RAILROAD CROSSINGS

ASSET MANAGEMENT PLAN

2025

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This Asset Management Plan may be used as a supporting document to inform an overarching Transportation Infrastructure Strategic Asset Management Plan.

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1.0 STATE OF INFRASTRUCTURE REPORT (SOIR) CARD

1.1 Executive Summary

The City of Fort Collins initiated the development of an asset management system for effective management of the assets in the six service areas: streets, bridges, traffic devices, sidewalks and ramps, railroad crossings, and transit & parking facilities. In addition to other components, the asset management system includes the development of an asset management plan for each of the six service areas. An asset management plan is developed following four steps: (I) define the state of the infrastructure, (II) determine the level of service, (III) devise an asset management strategy, and (IV) develop a financing strategy. This report outlines the development of the state of the infrastructure or infrastructure report card for the rail Crossings service area.

The infrastructure report card for the rail crossings service area is developed following four steps:

1. Capture asset inventory.
2. Conduct condition assessment.
3. Calculate age and remaining useful life.
4. Complete asset valuation.

For Step 2, the condition assessment utilizes existing condition data collected by the City of Fort Collins. The cumulative rail crossing inventory includes 79 crossings. For Step 3, not enough information was available in GIS to determine the age and remaining useful life for all crossings.

A letter grade (A through F) was assigned to each service area to reflect its performance in relation to established level of service goals within the following categories: Condition versus Performance and Funding versus Needs. A third category was included for the Railroad Crossings service area: Capacity versus Condition.

The Condition versus Performance category illustrates the average condition of all assets within that service area against the level of service goal(s). A letter grade of "A" indicates an average at or above what is specified within the goal, whereas an "F" signifies that the average condition is well below the established goal.

Condition vs. Performance		
Railroad Crossings Rating	Letter Grade	Description
B	A – Very Good	New or recently rehabilitated; performance beyond goal.
	B – Good	Minor deterioration or defects; performance meets goal.
	C – Fair	Moderate deterioration or defects; performance slightly below goal.
	D – Poor	Serious deterioration or defects; performance well below goal, remediation required.

	F – Very Poor	Critical deterioration, possibly closed or out of service; performance yields asset unusable.

The Funding versus Needs category indicates how well the current level of funding allows the city to reach its level of service goals with respect to required asset replacement or rehabilitation needs. A letter grade of "A" represents a funding level at or above what is required by the level of service goals and may indicate an opportunity to strengthen goals. A letter grade of "F" indicates that a large increase in funding is required to meet the current level of service goals, or that the goals need to be greatly reduced based on current funding levels.

Funding vs. Needs		
Bridges and Culverts Rating	Letter Grade	Description
C	A – Very Good	Funding exceeds requirement for current goals; consider strengthening goals.
	B – Good	Funding adequate to meet current goals.
	C – Fair	Minor increase to funding required to meet current goals.
	D – Poor	Funding inadequate for current goals; consider reducing goals.
	F – Very Poor	Funding greatly inadequate for current goals; Goal revision or large improvement to funding source(s) required.

Capacity versus Condition, a metric specific to the Railroad Crossings network, represents the ability of structures to efficiently carry traffic in relation to the controlling component condition rating. This item references the associated condition of the crossings versus average daily traffic crossing the structure. Comparing this rating against a structure's condition aids an owner in identifying infrastructure that may cause significant impacts to the movement of goods and services throughout the network. A Capacity versus Condition grade of "F" may indicate that a structure has sufficient capacity but whose poor structural condition may cause a closure in the near future, or that a structure is in good condition but due to poor capacity causes a bottleneck and possible delays for drivers. A grade of "A" indicates that both condition and capacity for the structure are currently beyond the needs of the network. It should be noted that the only ways to improve this metric are to increase a structure's capacity via replacement, or by improving a structure's condition through maintenance and/or rehabilitation efforts.

Capacity vs. Condition		
Bridges and Culverts Rating	Letter Grade	Description
B	A – Very Good	Capacity and Condition exceed the needs of the network.
	B – Good	Capacity and Condition meet the needs of the network.
	C – Fair	Capacity and/or Condition may cause impacts to the network.
	D – Poor	Capacity and/or Condition may cause significant delays or impacts.
	F – Very Poor	Capacity and Condition are threatening the ability to move goods and services through the network.

The railroad crossing inventory is primarily comprised of arterial, collector, local, and trolley crossings. The cumulative railroad crossing inventory includes 79 structures which is, on average, in good condition with useful service lives ranging from 15-35 years, and a replacement cost of $10.8 million. Presently, the railroad crossing assets are well managed minor areas for improvement. These are discussed in related sections, and recommendations are given towards the end of this report.

RAIL CROSSINGS - Overall

79 Total

B – Good Condition

$ 10.8 M

15-35 Yrs Useful Life

1.2 Approach

The State of Infrastructure Report (SOIR) card for the rail crossings service area is developed based on the following core asset management questions. Each question focuses on a specific aspect of the asset management domain. Each question results in creating a specific deliverable discussing and representing a fundamental component required for effective asset management planning. These deliverables are developed through extensive discussions held in meetings, workshops, and presentations.

- What assets do we own? (Asset Inventory Management):
  Refers to the identification, categorization, quantification, and recording of assets.
- What is the condition of assets? (Asset Condition Assessment):
  Refers to assessing the overall condition of assets in terms of the physical condition, capacity condition, and funding level. Due to limited information on the capacity and funding levels (estimated at $125,000 per year for the City and remaining costs shared by the RR), only physical condition is considered in the assessment presented in this report. In subsequent revisions, all three factors will be considered in the asset condition assessment.
- Are the assets accessible? (Asset Accessibility Assessment):
  Refers to assessing the overall compliance of assets in terms of the Americans with Disabilities Act of 1990 (ADA).
- What is the expected Useful Life or Service Life of asset? (Asset Useful Life Expectancy):
  Refers to the expected useful life of assets is defined to estimate the remaining useful life that is required for asset management planning.
- What is the worth of assets? (Asset Valuation):
  Refers to the asset worth in terms of the asset replacement cost. The overall value of the asset portfolio is determined by estimating the cost required to replace them.

A detailed discussion is presented towards the end of the report to identify gaps in the current SOIR card and propose recommendations to address them.

Key stakeholders in the preparation and implementation of this AM Plan are shown in Table 1.2.

Table 1.2: Key Stakeholders in the AM Plan

Key Stakeholder	Role in Asset Management Plan
City Council	• Represent needs of community/shareholders, • Allocate resources and provide high level oversight to deliver strategic objectives and plans, • Ensure sustainable service delivery, • Communicate City strategic objective and measures.
City Leadership	• Ensuring council's policy direction through day-to-day management of city functions, including oversight of City operating departments.

Key Stakeholder	Role in Asset Management Plan
	• Implementation of annual budget • Ensure effective delivery of services consistent with council direction.
PDT Directors	• Communicate needs of community/shareholders, • Approve bi-annual budget offers to meet community needs and planning efforts, • Approve department strategy, policy, plans and procedures, and status of asset management program.
City Engineer	• Represent needs of Engineering Department to PDT Directors, • Assist with policy, processes, and budgets. • Assist with establishing levels of service
Special Projects Manager	• Assist with development of objectives, measures, targets/goals, • Review budget to manage lifecycle costs, • Assist with establishing levels of service for asset infrastructure.
External Committees, Boards, or Groups	• Communicates with the community to identify and express concerns related to transportation issues, • Help develop or identify solutions related to levels of service, performance measures, or asset infrastructure.

1.2.1 Goals and Objectives of Asset Ownership

Our goal for managing infrastructure assets is to meet the defined level of service (as amended from time to time) in the most cost effective manner for present and future consumers.

The key elements of infrastructure asset management are:

- Providing a defined level of service and monitoring performance,
- Managing the impact of growth through demand management and infrastructure investment,
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined level of service,
- Identifying, assessing, and appropriately controlling risks, and
- Linking to a Long-Term Financial Plan which identifies required, affordable forecast costs and how it will be allocated.

Key elements of the planning framework are:

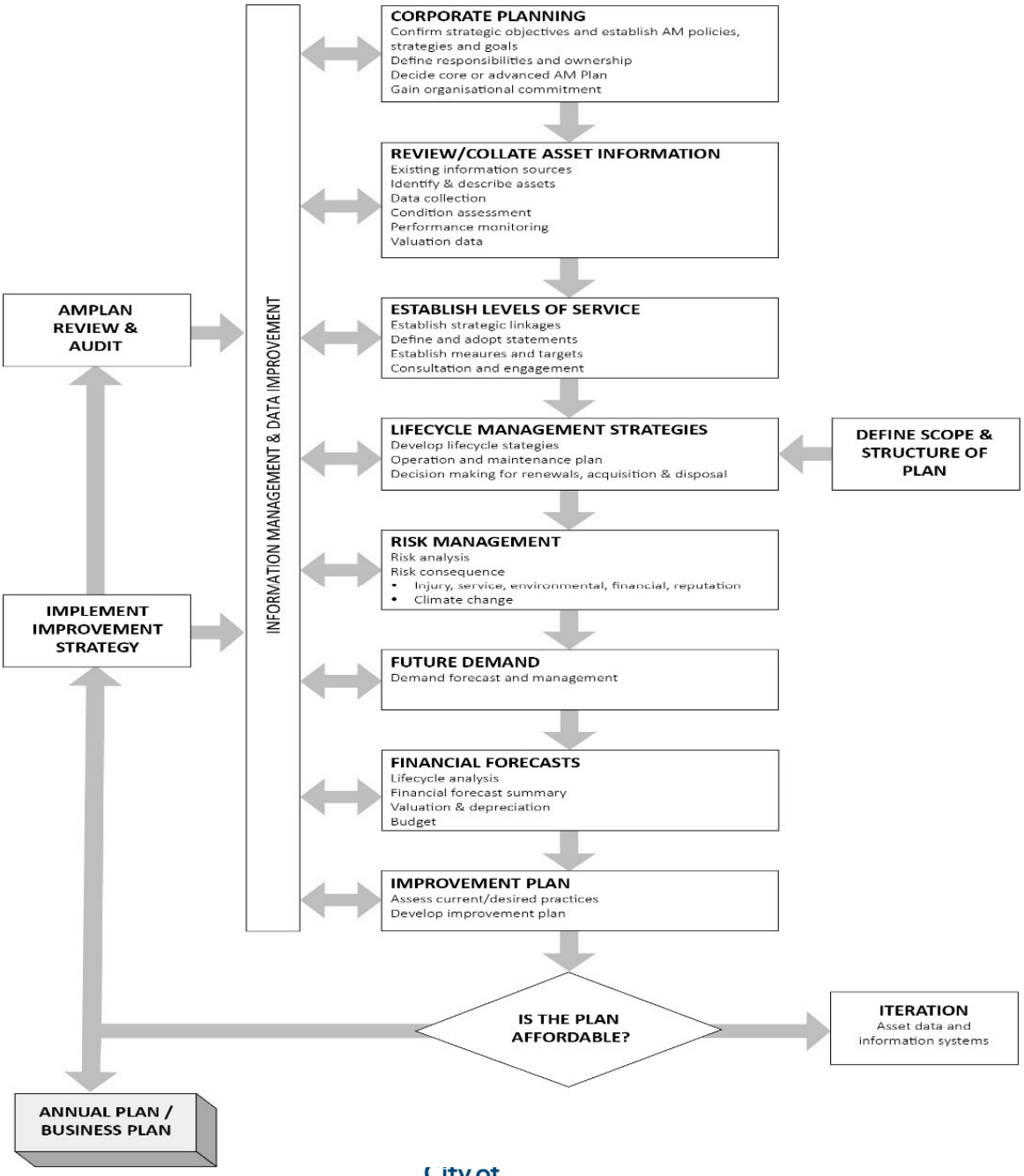
- Levels of service – specifies the services and levels of service to be provided,
- Risk management – what are the associated risks and consequences,
- Future demand – how this will impact on future service delivery and how this is to be met,

- Lifecycle management – how to manage its existing and future assets to provide defined levels of service,
- Financial summary – what funds are required to provide the defined services,
- Asset management practices – how we manage provision of the services,
- Monitoring – how the plan will be monitored to ensure objectives are met,
- Asset management improvement plan – how we increase asset management maturity.

Other references to the benefits, fundamentals principles and objectives of asset management are:

- International Infrastructure Management Manual 2015
- ISO 55000

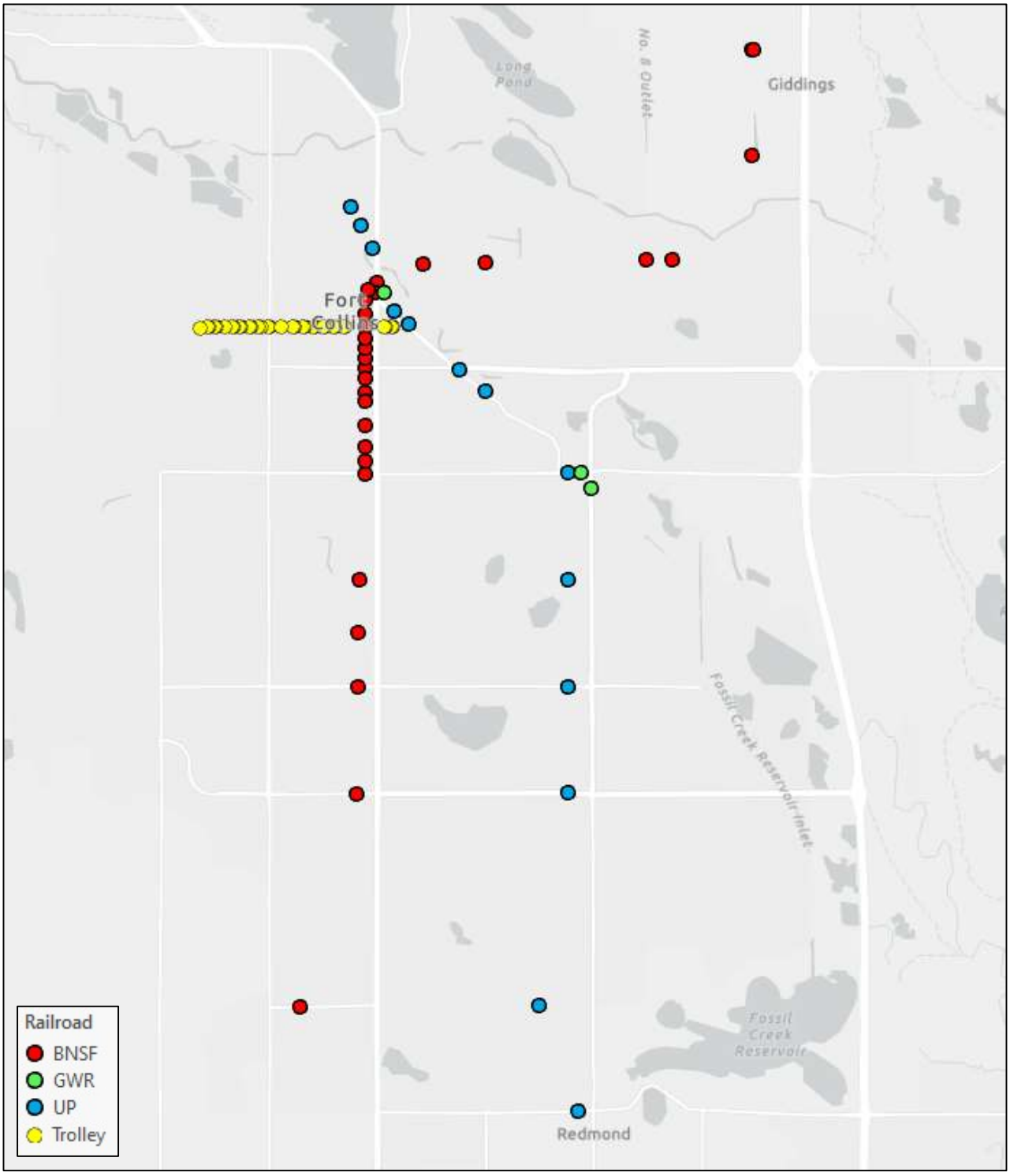
Road Map for preparing an Asset Management Plan



1.3 Inventory

The City's GIS database contains 79 rail crossing assets. The locations of all crossings are shown in Figure 1.3 below.

Figure 1.3: Rail Crossings GIS



1.4 Condition

The asset management best practices emphasize the use of three criteria for condition assessment of assets, including physical condition vs. performance, capacity condition vs. need, and funding vs. need. Due to the lack of detailed information about capacity and funding levels, the team decided to exclude capacity and funding criteria from this first-ever asset management plan and infrastructure report card.

Asset life expectancy depends on several factors, including installation practices (poor vs. good workmanship), maintenance practices (preventive vs. reactive), treatment timing, and asset usage. An asset gets deteriorated much earlier in its lifecycle, and its life expectancy is much shorter when proper attention is not given to these factors. It is important for the asset owners to establish and implement a comprehensive condition assessment program. In the absence of such a program, a good starting point is to use the remaining useful life of assets to represent the condition of an asset.

Sometimes, the asset age information is missing, and in lieu of, an expert opinion is used. In the expert opinion approach, experts subjectively assess the condition of assets based on explicit and tacit knowledge.

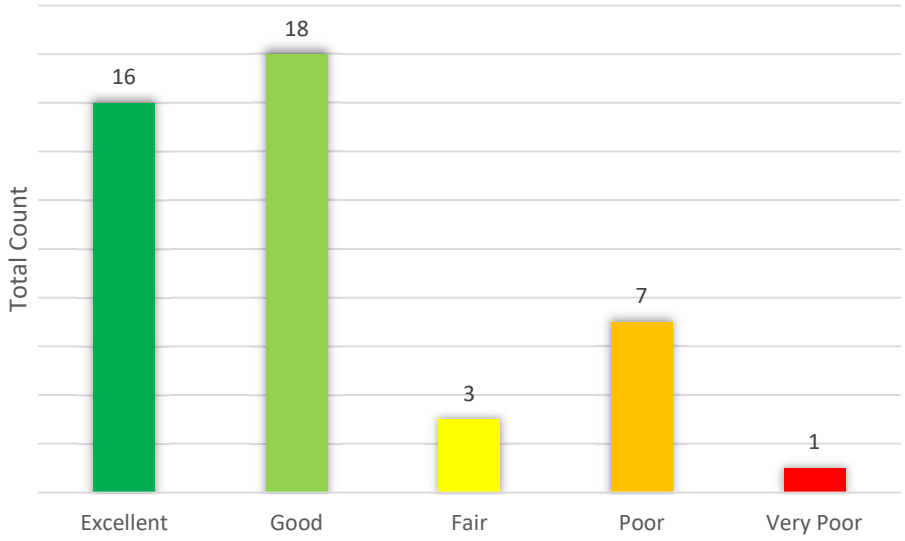
The condition of the rail crossing assets is taken directly from the 2024 GIS database provided by Fort Collins, and used the scale shown in Table 1.4. Assets with missing data are not graded on the scale shown below.

Table 1.4: Condition Index

Report Card Grade	GIS Condition Values
A – Excellent	1
B – Good	2
C – Fair	3
D – Poor	4
F – Very Poor	5

The overall report card grade for the rail crossings is “B – Good”. A breakdown of the GIS condition ratings is shown below in Figure 1.4.

Figure 1.4: Rail Crossing Condition Count



1.5 Life Expectancy

46 of the 79 total rail crossings contained age data in the GIS database provided. Material type is also missing for all but 29 of the rail crossing assets. The useful life expectancy data is based on observational and anecdotal data from City staff:

- Concrete (rail crossings): 15-35 years
- Timber (rail crossings): 15-20 years
- Asphalt (rail crossings): 15-20 years

1.6 Valuation

Asset valuation refers to the worth of an asset or asset portfolio at any given point in time. It is a process of estimating the present worth of tangible capital assets like roads, alleys, sidewalks, and curbs and gutters.

The asset management best practices, guides, and manuals specify two approaches for asset valuation; net book value (used for financial reporting), and replacement cost (used for financial planning).

The net book value is determined based on the historical cost, which includes all the costs associated with the acquisition, construction, development, or betterment of assets at the time of ownership.

The net book value is the original acquisition cost less accumulated depreciation, depletion, or amortization. In the domain of asset management, the net book value is not used for the infrastructure renewal planning because many assets are long-lived and are fully depreciated in the financial statement but still is service.

The replacement cost is the amount of dollars required at any given point in time to replace various tangible capital assets. The replacement cost valuation approach is preferred for asset management financial planning as it represents a true picture of the financial requirements for capital improvements. The replacement cost valuation is useful for assets having relatively long useful lives like water, wastewater, and transportation infrastructure. Compared to net book value, the replacement cost approach is more representative of future capital needs and more useful for decision-making. Replacement values are used to estimate potential investments for asset management purposes. The replacement values are the preferred indicator of cost used to estimate expenditures that will be required when assets reach the end of their useful lives.

To determine the replacement cost of assets, the 2022 CDOT cost data book was used to derive a typical per square yard cost for concrete. There is no dimensional data to describe the crossings in GIS, however concrete crossing panels are quantified. Crossing replacement costs average $300,000 each. The total replacement value of the rail crossings (less trolley crossings) is estimated at $10,800,000, using the information provided in GIS for the assessment.

2.0 LEVEL OF SERVICE (LOS) METRICS

2.1 Customer Level of Service (LOS) Metric

Customer Value	Organizational Level of Service Objectives (Org. Objectives)	Customer Level of Service (Measures)	Customer Level of Service (Performance)	Customer Level of Service (Frequency)	Customer Level of Service (Target)
Quality Is the service of sufficient quality?	Rail crossings are smooth to traverse in a vehicle and as a pedestrian/cyclist.	Rail crossings with condition rating of Fair or better	82%	3 Year	> 90% of inventory
Quantity and Scope Is the service of sufficient quantity and adequate coverage?	Sufficient rail crossings exist to provide connectivity of the City's street network.	Arterial and collector street network continuous across rail network	98.7%	Ongoing	100%
Legislative Does the service meet legal requirements?	Design, implement, and maintain rail crossings in compliance with regulations.	Feedback from staff/auditors	100%	Ongoing	100%
Reliability/Functionality How predictable is the service? How operational is the service?	Rail crossings operate consistently.	# of rail crossing signal malfunctioning events causing vehicle delay	4	Annual	< 10

Customer Value	Organizational Level of Service Objectives (Org. Objectives)	Customer Level of Service (Measures)	Customer Level of Service (Performance)	Customer Level of Service (Frequency)	Customer Level of Service (Target)
Sustainability Does the service fit with future needs?	Rail crossings are provided as necessary in new development and annexation to provide connectivity of the arterial and collector street network.	Arterial and collector street network continuous across rail network in new development and annexed areas.	98.7%	Annual	100%
Accessibility Can the service be easily accessed and used?	Rail crossings are compliant with applicable federal regulations, including ADA requirements.	Rail crossings fully compliant with ADA regulations	44.1%	Annual	100%
Health and Safety Does the service pose a risk to health and safety?	Rail crossings are safe to traverse in a vehicle and as a pedestrian/cyclist.	# accidents related to rail crossings	0	Annual	Vision Zero
Affordability/Cost Efficient Does the service offer best value for the money?	Rail crossings are planned, designed, and implemented in an efficient manner.	Annual operating budget for rail crossings ($)	$125,000	Annual	$367,400
Customer Services/Responsiveness Does the organization promptly engage and reply to customers?	Complaints about rail crossings are promptly and adequately addressed.	% inquiries/complaints responded to within 3 business days	100%	Ongoing	75%

2.2 Technical Level of Service (LOS) Metric

Customer Value	Organizational Level of Service Objectives (Org. Objectives)	Technical Level of Service (Measures)	Technical Level of Service (Performance)	Technical Level of Service (Frequency)	Technical Level of Service (Target)
Quality Is the service of sufficient quality?	Provide high quality and well-maintained rail crossings.	# of rail crossing projects per year	1	Annual	2
Quantity and Scope Is the service of sufficient quantity and adequate coverage?	Provide sufficient rail crossings exist to provide connectivity of the arterial and collector street network.	# new rail crossings built to facilitate street connectivity	1	Annual	As Needed
Legislative Does the service meet legal requirements	Design, implement, and maintain rail crossings in compliance with regulations.	Feedback from staff/auditors	100%	Ongoing	100%
Reliability/Functionality How predictable is the service? How operational is the service?	Provide rail crossing signals that operate consistently.	Time of delay per rail crossing signal malfunctioning events (seconds)	TBD	Annual	< 180 seconds 50% of the time
Sustainability Does the service fit with future needs?	Provide rail crossings on arterial and collector street network in new development and annexation.	Arterial and collector street network continuous across rail network in new development and annexed areas	98.7%	Per Development Review	100%

Customer Value	Organizational Level of Service Objectives (Org. Objectives)	Technical Level of Service (Measures)	Technical Level of Service (Performance)	Technical Level of Service (Frequency)	Technical Level of Service (Target)
Accessibility Can the service be easily accessed and used?	Provide rail crossings that are compliant with ADA regulations.	Accessibility improvements included in rail crossing projects	0%	Per Project	100%
Health and Safety Does the service pose a risk to health and safety?	Provide rail crossings are safe to traverse in a vehicle and as a pedestrian/cyclist.	Safety enhancements included in rail crossing projects	100%	Per Project	100%
Affordability/Cost Efficient Does the service offer best value for the money?	Plan, design, and implement rail crossings in an efficient manner.	Annual operating budget for rail crossings ($)	$125,000	Annual	$367,400
Customer Services/Responsiveness Does the organization promptly engage and reply to customers?	Respond promptly to customer inquiries and complaints about rail crossings.	% inquiries/complaints responded to within 3 business days	100%	Ongoing	75%

3.0 DECISION MAKING STRATEGY

3.1 Background Overview

Figure 3.1: Decision Making Flow Chart

The general decision-making process is shown above in Figure 3.1. Detailed information for each step is outlined below.

3.2 Asset Inspection & Inventory

- The Railroad owner performs all inspections but does not routinely share inspection data. City staff will perform visual inspections on an annual basis.
- Railroad assets are assigned condition values 1 to 5, where 1 is rail crossing infrastructure in Excellent condition and 5 is rail crossing infrastructure in Very Poor condition. Assessment is based on visual observation.
- The rail crossing network includes asphalt, timber, and concrete crossings. Presently, rail crossing condition data is stored in GIS.

3.3 Asset Prioritization

- The rail department keeps a condition-based running list of the top 3-5 asset candidates, with the goal of completing 2 projects per year; however, this goal has not been consistently met.
- If, under the prioritization process, two different assets tie in condition score, then the priority is adjusted based off traffic volumes, school bus routes, equity concerns, and safety concerns.

3.4 Project Selection

3.4.1 Strategic and Corporate Goals

This AM Plan is prepared under the direction of the City of Fort Collins' vision, mission, goals and objectives.

Our vision is:

"We foster a thriving and engaged community through our operational excellence and culture of innovation."

Our mission is:

"Exceptional Service for an Exceptional Community."

Strategic goals have been set by the City of Fort Collins City Plan and Strategic Plan. The relevant goals and objectives and how these are addressed in this AM Plan are summarized in Table 3.4.1.

Table 3.4.1: Goals and how these are addressed in this Plan

Goal	Objective	How Goal and Objectives are addressed in the AM Plan
Transportation & Mobility 1	Make significant progress toward the City's Vision Zero goal to have no serious injury or fatal crashes for people walking, biking, rolling, or driving in Fort Collins.	Reviews condition, functionality, and service capacity of railroad crossings and identifies the necessary budget to improve those conditions
Transportation & Mobility 6.2	Support an efficient, reliable transportation system for all modes of travel, enhance high-priority intersection operations, and reduce Vehicle Miles Travelled (VMT).	Review lifecycle costs to ensure financial sustainability while focusing efforts on demand and risk management
Transportation & Mobility 6.5	Maintain existing and aging transportation infrastructure to keep the system in a state of good repair and continually address missing elements to meet community needs and expectations.	Reviews customer levels of service for lifecycle costing while balancing associated risks within the proposed budget

3.4.2 Project Categorization

- Presently, there is no set process for differentiating Maintenance vs. Rehabilitation vs. Reconstruction. Emergency repairs due to vehicular damage may use temporary asphalt.
- Presently, there is no set process for Disposal activities nor Expansion activities.
- Railroad owner prefers Reconstruction over Rehabilitation. 1-2 Panels typically trigger full reconstruction of crossing.

3.4.3 Project Coordination

- The list of projects is coordinated internally within the department, with the streets department, and with the Railroad owner to establish priorities and coordinate construction to optimize project costs and reduce social impact.

3.5 Forecasting

3.5.1 Financial Planning

- Due to budgetary constraints, the Council allocated an amount of $125K/year (reduced from $150K/year) for rail crossing improvement. This funding is a combination of both capital and maintenance funding.
- The financial planning for rail crossings is based on explicit information and tacit knowledge of the staff and historical costs to develop cost per linear foot or cost per area. No application is used to identify and select appropriate capital improvement projects related to rail crossings.

3.5.2 Lifecycle Analysis

- Presently, there is no forecasting process defined and no deterioration curves have been developed for Railroad assets.
- NAMS+ toolkit to be used for future AM forecasting but will require estimated age data to be collected via inspection.

3.5.3 Risk Management Planning

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Risk Management is defined in ISO 31000:2018 as: 'coordinated activities to direct and control with regard to risk'.

An assessment of risks associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, and the consequences should the event occur. The risk assessment should also include the development of a risk rating, evaluation of the risks and development of a risk treatment plan for those risks that are deemed to be non-acceptable.

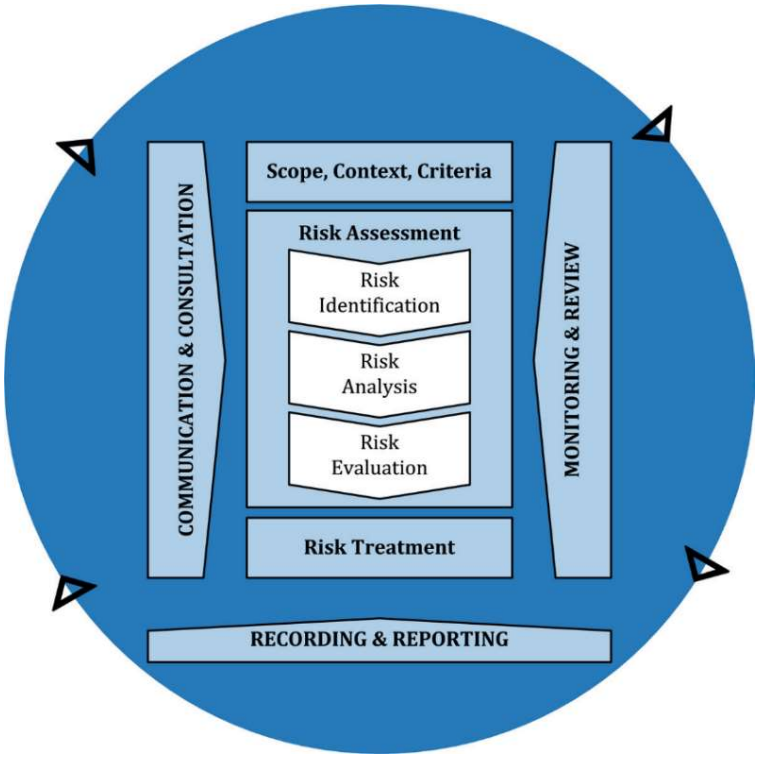
3.5.4 Risk Assessment

The risk management process used is shown in Figure 6.2 below.

It is an analysis and problem-solving technique designed to provide a logical process for the selection of treatment plans and management actions to protect the community against unacceptable risks.

The process is based on the fundamentals of International Standard ISO 31000:2018.

Fig 3.5.4: Risk Management Process – Abridged



Source: ISO 31000:2018, Figure 1, p9

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and development of a risk treatment plan for non-acceptable risks.

An assessment of risks associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment costs of implementing the selected treatment plan is shown in Table 3.5.4. It is essential that these critical risks and costs are reported to Planning Development & Transportation Directors.

Table 3.5.4: Risks and Treatment Plans

Service or Asset at Risk	What can Happen	Risk Rating (VH, H)	Risk Treatment Plan	Residual Risk *	Treatment Costs
Railroad Crossing Network	Maintenance and Renewal underfunding to maintain crossings in good state of repair.	H	Cost Share, Budget Offers to increase base funding, Highway User Funds to supplement funding.	L	$350,000/year

** The residual risk is the risk remaining after the selected risk treatment plan is implemented.*

3.5.5 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified and along with their typical failure mode, and the impact on service delivery, are summarized in Table 3.3.1 Failure modes may include physical failure, collapse or essential service interruption.

Table 3.5.5: Critical Assets

Critical Asset(s)	Failure Mode	Impact
Arterial Roadway Crossings	Close high traffic corridors and connectivity	Impact will disrupt community services, emergency service, school routes, and higher levels of traffic congestion on main roadways.
Crossings along Evacuation Routes	Safety risk to those leaving the city.	Potentially impacting the ability to exit the city in case of an emergency.
Poor Condition Crossings	Safety of travelling public	Impact will disrupt community services, emergency service, school routes, and increased travel time due to road closures.

By identifying critical assets and failure modes an organization an ensure that investigative activities, condition inspection programs, maintenance and capital expenditure plans are targeted at critical assets.

3.5.6 Infrastructure Resilience Approach

The resilience of our critical infrastructure is vital to the ongoing provision of services to customers. To adapt to changing conditions we need to understand our capacity to 'withstand a given level of stress or demand', and to respond to possible disruptions to ensure continuity of service.

Resilience recovery planning, financial capacity, climate change risk assessment and crisis leadership.

Our current measure of resilience is shown in Table 3.5.6 which includes the type of threats and hazards and the current measures that the organization takes to ensure service delivery resilience.

Table 3.5.6: Resilience Assessment

Threat / Hazard	Assessment Method	Current Resilience Approach
Crossing Closures	Condition Assessment	Continue to perform crossing inspections and prioritize and critical maintenance activities. Prioritize renewals based upon risk assessment.
Maintain crossings in a state of good or fair condition	Condition Assessment	Perform maintenance activities when possible to extend lifecycle. Develop multi-year replacement program.

4.0 RECOMMENDATIONS

1. A complete set of the rail crossing assets is not presently inventoried and represented in the GIS database. The crossings inventory needs to be expanded to include missing and incomplete data such as asset material, age, condition, and square footage.
2. Regularly collect inspection and GIS data from Railroad Owner.
3. Due to the non-availability of sufficient data, data trends are not established and reported in the current report. To establish data trends, at least three data points are required. Include data trends in the subsequent reports when sufficient data is available.
4. The best practice is to assess the condition of assets based on three perspectives, including physical condition, capacity condition, and funding level. Due to limited information on the capacity and funding level, only physical condition is considered for asset condition assessment. In the subsequent revisions, for the condition assessment of assets, all three factors need to be considered.
5. Presently, the conditions of rail crossings are assessed qualitatively using subjective assessment based on a five-rating system (Excellent, Good, Fair, Poor, and Very Poor). In this approach, assessment is done subjectively by visually examining the videos and imagery. For long-term investment planning, all remaining rail crossings need an on-going assessment to accurately determine the condition of the total number of crossings in the City.
6. Inflation and operation & maintenance costs are not included in the current Asset model to keep it simple. These factors need to be included to refine the model.
7. Develop formal criteria for differentiating between Maintenance vs. Rehabilitation vs. Reconstruction.
8. Create treatment strategies using deterioration curves and defined Maintenance, Rehabilitation, & Reconstruction activities for useful life of assets.

APPENDIX A – AGE & EXPORT OPINION-BASED RATINGS

Ratings	Definition
A - Very Good - 5 Fit for the future (81-100)	The infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and are resilient to withstand most disasters and severe weather events.
B - Good - 4 Adequate for now (61-80)	The infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe and reliable, with minimal capacity issues and minimal risk.
C - Fair - 3 Requires attention (41-60)	The infrastructure in the system or network is in fair to good condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, increasing vulnerability to risk.
D - Poor - 2 At risk RUL (21-40)	The infrastructure is in fair to poor condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of serious concern with strong risk of failure.
F - Very Poor - 1 Failing/critical, unfit for sustained service (0-20)	The infrastructure in the system is in unacceptable condition with widespread, advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.