

Niagara  Region

REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

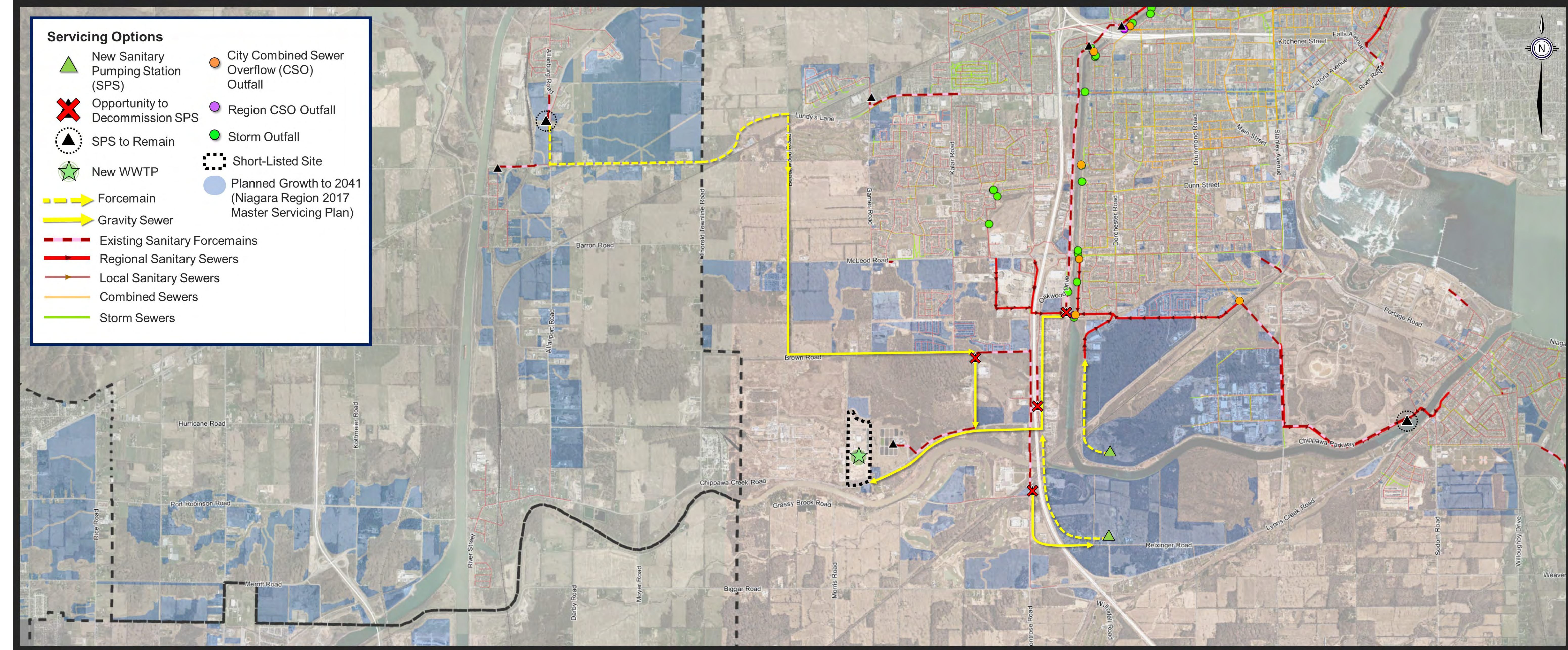
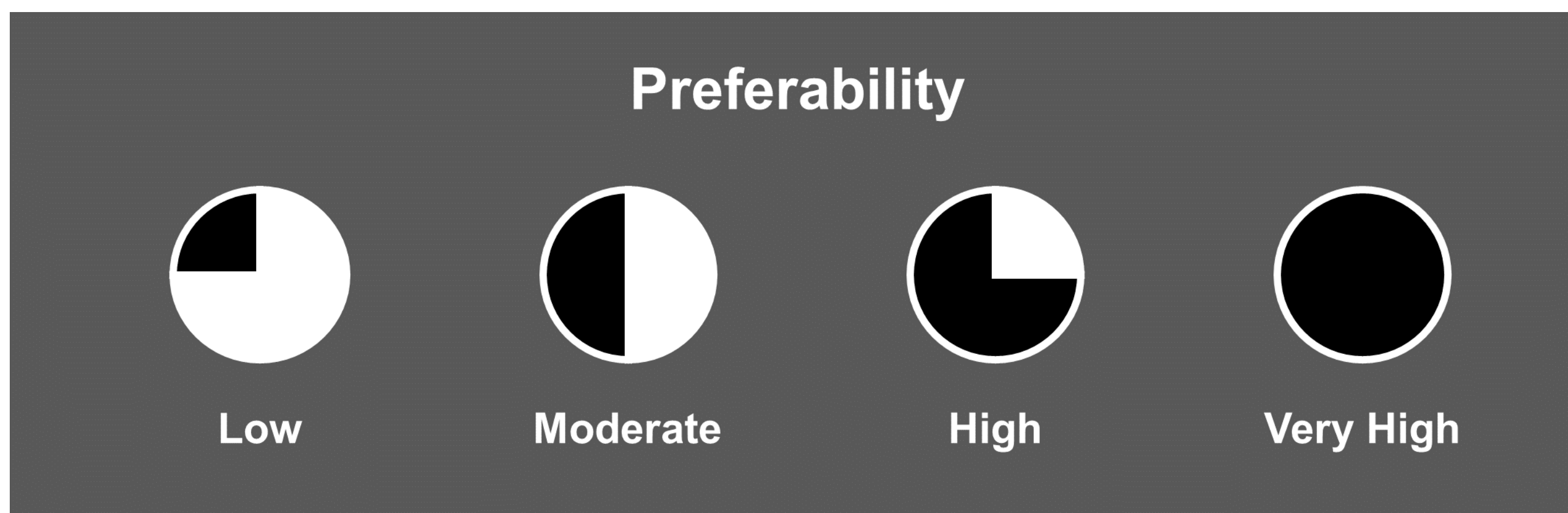
V2.3 – SNF WWTP Sites Short List Alternatives Evaluation

V2.3.1

REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

SNF WWTP Sites Short List Alternatives Evaluation

Site No. 1





Site & Treatment


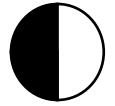
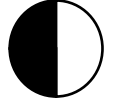
Outfall Location

Collection Strategy

Criteria	Sub-Criteria	Site 1 – Preferred Site Secondary Treatment	Site 1 – Preferred Outfall Hydro Electric Power Canal	Site 1 – Preferred Collection Strategy Remove High Lift Pumping Station and no Lyons Creek
Environmental (25%)	<ul style="list-style-type: none"> Environmentally Sensitive Features Species at Risk Water Features / Resources Receiving Waterbody 	<ul style="list-style-type: none"> System Overflows Physical Environmental Considerations Climate Change 		
Social / Cultural (25%)	<ul style="list-style-type: none"> Community Concerns for Residents / Local Businesses / Traffic Indigenous Communities and Archaeological / Cultural Heritage 	<ul style="list-style-type: none"> Air Quality and Odour Noise, Vibration and Dust Current / Planned Land Uses 		
Legal / Jurisdictional (10%)	<ul style="list-style-type: none"> Approvals / Coordination Land Use Suitability Land Acquisition Worker Safety and Operability 			
Technical (20%)	<ul style="list-style-type: none"> Compatibility / Existing and Future Infrastructure System Security and Level of Service Traffic Management 	<ul style="list-style-type: none"> Operation and Maintenance 		
Financial (20%)	<ul style="list-style-type: none"> Capital Cost Lifecycle Cost Cash Flow / Phasing of Costs Funding Opportunities 			



Site 1 – Strategy Evaluation					
Criteria	Sub Criteria	Site 1 – Preferred Site Secondary Treatment	Site 1 – Preferred Outfall Hydro Electric Power Canal (HEPC)	Site 1 – Preferred Collection Strategy Remove HLPS no Lyons Creek	Scoring
Environmental (25%)	Environmentally Sensitive Features	<ul style="list-style-type: none"> Site has minor environmental constraints Site has a minor creek tributary in the southeast quadrant and Environmental Conservation Area (ECA) designated lands to the south border Site is within a Highly Vulnerable Aquifer designated area (HVAs) which is more susceptible to contamination Part of site has industrial use increasing potential for contamination in these areas, further Environmental Site Assessment (ESA) work required Site large enough for new plant to avoid ECA Low potential for impact to ECA designated lands and natural features through avoidance and standard mitigation methods during construction 	<ul style="list-style-type: none"> Hydro Electric Power Canal (HEPC) has high flows and favourable mixing conditions Alignment has minimal environmental constraints Does not require significant environmental crossings but does require minor ECA crossing to access canal Long alignment from plant to receiving body required compared to other options largely within existing road right of way Standard construction methods available to mitigate risk of impact to environment HEPC is a man-made waterway that is gated, screened and non-natural habitat reducing potential impact to the environment during construction No risk of impact to floodplains and meander belt as receiving waterbody is a constructed waterway Treatment requirements to meet effluent criteria common to all 	<ul style="list-style-type: none"> All options require major environmental crossing of the Welland River Trenchless construction methodologies (tunneling) can mitigate impact to feature crossing Majority of alignments will be constructed within existing road right of ways avoiding natural features All options reduce the number of existing Sewage Pumping Stations (SPS) and provide improved risk management of flooding / overflows Option will require large new SPS south of Chippawa Creek increasing energy use compared to plant site option (8) south of Chippawa Creek Future expansion south of Chippawa Creek will be reliant on pumping and forcemain strategy with increased potential to negatively impact the climate All options have assumed High Lift Pumping Station (HLPS) are replaced by trunk sewer which will enable improved wet weather flow management and ability to provide improved adaptability and resilience to the impact of climate change 	
	Species at Risk				
	Water Features / Resources				
	Receiving Waterbody				
	System Overflows				
	Physical Environmental Considerations				
	Climate Change				
Social / Cultural (25%)	Community Concerns for Residents / Local Businesses / Traffic	<ul style="list-style-type: none"> Site has good road access Chippawa Creek Road and Garner Road are used for truck traffic to access/egress the existing and future zoned industrial use Chippawa Creek Road is an arterial road designed to carry a significant amount of traffic, compatible for construction and operation of a new plant All options require a Stage II Archeology investigation Low potential for cultural impact, site has no known cultural heritage resources Site is set back from natural waterways marginally reducing potential archeology impact All options require evaluation for the potential of air and odour impact through a review of site receptors and the selection of appropriate technology and design to mitigate impact Large site surrounded by compatible industrial use presents favorable buffer and distance to air and odour receptors All options will require standard construction procedures and methods to be determined through design to mitigate impacts of noise, vibration and dust during construction Large site surrounded by compatible industrial use presents favorable buffer and distance to noise, vibration and dust receptors High potential to buffer odour, air, noise and dust Existing use and future designated use of this area is industrial, compatible with a new treatment plant and adjacent to biosolids facility Site is furthest removed from the existing core residential and commercial areas and future surrounding use is industrial 	<ul style="list-style-type: none"> Higher potential for traffic impact/disruption during construction due to length of alignment within existing road right of way (Chippawa Creek Road) Lower potential for long-term public health and safety concerns as receiving water body has no public access and no recreational use Construction and operation of outfall not expected to impact HEPC as a Cultural Heritage Landscape feature Lower potential for archeological impact due HEPC being a manmade structure and surrounding land being previously disturbed Construction in HEPC not expected to impact Ontario Power Generation (OPG) operations Increased potential need to mitigate noise, vibration and dust during construction due to increased length of outfall and proximity of existing land use to the eastern limits (Holiday Park) Low potential to impact recreational and waterway use during construction and operation 	<ul style="list-style-type: none"> All options have similar lengths of new collection system and will require similar mitigation measures Ability to remove HLPS provides opportunity for improved landuse planning in commercial area 	
	Indigenous Communities & Archaeological / Cultural Heritage Features				
	Air Quality and Odour				
	Noise, Vibration and Dust				
	Compatibility with Current / Planned Land Uses				

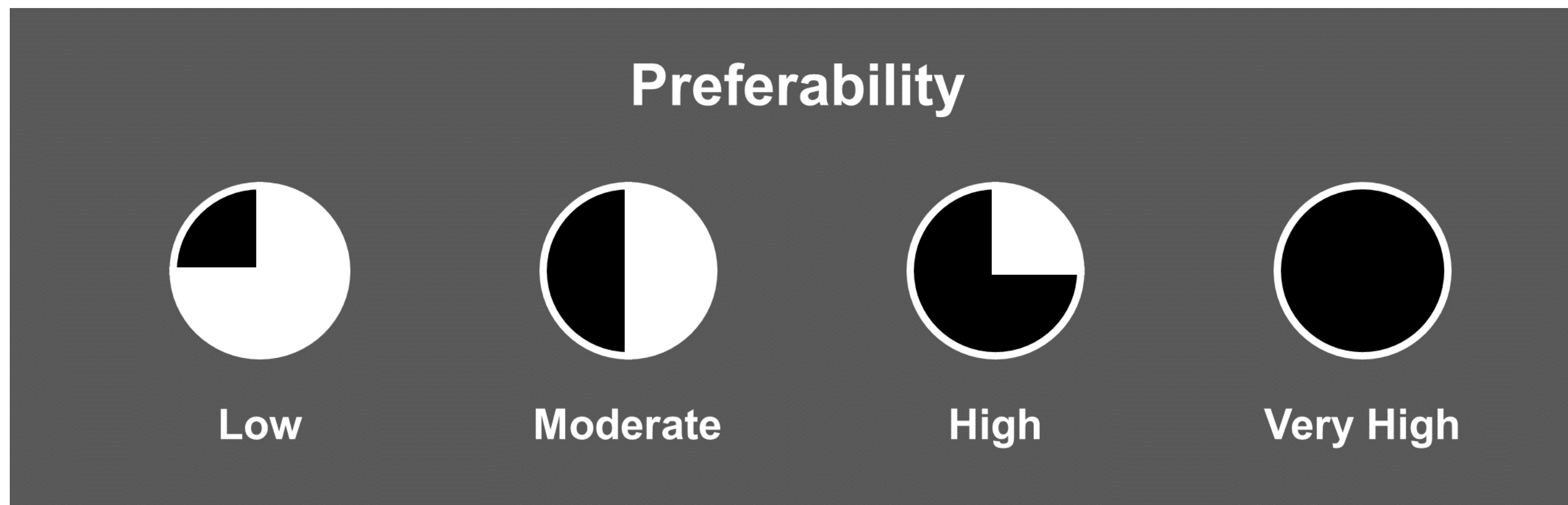
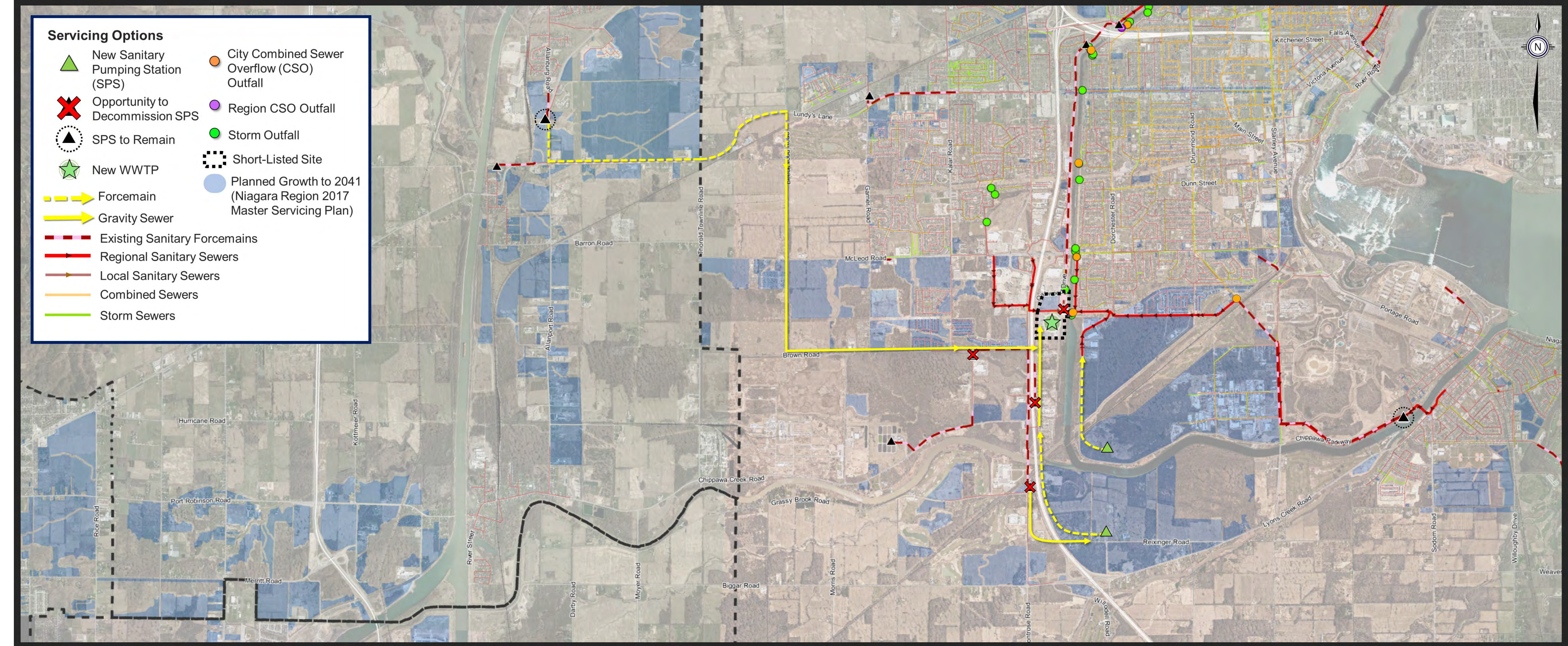
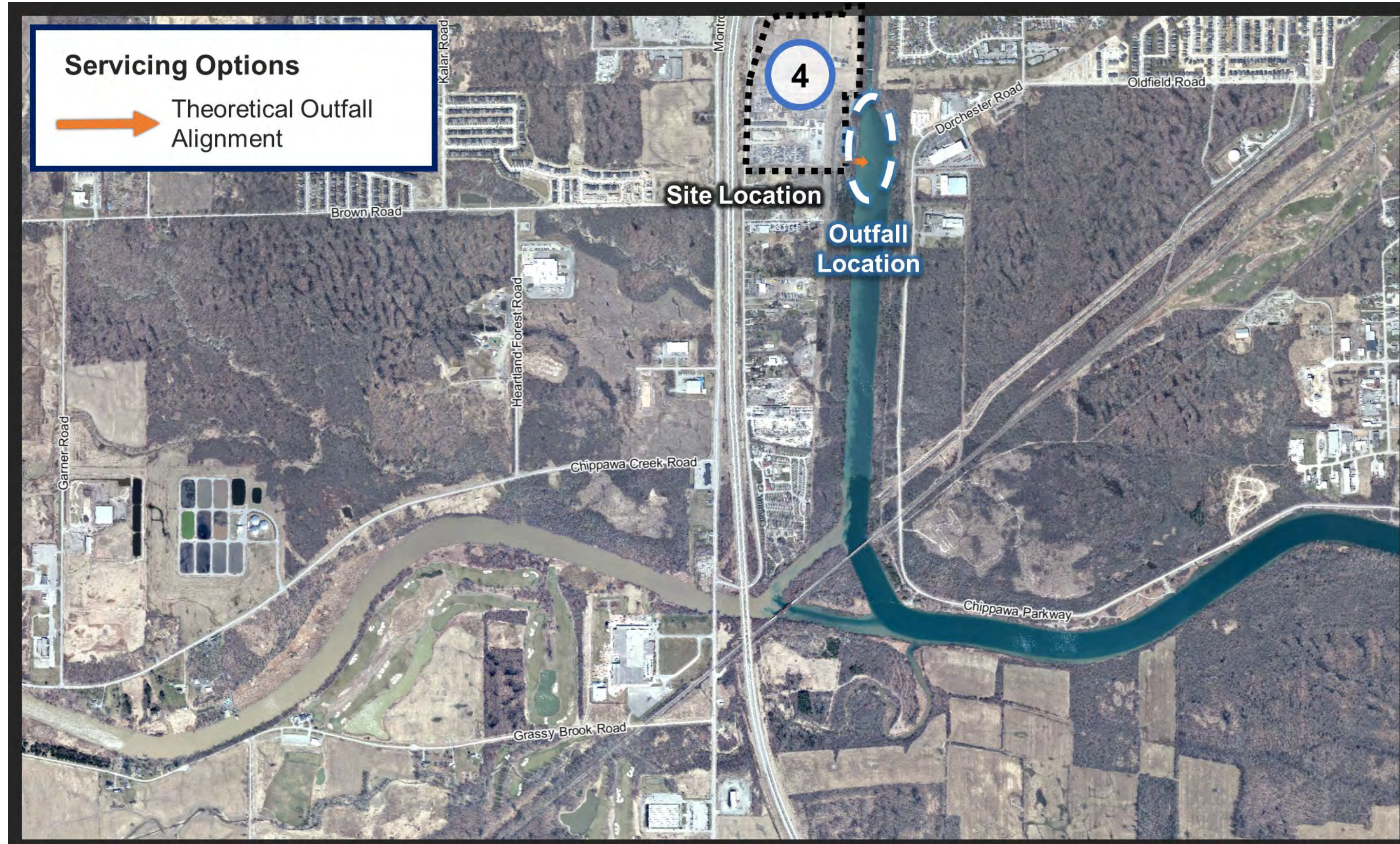
Site 1 – Strategy Evaluation					
Criteria	Sub Criteria	Site 1 – Preferred Site Secondary Treatment	Site 1 – Preferred Outfall Hydro Electric Power Canal (HEPC)	Site 1 – Preferred Collection Strategy Remove HLPS no Lyons Creek	Scoring
Legal/ Jurisdictional (10%)	Approvals / Coordination	<ul style="list-style-type: none"> Suitable land use Minimal environmental approvals/coordination One land owner – active stakeholder 	<ul style="list-style-type: none"> Suitable land use alignment mainly within Regional Road right of way Minimal environmental approvals/coordination as alignment avoids Environmental Protection Areas (EPA) Increased coordination with OPG for approvals / access to HEPC and easement Potential acquisition required for alignment of outfall from Oakwood Drive to Canal Outfall alignment may require crossing of hydro corridor requiring approvals and coordination 	<ul style="list-style-type: none"> All options maximize new alignments within existing road right of ways in line with Regional Master Plan Principles and Policies All options have similar approvals coordination requirements for new alignments within existing road right of ways All options will require coordination and approvals for crossing of the Welland River and QEW Shaft sites required to support tunneled crossing of Welland River Option requires additional land for new south SPS 	
	Land Use Suitability				
	Land Acquisition				
	Worker Safety and Operability				
Technical (20%)	Compatibility / Existing and Future Infrastructure	<ul style="list-style-type: none"> Large area to support siting and flexibility Site is appropriately sized to accommodate future expansions Site is removed from core residential and commercial uses, minimizing traffic impact during construction and operations Site is adjacent to existing biosolids facility – positive impact on future biosolids management 	<ul style="list-style-type: none"> Long outfall alignment to HEPC Overall higher constructability risk due to extensive outfall length and constrained access to receiving body Requires coordination with OPG operation and maintenance, increasing potential risk of conflict Increased construction traffic management and operation and maintenance requirements due to increased outfall length Receiving body less sensitive or susceptible to changes in future effluent criteria requirement (less stringent) Increased overall construction, schedule, and timing risk due to extended length, crossings and access 	<ul style="list-style-type: none"> Strategy supports existing SPS decommissioning Strategy supports Thorold South servicing All options reduce number of existing SPS improving risk management of flooding / overflows Option requires large new SPS and forcemain south of Chippawa Creek increasing energy use Future expansion south of Creek will be reliant on increased pumping requirements, increased energy use and lifecycle costs 	
	System Security and Level of Service				
	Traffic Management				
	Operation & Maintenance				
Financial (20%)	Capital Cost	<ul style="list-style-type: none"> Plant construction cost same for all options Similar capital and lifecycle costs to other alternatives All options have potential opportunity to receive government grants 	<ul style="list-style-type: none"> Increased operation and maintenance requirements due to longer outfall Outfall will have elevated construction costs related to length of alignment to reach HEPC 	<ul style="list-style-type: none"> All options require QEW and Welland River crossings which are higher cost risk alignments Crossing of the Welland River is a forcemain and less complex compared to deep trunk sewer (Option 8) reducing construction and financial risk Option does not require the upfront costs associated with the deep trunk sewer south of Welland River required for (Option 8) Collection system less efficient with higher capital costs, lifecycle and future servicing costs Higher risk associated with future servicing strategy reliant on pumped collection system south of Chippawa Creek 	
	Lifecycle Cost				
	Cash Flow / Phasing of Costs				
	Funding Opportunities				

V2.3.2

REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

SNF WWTP Sites Short List Alternatives Evaluation

Site No. 4




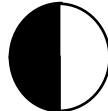
Site & Treatment

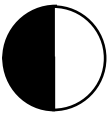


Outfall Location

Collection Strategy

Criteria	Sub-Criteria	Site 4 – Preferred Site Secondary Treatment	Site 4 – Preferred Outfall Hydro Electric Power Canal	Site 4 – Preferred Collection Strategy Remove High Lift Pumping Station and no Lyons Creek	
Environmental (25%)	<ul style="list-style-type: none"> Environmentally Sensitive Features Species at Risk Water Features / Resources Receiving Waterbody 	<ul style="list-style-type: none"> System Overflows Physical Environmental Considerations Climate Change 			
Social / Cultural (25%)	<ul style="list-style-type: none"> Community Concerns for Residents / Local Businesses / Traffic Indigenous Communities and Archaeological / Cultural Heritage 	<ul style="list-style-type: none"> Air Quality and Odour Noise, Vibration and Dust Current / Planned Land Uses 			
Legal / Jurisdictional (10%)	<ul style="list-style-type: none"> Approvals / Coordination Land Use Suitability Land Acquisition Worker Safety and Operability 				
Technical (20%)	<ul style="list-style-type: none"> Compatibility / Existing and Future Infrastructure System Security and Level of Service Traffic Management 	<ul style="list-style-type: none"> Operation and Maintenance 			
Financial (20%)	<ul style="list-style-type: none"> Capital Cost Lifecycle Cost Cash Flow / Phasing of Costs Funding Opportunities 				



Site 4 – Strategy Evaluation					
Criteria	Sub Criteria	Site 4 – Preferred Site Secondary Treatment	Site 4 – Preferred Outfall Hydro Electric Power Canal (HEPC)	Site 4 – Preferred Collection Strategy Remove HLPS no Lyons Creek	Scoring
Environmental (25%)	Environmentally Sensitive Features	<ul style="list-style-type: none"> Site has minimal environmental constraints Site has no Environmental Conservation Areas or Environmental Protection Areas Small area within site is a Highly Vulnerable Aquifer designated area (HVAs) which are more susceptible to contamination Parts of site has industrial use increasing potential for contamination in these areas, further Environmental Site Assessment (ESA) work required to determine 	<ul style="list-style-type: none"> HEPC has high flows and favourable mixing conditions Alignment has minimal environmental constraints Does not require significant environmental crossings Short alignment from plant to receiving body Standard construction methods available to mitigate risk of impact to environment HEPC is a man-made waterway gated, screened and non-natural habitat reducing potential impact to the environment during construction No risk of impact to floodplains and meander belt as receiving waterbody is a constructed waterway and does not have these characteristics Treatment requirements to meet effluent criteria common to all options 	<ul style="list-style-type: none"> All options require major environmental crossing of the Welland River Trenchless construction methodologies (tunneling) can mitigate impact to feature crossing Majority of alignments will be constructed within existing road right of ways avoiding natural features All options reduce the number of existing Sewage Pumping Stations (SPS) and provide improved risk management of flooding / overflows Option will require large new SPS south of Chippawa Creek increasing energy use compared to plant site option (8) south of Chippawa Creek Future expansion south of Chippawa Creek will be reliant on pumping and forcemain strategy with increased potential to negatively impact the climate All options have assumed High Lift Pumping Station (HLPS) replaced by trunk sewer which will enable improved wet weather flow management and ability to provide improved adaptability and resilience to the impact of climate change 	
	Species at Risk				
	Water Features / Resources				
	Receiving Waterbody				
	System Overflows				
	Physical Environmental Considerations				
	Climate Change				
Social / Cultural (25%)	Community Concerns for Residents / Local Businesses / Traffic	<ul style="list-style-type: none"> Site has good road access of Oakwood Drive Surrounding commercial and residential uses increases potential for traffic impact during construction and operation Site is adjacent to Hydro Electric Power Canal (HEPC), construction and operation of plant not expected to impact HEPC as a Cultural Heritage Landscape feature – low potential for cultural impact All options require a Stage II Archeology investigation All options require evaluation for the potential of air and odour impact through a review of site receptors and the selection of appropriate technology and design to mitigate Site is closer to residential properties, presenting less favourable distance to air and odour receptors and potentially increasing need for mitigation for noise, vibration and dust impacts during construction and operation All options will require standard construction procedures and methods to be determined through design to mitigate impacts of noise, vibration and dust during construction Site is smaller and closer to residential and commercial, less potential for land to buffer against odour, air, noise, vibration and dust impact Southeast corner of site constrained by existing hydro pylon Existing land use is mixed (commercial and industrial) with planned development applications for future commercial, less compatible with siting a new wastewater treatment plant 	<ul style="list-style-type: none"> Low potential for traffic impact due to length of alignment within site to access HEPC Increased potential for impact during construction as outfall location is within close proximity to residential properties Lower potential for long-term public health and safety concerns as receiving water body has no public access and no recreational use Construction and operation of outfall not expected to impact HEPC as a Cultural Heritage Landscape feature Lower potential for archeological impact due HEPC being a manmade structure and surrounding land being previously disturbed Low potential to impact recreational and waterway use during construction and operation Increased potential need to mitigate noise, vibration and dust during construction due to proximity to existing surrounding land use (commercial and residential) 	<ul style="list-style-type: none"> All options have similar lengths of new collection system and will require similar mitigation measures Increased potential for local business and traffic impact compared to greenfield site options 1 & 8 	
	Indigenous Communities & Archaeological / Cultural Heritage Features				
	Air Quality and Odour				
	Noise, Vibration and Dust				
	Compatibility with Current / Planned Land Uses				

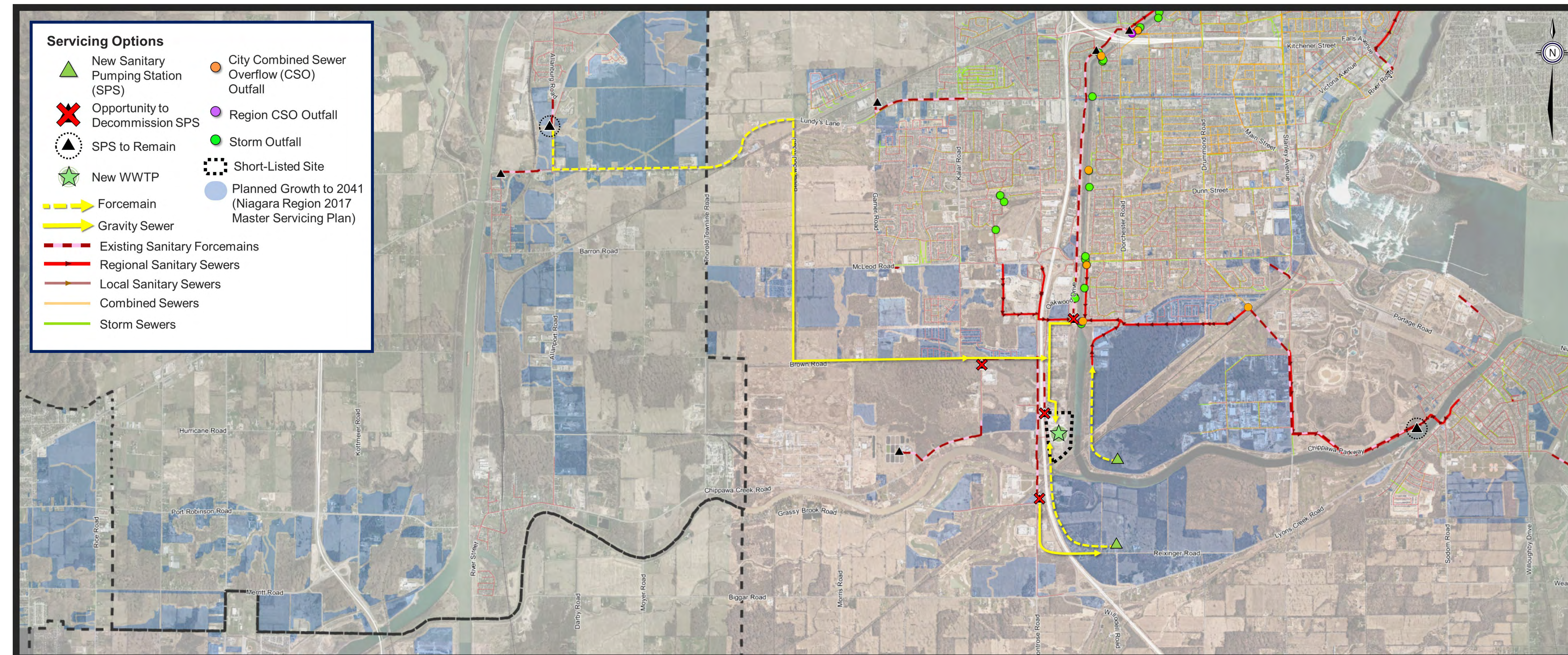
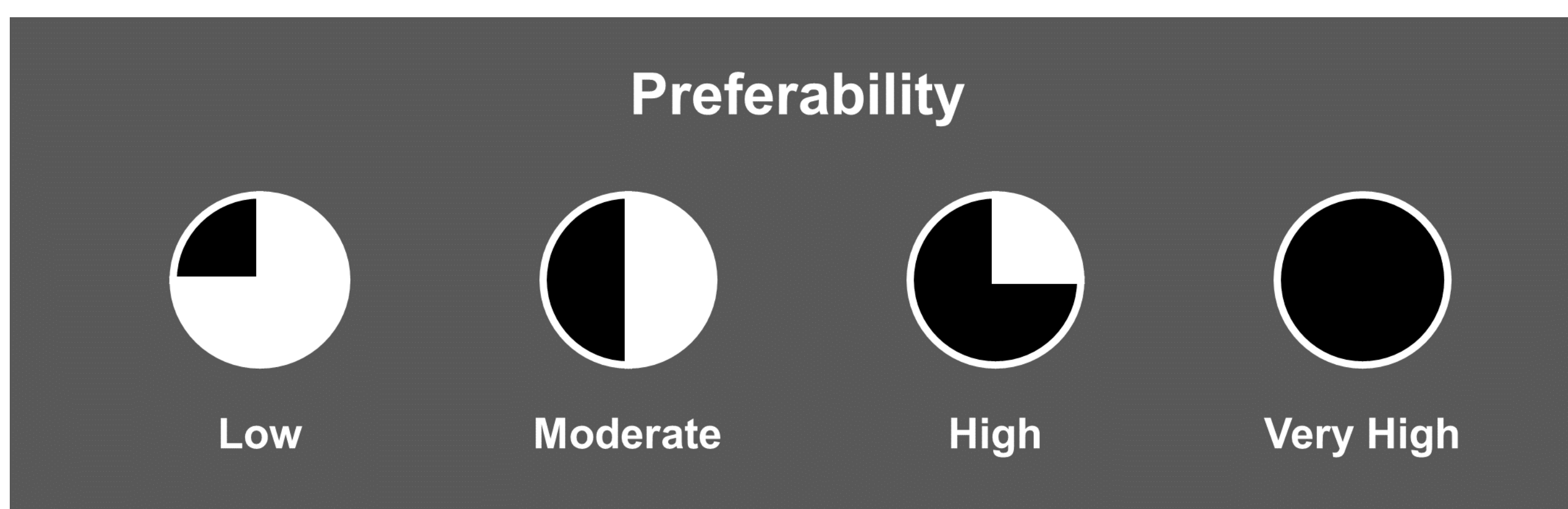
Site 4 – Strategy Evaluation					
Criteria	Sub Criteria	Site 4 – Preferred Site Secondary Treatment	Site 4 – Preferred Outfall Hydro Electric Power Canal (HEPC)	Site 4 – Preferred Collection Strategy Remove HLPS no Lyons Creek	Scoring
Legal/ Jurisdictional (10%)	Approvals/ Coordination	<ul style="list-style-type: none"> Existing land use is compatible (mixed commercial and industrial) however site has an active planned commercial development on large portion of the site Increased property acquisition risk associated with existing and planned commercial development Multiple property acquisitions required with several different owners – active stakeholders 	<ul style="list-style-type: none"> Minimal environmental approvals/coordination as outfall alignment avoids environmentally sensitive lands and is short in length Increased coordination with Ontario Power Generation (OPG) for approvals / access to HEPC and easement requirements Outfall alignment may require crossing of hydro corridor requiring approvals and coordination 	<ul style="list-style-type: none"> All options maximize new alignments within existing road right of ways in line with Regional Master Plan Principles and Policies All options have similar approvals coordination requirements for new alignments within existing road right of ways All options will require coordination and approvals for crossing of the Welland River and QEW Shaft sites required to support tunneled crossing of Welland River Option requires additional land for new south SPS compared to Option 8 	
	Land Use Suitability				
	Land Acquisition				
	Worker Safety and Operability				
Technical (20%)	Compatibility with Existing and Future Infrastructure	<ul style="list-style-type: none"> Smaller site with limited plant siting options and limited area to accommodate future plant expansions Site is within close proximity to residential and commercial uses, increasing potential traffic impact during construction and operations Site closer to residential and commercial uses, site may require increased mitigation to buffer odour, air and noise impact during construction and operation 	<ul style="list-style-type: none"> Short outfall alignment length within plant site to get to HEPC Overall reduced constructability risk due to short outfall length to receiving waterbody Requires coordination with OPG operation and maintenance, increasing potential risk of conflict Receiving body less sensitive or susceptible to changes in future effluent criteria requirement (less stringent) Reduced overall construction, schedule, and timing risk due to short outfall length, minimal crossings and access within site 	<ul style="list-style-type: none"> Strategy supports existing SPS decommissioning Strategy supports Thorold South servicing Existing collection system is conveyed to HLPS which is adjacent to the siting area bringing system efficiencies All options reduce number of existing SPS improving risk management of flooding/overflows Option requires large new SPS and forcemain south of Chippawa Creek increasing energy use Future expansion south of Creek will be reliant on increased pumping requirements, increased energy use and lifecycle costs 	
	System Security and Level of Service				
	Traffic Management				
	Operation & Maintenance				
Financial (20%)	Capital Cost	<ul style="list-style-type: none"> Plant construction cost same for all options Similar capital and lifecycle costs to other alternatives Requires multiple property acquisitions All options have potential opportunity to receive government grants 	<ul style="list-style-type: none"> Reduced operation and maintenance requirements due to short outfall Lower capital cost to construct related to short length of outfall alignment to HEPC 	<ul style="list-style-type: none"> All options require QEW and Welland River crossings which are higher cost risk alignments Crossing of the Welland River is a forcemain compared to deep trunk sewer (Option 8) reducing construction and financial risk Option does not require the upfront costs associated with the deep trunk sewer south of Welland River required for (Option 8) Future expansion south of Creek will be reliant on pumping increasing energy cost Collection system is efficient with lower capital and lifecycle costs Higher risk associated with future servicing strategy reliant on pumped collection system south of Chippawa Creek 	
	Lifecycle Cost				
	Cash Flow / Phasing of Costs				
	Funding Opportunities				

V2.3.3

REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

SNF WWTP Sites Short List Alternatives Evaluation

Site No. 5








Site & Treatment

Outfall Location

Collection Strategy

Criteria	Sub-Criteria	Site 5 – Preferred Site Secondary Treatment	Site 5 – Preferred Outfall Hydro Electric Power Canal	Site 5 – Preferred Collection Strategy Remove High Lift Pumping Station and no Lyons Creek	
Environmental (25%)	<ul style="list-style-type: none"> Environmentally Sensitive Features Species at Risk Water Features / Resources Receiving Waterbody 	<ul style="list-style-type: none"> System Overflows Physical Environmental Considerations Climate Change 			
Social / Cultural (25%)	<ul style="list-style-type: none"> Community Concerns for Residents / Local Businesses / Traffic Indigenous Communities and Archaeological / Cultural Heritage 	<ul style="list-style-type: none"> Air Quality and Odour Noise, Vibration and Dust Current / Planned Land Uses 			
Legal / Jurisdictional (10%)	<ul style="list-style-type: none"> Approvals / Coordination Land Use Suitability Land Acquisition Worker Safety and Operability 				
Technical (20%)	<ul style="list-style-type: none"> Compatibility / Existing and Future Infrastructure System Security and Level of Service Traffic Management 	<ul style="list-style-type: none"> Operation and Maintenance 			
Financial (20%)	<ul style="list-style-type: none"> Capital Cost Lifecycle Cost Cash Flow / Phasing of Costs Funding Opportunities 				

Site 5 – Strategy Evaluation					
Criteria	Sub Criteria	Site 5 – Preferred Site Secondary Treatment	Site 5 – Preferred Outfall Hydro Electric Power Canal (HEPC)	Site 5 – Preferred Collection Strategy Remove HLPS no Lyons Creek	Scoring
Environmental (25%)	Environmentally Sensitive Features	<ul style="list-style-type: none"> Site has minimal environmental constraints Site has no Environmental Protection Areas (EPA) Site has Environmental Conservation Area (ECA) bordering the canal Site large enough to avoid plant siting within environmental areas Parts of site has industrial use increasing potential for contamination in these areas, further Environmental Site Assessment (ESA) work required to determine Moderate potential for contaminated soil 	<ul style="list-style-type: none"> HEPC has high flows and favourable mixing conditions Alignment has minimal environmental constraints but requires short crossing of ECA Short alignment from plant to receiving body Standard construction methods available to mitigate risk of impact to environment HEPC is a man-made waterway gated, screened and non-natural habitat reducing potential impact to the environment during construction No risk of impact to floodplains and meander belt as receiving waterbody is a constructed waterway and does not have these characteristics Treatment requirements to meet effluent criteria common to all options 	<ul style="list-style-type: none"> All options require major environmental crossing of the Welland River Trenchless construction methodologies (tunneling) can mitigate impact to feature crossing Majority of alignments will be constructed within existing road right of ways avoiding natural features All options reduce the number of existing Sewage Pumping Stations (SPS) and provide improved risk management of flooding/ overflows Option will require large new SPS south of Chippawa Creek increasing energy use compared to plant site option (8) south of Chippawa Creek Future expansion south of Creek will be reliant on pumping and forcemain strategy with increased potential to negatively impact the climate All options have assumed High Lift Pumping Station (HLPS) replaced by trunk sewer which will enable improved wet weather flow management and ability to provide improved adaptability and resilience to the impact of climate change 	
	Species at Risk				
	Water Features / Resources				
	Receiving Waterbody				
	System Overflows				
	Physical Environmental Considerations				
	Climate Change				
Social / Cultural (25%)	Community Concerns for Residents / Local Businesses / Traffic	<ul style="list-style-type: none"> Site has good road access off Oakwood Drive Smaller road size and surrounding commercial uses increases potential for traffic impact during construction and operation Site is adjacent to Hydro Electric Power Canal (HEPC), construction and operation of plant not expected to impact HEPC as a Cultural Heritage Landscape feature – low potential for cultural impact Site includes structures identifies over 40 years old marginally increasing potential impact on cultural heritage resources All options require a Stage II Archeology investigation All options require evaluation for the potential of air and odour impact through a review of site receptors and the selection of appropriate technology and design to mitigate All options will require standard construction procedures and methods agreed through design to mitigate impacts of noise, vibration and dust during construction Site smaller but has high potential to buffer odour, air, vibration, noise and dust with QEW to the west, HEPC to the east and Chippawa Creek to the south Existing land use is mixed tourist commercial and industrial less compatible with siting a new wastewater treatment plant compared to greenfield sites Transected by hydro corridor with one pylon within site, existing utilities would require relocation Future land use is compatible zoned as industrial 	<ul style="list-style-type: none"> Low potential for traffic impact due to length of alignment within site to access HEPC Lower potential for long-term public health and safety concerns as receiving water body has no public access and no recreational use Construction and operation of outfall not expected to impact HEPC as a Cultural Heritage Landscape feature Lower potential for archeological impact due HEPC being a manmade structure and surrounding land being previously disturbed Low potential to impact recreational and waterway use during construction and operation 	<ul style="list-style-type: none"> All options have similar lengths of new collection system and will require similar mitigation measures Increased potential for local business and traffic impact compared to greenfield site options 1 & 8 	
	Indigenous Communities & Archaeological/ Cultural Heritage Features				
	Air Quality and Odour				
	Noise, Vibration and Dust				
	Current / Planned Land Uses				

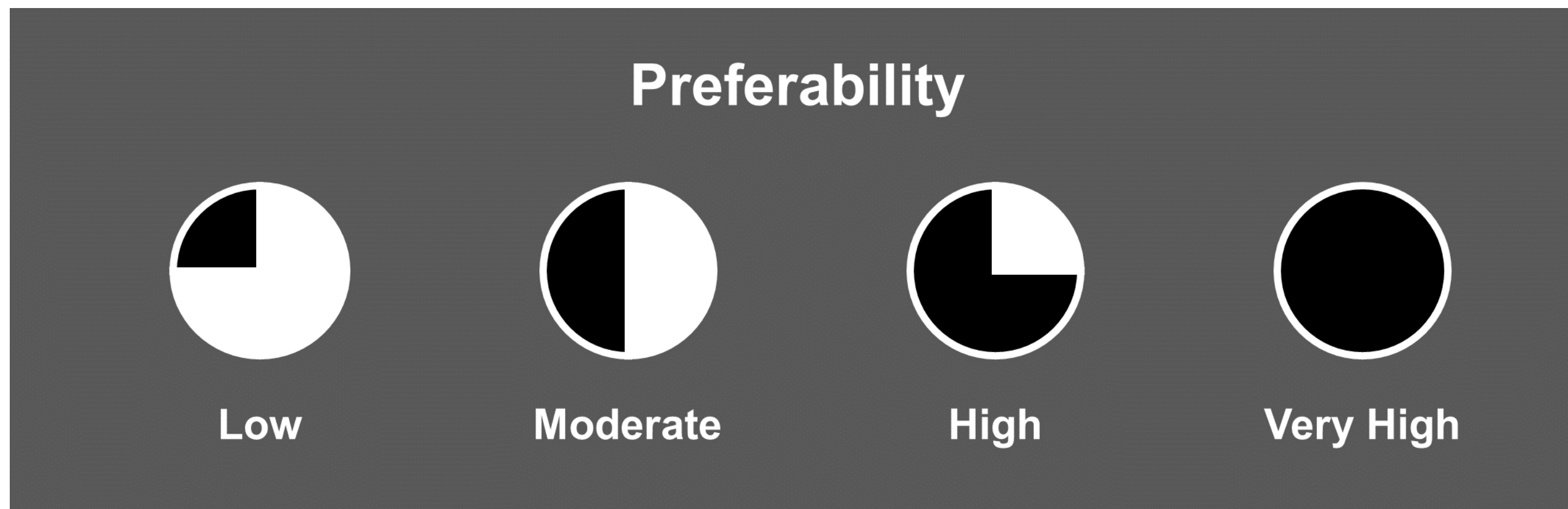
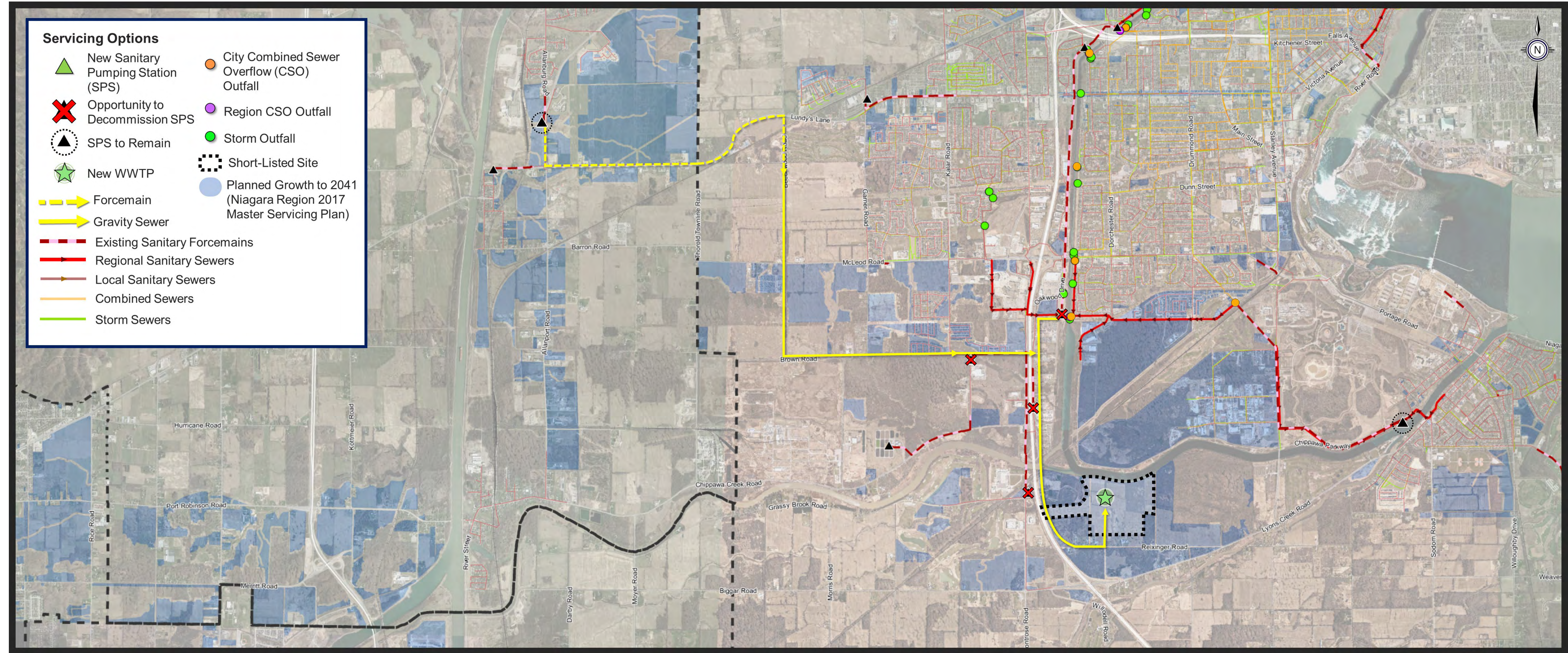
Site 5 – Strategy Evaluation					
Criteria	Sub Criteria	Site 5 – Preferred Site Secondary Treatment	Site 5 – Preferred Outfall Hydro Electric Power Canal (HEPC)	Site 5 – Preferred Collection Strategy Remove HLPS no Lyons Creek	Scoring
Legal/ Jurisdictional (10%)	Approvals / Coordination	<ul style="list-style-type: none"> Existing land use primarily includes a Holiday Park with additional mixed-use properties to the north increasing acquisition complexity and coordination Multiple property acquisitions with different property owners – active stakeholders Increased property acquisition risk associated with existing use and multiple owners Increased approvals and coordination required for hydro relocation 	<ul style="list-style-type: none"> Minimal environmental approvals/coordination as alignment avoids environmentally sensitive lands and is short in length Increased coordination with Ontario Power Generation (OPG) for approvals / access to HEPC and easement requirements Outfall alignment may require crossing of hydro corridor requiring approvals and coordination 	<ul style="list-style-type: none"> All options maximize new alignments within existing road right of ways in line with Regional Master Plan Principles and Policies All options have similar approvals coordination requirements for new alignments within existing road right of ways All options will require coordination and approvals for crossing of the Welland River and QEW Shaft sites required to support tunneled crossing of Welland River Option requires additional land for new south SPS compared to Option 8 	
	Land Use Suitability				
	Land Acquisition				
	Worker Safety and Operability				
Technical (20%)	Compatibility with Existing and Future Infrastructure	<ul style="list-style-type: none"> Smaller site with limited plant siting options and limited area to accommodate future plant expansions Site has direct access to Oakwood Drive with no immediate properties to the south marginally reducing potential traffic impact during construction and operations compared to Option 4 Site closer to residential and commercial uses compared to greenfield options but has good buffers Decreased mitigation complexity compared to Option 4 with plant siting adjacent to QEW, industrial to the north and Chippawa Creek to the south Existing hydro corridor including one pylon on site will require relocation 	<ul style="list-style-type: none"> Short outfall alignment length within plant site to get to HEPC Reduced constructability risk due to short outfall length to receiving waterbody Requires coordination with OPG operation and maintenance, increasing potential risk of conflict Receiving body less sensitive or susceptible to changes in future effluent criteria requirement (less stringent) Reduced overall construction, schedule, and timing risk due to short outfall length, minimal crossings and access within site 	<ul style="list-style-type: none"> Strategy supports existing SPS decommissioning Strategy supports Thorold South servicing Existing collection system is conveyed to HLPS which is close to the siting area bringing some system efficiencies All options reduce number of existing SPSs improving risk management of flooding / overflows Option requires large new SPS and forcemain south of Chippawa Creek increasing energy use Future expansion south of Creek will be reliant on increased pumping requirements, increased energy use and lifecycle costs 	
	System Security and Level of Service				
	Traffic Management				
	Operation & Maintenance				
Financial (20%)	Capital Cost	<ul style="list-style-type: none"> Plant construction cost same for all options Similar capital and lifecycle costs to other alternatives Requires multiple property acquisitions All options have potential opportunity to receive government grants 	<ul style="list-style-type: none"> Reduced operation and maintenance requirements due to short outfall Lower capital cost to construct related to short length of outfall alignment to HEPC 	<ul style="list-style-type: none"> All options require QEW and Welland River crossings which are higher cost risk alignments Crossing of the Welland River is a forcemain compared to deep trunk sewer (Option 8) reducing construction and financial risk Option does not require the upfront costs associated with the deep trunk sewer south of Welland River required for (Option 8) Future expansion south of Creek will be reliant on pumping increasing energy cost Collection system is efficient with lower capital and lifecycle costs Higher risk associated with future servicing strategy reliant on pumped collection system south of Chippawa Creek 	
	Lifecycle Cost				
	Cash Flow / Phasing of Costs				
	Funding Opportunities				

V2.3.4

REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

SNF WWTP Sites Short List Alternatives Evaluation

Site No. 8





Site & Treatment

Outfall Location

Collection Strategy

Criteria	Sub-Criteria	Site 8 – Preferred Site Secondary Treatment	Site 8 – Preferred Outfall Welland River East (Chippawa Creek)	Site 8 – Preferred Collection Strategy Remove High Lift Pumping Station and no Lyons Creek	
Environmental (25%)	<ul style="list-style-type: none"> Environmentally Sensitive Features Species at Risk Water Features / Resources Receiving Waterbody 	<ul style="list-style-type: none"> System Overflows Physical Environmental Considerations Climate Change 	●	◐	●
Social / Cultural (25%)	<ul style="list-style-type: none"> Community Concerns for Residents / Local Businesses / Traffic Indigenous Communities and Archaeological / Cultural Heritage 	<ul style="list-style-type: none"> Air Quality and Odour Noise, Vibration and Dust Current / Planned Land Uses 	◐	◐	◐
Legal / Jurisdictional (10%)	<ul style="list-style-type: none"> Approvals / Coordination Land Use Suitability Land Acquisition Worker Safety and Operability 	●	◐	◐	
Technical (20%)	<ul style="list-style-type: none"> Compatibility / Existing and Future Infrastructure System Security and Level of Service Traffic Management 	<ul style="list-style-type: none"> Operation and Maintenance 	●	●	●
Financial (20%)	<ul style="list-style-type: none"> Capital Cost Lifecycle Cost Cash Flow / Phasing of Costs Funding Opportunities 	◐	◐	◐	



Site 8 – Strategy Evaluation					
Criteria	Sub Criteria	Site 8 – Preferred Site Secondary Treatment	Site 8 - Preferred Outfall Chippawa Creek	Site 8 – Preferred Collection System Remove High Lift Pumping Station (HLPS), No Lyons Creek Sewer	Score
Environmental (25%)	Environmentally Sensitive Features	<ul style="list-style-type: none"> Site has minimal environmental constraints Site has an Environmental Conservation Area (ECA) designated feature running through upper north east quadrant and an Environmental Protection Area (EPA) bordering the north along the Chippawa Creek – site large enough to avoid Site has been used for agricultural use and has no history of industrial or commercial use – low potential for contamination Low potential for impact to ECA and EPA designated lands and natural features through avoidance of areas and standard mitigation methods during construction 	<ul style="list-style-type: none"> Chippawa Creek has high flows and favourable mixing conditions Outfall alignment has minimal environmental constraints prior to reaching the Chippawa Creek Chippawa Creek is designated within the Environmental Protection Area (EPA) increasing potential for environmental impact and need for mitigation measures during construction Standard construction methods available to mitigate risk of impact to environment Construction will be within the Creek and floodplain further investigations and mitigation measures will be required through design evaluation and construction to support permits and approvals Treatment requirements to meet effluent criteria common to all options 	<ul style="list-style-type: none"> All options require major environmental crossing of the Welland River Trenchless construction methodologies (tunneling) can mitigate impact to feature crossing Majority of alignments will be constructed within existing road right of ways avoiding natural features All options reduce the number of existing Sewage Pumping Stations (SPS) and provide improved risk management of flooding/overflows Option includes deep trunk collector sewer from decommissioned High Lift SPS to treatment plant site south of Chippawa Creek Option does not require large new SPS south of Chippawa Creek decreasing energy use compared to all other plant site options (1, 4 & 5) north of Chippawa Creek Future expansion south of Creek will not need to be pumped north compared to options 1, 4 & 5 lowering energy use and decreasing the potential to negatively impact the climate All options have assumed High Lift Pumping Station (HLPS) replaced by trunk sewer which will enable improved wet weather flow management and ability to provide improved adaptability and resilience to the impact of climate change 	
	Species at Risk				
	Water Features / Resources				
	Receiving Waterbody				
	System Overflows				
	Physical Environmental				
	Climate Change				
Socio/Cultural (25%)	Community Concerns for Residents / Local Businesses / Traffic	<ul style="list-style-type: none"> Site has good road access for construction and operations from QEW, Lyons Creek Road and Reixinger Road Low potential to impact community based on planned land use designation, size of site, buffer and distance from existing/planned residential and commercial uses All options require a Stage II Archeology investigation Site does not have any Cultural Heritage Resources but does border on an existing cemetery and several buildings/structures older than 40 years Site is large enough to avoid impact to cultural heritage features – low potential for cultural heritage impact Site is set back from natural waterways marginally reducing potential archeology impact All options require evaluation for the potential of air and odour impact through a review of site receptors and the selection of appropriate technology and design to mitigate Large site available to enable necessary buffer and distance to air and odour receptors All options will require standard construction procedures and methods agreed through design to mitigate impacts of noise, vibration and dust during construction Large site surrounded by compatible use presents favorable buffer and distance to noise, vibration and dust receptors High potential to buffer odour, air, noise, vibration and dust Site is compatible for new plant currently being used for agriculture within the existing urban boundary and zoned for future commercial uses There is no anticipated agricultural impact as site already planned for commercial uses 	<ul style="list-style-type: none"> Chippawa Creek is used for recreational purposes Majority of formal recreation facilities are east of the site including park and trail heads, boat launch facilities and Niagara Boating Club Temporary impact to Chippawa Creek during construction Low potential to impact recreational and waterway use during operation Higher potential for long-term public health and safety concerns as receiving water body has public access and recreational use Low potential for traffic impact/disruption during construction alignment within the site boundary and not within existing road right of way Site does not have any Cultural Heritage Resources – low potential for cultural heritage impact Higher potential for archeological impact construction within creek and bank Lower potential need to mitigate noise, vibration and dust during construction due to shorter length of outfall and no existing land use in close proximity 	<ul style="list-style-type: none"> All options have similar lengths of new collection system and will require similar mitigation measures Ability to remove HLPS provides opportunity for improved land use planning in commercial area 	
	Impacts on Archaeological/ Cultural Heritage Features				
	Air Quality and Odour				
	Noise, Vibration and Dust				
	Current / Planned Land Uses				

Criteria	Sub Criteria	Site 8 – Preferred Treatment • “Option 2: Secondary Treatment”	Site 8 - Preferred Outfall • “Option 1: Chippawa Creek”	Site 8 – Preferred Collection System • “Option 4: Remove High Lift Pumping Station (HLPS), No Lyons Creek Sewer”	Score
Legal/ Jurisdictional (10%)	Approvals / Coordination	<ul style="list-style-type: none"> Suitable land use Minimal environmental approvals/coordination Several land owners – active stakeholders Large area several siting opportunities minimizing suitability risk Site is appropriately sized to accommodate future expansion 	<ul style="list-style-type: none"> Alignment within site Increased coordination with Ministry of the Environment, Conservation, and Parks (MECP), Department of Fisheries (DFO) and Niagara Peninsula Conservation Authority (NPCA) for environmental approvals. No impact to Ontario Power Generation (OPG) operation and maintenance (O&M) 	<ul style="list-style-type: none"> All options maximize new alignments within existing road right of ways in line with Regional Master Plan Principles and Policies All options have similar approvals coordination requirements for new alignments within existing road right of ways All options will require coordination and approvals for crossing of the Welland River and QEW Shaft sites required to support tunneled crossing of Welland River Option does not require additional land for new south SPS 	
	Land Use Suitability				
	Land Acquisition				
	Worker Safety and Operability				
Technical (20%)	Compatibility with Existing and Future Infrastructure	<ul style="list-style-type: none"> Large area to support siting and flexibility Site is appropriately sized to accommodate future expansions Site is removed from core existing residential and commercial uses, minimizing traffic impact during construction and operations Site is large enough to enable adequate buffer from future surrounding uses to minimize operational impacts 	<ul style="list-style-type: none"> Short outfall length within site required to reach Chippawa Creek Lower constructability risk due to shorter outfall length and less constrained access to receiving body Limited coordination with OPG operation and maintenance, decreasing potential risk of conflict Lower construction, schedule, and timing risk due to shorter length and access 	<ul style="list-style-type: none"> Strategy supports existing SPS decommissioning Strategy supports Thorold South servicing All options reduce number of existing Sewage Pumping Stations (SPS) improving risk management of flooding/overflows Strategy requires deep trunk sewer alignment to the plant with increased tunneling complexity Option does not require large new SPS south of Chippawa Creek Strategy maximizes gravity servicing for the south growth areas Future expansion south of Creek will not be pumped north providing improved long-term build-out strategy Most flexible option for future Low Lift Pumping Station decommissioning 	
	System Security and Level of Service				
	Traffic Management				
	Operation & Maintenance				
Finance (20%)	Capital Cost / Lifecycle Cost	<ul style="list-style-type: none"> Plant construction cost same for all options Similar capital and lifecycle costs to other alternatives All options have potential opportunity to receive government grants 	<ul style="list-style-type: none"> Lower operation and maintenance requirements due to shorter outfall Increased capital cost to construct related to Chippawa Creek depth Lower capital cost to construct related to shorter length compared Site 1 	<ul style="list-style-type: none"> All options require QEW and Welland River crossings which are higher cost risk alignments Crossing of the Welland River is a deep trunk sewer compared to forcemain for other options increasing construction and financial risk Option does require the upfront costs associated with the deep trunk sewer south of Welland River Future expansion south of Creek not reliant on pumping decreasing energy costs compared to Options 1, 4 & 5 Collection system is efficient with higher capital costs associated with the deep trunk sewer compared to Sites 4 and 5 Lowest risk associated with future servicing strategy, not reliant on pumped collection system south of Chippawa Creek 	
	Cash Flow / Phasing of Costs				
	Funding Opportunities				

V2.3.5

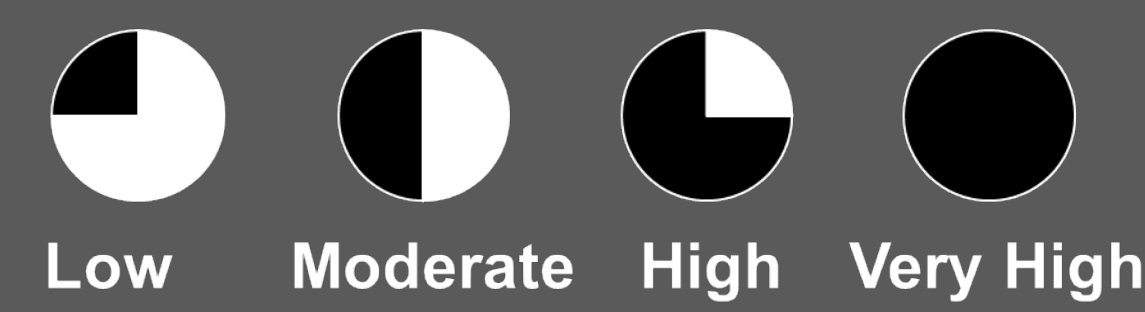
REGIONAL MUNICIPALITY OF NIAGARA
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

SNF WWTP Sites Short List Alternatives Evaluation

Comparative Evaluation

Comparative Evaluation

Preferability



Criteria	Site 1 Hydro Electric Power Canal	Site 4 Hydro Electric Power Canal	Site 5 Hydro Electric Power Canal	Site 8 Welland River East (Chippawa Creek)
Environmental (25%)				
Social / Cultural (25%)				
Legal / Jurisdictional (10%)				
Technical (20%)				
Financial (20%)				
Site Differentiator	<p>1. Siting / Treatment:</p> <ul style="list-style-type: none"> Minor environmental features on the site Adjacent to existing Biosolids Plant Furthest removed from core existing and future residential Low potential for cultural impact Large area to support siting and flexibility High potential to buffer odour, air and noise <p>2. Outfall:</p> <ul style="list-style-type: none"> Long outfall to Hydro Electric Power Canal Hydro Electric Power Canal has high flows and favourable mixing conditions Low potential to impact recreational and waterway use during construction and operation No impact to Hydro Electric Power Canal during operations Temporary impact on Hydro Electric Power Canal during construction <p>3. Collection Strategy:</p> <ul style="list-style-type: none"> Strategy supports existing Sewage Pumping Station decommissioning Supports Thorold South servicing Requires additional Sewage Pumping Station and long forcemain strategy for south growth areas Sewer alignments anticipated in road right-of-way <p>4. Financial Considerations:</p> <ul style="list-style-type: none"> Plant construction costs same for all options Outfall will have elevated construction costs related to length to reach the Hydro Electric Power Canal Lifecycle costs benefit from Sewage Pumping Station decommissioning Higher risk associated with future servicing strategy cost Overall strategy more costly than options 4, 5 & 8 	<p>1. Siting / Treatment:</p> <ul style="list-style-type: none"> Minimal environmental features on the site Increased property acquisition risk associated with existing and planned commercial developments Moderate potential for contaminated soil Low potential for cultural impact Smaller area limits siting and flexibility Site closer to residential and commercial uses Requires increased mitigation to buffer odour, air and noise <p>2. Outfall:</p> <ul style="list-style-type: none"> Short outfall to Hydro Electric Power Canal Hydro Electric Power Canal has high flows and favourable mixing conditions Low potential to impact recreational and waterway use during construction and operation No impact to Hydro Electric Power Canal during operations Temporary impact on Hydro Electric Power Canal during construction <p>3. Collection Strategy:</p> <ul style="list-style-type: none"> Existing system supports conveyance to this location Strategy supports existing Sewage Pumping Station decommissioning Supports Thorold South servicing Requires additional Sewage Pumping Station and long forcemain strategy for south growth areas Sewer alignments anticipated in road right-of-way <p>4. Financial Considerations:</p> <ul style="list-style-type: none"> Plant construction costs same for all options Lifecycle costs benefit from Sewage Pumping Station decommissioning Outfall will have lower construction cost related to shorter length to reach Hydro Electric Power Canal Higher risk associated with future servicing strategy cost Overall strategy has similar costs to option 5 but less costly than options 1 & 8 	<p>1. Siting / Treatment:</p> <ul style="list-style-type: none"> Minimal environmental features on the site Increased property acquisition risk associated with existing seasonal recreational use and hydro corridor Moderate potential for contaminated soil Low potential for cultural impact Smaller area may limit siting and flexibility Requires increased mitigation to buffer odour, air and noise <p>2. Outfall:</p> <ul style="list-style-type: none"> Short outfall to Hydro Electric Power Canal Hydro Electric Power Canal has high flows and favourable mixing conditions Low potential to impact recreational and waterway use during construction and operation No impact to Hydro Electric Power Canal during operations Temporary impact on Hydro Electric Power Canal during construction <p>3. Collection Strategy:</p> <ul style="list-style-type: none"> Strategy supports existing Sewage Pumping Station decommissioning Supports Thorold South servicing Requires additional Sewage Pumping Station and long forcemain strategy for south growth areas Sewer alignments anticipated in road right-of-way <p>4. Financial Considerations:</p> <ul style="list-style-type: none"> Plant construction costs same for all options Lifecycle costs benefit from Sewage Pumping Station decommissioning Outfall will have lower construction cost related to shorter length to reach Hydro Electric Power Canal Higher risk associated with future servicing strategy cost Overall strategy has similar costs to option 4 but less costly than options 1 & 8 	<p>1. Siting / Treatment:</p> <ul style="list-style-type: none"> Minimal environmental features on the site Low potential for contaminated soil Good road access for construction and operations Low potential for cultural impact Large greenfield area to support siting and flexibility High potential to buffer odour, air and noise <p>2. Outfall:</p> <ul style="list-style-type: none"> Short outfall to Chippawa Creek Chippawa Creek has high flows and favourable mixing conditions Low potential to impact recreational and waterway use during operation No impact to Hydro Electric Power Canal during operations Temporary impact on Chippawa Creek during construction <p>3. Collection Strategy:</p> <ul style="list-style-type: none"> Deep trunk sewer provides future servicing flexibility Strategy supports existing Sewage Pumping Station decommissioning Maximizes gravity servicing of the south growth areas Deep trunk sewer will require increased tunneling complexity Supports Thorold South servicing Sewer alignments anticipated in road right-of-way <p>4. Financial Considerations:</p> <ul style="list-style-type: none"> Plant construction costs same for all options Outfall will have elevated construction costs related to water depth Higher upfront trunk sewer servicing costs Lifecycle costs benefit from Sewage Pumping Station decommissioning Lowest risk associated with future servicing strategy cost Overall strategy more costly than options 4 & 5 but is less costly than option 1
Impact	Least Preferred	Less Preferred	Less Preferred	Preferred

