How to Optimize Capital Improvement Dollars and Maximize Revenue Streams

A Public Private Partnership Case Study

Washington State Department of Enterprise Services | PUGET SOUND ENERGY | TRANE

Agenda

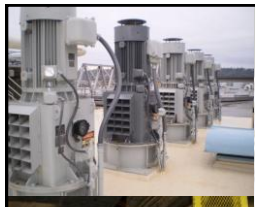
- The City of Bremerton
- Bremerton Wastewater Treatment Plant
- The Catalyst
- Public/Private Partnership
- Project Summary
- Project Keys to Success & The Financial Results
- Questions

The City of Bremerton

- The City of Bremerton is located in Kitsap County, WA and lies east of the Olympic mountains directly across Puget Sound from Seattle.
- Bremerton's 39,000 people live among East and West Bremerton, divided by the waters of Port Washington Narrows and connected by the Manette and Warren Avenue bridges.
- The city houses the Puget Sound Naval Shipyard and Naval Base Kitsap-Bremerton Annex and is connected to Seattle via a 55-minute ferry ride.
- According to the US Census Bureau, the city has a total area of 32.29 square miles, of which, 28.41 square miles is land and 3.88 square miles is water.
- Voted one of the top 5 cities to raise a family

Bremerton Wastewater Treatment Plant Overview

- Bremerton's sewage system provides sewer service to approximately 37,000 people and consists of the following:
  - 188 miles of combined and sanitary sewer mains
  - 14 combined sewer overflow outfalls
  - 37 lift stations
  - 16 miles of force mains
  - 3 odor control stations
  - 6 flow monitoring stations
  - 2 composite sampling stations
- Serves City residents as well as nearby areas in unincorporated Kitsap County.
- Average annual flow of 5 MGD and a hydraulic peak capacity of 32.5 MGD.
- Peak flow of 68.5 MGD.
- Treated effluent from the wastewater treatment plant discharges into the Sinclair Inlet.



Bremerton Wastewater Treatment Plant Situation

- The existing Primary Effluent Pumps have been operating since 1985, utilized older, less energy-efficient technology for controls
- Risk of imminent failure of pump controls
- Capital Improvement Plan(CIP) piecemealed several projects for eventual total PE pump system replacement including motors, suction and discharge knife-gate valves, check valves, flow meter, and main header valves
- Reprioritization of projects

The Catalyst

- **Optimize Capital**
  - Old Capital Plan was limited
  - New Capital Plan re-allocated capital based on business case analysis
- **Maximize Revenue Streams**
  - Dept. of Commerce Energy Efficiency Grant opportunity
  - Significant utility incentive dollars available
  - Operational $ Savings through reduced energy consumption, re-allocation of staff and hours for maintenance and materials (replacement parts)
  - Indirect benefit through facility staff time reduction
- **Minimize Risk**
  - 1985 Primary Effluent Pump System with 5 Eddy Current Drives - outdated, inefficient and beyond useful life
  - Significant risk reduction
  - Limited parts available
  - Performance and Cost Guarantee
  - Control of Project-Specifying contractors, consultants, and equipment
  - Speed of implementation (Concept to Construction) prior to rainy season
- **Utilize a Fully Transparent & Proven Procurement Program**

Energy Saving Performance Contract Program

- WA State Department of Enterprise Services Energy Saving Performance Contract (ESPC) was used to procure services for the design, acquisition, and installation of the entire Primary Effluent (PE) Pump System.
- ESPC Program and process enables Bremerton to:
  - Optimize capital improvement dollars
  - Maximize all grant and utility incentive dollars
  - Utilize energy, material, and operational savings
  - Streamline the contracting process
  - Expedite construction-(concept to completion in less than a year)
- Trane Energy Services pre-approved through the State Dept. of Enterprise Services (DES)-Meeting all State bid requirements
- Bremerton only has one contract with the WA State Dept. of Enterprise Services for the entire project(s)

Laying the foundation of partnership

- Design Build Energy Services Contractor
- Bremerton was integrated throughout the process and encouraged to shape the project through equipment selection, consultants, contractors, design and solutions
- Bremerton selected Trane because Trane partnered with the City to make it the *City's* project
- ESPC program requires Guaranteed Maximum Cost and Guaranteed Minimum Savings
- City maintained complete control over the project

PUGET SOUND ENERGY

Washington State Department of Enterprise Services

TRANE

CITY OF BREMERTON

Public Private Partnership

http://climatesolutions.org/solution-stories/reclaiming-waste-energy

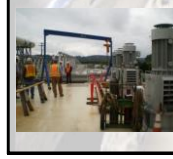
The Project

Project Overview

- Concept to completion in 13 months
- Replaced the entire Primary Effluent (PE) pumping system, including:
  - New 125 HP higher efficiency inverter-rated motors
  - New Variable Frequency Drives (VFD's)
  - New High efficiency Flygt dry pit pumps, piping and isolation valves on all five systems
  - Full up permanent bypass system for future use
  - New pre-fab Blazer building to house VFD's

Project Goals

- Replace end of life equipment with new high efficient equipment
- Increase system reliability
- Reduce annual energy consumption (save operational dollars)
- Utilize Dept. of Commerce Energy Efficiency Grant dollars
- Maximize available energy conservation incentives from Puget Sound Energy
- Complete entire PE Pump System replacement before Oct. 1, 2014 (rainy season)



Timeline

- August 2012 — Introduction to ESPC Program
- September 2012 — Preliminary Audit
- November 2012 — IGA – Investment Grade Audit
- January 2013 — Final proposal
- March 2013 — Implementation/construction-Kick off
- Oct 2013 — Project Completion
- One Year — Measurement & Verification period

Picture Time

Bypass Roof Penetration

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Godwin/Xylem Bypass Pump Testing

July 16-22-five (6) Godwin bypass pumps (4 electric, 2 diesel backup) were installed and tested. Upon successfully testing, plant then authorized PE Pump demolition to begin.

Eddy Current Drive Demolition

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Rigging for Lift

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Starting Second Lift

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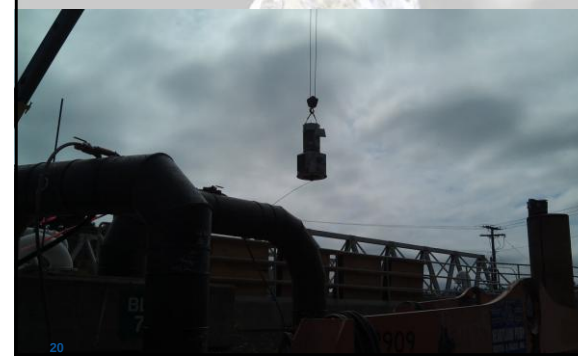
Crane Pick of Pump #3 Demolition



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Pump Base Demo

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Pump Base Demo

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Pipe Separation

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Critical Events

Shutdown #1

On the evening of July 15th, plant and construction personnel coordinated the shut-down of the Primary Effluent Pumps and the holding of flow through the plant, to remove a portion of the 30 inch discharge piping, and install a new in-line flow meter and bypass pumping port. Contractor and plant staff worked side by side to get this done efficiently and effectively.

Mayor at 2:00 a.m. Shutdown

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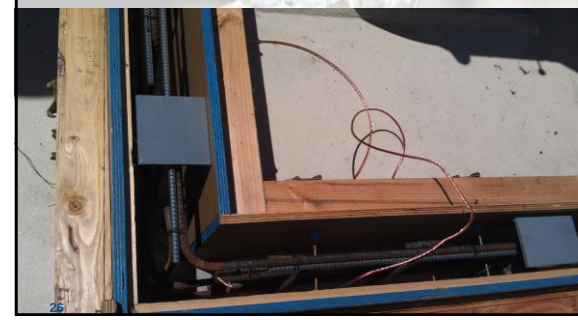
Stem Wall Framing



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Shutdown #2

On the evening of August 6th, plant and construction personnel coordinated the shut-down of the Bypass pumps and the holding of flow through the plant, to drain the wet well down and install the new 24" Suction Knife Gate Valves.

Blazer Building Pick & Placement

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Blazer Building Pick & Placement

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New Suction, Discharge, and Volute Install

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Pump #2, 3, and 4 Volutes and Base Plates

New PE Pumps 1 thru 4 Installed

Pedestal Framing for Pour

Pedestal Final

New PE Pump & VFD Startup

Startup began on and September 4th

Testing of new pumps and VFDs occurred over the next week allowing for each pump to be in the lead position and to ensure proper operation of PLC.

VFD and Pump Startup, Programming, Testing

Keys to Success

- A cooperative, partnership approach to the project on an operational wastewater facility (GC, Subcontractors, Suppliers, Plant Personnel).
- Close coordination and execution of system shutdown by plant staff.
- Constant, open communication with all parties through regularly scheduled on-site meetings.
- Rehearsals (Walk-Thru/Talk-Thru) with executors of critical evolutions.

Results

- Total Project Value: $3,100,000
- Anticipated Utility Rebate: $417,000 (PSE)
- Dept. of Commerce Grant: $500,000
- Anticipate Electrical Savings: $100,000/annually
- Estimated Maintenance Savings: $15,000/annually
- Concept to Completion in less than 12 months

Opportunity Cost & Risk Management

- Annual Energy Savings = $109,956
- Annual Operational Savings = $ 15,130
- PSE Rebate Loss = $417,554
- Commerce EE Grant = $500,000

Total Opportunity Cost Year 1 = $1,042,000

Risk – Pump failure due to being past their useful life, unplanned maintenance & repair costs

Financial Inputs

Assumptions

Project Related Capital Costs	$	3,048,534
Estimated Utility Incentives	$	417,554
Estimated Commerce Funding	$	500,000
Project Related Capital Costs After Rebates	$	2,130,980
Loan		no
Customer Down Payment / Contribution	$	2,130,980
Utility Escalation Rate		3.0%

Annual Baseline Electric Use*	3,827,240	kWh
Annual Baseline Gas Use*		Therms
Annual Baseline Electric Cost*	$ 298,525	
Annual Baseline Gas Cost*	$ -	
Projected Electric Savings	1,391,847	kWh
Projected Gas Savings	-	Therms
Projected Energy Savings	$ 109,956	
Energy-only Payback	19.4	Years

Cash Flow

Bremerton Financial Proforma with Commerce Grant

Customer Status Quo

Year	0	1	2	3	4	5	6	7	8	9	10
Operating Costs											
Annual Utility Cost	$ -	$ 298,525	$ 307,480	$ 316,705	$ 326,206	$ 335,992	$ 346,072	$ 356,454	$ 367,148	$ 378,162	$ 389,507
Repair/Replace/Maintain Costs											
PE System Maintenance & Repairs Material Only		$ 15,130	$ 15,587	$ 16,057	$ 17,515	$ 18,361	$ 19,310	$ 20,279	$ 21,289	$ 22,354	$ 23,472
PE System Maintenance & Repairs Labor Only		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PE System Replacement Capital Cost Avoidance		$ 304,853	$ 304,853	$ 304,853	$ 304,853	$ 304,853	$ 304,853	$ 304,853	$ 304,853	$ 304,853	$ 304,853
Annual Cash flow	$ -	$ 618,508	$ 628,239	$ 638,239	$ 648,574	$ 659,256	$ 670,236	$ 681,585	$ 693,291	$ 705,370	$ 717,832
Cumulative Cash flow	$ -	$ 618,508	$ 1,246,739	$ 1,884,968	$ 2,533,542	$ 3,192,770	$ 3,863,014	$ 4,544,597	$ 5,237,888	$ 5,943,257	$ 6,661,089

Trane Performance Contract

Year	0	1	2	3	4	5	6	7	8	9	10
Operating Costs											
Annual Utility Cost	$ -	$ 189,589	$ 194,235	$ 200,052	$ 206,054	$ 212,256	$ 218,602	$ 225,161	$ 231,916	$ 238,872	$ 246,040
Project Related Costs											
Debt Service / Capital Costs	$ 2,130,980	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
One time Measurement & Verification Cost		$ 1,259									
Annual Cash Flow	$ 2,130,980	$ 191,848	$ 194,235	$ 200,052	$ 206,054	$ 212,256	$ 218,602	$ 225,161	$ 231,916	$ 238,872	$ 246,040
Cumulative Cash Flow	$ 2,130,980	$ 2,322,848	$ 2,517,076	$ 2,717,127	$ 2,923,181	$ 3,135,437	$ 3,354,039	$ 3,579,201	$ 3,811,097	$ 4,049,970	$ 4,296,009
Annual Savings	$ (2,130,980)	$ 426,649	$ 433,995	$ 438,186	$ 442,520	$ 447,000	$ 451,633	$ 456,422	$ 461,375	$ 466,498	$ 471,792
Cumulative Savings	$ (2,130,980)	$ (1,704,340)	$ (1,270,345)	$ (832,159)	$ (389,639)	$ 57,361	$ 508,994	$ 965,416	$ 1,426,791	$ 1,893,287	$ 2,365,080
IRR	19.0%										
NPV	NA										
Cumulative Savings (20 years)	$4,058,115										

* Maintenance material Savings = Annual equipment repair less labor
** System Replacement Capital Cost Avoidance = Total project cost spread over 10 year term

Questions?

Happy Customer