1. Orientation: The HSIP Program Website

2. Getting Started: The HSIP Implementation Guidelines
   • HSIP Process
   • Application Forms

3. Proposed Project Submissions: Highway Safety Program
   Proposed Safety Improvement Form
   • Benefit Cost Ratio Analysis Example
   • How to Submit

4. Q&A
1. The HSIP Program Website
VDOT HSIP Program Website

- Overview of HSIP Program
- Links to:
  - Supplemental information (MAP-21, new and active projects, Tableau, etc.)
  - HSIP Implementation Guidelines
  - HSIP Application Forms

Website: http://www.virginiadot.org/business/ted_app_pro.asp
The HSIP Program Website

Website: http://www.virginiadot.org/business/HSIP_Implementation_Manual_060315.docx

VDOT HSIP Program Website
• Links to:
  • HSIP Implementation Guidelines
Getting Started

2. The HSIP Implementation Guidelines
The Highway Safety Improvement Program (HSIP)

- Core program administered by FHWA Office of Safety
- Purpose is to reduce fatalities and serious injuries
- Requirements include development and implementation of a Strategic Highway Safety Plan (SHSP)
- VDOT’s Program consists of the following programs:
  - Highway Safety Program (HSP)
  - Bicycle and Pedestrian Safety Program (BPSP)
  - Highway-Rail Grade Crossing Safety Program (H-RGCP)
  - Local Agency Safety Program (LASP)
- Documented in VDOT’s HSIP Implementation Guidelines
- Administered by VDOT TED
HSIP projects must:

1. Be relevant to the program purpose of reducing severe crashes, or risks to transportation users.

2. Address hazardous situations through good safety planning and identified by safety data driven network screening.

3. Demonstrate compliance with the appropriate VDOT design guidelines and standards.

4. Upgrade non-standard safety features to existing standards, when those features are related to the targeted crashes identified within the work area of the engineering study (or Roadway Safety Assessment).
HSIP Overview

- HSIP funds are available for two types of projects:
  - Location-specific: supported by data on severe crashes
  - Systemic: locations where risk based analysis has demonstrated the need for low-cost, widely implemented countermeasures
HSIP Overview

- Proposed safety projects accepted through November 1
- HSIP allocations approved by FHWA in Statewide Transportation Improvement Program (STIP)
- Intent is proposals will be designed and constructed within 3 years
- Proposals should not require acquisition of right-of-way
HSIP Implementation Supporting Proposal Forms

**HSIP forms**

1. Highway Safety Program Proposed Safety Improvement Form (benefit/cost analysis)
2. Bicycle and Pedestrian Safety Program Proposed Safety Improvement Form (risk analysis)
3. Highway-Rail Grade Crossing Safety Program Proposed Safety Improvement Form (risk analysis)
4. *Highway Safety Program Proposed Systemic Safety Improvement Form (In Development)* (risk assessment methodology)
Highway Safety Program
Proposed Safety Improvement Form:
http://www.virginiadot.org/business/FY2016-17HSP_Proposal_Form.xls
HSIP Implementation Supporting Proposal Forms

VDOT HSIP Program
- Links to:
  - HSIP Proposal Forms

Bicycle and Pedestrian Safety Program
Proposed Safety Improvement Form:
http://www.virginiadot.org/business/FY2016-17BPS_Proposal_Form.xls
VDOT HSIP Program
• Links to:
  • HSIP Proposal Forms

Highway-Rail Grade Crossing Safety Program
Proposed Safety Improvement Form:
http://www.virginiadot.org/business/FY2016-17HRGC_Proposal_Form.xls
Systemic Improvements Proposal Form

- Currently in development
- Utilizes risk assessment methodology
- Links following:
  - Crash type
  - Risk factor
  - Improvement
Preliminary Engineering

• For selected safety proposals sponsor much ensure cost of project does not exceed submission cost

• Authorization requires:
  • Allocations programmed
  • Project phases must be in STIP/TIP
  • All agreements executed

Construction

• Scheduling and Contract Prepares construction and bid documents

Performance Measurement

• Monitor project schedule and cost
Highway Safety Program (HSP)

Primary Objective: Identify and improve locations where there is a high concentration, or risk, of vehicle crashes that result in deaths or injuries and to implement strategies to attain Virginia’s Towards Zero Deaths vision

• HSIP staff produces high, severe crash locations lists annually
• Employing advanced network screening using Highway Safety Manual
• Eligibility
  • Documented crashes
  • Risk assessment
  • Tied to SHSP emphasis area
• Ineligible projects
  • Bridge replacement
  • Automated enforcement
  • General maintenance
Benefit/Cost Analysis

Benefit-Cost (B/C) Ratio

- Result of B/C analysis
- Used to assess eligibility
- B/C greater than 1.0 required
Benefit/Cost Analysis

B/C Analysis Inputs

- Latest three years of crash history by type and severity
- Cost of each proposed improvement
  - Lifecycle cost
- Benefit of each improvement
  - Benefits derived from reduction in crashes
  - Calculated using Crash Modification Factors (CMFs)
  - CMF Clearinghouse (www.cmfcleaninghouse.org)
Benefit/Cost Analysis

Single or Multiple Improvements

• If a single proposed improvement, complete one B/C spreadsheet
• If multiple improvements, complete single or multiple spreadsheets
  • Do selected CMFs for each treatment apply to the same crash types and severities?
    – If no, use multiple spreadsheets
    – If yes, proceed to next question
  • Do the treatments target the same underlying safety issue?
    – If yes, use multiple spreadsheets if more than 3 proposed treatments
Bicycle and Pedestrian Safety Program (BPSP)

- Purpose is to evaluate proposals addressing non-motorized crashes and risks
- Proposals must encompass the following factors
  - Document the expected reduction in crashes
  - Address existing hazardous conditions
  - Demonstrate proposal will meet necessary VDOT design guidelines
  - Upgrade non-standard safety features to existing standards
Highway-Rail Grade Crossing Safety Program (H-RGCP)

Purpose to reduce risk and number of crashes involving trains at highway-rail grade crossings

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Project Type</th>
<th>County</th>
<th>Route (Include Name)</th>
<th>System (1)</th>
<th>Traffic Control</th>
<th>Frm/Mjr Road (HTRIS/RNS Node-Offset If Applicable)</th>
<th>To/Cross Rd/HTRIS/RNS Node-Offset If Applicable</th>
<th>Study Period Begins</th>
<th>Study Period Ends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail</td>
<td>Surface Improvement</td>
<td>Primary (P)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Functional Class Code**

**Area Location Code**

**Federal System Code**

**Fully Describe Project**

(Specific Location of Proposed Grade Crossing Improvement Project-Sketch/Map or Aerial Photos are required with all proposals)
Local Agency Safety Program

Eligibility Criteria

1. Has your locality administered a federal aid highway improvement project within the previous 5 years?
   - NO: Limited to maximum of 1 HSIP project (Project must progress to construction phase before additional funds will be considered)
   - YES: Proceed to next step

2. Does your locality have more than $5 million in HSIP funds allocated or 5 or more HSIP projects?
   - NO: Ineligible to request new HSIP project funds
   - YES: Proceed to next step

3. Are 70% of the HSIP project allocations authorized for construction at the time of application?
   - NO: Ineligible to request new HSIP project funds
   - YES: Proceed to next step

4. HSIP projects WITHOUT Right of Way must be authorized for construction within 18 months.
   - NO: Ineligible to request new HSIP project funds
   - YES: Proceed to next step

5. HSIP projects WITH Right of Way must be authorized for construction within 30 months.
   - NO: Ineligible to request new HSIP project funds
   - YES: Proceed to next step

6. Does your locality have 1 or more projects not meeting these schedule requirements?
   - NO: Ineligible to request new HSIP project funds
   - YES: AND...
Local Agency Safety Program

Eligibility Criteria (Cont.)

AND....

Does your locality have an HSIP project without expenditures for 12 months or more?

- **NO**
  - Eligible to request new HSIP project funds

- **YES**
  - Ineligible to request new HSIP project funds
3. Highway Safety Program
Proposed Safety Improvement
Form Example
Highway Safety Program Proposed Safety Improvement Form Example

**Agency:**
The name of the governmental agency, municipality, organization, citizen’s group or private individual who is proposing a safety improvement project.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Project Sponsor</th>
<th>Address</th>
<th>City</th>
<th>State</th>
<th>Zip</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDOT</td>
<td>VDOT CO</td>
<td>1401 E Broad Street</td>
<td>Richmond</td>
<td>VA</td>
<td>23219</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Email Address</th>
<th>Phone</th>
<th>Priority Number</th>
<th>State Milepoint</th>
<th>VDOT District</th>
<th>VDOT Region</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="mailto:HSIProgram@VirginiaDOT.org">HSIProgram@VirginiaDOT.org</a></td>
<td>804-786-6610</td>
<td>1</td>
<td>19.91</td>
<td>CO</td>
<td>Central</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Project Type</th>
<th>Functional Class Code</th>
<th>Area Location Code</th>
<th>Fed. Sys. Code</th>
<th>Study Period Begins</th>
<th>Study Period Ends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular</td>
<td>Intersection</td>
<td>Urban Minor Arterial</td>
<td>Small Urban (5,000 - 49,999)</td>
<td>NHS</td>
<td>1/1/2012</td>
<td>12/31/2014</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>County</th>
<th>Safety Proposal Location / Route</th>
<th>System</th>
<th>Traffic Control</th>
<th>From / Major Road</th>
<th>To / Cross Street</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chesterfield</td>
<td>W Hundred Rd and Old Bermuda Hund Rd/ SR00010 &amp; 2000618</td>
<td>Primary</td>
<td>Traffic Signal</td>
<td>203162</td>
<td>203162</td>
</tr>
</tbody>
</table>
**Highway Safety Program Proposed Safety Improvement Form Example**

Fill out the project information

<table>
<thead>
<tr>
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<td>23219</td>
</tr>
</tbody>
</table>

**Email Address**: HSIProgram@VirginiaDOT.org

**Phone**: 804-786-6610

**Priority Number**: 1

**State Milepoint**: 19.91

**VDOT District**: CO

**VDOT Region**: Central

**Program Type**: Regular

**Project Type**: Intersection

**Functional Class Code**: Urban Minor Arterial

**Area Location Code**: Small Urban (5,000 - 49,999)

**Fed. Sys. Code**: NHS

**Study Period Begins**: 1/1/2012

**Study Period Ends**: 12/31/2014

**County**: Chesterfield

**Safety Proposal Location / Route**: W Hundred Rd and Old Bermuda Hund Rd/ SR00010 & 2000618

**System**: Primary

**Traffic Control**: Traffic Signal

**From / Major Road**: 203162

**To / Cross Street**: 203162

*Project Sponsor:*
The name of the person representing the governmental agency, municipality, organization, citizen’s group or private individual who is proposing a safety improvement project.
### Contact Information:
The contact information for the person representing the governmental agency, municipality, organization, citizen’s group or private individual who is proposing a safety improvement project. Contact information includes the Address, City, State, Zip, Email, and Phone Number.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Project Sponsor</th>
<th>Address</th>
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<tr>
<td>VDOT</td>
<td>VDOT CD</td>
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*Include Name*
Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information

Priority Number:
If there are multiple proposals submitted by the same jurisdiction, use this field to identify the priority ranking number of each proposal.

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Highway Safety Program Proposed Safety Improvement Form Example

Fill out the project information

<table>
<thead>
<tr>
<th>General Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>This section defines the general location of the proposed work. Select from the dropdown menus to identify the VDOT District and Region.</td>
</tr>
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</table>

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<table>
<thead>
<tr>
<th>Agency</th>
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<td>CO</td>
<td>Central</td>
</tr>
</tbody>
</table>
```

Program Type: Regular
Project Type: Intersection
Functional Class Code: Urban Minor Arterial
Area Location Code: Small Urban (5,000 - 49,999)
Study Period Begins: 1/1/2012
Study Period Ends: 12/31/2014
System: Primary
Traffic Control: Traffic Signal
From / Major Road: 203162
To / Cross Street: 203162

(include Name)
General Project Description:
This section defines the general type of proposed work. Select from the dropdown menus to identify the Program Type and Project Type. The Program Type is defined as a “Regular” Highway Safety Improvement Program (HSIP), High Risk Rural Roads (HRRR), Strategically Targeted Affordable Roadway Solutions (STARS), or Corridors of Statewide Significance (COSS) project. The Project Type is defined as a Segment, Intersection, or Corridor project.
### Highway Safety Program Proposed Safety Improvement Form Example

#### Fill out the project information

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**Email Address**: HSIProgram@VirginiaDOT.org

**Phone**: 804-786-6610

**Priority Number**: 1

**State Milepoint**: 19.91

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**VDOT Region**: Central

**Program Type**: Regular

**Project Type**: Intersection

**Functional Class Code**: Urban Minor Arterial

**Area Location Code**: Small Urban (5,000 - 49,999)

**Fed. Sys. Code**: NHS

**Study Period Begins**: 1/1/2012

**Study Period Ends**: 12/31/2014

**County**: Chesterfield

**Safety Proposal Location / Route**: W Hundred Rd and Old Bermuda Hund Rd/ SR00010 & 2000618

**System**: Primary

**Traffic Control**: Traffic Signal

**From / Major Road**: 203162

**To / Cross Street**: 203162

---

**Roadway Description**: This section defines the type of roadway on which the proposed work is to be performed. Select from the dropdown menus to identify the Functional Class Code, Area Location Code, Federal System Code, System, and Traffic Control.
### Study Period:
This section defines the study period of the analysis. Identify the begin date of the study period under Study Period Begins. Identify the end date of the study period under Study Period Ends.

<table>
<thead>
<tr>
<th>Agency</th>
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<td>Email Address</td>
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<thead>
<tr>
<th>Program Type</th>
<th>Project Type</th>
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<th>Area Location Code</th>
<th>Fed. Sys. Code</th>
<th>Study Period Begins</th>
<th>Study Period Ends</th>
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<tbody>
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<td>NHS</td>
<td>1/1/2012</td>
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<tr>
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<td>System</td>
<td>Traffic Control</td>
<td>From / Major Road</td>
<td>To / Cross Street</td>
<td></td>
</tr>
<tr>
<td>Chesterfield</td>
<td>W Hundred Rd and Old Bermuda Hund Rd/ SR00010 &amp; 2000618</td>
<td>Primary</td>
<td>Traffic Signal</td>
<td>203162</td>
<td>203162</td>
<td></td>
</tr>
</tbody>
</table>
### Fill out the project information

**Specific Location:**
This section defines the specific location and limits of the proposed work. Identify the County, Safety Proposal Location/Route, From / Major Road, and To / Cross Street.

<table>
<thead>
<tr>
<th>County</th>
<th>Safety Proposal Location / Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chesterfield</td>
<td>W Hundred Rd and Old Bermuda Hund Rd/ SR00010 &amp; 2000618 (Include Name)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From / Major Road</th>
<th>To / Cross Street</th>
</tr>
</thead>
<tbody>
<tr>
<td>203162</td>
<td>203162</td>
</tr>
</tbody>
</table>
Highway Safety Program Proposed Safety Improvement Form Example

Step 1: Crash History (Define crashes by type and severity)
Highway Safety Program Proposed Safety Improvement Form Example

Step 1: Crash History (Define crashes by type and severity)

<table>
<thead>
<tr>
<th>Crash Type Categories</th>
<th>Total Crashes</th>
<th>All</th>
<th>Fatal (K)</th>
<th>Incapacitating Injury (A)</th>
<th>Minor Injury (B+C)</th>
<th>Property Damage (O)</th>
<th>Not specified</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>32</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>19</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Enter total crashes by crash severity
### Highway Safety Program Proposed Safety Improvement Form Example

#### Step 1: Crash History (Define crashes by type and severity)

<table>
<thead>
<tr>
<th>Crash Type Categories</th>
<th>Crash Severity</th>
<th>All</th>
<th>Fatal (K)</th>
<th>Incapacitating Injury (A)</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Crashes</td>
<td>All</td>
<td>32</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary Crash Categories (sum of all 3 must equal total crashes)</th>
<th>Roadway Departure or Intersection</th>
<th>All</th>
<th>Fatal (K)</th>
<th>Incapacitating Injury (A)</th>
<th>Minor</th>
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<tr>
<td>Cross median</td>
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<tr>
<td>Fixed object</td>
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<tr>
<td>Run off road</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Head on</td>
<td>0</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Non-Collision</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sideswipe</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Angle</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Left turn</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Right turn</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Rear end</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bicycle</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Highway Safety Program Proposed Safety Improvement Form Example

Step 1: Crash History (Define crashes by type and severity)

<table>
<thead>
<tr>
<th>Crash Type Categories</th>
<th>Crash Severity</th>
<th>All</th>
<th>Fatal (K)</th>
<th>Incapacitating Injury (A)</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Crashes</td>
<td></td>
<td>32</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*Note: The number of crashes in the primary crash category MUST equal the total crash summary.*

<table>
<thead>
<tr>
<th>Roadway Departure or Intersection</th>
<th>Crash Severity</th>
<th>All</th>
<th>Fatal (K)</th>
<th>Incapacitating Injury (A)</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross median</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fixed object</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Run off road</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Head on</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Non-Collision</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sideswipe</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Angle</td>
<td></td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Left turn</td>
<td></td>
<td>8</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Right turn</td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Rear end</td>
<td></td>
<td>16</td>
<td>0</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Non-Motorized</td>
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<td>0</td>
</tr>
<tr>
<td>Pedestrian</td>
<td></td>
<td>0</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Step 1: Crash History (Define crashes by type and severity)

Secondary Crash Types: The breakdown of crashes by secondary crash type is necessary because some crash modification factors (CMFs) apply to these crash types.

<table>
<thead>
<tr>
<th>Secondary Crash Categories</th>
<th>Nighttime</th>
<th>Wet weather</th>
<th>Single vehicle</th>
<th>Multiple vehicle</th>
<th>Speed related</th>
<th>Unbelted</th>
<th>Alcohol related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Factors</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Number of Vehicles</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Driver Behavior</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Step 2: Cost (Compute the economic cost of each improvement)

- The safety proposal must show the estimated project costs broken down by project phase (PE, R/W and Utilities, and Construction).
- Detailed and accurate cost estimates should utilize VDOT’s Project Cost Estimation System (PCES) worksheets.
- Project sponsors who do not have access to the PCES worksheets shall submit detailed costs with a descriptive reason for not using PCES. VDOT district local assistance staff will work with local jurisdictions to ensure project cost estimates are consistent with PCES.

<table>
<thead>
<tr>
<th>Proposed Improvement</th>
<th>Service Life</th>
<th>PE Cost + $5000(*)</th>
<th>Right-of-Way &amp; Utility Cost</th>
<th>Construction Cost</th>
<th>Total Construction Cost (PV)</th>
<th>Contingency (10%)</th>
<th>Annual Maintenance</th>
<th>Maintenance Cost (PV)</th>
<th>Total Cost (PV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Install traffic signal</td>
<td>20</td>
<td>$15,000</td>
<td>$5,000</td>
<td>$250,000</td>
<td>$270,000</td>
<td>$25,000</td>
<td>$1,500</td>
<td>$22,316</td>
<td>$317,316</td>
</tr>
<tr>
<td>2. Install left-turn lane</td>
<td>20</td>
<td>$10,000</td>
<td>$20,000</td>
<td>$100,000</td>
<td>$130,000</td>
<td>$10,000</td>
<td>$0</td>
<td>$0</td>
<td>$140,000</td>
</tr>
<tr>
<td>3. Install roundabout</td>
<td>20</td>
<td>$50,000</td>
<td>$100,000</td>
<td>$1,250,000</td>
<td>$1,400,000</td>
<td>$125,000</td>
<td>$0</td>
<td>$0</td>
<td>$1,525,000</td>
</tr>
</tbody>
</table>
Highway Safety Program Proposed Safety Improvement Form Example

Step 2: Cost (Compute the economic cost of each improvement)

Enter:
- PE Cost +$5000
- Right-of-Way & Utility Cost
- Construction Cost

<table>
<thead>
<tr>
<th>Proposed Improvement</th>
<th>Service Life</th>
<th>PE Cost + $5000</th>
<th>Right-of-Way &amp; Utility Cost</th>
<th>Construction Cost</th>
<th>Total Construction Cost (PV)</th>
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<th>Total Cost (PV)</th>
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<td>$130,000</td>
<td>$10,000</td>
<td>$0</td>
<td>$0</td>
<td>$140,000</td>
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<tr>
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<td>$100,000</td>
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<td>$1,400,000</td>
<td>$125,000</td>
<td>$0</td>
<td>$0</td>
<td>$1,525,000</td>
</tr>
</tbody>
</table>
Highway Safety Program Proposed Safety Improvement Form Example

Step 2: Cost (Compute the economic cost of each improvement)

Enter:
• Service Life
• Annual Maintenance

Note: Refer to Service Life and Maintenance & Utility Costs tabs

<table>
<thead>
<tr>
<th>Proposed Improvement</th>
<th>Service Life</th>
<th>PE Cost + $5000[^]</th>
<th>Right-of-Way &amp; Utility Cost</th>
<th>Construction Cost</th>
<th>Total Construction Cost (PV)</th>
<th>Contingency (10%)</th>
<th>Annual Maintenance</th>
<th>Maintenance Cost (PV)</th>
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<td>$1,500</td>
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<td>$130,000</td>
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<td>$100,000</td>
<td>$1,250,000</td>
<td>$1,400,000</td>
<td>$125,000</td>
<td>$0</td>
<td>$0</td>
<td>$1,525,000</td>
</tr>
</tbody>
</table>
Highway Safety Program Proposed Safety Improvement Form Example

Step 2: Cost (Compute the economic cost of each improvement)

Enter:
- Service Life
- Annual Maintenance

Note: Refer to Service Life and Maintenance & Utility Costs tabs
### Highway Safety Program Proposed Safety Improvement Form Example

#### Step 3: Benefit (Compute the economic benefit of each improvement)

<table>
<thead>
<tr>
<th>Proposed Improvement</th>
<th>CMF Value</th>
<th>Applicable Crash Type</th>
<th>Applicable Crash Severity Type</th>
<th>Include CMF in Final Analysis? (Yes/No)</th>
<th>Reference Link to CMF ID from CMF Clearinghouse</th>
<th>Other Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Install traffic signal</td>
<td>0.23</td>
<td>Angle</td>
<td>All</td>
<td>Yes</td>
<td><a href="http://www.cmfclearinghouse.org/detail.cfm">http://www.cmfclearinghouse.org/detail.cfm?</a></td>
<td>Applies to rural intersections</td>
</tr>
<tr>
<td></td>
<td>0.4</td>
<td>Left turn</td>
<td>All</td>
<td>Yes</td>
<td><a href="http://www.cmfclearinghouse.org/detail.cfm">http://www.cmfclearinghouse.org/detail.cfm?</a></td>
<td>Applies to rural intersections</td>
</tr>
<tr>
<td></td>
<td>1.58</td>
<td>Rear end</td>
<td>All</td>
<td>Yes</td>
<td><a href="http://www.cmfclearinghouse.org/detail.cfm">http://www.cmfclearinghouse.org/detail.cfm?</a></td>
<td>Applies to rural intersections</td>
</tr>
<tr>
<td>2. Install left-turn lane</td>
<td>0.52</td>
<td>All</td>
<td>All</td>
<td>Yes</td>
<td><a href="http://www.cmfclearinghouse.org/detail.cfm">http://www.cmfclearinghouse.org/detail.cfm?</a></td>
<td>Applies to rural intersections</td>
</tr>
<tr>
<td></td>
<td>0.42</td>
<td>All</td>
<td>K, A, B+C</td>
<td>Yes</td>
<td><a href="http://www.cmfclearinghouse.org/detail.cfm">http://www.cmfclearinghouse.org/detail.cfm?</a></td>
<td>Applies to rural intersections</td>
</tr>
<tr>
<td>3. Install roundabout</td>
<td>0.29</td>
<td>All</td>
<td>All</td>
<td>Yes</td>
<td><a href="http://www.cmfclearinghouse.org/detail.cfm">http://www.cmfclearinghouse.org/detail.cfm?</a></td>
<td>Applies to rural intersections</td>
</tr>
<tr>
<td></td>
<td>0.13</td>
<td>All</td>
<td>A, B+C</td>
<td>Yes</td>
<td><a href="http://www.cmfclearinghouse.org/detail.cfm">http://www.cmfclearinghouse.org/detail.cfm?</a></td>
<td>Applies to rural intersections</td>
</tr>
</tbody>
</table>
Step 3: Benefit (Compute the economic benefit of each improvement)

- Single vs. Multiple Improvements
- Multiple improvements for the same location:
  1. Do the selected CMFs for each treatment apply to the same crash types and severities?
  2. Do the treatments target the same underlying safety issue?
Step 3: Benefit (Compute the economic benefit of each improvement)

Example: There are multiple proposed treatments for a single location, including the addition of four-foot paved shoulders and the installation of shoulder rumble strips.

Multiple improvements for the same location:

1. Do the selected CMFs for each treatment apply to the same crash types and severities? Yes. One can assume that both CMFs apply to all crash types and severities.

2. Do the treatments target the same underlying safety issue? Yes. As paved shoulders and shoulder rumble strips can both help to address run-off-road crashes.

Since there are only two proposed treatments, a single spreadsheet can be used, recognizing that the B/C ratio may be slightly inflated because the two proposed treatments address similar safety issues.
**Highway Safety Program Proposed Safety Improvement Form Example**

**Step 3: Benefit (Compute the economic benefit of each improvement)**

From CMF Clearinghouse Enter:
- CMF Value
- Applicable Crash Type
- Applicable Crash Severity Type
- Reference Link
- Other Notes

<table>
<thead>
<tr>
<th>Proposed Improvement</th>
<th>CMF Value</th>
<th>Applicable Crash Type</th>
<th>Applicable Crash Severity Type</th>
<th>Include CMF in Final Analysis? (Yes/No)</th>
<th>Reference Link to CMF ID from CMF Clearinghouse</th>
</tr>
</thead>
</table>
| 1. Install traffic signal | 0.23 | Angle | All | Yes | [http://www.cmfclearinghouse.org/detail.cfm?](http://www.cmfclearinghouse.org/detail.cfm?| Applies to rural intersections
| 0.4 | Left turn | All | Yes | [http://www.cmfclearinghouse.org/detail.cfm?](http://www.cmfclearinghouse.org/detail.cfm? | Applies to rural intersections
| 1.58 | Rear end | All | Yes | [http://www.cmfclearinghouse.org/detail.cfm?](http://www.cmfclearinghouse.org/detail.cfm? | Applies to rural intersections
| 2. Install left-turn lane | 0.52 | All | All | Yes | [http://www.cmfclearinghouse.org/detail.cfm?](http://www.cmfclearinghouse.org/detail.cfm? | Applies to rural intersections
| 0.42 | All | K, A, B+C | Yes | [http://www.cmfclearinghouse.org/detail.cfm?](http://www.cmfclearinghouse.org/detail.cfm? | Applies to rural intersections
Highway Safety Program Proposed Safety Improvement Form Example

Step 4: B/C Ratio (Compute the B/C ratio for specific combinations of CMFs)

Decide whether to include proposed improvement in B/C Analysis (Yes/No)
The spreadsheet can be used to compare the B/C ratio for various combinations of improvements to determine the most cost-effective combination.

Note that VDOT District and Central Office personnel charge review and administration time to projects managed by localities. Safety Projects not managed by VDOT shall include a minimum of $5,000 for VDOT PE costs.
Highway Safety Program Proposed Safety Improvement Form Example

**Project Schedule**

- To be completed, if applicable, after STIP approval.
- Note: The Begin PE date should be set no earlier than October 1st of the first year to allow for FHWA STIP approval and project authorization to begin. With this start, the advertisement date should be within 12 months but shall not be any later than January of the second year for projects added to the current fiscal year. The completion date of a project should not be any later than January of the fourth year. In other words, a project will be advertised in two years and completed in three years from STIP approval at the latest. The project sponsor and project manager are responsible for coordinating the proposal schedule.

**Signature of Sponsor**

Submission Information

Please submit an electronic copy of this spreadsheet and a scanned digital copy with signature to HSIProgram@virginia dot org. Paper copies of reference materials may be mailed Attn: HSP BCR Improvement Proposal Mr. Raymond Khoury, P.E., State Traffic Engineer, Virginia Department of Transportation 1401 East Broad Street, Richmond, Virginia 23219.
Submission Requirements:

1. Must use the latest HSP or Systemic Safety Improvement Proposal Form.
2. Must be received in VDOT’s Traffic Engineering office by November 1st.
3. Must be renamed HSP_YEAR_”Physical Jurisdiction”_Project##.xls
4. Must be submitted both as:
   a) An electronic version with the email title format “HSP_YEAR_”Safety Partner Name”_Project Proposal(s)” to HSIProgram@VirginiaDOT.org
   b) As a signed hardcopy to: Attn: HSP BCR Improvement Proposal Mr. Raymond Khoury, P.E., State Traffic Engineer, Virginia Department of Transportation 1401 East Broad Street, Richmond, Virginia 23219
Highway Safety Program Proposed Safety Improvement Form Example

• Submitting the proposal:
  ✔ 1. Used the latest HSP Proposal Form.
  ✔ 2. Renamed proposal form “HSP_2017_Chesterfield County_Project01.xls”
  ✔ 3. Submitted the following to VDOT’s Traffic Engineering office by November 1st:
     ✔ a) Electronic version of HSP form with email titled “HSP_2017_Richmond District_Project Proposals” to HSIProgram@VirginiaDOT.org
     ✔ b) Signed hardcopy of HSP form to: Attn: HSP BCR Improvement Proposal

Mr. Raymond Khoury, P.E.,
State Traffic Engineer,
Virginia Department of Transportation
1401 East Broad Street,
Richmond, Virginia 23219
Questions?