Roadmap for the City of Mandan

Comprehensive Sanitary Sewer Planning

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Why Comprehensive Planning?

- **Population Growth**
- **Hydraulic Capacity Exceeded (Master Lift)**
- **System Failures (Pipes and Manholes)**

ULTIMATE QUESTION:

Where do we Spend Limited Resources to Correct the Right Problems?

Ask Yourself

- **How will Growth Affect the System?**
- **Where is the Growth Going and How do we get the Anticipated Flows to Treatment?**
- **Where is all the Existing Water Coming From?**
- **How do we Identify the Condition of the Underground Piping?**
- **What do we Address First?**

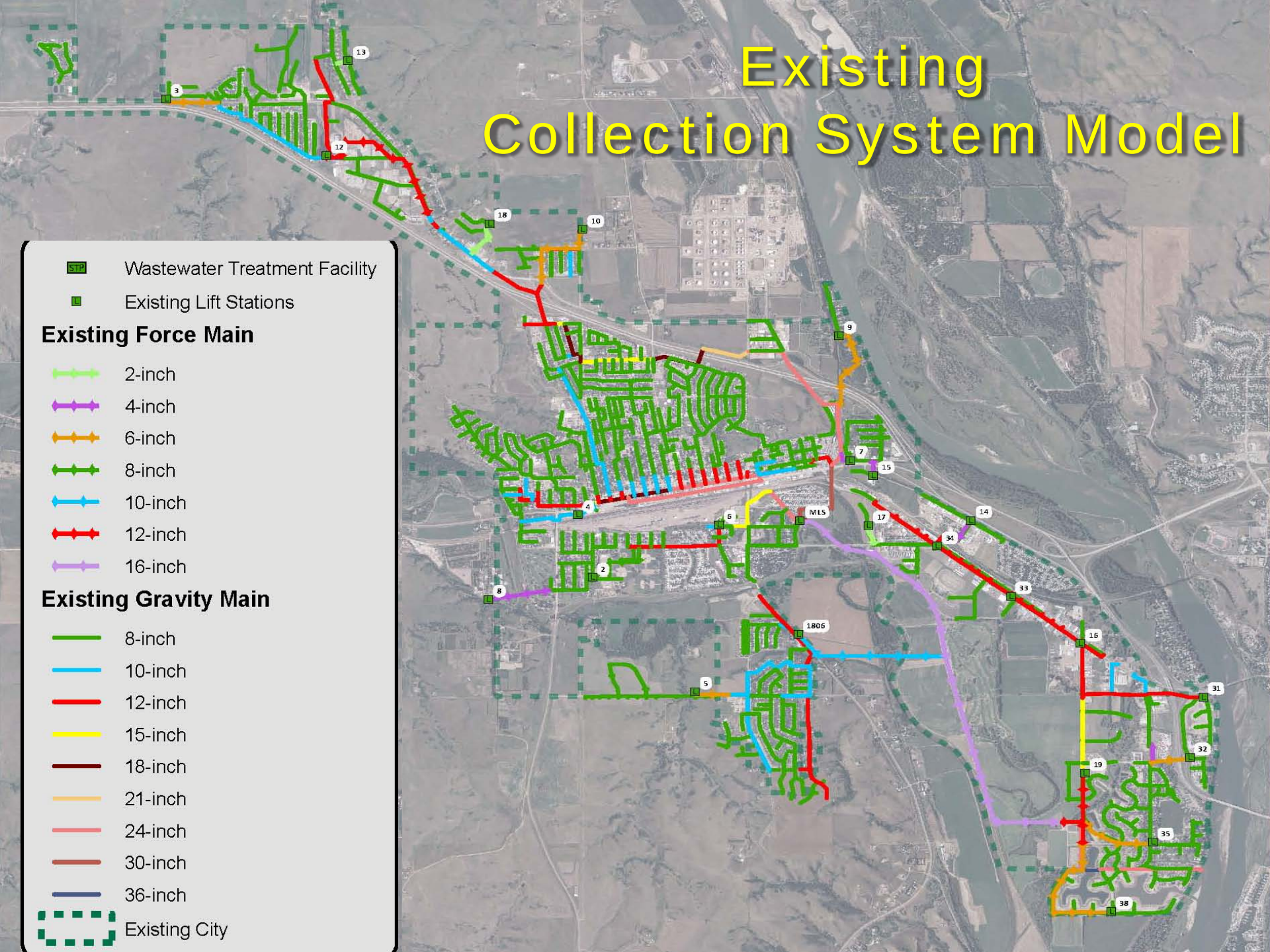
Step by Step System Analysis

- **Data Gathering**
- **System Monitoring**
- **Existing System Evaluation**
- **Future System Growth**

Begin with DATA GATHERING

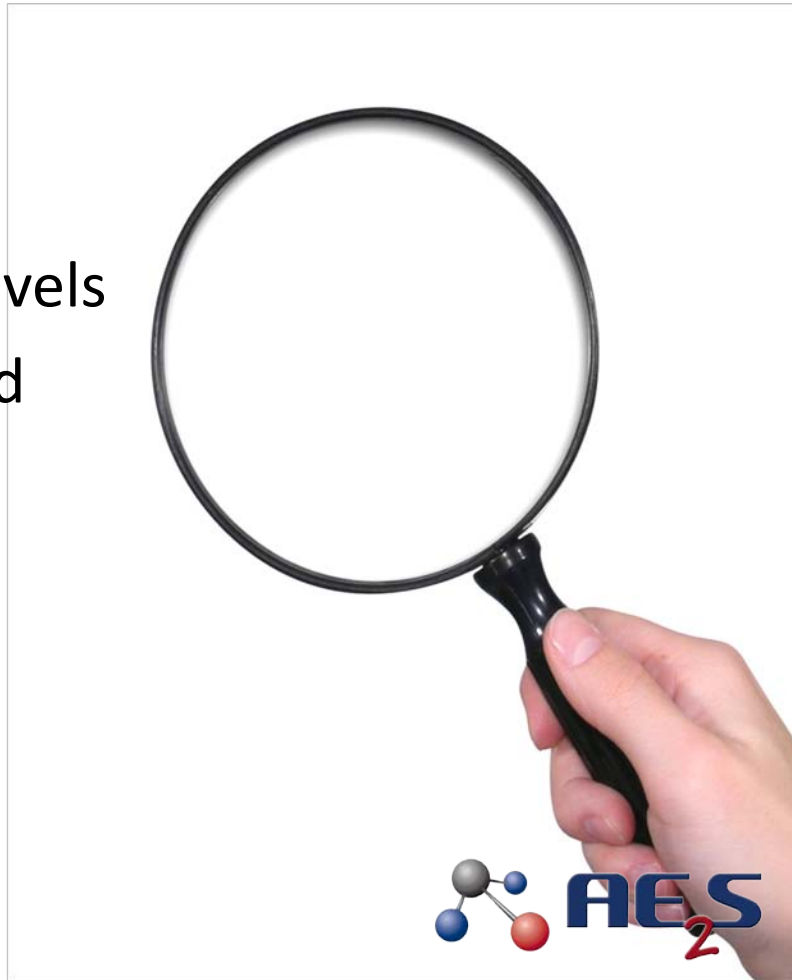
- **Review of Existing GIS Data**
- **Field Investigations**
- **Input Recent System Additions**
- **Interview City Staff**
- **Build a Dynamic Collection System Computer Model**
- **Calibrate Model using Field Monitoring Data**

Existing Collection System Model

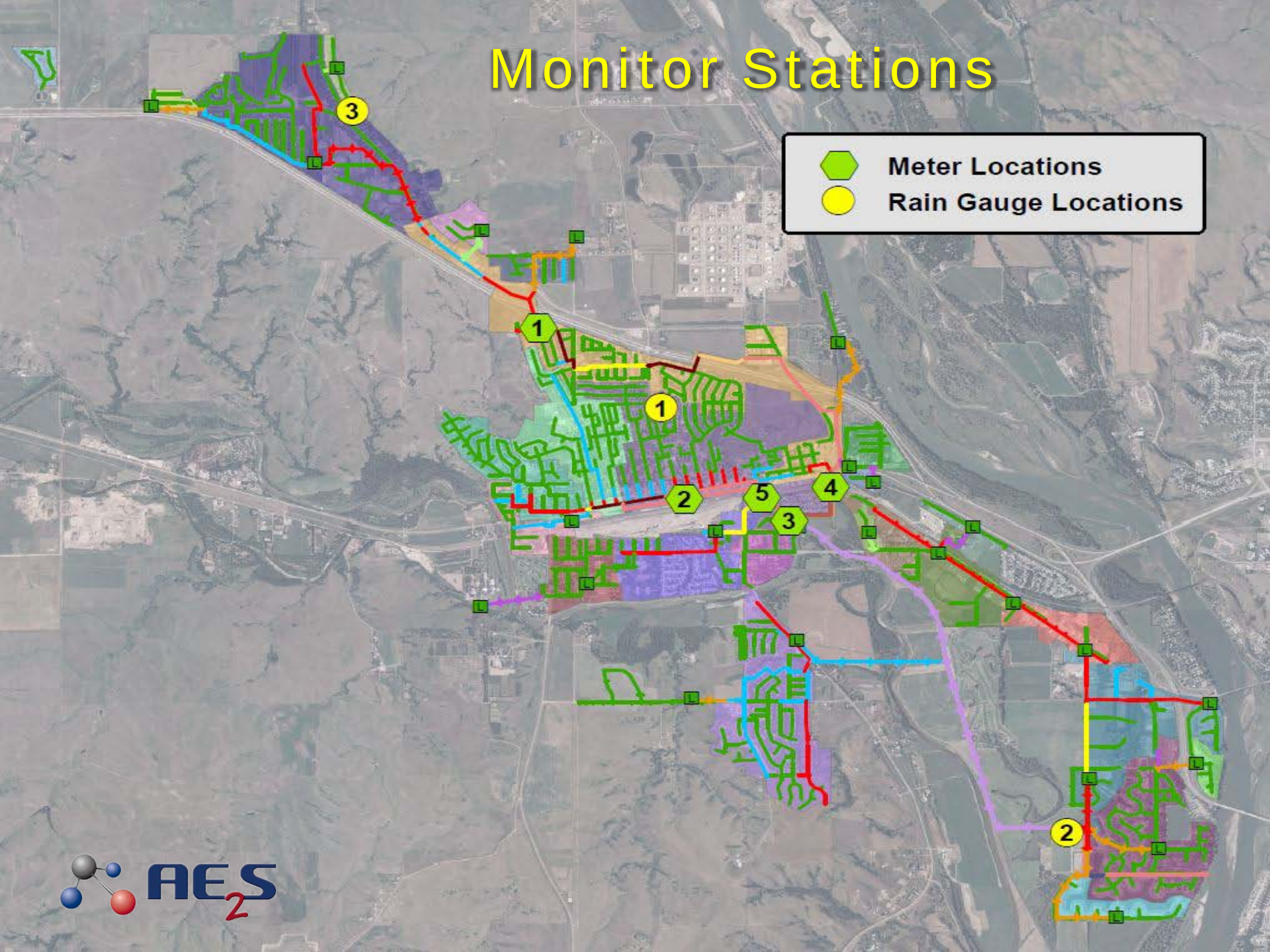


System MONITORING

- **Pipe Flows**
- **Rainfall Monitoring**
- **Lift Station Monitors**
  - Track Inflow/Outflow based on Levels
  - Algorithm Calculates Fill Rates and Pump Capacities



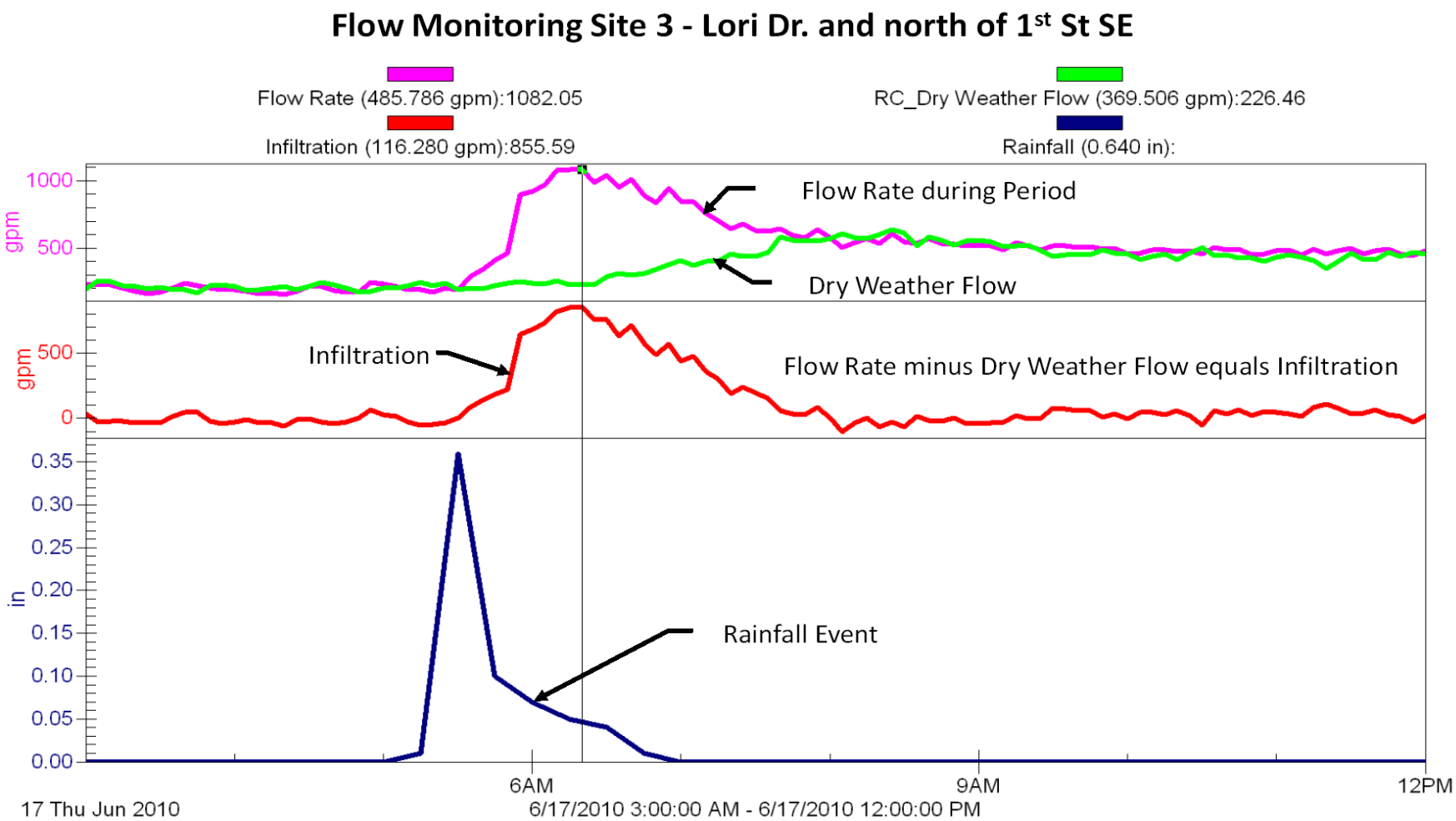
Monitor Stations



Flow Monitor INSTALLATIOIN

Flow Data COLLECTION

Flow Monitoring RESULTS



Maximum Infiltration = 850 gpm
Total Rainfall = 0.64 in

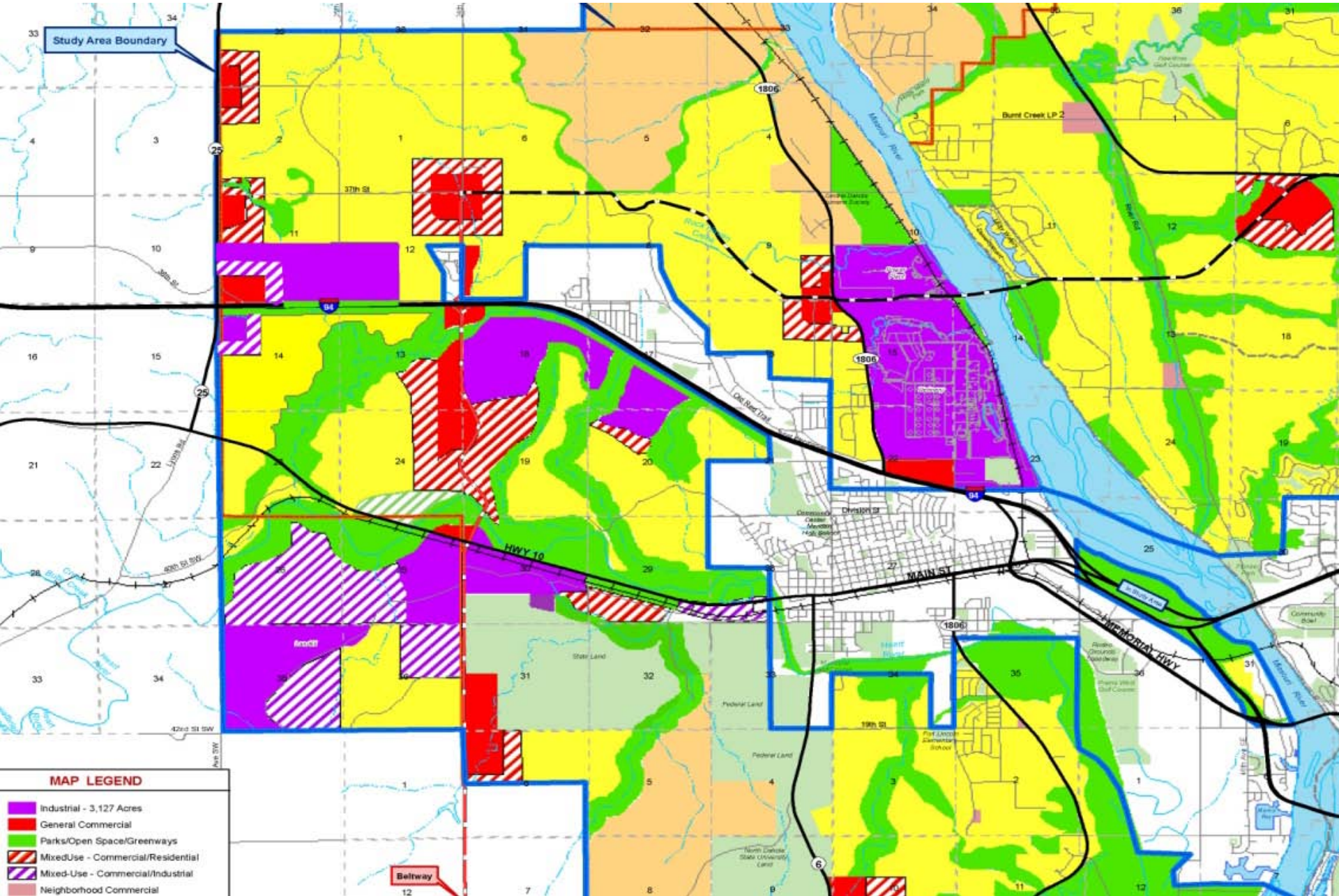
Data Used to Calibrate Computer Model

Population GROWTH

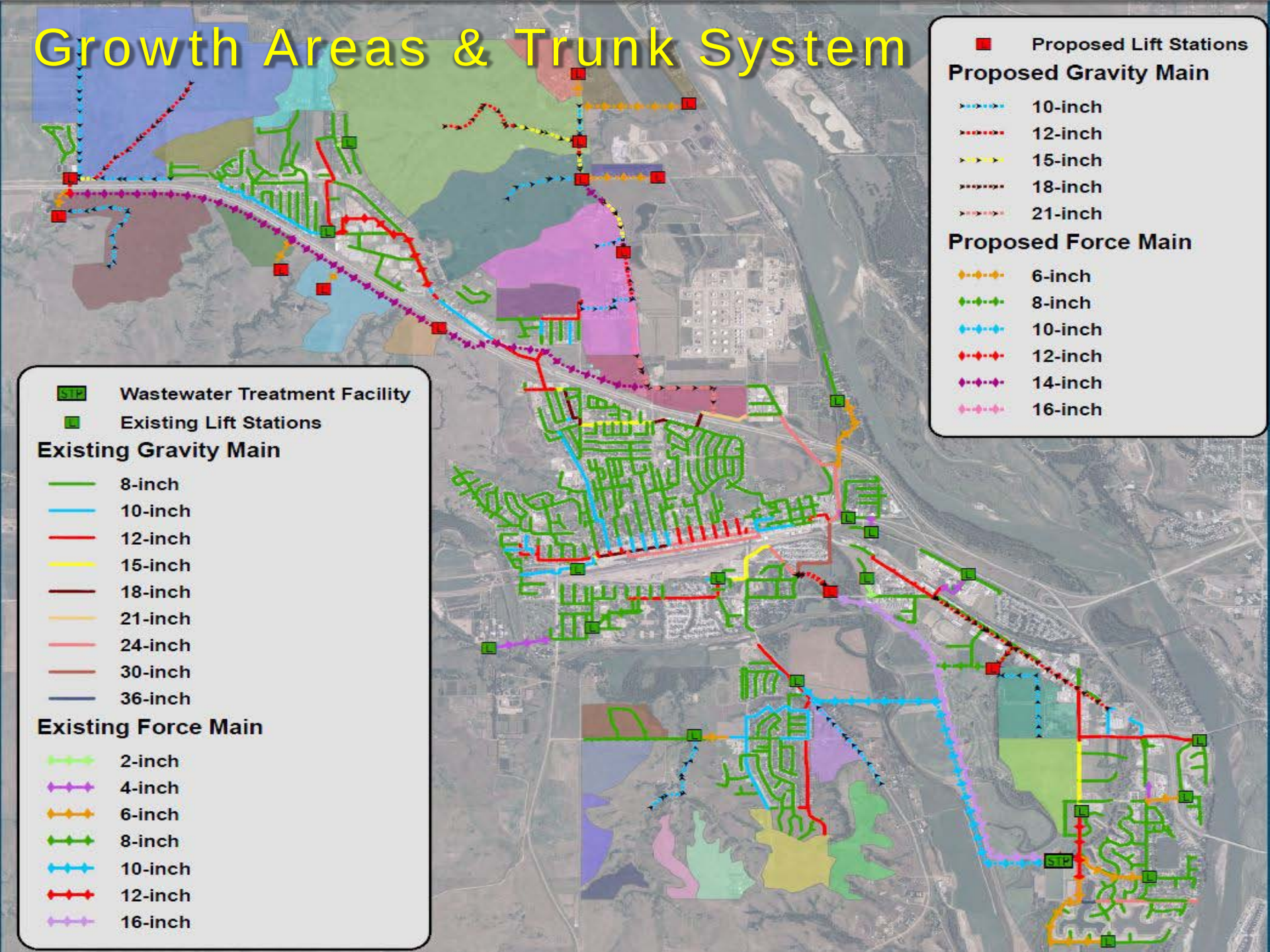
Utilize Existing Studies that are Consistent with City Planning and Zoning Growth Patterns

- **Mandan and Morton County Land Use Plan**
- **Mandan Water Distribution System Master Plan**

APPROVED Land Use Plan



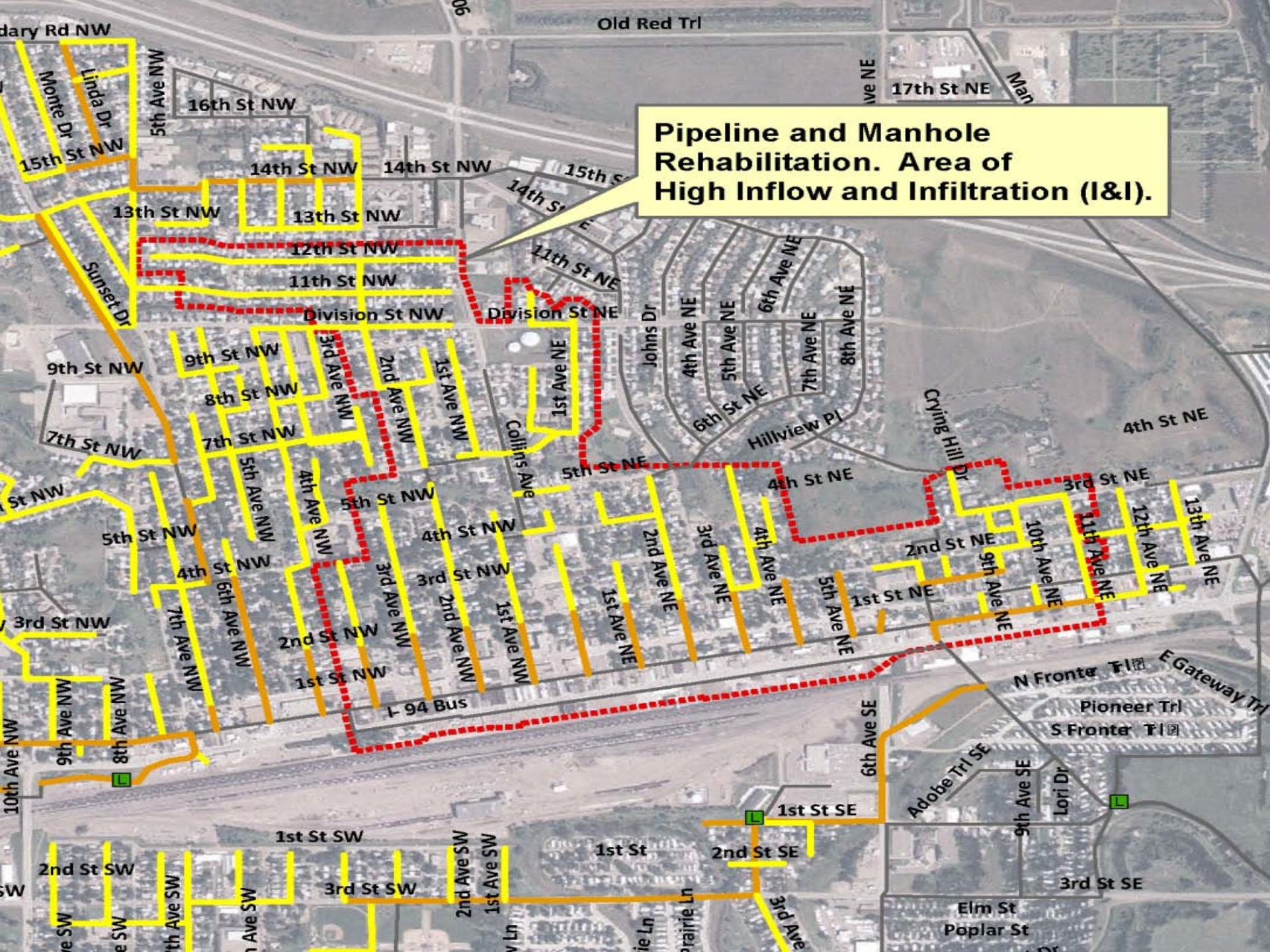
Growth Areas & Trunk System



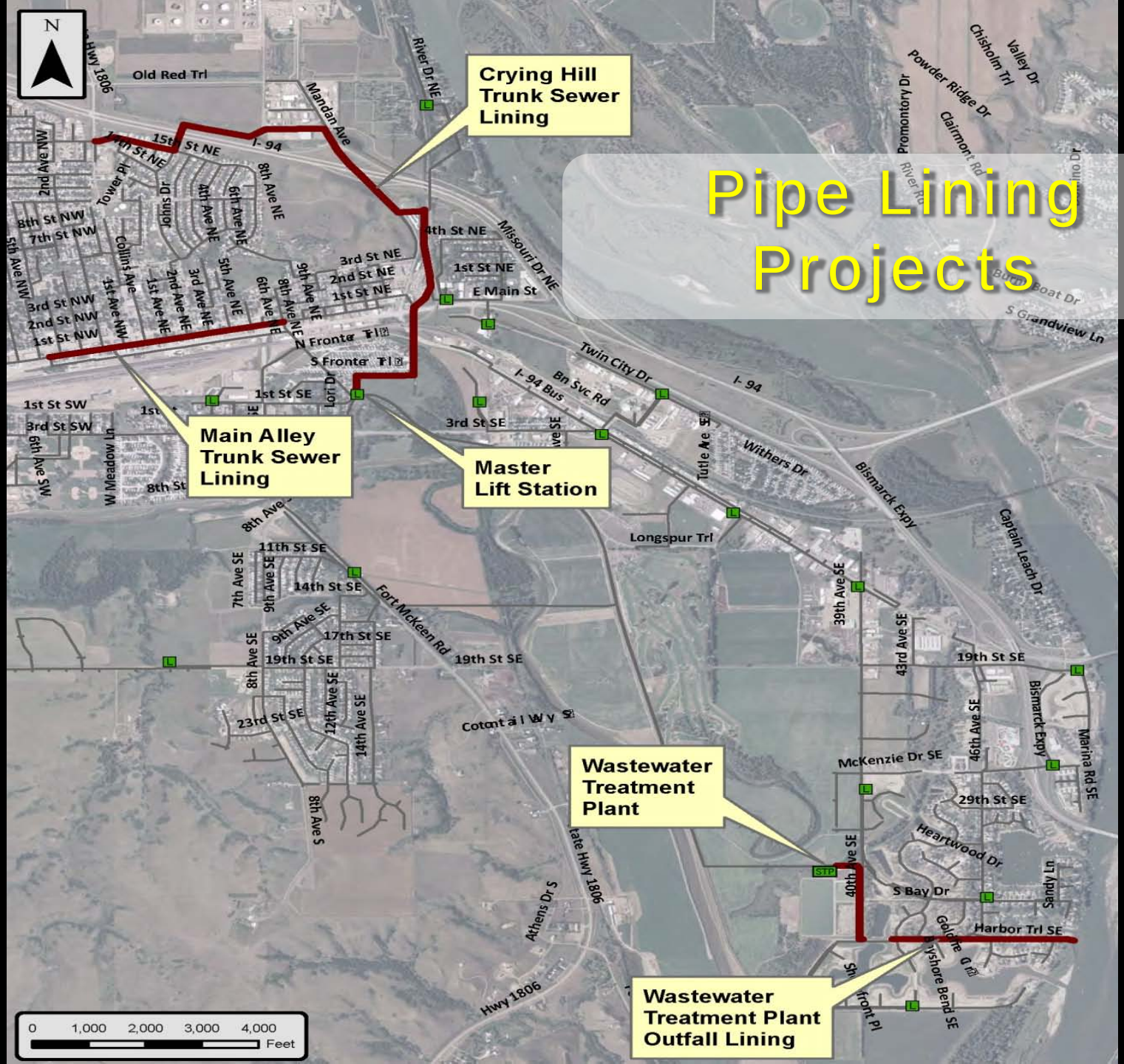
MODEL Results

- Inflow and Infiltration Areas
- Pipe Integrity Problem Areas

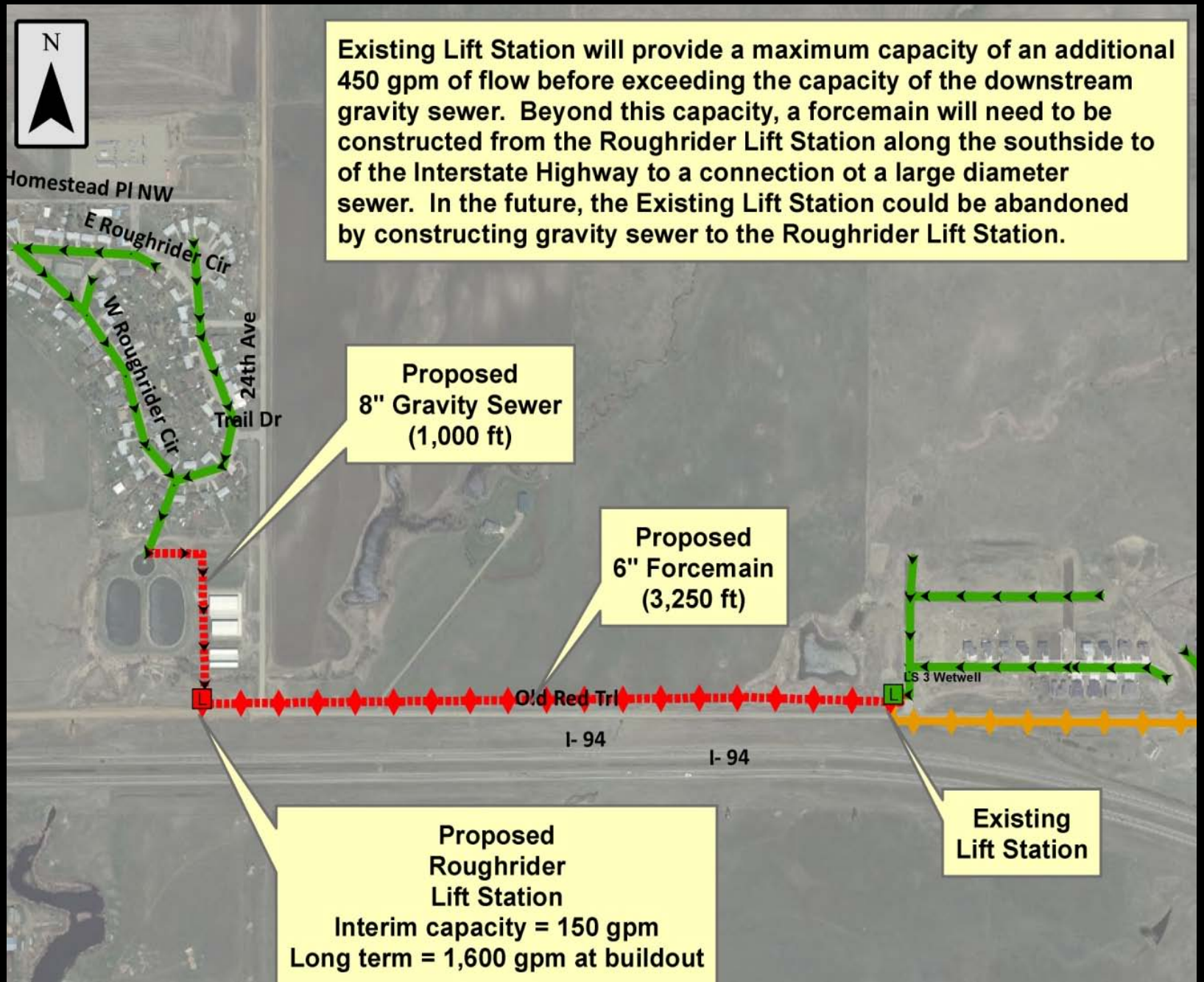
- Removal of Ponds within City Limits
- Memorial Highway Sewer Improvements
- Master Lift Station Capacity Exceeded


Pipeline and Manhole Rehabilitation. Area of High Inflow and Infiltration (I&I).
Old Red Trl
dary Rd NW
Monte Dr
Linda Dr
5th Ave NW
16th St NW
15th St NW
14th St NW
14th St NW
13th St NW
13th St NW
12th St NW
11th St NW
Sunset Dr
Division St NW
Division St NE
11th St NE
17th St NE
Johns Dr
4th Ave NE
5th Ave NE
6th Ave NE
7th Ave NE
8th Ave NE
6th St NE
Hillview Pl
Crying Hill Dr
4th St NE
9th St NW
8th St NW
7th St NW
3rd Ave NW
2nd Ave NW
1st Ave NW
1st Ave NE
Collins Ave
5th St NE
4th St NE
3rd St NE
5th St NW
4th St NW
3rd St NW
2nd St NW
1st St NW
6th Ave NW
7th Ave NW
2nd Ave NE
3rd Ave NE
4th Ave NE
5th Ave NE
1st St NE
2nd St NE
9th Ave NE
10th Ave NE
11th Ave NE
12th Ave NE
13th Ave NE
I- 94 Bus
N Frontage Trl
E Gateway Trl
Pioneer Trl
S Frontage Trl
6th Ave SE
Adobe Trl SE
9th Ave SE
Lori Dr
1st St SE
2nd St SE
3rd St SE
1st St SW
2nd St SW
3rd St SW
2nd Ave SW
1st Ave SW
1st St
Prairie Ln
Elm St
Poplar St
9th Ave NW
8th Ave NW
10th Ave NW

Pipe Lining Projects



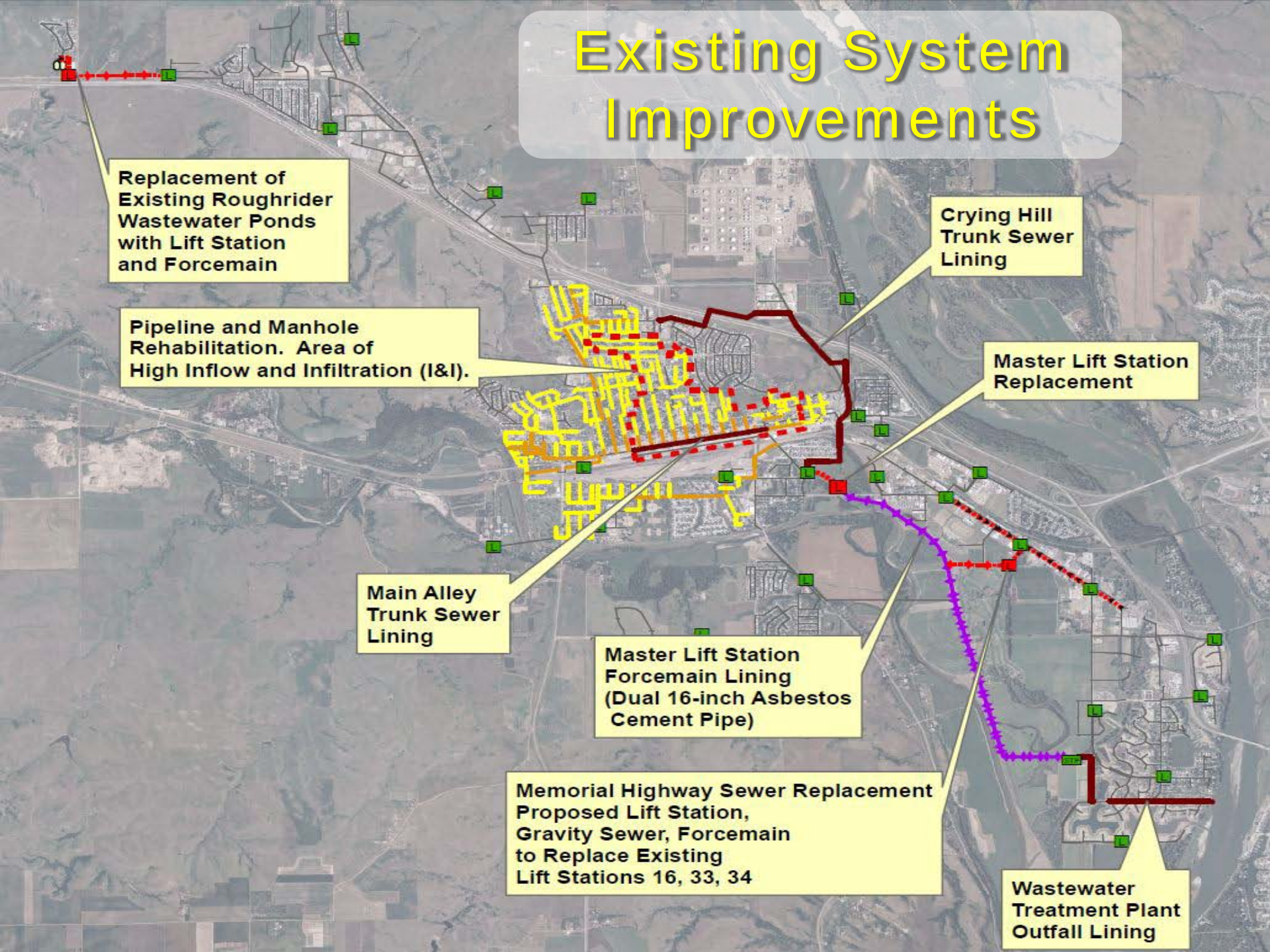
Retirement of Ponds



Memorial Highway Upgrade

Master Lift Station Replacement

Existing System Improvements



Additional RECOMMENDATIONS

- **Combine Sanitary Sewer Rehabilitation Projects with Street Reconstruction**
- **Establish a Program for Removal of Sump Pump System Discharge into Sanitary System**
- **Install New Lift Station Alarm and Radio Communication System**
- **Incorporate Collection Improvements and Treatment System Improvements into Comprehensive Capital Improvements Plan**

Questions

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Fundamentals of Asset Management
A "Hands-On" Approach

Presented By the US EPA

November 16 & 17, 2011
Alerus Center, Grand Forks, ND

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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