

# Chapter 9 *Traffic Planning, Safety, Operations, and Design*

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## 9-1 Overview

### 9-1.1 *General*

The Traffic Office can be involved in planning studies, safety analysis, project design, and operations. This chapter contains information that can be helpful when working in the above project phases.

The [Manual on Uniform Traffic Control Devices \(MUTCD\)](#) is used as a resource for projects that include traffic items.

### 9-1.2 *Transportation Systems Management and Operations (TSMO)*

While the activities that the Traffic Office can be involved with may seem to happen in isolation from other distinct efforts, the decisions made at any one stage affects project lifecycles and all elements of the multimodal transportation system from cradle to grave. Viewing these types of efforts and how they influence WSDOT's ability to deliver, maintain, and operate the transportation system as a whole is foundational to the definition of TSMO as applied in Washington. TSMO covers a broad range of categories and associated strategies that encompass a better balance approach to transportation engineering, planning, and operational activities with a look toward the future and keeping both the maintainability and sustainability in mind. For more detailed information, visit [TSMOWA.org](https://www.tsmowa.org).

### 9-1.3 *Maintenance*

Whether reviewing an existing facility or constructing a new project it is important to consider impacts to maintenance. Working with the maintenance division allows the traffic office to implement projects such as Low Cost Enhancements (LCEs) more readily.

### 9-1.4 *Active Transportation*

In each area of Planning, Safety, Design, and Operations multimodal and active transportation should be considered. Active Transportation has resources for the safety and mobility of pedestrian and bicycle traffic as well as safe routes to school. Also see [Chapter 4](#).

## 9-2 Planning

Guidelines and criteria for corridor planning studies can be found [here](#), the [Transportation Corridor Planning Studies Guidelines and Criteria](#). The Traffic Office can be involved in planning studies, especially with traffic and safety analysis. The Safety Guidance for Corridor Planning Studies documentation provides more information for safety. Traffic analysis is addressed in [Chapter 12](#).

## 9-3 Safety

### 9-3.1 General

The Washington State DOT requires safety analysis for all projects, the analysis is scalable depending on the scope and type of project. The [Safety Analysis Guide \(SAG\)](#) goes into more detail on safety analyses for each project type.

### 9-3.2 I2 Program

Every biennium the HQ Traffic Office develops lists for potential safety projects based on a statewide network screening, these are the Crash Analysis Location/Crash Analysis Corridor/Intersection Analysis Location (CAL/CAC/IAL) lists. The locations on the lists require region input and sometimes analysis to determine if there are viable cost effective safety countermeasures. If the region determines that a countermeasure can be applied, more detailed analysis will be completed to develop a [Crash Analysis Report \(CAR\)](#), which will then be presented to the I2 Panel for endorsement.

The HQ Traffic Office is responsible for the Highway Safety Issues Group (HSIG) and I2 Panel meetings which occur quarterly to discuss safety projects and practices.

HSIG involves other divisions and all regions to communicate current efforts in safety methodology, programs, and funding. The I2 Panel involves the region traffic engineers as well as other experts to discuss and endorse safety projects based on a statewide priority, from the CAL/CAC/IAL lists.

### 9-3.3 Human Factors

When performing safety, or operational, analyses it is important to also keep in mind how the roadway users will interact with or perceive their environment and how human factors have influenced the safety performance. Currently there is no WSDOT specific manual or guidelines on human factors, however NCHRP and [FHWA](#) have research and documentation on the subject. [Chapter 2](#) of the HSM (2010) and [NCHRP Report 600](#), (Human Factors Guidelines for Road Systems, 2nd Edition, 2015) are valuable resources that can be used to perform human factors task analysis and specific human factors considerations during design.

### 9-3.4 Target Zero

Washington State has committed to the [Target Zero](#) plan, in an effort to reduce fatal and serious injury crashes to zero. The Washington Traffic Safety Commission (WTSC) prepares a Target Zero report every three years detailing trends in crashes statewide at the state and local agency levels. This report helps guide where to spend resources, such as prominent crash types

## 9-4 Design

### 9-4.1 General

Whether reviewing design plans or developing a Low Cost Enhancement (LCE) the [Design Manual](#) and [Standard Plans](#) are important resources to have. When reviewing design plans it is important to evaluate not only how the facility will operate, but how maintenance will be performed as well. Consult the area and signal maintenance crews as needed.

In general projects originating from the Traffic Office will be LCEs. These projects must be documented per Traffic Office procedures. Design Bid Build (DBB) contracts must be documented per the [Design Manual](#).

### 9-4.2 QBOD

The QBOD is a version of the Basis of Design specifically for Q projects. The Policy and template can be found [here](#).

### 9-4.3 Signals, Illumination, and ITS

Guidance and information on electrical design and implementation can be found [here](#).

## 9-5 Operations

### 9-5.1 General

The traffic office is responsible for project reviews as well as operational policies and implementation of various elements of statewide traffic control, ITS deployments, LCEs, etc. on state facilities, employing TSMO principles with a focus on safety and mobility.

### 9-5.2 Traffic Systems and other Statewide Electrical Systems

Traffic Electrical Systems manages standards and policies for all highway lighting, traffic signal, intelligent transportation system (ITS; includes Commercial Vehicle Program field equipment), and associated power distribution systems. This includes the entire life cycle of this equipment, from initial selection, through planning, design, construction, and maintenance, to replacement and/or removal. The HQ Traffic Office is developing a manual specific to lighting, traffic signal, and ITS regarding the design, construction, material, and maintenance standards of these systems. For training and current resources consult headquarters and the [Traffic Design – Signals, Illumination and ITS website](#).

### 9-5.3 **Intelligent Transportation System (ITS) and Corridor Operations**

ITS and Corridor Operations focuses on the coordination and utilization of technology to manage a corridor, maximizing safety and efficiency. Activities include optimizing traffic signals, operating ramp meters and active traffic management systems, integrated corridor management, and using traffic cameras, traffic data collection systems, road/ weather information systems, and variable message signs to provide up to date information to travelers. Included in this effort is the operation of six year-round traffic management centers across the state and one winter operations center at Snoqualmie Pass, supported by software, web application IT development, and maintenance staff.

Each Regions' Traffic Management Center (TMC) has its own standard operating procedures/ guidelines and system standards and is subject to specific regional ITS architectures, systems engineering, and concept of operations documents. However, overarching agency policies exist for certain systems, activities, and functions for the sake of consistency and resiliency (in the event of statewide emergencies and continuity of operations, for instance). Some internal applications and TSMO-related tools, policies and procedures are located under [Tools & Services](#) on the intranet site.

Similarly, capabilities and systems vary among each Region regarding legacy traffic signal equipment and software. Standardization of equipment, specifications, and operational practices are underway including the increasing use of automated traffic signal performance measures (ATSPMs), multimodal detection and operations, signal preemption and priority treatment.

For training and current resources consult the HQ Traffic Office.

### 9-5.4 **Field Assessment (FA)**

#### **A. Overview**

In September of 2014 the Field Assessment program was created to replace the identification of WSDOT's safety efforts, previously implemented as spot safety investments associated with pavement preservation and in alignment with FHWA's stewardship agreement at the time. Field assessments are a programmatic approach to review all state highways to identify safety improvement opportunities, evaluate potential benefits and risks, and develop lower cost spot safety enhancements that can be incorporated into a paving project.

By systematically reviewing all highways using a consistent statewide approach, Region Field Assessment engineers are able to identify potential fatal and serious crash reduction opportunities, address emerging crash trends, and recommend incremental solutions.

The Field Assessment program is comprised of two Field Assessment engineers in each region and a headquarters program manager.

## B. Methodology

Annually, each region Field Assessment team reviews 270 miles of state highways. Field assessment evaluations may include: identification of striping and signing needs, rumble strips, channelization, curve mitigation, lane use, and pedestrian and bicycle operations. Community and local law enforcement outreach are key elements of the program. As part of the analysis, the Field Assessment program conducts a traffic engineering review and crash analysis for the location or corridor being surveyed.

Several miles of these assessments are conducted in advance of paving projects (2-3 years) in an attempt to incorporate solutions into the paving projects to minimize traffic impacts. Once solutions have been identified and prioritized, Region Traffic and Program Management work together to coordinate identified solutions to be included into P1 Pavers. This makes for an efficient use of traffic control and contractor construction.

## C. Benefits

By analyzing highway segments for potential crash reduction, selecting appropriate countermeasures, and then prioritizing them, we are in alignment with WSDOT's Sustainable Highway Safety Program.

These reviews provide a consistent statewide approach in crash risk reduction for the P1 Paving program.

### 9-5.5 *Transit/Public Transportation*

Transit and public transportation can have a large impact on operations and should be a consideration for traffic reviews and projects. The [Public Transportation Division](#) has further information on sustainable transportation, park and rides, and other transit related topics. The Public Transportation Division can help find ways to reduce transportation demand and to improve access for people.

### 9-5.6 *Traffic Impact Analysis (TIA)*

When new developments occur the traffic office may need to perform analyses for traffic and potentially safety impacts from the increased volumes. Safety impacts will need to be addressed especially if the impacted facility has been identified on the CAL/CAC/IAL lists. The [Developer Services Manual](#) has information relating to TIAs. Specific details on TIAs can be found in the *Design Manual* [Chapter 320](#).

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