

Stimulating New Design Concepts with Value Analysis

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Outline

- Using Value Analysis to stimulate innovation
- Organization level innovation
- Case Studies
 - Highway 401/Holt Road
 - QEW/Evens to Cawthra EA study
 - QEW/Seventh St Interchange
- Future Studies
- Summary

Using Value Analysis to stimulate innovation

- A tool to innovate
- Overcoming aversion to risk inherent to innovation
- Challenging established practices
- Public Opinion/Stakeholder Consensus

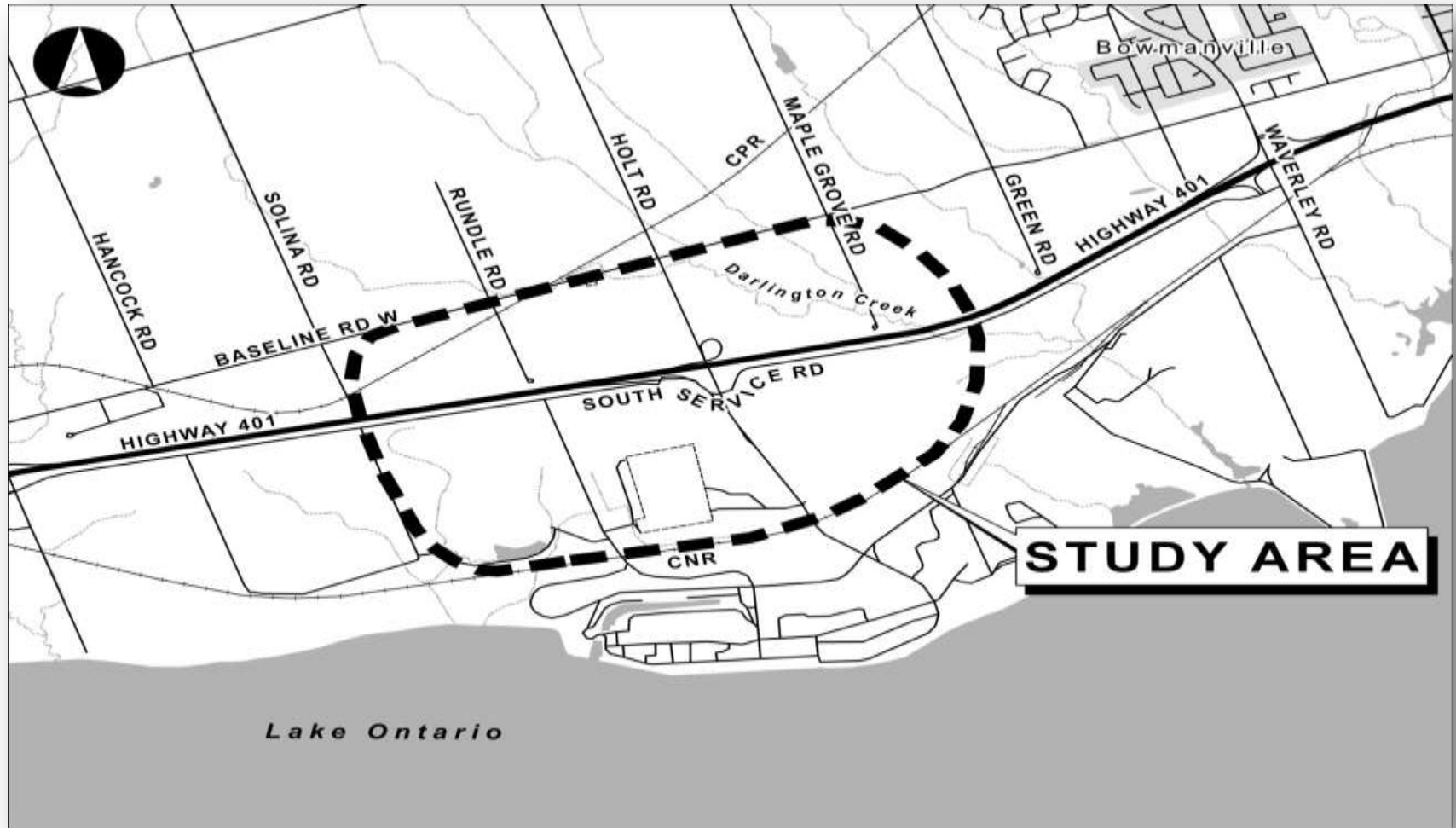
Organization Level Innovation

- No lack of innovation in public service
- Advertizing innovation
- Innovation in isolation
- Replicating innovation across the organization

Case Studies: Replicating/Stimulating Innovation

1. Highway 401/Holt Road
2. QEW/ Evans to Cawthra
3. QEW/ Seventh St

Highway 401/Holt Road



Holt Rd – Project Background

Short Term Needs

- Refurbishment of the Darlington Nuclear Generating Station
- Access to/from Highway 401 to the west only
- Existing Holt Road is only 2 lanes at Highway 401
- Stop controlled on the ramps

Holt Rd – Project Background

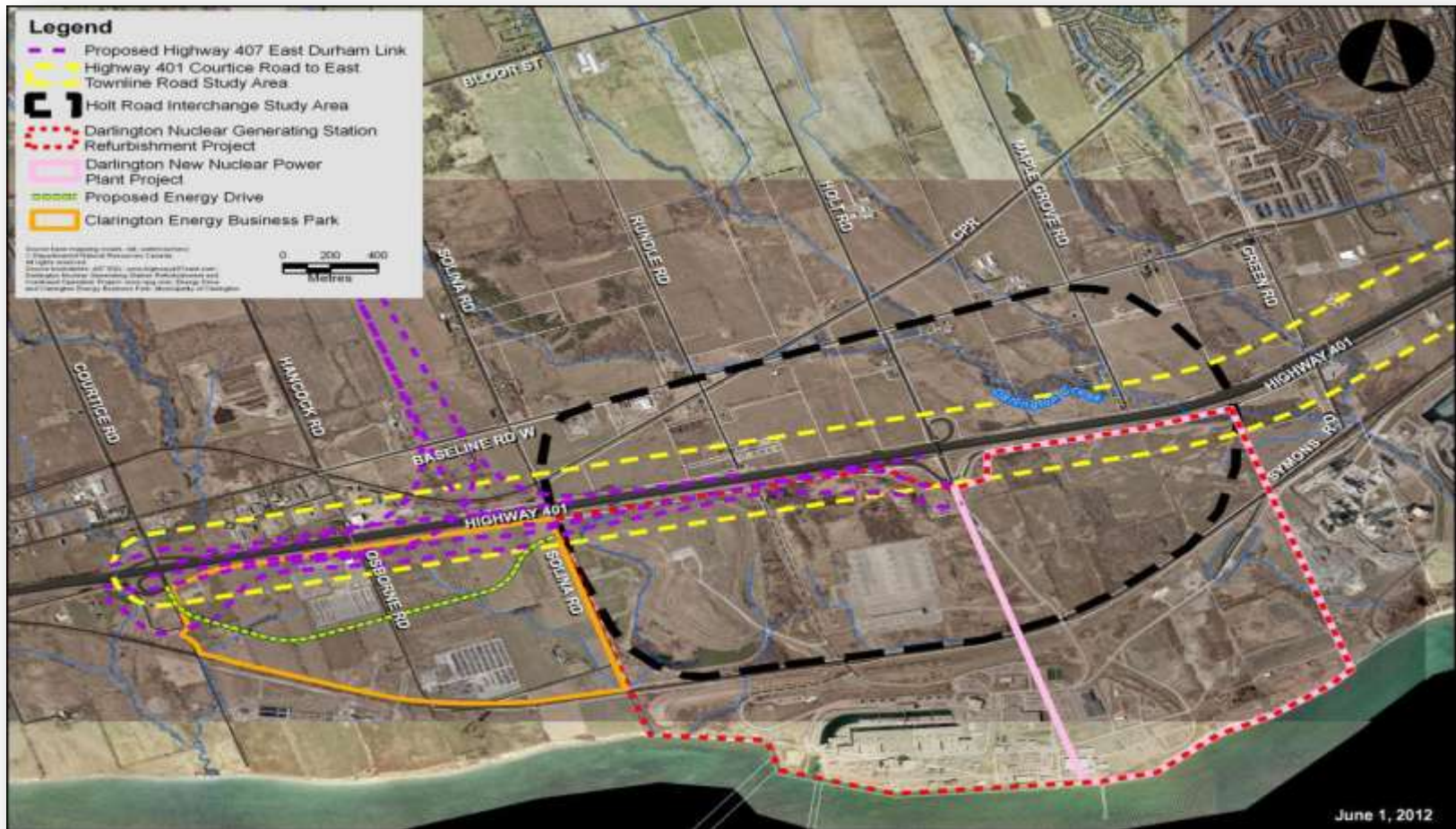


Holt Road – Project Background

Long Term Needs

- Highway 401 from 6 to 10 lanes
- Existing structure was constructed in 1961
- Highway 407 Link

Holt Road – Project Background





Proposed Sub-Collector System through Highway 407 East Durham Link Interchange



Alternative 1

Realignment of Holt Road 40m West (Parclo A4)



Alternative 2

Realignment of Holt Road 30m East (Parclo A4)



Alternative 3

Realignment of Holt Road 160m East (Parclo A4)

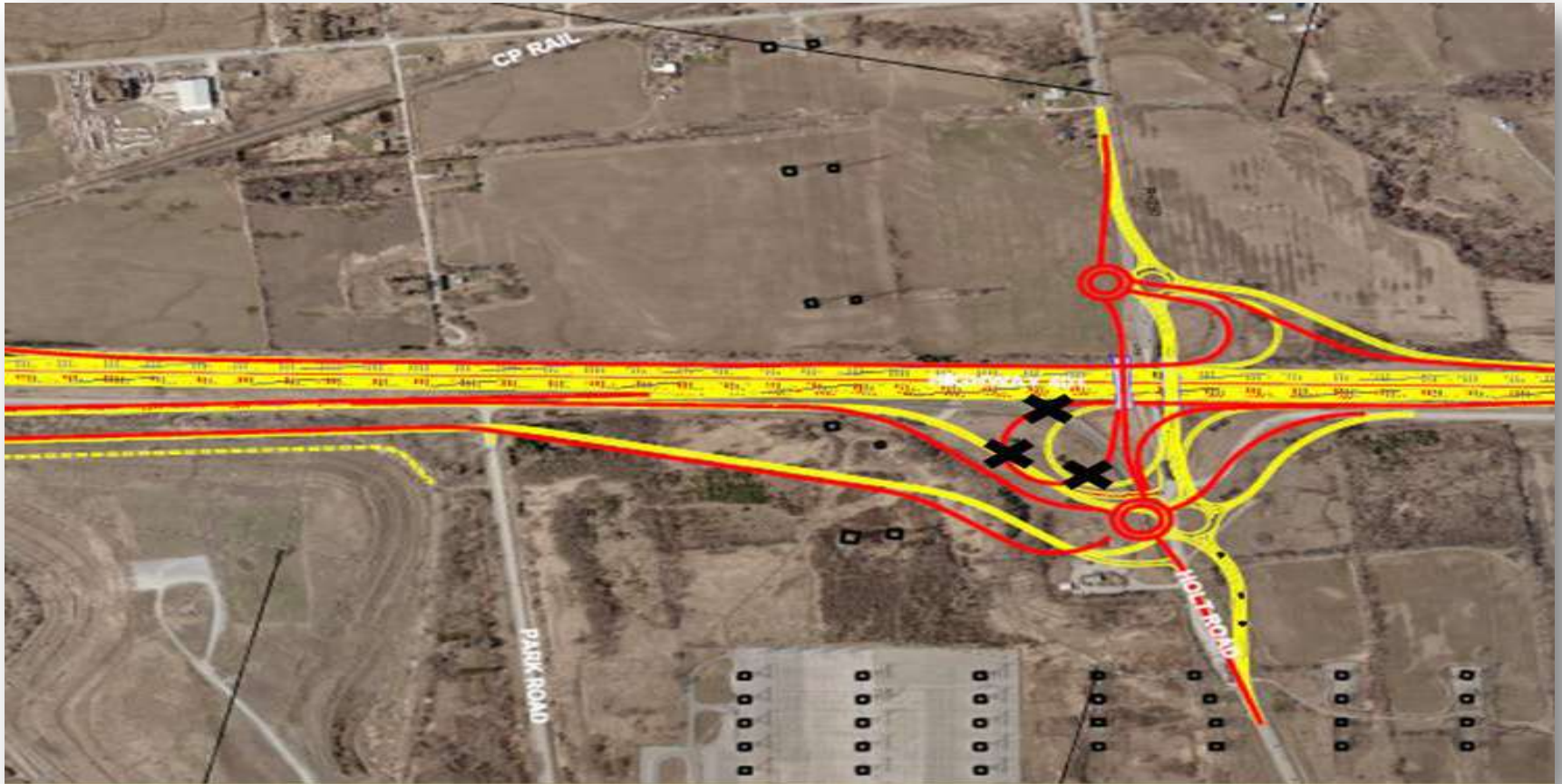


Base Case

Realignment of Holt Road 30m East with Roundabouts

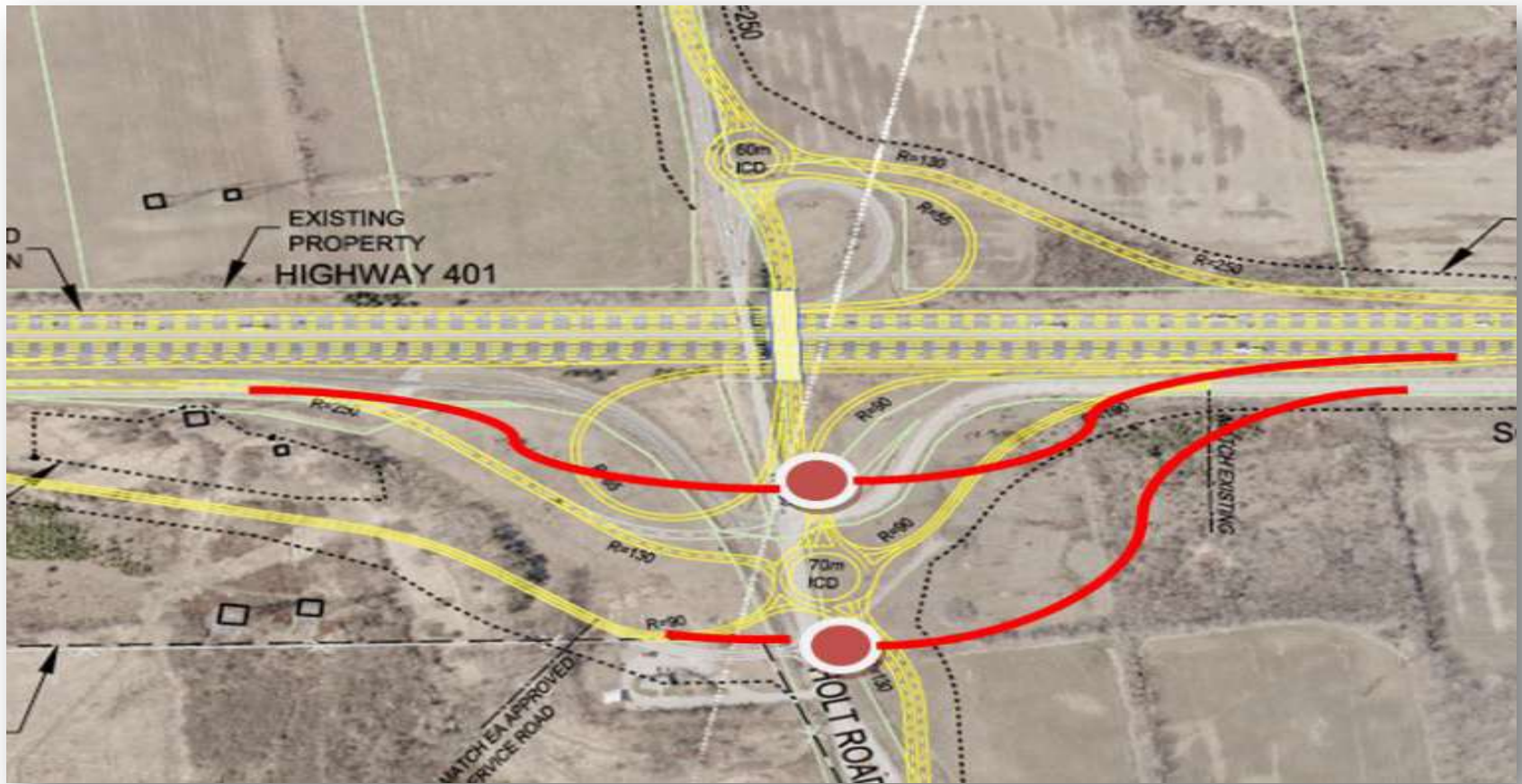
Scenario 1





Scenario 2

Realign Holt Road West of Existing Alignment and RI-8: Remove the N-E Loop Ramp

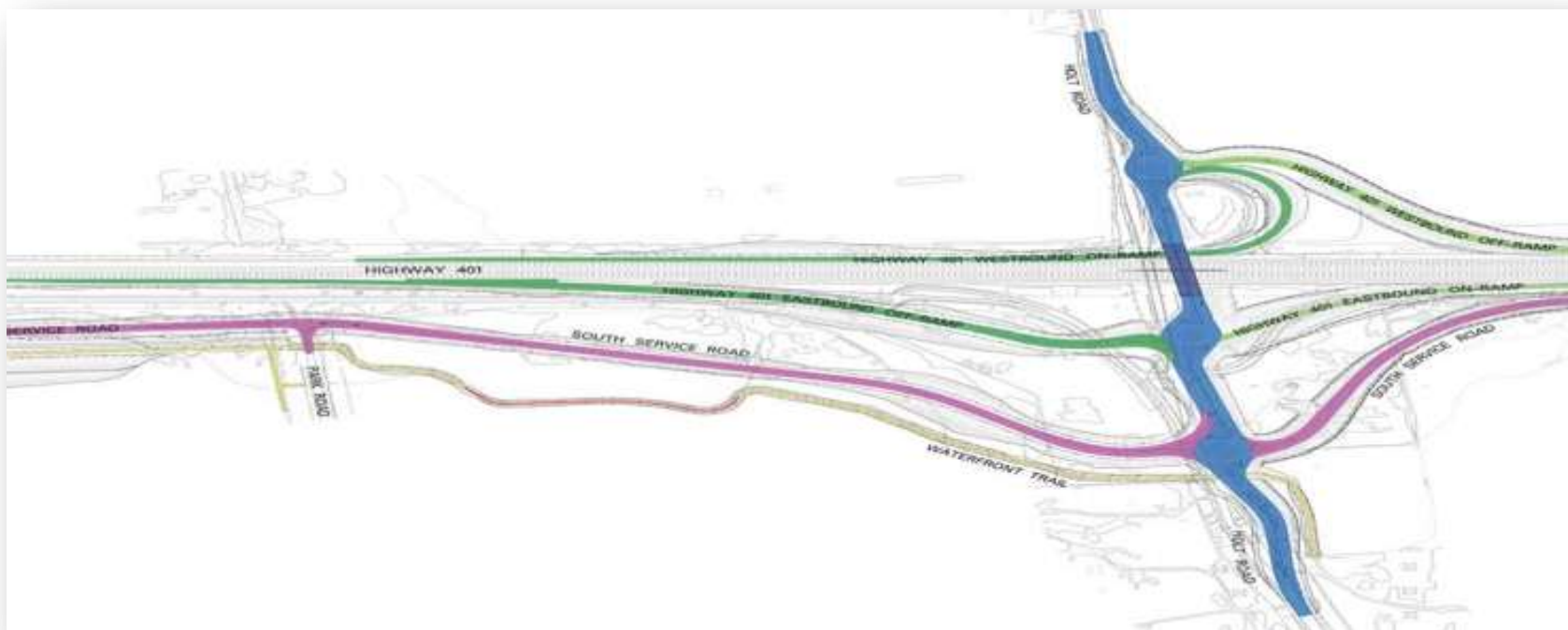


Scenario 3

Tight Diamond with Roundabouts on South Side Only - Base Case on North Side

Preferred Scenario

Page 1 of 1		EVALUATION MATRIX									
1. HOW WELL DOES THE SCENARIO SATISFY THE PERFORMANCE CRITERIA (ENTER RATING FROM 1-10, 10=BEST) 2. ENTER ASSIGNED WEIGHT TIMES RATING IN SUB TOTAL 3. SUM ACROSS AND RANK	Performance Criteria	- Performance Measure	Impacts of Ramps on Mainline Operations	Local Operations	Maintainability	Construction Impacts to OPG	Environmental Impacts	Project Schedule	Total Performance (P)	Total Capital Cost - \$ M (C)	P/C
	SCENARIOS	Weight	38	35	3	10	8	6			
Base Case	Rating 1-10	4.6	4.7	5.0	5.0	7.0	5.0				
	Sub Total	176	165	15	50	56	30	491	26.7	18.40	
Scenario 1 - Minor Modifications	Rating 1-10	4.8	5.3	5.3	5.0	7.0	5.0				
	Sub Total	181	184	16	50	56	30	516	22.9	22.53	
Scenario 2 - Base Case with Minor Modifications Shifted to the West	Rating 1-10	4.8	5.0	5.3	5.0	6.5	5.3				
	Sub Total	181	173	16	50	52	32	503	23.2	21.68	
Scenario 3 - Tight Diamond with Roundabouts on South Side Only – Base Case on North Side	Rating 1-10	5.1	5.8	5.3	5.0	6.0	4.9				
	Sub Total	192	203	16	50	48	29	538	23.7	22.70	
SEEK THE BEST - NOT PERFECTION											



Final Design

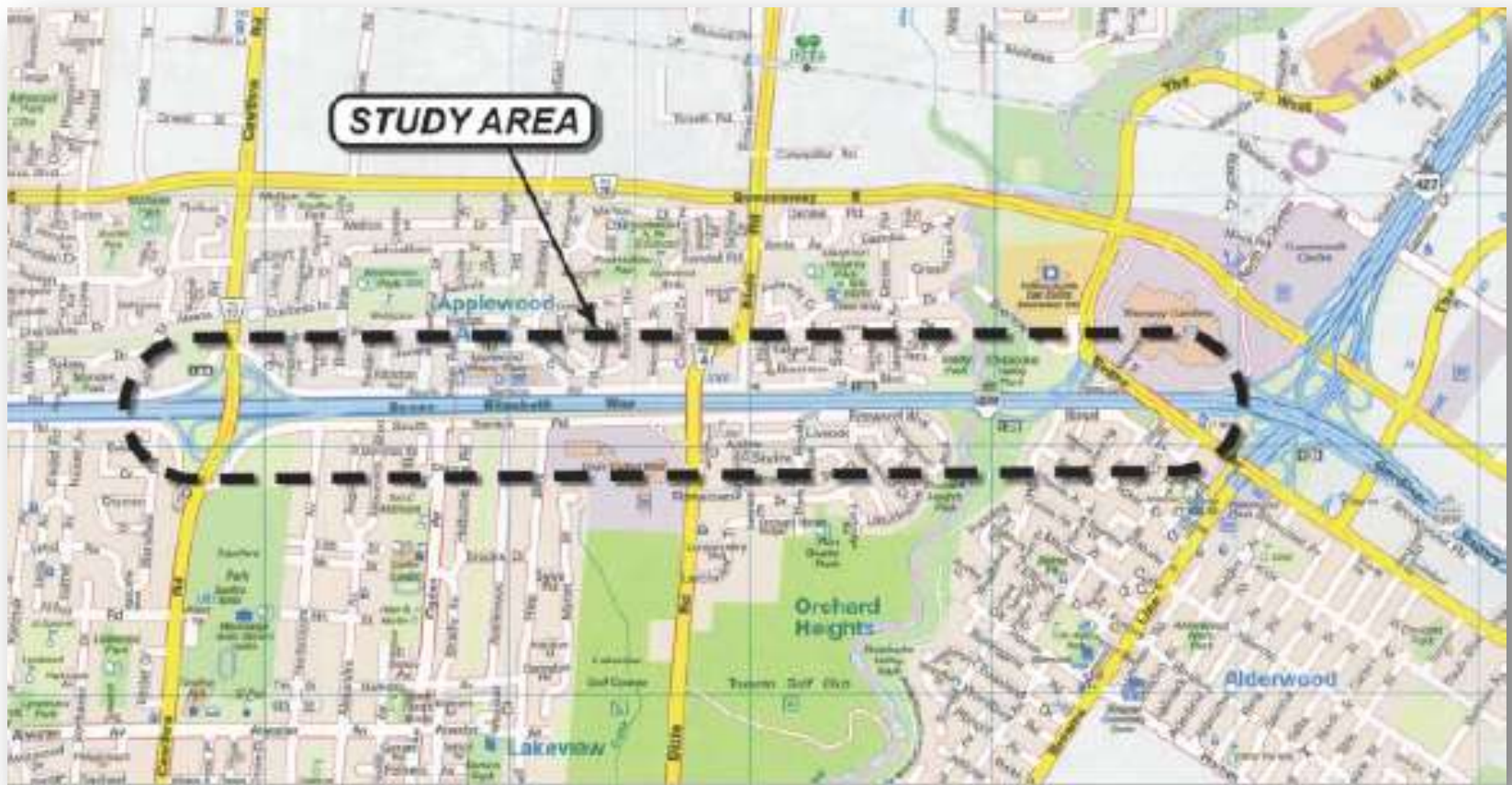
Construction of three roundabouts:

- Three-legged roundabout at the Holt Road/Highway 401 north ramp terminal
- Four-legged roundabout at the Holt Road/Highway 401 south ramp terminal
- Four-legged roundabout at the Holt Road/South Service Road intersection

Realignment and reconstruction of Holt Road including:

- Widening of Holt Road from 2 lanes to 4 lanes with fully paved shoulders
- Widening of Holt Road from 2 lanes to 4 lanes with fully paved shoulders

QEW/Evans to Cawthra

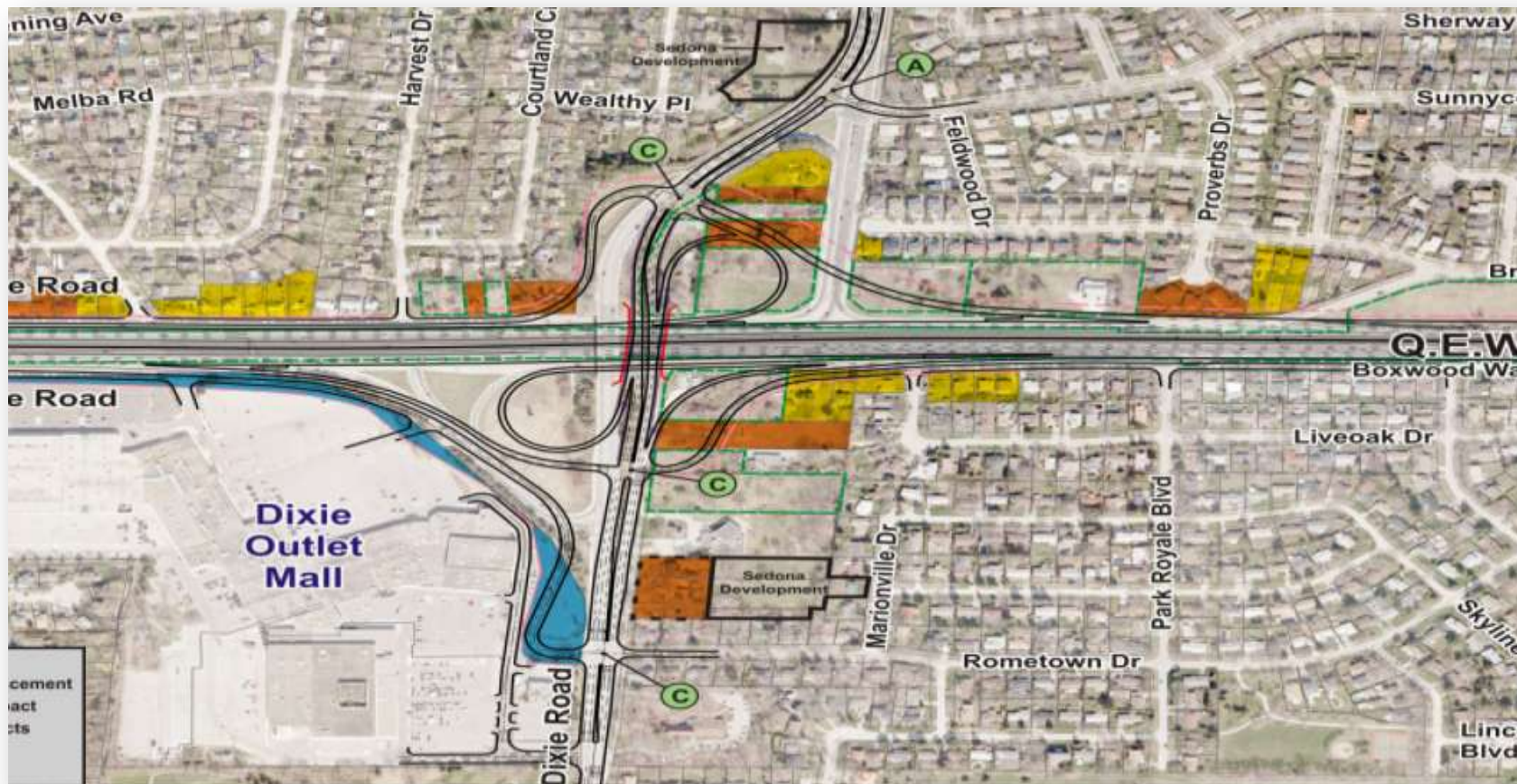


Project Background

- Replacement of bridges -Dixie Road and Etobicoke Creek bridges and Ogden Avenue Pedestrian Bridge);
- Reconfiguration of the Dixie Road interchange;
- Realignment of local service roads;
- New auxiliary lanes on the QEW from Highway 427 westbound to Cawthra Road off-ramp
- From Cawthra Road eastbound to a new Dixie Road off-ramp; and
- Localized QEW widening to maintain 6 basic lanes of traffic during construction.

QEW/Dixie - Challenges

- Narrow corridor
- Adjacent service roads and properties in close proximity
- Significant stakeholders and community interest, organized neighbourhood groups
- Study not addressing capacity issue
- EA Improved 6-lanes & Protecting for future 8-lanes
- Making use of the 12m widened Etobicoke Creek Bridge
- Closed MTO Landfill Northeast of Etobicoke Creek
- Coordination of staging between interchange and bridge
- Local business accesses
- QEW mainline alignment shift



Base Case

Property Impact



Scenario 2

Roundabout at ramp terminal

Scenario 3

Base Case



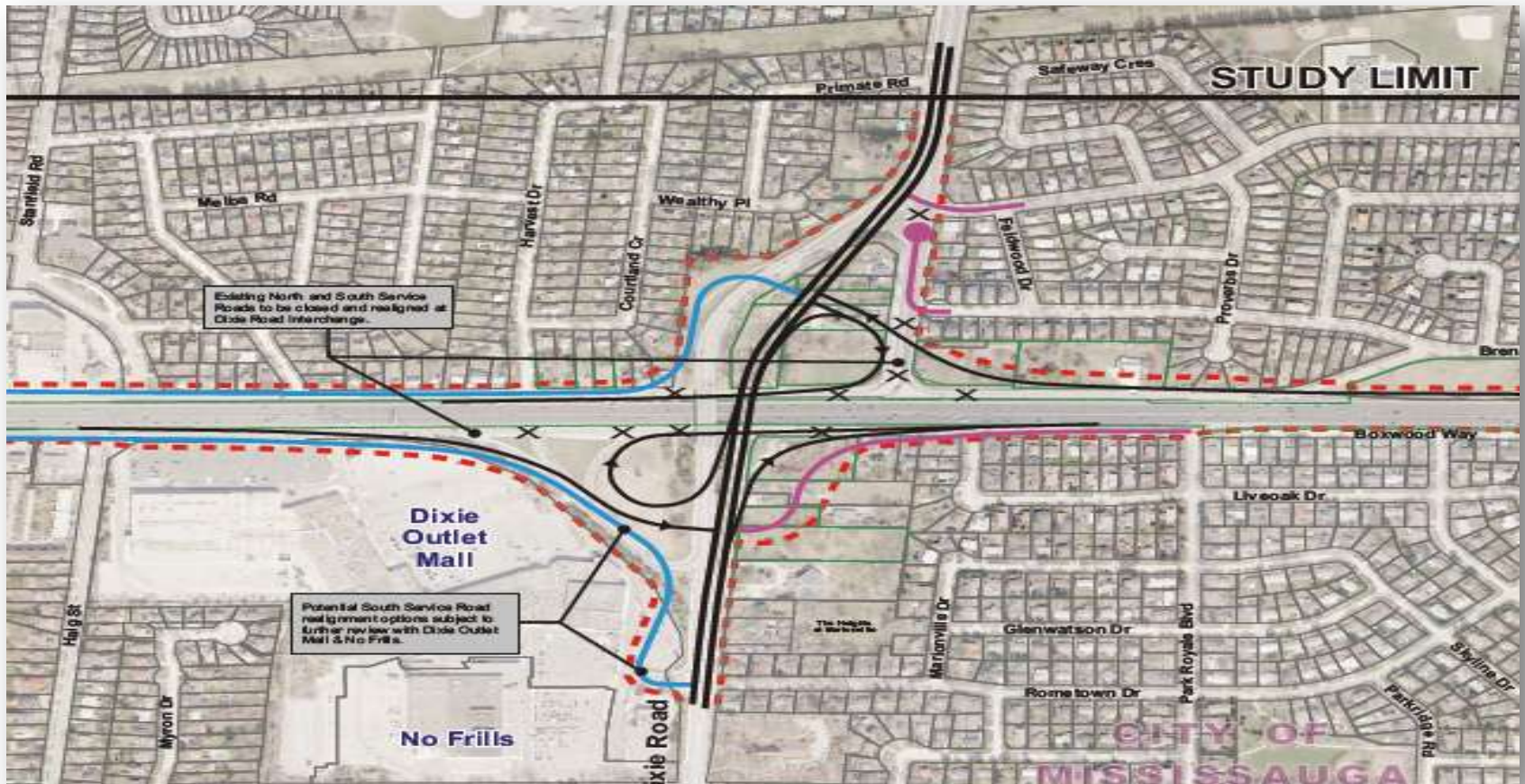
Scenario 3



Summary of VE Scenarios

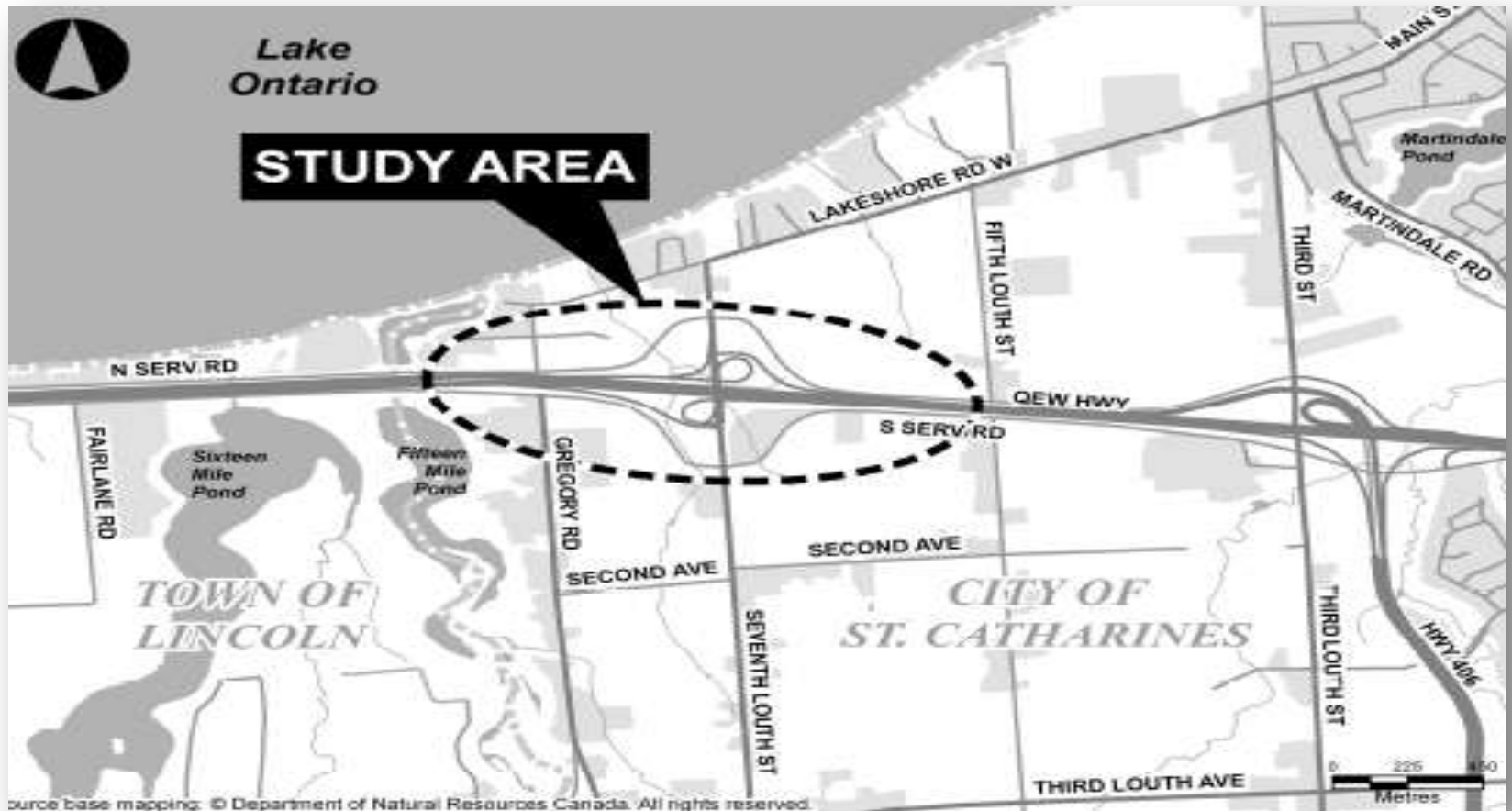
Summary of VE SCENARIOS

Scenario Description	Initial Cost Savings	Change in Schedule	Change in Performance	Value Change
Base Case: Parclo A2 (N) + Parclo A4 (S)	-	-	-	-
Scenario 1: Partial diamond interchange with roundabout ramp terminals and additional auxiliary lanes along QEW in both directions Proposals 1.2, 3.0, 4.1, 5.0, 6.0	\$12,840,000	- 24 months	+11%	+30%
Scenario 2: Build a Parclo A4 interchange with a moderate skew of the Dixie Road alignment and additional auxiliary lanes along QEW in both directions Proposals 1.1, 4.1, 5.0, 6.0	(\$8,530,000)	- 24 months	+7%	+15%
Scenario 3: Eliminate the S-W loop ramp direct taper and replace with a right turn through the intersection and additional auxiliary lanes along QEW in both directions Proposals 2.0, 4.1, 5.0, 6.0	\$2,480,000	- 24 months	+8%	+21%



Preferred Alternative Parclo A2 (N) + Parclo A4 (S)

QEW/Seventh Street



Project Background

- The existing Seventh Street Bridge was constructed in 1970
- Accommodate future widening of QEW (NGTA)
- Vehicles approaching the interchange ramp terminals from the bridge have an undesirable stopping sight distance.
- The Seventh Street S-W and N-W on-ramps do not have the adequate separation distance to allow for a standard merge.
- The shoulder widths along Seventh Street Bridge are less than the standard 1.5 m.



Alternative 1

- Higher cost
- May require traffic control signals at the south ramp terminal by 2023



Alternative 1A

- Lowest cost
- Slightly more desirable geometrics



Alternative 1A West

- Slightly more expensive to construct than Alternative 1
- Reduced length of construction for grade raise



Final Design



Ontario

MINISTRY OF TRANSPORTATION

Future Studies

- Highway 403/401/410 Interchange Accelerated bridge rehab/replacement
 - No conversion to semi integral abutments of existing structures
 - Replacing bridge structures instead of major rehabs
- GTA West
 - High speed ramps
 - Development vs standard design
- Stakeholder Consensus
 - VE is one of the tools used to build consensus GTA West
 - Holt Road

Summary

- VE was used to challenge conventional design
- Expert opinion matters
- Developing stakeholder consensus
- Replicating innovation at organizational level

Questions

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