

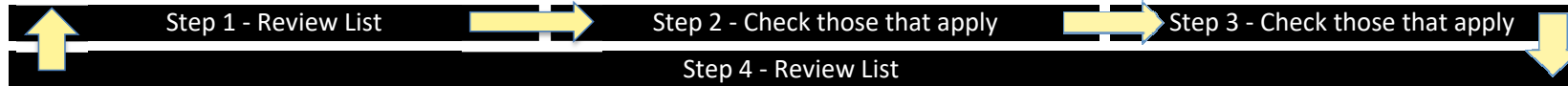
| Table B-1: Town of Annapolis Royal Flood Risk Assessment: Infrastructure Response Considerations | |
|---|---|
| Date: | December 1, 2022 |
| Completed by: | AIM Network |
| Structural Design | Safety Load carrying capacity Fatigue Serviceability Deflection Cracking and deterioration Foundation Design considerations |
| Functionality | Level of Service, Serviceability, Reliability Level of Effective Capacity Short term Medium term Long term Equipment - Component selection, design, process and capacity considerations |
| Watershed, Surface Water, and Groundwater | Erosion along streams, rivers, and ditches Erosion scour of associated or supporting earthworks Sediment transport and sedimentation Channel realignment / meandering Change in water quantity Slope stability |
| Operations, Maintenance, and Materials Performance | Structural aspects Functionality & Effective Capacity Materials Performance (changes over time from design expectation) Pavement Aspects (i.e. hail, softening, cracking from freeze thaw and other causes) |
| Emergency Response | Storm Flood Ice Water damage |
| Insurance Considerations | Cost of damage to municipal infrastructure and private buildings |
| Policy Considerations | Codes Public sector policy Land use planning documents Guidelines |
| Social Effects | Displacement of residents Interruption of municipal services Interruption of private services Access to services for vulnerable populations (older, disabled) |

| Table B-2: Infrastructure Threshold Parameters | |
|---|--|
| Date: | December 1, 2022 |
| Completed by: | AIM Network |
| Climate Events | Infrastructure Threshold Parameters |
| 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 B-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 | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| Facilities | | | | | | | | | | | | | | | | | | | | | |
| Private Buildings on St. George Street | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | | | | | | | | ✓ |
| Boardwalk | ✓ | ✓ | | ✓ | | ✓ | | | | | | | | | | | | | | | |
| Wharf | ✓ | ✓ | | ✓ | | ✓ | | | | | | | | | | | | | | | |
| Amphitheater | ✓ | ✓ | | ✓ | | ✓ | | ✓ | | | | | | | | | | | | | ✓ |
| Shoreline Revetement | ✓ | ✓ | | ✓ | | | | | | | | | ✓ | | | | | | | | |
| Transportation | | | | | | | | | | | | | | | | | | | | | |
| Road Pavement Structure | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | | | | | | | | |
| Sidewalks | ✓ | ✓ | | ✓ | | ✓ | | | | | | | | | | | | | | | |
| Signage | ✓ | ✓ | | ✓ | | ✓ | | | | | | | | | | | | | | | ✓ |
| Underground Utilities | | | | | | | | | | | | | | | | | | | | | |
| Stormwater System | | ✓ | | | | | | | | | | | | | | | | | | | |
| Water Distribution System | | | | | | | | | | | | | ✓ | | | | | | | | |
| Sanitary Collection System | | | | | | | ✓ | | | ✓ | ✓ | | | | | | | | | | |
| Other Utilities | | | | | | | | | | | | | | | | | | | | | |
| Electrical Network | | | | | | | | | | | | | | | | | | | | | ✓ |
| Communications Network | | | | | | | | | | | | | | | | | | | | | ✓ |



Town of Annapolis Royal
 Flood Adaptation Study: Risk Assessment
 Table B-4: Risk Assessment

| Infrastructure Components | Infrastructure Response Considerations | | | | | | | | | Potential Climate Events and Change Factors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---------------|---------------------------------------|-------------------------|--------------------|--------------------------|-------------------------------|----------------|------------------------|---|-----------------------------------|---|---------------------------------|----|---|----|---|---|--|---|--------------|----|----------------------|---|---|---|-----|----|----|---|---|---|----|----|----|---|---|---|---|---|---|--|------------|--|--|--|--|--|--|---|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----|---------------------|-----|--------|-------|--------------------------------------|-------|----------------------------------|
| | Structural Design | Functionality | Watershed, Surface Water, Groundwater | Operations, Maintenance | Emergency Response | Insurance Considerations | Policy Guidelines & Standards | Social Effects | Public Health & Safety | Environmental Effect | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Facilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Private Buildings on St. George Street | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | 3 | 5 | 15 | ✓ | 3 | 5 | 15 | ✓ | | 2 | 4 | 8 | ✓ | 1 | 4 | 4 | | | | | ✓ | 5 | 2 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Boardwalk | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | ✓ | 4 | 2 | 8 | ✓ | 4 | 2 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Wharf | ✓ | ✓ | | ✓ | | ✓ | | | | ✓ | 3 | 5 | 15 | ✓ | 3 | 5 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Amphitheater | ✓ | ✓ | | ✓ | | ✓ | | ✓ | | ✓ | 2 | 2 | 4 | ✓ | 2 | 2 | 4 | | | | | | | | | | | | | | ✓ | 3 | 2 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shoreline Revetement | ✓ | ✓ | | ✓ | | | | | | ✓ | 1 | 4 | 4 | ✓ | 1 | 4 | 4 | | | | | | ✓ | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Transportation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Road Pavement Structure | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | 2 | 4 | 8 | | | | | ✓ | 3 | 1 | 3 | ✓ | 3 | 1 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sidewalks | ✓ | ✓ | | ✓ | | ✓ | | | | ✓ | 2 | 3 | 6 | | | | | ✓ | 2 | 1 | 2 | ✓ | 2 | 1 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Signage | ✓ | ✓ | | ✓ | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | ✓ | 3 | 1 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Underground Utilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stormwater System | | ✓ | | | | | | | | | | | | | | | | | | ✓ | 5 | 1 | 5 | | | | ✓ | 3 | 1 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Water Distribution System | | | | | | | | | | ✓ | 1 | 3 | 3 | | | | | ✓ | | | | ✓ | 5 | 1 | 5 | | | ✓ | 3 | 1 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sanitary Collection System | | | | | | ✓ | | ✓ | ✓ | ✓ | 2 | 5 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Other Utilities | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electrical Network | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ✓ | 4 | 3 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Communications Network | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ✓ | 4 | 3 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Likelihood (L) | Consequence (C) | | | | | | | | | Risk Thresholds - Risk(R) = Likelihood (L) x Consequence (C) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Negligible - Not Applicable | No Effect | | | | | | | | | <table border="1"> <tr> <th rowspan="5">Consequence</th> <th>5</th><th>5</th><th>10</th><th>15</th><th>20</th><th>25</th> </tr> <tr> <th>4</th><td>4</td><td>8</td><td>12</td><td>16</td><td>20</td> </tr> <tr> <th>3</th><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td> </tr> <tr> <th>2</th><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td> </tr> <tr> <th>1</th><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> <tr> <td></td> <th colspan="6">Likelihood</th> </tr> <tr> <td></td> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th> </tr> </table> | Consequence | 5 | 5 | 10 | 15 | 20 | 25 | 4 | 4 | 8 | 12 | 16 | 20 | 3 | 3 | 6 | 9 | 12 | 15 | 2 | 2 | 4 | 6 | 8 | 10 | 1 | 1 | 2 | 3 | 4 | 5 | | Likelihood | | | | | | | 1 | 2 | 3 | 4 | 5 | <table border="1"> <tr> <td>< 5</td> <td>Low: minimal action</td> </tr> <tr> <td>5-9</td> <td>Medium</td> </tr> <tr> <td>10-14</td> <td>High Medium: Review risk sensitivity</td> </tr> <tr> <td>>= 15</td> <td>May require high-priority action</td> </tr> </table> | | | | | | | | | | | | | | | | < 5 | Low: minimal action | 5-9 | Medium | 10-14 | High Medium: Review risk sensitivity | >= 15 | May require high-priority action |
| Consequence | 5 | 5 | 10 | 15 | 20 | 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4 | 4 | 8 | 12 | 16 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | 3 | 6 | 9 | 12 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2 | 2 | 4 | 6 | 8 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Likelihood | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| < 5 | Low: minimal action | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5-9 | Medium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10-14 | High Medium: Review risk sensitivity | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| >= 15 | May require high-priority action | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Highly Unlikely - Improbable | Insignificant | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Remotely Possible | Minor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Possible - Occasional | Moderate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Somewhat Likely - Normal | Major | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Likely - Frequent | Catastrophic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |