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Spurring New Hydro Development in the U.S.: Inflation Reduction Act (IRA) in Action

ITC & Increased USDA Funding make smaller projects economical

Jeremy Wells, PE

Wednesday, July 12, 2023

Presentation Summary

- General overview of potential hydropower in the USA
- Changes to USDA REAP funding limits resulting from IRA
- Case Study of a 500-kW hydro development under construction

"Over 80,000 Non-Powered Dams!" *but…*

< 3,000 have potential capacity > 100 kW

< 600 have potential capacity > 1 MW

< 100 have anticipated development costs < $5,000/kW (pre-feasibility estimates)

Construction Costs of Recent NPD Retrofits

- General observation: For a project to be economically feasible, it needs to cost around:
  - $5,000/kW or less if developed by a utility or with favorable PPA
  - $2,000/kW or less if selling electricity at wholesale price

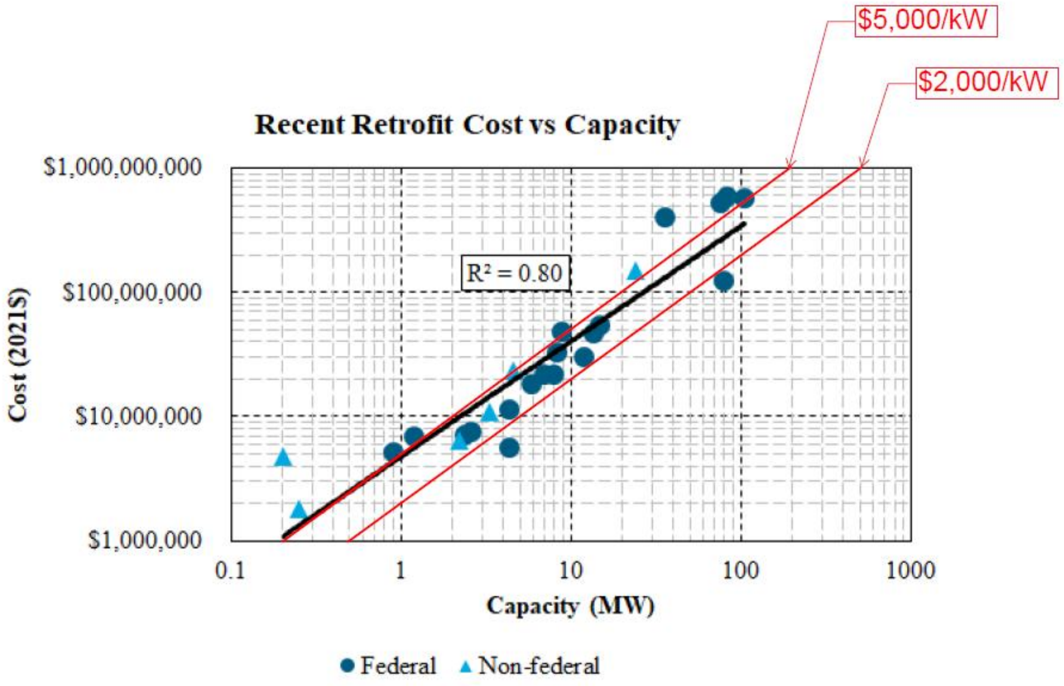


Figure 6. Recent retrofit cost versus capacity by owner type. Data source: ORNL.

(Source: ORNL, 2022, p. 10)

Anticipated Hydropower Development Costs

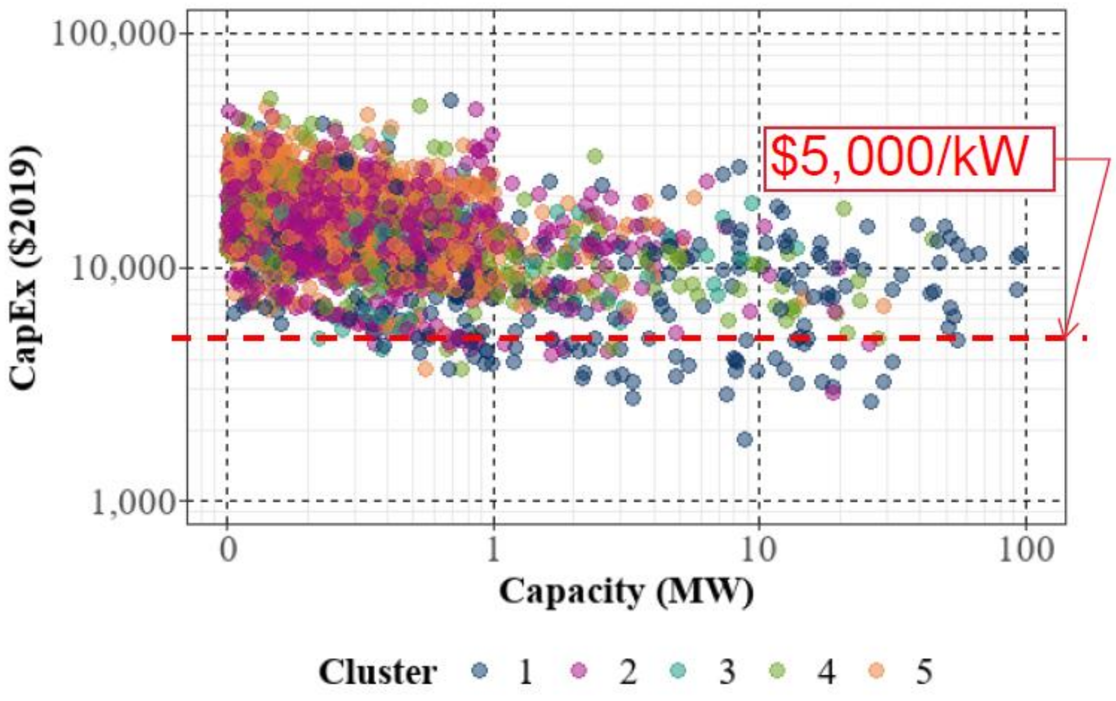
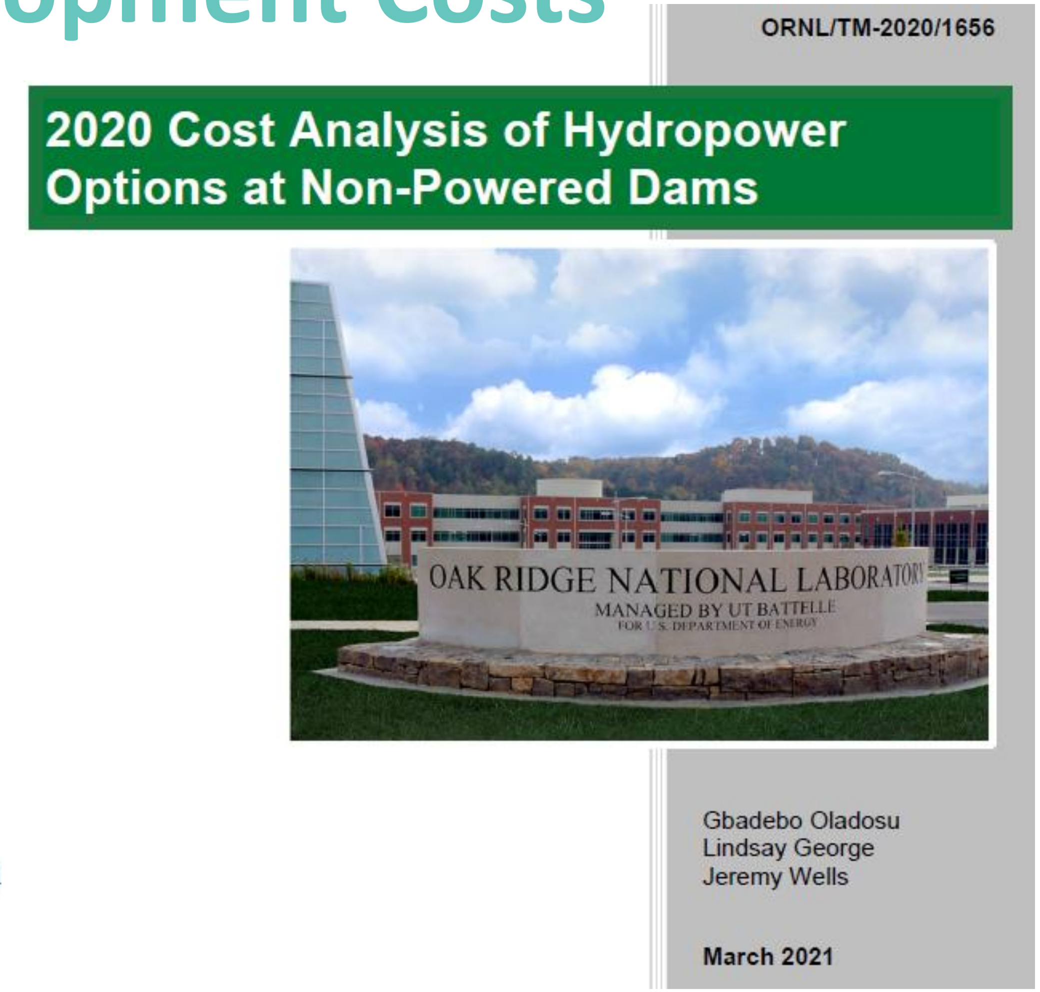


Figure 21. Estimated CapEx versus capacity for the NPD population

(Source: ORNL, 2022, p. 26)



ORNL/TM-2020/1656

2020 Cost Analysis of Hydropower Options at Non-Powered Dams

Gbadebo Oladosu
Lindsay George
Jeremy Wells

March 2021

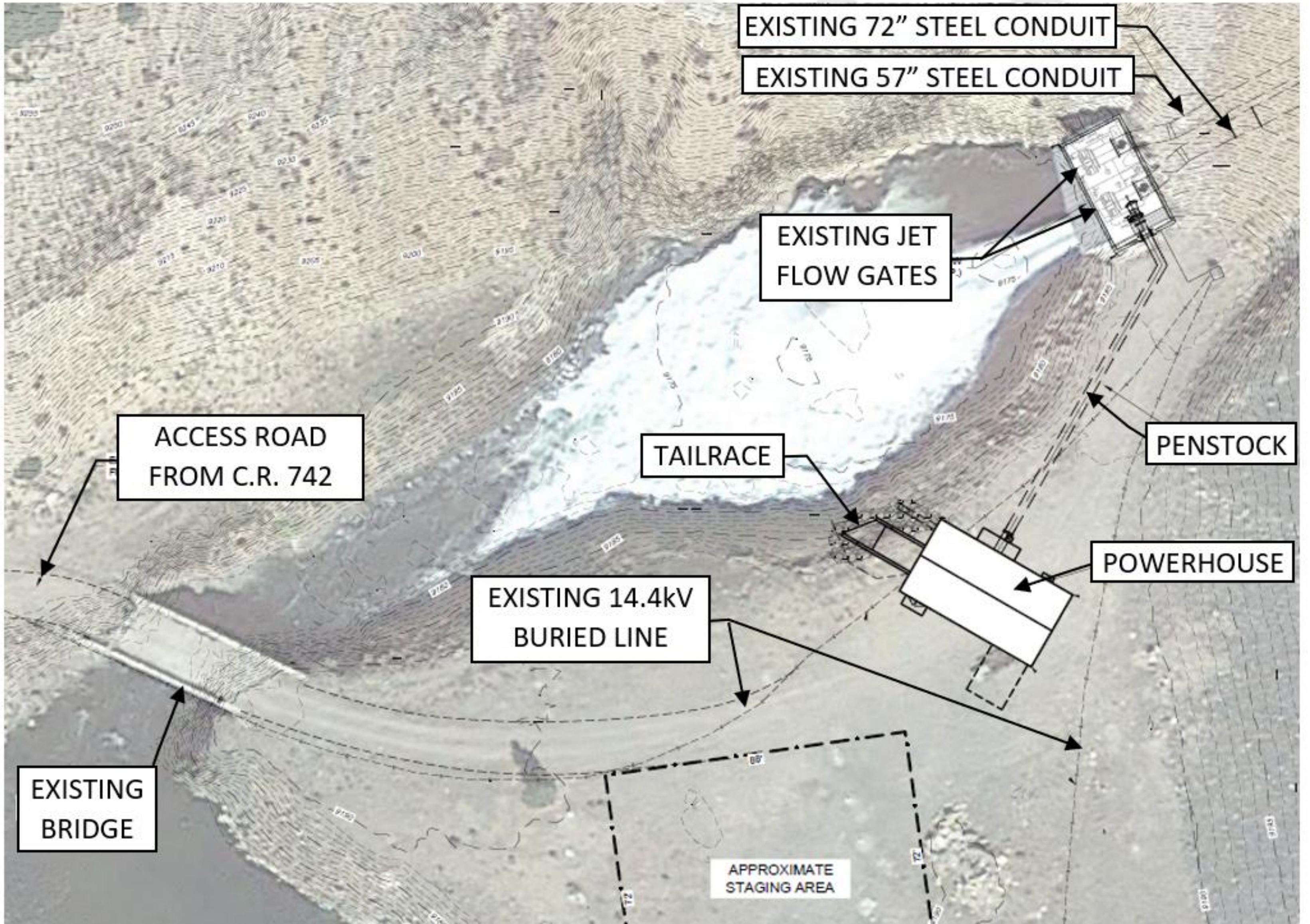
Changes to USDA REAP Funding (Rural Energy for America)

- ~$1 Billion available in REAP Funds
- Maximum grant sizes were doubled to $1,000,000 for hydropower systems
- Maximum grant portion doubled to 50% of total eligible project costs
- Direct Pay – for tax-exempt entities including state and local governments


Case Study
Taylor Park Dam,
Colorado

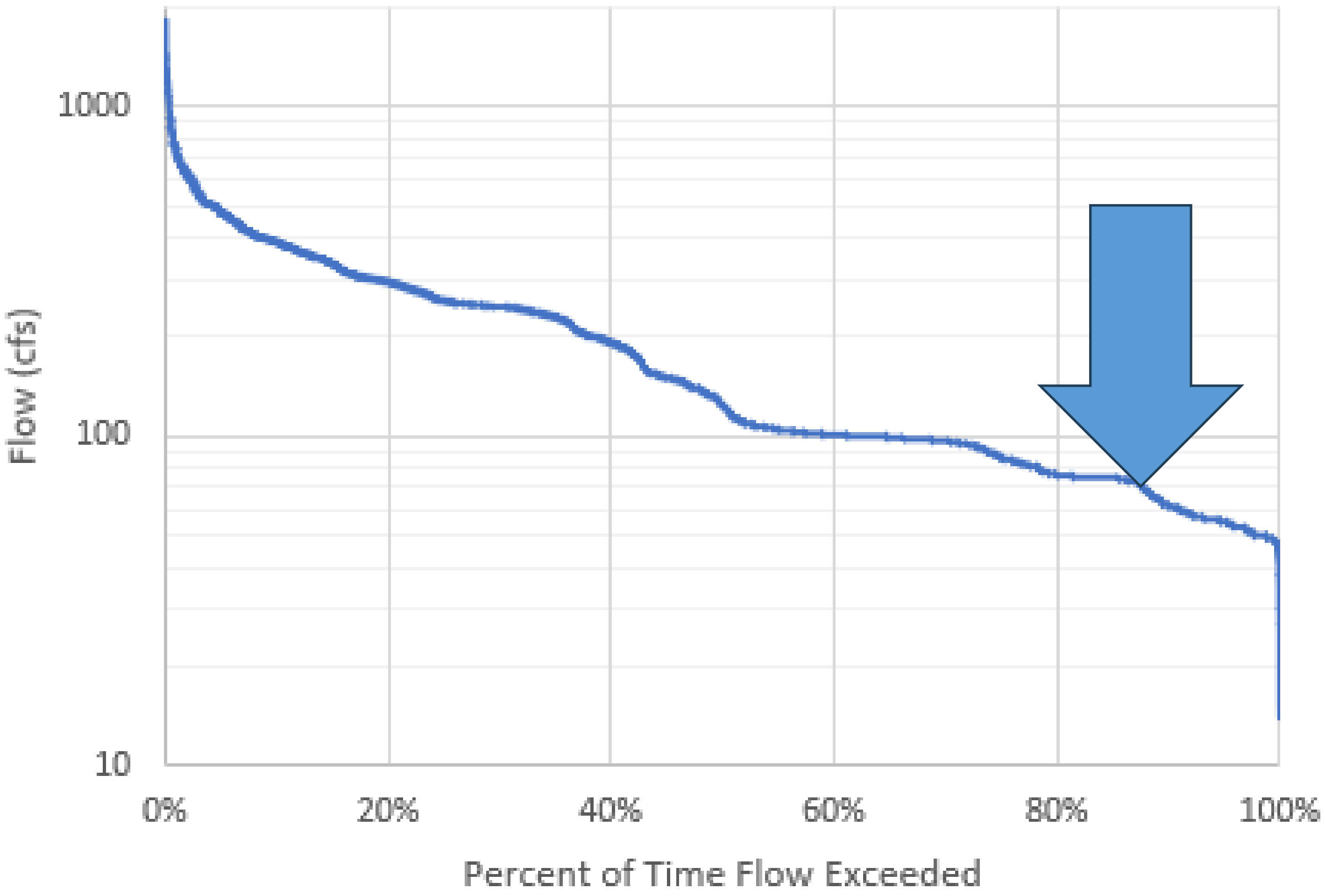
Project Characteristics:

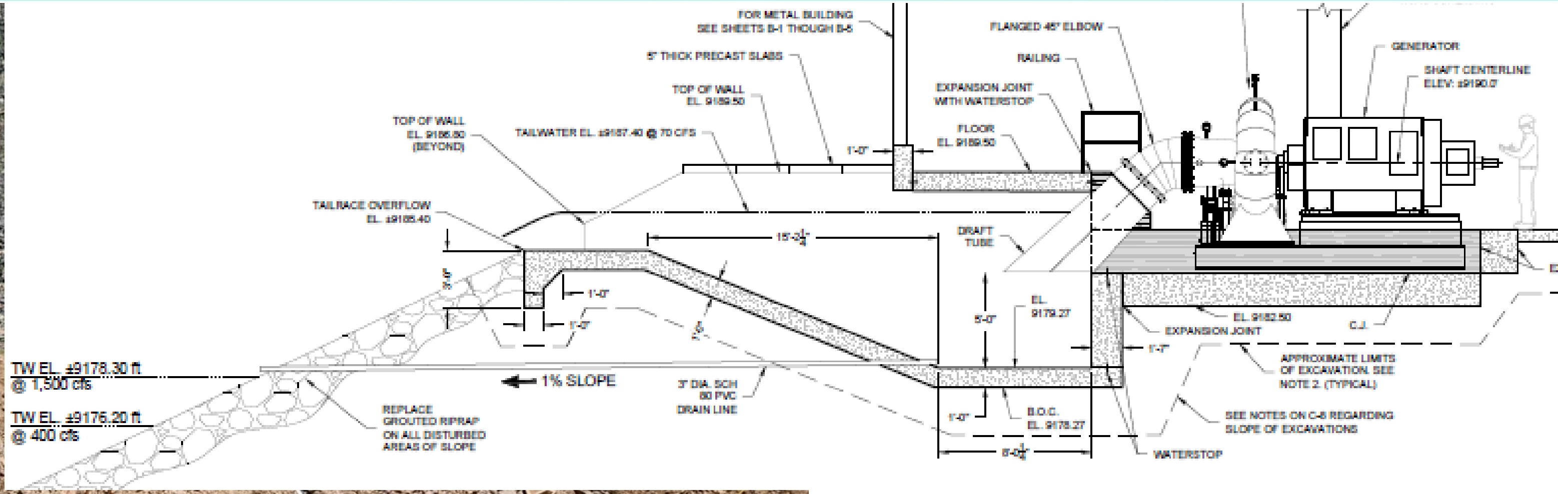
- Limited to single-phase 500-kW generator due to existing ~20-mile single-phase line to dam



Project Characteristics:

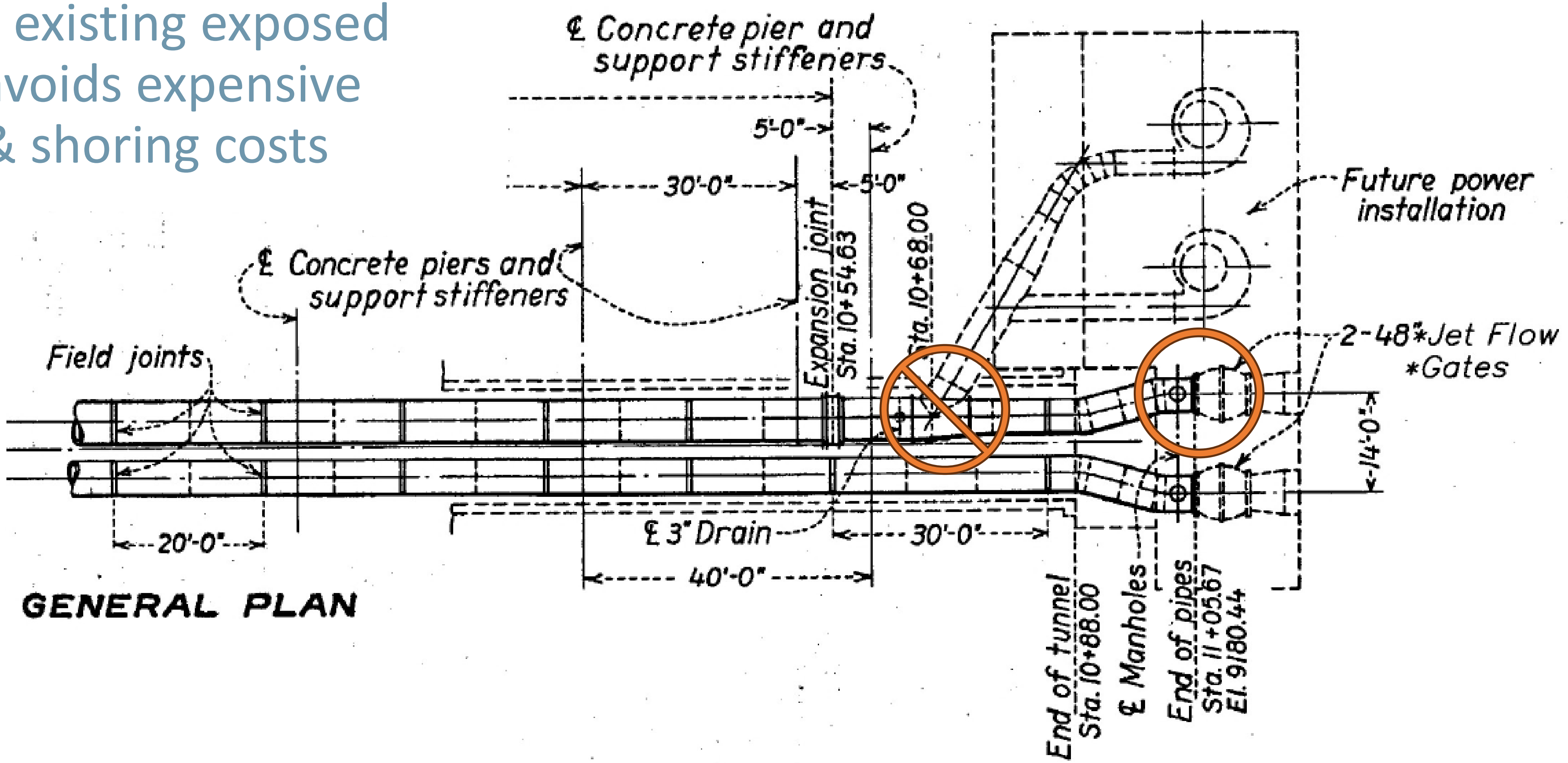
- Design flow for 500 kW results in ~97% capacity factor





Powerhouse discharges above tailwater to avoid cofferdams and dewatering

Small penstock size allows tapping into existing exposed piping and avoids expensive excavation & shoring costs



Project Costs

~$3,200,000 Capital costs

~$1,000,000 USDA REAP grant (anticipated amount; grant is competitive)

~$1,300,000 ITC 40% direct payment (10% Energy Community Bonus)

~$ 900,000 Contributed by Owner via loans

~$1,800/kW

Thank you!

Jeremy Wells, PE

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References

- (ORNL, 2021). Oladosu, G., George, L., and Wells, J. 2020 Cost Analysis of Hydropower Options at Non-Powered Dams. ORNL, March 2021.
- (ORNL, 2022). DeNeale, S., et. al. An Assessment of Non-Powered Dam Hydropower Development Opportunities in the United States. ORNL, Oct. 2022.
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