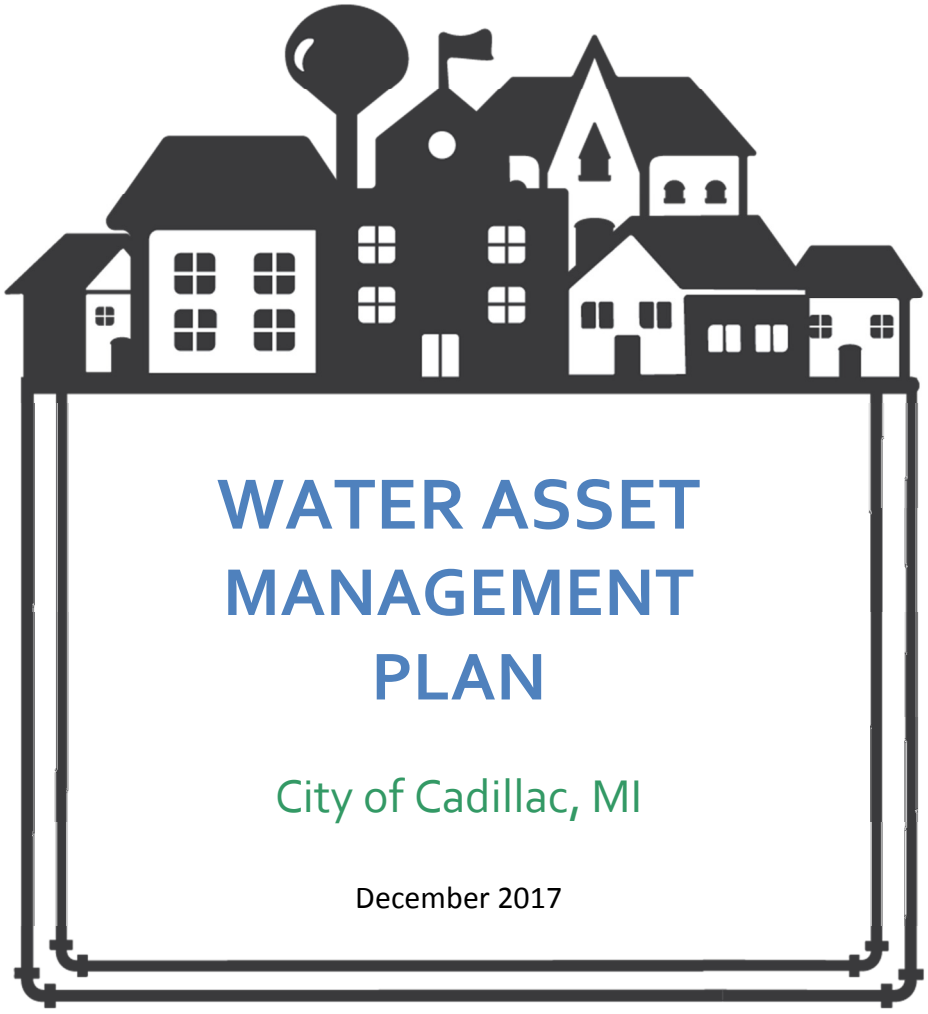

WATER ASSET MANAGEMENT PLAN

City of Cadillac, MI

December 2017

Where we're going: System Goals

INTRODUCTION

About this Document

This document is our Water Asset Management Plan. It defines the goals and guiding principles for our asset management activities. With input from our community, the Asset Management Plan will be maintained through a joint effort of our staff, administration, and elected officials. We will update our Plan on a 5 year schedule to ensure its relevancy and effectiveness.

A companion document, our Water Asset Management Program, shows how we will apply the principles of asset management to achieve the goals outlined in this Water Asset Management Plan.

Our Commitment

Our community water system is a complex set of components that we operate and maintain in a way that provides us with clean and reliable drinking water. That system includes assets such as wells which supply our water, a water treatment plant which filters and purifies the water, tanks which provide storage, and a pipe network which distributes our water. As members of our community, each one of us helps pay for the operation, maintenance, and replacement of those system assets through our utility rates. In effect, we are all owners of the water system. As the system owners, we commit to proactively manage our system assets and make decisions based on long term life cycle cost.

Asset Management Principles

All infrastructure deteriorates with age and requires proactive management to operate, maintain, repair, and eventually replace each physical component, or asset. This progression over time from routine operation and maintenance through repairs and eventual replacement is the asset's life cycle. Waiting to perform maintenance or make repairs can save money in the short term but may decrease the life cycle of an asset. On the other hand, replacing an asset before it fails may not take full advantage of the asset's value. It is this balance which puts the decisions for operations, maintenance, repair, and replacement actions at the heart of asset management.

Asset management is an evaluation of needed actions after considering the condition of an asset, the consequences of an asset failure, and the action alternatives available. The solution that provides lowest life cycle cost at the desired level of service is implemented.

Contents

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PART 1: DEFINING OUR GOALS – WHAT IS OUR DESIRED LEVEL OF SERVICE?

Our mission is to provide clean potable water for our community by proactively managing our water source, treatment, storage, and distribution assets to meet our desired level of service goals.

Our community, as the system owners, must determine the level of service we want from our system. Many factors play into this determination including: compliance with regulations, public health, aesthetics, service reliability, stable rates, etc. To this end, we have established the following primary goals:

Goal 1: Meet Regulatory Requirements

Our water system provides high-quality drinking water which meets or exceeds all regulations established in the Michigan Safe Drinking Water Act. Our system operators routinely test for contaminants in the drinking water according to Federal and State laws. We strive to achieve continued compliance with environmental regulations and provide the cleanest, safest water achievable with the treatment facilities we have.

Goal 2: Minimize Service Interruptions

Service interruptions from watermain breaks, repair operations, and asset replacements are an inevitable part of operating a water system. However, by proactively managing and investing in our system, we can minimize how often these interruptions occur.

Goal 3: Minimize Public Hazards

Watermain breaks can cause significant damage, not only to the streets above the mains but also to adjacent utilities and property. Additionally, watermain breaks may result in boil-water requirements and/or other use restrictions. The American Water Works Association offers a goal guideline of 15 watermain breaks per 100 miles of distribution watermain. Our system contains 71.3 miles of distribution of watermain and our goal is to have less than 3 breaks per calendar year.

To limit the potential damage from main breaks, we will maintain staffing levels to provide emergency response services 24 hours per day, 7 days a week.

Goal 4: Provide Enhanced-Fire Protection in the Distribution System

In accordance with the American Water Works Association Standards Manual of Water Supply Practices M31, we have oversized our drinking water system to provide water for firefighting. Our system, at a minimum, is designed to provide for the maximum expected demand for non-firefighting uses (domestic use, commercial uses, manufacturing, etc.). Although there is no legal requirement that we must oversize portions or all of our watermains or water storage to allow the use of drinking water for firefighting, we understand that oversizing can increase the amount of time water sits within the system (when we are not using it for firefighting) which can create water quality issues in the system.

Based on life cycle costs, water quality considerations, the risks in various areas of our community, and the capabilities of our fire department, we will determine what level of enhanced fire protection is desired in various areas.

Goal 5: Minimize Water Loss

Water loss is often a significant source of lost revenue. We monitor the volume of pumped water and billed water which allows an accounting of potential leaked water. Causes of known, unbilled water loss include fire-fighting, hydrant flushing, and main breaks. Other water loss may occur through inaccurate water meters and leakage in the system. The American Water Works Association notes that the average water system can expect up to 10 percent water loss on an annual basis through the various causes of water loss. We will operate and maintain our system to meet the goal of 10 percent or less of annual water loss.

Goal 6: Identify and Replace Lead/Galvanized Water Services

In the early part of the 20th Century, many water systems utilized lead and galvanized metal for water service connections. Later in time, copper services became the norm for use on the public systems. However, lead and galvanized metal may still have been used within homes beyond the point of the public service connection. Under certain conditions, lead and galvanized water services may corrode and adversely affect water quality. We will locate lead and galvanized water services and implement a program to replace them.

Goal 7: Minimize Life Cycle Costs

The best financial decisions are those which achieve the lowest life cycle costs. This means we consider the full life cycle of each investment each time we evaluate improvements to our system. It is recognized that short term fixes, while they may have lowest immediate costs, may not be the best long term financial decision. Likewise, not spending money on maintenance and repairs can provide short term cost savings but result in asset failure, ultimately increasing life cycle costs. We intend to manage our system to always pursue the lowest life cycle cost possible for each system asset.

PART 2: INVENTORY - WHAT DO WE OWN?

Our System

Our water system includes assets such as wells which supply our water, a water treatment plant which filters and purifies the water, tanks which provide storage, and a pipe network which distributes our water.

Our Plan

We intend to keep our system inventory current by maintaining records of water system construction/maintenance utilizing a Geographic Information System for mapping and a comprehensive data base for asset information. This system will include mapping of all water distribution system assets, inventory of non-pipe assets (equipment, buildings, etc.), and asset data pertinent to Operations, Maintenance, Repair, and Replacement.

PART 3: RISK OF FAILURE – WHAT ARE THE CONDITIONS OF OUR ASSETS?

Our System

To understand how long each of our assets may last, we must maintain an understanding of their condition and evaluate the potential risk for failure. We will consider functional failure of an asset to be the primary consideration for Risk of Failure. However, physical failure of an asset must also be evaluated. Water pipes, valves, hydrants, and water services can be evaluated based on break history, evidence of corrosion, and age to determine their condition. Non-pipe assets such as buildings, wells, and storage tanks can be inspected to determine their physical condition.

Our Plan

We will keep our condition assessments current by making recurring inspections of the assets at intervals frequent enough to document reasonably expected condition changes. These intervals will vary by asset type and expected asset life cycle. Once evaluations are completed, assets will be ranked based on the likelihood / risk of failure. All Risk of Failure ratings will be on a scale of 1-5 with 5 being the highest Risk of Failure.

PART 4: CONSEQUENCE OF FAILURE – WHAT HAPPENS WITH A FAILURE?

Our System

It is important that we understand the severity of consequences that may occur if any asset in our system fails. Functional failure consequences can occur when pumps stop working, valves cannot be opened/closed, and when watermains become corroded (pipe capacity is lost). Physical failure consequences can occur when we have watermain breaks or catastrophic equipment failures.

Our Plan

We will evaluate the Consequences of Failure of each asset, from both a functional and physical failure perspective. We will maintain redundancy on assets with a high Consequence of Failure. All Consequence of Failure ratings will be on a scale of 1-5 with 5 being the highest Consequence of Failure.

PART 5: CRITICALITY – HOW DO WE PRIORITIZE OUR ACTIONS?

Our System

We must prioritize the actions we need to take for our system to meet our Level of Service goals while managing our work loads, utility rates, and minimizing life cycle costs. Criticality is the product of an asset's Risk of Failure and Consequence of Failure. The Criticality of an asset should not be confused with its Consequence of Failure. Criticality, being the product of Risk and Consequence, is simply a measure of priority.

Our Plan

Criticality Ratings will be used to guide the priority of needed improvements and development of the Capital Improvement Plan. Criticality of assets within our system will be determined by multiplying each asset's Risk of Failure rating (1-5) by an asset's Consequence of Failure rating (1-5) to establish the Criticality Rating (1-25).

PART 6: CAPACITY – DO WE HAVE ENOUGH, NOW AND FOR THE FUTURE?

Our System

Our system must meet water demands both now and into the future for both typical uses and fire protection. Over time, the flow demands will change with changes in property use and population. System analysis indicates we are currently meeting typical peak demands and meet our enhanced-fire protection goals.

Our Plan

Our General Plan outlining the capacity improvements which are needed to keep up with future flow projections, peak demands, and desired fire flow supply is maintained as part of our requirements under the Safe Drinking Water Act. Additional system analysis is found in our Water System Reliability Study report.

PART 7: OPERATIONS AND MAINTENANCE – KEEPING UP WITH ROUTINE WORK

Our System

Certain portions of our system need routine/on-going service to continue functioning. Our system Operations and Maintenance (O&M) demands are relatively stable and we will manage the system to maintain that stability. We will utilize Computerized Operations Maintenance and Management tools to maintain asset inventories and schedule regular O&M activities.

Our Plan

We have established the following O&M goals:

1. Maintain staffing and equipment levels such that routine O&M activities can be accomplished by in-house staff with a maximum overtime goal of 15%.

2. Utilize in-house staff to verify proper function of all system assets such as equipment, valves, and hydrants.

3. Outside consultants/contractors will be utilized when specialized technical or equipment capabilities are required.

PART 8: CAPITAL IMPROVEMENTS – CONTINUING SYSTEM RENEWAL

Our System

A Capital Improvement Plan (CIP) for our water system is found in our most recent Water Reliability Study (WRS). That study identifies the priorities of proposed water system improvements such as watermain replacements, equipment replacements, and major O&M activities.

Our Plan

We will incorporate the recommendations of the WRS into a comprehensive Capital Improvement Plan (CIP) which will document the major projects we plan to complete within the next 10 years. The order and timing of projects will be guided by the Criticality Ratings developed during the

asset evaluation process. Project timing may also be driven by availability of outside funding sources such as loans and grants. We will maintain and update our comprehensive Capital Improvement Plan on an annual basis.

PART 9: FINANCIAL STRATEGY – RATE PLANNING AND STABILITY

Our System

All system costs are funded through our water system billings. Our billings are broken into two primary categories: Readiness to Serve (RTS) charges and Commodity charges. The RTS charges pay for the investment into the physical assets of the system such as treatment works, storage tanks, and distribution piping. Those assets must be in-place before any actual water can be used and must be maintained regardless of the amount of water used. The Commodity charge is based on the cost to supply, treat, and pump the actual water. It is the smaller of the two primary cost categories and is based on both the user category (residential, commercial, and industrial) and the actual amount of water used.

The billings also support O&M activities and payments on utility bonds (borrowed money) used to fund major system improvements.

Our Plan

We intend to maintain a life cycle forecast of anticipated costs, income from rates, and cash balances. We will use this forecast to establish sustainable and stable utility rates. This in turn helps our residential, business, and industrial owners in their individual, long-term financial planning.

We intend to fund system O&M on a cash basis through the rate structure and intend to maintain minimum cash balance equal to 6 months of standard O&M. This will also allow us to cash fund emergency repairs and minor unanticipated asset repairs/replacements.

We intend to also cash fund planned system repairs and replacements if that can be accomplished with a stable rate structure and appropriate cash balances. Significant expenditures may be bond financed to stabilize rate impacts and maintain reasonable cash balances.

SUMMARY

Our Asset Management Plan is a compilation of goals to guide us in maintaining a reliable water system. By achieving these goals, our utility system will be proactively managed to provide the Desired Level of Service for the lowest possible long term cost.

WATER ASSET MANAGEMENT PROGRAM

City of Cadillac, MI

December 2017

How we'll get there: The Action Plan

INTRODUCTION

About this Document

This document is our Water Asset Management Program. It is an internal document which defines how we will apply the principles of asset management to achieve the goals outlined in our Water Asset Management Plan.

The Asset Management Program will be maintained through a joint effort of our staff and administration. We will update our program on an annual basis to ensure its relevancy and effectiveness.

Our Commitment

Our community water system is a complex set of components that we operate and maintain in a way that provides us with clean and reliable drinking water. That system includes assets such as wells which supply our water, a water treatment plant which filters and purifies the water, tanks which provide storage, and a pipe network which distributes our water. As members of our community, each one of us helps pay for the operation, maintenance, and replacement of those system assets through our utility rates. In effect, we are all owners of the water system. As the system owners, we commit to proactively manage our system assets and make decisions based on long term life cycle cost.

Asset Management Principles

All infrastructure deteriorates with age and requires proactive management to operate, maintain, repair, and eventually replace each physical component, or asset. This progression over time from routine operation and maintenance through repairs and eventual replacement is the asset's life cycle. Waiting to perform maintenance or make repairs can save money in the short term but may decrease the life cycle of an asset. On the other hand, replacing an asset before it fails may not take full advantage of the asset's value. It is this balance which puts the decisions for operations, maintenance, repair, and replacement actions at the heart of asset management.

Asset management is an evaluation of needed actions after considering the condition of an asset, the consequences of an asset failure, and the action alternatives available. The solution that provides lowest life cycle cost at the desired level of service is implemented.

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Our community, as the system owners, must determine the level of service we want from our system. Many factors play into this determination including: compliance with regulations, public health, aesthetics, service reliability, stable rates, etc. To this end, we have established primary system goals in a separate document titled as our Water Asset Management Plan. This document, our Water Asset Management Program, identifies how we plan to meet our goals:

Goal 1: Meet Regulatory Requirements

We will have a minimum of 1 certified water system operators to provide staff coverage, quality control cross checking, and broadened institutional knowledge.

We will perform the required testing in-house by maintaining a laboratory testing space and maintain a certified laboratory.

We will continue to use a third-party for blind tests and specialized testing.

We will maintain a cross-connection elimination program.

Goal 2: Minimize Service Interruptions

We will monitor and maintain all of our water supply, treatment, and distribution system assets such that there are no interruptions in system operation that are reasonably preventable.

We will maintain service crew levels to ensure continued operations and maintenance activities such that no more than 10 emergency responses per year are required.

Goal 3: Minimize Public Safety Hazards

Water system assets that are significantly affected by environmental conditions (freezing, heating, corrosion) will be improved / replaced so as to minimize their failure vulnerability.

Our 24 hour emergency response services will be equipped and staffed to provide maximum 30 minute response times to main breaks and major equipment failures. We will strive to limit the duration of individual service interruptions to less than 6 hours whenever possible. Staff will be provided cell phones, e-mails, radios, and /or other contact mechanism to be notified when a response is required.

Goal 4: Provide Enhanced-Fire Protection in the Distribution System

Enhanced fire protection in accordance with American Water Work Association, AWWA, standards Manual M31 will be provided as noted for the following areas:

- Low and Medium Density Residential : No enhanced protection
- High Density Residential: Up to 1,500 gallon per minute for 2 hours
- All commercial/industrial: Up to 2,500 gallons per minute for 2 hours

Goal 5: Minimize Water Loss

We will implement a water efficiency program to track the actual lost water. Once water loss causes are identified and quantified, we will implement corrective measures such as main replacement and meter replacement to meet our water loss goal.

We will maintain a water meter replacement program. Replacement of meters are initiated upon complaints or when leaking or malfunctioning meters are identified. Maintaining meter records and developing a systematic plan to change out meters helps maintain accurate water billing and can provide a significant increase in system revenue. As part of this effort, we evaluate meter technologies that relate to accuracy, labor efficiency and cost effectiveness. Meter replacement will be made with either new or refurbished meters with the goal of providing more accurate billings to our system owners and to help minimize revenue loss. The replacement schedule goals are within 15-years for business/commercial and industrial facilities and within 15-years for residential meters.

Goal 6: Identify and Replace Lead/Galvanized Water Services

We will maintain our water chemistry to minimize the corrosion potential in the various water service materials.

Lead and galvanized metal services within the public portions of system will be replaced when road replacement projects or work on other assets impact the immediate area where lead/galvanized services are found to exist. It is the City's policy to replace with copper if found.

Every 3 years, the City offers free testing of homes that are reasonably suspect of possibly having those types of lines or services on their private property outside of the City right-of-way or within their homes/businesses.

Goal 7: Minimize Life Cycle Costs

We will implement asset condition tracking and criticality assessments to determine the optimum time for asset maintenance and/or replacement. Decisions will be made which strike a balance between maximizing the life cycle use of all assets, the risk of failure of the assets, and the consequence of failure of the assets.

PART 2: INVENTORY - WHAT DO WE OWN?

Our System

Our water system includes assets such as wells which supply our water, a water treatment plant which filters and purifies the water, tanks which provide storage, and a pipe network which distributes our water. Cast iron pipe was the dominant choice for water construction in North America for many decades. Cast iron pipes are subject to internal corrosion (rusting) and can be prone to cracking. In more recent decades, ductile iron and plastic water pipes have become the standards in new watermain construction. Watermains made from these newer materials are expected to outlast their cast iron predecessors and as time continues, there is more data being gathered regarding the potential failure modes of those materials.

The majority of our watermains which were installed from the 1950's through 1970's are made of cast iron pipe material. Pipes installed after 1980 are made of ductile.

A detailed summary of our water system assets is found in our Water Reliability Study (WRS) as well as in a detailed asset inventory maintained by our Distribution and Collection Division in a General Plan as required by the Safe Drinking Water Act.

A history on non-pipe assets is maintained by our Distribution and Collection Division, and generally includes date of purchase, purchase costs, inspection reports, repair history, maintenance schedule, and specifications.

Our Plan

We will keep our system inventory current by keeping records of water system construction with the use of our Geographic Information System (GIS). This system will include mapping of all water distribution system assets, inventory of non-pipe assets (equipment and buildings), and asset data pertinent to Operations, Maintenance, Repair, and Replacement.

Our Program

When the water system is altered, either by construction of new assets or rehabilitation/replacement of existing assets, we will maintain records of each water project in our GIS system.

Distribution System

We will maintain data on pipe materials, installation dates, sizes, and any other pertinent information which will assist with our asset management program. Pipe locations will be determined based on record drawing information.

Hydrants and valves locations will initially be identified using base aerial photography and field observations. As time and budget permit, we will utilize either handheld GPS or survey GPS to collect and refine locational data.

Assets within our pumping stations will be tracked using Computerized Operations Maintenance and Management tools to maintain asset inventories, schedule regular O&M activities, and create financial projections for future replacement. We will utilize the Antero CMMS software as well as continue to use customized spreadsheets.

We will also collect locational data on water services for tap and curb box locations. Other data such as size, material, and installation date will also be documented in our GIS system.

Water Supply

We will maintain GIS locational data on each well in our system. Other well data such as depth, diameter, capacity, and installation dates will also be maintained.

Our surface water intake locations(s) will be identified in our GIS system.

Water Treatment and Water Storage

Our treatment/storage facility locations will be identified in our GIS system. Assets within our treatment system will be tracked using Computerized Operations Maintenance and Management tools to maintain asset inventories, schedule regular O&M activities, and create financial projections for future replacement. We will utilize the Antero CMMS software as well as customized spreadsheets.

Other Assets

We will maintain active inventories of assets such as trucks, loaders, generators, backhoes, or any other functionally or financially significant assets. Informational data such as manufacture date, purchase price, maintenance budget, and warranty information will be tracked.

In this way, the GIS database will be kept up to date and serve as a complete record of the current water system inventory. We will use this inventory and database to operate and manage our system.

PART 3: RISKS OF FAILURE – IN WHAT CONDITION ARE OUR ASSETS?

Our System

To understand how long each of our assets may last, we must maintain an understanding of their condition and evaluate the potential risk for failure. We will consider functional failure of an asset to be the primary consideration for Risk of Failure. However, physical failure of an asset must also be evaluated. Water pipes, valves, hydrants, and water services can be evaluated based on break history, evidence of corrosion, and age to determine their condition. Non-pipe assets such as buildings, wells, and storage tanks will be inspected to determine their physical condition.

Our Plan

We will keep our condition assessments current by making recurring inspections of the assets at intervals frequent enough to document reasonably expected condition changes. These intervals will vary by asset type and expected asset life cycle. Once evaluations are completed, assets will be ranked based on the likelihood / risk of failure. All Risk of Failure ratings will be on a scale of 1-5 with 5 being the highest Risk of Failure.

Our Program

We will assess water pipe conditions on a regular basis based on break/repair records, break history, material, and age. All system data for the distribution network, including Risk of Failure ratings, will be maintained within a GIS database.

We will exercise hydrants and valves yearly to insure they are properly working. All data for these assets will be maintained within a GIS database.

Production wells, storage tanks, buildings, and water meters condition information will be kept up to date as part of routine operations.

Higher consequence of failure items may be inspected or assessed more frequently.

PART 4: CONSEQUENCE OF FAILURE –WHAT HAPPENS WITH A FAILURE?

Our System

It is important that we understand the severity of consequences that may occur if any asset in our system fails. Functional failure consequences can occur when pumps stop working, valves cannot be opened/closed, and when watermains become corroded (pipe capacity is lost). Physical failure consequences can occur when we have watermain breaks or catastrophic equipment failures.

Our Plan

We will evaluate the Consequences of Failure of each asset, from both a functional and physical failure perspective. We will maintain redundancy on assets with a high Consequence of Failure. All Consequence of Failure ratings will be on a scale of 1-5 with 5 being the highest Consequence of Failure.

Our Program

It is important that we understand the severity of consequences that may occur if any asset in our system fails. Functional failure considerations include potential health risks, service interruption, and damage to connected assets. Physical failure considerations include damage to adjacent infrastructure, environmental damage, and property damage. Each of these factor will be considers separately and then compiled into a single Consequence of Failure (CoF) rating for each asset.

For the distribution system watermains, all data for the CoF factors will be maintained in the GIS database. For all other assets, CoF factors will be maintained in either the Antero CMMS software or in customized asset spreadsheets.

Consequence of Failure

5	Unacceptable Impacts
4	Critical Impacts
3	Significant Impacts
2	Minor Impacts
1	Redundant System or No Impacts

PART 5: CRITICALITY – HOW DO WE PRIORITIZE?

Our System

We must prioritize the actions we need to take for our system to meet our Level of Service goals while managing our work loads, utility rates, and minimizing life cycle costs. Criticality is the product of an asset's Risk of Failure and Consequence of Failure. The Criticality of an asset should not be confused with its Consequence of Failure. Criticality, being the product of Risk and Consequence, is simply a measure of priority.

Our Plan

Criticality Ratings will be used to guide the priority of needed improvements and development of the Capital Improvement Plan. Criticality of assets within our system will be determined by multiplying each asset's Risk of Failure rating (1-5) by an asset's Consequence of Failure rating (1-5) to establish the Criticality Rating (1-25).

Our Program

The condition of the asset, and therefore its Risk of Failure, will change over time. Additionally, the Consequences related to failure may also change. We will review the criticality of each asset on an annual basis and make adjustments to account for these changes. As with all the components of the Asset Management program, the criticality analysis is an on-going process. We will keep our criticality assessments current after performing repairs, improvements, or inspections. When evaluating the criticality of an asset, we also consider redundancy as this can significantly reduce the Consequence of Failure of an individual asset. We will use our criticality assessments when establishing priorities regarding maintenance, repairs, and capital improvements.

PART 6: CAPACITY – DO WE HAVE ENOUGH, NOW AND FOR THE FUTURE?

Our System

Our system must meet water demands both now and into the future for both typical uses and fire protection. Over time, the flow demands will change with changes in property use and population. System analysis indicates we are currently meeting typical peak demands and meet our enhanced-fire protection goals. A detailed analysis of our system capacity is found in our Water System Reliability Study report.

Our Plan

Our General Plan outlining the capacity improvements which are needed to keep up with future flow projections, peak demands, and desired fire flow supply is maintained as part of our requirements under the Safe Drinking Water Act. Additional system analysis is found in our Water System Reliability Study report.

Our Program

We will update our General Plan and Water System Reliability Study report in accordance with current regulations. The evaluations will include review of the distribution system, source and treatment system and storage requirements under maximum day demands and desired fire flow.

We will monitor water use for consistency with the water system's General Plan. As water uses change and connections are added or changed, the system demands will be monitored. If significant changes in system flow occur, the General Plan and Reliability Study will be updated to account for these changes.

System improvement needs identified in the Water Reliability Study will be integrated into the comprehensive Capital Improvement Plan.

PART 7: OPERATIONS AND MAINTENANCE – KEEPING UP WITH ROUTINE WORK

Our System

Certain portions of our system need routine/on-going service to continue functioning. Our system Operations and Maintenance (O&M) demands are relatively stable and we will manage the system to maintain that stability. We will utilize Computerized Operations Maintenance and Management tools to maintain asset inventories and schedule regular O&M activities.

Our Plan

We have established the following O&M goals:

1. Maintain staffing and equipment levels such that routine O&M activities can be accomplished by in-house staff with a maximum overtime goal of 15%.

2. Utilize in-house staff to verify proper function of all system assets such as equipment, valves, and hydrants.

3. Outside consultants/contractors will be utilized when specialized technical or equipment capabilities are required.

Our Program

Staffing and Equipment

We will monitor crew workloads and production rates to establish general workload goals for our crews. This will include periodic review of crew size, methods, and equipment in an effort to maximize staff efficiency and effectiveness. Equipment ownership versus rental will be evaluated based on an annual cost of service basis. Staffing levels will be adjusted based on normalized workload projections and workload goals to meet utilization goals.

Water System Flushing

We will perform system flushing on all hydrants on a twice-annual basis, once in the spring and once in the fall. A detailed flushing plan will be maintained by the Distribution and Collection Division.

We will exercise each system valve on a once-annual basis.

Valves or hydrants requiring repairs will be identified and scheduled for repair within three months of being identified or as soon as seasonal weather allows.

Data relative to hydrant flushing and valve exercising will be maintained in the GIS database.

Production Wells, Storage Tanks and Treatment Facilities

We will continue operating these facilities and perform maintenance in accordance with site specific operations and maintenance plans for each of these assets. This includes having the wells inspected every 7 years (1 per year) and storage tanks every 5 years by a trained expert. Operations and maintenance manuals will be kept on file to document all maintenance performed and list of recommended scheduled maintenance.

Supporting Assets

We plan to renew our maintenance equipment and other supporting assets on a scheduled replacement cycle. This will allow us to keep reliable equipment in service for operating and maintaining the system to achieve our level of service goals.

Water System Management

We will monitor the break history of the watermains and record the date and locations of such breaks using the GIS system. We will track maintenance activities to identify assets requiring higher than expected maintenance levels.

We will perform O&M activities to extend the useful life of these assets until complete rehabilitation or replacement of the asset is more cost effective. We will use our software systems to manage this data and keep our planned activities up to date. We will maintain regularly scheduled O&M activities, plan/schedule appropriate replacements, and coordinate activities with work on other assets that share common space (i.e. within the same road right-of-way)

PART 8: CAPITAL IMPROVEMENTS – CONTINUING SYSTEM RENEWAL

Our System

A Capital Improvement Plan (CIP) for our water system is found in our most recent Water Reliability Study (WRS). That study identifies the priorities of proposed water system improvements such as watermain replacements, equipment replacements, and major O&M activities.

Our Plan

We will incorporate the recommendations of the WRS into a comprehensive CIP which will document the major projects we plan to complete within the next 10 years. The order and timing of projects will be guided by the Criticality Ratings developed during the asset evaluation process. Project timing may also be driven by availability of outside funding sources such as loans and grants. We will maintain and update our comprehensive Capital Improvement Plan on an annual basis.

Our Program

Planning for capital improvements is a continual management process. The Capital Improvement Plan shows our foreseeable project priorities based on the information we have available now. Our CIP will be adjusted annually and will consider the following influences:

- Outside funding sources (grants and loans) may become available for certain types of projects from time to time. When this happens, we will reprioritize to make best use of available funds.
- Adjustment of asset condition assessments.
- Changes in economic conditions such as costs of materials, labor, and financing.
- Coordination with road work and other utility work may require adjustments in timing of water system improvements. Roadway conditions can dramatically change with severe weather seasons. Where utility projects require excavation below streets, coordinating utility and road projects is essential to achieve the lowest life cycle cost. As roadway conditions change and paving plans are revised, the water system plans will be adjusted.

We will keep the Capital Improvement Plan up to date by taking the following steps annually:

- Adjust the cost estimates for capital projects based on current market pricing.
- Reconsider capital improvements priorities based on any updated criticality assessments.
- Reconsider implementation years for upcoming capital projects to coordinate with changing conditions of roads and other utilities.
- Adjust our financial forecast based on number of users, current rates, and cash balances.

- Adjust the utility rates according to these changed conditions, to stay consistent with established long term financial strategy.
- We will make miscellaneous system repairs which are small enough to be accomplished without engineered project plans or project specific budgeting on an as-needed basis. We will continue budgeting for such repairs based on prior year expenses and known system repair needs. When making decisions on system repairs, we will consider the criticality assessments as well as planned rehabilitation and replacement projects. We will perform proactive repairs with in-house staff and equipment as to the ability of staff and the available resources. Proactive repairs outside the available staff resources or abilities will be contracted out.
- We will fully rehabilitate or replace pipes, hydrants, production wells, and elevated storage tanks when doing so would provide the lowest life cycle cost. Such projects are identified in our Capital Improvement Plan.

PART 9: FINANCIAL STRATEGY – RATE PLANNING AND STABILITY

Our System

All system costs are funded through our water system billings.

Our Plan

We intend to maintain a life cycle forecast of anticipated costs, income from rates, and cash balances. We will use this forecast to establish sustainable and stable utility rates. This in turn helps our residential, business, and industrial owners in their individual, long-term financial planning.

We intend to fund system O&M on a cash basis through the rate structure and intend to maintain minimum cash balance equal to 6 months of standard O&M. This will also allow us to cash fund emergency repairs and minor unanticipated asset replacements.

We intend to also cash fund planned system repairs and replacements if that can be accomplished with a stable rate structure and appropriate cash balances. Significant expenditures may be bond financed to stabilize rate impacts and maintain reasonable cash balances.

Our Program

We will maintain a life cycle forecast of anticipated costs, income from rates, and cash balances. The early years of the forecast are tabulated from our CIP cost estimates while the later years of the forecast are projected from the system inventory and life cycle data. We will use this forecast to establish sustainable and stable utility rates.

We will fund system operations and maintenance on a cash basis through the rate structure and will maintain a minimum cash balance as set by the system goals.

We will also cash fund planned system repairs and replacements if that can be accomplished with a stable rate structure and cash balances not exceeding our base cash balance by a factor of 2.5. Significant expenditures may be bond financed to stabilize rate impacts and maintain reasonable cash balances. We will maintain and update our CIP plan annually, and review it with our financial advisor to confirm rates and cash balances are acceptable.

We will also implement standard, annual rate changes that, at a minimum, parallel inflation so as to foster a stable rate structure.

To keep the financial strategy on track with changing conditions, we plan to make the following updates each year:

- Update all spending and income projections
- Adjust or reaffirm the long term financial strategy
- Implement updated user rates.

SUMMARY

Our Asset Management Program outlines how we will achieve our Asset Management Plan goals. It may be adjusted from time to time based as new/improved tools, software, and evaluation techniques are developed. Regardless of those changes, we will incorporate Asset Management into our everyday activities, including implementation of system improvements and our system master planning. The current level of completion of these goals can be found in our Water Reliability Study. By proactively managing our water system, we will be able to achieve our Desired Level of Service for the lowest possible long term cost.

The following table notes tentative start dates for each of the noted major activities:

Activity	**Estimated Start**
Inventory	On-going
Condition Assessment	On-going
Criticality Determination	August 2018
Capacity Analysis	October 2018
Capital Improvement Plan	January 2018

Special Programs	**Estimated Start**
Water Efficiency	On-going
Meter Replacement	On-going
Lead/Galvanized Services	On-going

CAPITAL IMPROVEMENT PLAN (WATER)

City of Cadillac
Wexford County, Michigan

December 2017

CONTENTS

Prepared by

ENGINEER:
Prein&Newhof
[2170378]

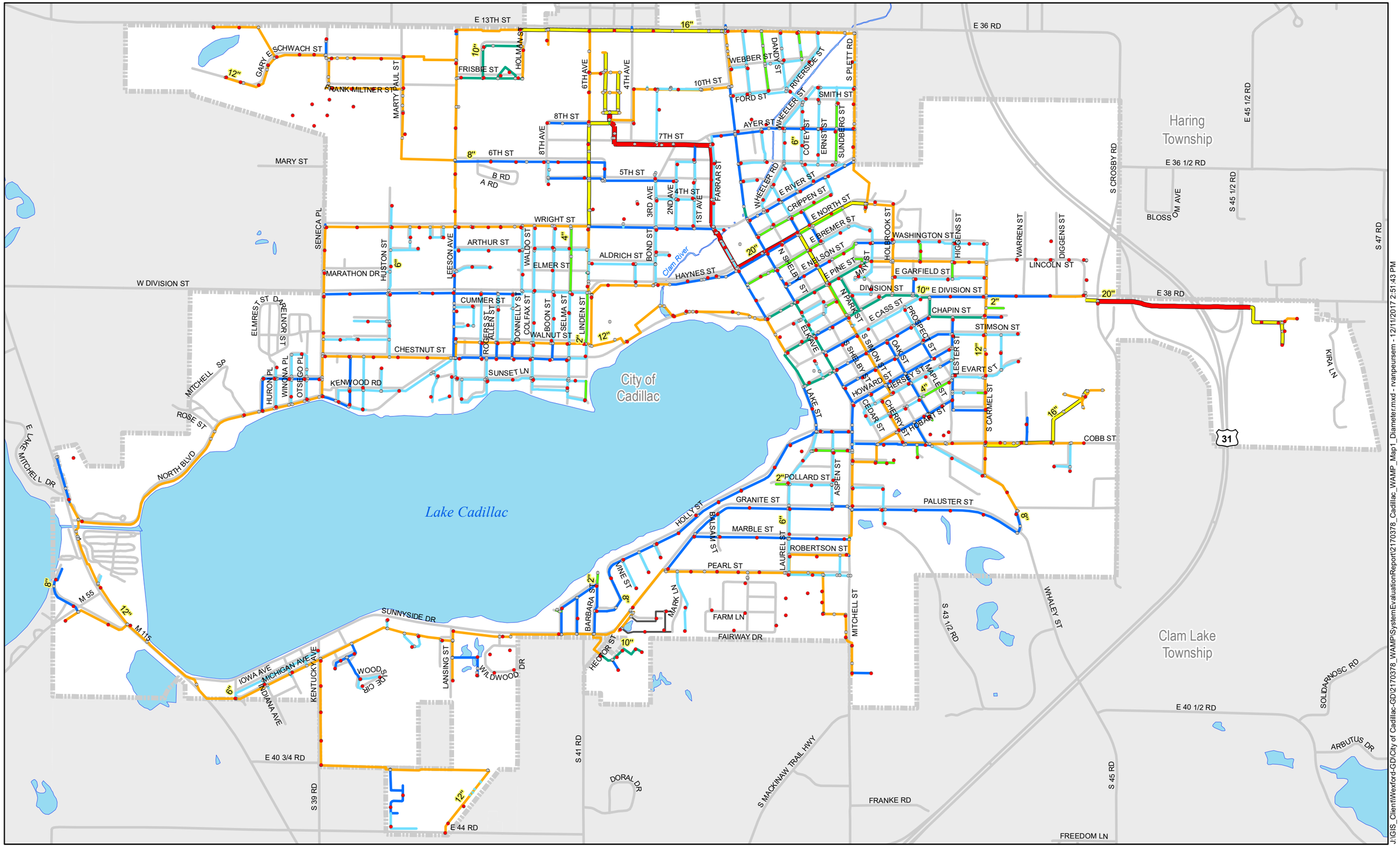
INTRODUCTION

The City of Cadillac's public infrastructure includes drinking water supply and delivery systems, storm drainage systems, and public streets. These systems are aging and certain parts need to be repaired or replaced to keep up with deterioration over time. This capital improvement plan focuses on the water supply and delivery system only.

Waiting until something breaks to make emergency repairs is expensive. A more proactive approach can minimize life cycle costs using the following steps:

- Evaluate the condition and capacity of assets to determine the needs.
- Implement a maintenance program for the small needs.
- Implement a Capital Improvement Plan for the big needs.
- Develop financial strategies to fund all planned work before needs become emergencies.

The City of Cadillac is actively managing the needs of these systems. The needs have been evaluated and financial strategies have been considered. All non-pipe assets above $5000 were inspected and recorded for financial analysis. Assumptions were made using the best available information to estimate unknown pipe and non-pipe asset data. This Capital Improvement Plan presents the City of Cadillac's infrastructure priorities that have been established within a 20-year planning period, a timeline for accomplishing the needed improvements, and a financial strategy to implement the plan.



Feet
1,500 750 0 1,500

LEGEND

Water Main Diameter

- 4" and less
- 6"
- 8"
- 10"
- 12"
- 16"
- 20"

- Hydrants
- Valves
- Private Main

CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM

MAP 1: DIAMETER

DECEMBER 2017

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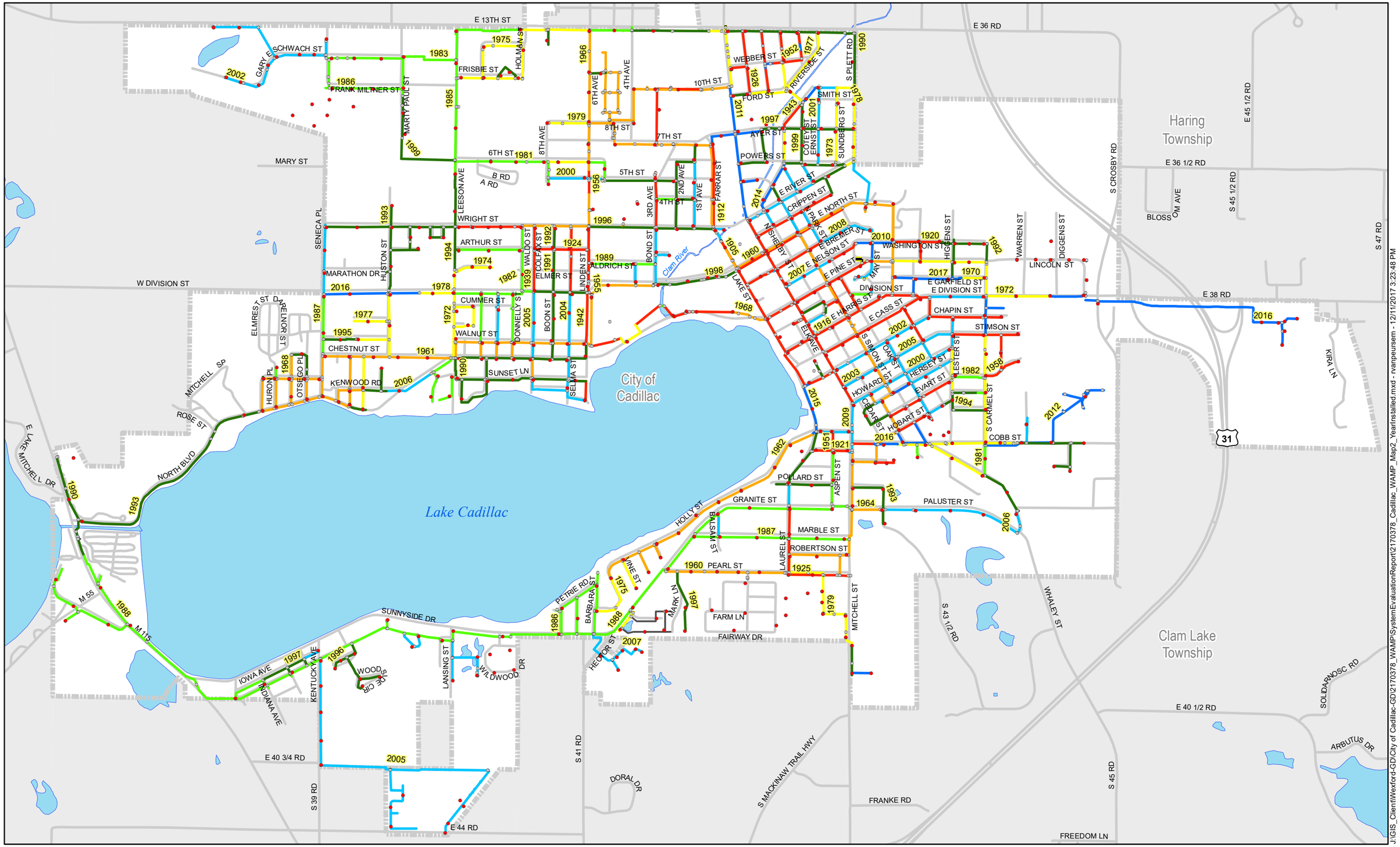

LEGEND

Water Main Year Installed

- Unknown
- 1950s and earlier
- 1960s
- 1970s
- 1980s
- 1990s
- 2000s
- 2010s
- Hydrants
- Valves
- Private Main

CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM

MAP 2: YEAR INSTALLED

DECEMBER 2017

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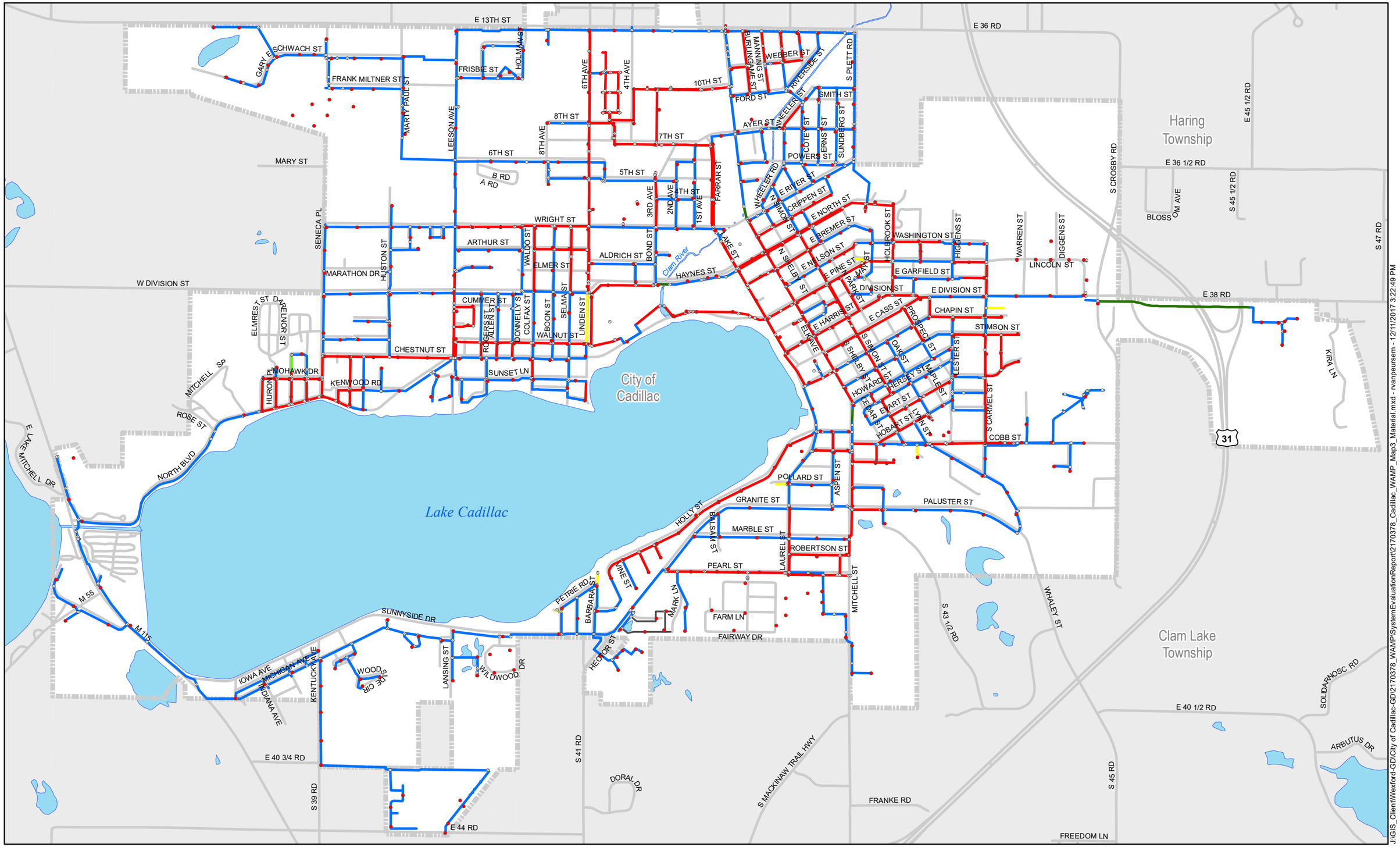

1,500 750 0 1,500 Feet

LEGEND

Water Main Material

- Ductile Iron
- Cast Iron
- Copper
- Polyethylene
- Asbestos Cement

- Hydrants
- Valves

CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM

MAP 3: MATERIAL

DECEMBER 2017

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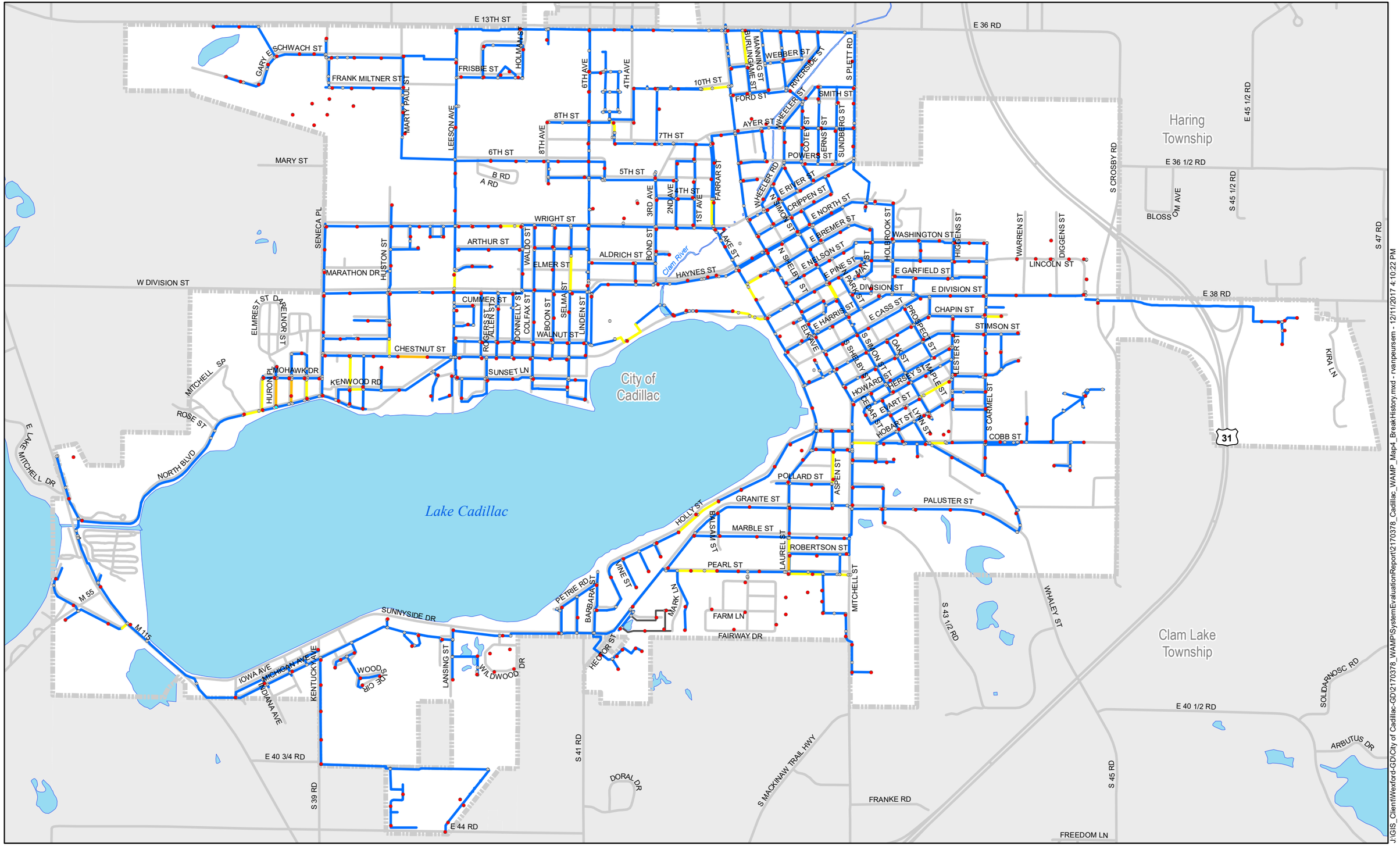

LEGEND

Water Main Break History

- 1 - No Leakage or Breaks
- 2 - Leakage
- 3 - Singular Breaks
- 4 - Multiple Breaks
- 5 - Imminent Failure

- Hydrants
- Valves

CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM

MAP 4: BREAK HISTORY

DECEMBER 2017

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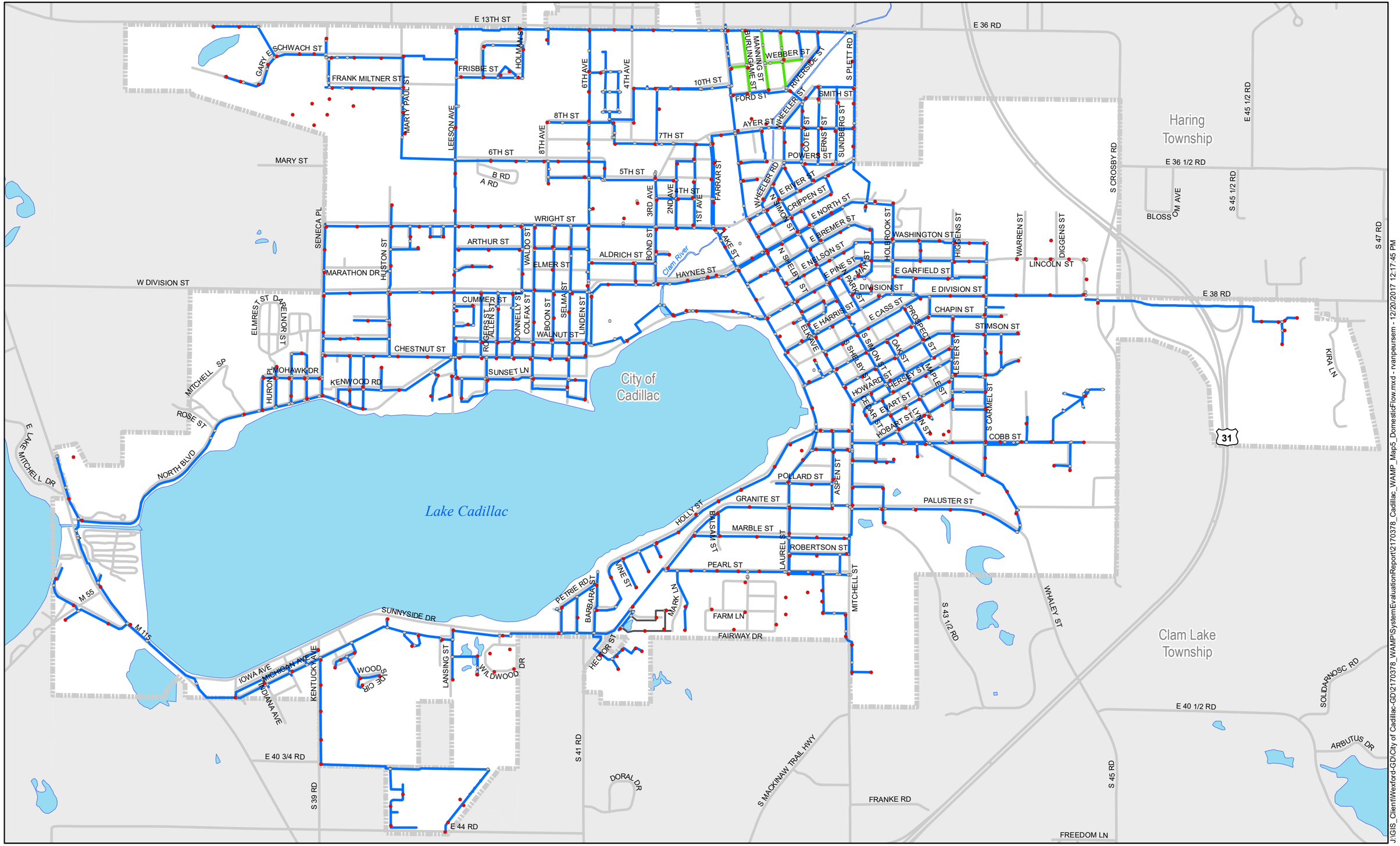

LEGEND

Water Main Domestic Flow Rating

- 1 - Adequate
- 2 - Substandard Diameter
- 3 - Discoloration
- 4 - Inadequate Residential Flow
- 5 - Inadequate Comm/Industrial Flow

- Hydrants
- Valves

CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM

MAP 5: DOMESTIC FLOW RATING

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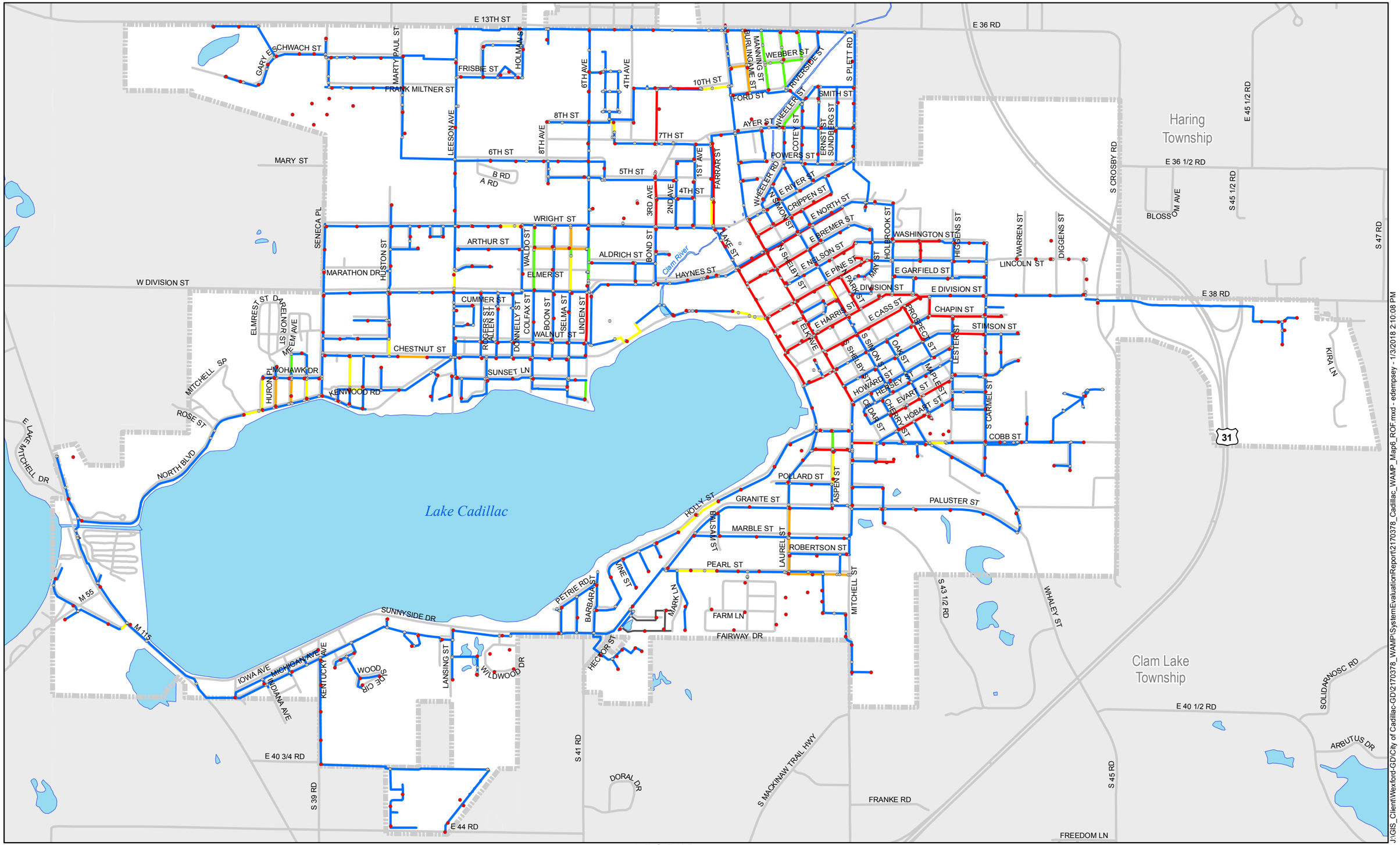

LEGEND

Risk of Failure

- 1 - Lowest Risk of Failure
- 2
- 3
- 4
- 5 - Highest Risk of Failure

- Hydrants
- Valves

CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM

MAP 6: RISK OF FAILURE

DECEMBER 2017

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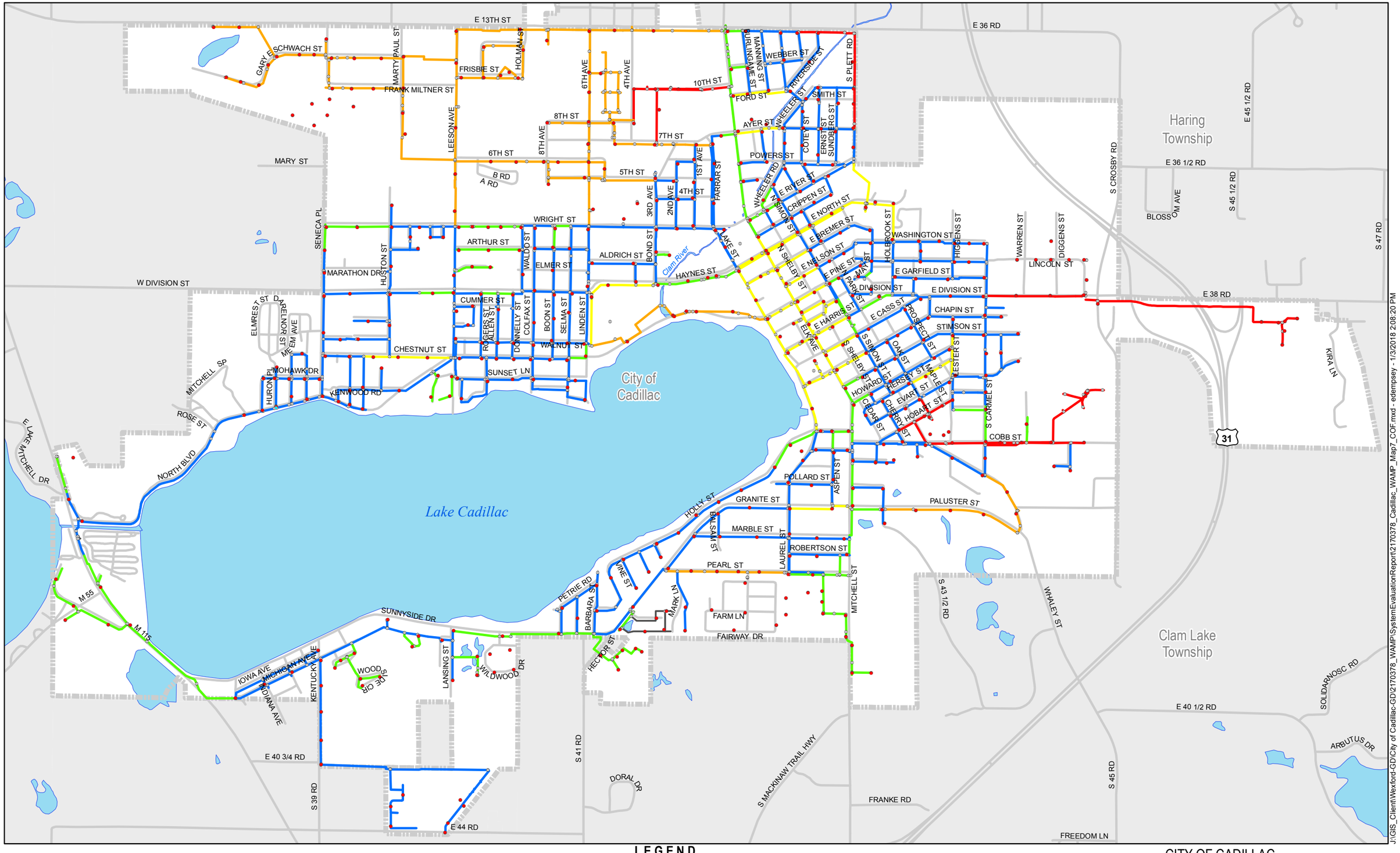

Feet
1,500 750 0 1,500

LEGEND

Consequence of Failure
- 1 - Lowest Consequence of Failure
- 2
- 3
- 4
- 5 - Highest Consequence of Failure

- Hydrants
- Valves

CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM

MAP 7: CONSEQUENCE OF FAILURE

DECEMBER 2017
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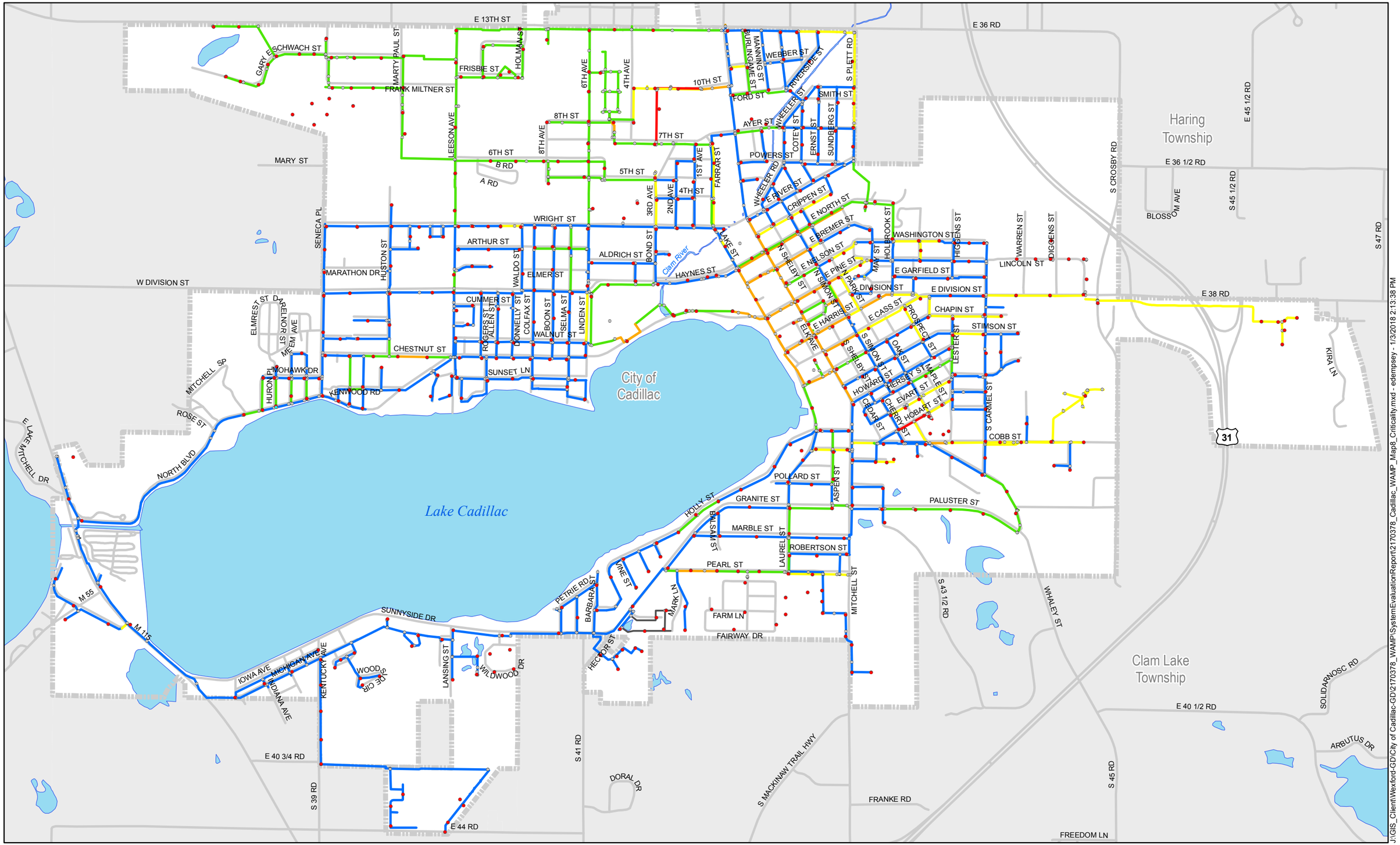

Feet
1,500 750 0 1,500

LEGEND

Criticality
- Least Critical
- Most Critical

- Hydrants
- Valves

CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM

MAP 8: CRITICALITY

DECEMBER 2017
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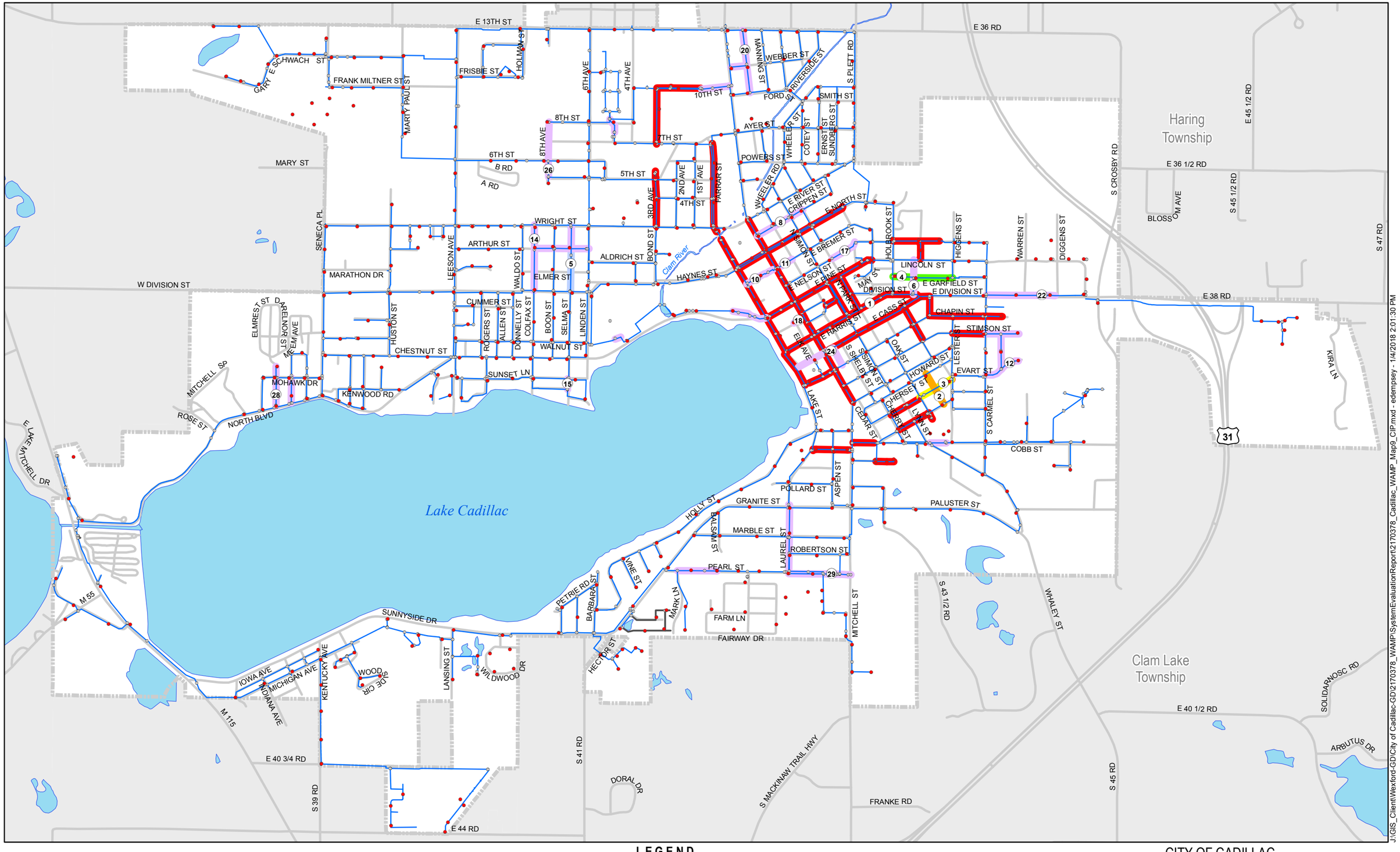
E 13TH ST
E 36 RD
GARY E SCHWACH ST
FRANK MILTNER ST
MARTY PAUL ST
FRISBIE ST
HOLLAW ST
6TH AVE
4TH AVE
10TH ST
MANNING ST
WEBBER ST
FORD ST
RIVERSIDE ST
S PLETT RD
SMITH ST
8TH ST
8TH AVE
7TH ST
AYER ST
WHEELER ST
COTEY ST
ERNST ST
SUNDBERG ST
6TH ST
B RD
A RD
26
5TH ST
POWERS ST
MARY ST
3RD AVE
2ND AVE
1ST AVE
4TH ST
FARRAR ST
WHEELER RD
E RIVER ST
CRIPPEN ST
E NORTH ST
HOLBROOK ST
HIGGENS ST
WARREN ST
DIGGENS ST
Haring Township
E 45 1/2 RD
S CROSBY RD
E 36 1/2 RD
BLOSSOM AVE
S 45 1/2 RD
S 47 RD
WRIGHT ST
SENECA PL
ARTHUR ST
14
ALDRICH ST
BOND ST
Clam River
HAYNES ST
E BREMER ST
E NELSON ST
E PINE ST
MAIN ST
LINCOLN ST
E GARFIELD ST
E DIVISION ST
DIVISION ST
E CASS ST
CHAPIN ST
E HARRIS ST
STIMSON ST
LESTER ST
EVART ST
OAK ST
HOWARD ST
SHERIDAN ST
CHERRY ST
LAWN ST
S CARMEL ST
COBB ST
E 38 RD
KIRA LN
31
MARATHON DR
LEESON AVE
WALDO ST
ELMER ST
5
W DIVISION ST
CUMMER ST
ROGERS ST
ALLEN ST
DONNELLY ST
COLFAX ST
BOON ST
SELMA ST
LINDEN ST
WALNUT ST
ELMREST ST
MELROSE ST
MELEM AVE
HUSTON ST
CHESTNUT ST
SUNSET LN
15
MITCHELL SP
MOHAWK DR
28
KENWOOD RD
ROSE ST
NORTH BLVD
E LAKE MITCHELL DR
M 55
Lake Cadillac
SUNNYSIDE DR
PETRIE RD
BARBARA ST
VINE ST
HOLLY ST
BALSAM ST
GRANITE ST
MARBLE ST
LAUREL ST
ROBERTSON ST
PEARL ST
29
POLLARD ST
ASPEN ST
PALUSTER ST
MARK LN
FARM LN
FAIRWAY DR
MITCHELL ST
S 43 1/2 RD
WHALEY ST
HECTOR ST
IOWA AVE
MICHIGAN AVE
INDIANA AVE
KENTUCKY AVE
WOOD SIDE DR
LANSING ST
WILDWOOD DR
M 115
E 40 3/4 RD
S 39 RD
S 41 RD
DORAL DR
S MACKINAW TRAIL HWY
FRANKE RD
E 44 RD
Clam Lake Township
E 40 1/2 RD
SOLIDARNOSC RD
ARBUTUS DR
S 45 RD
1,500 750 0 1,500 Feet
LEGEND
Capital Improvement Projects By Year
2017
2018
2019
2020
2021
2022 and Beyond
Water Main
Hydrants
Valves
CITY OF CADILLAC
WEXFORD COUNTY, MI
WATER DISTRIBUTION SYSTEM
MAP 9: CAPITAL IMPROVEMENT PLAN
DECEMBER 2017
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Table 1: Capital Improvement Priorities

Capital Improvement Priorities

Project ID	Location & Description	Today's Cost	Estimated Year*	Future Cost**
1	Replace all water main that was installed on or before 1921	$6,650,000	2017	$6,650,000
2	Extend 550 LF 8" S in Maple then W in easement to close dead end	$55,000	2018	$56,000
3	Replacing water main on Evart St. between Oak St. and Lester St. (8")	$137,000	2019	$143,000
4	Replacing water main on E. Garfield St. between Holbrook St. and Higgins St. (8")	$242,000	2020	$257,000
5	Replacing water main on Selma Street between W. Division St. and Wright St. (8")	$273,000	2021	$296,000
6	Replacing water main on Blodgett St. between Lincoln Street and E. Division St. (8")	$74,000	2022	$82,000
7	Well House #1 Portable Generator, Ford F150 P/U, GMC 1500 4x4	$111,000	2022	$122,500
8	Replacing water main on Crippen St. between Mitchell St. and Park St. (8")	$357,000	2023	$402,000
9	Ford F350, Work Trailer	$36,000	2023	$41,200
10	Replacing water main on W. Bremer St. between Lake St. and Mitchell St. (8")	$126,000	2024	$145,000
11	Replacing water main on E. Bremer St. between Mitchell St. and Shelby St. (8")	$73,500	2025	$86,000
12	Replacing water main on Crestview St., Evart St., and Stimson St. (8")	$441,000	2026	$527,000
13	Ford 4wd SuperCab	$25,000	2026	$30,000
14	Replacing water main on Colfax St. between W. Division St. and Wright St. (8")	$273,000	2027	$333,000
15	Replacing water main between Sunset St. and Lakeshore St. (8")	$84,000	2028	$104,000

CITY OF CADILLAC
CAPITAL IMPROVEMENT PROJECTS (WATER)

16	Casing and Screen for Well 8, Well 9, Well 10	$68,000	2028	$85,000
17	Replacing water main on Nelson St. between Park St. and Hemlock St. (8")	$126,000	2029	$160,000
18	Replacing water main on Mason St. between Mitchell St. and parking lot (8")	$52,500	2030	$68,000
19	Vactor Truck	$370,000	2030	$480,500
20	Replacing water main on Burlingame St. between 13th St. and Ford St. (8")	$252,000	2031	$333,000
21	Electrical for Well House #8, #9,#10, Meter Program, Ford E250 Van, Backhoe	$267,000	2032	$362,000
22	Upsizing water main to remove improve flow to Cadillac Junction development on E. Division between Carmel St. to Diggins St. (12”)	$351,000	2033	$482,000
23	Completing a loop along the Eighth Ave. (8”)	$174,000	2034	$244,000
24	Upsizing water main and completing loop under parking lot from Chapin St. to E. Cass St. and on W. Cass St. from parking lot to Mitchell St. (8")	$137,000	2035	$196,000
25	Well House #8, #9, #10 Upgrades	$584,000	2035	$840,000
26	Upsizing water main to increase fire flow on Eighth Ave. from 5th St. to 6th St. (8")	$95,000	2036	$138,000
28	Replace Water Main on Winona Pl, Huron Pl, and Chestnut Street	$367,000	2036	$538,000
27	Water Tank Interior/Exterior Coating, Permanent Generator, Ford F150 P/U, GMC 1500	$224,000	2037	$335,500
29	Replace Water Main on Multiple Streets	$1,335,000	2037	$2,000,000

*Actual year subject to change pending available funding and coordination with other infrastructure

** Future costs include annual 2 percent inflation

Table 2: Non-Pipe Assets

Asset Category	Asset Item	Installation Year	Purchase Price	Life Cycle (Years)	Notes
Water Tank	Tank Structure	1961	$1,000,000	65	1,000,000 Gallons
Water Tank	Primary Well Controls	1961	$4,000	10	Recurring cost
Water Tank	Interior Coating	2016	$20,000	20	
Water Tank	Exterior Coating	2016	$45,000	20	
Process Control Building	Structure	2012	$459,800	50	
Process Control Building	Permanent Generator	2011	$98,000	20	Diesel 350 KW
Process Control Building	Chemical Feed System	2011	$38,000	5	Recurring Cost
Blue Barn	Structure	1985	$50,000	50	
Well House #1	Structure	1960	$33,000	75	
Well House #1	Portable Generator	1960	$20,000	20	210 KWh
Well House 2	Structure	1960	N/A	50	Decommissioned 2018/2019
Well House 2	Piping	1960	N/A	35	Decommissioned 2018/2020
Well House 2	Chemical Feed Systems	1960	N/A	5	Decommissioned 2018/2021
Well House 2	Electrical	1960	N/A	20	Decommissioned 2018/2022
Well House 2	Pump Controls	1960	N/A	45	Decommissioned 2018/2023
Well 2	Casing and Screen	1960	N/A	15	Decommissioned 2018/2024
Well 2	turbine Pump	1960	N/A	30	Decommissioned 2018/2025

CITY OF CADILLAC
CAPITAL IMPROVEMENT PROJECTS (WATER)

Well House 3	Structure	1960	N/A	50	Decommissioned 2018/2027
Well House 3	Piping	1960	N/A	35	Decommissioned 2018/2028
Well House 3	Chemical Feed Systems	1960	N/A	5	Decommissioned 2018/2029
Well House 3	Electrical	1960	N/A	20	Decommissioned 2018/2030
Well House 3	Pump Controls	1960	N/A	45	Decommissioned 2018/2033
Well 3	Casing and Screen	1960	N/A	15	Decommissioned 2018/2034
Well 3	Turbine Pump	1960	N/A	30	Decommissioned 2018/2035
Well House 4	Structure	1960	N/A	50	Decommissioned 2018/2037
Well House 4	Piping	1960	N/A	35	Decommissioned 2018/2038
Well House 4	Chemical Feed Systems	1960	N/A	5	Decommissioned 2018/2039
Well House 4	Electrical	1960	N/A	20	Decommissioned 2018/2040
Well House 4	Generator	1960	N/A	20	Decommissioned 2018/2041
Well 4	Casing and Screen	1960	N/A	15	Decommissioned 2018/2044
Well 4	Turbine Pump	1960	N/A	30	Decommissioned 2018/2045
Well House 8	Structure	2011	$102,000	50	1000 gpm
Well House 8	Piping	2011	$20,000	35	
Well House 8	Chemical Feed Systems	2011	$10,000	5	Recurring Cost
Well House 8	Electrical	2011	$28,000	20	
Well House 8	Scada system w/ Fiber	2011	$46,666	8	Recurring Cost
Well House 8	Pump Controls	2011	$19,000	45	
Well 8	Casing and Screen	2009	$20,000	15	Test Well Casing
Well 8	Turbine Pump	2011	$33,000	30	125 HP
Well House 9	Structure	2011	$102,000	50	1000 gpm
Well House 9	Piping	2011	$20,000	35	

CITY OF CADILLAC
CAPITAL IMPROVEMENT PROJECTS (WATER)

Well House 9	Chemical Feed Systems	2011	$10,000	5	Recurring Cost
Well House 9	Electrical	2011	$28,000	20	
Well House 9	Scada system	2011	$46,666	8	Recurring Cost
Well House 9	Pump Controls	2011	$19,000	45	
Well 9	Casing and Screen	2011	$20,000	15	
Well 9	Turbine Pump	2011	$33,000	30	125 HP
Well House 10	Structure	2011	$102,000	50	1000 gpm
Well House 10	Piping	2011	$20,000	35	
Well House 10	Chemical Feed Systems	2011	$10,000	5	Recurring Cost
Well House 10	Electrical	2011	$28,000	20	
Well House 10	Scada System w/ Fiber	2011	$46,666	8	Recurring Cost
Well House 10	Pump Controls	2011	$19,000	45	
Well 10	Casing and Screen	2011	$20,000	15	
Well 10	Turbine Pump	2011	$33,000	30	125 HP
Water System	Meter Program	2012	$75,000	15	
Buildings	Water Department Building	1963	$500,000	50	90% Water
Vehicles	Ford 4wd SuperCab	2011	$22,500	15	
Vehicles	Ford F350 4x4 Utility	2008	$25,000	15	
Vehicles	Ford E250 3/4 Ton Van	2016	$20,000	15	
Vehicles	Ford F150 P/U	2004	$18,000	15	
Vehicles	GMC 1500 4x4	2004	$20,000	15	
Vehicles	Backhoe	2016	$70,000	15	
Vehicles	Work Trailer	2002	$5,000	15	
Vehicles	Sewer Truck - (Vactor)	2014	$350,000	15	

Table 3: Recurring Cost Schedule

Recurring Cost Schedule

Item Description	Recurrence Interval	Next Occurrence	Today's Cost
Tower Inspection	every 5 years	2021	$ 2,700
Tower Cleaning	every 5 years	2021	$ 3,700
Reliability Study	every 5 years	2021	$ 15,000
PCB Chemical Feed System	every 5 years	2017	$ 43,000
Water Tank Well Controls	every 5 years	2017	$ 12,000
WH#8 Chemical Feed System	every 5 years	2017	$ 12,000
WH#8 Scada	every 8 years	2019	$ 50,000
WH#9 Chemical Feed System	every 5 years	2017	$ 12,000
WH#9 Scada	every 8 years	2019	$ 50,000
WH#10 Chemical Feed System	every 5 years	2017	$ 12,000
WH#10 Scada	every 8 years	2019	$ 50,000

Table 4: Future Costs

City of Cadillac Water System

Future Costs
(not including annual operations and maintenance)

Year	Recurring Costs	NON-Pipe Assets Capital Improvements	Water Main Capital Improvements	Description of Major Items	Total
2017	91,000	6,650,000	-	CIP Project #1	6,741,000
2018	-	56,000	-	CIP Project #2	56,000
2019	156,000	143,000	-	CIP Project #3	299,000
2020	-	257,000	-	CIP Project #4	257,000
2021	23,100	296,000	-	CIP Project #5	319,100
2022	100,300	122,500	82,000	CIP Project #6 & #7	304,800
2023	-	41,200	402,000	CIP Project #8 & #9	443,200
2024	-	145,000	-	CIP Project #10	145,000
2025	-	86,000	-	CIP Project #11	86,000

CITY OF CADILLAC
CAPITAL IMPROVEMENT PROJECTS (WATER)

Year	Recurring Costs	NON-Pipe Assets Capital Improvements	Water Main Capital Improvements	Description of Major Items	Total
2026	25,500	30,000	527,000	CIP Project #12 & #13	582,500
2027	293,500	333,000	-	CIP Project #14	626,500
2028	-	85,000	104,000	CIP Project #15 & #16	189,000
2029	-	160,000	-	CIP Project #17	160,000
2030	-	480,500	68,000	CIP Project #18 & #19	548,500
2031	28,300	333,000	-	CIP Project #20	361,300
2032	122,700	362,000	-	CIP Project #21	484,700
2033	-	482,000	-	CIP Project #22	482,000
2034	-	244,000	-	CIP Project #23	244,000
2035	214,200	840,000	196,000	CIP Project #24 & #25	1,250,200
2036	31,200	138,000	-	CIP Project #26 & #27	169,200
2037	135,100	335,500	-	CIP Project #28 & #29	470,600

FINANCIAL FORECAST

UMBAUGH

H. J. Umbaugh & Associates
Certified Public Accountants, LLP
2150 Association Drive
Suite 100
Okemos, MI 48864
Phone: 517-321-0110
Fax: 517-321-8866
www.umbaugh.com

December 29, 2017

City of Cadillac
200 North Lake Street
Cadillac, MI 49601

Re: City of Cadillac (Michigan) Water Asset Management Program – Abbreviated Rate Study

Dear City of Cadillac:

The attached schedules (listed below) present unaudited and limited information for the purpose of discussion and consideration in the preliminary planning stage of an abbreviated rate study by the appropriate officers, officials and advisors of the City of Cadillac. The use of these schedules should be restricted to this purpose, for internal use only, as the information is subject to future revision.

We would appreciate your questions or comments on this information and would provide additional information upon request.

Sincerely,

UMBAUGH

Tom Traciak

CITY OF CADILLAC (MICHIGAN) WATER & SEWER FUND

COMPARATIVE STATEMENT OF NET POSITION

	As of			
	6/30/2014	**6/30/2015**	**6/30/2016**	**6/30/2017**
	(----------Per Audit----------)			
Assets				
Current assets:				
Cash and pooled investments	$2,297,217	$2,255,506	$2,306,920	$2,567,330
Receivables	696,204	602,567	804,314	827,020
Due from fiduciary funds	20,265	36,651	-	-
Inventory, at cost	196,823	196,087	195,853	204,623
Prepaid expense	11,970	44,935	-	13,552
Total current assets	3,222,479	3,135,746	3,307,087	3,612,525
Noncurrent assets:				
Restricted assets:				
Cash	625,784	625,784	643,465	642,681
Capital Assets:				
Capital assets not being depreciated	650,460	542,401	310,814	574,440
Capital assets being depreciated	21,112,130	20,634,754	20,346,342	20,591,141
Total noncurrent assets	22,388,374	21,802,939	21,300,621	21,808,262
Total Assets	$25,610,853	$24,938,685	$24,607,708	$25,420,787
Deferred Outflows of Resources				
Pension	-	123,648	584,613	333,797
Liabilities				
Current liabilities:				
Accounts payable	$213,030	$153,831	$94,726	$230,562
Accrued interest	62,272	58,652	57,327	51,001
Accrued liabilities	15,001	20,872	27,128	31,392
Customer deposits	7,930	8,100	8,780	8,780
Current portion of compensated absences	-	-	97,556	56,819
Current portion of long-term debt	530,000	550,000	560,000	570,000
Due to other funds	-	-	-	454,628
Total current liabilities	828,233	791,455	845,517	1,403,182
Noncurrent liabilities:				
Compensated absences	143,306	170,232	83,104	126,468
Long-term debt	8,694,061	8,144,061	7,584,061	7,014,061
Net pension liability	-	411,130	1,386,077	1,192,192
Total noncurrent liabilities	8,837,367	8,725,423	9,053,242	8,332,721
Total Liabilities	9,665,600	9,516,878	9,898,759	9,735,903
Deferred Inflows of Resources				
Pension	-	-	-	104,944
Net Position				
Net investment in capital assets	12,538,529	12,483,094	12,513,095	13,581,520
Restricted for:				
Debt service	625,784	625,784	643,465	642,681
Unrestricted	2,780,940	2,436,577	2,137,002	1,689,536
Total Net Position	15,945,253	15,545,455	15,293,562	15,913,737
Total Liabilities and Net Position	$25,610,853	$25,062,333	$25,192,321	$25,649,640

CITY OF CADILLAC (MICHIGAN) WATER & SEWER FUND

COMPARATIVE STATEMENT OF REVENUES, EXPENSES AND CHANGES IN NET POSITION

	Fiscal Year Ended			
	6/30/2014	**6/30/2015**	**6/30/2016**	**6/30/2017**
	(----------Per Audit----------)			
Operating Revenues				
Local revenue sharing	$126,344	-	-	-
Charges for services	3,903,519	$4,059,420	$4,168,790	$4,547,180
Rent	-	-	23,750	23,750
Miscellaneous	1,899	720	4,720	2,376
Total operating revenues	4,031,762	4,060,140	4,197,260	4,573,306
Operating Expenses				
Salaries and wages	1,370,578	1,444,861	1,535,472	1,569,766
Materials and supplies	345,441	371,018	371,521	353,821
Utilities	461,024	465,071	438,668	381,306
Repair and maintenance	132,067	157,356	114,362	96,069
Equipment rental	237,428	245,992	242,080	243,768
Contracted services	351,759	456,124	334,751	326,407
Subtotal	2,898,297	3,140,422	3,036,854	2,971,137
Depreciation expense	917,646	930,587	905,795	829,226
Total operating expenses	3,815,943	4,071,009	3,942,649	3,800,363
Net operating income (loss)	215,819	(10,869)	254,611	772,943
Non-Operating Revenues (Expenses)				
Interest income	17,051	16,881	20,020	29,192
Miscellaneous income	-	75,505	-	-
Interest expense	(266,008)	(203,887)	(193,728)	(175,959)
Bond issuance cost	(56,421)	-	-	-
Loss on disposal of fixed assets	-	-	-	(6,001)
Federal grants	-	9,962	-	-
Total non-operating revenues (expenses)	(305,378)	(101,539)	(173,708)	(152,768)
Change in net position	(89,559)	(112,408)	80,903	620,175
Net position, beginning of year	16,034,812	15,657,863	15,212,659	$15,293,562
Net position, end of year	$15,945,253	$15,545,455	$15,293,562	$15,913,737

CITY OF CADILLAC (MICHIGAN) WATER & SEWER FUND

COMPARATIVE DETAIL OF OPERATING EXPENSES - WATER PORTION (33%)

	Fiscal Year Ended				
	6/30/2015	6/30/2016	6/30/2017	6/30/2018	Test Year
	(----------Per Client----------)				
Operating Expenses					
Administration					
Salaries and Wages	$116,412	$112,969	$117,137	$113,850	$113,850
Fringes	61,610	55,164	58,593	56,133	56,133
Office Supplies	3,996	4,000	4,159	3,960	3,960
Postage	7,092	6,660	6,959	7,260	7,260
Safety Supplies	1,441	1,132	660	1,485	1,485
Contractual Services	5,260	5,210	4,632	4,950	4,950
Engineering Fees	-	3,428	1,768	4,950	4,950
Audit	1,320	1,320	1,320	1,320	1,320
G.I.S. Contractual Services	8,292	7,538	2,024	3,300	3,300
Legal Fees	31,507	12,599	11,357	8,250	8,250
State Mandated Fees	9,189	9,167	7,560	6,930	6,930
Data Processing	15,675	15,675	15,675	15,840	15,840
Liability Insurance	9,911	10,533	10,591	11,550	11,550
Dues & Publications	820	1,029	1,505	990	990
Telephone	2,304	3,723	3,752	2,475	2,475
Alarm Systems	669	862	1,238	990	990
Travel & Education - Salary	1,938	1,179	1,246	2,310	2,310
Travel & Education - Hourly	1,074	1,671	1,706	1,815	1,815
Vehicle Repair & Maintenance	13	31	342	330	330
Employee Safety	1,155	1,650	17	1,650	1,650
Bad Debt Expense	-	-	-	330	330
Groundwater Cleanup	-	-	-	-	-
Administration - City	79,200	79,211	79,200	85,800	85,800
Public Relations	822	676	1,243	990	990
Property Taxes	-	-	-	2,475	2,475
Total Administration Expenses	359,699	335,426	332,683	339,933	339,933
Water Resources					
Preliminary Treatment	-	-	-	-	-
Primary Treatment	-	-	-	-	-
Secondary Treatment	-	-	-	-	-
Tertiary Treatment	-	-	-	-	-
Sludge Removal	-	-	-	-	-
Nutrient Removal	-	-	-	-	-
Effluent Disposal	-	-	-	-	-
Building & Grounds	-	-	-	-	-
Industrial Surveillance	-	-	-	-	-
Lift Station-Sanitary	-	-	-	-	-
Vehicles	-	-	-	-	-
Total Water Resources Expenses	-	-	-	-	-
Distribution and Collection					
Building & Water Tank	18,426	40,032	23,787	30,300	30,300
Pumping Station	247,988	230,605	195,050	252,900	252,900
Wells & Well Field	52,869	48,074	37,379	57,100	57,100
General Street Expense	12,176	19,710	17,938	19,100	19,100
Meter Reading & Delinquent Accounts	8,250	5,969	7,516	8,877	8,877
Meter Operations & Maintenance	87,382	103,470	107,876	95,106	95,106
Customer Service	8,120	8,556	6,854	10,626	10,626
Maintenance-Mains & Hydrants	171,610	64,003	66,811	95,300	95,300
New Water Service	16,684	23,709	16,051	16,000	16,000
Water Service Maintenance	44,695	12,242	9,195	14,800	14,800
Sanitary Sewer	-	-	-	-	-
Vehicles	9,130	8,428	7,689	12,078	12,078
Total Distribution and Collection	677,329	564,797	496,146	612,187	612,187
Laboratory Division					
General Laboratory	18,987	17,028	16,273	21,318	21,318
Contract Laboratory	15,198	15,997	15,014	16,962	16,962
Total Laboratory Division	34,185	33,025	31,286	38,280	38,280
Total Operating Expenses - Water	$1,071,213	$933,248	$860,116	$990,400	$990,400

CITY OF CADILLAC (MICHIGAN) WATER & SEWER FUND

SCHEDULE OF AMORTIZATION OF $1,848,856 PRINCIPAL AMOUNT OUTSTANDING OF 2011 DWRF BONDS

Payment Date	Principal Balance	Interest Rate	Debt Service			Fiscal Year Total
			Principal	Interest	Total	
	(In Dollars)	(%)	(----------In Dollars----------)			
10/01/17	$1,848,856			$23,110.70	$23,110.70	
04/01/18	1,848,856	2.50	$100,000	23,110.70	123,110.70	$146,221.40
10/01/18	1,748,856			21,860.70	21,860.70	
04/01/19	1,748,856	2.50	105,000	21,860.70	126,860.70	148,721.40
10/01/19	1,643,856			20,548.20	20,548.20	
04/01/20	1,643,856	2.50	110,000	20,548.20	130,548.20	151,096.40
10/01/20	1,533,856			19,173.20	19,173.20	
04/01/21	1,533,856	2.50	110,000	19,173.20	129,173.20	148,346.40
10/01/21	1,423,856			17,798.20	17,798.20	
04/01/22	1,423,856	2.50	115,000	17,798.20	132,798.20	150,596.40
10/01/22	1,308,856			16,360.70	16,360.70	
04/01/23	1,308,856	2.50	115,000	16,360.70	131,360.70	147,721.40
10/01/23	1,193,856			14,923.20	14,923.20	
04/01/24	1,193,856	2.50	120,000	14,923.20	134,923.20	149,846.40
10/01/24	1,073,856			13,423.20	13,423.20	
04/01/25	1,073,856	2.50	120,000	13,423.20	133,423.20	146,846.40
10/01/25	953,856			11,923.20	11,923.20	
04/01/26	953,856	2.50	125,000	11,923.20	136,923.20	148,846.40
10/01/26	828,856			10,360.70	10,360.70	
04/01/27	828,856	2.50	130,000	10,360.70	140,360.70	150,721.40
10/01/27	698,856			8,735.70	8,735.70	
04/01/28	698,856	2.50	130,000	8,735.70	138,735.70	147,471.40
10/01/28	568,856			7,110.70	7,110.70	
04/01/29	568,856	2.50	135,000	7,110.70	142,110.70	149,221.40
10/01/29	433,856			5,423.20	5,423.20	
04/01/30	433,856	2.50	140,000	5,423.20	145,423.20	150,846.40
10/01/30	293,856			3,673.20	3,673.20	
04/01/31	293,856	2.50	145,000	3,673.20	148,673.20	152,346.40
10/01/31	148,856			1,860.70	1,860.70	
04/01/32	148,856	2.50	148,856	1,860.70	150,716.70	152,577.40
		Totals	$1,848,856	$392,571.00	$2,241,427.00	$2,241,427.00

CITY OF CADILLAC (MICHIGAN) WATER & SEWER FUND

SCHEDULE OF AMORTIZATION OF $1,079,100 PRINCIPAL AMOUNT OUTSTANDING OF 2013 WATER SUPPLY & WASTEWATER REFUNDING BONDS - WATER PORTION

Payment Date	Principal Balance	Interest Rate	Debt Service			Fiscal Year Total
			Principal	Interest	Total	
	(In Dollars)	(%)	(----------In Dollars----------)			
09/01/17	$1,079,100	2.70	$92,400	$14,567.88	$106,967.88	
03/01/18	986,700			13,320.48	13,320.48	$120,288.36
09/01/18	986,700	2.70	94,050	13,320.48	107,370.48	
03/01/19	892,650			12,050.80	12,050.80	119,421.28
09/01/19	892,650	2.70	99,000	12,050.80	111,050.80	
03/01/20	793,650			10,714.30	10,714.30	121,765.10
09/01/20	793,650	2.70	103,950	10,714.30	114,664.30	
03/01/21	689,700			9,310.97	9,310.97	123,975.27
09/01/21	689,700	2.70	107,250	9,310.97	116,560.97	
03/01/22	582,450			7,863.09	7,863.09	124,424.06
09/01/22	582,450	2.70	110,550	7,863.09	118,413.09	
03/01/23	471,900			6,370.66	6,370.66	124,783.75
09/01/23	471,900	2.70	112,200	6,370.66	118,570.66	
03/01/24	359,700			4,855.96	4,855.96	123,426.62
09/01/24	359,700	2.70	117,150	4,855.96	122,005.96	
03/01/25	242,550			3,274.43	3,274.43	125,280.39
09/01/25	242,550	2.70	120,450	3,274.43	123,724.43	
03/01/26	122,100			1,648.35	1,648.35	125,372.78
09/01/26	122,100	2.70	122,100	1,648.35	123,748.35	123,748.35
		Totals	$1,079,100	$153,385.96	$1,232,485.96	$1,232,485.96

CITY OF CADILLAC (MICHIGAN) WATER & SEWER FUND

SCHEDULE OF COMBINED DEBT SERVICE - WATER

Fiscal Year	2011 DWRF Bonds	2013 Refunding Bonds	Total	
2017/18	$146,221.40	$120,288.36	$266,509.76	
2018/19	148,721.40	119,421.28	268,142.68	
2019/20	151,096.40	121,765.10	272,861.50	
2020/21	148,346.40	123,975.27	272,321.67	
2021/22	150,596.40	124,424.06	275,020.46	*
2022/23	147,721.40	124,783.75	272,505.15	
2023/24	149,846.40	123,426.62	273,273.02	
2024/25	146,846.40	125,280.39	272,126.79	
2025/26	148,846.40	125,372.78	274,219.18	
2026/27	150,721.40	123,748.35	274,469.75	
2027/28	147,471.40		147,471.40	
2028/29	149,221.40		149,221.40	
2029/30	150,846.40		150,846.40	
2030/31	152,346.40		152,346.40	
2031/32	152,577.40		152,577.40	
Totals	$2,241,427.00	$1,232,485.96	$3,473,912.96	

* Maximum annual combined debt service

CITY OF CADILLAC (MICHIGAN) WATER & SEWER FUND

WATER CASH FLOW ANALYSIS

		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Assumptions									
Rate revenue increase assumption over previous year			30.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Rate revenues		$1,299,900	$1,689,870	$1,740,566	$1,792,783	$1,846,567	$1,901,964	$1,959,022	$2,017,793
Other revenues		186,700	186,700	186,700	186,700	186,700	186,700	186,700	186,700
Total revenues		1,486,600	1,876,570	1,927,266	1,979,483	2,033,267	2,088,664	2,145,722	2,204,493
	Increase								
Total operating expenditures	2.00%	990,400	1,010,208	1,030,412	1,051,020	1,072,041	1,093,482	1,115,351	1,137,658
Net operating revenue		496,200	866,362	896,854	928,463	961,226	995,182	1,030,371	1,066,835
Less: Current debt service payments		266,510	268,143	272,862	272,322	275,020	272,505	273,273	272,127
Estimated cash-funded capital improvements		91,000	56,000	299,000	257,000	319,100	304,800	443,200	145,000
Estimated debt service #1 2017/18 Bonds [1]		116,375	462,050	462,050	462,050	462,050	462,050	462,050	462,050
Net cash flow		$22,315	$80,169	($137,058)	($62,909)	($94,945)	($44,173)	($148,152)	$187,658
Cash & investments [2]	*$847,219*	*$869,534*	*$949,703*	*$812,646*	*$749,737*	*$654,792*	*$610,619*	*$462,467*	*$650,125*

[1] Estimated debt service payments based on a $6,650,000 20-year bond issue at current market rates.
[2] Includes 33% of total Water & Sewer Fund unrestricted cash & investments balance.

CITY OF CADILLAC (MICHIGAN) WATER & SEWER FUND

(Continued)

WATER CASH FLOW ANALYSIS

2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38
3.00%	3.00%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
$2,078,327	$2,140,677	$2,151,380	$2,162,137	$2,172,948	$2,183,812	$2,194,732	$2,205,705	$2,216,734	$2,227,817	$2,238,956	$2,250,151	$2,261,402
186,700	186,700	186,700	186,700	186,700	186,700	186,700	186,700	186,700	186,700	186,700	186,700	186,700
2,265,027	2,327,377	2,338,080	2,348,837	2,359,648	2,370,512	2,381,432	2,392,405	2,403,434	2,414,517	2,425,656	2,436,851	2,448,102
1,160,411	1,183,620	1,207,292	1,231,438	1,256,067	1,281,188	1,306,812	1,332,948	1,359,607	1,386,799	1,414,535	1,442,826	1,471,682
1,104,615	1,143,757	1,130,788	1,117,399	1,103,581	1,089,324	1,074,620	1,059,457	1,043,827	1,027,718	1,011,121	994,025	976,420
274,219	274,470	147,471	149,221	150,846	152,346	152,577	-	-	-	-	-	-
86,000	582,500	626,500	189,000	160,000	548,500	361,300	484,700	482,000	244,000	1,250,200	169,200	470,600
462,050	462,050	462,050	462,050	462,050	462,050	462,050	462,050	462,050	462,050	462,050	462,050	462,050
$282,346	($175,263)	($105,233)	$317,128	$330,685	($73,572)	$98,692	$112,707	$99,777	$321,668	($701,129)	$362,775	$43,770
$932,472	*$757,209*	*$651,976*	*$969,103*	*$1,299,788*	*$1,226,216*	*$1,324,908*	*$1,437,616*	*$1,537,392*	*$1,859,061*	*$1,157,932*	*$1,520,707*	*$1,564,477*

City Council

200 North Lake Street
Cadillac, Michigan 49601
Phone (231) 775-0181
Fax (231) 775-8755

CITY OF CADILLAC MICHIGAN

ORDINANCE NO. 2016-07

AN ORDINANCE TO AMEND SECTIONS 42-201 AND 42-202(3) OF CHAPTER 42 OF THE CADILLAC CITY CODE TO INCREASE WATER RATES IN THE CITY OF CADILLAC 2.5%.

THE CITY OF CADILLAC ORDAINS:

Section 1.

The City hereby amends Section 42-201 of the Cadillac City Code, entitled "Service rates," which shall read as follows:

The rates for water service furnished by the city water supply system shall be as follows:

(1) *Monthly service charges.*

Meter Size (in inches)	Charge (per month)
5/8	$6.39
3/4	$9.40
1	$15.66
1 1/2	$31.38
2	$50.06
3	$109.64
4	$187.95
6	$391.62
8	$563.90

(2) *Commodity charge.*

Volume (100 cubic-foot unit)	Per Month (per unit)
0 to 600 cu. ft.	$1.34
601 to 10,000 cu. ft.	$1.14
10,001 to 100,000 cu. ft.	$1.01
100,001 to 250,000 cu. ft.	$0.88
250,001 and above	$0.77

Section 2.

The City hereby amends Section 42-202(3) of the Cadillac City Code, which shall read as follows:

The rates for providing fire protection sprinklers shall be as follows:

Line Size (in inches)	Charges (per month)
¾	$2.29
1	$3.92
1 ½	$7.77
2	$12.54
3	$27.22
4	$46.81
6	$97.70
8	$140.77
10	$226.74
12	$336.08

Section 3.

All other ordinances inconsistent with the provisions of this Ordinance are hereby repealed only to the extent necessary to give this Ordinance full force and effect.

Section 4.

This Ordinance shall take effect July 1, 2016.

Approved this 2nd day of May, 2016.

Sandra Wasson
Sandra Wasson, Clerk

Carla J. Filkins
Carla J. Filkins, Mayor

I, Sandra Wasson, City Clerk of the City of Cadillac, Michigan, do hereby certify that Ordinance No. 2016-07 was published in the Cadillac News on the 7th day of May, 2016.

Sandra Wasson
Sandra Wasson, City Clerk