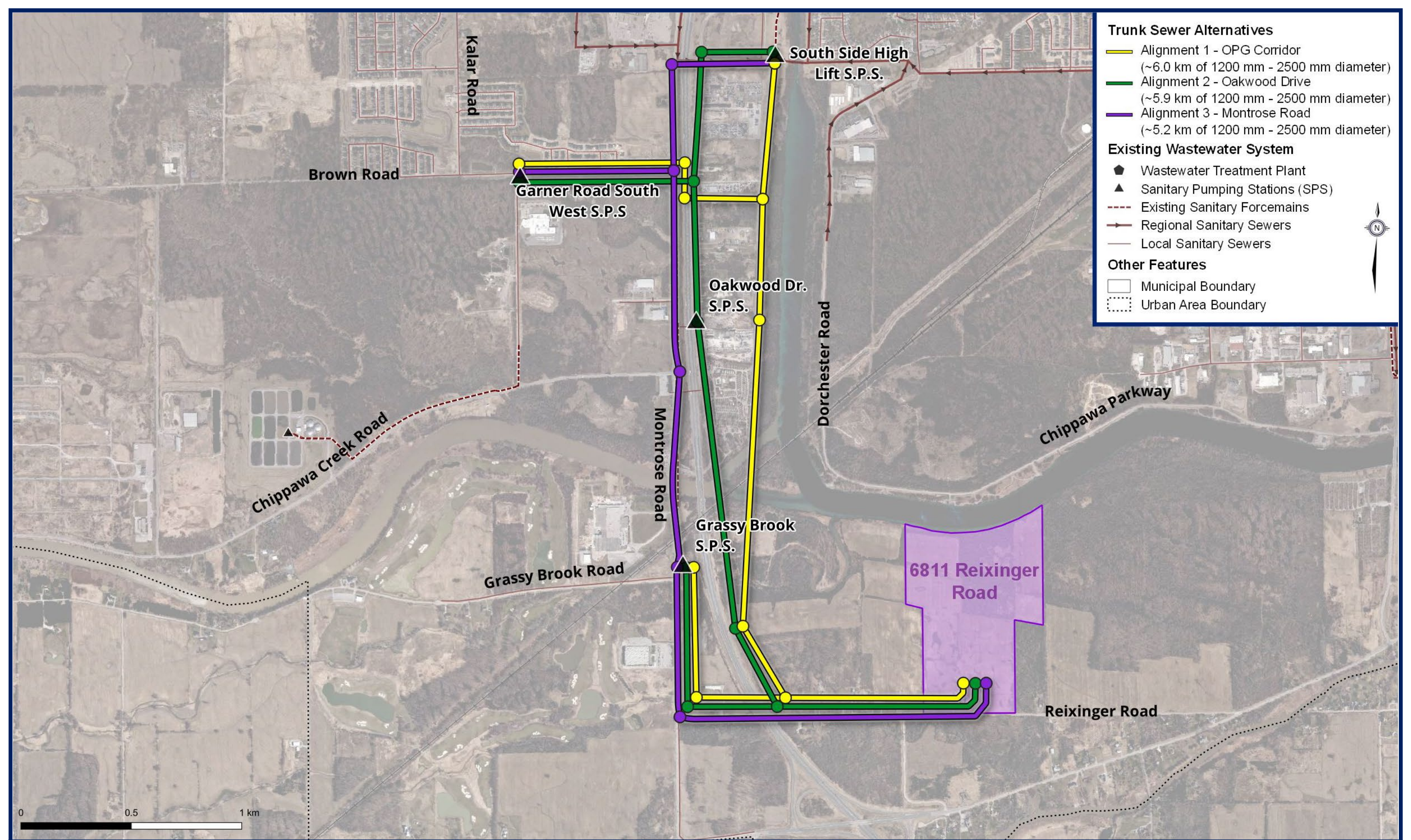


Niagara  Region

REGIONAL MUNICIPALITY OF NIAGARA  
SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS

# V2.4 – SNF Trunk Sewer Short List Alternatives Evaluation





**Trunk Sewer Alternatives**

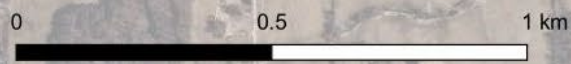
- Alignment 1 - OPG Corridor (~6.0 km of 1200 mm - 2500 mm diameter)
- Alignment 2 - Oakwood Drive (~5.9 km of 1200 mm - 2500 mm diameter)
- Alignment 3 - Montrose Road (~5.2 km of 1200 mm - 2500 mm diameter)

**Existing Wastewater System**

- Wastewater Treatment Plant
- Sanitary Pumping Stations (SPS)
- Existing Sanitary Forcemains
- Regional Sanitary Sewers
- Local Sanitary Sewers

**Other Features**

- Municipal Boundary
- Urban Area Boundary





## South Niagara Falls Wastewater Solutions Class EA Alignment Evaluation

		Detailed Evaluation Table		
Criteria		Alignment 1 – OPG Lands	Alignment 2 – Oakwood Drive	Alignment 3 – Montrose Road
<b>Environmental</b>		<ul style="list-style-type: none"> <li>Ontario Power Generation (OPG) lands have slightly higher chance of contamination (from Hydro Electric Power Canal [HEPC] fill)</li> <li>Requires additional length of water crossing to reach preferred site</li> </ul>	<ul style="list-style-type: none"> <li>Majority of alignment will be constructed within Road ROW (less impact to surrounding environment)</li> </ul>	<ul style="list-style-type: none"> <li>Majority of alignment will be constructed within Road ROW (less impact to surrounding environment)</li> </ul>
<b>Social / Cultural</b>		<ul style="list-style-type: none"> <li>Minimizes construction within road right-of-way (ROW) which will reduce traffic impact and business disruption</li> <li>Garner Road SPS (Brown Road) sewer receiving shafts along:                             <ul style="list-style-type: none"> <li>Montrose Road will require traffic control and temporary land closure</li> <li>Oakwood Drive will require road closure – shafts located within road avoid existing watermain and overhead utility poles</li> </ul> </li> <li>Shaft along Reixinger Road at Wastewater Treatment Plant (WWTP) can be located within site property to mitigate traffic control along Reixinger Road</li> </ul>	<ul style="list-style-type: none"> <li>Garner Road SPS (Brown Road) sewer receiving shafts along:                             <ul style="list-style-type: none"> <li>Montrose Road will require traffic control and temporary land closure; and,</li> <li>Oakwood Drive will require road closure – shafts located within road avoid existing watermain and overhead utility poles</li> </ul> </li> <li>Access to all properties along Oakwood Drive will be maintained – from either north (McLeod Road) or south (Montrose Road)</li> <li>Shaft along Reixinger Road at Wastewater Treatment Plant (WWTP) can be located within site property to mitigate traffic control along Reixinger Road</li> </ul>	<ul style="list-style-type: none"> <li>Sewer and shafts constructed along east side of Montrose Road will reduce disruption to traffic – lane closures will be required, but it is not expected that any road closures will be required</li> <li>Shaft along Reixinger Road at Wastewater Treatment Plant (WWTP) can be located within site property to mitigate traffic control along Reixinger Road</li> </ul>
<b>Legal / Jurisdictional</b>	<b>Required Easements/Property</b>	<ul style="list-style-type: none"> <li>Ontario Power Generation (OPG) easement required</li> <li>Easement south of Nissan Dealership for Brown Road (Garner SPS crossing)</li> <li>Easement north of Modern Mosaic (Oakwood SPS easement)</li> <li>Parallel to QEW south of Welland River to Reixinger Road (through Grassy Brook Park)</li> <li>All future access will require coordination with OPG and property owners (south of Nissan and north of Modern Mosaic), City of Niagara Falls</li> <li>Easement through private property along west side of Montrose Road from Grassy Brook Road to Reixinger Road is required</li> </ul>	<ul style="list-style-type: none"> <li>South Side High Lift SPS to Oakwood Drive easement required</li> <li>Proposed alignment south of existing gravity sewer to South Side High Lift to maintain easement on single property (rather than crossing property line)</li> <li>Parallel to QEW south of Welland River to Reixinger Road (through Grassy Brook Park)</li> <li>Easement through private property along west side of Montrose Road from Grassy Brook Road to Reixinger Road is required</li> <li>Compound sites will require additional temporary property (approx. 1,000m<sup>2</sup> along Montrose Road)</li> </ul>	<ul style="list-style-type: none"> <li>South Side High Lift SPS to Montrose Road easement required</li> <li>Proposed alignment south of existing gravity sewer to South Side High Lift to maintain easement on single property (rather than crossing property line)</li> <li>ES Fox Construction owns property between Welland River and CP rail both east and west of Montrose Road – active with Region and will be engaged as part of the Road EA project – easement through east property would be preferred</li> <li>Easement through private property along west side of Montrose Road from Grassy Brook Road to Reixinger Road is required</li> <li>Compound sites will require additional temporary property (approx. 1,000m<sup>2</sup> along Montrose Road)</li> </ul>
	<b>MTO Crossings and Restrictions</b>	<ul style="list-style-type: none"> <li>Outside of the Ministry of Transportation Ontario (MTO) desired 14m setback from property line for parallel structures</li> </ul>	<ul style="list-style-type: none"> <li>Significant section of Oakwood Drive (from approximate Brown Road crossing to Oakwood Drive SPS) has entire paved limits of road within MTO's required 14m setback</li> <li>Upgrade Welland River bridge structure is reduced cross-section with existing centreline alignment to be retained (twinning / separate EB/WB lane structures going to continuous structure) – greater than 14m from tunnelled sewer</li> </ul>	<ul style="list-style-type: none"> <li>Outside of MTO's desired 14m setback from property line for parallel structures</li> <li>Sewer south of Chippawa Creek Road and north of Welland River to be reviewed further with MTO to confirm setback limits and restrictions</li> <li>MTO will consider parallel structures within 14m setback based on engineering reasons (cannot be based primarily on financial reasons)</li> </ul>
	<b>Montrose Road EA Impacts and Coordination</b>	<ul style="list-style-type: none"> <li>Section of Montrose Road from Grassy Brook SPS to Reixinger Road will be required and will need to be coordinated with Montrose Road EA</li> <li>Sewer alignment along west side of Montrose, within private property allows for separation from existing underground utilities                             <ul style="list-style-type: none"> <li>Potential for shaft sites at Grassy Brook Road and Reixinger Road to be located on west side</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Section of Montrose Road from Grassy Brook SPS to Reixinger Road will be required and will need to be coordinated with Montrose Road EA</li> <li>Sewer alignment along west side of Montrose allows for separation from existing underground utilities                             <ul style="list-style-type: none"> <li>Potential for shaft sites at Grassy Brook Road and Reixinger Road to be located on west side (property easements required)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Required Montrose Road section will be incorporated into overall sewer alignment</li> <li>Welland River crossing drives depth of sewer 7m below what would be required just to service Grassy Brook SPS (for section along Montrose Road and Reixinger Road to QEW crossing only – Reixinger Road east of QEW approximately same depth for all options)</li> </ul>

## South Niagara Falls Wastewater Solutions Class EA Alignment Evaluation

Detailed Evaluation Table				
Criteria	Alignment 1 – OPG Lands	Alignment 2 – Oakwood Drive	Alignment 3 – Montrose Road	
	<ul style="list-style-type: none"> <li>Montrose Road will be going to urban-style cross-section with 5 lanes, curb and sidewalk, multi-use pathway, etc.</li> <li>Standard cross-section will be determined through EA work and available end-2020/early 2021</li> <li>Overhead utilities will be buried within common trench (currently hydro and Cogeco are overhead along East side)</li> <li>Montrose Road from Grassy Brook to Reixinger Road will be constructed in 2022/2023 and there will be opportunity to coordinate any required sewer work with the road construction</li> <li>Construction of Montrose Road from McLeod Road to Grassy Brook Road within 10-year capital budget</li> <li>New Niagara Hospital requires full site (south of Reixinger Road) for parking and this is driving the corridor width restrictions for the Road EA through the section south of Grassy Brook Road               <ul style="list-style-type: none"> <li>EA is considering east widening of Montrose Road south of Grassy Brook Road</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Montrose Road will be going to urban-style cross-section with 5 lanes, curb and sidewalk, multi-use pathway, etc.</li> <li>Standard cross-section will be determined through EA work and available end-2020/early 2021</li> <li>Overhead utilities will be buried within common trench (currently hydro and Cogeco are overhead along East side)</li> <li>Montrose Road from Grassy Brook to Reixinger Road will be constructed in 2022/2023 and there will be opportunity to coordinate any required sewer work with the road construction</li> <li>Construction of Montrose Road from McLeod Road to Grassy Brook Road within 10-year capital budget</li> <li>New Niagara Hospital requires full site (south of Reixinger Road) for parking and this is driving the corridor width restrictions for the Road EA through the section south of Grassy Brook Road</li> <li>EA is considering east widening of Montrose Road south of Grassy Brook Road</li> </ul>	<ul style="list-style-type: none"> <li>Montrose Road will be going to urban-style cross-section with 5 lanes, curb and sidewalk, multi-use pathway, etc.               <ul style="list-style-type: none"> <li>Standard cross-section will be determined through EA work and available end-2020/early 2021</li> <li>Overhead utilities will be buried within common trench (currently hydro and Cogeco are overhead along east side)</li> </ul> </li> <li>Montrose Road from Grassy Brook to Reixinger Road will be constructed in 2022/2023 and there will be opportunity to coordinate any required sewer work with the road construction               <ul style="list-style-type: none"> <li>Construction of Montrose Road from McLeod Road to Grassy Brook Road within 10-year capital budget</li> </ul> </li> <li>Montrose Road north of Welland River will likely be widened with property taking considered. It is expected that the road widening would be to the west to maintain separation from the QEW, but this has not been progressed yet.               <ul style="list-style-type: none"> <li>Montrose Road north of Grassy Brook Road likely 5+ years away to Construction (EA completed end-of-2020/early 2021)</li> <li>Chippawa Creek Road intersection has no daylighting to southwest – this restricts proposed sewer along the west corridor without property</li> </ul> </li> <li>Montrose Road at Welland River will require bridge widening or twinning – this could include additional travelled lanes or separate pedestrian bridge – this will be determined through EA work               <ul style="list-style-type: none"> <li>Bridge twinning/widening will be completed to west and this is driven by the existing intersection with Oakwood Drive</li> <li>Oakwood Drive intersection is problematic from traffic review and cannot be expanded/widened to the east towards QEW bridge structure</li> </ul> </li> <li>Montrose Road south of Welland River and north of CP Rail will likely be widened to west (with property taking from ES Fox Construction Company)               <ul style="list-style-type: none"> <li>ES Fox Construction owns property between Welland River and CP corridor both west and east of Montrose Road</li> </ul> </li> <li>Montrose Road south of Grassy Brook Road will be required to be upgraded within the same ROW corridor</li> <li>New Niagara Hospital requires full site (south of Reixinger Road) for parking and this is driving the corridor width restrictions for the Road EA through the section south of Grassy Brook Road</li> </ul>	
	<b>Additional Permitting</b>	<ul style="list-style-type: none"> <li>Increased permitting and approval coordination with Niagara Peninsula Conservation Authority (NPCA), Ministry of the Environment, Conservation and Parks (MECP), and City of Niagara Falls (CNF) regarding the crossing of Grassy Brook Park</li> </ul>	<ul style="list-style-type: none"> <li>Increased permitting and approval coordination with NPCA, MECP, and CNF regarding the crossing of Grassy Brook Park</li> </ul>	
<b>Technical</b>	<b>Total Length</b>	<ul style="list-style-type: none"> <li>~6.0 km of 1200mm dia. to 2500mm dia. tunnelled sewer               <ul style="list-style-type: none"> <li>Additional ~300m Oakwood Dr. SPS sewer (~450mm dia.)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>~5.9 km of 1200mm dia. to 2500mm dia. tunnelled sewer</li> </ul>	<ul style="list-style-type: none"> <li>~5.2 km of 1200mm dia. to 2500mm dia. tunnelled sewer               <ul style="list-style-type: none"> <li>Additional 350m Oakwood SPS crossing of QEW to Chippawa Creek Road (~450mm dia.)</li> </ul> </li> </ul>

## South Niagara Falls Wastewater Solutions Class EA Alignment Evaluation

Detailed Evaluation Table			
Criteria	Alignment 1 – OPG Lands	Alignment 2 – Oakwood Drive	Alignment 3 – Montrose Road
<b>No. of Shafts</b>	<ul style="list-style-type: none"> <li>11 – 13 Total (including the inlet PS)                             <ul style="list-style-type: none"> <li>Conventional tunnelling method may allow for an ~1800m drive from the Oakwood Drive SPS easement shaft to Reixinger Road (eliminating the requirement for shaft within the WWTP site “finger”)</li> </ul> </li> <li>Minimum 11 required at commissioning                             <ul style="list-style-type: none"> <li>Oakwood SPS shaft and crossing can be postponed</li> <li>Oakwood SPS currently drains to South Side High Lift, has been recently upgraded and does not service significant growth. Decommissioning can be postponed</li> </ul> </li> <li>1 additional potential future shaft required</li> <li>An additional shaft at Montrose Road and Chippawa Creek Road can be constructed with a future QEW crossing to service future Chippawa Creek Road catchment area</li> </ul>	<ul style="list-style-type: none"> <li>9 - 10 Total (including inlet PS)                             <ul style="list-style-type: none"> <li>Conventional tunnelling method may allow for an ~1800m drive from the Oakwood Drive SPS easement shaft to Reixinger Road (eliminating the requirement for shaft within the WWTP site “finger”)</li> </ul> </li> <li>All 9 – 10 shafts will be required at commissioning</li> <li>1 additional potential future shaft required</li> <li>An additional shaft at Montrose Road and Chippawa Creek Road can be constructed with a future QEW crossing to service future Chippawa Creek Road catchment area</li> </ul>	<ul style="list-style-type: none"> <li>8 - 9 Total (including inlet PS)</li> <li>Minimum 8 required at commissioning                             <ul style="list-style-type: none"> <li>Oakwood SPS shaft and crossing can be postponed</li> <li>Oakwood SPS currently drains to South Side High Lift, has been recently upgraded and does not service significant growth. Decommissioning can be postponed</li> </ul> </li> <li>Shaft locations set-up well for future drainage areas (already includes a shaft/MH at Montrose Road and Chippawa Creek Road)</li> </ul>
<b>Profile</b>	<ul style="list-style-type: none"> <li>Northern-most section driven by depth of inletting sewers at South Side High Lift SPS</li> <li>Required depth to pick up flows to Garner Road SPS depth of shaft located south of Nissan Dealership and downstream to Welland River (Oakwood SPS can be effectively picked up at this depth)</li> <li>Welland River crossing drives depth south of Welland River – cover required below river to be confirmed by Geotech report (assumed a conservative ~5m for now)</li> </ul>	<ul style="list-style-type: none"> <li>Existing sewer along Oakwood Drive draining to South Side High Lift SPS will drive depth of proposed sewer (crossing below existing sewer)</li> <li>Garner Road SPS required depth drives depth at shaft located south of Nissan dealership and downstream to Welland River (Oakwood SPS can be effectively picked up at this depth)</li> <li>Welland River crossing drives depth south of Welland River – cover required below river to be confirmed by Geotech report (assumed a conservative ~5m for now)</li> </ul>	<ul style="list-style-type: none"> <li>Existing sewers along Oakwood Drive draining to South Side High Lift SPS will drive depth of proposed sewer (crossing below existing sewer)</li> <li>Garner Road SPS required depth drives depth at Brown/Montrose shaft and downstream to Welland River (Oakwood SPS and 5m+ QEW crossing can be effectively picked up at this depth)</li> <li>Welland River crossing drives depth south of Welland River – cover required below river to be confirmed by Geotech report (assumed a conservative ~5m for now)</li> <li>Deeper shaft at Reixinger will provide for a larger gravity sewer drainage catchment</li> </ul>
<b>Welland River Crossing</b>	<ul style="list-style-type: none"> <li>Triangle Island crossing is more than 600m metres of higher risk crossing                             <ul style="list-style-type: none"> <li>Crossing remains west of the “ledge” which is approximately 5 metres deeper (160m compared to 165m)</li> </ul> </li> <li>South of Welland River, alignment through City of Niagara Falls Baden-Powell (Grassy Brook) Park is required</li> <li>~1300m MTBM drive length from shaft located north of Modern Mosaic to shaft located within WWTP “finger” is near maximum drive length for MTBM</li> </ul>	<ul style="list-style-type: none"> <li>Crossing near Oakwood Drive and new bridge structure – outside of MTO’s preferred 14m setback from property line</li> <li>~1300m MTBM drive length from shaft at Oakwood Drive SPS to shaft located within WWTP “finger” is near maximum drive length for MTBM</li> </ul>	<ul style="list-style-type: none"> <li>Crossing of Welland River along east side of existing Montrose Road bridge</li> <li>NRBN and Cogeco have planned crossing here</li> <li>Can cross under existing Grassy Brook SPS FM that is to be abandoned</li> <li>Bridge structure not likely to be widened to east because Montrose Road EA will not widen road to east through this section because of limited separation from QEW and problematic Oakwood Drive intersection (see Montrose Road EA section below)</li> </ul>
<b>QEW Crossings</b>	<ul style="list-style-type: none"> <li>2 QEW crossings required                             <ul style="list-style-type: none"> <li>QEW crossing near Brown Road to pick up Garner SPS</li> <li>QEW crossing along Reixinger Road to pick up Grassy Brook SPS</li> </ul> </li> <li>Future QEW crossing at Chippawa Creek Road may be required to pick up future growth</li> <li>All proposed crossings will be deeper than the MTO’s required 5 metres</li> </ul>	<ul style="list-style-type: none"> <li>2 QEW crossings required                             <ul style="list-style-type: none"> <li>QEW crossing near Brown Road to pick up Garner SPS</li> <li>QEW crossing along Reixinger Road to pick up Grassy Brook SPS</li> </ul> </li> <li>Future QEW crossing at Chippawa Creek Road may be required to pick up future growth</li> <li>All proposed crossings will be deeper than the MTO’s required 5 metres</li> </ul>	<ul style="list-style-type: none"> <li>3 QEW crossings required                             <ul style="list-style-type: none"> <li>QEW crossing near South Side SPS easement to pick up South Side High Lift SPS</li> <li>QEW crossing at Chippawa Creek Road (near Oakwood Drive SPS)</li> </ul> </li> <li>Not required at commissioning – Oakwood Drive SPS recently upgraded and catchment area does not include significant growth</li> <li>Shaft at Montrose Road and Chippawa Creek Road can be constructed east of exiting travelled road (and remain outside of expected MTO setbacks) for future receiving shaft work that will minimally disrupt Montrose Road operation                             <ul style="list-style-type: none"> <li>QEW crossing along Reixinger Road to pick up Grassy Brook SPS</li> <li>Approximately 7m deeper crossing compared to Alternative 1 and Alternative 2</li> </ul> </li> <li>This will be confirmed after geotechnical investigation confirms required cover under Welland River</li> </ul>
<b>CP Crossing</b>	<ul style="list-style-type: none"> <li>Canadian Pacific Railway (CP) crossing is on Triangle Island</li> <li>CP along Triangle Island is at grade – not likely that foundation structures will conflict with the deep sewer</li> </ul>	<ul style="list-style-type: none"> <li>CP crossing is immediately south of the Welland River</li> <li>Crossing is at grade and it is likely that the sewer will be west of any bridge foundation – will need drawing info from CP to confirm</li> </ul>	<ul style="list-style-type: none"> <li>CP crossing at Montrose Road is assumed to remain an at-grade crossing – EA will note recommend grade separation (construction cost not supported by projected traffic volumes)</li> </ul>

## South Niagara Falls Wastewater Solutions Class EA Alignment Evaluation

Detailed Evaluation Table			
Criteria	Alignment 1 – OPG Lands	Alignment 2 – Oakwood Drive	Alignment 3 – Montrose Road
<b>Utilities</b>	<ul style="list-style-type: none"> <li>Temporary support of overhead utility poles on east side of Montrose Road may be required</li> <li>City of Niagara Falls has new watermain proposed for Reixinger Road and Montrose Road (south of Reixinger) – sewer along Reixinger Road can be coordinated with proposed watermain</li> <li>Existing high-pressure gas main running along Reixinger Road (from site west to Montrose Road) will need to be avoided</li> </ul>	<ul style="list-style-type: none"> <li>Existing sewer along Oakwood Drive draining to South Side High Lift SPS will drive depth of proposed sewer (crossing below existing sewer)</li> <li>Existing overhead utilities and existing City watermain run down east side of Oakwood Drive, which will drive local road closure and temporary pole support for shaft construction</li> <li>Temporary support of overhead utility poles on east side of Montrose Road may be required</li> <li>City of Niagara Falls has new watermain proposed for Reixinger Road and Montrose Road (south of Reixinger) – sewer along Reixinger Road can be coordinated with proposed watermain</li> <li>Existing high-pressure gas main running along Reixinger Road (from site west to Montrose Road) will need to be avoided</li> </ul>	<ul style="list-style-type: none"> <li>Montrose Road is a congested ROW with many existing underground and overhead utilities including overhead hydro and Cogeco and underground Bell and gas as well as watermain, local gravity sanitary sewer and forcemains from Garner Road SPS and Grassy Brook SPS                             <ul style="list-style-type: none"> <li>Temporary support of overhead utility poles may be required at Chippawa Creek Road for shaft construction</li> </ul> </li> <li>Road EA will recommend that utilities be buried within common trench                             <ul style="list-style-type: none"> <li>Proposed directionally drilled Niagara Region Broadband Network (NRBN) and Cogeco along east side of Montrose Road / Welland River bridge</li> </ul> </li> <li>City of Niagara Falls has new watermain proposed for Reixinger Road and Montrose Road (south of Reixinger) – sewer along Reixinger Road can be coordinated with proposed watermain</li> <li>Existing high-pressure gas main running along Reixinger Road (from site west to Montrose Road) will need to be avoided</li> </ul>
<b>SPS Decommissioning</b>	<ul style="list-style-type: none"> <li>South Side High Lift can be picked up effectively at commissioning                             <ul style="list-style-type: none"> <li>Proposed shaft located south of SPS site will allow for construction with minimal disruption to existing SPS and straightforward connection of existing sewer to new trunk sewer</li> </ul> </li> <li>Garner Road SPS will require a QEW crossing and easement south of the Nissan Dealership – extensive deep tunnelled sewer will be required, and it makes sense to construct this portion as part of the overall tunnelling project for pick-up of flows to Garner at commissioning                             <ul style="list-style-type: none"> <li>Proposed shaft located north of existing inlet manhole (intersection of Brown Road and Heartland Forest Road) will allow for straightforward final connection</li> </ul> </li> <li>Oakwood SPS will require the easement north of Modern Mosaic                             <ul style="list-style-type: none"> <li>Oakwood SPS currently drains to South Side High Lift, has been recently upgraded and does not service significant growth. Decommissioning can be postponed</li> </ul> </li> <li>Grassy Brook SPS will require sewer along Montrose Road south of Grassy Brook Road as well as Reixinger Road with a QEW crossing. City has noted that there may be capacity concerns with Grassy Brook SPS once the new hospital (and potentially the Grassy Brook Secondary Plan Area development comes online).                             <ul style="list-style-type: none"> <li>New Niagara Hospital has not confirmed sanitary flows with City of Niagara Falls (it is expected that the hospital can be serviced by existing sewers with potential capacity upgrades at the Grassy Brook SPS required).</li> </ul> </li> <li>New 70m section of sewer from SPS inlet MH to MH located at Grassy Brook Road intersection will be required to drain E.S. Fox lands.</li> </ul>	<ul style="list-style-type: none"> <li>South Side High Lift can be picked up effectively at commissioning – easement required through property south of South Side High Lift SPS                             <ul style="list-style-type: none"> <li>Proposed shaft located south of SPS site will allow for construction with minimal disruption to existing SPS and straightforward connection of existing sewer to new trunk sewer</li> </ul> </li> <li>Garner Road SPS will require a QEW crossing and shaft within Oakwood Drive (with localized road closure) – extensive deep tunnelled sewer will be required, and it makes sense to construct this portion as part of the overall tunnelling project for pick-up of flows to Garner at commissioning                             <ul style="list-style-type: none"> <li>Proposed shaft located north of existing inlet manhole (intersection of Brown Road and Heartland Forest Road) will allow for straightforward final connection</li> </ul> </li> <li>Oakwood SPS will require a shaft with localized road closure of Oakwood Drive – based on the proximity of a required shaft at this location, it makes sense to pick up flows to Oakwood SPS at commissioning</li> <li>Grassy Brook SPS will require sewer along Montrose Road south of Grassy Brook Road as well as Reixinger Road with a QEW crossing. City has noted that there may be capacity concerns with Grassy Brook SPS once the new hospital (and potentially the Grassy Brook Secondary Plan Area development comes online).                             <ul style="list-style-type: none"> <li>New Niagara Hospital has not confirmed sanitary flows with City of Niagara Falls (it is expected that the hospital can be serviced by existing sewers with potential capacity upgrades at the Grassy Brook SPS required).</li> <li>New 70m section of sewer from SPS inlet MH to MH located at Grassy Brook Road intersection will be required to drain E.S. Fox lands.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>South Side High Lift can be picked up effectively at commissioning – easement required through property south of South Side High Lift SPS                             <ul style="list-style-type: none"> <li>Proposed shaft located south of SPS site will allow for construction with minimal disruption to existing SPS and straightforward connection of existing sewer to new trunk sewer</li> </ul> </li> <li>Garner Road SPS pick-up will not require a QEW crossing and does not require a road closure – flows can be effectively picked up at commissioning                             <ul style="list-style-type: none"> <li>Proposed shaft located north of existing inlet manhole (intersection of Brown Road and Heartland Forest Road) will allow for straightforward final connection</li> </ul> </li> <li>Oakwood SPS will require a shaft with localized road closure of Oakwood Drive and crossing of QEW to Montrose Road/Chippawa Creek road shaft                             <ul style="list-style-type: none"> <li>Oakwood SPS currently drains to South Side High Lift, has been recently upgraded and does not service significant growth. Decommissioning can be postponed</li> </ul> </li> <li>Grassy Brook SPS will require sewer along Montrose Road south of Grassy Brook Road as well as Reixinger Road with a QEW crossing                             <ul style="list-style-type: none"> <li>Tunnelled sewer crosses below existing inlet sewer to pumping station (at 15m depth); should not disrupt PS operation during sewer construction</li> <li>City has noted that there may be capacity concerns with Grassy Brook SPS once the new hospital (and potentially the Grassy Brook Secondary Plan Area development comes online).</li> <li>New Niagara Hospital has not confirmed sanitary flows with City of Niagara Falls (it is expected that the hospital can be serviced by existing sewers with potential capacity upgrades at the Grassy Brook SPS required).</li> </ul> </li> <li>New 70m section of sewer from SPS inlet MH to MH located at Grassy Brook Road intersection will be required to drain E.S. Fox lands.</li> </ul>



## South Niagara Falls Wastewater Solutions Class EA Alignment Evaluation

Detailed Evaluation Table				
Criteria	Alignment 1 – OPG Lands	Alignment 2 – Oakwood Drive	Alignment 3 – Montrose Road	
<b>Constructability</b>	<ul style="list-style-type: none"> <li>Proposed sewers will range in diameter from 1200mm to 2500mm diameter</li> <li>Shafts within OPG Corridor are more than 10m away from top of bank (located to east) and there should be no bank stability issues with construction of shafts in these locations</li> <li>Temporary construction/long-term maintenance access roads will be required to be constructed to shafts within the OPG corridor and at the site “finger”                             <ul style="list-style-type: none"> <li>Construction / maintenance access to Shaft-OPG-02 Garner road SPS shaft (within OPG Corridor) can be from north through OPG corridor or through property south of Nissan</li> <li>Construction / maintenance access to Shaft OPG-03 Oakwood SPS shaft will require access through Modern Mosaic property (or property immediately north) – Watercourse from culvert restricts access from further north</li> </ul> </li> <li>Conventional tunnelling could allow for drive length from Oakwood Drive easement shaft to Reixinger Road (nearly 2 km)                             <ul style="list-style-type: none"> <li>Access to shaft within site “finger” will require temporary construction and long-term maintenance access road from Reixinger Road</li> </ul> </li> <li>Initial and long-term access to ~1 km of tunnel from north of Welland River, under Triangle Island and through Grassy Brook Park is severely restricted</li> </ul>	<ul style="list-style-type: none"> <li>Proposed sewers will range in diameter from 1200mm to 2500mm diameter</li> <li>Shafts within Oakwood Drive can be constructed with localized road closures</li> <li>Conventional tunnelling could allow for drive length from Oakwood SPS shaft to Reixinger Road (nearly 2 km)                             <ul style="list-style-type: none"> <li>Access to shaft within site “finger” will require temporary construction and long-term maintenance access road from Reixinger Road</li> </ul> </li> <li>MTO Oakwood Drive/Welland River bridge structure is scheduled to be completed in 2023 – ahead of proposed construction</li> </ul>	<ul style="list-style-type: none"> <li>Proposed sewers will range in diameter from 1200mm to 2500mm diameter                             <ul style="list-style-type: none"> <li>All flows going to Montrose Road sewer increases pipe sizes (largest pipe size up to 2500mm diameter)</li> </ul> </li> <li>Montrose Road is a congested ROW with many underground and overhead utilities including overhead hydro and Cogeco and underground Bell and gas as well as watermain, local gravity sanitary sewer and forcemains from Garner Road SPS and Grassy Brook SPS</li> <li>Shafts constructed along east side of ROW will allow for Montrose Road to remain open with appropriate traffic control</li> <li>All flows going to Montrose Road sewer increases pipe sizes (largest pipe size up to 2500mm diameter)</li> </ul>	
	<b>Future Servicing Opportunities</b>	<ul style="list-style-type: none"> <li>New growth sewers along Chippawa Creek Road would require to be serviced with a new QEW crossing and shaft/manhole along Oakwood Drive with sewer to shaft manhole that will be located at Oakwood Drive/Modern Mosaic easement</li> <li>Connection to shaft at Grassy Brook Road not feasible unless shaft to be constructed at Montrose Road/Grassy Brook Road is deepened to accommodate future Welland River crossing</li> </ul>	<ul style="list-style-type: none"> <li>Oakwood SPS shaft can be located south to best provide for future QEW crossing from Chippawa Creek Road</li> <li>Connection to shaft at Grassy Brook Road not feasible unless shaft to be constructed at Montrose Road/Grassy Brook Road is deepened to accommodate future Welland River crossing</li> </ul>	<ul style="list-style-type: none"> <li>Provides a future deep shaft connection at Chippawa Creek Road / Blackburn Parkway to accommodate growth within the area catchment</li> </ul>
<b>Financial</b>	<b>To Commissioning</b>	<ul style="list-style-type: none"> <li>Easements required through OPG Corridor and south of Nissan Dealership (between Oakwood Drive and OPG Corridor)</li> <li>Easement required through properties east of QEW and south of Welland River (north and south of WWTP site “finger”)</li> <li>Easement required west of Montrose Road (from Grassy Brook Road to Reixinger Road)</li> <li>Estimated highest construction cost of three alternatives based on extensive tunnelled length and the greatest number of shafts required</li> </ul>	<ul style="list-style-type: none"> <li>Easement required for South Side High Lift SPS to Oakwood Drive</li> <li>Easement required through properties east of QEW and south of Welland River (north and south of WWTP site “finger”)</li> <li>Easement required west of Montrose Road (from Grassy Brook Road to Reixinger Road)</li> <li>Estimated second-most expensive construction cost of three alternatives based on extensive tunnelled length and significant number of shafts required</li> <li>MTBM(s) required to be set-up on either side of the QEW, within Oakwood Drive and along Montrose Road</li> </ul>	<ul style="list-style-type: none"> <li>Easement required for South Side High Lift SPS to Montrose Road</li> <li>Easement required west of Montrose Road (from Grassy Brook Road to Reixinger Road)</li> <li>Estimated least expensive construction cost of three alternatives based on shortest tunnelled length and least number of shafts required                             <ul style="list-style-type: none"> <li>Tunnelling and shaft set-up focused on west side of QEW which should provide some efficiencies – only one run for the MTBM (along Montrose and Reixinger) rather than two for Alternative 1 and 2</li> <li>Construction timing reduced based on availability of MTBM (shorter overall tunnelled length and set-up of MTBMs)</li> </ul> </li> </ul>
	<b>Future Costs</b>	<ul style="list-style-type: none"> <li>If Oakwood Drive SPS is to be decommissioned in future, easement north of Modern Mosaic property will be required as well as smaller diameter shaft at Oakwood Drive and tunnelled sewer (~600mm dia. from Oakwood Drive to OPG Corridor)</li> <li>Future servicing from west of QEW, north of Welland River (Chippawa Creek Road or Blackburn Parkway) will require an additional crossing of the QEW</li> </ul>	<ul style="list-style-type: none"> <li>Oakwood Drive SPS is well-positioned to be picked up at commissioning</li> <li>Future servicing from west of QEW, north of Welland River (Chippawa Creek Road or Blackburn Parkway) will require an additional crossing of the QEW</li> </ul>	<ul style="list-style-type: none"> <li>If Oakwood Drive is to be decommissioned in future, crossing of QEW with smaller shaft and ~600mm dia. sewer will be required</li> <li>Future servicing from west of QEW, north of Welland River (Chippawa Creek Road or Blackburn Parkway) is provided at commissioning</li> </ul>