Table of Contents

Introduction

The Hazard Identification and Risk Analysis (HIRA) is comprised of four components:

- General Hazard Checklist;
- Risk assessment;
- Establishing priorities;
- Risk profile (hazard information Sheets).

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General Hazard Checklist

The hazards named on this worksheet are based on the 37 hazards listed in Emergency Management Ontario's *Provincial Hazard Identification and Risk Assessment* (May 2004). The hazards are divided into four groups:

- Natural events
- Technological events
- Human events
- Other local hazards

Directions:

For each hazard, a mark was placed in the box that most closely reflects the potential for that hazard in your community. Please note: for items listed that may become an emergency as a result of a primary cause have a * placed beside them and have received a ranking.

Definitions:

Hazard: An event or physical condition that has the potential to cause fatalities, injuries, property damage, agricultural loss, damage to the environment, interruption of business or other types of harm or loss.

Likely: The listed hazard has occurred in recent memory and is likely to occur again.

Possible: The listed hazard has not occurred in recent memory, but could occur based on prior incidence or "expert" assessment (e.g. a nuclear facility, terrorism or earthquake).

Unlikely: The hazard has never occurred and likely will not occur in the foreseeable future (e.g. a mine emergency where there is no mine).

HAZARD – NATURAL EVENTS	LIKELY	POSSIBLE	UNLIKELY
Agriculture & food emergencies*		✓	
Fog	✓		
Snowstorms/Blizzards	✓		
Ice/Sleet Storms	✓		
Hail Storms	✓		
Lightening Storms	✓		
Hurricanes/Tropical Storms			✓
Windstorms	✓		
Tornadoes	✓		
Extreme Heat/Cold	✓		
Forest Fires			✓
Earthquakes			✓
Landslides			✓
Land Subsidence			✓
Human Health Emergencies & epidemics	✓		
Drought/Low Water			✓
Erosion			✓
Flooding	✓		
Water Quality Emergencies	✓		

HAZARD – TECHNOLOGICAL EVENTS	LIKELY	POSSIBLE	UNLIKELY
Building/Structural Collapse*		✓	
Critical Infrastructure Failures	✓		
Dam Failures			✓
Energy Emergencies (Supply)	✓		
Explosions/Fires	✓		
Hazardous Materials – Fixed Site Incident		✓	
Hazardous Materials – Transportation Incident		✓	
Mine Emergencies			✓
Nuclear Facility Emergencies			✓
Oil, Natural Gas Emergencies		✓	
Radiological Emergencies			✓
Space Object Crash			✓
Transportation Emergencies		✓	
Loss of HVAC (air conditioning/heat)	✓		

HAZARD – HUMAN EVENTS	LIKELY	POSSIBLE	UNLIKELY
Civil Disorder		✓	

Sabotage		✓	
Special Events		✓	
Terrorism		✓	
War & International Emergencies			✓

HAZARD – OTHER LOCAL HAZARDS	LIKELY	POSSIBLE	UNLIKELY
Oxygen tanks		✓	
Internet Failure	✓		
Telephone Failure	✓		
Call Bell System Failure	✓		
Evacuation		✓	
Behaviour Management	✓		
Missing Resident	✓		
Cardiac Arrest		✓	
Bomb Threat			✓
Elevator Failure	✓		

TOTAL HAZARDS	LIKELY	POSSIBLE	UNLIKELY
	21	13	14

Probability/consequences Risk Assessment Grid

As the General Hazard Checklist has outlined the potential risks to Riverview Gardens, the probability and consequences of those identified risks must be assessed. This assessment is completed based on the four identified groups of hazards (natural, technological, human and other local hazards).

Probability

Probability determines how likely it is for the emergency to occur. For new and evolving threats (e.g. SARS) the record from the last 15 years may not adequately describe the risk. The best information available, including expert advice, will be used to determine probability

Scoring Probability:

1. No incidents in the last 15 years
2. Last incident in 5 – 15 years
3. One incident in last 5 years
4. Multiple incidents in last 5 years

Consequences

Each hazard would have it's own set of consequences on the home, including generating other emergencies to deal with. The severity of the hazard can impact the number of lives lost or injuries; infrastructure; property loss or damage; environment; public perception, social impacts on residents, families and staff.

Scoring Consequences:

1. Negligible impact
2. Limited impact (injuries, minor or localized damage)
3. Substantial impact (widespread injuries, widespread and/or severe damage, temporary disruption of basic services)
4. High impact (fatalities, widespread and severe damage disrupting delivery of essential services, long term disruption of basic services)

Only those items ranked as Likely or Possible on the General Hazards Checklist will be ranked according to their probability and consequences and each is ranked as if it directly effects Riverview Gardens.

A Hazard Information Sheet will then be completed for each hazard outlined on the assessment grid to further explain the potential risks. The information sheet will include the type of hazard; specific hazard, facility/area; lead time; probability and consequences both based on the grid below.

RISK ASSESSMENT GRID NATURAL EVENTS					
PROBABILITY	**4**	Fog	Snowstorms or blizzards Hail Storms Ice/sleet storms Lightening storms	Extreme heat/cold Water Quality Emergencies	Human health emergencies & epidemics
	3				

	2	Windstorms			Tornadoes
	1			Flooding	Agriculture & food emergency
	1 – Negligible		**2 – Limited**	**3 – Substantial**	**4 – High**
	CONSEQUENCES				

RISK ASSESSMENT GRID TECHNOLOGICAL					
PROBABILITY	**4**				Critical infrastructure failures
	3				
	2		Transportation emergency		Explosion/Fires

	1		Energy emergencies (supply)		Building structure collapse Hazardous materials – fixed site incident Hazardous materials – transportation incident Oil, natural gas emergency
	1 – Negligible		**2 – Limited**	**3 – Substantial**	**4 – High**
	CONSEQUENCES				

RISK ASSESSMENT GRID HUMAN EVENTS					
PROBABILITY	**4**		Civil disorder Sabotage Special events Terrorism Strike		
	3				
	2				
	1				
	1 – Negligible		**2 – Limited**	**3 – Substantial**	**4 – High**
	CONSEQUENCES				

RISK ASSESSMENT GRID OTHER HAZARDS					
PROBABILITY	4		Oxygen tanks	Behaviour Management Missing Resident Internet Failure Telephone Failure Call Bell System Failure Elevator Failure	
	3				
	2			Evacuation Cardiac Arrest	
	1				Bomb Threat
		1 – Negligible	2 – Limited	3 – Substantial	4 – High
		CONSEQUENCES			

Establishing Priorities

Hazard Situation	Risk Assessment	Priority	Separate Policy	Internal or external
Transportation Emergencies	P = 2; C = 2	M	??	E
Hazardous Materials – Fixed Site Incident	P = 1; C = 4	M	Air quality	E
Hazardous Materials – Transportation Incident	P = 1; C = 4	M	Air quality	E
Civil Disorder	P = 4; C = 2	L	Community	E
Sabotage	P = 4; C = 2	L	Community	E
Special Events	P = 4; C = 2	L	Community	E
Terrorism	P = 4; C = 2	L	Community	E
Critical Infrastructure Failures	P = 4; C = 4	M	Essential services	E
Energy Emergencies (Supply)	P = 1; C = 2	M	Essential services	E
Oil, Natural Gas Emergencies	P = 1; C = 4	H	Essential services	E
Agriculture & food emergencies*	P = 1; C = 4	M	Food & water	E
Water Quality Emergencies	P = 4; C = 3	M	Water	E
Fog	P = 4; C = 1	L	Weather	E
Snowstorms/Blizzards	P = 4; C = 2	L	Weather	E
Ice/Sleet Storms	P = 4; C = 2	L	Weather	E
Hail Storms	P = 4; C = 2	L	Weather	E
Lightening Storms	P = 4; C = 2	L	Weather	E
Windstorms	P = 2; C = 2	L	Weather	E
Tornadoes	P = 2; C = 4	M	Weather	E
Extreme Heat/Cold	P = 3; C = 3	L	weather	E
Flooding	P = 1; C = 3	L	Weather	E
Building/Structural Collapse*	P = 1;C = 4	L	Building	I
Internet Failure	P = 4; C = 2	H	Communications	I
Telephone Failure	P = 4; C = 2	H	Communications	I
Call Bell System Failure	P = 4; C = 2	H	Communications	I
Oxygen	P = 4; C = 2	L	Hazardous mat	I
Human Health Emergencies & epidemics	P = 4; C = 4	VH	yes	I
Explosions/Fires	P = 2; C = 4	VH	yes	I
Evacuation	P = 2; C = 3	H	Yes	I

Behaviour Management	P = 4; C = 3	H	Yes	I
Missing Resident	P = 4; C = 3	H	Yes	I
Cardiac Arrest	P = 2; C= 3	H	Yes	I
Bomb Threat	P = 1; C = 4	H	Yes	I
Elevator Failure	P = 4; C = 2	H	Yes	I

L = Low; M = Medium; H = high; VH = Very high

P = Probability	C = Consequence
1. No incidents in the last 15 years 2. Last incident in 5-15 years 3. One incident in last 5 years 4. Multiple incidents in last 5 years	1. Negligible impact 2. Limited impact (injuries, minor or localized damage) 3. Substantial impact (widespread injuries, widespread and/or severe damage, temporary disruption of basic services) 4. High impact (fatalities, widespread and severe damage disrupting deliver of essential services, long term disruption of basic services)

Risk profile (hazard information Sheets)

A Hazard Information Sheet will be completed for each hazard outlined on the assessment grid to further explain the potential risks. The information sheet will include:

- the type of hazard, such as a tornado, hazardous material fixed site etc
- specific hazard, such as widespread wind damage, etc
- facility/area, such as Riverview Gardens in general, Ethanol plant on Bloomfield Rd;
- lead time, which should outline the advance notice emergency personal would have to prepare their response, ranging from no advance warning to days;
- probability which will outline listing factors that increase or decrease the likelihood of this hazard occurring;
- consequences, which will include information such as potential risks and factors to consider when preparing for that particular hazard and any secondary incidents that may be caused.

The hazard information sheets are listed in the same order as they appear on the general hazard checklist. Each hazard is ranked as if it directly affects Riverview Gardens.

Riverview Gardens
Hazard Information Sheet

Type of Hazard: Agriculture and Food Emergency
Specific Hazard: • Inability to provide proper food and nutrition to the residents.
Facility/Area: • Effects entire resident population.
Lead Time: • Emergency supply of food designed to last 5 – 7 days.
Probability: **Score: 1** • Emergency food supply onsite • Kitchen equipment can function on back up generator • Service agreements with suppliers
Consequence: **Score: 4** • Loss of life • Loss of confidence in the home • Legal liability • Unmet standards from MOHLTC • Orders from MOL • Psycho-social effects on residents, families and staff

Type of Hazard: Fog
Specific Hazard: • Short term decrease in visibility • May effect critical infrastructure
Facility/Area: • General hazard
Lead Time: • None to minimal – can develop quickly
Probability: **Score: 4** • Occurs frequently typically on a small scale • Worst case scenario if effects staff's ability to report to work

Consequence: **Score: 1**

- Low risk of consequence, including secondary incidents
- Staff shortages
- Closure of roads
- Delay of supplies
- Possible loss of critical infrastructure as a secondary incident

Type of Hazard:

Snowstorm/Blizzard
Ice/sleet storms
Hail storms
Lightening storms
Windstorms

Specific Hazard:

- Widespread snow/ice/sleet/hail/lightening/wind coverage

Facility/Area:

- General hazard

Lead Time:

- Ranging from 1 – 36 hours depending on the reports from Environment Canada

Probability: **Score: 4**

- Storms of this type occur frequently, typically on a small scale
- Worst case scenario complete loss of critical infrastructure and highways closed preventing staff from reporting into work
- Environment Canada is monitored as weather conditions warrant
- Extra supplies are kept on site in case roads are closed and travel is limited
- Back up generator in place for loss of hydro
- Policies and procedures are in place for loss of water, hydro and if staff need to remain at work after their shift

Consequence: **Score: 2**

- Inability to meet resident daily needs due to staff shortages
- Short to long term effects on transportation
- Possible effects on critical infrastructure
- May result in flooding when it thaws
- Decrease in resident satisfaction due to temperature outside & limited outdoor activities as a result
- Increased risk for injury by staff, residents and visitors when approaching the building

Type of Hazard:

Tornadoes

Specific Hazard:

- Widespread damage to buildings and infrastructure

Facility/Area:

- General hazard

Lead Time:

- Limited to minimal – based only on what Environment Canada can provide

Probability: **Score: 2**

- Worst case scenario would be direct contact of the tornado with Riverview Gardens
- Environment Canada is monitored as weather conditions warrant
- Extra supplies are kept on site in case roads are closed and travel is limited
- Back up generator in place for loss of hydro
- Policies and procedures are in place for loss of water, hydro and if staff need to remain at work after their shift

Consequence: **Score: 4**

- Loss of life
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC
- Orders from MOL
- Psycho-social effects on residents, families and staff
- Severe damage to the home
- Evacuation of residents while repairs being made
- Assistance from outside might be limited depending on severity of damage across the municipality
- Fire, police and EMS maybe become quickly overwhelmed
- Risk of fires as a secondary incident
- Risk of oxygen tanks exploding as a secondary incident
- Catastrophic malfunction of critical infrastructure

Type of Hazard:

Extreme heat/cold

Specific Hazard:

- Risk to health and safety of residents and staff
- Building is to be maintained at approximately 22.5 degrees Celsius

Facility/Area:

- General hazard

Lead Time:

- Ranging from 1 – 36 hours depending on the reports from Environment Canada

Probability: **Score: 4**

- Temperatures of this type occur frequently throughout the year, typically for a limited number of days at any one given time
- Environment Canada is monitored as weather conditions warrant
- Limited number of fans located throughout the home for failures of the air conditioning units

Consequence: **Score: 3**

- Risk of ill effects on health of residents
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC
- Orders from MOL
- Psycho-social effects on residents, families and staff
- Damage to building operating system if pushed passed maximum capacity

Type of Hazard:

Human Health Emergencies & Epidemics

Specific Hazard:

- Risk to health and well being of residents, families and staff.

Facility/Area:

- General hazard

Lead Time:

- None to minimal – may start off small and isolated and spread

Probability: **Score: 4**

- Worst case scenario is a complete closure of the home under a quarantine order from the Public Health Unit or MOHLTC
- Small scale outbreaks are common in the home and occur yearly
- Isolation precautions are used, including routine precautions, contact precautions, droplet precautions, airborne precautions or any combination of all of them
- Staff receive training yearly on infection control
- Units are quickly closed when a baseline is established

Consequence: **Score: 4**

- Loss of life
- Loss of confidence in the home
- Legal liability

- Unmet standards from MOHLTC
- Orders from MOL
- Staff shortages
- Supply disruption
- Psycho-social effects on residents, families and staff
- Assistance from outside might be limited depending on severity of pandemic/epidemic across the municipality
- Hospitals, fire, police and EMS maybe become quickly overwhelmed
- Schools and day cares could be ordered closed creating child care issues for staff
- Loss of critical infrastructure

Type of Hazard:

Flooding

Specific Hazard:

- Flooding of the Thames River which Riverview Gardens backs on

Facility/Area:

- General hazard

Lead Time:

- None to minimal – floods can occur very quickly and unexpectedly or can be a result of extensive rains or spring thaw.

Probability: **Score: 1**

- Flooding has not occurred at this spot of the river and come up the banks high enough to cause damage to the home in recent history
- Flooding has occurred in other spots of the river just a few kilometres down stream
- The home sits up a fairly high embankment
- The municipality monitors water flow and level in the Thames River

Consequence: **Score: 3**

- Risk of injury to residents and staff
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC
- Orders from MOL
- Psycho-social effects on residents, families and staff
- Severe damage to the home
- Evacuation of residents while repairs being made
- Assistance from outside might be limited depending on severity of damage across the municipality

- Fire, police and EMS maybe become quickly overwhelmed
- Risk of fires as a secondary incident
- Catastrophic malfunction of critical infrastructure (electrical rooms located on the ground floor)

Type of Hazard:

Water Quality Emergencies

Specific Hazard:

- Loss of cooking, drinking and bathing facilities

Facility/Area:

- General hazard

Lead Time:

- None to minimal – numerous reasons for the loss of water which effects lead time

Probability: **Score: 4**

- Numerous boil water advisories across the municipality have occurred due to sewer maintenance, but none lasting a significant length of time or directly effecting Riverview Gardens
- The home is on a notification system with the Public Health Unit for boil water advisories
- Bottled water is kept in stock and on site for emergency use for short term emergencies

Consequence: **Score: 3**

- Risk of ill effects on health of residents
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC
- Orders from MOL
- Psycho-social effects on residents, families and staff
- If water loss was for extended period of time may result in an evacuation
- If a fire occurred during water loss may result in injury or death of residents, families or staff because sprinkler system may not function

Type of Hazard:

Building/Structural Collapse*

Specific Hazard:

- Loss of critical infrastructure and building structure

Facility/Area:

- Riverview Gardens

Lead Time:

- None to minimal – building/structure collapse is unlikely all on it's own due to the age of the facility

Probability: **Score: 1**

- Worst case scenario would be a complete building/structure collapse
- Building/structure collapse would be a secondary incident caused by another emergency such as a fire or tornado
- Fire alarm system is advanced and includes sprinklers throughout, monitoring system and the staff receives annual training on response to a Code Red.
- Tornado's are infrequent and unpredictable

Consequence: **Score: 4**

- Risk of injury or death to residents, families and staff
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC
- Orders from MOL
- Psycho-social effects on residents, families and staff
- Severe damage to the home
- Evacuation of residents while repairs being made
- Assistance from outside might be limited depending on cause of building/structure collapse and the severity of damage across the municipality
- Fire, police and EMS may be become quickly overwhelmed, depending on the cause of collapse
- Risk of fires as a secondary incident

Type of Hazard:

Critical Infrastructure Failures

Specific Hazard:

- Loss of essential services such as hydro, gas and water

Facility/Area:

- Riverview Gardens

Lead Time:

- None to minimal – depends on the cause of the failures

Probability: **Score: 4**

- Worst case scenario is loss of any service, such as water, sanitation, hydro or gas for an extended period of time
- Water treatment plants in municipality are on back up generators
- Riverview Gardens has a back up generator that can function for 3 – 5 days before needing to be refuelled

- Loss of services has occurred in recent history but not for extended periods of time

Consequence: **Score: 1**

- Providing the failures are not for an extended period of time the home as emergency plans to support the continuation of operations until services are restored
- If failure is expected to be long term it may result in an evacuation of the home

Type of Hazard:

Energy Emergencies (Supply)

Specific Hazard:

- Loss of natural gas
- Loss of diesel fuel for back up generator

Facility/Area:

- Riverview Gardens

Lead Time:

- None to minimal – depends on the cause of emergency

Probability: **Score: 1**

- Diesel fuel is tested or used up annually as per the fire code
- The Municipality has service agreements to ensure delivery of diesel fuel

Consequence: **Score: 2**

- Proving there is hydro to the home a supply emergency for the diesel tank will have minimal effect
- If we are operating on back up generator and the tank needs refuelling and there is a disruption in supply it will result in an evacuation of the home

Type of Hazard:

Explosions/Fires

Specific Hazard:

- Damage to the facility and risk to life and health of residents, families and staff

Facility/Area:

- Riverview Gardens

Lead Time:

- None – unanticipated explosion or fire would likely occur

Probability: **Score: 2**

- Worst case scenario would result in complete evacuation of the home due to damage caused, and involve injuries or deaths

- Emergency plan in place to address the quick and safe evacuation of fire zones
- Facility is equipped with heat sensors, smoke detectors, sprinklers and is the fire panel is monitored by an external company who contacts the Chatham-Kent Fire Department
- Staff receive yearly training on Code Red (fire) and starting in 2009 will receive yearly training on the new Code Green (evacuation)
- Chatham-Kent Fire Department receives yearly tours of the facility to ensure they are familiar with the buildings operations
-

Consequence: **Score: 4**

- Risk of injury or death to residents, families and staff
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC
- Orders from MOL
- Psycho-social effects on residents, families and staff
- Severe damage to the home
- Partial or complete evacuation of residents in a time limited fashion
- Long term evacuation of residents while repairs being made
- Damage to surrounding homes if an explosion occurs

Type of Hazard:

Hazardous Materials – Fixed Site Incident
Hazardous Materials - Transportation Incident
Oil and Natural Gas Emergencies
Transportation Emergencies

Specific Hazard:

- Numerous materials are possible, would be advised by the Fire Department at the time of what appropriate steps to take

Facility/Area:

- On site diesel tank
- Ethanol plant
- Local factories
- CN Railway tracks
- Highways (e.g. 401, 40 etc)

Lead Time:

- None to minimal – unanticipated explosion or release would occur quickly

Probability: **Score: 1**

- Worst case scenario complete evacuation of the home or direct damage to the home from the emergency
- Municipality has HIRA outlining potential risks and hazards
- Municipality would be responsible for setting up EOC and providing direction to residents including whether to shelter in place or evacuate

Consequence: **Score: 4**

- Risk of injury or death to residents, families and staff
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC
- Orders from MOL
- Psycho-social effects on residents, families and staff
- Evacuation of residents while clean up in process
- Assistance from outside might be limited depending on cause of hazardous material spill, the product spilled and the severity of damage across the municipality
- Fire, police and EMS may be become quickly overwhelmed, depending on the hazardous material spilled

Type of Hazard:

Civil Disorder
Sabotage
Special Events
Terrorism

Specific Hazard:

- Human caused

Facility/Area:

- General Hazard

Lead Time:

- None to minimal – unanticipated human behaviour could occur quickly

Probability: **Score: 4**

- Worst case scenario is the facility is the direct target of the behaviour
- Home has a plan to lock down facility
- Close proximity to police head quarters

Consequence: **Score: 2**

- Risk of injury to residents, families and staff
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC

- Orders from MOL
- Psycho-social effects on residents, families and staff
- Evacuation of residents if damage to facility is extensive

Type of Hazard:

Oxygen Tanks

Specific Hazard:

- Risk of explosion of tanks
- Risk of release of oxygen from tanks

Facility/Area:

- Riverview Gardens

Lead Time:

- None to minimal – unanticipated explosion/release could occur quickly

Probability: **Score: 4**

- Worst case scenario is an explosion of an oxygen tank in proximity to a flammable material
- Risk of secondary emergency of fire and evacuation
- Training of staff occurs on the proper use and PPE required when handling oxygen

Consequence: **Score: 2**

- Risk of injury to residents, families and staff
- Loss of confidence in the home
- Legal liability
- Unmet standards from MOHLTC
- Orders from MOL
- Psycho-social effects on residents, families and staff
- Evacuation of residents if damage to facility is extensive

Identified Risks

As a result of the HIRA the most likely emergencies to occur at Riverview Gardens have been identified as, in no particular order:

- Bomb threat;
- Security breach;
- Cardiac Arrest (Code Blue);
- Evacuation (Code Green);
- Fire (Code Red);

- Violent behaviour (Code White, Behaviour Management);
- Missing Resident (Code Yellow):
- Communications Malfunctions;
- Elevator Malfunctions;
- Gas Leaks;
- Hydro and/ or generator Malfunctions including HVAC (heat and air conditioning);
- Oxygen Leaks:
- Pandemic;
- Water Loss or Contamination;
- Poor Outdoor Air Quality (Hazardous Materials from Fixed Site and Transportation Incidents) (Code Grey);
- External Emergency (Code Orange);
- Weather Related Emergencies.

Polices and procedures will be written to provide direction on the appropriate response to each of these emergencies.