ADM-AM-006

Capital Asset Risk Management Policy

Date Approved: 19/10/16

Service: Administration

Date of Last Update: 19/10/01

Sub-service: Asset Management

Next Review Date: 23/10/01

Lead: Director of Operations

Updates: ADM-CAM-006 - Capital Asset Risk Management Policy

Implements: City of Selkirk Capital Asset Management By-law No. 5300

OBJECTIVES

The objectives of this Policy are to:

- define how the City calculates operational risk for capital assets.
- establish critical asset characteristics for each capital asset subclass.
- identify how the City considers risk when prioritizing capital projects.

SUPPORTING POLICY, PROCEDURES, AND TOOLS

Policy
ADM-AM-001 - Capital Asset Registry Policy
ADM-AM-003 - Capital Asset Life-Cycle Management Policy

Procedures
ADM-AM-006-01 – Procedure to Update the City of Selkirk Risk Registry
ADM-AM-006-02 – Procedure to Monitor Service Area Operational Risk from Year to Year

Tools:
ADM-AM-001-00-01 - Capital Asset Registry
ADM-AM-006-00-01 – City of Selkirk Risk Registry
ADM-AM-001-02-01 – Annual Capital Asset Risk Report

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1 DEFINITIONS

"Administration" means all management and staff of the City of Selkirk as outlined within the City of Selkirk Organization Chart.

"Arterial Roads" means high capacity urban roads with the primary function being to deliver traffic from residential and collector roads to highways.

"Asset Registry" means the *ADM-AM-001-00-01- City of Selkirk Asset Registry* document.

"Capital Asset" means a Natural or Engineered Asset deemed material by the City and included in the City's Asset Registry.

"Chief Administrative Officer" means the Chief Administrative Officer for the City of Selkirk as designated by by-law.

"City" means the City of Selkirk.

"Collector Road" means a road which traffic movement and access have similar importance.

"Commercial District" means the area of Manitoba Avenue between PTH 9 and the Gaynor Family Library (806 Manitoba Avenue). This area also includes Morris Avenue, Superior Avenue, Manitoba Avenue, Calderone Avenue, Eaton Avenue, and Mclean Avenue between Eveline Street and Main Street.

"Criticality Score" means the sum of all Critical Asset Characteristic scores, that is equal to a value between 0 and 10. This number shall be accepted as the magnitude of consequence in the risk equation.

"Key Destination" means a destination that has been defined in section 5 of this Policy.

"Service Critical Assets" means a select group of unique assets defined for each subclass that have been identified by service experts. These assets have inconsistent characteristics, but the function of the entire service depends on their function.

"Key Community Facility" means a facility that has been defined in Section 6 of this Policy.

"Natural Asset" means a naturally occurring land, water, air or subservice feature which performs or supports the delivery of a municipal service.

"Operational Risk" means the risk associated with the reduction or elimination of service delivery due to unexpected asset failures.

'Residential Road" means a street or road in a mixed residential/local area that is lightly trafficked.

2 SCOPE

2.1 This Policy shall:

2.1.1 Outline what risk is, and how the City of Selkirk defines risk for individual Capital Assets.

2.1.2 Define what characteristics makes one asset more critical than other assets within the same service area.

2.1.3 Provide direction on how the City determines asset criticality, risk levels, and manages infrastructure risks.

2.1.4 Guide Administration on how decisions are made around risk, and how risk levels are incorporated into the decision-making process when prioritizing infrastructure projects.

3 DEFINING RISK

3.1 Operational Risk, which is the potential for loss in service delivery, shall be the type of risk being measured by this Policy.

3.2 Operational Risk is defined by the City of Selkirk as the Likelihood of Asset Failure multiplied by the Magnitude of Failure Consequence.

3.3 Each Capital Asset's Operational Risk shall be determined using the following equation:

Operational Risk = Magnitude of Failure Consequence X Likelihood of Asset Failure

3.4 An asset's Criticality Score, as recorded in the City of Selkirk Risk Registry, shall be accepted as the Magnitude of Failure Consequence in the Operational Risk Equation.

3.5 An asset's condition, as recorded in the City of Selkirk Asset Registry, shall be accepted as the Likelihood of Asset Failure in the Operational Risk Equation.

3.6 When identifying Critical Asset Characteristics, the following general risk categories are considered:

- Social Risk
- Environmental Risk
- Economic Risk
- Human Safety
- Climate Risk
- Political Risk

4 MAGNITUDE OF FAILURE CONSEQUENCE

4.1 An asset's Criticality Score shall be determined by the Critical Asset Characteristic Table developed for each subclass set out in Section 7.

4.2 A Critical Asset Characteristic Table shall be developed by asset subclass. Each table will contain a list of critical characteristics and potential variations. Each characteristic shall be weighted for importance, and each variation of the characteristic shall receive a score no

higher than the weighting of the characteristics. The higher the score of the characteristic variation, the more critical it makes the asset.

4.3 Overall Criticality Score for an individual asset shall be determined by summing the score of all Asset Criticality Characteristics.

Equation:

$$\sum_{i=1}^{n} Ci$$

5 KEY DESTINATIONS

Key destinations have been identified by Administration and include Selkirk Park, Selkirk Reginal Health Centre, Selkirk RCMP Detachment, and Selkirk Golf & Country Club.

6 KEY COMMUNITY FACILITIES

Key Community Facilities have been identified by Administration and include Betel Personal Care Home, Tudor House Personal Care Home, Extendicare Red River Place, Selkirk Regional Health Centre, Selkirk Mental Health, City of Selkirk Fire Hall, and the Selkirk RCMP Detachment.

7 CRITICAL ASSET CHARACTERISTIC TABLES

7.1 Transportation Services

7.1.1 Road Subbase, Road Base and Road Surface Assets

Characteristic # (C)	Criticality Characteristic	Total Weighting	Variable	Score
C1	Traffic Count	3.5	Arterial Road	3.5
			Collector Road	2.0
			Residential Road	1.0
C2	Commercial District	2.0	Yes	2.0
			No	0.0
C3	Primary Route to Key Destination	2.0	Yes	2.0
			No	0.0
C4	Bus Route	1.5	Yes	1.5
			No	0.0
C5	Truck Route	0.5	Yes	0.5
			No	0.0
C6	Redundancy	0.5	Yes	0.5
			No	0.0

7.1.2 **Traffic Count** shall be determined by whether the road segment is classified as an arterial road, collector road, or residential road. The higher traffic flow, the more critical the road asset.

7.1.3 **Commercial District** is an area in which the primary use of land is for commercial activities such as shopping, restaurants, and offices. These are prioritized as they see an increased amount of traffic from both residents and non-residents of the City.

7.1.4 **Primary Route to Key Destination** is defined as the road network segments that are a part of the shortest and easiest way for an individual coming to a Key Destination within the City of Selkirk, if their origin was outside of the City boundaries. These assets have been prioritized because these are routes used frequently by those travelling to Selkirk from out of town.

7.1.5 **The Bus Route** shall be those road segments that are used for the City of Selkirk Bus Route. These assets have been prioritized because services provided by various trucks that use these routes, rely on the function of these road assets.

7.1.6 **Redundancy** in the road network means that there is an additional or alternate route that can be used to access areas of the City. A lack of redundancy increases the Criticality Score because the impact of a loss of service would be greater if there is no alternate route available.

7.2 Land Drainage Services

7.2.1 Storm Main

Characteristic # (C)	Criticality Characteristic	Total Weighting	Variable	Score
C1	Pipe Diameter	4.0	900-1650mm	4.0
			600-750mm	2.0
			200-525mm	1.0
C2	Service Critical Assets	3.0	Yes	3.0
			No	0.0
C3	Current Over Capacity	2.0	Yes	2.0
			No	0.0
C4	Predicted Over Capacity	1.0	Yes	1.0
			No	0.0

7.2.2 **Pipe Diameter** is the diameter of each storm pipe, as determined by the City of Selkirk Asset Registry. The larger diameters have been given priority as it implies that larger pipes services more customers, and therefore would have a greater impact if the service was lost.

7.2.3 **Service Critical Assets** are a select group of assets that have been identified as critical by service experts. They are unique, but the entirety of the network depends on their function. For the Land Drainage Service Area, these assets are those outfall pipes that bring surface run off to the river.

7.2.4 **Current Over Capacity** is defined as an asset that is within an area that has been identified by City of Selkirk service experts as an area that floods frequently during rain events. These areas have been given increased weighting because they are currently failing or are providing service poorly during rain events, and due to climate

change predictions in the City of Selkirk, this loss of service will occur more frequently and with greater intensity. Data to be collected.

7.2.5 **Predicted Over Capacity** assets are those that are not currently over capacity but based on the expected climate change trends in the City of Selkirk, these will be problem areas in the future. To adapt to the changing climate, these assets have been prioritized. Data to be collected.

7.3 Wastewater Services

7.3.1 Wastewater Main

Characteristic # (C)	Criticality Characteristic	Total Weighting	Variable	Score
C1	Pipe Diameter	3.0	525-900mm	4.0
			300-500mm	2.0
			100-300mm	1.0
C2	Combined/Separated Sewers	2.5	Combined	2.5
			Separated	0.0
C3	Service Critical Assets	2.0	Yes	2.0
			No	0.0
C4	Force vs Gravity Sewer	1.5	Yes	1.5
			No	0.0
C5	Key Community Facility Service Critical Asset	1.0	Yes	1.0
			No	0.0

7.3.2 **Pipe Diameter** is the diameter of each wastewater main pipe, as determined by the City of Selkirk Asset Registry. The larger diameters have been given priority as it implies that larger pipes services more customers, and therefore would have a greater impact if the service was lost.

7.3.3 **Combined/Separated Sewers** means that the land drainage and sewer mains are or are not separated. Combined sewers have been given a higher priority due to the risk that they pose to the environment in times of high rainfall when there is potential for this material to be deposited in the river. In addition, the City has made it a priority to separate combined sewers to better manage the increased amount of storm water that is predicted due to climate change.

7.3.4 **Service Critical Asset** are a select group of assets that have been identified as critical by service experts. They are unique, but the entirety of the network depends on their function. In the Wastewater Service Area, these assets include the main directly after the Dufferin Lift Station.

7.3.5 **Force vs Gravity Sewer** defines the way in which materials are transported through a sewer main. Where slope is not great enough, sewer mains are forced as opposed to gravity. Forced gravity sewer mains have been prioritized because they are responsible for the movement of more effluent than a pipe of its diameter that is a gravity main. This extra weighting ensures that the pipe is prioritized, despite the diameter of the pipe.

7.3.6 **Key Community Facility Service Critical Asset** is a wastewater main asset that is within a critical distance from a Key Community Facility to the first tee in the main. These assets are prioritized because a break in these assets would result in immediate loss of service to the facility.

7.4 Water Services

7.4.1 Watermain

Characteristic # (C)	Criticality Characteristic	Total Weighting	Variable	Score
C1	Service Critical Assets	3.5	Yes	3.5
			No	0.0
C2	Pipe Diameter	3.0	525-900mm	4.0
			300-500mm	2.0
			100-300mm	1.0
C3	Redundancy	2.0	No	2.0
			Yes	0.0
C4	Key Community Facility Service Critical Asset	1.5	Yes	1.5
			No	0.0
			No	0.0

7.4.2 **Service Critical Assets** are a select group of assets that have been identified as critical by service experts. They are unique, and the entirety of the network depends on their function. For this Service Area, the Service Critical Assets are those that move water directly in or out of the Water Treatment Plant, or Reserve Tanks.

7.4.3 **Pipe Diameter** is the diameter of each water main pipe, as determined by the City of Selkirk Asset Registry. The larger diameters have been given priority as it implies that larger pipes service more customers, and therefore would have a greater impact if the service was lost.

7.4.4 **Redundancy** in the water network means that there is an additional or alternate watermain that services a specific area of the City. A lack of redundancy increases the Criticality Score because the impact of a loss of service would be greater if there is no alternate supply source.

7.4.5 **Key Community Facility Service Critical Asset** is a watermain asset that is within a critical distance from a Key Community Facility to the first tee in the main. These assets are prioritized because a break in these assets would result in immediate loss of service to the facility.

7.5 Parks and Recreation Services

7.5.1 Parks

Characteristic # (C)	Criticality Characteristic	Total Weighting	Variable	Score
C1	Park Category	3.5	Reginal Park	3.5
			Community Park	2.5

			Neighborhood Park	1.5
C2	Amenities	2.5	> X amenities present	2.5
			< X amenities Present	0.0
C3	Natural Assets	2.5	Yes – The majority of surroundings are Natural Assets	2.5
			No – The majority of surroundings are not natural assets, they are groomed	0.0
C4	Seasonal	1.5	Yes – This is open year-round	1.5
			No – This is open for only a specific season	0.0

7.5.2 **Park Category** is defined by the Selkirk Recreation Master Plan. A regional park is defined as facilities and parks that are designed to serve a critical mass of participants, and people will travel throughout the region to visit. A Community Park provides services to a smaller market than regional parks; they are multipurpose and multi-use in nature. Neighborhood parks serve residents near their home and provide access to basic recreation activities.

7.5.3 **Amenities** are defined as a desirable or useful feature in a park, such as benches, washrooms, picnic areas, recreation structures etc.

7.5.4 **Natural Assets** describe the assets that are present and surround the park. Natural Assets within or surrounding the park are prioritized as it is more difficult to replace these assets, than it would be to replace engineered or groomed park areas.

7.5.5 **Seasonality** of a park is defined by the seasons of operation, whether it is open year round or only during specific seasons.

7.6 Pathways

Characteristic # (C)	Criticality Characteristic	Total Weighting	Variable	Score
C1	Natural Assets	3.3	Yes	3.3
			No	0.0
C2	Number of Users	3.0	Regional	3.0
			Community	2.0
			Neighbourhood	1.0
C3	Connectivity	2.0	> 5 Entry Points	2.0
			< 5 Entry Points	1.0
C4	Accessible	1.7	Yes, this park is accessible to all	1.7
			No, this park is not accessible to all	0.0

7.6.1 **Natural Assets** describe the assets that are present and surround the pathways. Natural Assets within or surrounding the pathways are prioritized as it is more difficult to replace these assets, than it would be to replace engineered or groomed park areas.

7.6.2 **Number of Users** is defined by the category of park that the pathway is located within. This can be either a Neighborhood Park, a Community Park, or a regional facility.

7.6.3 **Connectivity** of a pathway is defined by the number of entry points to the pathway. This is a measure of capacity for interconnection with the active transportation or sidewalk network, and a gauge of how easily accessible it is to users. Data to be collected.

7.6.4 **Accessible** is a pathway that is flat with no barriers for wheelchair mobility. Data to be collected.

8 LIKELIHOOD OF OCCURANCE

An assets' likelihood of occurrence is equal to the condition score of the asset.

9 RISK SCORE

9.1 A risk score shall be determined for each asset in the *City of Selkirk Capital Asset Registry*.

9.1.1 Risk score shall be calculated by using the following equation:

Risk Score = Operational Risk X Service Area Multiplier

9.1.2 Due to differences between service areas and some being inherently more critical than other due to the type of risk consequences, assets belonging to different service areas cannot be compared using operational risk values. A service area multiplier must be applied before comparing risk between assets of different service areas.

9.1.3 The following table shall define the Service Area Multiplier to be applied to each Service Area when comparing risk.

9.1.4 The weighting for each service area takes into consideration health and human safety, climate change impacts, legislative requirements, as well as service delivery expectations.

Service Area	Service Area Multiplier
Water Services	10.0
Wastewater Services	8.0
Land Drainage Services	7.0
Transportation Services	6.0
Parks and Recreation Services	4.0

10 ACCEPTABLE RISK

10.1 There shall be risk associated with all City assets. There is not a condition of zero risk.

10.2 If a temporary loss of service in a service area is acceptable for the asset in question, that asset may be allowed to deteriorate to a point that represents a high probability of failure.

10.3 As the City continues to develop this tool, an acceptable risk level shall be established for each service area.

11 CLIMATE CHANGE CONSIDERATION

11.1 Opportunities to mitigate, adapt or increase resiliency to climate change were identified throughout the Critical Asset Characteristic weighting process, and those characteristics that increased the City's adaptation were weighted to reflect higher priority.

11.2 Consideration was given to climate change, and the City's Climate Change Adaptation Strategy in the following ways:

11.2.1 The Land Drainage Service Area's Critical Asset Characteristic identifying areas that are likely to be over capacity based on future precipitation predictions being prioritized over those assets that have sufficient capacity for future precipitation predictions.

11.2.2 Prioritization of sewers that have the potential to be separated is built into consideration by the level of weighting these assets receive. This is important for both the land drainage network, as well as the wastewater network as the climate changes.

11.2.3 Prioritization of Natural Assets and recognizing the importance of biodiversity, protection of environmental services such as storm water absorption, carbon sequestration and tree shading, through the increased score associated with parks and pathways that have Natural Assets.

11.3 As asset classes are added, climate mitigation, adaptation and resiliency will be prioritized throughout Critical Asset Characteristic weightings.

12 RISK MANAGEMENT DECISIONS/PRIORITIZING ACTIONS

12.1 All assets shall be managed according to the *Capital Asset Life-Cycle Management Policy* to ensure assets are designed, managed, and operated in a way that meets organizational objectives and minimizes operational risk.

12.1.1 Preventative maintenance scheduled for each asset subclass outlined by the *Capital Asset Life-Cycle Management Policy* shall be followed to reduce the risk of operational failure.

12.1.2 Infrastructure projects that have a high overall Risk Score shall be generally prioritized over infrastructure projects with a low-Risk Score.

12.1.3 In the situation where more than one infrastructure project is being considered and both have a high-risk score, the conflict shall be discussed among Administration and a decision will be made with considerations of the types of risk and consequences associated with each.

13 RISK REGISTRY

13.1 The City shall develop and maintain a digital *Risk Registry*, which contains an asset Criticality Score for each asset, based on that asset subclasses Critical Asset Characteristic Table.

13.2 All Capital Assets within an Asset Subclass that has a defined Critical Asset Characteristic Table in this Policy shall be included in the *Risk Registry*.

14 CURRENCY OF RISK REGISTRY

14.1 Administration shall ensure that the *Risk Registry* is maintained and kept current according to the provisions set out in this Policy.

14.1.1 Capital Assets in the *Risk Registry* shall, as practicable, be recorded or updated in the *Risk Registry* within 30 days of their requirement, procurement, or completion of construction.

14.1.2 When adding, removing, or making an update to an asset in the *Risk Registry*, the impact on adjacent assets in the network must be considered by revaluating critical asset risk scores.

14.1.3 The Critical Asset Characteristics for all assets shall be reviewed annually to ensure the accuracy of the *Risk Registry*.

15 MONITORING RISK

15.1 The Service Area Operational Risk score for each service area shall be calculated using the following equation:

$$\text{Service Area Operational Risk Score} = \frac{\sum_{i=1}^{n} \textit{Operational Risk Score}_i}{\sum_{i=1}^{n} \textit{Worst Case Scenario Risk}_i}$$

15.2 At the end of the year, the Service Area Operational Risk score for each service area identified in the City of Selkirk Asset Registry Policy shall be documented in the Annual Sustainable Service Delivery Report Card and compared to the previous years overall risk scores to monitor risk levels from year to year.

15.3 Worst Case Scenario Risk shall assume that all assets belonging to a service area have the greatest Likelihood of Failure (5).

15.4 Based on the Service Area Operational Risk Score, the service areas level of risk shall be determined based on the following table:

Service Area Operational Risk Score Range	Service Area Risk Category
81-100	Very High
61-80	High
41-60	Medium
21-40	Low
0-20	Very Low

16 POLICY REVIEW

This Policy shall be reviewed no less than every five years from the date it is effective.

17 EFFECTIVE DATE

This Policy shall be effective as of January 30, 2019.

Recommended By:

Edie Henrichsen — 19/10/16

Edie Henrichsen
Director of Corporate Services

Date Recommended (YY/MM/DD)

Approved By:

Duane Nicol — 19/10/16

Duane Nicol
Chief Administrative Officer

Date Approved (YY/MM/DD)