









Attachment 5 – Alternative
Methods Comparative Evaluation
Tables

Comparative Evaluation – Site Development Alternatives					
Environment/ Criteria	Indicators	Alternative 1 Vertical Expansion of Old Landfill, Addition of Footprint A + B	Alternative 2 Vertical Expansion of Old Landfill, Landfill Mining of Old Landfill, Addition of Footprint A + Reduced B	Alternative 3 No Vertical Expansion, Addition of Footprint A+B+C	Do Nothing
NATURAL ENVIRONMENT - BIOLOGICAL					
Potential for effect on terrestrial systems from construction and operation.	<ul style="list-style-type: none"> Area and type of terrestrial systems (e.g., significant woodlots, hedgerows, wetlands, etc.) to be removed on-site. 	<p>● Preferred</p> <p>Removes approximately 3.7 ha of lower quality southwest woodlot and temporarily removes meadow habitat. Alternatives 1 and 2 will result in minimal effects on terrestrial systems as compared to Alternative 3. Discussions are already underway regarding replanting the trees at a 2-to-1 ratio. Some trees will be planted adjoining an existing woodlot making it larger.</p>	<p>● Preferred</p> <p>Removes approximately 3.7 ha of lower quality southwest woodlot and temporarily removes meadow habitat. Alternatives 1 and 2 will result in minimal effects on terrestrial systems as compared to Alternative 3. Discussions are already underway regarding replanting the trees at a 2-to-1 ratio. Some trees will be planted adjoining an existing woodlot making it larger.</p>	<p>● Less Preferred</p> <p>Removes approximately 3.7 ha of lower quality southwest woodlot plus 8 ha of higher quality southeast woodlot with SAR bat habitat. Discussions are already underway regarding replanting the trees at a 2-to-1 ratio. Some trees will be planted adjoining an existing woodlot making it larger.</p> <p>Alternative 3 has a greater potential effect on terrestrial features than Alternatives 1 and 2.</p>	
	<ul style="list-style-type: none"> Area and type of terrestrial systems (e.g., significant woodlots, hedgerows, wetlands, etc.) potentially disrupted within 1 km. 	<p>○ Equally Preferred</p> <p>No disruption from construction or operation off-site.</p> <p>There is no difference between the alternatives for this criterion/indicator.</p>	<p>○ Equally Preferred</p> <p>No disruption from construction or operation off-site.</p> <p>There is no difference between the alternatives for this criterion/indicator.</p>	<p>○ Equally Preferred</p> <p>No disruption from construction or operation off-site.</p> <p>There is no difference between the alternatives for this criterion/indicator.</p>	
Potential for effect on habitat of Endangered or Threatened Species during construction.	<ul style="list-style-type: none"> Area of habitat for endangered or threatened species on-site. 	<p>● Preferred</p> <p>Temporary removal of meadow that is habitat for eastern meadowlark.</p> <p>Alternatives 1 and 2 will result in minimal impact on significant habitat.</p>	<p>● Preferred</p> <p>Temporary removal of meadow that is habitat for eastern meadowlark.</p> <p>Alternatives 1 and 2 will result in minimal impact on significant habitat.</p>	<p>● Less Preferred</p> <p>Permanently removes the SAR bat habitat associated with the 8 ha SE woodlot.</p> <p>Alternative 3 has more of an impact on significant habitat than Alternatives 1 and 2.</p>	
Potential effect on medicinal or other culturally sensitive species of importance to Indigenous Communities during construction.	<ul style="list-style-type: none"> Area and type of species of importance to be removed on-site. 	<p>● Preferred</p> <p>As intact and healthy native ecosystems, the on-site woodlots are considered culturally relevant. Alternative 3 requires removal of both woodlots it is considered less preferred than Alternatives 1 and 2 which would remove only the SW woodlot.</p>	<p>● Preferred</p> <p>As intact and healthy native ecosystems, the on-site woodlots are considered culturally relevant. Alternative 3 requires removal of both woodlots it is considered less preferred than Alternatives 1 and 2 which would remove only the SW woodlot.</p>	<p>● Less Preferred</p> <p>As intact and healthy native ecosystems, the on-site woodlots are considered culturally relevant. Alternative 3 requires removal of both woodlots it is considered less preferred than Alternatives 1 and 2 which would remove only the SW woodlot.</p>	







Comparative Evaluation – Site Development Alternatives					
Environment/ Criteria	Indicators	Alternative 1 Vertical Expansion of Old Landfill, Addition of Footprint A + B	Alternative 2 Vertical Expansion of Old Landfill, Landfill Mining of Old Landfill, Addition of Footprint A + Reduced B	Alternative 3 No Vertical Expansion, Addition of Footprint A+B+C	Do Nothing
Potential for effect on aquatic systems during construction.	<ul style="list-style-type: none"> Amount and type of aquatic systems (i.e., ponds, drains) that would be displaced on-site. 	<p>○ Equally Preferred</p> <p>Requires relocation of Howard Drain and an existing pond. Aquatic habitat is of low sensitivity and it will be relocated. Effect is considered minimal.</p> <p>The difference between the alternatives for this criterion/indicator is minor and all are considered relatively equal.</p>	<p>○ Equally Preferred</p> <p>Requires relocation of Howard Drain and an existing pond. Aquatic habitat is of low sensitivity and it will be relocated. Effect is considered minimal.</p> <p>The difference between the alternatives for this criterion/indicator is minor and all are considered relatively equal.</p>	<p>○ Equally Preferred</p> <p>Requires relocation of Howard Drain and an existing pond. Aquatic habitat is of low sensitivity and it will be relocated. Effect is considered minimal.</p> <p>The difference between the alternatives for this criterion/indicator is minor and all are considered relatively equal.</p>	
	Biological Ranking	Preferred – Only removes the lower quality SW woodlot and has not impact on endangered/threatened species.	Preferred – Only removes the lower quality SW woodlot and has not impact on endangered/threatened species.	Less Preferred – Removes both the SW and SE woodlots and removes potential SAR bat habitat.	The southwest woodlot would remain.
NATURAL ENVIRONMENT – PHYSICAL - GROUNDWATER					
Potential impacts to groundwater quality during construction, operation and post closure.	<ul style="list-style-type: none"> Qualitative assessment of ability of alternative to meet Reasonable Use Guideline. 	<p>○ Equally Preferred</p> <p>All alternatives are reasonably expected to meet Reasonable Use Guideline based on historical monitoring data and extensive natural protection supported by engineering controls. Predictive modelling will be run to confirm for the preferred site.</p>	<p>○ Equally Preferred</p> <p>All alternatives are reasonably expected to meet Reasonable Use Guideline based on historical monitoring data and extensive natural protection supported by engineering controls. Predictive modelling will be run to confirm for the preferred site.</p>	<p>○ Equally Preferred</p> <p>All alternatives are reasonably expected to meet Reasonable Use Guideline based on historical monitoring data and extensive natural protection supported by engineering controls. Predictive modelling will be run to confirm for the preferred site.</p>	
Leachate contaminating lifespan during construction, operation and post closure.	<ul style="list-style-type: none"> Prediction based on tonnes of waste per hectare of footprint area and leachate generation rate. 	<p>○ Equally Preferred</p> <p>Leachate generation rate is similar for alternatives and the qualitative estimate of contaminating lifespan ranges from approximately 294-years to approximately 316-years.</p>	<p>○ Equally Preferred</p> <p>Leachate generation rate is similar for alternatives and the qualitative estimate of contaminating lifespan ranges from approximately 294-years to approximately 316-years.</p>	<p>○ Equally Preferred</p> <p>Leachate generation rate is similar for alternatives and the qualitative estimate of contaminating lifespan ranges from approximately 294-years to approximately 316-years.</p>	
Potential impacts to groundwater quantity.	<ul style="list-style-type: none"> Landfill footprint. 	<p>○ Equally Preferred</p> <p>All site development alternatives have relatively similar footprint sizes ranging from 185 ha to 214 ha. Landfill footprint serves as an indication of the extent of recharge area that will be removed.</p>	<p>○ Equally Preferred</p> <p>All site development alternatives have relatively similar footprint sizes ranging from 185 ha to 214 ha. Landfill footprint serves as an indication of the extent of recharge area that will be removed.</p>	<p>○ Equally Preferred</p> <p>All site development alternatives have relatively similar footprint sizes ranging from 185 ha to 214 ha. Landfill footprint serves as an indication of the extent of recharge area that will be removed.</p>	

Comparative Evaluation – Site Development Alternatives					
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Potential impacts to water supply wells.	<ul style="list-style-type: none"> Extent of natural setting protection. 	<p>○ Equally Preferred</p> <p>All site development alternatives have over 30 m of clay underneath which together with engineered systems will protect water supply. The travel time to residential wells is anticipated to be approximately 3400 years for all three alternatives. Residences and businesses on Erieau Road and Charing Cross are on municipal servicing.</p>	<p>○ Equally Preferred</p> <p>All site development alternatives have over 30 m of clay underneath which together with engineered systems will protect water supply. The travel time to residential wells is anticipated to be approximately 3400 years for all three alternatives. Residences and businesses on Erieau Road and Charing Cross are on municipal servicing.</p>	<p>○ Equally Preferred</p> <p>All site development alternatives have over 30 m of clay underneath which together with engineered systems will protect water supply. The travel time to residential wells is anticipated to be approximately 3400 years for all three alternatives. Residences and businesses on Erieau Road and Charing Cross are on municipal servicing.</p>	
	Groundwater Ranking	Equally Preferred – All three (3) site development alternatives are underlain by 30 m of clay and will have no impact on groundwater quality or quantity. With the limited groundwater movement there is no impact to residential water supply wells.	Equally Preferred – All three (3) site development alternatives are underlain by 30 m of clay and will have no impact on groundwater quality or quantity. With the limited groundwater movement there is no impact to residential water supply wells.	Equally Preferred – All three (3) site development alternatives are underlain by 30 m of clay and will have no impact on groundwater quality or quantity. With the limited groundwater movement there is no impact to residential water supply wells.	Historical monitoring activity has shown that the Ridge landfill site consistently meets the Reasonable Use Guideline.
NATURAL ENVIRONMENT – PHYSICAL - SURFACE WATER					
Potential impacts to surface water quantity.	<ul style="list-style-type: none"> Changes in peak flows pre- and post-expansion. 	<p>○ Equally Preferred</p> <p>Pre and post peak flows are maintained at or below the baseline condition for all three of the site development alternatives.</p>	<p>○ Equally Preferred</p> <p>Pre and post peak flows are maintained at or below the baseline condition for all three of the site development alternatives.</p>	<p>○ Equally Preferred</p> <p>Pre and post peak flows are maintained at or below the baseline condition for all three of the site development alternatives.</p>	
Potential impacts to surface water quality.	<ul style="list-style-type: none"> Anticipated change in temperature, water quality, benthos and fish habitat. 	<p>○ Equally Preferred</p> <p>Change in temperature, water quality, benthos or fish habitat is anticipated to be minimal and not expected to significantly change from current.</p>	<p>○ Equally Preferred</p> <p>Change in temperature, water quality, benthos or fish habitat is anticipated to be minimal and not expected to significantly change from current.</p>	<p>○ Equally Preferred</p> <p>Change in temperature, water quality, benthos or fish habitat is anticipated to be minimal and not expected to significantly change from current.</p>	
	Surface Water Ranking	Equally Preferred – None of the three (3) site development alternatives will significantly impact surface water quality or quantity.	Equally Preferred – None of the three (3) site development alternatives will significantly impact surface water quality or quantity.	Equally Preferred – None of the three (3) site development alternatives will significantly impact surface water quality or quantity.	The existing site would continue to have minimal to no impact on surface water.

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NATURAL ENVIRONMENT – PHYSICAL - ATMOSPHERIC					
Potential for dust during construction and operation.	<ul style="list-style-type: none"> Relative concentration of dust at discrete receptors. 	<p>○ Equally Preferred</p> <p>Landfill construction requires approximately 500-750 trucks per year, on average, for construction material over the 20 year operation. During operation all three alternatives will receive the same number of waste trucks.</p> <p>Conservative screening level modelling identifies potential for off-property dust impacts for all three alternatives during construction and operation.</p>	<p>○ Equally Preferred</p> <p>Landfill construction requires approximately 500-750 trucks per year, on average, for construction over the 20 year operation. During operation all three alternatives will receive the same number of waste trucks.</p> <p>Conservative screening level modelling identifies potential for off-property dust impacts for all three alternatives during construction and operation.</p>	<p>○ Equally Preferred</p> <p>Landfill construction requires approximately 500-750 trucks per year, for construction over the 20 year operation. During operation all three alternatives will receive the same number of waste trucks.</p> <p>Conservative screening level modelling identifies potential for off-property dust impacts for all three alternatives during construction and operation.</p>	
Potential for impacts to air quality during construction and operation.	<ul style="list-style-type: none"> Relative concentrations of Nitrogen Oxides, Sulphur Dioxide and Carbon Monoxide (together referred to as criteria air contaminants) at discrete receptors Relative concentrations of Hydrogen Sulphide, Vinyl Chloride, Chloroform at discrete receptors 	<p>● Preferred</p> <p>Similar waste quantities being landfilled and similar landfill gas capture and control in place all three alternatives will result in similar landfill gas emissions from the standard landfill operations.</p> <p>Vehicular activity associated with construction and operation similar to that experienced today will occur for this alternative. Conservative screening level modelling identifies low potential for impact to ambient air quality as a part of regular landfill operations.</p> <p>Proper vehicle maintenance will help minimize the potential for air quality impact as a result of vehicular activity.</p> <p>Conservative screening level modelling identifies low potential for off-property impacts.</p>	<p>● Less Preferred</p> <p>Similar waste quantities being landfilled and similar landfill gas capture and control in place all three alternatives will result in similar landfill gas emissions from standard landfill operations. This alternative also includes landfill mining. While this will result in a short term increase in the release of by-products of waste decomposition it is not show to have an impact on the overall air quality.</p> <p>Vehicular activity associated with construction and operation similar to that experienced today will occur for this alternative. With the addition of landfill mining, this alternative involves additional vehicular activity associated landfill mining. This additional traffic is minor relative to the regular operational vehicle activity.</p> <p>Proper vehicle maintenance will help minimize the potential for air quality impact as a result of vehicular activity</p> <p>Conservative screening level modelling identifies low potential for off-property impacts. The landfill mining included as part of site development Alternative 2 has potential for air quality impacts because of the required exposure and handling of previously buried waste.</p>	<p>● Preferred</p> <p>Similar waste quantities being landfilled and similar landfill gas capture and control in place all three alternatives will result in similar landfill gas emissions from standard landfill operations.</p> <p>Vehicular activity associated with construction and operation similar to that experienced today will occur for this alternative. Proper vehicle maintenance will help minimize the potential for air quality impact as a result of vehicular activity</p> <p>Conservative screening level modelling identifies low potential for off-property impacts.</p>	










Comparative Evaluation – Site Development Alternatives					
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	Atmospheric Ranking	Preferred – While there are differences between the alternatives the level of vehicular activity and the quantity of waste being landfilled is relatively similar for all and thus the potential for impacts to ambient air quality as part of regular operations is similar.	Less Preferred – While there are differences between the alternatives the level of vehicular activity and the quantity of waste being landfilled is relatively similar for all and thus the potential for impacts to ambient air quality as part of regular operations is similar. However, the landfill mining component of this alternative has the potential for greater air quality impacts because of the required exposure and handling of previously buried waste.	Preferred – While there are differences between the alternatives the level of vehicular activity and the quantity of waste being landfilled is relatively similar for all and thus the potential for impacts to ambient air quality as part of regular operations is similar.	Landfill gas emissions would continue to be managed by flaring or utilization. Traffic related dust would diminish and air quality would improve once site is no longer operational.
NATURAL ENVIRONMENT – PHYSICAL - CLIMATE CHANGE					
Potential for greenhouse gas emissions during construction and operation.	<ul style="list-style-type: none"> Daily/annual waste volume landfilled. Anticipated differences in on-site vehicular activity. Extent of woodlot removal. 	<p> Preferred</p> <p>All alternatives will receive 1.3 million tonnes of waste annually, the same as current site operations.</p> <p>On-site vehicular activity associated with standard landfill construction and operation will be relatively consistent with what occurs today.</p> <p>3.7 ha of woodlot would be removed and replanted at a 2-to-1 ratio.</p> <p>For all alternatives landfill gas will be collected and managed and standard landfill operation is anticipated to result in similar greenhouse gas emissions to what occurs today.</p>	<p> Less Preferred</p> <p>All alternatives will receive 1.3 million tonnes of waste annually, the same as current site operations.</p> <p>On-site vehicular activity associated with standard landfill construction and operation will be relatively consistent with what occurs today.</p> <p>3.7 ha of woodlot would be removed and replanted at 2-to-1 ratio.</p> <p>Landfill mining would result in a short-term increase in greenhouse gases from an increase in vehicular activity during the 5-10 year period of mining.</p> <p>For all alternatives landfill gas will be collected and managed and standard landfill operation is anticipated to result in similar greenhouse gas emissions to what occurs today.</p> <p>Overall, the additional vehicle activity associated with landfill mining for Alternative 2 will result in a greater potential for greenhouse gas emissions than Alternatives 1 and 3.</p>	<p> Preferred</p> <p>All alternatives will receive 1.3 million tonnes of waste annually, the same as current site operations.</p> <p>On-site vehicular activity associated with standard landfill construction and operation will be relatively consistent with what occurs today.</p> <p>11.7 ha of woodlot would be removed and replanted at 2-to-1 ratio.</p> <p>For all alternatives landfill gas will be collected and managed and standard landfill operation is anticipated to result in similar greenhouse gas emissions to what occurs today.</p>	
Resilience of engineered systems.	<ul style="list-style-type: none"> Qualitative assessment of the resiliency of proposed infrastructure. 	<p> Equally Preferred</p> <p>The expanded site will be designed with consideration of future changes in climate to allow for resilience of engineered systems.</p>	<p> Equally Preferred</p> <p>The expanded site will be designed with consideration of future changes in climate to allow for resilience of engineered systems.</p>	<p> Equally Preferred</p> <p>The expanded site will be designed with consideration of future changes in climate to allow for resilience of engineered systems.</p>	

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	Climate Change Ranking	Preferred: Site development alternatives 1 and 3 will result in similar potential for greenhouse gas emissions as exists today.	Less Preferred: The landfill mining associated with site development alternative 2 has the potential to result in increased greenhouse gas emissions over the 5-10 year mining period.	Preferred: Site development alternatives 1 and 3 will result in similar potential for greenhouse gas emissions as exists today.	Landfill gas emissions and associated GHG emissions would continue to be managed by flaring or utilization.
SOCIAL ENVIRONMENT					
Potential for noise / vibration impacts on residents during site construction and site operation.	<ul style="list-style-type: none"> Number of households in the study area who may experience noise/ vibration impacts. 	<p>○ Equally Preferred</p> <p>There are 24 households, two (2) businesses and one (1) institution in the 1 km study area who may experience noise during construction and operation. The proposed changes for all alternatives generally moves the active fill areas south moving noise-causing activities closer to some and further away from others. 7-13 of the receptors may experience a moderate noise level increase (6-11 dBA)</p> <p>Based on past noise assessments it is anticipated that noise at residences in the vicinity of the landfill will not exceed the MECP’s criterion of 55 dBA for landfills. Noise will be modelled for the preferred site development alternative and mitigation recommended if necessary.</p> <p>Based on the site’s long operating history, the types of activities and the location of receptors, vibration is not anticipated.</p>	<p>○ Equally Preferred</p> <p>There are 24 households, two (2) businesses and one (1) institution in the 1 km study area who may experience noise during construction and operation. The proposed changes for all alternatives generally moves the active fill areas south moving noise-causing activities closer to some and further away from others. 7-13 of the receptors may experience a moderate noise level increase (6-11 dBA).</p> <p>Based on past noise assessments it is anticipated that noise at residences in the vicinity of the landfill will not exceed the MECP’s criterion of 55 dBA for landfills. Noise will be modelled for the preferred site development alternative and mitigation recommended if necessary.</p> <p>Based on the site’s long operating history, the types of activities and the location of receptors, vibration is not anticipated.</p>	<p>○ Equally Preferred</p> <p>There are 24 households, two (2) businesses and one (1) institution in the 1 km study area who may experience noise during construction and operation. The proposed changes for all alternatives generally moves the active fill areas south moving noise-causing activities closer to some and further away from others. 7-13 of the receptors may experience a moderate noise level increase (6-11 dBA).</p> <p>Based on past noise assessments it is anticipated that noise at residences in the vicinity of the landfill will not exceed the MECP’s criterion of 55 dBA for landfills. Noise will be modelled for the preferred site development alternative and mitigation recommended if necessary.</p> <p>Based on the site’s long operating history, the types of activities and the location of receptors, vibration is not anticipated.</p>	

Comparative Evaluation – Site Development Alternatives					
Environment/ Criteria	Indicators	Alternative 1 Vertical Expansion of Old Landfill, Addition of Footprint A + B	Alternative 2 Vertical Expansion of Old Landfill, Landfill Mining of Old Landfill, Addition of Footprint A + Reduced B	Alternative 3 No Vertical Expansion, Addition of Footprint A+B+C	Do Nothing
Potential for odour during construction and operation.	<ul style="list-style-type: none"> Relative concentration of odour at discrete receptors. 	<p> Preferred</p> <p>Primary odour sources for Alternatives 1 and 3 include the open disposal face and fugitive landfill gas emissions. These are the same key odour sources as the current condition.</p> <p>It is noted that for all three (3) alternatives landfill gas flares/management system would remain in place.</p> <p>Conservative screening level modelling identifies low potential for off-property odour impacts.</p>	<p> Least Preferred</p> <p>Primary odour sources for Alternative 2 include the open disposal face, fugitive landfill gas emissions and the landfill mining area. The first 2 odour sources noted are the same key odour sources as the current condition. It is noted that for all three (3) alternatives landfill gas flares/management system would remain in place.</p> <p>Conservative screening level modelling identifies low potential for off-property odour impacts.</p> <p>The landfill mining is a potentially more significant odour source that could occur over the 5 -10 years of landfill mining operation.</p>	<p> Less Preferred</p> <p>Primary odour sources for Alternatives 1 and 3 include the open disposal face and fugitive landfill gas emissions. These are the same key odour sources as the current condition.</p> <p>It is noted that for all (3) three alternatives landfill gas flares/management system would remain in place.</p> <p>Conservative screening level modelling identifies medium potential for off-property odour impacts primarily as a result of the shift in landfill footprint.</p>	
Potential for visual impacts on residents during site construction and site operation.	<ul style="list-style-type: none"> Percent change in view within study area. 	<p> Equally Preferred</p> <p>While the shape of the mound will differ between alternatives, the height of the proposed expansion will not exceed the restricted height of 241.3 m above sea level (masl) dictated by the Chatham Airport Zoning Regulation and will be built no higher than the current elevation of the existing landfill.</p> <p>The existing landfill is visible from approximately 27% of the land within the 3 km visual study area. The proposed expansion will be visible from approximately 43% of the land within this study area for all three (3) alternatives.</p>	<p> Equally Preferred</p> <p>While the shape of the mound will differ between alternatives, the height of the proposed expansion will not exceed the restricted height of 241.3 m above sea level (masl) dictated by the Chatham Airport Zoning Regulation and will be built no higher than the current elevation of the existing landfill.</p> <p>The existing landfill is visible from approximately 27% of the land within the 3 km visual study area. The proposed expansion will be visible from approximately 43% of the land within this study area for all three (3) alternatives.</p>	<p> Equally Preferred</p> <p>While the shape of the mound will differ between alternatives, the height of the proposed expansion will not exceed the restricted height of 241.3 m above sea level (masl) dictated by the Chatham Airport Zoning Regulation and will be built no higher than the current elevation of the existing landfill.</p> <p>The existing landfill is visible from approximately 27% of the land within the 3 km visual study area. The proposed expansion will be visible from approximately 43% of the land within this study area for all three (3) alternatives.</p>	

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Potential for landfill traffic effect on residents during construction and operation.	<ul style="list-style-type: none"> Number of waste trucks during operation. Number of trucks for construction. 	<p>○ Equally Preferred</p> <p>All alternatives include approximately 200 waste trucks on the designated haul route per day during operation.</p> <p>All alternatives include approximately 500-750 additional construction material trucks per year, on average, using the designated haul route over the 20-year operation of the proposed expansion.</p>	<p>○ Equally Preferred</p> <p>All alternatives include approximately 200 waste trucks on the designated haul route per day during operation.</p> <p>All alternatives include approximately 500-750 additional construction material trucks per year, on average, using the designated haul route over the 20-year operation of the proposed expansion.</p>	<p>○ Equally Preferred</p> <p>All alternatives include approximately 200 waste trucks on the designated haul route per day during operation.</p> <p>All alternatives include approximately 500-750 additional construction material trucks per year, on average, using the designated haul route over the 20-year operation of the proposed expansion.</p>	
Potential for effect on worker safety during construction and operation.	<ul style="list-style-type: none"> Likelihood of safety concerns with alternative. 	<p>● Preferred</p> <p>Operation similar to current with known and manageable safety risks.</p>	<p>● Less Preferred</p> <p>Landfill mining component poses a higher potential safety risk for workers as the Old Landfill dates back to the 1960s and Waste Connections has no records on materials deposited in the landfill prior to 1982.</p>	<p>● Preferred</p> <p>Operation similar to current with known and manageable safety risks.</p>	
	Social Ranking	<p>Preferred – Site development alternatives 1 and 3 would operate similar to current operation and landfill neighbours would experience minimal change related to noise, odour and traffic. The site will be more visible for all alternatives.</p>	<p>Less preferred – Alternative 2 introduces landfill mining which has a greater potential to result in odours experienced by site neighbours over the 5-10 year mining period.</p>	<p>Preferred – Site development alternatives 1 and 3 would operate similar to current operation and landfill neighbours would experience minimal change related to noise, odour and traffic. The site will be more visible for all alternatives.</p>	<p>Upon closure, disruption from noise and truck traffic would be reduced. The landfill will continue to generate landfill gas and have the potential for odours. The site will remain visible from some surrounding residences/businesses.</p>

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ECONOMIC ENVIRONMENT					
Potential for effect on businesses during construction and operation.	<ul style="list-style-type: none"> Number of businesses (e.g., agricultural operations) in the study area who may experience disruption. 	<p>● Preferred</p> <p>There are two (2) retail businesses in the 1 km study area (farm market/agricultural operation and small equipment dealer) plus farming operations. All alternatives include a berm around the perimeter of the site which will minimize impact on businesses in the vicinity.</p> <p>Conservative screening level modelling identifies low potential for off-property odour impacts.</p>	<p>● Least Preferred</p> <p>There are two (2) retail businesses in the 1 km study area (farm market/agricultural operation and small equipment dealer) plus farming operations. All alternatives include a berm around the perimeter of the site which will minimize impact on businesses in the vicinity.</p> <p>Conservative screening level modelling identifies low potential for off-property odour impacts.</p> <p>The landfill mining is a potentially more significant odour source that could occur over the 5 -10 years of landfill mining operation.</p>	<p>● Less Preferred</p> <p>There are two (2) retail businesses in the 1 km study area (farm market/agricultural operation and small equipment dealer) plus farm operation. All alternatives include a berm around the perimeter of the site which will minimize impact on businesses in the vicinity.</p> <p>Conservative screening level modelling identifies medium potential for off-property odour impacts primarily as a result of the shift in landfill footprint.</p>	
Potential for landfill traffic effect on businesses during construction and operation.	<ul style="list-style-type: none"> Number of waste trucks during operation. Number of trucks for construction. 	<p>○ Equally Preferred</p> <p>All alternatives include approximately 200 waste trucks on the designated haul route per day during operation.</p> <p>All alternatives include approximately 500-750 additional construction material trucks per year, on average, using the designated haul route over the 20-year operation of the proposed expansion.</p>	<p>○ Equally Preferred</p> <p>All alternatives include approximately 200 waste trucks on the designated haul route per day during operation.</p> <p>All alternatives include approximately 500-750 additional construction material trucks per year, on average, using the designated haul route over the 20-year operation of the proposed expansion.</p>	<p>○ Equally Preferred</p> <p>All alternatives include approximately 200 waste trucks on the designated haul route per day during operation.</p> <p>All alternatives include approximately 500-750 additional construction material trucks per year, on average, using the designated haul route over the 20-year operation of the proposed expansion.</p>	
Potential for effect on agriculture during construction.	<ul style="list-style-type: none"> Area of on-site crop production lost. Area of Class 1-3 soils lost. 	<p>○ Equally Preferred</p> <p>All three (3) site development alternatives will require the displacement of agricultural uses on the site.</p> <p>For all alternatives it can be assumed that the full site will be used for landfilling activities for the 20-year lifespan of the site; however farming operations will be permitted until those lands are required.</p> <p>This alternative includes landfilling over approximately 59 ha of Class 2 soils. It is noted that landfills can return to some form of agricultural use, as has been done at other locations in Ontario.</p>	<p>○ Equally Preferred</p> <p>All three (3) site development alternatives will require the displacement of agricultural uses on the site.</p> <p>For all alternatives it can be assumed that the full site will be used for landfilling activities for the 20-year lifespan of the site; however farming operations will be permitted until those lands are required.</p> <p>This alternative includes landfilling over approximately 54 ha of Class 2 soils. It is noted that landfills can return to some form of agricultural use, as has been done at other locations in Ontario.</p>	<p>○ Equally Preferred</p> <p>All three (3) site development alternatives will require the displacement of agricultural uses on the site.</p> <p>For all alternatives it can be assumed that the full site will be used for landfilling activities for the 20-year lifespan of the site; however farming operations will be permitted until those lands are required.</p> <p>This alternative includes landfilling over approximately 83 ha of Class 2 soils. It is noted that landfills can return to some form of agricultural use, as has been done at other locations in Ontario.</p>	

Comparative Evaluation – Site Development Alternatives					
Environment/ Criteria	Indicators	Alternative 1 Vertical Expansion of Old Landfill, Addition of Footprint A + B	Alternative 2 Vertical Expansion of Old Landfill, Landfill Mining of Old Landfill, Addition of Footprint A + Reduced B	Alternative 3 No Vertical Expansion, Addition of Footprint A+B+C	Do Nothing
Cost of facility.	<ul style="list-style-type: none"> Approximate cost of site development alternative. 	<p> Preferred</p> <p>Represents standard landfill construction with an order of magnitude capital cost of approximately \$60 million.</p>	<p> Least Preferred</p> <p>Represents standard landfill construction with the addition of a landfill mining component. Alternative 2 has an order of magnitude capital cost of approximately \$165 million.</p>	<p> Less Preferred</p> <p>Represents standard landfill construction with an order of magnitude capital cost of approximately \$80 million.</p>	
	Economic Ranking	Preferred – Site development alternatives 1 and 3 would operate similar to current operation and businesses in the vicinity would experience minimal change. This alternative represents the lowest cost to construct and operate.	Less preferred – Alternative 2 introduces landfill mining which has a greater potential to result in odours experienced by businesses over the 5-10 year mining period. This alternative is also the most expensive.	Less Preferred – Site development alternatives 1 and 3 would operate similar to current operation and businesses in the vicinity would experience minimal change. This alternative would be more expensive than Alternative 1.	Upon closure, disruption impacts such as noise and truck traffic would be reduced. The on-site lands that are currently leased for farming could continue to be farmed.
CULTURAL ENVIRONMENT					
Potential effects to archaeological resources as a result of construction.	<ul style="list-style-type: none"> Area of undisturbed land affected by the expansion alternative. 	<p> Equally Preferred</p> <p>Approximately 59 ha of undisturbed land may be affected by the proposed expansion. Some of this land has been cleared of archaeological potential based on a Stage 1 Archaeological Assessment. A Stage 2 Archaeological Assessment will be completed and any resources found will be documented and removed.</p>	<p> Equally Preferred</p> <p>Approximately 54 ha of undisturbed land may be affected by the undertaking. Some of this land has been cleared of archaeological potential based on a Stage 1 Archaeological Assessment. A Stage 2 Archaeological Assessment will be completed and any resources found will be documented and removed.</p>	<p> Equally Preferred</p> <p>Approximately 83 ha of undisturbed land may be affected by the undertaking. Some of this land has been cleared of archaeological potential based on a Stage 1 Archaeological Assessment. A Stage 2 Archaeological Assessment will be completed and any resources found will be documented and removed.</p>	
Potential effects to cultural heritage resources as a result of construction.	<ul style="list-style-type: none"> Number and type of cultural heritage resources affected by expansion alternative. 	<p> Equally Preferred</p> <p>On-site cultural resources (residence, barn, and a farmscape) will be removed. The features will be documented prior to removal/demolition if shown to be warranted.</p>	<p> Equally Preferred</p> <p>On-site cultural resources (residence, barn, and a farmscape) will be removed. The features will be documented prior to removal/demolition if shown to be warranted.</p>	<p> Equally Preferred</p> <p>On-site cultural resources (residence, barn, and a farmscape) will be removed. The features will be documented prior to removal/demolition if shown to be warranted.</p>	

Comparative Evaluation – Site Development Alternatives					
Environment/ Criteria	Indicators	Alternative 1 Vertical Expansion of Old Landfill, Addition of Footprint A + B	Alternative 2 Vertical Expansion of Old Landfill, Landfill Mining of Old Landfill, Addition of Footprint A + Reduced B	Alternative 3 No Vertical Expansion, Addition of Footprint A+B+C	Do Nothing
	Cultural Heritage Ranking	Equally Preferred – None of the site development alternatives are expected to result in significant impacts to archaeological or cultural heritage resources.	Equally Preferred – None of the site development alternatives are expected to result in significant impacts to archaeological or cultural heritage resources.	Equally Preferred – None of the site development alternatives are expected to result in significant impacts to archaeological or cultural heritage resources.	Any archaeological resources will remain undiscovered and on-site cultural features may remain, subject to property owner wishes and/or the site closure plan.
BUILT ENVIRONMENT					
Effects on land use as a result of construction.	<ul style="list-style-type: none"> Size of landfill footprint. 	<p>● Preferred</p> <p>Approximately 190 ha footprint for this alternative. Lands in the southeast corner of site will have a more flexible use upon closure.</p> <p>The difference between Alternatives 1 and 2 was not considered significant and they were ranked the same as they both leave some lands available for flexible future use.</p>	<p>● Preferred</p> <p>Smallest footprint at approximately 185 ha. Lands in the southeast corner of site will have a more flexible use upon closure.</p> <p>The difference between Alternatives 1 and 2 was not considered significant and they were ranked the same as they both leave some lands available for flexible future use.</p>	<p>● Disadvantage</p> <p>Largest footprint size at approximately 214 ha. This alternative uses the full property and limits the flexibility of future use upon closure.</p> <p>Alternative 3 was considered to have a greater negative impact on land use than Alternatives 1 and 2.</p>	
Potential effects on existing transportation infrastructure and transportation operation.	<ul style="list-style-type: none"> Number of waste trucks during operation. Number of trucks for construction. Anticipated impact on the Chatham-Kent Airport. 	<p>○ Equally Preferred</p> <p>All of the alternatives would continue the approximately 200 waste trucks/ day for the 20-year operation of the facility. Construction related truck traffic will be minimal. Soil movement to remain on-site. Waste Connections provides funds to the Municipality of Chatham-Kent for upkeep of the designated haul route so no change in impact to the transportation infrastructure is anticipated.</p> <p>All alternatives will be within the height restriction dictated by the airport, so no change in effect on the airport is anticipated.</p>	<p>○ Equally Preferred</p> <p>All of the alternatives would continue the approximately 200 waste trucks/ day for the 20-year operation of the facility. Construction related truck traffic will be minimal. Soil movement to remain on-site. Waste Connections provides funds to the Municipality of Chatham-Kent for upkeep of the designated haul route so no change in impact to the transportation infrastructure is anticipated.</p> <p>All alternatives will be within the height restriction dictated by the airport, so no change in effect on the airport is anticipated.</p>	<p>○ Equally Preferred</p> <p>All of the alternatives would continue the approximately 200 waste trucks/ day for the 20-year operation of the facility. Construction related truck traffic will be minimal. Soil movement to remain on-site. Waste Connections provides funds to the Municipality of Chatham-Kent for upkeep of the designated haul route so no change in impact to the transportation infrastructure is anticipated.</p> <p>All alternatives will be within the height restriction dictated by the airport, so no change in effect on the airport is anticipated.</p>	
Ease to implement/construct and maintain/operate.	<ul style="list-style-type: none"> Anticipated complexity of construction and operation. 	<p>● Preferred</p> <p>Construction processes similar to that at the existing landfill. Operational processes similar to the existing landfill.</p>	<p>● Disadvantage</p> <p>Construction more complex than at the existing landfill due to landfill mining. Operational processes similar to the existing landfill.</p>	<p>● Preferred</p> <p>Construction processes similar to that at the existing landfill. Operational processes similar to the existing landfill.</p>	




Comparative Evaluation – Site Development Alternatives					
Environment/ Criteria	Indicators	Alternative 1 Vertical Expansion of Old Landfill, Addition of Footprint A + B	Alternative 2 Vertical Expansion of Old Landfill, Landfill Mining of Old Landfill, Addition of Footprint A + Reduced B	Alternative 3 No Vertical Expansion, Addition of Footprint A+B+C	Do Nothing
Potential for effects on existing landfill infrastructure as a result of construction.	<ul style="list-style-type: none"> Extent and type of change required to existing site facilities. 	<input type="radio"/> Equally Preferred Existing berms, stock pile and flood control facilities to the north, entrance, scale house, office remain the same for all alternatives.	<input type="radio"/> Equally Preferred Existing berms, stock pile and flood control facilities to the north, entrance, scale house, office remain the same for all alternatives.	<input type="radio"/> Equally Preferred Existing berms, stock pile and flood control facilities to the north, entrance, scale house, office remain the same for all alternatives.	
	Built Environment Ranking	Preferred – Alternative 1 has a relatively small overall footprint and is relatively easy to construct and operate.	Less Preferred – Alternative 2 also has a relatively small overall footprint but is more complex to construct and operate.	Less Preferred – Alternative 3 has a larger footprint than Alternatives 1 and 2 and is easy to construct and operate.	The designated haul route would not be required and Waste Connections would no longer pay for its maintenance and upkeep.

Comparative Evaluation – Landfill Gas Management Alternatives					
Environment/Criteria	Indicators	Alternative 1 FLARING	Alternative 2 GAS UTILIZATION – RNG	Alternative 3 GAS UTILIZATION - Electricity	Do Nothing
NATURAL ENVIRONMENT – PHYSICAL – ATMOSPHERIC					
Potential for impacts to air quality during construction and operation.	<ul style="list-style-type: none"> Relative levels of construction as an indicator of the generation of air contaminants from equipment exhaust (nitrogen oxides, sulphur dioxide and carbon monoxide). 	<p>○ Equally Preferred</p> <p>Two (2) flares are already operational with a third flare approved. Additional flares are required. Minor construction for additional flares. Minimal to no impacts to air quality anticipated.</p>	<p>○ Equally Preferred</p> <p>Any on-site construction would be minimal involving pumping gas to an off-site facility. Additional flares are required as back-up. Minimal to no impacts to air quality anticipated.</p>	<p>○ Equally Preferred</p> <p>Converting gas to electricity requires some construction which may or may not be on-site. Additional flares are required as back-up. Minimal to no impacts to air quality anticipated.</p>	
	<ul style="list-style-type: none"> Relative amount of energy required to operate facility. 	<p>○ Equally Preferred</p> <p>Operation of this alternative does not require a significant amount of energy.</p>	<p>○ Equally preferred</p> <p>The extent of energy required for operation of Alternatives 2 and 3 will depend on the specific facility, which is undefined at this time but is expected to be minimal.</p>	<p>○ Equally preferred</p> <p>The extent of energy required for operation of Alternatives 2 and 3 will depend on the specific facility, which is undefined at this time but is expected to be minimal.</p>	
Atmospheric Ranking		Equally Preferred – The difference in anticipated construction and energy use is minor.	Equally Preferred - The difference in anticipated construction and energy use is minor.	Equally Preferred - The difference in anticipated construction and energy use is minor.	The do nothing alternative is the same as Alternative 1 as it involves continued flaring of landfill gas which has minimal impact on air quality
NATURAL ENVIRONMENT – PHYSICAL – CLIMATE CHANGE					
Potential for reduction of greenhouse gas (GHG) emissions during construction and operation.	<ul style="list-style-type: none"> Qualitative assessment of the potential for GHG emissions reduction as a result of landfill gas alternatives. 	<p>● Less Preferred</p> <p>Minimal greenhouse gas (GHG) emissions remain after flaring.</p>	<p>● Preferred</p> <p>This alternative minimizes GHG emissions and has the potential for a positive impact on climate change from the offset of the use of traditional fuels.</p>	<p>● Preferred</p> <p>This alternative minimizes GHG emissions and has the potential for a positive impact on climate change from the offset of the use of traditional fuels.</p>	
Climate Change Ranking		Less Preferred – This alternative reduces GHG emissions.	Preferred - This alternative minimizes GHG emissions and has the potential for a positive impact on climate change from the offset of the use of traditional fuels.	Preferred - This alternative minimizes GHG emissions and has the potential for a positive impact on climate change from the offset of the use of traditional fuels.	The do nothing alternative is the same as Alternative 1 as it involves continued flaring of landfill gas which manages GHG emissions.

Comparative Evaluation – Landfill Gas Management Alternatives					
Environment/Criteria	Indicators	Alternative 1 FLARING	Alternative 2 GAS UTILIZATION – RNG	Alternative 3 GAS UTILIZATION - Electricity	Do Nothing
SOCIAL					
Potential for noise as a result of landfill gas management facility construction and operation.	<ul style="list-style-type: none"> Number of households in the study area who may experience noise or other disturbance. 	<input type="radio"/> Equally Preferred There are twenty-four residences within 1 km of the property boundary. Construction noise and disturbance is anticipated to be minimal given limited construction activity (two (2) construction periods at 1-2 weeks each). No off-site operational noise is anticipated with any of the alternatives.	<input type="radio"/> Equally Preferred There are twenty-four residences within 1 km of the property boundary. While specific projects for Alternatives 2 and 3 have not been defined, the level of construction is anticipated to be minimal (approximately 1-2 weeks of construction for RNG on-site equipment plus construction of flares). No off-site operational noise is anticipated with any of the alternatives.	<input type="radio"/> Equally Preferred There are twenty-four residences within 1 km of the property boundary. While specific projects for Alternatives 2 and 3 have not been defined, the level of construction is anticipated to be minimal (approximately 3-4 weeks of construction for electrical generation on-site equipment plus construction of flares). No off-site operational noise is anticipated with any of the alternatives.	
Potential for odour during construction and operation.	<ul style="list-style-type: none"> Number of potential odour sources; relative significance of odour sources (if characterization is possible), distance of odour sources to discrete receptors. 	<input type="radio"/> Equal This alternative does not add any new odour sources that would impact residents. Back-up and contingency plans would be in place to deal with any upset condition to prevent or mitigate the escape of fugitive landfill gas.	<input type="radio"/> Equal This alternative does not add any new odour sources that would impact residents. Back-up and contingency plans would be in place to deal with any upset condition to prevent or mitigate the escape of fugitive landfill gas.	<input type="radio"/> Equal This alternative does not add any new odour sources that would impact residents. Back-up and contingency plans would be in place to deal with any upset condition to prevent or mitigate the escape of fugitive landfill gas.	
Social Ranking		Equally Preferred – Flaring involves less construction and thus less potential for noise impacts on residents. No odour impacts are anticipated.	Equally preferred – Gas utilization involves minimal construction and potential for noise impacts on residents. No odour impacts are anticipated.	Equally preferred - Gas utilization involves minimal construction and potential for noise impacts on residents. No odour impacts are anticipated.	The do nothing alternative is the same as Alternative 1 as it involves continued flaring of landfill gas which has not proven to result in noise or odour impacts to neighbours.
ECONOMIC					
Potential for effect on businesses during construction and operation.	<ul style="list-style-type: none"> Number of potential odour sources and relative significance of odour sources (if characterization is possible), distance of odour sources to discrete receptors. 	<input type="radio"/> Equal This alternative does not add any new odour sources that would impact businesses. Back-up and contingency plans would be in place to deal with any upset condition to prevent or mitigate the escape of fugitive landfill gas.	<input type="radio"/> Equal This alternative does not add any new odour sources that would impact businesses. Back-up and contingency plans would be in place to deal with any upset condition to prevent or mitigate the escape of fugitive landfill gas.	<input type="radio"/> Equal This alternative does not add any new odour sources that would impact businesses. Back-up and contingency plans would be in place to deal with any upset condition to prevent or mitigate the escape of fugitive landfill gas.	










Comparative Evaluation – Landfill Gas Management Alternatives					
Environment/Criteria	Indicators	Alternative 1 FLARING	Alternative 2 GAS UTILIZATION – RNG	Alternative 3 GAS UTILIZATION - Electricity	Do Nothing
	<ul style="list-style-type: none"> Number of businesses in the study area who may experience noise or other disturbance. 	<p>○ Equally Preferred</p> <p>There are 2 businesses in the vicinity of the site. Construction noise and disturbance is anticipated to be minimal given limited construction activity (two (2) construction periods at 1-2 weeks each).</p> <p>No off-site operational noise is anticipated with any of the alternatives.</p>	<p>○ Equally Preferred</p> <p>There are 2 businesses in the vicinity of the site. While specific projects for Alternatives 2 and 3 have not been defined, the level of construction is anticipated to be minimal (approximately 1-2 weeks of construction for RNG on-site equipment plus construction of flares).</p> <p>No off-site operational noise is anticipated with any of the alternatives.</p>	<p>○ Equally Preferred</p> <p>There are 2 businesses in the vicinity of the site. While specific projects for Alternatives 2 and 3 have not been defined, the level of construction is anticipated to be minimal (approximately 3-4 weeks of construction for electrical generation on-site equipment plus construction of flares).</p> <p>No off-site operational noise is anticipated with any of the alternatives.</p>	Based on current experience, businesses in the study area do not experience noise from existing flares.
Cost of facility.	<ul style="list-style-type: none"> Approximate cost of landfill gas recovery facility. 	<p>● Preferred</p> <p>Additional expenditures associated with an expanded flare system will be minimal and can be readily estimated.</p>	<p>● Less Preferred</p> <p>The cost associated with adding flares for the expanded landfill is required for all three alternatives. Alternative 2 and 3 are anticipated to have additional costs which could be off-set depending on the third party agreement to purchase electricity or landfill gas. With unknown costs these alternatives are less preferred.</p>	<p>● Less Preferred</p> <p>The cost associated with adding flares for the expanded landfill is required for all three alternatives. Alternative 2 and 3 are anticipated to have additional costs which could be off-set depending on the third party agreement to purchase electricity or landfill gas. With unknown costs these alternatives are less preferred.</p>	This option involves no new capital or operating costs.
Economic Ranking		Preferred - None of the alternatives are anticipated to result in noise or odour impacts to businesses. This alternative involves minimal costs which are known.	Less preferred - None of the alternatives are anticipated to result in noise or odour impacts to businesses. The gas utilization alternatives are likely higher costs and without a known project and third party agreement the costs are uncertain.	Less preferred - None of the alternatives are anticipated to result in noise or odour impacts to businesses. The gas utilization alternatives are likely higher costs and without a known project and third party agreement the costs are uncertain.	The do nothing alternative involves continued flaring of landfill gas which has proven to result in no noise or odour impacts to businesses.
CULTURAL					
Potential effects to archaeological resources as a result of construction.	<ul style="list-style-type: none"> Area of undisturbed land affected by the on-site component of landfill gas management alternative. 	<p>○ Equal</p> <p>No archaeological effects are anticipated as the additional flares will be located on lands that have been identified as having no archaeological potential.</p>	<p>○ Equal</p> <p>No archaeological effects are anticipated as the additional flares and RNG on-site equipment will be located on lands that have been identified as having no archaeological potential or lands that have been cleared of archaeological potential.</p>	<p>○ Equal</p> <p>No archaeological effects are anticipated as the additional flares and electricity generation on-site equipment will be located on lands that have been identified as having no archaeological potential or lands that have been cleared of archaeological potential.</p>	
Cultural Ranking		Equal – all construction for landfill gas management will take place in areas that have been identified as previously disturbed or have been cleared of archaeological resources.	Equal – all construction for landfill gas management will take place in areas that have been identified as previously disturbed or have been cleared of archaeological resources.	Equal – all construction for landfill gas management will take place in areas that have been identified as previously disturbed or have been cleared of archaeological resources.	The do-nothing alternative is in an area that is previously disturbed and no construction is required.

Comparative Evaluation – Landfill Gas Management Alternatives					
Environment/Criteria	Indicators	Alternative 1 FLARING	Alternative 2 GAS UTILIZATION – RNG	Alternative 3 GAS UTILIZATION - Electricity	Do Nothing
BUILT					
Ease to implement/construct and maintain/operate.	<ul style="list-style-type: none"> Anticipated complexity of construction and operation. 	<p>● Preferred Alternative is easy to implement and maintain/operate.</p>	<p>● Less Preferred Landfill gas utilization is more complex than flaring as it involves more specialize equipment and coordination with a third party. Specific projects are not defined at this time.</p>	<p>● Less Preferred Landfill gas utilization is more complex than flaring as it involves more specialize equipment and coordination with a third party. Specific projects are not defined at this time.</p>	
	Built Ranking	Preferred – Flaring is a straight forward landfill gas management alternative that is completely within Waste Connections control.	Less preferred - Gas utilization opportunities will require third party agreements, and specialized technology and equipement.	Less preferred - Gas utilization opportunities will require third party agreements, and specialized technology and equipement.	The do nothing alternative involves continued use of the flaring to manage landfill gas which is straight forward to maintain/operate.

Comparative Evaluation – Leachate Treatment Alternatives					
Environment/Criteria	Indicators	Alternative 1 DIRECT DISCHARGE TO SANITARY SEWER	Alternative 2 ON-SITE PRE-TREATMENT AND DISCHARGE TO SANITARY SEWER	Alternative 3 ON-SITE FULL TREATMENT AND DISCHARGE TO SURFACE WATER	Do-Nothing
NATURAL ENVIRONMENT – BIOLOGICAL					
Potential for effect on aquatic systems during construction and operation.	<ul style="list-style-type: none"> Volume of leachate stored and/or treated on site at any one given time. Proximity to on-site watercourse/aquatic habitat 	<p> Preferred</p> <p>This alternative has minimal potential for an on-site spill or leakage from leachate storage tank. The alternative has only 1 day of untreated leachate on-site (represents existing tank with a capacity of 605 m³).</p> <p>The existing leachate storage is approximately 50 m from the nearest ditch and testing occurs prior to release to the drain which is of low aquatic habitat sensitivity.</p>	<p> Less Preferred</p> <p>This alternative retains all leachate on-site for pre-treatment and has a greater potential for accidental release of untreated or partially treated leachate to on-site watercourses. This alternative has 1 day of storage (represents existing tank with a capacity of 605 m³) and 1-2 days of pumping capacity on-site.</p> <p>The pre-treatment location would be approximately 50 m from the nearest ditch and testing occurs prior to release to the drain which is of low aquatic habitat sensitivity.</p>	<p> Less Preferred</p> <p>This alternative retains all leachate on-site for full treatment and discharge to the environment and has a greater potential for accidental release of untreated or partially treated leachate to on-site watercourses. This alternative has 1 day of storage (represents existing tank with a capacity of 605 m³) and 2-3 days of leachate within the treatment process on-site.</p> <p>The full treatment location would be at least 50 m from the nearest ditch and testing occurs prior to release to the drain which is of low aquatic habitat sensitivity.</p>	
	Biology Ranking	Preferred: Continuing to discharge leachate to the existing sanitary sewer has the least potential to impact aquatic systems during construction or operation.	Less Preferred: Pre-treatment retains leachate on-site for a period of time for treatment and has potential for an accidental release of untreated or partially treated leachate to a watercourse with some impact to fish habitat.	Less Preferred: Full treatment retains leachate on-site and has potential for an accidental release of untreated or partially treated leachate to a watercourse with some impact to fish habitat.	The do-nothing alternative would continue with the existing discharge to sanitary sewer with limited potential for aquatic impact.

Comparative Evaluation – Leachate Treatment Alternatives					
Environment/Criteria	Indicators	Alternative 1 DIRECT DISCHARGE TO SANITARY SEWER	Alternative 2 ON-SITE PRE-TREATMENT AND DISCHARGE TO SANITARY SEWER	Alternative 3 ON-SITE FULL TREATMENT AND DISCHARGE TO SURFACE WATER	Do-Nothing
NATURAL ENVIRONMENT – PHYSICAL					
Groundwater					
Potential impacts to groundwater quality during construction, operation and post closure.	<ul style="list-style-type: none"> Approximate travel time to groundwater aquifer. 	<p>○ Equally Preferred</p> <p>There is more than 30 metres of natural clay under the site and the approximate travel time to the groundwater aquifer should an operational upset, spill or leak occur is about 3000 years.</p> <p>Should an operational upset, spill or leak occur, leachate pumps can be cycled off and the landfill can contain leachate for a significant period of time to allow for effective clean up and repair.</p>	<p>○ Equally Preferred</p> <p>There is more than 30 metres of natural clay under the site and the approximate travel time to the groundwater aquifer should an operational upset, spill or leak occur is about 3000 years.</p> <p>Should an operational upset, spill or leak occur, leachate pumps can be cycled off and the landfill can contain leachate for a significant period of time to allow for effective clean up and repair.</p>	<p>○ Equally Preferred</p> <p>There is more than 30 metres of natural clay under the site and the approximate travel time to the groundwater aquifer should an operational upset, spill or leak occur is about 3000 years.</p> <p>Should an operational upset, spill or leak occur, leachate pumps can be cycled off and the landfill can contain leachate for a significant period of time to allow for effective clean up and repair.</p>	
	Groundwater Ranking	Equally Preferred: For all the alternatives, any leachate spill would take approximately 3,000 years to reach the aquifer.	Equally Preferred: For all the alternatives, any leachate spill would take approximately 3000 years to reach the aquifer.	Equally Preferred: For all the alternatives, any leachate spill would take approximately 3000 years to reach the aquifer.	If no change was made to the leachate treatment, any leachate spill would take approximately 3000 years to reach the aquifer
Surface Water					
Potential impacts to surface water quantity and quality.	<ul style="list-style-type: none"> Volume of leachate stored and/or treated on site at any one given time. Proximity to on-site watercourse. 	<p>● Preferred</p> <p>This alternative has minimal potential for an on-site spill or leakage from leachate storage tank or underground pipe as leachate is not retained on site for any length of time. The existing leachate storage is approximately 100 m from the nearest ditch/drain.</p>	<p>● Less Preferred</p> <p>This alternative retains all leachate on-site for pre-treatment and has a greater potential for accidental release of untreated or partially treated leachate to on-site watercourses. The pre-treatment location would be approximately 100 m from the nearest ditch/drain.</p>	<p>● Least Preferred</p> <p>This alternative retains all leachate on-site for full treatment and has a greater potential for accidental release of untreated or partially treated leachate to on-site watercourses. The full treatment alternative increases the quantity of water in the Duke Drain.</p>	
	Surface Water Ranking	Preferred: Continuing to discharge leachate to the existing sanitary sewer has the least potential to impact surface water and is preferred.	Less Preferred: This alternative retains all leachate on-site for a period of time and has potential for an accidental release of untreated or partially treated leachate to surface water.	Least Preferred: Full treatment has potential for an accidental release of untreated or partially treated leachate to surface water. It also increases the quantity of water released to the Duke Drain.	The do-nothing alternative would continue with the existing discharge to sanitary sewer with limited potential for aquatic impact.

Comparative Evaluation – Leachate Treatment Alternatives					
Environment/Criteria	Indicators	Alternative 1 DIRECT DISCHARGE TO SANITARY SEWER	Alternative 2 ON-SITE PRE-TREATMENT AND DISCHARGE TO SANITARY SEWER	Alternative 3 ON-SITE FULL TREATMENT AND DISCHARGE TO SURFACE WATER	Do-Nothing
Atmospheric					
Potential impacts to air quality during construction and operation.	<ul style="list-style-type: none"> Nitrogen Oxides, Sulphur Dioxide and Carbon Monoxide (together referred to as criteria air contaminants): relative levels of construction as an indicator. Relative amount of energy required to operate facility. 	<p>● Preferred</p> <p>This alternative involves no construction to impact air quality.</p> <p>The energy required to operate the infrastructure for Alternatives 1 and 2 will be relatively minimal.</p>	<p>● Preferred</p> <p>Construction Alternatives 2 will be approximately 4-6 weeks. Construction emissions would have a relatively short term impact on air quality.</p> <p>The energy required to operate the infrastructure for Alternatives 1 and 2 will be relatively minimal.</p>	<p>● Less Preferred</p> <p>Construction Alternatives 2 will be approximately 6-9 months. Construction emissions would have a relatively short term impact on air quality.</p> <p>Significantly more electrical or natural energy is required to operate a full treatment scenario.</p>	
	Atmospheric Ranking	Preferred: This alternative has no construction related air quality impacts and the energy required for operation is minimal.	Preferred: This alternative has minimal short term construction related air quality impacts and the energy for operation is minimal.	Less Preferred: This alternative has some short term construction related air quality impacts and requires significant energy for long term operation.	The do nothing alternative has no construction and requires minimal energy for operation.
Climate Change					
Potential for greenhouse gas emissions during construction and operation.	<ul style="list-style-type: none"> Relative amount of energy required to operate facility. 	<p>● Preferred</p> <p>GHG emissions similar to what occurs today will be extended over time.</p>	<p>● Preferred</p> <p>GHG emissions similar to what occurs today will be extended over time.</p>	<p>● Less Preferred</p> <p>Full treatment of leachate on-site involves a longer construction period and significant energy for operation which has higher GHG emissions.</p>	
	Climate Change Ranking	Preferred: Alternatives 1 and 2 have similar energy use to today and do not significantly change GHG emissions.	Preferred: Alternatives 1 and 2 have similar energy use to today and do not significantly change GHG emissions.	Less Preferred: The full treatment uses significant energy which results in higher GHG emissions.	The do nothing alternative maintains the existing leachate treatment system which does not significantly change GHG emissions.

Comparative Evaluation – Leachate Treatment Alternatives					
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SOCIAL					
Potential for noise/vibration impacts on residents during construction and operation.	<ul style="list-style-type: none"> Number of households in the study area who may experience noise/vibration impacts as a result of leachate treatment facility construction and operation. 	<p> Preferred</p> <p>There are twenty-four residences within 1 km of the property boundary. No households will experience noise or vibration impacts as a result of facility construction. Operational noise is expected to be minimal and fully mitigated by the existing and expanded berms. All alternatives have the same number of existing households who could potentially be impacted by noise.</p>	<p> Less Preferred</p> <p>There are twenty-four residences within 1 km of the property boundary. There is some potential for temporary noise during the 4-6 week construction of the pre-treatment infrastructure. Operational noise is expected to be minimal and fully mitigated as the pre-treatment will be enclosed and buffered by the site berms. All alternatives have the same number of existing households who could potentially be impacted by noise.</p>	<p> Least Preferred</p> <p>There are twenty-four residences within 1 km of the property boundary. There is potential for noise during the 6-9 month construction of the full treatment infrastructure. Operational noise is expected to be minimal and fully mitigated as the treatment infrastructure will be enclosed and buffered by the site berms. All alternatives have the same number of existing households who could potentially be impacted by noise.</p>	
Potential for odour during construction and operation.	<ul style="list-style-type: none"> Number of potential odour sources from leachate treatment facility construction and operation; relative significance of odour sources and relative distance of odour sources to discrete receptors. 	<p> Preferred</p> <p>Odour is not anticipated during construction of any of the alternatives.</p> <p>This alternative does not add any new odour sources. No change to existing conditions for operating lifespan of proposed expansion.</p>	<p> Less Preferred</p> <p>Odour is not anticipated during construction of any of the alternatives.</p> <p>The pre-treatment facility has some potential to be a source of odour under upset conditions.</p>	<p> Least Preferred</p> <p>Odour is not anticipated during construction of any of the alternatives.</p> <p>The on-site full treatment facility has the potential to be a source of odour under upset conditions (e.g. prolonged severe heat wave) due to the complexity of treatment that would occur on-site.</p>	
Potential for landfill traffic effect on residents during construction and operation.	<ul style="list-style-type: none"> Number of trucks during construction and number of trucks required for chemicals and disposal of residue during operation. 	<p> Equally Preferred</p> <p>There will no trucking for construction or operation. Trucking of leachate is a contingency for all three alternatives and should it be necessary approximately 14 tanker truck trips/day would be required.</p>	<p> Equally Preferred</p> <p>2 trucks per day for construction over 4-6 weeks and 2 trucks per day during operation are estimated for this alternative. This number of trucks is considered negligible given the number of waste trucks accessing the site. Trucking of leachate is a contingency for all three alternatives and should it be necessary approximately 14 tanker truck trips/day would be required.</p>	<p> Equally Preferred</p> <p>5-10 trucks per day for construction over 6-9 months and 2-5 trucks per day during operation are estimated for this alternative. This number of trucks is considered negligible given the number of waste trucks accessing the site. Trucking of leachate is a contingency for all three alternatives and should it be necessary approximately 14 tanker truck trips/day would be required.</p>	

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	Social Ranking	Preferred: This alternative will not change the potential for noise and odour impacts from what is experienced today which is minimal.	Less Preferred: This alternative results in some potential for construction noise over a short duration (4-6 weeks) and some potential for odour from leachate stored on site during upset conditions.	Least Preferred: This alternative results in the potential for construction noise over a 6-9 month duration. This alternative also has greater potential for odour from leachate during upset conditions due to the complex on-site treatment processes.	The do nothing alternative will continue the status quo which results in minimal noise or odour attributable to leachate treatment.
ECONOMIC					
Potential for effect on businesses during construction and operation.	<ul style="list-style-type: none"> Number of potential odour sources and relative significance of odour sources. Number of trucks during construction and number of trucks required for chemicals and disposal of residue during operation. 	<p>Preferred</p> <p>No change to the number of odour sources at the site during operation. Odour is not anticipated for any of the alternatives during construction.</p> <p>No truck traffic associated with Alternative 1 construction or operation. Trucking of leachate is a contingency measure for all alternatives.</p>	<p>Less Preferred</p> <p>Alternatives 2 and 3 have some potential for odour during upset conditions. Odour is not anticipated for any of the alternatives during construction.</p> <p>On-site facility construction will result in some construction trucks as well as ongoing delivery of treatment products. Trucking of leachate is a contingency measure for all alternatives.</p>	<p>Less Preferred</p> <p>Alternatives 2 and 3 have some potential for odour during upset conditions. Odour is not anticipated for any of the alternatives during construction.</p> <p>On-site facility construction will result in some construction trucks as well as ongoing delivery of treatment products. Trucking of leachate is a contingency measure for all alternatives.</p>	
Cost of facility.	<ul style="list-style-type: none"> Approximate cost of leachate treatment facility alternative. 	<p>Preferred</p> <p>No facility construction; no construction cost.</p>	<p>Less Preferred</p> <p>Approximately \$3-5 Million for construction of a pre-treatment facility plus the addition of some operations staff time commitment.</p>	<p>Least Preferred</p> <p>Approximate range of \$15-20 Million for construction of a full-treatment facility and associated infrastructure, plus a full time staff compliment.</p>	
	Economic Ranking	Preferred: This alternative has minimal potential for impact to businesses and no cost to implement.	Less Preferred: This alternative has some potential for odour impact to businesses during upset conditions and a significant construction cost of \$3-5 million.	Least Preferred: This alternative has the greatest potential for odour disruption to businesses during upset conditions and a very significant construction cost of \$15-20 million.	The do nothing alternative has no potential impact to businesses beyond what is currently experienced which is minimal and no cost.

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CULTURAL					
Potential effects to archaeological resources as a result of construction.	<ul style="list-style-type: none"> Area of undisturbed land affected by the on-site component of the leachate treatment alternative. 	<p>○ Equally Preferred</p> <p>The lands in the vicinity of the current leachate storage and pump location have been identified as having no archaeological potential.</p>	<p>○ Equally Preferred</p> <p>A pre-treatment facility would be constructed in an area that has been cleared of archaeological potential.</p>	<p>○ Equally Preferred</p> <p>A full treatment facility would be constructed in an area that has been cleared of archaeological potential.</p>	
	Cultural Ranking	Equally Preferred: Alternative 1 involves no construction or disturbance to land and has no archaeological impact.	Equally Preferred: Alternatives 2 and 3 would be constructed in an area that has no archaeological potential or will be cleared prior to construction.	Equally Preferred: Alternatives 2 and 3 would be constructed in an area that has no archaeological potential or will be cleared prior to construction.	The do nothing alternative involves no construction or disturbance to land and has no archaeological impact.
BUILT					
Potential effects on existing transportation infrastructure and transportation operation.	<ul style="list-style-type: none"> Anticipated number of trucks required. 	<p>○ Equally Preferred</p> <p>There will no trucking for construction or operation and no impact on transportation infrastructure or operation.</p> <p>Trucking of leachate is a contingency for all three alternatives and should it be necessary approximately 14 tanker truck trips/day would be required.</p>	<p>○ Equally Preferred</p> <p>2 trucks per day for construction over 4-6 weeks and 2 trucks per day during operation are estimated for this alternative. This number of trucks is considered negligible given the number of waste trucks accessing the site and no significant impact on transportation infrastructure or operation is anticipated.</p> <p>Trucking of leachate is a contingency for all three alternatives and should it be necessary approximately 14 tanker truck trips/day would be required.</p>	<p>○ Equally Preferred</p> <p>5-10 trucks per day for construction over 6-9 months and 2-5 trucks per day during operation are estimated for this alternative. This number of trucks is considered negligible given the number of waste trucks accessing the site and no significant impact on transportation infrastructure or operation is anticipated.</p> <p>Trucking of leachate is a contingency for all three alternatives and should it be necessary approximately 14 tanker truck trips/day would be required.</p>	
Ease to implement/construct and maintain/operate.	<ul style="list-style-type: none"> Anticipated complexity of construction and operation. 	<p>● Preferred</p> <p>No facility construction; alternative similar to existing and is straightforward to implementation and operation.</p>	<p>● Less Preferred</p> <p>Pre-treatment facility construction requires somewhat specialized construction, and licensed operator to maintain/operate.</p>	<p>● Least Preferred</p> <p>Full treatment facility construction extremely complex and requires full staff complement licensed operators to maintain/operate. In addition, the regulatory requirements associated with securing permits and approvals to discharge treated effluent to the environment would severely limit the proponent's ability to manage leachate from the site</p>	

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	Built Ranking	Preferred: This alternative represents a continuation of existing operation and is considered straightforward to operate.	Less Preferred: This alternative involves a new process step at the landfill and is more complex than the current leachate treatment.	Least Preferred: Full treatment on-site is the most complex requiring a full complement of trained staff.	The do nothing alternative is status quo and straightforward to operate.