **maximum practical pacing operation length** is 10 miles.

S_r = Regulatory speed (mph) S_p = Pacing speed (mph) t_w = work duration (min)

$$L = \frac{t_w}{60} S_p \left(\frac{S_p}{S_r - S_p} + 1 \right)$$

L = Total pacing distance in miles L_c = distance paced vehicles must travel L_w = distance paced vehicle before the vehicles at regulatory speed travel while work is performed have cleared the work zone.

$$L = L_c + L_w$$

$$L_c = \left(\frac{\frac{t_w}{60} \times S_p^2}{S_r - S_p} \right)$$

$$L_w = \left(\frac{t_w}{60} \times S_p \right)$$

Traffic Pacing Distances (miles)

Regulatory Speed (MPH)	Total Time Allowed for Work Activity (minutes)					
	5	10	15	20	25	30
70	2.3 miles	4.7 miles	7 miles	9.3 miles	*	*
65	2.4 miles	4.8 miles	7.2 miles	9.6 miles	*	*
60	2.5 miles	5 miles	7.5 miles	10 miles	*	*
55	2.6 miles	5.2 miles	7.9 miles	*	*	*
50	2.8 miles	5.6 miles	8.3 miles	*	*	*

+ Site-specific design required.

Notes: The time allowed for work activity starts just after the last vehicle traveling at the pre-pacing regulatory speed clears the work area and ends just as the pacing operation reaches the work area. The time allowed for work must include the time required to clear the roadway of equipment, materials, and personnel.

The selection of the speed of the roadblock should consider the work duration and the location of upstream on-ramps which need to be closed, should generally be 15 mph or greater. Example: a 15 minute duration would require the pace vehicle to travel 5 miles while the work is perform at a 20 mph pace plus an additional 2.2 miles must be traveled to include buffer space, set-up and deceleration distance before the vehicles traveling at the regular speed have cleared the work zone. This distance does not include the 1500 feet before the work area where traffic would be required to stop if work was not completed as scheduled.

SAMPLE PCMS Messages*:

The message one week in advance of activity:

Phase - 1	*Phase - 2*
UTILITY	SUNDAY
WORK	NOV 12
PLANNED	7AM-9AM

or

Phase - 1
ROLLING
RD BLOCK
PLANNED

The message while closure is in progress:

Phase - 1	*Phase - 2*
TRAFFIC	KEEP
STOPPED	SAFE
AHEAD	DISTANCE

The message when closure is completed and work activities continue:

Phase - 1	*Phase - 2*
UTILITY	BE
WORK	PREPARED
AHEAD	TO STOP

or

Phase - 2
STAY
ALERT

*All messages to be centered on PCMS not left justified

SAMPLE Sign progression (gate-posted):

Option 1	Option 2
ROAD WORK AHEAD	UTILITY WORK AHEAD
TRAFFIC STOPPED 2 MILES	UTILITY WORK 2 MILES
REDUCE SPEED AHEAD	UTILITY WORK 1 MILE
TRAFFIC STOPPED 1 MILE	BE PREPARED TO STOP
BE PREPARED TO STOP	UTILITY WORK ½ MILE
STOP AHEAD (SYMBOL)	UTILTY WORK 1500 FT

Rolling Roadblock Planning Check list

Note that Roadblocks shall not be performed during periods of fog, rain or snow or other inclement weather conditions. Rolling Roadblocks are preferred to occur during off-peak hours, those times when traffic volumes are at their lowest

Purpose

Description where, when, why work is to take place.

Town
Route
Direction (NB,SB,EB,WB)
When (early AM, nighttime, weekends)
Date
Days of the Week
Times of the Day
Number of lanes to be blocked
Vehicle Volume
Entity Performing Work
Brief description of work

Communication Plan

Advance planning meeting to be held 1-2 weeks in advance to define everyone's responsibilities and make sure activities required for accomplishing the task will be in place for the event.

Advance Planning meeting conducted on
Lead coordinator
Press release (responsible party)
Date of Press Release
Newspaper(s)
Television Station(s)
Web Page
Traffic Operation Center (contact date)
Other

Resources

Essential tools for a successful event.

Portable Changeable Message Sign -(QTY)
PCMS- Before Message
PCMS – During Message
PCMS – After Message
Traffic Control Plan (attach layout)
of Law Enforcement Vehicles
of Sweep Vehicles with strobe lights
of contractor vehicles with strobe lights to assist in closing off U-Turns within pace area
of Flaggers to assist in managing on-ramp traffic within pace area
of individuals with radios to communicate event plan
Other

Emergency Management

Notification to emergency management (persons responsible; a list of contacts; and written notification is recommended).

Fire
Ambulance
Police
Other

Project Contact List

Essential personnel necessary coordinate with for this event.

Contractor
AOT-Project Manager
AOT-District Representative
Person Coordinating work area

Event Operations

Pace vehicles provided by law enforcement only. Means of communication with each entity at time of event and a list of contact information

Contractor
Sub-Contract
AOT-District Representative
AOT-Designer
AOT-Construction Personnel
AOT-Other
Law Enforcement Officer(s)
Traffic Control Provider

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