



TOWN OF OXFORD, MAINE

Alternative Project Delivery – Allows New Wastewater System To Unlock Economic Opportunity For Rural Community



Robert Polys, P.E., Woodard & Curran
Maggie Connolly, P.E., Woodard & Curran



NEWEA
WORKING FOR WATER QUALITY

COMMITMENT & INTEGRITY DRIVE RESULTS



Presentation Overview



- General Overview – Town of Oxford
- General Overview – Overall Project
- Alternative Delivery #1 - Initial Project Planning & Funding
- Alternative Delivery #2 – Membrane Pre-Procurement
- Alternative Delivery #3 – Construct WWTF Foundation In Advance of Full WWTF
- Wastewater System In Its First Year
- Lessons Learned
- Notable Successes
- Questions & Answers



Overview: Town of Oxford, ME

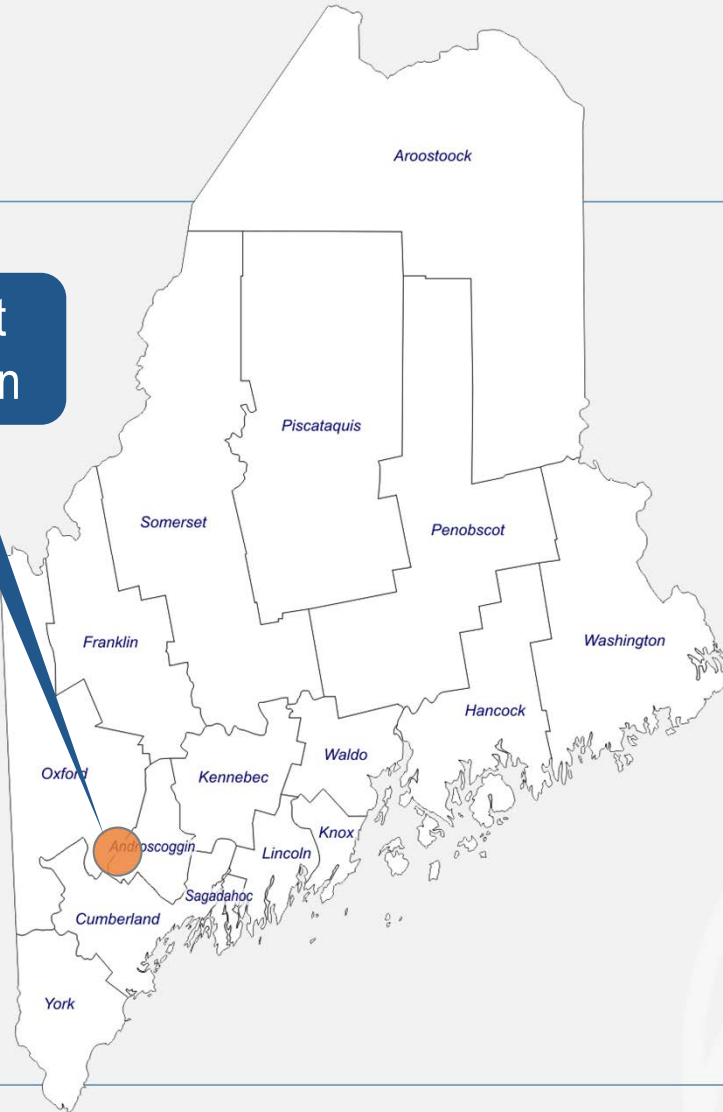


- Located Northwest of Portland, ME
 - Approximately 45 Minutes Drive
 - State Route 26
- Approximately 4,200 Residents
- Weighted MHI = \$34,687
- Government
 - Appointed Town Manager
 - Five Selectman
- Land Area 42 Square Miles





Project Location



Project Need & Drivers



Why Did Oxford Need A Wastewater System?

- No Existing Wastewater Systems In Town
 - Limited Economic Growth & Development
- Failing On Site Systems
 - Poor Soil Conditions
 - High Groundwater
 - Past Contamination of Groundwater Wells
- Both Economic & Environmental Needs & Drivers

Alternative Delivery - Finding Funding

- USDA Rural Development Funding
- Process Start - Beginning of 2012
- Preliminary Engineering Report
- Establish Project User Base
 - Parcel & Tax Map Survey
 - Number of User Connections
 - Residential
 - Industrial
 - Commercial
 - Governmental
- Collection System Areas
 - Established Based On User Connections
 - Town Areas In of Need



Alternative Delivery - Finding Funding

- Comprehensive Alternatives Evaluations
- Collection System
- WWTF Site Locations – Two Alternative Locations In Town
- Regionalization Alternatives
 - Connection to Neighboring Communities
- WWTF Treatment Technologies
 - Membrane Bioreactor
 - Sequencing Batch Reactor
 - Conventional Activated Sludge

Project Planning



- Project Phasing
 - Why Not In One Big Contract?
 - Decreased Project Time Frame
 - Larger Contractor Base Appeal (Smaller Values)
 - Allowed User Connections Sooner
 - Project Efficiency (Inspection)
 - Design Lessons Learned (Site Specific Conditions)
- Areas of Economical Cost Per User Connection
- Planning Level Layout For Each Area
 - Piping & Lift Station Locations
 - Construction Cost Estimates

Unique User Base

- Oxford Casino
- Oxford Plains Speedway
- **New** Hampton Inn
- **New** Dunkin Donuts
- MGA Cast Stone
- Challenge For Project Planning





Project Funding & Time Line



- Initial Project Planning Work
 - Started April 2012
- Town Established TIF District
 - 2012
- Phase I Funding
 - April 2013 - \$13,700,000
- Final PER & ER to Washington to D.C.
 - March 2014
- USDA Full Funding Package Awarded
 - April 2014 - \$28,500,000



Final Overall Project Overview

- New WWTF at Welchville Dam Site
 - MBR Treatment Technology
 - First In History of ME @ Municipal Facility
- New Sanitary Collection System
 - 9.2 Miles of Gravity Sewer
 - 4.8 Miles of Force Main
 - 7 Collection System Pump Stations
 - 3 Collection System Bridge Crossings
- Total Project Cost: **\$28,500,000**
- Funded By USDA Rural Development – Unique Delivery
 - 40% Grant & 60% Loan
 - The Largest In Maine & One of Largest In Country

Why MBR For Oxford?



- WWTF Treatment Technologies
 - Membrane Bioreactor (MBR) - Recommended
 - Sequencing Batch Reactor
 - Conventional Activated Sludge
- Site Constraints
 - Buildable Land Area Of Only 0.67 Acres & Close Abutters
- Poor Soil Conditions
 - Less Tankage & Structures Were Better
- Wide Swings In Flows & Loads
 - Filtration Barrier Improves Operability
- Total Phosphorous Removal
 - Reliably meet both current & future permit requirements

Oxford Construction Contracts

- 1) **September 2013 – Membrane Pre-Procurement – Alt. Delivery**
- 2) March 2014 – Area F Covered Bridge Project
- 3) April 2014 – Area A Collection System
- 4) **August 2014 – WWTF Foundation & Outfall – Alt. Delivery**
- 5) October 2014 – WWTF & Pump Stations
 - Construction Start = April 2015
- 6) May 2015 – Area C Collection System
- 7) February 2016 – Area E&F Collection System
 - Construction Start = April 2016
- 8) October 2017 – Area G&H Collection System



Oxford-Contract #1 Membrane Pre-Procurement



- What Is Pre-Procurement?
- Purchase Goods & Special Services In Advance
 - Items Normally Purchased By Contractor
- Step #1 = Pre-Procurement-Then Detailed Design
- Step #2 = Bid & Assignment Of Contract
 - Assignment of Pre-Procured (Goods & Special Services) to General Contractor
- Step #3 = Build



Structure Pre-Procurement Contract

- Goal #1: Fair Evaluation For All Bidders
- Goal #2: Funding Agency Compliance & Acceptance
 - Pre-Procurement Not Widely Used With USDA Funding Historically
- Goal #3: Ensure Best Value For Town

Evaluation Criteria Number	Evaluation Criteria	Weight (Points)
1	Total System Cost	20
2	Net Present Value Life Cycle Cost	40
3	System Operability & Reliability	10
4	Warranty	10
5	Technical Support Capabilities	10
6	Experience & Qualifications	10
Total Points		100



Pre-Procurement Bidding



- Three Bidders
 - Vendor A
 - Vendor B
 - Vendor C
- Many Others Expressed Interest During Bid Period
- Fully Open Public Bid Forum



Pre-Procurement Scope



■ Defined Scope & Matching Bid Form

- **Item A:** Fine Screening Equipment
- **Item B:** Aeration Blowers
- **Item C:** Fine Bubble Aeration Equipment
- **Item D:** Anoxic Zone Mixers
- **Item E:** Membrane Filtration Equipment
- **Item F:** Air Scour Blowers
- **Item G:** Permeate Pumps
- **Item H:** Return Sludge Pumps
- **Item I:** Membrane Chemical Cleaning Systems
- **Item J:** EQ Aeration Blower
- **Item K:** EQ Coarse Bubble Aeration
- **Item L:** EQ Transfer Pumps
- **Item M:** Instrumentation – MBR System
- **Item N:** Integration & Controls – MBR System
- **Item O:** Engineering & Drawings
- **Item P:** Startup, Testing & Commissioning
- **Item Q:** Membrane Equipment Warranty
- **Item R:** Process Performance Warranty

Final Pre-Procurement Scoring



- Vendor A & B – Top Two
- Each Held 1 Hour Presentation To Town
- Vendor A – Awarded Pre-Procurement Contract
- Initial Capital Cost Bids – Carried As Allowance In WWTF
 - A = \$1,208,763
 - B = \$1,281,950
 - C = \$1,317,250

Criteria Number	Evaluation Criteria	Weight (Points)	Vendor A	Vendor B	Vendor C
1	Total System Capital Cost	20	20	10	15
2	Net Present Value Life Cycle Cost	40	40	40	30
3	System Operability & Reliability	10	8	5	7
4	Warranty	10	10	4	6
5	Technical Support Capabilities	10	6	10	4
6	Experience & Qualifications	10	10	10	8
TOTAL SCORING			94	79	70

Why Pre-Procurement?



- Unique Systems For Each MBR Vendor
 - Difficult To Design The Supporting Facility
- Ensure Quality System Is Used
 - Remove Selection From GC - Based Only On Price
- Fast-Track Design Requirements
 - Submittal Review Concurrent With Final Design + Bidding
- Full Control Over Vendor Equipment
 - Dictate Key Supporting Equipment (Influent Screens)
- Easier Collaboration & Detail From Vendor
 - Greatly Assists With Detailed Design
 - Streamlined Information Sharing



Alternative Delivery – WWTF Foundation & Outfall Project



- Design & Construct Exterior Building & Tank Foundation
 - In Advance of Full WWTF Construction
- Foundation Project = August 2014 to Spring 2015
- WWTF Project = Spring 2015 to Summer 2016
- Goal – Avoid Excavation & Construction In Wet Spring & Poor Soils
- Install Outfall – During Permitted Season & Lower Flow Period
- Challenge
 - Ensure Foundation is Correct While Still Finishing Full WWTF Design
 - Find Appropriate Tie-In Points for Subsequent WWTF Construction
 - Setup Both Projects for Success & Seamless Transition





Alternative Delivery – WWTF Foundation & Outfall Project





Alternative Delivery – WWTF Foundation & Outfall



Wastewater System Initial Year Of Operation



- Seeding & Acclimation Period
 - Seed Activated Sludge
 - Mechanic Falls & Lewiston-Auburn WPCA
- Current Average Flow = 20,000 to 40,000 gpd
 - 25% of Projected Total Project ADF In First Year
- Current Average Influent Load
 - BOD = 450 to 1,000 mg/L
 - TSS = 450 to 950 mg/L
 - Total Phosphorous = 7 to 15 mg/L

Wastewater System Initial Year Of Operation



- Effluent Performance
 - BOD = 1 to 2 mg/L or less
 - TSS = <1 mg/L
 - Turbidity = <0.12 NTU
 - Ammonia = 0.03 mg/L
 - E. Coli = <1 / 100 mL
- Staff
 - Chief Operator:
Zhenya Schevchenko
 - Superintendent:
Mike Harris
- Notable First Year User Connections
 - Oxford Casino – Expansion From Sewer
 - Hampton Inn – New Business From to Sewer
 - Dunkin Donuts – New Business From Sewer
 - Affordable Events – New Business From Sewer
 - MGA Cast Stone – Failed On Site System
 - Residential Users – Failing On Site Systems
 - Roopers Store – New Business From Sewer

Lessons Learned



- Public Outreach & Education Is Essential
 - Project Neighborhood Meetings
 - Education to User Base
- Finding Operations Staff Is Challenging
 - Limited Available Staffing In Industry
- Challenging Soil Conditions & Groundwater
 - Impacts On All Project Phases
- Limited Available Land
 - Challenge For Finding Land-WWTF & Pump Stations
- Startup Assistance Has Been Essential
 - Weekly Calls With Engineering & Operations Staff
 - Support & Training

Notable Successes



- Membrane Equipment Pre-Procurement
 - Project Time Savings – At Least 6-8 Months
 - Ensured Robust & Quality System
 - Full Control Over Key Equipment (Screens)
- Foundation & Outfall Separate From WWTF
 - Excavation In Least Challenging Time of Year – Saved 1 Year on Project Timeline
 - Seamless Coordination – WWTF Contract
- Construction Cost Control
 - 0.05% Change Orders Total – Through All 7 Construction Contracts
- WWTF Opening Ceremony
 - Governor LePage & Representative Bruce Poliquin
- Project Awards
 - 2017 ACEC Grand Conceptor Award – Project Of The Year
 - Sargent Corporation – Area C Project – Build Maine Award
 - WEF WE&T Article Published – September 2017 Issue



Questions?



COMMITMENT & INTEGRITY DRIVE RESULTS