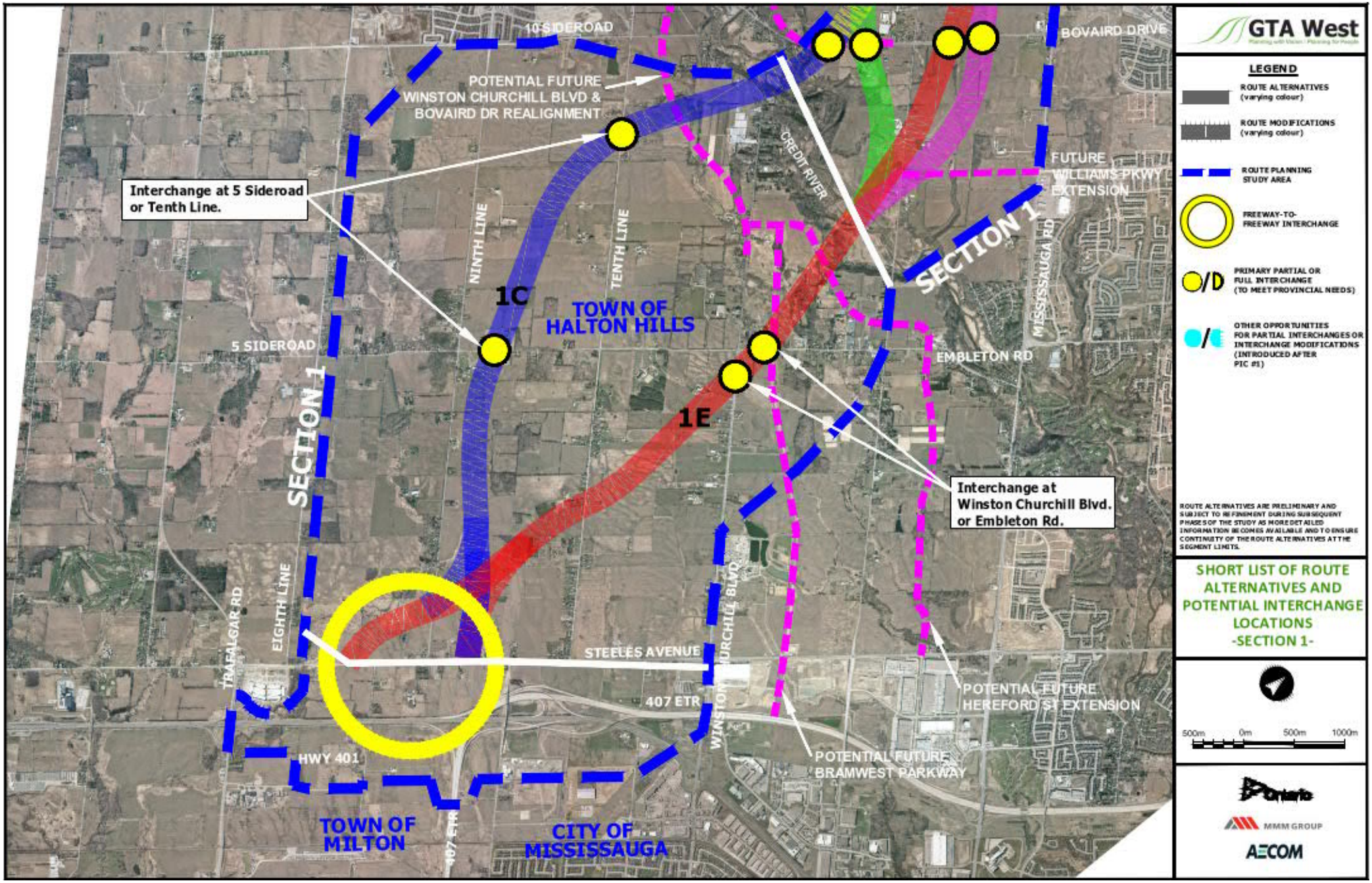
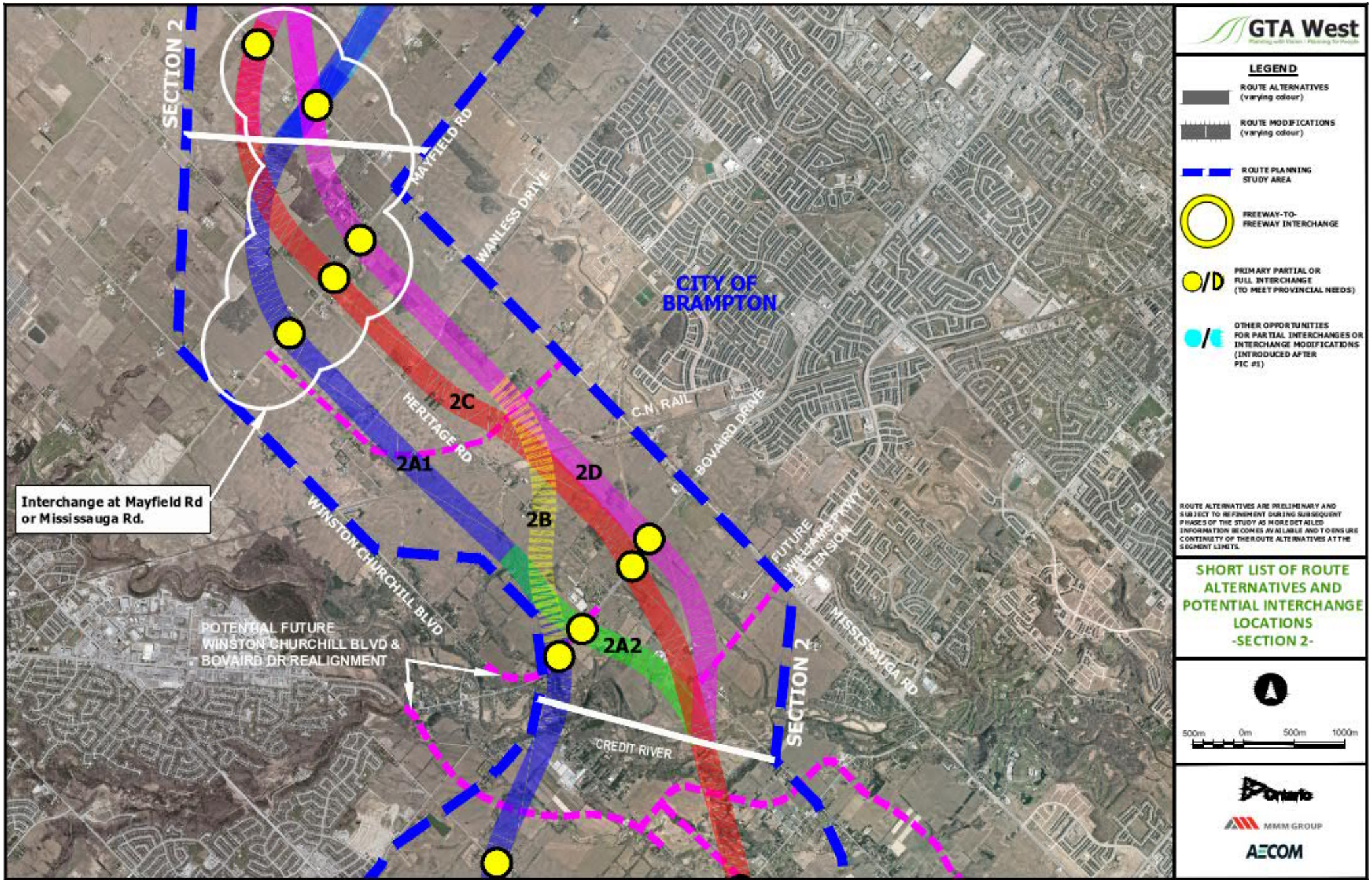
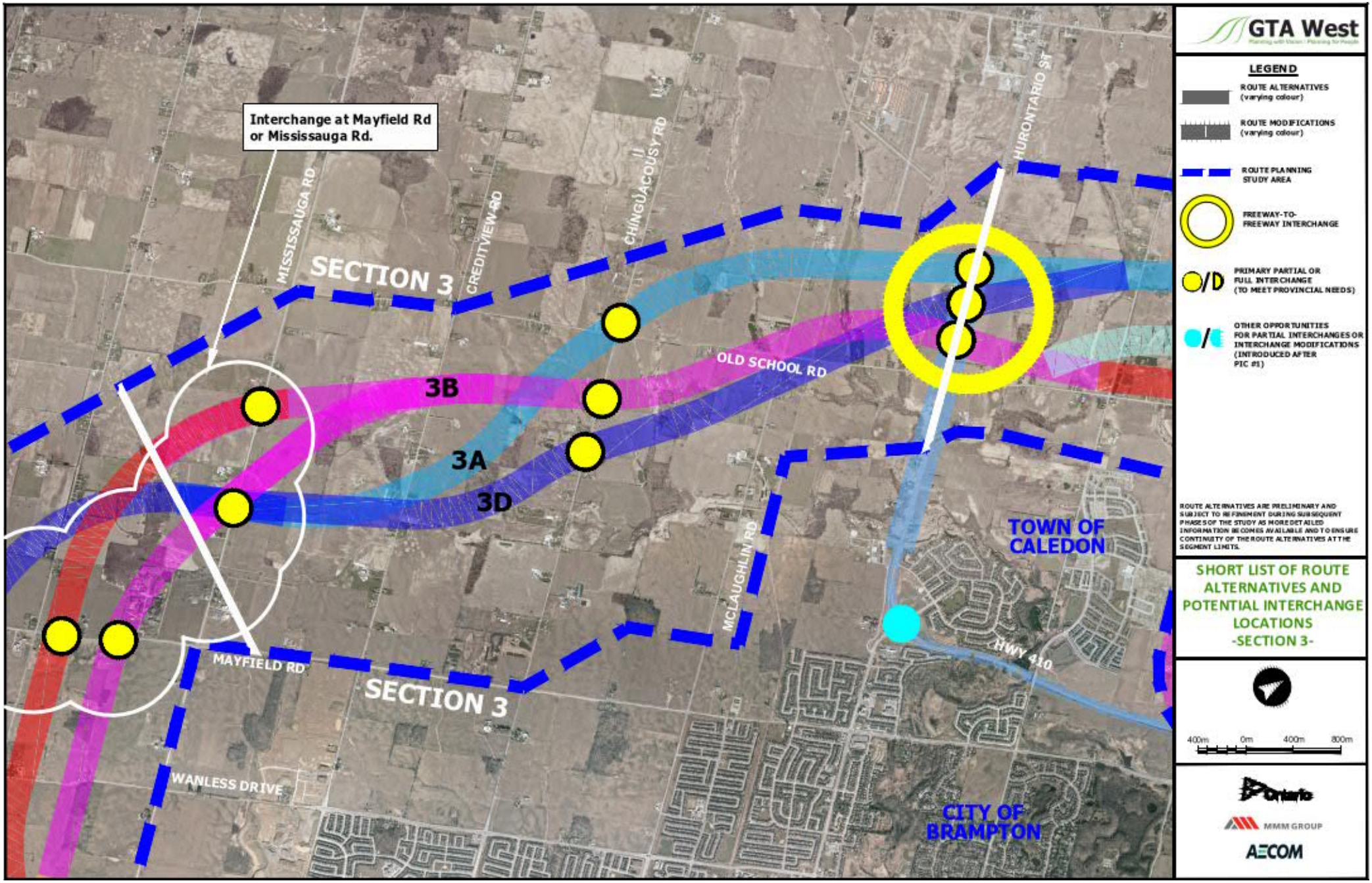
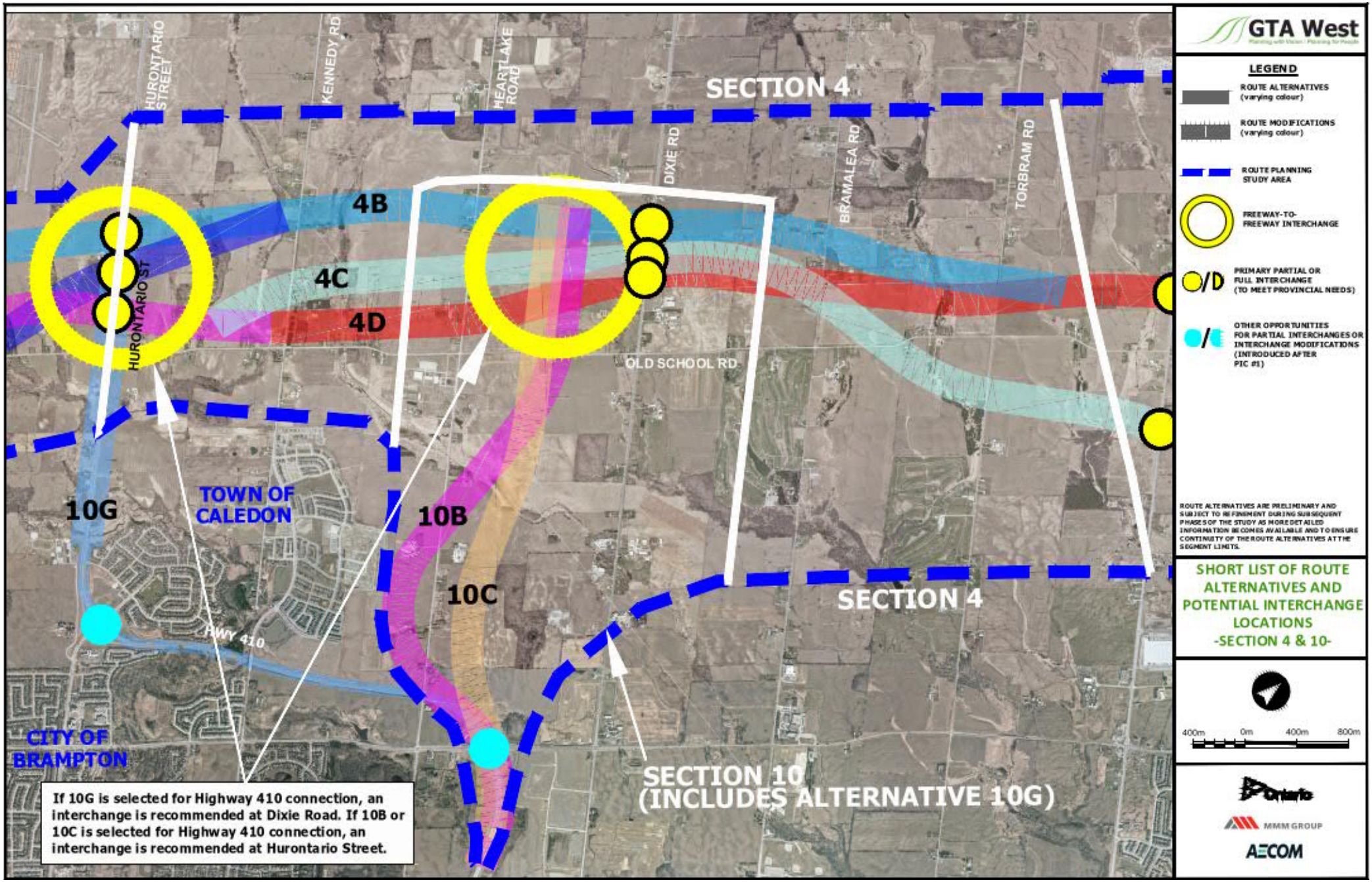
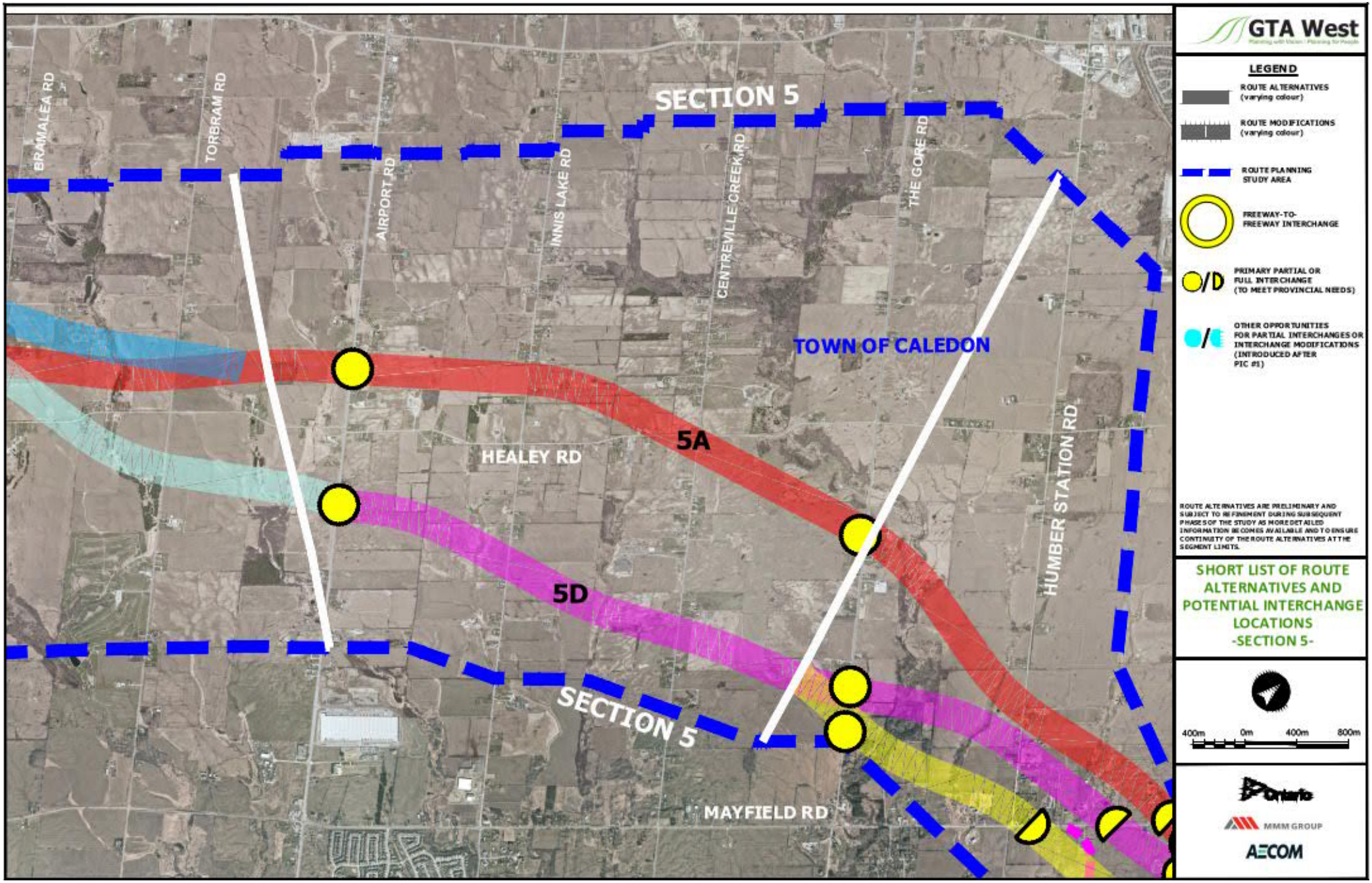
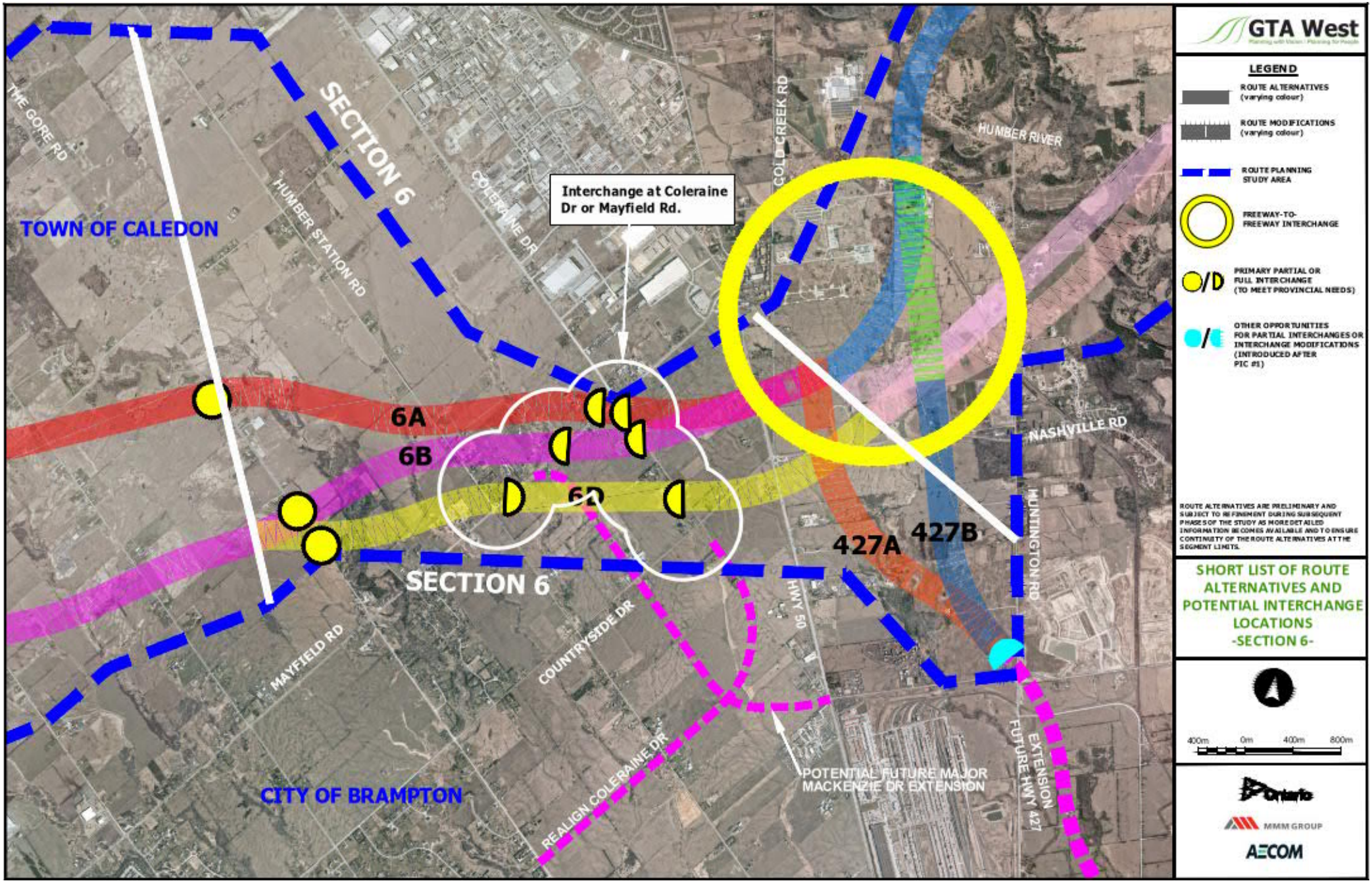

GTA West
LEGEND
ROUTE ALTERNATIVES (varying colour)
ROUTE MODIFICATIONS (varying colour)
ROUTE PLANNING STUDY AREA
FREEWAY-TO-FREEWAY INTERCHANGE
PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)
ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 1-
500m 0m 500m 1000m
Ontario
MMM GROUP
AECOM
10 SIDEROAD
BOVAIRD DRIVE
POTENTIAL FUTURE WINSTON CHURCHILL BLVD & BOVAIRD DR REALIGNMENT
CREDIT RIVER
FUTURE WILLIAMS PKWY EXTENSION
Interchange at 5 Sideroad or Tenth Line.
NINTH LINE
TENTH LINE
1C
TOWN OF HALTON HILLS
SECTION 1
MISSISSAUGA RD
5 SIDEROAD
EMBLETON RD
1E
SECTION 1
Interchange at Winston Churchill Blvd. or Embleton Rd.
TRAFALGAR RD
EIGHTH LINE
STEELES AVENUE
WINSTON CHURCHILL BLVD
407 ETR
POTENTIAL FUTURE HEREFORD ST EXTENSION
HWY 401
POTENTIAL FUTURE BRAMWEST PARKWAY
TOWN OF MILTON
407 ETR
CITY OF MISSISSAUGA

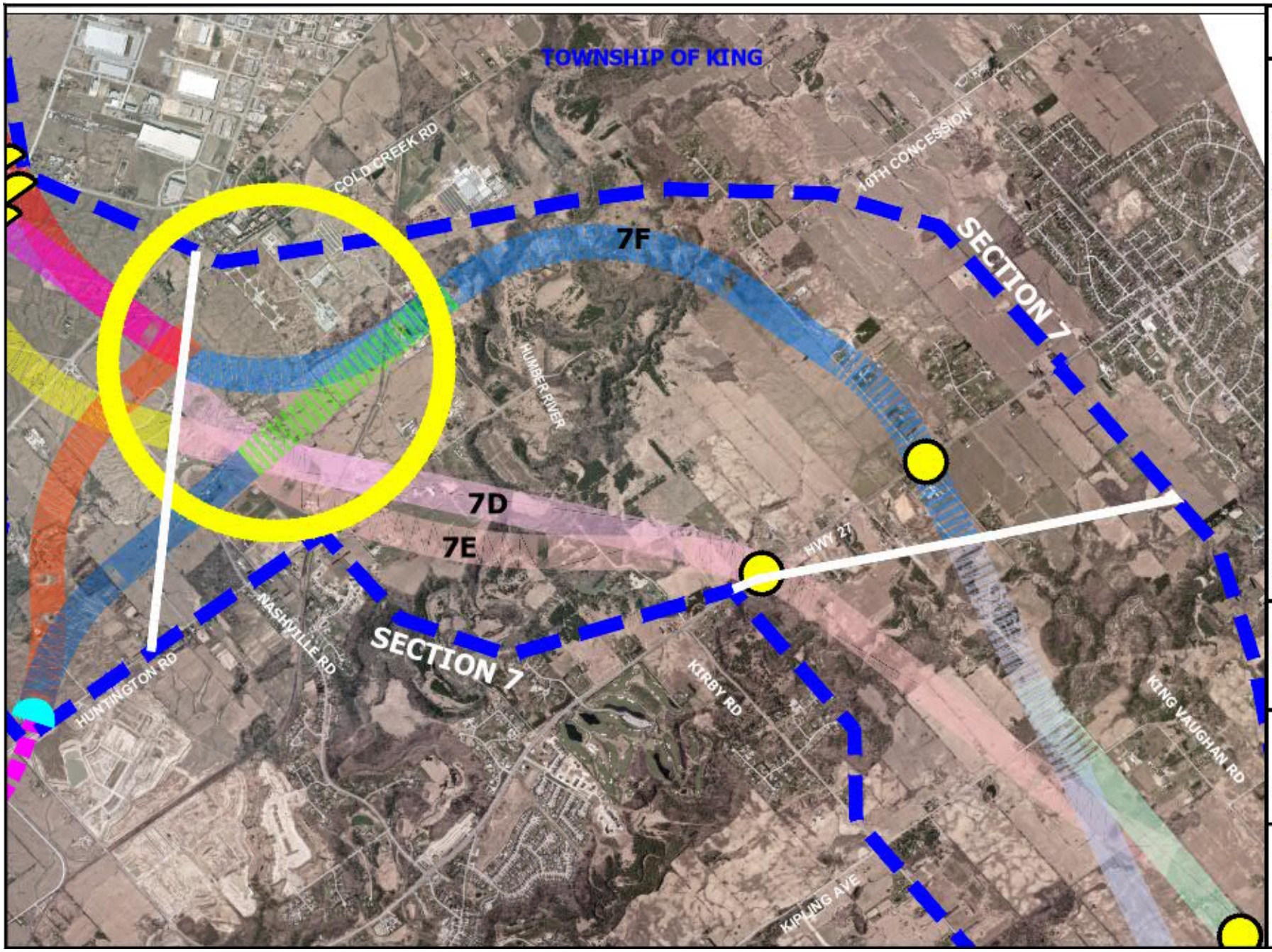

GTA West
LEGEND
ROUTE ALTERNATIVES (varying colour)
ROUTE MODIFICATIONS (varying colour)
ROUTE PLANNING STUDY AREA
FREEWAY-TO-FREEWAY INTERCHANGE
PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)
ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 2-
500m 0m 500m 1000m
Ontario
MMM GROUP
AECOM
SECTION 2
MAYFIELD RD
WANLESS DRIVE
CITY OF BRAMPTON
C.N. RAIL
BOVAIRD DRIVE
HERITAGE RD
2C
2A1
2D
2B
2A2
Interchange at Mayfield Rd or Mississauga Rd.
WINSTON CHURCHILL BLVD
POTENTIAL FUTURE WINSTON CHURCHILL BLVD & BOVAIRD DR REALIGNMENT
FUTURE WILLIAMS PKWY EXTENSION
MISSISSAUGA RD
CREDIT RIVER
SECTION 2


GTA West
LEGEND
ROUTE ALTERNATIVES (varying colour)
ROUTE MODIFICATIONS (varying colour)
ROUTE PLANNING STUDY AREA
FREEWAY-TO-FREEWAY INTERCHANGE
PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)
ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 3-
400m 0m 400m 800m
Ontario
MMM GROUP
AECOM
Interchange at Mayfield Rd or Mississauga Rd.
MISSISSAUGA RD
CREDITVIEW RD
CHINGUACOUSY RD
HURONTARIO ST
SECTION 3
OLD SCHOOL RD
3B
3A
3D
MCLAUGHLIN RD
TOWN OF CALEDON
HWY 410
MAYFIELD RD
SECTION 3
WANLESS DRIVE
CITY OF BRAMPTON


GTA West
LEGEND
ROUTE ALTERNATIVES (varying colour)
ROUTE MODIFICATIONS (varying colour)
ROUTE PLANNING STUDY AREA
FREEWAY-TO-FREEWAY INTERCHANGE
PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)
ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 4 & 10-
400m 0m 400m 800m
Ontario
MMM GROUP
AECOM
SECTION 4
HURONTARIO STREET
KENNEDY RD
HEART LAKE ROAD
DIXIE RD
BRAMALEA RD
TORBRAM RD
4B
4C
4D
OLD SCHOOL RD
HURONTARIO ST
10G
TOWN OF CALEDON
10B
10C
HWY 410
CITY OF BRAMPTON
SECTION 4
SECTION 10 (INCLUDES ALTERNATIVE 10G)
If 10G is selected for Highway 410 connection, an interchange is recommended at Dixie Road. If 10B or 10C is selected for Highway 410 connection, an interchange is recommended at Hurontario Street.


GTA West
LEGEND
ROUTE ALTERNATIVES (varying colour)
ROUTE MODIFICATIONS (varying colour)
ROUTE PLANNING STUDY AREA
FREEWAY-TO-FREEWAY INTERCHANGE
PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)
ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 5-
400m 0m 400m 800m
Ontario
MMM GROUP
AECOM
SECTION 5
BRAMALEA RD
TORBRAM RD
AIRPORT RD
INNIS LAKE RD
CENTREVILLE CREEK RD
THE GORE RD
HUMBER STATION RD
TOWN OF CALEDON
HEALEY RD
5A
5D
SECTION 5
MAYFIELD RD


GTA West
LEGEND
ROUTE ALTERNATIVES (varying colour)
ROUTE MODIFICATIONS (varying colour)
ROUTE PLANNING STUDY AREA
FREEWAY-TO-FREEWAY INTERCHANGE
PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)
ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 6-
400m 0m 400m 800m
Ontario
MMM GROUP
AECOM
TOWN OF CALEDON
CITY OF BRAMPTON
SECTION 6
SECTION 6
Interchange at Coleraine Dr or Mayfield Rd.
6A
6B
6D
427A
427B
THE GORE RD
HUMBER STATION RD
COLERAINE DR
COLD CREEK RD
HUMBER RIVER
NASHVILLE RD
HUNTINGTON RD
MAYFIELD RD
COUNTRYSIDE DR
HWY 50
REALIGN COLERAINE DR
POTENTIAL FUTURE MAJOR MACKENZIE DR EXTENSION
EXTENSION FUTURE HWY 427



GTA West

Planning with Vision / Planning for People

LEGEND

- ROUTE ALTERNATIVES (varying colour)
- ROUTE MODIFICATIONS (varying colour)
- ROUTE PLANNING STUDY AREA
- FREEWAY-TO-FREEWAY INTERCHANGE
- PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
- OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)

ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.

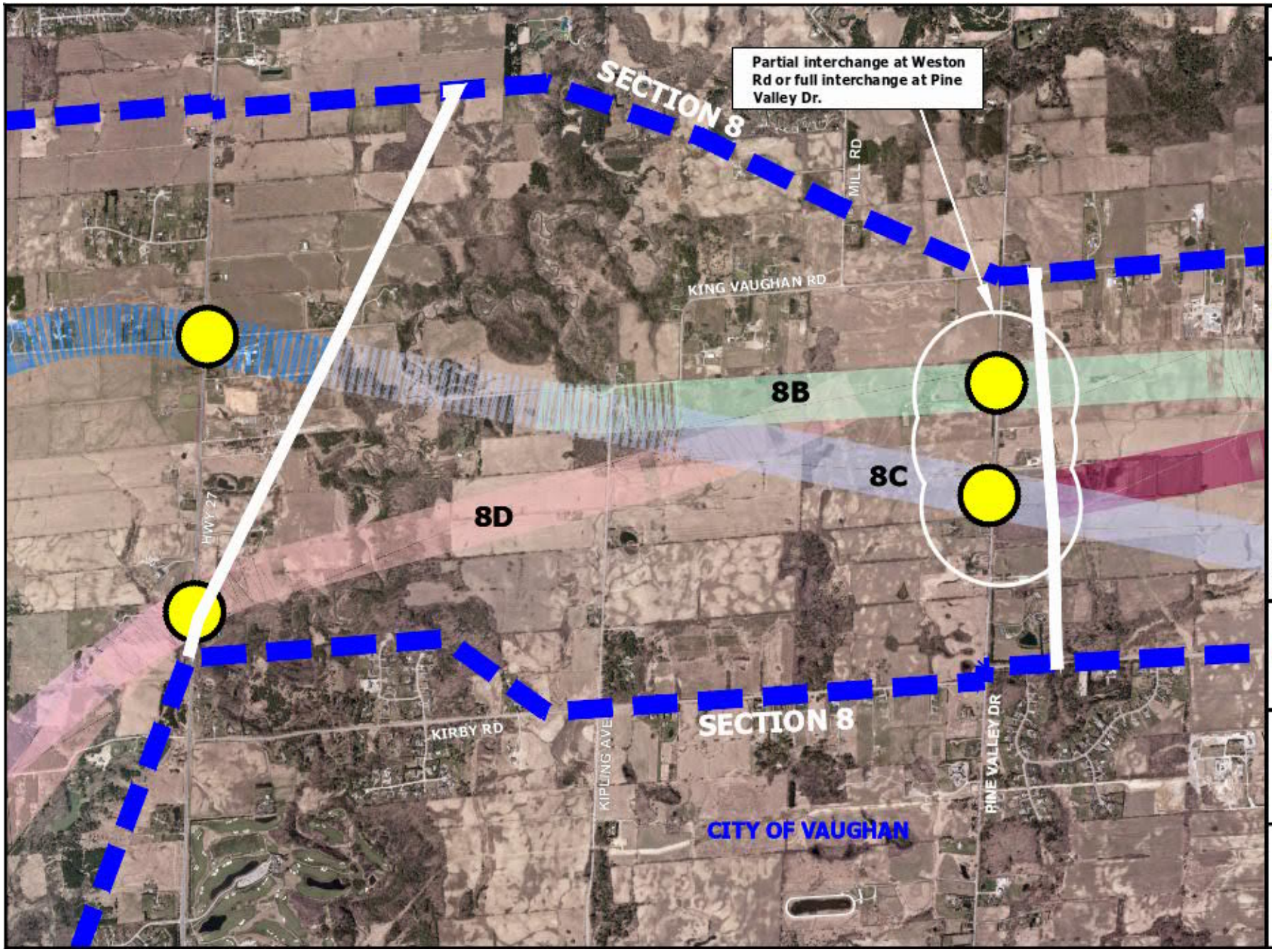
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 7-

400m 0m 400m 800m

Ontario

MMM GROUP

AECOM



GTA West

Planning with Vision | Planning for People

LEGEND

- ROUTE ALTERNATIVES (varying colour)
- ROUTE MODIFICATIONS (varying colour)
- ROUTE PLANNING STUDY AREA
- FREEWAY-TO-FREEWAY INTERCHANGE
- PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
- OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)

ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.

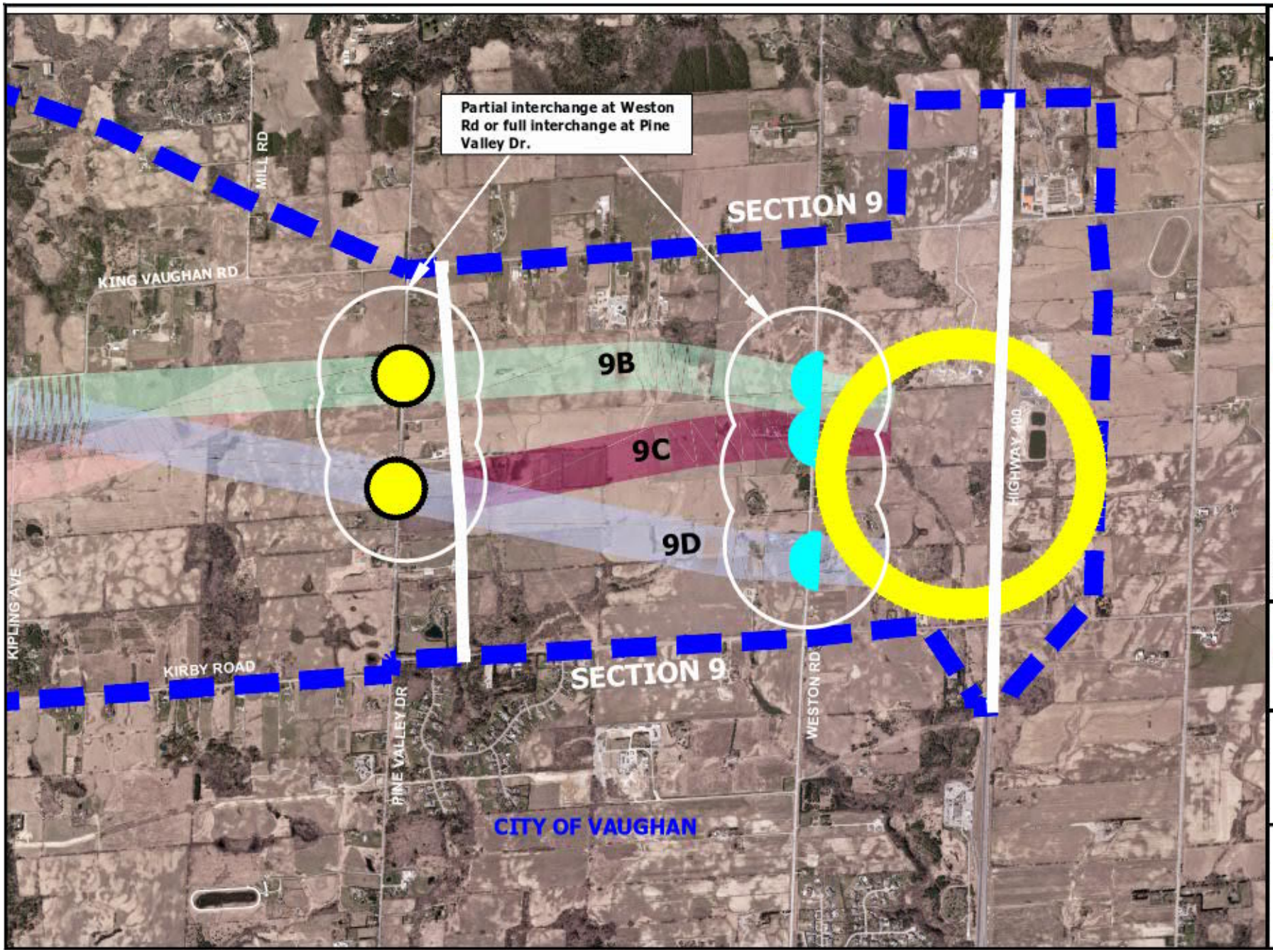
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 8-

250m 0m 250m 500m

Ontario

MMM GROUP

AECOM



GTA West

LEGEND

- ROUTE ALTERNATIVES (varying colour)
- ROUTE MODIFICATIONS (varying colour)
- ROUTE PLANNING STUDY AREA
- FREEWAY-TO-FREEWAY INTERCHANGE
- PRIMARY PARTIAL OR FULL INTERCHANGE (TO MEET PROVINCIAL NEEDS)
- OTHER OPPORTUNITIES FOR PARTIAL INTERCHANGES OR INTERCHANGE MODIFICATIONS (INTRODUCED AFTER PIC #1)

ROUTE ALTERNATIVES ARE PRELIMINARY AND SUBJECT TO REFINEMENT DURING SUBSEQUENT PHASES OF THE STUDY AS MORE DETAILED INFORMATION BECOMES AVAILABLE AND TO ENSURE CONTINUITY OF THE ROUTE ALTERNATIVES AT THE SEGMENT LIMITS.

SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS -SECTION 9-

250m 0m 250m 500m

Ontario

MMM GROUP

AECOM

GTA West Corridor
Environmental Assessment

Updated (June 2015)

Summary of Evaluation Factors and Criteria for Alternative Methods

Appendix A - Summary of Evaluation Factors and Criteria For Alternative Methods

FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
1. NATURAL ENVIRONMENT						

1.1 Fish and Fish Habitat	1.1.1 Fish Habitat	Potential degree of/scale of negative effects on fish habitat (extent, duration, intensity), considering sensitivity of fish habitat, e.g.:
		• critical/specialized fish habitat features
		• rarity of habitat types
		• habitat resilience
		• relative importance of riparian areas
		• habitat rehabilitation goals, as relevant
		
		Potential to design crossing or adjacent transportation corridor section to avoid serious harm to fish habitat.
			Number watercourse and waterbody crossings, considering sensitive habitat features and functions and complexity of crossing site in relation to degree of impact. General measures of sensitivity include: presence of Species at Risk (SAR) or coldwater species with specific habitat dependencies, critical/specialized habitat and features or functions that are less common or limiting to the system, etc. Siting considerations, including crossing of highly meandering reach/major bend, complex valley, mature/intact riparian and floodplain system etc.
			
			Number and relative length of channel sections potentially requiring realignment (and relative complexity).
				• The crossing of water bodies by transportation facilities has the potential to affect fish and fish habitat features through impediments to fish passage, loss of vegetation, changes to channel fluvial geomorphology (channel form and function), substrate and cover, changes to the water quality due to erosion and sedimentation, stormwater discharge and temperature changes, etc.
				• The relative overall impact is higher (and potential for mitigation effectiveness lower or more difficult) for crossings that support less common and/or more sensitive fish communities and habitat features and functions.
				• Siting issues include:
				  • Meandering crossings create design challenges and tend to be more 'unstable'/subject to migration than straight riffle sections.
				  • Steep valley slopes and intact vegetation communities create access issues and greater overall disturbance.
				  • Presence of groundwater discharge creates construction issues and potential slope instability and obstruction affects coldwater fish and fish habitat.
				• Channel realignment requires considerable effort to replace habitat features and functions, particularly in more complex habitats, and reduces productivity in the short to medium term. Some functions are difficult to reinstate and certain habitat and physical conditions create construction and re-stabilization challenges.
				• The federal *Fisheries Act* prohibits serious harm to fish including the obstruction of fish passage unless authorized by Fisheries and Oceans Canada (DFO). Where effects cannot be mitigated and the project works may result in serious harm to fish, the works may proceed with authorization by DFO, usually supported by a plan that includes measures designed to off-set the loss.
				• Certain fish species and habitats are more sensitive than others. Species such as Brook Trout are dependent on specific habitat functions such as groundwater, and interference which can result in significant impacts to the population.
				• Certain species of fish are also protected by the Endangered Species Act (ESA) and/or the Species at Risk Act (SARA). The rarity of these species elevates their sensitivity and many are depending on specific habitat features that are often not well understood.
				• Provincial Policy Statement (PPS) Policy 1.6.8.5 stipulates that when planning for corridors and rights-of-way for significant transportation facilities, consideration will be
					• Fisheries and Oceans Canada (DFO) Species at Risk (SAR) mapping
					• Ontario Ministry of Natural Resources and Forestry (MNRF) fish records and databases
					• MNRF Natural Resource Values Information System (NRVIS), Land Inventory Ontario (LIO), Natural Heritage Information Centre (NHIC)
					• Conservation Authorities (ex. Fish records, inventories, monitoring studies)
					• Fisheries Management Plans for long-term management goals, as well as Watershed and Subwatershed studies, and other development related studies (ex. Environmental Impact Statements)
					• 2015 Field investigations
					• Interest groups
					• Public consultation
					• First Nations and Métis communities
					• SAR Recovery Plans, Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status/assessment reports, etc.
					• Direct consultation with agency staff
					• DFO – Conservation Authorities Agricultural Drain Database
						Updated factor title to "Fish and Fish Habitat".
						
						Legislation, agency references and data sources updated in response to legislative and policy amendments since 2007.

	1.1.2 Fish Community	Potential degree of/scale of negative effects on fish (extent, duration, intensity) considering sensitivity of fish, e.g.: • species sensitivity to disturbance • species rarity, including species at risk (special concern, threatened or endangered fish species) • fish dependence on habitat (e.g. specialized/critical fish life stage processes like spawning, rearing, nursery, feeding) and fish movement/migration • long-term fish community management goals Potential to design crossing or adjacent transportation corridor section to avoid serious harm to fish.	Number of crossing locations based on nature and sensitivity of fish communities (e.g., locations with Species at Risk, coldwater species, etc.). Number and location of crossings of specialized aquatic habitat which provides for various critical life stages.			Legislation, agency references and data sources updated in response to legislative and policy amendments since 2007.

Appendix A - Summary of Evaluation Factors and Criteria For Alternative Methods

FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
				given to significant natural heritage, water, agricultural, mineral, cultural heritage and archaeological resources. • Relevant aspects of the PPS also include minimizing impacts to water quality and quantity of surface water, including headwater areas and groundwater and related functions.		
1.2 Terrestrial Ecosystems	1.2.1 Wildlife and Wildlife Habitat	Potential and significance of encroachment, fragmentation, removal long-term alteration/ disruption as applicable to the following: • Habitat rarity (i.e. representation on landscape) • Habitat sensitivity / resilience • Habitat diversity within feature and landscape • Habitat function within feature and landscape • Confirmed Significant Wildlife Habitat • Potential Significant Wildlife Habitat • Movement corridors and habitat connectivity • Potential or confirmed habitat for Species at Risk • Presence of wildlife Species at Risk • Presence of wildlife of local and regional importance • Interference with critical wildlife life stage processes (e.g. mating/rearing, etc.) Consideration of impacts to individuals of species or species groups and impacts to their respective habitats will be considered. Opportunities to design crossings or transportation corridor section(s) to avoid or minimize impacts to Wildlife and Wildlife Habitat.	General measures will include those outlined in the Ecoregion Criterion schedules 6E and 7E. These measures include habitat community types, sizes and the presence and number of indicator species observed within suitable communities as outlined in the schedules. Area and number of potential habitats for species at risk (SAR) and species of conservation concern (SCC) crossed by each alternative.	• Construction of transportation facilities has the potential to affect wildlife and wildlife habitat through direct and indirect impacts including: mortality, harm and / or harassment of individuals (wildlife), direct removal or changes to wildlife habitat (composition, introduction of invasive species, etc.), loss of diversity, noise, light and runoff (water, spray, sediment, etc.), habitat avoidance, edge impacts, etc. • Consideration for the species assemblages, biology (e.g. life cycle), movement, etc. will be considered in assessing route alternatives. Movement and or an ability to transfer material may impact existing feature form and function and its support of wildlife species. • Species at Risk are legislatively protected (ESA, SARA) and are generally more susceptible to stressors (e.g. changes to their habitat). Consideration for the maintenance and / or protection for the species will be considered. • Regionally rare and provincially rare species will also be considered in the assessment of diversity, significance and sensitivity • The Migratory Birds Convention Act (MBCA) provides protection for migratory bird species (as listed), their nests and their young. • PPS Policy 1.6.8.5 stipulates that when planning for corridors and rights-of-way for significant transportation facilities, consideration will be given to significant natural heritage, water, agricultural, mineral, cultural heritage and archaeological resources.	• NHIC • MNRF • Conservation Authorities • Species at Risk Recovery Plans and Management Guidelines (where available) • MNRF Significant Wildlife Habitat Technical Guide • Significant Wildlife Habitat Criterion Schedules for Ecoregions 6E &7E, MNRF (draft 2012) • MNRF Natural Heritage Reference Manual • 2015 Field investigations • First Nations and Métis communities • Atlas of Breeding Birds of Ontario, 2001-2005 www.birdsontario.org/atlas/index.jsp?lang=en	Legislation, agency references and data sources updated in response to legislative and policy amendments since 2007. References to the Niagara Escarpment Plan have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area. The sub-factors of "Wildlife" and "Wildlife Habitat" were combined, given the overlap and similarity in content.
	1.2.2 Wetlands	Potential and significance of encroachment, fragmentation, removal and/or long-term alteration/ disruption on wetlands features as applicable to the following: • Provincially Significant Wetlands • Non-Provincially Significant Wetlands • un-evaluated wetlands • lands adjacent to wetland features required to maintain ecological features and functions • rarity, feature sensitivity / resilience, feature diversity, size and representation on the landscape. Opportunities to design crossings or transportation corridor section(s) to avoid or minimize impacts to wetlands.	Area or number of wetlands crossed by each alternative – includes Provincially Significant Wetlands (PSWs), non-PSWs and PSW status to be determined.	• Wetlands serve ecological functions to varying degrees including groundwater recharge/discharge, flood attenuation, wildlife movement corridors, habitat for flora and fauna, and water filtration. • Wetlands may be impacted through direct and indirect impacts – including, but not limited to direct removals, changes to hydrological regime within or in adjacent areas that support wetland features, impacts to water quality, introduction of invasive species, and indirect impacts to the species assemblages that use wetland features. • Wetlands offer habitat opportunities for Species at Risk, provincially and regionally rare species, and area sensitive / disturbance sensitive species. • Section 2.1.2 of the PPS recognizes the connectivity and linkages between natural heritage features to maintain or enhance	• MNRF • NHIC • MNRF wetland mapping • Ontario Wetland Evaluation System • Conservation Authorities (i.e., regulatory mapping if available, identification of non-provincially significant wetlands) • MNRF Natural Heritage Reference Manual • 2015 Field investigations • First Nations and Métis communities • Wetland Management Plans or Areas	Legislation, agency references and data sources updated in response to legislative and policy amendments since 2007. References to the Niagara Escarpment Plan / Niagara Escarpment Commission have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area.

Appendix A - Summary of Evaluation Factors and Criteria For Alternative Methods

FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
				natural heritage systems where possible, including groundwater and surface water connectivity with natural heritage features and functions. • PPS Policy 1.6.8.5 stipulates that when planning for corridors and rights-of-way for significant transportation facilities, consideration will be given to significant natural heritage, water, agricultural, mineral, cultural heritage and archaeological resources.		
	1.2.3 Woodlands and Vegetation	Potential and significance of encroachment, fragmentation, removal and the long-term alteration/ disruption as applicable to the following: • significant woodlands • significant valley lands • rarity, feature sensitivity/resilience, feature diversity, size and representation on the landscape • individuals/populations or habitats for vegetation Species at Risk • individuals / populations or significant habitat representation for vegetation species of provincial or regional / local conservation Opportunities to design crossings or highway section(s) to avoid or minimize impacts to woodlands and other vegetation.	Area of impact on significant woodlands, large intact habitat blocks, and associated wildlife habitat. Area of vegetation patches not associated with woodlands but may provide habitat for specialized species, (i.e. grassland birds, early-successional significant wildlife habitat, etc.).	• Woodlands serve ecological functions to varying degrees including providing multi-trophic habitat for wildlife, soil stability, carbon cycling, etc. • Woodlands may be impacted through direct and indirect impacts – including, but not limited to direct removals, changes to lot size, fragmentation, introduction of invasive species, and indirect impacts to the species assemblages that use woodland features. • Portions of the study area are located within the Carolinian Zone and may have important representations of Carolinian species assemblages. • Small degraded, isolated remnant woodlots and wetlands can have ecological value. • Large natural and relatively undisturbed features have high ecological sensitivity and value. • Woodlands and other vegetation communities (e.g. prairies / grasslands) offer habitat opportunities for Species at Risk, provincially and regionally rare species, and area sensitive / disturbance-sensitive species.	• NHIC • LIO / NRVIS • MNRF • MNR Natural Heritage Reference Manual (2010) • Conservation Authorities • Significant Wildlife Habitat Technical Guide • Management Plans • 2015 Field investigations • First Nations and Métis communities • Vegetation management, rehabilitation/research program sites	Legislation, agency references and data sources updated in response to legislative and policy amendments since 2007. References to the Niagara Escarpment Plan have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area.
	1.2.4 Designated/Special/ Natural Areas	Potential and significance of encroachment, fragmentation and removal, and long-term alteration/ disruption as applicable to the following: • purpose / rationale for original designation (i.e. relative potential to affect the core feature / function designated); • impact to the designated feature / function; • change in area character/ aesthetics of the features / area; • impact to the overall designation (i.e. does the impact potential effect the purpose of the designation). Designated natural areas, such as heritage rivers, Environmentally Significant Areas (ESAs), Environmentally Sensitive Policy Areas, Areas of Natural and Scientific Interest (ANSIs), Natural Heritage System(s), conservation lands (e.g. management tracts, reserves); and the designated special areas of national parks, provincial parks, conservation areas, etc.	Numbers or areas of ESAs, ANSIs, Greenbelt areas affected by each route alternative	• Elements of the features and functions may be captured under other criteria, however specific consideration must be given to designated areas as they may represent as a whole: o High quality examples of life or earth science features o A connected system designed for the maintenance or enhancement of natural features and functions at a regional or provincial scale o Recognition of the area relative to historic, aboriginal and/or social importance • Designated features have already been evaluated against a set of criteria to determine their significance at scale (municipal, provincial, federal), and due consideration should be made for these features within the evaluation of alternatives. • PPS Policy 1.6.8.5 stipulates that when planning for corridors and rights-of-way for significant transportation facilities, consideration will be given to significant natural heritage, water, agricultural, mineral, cultural heritage and archaeological resources.	• Identified by municipality, Conservation Authority, MNRF, Interest Groups or other background sources • Bird Studies Canada • Significant Wildlife Habitat Technical Guide • MNRF Natural Heritage Reference Manual • Greenbelt Plan • Oak Ridges Moraine • First Nations and Métis communities • 2015 Field investigations	Legislation and agency references updated in response to legislative and policy amendments since 2007. References to the Niagara Escarpment Plan have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area.

Appendix A - Summary of Evaluation Factors and Criteria For Alternative Methods

FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
1.3 Ecosystem Services		The relative potential impact for each corridor alternative on ecosystem services. Ecosystem services are the direct and indirect benefits to human well-being that are provided by healthy functioning ecosystems.	Measures and methods of assessment for ecosystem services may include: • Total area impacted (by land cover type or service) • Cost analysis examining services by land cover type • Cost analysis examining land cover type by total services provided	The innovative concept of ecosystem services was discussed as part of the Greenbelt Transportation Advisory Group workshops and meetings and is being incorporated in the current evaluation process. Ecosystem services are being integrated as a mechanism to measure impacts to ecosystem services for each route alternative by assigning values to non-market services. This allows the Project Team and MTO to consider the relative impact on ecosystem services between each route alternative. It is important to note that ecosystem services at this stage does not consider mitigation opportunities to reduce the magnitude of impacts, nor does it consider the potential cost of indirect impacts.	• Southern Ontario Land and Resource Information System • Estimating Ecosystem Services in Southern Ontario (MNRF, 2009)	Added as per recommendation in the *Guideline for Planning and Design of the GTA West Corridor Through the Greenbelt (Final Draft August 2013)*, and in consultation with the Greenbelt Transportation Advisory Group.
1.4 Groundwater	1.4.1 Areas of Groundwater Recharge or Discharge	Potential and significance of alteration to areas of groundwater recharge or discharge due to physical intrusion or groundwater interception, draw-down, impoundment, obstruction, or soil compaction affecting groundwater base-flow and quality.	Number and distance of groundwater recharge / discharge areas to the route alternative	Section 2.2 of the PPS identifies that the quality and quantity of water (including groundwater) should be protected improved or restored. Transportation facilities have the potential to effect groundwater resources through removal of recharge areas, interference with discharge areas/shallow groundwater zones, and introduction of contaminated runoff. Consequently, effects to areas identified as being susceptible to groundwater contamination and/or interference should be avoided/ minimized to the extent possible. Adherence to the Clean Water Act and Ontario Water Resources Act is also required.	• Groundwater Studies funded by the Ministry of the Environment and Climate Change (MOECC) • Clean Water Act • Ontario Water Resources Act • Geological Mapping • MOECC well record data • Permit to Take Water (PTTW) records • Watershed and subwatershed studies • PPS, 2014 and associated MNRF Natural Heritage Reference Manual • 2015 Field investigations • First Nations and Métis communities • Source Water Protection Plans	Legislation, agency references and data sources updated. References to the Niagara Escarpment Plan have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area.
	1.4.2 Groundwater Source Areas and Wellhead Protection Areas	Potential and significance of alteration to groundwater source areas and wellhead protection areas due to physical intrusion, or groundwater interception, draw-down, impoundment, obstruction and by soil compaction.	Sensitivity (i.e. well depth and / or aquifer unit), number and distance of groundwater source areas and wellhead protection areas to the route alternative			
	1.4.3 Large Volume Wells	Potential and significance of alteration to large volume wells due to physical intrusion or groundwater interception, draw-down, impoundment, obstruction and by soil compaction.	Sensitivity (i.e. well depth and / or aquifer unit), number and distance of large volume wells to the route alternative			
	1.4.4 Private Wells	Potential and significance of alteration to private well use due to physical intrusion, or groundwater interception, draw-down, impoundment, obstruction and by soil compaction	Number and distance of shallow wells and reliance of households on groundwater use			
	1.4.5 Groundwater-Dependent Commercial Enterprises	Potential and significance of alteration to groundwater use by groundwater-dependent commercial enterprises due to physical intrusion, or groundwater interception, draw-down, impoundment, obstruction and by soil compaction.	Number and distance of groundwater dependent commercial enterprises to the route alternative.			
	1.4.6 Groundwater-Sensitive Ecosystems	Potential and significance of alteration to groundwater-sensitive ecosystems due to physical intrusion, or groundwater interception, draw-down, impoundment, obstruction and by soil compaction.	Number and distance of groundwater sensitive ecosystems to the route alternative. Severity of expected groundwater dewatering / obstruction and sensitivity of ecosystems relying on groundwater			
1.5 Surface Water	1.5.1 Watershed / Subwatershed Drainage Features/Patterns	Potential and significance of: • encroachment, severance, displacement; • long-term alteration/ disruption as applicable to the following: • watercourse crossings (permanent, intermittent and ephemeral) • floodplain • riparian areas • sensitive headwater areas • watershed and subwatershed management plans The approach to the fluvial assessment will be	Number of watercourse crossings. Number of crossings of sensitive reaches from a fluvial and slope stability perspective.	• It is an objective of Section 2.2 of the PPS, 2014, to protect, improve or restore the quality and quantity of surface water, including headwaters. • The crossing of water bodies by transportation facilities has the potential to affect fish and aquatic habitat features through impediments to fish passage, loss of vegetation, changes to channel geomorphology (channel form and function), substrate and cover, changes to the water quality due to erosion and sedimentation, stormwater discharge and temperature changes. MOE's Guidelines for the Evaluation of Construction Activities Impacting on Water	• Topographic maps • Base maps • Watershed Management Plans • Watershed and Subwatershed Studies • Conservation Authorities (i.e., regulatory mapping if available) • Provincial Water Quality Monitoring Network • MOECC data • HYDAT (Environment Canada) data • MNRF field studies • Papers available at: www.sustainabletechnologies.ca/	Legislation, data sources and agency references updated.

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FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
		confirmed, reviewed and made acceptable to reviewing agencies.		Resources will be referenced.	• MTO Highway Drainage Design Standards (2008) • TRCA/CVC Low Impact Development Stormwater Management Manual (2008) • Stormwater Management and Watercourse Impacts: The Need for a Water Balance Approach (Aquafor Beech Limited, November 2006) • Water Budget Discussion Paper (Gartner Lee Limited, October 2006)	
	1.5.2 Surface Water Quality and Quantity	Potential and significance of effects on quality through direct and indirect discharges of contaminated and sediment-laden run-off Potential and significance of effects on hydrology due to changes in ground permeability, modifications to surface drainage patterns and alterations of water bodies	Increase in percent impervious area on an outlet by outlet (receiving watercourse) basis Percentage of new impervious areas that can be serviced by SWM practices Number and extent of flow diversions as they relate to watercourses and wetlands			
1.6 Air Quality and Climate Change	1.6.1 Local and regional air quality impacts; greenhouse gas emissions	Comparison of total air contaminant emissions and total greenhouse gas emissions for the various alternatives (Regional Assessment). Route alternatives will also be compared with respect to local community exposure. The approach will be based on emissions and dispersion models.	Each alternative will be evaluated based on the number of sensitive receptors within various exposure intervals (as predicted from modelling), the magnitude of the exposure relative to the relevant provincial / federal thresholds and sensitivity of the receptor (e.g., residence versus a hospital or school).	• Consistent with MTO's Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects,	• Ambient air quality data from MOECC and Environment Canada • Emission models to predict vehicle emission rates of pollutants and greenhouse gases • Pollutant dispersion models to predict ambient air pollutant concentrations • Air quality guidelines, criteria and standards • Traffic volumes • Imagery showing surrounding land use	Agency references and data sources updated.
2. LAND USE / SOCIO-ECONOMIC ENVIRONMENTAL						
2.1 Land Use Planning Policies, Goals, Objectives	2.1.1 First Nation Land Claims	Potential and significance of encroachment, severance, displacement to areas for which there are First Nations outstanding land claims	Qualitative assessment of the potential and significance of each route's encroachment, severance and/or displacement to areas for which there are outstanding First Nations land claims.	• It is important that First Nation land claims within the Study Area are documented • The *Growth Plan* outlines a planning vision for the Greater Golden Horseshoe for building stronger, prosperous communities by managing growth in the region to 2031. • The Ontario Provincial Policy Statement notes that long-term prosperity and social well-being of Ontarians depends on maintaining strong communities, a clean and healthy environment and a strong economy. Transportation facilities play a key role in achieving these objectives. • There is a need to co-ordinate transportation planning with municipal land planning as established through Official Plans, Secondary Plans and Zoning by-laws as these specify land uses supported by residents, municipalities and the province. • The *Greenbelt Plan* notes that infrastructure is important to economic well-being, human health and quality of life in southern Ontario and the Greenbelt. • Policy 4.2.1 of the *Greenbelt Plan* states that, for lands within the protected countryside, as defined by the *Greenbelt Plan*, 2005, infrastructure must meet one of the following policies: it supports agriculture, recreation and tourism, rural settlement areas, resource use or the rural economic activity that exists and is permitted within the Greenbelt; or it serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the appropriate infrastructure connections among urban growth centers and between these centers and Ontario's borders.	• Approved provincial, municipal land use plans • Federal/provincial land use goals, objectives, policies and Policy Statements • Growth Plan for the Greater Golden Horseshoe • Greenbelt Plan • Oak Ridges Moraine • Current land use proposals • 2015 Field investigations • Public consultation • Agency consultation (Ministry of Municipal Affairs and Housing, Ministry of Tourism, Culture and Sport, Transport Canada, Public Works and Government Services Canada) • Development Organizations (i.e. Urban Development Institute) • First Nations and Métis communities, and umbrella organizations • Municipal zoning • 2013 Aerial Photography • Google Maps / Streetview • Low level flight photography	Legislation, agency references, study area reference and data sources updated. References to the Niagara Escarpment Plan have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area. Council approved statement of policy needs to be considered even if not fully approved by Upper Tier / Regional Municipalities or Ontario Municipal Board. Development applications currently under consideration need to be considered.

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	2.1.2 Provincial / Federal Land Use Planning Policies/Goals/ Objectives	Degree of compatibility with federal/provincial land use policies/goals/objectives (e.g. the Greenbelt Plan, the Oak Ridges Moraine Plan and the Growth Plan)	Qualitative assessment of each route's compatibility with Provincial and Federal land use policies/goals and objectives.			
	2.1.3 Municipal (local and regional) Land Use Planning Policies / Goals / Objectives	Degree of compatibility with municipal Official Plans	Qualitative assessment of each route's compatibility with municipal land use policies, goals, objectives etc., including Local Municipal Land Use Planning Policies that are Council Adopted but not fully Approved by Upper Tier / Regional Municipalities or the Ontario Municipal Board.			
	2.1.4 Development Objectives of Private Property Owners	Potential to isolate property from current/future urban envelope Effect on future land use	Qualitative assessment of each route's compatibility with development plans prepared and submitted to municipalities.			
2.2 Land Use – Community	2.2.1 First Nation Reserves	Potential and significance of: • encroachment, severance, displacement; • long-term alteration/ disruption; • change in area character / aesthetics; • nuisance effects; • change to access / travel time to First Nations Reserves.	Qualitative assessment of the potential and significance of each route's impact on First Nations reserves.	• It is important that potential and significance of effects to First Nation Reserves and First Nation sacred grounds be recognized and addressed in accordance with Ontario's New Approach to Aboriginal Affairs (Spring 2005) • Property takings / displacements and changes / effects on local access have a significant effect on owners and tenants as well as the broader community. • Property takings / displacements and changes / effects on local access have a significant effect on owners and tenants as well as the broader community and customer/client base. • Disruption or displacement of institutional features may adversely affect the users of these features / facilities and the broader community.	• Provincial, municipal land use plans • Federal/provincial land use goals, objectives, policies and Policy Statements • Current land use proposals • 2015 Field investigations • Public consultation • Agency consultation (Ministry of Municipal Affairs and Housing, Ministry of Aboriginal Affairs, Aboriginal Affairs and Northern Development Canada, Ministry of Tourism, Culture and Sport, Transport Canada, Public Works and Government Services Canada) • Development Organizations (i.e. Urban Development Institute) • First Nations and Métis communities	Legislation and agency references updated. Removed references to Grand River Notification Agreement, given it is no longer relevant to the project.
	2.2.2 First Nation Sacred Areas	Potential and significance of: • encroachment, severance, displacement; • long-term alteration/ disruption; • change in area character / aesthetics; • nuisance effects; • change to access / travel time to First Nation sacred areas.	Qualitative assessment of the potential and significance of each route's impact on First Nations sacred areas.			Legislation and agency references updated. Terminology updates.
	2.2.3 Urban and Rural Residential Uses and Properties	Potential and significance of: • encroachment, severance, displacement, property acquisition; • long-term alteration/ disruption; • change in area character/ aesthetics; • nuisance effects; • change to access / travel time; • change to facilities / utilities / services to urban and rural residential areas (residents [owners/tenants] and community groups).	Number of residential dwellings and residential properties directly impacted by each route alternative.			Legislation and agency references updated.
	2.2.4 Commercial/ Industrial Uses and Properties	Potential and significance of: • encroachment, severance, displacement, property acquisition; • long-term alteration/ disruption; • change in area character/ aesthetics; • nuisance effects; • change to access / travel time; • change to facilities / utilities / services to commercial and industrial areas and agricultural operations (business owners/tenants and customers).	Number of commercial/industrial properties directly impacted by each route alternative. Number of commercial/industrial buildings or infrastructure (parking lots/ stormwater management) directly impacted by each route alternative.			Legislation and agency references updated. Impacts on property and infrastructure can affect the viability of operations and should be considered, in addition to impacts on buildings.
	2.2.5 Recreational Areas and Tourist Attractions	Potential and significance of: • encroachment, severance, displacement, property acquisition; • long-term alteration/ disruption;	Number of tourist areas, attractions and recreational facilities directly impacted – golf courses, parks, conservation areas, trails, etc.			Legislation and agency references updated. Grammar edits to clarify intent of the criterion.

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FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
		• change in area character/ aesthetics; • nuisance effects; • change to access / travel time; • change to facilities / utilities / services to recreational areas and tourist attractions.				
	2.2.6 Community Facilities / Institutions	Potential and significance of: • encroachment, severance, displacement, property acquisition; • long-term alteration/ disruption; • change in area character/ aesthetics; • nuisance effects; • change to access / travel time; • change to facilities / utilities / services to community facilities and institutions.	Number of community facilities/institutions directly impacted – schools, places of worship, fairgrounds, cemeteries, etc.			Legislation and agency references updated.
	2.2.7 Municipal Infrastructure and Public Service Facilities	Potential and significance of: • encroachment, severance, displacement; • long-term alteration/ disruption; • change to access / travel time; • change to facilities / utilities / services to municipal infrastructure and public service facilities.	Number of municipal infrastructure and public service facilities directly impacted.			Legislation and agency references updated.
2.3 Noise Sensitive Areas (NSA's)	2.3.1 Transportation Noise	Number of noise sensitive areas (NSAs) where there is predicted to be a significant change in sound level (i.e., greater or equal to 5dB) or where the sound levels are predicted to be equal to or greater than 65 dBA.	Each route alternative will be evaluated based on the predicted increase in sound level and the number of affected NSAs. The number of NSAs with increases in the various 5 dB intervals will be determined (i.e. 0 to 5.0 dB, 5.1 to 10 dB, 10.1 to 15.0 dB, etc.). The number of NSAs within each interval band will be multiplied by the average increase in sound level within each range and summed.	• Based on the MTO Environmental Guide for Noise.	• Municipal land use information (e.g. draft plans of subdivision) • Current land use proposals • Traffic volume predictions	Legislation, agency references and data sources updated. More detailed approach relative to the 2007 Terms of Reference.
2.4 Land Use - Resources	2.4.1 First Nation Treaty Rights and Use of Land and Resources for Traditional Purposes	Potential and significance of: • encroachment, severance, displacement; • long-term alteration/ disruption; • nuisance effects; • change to access / travel time to First Nation treaty rights or use of land and resources for traditional purposes.	Qualitative assessment of the potential and significance of each route's impact on First Nations treaty rights or use of land and resources for traditional purposes.	• It is important that potential and significance of effects to First Nation Reserves and sacred grounds be recognized and addressed in accordance with Ontario's New Approach to Aboriginal Affairs (Spring 2005).	• Agency consultation (Ministry of Aboriginal Affairs, Aboriginal Affairs and Northern Development Canada) • First Nations and Métis communities	Agency references and terminology updated. Removed references to Grand River Notification Agreement, given it is no longer relevant to the project.
	2.4.2 Agriculture / Specialty Crop	Potential and significance of: • encroachment, severance, fragmentation of parcel, displacement, property acquisition; • long-term alteration/ disruption; • change in area character/ aesthetics; • nuisance effects; • change to field / farm access / travel time; • change to facilities / utilities / services; • loss of agricultural facility / farm complex (barns and ancillary buildings) as applicable to the following: • Canada Land Inventory Classes 1, 2 and 3 soils • Specialty crops/cropland • Diary/livestock operations • Field crop operations • High investment agricultural operations	Area of Class 1-3 soils. Impacts to Agricultural Areas as identified in Official Plan Schedules for each Municipality where future land uses remain agricultural (i.e., **not** where lands are designated for development). Count of farm complexes by relative size, potentially impacted by each route Comment on relative degree of compatibility with property fabric / property fragmentation (parallel to lot lines verses diagonal property crossing) for each route	• Section 2.3 of the Provincial Policy Statement (2014) requires prime agricultural areas be protected for long-term use for agriculture. Prime agricultural areas include specialty crop areas and Classes 1, 2 and 3 soils and any associated Class 4 through 7 lands within the prime agricultural area, in this order of priority. • Sections 2.3.4 and 2.3.5 of the PPS (2014) require planning authorities to justify the exclusion of land from prime agricultural areas, and states that impacts from any new or expanding non-agricultural uses on surrounding agricultural operations and lands should be mitigated to the extent feasible. • The Growth Plan Policy #4.2.2 – Prime Agriculture Areas, states that prime agricultural areas, including specialty crop areas in GGH will be identified through subarea assessment, and where appropriate, additional policies for	• Official land use plans and schedules • Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) resource maps, guidelines and data sets • Regional and local agricultural federations • 2014 and 2015 Field investigations • Soil reports and agricultural capabilities/soil mapping • Land tenure (assessment data and mapping) • Aerial photography; digital imaging • Land Evaluation and Area Review (LEAR) studies • Agricultural Survey / Questionnaire • Consultation	Legislation references and data sources updated. Criterion updated to reflect wording changes in the 2014 Provincial Policy Statement. Criterion updated to reflect comments from OMAFRA.

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		• Established agricultural farm communities		their protection will be developed.		
	2.4.3 Recreation	Potential and significance of: • encroachment, severance, displacement, property acquisition; • long-term alteration/ disruption; • change in area character/ aesthetics; • nuisance effects; • change to access / travel time; • change to facilities / utilities / services to parks, designated open space and recreational areas.	Number of properties impacted. Quantitative impact of encroachments, severances and displacements. Qualitative assessment of changes to access/travel time, character and aesthetics and disruption.	• Disruption or displacement of recreational / community features may adversely affect the users of the facility/feature. Parks are generally lands in public ownership aimed at preserving significant and sometimes unique components of the environment, and providing recreational opportunities. These areas should be avoided to the extent possible however, in some cases, transportation facilities can be situated along park boundaries without adversely affecting the park. Frequently, parks are isolated islands surrounded by development and as such they can function as wildlife refuge areas or may facilitate wildlife movement opportunities. PPS, 2014, Policy 1.5.1 states that healthy active communities shall be promoted by considering the effects of planning decisions on provincial parks, conservation reserves and conservation areas.	• Official land use plans • MNRF resource maps • MNRF • Interest Groups • Municipal plans • Consultation with municipal and regional governments • Consultation with Ministry of Tourism, Culture and Sport, Ontario Parks and Conservation Authorities	Legislation and agency references updated. References to the Niagara Escarpment Plan and Bruce Trail Association have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area and do not impact the Bruce Trail.
	2.4.4 Aggregate and Mineral Resources	Potential and significance of: • encroachment, severance, displacement, property acquisition; • long-term alteration/ disruption; • change to facilities / utilities / services to past (e.g. mine hazards and former mining operations) and current/future extraction of aggregate and mineral resources.	Number of existing or future aggregate resources areas directly impacted.	• Sections 2.4 and 2.5 of the Provincial Policy Statement have the objective of protecting mineral and aggregate resources for the long term. The policy statement makes provisions for the protection of both known deposits and areas of potential. • The Growth Plan Policy #4.2.3 – Mineral Aggregate Resources, states that through sub-area assessment, the Ministries of Public Infrastructure Renewal and Natural Resources will work with municipalities and stakeholders to identify significant mineral aggregate resources for the GGH, and to develop a long-term strategy. • MTO adheres to requirements of the *Aggregates Resources Act* to protect aggregate resources while minimizing sterilization of mineral aggregate resources as much as possible.	• MNRF Mapping • GIS Mapping • Ministry of Northern Development and Mines (MNDM) – Ontario Geological Survey (OGS) mapping and other databases • local MNDM – OGS technical expertise	Agency references updated. Changes to access/travel time to goods movement are captured in the Transportation section.
2.5 Major Utility Transmission Corridors and Pipelines	2.5.1 Major Existing Utility Transmission Corridors and Pipelines	Potential and significance of: • encroachment, severance, displacement; • long-term alteration/ disruption; • change to facilities / utilities / services to major existing and proposed utility transmission corridors and pipelines (e.g. railroads, hydro, gas, oil).	Number of major impacts and qualitative assessment of challenges associated with direct impacts to existing utility transmission corridors and pipelines.	• Utility corridors are subject to regulations from owners and governing authorities for operation of utilities including National Energy Board, Ontario Energy Board, Transport Canada, *Railway Safety Act*, etc.	• Consultation with utility providers, operators and regulatory authorities.	Updated to differentiate between existing and proposed utility transmission corridors and pipelines, as a result of proposals within the study area.
	2.5.2 Major Proposed Utility Transmission Corridors and Pipelines		Qualitative assessment of challenges associated with direct impacts to proposed utility transmission corridors and pipelines.		• Consultation with utility providers, operators and regulatory authorities. • Review of the status of plans for proposed utility transmission corridors and pipelines.	
2.6 Contaminated Property and Waste Management		Potential and significance of: • encroachment, severance, displacement; • long-term alteration/disruption; • change to access / travel time; • change to facilities / utilities / services to contaminated property and waste management (e.g. Landfills, Hazardous Waste Sites, "Brownfield" Areas, other known contaminated	**Property contamination**: Number of potential contaminated properties to be impacted by the project in *urban* areas: - Direct impacts – corridor impacting part or all of property; - Indirect impacts – highway footprint adjacent to all or part of property Number of potential contaminated properties to	• Localized significant sources of property contamination can be associated with operating and closed waste disposal sites, the latter being of more significance due to their difficulty in accurately locating them. Consideration should be given to avoiding/ minimizing impacts to waste disposal sites including the fill areas themselves and the "Contaminant Attenuation Zone" (buffer area)"	• 2015 Field investigations • EcoLog ERIS Database Search • MOECC electronic registry for Records of Site Condition • MOECC Waste Disposal Site Inventory • Technical Standards & Safety Authority • Aerial Photographs • Municipal Directories and Assessment Maps	Agency references and data sources updated.

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		sites, and high-risk contamination areas).	be impacted by the project in *rural* areas: - Direct impacts – corridor impacting part or all of property; - Indirect impacts – corridor adjacent to all or part of property **Waste management**: Number of known operating and / or closed waste management facilities (e.g., transfer stations, wastewater treatment plants, waste disposal sites, landfills)	lands surrounding the fill areas. • There is the potential that some of the lands in the project area may be contaminated due to the nature of existing and historical land use especially in older commercial/industrial areas and in areas with heavy industrial activity. Sources of potential property contamination in rural areas are most commonly associated with service stations; isolated pockets of commercial/industrial areas; unknown fill areas; scrap yards and other high-risk land uses. Potential effects to these areas should be avoided / minimized to the extent possible.	• OBM and NTS Mapping • Historical Plans, Soils, Hydrogeological and Geological Maps • Libraries, Historical Archives, Land Registry Offices and Municipal Offices	
2.7 Landscape Composition	2.7.1 Terrain	Potential and significance of alterations to significant topography, landform and land uses.	Scale and significance of change to terrain and its function: • Topographic character • Drainage patterns • Connectivity of recreational uses • Connectivity of greenways and natural features due to landform changes • Land-use patterns	The factor-specific study area encompasses all landscaping conditions within the proposed right-of-way, plus the surrounding viewshed. The new transportation corridor can utilize existing landforms along with horizontal and vertical deflection, to enhance the quality of highway design, aesthetics and driver experience Alterations to terrain have the potential for positive and negative impacts to and from: • Natural geomorphologic landforms, waterscapes, or vistas • Ecosystem function • Man-made features • Noise and light pollution • Agricultural operations • Recreation and commuter movement	• 2015 Field investigations • Mapping, aerial imagery and GIS data • Information on route options and impacts • MTO Environmental Reference for Highway Design, Section 3 • Greenbelt Plan • Habitat, land use, recreation and socio-economic information and evaluation • Interest Groups • Public consultation	Data sources updated. References to the Niagara Escarpment Plan have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area. Revisions provide better distinction between sub-factors and measurement criteria. 2007 Terms of Reference excluded physical impacts to the landscape and its function. Terrain and Vegetation sub-factors were added to reflect potential bio-physical alterations of a route. 2007 Terms of Reference sub-factors (2.7.1 Scenic Composition, and 2.7.3 Scenic Value of Views/Vistas From the Transportation Facility) were measuring the same impact. These have been combined into the Aesthetic sub-factor. 2007 Terms of Reference sub-factor 2.7.2 Sensitive Viewer Groups is renamed as "Visual Impact" and is measured from sensitive receptors. The bio-physical measurements are new as they were excluded from the 2007 Terms of Reference.
	2.7.2 Vegetation	Potential and significance of impacts of alterations to flora along the corridor and its boundaries. Overall connectivity of greenways and vegetation communities.	Potential and significance of change to vegetation form and function: • vegetation stands and masses • vegetation relative to fisheries habitat • rare /significant vegetative species; • impact on vegetative cover relative to forest viability • impact on linear vegetation communities and connections	The new transportation corridor can have significant positive and negative impacts to the immediate and surrounding landscape and vegetation communities, which must be considered as integrated and interdependent systems. Alterations to vegetation have the potential for positive and negative impacts to and from: • Vegetation communities • Tree stands • Important specimens		
	2.7.3 Visual Impacts	Potential and significance of impacts of alterations to the appearance of the landscape when viewed from outside the corridor and its boundaries.	Potential and significance of change to vistas/outlooks for sensitive viewers who are located at key receptor locations: • Landscape Absorptivity • Spatial dominance of landscape alterations	The new transportation corridor can utilize existing landscape features along with horizontal and vertical deflection, to enhance the quality of highway design, aesthetics and driver experience Alterations to the landscape have the potential for positive and negative impacts to and from: • Density and proximity of surrounding dwellings. • Views and quality of visual experience • Viewer sensitivity • Creek and river valleys and their terrain		
	2.7.4 Aesthetics	Potential and significance of impacts of alterations to the aesthetic quality of the project along the corridor and its boundaries.	Potential and significance of change to scenic composition (total aesthetic value of landscape components). Kinesthetic perception of: • Form of alignment which conveys sense of landscape integration and compatibility	The new transportation corridor can utilize existing landscape features along with horizontal and vertical deflection, to enhance the quality of highway design, aesthetics and driver experience Alterations to the landscape have the potential for		

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			• Impact to potential views and vistas available to the corridor's users	positive and negative impacts to and from: • Visual effects on adjacent land use and effects on the visual experiences for users of the facility. • Significance of views from the highway and sensitivity of views to the highway • Visual impact on the open landscape Culturally/visually significant vegetation and built works (walls, architectural, existing infrastructure) • The surrounding context can positively and negatively impact the new transportation corridor including construction, user experience, aesthetics and safety.		
3. CULTURAL ENVIRONMENT						
3.1 Built Heritage and Cultural Heritage Landscapes	3.1.1 Built Heritage Resources (BHR) - *These resources may be identified through designation or heritage conservation easement under the Ontario Heritage Act, listed by local, provincial or federal jurisdictions, or identified as potential Heritage Resources as part of the Environmental Assessment process*	Potential and significance of: • encroachment, severance, displacement, property acquisition; • long-term alteration/ disruption; • change in area character/ aesthetics; • temporary vibration related effects to built heritage structures; • permanent obstruction of significant views or vistas; • shadows from any new proposed structures (i.e. bridges); • audible or atmospheric elements that may lead to impact (i.e. dust particles from construction activity); • nuisance effects; • change to access / travel time; • change to facilities / utilities / services to BHRs and Cultural Heritage Landscapes (CHLs) of local, provincial or national cultural heritage value or interest including Ontario Heritage Foundation easements properties.	Number of identified properties being impacted that are designated under the Ontario Heritage Act (OHA), Listed on municipal Heritage Registers, and identified as part of the MTO EA process) which refers to properties pre-screened as having cultural heritage significance potential. Number of identified or potential heritage bridge and culvert structures being impacted. Number of identified and/or potential cultural heritage landscapes, such as agricultural complexes, cemeteries, hedgerows, etc. being impacted.	• A new transportation facility may result in the loss of built heritage resources and cultural heritage landscapes resulting in the removal of significant heritage features which contribute to the character of an area. • The effectiveness of proposed conservation, mitigation or avoidance measures should be evaluated on the basis of established principles, MTO environmental standards and practices for heritage conservation, as well as compliance to the Ontario Heritage Act Standards and Guidelines for Conservation of Provincial Heritage Properties.	• Historical mapping and aerial photographs, municipal, provincial and federal inventories, listings, plaques, easements and designations of National Historic Sites and under the Ontario *Heritage Act*. • Input from other factor areas • Consultation with municipal and regional heritage planning staff or designates, Municipal Heritage Committees (formerly referred to as Local Architectural Advisory Committees - LACACS), historical societies and other heritage groups as necessary • Consultation with local heritage organizations, historical societies and other groups knowledgeable about local cultural heritage • Consultation with Ministry of Tourism, Culture and Sport and Ontario Heritage Trust, • 2015 Field investigations	Grammar edits. Agency references and data sources updated. References to the Niagara Escarpment Plan / Niagara Escarpment Commission have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area. Given "Areas of Historic 19th Century Settlement" are considered Cultural Heritage Landscapes, the criterion was consolidated into 3.1.3.

Appendix A - Summary of Evaluation Factors and Criteria For Alternative Methods

FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
	3.1.2 Heritage Bridges - *These resources may be identified through designation or heritage conservation easement under the Ontario Heritage Act, or listed by local, provincial or federal jurisdictions.*	Potential for destruction or substantial alteration of significant MTO and/or municipal heritage bridges and culvert structures.		• MTO is required to operate in accordance with the Ontario *Heritage Act*, Bridges Act, Ontario Heritage Bridge List, Ontario Heritage Guidelines (1983, 1991, 2007 in draft)		
	3.1.3 Cultural Heritage Landscapes (CHL) - *These resources may be identified through designation or heritage conservation easement under the Ontario Heritage Act, listed by local, provincial or federal jurisdictions, or identified as potential Heritage Resources as part of the Environmental Assessment process.*	Potential and significance of removal, destruction and/or change to the composition of cultural heritage landscapes and associated features.		• A new transportation facility may result in the loss of built heritage resources and cultural heritage landscapes resulting in the removal of significant heritage features which contribute to the character of an area. • The effectiveness of proposed conservation, mitigation or avoidance measures should be evaluated on the basis of established principles, MTO environmental standards and practices for heritage conservation, as well as compliance to the Ontario Heritage Act Standards and Guidelines for Conservation of Provincial Heritage Properties.		
3.2 Archaeology	3.2.1 Pre-Contact and Contact First Nation Archaeological Sites	Potential for destruction or disturbance of pre-contact and contact First Nation archaeological sites of extreme local, provincial or national interest.	Number of known sites. Total area of archaeological potential. Presence of sensitive site types, such as villages.	• Disturbance or destruction of certain archaeological sites of extreme local, provincial or national interest represents a significant cultural loss. • Effects to archaeological resources/sites should be avoided or minimized to the extent possible. • Significant archaeological sites shall be preserved and avoided in accordance with the Ontario Ministry of Tourism, Culture and Sport (MTCS) and First Nation policies and procedures, and all others shall be excavated to MTCS standards.	• Ontario Ministry of Tourism, Culture and Sport (MTCS) Ontario Archaeological Sites Database • Archaeological/heritage studies and reports • Historic mapping • Other published and unpublished archaeological literature • First Nations and Métis communities	Agency references updated. Change in wording from "Historic" to "Contact". "Historic" implies that First Nations had no history before the arrival of Europeans; "Contact" indicates a clearer point in time when events occurred.
	3.2.2 Historic Euro-Canadian Archaeological Sites	Potential for destruction or disturbance of historic Euro-Canadian archaeological sites of extreme local, provincial or national interest.	Number of known sites. Sites associated with significant extant heritage features.			Agency references updated.
	3.2.3 First Nation Burial Sites	Potential and significance of: • encroachment, severance, displacement; • long-term alteration/ disruption; • change in area character / aesthetics; • nuisance effects; • change to access / travel time. to First Nation burial sites.	Presence of Archaeological sites that may contain burials – *i.e.* villages	• MTO is required to operate in accordance with the *Cemeteries Act* and have regard for areas protected by municipalities either through Part IV (individual designation) or Part V (heritage conservation districts) under the Ontario Heritage Act	• Historical mapping and aerial photographs, cemetery lists, municipal, provincial and federal inventories, listings, plaques, easements and designations of National Historic Sites and under the Ontario *Heritage Act*. • Input from other factor areas • Ontario Heritage Act – Ministry of Tourism, Culture and Sport • Consultation with municipal and regional heritage planning staff or designates, Municipal Heritage Committees (formerly referred to as Local Architectural Advisory Committees - LACACS), historical societies and other heritage groups as necessary • Consultation with Ministry of Tourism, Culture and Sport • 2015 Field investigations • Provincial Policy Statement • Ontario Genealogical Society for Cemeteries • First Nations and Métis communities	Legislation, agency references and data sources updated. Moved from Section 3.1 to 3.2, given it is an archaeological consideration.
	3.2.4 Cemeteries	Potential and significance of: • encroachment, severance, displacement; • long-term alteration/ disruption; • change in area character/ aesthetics; • nuisance effects; • change to access / travel time; • change to facilities / utilities / services to cemeteries.	Number of cemeteries by site number			Legislation, agency references and data sources updated. Moved from Section 3.1 to 3.2, given it is an archaeological consideration.
4. TRANSPORTATION						

Appendix A - Summary of Evaluation Factors and Criteria For Alternative Methods

FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
4.1 System Capacity & Efficiency	4.1.1 Movement of People	Potential to support the efficient movement of people between communities and regions based on Level of Service (LOS) and volume to capacity (v/c) on a network, screenline and critical link basis	Projected traffic volume diverted from local and regional roads to provincial roads Qualitative assessment of connections to existing and planned urban centres Qualitative assessment of connections to transitway from urban centres, mobility hubs, and other transit services Route directness, measured as total length from end-to-end (km)	• The approved Official Plans of municipalities within the Study Area, and the strategic growth policies and targets embodied in the Provincial *Growth Plan*, suggest that population and employment growth will continue over time and will be important to future economic prosperity. In order for this economic growth to be realized, an efficient transportation system to move both people and goods within and through the Study Area is considered fundamental. • The Growth Plan policies envision a safe and efficient transportation system that will provide connectivity among transportation modes and offer a balance of transportation choices. • Goods movement between economic centres and growth areas incurs out-of-way travel and delay due to congestion through the Study Area. Reducing travel times, out-of-way travel and improving travel time and reliability would lead to lower transportation costs and benefit the local, provincial and national economy. • The effectiveness of each alternative needs to be determined.	• Transportation Association of Canada (TAC Manual) • Base Mapping and Field Reviews • Construction Standards and Specifications • Field Reviews and Geotechnical Sampling • Stakeholder Consultation • Municipal and Regional Official Plans and Transportation Plans • Travel demand forecasts	Updated study area references and data sources.
	4.1.2 Movement of Goods	Potential to support efficient movement of goods between urban growth centres and regional intermodal facilities based on road network and highway performance measures (level of service and travel speed)	Projected truck volumes on GTA West corridor Diversion of truck traffic from local and regional roads to provincial roads Qualitative assessment of connections to existing and planned freight trip generators			
	4.1.3 System performance during peak periods	Potential to reduce growth in peak hour travel demand through Transportation Demand Management (TDM) and Transportation Systems Management (TSM_ strategies.	Screenline volume / capacity (V/C) Link level of service (LOS), V/C on GTA West corridor and key connecting roads (collectors, arterials, and freeways) Qualitative assessment of demand management strategies and travel demand supportive measures.	• There is a need to determine how well transportation solutions operate during peak periods.		
4.2 System reliability / redundancy		Potential to support system reliability and redundancy for travel (people and goods) between regions and communities during adverse conditions.	Qualitative assessment of redundancy within the transportation network	• There is a need to determine how transportation solutions address future needs in relation to existing and proposed future transportation infrastructure.		No change.
4.3 Safety	4.3.1 Traffic Safety	Potential to improve traffic safety based on opportunity to reduce traffic volumes and/or congestion on area road network.	Qualitative assessment, considering geometry, Link LOS, V/C on area road network	• Traffic safety is governed by factors including geometry, sight distances, road drainage, road illumination, roadside environment, and traffic volume. Some of these issues will be addressed in preliminary design, but a qualitative assessment of the geometry, traffic operations, and potential for other issues will be developed here.	• *Geometric Design Standards for Ontario Highways*/TAC Manual • *Safety Standards Manual for New Rural Freeways*	Data sources updated.
	4.3.2 Emergency Access	Potential to provide and/or improve emergency access on existing and/or new provincial facilities. Impacts and opportunities to improve emergency access on municipal and regional roads.	Qualitative assessment, considering change in emergency access/routing and mean travel time to hospitals and fire halls in and adjacent to the study area	• There is a need to determine emergency access related to transportation solutions.	• Consultation with Emergency Services Providers	Removed safety aspect, given traffic safety is being justified separately in 4.3.1. Added consideration of emergency access on municipal and regional roads.
4.4 Mobility & Accessibility	4.4.1 Modal integration and balance	Potential to improve modal choice and increase transit and other non-auto mode split shares between communities, regions and intermodal facilities at critical screenlines and for highway corridor.	Qualitative assessment of connections to transitway from urban centres, mobility hubs, and other transit services	• There is the need to determine how transportation solutions address future needs in relation to existing and proposed future transportation infrastructure (like and other transportation modes).	• Base Mapping and Field Reviews • Municipal and Regional Official Plans and Transportation Plans	Grammar edits. Clarified approach and updated data sources.
	4.4.2 Linkages to Population and Employment Centres	Potential to improve accessibility to urban growth centres for people and goods movement based on	Qualitative assessment of connections to existing and planned urban centres	• Goods and people movement between economic centres and growth areas incurs out-	• Base Mapping and Field Reviews • Municipal plans, etc.	Grammar edits.

Appendix A - Summary of Evaluation Factors and Criteria For Alternative Methods

FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
		transportation network continuity and connectivity		of-way travel and delay due to congestion through the Study Area. Reducing travel times, out-of-way travel and improving travel time and reliability would lead to lower transportation costs, enhance attractiveness of transit services, and benefit the local, provincial and national economy.		Clarified approach and updated data sources. Updated study area reference.
	4.4.3 Recreation and Tourism Travel	Potential to support recreation and tourism travel within and to/from the Study Area by provision of higher order network (roads and transit) continuity and connectivity and through network performance indicators (level of service, vehicle to capacity ratio, travel speed)	Qualitative assessment of connections to identified tourism trip generators (i.e. tourism destinations) Link LOS, V/C on GTA West corridor and key connecting roads (collectors, arterials, and freeways)	• Policy 4.2.1 of the *Greenbelt Plan* states that, for lands within the protected countryside, as defined by the *Greenbelt Plan*, 2005, infrastructure must meet one of the following policies; i) it supports agriculture, recreation and tourism, rural settlement areas, resource use or the rural economic activity that exists and is permitted within the Greenbelt; or ii) it serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the appropriate infrastructure connections among urban growth centers and between these centers and Ontario's borders.	• Consultation with Ministry of Tourism, Culture and Sport, Ontario Parks and Conservation Authorities • Stakeholder input • Consultation with Community Groups • Mapping	Agency and study area references updated. References to the Niagara Escarpment Plan and Bruce Trail Association have been removed, given the Route Planning Study Area and short-list alternatives are outside of the Plan area and do not impact the Bruce Trail.
	4.4.4 Accommodation for pedestrians, cyclists, snowmobiles, and specialized vehicles	Potential to accommodate pedestrians, cyclists within critical travel corridors in urbanized areas and snowmobiles in recognized rural trails; and specialized vehicles such as farm equipment in rural agricultural areas	Qualitative assessment of opportunities for accommodation of pedestrians, cyclists, snowmobiles and specialized vehicles at grade separated crossings of the GTA West corridor	• Disruption to community activities may affect quality of life for residents, businesses (including agricultural businesses) and community groups including local pedestrian and cycling facilities. • Identify opportunities to improve active transportation connections to urban growth centres, transit hubs, and communities • Identify opportunities to improve active transportation facilities.	• Stakeholder input • Consultation with Community Groups and Municipal Active Transportation Staff • MTO *Ontario Bikeways Design Manual* • Ontario Traffic Manual Book 18 • Municipal active transportation plans	Data sources updated. Criterion updated to include consideration of specialized vehicles (such as farm equipment).
4.5 Network Compatibility	4.5.1 Network connectivity	Potential to improve provincial network connectivity within and to/from the Study Area.	Compatibility with Municipal/Regional existing/planned key transportation corridors and potential interchange locations. Impacts to local road network (realignments, service roads, cul-de-sacs). Compatibility and proximity to Municipal/Regional existing/planned transit initiatives, including rail and bus routes and transit stations.	• There is the need to determine how transportation solutions address future needs in relation to existing and proposed future transportation infrastructure (like and other transportation modes).	• Consultation with Local Municipalities and Transportation Service Providers • Municipal plans, etc.	Updated study area reference and data sources.
	4.5.2 Flexibility for future expansion	Potential to address future transportation needs beyond the forecasted planning horizons.	Qualitative assessment of opportunities for future expansion of the corridor and potential for future connections to the provincial freeway and transitway network	• There is a need to determine the flexibility of transportation solutions to address future needs beyond the forecasted planning horizon.	• Base Mapping and Field Reviews • Municipal and Regional Official Plans and Transportation Plans • Consultation with Local Municipalities and Transportation Service Providers	Clarified approach and updated data sources.
4.6 Engineering	4.6.1 Constructability	Potential ease of implementation considering feasibility/difficulty of physical, property or environmental constraints	Significant features that may impact construction (including route length, number and lengths of bridges, crossing of/proximity to utilities (i.e., Hydro Corridors, TCPL).	• Physical conditions and staging issues can affect the feasibility of implementing transportation solutions.	• *Geometric Design Standards for Ontario Highways*/TAC Manual • Utility Design Guidelines (i.e. TCPL) • Geotechnical field surveys	Data sources updated.
	4.6.2 Compliance with design criteria	Conformity to applicable provincial safety and design standards.	Ability of the route to meet the geometric design standards (i.e. interchange spacing, horizontal and vertical curves).	• Transportation agencies have developed design standards to ensure that safety objectives are reflected in all new / expanded infrastructure.	• *Geometric Design Standards for Ontario Highways*/TAC Manual • *Safety Standards Manual for New Rural Freeways*	Data sources updated.

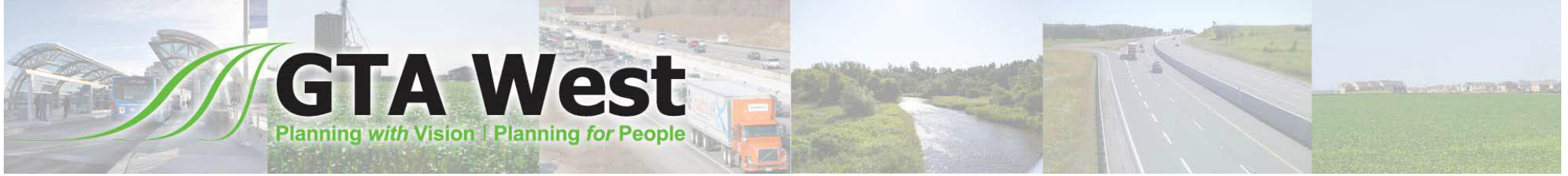
Appendix A - Summary of Evaluation Factors and Criteria For Alternative Methods

FACTORS	SUB-FACTORS	CRITERIA	MEASUREMENT	RATIONALE	DATA SOURCE	RATIONALE FOR EDITS MADE TO THE APPROVED 2007 TERMS OF REFERENCE
4.7 Construction Cost		Relative road construction cost, excluding property and engineering costs	Parametric cost estimate – Quantitative construction cost based on unit cost per kilometre of new corridor.	• There is a need to identify the costs associated with possible transportation solutions. Construction costs can influence the feasibility of a given alternative.	• Cost data • Base Mapping and Field Reviews	No change
4.8 Traffic Operations		Potential effects on traffic operations due to factors such as design features, private access, and transportation network connections	Qualitative assessment, considering spacing between interchanges; location of and proximity between ramp terminal intersections and adjacent intersections; and impacts to local road network	• The effectiveness (i.e. level of service) of each alternative needs to be determined. • Transportation agencies have developed design standards to ensure that safety objectives are reflected in all new / expanded infrastructure.	• *Geometric Design Standards for Ontario Highways* • Transportation Association of Canada (TAC Manual) • Base Mapping and Field Reviews	Data sources updated.

EVALUATION FACTORS

FACTOR	SUB-FACTOR
NATURAL ENVIRONMENT	
Fisheries and Aquatic Ecosystems	• Fish Habitat • Fish Community
Terrestrial Ecosystems	• Wildlife and Wildlife Habitat • Wetlands • Woodlands and Vegetation • Designated / Special / Natural Areas
Ecosystem Services	
Groundwater	• Areas of Groundwater Recharge or Discharge • Groundwater Source Areas and Wellhead Protection Areas • Large Volume Wells • Private Wells • Groundwater Dependent Commercial Enterprises • Groundwater Sensitive Ecosystems
Surface Water	• Watershed / Subwatershed Drainage Features / Patterns • Surface Water Quality and Quantity
Air Quality	• Local and Regional Air Quality Impacts; Greenhouse Gas Emissions
TRANSPORTATION	
System Capacity and Efficiency	• Movement of People • Movement of Goods • System Performance During Peak Periods
System Reliability and Redundancy	
Safety	• Traffic Safety • Emergency Access
Mobility and Accessibility	• Modal Integration and Balance • Linkages to Population and Employment Centres • Recreation and Tourism Travel • Accommodation for Pedestrians, Cyclists and Snowmobiles
Network Compatibility	• Network connectivity • Flexibility for Future Expansion
Engineering	• Constructability • Compliance with Design Criteria
Construction Cost	
Traffic Operations	

FACTOR	SUB-FACTOR
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	
Land Use Planning, Policies, Goals, Objectives	• First Nation Land Claims • Provincial / Federal Land Use Planning Policies / Goals / Objectives • Municipal (Local / Regional) Land Use Planning Policies / Goals / Objectives • Development Objectives of Private Property Owners
Land Use – Community	• First Nation Reserves • First Nation Sacred Grounds • Urban and Rural Residential Uses and Properties • Commercial / Industrial Uses and Properties • Recreation Areas and Tourist Attractions • Community Facilities / Institutions • Municipal Infrastructures and Public Service Facilities
Noise Sensitive Areas	• Transportation Noise
Land Use Resources	• First Nation Treaty Rights and Use of Land and Resources for Traditional Purposes • Agriculture / Specialty Crop • Recreation • Aggregate and Mineral Resources
Major Utility Transmission Corridors and Pipelines	• Major Existing Utility Transmission Corridors and Pipelines • Major Proposed Utility Transmission Corridors and Pipelines
Contaminated Property and Waste Management	
Landscape Composition	• Terrain • Vegetation • Visual Impacts • Aesthetics
CULTURAL ENVIRONMENT	
Built Heritage and Cultural Heritage Landscapes	• Built Heritage Resources • Heritage Bridges • Cultural Heritage Landscapes
Archaeology	• Pre-Contact and Contact First Nations Archaeological Sites • Historic Euro Canadian Archaeological Sites • First Nation Burial Sites • Cemeteries



EXAMPLES OF TRADE-OFFS IN THE WEST SECTION

- North vs. south crossing of Credit River
  - **Residences, religious institutions, natural environment, proximity to Norval, compatibility with future municipal road network**
- Interchange options
  - **Land use impacts, access issues, TransCanada Pipeline crossing, compatibility with future municipal road network**
- East vs. west of Heritage Road
  - **Religious institutions, planned cemetery, Heritage Heights concept plan and landowners, natural environment**

Questions

1. **Do you prefer a northerly or southerly crossing of the Credit River and why?**
2. **Do you prefer an interchange at Mississauga Road or Mayfield Road and why?**
3. **Do you prefer the easterly or westerly routes through the Heritage Heights area and why?**

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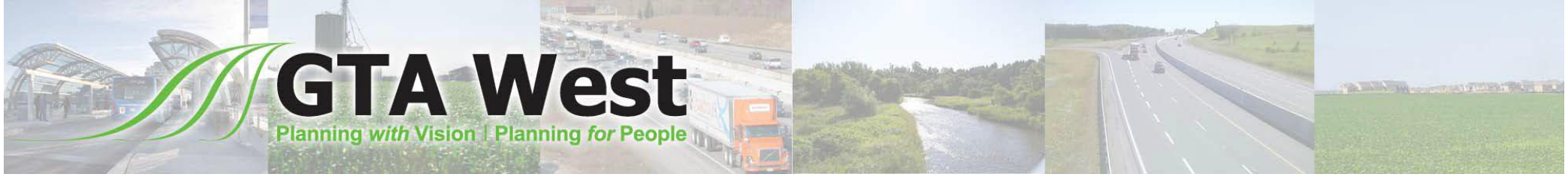

EXAMPLES OF TRADE-OFFS IN THE CENTRAL SECTION

- Widening existing Highway 410/10 vs. new direct Highway 410 connection
  - **Access and community impacts to Valleywood, access for properties on Hurontario Street, impacts to planned developments, natural environment**
- Road network in the Highway 50 / Coleraine Drive/Highway 427 area
  - **Compatibility with future municipal road network, interchange spacing, development**
- Northern vs. southern routes
  - **Agriculture and fragmentation of land, residences, sensitive environmental features, compatibility with future municipal road network**

Questions

1. **Do you prefer the northerly or southerly routes through the area and why?**
2. **Do you prefer Alternative 10G (utilizes existing Highway 10/410) or Alternatives 10B or 10C (new direct Highway 410 connection) and why?**
3. **What are your interchange option preferences in the Highway 427 / Coleraine Drive / Highway 50 / Mayfield Road area and why?**

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EXAMPLES OF TRADE-OFFS IN THE EAST SECTION

- Road network in the Highway 50/ Coleraine Drive/Highway 427 area
  - **Compatibility with future municipal road network, interchange spacing, development**
- North vs. south crossing of Humber River
  - **Natural environment, residences, proximity to Kleinburg**
- Interchange options
  - **Weston Road vs. Pine Valley Drive, compatibility with future municipal vision (Vaughan Employment Lands), natural environment**

Questions

1. **Do you prefer a northerly or a southerly crossing of the Humber River and why?**
2. **What are your interchange option preferences in the Highway 427 / Coleraine Drive / Highway 50 / Mayfield Road area and why?**
3. **Do you prefer an interchange at Pine Valley Drive or Weston Road?**

Ontario MMM GROUP AECOM

Thank you for taking the time to provide your feedback regarding the information presented at Community Workshop #2 for the GTA West Study.

Session 1: Approach for Evaluating the Short List of Route Alternatives

Please refer to the Summary of Evaluation Factors and Criteria that will be used to evaluate the Short List of Route Alternatives.

1) Consideration is given to a full range of potential benefits and impacts in an evaluation. Do you have any comments on the factors, sub-factors, criteria, or measures that the project team will use to evaluate the short list of route alternatives?

2) Arithmetic Method: Weighting of Factors

The Arithmetic Method will be used to test the results of the Reasoned Argument Method. It is expected that the relative importance of each factor may change when in an urbanized area or in a rural/natural/agricultural area. Please identify the importance of each of the 4 factors by assigning a weight out of 100 to each:

- The higher the weight, the more important that factor is to you.
- Weights must be allocated to all factors. The minimum that must be allocated to each factor is 10 and the maximum is 50.
- The total weight for all factors must add up to 100.
- You may provide weightings for 2 scenarios: 1) Weightings for a more urbanized area; and 2) Weightings for rural/natural/agricultural areas.

FACTOR	URBAN	RURAL
NATURAL ENVIRONMENT		
LAND USE/SOCIO-ECONOMIC ENVIRONMENT		
CULTURAL ENVIRONMENT		
TRANSPORTATION		
TOTAL	**100**	**100**

(Continued on next page)

Session 2: Issues and Trade-Offs in the West Section of the Study Area

1) Can you identify any other issues or trade-offs in the west section of the study area that the project team should consider when evaluating the short list of route alternatives?

2) Do you have any additional information regarding issues or trade-offs in the rest of the study area that the project team should consider when evaluating the short list of route alternatives?

(Continued on next page)

General Workshop Comments

1) What did you LIKE about Community Workshop #2?

- ❑ Hours of Community Workshop
- ❑ Information Presented
- ❑ Small group discussion format
- ❑ Handouts provided
- ❑ Opportunity to speak with the project team
- ❑ Opportunity to hear from and speak with other members of the public
- ❑ Other (please specify)

2) What would have improved your experience at Community Workshop #2?

3) Other comments?

Responses to general questions will be answered in the Community Workshop #2 Summary Report, which will be available on our project website (www.gta-west.com) in summer 2015. Comments and information regarding this study are being collected to assist the MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments will become part of the public record.

Name:

Organization (if applicable):

Position (if applicable):

Address:

City/Town: *Postal Code:*

Email: *Phone #:*

PLEASE PLACE YOUR COMMENTS IN A DROP-BOX TODAY OR
E-MAIL, FAX, OR MAIL YOUR COMMENTS BY JULY 31 TO:

Mr. Patrick Puccini
GTA West Project Team
c/o AECOM
30 Leek Crescent, 4th Floor
Richmond Hill, ON, L4B 4N4
EMAIL: project_team@gta-west.com
FAX: (905) 882-4399

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NATURAL ENVIRONMENT		
LAND USE/SOCIO-ECONOMIC ENVIRONMENT		
CULTURAL ENVIRONMENT		
TRANSPORTATION		
TOTAL	**100**	**100**

(Continued on next page)

Session 2: Issues and Trade-Offs in the East Section of the Study Area

1) Can you identify any other issues or trade-offs in the east section of the study area that the project team should consider when evaluating the short list of route alternatives?

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(Continued on next page)

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- The total weight for all factors must add up to 100.
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NATURAL ENVIRONMENT		
LAND USE/SOCIO-ECONOMIC ENVIRONMENT		
CULTURAL ENVIRONMENT		
TRANSPORTATION		
TOTAL	**100**	**100**

(Continued on next page)

Session 2: Issues and Trade-Offs in the Central Section of the Study Area

1) Can you identify any other issues or trade-offs in the central section of the study area that the project team should consider when evaluating the short list of route alternatives?

2) Do you have any additional information regarding issues or trade-offs in the rest of the study area that the project team should consider when evaluating the short list of route alternatives?

(Continued on next page)

General Workshop Comments

1) What did you LIKE about Community Workshop #2?

- ☐ Hours of Community Workshop
- ☐ Information Presented
- ☐ Small group discussion format
- ☐ Handouts provided
- ☐ Opportunity to speak with the project team
- ☐ Opportunity to hear from and speak with other members of the public
- ☐ Other (please specify)

2) What would have improved your experience at Community Workshop #2?

3) Other comments?

Responses to general questions will be answered in the Community Workshop #2 Summary Report, which will be available on our project website (www.gta-west.com) in summer 2015. Comments and information regarding this study are being collected to assist the MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments will become part of the public record.

Name:

Organization (if applicable):

Position (if applicable):

Address:

City/Town: *Postal Code:*

Email: *Phone #:*

PLEASE PLACE YOUR COMMENTS IN A DROP-BOX TODAY OR E-MAIL, FAX, OR MAIL YOUR COMMENTS BY JULY 31 TO:

Mr. Patrick Puccini
GTA West Project Team
c/o AECOM
30 Leek Crescent, 4th Floor
Richmond Hill, ON, L4B 4N4
EMAIL: project_team@gta-west.com
FAX: (905) 882-4399

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GTA West

Planning *with* Vision | Planning *for* People

GTA West Transportation Corridor Planning and Environmental Assessment Study – Stage 2

Community Workshop #2

June 2015

Ontario

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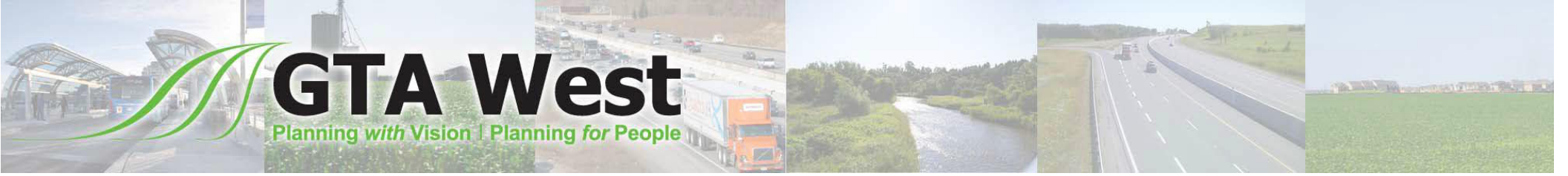
TODAY'S AGENDA

- Study overview
- Update on project activities since PIC #1
- Breakout sessions:

SESSION	ACTIVITY
SESSION 1: APPROACH FOR EVALUATING THE SHORT LIST OF ROUTE ALTERNATIVES	Presentation Facilitated Group Discussion Session Review
SESSION 2: TRADE-OFFS IN THE WEST SECTION OF THE STUDY AREA	Presentation Facilitated Group Discussion Session Review

THE GTA WEST PROJECT TEAM

- Natalie Rouskov, MTO: Project Manager
- Sarah Merriam, MTO: Consultation Lead and Environmental Planner
- Neil Ahmed, MMM: Consultant Project Manager
- Tim Sorochinsky, AECOM: Manager – West Section
- Brenda Jamieson, AECOM: Manager – Central Section
- Jim Dowell, MMM: Manager – East Section
- Sandy Nairn, MMM: Environmental Planning Lead
- Patrick Puccini, AECOM: Consultation Lead



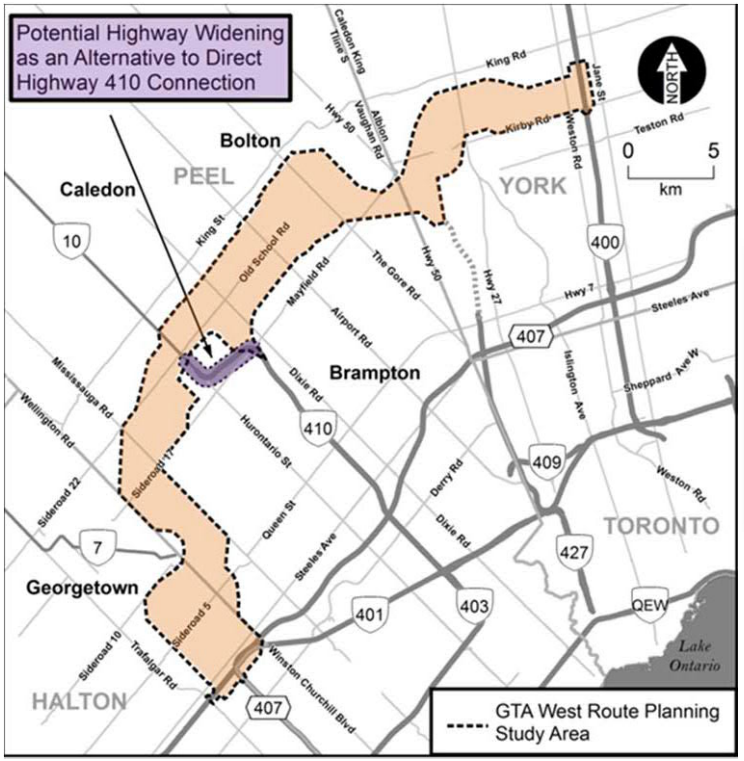
PLANNING *WITH* VISION, PLANNING *FOR* PEOPLE

- An open and transparent process that provides opportunities for all stakeholders to help shape the outcome of the project

- Arrive at a recommended solution that provides the best balance of benefits and impacts for the local communities and the users of the transportation system

To accomplish this, we are committed to engaging all of our stakeholders in open two-way communication that leads to meaningful discussions, proactive information exchange and constructive working relationships

STUDY OVERVIEW



Stage 1 (November 2012) recommendations included:

- **Optimizing the existing transportation network**
- **Improving non-roadway transportation modes**
- **Widening of existing highways**
- ***A new transportation corridor***

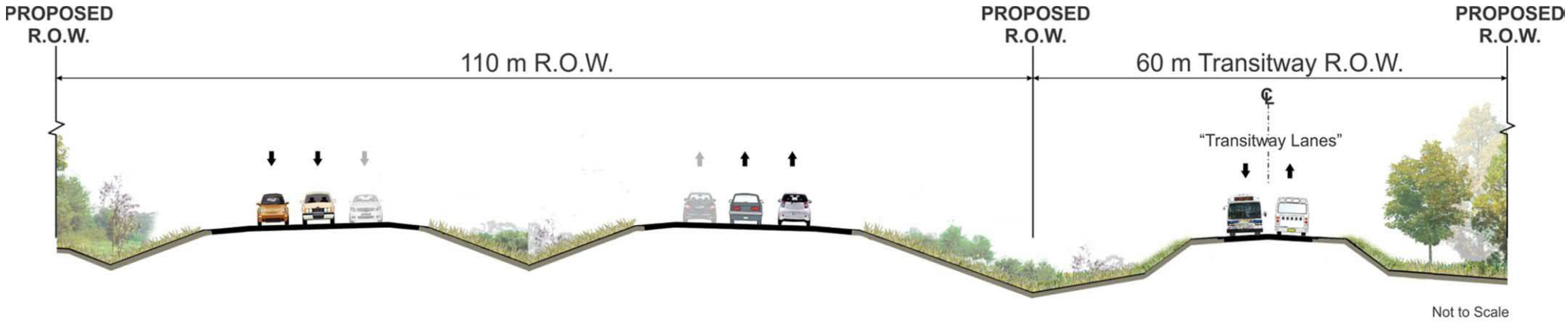
Even with optimizing the existing transportation network, widening existing highways, and the transit expansion projects identified in Metrolinx' Regional Transportation Plan, additional road capacity is needed

This study (**Stage 2**) focuses on the recommendation for a new transportation corridor:

- **From Highway 400 to the Highway 401/407 ETR interchange area**
- **Includes a 400-series highway, transitway, and potential goods movement priority features**

THE NEW CORRIDOR

- The new corridor is anticipated to be a 4- to 6-lane highway with a separate adjacent transitway and potential goods movement priority features
  - **Transitway stations will be located at key interchanges and connection points**



STAGE 2 OVERALL PROCESS

2014 → 2018

Data Collection

- Identify existing features and constraints

Route Planning Alternatives

- Develop and screen a long list of route alternatives and interchange locations to arrive at a short list
- Evaluate the short list of route alternatives and interchange locations to arrive at a preferred plan
- For crossing roads not identified as an interchange location, develop treatment at the corridor (i.e. overpass, underpass, or truncation)

Preliminary Design

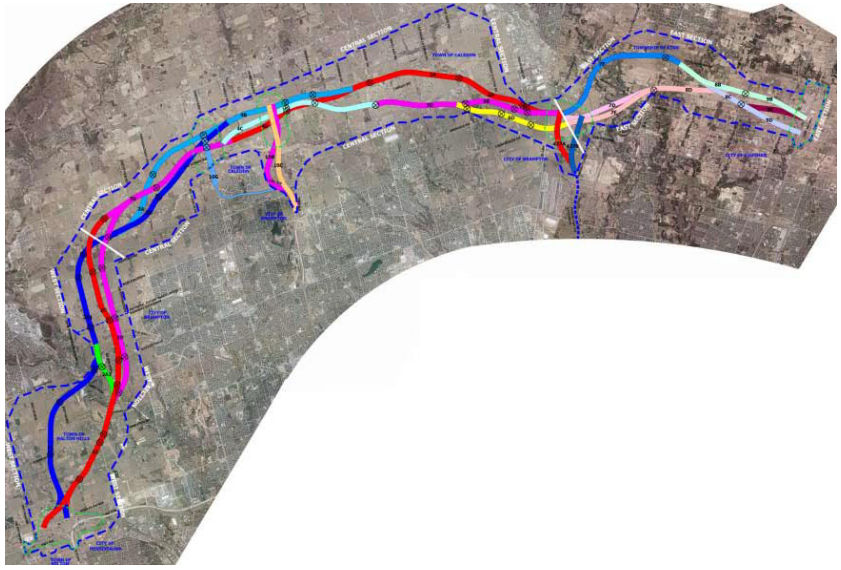
- Develop the preferred plan to a preliminary design level of detail

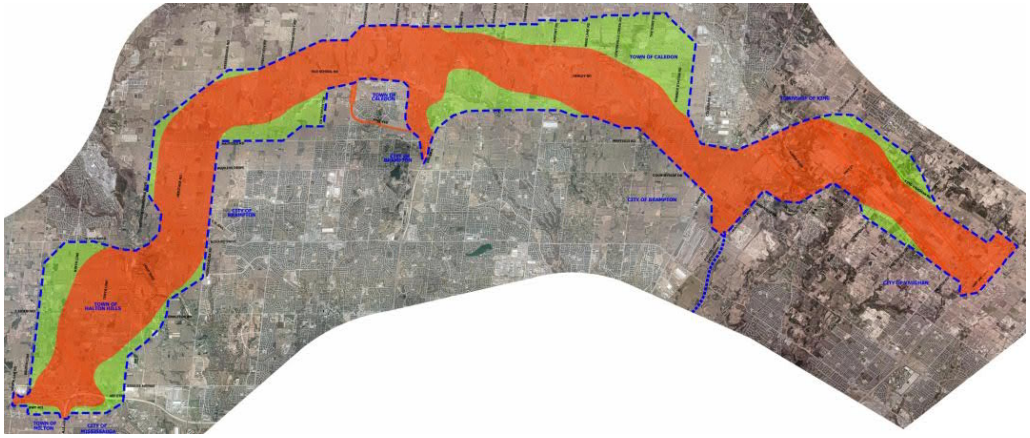
Draft Environmental Assessment Report

Submission of Final Environmental Assessment Report

PUBLIC INFORMATION CENTRE (PIC) #1

- PIC #1 was held at 3 venues (Halton, York, Peel) in November/December 2014
- The purpose of PIC #1 was to present an overview of the study background, process, existing conditions, route and interchange alternatives and the Focused Analysis Area
- Over 750 people attended and approx. 200 written comments were received





PIC #1 GENERAL FEEDBACK RECEIVED

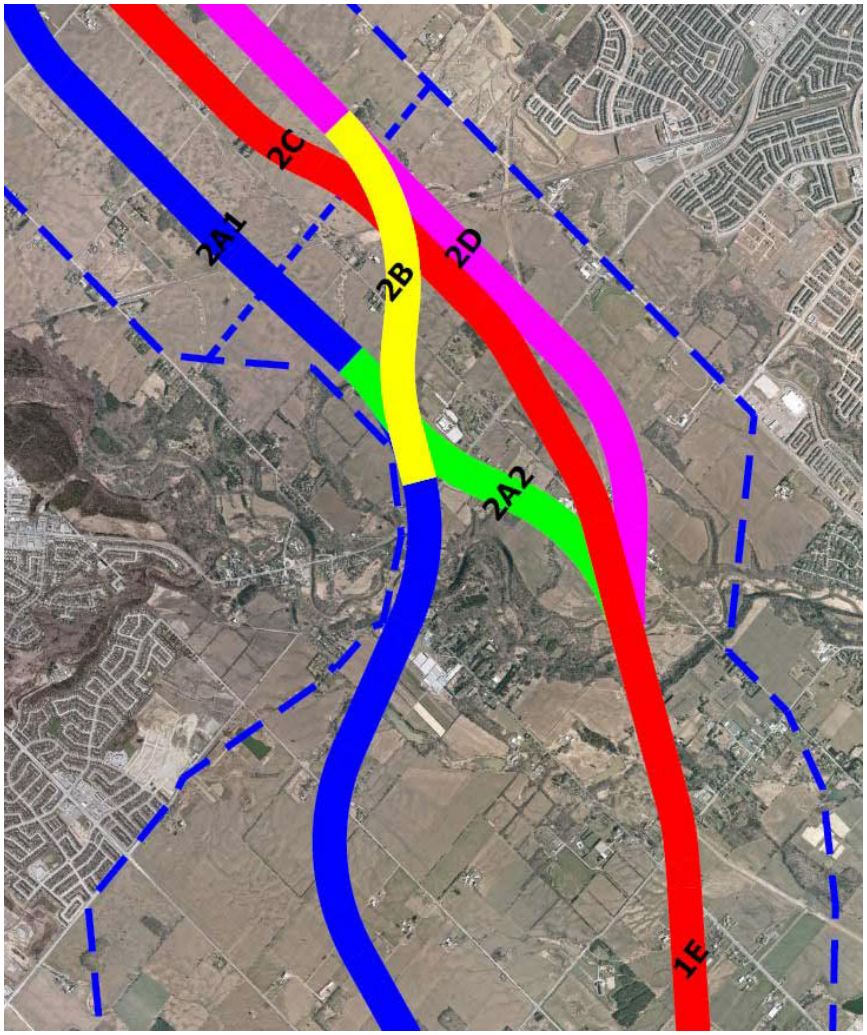
- Incorporate recommendations of previously conducted studies (e.g. HPBATS) to avoid unnecessary work
- Bypass specific areas
- Support and opposition for the transitway
- Support for goods movement priority features
- Comments regarding specific route and interchange locations
- Protection of agricultural lands and Greenbelt lands
- Pleased with study progress and the concept of Focused Analysis Area
- Inquiries about the study schedule, process and timing of construction
- Inquiries about property acquisition
- Inquiries about route generation and evaluation

INCORPORATING PIC #1 COMMENTS INTO THE STUDY

- The project team responds to all comments
- Features identified by stakeholders were verified and incorporated into existing conditions mapping
  - **These maps will be used when evaluating route and interchange alternatives**
- Suggested new routes were evaluated and those with merit will be carried forward for further study

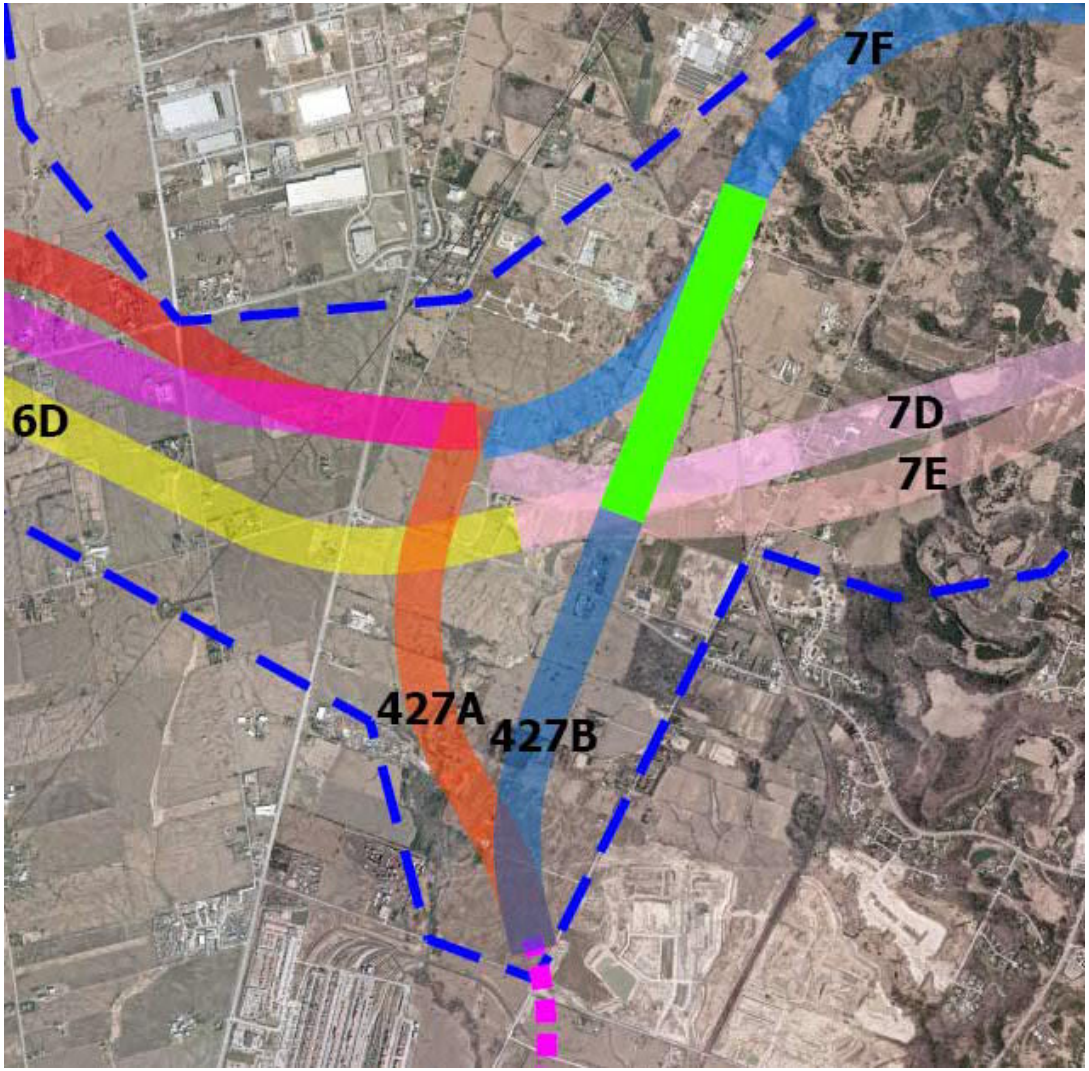
REFINEMENTS TO ROUTE ALTERNATIVES

- Alternative 2B in Peel Region has been added to the short list:
  - **Provides planning flexibility between Sections 1 and 2**
  - **Similar potential impacts to other alternatives in the area**



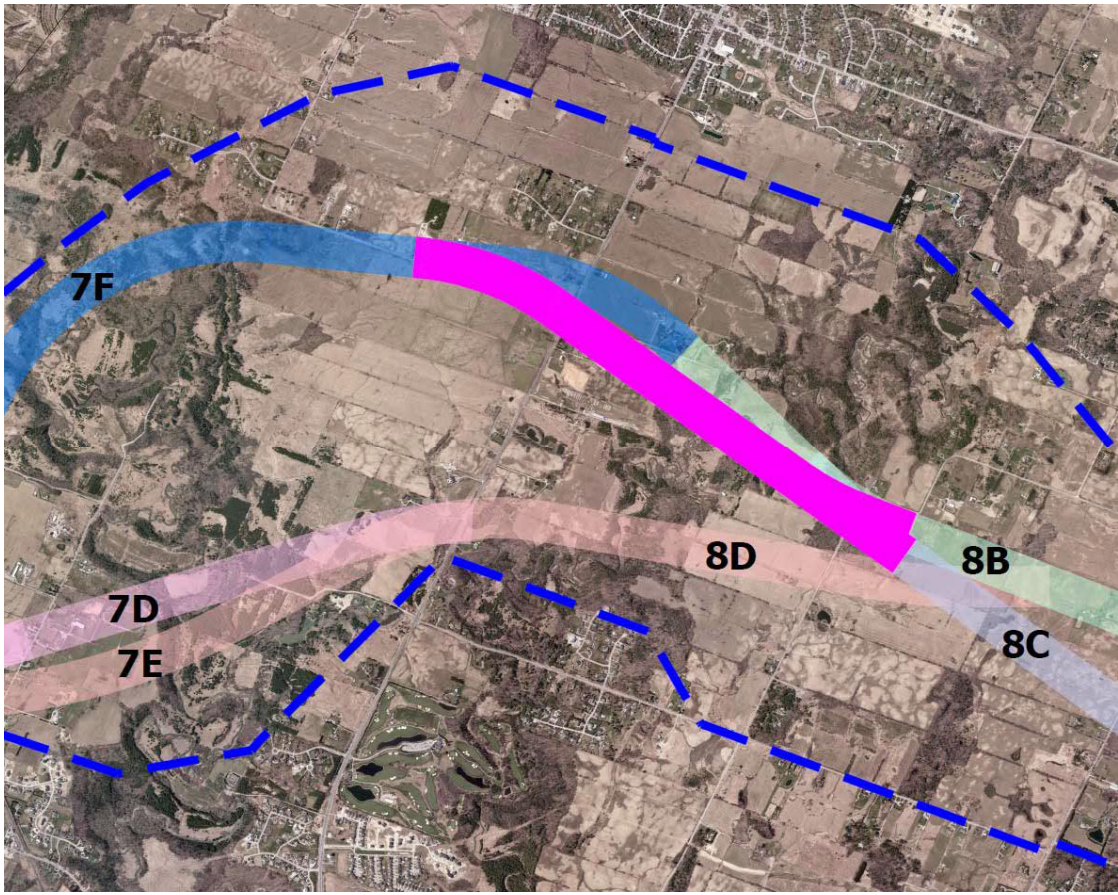
REFINEMENTS TO ROUTE ALTERNATIVES

- A refinement to Alternative 427B was made:
  - **Facilitates a connection to Alternative 7F**



REFINEMENTS TO ROUTE ALTERNATIVES

- A refinement to Alternative 7F was made:
  - **Minimizes impacts and access restrictions to community north of King-Vaughan Road at Highway 27**
  - **Suitable crossing of the East Humber River with minimal impact to environmentally sensitive features**
  - **Increases impacts to an Equestrian Centre**

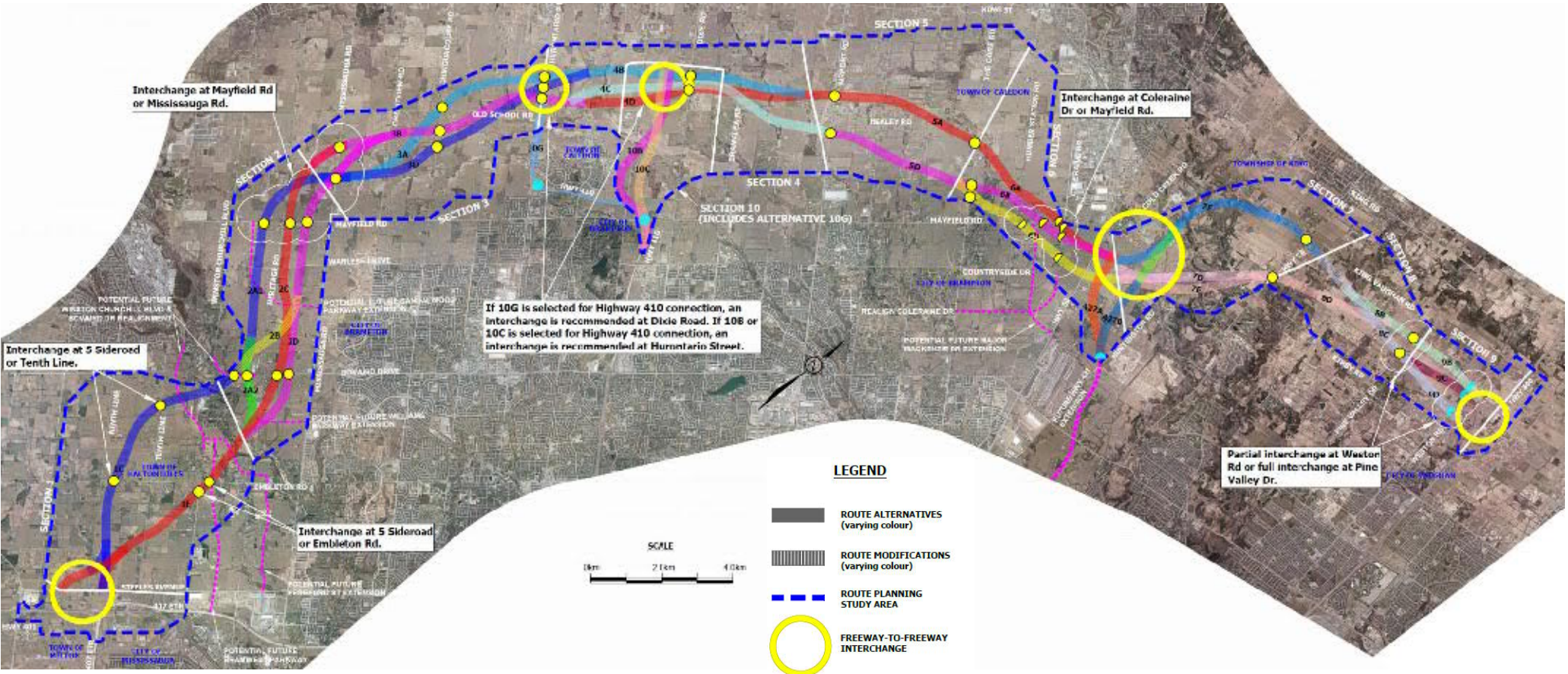


INTERCHANGE LOCATIONS

- Prior to PIC #1, all existing and planned crossing roads were initially considered for interchanges, then screened based on:
  - **Minimizing impacts to significant natural features**
  - **Minimizing impacts to existing and planned (approved) population and employment areas**
  - **Ensuring efficient and direct connections and addressing future transportation needs**

- Subsequent to PIC #1, the project team began an exercise to confirm the potential interchange locations by using criteria such as:
  - **Maximum spacing of 8 km between interchanges**
  - **Where more than one road meets the spacing criteria, identify the crossing road that best serves transportation needs based on:**
    - **Road classification**
    - **Connectivity to existing and planned urban centres**
    - **Conflicts with other interchanges**
    - **Forecasted utilization of the interchanges**
  - **Input from municipalities**

REFINED SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS



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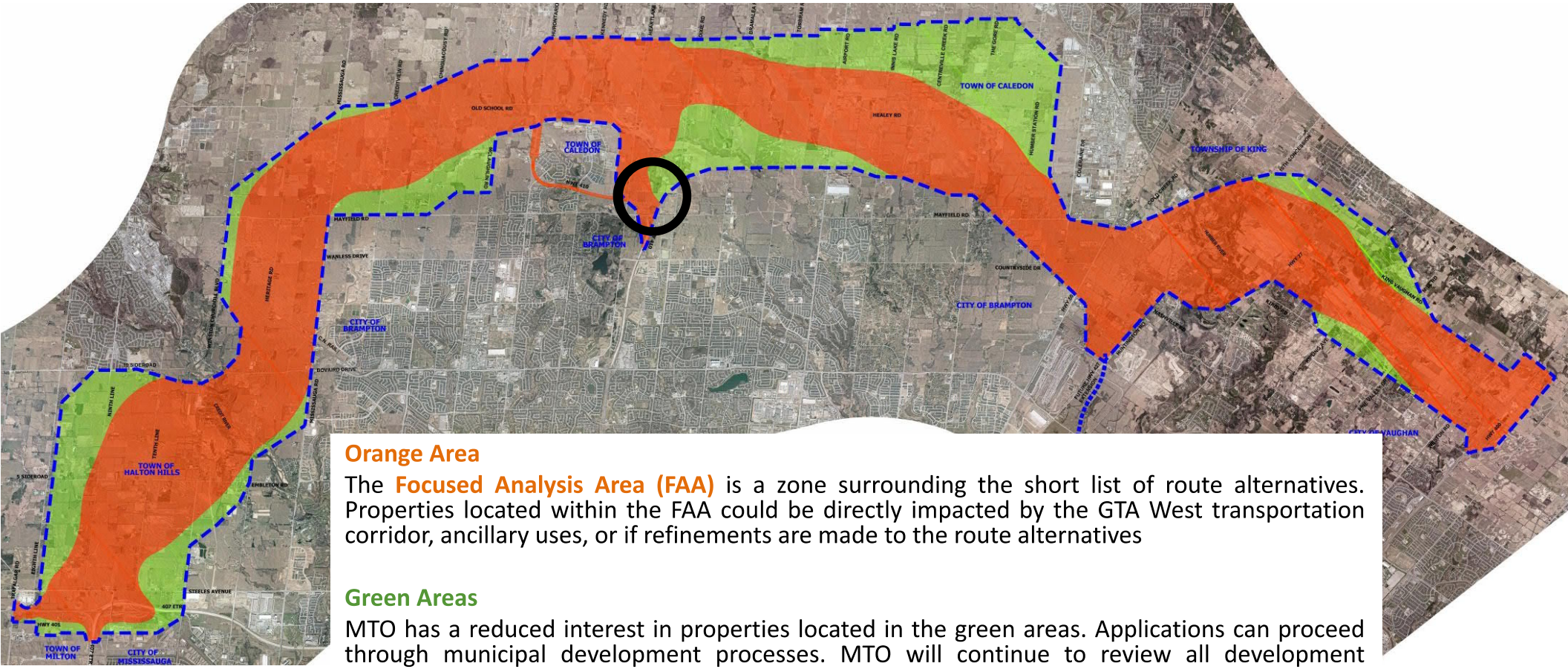
FOCUSED ANALYSIS AREA



Orange Area

The **Focused Analysis Area (FAA)** is a zone surrounding the short list of route alternatives. Properties located within the FAA could be directly impacted by the GTA West transportation corridor, ancillary uses, or if refinements are made to the route alternatives

Green Areas

MTO has a reduced interest in properties located in the green areas. Applications can proceed through municipal development processes. MTO will continue to review all development applications in the study area, but it is anticipated that applications in the green areas will not be impacted by the GTA West transportation corridor

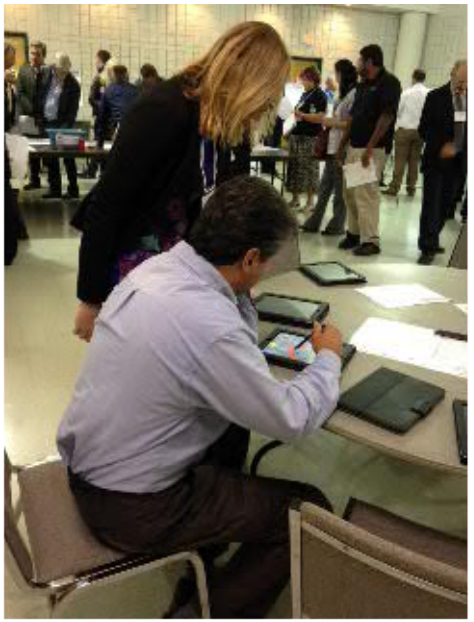
Minor refinement based on stakeholder input

FIELD INVESTIGATIONS

- Requests for Permission to Enter were mailed to approximately 800 properties in the study area
- Field Investigations are being conducted to:
  - **Inventory natural environmental features, including vegetation, birds, reptiles and amphibians**
  - **Confirm or update secondary source information**
  - **Assess the significance of natural features**

CONSULTATION & ENGAGEMENT

- Community workshops (4 rounds)
  - **You are attending Community Workshop #2 today**
- Public Information Centres (3 rounds)
  - **PIC #2 is planned for late 2015**
- Ongoing consultation with First Nation and Métis Councils/Communities
- Stakeholder advisory groups, municipal working groups, meetings with landowners, Council presentations, utilities (Hydro One, TransCanada Pipelines)
- Website, email, toll-free telephone, Twitter



NEXT STEPS

Opportunity for Input

- Remain on schedule
- Further develop, assess and evaluate the short list of route alternatives and the potential interchange locations
  - **Meetings with Advisory Groups**
- Present the preferred route at PIC #2 (Fall/Winter 2015)
- Present the preliminary design of the preferred route at PIC #3 (Winter/Spring 2017)

Contact the GTA West Project Team

Website: www.gta-west.com
Email: project_team@gta-west.com
Toll-Free: 1-877-522-6916
Twitter: @GTAWestStudy

GTA West

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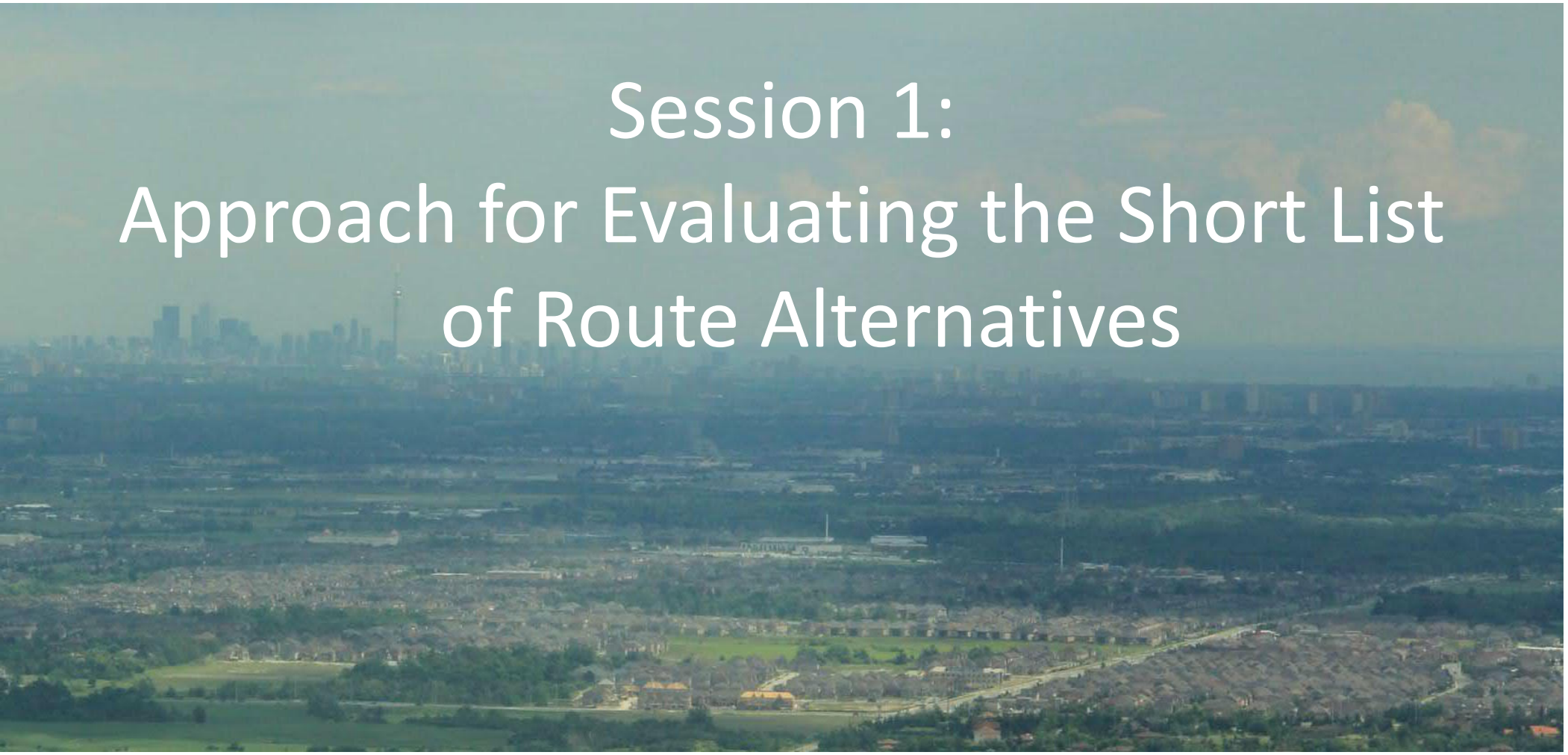

Session 1:
Approach for Evaluating the Short List of Route Alternatives

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PURPOSE

- Review and discuss the evaluation methodology for the short list of route alternatives
- Obtain your input on the importance of each of the evaluation factors

WHAT IS THE PURPOSE OF THE EVALUATION?

- Find a location for a new transportation corridor
  - **Balance benefits and impacts to:**
    - **Natural environment**
    - **Land use /socio-economic environment**
    - **Cultural environment**
    - **Transportation needs**
    - **Cost**
- The GTA West Study Terms of Reference (ToR) was approved in 2008 and specifies:
  - **Factors to be considered in the evaluation**
  - **Consultation requirements**

A GOOD EVALUATION PROCESS IS:

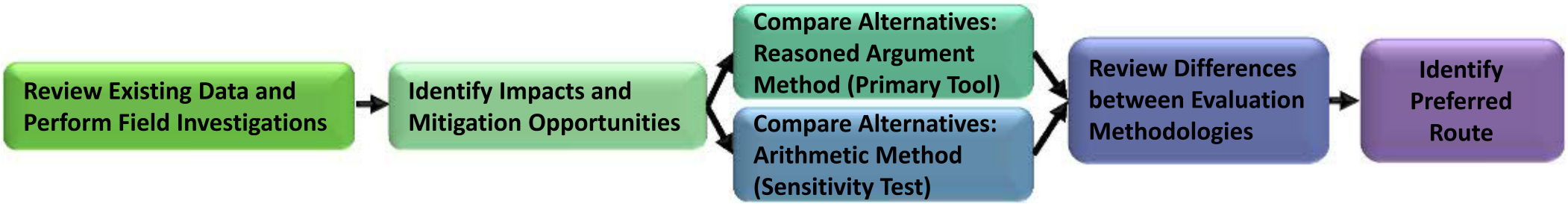
1. Comprehensive and systematic
2. Rational and understandable
3. Replicable
4. Traceable
5. Participatory

TWO EVALUATION METHODOLOGIES

1. Reasoned Argument Method
   - **Qualitatively (with words)** compares advantages and disadvantages of the alternatives
   - Primary tool to select a preferred route

2. Arithmetic Method
   - **Quantitatively (with numbers)** compares advantages and disadvantages of the alternatives
   - Secondary tool that tests the results of the reasoned argument method by running multiple numerical evaluations, each based on a stakeholder group's perspective

EVALUATION PROCESS



EVALUATION FACTORS

FACTOR	SUB-FACTOR
NATURAL ENVIRONMENT	
Fisheries and Aquatic Ecosystems	• Fish Habitat • Fish Community
Terrestrial Ecosystems	• Wildlife and Wildlife Habitat • Wetlands • Woodlands and Vegetation • Designated / Special / Natural Areas
Ecosystem Services	
Groundwater	• Areas of Groundwater Recharge or Discharge • Groundwater Source Areas and Wellhead Protection Areas • Large Volume Wells • Private Wells • Groundwater Dependent Commercial Enterprises • Groundwater Sensitive Ecosystems
Surface Water	• Watershed / Subwatershed Drainage Features / Patterns • Surface Water Quality and Quantity
Air Quality	• Local and Regional Air Quality Impacts; Greenhouse Gas Emissions
TRANSPORTATION	
System Capacity and Efficiency	• Movement of People • Movement of Goods • System Performance During Peak Periods
System Reliability and Redundancy	
Safety	• Traffic Safety • Emergency Access
Mobility and Accessibility	• Modal Integration and Balance • Linkages to Population and Employment Centres • Recreation and Tourism Travel • Accommodation for Pedestrians, Cyclists and Snowmobiles
Network Compatibility	• Network connectivity • Flexibility for Future Expansion
Engineering	• Constructability • Compliance with Design Criteria
Construction Cost	
Traffic Operations	

FACTOR	SUB-FACTOR
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	
Land Use Planning, Policies, Goals, Objectives	• First Nation Land Claims • Provincial / Federal Land Use Planning Policies / Goals / Objectives • Municipal (Local / Regional) Land Use Planning Policies / Goals / Objectives • Development Objectives of Private Property Owners
Land Use – Community	• First Nation Reserves • First Nation Sacred Grounds • Urban and Rural Residential Uses and Properties • Commercial / Industrial Uses and Properties • Recreation Areas and Tourist Attractions • Community Facilities / Institutions • Municipal Infrastructures and Public Service Facilities
Noise Sensitive Areas	• Transportation Noise
Land Use Resources	• First Nation Treaty Rights and Use of Land and Resources for Traditional Purposes • Agriculture / Specialty Crop • Recreation • Aggregate and Mineral Resources
Major Utility Transmission Corridors and Pipelines	• Major Existing Utility Transmission Corridors and Pipelines • Major Proposed Utility Transmission Corridors and Pipelines
Contaminated Property and Waste Management	
Landscape Composition	• Terrain • Vegetation • Visual Impacts • Aesthetics
CULTURAL ENVIRONMENT	
Built Heritage and Cultural Heritage Landscapes	• Built Heritage Resources • Heritage Bridges • Cultural Heritage Landscapes
Archaeology	• Pre-Contact and Contact First Nations Archaeological Sites • Historic Euro Canadian Archaeological Sites • First Nation Burial Sites • Cemeteries

EVALUATION FACTORS

FACTOR	SUB-FACTOR
NATURAL ENVIRONMENT	
Fisheries and Aquatic Ecosystems	• Fish Habitat • Fish Community
Terrestrial Ecosystems	• Wildlife and Wildlife Habitat • Wetlands • Woodlands and Vegetation • Designated / Special / Natural Areas
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Surface Water	• Watershed / Subwatershed Drainage Features / Patterns • Surface Water Quality and Quantity
Air Quality	• Local and Regional Air Quality Impacts; Greenhouse Gas Emissions
TRANSPORTATION	
System Capacity and Efficiency	• Movement of People • Movement of Goods • System Performance During Peak Periods
System Reliability and Redundancy	
Safety	• Traffic Safety • Emergency Access
Mobility and Accessibility	• Modal Integration and Balance • Linkages to Population and Employment Centres • Recreation and Tourism Travel • Accommodation for Pedestrians, Cyclists and Snowmobiles
Network Compatibility	• Network connectivity • Flexibility for Future Expansion
Engineering	• Constructability • Compliance with Design Criteria
Construction Cost	
Traffic Operations	

FACTOR	SUB-FACTOR
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	
Land Use Planning, Policies, Goals, Objectives	• First Nation Land Claims • Provincial / Federal Land Use Planning Policies / Goals / Objectives • Municipal (Local / Regional) Land Use Planning Policies / Goals / Objectives • Development Objectives of Private Property Owners
Land Use – Community	• First Nation Reserves • First Nation Sacred Grounds • Urban and Rural Residential Uses and Properties • Commercial / Industrial Uses and Properties • Recreation Areas and Tourist Attractions • Community Facilities / Institutions • Municipal Infrastructures and Public Service Facilities
Noise Sensitive Areas	• Transportation Noise
Land Use Resources	• First Nation Treaty Rights and Use of Land and Resources for Traditional Purposes • **Agriculture / Specialty Crop** • Recreation • Aggregate and Mineral Resources
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Archaeology	• Pre-Contact and Contact First Nations Archaeological Sites • Historic Euro Canadian Archaeological Sites • First Nation Burial Sites • Cemeteries

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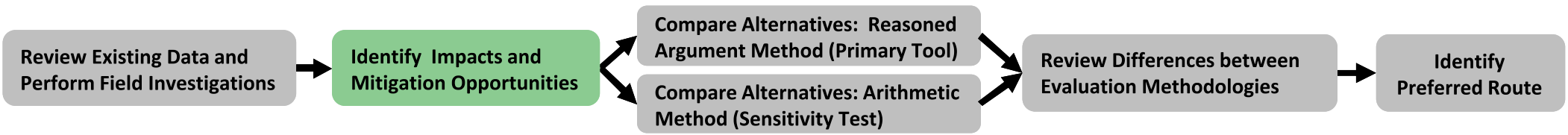
IMPACT ASSESSMENT

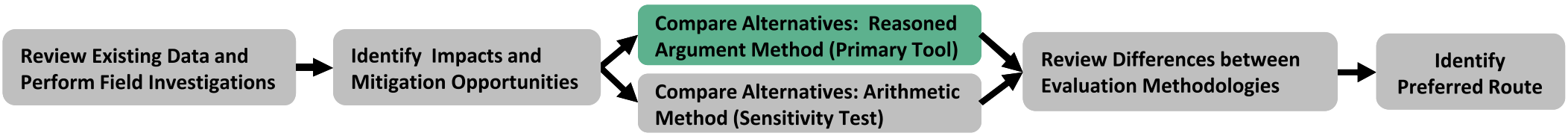
- For each alternative, the project team will determine:
  - **Positive and negative impacts**
  - **Opportunities for mitigation**

Example for illustrative purposes only

Route Alternative	FACTOR & SUB-FACTOR	POTENTIAL EFFECTS BASED ON INDICATORS	POTENTIAL MITIGATION MEASURES	RANGE OF IMPACT
LAND USE / SOCIO-ECONOMIC ENVIRONMENT				
Route X	**Agriculture / Specialty Crop**	• Class 1 soils – 100 hectares impacted • Class 4 soils – 30 hectares impacted • Class 5 soils – 15 hectares impacted • Route bisects two properties farmed by one agricultural operation. Eliminates access to one field.	• Opportunity to provide alternate access to farm property.	• **Medium** impact on agricultural lands.
Route Y	**Agriculture / Specialty Crop**	• Class 1 soils – 20 hectares impacted • Class 4 soils – 15 hectares impacted • Class 5 soils – 30 hectares impacted	• Maintenance of farm building and field access location.	• **Low** impact on agricultural lands.



REASONED ARGUMENT METHOD

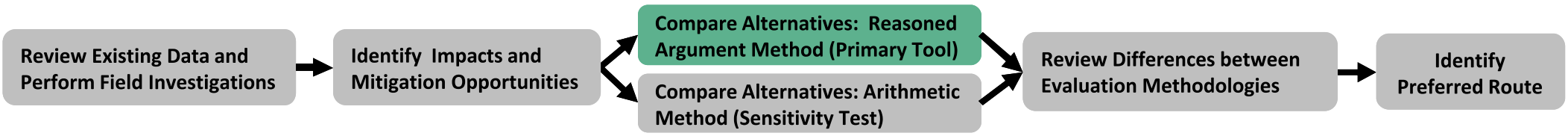


REASONED ARGUMENT METHOD

- For each factor, compare the ranges of impact between alternatives and explain why one is preferred

Example for illustrative purposes only

FACTOR / SUB-FACTOR	RANGE OF IMPACT	
	Route X	Route Y
LAND USE / SOCIO-ECONOMIC ENVIRONMENT		
Agriculture / Specialty Crop	• **Medium** impact on agricultural lands.	• **Low** impact on agricultural lands.
Urban and Rural Residential Uses and Properties		
Commercial / Industrial Uses and Properties		
Factor Recommendation		

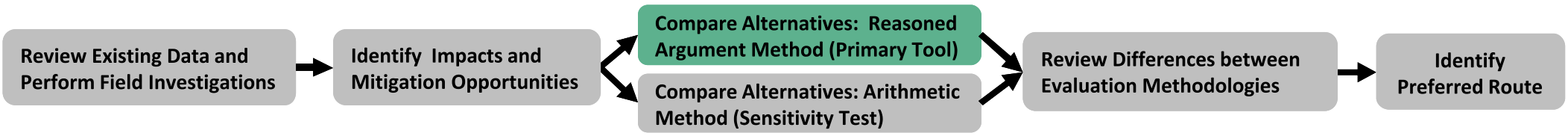


REASONED ARGUMENT METHOD

- For each factor, compare the ranges of impact between alternatives and explain why one is preferred

Example for illustrative purposes only

FACTOR / SUB-FACTOR	RANGE OF IMPACT	
	Route X	Route Y
LAND USE / SOCIO-ECONOMIC ENVIRONMENT		
Agriculture / Specialty Crop	• **Medium** impact on agricultural lands.	• **Low** impact on agricultural lands.
Urban and Rural Residential Uses and Properties	• **High** impact • 29 rural residences displaced.	• **Low** impact • 3 rural residences displaced.
Commercial / Industrial Uses and Properties	• **Low** impact • 1 industrial property access realignment.	• **Medium** impact • 4 commercial property displacements.
Factor Recommendation		

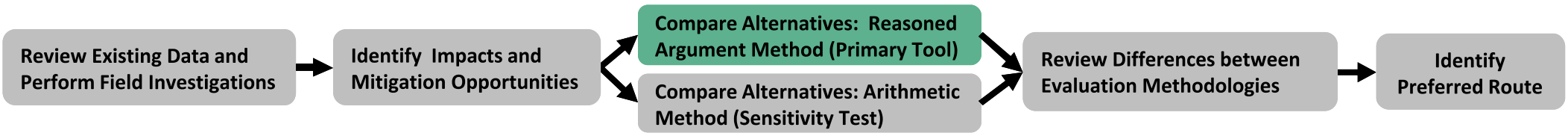


REASONED ARGUMENT METHOD

- For each factor, compare the ranges of impact between alternatives and explain why one is preferred

Example for illustrative purposes only

FACTOR / SUB-FACTOR	RANGE OF IMPACT	
	Route X	Route Y
LAND USE / SOCIO-ECONOMIC ENVIRONMENT		
Agriculture / Specialty Crop	• **Medium** impact on agricultural lands.	• **Low** impact on agricultural lands.
Urban and Rural Residential Uses and Properties	• **High** impact • 29 rural residences displaced.	• **Low** impact • 3 rural residences displaced.
Commercial / Industrial Uses and Properties	• **Low** impact • 1 industrial property access realignment.	• **Medium** impact • 4 commercial property displacements.
Factor Recommendation	**2nd**	**1st**
	Although Route Y displaces 3 additional commercial properties, it minimizes rural residential displacements, and has a low impact on agricultural lands. **Therefore, Route Y is preferred from a Land Use/Socio-Economic Environment perspective.**	

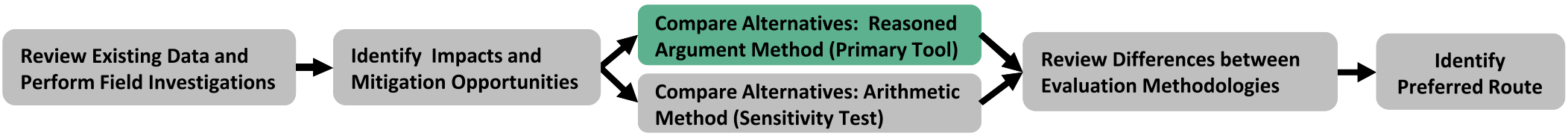


REASONED ARGUMENT METHOD

- Summarize factor rankings and identify the preferred alternative overall

Example for illustrative purposes only

FACTOR	Route X	Route Y
Natural Environment		
Land Use / Socio-Economic Environment	2nd	1st
Cultural Environment		
Transportation		
RECOMMENDATION		

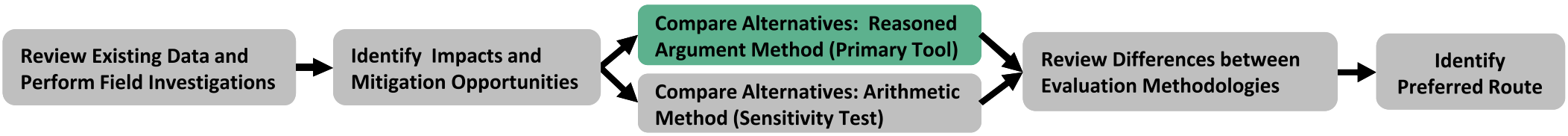


REASONED ARGUMENT METHOD

- Summarize factor rankings and identify the preferred alternative overall

Example for illustrative purposes only

FACTOR	Route X	Route Y
Natural Environment	1st	2nd
Land Use / Socio-Economic Environment	2nd	1st
Cultural Environment	1st (Tied)	1st (Tied)
Transportation	2nd	1st
RECOMMENDATION		

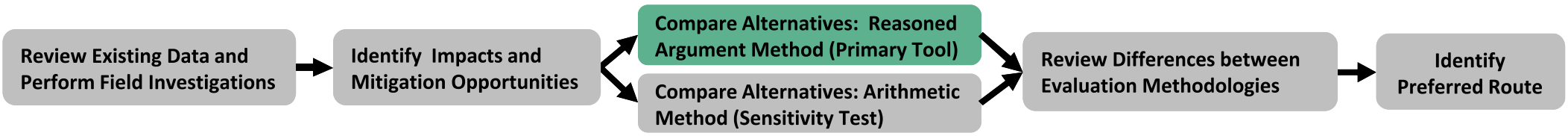


REASONED ARGUMENT METHOD

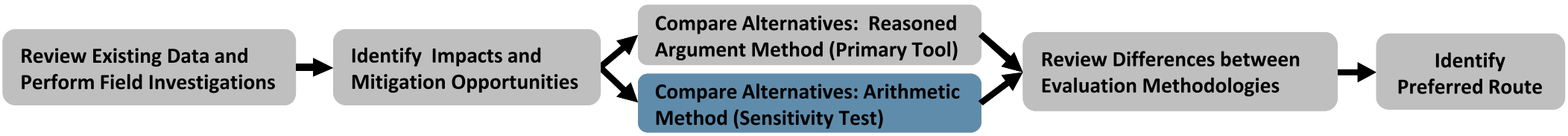
- Summarize factor rankings and identify the preferred alternative overall

Example for illustrative purposes only

FACTOR	Route X	Route Y
Natural Environment	1st	2nd
Land Use / Socio-Economic Environment	2nd	1st
Cultural Environment	1st (Tied)	1st (Tied)
Transportation	2nd	1st
	2nd	**1st**
RECOMMENDATION	**Route Y** is preferred from land use/socio-economic environment, cultural environment, and transportation perspectives. These benefits outweigh the slightly larger impact to the natural environment.	



ARITHMETIC METHOD

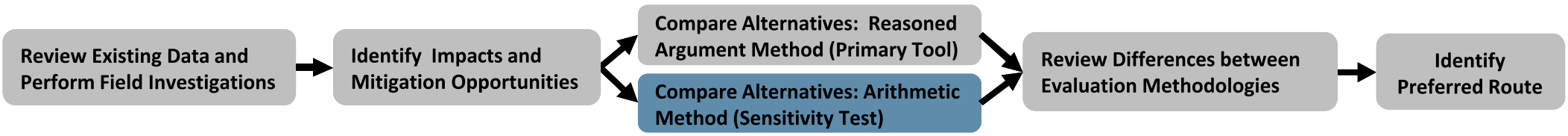


ARITHMETIC METHOD

- A level of importance (numerical weighting) will be assigned to each factor
  - **Higher weight = more important factor to you**

Example for illustrative purposes only

FACTOR	WEIGHTING
NATURAL ENVIRONMENT	25
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	30
CULTURAL ENVIRONMENT	10
TRANSPORTATION	35
TOTAL	100



ARITHMETIC METHOD

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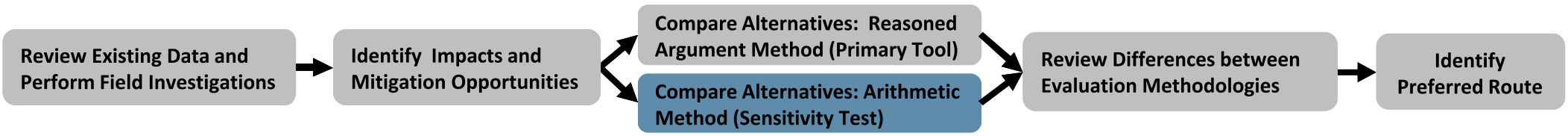
Example for illustrative purposes only

FACTOR	WEIGHTING
NATURAL ENVIRONMENT	25
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	30
CULTURAL ENVIRONMENT	10
TRANSPORTATION	35
TOTAL	100

You can provide your factor weighting today!



ARITHMETIC METHOD – WEIGHTING

- A level of importance (numerical weighting) will be assigned to each factor
  - **Higher weight = more important factor to you**

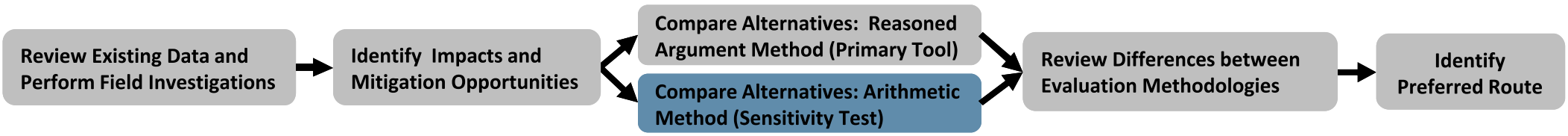
Example for illustrative purposes only

FACTOR	WEIGHTING
NATURAL ENVIRONMENT	25
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	30
CULTURAL ENVIRONMENT	10
TRANSPORTATION	35
TOTAL	100

Weightings will be divided within each factor:

LAND USE / SOCIO-ECONOMIC ENVIRONMENT	30
Agriculture / Specialty Crop	11
Urban and Rural Residential Uses and Properties	9
Commercial / Industrial Uses and Properties	10

You can provide your factor weighting today!



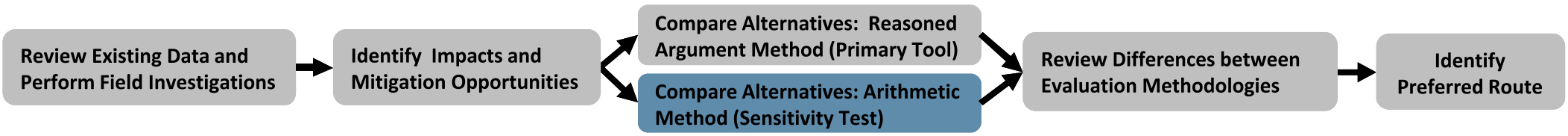
ARITHMETIC METHOD – SCORE

- The qualitative impacts previously determined are converted into numerical scores
  - **Higher score = more benefits, lower impacts**

Range of Impact	Score
No Impact	1
Low	0.67
Medium	0.33
High	0

Example for illustrative purposes only

ROUTE ALTERNATIVE	FACTOR & SUB-FACTOR	RANGE OF IMPACT	SCORE
LAND USE / SOCIO-ECONOMIC ENVIRONMENT			
Route X	**Agriculture / Specialty Crop**	• **Medium** impact on agricultural lands.	0.33
Route Y	**Agriculture / Specialty Crop**	• **Low** impact on agricultural lands.	0.67

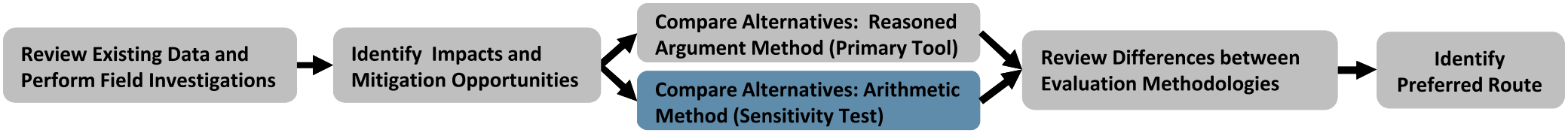


ARITHMETIC METHOD

- The range of impact (score) is multiplied by the importance of the impact (weight) to give the weighted score for that factor

Example for illustrative purposes only

Factor / Sub-Factor	Route X			Route Y		
	Weight	Score	Weighted Score (Weight x Score)	Weight	Score	Weighted Score (Weight x Score)
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	30			30		
Agriculture / Specialty Crop	11	0.33		11	0.67	
Urban and Rural Residential Uses and Properties						
Commercial / Industrial Uses and Properties						

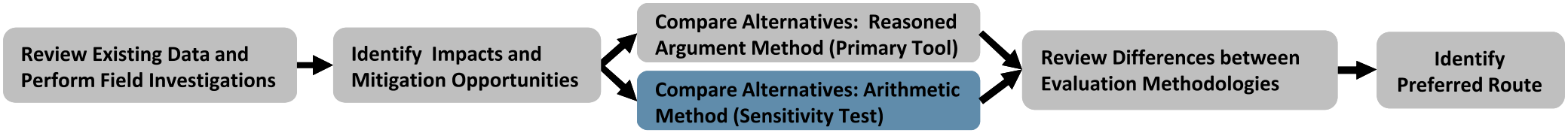


ARITHMETIC METHOD

- The range of impact (score) is multiplied by the importance of the impact (weight) to give the weighted score for that factor

Example for illustrative purposes only

Factor / Sub-Factor	Route X			Route Y		
	Weight	Score	Weighted Score (Weight x Score)	Weight	Score	Weighted Score (Weight x Score)
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	**30**			**30**		
Agriculture / Specialty Crop	**11**	**0.33**		**11**	**0.67**	
Urban and Rural Residential Uses and Properties	9	0.00		9	0.67	
Commercial / Industrial Uses and Properties	10	0.67		10	0.33	

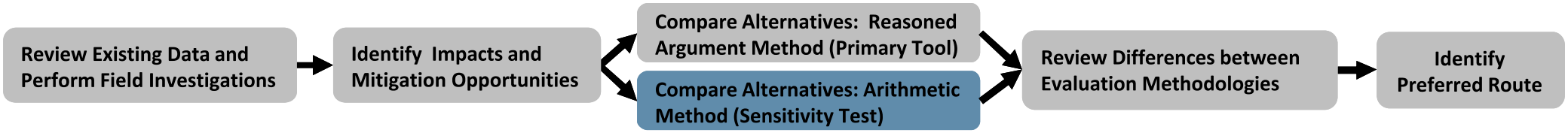


ARITHMETIC METHOD

- The range of impact (score) is multiplied by the importance of the impact (weight) to give the weighted score for that factor

Example for illustrative purposes only

Factor / Sub-Factor	Route X			Route Y		
	Weight	Score	Weighted Score (Weight x Score)	Weight	Score	Weighted Score (Weight x Score)
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	30			30		
Agriculture / Specialty Crop	11 X	0.33 =	3.63	11 X	0.67 =	7.37
Urban and Rural Residential Uses and Properties	9	0.00	0	9	0.67	6.03
Commercial / Industrial Uses and Properties	10	0.67	6.70	10	0.33	3.30

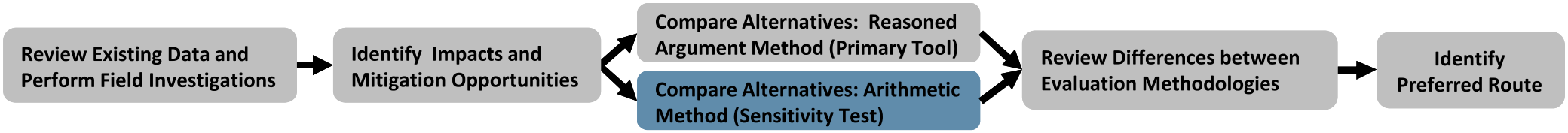


ARITHMETIC METHOD

- The range of impact (score) is multiplied by the importance of the impact (weight) to give the weighted score for that factor

Example for illustrative purposes only

Factor / Sub-Factor	Route X			Route Y		
	Weight	Score	Weighted Score (Weight x Score)	Weight	Score	Weighted Score (Weight x Score)
LAND USE / SOCIO-ECONOMIC ENVIRONMENT	**30**			**30**		
Agriculture / Specialty Crop	**11**	**0.33**	**3.63**	**11**	**0.67**	**7.37**
Urban and Rural Residential Uses and Properties	9	0.00	**+ 0**	9	0.67	**+ 6.03**
Commercial / Industrial Uses and Properties	10	0.67	**+ 6.70**	10	0.33	**+ 3.30**
LAND USE / SOCIO-ECONOMIC FACTOR WEIGHTED SCORE			**= 10.33**			**= 16.70**
RANK			**2ND**			**1ST**

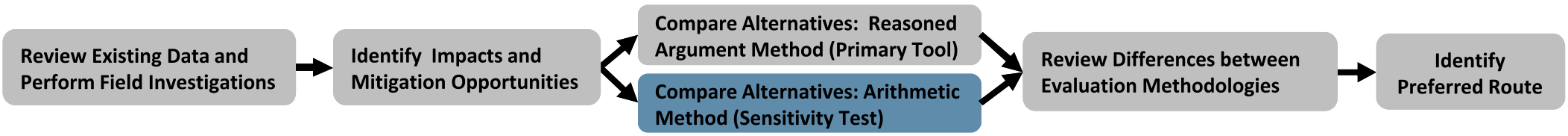


ARITHMETIC METHOD

- The weighted factor scores are added to give a total for each alternative
  - **Higher total = more preferred**

Example for illustrative purposes only

Factors	Route X	Route Y
	Weighted Factor Score	Weighted Factor Score
Natural Environment		
Land Use / Socio-Economic Environment	10.33	16.70
Cultural Environment		
Transportation		
TOTAL		
RANK		

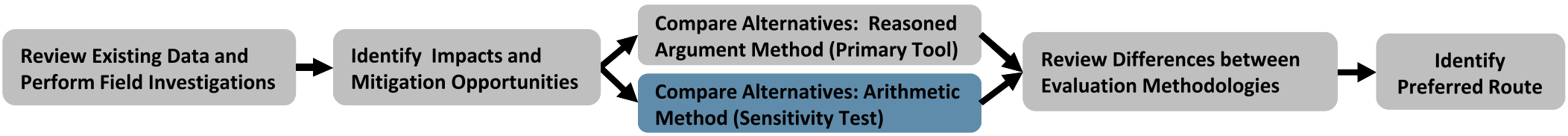


ARITHMETIC METHOD

- The weighted factor scores are added to give a total for each alternative
  - **Higher total = more preferred**

Example for illustrative purposes only

Factors	Route X	Route Y
	Weighted Factor Score	Weighted Factor Score
Natural Environment	15.30	14.10
Land Use / Socio-Economic Environment	10.33	16.70
Cultural Environment	21.30	21.30
Transportation	20.15	25.33
TOTAL		
RANK		

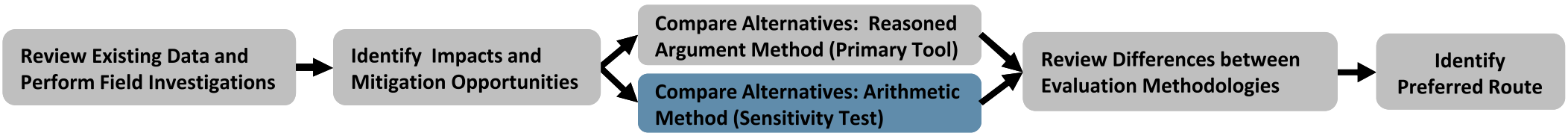


ARITHMETIC METHOD

- The weighted factor scores are added to give a total for each alternative
  - **Higher total = more preferred**

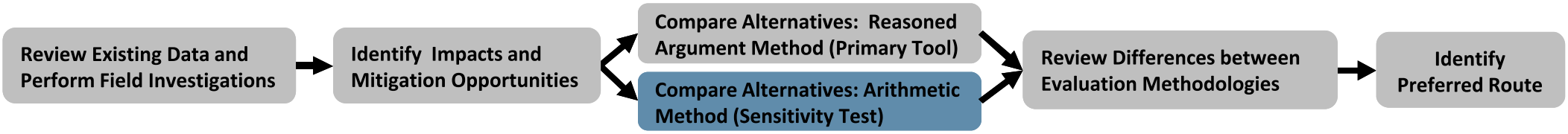
Example for illustrative purposes only

Factors	Route X	Route Y
	Weighted Factor Score	Weighted Factor Score
Natural Environment	15.30	14.10
Land Use / Socio-Economic Environment	+ 10.33	+ 16.70
Cultural Environment	+ 21.30	+ 21.30
Transportation	+ 20.15	+ 25.33
TOTAL	**= 67.08**	**= 77.43**
RANK	**2nd**	**1st**



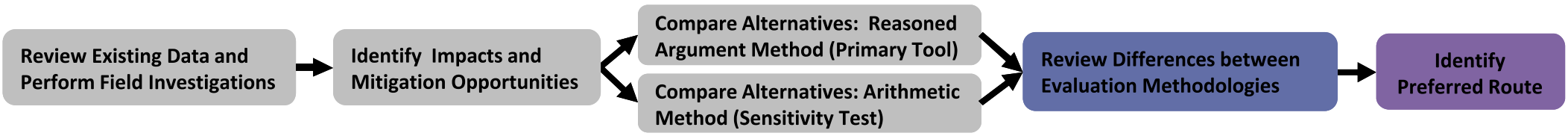
ARITHMETIC METHOD

- Rural and urban scenario weightings will be collected from each of these groups:
  - **Project Team**
  - **Public (June 18 - July 31)**
  - **Community and Greenbelt Transportation Advisory Groups (May 7)**
  - **Municipalities and Regulatory Agencies (May 11)**
  - **First Nation and Métis Communities (Summer)**
- The arithmetic method will be run for each group
  - **Results from all groups incorporated so that all perspectives are captured**



COMPARE RESULTS

- If the results of the reasoned argument method (qualitative) and arithmetic method (quantitative) scenarios are consistent – evaluation is confirmed
- If there are significant differences, the project team will revisit the rationale in the reasoned argument method
- The results of the reasoned argument method and the arithmetic scenarios will be available for review at PIC #2 (December 2015)



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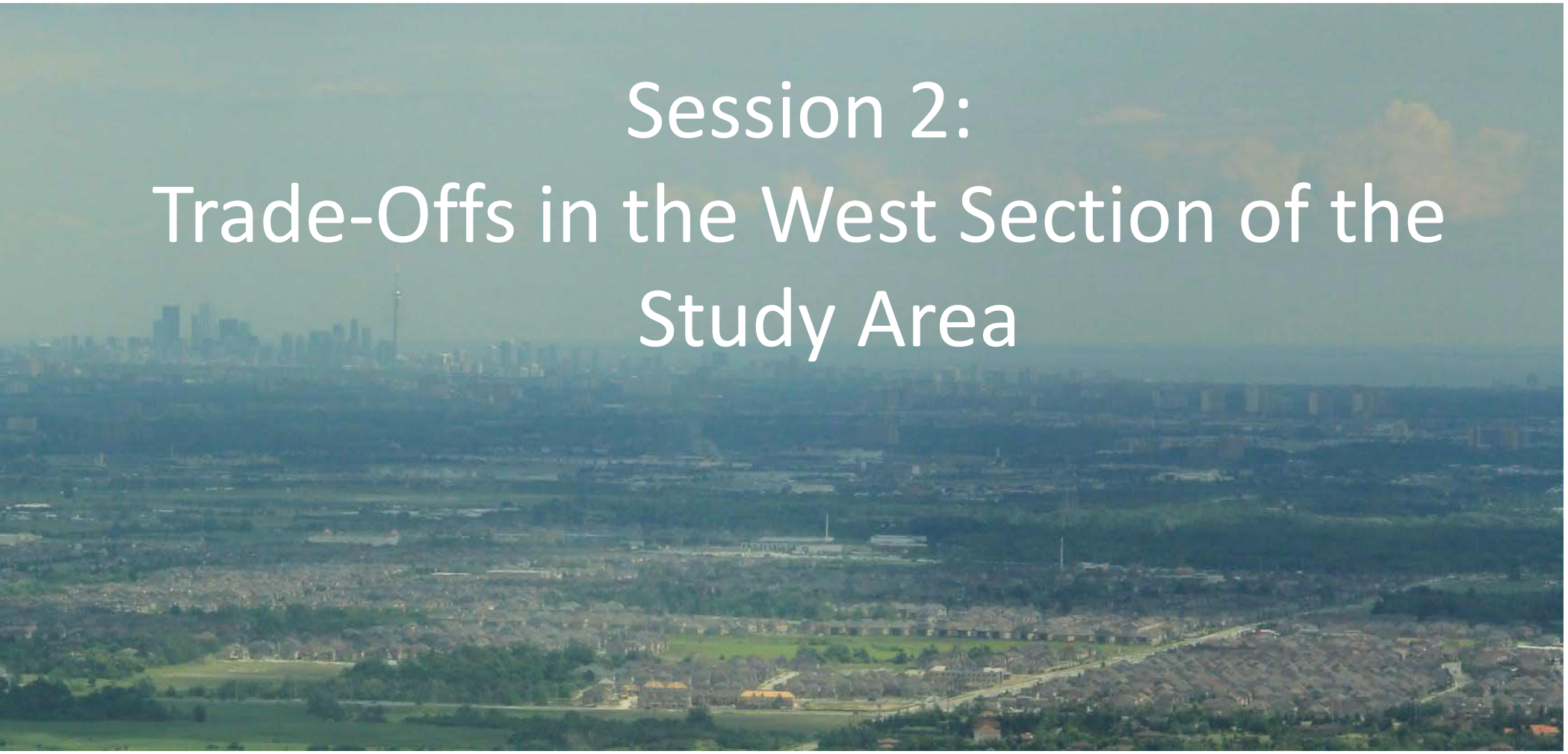


Session 2:
Trade-Offs in the West Section of the Study Area

Ontario

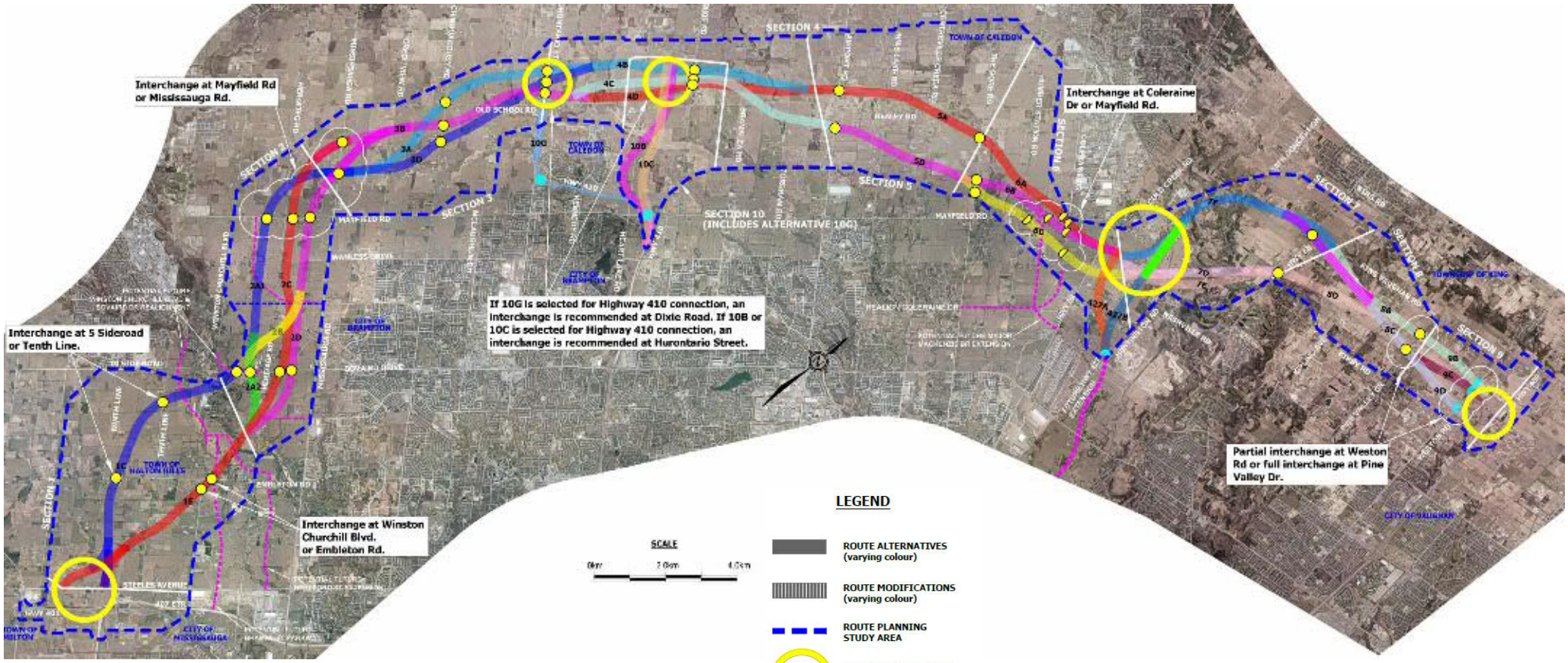
MMM GROUP

AECOM

PURPOSE

- Review the key issues and trade-offs the project team has identified in the west section of the GTA West study area
- Obtain your input on the key issues and trade-offs

REFINED SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS



NOTE: POTENTIAL INTERCHANGE LOCATIONS BEING REFINED THROUGH MUNICIPAL INPUT NOW UNDERWAY

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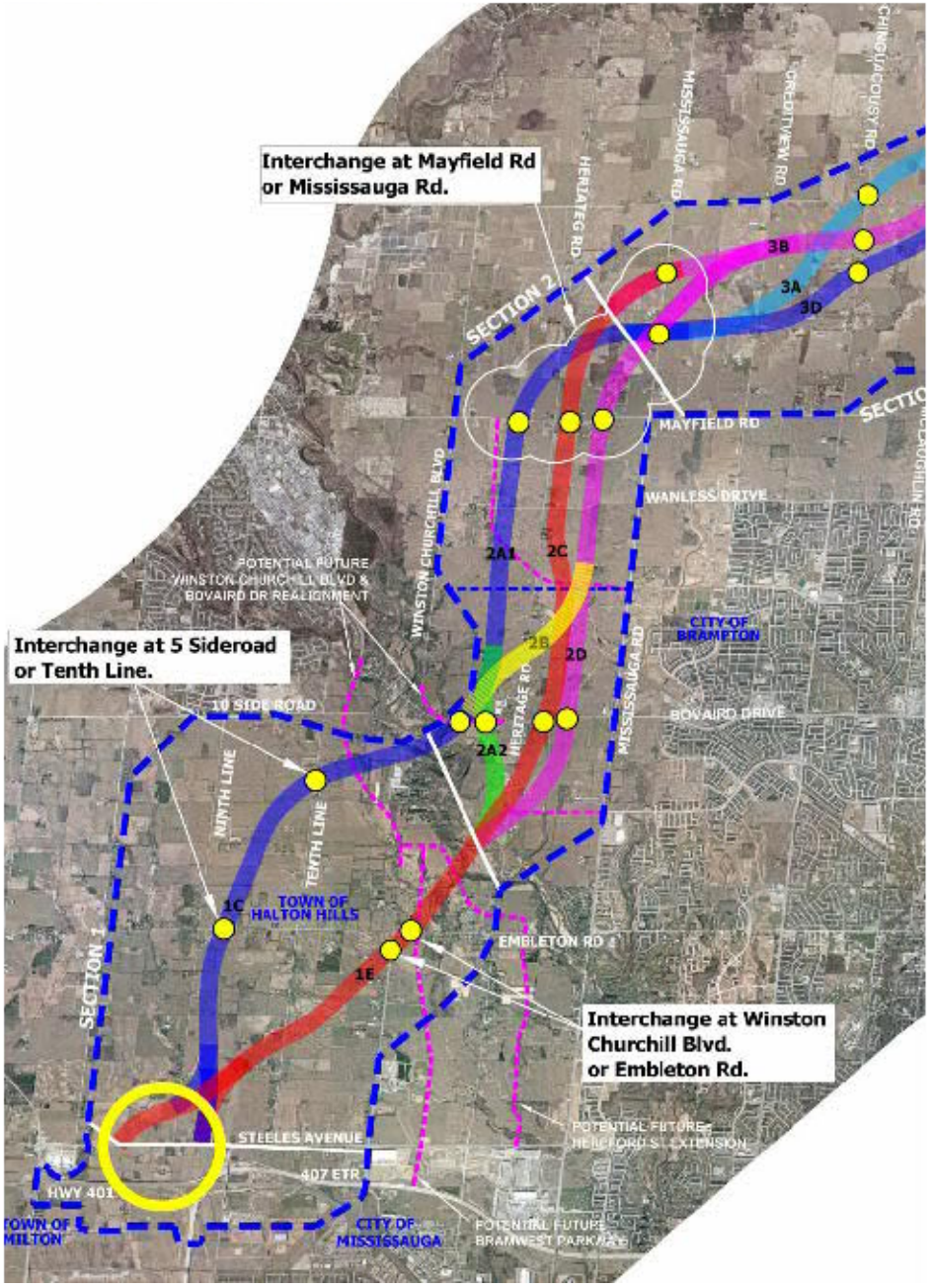
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS

WEST SECTION



NOTE: POTENTIAL INTERCHANGE LOCATIONS BEING REFINED THROUGH MUNICIPAL INPUT NOW UNDERWAY

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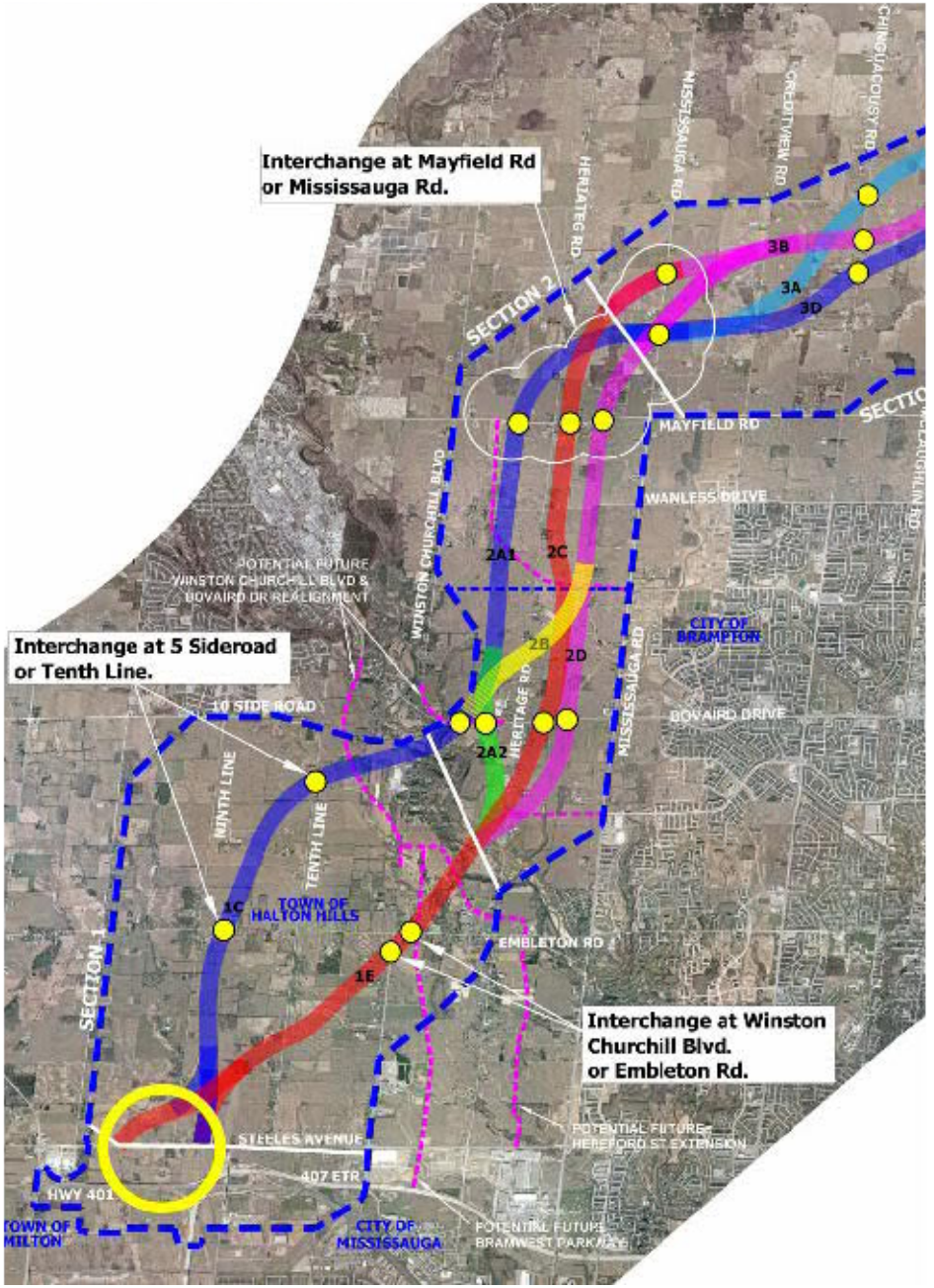
EXAMPLES OF TRADE-OFFS

- North vs. south crossing of Credit River
  - **Residences, religious institutions, natural environment, proximity to Norval, compatibility with future municipal road network**
- Interchange options
  - **Land use impacts, access issues, TransCanada Pipeline crossing, compatibility with future municipal road network**
- East vs. west of Heritage Road
  - **Religious institutions, planned cemetery, Heritage Heights concept plan and landowners, natural environment**



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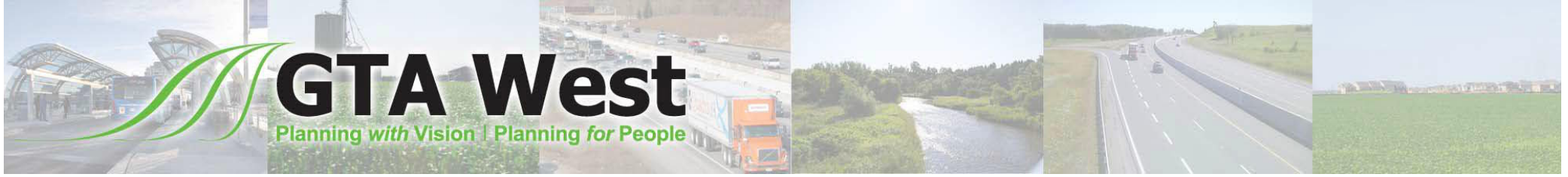
FACILITATED GROUP DISCUSSION



FACILITATED GROUP DISCUSSION – WEST SECTION

1. Do you prefer a northerly or southerly crossing of the Credit River and why?

2. Do you prefer an interchange at Mississauga Road or Mayfield Road and why?

3. Do you prefer the easterly or westerly routes through the Heritage Heights area and why?

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Session 2:
Trade-Offs in the Central Section of the Study Area

Ontario

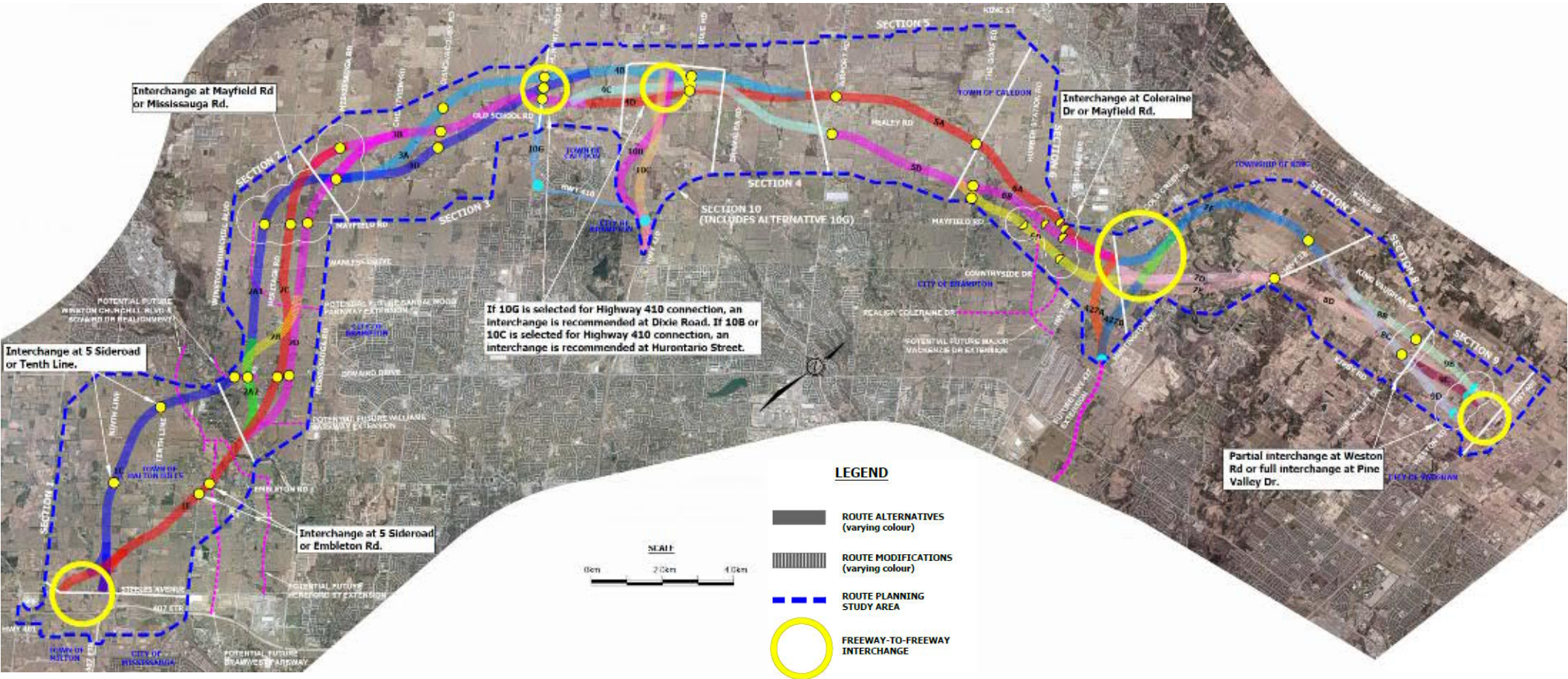
MMM GROUP

AECOM

PURPOSE

- Review the key issues and trade-offs the project team has identified in the central section of the GTA West study area
- Obtain your input on the key issues and trade-offs

REFINED SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS



NOTE: POTENTIAL INTERCHANGE LOCATIONS BEING REFINED THROUGH MUNICIPAL INPUT NOW UNDERWAY

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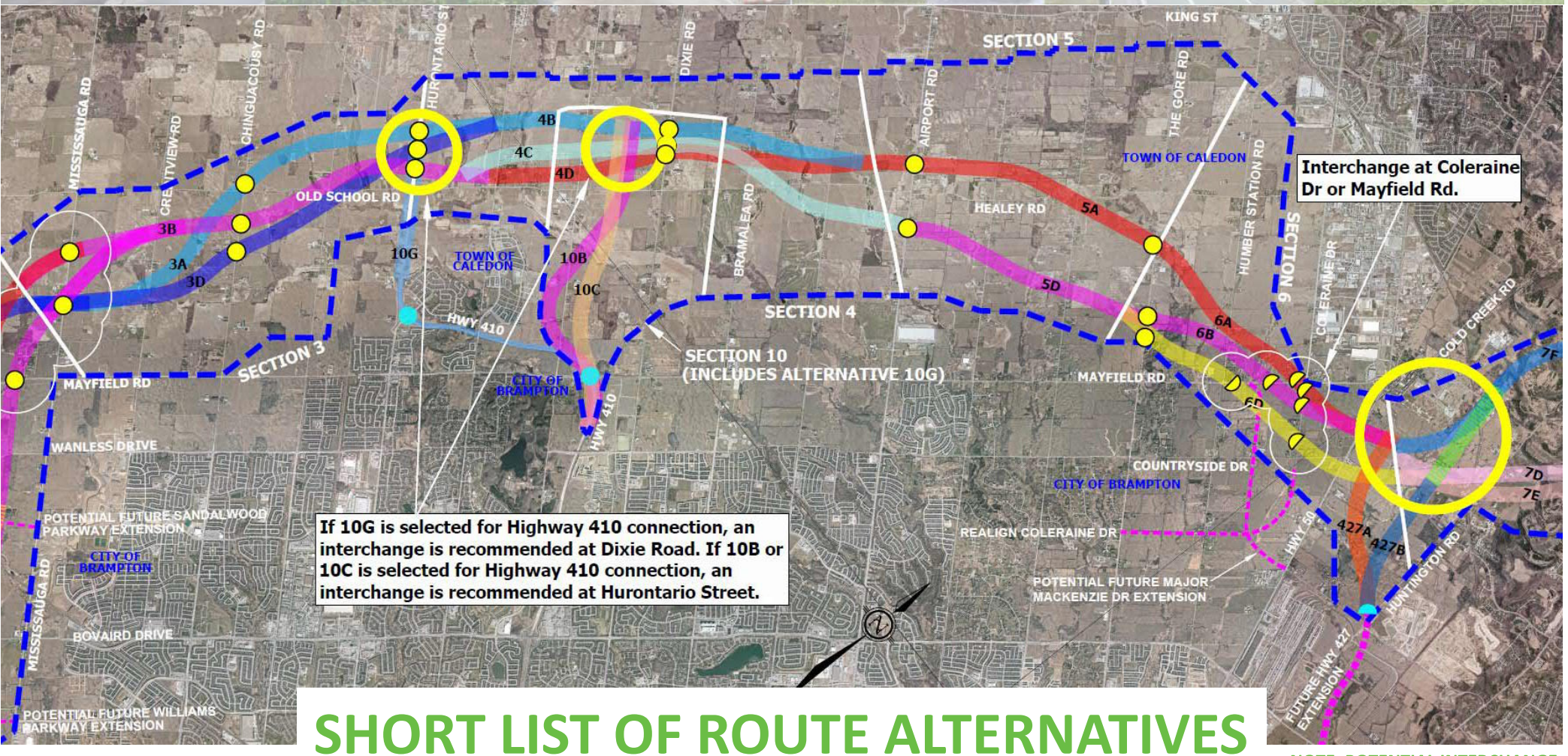
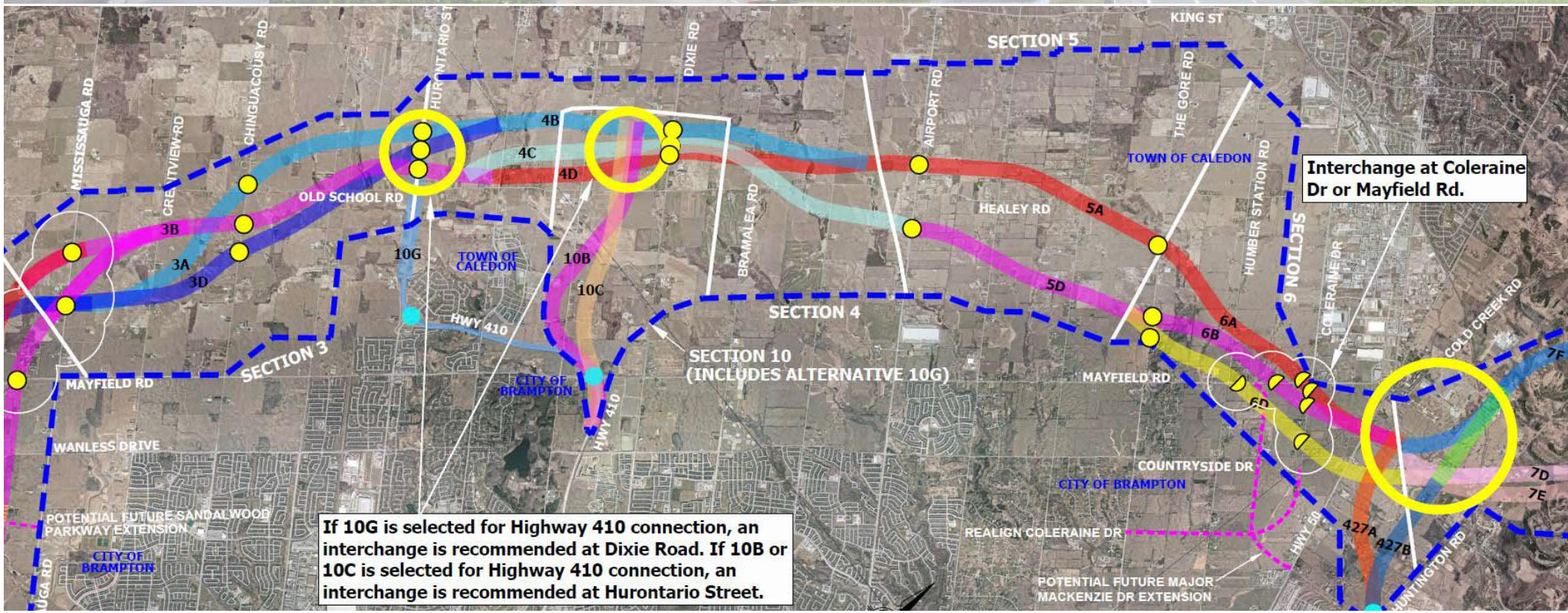


SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS - CENTRAL SECTION

NOTE: POTENTIAL INTERCHANGE LOCATIONS BEING REFINED THROUGH MUNICIPAL INPUT NOW UNDERWAY

Ontario MMM GROUP AECOM



EXAMPLES OF TRADE-OFFS

- Widening existing Highway 410/10 vs. new direct Highway 410 connection
  - **Access and community impacts to Valleywood, access for properties on Hurontario Street, impacts to planned developments, natural environment**

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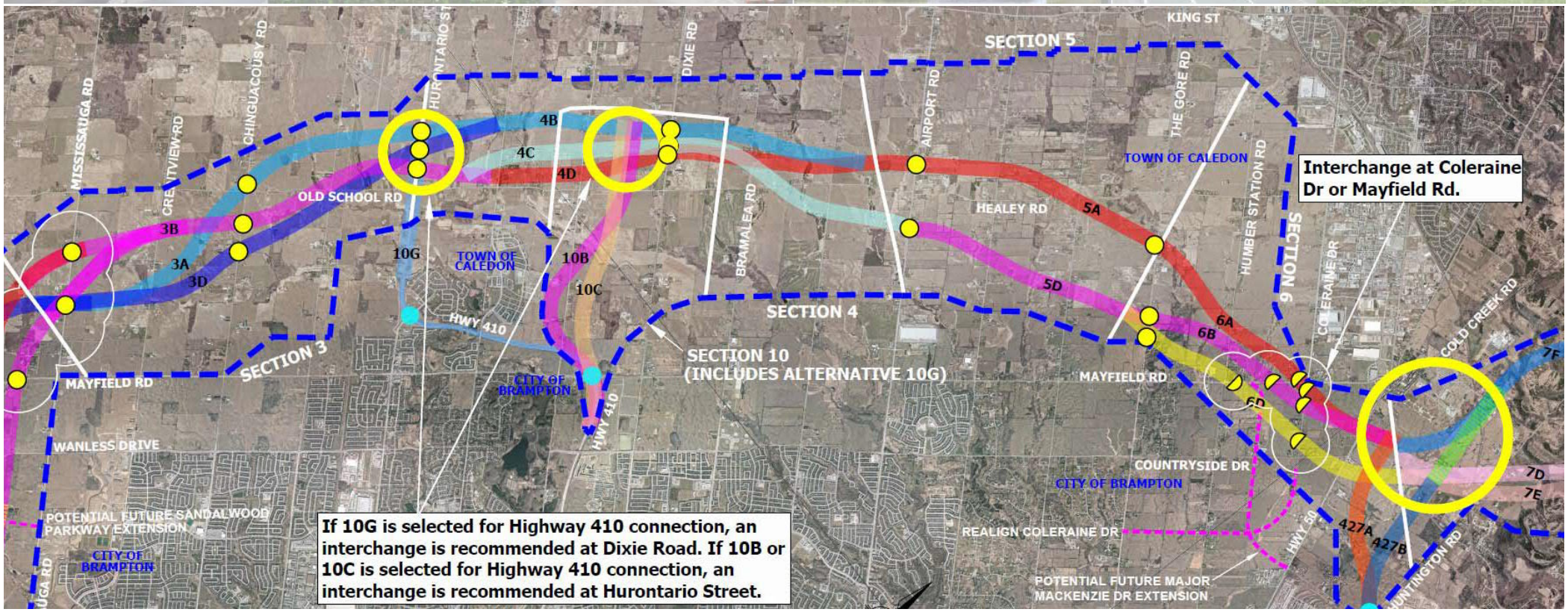
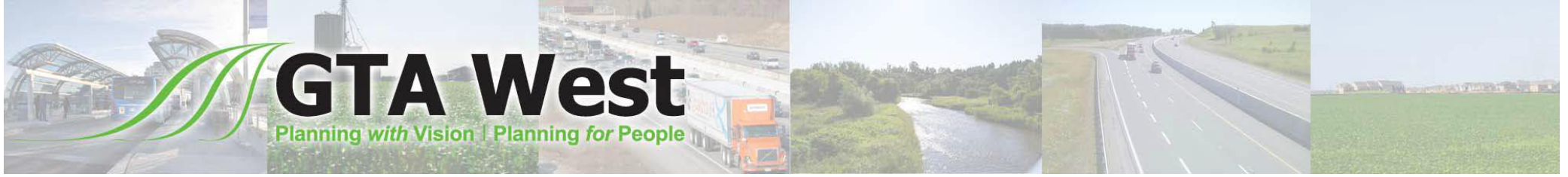


EXAMPLES OF TRADE-OFFS

- Road network in the Highway 50 / Coleraine Drive/Highway 427 area
  - **Compatibility with future municipal road network, interchange spacing, development**
- Northern vs. southern routes
  - **Agriculture and fragmentation of land, residences, sensitive environmental features, compatibility with future municipal road network**

FACILITATED GROUP DISCUSSION



FACILITATED GROUP DISCUSSION – CENTRAL SECTION

1. Do you prefer the northerly or southerly routes through the area and why?

2. Do you prefer Alternative 10G (utilizes existing Highway 10/410) or Alternatives 10B or 10C (new direct Highway 410 connection) and why?

3. What are your interchange option preferences in the Highway 427 / Coleraine Drive / Highway 50 / Mayfield Road area and why?

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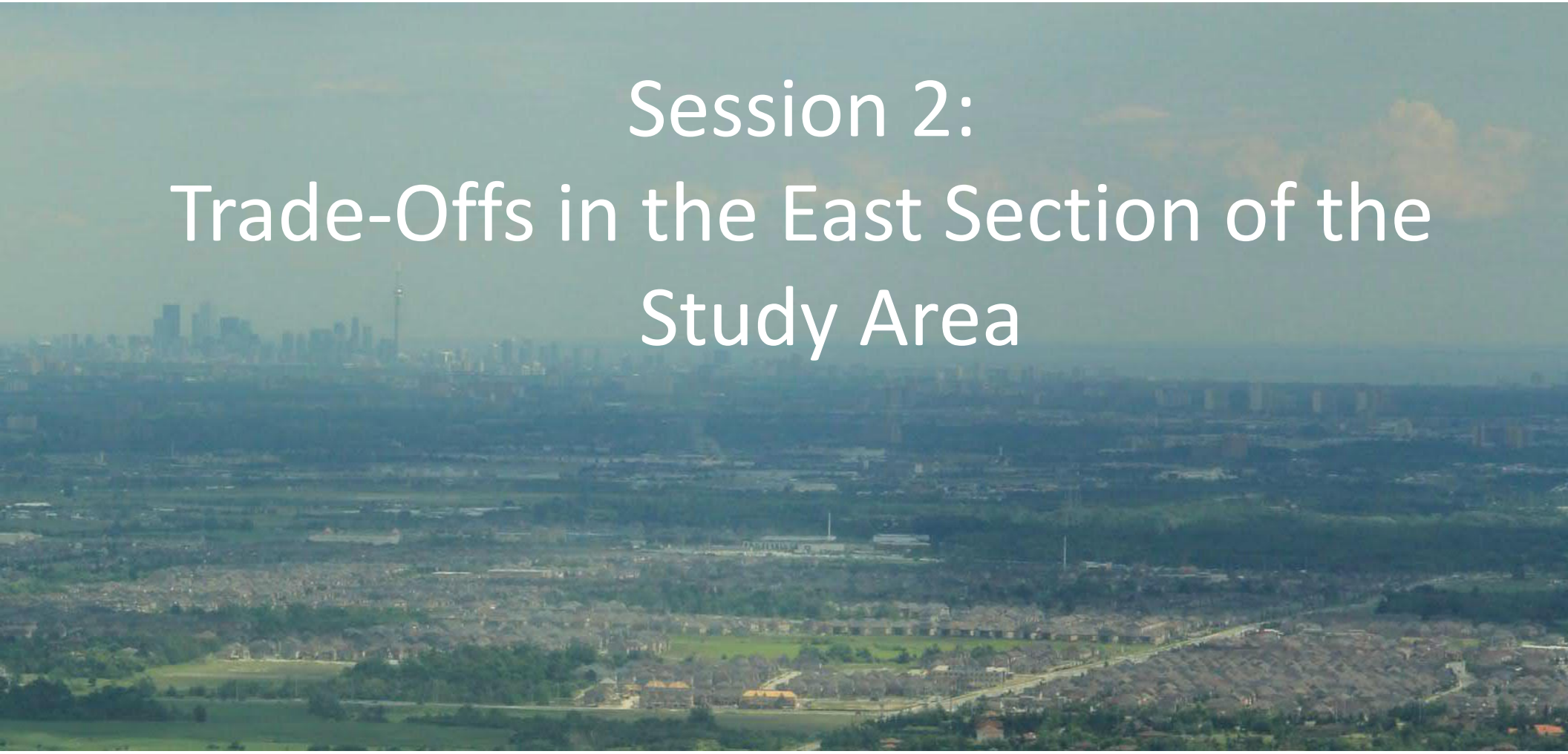


Session 2:
Trade-Offs in the East Section of the Study Area

Ontario

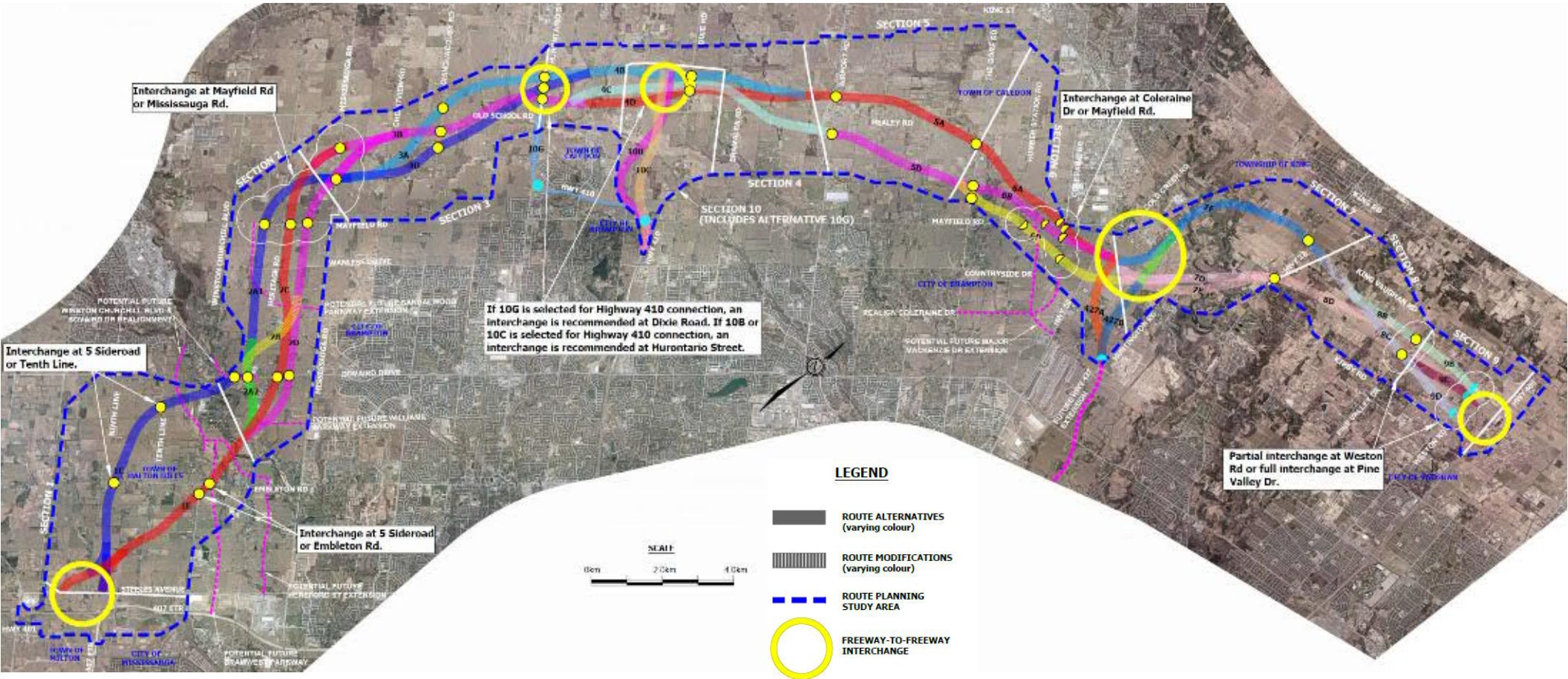
MMM GROUP

AECOM

PURPOSE

- Review the key issues and trade-offs the project team has identified in the east section of the GTA West study area
- Obtain your input on the key issues and trade-offs

REFINED SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS



NOTE: POTENTIAL INTERCHANGE LOCATIONS BEING REFINED THROUGH MUNICIPAL INPUT NOW UNDERWAY

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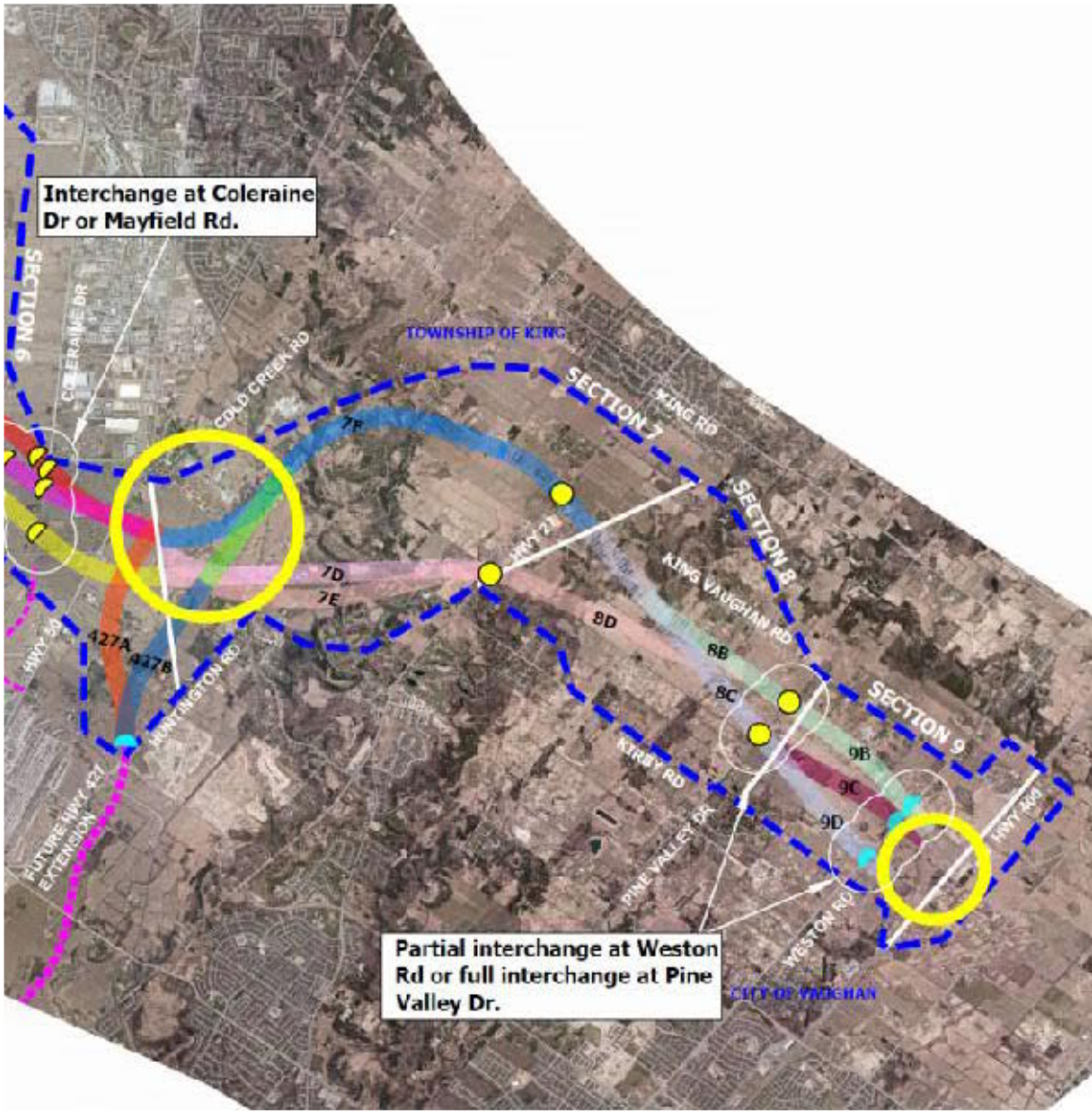
SHORT LIST OF ROUTE ALTERNATIVES AND POTENTIAL INTERCHANGE LOCATIONS

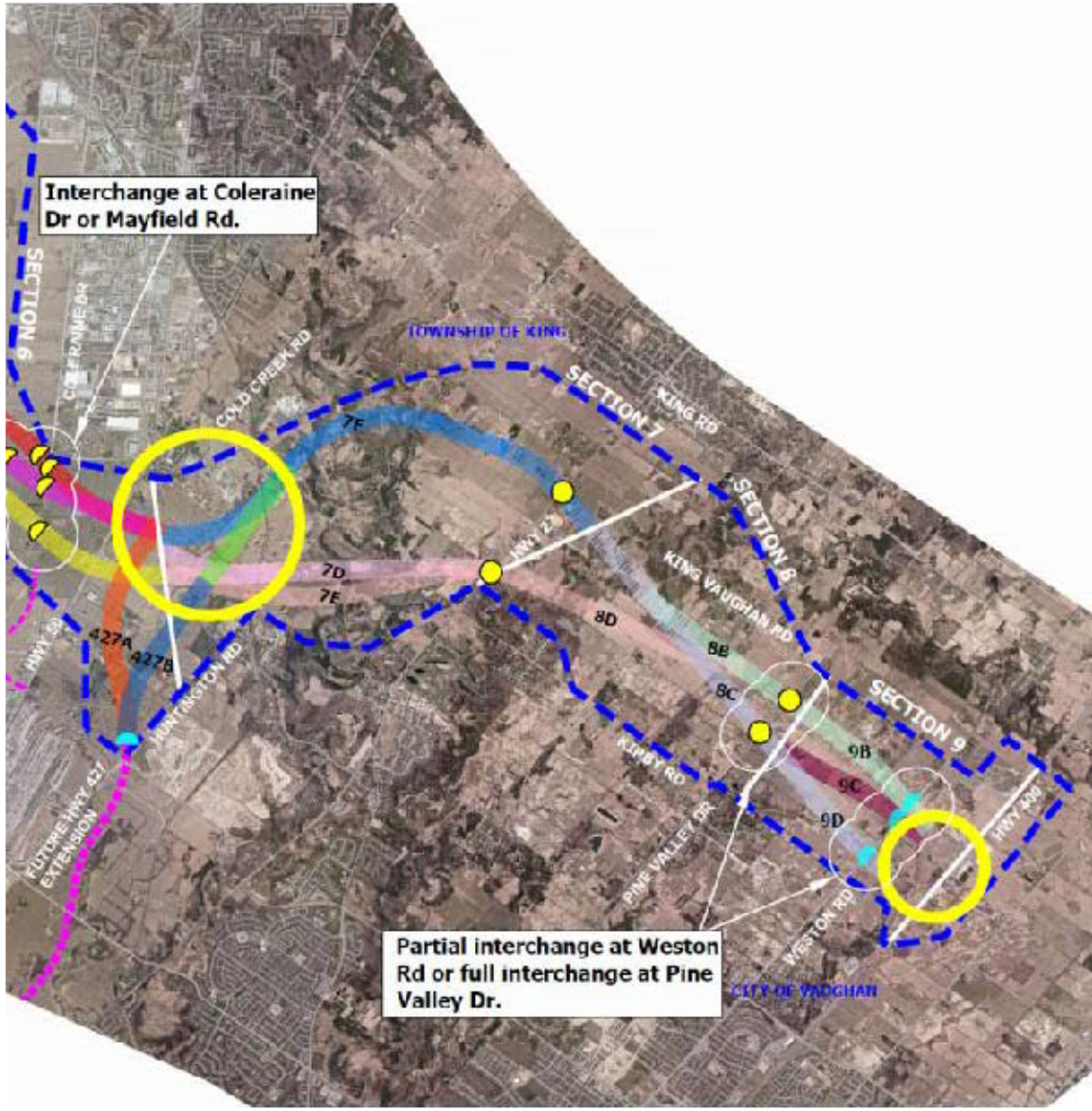
EAST SECTION



NOTE: POTENTIAL INTERCHANGE LOCATIONS BEING REFINED THROUGH MUNICIPAL INPUT NOW UNDERWAY

EXAMPLES OF TRADE-OFFS

- Road network in the Highway 50/ Coleraine Drive/Highway 427 area
  - **Compatibility with future municipal road network, interchange spacing, development**
- North vs. south crossing of Humber River
  - **Natural environment, residences, proximity to Kleinburg**
- Interchange options
  - **Weston Road vs. Pine Valley Drive, compatibility with future municipal vision (Vaughan Employment Lands), natural environment**



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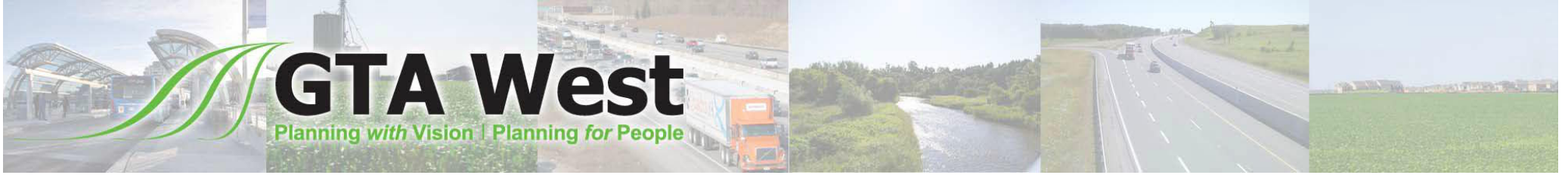
FACILITATED GROUP DISCUSSION



FACILITATED GROUP DISCUSSION – EAST SECTION

1. Do you prefer a northerly or a southerly crossing of the Humber River and why?

2. What are your interchange option preferences in the Highway 427 / Coleraine Drive / Highway 50 / Mayfield Road area and why?

3. Do you prefer an interchange at Pine Valley Drive or Weston Road?