Quantities and Work Estimate

Anticipated duration of work is approximately 4-6 weeks. Minimum heavy equipment viewed as necessary:
1. Hydraulic excavator, 2 CY bucket with thumb attachment, Cat 320C L or similar for dike removal, diversion weirs, channel widening, rock vane construction, culvert installation, wetland drainage channels
2. Wheel loader, Cat 930G or similar 3-4 CY for rock and materials hauling, east wetland excavation
3. Tracked variable-terrain loader/dozer, Cat 267B or similar for east wetland excavation, interpretive area construction
4. Roller compactor, small self-powered with a smooth-drum for road, parking area, interpretive area and berm compaction

Work Items:

1. Pre-Construction Activities including permit applications, coordination with local organizations, vendor procurement
2. Mobilization of equipment and personnel, construction of equipment and materials lay-down areas. Lay-down area assumed to be open area west of the new parking location.
3. Rock dike removal and reconstruction
4. Alluvial dike removal and reconstruction
5. Diversion structure construction
6. Stream channel widening and rock vane construction
7. East wetland excavation
8. Wetland drainage channels and plunge pools
9. Culvert installation
10. Road armoring
11. Parking and interpretive area construction, disturbed area repair, seeding and vegetation
12. Reporting, administration

Rock Dike Removal: Assume 500 lineal feet, end-area approximately 17.5 sq. ft. Assume some additional excavation to install key where needed. Excavation volume = 400 CY. Rock produced 325 CY. Place 90 CY of vegetative soil.

Alluvial Dike Removal: Assume 500 lineal feet, end-area approximately 30 sq. ft. Volume = 550 CY. Assumed to comprise 450 CY alluvial rock, 100 CY Type-57 aggregate

Diversion Structure Construction: Three locations. Assume 20 CY of excavation. Place 20 CY of boulders, place 20 CY of Type-A rock, place 30 CY of alluvial rock as erosion control near stream diversion structures.

Channel Widening and Rock Vane Construction: Assume 150 lineal feet widened 8-ft. with an average excavation depth of 2-ft. = 90 CF. Assume five rock vanes 15-ft long, 3-ft wide and 3-ft. deep = 25 CY. Excavation total = 115 CY. Place 50 CY of boulders for vanes and stream bank, 30 CY of Type-A rock and 10 CY of Type-57 aggregate.

East Wetland Excavation and Construction: Approximate dimensions of new wetlands areas (feet) = 80X40 + 80X40 + 50X25 = 7,650 sq. ft. plus minor channel improvements. Assume average depth of 1.0 foot. Excavation volume = 300 CY. Place 50 CY of vegetative soil, 50 CY of Type-57 aggregate, 30 CY of dike rock.

Wetland Drainage Channels and Plunge Pools: Assume 260 lineal feet of channel 4-ft bottom width and 1.25-ft deep (including rock depth), two plunge pools, 100 lineal feet of rock-faced training berm. Excavate 100 CY of material, place 10 CY of boulders 70 CY of dike rock, 20 CY of alluvial rock.

Culvert Installation: Assume three excavations 40 feet in length to 5-ft depth and 4-ft width. Volume = 90 CY. Install three arched concrete culverts with an internal section of 22.5-inches high and 36.25-inches wide, with flared ends 8-ft long. Place and compact 50 CY of re-used road base, plus 20 CY of new road base.

Road Armoring: Assume 330 lineal feet of armoring, 2X4 ft. section covered with a 1-ft. thick layer of alluvial rock and Type-57 aggregate. Place 100 CY of dike rock, 50 CY of alluvial rock, 20 CY of Type-57 aggregate.

Parking and Interpretive Area Construction, Disturbed Area Repair, Seeding and Vegetation: Assume parking area of 80 X 30 ft. Place and compact 90 CY of road base over geotextile. The gravel-covered portion of the interpretive area is 30X40 ft. and elevated approximately 1-ft. Place and compact 50 CY of fill, 25 CY of gravel over geotextile, 10 CY of vegetative soil. Place 20 CY of boulders as barriers and landscaping. Scarify 1,500 SY materials lay-down area. Broadcast seed 2,750 SY of ground.

Imported Materials Quantities:
1. Boulders: 100 CY
2. Type-A rock: 50 CY
3. Geotextile: 400 SY Geotextile to have a minimum weight of 4-oz/SY, minimum grab tensile strength of 120 pounds, puncture resistance of 65 pounds, and an apparent opening size equal to a No. 70 sieve
4. MDOT road base: 110 CY
5. Crushed gravel: 25 CY Crushed gravel to be well-graded D(100) = 1-inch, D(50) = 3/8 to 1/4 inch, with at least 10% passing the No. 200 sieve. The fines shall be non-plastic or have a plasticity index of 4 or less.
6. Seed mix: Approximately 200 pounds total
7. Live/dormant plants: 150 specimens
8. Culverts: Concrete arch 22.5X36.25 inch dimensions, 150 lineal feet with sealed joints. Six flared end sections 60-inches wide.

Salvaged On-Site Materials Quantities:
1. Dike Rock from removal of rock portion of dike: 325 CY produced, 250 CY reused, 75 CY excess
2: Alluvial Rock from removal of alluvial portion of dike: 450 CY produced, 160 CY reused, 290 CY excess
3. Type-57 aggregate from alluvial dike removal and east wetland excavation: 100 CY produced, 80 CY reused, 20 CY excess.
4. Vegetative soil from east wetland excavation: 150 CY produced, 150 CY reused, no excess