

CIMA+ Partners in excellence

Red Hill Valley Parkway Safety Review
Progress Meeting



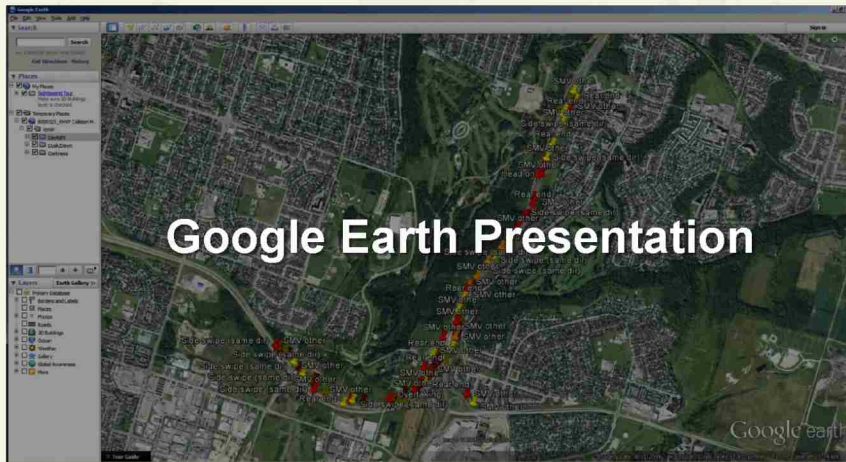
Outline

- **Analysis Results and Findings**
 - A. Collisions
 - B. Illumination
 - C. Signing
 - D. Lane Departure Collisions
 - E. Roadside Design
 - F. Mud Street On-Ramp (Ramp 6): Link-Bound
 - G. Geometrics (Field Investigation Findings Only)
- **Summary of Issues & Potential Countermeasures**
- **Next Steps**

A. Collisions

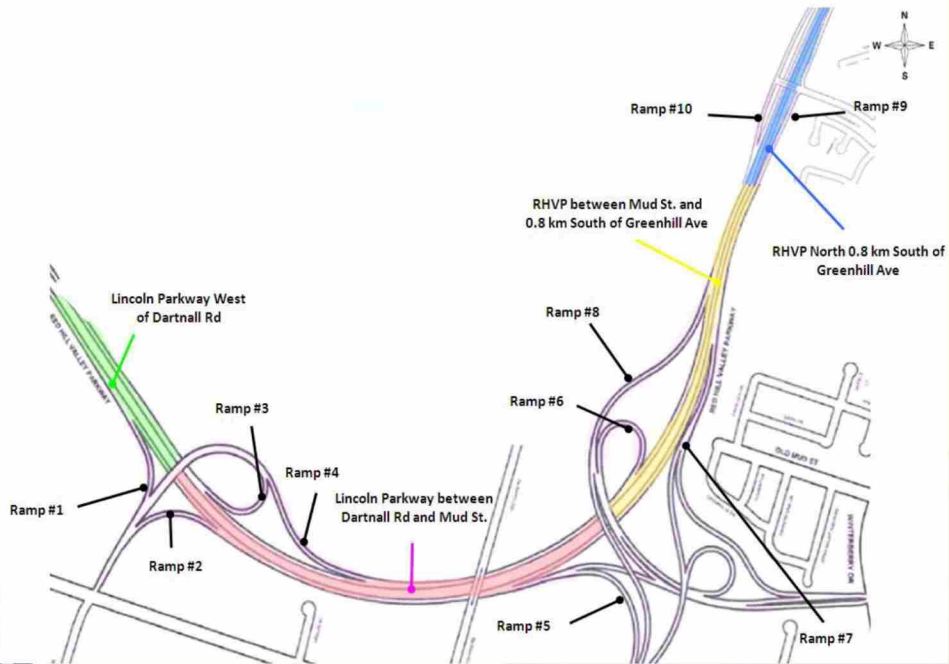
- Collision data for five-year period - October 10, 2008 to October 9, 2013
- Obtained for 10 ramps and a 4 kilometre stretch of RHVP from Dartnall Road to Greenhill Avenue

Collisions geo-coded



A. Collisions (Cont'd)

Segmentation

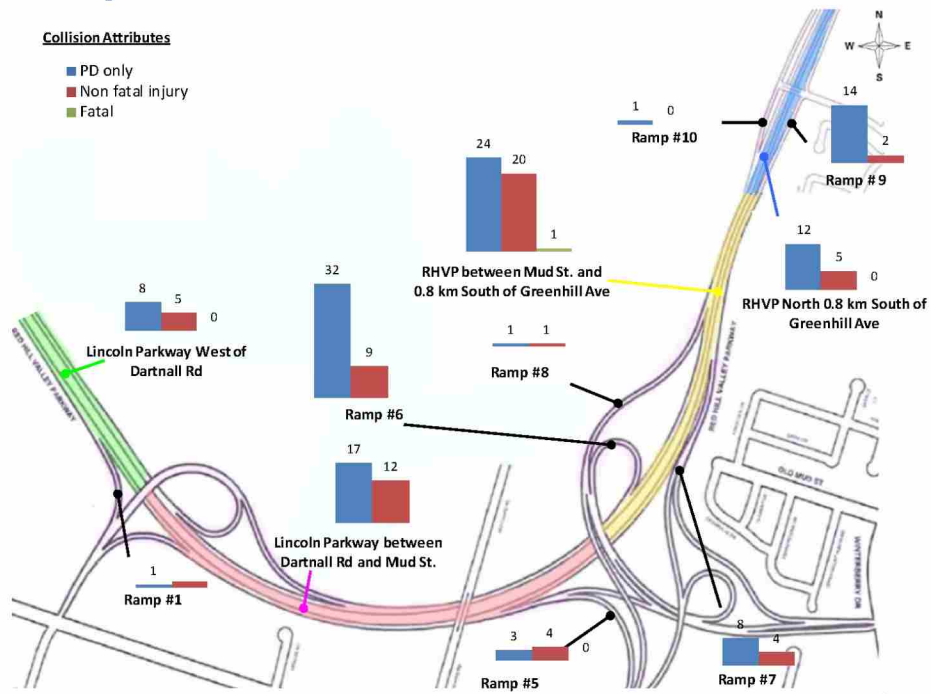


A. Collisions (Cont'd)

Severity

Collision Attributes

- PD only
- Non fatal injury
- Fatal

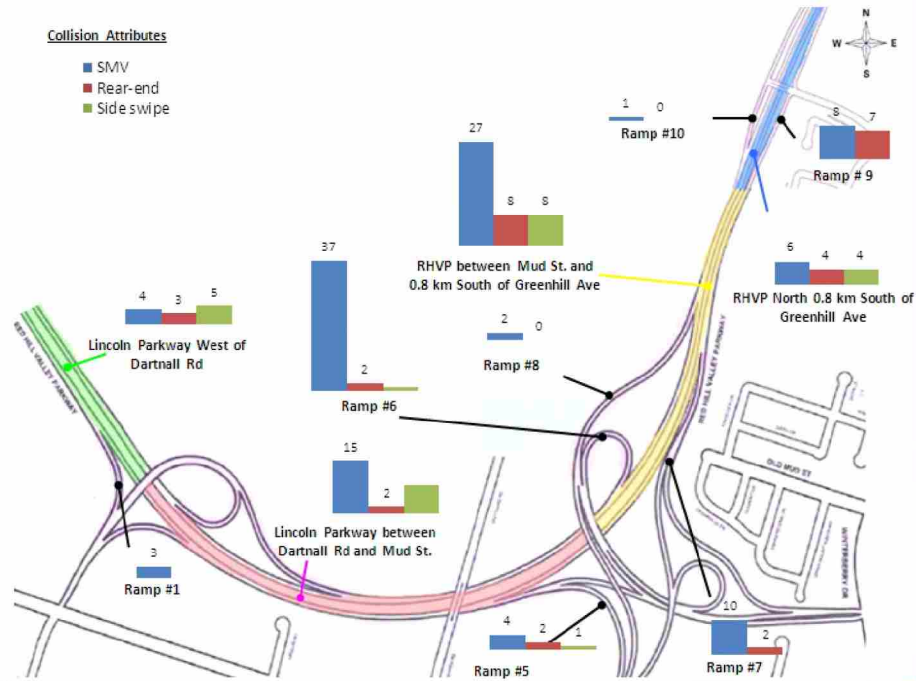


A. Collisions (Cont'd)

Impact Type

Collision Attributes

- SMV
- Rear-end
- Side swipe

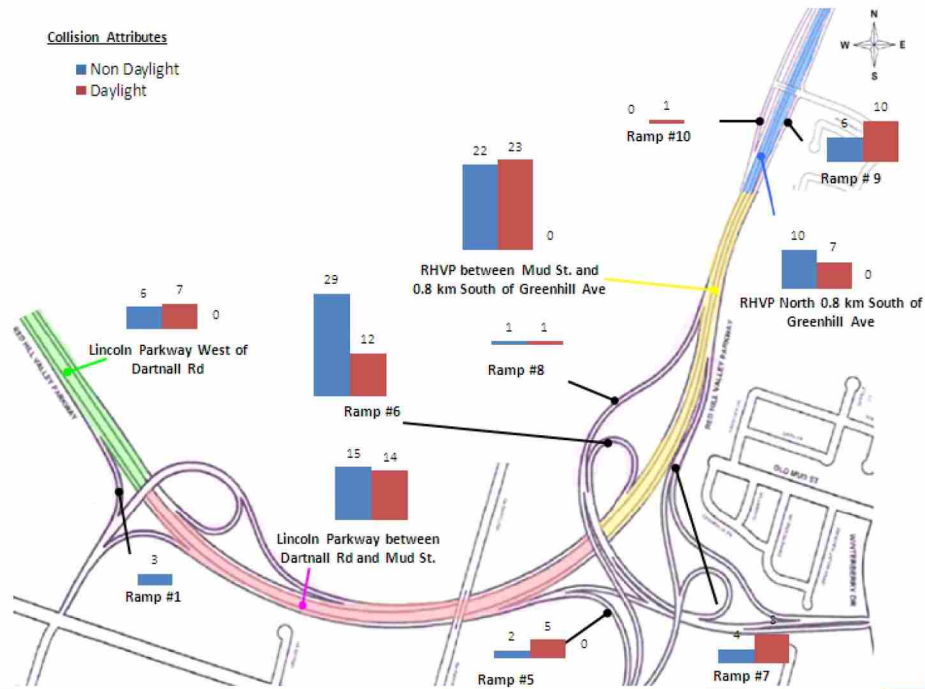


A. Collisions (Cont'd)

Lighting Conditions

Collision Attributes

- Non Daylight
- Daylight

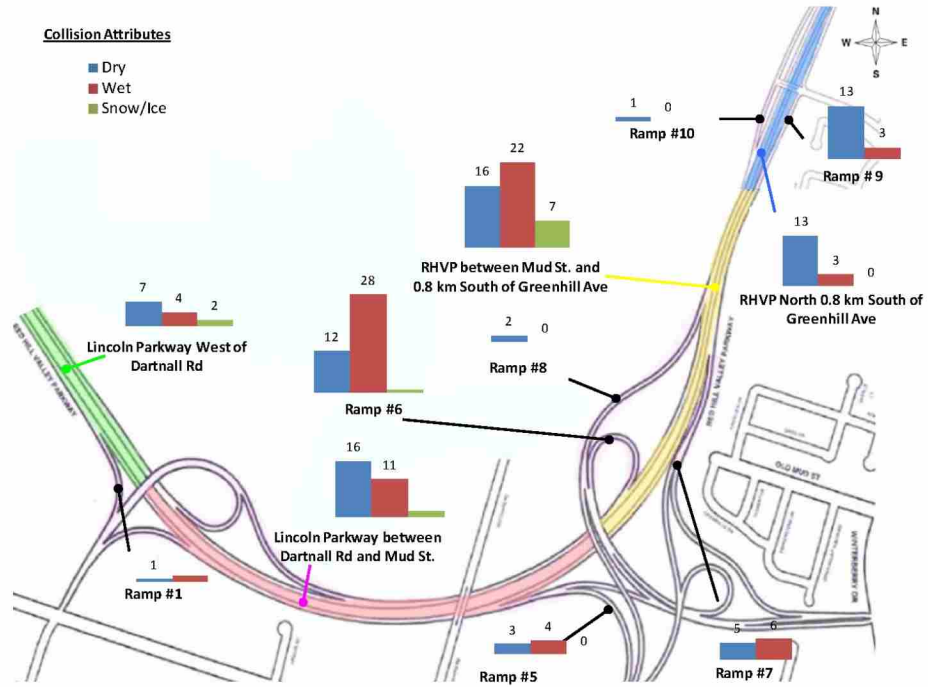


A. Collisions (Cont'd)

Road Surface Conditions

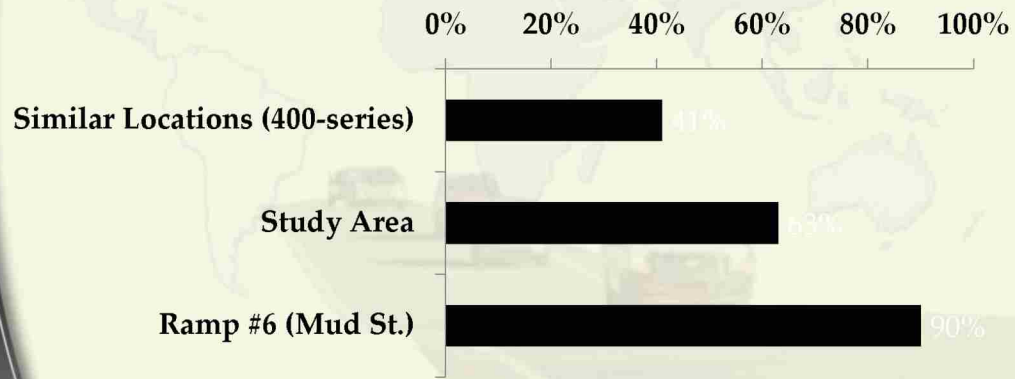
Collision Attributes

- Dry
- Wet
- Snow/Ice



A. Collisions (Cont'd)

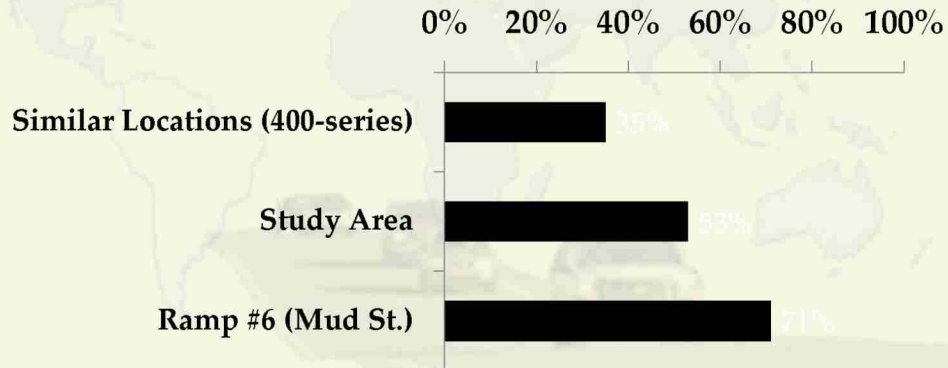
Most common collision impact type observed is SMV



SMV Collision Proportions

A. Collisions (Cont'd)

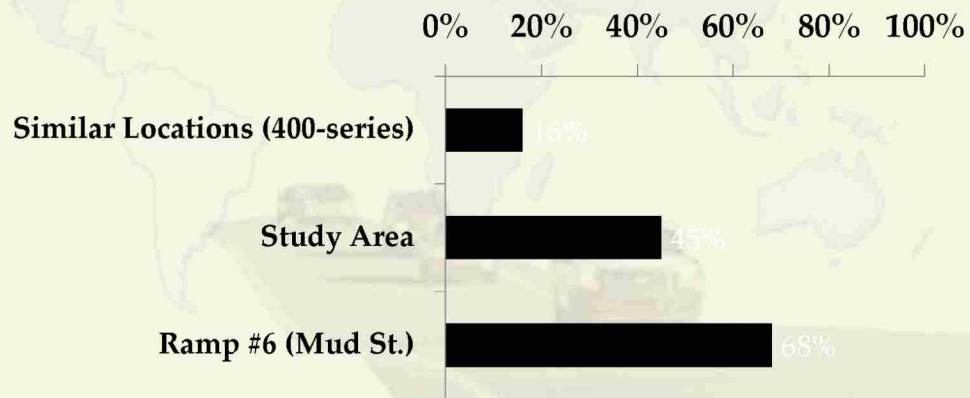
Atypical high proportion of non-daylight collisions



Non-daylight Collision Proportions

A. Collisions (Cont'd)

High proportion of collisions that occurred under wet road surface conditions



Wet Road Surface Proportions

B. Illumination

Ministry Policy for Highway Illumination used to evaluate need for illumination

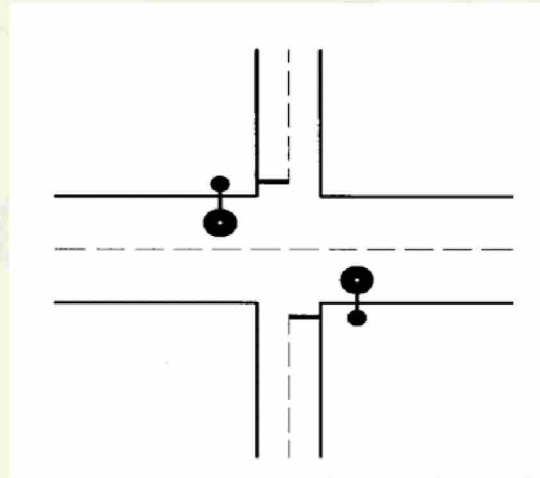
Types of Illumination considered by the warrant:

- Continuous Illumination (freeway segments)
- Partial Illumination (at interchange)
- Full Illumination (at interchange)

B. Illumination (Cont'd)

Partial Illumination

At decision points where identification is required. The term refers to an installation with less luminaires than that required for a continuous or full illumination system. A minimum of 2 luminaires is required



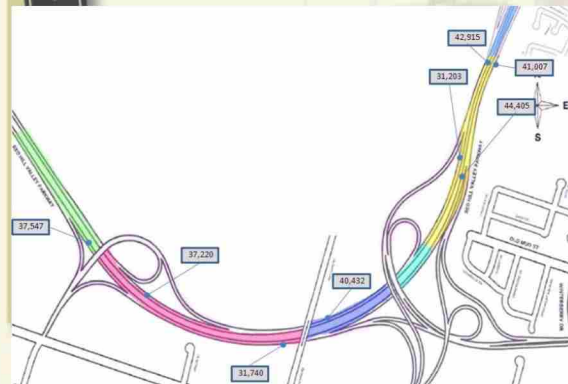
B. Illumination (Cont'd)

Partial Illumination

Conditions for partial illumination of an interchange:

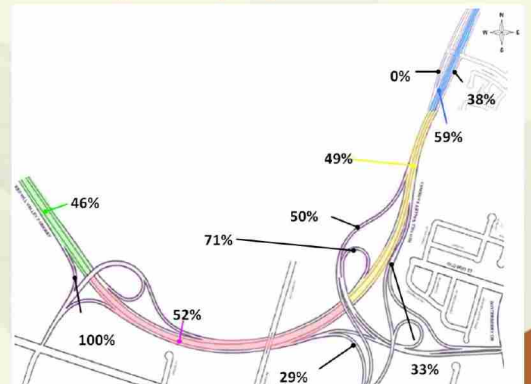
- AADT > of 30,000
- Geometric standards are below recommended practices
- Ratio of night to day collision rates > 1.25 of the province wide average

Traffic Volumes (ADT)



Night to Day Collision Proportions

- Provincial proportion: <35%
- Study area proportion: 53%



B. Illumination (Cont'd)

Continuous Illumination

On an essentially straight and linear section of roadway which covers the traveled portion of the roadway in a uniform



Conditions for continuous illumination



Based on the various factors outlined in Form 2

FORM 1 FREEWAY INTERCHANGE - FULL ILLUMINATION									
Highway: _____		and _____		MP No.: _____		Date: _____			
Location: _____ <i>2 pages</i>									
CLASSIFICATION FACTOR	RATING (I)					UNLIT WEIG HT (A)	LIGHT ED WEIG HT (B)	DIFF (A - B)	SCOR E (RATIN G X (A - B))
	1	2	3	4	5				
Geometric Factors Ramp Types	Directional	Diamond	Cloverleaf Button-hook	Parclo	Multi-level (v) Trumpet	2.0	1.0	1.0	
Cross-road Channelization (Raised Islands)	none		continuous		at interchange intersection	2.0	1.0	1.0	
Service Roads	none		one-way		two-way	1.5	1.0	0.5	
Freeway Lane Widths (m)	> 3.75	3.75	3.66	3.50	< 3.50	3.0	2.5	0.5	
Freeway Median Widths (m)	> 15.0 or barrier		10.0 - 15.0		< 10.0	1.0	0.5	0.5	
No Freeway Lanes	4		6		8	1.0	0.8	0.2	
Main Line Curves (m (deg))	> 1,900 (< 1°)	1,900-850 (1-2°)	849-600 (2.1-3°)	599-450 (3.1-4°)	< 450 (> 4°)	13.0	5.0	8.0	
Grades (vertical)	< 3%	3 - 3.9%	4 - 4.9%	5 - 6.9%	7%	3.2	2.8	0.4	
Sight Distance Cross Road Intersection (m)	> 305	216 - 305	151 - 215	120 - 150	< 120	2.0	1.8	0.2	

B. Illumination (Cont'd)

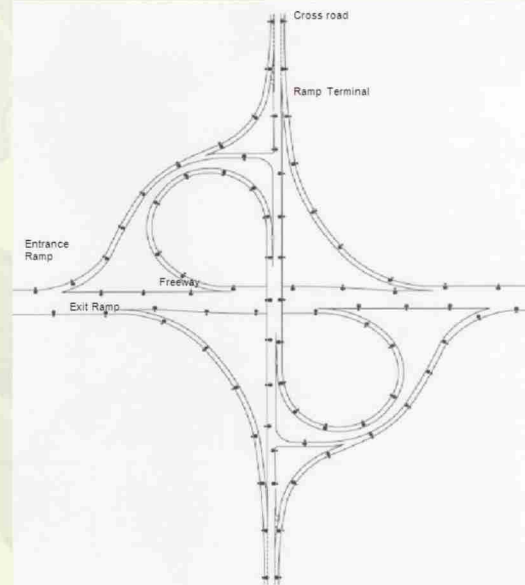
Full Illumination

An area such as an interchange or intersection in a uniform manner over the traveled portion of the roadway. The illumination system pole spacing is relatively constant

Conditions for continuous illumination



Based on the various factors outlined in Form 1



C. Signing

Findings

- Placement & configurations
- Unnecessary signs



C. Signing (Cont'd)

Findings

- Copy display layouts



D. Lane Departure Collisions

Findings

- Guide rail damage / barrier scuffs
- Some design issues



E. Roadside Design

Findings

- Eccentric Loader (gating) end treatment on outside curve / slope
- Earth build-up in front of steel beam guide rail system



F. Mud Street On-Ramp (Ramp 6): Link-Bound

- Given the high number of collisions: Detailed review
- A number of warning devices in place



F. Mud Street On-Ramp (Ramp 6): Link-Bound

In order to address issues, next steps to consider

- Speed management treatments further in advance of curve
- Innovative treatments potentially including:
 - Pavement marking configurations (peripheral, transverse, converging bars)
 - Signage
 - High friction pavement surface treatment



G. Geometrics (Field Investigation Findings Only)

Alignment Discontinuity through Mainline Curve



G. Geometrics (Field Investigation Findings Only) Cont'd

...the result observed

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Summary of Issues & Potential Countermeasures

Collision Analysis Results

High number of:

- SMV Collisions
- Collisions in non-daylight conditions
- Collisions in wet road surface conditions

Field Investigation Findings

- Design issues: signage and roadside protection
- Evidence of road departure collisions

Preliminary list of Proposed Countermeasures

- Validation of illumination needs
- Sign layout design plan: Existing & Proposed (relocation/removal)
- Repair of roadside protection (near-term), & considerations for re-design & construction

Next Steps

- Update Illumination Warrant (following discussion with MTO)
- Geometric Review
- FHWA Interchange Safety Analysis Tool (Enhanced)
- Identification of all Countermeasures
- Second Progress Meeting
- Benefit Cost Analysis
- Draft Report
 - *City Review of Draft Report*
- Final Report
- Final Presentation

Thank you

