SITE EVALUATION AND FEASIBILITY STUDIES

OVERVIEW

PRE-FEASIBILITY STUDY

- Preliminary investigation - hydrology, hydraulics, energy potential & potential site/development constraints
- Is it worthwhile to invest additional money for more detailed feasibility studies, licensing and design?

FULL FEASIBILITY STUDY

- More detailed study to firm up potential site configurations, development costs and energy prediction
- Develop proposal to a point where it can be submitted to FERC and VANR (401 WQC)

DESIGN

- Permitting
- Construction Bid Package

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PRE-FEASIBILITY STUDY

LEVEL OF EFFORT
• Site Review Using Best Available Information
• Supplement with Site Visit and Minor Surveying, if needed

INFORMATION NEEDED
• Hydrology and Hydraulics (Flow, Head)
• Potential Regulatory Constraints
• Existing Infrastructure and Site Data

DELIVERABLE
• Report/Memo on Potential Economic Feasibility
PRE-FEASIBILITY STUDY

~ HYDROLOGIC ANALYSIS ~

TOTAL FLOW AVAILABLE AT SITE

• Gaged Watershed -- Streamflow Data
• Ungaged Watershed -- Synthetic Methods
  Relate to a Gaged Watershed, considering
  ◆ Drainage Areas
  ◆ Land Use and Land Slopes
  ◆ Precipitation

FLOW AVAILABLE FOR DEVELOPMENT

• Water Use Constraints
• Infrastructure Constraints
ANNUAL FLOW DURATION CURVE

Q_{20} (Flow Equal or Exceeded 20% of Time)

0.25 \times Q_{20}

GENERATING CAPACITY - NO MINIMUM FLOW REQUIREMENT
- NO SITE INFRASTRUCTURE CONSTRAINTS

Flow (cfs)

% of Time Flow is Equaled or Exceeded
PRE-FEASIBILITY STUDY
~ CONSTRAINT ANALYSIS ~

CONSULT WITH REGULATORY AGENCIES TO DETERMINE POSSIBLE CONSTRAINTS

• Minimum Flows for Other Uses
  Aesthetics
  Habitat
  Fish Passage
  Waste Assimilation
• Threatened or Endangered Species
• Historic Properties
• Hazardous Materials
• Public Use of River
PRE-FEASIBILITY STUDY

PRELIMINARY COST OPINION

• Turbine, Generator, Other Equipment/Components
• Civil Works
• Regulatory and Legal
• Engineering and Administration Costs
• Contingency Allowance

~ ECONOMIC ANALYSIS AND REPORT ~

Engineering Economic Analysis Only
How long to see Payback

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FEASIBILITY STUDY
More Detailed Reports
Fill in Data Gaps

• DETAILED TOPOGRAPHY AND BATHYMETRY
  Firm up excavation quantities

• DETAILED HYDRAULIC ANALYSIS
  Firm up head and tailwater
  over a range of flows

• BORINGS & GEOTECHNICAL DATA
  Firm up type of material for excavation

• RE-EXAMINE ENERGY AND
  COST IN MORE DETAIL
LICENSE APPLICATION
FINAL LEVEL OF DATA COMPILATION AND ASSESSMENT

• COMPETING WATER USES
  • Other hydropower users
  • Agricultural/Industrial users
  • Water needed for aesthetics, fish habitat, fish passage and waste assimilation

• FISH PASSAGE STRUCTURES

• RECREATION ENHANCEMENTS

• HISTORIC AND ARCHAEOLOGICAL RESOURCES

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DESIGN

• Initiate at appropriate level of regulatory certainty
• 30% completion – May initiate “permit” review
• 90% completion – Full “permit” application & review
• 100% Complete – Based on agency and owner comments, complete design for contractor bid package