Defining the Requirements of Truck Inspection Station

2016 Value Summit

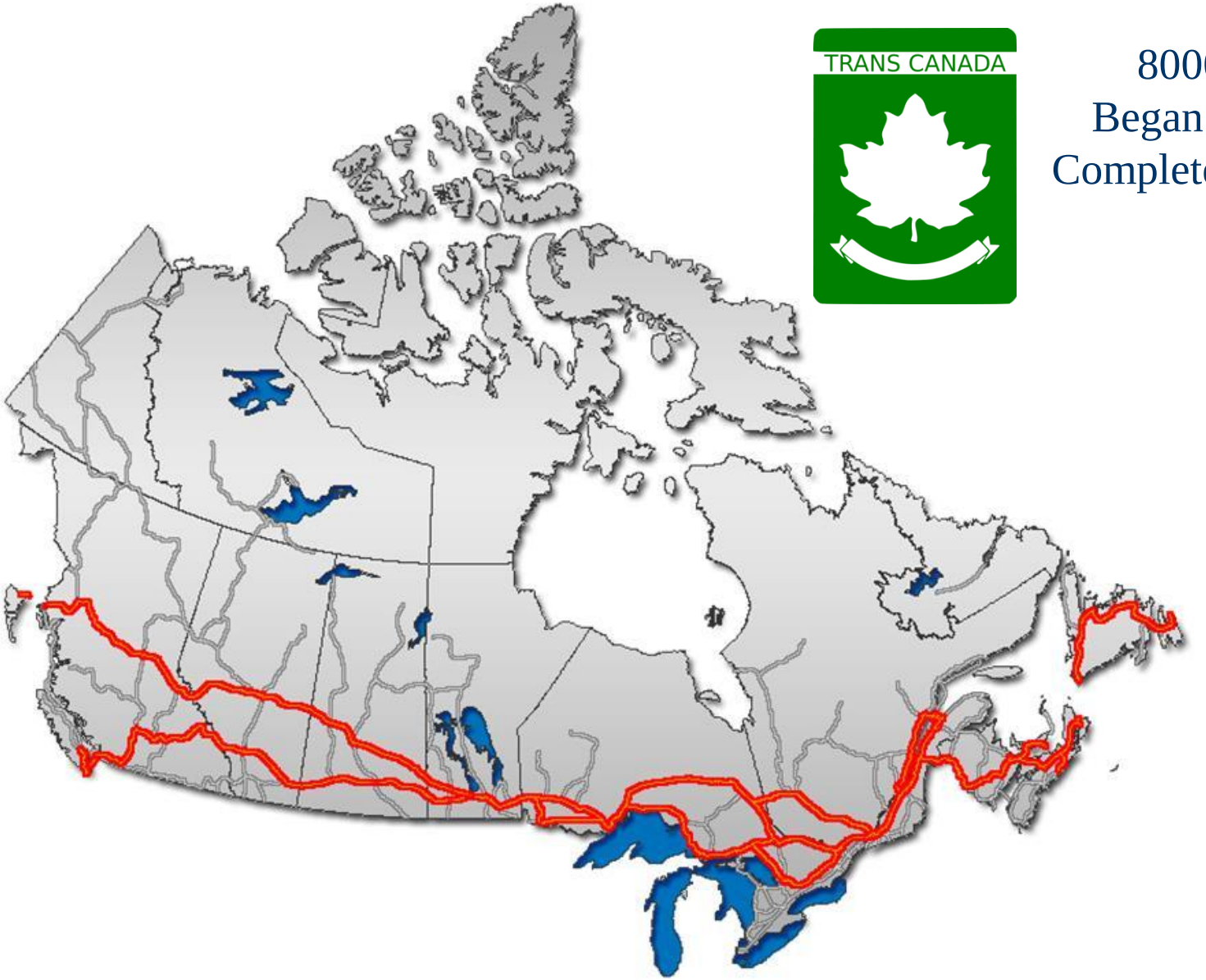
June 5-7

Lori Brake

Topic Overview

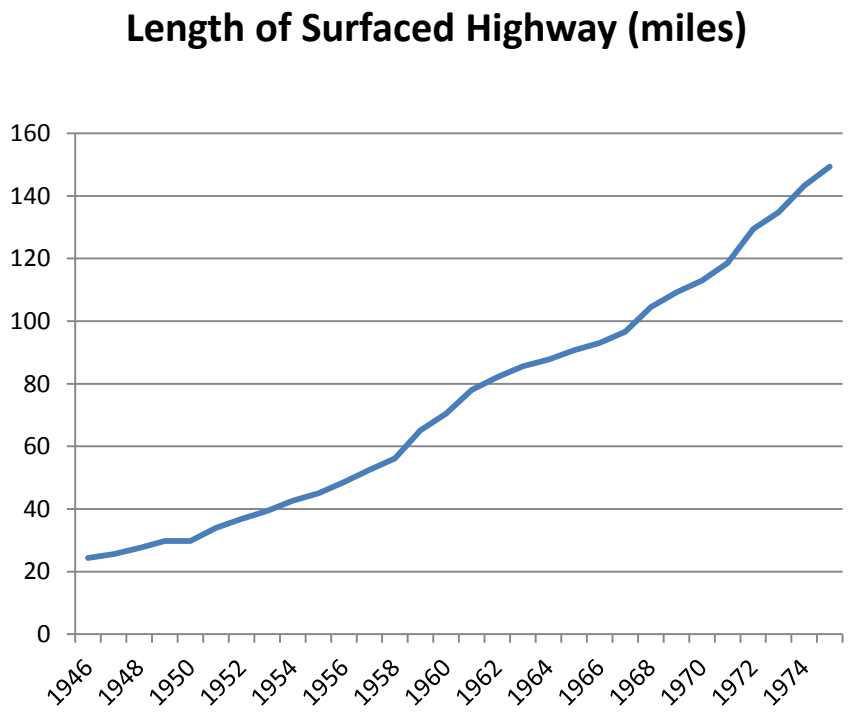
- *The business context*
- *Truck Inspection Stations – changing business needs*
- *Gathering Operational Intelligence*
- *Defining Business Needs through FPS and Generating Solutions with VA*
- *Combining FPS with Value Analysis*
- *The Outcome*

Key Events: TransCanada Highway



8000 km
Began in 1950
Completed in 1971

Transportation in Canada: The Highway Backbone

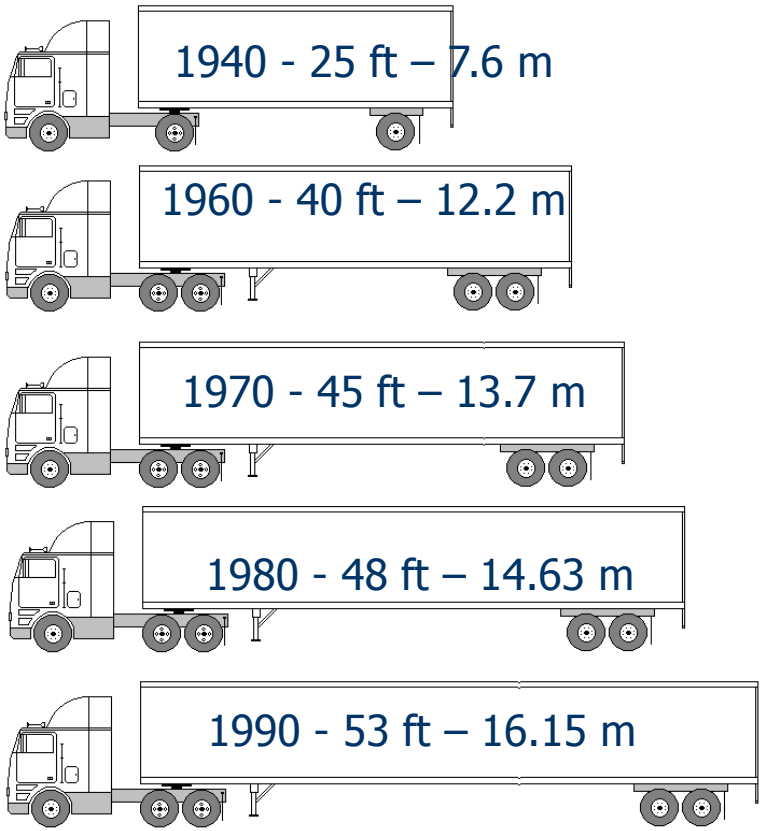


Length of Surfaced Highways:

1946: 24,400 miles

1975: 149,400 miles

Change: + 500%



2013 - 60 ft - 18.3 m

Highway Carrier Enforcement Program

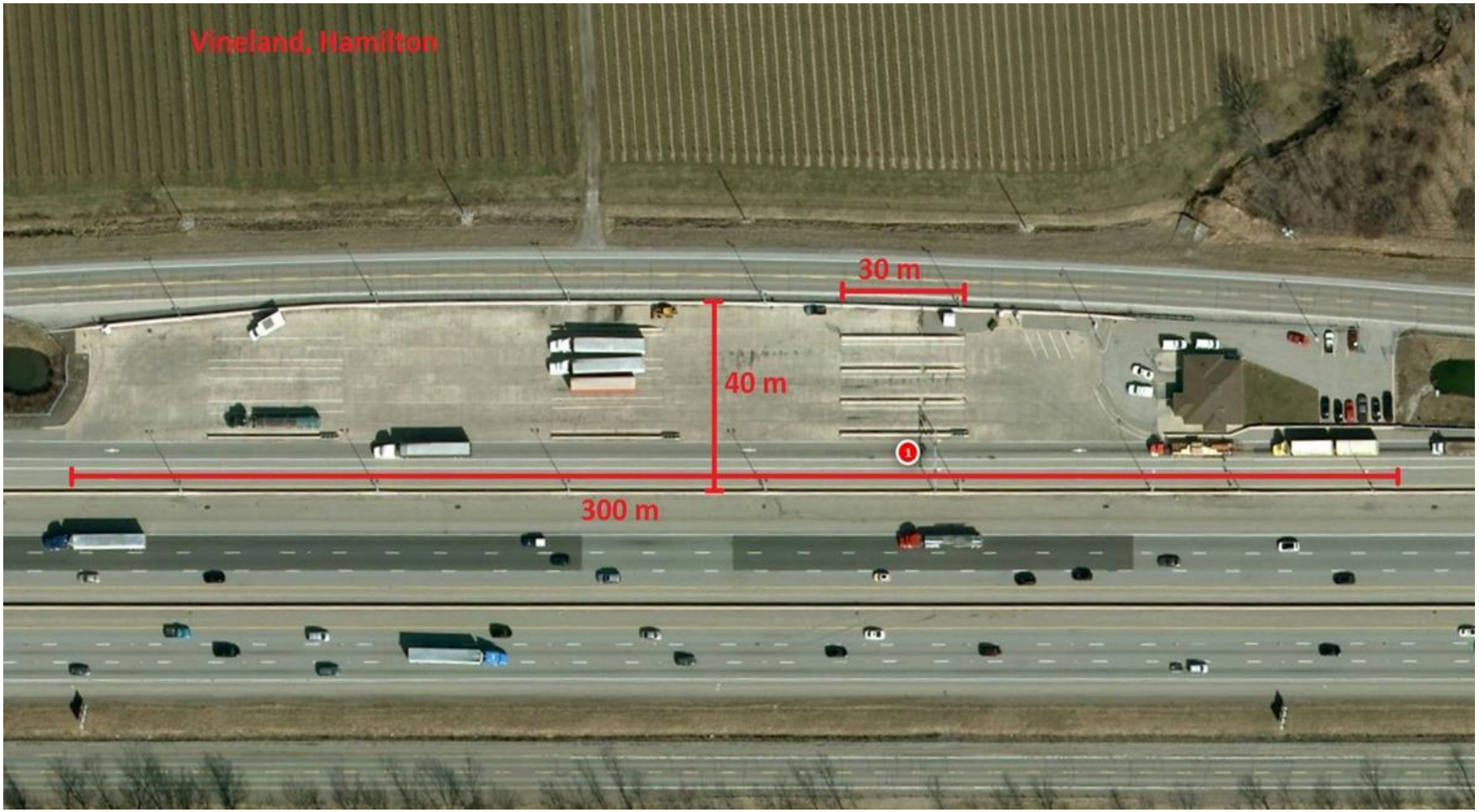
- Roadside inspections are conducted at a fixed truck inspection station or another location suitable for performing an inspection safely.

Race Track Layout (1970's)

Adding Value. Enhancing Ideas.

AV Canada
VA Canada

Linear Inspection Station (1990's)



Adding Value. Enhancing Ideas.

AV Canada
VA Canada

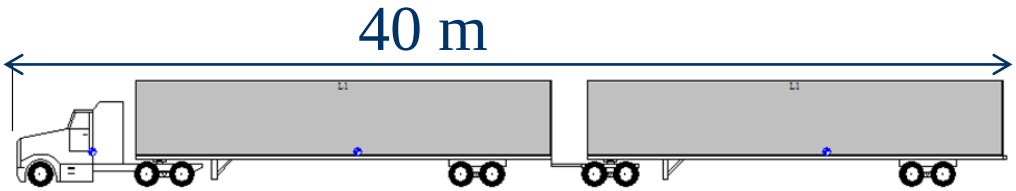
2008 – CVIF Standard Design

Adding Value. Enhancing Ideas.

AV Canada
VA Canada

Changes after Commercial Vehicle Inspection Station 2008 Standard

- Long Combination Vehicles (double trailers) (40m) introduced
- Truck length increasing from 23 to 27.5 m
- % of Trucks with Aerodynamic skirts increased from 1-3% to 3-9%.



SAVE Adding Value. Enhancing Ideas.

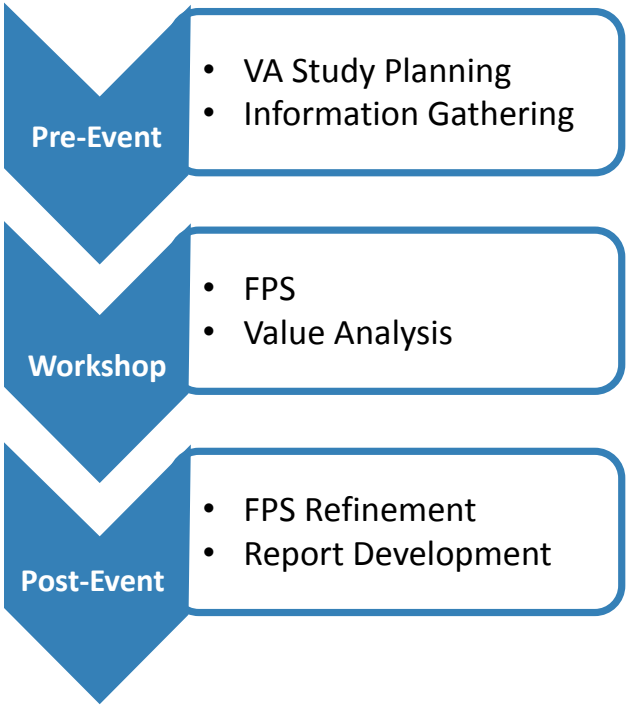
AV Canada
VA Canada

The business need for a VA study -

- Preliminary Design was underway to replace 2 truck inspection facilities along Highway 401 in Eastern Ontario
- Road User Safety Enforcement Officers identified the CVIF facilities did not meet their needs
- *A functional performance specification was requested to lock down the business requirements.*

Study Plan

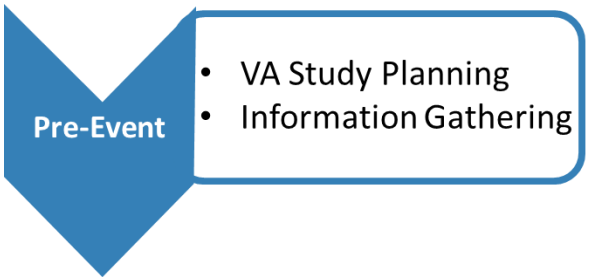
- Systematic Approach
- Met with client to define scope before scheduling workshop
- Information Gathering for an FPS study can be a lengthy process



Adding Value. Enhancing Ideas.

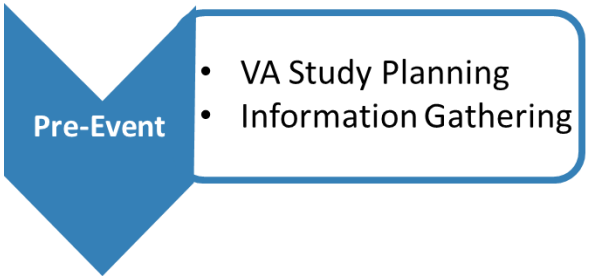
AV Canada
VA Canada

The Study Team



- Owners - Senior Management from Regional Operations and Carrier Safety and Enforcement
- Users – Enforcement Officers to represent field experience at the different facility types.
- Technical Specialists – Highway Engineering, Mechanical Engineers, Vehicle Dimension Specialists, Goods Movements

Information Gathering



Data collection and analysis to support the information phase of the workshop

- Overview of Inspection Procedures
- Future of Trucking Fleet – Trends in Size, type etc.
- Analysis of wait times and site efficiency.
- Weigh Scale Technologies and Field Experience
- SWOT Analysis of different styles of inspection stations.
- Jurisdictional Scan
- New and Emerging Inspection Technologies

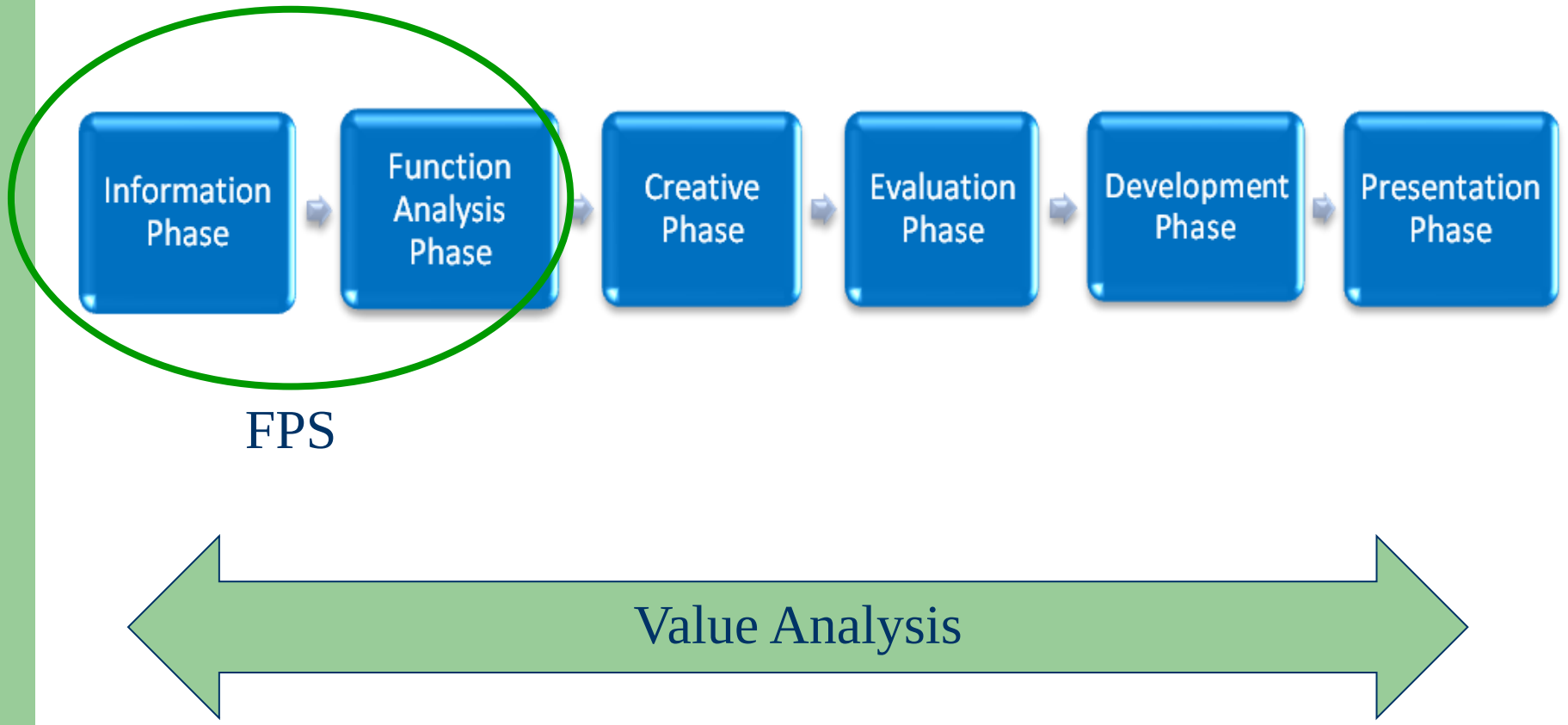
Gathering Information: SWOT Analysis

Pre-Event
- VA Study Planning
- Information Gathering

- Facilities Visited:
  - Putnam – Commercial Vehicle Inspection Facility
  - Vineland – Linear
  - Trafalgar – Racetrack
  - Gananoque – Modified Racetrack
  - Lancaster – Modified Racetrack

- Categories:
  - Health & Safety
  - Vehicle Flow
  - Highway Access/Egress
  - Driver Selection
  - Site Navigation
  - Vehicle Selection
  - Weight Enforcement
  - Secondary Inspection
  - Out of Service Area
  - Long Combination Vehicles (LCV)
  - Technology
  - Maintenance
  - Building

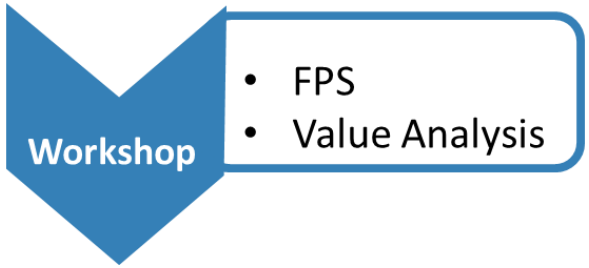
Workshop Combined FPS with Value Analysis



Adding Value. Enhancing Ideas.

AV Canada
VA Canada

VE Study Process



- Functional Performance Specification (FPS) defines project requirements based on the functions.
- FPS was generated based on Functional Tree developed for the project.
- Enforcement officers characterized the FPS

Functional Performance Specification

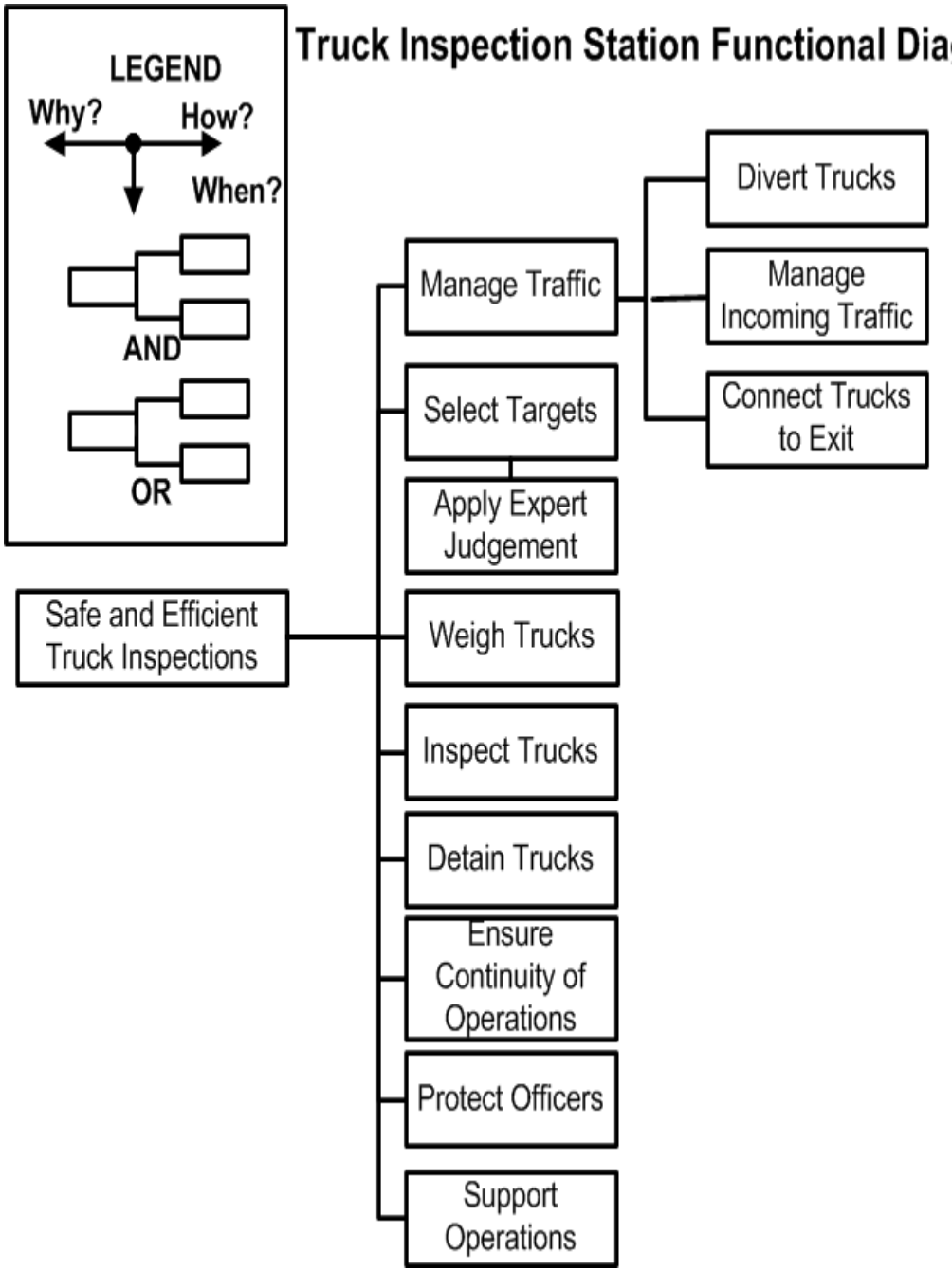
Document in which the	USER
States a	NEED
In terms of and	FUNCTIONS CONSTRAINTS
For each of these Functions	ASSESSMENT CRITERIA
and their	LEVELS of performance are defined
There is	FLEXIBILITY for each level

Flexibility

Flexibility: Establish the tolerance or negotiability of the Level:

- **F0** is an absolute must, not negotiable;
- **F1** must reach this level if at all possible;
- **F2** negotiable, hope this level is reached, ready to discuss;
- **F3** very flexible, this level is proposed but open to any suggestion (Nice to have)

Truck Inspection Station Functional Diagram



Workshop

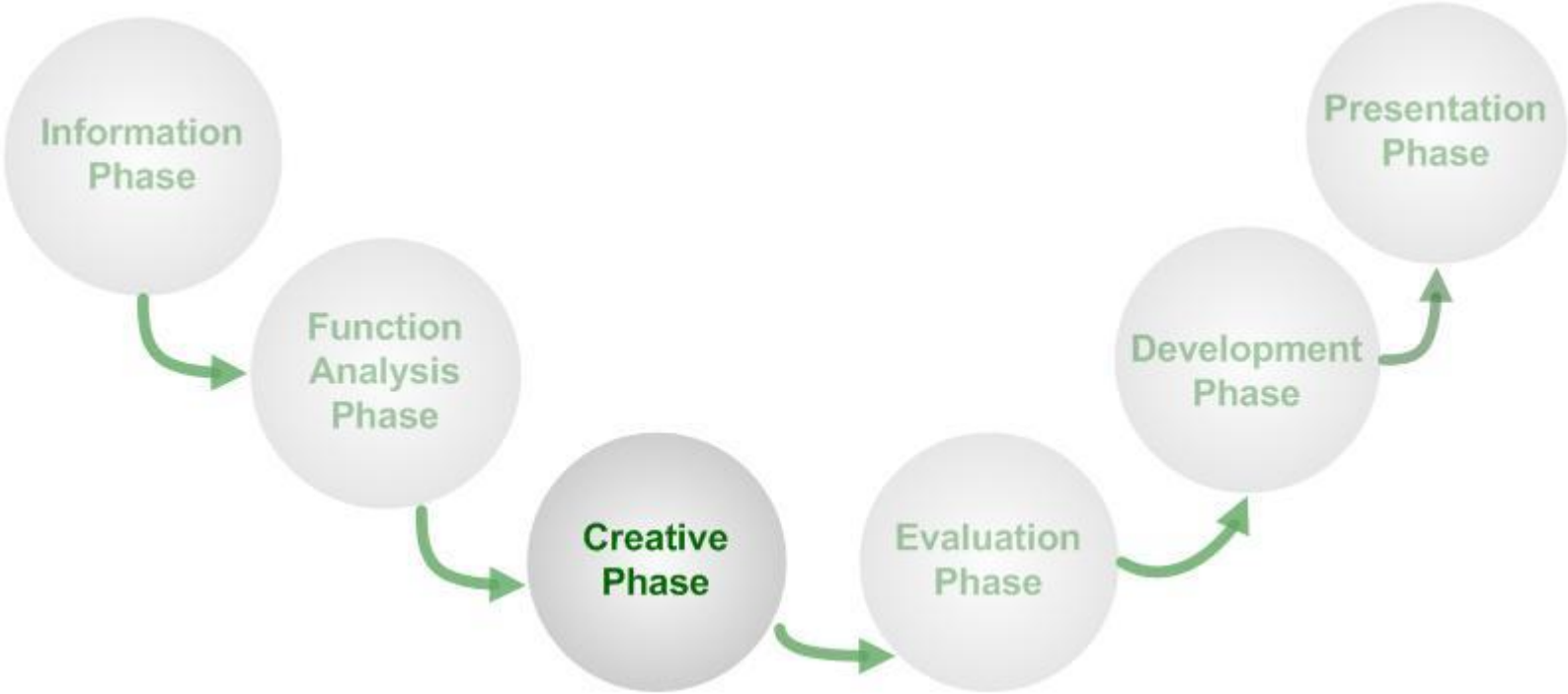
- FPS
- Value Analysis

Sample Function Characterization

Function	Criteria	Level	Flexibility
Inspect Trucks	Number of Inspection Lanes	4	F0 (Must Have)
	Individual Control of Inspection Lane Lights	Yes	F2
	Number of Inspection Lanes protected by overhead Canopy	2	F1

Creative Phase

- Function Based Brainstorming was used to develop 6 alternative layout concepts.



Evaluation

- Higher order Functions were used as starting points to develop performance criteria
- Analytical Hierarchy Process was used to evaluate each alternative concept.

Performance Criteria

	A	B	C	D	E	F	G	H	I	% of Total
(A) Manage veh flow	1	**2**	1	**3**	0.5					22.1%
(B) Weigh Vehicles	0.5	1	**3**	**2**	0.5					21.3%
(C) Efficiency of Inspection	1	0.333	1	**4**	1					20.9%
(D) Out of Service Verification	0.333	0.5	0.25	1	0.5					8.4%
(E) Traffic Exposure	**2**	**2**	1	**2**	1					27.4%
(F)										0.0%
(G)										0.0%
(H)										0.0%
(I)										0.0%

Total	100.0%

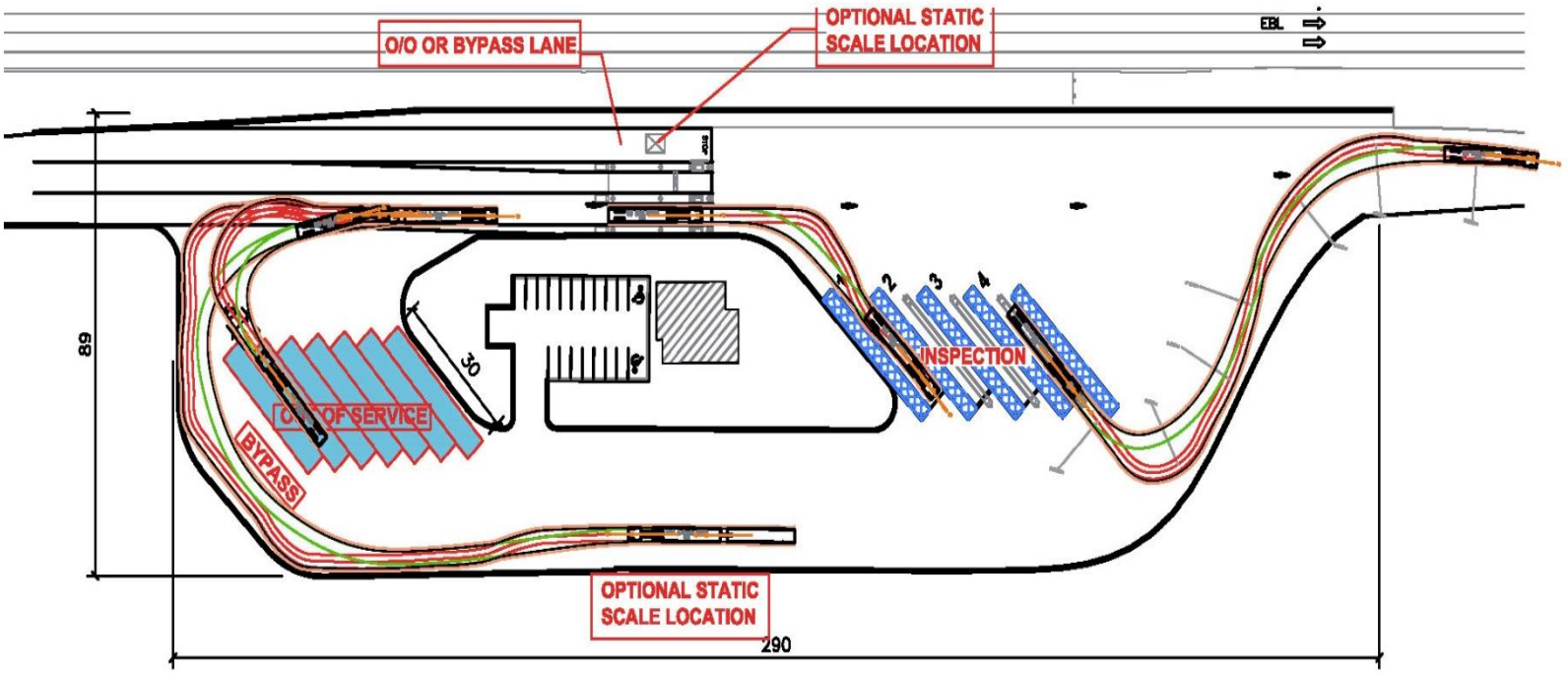
Adding Value. Enhancing Ideas.

AV Canada
VA Canada

Scenario Comparison

Summary of Results	Evaluation Criteria						
	Traffic Exposure	Manage Traffic	Weigh Vehicles	Efficiency of Inspection	Out of Service Verification		
Evaluation Criteria Weight	*27.38%*	*22.05%*	21.29%	*20.86%*	*8.42%*		
Alternatives						*Sum*	*Rank*
CVIF	5	2	3	3	1	*14*	*4*
CVIF-01	2	4	3	3	1	*12*	*6*
RT-01	2	4	3	2	2	*13*	*5*
RT-02	7	4	3	3	1	*18*	*1*
RT-03	3	3	3	2	1	*12*	*7*
RT-05B	5	3	3	4	1	*16*	*2*
RT-06	4	2	3	4	1	*15*	*3*
Sum	*27*	*22*	*21*	*21*	*8*	*100*	

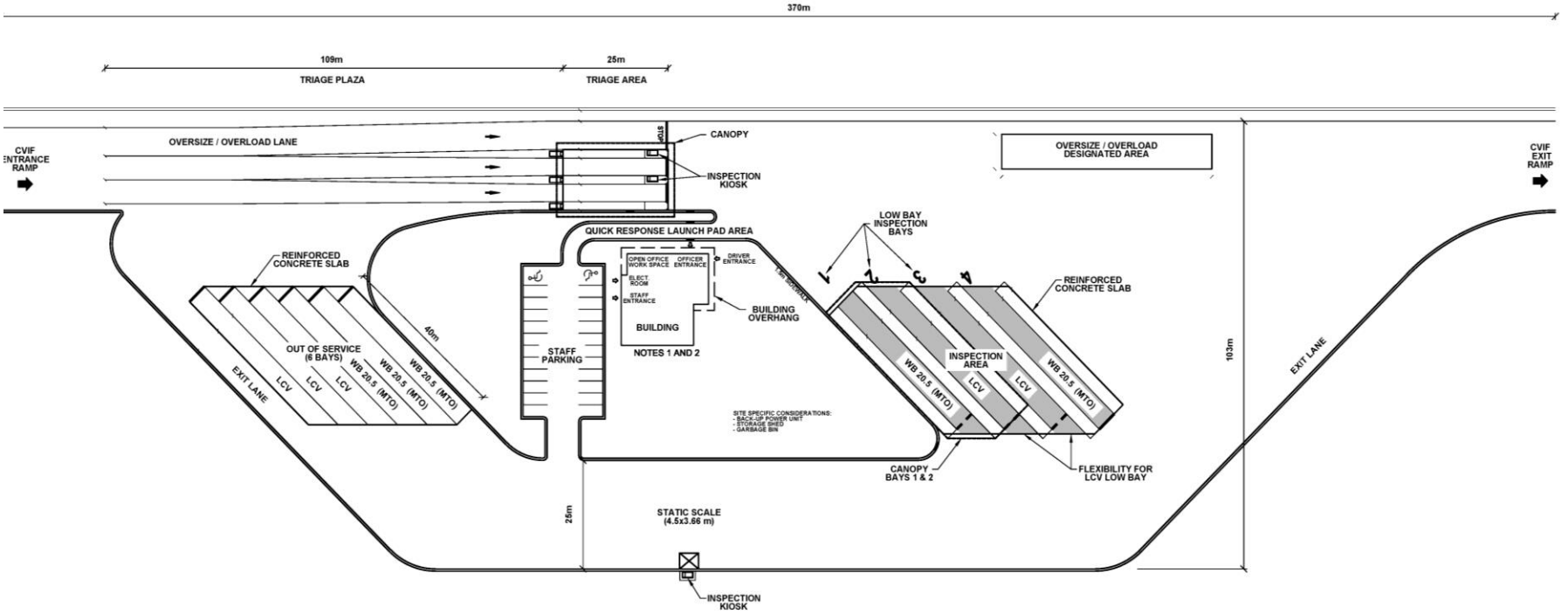
Highest Scoring Scenario



Adding Value. Enhancing Ideas.

AV Canada
VA Canada

The Outcome



save
Adding Value. Enhancing Ideas.

AV Canada
VA Canada

References

Lori Brake
Traffic Specialist, Eastern Region MTO
Lori.brake@ontario.ca

- www.valueanalysis.ca