

**APPENDIX D**

**PRELIMINARY OPINION OF COST**

Ragged Mountain Dam  
Earthen Embankment Dam  
Preliminary Opinion of Cost  
(Prices in 2010 Dollars)

| Dam Construction |   | Schnabel Engineering 2010 |          |             |             |
|------------------|---|---------------------------|----------|-------------|-------------|
| Item Number      |   | Units                     | Quantity | Unit Price  | Extended    |
| 1                | Mobilization & Demobilization   |                           |          |             |             |
|                  | a. General  | LS                        | 1        | \$1,342,503 | \$1,342,503 |
|                  | b. Bonds and Insurance  | LS                        | 1        | \$617,358   | \$617,358   |
| 2                | Care and Diversion of Water   |                           |          |             |             |
|                  | a. Erosion and Sediment Control   | LS                        | 1        | \$800,000   | \$800,000   |
|                  | b. Foundation Dewatering/Water Control  | LS                        | 1        | \$400,000   | \$400,000   |
| 3                | Clearing and Grubbing   |                           |          |             |             |
|                  | a. Dam, Access Road, Inlet and Outlet Excavation, Emergency Spillway  | AC                        | 16       | \$6,000     | \$96,000    |
|                  | b. Borrow Areas   | AC                        | 45       | \$4,500     | \$202,500   |
| 4                | Reservoir Clearing  | AC                        | 100      | \$6,500     | \$648,700   |
| 5                | Demolition and Removal of Structures  |                           |          |             |             |
|                  | a. Miscellaneous Structures   | LS                        | 1        | \$10,000    | \$10,000    |
|                  | b. Modifications to Lower Dam   | LS                        | 1        | \$100,000   | \$100,000   |
|                  | c. Removal of Upper Dam   | LS                        | 1        | \$200,000   | \$200,000   |
|                  | d. Removal of Old Piping  | LS                        | 1        | \$50,000    | \$50,000    |
| 6                | Excavation  |                           |          |             |             |
|                  | a. Common Excavation  | CY                        | 65,000   | \$5.00      | \$325,000   |
|                  | b. Rock Excavation  | CY                        | 37,000   | \$20.00     | \$740,000   |
|                  | c. Rock Trimming  | CY                        | 3,000    | \$75.00     | \$225,000   |
|                  | d. Rock Shaping   | SY                        | 250      | \$50.00     | \$12,500    |
|                  | e. Tunneling - 10' Diameter Drill & Blast   | LF                        | 560      | \$2,500.00  | \$1,400,000 |
| 7                | Rock Cleaning   | SY                        | 5,410    | \$40.00     | \$216,400   |
| 8                | Foundation Drilling and Grouting  | SF                        | 129,000  | \$25        | \$3,225,000 |
| 9                | Fill  |                           |          |             |             |
|                  | a. Common Earth Fill (Shell Fill)   | CY                        | 475,200  | \$4.00      | \$1,900,800 |
|                  | b. Select Earth Fill (Core 1 Fill, Includes Keyway)   | CY                        | 79,300   | \$6.50      | \$515,450   |
|                  | c. Select Earth Fill (Core 1A Fill)   | CY                        | 76,000   | \$5.50      | \$418,000   |
|                  | d. Fine Drain Fill  | CY                        | 23,100   | \$65.00     | \$1,501,500 |
|                  | e. Coarse Drain Fill  | CY                        | 4,650    | \$50.00     | \$232,500   |
|                  | f. Embankment Test Fill   | LS                        | 1        | \$25,000    | \$25,000    |
| 10               | Slope Protection  |                           |          |             |             |
|                  | a. Class I Rip Rap (Plunge Pool and Wave Action Protection)   | CY                        | 6,320    | \$80.00     | \$505,600   |
|                  | b. Class IA Rip Rap (Abutment Swales)   | CY                        | 1,020    | \$75.00     | \$76,500    |
|                  | c. Rip Rap Bedding Material   | CY                        | 2,400    | \$45.00     | \$108,000   |
|                  | d. Geotextile   | SY                        | 2,300    | \$3.50      | \$8,050     |
| 11               | Conventional Concrete (Includes Waterstop)  |                           |          |             |             |
|                  | a. Structural Concrete (Riser, Bridge Pier, Retaining Walls, Tunnel, Vaults)                                | CY                        | 2,400    | \$750.00    | \$1,800,000 |
|                  | b. Dental Concrete  | CY                        | 2,500    | \$250.00    | \$625,000   |
| 12               | Steel Reinforcing Bars (170 lb / yd <sup>3</sup> Concrete)  | LB                        | 408,000  | \$0.80      | \$326,400   |
| 13               | Gates   |                           |          |             |             |
|                  | a. 18-Inch Ball Valves  | EA                        | 2        | \$40,000    | \$80,000    |
|                  | b. 30-Inch Sluice Gate  | EA                        | 4        | \$60,000    | \$240,000   |
|                  | c. 30-inch Knife Gate (Electrically Operated)   | EA                        | 3        | \$85,000    | \$255,000   |
| 14               | Operation Building  | LS                        | 1        | \$20,000    | \$20,000    |
| 15               | Drainage Pipe and Materials   |                           |          |             |             |
|                  | a. Solid 8-inch PVC Pipe  | LF                        | 100      | \$30        | \$3,000     |
|                  | b. Perforated 8-inch PVC Pipe   | LF                        | 2,400    | \$35        | \$84,000    |
| 16               | Chain-Linked Fence  | LF                        | 1,000    | \$30        | \$30,000    |
|                  | Gates   | EA                        | 3        | \$250       | \$750       |
| 17               | Instrumentation   | LS                        | 1        | \$165,000   | \$165,000   |
| 18               | Riser Bridge (14' Wide, Light Vehicular Loading)  | LS                        | 1        | \$135,000   | \$135,000   |
| 19               | Storm Drainage System   |                           |          |             |             |
|                  | a. Manhole  | EA                        | 9        | \$2,000     | \$18,000    |
|                  | b. 18-inch HDPE Pipe  | LF                        | 1,075    | \$75        | \$80,625    |
| 20               | Metal Work  | LS                        | 1        | \$100,000   | \$100,000   |
| 21               | Landscaping and Site Restoration  |                           |          |             |             |
|                  | a. Topsoil  | CY                        | 15,900   | \$6.00      | \$95,400    |
|                  | b. Permanent Turf Establishment (with Matting) (20% of Area)  | AC                        | 15       | \$3,000     | \$45,000    |
| 24               | 30/36-Inch Flange Pipe & Fittings, Riser and Tunnel   |                           |          |             |             |
|                  | a. Furnish and Install  | LS                        | 1        | \$350,000   | \$350,000   |
| 25               | 525-Feet of 36-inch Pipe, Open Cut, 10-foot Depth, Class 53 Ductile Iron Pipe (Access Vault to Valve Vault) |                           |          |             |             |
|                  | a. Furnish and Install Pipe   | LF                        | 525      | \$280       | \$147,000   |
|                  | b. Rock Removal (20% Rock, 6-Foot Wide Trench)  | CY                        | 200      | \$200       | \$40,000    |
|                  | c. 36/18-Inch Connections   | EA                        | 2        | \$6,000     | \$12,000    |
| 26               | 100-Feet of 42-Inch Ductile Iron Pipe   |                           |          |             |             |
|                  | a. Furnish and Install Pipe   | LF                        | 100      | \$350       | \$35,000    |
|                  | b. Rock Removal (25% Rock, 6-Foot Wide Trench)  | CY                        | 100      | \$200       | \$20,000    |
| 27               | Ball Valves, Electrical and Controls  |                           |          |             |             |
|                  | a. Electrical   | EA                        | 1        | \$150,000   | \$150,000   |
|                  | b. Controls   | EA                        | 1        | \$100,000   | \$100,000   |
|                  | c. Mechanical   | EA                        | 1        | \$15,000    | \$15,000    |
| 28               | Roadways  |                           |          |             |             |
|                  | a. Reservoir Drive Upgrade and Maintenance  | LS                        | 1        | \$250,000   | \$250,000   |
|                  | b. Traffic Control  | LS                        | 1        | \$150,000   | \$150,000   |
|                  | c. Roadway Surfacing  | SY                        | 7,000    | \$12        | \$84,000    |
|                  | d. Access Road Improvements   | LS                        | 1        | \$200,000   | \$200,000   |
| 29               | Unlisted Items (5%)   | LS                        | 1        | \$979,934   | \$979,934   |

Construction Costs Subtotal: **\$22,538,470**

Construction Costs Subtotal Minus 10% Factor: **\$20,284,623**

Construction Costs Subtotal Plus 20% Factor: **\$27,046,164**

Engineering Services

|    |   |    |   |             |             |
|----|---|----|---|-------------|-------------|
| 30 | Engineering Services                    |    |   |             |             |
|    | a. Engineering Design                   | LS | 1 | \$890,298   | \$890,298   |
|    | b. Construction Observation and Testing | LS | 1 | \$2,800,000 | \$2,800,000 |

Engineering Services Subtotal: **\$3,690,298**

Engineering Services Subtotal Plus 10% Factor: **\$4,059,328**