Omaha Combined Sewer Overflow (CSO) Control Program

Service Disabled Veteran Owned
Small Business Outreach, Training,
Industry Forum

Marty Grate - City of Omaha
May 28, 2009
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
Metro Service Area

- Two regional treatment plants
- 10 wholesale users
- 275 sq mi drainage area
- 550,000 service population
Omaha Sewer System

• 1,950 miles of sewers
  – Eastern half combined
  – Western half separate
• 51 sq mi combined sewer area
  – 33,000 acres
  – 7,300 sq blocks
• 29 CSO outfalls
  – 10 to Papio Creek
  – 19 to Missouri River
  – 3 recently eliminated
CSO Control Program Timeline

- Preliminary Combined Sewer Overflow (CSO) Long-Term Control Plan (LTCP) 2006 - 2007
- Final CSO LTCP 2007 - 2009
- Implementation of CSO Controls 2010 - 2024
- Negotiate Final Water Quality Goal 2008
- Design of CSO Controls 2009 - 2023

CSO! Clean Solutions for Omaha
CSO Control Options Considered

• Complete sewer separation
  – 490 sq blocks per year for 15 years
  – Then, treat separated stormwater?

• Storage
  – Below-ground tanks
  – Deep tunnels
CSO Control Options Considered (cont.)

• High-rate treatment
  – Near points of discharge
  – Operate only in wet weather

• Combination of Solutions
  – Green/Natural solutions
Typical Combined Sewer
Typical Sewer Separation
Storage – Above-Ground Tanks
Storage – Below-Ground Tanks

- Access Manhole for Cleaning, etc.
- Inflow Pipe
- To Interceptor
- Baffle Wall
- Pumps
- “Tipping Bucket” Flushing System
- Access Shaft
- To Overflow
- Vent Shaft
Tunnel Examples

Henderson Tunnel - Seattle, WA

Crosstown Tunnel – Milwaukee, WI
Deep Tunnel Storage Concept in Omaha
High-rate treatment technology
Green Solutions

• Approach to stormwater management
  – Sustainable
  – Cost effective
  – Environmentally friendly

• Purpose is to capture, clean, and reduce stormwater runoff using plants and soils
Wetlands

Wet Pond

Extended Dry Pond
CSO Control Plan
Proposed Major Elements
October 2007 Submittal

Targeted Sewer Separation Projects

3 High Rate Treatment Facilities

One Deep Conveyance Tunnel
2009 CSO Controls

- High-Rate Treatment at Saddle Creek Outfall
  - Flow rate: 315 million gallons per day
  - Reduced size of facility by adding additional sewer separation area

- High-Rate Treatment at Missouri River Wastewater Treatment Plant
  - Flow rate: 52 million gallons per day
  - Reduced size of facility by increasing tunnel size

- Storage Tank at Minne Lusa Outfall
  - Volume: 3.7 million gallons
  - Eliminate Treatment Facility by adding additional sewer separation areas

- Storage Tank near Benson Park
  - Volume: 80,000 gallons
CSO Control - Tunnel

- **Deep Tunnel:**
  - Length: 5.4 miles
  - Diameter: 17 feet
  - Depth: 160 feet
  - Number of drop shafts: 5

- **Changes**
  - Reduced length by 0.4 miles and increased diameter from 12.5 to 17 feet
  - Reduced number of drop shafts from 6 to 5 by combining facilities
Water Quality Benefits

Reduction of Overflows and Bacteria
# Overflow Statistics for Average Year

<table>
<thead>
<tr>
<th>Watershed</th>
<th>Number of Overflows (2024)</th>
<th>Percent of overflow volume controlled (2024)</th>
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<tr>
<td>Missouri River Watershed</td>
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<td>Papillion Creek Watershed</td>
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<tr>
<td>Total System</td>
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Costs & Implementation Plan
CSO Control Costs

• CSO Control Programs involve a significant cost
  – Atlanta, GA - $3.0B for 19 sq mi
  – Cincinnati, OH - $1.5B for 74 sq mi
  – Cleveland, OH - $1.6B for 75 sq mi
  – Louisville, KY - $500M for 27 sq mi
  – Nashville, TN - $1.3B for 15 sq mi
  – Omaha, NE - $_____ for 51 sq mi
Preliminary Cost Estimates

- Total cost estimate $1.5 billion (2006 $)
  - Sewer rates are likely source of funds
  - All system users in Omaha and metro area
  - All rate payers affected including residential, commercial and industrial

- Residential rate of $15/month in 2010 estimate up to $50/month by 2017
Stimulus funds

• American Recovery and Reinvestment Act - $800B
• Clean Water Act share $4B
• Nebraska share $20 M
• Omaha CSO (separation) share: $7.5M
  – $3.75M 20-year loan @2%
  – $1.875M 20-year loan @0%
  – $1.875M loan forgiveness (grant)
• Additional $7.5M loan @2% for treatment plant improvements
Monthly Household Bill

$0.00
$5.00
$10.00
$15.00
$20.00
$25.00

2006 2007 2008 2009 2010

Typical Residential Sewer Bills-
Past, Present, and Future

Monthly Household Bill
Final LTCP Costs

- Refined LTCP
- Updated capital costs to April 2009 dollars
- Latest estimated total program cost ~$1.7B (2009 $)
- Updated financial plan and cost of service model for sewer use fees
- Drafted ordinance for 2011-2014 rate increases
Average Residential Sewer Bills: Past, Present, and Future
Rates Remain Competitive

Memphis Light, Gas and Water

2009 Utility Bill Comparisons for Selected U.S. Cities
Omaha vs. National Avg.

Average Monthly Residential Wastewater Fees

- National Average
- Omaha

1994 - 2014
Path Forward
**Schedule – LTCP Completion**

- Rate ordinance vote – **June 2**
- Community Basin Panel meeting – **June 17**
- Public release of the LTCP and 30-day comment period – **June 30**
- Community Basin Panel meeting – **July 15**
- Public meeting – **August 18**
- BAP meetings – **August 19 to September 10**
- Submit Final Long Term Control Plan – **October 1, 2009**
Sustainability Incorporates the Triple Bottom Line

Economic Affordability

Community Acceptance

Regulatory Compliance

Economic Growth

Social Progress

Environmental Stewardship
Learn more...

• Public web site: www.omahaCSO.com
• CSO hotline: 341-0235
• Information sites at Omaha Public Libraries, Community Centers, and the Neighborhood Center
• NE Educational TV documentary “Our Water, Our Future” NETV2
Discussion & Questions
Key Refinements

• Respond to Regulator comments and prepare Final Long Term Control Plan
• Confirm tunnel and treatment concepts
• Refine project costs and schedule
• Continued public involvement and education
• Maximize community benefits
  – Green solutions and sustainability
Commercial/Industrial Rates

- Wastewater conveyance and treatment fees are assessed on a cost of service basis.
- Billing is generally done through MUD.
- The charge labeled City of Omaha Sewer includes:
  - A flat monthly customer charge.
  - A flow charge that is based on water use.
  - Where appropriate a high strength surcharge.
Commercial MUD Bill

Details of current charges:

**GAS COMMERCIAL RATE B: Mar 27 to Apr 27**

- Meter Number 391125
- Current read (actual): 61647 - Previous read (actual): 60842 = 805 MCF
- Gas Use: 805 MCF x 1.028 (heat value) x 10 = 8275.400 therms
  - 403.226 therms at 0.6442 = $259.76
  - 931.516 therms at 0.6342 = $590.77
  - 2096.774 therms at 0.4483 = $939.98
  - 4843.883 therms at 0.4383 = 2,123.08
- Service Charge: 17.00
- Gas Cost: $3,930.59
- Gas Infrastructure Replacement: 23.00

**WATER COMMERCIAL RATE W-2: Mar 27 to Apr 27**

- Meter Number 70037631  Size: 3 -inch
- Current read (actual): 67901  Previous read (actual): 67577 = 324 CCF
- Water Use: 324,000 CCF or 242,352 gallons
  - 324,000 CCF at 0.9457 = $274.01
- Service Charge: 48.54
- Water Cost: $322.55
- Water Infrastructure Replacement: 10.00
- City of Omaha Sewer: 265.82
- Sales Tax: 0.00
- Current Charges: $4,551.96
## CSO Controls Schedule

Schedule shows “Start Final Design” to “Complete Start Up”

*Schedule may be modified further for final LTCP*
# Sewer Separation Schedule

<table>
<thead>
<tr>
<th></th>
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Schedule shows “Start Final Design” to “Complete Start Up”

*Schedule may be modified further for final LTCP*
Who Pays for Assistance Programs?
Conveyance - Swales

Rainwater Capture

Landscaping – Bioretention Basin

Conveyance - Swales
Public Participation Process

Community Basin Panel (CBP)
- Appointed by Mayor Fahey
- Vision-specific
- “Big picture perspective”
- Define and assign weights to non-monetary criteria
Public Participation Process

Basin Advisory Panels (BAPs)

• Recruited through Neighborhood Center of Greater Omaha with input from City Council
• Basin-specific
• Neighborhood focus
• Refined weights by basin for non-monetary criteria
## CBP Non-Monetary Criteria Weights

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<td>Reduction of Combined Sewer Back-Ups into Basements</td>
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<td>Reduction of Street Flooding</td>
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<td>Minimizing Community Disruptions</td>
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<td>Opportunities for Infrastructure/Utility Improvements</td>
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<td>Opportunities for Community Enhancements</td>
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Estimate Costs and Calculate Benefit/Cost Ratios

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<th>Alternative</th>
<th>Cost ($ Million)</th>
<th>Benefit/Cost Ratio</th>
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<td>Alt. 3</td>
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<tr>
<td>Alt. 4</td>
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A Cost-Benefit Analysis Was Used To Provide Sound Planning Recommendations
CSO Control – Sewer Separation

- Less complex basins will have separation as primary controls

- Targeted separation in complex basins

- Separation benefits
  - Basement backup reduction
  - Infrastructure upgrades
  - Opportunities for community enhancements
CSO Controls – Treatment Facilities

- High-Rate Treatment at Minne Lusa Outfall
  - Flow rate: 21 million gallons per day

- High-Rate Treatment at Saddle Creek Outfall
  - Flow rate: 50 million gallons per day

- High-Rate Treatment at Missouri River Wastewater Treatment Plant
  - Flow rate: 114 million gallons per day
CSO Control - Tunnel

• Deep Tunnel:
  – Length: 5.8 miles
  – Diameter: 12.5 feet
  – Depth: 170 feet
  – Number of drop shafts: 6

• Tunnel Benefits
  – Minimize community disruption during and after construction
  – Achieves water quality goals
  – Reduces number of treatment facilities
Storage - Below-Ground Example

During Construction

After Construction
Omaha’s Combined Sewer System

10 drainage basins:
- 6 Complex / 4 Less Complex

- Missouri River Watershed
  - Bridge Street
  - Minne Lusa
  - Burt-Izard
  - Leavenworth
  - South Interceptor
  - Ohern/Monroe

Papillion Creek Watershed
- Cole Creek
- Papillion Creek North
- Saddle Creek
- Papillion Creek South
STAKEHOLDER PARTICIPATION

- Community acceptance is critical
- Obtain local knowledge of the impacted area
- Early communication of ideas and concerns to the project consultants
- Establish and weight non-monetary criteria (community concerns)
# Residential Wastewater Bills

Rules in effect January 1, 2009

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<th>Rank</th>
<th>City</th>
<th>State</th>
<th>Company</th>
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## COMMERCIAL WASTEWATER BILLS

Rates in effect January 1, 2009

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Schedule shows “Start Final Design” to “Complete Start Up”

*Schedule may be modified further for final LTCP
Missouri River Downstream of CSOs
Bacteria Levels

E. coli (#/year x 10^17)

Existing Conditions

LTCP

CSO - Treated
Stormwater
Upstream
CSO 102
Papillion Creek Watershed
CSO - Untreated
Papillion Creek
Annual Bacteria Levels

E. coli (#/year x 10^7)

Existing Conditions
LTCP

CSO - Treated
Stormwater
Upstream
CSO - Untreated
Commercial MUD Bill

Account: 216-180-0144
OMAHA HOUSING AUTHORITY
Service address: 2805 R ST

Having difficulty paying a bill?
Please call 504.7002.

We will work with you to set up a payment plan that works for you and M.U.D. Call today!

Billing date: May 1, 2009
Previous balance: $1,012.14
Payment received - Thank you: 1,012.14 CR
Current charges: 1,051.42
New balance: 1,051.42

Total due: $1,051.42

Details of current charges:
WATER COMMERCIAL RATE W-2: Mar 27 to Apr 27
Meter Number 2863146  Size: 1.5 inch
Current read (actual): 14566 - Previous read (actual): 13948 = 618 CCF
Water Use: 618.000 CCF or 462,264 gallons
618.000 CCF at 0.8457 = $522.64

Service Charge: 19.43
Water Cost: $542.07
Water Infrastructure Replacement: 10.00
City of Omaha Sewer: 499.35
Sales Tax: 0.00

Current Charges: $1,051.42

Your Water Use

June July Aug Sep Oct Nov Dec Jan Feb Mar Apr May
Past 12 Months Past 13-24 Months

Billing units: 618 352
Use per day: 19.9 11.0
Average cost per day: $17.81 $9.75
Number of days in billing cycle: 31 32
Satellite Treatment – High-Rate

ACTIFLO Flow Diagram