

DULUTH PUBLIC UTILITIES COMMISSION

Tuesday, February 17, 2015

City Council Chambers

AGENDA

1. Roll call
2. Approval of previous meeting minutes
3. New business
 - 3.1 15PUC-001 - RESOLUTION ESTABLISHING THE CUSTOMER CHARGE AND USER CHARGES FOR THE CITY'S WASTEWATER FACILITIES EFFECTIVE WITH METER READINGS AFTER MAY 1, 2015; SUPERSEDING ALL PRIOR INCONSISTENT OR CONFLICTING RATES.
- for discussion only
 - 3.2 15PUC-002 - RESOLUTION ESTABLISHING FEES FOR VARIOUS UTILITY-RELATED SERVICES. - for discussion only
 - 3.3 Establish public hearing dates for rate changes
 - 3.4 5-year natural gas capital plan
4. Updates from staff
5. Upcoming Council actions
6. Commissioner questions or comments
7. Preview of upcoming business

DULUTH PUBLIC UTILITIES COMMISSION
Meeting Minutes
January 20, 2015

Members Present: Councilor Zack Filipovich, Councilor Jennifer Julsrud, Rob Prusak, Jim Ramnes, Linda Sellner, Councilor Joel Sipress, Jason Thorsell

Staff Present: Bob Asleson, Jim Benning, Leanna Gilbert, Howard Jacobson, Tom Johnson, Chris Kleist, Eric Shaffer, Glenn Strid

Call to Order: The meeting was called to order at 5:15 p.m. by President Prusak.

Approval of previous meeting minutes

Old business:

14PUC-004 - RESOLUTION OF THE DULUTH PUBLIC UTILITIES COMMISSION RECOMMENDING THAT THE CITY OF DULUTH ADOPT A NO-LOSS POLICY FOR REMAINING WETLANDS WITHIN CITY BOUNDARIES.

Commissioner Sellner explained the intent of resolution 14PUC-004. Commissioners and staff discussed whether a policy regarding wetlands was in the purview of the Commission. Commissioner Julsrud motioned to remove 14PUC-004 from the agenda. The motion carried 6-1.

New business:

Repayment to MN Power

After the Hibbard steam plant put in a well, there was no way for the City to measure their sewage. This resulted in overcharging for sewage in the amount of approximately \$130,000, so we are repaying them.

Election of officers

Commissioner Julsrud motioned to re-elect Rob Prusak for President and Jim Ramnes for Vice President. Their re-election was approved unanimously.

Updates from staff

Chris Kleist gave a brief presentation on stormwater billing for residential and non-residential customers and answered questions from commissioners.

Upcoming Council actions

Jim Benning mentioned an ordinance on the upcoming agenda that would update Chapter 48 of the City code, which is the water and gas section.

Commissioner Julsrud stated that she is the Public Works & Utilities chair this year.

Commissioner questions or comments

Commissioner Sipress mentioned the recent increase in service fees. He is concerned that the fees might keep residents from getting preventative maintenance and suggested providing incentives.

Commissioner Julsrud said that she would also be interested in that and added that she would like to see opportunities for low-cost comprehensive energy audits as well.

Commissioner Sellner commented that the Commission was a little lax about parliamentary procedure in regards to the agenda tonight and requested Bob Asleson research the removal of resolutions from the agenda and the discussion of resolutions prior to putting them to a vote.

President Prusak stated that his first term expires on March 31st and that he would appreciate the councilors' support of his re-appointment.

Commissioner Julsrud noted that when the Commission was established, it was decided that it should be structured and professional, but commissioners don't need to hold each other's feet to the fire regarding Robert's Rules.

Preview of upcoming business

The next regular meeting is scheduled for Tuesday, February 17, 2015, at 5:15 p.m. in City Council Chambers. Eric Shaffer will present the 5-year natural gas capital plan at an upcoming meeting.

Adjournment: The meeting was adjourned at 6:15 p.m.

RESOLUTION NO. 15PUC-001

RESOLUTION ESTABLISHING THE CUSTOMER CHARGE AND USER CHARGES FOR THE CITY'S WASTEWATER FACILITIES EFFECTIVE WITH METER READINGS AFTER MAY 1, 2015; SUPERSEDING ALL PRIOR INCONSISTENT OR CONFLICTING RATES.

RESOLVED by the Duluth Public Utilities Commission (the "Commission") that the Commission hereby makes the following Findings of Fact:

- 1.) There exists in the City commercial entities that create and use steam in their operations that discharge substantial water products into the City sanitary sewer system, which products do not contain material amounts of total suspended solids ("TSS") or biological oxygen demand ("BOD") and which therefore result in such entities paying a disproportionately higher rate for sanitary sewer service as compared to the cost of treating their discharge.
- 2.) There is a need to create new user classes for such customers with rates that fairly reflect the cost of treating their discharge in order to fairly apportion the costs of operating the sanitary sewer system and to encourage the growth and health of such industries.

RESOLVED FURTHER, that pursuant to section 43-11 of the Duluth City Code, 1959, as amended, for the purpose of increasing the revenue of the sewer utility, there is established and shall be collected effective with the meter readings after May 1, 2015, customer charge and user charges, based upon the volume of wastewater discharged to the city's wastewater facilities system and determined as in Section 43-7 of the Duluth City Code, as follows:

	Effective May 1, 2015	2012 rate with WLSSD annual adjustments per 11PUC-WLSSD	Effective February 1, 2012
Customer charge	No Change	\$5.89 per month	\$5.89 per month
User charge - Class I	No Change	\$5.60/ccf	\$5.52/ccf
User charge - Class II	No Change	\$7.78/ccf	\$7.67/ccf
User charge - Class III	No Change	\$9.59/ccf	\$9.45/ccf
User charge - Class IV	No Change	\$15.34/ccf	\$15.11/ccf
User charge - Class VI	Delete	\$7.19/ccf	\$7.19/ccf
User charge - Class IX	\$3.36/ccf	\$2.64/ccf	N/A

RESOLVED FURTHER, that any prior rates inconsistent or conflicting with the rates set forth herein are hereby superseded.

Approved by the DPUC: _____
(date)

Submitted to City Council: _____
(where appropriate) (date)

ATTEST:

Director
Public Works and Utilities
City of Duluth

STATEMENT OF PURPOSE:

This resolution creates a new rate class IX to reflect a class of users that discharge substantially clear water into the sewer system. The two existing users that fall into this category are the two district steam utilities, the Hibbard facility and Duluth Steam District No. 1.

Presently the City pays WLSSD a rate for treatment of effluent that reflects volume of discharge and also total suspended solids (TSS) and biological oxygen demand (BOD) in the discharge. We have determined that 60% of our charges from WLSSD are based on flow. The remaining 40% of the charges are based on TSS and BOD. It is safe to assume that the vast majority of the steam plants sewage is just hot water and they should not be charged for TSS or BOD. This new rate will adequately recoup our actual expenses.

This resolution also eliminates rate class VI, which was previously established for a single customer with unique effluent loadings. This customer is no longer in business. The elimination of this rate is a housekeeping function to make the rate schedule clearly indicate that rate class VI is no longer in use.

RESOLUTION NO. 15PUC-002

**RESOLUTION ESTABLISHING FEES FOR VARIOUS
UTILITY-RELATED SERVICES.**

RESOLVED by the Duluth Public Utilities Commission (the “Commission”) that, pursuant to the authority contained in Section 2-186 (c) of the Duluth City Code, 1959, as amended, the Commission hereby establishes fees for the services described in Exhibit A attached hereto and made a part hereof (the “Services”) in the amounts as set forth in said Exhibit A, said fees to be effective for services provided after April 30, 2015.

RESOLVED FURTHER, that to the extent that any fee approved by an earlier resolution has been amended by any later resolution, the prior inconsistent or conflicting fee shall be deemed to have been superseded.

Approved by the DPUC: _____
(date)

Submitted to City Council: _____
(where appropriate) (date)

ATTEST:

Director
Public Works and Utilities
City of Duluth

STATEMENT OF PURPOSE: The purpose of this resolution is for the DPUC to formally adopt fees for various services provided by the City in conjunction with the provision of utility services as authorized by Section 2-186 (c) of the City code.

15PUC-002: Exhibit A

Services	Fee
FOG Program - Failure to Maintain Records - per day	\$100.00
FOG Program - Noncompliance - Maximum Penalty - per month	\$1,000.00
Gas Furnace Comfort Policy Fee - DCC - annual	\$190.00
Gas Furnace Comfort Policy Fee - Electronic Ignition - Annual	\$178.00
Gas Furnace Comfort Policy Fee - Standing Pilot - Annual	\$166.00
Gas Furnace/Appliance Service - Midnight to 8:00 a.m. - 1st hour OR No show fee	\$165.00
Gas Furnace/Appliance Service - Midnight to 8:00 a.m. - Each additional 15 minutes	\$41.25
Gas Furnace/Appliance Service - Weekdays - 4:30 p.m. to Midnight - 1st 1/2 hour OR no show fee	\$110.00
Gas Furnace/Appliance Service - Weekdays - 4:30 p.m. to Midnight - Each additional 15 minutes	\$27.50
Gas Furnace/Appliance Service - Weekdays - 8:00 a.m. to 4:30 p.m. - 1st 1/2 hour OR no show fee	\$55.00
Gas Furnace/Appliance Service - Weekdays - 8:00 a.m. to 4:30 p.m. - Each additional 15 minutes	\$27.50
Gas Furnace/Appliance Service - Weekends and Holidays - 4:00 p.m. to Midnight - 1st 1/2 hour OR No Show Fee	\$110.00
Gas Furnace/Appliance Service - Weekends and Holidays - 4:00 p.m. to Midnight - Each additional 15 minutes	\$27.50
Gas Furnace/Appliance Service - Weekends and Holidays - 8:00 a.m. to 4:00 p.m. - 1st 1/2 hour OR No Show Fee	\$110.00
Gas Furnace/Appliance Service - Weekends and Holidays - 8:00 a.m. to 4:00 p.m. - Each additional 15 minutes	\$27.50
Gas Furnace/Appliance Service - Weekends and Holidays - Midnight to 8:00 a.m. - 1st 1/2 hour OR no show fee	\$165.00
Gas Furnace/Appliance Service - Weekends and Holidays - Midnight to 8:00 a.m. - Each additional 15 minutes	\$41.25
I&I Noninspection/noncompliance Surcharge - per month	\$250.00
Point of Sale - Inspection Fee - Sump Pump Already in Place or Not Required	\$105.00
Point of Sale - Inspection Fee - Sump Pump Installation Required	\$205.00

15PUC-002: Exhibit A

Point of Sale - Noncompliance surcharge - per month	\$250.00
Sewer Connection - Property not Previously Assessed (per foot of frontage; varies depending on lot size)	\$90.00
Violations/Noncompliance/Credit Service Charge - Dispatch of Service Vehicle	\$55.00
Violations/Noncompliance/Credit Service Charge - Restoration of Service - Weekdays between 12:00 a.m.-8:00 a.m.	\$160.00
Violations/Noncompliance/Credit Service Charge - Restoration of Service - Weekdays between 4:30 p.m.-12:00 a.m.	\$80.00
Violations/Noncompliance/Credit Service Charge - Restoration of Service - Weekdays between 8:00 a.m.-4:30 p.m.	\$55.00
Violations/Noncompliance/Credit Service Charge - Restoration of Service - Weekends and Holidays	\$160.00
Water and Gas - Shut Off or Turn On - Minimum Charge	\$55.00
Water and Gas Service Construction Permit - Special inspection fee - minimum	\$25.00
Water Connection - Property not Previously Assessed (per foot of frontage; varies depending on lot size)	\$90.00
Water Hydrant, Use of	\$210.00
Water Service - Tapping Fee (1" or less)	\$385.00

City of Duluth

Natural Gas Supply System

2015 Capital Improvement Plan

January 20, 2015

Table of Contents

I. Purpose	2
II. Gas Main Replacements and Upgrades.....	2
III. Lower Woodland/University of Minnesota Duluth Campus Area.....	4
IV. New Gas Supply to the Lower Woodland/UMD area.....	5
V. Upgrading Lower Woodland	7
VI. Woodland Avenue Main Replacement.....	7
VII. Upgrading Upper Woodland	7
VIII. Connection of the East Leg (in Jean Duluth Road) 66 psi gas supply to the Arrowhead/Wallace Supply.....	8
IX. Upgrading Lakeside and the Northshore to 66 psi	9
X. MNDOT Highway 23 Improvements.....	9
XI. Regulator Stations.....	9
XII. Services and Meter Sets	11
XIII. Additional Upgrading	11
XIV. Capital Plan	12
XV. Modeling Summary.....	12
Appendix A: Natural Gas System Capital Improvement Plan.....	12
Appendix B: Natural Gas Model Comparison Runs	14

I. Purpose

The purpose of this report is to:

- a. Identify and summarize known major deficiencies in the system.
- b. Identify and summarize proposed improvements to the gas system to increase supply pressures and volumes of gas to the Lower Woodland/UMD area.
- c. Review alternatives to eliminate dependence on the use of Town Border Station No. 1B.
- d. Increase the connectivity of the 66 psi gas system in the project area to provide a stronger supply throughout both Lower and Upper Woodland, Hunter's Park, Congdon Park, Lakeside and the North Shore.

This report covers only capital construction projects and does not address operation and maintenance costs or issues.

II. Gas Main Replacements and Upgrades

- a. Michigan Street between 1st and 3rd Avenue East
During construction of the sanitary sewer overflow piping from 2nd Avenue East to 1st Avenue East in 2011, it was found that the coating on the 10-inch steel gas main in Michigan Street had failed. Approximately 1,100 feet of steel gas main was installed in 1985. It appears the coating failure is limited to this stretch of pipe. Without a protective coating, the pipe is extremely vulnerable to corrosion. Inspection of the exposed portions of the pipe showed that no major corrosion had occurred at that time; however, this pipe must be replaced within the next 5 to 10 years at the most. Tentative plans are to have City Utility Operations crews replace this pipe in 2018 at an estimated cost of \$120,000.
- b. 58th Avenue West and London Road 14-inch mains
The City's Utility Operations Division carries an extensive amount of repair parts on inventory to enable them to repair any leaking or damaged gas main within the city. However, there are two 14-inch diameter pipes within the City system that we do not carry adequate materials for because 14-inch pipe is an uncommon size. In 1960, the City installed two segments of 14-inch pipe. Since these pipes are relatively old and cannot currently be repaired, they have been prioritized for replacement. The estimated cost to replace both sections of pipe is \$500,000. The 14-inch pipe in London Road is addressed in more detail later in this report.
- c. Woodland Avenue "Dresser" Couplings
"Dresser" style couplings are commonly used on water systems for connecting pipes and were, for a short period of time, also used on natural gas systems. Due to an excessive number of leaks, their use has been completely stopped and their removal within the gas system was made a priority. The Minnesota Office

of Pipeline Safety has mandated that all gas utilities remove any known Dresser couplings within their systems. Until recently, the City believed all Dresser couplings had been removed. However, it has been determined that numerous Dresser style couplings are still in use on a 6-inch steel main located in Woodland. This main extends from the City regulator station at Arrowhead Road and Wallace Avenue, north along Woodland Avenue to Redwing Street, east on Redwing Street to Allendale Avenue, north on Allendale Avenue to West Chisholm Street, then up West Chisholm Street to St. Johns Avenue. Removal of these couplings is necessary and should be completed as soon as possible to eliminate the possibility of natural gas leaks. The 6-inch steel main will be replaced with an 8-inch polyethylene main at an approximate cost of \$500,000. This project is currently scheduled for 2018 and is addressed in more detail later in this report.

Other Dresser couplings have been identified in the system and will be removed as soon as possible.

d. SDR 21 PE Pipe

At various locations within the city, SDR 21 PE pipe was utilized for gas main instead of the City standard of SDR 11.5. This pipe does not have the pressure rating of our standard plastic pipe. It is also harder to maintain and connect services to this pipe as we do not have the ability to “squeeze” the pipe off to stop gas flow. Replacement of this pipe should be completed as funds become available or when street projects are performed in the area. This pipe is found in the following locations:

- In 48th Avenue East – 3,700 feet
- In 3rd Street from Chestnut to Vernon, down Vernon to 2nd Street alley, down 2nd Street alley to 28th Avenue East – 2,000 feet
- In 18th Avenue East from 3rd Street to 8th Street – 2,000 feet
- In 20th Avenue West from 1st Street alley to 1st Street, then west to 23rd, then up 23rd to 9th Street, then again on 10th from 23rd to 24th, then up 24th to 11th Street – 5,500 feet

The pipe listed above in 18th Avenue East will be replaced as part of the proposed 4th Street project planned for 2016.

Pipe in 48th Avenue east will be replaced or abandoned as part of the Lakeside uprating discussed later in this report.

e. I-35 crossing at 26th Avenue West

During the recent construction of Interstate 35, an existing steel gas line was in conflict with the new bridge piers. While installing a replacement for this pipe, a second gas main was also installed under the interstate at 26th Avenue West as a future replacement to an existing steel line. This pipe is currently not in use and

will need to be connected at each end in the future. Once connected, approximately 1,500 feet of steel pipe will be removed from service. The estimated cost for this project is \$30,000. This work will be completed in 2015. The existing steel line also had a leak in 2014. The temporary repair performed on this pipe must be permanently repaired in 2015 per code.

III. Lower Woodland/University of Minnesota Duluth Campus Area

The Lower Woodland/University of Minnesota Duluth Campus (UMD) area of the city currently suffers from low pressures within the natural gas system during peak hour demands on peak days. UMD is the largest single day customer on the City's natural gas system and as such the demand in this area is quite large. In addition, UMD operates its boiler facility at 30 psi, which reduces the amount of allowable pressure drop within the City system.

The gas supply in this area of the city was greatly reinforced when the East Leg system was installed in 2001. This included the installation of new 8 and 10-inch gas mains along Airport Road, Martin Road and Jean Duluth Road. Prior to these upgrades, interruptions to the gas service at the University were common during the winter heating season.

Gas to the East Leg flows from Town Border Station No. 1B (TBS1B) located just west of the airport. Over the past decade, the City has provided uninterrupted natural gas service to UMD through continuous operation of this station. Were TBS1B to be taken off line at any time during the heating season, gas flow to UMD would have to be curtailed.

During the winter of 2013/2014, Northern Natural Gas notified the City of Duluth that the quantity of gas purchased through TBS1B has historically exceeded the amount the City has a contract to purchase (the "entitlement"). In addition, Northern Natural Gas also stated that the City will need to meet all entitlements in the future. This includes limiting the gas purchased at TBS1B to 6,000 MCF per day (250 MCF per hour) with a peak flow rate of 400 MCF per hour. In an attempt to comply with this mandate, the City installed new gas main along Skyline Boulevard and Kenwood Avenue during the summer of 2014 and updated the neighborhoods directly north of Skyline Boulevard between Central Entrance and Kenwood Avenue from 22 psi to 66 psi. This construction provided a second 66 psi feed to the project area. It is hoped that this second gas feed will allow the City to continue to provide UMD uninterrupted gas service while also meeting the entitlement limits included in the Northern Natural Gas contract. However, these improvements will still not allow the City to operate the gas system without the use of TBS1B. If TBS1B were to fail during a cold period, gas to UMD would have to be curtailed and supply to Lakeside and the North Shore would be probably be lost.

TBS1B and the East Leg are the primary gas supply for Lakeside and the North Shore. Natural gas was extended from Lakeside up Superior Street to the Lakewood water treatment facility in 2006. SCADA monitoring of this extension was not installed until 2012. During cold weather periods, the monitoring shows pressure on this system dropping from the maximum absolute operating pressure of 22 psi to as low as 15 psi at the water plant and 9 psi in Upper Lakeside. While this pressure is still more than adequate to provide residential heating loads, any future extensions further north will be met with scrutiny to ensure there is adequate capacity. Upgrading of the North Shore line to 66 psi would greatly increase the amount of gas available for use along the North Shore as well as increasing the capacity within the Lakeside neighborhood where this supply originates. All proposed upgrades in the Lower Woodland/UMD area will be reviewed to determine if they can also help facilitate the extension of 66 psi gas to the North Shore area.

IV. New Gas Supply to the Lower Woodland/UMD area

Installation of a new trunk gas main to the Lower Woodland/UMD area from one of the City's primary trunk mains will be required to significantly increase gas volumes available and to ensure uninterrupted operation without the use of TBS1B.

The City is fed gas from four locations. Figure 1 shows these four locations. The two primary feeds are summarized as follows:

a. Town Border Station No. 1 (TBS1)

TBS1 is located on Morris Thomas Road and feeds natural gas through a 16-inch main along Morris Thomas Road to Piedmont Avenue, then along Piedmont Avenue to 24th Avenue West, then along 24th Avenue West to Michigan Street. At Michigan Street this line splits to run east to the steam plant and west to the Stora Enso regulator station.

b. The Great Lakes Regulator Station

The Great Lakes Regulator Station is located in Gary-New Duluth along East McCuen Street. This regulator feeds gas through a 16-inch pipe all the way to the Stora Enso regulator station where it then combines with the 16-inch main also fed by TBS-1. Thru this route, the Great Lakes supply provides a main feed into the center of the city.

A new trunk line tying one or both of these main feeds to the project area would provide the increase in volume and pressure the system requires. Since these trunk lines are tied together on Michigan Street, gas could be fed from either supply regardless of which pipe the new feed is directly connected to. Having gas flow from TBS1 or the Great Lakes Regulator Station to provide supply to the project area would eliminate the City's dependence on TBS1B. The two potential routes are summarized as follows:

- a. New gas main from Piedmont Avenue along Arlington Avenue and Arrowhead Road – Alternative No. 1

A new trunk gas main could be connected to the project area by construction of a new pipe from Piedmont Avenue, along Trinity Road, then along Arlington Road to Arrowhead Road, then along Arrowhead Road to Kenwood Avenue. The new pipe would tie into the existing 16-inch pipe in Piedmont Avenue and end at Kenwood Avenue. The existing pipes within Arlington Road would remain in service. Utilizing the City's natural gas computer model, it was determined that a 16-inch steel pipe would be required for this alternative. The estimated cost for this alternative is \$8,400,000. This route is shown in Figure 2.

- b. New gas main from Downtown through the Central and East Hillside Neighborhoods – Alternative No. 2

This new trunk gas main could be connected to the project area by installing a new pipe from Michigan Street through downtown, then north to the UMD area and east towards the Lower Woodland area or directly towards Lakeside. Various routes are available for this construction; however, by combining this project with a proposed street improvement project, overall costs to the gas utility can be reduced. Currently, the County is proposing to reconstruct 4th Street from 6th Avenue East to Wallace Avenue and to mill and overlay Wallace Avenue from 4th Street to Arrowhead Road. By combining the proposed gas main project with the street project, street restoration costs will not be charged to the gas utility. Utilizing the City's natural gas computer model, it was determined that a 12-inch PE pipe would be required for this alternative from Michigan Street to 18th Avenue East. From this point, the pipe would split and an 8-inch would feed UMD up 18th Avenue East and an 8-inch would extend east along 4th Street. The estimated cost for this alternative is \$4,114,500. This route is shown in Figure 2.

Under this scenario, the new trunk line would not be tied into to the existing neighborhoods it passes through enroute to the project areas. One exception would be at 18th Avenue East. At 18th Avenue East, this new pipe would replace the existing SDR 21 pipe on the upper side of 4th street and this area would be updated to 66 psi. Provisions would be made for future connections in other areas.

The new pipe would connect to the existing 66 psi system in College Avenue near the UMD service and as such the City will have a direct feed to their largest customer. The second leg of this system will tie into an existing 8-inch steel pipe in 4th Street at Hawthorne Road.

Connection of the new 12-inch main to the existing 16-inch main in Michigan Street will require the uprating of a short stretch of 16-inch main under interstate 35 from 22 to 66 psi and construction of a new regulator station on Michigan Street. By relocating the regulator station across the interstate, a new regulator station will be required to serve Canal Park and Park Point

The new 12 and 8-inch mains would be installed in 2015 and 2016, based upon the current County reconstruction plans for 4th Street.

Alternative No. 2 is the recommended alternative for supplying additional gas to Lower Woodland/UMD and Lakeside. Additional model runs show that after this upgrade is complete, and multiple other upgrades listed below, the system will be capable of operating without TBS1B in service.

V. Uprating Lower Woodland

To further increase gas flows within the Lower Woodland neighborhood, it is proposed to uprate this area to 66 psi. Uprating the local mains from 22 psi to 66 psi greatly increases the capacity of the entire neighborhood and allows the small diameter loops to carry a much greater amount of gas to large customers like UMD. The uprating area is shown in Figure 3 and is generally bounded by Kenwood Avenue on the west, 4th Street on the south, Woodland Avenue on the east, and West St. Andrews Street on the north. These boundaries are general and the actual boundaries will vary based upon where each gas line ends. The plan is to uprate this area in 2015. Once this area is uprated, a regulator located on Brainerd Avenue and a regulator located on Melrose Avenue will both be removed. A new regulator will be added at 27th Avenue East and 8th Street near the Bluestone Development.

VI. Woodland Avenue Main Replacement

This project was previously described in Section II of this report. This project is planned for 2018 at a cost of approximately \$500,000. When this project is completed, the new main will be 66 psi instead of 22 psi and will provide an additional feed from the East Leg to the Lower Woodland/UMD area. This project is shown in Figure 4.

VII. Uprating Upper Woodland

Once the new pipe is installed in Woodland Avenue as described above, Upper Woodland from St. Andrews Street to Vassar Street will be uprated to 66 psi. This uprating will create numerous loops and allow 66 psi gas to flow along Woodland Avenue between Arrowhead Road and Martin Road. These loops will increase system capacity and reliability. This project will also eliminate the regulator station located at the intersection of Calvary Road and Arnold Road. This uprating will take place in 2019. This uprating area is shown in Figure 4.

VIII. Connection of the East Leg (in Jean Duluth Road) 66 psi gas supply to the Arrowhead/Wallace Supply

The new 8 and 10-inch East Leg main provided increased gas supply to the eastern portion of the city. This feed originates at TBS1B and extends east on Airport Road at 125 psi. At the junction of Airport Road and Rice Lake Road, this feed splits and extends south on Rice Lake Road to Airpark Road and north on Rice Lake Road to Martin Road. At Airpark Road and at Martin Road, a regulator station is located that cuts the supply pressure to 66 psi. The regulator station at Airpark Road provides the primary feed to Lower Woodland/UMD with the 66 psi gas terminating at UMD and at the Arrowhead/Wallace regulator station. The regulator station at Martin Road provides the primary feed to the city east of UMD including Lakeside and the North Shore.

It is proposed to tie these two main feeds together to provide a loop. This loop would ensure adequate supply if either pipe was required to be taken off line. There is an existing 6-inch pipe extending from 34th Avenue East along Mellwood Drive and Valley Drive up to Glenwood Street. Upgrading this pipe to 66 psi would provide a full loop for this supply. In addition, a new 8-inch PE pipe would be installed in Glenwood from Woodbury Lane to Old Howard Mill Road to increase the capacity of this loop.

Upgrading of this 6-inch pipe will include upgrading an entire neighborhood. This neighborhood is bounded by Carlisle Avenue, Sparkman Avenue and Everett Street on the north, Woodland Avenue and Congdon Park Drive on the west, London Road on the south and 40th Avenue Creek on the east (Hunters Park, Hidden Valley and the east half of Congdon Park). Due to the large size of this area, it would be upgraded in stages over a summer and could require the installation of one or two temporary regulator stations to facilitate the upgrade. A more detailed upgrading plan will be prepared prior to this work being completed. This work would be done in 2017 and is shown in Figure 5.

The existing regulator station at Arrowhead/Wallace feeds this area, as well as Upper Woodland and Lakeside. This regulator will ultimately not be required. However, if it is still needed to feed Upper Woodland following this upgrading, then a bypass would be installed around the regulator station to complete the loop. Once this area and Upper Woodland have been upgraded, this regulator will be removed.

The existing regulator on Howard Mill Road also feeds this area. New regulator stations will be temporarily required on Glenwood Street and London Road to continue to provide 22 psi gas to Lakeside when this area is upgraded, and the regulator on Old Howard Mill Road can be removed. Currently, there is a pressure loss of greater than 5 psi in the gas feed along Glenwood Street from Old Howard Mill Road to 43rd Avenue East. By moving the new regulator along Glenwood as far east as possible, a 5 psi pressure increase in Lakeside can be achieved during the interim until the entire neighborhood is upgraded to 66 psi. These regulators will be relocated in 2016.

Once the new regulators are installed, the existing Old Howard Mill Road regulator can be utilized to uprate the upper half of this area and the existing regulator at Wallace Road and Arrowhead Road can be used to uprate the lower half of the area.

IX. Uprating Lakeside and the Northshore to 66 psi

Following completion of the additional gas supply to the Lower Woodland/UMD area and the looping of the East Leg from Old Howard Mill Road to Wallace/Arrowhead, the gas system will be capable of supplying additional gas at 66 psi to Lakeside and the North Shore. As part of the East Leg looping, 3 regulators will be installed and one will be abandoned. One new regulator will be installed on Glenwood Street feeding to the east and two on London Road feeding both east and west. (Potentially, the London Road regulators may be combined into one regulator.) Prior to any uprating in Lakeside, the existing SDR 21 pipe located within 48th Avenue East and the 14-inch pipe in London Road must be replaced. These pipes will be replaced in 2017. This work is shown in Figure 6.

The two new regulators feeding Lakeside will be removed following the uprating. The new regulator on London Road feeding to the west will remain.

X. MNDOT Highway 23 Improvements

In 2015, MNDOT will be improving Highway 23 in the western end of the city. As part of these improvements, a new bridge will be constructed over Kingsbury Creek adjacent to the Zoo. In 2014, the 12-inch steel gas main in this area was replaced with polyethylene and relocated out of the roadway towards the river to make room for new bridge. In this area a 3-inch gas main also exists serving the upper side of the highway. This main operates at 22 psi. During construction, this pipe will be cut off. Instead of replacing it, the neighborhood directly to the west (Norton Park) will be uprated to 66 psi. Once this is done, a second feed will be directionally drilled across Highway 23 so this neighborhood has two feeds. The existing regulator serving Norton Park will be relocated to Fremont Street so the 22 psi system in Fairmont still has two feed points. This is shown in Figure 7.

MNDOT will also be constructing a new bridge over Knowlton Creek in 2016. In 2015 the City will need to relocate an existing 8-inch steel pipe located on the south side of Grand Avenue to make room for this construction. This is also shown in Figure 7.

XI. Regulator Stations

The City's gas regulator stations are used to reduce feed pressure to that of the distribution system and provide over-pressure protection. The distribution system operates at 22 or 66 psi. Overall, the regulator stations are in excellent shape. Planned

improvements will increase capacity where necessary and provide additional system control. These regulators are shown on Figure 1.

a. Airpark, Stora Enso, and Riveness Flow Meters

The City's System Control and Data Acquisition (SCADA) system allows operation of the natural gas system from the gas control room located at Comfort Systems at 520 Garfield Avenue. The use of a SCADA system is mandated under federal law to provide continuous monitoring of the entire system. The City has recently completed installation of a new SCADA system for gas, water, and sanitary sewer. The upgraded SCADA system now allows the gas control staff to monitor system flows and pressures substantially better than previously. This new system control allows for better gas purchasing. To further enhance the system, control flows, monitor pressures, and evaluate future system upgrades, additional flow metering stations should be installed. It is recommended that new flow meters be installed in the existing regulator stations at Riveness and Stora Enso. This work will be performed by Utility Operations crews at an estimated cost of \$50,000 for Riveness and \$100,000 for Stora Enso. Riveness will be updated in 2017 and Stora Enso in 2019.

As part of the East Leg looping previously described above, the regulator station at Airpark should be relocated along Rice Lake Road to allow gas to flow in a full circle. Currently, there is no gas supply available between Airpark Road and Martin Road because the gas feed in this area is 125 psi. This situation will be evaluated and either the two regulators will be replaced with one new regulator at Airport Road or a parallel main will be installed from Airpark Road to Martin Road.

b. Regulator Station Enclosures

While the City has numerous regulator stations, there are several more significant stations that control much of the flow of natural gas around the city. These stations are critical for metering and controlling gas flows and pressure. If any of these stations are out of service during cold weather, gas supply could be affected to thousands of customers. There are two key stations where enclosures should be installed: Stora Enso Regulator Station and Riveness Regulator Station.

The Stora Enso Regulator Station is located near the former Stora Enso paper mill. All the gas flow from the Great Lakes Town Border Station flows through a 16-inch main at 125 psi to this regulator station for distribution. Due to the close proximity of this station to Interstate 35, it is continually coated with spray from the roadway during the winter months. This snow/water/salt combination is not only bad for the protective coatings on the gas pipes but also adds to freezing of the regulators and pilot lines. Currently, a portion of the piping is wrapped with plastic and duct tape to protect it from this condition. It is recommended that a

permanent enclosure be constructed at this location to protect the regulators and the pilot lines.

The Riveness Regulator Station is located at the intersection of Riveness and Morris Thomas Road. This station receives natural gas from TBS1 at 125 psi and reduces pressure for distribution. During certain natural gas flows, the regulators at this station make a substantial amount of noise. While noise is present at all of the City regulator stations, it is excessively loud at this location. In addition, the station is located directly adjacent to residential dwellings. These residents have consistently complained about the noise. Attempts to change pressure regulators or settings have not alleviated the noise. It is recommended that a permanent enclosure be constructed at this location to reduce the noise heard by adjacent residents.

XII. Services and Meter Sets

Most services within the City are PE pipe and are in good condition. Steel services are regularly replaced as part of annual miscellaneous gas construction projects. The riser is the portion of the service that connects the underground PE gas service to the above-ground meter set. During the 1970's, copper risers were commonly used on house services. These copper risers are known for leaking and so the Minnesota Office of Pipeline Safety has mandated that they all be replaced. The City has been aggressively replacing them over the past 2 years and the majority of the risers will be gone by mid-2015.

The Minnesota Office of Pipeline Safety recently passed new requirements to protect above ground piping from vehicle damage. This rule is requiring the City to inspect all above ground piping, including meter sets, to determine if they need protection or relocation. As such, two new annual projects will be included in the budget to meet this regulation. These include a bollard project where concrete filled steel pipes will be installed near above ground piping to protect it and a meter relocation project where meter sets will be relocated out of vulnerable areas. This work will take approximately 5 years to complete.

XIII. Additional Uprating

The City will continue to work to uprate areas when convenient, particularly to increase capacity or to reduce maintenance by removing regulators. The Norton Park area will be uprated in 2015. From Norton Park to the east up to 32nd Avenue can easily be uprated in small sections and would allow for the removal of 5 regulator stations. These uprates should be done prior to uprating the Stora Enso regulator station currently planned for 2019. This uprate would include the neighborhoods of Fairmont, Spirit Valley, Denfeld, Irving and Cody.

XIV. Capital Plan

The table in Appendix A shows a proposed capital improvement plan for construction projects through 2019. The plan includes the name of the proposed projects, their estimated cost, and the budget year. The plan should be updated on an annual basis to reflect the current status of the natural gas utility and add or remove projects based upon the need at that time.

XV. Modeling Summary

The table in Appendix B shows the results of computer modeling of the system with the proposed alternatives at key pressure locations.

Appendix A: Natural Gas System Capital Improvement Plan

5-year natural gas capital projects						
Project	2015	2016	2017	2018	2019	
I-35 crossing at 26 th Avenue West, 6-inch PE	\$30,000					Remove steel pipe with temporary repair
1 st Avenue West from Michigan Street to 4 th street and 4 th Street from 1 st Avenue West to 6 th Avenue East , 12-inch PE pipe	\$1,200,000					New gas feed to Lower Woodland/UMD and Lakeside
4 th Street, 12 th Avenue East to 16 th Avenue East, 12-inch PE pipe	\$350,000					New gas feed to Lower Woodland/UMD and Lakeside
New regulator station at 27th Avenue East and 8 th Street	\$50,000					Provides new feed to 22 psi system farther east
New 8-inch main in Glenwood between Woodbury and Old Howard Mill Road	\$250,000					Provides loop between East Leg and Arrowhead Road
Knowlton Creek pipe realignment	\$200,000					Relocate for MNDOT
Copper Risers	\$350,000					
Meter Relocations	\$500,000	\$400,000	\$300,000	\$300,000	\$300,000	
Pipe Bollards	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	
4 th Street, 6 th Avenue East to 12 th Avenue East, 12-inch PE pipe		\$675,000				New gas feed to Lower Woodland/UMD and Lakeside
4 th Street, 16 th Avenue East to Hawthorne, 8-inch PE pipe		\$1,164,500				New gas feed to Lakeside
New regulator station on Michigan Street		\$75,000				New gas feed to Lower Woodland/UMD and Lakeside
18 th Avenue East to 8 th Street, 8 th to 19 th Avenue East, 19 th Ave East to Shelling Avenue, Shelling to College, 2000 feet, replacement with 8-inch and 1800 feet new 8-inch PE		\$650,000				SDR 21 pipe, coordinate with County 4 th Street project, provide additional feed to UMD area
New regulators East of Old Howard Mill and London Road		\$100,000				Provides increased capacity to Lakeside and provides loop between East Leg and Arrowhead Road

London Road - 14-inch replacement with 8-inch			\$300,000			Replacement of steel pipe (odd size, no repair parts available, uprating of Lakeside)
48 th Avenue East – 3700 feet, replacement with 8 inch			\$750,000			SDR 21 pipe, uprating of Lakeside
Riveness flow meter			\$50,000			Enhanced system control
Relocation of Airpark/Martin Regulators or parallel main				\$150,000		Provides a dual feed and provides service on Rice Lake Road
Michigan Street - 10-inch - installed by Garfield				\$120,000		Protective coating severely deteriorated - 2 blocks of pipe to be replaced
Woodland Ave. 6-inch steel Dressers - 2 miles				\$500,000		Project mandated by MN Office of Pipeline Safety - safety issue, uprating of Woodland
Building shell at Stora Enso and Riveness				\$120,000		Building project to protect equipment and reduce winter time outages
58th Ave West - 14-in replacement with 3-inch					\$200,000	Replacement of steel pipe with leak history (odd size, no repair parts available)
Stora Enso flow meter					\$100,000	Enhanced system control, includes regulator reconfiguration
3 rd Street, Vernon, 2 nd Street Alley					\$200,000	SDR 21 pipe
20 th Avenue West, 23 rd Avenue West, 10 th Street					\$1,000,000	SDR 21 pipe
Uprating Norton Park	\$10,000					
Uprating of Lower Woodland	\$10,000					Upgrades capacity of neighborhood system
Uprating Hunters Park and Hidden Valley		\$10,000				Provides loop between East Leg and Arrowhead Road
Uprating of Fairmont, Spirit Valley, Denfeld, Irving and Cody			\$20,000			
Uprating Lakeside/Northshore				\$10,000		Increase supply capabilities and eliminates low pressure areas
Uprating of Upper Woodland					\$10,000	Upgrades capacity of neighborhood system and provides additional feed to Lower Woodland
Total	\$3,000,000	\$3,124,500	\$1,470,000	\$1,250,000	\$1,860,000	

Appendix B: Natural Gas Model Comparison Runs

All models runs at 90 degree days (total flow 2325.982 MCFH) except where noted

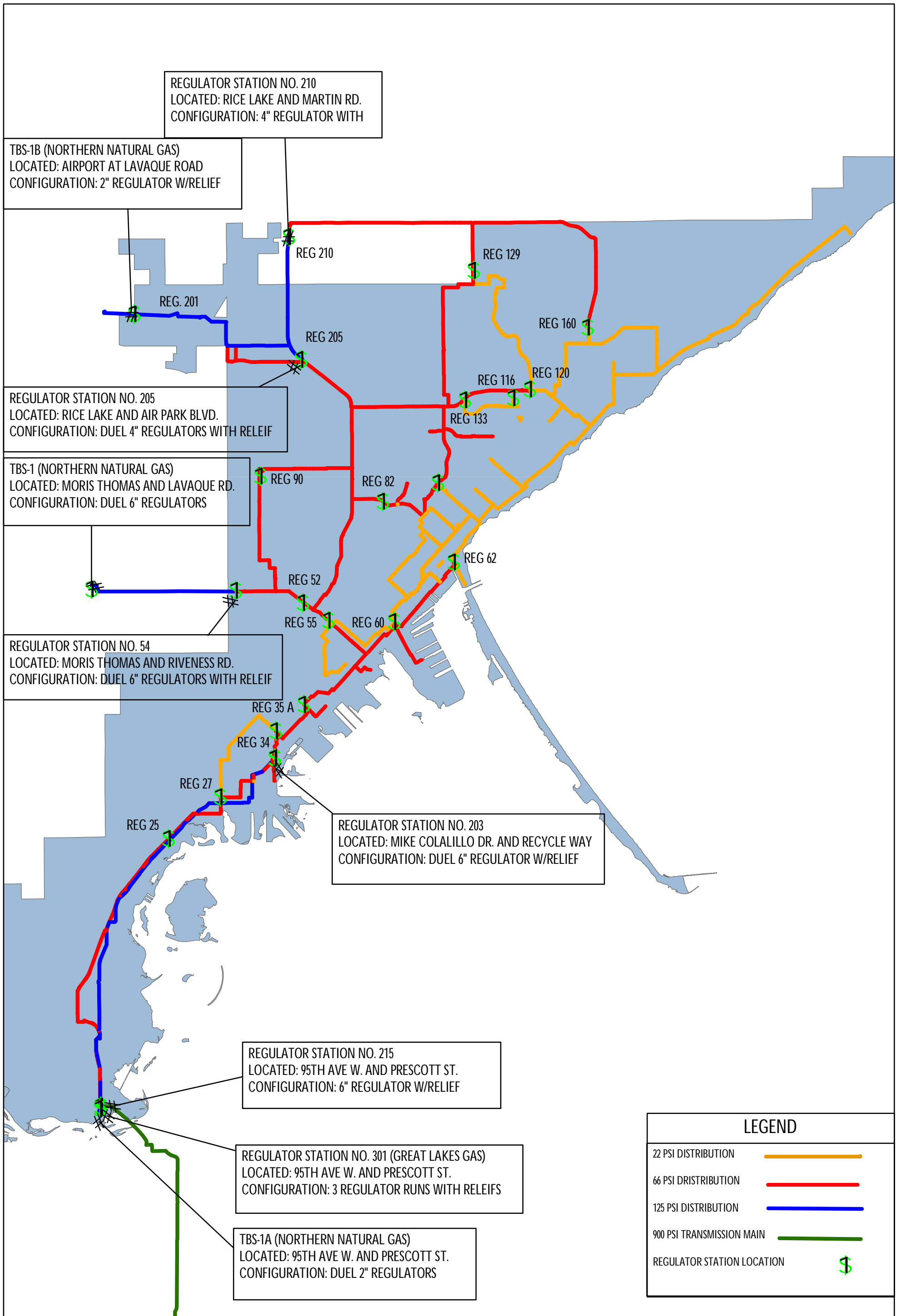
All model runs have gas supplied from Great Lakes, TBS1 and TBS1B except where noted.

Each run includes all improvements from previous runs listed above it.

Run no.	Description	TBS-1B Flow (MCFH)	Pressure at UMD (PSI)	Pressure at Wallace and Arrowhead Reg (PSI)	Pressure in Upper Lakeside (PSI)
1	2013 System	557.575	26.47	40.42	7.23
2	2104 System	553.799	31.20	41.76	8.51
3	UMD area uprated to 66 psi	554.683	34.35	41.54	8.52
4a	New 12" pipe along 4th Street and 8" pipe up to UMD on 18th Avenue East	403.022	51.93	49.03	8.52
4b	New 12" pipe along 4th Street and 12" pipe up to UMD on 18th Avenue East	377.084	54.41	50.03	8.52
5a	The 4a situation with TBS-1B off	0	42.79	31.83	7.55
5b	The 4b situation with TBS-1B off	0	49.20	35.68	8.52
6a-1	Hunters Park and Congdon Park uprated to 66 psi, new reg at 35th Ave East and London Road, new reg on Glenwood at 43rd Ave East, new 8" pipe from 18th Avenue East to existing 6" steel pipe at Tischer Creek, 18th Ave E is 8" pipe	410.126	51.99	51.50	13.98
6a-2	Hunters Park and Congdon Park uprated to 66 psi, new reg at 35th Ave East and London Road, new reg on Glenwood at 43rd Ave East, new 8" pipe from 18th Avenue East to existing 6" steel pipe at Tischer Creek, 19th Ave E is 12" pipe	356.104	53.24	51.83	13.98
6b	Hunters Park and Congdon Park uprated to 66 psi, new reg at 35th Ave East and London Road, new reg at Glenwood and 43rd Ave East, new 12" pipe from 18th Avenue East to existing 6" steel pipe at Tischer Creek, 19th Ave E is 8" pipe	310.00	52.03	52.05	13.98
7a-1	The 6a-1 situation with TBS-1B in flow control at 250 MCFH	250	49.58	48.20	13.97
7a-2	The 6a-1 situation with TBS-1B off	0	47.04	45.92	13.97
8	Uprated Lakeside	250	49.56	48.59	41.87

8a	Uprated Lakeside with TBS-1B off	0	43.12	40.65	-
9a	New pipe on Woodland and Uprated Upper Woodland	250	49.56	48.46	-
9b	New pipe on Woodland and Uprated Upper Woodland, TBS-1B off	0	43.12	40.37	-
10a	All improvements run at 95 degree days	250	47.74	46.43	39.15
10b	All improvements run at 95 degree days with TBS-1B off	0	40.72	37.55	28.32
11a	Replace Airpark and Martin regs with a single reg station	250	49.88	49.01	42.85
11b	Replace Airpark and Martin regs with a single reg station, TBS-1B off	0	43.57	41.33	34.04
12	The 11b situation with TBS-1 also off (Great Lakes Only)*	0	13.06	11.09	0.00
13	The 12 situation on a 75 Degree Day	0	33.61	31.47	24.95
14	Normal Winter Day - 75 Degree Day with TBS-1B Fixed at 250 MCFH	250	54.53	54.05	49.97

* Customers North of Central Entrance in the 66 PSI system mostly lost

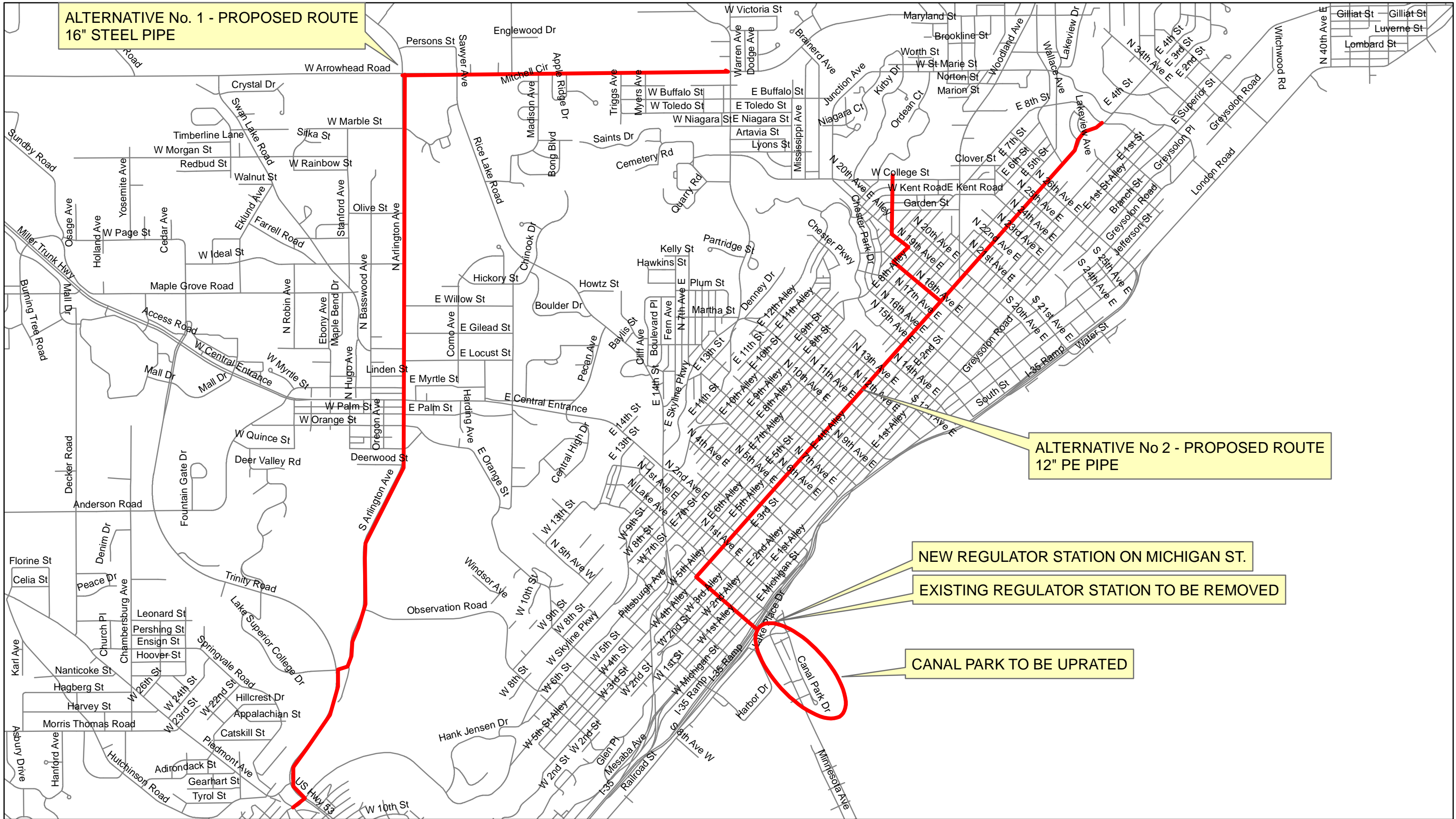


The City of Duluth has tried to ensure that the information contained in this map or electronic document is accurate. The City of Duluth makes no warranty or guarantee concerning the accuracy or reliability. This drawing/data is neither a legally recorded map nor a survey and is not intended to be used as one. The drawing/data is a compilation of records, information and data located in various City, County and State offices and other sources affecting the area shown and is to be used for reference purposes only. The City of Duluth shall not be liable for errors contained within this data provided for any damages in connection with the use of this information contained within.

City of Duluth Utilities Map Figure 1



K



**ALTERNATIVE No. 1 - PROPOSED ROUTE
16" STEEL PIPE**

**ALTERNATIVE No 2 - PROPOSED ROUTE
12" PE PIPE**


NEW REGULATOR STATION ON MICHIGAN ST.

EXISTING REGULATOR STATION TO BE REMOVED

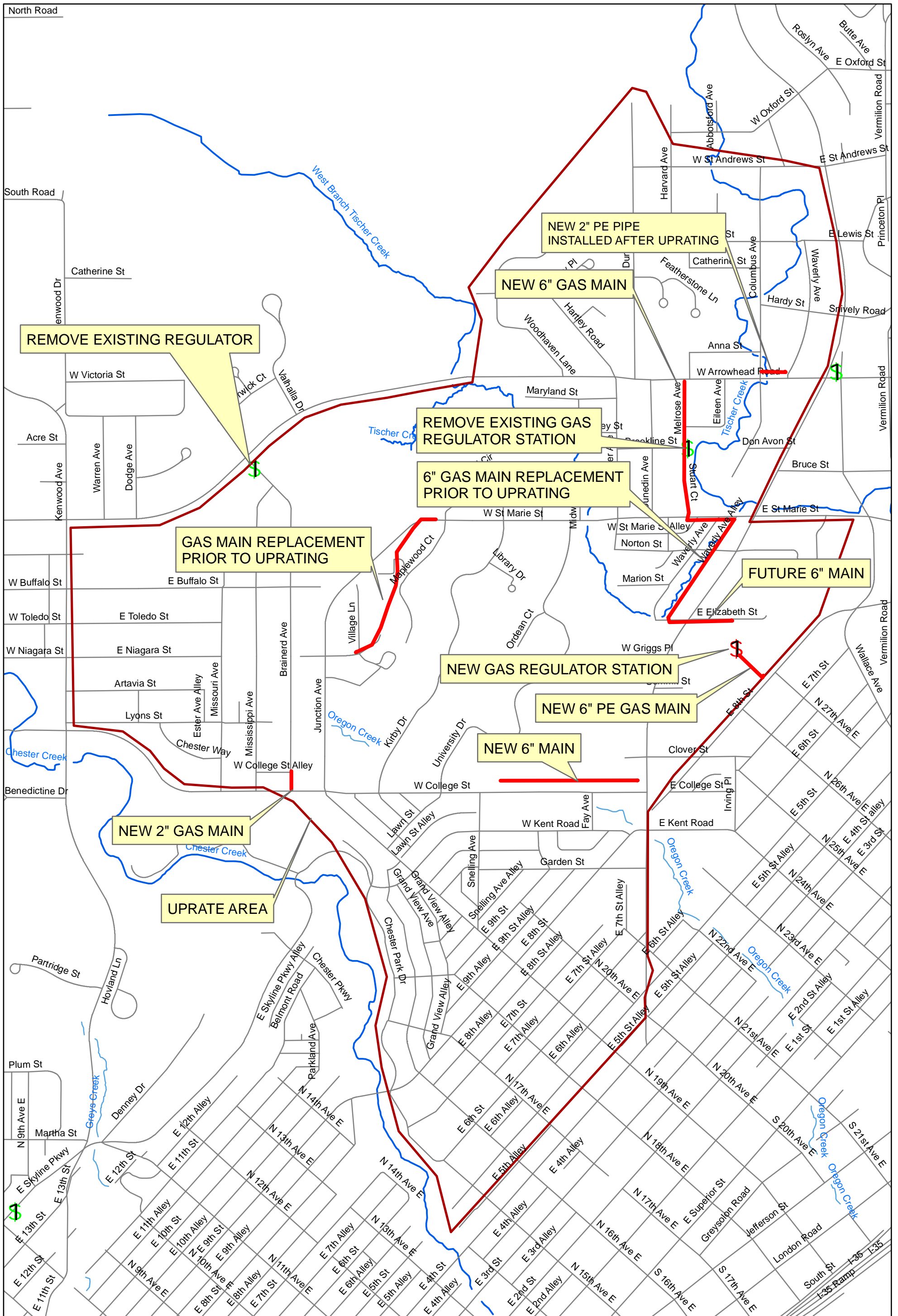
CANAL PARK TO BE UPDATED

**City of Duluth Utilities Map
Figure 2**

K
1 inch = 2,167 feet



The City of Duluth has tried to ensure that the information contained in this map or electronic document is accurate. The City of Duluth makes no warranty or guarantee concerning the accuracy or reliability. This drawing/data is neither a legally recorded map nor a survey and is not intended to be used as one. The drawing/data is a compilation of records, information and data located in various City, County and State offices and other sources affecting the area shown and is to be used for reference purposes only. The City of Duluth shall not be liable for errors contained within this data provided or for any damages in connection with the use of this information contained within.



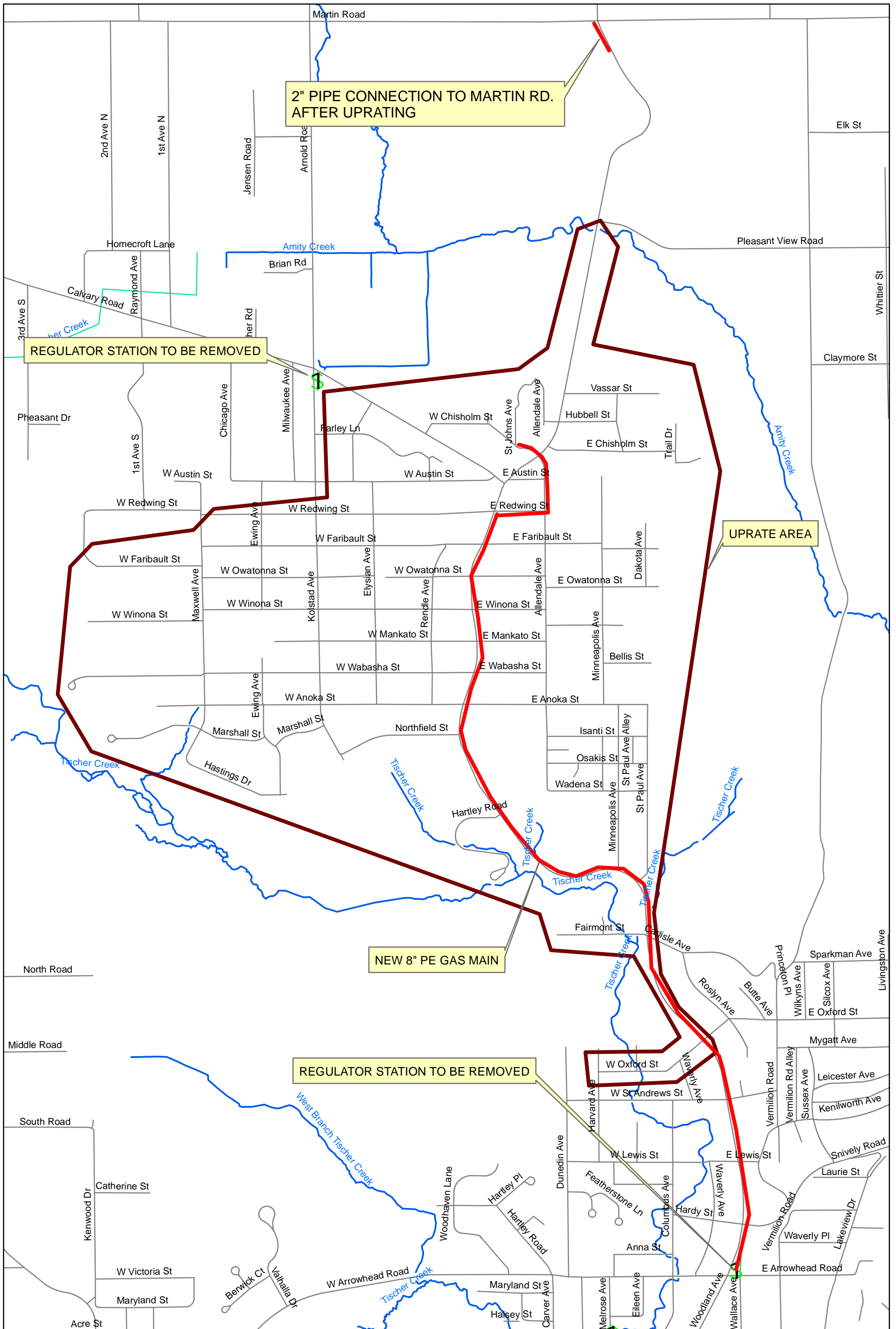
The City of Duluth has tried to ensure that the information contained in this map or electronic document is accurate. The City of Duluth makes no warranty or guarantee concerning the accuracy or reliability. This drawing/data is neither a legally recorded map nor a survey and is not intended to be used as one. The drawing/data is a compilation of records, information and data located in various City, County and State offices and other sources affecting the area shown and is to be used for reference purposes only. The City of Duluth shall not be liable for errors contained within this data provided or for any damages in connection with the use of this information contained within.

City of Duluth Utilities Map Figure 3

K



1 inch = 833 feet



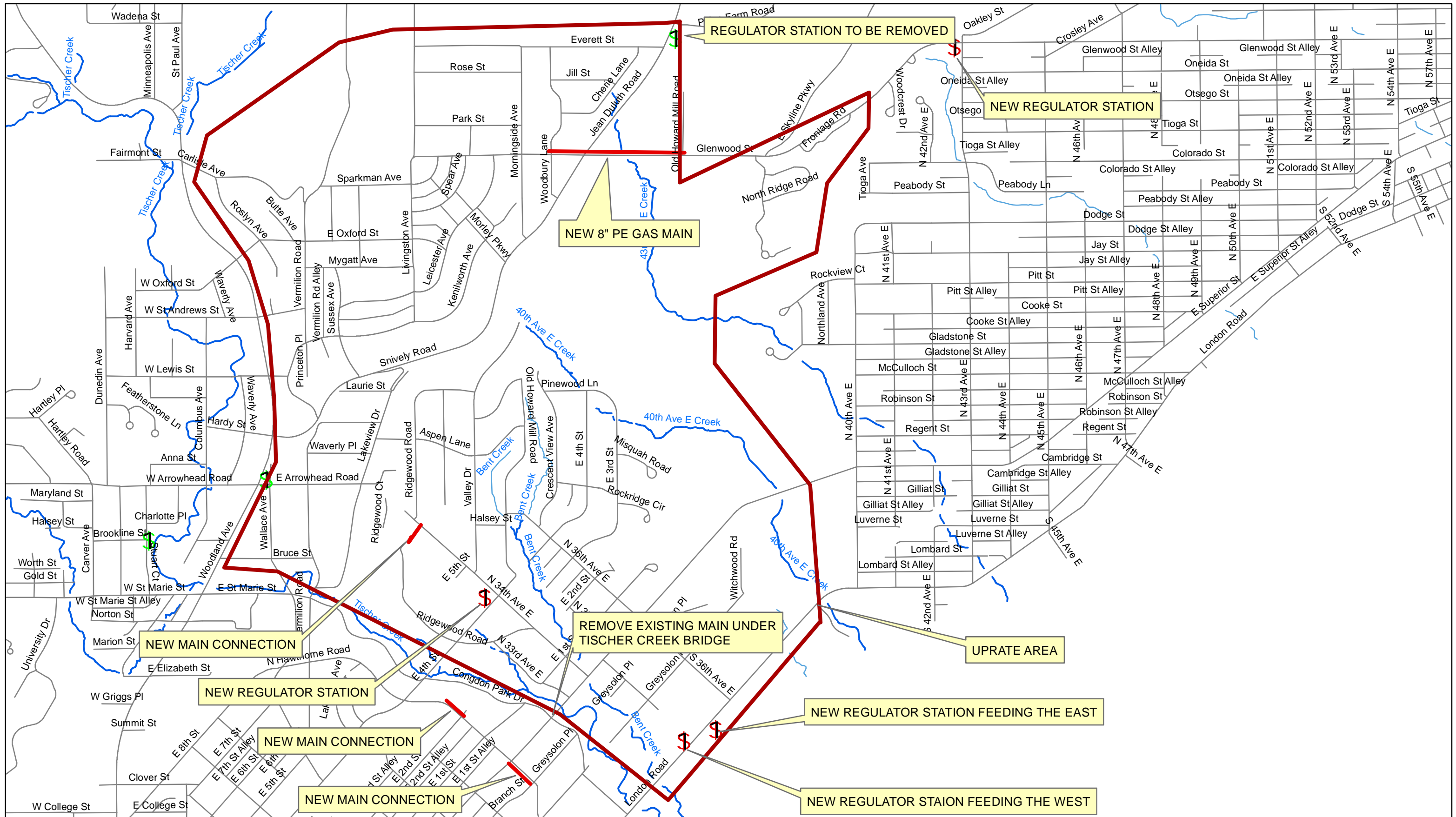
The City of Duluth has tried to ensure that the information contained in this map or electronic document is accurate. The City of Duluth makes no warranty or guarantee concerning the accuracy or reliability. This drawing/data is neither a legally recorded map nor a survey and is not intended to be used as one. The drawing/data is a compilation of records, information and data located in various City, County and State offices and other sources affecting the area shown and is to be used for reference purposes only. The City of Duluth shall not be liable for errors contained within this data provided or for any damages in connection with the use of this information contained within.

City of Duluth Utilities Map Figure 4

K

1 inch = 1,000 feet



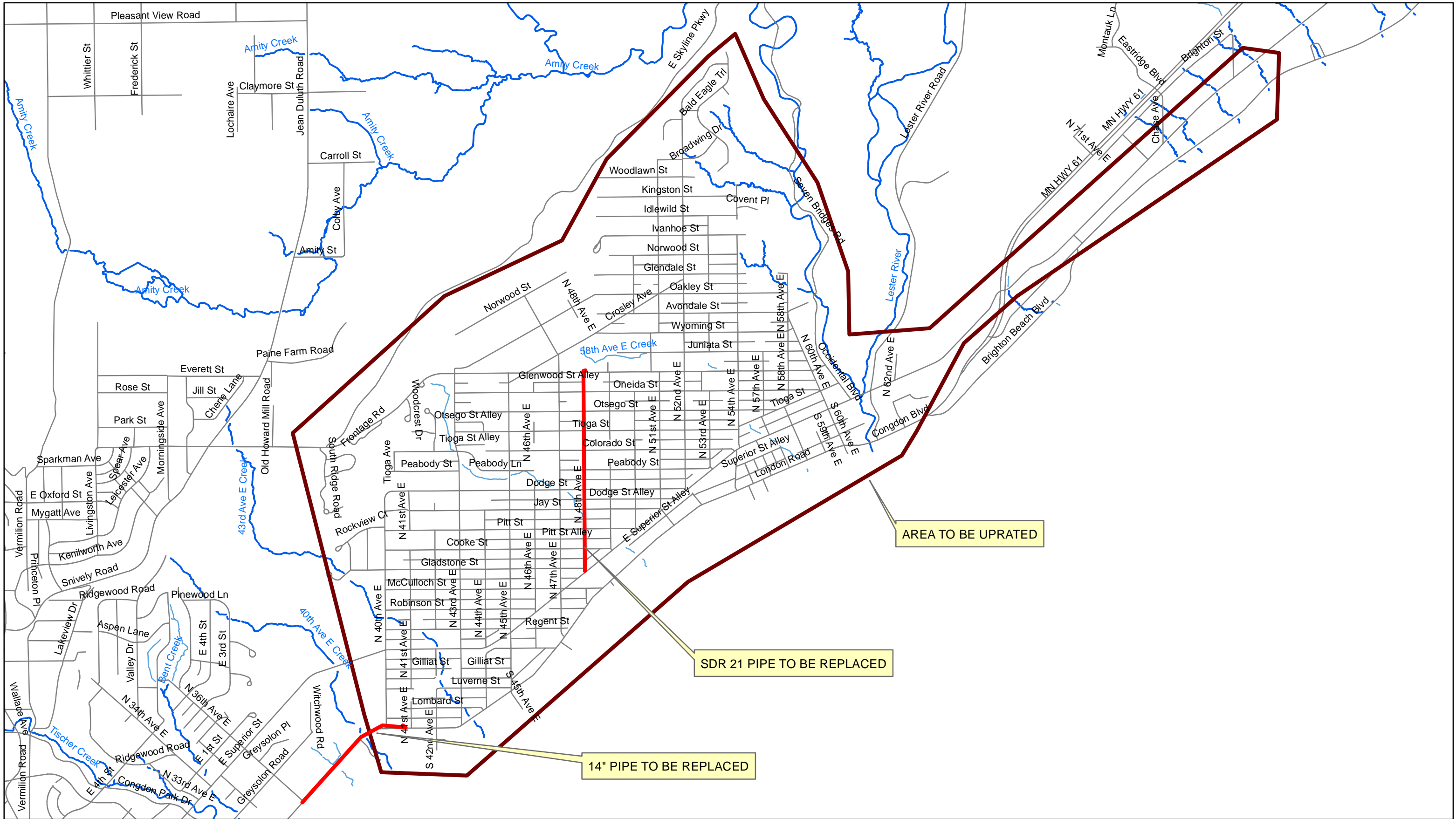


The City of Duluth has tried to ensure that the information contained in this map or electronic document is accurate. The City of Duluth makes no warranty or guarantee concerning the accuracy or reliability. This drawing/data is neither a legally recorded map nor a survey and is not intended to be used as one. The drawing/data is a compilation of records, information and data located in various City, County and State offices and other sources affecting the area shown and is to be used for reference purposes only. The City of Duluth shall not be liable for errors contained within this data provided or for any damages in connection with the use of this information contained within.

City of Duluth Utilities Map Figure 5

K
1 inch = 1,083 feet



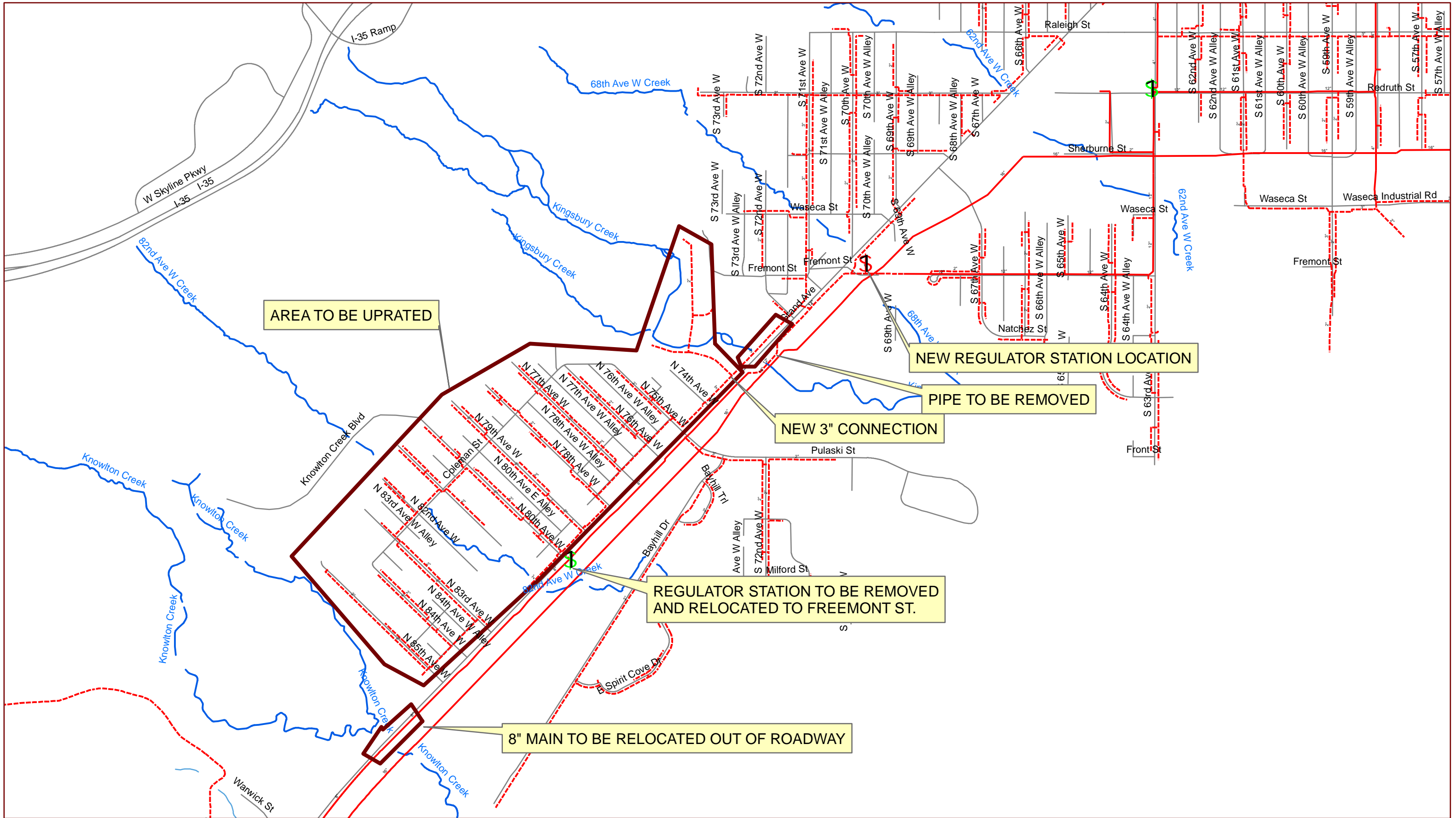


The City of Duluth has tried to ensure that the information contained in this map or electronic document is accurate. The City of Duluth makes no warranty or guarantee concerning the accuracy or reliability. This drawing/data is neither a legally recorded map nor a survey and is not intended to be used as one. The drawing/data is a compilation of records, information and data located in various City, County and State offices and other sources affecting the area shown and is to be used for reference purposes only. The City of Duluth shall not be liable for errors contained within this data provided or for any damages in connection with the use of this information contained within.

City of Duluth Utilities Map Figure 6

K
1 inch = 1,667 feet





The City of Duluth has tried to ensure that the information contained in this map or electronic document is accurate. The City of Duluth makes no warranty or guarantee concerning the accuracy or reliability. This drawing/data is neither a legally recorded map nor a survey and is not intended to be used as one. The drawing/data is a compilation of records, information and data located in various City, County and State offices and other sources affecting the area shown and is to be used for reference purposes only. The City of Duluth shall not be liable for errors contained within this data provided or for any damages in connection with the use of this information contained within.

City of Duluth Utilities Map Figure 7

K

1 inch = 686 feet

