
TOWN OF KILLAM

5 YEAR CAPITAL PROJECTS REPORT



Prepared for: Town of Killam
Presented by: Select Engineering Consultants Ltd.
Date: October 19, 2018
5 Year Capital Projects Report

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1.0 Introduction

1.1 Background Information

The Town of Killam is located in central Alberta within Flagstaff County, approximately 170 km southeast of Edmonton at the junction of Highway 13 and Highway 36. In 2011, the population of Killam was recorded at 981 people. Killam is a thriving town in central Alberta, and with growth it is expected that Infrastructure will require upgrading or rehabilitation. The Town of Killam has contracted Select Engineering Consultants to complete a 5 Year Capital Projects report to help guide the community in this matter.



Killam

ALBERTA

1.2 5 Year Capital Project

A Capital Projects Report provides a comprehensive overview of the condition of existing underground utilities and road infrastructure while setting forth a framework to guide the rehabilitation and upgrading of this infrastructure for the proposed duration (five years). This report will include the assessment of existing infrastructure with the review of previously completed reports and studies, on-site inspections, and feedback from Town of Killam Administration and Public Works staff.

The scope of this report will include the following:

- **Road Infrastructure**
- **Watermain Distribution Network**
- **Sanitary Sewer Network**
- **Recommendations**

1.3 Previous Reports

The following reports and studies were reviewed and incorporated in this capital projects report:

- **Town of Killam – Roadway Assessment and 5 Year Rehabilitation and Capital Plan**
Clifton Associates Ltd. **October 2008**

The Town of Killam and Clifton Associates Ltd. completed this Roadway Assessment and Five Year Rehabilitation and Capital Plan in October of 2008 in order to evaluate the condition of the roadways and provide recommendations for improvements to the roadways over a five year period. The Town of Killam has followed this plan extensively following its completion and the projects included in this capital plan have been identified as either completed or no longer required.

- **Town of Killam – Stormwater Management Plan (SWMP)**
Clifton Associates Ltd. **August 2009**

The Town of Killam and Clifton Associates Ltd. completed this Stormwater Management Plan in August of 2009 in order to evaluate the existing drainage conditions throughout the Town and provide recommendations for improvements to the conveyance of stormwater in Town, specifically in the northwest area of Town. Since completion of this report, stormwater improvements have been completed following the recommendations of this plan.

- **Town of Killam – Groundwater Disinfection Concept Cost Assessment**
Associated Engineering **March 2012**

The Town of Killam and Associated Engineering completed this Groundwater Disinfection Concept Cost Assessment in March of 2012 in order to evaluate the capacity of the water treatment plant to meet disinfection requirements, and provide recommendations for improvements to the system. Since completion of this report, alternative improvements have been completed to the Water Treatment Plant that were not included in the report.

- **Town of Killam – Water Distribution System Assessment Report**
Select Engineering Consultants **April 2018**

The Town of Killam and Select Engineering Consultants completed this Water Distribution System Assessment Report in April of 2018 in order to evaluate the capacity of the existing water distribution system for a growth period of 20 years, and provide recommendations for improvements to the system in Town.

- **Town of Killam – Sanitary Sewer CCTV Inspections**
Cam-Trac/Insituform/Inline **2013 through 2018**

The Town of Killam has previously completed various sanitary sewer CCTV inspections from 2013 through 2018 to assess the condition of the existing infrastructure. As of the end of 2018, the majority of the Town of Killam has been inspected during this time.

2.0 Road Network

2.1 Overview

The Town of Killam currently maintains an approximate 11.2 kilometers of roadway to serve the community and this roadway network provides access to residential, commercial, and industrial areas for vehicular and pedestrian traffic. The existing roadways within the Town fall into the following categories:

- Urban cross section with concrete sidewalks or curb and asphaltic cement surface;
- Rural cross section with drainage boulevards and asphaltic cement surface;
- Rural cross section with drainage boulevards and gravel or cold mix surface.

Roadways constructed with Cold Mix or a Gravel Surface are excluded from this report and were not assigned ratings during the on-site inspections, and Highway and County roads located within the Town of Killam boundary were also excluded.

2.2 Infrastructure Status

Select Engineering Consultants had personnel on-site conducting a visual inspection of the existing roadway network on October 5, 2018. This visual inspection was completed throughout the entire community, and was done to establish a rating for each roadway within the Town. Each roadway was assigned a rating based on when the Town should complete remedial work to ensure an adequate level of service is maintained. The ratings are as follows: immediate attention (0 years), 1-3 years, 3-5 years, 5-10 years, and 10+ years.

When assigning a rating to a roadway, the following items were considered:

- Condition of Concrete Curbs and Sidewalks;
- Drainage conditions;
- Roadway Cracking and Base Failures;
- Settlements of Prior Underground Installations;
- Overall Drive-ability.

The overall ratings applied to each roadway are summarized in the attached Figure 1. Two areas were found requiring immediate attention with a rating of 0 years, six areas were identified with a rating of 1-3 years, and twenty-five areas were identified with a rating of 3-5 years.

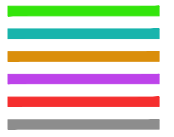


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LEGEND

- ROAD GOOD FOR 10+ YEARS
- ROAD GOOD FOR 5-10 YEARS
- ROAD GOOD FOR 3-5 YEARS
- ROAD GOOD FOR 1-3 YEARS
- ROAD REQUIRES IMMEDIATE ATTENTION
- GRAVEL/COLD MIX ROAD



**TOWN OF KILLAM
EXISTING ROAD CONDITIONS
OCTOBER 2018**



3.0 Water Distribution

3.1 Overview

The Town of Killam currently maintains a water treatment, storage and distribution system that provides potable water to the community. The Town treats raw water from wells located in close proximity to the Water Treatment Plant and stores the treated water in an underground reservoir. Water is distributed to the Town through two distribution pumps and through a distribution network consisting of various sizes of asbestos cement (AC), cast iron (CI), and polyvinylchloride (PVC) watermains.

In 2018, the Town of Killam completed a study titled "Water Distribution System Assessment Report" with Select Engineering Consultants and it included a detailed assessment of the existing water distribution system to meet existing and future growth requirements; And in 2012, the Town of Killam completed a study titled "Groundwater Disinfection Concept Cost Assessment" with Associated Engineering and it included a detailed assessment of the disinfection capabilities of the existing treatment system. Together, these assessments included several recommendations for the water distribution system, as summarized below:

- Improvements to existing watermains within established neighbourhoods;
- Additional watermains installed surrounding the community;
- Replacement of the Back-up Pump and Distribution Pumps;
- Installation of Additional Fire Hydrants;
- Improvements to the Disinfection System within the Water Treatment Plant.

Since 2012, the Town of Killam has completed some of the recommended watermain improvements, as summarized below:

- Installation of a new 300mm watermain from the Water Treatment Plant to 49th Avenue;
- Installation of a new 300mm watermain along 49th Avenue, from the laneway to the Water Treatment Plant to 49th Street;
- Additional Fire Hydrants along 49th Avenue; and
- Installation of a baffle curtain in the reservoir to improve disinfection capacity at the Water Treatment Plant.

The existing distribution system, as it operates in 2018, is summarized in Figure 2.



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LEGEND

- 100mm OR LESS WATER MAIN ---
- 150mm WATER MAIN ---
- 200mm WATER MAIN ---
- 250mm WATER MAIN ---
- 300mm WATER MAIN ---



TOWN OF KILLAM
EXISTING WATER MAINS



3.2 Improvements Required

In discussions with the Town's Public Works staff, concerns have been raised regarding the age of the infrastructure within the Water Treatment Plant related to treatment and distribution. Specifically, concerns were raised in regards to the treatment system (Greensand Filters), internal piping, and the distribution pumps.

As per the previously completed reports, when considering existing and future consumption demands for the Town of Killam, the Water Treatment Distribution System requires improvements in the following areas:

- Upgrading of Distribution Pumps to ensure a single pump is capable of providing the Peak Hour Demand;
- Upgrading the Back-up Pump to provide the recommended 230 liters/second flow rate;
- Increase Water Storage Capacity to accommodate the recommended 230 liters/second flow rate Back-up Pump; and
- Various Watermains to be upgraded.

Following our further discussions with the Town's Administration and Public Works staff, and based on the age and condition of the existing infrastructure at the Water Treatment Plant, we are recommending the following projects are considered to be completed within the time frame of 5 years:

- Replacement of the existing Back-up Pump as it has reached the end of its service life, at the maximum allowable flow rate available based on existing reservoir capacities; and
- Upgrading of Watermain infrastructure along 49 Avenue, 53 Street, and 51 Street.

The recommended improvements to the water distribution system to be completed over the next five years are summarized in Figure 3.



LEGEND

- 100mm OR LESS WATER MAIN ---
- 150mm WATER MAIN ---
- 200mm WATER MAIN ---
- 250mm WATER MAIN ---
- 300mm WATER MAIN ---

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TOWN OF KILLAM
PROPOSED WATER IMPROVEMENTS



4.0 Sanitary Sewer Network

4.1 Overview

The Town of Killam currently operates and maintains a sanitary sewer collection system that operates with gravity collection and the use of sewage pumping stations to discharge the collected wastewater at the wastewater treatment facility. The west portion of Town is serviced by a smaller sewage pumping station, and the east portion of Town is serviced by the main sewage pumping station which handles all of the wastewater generated by the Town.

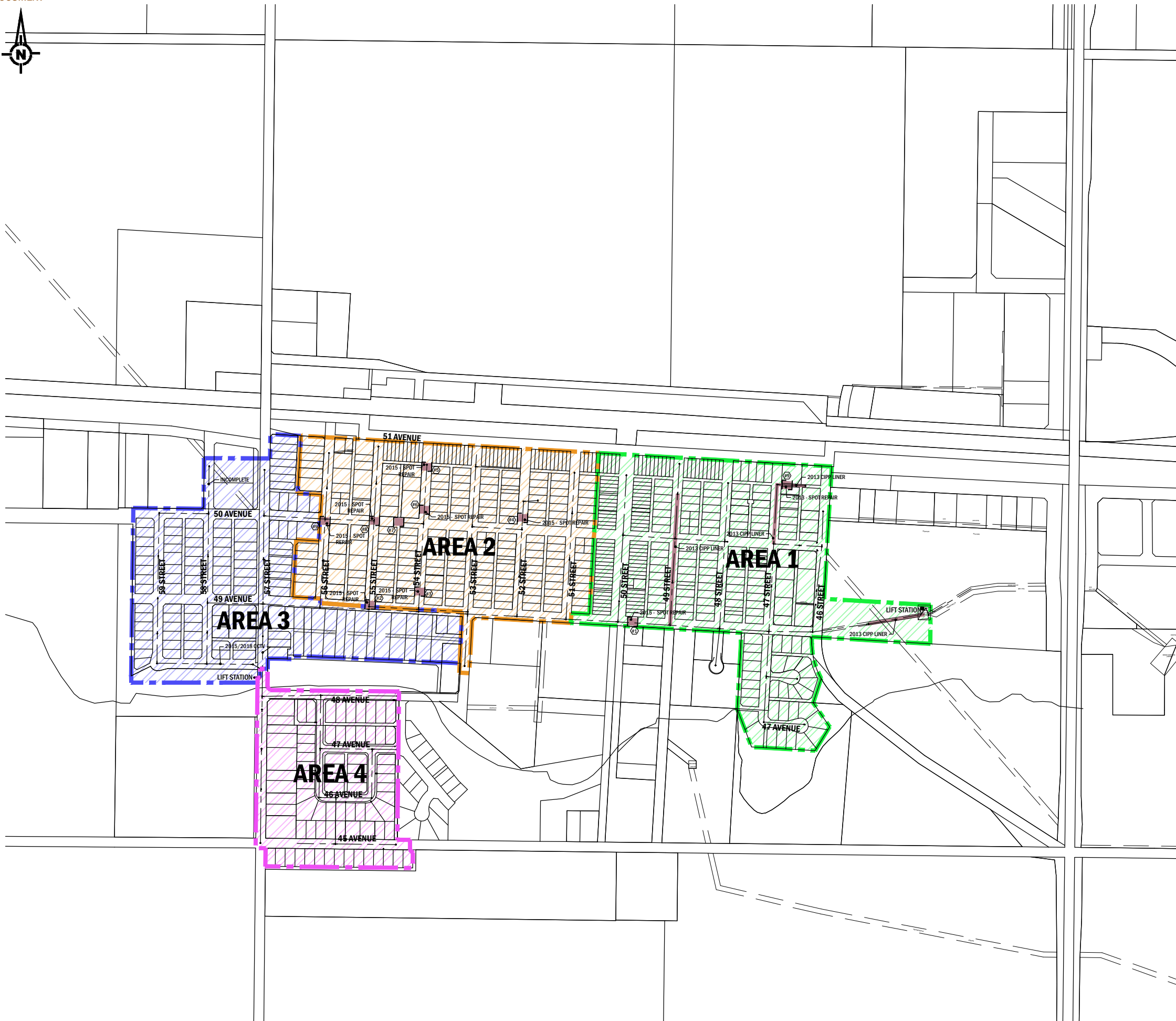
The wastewater treatment facility is located in Flagstaff County, approximately 1.7 kilometers east of the town. This facility is constructed of four (4) anaerobic cells, one (1) aerobic cell, and one (1) storage cell occupying approximately 20.0 hectares, and currently discharges once per year.

From 2013 through to 2018, the Town has completed an annual CCTV inspection of portions of the sanitary sewer collective system to assess the condition of the infrastructure, and has completed several local improvements as required. As of the end of 2018, the majority of the Towns sanitary system has been inspected. Figure 4 summarizes the inspections and local improvements that have been completed.

Area #4 remains incomplete.



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LEGEND

- EXISTING MANHOLE ●
- EXISTING SANITARY — — — — —
- AREA 1 - 2013 INSPECTED SANITARY SEWER — — — — —
- AREA 2 - 2014 INSPECTED SANITARY SEWER — — — — —
- AREA 3 - 2015/2018 INSPECTED SANITARY SEWER — — — — —
- AREA 4 - TO BE INSPECTION — — — — —
- INCOMPLETE INSPECTION — — — — —
- REPAIR COMPLETED ■

SANITARY SEWER SPOT REPAIRS	
1	4.0m REPAIR - COMPLETED 2015
2	15.0m REPAIR AND MANHOLE 50A REPLACEMENT - COMPLETED 2015
3	4.0m REPAIR - COMPLETED 2015
4	4.0m REPAIR - COMPLETED 2015
5	4.0m REPAIR - COMPLETED 2015
6	4.0m REPAIR - COMPLETED 2015
7	4.0m REPAIR AND MANHOLE 51 REPLACEMENT - COMPLETED 2015
8	4.0m REPAIR AND MANHOLE 56 REPLACEMENT - COMPLETED 2015
9	4.0m REPAIR - COMPLETED 2013



**TOWN OF KILLAM
SANITARY SEWER INSPECTIONS
REPAIRS COMPLETED TO DATE**



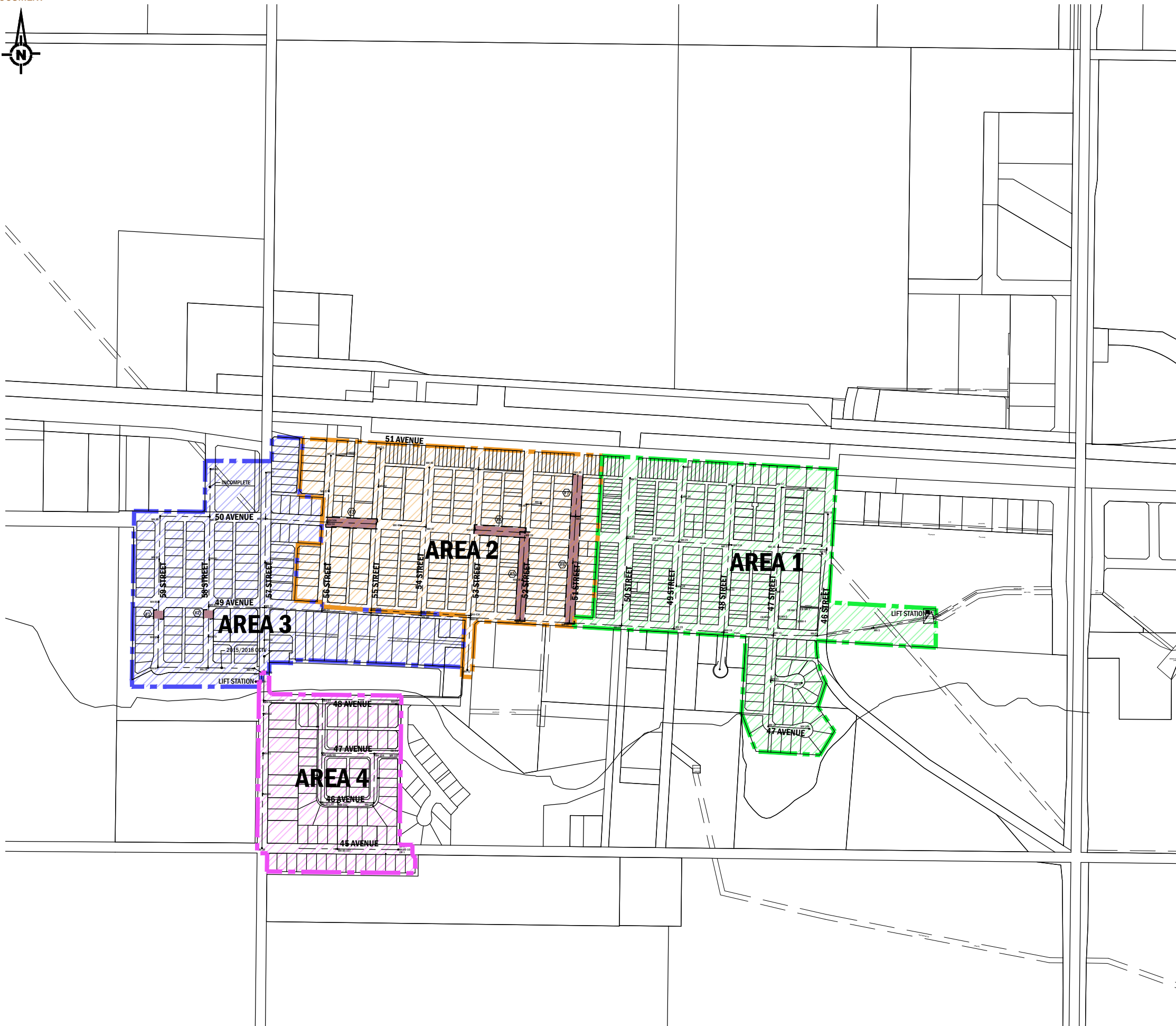
4.2 Improvements Required

Since the completion of the recent CCTV Inspection in 2018 by Insituform, several areas were noted requiring rehabilitation. These deficiencies include spot repairs, recommended Cured In Place Pipe Liner (CIPP), or recommended complete removal and replacement due to significant settlement & sagging.

Our recommendations for Sanitary Improvements to be completed within the next five year time frame are shown on the following figure.



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LEGEND

- EXISTING MANHOLE ●
- EXISTING SANITARY — — — — —
- AREA 1 - 2013 INSPECTED SANITARY SEWER — — — — —
- AREA 2 - 2014 INSPECTED SANITARY SEWER — — — — —
- AREA 3 - 2015/2018 INSPECTED SANITARY SEWER — — — — —
- AREA 4 - TO BE INSPECTED — — — — —

RECOMMENDED REPAIR SECTION

SANITARY SEWER SPOT REPAIRS	
1	4.0m REPAIR
2	4.0m REPAIR
3	100.0m REMOVE AND REPLACE
4	100.5m REMOVE AND REPLACE
5	175.0m REMOVE AND REPLACE
6	213.6m REMOVE AND REPLACE
7	82.0m CIPP LINER



**TOWN OF KILLAM
SANITARY SEWER INSPECTIONS
RECOMMENDED REHABILITATION**



5.0 Infrastructure Discussion

5.1 Overview

In order to complete improvements to infrastructure within a community in a cost effective manner, it is important to consider the condition and requirements of all infrastructure within a proposed work area. By previously completing an overview of the roadway network, water distribution system, and sanitary sewer network, we can determine a suitable staging of projects over the course of the next five years.

5.2 Water Distribution System

Taking into consideration concerns of the Public Works staff, the previously completed reports, and the improvements that the Town of Killam has completed since the completion of those reports, the recommended improvements to the water distribution system to be completed over the next five years are summarized below:

- Upgrading of Watermain infrastructure along 49th Avenue, 51st Street, 52 Street, and 53rd Street; and
- Replacement of the Back-up Pump.

5.3 Sanitary Sewer Network

With the completion of the majority of the Town's Sanitary Sewer System via CCTV Inspections, the recommended improvements to the sanitary sewer system to be completed over the next five years are summarized below:

- Sanitary Improvements on 51 Street, 52 Street, 50 Avenue, and miscellaneous Spot Repairs;
- Inspection of Area #4, the Southwest portion of Town

5.4 Road Network

The visual inspection of the existing roadway network completed in October of 2018 identified one area requiring immediate addition with a rating of 0 years, ten areas were identified with a rating of 1-3 years, and twenty-six areas were identified with a rating of 3-5 years.

Due to the high number of roadways categorized with a rating of 3-5 years, and budgetary restrictions, the majority of these roadways have been excluded based on daily use and the importance of the roadway to the Town of Killam.

As a preliminary geotechnical investigation on existing roadways to determine suitable rehabilitation measures has not been completed in recent years, we are recommending this investigation be completed to ensure improvements are completed in a cost effective and suitable manner. Costs estimates included in this report are based on full depth reconstruction, however the geotechnical investigation may determine that asphalt overlays will be suitable for certain roadways, at a significant cost savings.

The recommended improvements to be completed within the five year time frame are as follows:

- Preliminary Geotechnical Investigation
- 51 Street – 49 Avenue to 51 Avenue
- 52 Street – 50 Avenue to 51 Avenue
- 53 Street – 48 Avenue to 50 Avenue
- 54 Street – 50 Avenue to 51 Avenue
- 56 Street – 50 Avenue to 51 Avenue

6.0 Five Year Capital Plan

A detailed cost estimate is included in Appendix B for the below recommended projects. Cost estimates are subject to change following confirmation of scope of work, the completion of inspections on the sanitary sewer system, and the preliminary geotechnical investigation. The total estimated cost for the proposed major rehabilitation/capital projects during the 2017-2021 period is approximately **\$2,694,350**.

6.1 Year 2019 Proposed Projects

■ Preliminary Geotechnical Investigation	\$30,000.00
■ Replacement of Back-up Pump & Associated Work	\$85,000.00
■ 51 Street Improvements (51 Ave to North of 50 Ave)	\$278,100.00
■ Sanitary Spot Repairs (59 & 58 Street)	\$25,000.00

6.2 Year 2020 Proposed Projects

■ CCTV Inspections – Area 4	\$12,000.00
■ 53 Street Improvements (48 Ave to 51 Ave)	\$648,750.00

6.3 Year 2021 Proposed Projects

■ 52 Street Improvements (50 Ave to 51 Ave)	\$402,200.00
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6.4 Year 2022 Proposed Projects

■ 51 Street Improvements (49 Ave to North of 50 Ave)	\$595,000.00
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6.5 Year 2023 Proposed Projects

■ 48 Street – Roadway and Watermain Improvements	\$618,300.00
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APPENDIX A

Cost Estimates

**Town of Killam
5 Year Capital Projects
Cost Estimates**



Schedule 'A' - Year 2019 Proposed Projects

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE	TENDER AMOUNT
1.	Preliminary Geotechnical Investigian to Provide Road Structure Recommendations	Cash Allowance			\$ 30,000.00
2.	Replacement of Back-up Pump, complete with Electrical Modifications, Structural Assessment, Piping Modifications, Control Valve Replacement, and all necessary work to accommodate Replacement	Cash Allowance			\$ 85,000.00
<u>51 Street Watermain, Sanitary Sewer & Road Improvements (51 Avenue to North of 50 Avenue MH35)</u>					
3.	CIPP Liner Rehabilitation on Sanitary Sewer	m(lin)	85.0	\$ 150.00	\$ 12,750.00
4.	Install New 200mm PVC Watermain	m(lin)	85.0	\$ 320.00	\$ 27,200.00
5.	Install New 200mm Gate Valve	ea.	1.0	\$ 2,500.00	\$ 2,500.00
6.	Install New Hydrant Assembly	ea.	1.0	\$ 10,000.00	\$ 10,000.00
7.	Remove & Dispose of Existing Road Structure	sq.m.	1,500.0	\$ 15.00	\$ 22,500.00
8.	Miscellaneous Concrete Repairs	m(lin)	50.0	\$ 300.00	\$ 15,000.00
9.	Subgrade Preparation & Granular Base Course	sq.m.	1,500.0	\$ 50.00	\$ 75,000.00
10.	Asphalt Surface	sq.m.	1,500.0	\$ 25.00	\$ 37,500.00
11.	Arena Approaches	sq.m.	50.0	\$ 400.00	\$ 20,000.00
12.	25% Contingency & Engineering				\$ 55,612.50
				Total	\$ 278,062.50
13.	Sanitary Spot Repairs, including Asphalt Road Restoration	Cash Allowance			\$ 25,000.00

**Town of Killam
5 Year Capital Projects
Cost Estimates**



Schedule 'B' - Year 2020 Proposed Projects

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE	TENDER AMOUNT
<u>CCTV Inspection - Area 4</u>					
1.	CCTV Inspection of Existing Sanitary Sewer Mains c/w Flushing	m(lin)	1,500.0	\$ 8.00	\$ 12,000.00
<u>53 Street Watermain & Road Improvements (48 Avenue to 50 Avenue)</u>					
2.	Remove & Replace Watermain w/ 200mm PVC	m(lin)	180.0	\$ 400.00	\$ 72,000.00
3.	Install New 200mm Gate Valve	ea.	2.0	\$ 2,500.00	\$ 5,000.00
4.	Install New Hydrant Assembly	ea.	1.0	\$ 10,000.00	\$ 10,000.00
5.	Remove & Dispose of Existing Road Structure	sq.m.	4,300.0	\$ 15.00	\$ 64,500.00
6.	Miscellaneous Concrete Repairs	m(lin)	150.0	\$ 300.00	\$ 45,000.00
7.	Subgrade Preparation & Granular Base Course	sq.m.	4,300.0	\$ 50.00	\$ 215,000.00
8.	Asphalt Surface	sq.m.	4,300.0	\$ 25.00	\$ 107,500.00
9.	25% Contingency & Engineering				\$ 129,750.00
Total					\$ 648,750.00

**Town of Killam
5 Year Capital Projects
Cost Estimates**



Schedule 'C' - Year 2021 Proposed Projects

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE	TENDER AMOUNT
<u>52 Street Watermain & Road Improvements (50 Avenue to 51 Avenue)</u>					
1.	Remove & Replace Watermain w/ 300mm PVC	m(lin)	110.0	\$ 525.00	\$ 57,750.00
2.	Install New 300mm Gate Valve	ea.	2.0	\$ 4,000.00	\$ 8,000.00
3.	Install New Hydrant Assembly	ea.	1.0	\$ 10,000.00	\$ 10,000.00
4.	Remove & Dispose of Existing Road Structure	sq.m.	2,400.0	\$ 15.00	\$ 36,000.00
5.	Miscellaneous Concrete Repairs	m(lin)	100.0	\$ 300.00	\$ 30,000.00
6.	Subgrade Preparation & Granular Base Course	sq.m.	2,400.0	\$ 50.00	\$ 120,000.00
7.	Asphalt Surface	sq.m.	2,400.0	\$ 25.00	\$ 60,000.00
8.	25% Contingency & Engineering				\$ 80,437.50
				Total	\$ 402,187.50

**Town of Killam
5 Year Capital Projects
Cost Estimates**



Schedule 'D' - Year 2022 Proposed Projects

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE	TENDER AMOUNT
<u>51 Street Watermain, Sanitary Sewer & Road Improvements (49 Avenue to North of 50 Ave MH35)</u>					
1.	Remove & Replace Watermain w/ 200mm PVC	m(lin)	220.0	\$ 400.00	\$ 88,000.00
2.	Install New 200mm Gate Valve	ea.	2.0	\$ 2,500.00	\$ 5,000.00
3.	Install New Hydrant Assembly	ea.	2.0	\$ 10,000.00	\$ 20,000.00
4.	Remove & Replace Sanitary Sewer w/ 200mm PVC	m(lin)	240.0	\$ 325.00	\$ 78,000.00
5.	Remove & Replace Manhole	ea.	2.0	\$ 7,500.00	\$ 15,000.00
6.	Remove & Dispose of Existing Road Structure	sq.m.	2,600.0	\$ 15.00	\$ 39,000.00
7.	Miscellaneous Concrete Repairs	m(lin)	120.0	\$ 300.00	\$ 36,000.00
8.	Subgrade Preparation & Granular Base Course	sq.m.	2,600.0	\$ 50.00	\$ 130,000.00
9.	Asphalt Surface	sq.m.	2,600.0	\$ 25.00	\$ 65,000.00
10.	25% Contingency & Engineering				\$ 119,000.00
				Total	\$ 595,000.00

**Town of Killam
5 Year Capital Projects
Cost Estimates**



Schedule 'E' - Year 2023 Proposed Projects

ITEM NO.	DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE	TENDER AMOUNT
<u>51 Street Watermain, Sanitary Sewer & Road Improvements (49 Avenue to North of 50 Ave MH35)</u>					
1.	Remove & Replace Watermain w/ 300mm PVC	m(lin)	230.0	\$ 525.00	\$ 120,750.00
2.	Install New 300mm Gate Valve	ea.	3.0	\$ 4,000.00	\$ 12,000.00
3.	Install New Hydrant Assembly	ea.	2.0	\$ 10,000.00	\$ 20,000.00
4.	Remove & Replace Sanitary Sewer w/ 200mm PVC	m(lin)	175.0	\$ 325.00	\$ 56,875.00
5.	Remove & Replace Manhole	ea.	2.0	\$ 7,500.00	\$ 15,000.00
6.	Remove & Dispose of Existing Road Structure	sq.m.	2,600.0	\$ 15.00	\$ 39,000.00
7.	Miscellaneous Concrete Repairs	m(lin)	120.0	\$ 300.00	\$ 36,000.00
8.	Subgrade Preparation & Granular Base Course	sq.m.	2,600.0	\$ 50.00	\$ 130,000.00
9.	Asphalt Surface	sq.m.	2,600.0	\$ 25.00	\$ 65,000.00
10.	25% Contingency & Engineering				\$ 123,656.25
				Total	\$ 618,281.25