COLORADO
Department of Transportation
Office of the Chief Engineer

MOVING TOWARDS ZERO DEATHS

# Federal Highway Safety Improvement Program (HSIP)
# Local Agency Application (submit applications to Regional Traffic Engineer)

**Requesting Agency:** City of Loveland

**Submitted By:**

**Title:**

**Email:**

**Phone:**

**Date:** November 30, 2016

(All fields required unless otherwise noted)

1) **Location** (Road Number, Street, Milepost, etc.):

   Various on US 287, US 34, Colorado Hwy 402, Wilson Avenue, Taft Avenue (37 intersections total)

2) **Documented crash history** (if available, otherwise CDOT Crash Database will be used for evaluation using the most recent available three to five years of crash data):

   See attachments for; 5 year crash history and collision diagrams for each intersection

3) **Traffic volume counts** (All directions/approaches, if available):

   See spread sheet for all intersection locations, volume counts, crashes, and cost estimates per location.

4) **Description/Illustration of existing safety concern** (Photos Recommended):

   Placement and operation of left turn signals at signalized intersection. Five section (with arrows) and three section signal heads are over left turn lanes which is contrary to the latest MUTCD requirements for new construction. Crashes are predicted to be reduced using new head placements with proposed Flasing Yellow Arrow (FYA) operation. One CDOT location in Loveland was studied by Region IV (US 287/Colorado Hwy 402- CDOT Region IV Intersection Prioritization Study-2016) and recommended new signal head placements and FYA operation at a total cost (engineering and construction) of $170,000. The study estimate included construction of two new signal poles with longer mast arms for better left turn head placements over left turn lane allignments. This is one example of the safety concerns to be improved with this project. Another 36 locations to be modified will not require expensive signal pole/mast arm modifications. These locations will require removing left turn lane signal heads ( 5 section or 3 section) and replacing (or adding) FYA signal heads. See photos of Taft/14th Street SW and Wilson/14th Street for examples.

5) **Description/Illustration of proposed improvement and the extent to which it addresses the crash problem:**

The project will implement the use of FYA at 37 of Loveland's 93 signalized intersections on US Highways, CDOT Highways, and along 2 major city arterials to improve intersection safety by reducing crashes associated with left turns. Implementing the new requirements for left turn signal head placements by the Manual on Uniform Traffic Control Devices (MUTCD) and changing to flashing yellow arrow (FYA) operational strategy are being proposed to address left turn crash concerns. Existing five section signal head placements over left turn lanes (or 3 section heads over left turn lanes) are no longer acceptable as per the current MUTCD. FYA four section signal heads will be placed over left turn lanes and on the far side left signal pole lcoations to improve left turn safety. This project requests funding a comprehensive change-out to FYA along major Loveland corridors to inlcude; CDOT's US 34, US 287, and Colorado 402, plus the major city arterials including Wilson and Taft Avenues. In some cases the project will also change out 3 section heads(red-yellow-green ball) to 4 section FYA and place directly over left turn lanes. A third case installs FYA 4 section heads where there are no left turn indications existing for left turn lanes. Please see the photo of Wilson/14th Street SW as it shows examples of no signal head over eastbound left and the existing three section head over the n.b. left turn lane. According to the Crash Modification Clearing House, the proposed 4 section flashing yellow arrow signal heads over left turn lanes are clearly safer using FYA. This project will remove 5 section heads over left turn lanes, replace with 4 section heads for a change to using FYA. CMFs from this reference are as follows:

Category: Intesection Traffic Control

Countermeasure: Changing left turn phasing from protected-permissive to flashing yellow arrow (FYA)

| CMF | CRF(%) | Quality | Crash Type | Crash Severity | Roadway Type | Area Type |
|---|---|---|---|---|---|---|
| .922 | 7.8 | 4 stars | All | All | Not Specified | Urban |
| .806 | 19.4 | 4 stars | All | All | Not Specified | Urban |

The project proposed will place 4 section FYA heads for left turn lanes over the lane and on the far side left signal pole. Left turn crashes are clearly predicted to be reduced using FYA as per the above table and the MUTCD now requires specific signal head placements regarding signalized intersection left turns and phasing. This project will change the intersections' look and operate similarly to the intersection of Wilson/1st Street which already has the 4 section head configuration (see attached photo of this intersection and samples of intersections to be changed to FYA).

# Cost Estimate per Approach for FYA

| Item | Unit | Description | Unit Price | Quantity | Amount |
|---|---|---|---|---|---|
| 73 | Each | Removed Signal Head | $60.00 | 2 | $120.00 |
| 69 | Each | 4 Section FYA Head | $1,170.00 | 1 | $1,170.00 |
| 63 | Each | Vertical Side of Pole | $905.00 | 1 | $905.00 |
| - | Each | Conflict Monitor | $552.00 | 1 | $552.00 |
| 155 | Day | VMS Traffic Control | $840.00 | 0.5 | $420.00 |
| 160 | Day | Arrow Board | $135.00 | 0.5 | $67.50 |
| 161 | Day | Flagger | $480.00 | 0.5 | $240.00 |
| | | | | Sub Total | $3,474.50 |
| | | 15% Contingencies, Mobilization | | | $525.50 |
| | | | | **Total** | $4,000.00 |

| # of Directions | Cost |
|---|---|
| 1 | $4,000.00 |
| 2 | $7,500.00 |
| 4 | $14,500.00 |

# HSIP Project Application- Loveland Traffic Signals Left Turn - FYA

**November 30, 2016**

## Project Goal – Change to Flashing Yellow Arrow (FYA) Operations – Change 5 section left turn heads to 4 section FYA heads as shown below at the Wilson/1st Street intersection:

*Wilson Avenue/1st Street Northbound – Existing FYA intersection in Loveland. Note 4 section head placements,*

- **Example Photos below show of some of the 36 Intersections to be changed to FYA –** Some intersections need 5 section or 3 section heads removed from over left turn lanes and replaced with 4 section FYA heads. Other intersections need FYA heads installed where there are no signal heads over the left turn lane.



**Garfield/US 34 eastbound shows 5 section left turns over left turn lanes, contrary to the current MUTCD.**

**Taft/US 34 westbound shows 5 section signal heads over the middle of the left turn lanes on all approaches.**


**Taft Avenue/37th Street northbound approach shows 3 section heads over left turn lanes.**


**VanBuren/US 34 eastbound has no signal heads left turn lanes e/w and needs signal heads changed out n/s.**


**Wilson Ave/14th Street SW northbound has signal head over left turn and eastbound has no head over left turn lane.**

**US 287/Colorado Hwy 402 southbound shows 5 section head placement vs. CDOT Study recommended FYA countermeasure (for project phase 2) which requires new signal poles/longer mast arms for FYA 4 section heads.**