WEP’s Asset Management Program

BUILDING A FOUNDATION TODAY...

FOR THE CHALLENGES WE WILL FACE TOMORROW.

BY: Frank Mento, P.E. & Jim Thayer, P.E.
Presentation Summary

- **WEP Background Information**
- **History**
- **Present**
- **Future**
- **Q&A**
What is Onondaga County’s Department of WEP: Water Environment Protection (OCDWEP)

- Located in Syracuse, NY
- Large, advanced & progressive wastewater utility
- Provides services to 450,000 residents
- ~400 Employees
- $90,000,000 Operating Budget
Vision:
To be a respected leader in wastewater treatment, stormwater management, and the protection of our environment using state-of-the-art innovative technologies and sound scientific principles as our guide.

Mission:
To protect and improve the water environment of Onondaga County in a cost-effective manner ensuring the health and sustainability of our community and economy.
Age of our Assets

![Age of our Assets Chart]

- **Category 1**
  - Series 1: 4
  - Series 2: 6
  - Series 3: 2

- **Category 2**
  - Series 1: 4
  - Series 2: 6
  - Series 3: 2

- **Category 3**
  - Series 1: 4
  - Series 2: 6
  - Series 3: 2

- **Category 4**
  - Series 1: 4
  - Series 2: 6
  - Series 3: 2
  - Series 4: 2
Sewers Dating Back to 1880’s

- Miles of Sewer
- Manholes
- Force Mains
Metropolitan WWTP (Metro)

- WEP’s largest plant
- 270,000 capita
- Adv. tertiary treatment
- 84 MGD Average
- 240 MGD design peak

Over $1 Billion in Assets
WEP WWTP Facilities

- Brewerton: 3 mgd @ $70 million
- Meadowbrook Limestone: 6.5 mgd @ $80 Million
- Baldwinsville Seneca Knolls: 9 mgd @ $126 Million
- Wetzel Road: 7 mgd @ $147 Million
- Oak Orchard: 10 mgd @ $140 Million
Largest WEP Facilities

Ley Creek Pump Station (20 mgd)  
$X Asset Value

West Side Pump Station (40 mgd)  
$X Million

Davis Road Pump Station (18 mgd)  
$X Asset Value
Clinton (Trolley Lot) CSO Storage Facility
6.5 Million Gallons of Storage - $77.68 Million
Since 1998’s Amended Consent Judge (ACJ)

* Approx. $600 Million invested
* Nine (9) New CSO Facilities
* Countless Green Infrastructure

Onondaga Lake is experiencing a remarkable recovery

Water quality in Onondaga Lake is the best it’s been in 100 years!
Investment History

Category 1
Category 2
Category 3
Category 4

Series 1
Series 2
Series 3

County Executive
J. Ryan McMahon
WHY?
CLEAN WATER
WHY WE STRIVE FOR CLEAN WATER?
WE ARE DETERMINED TO REPLACE THE RIGHT ASSET....

AT THE RIGHT TIME....

FOR THE RIGHT REASONS.
“Asset Management is… an integrated set of processes to minimize the life-cycle costs of infrastructure assets, at an acceptable level of risk, while continuously delivering established levels of service”
What is an Asset?

“An asset is a component of a facility with an independent physical and functional identity and age”

EPA provides four examples: Pump, Motor, Sedimentation Basin, Main
WEP’s Five (5) Levels of Service categories:

1. System Reliability
2. Regulatory Compliance
3. Public and Employee Health and Safety
4. Fiscal Impacts
5. Public Confidence
What is EAM & CMMS Software?

- Enterprise Asset Management (EAM)
- Computerized Maintenance Management System (CMMS)
- Asset Inventory
- Database for AM Data
- Organizational Efficiencies
Core Asset Data

- Asset Name
- Physical Location
- Asset Classifications
- Install Date
- Nameplate Data
- Replacement Cost
- Condition Score
- Risk Score
Asset Classifications

- Aeration Diffusers
- Blowers
- Electrical
- HVAC
- Instrumentation & Controls
- Pumps
- Piping
- Tanks
- Valves
# Condition Assessments

## Electrical Assets Condition Criteria

<table>
<thead>
<tr>
<th>Assessment Description</th>
<th>Scoring</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment has appropriate classification</td>
<td>1</td>
<td>Equipment is listed for the environment?</td>
</tr>
<tr>
<td>2</td>
<td>Equipment is not listed for the environment?</td>
<td></td>
</tr>
<tr>
<td>General Condition Description</td>
<td>1</td>
<td>No corrective maintenance required</td>
</tr>
<tr>
<td>2</td>
<td>Few minor deficiencies and minimal corrective maintenance required</td>
<td></td>
</tr>
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<td>3</td>
<td>Several minor deficiencies noted and corrective maintenance required.</td>
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<tr>
<td>5</td>
<td>Asset may be unserviceable, needs replacement or rehabilitation</td>
<td></td>
</tr>
<tr>
<td>Visual Asset Condition and Remaining Useful Life</td>
<td>1</td>
<td>Asset appears to be in very good condition, with more than 80% of life remaining</td>
</tr>
<tr>
<td>2</td>
<td>Asset appears to be in good condition, with 60-80% of life remaining</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Asset appears to be in average condition, with approx. 50% of life remaining</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Asset appears to be in poor condition, with approx. 20-40% of life remaining</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Asset appears to be in very poor condition, with less than 20% of life remaining</td>
<td></td>
</tr>
<tr>
<td>Electric Enclosures</td>
<td>1</td>
<td>Protective enclosure coating sound, no deterioration, Sealing and ventilation /</td>
</tr>
<tr>
<td>2</td>
<td>Coating cracked with some flaking exposing undercoat &lt;20% of area, evident Some seal wear but no dirt ingress, Ventilation and cooling adequate.</td>
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<tr>
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<td>Coating cracked with some flaking exposing undercoat &gt;20% of area, evident Some seal wear but no dirt ingress, Ventilation and cooling adequate.</td>
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<td>Coating cracked and flaking exposing metal &gt; 20% of area, areas of panel heat Seal allowing dirt ingress, contaminating components. Ventilation and cooling</td>
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<tr>
<td>Component / Part Availability</td>
<td>1</td>
<td>Components available locally. Component age &lt; 2 yrs.</td>
</tr>
<tr>
<td>2</td>
<td>Components available locally. Component age &lt; 5 yrs.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Components available locally. Component age &lt; 10 yrs.</td>
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<tr>
<td>4</td>
<td>Components available special order only. Component age &lt; 15 yrs.</td>
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<tr>
<td>5</td>
<td>Components not available. Component age &gt; 15 yrs.</td>
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### Asset Specifications / Attributes

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<tr>
<th>Attribute</th>
<th>Value</th>
<th>Reading / Description</th>
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<tbody>
<tr>
<td>Capacity</td>
<td>3000</td>
<td>HP</td>
</tr>
<tr>
<td>RPM</td>
<td>3070</td>
<td>RPM</td>
</tr>
<tr>
<td>Horsepower</td>
<td>100</td>
<td>HP</td>
</tr>
<tr>
<td>Inlet Size</td>
<td>8</td>
<td>INCHES</td>
</tr>
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<td>INCHES</td>
</tr>
<tr>
<td>Pressure</td>
<td>25</td>
<td>PSDG</td>
</tr>
<tr>
<td>Speed</td>
<td>3070</td>
<td>RPM</td>
</tr>
<tr>
<td>Stage</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Centrifugal</td>
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### Condition Assessments

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#### Visual Asset Condition and Remaining Useful Life

| Electric Enclosures | 1 | Protective enclosure coating sound, no deterioration, Sealing and ventilation / |
| | 2 | Coating cracked with some flaking exposing undercoat <20% of area, evident some seal wear but no dirt ingress, Ventilation and cooling adequate. |
| | 3 | Coating cracked with some flaking exposing undercoat >20% of area, evident some seal wear but no dirt ingress, Ventilation and cooling adequate. |
| | 4 | Coating cracked and flaking exposing metal >20% of area, areas of panel heater Allow ing dirt ingress, contaminating components, Ventilation and cooling |
| | 5 | Coating cracked and flaking exposing metal >20% of area, areas of panel heater Allow ing dirt ingress, contaminating components, Ventilation and cooling |

#### Component / Part Availability

| 1 | Components available locally, Component age < 2 yrs. |
| 2 | Components available locally, Component age < 5 yrs. |
| 3 | Components available locally, Component age < 10 yrs. |
| 4 | Components available special order only. Component age < 15 yrs. |
| 5 | Components not available. Component age > 15 yrs. |

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#### Asset Specifications / Attributes

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<tr>
<td>Density</td>
<td>3000</td>
<td>gpm</td>
</tr>
<tr>
<td>HP</td>
<td>3010</td>
<td>kW</td>
</tr>
<tr>
<td>Horsepower</td>
<td>100</td>
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#### Maintenance History

![Maintenance History Chart]
Maintenance (Preventative & Reactive)
Risk Scoring

Risk = (consequence x likelihood)

How severe are the consequences of asset failure?

How likely is it for the asset to fail?

Consequence of Failure by Level of Service Category

<table>
<thead>
<tr>
<th>Consequence Category</th>
<th>Level</th>
<th>Scale</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Reliability</td>
<td>60%</td>
<td>1-9</td>
<td>Capacity, SSO/Dry Weather CSO, Property damage, Odor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Process/System Impact</td>
</tr>
</tbody>
</table>

Likelihood of Failure

<table>
<thead>
<tr>
<th>Likelihood Category</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1</td>
</tr>
<tr>
<td>Medium</td>
<td>2</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
</tr>
</tbody>
</table>

Physical Condition (60%)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>1</td>
</tr>
<tr>
<td>Fair</td>
<td>2</td>
</tr>
<tr>
<td>Good</td>
<td>3</td>
</tr>
</tbody>
</table>

General Condition

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
<td>Fair</td>
</tr>
<tr>
<td>3</td>
<td>Good</td>
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</tbody>
</table>

Maintenance Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life (10 to 20 years)</td>
<td>moderate</td>
</tr>
<tr>
<td>Life (20 to 30 years)</td>
<td>significant</td>
</tr>
</tbody>
</table>

Age (Remaining Useful Life)

<table>
<thead>
<tr>
<th>Age</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Subject to failure</td>
</tr>
<tr>
<td>2</td>
<td>Spare part</td>
</tr>
</tbody>
</table>

History of Planned Maintenance (H) %

<table>
<thead>
<tr>
<th>H (Percentage)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20%</td>
<td>No written or online protocols</td>
</tr>
<tr>
<td>21 to 80%</td>
<td>Written protocols but outdated, or written without enforcement</td>
</tr>
<tr>
<td>81 to 99%</td>
<td>Written protocols but complete, or fully implemented</td>
</tr>
<tr>
<td>100%</td>
<td>Written protocols but complete, or fully implemented</td>
</tr>
</tbody>
</table>

Risk analysis considerations for various levels of service:

- Condition Grade 1: Poor
- Condition Grade 2: Fair
- Condition Grade 3: Good
- Condition Grade 4: Very good
- Condition Grade 5: Excellent

Risk assessment process:

1. Identify the asset and its potential failures.
2. Assess the likelihood of each failure mode.
3. Determine the consequence of each failure mode.
4. Calculate the risk using the formula: Risk = (consequence x likelihood).
5. Prioritize actions and allocate resources accordingly.
WEP’s AM Accomplishments

- 17 years of Asset Management & CMMS
- Strategic AM Plan
- Review of 6 WWTP in 5 years
- Mapping of collection system
GIS Mapping & Maximo Spatial

County Executive
J. Ryan McMahon
Brewerton WPCP - Project

Plant Performance & Condition Assessment Conducted in 2014

- 20 Year CIP Planning
  - Immediate Need
  - 10 Year Window
  - 20 Year Window
Baldwinsville Seneca Knolls - Project

Onondaga County, NY
Condition Assessment Report
Baldwinsville-Seneca Knolls Wastewater Treatment Plant
December 2015

BSK Tolerable Risk Chart - for Active Scenario EXAMPLE

Location: Central Building - Exterior
Gable Area View
Description:
Concrete slab joint along the bottom of the concrete area should be sealed.

County Executive
J. Ryan McMahon
Current Projects

- Metro 1978 Plant
- Risk Scoring of all Collection System (WEP staff)
- Strategic Energy Management
Tank, Building & Gallery Inspections
Pipeline Inspection Methods

* Multiple inspection methods
  * API-570
    * Robotic
      - CCTV
      - Sonar
      - Lidar
  * Best technology selected for the situation
    * Pipe material
    * Accessibility
    * Full vs. drained pipe
Road Map for the Future

- Replacement vs. Rehabilitation Evaluation
- Assembling Manageable Projects
- 20 year forecast for Capital Planning
Risk Scoring of all Collection System

• Pump Station Assessments
• Trunk Sewer COF scoring
Increased Efficiency

Decrease Energy Usage And Energy Cost

Strategic Energy Management (NYSERDA Pilot)
Energy Performance Contract (ECMs)
How do you prepare for the future...
Challenges

- Increased Demand on Infrastructure (Age, Climate, budgets, etc.)
- Staff Turnover
- Consolidation
- The Unknown (New Regulations?, Funding, etc.)
How do you prepare for the future...

Asset Management
Increased Demand on Infrastructure

Assets are getting older....

and we keep asking them to do more new things.
Increased Demand on Infrastructure

How will weather be 10 years from now...

More Intense Storms?  Longer Droughts?

Are we prepared with our current assets?
Doing More With Less.........

County Executive
J. Ryan McMahon
How do you prepare for the future...
NEW PEOPLE SINCE 2016

111 NEW PEOPLE COMING IN THE DOOR...

Approx. 1/3 of WEP’s Staff
How do you prepare for the future...

Asset Management

Workforce Development

Local Sewer Consolidation
Consolidation

Many System Components
Various Ages
21 Municipal Owners
Consolidation

Assess Condition of facilities
Standardize Facilities
Standardize O&M
Consolidation

Result:

One Consolidated System
The Unknown (New Regulations?, Funding, etc.)
Questions???