



WATER STUDY

City of Horace

May 18, 2020



PRELIMINARY ENGINEERING REPORT AND WATER STUDY



- WATER QUALITY ANALYSIS AND IMPROVEMENTS
- WATER TREATMENT PLANT ANALYSIS AND IMPROVEMENTS
- WATER STORAGE ANALYSIS AND IMPROVEMENTS
- WATER CAPACITY ANALYSIS AND IMPROVEMENTS

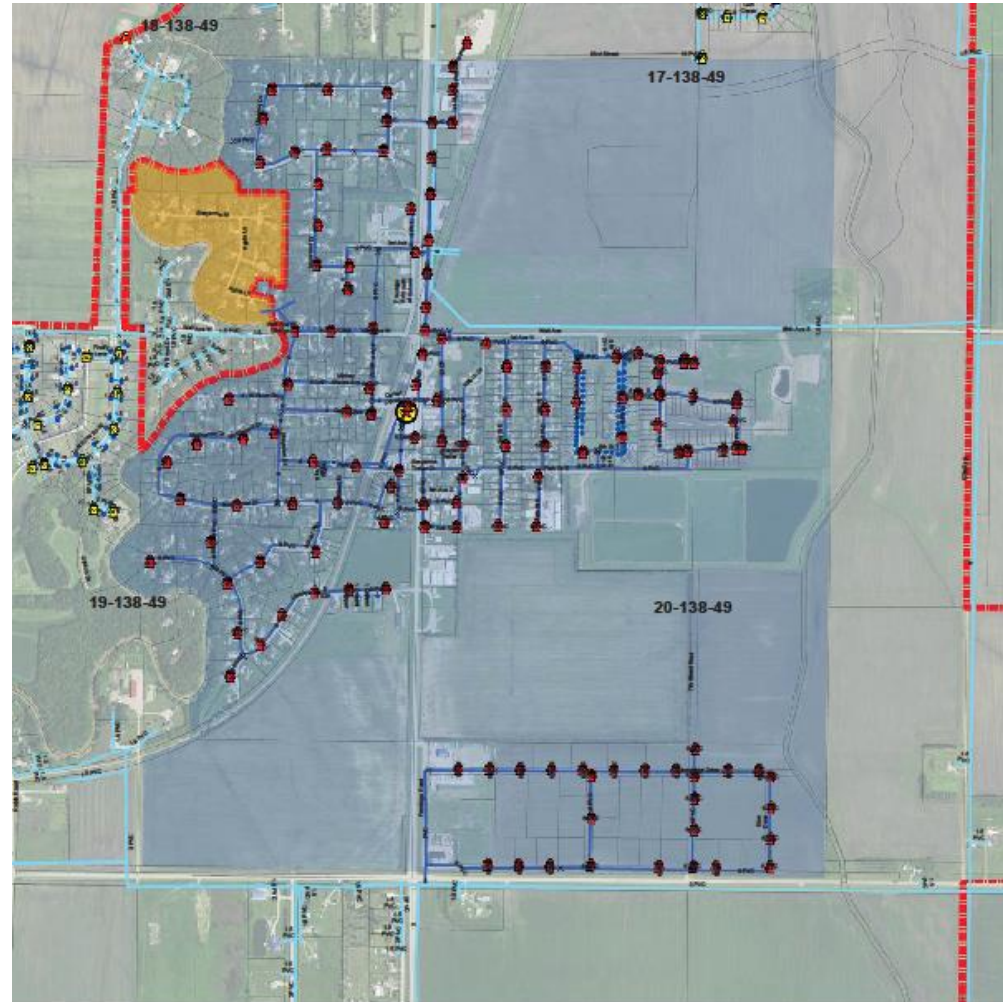
PURPOSE

- Provide the City with options and cost alternatives to supply a safe, reliable, cost effective, high quality potable water supply to its residents.



WATER SERVICE AREA

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WATER SERVICE AREA

- Defined in an agreement between Cass Rural Water User District and the City of Horace.
- Consists of approximately 1,150 acres.
- 400 acres currently developed.
- 750 acres undeveloped.

UNDEVELOPED AREA

- Based on the Horace Comprehensive Plan the 750 acres of undeveloped equal:
 - 400 acres of residential
 - 225 acres zoned commercial, light industrial and industrial
 - 125 acres for public facilities



POPULATION

POPULATION

Current:

- Estimated at 1,545. Based on water use.
 - 473 users times 3.27 persons/user
 - 26 commercial accounts

POPULATION

Projection:

- Estimated population is 4,000.
 - 400 acres undeveloped to residential
 - Average lot size 0.33 acres
 - 3.27 persons (2010 census data)



EXISTING SYSTEM REVIEW

WATER SUPPLY

- West Fargo Aquifer:
 - City has rights to:
 - 160 Acre-Feet or
 - 52.1 Million gallons per year.

WATER SUPPLY

- Recently the City installed remote read water meters to accurately account for water usage.
- Allows the City to more accurately predict future usage and needs.

WATER WELLS

- Two existing wells.
- Close together with similar water quality.

WATER WELLS

- Well No. 1 (south)
 - Installed in October 2013.
 - 4" – 189' deep
 - 30 HP – 350 GPM Pump

WATER WELLS

- Well No. 2 (north)
 - Installed in November 2013.
 - 4" – 147' deep
 - 30 HP – 350 GPM Pump

WATER TREATMENT

- Existing plant constructed in 2003.
- Designed to treat 240 GPM
- Produces approximately 42.9 million gallons of treated water annually.

WATER TREATMENT

- Treatment process:
 - Gas Chlorination – primary disinfectant
 - Polyphosphate – sequestering agent
 - Cleritas 101 – reduce scaling

WATER TREATMENT

- Gas Chlorination – primary disinfectant
- Polyphosphate – sequestering agent to reduce iron coloration.
- Cleritas 101 – reduce scaling and buildup in mains and fixtures.

WATER STORAGE

- Elevated water storage reservoir:
 - Constructed in 1982
 - 75,000 gallon storage capacity

WATER DISTRIBUTION

- Services as of November 2019
 - 499 service connections
 - 473 residential
 - 26 commercial

WATER DISTRIBUTION

- Approximately 44,000 LF of piping
 - 4-inch, 6-inch, and 8-inch pipe
 - Transite Pipe (ACP) and PVC pipe material.
 - Approximately 4,000 Feet of 4”.

The image features a dark green background with a faint, light green grid pattern. Overlaid on this is a semi-transparent architectural drawing or site plan. The drawing includes various lines, curves, and text labels such as 'ROAD B', 'ROAD A', 'ROAD C', and 'ROAD D'. There are also some numerical annotations and smaller text blocks scattered throughout the plan. On the right side of the image, the words 'FUTURE' and 'NEEDS' are written in a large, white, sans-serif font, stacked vertically. The overall aesthetic is clean and professional, suggesting a focus on urban planning or infrastructure development.

FUTURE NEEDS

FUTURE NEEDS

Based on a projected population of 5,500 within the service area, the City's:

- Water source,
- Water supply,
- Water treatment,
- Water distribution,
- And Storage facilities

are not adequate.

FUTURE WATER SUPPLY

- The City would need a water source capable of producing **200.75** million gallons of water per year.
- Currently the City has rights to **52.1** million gallons of water per year.



ALTERNATIVES

ALTERNATIVES

1. Utilize the existing water treatment system and purchase the balance of projected water needs from Cass Rural Water User District or City of Fargo.

ALTERNATIVES

- 2a. Construct a new water treatment plant to fully utilize the current water appropriation and purchase the balance from Cass Rural Water Users or City of Fargo.
- Capital Cost = \$3.8 million

ALTERNATIVES

- 2b. Rehabilitate the existing water treatment plant to fully utilize the current water appropriation and purchase the balance from Cass Rural Water User District or City of Fargo.
- Capital Cost = \$1.45 million

ALTERNATIVES

3. Purchase all water in the service area from Cass Rural Water Users.
 - Decommission the current water treatment plant.
 - Capital Cost = \$300,000.00

ALTERNATIVES

4. Purchase all water in the study area from the City of Fargo.
 - Decommission current water treatment plant.
 - Capital Cost = \$3.6 million

The background of the image is a solid green color with a white grid pattern. Overlaid on this grid are faint, light blue architectural blueprints or technical drawings. These drawings include various lines, curves, and text, such as the word 'ROAD' appearing multiple times in different orientations and sizes. The overall aesthetic is technical and professional.

RECOMMENDATION

RECOMMENDATION



The City of Horace should upgrade its infrastructure to fully utilize the 52.1 million gallons of water appropriation from the West Fargo aquifer. Then purchase the balance of the water from an outside source such as Cass Rural Water User District.

This recommendation is discussed in further detail in Alternative 2a and Alternative 2b..

This recommendation allows the City to control its water treatment by utilizing the maximum water allocation from the West Fargo aquifer, control its rates and also provides an opportunity for redundancy in the water system, if an unpredictable event in which another water source became compromised in any way.

ANALYSIS

Alternative 2a (new water plant):

Advantages

- The City of Horace would get water quality softer than Cass Rural Water Users. More comparable to the City of Fargo's water.
- Reduces the need for individual water softener systems (dependent on user preference).

Disadvantage:

- Estimated to be between \$5.25 and \$6.00 per 1000 gallons, *includes operation and maintenance costs.*
- Highest cost alternative.
- Cost to just produce water.

ANALYSIS

Alternative 2b (rehabilitate existing water plant):

Advantage:

- The City of Horace would get water quality similar to Cass Rural Water Users. The discoloration and scaling would be reduced, but the hardness would stay approximately the same.

Disadvantage:

- Water hardness would not change. Harder water quality than alternative 2a.
- Individual water softener systems will still be required by those who prefer it.

Cost:

- Estimated to be between \$3.25 and \$3.60 per 1000 gallons - *includes operation and maintenance costs.*
- Cost to just produce water.

ANALYSIS

Alternative 3 (purchase from Cass Rural Water District):

Advantage:

- The City of Horace would get water from Cass Rural Water Users. The discoloration and scaling would be reduced, but the hardness would stay approximately the same.

Disadvantage:

- Water hardness would not change. Harder water quality than alternative 2a.
- Individual water softener systems will still be required by those who prefer it.
- No control over your bulk rate cost. Could change yearly. Currently \$4.25/1000.

Cost:

- Estimated to be between \$4.60 and \$4.70 per 1000 gallons - *includes operation and maintenance costs.*

ANALYSIS

Alternative 4 (purchase from City of Fargo):

Advantage:

- The City of Horace would get water from the City of Fargo.
- The water hardness would be reduced.

Disadvantage:

- No control over your bulk rate cost. Could change yearly. Currently \$3.25/1000.

Cost:

- Estimated to be between \$4.50 and \$4.70 per 1000 gallons - *includes operation and maintenance costs.*

Potential Timeline

- Alternative No. 2a
 - Secure funding: Summer-Fall 2020
 - Design Winter: 2020-2021
 - Start Construction: Spring 2021
 - Plant online: Spring 2022

Potential Timeline

- Alternative No. 2b
 - Secure funding: Summer-Fall 2020
 - Design Winter: 2020-2021
 - Start Construction: Spring 2021
 - Plant online: Spring 2022

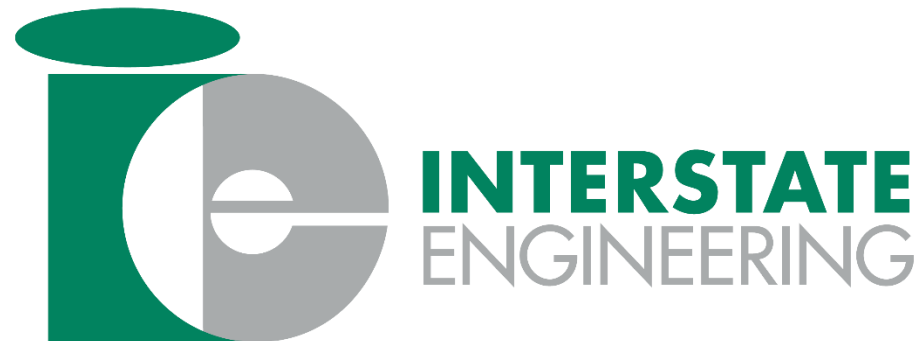
Potential Timeline

- Alternative No. 3
 - Install meter vault near 63rd Street and 81st Avenue.
 - Design Fall-Winter 2020
 - Start Construction: Spring 2021
 - Online: Summer 2021

Potential Timeline

- Alternative No. 4
 - Install meter vault and watermain
 - Design Fall-Winter 2020
 - Start Construction: Spring 2021
 - Online: Fall 2021

Questions



Professionals You Need, People You Trust.