



DRAFT

IMPACT STATEMENTS

(WITH ADDITIONAL INFORMATION)

NOTES FOR UNDERSTANDING IMPACT STATEMENTS

- **Impact ID** column contains a number assigned to impacts for tracking purposes with no weight or value assigned.
- **Climate Category** column refers to the general changes in climate projected to occur, divided into three categories: temperature, precipitation, and extreme weather.
- **Climatic Threat** column refers to specific changes in climate projected to occur.
- **Impact Statement** column refers to the impact statement developed based on the climate variable (anticipated change), what happens (outcome) and what the impact to the municipality is (consequence). A total of 74 impact statements have been developed.
- **Theme** column refers to the predominant theme that each impact statement fits within. Impact statements may fit into more than one theme, however, only one theme was selected for each impact in order to group the impacts statements for further consultation. A total of 15 themes have been identified and are identified below:

Theme Categories		
Energy	Insects, Pests and Invasive Species	Winter Maintenance
Community Facilities	Natural Environment	Sewage Services
Stormwater and Flooding	Built Infrastructure (roads, sidewalks, buildings)	Private Property
Water Services	Fire Services	Community Well-being
Emergency Services	Outdoor Maintenance and Construction	Administration (Finance, Clerk, Communications, Human Resources)

- **Impact Statement Identified Through** column refers to the avenue in which the impact statement was identified through. It should be noted that full impact statements were not developed through initial public consultation. Public survey responses indicated potential impacts which then were verified and further developed into detailed impact statements internally by staff.
- **Likelihood of Occurrence** column describes the likelihood of the impact occurring based on climate science and current observations. **Note: The assigned value may be altered throughout the project as determined through consultation.*

The following are the likelihood rankings and explanation for recurrent and single events:

Likelihood Ranking	Recurrent Impact	Single Event
<i>Almost Certain (5)</i>	Could occur several times per year	More likely than not – probability greater than 50%
<i>Likely (4)</i>	May arise about once per year	As likely as not – 50/50 chance
<i>Possible (3)</i>	May arise once in 10 years	Less likely than not but still appreciable - probability less than 50% but still quite high
<i>Unlikely (2)</i>	May arise once in 10 to 25 years	Unlikely not but negligible – probability low but noticeably greater than zero
<i>Rare (1)</i>	Unlikely during the next 25	Negligible – probability very small, closer to zero

Impact ID	Climate Category	Climatic Threat	Impact Statement	Theme	Impact Statement Identified Through:	Likelihood of Occurrence (Risk Assessment)
52	Extreme Weather Event	Increase in frequency of extreme weather events	Increased need for 24/7 (including after-hour services) for public to access municipal staff regarding occurrences requiring immediate attention, increase in requests for service, coordination and communications to the general public.	Administration	✓ Staff consultation ✓ Public consultation	4
54	Extreme Weather Event	Increase in frequency of extreme weather events	Increased demand for essential services and disaster recovery costs resulting in an increase in staff time and financial cost to the municipality.	Administration	✓ Staff consultation ✓ Public consultation	4
59	Extreme Weather Event	Increase in frequency of extreme weather events	Increased power outages and electrical surges, resulting in the inability for municipal staff to utilize phones and computers, process work orders, provide communications to the entire municipality and access information for coordinated effort during extreme weather events.	Administration	✓ Staff consultation ✓ Public consultation	4
61	Extreme Weather Event	Increase in frequency of extreme weather events	Increased liability, public and health and safety hazards and risks, private property damage, dangerous conditions that may impact the entire municipality.	Administration	✓ Staff consultation	5
14	Temperature	Increase in Very Hot Days (over 30°C)	Increased damage to hard surfaces (roads, sidewalks) resulting in an increase in request for service and staff time to repair/replace, increased costs and integration into asset management planning.	Built Infrastructure (roads, sidewalks, buildings)	✓ Staff consultation ✓ Public consultation	5
17	Temperature	Increase in Very Hot Days (over 30°C)	Increased temperature within urban areas where built infrastructure is most prominent resulting in heat being trapped causing an increase in temperature within urban boundaries.	Built Infrastructure (roads, sidewalks, buildings)	✓ Staff consultation	4
29	Temperature	Increased in Freeze-thaw cycles in January and February	Increased underground movement causing potential damage to municipal infrastructure (buildings, underground services, roads, sidewalks, cemetery) resulting in increase in request for service and staff time to monitoring and repair/replace, increased costs and integration into asset management planning.	Built Infrastructure (roads, sidewalks, buildings)	✓ Staff consultation ✓ Public consultation	5
55	Extreme Weather Event	Increase in frequency of extreme weather events	Increased damage and/or decreased service life of municipal infrastructure (buildings, underground services, roads, bridges/culverts), public spaces requiring the potential closure of municipal facilities, increase request for service, staff time to repair/replace infrastructure and financial cost to the municipality.	Built Infrastructure (roads, sidewalks, buildings)	✓ Staff consultation ✓ Public consultation	5
71	Extreme Weather Event	Increased frequency of extreme cold events	Increased risk of deep freeze to municipal infrastructure causing deficiencies resulting in an increased immediate request for service, staff time to repair/replace the damaged infrastructure and cost to the municipality.	Built Infrastructure (roads, sidewalks, buildings)	✓ Staff consultation	4

Impact ID	Climate Category	Climatic Threat	Impact Statement	Theme	Impact Statement Identified Through:	Likelihood of Occurrence (Risk Assessment)
15	Temperature	Increase in Very Hot Days (over 30°C)	Reduced air quality that may cause heat stress or respiratory illnesses resulting in increased health and safety risk to the public, especially vulnerable populations.	Community Well-being	✓ Staff consultation ✓ Public consultation	4
18	Temperature	Increase in Very Hot Days (over 30°C)	Increased in incidents of violent crimes resulting in disruption to the entire municipality and an increase in demand for emergency services.	Community Well-being	✓ Staff consultation	3
49	Extreme Weather Event	Heavy localized flooding events	Increase in flooding in areas that may lead to an increased risk of public exposure to potential illnesses and pathogens (including water-borne illnesses, mold).	Community Well-being	✓ Staff consultation	4
58	Extreme Weather Event	Increase in frequency of extreme weather events	Increased power outages and electrical surges, resulting in service disruptions for the entire municipality.	Community Well-being	✓ Staff consultation ✓ Public consultation	4
62	Extreme Weather Event	Increase in frequency of extreme weather events	Disruption to regional food distribution system resulting in potential food shortages impacting the entire municipality.	Community Well-being	✓ Public consultation	3
5	Temperature	Increased Annual Temperature	Increased opportunities for the community to participate in active transportation (i.e. cycling, walking, biking) and outdoor recreation.	Community Well-being	✓ Staff consultation	5
73	Extreme Weather Event	Increased frequency of extreme cold events	Increased health and safety risk to vulnerable (thermoregulation, frostbite) populations resulting in an increase in the need for community cold alerts, service requests, and access to warming facility resulting in increased request for service and staff time and coordination, potentially outside of regular working hours.	Community Well-being	✓ Staff consultation ✓ Public consultation	5
38	Extreme Weather Event	Increased frequency and duration of heatwaves	Increased health and safety risk to vulnerable populations resulting in an increase in service requests, access to cooling facility resulting in increased request for service and staff time and coordination, potentially outside of regular working hours.	Community Well-being	✓ Staff consultation ✓ Public consultation	4
7	Temperature	Increased Summer Temperature	Increased risk of bacteria growth in Lake Huron from increase surface water temperatures resulting in more beach closures and potential revenue loss from Port Blake.	Community Facilities	✓ Staff consultation	5
11	Temperature	Increase in Very Hot Days (over 30°C)	Reduced air quality that may cause heat stress or respiratory illnesses leading to outdoor programming requiring alternative locations.	Community Facilities	✓ Staff consultation ✓ Public consultation	4
16	Temperature	Increase in Very Hot Days (over 30°C)	Reduced air quality that may cause heat street or respiratory illnesses lead to an increased in request for service and staff time to accommodate demand for outdoor cooling facilities (pools, tree covered areas, splash pads) and indoor facilities.	Community Facilities	✓ Staff consultation ✓ Public consultation	4
23	Temperature	Increase in Very Hot Days (over 30°C)	Increased energy demand during ice making in August, resulting in an increase demand for energy, potential failure from equipment overworking, leading to an overall decrease life cycle of equipment.	Community Facilities	✓ Staff consultation	3

Impact ID	Climate Category	Climatic Threat	Impact Statement	Theme	Impact Statement Identified Through:	Likelihood of Occurrence (Risk Assessment)
30	Precipitation	Increased in Heavy Precipitation Days (20mm)	Inundated municipal outdoor facilities (sports fields, parks, natural areas and trails, cemetery) leading to temporary disruption in using these spaces or increase in demand for alternative spaces, where applicable.	Community Facilities	✓ Staff consultation	5
32	Precipitation	Increased Spring Precipitation	Leading to inundated municipal outdoor facilities (sports fields, parks, natural areas and trails, cemetery) and disruptions preventing municipal staff from maintaining these spaces in the spring season.	Community Facilities	✓ Staff consultation	5
33	Precipitation	Increased Spring Precipitation	Leading to inundated Port Blake day-use area preventing municipal staff from maintaining the site resulting in a delay in public usage of the park and potential lost revenues.	Community Facilities	✓ Staff consultation	5
39	Extreme Weather Event	Increased frequency and duration of heatwaves	Shift in timing and scheduling of outdoor seasonal programming (sports, events, camps) to avoid peak summer temperatures and heatwaves resulting in the potential for an increase in extended maintenance periods.	Community Facilities	✓ Staff consultation	3
40	Extreme Weather Event	Heavy localized flooding events	Inundation of outdoor municipal facilities (sports fields, parks, natural areas and trails, cemetery) leading to temporary disruption of facilities and an increased cost and staff time to repair damages or address stormwater deficiencies.	Community Facilities	✓ Staff consultation	5
53	Extreme Weather Event	Increase in frequency of extreme weather events	Increased number of displaced residents from their homes due to extreme weather events, leading to an increase usage of the Emergency Operations Centre (Town Hall), request for service, coordination and communications from municipal staff.	Emergency Services	✓ Staff consultation ✓ Public consultation	4
56	Extreme Weather Event	Increase in frequency of extreme weather events	Increase in occurrences of power outages, transportation disruptions, and public health and safety situations resulting in an increased demand for emergency services, communications, coordination and resources.	Emergency Services	✓ Staff consultation ✓ Public consultation	4
63	Extreme Weather Event	Increase in frequency of extreme weather events	Increased power outages and electrical surges, resulting in potential risk to the public associated with heating/cooling buildings and cooking meals.	Emergency Services	✓ Staff consultation ✓ Public consultation	4
8	Temperature	Increased Summer Temperatures	Increased summer energy usage for municipally-owned facilities leading to increased utility costs for the municipality.	Energy	✓ Staff consultation	4
27	Temperature	Increase in Winter Temperature	Decreased winter heating costs for municipally-owned facilities leading to decreased costs to the municipality during the winter months.	Energy	✓ Staff consultation	3
22	Temperature	Increase in Very Hot Days (over 30°C)	Reduced air quality that may cause heat stress or respiratory illnesses resulting in increased health and safety risk to municipal volunteer fire fighters working during periods of very hot days requiring appropriate working hours, cooling aids and relief mechanisms.	Fire Services	✓ Staff consultation	4

Impact ID	Climate Category	Climatic Threat	Impact Statement	Theme	Impact Statement Identified Through:	Likelihood of Occurrence (Risk Assessment)
68	Extreme Weather Event	Increased frequency and duration of drought	Increased risk of fire during dry conditions resulting in an increase in fire related calls and increase in the total number of calls for fire department during dry periods.	Fire Services	✓ Public consultation	5
69	Extreme Weather Event	Increased frequency and duration of drought	Increased risk of fire at the landfill during dry conditions resulting in an increased risk of exposure to landfill operations employees and increase in fire related calls during dry periods.	Fire Services	✓ Staff consultation	3
2	Temperature	Increased Annual Temperature	Increased reproduction rates and range of vectors (e.g. West Nile Virus, Lyme Disease) resulting in an increased risk of exposure to vector-borne diseases for municipal outdoor workers.	Insects, Pests and Invasive Species	✓ Staff consultation	4
3	Temperature	Increased Annual Temperature	Extended growing seasons resulting in the potential for an increase presence and impacts from invasive species within municipally owned property.	Insects, Pests and Invasive Species	✓ Staff consultation	3
24	Temperature	Increase in Winter Temperatures	Increased survival rates for pests and insects, leading to impacts to tree and vegetation and potential loss of natural assets throughout municipally-owned property.	Insects, Pests and Invasive Species	✓ Staff consultation	4
31	Precipitation	Increased Annual Precipitation	Increased areas with standing water resulting in greater risk of areas supporting reproduction of mosquitos with the potential to increase the exposure risk of West Nile Virus.	Insects, Pests and Invasive Species	✓ Staff consultation	4
20	Temperature	Increase in Very Hot Days (over 30°C)	Increased stress on trees resulting in an increase in water demand and staff time to ensure the health and success of trees, or, removal of hazard trees located on municipally-owned property not able to survive.	Natural Environment	✓ Staff consultation ✓ Staff consultation	5
28	Temperature	Increased in Freeze-thaw cycles in January and February	Increased stress on trees and natural areas resulting in an increase in request for service and staff time to monitor and remove hazard trees on municipally-owned property.	Natural Environment	✓ Staff consultation ✓ Public consultation	5
46	Extreme Weather Event	Heavy localized flooding events	Increase in erosion rates and sediment release within riparian areas and unstable transition to low lying areas, causing an increase in bank destabilization, loss of habitat and impact on water quality.	Natural Environment	✓ Staff consultation	5
57	Extreme Weather Event	Increase in frequency of extreme weather events	Increased damage to urban trees, parks, and trails resulting in closures, increased request for service and staff time and cost to the municipality to identify and remove hazard trees.	Natural Environment	✓ Staff consultation ✓ Public consultation	5
64	Extreme Weather Event	Increase in frequency of extreme weather events	Increase in repairs/replacements addressed under tender bids during times of overload to municipal staff resulting in increased cost and project management time to the municipality.	Outdoor Maintenance and Construction	✓ Staff consultation	4

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1	Temperature	Increased Annual Temperature	Extended shoulder season (spring and fall) resulting in an extended maintenance seasons and potential changes in timing of staff hiring, type of staff hired (students), scheduling and work restrictions.	Outdoor Maintenance and Construction	✓ Staff consultation	3
9	Temperature	Increased Summer Temperatures	Increase in landfill odors due to an increase in decomposition rate leading to an increase in complaints related to odors within the vicinity of the landfill.	Outdoor Maintenance and Construction	✓ Staff consultation	3
12	Temperature	Increase in Very Hot Days (over 30°C)	Reduced air quality that may cause heat stress or respiratory illnesses resulting in increased health and safety risk and demand for municipal outdoor workers to have appropriate working hours, cooling aids, personal protective gear and spaces for relief.	Outdoor Maintenance and Construction	✓ Staff consultation	4
13	Temperature	Increase in Very Hot Days (over 30°C)	Potential for periods of shortened windows to work outside, reduced productivity and extended periods that outdoor work cannot be completed.	Outdoor Maintenance and Construction	✓ Staff consultation	4
19	Temperature	Increase in Very Hot Days (over 30°C)	Increased demand for pool and splash pad, resulting in disrupted disinfectant practices during a time of high chemical dissipation and limited maintenance opportunities during peak usage.	Outdoor Maintenance and Construction	✓ Staff consultation ✓ Public consultation	5
34	Precipitation	Increased Spring Precipitation	Leading to increased sediment and debris on municipally-owned roadways from vehicular traffic and saturated conditions resulting in an increased service request for street cleaning services.	Outdoor Maintenance and Construction	✓ Staff consultation	4
65	Extreme Weather Event	Increased frequency and duration of drought	Reduced quality of outdoor municipal facilities (sports fields, parks, natural areas and trails, cemetery) requiring an increase in municipal water usage, request for service, and maintenance and monitoring of the quality of spaces.	Outdoor Maintenance and Construction	✓ Staff consultation	5
67	Extreme Weather Event	Increased frequency and duration of drought	Reduced quality of municipal lawn/gardens, and drought in-tolerant trees and vegetation requiring an increase in effort to maintain and remove distressed species located on municipal property.	Outdoor Maintenance and Construction	✓ Staff consultation	5
74	Extreme Weather Event	Increased frequency of extreme cold events	Increased health and safety risk (thermoregulation, frostbite) and demand for municipal outdoor workers to have appropriate working hours, warming aids, personal protective gear and spaces for relief.	Outdoor Maintenance and Construction	✓ Staff consultation	5
48	Extreme Weather Event	Heavy localized flooding events	Increased damage to private property due to flooding resulting in an increase in number of residents contacting the municipality, specifically directed to the Building Department requesting information on flooding and assistance to address the situation.	Private Property	✓ Staff consultation ✓ Public consultation	4

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51	Extreme Weather Event	Increase in frequency of extreme weather events	Increased extensive damaged to private property resulting in an increase in requests for permits (with the potential for quick turnarounds requested) resulting in an increase in staff time to consult and prepare required documentation to issue permits.	Private Property	✓ Staff consultation	4
72	Extreme Weather Event	Increase in frequency of extreme cold events	Increase risk of deep freezing of private property underground water service breakage or freezing resulting in an increase in repair/replacement of the damaged services resulting in an increase in permits/agreements required for connection.	Private Property	✓ Staff consultation	4
10	Temperature	Increase in Summer Temperatures	Increase in anaerobic activity resulting in a decrease in dissolved oxygen (DO) leading to disruption to the treatment process, potentially requiring an increased in existing treatment or alternative process(es).	Sewage Services	✓ Staff consultation	4
25	Temperature	Increase in Winter Temperatures	Decrease in duration of pond freeze-over (sewage lagoon) during the winter season resulting in the potential to discharge treated effluent year-round	Sewage Services	✓ Staff consultation	3
41	Extreme Weather Event	Heavy localized flooding events	Overloading of older sanitary sewers (in particular, where inflow and infiltration of stormwater/groundwater into sanitary sewers), resulting in the potential for untreated sewage overflow by-passing secondary treatment allowing contaminants and infectious organisms entering into the receiving waterbody.	Sewage Services	✓ Staff consultation	3
42	Extreme Weather Event	Heavy localized flooding events	Overwhelming of sanitary sewers resulting in the potential back up of sewage into basements, particularly in low lying areas.	Sewage Services	✓ Staff consultation	3
43	Extreme Weather Event	Heavy localized flooding events	Overflow by-pass resulting in an increase in call outs to Municipal staff due to emergency alarms, service calls and mandatory reporting to agencies (i.e. Ministry of Environment, Conservation and Parks).	Sewage Services	✓ Staff consultation	3
44	Extreme Weather Event	Heavy localized flooding events	Increased surface runoff resulting in an increased risk of pollution from the landscape entering local waterbodies.	Sewage Services	✓ Staff consultation	5
4	Temperature	Increase in Annual Temperature	Changes in timing of spring melt resulting in surcharge and runoff from rapid snowmelts resulting in the potential of overburdening of the municipal stormwater system.	Stormwater and Flooding	✓ Staff consultation ✓ Public consultation	5
26	Temperature	Increase in Winter Temperature	Changes in timing of winter melt resulting in surcharge and runoff from rapid snowmelts resulting in an overburdening of the stormwater system.	Stormwater and Flooding	✓ Staff consultation	5
36	Precipitation	Increase in Winter Precipitation	Increased rainfall and melting during periods when the ground is frozen and saturated causing an increased risk of overland flooding leading to damage to municipal infrastructure.	Stormwater and Flooding	✓ Staff consultation	4

Impact ID	Climate Category	Climatic Threat	Impact Statement	Theme	Impact Statement Identified Through:	Likelihood of Occurrence (Risk Assessment)
45	Extreme Weather Event	Heavy localized flooding events	Increase in sediment and debris within municipally-owned drains and culverts, requiring an increase in maintenance scheduling and monitoring.	Stormwater and Flooding	✓ Staff consultation	4
47	Extreme Weather Event	Heavy localized flooding events	Increased stress on bridges/culverts, potential for road washouts, erosion and transportation disruptions requiring an increase in emergency service requests and staff time to monitor, repair/replace damages, financial cost to the municipality and increased management required during the response period.	Stormwater and Flooding	✓ Staff consultation ✓ Public consultation	5
6	Temperature	Increased Summer Temperatures	Increased number of dry periods resulting in increased irrigation required for parks, gardens, and sport fields.	Water Services	✓ Staff consultation	5
21	Temperature	Increase in Very Hot Days (over 30°C)	Increased bacteria growth and dissipation of chlorine within municipally-owned water storage facilities resulting in increased staff monitoring and changes to the amount/type of chemicals (chlorine) required within the system to ensure drinking water standards are adhered to.	Water Services	✓ Staff consultation ✓ Public consultation	4
60	Extreme Weather Event	Increase in frequency of extreme weather events	Increased power outages and electrical surges, resulting in back up power (short and long term) required for critical infrastructure including water and sewage pumping stations and sewage lagoons.	Water Services Sewage Services	✓ Staff consultation	3
66	Extreme Weather Event	Increased frequency and duration of drought	Reduced quality of municipal and private property lawn/gardens, and drought in-tolerant trees and vegetation resulting in an increase in demand for municipal water.	Water Services	✓ Staff consultation	5
70	Extreme Weather Event	Increased frequency of extreme cold events	Increased risk of deep freeze to municipal underground water service causing breakage or freezing resulting in an increased immediate request for service, staff time to repair/replace the damaged services and cost to the municipality.	Water Services	✓ Staff consultation	4
35	Precipitation	Increased Winter Precipitation	Increased use of salt and/or sand on roadways, sidewalks and in parking lots resulting in increase in staff time, increased corrosion to equipment and facilities, and greater impact on water quality within the municipality.	Winter Maintenance	✓ Staff consultation	5
37	Precipitation	Increased Winter Precipitation	Increased outdoor maintenance from precipitation falling as snow or rain requiring more staff time to monitor and operate, equipment requirements and cost to the municipality.	Winter Maintenance	✓ Staff consultation	5
50	Extreme Weather Event	Increase in freezing rain events	Increased hazardous road and walking conditions resulting in an increase need for monitoring and salt/sand applications applied by municipal staff.	Winter Maintenance	✓ Staff consultation ✓ Public consultation	5