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ASSET MANAGEMENT PLAN

PREPARED FOR:
TOWN OF ABERDEEN, SK

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1.0 Introduction

The Asset Management Plan (AMP) document is a comprehensive report outlining the Asset Management (AM) program of an organization, along with information on the current state of assets, the desired level of service, financing strategy, and risk management for assets. It is an important document to ensure appropriate and consistent investment in the Town's infrastructure assets. It will serve as a valuable planning tool for budgeting, decision-making, and risk assessment for Administration and Council. It will provide continuity as elected officials and staff members change. Ultimately, the AMP will benefit the municipality by ensuring that assets are well-managed and investment into municipal infrastructure is efficiently allocated. The creation of an integrated AMP is a priority for the Town of Aberdeen at this time to ensure responsible management of existing infrastructure and to provide information for prioritizing investment.

It is imperative for a municipality to manage and maintain the highly visible infrastructure assets, given the replacement cost and level of scrutiny they receive from residents and visitors. The AMP is a tool for Town representatives to ensure adequate management of infrastructure, to evaluate existing state of infrastructure and compare to practical desired levels of service, and to communicate risks associated with neglecting asset investment.

The AMP strives to provide direction to the Town in order to accomplish the strategic priorities identified in the recently completed Strategic Plan: infrastructure/resource management, business development, and community development. Consistency with the Strategic Plan was considered during the preparation of the AMP.

The following AMP strives to provide a practical approach to AM while referencing industry-standard ISO standards (ISO 55000-55002 Asset Management Standards).

1.1 AMP Updates: April 2022

The first AMP was prepared for the Town of Aberdeen by Catterall & Wright in 2018/1019. In 2022, Catterall & Wright completed the second phase of the Town's AMP by expanding the AMP in the following areas:

- Storm Water Management Asset Class, including comprehensive visual culvert assessment and storm water modelling using XPSWMM software to determine areas at-risk of flooding. – ***Section 4.6 expanded, and Appendix G added.***
- Updated asset inventory spreadsheets to current year and estimated current replacement costs – ***Appendix C updated and Section 3 (Report Cards) updated.***
- Expanded financial information discussion, including adding Funding Gap Analysis – ***Section 6.4 below added.***
- Creation of a GIS map of water & sanitary sewer assets ***– Section 4.1.1 added, Appendix F added.***
- Priority Investments – ***Section 8.0 updated.***

2.0 Asset Management System

2.1 AM Background

The following is a discussion from the Town regarding the background AM work prior to the preparation of this AMP:

"The asset management idea has been an immense undertaking for our community. Much of the information we began collecting in 2009 was not easily accessible, so many hours were spent by staff gathering the details for our Tangible Capital Asset Listing/Registry. In 2010, we purchased the PubWorks program software to store the data we collected. We are now able to track the complete list of assets we own, their life cycle, upgrade expectations, maintenance requirements and disposal. In 2017, we began to pursue the idea of obtaining a professional Asset Management Plan. We hired our engineers Catterall & Wright to provide us with a plan that would maximize the assets, devise an asset management solution, identify and improve wasteful purchasing practices, develop proactive solutions in risk management, account for amortization in cooperation with our financial statements, forecast for our budgetary needs, and that this cost in the long term would be worth the time and investment."

2.2 AM Policy

The purpose of the AM policy is to ensure consistent commitment to the AM system by Administration and Council. The scope of the policy extends to all staff members and elected officials. Adopting this AM policy will formalize the commitment of Council to the AM system presented in this document. Once the AMP has been reviewed and approved by Council, the adoption of the AM policy should be formalized with authorization of the policy, included in Appendix A.

2.3 AM Strategy

The purpose of the AM strategy is to outline the organization's intention for the AM system. The strategy includes defining objectives and establishing a roadmap for the AM system to follow, described in detail in the following sections.

2.4 AM Objectives

Establishing specific objectives for the AM system is an important component to ensuring the plan is contributing to the organization's planning and decisions-making. In order for the AM plan to be most relevant and useful for an organization, the AM objectives should align with the goals and objectives of the organization as a whole.

The Strategic Plan identifies the Town's Mission as follows: To support growth by favoring innovation and development while promoting quality of life and respecting our traditions and diversity. The values outlined in the Strategic Plan include: Trust/Integrity, Solutions Oriented, Financially Accountable, Customer Focused, Environmentally Responsible. The AMP should provide a tool that contributes to each of these values; as such, each AMP objective listed below corresponds to the values outlined in the Strategic Plan.

The objectives of the AMP are:

- Create an environment where all Councillors and Staff Members take part in thorough management of municipal assets (Trust/Integrity);
- Demonstrate transparency and stewardship in management and investment of municipal assets (Trust/Integrity);
- Provide a resource for recommendations on asset investment and record-keeping (Trust/Integrity);
- Provide practical recommendations for improved asset management and asset investment (Solutions Oriented);
- Provide recommendations for infrastructure planning considering life-cycle infrastructure costing, including construction, maintenance, operations, repairs, and replacement (Financially Accountable);
- Provide recommendations to ensure assets provide appropriate levels of service to the residents (Customer Focused);
- Maintain infrastructure according to all current government regulations, including environmental regulations (Environmentally Responsible);
- Maintain AM program according to all government regulations, including Gas Tax and accounting requirements (Financially Accountable).

2.5 AM Roadmap

The following section describes a recommended "roadmap" for the AM program. This roadmap intends to provide a framework for how the AM program can continue to advance to become increasingly specific and relevant to the Town. AM programs can get incredibly sophisticated; however, it is our goal to keep this program practical for the Town.

An important distinction is that the following sections describe our recommended tasks for the AM program itself, but do NOT include recommendations for specific infrastructure tasks (ie. maintenance, renewal, replacement); recommendations for infrastructure priorities will be discussed in Section 7.

2.5.1 Annual Tasks

The AMP is a dynamic tool and will have to be kept up to date in order to be of ongoing value to municipal decision-makers. Thus, it is recommended that an annual review of the AMP be performed, including updating the asset summary tables. This annual review could be coordinated with the annual review of the Town's Strategic Plan.

2.5.1.1 AM Objectives

In coordination with review of the Strategic Plan, there should be an annual review to confirm that the AM Objectives remain relevant to the Town's priorities. Objectives should be modified or expanded to align with the Town's priorities.

2.5.1.2 Current State of Infrastructure Update

Annual review of the AMP should at a minimum include updating the Current Condition of Infrastructure section by adjusting age of all assets, revising replacement costs to reflect current construction market conditions, and most importantly adding information regarding asset replacement or new construction.

2.5.1.3 Review of Regulations Regarding Asset Management

The priorities of the AM program may change depending on changes by external entities such as federal or provincial government mandates. Annual review of pertinent regulations such as Gas Tax Fund requirements are recommended to ensure the AM program is consistent with changing industry requirements.

2.5.2 Short-term AM Program Priorities

The recommended focus of AM priorities for the next 5 years (2019-2023) is expanded asset condition assessment, as outlined below.

2.5.2.1 Asset Condition Assessment

Ongoing condition assessments of assets are recommended as follows:

- Water System: hydrant flow testing; creation of a comprehensive water model to identify available pressures within the system; valve exercising of all valves at least every second year.
- Waste-water System: flushing and video inspection of local sanitary sewers at least every 8 years; flushing and video inspection of main sanitary sewers at least every 5 years.
- Roads: visual condition assessment of all roads at least once every 5 years; comprehensive GPS survey of road cross-sections to determine detailed crown and longitudinal grade of roads.
- Drainage/Storm Water Management: comprehensive drainage review to identify drainage issues and infrastructure threatened by inadequate storm water management facilities.
- Culverts: condition assessment and capacity review of all culverts at least once every 5 years.
- Miscellaneous. – Buildings, Equipment: current appraisals by a Registered Appraiser of all buildings at least once every 10 years.

2.5.3 Medium-Term Priorities

For AMP purposes, we discuss "medium-term" tasks as those recommended to be performed from five to ten years in advance (2023-2028).

Once the Asset Condition Assessments are completed and current, the Current Condition of Infrastructure within the AMP should much more closely reflect the infrastructure's existing conditions. From there, the recommended focus can shift to a more critical evaluation of the Infrastructure Levels of Service.

The Asset Management Team, along with input from Administration/Council should review the Levels of Service Rubric for each infrastructure class. If desired, Council may choose to engage with the public to reassess whether the acceptable Levels of Service align with the expectation of residents.

2.5.4 Long-Term Tasks

For AMP purposes, we discuss "long-term" tasks as those recommended to be performed from ten to fifteen years in advance (2028-2033). At this stage, the long-term tasks can be generally summarized as any activities required to maintain at least minimal compliance with regulations (accounting, Gas Tax, etc.).

2.6 AM Program

2.6.1 Responsibility

The responsibility for the AM Program is shared among the elected officials and staff members of the Town.

2.6.2 Responsibility of Elected Officials

The AM responsibilities of all elected officials are: to endorse the AM policy, and provide adequate funding to support the ongoing AM program as well as at least the minimal infrastructure investment recommended in the AMP.

2.6.3 Responsibility of Staff

The AM responsibilities of the Town staff are to review the AMP as it is updated and endorse the AM policy in their associated work.

2.6.4 Cross-Functional AM Team

It is recommended to have a cross-functional AM team identified. Given the size of the Town of Aberdeen, assigning one elected official and one staff member as the asset management team is sufficient. The responsibilities of the AM team will be to review compliance with the AMP, report to Council on AM status and compliance twice per year, and update the AMP annually (or work with Catterall & Wright to update accordingly) to ensure optimal effectiveness of the AMP for the Town. The purpose of establishing this team is to ensure clear accountability.

2.6.5 AM Training

Taking opportunities to invest in AM training for the organization's members is an important component of the AM program. The AMP recommends approximately 10% of the annual AM budget be retained for AM training for Councillors and staff members, most notably, the AM team members.

Presently, Asset Management Saskatchewan is offering several training opportunities. The Town Administrator has engaged with several of these course offerings. We encourage ongoing participation in these course offerings.

2.6.6 Continued AM Investment

In order to be of continued value to the municipality, asset management is intended to be an ongoing program. As such, continuous Council approval for AM investment is essential. Establishing an annual investment value for the AM program requires estimation of the internal and external resources required to maintain the program. The internal resources include the time required by the AM team members as well as the public works operators for additional record-keeping. External resources include services provided by contractors or consultants. In addition to resources required to maintain the AM program, Council support is required for the construction, maintenance, and renewal recommended in the AMP. The investment required to sustain the AM program should be measured and monitored over time.

3.0 Infrastructure Report Cards

Infrastructure Report Cards provide a glimpse into the value and condition of current infrastructure. The report cards help decision-makers determine the shortfalls in each infrastructure system and establish reinvestment levels to ensure the proper management of assets in the future.

The following infrastructure report cards provide a high-level summary of the infrastructure constituents and the condition rating of each of the main infrastructure classes: roads, water, waste water, and storm sewer. The report cards also include a comparison of Aberdeen's infrastructure condition relative to the national average reported in Canada's Infrastructure Report Card (2016).

Subsequent sections of the report describe the current condition of infrastructure in greater detail.

3.1 2022 Update

The report cards were updated with the 2022 AMP Update project as follows:

- Current Year and Remaining Design Life were adjusted to 2022
- For Asset Classes where Condition is assumed based on age, the Conditions were updated (ie. water asset class).
- Estimated Replacement Costs were adjusted;
- Canada's Infrastructure Report Card data was updated to 2019 version.
- Storm Water Report Card was added.

Waste Water System

VERY GOOD

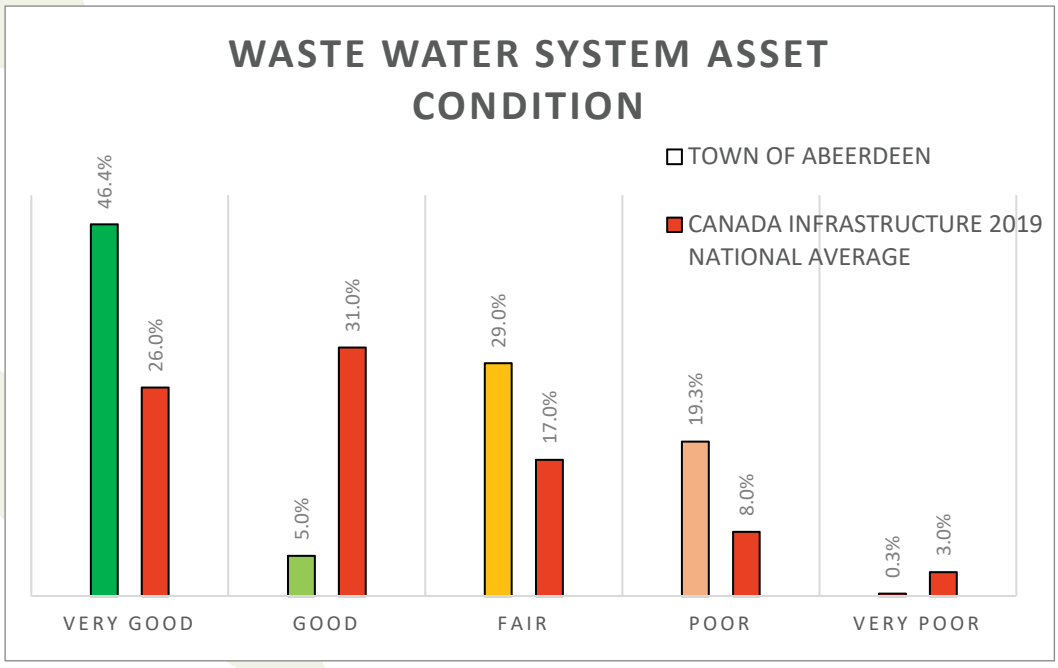
CURRENT VALUE

$7.15 Million

INCLUDES

- 1,370 m of Polyvinyl Chloride (PVC) gravity sewer
- 3,695 m of Vitrified Clay (VC) gravity sewer
- 1,600 m of High-density Polyethylene (HDPE) sewage forcemain
- 52 manholes
- 1 sewage pumping station
- 1 facultative wastewater lagoon treatment system

Physical condition ratings are based on current replacement value. Replacement value is the approximate cost of reconstructing an asset to new condition. The overall system is rated as VERY GOOD. This reflects the newly constructed lagoon and sewage lift station. However, the waste water collection system alone receives as overall condition rating of FAIR.



Potable Water System

VERY POOR

CURRENT VALUE

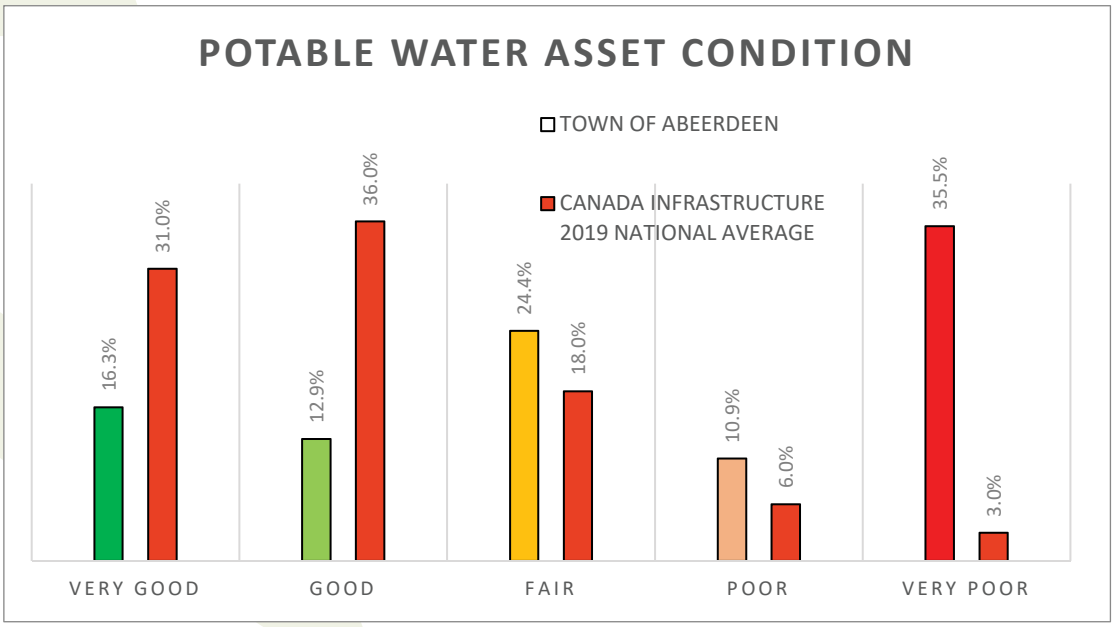
$6.28 Million

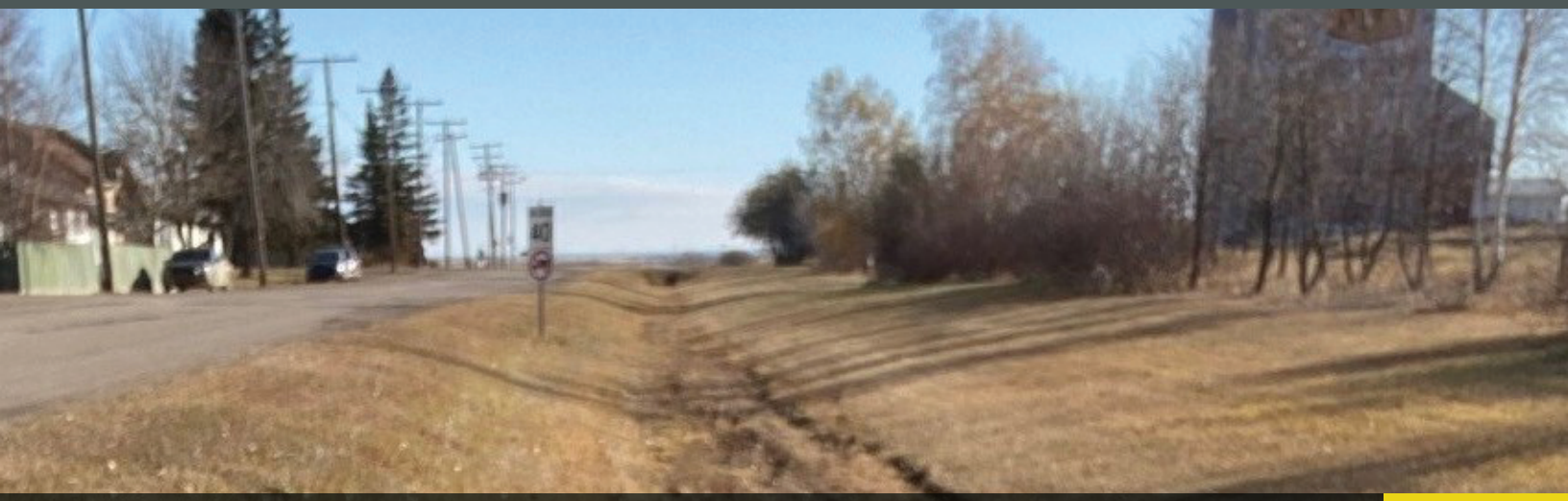
INCLUDES

1	water pump house
2	reservoirs
2,925	m of Polyvinyl Chloride (PVC)watermains
5,600	m of Asbestos Cement (AC) watermains
220	m of High-density Polyethylene (HDPE) watermains
35	hydrants
95	valves

Physical condition ratings are based on current replacement value. Replacement value is the approximate cost of reconstructing an asset to new condition. The overall system is rated as VERY POOR; however, this reflects the age of the majority of the distribution system (1964) and how it is nearing the end of its estimated service life. Note, prudent record keeping on functional performance of the Very Poor segments is critical to prioritize replacement. Additionally, some of the Very Poor segments may be functioning satisfactorily at this time.

New development as well as recent upgrades and maintenance to the water pump house constitute most of the good and very good ratings. The natural gas engine for pump 2 is also rated as Very Poor since it is deemed "Unsatisfactory" by SaskPower.





Storm Water Management

FAIR

CURRENT VALUE

$920,000

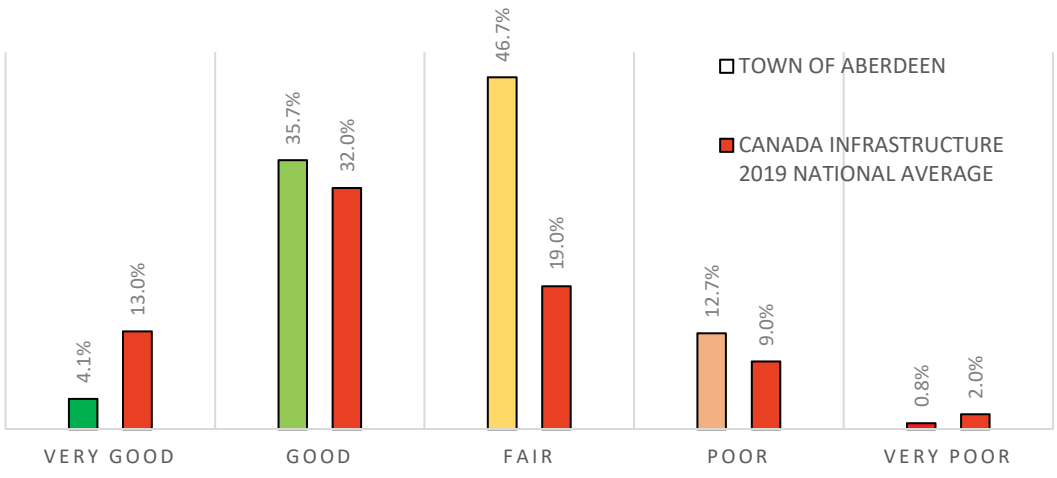
INCLUDES

1540 lin.m. of corrugated steel pipe (CSP) culverts

4241 lin.m. of drainage ditches

Physical condition ratings are based on the 2021 visual condition assessment. Current value includes estimated cost of replacing an asset to new condition. The overall system is rated as FAIR. This reflects the overall material condition of the culvert network. Functional condition based on storm water modelling may reduce the condition of storm water management infrastructure in at-risk areas.

STORM WATER ASSET CONDITION



Roadways

FAIR

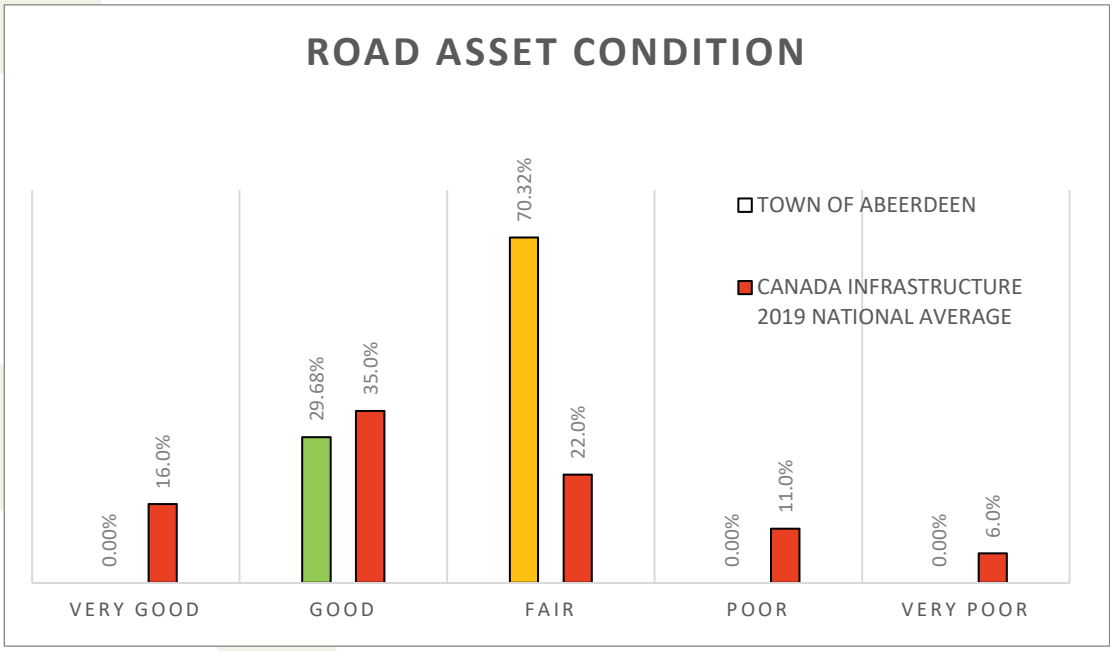
CURRENT VALUE

$4.65 Million

INCLUDES

525	lin.m. of paved road
767	lin.m. of chip-sealed road
8.1	km of RAS/gravel roads
3.1	km of curb & gutter
1,710	lin. m of concrete sidewalk

Physical condition ratings are based on current replacement value. Replacement value is the approximate cost of reconstructing an asset to new condition. The overall system is rated as FAIR. This reflects the recent investment in Recycled Asphalt Shingles (RAS) surfacing material on granular roads. Roads surfaces are well-maintained, resulting in fair or good ride at the posted speed. Several roads contain good condition rolled curb & gutter.



4.0 Current Condition of Infrastructure

The most critical aspect of a useful AMP is having comprehensive, current, and accurate information on the existing assets. The first component of this infrastructure data collection involves accurate quantification of the existing assets using Global Positioning System (GPS) survey data, and the second component is infrastructure condition assessments. The 2022 AMP Update project included creation of a compiled plan map on a Geographic Information System (GIS) application, described in more detail in Section 4.1.1. below.

4.1 Quantification of Assets

As part of this project, a comprehensive GPS topographic survey was performed on Town municipal infrastructure (wastewater system, potable water system, drainage) during summer of 2018. The precise location and elevation data was collected for all available manholes, valves, hydrants, culverts, road width, sidewalk & curb extents. This information was used to update the Town's compiled plan maps, shown in Appendix B. The survey data was also used to confirm quantities included in the Town's asset summary tables, shown in Appendix C. These asset summary tables are an inventory of the major asset classes and offer the following information on the assets: asset ID, material, year constructed, design life, and estimated current (2022) replacement cost.

It is important to distinguish between design life and service life of assets. The design life is the theoretical life expectancy of a product. The service life is the length of time that a product provides its required service; service life is dependent on a number of factors including material, soil conditions, proper installation, maintenance, etc. For example, the design life of water main is 50 years; however, we often see well-installed water main function adequately after 60 or 70 years. In asset management, we generally refer to the design life. Sometimes this may result in an overly critical evaluation of the infrastructure if much of the system is beyond its design life and still functioning adequately. The reason is that for prudent planning, we cannot assume infrastructure will consistently surpass its design life. On the other hand, there is no need to replace infrastructure that is beyond its design life if it is still performing adequately.

4.1.1 GIS Compiled Water and Sanitary Sewer Map

The 2022 AMP Update project included creation of a GIS map application which includes the Town's water and sanitary sewer infrastructure. The data within the GIS is based off the previously completed GPS survey as well as the corresponding asset inventory spreadsheet data.

The GIS map provides an interactive map that is accessible by computer or mobile devices to access critical water and sanitary sewer data. The benefits of the GIS application are increased accessibility to key infrastructure data, improved organization and record keeping, cost savings from improved efficiency, improved decision making, and less knowledge lost when transitioning new employees.

There are countless ways for future expansion of the Town's GIS map, as requested, including expanding to include additional asset classes, such as storm water management infrastructure, and adding additional content such as record drawings, reports, and photos. Appendix F includes images taken from the GIS application.

4.2 Infrastructure Condition Assessments

Infrastructure condition assessments are technical assessments and analysis to provide insight into an asset's current physical condition, performance, probability of failure, and remaining useful life. Ongoing condition assessment of all assets offers valuable information to the asset inventory.

Performance data in the form of maintenance records and anecdotal information from Town operations personnel offers valuable additional information regarding many assets. If recorded, this performance data can be included in the condition assessment.

4.2.1 Condition Assessment Criteria

The condition assessment rating system for this AMP is based on that presented in Canada's Infrastructure Report Card – Asset Management Primer. The following offer general definitions of each rating condition:

- Very Good: Fit for the future; well maintained, good condition, new or recently rehabilitated; (80-100% of estimated service life remaining).
- Good: Adequate for now; acceptable, generally approaching mid-stage of expected service life; (60-79% of estimated service life remaining).
- Fair: Requires attention; signs of deterioration, some elements exhibit deficiencies; (40-59% of estimated service life remaining).
- Poor: At risk of affecting service; approaching end of service life, condition below standard, large portion of system exhibits significant deterioration; (20-40% of estimated service life remaining).
- Very Poor: Unfit for sustained service; near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable (less than 20% of estimated service life remaining).

If available, condition assessment data should be used to determine the above rating for each asset. If condition data is not available, approximations based on age should be used (provided in brackets above).

When summarizing the overall condition of each asset class, it is important to base the overall rating on weighted based on the infrastructure current replacement costs.

4.3 Sanitary Sewer System

4.3.1 Sanitary Sewer Pipes and Manholes

In 2018, condition assessment by way of flushing and video inspection was performed on most sanitary sewer pipes. There is a summary of issues encountered during the sanitary sewer inspection included in Appendix D as well as representative photos of some of the defects discovered.

For condition assessment of the sanitary sewer system, subjective judgement was used to assign the grade based on the video inspection data. Several of the pipes were in good or fair condition, often showing slight signs of deterioration such as calcite buildup. Some of the defects discovered included extended service pipes into the main, excessive calcite buildup impeding flow, pipe settlement. Some of the pipes were in poor condition which included defects such as joint separation and foreign objects impeding flow.

It is important to note that a large portion of the Town's sanitary sewer pipes are approaching or exceeding their theoretical useful life (pre-1970s); yet much of this older sanitary sewer was deemed to be in good or fair condition on the video inspection. The public works personnel included manhole bottom restoration as a future priority.

4.3.2 Lagoon & Lift Station

The lagoon and lift station are both newly constructed in 2018. They offer significant capacity for future growth for the Town. As such, their condition is considered very good.

4.4 Water System

The water system condition assessment is based on review of the 2016 Water System Assessment (WSA) report prepared by Catterall & Wright for the Town and the Water Security Agency of Saskatchewan (WSASK), included for reference in Appendix E.

4.4.1 Water Mains, Valves, and Hydrants

Condition assessment of the water distribution system was not included in this project. Therefore, the condition of water mains, valves, and hydrants are assumed based on age of infrastructure and anecdotal comments from the Town's public works personnel.

The water distribution system condition rating can be refined following completion of the recommended water system assessment tasks described in Section 2.4.2.1 above.

4.4.2 Water Reservoir & Pump House

The WSA generalizes the reservoir and pump house to be in fair to good condition. Recommendations for system improvements are included and should be completed to maintain the present good condition of this infrastructure.

Since the completion of the WSA report, the Town has installed a small generator in the water plant, which is capable of running one pump and related essentials for the short-term.

4.4.3 Water Meters

All water meters in Town are considered in good condition. All meters were replaced in 2010; however, this style of meter requires access to each property to read. The Town is presently upgrading the meters to Radio Frequency (RF) meters which can be read from the street, eliminating the need for property access. The upgrading the RF meters is scheduled to be completed by 2021.

4.5 Roadways

In 2018, a high-level road assessment was performed as well, which evaluated road surfacing quality, drainage condition, and presence of concrete curbs. The road summary sheets are included in Appendix C.

A comprehensive roadway condition assessment was performed on all roadways as part of this project. Good roads include those where negligible failures are present and the ride is good at the posted speed. Fair roads offer decent ride at the posted speed, but may include select failures. Poor roads contain significant failures to the surface, resulting in a poor ride and driver's desire to travel below the posted speed.

4.5.1 Paved Roads

Central Ave. is the only paved road in Town. It is in good pavement condition. Negligible pavement distresses were observed and the ride was good.

Main St. and Cannon Ct. are surfaced using chip-seal. They are in fair condition, presenting moderate cracking and fair ride at the posted speed. The far east extents of Cannot Ct. exhibits more severe failures.

4.5.2 Unpaved Roads

The majority of the Town's roads are gravel or gravel with a recently applied Recycled Asphalt Shingles (RAS) surfacing. The majority of the unpaved road surfacing condition was considered fair, which typically included minor wash boarding/potholes and rutting along the road edges.

4.6 Drainage

All drainage infrastructure in Town is at-grade and includes ditches, culverts, and concrete curbs. There is presently no storm sewer system.

High-level drainage assessment was performed in coordination with the 2018 roadways condition assessment. It is important to note that this assessment was performed in the fall; a spring drainage

assessment would offer a better representation of the drainage condition and likely a more critical evaluation.

Good drainage condition streets were those that have a definite and consistent cross-section and showed no visible evidence of ponding along ditches or road edges. Fair drainage condition streets are those that had a consistent cross-section but obviously lacked adequate grade due to evidence of ponding in ditches or soft road edges. Poor drainage condition streets were those that have an inconsistent cross-section (rural to urban) and demonstrated considerable drainage issues.

4.6.1 Storm Water Model (XPSWMM)

As part of the 2022 updates, Catterall & Wright created a storm water model of the Town's overland drainage system using the XPSWMM modelling software. The model inputs used was culvert and road GPS survey data collected in 2018.

There are two systems within every typical drainage system. They are known as the minor drainage system and the major drainage system. The minor drainage system refers to underground conduits (storm sewers), whereas the major system references overland flow and storm water retention/detention ponds. The minor system is typically designed to convey the 1:2 year storm, and the major drainage system is designed to handle a 1:100 year storm with minimal damage to the community. In Aberdeen, the local, small diameter culverts and ditches could be considered the minor system and the larger diameter culverts and ditches along with the roadways could be considered the major system.

4.6.1.1 Modelling Assumptions

Estimated runoff was determined by dividing the Town into several catchment areas. These areas were then broken into pervious and impervious areas. Pervious areas are those which allow water to pass through them, such as lawns. Impervious surfaces include houses and roadways. It should be noted that in major storm events pervious surfaces become saturated and will eventually act as an impervious surface. The pervious and impervious percentages were estimated for each catchment and used in the XPSWMM model. Rainfall data was input into the program for the 1:2 year storms and the 1:100 year storms. Runoff is calculated based on these inputs allowing for capacity analysis of culvert/piping networks.

For the model, three typical ditch cross-sections were used as follows:

Table 1: Ditch Cross-sections for XPSWMM Model

Ditch Type	Depth (m)	Width (m)
Shallow	0.3	5
Medium	1.0	9
Large	1.7	10

Sports Center	0.3	12

shallow ditch (0.3m depth, 5m width), medium ditch (1.0m depth), and large ditch (1.7m depth). Each ditch was assigned one of the typical ditch profiles based on visual appearance. This assignment of ditch parameters is an approximation required for modelling. The typical ditch configurations are shown in the drawings included in Appendix G.

4.6.1.2 Modelling Results

The main purpose of the model is to identify and predict areas that are at-risk to surface flooding due to storm water. There following list describes the areas that were shown to be at risk in the corresponding storm event. There are maps included in Appendix G that depict the at-risk areas.

Table 2: Summary of At-Risk Areas based on XPSWMM Model

Ditch Location	**1:2 Year Storm**	**1:100 Year Storm**
Thompson St. from Jackson Ave. to Central Ave. (North Side)	Area of Concern	Area of Concern
Thompson St. from Jackson Ave. to Central Ave. (South Side)	Potential Area of Concern	Area of Concern
3rd Ave. from Thompson St. to half block south (East and West Sides)	Area of Concern	Area of Concern
4th Ave. from Rupert St. to half block north (West Side)	Potential Area of Concern	Area of Concern
Main West to West Drainage Ditch from 3rd Ave to 5th Ave./Rupert St.	Potential Area of Concern	Potential Area of Concern

As the Town looks to replace the culverts in the areas of concern described above, Catterall & Wright can review whether culvert upsizing would help reduce the risk of flooding, upon request.

4.7 Curbs, Swales & Sidewalks

The purpose of concrete curbs and swales are to help facilitate drainage of an urban cross-section road. The purpose of concrete sidewalks are to facilitate pedestrian connectivity and accessibility in Town.

The condition of the rolled curb and gutter was generally in good condition. The condition of monolithic concrete walks varied from very good to fair. Note, the narrow separate concrete walks were not included in the assessment as they are in the process of being removed by the Town.

5.0 Levels of Service

The condition assessments described above provide a technical generalization of the status of infrastructure. It is useful to extend the discussion to customer levels of service. It is often more practical to discuss levels of service of infrastructure with rate-payers compared to condition assessment ratings.

Table 1 below provides a level of service rubric that outlines "Unsatisfactory", "Acceptable", and "Ideal" levels of service for various infrastructure classes including tangible descriptors. The following offers a general description of each level of service category:

- "Ideal": new or near-new infrastructure constructed based on current design standards;
- "Acceptable" : any deficiencies can be improved with maintenance measures;
- "Unsatisfactory" : requires a renewal or upgrade.

Table 1 outlines a level of service rubric for various infrastructure classes; it offers a tool for Administration/Council to discuss levels of service with rate-payers. The Town can review and confirm the level of service descriptors included in Table 1.

Table 3: Infrastructure Level of Service Rubric

Infrastructure Class	Level of Service		
	Unsatisfactory	Acceptable	Ideal
Water	• Treated Potable Water not available at all premises. • Interruptions to service/boil water advisories more than twice per year. • Inadequate fire flow capacity.	• Treated Potable Water to all premises. • Interruptions to service/boil water advisories between 1 and 2 times per year. • Sufficient fire flow capacity to all premises.	• Treated Potable Water to all premises. • Interruptions to service/boil water advisories at most once per year. • Sufficient fire flow capacity to all premises.
Waste Water	• Significant odours extending beyond 600m from the lagoon. • Inadequate lagoon treatment resulting in effluent exceeding Operating Permit. • Insufficient sanitary sewer collection capacity.	• Sufficient waste water treatment capacity for all existing premises and 5 year future residential development. • Sufficient sanitary sewer collection.	• No noticeable odours extending beyond 600m from the lagoon. • Sufficient sanitary sewer and lagoon capacity for waste water capacity for commercial/industrial development opportunities.

Drainage	• Major flooding of roads relating to 1:5 year storm events. • Premise flooding relating to overland flow or sewer backup from 1:5 year storm. • Road grades: less than 1.0% crown; less than 0.5% longitudinal grade. • Inadequate culvert capacity or ground cover. • Damaged culverts affecting drainage.	• Major flooding of roads relating to 1:25 year storm events. • Premise flooding relating to overland flow or sewer backup from 1:25 year storm. • Road grades: 1.0-2.0% crown; 0.5-1.0% longitudinal grade.	• Major flooding of roads relating to 1:100 year storm events. • Premise flooding relating to overland flow or sewer backup from 1:100 year storm. • Road grades: over 2.0-3.0% % crown; over 1.0% longitudinal grade.
Roads	• Significant road failures affecting driveability (potholes, wash-boarding, etc.).	• Arterial roads are paved with a Pavement Condition Index (PCI) rating of "fair" or better. • Local roads are granular or paved with good driveability.	• All paved roads with Pavement Condition Index (PCI) rating of "fair" or better.
Pedestrian Connection	• No provision made for pedestrian connection.	• For arterial roads: concrete sidewalks complete with accessibility ramps at crossings. • For local roads: concrete sidewalks or sufficient granular shoulder on roads to allow for safe pedestrian access (1.5m).	• Concrete sidewalks on all roads, complete with accessibility ramps at crossings. • For children's crossing areas (school, playgrounds, recreation complex): pedestrian crossing designation such as traffic calming concrete structures.

5.1 Current Level of Service

Presently, we do not have enough information to assign a level of service to each infrastructure segment. However, with deliberate record-keeping and assessment, the AM team can assign a level of service to each infrastructure class, if desired. The Town may expand the Asset Summary Sheets provided to assign a current level of service rating for each asset.

With the information available at this time, this AMP will use the condition ratings in lieu of customer level of service grades, where "good/very good" condition is considered ideal, "fair" condition is considered acceptable, and "poor/very poor" is considered unsatisfactory.

5.2 Desired Level of Service

It is ideal for a municipality to strive for providing the desired level of service that is aligned with what the rate-payers are interested in investing. It is crucial to be reasonable and practical when discussing the desired level of service of infrastructure. In discussing infrastructure desired levels of service with rate-payers, it is important to relate increased levels of service with the associated investment required; framing discussions as "what do you want to pay for" rather than "what do you want" can facilitate agreement on establishing affordable desired levels of service.

Once the existing levels of service are summarized, and the desired levels of service are established, a financing strategy can be established to correlate the desired level of service and investment required. Desired level of service can be established using the Level of Service rubric or based on asset condition (ie assuming "Fair" condition or better is acceptable).

6.0 Financing Strategy

Infrastructure financing is a challenge for every municipality. Financing is required for operations, maintenance, renewal, and new construction, yet adequate funding seems impossible. It is a constant struggle for municipalities to balance the expectations of rate-payers with their willingness to pay.

6.1 Capital Expenditures

Capital projects for renewal or new construction often receive funding from provincial and federal infrastructure grant programs such as stimulus funding or ongoing Gas Tax revenue.

Recent upgrades to major infrastructure items in Aberdeen have received government funding. This is extremely beneficial for long-term infrastructure delivery and will allow the Town to have a favourable budget for ongoing asset management. Without these funding streams, capital expenditures for short and long-term forecasting would be drastically different.

The uncertainty of grant opportunities from other levels of government can be a challenge to long-term financial planning and asset management. Prudent AMP financial strategies include no expectation for additional grants; if additional funding is secured in this capacity, the AM team members should be consulted prior to proceeding with the projects.

Additionally, it is important to consider and adequately plan for the long-term operations and maintenance costs associated with all capital projects.

6.2 Life-Cycle Costs

When considering infrastructure costs, it is important to look beyond merely the capital construction cost of the asset to a total life-cycle cost approach, which considers all spending on construction, preservation, maintenance, rehabilitation, and disposal.

Evaluation of the life-cycle costs of assets requires record-keeping data on amount invested in preservation and maintenance. To start, the costs associated with maintenance can be tracked by asset category: sanitary sewer system, water system, roads, drainage, and curbs & sidewalks. The maintenance costs should include all labour, equipment, and supplies required. The cost-tracking completed in order to determine water rates in the WSA is precisely the tracking required to determine life-cycle costs for each asset class.

Operations and maintenance costs are typically 2-10% of the replacement cost of infrastructure; therefore, for budgeting purposes at this time, it is recommended that the Town review its an annual maintenance budget to ensure adequate investment.

6.3 Sustainable Infrastructure Investment

In order for the AMP to inform financial decisions, a link between the AMP and the organization's annual budgets and long-term financial plans need to be offered. It is important to plan infrastructure investment so that current users are paying for current services, and future users will pay for future services. If infrastructure investment is insufficient and therefore unsustainable, future users will be forced to pay for deferred costs associated with previous planning inadequacies.

6.3.1 Average Annual Reinvestment Rate

The financial attribute discussed in Canada' Infrastructure Report Card is the Average Annual Reinvestment Rate (AARR). The Report Card recommends a target Average Annual Reinvestment Rate between 1.0 to 3.0% of the Total Current Replacement Costs, depending on the asset class. The reinvestment rate is a percentage of the total infrastructure renewal/rehabilitation budget compared to the total infrastructure current replacement costs.

6.3.2 Financial Sustainability Recommendations

In order to budget appropriately for the operations, maintenance, and renewal costs of all assets, we recommend working towards a budget that includes:

- Operations = current fixed fee increasing annually relative to inflation;
- Maintenance = at least 2% of the Total Current Replacement Costs; and,
- Capital Renewal Expenditures = 2% of the Total Current Replacement Costs.

6.3.3 Funding Gap Analysis

As part of the 2022 update, the following funding gap analysis has been included. The purpose of the funding gap analysis is to compared current and desired levels of service and the associated investment required to bridge any deficient. For this analysis, the total estimated replacement cost of infrastructure that was below acceptable condition (ie poor or very poor) was totalled.

The following table summarizes the total Funding Gap of the main asset classes:

Table 4: Funding Gap Analysis Summary

Asset Class	Total Funding Gap
Potable Water	$2,910,000
Wastewater	$1,400,000
Storm Water	$130,000
Roads	N/A

Note, based on the most recent condition assessment of the roads, completed in 2018, all roads were in fair or better condition, therefore, there is no funding gap identified. However, this does not consider any upgrades on roads for example from granular road to pavement. An increase in level of service such as conversion from granular to paved local roads would result in a significant capital investment requirement.

7.0 Risk Management

7.1 Risk Identification

The first aspect of risk management is identifying relevant risks. Discussion with Town personnel can help identify current operational risks. These operational risks should be clearly communicated to Council. Systematic review of maintenance and upgrading priorities annually should also include discussion of risk management. Risk identification is especially important for those assets that are not currently receiving priority maintenance/renewal investment. The risks associated with deferred investment should be identified, analyzed, and managed, if possible.

7.2 Risk Analysis

Risk analysis should include evaluation of two components of the possible consequence: the likelihood of the consequence and the severity of the consequence. Since the AMP cannot offer risk analysis of any potential situation, applying the risk rating table below offers some risk management direction for Council and Administration.

Table 5: Risk Evaluation Matrix

Likelihood of Consequence	Severity of Consequence			
	Low	Medium	High	Catastrophic
Improbable	1	4	6	10
Possible	2	5	8	11
Probable	3	7	9	12

The risk tolerance of the organization is unique to each and should be decided by Council; however, as a suggestion, risk scores of 6 or less would generally be considerable tolerable, those between 7-10 would be undesirable, and those above 10 would be intolerable. This risk evaluation can provide valuable direction to compare multiple alternatives.

7.3 Minimizing Risk

It is most prudent to minimize risk by prioritizing management of situations that would have high severity consequences. Many risks cannot be eliminated; however, it is possible to reduce risk of by reducing the severity of consequence or reducing the likelihood of consequence, whichever is most practical given the situation.

For a more detailed discussion of Risk Assessment refer to ISO Standard 31000.

8.0 Priority Investments

There are several factors that affect infrastructure investment prioritization including political considerations and operational challenges. When planning and prioritizing asset upgrades, it is important to consider sequencing. For example, all underground utility upgrades should be performed prior to road improvements.

8.1 Recommendations

For Town of Aberdeen's priority infrastructure investments, Catterall & Wright recommends initially focussing on drainage planning and improvements. Drainage infrastructure was overall some of the worst rated infrastructure in the condition assessments. Addressing widespread drainage issues will provide functional and aesthetic improvements for the Town, as well as operational efficiencies and risk management. Also, if the Town intends on performing road surfacing upgrades in the future, it is important to ensure proper drainage conditions. Improved surfaces, such as asphalt, will increase runoff, making drainage improvements imperative.

8.1.1 2022 Recommendations

The Town has begun a multi-year culvert replacement program as part of their capital planning. Catterall & Wright recommends combining the planned culvert replacement work with review of the at-risk areas presented in Table 2 above. Catterall & Wright can assist with design recommendations for culvert sizing and ditch grading to help improve at-risk areas, if requested.

The other recommendation resulting from the 2022 update is regarding the potable water system. Much of the distribution system was installed in 1964, resulting in this infrastructure now approaching the end of its theoretical design life and as such receiving a condition rating of Very Poor. It is prudent to begin to plan for replacement of these lines and try to take advantage of any grant opportunities that may come available. In the meantime, diligent record keeping on maintenance required on the potable water distribution system will allow the Town to distinguish appropriate prioritization of the water lines based on function performance and maintenance requirements.

8.2 Town Priorities

Input from the Town's public works personnel and administration provides the following intended priority infrastructure investments.

8.2.1 Water

- Reservoir upgrade to expand storage capacity to at least double average day demand;
- Blake Cres. – water service replacement prior to sidewalk/pavement upgrade (existing service pipe material is incorrect, which necessitates use of inferior products to facilitate repairs);
- Mobile homes – relocate water meters inside the trailer;
- Comprehensive water meter upgrades and software replacement (AMI System from Neptune);
- Computer generated billing software;
- Ongoing valve extensions to facilitate easier access close to surface;
- All – ongoing replacement of main curbstops.

8.2.2 Waste Water

- Manholes require restoration of bottoms including benching;
- Ongoing manhole grade ring additions to facilitate easier access;
- Former lagoon – decommissioning and potential sale of land.

8.2.3 Roads

- Soft spots requiring new granular material:
    - 4th Ave.,
    - Industrial Dr.,
    - Rupert St./ 5th Ave. corner,
    - Central Ave. north of Rec Centre,

  - 3rd Ave. in front of infill housing,
  - Main St.,
  - 7th Ave.
- Main Street:
  - Short term: slurry seal to seal existing cracks;
  - Long term: full rehabilitation. An asphalt overlay is likely not an option due to the high existing elevation of the road surface relative to adjacent features. Full rehabilitation design would consider site conditions such as review of surrounding elevations, test holes to determine existing granular thickness, and consideration of depth of bury of utilities.
- Road Paving:
  - 4th Avenue: Main St. to McDonald St. (short term priority: Main to Rupert);
  - Thompson St: Central Ave. to 5th Ave. (short-term priority: 4th Ave. to Central Ave.).
- New Road Construction:
  - 5th Avenue: 300 and 400 blocks (north of the new lift station).

8.2.4 Curbs/Walks

- Blake Cres. – sidewalk sunken requires repair;
- Removal of all old sidewalks excluding Blake Cres;
- New concrete sidewalk:
  - Short term: Thompson St. (Central to 4th Ave. North side);
  - Long term: New sidewalk on priority pedestrian routes, as determined by the Town.

8.2.5 Drainage

- Comprehensive Drainage Plan;
- Comprehensive Lot Grade Plan;
- Blake Cres. – drainage concerns due to former slough conditions;
- Culvert replacements – Rupert St., Thompson St./Norman Ave intersection, 3rd Ave. in front of infill housing (culvert too long and always freezes up);
- Back alley at Cannon Court (cement swale and curb damaged from frost);
- 2nd Ave. swale between the Community Hall and the Equestrian Centre;
- 5th Ave. at the new lift station requires a new cement swale.

8.2.6 Back Alleys

- Reconstruction of several lanes to eliminate issues of poor material and poor drainage (between Jackson Ave. and Norman Ave, 200 block of 4th Ave., 200 block of 5th Ave., 500 block of Main St., 300 block between 3rd and 4th Ave);
- New Alley Construction:
  - 5th Ave. – 300 and 400 blocks (north of the new lift station).

8.2.7 2022 Update Priorities

The following is a list of Town update priorities and associated 2022 budgeted amounts.

- Culvert Replacements ($7,000)
- Sanitary Sewer Manhole Upgrade ($30,000)
- Curb Stop Replacements ($25,000)
- Water Plant Pump ($12,000)
- Swale at 4th Ave. ($18,000)
- Blake Cres. sidewalk replacement ($17,000)
- Veteran's Park concrete ($31,500)
- Curb & gutter – 411 4th Ave. ($5,000)
- Asphalt patching – Main St. chip seal patching ($15,000)

Additionally, the 5-10 year plan budget includes annual reinvestment rates as follows:

- Manhole Replacements ($30,000/year)
- Valve Replacements ($25,000/year)
- Culvert Replacements ($5,000/year)

9.0 Reference Materials

There are several excellent resources for developing an AMP. The following documents were referenced during the preparation of this document:

- Canadian Infrastructure Report Card (2016; Updated 2019);
- AWWA Asset Management Definitions Guidebook (2018);
- Canadian Infrastructure Report Card – Asset Management Primer (2014).

10.0 Summary

This report strives to provide useful information and recommendations for preserving and improving the valuable infrastructure assets in the Town of Aberdeen. The benefits of proper AM include improved: financial performance, asset decision-making, sustainability, risk management, efficiency, and ultimately performance of infrastructure.

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The preparation of this project was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

Appendix A: Asset Management Policy

1.0 Policy Name: Asset Management (Version 1)

1.1 AM Policy

The purpose of the AM Policy is to ensure consistent commitment to the AM system by Administration and Council. The scope of the policy extends to all staff members and elected officials. Adopting this AM policy will formalize the commitment of Council to the AM system presented in this document.

1.2 AM Strategy

The purpose of the AM Strategy is to outline the organization's intention for the AM system. The strategy includes outlining objectives and establishing a roadmap for the AM system to follow, described in detail in the AMP.

1.3 AM Objectives

Establishing specific objectives for the AM system is an important component to ensuring the plan is contributing to the organization's planning and decisions-making. In order for the AM plan to be most relevant and useful for an organization, the AM objectives should align with the goals and objectives of the organization as a whole.

The Strategic Plan identifies the Town's Mission as follows: To support growth by favoring innovation and development while promoting quality of life and respecting our traditions and diversity. The values outlined in the Strategic Plan include: Trust/Integrity, Solutions Oriented, Financially Accountable, Customer Focused, Environmentally Responsible. The AMP should provide a tool that contributes to each of these values, as such, each AMP objective listed below corresponds to the values outlined in the Strategic Plan. The objectives of the AMP are:

- Create an environment where all Councillors and Administration take part in thorough management of municipal assets (Trust/Integrity);
- Demonstrate transparency and stewardship in management and investment of municipal assets (Trust/Integrity);
- Provide a resource for recommendations on asset investment and record-keeping (Trust/Integrity);
- Provide practical recommendations for improved asset management and asset investment (Solutions Oriented);
- Provide recommendations for infrastructure planning considering life-cycle infrastructure costing, including construction, maintenance, operations, repairs, and replacement (Financially Accountable);
- Provide recommendations to ensure assets provide appropriate levels of service to the residents (Customer Focused);

- Maintain infrastructure according to all current government regulations, including environmental regulations (Environmentally Responsible);
- Maintain Asset Management Program according to all government regulations, including Gas Tax and Accounting requirements (Financially Accountable).

1.4 AM Program

1.4.1 Responsibility

The responsibility for the AM Program is shared among the elected officials and staff of the Town.

1.4.2 Responsibility of Elected Officials

The AM responsibilities of all elected officials are: to endorse the AM policy, provide adequate funding to support the ongoing AM program as well as working towards infrastructure investment recommended in the AMP.

1.4.3 Responsibility of Staff

The AM responsibilities of the Town staff are to review the AMP as it is updated, and endorse the AM policy in their associated work.

1.4.4 Cross-Functional AM Team

It is recommended to have a cross-functional AM team identified; given the size of the Town of Aberdeen, assigning one elected official and one staff member as the asset management team is sufficient. The responsibilities of the AM team will be to review compliance with the AMP, report to Council on AM status and compliance twice per year, and update the AMP annually (or work with Catterall & Wright to update accordingly) to ensure optimal effectiveness of the AMP for the Town. The purpose of establishing this team is not ensure clear accountability.

***AM Team Member Names:**_____

1.4.5 AM Training

Taking opportunities to invest in AM training for the organization's members is an important component of the AM Program. The Plan recommends approximately 10% of the annual AM budget be retained for AM training for Councillors and staff members, most notably, the AM team members.

1.4.6 Continued AM Investment

Asset management is intended to be an ongoing program to be of continued value to the municipality. As such, continuing Council approval for AM investment is essential. Establishing an annual investment value for the AM program requires estimation of the internal and external resources required to maintain the program. The internal resources include the time required by the AM team members as well as the

public works operators for additional record-keeping. External resources include services provided by contractors or consultants. In addition to resources required to maintain the AM program, Council support is required for the construction, maintenance, and renewal recommended in the AMP. The investment required to sustain the AM program should be measured and monitoring over time.

1.5 Endorsement

This policy has been approved by Council for the remainder of this Council term. It will be reviewed within 3 months of each Council election and is intended to remain for the Council term.

_____

Authorization

_____

Date

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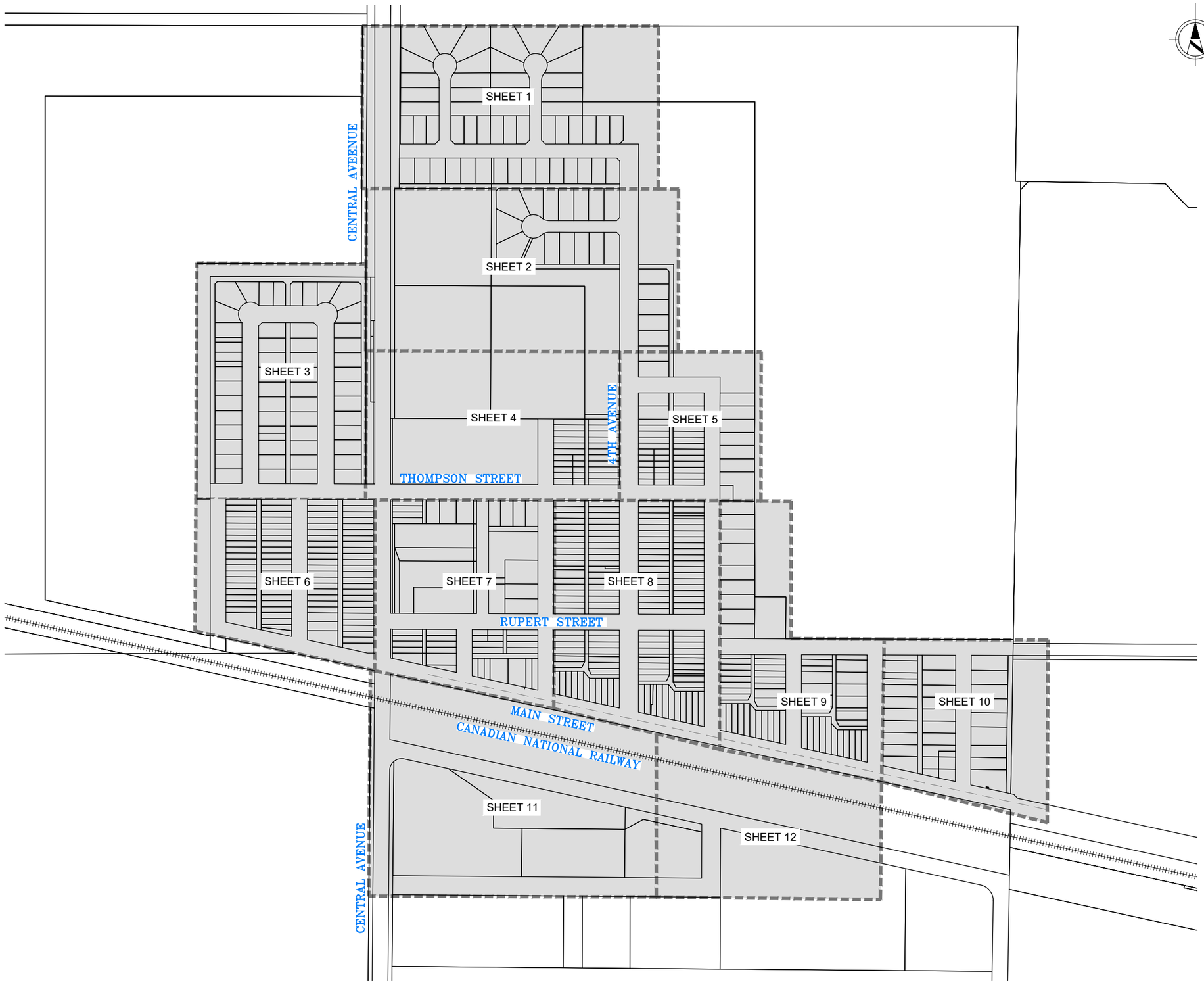
The preparation of this project was carried out with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

Appendix B: Compiled Plan Maps

TOWN OF ABERDEEN

SANITARY SEWER & DOMESTIC WATER MAPS & ASSET IDENTIFICATION



COMPILED BY:

CATTERALL & WRIGHT
CONSULTING ENGINEERS
1221 - 8th Street East
SASKATOON SK S7H 0S5
Tel: (306) 343-7280, Fax: (306) 956-3199

NOTE:
DATA PROVIDED COMPILED FROM SURVEY TAKEN IN THE MONTH OF MAY, 2018

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ROAD TO LAGOON

CENTRAL AVEENUE

GRAHAM COURT

HAMM COURT

MCDONALD STREET

4TH AVENUE

2008 37mm HDPE PRESSURE SEWER SERVICE

2008 50mm HDPE WATER SERVICE

2014 150mm C-900 PVC W.M.

2009 200mm PVC S.S. (52.9m)

2009 150mm C-900 PVC W.M.

2012 200mm PVC S.S. @ 0.41% (110.7m)

2012 150mm C-900 PVC W.M.

2009 150mm C-900 PVC W.M.

2009 200mm PVC S.S. @ 0.47% (115.5m)

2009 150mm C-900 PVC W.M.

2009 200mm PVC S.S. @ 0.41% (120.0m)

2009 200mm PVC S.S. (53.1m)

2009 150mm C-900 PVC W.M.

2009 200mm PVC S.S. @ 0.40% (95.7m)

2009 150mm C-900 PVC W.M.

2009 150mm C-900 PVC W.M.

2009 200mm PVC S.S. @ 0.09% (45.4m)

SS MH52
RIM 517.32
E INV. 514.29
S INV. 514.26
W INV. 514.26

SS MH51
RIM 517.25
W INV. 514.25
E INV. 514.12
N INV. 514.11

SS MH50
RIM 517.30
S INV. 514.04

SS MH49
RIM 516.77
N INV. 513.59
W INV. 513.58
E INV. 513.57

SS MH48
RIM 516.21
N INV. 513.10
W INV. 513.08
S INV. 513.06

VLV085 VLV084 VLV083 VLV082 VLV081 HYD025 VLV080 VLV079 HYD024 VLV078 HYD023 VLV077 HYD022 VLV076 VLV075

W1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37

18 19 18 19

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

SCALE BAR

0 50m 100m

DRAWING TITLE
MCDONALD STREET
GRAHAM & HAMM CT

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 1

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CENTRAL AVEENUE

CANNON COURT

4TH AVENUE

ASH STREET

H

A

X

Y

18

17

9 10 11 12 13 14 15

8

7 6 5 4 3 2 1

7 6 5 4 3 2 1

W1

1990 150mm PVC SDR26 W.M.

1990 200mm PVC S.S. @ 0.62% (120.0m)

SS MH47
RIM 516.92
E INV. 513.60

SS MH46
RIM 516.22
W INV. 512.86
N INV. 512.68
S INV. 512.68

SS MH45
RIM 516.52
N INV. 512.31
S INV. 512.31

2009 200mm PVC S.S. @ 0.40% (95.7m)

2009 150mm C-900 PVC W.M.

1990 200mm PVC S.S. @ 0.33% (113.4m)

1990 150mm PVC SDR26 W.M.

1990 200mm PVC S.S. @ 0.33% (113.2m)

2014 150mm C-900 PVC W.M.

VLV072

HYD023

VLV071

VLV073

VLV074

HYD022

HYD018

VLV066

VLV070

HYD021

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

SCALE BAR

0 50m 100m

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4TH AVE
CENTRAL AVE
CANNON CT - ASH ST

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SCALE
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DRAWING
SHEET 2

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SS MH39
RIM 517.38
S INV. 513.69
E INV. 513.66

VLV058

1964 250mm V.C. S.S. @ 0.26% (42.5m)

1964 150mm A.C. W.M.

VLV060

HYD015

VLV061

BLAKE CRESCENT

1977 150mm A.C. W.M.

VLV062

HYD016

VLV063

SS MH38
RIM 517.12
N INV. 513.67
E INV. 513.55
W INV. 513.55

1977 200mm V.C. S.S. @ 0.42% (113.0m)

SS MH42
RIM 516.93
N INV. 514.14
S INV. 514.14

1977 200mm V.C. S.S. @ 0.34% (114.9m)

SS MH34
RIM 517.35
E INV. 514.56
S INV. 514.53

1964 250mm V.C. S.S. @ 0.51% (60.8m)

1964 150mm A.C. W.M.

THOMPSON STREET

1977 200mm V.C. S.S. @ 0.38% (96.8m)

1977 150mm A.C. W.M.

SS MH35
RIM 516.83
N INV. 513.25
W INV. 513.24
S INV. 513.21
E INV. 513.21

VLV054

HYD013

1964 250mm V.C. S.S. @ 0.08% (35.3m)

VLV053

SS MH32
RIM 516.62
N INV. 513.68
S INV. 513.68

SS MH33
RIM 517.26
S INV. 514.20
W INV. 514.19

SS MH31
RIM 516.58
N INV. 513.25
W INV. 513.18
E INV. 513.18

1977 200mm V.C. S.S. @ 0.38% (114.0m)

1977 200mm V.C. S.S. @ 0.46% (113.8m)

1977 150mm A.C. W.M.

VLV064

VLV065

HYD017

VLV052

BLAKE CRESCENT

1964 250mm V.C. S.S. @ 0.55% (71.1m)

1964 150mm A.C. W.M.

SS MH27
RIM 517.41
S INV. 513.08
W INV. 512.79
E INV. 512.80

VLV051

2014 150mm C-900 PVC W.M.

HYD018

VLV066

VLV050

VLV048

CENTRAL AVEENUE

VLV049

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

SCALE BAR

0 50m 100m

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BLAKE CRESCENT
THOMPSON STREET

DATE 18/10/05

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LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

A

X

Y

X

E

W1

ASH STREET

THOMPSON STREET

CENTRAL AVENUE

3RD AVENUE

4TH AVENUE

2014 150mm C-900 PVC W.M.

SS MH27
RIM 517.41
S INV. 513.08
W INV. 512.79
E INV. 512.80

SS MH26
RIM 516.08
N INV. 512.67
E INV. 512.47
W INV. 512.47

SS MH25
RIM 516.50
N INV. 513.13
S INV. 513.13

SS MH22
RIM 516.23
N INV. 512.48
S INV. 512.47
E INV. 512.08
W INV. 512.08

SS MH19
RIM 516.60
N INV. 512.29
S INV. 512.00
NW INV. 511.63
E INV. 511.63
W INV. 511.63

SS MH44
RIM 516.04
N INV. 511.94
S INV. 511.94

SS MH43
RIM 515.89
S INV. 512.78

1964 150mm A.C. W.M.
1964 200mm V.C. S.S. @ 0.32% (104.7m)

1964 150mm A.C. W.M.
1964 200mm V.C. S.S. @ 0.38% (103.4m)

1964 150mm A.C. W.M.
1964 200mm V.C. S.S. @ 0.42% (106.4m)

1964 200mm V.C. S.S. @ 0.74% (88.3m)
1964 150mm A.C. W.M.

1990 200mm PVC S.S. @ 1.01% (113.4m)
1964 200mm V.C. S.S. @ 0.56% (87.7m)
1964 150mm A.C. W.M.

1964 200mm V.C. S.S. @ 0.53% (106.6m)

1990 150mm P.V.C. SDR26 W.M.

VLV051 VLV050 VLV049 VLV048 VLV042 VLV041 VLV032 VLV031 VLV030 VLV029 VLV028 VLV027 VLV026 VLV033 VLV067 VLV068 VLV069 VLV070

HYD012 HYD019 HYD020 HYD021 HYD007 HYD007

SCALE BAR
0 50m 100m

DRAWING TITLE
THOMPSON STREET
CENTRAL AVE - 4TH AVE
DATE 18/10/05
SCALE 1:1000
DRAWING SHEET 4

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4TH AVENUE

1964 200mm V.C. S.S. @ 0.42% (106.4m)

1964 150mm A.C. W.M.

VLV029

1964 250mm V.C. S.S. @ 0.64% (107.0m)

VLV026

VLV028

1990 200mm PVC S.S. @ 1.01% (113.4m)

1964 200mm V.C. S.S. @ 0.56% (87.7m)

1964 150mm A.C. W.M.

HYD020

VLV068

SS MH44
RIM 516.04
N INV. 511.94
S INV. 511.94

1990 200mm PVC S.S. @ 0.33% (113.2m)

1990 200mm PVC S.S. @ 0.33% (113.4m)

1990 150mm PVC SDR26 W.M.

SS MH19
RIM 516.60
N INV. 512.29
S INV. 512.00
NW INV. 511.63
E INV. 511.63
W INV. 511.63

VLV027

HYD007

SS MH43
RIM 515.89
S INV. 512.78

1990 150mm
P.V.C. SDR26 W.M.

VLV069

VLV070

HYD021

THOMPSON STREET

ASH STREET

1964 200mm V.C. S.S. @ 0.53% (106.6m)

1964 150mm A.C. W.M.

5TH AVENUE

SS MH2
RIM 516.03
S INV. 511.18
E INV. 511.11
N INV. 511.09
W INV. 511.07

VLV002

1964 200mm V.C. S.S. @ 0.47% (91.8m)

1964 200mm V.C. S.S. @ 0.53% (20.9m)

HYD001

VLV003

VLV001

1964 250 PVC C900 S.S. @ 0.3%

40 DR9 POLY WATER SERVICE

SEWAGE PUMPING STATION No.1

SEE DETAIL A

150mm A.C. F.M.

SEWAGE PUMPING STATION No.1

200 HDPE DR17 FORCE MAIN

150mm A.C. F.M.

ABANDONED 150mm A.C. F.M.

ABANDONED SEWAGE PUMPING STATION & WET WELL

DETAIL A

SCALE: 1:500

LEGEND:

- SANITARY SEWER
- WATER MAIN
- FORCEMAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

SCALE BAR

0 50m 100m

DRAWING TITLE
4TH AVE.
5TH AVE.
THOMPSON ST. - ASH ST.

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 5

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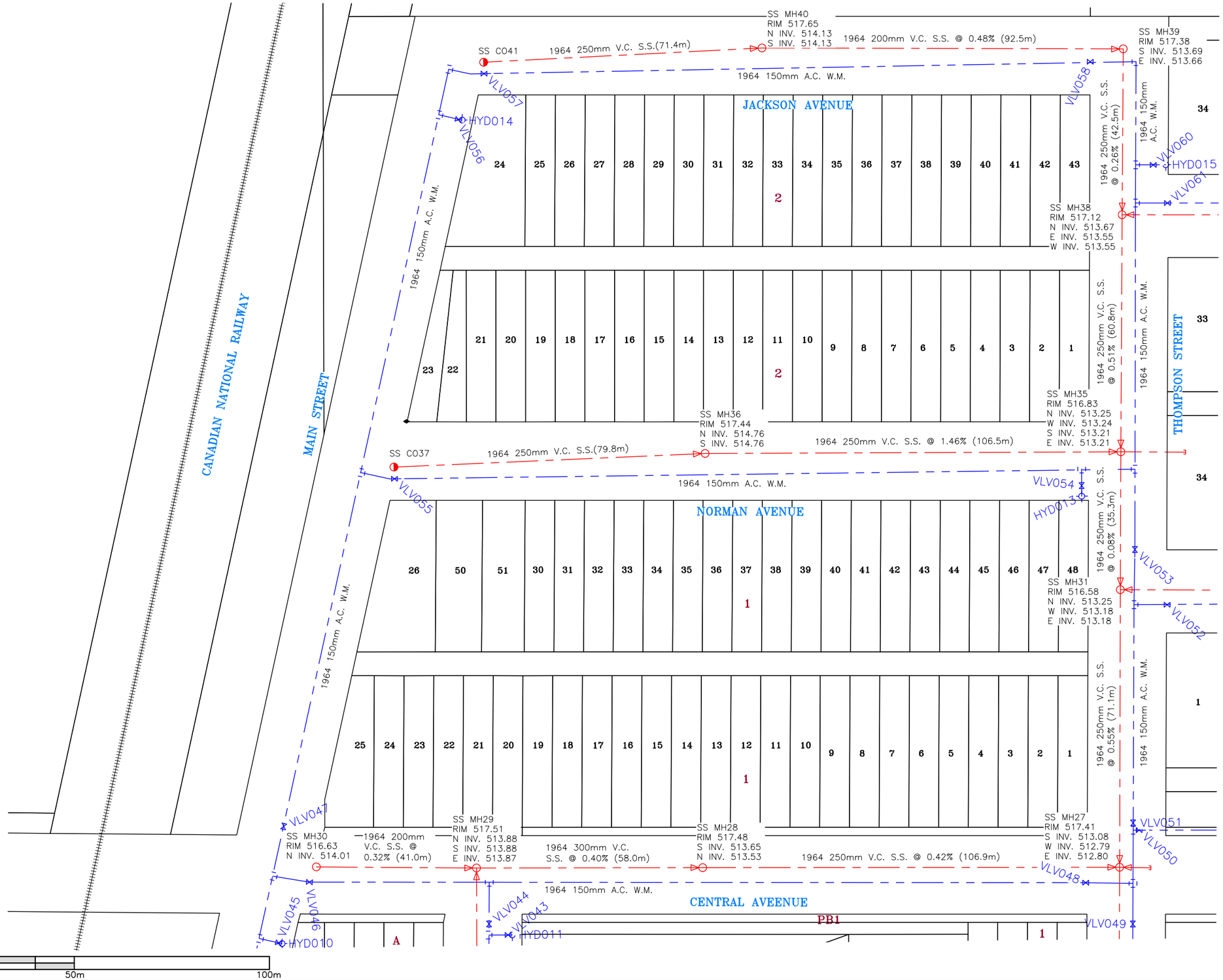

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

DRAWING TITLE
JACKSON, NORMAN, & CENTRAL AVE.
MAIN ST. - THOMPSON ST.

DATE
18/10/05

SCALE
1:1000

DRAWING
SHEET 6

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CENTRAL AVEENUE

2ND AVENUE

3RD AVENUE

RUPERT STREET

THOMPSON STREET

MAIN STREET

CANADIAN NATIONAL RAILWAY

SS MH30
RIM 516.63
N INV. 514.01

1964 200mm V.C. S.S. @ 0.32% (41.0m)

SS MH29
RIM 517.51
N INV. 513.88
S INV. 513.88
E INV. 513.87

1964 300mm V.C. S.S. @ 0.40% (58.0m)

SS MH28
RIM 517.48
S INV. 513.65
N INV. 513.53

1964 250mm V.C. S.S. @ 0.42% (106.9m)

SS MH27
RIM 517.41
S INV. 513.08
W INV. 512.79
E INV. 512.80

1964 150mm A.C. W.M.

1964 150mm A.C. W.M.

1964 200mm V.C. S.S. @ 0.51% (104.4m)

1964 150mm A.C. W.M.

1964 200mm V.C. S.S. @ 0.32% (104.7m)

1964 150mm A.C. W.M.

SS MH17
RIM 516.78
N INV. 513.89
E INV. 513.85

1964 200mm V.C. S.S. @ 0.68% (77.8m)

SS MH18
RIM 516.86
S INV. 514.42
W INV. 514.40

1964 150mm A.C. W.M.

1964 200mm V.C. S.S. @ 0.04% (106.2m)

1964 150mm A.C. W.M.

1964 200mm V.C. S.S. @ 0.38% (103.4m)

SS MH16
RIM 516.66
W INV. 513.89
E INV. 513.88

SS MH24
RIM 516.18
N INV. 513.47

SS MH23
RIM 516.03
N INV. 513.02
S INV. 513.02

SS MH22
RIM 516.23
N INV. 512.48
S INV. 512.47
E INV. 512.08
W INV. 512.08

SS MH26
RIM 516.08
N INV. 512.67
E INV. 512.47
W INV. 512.47

1964 250mm V.C. S.S. @ 0.47% (96.2m)

1964 250mm V.C. S.S. @ 0.51% (107.1m)

1964 150mm A.C. W.M.

VLV047 VLV046 VLV045 VLV044 VLV043 VLV051 VLV050 VLV048 VLV049 VLV042 VLV041 VLV039 VLV038 VLV037 VLV034 VLV035 VLV040 VLV032 VLV033 VLV031 VLV030

HYD010 HYD011 HYD012 HYD009 HYD008 HYD007

PB1

A B F K L J M H P G E W1

SCALE BAR
0 50m 100m

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

DRAWING TITLE
CENTRAL, 2ND & 3RD AVENUE
MIAN ST. - THOMPSON ST.

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 7

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CANADIAN NATIONAL RAILWAY

MAIN STREET

3RD AVENUE

4TH AVENUE

5TH AVENUE

THOMPSON STREET

SS MH16
RIM 516.66
W INV. 513.89
E INV. 513.88

SS MH24
RIM 516.18
N INV. 513.47

SS MH23
RIM 516.03
N INV. 513.02
S INV. 513.02

SS MH22
RIM 516.23
N INV. 512.48
S INV. 512.47
E INV. 512.08
W INV. 512.08

1964 250mm V.C. S.S. @ 0.47% (96.2m)

1964 250mm V.C. S.S. @ 0.51% (107.1m)

1964 150mm A.C. W.M.

VLV037 VLV034 VLV035 VLV032 VLV033 VLV031

HYD008 HYD007 VLV030

1964 200mm V.C. S.S. @ 0.85% (108.7m)

1964 150mm A.C. W.M.

VLV036

1964 200mm V.C. S.S. @ 0.42% (106.4m)

1964 150mm A.C. W.M.

VLV029

SS MH15
RIM 516.71
W INV. 512.96
E INV. 512.95

SS MH21
RIM 516.55
N INV. 513.24

SS MH20
RIM 515.91
N INV. 512.69
S INV. 512.69

1964 200mm V.C. S.S. @ 0.48% (115.3m)

1964 250mm V.C. S.S.
@ 0.64% (107.0m)

1964 150mm A.C. W.M.

1964 150mm A.C. W.M.

VLV024 VLV025 VLV026 VLV028

HYD006

SS MH19
RIM 516.60
N INV. 512.29
S INV. 512.00
NW INV. 511.63
E INV. 511.63
W INV. 511.63

VLV027

HYD007

1964 200mm V.C. S.S. @ 0.35% (108.5m)

1964 150mm A.C. W.M.

1964 200mm V.C. S.S. @ 0.53% (106.6m)

1964 150mm A.C. W.M.

SS MH5
RIM 516.56
E INV. 512.57
W INV. 512.57
N INV. 512.56

SS MH4
RIM 515.87
S INV. 512.12
N INV. 512.08

SS MH3
RIM 516.24
N INV. 511.61
S INV. 511.61

SS MH2
RIM 516.03
S INV. 511.18
E INV. 511.11
N INV. 511.09
W INV. 511.07

VLV008 VLV002

1964 200mm V.C. S.S. @ 0.38% (117.3m)

1964 200mm V.C. S.S. @ 0.47% (100.8m)

1964 200mm V.C. S.S.
@ 0.47% (91.8m)

1964 200mm
V.C. S.S. @
0.53% (20.9m)

1964 150mm A.C. W.M.

1964 150mm A.C. W.M.

VLV005 VLV006 VLV004 HYD001 VLV003 VLV001

1964 250
PVC C900
S.S. @ 0.3%

SCALE BAR
0 50m 100m

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

DRAWING TITLE
3RD, 4TH &
5TH AVE.
MAIN ST. - THOMPSON ST.

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 8

C

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SS MH5
RIM 516.56
E INV. 512.57
W INV. 512.57
N INV. 512.56

VLV008

VLV005

1964 200mm V.C. S.S. @ 0.38% (117.3m)

SS MH4
RIM 515.87
S INV. 512.12
N INV. 512.08

1964 200mm V.C. S.S. @ 0.47% (100.8m)

SS MH3
RIM 516.24
N INV. 511.61
S INV. 511.61

5TH AVENUE

1964 200mm V.C. S.S.
@ 0.47% (91.8m)

SS MH2
RIM 516.03
S INV. 511.18
E INV. 511.11
N INV. 511.09
W INV. 511.07

VLV002

1964 200mm
V.C. S.S. @
0.53% (20.9m)

1964 150mm A.C. W.M.

1964 150mm A.C. W.M.

VLV006

HYD002

VLV007

VLV004

HYD001

VLV003

VLV001

1964 250
PVC C900
S.S. @ 0.3%

40 DR9
POLY WATER
SERVICE

SEWAGE
PUMPING
STATION
No.1

CANADIAN NATIONAL RAILWAY

MAIN STREET

1964 200mm V.C. S.S. @ 0.35% (106.1m)

1964 150mm A.C. W.M.

1992 150mm SER. 160 PVC W.M.

150mm A.C. F.M.

1 2 3 4 5 6 7 8 9 10 11

26 25 24 23 22 21 20 27

24 28 15 16 17 18 19 28

1 2 3 4 5 6 7 8 9 10 11

22 21 20 19 18 24 23

12 13 23 14 15 16 17 24

C

19

SS MH6
RIM 516.43
N INV. 513.03
E INV. 512.95
W INV. 512.94

1964 200mm V.C. S.S. @ 0.45% (77.0m)

SS MH7
RIM 516.04
N INV. 513.30
S INV. 513.29

6TH AVENUE

HYD003

VLV011

1964 200mm V.C. S.S. @ % (51.4m)

SS C08

1964 150mm A.C. W.M.

VLV010

VLV009

1964 200mm V.C. S.S. @ 0.39% (106.5m)

1964 150mm A.C. W.M.

SS MH9
RIM 516.73
N INV. 513.40
E INV. 513.38
W INV. 513.37

VLV015

1964 200mm V.C. S.S. @ 0.44% (98.7m)

SS MH10
RIM 517.73
N INV. 513.84
S INV. 513.83

7TH AVENUE

1964 200mm V.C. S.S. (52.5m)

SS C011

1964 150mm A.C. W.M.

VLV016

VLV014

VLV013

VLV012

HYD004

RUPERT STREET

SCALE BAR

0 50m 100m

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

DRAWING TITLE
5TH, 6TH &
7TH AVE.
MAIN ST. - RUPPERT ST.

DATE
18/10/05

SCALE
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DRAWING
SHEET 9

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POOL SHED

POOL ELEVATOR

CANADIAN NATIONAL RAILWAY

MAIN STREET

RUPERT STREET

7TH AVENUE

8TH AVENUE

SS MH9
RIM 516.73
N INV. 513.40
E INV. 513.38
W INV. 513.37

SS MH10
RIM 517.73
N INV. 513.84
S INV. 513.83

SS C011

1964 200mm V.C. S.S. @ 0.44% (98.7m)

1964 200mm V.C. S.S. (52.5m)

1964 150mm A.C. W.M.

1964 200mm PVC. S.S. @ 0.10% (115.3m)

1964 150mm A.C. W.M.

1992 150mm SER. 160 PVC W.M.

VLV012
VLV013
VLV014
VLV015
VLV016
VLV017
VLV018
VLV019
VLV020
VLV021
VLV022
VLV023

HYD004
HYD005

WATER TREATMENT PLANT
RESERVOIR

SS MH12
RIM 516.42
NW INV. 513.93
W INV. 513.49
N INV. 513.48

SS MH13
RIM 516.76
S INV. 514.22
N INV. 514.20

SS MH14
RIM 516.79
S INV. 514.53

1982 200mm PVC. S.S. @ 0.91% (79.2m)

1982 200mm PVC. S.S. @ 0.38% (87.1m)

1992 150mm PVC SDR26 W.M.

100mm A.C. WATER SUPPLY LINE

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

SCALE BAR
0 50m 100m

DRAWING TITLE
7TH AVE.
8TH AVE.
MAIN ST. - RUPPERT ST.

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 10

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CANADIAN NATIONAL RAILWAY

HYD026

VLV086

ELEVATOR ROAD

2000 150mm C900 PVC W.M.

CARGILL FERTILIZER

CARGILL SHED

CENTRAL AVENUE

INDUSTRIAL DRIVE

2000 150mm C900 PVC W.M.

VLV087

HYD027

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

SCALE BAR

0 50m 100m

DRAWING TITLE
CENTRAL AVE,
ELEVATOR RD
& CENTRAL AVE.

DATE
18/10/05

SCALE
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DRAWING
SHEET 11

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CANADIAN NATIONAL RAILWAY

ELEVATOR ROAD

CARGILL SHED

R.M.

INDUSTRIAL DRIVE

2000 150mm C900 PVC W.M.

2000 150mm C900 PVC W.M.

2000 150mm C900 PVC W.M.

2000 150mm C900 PVC W.M.

2000 150mm C900 PVC W.M.

25mm P.E. SERVICE

25mm P.E. SERVICE

HYD029

VLV090

HYD030

VLV091

VLV088

VLV089

HYD028

DAYCON WOOD PRODUCTS

LEGEND:

- SANITARY SEWER
- WATER MAIN
- MANHOLE
- FLOW DIRECTION
- TEE
- VALVE
- HYDRANT
- PLUG
- XXX000 ASSET IDENTIFIER

SCALE BAR

0 50m 100m

DRAWING TITLE
ELEVATOR ROAD
INDUSTRIAL DR.

DATE
18/10/05

SCALE
1:1000

DRAWING
SHEET 12

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TOWN OF ABERDEEN

WATER SECTION
IDENTIFICATION SITE PLAN

JACKSON AVENUE
BLAKE CRESCENT
NORMAN AVENUE
CENTRAL AVEENUE
CENTRAL AVENUE
CENTRAL AVEENUE
HIGHWAY 785
GRAHAM COURT
HAMM COURT
MCDONALD STREET
CANNON COURT
THOMPSON STREET
2ND AVENUE
3RD AVENUE
3RD AVENUE
4TH AVENUE
4TH AVENUE
5TH AVENUE
6TH AVENUE
7TH AVENUE
8TH AVENUE
RUPERT STREET
RUPERT STREET
ASH STREET
INDUSTRIAL DRIVE
ELEVATOR ROAD
CANADIAN NATIONAL RAILWAY
MAIN STREET
ROAD TO LAGOON
ELEVATOR ROAD

W1 W2 W3 W4 W5 W6 W7 W8 W9 W10 W11 W12 W13 W14 W15 W16 W17 W18 W19 W20 W21 W22 W23 W24 W25 W26 W27 W28 W29 W30 W31 W32 W33 W34 W35 W36 W37

SCALE BAR
0 250m 500m

COMPILED BY:

CATTERALL & WRIGHT
CONSULTING ENGINEERS
1221 - 8th Street East
SASKATOON SK S7H 0S5
Tel: (306) 343-7280, Fax: (306) 956-3199

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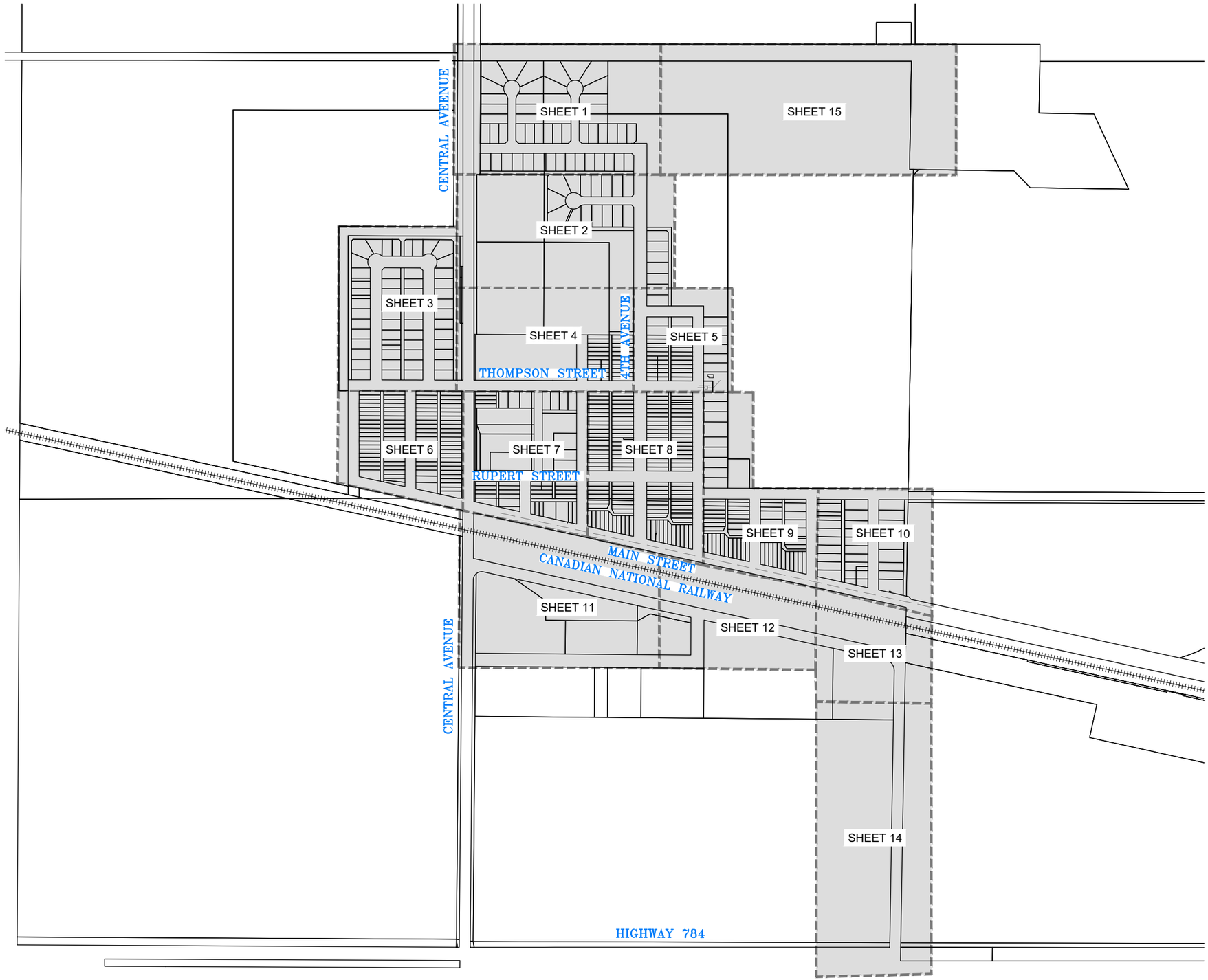
TOWN OF ABERDEEN

ROADWAY & CULVERT MAPS & ASSET IDENTIFICATION



SCALE BAR

0 375m 750m

COMPILED BY:

CATTERALL & WRIGHT
CONSULTING ENGINEERS
1221 - 8th Street East
SASKATOON SK S7H 0S5
Tel: (306) 343-7280, Fax: (306) 956-3199

NOTE:
DATA PROVIDED COMPILED FROM SURVEY TAKEN IN THE MONTH OF MAY, 2018

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ROAD TO LAGOON

CLV095 600mm
W INV. 515.54
E INV. 515.48

CLV094 600mm
N INV. 515.80
S INV. 515.70

CLV096 600mm
N INV. 515.69
S INV. 515.53

CLV093 600mm
S INV. 515.64
N INV. 515.56

CENTRAL AVENUE

GRAHAM COURT

HAMM COURT

MCDONALD STREET

4TH AVENUE

W1

8 9 10 25 26 27

7 11 24 28

6 12 23 29

5 19 13 22 30 19

4 14 21 31

1 2 3 15 16 17 18 19 20 32 33 34 35 36 37

30 29 28 27 26 25 24 23 22 21 20 19 18 17 16

18 18

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA

SCALE BAR

0 50m 100m

DRAWING TITLE
MCDONALD STREET
GRAHAM & HAMM CT

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 1

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CENTRAL AVEENUE

CANNON COURT

9 10 11 12 13 14 15

8

7 W1 6 5 4 3 2 1

18

H

CLV092 500mm
S INV. 515.75
N INV. 515.75

CLV091 500mm
N INV. 515.81
S INV. 515.79

CLV089 500mm
S INV. 515.85
N INV. 515.81

A

X

Y

7

6

5

17

4

3

2

1

4TH AVENUE

ASH STREET

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA

SCALE BAR

0 50m 100m

DRAWING TITLE
4TH AVE
CENTRAL AVE
CANNON CT - ASH ST

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 2

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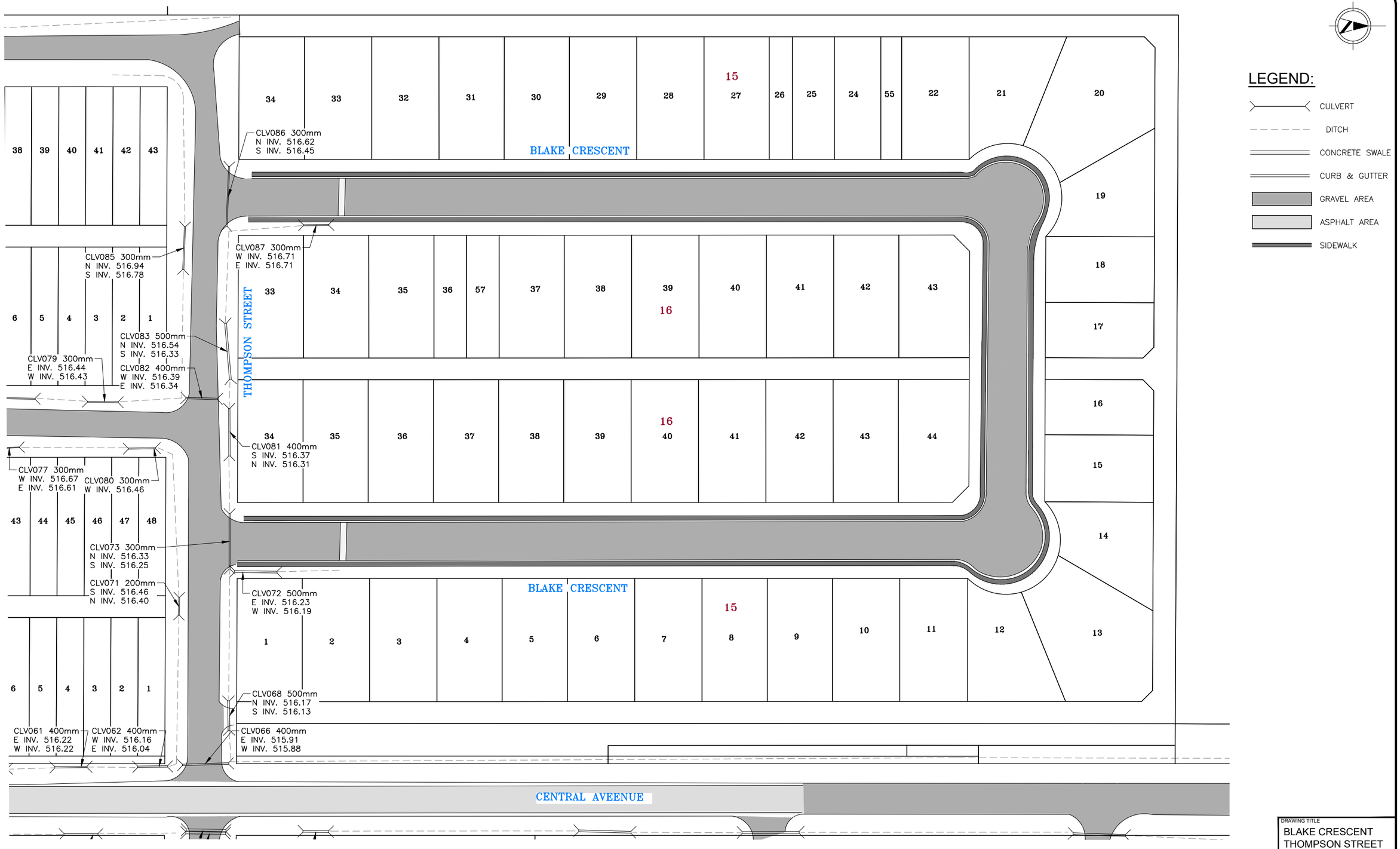

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA
- SIDEWALK

DRAWING TITLE
BLAKE CRESCENT
THOMPSON STREET

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 3

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CLV089 500mm
S INV. 515.85
N INV. 515.81

CLV088 500mm
S INV. 515.97
N INV. 515.91

A

X

Y

ASH STREET

CENTRAL AVENUE

3RD AVENUE

4TH AVENUE

THOMPSON STREET

CLV067 500mm
W INV. 515.96
E INV. 515.95

CLV068 500mm
N INV. 516.17
S INV. 516.13

CLV065 600mm
E INV. 516.10
W INV. 516.05

CLV066 400mm
E INV. 515.91
W INV. 515.88

CLV064 600mm
W INV. 516.01
E INV. 515.98

CLV045 300mm
E INV. 515.66
W INV. 515.59

CLV046 400mm
W INV. 515.73
E INV. 515.65

CLV090 200mm
N INV. 516.31
S INV. 516.26

CLV047 200mm
E INV. 516.09
W INV. 516.03

CLV048 300mm
E INV. 515.72
W INV. 515.68

CLV043 500mm
W INV. 515.40
E INV. 515.35

CLV042 500mm
E INV. 515.41
W INV. 515.41

W1

E

1 2 3

38 37 36 39 40

1 2 3 4 5 6 7 8 9 10 11 12

22 21 20 19 18 17 16 15 14 13 12 23 24 25 26 27

1 2 3 4 5 6 7 8 9 10 11 12 13 21 20 19 18 17 16 15 14 13 22 23 24

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA
- SIDEWALK

SCALE BAR

0 50m 100m

DRAWING TITLE
THOMPSON STREET
CENTRAL AVE - 4TH AVE

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 4

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DRAWING TITLE
4TH AVE.
5TH AVE.
THOMPSON ST. - ASH ST.

DATE
18/10/05

SCALE
1:1000

DRAWING
SHEET 5

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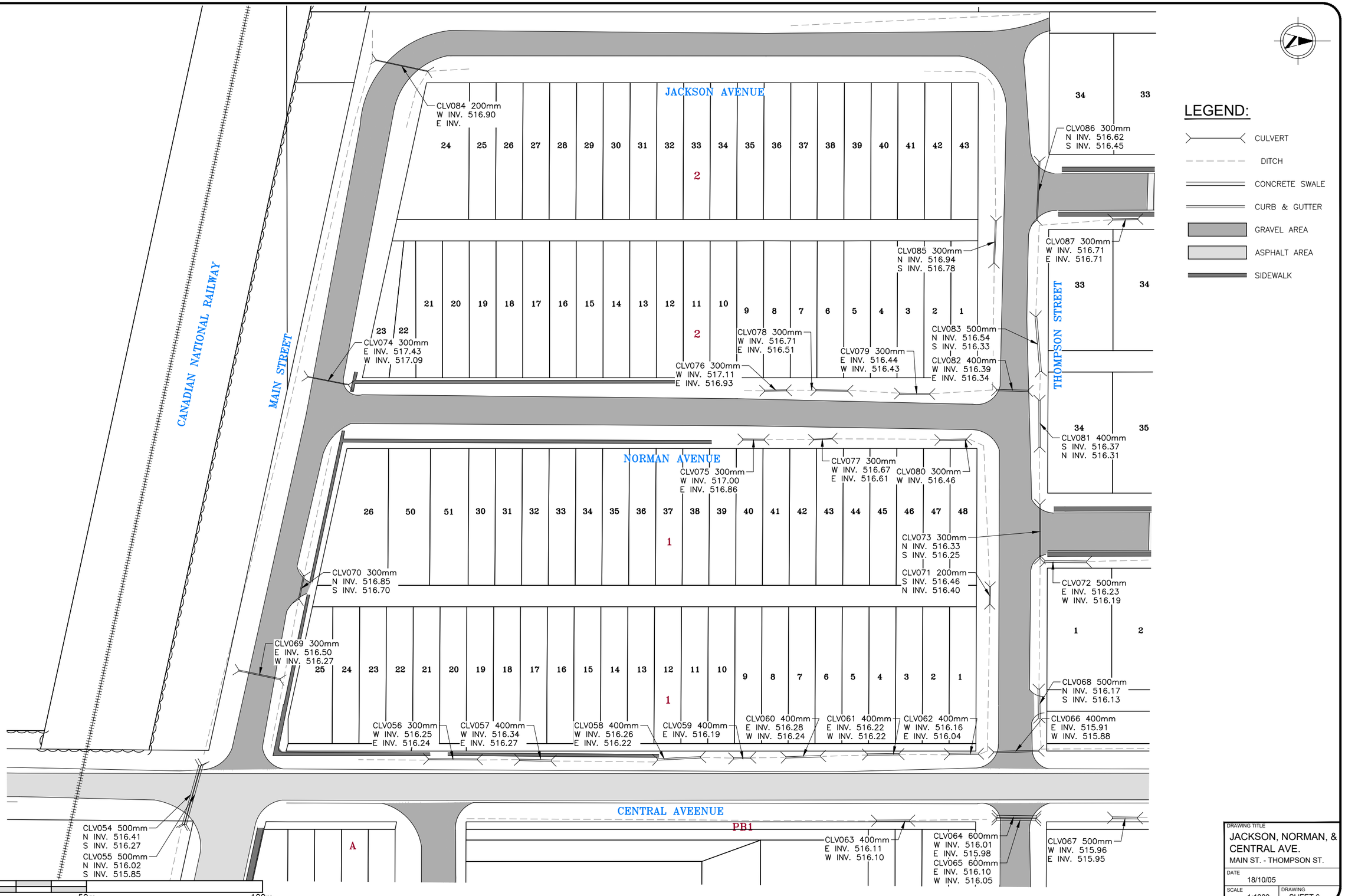

DRAWING TITLE
JACKSON, NORMAN, & CENTRAL AVE.
MAIN ST. - THOMPSON ST.

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 6

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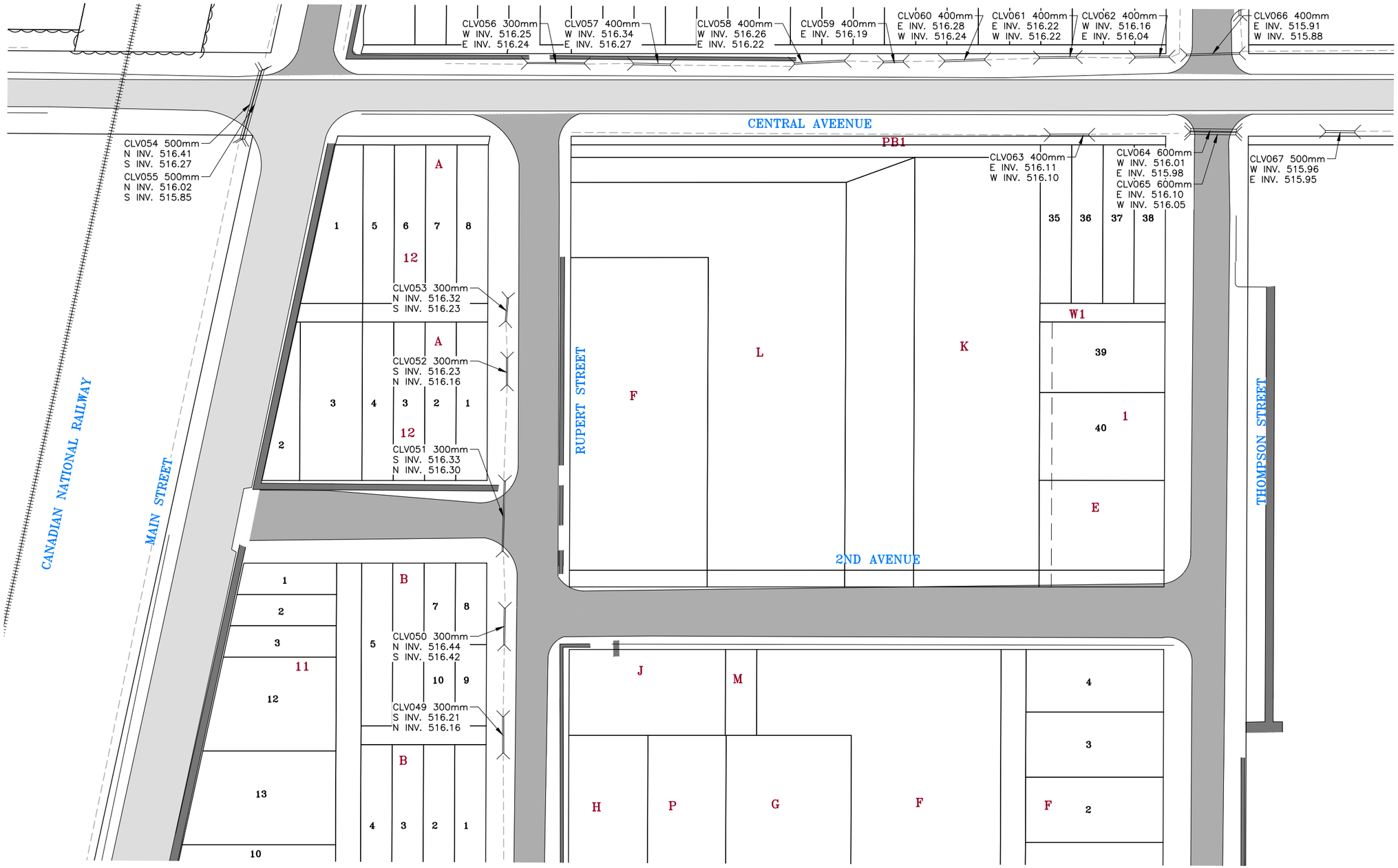

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA
- SIDEWALK

SCALE BAR

0 50m 100m

DRAWING TITLE
CENTRAL, 2ND & 3RD AVENUE
MIAN ST. - THOMPSON ST.

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 7

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CANADIAN NATIONAL RAILWAY

MAIN STREET

3RD AVENUE

4TH AVENUE

5TH AVENUE

THOMPSON STREET

CLV022 600mm
S INV. 515.84
N INV. 515.77

CLV023 600mm
N INV. 515.83
S INV. 515.79

CLV016 600mm
N INV. 515.64
S INV. 515.55

CLV017 600mm
N INV. 515.47
S INV. 515.43

CLV033 250mm
E INV. 515.87

CLV032 300mm
W INV. 516.02
E INV. 515.68

CLV034 300mm
NW INV. 516.12
SE INV. 515.80

CLV035 500mm
E INV. 515.80
W INV. 515.72

CLV036 400mm
W INV. 515.59
E INV. 515.39

CLV043 500mm
W INV. 515.40
E INV. 515.35

CLV044 600mm
N INV. 515.35
S INV. 515.33

CLV045 300mm
E INV. 515.66
W INV. 515.59

CLV047 200mm
E INV. 516.09
W INV. 516.03

CLV046 400mm
W INV. 515.73
E INV. 515.65

CLV041 150mm
E INV. 515.55
W INV. 515.28

CLV042 500mm
E INV. 515.41
W INV. 515.41

CLV048 300mm
E INV. 515.72
W INV. 515.68

CLV038 500mm
W INV. 515.50
E INV. 515.47

CLV037 500mm
W INV. 515.55
E INV. 515.49

CLV040 600mm
NE INV. 515.38
SW INV. 515.36

CLV039 600mm
NE INV. 515.44
SW INV. 515.39

CLV123 600mm
N INV. 515.37
S INV. 515.31

CLV030 600mm
N INV. 515.35
S INV. 515.28

CLV031 400mm
W INV. 515.68

CLV029 300mm
E INV. 515.55
W INV. 515.30

CLV028 600mm
NE INV. 515.27
SW INV. 515.26

CLV026 500mm
E INV. 515.47
W INV. 515.26

CLV027 600mm
E INV. 515.32
W INV. 515.38

CLV025 600mm
NE INV. 515.36
SW INV. 515.35

CLV024 400mm
W INV. 515.87
E INV. 515.85

CLV020 600mm
N INV. 515.32
S INV. 515.29

CLV021 600mm
N INV. 515.37
S INV. 515.31

CLV019 600mm
N INV. 515.27
S INV. 515.15

CLV018 300mm
N INV. 515.58
S INV. 515.33

MH1

SCALE BAR
0 50m 100m

LEGEND:
- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA
- SIDEWALK

DRAWING TITLE
3RD, 4TH & 5TH AVE.
MAIN ST. - THOMPSON ST.

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 8

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CLV016 600mm
N INV. 515.64
S INV. 515.55

CLV017 600mm
N INV. 515.47
S INV. 515.43

CLV018 300mm
N INV. 515.58
S INV. 515.33

CLV014 400mm
NW INV. 515.32
SE INV. 515.11

CLV015 300mm
E INV. 515.95
W INV. 515.66

CLV013 300mm
N INV. 515.45
S INV. 515.29

CLV012 800mm
N INV. 515.12
S INV. 515.07

CLV011 1200mm
S INV. 515.00
N INV. 514.66

CLV010 300mm
E INV. 516.08
W INV. 515.74

CLV009 300mm
W INV. 515.18
E INV. 515.03

CLV008 250mm
W INV. 515.21
E INV. 515.02

CANADIAN NATIONAL RAILWAY

MAIN STREET

5TH AVENUE

6TH AVENUE

7TH AVENUE

RUPERT STREET

SCALE BAR

0 50m 100m

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA
- SIDEWALK

DRAWING TITLE
5TH, 6TH &
7TH AVE.
MAIN ST. - RUPPERT ST.

DATE
18/10/05

SCALE
1:1000

DRAWING
SHEET 9

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POOL SHED

POOL ELEVATOR

CANADIAN NATIONAL RAILWAY

MAIN STREET

7TH AVENUE

8TH AVENUE

RUPERT STREET

CLV006 600mm
S INV. 515.69
N INV. 515.64

CLV007 600mm
S INV. 515.70
N INV. 515.66

CLV005 300mm
E INV. 516.34
W INV. 515.65

CLV004 300mm
N INV. 515.45
S INV. 515.33

CLV003 300mm
W INV. 515.21
E INV. 515.11

CLV002 400mm
W INV. 516.14
E INV. 515.95

CLV001 400mm
NW INV. 516.24
SE INV. 516.20

9

10

11 10 9 8 7 21 20 19 22 18 17

23 2 3 4 5 6 12 13 26 27

24 25 26

0 1 2 3 4 5 6 7 8 9

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA
- SIDEWALK

SCALE BAR

0 50m 100m

DRAWING TITLE
7TH AVE.
8TH AVE.
MAIN ST. - RUPPERT ST.

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 10

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CANADIAN NATIONAL RAILWAY

ELEVATOR ROAD

CENTRAL AVENUE

INDUSTRIAL DRIVE

CARGILL FERTILIZER

CARGILL SHED

CLV097 500mm
N INV. 516.10
S INV. 515.90

CLV098 600mm
W INV. 516.46
E INV. 516.44

CLV099 600mm
W INV. 516.49
E INV. 516.44

CLV106 300mm
SE INV. 516.13
NW INV. 515.95

CLV102 300mm
E INV. 516.59
W INV. 516.45

CLV103 500mm
W INV. 516.46
E INV. 516.39

CLV105 400mm
W INV. 516.26
E INV. 516.26

CLV100 600mm
S INV. 516.46
N INV. 516.35

CLV101 400mm
S INV. 516.48
N INV. 516.40

CLV104 500mm
E INV. 516.49
W INV. 516.47

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA

SCALE BAR

0 50m 100m

DRAWING TITLE
CENTRAL AVE,
ELEVATOR RD
& INDUSTRIAL DRIVE

DATE 18/10/05

SCALE 1:1000

DRAWING SHEET 11

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CANADIAN NATIONAL RAILWAY

ELEVATOR ROAD

INDUSTRIAL DRIVE

CARGILL SHED

R.M.

DAYCON WOOD PRODUCTS

CLV103 500mm
W INV. 516.46
E INV. 516.39

CLV104 500mm
E INV. 516.49
W INV. 516.47

CLV105 400mm
W INV. 516.26
E INV. 516.26

CLV106 300mm
SE INV. 516.13
NW INV. 515.95

CLV107 400mm
NE INV. 515.99
SW INV. 515.59

CLV108 600mm
W INV. 516.09
E INV. 515.91

CLV109 500mm
S INV. 515.81
N INV. 515.71

CLV110 700mm
E INV. 515.62
W INV. 515.56

CLV111 700mm
W INV. 515.59
E INV. 515.56

CLV112 600mm
S INV. 515.96
N INV. 515.95

CLV113 800mm
W INV. 515.54
E INV. 515.46

CLV114 800mm
W INV. 515.51
E INV. 515.50

SCALE BAR

0 50m 100m

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASHPHALT AREA

DRAWING TITLE
INDUSTRIAL DRIVE
ELEVATOR ROAD

DATE
18/10/05

SCALE
1:1000

DRAWING
SHEET 12

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CANADIAN NATIONAL RAILWAY

ELEVATOR ROAD

CLV001 400mm
NW INV. 516.24
SE INV. 516.20

CLV007 600mm
S INV. 515.70
N INV. 515.66

CLV006 600mm
S INV. 515.69
N INV. 515.64

CLV005 300mm
E INV. 516.34
W INV. 515.65

CLV112 600mm
S INV. 515.96
N INV. 515.95

POOL SHED

POOL ELEVATOR

CLV109 500mm
S INV. 515.81
N INV. 515.71

CLV113 800mm
W INV. 515.54
E INV. 515.46

CLV114 800mm
W INV. 515.51
E INV. 515.50

CLV115 400mm
E INV. 515.59
W INV. 515.58

CLV116 300mm
E INV. 515.55
W INV. 515.48

CLV120 600mm
S INV. 515.43
N INV. 515.39

CLV121 600mm
S INV. 515.40
N INV. 515.28

DAYCON
WOOD
PRODUCTS

POOL
SHED

CLV117 600mm
W INV. 515.37
E INV. 515.34

CLV118 600mm
W INV. 515.35
E INV. 515.34

CLV119 600mm
SW INV. 515.28
NE INV. 515.16

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA

SCALE BAR

0 50m 100m

DRAWING TITLE
ELEVATOR ROAD

DATE
18/10/05

SCALE
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DRAWING
SHEET 13

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ELEVATOR ROAD

MATCH LINE

CLV122 600mm
S INV. 515.94
N INV. 515.92

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA

MATCH LINE

ELEVATOR ROAD

HIGHWAY 784

SCALE BAR

0 50m 100m

DRAWING TITLE
ELEVATOR ROAD
HIGHWAY 784

DATE
18/10/05

SCALE
1:1000

DRAWING
SHEET 14

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ROAD TO LAGOON

MATCH LINE

26

27

28

29

30

31

19

HAMM COURT

MATCH LINE

ROAD TO LAGOON

LEGEND:

- CULVERT
- DITCH
- CONCRETE SWALE
- CURB & GUTTER
- GRAVEL AREA
- ASPHALT AREA

SCALE BAR

0 50m 100m

DRAWING TITLE
ROAD TO LAGOON

DATE
18/10/05

SCALE
1:1000

DRAWING
SHEET 15

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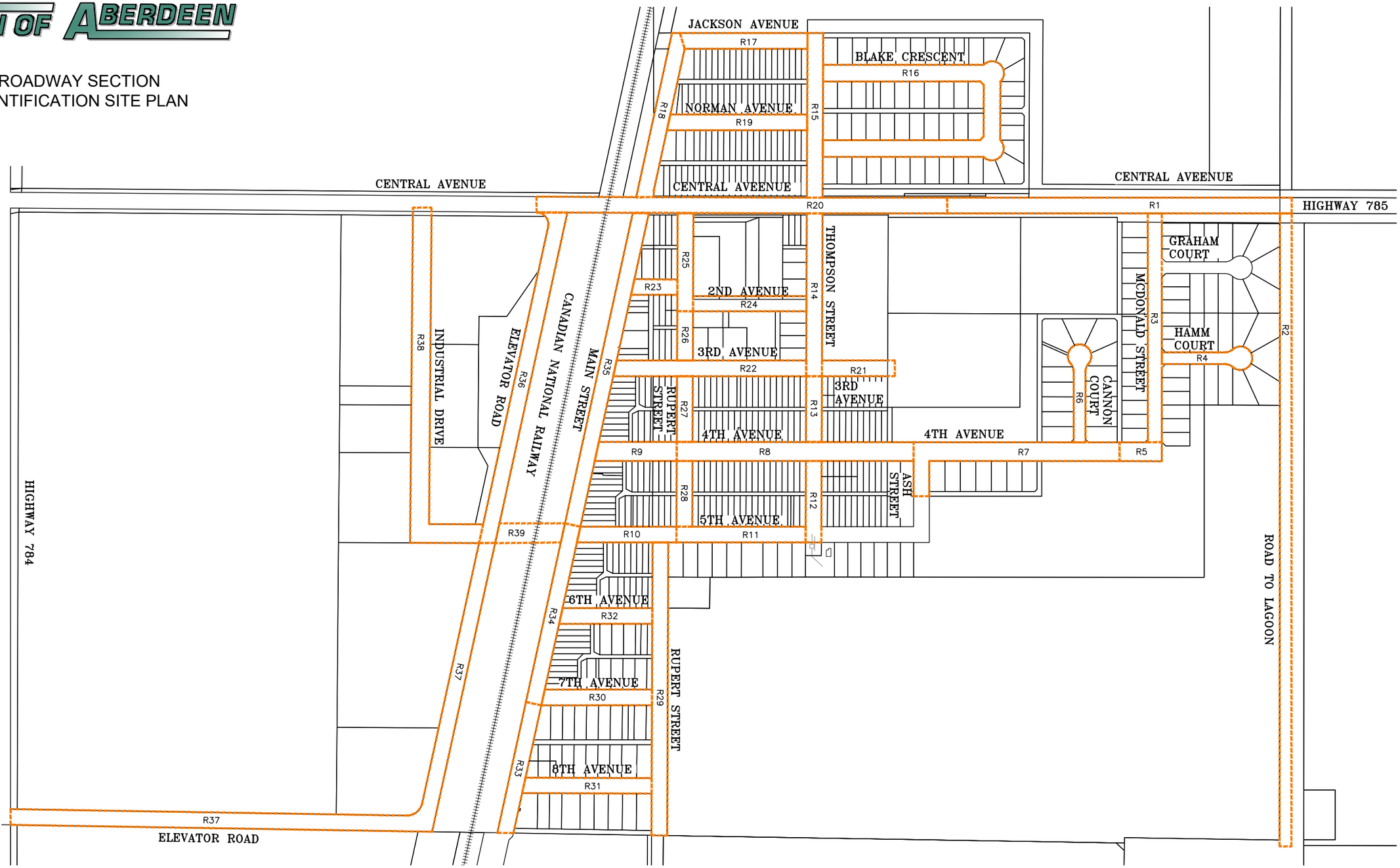
TOWN OF ABERDEEN

ROADWAY SECTION IDENTIFICATION SITE PLAN



SCALE BAR

0 250m 500m

COMPILED BY:

CATTERALL & WRIGHT
CONSULTING ENGINEERS
1221 - 8th Street East
SASKATOON SK S7H 0S5
Tel: (306) 343-7280, Fax: (306) 956-3199

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Appendix C: Asset Summary Tables

APPENDIX C
ASSET SUMMARY TABLES
WASTEWATER - 2022

Asset ID	Description	Location	Quantity	Unit	Condition:	Year Installed	Deign Life	Est. Years Remaining	Cost per unit	Total Value	Existing Level of Service	Desired Level of Service	Funding Gap
SS (SPS1 - MH1)	250mm PVC C900	SPS1	18.0	lin. metre	Fair	1964	50	-8	$630.00	$11,340.00	Acceptable	Acceptable	-----
MH1		5th Avenue North of Thompson St	5.5	vert. metre	Fair	1964	50	-8	$1750.00	$9,677.50	Acceptable	Acceptable	-----
SS (MH1-2)	200mm VC	5th Avenue North of Thompson St	20.9	lin. metre	Fair	1964	50	-8	$630.00	$13,167.00	Acceptable	Acceptable	-----
MH2		Thompson Street and 5th Avenue	5.0	vert. metre	Fair	1964	50	-8	$1750.00	$8,680.00	Acceptable	Acceptable	-----
SS (MH2-3)	200mm VC	5th Avenue Between Rupert Stree	91.8	lin. metre	Fair	1964	50	-8	$630.00	$57,834.00	Acceptable	Acceptable	-----
MH3		5th Avenue Mid Block Between Ru	4.6	vert. metre	Fair	1964	50	-8	$1750.00	$8,102.50	Acceptable	Acceptable	-----
SS (MH3-4)	200mm VC	5th Avenue Mid Block Between Ru	100.8	lin. metre	Poor	1964	50	-8	$630.00	$63,504.00	Unsatisfactory	Acceptable	$63,504.00
MH4		5th Avenue and Rupert Street	3.8	vert. metre	Fair	1964	50	-8	$1750.00	$6,632.50	Acceptable	Acceptable	-----
SS (MH4-5)	200mm VC	5th Avenue Between Rupert Stree	117.3	lin. metre	Poor	1964	50	-8	$630.00	$73,899.00	Unsatisfactory	Acceptable	$73,899.00
MH5		5th Avenue and Main Street	4.0	vert. metre	Fair	1964	50	-8	$1750.00	$7,000.00	Acceptable	Acceptable	-----
SS (MH5-6)	200mm VC	Main Street Between 5th Avenue a	106.1	lin. metre	Fair	1964	50	-8	$630.00	$66,843.00	Acceptable	Acceptable	-----
MH6		Main Street and 6th Avenue	3.5	vert. metre	Fair	1964	50	-8	$1750.00	$6,107.50	Acceptable	Acceptable	-----
SS (MH6-7)	200mm VC	6th Avenue Between Main Street a	77.0	lin. metre	Fair	1964	50	-8	$630.00	$48,510.00	Acceptable	Acceptable	-----
MH7		6th Avenue Mid Block	2.8	vert. metre	Fair	1964	50	-8	$1750.00	$4,812.50	Acceptable	Acceptable	-----
SS (MH7-CO8)	200mm VC	6th Avenue Between Main Street a	51.4	lin. metre	Fair	1964	50	-8	$630.00	$32,382.00	Acceptable	Acceptable	-----
CO8		6th Avenue and Rupert Street	1.0	each	Fair	1964	50	-8	1500	$1,500.00	Acceptable	Acceptable	-----
SS (MH6-9)	200mm VC	Main Street Between 6th Avenue a	106.5	lin. metre	Fair	1964	50	-8	$630.00	$67,095.00	Acceptable	Acceptable	-----
MH9		Main Street and 7th Avenue	3.4	vert. metre	Fair	1964	50	-8	$1750.00	$5,880.00	Acceptable	Acceptable	-----
SS (MH9-10)	200mm VC	7th Avenue Between Main Street a	98.7	lin. metre	Fair	1964	50	-8	$630.00	$62,181.00	Acceptable	Acceptable	-----
MH10		7th Avenue Mid Block	3.9	vert. metre	Fair	1964	50	-8	$1750.00	$6,825.00	Acceptable	Acceptable	-----
SS (MH10-CO11)	200mm VC	7th Avenue Between Main Street a	52.5	lin. metre	Fair	1964	50	-8	$630.00	$33,075.00	Acceptable	Acceptable	-----
CO11		7th Avenue and Rupert Street	1.0	each	Fair	1964	50	-8	1500	$1,500.00	Acceptable	Acceptable	-----
SS (MH9-12)	200mm PVC	Main Street Between 7th Avenue a	115.3	lin. metre	Fair	1964	50	-8	$630.00	$72,639.00	Acceptable	Acceptable	-----
MH12		Main Street and 8th Avenue	2.9	vert. metre	Fair	1964	50	-8	$1750.00	$5,145.00	Acceptable	Acceptable	-----
SS (MH12-13)	200mm PVC	8th Avenue Between Main Street a	79.2	lin. metre	Good	1982	50	10	$630.00	$49,896.00	Ideal	Acceptable	-----
MH13		8th Avenue Mid Block	2.6	vert. metre	Fair	1982	50	10	$1750.00	$4,480.00	Acceptable	Acceptable	-----
SS (MH13-14)	200mm PVC	8th Avenue Between Main Street a	87.1	lin. metre	Fair	1982	50	10	$630.00	$54,873.00	Acceptable	Acceptable	-----
MH14		8th Avenue and Rupert Street	2.3	vert. metre	Fair	1982	50	10	$1750.00	$3,955.00	Acceptable	Acceptable	-----
SS (MH5-15)	200mm VC	Main Street Between 4th Avenue a	108.5	lin. metre	Poor	1964	50	-8	$630.00	$68,355.00	Unsatisfactory	Acceptable	$68,355.00
MH15		Main Street and 4th Avenue	3.8	vert. metre	Very Poor	1964	50	-8	$1750.00	$6,580.00	Unsatisfactory	Acceptable	$6,580.00
SS (MH15-16)	200mm VC	Main Street Between 3rd Avenue a	108.7	lin. metre	Poor	1964	50	-8	$630.00	$68,481.00	Unsatisfactory	Acceptable	$68,481.00
MH16		Main Street and 3rd Avenue	2.8	vert. metre	Very Poor	1964	50	-8	$1750.00	$4,865.00	Unsatisfactory	Acceptable	$4,865.00
SS (MH16-17)	200mm VC	Main Street Between 2nd Avenue	106.2	lin. metre	Poor	1964	50	-8	$630.00	$66,906.00	Unsatisfactory	Acceptable	$66,906.00
MH17		Main Street and 2nd Avenue	2.9	vert. metre	Fair	1964	50	-8	$1750.00	$5,127.50	Acceptable	Acceptable	-----
SS (MH17-18)	200mm VC	2nd Avenue Between Main Street	77.8	lin. metre	Fair	1964	50	-8	$630.00	$49,014.00	Acceptable	Acceptable	-----
MH18		2nd Avenue and Rupert Street	2.5	vert. metre	Fair	1964	50	-8	$1750.00	$4,305.00	Acceptable	Acceptable	-----
SS (MH2-19)	200mm VC	Thompson Street Between 4th Av	106.6	lin. metre	Fair	1964	50	-8	$630.00	$67,158.00	Acceptable	Acceptable	-----
MH19		4th Avenue and Thompson Street	5.0	vert. metre	Fair	1990	50	18	$1750.00	$8,697.50	Acceptable	Acceptable	-----
SS (MH19-20)	200mm VC	4th Avenue Between Thompson S	107.0	lin. metre	Fair	1964	50	-8	$630.00	$67,410.00	Acceptable	Acceptable	-----
MH20		4th Avenue Mid Block Between Th	3.2	vert. metre	Fair	1964	50	-8	$1750.00	$5,635.00	Acceptable	Acceptable	-----
SS (MH20-21)	200mm VC	4th Avenue Between Thompson S	115.3	lin. metre	Fair	1964	50	-8	$630.00	$72,639.00	Acceptable	Acceptable	-----
MH21		4th Avenue Mid Block Between Ru	3.3	vert. metre	Fair	1964	50	-8	$1750.00	$5,792.50	Acceptable	Acceptable	-----
SS (MH19-22)	200mm VC	Thompson Street Between 3rd Av	106.4	lin. metre	Poor	1964	50	-8	$630.00	$67,032.00	Unsatisfactory	Acceptable	$67,032.00
MH22		3rd Avenue and Thompson Street	4.1	vert. metre	Fair	1964	50	-8	$1750.00	$7,262.50	Acceptable	Acceptable	-----
SS (MH22-23)	250mm VC	3rd Avenue Between Thompson S	107.1	lin. metre	Poor	1964	50	-8	$630.00	$67,473.00	Unsatisfactory	Acceptable	$67,473.00
MH23		3rd Avenue Mid Block Between Th	3.0	vert. metre	Fair	1964	50	-8	$1750.00	$5,267.50	Acceptable	Acceptable	-----

APPENDIX C
ASSET SUMMARY TABLES
WASTEWATER - 2022

SS (MH23-24)	250mm VC	3rd Avenue Between Thompson S	96.2	lin. metre	Poor	1964	50	-8	$630.00	$60,606.00	Unsatisfactory	Acceptable	$60,606.00
MH24		3rd Avenue Mid Block Between R	2.7	vert. metre	Fair	1964	50	-8	$1750.00	$4,742.50	Acceptable	Acceptable	-----
SS (MH22-25)	200mm VC	3rd Avenue North of Thompson S	88.3	lin. metre	Fair	1964	50	-8	$630.00	$55,629.00	Acceptable	Acceptable	-----
MH25		North End of 3rd Avenue	3.4	vert. metre	Fair	1964	50	-8	$1750.00	$5,897.50	Acceptable	Acceptable	-----
SS (MH22-26)	200mm VC	Thompson Street Between Centra	103.4	lin. metre	Poor	1964	50	-8	$630.00	$65,142.00	Unsatisfactory	Acceptable	$65,142.00
MH26		Thompson Street Mid Block Betwe	3.6	vert. metre	Fair	1964	50	-8	$1750.00	$6,317.50	Acceptable	Acceptable	-----
SS (MH26-27)	200mm VC	Thompson Street Between Centra	104.7	lin. metre	Poor	1964	50	-8	$630.00	$65,961.00	Unsatisfactory	Acceptable	$65,961.00
MH27		Central Avenue and Thompson St	4.6	vert. metre	Fair	1964	50	-8	$1750.00	$8,085.00	Acceptable	Acceptable	-----
SS (MH27-28)	250mm VC	Central Avenue Between Thomps	106.9	lin. metre	Poor	1964	50	-8	$630.00	$67,347.00	Unsatisfactory	Acceptable	$67,347.00
MH28		Central Avenue Mid Block Betwee	4.0	vert. metre	Fair	1964	50	-8	$1750.00	$6,912.50	Acceptable	Acceptable	-----
SS (MH28-29)	300mm VC	Central Avenue Between Thomps	58.0	lin. metre	Poor	1964	50	-8	$630.00	$36,540.00	Unsatisfactory	Acceptable	$36,540.00
MH29		Central Avenue and Rupert Street	3.6	vert. metre	Fair	1964	50	-8	$1750.00	$6,370.00	Acceptable	Acceptable	-----
SS (MH29-30)	200mm VC	Central Avenue Between Rupert S	41.0	lin. metre	Fair	1964	50	-8	$630.00	$25,830.00	Acceptable	Acceptable	-----
MH30		Central Avenue and Main Street	2.6	vert. metre	Fair	1964	50	-8	$1750.00	$4,585.00	Acceptable	Acceptable	-----
SS (MH18-29)	200mm VC	Rupert Street Between Central Av	104.4	lin. metre	Poor	1964	50	-8	$630.00	$65,772.00	Unsatisfactory	Acceptable	$65,772.00
SS (MH27-31)	250mm VC	Thompson Street Between Blake	71.1	lin. metre	Fair	1964	50	-8	$630.00	$44,793.00	Acceptable	Acceptable	-----
MH31		Thompson Street and Blake Cresc	3.4	vert. metre	Fair	1964	50	-8	$1750.00	$5,950.00	Acceptable	Acceptable	-----
SS (MH31-32)	200mm VC	Blake Crescent East Leg	114.0	lin. metre	Poor	1977	50	5	$630.00	$71,820.00	Unsatisfactory	Acceptable	$71,820.00
MH32		Blake Crescent Mid Block East Leg	2.9	vert. metre	Fair	1977	50	5	$1750.00	$5,145.00	Acceptable	Acceptable	-----
SS (MH32-33)	200mm VC	Blake Crescent East Leg	113.8	lin. metre	Fair	1977	50	5	$630.00	$71,694.00	Acceptable	Acceptable	-----
MH33		Blake Crescent North End of East	3.1	vert. metre	Fair	1977	50	5	$1750.00	$5,372.50	Acceptable	Acceptable	-----
SS (MH33-34)	200mm VC	Blake Crescent Between West Leg	96.8	lin. metre	Fair	1977	50	5	$630.00	$60,984.00	Acceptable	Acceptable	-----
MH34		Blake Crescent North End of West	2.8	vert. metre	Fair	1977	50	5	$1750.00	$4,935.00	Acceptable	Acceptable	-----
SS (MH34-42)	200mm VC	Blake Crescent West Leg	114.9	lin. metre	Poor	1977	50	5	$630.00	$72,387.00	Unsatisfactory	Acceptable	$72,387.00
MH42		Blake Crescent Mid Block West Le	2.8	vert. metre	Fair	1977	50	5	$1750.00	$4,882.50	Acceptable	Acceptable	-----
SS (MH42-38)	200mm VC	Blake Crescent West Leg	113.0	lin. metre	Fair	1977	50	5	$630.00	$71,190.00	Acceptable	Acceptable	-----
MH35		Thompson Street and Norman Av	3.6	vert. metre	Very Poor	1964	50	-8	$1750.00	$6,335.00	Unsatisfactory	Acceptable	$6,335.00
SS (MH31-35)	250mm VC	Thompson Street Between Norma	35.3	lin. metre	Fair	1964	50	-8	$630.00	$22,239.00	Acceptable	Acceptable	-----
SS (MH35-36)	250mm VC	Norman Avenue Between Thomp	106.5	lin. metre	Fair	1964	50	-8	$630.00	$67,095.00	Acceptable	Acceptable	-----
MH36		Norman Avenue Mid Block	2.7	vert. metre	Fair	1964	50	-8	$1750.00	$4,690.00	Acceptable	Acceptable	-----
SS (MH36-CO37)	250mm VC	Norman Avenue Between Thomp	79.8	lin. metre	Fair	1964	50	-8	$630.00	$50,274.00	Acceptable	Acceptable	-----
CO37		Norman Avenue and Main Street	1.0	each	Fair	1964	50	-8	1500	$1,500.00	Acceptable	Acceptable	-----
SS (MH35-38)	250mm VC	Thompson Street Between Blake	60.8	lin. metre	Fair	1964	50	-8	$630.00	$38,304.00	Acceptable	Acceptable	-----
MH38		Thompson Street and Blake Cresc	3.6	vert. metre	Fair	1964	50	-8	$1750.00	$6,247.50	Acceptable	Acceptable	-----
SS (MH38-39)	250mm VC	Thompson Street Between Jackso	42.5	lin. metre	Fair	1964	50	-8	$630.00	$26,775.00	Acceptable	Acceptable	-----
MH39		Thompson Street and Jackson Ave	3.7	vert. metre	Fair	1964	50	-8	$1750.00	$6,510.00	Acceptable	Acceptable	-----
SS (MH39-40)	200mm VC	Jackson Avenue Between Thomps	92.5	lin. metre	Fair	1964	50	-8	$630.00	$58,275.00	Acceptable	Acceptable	-----
MH40		Jackson Avenue Mid Block	3.5	vert. metre	Fair	1964	50	-8	$1750.00	$6,160.00	Acceptable	Acceptable	-----
SS (MH40-41)	200mm VC	Jackson Avenue Between Thomps	71.4	lin. metre	Poor	1964	50	-8	$630.00	$44,982.00	Unsatisfactory	Acceptable	$44,982.00
CO41		Jackson Avenue and Main Street	1.0	each	Fair	1964	50	-8	1500	$1,500.00	Acceptable	Acceptable	-----
SS (MH19-43)	200mm VC	4th Avenue Between Thompson S	87.7	lin. metre	Fair	1964	50	-8	$630.00	$55,251.00	Acceptable	Acceptable	-----
MH43		4th Avenue Mid Block Between Th	3.11	vert. metre	Fair	1990	50	18	$1750.00	$5,442.50	Acceptable	Acceptable	-----
SS (MH19-44)	200mm PVC	4th Avenue Between Thompson S	113.4	lin. metre	Poor	1990	50	18	$630.00	$71,442.00	Unsatisfactory	Acceptable	$71,442.00
MH44		4th Avenue Between Thompson S	4.1	vert. metre	Poor	1990	50	18	$1750.00	$7,175.00	Unsatisfactory	Acceptable	$7,175.00
SS (MH44-45)	200mm PVC	4th Avenue Between Thompson S	113.2	lin. metre	Good	1990	50	18	$630.00	$71,316.00	Ideal	Acceptable	-----
MH45		4th Avenue Mid Block Between As	4.2	vert. metre	Good	1990	50	18	$1750.00	$7,367.50	Ideal	Acceptable	-----
SS (MH45-46)	200mm PVC	4th Avenue Between Ash Street a	113.4	lin. metre	Good	1990	50	18	$630.00	$71,442.00	Ideal	Acceptable	-----
MH46		4th Avenue and Cannon Court	3.5	vert. metre	Good	1990	50	18	$1750.00	$6,195.00	Ideal	Acceptable	-----
SS (MH46-47)	200mm PVC	Cannon Court	120.0	lin. metre	Good	1990	50	18	$630.00	$75,600.00	Ideal	Acceptable	-----

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WASTEWATER - 2022

MH47		Cannon Court Bubble	3.3	vert. metre	Good	1990	50	18	$1750.00	$5,810.00	Ideal	Acceptable	-----
SS (MH46-48)	200mm PVC	4th Avenue Between Cannon Cou	95.7	lin. metre	Very Good	2009	50	37	$630.00	$60,291.00	Ideal	Acceptable	-----
MH48		4th Avenue and McDonald Street	3.2	vert. metre	Very Good	2009	50	37	$1750.00	$5,512.50	Ideal	Acceptable	-----
SS (MH48-Plug)	200mm PVC	4th Avenue North of McDonald St	53.1	lin. metre	Very Good	2009	50	37	$630.00	$33,453.00	Ideal	Acceptable	-----
SS (MH48-Plug)	200mm PVC	McDonald Street East of 4th Aven	20.0	lin. metre	Very Good	2009	50	37	$630.00	$12,600.00	Ideal	Acceptable	-----
SS (MH48-49)	200mm PVC	McDonald Street Between Hamm	120.0	lin. metre	Very Good	2009	50	37	$630.00	$75,600.00	Ideal	Acceptable	-----
MH49		McDonald Street and Hamm Cour	3.2	vert. metre	Very Good	2009	50	37	$1750.00	$5,600.00	Ideal	Acceptable	-----
SS (MH49-50)	200mm PVC	Hamm Court	110.7	lin. metre	Very Good	2012	50	40	$630.00	$69,741.00	Ideal	Acceptable	-----
MH50		Hamm Court Bubble	3.3	vert. metre	Very Good	2012	50	40	$1750.00	$5,705.00	Ideal	Acceptable	-----
SS (MH49-51)	200mm PVC	McDonald Street Between Grahar	115.5	lin. metre	Very Good	2009	50	37	$630.00	$72,765.00	Ideal	Acceptable	-----
MH51		Graham Court and McDonald Stre	3.1	vert. metre	Very Good	2009	50	37	$1750.00	$5,495.00	Ideal	Acceptable	-----
SS (MH51-Plug)	200mm PVC	Graham Court	52.9	lin. metre	Very Good	2009	50	37	$630.00	$33,327.00	Ideal	Acceptable	-----
SS (MH51-52)	200mm PVC	McDonald Street Between Central	45.4	lin. metre	Very Good	2009	50	37	$630.00	$28,602.00	Ideal	Acceptable	-----
MH52		McDonald Street Between Central	3.1	vert. metre	Very Good	2009	50	37	$1750.00	$5,355.00	Ideal	Acceptable	-----
SS (MH52-HWY 785)	37mm HDPE	McDonald Street and Central Avenue to North East Corner of Highway 785 and Central Avenue	231.1	lin. metre	Very Good	2008	50	36	$630.00	$145,593.00	Ideal	Acceptable	-----
SS (MH12-WTP)	200mm VC	Main Street and 8th Avenue to WT	25.2	lin. metre	Fair	1964	50	-8	$630.00	$15,876.00	Acceptable	Acceptable	-----
Sewage Pumping Station		5th Avenue and Thompson Street	1.0	each	Very Good	2018	30	26	$1,349,032.02	$1,349,032.02	Ideal	Acceptable	-----
SPS1-Lagoon Forcemain	200mm HDPE	Sewage Pumping Station #1 to La	1603.0	lin. metre	Very Good	2018	50	46	$120.00	$192,360.00	Ideal	Acceptable	-----
Lagoon		Lagoon	1.0	each	Very Good	2018	50	46	$1,076,224.96	$1,076,224.96	Ideal	Acceptable	-----
Sanitary Services	100mm		41.6	each	Very Good	-	-	#VALUE!	$3,335.00	$138,669.89	Ideal	Acceptable	-----
Sanitary Services	100mm		21.4	each	Good	-	-	#VALUE!	$3,335.00	$71,272.06	Ideal	Acceptable	-----
Sanitary Services	100mm		123.6	each	Fair	-	-	#VALUE!	$3,335.00	$412,328.57	Acceptable	Acceptable	-----
Sanitary Services	100mm		82.1	each	Poor	-	-	#VALUE!	$3,335.00	$273,768.50	Unsatisfactory	Acceptable	$273,768.50
Sanitary Services	100mm		1.3	each	Very Poor	-	-	#VALUE!	$3,335.00	$4,405.81	Unsatisfactory	Acceptable	$4,405.81

APPENDIX C
ASSET SUMMARY TABLES
POTABLE WATER - 2022

Section ID	Asset Description	Location	Units	Quantity	Condition	Cost Per Unit	Total Value	Year Installed	Design Life	Est. Remaining Life	Existing Level of Service	Desired Level of Service	Funding Gap
W1		Central Avenue											
	50mm HDPE Service		lin.metre	219.8	Very Good	$125.00	$27,475.00	2008	70	56	Ideal	Acceptable	----
W2		Central Avenue											
	150mm PVC C-900		lin.metre	451.9	Very Good	$400.00	$180,760.00	2014	70	62	Ideal	Acceptable	----
	150mm Valve		each	1.0	Very Good	$2,300.00	$2,300.00	2014	70	62	Ideal	Acceptable	----
	Hydrant		each	1.0	Very Good	$8,100.00	$8,100.00	2014	70	62	Ideal	Acceptable	----
W3		McDonald Street											
	150mm PVC C-900		lin.metre	396.3	Very Good	$400.00	$158,520.00	2009	70	57	Ideal	Acceptable	----
	50mm Valve		each	1.0	Very Good	$1,800.00	$1,800.00	2009	70	57	Ideal	Acceptable	----
	150mm Valve		each	7.0	Very Good	$2,300.00	$16,100.00	2009	70	57	Ideal	Acceptable	----
	Hydrant		each	2.0	Very Good	$8,100.00	$16,200.00	2009	70	57	Ideal	Acceptable	----
W4		Hamm Court											
	150mm PVC C-900		lin.metre	78.3	Very Good	$400.00	$31,320.00	2012	70	60	Ideal	Acceptable	----
	150mm Valve		each	1.0	Very Good	$2,300.00	$2,300.00	2012	70	60	Ideal	Acceptable	----
	Hydrant		each	1.0	Very Good	$8,100.00	$8,100.00	2012	70	60	Ideal	Acceptable	----
W5		4th Avenue											
	150mm PVC C-900		lin.metre	177.8	Very Good	$400.00	$71,120.00	2009	70	57	Ideal	Acceptable	----
	150mm Valve		each	3.0	Very Good	$2,300.00	$6,900.00	2009	70	57	Ideal	Acceptable	----
	Hydrant		each	1.0	Very Good	$8,100.00	$8,100.00	2009	70	57	Ideal	Acceptable	----
W6		Cannon Court											
	150mm PVC C-900		lin.metre	119.0	Fair	$400.00	$47,600.00	1990	70	38	Acceptable	Acceptable	----
	150mm Valve		each	1.0	Fair	$2,300.00	$2,300.00	1990	70	38	Acceptable	Acceptable	----
	Hydrant		each	1.0	Fair	$8,100.00	$8,100.00	1990	70	38	Acceptable	Acceptable	----
W7		4th Avenue											
	150mm PVC C-900		lin.metre	297.4	Fair	$400.00	$118,960.00	1990	70	38	Acceptable	Acceptable	----
	150mm Valve		each	5.0	Fair	$2,300.00	$11,500.00	1990	70	38	Acceptable	Acceptable	----
	Hydrant		each	2.0	Fair	$8,100.00	$16,200.00	1990	70	38	Acceptable	Acceptable	----
W8		4th Avenue											
	150mm AC		lin.metre	311.1	Very Poor	$400.00	$124,440.00	1964	70	12	Unsatisfactory	Acceptable	$124,440.00
	150mm Valve		each	4.0	Very Poor	$2,300.00	$9,200.00	1964	70	12	Unsatisfactory	Acceptable	$9,200.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W9		4th Avenue											
	150mm AC		lin.metre	110.7	Very Poor	$400.00	$44,280.00	1964	70	12	Unsatisfactory	Acceptable	$44,280.00
	150mm Valve		each	2.0	Very Poor	$2,300.00	$4,600.00	1964	70	12	Unsatisfactory	Acceptable	$4,600.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W10		5th Avenue											
	150mm AC		lin.metre	133.7	Very Poor	$400.00	$53,480.00	1964	70	12	Unsatisfactory	Acceptable	$53,480.00
	150mm Valve		each	2.0	Very Poor	$2,300.00	$4,600.00	1964	70	12	Unsatisfactory	Acceptable	$4,600.00
W11		5th Avenue											
	150mm AC		lin.metre	171.1	Very Poor	$400.00	$68,440.00	1964	70	12	Unsatisfactory	Acceptable	$68,440.00
	150mm Valve		each	1.0	Very Poor	$2,300.00	$2,300.00	1964	70	12	Unsatisfactory	Acceptable	$2,300.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W12		Thompson Street											
	150mm AC		lin.metre	153.0	Very Poor	$400.00	$61,200.00	1964	70	12	Unsatisfactory	Acceptable	$61,200.00

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	150mm Valve		each	3.0	Very Poor	$2,300.00	$6,900.00	1964	70	12	Unsatisfactory	Acceptable	$6,900.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W13		Thompson Street											
	150mm AC		lin.metre	90.6	Very Poor	$400.00	$36,240.00	1964	70	12	Unsatisfactory	Acceptable	$36,240.00
	150mm Valve		each	1.0	Very Poor	$2,300.00	$2,300.00	1964	70	12	Unsatisfactory	Acceptable	$2,300.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W14		Thompson Street											
	150mm AC		lin.metre	225.9	Very Poor	$400.00	$90,360.00	1964	70	12	Unsatisfactory	Acceptable	$90,360.00
	150mm Valve		each	6.0	Very Poor	$2,300.00	$13,800.00	1964	70	12	Unsatisfactory	Acceptable	$13,800.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W15		Thompson Street											
	150mm AC		lin.metre	235.0	Very Poor	$400.00	$94,000.00	1964	70	12	Unsatisfactory	Acceptable	$94,000.00
	150mm Valve		each	2.0	Very Poor	$2,300.00	$4,600.00	1964	70	12	Unsatisfactory	Acceptable	$4,600.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W16		Blake Crescent											
	150mm AC		lin.metre	550.9	Poor	$400.00	$220,360.00	1977	70	25	Unsatisfactory	Acceptable	$220,360.00
	150mm Valve		each	6.0	Poor	$2,300.00	$13,800.00	1977	70	25	Unsatisfactory	Acceptable	$13,800.00
	Hydrant		each	2.0	Poor	$8,100.00	$16,200.00	1977	70	25	Unsatisfactory	Acceptable	$16,200.00
W17		Jackson Avenue											
	150mm AC		lin.metre	550.9	Poor	$400.00	$220,360.00	1977	70	25	Unsatisfactory	Acceptable	$220,360.00
	150mm Valve		each	6.0	Poor	$2,300.00	$13,800.00	1977	70	25	Unsatisfactory	Acceptable	$13,800.00
	Hydrant		each	2.0	Poor	$8,100.00	$16,200.00	1977	70	25	Unsatisfactory	Acceptable	$16,200.00
W18		Central Avenue											
	150mm AC		lin.metre	221.7	Very Poor	$400.00	$88,680.00	1964	70	12	Unsatisfactory	Acceptable	$88,680.00
	150mm Valve		each	2.0	Very Poor	$2,300.00	$4,600.00	1964	70	12	Unsatisfactory	Acceptable	$4,600.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W19		Norman Avenue											
	150mm AC		lin.metre	184.9	Very Poor	$400.00	$73,960.00	1964	70	12	Unsatisfactory	Acceptable	$73,960.00
	150mm Valve		each	2.0	Very Poor	$2,300.00	$4,600.00	1964	70	12	Unsatisfactory	Acceptable	$4,600.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W20		Central Avenue											
	150mm AC		lin.metre	291.5	Very Poor	$400.00	$116,600.00	1964	70	12	Unsatisfactory	Acceptable	$116,600.00
	150mm Valve		each	4.0	Very Poor	$2,300.00	$9,200.00	1964	70	12	Unsatisfactory	Acceptable	$9,200.00
W21		3rd Avenue											
	150mm AC		lin.metre	94.4	Very Poor	$400.00	$37,760.00	1964	70	12	Unsatisfactory	Acceptable	$37,760.00
	150mm Valve		each	1	Very Poor	$2,300.00	$2,300.00	1964	70	12	Unsatisfactory	Acceptable	$2,300.00
	Hydrant		each	1	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W22		3rd Avenue											
	150mm AC		lin.metre	244.9	Very Poor	$400.00	$97,960.00	1964	70	12	Unsatisfactory	Acceptable	$97,960.00
	150mm Valve		each	1.0	Very Poor	$2,300.00	$2,300.00	1964	70	12	Unsatisfactory	Acceptable	$2,300.00
W23		3rd Avenue											
	150mm AC		lin.metre	57.4	Very Poor	$400.00	$22,960.00	1964	70	12	Unsatisfactory	Acceptable	$22,960.00
	150mm Valve		each	1.0	Very Poor	$2,300.00	$2,300.00	1964	70	12	Unsatisfactory	Acceptable	$2,300.00
W24		Rupert Street											
	150mm AC		lin.metre	137.0	Very Poor	$400.00	$54,800.00	1964	70	12	Unsatisfactory	Acceptable	$54,800.00
	150mm Valve		each	3.0	Very Poor	$2,300.00	$6,900.00	1964	70	12	Unsatisfactory	Acceptable	$6,900.00
	Hydrant		each	2.0	Very Poor	$8,100.00	$16,200.00	1964	70	12	Unsatisfactory	Acceptable	$16,200.00
W25		Rupert Street											

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	150mm SER. 160 PVC		lin.metre	88.9	Fair	$400.00	$35,560.00	1992	70	40	Acceptable	Acceptable	----
	150mm Valve		each	1.0	Fair	$2,300.00	$2,300.00	1992	70	40	Acceptable	Acceptable	----
	Hydrant		each	1.0	Fair	$8,100.00	$8,100.00	1992	70	40	Acceptable	Acceptable	----
W26		Rupert Street											
	150mm AC		lin.metre	110.9	Very Poor	$400.00	$44,360.00	1964	70	12	Unsatisfactory	Acceptable	$44,360.00
W27		Rupert Street											
	150mm SER. 160 PVC		lin.metre	134.6	Fair	$400.00	$53,840.00	1992	70	40	Acceptable	Acceptable	----
	150mm Valve		each	1.0	Fair	$2,300.00	$2,300.00	1992	70	40	Acceptable	Acceptable	----
W28		7th Avenue											
	150mm AC		lin.metre	139.6	Very Poor	$400.00	$55,840.00	1964	70	12	Unsatisfactory	Acceptable	$55,840.00
	150mm Valve		each	2.0	Very Poor	$2,300.00	$4,600.00	1964	70	12	Unsatisfactory	Acceptable	$4,600.00
W29		8th Avenue											
	150mm SDR26 PVC		lin.metre	170.6	Fair	$400.00	$68,240.00	1992	70	40	Acceptable	Acceptable	----
	150mm Valve		each	1.0	Fair	$2,300.00	$2,300.00	1992	70	40	Acceptable	Acceptable	----
	Hydrant		each	1.0	Fair	$8,100.00	$8,100.00	1992	70	40	Acceptable	Acceptable	----
W30		6th Avenue											
	150mm AC		lin.metre	117.6	Very Poor	$400.00	$47,040.00	1964	70	12	Unsatisfactory	Acceptable	$47,040.00
	150mm Valve		each	1.0	Very Poor	$2,300.00	$2,300.00	1964	70	12	Unsatisfactory	Acceptable	$2,300.00
W31		Main Street											
	150mm AC		lin.metre	249.9	Very Poor	$400.00	$99,960.00	1964	70	12	Unsatisfactory	Acceptable	$99,960.00
	150mm Valve		each	5.0	Very Poor	$2,300.00	$11,500.00	1964	70	12	Unsatisfactory	Acceptable	$11,500.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
	100mm AC Supply Line		lin.metre	201.0	Very Poor	$150.00	$30,150.00	1964	70	12	Unsatisfactory	Acceptable	$30,150.00
	100mm Valve		each	1.0	Very Poor	$2,000.00	$2,000.00	1964	70	12	Unsatisfactory	Acceptable	$2,000.00
W32		Main Street											
	150mm AC		lin.metre	275.9	Very Poor	$400.00	$110,360.00	1964	70	12	Unsatisfactory	Acceptable	$110,360.00
	150mm Valve		each	5.0	Very Poor	$2,300.00	$11,500.00	1964	70	12	Unsatisfactory	Acceptable	$11,500.00
	Hydrant		each	1.0	Very Poor	$8,100.00	$8,100.00	1964	70	12	Unsatisfactory	Acceptable	$8,100.00
W33		Main Street											
	150mm AC		lin.metre	738.5	Very Poor	$400.00	$295,400.00	1964	70	12	Unsatisfactory	Acceptable	$295,400.00
	150mm Valve		each	5.0	Very Poor	$2,300.00	$11,500.00	1964	70	12	Unsatisfactory	Acceptable	$11,500.00
	Hydrant		each	2.0	Very Poor	$8,100.00	$16,200.00	1964	70	12	Unsatisfactory	Acceptable	$16,200.00
W34		Industrial Drive											
	150mm PVC C-900		lin.metre	83.1	Good	$400.00	$33,240.00	2000	70	48	Ideal	Acceptable	----
W35		Elevator Road											
	150mm PVC C-900		lin.metre	298.1	Good	$400.00	$119,240.00	2000	70	48	Ideal	Acceptable	----
	150mm Valve		each	1.0	Good	$2,300.00	$2,300.00	2000	70	48	Ideal	Acceptable	----
	Hydrant		each	1.0	Good	$8,100.00	$8,100.00	2000	70	48	Ideal	Acceptable	----
W36		Elevator Road											
	150mm PVC C-900		lin.metre	161.5	Good	$400.00	$64,600.00	2000	70	48	Ideal	Acceptable	----
	150mm Valve		each	1.0	Good	$2,300.00	$2,300.00	2000	70	48	Ideal	Acceptable	----
	Hydrant		each	1.0	Good	$8,100.00	$8,100.00	2000	70	48	Ideal	Acceptable	----
W37		Elevator Road											
	150mm PVC C-900		lin.metre	467.3	Good	$400.00	$186,920.00	2000	70	48	Ideal	Acceptable	----
	150mm Valve		each	5.0	Good	$2,300.00	$11,500.00	2000	70	48	Ideal	Acceptable	----
	Hydrant		each	3.0	Good	$8,100.00	$24,300.00	2000	70	48	Ideal	Acceptable	----
WTP#1		Main Street and 8th Avenue											
	Building		each	1.0	Poor	$57,500.00	$57,500.00	1964	30	-28	Unsatisfactory	Acceptable	$57,500.00

APPENDIX C
ASSET SUMMARY TABLES
POTABLE WATER - 2022

	Building (Expansion)		each	1.0	Good	$57,500.00	$57,500.00	2012	30	20	Ideal	Acceptable	----
	Mechanical (Less Distribution Pumps)		each	1.0	Good	$57,500.00	$57,500.00	1964-2012	30		Ideal	Acceptable	----
	Electrical		each	1.0	Good	$115,000.00	$115,000.00	1964-2012	20		Ideal	Acceptable	----
	Reservoir Storage		each	1.0	Fair	$920,000.00	$920,000.00	1964-1984	50		Acceptable	Acceptable	----
	Pumps		each	1.0	Very Good	$115,000.00	$115,000.00	1964-2012	30		Ideal	Acceptable	----
	Truckfill Facilities		each	1.0	Good	$23,000.00	$23,000.00	1964-2012	20		Ideal	Acceptable	----
	Engine		each	1.0	Very Poor	$115,000.00	$115,000.00	1964	30	-28	Unsatisfactory	Acceptable	$115,000.00
Services													
	25mm Service		each	32.6	Very Poor	$3,450.00	$112,359.39				Unsatisfactory	Acceptable	$112,359.39
	25mm Service		each	36.0	Poor	$3,450.00	$124,290.98				Unsatisfactory	Acceptable	$124,290.98
	25mm Service		each	65.9	Fair	$3,450.00	$227,367.04				Acceptable	Acceptable	----
	25mm Service		each	28.2	Good	$3,450.00	$97,224.38				Ideal	Acceptable	----
	25mm Service		each	106.9	Very Good	$3,450.00	$368,687.70				Ideal	Acceptable	----

APPENDIX C
ASSET SUMMARY TABLES
CULVERTS - 2022

Asset ID	DIAMETER (mm)	LENGTH (m)	MATERIAL	DRAINAGE CONDITION	CONDITION	COMMENTS	COST PER UNIT	TOTAL VALUE	EXISTING LEVEL OF SERVICE	DESIRED LEVEL OF SERVICE	FUNDING GAP
94	600	25.3	CSP	DRY	Good		$749.08	$18,951.64	Ideal	Acceptable	----
95	600	22.1	CSP	DRY	Good		$749.08	$16,554.59	Ideal	Acceptable	----
96	600	21.4	CSP	DRY	Good		$749.08	$16,030.24	Ideal	Acceptable	----
93	600	24	CSP	DRY	Fair	SLIGHT RUST	$749.08	$17,977.84	Acceptable	Acceptable	----
92	450	14.6	CSP		Poor	FLAKING RUST	$554.46	$8,095.17	Unsatisfactory	Acceptable	$8,095.17
91	450	14.6	CSP	ST	Fair	POOR MAINTENANCE	$554.46	$8,095.17	Acceptable	Acceptable	----
89	450	16	CSP	ST	Poor	FLAKING RUST	$554.46	$8,871.42	Unsatisfactory	Acceptable	$8,871.42
88	450	14.7	CSP	ST	Fair	RUST	$554.46	$8,150.61	Acceptable	Acceptable	----
67	450	7.2	CSP	ST	Fair	ST. WATER IN DITCH	$554.46	$3,992.14	Acceptable	Acceptable	----
NEW	600			ST	Very Good		$749.08		Ideal	Acceptable	----
65	600	11.1		ST	Poor	MAINTENANCE TO S. END COULD INCREASE CONDITION RATING	$749.08	$8,314.75	Unsatisfactory	Acceptable	$8,314.75
64	600	11.1		ST	Poor	NO S. END VISIBLE, MAINTENANCE REQ'D	$749.08	$8,314.75	Unsatisfactory	Acceptable	$8,314.75
66	450	13		DRY	Fair		$554.46	$7,208.03	Acceptable	Acceptable	----
68	450	8.3		DRY	Very Good		$554.46	$4,602.05	Ideal	Acceptable	----
72	500	12		DRY	Fair		$641.98	$7,703.80	Acceptable	Acceptable	----
73	450	15.6		DRY	Fair		$554.46	$8,649.63	Acceptable	Acceptable	----
71	200	5		DRY	Poor	MAINTENANCE COULD INCREASE CONDITION	$244.47	$1,222.35	Unsatisfactory	Acceptable	$1,222.35
81	450	13.4		DRY	Good		$554.46	$7,429.81	Ideal	Acceptable	----
82	400	8.9		DRY	Poor	BLOCKED ON BOTH EDGES, NOT WELL VISIBLE	$488.39	$4,346.67	Unsatisfactory	Acceptable	$4,346.67
83	450	15.8		DRY	Fair		$554.46	$8,760.52	Acceptable	Acceptable	----
85	300	12.1		DRY	Good		$359.77	$4,353.20	Ideal	Acceptable	----
86	450	16.8		DRY	Poor	WEST END GOOD - MAY HAVE BEEN REPLACED, EAST END POOR	$554.46	$9,314.99	Unsatisfactory	Acceptable	$9,314.99
87	400	7.2		DRY	Very Good		$488.39	$3,516.41	Ideal	Acceptable	----
80	300	7.7			Good		$359.77	$2,770.22	Ideal	Acceptable	----
78	300	9.1			Good		$359.77	$3,273.89	Ideal	Acceptable	----
77	200	5.3	STEEL		Poor		$244.47	$1,295.69	Unsatisfactory	Acceptable	$1,295.69
76	300	6.2				DESTROYED DUE TO NEW BUILD?	$359.77	$2,230.56			
75	250	6.1	CSP		Fair		$308.63	$1,882.63	Acceptable	Acceptable	----
74	300	11.8			Poor	MAINTENANCE REQ'D ON ENDS	$359.77	$4,245.27	Unsatisfactory	Acceptable	$4,245.27
84	300	15.1	CSP	DRY	Very Good		$359.77	$5,432.50	Ideal	Acceptable	----
70	300	7	CSP		Fair		$359.77	$2,518.38	Acceptable	Acceptable	----
69	300	12	CSP		Good		$359.77	$4,317.22	Ideal	Acceptable	----
54	450	17.3	CSP		Fair		$554.46	$9,592.22	Acceptable	Acceptable	----
55	450	17.6			Poor	FLAKING RUST	$554.46	$9,758.56	Unsatisfactory	Acceptable	$9,758.56
56	300	14			Good		$359.77	$5,036.76	Ideal	Acceptable	----
57	450	9.1			Fair		$554.46	$5,045.62	Acceptable	Acceptable	----
58	450	12.3			Good		$554.46	$6,819.90	Ideal	Acceptable	----
59	450	4.9			Good		$554.46	$2,716.87	Ideal	Acceptable	----
60	450	9.9			Good		$554.46	$5,489.19	Ideal	Acceptable	----
61	450	9.1			Good		$554.46	$5,045.62	Ideal	Acceptable	----

APPENDIX C
ASSET SUMMARY TABLES
CULVERTS - 2022

62	450	8.4			Good		$554.46	$4,657.49	Ideal	Acceptable	----
63	450	9.5			Fair		$554.46	$5,267.40	Acceptable	Acceptable	----
45	300	10			Fair	N. SIDE BLOCKED	$359.77	$3,597.69	Acceptable	Acceptable	----
46	300	1.2			Very Good		$359.77	$431.72	Ideal	Acceptable	----
42	500	7.1			Fair		$641.98	$4,558.08	Acceptable	Acceptable	----
43	500	7.34			Fair		$641.98	$4,712.16	Acceptable	Acceptable	----
90	200	6.6	PVC		Very Good		$244.47	$1,613.50	Ideal	Acceptable	----
47	200	5.2	CSP		Poor		$244.47	$1,271.24	Unsatisfactory	Acceptable	$1,271.24
52	300	6.7	CSP		Fair		$359.77	$2,410.45	Acceptable	Acceptable	----
51	300	17.1	CSP		Fair	ENDS BLOCKED BUT APPEARS TO BE FAIR	$359.77	$6,152.04	Acceptable	Acceptable	----
50	200	9	CSP		Good		$244.47	$2,200.23	Ideal	Acceptable	----
49	300	8.9	CSP		Fair	MAINTENANCE REQ'D ON ENDS	$359.77	$3,201.94	Acceptable	Acceptable	----
33	300	10			Fair		$359.77	$3,597.69	Acceptable	Acceptable	----
34	300	21.4			Fair		$359.77	$7,699.05	Acceptable	Acceptable	----
35	450	58.8			Good		$554.46	$32,602.45	Ideal	Acceptable	----
36	300	5.4			Fair		$359.77	$1,942.75	Acceptable	Acceptable	----
37	450	9.4			Fair		$554.46	$5,211.96	Acceptable	Acceptable	----
38	450	9.2			Fair		$554.46	$5,101.06	Acceptable	Acceptable	----
39	600	12.4			Good		$749.08	$9,288.55	Ideal	Acceptable	----
40	600	12.3			Good		$749.08	$9,213.64	Ideal	Acceptable	----
41	450	9.8			Very Good		$554.46	$5,433.74	Ideal	Acceptable	----
123	600	5.9			Good		$749.08	$4,419.55	Ideal	Acceptable	----
30	600	19.6			Good		$749.08	$14,681.90	Ideal	Acceptable	----
32	300	11.5			Fair	N. END BLOCKED	$359.77	$4,137.34	Acceptable	Acceptable	----
24	300	11.5			Good		$359.77	$4,137.34	Ideal	Acceptable	----
25	600	4.9	CONCRETE		Fair		$749.08	$3,670.47	Acceptable	Acceptable	----
26	600	5.2			Good		$749.08	$3,895.20	Ideal	Acceptable	----
27	600	10.1			Good		$749.08	$7,565.67	Ideal	Acceptable	----
28	600	19.3			Fair		$749.08	$14,457.18	Acceptable	Acceptable	----
31	300	17.5			Fair		$359.77	$6,295.95	Acceptable	Acceptable	----
29	300	11.6			Fair		$359.77	$4,173.31	Acceptable	Acceptable	----
21	600	5.9				COULD NOT FIND - MAINTENANCE REQ'D	$749.08	$4,419.55			
20	600	4.4			Very Good		$749.08	$3,295.94	Ideal	Acceptable	----
19	600	6.4			Fair		$749.08	$4,794.09	Acceptable	Acceptable	----
18	600	13.8			Good		$749.08	$10,337.26	Ideal	Acceptable	----
14	300	12.7			Fair		$359.77	$4,569.06	Acceptable	Acceptable	----
13	250	13.2			Fair		$308.63	$4,073.89	Acceptable	Acceptable	----
12	750	10.1			Very Good		$1,000.00	$10,100.00	Ideal	Acceptable	----
11	750	15.9			Poor	RUSTING IN BOTTOM ROCKS TO BE FAIRLY AGGRESSIVE	$1,000.00	$15,900.00	Unsatisfactory	Acceptable	$15,900.00
NEW	300				Fair		$359.77		Acceptable	Acceptable	----
9	300	10.7			Fair		$359.77	$3,849.52	Acceptable	Acceptable	----
8	300	10.8			Fair	ENDS BENT	$359.77	$3,885.50	Acceptable	Acceptable	----
10	300	16.2			Fair		$359.77	$5,828.25	Acceptable	Acceptable	----
15	300	17.4			Fair	MAINTENANCE REQ'D - DIFFICULT TO SEE	$359.77	$6,259.97	Acceptable	Acceptable	----
16	600	17.4			Good		$749.08	$13,033.93	Ideal	Acceptable	----

APPENDIX C
ASSET SUMMARY TABLES
CULVERTS - 2022

17	600	18.2			Good		$749.08	$13,633.19	Ideal	Acceptable	----
6	600	10.1			Good		$749.08	$7,565.67	Ideal	Acceptable	----
7	600	9.4			Good		$749.08	$7,041.32	Ideal	Acceptable	----
5	300	15.7			Fair		$359.77	$5,648.37	Acceptable	Acceptable	----
1	400	13.8			Good		$488.39	$6,739.78	Ideal	Acceptable	----
2	400	17.4			Good		$488.39	$8,497.99	Ideal	Acceptable	----
3	300	10.1			Fair		$359.77	$3,633.66	Acceptable	Acceptable	----
4	300	7.3			Poor	RUST	$359.77	$2,626.31	Unsatisfactory	Acceptable	$2,626.31
22	600	7.8			Good		$749.08	$5,842.80	Ideal	Acceptable	----
23	600	7.5			Good		$749.08	$5,618.07	Ideal	Acceptable	----
EW (ELEVATO	600				Very Good		$749.08		Ideal	Acceptable	----
NEW (ELEVATOR	600				Very Good		$749.08		Ideal	Acceptable	----
B	750				Very Good	FIRE ACCESS	$1,000.00		Ideal	Acceptable	----
C	750				Very Good		$1,000.00		Ideal	Acceptable	----
106	400	10.7			Poor		$488.39	$5,225.77	Unsatisfactory	Acceptable	$5,225.77
110	600	19.9			Poor		$749.08	$14,906.62	Unsatisfactory	Acceptable	$14,906.62
111	600	19.6			Poor		$749.08	$14,681.90	Unsatisfactory	Acceptable	$14,681.90
112	600	12.8			Very Poor	REPLACE ENDS, DIFFICULT TO SEE	$749.08	$9,588.18	Unsatisfactory	Acceptable	$9,588.18
113	750	17			Fair		$1,000.00	$17,000.00	Acceptable	Acceptable	----
114	750	17			Fair		$1,000.00	$17,000.00	Acceptable	Acceptable	----
115	400	18.1				CAN'T SEE - TALL GRASS	$488.39	$8,839.86			
116	300	15.3				CAN'T SEE - TALL GRASS	$359.77	$5,504.46			
117	600	18			Fair		$749.08	$13,483.38	Acceptable	Acceptable	----
118	600	18.7			Fair		$749.08	$14,007.73	Acceptable	Acceptable	----
119	600	19.6			Fair		$749.08	$14,681.90	Acceptable	Acceptable	----
120	600	12.7			Fair		$749.08	$9,513.27	Acceptable	Acceptable	----
121	600	12.6			Fair		$749.08	$9,438.36	Acceptable	Acceptable	----
122	600	32.2			Fair		$749.08	$24,120.26	Acceptable	Acceptable	----
???	300				Fair		$359.77		Acceptable	Acceptable	----
109	500	20.1			Fair		$641.98	$12,903.87	Acceptable	Acceptable	----
108	450	20.3			Good		$554.46	$11,255.61	Ideal	Acceptable	----
107	400	14.1			Fair		$488.39	$6,886.30	Acceptable	Acceptable	----
105	400	23.7			Good	DAMAGE TO EAST END	$488.39	$11,574.84	Ideal	Acceptable	----
104	450	15.1			Good	DAMAGE TO EAST END	$554.46	$8,372.40	Ideal	Acceptable	----
103	450	15.8			Good	DAMAGE TO EAST END	$554.46	$8,760.52	Ideal	Acceptable	----
102	300	10.7			Fair	WEST END BLOCKED, DAMAGE ON EAST END	$359.77	$3,849.52	Acceptable	Acceptable	----
100	600	20			Fair	SOUTH END MANGLED,	$749.08	$14,981.53	Acceptable	Acceptable	----
98	600	17.6			Good		$749.08	$13,183.75	Ideal	Acceptable	----
99	600	17.1			Good		$749.08	$12,809.21	Ideal	Acceptable	----
44*	600	1.4			Fair		$749.08	$1,048.71	Acceptable	Acceptable	----
101*	400	12.1			Fair		$488.39	$5,909.52	Acceptable	Acceptable	----
97*	500	14.9			Fair		$641.98	$9,565.55	Acceptable	Acceptable	----
48*	300	10			Fair		$359.77	$3,597.69	Acceptable	Acceptable	----

APPENDIX C
ASSET SUMMARY TABLES
CULVERTS - 2022

53*	300	5.7			Fair		$359.77	$2,050.68	Acceptable	Acceptable	----
79*	300	8.7			Fair		$359.77	$3,129.99	Acceptable	Acceptable	----

APPENDIX C
ASSET SUMMARY TABLES
ROADWAYS - 2022

Section ID	Asset Description	Condition	Location	Length (m)	Width (m)	Area (m²)	Cost Per Unit	Total Value
R1			Central Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		439.8	9.5	4178.1	$36.50	$152,500.65
R2			Road to Lagoon					
	Gravel Roadway	Fair		807.7	5.5	4442.35	$36.50	$162,145.78
R3			McDonald Street					
	Gravel Roadway	Fair		292	10.5	3066	$36.50	$111,909.00
	Rolled Curb and Gutter	Good		271			$150.00	$40,650.00
	Concrete Swale	Good		20.4	1	20.4	$300.00	$6,120.00
R4			Hamm Court					
	Gravel Roadway	Fair		115	10.5	1207.5	$36.50	$44,073.75
	Rolled Curb and Gutter	Good		245.9			$150.00	$36,885.00
	Concrete Swale	Good		20.4	1	20.4	$300.00	$6,120.00
R5			4th Avenue					
	Gravel Roadway	Fair		58	10	580	$36.50	$21,170.00
	Rolled Curb and Gutter	Good		52.7			$150.00	$7,905.00
R6			Cannon Court					
	Chipseal Roadway	Fair		125	10.5	1312.5	$66.50	$87,281.25
	Rolled Curb and Gutter	Good		264.1			$150.00	$39,615.00
R7			4th Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		305.5	11.5	3513.25	$36.50	$128,233.63
	Rolled Curb and Gutter	Good		528.7			$150.00	$79,305.00
	Concrete Swale	Good		20	1.1	22	$300.00	$6,600.00
R8			4th Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		302.5	9.5	2873.75	$36.50	$104,891.88
	Concrete Swale	Good		11.3	1.8	20.34	$300.00	$6,102.00
R9			4th Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		102.1	15.3	1562.13	$36.50	$57,017.75
	Monolithic Sidewalk	Good		138.7	1.2	166.44	$300.00	$49,932.00
	Rolled Curb and Gutter	Good		214.1			$150.00	$32,115.00
R10			5th Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		125.8	12.5	1572.5	$36.50	$57,396.25

APPENDIX C

ASSET SUMMARY TABLES

R11			5th Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		164.9	10.5	1731.45	$36.50	63197.925
	Rolled Curb and Gutter	Good		307.5			$150.00	$46,125.00
R12			Thompson Street					
	Gravel Roadway	Fair		97.4	7	681.8	$36.50	$24,885.70
R13			Thompson Street					
	Gravel Roadway	Fair		84.8	7.5	636	$36.50	$23,214.00
R14			Thompson Street					
	Reclaimed Asphalt Shingles Roadway	Fair		207.9	8	1663.2	$36.50	$60,706.80
R15			Thompson Street					
	Gravel Roadway	Fair		208	8	1664	$36.50	$60,736.00
R16			Blake Crescent					
	Gravel Roadway	Fair		511.5	10.5	5370.75	$36.50	$196,032.38
	Rolled Curb and Gutter	Fair		1055.6			$150.00	$158,340.00
	Monolithic Sidewalk	Fair		1055.6	1.2	1266.72	$300.00	$380,016.00
	Concrete Swale	Good		10.6	1.8	19.08	$300.00	$5,724.00
R17			Jackson Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		159.7	7	1117.9	$36.50	$40,803.35
R18			Main Street					
	Reclaimed Asphalt Shingles Roadway	Good		209.8	8	1678.4	$36.50	$61,261.60
R19			Norman Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		176.5	8	1412	$36.50	$51,538.00
R20			Central Avenue					
	Asphalt Roadway	Good		524.5	9.5	4982.75	$71.50	$356,266.63
R21			Central Avenue					
	Gravel Roadway	Fair		92.9	8	743.2	$36.50	$27,126.80
R22			3rd Avenue					
	Gravel Roadway	Fair		244.7	9.5	2324.65	$36.50	$84,849.73
R23			2nd Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		57	10.6	604.2	$36.50	$22,053.30
R24			2nd Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		146.1	12.5	1826.25	$36.50	$66,658.13
R25			Rupert Street					
	Reclaimed Asphalt Shingles Roadway	Fair		125.9	10.5	1321.95	$36.50	$48,251.18

APPENDIX C

ASSET SUMMARY TABLES

R26			Rupert Street					
	Gravel Roadway	Fair		62.8	7.5	471	$36.50	$17,191.50
R27			Rupert Street					
	Gravel Roadway	Fair		83.8	7.5	628.5	$36.50	$22,940.25
R28			Rupert Street					
	Gravel Roadway	Fair		83.9	7.5	629.25	$36.50	$22,967.63
R29			Rupert Street					
	Reclaimed Asphalt Shingles Roadway	Fair		376.1	6.5	2444.65	$36.50	$89,229.73
R30			7th Avenue					
	Gravel Roadway	Fair		137.9	10	1379	$36.50	$50,333.50
R31			8th Avenue					
	Reclaimed Asphalt Shingles Roadway	Fair		162.6	10.5	1707.3	$36.50	$62,316.45
	Rolled Curb and Gutter	Good		235.7			$150.00	35355
R32			6th Avenue					
	Gravel Roadway	Fair		116.8	9.5	1109.6	$36.50	$40,500.40
R33			Main Street					
	Reclaimed Asphalt Shingles Roadway	Fair		168.8	10	1688	$36.50	$61,612.00
R34			Main Street					
	Chipseal Roadway	Fair		233.6	9.5	2219.2	$66.50	$147,576.80
	Separate Concrete Sidewalk	Fair		167.3	1.1	184.03	$300.00	55209
R35			Main Street					
	Chipseal Roadway	Good		408	13.5	5508	$66.50	366282
	Separate Concrete Sidewalk	Good		349.3	1.8	628.74	$300.00	$188,622.00
R36			Elevator Road					
	Gravel Roadway	Good		430.2	6.5	2796.3	$36.50	$102,064.95
R37			Elevator Road / East Road					
	Gravel Roadway	Fair		880.3	6.5	5721.95	$36.50	$208,851.18
R38			Industrial Road					
	Gravel Roadway	Fair		482.4	8	3859.2	$36.50	$140,860.80
R39			Industrial Road					
	Gravel Roadway	Fair		83.5	7.5	626.25	$36.50	$22,858.13

Appendix E: Waterworks System Assessment Report

APPENDIX D
SANITARY SEWER VIDEO INSPECTION SUMMARY
2018

Street Name:	Intersection	Upstream MH #:	Upstream MH Condition:	Downstream MH #:	Downstream MH Condition:	Sketch #	SS Size	SS Material	SS Length	SS Inspection Comments:
Main Street	2nd Ave to 3rd Ave	MH 17	No Issue	MH 16	No issue	SK 1	200mm	Vitrified Clay	165m	Started out Submarined for the first 1.5m from MH 17. Survey Abandoned, camera could not travel over calcite @24.94m from MH 17 and @70.73m from MH 16. No camera in between.
Main Street	3rd Ave to 4th Ave	MH 16	Could not travel. Offset outside MH wall.	MH 15	Could not travel. Offset Outside MH wall.	SK 2	200mm	Vitrified Clay	109m	Survey Abandoned. No camera in between.
Main Street	4th Ave to 5th Ave	MH 15	Broken Pipe at bottom of MH, could not deploy camera.	MH 5	Submarined from 1 to 5m	SK 3	200mm	Vitrified Clay	108m	Camera could not travel. Something Under water caused it to stop @37.69m from MH 5. No camera between above point and MH 15.
Main Street	5th Ave to 6th Ave	MH 6	No Issue	MH 5	Could not get camera into pipe at MH 5	SK 4	200mm	Vitrified Clay	106m	No Issues, Full run (6 to 5)
Main Street	6th Ave to 7th Ave	MH 9	No Issue	MH 6	Could not get camera into pipe from manhole due to Offset.	SK 5	200mm	Vitrified Clay		No Camera between point @32.92m from MH 9 and MH 6.
Main Street	7th Ave to 8th Ave	MH 12	No Issue	MH 9	No issue	SK 6	200mm	Polyvinyl Chloride	113m	Full Run, No Issues (12 to 9)
8th Ave	Main st. to MH 13	MH 13	No Issue	MH 12	No issue	SK 7	200mm	Polyvinyl Chloride	77m	Full Run, No Issues (13 to 12)
8th Ave	MH 13 to Rupert St.	MH 14	No Issue	MH 13	No issue	SK 7	200mm	Polyvinyl Chloride	86m	Full Run, No Issues (14 to 13)
7th Ave	Main st. to MH 10	MH 10	No Issue	MH 9	No issue	SK 8	200mm	Vitrified Clay	97m	No issues in pipe other than over extended services. Camera stopped over Extended Service @24.63m from MH 10.
7th Ave	MH 10 to Rupert St.	MH 11 (North End)	Note: MH 11 does not exist, it is a cleanout. Pipe Capped.	MH 10	No issue	SK 8	200mm	Vitrified Clay		No issues in pipe other than over extended services. Camera stopped over Extended Service @3.47m from MH 10.
6th Ave	Main St. to MH 7	MH 7		MH 6	Camera Could not enter pipe due to Offset @ Manhole	SK 9	200mm	Vitrified Clay	75m	Camera stopped by Calcite @64.07m from MH 7. No Camera beyond above point up to MH 6.
6th Ave	MH 7 to Rupert St.	MH 8 (North End)	Note: MH 8 does not exist, it is a cleanout. (North End)	MH 7	No issue	SK 9	200mm	Vitrified Clay	48m	Full Run, No Issues (MH 7 to North End)
5th Ave	Main st. to Rupert St.	MH 5	No Issue	MH 4	No issue	SK 10	200mm	Vitrified Clay	115m	Camera stopped by Calcite @47.14m from MH 5. Camera stopped by Calcite @16.77m from MH 4. No camera in between for 51.09m.

APPENDIX D
SANITARY SEWER VIDEO INSPECTION SUMMARY
2018

Street Name:	Intersection	Upstream MH #:	Upstream MH Condition:	Downstream MH #:	Downstream MH Condition:	Sketch #	SS Size	SS Material	SS Length	SS Inspection Comments:
Main Street	2nd Ave to 3rd Ave	MH 17	No Issue	MH 16	No issue	SK 1	200mm	Vitrified Clay	165m	Started out Submarined for the first 1.5m from MH 17. Survey Abandoned, camera could not travel over calcite @24.94m from MH 17 and @70.73m from MH 16. No camera in between.
Main Street	3rd Ave to 4th Ave	MH 16	Could not travel. Offset outside MH wall.	MH 15	Could not travel. Offset Outside MH wall.	SK 2	200mm	Vitrified Clay	109m	Survey Abandoned. No camera in between.
Main Street	4th Ave to 5th Ave	MH 15	Broken Pipe at bottom of MH, could not deploy camera.	MH 5	Submarined from 1 to 5m	SK 3	200mm	Vitrified Clay	108m	Camera could not travel. Something Under water caused it to stop @37.69m from MH 5. No camera between above point and MH 15.
Main Street	5th Ave to 6th Ave	MH 6	No Issue	MH 5	Could not get camera into pipe at MH 5	SK 4	200mm	Vitrified Clay	106m	No Issues, Full run (6 to 5)
Main Street	6th Ave to 7th Ave	MH 9	No Issue	MH 6	Could not get camera into pipe from manhole due to Offset.	SK 5	200mm	Vitrified Clay		No Camera between point @32.92m from MH 9 and MH 6.
Main Street	7th Ave to 8th Ave	MH 12	No Issue	MH 9	No issue	SK 6	200mm	Polyvinyl Chloride	113m	Full Run, No Issues (12 to 9)
8th Ave	Main st. to MH 13	MH 13	No Issue	MH 12	No issue	SK 7	200mm	Polyvinyl Chloride	77m	Full Run, No Issues (13 to 12)
8th Ave	MH 13 to Rupert St.	MH 14	No Issue	MH 13	No issue	SK 7	200mm	Polyvinyl Chloride	86m	Full Run, No Issues (14 to 13)
7th Ave	Main st. to MH 10	MH 10	No Issue	MH 9	No issue	SK 8	200mm	Vitrified Clay	97m	No issues in pipe other than over extended services. Camera stopped over Extended Service @24.63m from MH 10.
7th Ave	MH 10 to Rupert St.	MH 11 (North End)	Note: MH 11 does not exist, it is a cleanout. Pipe Capped.	MH 10	No issue	SK 8	200mm	Vitrified Clay		No issues in pipe other than over extended services. Camera stopped over Extended Service @3.47m from MH 10.
6th Ave	Main St. to MH 7	MH 7		MH 6	Camera Could not enter pipe due to Offset @ Manhole	SK 9	200mm	Vitrified Clay	75m	Camera stopped by Calcite @64.07m from MH 7. No Camera beyond above point up to MH 6.
6th Ave	MH 7 to Rupert St.	MH 8 (North End)	Note: MH 8 does not exist, it is a cleanout. (North End)	MH 7	No issue	SK 9	200mm	Vitrified Clay	48m	Full Run, No Issues (MH 7 to North End)
5th Ave	Main st. to Rupert St.	MH 5	No Issue	MH 4	No issue	SK 10	200mm	Vitrified Clay	115m	Camera stopped by Calcite @47.14m from MH 5. Camera stopped by Calcite @16.77m from MH 4. No camera in between for 51.09m.

APPENDIX D
SANITARY SEWER VIDEO INSPECTION SUMMARY
2018

Street Name:	Intersection	Upstream MH #:	Upstream MH Condition:	Downstream MH #:	Downstream MH Condition:	Sketch #	SS Size	SS Material	SS Length	SS Inspection Comments:
5th Ave	Rupert st. to MH 3	MH 4	Large Offset from PVC to Clay at Manhole	MH 3	No issue	SK 11	200mm	Vitrified Clay		Camera stopped by Calcite @81m from MH 4. No camera after above until MH 3.
5th Ave	MH 3 to Thompson st.	MH 3	No Issue	MH 2	No issue	SK 12	200mm	Vitrified Clay	89m	Full Run, No Issues (MH 3 to MH 2)
2nd Ave	Main st. to Rupert St.	MH 18	No Issue	MH 17	No issue	SK 13	200mm	Vitrified Clay	78m	Camera stopped @11.41m from MH 17 due to large debris wedged in pipe. Camera stopped @2.4m from MH 18 due to major Offset - Repaired Fall 2018. No camera in between.
Rupert Street	2nd Ave to Central Ave	MH 18	No Issue	MH 29	No issue	SK 14	200mm	Vitrified Clay	104m	Camera submarined for 5m from MH 29 then stopped by debris under water. Camera stopped by Calcite @96m from MH 18. No camera between above points. No issue for 96m from MH 18.
Central Ave	Main st. to Rupert St.	MH 30	No Issue	MH 29	No issue	SK 15	200mm	Vitrified Clay	38m	Full Run, No Issues (MH 30 to MH 29)
Central Ave	Rupert st. to MH 28	MH 29	Calcite build-up at MH 29. Camera could not travel to MH 28.	MH 28	No issue	SK 16	200mm	Vitrified Clay	58m	Camera stopped @55m from MH 28 due to Calcite. No camera beyond above point up to MH 29. No issue for 55m from MH 28.
Central Ave	MH 28 to Thompson st.	MH 28	Could not get camera into pipe going towards MH 28	MH 27	No issue	SK 17	200mm	Vitrified Clay	107m	Camera stopped @44.66m from MH 28 due to Calcite. No camera beyond above point until MH 27.
Norman Ave	Main st. to MH 36	MH 37	No Issue	MH 36	No issue	SK 18	200mm	Vitrified Clay	77m	Full Run, No Issues (MH 36 to MH 37)
Norman Ave	MH 36 to Thompson st.	MH 36	No Issue	MH 35	Offset in pipe just outside MH	SK 19	200mm	Vitrified Clay	103.63m	Full Run, No Issue (MH 36 to MH 35)
3rd Ave	MH 24 to MH 23	MH 24	Camera could not travel. Calcite just outside Manhole.	MH 23	No issue	SK 20	200mm	Vitrified Clay	95m	Camera stopped due to over Extended Service @ 19.57m from MH 23. No Camera between above point and MH24 (75.43m).
3rd Ave	MH 23 to Thompson St.	MH 23	No Issue	MH 22	Broken Piece of clay pipe would not allow camera to travel outside MH 22	SK 21	200mm	Vitrified Clay	106m	Camera stopped due to Calcite @4.64m from MH 23. No camera between above point and MH 22 (101.36m).
3rd Ave	MH 22 to MH 25	MH 25	No Issue	MH 22	No issue	SK 22	200mm	Vitrified Clay	85m	Full Run, No Issues (MH 25 to MH 22)
Jackson Ave	Thompson St. to MH 40	MH 40	No Issue	MH 39	No issue	SK 23	200mm	Vitrified Clay		Camera stopped due to Calcite @18.14m from MH 39. Camera stopped over extended service @26.66m from MH 40. No camera in between above two points.
Jackson Ave	MH 40 to MH 41	MH 41	NOTE: Manhole does not exist. It is a cleanout. (South End)	MH 40	No issue	SK 23	200mm	Vitrified Clay	75m	Camera stopped due to piece of broken Claypipe stuck in pipe @8m from MH 40. No camera beyond above point until South end.

Sanitary Sewer Video Inspection Photos

Figure 1: Calcite Buildup Blocking Camera (64m from MH 7 towards MH 6))

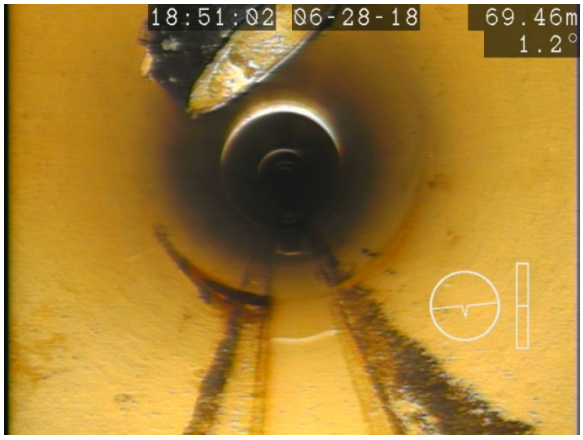

Figure 2: Extended Service (69.5m from MH 9 towards MH 10)

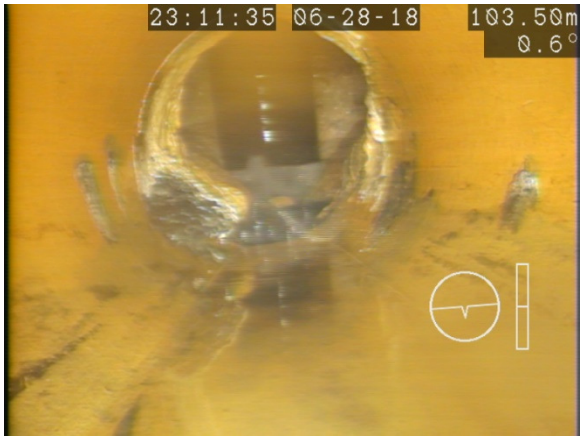

Figure 3: Calcite Buildup at Manhole (MH 5)

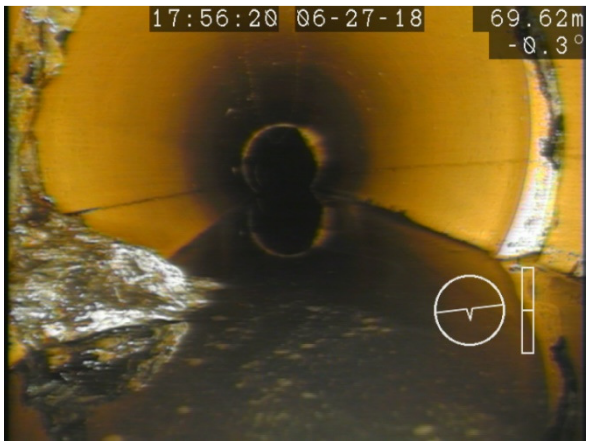

Figure 4: Calcite Buildup (69.62m from MH 16 towards MH 17)

Figure 5: Large Debris Lodged in Pipe (11.4 m from MH 17 toward MH 18)

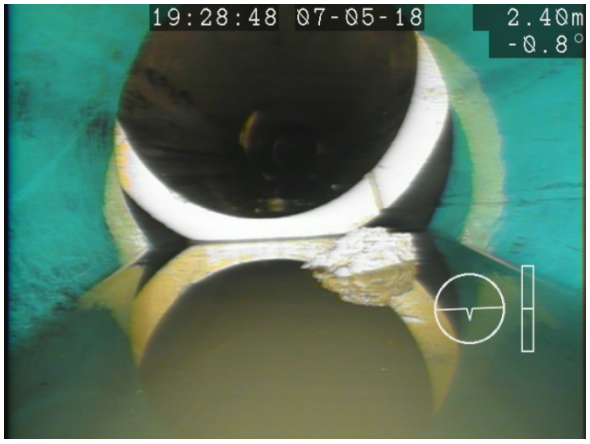

Figure 6: Major Offset (2.4m from MH 18 towards MH 17)

Figure 7: Calcite Buildup (4.6m from MH 23 towards MH 22)

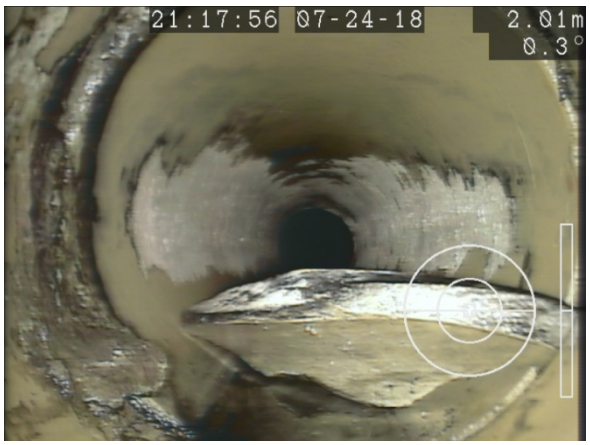

Figure 8: Broken Piece of Clay Pipe (MH 22)

Figure 9: Over-extended Service with Calcite Buildup (19.6m from MH 23 towards MH 24)

Figure 10: Calcite Buildup (at MH 24)

Figure 11:Calcite Buildup (80.5m from MH 43 towards MH 19)

Figure 12: Calcium Buildup (MH 44)

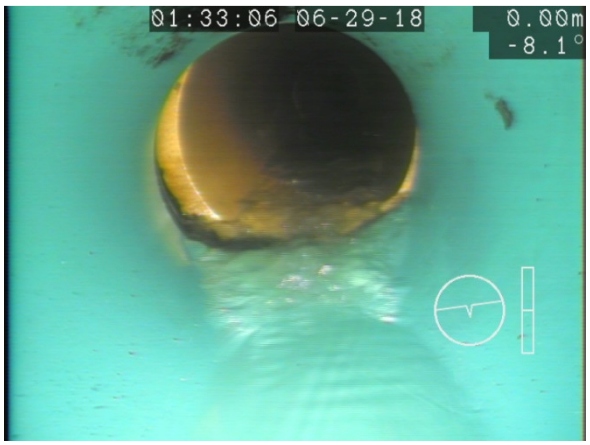

Figure 13: Large Offset from PVC to Clay at Manhole (MH 4)

Figure 14: Calcite Buildup (81m from MH 4 towards MH 3)

Figure 15: Calcite Buildup (47.1m from MH 5 towards MH 4)

Figure 16: Calcite Buildup (10.6m from MH 31 towards MH 32)

Figure 17: Calcite Buildup (15.5m from MH 32 towards MH 31)

Figure 18: Calcite Buildup (18m from MH 32 towards MH 33)

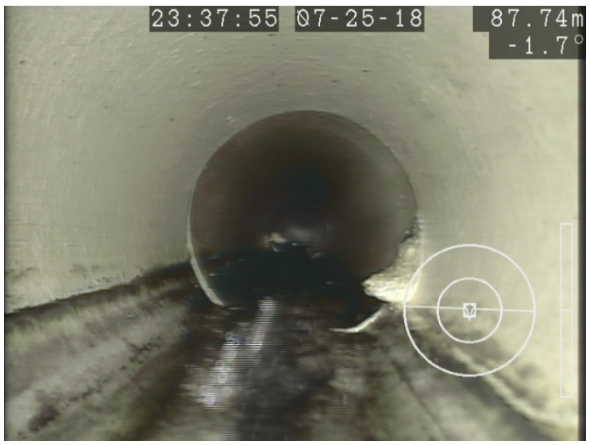

Figure 19: Calcite Buildup (87.74m from MH 33 to MH 32)

Figure 20: Calcite Buildup (56.6m from MH 34 towards MH 42)

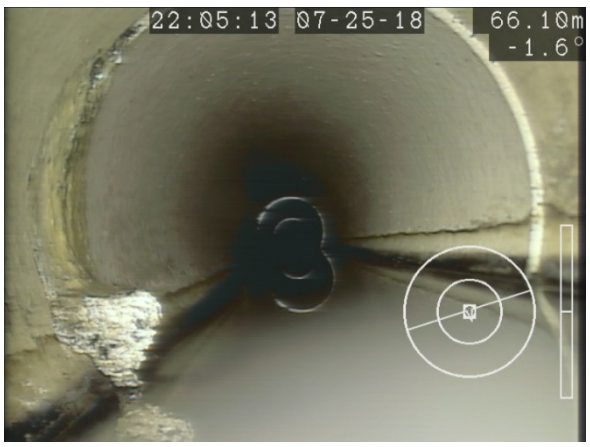

Figure 21: Calcite Buildup (66.1m from MH 38 towards MH 42)

Figure 22: Calcite Buildup (4.1m from MH 42 towards MH 34)

Figure 23: Calcite Buildup (9.33m from MH 42 towards MH 38)

Figure 24: Calcite Buildup (44.66m from MH 28 towards MH 27)

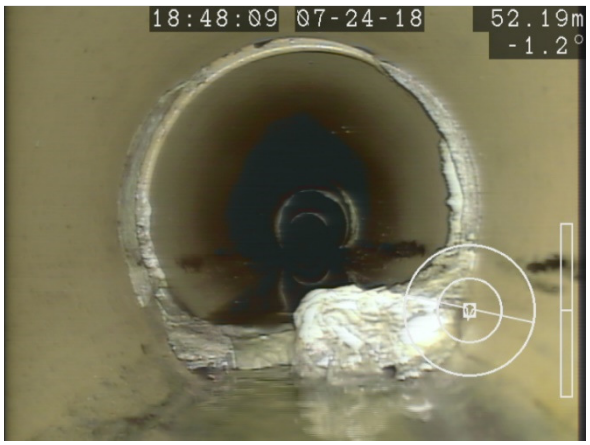

Figure 25: Calcite Buildup (55m from MH 28 towards MH 29)

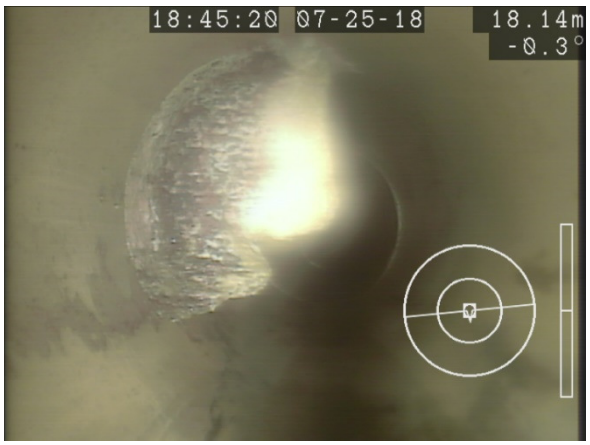

Figure 26: Calcite Buildup (18.14m from MH 39 towards MH 40)

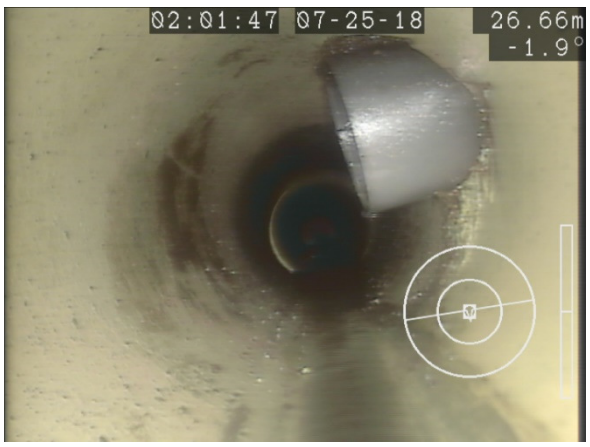

Figure 27: Over-extended Service (26.66m from MH 40 towards MH 39)

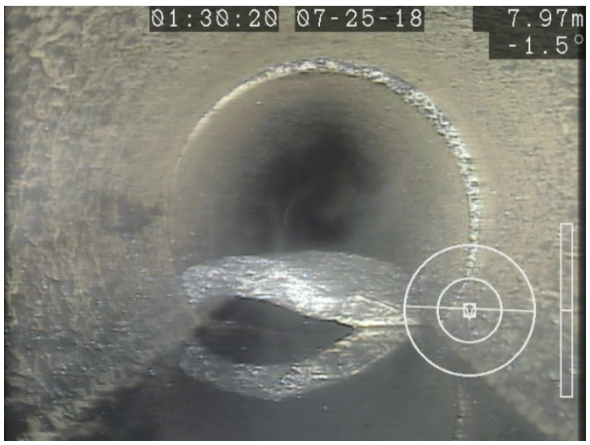

Figure 28: Broken Clay Pipe Piece (8m from MH 40 to MH 41)

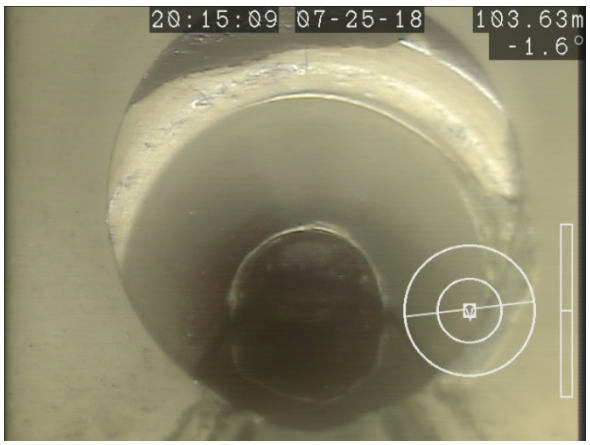

Figure 29: Offset in Pipe Just Outside Manhole (MH 35)

Figure 30: Calcite Buildup (95.71m from MH 18 to MH 29)

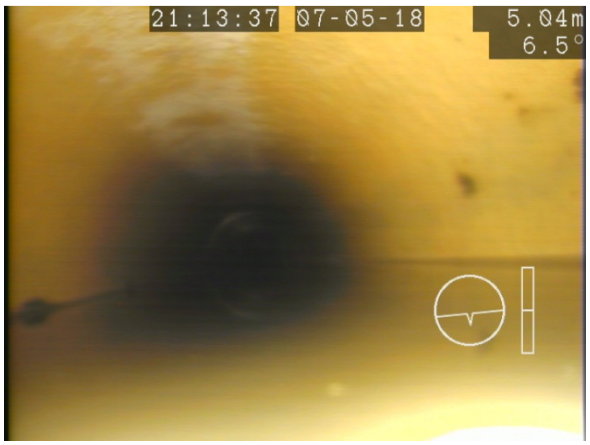

Figure 31: Submerged Section (5m from MH 29)

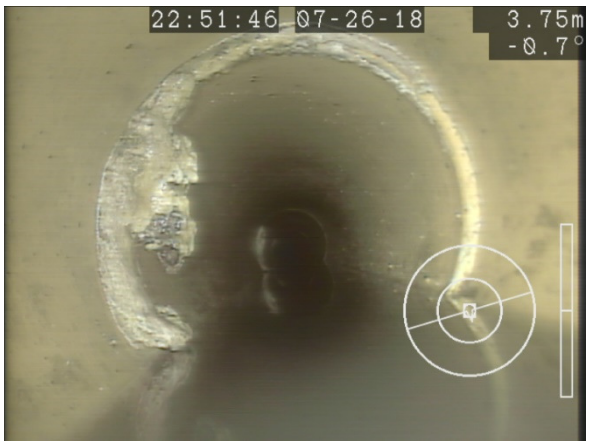

Figure 32: Calcite Buildup (3.75m from MH 22 towards MH 19)

Figure 33: Calcite Buildup (at MH 26)

Figure 34: Calcium Buildup (2.7m from MH 35 towards MH 31)

Appendix D: Sanitary Sewer Video Inspection Summary

Appendix E: Waterworks System Assessment Report

CATTERALL & WRIGHT
CONSULTING ENGINEERS

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June 2016

WATERWORKS SYSTEM ASSESSMENT

FINAL REPORT FOR:
TOWN OF ABERDEEN

Table of Contents

1.0 Background and General Overview

1.1 General

Aberdeen, Saskatchewan, has a population of 670 persons (estimated by the Town). In April of 2010, the Town began receiving potable water via the SaskWater Saskatoon Northeast Treated Pipeline (surface water from the South Saskatchewan river treated by the City of Saskatoon WTP) and abandoned their treatment system. The Town provides storage and pumping to the distribution system. The previous WSA was completed in 2011.

An addition to the water pumphouse (WPH) was completed in 2012. The addition included an upgrade of the electrical system and replacement of one of the distribution pumps. The Highway 41 Water Utility added two pumps to feed their rural distribution system from the Town reservoirs. The existing filters were removed to create space for the new pumps.

1.2 Location

The reservoirs and pump house are located on Lot 24, Blk/Par 9, Plan 101513078, in the Town of Aberdeen.

1.3 Inspection of Waterworks System

The waterworks system inspection took place on July 23, 2015. The Town foreman and primary waterworks operator, Brad Oleksyn, was interviewed.

1.4 Operators and Certification

The Town has two certified operators, Brad Oleksyn and Mural Hingston. Mr. Oleksyn holds WD2 and WT2 certifications and Mr. Hingston holds WD1 and WT1 certifications. There are no uncertified backup operators.

1.5 Previous WSA Report & Upgrades

1.5.1 Identified Issues & Risks

The previous WSA was completed in 2011. It identified the following issues and risks (paraphrased):

1. A chemical feed system is required to pump sodium hypochlorite and ammonium sulphate to allow for boosting of chloramines if required.
2. A double check valve is required on both the pailfill and the truckfill for backflow prevention.
3. A raised curb to 150 mm above the floor and a sealed cable entry are required at the access to Reservoir No. 1.

1.5.2 Recommendations

Recommendations from the previous WSA (paraphrased):

1. Upgrades to the distribution pumps are recommended to suit the projected pumping requirements.
2. Both reservoirs are recommended to be cleaned.

1.5.3 Upgrades

Since the previous WSA, the following upgrades were completed:

1. The pumphouse was expanded in 2012 to accommodate new electrical, a replacement distribution pump and distribution pumps for the Highway 41 Utility.
2. The pail fill has been removed.
3. A double check valve has been added to the truckfill to work with the existing vacuum breaker.
4. The access to Reservoir No. 1 has been upgraded to include an increased curb height to 150 mm as well as removing a control cable that used to pass through the access.
5. Approximately 600 m of distribution mains have been added.

2.0 Review of Available Information

2.1 Plans, Reports, and Manuals

Plans, reports, and manuals that were reviewed are listed in Appendix B. The records are generally complete and well kept.

Reports from the Environmental Project Officer (EPO) were reviewed from 2011-2015. The reports have generally been favourable.

2.2 Historic Problems

There are no reports of historic problems.

3.0 Water Usage Analysis

3.1 Population

Table 3.1 is a summary of population statistics for the Town based on Census data from Statistics Canada, covered population information from Saskatchewan Health (SHSP) and information provided by the Town. SHSP figures are not always an accurate representation of the actual population, but are useful for estimating growth.

The Census data shows a population increase of about 2.7% from 2006 to 2015. SHSP data fluctuates between growth and decline, however long term population changes are approximately 1.4% over the past decade. At the time of the inspection, the Town estimated a current population of 670 and that a growth rate of approximately 1.4% would be reasonable.

For analysis purposes, a reported 2015 population of 670 and a future growth of 1.4% will be used.

Table 3.1 – Population Summary

Year	Census	SHSP	Town	Forecast
2006	527	759		
2007		780		
2008		790		
2009		772		
2010		756		
2011	599	979		
2012		984		
2013		1013		
2014			670	
2015				670
2020				718
2025				770
2030				825
2035				884

3.2 Consumption and Sizing

A water usage analysis and projection was completed based on data supplied by the Town. The results of the analysis are shown in Table C.1, Appendix C. The average daily per capita water usage for the last five years was approximately 275 Lpcd (litres per capita per day). The Water Security Agency of Saskatchewan (WSASK) statistics (based on Saskatchewan Health Covered Population data) indicate an average of 325-398 Lpcd for a Saskatchewan community of this size. For future projection in this analysis, an average usage of 300 Lpcd will be used. This is consistent with other communities using SaskWater supply pipelines.

Peaking factors are used to determine the sizing requirements of various components. The required size is determined by multiplying the average daily consumption by the peaking factors. Peak day demand is used to determine the required supply rate based on a 24 hour day. Calculated peak day usage factors have ranged from 2.11 to 2.54. For a community of this size, the WSASK recommends a peak day factor of 2.75 which is used herein. Distribution pumps are sized to supply the estimated peak hour usage. For a community of this size, the WSASK recommends a peak hour factor of 4.13 which is used herein. Treated water storage equal to 2 times average daily use is recommended for a system with fire protection.

Based on the estimated population of 625 persons and the aforementioned factors, the 2015 water requirements are estimated and summarized in Table 3.1. Further analysis and a 20 year projection, based on the same factors are included in Table C.1.

Table 3.2 –Water Requirements (2015)

Estimated Average Day (m^3)	Estimated Peak Day (m^3)	Supply Rate (Lps)	Dist. Pumping Rate (Lps)	Storage (m^3)
201	553	6.4	9.6	402

4.0 Water Supply

4.1 SaskWater Supply

Potable water is supplied to the Town by the SaskWater Saskatoon Northeast Treated Pipeline (from the City of Saskatoon Water Treatment Plant). The supply pipeline adjacent to the building is 150 mm PVC pipeline. Inlet piping at the WPH includes a double check valve assembly, flow rate control valve, turbine water meter and solenoid fill valve (Photo 1).

There has been no change to the SaskWater supply agreement noted in the previous WSA. The details are as follows:

- Average flow rate: 5.6 Lps
- Maximum annual quantity: 176,602 m^3 (with the understanding that additional capacity will be provided, if available)

The contracted supply rate is less than the estimated 2015 peak day requirement but greater than the average.

During extended periods of high usage, it is possible that reservoir levels may be unacceptably low (i.e. less than half full). It is recommended that the Town monitor and record reservoir levels during high usage to determine reservoir levels fall unacceptably low. This can help determine if an increase in the contracted water supply rate is required.

The Highway 41 Utility is also drawing out of the Town's reservoir and their water supply allotment from SaskWater will also flow to the reservoir. The Town reports that a consistent incoming flow rate of 7.0 Lps is observed. This flow accounts for required volumes used by both the Town and the Utility. If stored water levels drop unreasonably low, the water supply agreement allows the Town to temporarily cut off water supply to the Utility. The usage and supply allotment will need to be monitored to ensure there is minimal impact to the Town's water supply.

5.0 General Water Pumphouse Facilities

The original WPH was constructed in 1964. The plant was expanded in 1984 and again in 2012. The interior is generally clean and well-kept.

The recently expanded area of the pumphouse houses upgraded electrical (Photo 8) and provides space for a future standby (fire) pump and standby power generator.

The access to the 1984 reservoir is outside and secured with a padlock.

The entrance has a storm door which is equipped with a locking handle. However, the door frame is rotted and the door can be opened without a key (Photo 15). Upgrades are required to this entrance to ensure that the building can be locked and secured.

The WTP is equipped with an autodialler to notify the operator of abnormal conditions.

6.0 Water Treatment Process

6.1 Process Description

Potable water enters the WPH building and is discharged to Reservoir No. 2 for storage. The water circulates to Reservoir No. 1 and then to the distribution pumps. Chlorine in the supplied water is manually monitored. Distribution pressure is maintained with the use of variable frequency drives (VFD's) on the pumps.

6.2 Water Treatment Chemicals

6.2.1 Chlorine and Ammonia

At the time of the inspection, the Town did not have a chemical feed system and no chemicals were being fed. Since the time of the inspection, the Town has installed a chemical feed system that allows for addition of chemicals (sodium hypochlorite and ammonium sulphate) to boost chloramines in the incoming water. The chemical drums on site are marked with gradations for the Town to record chemical usage.

In 2014, total chlorine residuals at the pumphouse ranged from 0.93 mg/L to 1.64 mg/L. The Town is consistently exceeding the minimum requirement of 0.5 mg/L.

6.3 Treated Water Quality

Extensive water quality testing is not necessary because good quality, treated potable water is received from SaskWater (which is treated by the City of Saskatoon). Typical water quality information is available from www.saskh2o.com under "City of Saskatoon".

In 2014, treated water turbidity ranged from 0.10 NTU to 0.39 NTU. The Town's permit does not have an applied limit for turbidity.

6.4 Disinfection

Primary disinfection of the water supplied to the Town is achieved at the City of Saskatoon water treatment plant. Disinfection analysis is not required for the Town. The City of Saskatoon water treatment plant uses monochloramine for secondary disinfection. Total chlorine content must be monitored at the pumphouse. Free chlorine content is very low, if any.

7.0 Treated Water Storage

There have been no changes to the treated water capacity since the previous WSA.

Treated water is stored in two below grade reinforced concrete reservoirs. Table 7.1 lists reservoir capacities.

Table 7.1 – Reservoir Characteristics

Reservoir	Year Constructed	Reservoir Capacity (m^3)
1	1964	113
2	1984	489
		Total = 602

Incoming water is discharged to the far side Reservoir No. 2 (Photo 2), flows through the reservoir to the connecting pipe to Reservoir No. 1. The water then flows across Reservoir No. 1 to the distribution pumps.

Water storage available is adequate for the projected Town requirements. This has not included any allowance for the water used by the Highway 41 Utility. As mentioned previously, the water supply agreement allows the Town to temporarily cut off water supply to the Utility if stored water levels drop unreasonably low. Regular review of the water use and storage requirements for the actual Utility use is recommended to ensure there is minimal impact on the Town system.

The reservoirs can be isolated for maintenance and inspection. The reservoirs have not been cleaned since the previous WSA. Recent EPO reports have indicated that the plant was quite dirty during the recent upgrade. Given that the plant was dirty and the reservoirs have not been cleaned for a while, it is recommended that both reservoirs be cleaned. Temporary distribution pumping may be required to facilitate cleaning of Reservoir No. 1.

The previous WSA noted that the steel curb for the access to Reservoir No. 1 was only 38mm high. The access was also not properly sealed as it had a control cable passing through the opening. Since the previous WSA, the curb has been raised to 150 mm and the control cable has been removed from the access (Photo 5).

The steel cover for the access to Reservoir No. 2 is outside and set on a concrete curb, which is approximately 150 mm above the adjacent grade. The most recent EPO report indicated that the gasket at the access hatch required replacement. The Town must ensure that the access is properly sealed. The exterior reservoir access is locked, and the reservoir vent is protected with an insect screen (Photo 6).

Reservoir No. 1 has an overflow pipe to the sanitary sewer. This overflow pipe does not have backflow prevention. The discharge space does not have adequate room to install a backflow preventer. It is recommended that this overflow be removed and the wall grouted and properly sealed. An allowance for temporary pumping may be required.

8.0 Distribution System

The WPH is equipped with two distribution pumps. There are also two distribution pumps that supply the Highway 41 Utility (Photo 9) which are owned and operated by the Utility. These two pumps do not supply water to the Town. A summary of the pumps available to the Town's distribution system are shown in Table 8.1.

Table 8.1 – Pump Descriptions

Pump No.	Type	Manufacturer/ Model	Installed	hp	Flow (Lps)	Head (m)
1	Primary	Goulds VIT-CT	2012	10	12.1	42.7
2	Secondary, Electric Driven	Johnston	1964	10	6.3	31.6
	Secondary, Natural Gas Engine Driven	Johnston	1964	---	27.8	31.6

Pump No. 1 (Photo 3) was installed with the recent upgrades. Both pumps received new 10 hp motors at the same time.

Pump No. 2 (Photo 4) can be driven by either electric motor or by a natural gas engine. When needed, the engine drive is manually operated at a greater RPM than the electric motor to supply more water. SaskPower conducted a review of the natural gas engine and placed an "Unsatisfactory Condition Report" tag on the engine. It notes that the engine is not CSA approved, exhaust piping is leaking CO_2 at 32 ppm, parts are obsolete, and replacement is recommended.

The motor driven pumps are speed controlled by variable frequency drives (VFD's) to provide near constant pressure. Pumps are brought into service by a fixed roster in the VFD programming; this involves Pump No. 1 always acting as the lead pump and Pump No. 2 being added when pressure drops below 45 psi.

The Town currently does not have a backup generator to mitigate a power outage; rather, the operators start the engine driven pump as quickly as they can. This leads to distribution system pressure reductions when relying on operator response time to resume pumping. The current state of the engine driven pump indicates that an alternative backup power source is required for power outages. The Town is planning to install a backup generator and an electric standby pump (for fire flows) in the newest portion of the building. Initial generator sizing is estimated at 150 kW and would allow for operation of the electric standby pump as well as the main distribution pumps. The electric standby pump is estimated to be a 60 hp pump with a capacity of 75.7 Lps (1200 USgpm). It is possible that the generator size could be reduced if standby pump capacity is reduced or other process equipment is locked out from operation, however further consultation is required with the Town.

Additional upgrades would be required to accommodate this upgrade (e.g. building revisions for air intake, controls, etc.), however they are beyond the scope of this report.

The distribution pumping capacity is sufficient to provide the estimated distribution pumping requirements for approximately 17 years. The distribution pumps do not have 100% redundancy, however the Town's requirements can be managed with Pump No. 1 operating on its own. Pump No. 2 is recommended to be upgraded to

match the capacity of Pump No. 1 when the future generator is installed. Discharge pressure at the plant is 45 psi to 50 psi.

The distribution header has a pressure relief valve which is intended to limit the maximum pressure in the distribution system. The current pressure relief valve is insufficient to function with the current and future pumps. The pressure relief valve must be replaced when pump upgrades are completed.

The WPH has an exterior, coin operated truck fill on the east side of the building (Photos 10-12). Water is supplied to the truck fill by a dedicated pump, capable of providing 7.0 Lps at 9.8 m of TDH. The truck fill is equipped with a double check valve and a vacuum breaker. The WPH was also previously equipped with an exterior pail fill facility, however it has been removed.

New services on the distribution system are required to be provided with backflow prevention. Commercial service connections as well as some residential service connections are required to be equipped with backflow prevention.

The distribution system consists of approximately 7,800 m of A.C. and PVC pipe (primarily 150 mm) plus services. Approximately 600 m of the aforementioned total length has been added since the previous WSA.

9.0 Water System Capacities

Table 9.1 is a summary of the capacity and remaining service life of major components within the waterworks system. The table makes reference to the 20-year design population of 884.

Table 9.1 – Capacity and Remaining Service Life of Waterworks Components

	Item	Year Installed	Existing Capacity	Serviceable Population	Typical Service Life (years)	Estimated Remaining Service Life (years)
Storage	Reservoir Storage	1964-1984	602 m^3	> 884	50	10-20
Distribution	Distribution Pumps	1964 to 2012	12.1①	845	30	5-25
	Engine Driven Standby Pump	1964	27.8 Lps	---	30	5-15
	Distribution Piping	1960's-2014	---	---	50	5-50

①Distribution pumping capacity with the largest pump (Pump No. 2 out of service)

Reservoir storage volume is sufficient for the 20-year design population. Highway 41 Utility usage should be closely monitored to determine if it is negatively affecting the water supply to the Town.

The distribution pumps are adequate for approximately 17 years with Pump No. 2 out of service. Pump No. 2 is recommended to be upgraded to match the capacity of Pump No. 1 when the future generator is installed.

A new generator is recommended to provide backup power and to eliminate reliance on the existing engine driven pump during power outages. A new, larger electric

standby pump is recommended to be installed at the time of the new generator installation to provide fire capacity to the Town.

Some of the older distribution piping has reached the end of its normal service life and the Town should consider a long term plan for main replacement.

10.0 Testing Procedures and Records

The Town has a Hach Pocket Colorimeter II (total and free chorine) and a Hach 2100P Turbidimeter (Photo 13). Both pieces of equipment are in good condition and calibration checks are done regularly. The Town tests regularly for both chlorine and turbidity. Work bench space within the plant is minimal (Photo 14).

The Town samples weekly for bacteriological quality and quarterly for trihalomethanes (THMs) as outlined in the Town's Permit to Operate. Bacteriological testing results have been acceptable and all repeat samples of positive samples have been negative. THM results, as shown in Appendix A, have all been well below the MAC.

The Town now has provision to boost chloramines in the incoming treated water if necessary. The Town is required to record chemical usage.

Daily testing records are maintained at the WPH. The records appear to be complete.

11.0 Operation and Maintenance

Daily plant operation includes chlorine residual testing, turbidity testing, meter readings, general plant review and maintenance as necessary.

The WPH is maintained in good condition. The maintenance performed is adequate and records are well kept and appear to be complete.

The Town reports that the distribution system hydrants and valves are exercised annually in the fall during directional flushing of the water mains.

O&M manuals were not available for review.

12.0 Metering and Water Usage Reporting

Table 12.1 lists the meters that are present in the water pumphouse:

Table 12.1 – Water Pumphouse Meters

Meter Location	Type	Registers	Reported to WSASK
Supply*	Turbine	m^3	Yes
Truckfill	Turbine	Igal	No
Hwy 41 Distribution+	Turbine	m^3	No

*Owned by SaskWater
+Owned by Hwy 41

13.0 Wastewater

This system does not generate process waste water. Wastewater (floor drainage, etc.) is directed to the sanitary sewer system.

14.0 Waterworks Cost Analysis

A waterworks cost analysis was completed to assist the Town in identifying water rates that will support the financial sustainability of the waterworks. This analysis provides a basis for full-cost pricing. Full-cost pricing is intended to generate sufficient revenue to recover all waterworks related expenses. It also heightens the value of the resource to consumers, and can affect consumers' usage habits.

The process of setting water rates can be complex with many variables. Some of these variables include the age of waterworks components (older systems tend to have a higher frequency of failure), previous debts incurred, and providing predictable rate increases for consumers. For the purposes of analysis, the following is intended to provide a screening level review to help assess the Town's ability to recoup its waterworks related expenses.

The waterworks cost analysis has been completed based on the following information supplied by the Town:

- A summary of annual operations and maintenance costs from the previous five years;
- Estimated unaccounted (non-billed) water usage; and
- The current water rate structure for the Town.

This analysis looks at operations and maintenance costs, capital replacement costs over the lifetime of the waterworks, and provides a comparison of recommended water rates with the current water rates provided by the Town.

14.1 Operations and Maintenance Costs

Waterworks operations and maintenance (O&M) costs consist of items such as chemicals, electricity, personnel, sampling/monitoring and routine maintenance. Routine maintenance consists of expected, planned or repeated maintenance items (ie: water main repair, water pumphouse maintenance and supplies, and meter replacements). O&M costs can either be fixed (ie: building heating, salaries, professional development) or variable (ie: bulk water purchase, chemical usage) with respect to water consumption.

Non-billed (non-metered) water is considered as a variable O&M cost. Non-billed water usage includes water that is unaccounted for through water main breaks, distribution system leaks, distribution system flushing and swabbing, firefighting/training, unmetered facilities and meter discrepancies. This usage is determined by comparing metered volumes of treated water leaving the water treatment plant with metered volumes from utility billings. The Town provided records of their volumes billed to consumers and bulk purchases from SaskWater for

the past three years. These records indicate that approximately 8% of incoming water is not billed to consumer. Non-billed water is typically in the range of 10-30%.

The Town provided O&M costs for the previous five years. Refer to Appendix F. Table 14.1 and Table 14.2 break these O&M costs into fixed and variable costs respectively. Variable costs have been adjusted to account for non-billed water. The Annual Operations and Maintenance Costs provided by the Town include the costs of non-routine (unplanned) maintenance over the past five years.

Table 14.1 – Fixed Operation and Maintenance Costs

Year	Fixed Annual O&M Cost
2010	$108,326.71
2011	$129,808.09
2012	$138,772.49
2013	$147,124.20
2014	$155,291.06
Fixed Average Annual O&M Costs	**$135,864.51**

Table 14.2 – Variable Operation and Maintenance Costs

Year	Annual O&M Cost	Annual Water Use (m^3)	O&M Cost Per m^3	O&M Cost Per 1000 Igal
2010	$172,010.35	37,907	$4.54	20.63
2011	$207,320.37	54,686	$3.79	17.23
2012	$173,827.52	61,119	$2.84	12.93
2013	$203,912.72	65,007	$3.14	14.26
2014	$196,165.56	67,241	$2.92	13.26
Average	$190,647.30	57,192	$3.45	$15.66
Unaccounted Water Use			8%	8%
Variable O&M Costs per Metered Volume			**$3.72**	**$16.92**

14.2 Capital Replacement Costs

Capital replacement costs are fixed costs to the Town. Although they may not be required today, a proportion of this cost must be allocated annually to ensure that waterworks infrastructure is sustainable in the long term. An estimate of capital replacement costs for major waterworks system components is shown in Table 14.3. The total estimated annual replacement cost represents the average amount that should be placed in reserves annually. The table identifies major system components, each with its associated current estimated replacement cost and estimated average service life.

Table 14.3 – Capital Replacement Costs

	Current Estimated Replacement Cost	Estimated Average Service Life	Annualized Cost①
Water Plant Facilities			
Building	$100,000.00	30	$3,206.04
Mechanical (less distribution pumps)	$50,000.00	30	$1,603.02
Electrical (less generator)	$100,000.00	20	$4,870.11
Storage			
Reservoir Storage	$800,000.00	50	$15,003.29
Distribution			
Pumps	$100,000.00	30	$3,206.04
Distribution System③	$2,350,000.00	50	$44,072.15
Truckfill Facilities	$20,000.00	20	$974.02
Fixed Annual Capital Replacement Cost			**$72,934.68**

①Annualized Cost based on an assume interest rate of 0.25% over the estimated average service life of the waterworks component

14.3 Suggested Water Rates

Based on the foregoing cost summaries, the following water rates are provided for comparison to the current water rates. These rates are suggested to meet the waterworks costs outlined in Sections 14.1 and 14.2 to ensure a financially self-sustaining system. These rates have been generated on the basis of a fixed base cost plus an incremental cost per volume used, and then adjusted to model the current water rate structure for the purpose of comparison.

Table 14.4 – Fixed Monthly Cost per Meter

Operations and Maintenance	$135,864.51
Capital Replacement	$72,934.68
Total Average Annual Fixed Costs	**$208,799.19**
Total Average Monthly Fixed Costs	$17,399.93
Number of Meters (for billing purposes)*	273
Fixed Monthly Cost per Meter	**$63.74**

*Number of meters provided by Town

Table 14.5 – Variable Cost per Metered Volume

	Variable Cost per m^3	Variable Cost Per 1000 Igal
Variable Operations and Maintenance Costs	**$3.72**	**$16.92**

A base rate of **$63.74** plus an additional **$16.92 per 1000 Igal** ($3.72 per cubic meter) is suggested for a full-cost recovery of waterworks related expenses. The recommended water rates do not account for inflation, and an appropriate inflation rate will need to be applied.

14.4 Waterworks Sustainability

Table 14.7 compares the Town's current rate structure to the suggested water rates for full cost recovery of waterworks related expenses. Both rates are compared based on a 2014 average consumption of 20.5 m^3 (4,500 Igal) per meter per month.

Table 14.7 – Reported 2015 Water Rates vs. Suggested Water Rates

2015 Aberdeen Monthly Water Rates				
Usage Rate	$4.41	/ m^3	$20.00	/1000 Igal
Infrastructure Fee	$35.00		$35.00	
Average Monthly Usage per Meter	20.5	m^3	4500	Igal
Average Monthly Revenue per Meter		**$125.00**		
*Water rates and fees provided by Town				
Suggested Water Rates				
Base Rate (including infrastructure fee)	$63.74		$63.74	
Usage Rate (each unit of usage)	$3.72	/ m^3	$16.92	/ 1000 Igal
Average Monthly Usage per Meter	20.5	m^3	4500	Igal
Average Monthly Cost per Meter		**$139.89**		

The Town's 2015 expected water related revenue is less than the revenue expected from the recommended water rates. This analysis suggests that the Town is recouping approximately 89% of their waterworks related expenses. It is recommended that the Town review their current water rates to determine if a rate increase is required.

The Town has kept detailed, consistent records of all waterworks related cost components over the past five years. It is important for the Town to continue these good record keeping practices to help review and establish future water rates.

The foregoing analysis has been generated based on variable assumptions, and is intended to provide a limited basis to establish appropriate water rates. The Town should continue to monitor long term utility revenues, expenditures and reserve funding to see if water rates need to be revised.

15.0 Recommendations

Issues & Risks are those items which have potential to adversely affect the ability to supply safe drinking water. Recommendations are items of system improvement.

15.1 Issues & Risks

Issues & Risks are those items which have potential to adversely affect the ability to supply safe drinking water. Recommendations are items of system improvement.

15.1.1 Exterior Storm Door

Upgrades are required to the storm door and lock at the entrance to the original portion of the WPH to ensure that the building can be properly secured. The estimated cost is $3,000.

15.1.2 Reservoir No. 2 Access

EPO reports indicate that the gasket at the access to Reservoir No. 2 requires replacement. The Town must ensure that the access is properly sealed.

15.1.3 Reservoir Overflow Backflow Prevention

The overflow from Reservoir No. 1 to the sanitary sewer is required to be removed to eliminate a contamination hazard. The estimated cost is $1,000 (allowance for temporary pumping may be required). This can be coordinated with reservoir cleaning (see Section 15.2.3).

15.2 Recommended System Improvements

15.2.1 Standby Generator and Electric Standby Pump

A backup generator and a new electric standby pump are recommended to be installed in the expanded portion of the building.

The estimated cost for a 150 kW generator is $130,000. The estimated cost of a 60 hp electric standby pump (75.7 Lps, 1200 USgpm) is $50,000.

Additional upgrades would be required to accommodate this upgrade (e.g. building revisions for air intake, controls, etc.), however they are beyond the scope of this report.

15.2.2 Distribution Pump and Pressure Relief Upgrades

Pump No. 2 is recommended to be upgraded to match the capacity of Pump No. 1 when the generator is installed. The pressure relief valve must be upgraded at the same time. The estimated cost for both of these upgrades is $50,000.

15.2.3 Reservoir Cleaning

It is recommended that both reservoirs be cleaned. The estimated cost is $5,000 (allowance for temporary pumping may be required).

16.0 Conclusion

The Aberdeen WPH is generally in good condition however, there are a few upgrades/revisions required. The Town has been doing a good job of general pumphouse operation.

We trust that the foregoing report fulfills the requirements for this assessment. If you require further information, please contact our office.

"I, the undersigned, declare that the information contained within this submission is, to the best of my knowledge, complete and accurate, and has been prepared in accordance with the standard for this submission as published by the Saskatchewan Water Security Agency."

Respectfully submitted,

Catterall and Wright

Per:

David Fong, P.Eng.

Reviewed:

Lyle McLeod, P.Eng.

Association of Professional Engineers & Geoscientists of Saskatchewan
CERTIFICATE OF AUTHORIZATION
CATTERALL & WRIGHT
Number C848
Permission to Consult held by:

Discipline	Sk. Reg. No.	Signature
CIVIL	04394	

PROFESSIONAL ENGINEER
N. L. McLEOD
MEMBER 4394
16 06 13
YR. MN. DAY
SASKATCHEWAN

Appendix A

Water Quality Data

Contents:

Table A.1 - Town of Aberdeen - Water Quality Analysis Results

	Units	Total THM	Annual Average
SDWQS MAC	mg/L		100
Date:			
	mg/L		
13-Jul-15	mg/L	48.1	47.3
22-Apr-15	mg/L	54.3	
19-Jan-15	mg/L	39.5	
15-Oct-14	mg/L	48.1	41.3
14-Apr-14	mg/L	32.1	
07-Jan-14	mg/L	43.6	
29-Oct-13	mg/L	47.7	47.0
23-Jul-13	mg/L	59.0	
22-Apr-13	mg/L	34.3	

Water quality data from www.saskh2o.ca, accessed October 23, 2015

SDWQS - Saskatchewan Drinking Water Quality Standards

MAC - Maximum Acceptable Concentration

For more detailed water quality info, refer to tests for City of Saskatoon

Appendix B

List of Plans, Reports and Manuals

Contents:

Table B.1 – List of Plans, Reports, and Manuals

Title	Consultant	Date	Comments/Description
Town of Aberdeen WTP Upgrade 1984	Catterall & Wright	1984	Reservoir expansion and plant upgrade
Town of Aberdeen Waterworks System Assessment	SAL Engineering Ltd.	2004	
WSA – Round 2	Catterall & Wright	2011	
EPO Reports		2010-2014	

Appendix C

Tables, Figures and Drawings

Contents:

Table C.1 - Town of Aberdeen - Water Usage

			Data		Calculated			Design Capacities†		
	Year	Estimated Population	Annual Water Use(m^3)	Peak Day (m^3)*	Average Day (m^3)	Peak Day Factor	Average Usage Per capita per day (Lpcd)	Supply Rate (Lps)	Distribution Pumping Rate (Lps)	Storage (m^3)
RECORDED DATA	2010	585	60,910	376	167	2.25	285	4.3	8	334
	2011	599	54,686	338	150	2.25	250	3.9	7.2	300
	2012	617	60,986	353	167	2.11	271	4.1	8	334
	2013	635	65,587	423	180	2.35	283	4.9	8.6	360
	2014	652	66,794	464	183	2.54	281	5.4	8.7	366
FORECAST/ ESTIMATE	2015	670	73,365	553	201	2.75	300	6.4	9.6	402
	2020	718	78,621	592	215	2.75	300	6.9	10.3	431
	2025	770	84,315	635	231	2.75	300	7.4	11	462
	2030	825	90,338	681	248	2.75	300	7.9	11.8	495
	2035	884	96,798	729	265	2.75	300	8.4	12.7	530
							Current	**5.6**	**12.1**	**602**

Estimated population based on Census Data from Statistics Canada and 1.4% future growth rate

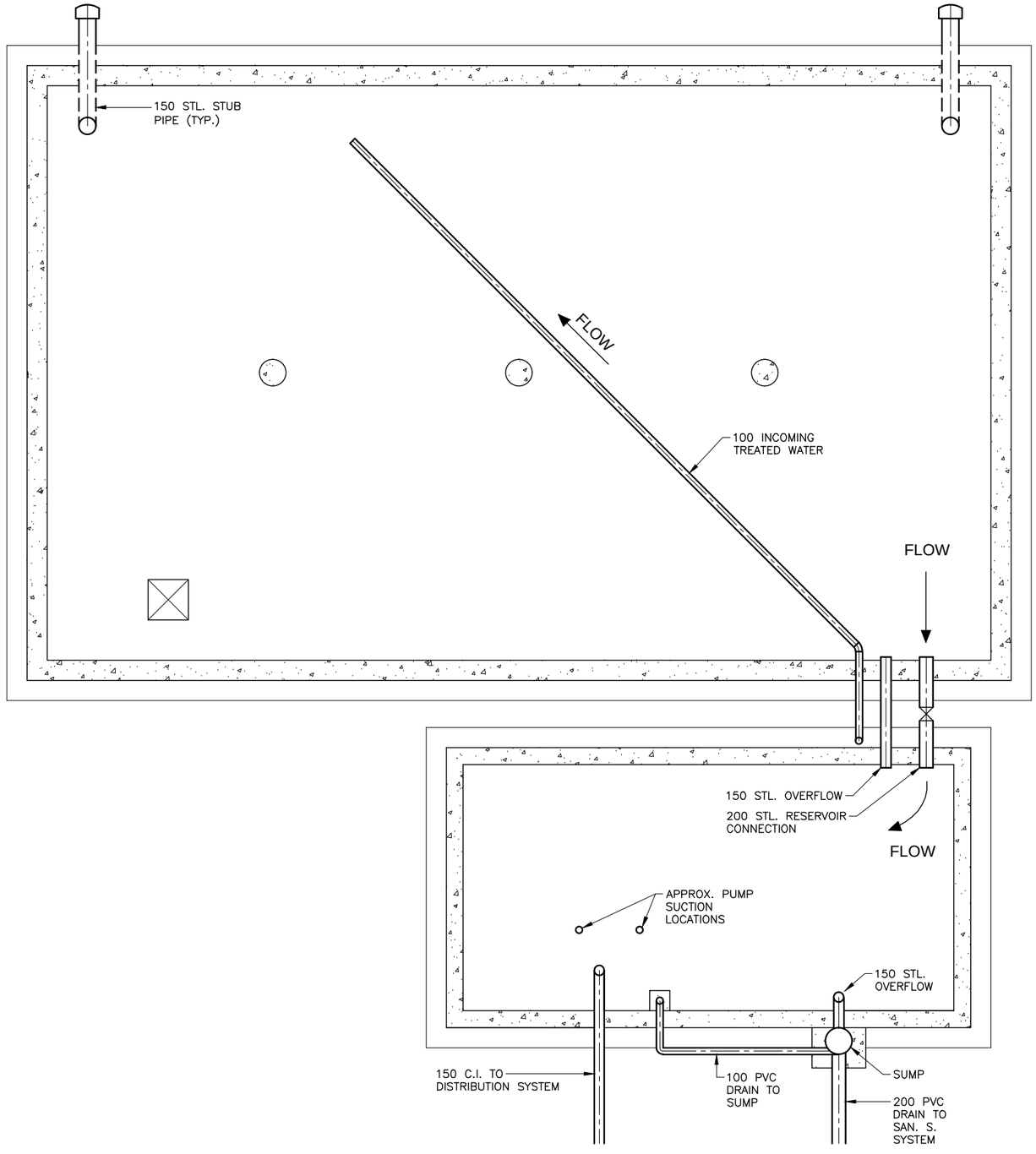
† As suggested by Saskatchewan Watershed Authority Community Water Use Records Report No. 27

Supply rate based on peak day use and 24 hour production day

Distribution pumping rate based on 4.13 times average day use

Storage based on 2 times average day use

Peak day unavailalbe for 2010-2011. Estimated using a peak day factor of 2.25



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SCALE VERIFICATION

WHEN DRAWING IS PLOTTED FULL SIZE
THIS LINE IS 30mm IN LENGTH.

DATE	REVISION

OWNER
TOWN OF
ABERDEEN

LOCATION
ABERDEEN, SK

PROJECT
WATERWORKS SYSTEM
ASSESSMENT ROUND 3

SHEET TITLE
RESERVOIR PIPING PLAN

SCALE	DESIGNED
1:75	
DRAWN	CHECKED
D.F.	S.M.
DATE	SHEET
	1 of 1

DRAWING NUMBER
FIG. C.1

Appendix D

Pictures

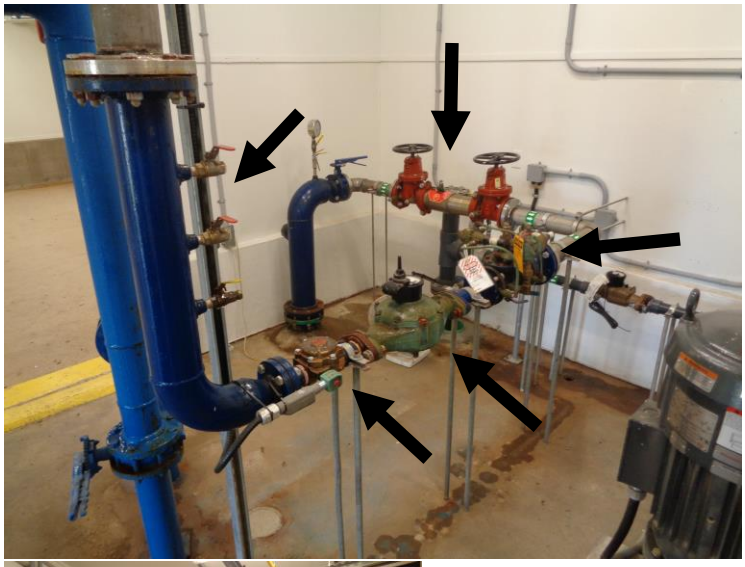


Photo 1

Water Supply Influent (Clockwise from back: backflow preventer, flow control valve, flow meter, solenoid fill valve, future chemical points of application)

Photo 2

Discharge to reservoirs

Photo 3

Distribution Pump No. 1 (left) and hydro pneumatic tank (right)

Photo 4

Pump No. 2 (electric and engine driven standby)

Photo 5

Reservoir No. 1 access – curb height extended to 150 mm

Photo 6

Reservoir No. 2 – exterior access

Photo 7
WPH exterior and exterior Reservoir No. 2

Photo 8
Upgraded electrical

Photo 9
Highway 41 Utility distribution pumps

Photo 10
Truck fill pump

Photo 11
Clockwise from bottom: Truck fill backflow preventor, extension for air release (air release not shown), flow meter

Photo 12
Truck fill exterior

Photo 13
Water testing equipment

Photo 14
Work bench space

Photo 15
Building access to original portion of building

- Rotten door frame (right)

Appendix E

C*t Calculation – Not Required

Appendix F

Waterworks Cost Analysis

Contents:

Table F.1 - Operational and Maintenance Costs

	Fixed/ Variable	2010	2011	2012	2013	2014
Personnel						
Wages and Benefits	F	$95,438.62	$119,417.96	$130,659.60	$142,912.97	$149,150.02
		$95,438.62	$119,417.96	$130,659.60	$142,912.97	$149,150.02
Professional/Contractual Services						
Street Water Repairs	V	$5,710.10	$30,789.69	$4,536.35	$9,148.19	$1,495.00
Lab Testing	F	$3,063.40	$3,672.99	$2,631.25	$1,583.01	$2,241.41
		$8,773.50	$34,462.68	$7,167.60	$10,731.20	$3,736.41
Utilities						
Heat	F	$677.92	$686.73	$764.30	$733.71	$1,054.01
Power	V	$1,752.88	$6,200.00	$1,733.05	$7,199.86	$5,883.19
Telephone	F	$0.00	$0.00	$664.08	$377.50	$437.89
SaskWater Annual Connection Fee	V	$29,348.78	$40,625.00	$37,500.00	$37,500.00	$34,375.00
SaskWater Monthly Water Charges	V	$72,819.36	$105,051.80	$123,722.76	$141,127.14	$145,413.26
		$104,598.94	$152,563.53	$164,384.19	$186,938.21	$187,163.35
Maintenance, Materials and Supplies						
Repairs, Equipment and Meters	V	$28,147.86	$1,279.66	$6,154.36	$8,783.23	$8,312.01
Small Tools and Equipment	F	$327.46	$3,600.00	$90.00	$244.21	$152.38
WTP Repairs	F	$8,144.23	$459.69	$2,801.23	$325.14	$167.09
Chemicals	V	$2,129.80	$253.42	$110.00	$154.30	$687.10
		$38,749.35	$5,592.77	$9,155.59	$9,506.88	$9,318.58
Administration						
Conference Fees/Memberships	F	$675.08	$746.94	$1,162.03	$947.66	$2,088.26
Sask Water Project Costs	V	$53.78	$13,500.00	$0.00	$0.00	$0.00
Other Misc.	V	$32,002.79	$4,895.20	$71.00	$0.00	$0.00
WSA Reporting	V	$45.00	$4,725.60	$0.00	$0.00	$0.00
Utility Billing Software	F	$0.00	$1,223.78	$0.00	$0.00	$0.00
		$32,776.65	$25,091.52	$1,233.03	$947.66	$2,088.26
Total Fixed Costs		**$108,326.71**	**$129,808.09**	**$138,772.49**	**$147,124.20**	**$155,291.06**
Total Variable Costs		**$172,010.35**	**$207,320.37**	**$173,827.52**	**$203,912.72**	**$196,165.56**
Total Annual O&M Costs		**$280,337.06**	**$337,128.46**	**$312,600.01**	**$351,036.92**	**$351,456.62**

Appendix G

Waterworks System Assessment Checklist

Round 3 Waterworks System Assessment Summary

Waterworks: Aberdeen Waterworks | Owner(s): Town of Aberdeen

Env. Project Officer: Lee Reinhart | Summary Completion Date: 20-Apr-16

Population: Full Time: 670 | Seasonal:

Source: Groundwater: ☐ | Surface Water: ☐ | GUDI (groundwater under direct influence): ☐
Treated Groundwater: ☐ | Treated Surface Water: ☒ | Treated GUDI: ☐

Sourcewater Protection Concerns: N/A

Source/Raw Water Quality Issues that May Affect Treatment/Treated Water Quality:

Parameter:	Level:	Parameter:	Level:

Raw water capacity/allocation:

Treated/Distributed Water Quality Issues (any that exceed Standards and Objectives after treatment):

Parameter:	Level:	Parameter:	Level:

List of Chemicals Used:

Description of Treatment Processes in Place:

The Town receives treated water from SaskWater and distributes to the community.

Treatment Processes with existing issues (including capacity issues):

Other issues identified within the waterworks:

- Building exterior door and lock require upgrades to ensure that building can be adequately secured.
- Reservoir No. 2 *may* require a replacement gasket at the access. Town to confirm if completed.
- The Reservoir No. 1 overflow to the sanitary sewer requires removal.
- Pump No. 2 and pressure relief valve are recommended to be upgraded at the time of the generator installation.
- Reservoir cleaning is recommended.

Major Recommendations:

- New backup generator and standby pump are recommended.

Any Recommendations that may pose an Immediate Health Concern:

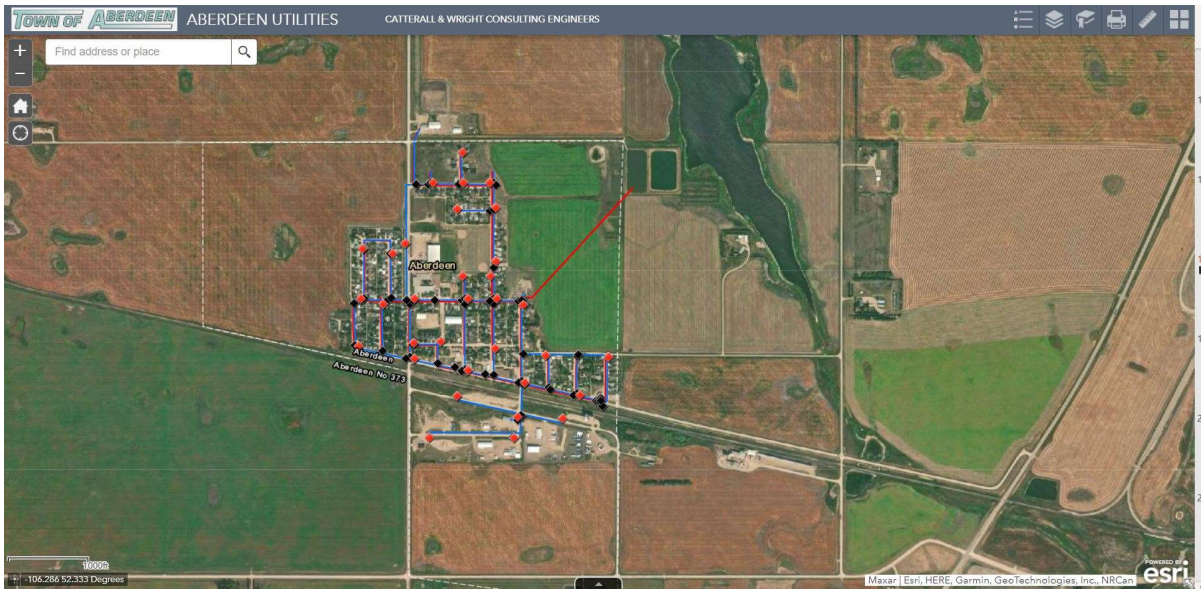
- The Reservoir No. 1 overflow to the sanitary sewer requires removal.

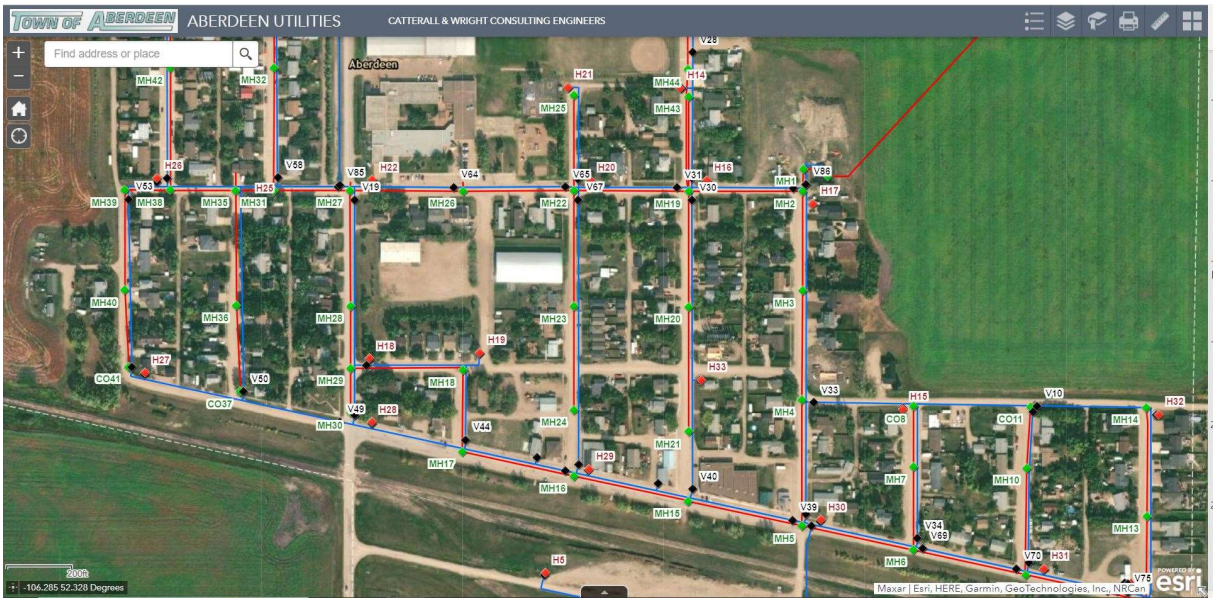
Total Cost of Recommended Upgrades: $240,000.00

Other Comments: - Total Cost of Recommended Upgrades does not include an allowance for temporary pumping. Generator and standby pump costs are included, however any further costs related to the proposed upgrades are not included as they are beyond the scope of this report.

*Please submit electronic copy to WSA. If more space is required, a longer summary sheet may be requested.

Appendix F: GIS Compiled Plan Map Images


TOWN OF ABERDEEN
ABERDEEN UTILITIES
CATTERALL & WRIGHT CONSULTING ENGINEERS
Find address or place
Aberdeen
Aberdeen
Aberdeen No 375
Maxar | Esri, HERE, Garmin, GeoTechnologies, Inc., NRCan
esri


TOWN OF ABERDEEN
ABERDEEN UTILITIES
CATTERALL & WRIGHT CONSULTING ENGINEERS
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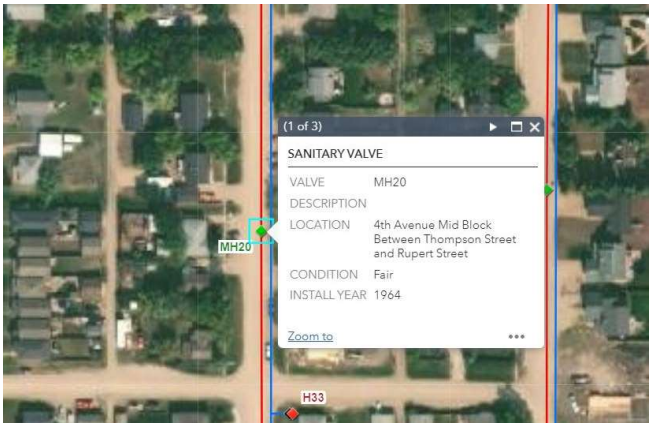
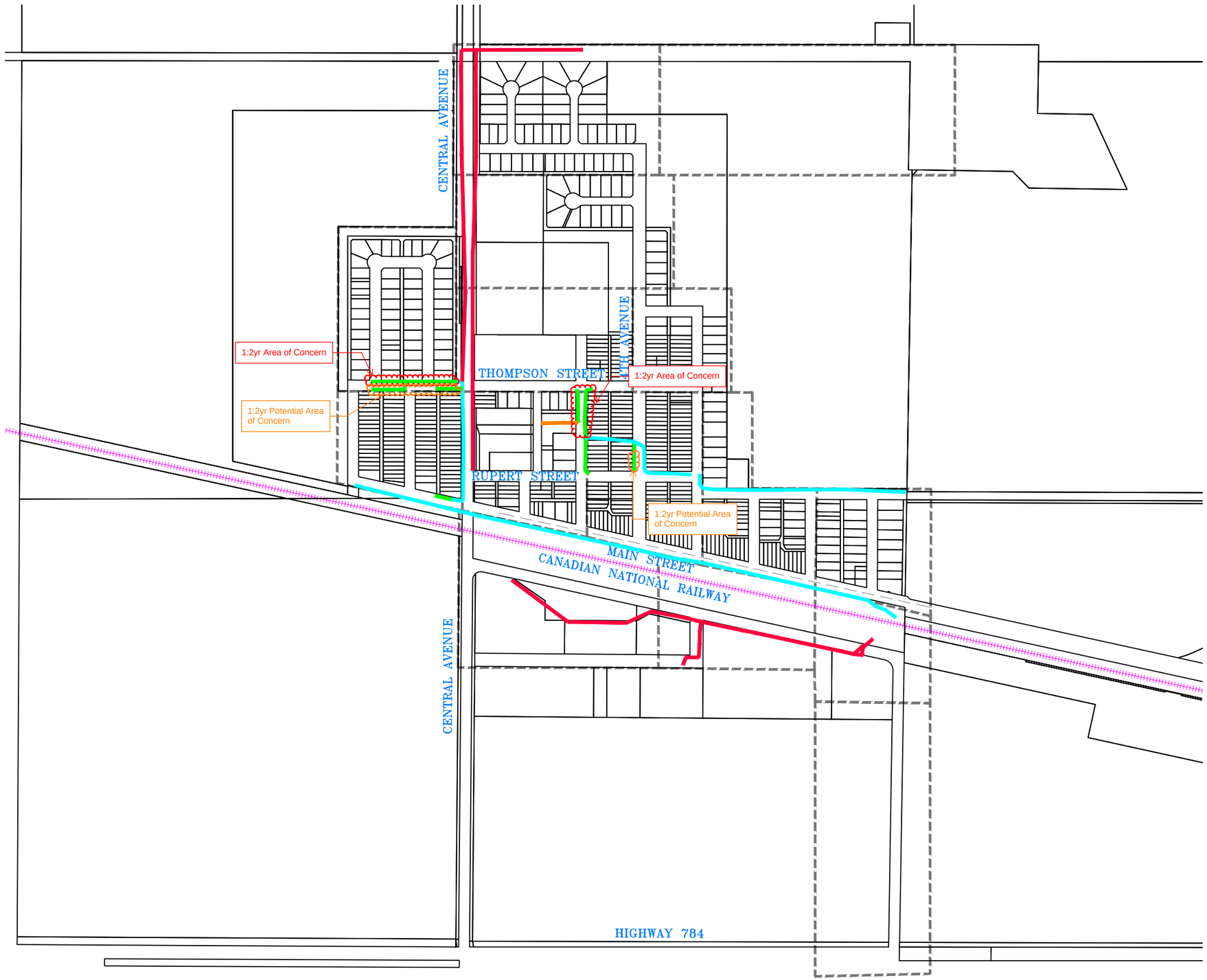
Aberdeen
Maxar | Esri, HERE, Garmin, GeoTechnologies, Inc., NRCan
esri


(1 of 3)
SANITARY VALVE
VALVE MH20
DESCRIPTION
LOCATION 4th Avenue Mid Block Between Thompson Street and Rupert Street
CONDITION Fair
INSTALL YEAR 1964
Zoom to
MH20
H33

Appendix G: Storm Water Modelling Maps

TOWN OF ABERDEEN



SCALE BAR

0 375m 750m

COMPILED BY:

CATTERALL & WRIGHT
CONSULTING ENGINEERS
1221 - 8th Street East
SASKATOON SK S7H 0S5
Tel: (306) 343-7280, Fax: (306) 956-3199

NOTE:
DATA PROVIDED COMPILED FROM SURVEY TAKEN IN THE MONTH OF MAY, 2018

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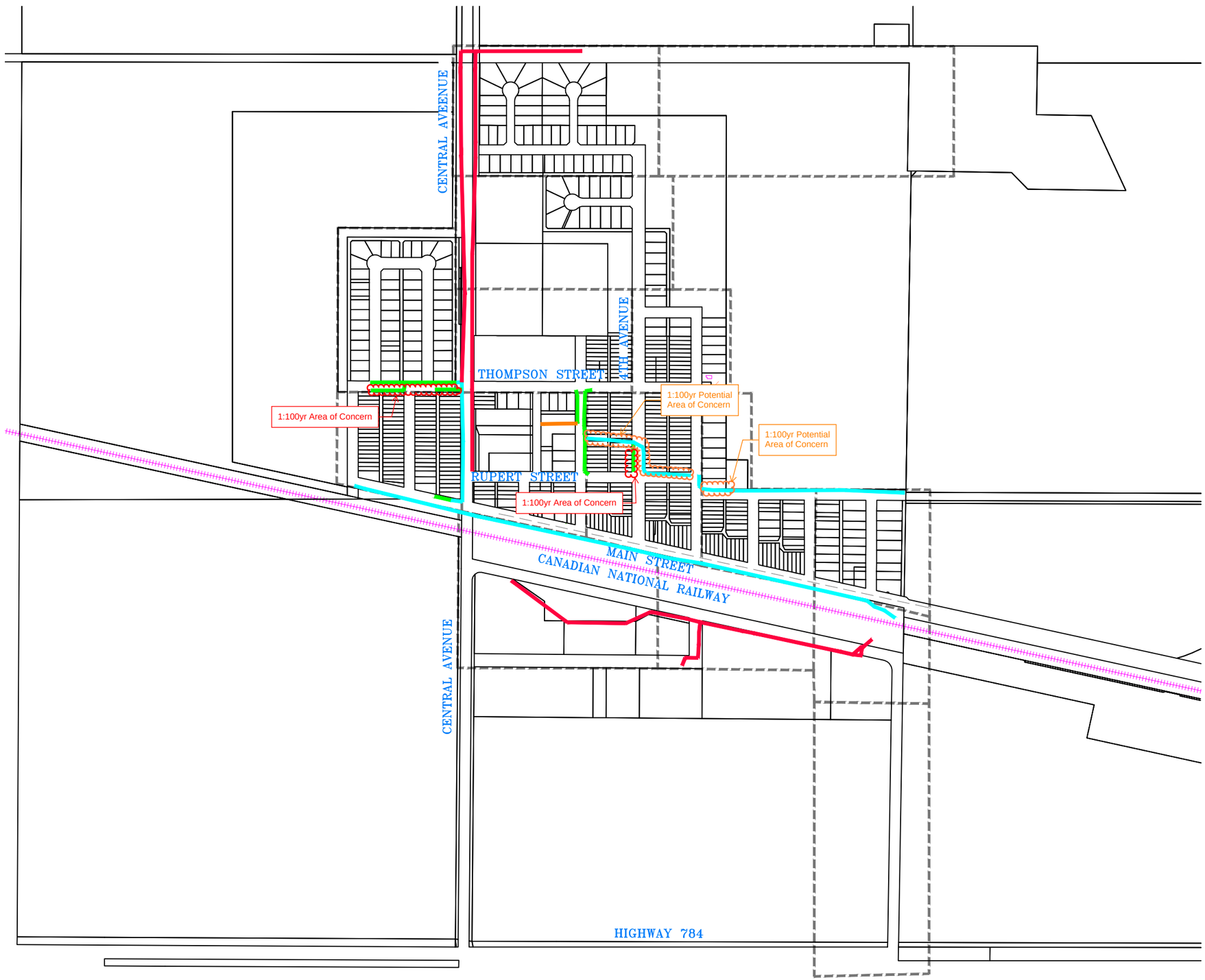
TOWN OF ABERDEEN



SCALE BAR

0 375m 750m

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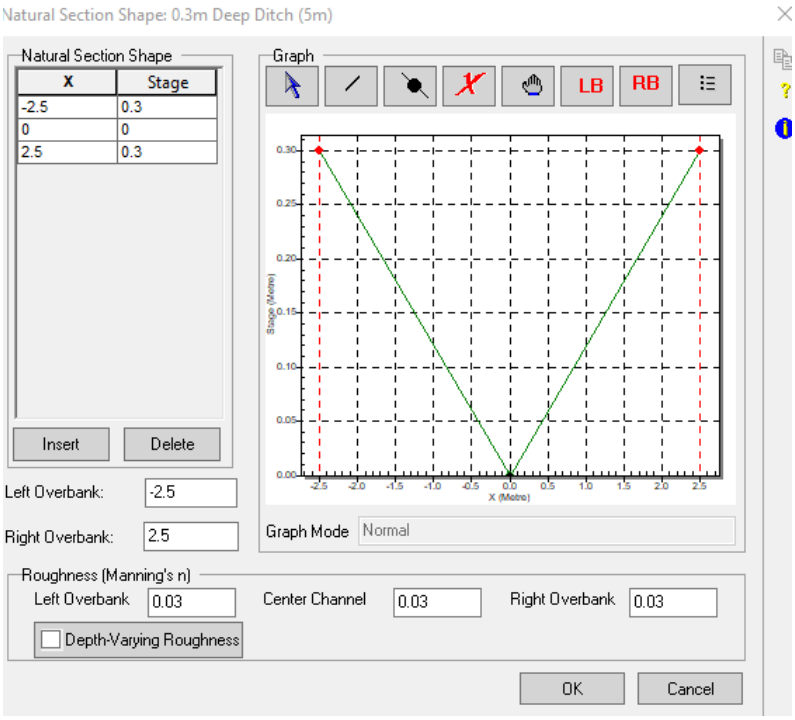

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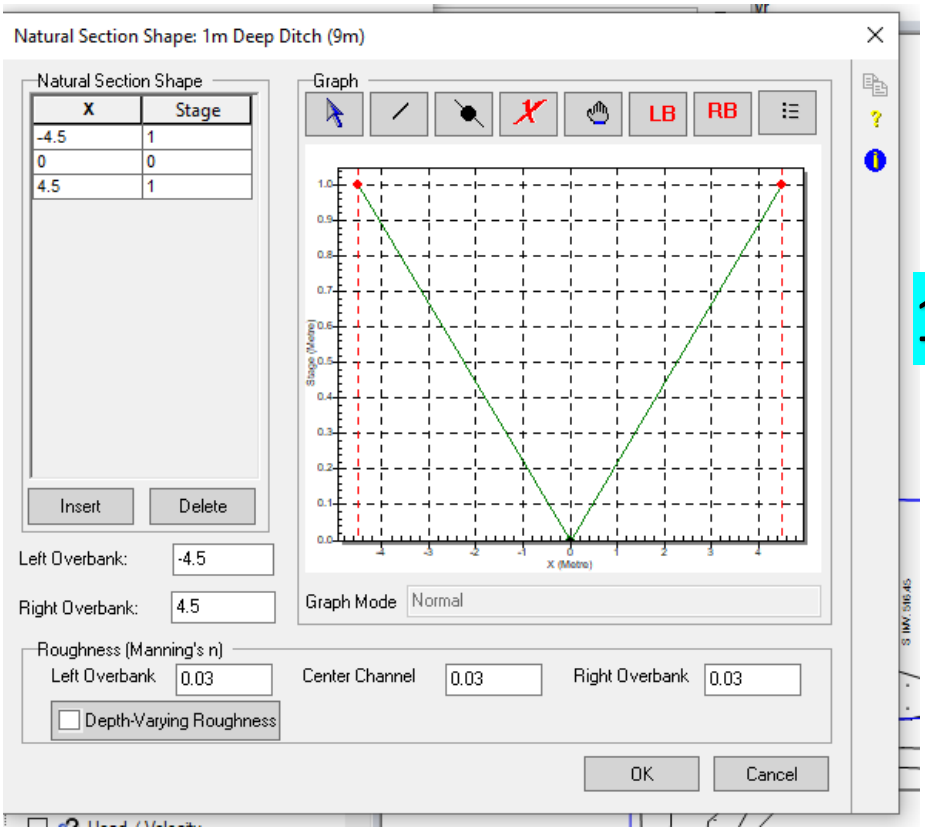
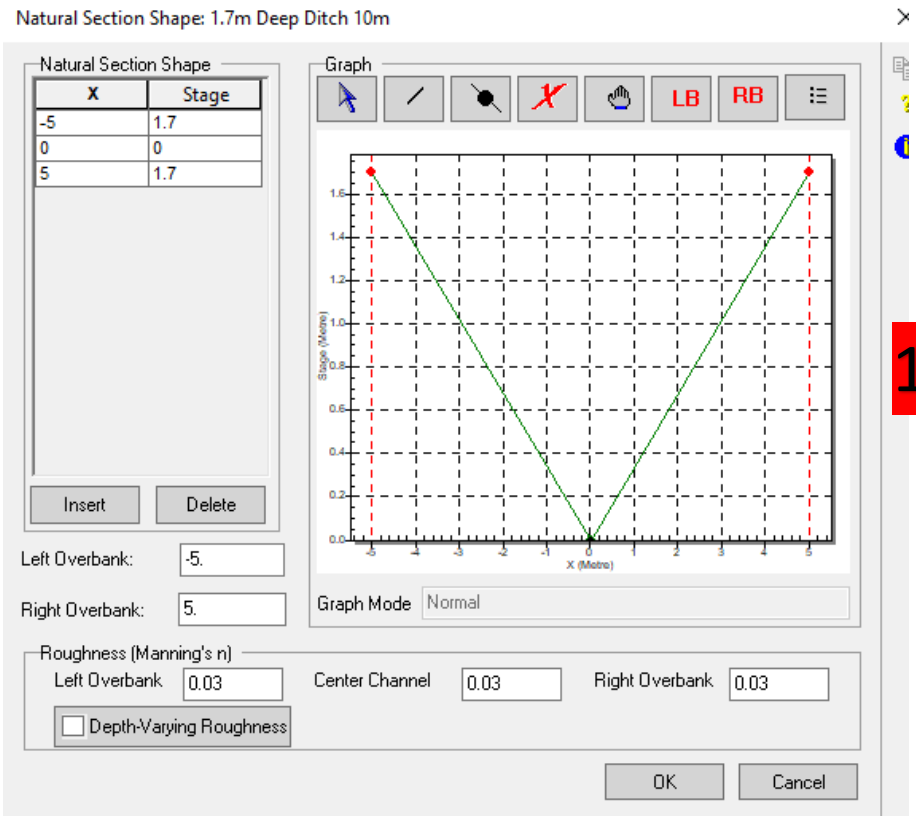
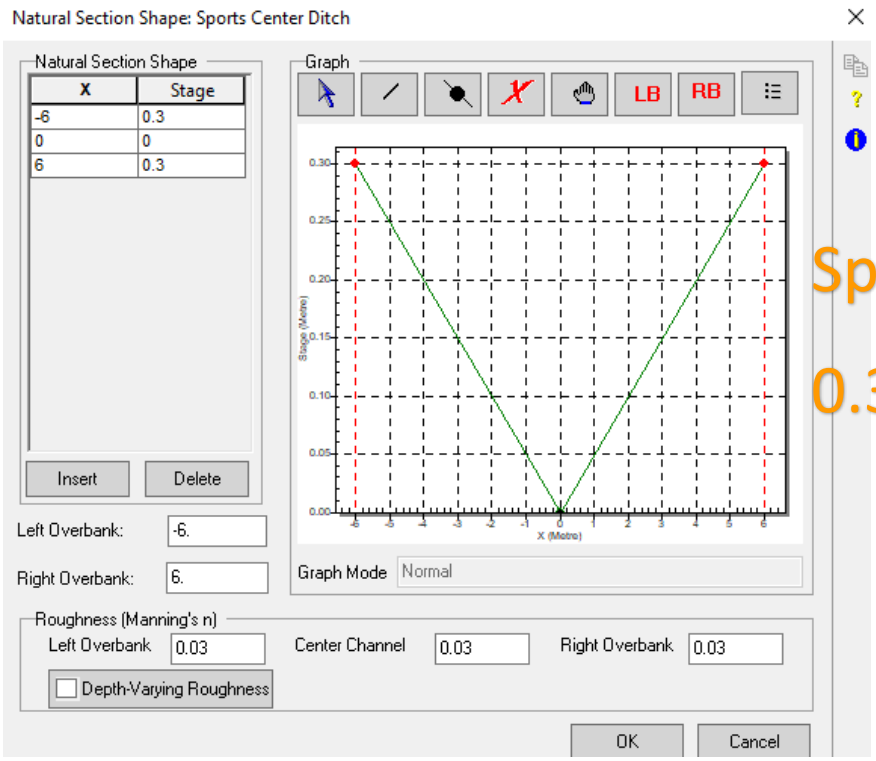


1.0m Ditch = Cyan



1.7m Ditch = Red



Sports Center Ditch

0.3m Deep = Oranage