FHWA Approval for Programmatic Exception to Standards (PES) on STH 3R Projects

FHWA has approved, subject to the conditions contained in this document, WisDOT's use of Programmatic Exception to Standards (PES) - as justified by a specially defined Safety Screening Analysis (SSA) - for eligible sub-standard controlling criteria (see Table A4.1 below). The PES applies to 3R projects in the Department's existing highway program where the work type is Resurfacing, Pavement Replacement or Reconditioning and which can be screened by WisDOT's Metamanager Safety Module - including projects on or off the National Highway System in rural or urban areas; including Expressways, Freeways and Interstate Highways.

A PES applies to a road segment:

- If existing eligible sub-standard controlling criteria in that road segment are not contributing to safety investigation flags identified by the SSA in that road segment, or
- If a road segment contains eligible sub-standard controlling criteria, but the SSA does not identify an investigation flag in that road segment

A Programmatic Exception to Standards (PES) differs from an Exception to Standards (ES) described in FDM 11-1-2. An ES applies to any type of project and all controlling criteria. An ES requires a detailed analysis of the safety aspects of a section of highway as well as a benefit/cost analysis for upgrading any substandard feature. An ES can be used to justify the retention of existing substandard controlling criteria, or to justify the introduction of new substandard controlling criteria.

A Programmatic Exception to Standards (PES) applies if it meets the conditions for its use. A PES allows the retention of existing eligible sub-standard controlling criteria. However, a PES does not allow worsening of sub-standard controlling criteria, or allow the introduction of new substandard controlling criteria. These would require an exception to standards (ES) as described in FDM 11-1-2.

Road segments with sub-standard controlling criteria that do not meet the conditions for a PES must be improved to meet the requirements of the applicable 3R design standard unless there is approved ES per FDM 11-1-2.

Benefits

The main benefit of a PES is that it eliminates the need to fix sub-standard controlling criteria if they have not contributed to crashes. These segments also do not require an exception to standards for substandard controlling criteria because they are covered by the PES.

Using the SSA and PES approach on 3R projects offers several advantages.

- It provides a uniform and formal approach for analyzing the safety aspects of a segment of highway.
- It identifies those highway segments that really need geometric improvements for safety reasons. These can be programmed separately and given higher priority. The use of this process results in projects and segments of projects with potential safety concerns to be identified earlier in the Programming and Facilities Development Process when cost, schedule, and program impacts can be more accurately predicted. High crash projects or segments can be rescheduled or programmed separately if extensive reconstruction or right of way is required.
- It allows more accurate estimates of cost, time and program impacts
- It reduces design time and costs.

Safety Screening Analysis

All resurfacing, pavement replacement and reconditioning projects will be screened using the Metamanager Safety Module. Project-level safety data is extracted from the overall Metamanager Safety dataset. Project segments are identified with an "investigation flag" when their 5-year average crash rate or the KAB (i.e., sum of fatal, A-level and B-level injury crashes) crash rate is greater than one standard deviation above the mean for similar roadways. A more detailed crash analysis is completed for those project segments with investigation flags to validate the Metamanager Safety data and identify where substandard roadway features contributed to the crashes based on engineering judgment. The investigation flag will remain if the substandard geometric feature contributed to the crashes that resulted in the investigation flag.

Cost Data

It has been determined that it would not be cost effective to upgrade eligible substandard controlling criteria on highway segments that meet the conditions for a PES. Therefore, it will not be necessary to evaluate the cost for these upgrades.

Other Adverse Upgrading Impacts

In many cases, other impacts to the man-made or natural environment may result from rebuilding a section of roadway to correct an eligible substandard controlling criteria. These will typically be filling wetlands, relocating homes and businesses, removing agricultural lands from production, loss of wildlife habitat, destruction of archeological and historic resources etc. Additional discussion of impacts pertinent to individual projects may be described in the project environmental document or design study report.

Design Standards

WisDOT's design standards for 3R projects are primarily in chapter 11 of WisDOT's Facilities Development Manual (FDM), and include design criteria for roadway segments that meet the conditions for a Programmatic Exception to Standards (PES), as well as for roadway segments that do NOT meet the conditions for a PES:

- FDM 11-40-1 - General 3R Requirements for Highways other than Interstates
- FDM 11-40-4 - Application of Safety Screening Analysis (SSA) For Programmatic Exception to Standards (PES)
- FDM 11-40-8 - Design Criteria for 3R Projects on Expressways and Freeways (Non-Interstate)
- FDM 11-44-1 - Design criteria for 3R projects on Interstate highways.

WisDOT 3R design standards apply to both NHS and non-NHS routes unless specifically noted otherwise.

A PES only applies to eligible controlling criteria Table A4.1 shows eligible controlling criteria. Some eligible controlling criteria have conditions or a minimum standard that might not allow retaining the existing.

Table A4.1 Controlling Criteria Eligibility for PES

Controlling Criteria	Non-expressway / Non-freeway non-NHS	Non-expressway / Non-freeway NHS	Expressway / Non-Interstate freeway	Interstate freeway
Design Speed	N	N	N	N
Lane width on Federally designated long truck routes (i.e. the "National Network" as defined in 23 CFR Part 658))	N	N	N	N
Lane Width (except on Federally designated long truck routes)	E	C_1	N	N
Pavement Cross Slope	C_2	C_2	N	N
Shoulder Width	E	E	C_3	N
Horizontal Clearance: lateral clearance	C_4	C_4	N	N
Horizontal Alignment	E	E	E	E
Superelevation	E	C_5	C_5	N
Vertical Alignment	E	E	E	E
Grades	E	E	E	E
Stopping Sight Distance	E	E	E	E
Bridge Width	N*	N*	N*	N*
Vertical Clearance	N*	N*	N*	N*
Horizontal Clearance: lateral underclearance to structure	N*	N*	N*	N*
Structural Capacity	N*	N*	N*	N*

Table Notes

N = NOT Eligible for PES. An approved ES per FDM 11-1-2 is needed to retain existing substandard controlling criteria.

* Structure-related controlling criteria –bridge width (aka clear roadway width of structure), vertical clearance, lateral under clearance to structure, and structural capacity - are not eligible for a PES. Structures are generally evaluated on the basis of functionality and condition. In other words, safety is not the only consideration. In addition, 3R guidance already allows the option of deferring the replacement or rehabilitation of structurally deficient or functionally obsolete structures to the current Six-Year Highway Improvement Program.

E = Eligible for PES

$C_{\#}$ = Eligible for PES - but with conditions or a minimum standard that might not allow retaining the existing

C_1 Lane Width (NHS): Through-lane width is the greater of existing or 11-feet; turn-lane width is the greater of existing or 10-feet

C_2 Pavement Cross slope (NHS and non-NHS): For all projects, improve pavement cross-slopes as much as possible, even if not corrected to equal the current standards. Provide a pavement cross slope on tangent sections that is equal to existing, except:

- NOT less than 1.5%, and
- NOT greater than 3.0%, and
- The rollover rate between adjacent travel lanes cannot exceed 5%.

C_3 Shoulder Width (Expressway / Non-Interstate freeway): the greater of existing or the minimum required paved shoulder width per FDM 11-15 Attachment 1.5., except freeway shoulders with a

requirement of 12-feet may be the greater of existing or 10-feet.

C_4 Horizontal Clearance: lateral clearance (NHS and non-NHS):

1. For rural highways, desirable Lateral Clearance is as shown in FDM 11-15 Table 1.1. Minimum Lateral Clearance width is equal to shoulder width (i.e., does not encroach into roadway), but not less than existing.
2. For urban and suburban roadways with shoulders, desirable Lateral Clearance is as shown in FDM 11-15 Table 1.1. Minimum Lateral Clearance width is equal to shoulder width (i.e., does not encroach into roadway), but not less than existing.
3. For roadways with curbs, desirable lateral Clearance width is 2.0-feet measured from face of curb, but not less than existing. Minimum Lateral Clearance width is 0.0-feet measured from face of curb (i.e., does not encroach into roadway), but not less than existing.

C_5 Superelevation (NHS and Expressway / Non-Interstate freeway): Improve as closely as practical to the appropriate rate for new construction.

Other Design Criteria

A PES only applies to eligible controlling criteria, as noted. Otherwise, 3R design criteria in FDM 11-40-1, FDM 11-40-6, FDM 11-40-8, FDM 11-44-1 and other FDM sections apply. This includes non-geometric requirements such as roadside hazard analysis, roadside barrier, signing and marking, etc.

Non-Geometric Safety Enhancements

Provide appropriate low cost safety enhancements and countermeasures as shown in FDM 11-40, Attachment 1.1 (or other approved source)

- At locations where an identified Investigation Flag has not been addressed
- At locations identified as having high-risk roadway features correlated with specific severe crash types, i.e., a systemic approach to safety.

Documentation

Design Study Report (DSR) documentation for 3R projects on which PES and SSA apply is the same as for other 3R projects per FDM 3-15-25, except:

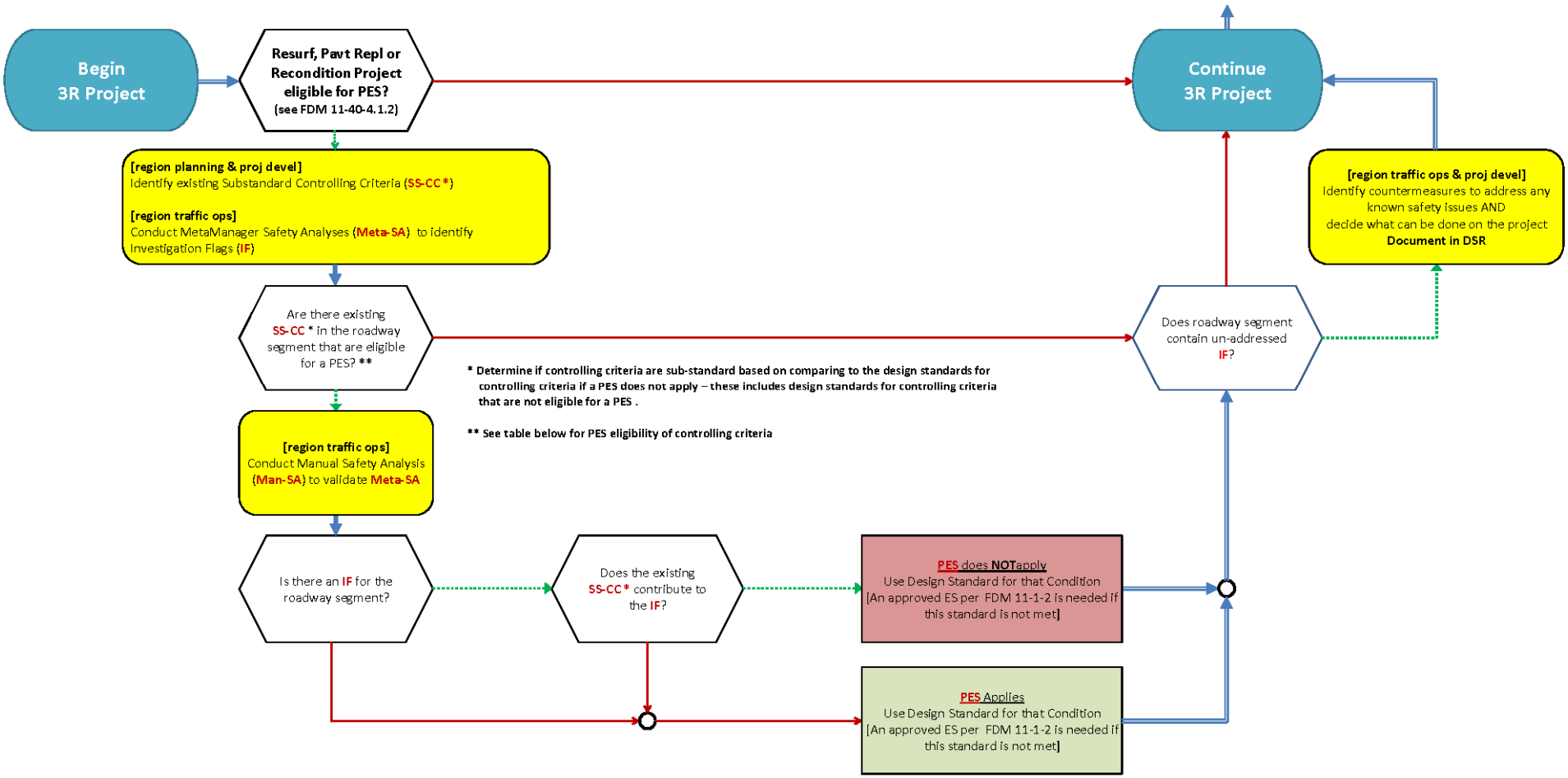
- Attach the Safety Screening Analysis worksheets.
- identify locations and sub-standard controlling criteria to which PES applies
- Discuss safety countermeasures used

Provide the above documentation to FHWA for “Projects of Corporate Interest” (PoCI), and for “Project of Division Interest” (PoDI) (see FDM 11-1-2.4 and FDM 5-2-1).

Concurrence

We concur with this Programmatic Exceptions to Standards Process.

FHWA date WisDOT date



LEGEND

SS-CC	Substandard Controlling Criteria (perr FDM 11-1-2)
Meta-SA	MetaManager Safety Analysis
Man-SA	Manual Safety Analysis
IF	Invetigation Flag
PES	Programmatic Exception to Standards
ES	Exception to Standards
⇢	YES
→	NO
⇉	Continue on Flowchart

Controlling Criteria	Non-expressway / Non-freeway non-NHS	Non-expressway / Non-freeway NHS	Expressway / Non-Interstate freeway	Interstate freeway
Design Speed	N	N	N	N
Lane width on Federally designated long truck routes (i.e. the "National Network" as defined in 23 CFR Part 658))	N	N	N	N
Lane Width (except on Federally designated long truck routes)	E	C	N	N
Pavement Cross Slope	C	C	N	N
Shoulder Width	E	E	C	N
Horizontal Clearance: lateral clearance	C	C	N	N
Horizontal Alignment	E	E	E	E
Superelevation	E	C	C	N
Vertical Alignment	E	E	E	E
Grades	E	E	E	E
Stopping Sight Distance	E	E	E	E
Bridge Width	N	N	N	N
Vertical Clearance	N	N	N	N
Horizontal Clearance: lateral underclearance to structure	N	N	N	N
Structural Capacity	N	N	N	N

Key
N = NOT Eligible for PES – An approved ES per FDM 11-1-2 is needed to retain existing substandard controlling criteria
E = Eligible for PES
C = Eligible for PES - but with conditions or a minimum standard that might not allow retaining the existing (see FDM 11-40, Attachment 4.1, Table A4.1)

Controlling Criteria Deficiency Analysis Interim Worksheet

(Use link for a working copy of this worksheet: FDM 11-40-4 A3 xlsx1)

Controlling Criteria Deficiency Analysis Worksheet

Project ID:	
Highway:	
Project Limits:	
Project Description:	

col. No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
source						list an p.2	list an p.2	list an p.2	list an p.2			FDM 11-40-6 11-20-1, 11-15-1	FDM 11-40, 11-44 11-10, 11-15		see Att. 4.1, Table A4.1	IMPORT FROM SSA WORKSHEET col. (16)	FDM 11-40, 11-44			
destination						EXPORT TO SSA WORKSHEET col. (12)								EXPORT TO SSA WORKSHEET col. (10)	EXPORT TO SSA WORKSHEET col. (11)					
notes		add proj. sta if known		add proj. sta if known		see FDM 11-1-2								i.e., Does col. (11) existing meet col. (13) Standard? No - PES or ES not needed Yes - SS-CC	Yes - eligible for PES (use SSA to determine if PES applies) No - upgrade to col. (13) std or ES		NA if col. (14) - No NA if col. (15) - No NA if col. (16) - No, i.e., SSA determines that PES does not apply - upgrade to col. (13) std or ES	i.e., Does col. (11) existing need to be upgraded to meet col. (17) Standard? NA if col. (17) shows NA No - PES applies - existing OK Yes - PES applies - but upgrade to col. (17) std or ES		
Heading:	PDP ID	From RP (Proj. Sta)	RP Description	To RP (Proj. Sta)	Length	Controlling Criteria	Controlling Criteria Design Element	unit	Min. or Max?	Describe Existing Condition	Existing dimension	Design Classification	3R Design Standard if a PES Does Not Apply	Is existing SS-CC substandard? (Yes / No)	Is SS-CC eligible for a PES? (Yes / No)	Does a PES apply? (Yes/No)	3R Design Standard if a PES Applies	Does existing dimension need to be upgraded to meet std. in col. (17)? (Yes / No)	Proposed	Comments

Controlling Criteria Design Element	Controlling Criteria	unit	Speed related	Structure related	Cross-Section related	Alignment related	MAX or MIN?
Design Speed	Design Speed	mph	YES				MIN
Posted Speed	*Design Speed related*	mph	YES				NA
Lane Width-Auxiliary Lane	Lane Width	feet			YES		MIN
Lane Width-Climbing Lane/Passing Lane	Lane Width	feet			YES		MIN
Lane Width-Ramp	Lane Width	feet			YES		MIN
Lane Width-Travel Lane	Lane Width	feet			YES		MIN
Lane Width-Turn Lane	Lane Width	feet			YES		MIN
Lane Width-Turn Lane-TWLTL	Lane Width	feet			YES		MIN
Offset to curb face-from Auxilary Lane	Shoulder Width	feet			YES		MIN
Offset to curb face-from Ramp	Shoulder Width	feet			YES		MIN
Offset to curb face-from Travel Lane-median-side	Shoulder Width	feet			YES		MIN
Offset to curb face-from Travel Lane-outside	Shoulder Width	feet			YES		MIN
Offset to curb face-from Turn Lane	Shoulder Width	feet			YES		MIN
Shoulder Width-adjacent to Auxilary Lane	Shoulder Width	feet			YES		MIN
Shoulder Width-adjacent to Climbing Lane/Passing Lane	Shoulder Width	feet			YES		MIN
Shoulder Width-adjacent to Ramp	Shoulder Width	feet			YES		MIN
Shoulder Width-adjacent to Travel Lane-median-side	Shoulder Width	feet			YES		MIN
Shoulder Width-adjacent to Travel Lane-outside	Shoulder Width	feet			YES		MIN
Shoulder Width-adjacent to Turn Lane	Shoulder Width	feet			YES		MIN
Horizontal Curve Radius-Rmin	Horizontal Curve Radius	feet	YES			YES	MIN
Horizontal Curve Radius-PI Deflection-No Curve-Posted Speed	Horizontal Curve Radius	degrees	YES			YES	MAX
Superelevation Rate-e-max-table	Superelevation Rate	text	YES		YES	YES	NA
Superelevation Rate-minimum-for-R-and-speed	Superelevation Rate	percent	YES		YES	YES	MIN
Superelevation Rate-maximum	Superelevation Rate	percent	YES		YES	YES	MAX
Maximum Grade-intersection-reconstr-appr	Maximum Grade	percent	YES			YES	MAX
Maximum-level terrain	Maximum Grade	percent	YES			YES	MAX
Maximum-rolling terrain	Maximum Grade	percent	YES			YES	MAX
Stopping Sight Distance-Crest Vertical Curve	Stopping Sight Distance	feet	YES			YES	MIN
Stopping Sight Distance-Horizontal Curve	Stopping Sight Distance	feet	YES			YES	MIN
Stopping Sight Distance-thru undercrossing	Stopping Sight Distance	feet	YES			YES	MIN
Cross Slope-break at crown-maximum	Cross Slope	percent			YES		MAX
Cross Slope-break at shoulder-maximum	Cross Slope	percent			YES		MAX
Cross Slope-Lane-maximum	Cross Slope	percent			YES		MAX
Cross Slope-Lane-minimum-existing-ACP	Cross Slope	percent			YES		MIN
Cross Slope-Lane-minimum-existing-PCCP	Cross Slope	percent			YES		MIN
Vertical Clearance-remain-over-hwy-to-interch-str	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-remain-over-hwy-to-non-interch-str-or-to-RR-str	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-remain-over-hwy-to-ped/sh-use-str	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-remain-over-hwy-to-sign-str	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-remain-over-RR	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-replace-over-hwy-to-interch-str	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-replace-over-hwy-to-non-interch-str-or-to-RR-str	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-replace-over-hwy-to-ped/sh-use-str	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-replace-over-hwy-to-sign-str	Vertical Clearance	feet		YES	YES		MIN
Vertical Clearance-replace-over-RR	Vertical Clearance	feet		YES	YES		MIN
Design Loading Structural Capacity	Design Loading Structural Capacity	loading		YES			MIN

Safety Screening Analysis Interim Worksheet

(Use link for a working copy of this worksheet: FDM 11-40-4 A4 xlsx1)

Safety Screening Analysis Worksheet

Project ID:	
Highway:	
Project Limits:	
Project Description:	

	Conduct Meta-Manager Safety Analysis (Meta-SA) to Identify Investigation Flags (IF)												**Conduct Manual Safety Analysis to validate Meta-Manager Safety Analysis**					
col. No.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
source			(From STM Log)		PDP_Mile in Meta-Manager	RATEFLAG in Meta-Manager	MMGR_KAB_CRSH_RT from Meta-Manager	RORFLAG or INTFLAG or 'CRSHSPOT' from Meta-Manager		(pull from col. 14 in SS-CC worksheet)	(pull from col. 15 in SS-CC worksheet)	(pull from col. 6 in SS-CC worksheet)						
destination																Export to SS-CC worksheet		
notes						(Insert value if ≥ 1.0, otherwise leave blank)	(Insert value if ≥ 1.0, otherwise leave blank)	(Insert value(s) if ≥ 1.0, otherwise leave blank)										
Heading:	PDP ID	From RP	RP Description	To RP	Length	Crash Rate Flag	KAB Crash Rate Flag	Possible Contributing Factors	Did Meta-Manager generate Investigation Flag? (Yes / No)	Are there existing SS-CC in the roadway segment?	Is SS-CC eligible for PES?	Which SS-CC Exist?	If Crash Rate Flag or KAB Crash Rate Flag ≥ 1.0, was the flag verified? (Yes / No / N/A)	What are possible causes of the crash trend?	Does the existing SS-CC Contribute to the Investigation	Does PES Apply? (Yes / No / N/A)	Does roadway segment contain un-addressed Investigation Flags? (Yes / No)	Screening Recommendation