



HYDROPOWER & HYDRAULIC STRUCTURES

# Small & Micro Hydropower

Tapping the Energy Potential Within  
Water Supply Systems



BLACK & VEATCH

# Conduit Hydropower for Municipal Water Systems

## Harnessing Energy Potential

Our small and micro hydro solutions can help you achieve higher operating efficiencies, meet your sustainability objectives, reduce your carbon footprint, and maintain system reliability.

### What is Municipal Water System (MWS) Hydro?

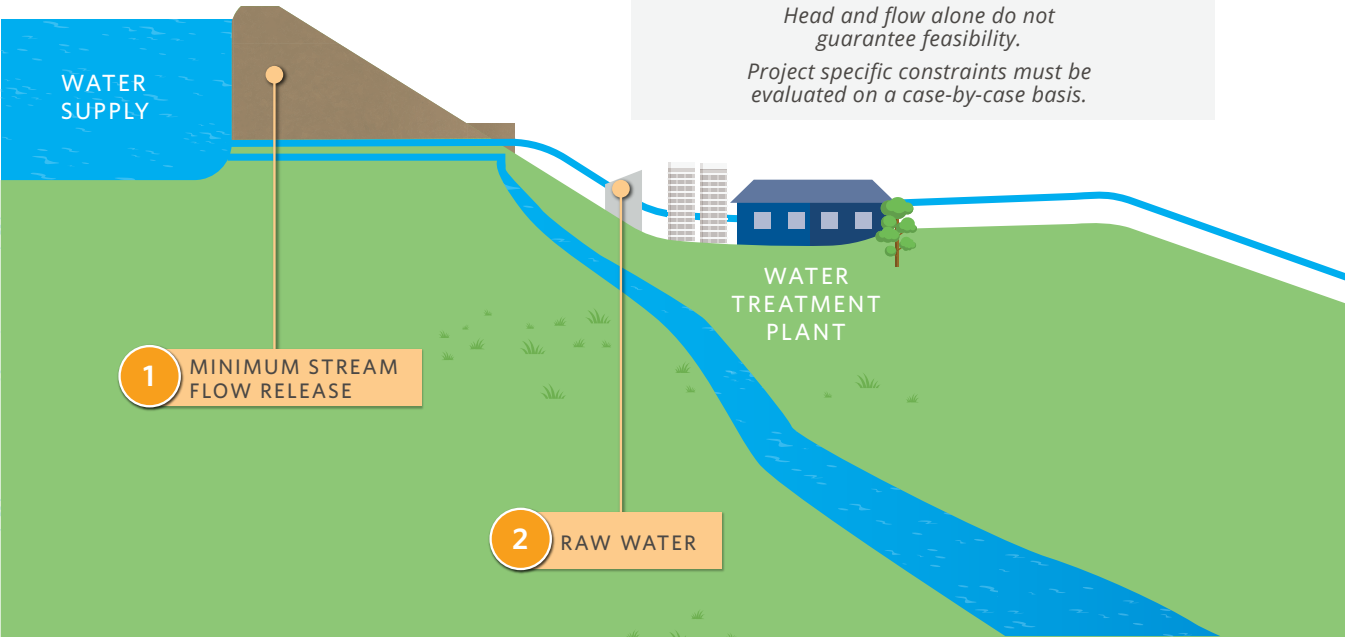
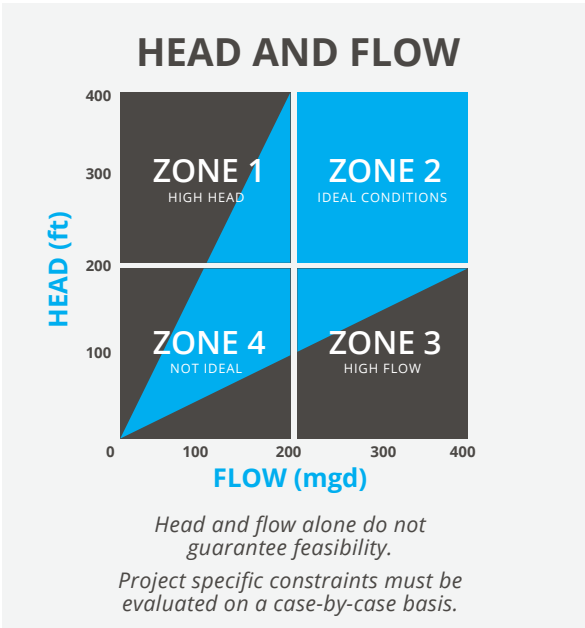
- Built within the existing system
- Usually considered small or micro hydro
  - Small hydro <10 MW
  - Micro hydro <250kW

### Benefits of MWS Hydro

- Offsets power consumption for water utility
  - Extra power to be sold
- Federal and state financial incentives may be available
- Renewable energy source
- Reliable generation capacity
- Limited community impact
- Limited ecological impact since water is already in treatment system
- Technology continues to develop and increase zone of feasibility

### Ideal Conditions for MWS Hydro

- Existing pressure reduction facilities
- Large-diameter transmission pipes
- Zone 2 head and flow
  - Reliable and predictable flow and head
- Zones 1 and 3 may be feasible in certain circumstances



# Project Experience

## 1. Minimum Stream Flow Release

*Reliable head and flow at dam release*

### Robert V. Trout Hydropower Project

Discharge from raw water reservoir

- Part of Colorado Big Thompson Project
- Head = 150 ft
- Flow = 160 mgd
- Output = 2.6 MW

## 2. Raw Water

*Head-breaking structure before water treatment plant*

### Rando Pensaquitos Pressure Control and Hydroelectric Facility

Located along 108-inch raw water pipeline

- Single turbine in parallel with four pressure control valves
- Head = 173 ft
- Flow = 225 mgd
- Output = 4.5 MW

### Arlington Outlet Hydroelectric Project

48-inch raw water outlet

- Single turbine in parallel with four pressure control valves
- Head = 154 ft
- Flow = 80 mgd
- Output = 1.3 MW
- Power sold to the grid

## 3. Potable Water

*Topography creates need for pressure reduction*

### Hillcrest Hydroelectric Project

On 60-inch diameter treated water transmission pipeline

- Transmission pipeline
- Head = 170 ft
- Flow = 103 mgd
- Output = 2.0 MW
- Used to power pump station

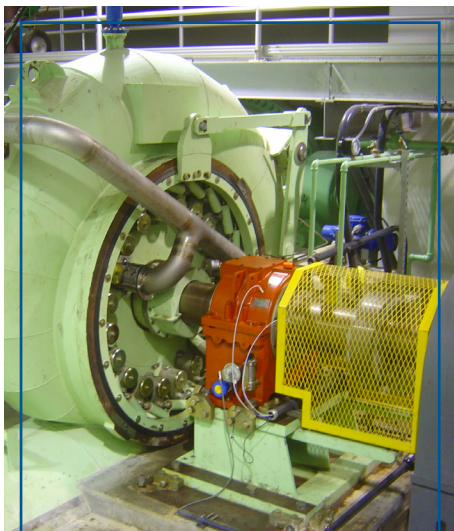
## 4. Treated Effluent

*Energy recovery structure of outfall*

- Many projects evaluated
- Costs not currently feasible



ROBERT V. TROUT  
HYDROPOWER PROJECT



RANCHO PESAQUITOS  
PROJECT



# Hydropower

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