South Omaha CSO! Projects

South Interceptor Force Main
Leavenworth Lift Station Replacement
Missouri River WWTP Improvements

February 16, 2011

CSO! Clean Solutions for Omaha

City of Omaha

Agenda

- Welcome
- CSO Program Overview
- Sustainable Project Funding
- Community Enhancements
- Overview of Omaha CSO! Projects
- Questions and Answers

CSO Program Overview

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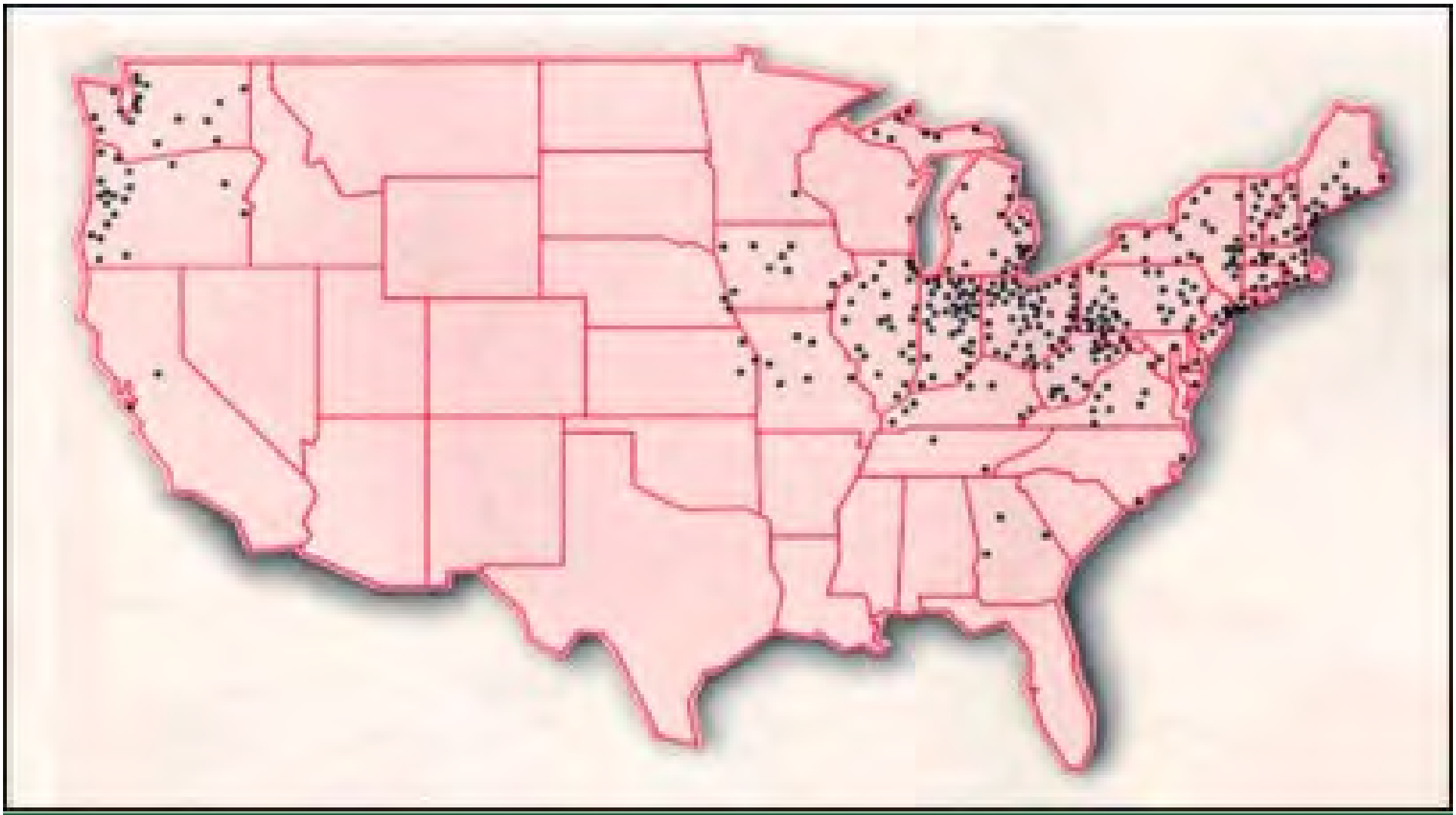
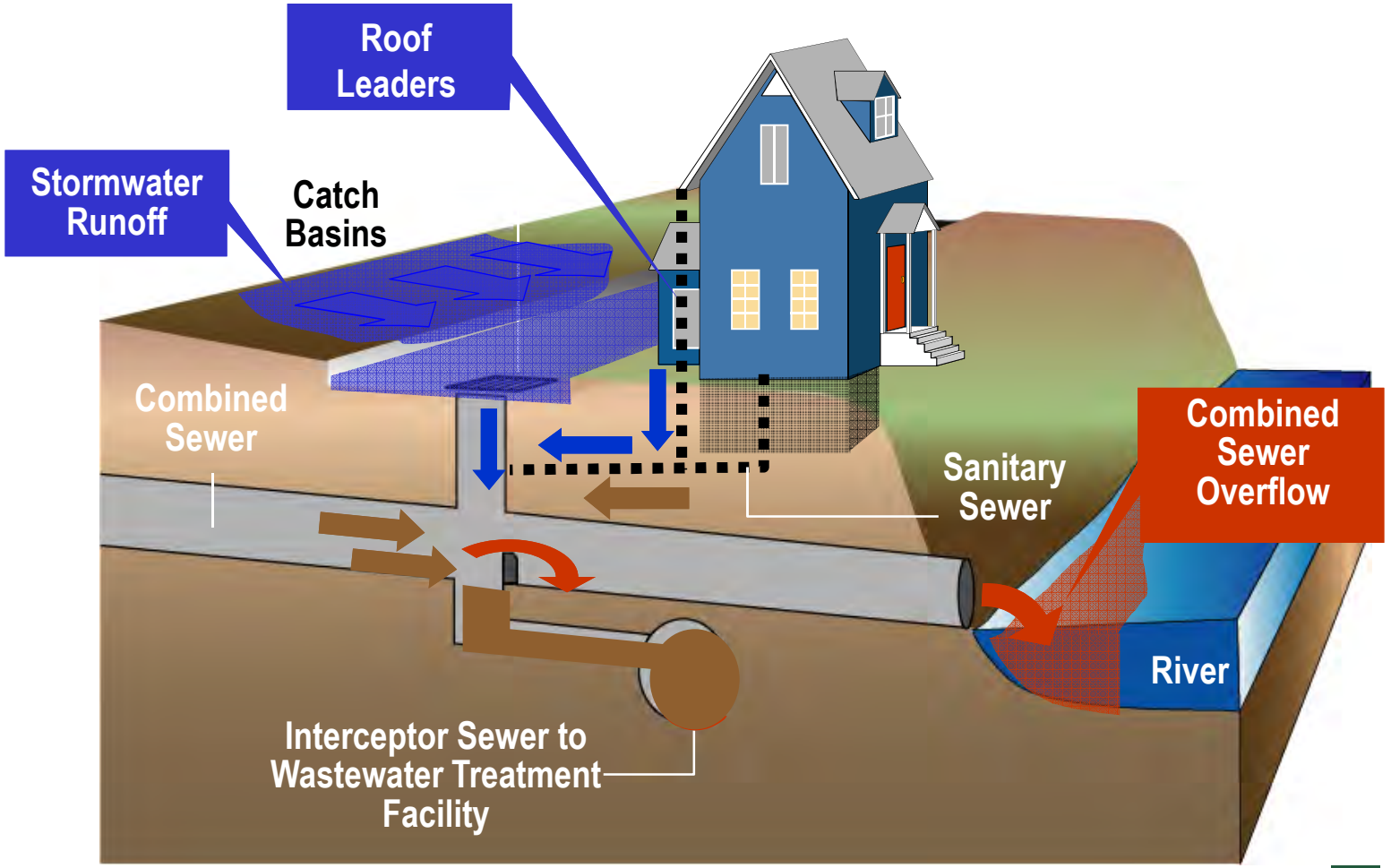
Challenges Facing Omaha

- Meeting the increased requirements of the federal Clean Water Act
- Balancing the following needs:
  - Regulatory compliance
  - Economic affordability
  - Community acceptance

772+ CSO Communities Nationwide

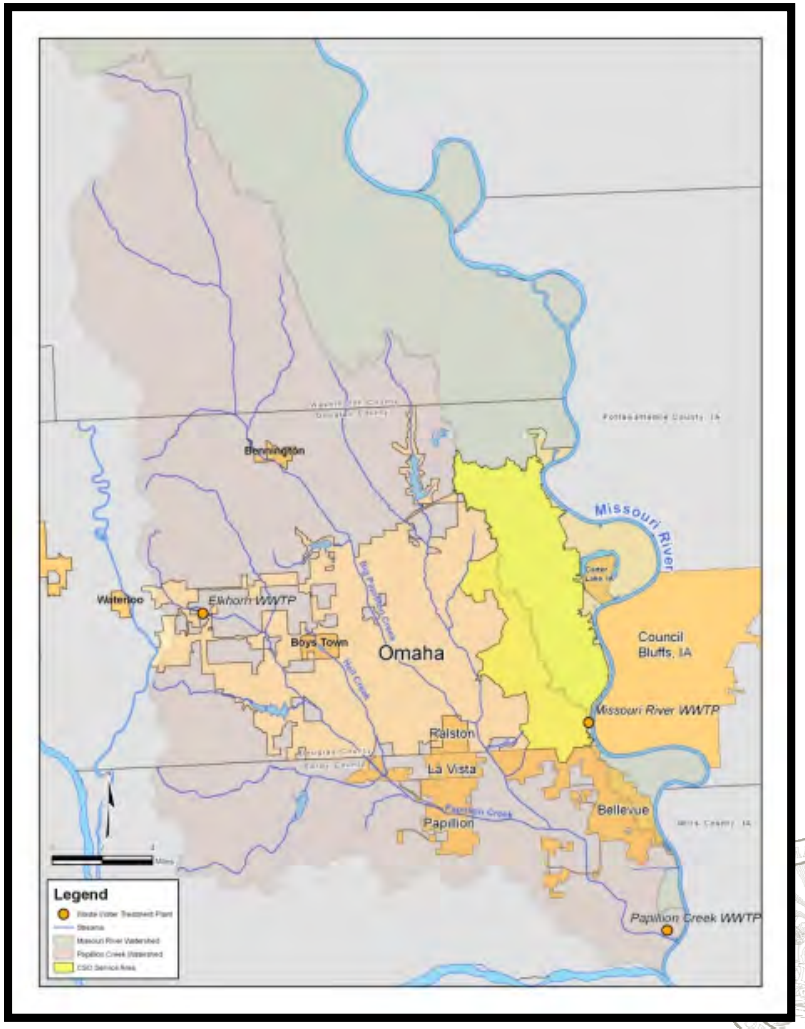


Wet weather inflows exceed the CSS capacity and trigger a CSO



Omaha Sewer Service Area

- Two regional treatment plants
- One smaller treatment plant
- 10 wholesale users
- 275 sq mi drainage area
- 600,000 service population



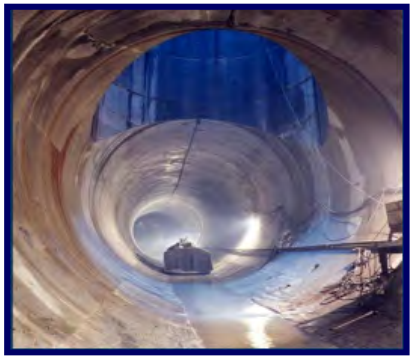
CSO Consent Order Timeline

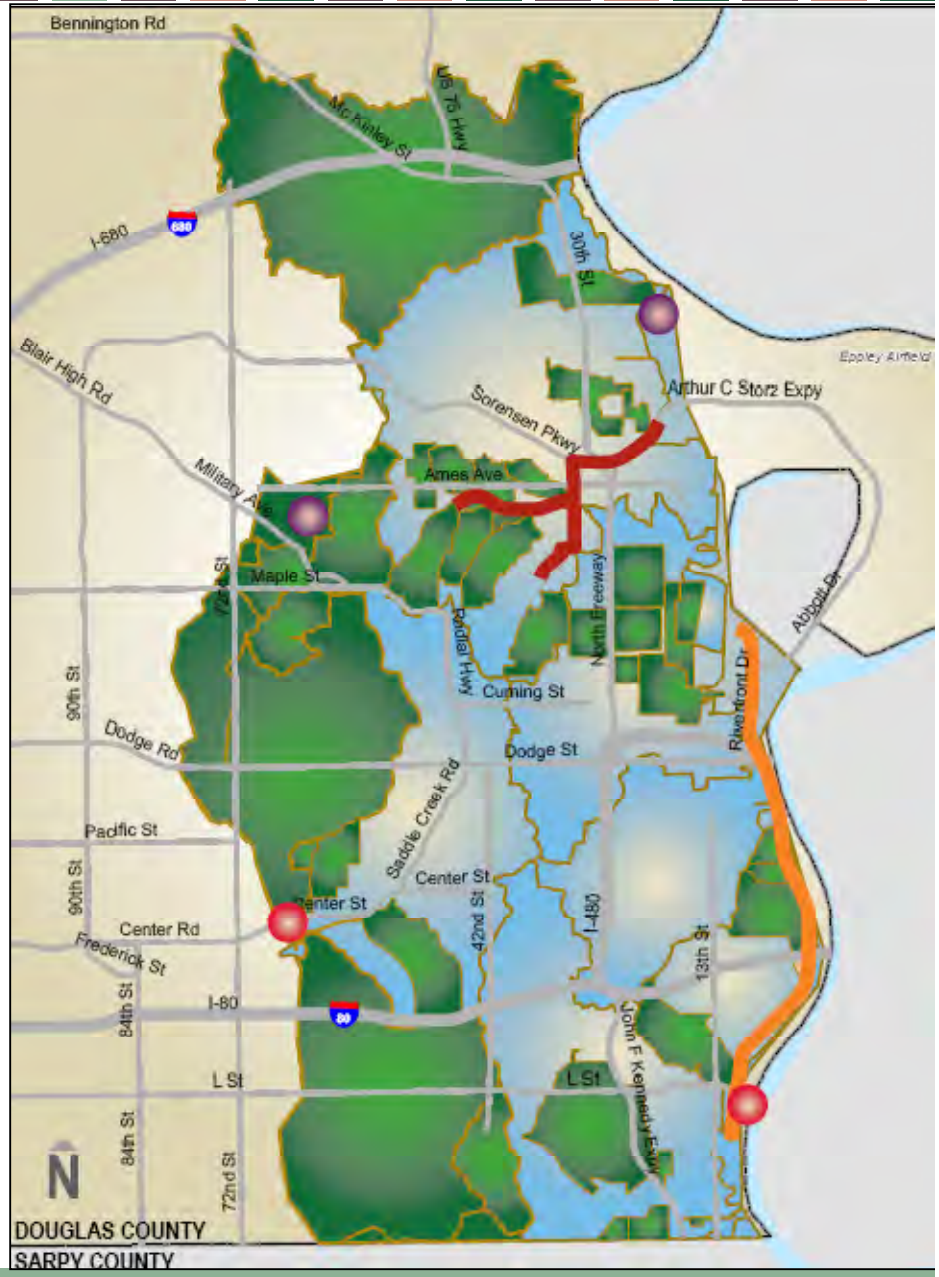
5 Major Elements of Final Long Term Control Plan

Targeted Sewer Separation Projects

2 High Rate Treatment Facilities

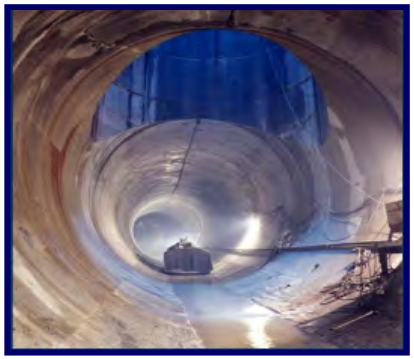
One Deep Conveyance Tunnel



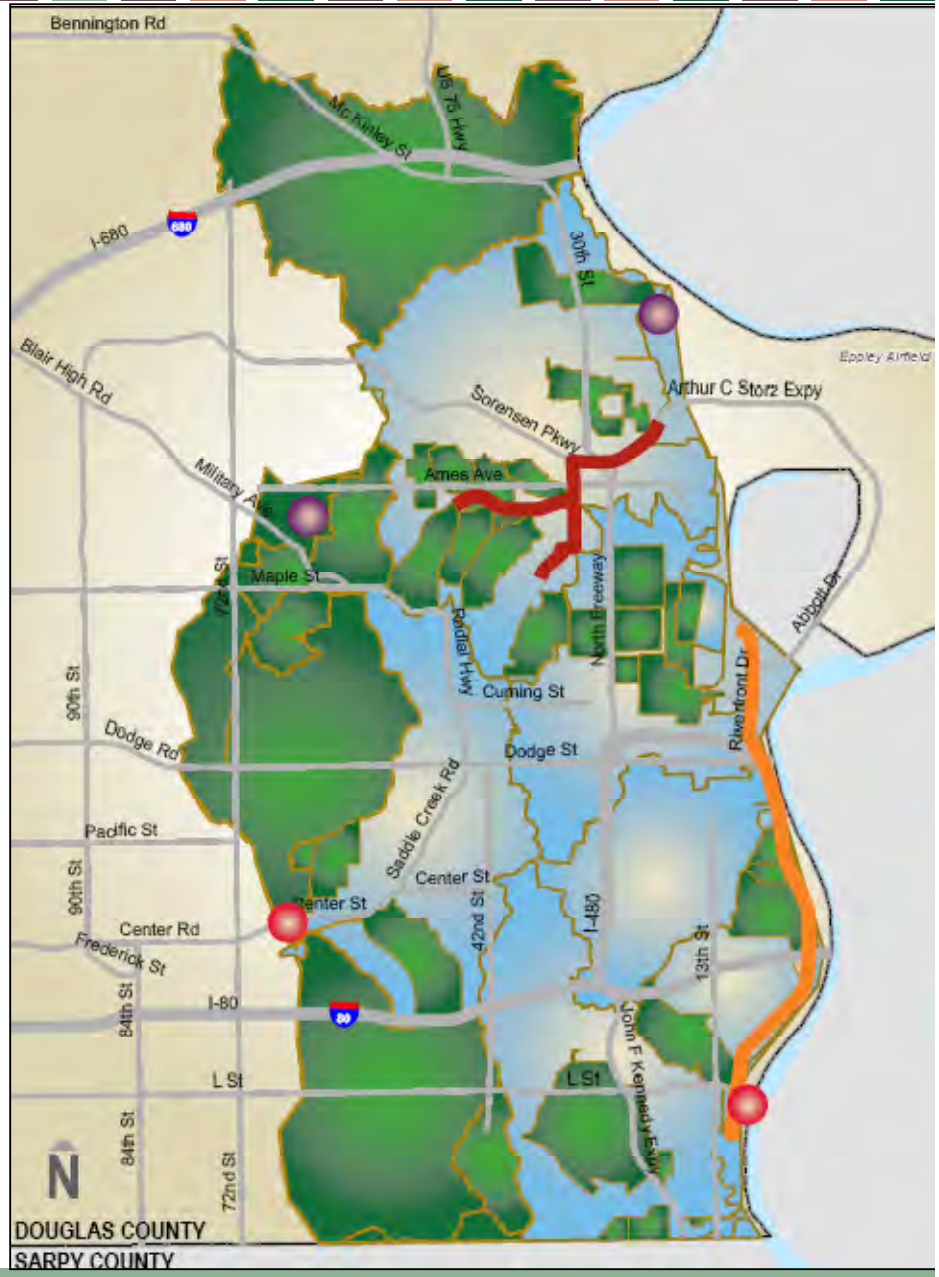


5 Major Elements of Final Long Term Control Plan

Two Underground Storage Tanks



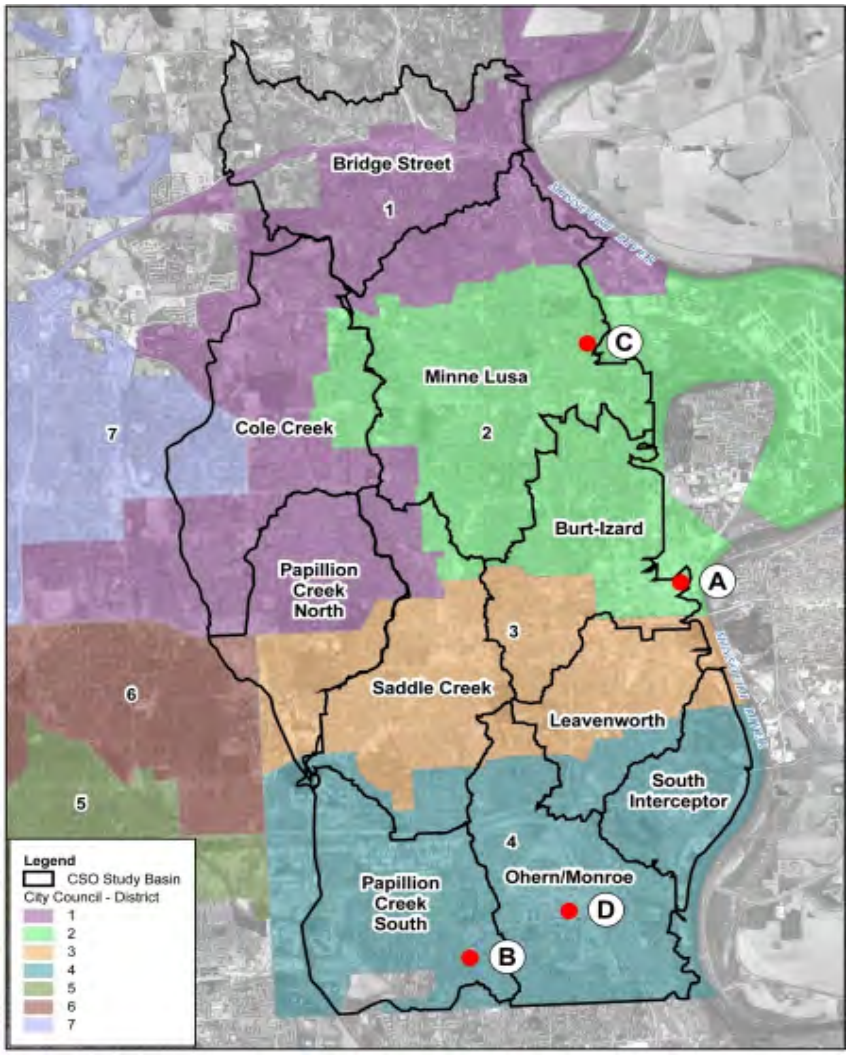
One Large Stormwater Conveyance Sewer



LTCP Costs (2009 Dollars)

Project Category	Program Cost
Deep Tunnel Project	$ 442,000,000
Minne Lusa Stormwater Collector Projects	$ 113,000,000
High Rate Treatment Projects	$ 126,000,000
South Interceptor Force Main Project	$ 77,000,000
MRWWTP Improvements	$ 91,000,000
Lift Station Projects	$ 131,000,000
Storage Structure Projects	$ 31,000,000
Sewer Separation Projects	$ 614,000,000
Miscellaneous Projects	$ 36,000,000
TOTAL	***$ 1,661,000,000***

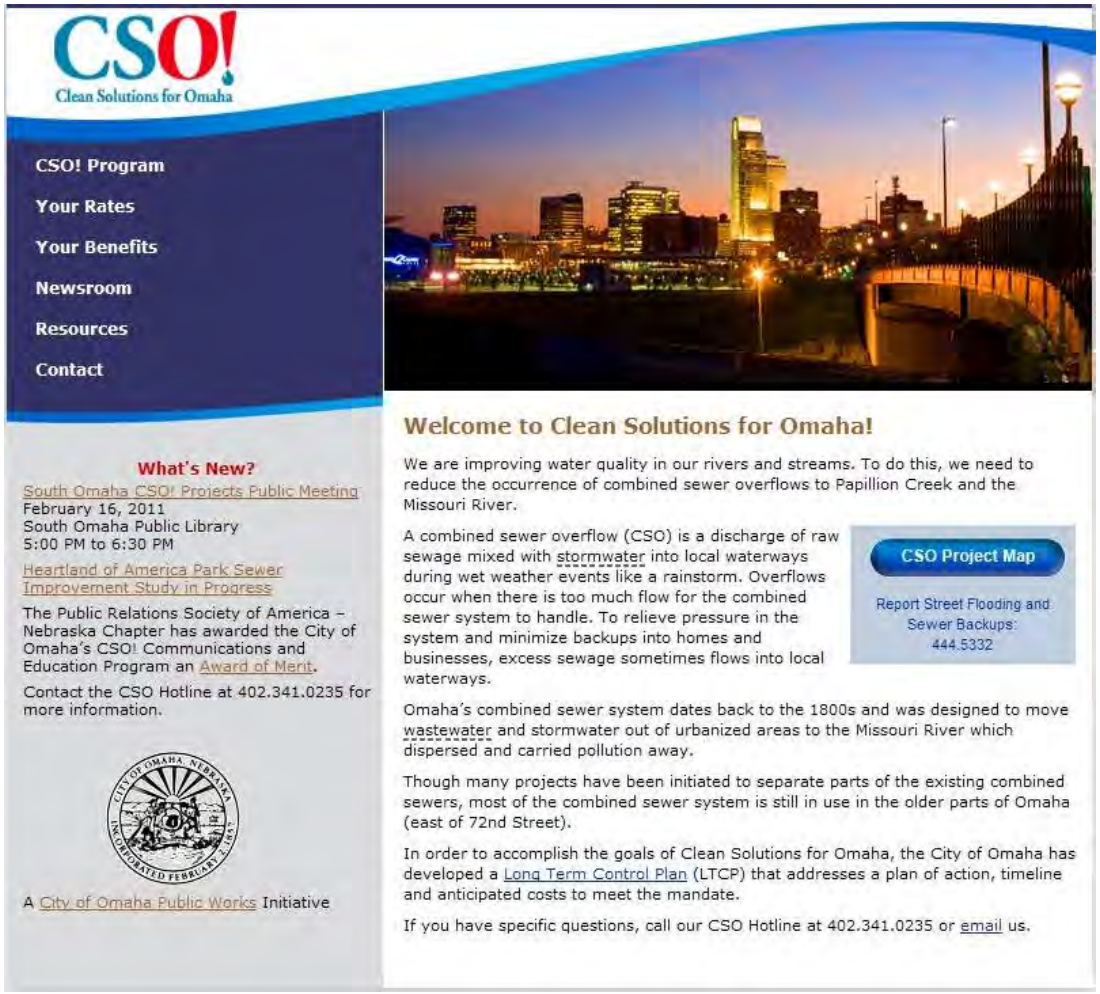
Program Project Status

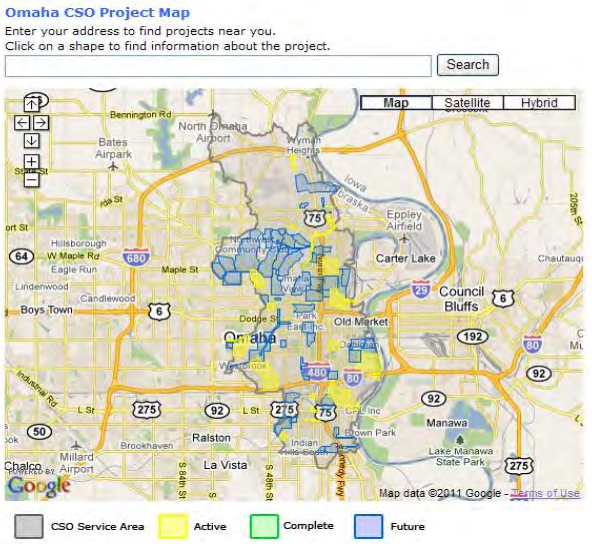


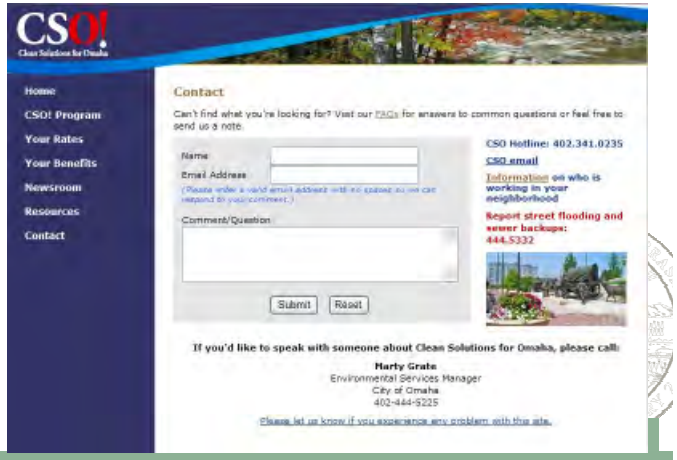
- Completed to Date: 4 Projects
- Study and Design: 17 Projects
- Future Projects: 67

CSO Public Website

http://www.omahacso.com







Sustainable Project Funding

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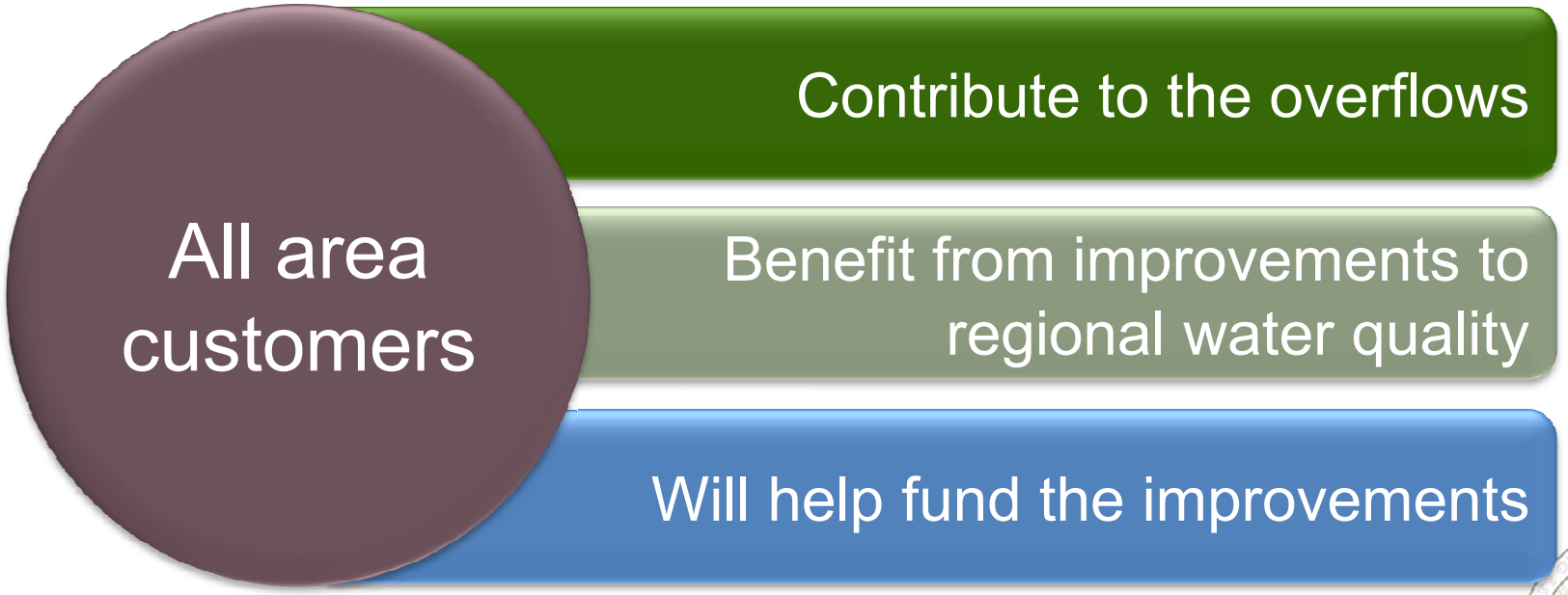
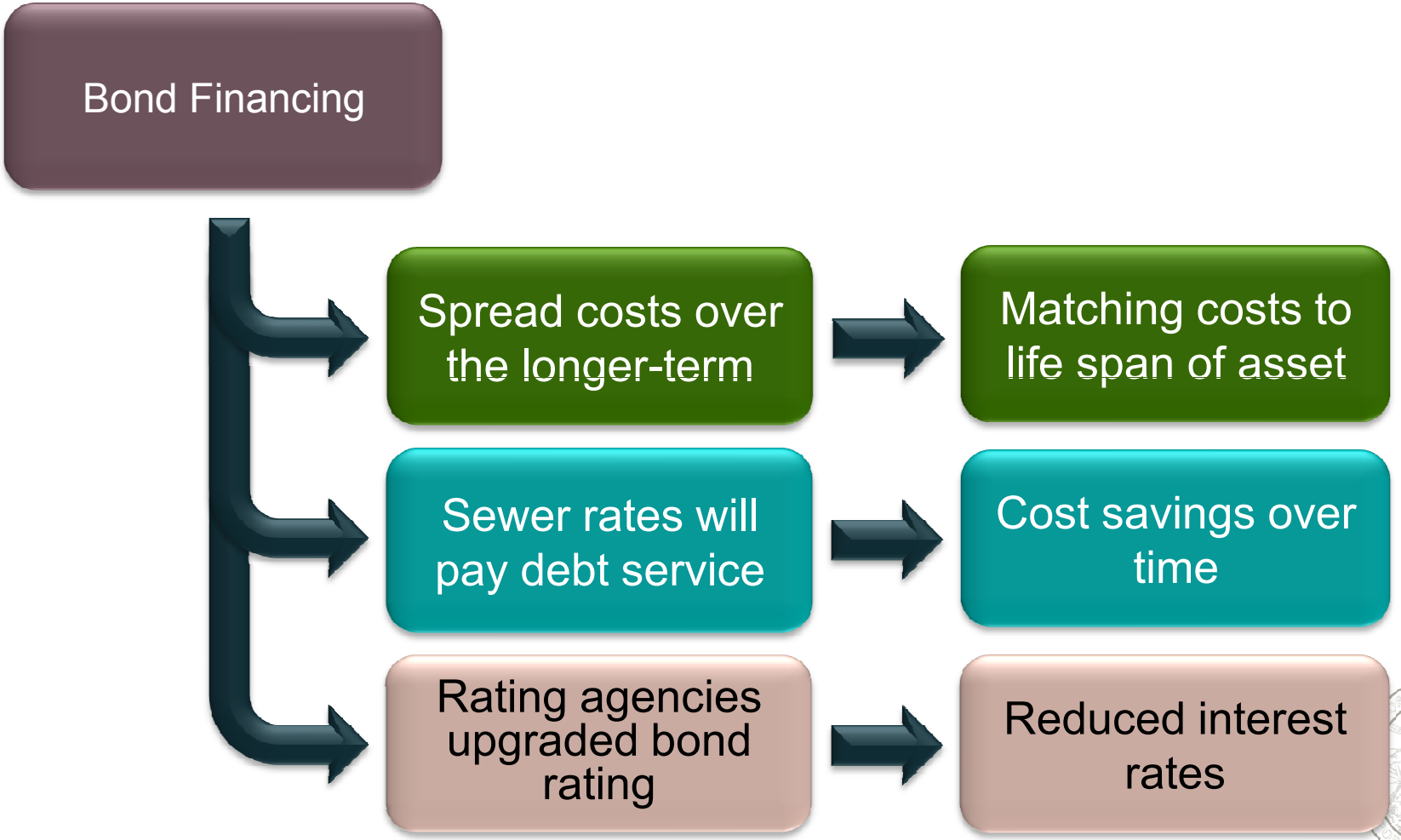
Funding the Program

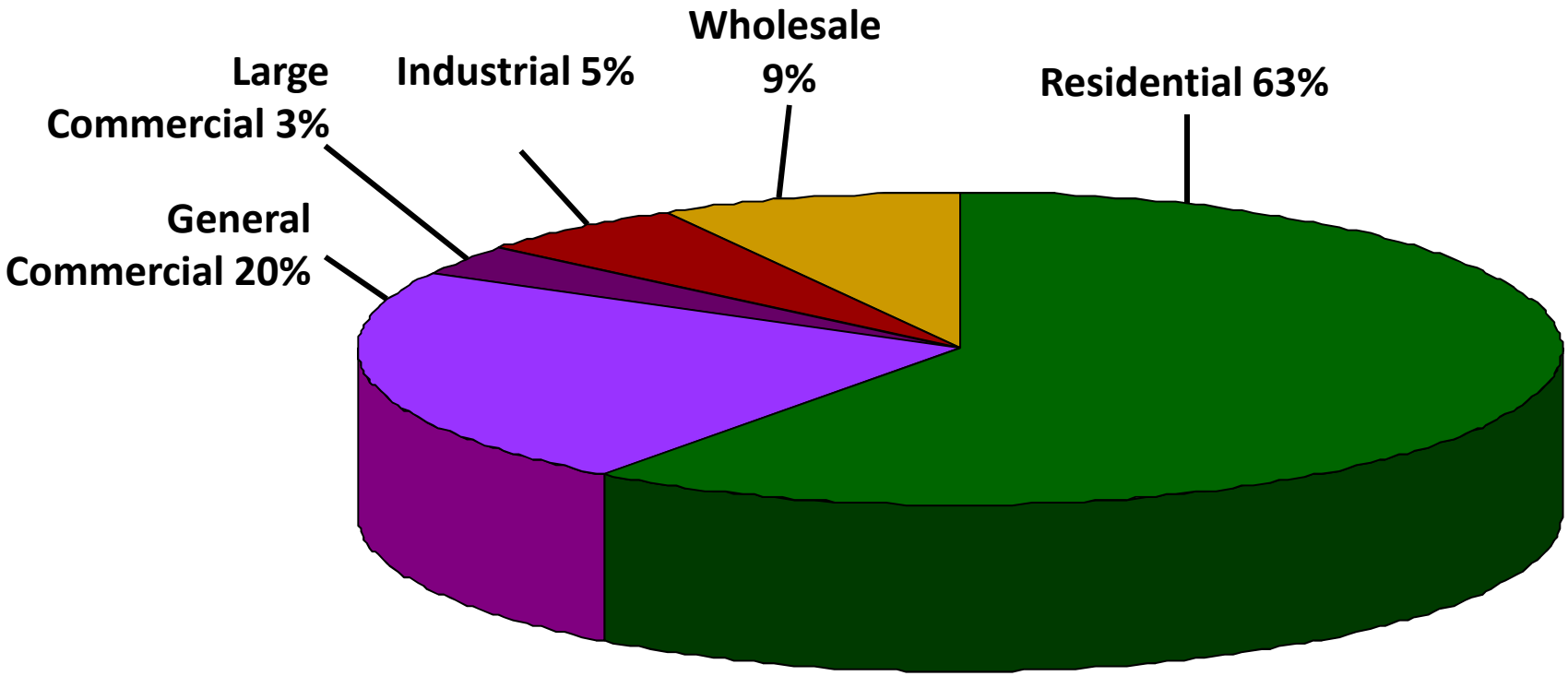
- The federal mandate for the Omaha system is to increase wet weather capacity to reduce sewage overflows



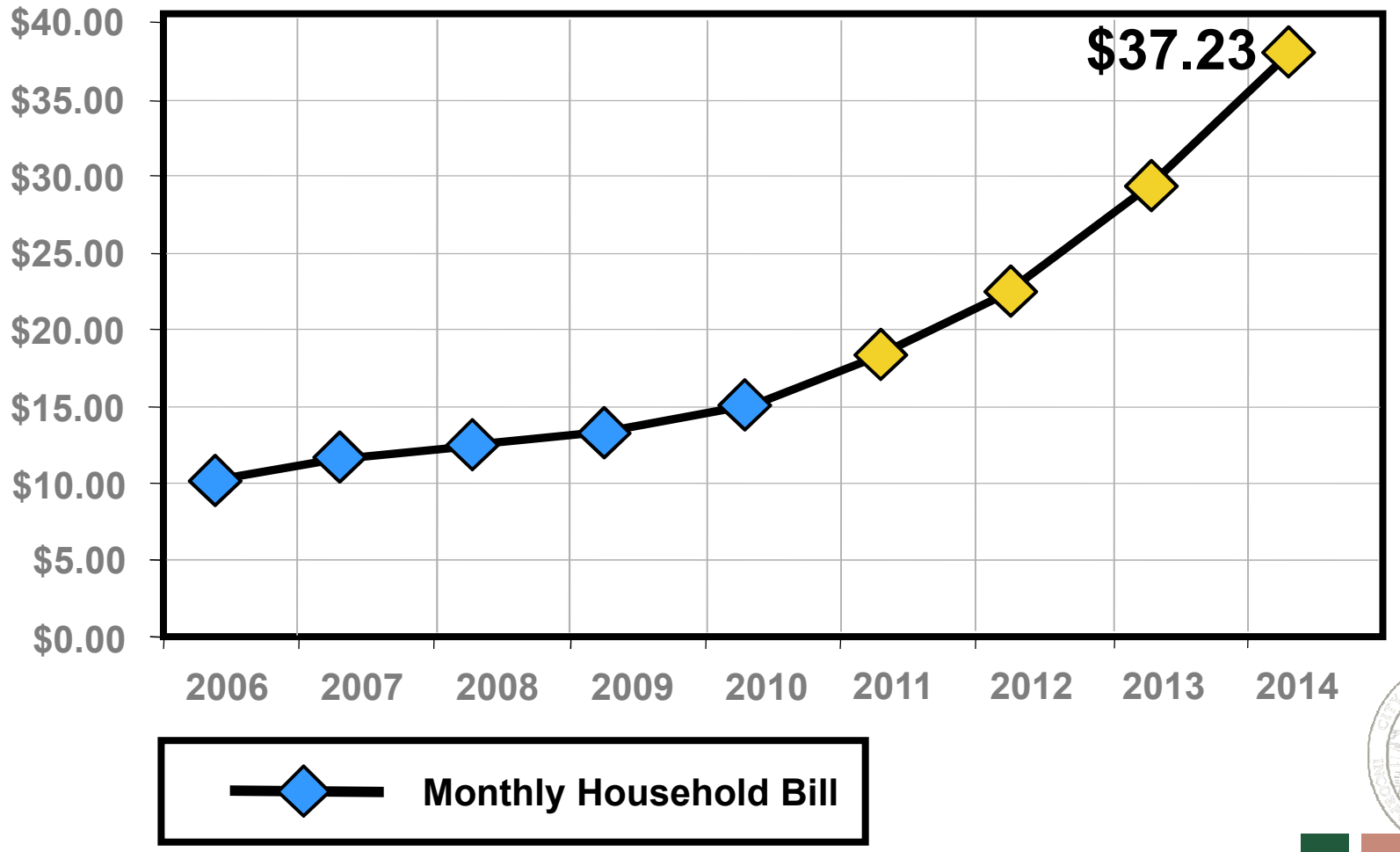
Financing the Program



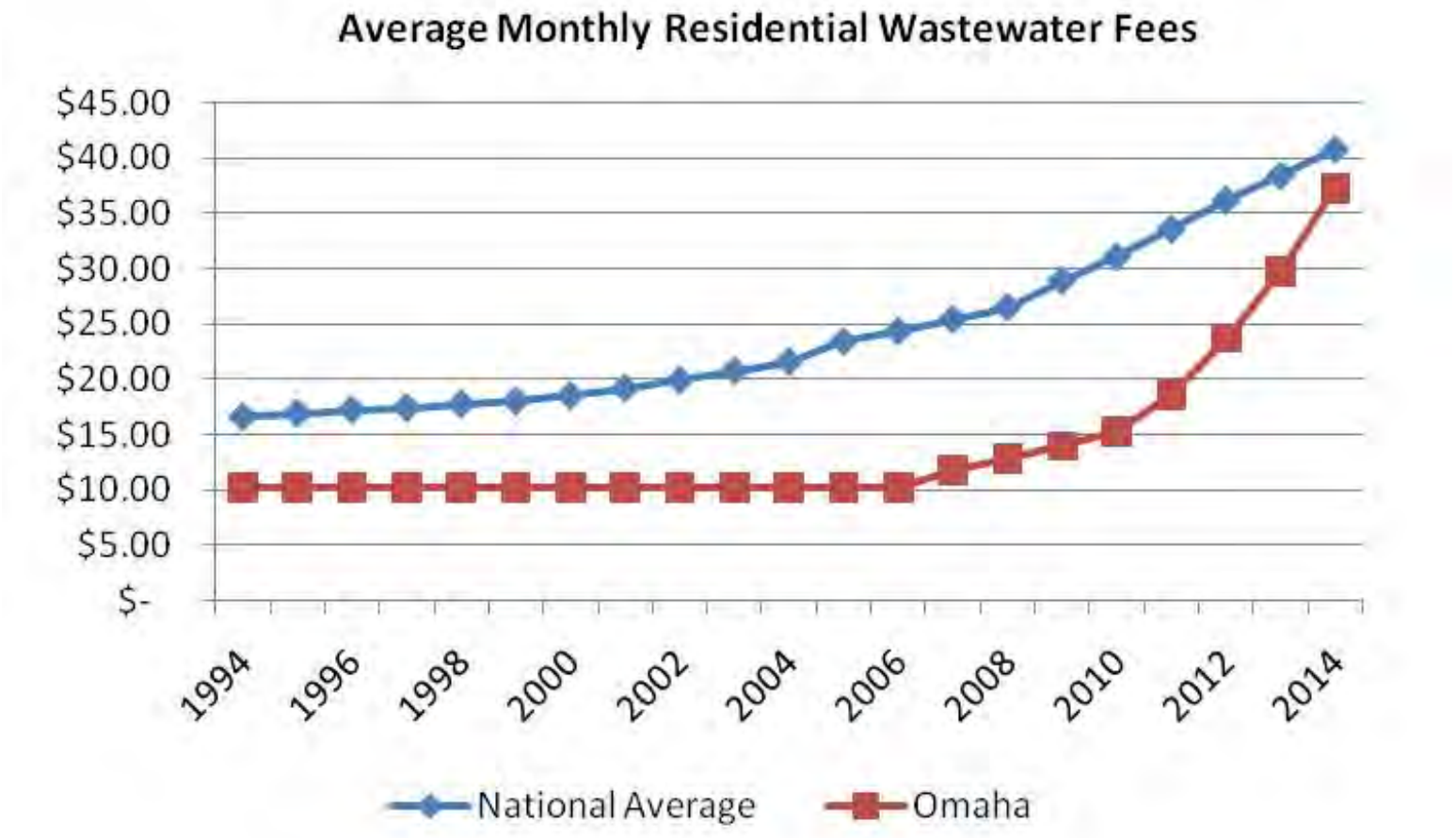
Proportion of Revenues by User Type-2011



Average Residential Sewer Bills: Past, Present, and Future



Omaha Versus National Average*



*National data obtained from the National Association of Clean Water Agencies

Community Enhancements

Community Enhancements

- What are Community Enhancements?
  - Efforts undertaken by either the City or the neighborhood to implement positive green and/or aesthetic changes during the planning and construction of a CSO! Project.
- How are these projects funded?
  - CSO Resources
    - The project reduces the impact of storm water on the system
    - Implementation fits the new design standards
  - Externally
    - Mayor's Neighborhood Grants
    - Omaha Community Foundation Grants
    - Nebraska Environmental Trust Grants
    - Other grants and sources

Community Enhancements
CSO Resources

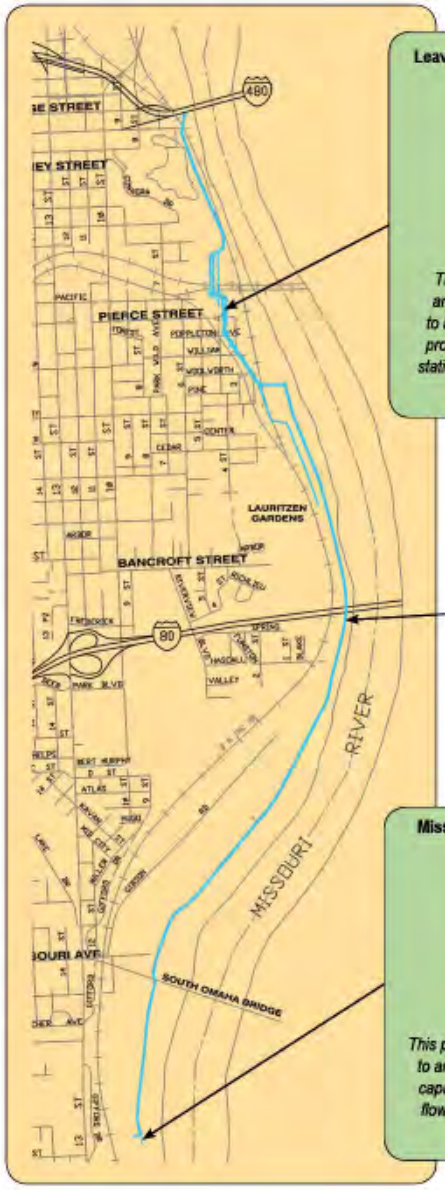
Enhancements and Infrastructure Replacement Funded with CSO Resources

- Wider planting strips between street and sidewalks
- Medians or roundabouts as warranted for traffic control
- Tree planting
- Install/replace sidewalks
- Utility relocation

Community Enhancements External Funding

Enhancement Opportunities with External Funding

- Streetscape enhancements
- Medians with landscaping
- Public art



Leavenworth Lift Station Replacement Project

The existing Leavenworth Lift Station at 1st and Leavenworth Street is not large enough to handle current flow during rain events. This project involves the construction of a larger lift station at approximately 4th and Pierce Street to accommodate this flow.

South Interceptor Force Main Project

The existing South Interceptor Force Main was constructed in the early 1960s and has remained in continuous operation for approximately 45 years. The current condition of the existing South Interceptor Force Main makes it unreliable for continued long term use and replacement is necessary to convey dry and wet weather flows to the Missouri River WWTP.

Missouri River WWTP Improvements Project

This project includes construction and modification to areas of the Missouri River WWTP to provide capacity for treatment of additional wet weather flows, resulting in improved water quality in the Missouri River.

South Omaha CSO! Projects

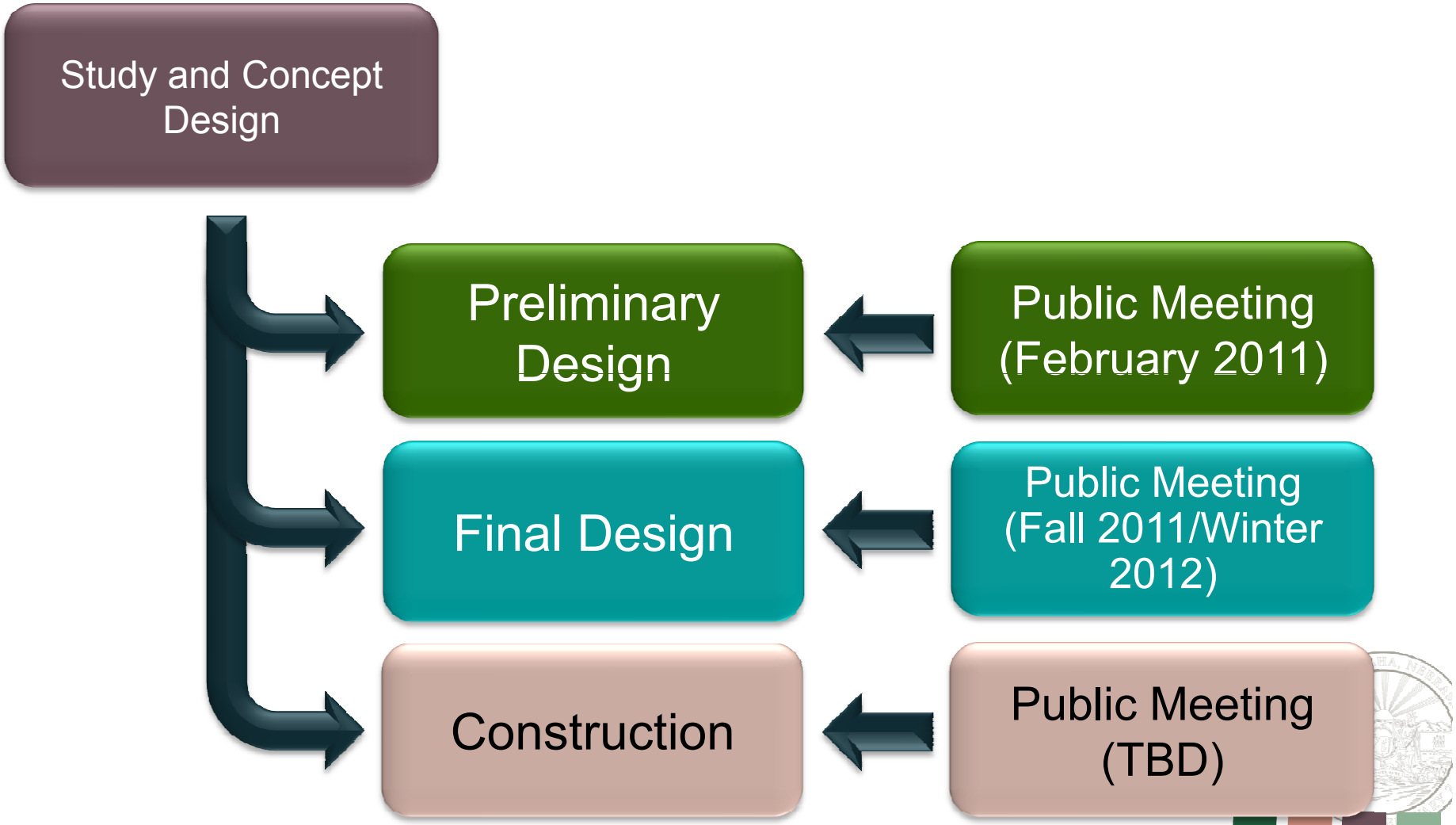
Common Project Goals

- Improve water quality and meet EPA requirements
- Minimize disruption to businesses and residents
- Integrate green and sustainable solutions as possible
- Provide opportunities for community enhancements as possible

Role of Projects in the LTCP

- Major Projects Phase 1
  - 6 Projects
    - South Omaha Industrial Area Sewer Separation (SOIASS) - Completed
    - South Omaha Industrial Area Lift Station
    - South Omaha Industrial Area Force Main
    - South Interceptor Force Main
    - Leavenworth Lift Station Replacement
    - Missouri River WWTP Improvements
  - Must be operationally complete by September 30, 2015
  - Will provide significant improvement to water quality in Missouri River

Design Process



South Interceptor Force Main

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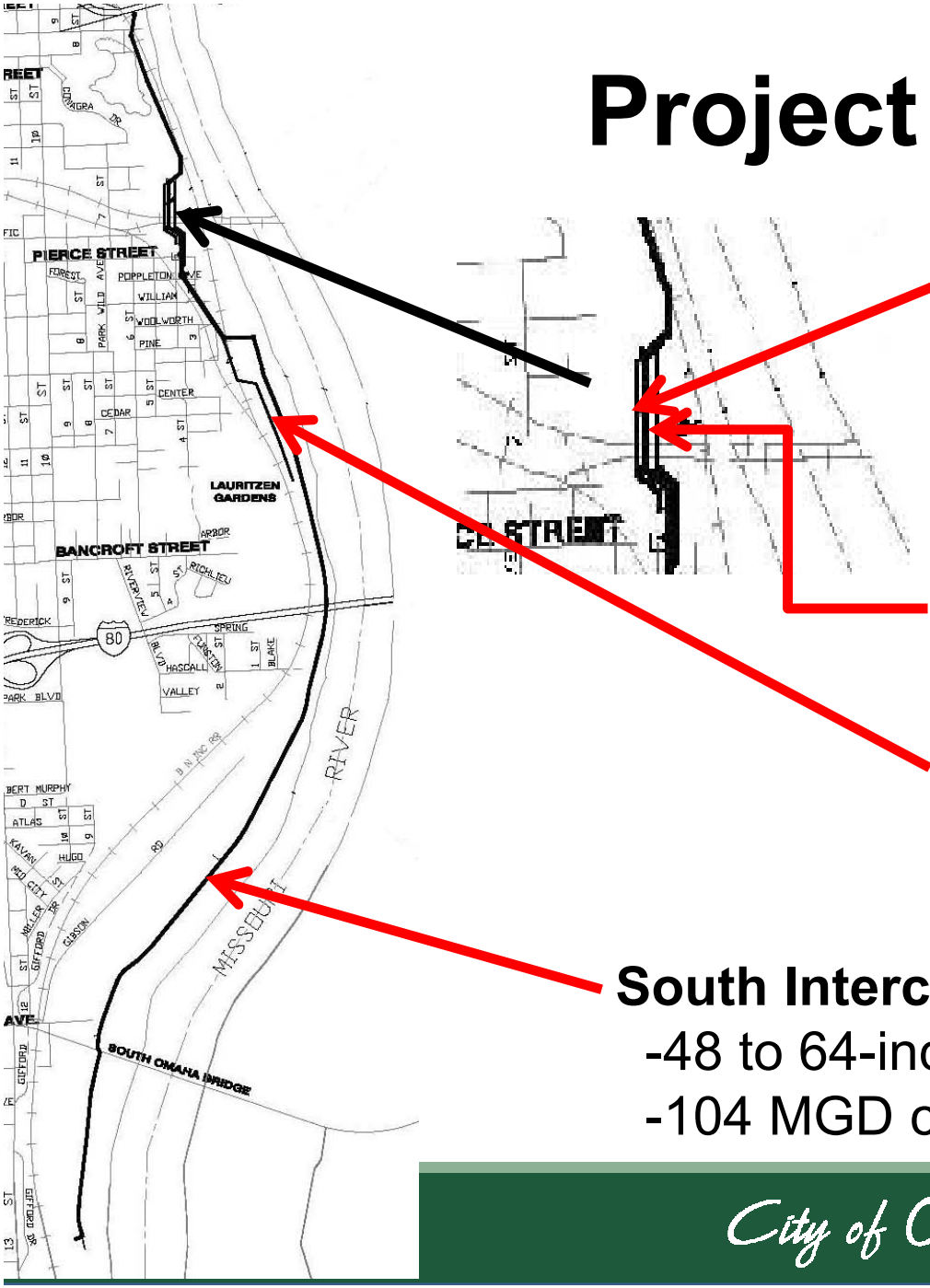
Project Need

- Existing South Interceptor Force Main constructed in early 1960s
- Continuously operated for approximately 50 years
- Current condition makes it unreliable for long term use
- Rehabilitation not a viable option as force main does not have backup and must run continuously

What are Gravity Sewers and Force Mains?

- Gravity Sewers
  - Sewer line that uses declining slope to convey wastewater
  - Most commonly used to convey sanitary waste
- Force Main
  - Sewer pipe fed by a lift (pump) station
  - Need to pump uphill
  - Under pressure
    - Similar pressure to water lines in your house

Project Components



North Gravity Sewer
- -54-inch diameter
- -Dry weather flow
- -35-45 MGD cumulative flow

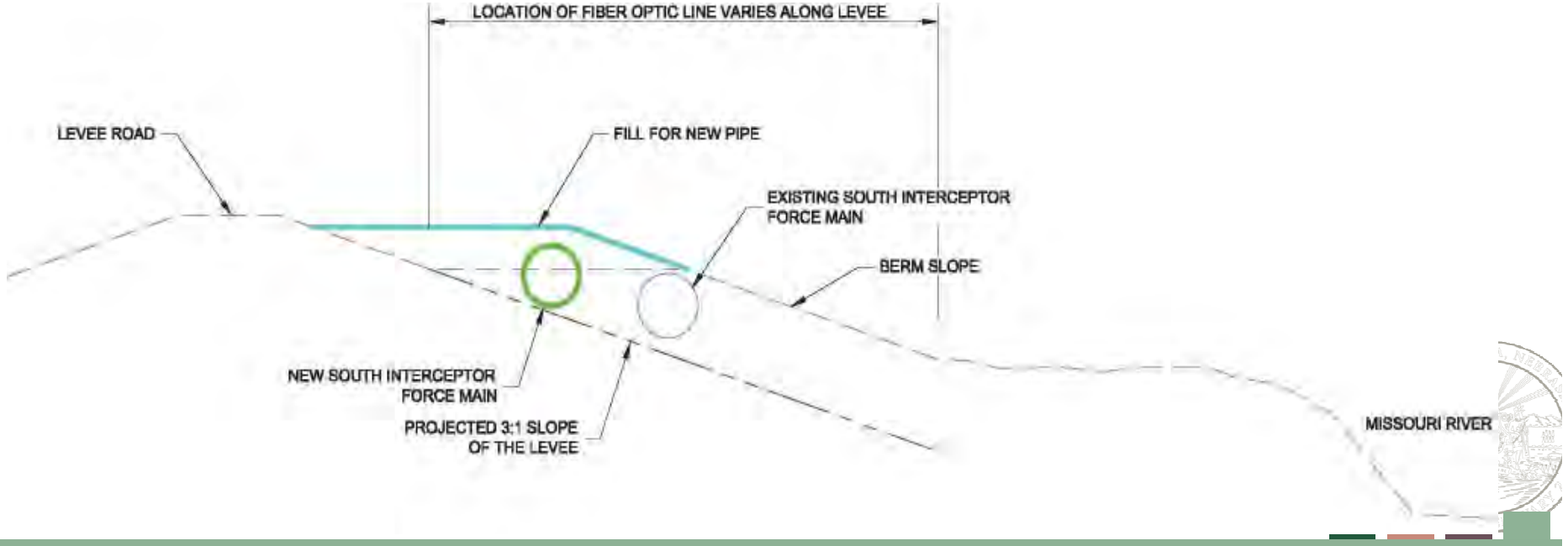
Future North Gravity Sewer
- -Wet weather flow

South Gravity Sewer
- -30 to 36-inch diameter
- -10 MGD cumulative flow

South Interceptor Force Main
- -48 to 64-inch diameter
- -104 MGD cumulative flow

Design Considerations

- Levee (US Army Corp of Engineers)
- Existing Utilities
- Existing South Interceptor Force Main
- Wetland Impacts



Project Location and Layout

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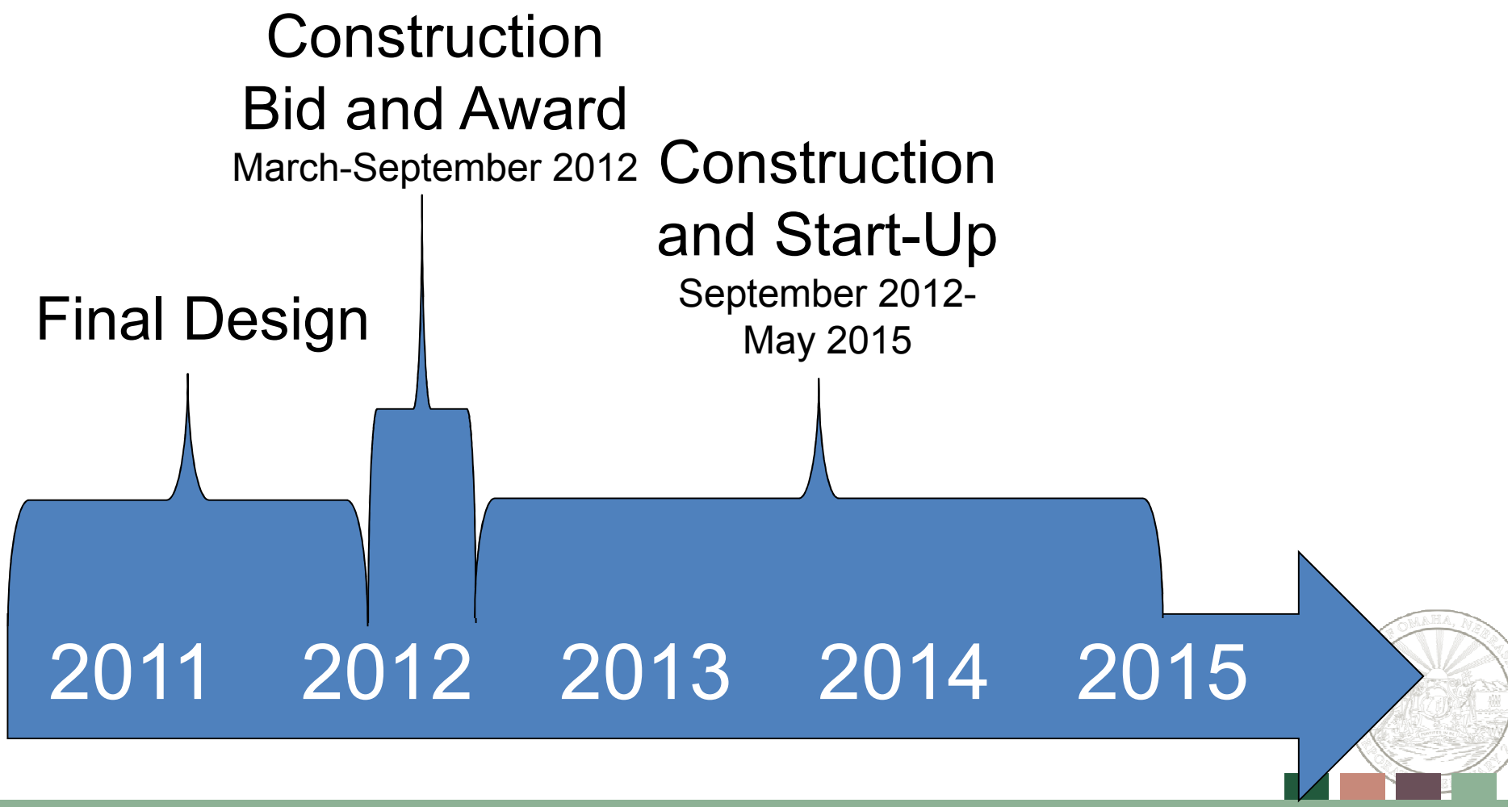
Community Enhancements

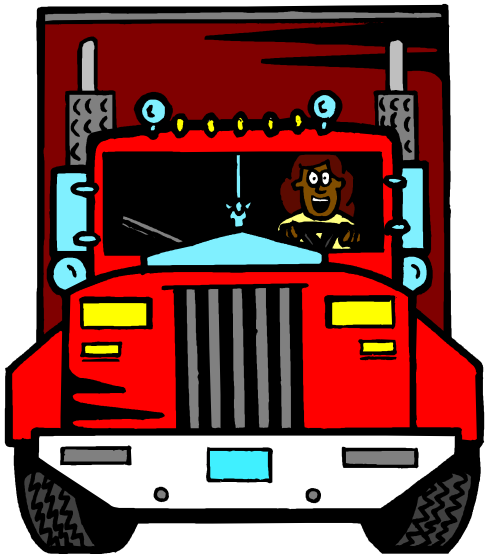
- Community Enhancements
  - Project encompasses large area
  - Community Enhancements restricted for much of alignment due to easements (non-City owned property)
  - Future trail opportunities along Missouri River being explored with local Natural Resources District
    - Paid with non-CSO funding sources

Schedule


Construction
Bid and Award
March-September 2012
Final Design
Construction
and Start-Up
September 2012-
May 2015
2011
2012
2013
2014
2015

How Will This Project Effect My Neighborhood or Business?

- Haul routes during construction
  - Pierce Street
  - Hickory Street
  - Gibson Road/Viaduct
  - Heartland of America Park – North Parking Lot
- Temporary street closings along Pierce Street near 4th Street
- Temporary closure of Heartland of America Park during winter months for construction



Leavenworth Lift Station Replacement

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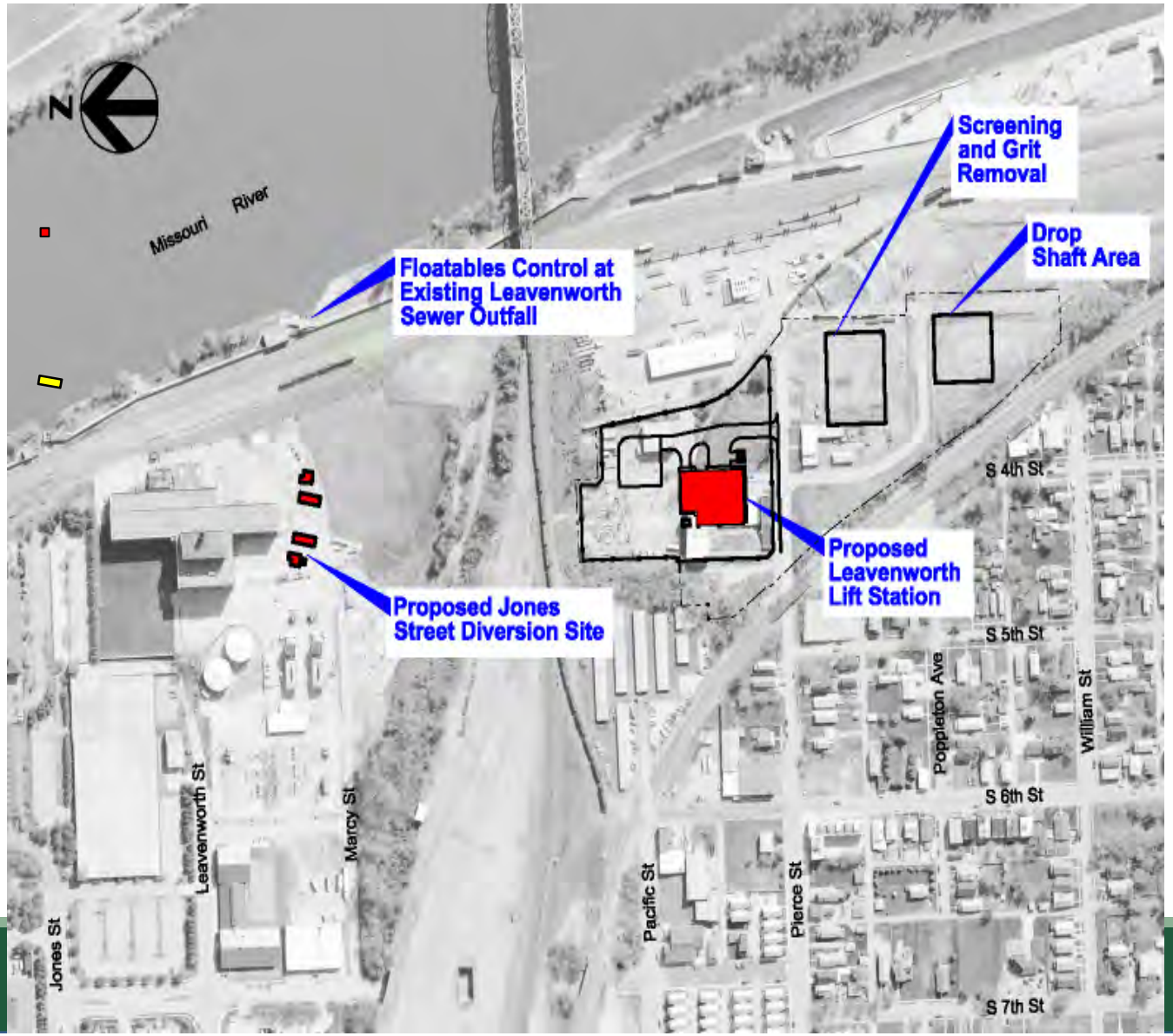
Project Need

- Existing Leavenworth Lift Station
  - Not large enough to handle current flow during rain events and is over 50 years old
  - Operating capacity is 15 million gallons per day (MGD)
- Approximately 45 MGD capacity needed during rain events

Project Location



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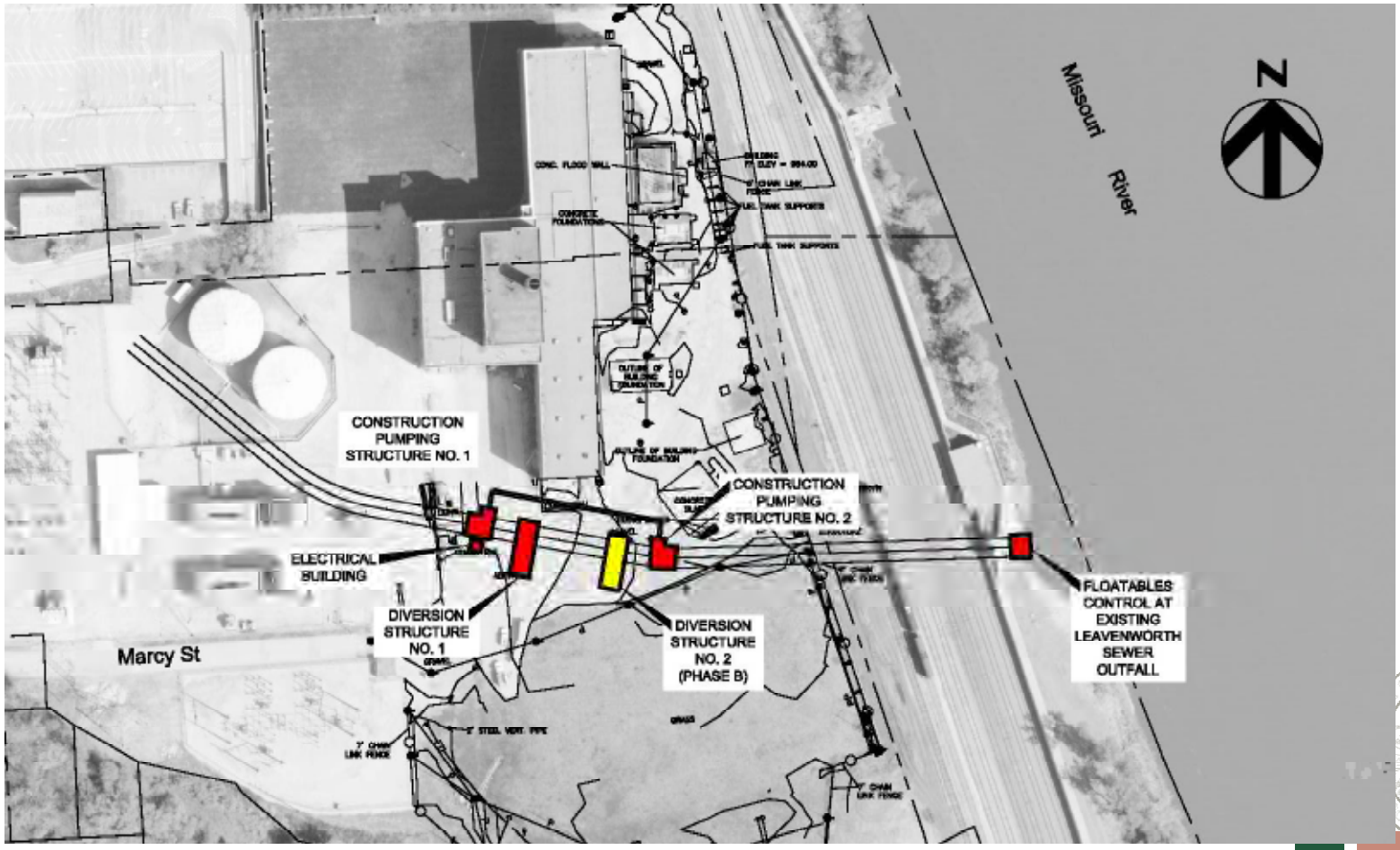
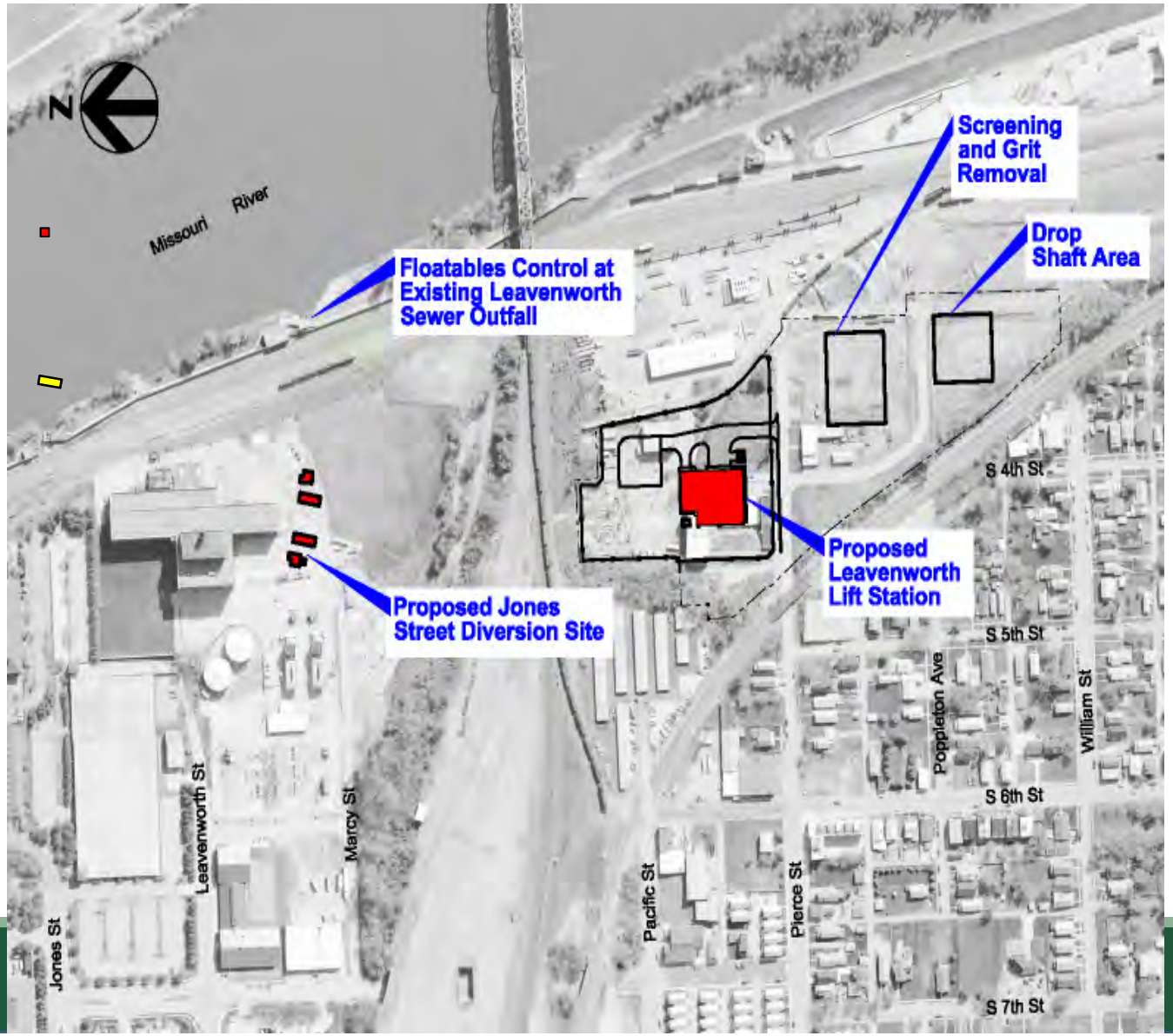
Project Location

Jones Street Site



Project Location



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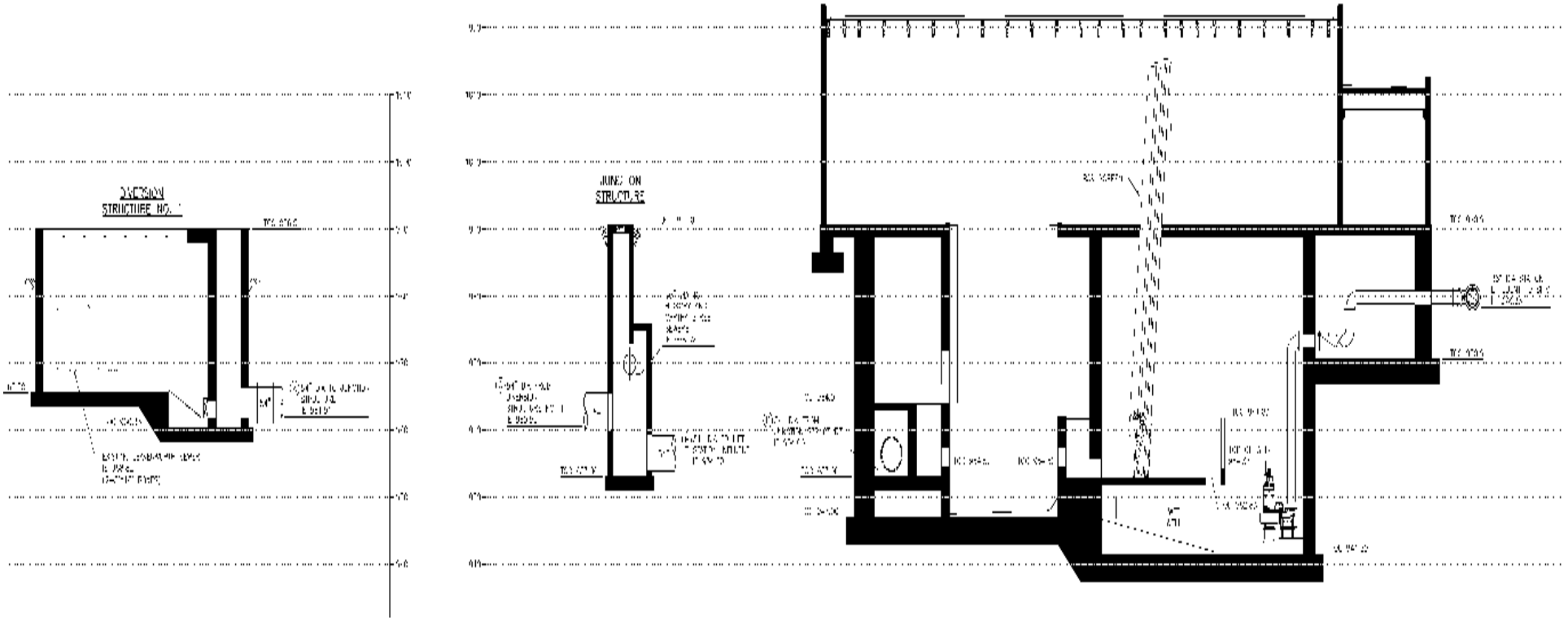
What Are We Doing?



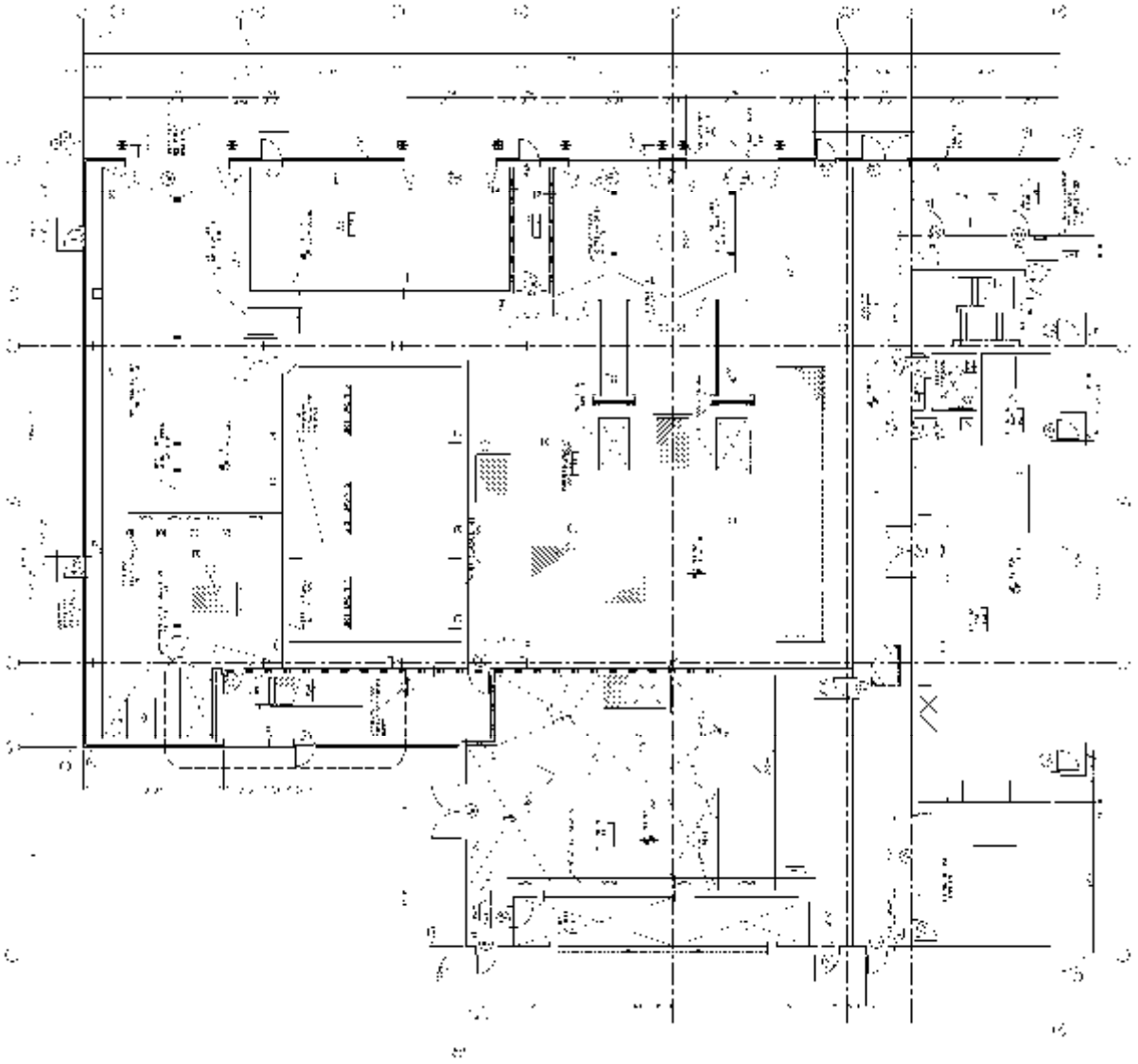
Lift Station Components

- Grit Removal Basins
  - 3 units, staged operation
  - Trucked removal of grit
- Mechanical Screens
  - 2 units
  - 22.5 MGD capacity each
  - Trucked screenings removal
- Wastewater Pumps
  - Dry weather: 2 pumps, 6 MGD each
  - Wet weather: 4 pumps, 15 MGD each

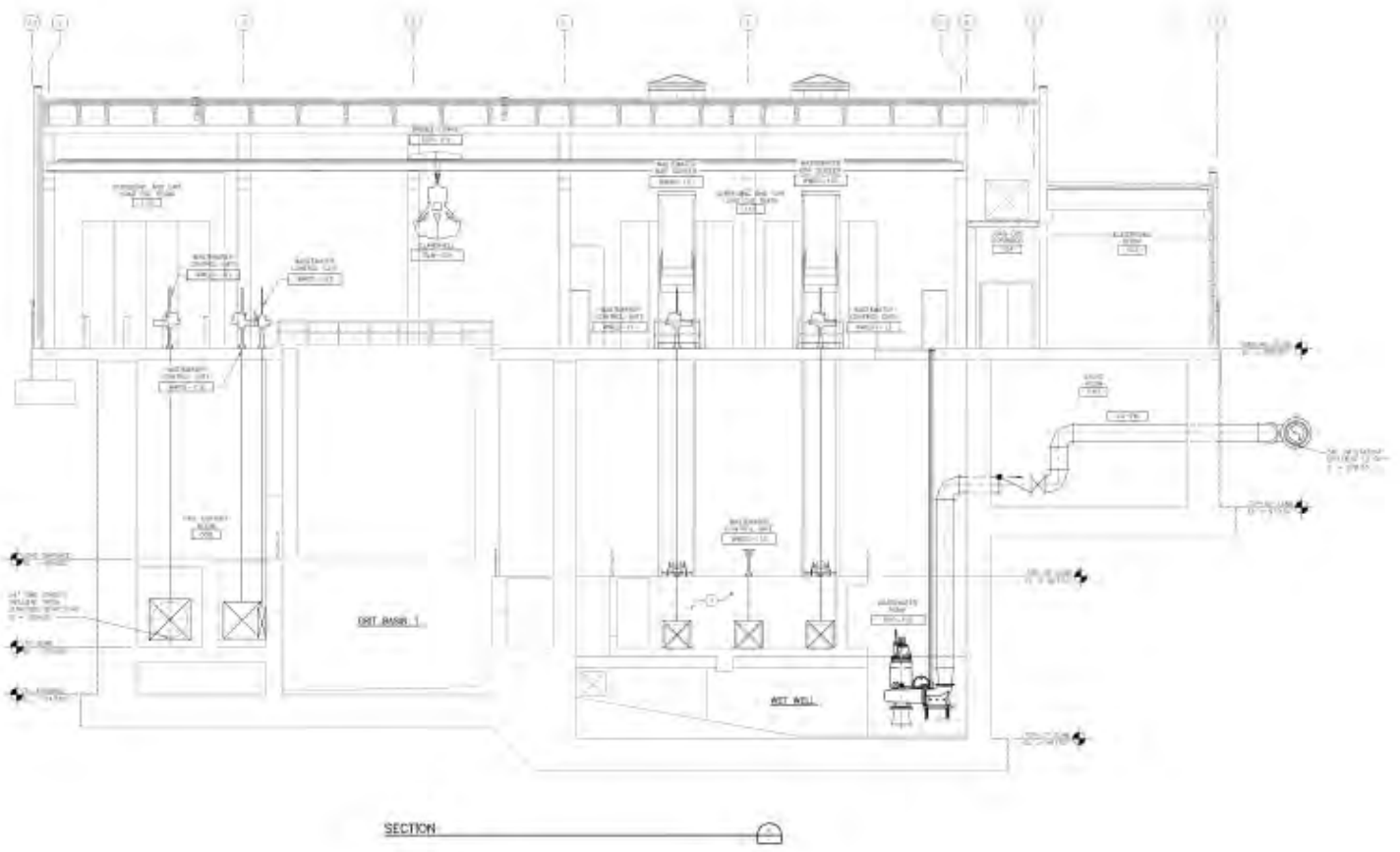
Design Considerations

- Construction Conditions
  - Lift station approximately 40 feet deep
  - Lower levels into rock
  - Groundwater 2 to 6 feet below surface, dewatering wells will be used

Building Plan



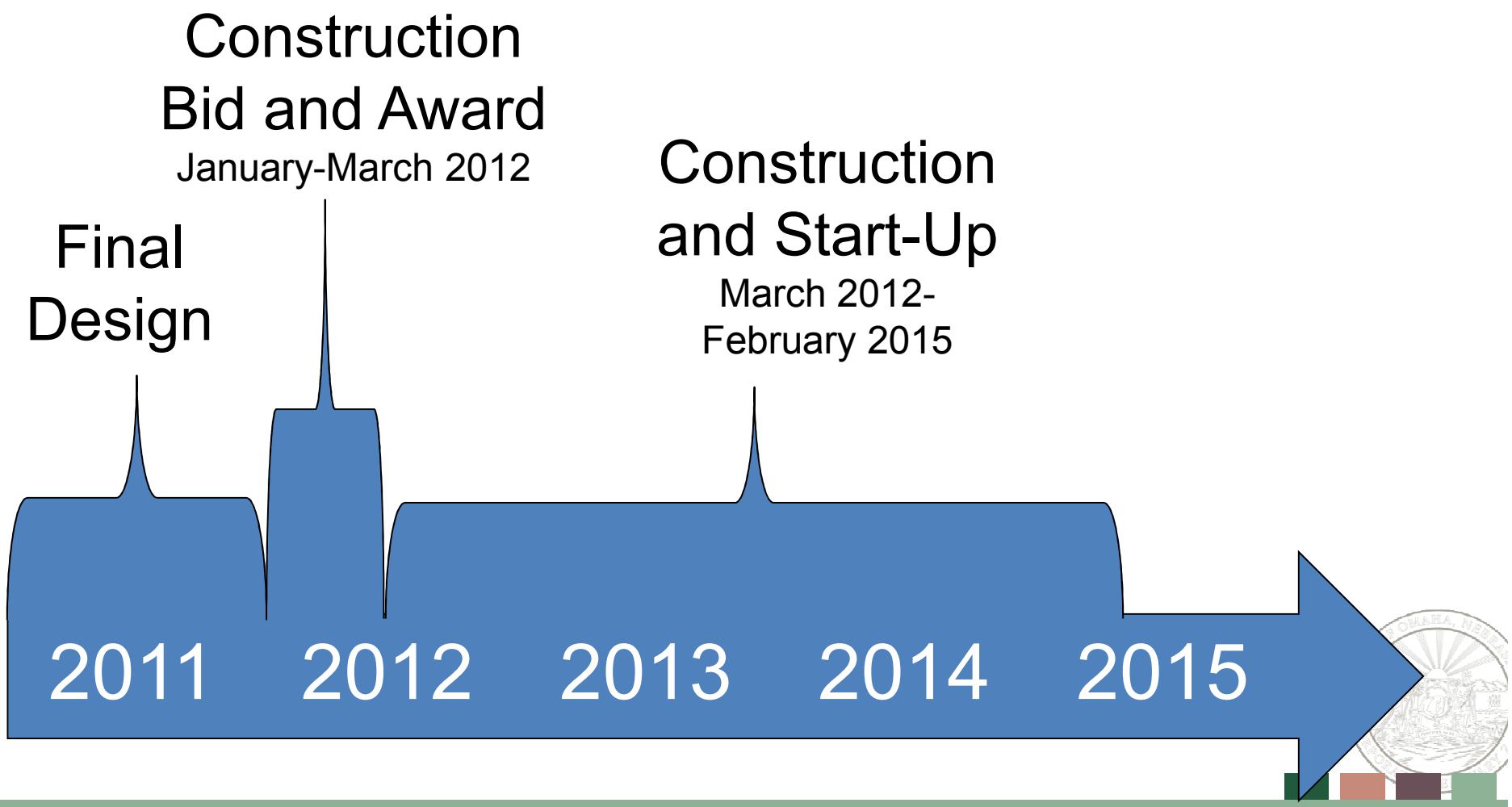
Side View-Section



Green Solutions

- Minimal Pavement
- Bioretention Garden
- Erosion Control Shrub Planting
- Tree Planting
  - Concolor Fur
  - Swamp White Oak
  - Colorado Blue Spruce

Schedule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How Will This Project Effect My Neighborhood or Business?

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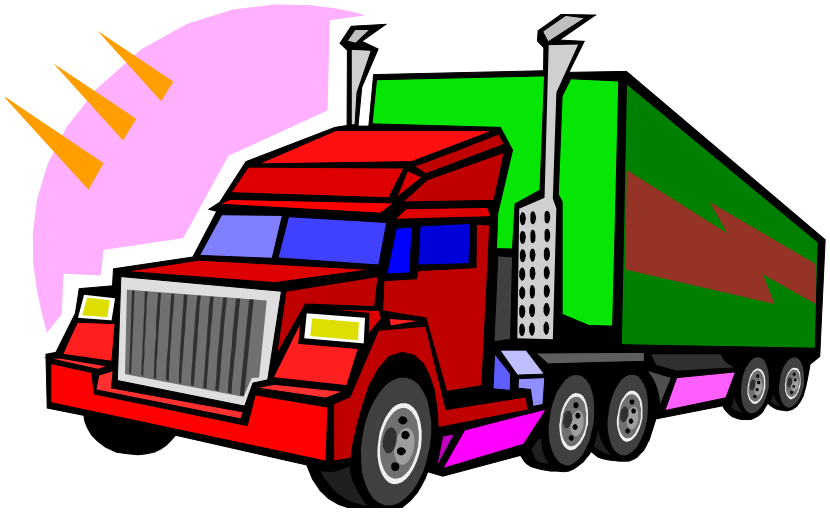

Missouri River Wastewater Treatment Plant (MRWWTP)

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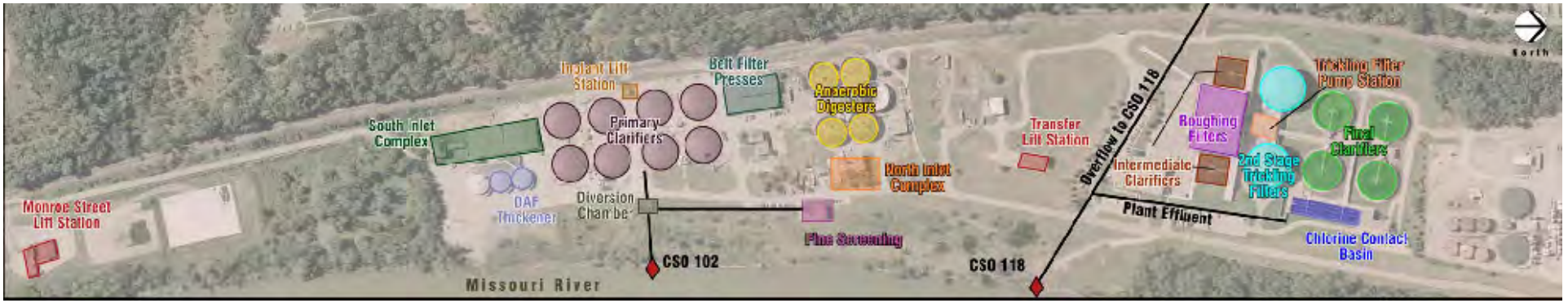
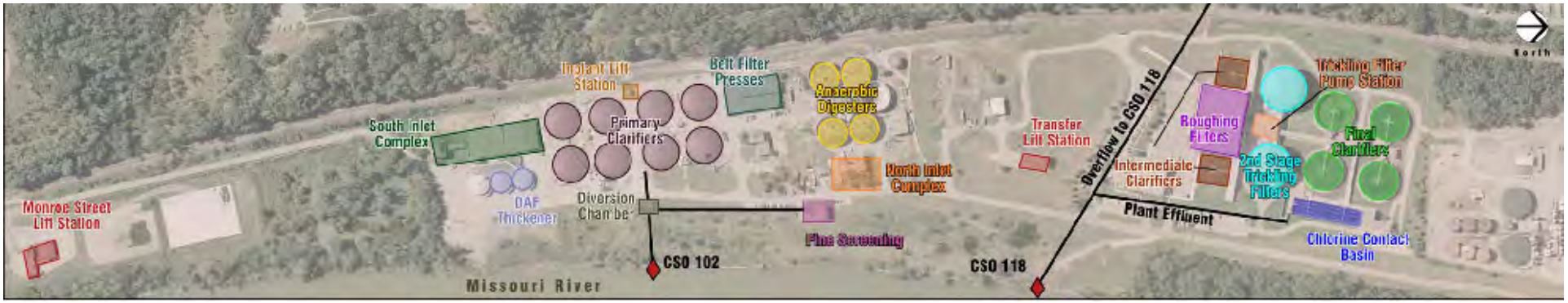
Site Location

What Happens at the Missouri River WWTP?



- Preliminary Treatment - Headworks Facility
  - Screening and Grit Removal
    - Remove large objects such as rags, paper, and plastics
    - Remove sand, gravel, and other heavy solid materials
  - Permit Requirements
    - Flow sampling and measurement
- Primary Treatment – Primary Clarifiers
  - Settleable Solids Removal

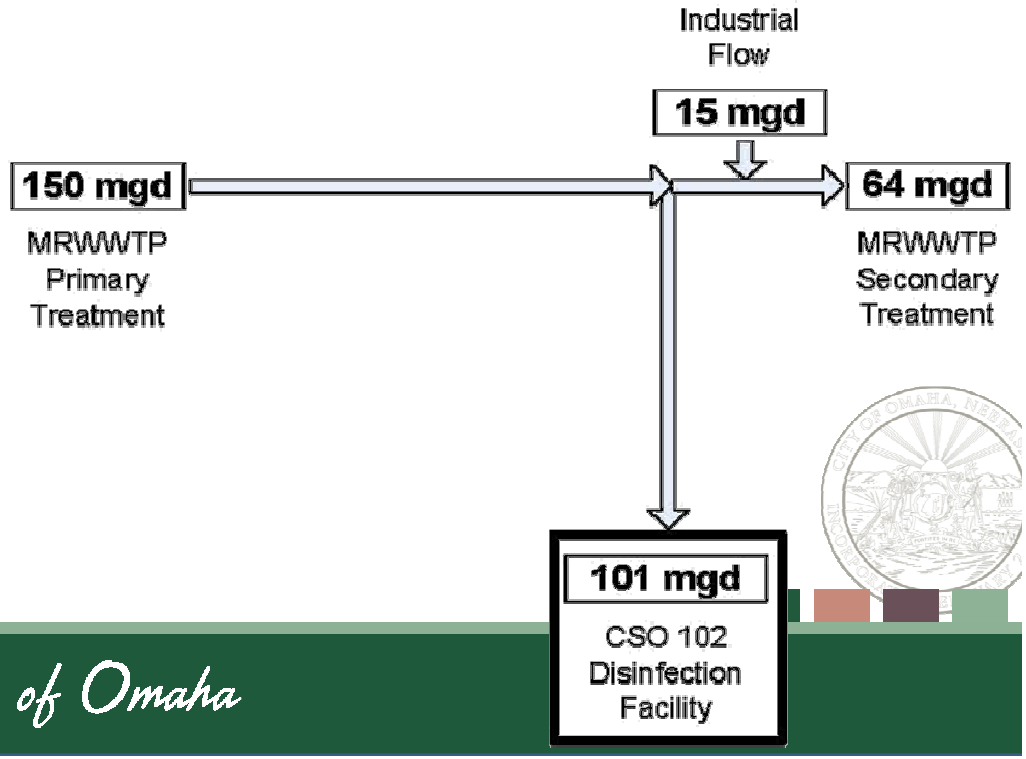
What Happens at the Missouri River WWTP?



- Secondary Treatment - Biological Treatment
  - Trickling Filters
  - Clarification
    - Remove organic matter from wastewater
- Disinfection
  - Chlorination
  - Dechlorination
    - Kill bacteria (E.Coli) using Sodium Hypochlorite
    - Remove active chlorine using Sodium Bisulfite

Project Need

- Missouri River WWTP current capacity not large enough for future wet weather flow
- Increase capacity to accommodate
  - Preliminary and primary treatment for 150 MGD design flow rate
  - Additional industrial flows
  - Reliable secondary treatment
  - Disinfect remaining flow



Site Improvements Plan

Project Components

- **Municipal Headworks Facility**
  - Preliminary treatment of 150 MGD
  - Take flow from several existing sources and the future deep tunnel
- **Municipal Primary Splitter Structure**
  - Split flow to primary treatment
- **In-Plant Lift Station**
  - Reliably pump 18 MGD to Municipal Headworks Facility

Project Components

- **Municipal Primary Clarifiers**
  - Primary treatment of 150 MGD
  - Improvements to existing facilities

- **CSO 102 Chlorination and Dechlorination Facility**
  - Chemical storage of Sodium Hypochlorite and Sodium Bisulfite
  - Disinfection of primary effluent up to 101 MGD
  - Flow sampling and measurement
    - 126 E.Coli Bacteria organisms/ 100 mL
    - 0.137 mg/L of Total Residual Chlorine

Project Components

- **South Omaha Industrial Area (SOIA) Treatment Facilities**
  - Dedicated preliminary and primary treatment of flow
  - Prioritized secondary treatment
- **Transfer Lift Station**
  - Reliably convey 64 MGD to secondary treatment
- **Primary Effluent Flow Control Structure**
  - Isolate Municipal and South Omaha Industrial Area flows

Project Components

- Biological treatment of odors
  - Reduced chemical usage
- Locally proven technology
- Improved odor control over existing facility
  - More air treated
  - Better at removing complex compounds

- **Odor Control**
  - Three locations
    - Municipal Headworks
    - Primary Clarifiers
    - South Omaha Industrial Area Facilities

Buildings


Smooth-face masonry units with single 8-inch vertical score
Split-face textured masonry units with single 8-inch vertical score


Fixed glass-block windows to allow natural insulated light into the process and storage spaces

Potential Impact to Wetlands

Facility	Approximate Anticipated Impact (acres)
Odor Control for Primary Clarifiers	~ 0.9
Disinfection Facility (for flow in excess of the secondary treatment system capacity prior to discharge to CSO 102)	~ 2.5
Disinfection Chemical Building	~ 0.5
Pipeline Connection to South Interceptor Force Main	TBD
Total	**4**

Community Enhancements

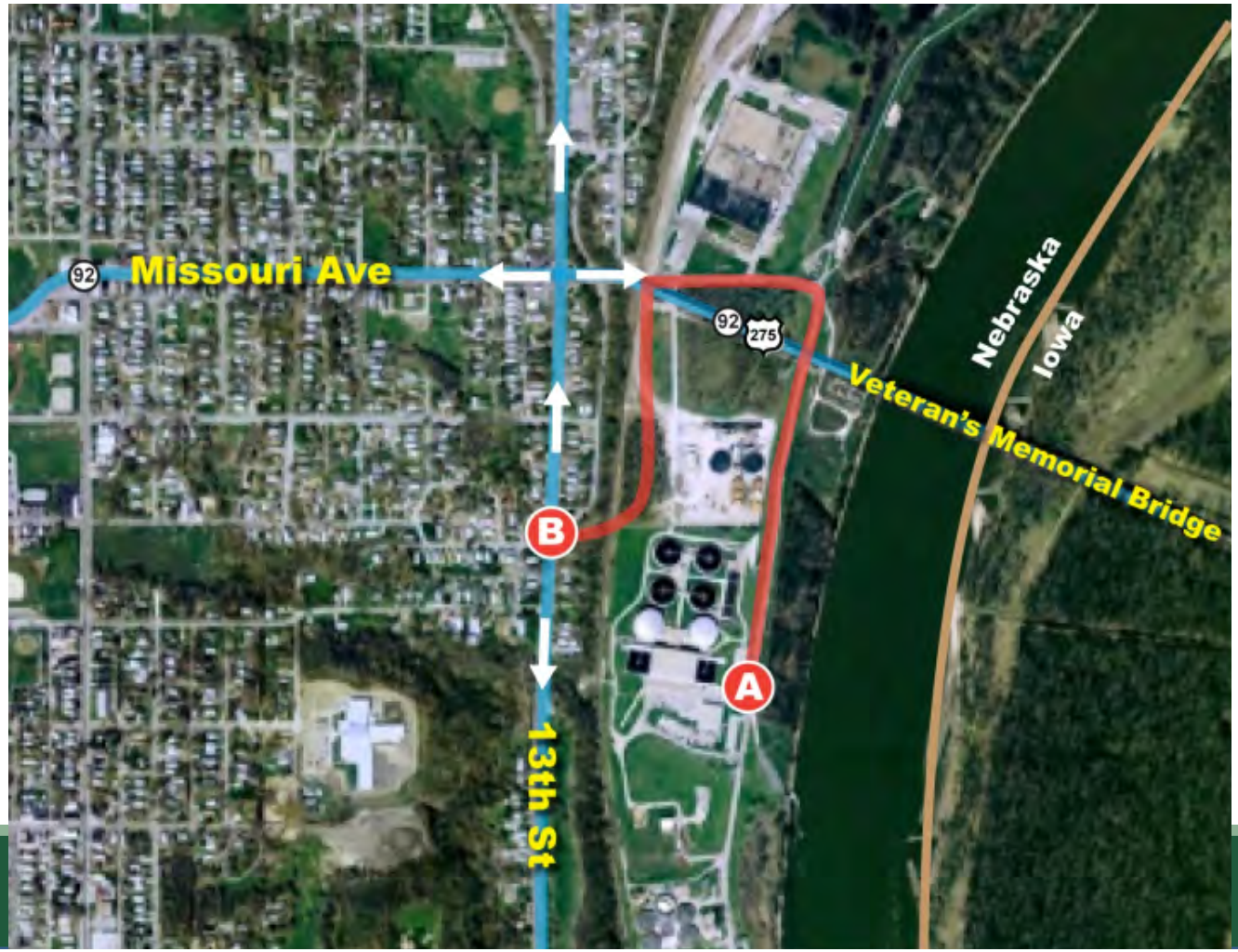
- Community Enhancements
  - Secure site with no access to the public
  - Community enhancements, as defined by the CSO Program, do not apply

Green Solutions for Stormwater Management

- Vegetated Swales
  - Open, shallow channel with vegetation covering the side slopes and bottom
- Dry Ponds
  - Pond with no permanent pool
  - Relies upon detention storage
- Filter Strips
  - Evenly sloped vegetated areas adjacent to impervious areas
  - Treat stormwater by filtering it through vegetation

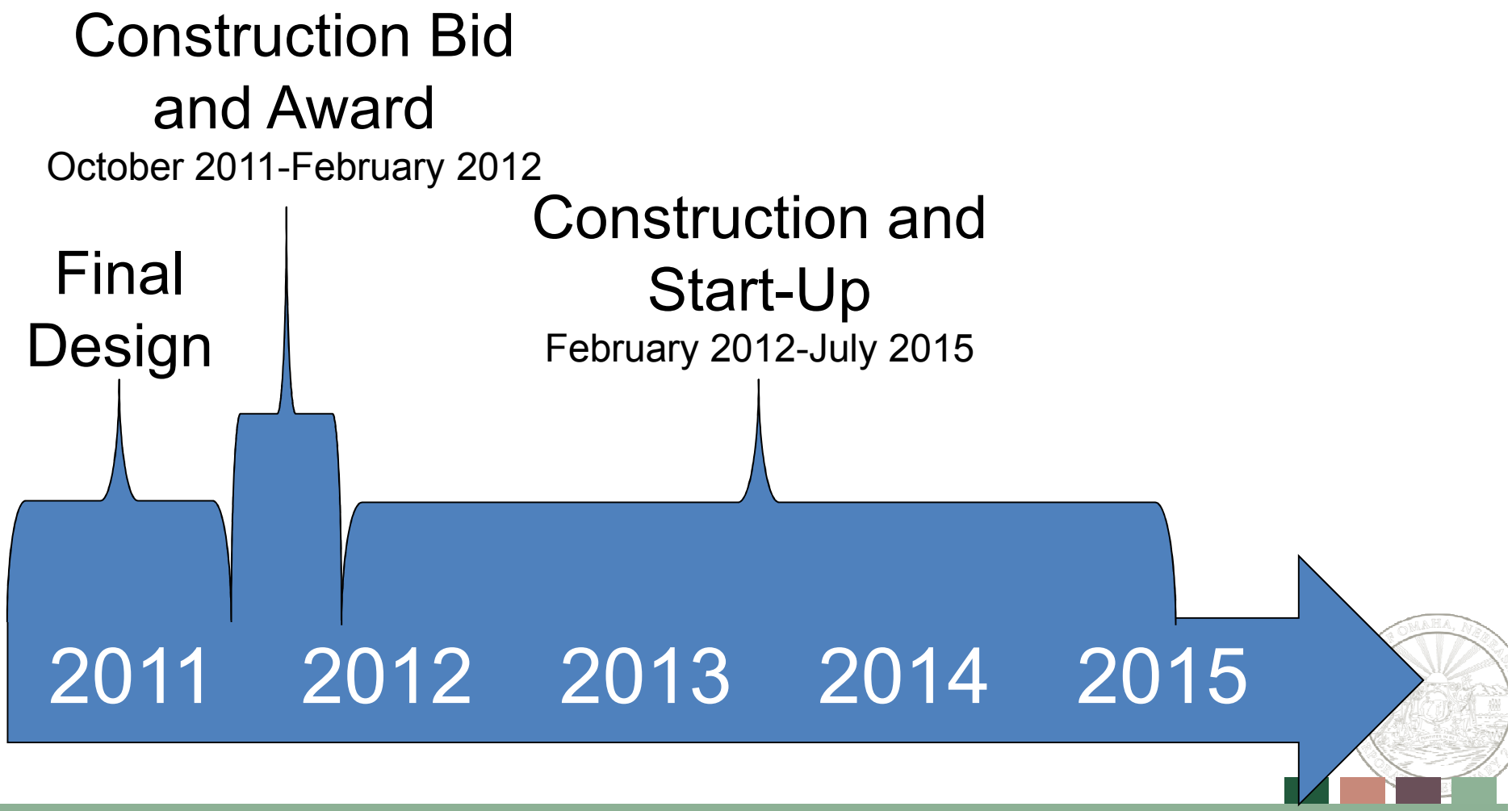
How Will This Project Effect My Neighborhood or Business?

- Trucking Routes During Construction



CSO! Clean Solutions for Omaha

Schedule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October 2011-February 2012
Final Design
Construction and Start-Up
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2011
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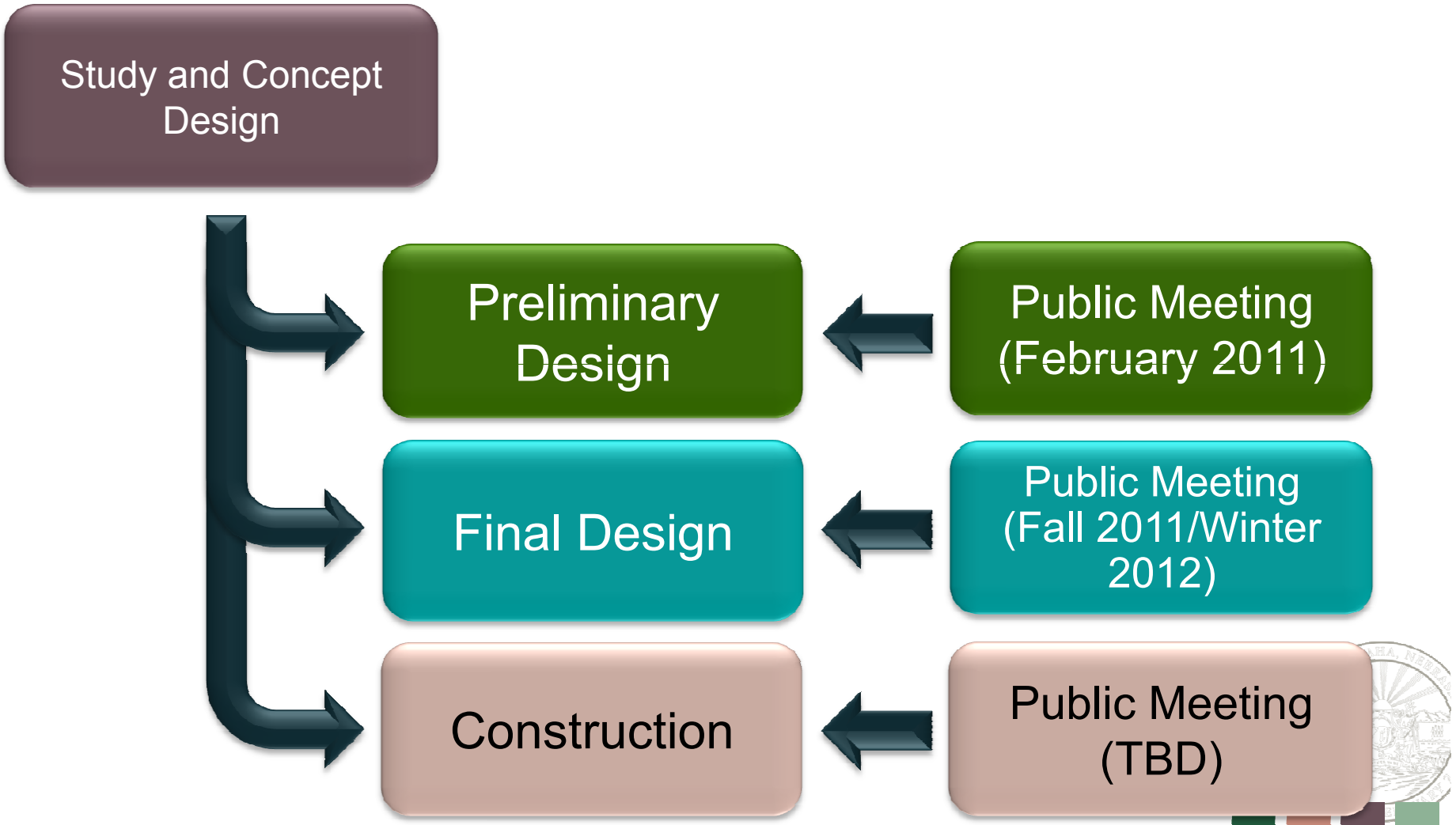
2015

What's Next?


Study and Concept Design
Preliminary Design
Public Meeting (February 2011)
Final Design
Public Meeting (Fall 2011/Winter 2012)
Construction
Public Meeting (TBD)

Contact Information

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  402-444-3915
- Missouri River WWTP
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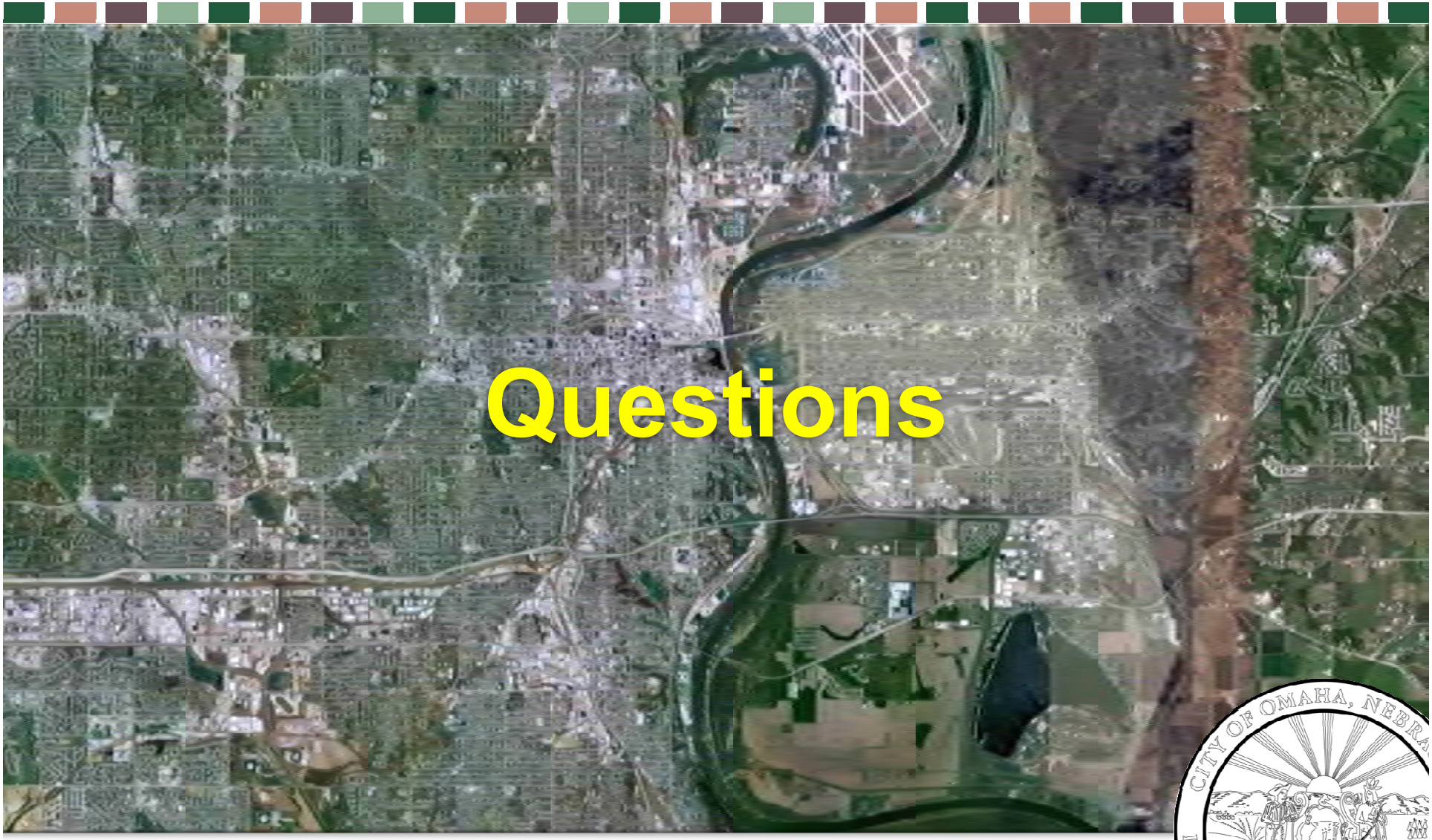
Questions