

PERMITTING AND CONSTRUCTION OF A MICRO-HYDROELECTRIC POWER FACILITY UTILIZING TREATED MINE DRAINAGE.

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Outline

- ▣ What are we doing?
- ▣ Hydroelectric Basics
- ▣ Site Location
- ▣ Site Overview
- ▣ Permitting
- ▣ Construction
- ▣ Final Remarks
- ▣ Questions / Acknowledgements

What we are doing?

- ▣ Babb Creek Watershed Association (BCWA) was awarded a Energy Harvest Grant
- ▣ Selected BioMost, Inc. for design and installation
- ▣ Design
 - utilize as much of the flow as possible
 - grid tied
 - eliminate electric bill!
 - two 20kW turbines

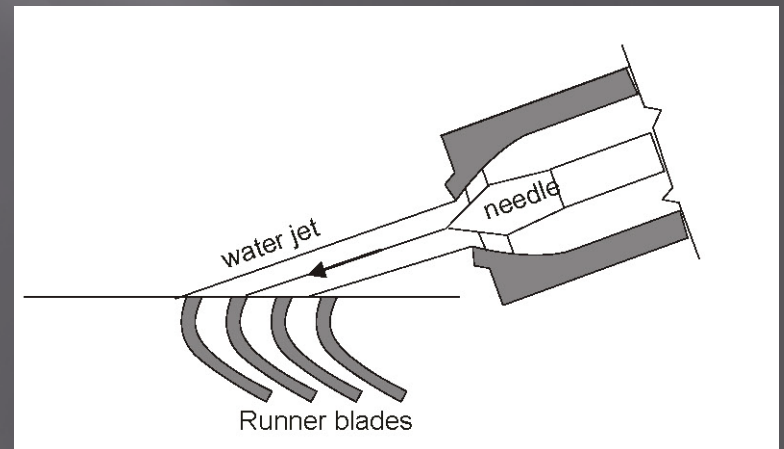
Hydroelectric Basics

▣ Terminology

- Forebay – a pond or basin of sufficient size to stabilize and control the flow of water to the penstock
- Penstock – a pipe that conveys water, under pressure, from the forebay to the turbine
- Tailrace – a channel to convey the water away from the turbine to the discharge point

Hydroelectric Basics

- ▣ Turbine
 - Reaction - low head, high flow
 - ▣ Kaplan
 - ▣ Francis
 - Impulse – high head, low flow
 - ▣ Pelton
 - ▣ Turgo
 - ▣ Cross-flow



basic diagram of a Turgo turbine

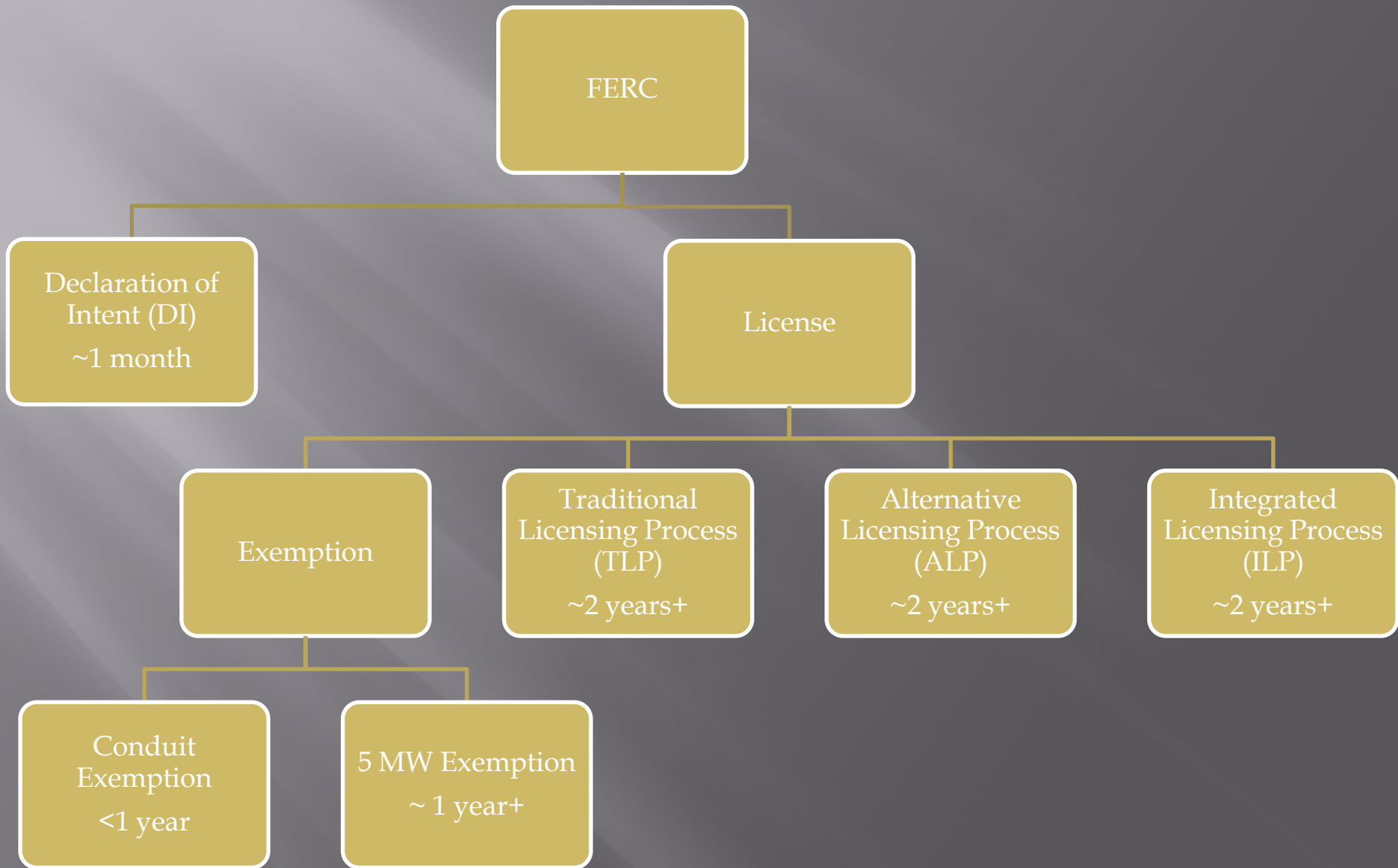
Permitting

- ▣ Local – Building Permit
- ▣ State – GP4 (discharge point)
- ▣ Federal – Federal Energy Regulatory Commission (FERC)

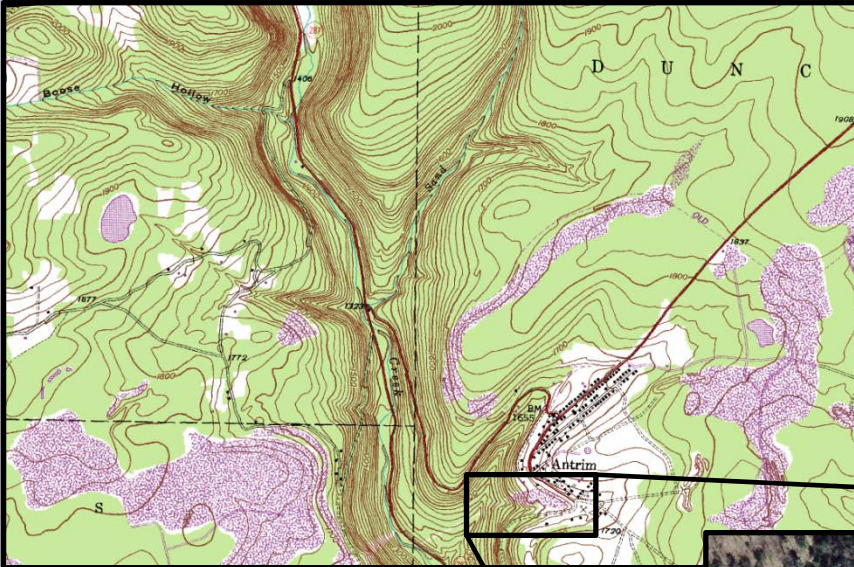
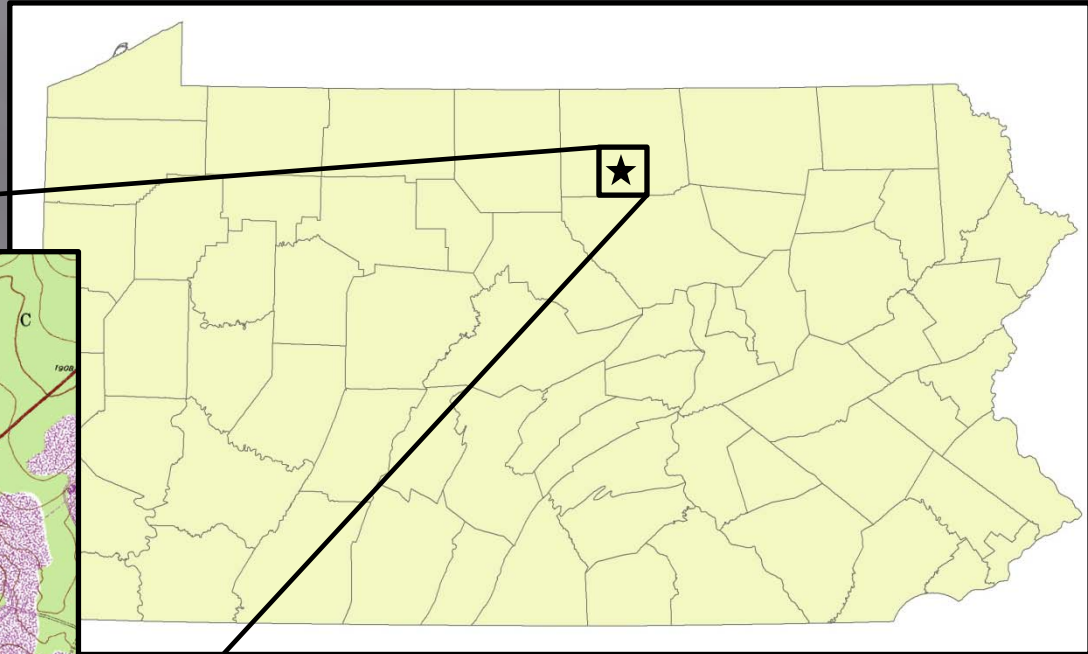
Federal Energy Regulatory Commission (FERC)

- ▣ To license or not license?
 - a.) navigable waters
 - b.) occupy U.S. lands
 - c.) U.S. government dam
 - d.) “the project affects the interests of interstate or foreign commerce”

Licenses and Declaration of Intent



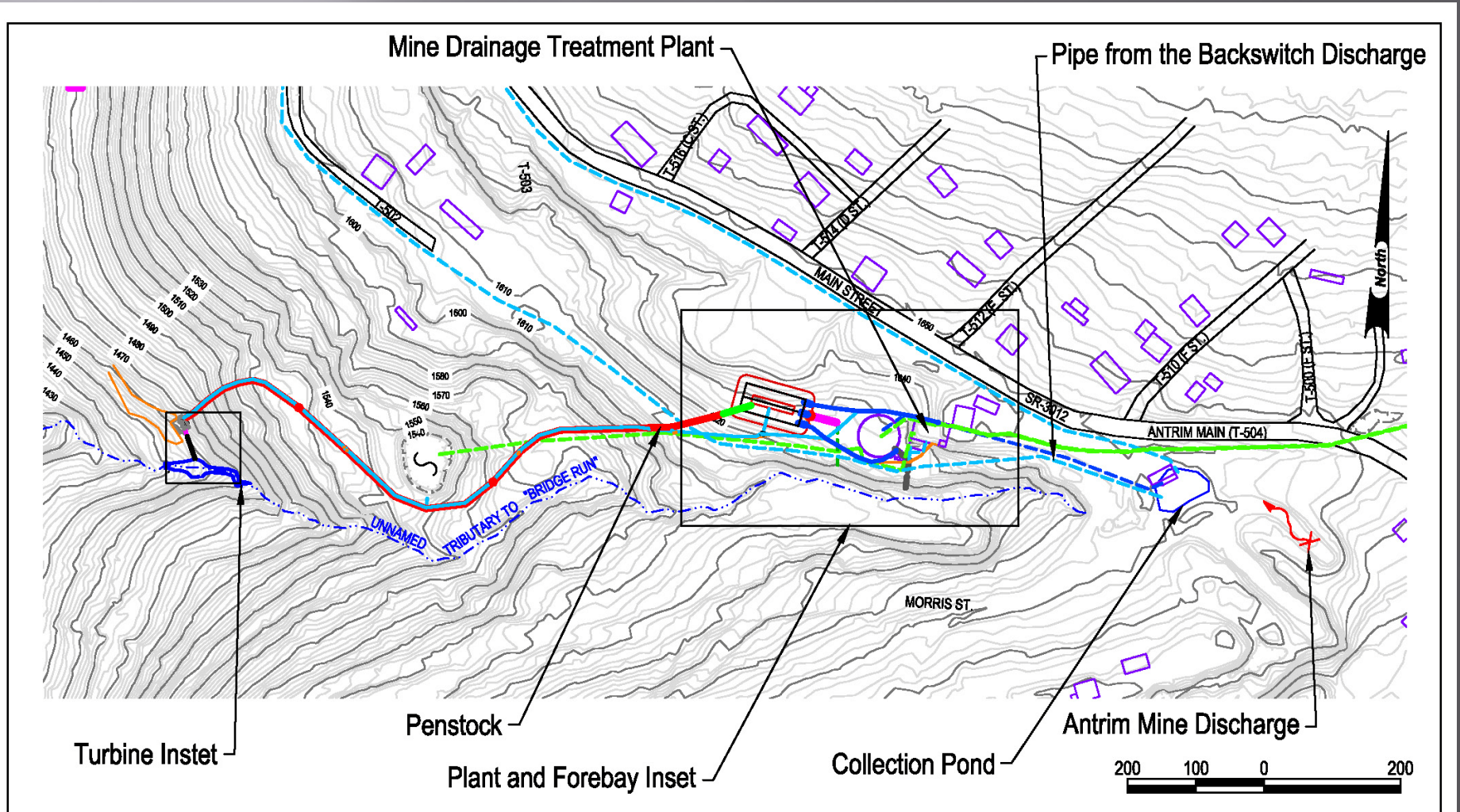
Site Location



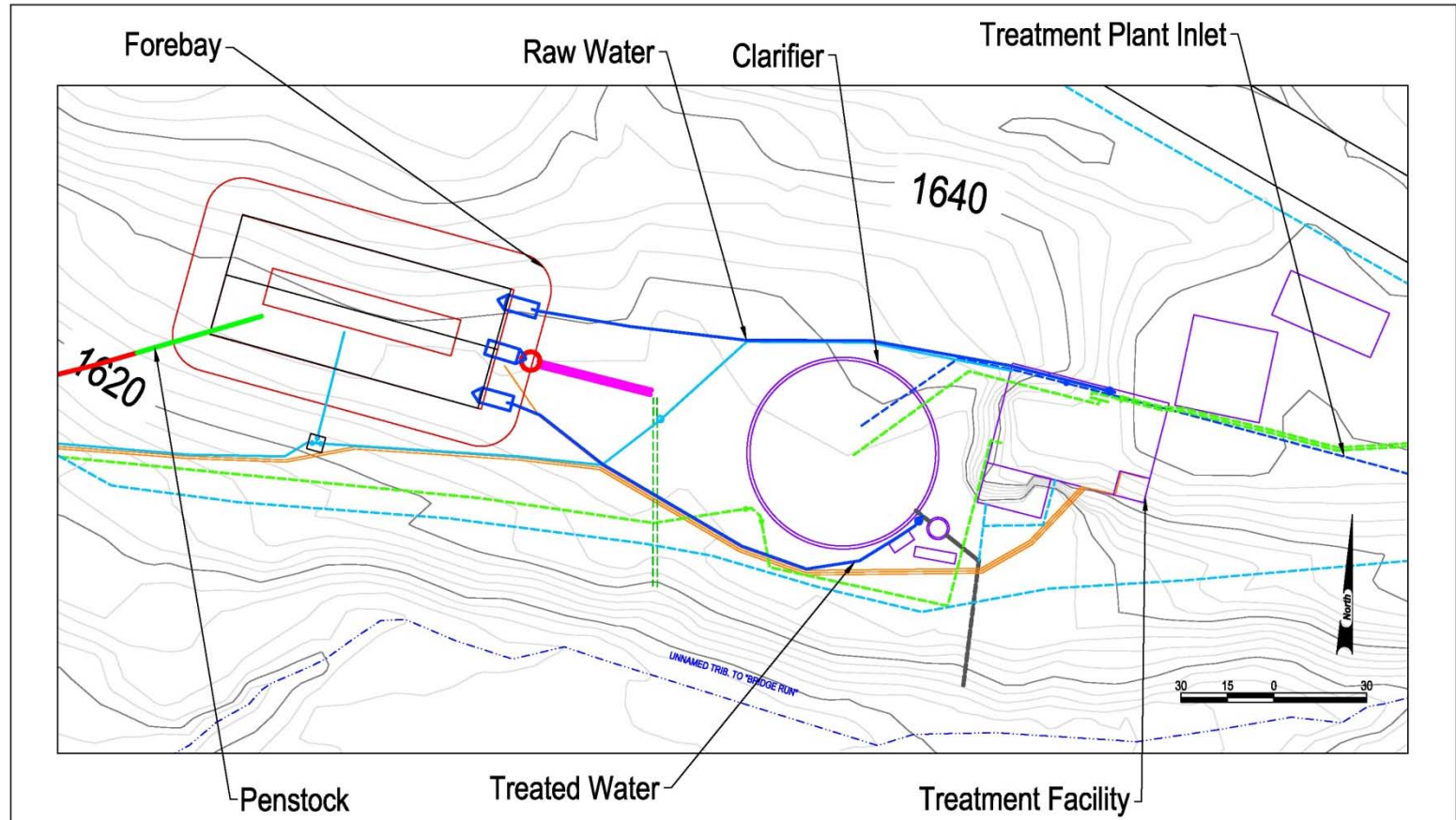
Construction

- ▣ Plant and Forebay
- ▣ Penstock
- ▣ Powerhouse

Site Overview



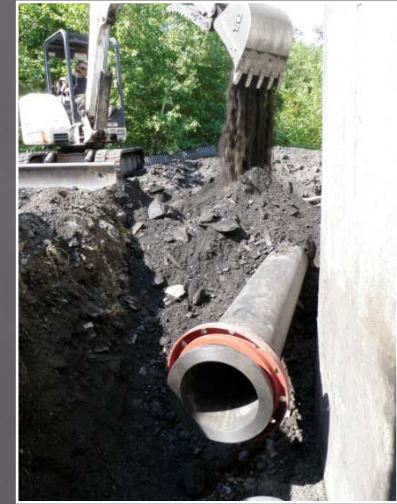
Plant and Forebay



Plant and Forebay



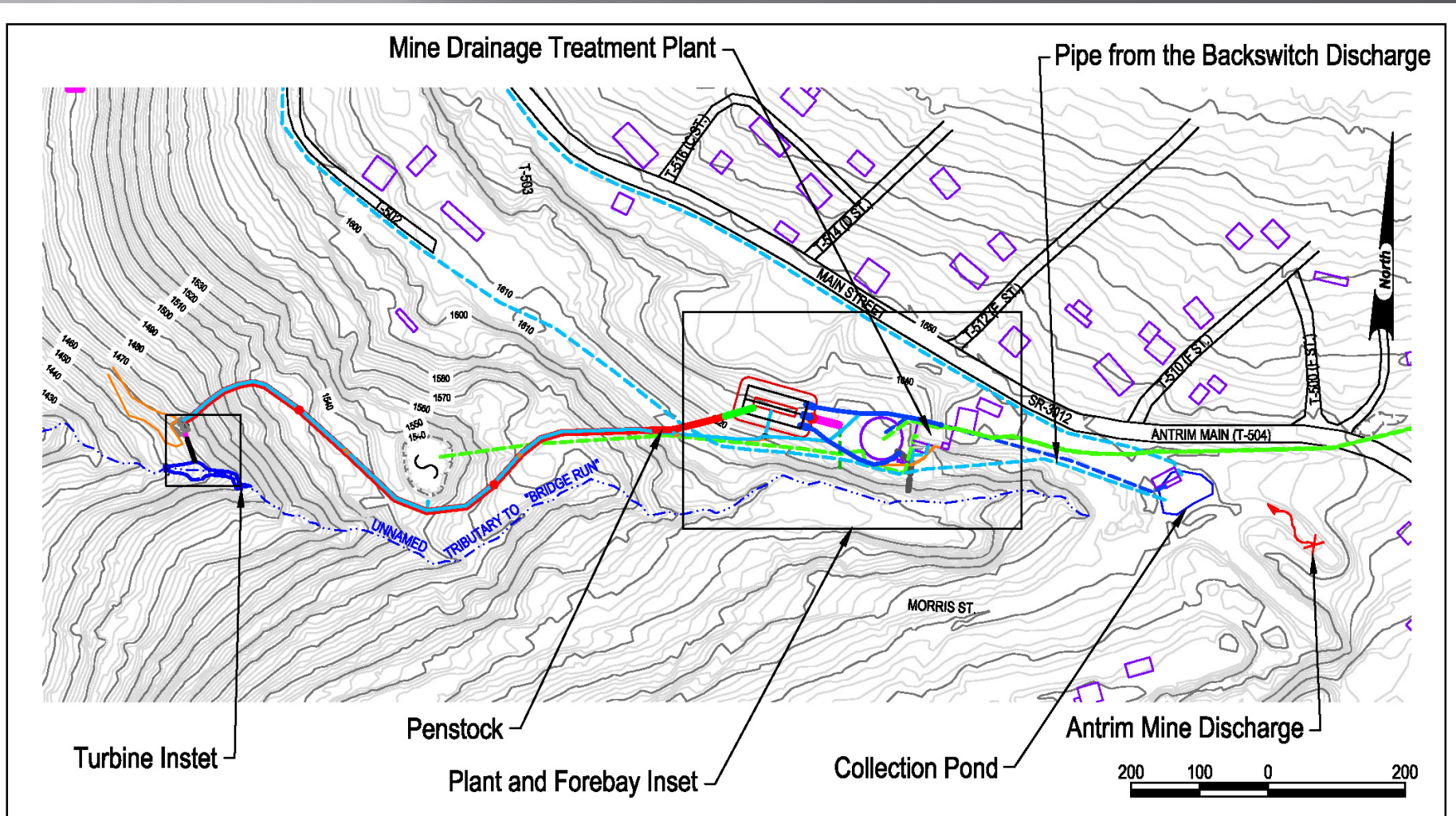
Plant and Forebay



Plant and Forebay



Site Overview: Penstock



Penstock



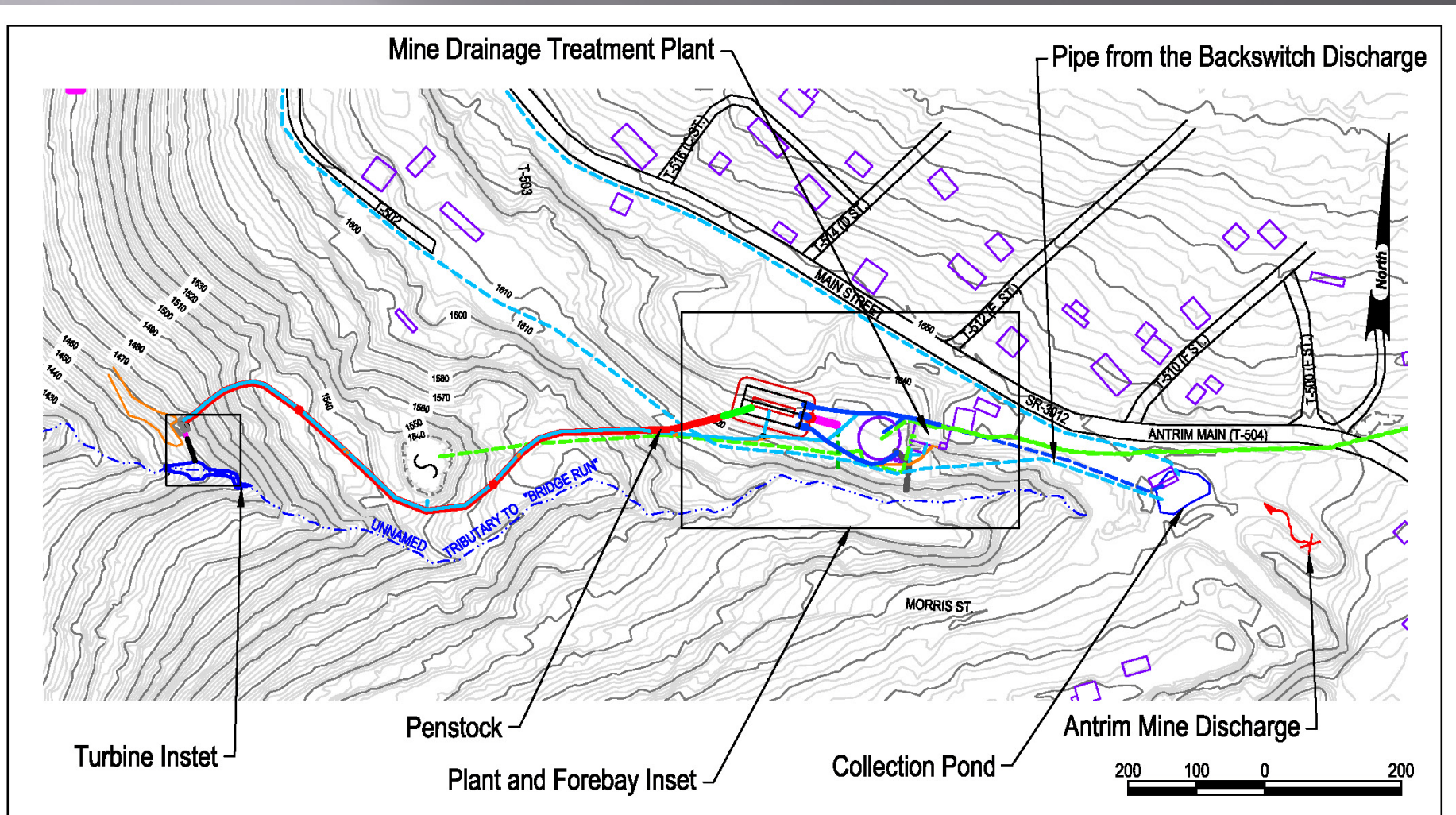
Penstock



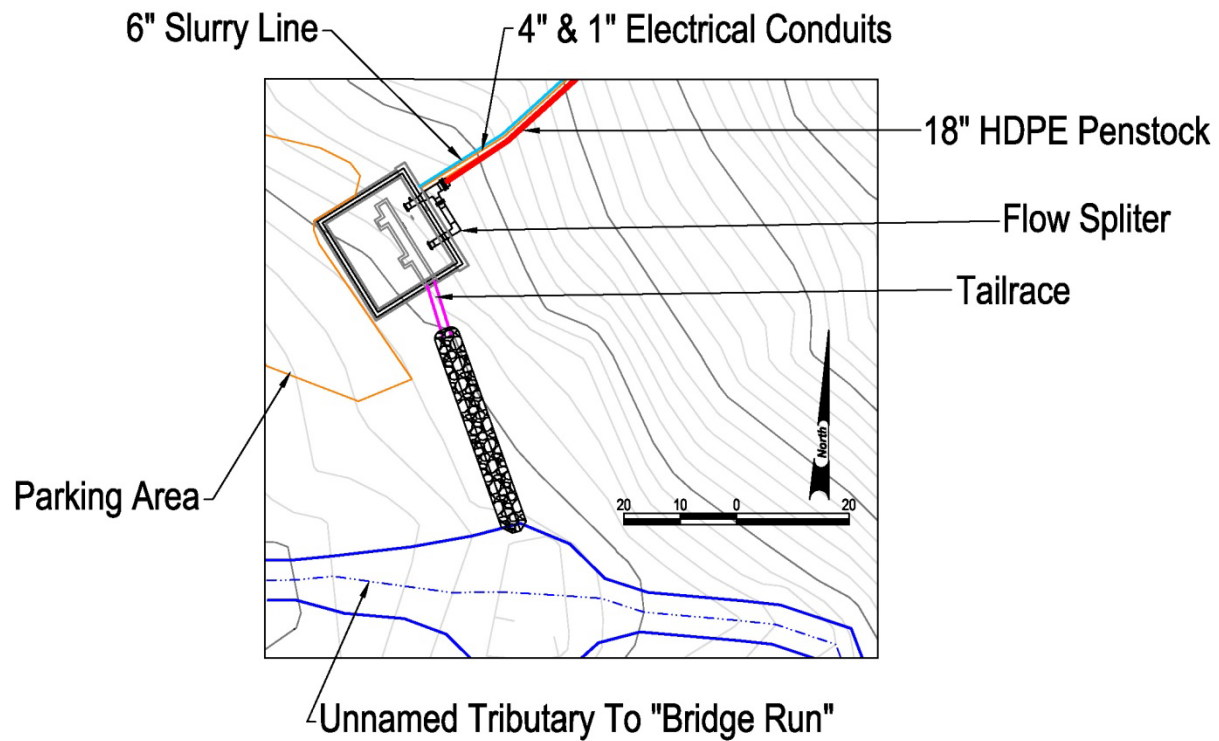
Penstock



Site Overview: Powerhouse



Powerhouse



Powerhouse



Powerhouse



Powerhouse



Powerhouse



Powerhouse



GENERATING POWER!!!!



Concluding Remarks

- ▣ Construction is complete
- ▣ Generating power!!
 - 9.29 hp (6.9 kW)
 - 329 gpm
- ▣ Off- grid configuration
- ▣ FERC license to become on-grid

Acknowledgements

- ▣ Babb Creek Watershed Association
- ▣ PA DEP
- ▣ Antrim Treatment Trust
- ▣ Ellingham Electric
- ▣ J&S Construction
- ▣ Signor Brothers Contracting
- ▣ Bruce Leavitt
- ▣ Denny Wallbridge



Questions?