Miles Crossing
Vacuum Sewer System Project

Presented by:
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Presentation Overview

- Background
- Vacuum Sewer Systems
- Vacuum System Manufacturer - Supplier Selection Process
- Project Details
- Project Challenges
- Summary
Background

- Miles Crossing community
  - Unincorporated
  - Population approx. 900
  - Mixed development
  - Residential, commercial
  - Industrial
  - Elementary school
Background (cont.)

- Individual on-site septic tank/drainfield systems
- High groundwater/high system failure rate
- Undertreated/untreated sewage discharges
- Historical environmental degradation and public health hazards
Background (cont.)

- District formed in 1999 by Clatsop County Board of Commissioners
- Purpose to implement a public wastewater collection, treatment and disposal system
- Development restrictions imposed by County due to on-site disposal system failures
- Some development subsequently allowed with use of “Blue Rooms”
Background (cont.)

- District obtained funding and completed facility planning
- Alternative sewage collection methods evaluated
- Vacuum sewer technology recommended
- Treatment and disposal alternatives evaluated
- Discharge to City of Astoria system selected
- DEQ approved facility plan
District and City signed IGA for sewage treatment and disposal

District obtained funding for design and construction

Business Oregon (Oregon Economic & Community Development Department) funded project design (Clatsop County managed)

USDA Rural Development funded construction (grant and loan)
Vacuum Sewer Systems

- Use the differential pressure between atmospheric and a partial vacuum in the piping network and vacuum station collection vessel to transport and collect sewage

- Vacuum sewers first installed in Europe in 1882

- Basic elements
  - Vacuum valve pit
  - Vacuum sewer mains
  - Vacuum station
Vacuum Sewer System Schematic
Vacuum Sewer System Operation

How AIRVAC Works:

1. Traditional gravity lines carry wastewater from the customer to an AIRVAC valve pit package.

2. When 10 gallons of wastewater collects in the sump, the AIRVAC valve opens and differential pressure propels the contents into the vacuum main.

3. Wastewater travels at 15 to 18 fps in the vacuum main, which is laid in a sawtooth fashion to insure adequate vacuum levels at the end of each line.

4. At the vacuum station, vacuum pumps cycle on and off as needed to maintain a constant level of vacuum on the entire collection system.

   Wastewater enters the collection tank. When the tank fills to a predetermined level, sewage pumps transfer the contents to the treatment plant via a force main.
Vacuum System Manufacturer – Supplier Selection Process

- Early in design
- Process approved by USDA – RD
- AIRVAC, Inc. selected
- AIRVAC equipment incorporated into project design
- Vacuum valve pits, buffer tanks, vacuum tank, vacuum pumps, sewage pumps, and vacuum station control system
Project Details
Basic Project Data

- Service Area Characteristics
  - Service Area: 642 acres
  - Current Population: 900
  - Design Population (20 years): 1,130
  - Current Average Daily Flow: 31,000 GPD (approx. 35 GPCD)

- Vacuum Station
  - Vacuum Tank: 3,400 gallons
  - Operating Range: 16”-20” Hg (18.1’-22.6’) vacuum
  - Vacuum Pumps: 4 @ 455 CFM; 25 HP each, 1 future
  - Sewage Pumps: 2 @ 520 GPM @ 183’ TDH - 75 HP
  - Backup Power: 300 kW; diesel
Basic Project Data (cont.)

- **Force Main**
  - Force Main: 8” diameter - 9,250’ long
  - 2,000’ under Youngs Bay - HDD
  - Odor Control: Calcium nitrate

- **Raw Sewage Storage Tank at Vacuum Station**
  - Total Volume: 105,000 gallons
  - Operating Volume: 72,000 gallons

- **Sewage Collection System**
  - 4”-10” vacuum mains - 40,000’
  - 3” vacuum service laterals – 13,000’
  - 315 vacuum pits
  - 4” gravity sewers – structures to vac. pits – 28,000’

- **Construction Cost**
  - $8.3 million
Central Vacuum Station
Youngs Bay Crossing

- Parallel and immediately east of Youngs Bay Bridge
- Horizontal directional drill – 2,000’ long
- 8” HDPE force main
Jeffers Slough Crossing

- 125’ slough wide slough
- Over-water crossing needed to conserve available vacuum
- Pipe bridge to support 10” vacuum main
Private Service Work

- Complete new service connections
- Existing foundations to new vacuum pits
- Easement and access agreements
- Documentation of existing conditions
- Coordination with property owners
- Detailed site mapping for attachment to easements
- Property owner releases
Astoria IGA

- Anticipated additional District flow to City system triggered CSO concerns
- Extended negotiations with City and DEQ regarding potential for overflows to Youngs Bay with additional District flow
- Final resolution – amended IGA
- Requirement for raw sewage storage at District’s vacuum station
Coordination with ODOT/County

- ODOT/Clatsop County Public Works coordination
- Project trench patching funds transferred to County
- Partially funded full-width County road restoration/upgrading in District
- Achieved best value for District and County
- Close coordination with Highway 101 Business upgrading by ODOT
Public Relations

- Long history of community involvement

- Design
  - Public meetings & open houses
  - Project brochure – meetings & mailing
  - Direct property owner contact

- Construction
  - Periodic contacts with property owners – District, engineer & contractor
Summary

- 100% of structures connected to new system
- Discharge of undertreated/untreated sewage eliminated
- Decades of environmental degradation and public health hazards eliminated
- Need for interim disposal measures (Blue Rooms) eliminated
Summary

- Impediment to community economic growth removed
- Substantial current building activity and planning for development within District
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