

## **SAFETY WARRANTS**

The updated safety warrant criteria for the 2009 HSIP is based on non-PVA reportable crashes occurring between 2004 and 2008 (1999 through 2008 for warrants requiring 10 years of data). The following warrants are intended to identify a specific crash type, pattern, or condition and the warrant name is typically used as the identifying moniker. All safety warrants are based on five years of crash data (unless specifically noted otherwise).

### ***Intersection Warrants***

#### Warrant I-1: Frontal Impact

Locations with a minimum of 25 total crashes AND a minimum of 50% of all crashes were frontal impact crashes AND a minimum of 25% of the total crashes occurred in the last 2 years. For the purposes of this warrant, a frontal impact crash is considered to be one of the following crash types:

- Angle
- Left Turn (same or different roads)
- Right Turn (same or different roads)
- Head On

#### Warrant I-2: Last Year Increase

Locations with a minimum of 25 total crashes AND a minimum of 35% of the total crashes occurred in the last year.

#### Warrant I-3: Frequency with a Severity Index Minimum

Locations with a minimum of 25 total crashes AND a minimum severity index of 6.0 AND a minimum of 40% of the total crashes occurred in the last 2 years.

#### Warrant I-4: Night Location

Locations with a minimum of 25% of the total crashes occurring in the last 2 years AND a minimum of 12 crashes occurring at night AND a minimum of 38% of the total crashes occurred at night.

#### Warrant I-5: Chronic Crossing Pattern

(NOTE – this warrant is only used if warrants I-1 through I-4 are not met)

(NOTE – this warrant is based on ten years of data)

Locations with a minimum of 20 crashes, 15% of the total crashes occurring in the last 3 years AND a minimum of 80% of the total crashes were crossing pattern crashes. For the purposes of this warrant, a crossing pattern crash is considered to be on the following crash types:

- All Left Turn
- Angle
- Head On

***Section Warrants***

For each valid warrant location, it is required that for the analysis period of 5 years, a minimum number of crashes and crashes/per mile rates are met. These minimum required values were defined by facility type as follows:

Facility Type	Minimum Total Crashes	Minimum Crashes/ Mile Rate
All Freeway Sections	30	60
US Non-Freeway Route	20	40
NC Non-Freeway Route	15	30
SR Non-Freeway Route	15	30
City Non-Freeway Street	20	40

For the purposes of warrants F-1, F-2, N-1 and N-2, a run off road (ROR) type crash is considered to be one of the following crash types:

- Run Off Road (right, left or straight)
- Fixed Object
- Overturn/Rollover

In addition, the following crash types are reviewed and may be considered as run off road crashes for the purpose of these warrants

- Sideswipe Opposite Direction
- Parked Motor Vehicle
- Head On

Currently, the animal crash type has been removed from the section warrant analysis to assist in identifying target crash locations. This is done because animal crashes, predominately deer crashes on rural routes, are not applicable to the current warrants. Eliminating these crashes helps to focus the attention on to crash locations that counter measures can be applied based upon the current warrants.

Warrant F-1: Run Off Road during Wet Road Conditions (Freeway)

Freeway locations that met the minimum total crash and crash rate for freeways AND a minimum of 45% of the total crashes were run off road crashes occurring during wet road conditions.

Warrant F-2: Run Off Road (Freeway)

Freeway locations that met the minimum total crash and crash rate for freeways AND a minimum of 70% of the total crashes were run off road crashes.

Warrant F-3: Wet Road Condition (Freeway)

Freeway locations that met the minimum total crash and crash rate for freeways AND a minimum of 55% of the total crashes occurred during wet road conditions.

Warrant F-4: Night Location (Freeway)

Freeway locations that met the minimum total crash and crash rate for freeways AND a minimum of 42% of the total crashes occurred during dark lighting conditions.

Warrant N-1: Run Off Road during Wet Road Conditions (Non-Freeway)

Non-freeway locations that met the minimum total crash and crash rate for the respective facility type AND a minimum of 35% of the total crashes were run off road crashes occurring during wet road conditions.

Warrant N-2: Run Off Road (Non-Freeway)

Non-freeway locations that met the minimum total crash and crash rate for the respective facility type AND a minimum of 60% of the total crashes were run off road crashes.

Warrant N-3: Wet Road Condition (Non-Freeway)

Non-freeway locations that met the minimum total crash and crash rate for the respective facility type AND a minimum of 45% of the total crashes occurred during wet road conditions.

Warrant N-4: Non-Intersection Night Location (Non-Freeway)

Non-freeway locations that met the minimum total crash and crash rate for the respective facility type AND a minimum of 40% of the total non-intersection crashes occurred during dark lighting conditions.

***Bicycle / Pedestrian Intersection Warrant***

Warrant BP-1: Chronic Location

Locations with a minimum of 5 crashes involving pedestrians or bicyclists reported in the last 10 years AND a minimum of 50% of all crashes involving pedestrians or bicyclists must have occurred in the last 5 years.