

WELCOME

to the Fourth Series of Open Houses
Residual Waste Disposal Strategy



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Today you will learn about:

Environmental Assessment (EA) for Proposed W12A Landfill Expansion, including:

- The EA Process
- Details about the proposed landfill expansion alternative
- Results from various impact assessment studies (e.g. groundwater, air quality, etc.)
- Next steps in the approval process
- How you can be involved, stay informed and provide feedback



City staff and project consultants are available to answer your questions and discuss the information presented.

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The Proposed Project



Expansion of the W12A Landfill is the overall preferred way to meet London's future waste management planning needs. This is based on the conclusion of a previous waste management planning study.

The Proposed Project includes:

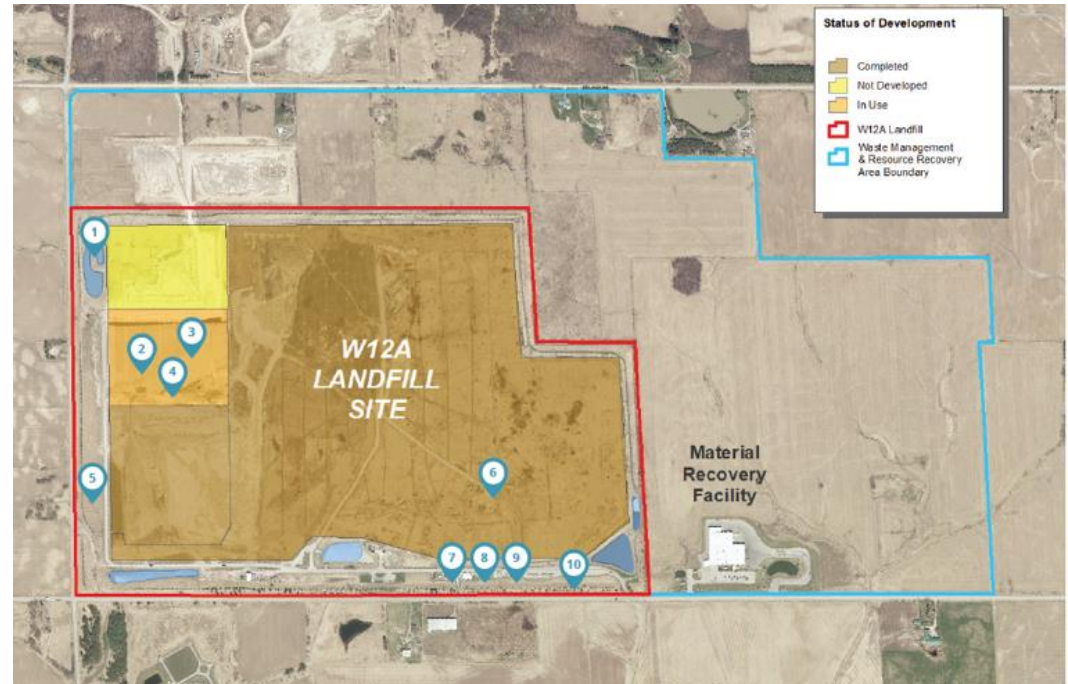
- Expansion of the W12A Landfill (the subject of this EA) within a portion of the Waste Management & Resource Recovery Area
- The landfill expansion alternatives have been compared and a vertical expansion of the existing landfill is the preferred alternative
- Development of a Resource Recovery Strategy to maximize waste reduction, reuse, recycling, composting and resource recovery in an economically viable and environmentally responsible manner



W12A Landfill - Site Features

Approximately 9,000,000 tonnes of waste has been disposed of since 1977

- Current approved waste fill area is 107 hectares
- Average height of 9 to 12 metres above ground
- Has room for another 1,000,000 tonnes of waste
- Expected to reach capacity in 2024





W12A Landfill –Site Features

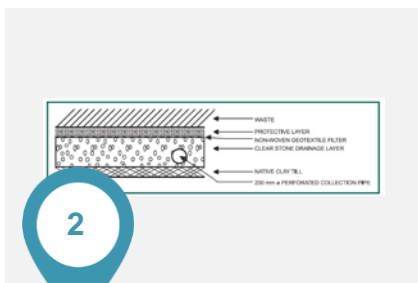
Stormwater Management Ponds



1

- 4 ponds
- Provides flow control (flooding) and quality control (sediment removal)

Leachate Collection System



2

- Leachate is water that has come into contact with the garbage
- More than 10 kilometres of leachate collection pipe and more than 200,000 tonnes of clear stone (drainage layer) installed to date

Portable Litter Fence



3

- Placed close to where garbage is dumped (tipping face)
- Moved based on wind direction

Fill Area



4

- Areas where garbage is placed
- Covered with 150 millimetres of material (e.g. soil) at the end of each day



W12A Landfill –Site Features

Perimeter Litter Fence & Vegetation Berm



- 2 kilometres of perimeter litter fence
- 4 kilometres of berms

Landfill Gas Collection System



- 70 landfill collection wells
- More than 5 kilometres of gas collection pipe installed to-date

Landfill Gas Flare



- Flares 1,000 to 1,500 cubic feet (28 to 42 cubic metres) per minute of landfill gas
- Greenhouse gas destroyed equivalent to removing 26,000 to 40,000 cars from London's roads

Household Special Waste Depot



- 8,000 to 12,000 visitors per year
- 350,000 to 450,000 litres collected per year for off-site recycling/disposal



W12A Landfill –Site Features

Public Drop-Off Depot



- 8,000 to 12,000 visitors per year
- 3,000 to 4,000 tonnes/year collected for composting and recycling

Leachate Pumping Station



- Manages 150,000 to 220,000 cubic metres of leachate per year
- Sends leachate to Greenway Wastewater Treatment Plant to be treated



W12A Landfill – Environmental Monitoring



Private Well Monitoring

15 water wells sampled
annually

Tested in accordance with
the Ministry of the
Environment, Conservation
and Parks regulations and
requirements

There have been no impacts
to the private wells identified



Groundwater Monitoring

25 groundwater monitoring
wells sampled 3 times
per year

Tested in accordance with
the Ministry of the
Environment, Conservation
and Parks regulations and
requirements

There have been no impacts
to the groundwater identified



Surface Water Monitoring

6 drainage ditches and
4 stormwater
management ponds

Sampled 4 times per year
Tested in accordance with
the Ministry of the
Environment, Conservation
and Parks regulations and
requirements

W12A Landfill – Environmental Monitoring



Landfill Gas Monitoring

2 on-site landfill gas
monitoring wells

Monitored 4 times per year



Leachate Monitoring

3 leachate monitoring wells
sampled 3 times per year

1 pumping station sampled
monthly

Tested in accordance with
the Ministry of the
Environment, Conservation
and Parks regulations and
requirements



Other Monitoring

Odour

Slope inspections

Litter

Weather station



Addressing Landfill Concerns



Property Values

Current Mitigative Measures

Property value protection plan
Community enhancement fund



Traffic

Current Mitigative Measures

Roadway improvements as required
Dedicated haul routes



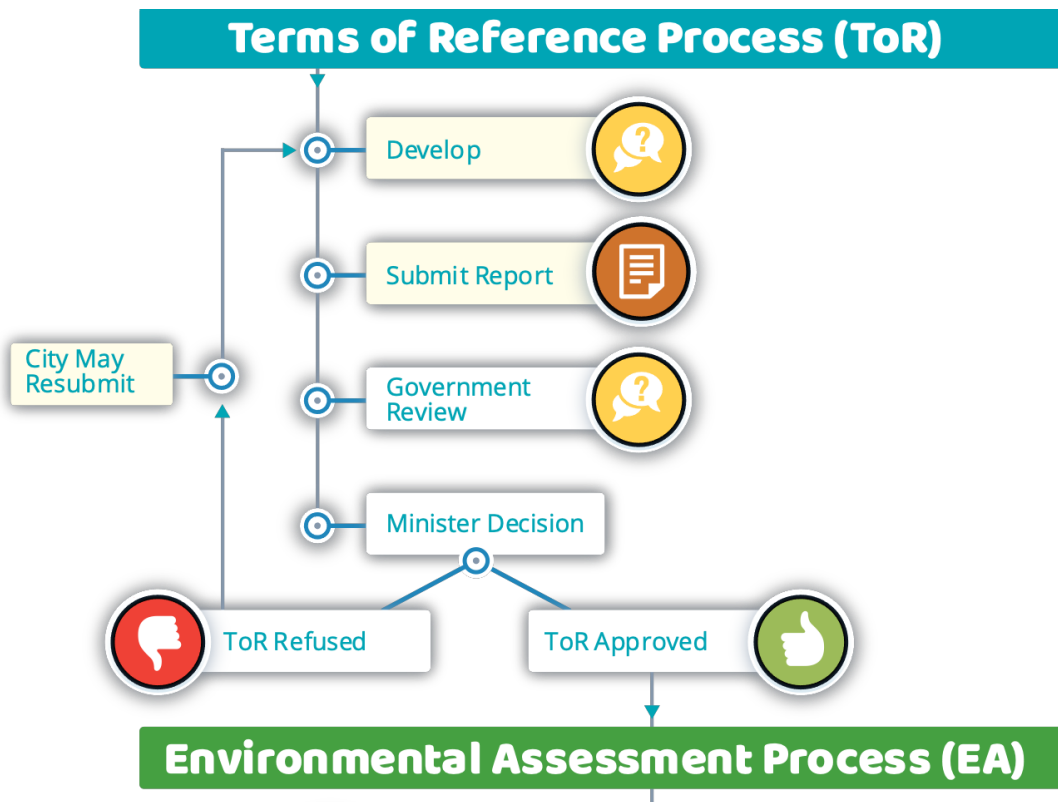
Visuals

Screening berms

Plant vegetation around perimeter



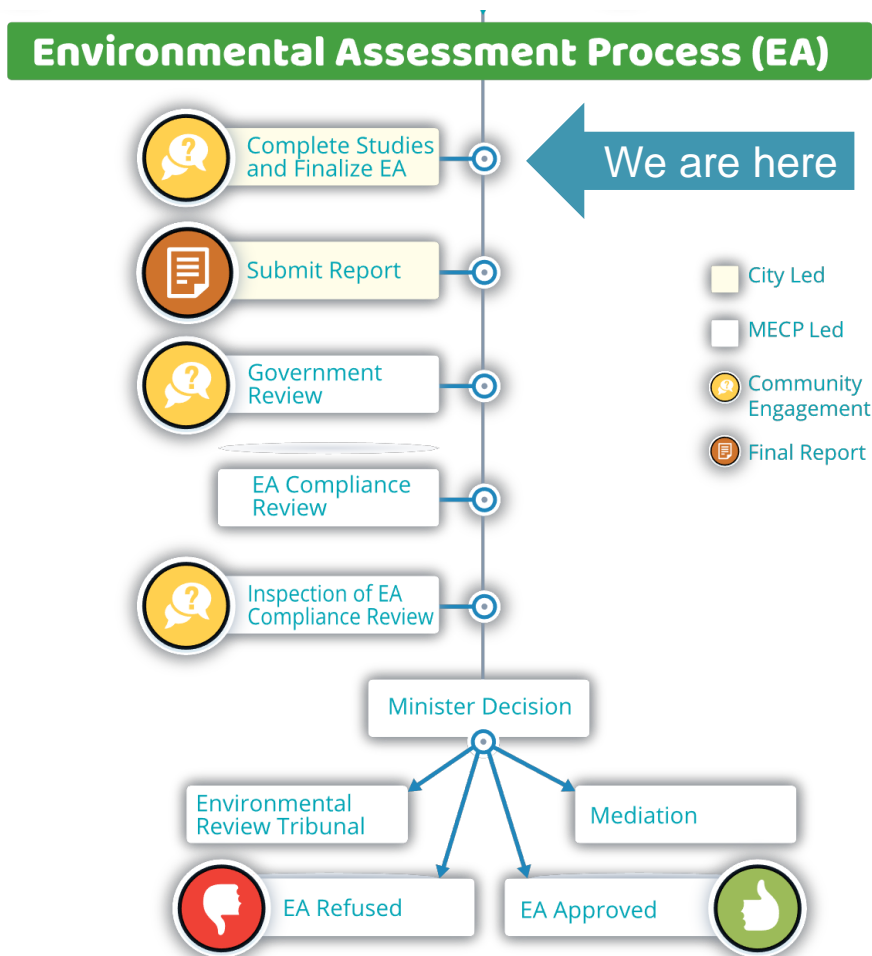
Timeline: Environmental Assessment Process



(continued)



Timeline: Environmental Assessment Process





Complete Studies and Finalize EA

Steps	Status
1. Characterize the existing environmental conditions	Complete
Work Plans online for review and comment Indigenous community review	
2. Identify the alternatives for landfill expansion (and incorporate conceptual design mitigation measures)	Complete
3. Evaluation of alternatives	Complete
4. Comparison of the alternatives for landfill expansion for each component of the environment and then identify the overall preferred alternative for landfill expansion	Complete
Open House #3 – February 2020 Indigenous community review	
5. Refine the mitigation measures and determine the net effects on the environment of the preferred alternative for landfill expansion	Complete
6. Describe the preferred alternative for landfill expansion	Complete
Open House #4 – Today	
7. Consideration of climate change	90% Complete
8. Cumulative impact assessment	90% Complete
9. Preparation of the EA Study Report	Started, to be completed
Various opportunities will be available to comment on the EA Study Report through the City and the Ministry of Environment, Conservation and Parks (MECP)	



Website
getinvolved.london.ca



Meetings
W12A Landfill PLC, Waste
Management CLC,
Waste Management
Working Group

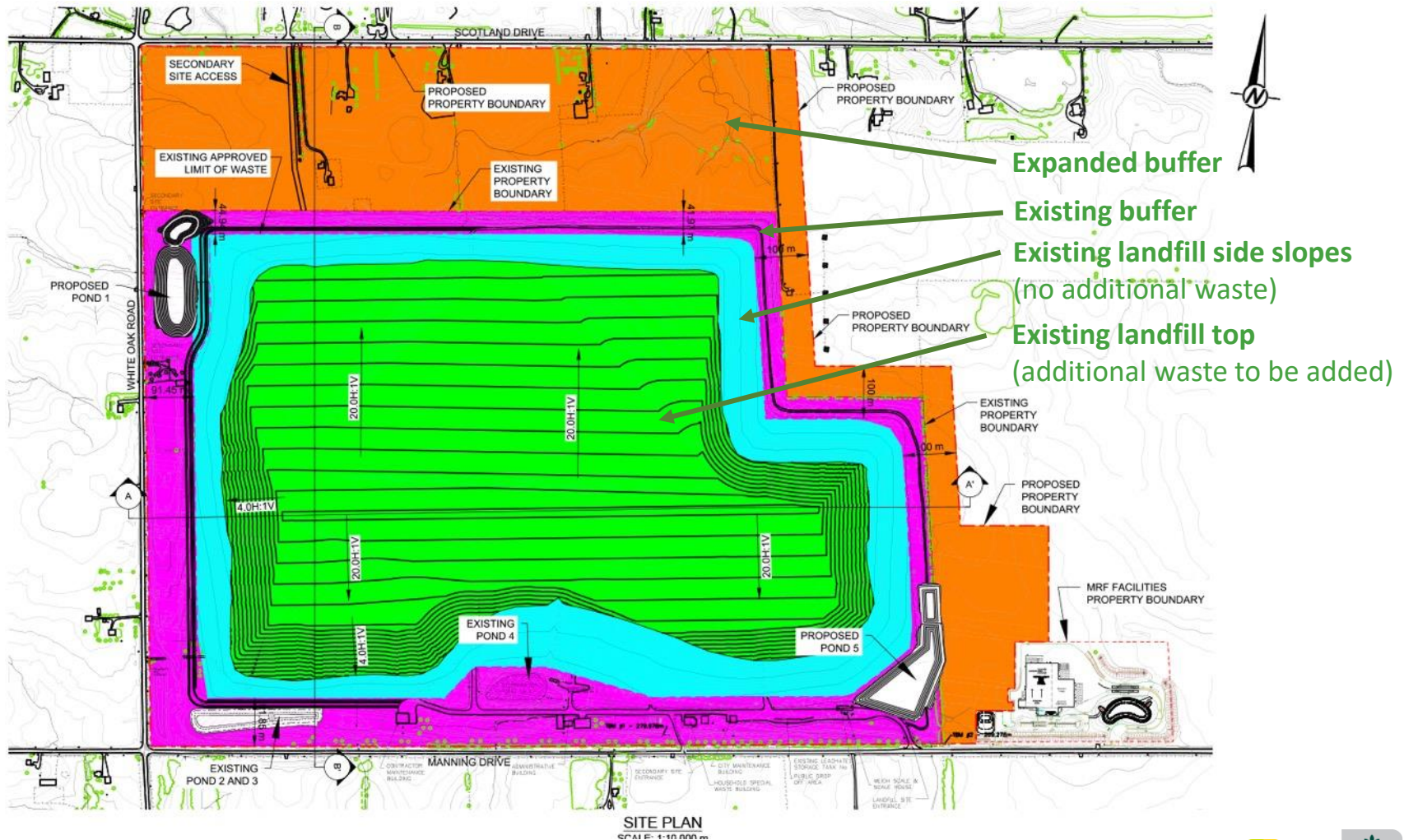


Meet with residents
(if requested)

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Proposed Expansion Design - Vertical Expansion Over Existing Footprint



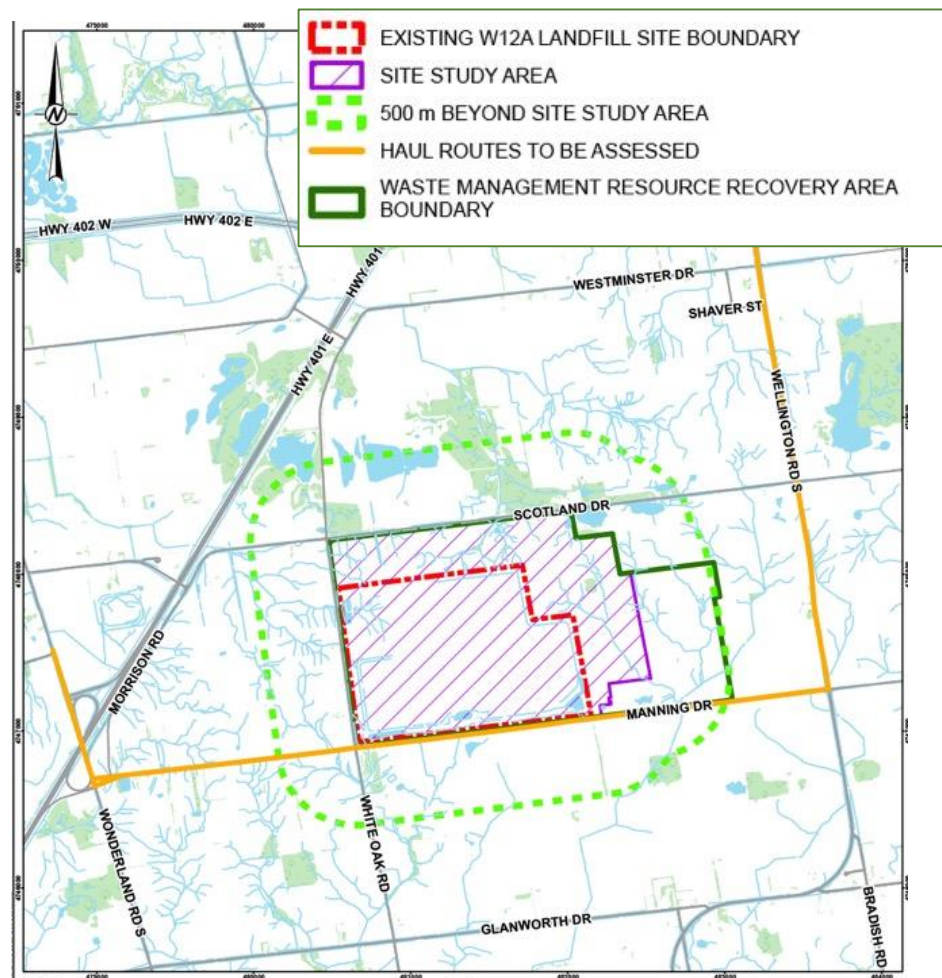


Proposed Expansion Design - Vertical Expansion Over Existing Footprint

- Approximately doubles capacity (additional 13.8 million m³ of airspace, 9.8 million tonnes)
- Highest part of landfill approximately 43 m above ground elevation (about 14 storeys high)
- On-site buffer land increased to the north (Scotland Drive) and east (minimum of 100 m)
- Reasons for selecting this alternative include:
 - Most protection to groundwater quality off-Site
 - Best alternative to limit odours
 - Least modifications required for stormwater management systems
 - Least potential for air quality, archaeology, agricultural land, terrestrial and aquatic ecosystems, community, noise and land use impacts
 - Lowest cost alternative

Study area for impact assessments was 500 m except for:

- Odour study extends 1.5 km from Site Study Area
- Visual study area extends 5 km from Site Study Area
- Surface water study area extends to drainage boundaries of sub-watersheds
- Cultural heritage study area extends to all parcels within, and adjacent to, the Site Study Area (approximately 500 m)



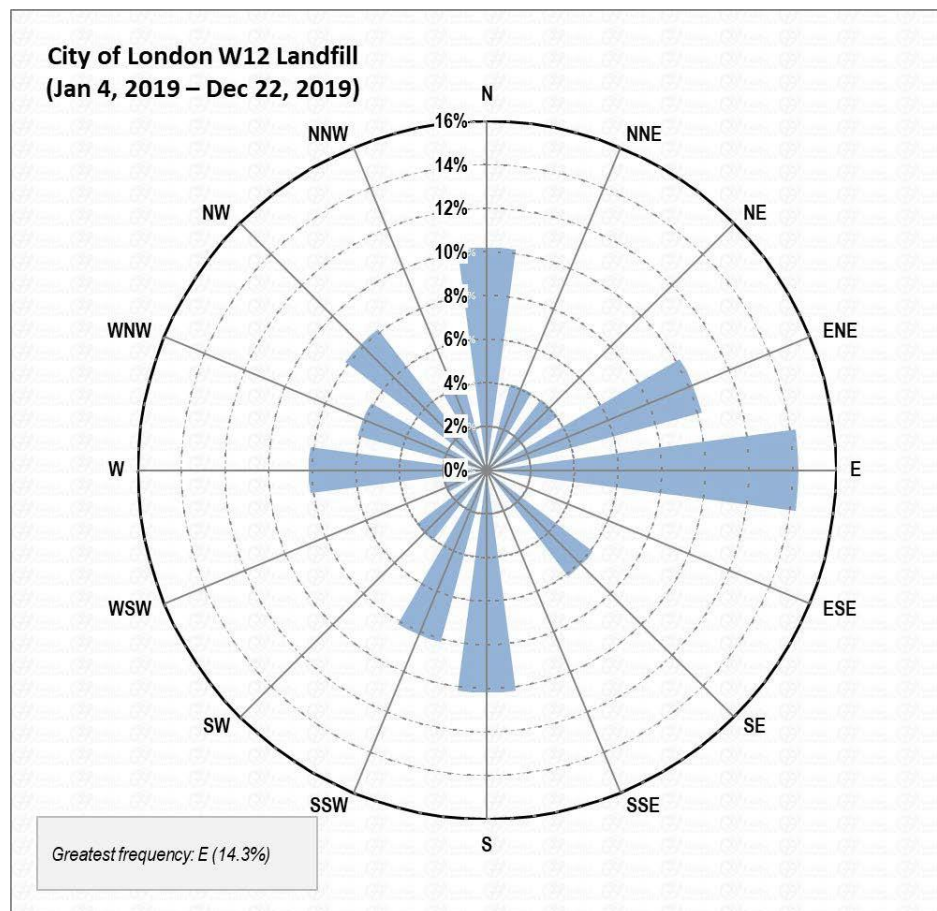


Atmosphere – Air and Odour Impact Assessment

Existing Conditions

- Existing background air quality from Provincial monitoring stations meets applicable Ontario criteria
- 7 sensitive receptor locations have been identified within 500 m of the Site

**Odour Rose for 2019 Odour Complaints
Potentially Attributed to W12A Landfill**

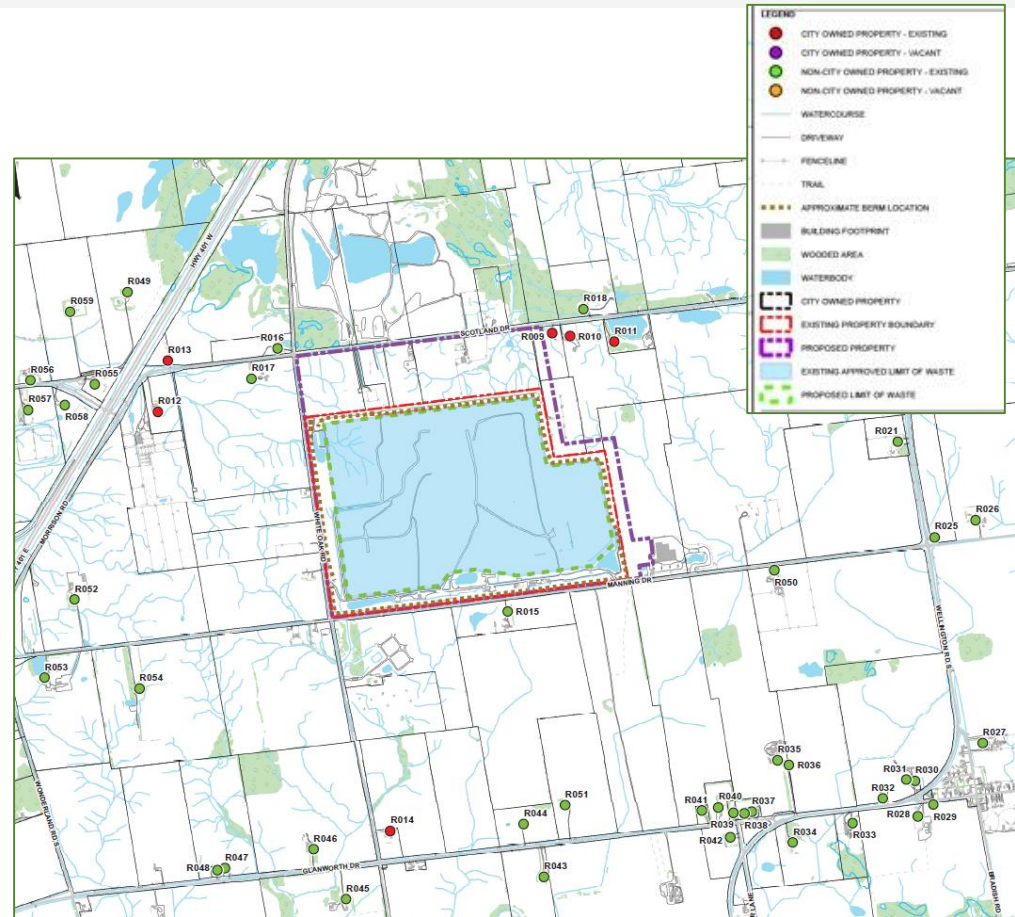




Atmosphere – Air and Odour Impact Assessment

Assessment Methods

- Air quality and odour emissions were simulated with an advanced atmospheric dispersion model (AERMOD)
- Indicator compounds modelled were:
 - Suspended particulate matter
 - Combustion gases
 - Other Indicator Compounds (hydrogen sulphide, vinyl chloride and odour)
- Typical best management operational practices and mitigation will be in place (e.g., dust suppression, speed limits enforced)





Atmosphere – Air and Odour Impact Assessment

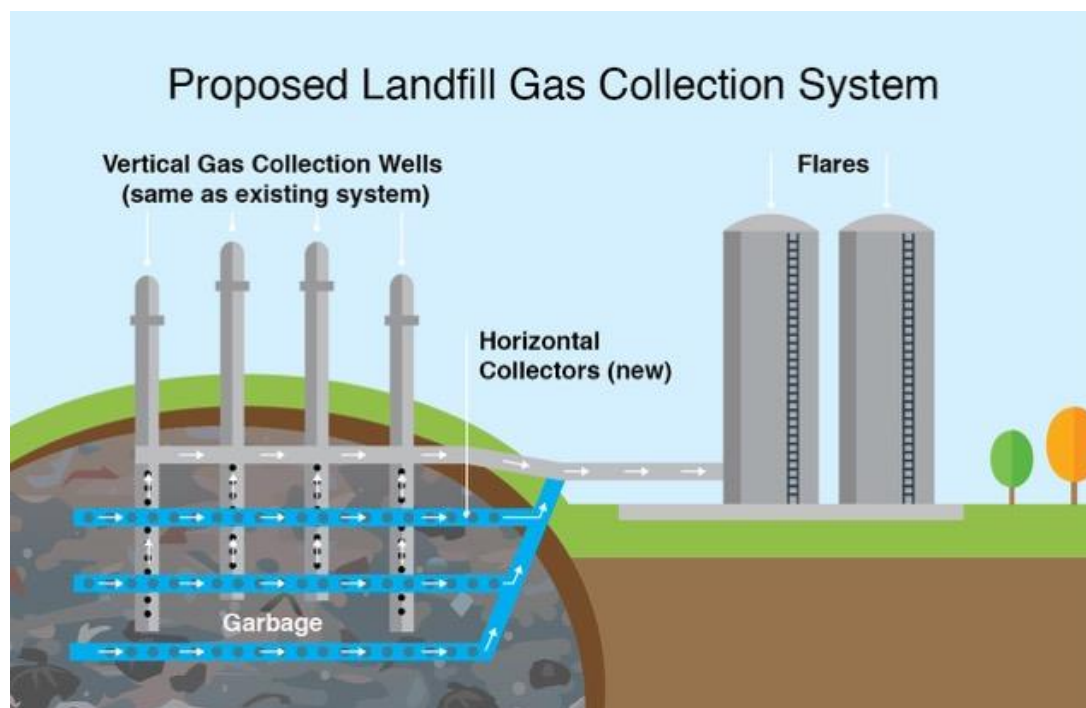
Addressing Predicted Impacts of the Proposed Expansion

- Air quality and odour associated with the expansion are predicted to meet relevant Ontario Regulations at sensitive receptors

Mitigation and Monitoring

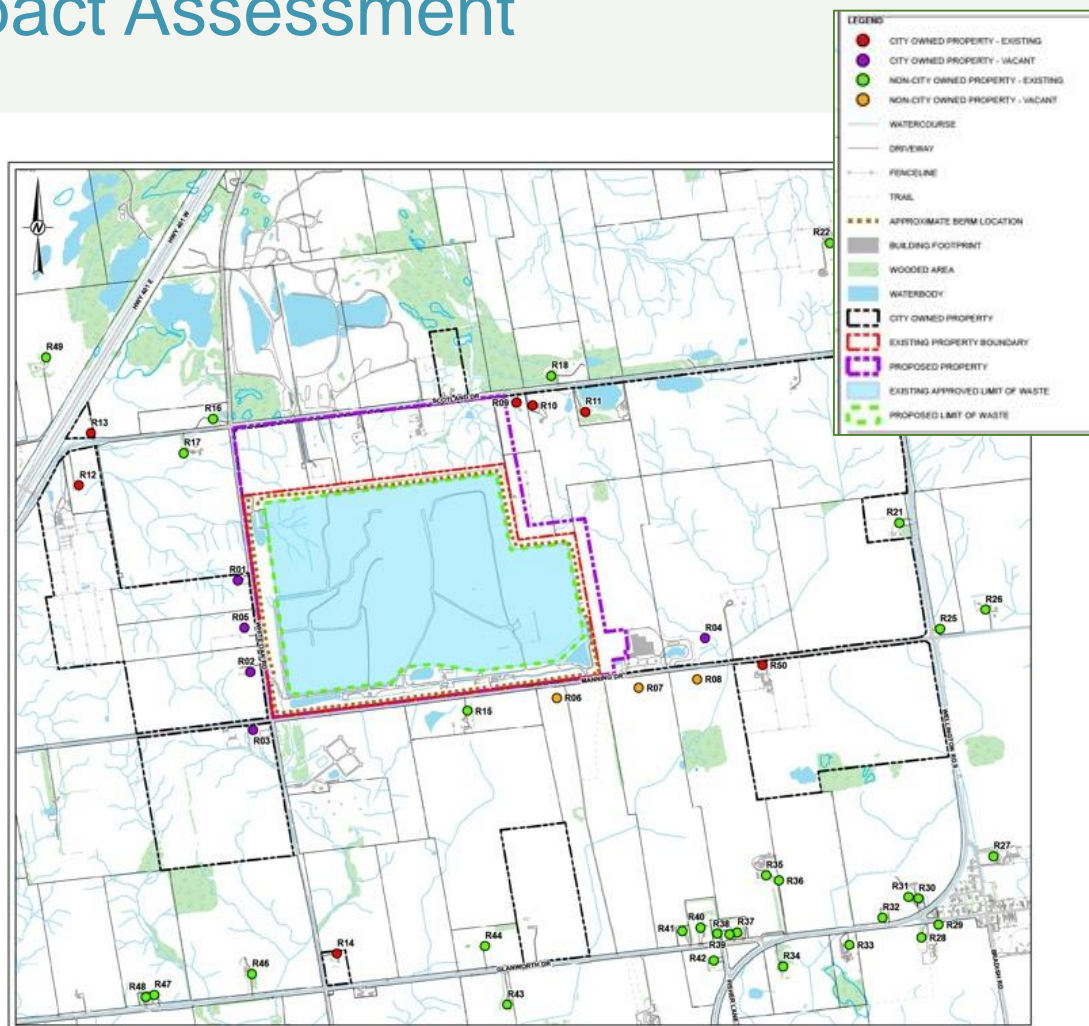
- Follow-up one-time monitoring program for air quality and odour to validate model
- Review and update existing odour management plan and complaints response protocol
- Develop new fugitive dust management plan

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Existing Conditions

- Existing noise levels are influenced by landfill operations, ancillary and emergency equipment (e.g., backup generators), traffic
- 11 noise-sensitive receptors were identified within 500 m of the Site
- Existing noise levels measured at 10 locations

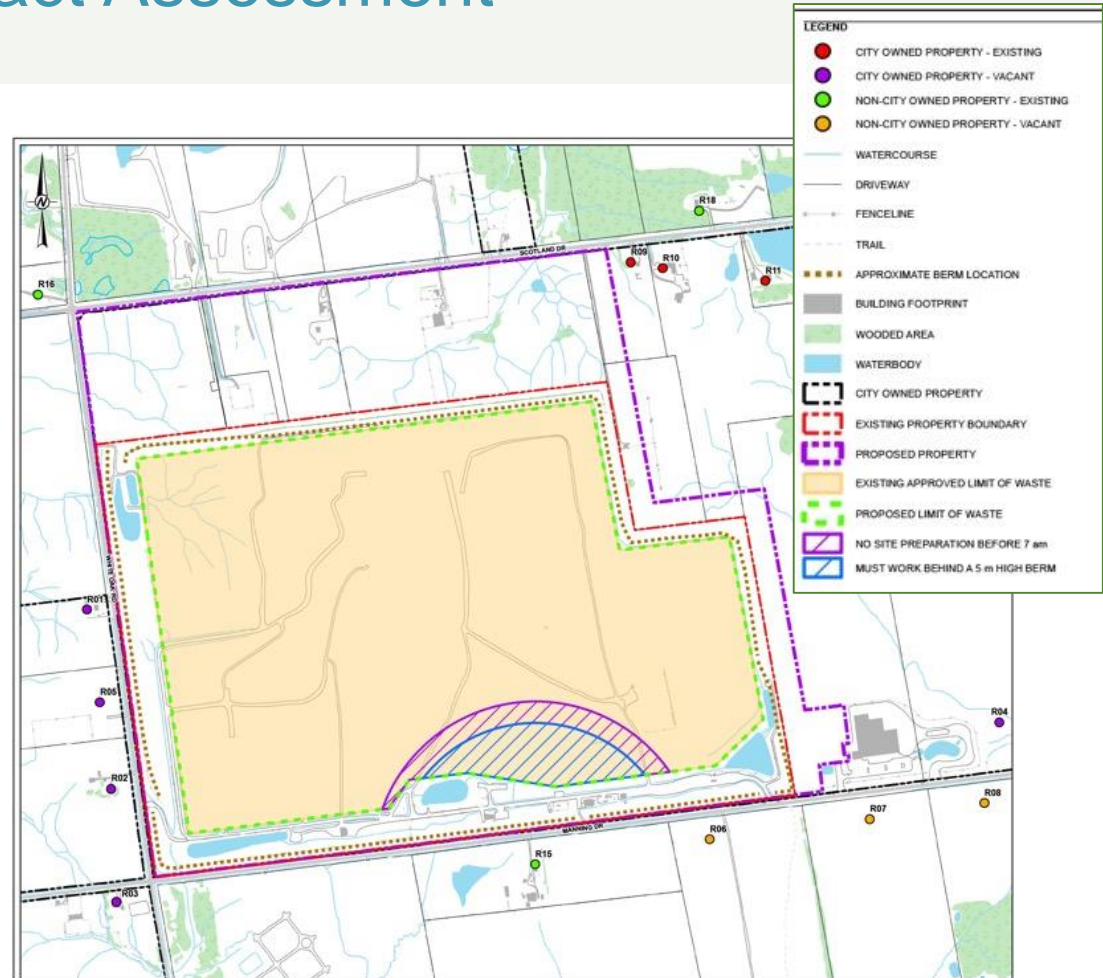




Atmosphere – Noise Impact Assessment

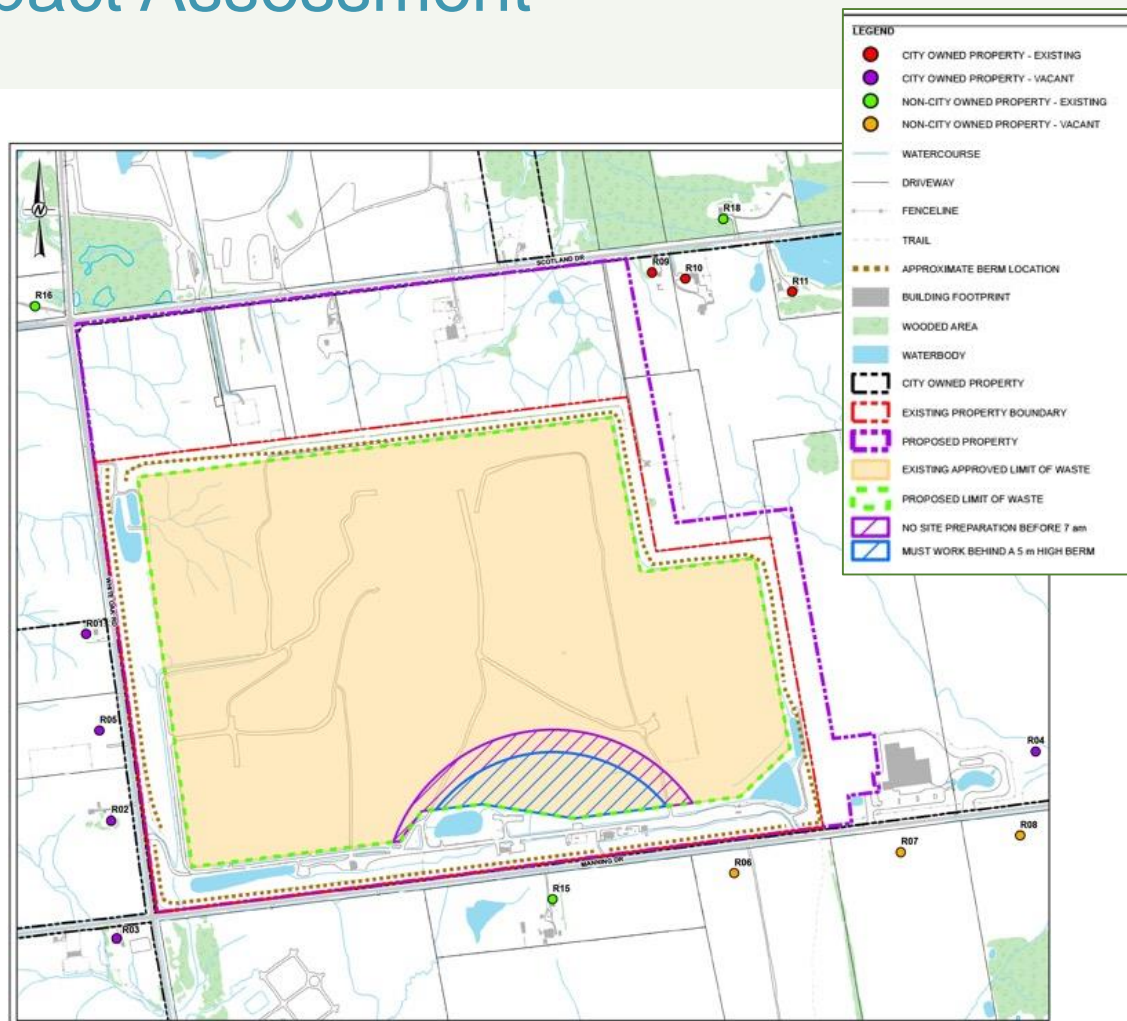
Assessment and Addressing Predicted Impacts of the Proposed Expansion

- Additional on-Site noise mitigation required for landfill operations within 330 m of an off-Site noise sensitive receptor
- Ancillary equipment and emergency equipment are expected to operate below the NPC-300 sound level limits
- Change in traffic noise levels between existing landfill and proposed landfill expansion is insignificant to noticeable; this is considered an acceptable change



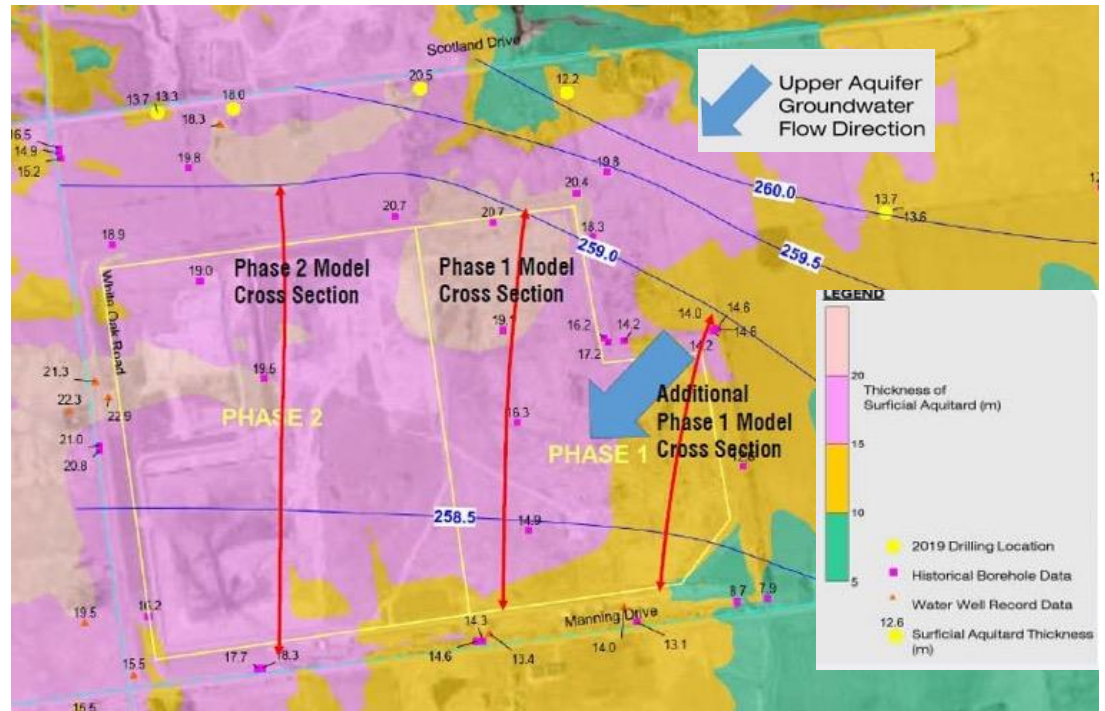
Mitigation and Monitoring

- Only one residence within 330 m of landfill operations; working in this area will require berms to act as sound barriers
- Follow-up noise monitoring program is recommended when landfill operations are within 330 m of an off-Site noise sensitive receptor



Existing Conditions

- The Surficial Aquitard (clay soils) protects groundwater beneath the Site
- The upper approximately 3 m of the Surficial Aquitard has fractures that have the potential to allow increased flow and hence increased impacts to groundwater
- Groundwater flows toward the southwest
- Existing groundwater meets MECP water quality guidelines for landfills (Reasonable Use Guideline)





Geology and Hydrogeology Impact Assessment

Assessment Methods

- The POLLUTE model was used to evaluate potential groundwater impacts
- Key water quality parameters were evaluated including chlorides (most likely parameter to exceed water quality guidelines)
- Model assumed upgrades to perimeter leachate collection system in older part (eastern half) of the landfill

Addressing Predicted Impacts of the Proposed Expansion

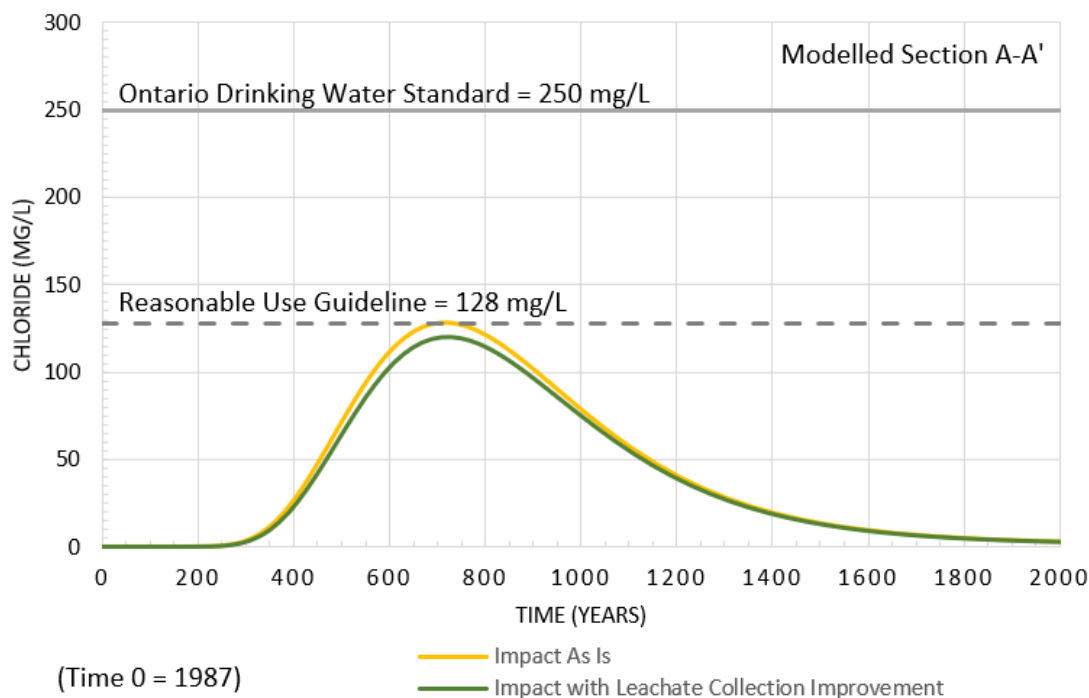
- All parameters and conditions modelled met the required water quality guidelines for landfills except chloride in the older part of the landfill
- Chloride (aesthetic parameter) was predicted to be 129 mg/L in about 700 years
- Drinking water standard is 250 mg/L; water quality guideline for landfills is 128 mg/L



Geology and Hydrogeology Impact Assessment

Mitigation and Monitoring

- Additional mitigation (using the horizontal landfill gas collectors to collect additional leachate) is expected to result in meeting the water quality guideline for landfills. Additional mitigation cost estimated to be \$5,000,000
- Annual groundwater monitoring program (similar to existing program)

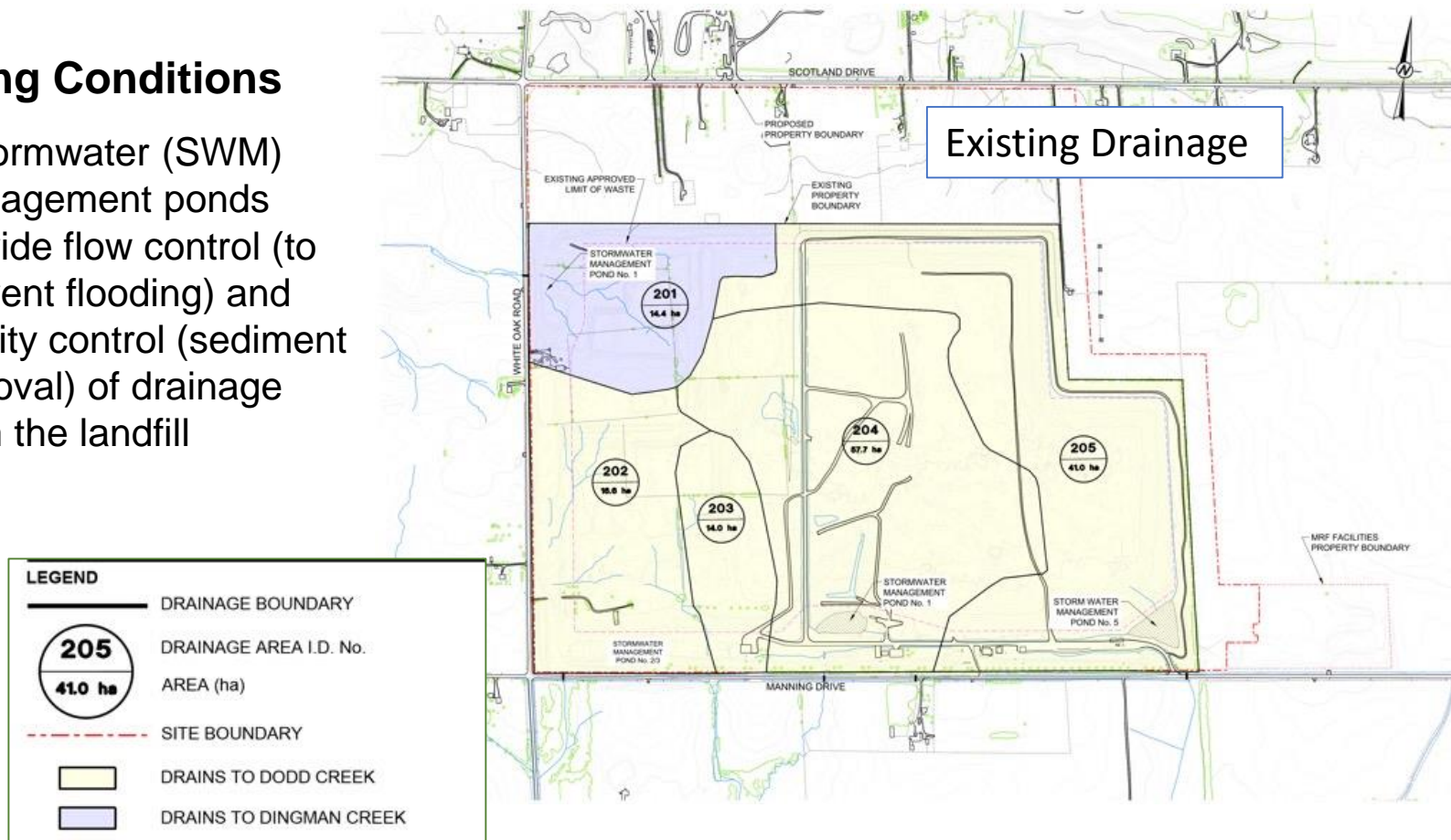




Surface Water Impact Assessment

Existing Conditions

- 4 stormwater (SWM) management ponds provide flow control (to prevent flooding) and quality control (sediment removal) of drainage from the landfill



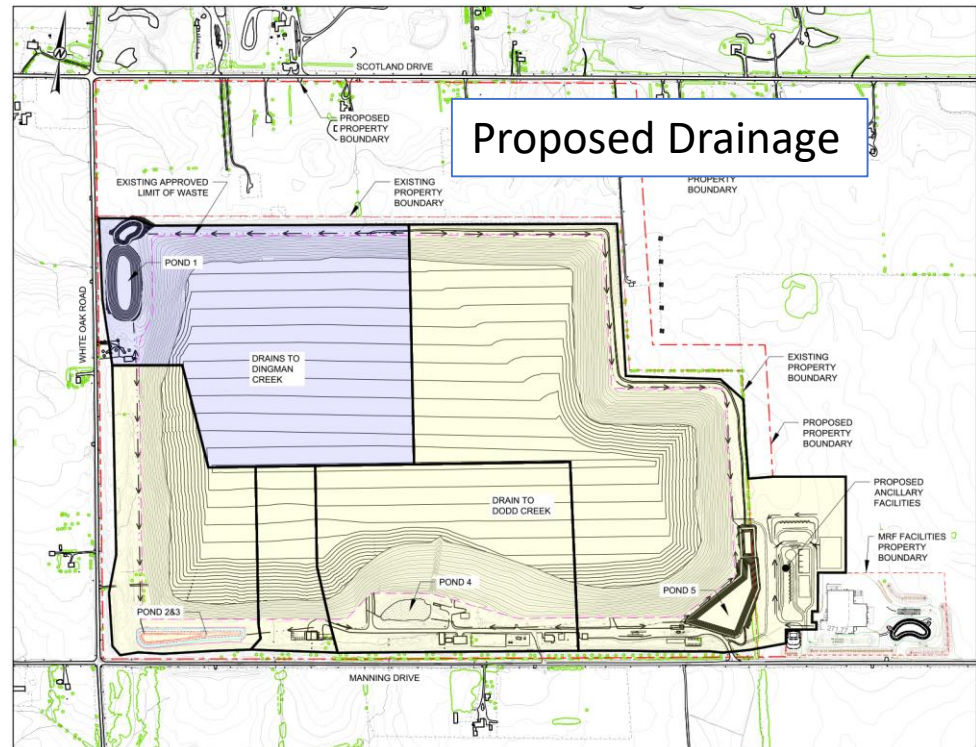


Surface Water Impact Assessment

Assessment Methods

Designed such that:

- Waste related activities and leachate are isolated from surface drainage
- Surface drainage and SWM ponds protect water quality and limit peak water quantity leaving the Site
- Runoff scenarios were assessed with the Visual Otthymo model





Surface Water Impact Assessment

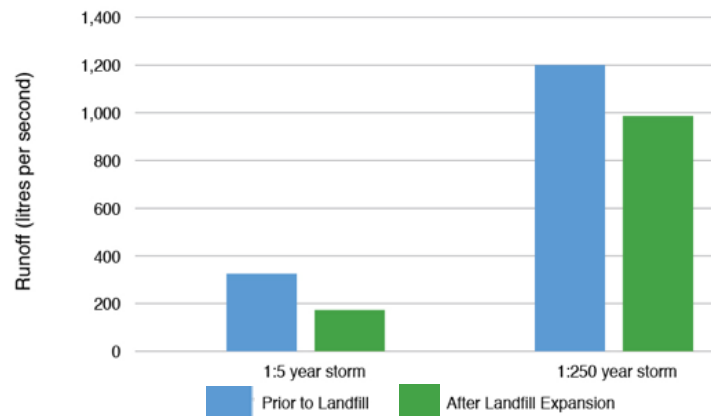
Addressing Predicted Impacts of the Proposed Expansion

- Improved sediment removal at SWM Ponds (80% for all SWM Ponds; existing SWM Ponds provide 70 to 80% removal)
- No adverse impacts from changes to subwatershed areas

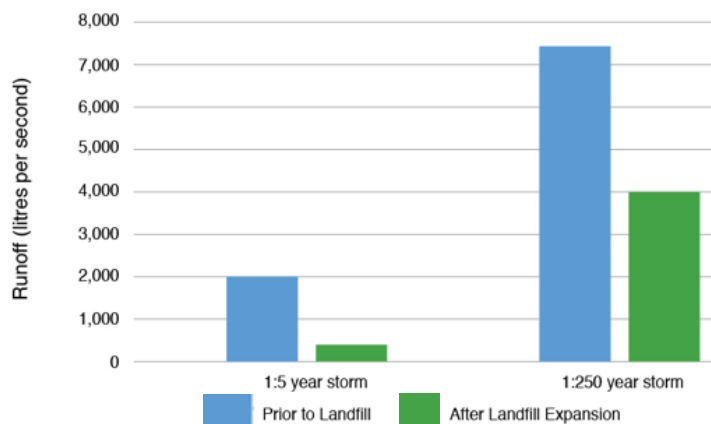
Mitigation and Monitoring

- Annual surface water monitoring program (similar to existing program)

Dingman Creek - Peak Stormwater Runoff

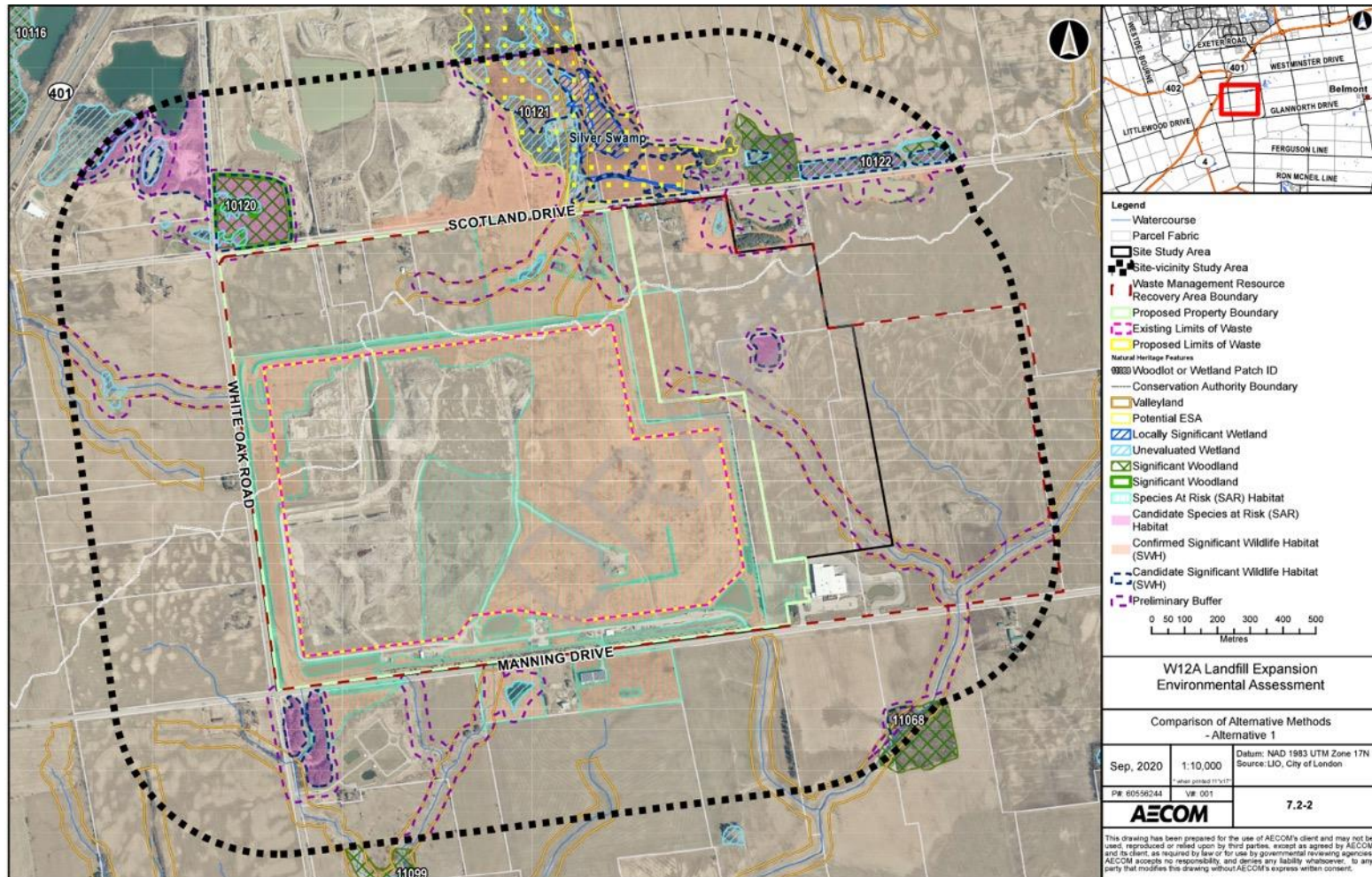


Dodd Creek - Peak Stormwater Runoff





Biology Impact Assessment





Biology Impact Assessment



Existing Conditions

- Silver Swamp Locally Significant Wetland is located within the Site-vicinity Study Area
- 4 provincially listed Species at Risk (3 bird species and Monarch butterfly) were observed within the Site and Site-vicinity Study Areas

Assessment Methods

- Potential adverse effects on the terrestrial and aquatic environment were assessed using both quantitative and qualitative methods
- Indirect effects assessed based on results from other component study teams, i.e., air, noise, groundwater, surface water



Biology Impact Assessment

Addressing Predicted Impacts of the Proposed Expansion

- No direct impacts to aquatic species or habitat are anticipated
- Potential indirect impacts to aquatic ecosystems resulting from a reduction in the volume of surface water drainage to Dodd Creek
- Direct impacts to habitat for Monarch and Species at Risk grassland birds (Bobolink and Eastern Meadowlark)
- No direct impacts to habitat for other species identified during field investigations

Eastern
Meadowlark



Bobolink



Mitigation and Monitoring

- A detailed Environmental Mitigation and Monitoring Plan (EMMP), Construction Monitoring Plan, and Species at Risk and Wildlife Observation Protocol will be developed to minimize impacts during construction and operation
- Compensation for habitat loss will be developed in consultation with the MECP for Bobolink and Eastern Meadowlark

Eastern
Meadowlark



Bobolink





Land Use and Agriculture Impact Assessment

Existing Conditions

The following provides a characterization of land uses in the vicinity of the existing W12A Landfill site:

- **North:** Small area of soybeans between the existing landfill berm and Scotland Dr.; remaining lands in this area are considered fallow and hilly; 2 aggregate pits and soybean and corn production on the north side of Scotland Dr.; 5 rural residential dwellings
- **East:** The City of London Material Recovery Facility; remaining lands actively used for conventional cash crop production (corn, soybeans, wheat rotation); 3 rural residential dwellings
- **South:** Livestock operation south of Manning Dr.; large agricultural parcels with conventional cash crop production (corn); 1 rural residential dwelling; the Islamic Cemetery of London
- **West:** Lands are primarily comprised of large agricultural parcels used for cash crops (soybeans); 2 rural residential dwellings



Land Use and Agriculture Impact Assessment

Assessment Methods

- Review relevant policy documents, plans, mapping, aerial imagery, inventories, etc.

Addressing Predicted Impacts of the Proposed Expansion

- No impacts to degree of agriculture investment, soil capability or agriculture system
- Some loss of non-productive lands at the Site to the north and minimal loss of productive lands at the Site to the east
- No loss of agriculture land base in the Site-vicinity Study Area
- It is unlikely that any new sensitive land uses would be developed within or near the Site-vicinity Study Area within the 2035 planning horizon. Accordingly, the proposed landfill expansion should not adversely impact on any future land uses

Mitigation and Monitoring

- No specific mitigation or monitoring for land use or agriculture but plans identified for air, noise and biology will be important to ensure no negative impacts to existing land use and agriculture



Archaeology Impact Assessment

Existing Conditions

- There are no registered archaeological sites located within a 1 km radius of the Site Study Area according to the Ontario Archaeological Sites Database
- A Stage 1 Archaeological Assessment from Scotland Drive to Manning Drive between White Oak Road and Wellington Road in 2005 determined that portions of the area had archaeological potential

Assessment Methods

- **Stage 2 Archaeological Assessment**
 - Pedestrian surveys were used to assess agricultural fields. Artifacts were retained for laboratory analysis
 - Test Pit surveys were used to assess the remaining areas (overgrown fields, woodlot, and residential properties)
 - Found site of potential interest (White Oak 1)
- **Stage 3 Archaeological Assessment**
 - Stage 3 assessment of White Oak 1
 - Hand excavation of 28 one-metre square test plots



Addressing Predicted Impacts of the Proposed Expansion

- The White Oak 1 site appears to represent a briefly occupied area dating to the Late Archaic Period (ca. 1500 – 500 B.C.)
- No direct impact because only vertical expansion proposed for the landfill
- Potential indirect impacts if ancillary features (e.g., road, SWM Ponds) built in area of White Oak 1

Mitigation and Monitoring

- The Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) preferred method of Stage 4 mitigation is through avoidance and protection
- It has been determined that the White Oak 1 site can be avoided



Cultural Heritage Impact Assessment

Existing Conditions

- 7 known and potential cultural heritage resources identified within all parcels, and parcels adjacent to, the Site Study Area

Assessment Methods

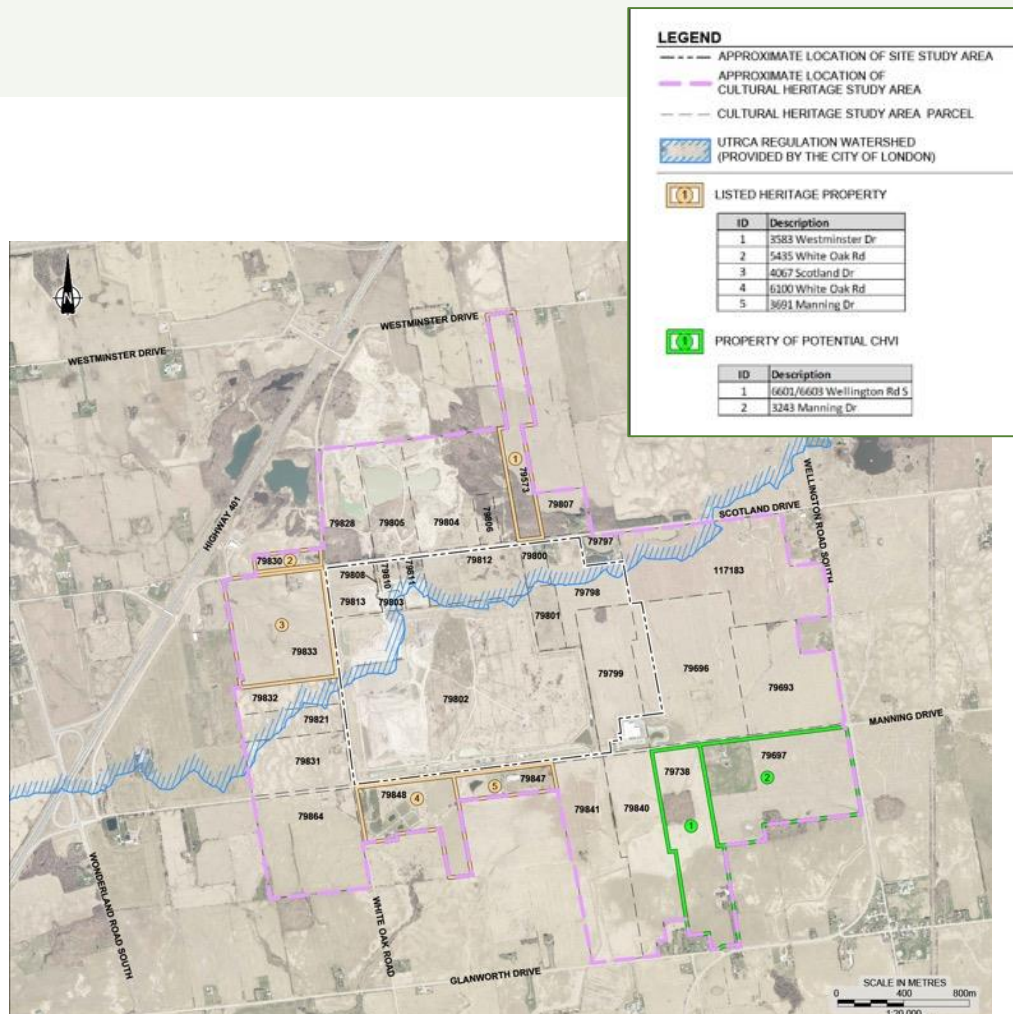
- Cultural heritage resources were evaluated using methods prescribed by the Province

Addressing Predicted Impacts of the Proposed Expansion

- No predicted impact on potential or built heritage resources, or cultural heritage landscapes

Mitigation and Monitoring

- No further cultural heritage studies or monitoring is recommended





Socio-economic Impact Assessment

Existing Conditions

- Demographic Profile for the City of London (StatsCan 2016)
- Population: 383,822
- Average Household Income: \$43,976
- Labour Force Participation Rate: 63.2%
- Unemployment Rate: 7.9%
- Site-vicinity study area around landfill: agriculture production; 2 aggregate pits; 8 rural residential dwellings; the City of London Material Recovery Facility; the Islamic Cemetery of London

Assessment Methods

- The potential direct and indirect effects on existing and future socio-economic conditions in the area were assessed
- Displacement of residents and interference with residential properties was also evaluated



Socio-economic Impact Assessment

Addressing Predicted Impacts of the Proposed Expansion

- No lasting positive or negative effects on the local economy
- Over time, the landfill will cost more and be a higher source of revenue for the City of London than currently
- Out-migration is not anticipated since residents are accustomed to living in an agricultural area and near the existing landfill where any noise, odour or dust associated with existing conditions are fairly commonplace
- Gradual reduction in residences may occur as City purchases neighbouring properties
- Nuisance effects are expected to be managed and mitigated appropriately so as not to cause increased issues for local residents and users of outdoor spaces

Mitigation and Monitoring

- None specific for socio-economic, all suggested mitigation and monitoring are described by other components



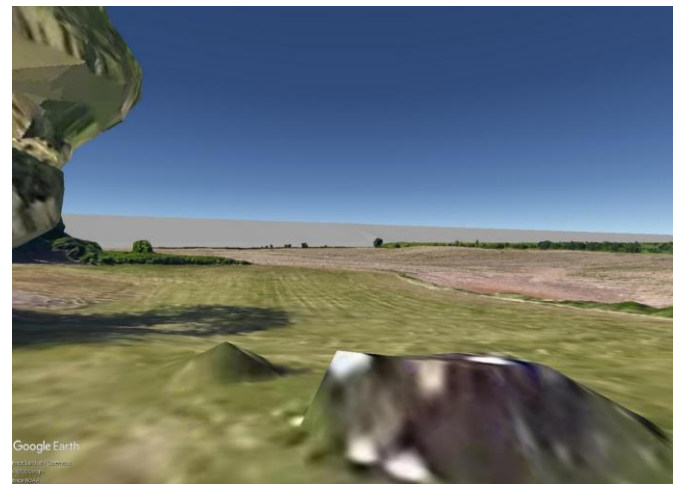
Visual Impact Assessment

Existing Conditions

- an anomaly rising approximately 9 to 12 m above an otherwise generally flat to gently sloping landscape
- can be seen from up to five kilometres from the south and east, three kilometres from the west and one kilometre from the north

Assessment Methods

- Outdoor private recreation areas were identified using aerial photography, and significant viewpoints from each were selected
- Determined how much of an observer's view is occupied by the proposed landfill, taking into account the intervening terrain's hilliness and tree cover



Simulated View of Expanded Landfill
from 3465 Scotland Drive

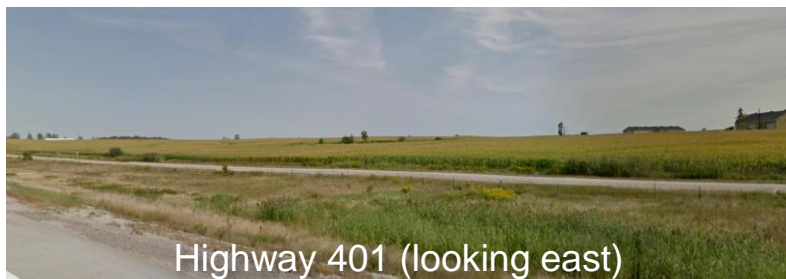


Visual Impact Assessment

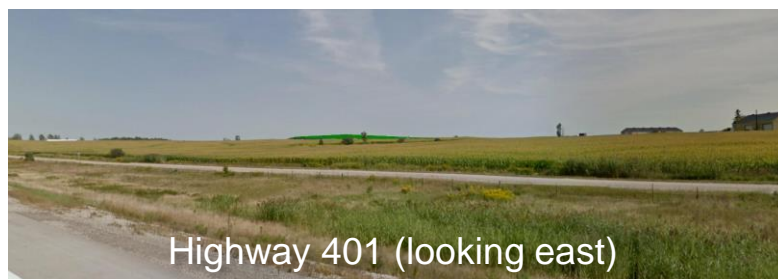
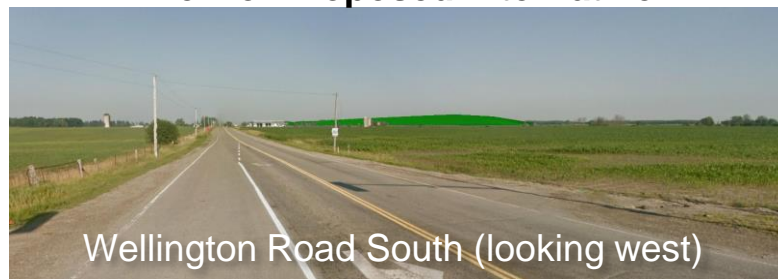
Addressing Predicted Impacts of the Proposed Expansion

- Five properties (3 city owned) with high or moderate-high visual impact
- Approximately 70 other properties have increased visual impact
- Views from major roads

View of Existing Landfill



View of Proposed Alternative





Visual Impact Assessment

Mitigation and Monitoring

New screening berm along Scotland Drive

Berm on top of landfill (south side) to screen view to south during operations

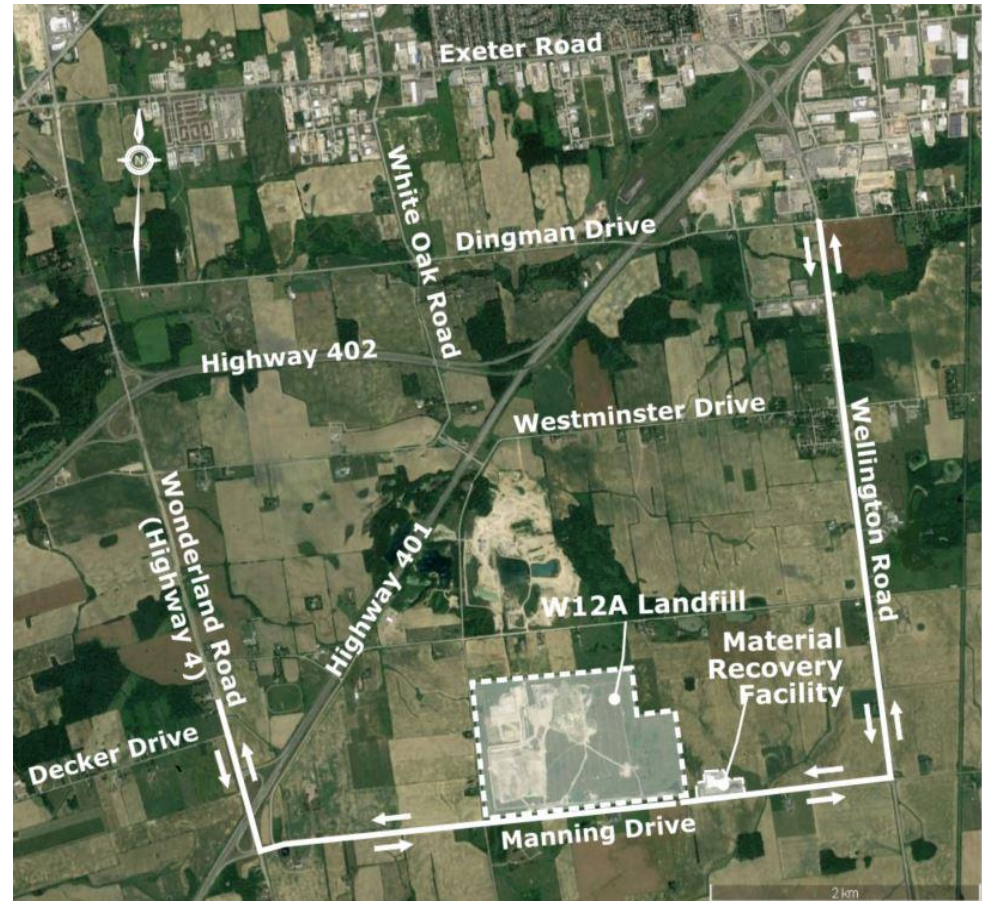
Consider including screening measures on private property in updated Community Enhancement and Mitigative Measures Program



Screening Berm

Existing Conditions

- W12A Landfill access consists of two accesses to Manning Drive and two accesses to White Oak Road
- In 2018, a total of 71,220 vehicles accessed the W12A Landfill (approximately 51% were small vehicles and 49% were heavy vehicles)
- Less than 1% of traffic on Wellington or Wonderland Roads

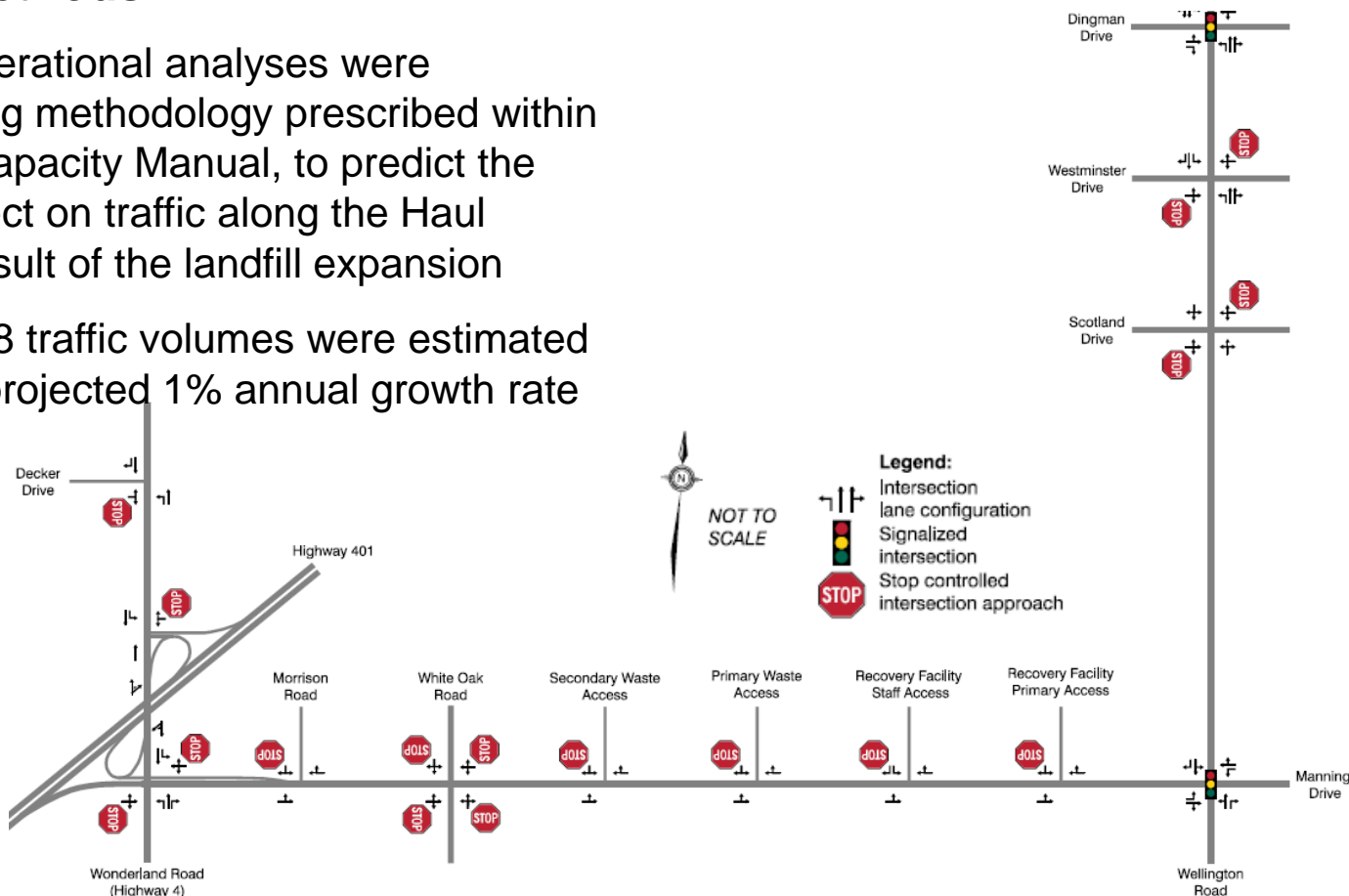




Transportation Impact Assessment

Assessment Methods

- Intersection operational analyses were completed using methodology prescribed within the Highway Capacity Manual, to predict the anticipated effect on traffic along the Haul Routes as a result of the landfill expansion
- The future 2048 traffic volumes were estimated considering a projected 1% annual growth rate





Transportation Impact Assessment

Addressing Predicted Impacts of the Proposed Expansion, Mitigation and Monitoring

- intersections with traffic lights (Wellington Road at Dingman Drive and Manning Drive intersections) - forecasted to remain at a good to reasonable level of service
- other intersections - no road improvements except possibly at Wonderland Road (Highway 4) and 401 after 2045;
 - Improvements maybe required due to increase in general traffic (not landfill traffic which is less than 1% of overall traffic)
 - Need to collect new traffic data in future to determine when (if) improvements required



Design & Operations Impact Assessment

Existing Conditions

- Existing features presented on “*W12A Landfill – Site Features*” board
- Ongoing environmental monitoring to demonstrate site compliance with regulatory requirements

Assessment Methods

- The overall design of the landfill expansion was compared to MECP regulations, policies and guidelines with a focus on:
 - engineered control systems for leachate and landfill gas management
 - leachate effects on groundwater and surface water
 - landfill gas migration in the subsurface



Design & Operations Impact Assessment

Addressing Predicted Impacts of the Proposed Expansion

- Phasing plan and development sequence designed to reduce potential visual impacts from off-Site vantage points to the south
- The management of leachate will continue to rely on the same strategies/systems that have proven effective in preventing impacts on groundwater and surface water quality
- Additional temporary leachate storage provided which allows for on-site leachate storage if Dingman Pumping Station or Greenway Wastewater Treatment facility is in a by-pass situation
- Landfill gas collection will be enhanced by adding horizontal landfill gas collectors (in addition to vertical collection wells) to further control landfill gas (including odour)
- Second landfill gas flare installed within 5 years of expansion



Design & Operations Impact Assessment

Addressing Predicted Impacts of the Proposed Expansion

- Landfill will be geotechnically stable
- Overall soil surplus at the end of the expansion period
- Capital costs will be marginally less than projected costs
- Operating costs will be marginally higher than the current operating costs (about 10%)

Mitigation and Monitoring

- No additional mitigation measures associated with the design and operations of the W12A Landfill expansion
- Continued annual monitoring of landfill gas in on-Site buildings and several landfill gas monitoring wells



Next Steps in EA and How to Get Involved

Next Steps are as follows:

- Complete Steps 7 and 8 of the EA methodology:
 - **Step 7** – Consider potential effects of climate change on the preferred alternative
 - **Step 8** – Complete a cumulative impact assessment of the landfill expansion and other activities in the area
- The Draft EA will be circulated for stakeholder feedback prior to finalization and submission to the MECP for approval.
- MECP will provide a seven week period to provide feedback directly to them after final report submitted by the City
- MECP will provide a five week period to review and provide comments to Minister on proposed MECP staff recommendation



City staff and project consultants are available to answer your questions and discuss the information presented.