

**Table C-1: Town of Annapolis Royal Flood Risk Assessment: Infrastructure Response Considerations**

Date:	December 1, 2022
Completed by:	AIM Network
<b>Structural Design</b>	<p>Safety</p> <ul style="list-style-type: none"> <li>Load carrying capacity</li> <li>Fatigue</li> <li>Serviceability</li> </ul> <p>Deflection</p> <ul style="list-style-type: none"> <li>Cracking and deterioration</li> </ul> <p>Foundation Design considerations</p>
<b>Functionality</b>	<p>Level of Service, Serviceability, Reliability</p> <p>Level of Effective Capacity</p> <ul style="list-style-type: none"> <li>Short term</li> <li>Medium term</li> <li>Long term</li> </ul> <p>Equipment - Component selection, design, process and capacity considerations</p>
<b>Watershed, Surface Water, and Groundwater</b>	<p>Erosion along streams, rivers, and ditches</p> <p>Erosion scour of associated or supporting earthworks</p> <p>Sediment transport and sedimentation</p> <p>Channel realignment / meandering</p> <p>Change in water quantity</p> <p>Slope stability</p>
<b>Operations, Maintenance, and Materials Performance</b>	<p>Structural aspects</p> <p>Functionality &amp; Effective Capacity</p> <p>Materials Performance (changes over time from design expectation)</p> <p>Pavement Aspects (i.e. hail, softening, cracking from freeze thaw and other causes)</p>
<b>Emergency Response</b>	<p>Storm</p> <p>Flood</p> <p>Ice</p> <p>Water damage</p>
<b>Insurance Considerations</b>	<p>Cost of damage to municipal infrastructure and private buildings</p>
<b>Policy Considerations</b>	<p>Codes</p> <p>Public sector policy</p> <p>Land use planning documents Guidelines</p>
<b>Social Effects</b>	<p>Displacement of residents</p> <p>Interruption of municipal services</p> <p>Interruption of private services</p> <p>Access to services for vulnerable populations (older, disabled)</p>

<b>Table C-2: Infrastructure Threshold Parameters</b>	
Date:	December 1, 2022
Completed by:	AIM Network
<b>Climate Events</b>	<b>Infrastructure Threshold Parameters</b>
Storm Surge	Thunderstorm winds causing storm surge Extremes / wind gusts
Precipitation as Rain	Frequency (one-day, short duration max 24 hours) Extreme Rainfall Intensity < 1 Day Rain on Snow High River Flows
Wind	Sustained Winds (> 1 hour)

**Town of Annapolis Royal**  
**Flood Adaptation Study: Risk Assessment**  
**Table C-3: Exposure Analysis**

**Scope:** Municipal infrastructure limited to asset inventory items. Private infrastructure limited to buildings within impacted zone. Does not consider vehicles or personal effects. Time frame to 2100.  
**Context:** Looking inward, only at elements that can be controlled by municipal action or policy (not outside policy, socio-economic impacts or out of jurisdiction regulations)  
**Criteria:** Risk definition (PoF and CoF) from asset management plan. Climate predictions from documented analysis, flood events from tide and storm surge coincidence.

Infrastructure Components	Infrastructure Response Considerations									Potential Climate Events and Change Factors							
										Storm Surge		Rain		Snow / Storm	Wind		
										Thunderstorms causing storm surge	Extreme Wind Gusts & Wave Runup	Frequency of Severe Storm Driven Peak Flows	Magnitude of Severe Storm Driven Peak Flows	High River Flows from Precipitation / Melt	Rain on Snow	Sustained High Winds	
<b>Facilities</b>																	
Private Buildings on St. George Street	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓			✓
Boardwalk	✓	✓		✓		✓			✓		✓	✓					
Wharf	✓	✓		✓		✓					✓	✓					
Amphitheater	✓	✓		✓		✓		✓			✓	✓					✓
Shoreline Revetement	✓	✓		✓							✓	✓			✓		
Wastewater Treatment Plant	✓	✓		✓		✓					✓	✓			✓		✓
<b>Transportation</b>																	
Road Pavement Structure	✓	✓		✓	✓	✓		✓	✓		✓		✓	✓			
Sidewalks	✓	✓		✓		✓					✓		✓	✓			
Signage	✓	✓		✓		✓											✓
<b>Underground Utilities</b>																	
Stormwater System		✓											✓	✓		✓	
Water Distribution System											✓						
Sanitary Collection System						✓			✓	✓	✓						
<b>Other Utilities</b>																	
Electrical Network																	✓
Communications Network																	✓







Town of Annapolis Royal  
Flood Adaptation Study: Risk Assessment  
Table B.3: Risk Assessment

80-YEAR TIME HORIZON

Infrastructure Components

Infrastructure Response Considerations

Potential Climate Events and Change Factors

Infrastructure Components	Infrastructure Response Considerations									
	Structural Design	Functionality	Watershed, Surface Water, Groundwater	Operations, Maintenance	Emergency Response	Insurance Considerations	Policy Guidelines & Standards	Social Effects	Public Health & Safety	Environmental Effect
<b>Facilities</b>										
Private Buildings on St. George Street	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Boardwalk	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wharf	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Amphitheater	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shoreline Revetment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wastewater Treatment Plant	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Transportation</b>										
Road Pavement Structure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sidewalks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Signage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Underground Utilities</b>										
Stormwater System	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water Distribution System	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sanitary Collection System	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>Other Utilities</b>										
Electrical Network	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Communications Network	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

STORM SURGE		RAIN												SNOW/ STORM				WIND									
		Thunderstorms causing storm surge				Extreme Wind Gusts & Wave Runup				Frequency of Severe Storm Driven Peak Flows				Magnitude of Severe Storm Driven Peak Flows				High River Flows from Precipitation / Melt				Rain on Snow				Sustained High Winds	
Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R	Y/N	L	C	R
✓	5	5	25	✓	2	3	6	✓	2	3	6	✓	1	4	4									✓	5	2	10
✓	5	2	10	✓	5	2	10																				
✓	5	5	25	✓	5	5	25																				
✓	4	2	8	✓	4	2	8																	✓	4	2	8
✓	5	1	5	✓	5	1	5									✓	1	1	1								
✓	5	4	20	✓	1	3	3									✓	3	1	3					✓	3	3	9
✓	5	3	15					✓	3	1	3	✓	3	1	3												
✓	4	3	12					✓	2	1	2	✓	2	1	2												
																								✓	3	1	3
								✓	5	1	5	✓	5	1	5					✓	3	1	3				
✓	1	3	3																								
✓	4	2	8																								
																								✓	4	3	12
																								✓	4	3	12

Likelihood (L)
0 Negligible - Not Applicable
1 Highly Unlikely - Improbable
2 Remotely Possible
3 Possible - Occasional
4 Somewhat Likely - Normal
5 Likely - Frequent

Consequence (C)
No Effect
Insignificant
Minor
Moderate
Major
Catastrophic

Risk Thresholds - Risk(R) = Likelihood (L) x Consequence (C)	
Consequence	Likelihood
5	15 19 22 24 25
4	10 14 18 21 23
3	6 9 13 17 20
2	3 5 8 12 16
1	1 2 4 7 11
	1 2 3 4 5

< 10	Very Low: no action
10-15	Low: Monitor, minimal action
16-19	Medium: Review Risk Sensitivity
20-22	High: Plan Near -Term Action
>= 23	Critical: Immediate Action